Form No. 3329-581 Rev B

# Multi-Pro® 5700-D Turf Sprayer

**Model No. 41581—Serial No. 240000001 and Up**

## Operator's Manual

Register your product at www.Toro.com

Original Instructions (EN)

**Warning**

**CALIFORNIA**

**Proposition 65 Warning**

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

**Important** The engine in this product is not equipped with a spark arrester muffler. It is a violation of California Public Resource Code Section 4442 to use or operate this engine on any forest-covered, brush-covered, or grass-covered land as defined in CPRC 4126. Other states or federal areas may have similar laws.

This spark ignition system complies with Canadian ICES-002.

Ce système d'allumage par étincelle de véhicule est conforme à la norme NMB-002 du Canada.

# Contents


| | Page |
|---|---|
| Introduction | 3 |
| Safety | 3 |
| Safe Operating Practices | 3 |
| Chemical Safety | 4 |
| Before Operating | 4 |
| While Operating | 5 |
| Maintenance | 6 |
| Sound Pressure | 7 |
| Sound Power | 7 |
| Vibration | 7 |
| Safety and Instruction Decals | 7 |
| Specifications | 11 |
| Optional Equipment | 12 |
| Setup | 12 |
| Loose Parts | 12 |
| Before Operating | 12 |
| Checking the Engine Oil Level | 12 |
| Checking the Tire Pressure | 13 |
| Adding Fuel | 13 |
| Filling the Fuel Tank | 14 |
| Checking the Coolant Level | 14 |
| Checking the Hydraulic Fluid | 15 |
| Checking the Brakes | 15 |
| Filling the Fresh Water Tank | 16 |
| Operation | 16 |
| Think Safety First | 16 |
| Vehicle Controls | 16 |
| Pre-Starting Checks | 18 |
| Starting the Engine | 18 |
| Bleeding the Fuel System | 18 |
| Driving the Sprayer | 19 |
| Stopping the Engine | 19 |
| Setting the Cruise Control | 19 |
| Breaking in a New Sprayer | 19 |
| Transporting the Sprayer | 20 |
| Towing the Sprayer | 20 |
| Sprayer Controls and Components | 21 |
| Adjusting the Boom Bypass Valves | 23 |
| Operating the Sprayer | 23 |
| Maintenance | 26 |
| Recommended Maintenance Schedule | 26 |
| Daily Maintenance Checklist | 27 |
| Jacking the Sprayer | 28 |
| Inspecting the Wheels and Tires | 29 |
| Servicing the Air Cleaner | 29 |
| Servicing the Engine Oil | 30 |
| Servicing the Fuel Tank | 31 |
| Checking the Fuel Line and Connections | 31 |
| Draining the Fuel Filter/Water Separator | 31 |
| Bleeding Air from the Injectors | 32 |
| Greasing the Sprayer | 32 |
| Greasing the Boom Pivot Arms | 33 |
| Replacing the Fuel Filters | 34 |
| Servicing the Cooling System | 34 |
| Servicing the Hydraulic Oil | 35 |
| Changing the Planetary Gearbox Fluid | 36 |
| Adjusting the Brakes | 37 |
| Adjusting the Throttle Lever Tension | 37 |
| Adjusting the Front Wheel Toe-in | 38 |
| Servicing the Drive Belts | 39 |
| Replacing the Fuses | 39 |
| Servicing the Battery | 39 |
| Cleaning the Suction Strainer | 41 |
| Adjusting the Extension Booms | 41 |
| Adjusting the Boom Bypass Valves | 42 |
| Stowing the Boom Extensions | 42 |
| Storage | 42 |
| Troubleshooting | 43 |
| Troubleshooting the Engine and Vehicle | 43 |
| Troubleshooting the Spray System | 46 |
| The Toro General Commercial Products Warranty | 48 |



**© 2004 by The Toro Company**


**8111 Lyndale Avenue South**
**Bloomington, MN 55420-1196**





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

# 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 on the internet at www.Toro.com for product and accessory information, help finding a dealer, or to register your product.

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




**Figure 1**

1. Location of the model and serial numbers

Write the product model and serial numbers in the space below:

**Model No.** _____

**Serial No.** _____

This manual identifies potential hazards and has special safety messages that help you and others avoid personal injury and even death. ***Danger***, ***Warning***, and ***Caution*** are signal words used to identify the level of hazard. However, regardless of the hazard, be extremely careful.

***Danger*** signals an extreme hazard that **will** cause serious injury or death if you do not follow the recommended precautions.

***Warning*** signals a hazard that **may** cause serious injury or death if you do not follow the recommended precautions.

***Caution*** signals a hazard that may cause minor or moderate injury if you do not follow the recommended precautions.

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

# Safety

**To ensure maximum safety and best performance, and to gain knowledge of the product, it is essential that you and any other operator of the product read and understand the contents of this manual before the engine is ever started.**

**⚠ This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.**

**Improperly using or maintaining this product could result in injury or death. To reduce this potential, comply with the following safety instructions.**

Supervisors, operators, and service persons should be familiar with the following standards and publications: (The material may be obtained from the addresses shown).

- Flammable and Combustible Liquids Code: ANSI/NFPA 30
- National Fire Protection Association: ANSI/NFPA #505; Powered Industrial Trucks
  National Fire Prevention Association
  Barrymarch Park
  Quincy, Massachusetts 02269 U.S.A.
- ANSI/ASME B56.8 Personal Burden Carriers
  American National Standards Institute, Inc.
  1430 Broadway
  New York, New York 10018 U.S.A.
- ANSI/UL 558; Internal Combustion Engine Powered Industrial Trucks
  American National Standards Institute, Inc.
  1430 Broadway
  New York, New York 10018 U.S.A.
  or
  Underwriters Laboratories
  333 Pfingsten Road
  Northbrook, Illinois 60062 U.S.A.

## Safe Operating Practices

**⚠ Warning ⚠**

**The sprayer is an off-highway vehicle only and is not designed, equipped, or manufactured for use on public streets, roads, or highways.**

### Supervisor's Responsibilities

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

## Chemical Safety

**Warning**

**Chemicals are hazardous and can injure you, bystanders, animals, plants, soils, or other property.**

- **Carefully read and follow the chemical manufacturer's instructions for the safe preparation, use, and disposal of the chemical.**
- **Keep chemicals off the your skin or the skin of bystanders. if contact should occur, wash it off immediately with clean water and detergent.**
- **Wear goggles and other protective equipment as instructed by the chemical manufacturer.**

- Obtain the 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.
- Handle chemicals in a well-ventilated area.
- Wear goggles and other protective equipment as instructed by the chemical manufacturer. Ensure that as little skin as possible is exposed while using chemicals.
- Have clean water available especially when filling the spray tank.
- Do not eat, drink, or smoke while working with chemicals.
- Always wash your hands and other exposed areas as soon as possible after finishing the work.
- Properly dispose of unused chemicals and chemical containers as instructed by the chemical manufacturer and your local codes.
- Chemicals and fumes in the tanks are dangerous; never enter the tank or place your head over or in the opening.

## Before Operating

- Operate the machine only after reading and understanding the contents of this manual.
- **Never** allow children to operate the sprayer. Anyone who operates the sprayer should have a motor vehicle license.
- **Never** allow other adults to operate the sprayer without first reading and understanding the *Operator's Manual*. Only trained and authorized persons should operate this sprayer. Ensure that all operators are physically and mentally capable of operating the sprayer.
- This sprayer is designed to carry **only you**, the operator, and **one passenger** in the seat provided by the manufacturer. **Never** carry any other passengers on the sprayer.
- **Never** operate the sprayer when under the influence of drugs or alcohol. Even prescription drugs and cold medicines can cause drowsiness.
- Do not drive the sprayer when you are tired. Be sure to take occasional breaks. It is very important that you stay alert at all times.
- Become familiar with the controls and know how to stop 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.
- Always wear substantial shoes. Do not operate the machine while wearing sandals, tennis shoes, or sneakers. Do not wear loose fitting clothing or jewelry which could get caught in moving parts and cause personal injury.
- Wearing safety glasses, safety shoes, long pants, and a helmet is advisable and required by some local safety and insurance regulations.
- Avoid driving when it is dark, especially in unfamiliar areas. If you must drive when it is dark, be sure to drive cautiously, use the headlights, and even consider adding additional lights.
- Be extremely careful when operating around people. Always be aware of where bystanders might be.
- Before operating the sprayer, always check the designated areas of the sprayer that are stated in the Pre-Starting section of this manual on page 18. If something is wrong, do **not** use the sprayer. Ensure that the problem is corrected before the sprayer or attachment is operated.
- Ensure that all fluid line connectors are tight and all hoses are in good condition before applying pressure to the system.

- Since fuel is highly flammable, handle it carefully.
  - Use an approved fuel container.
  - Do not remove the cap from the fuel tank when the engine is hot or running.
  - Do not smoke while handling fuel.
  - Fill the fuel tank outdoors, and fill it to about 1 inch (25 mm) below the top of the tank (the bottom of the filler neck). Do not overfill it.
  - Wipe up any spilled fuel.

## While Operating

**Warning**

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

**Do not run the engine indoors or in an enclosed area.**

- The operator and passenger should remain seated whenever the sprayer is in motion. The operator should keep both hands on the steering wheel whenever possible, and the passenger should use the hand holds provided. Keep your arms and legs within the sprayer body at all times.
- Drive slower and turn less sharply when you are carrying a passenger. Remember your passenger may not be expecting you to brake or turn and may not be ready.
- Always watch out for and avoid low overhangs such as tree limbs, door jambs, and overhead walkways. Ensure that there is enough room overhead to easily clear the sprayer and your head.
- Failure to operate the sprayer 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 sprayer on wet surfaces, in adverse weather conditions, at higher speeds, or with a full load. Stopping time and distance will increase 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 stopped. 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 of the seat:
  A. Stop the movement of the machine.
  B. Remove your foot from the traction pedal and set the parking brake.
  C. Turn the ignition key to Off.
  D. Remove the ignition key.

**Note:** If the sprayer is stopped on an incline, block the wheels after getting off the sprayer.

### Braking

- Slow down before you approach an obstacle. This gives you extra time to stop or turn away. Hitting an obstacle can damage the sprayer and its contents. More important, it can injure you and your passenger.
- Gross Vehicle Weight (GVW) has a major impact on your ability to stop or turn. Heavy loads and attachments make a sprayer harder to stop or turn. The heavier the load, the longer it takes to stop.
- Turf and pavement are much slipperier 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 ensure that

they work properly. If they do not, drive slowly while putting light pressure on the brake pedal. This will dry the brakes out.

- When operating the machine with liquid in the tank, 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.

### Operating on Hills and Rough Terrain

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

- Do not accelerate or brake quickly when backing down a hill, especially with liquid in the tank.
- 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.
- Avoid stopping on hills, especially with liquid in the tank. Stopping while going down a hill will take longer than stopping on level ground. If the sprayer must be stopped, avoid sudden speed changes, which may initiate tipping or rolling of the sprayer. Do not brake hard when rolling backward, as this may cause the sprayer to overturn.
- The Toro Company strongly recommends installing the optional rollover protection system (ROPS) kit when operating on hilly terrain. If you install a ROPS, always wear the seat belt when driving the sprayer.
- Liquid loads shift when you are turning, going up or down hills, suddenly changing speeds, or while driving over rough surfaces. Shifting loads can cause the sprayer to tip over. Reduce your speed in these conditions.

**Warning**

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

- **Reduce your speed when operating the machine on rough terrain and near curbs.**
- **Grip the steering wheel loosely around the perimeter. Keep your hands clear of the steering wheel spokes.**

## Maintenance

- Only permit qualified and authorized personnel to maintain, repair, adjust, or inspect the sprayer.
- Before performing any maintenance, ensure that the system has been thoroughly rinsed and cleaned.
- Before servicing or making adjustments to the machine, stop the engine, set the parking brake, and remove the key from the ignition to prevent someone from accidentally starting the engine.
- To ensure 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 the engine must be running 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 pin hole leaks or nozzles that eject high pressure fluid. Use cardboard or paper to find leaks. Fluid escaping under pressure can penetrate the skin and cause an injury that requires 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 ensure 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 sprayer in any manner that may affect sprayer operation, performance, durability, and may result in injury or death. Such use could void the product warranty.

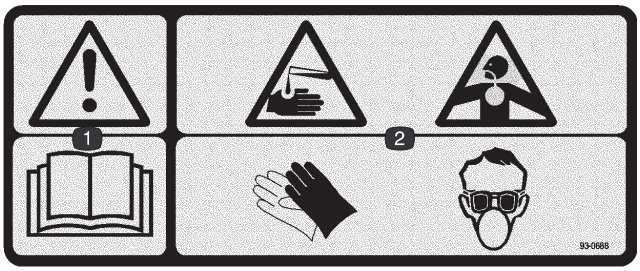
## Safety and Instruction Decals

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




**26-7170**

1. Recycle

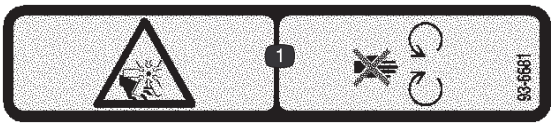



**93-0688**

1. Warning—read the *Operator's Manual.*
2. Caustic liquid/chemical burn and toxic gas inhalation hazards—wear hand, skin, eye, and respiratory protection.




**93-6680**




**93-6681**

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



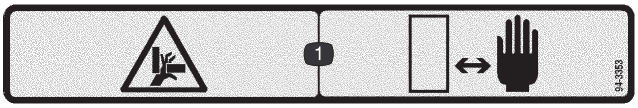

**93-6686**

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



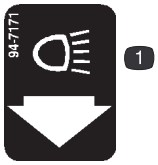

**93-6687**

1. Do not step here.



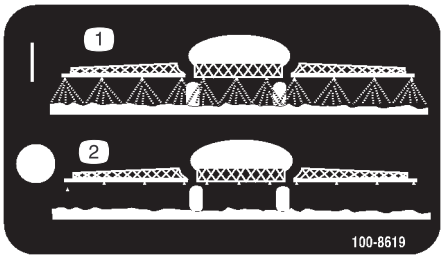

**94-3353**

1. Crushing hazard of hand—keep your hands a safe distance away.




**94-7171**

1. Lights



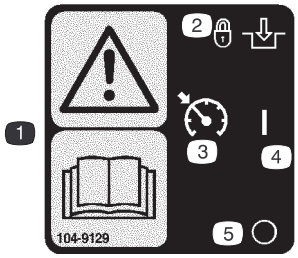

**100-8619**

1. Spray on
2. Spray off



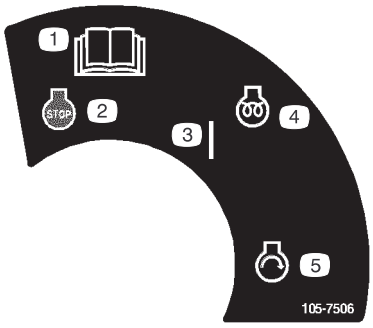

**104-7628**

1. Read the *Operator's Manual.*



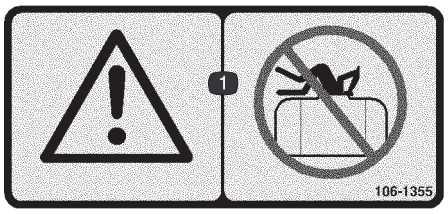

**104-9129**

1. Warning—read the *Operator's Manual*.
2. Lock and engage
3. Cruise control
4. On
5. Off



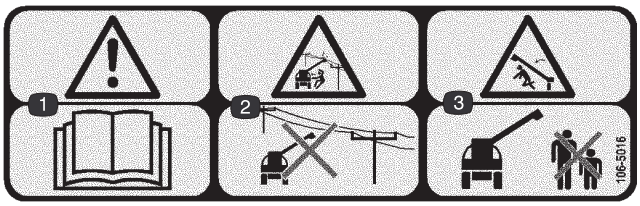

**105-7506**

1. Read the *Operator's Manual*
2. Engine—stop
3. On
4. Engine—preheat
5. Engine—start



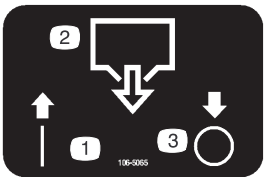

**106-1355**

1. Warning—do not enter the tank.



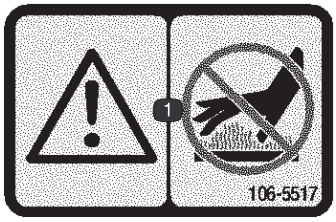

**106-5016**

1. Warning—read the *Operator's Manual.*
2. Electric shock hazard, overhead power lines—stay away from overhead power lines.
3. Crushing hazard, boom—keep bystanders a safe distance from the machine.



