Form No. 3356–617 Rev A

TORO®

Reelmaster® 2000-D

Traction Unit

Model No. 03431—270000001 and Up

Operator's Manual

CE

English (EN, GB)

Warning

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and 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. The two numbers are stamped into a plate that is riveted to the frame of the mower.

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 CEN standard EN 836:1997, ISO standard 5395:1990, and ANSI B71.4-1999 specifications in effect at the time of production when weights are installed according to chart on page 20.

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 the CEN standard EN 836:1997, ISO standard 5395:1990, and 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.
- 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 refuelling.
  - 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.
- 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.
- 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-cylinder/multi-reel machines, take care as rotating one cylinder/reel can cause other cylinders/reels 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 CEN, ISO, or 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 four 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.
- The grass baskets must be in place during operation of the cylinders/reels or thatchers for maximum safety. Shut the engine off before emptying the baskets.
- 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 fans, belts or pulleys. 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.

Sound Power Level

This unit has a guaranteed sound power level of 105 dBA/1 pW, based on measurements of identical machines per Directive 2000/14/EC and amendments.

Sound Pressure Level

This unit has an equivalent continuous A-weighted sound pressure level at the operator ear of 87 dBA based on measurements of identical machines per Directive 98/37/EC and amendments

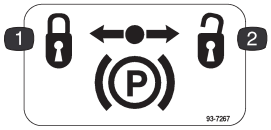
Vibration Level

This unit does not exceed a vibration level of 2.50 m/s^2 at the hands based on measurements of identical machines per ISO 5349 procedures.

This unit does not exceed a vibration level of 0.50 m/s^2 at the posterior based on measurements of identical machines per ISO 2631 procedures.

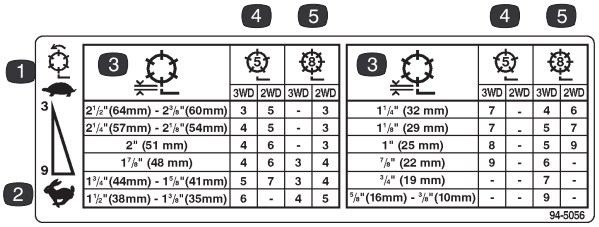
Safety and Instruction Decals

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.



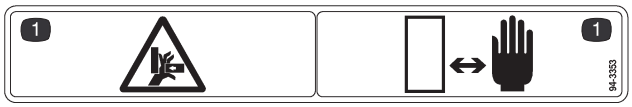
93-7267

1. Lock parking brake
2. Unlock parking brake



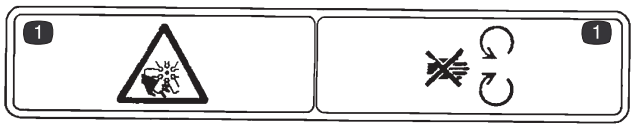
94-5056

1. Slow reel speed
2. Fast reel speed
3. Reel height
4. 5 Blade cutting unit
5. 8 Blade cutting unit



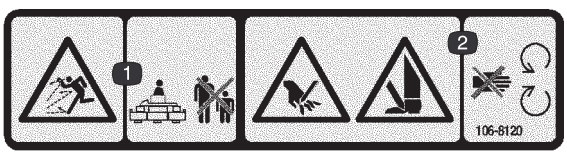
94-3353

1. Crushing of fingers or hands—stay a safe distance away.



93-7272

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



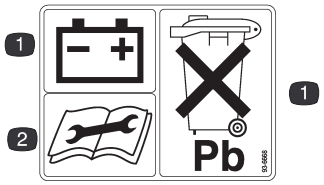
106-8120

1. Thrown object hazard—keep bystanders a safe distance from the machine.
2. Cutting hazard of hand and foot—stay away from moving parts.

93-6696

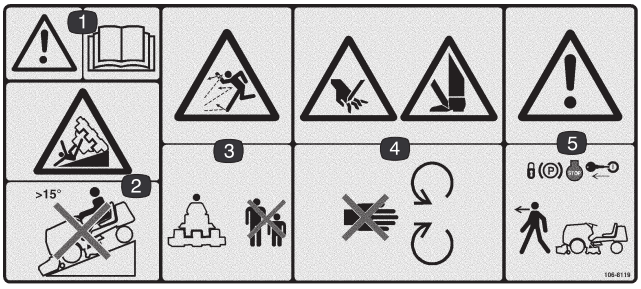
1. Warning—spring loaded mechanism. Read the operator's manual.

67-5360



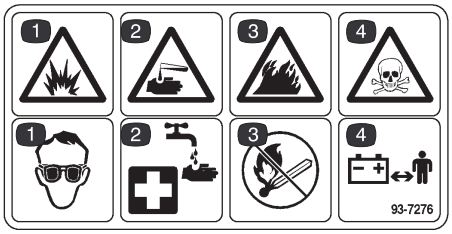
93-6668

1. The battery contains lead. Do not dispose of in the garbage.
2. Read the operator's manual before performing any maintenance.



106-8119

1. Warning—read the *Operator's Manual*.
2. Tipping hazard—do not drive the machine on a slope greater than 15 degrees.
3. Thrown object hazard—keep bystanders a safe distance from the machine.
4. Cutting hazard of hand and foot—stay away from moving parts.
5. Warning—lock the parking brake, stop the engine, and remove the ignition key before leaving the machine.

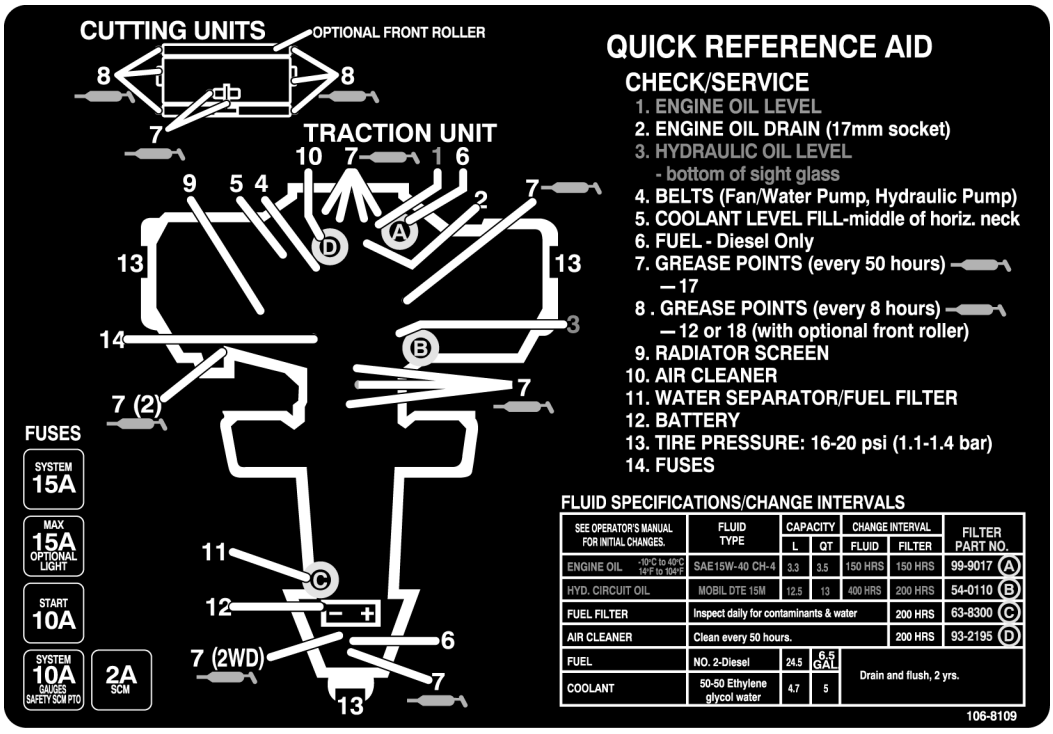


93-7276

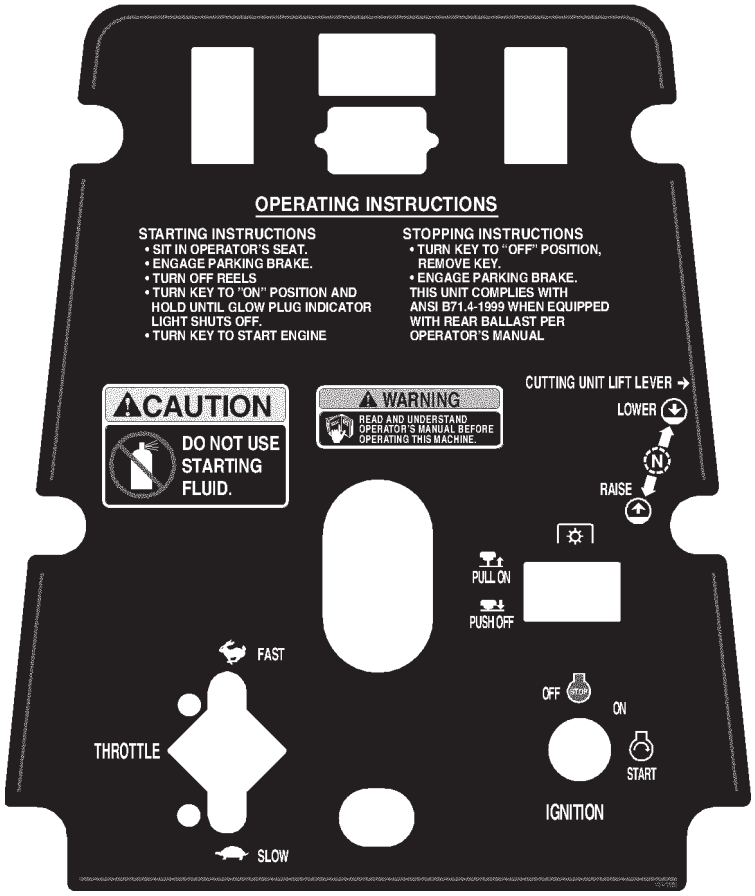
1. Explosion hazard—wear eye protection.
2. Caustic liquid hazard—flush skin with water.
3. Fire hazard—sparks, flame, and smoking prohibited.
4. Poison—keep children away from the battery.

106-5976

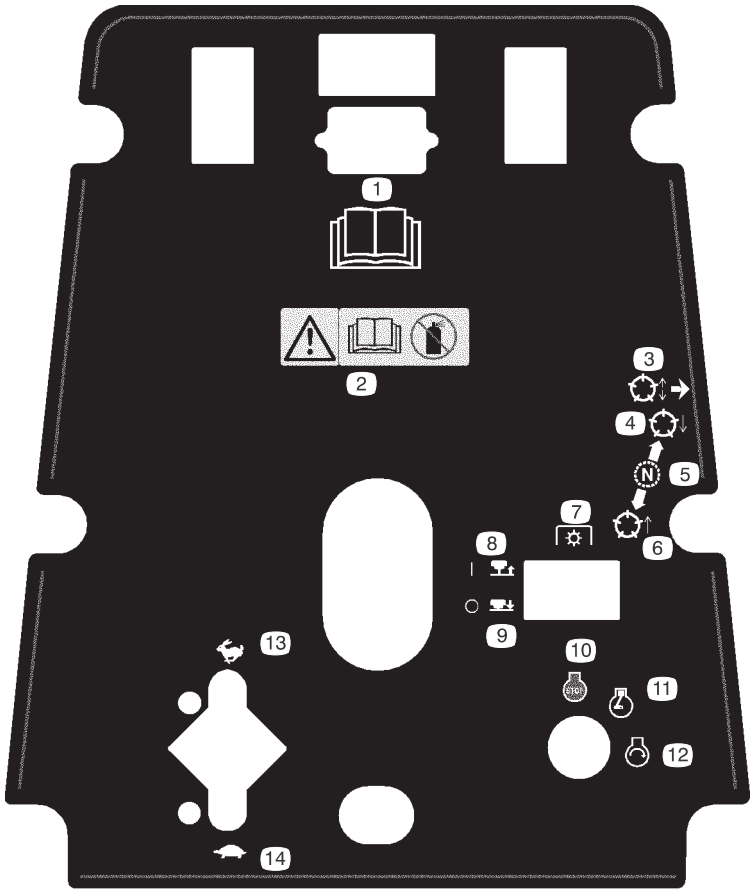
1. Engine coolant under pressure
2. Explosion hazard—read the *Operator's Manual.*
3. Warning—do not touch the hot surface.
4. Warning—read the *Operator's Manual.*



106-8109


OPERATING INSTRUCTIONS
STARTING INSTRUCTIONS
• SIT IN OPERATOR'S SEAT.
• ENGAGE PARKING BRAKE.
• TURN OFF REELS
• TURN KEY TO "ON" POSITION AND HOLD UNTIL GLOW PLUG INDICATOR LIGHT SHUTS OFF.
• TURN KEY TO START ENGINE
STOPPING INSTRUCTIONS
• TURN KEY TO "OFF" POSITION, REMOVE KEY.
• ENGAGE PARKING BRAKE.
THIS UNIT COMPLIES WITH ANSI B71.4-1999 WHEN EQUIPPED WITH REAR BALLAST PER OPERATOR'S MANUAL
CAUTION
DO NOT USE STARTING FLUID.
WARNING
READ AND UNDERSTAND OPERATOR'S MANUAL BEFORE OPERATING THIS MACHINE.
CUTTING UNIT LIFT LEVER
LOWER
N
RAISE
PULL ON
PUSH OFF
FAST
THROTTLE
SLOW
OFF
ON
START
IGNITION

104-3991



104-3994
(Affix over decal part no. 104–3991 for CE)

1. Read the *Operator's Manual.*
2. Warning—read the *Operator's Manual.* Do not use starting fluid.
3. Raise and lower the reels.
4. Lower the reels.
5. Neutral
6. Raise the reels.
7. Power take-off (PTO)
8. Pull on
9. Push off
10. Engine—stop
11. Engine—run
12. Engine—start
13. Fast
14. Slow

Specifications

Note: Specifications and design subject to change without notice.

General Specifications

Configuration	Tricycle vehicle with 2-wheel traction drive and rear wheel steering.
Engine	Briggs & Stratton–Daihatsu, 4-cycle, 3-cylinder, liquid cooled, vertical OHV, diesel engine with centrifugal water pump. 18.4 hp (13.7 kW); governed to a maximum speed of 3200 RPM. 51.9 cu. in. (850 cc) displacement. Forced lubrication gear pump. Mechanical centrifugal governor. Mechanical fuel transfer pump. Fuel filter/water separator with replaceable filter element. 12 volt (1 kW) starter. Heavy duty remote mounted air cleaner spin-on oil filter.
Radiator	Side mounted industrial radiator, 7 fins per inch. Approx. 5 quart (4.7 liter) capacity.
Electrical	12 volt Group 55, 450 cold cranking amps at 0°F (–18°C) ,75 minute reserve capacity at 80°F (27°C). 40 amp alternator with regulator/rectifier. Seat switch, PTO, parking brake, and traction interlock switches. Indicator light when cutting units are running.
Fuel Capacity	6.5 gallons
Traction Drive	High torque hydraulic wheel motors. 2-wheel drive. Oil cooler and shuttle valve provide positive closed-loop cooling. Optional 3–wheel drive kit.
Hydraulic Oil Capacity/Filter	Remote mounted, 2.3 gallon (8.7 liter) oil reservoir. 25 micron remote mounted spin on filter.
Ground Speed	Infinitely variable speed selection in forward and reverse Mowing speed: 0–5 mph (0–8 km/h) Transport speed: 0–8 mph (0–13 km/h) Reverse speed: 0–3 mph (0–4.8 km/h).
Tires/Wheels	Two front traction drive tires, 20 x 10-8 tubeless, 4-ply rating. Rear steering tire and tube; 20 x 8-8, 4-ply rating. Demountable front rims. Recommended tire pressure: 16–20 psi front and rear tires.
Frame	Frame consists of formed steel, welded steel, and steel tubing components.
Steering	Pinion and sector gear with solid drag link to rear steer wheel arm
Brakes	Service braking accomplished through dynamic characteristics of hydrostat. Parking or emergency brake is actuated by ratchet hand lever on the operator's left-hand side.
Controls	Foot operated traction pedal and traction pedal stop. Hand operated throttle, ignition switch, reel engagement switch, reel unit lift lever, parking brake, and seat adjustment.
Gauges and Protective Systems	Hour meter. Warning lights: oil pressure, water temperature, amps, glow plug and reel engagement light. High water temperature shut-down. Engine preheat incorporated into ignition switch.
Seat	Adjustable to operator weight, fore and aft, w/removeable fold-up armrests
Cutting Unit Lift	Hydraulic lift with automatic reel shut-off

Measurements

Wheel tread width	54-1/2 in. (138 cm)
Wheel base	55 in. (140 cm)
Width	76-1/2 in. (194 cm)
Transport width	
with 27″ cutting units	72 in. (183 cm)
with 32″ cutting units	85 in. (216 cm)
Length	96 in. (244 cm)
Height w/o seat	44 in. (112 cm)
Weight	
Traction Unit without cutting units	1066 lb. (484 kg)
Model 03210—27″ 5 blade cutting unit	136 lb. (62 kg)
Model 03211—27″ 8 blade cutting unit	143 lb. (65 kg)
Model 03214—27″ 11 blade cutting unit	149 lb. (68 kg)
Model 03212—32″ 5 blade cutting unit	158 lb. (72 kg)
Model 03213—32″ 8 blade cutting unit	167 lb. (76 kg)

Optional Equipment

3–Wheel Drive Kit	Model No. 03429
Weight Kit	Part No. 94-3698
Rear Weight Kit	Part No. 83-9370
Rear Weight	Part No. 83-9390
27” Lift Arm Kit	Model No. 03471
5 Blade Cutting Unit	Model No. 03210
8 Blade Cutting Unit	Model No. 03211
11 Blade Cutting Unit	Model No. 03214
Basket Kit	Model No. 03227
32” Lift Arm Kit	Model No. 03472
5 Blade Cutting Unit	Model No. 03212
8 Blade Cutting Unit	Model No. 03213

Setup

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

Loose Parts

Note: Use this chart as a checklist to ensure that all parts necessary for assembly have been received. Without these parts, total setup cannot be completed. Some parts may have already been assembled at the factory.

