Form No. 3329–120

TORO®

Groundsmaster® 345

Traction Unit

Model No. 30789—Serial No. 230000001 and Up

Operator’s Manual

Warning

CALIFORNIA

Proposition 65 Warning

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

Contents

8111 Lyndale Avenue South
Bloomington, MN 55420-1196

Introduction

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

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

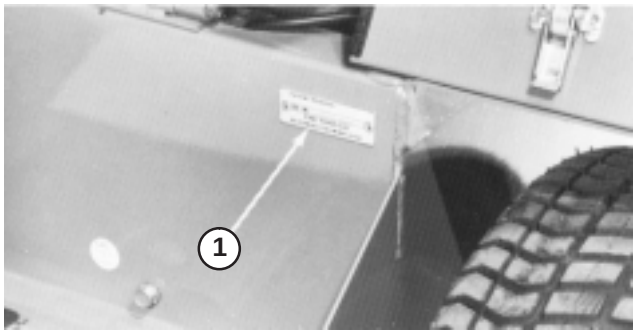


Figure 1

1. Location of the model and serial numbers

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

Model No. _____

Serial No. _____

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

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

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

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

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

Safety

This machine meets or exceeds ANSI B71.4-1999 specifications in effect at the time of production when and equipped with rear weight as listed in the weight chart.

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

The following instructions are from ANSI B71.4-1999.

Training

- Read the operator's manual and other training material carefully. Be familiar with the controls, safety signs, and the proper use of the equipment.
- If the operator or mechanic can not read the language of is the owner's responsibility to explain this material to them.
- Never allow children or people unfamiliar with these instructions to use or service the mower. Local regulations may restrict the age of the operator.
- Never mow while people, especially children, or pets are nearby.
- Keep in mind that the operator or user is responsible for accidents or hazards occurring to other people or their property.
- Do not carry passengers.
- All drivers and mechanics should seek and obtain professional and practical instruction. The owner is responsible for training the users. Such instruction should emphasize:
  - the need for care and concentration when working with ride-on machines;
  - control of a ride-on machine sliding on a slope will not be regained by the application of the brake. The main reasons for loss of control are:
    - insufficient wheel grip;
    - being driven too fast;
    - inadequate braking;
    - the type of machine is unsuitable for its task;
    - lack of awareness of the effect of ground conditions, especially slopes;
    - incorrect hitching and load distribution.
- The owner/user can prevent and is responsible for accidents or injuries occurring to himself or herself, other people, or property.

Preparation

- While mowing, always wear substantial footwear, long trousers, hard hat, safety glasses, and ear protection. Long hair, loose clothing, or jewelry may get tangled in moving parts. Do not operate the equipment when barefoot or wearing open sandals.
- Thoroughly inspect the area where the equipment is to be used and remove all objects which may be thrown by the machine.
- **Warning**—Fuel is highly flammable. Take the following precautions:
  - Store fuel in containers specifically designed for this purpose.
  - Refuel outdoors only and do not smoke while refueling.
  - Add fuel before starting the engine. Never remove the cap of the fuel tank or add fuel while the engine is running or when the engine is hot.
  - If fuel is spilled, do not attempt to start the engine but move the machine away from the area of spillage and avoid creating any source of ignition until fuel vapors have dissipated.
  - Replace all fuel tanks and container caps securely.
- Replace faulty silencers/mufflers.
- Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job. Only use accessories and attachments approved by the manufacturer.
- Check that operator's presence controls, safety switches and shields are attached and functioning properly. Do not operate unless they are functioning properly.

Operation

- Do not operate the engine in a confined space where dangerous carbon monoxide fumes can collect.
- Mow only in daylight or in good artificial light.
- Before attempting to start the engine, disengage all blade attachment clutches, shift into neutral, and engage the parking brake.
- Do not put hands or feet near or under rotating parts. Keep clear of the discharge opening at all times.

- Do not use on slopes of more than
  - 20° when mowing across a slope
  - 30° when mowing up or down a slope
- The maximum value of 50% of the limit of stability for EN836 is
  - 10° when mowing across a slope
  - 15° when mowing up or down a slope
- Remember there is no such thing as a safe slope. Travel on grass slopes requires particular care. To guard against overturning:
  - do not stop or start suddenly when going up or downhill;
  - engage clutch slowly, always keep machine in gear, especially when travelling downhill;
  - machine speeds should be kept low on slopes and during tight turns;
  - stay alert for humps and hollows and other hidden hazards;
  - never mow across the face of the slope, unless the mower is designed for this purpose.
- Stay alert for holes in the terrain and other hidden hazards.
- Use care when pulling loads or using heavy equipment.
  - Use only approved drawbar hitch points.
  - Limit loads to those you can safely control.
  - Do not turn sharply. Use care when reversing.
  - Use counterweight(s) or wheel weights when suggested in the operator's manual.
- Watch out for traffic when crossing or near roadways.
- Stop the blades rotating before crossing surfaces other than grass.
- When using any attachments, never direct discharge of material toward bystanders nor allow anyone near the machine while in operation.
- Never operate the machine with damaged guards, shields, or without safety protective devices in place. Be sure all interlocks are attached, adjusted properly, and functioning properly.
- Do not change the engine governor settings or overspeed the engine. Operating the engine at excessive speed may increase the hazard of personal injury.
- Before leaving the operator's position:
  - stop on level ground;
  - disengage the power take-off and lower the attachments;
  - change into neutral and set the parking brake;
  - stop the engine and remove the key.
- Disengage drive to attachments when transporting or not in use.
- Stop the engine and disengage drive to attachment
  - before refuelling;
  - before removing the grass catcher/catchers;
  - before making height adjustment unless adjustment can be made from the operator's position.
  - before clearing blockages;
  - before checking, cleaning or working on the mower;
  - after striking a foreign object or if an abnormal vibration occurs. Inspect the mower for damage and make repairs before restarting and operating the equipment.
- Reduce the throttle setting during engine run-out and, if the engine is provided with a shut-off valve, turn the fuel off at the conclusion of mowing.
- Keep hands and feet away from the cutting units.
- Look behind and down before backing up to be sure of a clear path.
- Slow down and use caution when making turns and crossing roads and sidewalks. Stop cylinders/reels if not mowing.
- Be aware of the mower discharge direction and do not point it at anyone.
- Do not operate the mower under the influence of alcohol or drugs
- Use care when loading or unloading the machine into a trailer or truck
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

Maintenance and Storage

- Keep all nuts, bolts and screws tight to be sure the equipment is in safe working condition.
- Never store the equipment with fuel in the tank inside a building where fumes may reach an open flame or spark.
- Allow the engine to cool before storing in any enclosure.
- To reduce the fire hazard, keep the engine, silencer/muffler, battery compartment and fuel storage area free of grass, leaves, or excessive grease.

- Check the grass catcher frequently for wear or deterioration.
- Keep all parts in good working condition and all hardware and hydraulic fittings tightened. Replace all worn or damaged parts and decals.
- If the fuel tank has to be drained, do this outdoors.
- Be careful during adjustment of the machine to prevent entrapment of the fingers between moving blades and fixed parts of the machine.
- On multi-spindle mowers, take care as rotating one blade can cause other blades to rotate.
- Disengage drives, lower the cutting units, set parking brake, stop engine and remove key and disconnect spark plug wire. Wait for all movement to stop before adjusting, cleaning or repairing.
- Clean grass and debris from cutting units, drives, silencers/mufflers, and engine to help prevent fires. Clean up oil or fuel spillage.
- Use jack stands to support components when required.
- Carefully release pressure from components with stored energy.
- Disconnect battery and remove spark plug wire before making any repairs. Disconnect the negative terminal first and the positive last. Reconnect positive first and negative last.
- Use care when checking the cylinders/reels. Wear gloves and use caution when servicing them.
- Keep hands and feet away from moving parts. If possible, do not make adjustments with the engine running.
- Charge batteries in an open well ventilated area, away from spark and flames. Unplug charger before connecting or disconnecting from battery. Wear protective clothing and use insulated tools.

Toro Riding Mower Safety

The following list contains safety information specific to Toro products or other safety information that you must know that is not included in the ANSI standard.

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

Use of this product for purposes other than its intended use could prove dangerous to user and bystanders.

Warning

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

Do not run engine indoors or in an enclosed area.

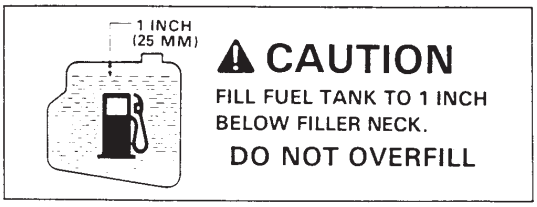
- Know how to stop the engine quickly.
- Do not operate the machine while wearing tennis shoes or sneakers.
- Wearing safety shoes and long pants is advisable and required by some local ordinances and insurance regulations.
- Handle fuel carefully. Wipe up any spills.
- Check the safety interlock switches daily for proper operation. If a switch should fail, replace the switch before operating the machine. After every two years, replace all interlock switches in the safety system, whether they are working properly or not.
- Before starting the engine, sit on the seat.
- Using the machine demands attention. To prevent loss of control:
  - Do not drive close to sand traps, ditches, creeks, or other hazards.
  - Reduce speed when making sharp turns. Avoid sudden stops and starts.
  - When near or crossing roads, always yield the right-of-way.
  - Apply the service brakes when going downhill to keep forward speed slow and to maintain control of the machine.
- Raise the cutting units when driving from one work area to another.
- Do not touch the engine, silencer/muffler, or exhaust pipe while the engine is running or soon after it has stopped because these areas could be hot enough to cause burns.
- If the engine stalls or loses headway and cannot make it to the top of a slope, do not turn the machine around. Always back slowly, straight down the slope.
- When a person or pet appears unexpectedly in or near the mowing area, **stop mowing.** Careless operation, combined with terrain angles, ricochets, or improperly positioned guards can lead to thrown object injuries. Do not resume mowing until the area is cleared.

Maintenance and Storage

- Make sure all hydraulic line connectors are tight and all hydraulic hoses and lines are in good condition before applying pressure to the system.
- Keep your body and hands away from pin hole leaks or nozzles that eject hydraulic fluid under high pressure. Use paper or cardboard, not your hands, to search for leaks. Hydraulic fluid escaping under pressure can have sufficient force to penetrate the skin and cause serious injury. Seek immediate medical attention if fluid is injected into skin.
- Before disconnecting or performing any work on the hydraulic system, all pressure in the system must be relieved by stopping the engine and lowering the cutting units and attachments to the ground.
- Check all fuel lines for tightness and wear on a regular basis. Tighten or repair them as needed.
- If the engine must be running to perform a maintenance adjustment, keep hands, feet, clothing, and any parts of the body away from the cutting units, attachments, and any moving parts, especially the screen at the side of the engine. Keep everyone away.
- To ensure safety and accuracy, have an Authorized Toro Distributor check the maximum engine speed with a tachometer. Maximum governed engine speed should be 3200 RPM.
- If major repairs are ever needed or if assistance is desired, contact an Authorized Toro Distributor.
- Use only Toro-approved attachments and replacement parts. The warranty may be voided if used with unapproved attachments.

Safety and Instruction Decals

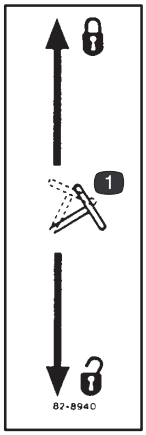
Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or lost.



27-7310

93-6686

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



82-8940

1. Locks and unlocks the steering column

27-7320

55-4300

77–3100

1. Fan blades can cause injury—stay away from moving parts.

67-1720

82-8930

1. Read the operator's manual for further instructions.

67–1710

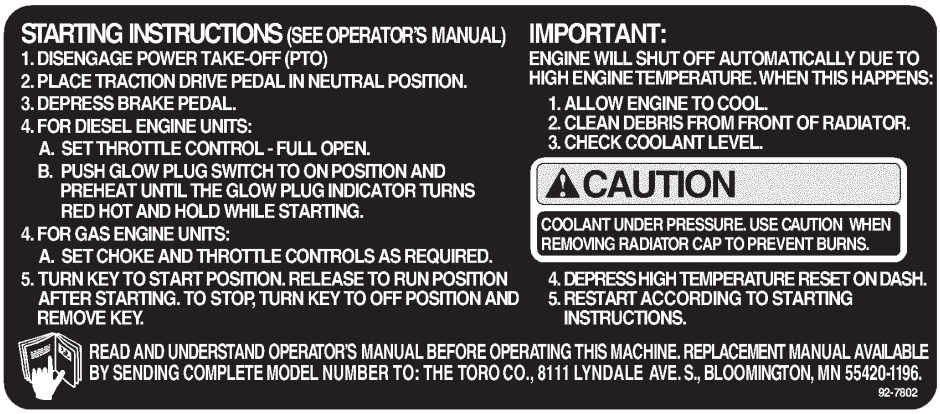
82-8970

1. Fill coolant to within 1 in. (25 mm) of the top of the tank.
2. Read the operator's manual for further instructions.

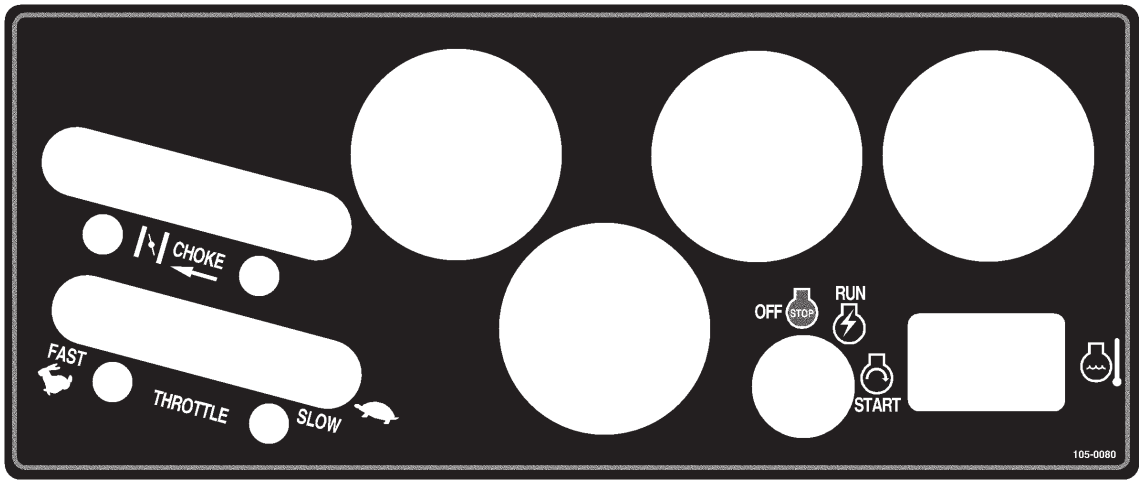
27-7290

53-4420

105-7822



92-7802



105-0080

Specifications

Note: Specifications and design subject to change without notice.

