Form No. 3327–762

Z147

Z–Master® with 112cm Mower

Model No. 74176TE—Serial No. 220000001 and Up

Operator’s Manual

CE

English (GB)

This spark ignition system complies with Canadian ICES-002.

Ce système d'allumage par étincelle de véhicule est conforme à la norme NMB-002 du Canada.

Keep this engine Owner's Manual with your unit. Should this engine Owner's Manual become damaged or illegible, replace immediately. Replacements may be ordered through the engine manufacturer.

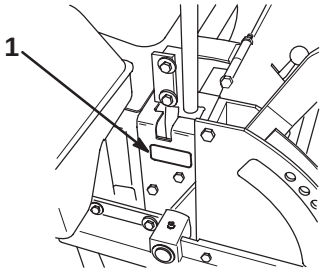
Contents

8111 Lyndale Avenue South
Bloomington, MN 55420-1196

Introduction

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

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



m–3648

Figure 1

1. Location of the model and serial numbers

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

Model No. _____

Serial No. _____

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

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

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

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

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

Safety

Safe Operation Practices for Ride-on (riding) Rotary Lawnmower Machines

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

Safe Operating Practices

The following instructions are from the CEN standard EN 836:1997.

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

Training

- Read the instructions carefully. Be familiar with the controls and the proper use of the equipment.
- Never allow children or people unfamiliar with these instructions to use the lawnmower. Local regulations can restrict the age of the operator.
- Never mow while people, especially children, or pets are nearby.
- Keep in mind that the operator or user is responsible for accidents or hazards occurring to other people or their property.
- Do not carry passengers.
- All drivers should seek and obtain professional and practical instruction. Such instruction should emphasize:
  - the need for care and concentration when working with ride-on machines;
  - control of a ride-on machine sliding on a slope will not be regained by the application of the brake. The main reasons for loss of control are:
    - insufficient wheel grip;
    - being driven too fast;
    - inadequate braking;
    - the type of machine is unsuitable for its task;

- lack of awareness of the effect of ground conditions, especially slopes;
- incorrect hitching and load distribution.

Preparation

- While mowing, always wear substantial footwear and long trousers. Do not operate the equipment when barefoot or wearing open sandals.
- Thoroughly inspect the area where the equipment is to be used and remove all objects which may be thrown by the machine.
- WARNING – Petrol is highly flammable.
  - Store fuel in containers specifically designed for this purpose.
  - Refuel outdoors only and do not smoke while refuelling.
  - Add fuel before starting the engine. Never remove the cap of the fuel tank or add petrol while the engine is running or when the engine is hot.
  - If petrol is spilled, do not attempt to start the engine but move the machine away from the area of spillage and avoid creating any source of ignition until petrol vapors have dissipated.
  - Replace all fuel tanks and container caps securely.
- Replace faulty silencers.
- Before using, always visually inspect to see that the blades, blade bolts and cutter assembly are not worn or damaged. Replace worn or damaged blades and bolts in sets to preserve balance.
- On multi-bladed machines, take care as rotating one blade can cause other blades to rotate.

Operation

- Do not operate the engine in a confined space where dangerous carbon monoxide fumes can collect.
- Mow only in daylight or in good artificial light.
- Before attempting to start the engine, disengage all blade attachment clutches and shift into neutral.
- Do not use on slopes of more than
  - 5° when mowing on side hills;
  - 10° when mowing uphill;
  - 15° when mowing downhill.
- Remember there is no such thing as a “safe” slope. Travel on grass slopes requires particular care. To guard against overturning:
  - do not stop or start suddenly when going up or downhill;
  - engage clutch slowly, always keep machine in gear, especially when travelling downhill;
  - machine speeds should be kept low on slopes and during tight turns;
  - stay alert for humps and hollows and other hidden hazards;
  - never mow across the face of the slope;
- Use care when pulling loads or using heavy equipment.
  - Use only approved drawbar hitch points.
  - Limit loads to those you can safely control.
  - Do not turn sharply. Use care when reversing.
  - Use counterweight(s) or wheel weights when suggested in the instruction handbook.
- Watch out for traffic when crossing or near roadways.
- Stop the blades rotating before crossing surfaces other than grass.
- When using any attachments, never direct discharge of material toward bystanders nor allow anyone near the machine while in operation.
- Never operate the machine with defective guards or without safety protective devices in place.
- Do not change the engine governor settings or overspeed the engine. Operating the engine at excessive speed can increase the hazard of personal injury.
- Before leaving the operator’s position:
  - disengage the power take-off and lower the attachments;
  - change into neutral and set the parking brake;
  - stop the engine and remove the key.
- Disengage drive to attachments, stop the engine, and disconnect the spark plug wires or remove the ignition key
  - before clearing blockages or unclogging chute;
  - before checking, cleaning or working on the lawnmower;
  - after striking a foreign object. Inspect the lawnmower for damage and make repairs before restarting and operating the equipment;
  - if the machine starts to vibrate abnormally (check immediately).

- Disengage drive to attachments when transporting or not in use.
- Stop the engine and disengage drive to attachment
  - before refuelling;
  - before removing the grass catcher;
  - before making height adjustment unless adjustment can be made from the operator's position.
- Reduce the throttle setting during engine run-out and, if the engine is provided with a shut-off valve, turn the fuel off at the conclusion of mowing.

