



GROUNDMASTER®

GM120

Traction Unit

Model No. 30612 – 790001 & Up

Operator's Manual

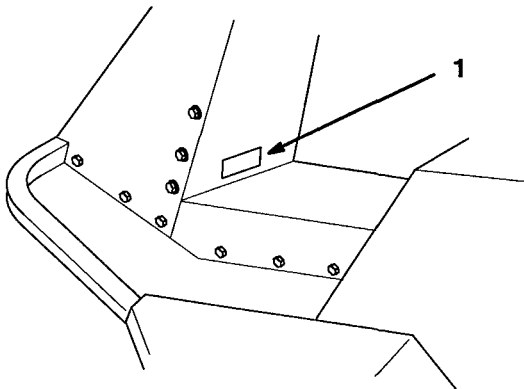
IMPORTANT: Read this manual carefully. It contains information about your safety and the safety of others. Also become familiar with the controls and their proper use before you operate the product.

Introduction

Thank you for purchasing a Toro product.

All of us at Toro want you to be completely satisfied with your new product, so feel free to contact your local Authorized Service Dealer for help with service, genuine replacement parts, or other information you may require.

Whenever you contact your Authorized Service Dealer or the factory, always know the model and serial numbers of your product. These numbers will help the Service Dealer or Service Representative provide exact information about your specific product. You will find the model and serial number plate located in a unique place on the product as shown below.



2196

1. Model and Serial Number Plate

For your convenience, write the product model and serial numbers in the space below.

Model No: _____
Serial No. _____

Read this manual carefully to learn how to operate and maintain your product correctly. Reading this manual will help you and others avoid personal injury and damage to the product. Although we design, produce and market safe, state-of-the-art products, you are responsible for using the product properly and safely. You are also responsible for training persons, who you allow to use the product, about safe operation.

The warning system in this manual identifies potential hazards and has special safety messages that help you and others avoid personal injury, 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 the recommended precautions are not followed.

WARNING signals a hazard that may cause serious injury or death if the recommended precautions are not followed.

CAUTION signals a hazard that may cause minor or moderate injury if the recommended precautions are not followed.

Two other words are also used to highlight information. "Important" calls attention to special mechanical information and "Note" emphasizes general information worthy of special attention.

The left and right side of the machine is determined by sitting on the seat in the normal operator's position.

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


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THE ENCLOSED ENGINE OWNER'S MANUAL IS SUPPLIED FOR CALIFORNIA EMISSION CONTROL REGULATION INFORMATION ON EMISSION SYSTEMS, MAINTENANCE AND WARRANTY.


KEEP THIS ENGINE OWNER'S MANUAL WITH YOUR UNIT. SHOULD THIS ENGINE OWNER'S MANUAL BECOME DAMAGED OR ILLEGIBLE, REPLACE IMMEDIATELY. REPLACEMENTS MAY BE ORDERED THROUGH THE ENGINE MANUFACTURER.

Safety

This machine meets or exceeds the B71.1–1990 specifications of the American National Standards Institute, in effect at the time of production. However, improper use or maintenance by the operator or owner can result in injury. To reduce the potential for injury, comply with these safety instructions and always pay attention to the safety alert  symbol, which means CAUTION, WARNING, or DANGER—“personal safety instruction.” Failure to comply with the instruction may result in personal injury or death.

Safe Operating Practices

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

 WARNING
POTENTIAL HAZARD <ul style="list-style-type: none">• Engine exhaust contains carbon monoxide, which is an odorless, deadly poison.
WHAT CAN HAPPEN <ul style="list-style-type: none">• Carbon monoxide can kill you and is also known to the State of California to cause birth defects.
HOW TO AVOID THE HAZARD <ul style="list-style-type: none">• Do not run engine indoors or in an enclosed area.

General Operation

1. Read, understand, and follow all instructions in the operator’s manual and on the machine before starting.
2. Allow only responsible adults who are familiar with the instructions to operate the machine.
3. Clear the area of objects such as rocks, toys, wire, etc., which could be picked up and thrown by the blade.
4. Be sure the area is clear of other people before mowing. Stop the machine if anyone enters the area.
5. Never carry passengers.
6. Do not mow in reverse unless absolutely necessary. Always look down and behind before and while backing.
7. Be aware of the mower discharge direction and do not point it at anyone. Do not operate the mower without either the entire grass catcher or the guard in place.
8. Slow down before turning. Sharp turns on any terrain may cause loss of control.
9. Never leave a running machine unattended. Always turn off blades, set parking brake, stop engine, and remove key before dismounting.
10. Turn off blades when not mowing.
11. Keep hands, feet, hair and loose clothing away from attachment discharge area, underside of mower and any moving parts while engine is running.
12. Stop the engine before removing the grass catcher or unclogging the chute.

13. Mow only in daylight or good artificial light.
14. Do not operate the machine while under the influence of alcohol or drugs.
15. Watch for traffic when operating near or crossing roadways.
16. Use extra care when loading or unloading the machine onto a trailer or truck.
17. Do not touch equipment or attachment parts which may be hot from operation. Allow to cool before attempting to maintain, adjust or service.

Slope Operation

Slopes are a major factor related to loss-of-control and tip-over accidents, which can result in severe injury or death. All slopes require extra caution. If you cannot back up the slope or if you feel uneasy on it, do not mow it.

DO

- Mow up and down slopes greater than 5°, not across.
- Mow downhill only on slopes above 10°, never mow uphill. If a steep slope must be ascended, back up the hill, and drive forward down the hill, keeping the machine in gear.
- Remove obstacles such as rocks, tree limbs, etc. from the mowing area. Watch for holes, ruts or bumps, as uneven terrain could overturn the machine. Tall grass can hide obstacles.
- Use slow speed. Choose a low gear so that you will not have to stop or shift while on the slope.
- Follow the manufacturer's recommendations for wheel weight or counterweights to improve stability.
- Use extra care with grass catchers or other attachments. These can change the stability of the machine.

- Keep all movement on slopes slow and gradual. Do not make sudden changes in speed or direction.
- Avoid starting or stopping on a slope. If tires lose traction, disengage the blades and proceed slowly straight down the slope.

DO NOT

- Do not operate machine on hillsides or slopes exceeding 15°.
- Avoid turning on slopes. If you must turn, turn slowly and gradually downhill, if possible.
- Do not mow near drop-offs, ditches, or embankments. The machine could suddenly turn over if a wheel goes over the edge of a cliff or ditch, or if an edge caves in.
- Do not mow on wet grass. Reduced traction could cause sliding.
- Do not try to stabilize the machine by putting your foot on the ground.
- Do not use a grass catcher on steep slopes. Heavy grass bags could cause loss of control or overturn the machine.

Children

Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the machine and the mowing activity. Never assume that children will remain where you last saw them. The following requirements must be followed to prevent injury to children.

1. Keep children out of the mowing area and under the watchful care of another responsible adult.
2. Be alert and turn the machine off if children enter the area.
3. Before and while backing, look behind and down for small children.
4. Never carry children. They may fall off and be seriously injured or interfere with safe machine operation.
5. Never allow children to operate the machine.
6. Use extra care when approaching blind corners, shrubs, trees, the end of a fence or other objects that may obscure vision.

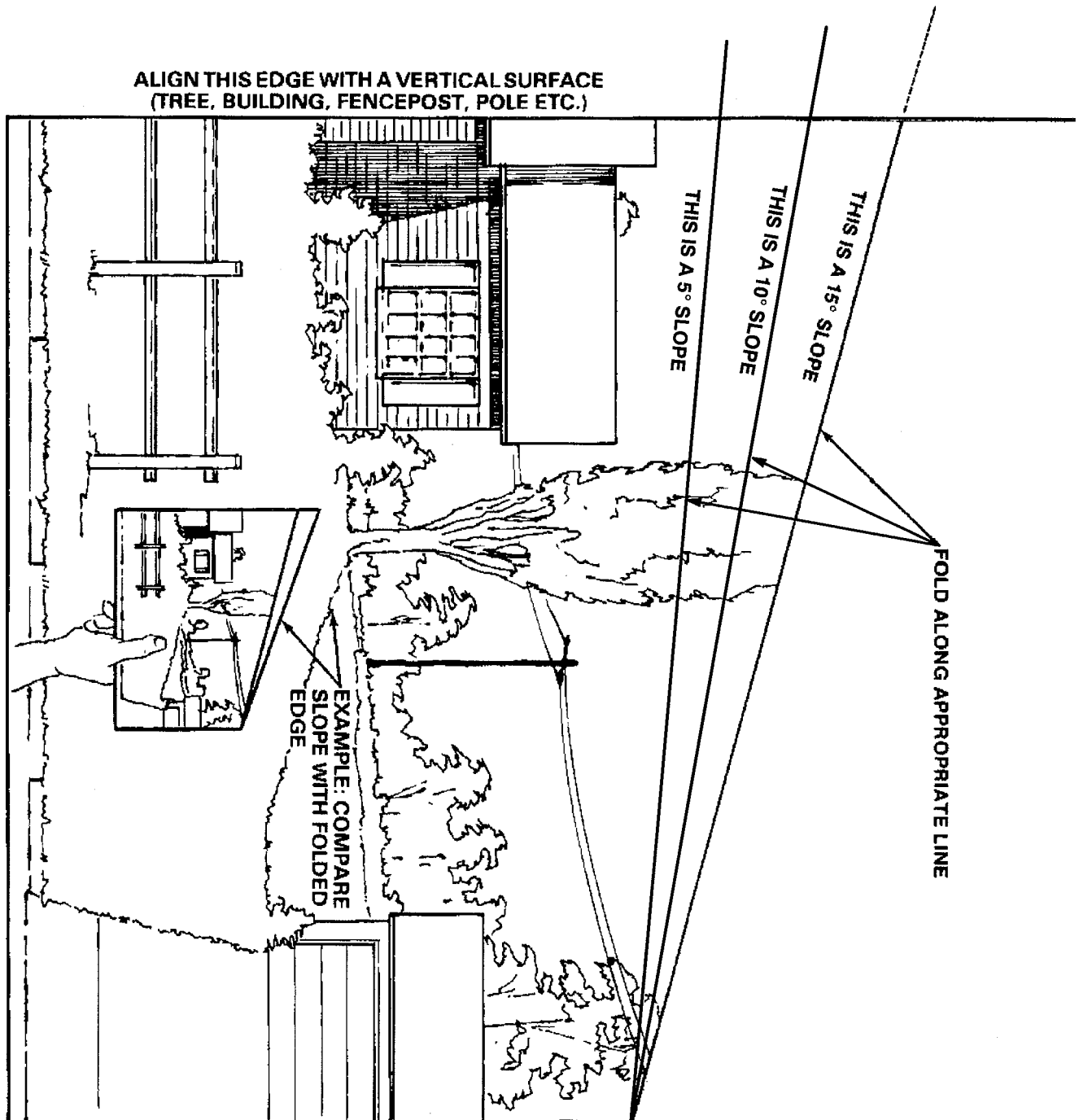
Service

1. Stop the engine, disconnect spark plug wire(s) and remove key before performing any service, repairs, maintenance or adjustments.
2. Use extra care when handling gasoline and other fuels. They are flammable and vapors are explosive.
 - A. Use only an approved container.
 - B. Never remove the gas cap or add fuel when the engine is running. Allow the engine to cool before refueling. Do not smoke.
 - C. Never refuel the machine indoors.
 - D. Never store the machine or fuel container inside where there is an open flame, such as near a water heater or furnace.
3. Never run a machine inside a closed area.