Description	Qty.	Use
Wheel assembly	1	Installing the rear wheel
Lug nut	4	
Flat washer	3	Mounting the carrier frames to the cutting units.
Capscrew	3	
Locknut	3	
Lift arm	2	Installing the front lift arms (supplied with the Lift Arm Kit)
Pivot rod	2	
Capscrew, 5/16 x 7/8 in.	2	
Lock washer	2	
Lift chain	2	
Clevis pin	4	
Cotter pin	4	
Thrust washer	3	Mounting the cutting units to the lift arms (supplied with the Lift Arm Kit)
Flat washer	3	
Flange head capscrew	3	
Spring	3	Installing the counterbalance springs (supplied with the Lift Arm Kit)
Vinyl sleeve	1	
Spring shackle	3	
Clevis pin	6	
Cotter pin	6	
Shackle	2	Installing the counterbalance springs (supplied with the 32” Cutting Unit Lift Arm Kit only)
Spring anchor	2	
Capscrew, 1/4 x 3/4 in.	4	
Locknut	4	
Key	2	
Hydraulic reservoir plug	1	
Danger decal	1	Affix to inside of right hand panel housing for European compliance.
Warning decal	1	Affix to skirt for European compliance.
Danger decal	1	Affix to battery for European compliance.
Instrument panel decal	1	Affix to instrument panel for European compliance.

Description	Qty.	Use
Parts catalog Certificate of compliance	1 1	
Operator video	1	View before operating the machine.
Operator's manual Engine operator's manual	2 1	Read before operating the machine.

Installing the Rear Wheel

1. Mount the wheel assembly onto the rear wheel hub (Fig. 1).

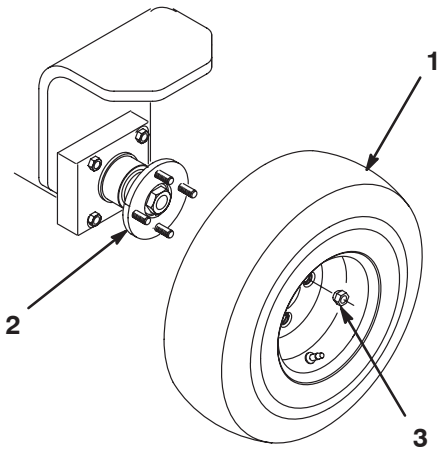


Figure 1

1. Wheel assembly
2. Rear wheel hub
3. Lug nut

2. Install the lug nuts (Fig. 1) and tighten them to 45–65 ft.-lb. (3–5 N·m).

Adjusting the Rear Carrier Frame Height

1. Slide the rear carrier frame onto the rear lift arm pivot rod (Fig. 2). **Do not** install the carrier frame to the cutting unit at this time.

2. Raise the lift arms and carrier frame fully.

3. Press down on one end of the carrier frame until the up stop on the opposite end contacts the underside of the foot step (Fig. 2). The distance between the up stop and the underside of the foot step, on the end pressed down, should be approximately 1/4 in. (6 mm). If the distance is not 1/4 in. (6 mm), an adjustment to the lift cylinder is required. If the distance is correct, remove the carrier frame and proceed with the setup instructions.

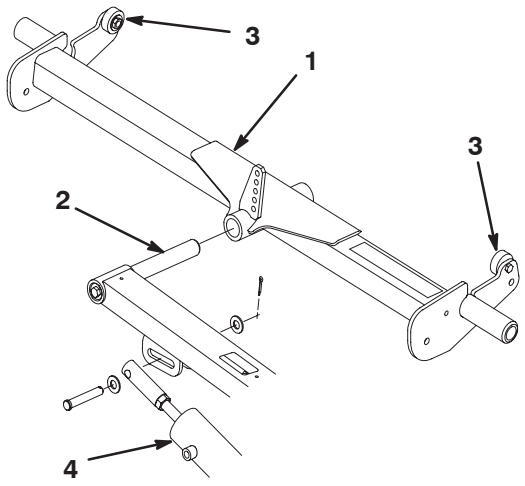


Figure 2

1. Rear carrier frame
2. Pivot rod
3. Up stop
4. Lift cylinder

4. If an adjustment to the lift cylinder is required, proceed as follows:

A. Remove the clevis pin securing the rod end of the lift cylinder to the lift arm (Fig. 2).

B. Loosen the hex nut securing the clevis to the cylinder rod.

C. Rotate the clevis end in or out until 1/4 in. (6 mm) clearance is attained. Check the adjustment and repeat steps 2–3 as required.

D. Tighten the hex nut and connect the cylinder rod end to the lift arm (Fig. 2).

Mounting the Carrier Frames to the Cutting Units

1. Remove the cutting units from the cartons. Adjust them per the Cutting Unit Operator's Manual.

2. Position a carrier frame onto each cutting unit, aligning the mounting holes with the mounting links (Fig. 3).

3. Secure each mounting link to the carrier frame with a capscrew (3/8 x 2-1/4 in.), 2 flat washers, and a locknut, as shown in Figure 3. Position a washer on each side of the link when mounting. Torque to 31 ft.-lb. (42 N·m).

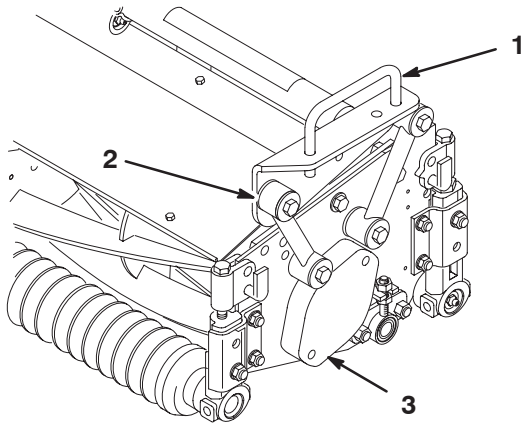


Figure 3

1. Carrier frame
2. Mounting link
3. Bearing housing cover

Installing the Front Lift Arms

1. Insert a pivot rod into the left lift arm and align the mounting holes (Fig. 4).

2. Secure the pivot rod to the lift arm with a capscrew (5/16 x 7/8 in.) and lock washer.

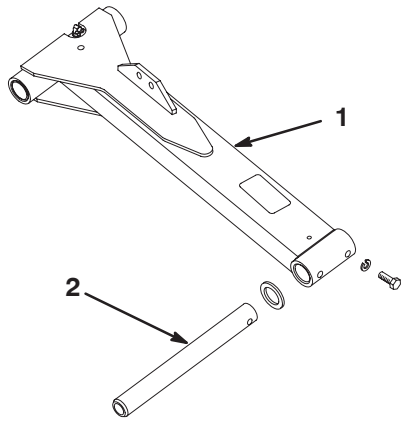


Figure 4

1. Lift arm
2. Pivot rod

3. Loosen the top capscrew securing the left counterbalance arm to the frame (Fig. 5).

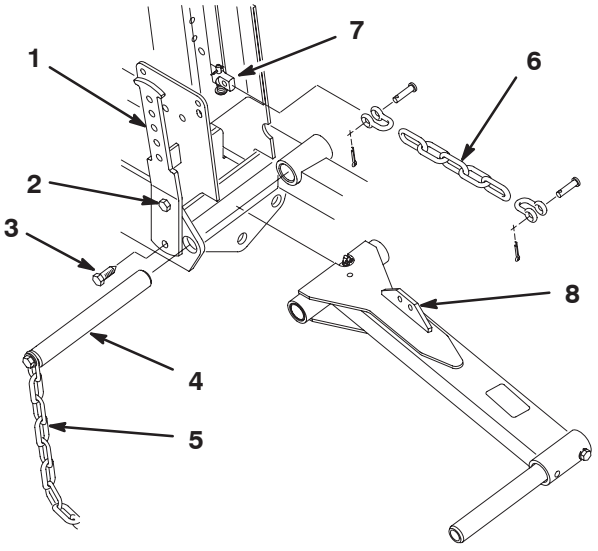


Figure 5

1. Counterbalance arm
2. Top capscrew
3. Bottom capscrew
4. Lift arm pivot pin
5. Tipper chain
6. Lift chain
7. Cylinder pin
8. Lift arm tab

4. Remove the bottom capscrew and nut securing the left counterbalance arm to the frame (Fig. 5).

5. Rotate the counterbalance arm outward, allowing removal of the lift arm pivot pin and tipper chain (Fig. 5).

6. Position the lift arm between the frame members, align the mounting holes, and install the pivot pin (Fig. 5). Insert the pivot pin so that the counterbalance arm fits into the slot in the pin. Do not secure the counterbalance arm at this time.

7. Secure one end of the lift chain to the lift cylinder pin with a clevis pin and cotter pin.

8. Secure the other end of the lift chain to the hole in the lift arm mounting tab with clevis pins and cotter pins. Use the appropriate hole in the lift arm as designated in Figure 6.

9. Repeat the procedure on the right-hand lift arm.

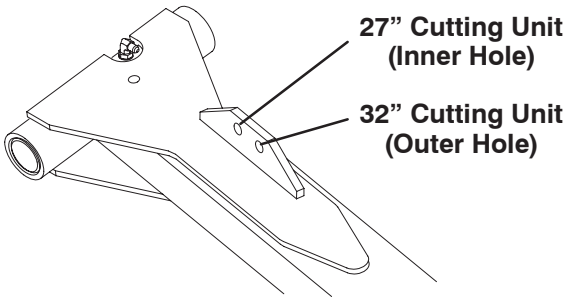


Figure 6

Mounting the Cutting Unit Drive Motors

1. Position the cutting units in front of the pivot rods.
2. Remove the bearing housing cover (Fig. 3) from the inside end of the right-hand cutting unit. Install the cover and gasket (supplied with the cutting unit) on the outside end. Locate the spider coupling (Fig. 7) shipped in the bearing housing.
3. Insert the O-ring (supplied with the cutting unit) on the flange of the drive motor (Fig. 7).
4. Mount the motor and the spider coupling to the drive end of the cutting unit and secure them with 2 capscrews provided with the cutting unit (Fig. 7).
5. On the center and left-hand cutting units, remove the bearing housing cover and install the gasket (supplied with the cutting units).

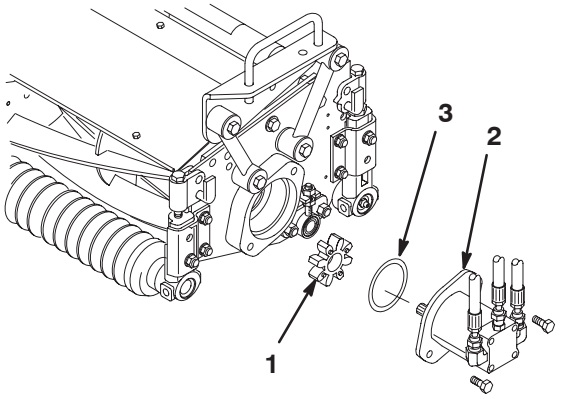


Figure 7

1. Spider coupling
2. Reel motor
3. O-ring

Mounting the Cutting Units

1. Slide a thrust washer onto the lift arm pivot rod (Fig. 8).
2. Slide the cutting unit carrier frame onto the pivot rod and secure it with a flat washer and flange head capscrew (Fig. 8).

Note: On the rear cutting unit, position the thrust washer between the rear of the carrier frame and the flat washer.

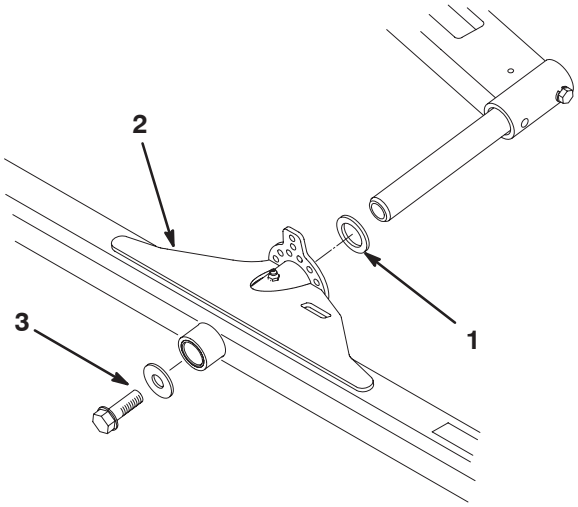


Figure 8

1. Thrust washer
2. Carrier frame
3. Flat washer and flange head capscrew

3. Secure a tipper chain to the top of each 27” cutting unit carrier frame and to the bottom of each 32” cutting unit carrier frame with a capscrew, washer, and locknut (Fig. 9).

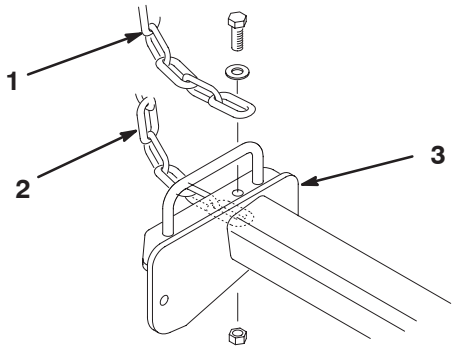


Figure 9

1. Tipper chain (27” Cutting Units)
2. Tipper chain (32” Cutting Units)
3. Carrier frame

4. Grease all lift arm and carrier frame pivot points.

Installing the Counterbalance Springs

Warning

Use caution when tensioning the springs as they are under heavy load.

The counterbalance springs help balance the cutting units to allow equal amounts of weight (down pressure) to be distributed to each end of the cutting unit. The springs also transfer weight from the cutting units to the traction unit therefore, increasing traction.

The following are recommended settings for the counterbalance springs. Minor changes may be required to achieve optimum performance for your turf conditions. The weight, at each end of the cutting unit, can be checked easily with a spring scale.

- **Increasing** the spring tension **reduces** the weight on **inboard** end of the cutting unit and **increases** the weight on the **outboard** end.
- **Decreasing** the spring tension **increases** the weight on the **inboard** end of the cutting unit and **reduces** the weight on **outboard** end.

27” Cutting Units

1. Hook the spring into the third hole from the top on the inboard side of both front cutting unit lift tabs and on the rear cutting unit lift tab (Fig. 10).

Note: Selecting the #4 hole position (increasing the spring tension) will reduce the weight on the inboard end of the cutting unit, increase the weight on the outboard end of the cutting unit, and increase traction. Selecting the #2 hole position has the opposite affect.

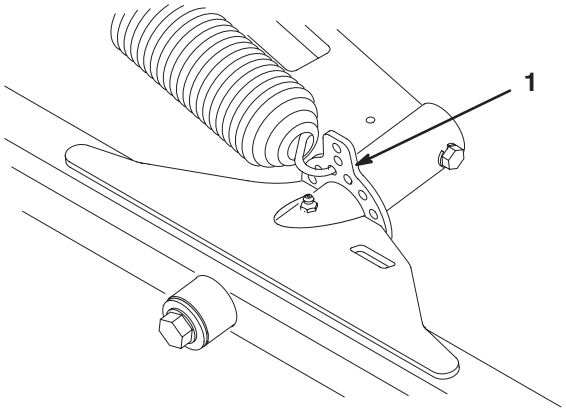


Figure 10

1. Cutting unit lift tab

2. Secure the other end of the spring to the appropriate hole (see below) on the front and rear counterbalance arms (Fig. 11 & 12) with the spring shackle, clevis pin, and cotter pin.
   - Fourth hole from the top for 5 blade reels
   - Third hole from the top for 8 blade reels
   - Top hole for reels with baskets

Note: On the rear counterbalance spring, install the vinyl cover over the spring before installing.