Maintenance and Storage

- Keep all nuts, bolts and screws tight to be sure the equipment is in safe working condition.
- Never store the equipment with petrol in the tank inside a building where fumes can reach an open flame or spark.
- Allow the engine to cool before storing in any enclosure.
- To reduce the fire hazard, keep the engine, silencer, battery compartment and petrol storage area free of grass, leaves, or excessive grease.
- Check the grass catcher frequently for wear or deterioration.
- Replace worn or damaged parts for safety.
- If the fuel tank has to be drained, this should be done outdoors.
- On multi-bladed machines, take care as rotating one blade can cause other blades to rotate.
- When machine is to be parked, stored or left unattended, lower the cutting means unless a positive mechanical lock is used.

Sound Pressure Level

This unit has an equivalent continuous A-weighted sound pressure at the operator ear of: 87 dB(A), based on measurements of identical machines per Directive 98/37/EC.

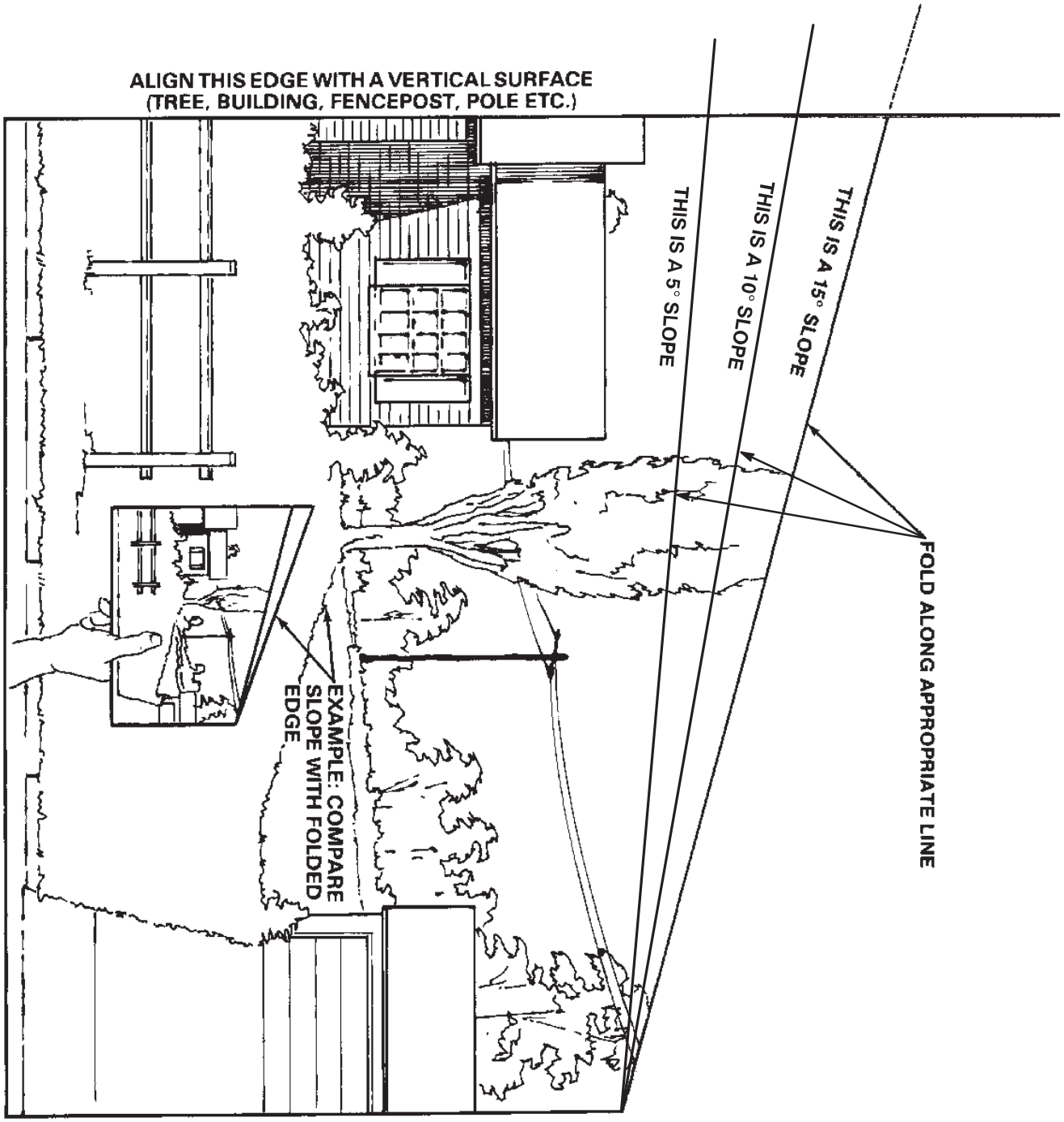
Sound Power Level

This unit has a sound power level of: 100 Lwa, based on measurements of identical machines per procedures outlined in Directive 2000/14/EC.

Vibration Level

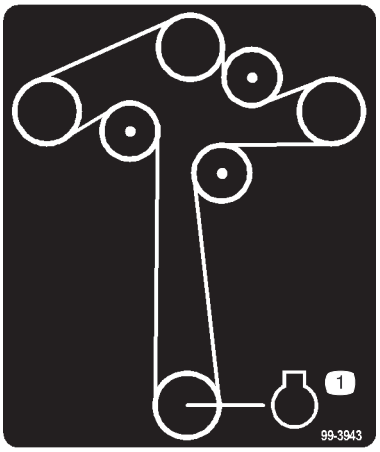
This unit has a maximum hand-arm vibration level of 3.9 m/s^2 and whole body vibration level of 0.1 m/s^2, based on measurements of identical machines per Directive 98/37/EC.

