FORM NO. 3325-238 Rev A

TORO®

MODEL NO. 30821—200000001 & UP

OPERATOR'S MANUAL

GROUNDSMASTER® 3500-D

Foreword

The Groundsmaster 3500-D was developed to provide an efficient, reliable and time-saving method of mowing high-quality turf. The latest concepts in engineering and design have been incorporated into this machine along with the highest quality parts and workmanship. Excellent service will be derived if proper operation and maintenance practices are followed.

Safety, mechanical and some general information in this manual is emphasized. DANGER, WARNING and CAUTION identify safety messages. Whenever the triangular safety alert symbol appears, it is followed by a safety message that must be read and understood. For more complete details concerning safety, read the safety instructions on pages 3–5. IMPORTANT identifies special mechanical information and NOTE identifies general information worthy of special attention.

Whenever yo have questions or need service, contact your local authorized Toro Distributor. Besides having a complete line of accessories and professional turf care service technicians, the distributor has a complete line of genuine TORO replacement parts to keep your machine operating properly. Keep your TORO product all TORO. Buy genuine TORO parts and accessories.

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Safety

The Groundsmaster 3500-D was tested and certified by TORO for compliance with the B71.4-1999 specifications of the American National Standards Institute. Although hazard control and accident prevention partially are dependent upon the design and configuration of the machine, these factors are also dependent upon the awareness, concern, and proper training of the personnel involved in the operation, transport, maintenance, and storage of the machine. Improper use or maintenance by the operator or owner of the machine can result in injury. To reduce the potential for any injury, comply with the following safety instructions.

Supervisor's Responsibilities

1. Make sure operators are thoroughly trained and familiar with the operator's manual and all the labels on the machine.

2. Be sure to establish your own special procedures and work rules for unusual operating conditions (e.g., slopes too steep for machine operation. Survey the complete mowing site to determine the hills on which the machine can be safely operated. When performing this site survey, always use common sense and take into consideration the turf condition and the rollover risk.

To determine which hills or slopes on which the machine may be safely operated, use the inclinometer provided with each machine. To perform a site survey, lay a 1.25 meter board on the slope surface and measure the angle of the slope. The board will average the slope but will not take into consideration dips or holes. THE MAXIMUM SIDE HILL ANGLE SHOULD NOT BE GREATER THAN 25 DEGREES.

Before Operating

3. Operate the machine only after reading and understanding the contents of this manual and viewing the operator's training video supplied with the machine. A free replacement manual is available by sending complete model and serial number to:

The Toro Company
8111 Lyndale Ave. S.
Bloomington, MN 55420-1196.

4. Only trained operators, skilled in slope operation and who have read this manual and viewed the operator's training video should operate the machine. Never allow children to operate the machine or adults to operate it without proper instructions.

5. Become familiar with the controls and know how to stop the machine and engine quickly.

6. Do not carry passengers on the machine. Keep everyone, especially children and pets, away from the areas of operation.

7. Keep all shields, safety devices and decals in place. If a shield, safety device or decal is damaged, malfunctioning or illegible, repair or replace it before operating the machine.

8. Always wear substantial shoes. Do not operate machine while wearing sandals, tennis shoes or sneakers. Do not wear loose fitting clothing because it could get caught in moving parts and possibly cause personal injury.

9. Wearing safety glasses, safety shoes, long pants and a helmet is advisable and required by some local ordinances and insurance regulations.

10. Make sure the work area is clear of objects which might be picked up and thrown by the blades.

11. Fill fuel tank with diesel fuel before starting engine. Avoid spilling any fuel. Since fuel is highly flammable, handle it carefully.

A. Use an approved fuel container.

B. Do not remove cap from fuel tank when engine is hot or running.

C. Do not smoke while handling diesel fuel.

D. Fill fuel tank outdoors and not over one inch from the top of the tank, (bottom of the filler neck). Do not overfill.

While Operating

12. Always wear your seat belt.

13. Do not run the engine in a confined area without adequate ventilation. Exhaust fumes are hazardous and could be deadly.

14. Sit on the seat when starting and operating the machine.

15. Check interlock switches daily for proper operation (Refer To *Checking Interlock Switches*). Do not rely entirely on safety switches -shut off engine before getting off seat. If a switch fails, replace it before operating the machine. The interlock system is for your protection, so do not bypass it. Replace all interlock switches every two years.

16. The operator must be skilled and trained in how to drive on hillsides. Failure to use caution on slopes or hills may cause vehicle to tip or roll, possibly resulting in personal injury or death.

17. This triplex mower has a unique drive system for superior traction on hills. The uphill wheel will not spin out and limit traction like conventional triplexes. If operated on a side hill that is too steep, rollover may occur before losing traction.

18. Before backing up, look to the rear and assure no one is behind the machine. Watch out for traffic when near or crossing roads. Always yield the right of way.

19. Keep hands, feet and clothing away from moving parts and the mower discharge area.

20. The slope angle at which the machine will tip is dependent on many factors. Among these are mowing conditions such as wet or undulating turf, speed (especially in turns), position of the cutting units (with sidewinder), tire pressure and operator experience. At side hill slope angles of 20 degrees or less the risk of a rollover is low. As the slope angle increases to a Toro recommended maximum limit of 25 degrees the risk of a rollover increases to a moderate level. DO NOT EXCEED A 25 DEGREE SIDE HILL ANGLE BECAUSE THE RISK OF A ROLLOVER AND SERIOUS INJURY OR DEATH IS VERY HIGH. The Groundsmaster 3500-D is equipped with an angle indicator, mounted on the steering tube, which indicates the side hill angle the machine is operating on and identifies the recommended maximum limit of 25 degrees.

Stay alert for holes in terrain and other hidden hazards which can cause a sudden change in side hill angle. Use extreme caution when operating close to sand traps, ditches, creeks, steep hillsides or other hazards. Reduce speed when making sharp turns. Do not turn on hills. Avoid sudden stops and starts. Use reverse pedal for braking. Cutting units must be lowered when going down slopes for steering control.

21. When starting the engine:

A. Engage parking brake.

B. Be sure traction pedal is in neutral and blade drive is in disengage position.

C. After engine starts, release parking brake and keep foot off traction pedal. Machine must not move. If movement is evident, the neutral control linkage is incorrectly adjusted: therefore, shut engine off and adjust until machine does not move when traction pedal is released. Refer to Adjusting Transmission for Neutral.

22. This product may exceed noise levels of 85 dB(A) at the operator position. Ear protectors are recommended for prolonged exposure to reduce the potential of permanent hearing damage.

23. Raise the cutting units when driving from one work area to another.

24. Do not touch engine, muffler, exhaust pipe or hydraulic tank while engine is running or soon after it has stopped because these areas could be hot enough to cause burns.

25. If a cutting unit strikes a solid object or vibrates

abnormally, stop immediately. Turn engine off, wait for all motion to stop and inspect for damage.

26. Before getting off the seat:

A. Move traction pedal to neutral.

B. Set the parking brake.

C. Disengage the cutting units and wait for the blades to stop spinning.

D. Stop the engine and remove key from the ignition switch.

27. Whenever machine is left unattended, make sure, key is removed from ignition switch and parking brake is set.

Maintenance

28. Before servicing or making adjustments to the machine, stop the engine and remove key from switch to prevent accidental starting of the engine.

29. Check performance of all interlock switches daily. Do not defeat interlock system. It is for your protection. 30. To ensure entire machine is in good operating condition, frequently check and keep all nuts, bolts, screws and hydraulic fittings tight.

31. Make sure all hydraulic line connectors are tight, and all hydraulic hoses and lines are in good condition before applying pressure to the system.

32. Keep body and hands away from pin hole leaks or nozzles that eject hydraulic fluid under high pressure. Use paper or cardboard, not hands, to search for leaks. Hydraulic fluid escaping under pressure can have sufficient force to penetrate skin and do serious damage. If fluid is injected into the skin it must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result. 33. Before disconnecting or performing any work on the hydraulic system, all pressure in system must be relieved by stopping engine and lowering cutting units to the ground.

34. If major repairs are ever needed or if assistance is desired, contact an Authorized Toro Distributor.

35. To reduce potential fire hazard, keep the engine area free of excessive grease, grass, leaves and accumulation of dirt.

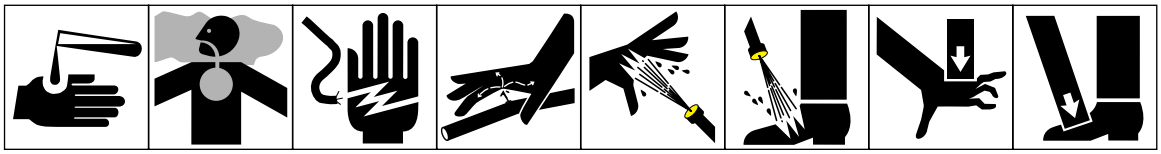
36. If the engine must be running to perform a maintenance adjustment, keep hands, feet, clothing, and any other parts of the body away from the cutting units and any moving parts. Keep everyone away.

37. Do not overspeed the engine by changing governor settings. To assure safety and accuracy, have an Authorized Toro Distributor check maximum engine speed with a tachometer.

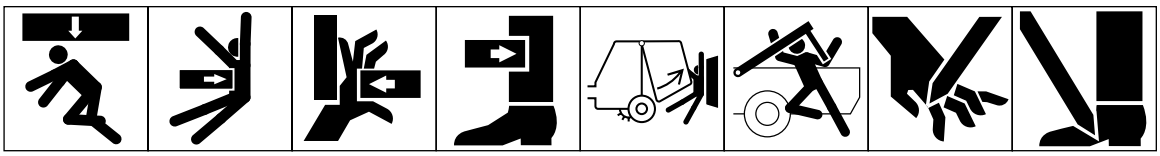
38. Engine must be shut off before checking oil or adding oil to the crankcase.

39. To insure optimum performance and safety, use genuine TORO replacement parts and accessories. Replacement parts and accessories made by other manufacturers could be dangerous, and such use could void the product warranty of The Toro Company.

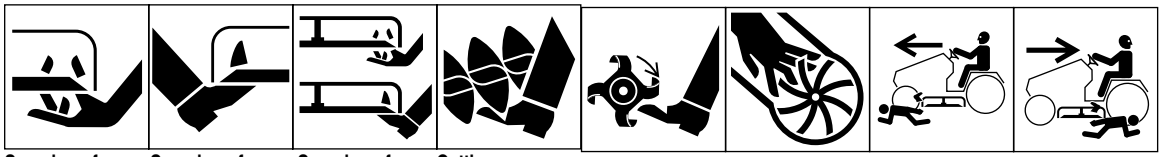
Symbol Glossary



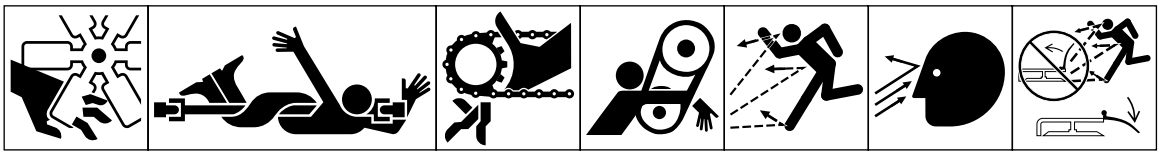
Caustic liquids, chemical burns to fingers or hand | Poisonous fumes or toxic gases, asphyxiation | Electrical shock, electrocution | High pressure fluid, injection into body | High pressure spray, erosion of flesh | High pressure spray, erosion of flesh | Crushing of fingers or hand, force applied from above | Crushing of toes or foot, force applied from above



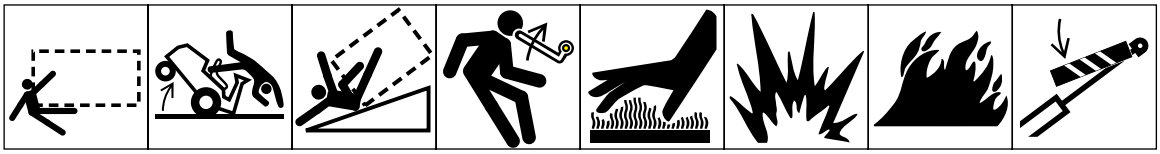
Crushing of whole body, applied from above | Crushing of torso, force applied from side | Crushing of fingers or hand, force applied from side | Crushing of leg, force applied from side | Crushing of whole body | Crushing of head, torso and arms | Cutting of fingers or hand | Cutting of foot



