



# **Reelmaster<sup>®</sup> 2300/2600-D**

## **Traction Unit**

**Model No. 03422—210000001 and Up**

**Model No. 03422TE—210000001 and Up**

**Model No. 03247—210000001 and Up**

**Model No. 03427TE—210000001 and Up**

**Model No. 03471**

**Model No. 03472**

**Operator's Manual**



## Warning



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

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## 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 at the rear of the mower.

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

<b>Model No.</b> _____
<b>Serial No.</b> _____

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 the B71.4 1990 specifications of the American National Standards Institute, in effect at time of production, when ballast is installed according to the chart on page 19.**

**Note:** The addition of attachments made by other manufacturers that do not meet American National Standards Institute certification will cause noncompliance of this machine.

**Improper use or maintenance by the operator or owner can result in injury. To reduce the potential for injury, comply with these safety instructions and always pay attention to the safety alert  symbol, which means CAUTION, WARNING, or DANGER—“personal safety instruction.” Failure to comply with the instruction may result in personal injury or death.**

## Safe Operating Practices

The following instructions are from ANSI standard B71.4—1990.

### Training

- Read the Operator’s Manual and other training material. If the operator(s) or mechanic(s) can not read English it is the owner’s responsibility to explain this material to them.
- Become familiar with the safe operation of the equipment, operator controls, and safety signs.
- All operators and mechanics should be trained. The owner is responsible for training the users.
- Never let children or untrained people operate or service the equipment. Local regulations may restrict the age of the operator.
- The owner/user can prevent and is responsible for accidents or injuries occurring to himself or herself, other people or property.

### Preparation

- 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.
- Wear appropriate clothing including hard hat, safety glasses and ear protection. Long hair, loose clothing or jewelry may get tangled in moving parts.
- Inspect the area where the equipment is to be used and remove all objects such as rocks, toys and wire which can be thrown by the machine.
- Use extra care when handling gasoline and other fuels. They are flammable and vapors are explosive.
  - Use only an approved container.
  - Never remove gas cap or add fuel with engine running. Allow engine to cool before refueling. Do not smoke.
  - Never refuel or drain the machine indoors.
- Check that operator’s presence controls, safety switches and shields are attached and functioning properly. Do not operate unless they are functioning properly.

### Operation

- Never run an engine in an enclosed area.
- Only operate in good light, keeping away from holes and hidden hazards.

- Be sure all drives are in neutral and parking brake is engaged before starting engine. Only start engine from the operator's position. Use seat belts if provided.
- Slow down and use extra care on hillsides. Be sure to travel in the recommended direction on hillsides. Turf conditions can affect the machine's stability. Use caution while operating near drop-offs.
- Slow down and use caution when making turns and when changing directions on slopes.
- Never operate with guards not securely in place. Be sure all interlocks are attached, adjusted properly, and functioning properly.
- Do not change the engine governor setting or overspeed the engine.
- Stop on level ground, disengage drives, engage parking brake (if provided), shut off engine before leaving the operator's position for any reason including emptying the grass baskets.
- Stop equipment and inspect the machine after striking objects or if an abnormal vibration occurs. Make necessary repairs before resuming operations.
- Keep hands and feet away from the cutting units.
- Look behind and down before backing up to be sure of a clear path.
- Never carry passengers and keep pets and bystanders away.
- Slow down and use caution when making turns and crossing roads and sidewalks. Stop 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

- Disengage drives, raise 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, mufflers, and engine to help prevent fires. Clean up oil or fuel spillage.
- Let engine cool before storing and do not store near flame.
- Shut off fuel while storing or transporting. Do not store fuel near flames or drain indoors.
- Park machine on level ground. Never allow untrained personnel to service machine.

- 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 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.
- Keep all parts in good working condition and all hardware and hydraulic fittings tightened. Replace all worn or damaged decals.

## Toro Mower Safety

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

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.

## Preparation

- Always use the proper amount of rear ballast as specified in this manual.
- Always wear substantial shoes. Do not operate the machine while wearing sandals, tennis shoes, or sneakers.
- Wearing safety shoes and long pants is advisable and required by some local ordinances and insurance regulations.
- Only fill the fuel tank to within 1 inch of the top of the tank, not the filler neck. Do not overfill.
- Handle fuel carefully. Wipe up any spills.

## Operation

- Know how to stop the machine and engine quickly.
- Check the safety interlock switches daily for proper operation. If a switch should fail, replace the switch before operating the machine. After every two years, replace all interlock switches in the safety system, **regardless** if they are working properly or not.
- Before starting the engine, engage the parking brake, put the traction pedal in neutral, and the reel drive is disengaged.
- Using the machine demands attention. To prevent loss of control:
  - Do not drive close to sand traps, ditches, creeks, steep hillsides, or other hazards.
  - Reduce speed when making sharp turns. Avoid sudden stops and starts.
- Do not touch the engine, muffler, exhaust pipe, or hydraulic tank while the engine is running or soon after it has stopped because these areas could be hot enough to cause burns.
- If a cutting unit strikes a solid object or vibrates abnormally, stop immediately, turn the engine off, wait for all motion to stop, and inspect the machine for damage. A damaged reel or bedknife must be repaired or replaced before operation is continued.
- Before getting off of the seat, move the traction pedal to neutral, set the parking brake, disengage the cutting units, and wait for the reels to stop. Stop the engine and remove the key from the ignition switch.
- Hills over 15 degrees should be mowed up and down, not side to side.
- Mowing hills may be dangerous. Hills over 20 degrees generally should not be mowed unless special safeguards, skills, and conditions exist.
- For steering control, the cutting units must be lowered when going down slopes.
- Use the reverse pedal for braking.
- Watch out for traffic when near or crossing roads. Always yield the right of way.
- Raise the cutting units when driving from one work area to another.

## 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.

- 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 to the ground.
- 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. Keep everyone away.
- Do not overspeed the engine by changing governor settings. To ensure safety and accuracy, have an Authorized Toro Distributor check the maximum engine speed.
- The engine must be shut off before checking the oil or adding oil to the crankcase.
- If major repairs are ever needed or if assistance is desired, contact an Authorized Toro Distributor.
- To make sure of optimum performance and continued safety certification of the machine, use only genuine Toro replacement parts and accessories. Replacement parts and accessories made by other manufacturers could be dangerous, and such use could void the product warranty.

## Sound Pressure Level

This unit has an equivalent continuous A-weighted sound pressure at the operator ear of: 85 dB(A), based on measurements of identical machines per procedures outlined in Directive 84/538/EEC and amendments.

## Vibration Level

This unit has a maximum hand-arm vibration level of 5.5 m/s<sup>2</sup> and whole body vibration level of 0.5 m/s<sup>2</sup>, based on measurements of identical machines per EN 1033 and EN 1032.

# 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



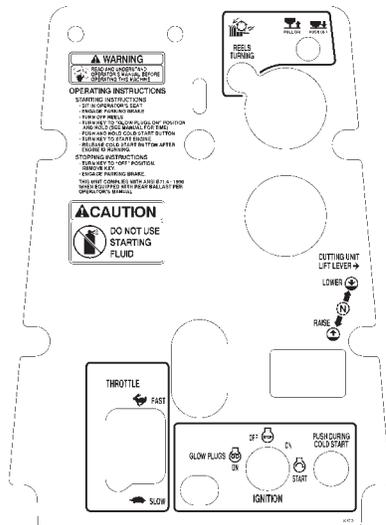
93-7270

1. Pull out for two wheel drive.
2. Push in for three wheel drive.

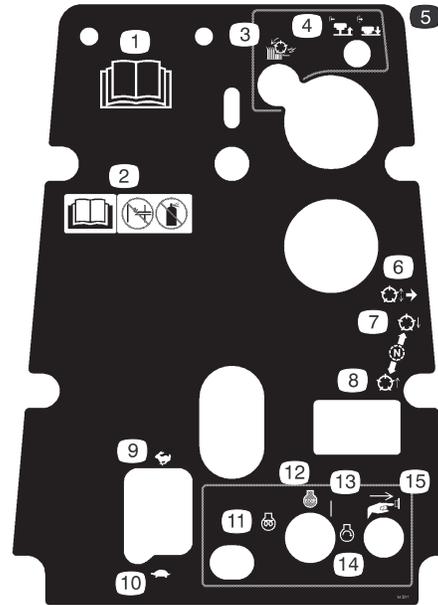


77-3100

1. Cutting/dismemberment hazard—stay away from rotating fan blade.



94-4985 (Model No. 03422 and 03427)



94-3351 (Model No. 03427TE)

1. Read the operator's manual.
2. Do not use starting fluid—read the operator's manual for further instructions.
3. Reels turning.
4. Pull out to turn cutting units on.
5. Push to turn cutting units off.
6. Cutting unit lift lever
7. Lower cutting units
8. Raise cutting units
9. Throttle fast
10. Throttle slow
11. Glow plugs on
12. Engine off
13. Engine on
14. Engine start
15. Push during cold start.

1	3	4				5			
		3WD	2WD	3WD	2WD	3WD	2WD	3WD	2WD
2 1/8" (64mm) - 2 1/8" (60mm)	3	5	-	3	1 1/8" (32 mm)	7	-	4	6
2 1/8" (57mm) - 2 1/8" (54mm)	4	5	-	3	1 1/8" (29 mm)	7	-	5	7
2" (51 mm)	4	6	-	3	1" (25 mm)	8	-	5	9
1 1/2" (48 mm)	4	6	3	4	7/8" (22 mm)	9	-	6	-
1 1/8" (44mm) - 1 1/8" (41mm)	5	7	3	4	3/4" (19 mm)	-	-	7	-
1 1/2" (38mm) - 1 1/8" (35mm)	6	-	4	5	5/8" (16mm) - 3/8" (10mm)	-	-	9	-

94-5056

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

**CUTTING UNITS** OPTIONAL FRONT ROLLER

**QUICK REFERENCE AID**

**CHECK/SERVICE**

- ENGINE OIL LEVEL
- ENGINE OIL DRAIN (17mm socket)
- HYDRAULIC OIL LEVEL
- BELTS (Fan/Water Pump, Hydraulic Pump)
- COOLANT LEVEL FILL-middle of horiz. neck
- FUEL - Diesel Only
- GREASE POINTS (every 50 hours)
  - 17-3WD; 18-2WD
- GREASE POINTS (every 8 hours)
  - 12 or 18 (with optional front roller)
- RADIATOR SCREEN
- AIR CLEANER
- WATER SEPARATOR/FUEL FILTER
- BATTERY
- TIRE PRESSURE: 16-20 psi (1.1 - 1.4 bar)
- FUSES

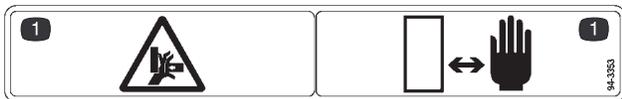
**FLUID SPECIFICATIONS/CHANGE INTERVALS**

SEE OPERATOR'S MANUAL FOR FULL DETAILS	FLUID TYPE	CAPACITY	CHANGE INTERVAL	FILTER	PART NO.
ENGINE OIL	SAE 15W-40	2.8 L (1.0 US GAL)	200 HRS	FLUO	85-4520 (A)
HYDRAULIC OIL	ISO 68	1.1 L (0.3 US GAL)	200 HRS	FLUO	84-1110 (B)
FUEL FILTER	Inspect daily for contaminants & water		200 HRS	FLUO	83-2196 (C)
AIR CLEANER	Clean every 50 hours		200 HRS	FLUO	83-2196 (D)
FUEL	NO. 2-Diesel	24.5 L (6.5 US GAL)			
COOLANT	50-50 Ethylene glycol/water	4.7 L (1.2 US GAL)			

Drain and flush, 2 yrs.

93-6902

104-3885 (Model No. 03422 and 03427)



94-3353

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



26-7390



93-6696

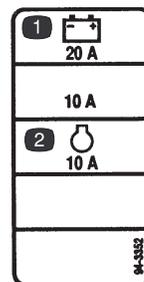
- Warning—spring loaded mechanism. Read the operator's manual.



67-5360

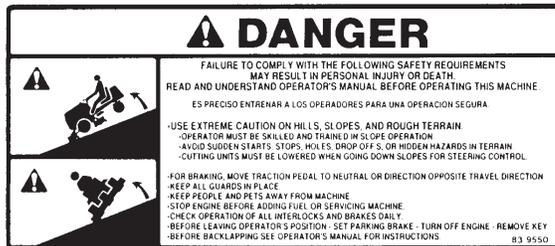
CHARGING	20 A
ACCESSORIES	10 A
ENGINE	10 A
OPEN	
FUSES	93-6902

93-6902 (Model No. 03422 and 03427)

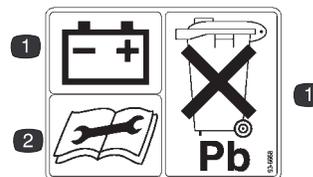


94-3352 (Model No. 03427TE)

- Battery
- Engine

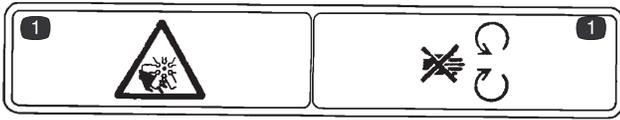


83-9550



93-6668

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



**93-7272**

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



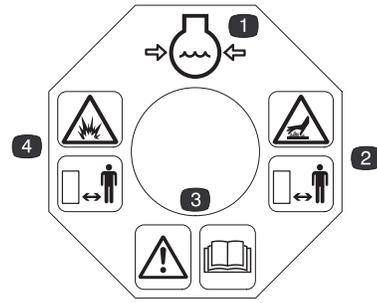
**93-7273**

1. Thrown object hazard—keep bystanders away.
2. Cutting/dismemberment hazard of hands or feet—stay away from moving parts.