Note: Increasing the spring tension will reduce the weight on the inboard end of the cutting unit, increase the weight on the outboard end of the cutting unit, and increase traction. Decreasing the spring tension has the opposite affect.

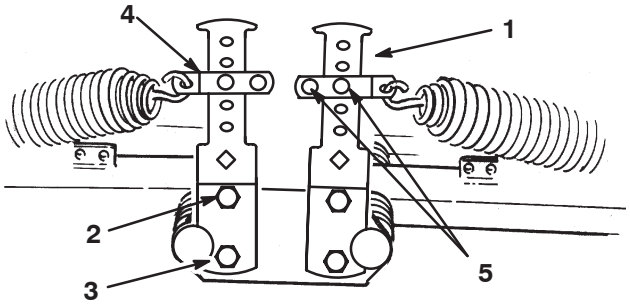


Figure 11

1. Counterbalance arm
2. Top capscrew
3. Bottom capscrew
4. Spring shackle
5. Clevis pin and cotter pin

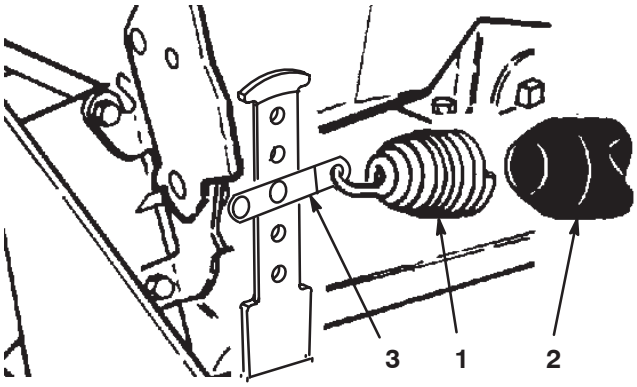


Figure 12

1. Rear counterbalance spring
2. Vinyl cover
3. Spring shackle

3. Insert the breaker bar into the square hole in the counterbalance arm and pivot the arm back to its original position, aligning the mounting holes.

4. Secure the bottom of the counterbalance arm to the frame with the capscrew and nut previously removed. Tighten the top capscrew (Fig. 11).

5. To tension the counterbalance springs, proceed as follows:

   A. Remove the cotter pin and clevis pin securing the spring shackle to the counterbalance arm. Do not remove the other clevis pin.

   B. Move the shackle up or down on the counterbalance arm until it is aligned with the desired hole on the arm. Install the clevis pin and cotter pin.

32” Cutting Units

1. Mount a spring anchor to the rear inboard side of each front cutting unit lift tab with 2 capscrews (1/4 x 3/4 in.) and locknuts, as shown in Figure 13.

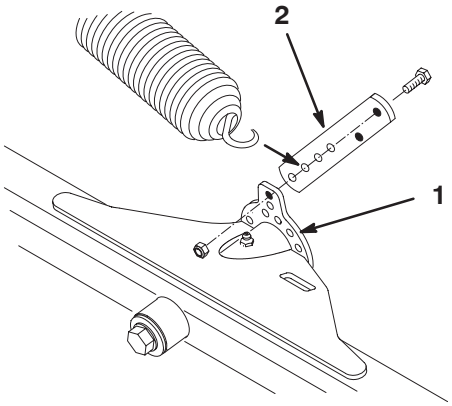


Figure 13

1. Cutting unit lift tab
2. Spring anchor

2. On the front cutting units, hook the spring into the second hole from the bottom (#3 position) in the spring anchor (Fig. 13).

Note: Selecting the #4 hole position (increasing the spring tension) will reduce the weight on the inboard end of the cutting unit, increase the weight on the outboard end of the cutting unit, and increase traction. Selecting the #2 hole position has the opposite affect.

3. On the rear cutting unit, hook the spring into the top hole on the rear cutting unit lift tab.

Note: Increasing the spring tension will reduce the weight on the inboard end of the cutting unit, increase the weight on the outboard end of the cutting unit, and increase traction. Decreasing the spring tension has the opposite affect.

4. Secure the other end of the spring to the appropriate hole (see below) on the front and rear counterbalance arms (Fig. 14 & 15) with the spring shackle with the chain, clevis, clevis pin, and cotter pin.

   - Third hole from the top for 5 blade reels
   - Second hole from the top for 8 blade reels
   - Top hole for reels with baskets

Note: On rear counterbalance spring, install vinyl cover over spring before installing.

5. Secure the other end of the spring to the second hole from the top with the spring shackle with the chain, clevis, clevis pin, and cotter pin (Fig. 14).

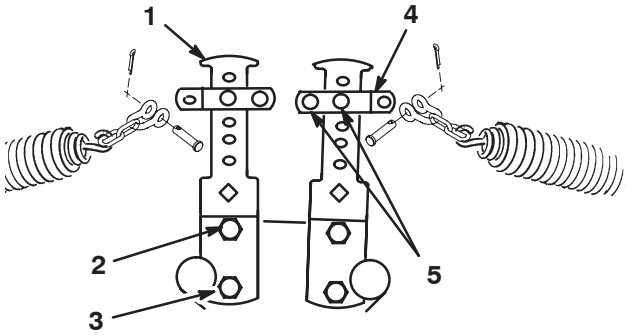


Figure 14

1. Counterbalance arm
2. Top capscrew
3. Bottom capscrew
4. Spring shackle
5. Clevis pin and cotter pin
6. Chain, clevis, and clevis pin

6. On the rear counterbalance arms, install the vinyl cover over the spring before hooking the other end of the spring into the spring shackle in the second hole from the top (Fig. 15).

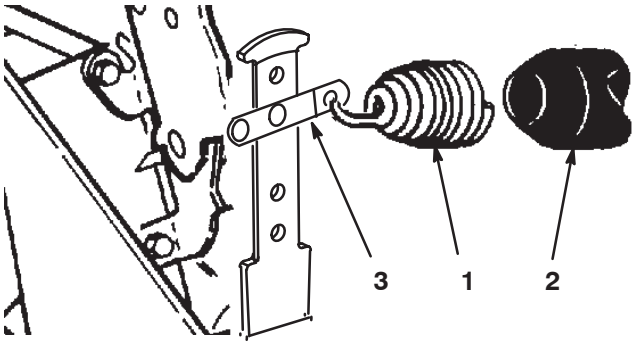


Figure 15

1. Rear counterbalance spring
2. Vinyl cover
3. Spring shackle

7. Insert the breaker bar into the square hole in the counterbalance arm and pivot the arm back to its original position, aligning the mounting holes.

8. Secure the bottom of the counterbalance arm to the frame with the capscrew and nut previously removed. Tighten the top capscrew (Fig. 14).

9. To tension the counterbalance springs proceed as follows:

   A. Remove the cotter pin and clevis pin securing the spring shackle to the counterbalance arm. Do not remove the other clevis pin.

B. Move the shackle up or down on the counterbalance arm until it is aligned with the desired hole on the arm. Install the clevis pin and cotter pin.

Adding Rear Ballast

This unit complies with ANSl B71.4–1999 Standard and all applicable European requirements when equipped with rear ballast. Use the following chart to determine the weight or combinations of weights needed.

Cutting Unit Configuration	Weight Kits Required
Standard machine with 27” cutting units	(1) 83-9370 (2) 83-9390
Standard machine with 27” cutting units & baskets	(1) 83-9370 (3) 83-9390 (2) 94-3698
Standard machine with three wheel drive kit & 27” cutting units	(1) 83-9390, (1) 83–9370
Standard machine with three wheel drive kit, 27” cutting units & baskets	(2) 83-9390 (2) 94-3698 (1) 83–9370
Standard machine with 32” cutting units	(3) 83-9390 (2) 94-3698 (1) 83–9370
Standard machine with 32” cutting units & three wheel drive kit	(1) 83-9370 (2) 83-9390 (1) 94–3698

Note: All configurations require calcium chloride in the rear tire. Tires should be filled to approximately 75% capacity (valve level with valve at the top) (60 lb. fluid or 74 lb. tire and fluid).

Important If a puncture occurs in a tire with calcium chloride, remove the unit from the turf area as quickly as possible. To prevent possible damage to the turf, immediately soak the affected area with water.

Either Type 1 (77%) or Type 2 (94%) commercial calcium chloride flake may be used.

Plain water freezes solid at 32°F (0°C). The 3-1/2 lb. (1.6 kg) calcium chloride to 1 gallon (3.8 l) of water solution is slush free to –12°F (–24°C) and will freeze solid at –52°F (–46°C). The 5 lb. (2.3 kg) per gallon (liter) solution is slush free to –50° F (–45°C) and will freeze solid at –62°F (–52°C).

Activating and Charging 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.***

If the battery is not filled with electrolyte or activated, bulk electrolyte with 1.260 specific gravity must be purchased from a local battery supply outlet and added to the battery.

1. Remove the filler caps from the battery and slowly fill each cell until the electrolyte is just above the plates.

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. Replace the filler caps with the vents pointing to the rear (toward the fuel tank) and 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.

Warning

Charging the battery produces gasses that can explode.

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

3. When the battery is charged, disconnect the charger from the electrical outlet and battery posts.
4. Remove the filler caps. Slowly add electrolyte to each cell until the level is up to the fill ring. Install the filler caps.

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

5. Install the positive cable (red) to the positive (+) terminal and the negative cable (black) to the negative (—) terminal of the battery (Fig. 16) and secure them with capscrews and nuts. Slide the rubber boot over the positive terminal to prevent a possible short from occurring.

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.**

Figure 16

1. Battery
2. Positive (+) batter cable
3. Negative (–) battery cable

Before Operating

Caution

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

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

Checking the Crankcase Oil

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

Crankcase capacity is approximately 3.5 qt. with the filter.

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

API Classification Level Required: CH–4, CI–4 or higher.

Preferred oil: SAE 15W–40 (above 0°F)

Alternate oil: SAE 10W–30 or 5W–30 (all temperatures)

Toro Premium Engine oil is available from your distributor in either 15W–40 or 10W–30 viscosity. See the parts catalog for part numbers.

1. Position machine on a level surface.
2. Remove dipstick and wipe it with a clean rag (Fig. 17). Insert dipstick into tube and make sure it is seated fully. Remove dipstick and check level of oil.

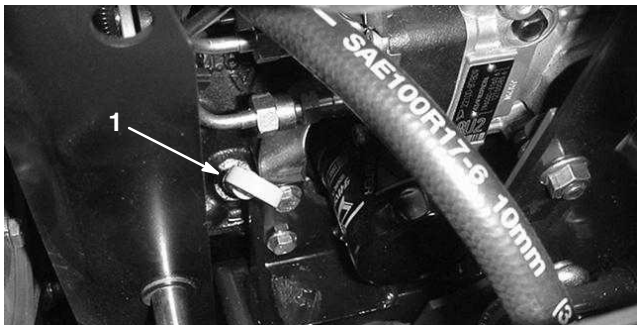


Figure 17

1. Dipstick

3. If oil level is low, remove filler cap (Fig. 18) and add enough oil to raise level to FULL mark on dipstick.

Figure 18

1. Filler cap

Note: When adding oil, remove dipstick to allow proper venting, pour oil slowly and check the level often during this process. DO NOT OVERFILL.

Important When adding engine oil or filling oil, there must be clearance between the oil fill device and the oil fill hole in the valve cover as shown in figure 19. This clearance is necessary to permit venting when filling, which prevents oil from overrunning into breather.

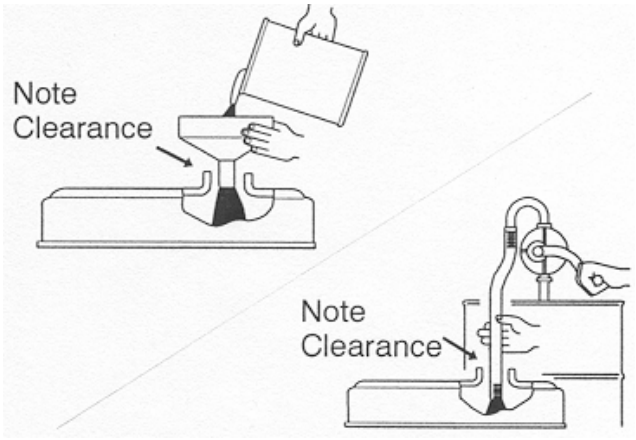


Figure 19

4. Install the dipstick firmly in place.

Important Be sure to keep the engine oil level between the upper and lower limits on the oil gauge. Engine failure may occur as a result of over filling or under filling the engine oil.

Note: After filling or changing oil, start and run the engine at idle for 30 seconds. Shut engine off. Wait 30 seconds and check oil level. Add enough oil to raise level to FULL mark on dipstick.

Filling the Fuel Tank

The engine runs on No. 2 diesel fuel.

The fuel tank capacity is approximately 6.5 gallons.

Danger

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

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

1. Clean the area around the fuel tank cap (Fig. 20).

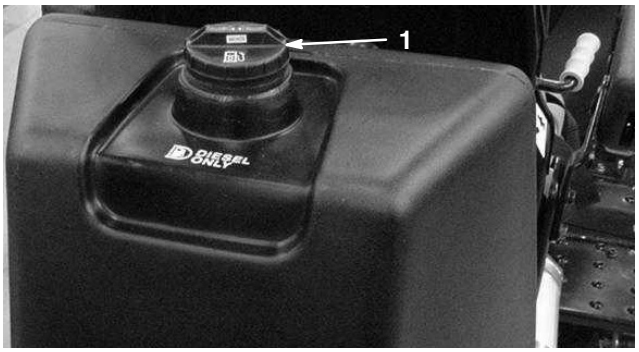


Figure 20

1. Fuel tank cap

2. Remove the fuel tank cap.
3. Fill the tank to about 1 in. (25 mm) below the top of the tank, (bottom of the filler neck). **Do not overfill.** Install the cap.
4. Wipe up any fuel that may have spilled to prevent a fire hazard.

Checking the Cooling System

The cooling system is filled with a 50/50 solution of water and permanent ethylene glycol anti-freeze. Check the coolant level at the beginning of each day before starting the engine. The cooling system capacity is approximately 5-1/4 quarts.

1. Clean debris off of the radiator screen (Fig. 21), radiator (Fig. 22) and oil cooler (Fig. 22) daily or hourly if conditions are extremely dusty and dirty; refer to Cleaning the Radiator and Screen, page 39.

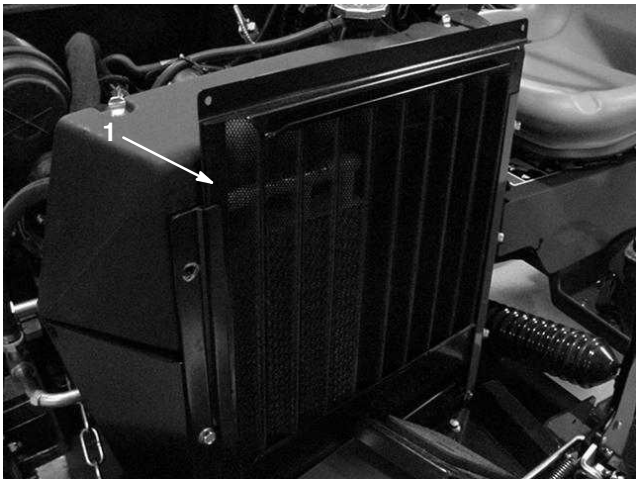


Figure 21

1. Radiator screen

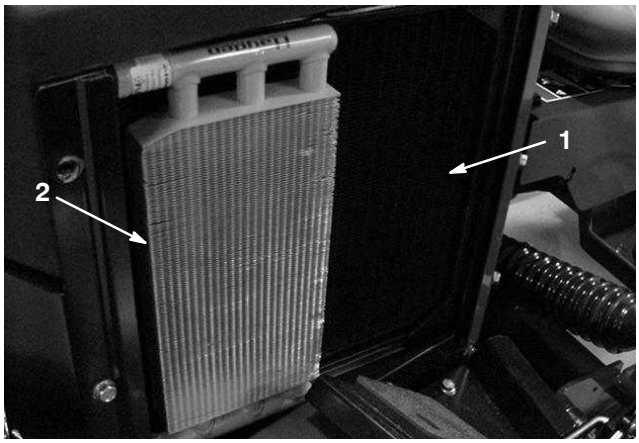


Figure 22

1. Radiator
2. Oil cooler

Caution

If the engine has been running, the pressurized, hot coolant can escape and cause burns.