Severing of fingers or hand, mower blade | Severing of toes or foot, mower blade | Severing of toes or fingers, rotary mower blade | Cutting or entanglement of foot, rotating auger | Severing of foot, rotating knives | Severing of fingers or hand, impeller blade | Dismember-ment, front engine mower in forward motion | Dismember-ment, front engine mower in rearward motion

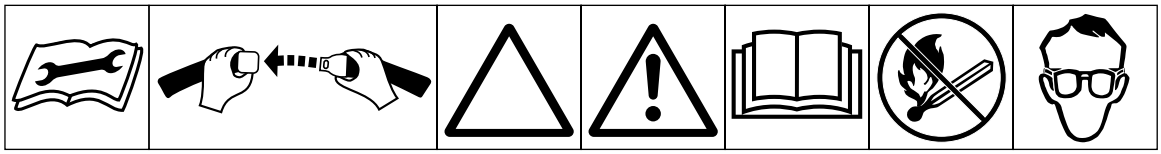


Severing of fingers or hand, engine fan | Whole body entanglement, implement input drive line | Fingers or hand entanglement, chain drive | Hand & arm entanglement, belt drive | Thrown or flying objects, whole body exposure | Thrown or flying objects, face exposure | Thrown or flying objects, rotary mover

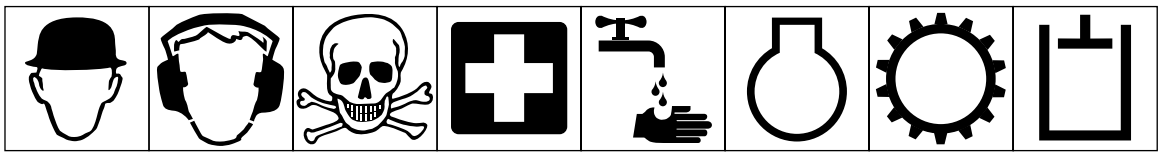


Runover/back-over, vehicle | Machine tipping, riding mower | Machine rollover, ROPS (rear engine mower) | Stored energy hazard, kickback or upward motion | Hot surfaces, burns to fingers or hands | Explosion | Fire or open flame | Secure lifting cylinder with locking device before getting in hazardous area

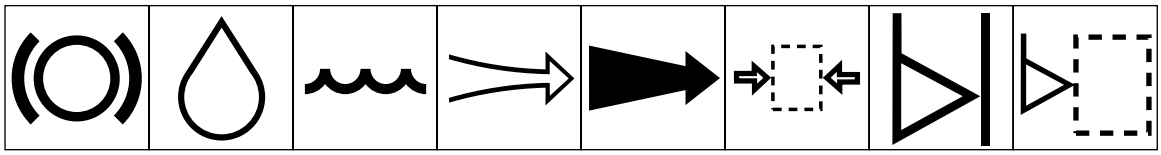
Stay a safe distance from the machine | Stay clear of articulation area while engine is running | Do not open or remove safety shields while engine is running | Do not step on loading platform if PTO is connect-ed to tractor & engine is running | Do not step | Wait until all machine comp-onents have completely stopped before touching them | Shut off engine & remove key before perform-ing maintenance or repair work | Riding on this machine is allowed only on a passen-ger seat & only if the driver's view is not hindered



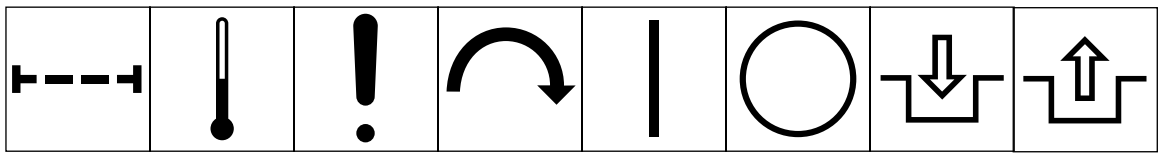
Consult technical manual for proper service procedures | Fasten seat belts | Safety alert triangle | Outline safety alert symbol | Read operator's manual | Fire, open light and smoking prohibited | Eye protection must be worn



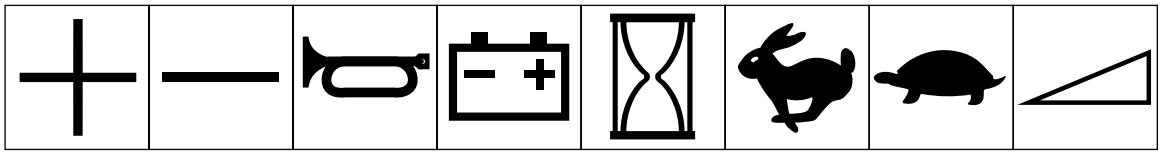
Head protection must be worn | Hearing protection must be worn | Caution, toxic risk | First aid | Flush with water | Engine | Transmission | Hydraulic system



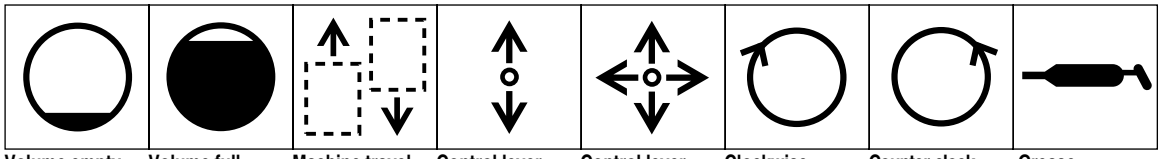
Brake system | Oil | Coolant (water) | Intake air | Exhaust gas | Pressure | Level indicator | Liquid level



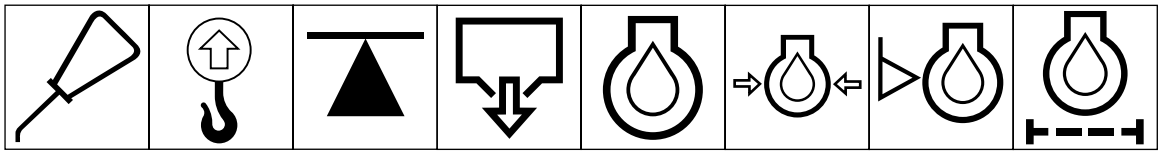
Filter | Temperature | Failure/ Malfunction | Start switch/ mechanism | On/start | Off/stop | Engage | Disengage



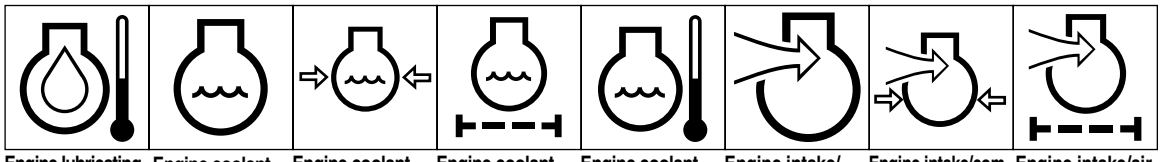
Plus/increase/ positive polarity | Minus/decrease/ negative polarity | Horn | Battery charging condition | Hourmeter/ elapsed operating hours | Fast | Slow | Continuous variable, linear



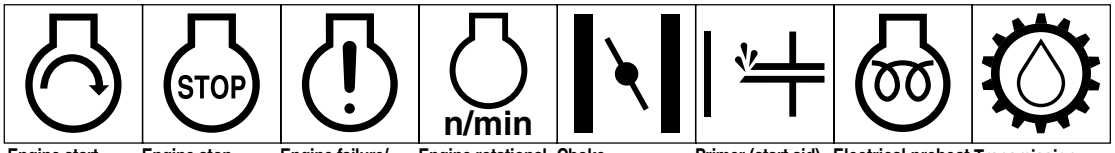
Volume empty | Volume full | Machine travel direction, forward/ rearward | Control lever operating direction, dual direction | Control lever operating direction, multiple direction | Clockwise rotation | Counter-clock-wise rotation | Grease lubrication point



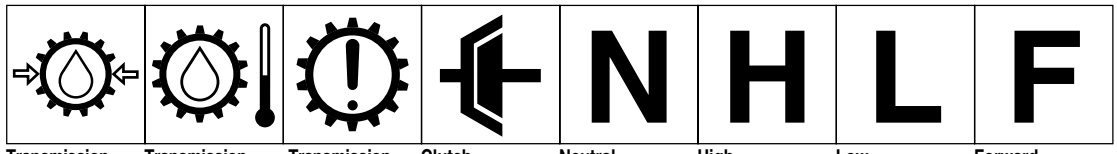
Oil lubrication point | Lift point | Jack or support point | Draining/ emptying | Engine lubricat-ing oil | Engine lubricating oil pressure | Engine lubricating oil level | Engine lubricating oil filter



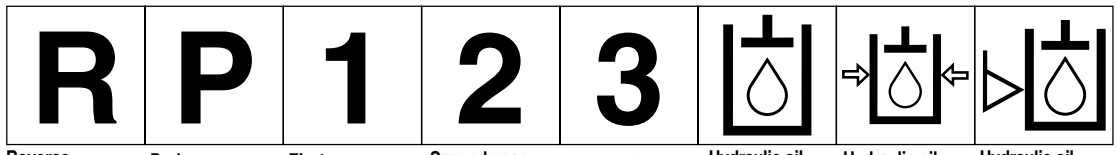
Engine lubricating oil temperature | Engine coolant | Engine coolant pressure | Engine coolant filter | Engine coolant temperature | Engine intake/ combustion air | Engine intake/com-bustion air pressure | Engine intake/air filter



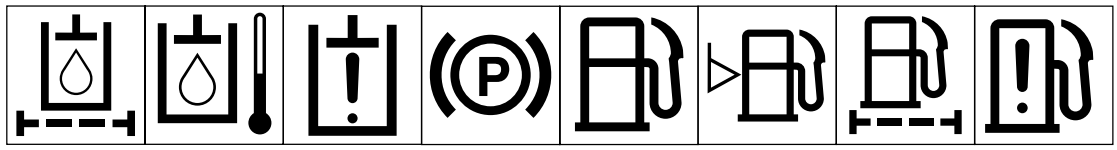
Engine start | Engine stop | Engine failure/ malfunction | Engine rotational speed/frequency | Choke | Primer (start aid) | Electrical preheat (low temperature start aid) | Transmission oil



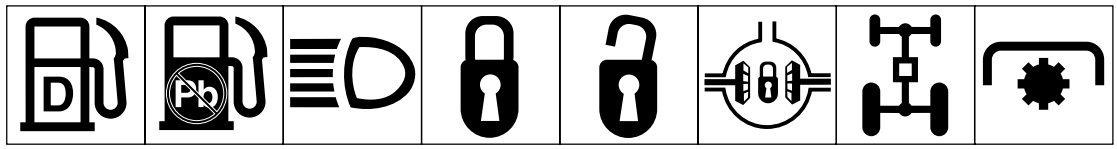
Transmission oil pressure | Transmission oil temperature | Transmission failure/malfunction | Clutch | Neutral | High | Low | Forward



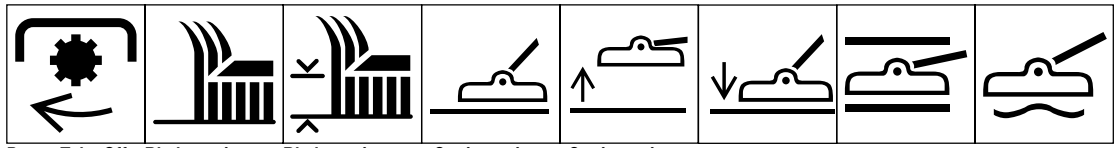
Reverse | Park | First gear | Second gear | Third gear (other #'s may be used until the maximum # of forward gears is reached.) | Hydraulic oil | Hydraulic oil pressure | Hydraulic oil level



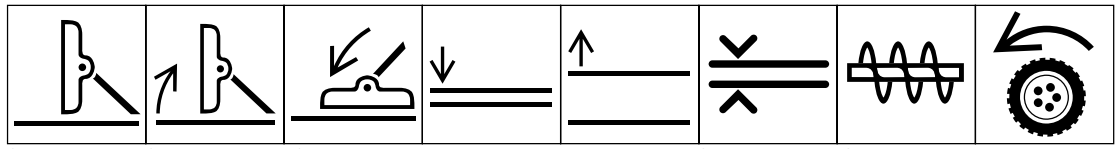
Hydraulic oil filter | Hydraulic oil temperature | Hydraulic oil failure/malfunction | Parking brake | Fuel | Fuel level | Fuel filter | Fuel system failure/malfunction