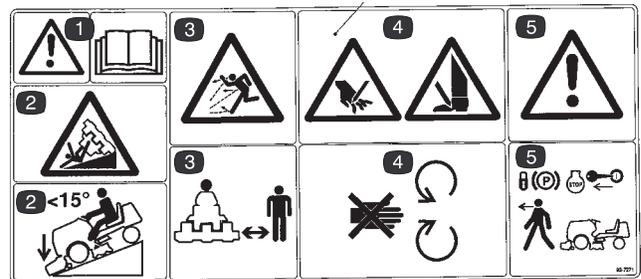
**93-7276**

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.



**93-7840**

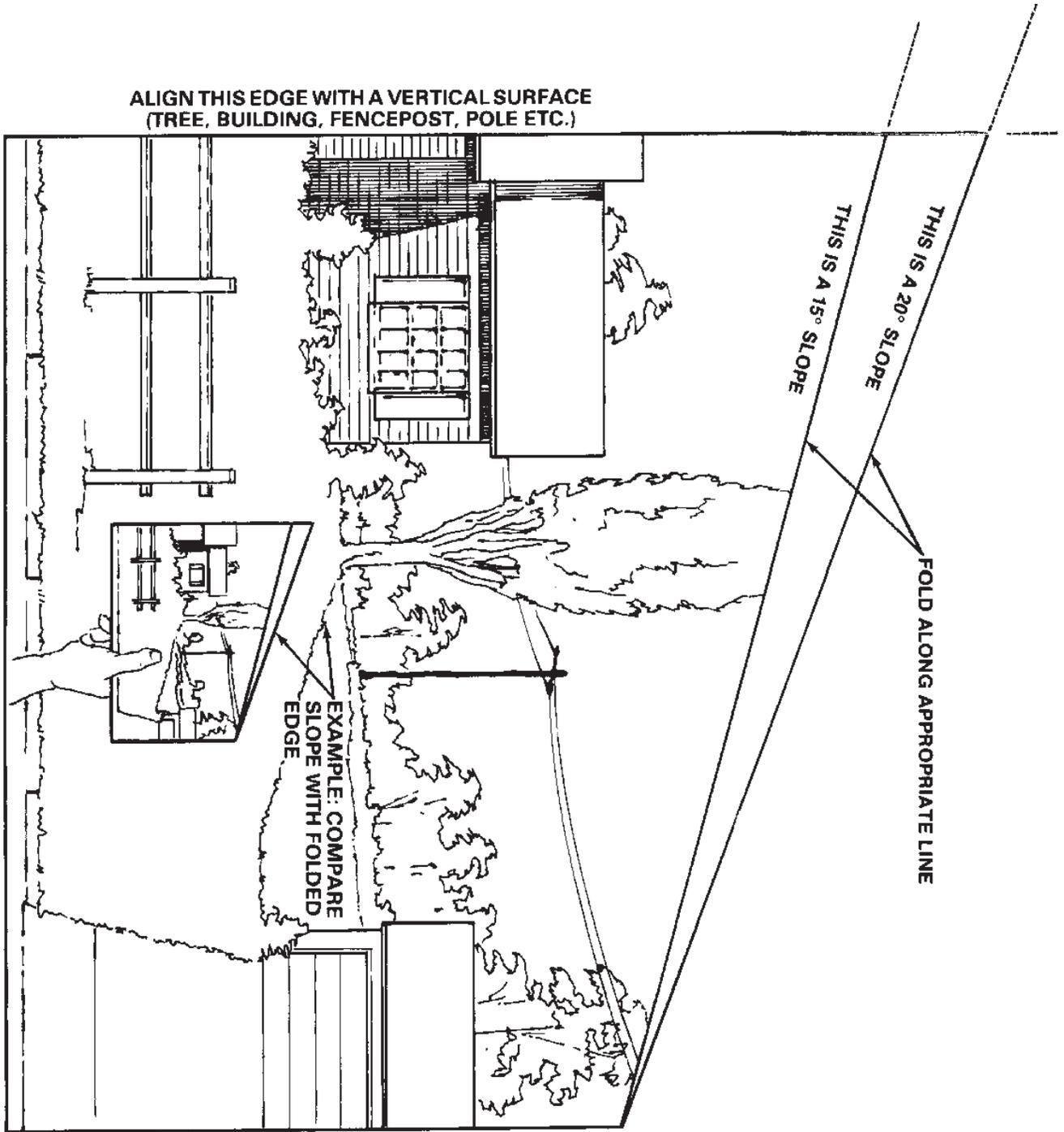
1. Engine coolant under pressure
2. Hot surface—stay away.
3. Warning—read the operator's manual.
4. Explosion hazard—stay away.



**93-7271**

1. Warning—read the operator's manual.
2. Tipping hazard—when driving down slopes less than 15 degrees, lower the cutting units to the ground.
3. Thrown object hazard—keep bystanders away.
4. Cutting/dismemberment hazard of hand or feet—stay away from rotating blades and moving parts.
5. Warning—before leaving the operator's seat, set the parking brake, stop the engine, and remove the ignition key.

# Slope Chart





# Specifications

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

## General Specifications

Engine	Perkins, 4-cycle, 3-cylinder, liquid cooled, vertical OHV, diesel engine with centrifugal water pump. 18 hp (13.4 kW); governed to a maximum speed of 3200 RPM. 41.2 cu. in. (676 cc) displacement. Forced lubrication gear pump. Mechanical centrifugal governor. Mechanical fuel transfer pump. Fuel filter/water separator with replaceable filter element. 12 volt (0.7 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). 14 amp alternator with regulator/rectifier. Seat switch, PTO, and traction interlock switches. Indicator light when cutting units are running.
Fuel Capacity	6.5 gallons
Traction Drive	High torque hydraulic wheel motors. 3-wheel drive; two position selector valve located below seat, push for 3-wheel drive and pull for 2-wheel drive. Oil cooler and shuttle valve provide positive closed-loop cooling.
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. Model 03422: Tricycle vehicle with 2-wheel traction drive and rear wheel steering Model 03427: Tricycle vehicle with 3-wheel traction drive and rear wheel steering
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, cold start button reel unit lift lever, parking brake, and seat adjustment. Model 03427 only: 2 position selector valve for 2 or 3-wheel drive selection.
Gauges and Protective Systems	Hour meter, temperature gauge. 4 light warning cluster gauge: oil pressure, water temperature, amps, and glow plug. High water temperature shut-down. Electric traction pump de-clutching switch for cold start. 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	
RM 2300-D	72 in. (183 cm)
RM 2600-D	85 in. (216 cm)
Length	
Height	
Weight	
Model 03422—2WD without cutting units	1066 lb. (484 kg)
Model 03427—3WD without cutting units	1096 lb. (497 kg)
Model 03461—27" 5 blade cutting unit	136 lb. (62 kg)
Model 03462—27" 8 blade cutting unit	143 lb. (65 kg)
Model 03466—32" 5 blade cutting unit	158 lb. (72 kg)
Model 03467—32" 8 blade cutting unit	167 lb. (76 kg)

## Optional Equipment

Cushion Seat	Model No. 30796
Deluxe Seat w/Suspension	Model No. 30797
Armrest Kit for Model No. 30796	Model No. 30707
Seat Weight Kit (for Seat Model No. 30796 Only)	Part No. 80-4210
3WD Rear Weight Kit	Part No. 94-3663
Rear Weight Kit	Part No. 83-9370
Rear Weight	Part No. 83-9390

### RM 2300-D Optional Equipment

5 Blade Cutting Unit	Model No. 03461
8 Blade Cutting Unit	Model No. 03462
2WD Weight Kit (Baskets)	Part No. 94-5974

### RM 2600-D Optional Equipment

5 Blade Cutting Unit	Model No. 03466
8 Blade Cutting Unit	Model No. 03467

## 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 on Model No. 03422
Flat washer	2	
Axle	1	
Locknut	1	
Wheel assembly	1	Installing the rear wheel on Model No. 03427
Lub nut	4	
Flat washer	3	Mounting the carrier frames to the cutting units.
Capscrew	3	
Locknut	3	

<b>Description</b>	<b>Qty.</b>	<b>Use</b>
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 RM 2600 Lift Arm Kit only)
Spring anchor	2	
Capscrew, 1/4 x 3/4 in.	4	
Locknut	4	
Key	2	
Hydraulic reservoir plug	1	
Warning decal	1	Affix to air cleaner housing for European compliance.
Warning decal	1	Affix to skirt for European compliance.
Danger decal	1	Affix to battery for European compliance.
Parts catalog	1	
Certificate of compliance	1	
Operator video	1	View before operating the machine.
Operator's manual	2	Read before operating the machine.
Engine operator's manual	1	
Registration card	1	Fill out and return to Toro.

# Installing the Rear Wheel

## Model 03422—Two Wheel Drive

Mount the wheel assembly to the rear castor fork with 2 flat washers, axle, and locknut. Position the washers on the outside of the fork (Fig. 1). Tighten the nut to 45–65 ft.-lb. (3–5 N·m).

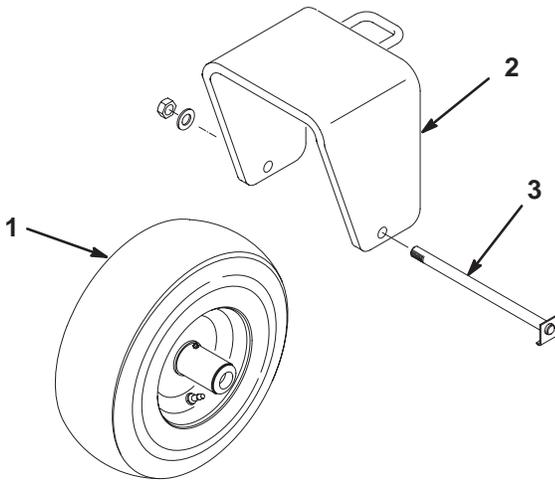


Figure 1

- 1. Wheel assembly
- 2. Rear castor fork
- 3. Axle

## Model 03427—Three Wheel Drive

1. Mount the wheel assembly onto the rear wheel hub (Fig. 2).

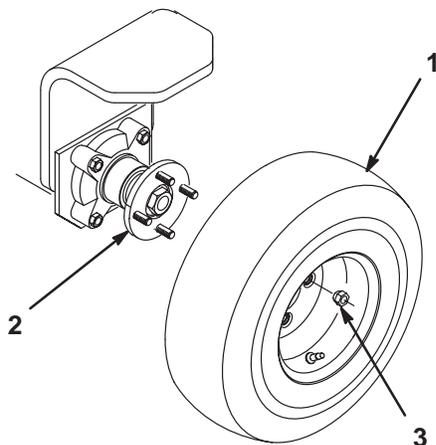


Figure 2

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

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

# Installing the Seat

The traction unit is shipped without the seat assembly. Deluxe Seat Kit, Model 30797, or Standard Seat Kit, Model 30796, must be installed as follows:

1. Remove the shipping ties securing the lower seat slides to the upper seat slides. Note the orientation of the lower slides for correct reinstallation (Fig. 3).

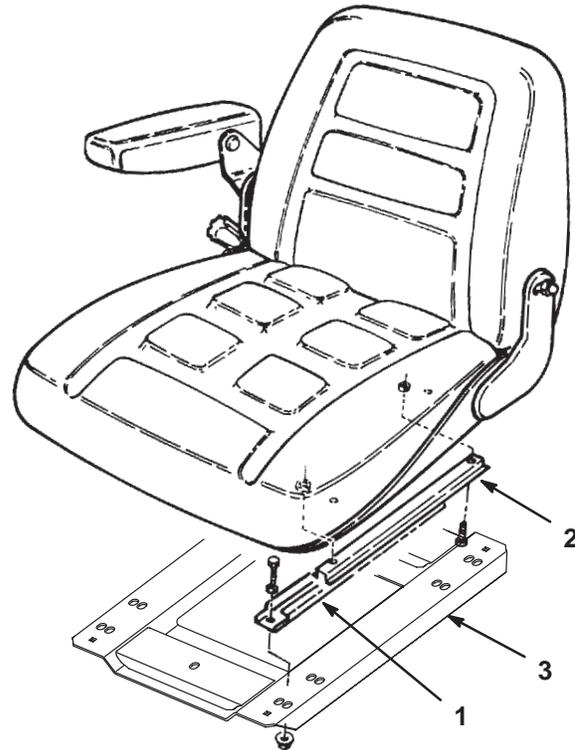


Figure 3

- 1. Lower seat slide
- 2. Upper seat slide
- 3. Seat plate

2. Insert the lower slides onto the upper slides (Fig. 3).

3. On the Deluxe Seat, check the alignment of the mounting holes with the seat plate. If the holes do not align, remove the machine screws securing the upper slides to the seat bottom. Move the seat slides inward to the next set of mounting holes and secure them with the machine screws and 4 locknuts (M8). Apply Loctite to the fasteners.

4. Loosely secure slides to seat plate with fasteners supplied with seat (Fig. 3).

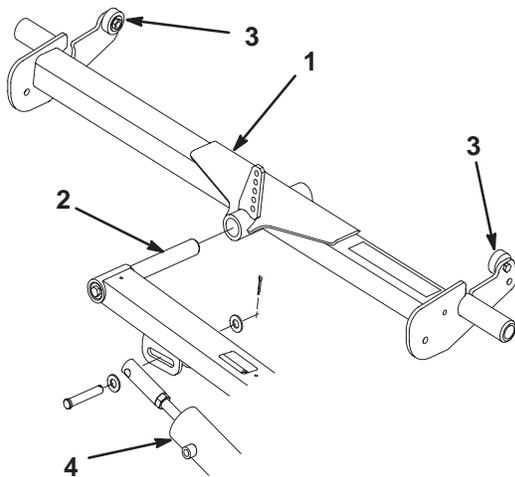
**Note:** Mount the seat in the forward holes to attain forward adjustment.