General Specifications

Engine	Ford, 4 cycle, 4-cylinder, overhead valve, liquid cooled gas engine with centrifugal water pump. Ford rates engine @ 52 hp (De–rated to 25.5 hp). Mechanically governed to a maximum speed of 3200 ± 100 rpm. 79 cu. in. (1300 cc) displacement. Distributor less electronic ignition. 3.5 quart (3.25 liter) oil capacity; replaceable oil filter. Forged connecting rods, cast iron cylinder head and block. Mechanical fuel pump. Spark arrestor muffler is standard.
Air Cleaner	Heavy duty, remote mounted
Cooling System	Radiator has tube and fin construction with hydraulic oil cooler in lower tank. Capacity of cooling system is approximately 6 quarts (5.7 l) of a 50% mixture of permanent, ethylene glycol anti-freeze and water.
Electrical	The 12 volt battery has 42 plates and is rated at 45 ampere hours. A 55 amp alternator with integral regulator is standard.
Fuel System	Fuel tank capacity is approximately 6-1/2 gal. (25 l).
Front Axle	The heavy duty Dana GT 20 axle has reduction of 20:9:1. Axle has automotive type differential, bevel gear pinion and ring gear with spur gear reduction from transmission. All axle components are mounted in tapered roller bearings.
Transmission	The in-line hydrostatic transmission is mounted directly to the front axle and is driven by flexible drive couplings. Operating pressure is 500 to 3000 psi (3447 to 20685 kPa) and normal charge pressure is 70 to 150 psi (453 to 1034 kPa). Implement relief valve setting is 700 to 900 psi (4826 to 6205 kPa). Displacement is 0.913 cubic inch (15 cm^3) per revolution, and transmission is controlled by foot-actuated pedal. Front axle is the hydraulic fluid reservoir, and its capacity is 5 quarts (4.7 l). The 25 micron hydraulic filter is a screw on replaceable type. For replacement filters, order Toro Part No. 23-9740.
Ground Speed	Speed is infinitely variable from 0 to 9.5 MPH (0 to 15 km/h) forward or reverse.
Tires	Two rear tires are 16 x 6.50-8, 4-ply, extra traction tread, on demountable, drop center wheels. The two from tires are 23 x 8.50-12, extra traction tread, 4-ply rating, on demountable, drop center wheels. Recommended air pressure for both the front and rear tires is 21 psi (145 kPa).
Brakes	Brakes controlled by 3 pedals. Two are for steering assist. Are individually controlled by left foot. Third pedal operates both brakes; is controlled by either foot. Parking brake latch provided for third pedal. Pedals are connected to brakes by multi-stranded cable and conduit.
Steering	The 13 inch (33 cm) steering wheel is mounted on a steering valve consisting of a control valve and metering section which regulates pressure and meters flow to the steering cylinder. Minimum turning radius is 18 in. from center of turn to closest side of drive wheel; however, zero turning radius results when individual wheel brakes are used. Steering wheel adjustable fore and aft for operator comfort.
Main Frame	Frame is welded, formed 11 ga. steel, reinforced with square and rectangular tubing.
Instrument Panel and Controls	Warning light cluster for battery, oil pressure and engine temperature. Hour–meter, fuel gauge, ignition switch, coolant temperature switch and gauge to prevent overheating, choke and throttle control are on instrument panel. Hand operated PTO lever is located to right of the seat. Foot pedal control for transmission operation at right of steering column.

General Specifications (continued)

PTO Drive	Shaft is driven by a tight-slack double “A” section, torque team V-belt directly from output shaft of engine. Shaft is clutched by pivoting the shaft support with a spring loaded, over center, hand operated lever. PTO speed 1810 RPM @ 3200 RPM engine speed. Connection to implement is with high quality, needle bearing universal joint with slip joint.
Implement Lift	Cutting unit or implement is lifted by hydraulic cylinder that has 2-1/2 in. (64 mm) bore and 3-1/4 in. (82 mm) stroke.

Dimensions and Weights (approx.)

Width (measured from outside of front tires)	46 in. (117 cm)
Length	91 in. (231 cm)
Height	50 in. (127 cm)
Height w/ROPS	78.5 in. (199 cm)
Dry Weight	1300 lb. (590 kg)
Wheel Base	49 in. (124 cm)

Optional Equipment

72” Side Discharge Cutting Unit	Model No. 30722
72” Rear Discharge Cutting Unit	Model No. 30710
72” Flex Deck Cutting Unit	Model No. 30799
Guardian 72″ Recycler Cutting Unit	Model No. 30716
Cushion Seat	Model No. 30623
Deluxe Suspension Seat Kit (requires Model No. 30628)	Model No. 30625
Seat Adapter Kit	Model No. 30628
Armrest Kit (for seat models 30623 & 30625)	Model No. 30707
Speed Control Kit	Model No. 30677
48 in. V-Plow (requires Model No. 30757)	Model No. 30750
V-Plow Mounting Kit (w/o tire chains)	Model No. 30757
Debris Blower	Model No. 30855
Rotary Broom	Model No. 30743
Quick Attach Receiver Kit (for traction unit)	Model No. 30711
Quick Attach (for Guardian 72″ Recycler Cutting Unit, Model No. 30716)	Model No. 30729
Quick Attach (for 72” Side Discharge Cutting Unit, Model No. 30722, 72” Rear Discharge Cutting Unit, Model No. 30710 and Rotary Broom, Model No. 30743)	Model No. 30719
Tire Chains (front) (set of 2)	Part No. 11-0390
Wheel Weight Kit (set of 2)	Part No. 11-0440
Rear Weight Kit (set of 2)	Part No. 24-5780
Rear Weight Kit (set of 1)	Part No. 24-5790
4-Ply Wide Tire w/Rim, 23 x 10.5 x 12 (2 required; will not fit with 72” Rear Discharge Cutting Unit, Model No. 30710)	Part No. 62-7020
6–Ply Wide Tire w/ Rim 23 x 10.5 x 12 (2 required; will not fit with 72” Rear Discharge Cutting Unit, Model No. 30710)	Part No. 69-9870
Jack Pad Kit	Part No. 106–4386

Setup

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

Loose Parts

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

Description	Qty.	Use
Steering wheel	1	Installing the steering wheel
Foam seal	1	
Nut	1	
Screw	1	
Cap	1	
Manual tube (shipped in tool box)	1	Holding the operator's manual. Install on right underside of seat.
R-clamp	2	
Right-hand ball joint (shipped in tool box)	1	Install ball joint (implement installation) and connect lift cylinder
Hydraulic oil filter	1	Change after 10 hours
Parts catalog	1	
Operator's Manual (traction unit)	2	Read before operating the machine.
Engine Dealer Listing	1	
Operator Video	1	Watch before operating the machine.
Registration card	1	Fill out and return to Toro.

Installing the Steering Wheel

1. Move rear wheels so they point straight ahead.
2. Remove jam nut from steering shaft. Slide foam seal and steering wheel onto steering shaft (Fig. 2).
3. Secure steering wheel to shaft with jam nut and tighten it to 10–15 ft.-lb.
4. Install cap to steering wheel with screw (Fig. 2).

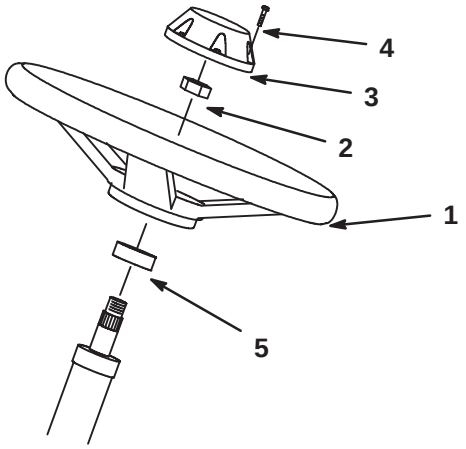


Figure 2

1. Steering wheel
2. Jam nut
3. Cap
4. Screw
5. Foam seal

Removing the Battery from the Chassis

1. Release the two latches holding instrument cover in place. Carefully remove instrument cover to expose the battery.
2. Remove two wing nuts and hold down strap that secures battery (Fig. 3). Lift battery out of chassis. Keep wing nuts and hold down strap in safe place for later use.

Warning

CALIFORNIA

Proposition 65 Warning

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

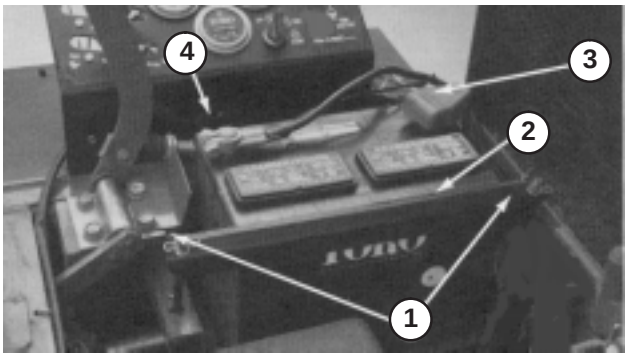


Figure 3

1. Wing nuts
2. Hold down strap
3. Positive terminal
4. Negative terminal

Installing the Seat

The machine is shipped without the seat assembly. Either optional Seat Kit, Model No. 30623 or 30625 must be installed.

Seat Kit, Model No. 30623, Standard Seat

1. Loosely secure (2) R-clamps to right side of seat bottom with 2 capscrews and flat washers supplied in kit (Fig. 4). Install manual tube into R-clamps and tighten capscrews (Fig. 4).

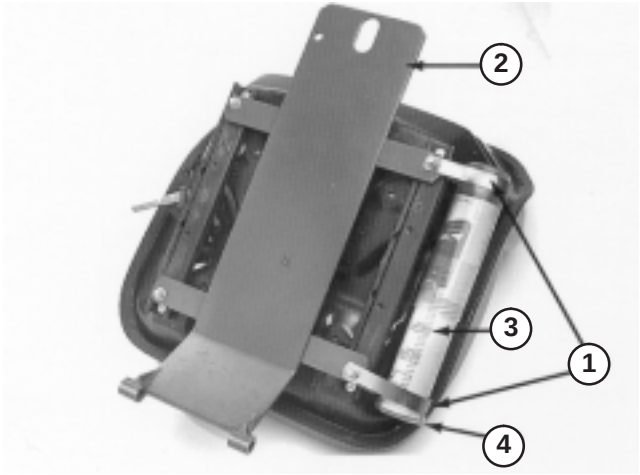


Figure 4

1. R-clamps
2. Seat support
3. Manual tube
4. Cap

2. Mount seat pivot bracket to frame with 2 flange screws supplied in kit (Fig. 5)

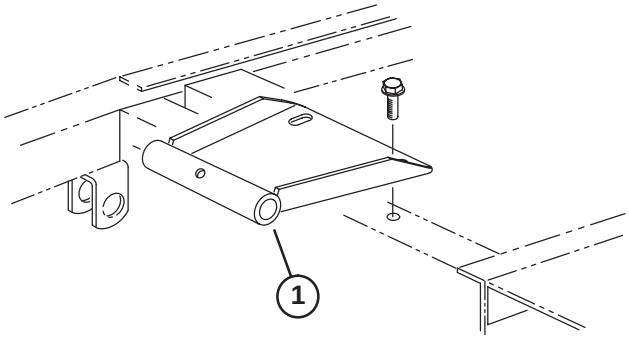


Figure 5

1. Seat pivot bracket

3. Mount seat and seat support to seat pivot bracket with pivot shaft and roll pin (Fig. 6).

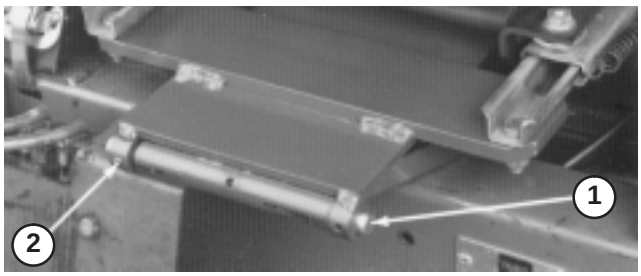


Figure 6

1. Pivot shaft
2. Roll pin

4. Hold seat up with seat support rod (Fig. 7).

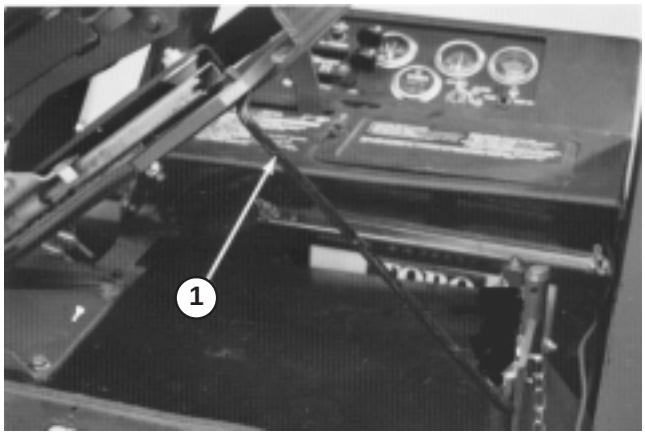


Figure 7

1. Seat support rod

5. Connect seat switch connector to traction unit wire harness connector.

Seat Kit, Model No. 30625, Deluxe Seat with Model No. 30628 Seat Adapter Kit

1. Mount seat suspension assembly to 4 capscrews on seat bottom and secure with 4 lock washers, flat washers, and nuts (Fig. 8).

2. Loosely secure 2 R-clamps to right side of seat bottom with 2 capscrews and flat washers supplied in kit (Fig. 8). Install manual tube into R-clamps and tighten capscrews (Fig. 8).

3. Mount seat support over four threaded studs at the bottom of seat suspension assembly and secure in place with flangenuts (Fig. 8).

Note: When mounting seat suspension, use forward set of mounting holes for a shorter operator, as shown in figure 7, or rear set for a taller operator.

4. Mount seat pivot bracket to frame with (2) flange screws supplied in kit (Fig. 5)

5. Mount seat and seat support to seat pivot bracket with pivot shaft and roll pin (Fig. 6).

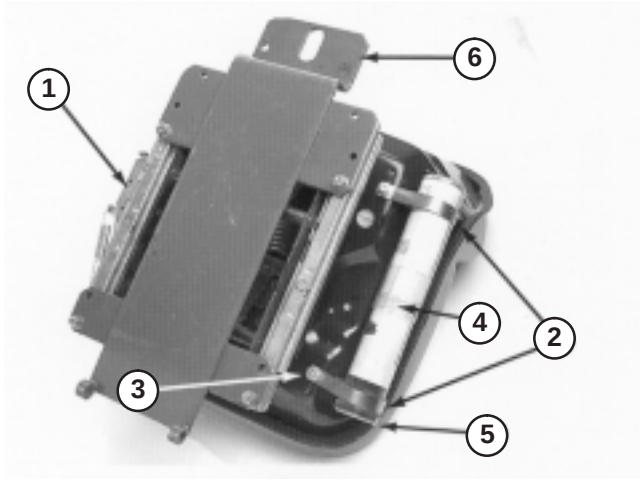


Figure 8

1. Seat suspension assembly
2. R-clamps
3. Lock washer, flat washer, and nut
4. Manual tube
5. Cap
6. Seat support

6. Hold seat up with seat support rod (Fig. 7).

7. Connect seat switch connector to traction unit wire harness connector.

Pushing the Traction Unit Off of the Pallet

1. Reach in and rotate bypass valve on transmission (Fig. 9) counterclockwise 1/2 to 1 turn. Opening the valve opens an internal passage in the pump, thereby bypassing transmission oil. Because fluid is bypassed, the machine can be pushed without damaging the transmission.

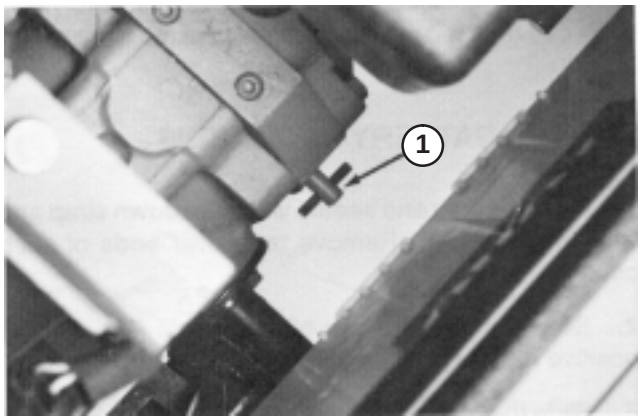


Figure 9

1. Bypass valve

2. Lift machine over shipping braces and push machine off pallet.
3. Close bypass valve by rotating it clockwise until it is securely seated. Do not exceed 5 to 8 ft.-lb. (7 to 11 N·m). Do not start engine when valve is open.

Activating and Charging the Battery

1. If battery is not filled with electrolyte or charged, bulk electrolyte with 1.280 specific gravity @ 77° F (25° C) must be purchased from a local battery supply outlet.

Danger

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

- **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.**

2. Remove filler caps from battery and slowly fill each cell until electrolyte is just above the plates. Install filler caps.
3. Connect a 3 to 4 amp. battery charger to the battery posts. Charge the battery at a rate of 3 to 4 amperes for 4 to 8 hours.
4. When battery is fully charged, disconnect charger from electrical outlet and battery posts.
5. Remove filler caps and slowly add electrolyte to each cell until level is up to fill ring. Install fill caps.