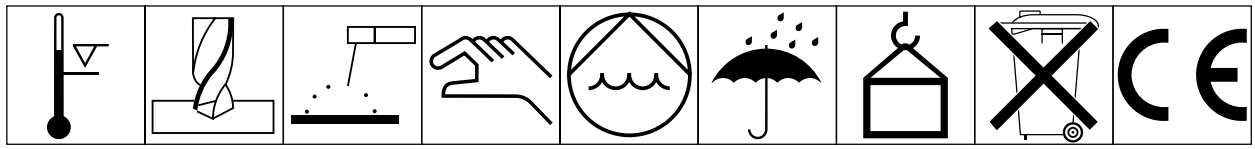
Diesel fuel | Unleaded fuel | Headlights | Lock | Unlock | Differential lock | 4-Wheel drive | Power Take-Off



Power Take-Off, rotational speed | Blade cutting element | Blade cutting element, height adjustment | Cutting unit | Cutting unit, raise | Cutting unit, lower | Cutting unit, hold | Cutting unit, float



Cutting unit, transport position | Cutting unit, raise to transport position | Cutting unit, lower to transport position | Attachment lower | Attachment raise | Spacing distance | Snow thrower, collector auger | Traction



Above working temperature range | Drilling | Manual metal arc welding | Manual | Water pump | Keep dry | Weight | Do not dispose in the garbage | CE logo

Specifications

Engine: Kubota three-cylinder, 4-cycle, liquid-cooled diesel engine. 23.9KW @ 2800 rpm. Governed to 3050 rpm. 68.5 cu. in. (1124 cc) displacement. Heavy-duty, 2-stage, remote-mounted air cleaner. High water temperature shutdown switch.

Cooling System: Radiator capacity is approximately 5.7 L of 50/50 mixture of ethylene glycol anti-freeze. Remote-mounted 0.9 L expansion tank.

Electrical: 12-volt Group 55, 585 cold cranking amps at 0°F (–18°C), 95-minute reserve capacity at 80°F (27°C). 40-amp alternator with regulator/ rectifier. Seat switch, PTO, parking brake and traction interlock switches.

Fuel Capacity: 41.6 liters.

Traction Drive: High-torque hydraulic wheel motors. 3-wheel drive. Oil cooler and shuttle valve provide positive closed-loop cooling.

Hydraulic Oil Capacity/Filter: Remote-mounted, 13.2 liter oil reservoir 10-micron remote-mounted spin on the filter.

Ground Speed: Infinitely variable speed selection in forward and reverse

Mowing Speed: 0–9.7 kmh (adjustable) Transport speed: 0–14.5 kmh. Reverse speed: 0–5.6 kmh

Tires/Wheels: Front tires are20x 12-10and rear tires are 20 x 10 - 10 tubeless, 4-ply rating with demountable rims. Recommended tire pressure: 97–124 kPa front and rear tires.

Frame: Tricycle vehicle with 3-wheel traction drive and rear wheel steering. Frame consists of formed steel, welded steel and steel tubing components.

Steering: Power steering.

Brakes: Service braking accomplished through the Hydrostat's dynamic characteristics. The parking or emergency brake is actuated by over-center hand lever on the operator's right hand side.

Controls: Foot-operated forward and reverse traction pedals and Mow/Transport slide. Hand-operated throttle, ignition switch, blade engagement switch, cutting unit lift and shift lever, parking brake and seat adjustment.

Gauges and Protective Systems: Hour meter. 4-light warning cluster gauge: oil pressure, water temperature, amps, glow plug and hill side angle indicator.

Seat: Optional standard or deluxe seats.

Cutting Unit Lift: Hydraulic lift with automatic shut off.

Optional Equipment:

Standard Seat Model 03224
Deluxe Suspension Seat Model 03225

Pre-Operation Checks

Adjusting The Lift Arms

1. Start the engine, raise the decks and check to make sure the clearance between each lift arm and the floor plate bracket is 0.46–0.81cm (Fig. 1). If clearance is not in this range, back off the stop bolts (Fig. 3) and adjust the cylinder to attain clearance. To adjust the cylinder, back off the jam nut on the cylinder (Fig. 2), remove the pin from the rod end and rotate the clevis. Install the pin and check clearance. Repeat the procedure if needed. Tighten the clevis jam nut.

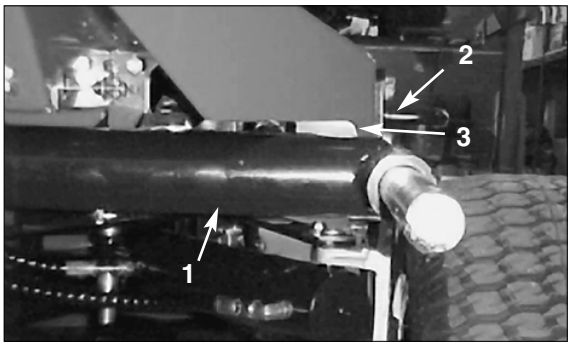


Figure 1

1. Lift arm
2. Floor plate bracket
3. Clearance (Decks removed for clarity)

2. Check to make sure clearance between each lift arm and stop bolt is 0.13–1.02mm (0.005”–0.040”) (Fig. 3). If clearance is not in this range, adjust the stop bolts to attain clearance.

3. Start the engine, raise the decks and check to make sure clearance between the wear strap on top of the rear cutting unit wear bar and the bumper strap is 0.51–2.54mm (.020”–0.10”) (Fig. 4). If clearance is not in this range, adjust the rear cylinder to attain clearance. To adjust the cylinder, lower the cutting units and back off the jam nut on the cylinder (Fig. 5). Grasp the cylinder rod close to the nut with a pliers and cloth and turn the rod. Raise the cutting units and check clearance. Repeat the procedure if necessary. Tighten the clevis jam nut.

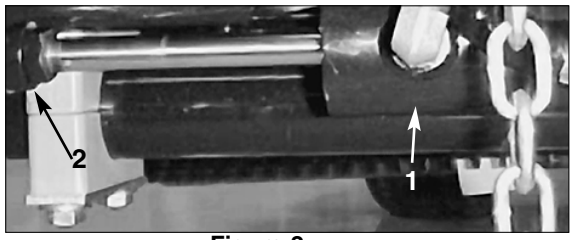


Figure 2

1. Front cylinder
2. Jam nut

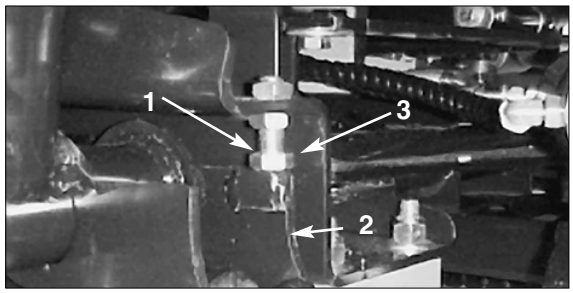


Figure 3

1. Stop bolt
2. Lift arm
3. Clearance

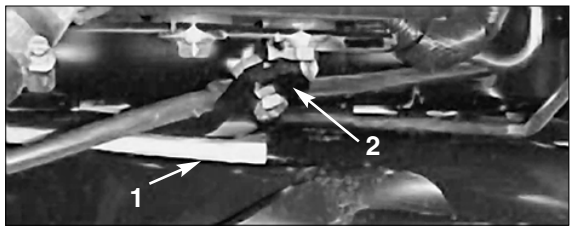


Figure 4

1. Wear bar
2. Bumper strap

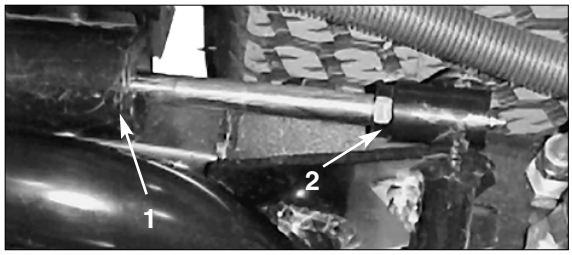


Figure 5

1. Rear cylinder
2. Adjusting nut

IMPORTANT: Lack of clearance at the front stops or the rear wear bar could damage the lift arms.

CAUTION

Before servicing or making adjustments to the machine, stop the engine and remove the key from the switch.

Check The Crankcase Oil (Fig. 6–7)

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

Crankcase capacity is approximately 4 qts. (3.8 1) with the filter.

1. Position the machine on a level surface.

2. Remove the dipstick and wipe it with a clean cloth. Push the dipstick down into the dipstick tube and make sure it is seated fully. Pull the dipstick out and check the level of oil. If the oil level is low, add enough oil to raise the the level to the FULL mark on the dipstick.

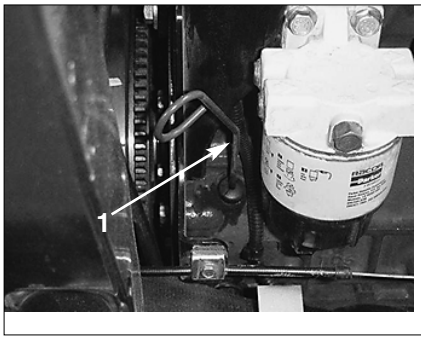


Figure 6

1. Dipstick

3. If the oil level is low, remove the oil fill cap and gradually add small quantities of oil—checking the level frequently—until the level reaches the FULL mark on the dipstick.

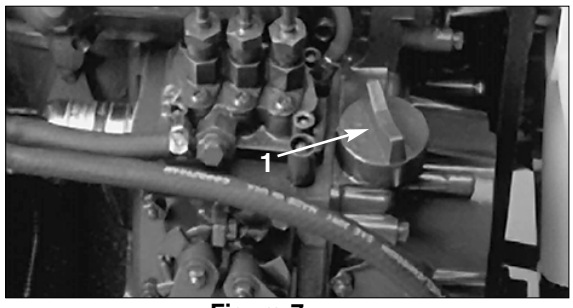


Figure 7

1. Oil fill cap

4. The engine uses any high-quality 10W30 detergent oil having the American Petroleum Institute—API—"service classification" CD, CE, CF CF-4 or CG-4.

5. Install the oil fill cap and close the hood.

IMPORTANT: Check the level of oil every 5 operating hours or daily. Change the oil after every 50 hours of operation.

Fill The Fuel Tank (Fig. 8)

The engine runs on No. 2 diesel fuel. Fuel tank capacity is approximately 4 l .

1. Clean the area around the fuel tank cap.

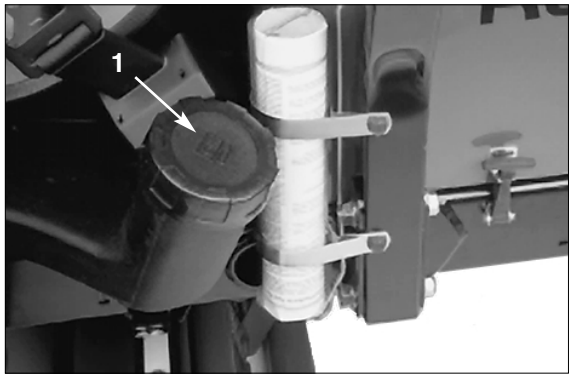


Figure 8

1. Fuel tank cap

2. Remove the fuel tank cap.

3. Fill the tank to the bottom of the filler neck. DO NOT OVERFILL. Then install the cap.

4. To prevent a fire hazard, wipe up any fuel that may have spilled to prevent a fire hazard.

DANGER

Because diesel fuel is flammable, use caution when storing or handling it. Do not smoke while filling the fuel tank. Do not fill the fuel tank while the engine is running, hot, or when the machine is in an enclosed area. Always fill the fuel tank outside and wipe up any spilled diesel fuel before starting the engine. Store fuel in a clean, safety-approved container and keep the cap in place. Use diesel fuel for the engine only; not for any other purpose.

Check The Cooling System (Fig. 9 & 10)

Clean debris off the radiator and oil cooler daily (Fig. 19); hourly if conditions are extremely dusty and dirty; refer to *Cleaning The Radiator*.