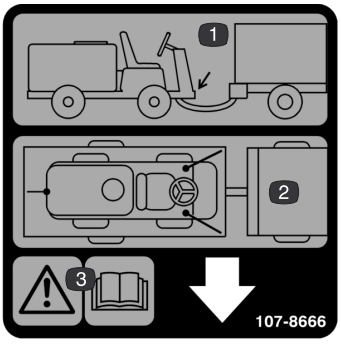

**106-5065**

1. On
2. Tank drain
3. Off



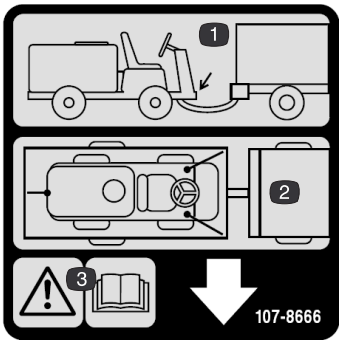

**106-5517**

1. Warning—do not touch the hot surface.



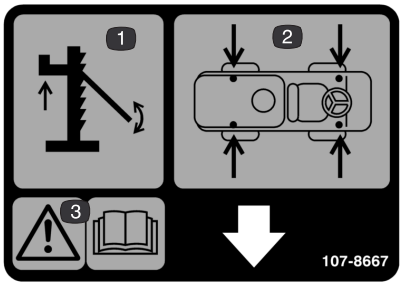

**107-8666**

1. Tow hitch location
2. Tie down locations
3. Warning—Read the *Operator's Manual* for more information on jacking the vehicle



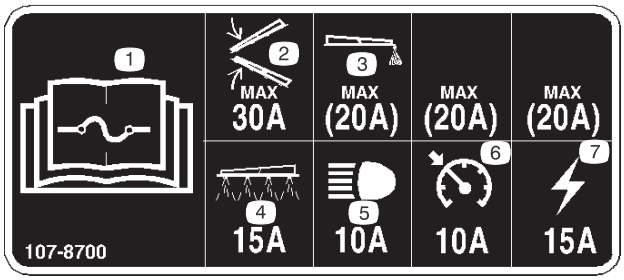

**107-8666**

1. Tow hitch location
2. Tie down locations
3. Warning—Read the *Operator's Manual* for more information on jacking the vehicle



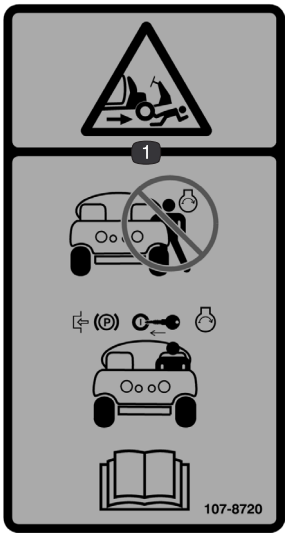

**107-8667**

1. Jacking
2. Jack point locations
3. Warning—Read the *Operator's Manual* for more information on jacking the vehicle



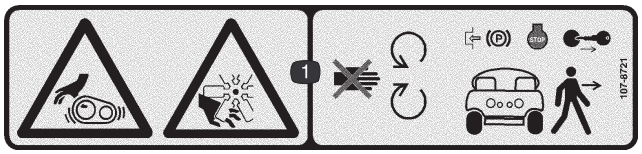

**107-8700**

1. Read the *Operator's Manual* for information on fuses.
2. Boom lift
3. Foam marker
4. Spray system
5. Headlights
6. Cruise control
7. Ignition



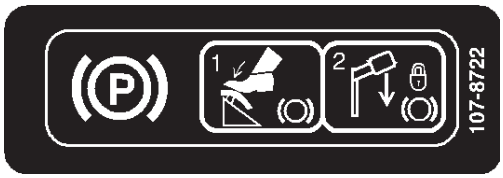

**107-8720**

1. Crushing/dismemberment hazard—do not start the engine while entering or exiting the vehicle; engage tthe parking brake, insert the key, and start the engine while seated in the drivers seat; read the *Operator's Manual*.



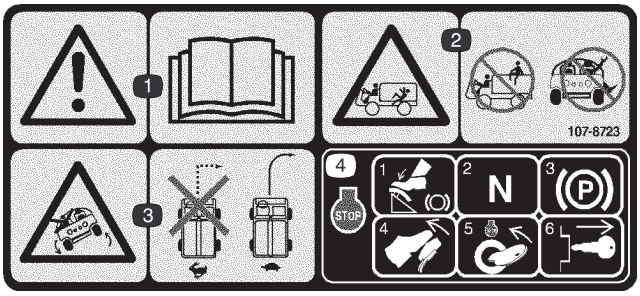

**107-8721**

1. Entanglement hazard, belt; cutting/dismemberment hazard, fan—stay away from moving parts; lock the parking brake, stop the engine, and remove the key before exiting the machine.



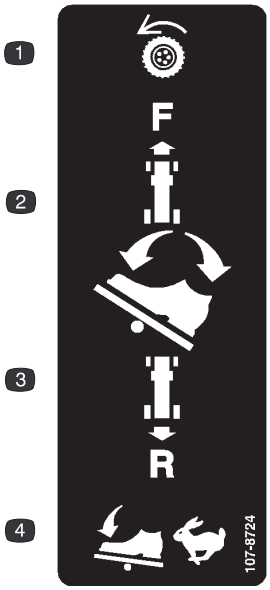

**107-8722**

1. To set the parking brake, press the brake, move the parking break lever to the locked position.



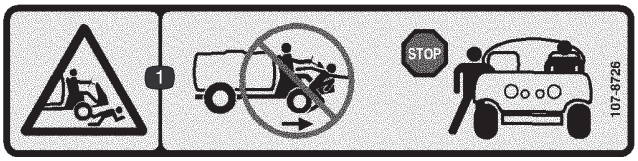

**107-8723**

1. Warning—read the *Operator's Manual*.
2. Falling, Crushing hazard—no riders on tank; keep arms and legs inside of the vehicle at all times.
3. Tipping hazard—do not turn sharply while traveling fast; drive slowly when turning.
4. To stop the engine, press the brake, put the gear selector in neutral, set the parking brake, release the brake, stop the engine, and remove the key.



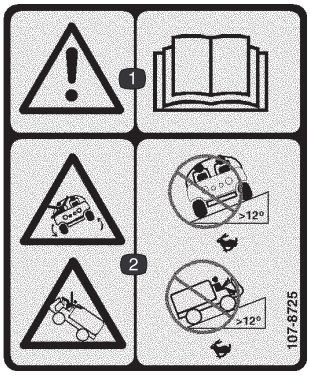

**107-8724**

1. Traction drive
2. To drive forward, press the top of the traction pedal forward and down.
3. To drive in reverse, press the bottom of the pedal rearward and down.
4. Vehicle speed increases with more pedal pressure.



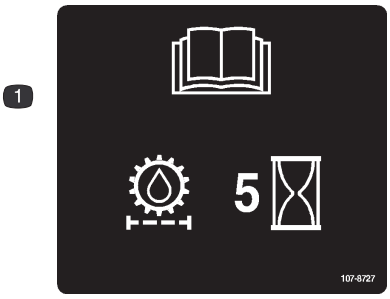

**107-8726**

1. Crushing/dismemberment hazard of bystanders—do not exit or enter the machine while it is moving; stop the machine before entering or exiting.



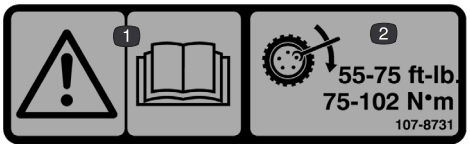

**107-8725**

1. Warning—read the *Operator's Manual*.
2. Tipping hazard—do not drive fast across slopes greater than 12°; do not drive fast up slopes greater than 12°.



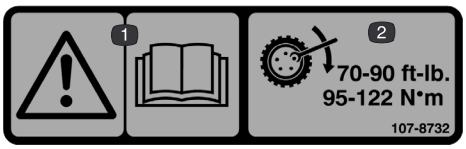

**107-8727**

1. Read the *Operator's Manual*; change the hydraulic fluid filter after the initial five operating hours.




**107-8731**

1. Warning—read the *Operator's Manual*.
2. Torque lug nuts to 55-75 ft-lb (75-102 N·m).




**107-8732**

1. Warning—read the *Operator's Manual*.
2. Torque lug nuts to 75-90 ft-lb (95-122 N·m).

# Specifications

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

| | |
|---|---|
| Engine | Kubota 4 cylinder, overhead valve, liquid-cooled diesel engine. 35.5 hp @ 3000 rpm. Heavy-duty, 3-stage, remote-mounted air cleaner. High-water temperature shutdown switch |
| Main frame | All welded formed steel frame, includes tie-down loops |
| Cooling system | Radiator capacity is approximately 5.75 qts. (4.4 l) of 50/50 mixture of ethylene glycol anti-freeze. Remote-mounted 1 qt. (0.9 l) expansion tank. Removeable oil cooler. Air-to-oil cooler, mounted to the front of the radiator. |
| Fuel system | Fuel tank capacity is 10.6 gal. (40 l) of #2 diesel fuel. Equipped with a fuel filter/water separator to capture the water in the fuel. |
| Traction system | Servo-controlled hydrostatic system driving double planetary gear reduction rear wheel drives. Foot pedal control of forward/reverse ground speed |
| Ground speed | 0 to 10 mph forward; 0 to 4 mph reverse |
| Seat | Deluxe high-back seat with adjustable front to back travel |
| Steering system | Power steering with dedicated power source |
| Tires | Two rear steering tires: 23 x 10.50–12, tubeless, 6-ply rating. Two rear traction drive tires: 26.5 x 14.00–12 tubeless, 4-ply rating. Recommended tire pressure for front and rear tires is 15 to 20 psi |
| Brakes | Hydrostatic braking through the traction drive |
| Electrical features | 12 volt, 690 cold-cranking amps at 0° F (–18° C), maintenance-free battery. 40-amp. alternator with I. C. regulator/rectifier. Automotive-type electrical system |
| Controls | Foot-operated traction and brake pedals. Hand-operated throttle, speed control lever, ignition switch with automatic preheat cycle |
| Gauges | Hour meter, fuel gauge, 4-bank warning lamp: 4-bank warning lamp: oil pressure, water temperature, amps, and glow plug |
| Base weight | 2580 lb (1170 kg) |
| Weight with standard spray system, empty, with operator | 2580 lb (1170 kg) |
| Weight with standard spray system, full, with operator | 5525 lb (2506 kg) |
| Maximum gross vehicle weight (GVW) (on level ground) | 6525 lb (2960 kg) |
| Tank capacity | 300 US gallons (1135.6 L) |
| Overall width with standard spray system | 72 inches (183 cm) |
| Overall length with standard spray system | 136 inches (345 cm) |
| Overall height with standard spray system to the top of the tank | 57.5 inches (146 cm) |
| Ground clearance | 7.5 inches (17.5 cm) |
| Wheel base | 78 inches (198 cm) |

## Optional Equipment

The Toro Company has optional equipment and accessories that you can purchase separately and install on your sprayer. Contact an Authorized Service Dealer for a complete list of optional equipment that is currently available for your sprayer.

# Setup

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

To use the sprayer, **you must obtain nozzles**. Contact an Authorized Toro Distributor for information on the available boom kits and accessories. After you install your booms and nozzles and before using the sprayer for the first time, adjust the boom bypass valves so that the pressure and application rate remains the same for all booms when you turn one or more booms off. Refer to Adjusting the Boom Bypass valves on page 23.

## Loose Parts

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

| Description | Qty. | Use |
|---|---|---|
| Key | 2 | Use in the ignition switch. |
| Operator's Manual<br>Engine operator's manual | 1<br>1 | Read before operating the machine. |
| Operator video | 1 | Watch before operating the machine. |
| Parts catalog | 1 | Use for ordering replacement parts. |
| Registration card | 1 | Complete and return to Toro. |
| Predelivery inspection form | 1 | Complete and file in your customer history portfolio. |

# Before Operating

## Checking the Engine Oil Level

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

1. Position the sprayer on a level surface, set the parking brake, stop the pump, stop the engine, and remove the ignition key.
2. Remove the dipstick, located under the passenger seat, and wipe it with a clean rag (Fig. 2).

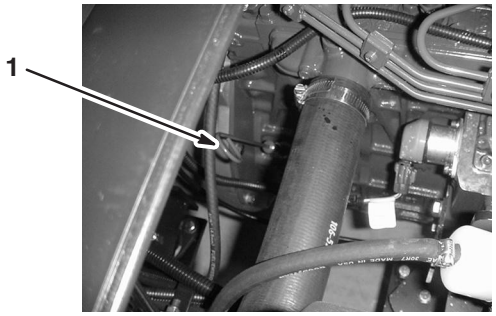



**Figure 2**

1. Dipstick

3. Insert the dipstick into the tube and ensure that it is seated fully.
4. Remove the dipstick and check the oil level.

5. If the oil level is low, remove the filler cap from the valve cover (Fig. 3) and pour oil into the opening until the oil level is up to the Full mark on the dipstick.

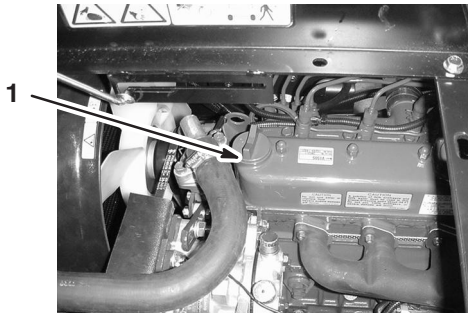



**Figure 3**

1. Oil filler cap

**Important** Refer to Servicing Engine Oil on page 30 for the proper oil type and viscosity. Add the oil slowly and check the level often during this process. **Do not overfill.**

6. Install the filler cap.

7. Install the dipstick firmly in place.

## Checking the Tire Pressure

Check the tire pressure every 8 operating hours or daily to ensure proper levels. Fill the tires to 18 psi (124 kPa). 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.**
- **Do not fill the fuel tank completely full. Add fuel to the fuel tank until the level is 1 inch (25 mm) 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 fuel fumes may be ignited by a spark.**
- **Store fuel in an approved container and keep it out of the reach of children. Never buy more than a 30-day supply of fuel.**
- **Always place fuel containers on the ground away from your sprayer 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 diesel-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 a fuel dispenser nozzle must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.**

## Filling the Fuel Tank

The fuel tank capacity is approximately 10.6 US gallons (40 l). The engine runs on No. 2-D or 1-D automotive type diesel fuel with a minimum cetane rating of 40.