5. Tighten the flange nuts and check the operation of the seat.

**Note:** For operators that are lightweight, (less than 150 lb. [68 kg]) and short in stature (less than 5 ft.-4 in. [163 cm] tall), an optional weight kit (Toro part no. 80-4210) for seat model 30796 is available from your Authorized Toro Distributor.

## Adjusting the Rear Carrier Frame Height

1. Slide the rear carrier frame onto the rear lift arm pivot rod (Fig. 4). **Do not** install the carrier frame to the cutting unit at this time.



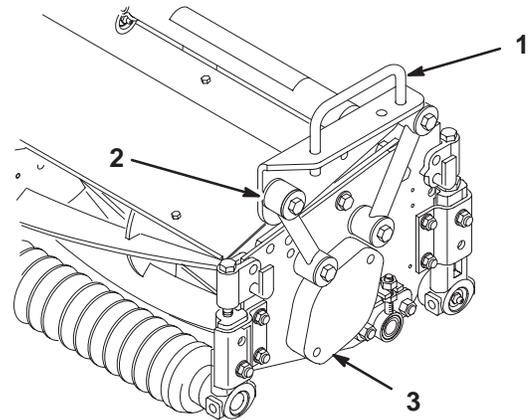
**Figure 4**

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

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. 4). 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.
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. 4).
  - 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. 4).

## 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. 5).
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 5. Position a washer on each side of the link when mounting. Torque to 31 ft.-lb. (42 N·m).

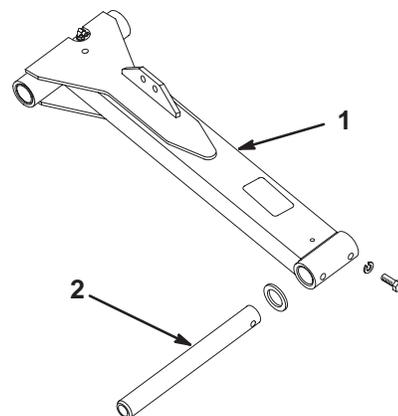


**Figure 5**

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

## Installing the Front Lift Arms

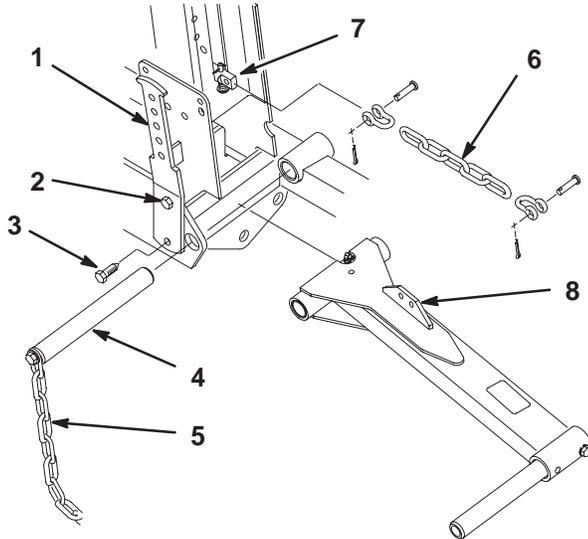
1. Insert a pivot rod into the left lift arm and align the mounting holes (Fig. 6).
2. Secure the pivot rod to the lift arm with a capscrew (5/16 x 7/8 in.) and lock washer.



**Figure 6**

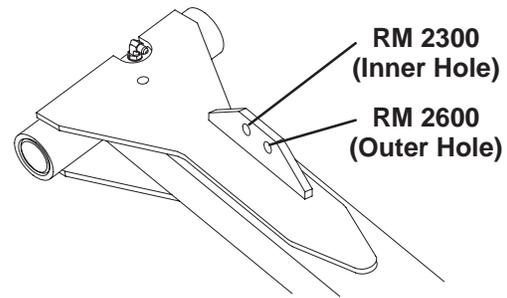
- |             |              |
|-------------|--------------|
| 1. Lift arm | 2. Pivot rod |
|-------------|--------------|

- Loosen the top capscrew securing the left counterbalance arm to the frame (Fig. 7).
- Remove the bottom capscrew and nut securing the left counterbalance arm to the frame (Fig. 7).
- Rotate the counterbalance arm outward, allowing removal of the lift arm pivot pin and tipper chain (Fig. 7).



**Figure 7**

- |                       |                 |
|-----------------------|-----------------|
| 1. Counterbalance arm | 5. Tipper chain |
| 2. Top capscrew       | 6. Cylinder pin |
| 3. Bottom capscrew    | 7. Lift arm tab |
| 4. Lift arm pivot pin |                 |
- Position the lift arm between the frame members, align the mounting holes, and install the pivot pin (Fig. 7). 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.
  - Secure one end of the lift chain to the lift cylinder pin with a clevis pin and cotter pin.
  - 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 8.
  - Repeat the procedure on the right-hand lift arm.

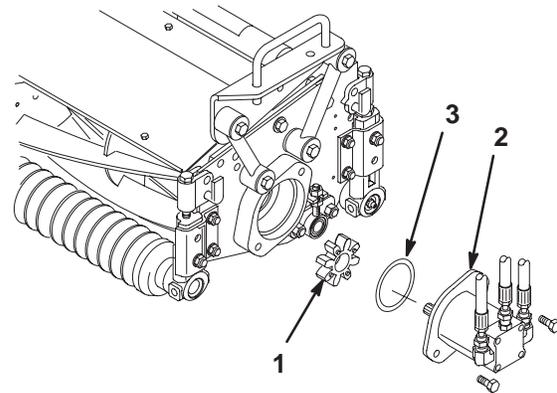


**Figure 8**

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

## Mounting the Cutting Unit Drive Motors

- Position the cutting units in front of the pivot rods.
- Remove the bearing housing cover (Fig. 5) 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. 9) shipped in the bearing housing.
- Insert the o-ring (supplied with the cutting unit) on the flange of the drive motor (Fig. 9).
- 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. 9).
- On the center and left-hand cutting units, remove the bearing housing cover and install the gasket (supplied with the cutting units).



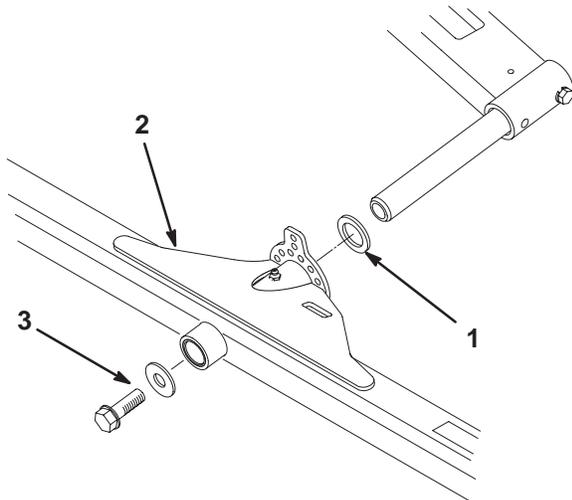
**Figure 9**

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

## Mounting the Cutting Units

1. Slide a thrust washer onto the lift arm pivot rod (Fig. 10).
2. Slide the cutting unit carrier frame onto the pivot rod and secure it with a flat washer and flange head capscrew (Fig. 10).

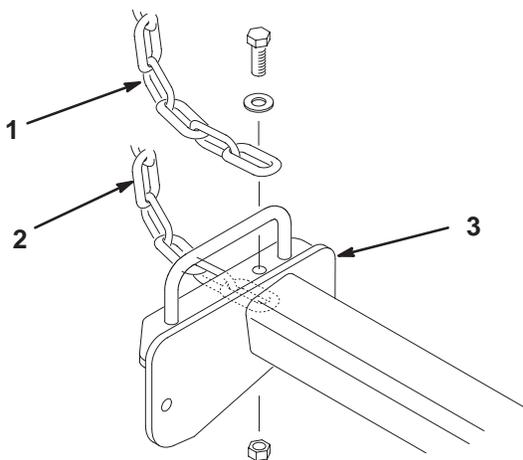
**Note:** On the rear cutting unit, position the thrust washer between the rear of the carrier frame and the flat washer.



**Figure 10**

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

3. Secure a tipper chain to the top of each Reelmaster 2300 carrier frame and to the bottom of each Reelmaster 2600 carrier frame with a capscrew, washer, and locknut (Fig. 11).



**Figure 11**

- |                           |                  |
|---------------------------|------------------|
| 1. Tipper chain (RM 2300) | 3. Carrier frame |
| 2. Tipper chain (RM 2600) |                  |

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.

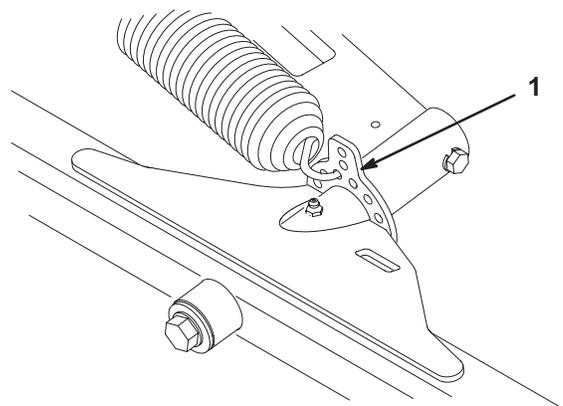
The following are recommended settings for the counterbalance springs. Minor changes may be required to achieve optimum performance for your turf conditions. The weight, at each end of the cutting unit, can be checked easily with a spring scale.

- **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.

### Reelmaster 2300

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. 12).

**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 12**

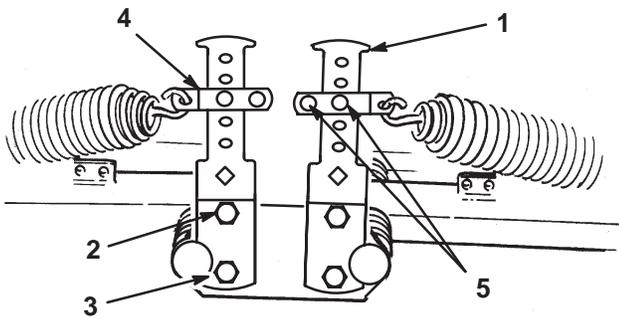
1. Cutting unit lift tab

2. Secure the other end of the spring to the appropriate hole (see below) on the front and rear counterbalance arms (Fig. 13 & 14) 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

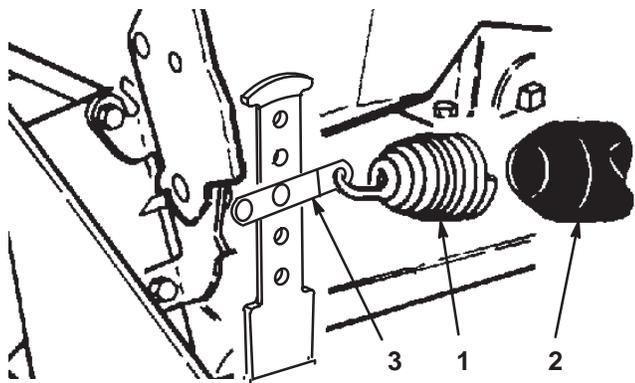
**Note:** On the rear counterbalance spring, install the vinyl cover over the spring before installing.

**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 13**

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



**Figure 14**

- |                               |                |
|-------------------------------|----------------|
| 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. 13).

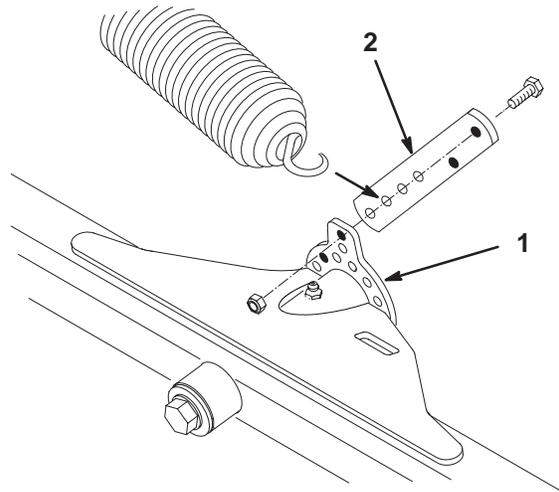
5. To tension the counterbalance springs, proceed as follows:

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.

## Reelmaster 2600

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 15.



**Figure 15**

- |                          |                  |
|--------------------------|------------------|
| 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. 15).

**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.

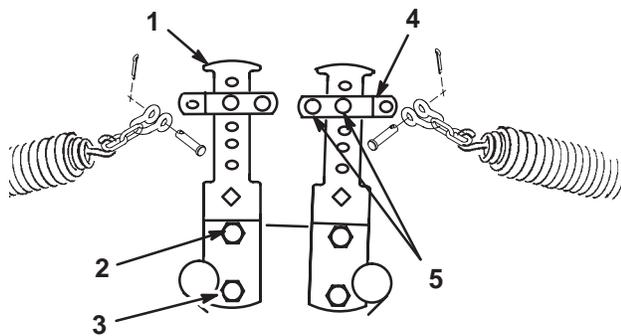
**Note:** Increasing the spring tension will reduce the weight on the inboard end of the cutting unit, increase the weight on the outboard end of the cutting unit, and increase traction. Decreasing the spring tension has the opposite affect.

4. Secure the other end of the spring to the appropriate hole (see below) on the front and rear counterbalance arms (Fig. 16 & 17) 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

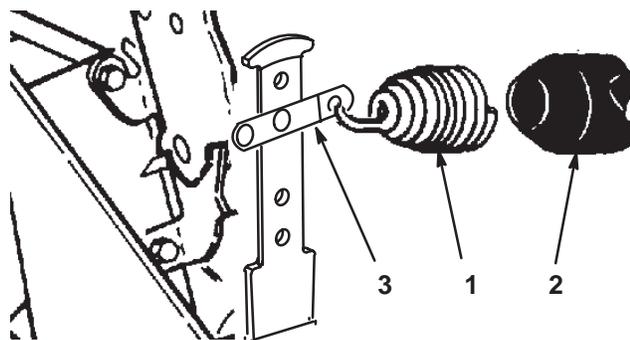
**Note:** On rear counterbalance spring, install vinyl cover over spring before installing.