Slope Chart


ALIGN THIS EDGE WITH A VERTICAL SURFACE
(TREE, BUILDING, FENCEPOST, POLE ETC.)
THIS IS A 5° SLOPE
THIS IS A 10° SLOPE
THIS IS A 15° SLOPE
FOLD ALONG APPROPRIATE LINE
EXAMPLE: COMPARE SLOPE WITH FOLDED EDGE

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.

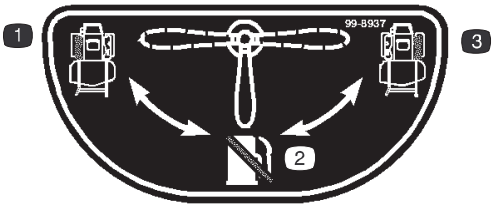


99-3943

1. Engine

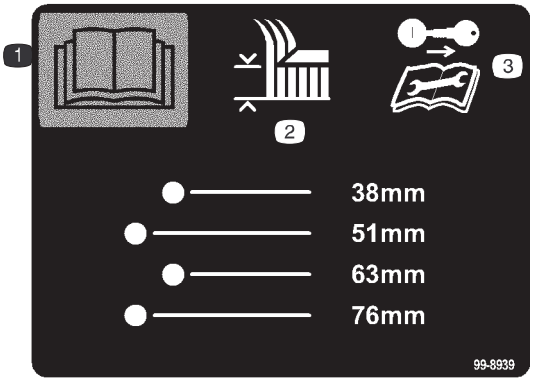
99-8936

1. Machine speed
2. Fast
3. Slow
4. Neutral
5. Reverse



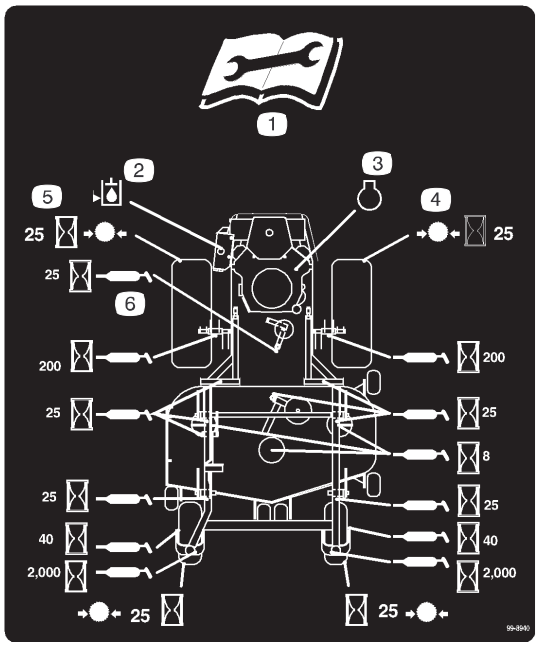
99-8937

1. Right side fuel tank open
2. Fuel tank shut off
3. Left side fuel tank open



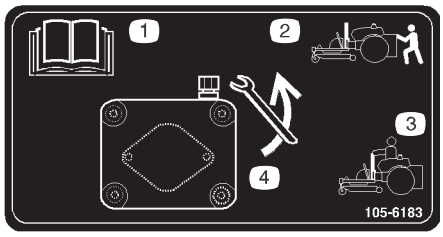
99-8939

1. Read the *Operator's Manual.*
2. Height of cut
3. Remove the ignition key and read the instructions before servicing or performing maintenance.



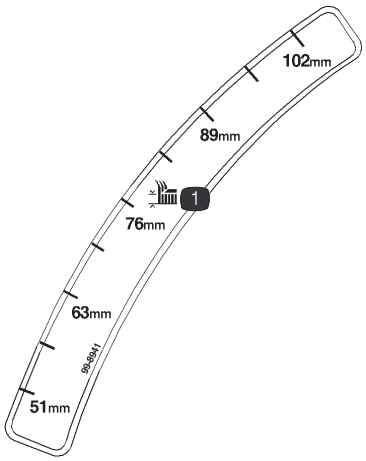
99-8940

1. Read the instructions before servicing or performing maintenance.
2. Hydraulic oil
3. Engine
4. Tire pressure
5. Hourly interval
6. Grease



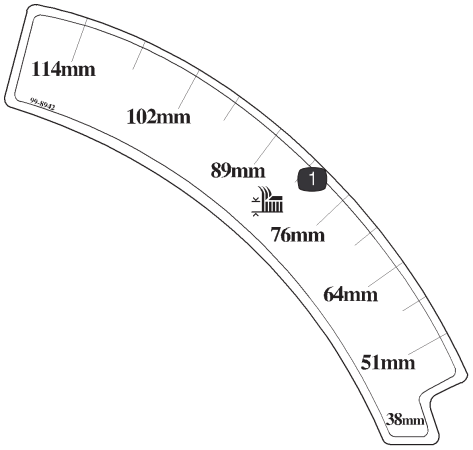
105-6183

1. Read the *Operator's Manual.*
2. Rotate the bypass valve out to push the machine.
3. Rotate the bypass valve in to drive the machine.
4. Use a wrench to rotate the bypass valve.