4. Keep nuts and bolts tight, especially the blade attachment bolts. Keep equipment in good condition.
5. Never tamper with safety devices. Check safety systems for proper operation before each use.
6. Keep the machine free of grass, leaves, or other debris build-up. Clean up oil or fuel spillage. Allow the machine to cool before storing.
7. Stop and inspect the equipment if you strike an object. Repair, if necessary, before restarting.
8. Grass catcher components are subject to wear, damage and deterioration, which could expose moving parts or allow objects to be thrown. Frequently check components and replace with manufacturer's recommended parts, when necessary.
9. Mower blades are sharp and can cut. Wrap the blade(s) or wear gloves, and use extra caution when servicing them.
10. Use only genuine replacement parts to ensure that original standards are maintained.
11. Check brake operation frequently. Adjust and service as required.
12. Battery acid is poisonous and can cause burns. Avoid contact with skin, eyes and clothing. Protect your face, eyes and clothing when working with a battery.
13. Battery gases can explode. Keep cigarettes, sparks and flames away from battery.

Slope Chart

Read all safety instructions on pages 2-7.



Gasoline and Oil

Recommended Gasoline

Use UNLEADED Regular Gasoline suitable for automotive use (85 pump octane minimum). Leaded regular gasoline may be used if unleaded regular is not available.

IMPORTANT: Never use methanol, gasoline containing methanol, or gasohol containing more than 10% ethanol because the fuel system could be damaged. Do not mix oil with gasoline.

DANGER

POTENTIAL HAZARD

- In certain conditions gasoline is extremely flammable and highly explosive.

WHAT CAN HAPPEN

- A fire or explosion from gasoline can burn you, others, and cause property damage.

HOW TO AVOID THE HAZARD

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

Stabilizer/Conditioner

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

- Keeps gasoline fresh during storage
- Cleans the engine while it runs
- Eliminates gum-like buildup in the fuel system, which causes hard starting

IMPORTANT: Never use fuel additives containing methanol or ethanol.

Filling the Fuel Tank

1. Shut the engine off.
2. Clean around the fuel tank cap and remove the cap. Use a funnel and add unleaded regular gasoline to the fuel tank, until the level is 1/4 to 1/2 inch (6 mm to 13 mm) below the bottom of the filler neck. This space in the tank allows gasoline to expand. Do not fill the fuel tank completely full.
3. Install the fuel tank cap securely. Wipe up any gasoline that may have spilled.

Check Engine Oil Level

Before you start the engine and use the machine, check the oil level in the engine crankcase; refer to Checking Oil Level, page 23.

Assembly

Loose Parts

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

DESCRIPTION	QTY.	USE
Spacer	1	Install steering wheel
Steering wheel	1	
Roll pin 1/4 x 2-1/2" (64 mm)	1	
Seat	1	Install seat
Bolt 5/16-18 x 1" (25 mm)	4	
Lock nut 5/16-18	4	
R-clamp	1	
Carriage bolt 1/4-20 x 3/4" (19 mm)	2	Install battery cables
Wing nut 1/4-20	2	
Operator's Manual	1	Rear before operating machine
Parts catalog	1	
Registration card	1	Fill out and return to Toro

Install Seat

1. Position seat assembly onto seat plate aligning mounting holes (Fig. 1).
2. Slide wire clamp over seat switch wire (Fig. 1).
3. Using left front hole, loosely secure wire clamp and seat to seat base with capscrews and lock nuts (Fig. 1).
4. Mount seat to seat base with (3) remaining bolts and lock nuts.
5. Route seat switch wire thru slot in seat plate and plug connector onto seat switch (Fig. 1).
6. Tighten all lock nuts and check operation of seat.
7. Make sure wire harness is clear of lift arm and all moving parts.

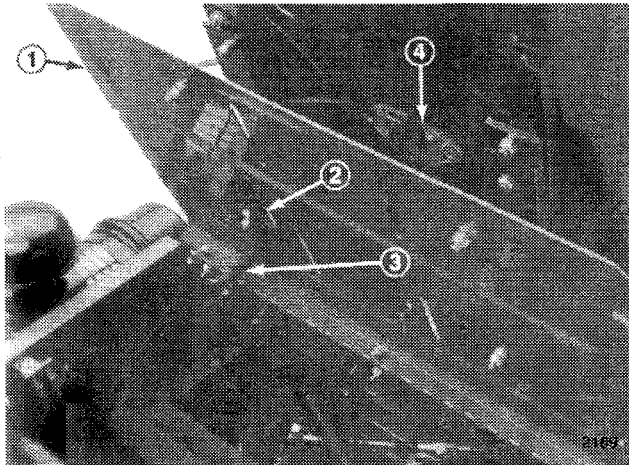


Figure 1

- | | |
|---------------|--------------------------|
| 1. Seat plate | 3. Seat switch wire |
| 2. R-clamp | 4. Seat switch connector |

Install Steering Wheel

1. Move rear wheels so they point straight ahead.
2. Slide spacer and steering wheel onto steering shaft aligning mounting holes. Check that logo on steering cap points forward.
3. Secure steering wheel to shaft with roll pin (Fig. 2).

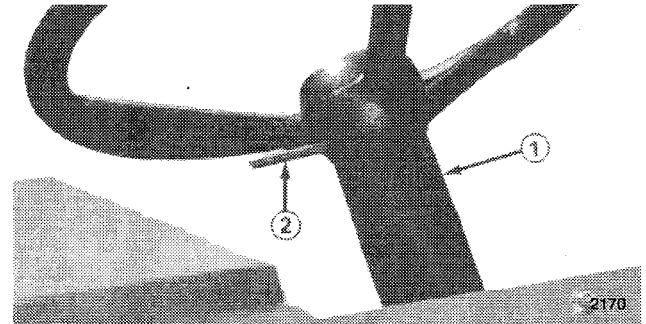


Figure 2

- | | |
|-----------|-------------|
| 1. Spacer | 2. Roll pin |
|-----------|-------------|

Activate the Battery

Bulk electrolyte with 1.260 specific gravity must be purchased from a local battery supply outlet.

1. If already installed, remove the battery from the holder.

DANGER

POTENTIAL HAZARD

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

WHAT CAN HAPPEN

- If you carelessly drink electrolyte you could die or if it gets onto your skin you will be burned.

HOW TO AVOID THE HAZARD

- Do not drink electrolyte and avoid contact with skin, eyes or clothing. Wear safety glasses to shield your eyes and rubber gloves to protect your hands.
- Fill the battery where clean water is always available for flushing the skin.
- Follow all instructions and comply with all safety messages on the electrolyte container.

2. Remove filler caps from the battery. Slowly pour electrolyte into each cell until the electrolyte level is up to the lower part of the tube (Fig. 3).

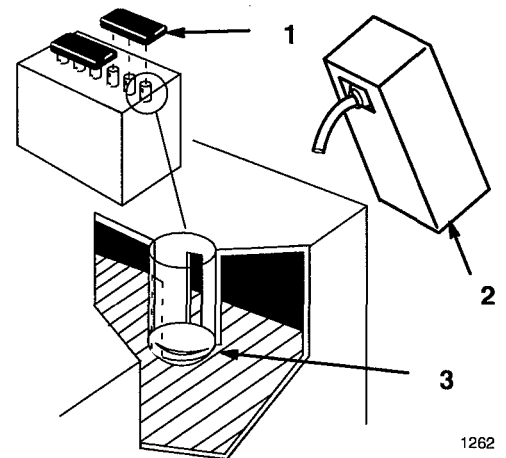


Figure 3

1. Filler caps
2. Electrolyte
3. Lower part of the tube

3. Leave the covers off and connect a 3 to 4 amp battery charger to the battery posts (Fig. 4). Charge the battery at a rate of 4 amperes or less for 4 hours (12 volts).

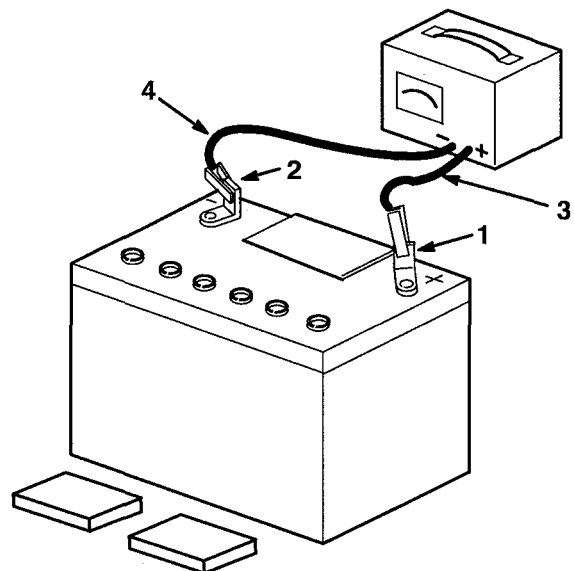


Figure 4

1. Positive post
2. Negative post
3. Charger red (+) wire
4. Charger black (-) wire

! WARNING

POTENTIAL HAZARD

- Charging battery produces gasses.

WHAT CAN HAPPEN

- Battery gasses can explode.

HOW TO AVOID THE HAZARD

- Keep cigarettes, sparks and flames away from battery.

4. When the battery is fully charged, disconnect the charger from the electrical outlet then from the negative and positive battery posts (Fig. 4).
5. Slowly pour electrolyte into each cell until the level is up to the lower part of the tube (Fig. 3) and install covers.
6. Install the battery into the holder.

Install the Battery

IMPORTANT: Activate battery with electrolyte and charge before installing.

1. Mount battery on battery support with terminal posts toward gas tank (Fig. 5).
2. Secure battery with clamp, support rod and wing nut (Fig. 5).

Note: DO NOT OVERTIGHTEN.

3. Slide the red terminal boot onto the red battery cable (Fig. 5).
4. Install the positive battery cable to positive (+) battery terminal and the negative battery cable to the negative (-) battery terminal and secure with carriage bolts and lock nuts (Fig. 5).

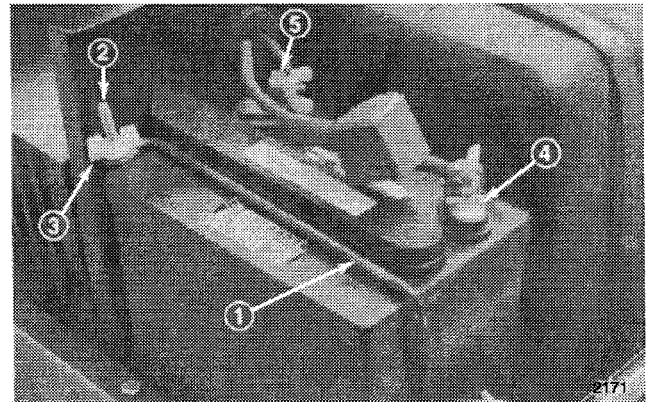


Figure 5

- | | |
|----------------|---------------------------|
| 1. Clamp | 4. Positive battery cable |
| 2. Support rod | 5. Negative battery cable |
| 3. Wing nut | |

Check Engine Oil

The engine is shipped with 4 pints of oil in the crankcase; however, oil level must be checked before and after the engine is first started.

IMPORTANT: Check level of oil every 5 operating hours or daily. Initially, change oil after the first 5 hours of operation; thereafter, under normal conditions, change oil after every 50 hours of operation. However, change oil and filter more frequently when engine is operated in extremely dusty and dirty conditions. Replace oil filter every other oil change.

1. Park on a level surface and open the hood.
2. Remove dipstick and wipe it with a clean rag. Push dipstick down into dipstick tube and make sure it is fully seated. Pull dipstick out and check level of oil (Fig. 6).
3. If oil level is low, add enough oil to raise level to FULL mark on dipstick. Do not overfill.
4. Remove filler cap (Fig. 6) and pour oil into filler neck until level is at FULL mark on dipstick.