**Note:** Your engine may require a higher cetane-rated fuel if you operate the machine at high altitudes or in low atmospheric temperatures.

1. Position the sprayer on a level surface.
2. Set the parking brake, stop the pump, stop the engine, remove the ignition key, and allow the engine to cool.
3. Clean the area around the fuel tank cap (Fig. 4).

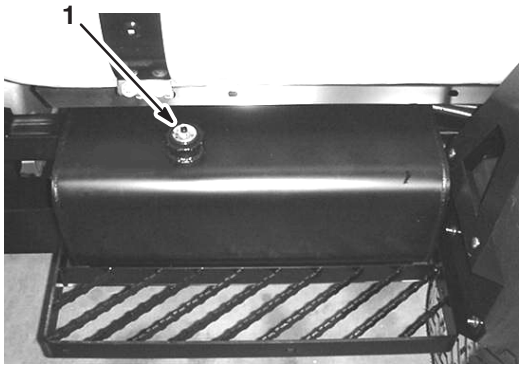



**Figure 4**

1. Fuel tank cap

4. Remove the fuel tank cap.

**Danger**

**Under certain conditions, diesel fuel and fuel vapors are highly flammable and explosive. A fire or explosion from fuel can burn you and others and can cause property damage.**

- **Use a funnel and fill the fuel tank outdoors, in an open area, when the engine is off and is cold. Wipe up any fuel that spills.**
- **Do not fill the fuel tank completely full. Add fuel to the fuel tank until the level is 1 inch (25 mm) below the bottom of the filler neck. This empty space in the tank allows the fuel to expand.**
- **Never smoke when handling fuel, and stay away from an open flame or where fuel fumes may be ignited by a spark.**
- **Store fuel in a clean, safety-approved container and keep the cap in place.**

5. Fill the tank to about 1 inch below the top of the tank, (bottom of the filler neck).

   **Note:** This space in the tank allows the fuel to expand. **Do not overfill.**

6. Install the fuel tank cap securely.
7. Wipe up any fuel that spills.

## Checking the Coolant Level

The cooling system is filled with a 50/50 solution of water and permanent ethylene glycol antifreeze. Check the level of coolant in the radiator and the expansion tank at the beginning of each day before starting the engine. The cooling system capacity is 5.5 qt. (5.4 l).

**Caution**

**If the engine has been running, the coolant may be hot and pressurized. If you open the radiator cap when the coolant is hot, it could spray out and severely burn you or bystanders.**

**Allow the engine to cool for at least 15 minutes before opening the radiator cap.**

1. Position the sprayer on a level surface.
2. Set the parking brake, stop the pump, stop the engine, and remove the ignition key.
3. Carefully remove the radiator cap (Fig. 5) and the expansion tank cap (Fig. 6).




**Figure 5**

1. Radiator cap

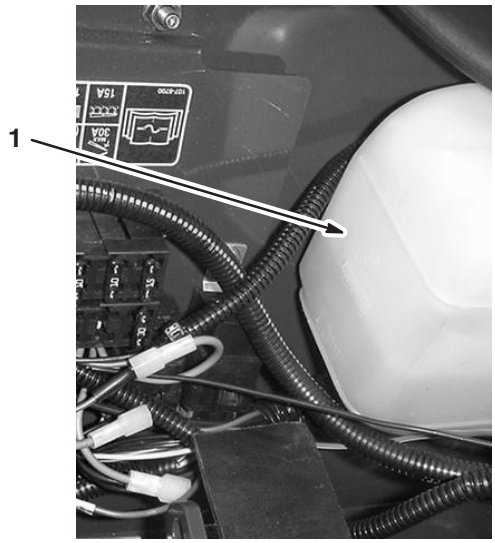



**Figure 6**

1. Expansion tank

4. Check the coolant level in the radiator and in the expansion tank.

   **Note:** The radiator should be filled to the top of the filler neck and the expansion tank filled to the Full mark.

5. If coolant level is low, remove the expansion tank cap and the radiator cap, and fill expansion tank to the Full mark and the radiator to the top of the filler neck. **Do not overfill the expansion tank.**

**Important** Do not use water only or an alcohol/methanol-based coolant.

6. Install the radiator cap and the expansion tank cap.

## Checking the Hydraulic Fluid

1. Position the sprayer on a level surface and set the parking brake.
2. Stop the pump, stop the engine, and remove the ignition key.
3. Clean the area around the hydraulic oil tank cap and remove it (Fig. 7).

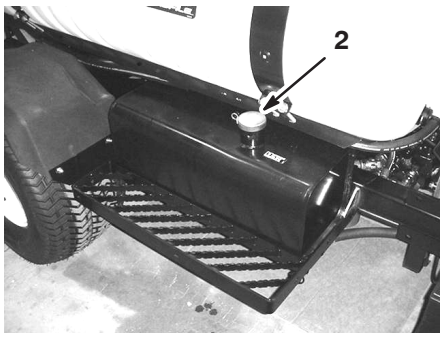



**Figure 7**

1. Hydraulic oil tank cap

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

4. Check the oil level by looking into the opening.

   The oil should be 2 inches (5 cm) below the bottom of the filler neck.

5. If the oil is low, fill the tank with Mobil DTE 15M hydraulic fluid or equivalent.
6. Install and secure the hydraulic oil tank cap.

## Checking the Brakes

Before starting the sprayer, lightly press the brake pedal. If the pedal travels more than 1 inch (2.5 cm) before you feel resistance, adjust the brakes; refer to Adjusting the Brakes on page 37.

**Warning**

**If you operate the sprayer with poorly adjusted or worn brakes, you could lose control of the sprayer, resulting in serious injury or death to you or bystanders.**

**Always check the brakes before operating the sprayer and keep them properly adjusted and repaired.**

## Filling the Fresh Water Tank

The sprayer is equipped with a fresh water tank (Fig. 8) for washing chemicals off your skin, eyes, or other surfaces in the case of accidental exposure. Always fill the fresh water tank with clean water before handling or mixing any chemicals.




**Figure 8**

1. Filler cap
2. Fresh water tank
3. Spigot

To open the fresh water tank spigot, turn the lever on the spigot toward the front of the sprayer.

# Operation

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

## Think 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.

## Vehicle Controls

### Traction Pedal

The traction pedal (Fig. 9) controls the movement of the machine, both forward and reverse. Using the heel and toe of the right foot, press the top of the pedal to move forward or the bottom of the pedal to move in reverse. Release the pedal to slow and stop.




**Figure 9**

1. Traction pedal
2. Brake pedal
3. Parking brake pedal
4. Master boom switch

**Important** Ensure that you allow the sprayer to come to a stop before switching between the Forward and Reverse position.

**Note:** The farther you press the pedal in either direction, the faster the sprayer will travel. To obtain maximum forward speed, set the throttle lever to the Fast position and press the traction pedal all the way forward.

**Note:** To obtain maximum power with a full tank or when traveling up a hill, set the throttle lever in the Fast position and drive slowly so that the engine remains at a high rpm.

### Brake Pedal

Use the brake pedal to stop or slow the sprayer (Fig. 9).

**Warning**

**If you operate the sprayer with poorly adjusted or worn brakes, you could lose control of the sprayer, resulting in serious injury or death to you or bystanders.**

**Always check the brakes before operating the sprayer and keep them properly adjusted and repaired.**

## Parking Brake

The parking brake is a pedal to the left of the brake (Fig. 9). Engage the parking brake whenever you plan on leaving the seat to prevent the sprayer from accidently moving. To engage the parking brake, press the brake pedal and, while holding the brake, press the parking brake pedal. To disengage, press and release the brake pedal. If the sprayer is parked on a steep grade, apply the parking brake and place the blocks on the downhill side of the wheels.

## Throttle Lever

The throttle lever, located on the control panel between the seats (Fig. 10), controls the speed of the engine. Push the lever forward to increase the engine speed and pull it rearward to decrease the engine speed.

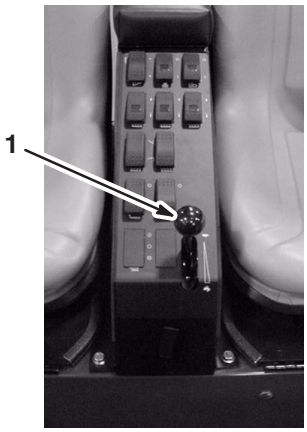



**Figure 10**

1. Throttle lever

## Ignition Switch

The ignition switch (Fig. 11), used to start and stop the engine, has 3 positions: Off, On/Preheat and Start.

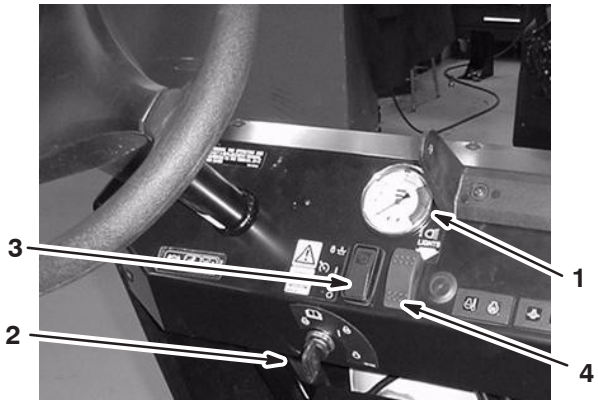



**Figure 11**

1. Pressure gauge
2. Ignition switch
3. Cruise control switch
4. Headlight switch

## Pressure Gauge

The pressure gauge (Fig. 11) indicates the pressure of the spray system. Refer to Pressure Gauge on page 22 for more information.

## Cruise Control Switch

The cruise control switch (Fig. 11) sets the forward speed of the machine and holds it without pressure on the traction pedal.

## Headlight Switch

Toggle the switch to operate the headlights (Fig. 11). Push it forward to turn the lights on and rearward to turn them off.

## Hour Meter

The hour meter (Fig. 12) indicates the total number of hours the engine has run. The hour meter starts to function whenever the key is turned to the Run position.

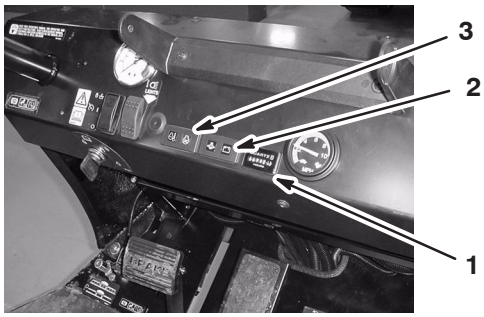



**Figure 12**

1. Hour meter
2. Oil pressure and battery light
3. Water temperature and glow plug light

## Fuel Gauge

The fuel gauge (Fig. 13) shows the amount of fuel in the tank.

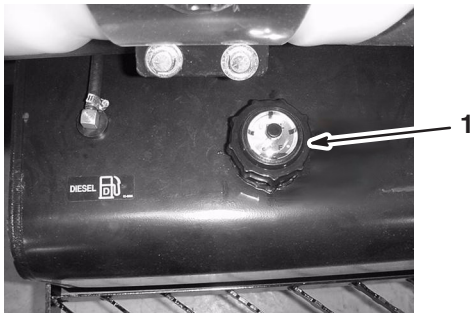



**Figure 13**

1. Fuel gauge

## 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.
- Ensure that the lights are working.
- With the engine off, check for oil leaks, loose parts, and any noticeable 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.

## Starting the Engine

1. Sit on the operator's seat and keep your foot off the traction pedal.
2. Ensure that the parking brake is engaged, the traction pedal is in the Neutral position, the throttle is in the Slow position.
3. Turn the ignition switch to the On/Preheat position.

   **Note:** An automatic timer will control the preheat for approximately 6 seconds.
4. After preheating, turn the key to the Start position.
5. Crank the engine for no longer than 15 seconds.
6. Release the key when the engine starts.
7. If the engine requires additional preheating, turn the key to the Off position, then to the On/Preheat position.

**Note:** Repeat steps 3 through 7 as required.

8. Run the engine at idle speed or partial throttle until the engine warms up.

## Bleeding the Fuel System

1. Park the machine on a level surface.
2. Ensure that the fuel tank is at least half full.

**Danger**

**Under certain conditions, diesel fuel and fuel vapors are highly flammable and explosive. A fire or explosion from fuel can burn you and others and can cause property damage.**

- **Use a funnel and fill the fuel tank outdoors, in an open area, when the engine is off and is cold. Wipe up any fuel that spills.**
- **Do not fill the fuel tank completely full. Add fuel to the fuel tank until the level is 1 inch (25 mm) below the bottom of the filler neck. This empty space in the tank allows the fuel to expand.**
- **Never smoke when handling fuel, and stay away from an open flame or where fuel fumes may be ignited by a spark.**
- **Store fuel in a clean, approved fuel container and keep the cap in place.**

3. Open the vent plug on the fuel/water separator (Fig. 14).

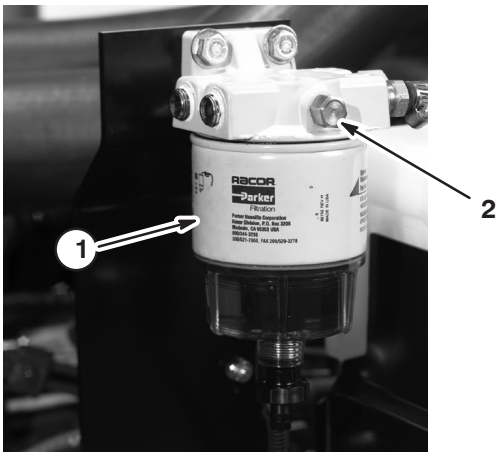



**Figure 14**

1. Fuel filter/water separator
2. Vent plug

4. Turn the key in the ignition switch to the On position.

   **Note:** The electric fuel pump will begin forcing air out around the air bleed screw.
5. Leave key in the On position until a solid stream of fuel flows out around the screw.
6. Tighten screw and turn the key to the Off position.

7. Open the air bleed screw on the fuel injection pump (Fig. 15).

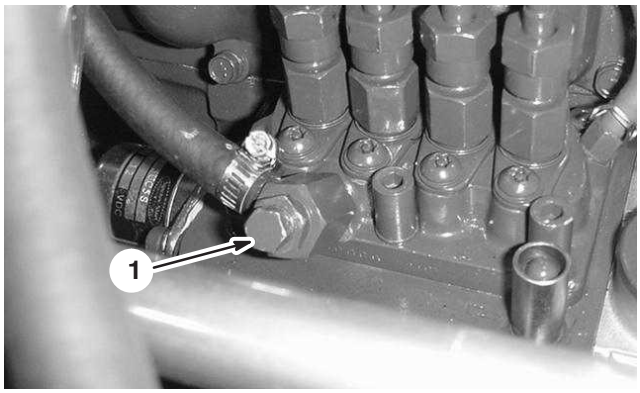



**Figure 15**

1. Fuel injection pump bleed screw

8. Turn key in ignition switch to the On position.

   **Note:** Electric fuel pump will begin operation, thereby forcing air out around air bleed screw on fuel injection pump.

9. Leave the key in the On position until a solid stream of fuel flows out around the screw.

10. Tighten the screw and turn the key to the Off position.

**Note:** Normally, the engine should start after you bleed the fuel system. However, if the engine does not start, there may be air trapped between the injection pump and the injectors; refer to Bleeding the Air from the Injectors on page 32.