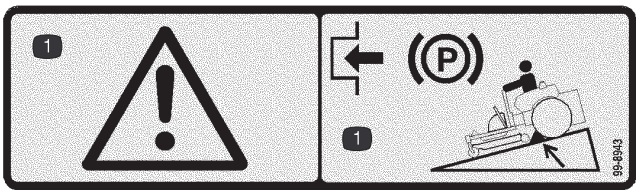
99-8941

1. Height of cut



99-8942

1. Height of cut

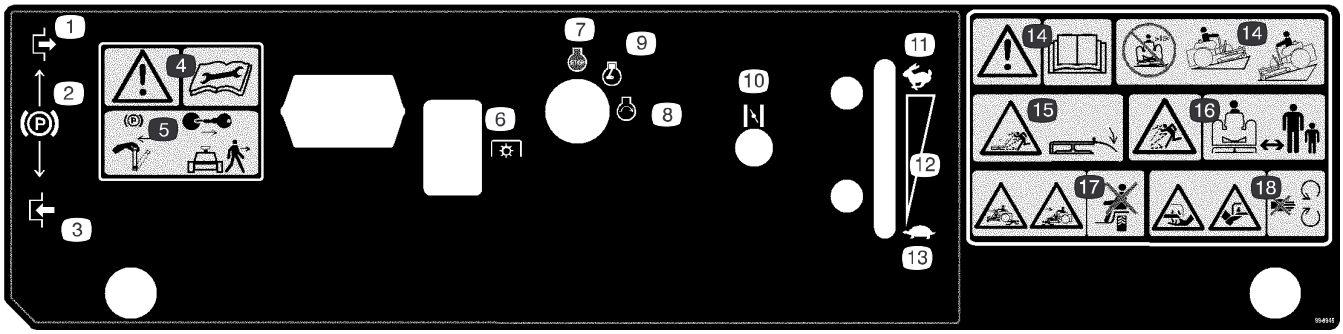


99-8943

1. Warning—engage the parking brake and chock the wheels when parking on a hill.

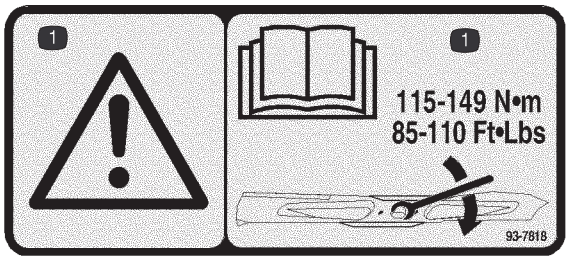
99-8944

1. Explosion hazard—wear eye protection.
2. Caustic liquid/chemical burn hazard—to perform first aid, flush with water.
3. Fire hazard—no fire, open flames, or smoking.
4. Poison hazard—keep children away from the battery.



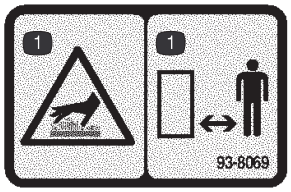
99-8945

1. Disengage
2. Parking brake
3. Engage
4. Warning—read the instructions before servicing or performing maintenance.
5. Set the parking brake and remove the ignition key before leaving the machine.
6. Power take-off (PTO)
7. Engine—stop
8. Engine—run
9. Engine—start
10. Choke
11. Fast
12. Increasing variable setting
13. Slow
14. Warning—read the *Operator's Manual*; On slopes greater than 15 degrees, drive up and down the slope, not side to side.
15. Thrown object hazard, mower—keep the deflector in place.
16. Thrown object hazard—keep bystanders a safe distance from the machine.
17. Crushing/dismemberment hazard of bystanders while backing—do not carry passengers.
18. Cutting/dismemberment hazard of hand or foot, mower blade—stay away from moving parts.



93-7818

1. Warning—read the *Operator's Manual* for instructions on torquing the blade bolt/nut to 115–149 N·m (85–110 ft.-lb.).



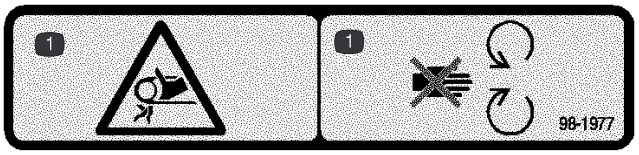
93-8069

1. Hot surface/burn hazard—stay a safe distance from the hot surface.

100-3952

1. Hydraulic oil level
2. Hot surface/burn hazard—stay a safe distance from the hot surface

---

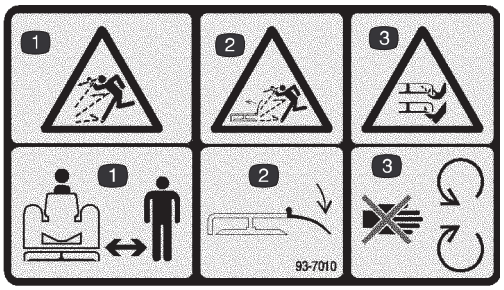


98-1977

1. Entanglement hazard, belt—stay away from moving parts.

98-4387

1. Warning—wear hearing protection.



93-7010

1. Thrown object hazard—stay a safe distance from the machine.
2. Thrown object hazard, mower—keep the deflector in place.
3. Cutting/dismemberment of hand or foot—stay away from moving parts.

93-7316

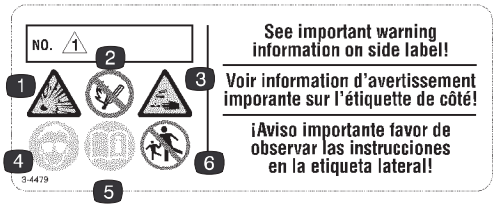
1. Thrown object hazard—stay a safe distance from the machine.
2. Thrown object hazard, mower—keep the deflector in place.
3. Cutting/dismemberment of hand or foot—stay away from moving parts.