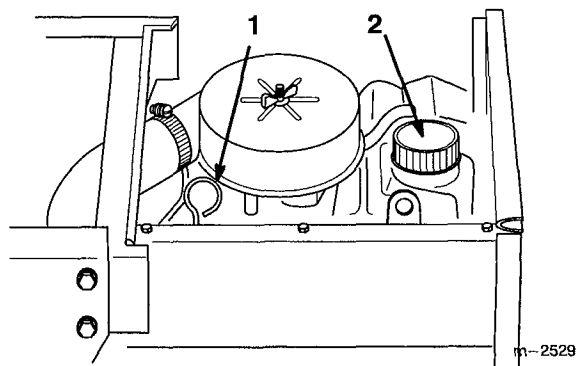


Figure 6

1. Dipstick 2. Filler cap

The engine requires high-quality detergent oil having the American Petroleum Institute – API– “service classification” SF or SE. Oil viscosity – weight – must be selected according to anticipated ambient temperature. Temperature/viscosity recommendations are:

A. Above 32° F (0°C) – Use 10W–30, and if it is not available, 10W–40 is an acceptable substitute.

B. Below 32° F (0°C) – Use 5W–20 or 5W–30, and if they are not available, 10W–30 is an acceptable substitute.

Check Hydraulic System Fluid

The hydraulic system is designed to operate on SAE 10W–30 engine oil or, as a substitute, SAE 10W–40 engine oil. The reservoir is filled at the factory with approximately 5 quarts of 10W–30 engine oil. Check reservoir oil level before engine is first started and daily thereafter.

1. Position machine on a level surface and stop the engine.
2. Remove dipstick cap from filler neck (Fig. 7) and wipe it with a clean rag. Insert dipstick cap onto filler neck; then remove it and check level of oil.
3. If level is not within 1/2 inch from full mark on dipstick, add SAE 10W–30 engine oil to raise level to FULL mark. Do not overfill.
4. Install dipstick filler cap onto filler neck (Fig. 7).
5. Run engine for approximately 1 minute, recheck reservoir oil level and add as required.

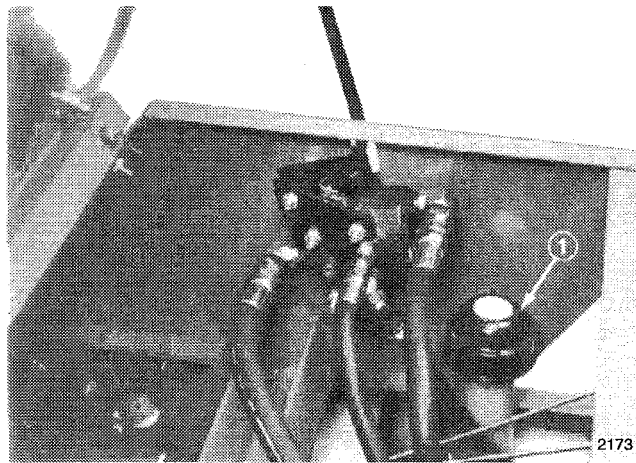


Figure 7

1. Dipstick cap
-

Operation

Think Safety First

Please carefully read all the safety instructions and symbols in the safety section. Knowing this information could help you, your family, pets or bystanders avoid injury.

Become familiar with all the controls before you start the engine and operate the machine.

Starting and Stopping the Engine

Starting

1. Make sure spark plug wire(s) are installed on spark plug(s).
2. Move the traction pedal to neutral, set the parking brake and move the PTO switch to “OFF”.
3. Move the choke control to the “CHOKE” position before starting a cold engine.

Note: A warm or hot engine usually does not require any choking.

4. Rotate ignition key to “START”. When engine starts, release key, gradually move choke to run and regulate throttle to desired speed.

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

Stopping

1. Move the throttle lever to “SLOW” (Fig. 8).

Note: If the engine has been working hard or is hot, let it idle for a minute before turning the ignition key “OFF.” This helps cool the engine before it is stopped. In an emergency, the engine may be stopped by turning the ignition key to “OFF.”

2. Turn the ignition key to “OFF” (Fig. 8).
3. Set the parking brake.
4. Pull wire off spark plug(s) to prevent possibility of accidental starting before storing machine.

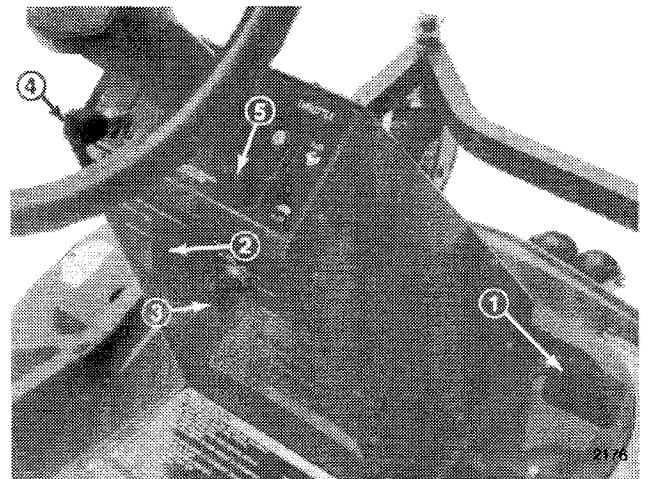


Figure 8

- | | |
|--------------------|-------------|
| 1. Traction pedal | 4. Choke |
| 2. PTO switch | 5. Throttle |
| 3. Ignition switch | |

Operating the Power Take Off (PTO)

The power take off (PTO) switch engages and disengages power to the electric clutch.

Engaging the PTO

1. Release the parking brake.
2. Release pressure on the traction pedal to stop movement (Fig. 9).
3. To engage lift cover and move the PTO switch to the “ON” position (Fig. 9).

Disengaging the PTO

1. Closing the cover moves the PTO switch to the “OFF” position (Fig. 9).

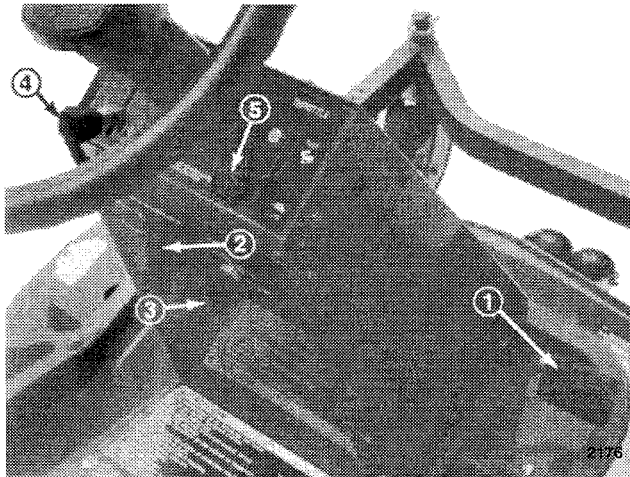


Figure 9

- | | |
|--------------------|-------------|
| 1. Traction pedal | 4. Choke |
| 2. PTO switch | 5. Throttle |
| 3. Ignition switch | |

Driving Forward or Backward

The throttle control regulates the engine speed as measured in rpm (revolutions per minute). Place the throttle control in the “FAST” position for best performance.

Forward

1. To go forward, place your foot on the traction pedal (Fig. 9).
2. Release the parking brake.
3. Slowly press on the upper pad of the traction control to move forward (Fig. 9).

Backward

1. To go backward, place your foot on the traction pedal (Fig. 9).
2. Release the parking brake.
3. Slowly press on the lower pad of the traction pedal to move rearward (Fig. 9).

Stopping the Machine

To stop the machine, release pressure on the traction pedal, move the PTO switch to “OFF” and turn the ignition key to “OFF” to stop the engine and remove the key. Also set the parking brake if you leave the machine unattended; refer to Setting the Parking Brake, page 17.

CAUTION

POTENTIAL HAZARD

- Someone could move or attempt to operate the machine while it is unattended.

WHAT CAN HAPPEN

- Children or bystanders may be injured if they use the machine.

HOW TO AVOID THE HAZARD

- Always remove the ignition key and set the parking brake when leaving the machine unattended, even if just for a few minutes.

Parking Brake

Always set the parking brake when you stop the machine or leave it unattended.

Setting the Parking Brake

1. Release pressure on the traction pedal to stop movement.
2. Lift the parking brake lever up (Fig. 10) to apply the parking brake.

Releasing the Parking Brake

1. Move the parking brake lever down (Fig. 10) to release the parking brake.

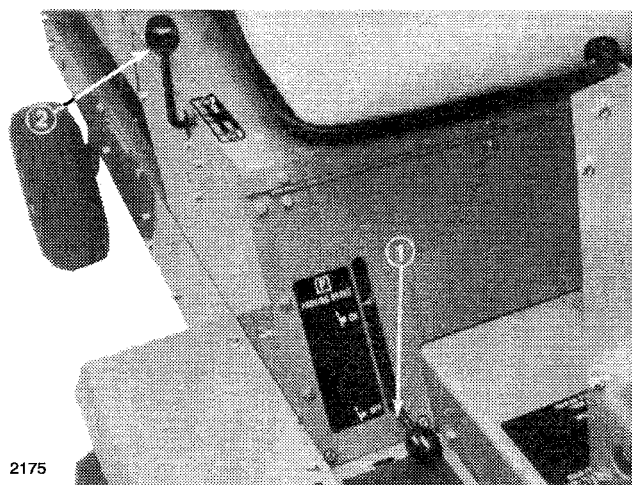


Figure 10

1. Parking brake
2. Implement lift lever

Implement Lift Lever

The implement lift lever (Fig. 10) is used to raise and lower various attachments.

Raising Attachments

1. Remove pressure from traction pedal to stop the machine.
2. Pull implement lift lever (Fig. 10) rearward to raise attachment to the desired height.

Lowering Attachments

1. Remove pressure from traction pedal to stop the machine.
2. Push implement lift lever (Fig. 10) forward to lower attachment.

Note: Hold lift lever in down position 1–2 seconds after attachment in down to extend lift cylinder allowing attachment to float with changes in ground contour.

The Safety Interlock System

Understanding the Safety Interlock System

The safety interlock system is designed to prevent the engine from rotating or starting unless:

- The traction pedal is in neutral
- The power take off (PTO) is disengaged

The safety interlock system is designed to stop the engine if you rise from the seat when the power take off (PTO) is engaged or the motion control is not in neutral.

Testing the Safety Interlock System

Test the safety interlock system before you use the machine each time. If the safety system does not operate as described below, have an Authorized Service Dealer repair the safety system immediately.

1. Switch the power take off (PTO) "ON". Now turn the key to "START"; the engine should not rotate.
2. Turn the power take off (PTO) "OFF" and move the motion control (forward or reverse). Now turn the ignition key to "START"; the engine should not rotate.
3. Set the parking brake, move the power take off (PTO) to disengaged, motion control to neutral and start the engine. While the engine is running, engage the power take off (PTO) and rise slightly from the seat; the engine should stop.
4. Set the parking brake, move the power take off (PTO) to disengaged, motion control to neutral and start the engine. While the engine is running, slowly move the motion control (forward or reverse) ; the engine should stop.

IMPORTANT: The unit can be started when all controls are in a safe position, without the operator in the seat, for servicing.

Positioning the Seat

The seat can move forward and backward. Position the seat where you have the best control of the machine and are most comfortable.

1. To adjust the seat move lever on left side of seat rearward (Fig. 11).
2. Slide seat to desired position and release lever to lock seat into position.