Installing the Battery in the Chassis

Warning

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

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

1. Install battery and secure with hold down strap and wing nuts (Fig. 3**)**. Remove tape over ends of each cable.
2. Slide the red, positive battery cable (Fig. 3) onto positive battery post and tighten nut securely.

Warning

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

- **Always *disconnect* the negative (black) battery cable before disconnecting the positive (red) cable.**
- **Always *connect* the positive (red) battery cable before connecting the negative (black) cable.**

3. Slide the black, negative battery cable (Fig. 3) onto negative battery post and tighten nut securely.
4. Coat both battery connections with either Grafo 112X (skin-over) grease, Toro Part No. 505-47, petroleum jelly or light grease to prevent corrosion and **slide rubber boot over positive terminal** (Fig. 3).

5. Install the instrument cover and lock the two latches.

Installing the Ball Joint and Connecting the Lift Cylinder

Note: Ball joints are not required for all implements; refer to implement operator's manual for requirements.

1. Thread jam nut fully onto right-hand ball joint.
2. Screw ball joint into right hand push arm until center of ball joint is 2-3/8 in. (60 mm) away from front of push arm (Fig. 10). Do not tighten jam nut.

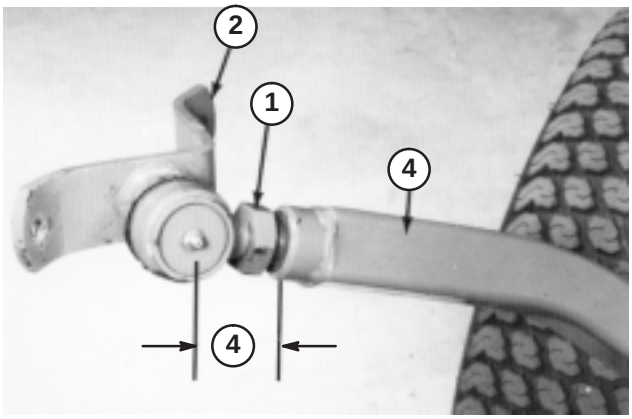


Figure 10

1. Jam nut
2. Ball joint mount
3. 2-3/8 in. (60 mm)
4. Right-hand push arm

Warning

Sudden release of the spring-loaded push arms could cause injury.

Acquire the help of another person to help push the arms down during installation of the ball joints or other implements.

3. Have a helper push down on the left push arm. Then insert a 2 x 4 in. (51 x 102 mm) block of wood between the frame and top of the push arm (Fig. 11). Screw ball joint into left hand push arm until center of ball joint is 2-3/8 in. (60 mm) away from front of push arm (Fig. 11). Do not tighten jam nut.
4. Carefully remove 2 x 4 in. (51 x 102 mm) block of wood from between frame and push arm.
5. Remove spring pin from cylinder pin and slide cylinder pin out of cylinder.

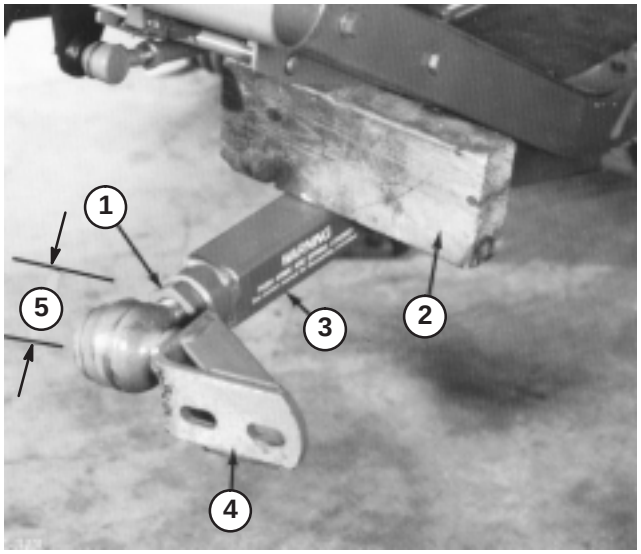


Figure 11

1. Jam nut
2. 2 x 4 in. (51 x 102 mm) block
3. Left-hand push arm
4. Ball joint mount
5. 2-3/8 in. (60 mm)

6. Raise front of lift arm until hole in movable end of cylinder lines up with holes in lift arm brackets. Use caution as lift arm is spring-loaded. Hold parts together with cylinder pin, spring pin, and cotter pin. Cotter pin must be to the outside.
7. Install implement; refer to implement Operator's Manual for proper installation procedures.

Checking the Tire Pressure

The tires are over-inflated for shipping. Therefore, release some of the air to reduce the pressure. Correct air pressure in the front and rear tires is 21 psi (145 kPa).

Checking the Torque of the Front Wheel Nuts

Warning

Failure to maintain proper torque of the front wheel nuts could result in failure, loss of wheel, or personal injury.

Torque the front wheel nuts to 45–55 ft.-lb. (61–75 N·m) after 1–4 hours of operation and again after 10 hours of operation. Torque every 250 hours thereafter.

Greasing the Traction Unit

Before the machine is operated, it must be greased to assure proper operating characteristics; refer to Lubrication Maintenance. Failure to grease the machine will result in premature failure of critical parts.

Note: After setup has been completed, remove protective edging (used for shipping) from fenders.

Install Rear Weight

To comply with ANSI/OPEI B71.4–1999 Standard, rear weight must be added to rear of traction unit. Use chart below to determine weight requirements. Order parts from your local Authorized Toro Distributor.

Cutting Unit Description	Rear Weight Required	Weight Part Number	Weight Description	Qty.
72″ Side Discharge (Model No. 30722) or 72″ Rear Discharge (Model No. 30710) or Guardian 72″ Recycler (Model No. 30716)	105 lb.	24–5780 & 24–5790 325–8 3253–7 3–8847 3217–9	Rear Weight Kit (two 35 lb. weights and mounting hardware) & Rear Weight Kit (one 35 lb. weight) Capscrew 1/2–13 x 2” Lockwasher 1/2” Spacer Nut 1/2”	1 1 2 2 2 2
72” Flex Deck (Model 30799)	210 lb.	24–5780	Rear Weight Kit (two 35 lb. weights and mounting hardware)	3

Before Operating

Hood Prop

1. Position the machine on a level surface.
2. Disengage hood latch and open the hood.
3. Slide bottom of hood prop (Fig. 12) out of retaining bracket. Lower hood prop, pivot upward, then downward to prop up hood.

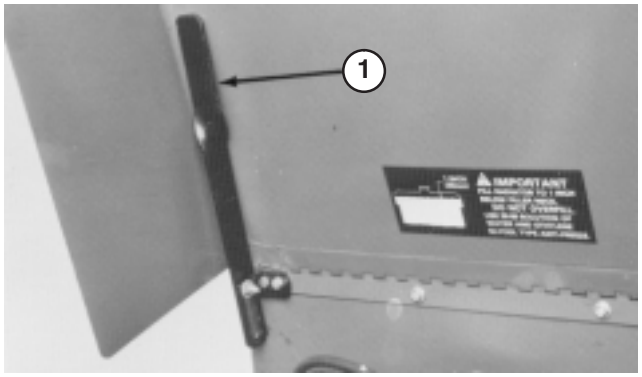


Figure 12

1. Hood prop

Check Engine Oil

The engine is shipped with 3.5 qt (3.25 l) of oil in the crankcase; however, level of oil must be checked before and after the engine is first started.

1. Park machine on a level surface, stop engine and remove key from ignition switch. Open hood and install hood prop.
2. Remove dipstick and wipe it with a clean rag (Fig. 13). Push dipstick down into the tube and ensure it is fully seated. Pull dipstick out of the tube and check level of oil.

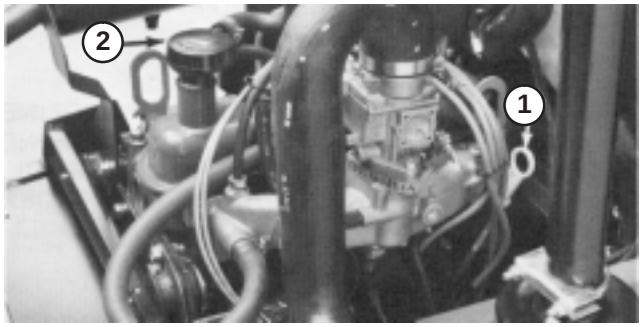


Figure 13

1. Dipstick
2. Oil fill cap

3. If oil level is low, remove filler cap (Fig. 13) and add enough oil to raise level to top notch on dipstick. DO NOT OVERFILL.
4. The engine uses any high–quality detergent oil having the American Petroleum Institute—API—"service classification" SG, SG/CC or SG/CD. Oil viscosity–weight– must be selected according to ambient temperature. Temperature/viscosity recommendations are:

Single Viscosity Oils

Outside Temperature	
–10°F to +60°F	SAE 10W
+10°F to +90°F	SAE 20W–20
Above +32°F	SAE 30
Above +50°F	SAE 40

Multi– Viscosity Oils

Outside Temperature	
Below +60°F	SAE 5W–30
–10°F to +90°F	SAE 10W–20
Above –10°F	SAE 10W–40 or 10W50
Above +10°F	SAE 20W–40 or 20W50

Important Check level of oil after every 5 hours of operation or daily. Change oil and filter initially after 50 hours and every 100 hours thereafter. Change oil and filter more frequently when engine is operated in extremely dusty or dirty conditions.

5. Install dipstick into tube.

Filling the Fuel Tank

THE TORO COMPANY STRONGLY RECOMMENDS THE USE OF FRESH, CLEAN, UNLEADED REGULAR GRADE GASOLINE IN TORO GASOLINE POWERED PRODUCTS. UNLEADED GASOLINE BURNS CLEANER, EXTENDS ENGINE LIFE, AND PROMOTES GOOD STARTING BY REDUCING THE BUILD–UP OF COMBUSTION CHAMBER DEPOSITS. LEADED GASOLINE CAN BE USED IF UNLEADED IS NOT AVAILABLE.

Note: Never Use Methanol, Gasoline Containing Methanol, Gasoline Containing More Than 10% Ethanol, Gasoline Additives, Premium Gasoline Or White Gas Because Engine Fuel System Damage Could Result.

Danger

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

- **Fill the fuel tank outdoors, in an open area, 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 in. (25 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.**
- **Always place gasoline containers on the ground away from your vehicle before filling.**
- **Do not fill gasoline containers inside a vehicle or on a truck or trailer bed because interior carpets or plastic truck bed liners may insulate the container and slow the loss of any static charge.**
- **When practical, remove gas-powered equipment from the truck or trailer and refuel the equipment with its wheels on the ground.**
- **If this is not possible, then refuel such equipment on a truck or trailer from a portable container, rather than from a gasoline dispenser nozzle.**
- **If a gasoline dispenser nozzle must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.**

1. Tip seat forward and prop it with the support rod so it cannot fall accidentally. Using a clean rag, clean area around fuel tank cap (Fig. 14).
2. Remove cap from the fuel tank and fill the 6-1/2 gallon (24 L) tank to within 1 inch (25 mm) from the top with gasoline. **DO NOT OVERFILL.**
3. Install fuel tank cap tightly after filling tank.

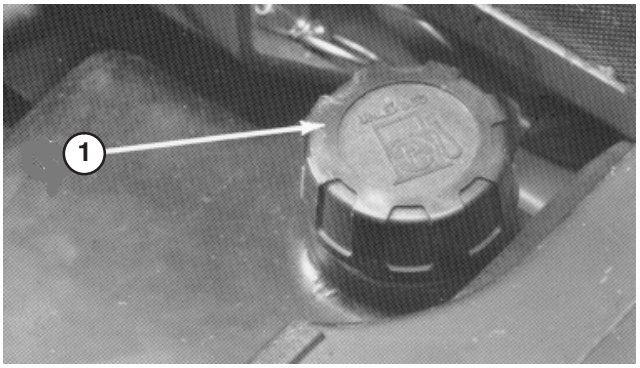


Figure 14

1. Fuel tank cap

Check Cooling System

Clean debris off screen and radiator/oil cooler daily, more often if conditions are extremely dusty and dirty.

The cooling system is filled with a 50 / 50 solution of water and permanent ethylene glycol anti–freeze. Check level of coolant in expansion tank at beginning of each day before starting the engine. Capacity of cooling system is 6 quarts (5.6 l).

Caution

- **If engine has been running, pressurized hot coolant can escape when radiator cap is removed and cause burns.**

1. Carefully remove radiator cap. Coolant is pressurized and may be hot if engine has been running.
2. Check level of coolant in radiator. Level of coolant must be above the core and about 1 inch (25 mm) below bottom of filler neck.
3. If coolant level is low, replenish the system. DO NOT OVERFILL.
4. Install radiator cap.

Checking the Hydraulic System Fluid

The front axle housing acts as the reservoir for the system. The transmission and axle housing are shipped from the factory with approximately 5 quarts (4.7 l) of high quality hydraulic fluid. However, check fluid level before engine is first started and daily thereafter.

Note: Fluid to operate the power steering is supplied by the hydraulic system transmission charge pump. Cold weather start-up may result in “stiff” operation of the steering until the hydraulic system has warmed up.

The following list is not assumed to be all–inclusive. Hydraulic fluids produced by other manufacturers may be used if they can cross reference to find an equivalent to the products listed. Toro will not assume responsibility for damage caused by improper substitutions, so use only products from reputable manufacturers who will stand behind their recommendation.

Universal Tractor Hydraulic Fluid

Mobil	Mobil Fluid 424
Amoco	1000 Fluid
Chevron	Tractor Hydraulic Fluid
Conoco	Power–Tran 3
Exxon	Torque Fluid
Pennzoil	Hydra–Tranz
Shell	Donax TD
Texaco	TDH

Note: Many hydraulic fluids are almost colorless, making it difficult to spot leaks. A red dye additive for the hydraulic system oil is available in 2/3 oz. (20 ml) bottles. One bottle is sufficient for 4–6 gal (15–22 1) of hydraulic oil. Order part no.44–2500 from your authorized Toro distributor.

1. Position machine on a level surface, raise the implement, and stop the engine.
2. Unscrew dipstick cap (Fig. 15) from the filler neck and wipe it with a clean rag. Screw dipstick cap finger tight onto filler neck. Unscrew the dipstick and check level of fluid. If level is not within 1/2 in. (13 mm) from the groove in the dipstick (Fig. 15), add enough fluid to raise level to groove mark. **Do not overfill** by more than 1/2 in. (13 mm) above groove.

Important When adding oil to the hydraulic system, use a funnel with a fine wire screen—200 mesh—and ensure funnel and oil are immaculately clean. This procedure prevents accidental contamination of the hydraulic system.

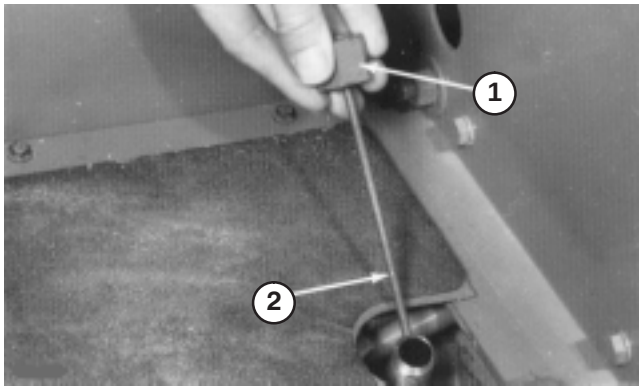


Figure 15

1. Dipstick cap
2. Groove

3. Screw dipstick filler cap finger–tight onto filler neck. It is not necessary to tighten cap with a wrench.
4. Lower the implement.

Operation

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

Controls

Traction Pedal

The traction pedal (Fig. 16) has two functions; one is to make the machine move forward, the other is to make it move backward. Using the heel and toe of the right foot, depress top of pedal to move forward and bottom of pedal to move backward. Ground speed is proportionate to how far pedal is depressed. For maximum ground speed with no load, traction pedal must be fully depressed while throttle is in FAST position. Maximum speed forward is approximately 9.5 mph (15 km/h). To get maximum power under heavy load or when ascending a hill, have throttle in FAST position while depressing traction pedal slightly to keep engine rpm high. When engine rpm begins to decrease, release traction pedal slightly to allow engine rpm to increase.