93-7824

1. Thrown object hazard—stay a safe distance from the machine.
2. Thrown object hazard, mower—keep the deflector in place.
3. Cutting/dismemberment of hand or foot—stay away from moving parts.

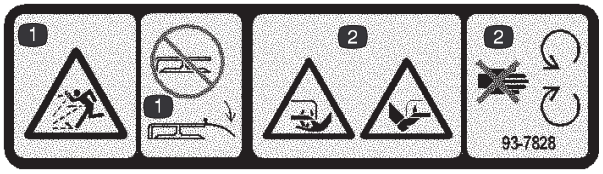
104-4164

1. Contains lead; do not discard.
2. Recycle
3. Wear eye protection; explosive gases can cause blindness and other injuries
4. No sparks, flame, or smoking
5. Sulfuric acid can cause blindness or severe burns.
6. Flush eyes immediately with water and get medical help fast.
7. Maximum fill line
8. Minimum fill line
9. Instructions for activating the battery



104-4163

1. Explosion hazard
2. No fire, open flames, or smoking.
3. Caustic liquid/chemical burn hazard
4. Wear eye protection
5. Read the *Operator's Manual.*
6. Keep bystanders a safe distance from the battery.



93-7828

1. Thrown object hazard, mower—do not operate the mower with the deflector up or removed; keep the deflector in place.
2. Cutting/dismemberment hazard of hand or foot, mower blade—stay away from moving parts.

Gasoline and Oil

Recommended Gasoline

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

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

Danger

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

- **Fill the fuel tank outdoors, in an open area, when the engine is cold. Wipe up any gasoline that spills.**
- **Never fill the fuel tank inside an enclosed trailer.**
- **Do not fill the fuel tank completely full. Add gasoline to the fuel tank until the level is 1/4 to 1/2 in. (6 to 13 mm) below the bottom of the filler neck. This empty space in the tank allows gasoline to expand.**
- **Never smoke when handling gasoline, and stay away from an open flame or where gasoline fumes may be ignited by a spark.**
- **Store gasoline in an approved container and keep it out of the reach of children. Never buy more than a 30-day supply of gasoline.**
- **Always place gasoline containers on the ground away from your vehicle before filling.**
- **Do not fill gasoline containers inside a vehicle or on a truck or trailer bed because interior carpets or plastic truck bed liners may insulate the container and slow the loss of any static charge.**
- **When practical, remove gas–powered equipment from the truck or trailer and refuel the equipment with its wheels on the ground.**
- **If this is not possible, then refuel such equipment on a truck or trailer from a portable container, rather than from a gasoline dispenser nozzle.**
- **If a gasoline dispenser nozzle must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.**

Warning

Gasoline is harmful or fatal if swallowed. Long-term exposure to vapors can cause serious injury and illness.

- **Avoid prolonged breathing of vapors.**
- **Keep face away from nozzle and gas tank or conditioner opening.**
- **Keep gas away from eyes and skin.**

Using Stabilizer/Conditioner

Use a fuel stabilizer/conditioner in the machine to provide the following benefits:

- Keeps gasoline fresh during storage of 90 days or less. For longer storage it is recommended that the fuel tank be drained.
- Cleans the engine while it runs
- Eliminates gum-like varnish buildup in the fuel system, which causes hard starting

Important Do not use fuel additives containing methanol or ethanol.

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

Note: A fuel stabilizer/conditioner is most effective when mixed with fresh gasoline. To minimize the chance of varnish deposits in the fuel system, use fuel stabilizer at all times.

Filling the Fuel Tank

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

Checking Engine Oil Level

Before you start the engine and use the machine, check the oil level in the engine crankcase; refer to Checking the Oil Level, page 34.

Setup

Loose Parts

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

Description	Qty.	Use
Rear Wheels	2	Installing the drive wheels
Retaining rod	1	Installing the seat retaining rod
Bolt, 5/16 x 1 in.	1	
Locknut, 5/16 in.	1	
Control lever—right	1	Installing the motion control levers
Control lever—left	1	
Bolt, 3/8 x 1 in.	4	
Spring washer, 3/8 in.	4	
Grass Deflector	1	Installing the grass deflector
Bolt, 5/16 x 7–1/2 in.	1	
Locknut, 5/16 in.	1	
Spacer	1	
Spring	1	
Blowout baffle—right	1	Using blowout baffle
Blowout baffle—left	1	
Screw	9	
Side Discharge Blade	3	Using side discharge blades
Key	2	Read before operating machine
Operator’s Manual	1	
Engine Operator’s Manual	1	
Parts Catalog	1	
Registration card	1	Fill out and return to Toro

Installing the Drive Wheels

1. Uncrate mower.
2. Remove wheel bolts or nuts from rear wheel hubs.
3. Align holes. Mount drive wheels with the valve stem to the outside of the traction unit.
4. Secure using wheel bolts or nuts provided. Torque to 95 ft.-lb. (128 N•M).

Checking the Tire Pressure

Check the air pressure in the front and rear tires (Fig. 2).

Pressure: 13 psi (90 kPa)

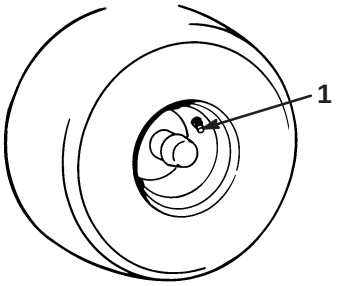


Figure 2

1. Valve stem

Installing the Seat Retaining Rod

1. Tilt seat up. Remove the locknut (5/16 in.) from bolt attaching seat retaining rod to seat frame (Fig. 3).

2. Remove retaining rod from seat and insert the **L** shaped end of the rod into the hole directly above the left–side hydraulic pump (Fig. 3).