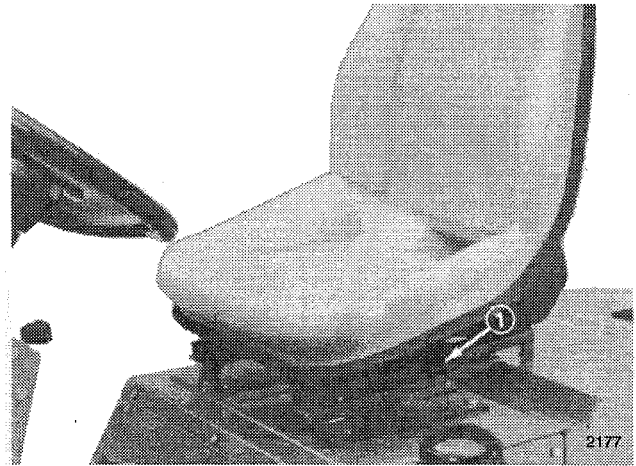


Figure 11

1. Seat adjustment lever

Pushing or Towing the Machine

In an emergency, the traction unit can be pushed or towed for a very short distance. Toro does not recommend this as standard procedure.

IMPORTANT: Do not push or tow the traction unit faster than 2 to 3 mph because transmission may be damaged. If traction unit must be moved a considerable distance, transport on a truck or trailer.

1. To push or tow forward, the traction pedal must be fully depressed forward.
2. To push or tow in reverse, the traction pedal must be fully depressed in reverse.

Maintenance

Service Interval Chart

Service Operation	Each Use	8 Hours	25 Hours	50 Hours	100 Hours	200 Hours	Storage Service
Oil—check level	X						X
Oil—change*		Initial		X			X
Oil Filter—change* (100 hours, every other oil change)					X		X
Safety System—check	X						X
Brake—check	X	X					X
Engine—clean outside and cooling fins	X				X		X
Bearings\Bushings—grease*			X				X
Air Filter—clean dust cup*				X			X
Paper Air Cleaner—clean*						X	X
Spark Plug(s)—check						X	X
Belts—check for wear/cracks				X			X
Fuel Filter—replace					X		X
Battery—check electrolyte level				X			X
Tires—check pressure				X			X
Hydraulic System—change oil (250 hrs)						X	X
Hydraulic System—change filter (250 hrs)						X	X
Front Axle—change oil (500 hours)							X
Chipped Surfaces—paint							X
* More often in dusty, dirty conditions							

CAUTION

POTENTIAL HAZARD

- If you leave the key in the ignition switch, someone could start the engine.

WHAT CAN HAPPEN

- Accidental starting of the engine could seriously injure you or other bystanders.

HOW TO AVOID THE HAZARD

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

Air Cleaner

General Air Cleaner Maintenance

To prevent possible severe engine damage and ensure maximum engine service life, periodically inspect the air cleaner and hose assembly.

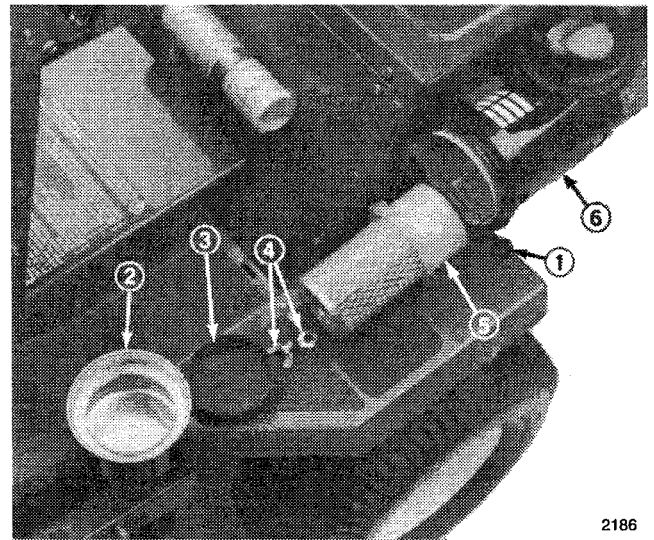
1. Assure hose between air cleaner and carburetor is clamped securely in place. Replace the hose if it is cracked or punctured.
2. Check air cleaner body for dents and other damage which could possibly cause an air leak. Replace a damaged air cleaner body.
3. Insure dust cup is sealing around bottom of air cleaner body.
4. Mounting screws and nuts holding air cleaner in place must be tight.
5. Inlet cap must be free of obstructions.

Service Dust Cup and Baffle

Inspect the dust cup and rubber baffle once a week or every 50 hours operation; however, daily or more frequent inspection is required when operating conditions are extremely dusty and dirty. Never allow dust to build up closer than 1 inch (25 mm) from the slot in top of dust cup.

Note: If conditions are extremely dusty and dirty, begin by checking dust cup and baffle after each day's operation to establish approximately how long an interval passes before dust cup should be emptied. Base further maintenance requirements on this figure. These conditions may be particularly prevalent if the rear discharge cutting unit is attached.

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to "OFF" to stop the engine. Remove the key.
2. Loosen thumb screw until dust cup and baffle can be removed. Separate dust cup and baffle (Fig. 12).
3. Dump dirt out of the dust cup. After cleaning cup and baffle, reinstall both parts with TOP of dust cup up (Fig. 12).



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Figure 12

- | | |
|----------------|-------------------------|
| 1. Thumb screw | 4. Wing nut with gasket |
| 2. Dust cup | 5. Filter element |
| 3. Baffle | 6. Air cleaner body |

Cleaning the Filter Element – Compressed Air Method

IMPORTANT: Replace filter if damage is evident.

Note: Compressed air is recommended when element must be used immediately after servicing because a washed element must be dried before it is used. By comparison, washing the element cleans better than blowing dirt out with compressed air.

IMPORTANT: Do not remove plastic fin assembly because back-blowing with compressed air removes dust from beneath fins.

1. Blow compressed air from inside to the outside of dry filter element. Do not exceed 100 psi (689 kPa) to prevent damage to the element.
2. Keep air hose nozzle at least 1 inch (25 mm) from pleated paper, and move nozzle up and down while rotating the filter element. Inspect element when dust and dirt are removed; refer to Inspecting Filter Element.
3. Wipe inside of air cleaner body with a damp cloth to remove excess dust. Slide filter into air cleaner body and secure in place with wing nut and gasket.
4. Install dust cup and baffle. Move thumb screw behind air cleaner body and tighten it securely.

Cleaning Engine Air Filter

1. Remove wing nut on top of engine air filter cover. Remove foam pre-cleaner from engine air filter.
2. Place bright light inside filter element.
3. Rotate filter slowly while checking for cleanliness, ruptures, holes, and tears. Replace defective filter element.

4. Clean pre-cleaner. Refer to Cleaning the Filter Element -Washing Method, page 21.

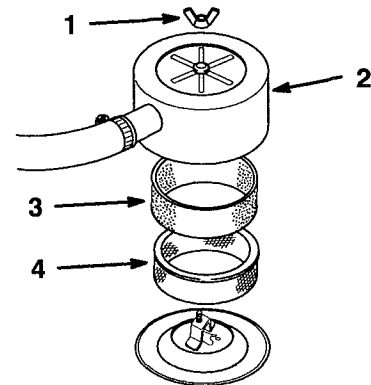


Figure 14

- | | |
|-------------|---------------|
| 1. Wing nut | 3. Filter |
| 2. Cover | 4. Pre-filter |

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Engine Oil

Service Interval/Specification

Change oil:

- After the first 8 operating hours.
- After every 50 operating hours.

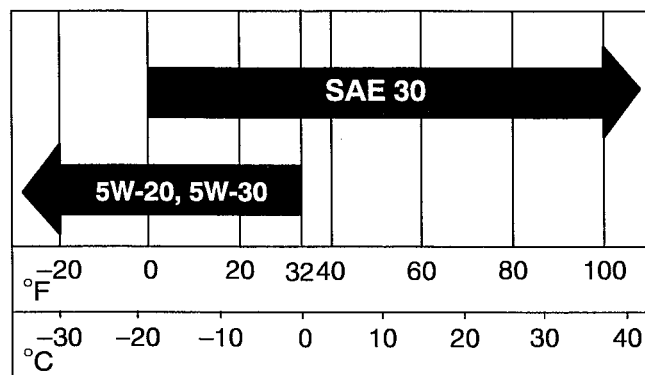
Note: Change oil more frequently when operating conditions are extremely dusty or sandy.

Oil Type: Detergent oil (API service SF, SE/CC, CD or SE)

Crankcase Capacity: w/filter, .94 l (4 pints)

Viscosity: See table below

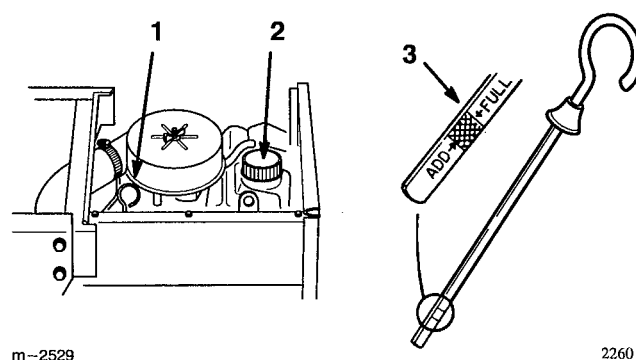
USE THESE SAE VISCOSITY OILS



Checking Oil Level

1. Park the machine on a level surface, disengage the power take off (PTO), set the parking brake, and turn the ignition key to "OFF" to stop the engine. Remove the key.
2. Clean around the oil dipstick and oil fill (Fig. 15) so dirt cannot fall into the filler hole and damage the engine.
3. Pull the oil dipstick out and wipe the metal end clean (Fig. 15).
4. Slide the oil dipstick fully into the dipstick tube (Fig. 15). Pull the dipstick out and look at the metal end. If oil level is low, slowly pour only enough oil into the filler hole to raise the level to the "FULL" mark.

IMPORTANT: Do not overfill the crankcase with oil because the engine may be damaged.



m-2529

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Figure 15

1. Oil dipstick
2. Oil fill
3. Metal end

Changing/Draining Oil

1. Start the engine and let it run five minutes. This warms the oil so it drains better.
2. Park the machine so that the drain side is slightly lower than the opposite side to assure the oil drains completely. Then disengage the power take off (PTO), set the parking brake, and turn the ignition key to "OFF" to stop the engine. Remove the key.
3. Place a pan below the oil drain. Remove the oil drain plug (Fig. 16).
4. When oil has drained completely, install the oil drain plug.

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

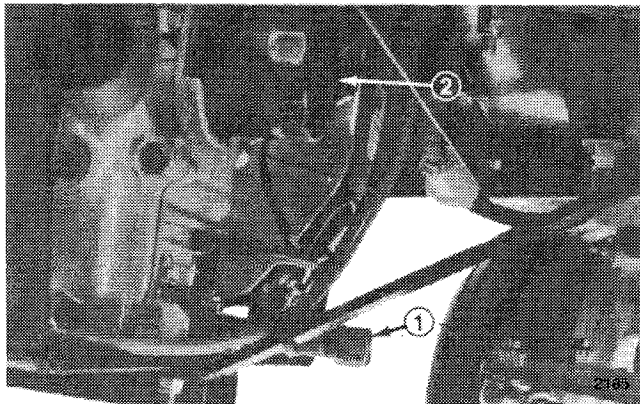


Figure 16

1. Oil drain plug 2. Oil filter

5. Slowly pour approximately 80% of the specified amount of oil into the filler tube (Fig. 15). Now check the oil level; refer to Checking Oil Level, page 23. Slowly add additional oil to bring to "FULL" mark on dipstick.

Change Oil Filter

Service Interval/Specification

Replace the oil filter every 100 hours or every other oil change.

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

1. Drain the oil from the engine; refer to Changing/Draining Oil, page 24.
2. Remove the old filter and wipe the filter adapter (Fig. 16 and 17) gasket surface.
3. Apply a thin coat of new oil to the rubber gasket on the replacement filter (Fig. 17).