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. 16).
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. 17).



**Figure 16**

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



**Figure 17**

- |                               |                |
|-------------------------------|----------------|
| 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. 16).

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 ANSI B71.4–1990 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
RM 2300D—2WD	(1) 83-9370, (1) 83-9390
RM 2300D—2WD with Baskets	(1) 83-9370, (1) 83-9390, (1) 94-5974
RM 2300D—3WD	(1) 83-9390, (1) 94-3663
RM 2300D—3WD with Baskets	(2) 83-9390, (1) 94-3663
RM 2600D—2WD	(2) 83-9390, (1) 94-3663
RM 2600D—3WD	(1) 83-9370, (1) 83-9390

**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).

## Affixing the Decals

Using the dimensions shown in Figure 18, locate and affix a Reelmaster 2300 or 2600 decal to the skirt on each side of the machine.

To ease installation of decal use the following procedure:

1. In a spray bottle, mix 1 ounce of liquid soap and 20 ounces of water.
2. Spray the skirt panel with the soap solution, peel the backing off of the decal, position the decal on the skirt, and adjust as necessary.
3. Run a plastic squeegee over the decal to remove any excess soap solution.
4. Peel the front cover paper off of the decal.

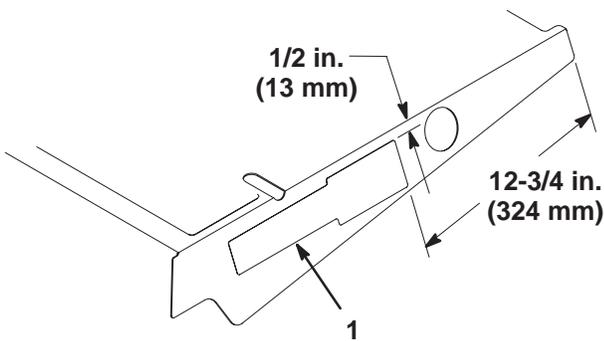


Figure 18

1. Decal

## Activating and Charging the Battery



### 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. 19) 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.**

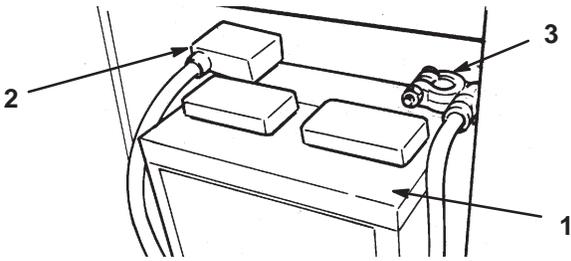


Figure 19

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

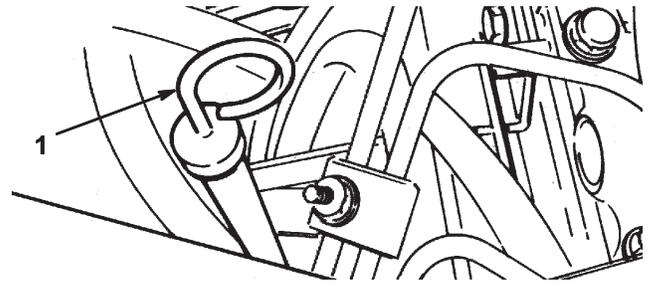


Figure 20

1. Dipstick

## Before Operating



### Caution



If you leave the key in the ignition switch, someone could accidentally 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.

3. If the oil level is low, remove the oil fill cap (Fig. 21) and gradually add small quantities of oil, checking the level frequently, until the level reaches the FULL mark on the dipstick.

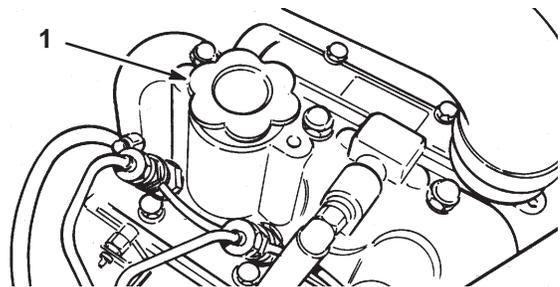


Figure 21

1. Oil fill cap

## Checking the Crankcase Oil

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

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 qts. (2.8 l) with the filter.

The engine uses any high-quality 10W30 detergent oil having the American Petroleum Institute (API) “service classification” CD.

1. Position the machine on a level surface.
2. Remove the dipstick (Fig. 20) and wipe it with a clean rag. Push the dipstick down into the dipstick tube and make sure it is seated fully. Pull the dipstick out and check the oil level.

## 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. 22).

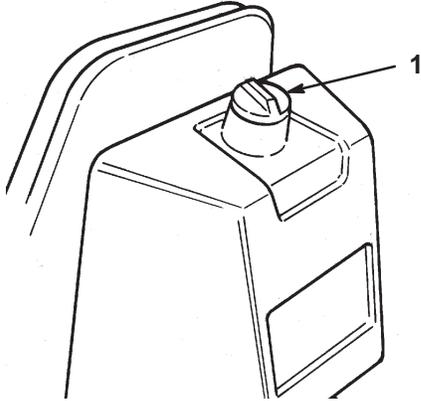


Figure 22

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, radiator, and oil cooler (Fig. 23) daily or hourly if conditions are extremely dusty and dirty; refer to Cleaning the Radiator and Screen, page 36.

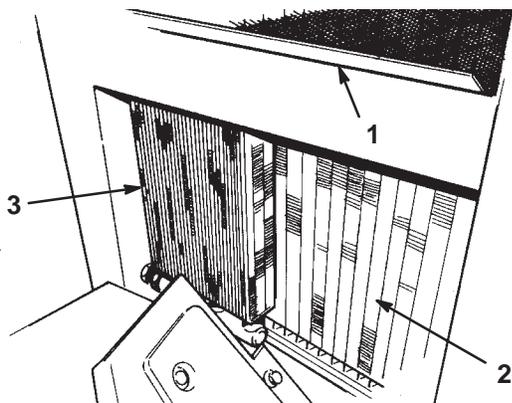


Figure 23

1. Radiator screen
2. Radiator
3. 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. 24).

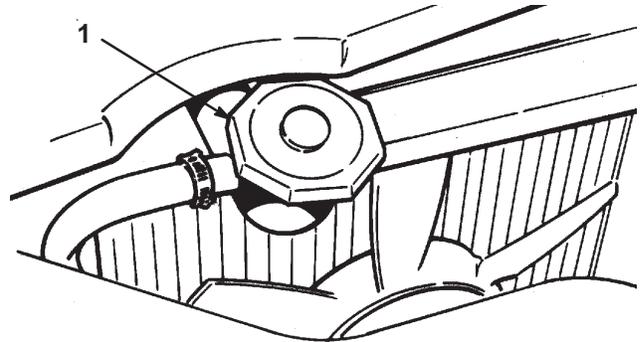


Figure 24

1. Radiator cap

2. Check the coolant level in the radiator. The radiator should be filled to the middle of the horizontal filler neck.
3. If the coolant level is low, replenish the system. **Do not overfill.**
4. Install the radiator cap.

## Checking the Hydraulic System Fluid

The hydraulic system is designed to operate on anti-wear hydraulic fluid. The hydraulic reservoir is filled at the factory with approximately 3.3 gallons (12.5 l) of Mobil 424 hydraulic fluid. **Check the level of hydraulic fluid before the engine is first started and daily thereafter.**

### Group 1 Hydraulic Fluid (Recommended for ambient temperatures consistently below 100°F.):

**Note:** The fluids within this group are interchangeable.

#### ISO type 46/68 anti-wear hydraulic fluid

Mobil  
Amoco

Mobil Fluid 424  
Amoco 1000

International Harvester	Hy-Tran
Texaco	TDH
Shell	Donax TD
Union Oil	Hydraulic/Tractor Fluid
Chevron	Tractor Hydraulic Fluid
BP Oil	BP HYD TF
Boron Oil	Eldoran UTH
Exxon	Torque Fluid
Conoco	Power-Tran 3
Kendall	Hyken 052
Phillips	HG Fluid

## Group 2 Hydraulic Fluid (Biodegradable):

### ISO VG 32/46 anti-wear hydraulic fluid

Mobil EAL 224H

**Important** Due to the nature of biodegradable fluids, it is critical that the fluid be changed at the recommended intervals or severe hydraulic component damage may occur.

**Note:** The fluid in this group is not compatible with the fluids in group 1.

**Important** These hydraulic fluids are specified to allow optimal operation of the machine in a wide range of temperatures encountered. The group 1 fluids are a multi-viscosity hydraulic fluids which allows operation at lower temperatures without the increased viscosity, which is associated with straight viscosity fluids.

**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.

**Important** Use only types of hydraulic fluids specified. Other fluids could cause system damage.

**Note:** A red dye additive for the hydraulic system fluid is available in 2/3 oz bottles. One bottle is sufficient for 4-6 gal. of hydraulic oil. Order Part No. 44-2500 from your Authorized Toro Distributor.

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.
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 Mobil 424 or equivalent hydraulic fluid until the level in it reaches the bottom of the sight gauge. **Do not overfill.**

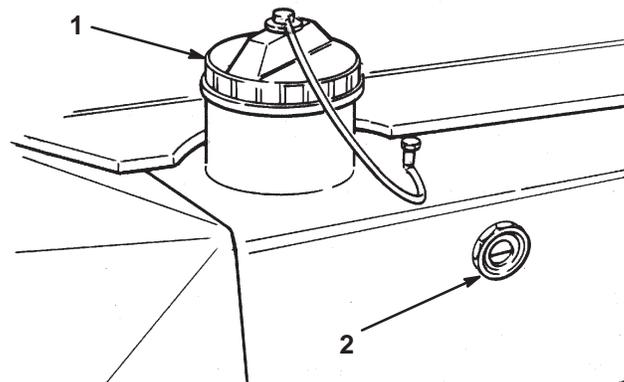


Figure 25

1. Hydraulic reservoir cap
2. Sight gauge

**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.

## Inspecting the Fuel Filter

Inspect the fuel filter bowl daily for water or other contaminants. If water or other contaminants are present, they must be removed before commencing operation.

1. Close the fuel shut-off above the filter (Fig. 26).
2. Unscrew the nut securing the bowl to the filter head. Remove water or other contaminants from the bowl.

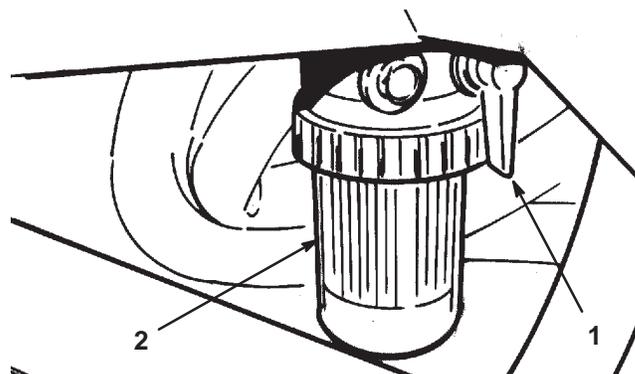


Figure 26

1. Fuel shut-off
2. Fuel filter

3. Inspect the fuel filter and replace it if it is dirty; refer to Replacing the Fuel Filter, page 37.

4. Install the bowl to the filter head. Make sure that the o-ring is positioned properly between the bowl mounting nut and filter head.
5. Open the fuel shut-off above the filter.
6. Open the bleed screw on the filter mounting, allowing the bowl to fill with fuel. Close the bleed screw.

## 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. 27) 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. 28). Also, allow the pedal to move or move it to the neutral position to stop the machine. For operator comfort, do not rest heel of your foot on reverse when operating forward.

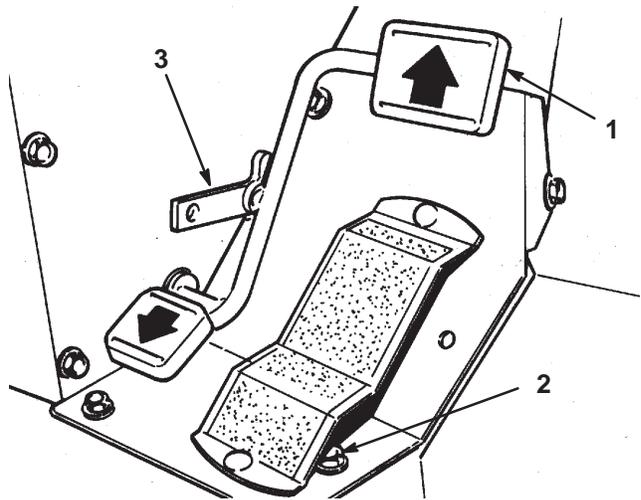


Figure 27

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

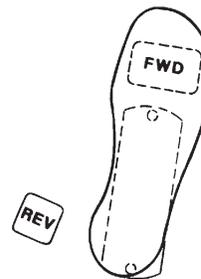


Figure 28

### Speed Selector

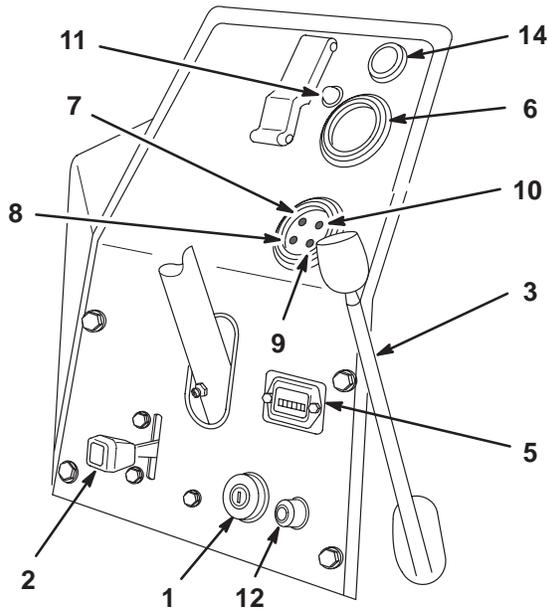
The speed selector is a cam lever at the side of the traction pedal (Fig. 27) that can be rotated to maintain desired speed.