- **Do not open the radiator cap when the engine is running.**
- **Use a rag when opening the radiator cap, and open the cap slowly to allow steam to escape.**

1. Carefully remove the radiator cap (Fig. 23).

Figure 23

1. Radiator cap

2. Check the coolant level in the radiator. The radiator should be filled to the middle of the horizontal filler neck and the surge tank (Fig. 24) should be half way between Full and Low.

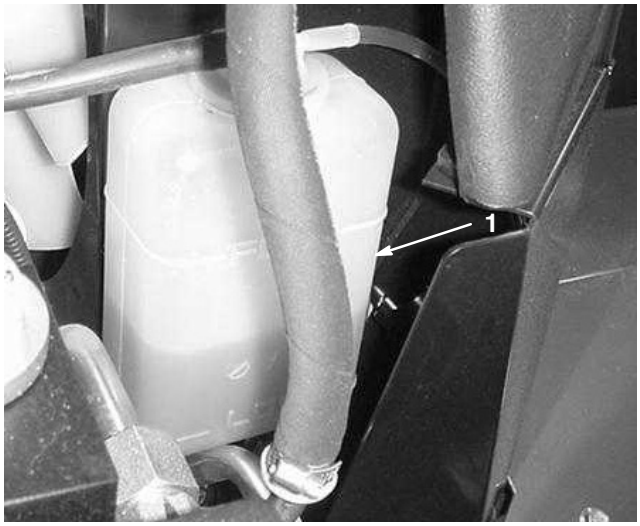


Figure 24

1. Surge tank

3. If the coolant level is low, replenish the system. **Do not overfill**.

4. Install the radiator cap.

Checking the Hydraulic System

The machines reservoir is filled at the factory with approximately 3.3 gallons (12.5 l) of high quality hydraulic fluid. **Check the level of the hydraulic fluid before the engine is first started and daily thereafter.** The recommended replacement fluid is:

Toro Premium All Season Hydraulic Fluid
(Available in 5 gallon pails or 55 gallon drums. See parts catalog or Toro distributor for part numbers.)

Alternate fluids: If the Toro fluid is not available, other fluids may be used provided they meet all the following material properties and industry specifications. We do not recommend the use of synthetic fluid. Consult with your lubricant distributor to identify a satisfactory product Note: Toro will not assume responsibility for damage caused by improper substitutions, so use only products from reputable manufacturers who will stand behind their recommendation.

High Viscosity Index/Low Pour Point Antiwear Hydraulic Fluid, ISO VG 46

Material Properties:

Viscosity, ASTM D445	cSt @ 40°C 44 to 48 cSt @ 100°C 7.9 to 8.5
Viscosity Index ASTM D2270	140 to 160
Pour Point, ASTM D97	–34°F to –49°F

Industry Specifications:
Vickers I–286–S (Quality Level), Vickers M–2950–S (Quality Level), Denison HF–0

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.

Biodegradable Hydraulic Fluid – Mobil 224H

Toro Biodegradable Hydraulic Fluid
(Available in 5 gallon pails or 55 gallon drums. See parts catalog or Toro distributor for part numbers.)

Alternate fluid: Mobil EAL 224H

This is vegetable–oil based biodegradable oil tested and approved by Toro for this model. This fluid is not as resistant to to high temperatures as standard fluid, so install an oil cooler if required by the operator manual and follow recommended fluid change intervals with this fluid. Contamination by mineral–based hydraulic fluids will change the biodegradability and toxicity of this oil. When changing from standard fluid to the biodegradable type, be certain to follow the approved flushing procedure. Contact your local Toro Distributor for details.

Note: When changing from one type of hydraulic fluid to the other, be certain to remove all the old fluid from the system, because some brands of one type are not completely compatible with some brands of the other type of hydraulic fluid.

1. Position the machine on a level surface.
2. Check the fluid level by viewing it in the sight gauge (Fig. 25). If the fluid is cold, the level should be at the bottom of the gauge. If the fluid is hot, the level should be at the center of the gauge.

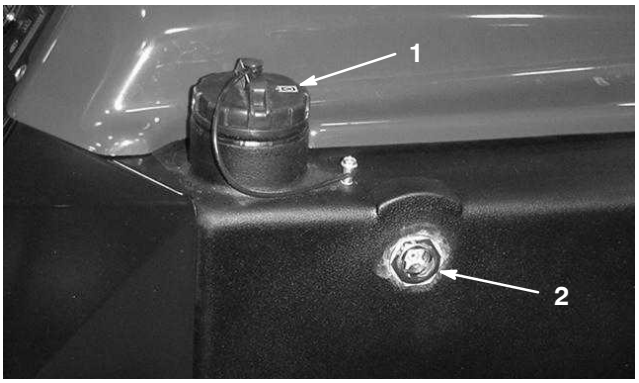


Figure 25

1. Hydraulic reservoir cap
2. Sight gauge

3. If the fluid level is not at least at the bottom of the gauge when it is cold, remove the cap from the hydraulic fluid reservoir (Fig. 25) and slowly fill the reservoir with high quality hydraulic fluid until the level in it reaches the bottom of the sight gauge. **Do not overfill.**

Important To prevent system contamination, clean the top of the hydraulic fluid containers before puncturing. Ensure that the pour spout and funnel are clean.

4. Install the reservoir cap. Wipe up any fluid that may have spilled.

Checking the Tire Pressure

The tires are over-inflated for shipping. Therefore, release some of the air to reduce the pressure. The correct air pressure in the tires is 16–20 psi (110–138 kPa).

Important Maintain the recommended pressure in all tires to ensure a good quality-of-cut and proper machine performance. **Do not under-inflate.**

Checking the Reel to Bedknife Contact

Each day before operating, check the reel to bedknife contact, regardless if the quality of cut had previously been acceptable. There must be light contact across the full length of the reel and bedknife; refer to Adjusting the Reel to the Bedknife in the Cutting Unit Operator's Manual.

Checking the Torque of the Wheel Nuts

Warning

Failure to maintain proper torque of the wheel nuts could result in personal injury.

Torque the wheel nuts to 45–65 ft.-lb. (61–88 N·m) after 1–4 hours of operation and again after 10 hours of operation. Torque every 200 hours thereafter.

Operation

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

Controls

Traction and Stopping Pedal

The traction pedal (Fig. 26) has three functions: to make the machine move forward, to move it backward, and to stop the machine. Using the heel and toe of the right foot, depress the top of the pedal to move forward and the bottom of the pedal to move backward or to assist in stopping when moving forward (Fig. 27). Also, allow the pedal to move or move it to the neutral position to stop the machine. For operator comfort, do not the rest heel of your foot on reverse when operating forward.

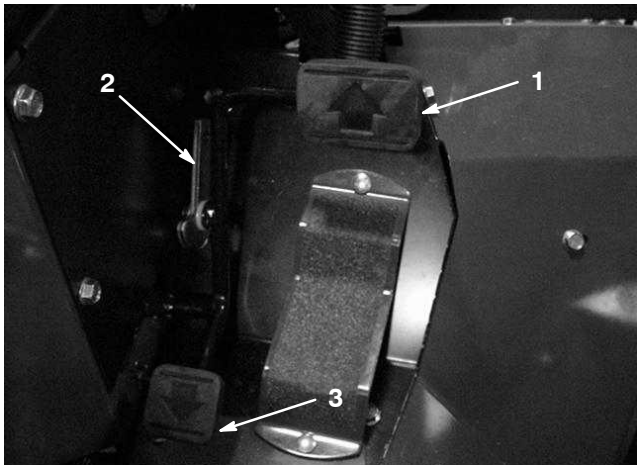


Figure 26

1. Traction pedal
2. Speed selector
3. Pedal stop

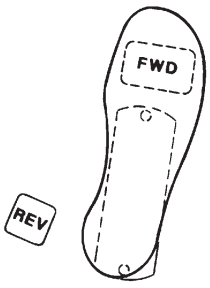


Figure 27

Speed Selector

The speed selector is a cam lever at the side of the traction pedal (Fig. 26) that can be rotated to maintain desired speed.

The reverse pedal stop (under the pedal) (Fig. 26) is set at the factory to provide 3 MPH maximum speed in reverse.

Starter Switch

The starter switch (Fig. 28), used to start, stop, and preheat the engine, has three positions: OFF, ON, and START. Rotate the key clockwise to ON position and hold until glow plug light goes out. Then rotate the key clockwise (START position) to engage the starter motor. Release the key when the engine starts. The key will move automatically to the ON/RUN position. To shut the engine off, rotate the key counterclockwise to the OFF position. Remove the key from the switch to prevent accidental starting.

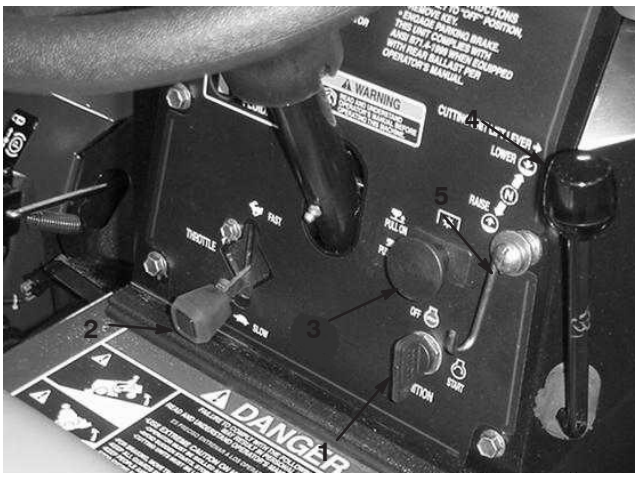


Figure 28

1. Starter switch
2. Throttle
3. Cutting unit drive switch
4. Cutting unit lift lever
5. Cutting unit lift lever lock

Throttle

Moving the throttle (Fig. 28) upward increases the engine speed and downward decreases the engine speed.

Cutting Unit Lift Lever

The lift lever (Fig. 28) has three positions: LOWER, RAISE, and NEUTRAL. To lower the cutting units to the ground, move the lift lever forward. When lowering the cutting units, make sure that the front hydraulic cylinder is completely retracted before releasing the lift lever. The cutting units will not operate unless the cylinder is retracted. To raise the cutting units, pull the lift lever rearward to the RAISE position.

Cutting Unit Lift Lever Lock

The cutting unit lift lever lock (Fig. 28) locks cutting units in the raised position for transporting.

Cutting Unit Drive Switch

The switch (Fig. 28) has two positions: ENGAGE and DISENGAGE. The push-pull switch operates a solenoid valve on the valve bank, to drive the cutting units.

Hour Meter

The hour meter (Fig. 29) indicates the total hours of machine operation. The Hour Meter starts to function whenever the key switch is rotated to “ON” position.

Oil Pressure Light

The oil pressure light (Fig. 29) glows if the engine oil pressure drops below a safe level.

Water Temperature Light

The water temperature light (Fig. 29) glows and the engine automatically shuts down when the engine coolant temperature gets too high.

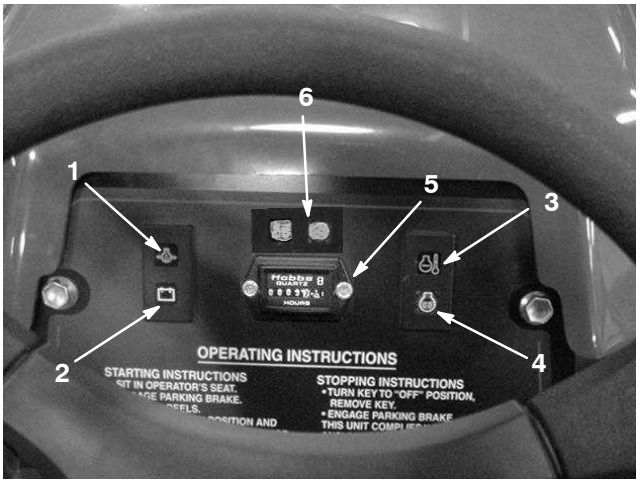


Figure 29

1. Oil pressure light
2. Alternator light
3. High water temperature shut-down light
4. Glow plug indicator light
5. Hour meter
6. Reel operating light

Alternator Light

The amp light (Fig. 29) should be off when the engine is running. If it is on, the charging system should be checked and repaired as necessary.

Glow Plug Indicator

The indicator light (Fig. 29) will glow when glow plugs are operating.

Reel Engage Indicator

The reel engage indicator light (Fig. 29) will glow when reels are lowered to cutting position.

Parking Brake

Whenever the engine is shut off, the parking brake must be engaged to prevent accidental movement of the machine. To engage the parking brake, pull back on the lever.

Reel Speed Control

To obtain the desired clip rate (reel speed), rotate the reel speed control knob (Fig. 30) to the appropriate setting for the height-of-cut setting and mower speed; refer to Selecting the Clip Rate, page 29.

Backlap Control

Rotate the knob (Fig. 30) to “R” for backlapping and to “F” for mowing. Do not change the knob position when the reels are rotating.

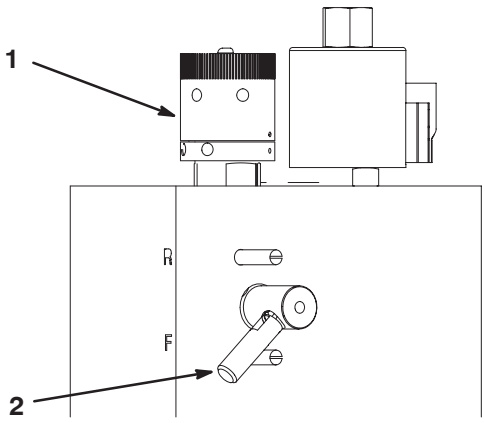


Figure 30

1. Reel speed control
2. Backlap control

Seat Adjustment

Fore and Aft Adjustment—Move the lever on the side of the seat outward, slide the seat to the desired position, and release the lever to lock the seat into position.

Fuel Shut-Off Valve

Close the fuel shut-off valve, under the fuel tank (Fig. 31), when storing the machine.

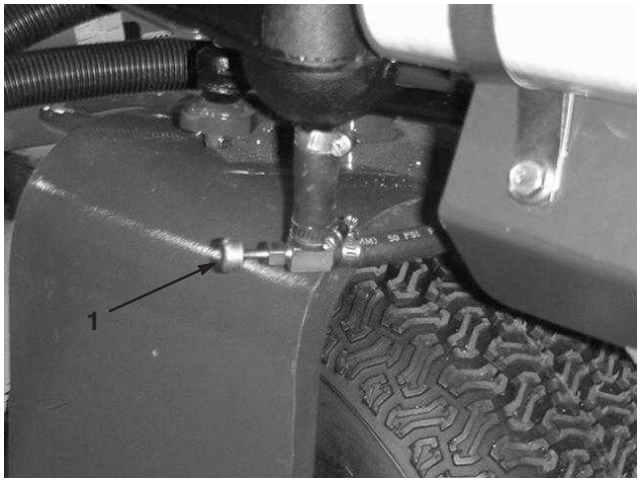


Figure 31

1. Fuel shut-off (under the fuel tank)

Starting and Stopping the Engine

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

- Initial start up of a new engine.
- Engine has ceased running due to lack of fuel.
- Maintenance has been performed upon fuel system components; i.e. filter replaced, etc.

  Refer to Bleeding the Fuel System.

1. Be sure that the parking brake is set and the reel drive switch is in the DISENGAGE position.
2. Remove your foot from the traction pedal and make sure that the pedal is in the neutral position.
3. Move the throttle lever to the full throttle position.
4. Insert the key into the switch and rotate it clockwise to ON position. Hold it until glow plug light goes out, then rotate the key clockwise to START position to engage the starter motor. Release the key when the engine starts. The key will move automatically to the ON/RUN position.

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

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

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

Caution

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

6. To stop the engine, move the throttle control downward to the IDLE position, move the reel drive switch to DISENGAGE, and rotate the ignition key to OFF. Remove the key from the switch.
7. Close the fuel shut-off valve before storing the machine.

Bleeding the Fuel System

1. Unlatch and raise the hood.
2. Loosen air bleed screw on top of fuel filter/water separator (Fig. 32).

Figure 32

1. Fuel filter/water separator
2. Air bleed screw

3. Follow starting instructions.
4. Tighten air bleed screw on top of fuel filter.

Note: Normally, engine should start after above bleeding procedures are followed. However, if engine does not start, air may be trapped between injection pump and injectors; refer to Bleeding Air From Injectors.