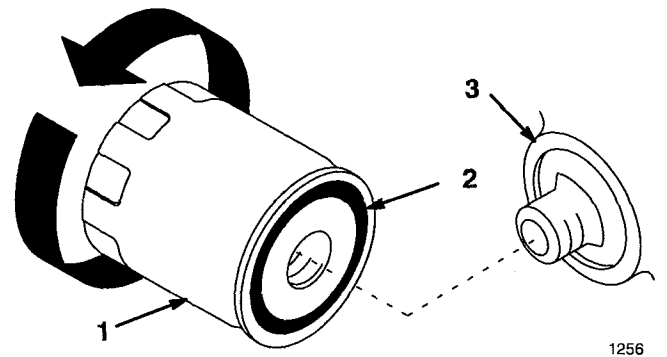


Figure 17

1. Oil filter 3. Adapter
2. Gasket

4. 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. 17).
5. Fill the crankcase with the proper type of new oil; refer to Changing/Draining Oil, page 24.

Spark Plug

Service Interval/Specification

Check the spark plug(s) after every 200 operating hours. Make sure the air gap between the center and side electrodes is correct before installing the spark plug. Use a spark plug wrench for removing and installing the spark plug(s) and a gapping tool/feeler gauge to check and adjust the air gap. Install a new spark plug(s) if necessary.

Type: Champion RC-12YC (or equivalent)
Air Gap: 0.040 in. (1 mm)

Removing the Spark Plug(s)

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to "OFF" to stop the engine. Remove the key.
2. To gain access to the rear spark plug the gas tank must be removed (Fig. 18).

DANGER

POTENTIAL HAZARD

- In certain conditions gasoline is extremely flammable and highly explosive.

WHAT CAN HAPPEN

- A fire or explosion from gasoline can burn you, others, and cause property damage.

HOW TO AVOID THE HAZARD

- Drain gasoline from the fuel tank when the engine is cold. Do this outdoors in an open area. Wipe up any gasoline that spills.
- Never drain gasoline near an open flame or where gasoline fumes may be ignited by a spark.
- Never smoke a cigarette, cigar or pipe.

3. Rotate tank and set in hood to prevent fuel spilling.
4. Push out plastic cover from access hole in plate between engine and gas tank.
5. Pull the wire(s) off the spark plug(s). Now clean around the spark plug(s) to prevent dirt from falling into the engine and potentially causing damage.
6. Remove the spark plug(s) and metal washer.

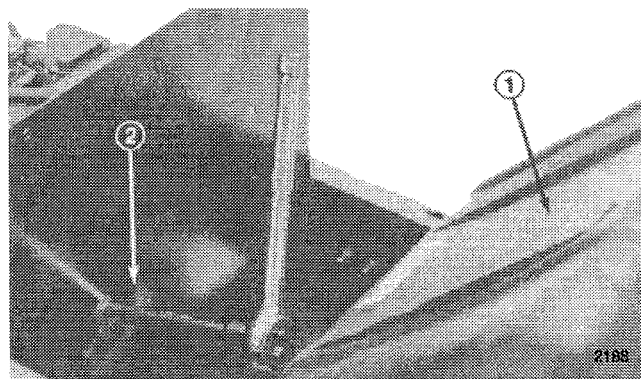


Figure 18

1. Fuel tank
2. Opening for access

Checking the Spark Plug

1. Look at the center of the spark plug(s) (Fig. 19). If you see light brown or gray on the insulator, the engine is operating properly. A black coating on the insulator usually means the air cleaner is dirty.

IMPORTANT: Never clean the spark plug(s). Always replace the spark plug(s) when it has: a black coating, worn electrodes, an oily film, or cracks.

2. Check the gap between the center and side electrodes (Fig. 19). Bend the side electrode (Fig. 19) if the gap is not correct.

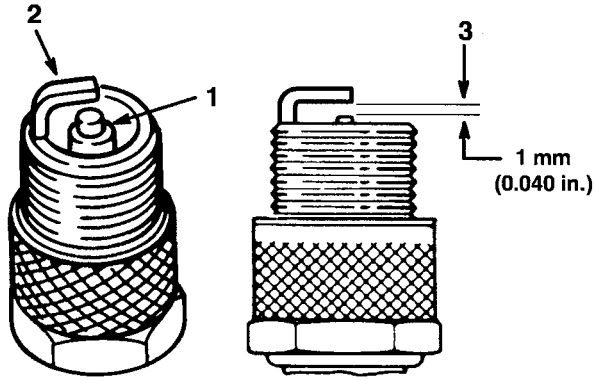


Figure 19

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

Installing the Spark Plug(s)

1. Install the spark plug(s) and metal washer. Make sure the air gap is set correctly.
2. Tighten the spark plug(s) to 12 ft-lb (17 N.m).
3. Push the wire(s) onto the spark plug(s) (Fig. 18).
4. Push plastic cover into access hole in plate between engine and gas tank.
5. Lift fuel tank and attach fuel hose, secure with hose clamp.
6. Rotate fuel tank into position, hook straps into lower bracket and secure with capscrews and lock nuts.

Greasing and Lubrication

Service Interval/Specification

Grease all bearings and bushings every 25 operating hours. Grease more frequently (daily) when operating conditions are extremely dusty or sandy and when machine is washed frequently.

Grease Type: General-purpose lithium base grease.

How to Grease

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to "OFF" to stop the engine. Remove the key.
2. Clean the grease fittings with a rag. Make sure to scrape any paint off the front of the fitting(s).
3. Connect a grease gun to the fitting. Pump grease into the fittings until grease begins to ooze out of the bearings.
4. Wipe up any excess grease.

Where to Add Grease

1. Lubricate the wheel bearings (Fig. 20).

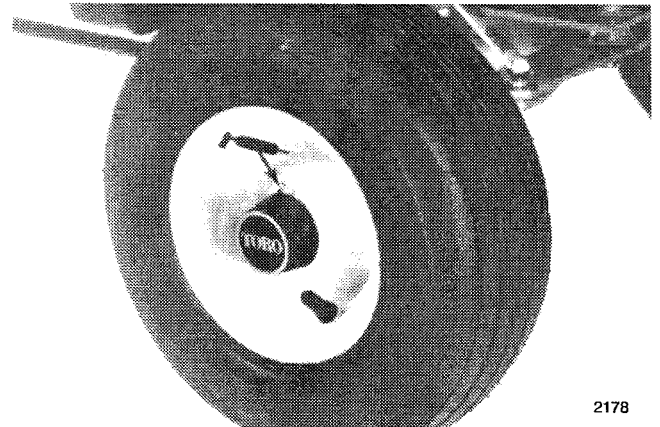


Figure 20

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2. Lubricate spindles, steering shaft and pivot (Fig. 21).

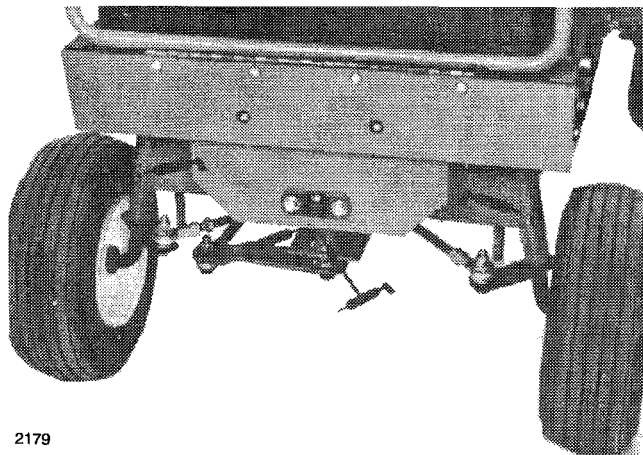


Figure 21

3. Lubricate the axle bearings (Fig. 22).

Once a year, grease front wheel hub to prevent the formation of rust and to simplify future wheel removal.

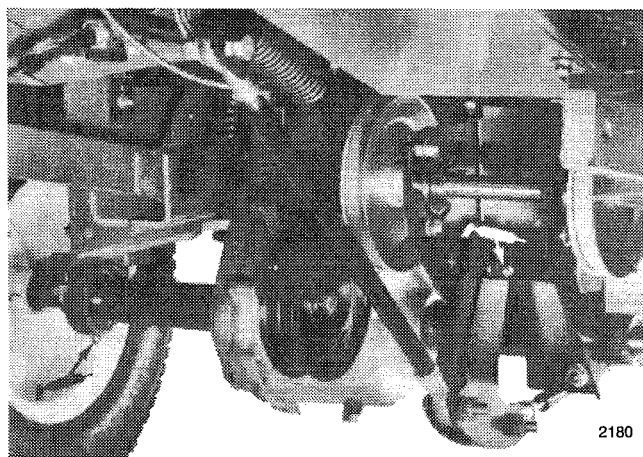


Figure 22

4. Lubricate the traction pedal bushings with a few drops of SAE 10W-30 oil or dry spray lube and the steering shaft (Fig. 23).

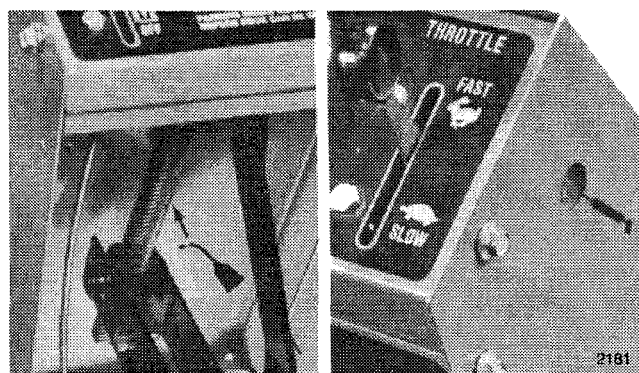


Figure 23

Tire Pressure

Service Interval/Specification

Maintain the air pressure in the front and rear tires as specified. Check the pressure at the valve stem after every 50 operating hours or monthly, whichever occurs first (Fig. 24). Check the tires when they are cold to get the most accurate pressure reading.

Pressure: .103 kPa (15 psi) front and rear

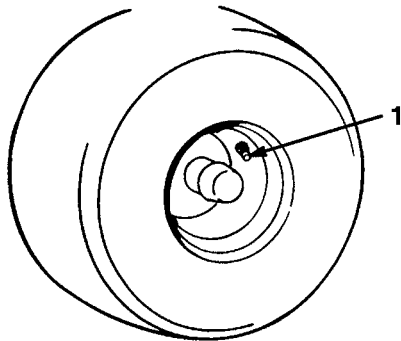


Figure 24

1. Valve stem

Cleaning the Cooling System

Service Interval/Specification

Before each use, remove grass clippings, dirt and grime from the entire machine, muffler and engine air intake screen. Every 100 operating hours clean dirt and chaff from the engine cylinder head fins and blower housing. This will help insure adequate cooling and reduce the possibility of overheating and mechanical damage to the engine.

1. Open hood and pull spark plug wire(s) off.
2. To avoid overheating and possible engine damage clean, grass, dust, dirt and oil from outside of engine, air intake screen and muffler.
3. To clean cylinder head fins, remove engine from chassis and remove cooling shrouds. Make sure cooling shrouds are re-installed before operating engine.
4. After storage check cooling system and wiring for animal nests.

Brake

Always set the parking brake when you stop the machine or leave it unattended. If the parking brake does not hold securely, an adjustment is required.

Checking the Brake

1. Park the machine on a level surface, disengage the power take off (PTO), set the parking brake, and turn the ignition key to "OFF" to stop the engine. Remove the key.
2. Drive wheels must lock when the brake is applied. Adjustment is required if the wheels turn and do not lock; refer to Adjusting the Brake, page 29.
3. Release the brake, wheels should rotate freely.
4. If both conditions are met no adjustment is required.

IMPORTANT: With the parking brake released, the drive wheels must rotate freely. If brake action and free wheel rotation cannot be achieved contact your service dealer immediately.