3. Place the seat retaining rod to the outside of the seat mounting tab and secure with a bolt (5/16 x 1 in.) and locknut (5/16 in.) (Fig. 3).

4. Tighten nut until snug, then loosen so the rod pivots freely.

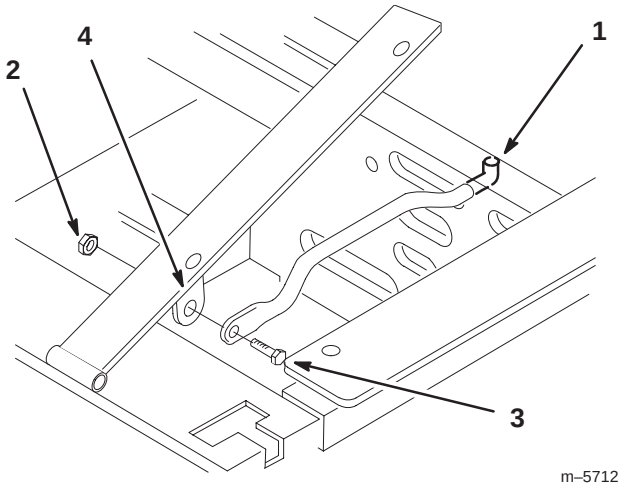


Figure 3

1. L end of retaining rod
2. Locknut, 5/16 in.
3. Bolt, 5/16 x 1 in.
4. Seat mounting tab

Installing the Motion Control Levers

There are two positions to install the control levers, high and low. Install levers in the top and middle holes for the high position. Install levers in the middle and bottom holes for the low position.

1. Remove the 4 bolts (3/8 x 1 in.) and 4 spring washers (3/8 in.) which attach the motion control levers to the control arm shafts for shipping (Fig. 4).

2. Place the levers (with the mounting plate toward the rear) on the outside of the control arm shaft and secure with 4 bolts (3/8 x 1 in.) and 4 spring washers (3/8 in.) (Fig. 4).

3. Position the levers so the bolts are in the center of the slots on the lever mounting plate and tighten until snug.

4. Align the front\rear position of the levers, with each other, in the neutral position. Loosen hardware and adjustment by sliding/tilting the lever(s) forward or backward until properly aligned(Fig. 4).

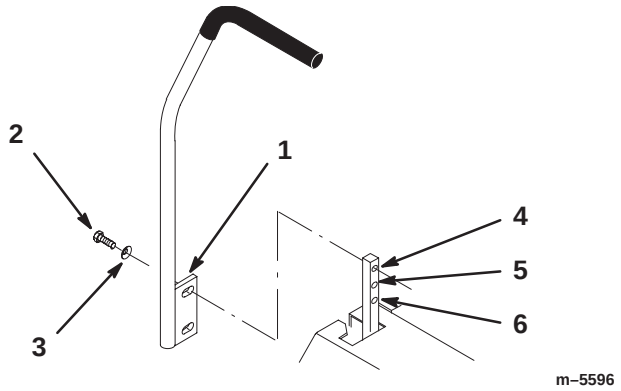


Figure 4

1. Mounting plate
2. Bolt, 3/8 x 1 in.
3. Spring washer, 3/8 in.
4. Top hole
5. Middle hole
6. Bottom hole

5. If the ends of the levers hit against each other, while in the drive position (Fig 5) (levers rotated in as far as possible) make adjustments by moving the levers outward to the neutral lock position and carefully bend them outward. Move them back to the drive position and check for clearance. Repeat if necessary.

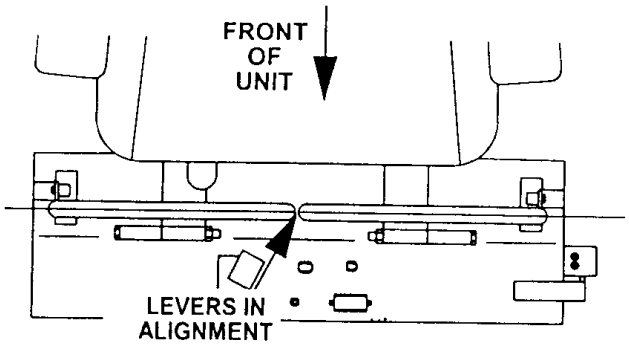


Figure 5

Installing the Grass Deflector

The grass deflector is used when in side discharge mode only.

Warning

An uncovered discharge opening could allow the lawn mower to throw objects in the operator's or bystander's direction and result in serious injury. Also, contact with the blade could occur.

Never operate the lawn mower unless you install a grass deflector, a mulch plate, or an entire grass catcher assembly.

1. Place spacer and spring onto grass deflector.
2. Place the grass deflector onto deck. Place the **L** end of spring behind deck edge.

Note: Make sure the **L** end of spring is installed behind deck edge before installing the bolt as shown in figure 6.

3. Install bolt and nut. Place **J** hook end of spring around grass deflector (Fig. 6).

Important The grass deflector must be able to lower down into position. Lift the deflector up to test that it lowers into the full down position.