Caution

When foot is removed from the traction pedal, machine should stop; it must not creep in either direction. If machine does creep, do not operate until neutral assembly has been repaired and adjusted; refer to Adjusting Traction Drive for Neutral.

Turn Pedals

The left and right turn pedals (Fig. 16) are connected to the left and right front wheel brakes since both brakes work independently of each other. The brakes can be used to turn sharply or to increase traction if one wheel tends to slip while operating on a hillside. However, wet grass or soft turf could be damaged when brakes are used to turn.

Tilt Steering Control

The tilt steering control is a lever on right side of steering column (Fig. 16). Pull lever rearward to adjust steering wheel to desired fore or aft operating position and push lever forward to lock adjustment.

Caution

Do not leave lever in unlocked position.

Brake Pedal

Whenever the engine is shut off, the parking brake (Fig. 16) must be engaged to prevent accidental movement of the machine.

The hydrostatic transmission will not, at any time, act as a parking brake for the machine. To engage parking brake, push down fully on brake pedal and pull parking brake knob out; then release the pedal. To release parking brake, depress brake pedal until parking brake knob retracts. To stop quickly, remove right foot from traction pedal and depress the brake pedal. To permit straight stops, brake cables must be evenly adjusted.

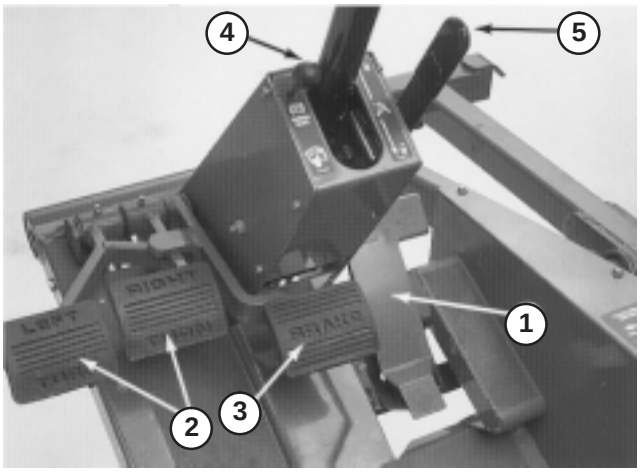


Figure 16

1. Traction pedal
2. Turn pedals
3. Brake pedal
4. Parking brake knob
5. Tilt steering control

Lift Lever

The hydraulic lift lever (Fig. 17) has three positions: FLOAT, TRANSPORT, and RAISE. To lower implement to the ground, move lift lever forward into detent, which is the FLOAT position. The FLOAT position is used for operation and also when machine is not in operation. To raise implement, pull lift lever backward to the RAISE position. After implement is raised, allow lift lever to move to the TRANSPORT position. Normally, implement should be raised when driving from one work area to another, except when descending steep slopes.

Caution

The exposed, rotating blades of the cutting unit or other implements are hazardous.

Never raise a cutting unit or implement while the blades or other components are rotating.

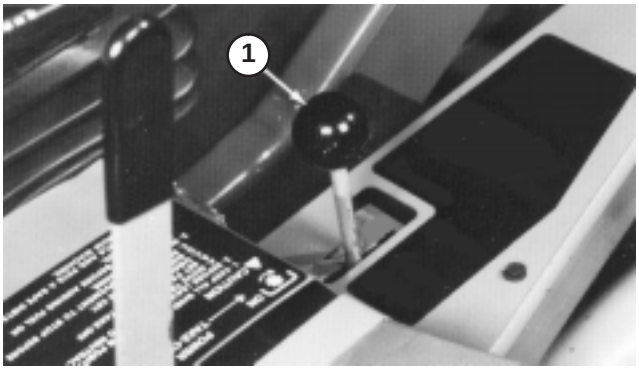


Figure 17

1. Lift lever

PTO Lever

The PTO lever (Fig. 18) has two positions: ON (engage) and OFF (disengage). Slowly push PTO lever fully forward to ON position to start the implement or cutting unit blades. Slowly, pull lever backward to OFF position to stop implement operation. The only time PTO lever should be in the ON position is when implement or cutting unit is down in operating position.

Fuel Gauge

The fuel gauge (Fig. 18) indicates quantity of fuel remaining in fuel tank.

Hour Meter

The hour meter (Fig. 18) registers accumulated hours of engine operation.

Oil Pressure Warning Light

The oil pressure warning light (Fig. 18) glows when oil pressure in engine drops below a safe level. If low oil pressure ever occurs, stop engine and determine the cause. Repair the damage before starting the engine again.

Charge Indicator

Illuminates when system charging circuit malfunctions (Fig. 18).

Engine Coolant Temperature Warning Light

The light illuminates and engine shuts down when coolant reaches a excessively high temperature (Fig. 18).

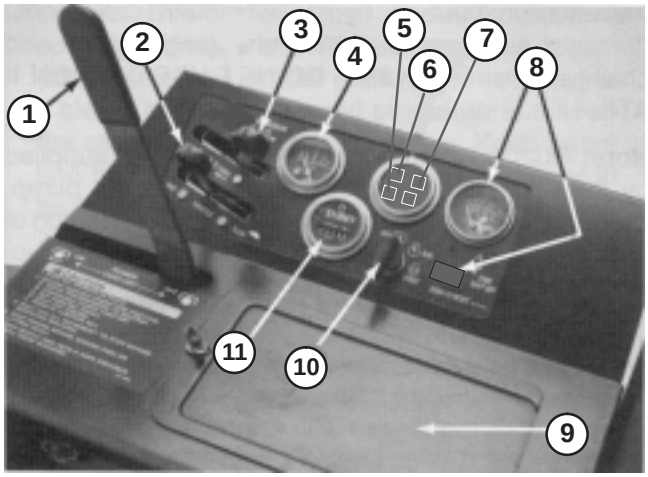


Figure 18

1. PTO lever
2. Choke
3. Throttle control
4. Fuel gauge
5. Battery
6. Oil pressure
7. Engine temperature
8. Temp. gauge & switch
9. Battery cover
10. Ignition switch
11. Hour meter

Temperature Gauge & Reset Switch

The temperature gauge (Fig. 18) registers the temperature of the coolant in the cooling system. If temperature of coolant gets too high the engine will shut off automatically. When this happens, rotate ignition key to OFF. Automatic shut–off of the engine usually results from debris on front of screen or radiator, which reduces air flow. After cleaning outside of screen and radiator or repairing some other damage, press the reset button (Fig. 18) and start the engine.

Important If the switch must be overridden because of an emergency, the engine can be started and will continue to run while reset switch is held in.

Ignition Switch

The ignition switch (Fig. 18), which is used to start and stop the engine, has three position: OFF, RUN, and START. Rotate key clockwise to the START position to engage starter motor. When engine starts, release key and it will move automatically to the ON position. To shut engine off, rotate key counterclockwise to the OFF position.

Throttle Control

The throttle (Fig. 18) is used to operate engine at various speeds. Moving throttle forward increases engine speed—FAST; backward decreases engine speed—SLOW.

The throttle regulates the speed of the cutter blades or other implement components and, in conjunction with traction pedal, controls ground speed of the traction unit.

Choke

To start a cold engine, close carburetor choke by moving choke control (Fig. 18) fully forward. After engine starts, regulate choke to keep engine running smoothly. As soon as possible, open the choke by pulling it backward.

Seat Adjusting Lever

To adjust standard seat, push lever (Fig. 19) backward and slide seat to the desired position. Release lever to lock seat in place. The suspension seat may be adjusted forward or rearward by pulling out the lever at the left side of the seat, sliding the seat to the desired position, and releasing the lever. The weight adjustment knob may be adjusted for any operator's comfort.

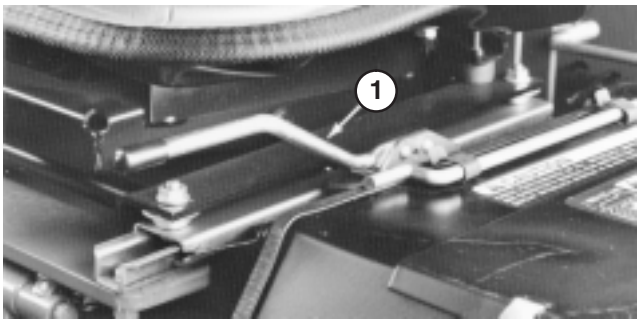


Figure 19

1. Seat adjusting lever

Starting/Stopping Engine

1. Ensure parking brake is set, PTO switch is in OFF position and lift lever is in TRANSPORT or FLOAT position. Remove foot from traction pedal and insure it is in neutral.
2. Move throttle control (Fig. 18) to 1/4–1/3 open position.
3. To start engine, move choke lever (Fig. 18) fully forward.
4. Insert key into ignition switch (Fig. 18) and rotate it clockwise to START position. Hold key in START position for a few seconds to energize ignition system. Release key immediately when engine starts and regulate choke to keep engine running smoothly.

Important To prevent overheating the starter motor, do not engage starter longer than 15 seconds. After 15 seconds of continuous cranking, wait 10 to 15 seconds before engaging starter motor again. To prevent a short in the ignition system, use only one key in the switch. If keys are on a ring, one of the keys could contact pin on top of temperature gauge resulting in a short.

5. When engine is started for the first time, or after overhaul of the engine, transmission or axle, operate the machine in forward and reverse for one or two minutes. Also operate the lift lever and PTO lever to assure proper operation of all parts. Turn steering wheel to the left and right to check steering response. Then shut engine off and check for oil leaks, loose parts, and any other noticeable difficulties.

Caution

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

6. To stop engine, move throttle control backward to 1/4–1/3 position, move PTO lever to OFF position and rotate ignition key to OFF. Remove key from switch to prevent accidental starting.

Checking the Interlock Switches

Caution

If safety interlock switches are disconnected or damaged the machine could operate unexpectedly causing personal injury.

- **Do not tamper with the interlock switches.**
- **Check the operation of the interlock switches daily and replace any damaged switches before operating the machine.**
- **Replace switches every two years or 1000 hours, whichever occurs first, regardless of whether they are operating properly or not.**

The machine has interlock switches in the electrical system. These switches are designed to stop the engine when operator gets off the seat while either the PTO lever is engaged or traction pedal is depressed. However, operator may get off the seat while engine is running. Although engine will continue to run if PTO lever is disengaged and traction pedal is released, it is strongly recommended that the engine be stopped before dismounting from the seat. Also, engine will stop if traction pedal is depressed when parking brake is engaged.

To check operation of interlock switches:

1. Drive the machine slowly to a large, relatively open area. Lower cutting unit, stop the engine and apply parking brake.
2. Sit on seat. Move PTO lever to ON position. With the traction pedal in neutral position, try to start the engine. The engine should not crank. If the engine cranks, there is a malfunction in the interlock system that should be corrected before beginning operation.
3. Sit on seat. Move PTO lever to OFF and depress the traction pedal. Try to start the engine. The engine should not crank. If the engine cranks, there is a malfunction in the interlock system that should be corrected before beginning operation.

Warning

Do not operate the machine without an implement unless the PTO drive shaft is also removed.

4. Sit on seat and start the engine. Raise off the seat and move the PTO lever to ON. The engine should stop within 2-3 seconds. If the engine does not stop, there is a malfunction in the interlock system that should be corrected before beginning operation.
5. Sit on seat. With parking brake engaged, engine running and PTO lever disengaged, depress the traction pedal. The engine should stop within 2-3 seconds. If the engine does not stop, there is a malfunction in the interlock system that should be corrected before beginning operation.

Pushing or Towing the Traction Unit

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

Important Do no push or tow the traction unit faster than 2 to 3 MPH (3 to 4.8 km/h) because transmission may be damaged. If traction unit must be moved a considerable distance, transport it on a truck or trailer. Whenever traction unit is pushed or towed, bypass valve must be open.

1. Reach under traction unit and rotate bypass valve (Fig. 20) 1/2 to 1 turn counterclockwise. Opening the valve opens an internal passage in the transmission, thereby bypassing transmission oil. Because fluid is bypassed, traction unit can be moved without damaging the transmission.

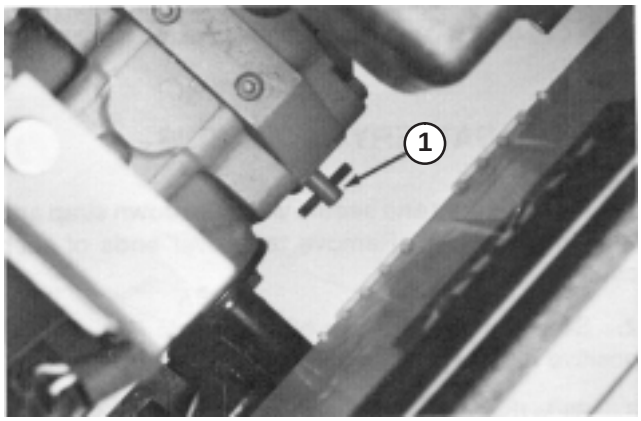


Figure 20

1. Bypass valve

2. Before starting engine, close bypass valve by rotating it clockwise until it is securely seated. Do not exceed 5 to 8 ft.-lb. (7 to 11 N·m). Do not start engine when valve is open.

Important Running the machine with bypass valve open will cause the transmission to overheat.

Operating Characteristics

Practice driving the machine because it has a hydrostatic transmission and its characteristics are different than many turf maintenance machines. Some points to consider when operating the traction unit, cutting unit, or other implement are the transmission, engine speed, load on the cutting blades or other implement components, and the importance of the brakes.

To maintain enough power for the traction unit and implement while operating, regulate traction pedal to keep engine rpm high and somewhat constant. A good rule to follow is: decrease ground speed as the load on the implement increases, and increase ground speed as the load decreases.

Therefore, allow traction pedal to move backward as engine rpm decrease, and depress pedal slowly as rpm increase. By comparison, when driving from one work area to another—with no load and cutting unit raised—have throttle in FAST position and depress traction pedal slowly but fully to attain maximum ground speed.

Another characteristic to consider is the operation of the turning pedals that are connected to the brakes. The brakes can be used to assist in turning the machine. However, use them carefully, especially on soft or wet grass because the turf may be torn accidentally. Another benefit of the turning brakes is to maintain traction. For example: in some slope conditions, the uphill wheel slips and loses traction. If this situation occurs, depress uphill turn pedal gradually and intermittently until the uphill wheel stops slipping, thus, increasing traction on the downhill wheel.

Use extra care when operating machine on slopes. Always have seat pivot retaining pin installed. Drive slowly and avoid sharp turns on slopes to prevent roll overs. The cutting deck must be lowered when going downhill for steering control.

The grass deflector must always be installed and in lowest position on the side discharge cutting unit.

Warning

Careless operation, combined with terrain angle, ricochets, or improperly positioned safety guards can lead to thrown object injuries.

A person or pet may suddenly appear in or near the mowing area.

Stop mowing and do not resume mowing until the area is cleared.

Before stopping the engine, disengage all controls and move throttle to 1/4 to 1/3 open. This reduces high engine rpm, noise, vibration and the possibility of backfiring of the engine. Turn key to OFF to stop engine.

Maintenance

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

Recommended Maintenance Schedule

Maintenance Service Interval	Maintenance Procedure
After first 10 hours	• Check the PTO belt tension. • Check the fan and alternator belt tension. • Change the transmission filter. • Torque the wheel lug nuts.
After first 50 hours	• Change the engine oil and filter. • Check the PTO belt tension. • Torque head, adjust valves and check engine RPM.
Every 50 hours	• Check the battery electrolyte level. • Check the battery cable connections. • Lubricate all grease fittings. • Lubricate the brake cables. • Check the cutting unit gear box oil level. • Clean under the cutting unit belt covers. • Check the cutting unit drive belt adjustment. • Check the PTO belt tension. • Inspect the air filter, dust cup and baffle.
Every 100 hours	• Change the engine oil and filter. • Check the fan and alternator belt tension. • Inspect the cooling system hoses.
Every 200 hours	• Change the transmission filter. • Service the air filter. • Check governor oil level • Decarbon spark arrestor muffler. • Check rear wheel toe-in and steering linkage. • Torque the wheel lug nuts.
Every 400 hours	• Replace the cutting unit gear box oil. • Change fuel filter. • Replace spark plugs • Pack the rear wheel bearings. • Torque head, adjust valves and check engine RPM.
Every 1000 hours or 2 years, whichever occurs first	• Replace moving hoses. • Replace safety switches. • Flush and replace the coolant system fluid. • Replace the hydraulic fluid.