Adjust the Brake

If drive wheels do not rotate when brake lever is in the OFF position, or brake does not hold when lever is in the ON position, an adjustment is required.

1. Move brake lever to the ON position.
2. Measure distance between disc brake actuating arm and stop pin on axle bracket assembly (Fig. 25). Distance should be less than 1/4 inch (6 mm).
3. If distance is greater than 1/4 inch (6 mm), tighten locknut to decrease distance between actuating arm and stop pin (Fig. 25).
4. With the brake lever OFF, check clearance between brake pads and disc with a feeler gauge (Fig. 25). Proper clearance is approximately .010 inch (2.5 mm).
5. The actuating arm should be no more than 3/8 inch (10 mm) away from stop with brake lever in the OFF position.
6. Check the brake operation again; refer to Checking the Brake, page 29.
7. Check adjustment. Drive wheels should rotate freely when brake lever is in the OFF position.

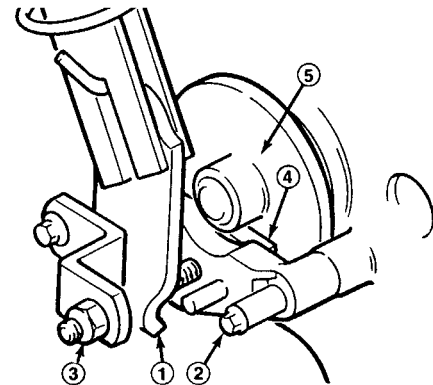


Figure 25

- | | |
|------------------------|------------------|
| 1. Brake actuating arm | 4. Brake pad (2) |
| 2. Stop pin | 5. Disc |
| 3. Lock nut | |

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Fuel Filter

Service Interval/Specification

Replace the fuel filter after every 100 operating hours or yearly, whichever occurs first.

Replacing the Fuel Filter

Never install a dirty filter if it is removed from the fuel line.

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to "OFF" to stop the engine. Remove the key.
2. Have a container ready to drain fuel from the tank. It is best to change fuel filter when fuel tank is almost empty.
3. Loosen hose clamps and slide them up the hose, away from the filter (Fig. 26).
4. Remove the filter from the fuel lines (Fig. 27).
5. Install a new filter, if the filter has an arrow, install with arrow pointing toward the carburetor.
6. Move the hose clamps close to the filter and tighten.

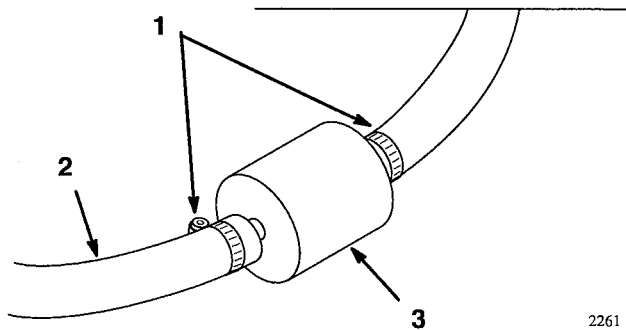


Figure 26

1. Hose clamp
2. Fuel line
3. Filter

Adjust Steering

1. Measure toe-in distance (at axle height) at front and rear of steering tires. Front measurement must be 0–1/4 inch (6 mm) less than rear measurement.
2. Loosening jam nuts and rotate tie rod to adjust front of tires in or out (Fig. 27).
3. Turn steering wheel full left to achieve a full left turn (Fig. 27).
4. Check clearance between left tire and tie rod. There should be 1 inch (25 mm) \pm 1/4 inch (6 mm) clearance at this position.
5. Loosening jam nuts and rotate steering rod to adjust clearance (Fig. 27).
6. Tighten jam nuts when adjustment is correct.

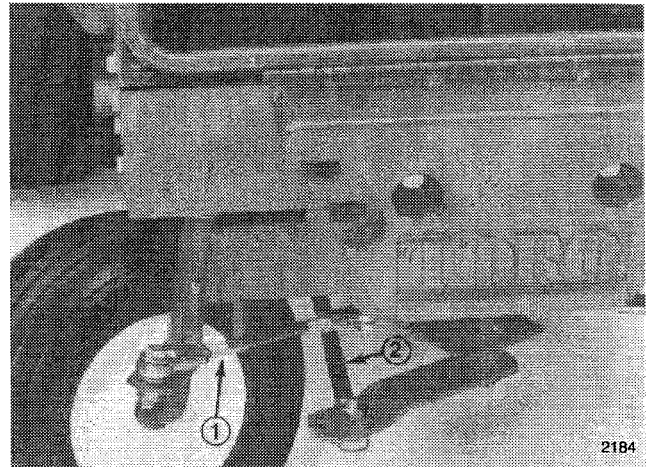


Figure 27

1. Tie rod
2. Steering rod

Adjust Belts

If belt slippage occurs, idler pulleys must be adjusted to increase belt tension.

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to "OFF" to stop the engine. Remove the key.
2. Measure distance from bottom of spacer on pulley mounting screw to bottom of slot in idler adjustment link. Distance should be 1/4 inch (6 mm) or less (Fig. 28).
3. Unhook tension spring from side of frame (Fig. 28).
4. To adjust, remove cotter pin and washer securing idler adjustment link to spring anchor (Fig. 28).
5. Slide link off mounting pin and select new hole until bottom of spacer is within 1/4 inch from bottom of slot (Fig. 28).
6. Reposition link onto spring anchor and secure with washer and cotter pin (Fig. 28).

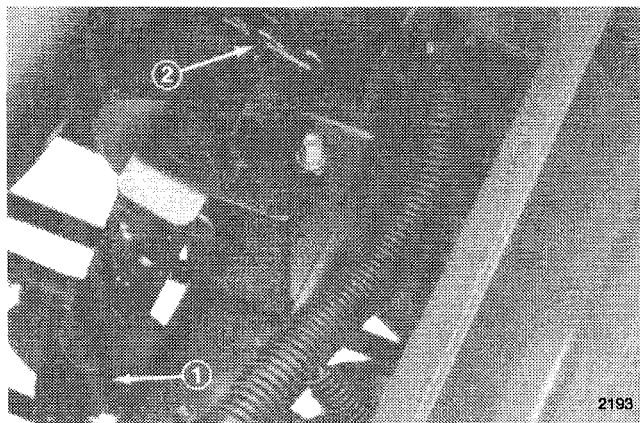


Figure 28

1. 1/4 in (6 mm) space
2. Idler adjustment

Replace Belts

To replace traction or jackshaft belt, use the following procedures and belt routing diagram (Fig. 29).

1. Clutch anchor bolt must be removed, and clutch unplugged from wire harness before traction belts can be removed.
2. Release tension in idler pulleys before removing or installing belts (Fig. 28).
3. Install belts, route traction belt over transmission as shown (Fig. 29).
4. Install clutch anchor bolt and plug in connector.

IMPORTANT: To avoid damage reinstall clutch anchor bolt before connecting wire.

5. Adjust belt tension; refer to Adjust Traction Belt page 31.

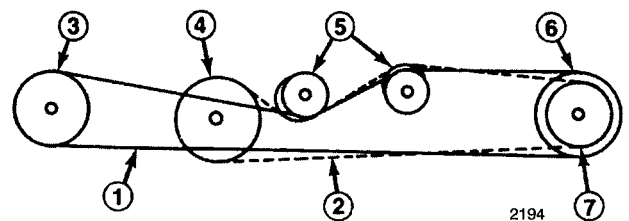


Figure 29

- | | |
|------------------------|------------------|
| 1. Jackshaft belt | 5. Idler pulley |
| 2. Traction belt | 6. Clutch pulley |
| 3. Jackshaft pulley | 7. Engine pulley |
| 4. transmission pulley | |

Adjust Lift Cylinder and Counterbalance Springs

1. Start engine and lower lift arms (cutting unit) until lift cylinder is fully extended and lift (cutting unit) is fully lowered.
2. Measure distance between cylinder jam nuts and cylinder pivot pin (Fig. 30). Distance should be approximately 2-1/4 inch.
3. Loosen jam nuts and adjust, if necessary, to attain needed clearance.

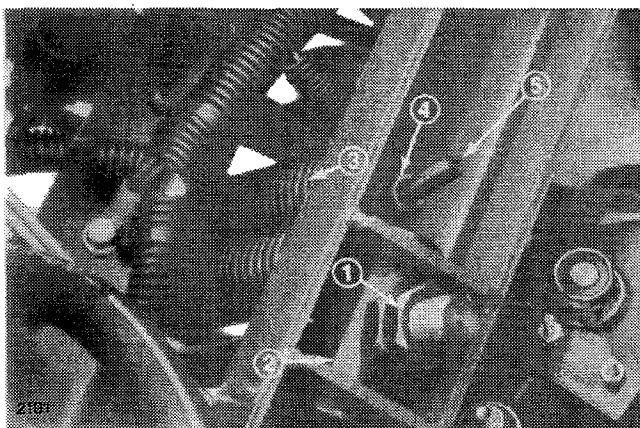


Figure 30

- | | |
|--------------------------|----------------------|
| 1. Jam nut | 4. Adjustment nut |
| 2. Cylinder pivot pin | 5. Lift arm "T" hook |
| 3. Counterbalance spring | |

4. Start engine and raise lift arms (cutting unit) until lift cylinder is fully retracted and lift (cutting unit) is fully raised.
5. Check distance between clevis pin and bottom hooks of springs (Fig. 25). Distance should be 1/4 inch or less.
6. Adjust nut on lift arm "T" hook to obtain required distance.

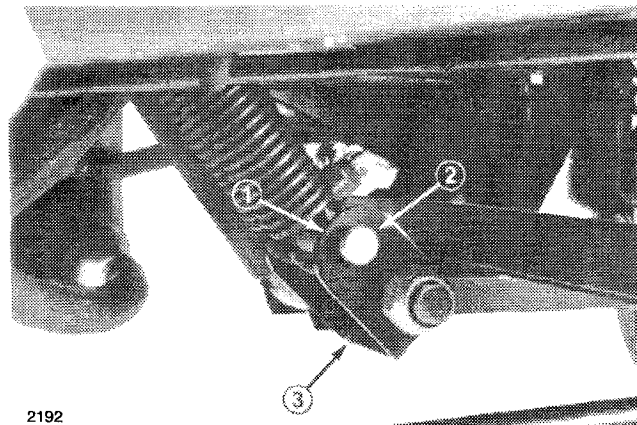


Figure 31

- | | |
|------------------------------|-----------------|
| 1. 1/4 inch (6 mm) clearance | 3. Lift bracket |
| 2. Clevis pin & cotter pin | |

Adjust Transmission Neutral

The machine must not creep when traction pedal is released. If it does creep, an adjustment is required.

1. Park machine on a level surface, lower cutting unit and shut engine off. Disengage the PTO and engage the parking brake.
2. Jack up front of machine until tires are off shop floor. Support machine with jack stands to prevent it from falling accidentally.
3. Loosen lock nut on adjustment cam (Fig. 32).
4. Start engine and rotate adjusting cam in either direction until wheels stop rotating (Fig. 32).

WARNING

POTENTIAL HAZARD

- Engine must be running so transmission neutral adjustment can be performed.

WHAT CAN HAPPEN

- Contact with moving parts or hot surfaces may cause personal injury.

HOW TO AVOID THE HAZARD

- Keep hands, feet, face and other body parts away from rotating parts, muffler and other hot surfaces.