1. The cooling system is filled with a 50/50 solution of water and permanent ethylene glycol anti-freeze. Check the level of coolant at the beginning of each day before starting the engine. Capacity of the cooling system is approximately 5.7 l.

CAUTION

If the engine has been running, pressurized hot coolant can escape when the radiator cap is removed and cause burns. Only open the radiator cap when the engine is cold.

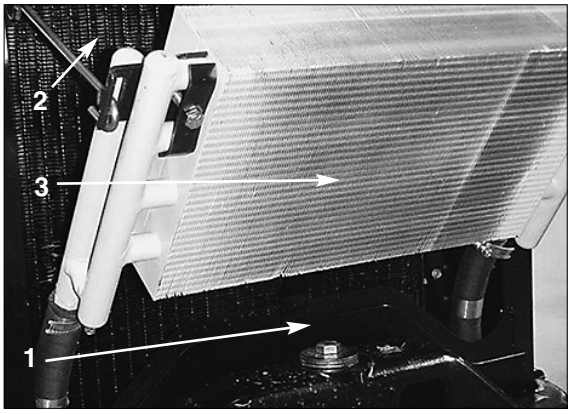


Figure 9

1. Access panel
2. Radiator
3. Oil cooler

2. Check the level of coolant in the expansion tank. With a cold engine, coolant level should be midway between the marks on the side of the tank.

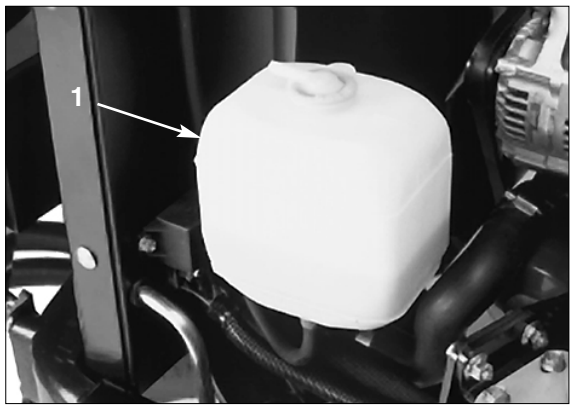


Figure 10

1. Expansion tank

3. If the coolant level is low, remove the expansion tank cap and replenish the system. DO NOT OVERFILL.

4. Install the expansion tank cap.

Check the Hydraulic System Fluid (Fig. 11)

The hydraulic system is designed to operate on anti-wear hydraulic fluid. The machine's reservoir is filled at the factory with approximately 13 liters of DTE 15M hydraulic fluid. **Check the level of hydraulic fluid before the engine is first started and daily thereafter.**

IMPORTANT: Use only the types of hydraulic fluids specified. Other fluids could cause system damage.

Group 1 Hydraulic Fluid (Moderate climate, average duty)

Note: The fluids within this group are interchangeable.

ISO VG 46/68 multi-viscosity, anti-wear hydraulic fluid

Mobil	DTE 15M
Amoco	Rykon Premium ISO 46
Castro[	AWH 46
Conoco	Hydroclear AW MV46
Gulf	Harmony HVI 46 AW
Kendall	Hyken Golden MV SAE 5W-20
Pennzbell	AWX MV46
Phillips	Magnus A KV 5W-20
Shell	Tellus T 46
Sunoco	Sun Hyd. Oil 2105
Texaco	Rando HDZ 46

Universal Tractor Hydraulic Fluid

Mobil	Mobilfluid 424
Amoco	1000 Fluid
Chevron	Tractor Hydraulic Fluid
Conoco	Hydroclear Powertran
Esso	Hydraul
Gulf	Universal Tractor Fluid
Kendall	Hyken 052
Marathon	Marafluid Super HT
Pennzoil	Hydra-trans
Phillips	HG Fluid
Shell	Donax TD
76 Lubricants	Hydraulic/Tractor Fluid
Sunoco	TH Fluid
Texaco	TDH

Group 2 Hydraulic Fluid (Hot Climate-Heavy Duty)

Note: The fluids within this group are inter-changeable.

ISO VG 68 anti-wear hydraulic fluid

Mobil	DTE 26
Amoco	Rykon AW No. 68
Castrol	AWS 68
Chevron	Hydraulic Oil AW ISO 68
Conoco	Hydroclear AW 68
Exxon	Nuto H 68
Gulf	Harmony 68AW
Kendall	Four Seasons AW 68
Marathon	IS068
Pennzbell	AW Hydraulic Oil 68
Phillips	Magnus A ISO 68
Shell	Tellus 68
76 Lubricants	AW 68
Sunoco	SunVis 868
Texaco	Rando HD 68

IMPORTANT: Group 1 fluids are recommended for use at typical ambient temperatures of 32° F (O°C) to 105° F (41 °C). The ISO Type 46/48 fluid has been found to offer optimal performance in a wide range of temperature conditions for the average user. The Universal Tractor Fluids offer similar performance for those who prefer them, with perhaps some slight loss of efficiency at high ambient temperatures compared to the Type 46/48 fluids.

Group 2 fluids are recommended for heavy-duty use in hot climates where ambient temperatures range from about 70°F (20°C) to 120°F (49°C). Use at lower ambient temperatures may result in hard starting, increased engine laboring while cold, sluggish or non-operating spool valves while cold and high filter back-pressure due to the higher viscosity of these fluids.

Note: When changing from one type of hydraulic fluid to another, be certain to remove all the old fluid from the system, as some fluids are incompatible with others.

Group 3 Hydraulic Fluid (Biodegradable)

ISO VG 32/46 anti-wear hydraulic fluid

Mobil	EAL 224H

Note: This biodegradable hydraulic fluid is not compatible with the fluids in Group 1 and 2.

Note: When changing from standard fluid to the biodegradable type, be certain to follow approved flushing procedures as published by Mobil. Contact your local Toro Distributor for details.

IMPORTANT: Use only the types of hydraulic fluids specified. Other fluids could cause system damage.

Note: A red dye additive for the hydraulic system fluid is available in 19 ml bottles. One bottle is sufficient for 15–22 liters. of hydraulic fluid. Order Part No. 44-2500 from your Authorized Toro Distributor.

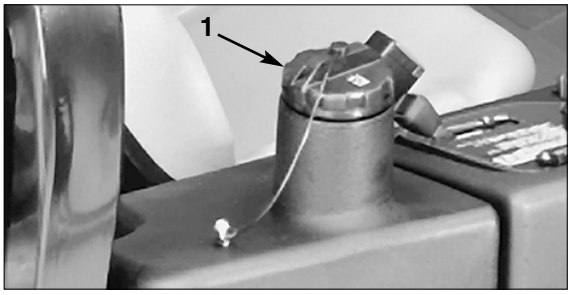


Figure 11
1. Hydraulic tank cap

1. Position the machine on a level surface, lower the cutting units and stop the engine.

2. Clean the area around the filler neck and cap of hydraulic tank. Remove the cap from the filler neck.

3. Remove the dipstick from the filler neck and wipe it with a clean cloth. Insert the dipstick into the filler neck; then remove it and check the level of fluid. Fluid level should be within the 6mm of mark on the dipstick.

4. If the level is low, add appropriate fluid to raise the level to the full mark.

5. Install the dipstick and cap onto the filler neck.

Check The Tire Pressure

The tires are over-inflated for shipping. Therefore, release some of the air to reduce the pressure. Correct air pressure in tires is 97–124 kPa.

IMPORTANT: Maintain recommended pressure in all tires to assure a good quality of cut and proper machine performance.

DANGER

Low tire pressure decreases the machine's hill side stability. Do not under inflate tires. This could cause a rollover that may result in personal injury or death.

Check Wheel Nut Torque

WARNING

Torque wheel nuts to 61–88 Nm after 1–4 hours of operation and again after 10 hours of operation and every 200 hours thereafter. Failure to maintain proper torque could result in failure or loss of wheel and may result in personal injury.

Controls

Traction Pedals (Fig. 12)—Depress the traction forward pedal to move forward. Depress the traction reverse pedal to move backward or to assist in stopping when moving forward. Also, allow the pedal to move or move it to the neutral position to stop the machine.

Mow/Transport Slide (Fig. 12)—Using your heel, move the slide to the left to transport and to the right to mow. The cutting units will only operate in the mow position. **Note:** Mow speed is set at the factory to 9.7 kmh. It can be increased or decreased by adjusting the speed stop screw (Fig. 13)

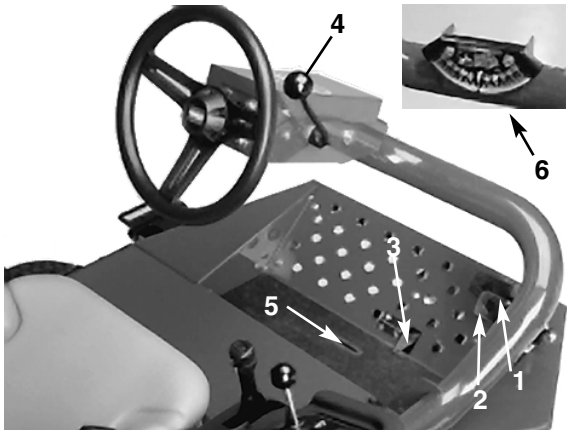


Figure 12

1 . Forward traction pedal
2. Reverse traction pedal
3 . Mow/Transport slide
4. Tilt steering lever
5. Indicator slot
6. Angle Indicator

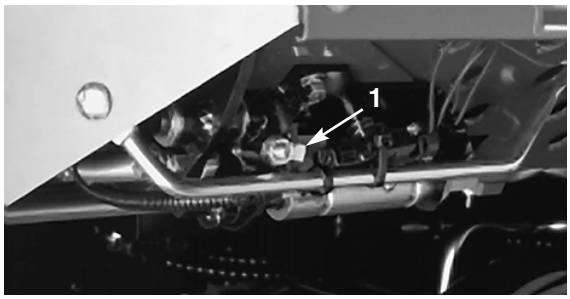


Figure 13

1. Speed stop screw

Tilt Steering Lever (Fig. 12)—Pull the lever back to tilt the steering wheel to the desired position. Then push the lever forward to tighten.

Angle Indicator (Fig. 12)—Indicates the hill side angle of the machine in degrees.

Starter Switch (Fig. 14)—The starter switch, used to start, stop and preheat the engine, has three positions: OFF, ON/PREHEAT and START. Turn the key to the ON/PREHEAT position until the glow plug indicator light goes out (approximately 7 seconds), then turn the key to the START position to engage the starter motor. Release the key when the engine starts The key will move automatically to the ON/RUN position. To shut off the engine, turn the key to the OFF position. Remove the key from the switch to prevent accidental starting.

Throttle (Fig. 14)—Moving the throttle forward increases engine speed, moving it rearward decreases engine speed.

Cutting Unit Shift Lever (Fig. 14)—To lower the cutting units to the ground, move the lift lever forward. (The cutting units will not drop unless the engine is running, and they will not operate in the raised position.) To raise the cutting units, pull the lift lever rearward to the RAISE position.

Move the lever to the right or left to move the cutting units in same direction. This should only be done when the cutting units are raised or if they're on the ground and the machine is moving.

DANGER

The machine is most stable on a hill side when the cutting units are shifted uphill. Shifting the cutting units downhill decreases machine stability. This could cause a rollover, which may resuit in personal injury or death.

Note: The lever does not have to be held in the forward position while the cutting units are lowered.

Indicator Slot (Fig. 12)—The slot in the operator's platform shows when the cutting units are in the center position.

Cutting Unit Drive Switch (Fig. 14)—The switch has two positions: ENGAGE and DISENGAGE.

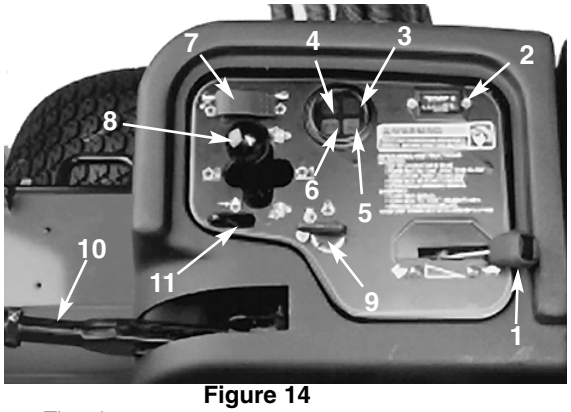


Figure 14

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

Hour Meter (Fig. 14)—Indicates the total hours of machine operation. The hour meter starts to function whenever the key switch is ON.