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

Daily Maintenance Checklist

Duplicate this page for routine use.

Maintenance Check Item	For the week of: Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
Check safety interlock operation.							
Check that the grass deflector is in the down position.							
Check brake operation.							
Check fuel level							
Check the engine oil level.							
Check the cooling system fluid level.							
Check the dust cup and baffle (air cleaner).							
Check the radiator and screen for debris.							
Check unusual engine noises.							
Check unusual operating noises.							
Check the transmission oil level.							
Check the hydraulic hoses for damage.							
Check for fluid leaks.							
Check the tire pressure.							
Check instrument operation.							
Check the condition of the blades.							
Lubricate all grease fittings.[1]							
Touch up damaged paint.							

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

Notation for Areas of Concern

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

Lubricating the Machine

The traction unit must be lubricated regularly. If machine is operated under normal conditions, lubricate all bearings and bushings after every 50 hours of operation.

The traction unit bearings and bushings that must be lubricated are:

All Models

PTO shaft and yokes (3) (Fig. 21)

Lift arm pivots (Fig. 21)

Right and left push arm ball joints (Fig. 21)

Push arm pivot bushings (Fig. 22)

PTO pivot housing blocks (Fig. 23)

Brake pivot bushings (Fig. 24);

Engine output shaft bearing (Fig. 25)

Rear wheel spindle bushings (Fig. 26)

Steering plate bushings (Fig. 26)

Axle pin bushing (Fig. 26)

Note: Apply grease to both brake cables at the drive wheel and brake pedal ends.

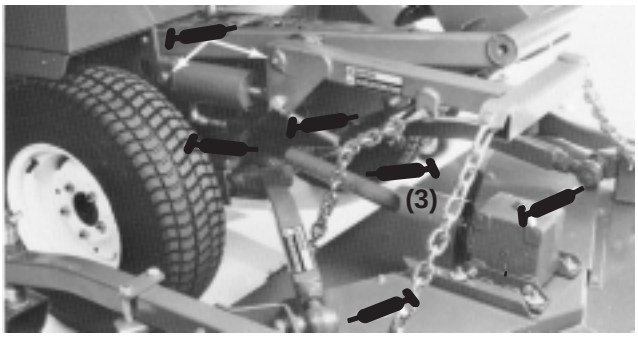


Figure 21

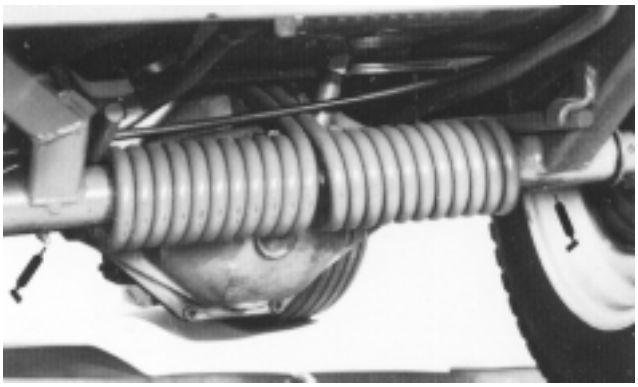


Figure 22

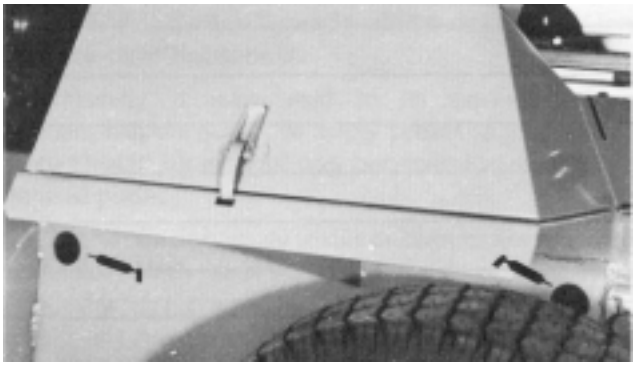


Figure 23

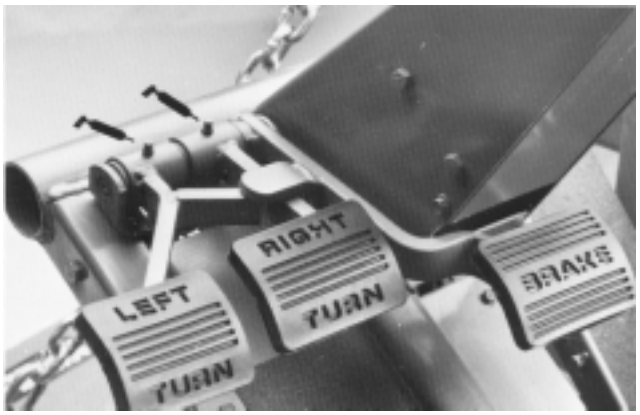


Figure 24

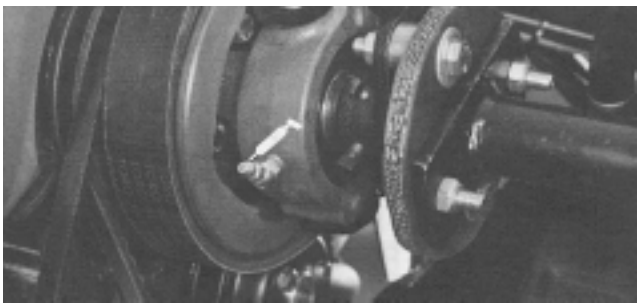


Figure 25

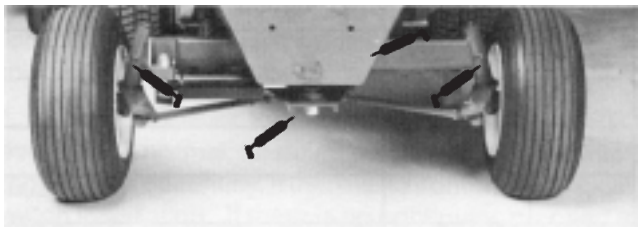


Figure 26

General Air Cleaner Maintenance

Inspect air cleaner and hose periodically to maintain maximum engine protection and to ensure maximum service life.

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

Servicing 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 one inch (25 mm) from the rubber baffle.

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.

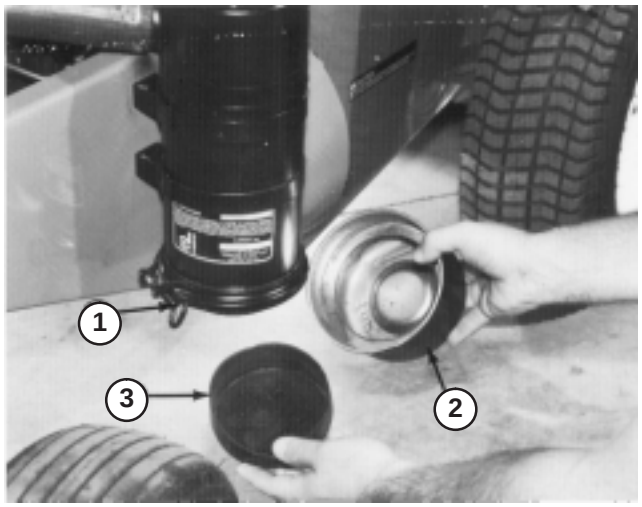


Figure 27

1. Thumbscrew
2. Dust cup
3. Baffle

1. Loosen thumb screw until dust cup and baffle can be removed (Fig. 27). Separate dust cup and baffle (Fig. 27).
2. Dump dust out of the dust cup. After cleaning cup and baffle, assemble and reinstall both parts.

Servicing Air Cleaner Filter

Service the air cleaner filter every 250 hours or more frequently in extreme dusty or dirty conditions by washing or using compressed air. Replace the element after every six cleanings (1500 hours) or annually, whichever comes first.

1. Remove and service dust cup; refer to Servicing Dust Cup and Baffle.
2. Remove wing nut w/gasket and slide filter element out of air cleaner body (Fig. 28).

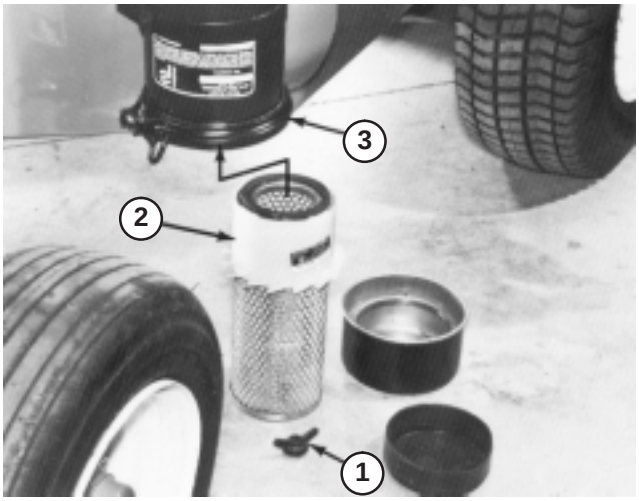


Figure 28

1. Wing nut with gasket
2. Filter element
3. Air cleaner body

3. Clean the element by washing it in a solution of filter cleaner (Toro Part No. 27-7220) and water, or blow dirt out of filter by using compressed air.

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. Remember, though, filter must be washed when exhaust soot is lodged in the filter pores.

Washing Method

Important **Do not remove plastic fin assembly because back–blowing with compressed air removes dust from beneath fins.**

- Prepare a solution of filter cleaner and water and soak filter element about 15 minutes Refer to directions on filter cleaner carton for complete information.
- After soaking filter for 15 minutes, rinse it with clear water. Maximum water pressure must not exceed 40 psi (276 kPa) to prevent damage to the filter element.
- Dry filter element using warm, flowing air (160°F (71°C) max), or allow element to air–dry. Do not use compressed air or a light bulb to dry the filter element because damage could result.

Compressed Air Method

Important **Do not remove plastic fin assembly because back–blowing with compressed air removes dust from beneath fins.**

- 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.
- Keep air hose nozzle at least one 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.

4. Wipe inside of air cleaner body with a damp cloth to remove excess dust. Slide filter into air cleaner body and secure it in place with wing nut and gasket.
5. Reinstall dust cup and baffle. Move thumb screw behind air cleaner body and tighten it securely.

Inspecting Filter Element

1. Place bright light inside filter.
2. Rotate filter slowly while checking for cleanliness, ruptures, holes, and tears. Replace defective filter element.
3. Check fin assembly, gasket, and screen for damage. Replace filter if damage is evident.

Cleaning the Radiator and Screen

The screen and front of the radiator must be kept clean to prevent the engine from overheating. Normally, check the screen and front of radiator daily and, if necessary, clean any debris off these parts. However, it will be necessary to check and to clean the screen each quarter hour and radiator checked every hour in extremely dusty and dirty conditions.

Note: This situation may be particularly prevalent if the rear discharge cutting unit is being used. The front of the radiator can be cleaned thoroughly by blowing with compressed air from the fan side of the radiator. Make sure to clean out any debris that settles to the bottom of the screen. The screen in front of radiator can be removed—by loosening wing nuts at top of screen—to make cleaning easier.

Changing Engine Oil And Filter

Check oil level after each day's operation or each time machine is used. Change oil and filter initially after first 50 hours of operation; change oil and filter after every 100 hours of operation thereafter. If possible, run engine just before changing oil because warm oil flows better and carries more contaminants than cold oil.

1. Position machine on a level surface.
2. Open the hood. Set drain pan under the oil pan and in line with drain plug.
3. Clean area around drain plug.
4. Remove oil drain plug and allow oil to flow into drain pan.
5. Remove and replace oil filter.
6. After oil is drained, reinstall drain plug and wipe up any oil that is spilled.
7. Fill crankcase with oil; refer to Check Crankcase Oil.

Servicing Fuel System

Danger

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

- **Fill the fuel tank outdoors, in an open area, 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 in. (25 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.**
- **Always place gasoline containers on the ground away from your vehicle before filling.**
- **Do not fill gasoline containers inside a vehicle or on a truck or trailer bed because interior carpets or plastic truck bed liners may insulate the container and slow the loss of any static charge.**
- **When practical, remove gas-powered equipment from the truck or trailer and refuel the equipment with its wheels on the ground.**
- **If this is not possible, then refuel such equipment on a truck or trailer from a portable container, rather than from a gasoline dispenser nozzle.**
- **If a gasoline dispenser nozzle must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.**

Fuel Lines and Connections

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

Replacing Fuel Filter

Replace the fuel filter after every 400 hours of operation or yearly, whichever comes first.

1. Disconnect elbow fitting from rear of fuel filter (Fig. 29).
2. Disconnect front of filter from elbow fitting (Fig. 29).
3. Install new filter and connect fittings. Start engine and check for leaks.

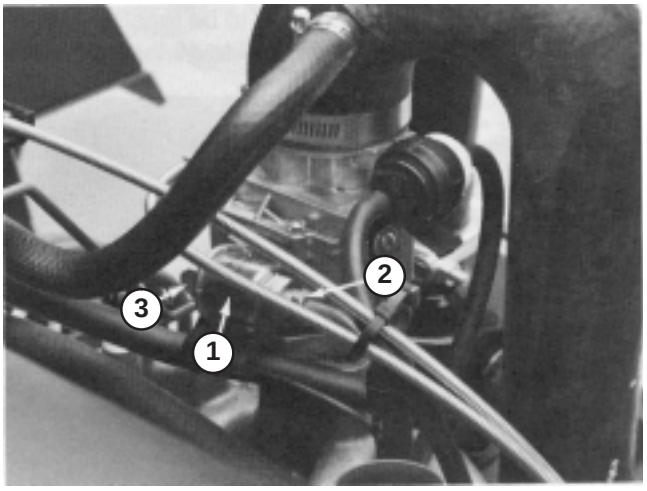


Figure 29

1. Fuel filter
2. Rear elbow
3. Front elbow

Cleaning Radiator And Screen

The screen and front of the radiator must be kept clean to prevent the engine from overheating. Normally, check the screen and front of radiator daily and, if necessary, clean any debris off these parts. However, it will be necessary to check and to clean the screen each quarter hour and radiator checked every hour in extremely dusty and dirty conditions.

Note: This situation may be particularly prevalent if the rear discharge cutting unit is being used. The front of the radiator can be cleaned thoroughly by blowing with compressed air from the fan side of the radiator. Make sure to clean out any debris that settles to the bottom of the screen. The screen in front of radiator can be removed—by loosening wing nuts at top of screen—to make cleaning easier.

Changing Coolant In Cooling System

The cooling system must be filled with a 50/50 solution of water and permanent ethylene glycol anti–freeze. Every two years, drain the coolant from the radiator and engine by opening the drain cock and block plug. After coolant is drained, flush the entire system and refill it with a 50/50 solution of water and anti–freeze. Capacity of cooling system is approximately 6 quarts (5.7 L). When filling the radiator, level of coolant must be above the core and 1 inch (25 mm) below bottom of filler neck. DO NOT OVERFILL. Always install radiator cap securely.

Servicing Belts

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

Alternator Belt

A new alternator belt (Fig. 30) is to be tensioned to 65 lbs. A used belt is to be tensioned to 40 lbs.