## Driving the Sprayer

1. Press the traction pedal forward to drive forward or rearward to drive in reverse.

**Important** Ensure that you allow the sprayer to come to a stop before switching between the Forward and Reverse positions.

2. To slowly stop the sprayer, release the traction pedal.

3. To stop quickly, press the brake pedal.

**Note:** Stopping distance may vary depending on the sprayer load and speed.

## Stopping the Engine

1. Press the brake to stop the sprayer.

2. Move all the controls to the Neutral position.

3. Set the parking brake.

4. Shift the throttle lever to the Idle position.

5. Turn the ignition key to the Off position.

6. Remove the key from the switch to prevent someone from accidentally starting the engine.

## Setting the Cruise Control

**Caution**

**If you press the switch to turn off the cruise control and do not have your foot on the traction pedal, the traction unit may suddenly stop and cause you to lose control, possibly injuring you or bystanders.**

**Ensure that you have you foot on the traction pedal when you disengage the cruise control using the switch.**

1. Drive forward and attain the desired speed; refer to Driving the Sprayer on page 19.

2. Press the top of the cruise control switch.

   **Note:** The light on the switch illuminates.

3. Take your foot off the traction pedal.

   **Note:** The sprayer will maintain the speed you set.

4. To release the cruise control, either press the bottom of the cruise control switch or press the brake pedal.

   **Note:** The light on the switch turns off and the traction control returns to the traction pedal.

## Breaking in a New Sprayer

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

- Check the fluid and engine oil 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.
- Avoid hard braking situations for the first several hours of new sprayer break-in operation. New brake linings may not be at optimum performance until several hours of use has caused the brakes to become burnished (broken in).
- Avoid racing the engine.
- Vary the sprayer speed during operation. Avoid fast starts and quick stops.
- Refer to the Maintenance section for any special low-hour checks.

# Transporting the Sprayer

For moving the sprayer long distances, use a trailer. Secure the sprayer to the trailer. Figures 16 and 17 illustrate the tie-down points.

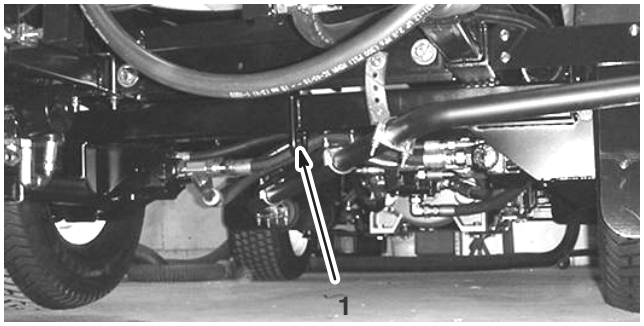



**Figure 16**

1. Rear tie down point

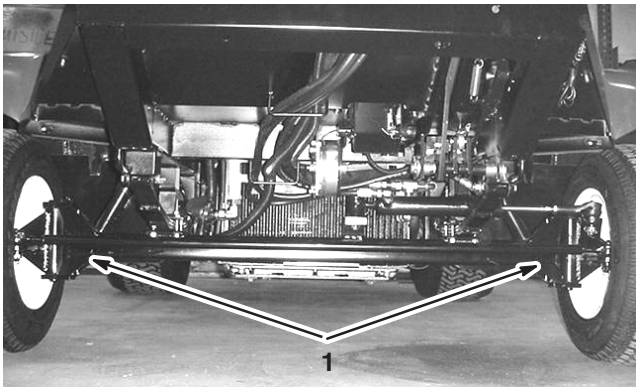



**Figure 17**

1. Front tie down points

# Towing the Sprayer

In case of an emergency, the sprayer can be towed for a short distance after you open the tow valve. However, we do not recommend 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 3 mph (4.8 kph).**

Towing the sprayer is a 2-person job. If you must move the machine a considerable distance, transport it on a truck or a trailer; refer to Transporting the sprayer on page 20.

1. Rotate the tow valve (Fig. 18) 90° in either direction to open it.

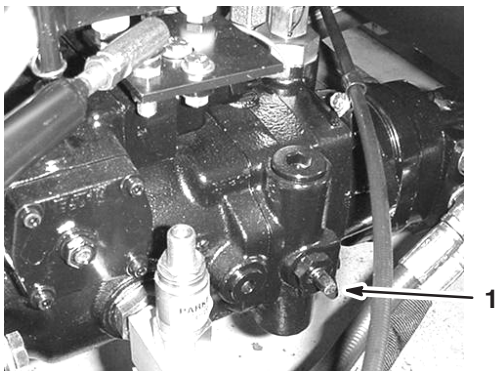



**Figure 18**

1. Tow valve

**Important** If you do not open the tow valve before towing the sprayer you will damage the transmission.

2. Affix a tow line to the frame. Refer to the front and rear towing points in Figures 19 and 20.

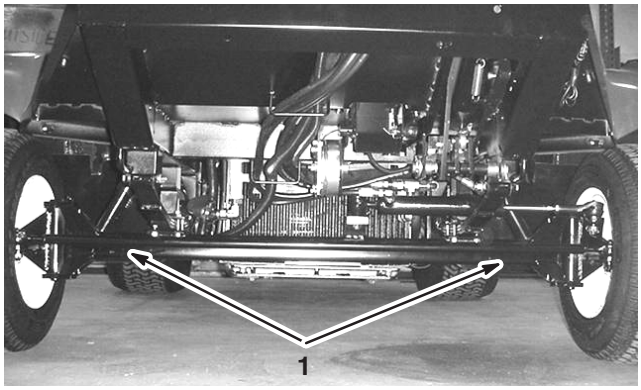



**Figure 19**

1. Front towing points

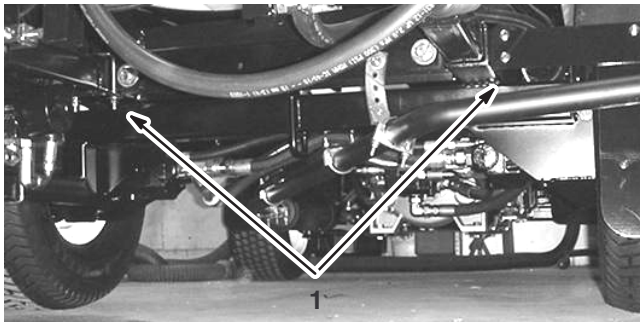



**Figure 20**

1. Rear towing points

3. Release the parking brake.
4. Tow the sprayer at less than 3 mph (4.8 kph).
5. When finished, close the tow valve and torque it to no more than 5 to 8 ft-lb (7 to 11 N·m).

# Sprayer Controls and Components

## Master Boom Switch

The master boom switch allows you to start or stop the spray operation. Press the switch with your foot to enable or disable the spray system (Fig. 21).

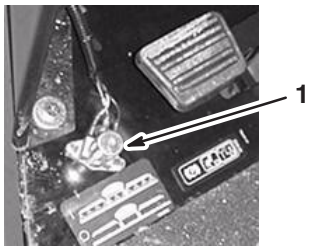



**Figure 21**

1. Master boom switch

## Boom Switches

The boom switches are located at the front of the control panel to the right of the seat (Fig. 22). Toggle each switch forward to turn the corresponding boom section on and rearward to turn each off. When the switch is turned on, a light on the switch illuminates. These switches will only affect the spray system when the master boom switch is on.

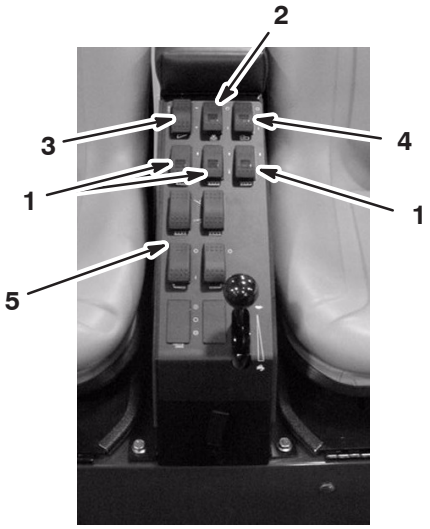



**Figure 22**

1. Boom switches
2. Pump switch
3. Application rate switch
4. Agitation switch
5. Boom lift switches

## Pump Switch

The pump switch is located on the control panel to the right of the seat (Fig. 22). Toggle this switch forward to run the pump or rearward to stop the pump. When the switch is turned on, a light on the switch illuminates.

## Application Rate Switch

The application rate switch is located on the control panel to the right of the seat (Fig. 22). Press and hold the switch forward to increase the spray system pressure, or press and hold it rearward to decrease the pressure.

## Agitation Switch

The agitation switch is located on the control panel to the right of the seat (Fig. 22). Toggle this switch forward to turn on the agitation in the tank or rearward to stop the agitation. When the switch is turned on, a light on the switch illuminates. For agitation to work, the pump must be on and the engine must be running above an idle. The agitation valve is located behind the tank (Fig. 23).

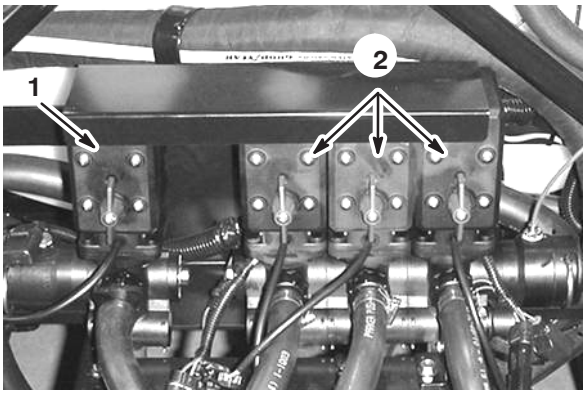



**Figure 23**

1. Agitation valve
2. Boom valves

## Sonic Boom and Foam Marker Switch Locations

If you install the sonic boom or foam marker kit, you will add switches to the control panel for controlling their operation. The sprayer comes with plastic plugs in these locations.

## Boom Valves

These valves turn the 3 booms on or off (Fig. 23). If you ever need to manually turn off a boom, rotate the knob on the valve clockwise to turn the valve off or counterclockwise to turn it on.

## Boom Bypass Valves

The boom bypass valves redirect the fluid flow for a boom to the tank when you turn off the boom section. They are located at the bottom of each boom valve section. You can adjust these valves to ensure that the boom pressure remains constant no matter how many booms are on. Refer to Adjusting the Boom Bypass Valves on page 23.

**Note:** If you use the Pro Control, you must shut all the bypass valves.

## Pressure Gauge

The pressure gauge is located on the dash (Fig. 11). This gauge shows the pressure of the fluid in the system in psi and kPa.

## Pump

The pump is located near the back of the tank on the left side (Fig. 24).

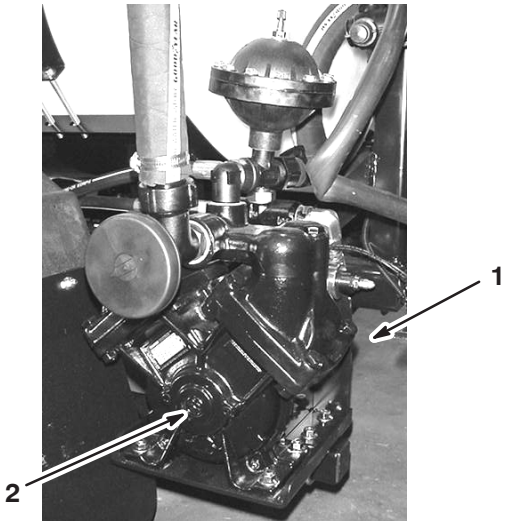



**Figure 24**

1. Pump
2. Grease fitting

## Tank Drain Knob

The tank drain knob is located on top of the tank (Fig. 25). Pull the handle approximately 1 inch (2.5 cm) to drain the tank. You can hold the drain in the open position by tightening the gland nut.

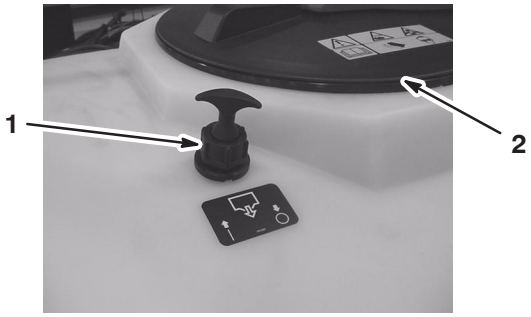



**Figure 25**

1. Tank drain
2. Tank cover

## Tank Cover

The tank cover is located in the center of the top of the tank (Fig. 25). To open it, turn off the engine, then turn the front half of the cover to the left and swing it open. You can remove the strainer inside for cleaning. To seal the tank, close the cover and rotate the front half toward the right.

## Anti-siphon Fill Receptacle

To the front of the tank cover is a hose receptacle with a threaded fitting and a 90° barbed fitting and tube which you can direct toward the tank opening (Fig. 26). This receptacle allows you to connect a water hose to it and fill the tank with water without contaminating the hose with the chemicals in the tank.

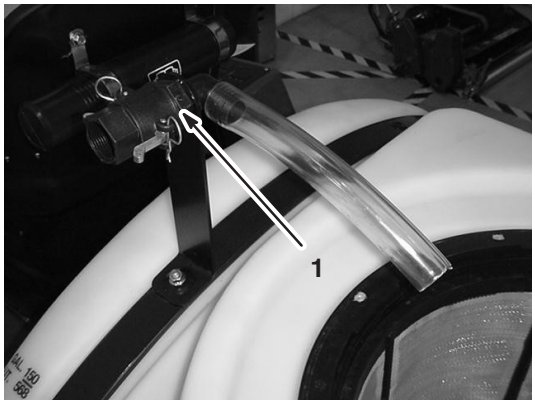



**Figure 26**

1. Anti-siphon fill receptacle

# Adjusting the Boom Bypass Valves

**Important** If you have the Pro Control™ Spray System installed, the boom bypass valves must be closed. Use the following adjustment only when you are not using the Pro Control Spray System.

After you install your booms and nozzles and before using the sprayer for the first time, adjust the boom bypass valves so that the pressure and application rate remains the same for all booms when you turn one or more booms off.

1. Select an open flat area to perform this procedure.
2. Fill the spray tank with clean water.
3. Put the extension booms down, if installed.
4. Set the parking brake and start the engine.
5. Move the throttle lever to the Spray position.
6. Set the pump switch to the On position to start the pump.
7. Set all 3 boom switches and the master boom switch to the On position.
8. Use the application rate switch to adjust the pressure as read on the pressure gauge until it is in the range for the nozzles you installed on the booms (typically 40 psi).
9. Record the reading on the pressure gauge.
10. Turn off one of the booms using the appropriate boom switch.
11. Adjust the boom bypass valve (Fig. 27) under the boom control valve for the boom you turned off until the pressure reading on the gauge is the same as it was in step 8.

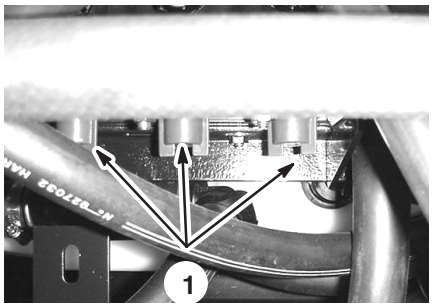



**Figure 27**

1. Boom bypass valves

12. Turn the boom on.
13. Repeat steps 10 through 12 for the other booms.
14. Drive the sprayer at the desired speed while spraying and turn each boom off individually. The pressure on the gauge should remain constant.