The reverse pedal stop (under the pedal) (Fig. 27) is set at the factory to provide 3 MPH maximum speed in reverse.

### Starter Switch

The starter switch (Fig. 29), used to start, stop, and preheat the engine, has four positions: OFF, ON, START and GLOW PLUGS (PREHEAT). Rotate the key counterclockwise (GLOW PLUG position) and hold for approximately 20 to 30 seconds. 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 and install the switch cover (Fig. 29) to prevent accidental starting.



**Figure 29**

- |                              |  |
|------------------------------|--|
| 1. Starter switch and cover  | 8. Alternator light                        |
| 2. Throttle                  | 9. Glow plug indicator light               |
| 3. Cutting unit lift lever   | 10. High water temperature shut-down light |
| 4. Cutting unit drive switch | 11. Reel operating light                   |
| 5. Hour meter                | 12. Cold start button                      |
| 6. Water temperature gauge   |  |
| 7. Oil pressure light        |  |

## Throttle

Moving the throttle (Fig. 29) upward increases the engine speed and downward decreases the engine speed.

## Cutting Unit Lift Lever

The lift lever (Fig. 29) 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. To decrease play in the lever, tighten the retaining locknut.

## Cutting Unit Drive Switch

The switch (Fig. 29) has two positions: ENGAGE and DISENGAGE. The push-pull switch operates a solenoid valve on the valve bank, to drive the cutting units. A yellow light on the dash indicates when the reels are rotating.

## 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.

## Temperature Gauge

The temperature gauge (Fig. 29) registers coolant temperature in the system.

## 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.

## 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.

## Cold Start Button

When starting a cold engine, press the cold start button (Fig. 29) to electrically de-clutch the traction pump. When the engine starts, release the button.

## 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.

## Drive Engagement Control (Model 03426 Only)

The drive engagement control is located on the lower left side of the operator (Fig. 30). Pull the knob out for 2 wheel drive; push the knob in for 3 wheel drive.

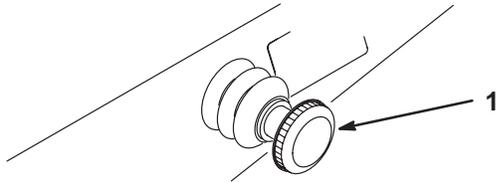


Figure 30

1. Drive engagement control—pull out for two wheel drive; push in for three wheel drive

## Reel Speed Control

To obtain the desired clip rate (reel speed), rotate the reel speed control knob (Fig. 31) to the appropriate setting for the height-of-cut setting and mower speed; refer to Selecting the Clip Rate, page 29.

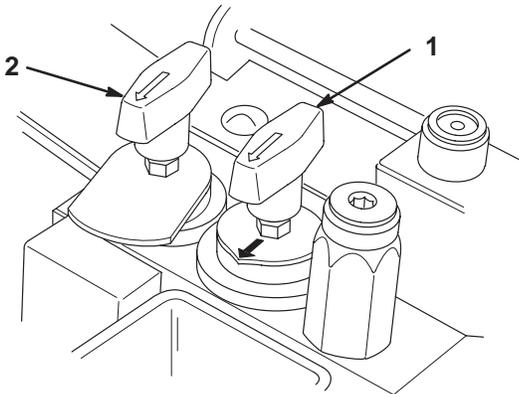


Figure 31

1. Reel speed control
2. Backlap control

## Seat Adjustments

Fore and Aft Adjustment (Fig. 32)—Move the lever on the side of the seat outward, slide the seat to the desired position, and release the lever to lock the seat into position.

## Deluxe Seat Adjustments

Weight Adjustment (Fig. 32)—Push the lever up or down to adjust to the operator's weight. Lever up for a light operator, lever in middle position for a medium weight operator, or lever down for a heavy operator.

Inclining Backrest (Fig. 32)—Turn the handle to adjust the angle of the backrest (Deluxe Seat only).

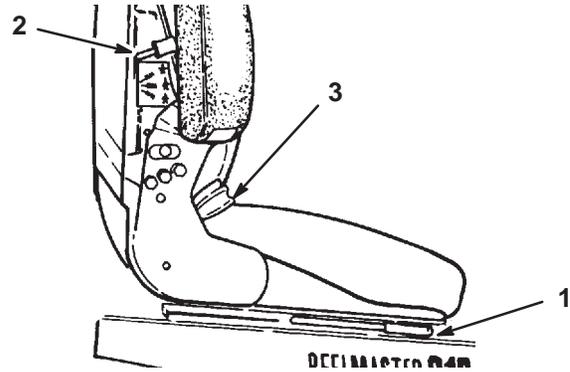


Figure 32

1. Fore and aft lever
2. Weight adjustment lever
3. Inclining backrest

## Backlap Control

Rotate the knob (Fig. 31) clockwise for backlapping and counterclockwise for mowing. Do not change the knob position when the reels are rotating.

## Fuel Shut-Off Valves

Close the fuel shut-off valves, under the fuel tank (Fig. 33) and on the fuel filter (Fig. 34), when storing the machine.

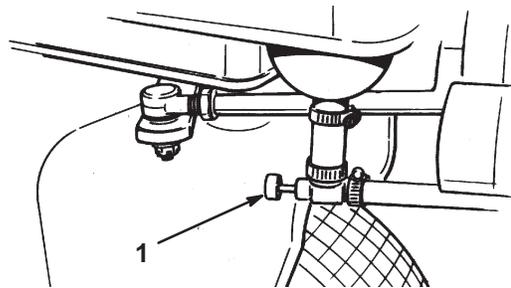


Figure 33

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

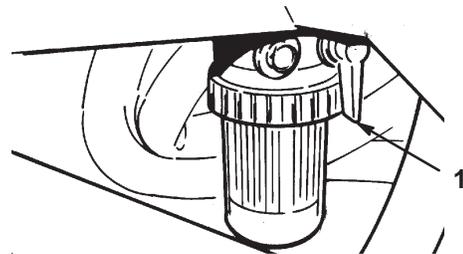


Figure 34

1. Fuel shut-off (on the fuel filter)

# 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, page 27.

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. Remove the cover from the starter switch. Insert the key into the switch and rotate it counterclockwise (GLOW PLUG position). Hold it for approximately 20 to 30 seconds, 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.

**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. **For cold weather starting**, press the cold start button to de-clutch the electric traction pump. When the engine starts, release the button.
6. 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.**

7. 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 and install the switch cover to prevent accidental starting.

8. Close the fuel shut-off valves before storing the machine.

# Bleeding the Fuel System

1. Park the machine on a level surface. Make sure that the fuel tank is at least half full.
2. Unlatch and raise the hood.



## 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.

3. Open the fuel shut-off valve under the fuel tank and on the fuel filter (Fig. 35).
4. Open the 2 bleed screws on the side of the fuel filter mounting head (Fig. 35), allowing the bowl to fill with fuel. Close the bleed screws when the bowl is filled.

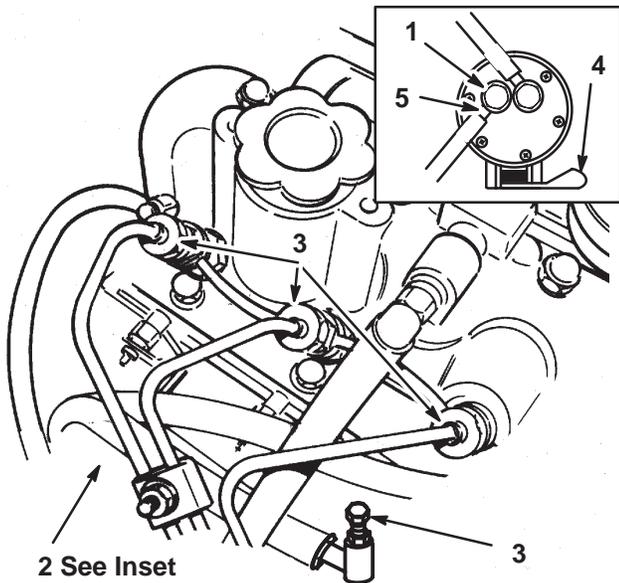


Figure 35

1. Fuel shut-off
2. Bleed screws (2)
3. Bowl

5. On the front of the engine (by the oil filter) locate the transfer pump inlet screw. Note the angle of the fitting on the transfer pump inlet and loosen the screw (left screw only).

6. When a steady stream of fuel flows out of the transfer pump screw, tighten the screw, retaining the angle of the fitting before loosening (Fig. 36).
7. Loosen the injection pump inlet screw on the front of the engine (Fig. 36).
8. Pump the priming lever (Fig. 36) until a steady stream of fuel flows out of the injection pump inlet screw, then tighten the screw. Do not over-tighten the screw as damage may occur.
9. Start the engine. If it still does not run smoothly after several minutes, crack each injector nut until fuel (no bubbles) comes out.



**Figure 36**

- |                                       |                                |
|---------------------------------------|--------------------------------|
| 1. Transfer pump screw                | 4. Priming lever               |
| 2. Transfer pump inlet screw location | 5. Note fitting angle location |
| 3. Injection pump inlet screw         | 6. Injector nuts               |

## 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.
- Replace switches every two years regardless of whether they are operating properly or not.

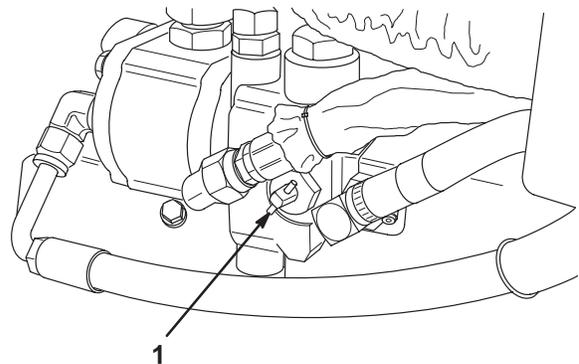
1. Be sure that the parking brake is set and all bystanders are away from the area of operation. Keep hands and feet away from the cutting units.
2. With the operator off of the seat, the backlap knob rotated counterclockwise, the traction pedal in neutral, and the reel switch in the OFF position, the 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 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.
5. 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. 37) and rotate it 90° (the bypass valve lever should be horizontal when it is open).



**Figure 37**

1. Bypass valve

- 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 and choices of two or three wheel drive (model 03427 only), 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. Use the Slope Chart, page 9, to assist in determining slope angles of questionable areas. 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)

		3WD		2WD				3WD		2WD		
		3WD	2WD	3WD	2WD			3WD	2WD	3WD	2WD	
		2 1/2" (64mm) - 2 3/8" (60mm)	3	5	-	3		1 1/2" (32 mm)	7	-	4	6
		2 1/4" (57mm) - 2 1/2" (54mm)	4	5	-	3		1 1/8" (29 mm)	7	-	5	7
		2" (51 mm)	4	6	-	3		1" (25 mm)	8	-	5	9
		1 7/8" (48 mm)	4	6	3	4		7/8" (22 mm)	9	-	6	-
		1 3/4" (44mm) - 1 3/8" (41mm)	5	7	3	4		3/4" (19 mm)	-	-	7	-
		1 1/2" (38mm) - 1 3/8" (35mm)	6	-	4	5		5/8" (16mm) - 3/8" (10mm)	-	-	9	-

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:

- 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.
- Turn the reel speed control knob (Fig. 38) to the number setting determined in step 1.

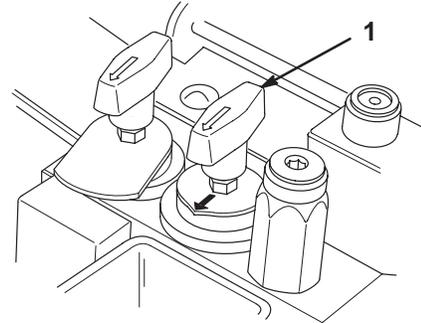


Figure 38

- Reel speed control
- 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.

# 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	<ul style="list-style-type: none"> <li>• Change the engine oil.</li> <li>• Check the engine belt tension.</li> <li>• Change the engine oil filter.</li> <li>• Check the traction belt tension.</li> <li>• Replace the hydraulic filter.</li> <li>• Torque the wheel lug nuts.</li> </ul>
After first 50 hours	<ul style="list-style-type: none"> <li>• Check the engine RPM (idle and full throttle).</li> </ul>
Every 50 hours	<ul style="list-style-type: none"> <li>• Inspect the air filter, dust cup, and burp valve.</li> <li>• Lubricate all grease fittings.</li> <li>• Change the engine oil.</li> <li>• Check the engine belt tension.</li> </ul>
Every 100 hours	<ul style="list-style-type: none"> <li>• Change the engine oil filter.</li> <li>• Check the traction belt tension.</li> </ul>
Every 200 hours	<ul style="list-style-type: none"> <li>• Service the air filter.</li> <li>• Replace the fuel filter/water separator.</li> <li>• Replace the hydraulic filter.</li> <li>• Torque the wheel lug nuts.</li> </ul>
Every 400 hours	<ul style="list-style-type: none"> <li>• Replace the hydraulic fluid.</li> <li>• Check the battery level and connections.</li> <li>• Inspect the traction linkage movement.</li> <li>• Check the engine RPM (idle and full throttle).</li> </ul>
Every 1000 hours or 2 years, whichever occurs first	<ul style="list-style-type: none"> <li>• Replace moving hoses.</li> <li>• Replace the safety switches.</li> <li>• Flush the cooling system and replace the hoses.</li> <li>• Replace the thermostat.</li> <li>• Drain and flush the fuel tank.</li> <li>• Drain and flush the hydraulic tank.</li> </ul>

**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 radiator and screen for debris.							
Check for unusual engine noises. <sup>1</sup>							
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. <sup>2</sup>							
Touch up damaged paint.							