Engine Coolant Temperature Warning Light (Fig. 14)—The light glows if engine coolant temperature is high. If the traction unit is not stopped and coolant temperature rises higher, the engine will die.

Oil Pressure Warning Light (Fig. 14)—The light glows if engine oil pressure drops below a safe level.

Alternator Light (Fig. 14)—The amp light should be off when the engine is running. If it is on, the charging system should be checked and repaired as necessary.

Glow Plug Indicator (Fig. 14)– An Indicator light that glows when the glow plugs are operating.

Parking Brake (Fig. 14)—Whenever the engine is shut off, the parking brake must be engaged to prevent accidental movement of the machine. To engage the parking brake, pull up on the lever. The engine will stop if the traction pedal is depressed with the parking brake engaged.

Lift Lever Lock (Fig. 14)—Move the lever rearward to prevent the cutting units from dropping.

Fuel Gauge (Fig. 15)—Registers the amount of fuel in the tank.

Seat Adjustments (Fig. 15)—Fore and Aft Adjustment—Move the lever on the side of the seat outward, slide the seat to the desired position and release the lever to lock the seat into position.

Deluxe Seat Adjustments Weight Adjustment—Push the lever up or down to adjust to operator's weight. Lever up—light operator, lever in middle position—medium weight operator or lever down for heavy operator. Inclining Backrest —Turn handle to adjust angle of backrest.

Figure 15

1. Fore and aft lever
2. Fuel gauge

Operation

Starting/Stopping The Engine

IMPORTANT: The fuel system may have to be bled if any of the following situations have occurred:

A. Initial start up of a new engine.

B. The engine has ceased running due to lack of fuel.

C. Maintenance has been performed upon fuel system components; i.e., filter replaced, etc.

Refer to *Bleeding The Fuel System*

1. Be sure the parking brake is set and the deck drive switch is in the DISENGAGE position.

2. Remove your foot from the traction pedal and make sure the pedal is in the neutral position.

3. Move the throttle lever to the 1/2 throttle position.

4. Insert the key into the switch and turn it to the ON/PREHEAT position until the glow plug indicator light goes out (approximately 7 seconds), then turn the key to the START position to engage the starter motor. Release the key when the engine starts. The key will move automatically to the ON/RUN position.

IMPORTANT: To prevent overheating the starter motor, do not engage the starter longer than 15 seconds. After 10 seconds of continuous cranking, wait 60 seconds before engaging the starter motor again.

5. When the engine is started for the first time, or after overhauling the engine, operate the machine in forward and reverse for one to two minutes. Also operate the lift lever and the deck drive switch to be sure all parts operate correctly.

Turn the steering wheel to the left and right to check steering response. Then shut the engine off and check for oil leaks, loose parts and any other noticeable malfunctions.

CAUTION

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

6. To stop the engine, move the throttle control to the IDLE position, move the deck drive switch to DISENGAGE and turn the starter key to the OFF Remove the key from the switch to prevent accidental starting.

Bleeding The Fuel System

1. Park the machine on a level surface. Make sure the fuel tank is at least half full.

2. Unlatch and raise the hood.

DANGER

Because diesel fuel is flammable, use caution when storing or handling it. Do not smoke while filling the fuel tank. Do not fill the fuel tank while the engine is running, hot, or when the machine is in an enclosed area. Always fill the fuel tank outside and wipe up any spilled diesel fuel before starting the engine. Store fuel in a clean, safety-approved container and keep the cap in place. Use diesel fuel for the engine only; not for any other purpose.

3. Open the air bleed screw on the fuel injection pump (Fig. 16).

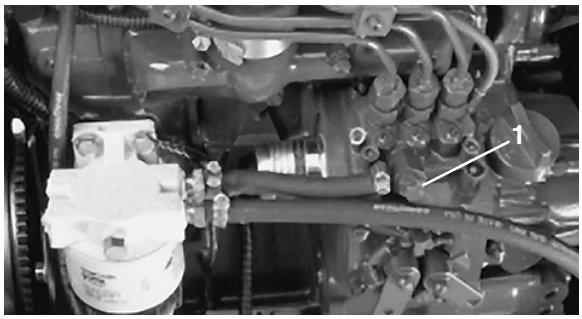


Figure 16

1. Fuel injection pump bleed screw

4. Turn the key in the ignition switch to the ON position. The electric fuel pump will begin forcing air out around the air bleed screw. Leave the key in the ON position until a solid stream of fuel flows out around the screw. Tighten the screw and turn the key to OFF
Note: Normally, the engine should start after above bleeding procedures are followed. However, if the engine does not start, air may be trapped between the injection pump and injectors; refer to *Bleeding Air From the Injectors.*

Check Interlock Switch Operation

CAUTION

Do not disconnect the safety switches because they are for the operator's protection. Check operation of the switches daily to be sure the interlock system is operating correctly. If a switch is not operating properly, replace it before operating the machine. Replace the switches every two years to be sure of maximum safety.

1. Make sure all bystanders are away from the area of operation. Keep your hands and feet away from the cutting units.

2. With the operator on the seat, the engine must not start with either the deck switch engaged or the traction pedal engaged. Correct the problem if not operating properly.

3. With the operator on the seat, the traction pedal in neutral, the parking brake off and the deck switch in the OFF position, the engine should start. Rise off the seat and slowly depress the traction pedal, the engine should stop in one to three seconds. Correct the problem if not operating properly.

4. With operator on the seat, engine running, deck transport slide in mow and the deck switch in the ON position, lower the cutting units. The decks should come on. Pull back on the lift lever; the decks should stop when fully raised. Correct the problem if not operating properly.

Note: The machine is equipped with an interlock switch on the parking brake. The engine will stop if the traction pedal is depressed with the parking brake engaged.

Towing The Traction Unit

In case of emergency, the Groundsmaster can be towed for a short distance. However, Toro does not recommend this as a standard procedure.

IMPORTANT: Do not tow the machine faster than 3–4 kmh because drive system may be damaged. If the machine must be moved a considerable distance, transport it on a truck or trailer.

1. Locate the by-pass valve on the pump and rotate it 90°.

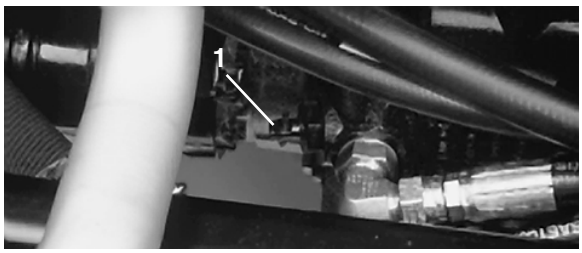


Figure 17

1. By-pass valve

2. Before starting the engine, close the by-pass valve by rotating it 90°. Do not start the engine when the valve is open.

Operating Characteristics

DANGER

The mower has a unique traction system that will allow the machine to move forward on side hills, even if the uphill wheel should come of the ground. If this should happen, the operator or any bystanders can be seriously injured or killed in a rollover.

The slope angle at which the machine will tip depends on many factors. Among these are mowing conditions such as wet or undulating turf, speed (especially in turns), position of the cutting units (with Sidewinder) tire pressure and operator experience.

At side hill angles of 20 degrees or less the risk of a rollover is low. As the slope angle increases to a Toro recommended maximum limit of 25 degrees the risk of a rollover increases to a moderate level. DO NOT EXCEED A 25 DEGREE SIDE HILL SLOPE ANGLE BECAUSE THE RISK OF A ROLLOVER AND SERIOUS INJURY OR DEATH IS VERY HIGH.

To determine the hills on you may safely operate, do a site survey of the mowing area. When performing this site survey always use common sense and take into consideration the turf condition and the rollover risk. Use the inclinometer provided with each machine. To perform a site survey, lay a 1.25 meter plank on the slope surface and measure the angle of the slope. The plank will average the slope but will not take into consideration dips or holes that can cause a sudden change in hill side angle. THE MAXIMUM HILL SIDE ANGLE SHOULD NOT BE GREATER THAN 25 DEGREES.

Additionally, the Groundsmaster 3500-D is equipped with an angle indicator mounted on the steering tube. This indicates the hill side angle the machine is on and identifies the recommended maximum limit of 25 degrees.

ALWAYS WEAR YOUR SEAT BELT

.

Practice operating the machine and become thoroughly familiar with it.

Start the engine and run it at half idle until it warms up. Push the throttle lever all the way forward, lift the cutting units, disengage the parking brake, press the forward traction pedal and carefully drive to an open area.

Practice going forward and in reverse, starting and stopping the machine. To stop, take your foot off the traction pedal and let it return to neutral or press down on the reverse pedal to stop. Going down a hill, you may need to use the reverse pedal to stop.

When driving on slopes, drive slowly to maintain steering control and avoid turns to prevent rollovers. In hill side situations, you should shift the sidewinder cutting units to the uphill side to give you more stability. Conversely, shifting the cutting units to the downhill side will give you less stability. This should always be done before going on a hillside.

When possible, mow up and down hills rather than across them. Have the cutting units lowered when going down a hill to maintain steering control. Don't try to turn on a hill.

Practice driving around obstacles with the decks up and down. Be careful when driving between narrow objects so you don't damage the machine or cutting units.

On the Sidewinder unit, get a feel for the reach of the cutting units so you don't hang them up or damage them in any way.

Don't shift the units from side to side, unless the cutting units are down and the machine is moving, or the cutting units are up in the transport position. Shifting the cutting units when they are down and the machine is not moving may cause turf damage.

The Groundsmaster is a precision mowing machine, so always drive slowly in rough areas.

If a person appears in or near the operating area, stop the machine, and don't start up again until the

area is cleared. The Groundsmaster is a one-person machine. Never let anyone else ride on the machine with you. This is extremely dangerous and could result in serious injury.

Accidents can happen to anyone. The most common causes are excessive speed, sudden turns, terrain (not knowing what slopes and hills can be mowed safely), not stopping the engine before leaving the operator's seat, and drugs, which impair your alertness. Cold capsules or prescription drugs may cause drowsiness, as can alcohol and other drugs. Stay alert and stay safe. Failure to do so could result in serious injury.

The sidewinder offers up to a maximum of 33cm of overhang, allowing you to trim closer to the edge of traps and other obstacles, while at the same time keeping the tractor tires as far away from the edge of traps or water hazards as possible.

If an obstacle is in the way, shift the cutting units to easily mow around it.

CAUTION: This product may exceed noise levels of 85 dB(A) at the operator position. Ear protectors are recommended for prolonged exposure to reduce the potential of permanent hearing damage.

When transporting the machine from one work area to another, raise the cutting units completely, move the Mow/Transport slide to the left to transport and place the throttle in the FAST position. (The cutting units will not operate in transport.)

Mowing Techniques

To begin cutting, engage the decks, then approach the mowing area slowly. Once the front decks are over the mowing area, lower the cutting units.

To achieve the professional straight-line cut and striping that is desirable for some applications, find a tree or other object in the distance and drive straight toward it.

As soon as the front decks reach the edge of the mowing area, lift the cutting units and perform a tear drop shaped turn, to quickly line you up for your next pass.

Mowing around bunkers, ponds or other contours is easily done with The Groundsmaster 3500-D with Sidewinder. To use the Sidewinder application, move the control lever left or right, depending on your mowing application. The cutting units can also be shifted to vary tire tracking.

The Groundsmaster 3500-D decks tend to throw grass to the left side of the machine. If trimming around bunkers, it is best to mow in a clockwise direction to prevent throwing clippings into the bunker.

The cutting decks can be equipped with bolt in mulching baffles. The mulching baffles perform well when turf is maintained on a regular schedule to avoid removing more than 2.5cm of growth per cutting. When too much growth is cut with the mulching baffles installed, after-cut appearance may deteriorate and the observed power to cut the turf increases. The mulching baffles also perform well for shredding leaves in the fall of the year.

After Mowing

After mowing, thoroughly wash the machine with a garden hose—without a nozzle so that excessive water pressure will not cause contamination and damage to seals and bearings. Make sure the radiator and oil cooler are kept free of dirt or grass clippings. After cleaning, inspect the machine for possible hydraulic fluid leaks, damage or wear to hydraulic and mechanical components and check the cutting unit blades for sharpness.

IMPORTANT: After wash down, move the Sidewinder mechanism from left to right several times to remove water between bearing blocks and cross tube.