Danger

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

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

Checking the Operation of 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.**

1. Be sure that the parking brake is set and all bystanders are away from the area of operation. Keep hands and feet away from the cutting units.
2. With the operator off of the seat, the backlap knob rotated counterclockwise, the traction pedal in neutral, parking brake engaged and the reel switch in the OFF position, the engine should start. If either the traction pedal is depressed or the reel switch is turned ON, with the operator off of the seat, the engine should stop. Correct the problem if it is not operating properly.
3. With the engine running, the operator off of the seat, and the backlap knob rotated clockwise, the engine should not stop when the reel switch is turned ON. Correct the problem if it is not operating properly.
4. With the engine running, the operator off of the seat, and the backlap knob rotated clockwise, the engine should stop if the traction pedal is engaged. Correct the problem if it is not operating properly.
5. With the operator on the seat, the engine running, and the reel switch in the ON position, the dash indicator light should be glowing and the reel motors turning when the lift cylinder is fully retracted. As the lift cylinder is extended, the light should go out and the reel motors should stop turning. Correct the problem if it is not operating properly.
6. With the operator on the seat, the engine must not start with either the reel switch engaged or the traction control engaged. Correct the problem if it is not operating properly.

Towing the Traction Unit

In case of an emergency, the machine can be towed for a short distance. However, we do not recommend this as a standard procedure.

Important Do not tow the machine faster than 2–3 MPH because the drive system may become damaged. If the machine must be moved a considerable distance, transport it on a truck or trailer.

1. Locate the bypass valve on the pump (Fig. 33) and rotate it 90° (the bypass valve lever should be horizontal when it is open).

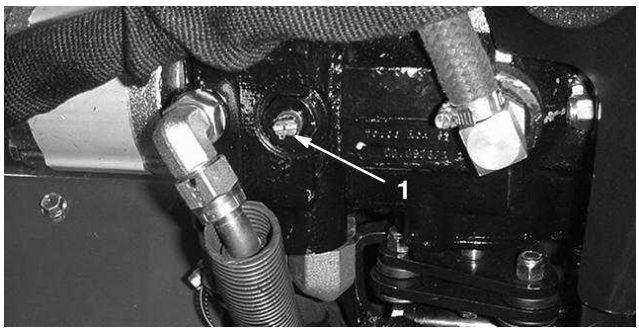


Figure 33

1. Bypass valve

2. Before starting the engine, close the bypass valve by rotating it 90° (the bypass valve lever should be vertical when closed). Do not start the engine when the valve is open.

Operating Characteristics

Caution

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

Wear hearing protection when operating this machine.

Practice operating the machine and become thoroughly familiar with it. Because of its hydrostatic transmission, its characteristics differ from many turf maintenance machines. Points to consider when operating are the traction drive, engine speed, and load on the cutting units. Regulate the traction pedal to keep the engine RPM high and somewhat constant while mowing to maintain adequate power for the traction and cutting units. Adjust the speed selector to maintain constant ground speed and quality of cut. However, when on hilly terrain, do not use the speed selector.

Follow the operating guidelines presented in this manual and know how to operate the machine safely on all types of terrain. Hills (or slopes) over 15 degrees should be traversed or mowed up and down, not side to side, and hills over 20 degrees should generally be avoided unless special safeguards, skills, and conditions exist. Always plan well ahead to avoid the need for sudden stops, starts, or turns. To stop, use the reverse pedal for braking. Before stopping the engine, disengage all controls, move the throttle to the IDLE position, and set the parking brake.

Selecting the Clip Rate (Reel Speed)

	5		8	
	3WD	2WD	3WD	2WD
2 1/2"(64mm) - 2 3/8"(60mm)	3	5	-	3
2 1/4"(57mm) - 2 1/8"(54mm)	4	5	-	3
2" (51 mm)	4	6	-	3
1 7/8" (48 mm)	4	6	3	4
1 3/4"(44mm) - 1 5/8"(41mm)	5	7	3	4
1 1/2"(38mm) - 1 3/8"(35mm)	6	-	4	5

	5		8	
	3WD	2WD	3WD	2WD
1 1/4" (32 mm)	7	-	4	6
1 1/8" (29 mm)	7	-	5	7
1" (25 mm)	8	-	5	9
7/8" (22 mm)	9	-	6	-
3/4" (19 mm)	-	-	7	-
5/8"(16mm) - 3/8"(10mm)	-	-	9	-

94-5056

To achieve a consistent, high quality of cut, and a uniform after cut appearance, it is important that the reel speed be matched to the height of cut.

Adjust the clip rate (reel speed) as follows:

1. Verify the height-of-cut setting on the cutting units. Using the column of the chart listing either 5 or 8 blade reels, find the height of cut listing nearest the actual height-of-cut setting. Look across the chart to find the number corresponding to that height of cut.
2. Turn the reel speed control knob (Fig. 34) to the number setting determined in step 1.

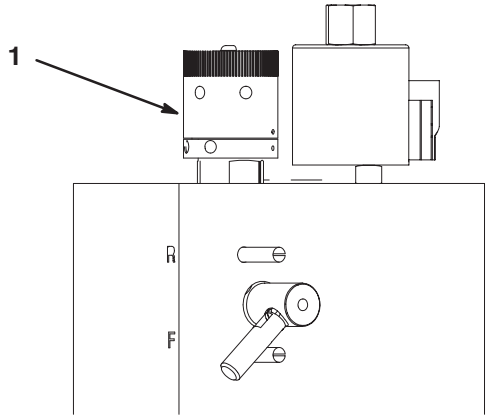


Figure 34

1. Reel speed control

3. Operate the machine for several days, then examine the cut to ensure satisfaction with the quality of cut. The reel speed knob may be set one position on either side of the position indicated on the chart to account for differences in grass condition, grass length removed, and personal preference of the superintendent.

Variable Reel Speed Selection Chart—5 Blade Reel

Height of Cut (in.)	3WD Speeds 3–5 MPH	2WD Speeds 6–7 MPH
2-1/2 (2.50)	3	5
2-3/8 (2.38)	3	5
2-1/4 (2.25)	4	5
2-1/8 (2.13)	4	5
2 (2.00)	4	6
1-7/8 (1.88)	4	6
1-3/4 (1.75)	5	7
1-5/8 (1.63)	5	7
1-1/2 (1.50)	6	9*
1-3/8 (1.38)	6	9*
1-1/4 (1.25)	7	9*
1-1/8 (1.13)	7	9*
1 (1.00)	8	9*
7/8 (.88)	9	9*
3/4 (.75)	9*	9*
5/8 (.63)	9*	9*
1/2 (.50)	9*	9*
3/8 (.38)	9*	9*

* This height-of-cut and/or mowing speed not recommended for 5 blade reels.

Variable Reel Speed Selection Chart—8 Blade Reel

Height of Cut (in.)	3WD Speeds 3–5 MPH	2WD Speeds 6–7 MPH
2-1/2 (2.50)	3*	3
2-3/8 (2.38)	3*	3
2-1/4 (2.25)	3*	3
2-1/8 (2.13)	3*	3
2 (2.00)	3*	3
1-7/8 (1.88)	3	4
1-3/4 (1.75)	3	4
1-5/8 (1.63)	3	4
1-1/2 (1.50)	4	5
1-3/8 (1.38)	4	5
1-1/4 (1.25)	4	6
1-1/8 (1.13)	5	7
1 (1.00)	5	9
7/8 (.88)	6	9*
3/4 (.75)	7	9*
5/8 (.63)	9	9*
1/2 (.50)	9	9*
3/8 (.38)	9	9*

* This height-of-cut and/or mowing speed not recommended for 8 blade reels.

Training Period

Before mowing with the machine, we suggest that you find a clear area and practice starting and stopping, raising and lowering cutting units, turning, etc. This training period will be beneficial to the operator in gaining confidence in the performance of the machine.

Before Mowing

Inspect the area for debris and clear area if necessary. Determine the best direction to mow on the previous mowing direction. Always mow in an alternate pattern from the previous mowing, so that the grass blades will be less apt to lay down and therefore be difficult to gather between the reel blades and bedknife.

Transport Operation

Be sure that the cutting units are in the fully up position, move the traction pedal stop from under the pedal to allow full traction pedal travel, and place the throttle control in the FAST position. While operating on slopes and uneven terrain, always reduce your speed and use extreme caution before turning to reduce the risk of tipping or losing control. Watch carefully for, and avoid, holes in the terrain, sudden drop-offs, and other hidden hazards. To prevent costly damage and down time, familiarize yourself with the width of the machine. Do not attempt to pass between immovable objects placed close together.

Inspection and Clean-Up After Mowing

At the completion of the mowing operation, thoroughly wash the machine with a garden hose—without a nozzle—so that excessive water pressure will not cause contamination and damage to the seals and bearings.

Make sure that the radiator screen, radiator, and oil cooler are kept free of dirt or grass clippings. After cleaning, it is recommended that the machine be inspected for possible hydraulic fluid leaks, damage or wear to the hydraulic and mechanical components, and the cutting units checked for sharpness and proper reel to bedknife adjustment.

Standard Control Module (SCM)

The Standard Control Module is a ”potted” electronic device produced in a ”one size fits all” configuration. The module uses solid state and mechanical components to monitor and control standard electrical features required for safe product operation.

The module monitors inputs including neutral, parking brake, PTO, start, backlap, and high temperature. The module energizes outputs including PTO, Starter, and ETR (energize to run) solenoid.

The module is divided into inputs and outputs. Inputs and outputs are identified by green LED indicators mounted on the printed circuit board.

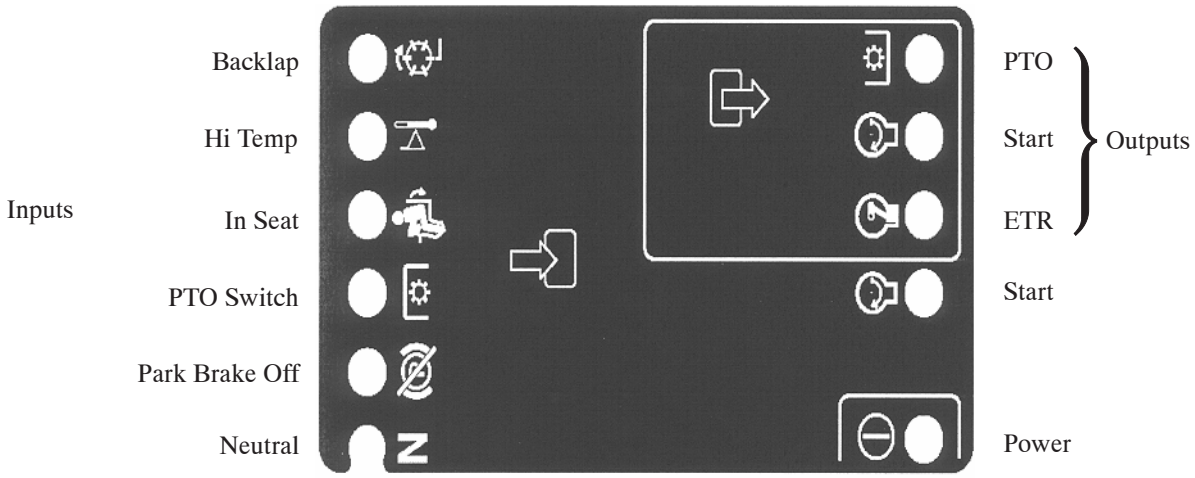
The start circuit input is energized by 12 VDC. All other inputs are energized when the circuit is closed to ground. Each input has a LED that is illuminated when the specific circuit is energized. Use the input LED’s for switch and input circuit troubleshooting.

Output circuits are energized by an appropriate set of input conditions. The three outputs include PTO, ETR, and START. Output LED’s monitor relay condition indicating the presence of voltage at one of three specific output terminals.

Output circuits do not determine output device integrity so electrical troubleshooting includes output LED inspection and conventional device and wire harness integrity testing. Measure disconnected component impedance, impedance through wire harness (disconnect at SCM), or by temporarily ”test energizing” the specific component.

The SCM does not connect to an external computer or hand held device, can not be re–programmed, and does not record intermittent fault troubleshooting data.

The decal on the SCM only includes symbols. Three LED output symbols are shown in the output box. All other LED’s are inputs. The chart below identifies the symbols.



Here are the logical troubleshooting steps for the SCM device.

1. Determine the output fault you are trying to resolve (PTO, START, or ETR).
2. Move key switch to ”ON” and ensure the red ”power” LED is illuminated.
3. Move all input switches to ensure all LED’s change state.
4. Position input devices at appropriate position to achieve the appropriate output. Use the following logic chart to determine the appropriate input condition.
5. If specific output LED is illuminated without appropriate output function, check output harness, connections, and component. Repair as required.
6. If specific output LED is not illuminated, check both fuses.
7. If specific output LED is not illuminated and inputs are in appropriate condition, install new SCM and determine if fault disappears.

Each row (across) in the logic chart below identifies input and output requirements for each specific product function. Product functions are listed in the left column. Symbols identify specific circuit condition including: energized to voltage, closed to ground, and open to ground.

	INPUTS								OUTPUTS		
FUNCTION	Power On	In Neutral	Start On	Brake Off	PTO On	In Seat	Hi Temp	Back Lap	START	ETR	PTO
Start	-	-	+	O	O	-	O	O	+	+	O
Run (off unit)	-	-	O	O	O	O	O	O	O	+	O
Run (on unit)	-	O	O	-	O	-	O	O	O	+	O
Mow	-	O	O	-	-	-	O	O	O	+	+
Backlap	-	-	O	O	-	O	O	-	O	+	+
Hi-Temp	-		O				-		O	O	O

– Indicates a circuit closed to ground. – LED ON

O Indicates a circuit open to ground or de–energized – LED OFF

\+ Indicates an energized circuit (clutch coil, solenoid, or start input) LED ON.

" " A Blank indicates a circuit that is not involved with the logic.

To troubleshoot, turn on the key without starting the engine. Identify the specific function that does not work and work across the logic chart. Inspect the condition of each input LED's to ensure it matches the logic chart.

If the input LED's are correct, check the output LED. If the output LED is illuminated but the device is not energized, measure available voltage at the output device, continuity of the disconnected device, and potential voltage on the ground circuit (floating ground). Repairs will vary depending on your findings.

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 engine belt tension. • Change the engine oil filter. • Check the traction belt tension. • Replace the hydraulic filter. • Torque the wheel lug nuts.
After first 50 hours	• Change the engine oil and filter. • Check the engine RPM (idle and full throttle).
Every 50 hours	• Inspect the air filter, dust cup, and burp valve. • Lubricate all grease fittings. • Check the engine belt tension.
Every 100 hours	• Check the traction belt tension.
Every 150 hours	• Change the engine oil and filter.
Every 200 hours	• Service the air filter. • Replace the fuel filter/water separator. • Replace the hydraulic filter. • Torque the wheel lug nuts.
Every 400 hours	• Replace the hydraulic fluid. • Check the battery level and connections. • Inspect the traction linkage movement. • Check the engine RPM (idle and full throttle).
Every 1000 hours or 2 years, whichever occurs first	• Replace moving hoses. • Flush the cooling system and replace the hoses. • Replace the thermostat. • Drain and flush the fuel tank. • Drain and flush the hydraulic tank.

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

Daily Maintenance Checklist

Duplicate this page for routine use.

Maintenance Check Item	For the week of: Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
Check the safety interlock operation.							
Check the brake operation.							
Check the engine oil level.							
Check the cooling system fluid level.							
Drain the water/fuel separator							
Check the air filter, dust cup, and burp valve.							
Check the oil cooler, radiator and screen for debris.							
Check for unusual engine noises.[1]							
Check for unusual operating noises.							
Check the hydraulic system oil level.							
Check the hydraulic hoses for damage.							
Check for fluid leaks.							
Check the fuel level.							
Check the tire pressure.							
Check instrument operation.							
Check reel-to-bedknife adjustment.							
Check height-of-cut adjustment.							
Lubricate all grease fittings.[2]							
Touch up damaged paint.							