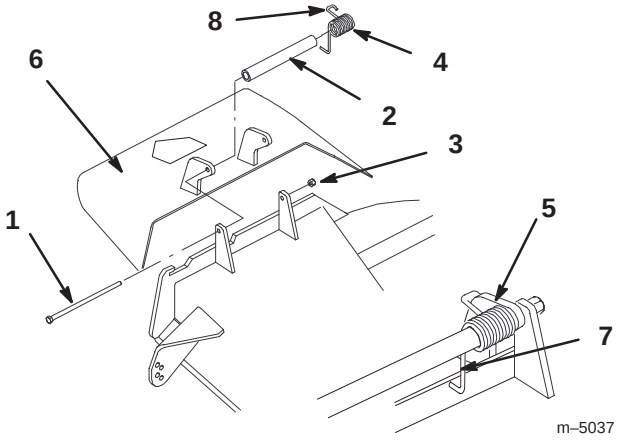


Figure 6

1. Bolt
2. Spacer
3. Locknut
4. Spring
5. Spring installed
6. Grass Deflector
7. **L** end of spring, place behind deck edge before installing bolt
8. **J** hook end of spring

Using the Blowout Baffles

The blowout baffles are used when in side discharge mode only.

Refer to Installing and Removing Blowout Baffles on page 22.

Important Do not use blowout baffles while in recycling mode.

Using the Side Discharge Blades

Side discharge blades are used when in side discharge mode only.

Refer to Servicing the Cutting Blades on page 31.

Important Do not use side discharge blades while in recycling mode.

Activating the Battery

Bulk electrolyte with 1.265 specific gravity must be purchased from a local battery supply outlet.

Danger

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

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

1. Remove the battery from the machine. Refer to Removing the Battery on page 45.
2. Clean the top of the battery with a paper towel.

Note: Never fill the battery with electrolyte while the battery is installed in the machine. Electrolyte could be spilled on other parts and cause corrosion.

3. Remove the vent caps from the battery (Fig. 7).
4. Slowly pour electrolyte into each battery cell until the level is up to the **upper** line (Fig. 7) on the battery case.

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

5. Wait five to ten minutes after filling the battery cells. Add electrolyte, if necessary, until the electrolyte level is up to the **upper** line (Fig. 7) on the battery case.
6. Reinstall battery filler caps.

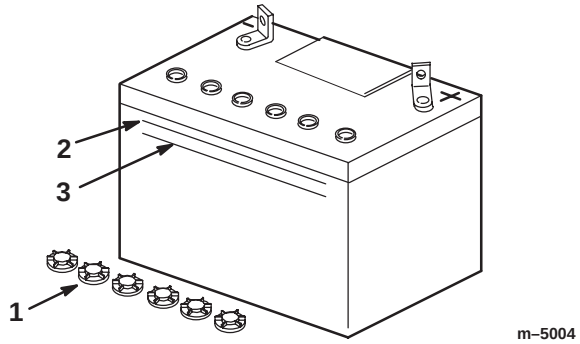


Figure 7

1. Filler caps
2. **Upper** line
3. **Lower** line

Warning

Charging battery produces gasses that can explode and cause serious injury.

- **Keep cigarettes, sparks and flames away from battery.**
- **Make sure the ignition switch is off.**
- **Ventilate when charging or using battery in an enclosed space.**

7. Charge the battery. Refer to Charging the Battery on page 46.
8. Install the battery into the machine. Refer to Installing the Battery on page 44.

Note: Do not run the machine with the battery disconnected, electrical damage may occur.

Checking the Hydraulic Fluid

Check the hydraulic fluid level before the engine is first started.

Refer to Checking the Hydraulic Fluid on page 39.

Greasing the Bearings

Important Make sure cutting unit spindles are full of grease before engine is first started.

Grease with No. 2 general purpose lithium base or molybdenum base grease.

Grease the fittings on the three spindle bearings. Grease until it comes out lower seals.

Refer to Greasing the Bearings on page 38.

Checking the Level of Mower

Check the level of the deck before machine is first put into use.

Refer to Leveling the Mower on page 46.

Check Engine Oil Level

Before you start the engine and use the machine, check the oil level in the engine crankcase; refer to Checking the Engine Oil Level, page 34.

Operation

Think Safety First

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

The use of protective equipment, for eyes, hearing, feet, and head is recommended.

Caution

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

Wear hearing protection when operating this machine.

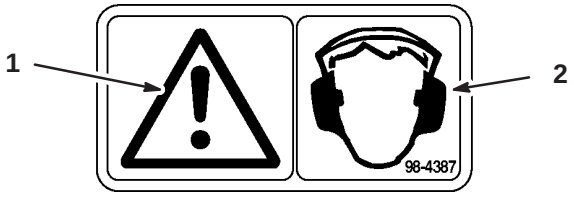


Figure 8

1. Caution
2. Wear hearing protection

Controls

Become familiar with all the controls (Fig. 9) before you start the engine and operate the machine.

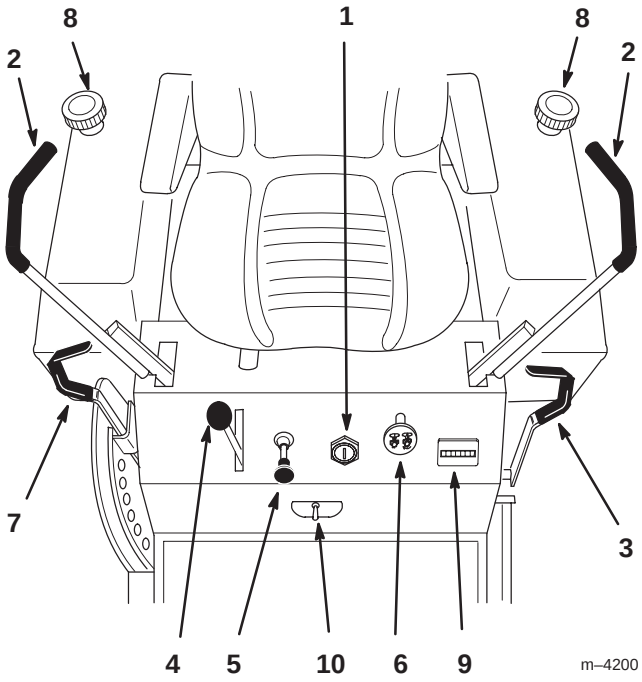


Figure 9

1. Ignition switch
2. Motion control lever
3. Parking brake lever
4. Throttle
5. Choke
6. Power take off (PTO)
7. Height-of-Cut lever
8. Fuel cap
9. Hourmeter
10. Fuel shut-off valve