# Operating the Sprayer

To operate the sprayer, first fill the spray tank, then apply the solution to the work area, and finally clean the tank. It is important that you complete all 3 of these steps in succession 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 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.**

## Filling the Spray Tank

**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.

1. Stop the sprayer on a level surface, stop the engine, and set the parking brake.
2. Determine the amount of water needed to mix the amount of chemical you need as prescribed by the chemical manufacturer.
3. Open the lid on the spray tank.
4. 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.

5. Start the engine and move the throttle lever to a higher idle.
6. Set the pump switch to the On position.
7. Set the agitation switch to the On position.
8. Add the proper amount of chemical concentrate to the tank, as directed by the chemical manufacturer.

**Important** If you are using a wettable powder, mix the powder with a small amount of water to form a slurry before adding it to the tank

9. Add the remaining water to the tank.

## Applying Chemicals

**Important** In order to ensure that your solution remains well mixed, use the agitation feature whenever you have solution in the tank. For agitation to work, the pump must be on and the engine must be running above an idle.

**Note:** This procedure assumes that the pump is on from the Filling the Spray Tank procedure (page 23).

1. Set the master boom switch to the Off position.
2. Drive to the location where you will be spraying.
3. Release the boom latches on the boom uprights.
4. Manually rotate the booms into the spray position from the transport position.
5. Set the individual boom switches, as needed, to the On positions.
6. Use the application rate switch to achieve the desired pressure as indicated in the *Nozzle Selection Guide* provided with the sprayer.
7. Drive at the desired speed and then set the master boom switch to the On position to begin spraying.

**Note:** When the tank is nearly empty, the agitation may cause foaming in the tank. In this case, turn the agitation switch off. Alternatively, you can use an anti-foaming agent in the tank.

8. When finished spraying, set the master boom switch to the Off position to turn off all booms, then set the pump switch to the Off position.

   **Note:** Return the booms to the transport position and drive the sprayer to the cleaning area.

   **Important** Always fold up the booms into the transport position and latch them whenever you move the sprayer from one spraying area to another or move to a storage or cleaning area. To move the sprayer, manually rotate the booms upward to the transport position, and latch each boom to the boom uprights.

## Operating Tips

- Do not overlap areas that you have previously sprayed.
- Watch for plugged nozzles. Replace all worn or damaged nozzles.
- Use the master boom switch to stop the spray flow before stopping the sprayer.
- You will obtain better results if the sprayer is moving when you turn the booms on.

## Unclogging a Nozzle

If a nozzle becomes clogged while you are spraying, you can clean it using a hand spray bottle of water or a toothbrush.

1. Stop the sprayer on a level surface, stop the engine, and set the parking brake
2. Set the master boom switch to the Off position and then set the pump switch to the Off position.
3. Remove the clogged nozzle and clean it using a spray bottle of water or a toothbrush.

## Adjusting a Nozzle

The nozzle bodies can accept up to 3 different nozzles. To adjust the nozzle:

1. Stop the sprayer on a level surface, stop the engine, and set the parking brake.
2. Set the master boom switch to the Off position and set the pump switch to the Off position.
3. Rotate the turret of the nozzles in either direction to the correct nozzle.

## Cleaning the Sprayer

**Important** You must always empty and clean the sprayer immediately after each use. Failure to do so may cause the chemicals to dry or thicken in the lines, clogging the pump and other components.

1. Stop the sprayer, set the parking brake, and turn off the engine.
2. Use the tank drain knob to drain any unused material from the tank and dispose of it according to local codes and the material manufacturer's instructions.
3. Fill the tank with at least 50 US gallons (190 l) of clean fresh water and close the cover.

**Note:** You can use a cleaning/neutralizing agent in the water as needed. On the final rinse, use only clean water.

4. Rotate the booms into the spray position.
5. Start the engine and move the throttle lever to a higher idle.
6. Ensure that the agitation control valve is in the On position.
7. Set the pump switch to the On position and use the application rate switch to increase the pressure to a high setting.

8. Set the master boom switch and boom control switches to the On position to begin spraying.

9. Allow all of the water in the tank to spray out though the nozzles.

10. Check the nozzles to ensure that they are all spraying correctly.

11. Set the master boom switch to the Off position, set the pump switch to the Off position, and stop the engine.

12. Repeat steps 3 through 11 at least **2 more times** to ensure that the spray system is fully cleaned.

**Important** You must always complete this procedure at least 3 times to ensure that the spray system is fully clean, preventing damage to the system.

13. Clean the strainer; refer to Cleaning the Suction Strainer on page 41.

**Important** If you used wettable powder chemicals, clean the strainer after each tank.

14. Using a garden hose, rinse off the outside of the sprayer with clean water.

15. Remove the nozzles and clean them by hand. Replace damaged or worn nozzles.

16. Rotate the booms upward to the transport position and latch.

# Maintenance

**Note:** Determine the left and right sides of the machine from the normal operating position. Before performing any maintenance, ensure that the system has been thoroughly rinsed and cleaned. Refer to Cleaning the Spray System on page 24.

## Recommended Maintenance Schedule

| Maintenance Service Interval | Maintenance Procedure |
|---|---|
| 8 hours | • Check the air filter, cap, and valve for wear or damage.<br>• Check the engine oil.<br>• Check the tire pressure.<br>• Check the engine coolant level.<br>• Check the hydraulic oil level.<br>• Clean the suction strainer.[3]<br>• **Initial break-in service only:** Check the fan/alternator belt, torque the wheel lug nuts, replace the hydraulic oil filter, and change the rear planetary gearbox fluid. |
| 50 hours | • Check the battery cable connections.<br>• Lubricate all grease fittings, including the booms.<br>• **Initial break-in service only:** Change the engine oil (includes synthetic oil) and replace the engine oil filter.<br>• Check the fuel pipes and clamps. |
| 100 hours | • Change the engine oil (including synthetic oil).[1]<br>• Replace the engine oil filter.<br>• Check the cooling system hoses for wear or damage.<br>• Service the air cleaner.[2]<br>• Check the fan and alternator belts.<br>• Inspect the condition and wear of the tires.<br>• Torque the wheel lug nuts. |
| 200 hours | • Check the front wheel toe-in.<br>• Clean the radiator fins.<br>• **Initial break-in service only:** Pack the front wheel bearings. |
| 400 hours or yearly | • Drain the fuel filter/water separator.<br>• Change the hydraulic oil.<br>• Replace the hydraulic oil filter.<br>• Inspect the fuel lines, pipes, and clamps.<br>• Replace the fuel filter.<br>• Inspect the pump diaphragm and replace it if necessary.<br>• Inspect the pressure dampener bladder and replace it if necessary.<br>• Inspect the pump check valves and replace them if necessary.<br>• Inspect the o-rings in the valve assemblies and replace them if necessary.<br>• Change the rear planetary gearbox fluid.<br>• Check the coolant (as directed by the manufacturer) and change if necessary.<br>• Drain and clean the fuel tank.<br>• Pack the front wheel bearings. |

| Maintenance Service Interval | Maintenance Procedure |
|---|---|
| 2 years | • Replace the o-rings on the hose couplings. |

[1]More often when operating in high temperatures
[2]More often in dusty, dirty conditions
[3]More often when using wettable powers

**Important** Refer to your engine operator'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 neutral lockout switch operation. | | | | | | | |
| Check the fuel level. | | | | | | | |
| Check the engine oil level. | | | | | | | |
| Check the hydraulic oil level. | | | | | | | |
| Check the coolant level. | | | | | | | |
| Inspect the air filter. | | | | | | | |
| Inspect the radiator and oil cooler for debris. | | | | | | | |
| Check any unusual engine noises. | | | | | | | |
| Check any unusual operating noises. | | | | | | | |
| Check the tire pressure. | | | | | | | |
| Check for fluid leaks. | | | | | | | |
| Check all hydraulic and fluid hoses for damage, kinks, or wear. | | | | | | | |
| Check the instrument operation. | | | | | | | |
| Check the accelerator operation. | | | | | | | |
| Clean the suction strainer. | | | | | | | |
| Lubricate all grease fittings.[1] | | | | | | | |
| Touch up any 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 | | |

**Caution**

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

**Remove the key from the ignition before you do any maintenance.**

## Jacking the Sprayer

Whenever you run the engine for routine maintenance and/or engine diagnostics, support the rear wheels of the sprayer 1 inch (25 mm) off the ground with the rear axle on jack stands.

**Danger**

**A sprayer on a jack may be unstable and slip off of 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 axle, directly under the leaf springs (Fig. 28)

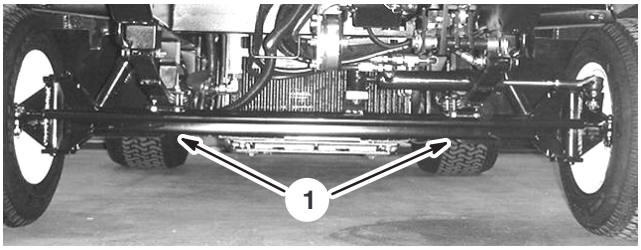



**Figure 28**

1. Front jacking points

The jacking point at the rear of the sprayer is on the rear side where the boom supports are (Figs. 29 and 30).

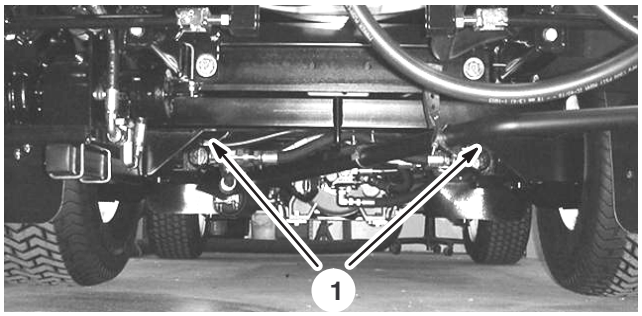



**Figure 29**

1. Rear jacking points

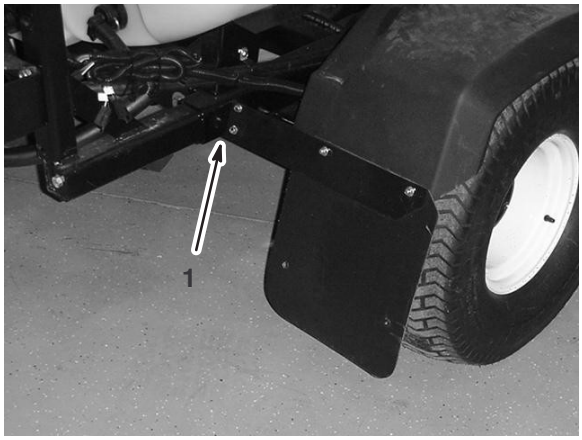



**Figure 30**

1. Rear jacking point (2)

# Inspecting the Wheels and Tires

Check the wheels to ensure that they are mounted securely after the first 1 to 4 operating hours and then every 100 operating hours thereafter. Torque the front bolts to 55 to 75 ft-lb (75 to 102 N·m) and the rear lug nuts to 70 to 90 ft-lb (95 to 122 N·m).

Check the tire condition at least every 100 operating hours. 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.

# Servicing the Air Cleaner

Check the air cleaner body for damage that could cause an air leak. Ensure that the dust cap is tightly sealed onto the air cleaner. Replace a damaged air cleaner body. Squeeze the valve (Fig. 31) before each use to clear it of dust and debris. Service the air cleaner filter every 100 hours.

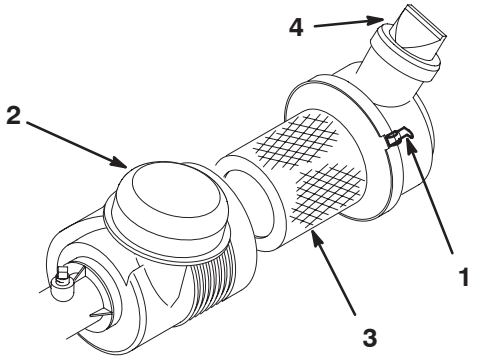



**Figure 31**

1. Air cleaner strap (2)
2. Dust cap
3. Filter
4. Valve

**Note:** Service the air cleaner more frequently if operating conditions are extremely dusty or sandy.

## Removing the Filter Element

1. Set the parking brake, stop the pump, stop the engine, and remove the ignition key.
2. Raise the passenger seat.
3. Loosen the air cleaner strap that secures the air cleaner cover to the air cleaner body (Fig. 31) and separate the cover from the body.
4. Clean the inside of the air cleaner cover.
5. Gently slide the filter out of the air cleaner body to reduce the amount of dust dislodged.

   **Note:** Avoid knocking the filter against the air cleaner body.
6. Inspect the filter and discard it if it is damaged.

**Important** Do not wash or reuse a damaged filter.

## Cleaning the Filter Element

Clean the air filter using one of the following methods:

- Wash the filter to remove fine dust and dirt embedded in the filter.
- Clean the filter with low pressure compressed air if it has large particles or is not very dirty.

**Washing method:**

1. Prepare a solution of filter cleaner and water and soak the filter element about 15 minutes; refer to the directions on the filter cleaner carton for complete information.
2. After soaking the filter for 15 minutes, rinse it with clear water. The maximum water pressure must not exceed 40 psi to prevent damage to the filter element. Rinse the filter from the clean side to the dirty side.
3. Allow the filter to air dry before installing it in the sprayer.

**Compressed air method:**

1. Blow the compressed air from inside to the outside of the dry filter element. Keep the air hose nozzle at least 2 inches (6 cm) from the filter and move the nozzle up and down while rotating the filter element.

   **Important** To prevent damage to the filter element, do not exceed 25 psi air pressure.
2. Inspect for holes and tears by looking through the filter toward a bright light.

### Installing the Filter Element

1. If you are installing a new filter, inspect it for shipping damage. Check the sealing end of the filter.

   **Important** Do not install a damaged filter.
2. Insert the filter into the air cleaner body. Ensure that the filter is sealed properly by applying pressure to the outer rim of the filter when installing. Do not press on the flexible center of the filter.
3. Install the cover with the valve pointing down and secure the straps (Fig. 31).

## Servicing the Engine Oil

Change the engine oil and the oil filter after the first 50 operating hours and every 100 operating hours thereafter.

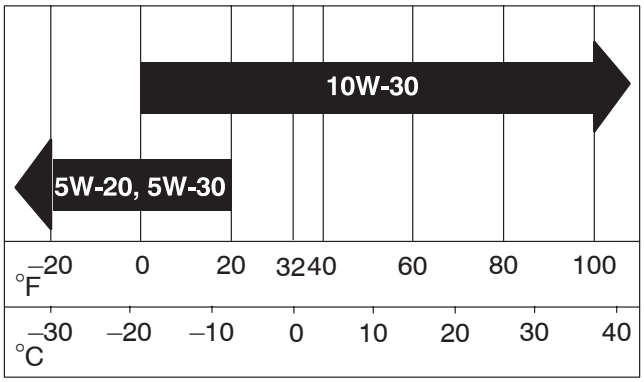
**Oil Type:** CH-4, CI-4, or higher

**Oil Filter Type:** Toro Part No. 104-5167

**Crankcase Capacity:** with filter, 4.9 qt. (4.7 l)

**Viscosity:** Refer to the following table.

**USE THESE SAE VISCOSITY OILS**




1. Start the engine and let it run for 5 minutes. This warms the oil so that it drains better.
2. Set the parking brake, stop the pump, stop the engine, and remove the ignition key.
3. Raise the seats.