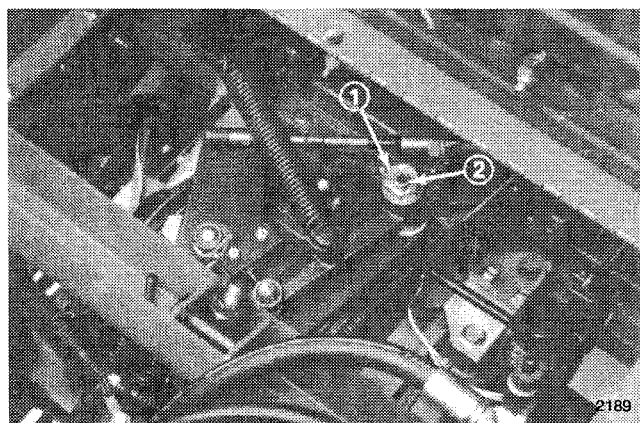


Figure 32

1. Adjustment cam
2. Lock nut

5. Stop engine and tighten lock nut to secure adjustment (Fig. 32).
6. Start engine and check adjustment. Repeat adjustment, if necessary.
7. Stop engine. Remove jack stands and lower machine to the shop floor. Test drive the machine to be sure it does not creep.

Adjust Electric Clutch

The clutch is adjusted to ensure proper engagement and braking action.

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to "OFF" to stop the engine. Remove the key.
2. To adjust clutch, tighten or loosen lock nuts on flange studs (Fig. 33).
3. Check adjustment by inserting feeler gauge thru slots next to studs.
4. The proper disengaged clearance between the clutch plates is 0.30-0.45 mm (.012-.018 in.). It will be necessary to check this clearance at each of the three slots to ensure the plates are parallel to each other.

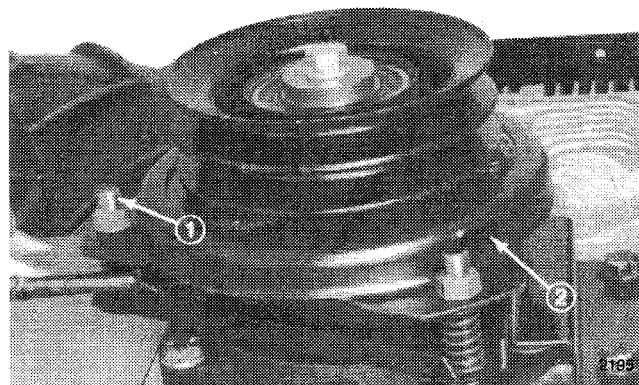


Figure 33

1. Lock nut
2. Adjustment slot

Change Hydraulic System Oil

The hydraulic system oil must be changed after every 250 hours of operation or yearly, whichever comes first. The reservoir has a capacity of approximately 5 U.S. quarts.

1. Park machine on a level surface, lower cutting unit, engage parking brake, and shut engine off.
2. Clean the area around the hydraulic oil filter and remove the filter from the bottom of the filter housing. Use bottom type filter wrench (Fig. 34).
3. Disconnect tube assembly and hose assembly from reservoir and allow the oil to flow into a drain pan (Fig. 34).

Note: To drain oil remaining in system, disconnect spark plug wires and crank engine for 15 seconds. This will pump remaining oil out of system thru tube assembly. Do not crank engine for more than 15 seconds.

4. Install the new hydraulic filter onto bottom of the filter housing (Fig. 34).
5. Install the tube assembly and hose assembly to reservoir (Fig. 34).

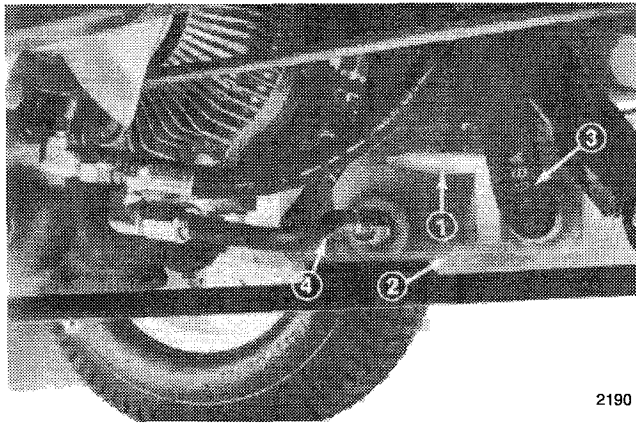


Figure 34

- | | |
|--------------|------------------|
| 1. Filter | 3. Hose assembly |
| 2. Reservoir | 4. Tube assembly |

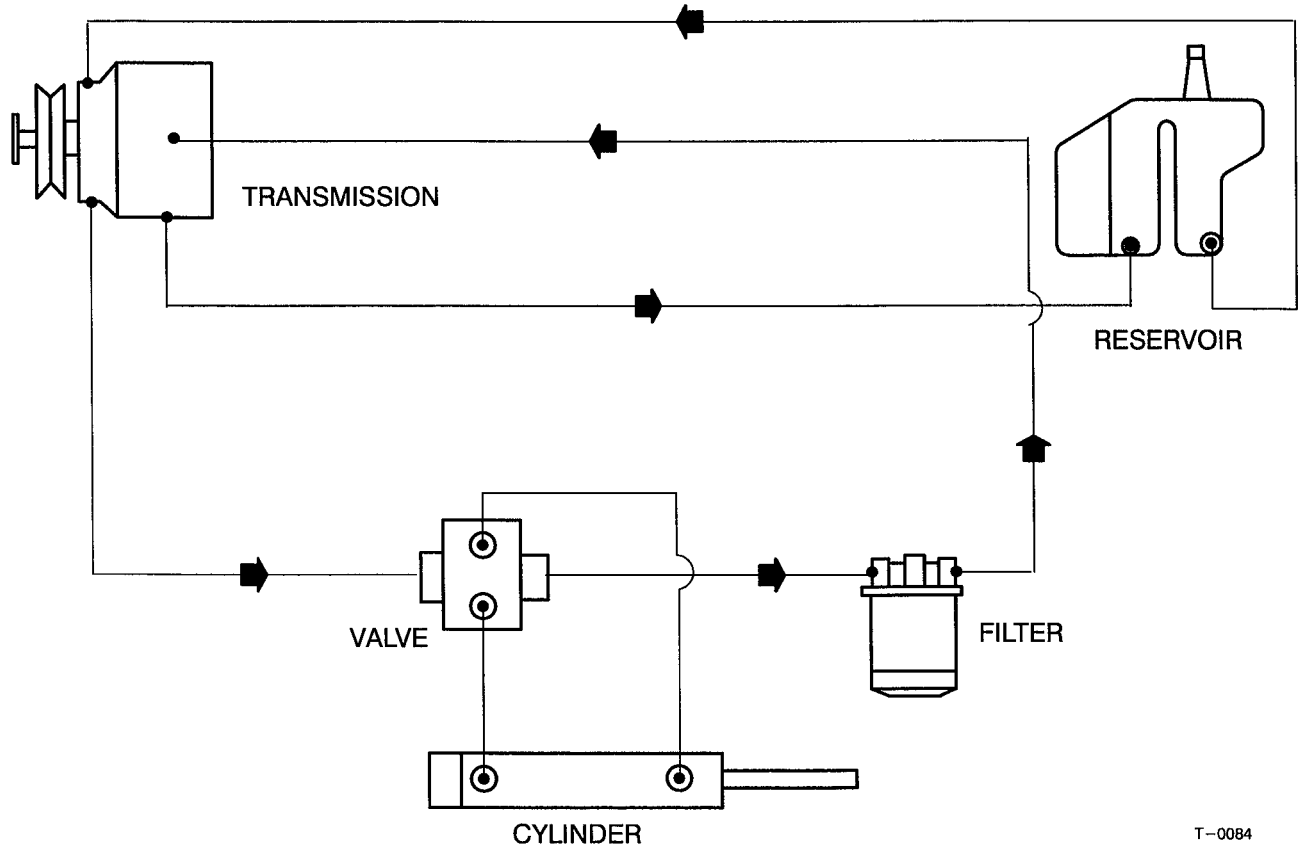
6. Fill the reservoir to the proper level; refer to Check Hydraulic System Fluid.
7. Place all controls in neutral or disengaged position and start engine. Run engine at lowest possible RPM to purge the system of air.
8. Run engine until lift cylinder extends and retracts and forward and reverse wheel motion is achieved.
9. Stop the engine and check the oil level in reservoir, add oil if necessary.
10. Check all connections for leaks.

Change Hydraulic Oil Filter

The hydraulic oil filter keeps the hydraulic system relatively free of contaminants. However, the hydraulic oil filter must be serviced at regular intervals. The intervals are: initially, after the first 5 hours of operation, and thereafter every 250 hours of operation or yearly, whichever comes first. Use a genuine TORO oil filter for replacement.

1. Remove hydraulic oil filter from mounting head. Use bottom type filter wrench (Fig. 34). Dispose of filter properly.
2. Apply a film of oil on the gasket. Install filter by hand until gasket contacts mounting head; then tighten filter an additional 3/4 turn.
3. Start engine and check for oil leaks. Allow engine to run for about 2 minutes so any air in system is purged. Then shut engine off.
4. Check level of oil in reservoir; refer to Check Hydraulic System Fluid.

Hydraulic Schematic

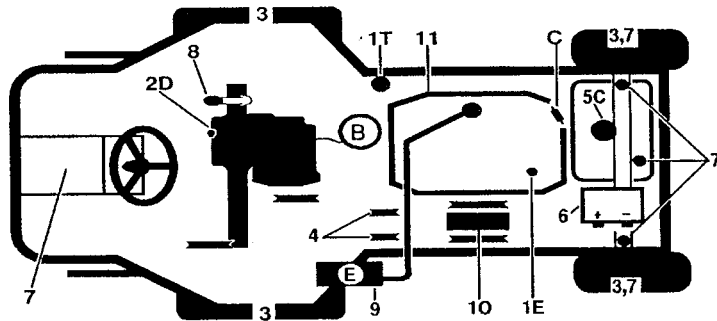


120 QUICK REFERENCE AID



CHECK/SERVICE

1. OIL LEVELS (ENGINE/TRANS)
2. AXLE OIL
3. TIRE PRESSURE
4. BELT TENSION (TRANS, PTO)
5. FUEL-GAS ONLY
6. BATTERY
7. GREASE, LUBE POINTS
8. ADJUST PARKING BRAKE
9. AIR CLEANER
10. ELECTRIC CLUTCH GAP .012-.018
11. DEBRIS UNDER HOOD & SEAT PLATE & ENGINE COOLING FINS



FLUID SPECIFICATION * SEE OPERATOR'S MANUAL FOR INITIAL CHANGE

A. ENGINE OIL*	TYPE >32°	TYPE <32°	CAPACITY	CHANGE INTERVALS	FILTER	FILTER PART NO.
	SAE 10W-30 OR 10W-40 SF OR SG	SAE 5W-20 OR 5W-30 SF OR SG	4 PT.	50 HRS.	FILTER 100 HRS	KOHLER 12 050 01
B. TRANS OIL	SAE 10W-30 SF-CC,CD	TYPE F OR FA TRANS FLUID	5 QT.	250 HRS.	FILTER 250 HRS	54-0110
C. FUEL	UNLEADED FUEL		5 GAL.	---	FILTER 400 HRS	38-8000
D. AXLE OIL	SAE E.R 90 WT.		44 OZ.	500 HRS		
E. AIR FILTER	STANDARD					33-1300

Change Front Axle Oil

After every 500 hours of operation, change oil in the front axle.

1. Drive machine around for five minutes before changing oil to warm axle oil. Warm oil flows more freely and carries more contaminants than cold oil.
2. Clean area around drain plug and place a drain pan below drain plug on axle (Fig. 35).
3. Remove drain plug and allow oil to flow into drain pan (Fig. 35). After oil is drained, reinstall drain plug.
4. Remove fill plug and fill to plug level with SAE EP-90 wt. oil (approximately 44 oz.) (Fig. 35).