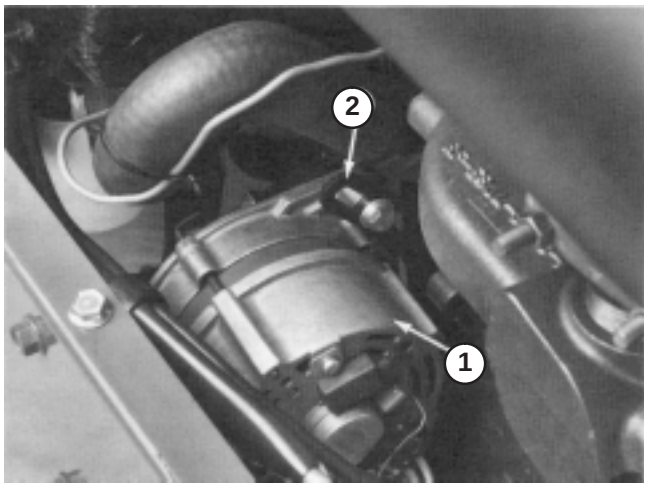


Figure 30

1. Alternator
2. Brace

1. To adjust belt tension, loosen bolt securing brace to engine, bolt securing alternator to brace and alternator mounting bolt (Fig. 30).

2. Insert pry bar between alternator and engine and pry out on alternator (Fig. 30).

3. Hold alternator in position after proper belt tension setting is achieved and tighten alternator and brace bolts to secure adjustment.

Cooling Fan Belt

A new cooling fan belt (Fig. 31) is to be tensioned to 65 lbs. A used belt is to be tensioned to 40 lbs.

1. To adjust belt tension, loosen upper and lower nuts securing idler arm to front engine mount (Fig. 31).

2. Pull out on idler arm until desired belt tension is achieved.

3. Tighten mounting nuts to secure adjustment.

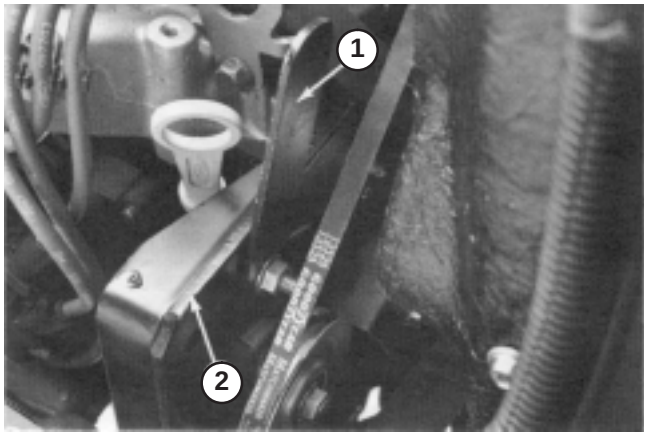


Figure 31

1. Idler arm
2. Engine mount

Adjusting PTO Drive Belt Tension

Important Check PTO belt tension initially after first 10 hours and 50 hours of operation and after every 100 hours of operation thereafter.

If belt begins to slip because it has stretched or because of worn linkage adjust as follows:

1. Unlatch and remove instrument cover.

2. Move PTO control lever to ON position.

3. Measure length of PTO spring between flat–washers (Fig. 32). There should be a spring length of 3-3/16 in. (81 mm).

4. To adjust, hold head of adjusting screw with wrench (under PTO actuating arm) and turn locknut (Fig. 32).

5. Move PTO lever to OFF position and install instrument cover.

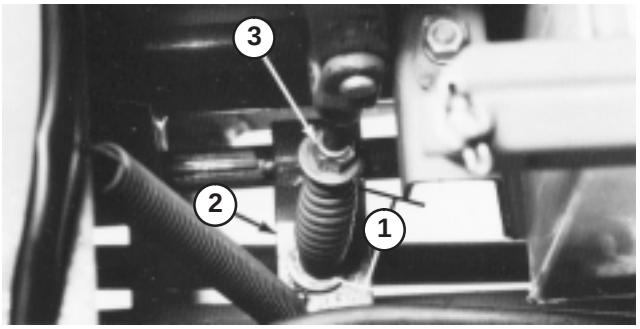


Figure 32

1. 3-3/16 in. (81 mm)
2. PTO actuating arm
3. Locknut

Replacing Spark Plugs

Change spark plugs after every 400 operating hours to assure proper engine performance and reduce exhaust emission level.

Correct spark plug to use is a Motorcraft–AGSF22C or AGRF22 or equivalent.

Recommended air gap is .040” (1.016 mm).

Note: The spark plug usually lasts a long time; however, the plug should be removed and checked whenever the engine malfunctions.

1. Clean area around spark plugs so foreign matter cannot fall into cylinder when spark plug is removed.
2. Pull spark plug wires off spark plugs and remove plugs from cylinder head.
3. Check condition of side electrode, center electrode, and center electrode insulator to assure there is no damage.

Important **A cracked, fouled, dirty or otherwise malfunctioning spark plug must be replaced. Do not sand blast, scrape, or clean electrodes by using a wire brush because grit may eventually release from the plug and fall into the cylinder. The result is usually a damaged engine.**

4. Set air gap between center and side of electrodes at .040” (1.016 mm). Install correctly gapped spark plug and tighten plug to 11–15 ft–lb. If torque wrench is not used, tighten plug firmly.
5. Install spark plug wires.

Adjusting Governor

1. With engine shut off, move throttle control to FAST position and open hood. Check between the throttle arm and the stop on the carburetor base to make sure there is 1/32” (0.8 mm) gap (Fig. 33). If gap is not correct, adjust throttle rod (Fig. 33) by turning ball joint ends until gap is 1/32” (0.8 mm). If gap is correct, proceed to step 2.

Warning

Engine must be running so final adjustment of the governor can be performed. To guard against possible personal injury, engage parking brake and keep hands, feet, face and other parts of the body away from fan or other moving parts.

2. Start engine and move throttle to SLOW position. Allow engine to warm up to normal operating temperature.
3. Rotate throttle arm closed until it contacts stop (Fig. 33).

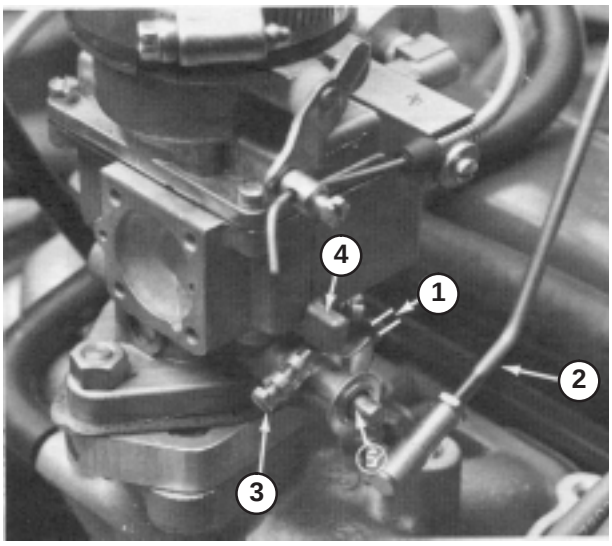


Figure 33

1. 1/32” (0.8 mm)
2. Throttle rod
3. Carburetor idle speed screw
4. Stop
5. Throttle arm

4. Check idle speed and adjust carburetor idle speed screw if necessary to attain 1350 ± 50 rpm.
5. Release throttle arm, loosen jam nut on governor low idle speed screw and adjust it to attain 1500 ± 100 rpm (Fig. 33).
6. Slowly move throttle to FAST position until engine speed reaches 3200 ± 100 rpm. Shut off engine. Adjust high idle stop screw until it contacts speed control lever (Fig. 34).

Important Do not over speed the engine because the transmission could be damaged.

7. Move throttle rapidly from SLOW to FAST. The engine should not surge. if engine surges, proceed to step 8.
8. Check V–belts from engine to governor pulley and assure they are tight. If belts are loose, the engine will surge. If belts are tensioned properly, loosen jam nut that retains the anti–surge screw (Fig. 34). Rotate screw clockwise 1/8 turn at a time until surging stops. Should governor continue to surge, check the following:
   - Carburetor too rich or too lean.
   - Binding in throttle linkage.
   - Governor worn internally.

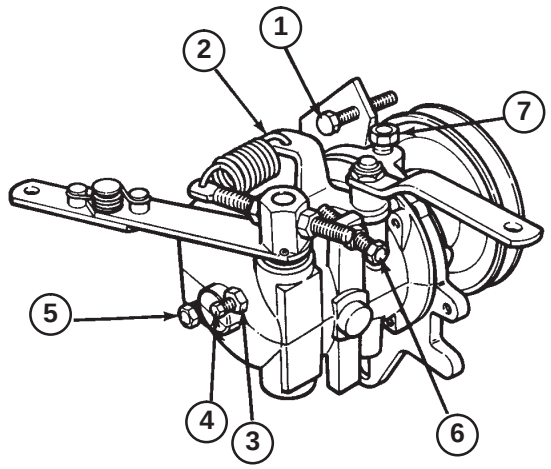


Figure 34

1. High idle stop screw
2. Speed control lever
3. Jam nut
4. Anti–surge screw
5. Oil check plug
6. low idle stop screw

Important Never rotate anti–surge screw in too far so that speed of engine increases.

9. Bump the throttle lever with your hand so engine speeds up momentarily. If governor is working properly, engine speed should return to normal within one or two surges of the governor. More than two surges of the governor usually indicates than the anti–surge screw must be turned in slightly more than it is. When adjustment is correct, lock jam nut against governor body.

10. Check low and high idle speed to be sure there is no change from the initial setting. If high idle sped has increased, anti–surge has been turned into the governor too far and it must be backed out. Then repeat the entire adjustment procedure.

Note: If the throttle control on the instrument panel will not stay in the FAST position during operation, remove the panel cover and tighten the nut and capscrew at base of throttle lever assembly.

Checking Oil Level In Governor

The governor is shipped with oil in it, but the level of oil must be checked after every 250 hours of operation.

1. Position machine on level surface and shut engine off.

2. Disengage hood latch and open the hood.

3. Clean area around check plug on governor (Fig. 34)

4. Remove check plug. Oil level must be up to bottom of filler hole. If oil level is low, remove oil fill plug and add same oil that is being used in engine. When oil is at point of overflowing out of check plug hole, install the check plug and fill plug.

Servicing Spark Arrestor Muffler

Every 200 hours operation, clear the muffler of carbon buildup.

1. Unlatch and raise hood assembly.

2. Remove pipe plug from clean–out port at lower side of muffler (Fig. 35).

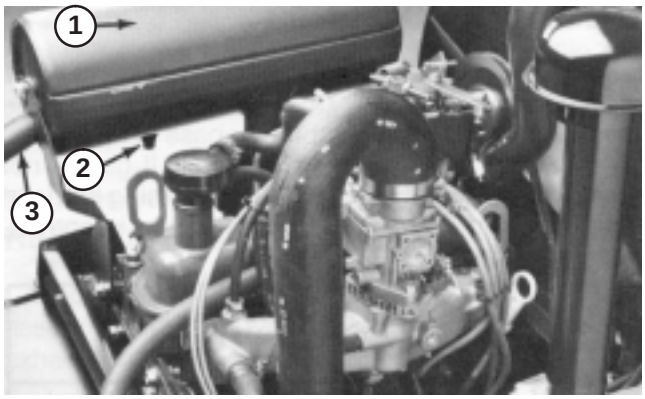


Figure 35

1. Muffler
2. Pipe plug
3. Outlet port

Caution

Be careful while working around muffler as it may be hot and could cause injury.

3. Start engine. Plug the normal muffler exit with block of wood or metal plate so exhaust flow will be forced out of the clean–out port (Fig. 53). Continue to block exit until carbon deposits cease coming out port.

Caution

Do not stand in line with the clean–out port. Always wear safety glasses.

4. Stop engine, replace pipe plug, and lower and latch hood.

Adjusting Traction Control Rod

1. Check traction drive neutral position to assure front wheels do not creep; refer to Adjusting Traction Drive for Neutral.
2. Loosen lock nuts and adjust traction pedal stop screw (Fig. 36) to a length of 3.00”.
3. Rotate pump lever to full forward speed location.

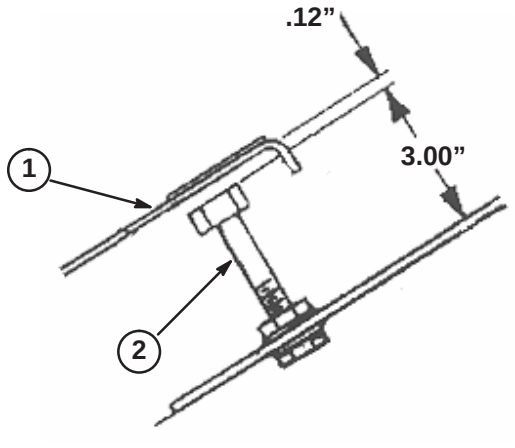


Figure 36

1. Traction pedal
2. Stop screw

4. Adjust control rod end (Fig. 37) until there is a .12” gap between top of traction pedal stop screw and pedal. Tighten lock nuts.

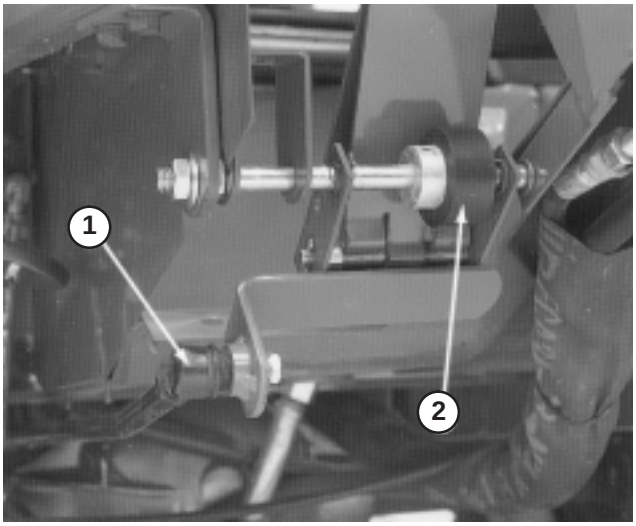


Figure 37

1. Control rod
2. Friction wheel

Adjusting Traction Pedal Friction Wheel

1. Loosen two nuts securing traction pedal shaft on right side of pedal (Fig. 37).
2. Rotate shaft to relocate worn surface of friction wheel away from underside of traction pedal.
3. Tighten nuts to secure shaft and wheel in position.

Adjusting the Traction Drive for Neutral

1. Park vehicle on a level surface and turn engine off. Apply the parking brake, tip seat forward, and actuate pump lever (Fig. 38) to ensure assembly is properly seated and operating freely. Correct any discrepancy.

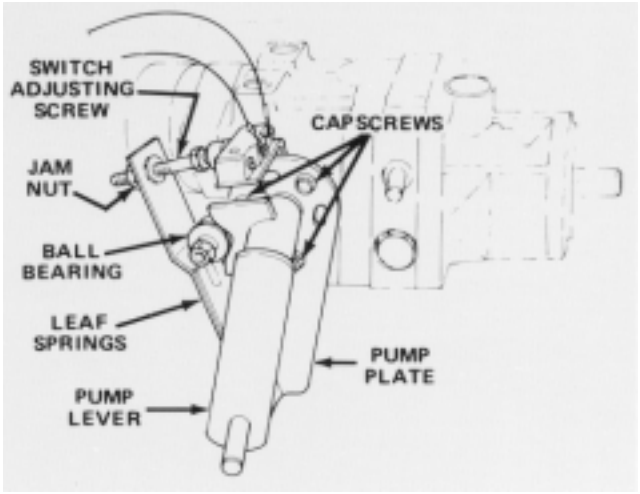


Figure 38

2. Block right front tire and both rear tires so vehicle cannot roll forward or backward.
3. Jack up frame so left front wheel is off the shop floor. Use a jack stand to support the frame.
4. Start engine and allow it to idle for 5 minutes to heat oil in transmission to operating temperature.
5. Release parking brake; then check left front wheel that is off shop floor. Wheel must not be rotating. If wheel is rotating, proceed to step 11 for an adjustment. If wheel is not rotating, proceed to step 13. Verify the adjustment with throttle in SLOW and FAST position.
6. Because the wheel is rotating, the pump plate must be adjusted. But before adjusting the pump plate, move throttle to SLOW. If wheel is rotating forward, loosen capscrews, and lightly tap bottom of pump plate counterclockwise (Fig. 38). By contrast, tap pump plate clockwise if wheel is rotating backward (Fig. 38). When

wheel stops rotating, tighten capscrews holding pump plate against side of transmission. Verify the adjustment with throttle in SLOW and FAST position.