<sup>1</sup>Check the glow plug and injector nozzles, if hard starting, excess smoke, or rough running is noted.

<sup>2</sup>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

**CUTTING UNITS** OPTIONAL FRONT ROLLER

**TRACTION UNIT**

**QUICK REFERENCE AID**

**CHECK/SERVICE**

- ENGINE OIL LEVEL
- ENGINE OIL DRAIN (17mm socket)
- HYDRAULIC OIL LEVEL  
- bottom of sight glass
- BELTS (Fan/Water Pump, Hydraulic Pump)
- COOLANT LEVEL FILL-middle of horiz neck
- FUEL - Diesel Only
- GREASE POINTS (every 50 hours) -- 17-3WD; 18-2WD
- GREASE POINTS (every 8 hours) -- 12 or 18 (with optional front roller)
- RADIATOR SCREEN
- AIR CLEANER
- WATER SEPARATOR/FUEL FILTER
- BATTERY
- TIRE PRESSURE: 16-20 psi (1.1 - 1.4 bar)
- FUSES

**FLUID SPECIFICATIONS/CHANGE INTERVALS**

SEE OPERATOR'S MANUAL FOR INITIAL CHANGES.	FLUID TYPE	CAPACITY		CHANGE INTERVAL		FILTER PART NO.
		L	QT	FLUID	FILTER	
ENGINE OIL	SAE10W-30CD	2.8	3.0	50 HRS	100 HRS	85-4930 (A)
HYD. CIRCUIT OIL	HYDRAULIC OIL	12.5	13	500 HRS	500 HRS	54-0110 (B)
FUEL FILTER	Inspect daily for contaminants & water			200 HRS		Paridns 13030041 (C)
AIR CLEANER	Clean every 50 hours.			200 HRS		93-2195 (D)
FUEL	NO. 2-Diesel	24.5	6.5 GAL	Drain and flush, 2 yrs.		
COOLANT	50-50 Ethylene glycol water	4.7	5			

93-6903

**Caution**

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

Remove the key from the ignition 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. 39), steering gears (2) (under the skirt below the steering sector), steering shaft (2) (Fig. 40), lift arms (3) (Fig. 41), pivot rods (3) (Fig. 42), rear lift cylinder pivot (Fig. 43), traction pedal pivot (Fig. 44) and rear wheel (2WD only) (Fig. 45)

Also, apply grease to slots in cylinder support (Fig. 46).

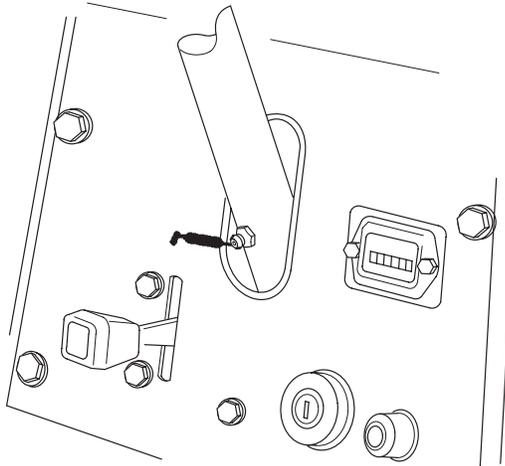


Figure 39

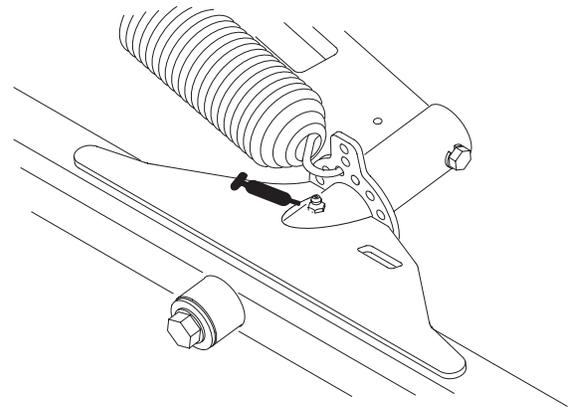


Figure 42

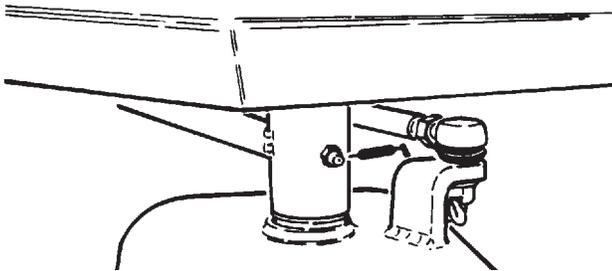


Figure 40

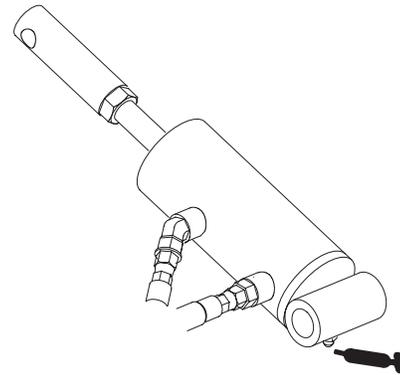


Figure 43

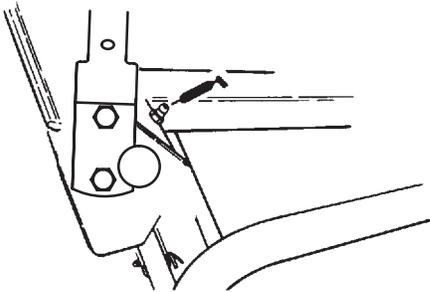


Figure 41

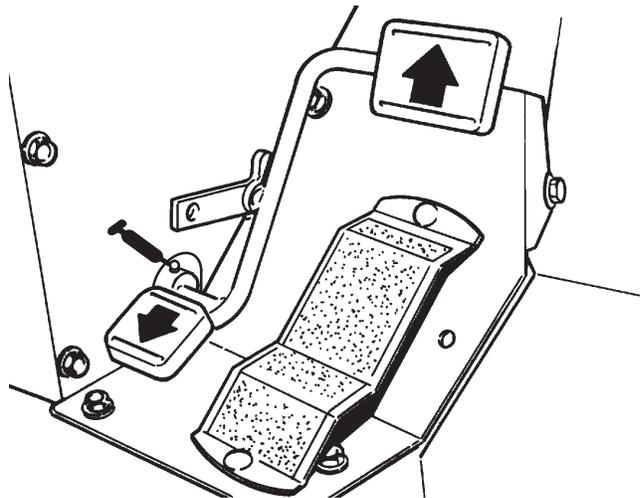


Figure 44

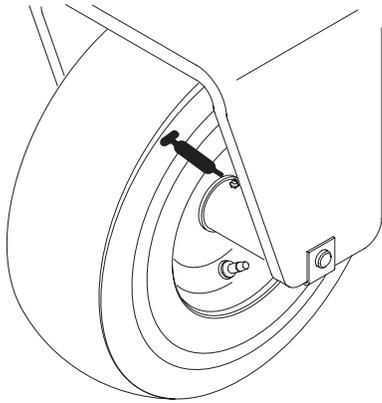


Figure 45

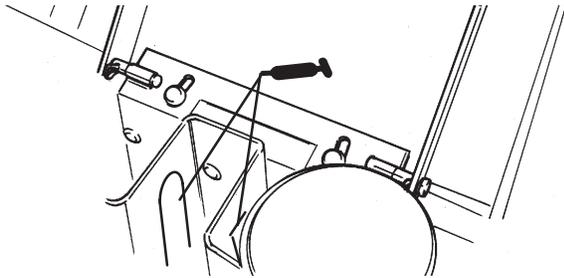


Figure 46

## 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. 47).

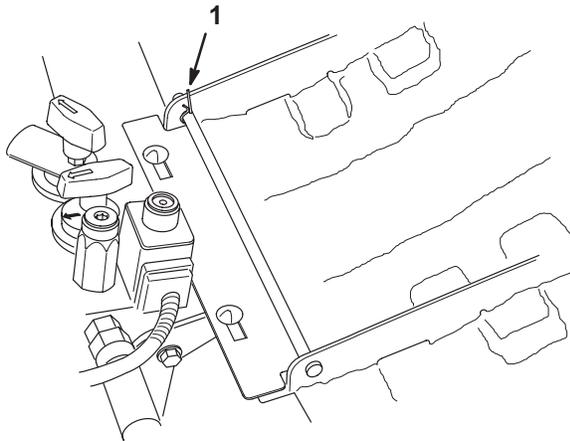


Figure 47

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 possibly cause an air leak. Replace a damaged air cleaner body.

Service the air cleaner filter every 400 hours (more frequently in extreme dusty or dirty conditions). Do not over-service the air filter.

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

## Servicing the Air Cleaner

1. Release the latches securing the air cleaner cover to the air cleaner body (Fig. 48). Separate the cover from the body. Clean the inside of the air cleaner cover.

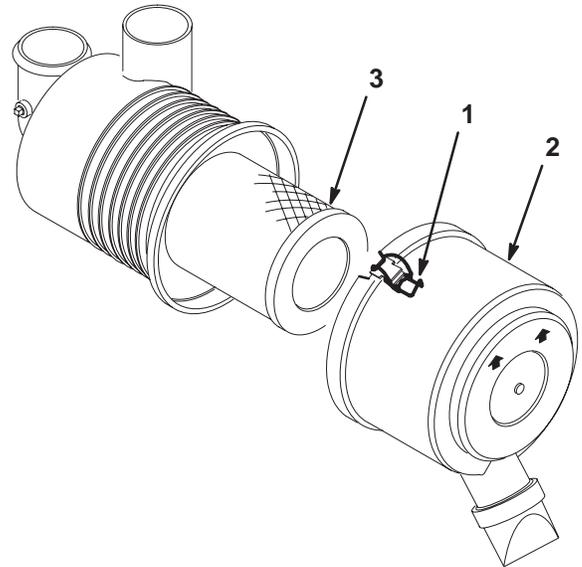


Figure 48

1. Air cleaner latches
  2. Dust cap
  3. Filter
2. Gently slide the filter out of the air cleaner body (Fig. 48) to reduce the amount of dust dislodged. Avoid knocking the filter against the air cleaner body.
  3. Inspect the filter and discard it if it is damaged. Do not wash or reuse a damaged filter.

#### 4. Washing Method

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

#### 5. Compressed Air Method

- A. Blow the compressed air from the inside to the outside of a dry filter element. Do not exceed 100 psi to prevent damage to the element.
  - B. Keep the air hose nozzle at least 2 in. (51 mm) from the filter and move the nozzle up and down while rotating the filter element. Inspect the filter for holes and tears by looking through the filter toward a bright light.
6. Inspect the new filter for shipping damage. Check the sealing end of the filter. Do not install a damaged filter.
  7. Insert the new filter properly into the air cleaner body. Make sure that the filter is sealed properly by applying pressure to the outer rim of the filter when installing. Do not press on the flexible center of the filter.
  8. Install the cover and secure the latches. Make sure that the cover is positioned with the TOP side up.

## 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 (Fig. 49).
2. Working from the fan side of the radiator, either spray the radiator with a hose or blow it with compressed air.

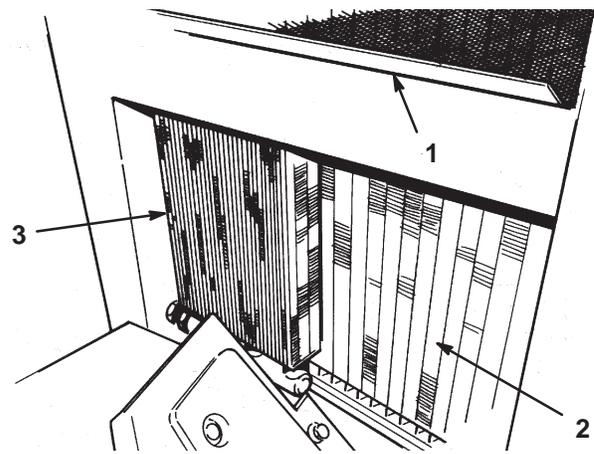


Figure 49

1. Radiator screen
2. Radiator
3. Oil cooler

3. Thoroughly clean the oil cooler (Fig. 49) and remove any other debris that may have collected around the components.
4. Clean the screen and install it.

## Changing the Engine Oil and Filter

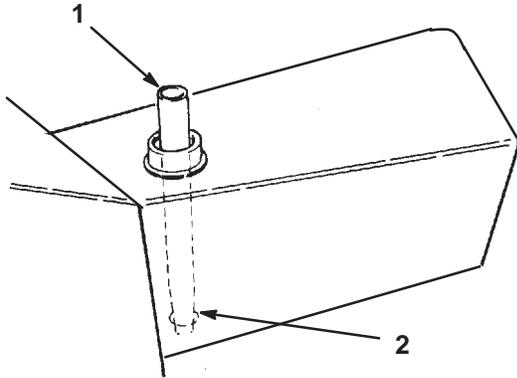
Change the oil and filter initially after the first 20 hours of operation. Thereafter, change the oil every 50 hours and the filter every 100 hours.

1. Locate the engine oil drain plug on the bottom of the oil pan. Remove the drain plug and let the oil flow into the drain pan. When the oil stops, install the drain plug.
2. Locate the engine filter on the front of the engine. Remove the oil filter. Apply a light coat of clean oil to the new filter seal before screwing it on. **Do not over-tighten.**
3. Add oil to the crankcase; refer to Checking the Crankcase Oil, page 21.