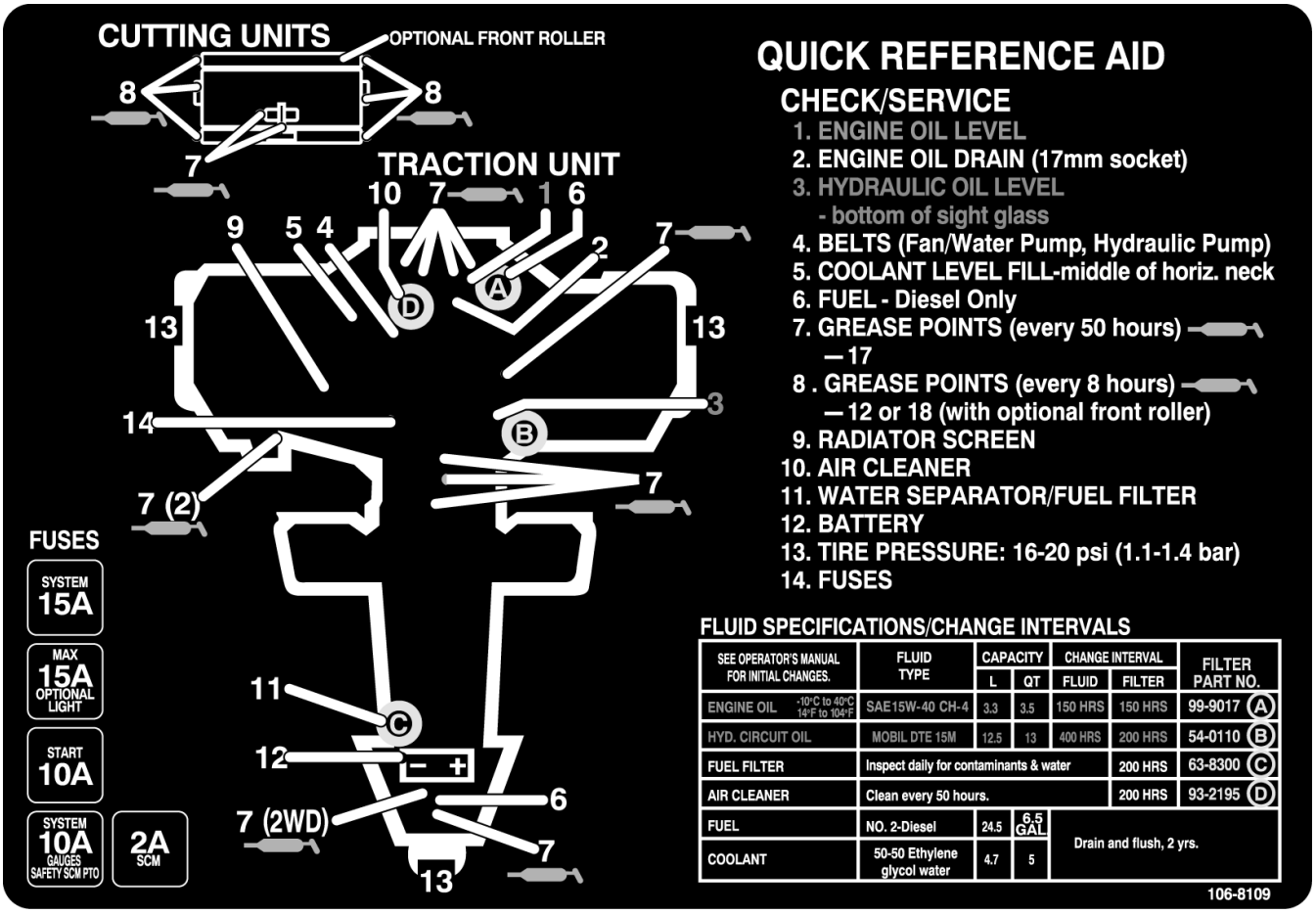
[1]Check the glow plug and injector nozzles, if hard starting, excess smoke, or rough running is noted.

[2]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		

Service Interval Chart



Caution

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

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

Greasing the Bearings and Bushings

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

The traction unit bearings and bushings that must be lubricated are: steering column (Fig. 35), steering gears (2) (under the skirt below the steering sector), steering shaft (2) (Fig. 36), lift arms (3) (Fig. 37), rear lift cylinder pivot (Fig. 37), pivot rods (3) (Fig. 38), traction pedal pivot (Fig. 39) and neutral centering (Fig. 40)

Also, apply grease to slots in cylinder support (Fig. 41).

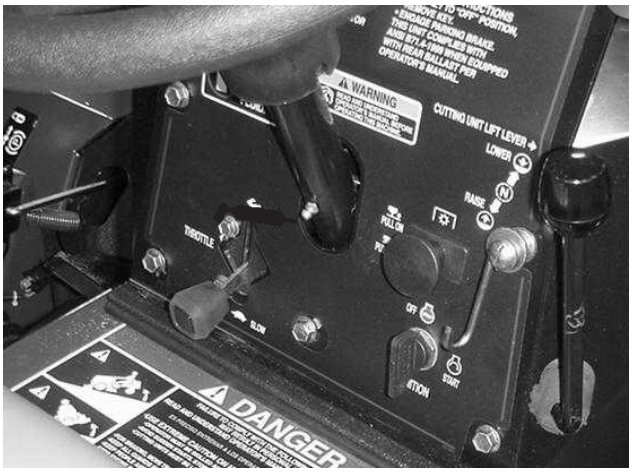


Figure 35

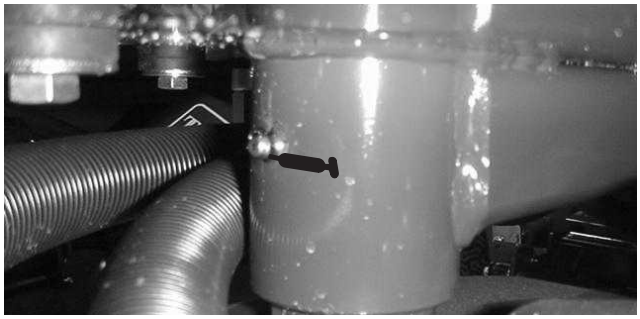


Figure 36

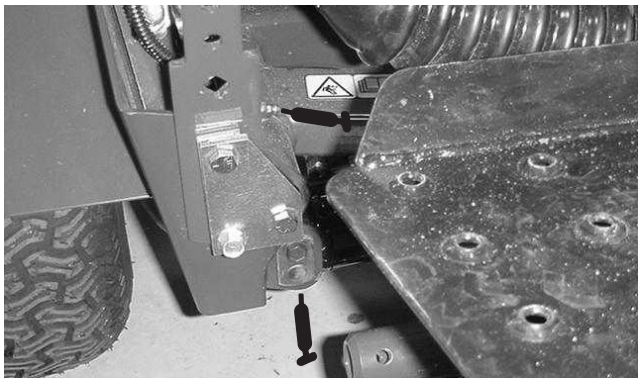


Figure 37

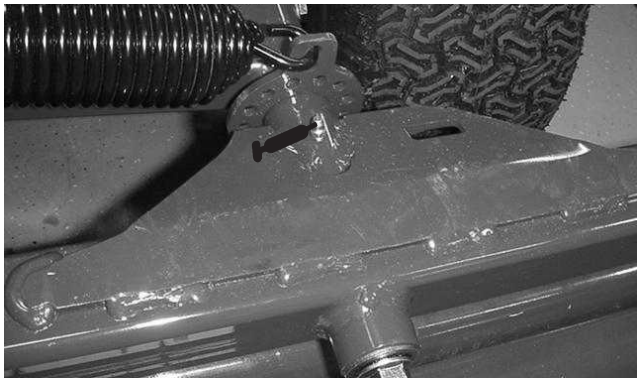


Figure 38

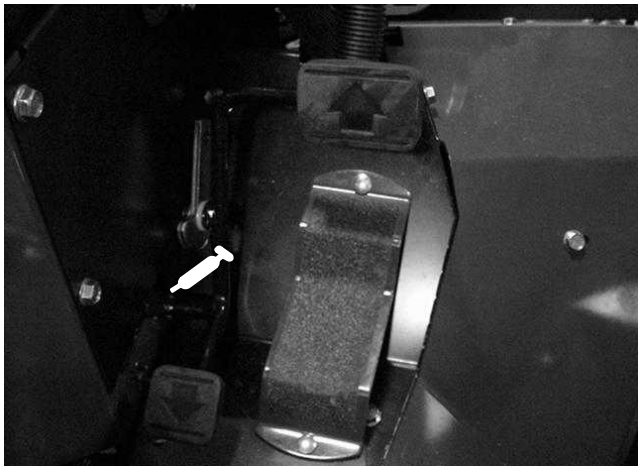


Figure 39

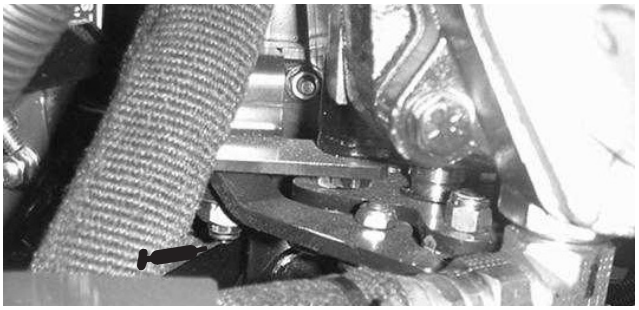


Figure 40

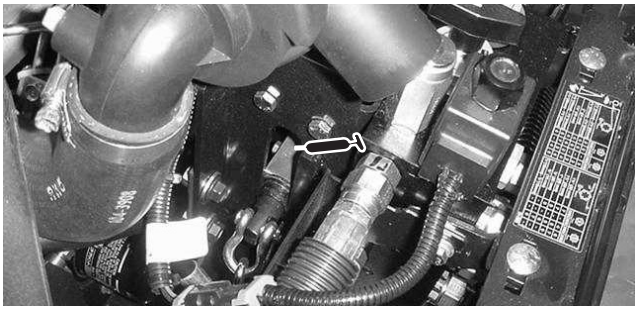


Figure 41

Removing the Hood

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

1. Unlatch and raise the hood.
2. Remove the cotter pin securing the hood pivot to the mounting brackets (Fig. 42).

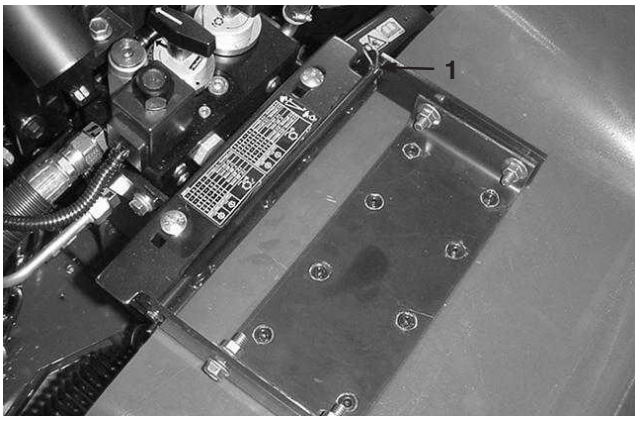


Figure 42

1. Cotter pin

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

General Air Cleaner Maintenance

- Check the air cleaner body for damage which could cause an air leak. Replace if damaged. Check the whole intake system for leaks, damage or loose hose clamps.
- Service the air cleaner filter every 200 hours or earlier if engine performance suffers due to extremely dusty, dirty conditions. Changing the air filter before it is necessary only increases the chance of dirt entering the engine when the filter is removed.
- Be sure the cover is seated correctly and seals with the air cleaner body.

Servicing the Air Cleaner

1. Release the latches securing the air cleaner cover to the air cleaner body (Fig. 43).

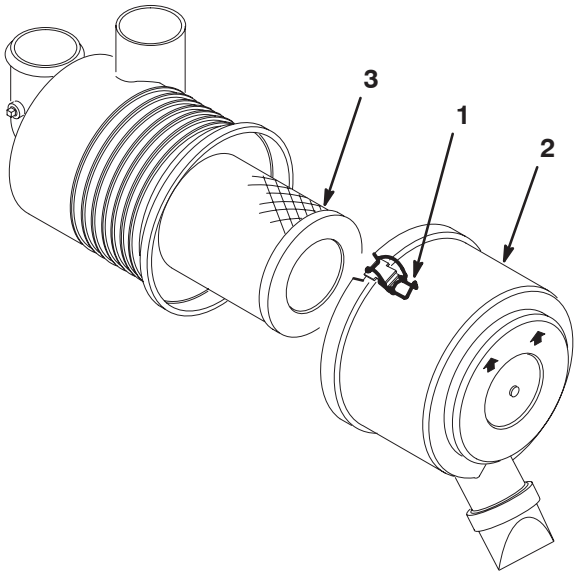


Figure 43

1. Air cleaner latches
2. Dust cap
3. Filter

2. Remove the cover from the air cleaner body. Before removing the filter, use low pressure air (40 psi, clean and dry) to help remove large accumulations of debris packed between outside of primary filter and the canister. Avoid using high pressure air which could force dirt through the filter into the intake tract. This cleaning process prevents debris from migrating into the intake when the primary filter is removed.
3. Remove and replace the primary filter. Cleaning of the used element is not recommended due to the possibility of damage to the filter media. Inspect the new filter for shipping damage, checking the sealing end of the filter and the body. Do not use a damaged element. Insert the

new filter by applying pressure to the outer rim of the element to seat it in the canister. Do not apply pressure to the flexible center of the filter.

4. Clean the dirt ejection port located in the removable cover. Remove the rubber outlet valve from the cover, clean the cavity and replace the outlet valve.
5. Install the cover orienting the rubber outlet valve in a downward position – between approximately 5:00 to 7:00 when viewed from the end.
6. Secure the latches.

Cleaning the Radiator and Screen

To prevent the system from overheating, the radiator screen, radiator, and oil cooler must be kept clean. Check the screen, radiator, and oil cooler daily and, if necessary, clean any debris off of these parts. Clean these components more frequently in dusty dirty conditions.

1. Remove the radiator screen.
2. Working from the fan side of the radiator, either spray the radiator with a hose or blow it with compressed air.

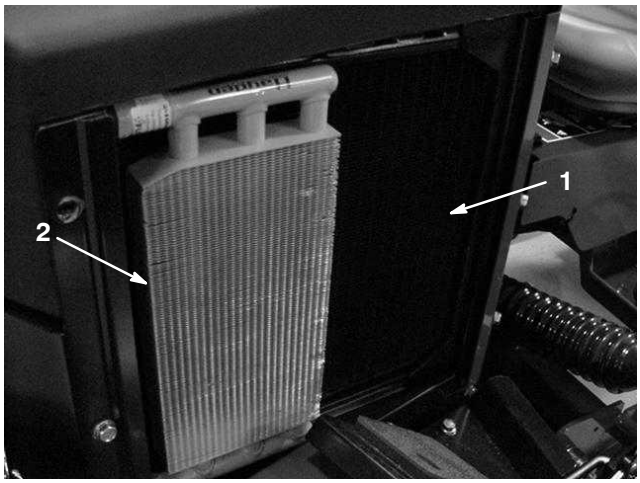


Figure 44

1. Radiator
2. Oil cooler

3. Thoroughly clean the oil cooler (Fig. 44) and remove any other debris that may have collected around the components.
4. Clean the screen and install it.

Changing Engine Oil And Filter

Change oil and filter initially after the first 50 hours of operation, thereafter, change oil and filter every 150 hours.

1. Park the machine on a level surface, lower the cutting units, set the parking brake, and turn the engine off.
2. Remove drain plug and let oil flow into drain pan. When oil stops, install drain plug.

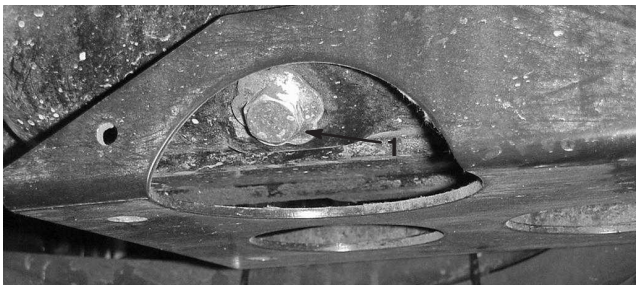


Figure 45

1. Engine oil drain plug

Figure 46

1. Engine oil filter

3. Remove oil filter. Apply a light coat of clean oil to the new filter seal before screwing it on. Screw filter on until gasket contacts mounting plate, then tighten 1/2 to 2/3 of a turn. DO NOT OVER–TIGHTEN.
4. Add oil to crankcase, refer to Check Engine Oil.

Changing the Hydraulic System Fluid and Filter

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

1. Park the machine on a level surface, lower the cutting units, set the parking brake, and turn the engine off.
2. If only the filter is to be changed, remove the reservoir cap and insert the reservoir plug (Fig. 47) to block the outlet. This will retain most of the fluid in the reservoir when the filter is removed.