**Caution**

**Components under the seats will be 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 oil drain plug (Fig. 32).

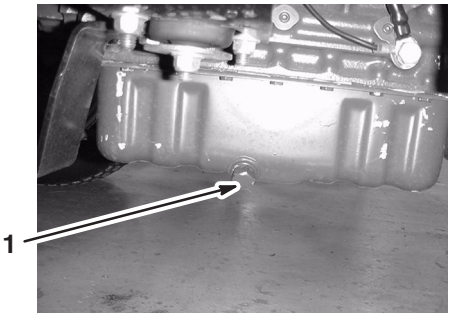



**Figure 32**

1. Oil drain plug

6. Place a separate pan under the oil filter.

7. Remove the old oil filter (Fig. 33).

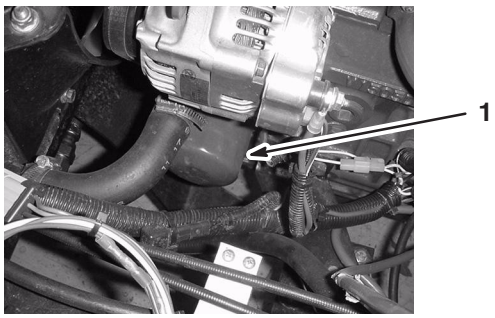



**Figure 33**

1. Oil filter

8. Wipe the filter adapter gasket surface.
9. Apply a thin coat of new oil to the rubber gasket on the replacement filter.
10. 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 (Fig. 33).

**Important** Do not over tighten the filter.

11. When the oil has drained completely, replace the oil drain plug and torque it to 10 ft-lb (13.6 N·m).
12. Dispose of the used oil and filter at a certified recycling center.
13. Remove the oil filler cap and slowly pour approximately 80% of the specified amount of oil into the oil filler tube (Fig. 34).

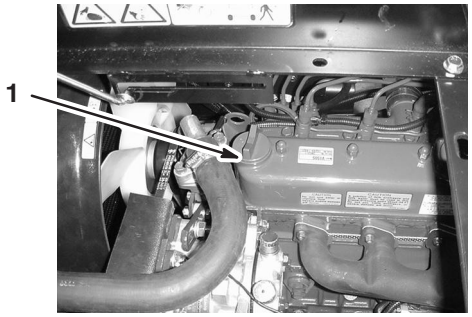



**Figure 34**

1. Oil filler cap

14. Check the oil level; refer to Checking the Engine Oil Level on page 12.
15. 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.

16. Replace the oil filler cap.

## Servicing the Fuel Tank

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 clean fuel to flush out the tank.

**Danger**

**Under certain conditions, diesel fuel and fuel vapors are highly flammable and explosive. A fire or explosion from fuel can burn you and others and can cause property damage.**

- **Use a funnel and fill the tank outdoors, in an open area, when the engine is off and is cold. Wipe up any fuel that spills.**
- **Do not fill the fuel tank completely full. Add fuel to the fuel tank until the level is 1 inch (25 mm) below the bottom of the filler neck. This empty space in the tank allows the fuel to expand.**
- **Never smoke when handling fuel, and stay away from an open flame or where fuel fumes may be ignited by a spark.**
- **Store fuel in a clean, safety-approved fuel container and keep the cap in place.**

## Checking the Fuel Line and Connections

Check the fuel lines and connections every 400 hours or yearly, whichever comes first. Inspect the lines and connections for deterioration, damage, or loose connections.

## Draining the Fuel Filter/Water Separator

Drain the water or other contaminants from the fuel filter/water separator daily.

1. Locate the fuel filter and place a clean container under it.
2. Loosen the drain plug on the bottom of the filter canister.
3. After draining the canister, tighten the plug.

   **Note:** Replace the filter canister after every 400 operating hours.
4. Clean the area where the filter canister is mounted.
5. Remove the filter canister and clean the mounting surface.

6. Lubricate the gasket on the filter canister with clean oil.
7. Install the filter canister by hand until the gasket contacts the mounting surface, then rotate the canister an additional 1/2 turn.

## Bleeding Air from the Injectors

You should perform this procedure only after you have purged the air in the system while you prime the engine and it does not start. Refer to Bleeding the System on page 18.

1. Loosen the pipe connection to the No. 1 nozzle and holder assembly.
2. Move the throttle to the Fast position.
3. Turn the key in the key switch to the Start position and watch the fuel flow around the connector. Turn the key to the Off position when you observe a solid flow of fuel.
4. Tighten the pipe connector securely.
5. Repeat this procedure for the remaining nozzles.

## Greasing the Sprayer

Lubricate all bearings and bushings after every 50 operating hours or once a year, whichever occurs first.

Grease Type: No. 2 general-purpose lithium base grease

1. Wipe the grease fitting clean so that foreign matter cannot be forced into the bearing or bushing.
2. Pump grease into the bearing or bushing.
3. Wipe off excess grease.

The grease fitting locations are in the positions illustrated in Figures 35 through 37.

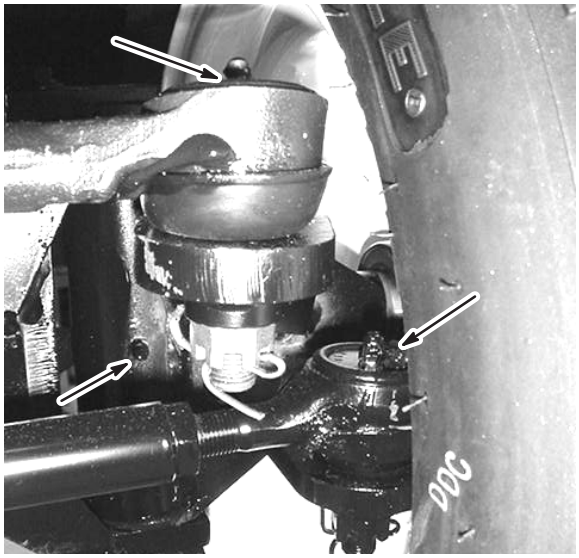


**Figure 35**

Three inside each front wheel

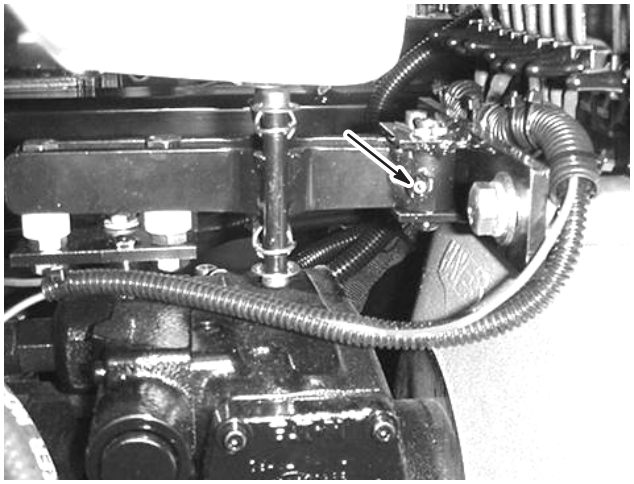


**Figure 36**

One on each side of the centering arm, between the tank and the engine compartment



**Figure 37**

One on the pump

**Note:** Add no more than 2 squirts of grease to the pump.

## Greasing the Boom Pivot Arms

The boom pivot arms are not greased at the time of factory assembly and must be greased before use.

Grease Type: No. 2 general-purpose lithium base grease.

1. Manually place grease on the support shaft and within the ball seat of the hinge plate as shown in Figure 1.
2. Pump grease into the fitting located below the spring until grease can be seen coming out of the bottom of the pivot assembly (Fig. 1).
3. Repeat the procedure for opposite pivot arm.

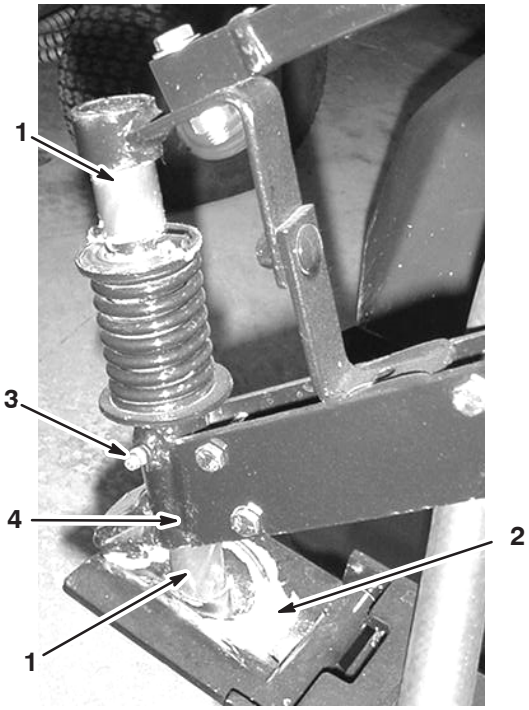



**Figure 38**

1. Support shaft
2. Ball seat of hinge plate
3. Grease fitting
4. Pivot assembly

**Note:** The left pivot arm is shown in the figure above.

# Replacing the Fuel Filters

The sprayer has 2 fuel filters, a fuel filter/water separator (located between the fuel pump and the carburetor) and an in-line filter (located between the fuel tank and the fuel pump). Replace the fuel filters after every 400 operating hours.

1. Set the parking brake, stop the pump, stop the engine, and remove the ignition key.
2. Clamp off the hose on either side of the in-line fuel filter to prevent fuel from pouring out of the hoses when you remove the filter.
3. Place a drain pan under the filter.
4. Loosen and slide the hose clamps away from the filter (Fig. 39).

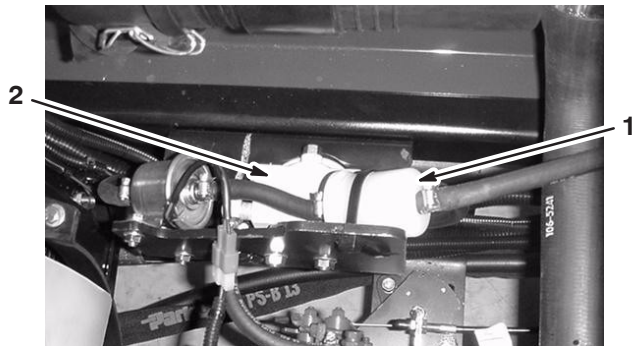



**Figure 39**

1. In-line fuel filter
2. Fuel filter/water separator

5. Remove the filter from the fuel lines.
6. Install a new filter and move the hose clamps close to the filter.

   **Note:** Ensure that the flow direction arrow points toward the engine.

# Servicing the Cooling System

Clean the radiator fins of all debris using low-pressure compressed air or a soft brush every 200 operating hours. Clean them more often if needed. Also check all coolant hoses and replace any that are worn, leaking, or damaged.

**Important** Do not spray water into a hot engine compartment.

**Important** Do not add coolant to an overheated engine until the engine has fully cooled. Adding coolant to an overheated engine may crack the engine block.

Check the engine coolant as directed by the manufacturer every 400 operating hours and change it as needed. Use 5.8 qt. (5.4 l) of a solution of 50% water and 50% permanent ethylene glycol antifreeze.

1. Position the sprayer on a level surface, set the parking brake, stop the pump, stop the engine, and remove the ignition key.

**Caution**

**If the engine has been running, the coolant may be hot and pressurized. If you open the radiator cap when the coolant is hot, it could spray out and severely burn you or bystanders.**

**Allow the engine to cool for at least 15 minutes before opening the radiator cap. The radiator cap must be cool to the touch.**

2. When the engine is cool, remove the radiator cap (Fig. 40).




**Figure 40**

1. Radiator cap

3. Place a large drain pan under the radiator.
4. Open the drain (Fig. 41) and drain the coolant into the pan.




**Figure 41**

1. Radiator drain

5. Close the drain.
6. Remove the radiator cap.
7. Slowly fill the radiator with coolant to approximately 1 inch (2.5 cm) below the sealing surface of the cap.

   **Note:** This will allow for the coolant to expand without it overflowing while the engine is warming up.
8. Use enough coolant to fill the engine and the system lines.
9. Start the engine with the cap loosely on the radiator.
10. Allow the engine to warm up until the thermostat opens.

    **Note:** This usually occurs between 175° and 190° F.

**Caution**

**As the engine continues to run, the coolant will become hot and pressurized. If you open the radiator cap when the coolant is hot, it could spray out and severely burn you or bystanders.**

**Wear protective clothing and avoid contact with hot coolant as you open the radiator cap.**

11. Once the coolant has warmed up, top off the coolant level to the sealing surface of the cap and tighten the cap.
12. Open the recovery bottle cap and fill with coolant to the Cold position after you tighten the radiator cap.
13. Check the coolant levels after several shut down and start up cycles and top off the coolant as needed.

**Caution**

**If the engine has been running, the coolant may be hot and pressurized. If you open the radiator cap when the coolant is hot, it could spray out and severely burn you or bystanders.**

**Allow the engine to cool for at least 15 minutes before opening the radiator cap. The radiator cap must be cool to the touch.**

# Servicing the Hydraulic Oil

Replace the hydraulic oil filter after the first 8 operating hours and replace the hydraulic oil and filter every 400 hours thereafter.

If the oil becomes contaminated, contact an Authorized Toro Distributor to have the system flushed.

**Note:** Contaminated oil looks milky or black when compared to clean oil.

## Replacing the Hydraulic Oil Filter

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

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

**Warning**

**Hot hydraulic fluid can cause severe burns.**

**Allow the hydraulic oil to cool before performing any maintenance to the hydraulic system.**

1. Position the sprayer on a level surface, set the parking brake, stop the pump, stop the engine, and remove the ignition key.
2. Clean the area around the filter mounting area (Fig. 42).

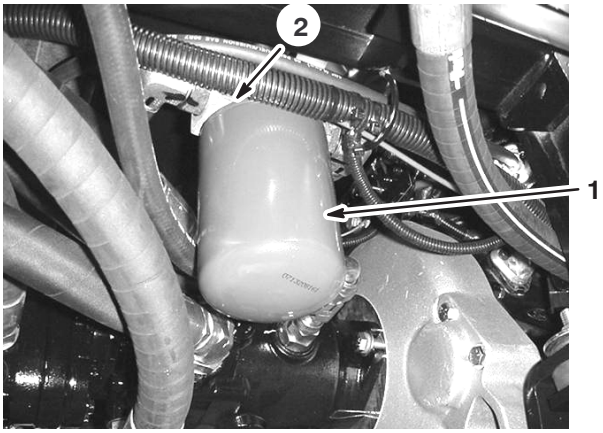



**Figure 42**

1. Hydraulic filter
2. Gasket

3. Place a drain pan under the filter.
4. Remove the filter (Fig. 42).
5. Lubricate the new filter gasket (Fig. 42).
6. Ensure that the filter mounting area is clean.
7. Screw the new 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. Stop the engine, check the hydraulic oil level, and check for leaks.
10. Dispose of the used filter at a certified recycling center.

## Changing the Hydraulic Oil

Use 12 US gallons (45.4 l) of Mobil 424 hydraulic oil or equivalent.

**Warning**

**Hot hydraulic fluid can cause severe burns.**

**Allow the hydraulic oil to cool before performing any maintenance to the hydraulic system.**

1. Replace the hydraulic oil filter; refer to Replacing the Hydraulic Oil Filter on page 35.
2. Clean the area around one hydraulic hose fitting on the bottom of the hydraulic oil tank (Fig. 43).