## 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.

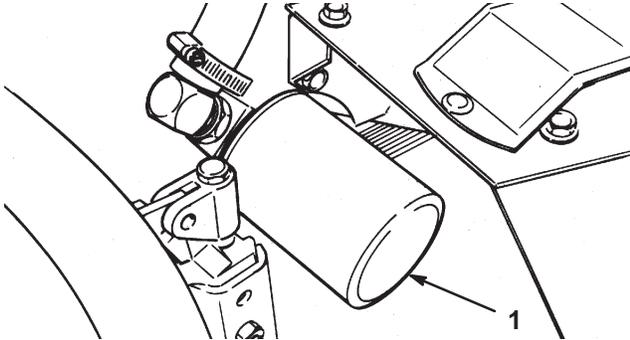
1. Park the machine on a level surface, lower the cutting units, set the parking brake, and turn the engine off.
2. If only the filter is to be changed, remove the reservoir cap and insert the reservoir plug (Fig. 50) to block the outlet. This will retain most of the fluid in the reservoir when the filter is removed.



**Figure 50**

1. Reservoir plug
2. Reservoir outlet

3. Clean the area around the hydraulic oil filter (Fig. 51). 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 51**

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 22.
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.

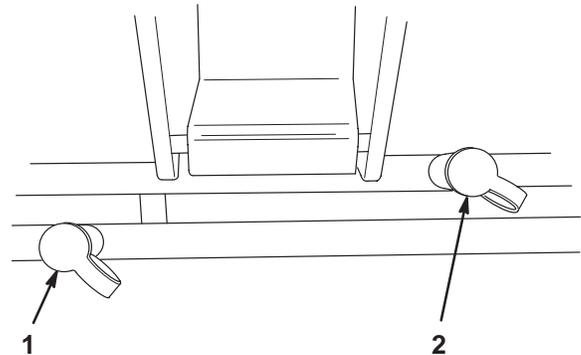
8. Stop the engine and check the oil level in the reservoir. Add oil if necessary.
9. Check all connections for leaks.

## 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. 52) is used to forward traction pressure.

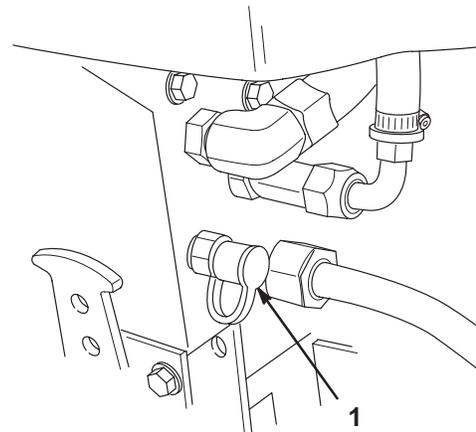
Test Port #2 (Fig. 52) is used to measure reverse traction pressure.



**Figure 52**

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

Test Port #3 (Fig. 53) is used to measure reel circuit pressure.



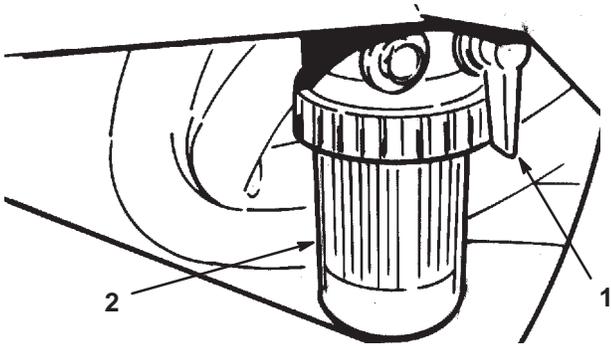
**Figure 53**

1. Test port #3

## Replacing the Fuel Filter

Inspect the fuel filter bowl daily for water or other contaminants. If water or other contaminants are present, they must be removed before commencing operation.

1. Close the fuel shut-off above the filter (Fig. 54).



**Figure 54**

1. Fuel shut-off                      2. Fuel filter

2. Unscrew the nut securing the bowl to the filter head. Remove water or other contaminants from the bowl.
3. Remove and inspect the fuel filter. Replace it if it is dirty.

⚠
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.

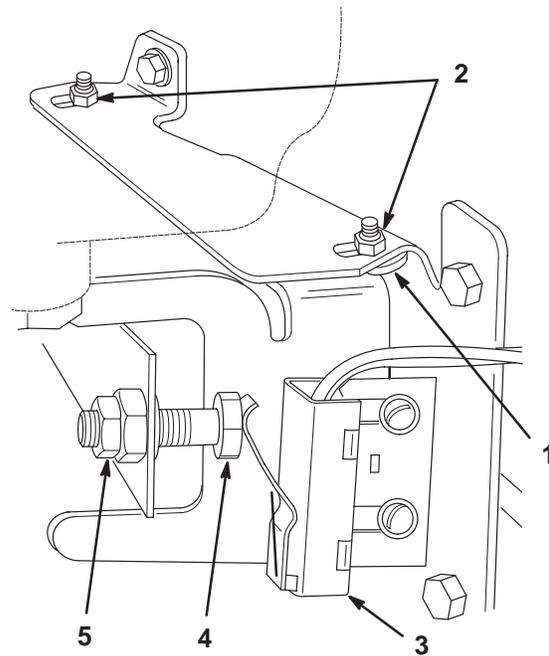
- Use a funnel and fill the fuel tank outdoors, in an open area, when the engine is off and is cold. Wipe up any fuel that spills.
- Do not fill the fuel tank completely full. Add fuel to the fuel tank until the level is 1 in. (25 mm) below the bottom of the filler neck. This empty space in the tank 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.

4. Install the bowl to the filter head. Make sure that the o-ring is positioned properly between the bowl mounting nut and filter head.
5. Open the fuel shut-off above the filter (Fig. 54).
6. Open the bleed screw on the filter mounting head to fill the bowl with fuel. Close the bleed screw.

## Adjusting the Transmission for Neutral

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

1. Block up under the frame so one of the front wheels is off of the floor. Place the selector control in the two wheel drive position.
2. Start the engine, move the throttle to SLOW, and check the front wheel that is off of shop floor; it must not be rotating. Loosen the pump plate nuts and rotate pump plate (Fig. 55) until creep does not occur in either direction. When the wheel stops rotating, tighten the nuts to lock the adjustment. Verify the adjustment with the throttle in the SLOW and FAST position.

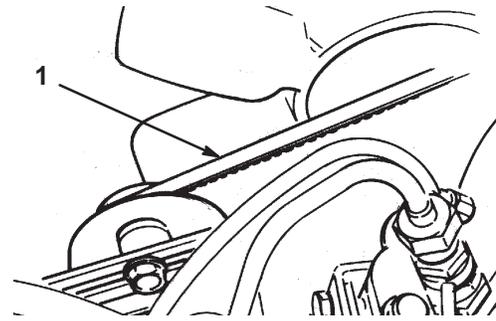


**Figure 55**

1. Pump plate                                      4. Adjusting screw  
 2. Pump plate mounting nuts              5. Locknut  
 3. Neutral switch

3. Should the wheel continue to rotate, check for the following:
  - A ball bearing is loose or worn out.
  - Loose or missing fasteners
  - Worn fasteners
  - The pump lever is loose on the control shaft.
  - The left springs are weak or damaged. Replace them.
  - Internal pump component malfunction

4. After adjusting the pump plate, check the neutral switch operation and, if necessary, adjust it as follows:
  - A. Loosen the locknut securing the switch adjusting screw. Thread it away from the switch until the capscrew head clears the switch.
  - B. Rotate the adjusting screw toward the switch until circuit through the switch is made. Then, turn the adjusting screw toward the switch an additional 2-1/2 turns.
  - C. Tighten the locknut



**Figure 57**

1. Engine belt

## Adjusting the Belts

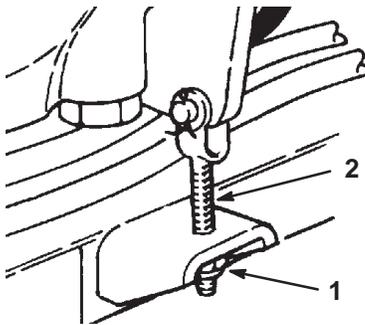
Make sure the belts are properly tensioned to ensure proper operation of the machine and prevent unnecessary wear. On new belts, check the tension after 8 hours operation.

### 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. 56) until the desired belt tension is attained.

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



**Figure 56**

1. Nut
2. Adjustment rod

### Engine Belt

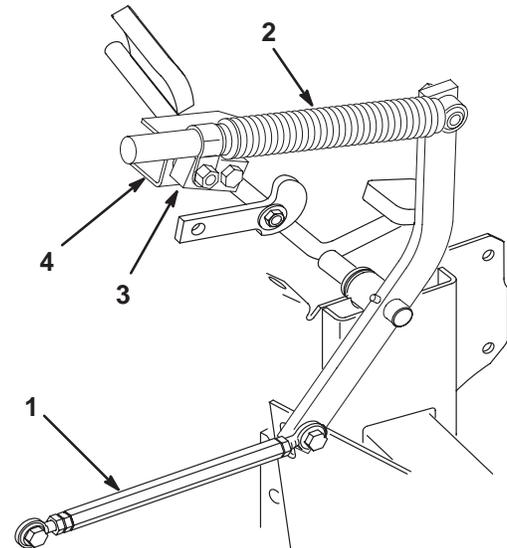
The engine belt should be tensioned so it deflects 0.2 inch with a 2–3 pound load applied midway between the crankshaft and alternator pulleys.

1. Loosen the bolts securing the alternator to the engine and adjusting strap.
2. Adjust the belt (Fig. 57) to the proper tension and tighten the bolts.

## 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 screws securing the right fender to the frame and remove the fender.
2. Loosen the jam nuts on each end of the traction rod (Fig. 58).



**Figure 58**

1. Traction rod
2. Damper
3. Damper pivot
4. Damper bracket

3. Rotate the rod until the required pedal clearance or traction speed is attained.
4. Tighten the jam nuts securing the traction rod 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.

## 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).
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.

## 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.

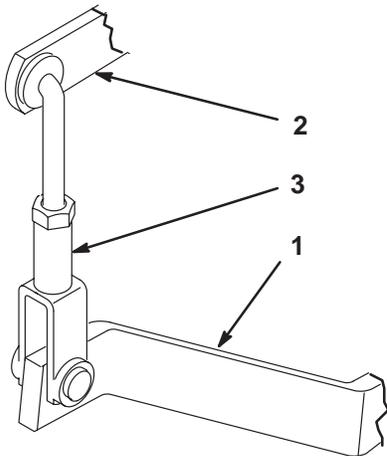


Figure 59

1. Lower brake lever
  2. Upper brake lever
  3. 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



**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).

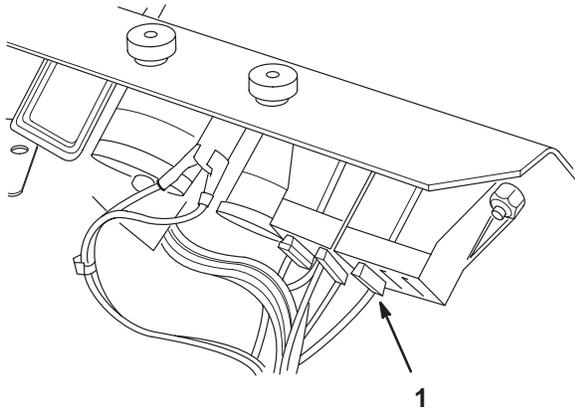


Figure 60

1. Fuses

CHARGING 20 A
ACCESSORIES 10 A
ENGINE 10 A
OPEN
FUSES

93-6902

## 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.

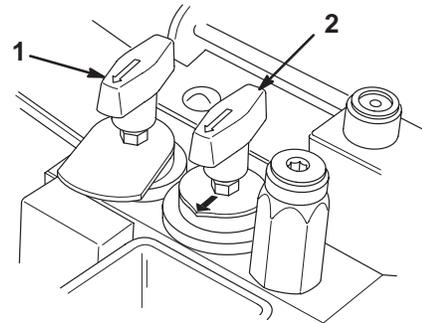


Figure 61

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



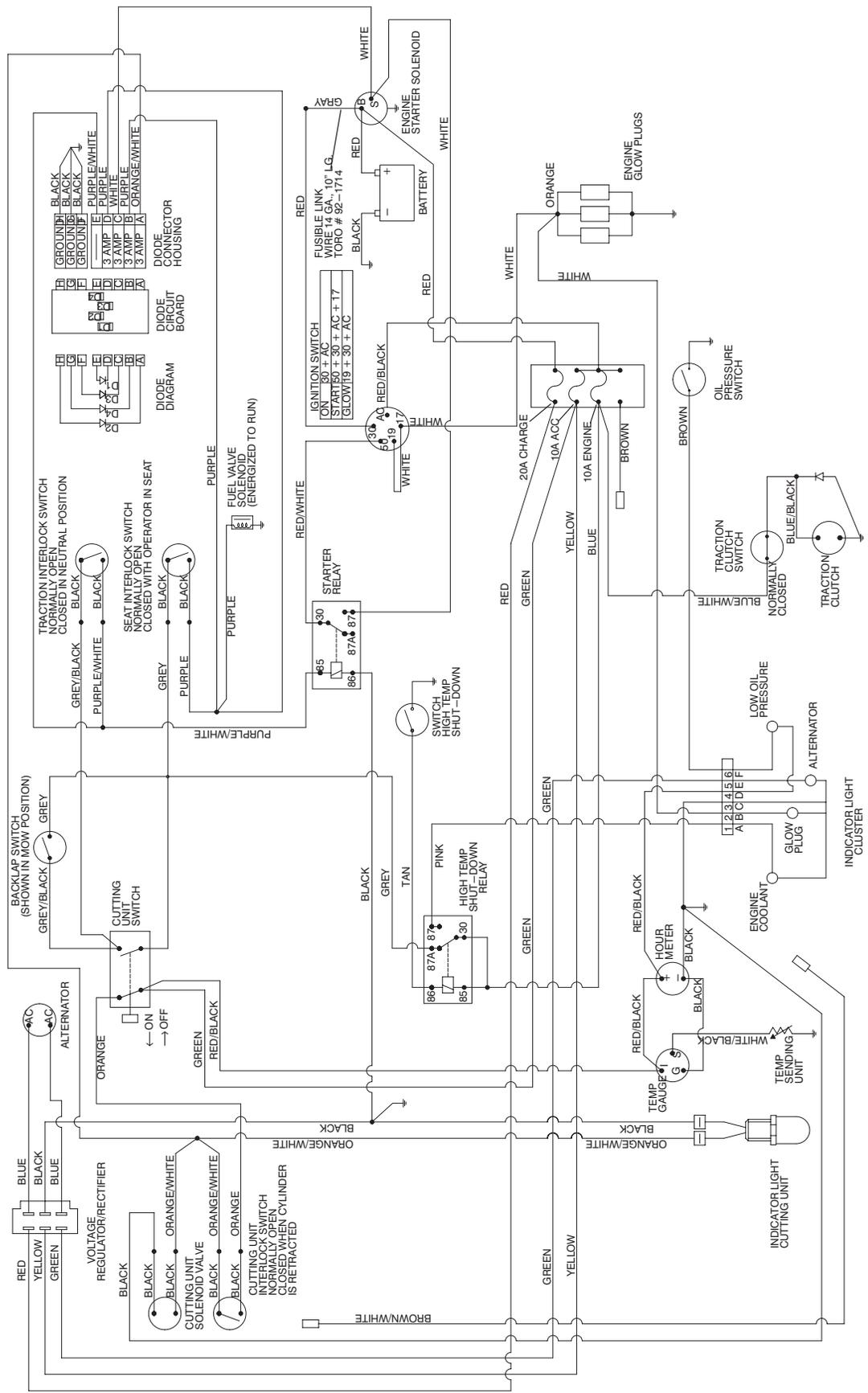
**Contact with the reel or other moving parts can result in personal injury.**

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.