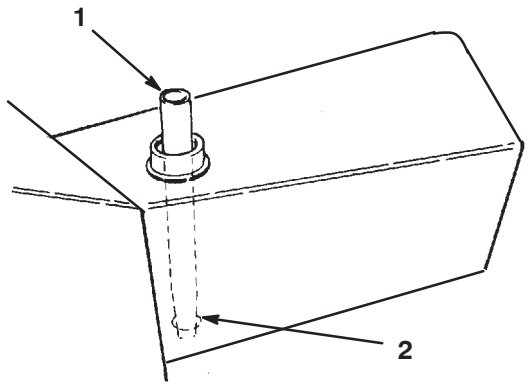


Figure 47

1. Reservoir plug
2. Reservoir outlet

3. Clean the area around the hydraulic oil filter (Fig. 48). Remove the filter from the bottom of the filter housing and allow the oil to flow into a drain pan. Use a bottom type filter wrench. Dispose of the oil filter properly.

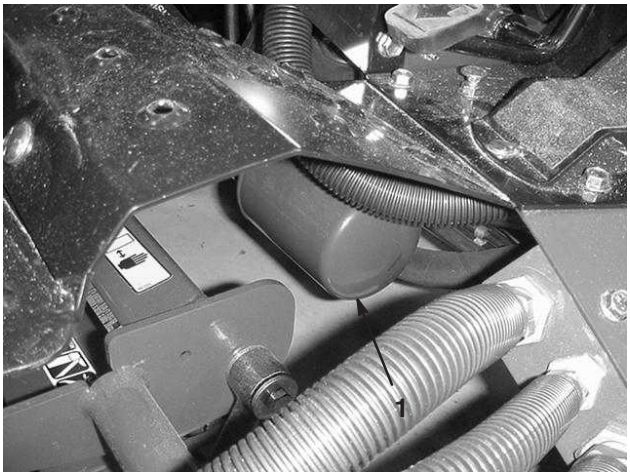


Figure 48

1. Hydraulic oil filter

4. Apply a film of oil on the filter gasket. Install the filter by hand until the gasket contacts the mounting head; then tighten the filter an additional 3/4 turn.
5. Fill the reservoir to the proper level; refer to Checking the Hydraulic System Fluid, page 23.
6. Place all controls in neutral or in the disengaged position and start the engine. Run the engine at the lowest possible RPM to purge the system of air.
7. Run the engine until the lift cylinders extend and retract and forward and reverse wheel motion is achieved.
8. Stop the engine and check the oil level in the reservoir. Add oil if necessary.
9. Check all connections for leaks.

Hydraulic System Test Ports

The test ports are used to test pressure in the hydraulic circuits. Contact your local Toro distributor for assistance.

Test Port #1 (Fig. 49) is used to forward traction pressure.

Test Port #2 (Fig. 49) is used to measure reverse traction pressure.

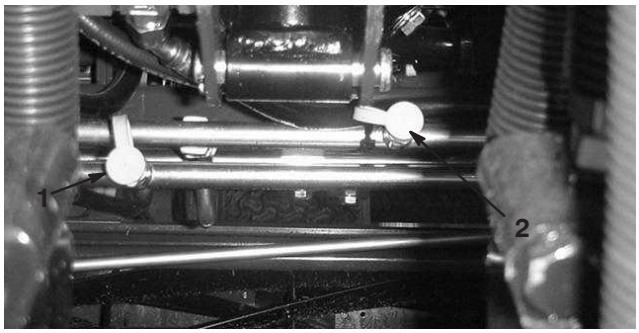


Figure 49

1. Test port #1
2. Test port #2

Test Port #3 (Fig. 50) is used to measure reel circuit pressure.

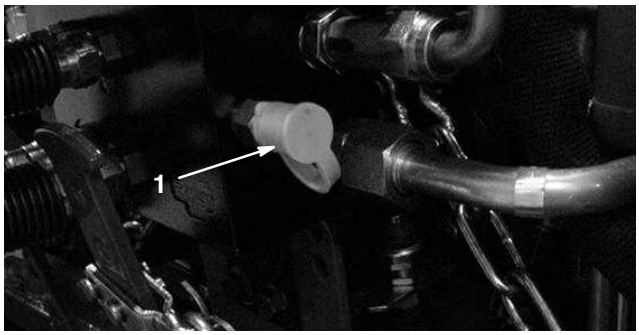


Figure 50

1. Test port #3

Fuel System

Fuel Lines and Connections

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

Fuel Filter/Water Separator

Drain water or other contaminants from fuel filter/water separator daily by loosening drain plug (Fig. 51) on filter canister. Tighten plug after draining. Replace filter canister after every 400 hours of operation.

1. Clean area around filter canister mounting surface.

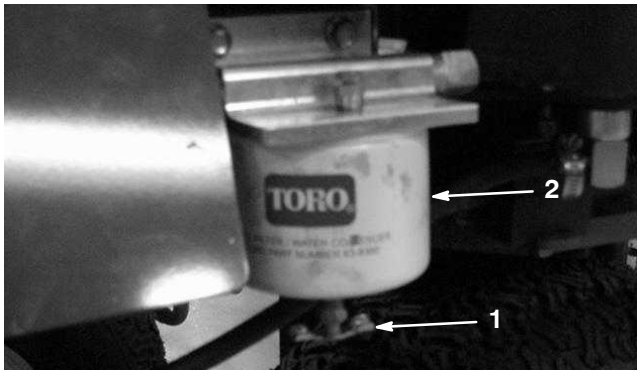


Figure 51

1. Drain plug
2. Filter canister

2. Remove filter canister and clean mounting surface.
3. Lubricate gasket on filter canister with clean engine oil.
4. Install filter canister by hand until gasket contacts mounting surface, then rotate an additional 1/2 turn.

Bleeding Air From Injectors

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

1. Loosen the pipe connection to the No. 1 nozzle and holder assembly (Fig. 52).

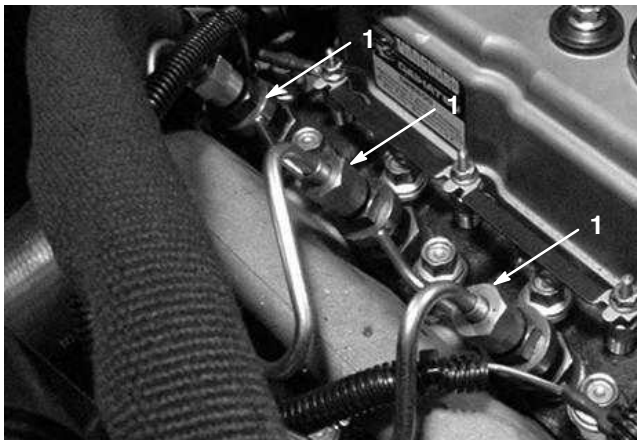


Figure 52

1. Fuel injectors (3)

2. Slowly move throttle to full FAST position.
3. Turn key in key switch to START position and watch fuel flow around connector. Turn key to OFF position when solid flow is observed.
4. Tighten pipe connector securely.
5. Repeat steps 1-4 on No. 2 and 3 nozzles.

Adjusting the Traction Drive for Neutral

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

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

Warning

If the machine is not supported adequately, it may accidentally fall, injuring anyone under the machine.

3. Loosen the locknut on the traction adjustment cam (Fig. 53).

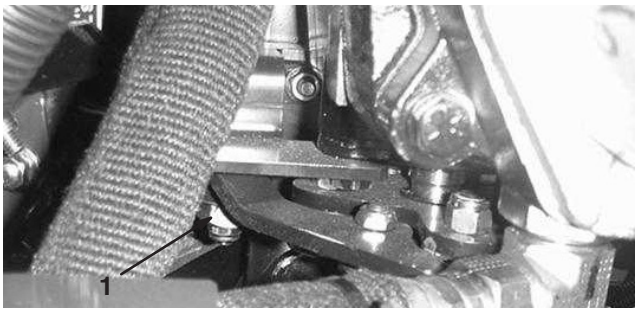


Figure 53

1. Traction adjustment cam

Warning

The engine must be running so a final adjustment of the traction adjustment cam can be performed. Contact with hot or moving parts can result in personal injury.

Keep hands, feet, face, and other body parts away from the muffler, other hot parts of the engine, and other rotating parts.

4. Start the engine and rotate the cam hex in both directions to determine the mid position of the neutral span.
5. Tighten the locknut securing the adjustment.
6. Stop the engine.

7. Remove the support blocks and lower the machine to the shop floor. Test drive the machine to make sure it does not move when the traction pedal is in neutral.

8. After adjusting the pump plate, check the neutral switch operation and adjust, if necessary.

Adjusting Neutral Switch

Whenever the pump plate is adjusted, check the neutral switch (Fig. 54) operation and, if necessary, adjust it as follows:

1. Park the machine on a level surface and turn the engine off.

2. Loosen the locknut securing the switch adjusting screw. Thread it away from the switch until the capscrew head clears the switch.

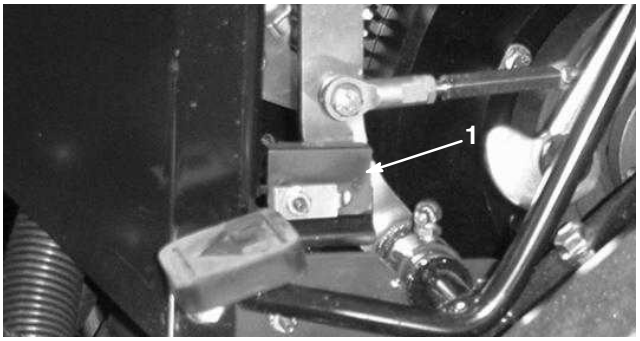


Figure 54

1. Neutral switch

3. Adjust switch location until circuit is made when in neutral and broken with 1 inch travel of traction pedal.

4. Tighten the locknut

Adjusting the Belts

Make sure the belts are properly tensioned to ensure proper operation of the machine and prevent unnecessary wear. On new belts, check the tension after 8 hours operation.

Hydraulic Pump Belt

A new hydraulic pump belt should be tensioned so that it deflects 0.12 inch with a 15–17 pound load applied midway in the span of the belt. A used belt should be tensioned so that it deflects 0.12 inch with a 11–13 pound load applied midway in the span of the belt.

Tighten the nut on the adjustment rod (Fig. 55) until the desired belt tension is attained.

Note: Tighten the belt to eliminate slippage (squealing under load) but do not overtighten.

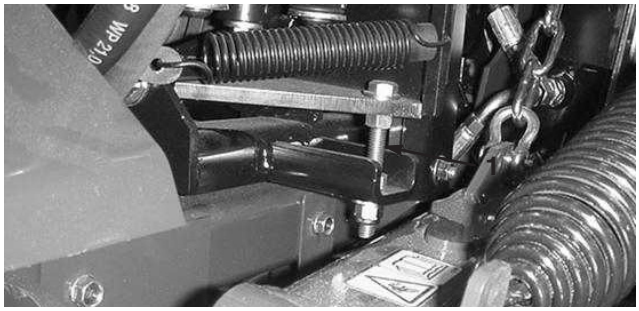


Figure 55

1. Adjustment rod

Alternator belt

1. Check tension by depressing belt at mid span of crankshaft and alternator pulleys with 22 lbs. of force. A new belt should deflect .3–.5 in. A used belt should deflect .4–.55 in. If deflection is incorrect, proceed to next step. If correct, continue operation.

2. To adjust belt tension:

   A. Loosen alternator mounting bolts.

   B. Using a bar, rotate alternator until proper belt tension is attained, then tighten mounting bolts.

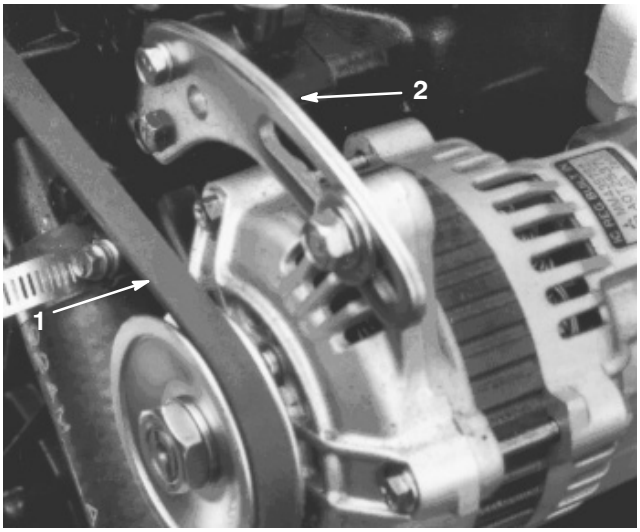


Figure 56

1. Alternator belt
2. Alternator brace

Adjusting the Traction Pedal

If the traction pedal contacts the footrest when it is pushed fully forward or maximum forward traction speed is unattainable, an adjustment to the traction pedal linkage is required.

1. To expose the traction rod, remove the right panel.

2. Loosen the jam nuts on each end of the traction rod barrel (Fig. 57).
3. Rotate the rod barrel until the required pedal clearance or traction speed is attained.
4. Tighten the jam nuts securing the adjustment.
5. The stop for reverse travel (under the pedal) may be adjusted for slower travel. Speeds in excess of 3 MPH are not recommended.
6. Check neutral switch adjustment.

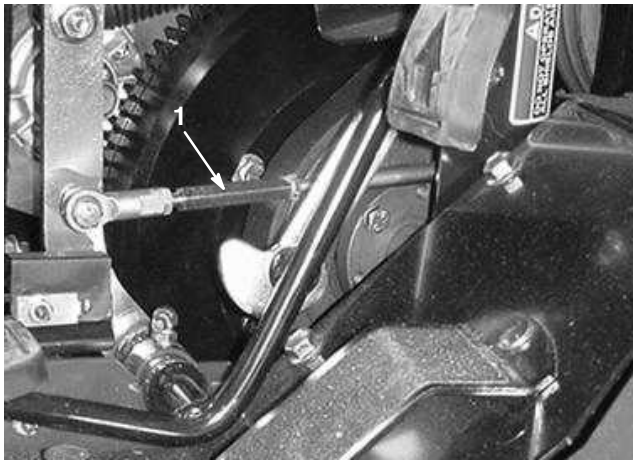


Figure 57

1. Traction rod barrel

Adjusting the Traction Pedal Damper

1. To expose the traction pedal damper, remove the right-hand panel.
2. Loosen the locknut securing the damper pivot to the damper bracket (Fig. 58).

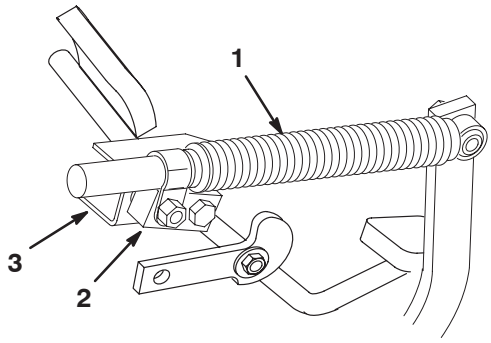


Figure 58

1. Damper
2. Damper pivot
3. Damper bracket

3. Depress the traction pedal fully forward.
4. Fully compress the damper and then release it, allowing it to extend 0.08 in. Tighten the locknut securing the adjustment.
5. When the traction pedal is fully depressed in the rearward direction, the damper must contact the reverse stop before extending the damper.
6. Check neutral switch adjustment.

Adjusting the Hand Brake

1. Remove both front wheels.
2. Make sure that the brake is in the OFF position.
3. Loosen the jam nut on the clevis. Remove the cotter pin securing the top of the clevis to the upper brake lever (Fig. 59). Rotate the clevis, one turn at a time, to decrease the distance between the levers.

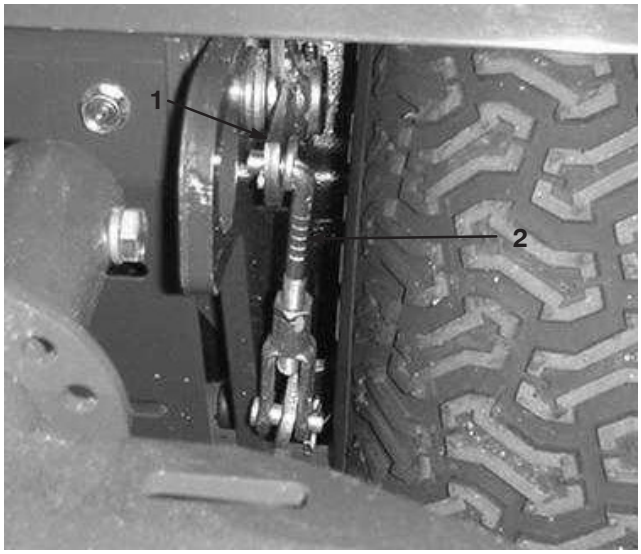


Figure 59

1. Upper brake lever
2. Clevis

4. Install the clevis to the upper brake lever and tighten the jam nut. Repeat the procedure on the opposite side of the machine.
5. After any brake adjustment, operate the vehicle at a low speed (one MPH or less) and check that the brakes engage equally on both wheels. Readjust as necessary.