Maintenance

Minimum Recommended Maintenance Intervals

Maintenance Procedure	Maintenance Interval & Service				
	Every 50 hours	Every 100 hours	Every 200 hours	Every 400 hours	Every 800 hours
Inspect air filter, dust cap and burp valve Lubricate all grease fittings Change engine oil Check battery cable connections † Check fan and alternator belt tension Check battery fluid level	✓	✓	✓	✓	✓
Change engine oil and filter Inspect traction belt		‡ ‡	✓	✓	✓
Replace the air filter †Replace the hydraulic filter †Torque wheel lug nuts				✓	✓
Replace hydraulic fluid Replace fuel/water separator filter Replace the fuel pre-filter Inspect traction cable movement ‡ Check engine rpm (idle and full throttle)					✓
Adjust valves					✓

† Initial break in at 10 hours
‡ Initial break in at 50 hours

Replace moving hydraulic hoses
Replace safety switches
Flush the cooling system and replace fluid
Drain and flush the fuel tank
Drain and flush the hydraulic tank

Recommendations:
Items are recommended every 1600 hours or two years, whichever occurs first.

Daily Maintenance Checklist

✓ Safety Interlock Operation
✓ Brake Operation
✓ Engine Oil Level
✓ Cooling System Fluid Level
✓ Drain Water/Fuel Separator
✓ Air Filter, Dust Cup & Burp Valve
✓ Radiator & Screen for Debris
✓ Unusual Engine Noises
✓ Unusual Operating Noises
✓ Hydraulic System Oil Level
✓ Hydraulic Hoses for Damage
✓ Fluid Leaks
✓ Fuel level
✓ Tire Pressure
✓ Instrument Operation
✓ Height-of-Cut Adjustment
✓ Lubricate All Grease Fittings[2]
✓ Touch-up Damaged Paint

Greasing Bearings and Bushings

The traction unit has grease fittings that must be lubricated regularly with No. 2 General Purpose Lithium Base Grease. If the machine is operated under normal conditions, lubricate bearings and bushings after every 50 hours of operation. Bearings and bushings must be lubricated daily when operating conditions are extremely dusty and dirty. Dusty and dirty operating conditions could cause dirt to get into the bearings and bushings, resulting in accelerated wear. Lubricate bearings and bushings immediately after every washing, regardless of the interval listed.

The traction unit bearings and bushings that must be lubricated are: Rear cutting unit pivot (Fig. 18), Front cutting unit pivot (Fig. 19), SideWinder cylinder ends (2) (Model 03201 only) (Fig. 20), Steering pivot (Fig. 21), Rear lift arm pivot and lift cylinder (2) (Fig. 22), Left front lift arm pivot and lift cylinder (2) (Fig. 23), Right front lift arm pivot and lift cylinder (2) (Fig. 24), Neutral adjust mechanism (Fig. 25), Mow/Transport slide (Fig. 26), Belt tension pivot (Fig. 27) Steering cylinder (Fig. 28). **Note:** If desired, an additional grease fitting may be installed in other end of steering cylinder. Tire must be removed, fitting installed, greased, fitting removed and plug installed (Fig. 29). **IMPORTANT: Do not lubricate Sidewinder cross tube, bearing blocks are self-lubricated.**

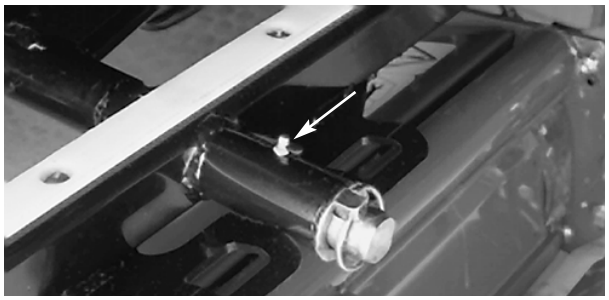


Figure 18

Figure 19

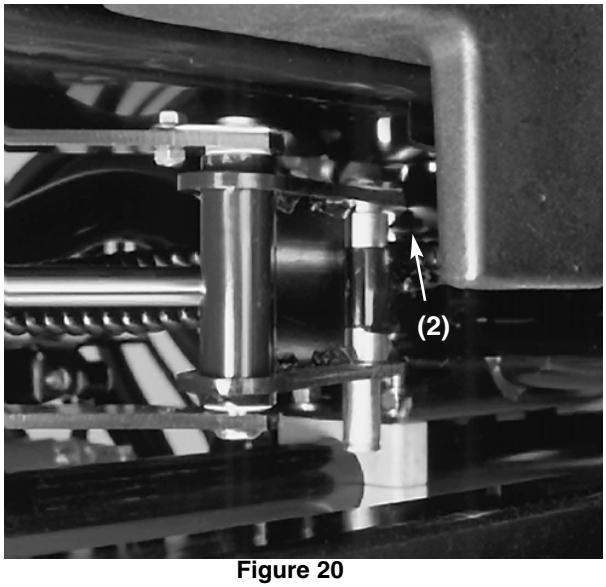


Figure 20

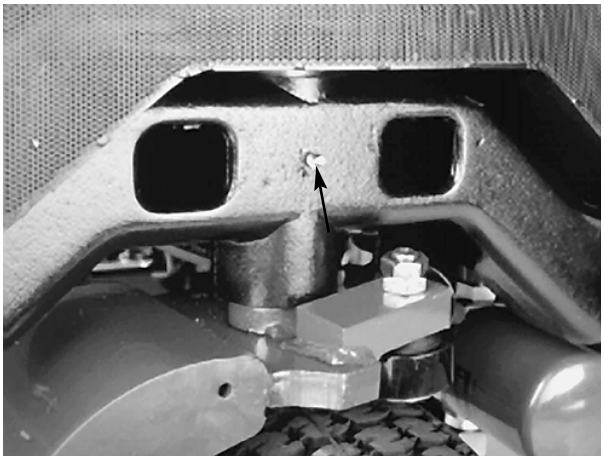


Figure 21

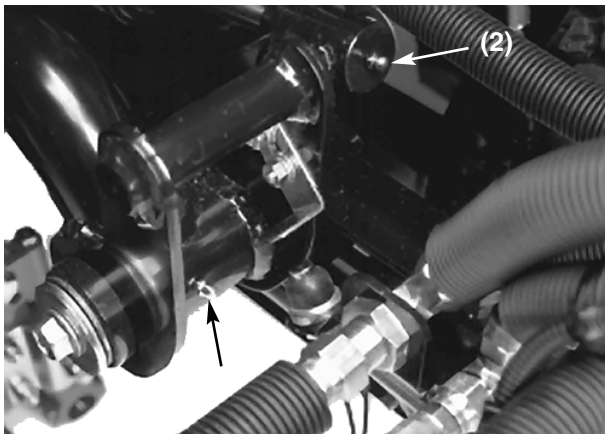


Figure 22

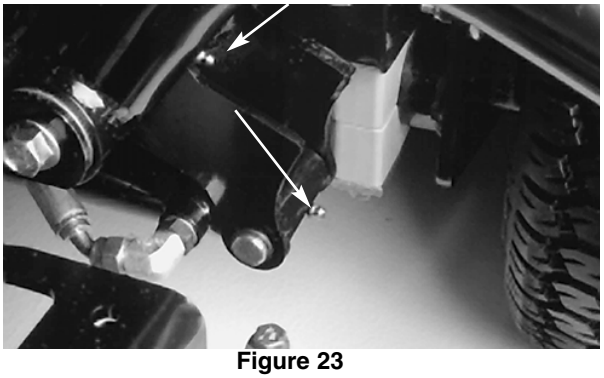


Figure 23

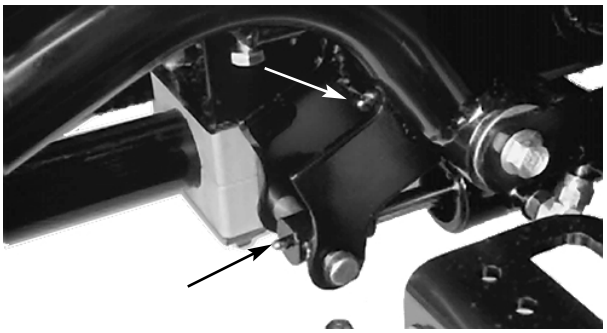


Figure 24

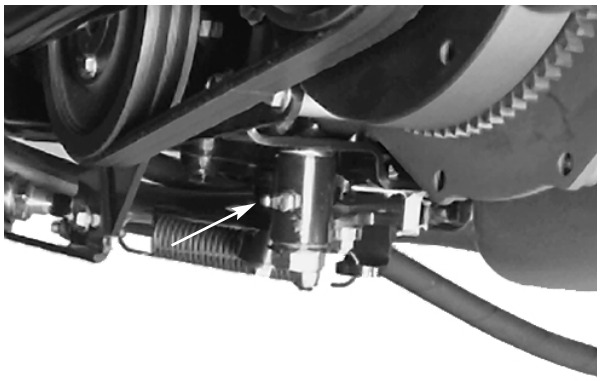


Figure 25

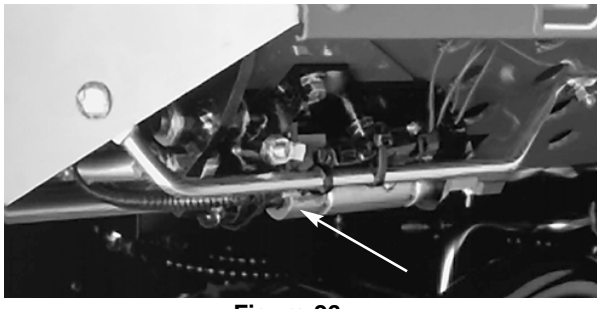


Figure 26

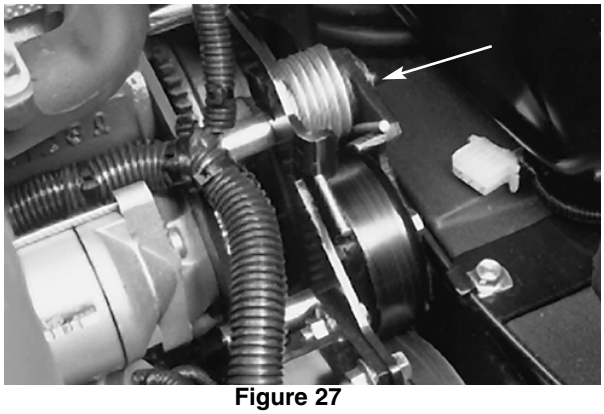


Figure 27

Figure 28

Figure 29
(See note on previous page)

CAUTION

Before servicing or making adjustments to the machine, stop the engine and remove the key from the switch.

Hood Removal

The hood may be easily removed to ease maintenance procedures in the engine area of the machine.

1. Unlatch and raise the hood.

2. Remove the cotter pin securing the hood pivot to the mounting brackets.

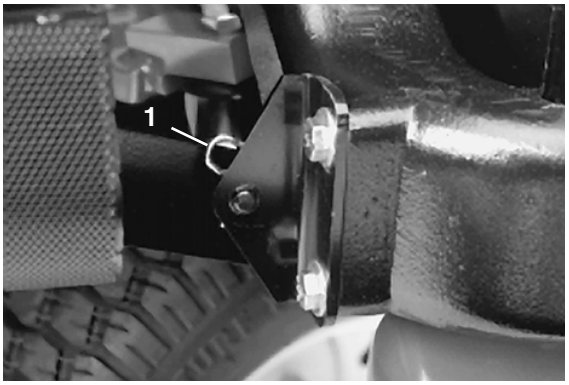


Figure 30

1. Cotter pin

3. Slide the hood to right side, lift the other side and pull it out of the brackets.

4. Reverse the procedure to install the hood.

General Air Cleaner Maintenance

1. Check the air cleaner body for damage that could possibly cause an air leak. Replace a damaged air cleaner body.

2. Service the air cleaner filter every 200 hours (more frequently in extreme dusty or dirty conditions).

3. Be sure cover is sealing around the air cleaner body.

Servicing The Air Cleaner

1. Release the latches securing the air cleaner cover to the air cleaner body. Separate cover from body Clean inside of the air cleaner cover.

Figure 31

1. Air cleaner dust cup
2. Air cleaner latch

2. Gently slide the filter out of the air cleaner body to reduce the amount of dust dislodged. Avoid knocking the filter against the air cleaner body.