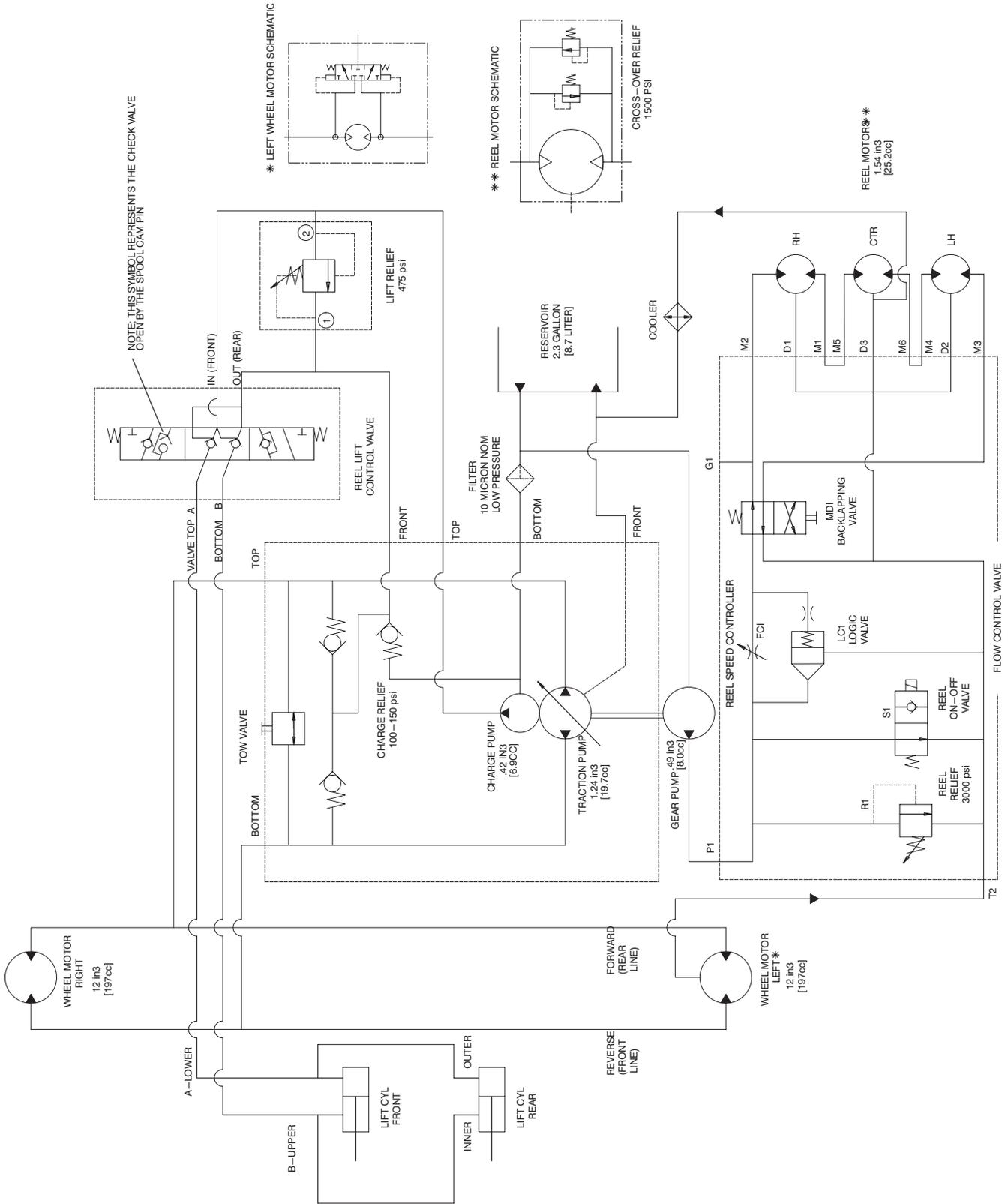
**Note:** Additional instructions and procedures on backlapping are available in the TORO Sharpening Reel & Rotary Mowers Manual, Form No. 80-300SL.

**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 (Model No. 03422—2WD)











# California Emission Control System Warranty Statement

## YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board and Ishikawajima-Shibaura Machinery Co., Ltd. (ISM) are pleased to explain the emission control system warranty on your 1995 and later utility or lawn and garden equipment engine. In California, new utility and lawn and garden equipment engines must be designed, built and equipped to meet the State's stringent anti-smog standards. ISM must warrant the California emission control system on your (utility or lawn and garden) equipment engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your (utility or lawn and garden) equipment engine.

Your California emission control system include parts such as the fuel injection pump, the fuel injector and the high pressure fuel oil line. Also included are the fuel filter element and the air cleaner element which are covered under this California emission control system warranty only to the first maintenance schedule replacement, if ISM supplies the fuel filter and air cleaner with the engine.

Where a warrantable condition exists, the manufacturer of your equipment or ISM's Engine Distributor will repair your utility or lawn and garden equipment engine at no cost to you including diagnosis, parts and labor (hereinafter such commitment is phrased "by ISM").

## MANUFACTURER'S (ISM) WARRANTY COVERAGE

The 1995 and later utility, lawn and garden equipment engines are warranted for two years. If any emission-related part on your engine is defective, the part will be repaired or replaced by ISM.

## OWNER'S WARRANTY RESPONSIBILITIES

- As the utility or lawn and garden equipment engine owner, you are responsible for the performance of the required maintenance listed in your Owner's Manual. ISM recommends that you retain all receipts covering maintenance on your said engine, but ISM cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.
- As the said equipment engine owner, you should be aware, however, that ISM may deny you warranty coverage if your said engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.
- You are responsible for presenting your said engine to the manufacturer of equipment or ISM's Engine Distributor as soon as the problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed thirty (30) days. If you have any questions regarding your warranty rights and responsibilities, you should contact the Equipment Dealer from whom the equipment was purchased, or manufacturer of said equipment. If you need further assistance please contact ISM's Representative at (212) 599-8100 or FAX your concern to (212) 599-8111 to the attention of ISM's Representative.

## MANUFACTURER'S (ISM) EXPLANATION OF EMISSION CONTROL SYSTEM WARRANTY COVERAGE

### 1. WARRANTY COMMENCEMENT DATE

The Warranty period commences on the date the engine powered utility, or lawn, or garden equipment is delivered to the first retail purchaser; or from the date the said equipment is first rented, loaned or leased prior to a sale to the first purchaser.

### 2. LENGTH OF COVERAGE

ISM warrants the initial owner and each subsequent purchaser that the engine emission control system is free from defects in materials and workmanship which cause the failure of a warranted California emission control system part for a period of two years as described in "A" above.

### **3. WHAT IS COVERED**

#### **A. REPAIR OR REPLACEMENT OF PARTS**

Repair or replacement of any California emission control warranted part will be performed at no charge to the owner at a service center where the equipment was purchased or at ISM's engine distributor. To obtain the telephone number of your nearest authorized service center in California contact the manufacturer's dealer from whom you purchased your equipment or call ISM representative at 1-212-599-8100.

#### **B. WARRANTY PERIOD**

Any warranted part which is not scheduled for replacement as required maintenance in the written instructions of the Owner's Manual shall be warranted for the warranty period of two (2) years. If any such part fails during the period of coverage, it shall be repaired or replaced by the equipment manufacturer's dealer, or other franchised dealership or distributor certified to accommodate such emission repairs, and by certain arrangements, ISM will be ultimately responsible for the expense of parts and labor. And, any such part repaired or replaced under the warranty shall be warranted for the remaining warranty period.

Any warranted part which is scheduled only for regular inspection as required in the written instructions of the Owner's Manual shall be warranted for a period of two (2) years. Any written instruction in the Owner's Manual which indicates "repair or replace as necessary" shall not reduce the period of warranty coverage.

Any such part repaired or replaced under warranty by the equipment manufacturer's dealer, or other franchised engine dealership or distributor certified to accommodate such emission repairs, ISM will be ultimately responsible for the expense of parts and labor. And, any such part repaired or replaced under the warranty shall be warranted for the remaining warranty period.

#### **C. DIAGNOSIS**

Warranty services or repairs to the emission control system and availability of ISM original equipment parts shall be provided at all ISM certified distributors of ISM's engines. The owner shall not be charged for diagnostic labor which leads to the determination that a warranted part is in fact defective, provided that such diagnostic work is performed at a warranty station. And, providing that such defective part is not the result of abuse, neglect or improper maintenance of the engine as described in the Owner's Manual.

#### **D. CONSEQUENTIAL DAMAGES**

ISM shall be liable for damages to other engine components proximately caused by a failure under warranty of any warranted part.

### **4. WHAT IS NOT COVERED**

- A. ISM shall not be liable for failure of warranted emission control system parts or other parts proximately caused by a failure under warranty of any warranted part due to any add-on part to the engine's emission control system which has not been approved by ISM. And, ISM disclaims any liability to cover failures of the emission control system when unauthorized add-on modified parts are or have been added to the system.
- B. ISM shall not be liable for failure of warranted emission control system parts or other parts proximately caused by a failure under warranty of any warranted part due to the use of diesel fuel, or any other fuel, which is not commercially available in California, and use of such fuel will invalidate this warranty.
- C. ISM shall not be liable for failure of warranted emission control system parts or damages to other engine components proximately caused by a failure under warranty when such defective part is the result of abuse, neglect or improper maintenance of the engine as described in the Owner's Manual.

### **5. HOW TO FILE A CLAIM**

All claims for California emission control warranty service including parts and labor is within the arrangements ISM has with its customers who purchase our engines (Distributors of our engines and their OEM customers as well as our customers) and it is not necessary for the owner of the ULGE engine to file a separate claim with ISM.

## 6. WHERE TO GET WARRANTY SERVICE

Repair or replacement of any California emission control warranted parts will be performed at no charge to the owner at a service center where the equipment was purchased or at ISM's engine distributor. To obtain the telephone number of your nearest authorized service center in California contact the manufacturer's dealer from whom you purchased your equipment or call ISM's representative at 1-212-599-8100.

## 7. MAINTENANCE, REPLACEMENT AND REPAIR OF EMISSION CONTROL SYSTEM AND RELATED PARTS

Any ISM approved replacement part may be used in the performance of any warranty maintenance or repairs on emission control system parts or components, and must be provided without charge to the owner if the part is still under the California emission control system warranty. Any replacement part that is equivalent in performance and durability may be used in non-warranty maintenance or repairs, and shall not reduce the warranty obligations ISM.

## 8. EMISSION CONTROL SYSTEM WARRANTY PARTS LIST

Following are the emission control system Warranty parts:

- Fuel injection pump
- Fuel injector
- Fuel injection pipe (high pressure fuel oil line)
- Intake manifold/exhaust manifold
- Fuel filter element
- Air cleaner element

**Note:** When and if the fuel filter and/or air cleaner element is supplied by ISM, these parts are under warranty only to the first maintenance scheduled replacement, including making available any related hoses, clamps, connectors or nuts and bolts that may be related to the fastening of such emission control system warranty parts, to fasten such components directly or indirectly to engine.

## 9. MAINTENANCE STATEMENT

The UGLE equipment engine owner is responsible for the performance of the required maintenance, as defined by the equipment manufacturer's operator's manual, and such instructions are supplied to the equipment manufacturer by ISM directly or indirectly through ISM's Engine Distributor.



# The Toro General Commercial Products Warranty

## A Two-Year Limited Warranty

### Conditions and Products Covered

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

\* Product equipped with hour meter

### Instructions for Obtaining Warranty Service

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

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

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

### Owner Responsibilities

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

### Items and Conditions Not Covered

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

- Product failures which result from the use of non-Toro replacement parts, or from installation and use of add-on, modified, or unapproved accessories
- Product failures which result from failure to perform required maintenance and/or adjustments
- Product failures which result from operating the Product in an abusive, negligent or reckless manner
- Parts subject to consumption through use unless found to be defective. Examples of parts which are consumed, or used up, during normal Product operation include, but are not limited to, blades, reels, bedknives, tines, spark plugs, castor wheels, tires, filters, belts, etc.

### 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.

- 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.