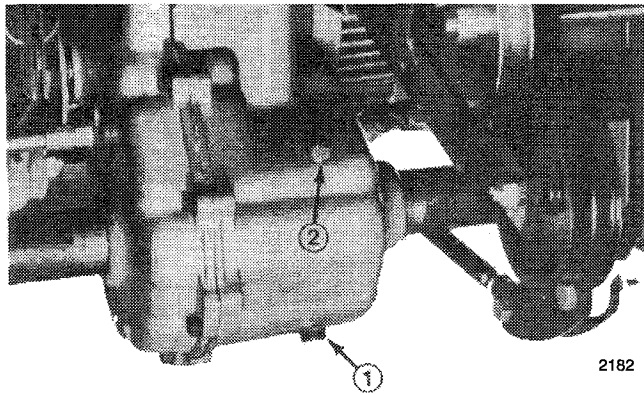


Figure 35

1. Drain plug
2. Fill plug

Battery

Service Interval/Specification

Check the electrolyte level in the battery every 50 hours. Always keep the battery clean and fully charged. Use a paper towel to clean the battery case. If the battery terminals are corroded, clean them with a solution of four parts water and one part baking soda. Apply a light coating of grease to the battery terminals to prevent corrosion.

Voltage: 12 v, 280 Cold Cranking Amps

Checking Electrolyte Level

1. With the engine off, open the covers to see into the cells. The electrolyte must be up to the lower part of the tube (Fig. 36). Do not allow the electrolyte to get below the plates. (Fig. 36).
2. If the electrolyte is low, add the required amount of distilled water; refer to Adding Water to the Battery, page 36.

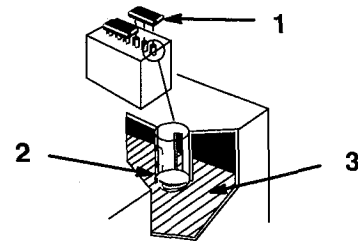


Figure 36

1. Filler caps
2. Lower part of tube
3. Plates

Adding Water to the Battery

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

1. Clean the top of the battery with a paper towel.
2. Lift off the filler caps (Fig. 36).

3. Slowly pour distilled water into each battery cell until the level is up to the lower part of the tube (Fig. 36).

IMPORTANT: Do not overfill the battery because electrolyte (sulfuric acid) can cause severe corrosion and damage to the chassis.

4. Press the filler caps onto the battery.

Charging the Battery

IMPORTANT: Always keep the battery fully charged (1.260 specific gravity). This is especially important to prevent battery damage when the temperature is below 0°C (32°F).

1. Remove the battery from the holder.
2. Check the electrolyte level; refer to Checking Electrolyte Level.
3. Remove the filler caps from the battery and connect a 3 to 4 amp battery charger to the battery posts. Charge the battery at a rate of 4 amperes or less for 4 hours (12 volts). Do not overcharge the battery. Install the filler caps after the battery is fully charged.

WARNING

POTENTIAL HAZARD

- Charging the battery produces gasses.

WHAT CAN HAPPEN

- Battery gasses can explode.

HOW TO AVOID THE HAZARD

- Keep cigarettes, sparks and flames away from battery.

4. Install the battery into the holder.

Wire Harness Service

Prevent corrosion of wiring terminals by applying Grafo 112X (Skin-over) grease, Toro Part No. 505-47, to the inside of all harness connectors whenever the harness is replaced.

Whenever working with the electrical system, always disconnect battery cables, negative (-) cable first, to prevent possible wiring damage from short-outs.

IMPORTANT: Before welding on the machine, disconnect ground cable from the battery to prevent damage to the electrical system.

Cleaning and Storage

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to "OFF" to stop the engine. Remove the key.
2. Remove grass clippings, dirt, and grime from the external parts of the entire machine, especially the engine. Clean dirt and chaff from the outside of the engine's cylinder head fins and blower housing.

IMPORTANT: You can wash the machine with mild detergent and water. Do not pressure wash the machine. Avoid excessive use of water, especially near the control panel, and engine.

3. Check the brake; refer to Brake, page 29.
4. Service the air cleaner; refer to Air Cleaner, page 20.
5. Grease the machine; refer to Greasing and Lubrication, page 26.
6. Change the crankcase oil and filter; refer to Engine Oil, page 23.
7. Remove the spark plug(s) and check its condition; refer to Spark Plug, page 25. With the spark plug(s) removed from the engine, pour two tablespoons of engine oil into the spark plug hole. Now use the starter to crank the engine and distribute the oil inside the cylinder. Install the spark plug(s). Do not install the wire on the spark plug(s).
8. Change the hydraulic system oil and filter; refer to Change Hydraulic Oil and Filter, page 34.
9. Remove the battery from the chassis, check the electrolyte level, and charge fully; refer to Battery, page 36. Do not connect the battery cables to the battery posts during storage. Store battery in a cool dry place, not in a heated area.

IMPORTANT: The battery must be fully charged to prevent it from freezing and being damaged at temperatures below 0° C (32° F). A fully charged battery maintains its charge for about 50 days at temperatures lower than 4° C (40° F). If temperatures will be above 4° C (40° F), check the electrolyte level in the battery and charge every 30 days.

10. Check the tire pressure; refer to Tire Pressure, page 28.
11. During long-term storage, either drain gasoline from the fuel tank (step 12) or add a fuel stabilizer/conditioner additive to a full tank of gasoline (step A).
12. Drain gasoline from the fuel tank. After fuel is drained, start the engine and let it idle until all gasoline is consumed and the engine stops. This eliminates gum-like buildup in the fuel system, which causes hard starting. Try to start the engine two more times to assure that no gasoline is in the fuel system.
 - A. Add the correct amount of a fuel stabilizer/conditioner to a full tank of gasoline.

Note: Stabilizer/conditioners normally preserve gasoline for six to eight months.
13. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged or defective.
14. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
15. Store the machine in a clean, dry garage or storage area. Remove the key from the ignition switch and keep it in a memorable place. Cover the machine to protect it and keep it clean.

Troubleshooting

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Starter does not rotate.	<ol style="list-style-type: none"> 1. Power take off (PTO) switch is ENGAGED. 2. Traction control pedal is not in neutral. 3. Electrical connections are corroded or loose. 4. Fuse is blown. 5. Battery is dead. 6. Solenoid or switch is defective. 	<ol style="list-style-type: none"> 1. Move (PTO) switch to DISENGAGED. 2. Move traction control pedal to neutral position. 3. Check electrical connections for good contact. 4. Replace fuse. 5. Charge battery. 6. Contact Authorized Service Dealer.
Engine will not start, starts hard, or fails to keep running.	<ol style="list-style-type: none"> 1. Operator is not seated. 2. Parking brake is OFF. 3. Fuel tank is empty. 4. Choke is not ON. 5. Air cleaner is dirty. 6. Spark plug wire is loose or disconnected. 7. Spark plug is pitted, fouled, or gap is incorrect. 8. Dirt in fuel filter. 9. Dirt, water, or stale fuel is in fuel system. 	<ol style="list-style-type: none"> 1. Sit on seat. 2. Move parking brake to ON. 3. Fill fuel tank with gasoline. 4. Move choke lever to ON. 5. Clean or replace air cleaner element. 6. Install wire on spark plug. 7. Install new, correctly gapped spark plug. 8. Replace fuel filter. 9. Contact Authorized Service Dealer.
Engine loses power.	<ol style="list-style-type: none"> 1. Engine load is excessive. 2. Air cleaner is dirty. 3. Oil level in crankcase is low. 4. Cooling fins and air passages under engine blower housing are plugged. 5. Spark plug is pitted, fouled, or gap is incorrect. 6. Vent hole in fuel cap is plugged. 7. Dirt in fuel filter. 8. Dirt, water, or stale fuel is in fuel system. 	<ol style="list-style-type: none"> 1. Reduce ground speed. 2. Clean air cleaner element. 3. Add oil to crankcase. 4. Remove obstruction from cooling fins and air passages. 5. Install new, correctly gapped spark plug. 6. Clean or replace the fuel cap. 7. Replace fuel filter. 8. Contact Authorized Service Dealer.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Engine over heats.	<ol style="list-style-type: none"> 1. Engine load is excessive. 2. Oil level in crankcase is low. 3. Cooling fins and air passages under engine blower housing are plugged. 	<ol style="list-style-type: none"> 1. Reduce ground speed. 2. Add oil to crankcase. 3. Remove obstruction from cooling fins and air passages.
Abnormal vibration.	<ol style="list-style-type: none"> 1. Engine mounting bolts are loose. 2. Loose engine pulley, idler pulley, or blade pulley. 3. Engine pulley is damaged. 	<ol style="list-style-type: none"> 1. Tighten engine mounting bolts. 2. Tighten the appropriate pulley. 3. Contact Authorized Service Dealer.
Machine does not drive.	<ol style="list-style-type: none"> 1. Traction belt is worn, loose or broken. 2. Traction belt is off pulley. 	<ol style="list-style-type: none"> 1. Adjust belt tension, replace belt. 2. Contact Authorized Service Dealer.



THE TORO TOTAL COVERAGE GUARANTEE

A One-Year Limited Warranty
(A Full Two-Year Warranty for Residential Use)

What Is Covered By This Express Warranty?

The Toro Company promises to repair any TORO product used for commercial, institutional, or rental purposes if defective in materials or workmanship for a period of one year from the date of purchase. The cost of parts and labor are included as well as transportation within a 15-mile radius of a TORO ProLine Service Dealer.

What Products Are Covered By This Warranty?

The following products and their attachments are covered by this warranty:

- Z-Master Zero Radius Tractors
- ProLine Mid-size Mowers
- Groundsmaster Riding Mowers
- ProLine Hand-held Gas Products
- Backpack Blowers
- Commercial WPM

How About Residential Use?

TORO products used for residential use are covered by a full two-year warranty.

How Do You Get Warranty Service?

Should you feel your TORO product contains a defect in materials or workmanship, contact the dealer who sold you the product or any TORO ProLine Service Dealer. The Yellow Pages of your telephone directory is a good reference source; look under TORO Commercial Service Dealers. The Service Dealer will either arrange service at his/her dealership or recommend another authorized Service Dealer who may be more convenient. You may need proof of purchase (copy of registration card, sales receipt, etc.) for warranty validation.

If for any reason you are dissatisfied with a Service Dealer's analysis of the defect in materials or workmanship or if you need a referral to a TORO ProLine Service Dealer, please feel free to contact us at the following address:

Toro Customer Service Department
8111 Lyndale Avenue South
Bloomington, MN 55420-1196
612-888-8801
800-348-2424

What Must You Do To Keep The Warranty In Effect?

You must maintain your TORO Product by following the maintenance procedures described in the operator's manual. Such routine maintenance, whether performed by a dealer or by you, is at your expense.

What Does This Warranty Not Cover? and

How Does Your State Law Relate To This Warranty?

There is no other express warranty except as described above. This express warranty does not cover:

- Cost of regular maintenance service or parts, such as filters, fuel, lubricants, tune-up parts, blade sharpening, brake and clutch adjustments.
- Any product or part which has been altered or misused or required replacement or repair due to normal wear, accidents, or lack of proper maintenance.
- Repairs necessary due to improper fuel, contaminants in the fuel system, or failure to properly prepare the fuel system prior to any period of non-use over three months.
- Pickup and delivery charges for distances beyond a 15-mile radius from a TORO ProLine Service Dealer.

All repairs covered by this warranty must be performed by a TORO Service Dealer using Toro approved replacement parts.

Repair by a TORO Service Dealer is your sole remedy under this warranty.

The Toro Company is not liable for indirect, incidental or consequential damages in connection with the use of the TORO Products covered by this warranty, including any cost or expense of providing substitute equipment or service during reasonable periods of malfunction or non-use pending completion of repairs under this warranty. Some states do not allow exclusions of incidental or consequential damages, so the above exclusion 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.

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 The Toro Company.