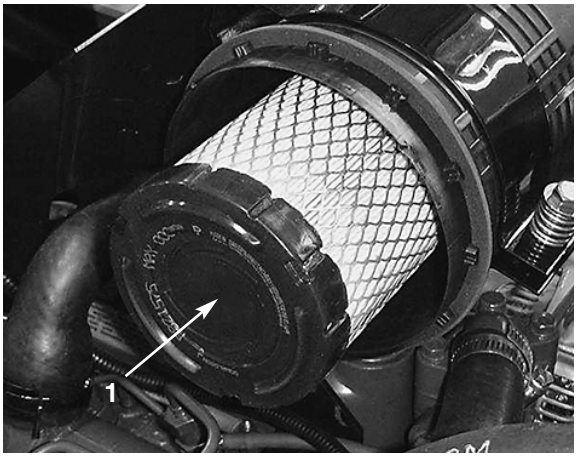


Figure 32

1. Filter element

3. Inspect the filter and discard it if it is damaged. Do not wash or reuse a damaged filter.

Washing Method

A. Prepare a solution of filter cleaner and water and soak the filter element about 15 minutes. Refer to directions on the filter

cleaner carton for complete information.

B. After soaking the filter for 15 minutes, rinse it with clear water. Maximum water pressure must not exceed 276 kPa to prevent damage to the filter element. Rinse the filter from clean side to dirty side.

C. Dry the filter element using warm, flowing air (71°C) max), or allow element to air dry. Do not use a light bulb to dry the filter element because damage could result.

Compressed Air Method

A. Blow compressed air from inside to the outside of dry filter element. Do not exceed 689 kPa to prevent damage to the element.

B. Keep the air hose nozzle at least 5 cm from the filter and move nozzle up and down while rotating the filter element. Inspect for holes and tears by looking through the filter toward a bright light.

4. Inspect the new filter for shipping damage. Check the sealing end of the filter. Do not install a damaged filter.

5. Insert the new filter properly into the air cleaner body. Make sure the filter is sealed properly by applying pressure to outer rim of the filter when installing. Do not press on flexible center of the filter.

6. Reinstall covers and secure the latches. Make sure the cover is positioned with the TOP side up.

Engine Oil and Filter

Change the oil and filter initially after the first 50 hours of operation; thereafter, change the oil every 50 hours and the filter every 100 hours.

1. Remove either drain plug and let the oil flow into a drain pan. When the oil stops flowing, install the drain plug.

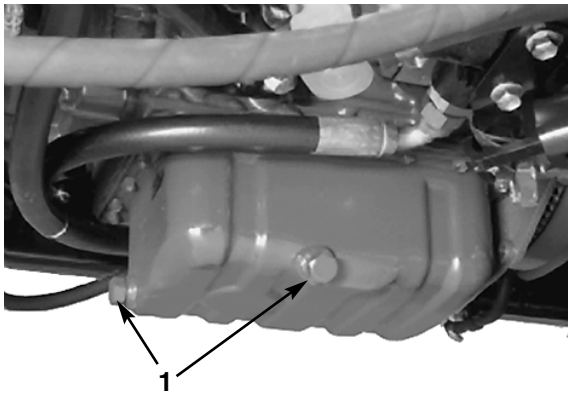


Figure 33
1. Engine oil drain plug

2. Remove the oil filter. Apply alight coat of clean oil to the new filter seal before screwing it on. DO NOT OVER-TIGHTEN.

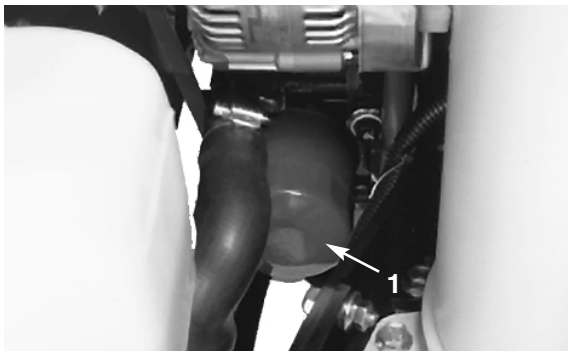


Figure 34
1. Engine oil filter

3. Add oil to the crankcase, refer to *Check The engine Oil.*

Fuel System

Fuel Tank

Drain and clean the fuel tank every 2 years. Also, drain and clean the tank if the fuel system becomes contaminated or if the machine is to be stored for an extended period. Use clean fuel to flush out the tank.

Fuel Lines and Connections

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

Water Separator

Drain water or other contaminants from water separator (Fig. 35) daily.

1. Place a clean container under the fuel filter.

2. Loosen the drain plug on the bottom of the filter canister. Tighten the plug after draining.

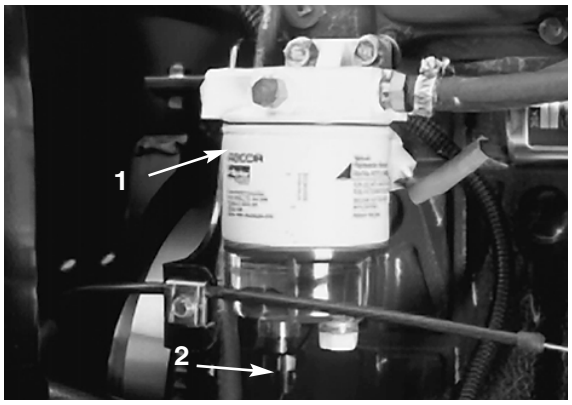


Figure 35
1. Water separator
2. Drain plug

Replace the filter canister after every 400 hours of operation.

1. Clean the area where the filter canister mounts.

2 Remove the filter canister and clean the mounting surface.

3. Lubricate the filter cannister's gasket with clean oil.

4. Install the filter canister by hand, until the gasket contacts the mounting surface, then turn an additional 1/2 turn.

Replacing The Fuel Pre Filter

Replace the fuel prefilter, located on the inside of the frame rail below the water separator after every 400 operating hours or yearly, whichever occurs first.

1. Remove the screw securing the filter to the frame rail.

2. Clamp both fuel lines that connect to the fuel filter so fuel cannot drain when lines are removed.

3. Loosen the hose clamps at both ends of the filter and pull the fuel lines off the filter.

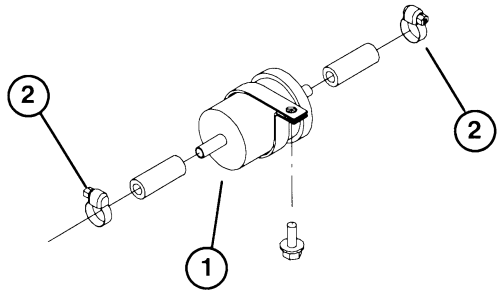


Figure 36
1. Fuel pre filter
2. Hose clamps

4. Slide the hose clamps onto the ends of the fuel lines. Push the fuel lines onto the fuel filter and secure them with hose clamps. Be sure the arrow on the side of the filter points toward the injection pump.

DANGER

Because diesel fuel is flammable, use caution when storing or handling it. Do not smoke while filling the fuel tank. Do not fill the fuel tank while the engine is running, hot, or when the machine is in an enclosed area. Always fill the fuel tank outside and wipe up any spilled diesel fuel before starting the engine. Store fuel in a clean, safety-approved container and keep the cap in place. Use diesel fuel for the engine only; not for any other purpose.

Bleeding Air From The Injectors

Note: This procedure should be used only if the fuel system has been purged of air through normal priming procedures and the engine will not start; refer to *Bleeding The Fuel System*.

1. Loosen the pipe connection to the No. 1 nozzle and holder assembly

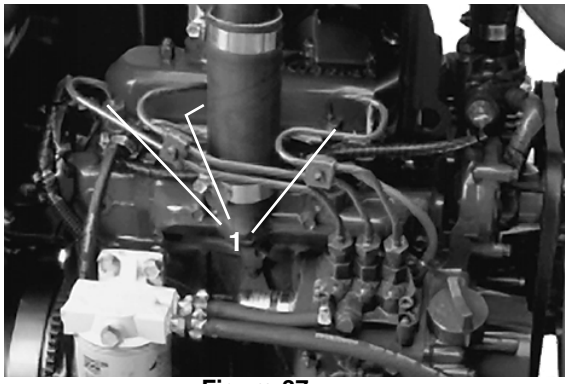


Figure 37

1. Fuel Injectors (3)

2. Move the throttle to the FAST position.

3. Turn the key in the key switch to the START position and watch fuel flow around the connector. Turn the key to the OFF position when solid flow is observed.

4. Tighten the pipe connector securely.

5. Repeat these steps on the remaining nozzles.

Engine Cooling System

1. Removing Debris—Remove debris from the oil cooler and radiator daily, clean more frequently in dirty conditions.

A. Turn the engine off and raise the hood. Clean the engine area thoroughly of all debris.

B. Remove the access panel.

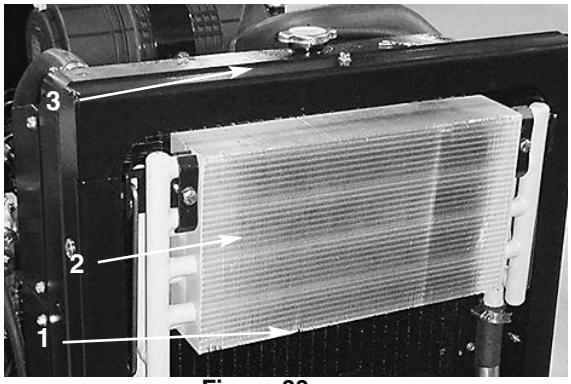


Figure 38

1. Access panel
2. Oil cooler
3. Radiator

C. Remove access panel. Unlatch the oil cooler and pivot rearward. Clean both sides of the oil cooler and radiator area thoroughly with water or compressed air. Pivot the oil cooler back into position.

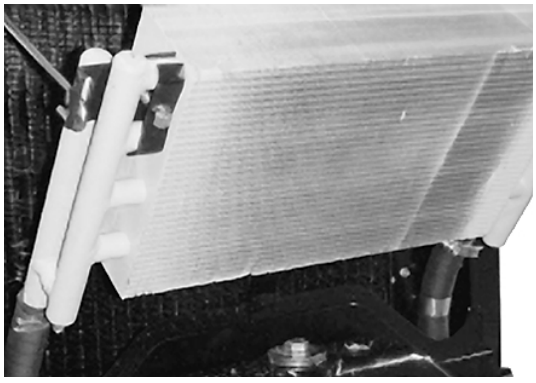


Figure 39

D. Install access panel and close the hood.

Servicing Engine Belts

Check the condition and tension of all belts after the first day of operation and every 100 operating hours thereafter.

Alternator/Fan Belt (Fig. 40)

1. Open the hood.

2. Check tension by depressing the belt midway between the alternator and crankshaft pulleys with 30 Nm of force. The belt should deflect 1.12 cm. If deflection is incorrect, go to step 3. If correct, continue operation.

3. Loosen the bolt securing the brace to the engine and the bolt securing the alternator to the brace.

4. Insert a pry bar between the alternator and the engine and pry out on the alternator.

5. When proper tension is achieved, tighten the alternator and brace bolts to secure adjustment.

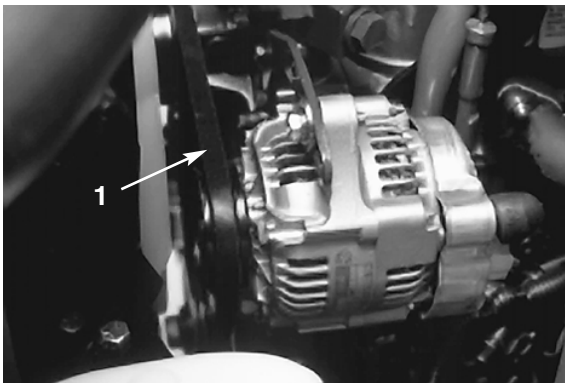


Figure 40
1. Alternator/fan Belt

Hydrostat Drive Belt Replacement

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

WARNING

Use caution when de-tensioning the spring as it is under a heavy load.