7. Block right front tire and both rear tires so vehicle cannot roll forward or backward.

8. Jack up frame so left front wheel is off the shop floor. Use a jack stand to support the frame.

9. Start engine and allow it to idle for 5 minutes to heat oil in transmission to operating temperature.

10. Release parking brake; then check left front wheel that is off shop floor. Wheel must not be rotating. If wheel is rotating, proceed to step 11 for an adjustment. If wheel is not rotating, proceed to step 13. Verify the adjustment with throttle in SLOW and FAST position.

11. Because the wheel is rotating, the pump plate must be adjusted. But before adjusting the pump plate, move throttle to SLOW. If wheel is rotating forward, loosen capscrews, and lightly tap bottom of pump plate counterclockwise (Fig. 38). By contrast, tap pump plate clockwise if wheel is rotating backward (Fig. 38). When wheel stops rotating, tighten capscrews holding pump plate against side of transmission. Verify the adjustment with throttle in SLOW and FAST position.

12. Should front wheel continue to rotate, check for the following:

    - Ball bearing is loose or worn out (Fig. 38).
    - Plunger on interlock switch is sticking.
    - Loose or missing fasteners
    - Worn roll pin securing pump lever to transmission
    - Pump lever loose on control shaft. (Correct by applying Loc-tite 271 or 601 to shaft.)
    - Weak or damaged leaf springs (Fig. 38). Replace.
    - Internal transmission component malfunction. Contact your local Toro distributor for assistance.

13. Shut engine off.

14. Adjust traction control rod; refer to Adjusting the Traction Control Rod, page 37.

Adjusting the Traction Interlock Switch

1. Adjust transmission for neutral; refer to Adjusting the Traction Drive for Neutral, page 36.

2. Actuate the pump lever (Fig. 38) to ensure all parts are operating freely and seated properly.

3. Loosen jam nut. Rotate switch adjusting screw (Fig. 38) until there is a gap between head of screw and switch button.

4. Rotate adjusting screw until it contacts the switch button. Continue to rotate the screw until the circuit is completed (switch “clicks”). After the switch clicks, rotate the adjusting screw an additional 1/2 turn. Tighten jam nut.

Replacing the PTO Switch

1. Remove instrument cover and disconnect negative battery cable from battery.

2. Move PTO lever forward to ON position.

3. Remove boot from button end of PTO switch (Fig. 39). Retain boot for reinstallation. Separate switch wire connectors.

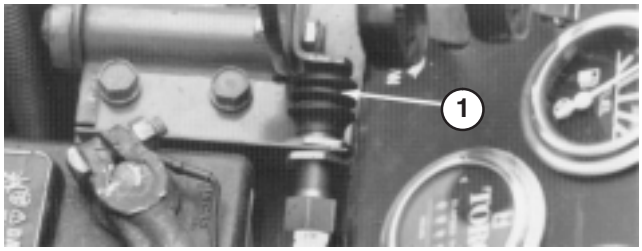


Figure 39

1. PTO switch

4. Remove front jam nut securing switch to mounting bracket and remove switch.

5. Install new PTO switch to mounting bracket. Adjust switch so it is depressed 1/2 in. (13 mm) when PTO lever is moved to OFF position. Tighten jam nuts to 75 in.-lb. Install boot to switch.

Important Switch threads will be damaged if jam nuts are over tightened.

6. Connect a continuity tester or ohm meter to switch connector. With PTO lever in the ON position the switch circuit **should not have** any continuity. If there is continuity, recheck switch installation. If there is no continuity, proceed to next step.

7. Move PTO lever to the OFF position. When PTO lever is in its normal, released position, the PTO switch **should have** continuity. If there is no continuity, recheck switch installation. If there is no continuity, proceed to next step.

8. Push switch connectors together.

9. Connect battery cable and install instrument cover.

Adjusting the Parking Brake Interlock Switch

1. Gap between parking brake shaft pivot paddle and bottom of interlock switch (Fig. 40) should be approximately 1/16” (Paddle must not contact switch).

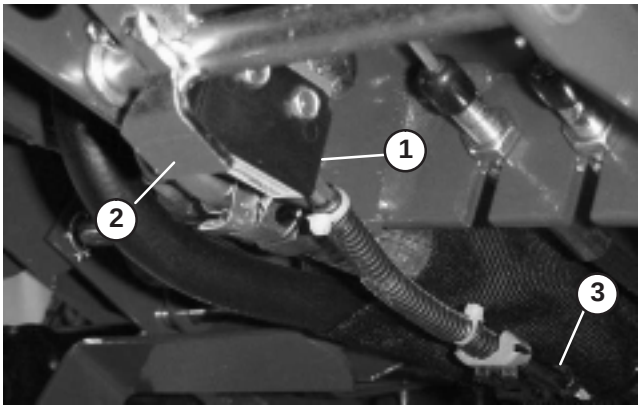


Figure 40

1. Parking brake interlock switch
2. Parking brake shaft pivot paddle
3. Wire harness connector

2. To adjust gap, loosen switch mounting screws, adjust gap and tighten screws.
3. Disconnect switch pigtail connector from wire harness.
4. Pull up on parking brake lever and depress brake pedal to lock pedal into first click on latch.
5. Connect a continuity tester or ohm meter to switch harness connector. With parking brake engaged, the switch circuit **should not have** continuity. If there is continuity, recheck switch or switch installation.

Adjusting the Tilt Steering Control

If steering wheel tilt control lever must be adjusted, proceed as follows:

1. Remove knob from parking brake and self tapping screws from steering column cover. Slide cover up steering shaft to expose pivot bracket (Fig. 41).

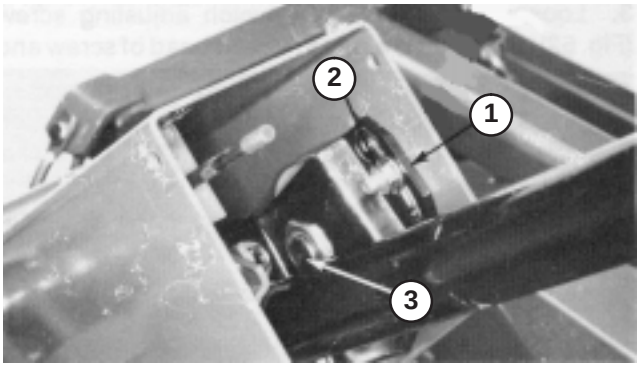


Figure 41

1. Pivot plate
2. Small nut
3. Large nut

2. Loosen small nut, rotate pivot bracket until it tightens large nut below (Fig. 41). Retighten small nut.
3. Reinstall steering column cover and parking brake knob.

Adjusting Rear Wheel Toe–in

The rear wheels should not toe–in or toe–out when they are adjusted correctly. To check the rear wheel toe–in, measure the center–to–center distance at wheel hub height, in front and in back of the rear tires. If the wheels toe–in or toe–out, an adjustment is required.

1. Rotate the steering wheel so rear wheels are straight ahead.
2. Loosen the jam nuts on both tie rods Adjust both tie rods until center-to-center distance at front and back of rear wheels is the same (Fig. 42).
3. When rear wheels are adjusted correctly, tighten jam nuts against tie rods.

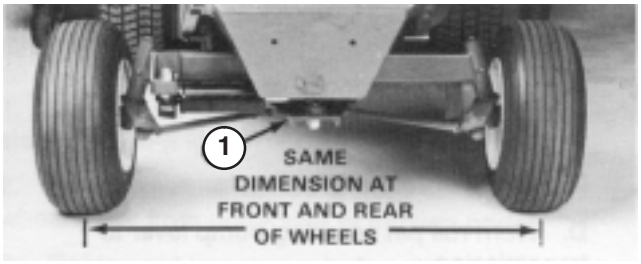


Figure 42

1. Steering plate

Adjusting the Rear Wheel Bearings

1. Jack up rear of machine until wheel is off shop floor. Use jack stands or block the machine to prevent it from accidentally falling.
2. Remove dust cap from end of wheel spindle. Also remove cotter pin securing retainer (Fig. 43).

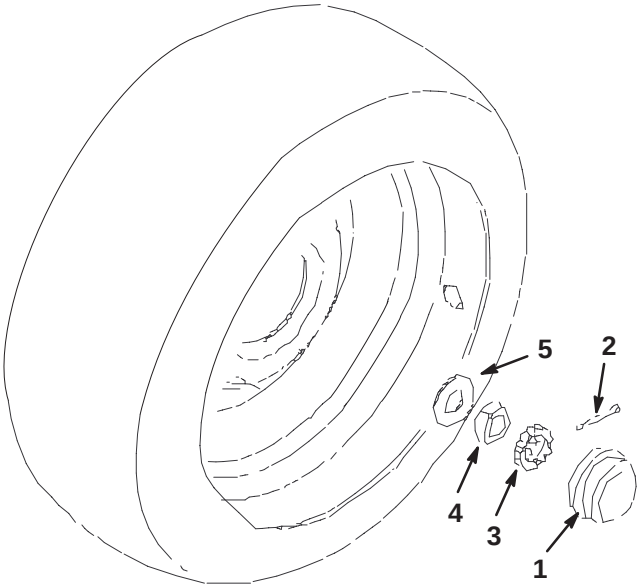


Figure 43

1. Dust cup
2. Cotter pin
3. Nut retainer
4. Jam nut
5. Flatwasher

3. Tighten the jam nut (Fig. 43) to approximately 75–100 in–lbs using a hand wrench.
4. Turn the wheel hub to seat the bearings.
5. Loosen the jam nut until it is away from the flatwasher and the wheel hub has end play.
6. Tighten the jam nut to 15–20 in–lbs while rotating the the wheel hub.
7. Place the nut retainer over the jam nut. If the cotter pin hole is not aligned with the retainer slot, remove the retainer nut and reorientate until alignment occurs.
8. Insert cotter pin. The wheel hub must not have any free play.
9. Install dust cap on end of wheel spindle.
10. Remove jack stands and lower machine to shop floor.

Adjusting the Brakes

Adjust the service brakes when there is more than 1 in. (25 mm) of “free travel” of the turn pedals, or when the brakes do not work effectively. Free travel is the distance the brake pedal moves before braking resistance is felt.

The brakes should only need adjusting after considerable use. These periodic adjustments can be performed where the brake cables connect to the brake pedal mount. When the cables are no longer adjustable, the star nut on the inside of the brake drum must be adjusted to move the brake shoes outward. However, the brake cables must be adjusted again to compensate for this adjustment.

1. To reduce free travel of turn pedals—tighten the brakes—loosen front nut on threaded end of brake cable (Fig. 44). Then tighten rear nut to move cable backward until turn pedals have 1/2 to 1 in. (13 to 25 mm) of free travel. Tighten front nut after brakes are adjusted correctly.

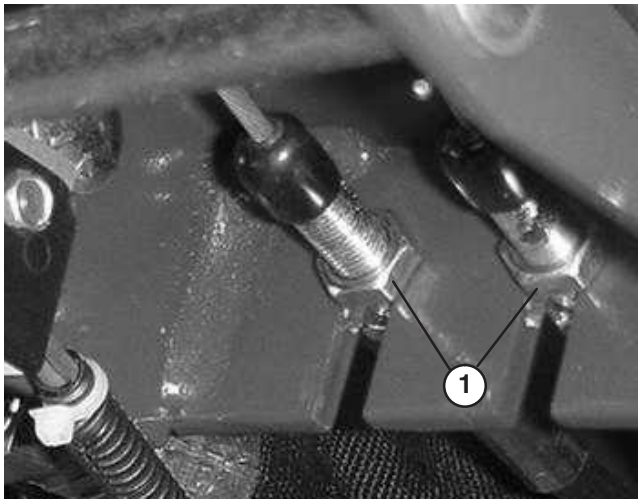


Figure 44

1. Jam nuts

2. When adjustment of brake cable cannot get free travel within 1/2 to 1 in. (13 to 25 mm), the star nut inside the brake drum must be adjusted. However, before adjusting the star nut, loosen brake cable nuts to prevent unnecessary strain on the cables.
3. Loosen five wheel nuts holding wheel and tire assembly on wheel studs.
4. Jack up machine until front wheel is off the shop floor. Use jack stands or block the machine to prevent it from falling accidentally.

5. Remove wheel nuts and slide wheel and tire assembly off studs. Rotate brake drum until adjusting slot is at bottom and centered over star nut that adjusts brake shoes (Fig. 45).

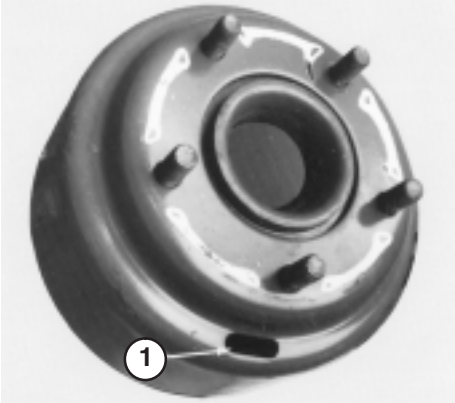


Figure 45

1. Slot

6. Using a brake adjusting tool or screwdriver, rotate star nut (Fig. 45) down until brake drum (Fig. 46) locks because of outward pressure of brake shoes (Fig. 46).

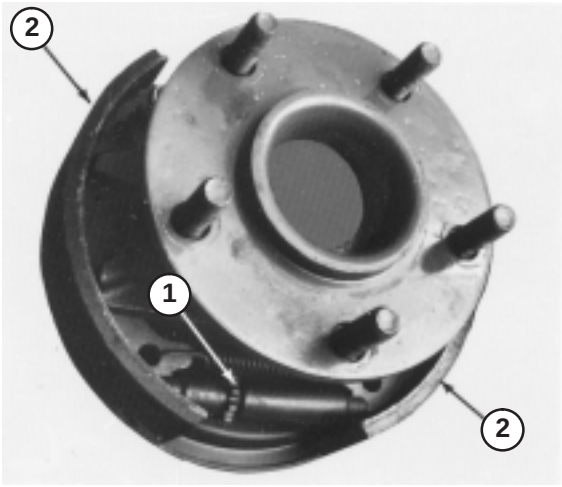


Figure 46

1. Star nut
2. Brake shoes

7. Loosen star nut about 12 to 15 notches or until brake drum rotates freely.
8. Install wheel and tire assembly on studs with five wheel nuts. Tighten nuts to 45-55 ft–lb (61-75 N·m).
9. Remove jack stands or blocking and lower machine to the shop floor.
10. Adjust the brake cables using step 1.

Replacing the Hydraulic Fluid Filter

The hydraulic fluid filter keeps the hydraulic system relatively free of contaminants and must be serviced at regular intervals. **Initially, change filter after first ten hours of engine operation, and thereafter, after every 200 hours of operation or yearly, whichever comes first.** Use Toro oil filter, Part No. 23-9740, as a replacement.

1. Clean area where hydraulic fluid filter mounts. Remove filter from base (Fig. 47) and clean filter mounting surface.

Figure 47

1. Hydraulic oil filter

2. Lubricate filter gasket with proper type of hydraulic fluid. Then fill filter using the same hydraulic fluid.
3. Install filter by hand until gasket contacts mounting head. Then rotate an additional 1/2 turn.
4. Start engine and check for hydraulic fluid leaks. Allow engine to run for about two minutes so any air in the system is purged (removed).
5. Shut engine off and check level of hydraulic system; refer to Checking the Hydraulic System Oil, page 21.

Changing the Hydraulic System Fluid

The hydraulic system fluid must be changed after every 1000 hours of normal operation or every two years, whichever comes first.

The following list is not assumed to be all–inclusive. Hydraulic fluids produced by other manufacturers may be used if they can cross reference to find an equivalent to the products listed. Toro will not assume responsibility for damage caused by improper substitutions, so use only products from reputable manufacturers who will stand behind their recommendation.