Battery Care

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

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

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

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.**

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

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

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*****.**

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.**

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

Storing the Battery

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

Fuses

The fuses in the electrical system are located on the back of the instrument panel (Fig. 60).

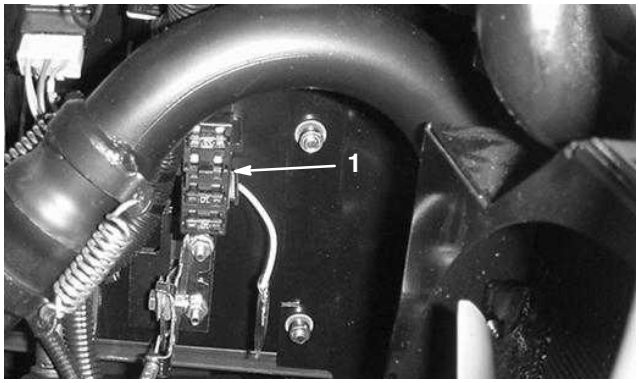
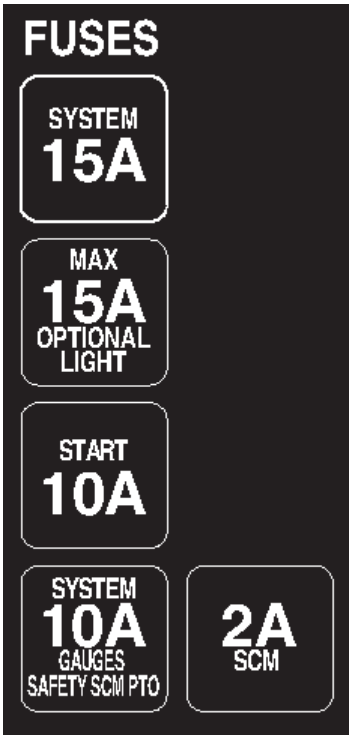


Figure 60

1. Fuses



Backlapping

Danger

While backlapping, the reels may stall and then restart. Placing your hands or feet in the reel area while backlapping will result in injury or death.

- **Never place hands or feet in the reel area while the engine is running.**
- **Do not attempt to restart the reels by hand or foot.**
- **Do not adjust the reels while the engine is running.**
- **If the reel stalls, stop the engine before attempting to clear the reel.**

1. Position the machine on a clean, level surface, lower the cutting units, stop the engine, engage the parking brake, and remove the key from the ignition switch.
2. Unlatch and raise the hood to expose the controls.
3. Rotate the backlap knob, on the valve block (Fig. 61), clockwise to the backlap position. Rotate the reel speed knob (Fig. 61) to position 1.

Important Do not rotate the backlap knob from the mow to the backlap position while the engine is running as damage to the reels may occur.

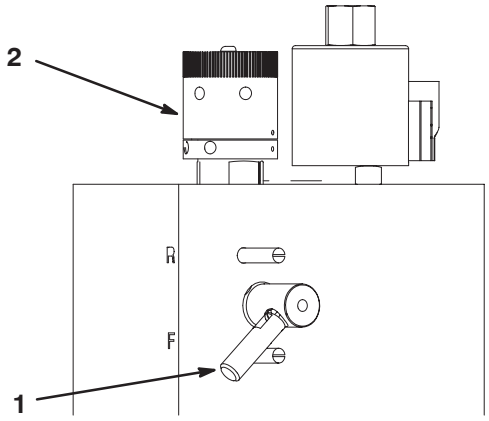


Figure 61

1. Backlap knob
2. Reel speed knob

4. Make the initial reel to bedknife adjustments appropriate for backlapping on all cutting units. Start the engine and set the engine to low idle speed.
5. Engage the reels by pulling out the knob on the instrument panel.
6. Apply lapping compound with the long handled brush supplied with the machine.

Caution

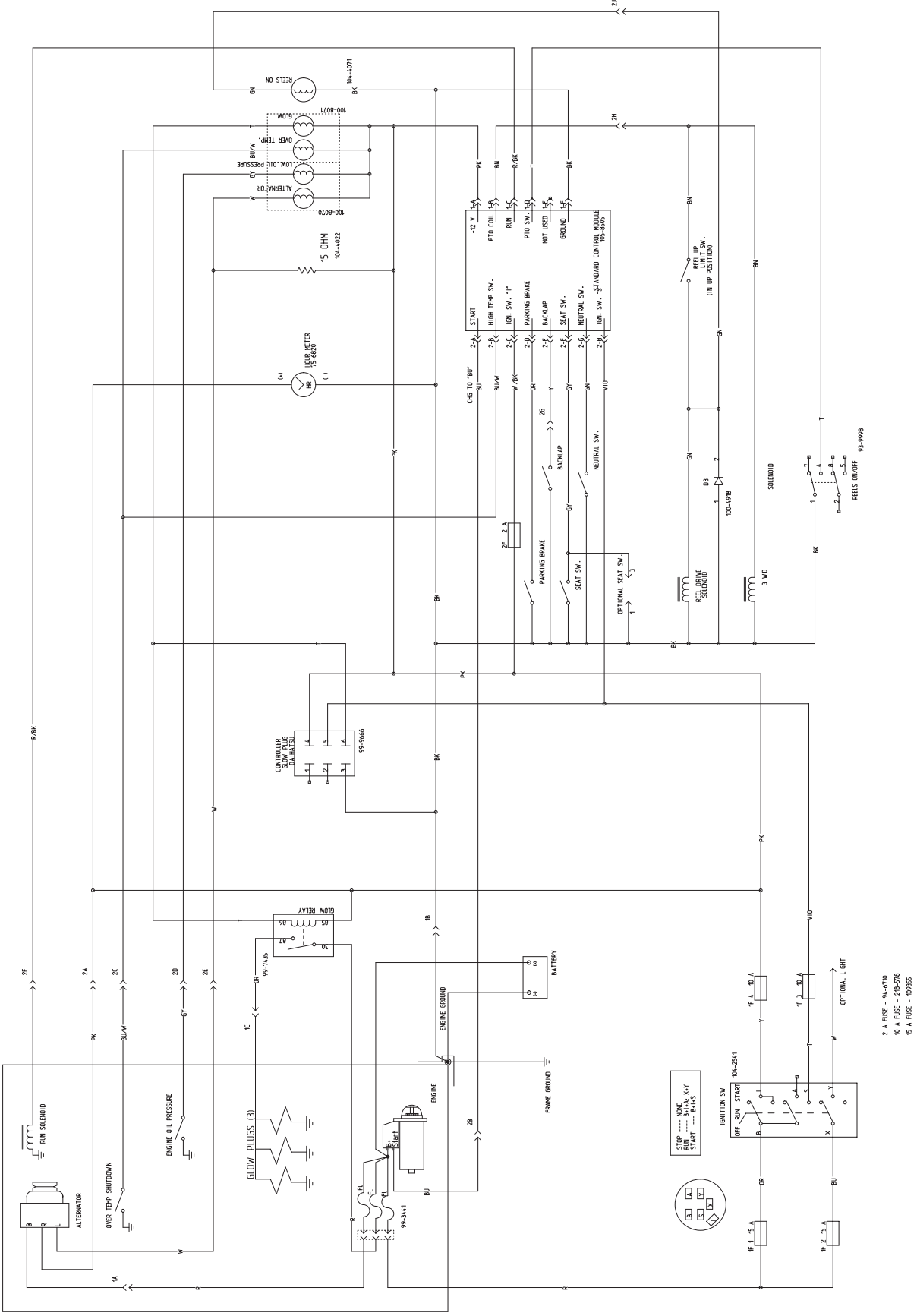
Contact with the reel or other moving parts can result in personal injury.

7. To make an adjustment to the cutting units while backlapping, turn the reels OFF by pushing in on the knob on the instrument panel and turning the engine OFF. After adjustments have been completed, repeat steps 4–6.
8. When the backlap operation is completed, stop the engine, rotate the backlap knob clockwise to the MOW position, set the reel speed controls to the desired mowing setting and wash all lapping compound off of the cutting units.

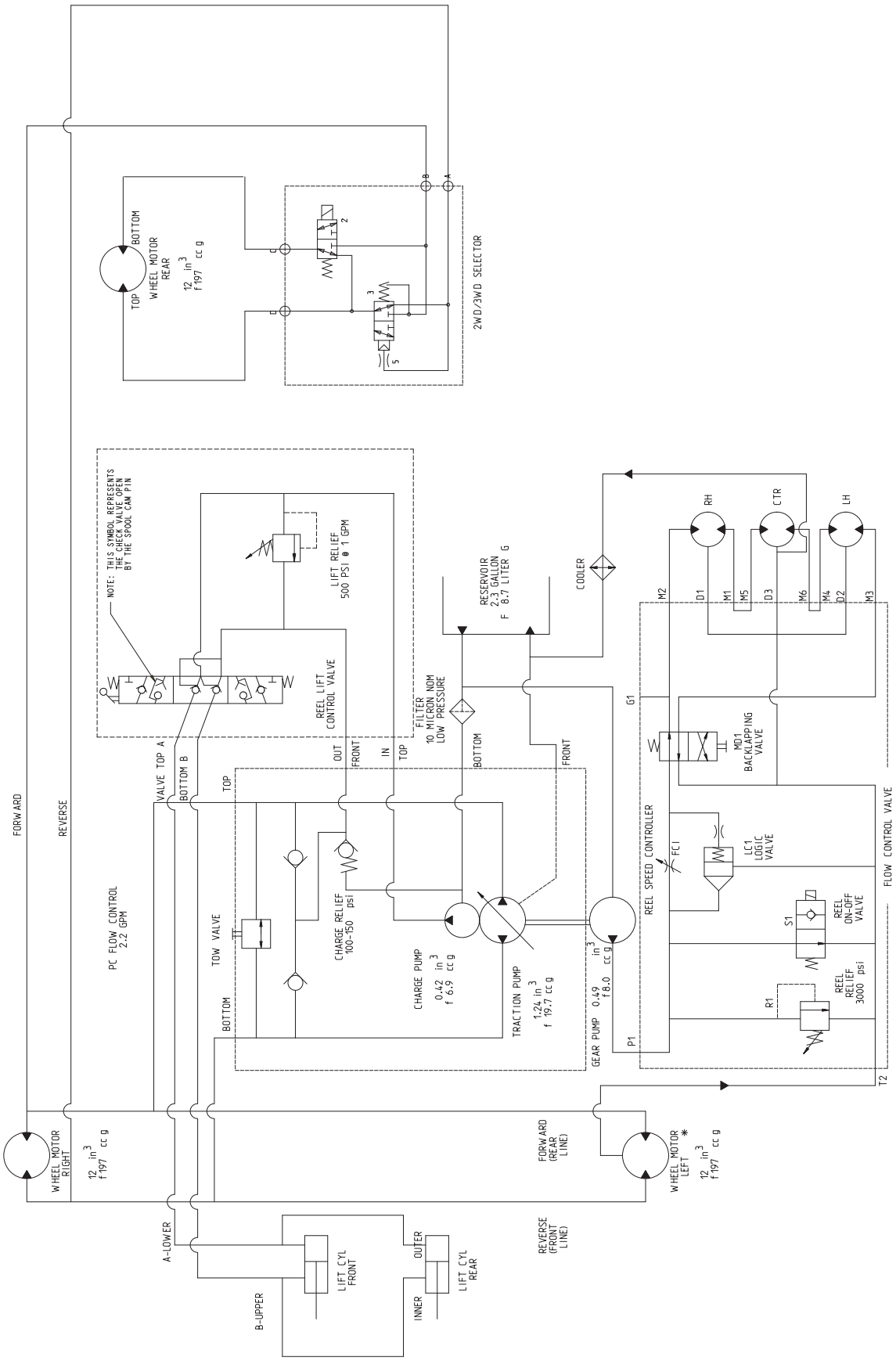
Note: Additional instructions and procedures on backlapping are available in the TORO Sharpening Reel & Rotary Mowers Manual, Form No. 80-300SL.

Note: For a better cutting edge, run a file across the front face of the bedknife when the lapping operation is completed. This will remove any burrs or rough edges that may have built up on the cutting edge.

Electrical Schematic



Hydraulic Schematic



Evaporative Emission Control Warranty Statement

California Evaporative Emission Control Warranty Statement
Your Warranty Rights and Obligations

Introduction

The California Air Resources Board and The Toro® Company are pleased to explain the evaporative emission control system's warranty on your 2006 model year equipment. In California, new equipment that use small off–road engines must be designed, built, and equipped to meet the State's stringent anti–smog standards. The Toro) Company must warrant the evaporative emission control system on your equipment for two years provided there has been no abuse, neglect or improper maintenance of your equipment.
Your evaporative emission control system may include parts such as: fuel lines, fuel line fittings, and clamps.

Manufacturer's Warranty Coverage:

This evaporative emission control system is warranted for two years. If any evaporative emission–related part on your equipment is defective, the part will be repaired or replaced by The Toro® Company.

Owner's Warranty Responsibilities:

- As the equipment owner, you are responsible for performance of the required maintenance listed in your Operator's Manual. The Toro® Company recommends that you retain all receipts covering maintenance on your equipment, but The Toro® Company cannot deny warranty solely for the lack of receipts.
- As the equipment owner, you should however be aware that The Toro® Company may deny you warranty coverage if your emission warranty parts have failed due to abuse, neglect, or improper maintenance or unapproved modifications.
- You are responsible for presenting your equipment to an Authorized Service Dealer as soon as the problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days. If you have a question regarding your warranty coverage, you should contact The Toro® Company at 1–952–948–4027 or call us toll free at the number listed in your Toro Warranty statement.

Defects Warranty Requirements:

9. The warranty period begins on the date the engine or equipment is delivered to an ultimate purchaser.

10. General Evaporative Emissions Warranty Coverage. The emission warranty parts must be warranted to the ultimate purchaser and any subsequent owner that the evaporative emission control system when installed was
    A. Designed, built, and equipped so as to conform with all applicable regulations; and
    B. Free from defects in materials and workmanship that causes the failure of a warranted part for a period of two years.

11. The warranty on evaporative emissions–related parts will be interpreted as follows:
    A. Any warranted part that is not scheduled for replacement as required maintenance in the written instructions must be warranted for the warranty period of two years. If any such part fails during the period of warranty coverage, it must be repaired or replaced by The Toro® Company. Any such part repaired or replaced under the warranty must be warranted for a time not less than the remaining warranty period.
    B. Any warranted part that is scheduled only for regular inspection in the written instructions must be warranted for the warranty period of two years. A statement in such written instructions to the effect of "repair or replace as necessary" will not reduce the period of warranty coverage. Any such part repaired or replaced under warranty must be warranted for a time not less than the remaining warranty period.
    C. Any warranted part that is scheduled for replacement as required maintenance in the written instructions must be warranted for the period of time prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part must be repaired or replaced by The Toro® Company. Any such part repaired or replaced under warranty must be warranted for a time not less than the remainder of the period prior to the first scheduled replacement point for the part.
    D. Repair or replacement of any warranted part under the warranty provisions of this article must be performed at no charge to the owner at an Authorized Service Dealer.
    E. Notwithstanding the provisions of subsection (D) above, warranty services or repairs must be provided at an Authorized Service Dealer.
    F. The owner must not be charged for diagnostic labor that leads to the determination that a warranted part is in fact defective, provided that such diagnostic work is performed at an Authorized Service Dealer.
    G. Throughout the evaporative emission control system's two year warranty period, The Toro® Company must maintain a supply of warranted parts sufficient to meet the expected demand for such parts.
    H. Manufacturer approved replacement parts must be used in the performance of any warranty maintenance or repairs and must be provided without charge to the owner. Such use will not reduce the warranty obligations of The Toro® Company.
    I. The use of any add–on or modified parts will be grounds for disallowing a warranty claim made in accordance with this article. The Toro® Company will not be liable under this Article to warrant failures of warranted parts caused by the use of an add–on or modified part.
    J. The Toro® Company shall provide any documents that describe the warranty procedures or policies within five working days of request by the Air Resources Board.

Emission Warranty Parts List:

The following list includes the parts covered under this warranty:

- Fuel Lines
- Fuel Line Fittings
- Clamps

The Toro General Commercial Products Warranty

A Two-Year Limited Warranty

Conditions and Products Covered

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

* Product equipped with hour meter

Instructions for Obtaining Warranty Service

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

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

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

Owner Responsibilities

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

Items and Conditions Not Covered

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

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

Parts

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

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

General Conditions

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

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

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

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

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

Countries Other than the United States or Canada

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

Part No. 374-0031 Rev. C