2. Push down and forward on the spring end to unhook it from the bracket and release tension on the spring.

3. Replace the belt.

4. Reverse procedure to tension the spring.

Figure 41
1. Hydrostat Drive Belt
2. Spring end

Adjusting The Throttle

1. Position the throttle lever rearward so it stops against control panel slot.

2. Loosen the throttle cable connector on the lever arm at the injection pump.

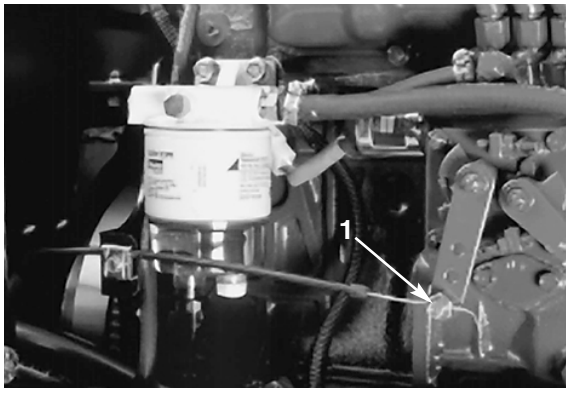


Figure 42
1. Injection Pump Lever Arm

3. Hold the injection pump lever arm against the low idle stop and tighten the cable connector.

4. Loosen the screws securing the throttle control to the control panel.

5. Push the throttle control lever all the way forward.

6. Slide the stop plate until it contacts the throttle lever and tighten the screws securing the throttle control to the control panel.

   If the throttle does not stay in position during operation, torque the lock nut that is used to set

the friction device on the throttle lever. The maximum force required to operate the throttle lever should be 27 Nm.

CAUTION

Before servicing or making adjustments to the machine, stop the engine and remove the key from the switch.

Changing Hydraulic Fluid

Change hydraulic fluid after every400 operating hours, in normal conditions. If fluid becomes contaminated, contact your local TORO distributor because the system must be flushed. Contaminated fluid looks milky or black when compared to clean oil.

1. Turn the engine off and raise the hood.

2. Disconnect the hydraulic line or remove the hydraulic filter and let hydraulic fluid flow into a drain pan. Reinstall the line when hydraulic fluid stops draining.

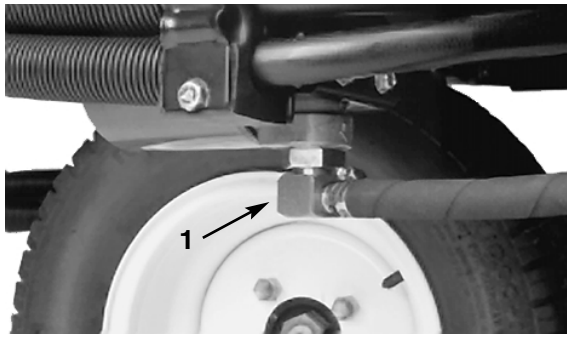


Figure 43

1. Hydraulic line

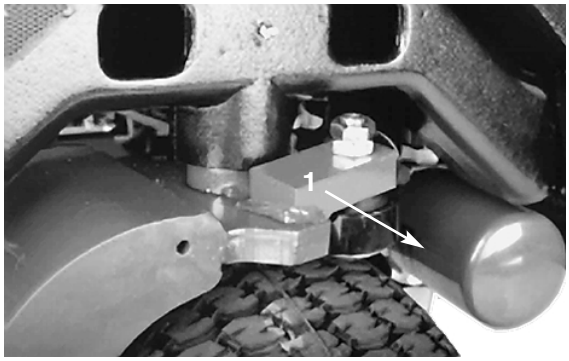


Figure 44

1. Hydraulic filter

3. Fill the reservoir with approximately 3.5 gallons of hydraulic fluid. Refer to *Checking Hydraulic Fluid.*

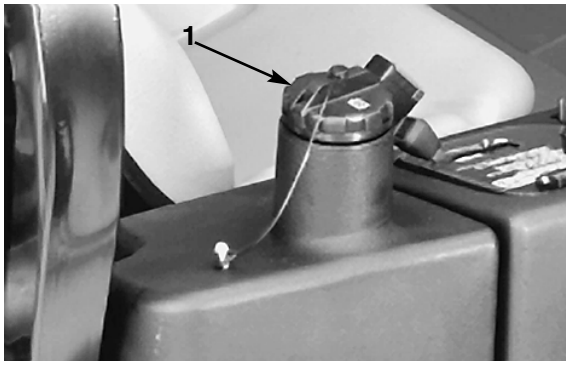


Figure 45

1. Hydraulic Reservoir

IMPORTANT: Use only hydraulic fluids specified. Other fluids could cause system damage.

4. Install the reservoir cap. Start the engine and use all hydraulic controls to distribute hydraulic fluid throughout the system. Also check for leaks. Then stop the engine.

5. Check the level of fluid and add enough to raise the level to the FULL mark on the dipstick. DO NOT OVER FILL.

Replacing The Hydraulic Filter

The hydraulic system filter must be changed initially, after the first 10 hours of operation, and thereafter every 200 hours of operation or yearly, whichever comes first. Use a genuine Toro oil filter for replacement. The hydraulic oil must be changed every 400 hours of operation or yearly,

whichever comes first.

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

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

1. Position the machine on a level surface, lower the cutting units, stop the engine, engage the parking brake and remove the key from ignition switch.
2. Pinch off the hose to the filter mounting plate.
3. Clean the area around the filter mounting area. Place a drain pan under the filter and remove the filter.
4. Lubricate the new filter gasket and fill the filter with hydraulic fluid.
5. Assure the filter mounting area is clean. Screw on the filter until the gasket contacts the mounting plate. Then tighten the filter one-half turn.
6. Start the engine and let it run for about two minutes to purge air from the system. Stop the engine and check for leaks.

Checking Hydraulic Lines and Hoses

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

WARNING

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. Hydraulic fluid escaping under pressure can penetrate skin and cause injury. Fluid accidentally injected into the skin must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.

Adjusting The Traction Drive For Neutral

If the machine “creeps” when the traction pedal is in the neutral position, the traction cam must be adjusted.

1. Park the machine on a level surface and turn the engine off.
2. Raise one front wheel and the rear wheel off the floor and place support blocks under the frame.

WARNING

One front wheel and rear wheel must be raised off the ground or the machine will move during adjustment. Make sure the machine is supported so it will not accidentally fall injuring anyone under the machine.

3. Loosen the locknut on the traction adjustment cam.

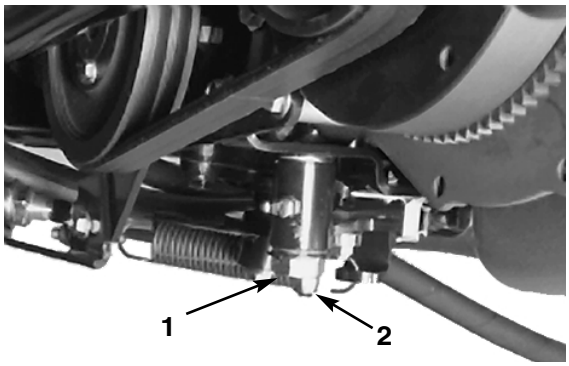


Figure 46

1. Traction adjustment cam
2. Locknut

WARNING

The engine must be running so final adjustment of the traction adjustment cam can be performed. To guard against possible personal injury, keep hands, feet, face and other parts of the body away from the muffler, other hot parts of the engine, and other rotating parts.

4. Start the engine and rotate the cam hex in both directions to determine the mid position of the neutral span.

5. Tighten the locknut to secure adjustment.

6. Stop the engine.

7. Remove the support blocks and lower the machine to the shop floor. Test drive the machine to make sure it does not creep.

Adjusting The Parking Brake

Check adjustment every 200 hours.

1. Loosen the set screw securing the knob to the parking brake lever.

2. Rotate the knob until a force of 41-68 Nm is required to actuate the lever.

3. Tighten the set screw after attaining adjustment.

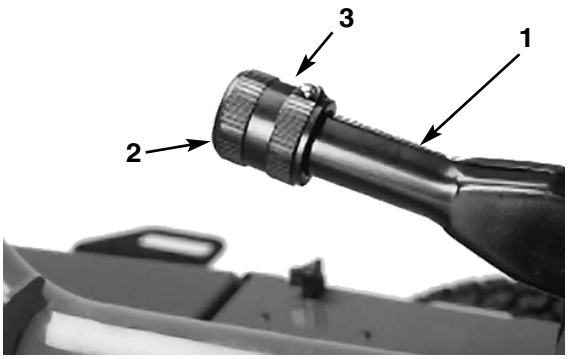


Figure 47

1. Parking brake lever
2. Knob
3. Setscrew

Battery Care

1. Battery electrolyte level must be properly maintained and the top of the battery kept clean. If the machine is stored in a location where temperatures are extremely high, the battery will run down more rapidly than if the machine is stored in a location where temperatures are cool.

2. Check the electrolyte level every 25 operating hours or, if the machine is in storage, every 30 days.

3. Maintain cell level with distilled or demineralized water. Do not fill cells above the bottom of the split ring inside each cell. Install the filler caps with vents pointing to the rear (toward the fuel tank).

CAUTION

Wear safety goggles and rubber gloves when working with electrolyte. Charge the battery in a well-ventilated place so gases produced while charging can dissipate. Since the gases are explosive, keep open flames and electrical sparks away from the battery; do not smoke. Nausea may result if the gases are inhaled. Unplug the charger from electrical outlet before connecting to, or disconnecting, charger leads from battery posts.

4. Keep the top of battery clean by washing periodically with a brush dipped in ammonia or bicarbonate of soda solution. Flush the top surface with water after cleaning. Do not remove the fill caps while cleaning.

5. Battery cables must be tight on terminals to provide good electrical contact.

WARNING

Connecting cables to the wrong post could result in personal injury and/or damage to the electrical system.

6. If corrosion occurs at terminals, disconnect cables—negative (–) cable first—and scrape the clamps and terminals separately. Reconnect the cables—positive cable first—and coat terminals with petroleum jelly

7. Always disconnect battery cables—ground cable (–) first—to prevent possible wiring damage from short outs whenever working with the electrical system.

Battery Storage

If the machine will be stored more than 30 days, remove the battery and charge it fully. Either store it on the shelf on the machine. Leave the cables disconnected if stored on the machine. Store the battery in a cool atmosphere to avoid quick deterioration of the charge in the battery. To prevent battery from freezing, make sure it is fully charged. The specific gravity of a fully charged battery is 1.265–1.299.

Fuses

The fuses in the machines electrical system are located under console cover.

Preparation for Seasonal Storage

Traction Unit

1. Thoroughly clean the traction unit, cutting units and the engine.
2. Check the tire pressure. Inflate all traction unit tires to 97–124 kPa.
3. Check all fasteners for looseness; tighten as necessary.
4. Grease or oil all grease fittings and pivot points. Wipe up any excess lubricant.
5. Cover the entire length of the Sidewinder cross tube with a light oil to prevent rust. After storage, wipe off all the oil.
6. Lightly sand and use touch-up paint on painted areas that are scratched, chipped, or rusted. Repair any dents in the metal body.
7. Service the battery and cables as follows:
   a. Remove the battery terminals from the battery posts.
   b. Clean the battery, terminals, and posts with a wire brush and baking soda solution.
   c. Coat the cable terminals and battery posts with Grafo 112X skin-over grease (Toro Part No. 50547) or petroleum jelly to prevent corrosion.
   d. Slowly recharge the battery every 60 days for 24 hours to prevent lead sulfation of the battery.

Engine

1. Drain the engine oil from the oil pan and replace the drain plug.
2. Remove and discard the oil filter. Install a new oil filter.
3. Refill the oil pan with SAE10W30 motor oil.
4. Start the engine and run at idle speed for approximately two minutes.
5. Stop the engine.
6. Thoroughly drain all fuel from the fuel tank, lines and the fuel filter/water separator assembly.
7. Flush the fuel tank with fresh, clean diesel fuel.
8. Resecure all fuel system fittings.
9. Thoroughly clean and service the air cleaner assembly.
10. Seal the air cleaner inlet and the exhaust outlet with weatherproof tape.
11. Check anti-freeze protection and add as needed for expected minimum temperature in your area.

Identification and Ordering

Model and Serial Number

The model and serial number is on a plate that is mounted on the left side of footrest. Use model and serial number in all correspondence and when ordering parts.

To order replacement parts from an authorized TORO Distributor, supply the following information:

1. Model and serial numbers of the machine.
2. Part number, description and quantity of parts desired.

Note: If using a parts catalog, do not order by reference number; use the part number instead.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