Universal Tractor Hydraulic Fluid

Mobil	Mobil Fluid 424
Amoco	1000 Fluid
Chevron	Tractor Hydraulic Fluid
Conoco	Power–Tran 3
Exxon	Torque Fluid
Pennzoil	Hydra–Tranz
Shell	Donax TD
Texaco	TDH

Note: Many hydraulic fluids are almost colorless, making it difficult to spot leaks. A red dye additive for the hydraulic system oil is available in 2/3 oz. (20 ml) bottles. One bottle is sufficient for 4–6 gal (15–22 1) of hydraulic oil. Order part no.44–2500 from your authorized Toro distributor.

1. Start engine, park machine on a level surface, lower implement to the shop floor, set the parking brake, and shut engine off. Block the two rear wheels.
2. Jack up both sides of front axle and support it with jack stands.
3. Clean area around hydraulic fluid filter and remove filter.
4. Remove drain plug from fitting between axle housing and oil filter and allow fluid to flow into drain pan (Fig. 48).

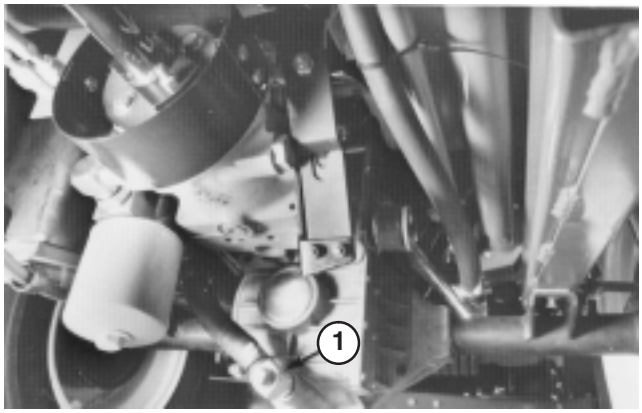


Figure 48

1. Drain plug

5. Install new filter; refer to steps 1–2 in Replacing Hydraulic Oil Filter, for proper procedures.
6. Install drain plug in fitting between axle housing and filter (Fig. 48).
7. Remove dipstick from axle filler tube (Fig. 49) and fill axle to proper level with correct type of hydraulic fluid; refer to table above.
8. Start and run the engine at idle speed for about two minutes and turn the steering wheel lock to lock to purge air trapped in the system. Shut the engine off.
9. Leave machine set for two additional minutes, then remove dipstick and check fluid level in axle (Fig. 49). If level is low, add fluid until level matches groove in dipstick (Fig. 49). If level is too high, remove drain plug (Fig. 48) and drain fluid until level matches groove in dipstick.

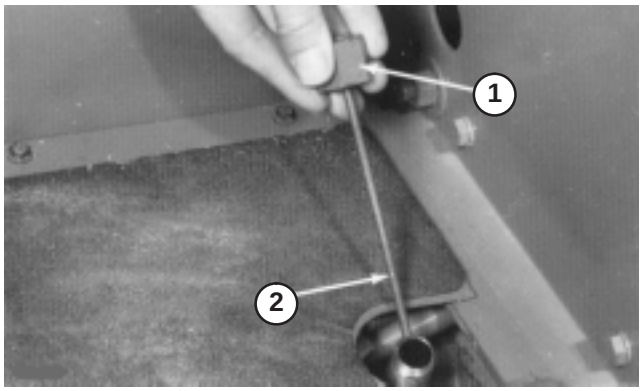


Figure 49

1. Dipstick
2. Groove

Fuses

The fuse block is located below control panel.

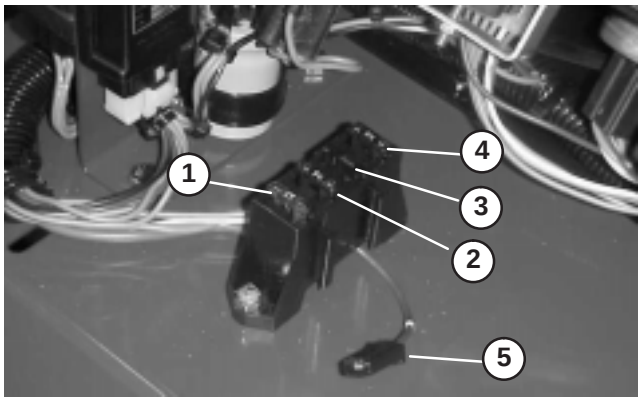


Figure 50

1. 15 Amp. Fuse
2. 7.5 Amp. Fuse
3. Open (Accessories)
4. 7.5 Amp. Fuse
5. Accessory connector

Servicing the Battery

Warning

CALIFORNIA

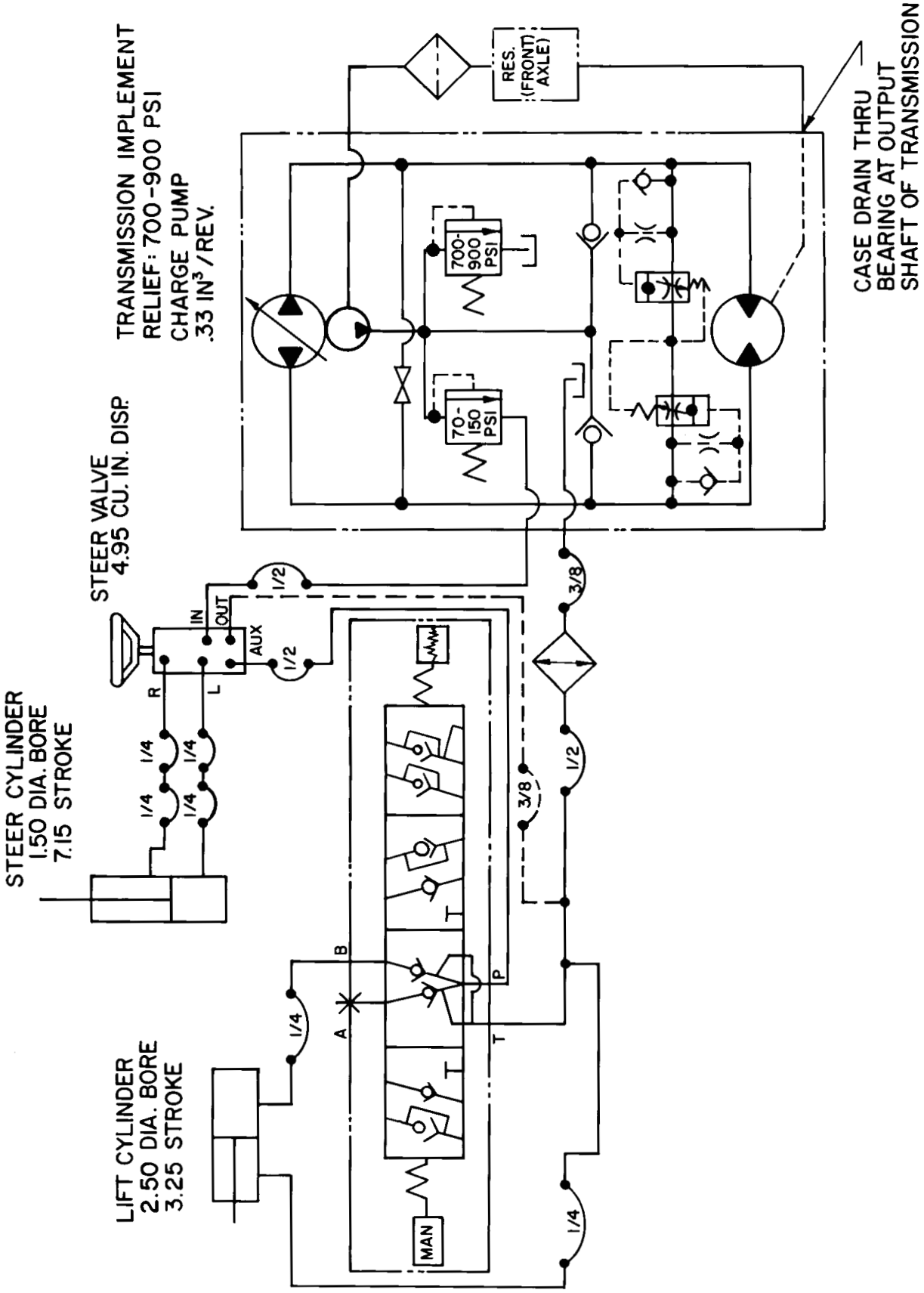
Proposition 65 Warning

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

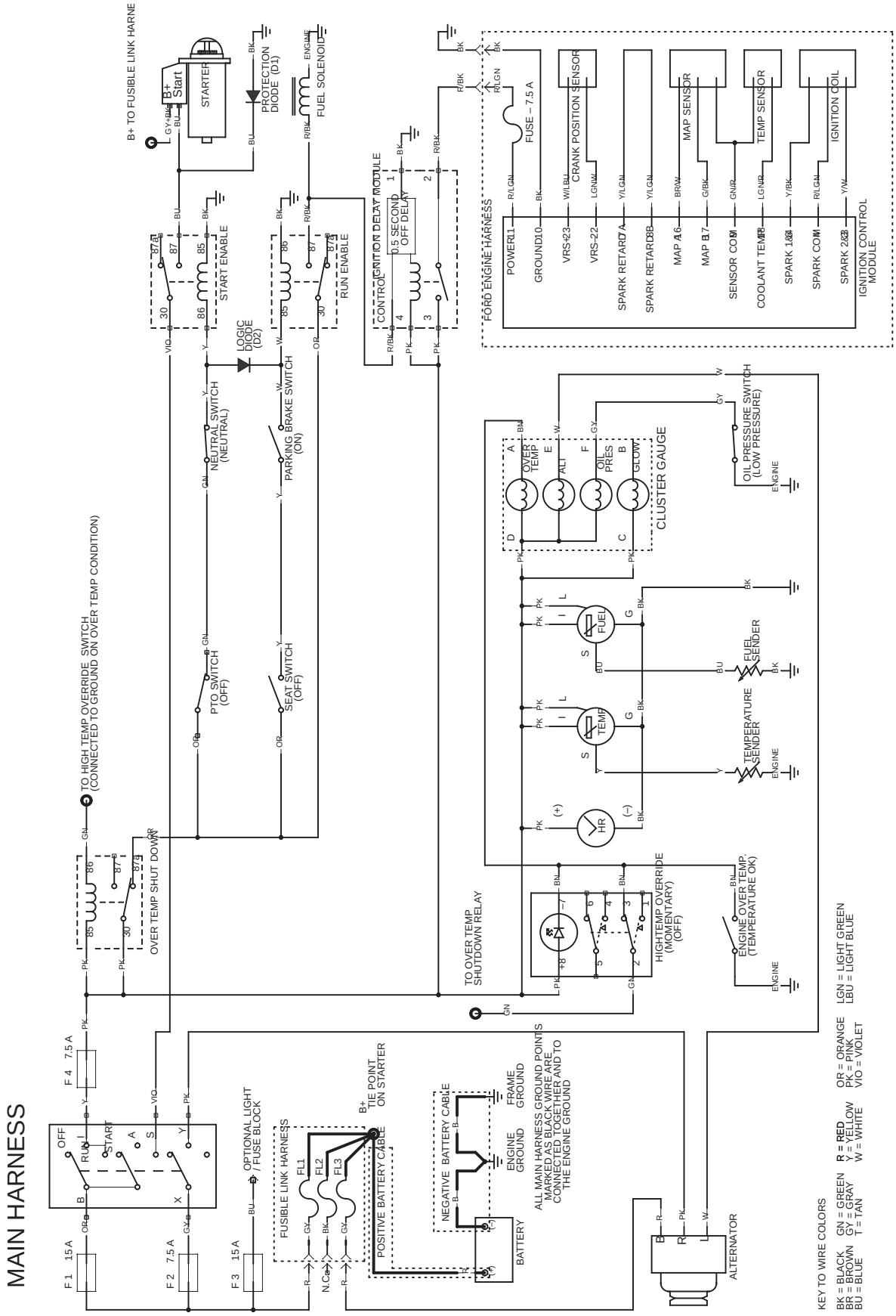
Important Before welding on the machine, disconnect ground cable from the battery to prevent damage to the electrical system.

Note: Check battery condition weekly or after every 50 hours of operation. Keep terminals and entire battery case clean because a dirty battery will discharge slowly. To clean the battery, wash the entire case with solution of baking soda and water. Rinse with clear water. Coat the battery posts and cable connectors with Grafo 112X (skin-over) grease (Toro Part No. 505-47) or petroleum jelly to prevent corrosion.

Hydraulic Schematic



Electrical Schematic



Seasonal Storage

Traction Unit

1. Thoroughly clean the traction unit, cutting unit and the engine, paying special attention to these areas:
   - radiator screen
   - underneath the cutting unit
   - under the cutting unit belt covers
   - counterbalance springs
   - P.T.O. Shaft Assembly
   - all grease fittings and pivot points
2. Check the tire pressure. Inflate all traction unit tires to 21 psi (145 kPa).
3. Remove, sharpen, and balance the cutting unit's blades. Reinstall the blades and torque the blade fasteners to specifications.
4. Check all fasteners for looseness; tighten as necessary.
5. Grease or oil all grease fittings and pivot points. Wipe up any excess lubricant.
6. Ensure that the P.T.O. belt remains in the disengaged position so that the P.T.O. belt does not take a "set."
7. Lightly sand and use touch-up paint on painted areas that are scratched, chipped, or rusted. Repair any dents in the metal body.
8. 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. 505-47) 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. Remove fill cap and add 3.5 qt (3.25 l) of high–quality detergent oi until level reaches FULL mark on dipstick. Refer to Check Engine Oil for proper viscosity–weight of oil. DO NOT OVERFILL.
4. Start the engine and run at idle speed for approximately two minutes.
5. Stop the engine.
6. Secure all fuel system fittings.
7. Thoroughly clean and service the air cleaner assembly.
8. Seal the air cleaner inlet and the exhaust outlet with weatherproof tape.
9. Check anti-freeze protection and add as needed for expected minimum temperature in your area.

The Toro General Commercial Products Warranty

A Two-Year Limited Warranty

Conditions and Products Covered

The Toro Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly warrant your 1996 or newer Toro Commercial Product ("Product") purchased after January 1, 1997, to be free from defects in materials or workmanship for two years or 1500 operational hours*, whichever occurs first. Where a warrantable condition exists, we will repair the Product at no cost to you including diagnosis, labor, parts, and transportation. This warranty begins on the date the Product is delivered to the original retail purchaser.

* Product equipped with hour meter

Instructions for Obtaining Warranty Service

You are responsible for notifying the Commercial Products Distributor or Authorized Commercial Products Dealer from whom you purchased the Product as soon as you believe a warrantable condition exists.

If you need help locating a Commercial Products Distributor or Authorized Dealer, or if you have questions regarding your warranty rights or responsibilities, you may contact us at:

Toro Commercial Products Service Department
Toro Warranty Company
8111 Lyndale Avenue South
Bloomington, MN 55420-1196
952-888-8801 or 800-982-2740
E-mail: commercial.service@toro.com

Owner Responsibilities

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

Items and Conditions Not Covered

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

- Product failures which result from the use of non-Toro replacement parts, or from installation and use of add-on, modified, or unapproved accessories
- Product failures which result from failure to perform required maintenance and/or adjustments
- Product failures which result from operating the Product in an abusive, negligent or reckless manner
- Parts subject to consumption through use unless found to be defective. Examples of parts which are consumed, or used up, during normal Product operation include, but are not limited to, blades, reels, bedknives, tines, spark plugs, castor wheels, tires, filters, belts, etc.
- Failures caused by outside influence. Items considered to be outside influence include, but are not limited to, weather, storage practices, contamination, use of unapproved coolants, lubricants, additives, or chemicals, etc.
- Normal "wear and tear" items. Normal "wear and tear" includes, but is not limited to, damage to seats due to wear or abrasion, worn painted surfaces, scratched decals or windows, etc.

Parts

Parts scheduled for replacement as required maintenance are warranted for the period of time up to the scheduled replacement time for that part.

Parts replaced under this warranty become the property of Toro. Toro will make the final decision whether to repair any existing part or assembly or replace it. Toro may use factory remanufactured parts rather than new parts for some warranty repairs.

General Conditions

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

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

Some states do not allow exclusions of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions and limitations may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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

Countries Other than the United States or Canada

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

Part No. 374-0031 Rev. –