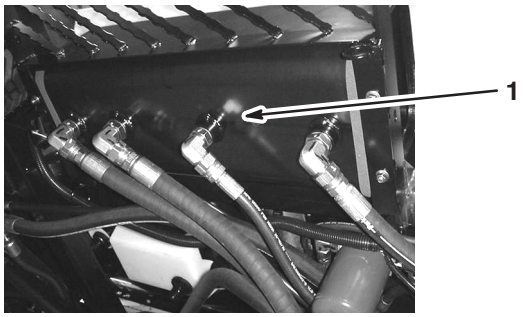



**Figure 43**

1. Hydraulic hose and fitting

3. Place a large pan under the fitting.
4. Remove the hose fitting from the tank, allowing the oil to drain into the pan (Fig. 43).
5. Install the hose and fitting to the tank and tighten it securely.
6. Fill the hydraulic reservoir with approximately 12 US gallons (45.4 l) of Mobil DTE 15M hydraulic oil or equivalent.
7. Start the machine and run it at idle for 3 to 5 minutes to circulate the fluid and remove any air trapped in the system.
8. Stop the engine, check the hydraulic oil level, and check for leaks.
9. Dispose of the used oil at a certified recycling center.

## 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 pin hole leaks or nozzles that eject high pressure hydraulic fluid.**
- **Use cardboard or paper to find hydraulic leaks.**
- **Safely relieve all pressure in the hydraulic system before performing any work on the hydraulic system.**
- **Get immediate medical help if fluid is injected into skin.**

# Changing the Planetary Gearbox Fluid

Change the planetary gearbox fluid in each rear wheel after the first 8 hours and then after every 400 hours thereafter.

Use high quality, SAE 85W-140 weight gear lube.

1. Position the sprayer on a level surface with the rear wheels positioned for draining as illustrated in Figure 44.

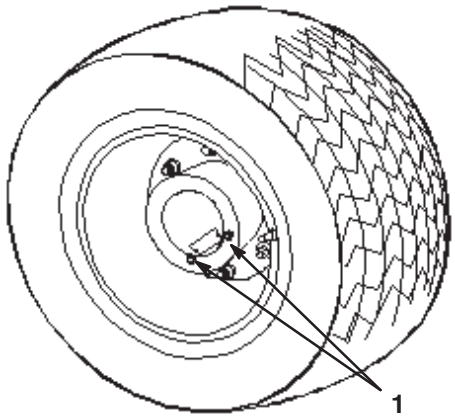



**Figure 44**

1. Drain plugs, positioned for draining

2. Set the parking brake, stop the pump, stop the engine, and remove the ignition key.

3. Place a pan under the drain plugs and remove them from the wheel (Fig. 44).

4. Place a pan under the inner drain plug and remove it (Fig. 45).

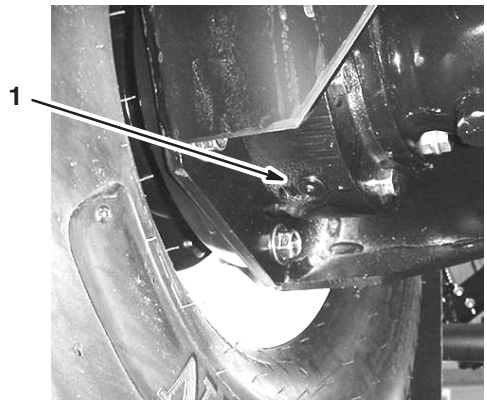



**Figure 45**

1. Inner drain plug

5. When all fluid has drained, replace the inner drain plug.

6. Move the vehicle slowly until the wheel is positioned for filling as illustrated in Figure 46.

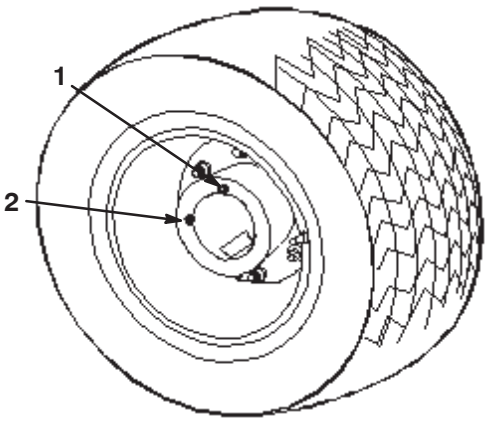



**Figure 46**

1. Upper hole, add fluid here 2. Lower hole

7. Set the parking brake, stop the pump, stop the engine, and remove the ignition key.

8. Pour SAE 85W-140 weight gear lube into the upper hole until it begins to come out of the lower hole.

9. Replace and tighten all drain plugs.

10. Repeat steps 1 through 9 for the other rear wheel.

11. Dispose of the used oil at a certified recycling center.

# Adjusting the Brakes

Check the brake adjustment daily. If the brake pedal travels more than 1 inch (2.54 cm) before you feel resistance, adjust the brakes.

1. Position the sprayer on a level surface, stop the pump, stop the engine, and remove the ignition key.

2. Set the parking brake.

3. Put the blocks under the wheels to prevent the machine from rolling.

4. Release the parking brake.

5. Loosen the front nuts on the brake cables under the front end of the sprayer (Fig. 47).

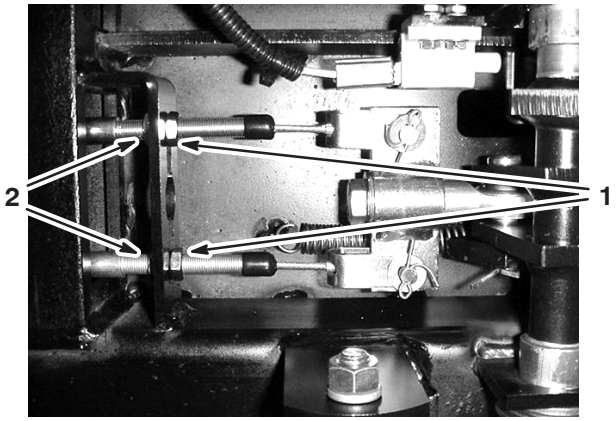



**Figure 47**

1. Front nuts 2. Rear nuts

6. Tighten the rear nuts equally until the brake pedal moves between 1/2 to 1 inch (1 to 2 cm) before you feel resistance (Fig. 47).

**Important** Ensure that you tighten both rear nuts equally so that the threaded ends of the brake cables in front of the front nuts are the same length.

7. Tighten the front nuts.

# Adjusting the Throttle Lever Tension

1. Position the sprayer on a level surface, set the parking brake, stop the pump, stop the engine, and remove the ignition key.

2. Adjust the high-speed position by loosening the nuts on the throttle cable at the mounting plate and adjusting it so that the throttle lever is within 1/16 inch (1.5 mm) from the front end of the slot in the console when the engine throttle arm hits the high-speed stop (Fig. 48).

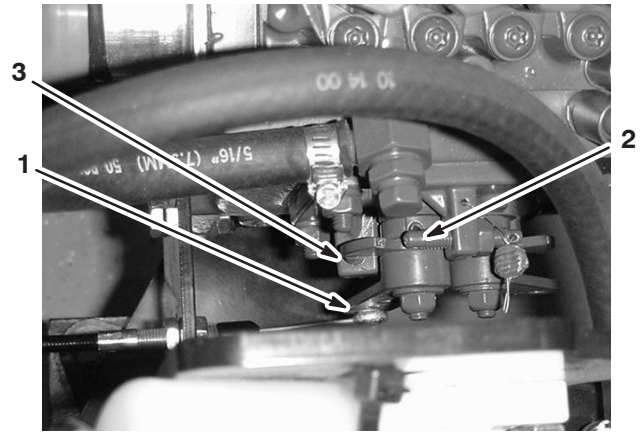



**Figure 48**

1. Engine throttle arm
2. Stop (high speed)
3. Stop (low idle)

3. Adjust the low idle by loosening the 2 bolts that mount the cable assembly to the center console (Fig. 49) and locating the cable assembly so that the throttle lever is within 1/16 inch (1.5 mm) of the rear end of the slot in the console when the engine throttle arm hits the low-idle stop (Fig. 48).

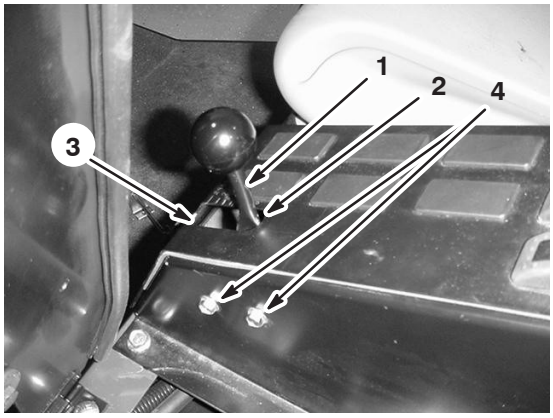



**Figure 49**

1. Throttle lever
2. Rear end of the slot
3. Front end of the slot
4. Bolts

4. Tighten the bolts.

# Adjusting the Front Wheel Toe-in

Check the front wheel toe-in after every 200 operating hours, or annually, whichever occurs first. The toe-in should be 1/8 to 1/4 inch (3 to 6 mm).

1. Check and fill all tires; refer to Checking Tire Pressure on page 13.
2. Measure the distance between both of the front tires at the axle height at both the front and rear of the front tires (Fig. 50).

   The front of the tires should be 1/8 to 1/4 inch (3 to 6 mm) less than the back side of the front tires.

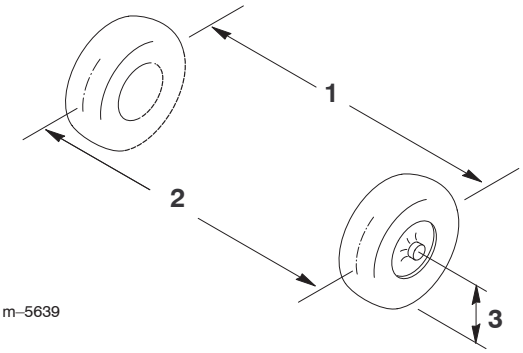



**Figure 50**

1. Tire center line—back
2. Tire center line—front
3. Axle center height

3. If the measurement does not fall within the specified range, loosen the jam nuts at both ends of the tie rod (Fig. 51).

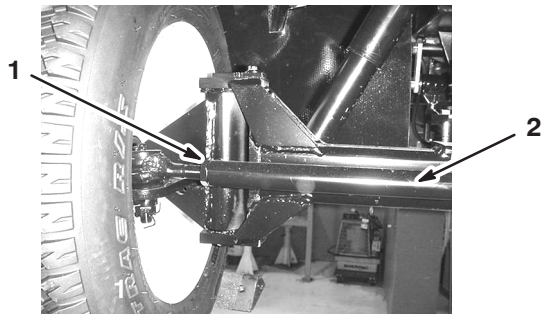



**Figure 51**

1. Jam nut
2. Tie rod

4. Rotate the tie rod to move the front of the tire inward or outward.
5. Tighten the tie rod jam nuts when the adjustment is correct.
6. Ensure that there is full travel of the steering wheel in both directions.

## Servicing the Drive Belts

Check the condition and tension of the alternator/cooling fan belt after every 100 operating hours. Replace the belt as necessary.

1. Position the sprayer on a level surface, set the parking brake, stop the pump, stop the engine, and remove the ignition key.
2. Check the tension by depressing the belt midway between the alternator and the crankshaft pulleys with 22 lb (10 kg) of force.

   **Note:** The belt should deflect 0.39 to 0.47 inches (10 to 12 mm). If the deflection is not correct, go to step 3. If it is correct, you may skip the remainder of this procedure and resume operating the sprayer.
3. Loosen the bolts that secure the brace to the engine and the bolt that secures the alternator to the brace (Fig. 52).

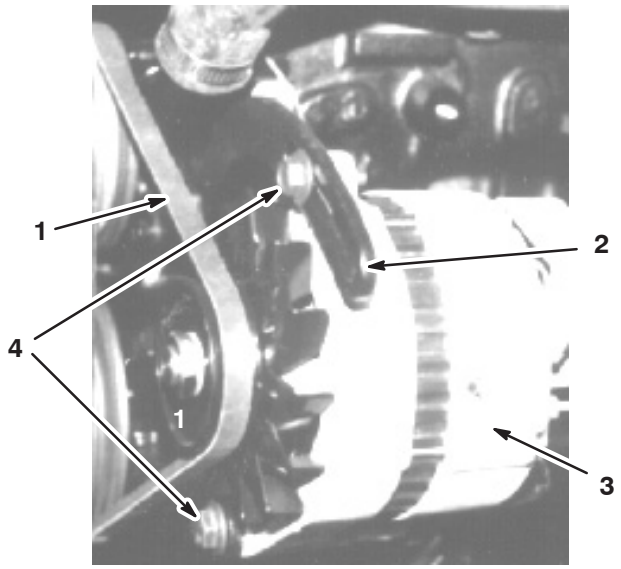



**Figure 52**

1. Alternator belt
2. Brace
3. Alternator
4. Bolts

4. Insert a pry bar between the alternator and the engine and pry on the alternator.
5. When you achieve the proper tension, tighten the alternator and the bolts to secure the adjustment.
6. Tighten the locknut to secure the adjustment.

## Replacing the Fuses

There are 4 fuses and 4 empty slots in the electrical system located beneath the driver seat (Fig. 53).

| | |
|---|---|
| Main electrical system | 15 amp |
| Speed control | 10 amp |
| Headlights | 10 amp |
| Spray system | 15 amp |

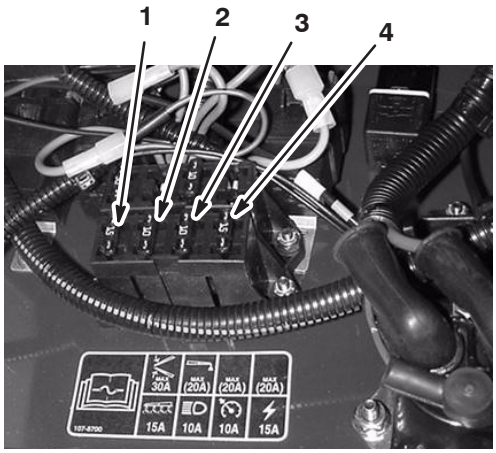



**Figure 53**

1. Spray system
2. Speed control
3. Headlights
4. Main electrical system

## 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.***

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 volts with 690 cold cranking Amps at 0° F (-18° C)

## Removing the Battery

1. Position the sprayer on a level surface, set the parking brake, stop the pump, stop the engine, and remove the ignition key.
2. Remove the battery retainer and fasteners (Fig. 54).




**Figure 54**

1. Battery
2. Battery retainer

3. Disconnect the negative (black) ground cable from the battery post.

**Warning**

**Incorrectly routing the battery cable 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 retainer in place to protect and secure the battery.**

4. Disconnect the positive (red) cable from the battery post.
5. Remove the battery.

## Installing the Battery

1. Set the battery on the battery box so that the battery posts are toward the back of the sprayer.
2. Connect the positive (red) cable to the positive (+) battery post and the negative (black) cable to the negative (–) battery post using the bolts and nuts. Slide the rubber boot over both battery posts.
3. Install the battery retainer and secure it with the fasteners you removed previously (Fig. 54).

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

## Charging the Battery

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

1. Remove the battery from the chassis; refer to Removing the Battery on page 40.
2. Connect a 3 to 4 amp battery charger to the battery posts. Charge the battery at a rate of 3 to 4 amperes for 4 to 8 hours (12 volts). **Do not overcharge the battery.**

**Warning**

**Charging the battery produces gasses that can explode.**

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

3. Install the battery in the chassis; refer to Installing the Battery on page 40.

## 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.

# Cleaning the Suction Strainer

Clean the suction strainer daily. If you are using wettable powders, clean it after every tank.

1. Position the sprayer on a level surface, set the parking brake, stop the pump, stop the engine, and remove the ignition key.
2. Remove the retainer from the red fitting attached to the large hose on the top of the tank (Fig. 55).

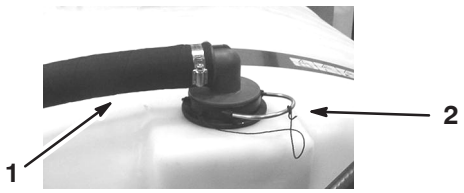



**Figure 55**

1. Suction hose
2. Retainer

3. Disconnect the hose from the tank (Fig. 55).
4. Pull the suction strainer out of the hole (Fig. 56).

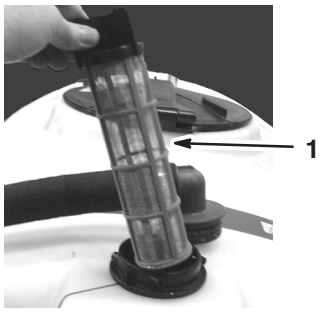



**Figure 56**

1. Suction strainer

5. Clean the suction strainer with clean running water.
6. Replace the suction strainer, seating it fully into the hole.
7. Connect the hose to the top of the tank and secure it with the retainer.

# Adjusting the Extension Booms

The electric lift on each extension boom adjusts the boom position. To ensure trouble-free operation, you must not allow the extension boom structure to contact any other portion of the boom structure during operation.

You must allow the actuator to travel its full stroke and be stopped by its own internal limits.

When the boom is fully upright, ensure that the ball support structure on the boom does not contact the center boom cut out. There should be a gap equal to the thickness of a 12-gauge piece of steel (0.106 inch or 3 mm) between these two components (Fig. 57).

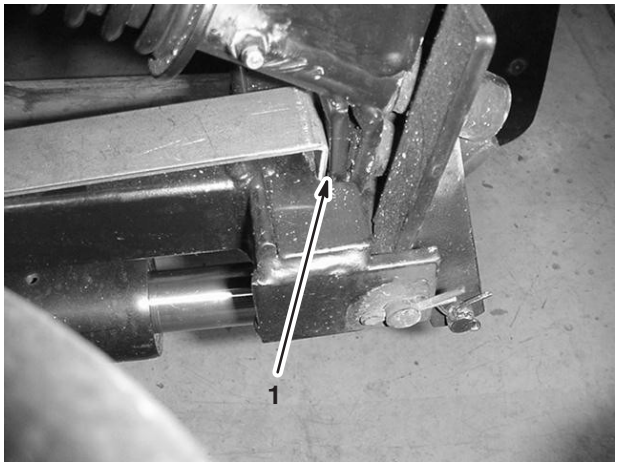



**Figure 57**

1. 12-gauge steel shim

To ensure this gap, adjust the boom as follows:

1. Set the boom in the horizontal position.
2. Rotate the adjustment nut until it is as close to the clevis as possible.
3. Snug the clevis into position by tightening the jam nut.
4. Engage the electric lift to raise the boom to the fully upright position.

   **Note:** The actuator must be fully extended at this point (at the end of its travel, a clutch will disengage and you will hear clicking if the power is held on to the actuator).
5. Insert a strip of 12-gauge steel stock between the ball support and the cutout on the center boom.
6. Loosen the jam nut and rotate the adjustment nut to bring the ball support into contact with the 12-gauge sheet stock shim and the cutout on the center boom.
7. Tighten the jam nut.
8. Remove the sheet stock shim.
9. Move the boom throughout its length of travel.

   **Note:** Ensure that no part of the boom assembly contacts any objects that may impede the boom travel.

   **Note:** When you complete the adjustment, ensure that the axis of the clevis pin is horizontal.

**Note:** The extension boom nozzles must be spaced 20 inches apart. Verify this spacing and adjust the nozzles if necessary.

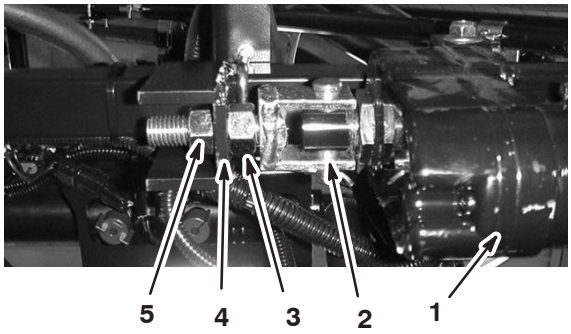



**Figure 58**

1. Actuator
2. Clevis assembly
3. Adjustment nut
4. Frame plate
5. Jam nut

## Adjusting the Boom Bypass Valves

### Operating without the Pro Control

Adjust the boom bypass valves so that the pressure and application rate remains the same for all booms when you turn one or more booms off. Refer to your sprayer *Operator's Manual* for a procedure specific to your sprayer model.

### Operating with the Pro Control

Shut off all the bypass valves by turning the handle clockwise (as viewed from the bottom) until it stops.

## Stowing the Boom Extensions

Use the boom restraints to lock the boom extensions in the X position when you are not spraying.

1. Pivot the left boom extension into the upright position.

**Important** Do not force the boom extension past the restraint hook when stowing or you may damage the extension and nozzles.

2. Push up on the right restraint knob to compress the spring and extend the hook.
3. With the spring compressed, rotate the hook to catch the boom extension frame.
4. Release the knob allowing the hook to catch the boom extension frame and secure it to the boom holder.
5. Repeat steps 1 through 4 with the right boom extension and left boom holder.

# Storage

1. Position the sprayer on a level surface, set the parking brake, stop the pump, stop the engine, and remove the ignition key.
2. Clean dirt and grime from the entire machine, including the outside of the engine 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 the Sprayer, page 24.
4. Add a rust inhibiting, nonalcohol-based, RV antifreeze solution to the system and run the pump for a few minutes to circulate it through the system, then drain the spray system as completely as possible.
5. Check the brakes; refer to Checking the Brakes on page 15.
6. Service the air cleaner; refer to Servicing the Air Cleaner on page 29.
7. Seal the air cleaner inlet and the exhaust outlet with waterproof tape.
8. Grease the sprayer; refer to Greasing the Sprayer on page 32.
9. Change the engine oil; refer to Servicing the Engine Oil on page 30.
10. Check the tire pressure; refer to Checking the Tire Pressure on page 13.
11. For storage over 30 days, prepare the fuel system as follows:
    A. Start the engine and run it at idle speed for approximately 2 minutes.
    B. Stop the engine.
    C. Flush the fuel tank with fresh, clean fuel.
    D. Secure all the fuel system fittings.
12. Use the electric starter to crank the engine and distribute the oil inside the cylinder.
13. Remove the battery from the chassis and charge it fully; refer to Servicing the Battery on page 39.

**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 32°F (0°C). A fully charged battery maintains its charge for about 50 days at temperatures lower than 40°F (4°C).

**14.** Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged.

**15.** Check the condition of all spray hoses, replacing any that are damaged or worn.

**16.** Tighten all hose fittings.

**17.** Paint all scratched or bare metal surfaces with paint available from an Authorized Service Dealer.

**18.** Store the machine in a clean, dry garage or storage area.

**19.** Remove the ignition key and put it in a safe place out of the reach of children.

**20.** Cover the machine to protect it and keep it clean.

**21.** To re-start the sprayer after it has been in storage, refer to “Pre-Starting Checks on page 18 and Starting the Engine on page 18.

# Troubleshooting

## Troubleshooting the Engine and Vehicle

| Problem | Possible Causes | Corrective Action |
|---|---|---|
| The starter does not crank. | 1. The traction pedal is not in the Neutral position. | 1. Release the traction pedal. |
| | 2. The electrical connections are corroded or loose. | 2. Check the electrical connections for good contact. |
| | 3. A fuse is blown or loose. | 3. Correct or replace the fuse. |
| | 4. The battery is discharged. | 4. Charge or replace the battery. |
| | 5. The safety interlock system is malfunctioning. | 5. Contact an Authorized Service Dealer. |
| | 6. A broken starter or starter solenoid. | 6. Contact an Authorized Service Dealer. |
| | 7. Internal engine components have seized. | 7. Contact an Authorized Service Dealer. |
| The engine cranks but will not start. | 1. The fuel tank is empty. | 1. Fill the tank with fresh fuel. |
| | 2. There is dirt, water, or stale fuel in the fuel system. | 2. Drain and flush the fuel system, then add fresh fuel. |
| | 3. There is air in the fuel system. | 3. Bleed the fuel system. |
| | 4. The fuel line is clogged. | 4. Clean or replace the fuel line. |
| | 5. The fuel filter is clogged. | 5. Replace the fuel filter. |
| | 6. The injection nozzle is clogged. | 6. Repair or replace the injection nozzle. |
| | 7. The injection pump is malfunctioning. | 7. Replace the injection pump. |
| | 8. The fuel has a high viscosity or the engine oil temperature is low. | 8. Use the specified fuel and engine oil. |
| | 9. The fuel has a low cetane number. | 9. Use the specified fuel. |
| | 10. The injection timing is incorrect. | 10. Contact an Authorized Service Dealer. |
| | 11. The ETR/run solenoid is not energized. | 11. Contact an Authorized Service Dealer. |

| Problem | Possible Causes | Corrective Action |
|---|---|---|
| The engine starts but does not keep running | 1. The fuel tank vent is restricted. | 1. Replace the fuel cap. |
| | 2. There is dirt or water in the fuel system. | 2. Drain and flush the fuel system, than add fresh fuel. |
| | 3. The fuel filter is clogged. | 3. Replace the fuel filter. |
| | 4. The air cleaner is clogged. | 4. Replace the air cleaner. |
| | 5. There is a fuel leak due to a loose injection pipe retaining nut. | 5. Tighten the injection pipe retaining nut. |
| | 6. The injection pump is malfunctioning. | 6. Replace the injection pump. |
| | 7. The nozzle injection pressure is incorrect. | 7. Adjust the nozzle injection pressure. |
| | 8. The injection nozzle is stuck or is clogged. | 8. Repair or replace the injection nozzle. |
| | 9. There are loose wires or poor connections. | 9. Check and tighten the wire connections. |
| The engine will not idle. | 1. The fuel tank vent is restricted. | 1. Replace the fuel cap. |
| | 2. There is dirt, water, or stale fuel in the fuel system. | 2. Drain and flush the fuel system, then add fresh fuel. |
| | 3. The idle speed adjusting screw is incorrectly set. | 3. Contact an Authorized Service Dealer. |
| | 4. The air cleaner element is dirty. | 4. Clean or replace the air cleaner element. |
| | 5. The fuel pump is broken. | 5. Contact an Authorized Service Dealer. |
| | 6. There is low compression. | 6. Contact an Authorized Service Dealer. |
| | 7. The injection pump is malfunctioning. | 7. Replace the injection pump. |
| | 8. The nozzle injection pressure is incorrect. | 8. Adjust the nozzle injection pressure. |
| | 9. The injection nozzle is stuck or is clogged. | 9. Repair or replace the injection nozzle. |
| The engine overheats. | 1. The crankcase oil level is incorrect. | 1. Fill or drain to the full mark. |
| | 2. The load is excessive. | 2. Reduce the load; use a lower ground speed. |
| | 3. The radiator is dirty. | 3. Clean the radiator with every use. |
| | 4. The coolant is low. | 4. Add coolant. |

| Problem | Possible Causes | Corrective Action |
|---|---|---|
| The engine loses power. | 1. The air cleaner element is dirty. | 1. Clean or replace the air cleaner element. |
| | 2. The crankcase oil level is incorrect. | 2. Fill or drain the oil to the full mark. |
| | 3. There is dirt, water, or stale fuel in the fuel system. | 3. Drain and flush the fuel system, then add fresh fuel. |
| | 4. The engine is overheated. | 4. See “The engine overheats” section. |
| | 5. The vent hole in the fuel tank vent fitting is plugged. | 5. Replace the fuel cap. |
| | 6. There is low compression. | 6. Contact an Authorized Service Dealer. |
| | 7. The injection timing is incorrect. | 7. Adjust the injection timing. |
| The sprayer will 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 sprayer will not operate in either direction. | 1. The parking brake was not released or the parking brake is not releasing. | 1. Release the parking brake or check the linkage. |
| | 2. The control linkage needs adjustment or replacement. | 2. Contact an Authorized Service Dealer. |
| | 3. The transmission is broken. | 3. Contact an Authorized Service Dealer. |
| | 4. The drive shaft or wheel hub key is damaged. | 4. Contact an Authorized Service Dealer. |
| There is an abnormal vibration or noise. | 1. The engine mounting bolts are loose. | 1. Tighten the engine mounting bolts. |

# Troubleshooting the Spray System

| Problem | Possible Causes | Corrective Action |
|---|---|---|
| A boom section does not spray. | 1. The electrical connection on the boom valve is dirty or disconnected. | 1. Turn the valve off manually, disconnect the electrical connector on the valve, clean all leads, then connect the electrical connector. |
| | 2. A fuse is blown. | 2. Check the fuses and replace them as necessary. |
| | 3. A hose is pinched. | 3. Repair or replace the hose. |
| | 4. A boom bypass valve is improperly adjusted. | 4. Adjust the boom bypass valves. |
| | 5. A boom valve is damaged. | 5. Contact an Authorized Service Dealer. |
| | 6. The electrical system is damaged. | 6. Contact an Authorized Service Dealer. |
| A boom section does not turn off. | 1. The valve is damaged. | 1. Stop the spray system and pump, turn off the sprayer, remove the retainer from under the boom valve, pull out the motor and stem, inspect all parts, and replace any that are damaged. |
| A boom valve is leaking | 1. An O-ring has deteriorated. | 1. Stop the spray system and pump, turn off the sprayer, empty out the chemicals, rinse out the system, disassemble the valve, and replace the O-rings. |
| The pressure drops when you turn on a boom. | 1. The boom bypass valve is improperly adjusted. | 1. Adjust the boom bypass valve. |
| | 2. There is an obstruction in the boom valve body. | 2. Remove the inlet and outlet connections to the boom valve and remove any obstructions. |
| The pressure increases when you turn on a boom. | 1. A nozzle filter is clogged. | 1. Remove and clean all nozzles. |
| | 2. The boom bypass valve is improperly adjusted. | 2. Adjust the boom bypass valve. |

# The Toro General Commercial Products 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. Where a warrantable condition exists, we will repair the Product at no cost to you including diagnosis, labor, parts, and transportation. This warranty begins on the date the Product is delivered to the original retail purchaser.

* Product equipped with 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 800-982-2740
E-mail: commercial.service@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 express 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, modified, or unapproved accessories
- Product failures which result from failure to perform required maintenance and/or adjustments
- 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, blades, reels, bedknives, tines, spark plugs, castor wheels, tires, filters, belts, and certain sprayer components such as diaphrams, nozzles, and check valves, etc.
- Failures caused by outside influence. Items considered to be outside influence include, but are not limited to, weather, storage practices, contamination, use of unapproved coolants, lubricants, additives, or chemicals, etc.
- Normal "wear and tear" items. 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 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 factory remanufactured parts rather than new parts for some warranty repairs.

## 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 printed in your operator's manual 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. If all other remedies fail, you may contact us at Toro Warranty Company.

Part No. 374-0031 Rev. B