Using the Hour Meter

The hour meter records the number of hours the engine has operated. It operates when the engine is running. Use these times for scheduling regular maintenance.

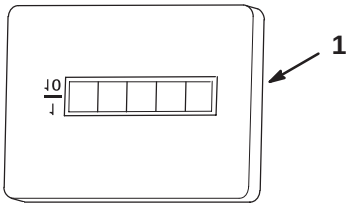


Figure 10

1. Hour meter

Switching the Fuel Tanks

The unit has two fuel tanks, one located on the left side and one on the right side. Each tank connects to the fuel shut off valve in the control panel. From there a common fuel line leads to the engine (Fig. 11).

To use the right side fuel tank rotate the fuel shut off valve 1/4 turn to the right from the off location. This uses fuel from the right side tank only. When the right fuel tank is empty, move the fuel shut off valve 1/4 turn to the left from the off position.

Close fuel shut off valve, on front panel before transporting or storing machine.

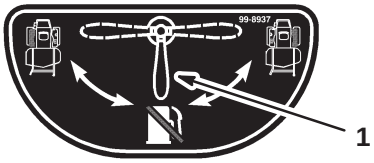


Figure 11

1. Shut-off valve

Operating the Parking Brake

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

Important Do not park on slopes unless wheels are chocked or blocked.

Setting the Parking Brake

1. Move the motion control levers (Fig. 9) out to the neutral lock position.
2. Pull back and up on the parking brake lever to set the parking brake (Fig. 12). The parking brake lever should stay firmly in the engaged position.

Releasing the Parking Brake

1. Push forward and down on the parking brake lever to release the parking brake (Fig. 12). The parking brake is disengaged.

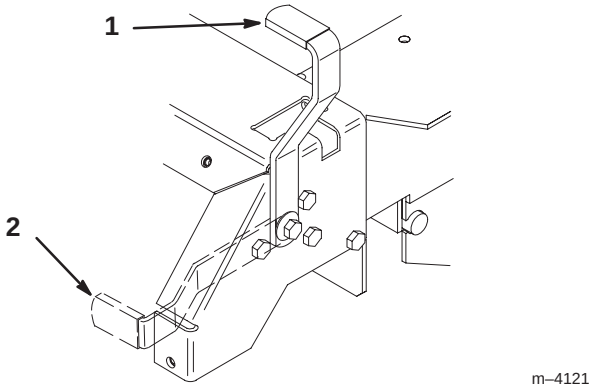


Figure 12

1. Parking brake—ON
2. Parking brake—OFF

Installing or Removing Baffles

The following instructions are for removing and installing baffles. The baffles are used for mulching only. It is written as though you were to install the baffles. Reverse the procedures to remove them.

Before Installing or Removing Baffles

Warning

Contact with sharp blade can cause serious injury.

Wear gloves or wrap sharp edges of the blade with a rag.

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to off. Remove the key.
2. Remove belt covers from mower deck.
3. Remove the mower deck.
4. Tip mower deck upside down and block up ends to ease installation of baffle components.
5. Thoroughly clean mower deck. All debris must be removed to ensure baffle will fit properly against mower deck.
6. Repair all bent or damaged areas of mower deck and replace any missing parts.

Installing or Removing Blades

1. Remove blades and anti-scalp cups from spindles. Save for use when side discharging.
2. Install new recycler blades without anti-scalp cups.

Important The sail part of the blades (i.e., the turned up section) must face the inside of the mower.

3. Tighten the blade mounting bolts to 85–110 ft.-lb. (115–150 Nm).

Installing or Removing the Baffles

Important The baffles are used only for mulching. The baffles must be removed when in side discharge mode.

1. Place 4 bolts (5/16 x 1-1/4 in.) into the deep recessed holes in the left and right baffles. Secure the bolts with 4 locknuts (5/16 in.) in the shallow recesses. Refer to Figures 13 and 14 for correct assembly and hole usage.

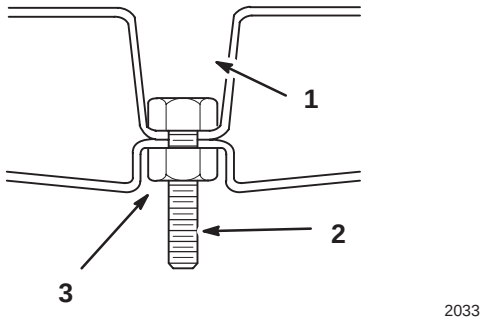


Figure 13

1. Deep recess
2. Bolt, 5/16 x 1-1/4 in.
3. Locknut, 5/16 in.

2. Place the left side baffle and the right side baffle inside the cutting chamber so the extended lugs are interlocked. Secure them with 4 locknuts (5/16 in.) and 4 lock washers (Fig. 14).

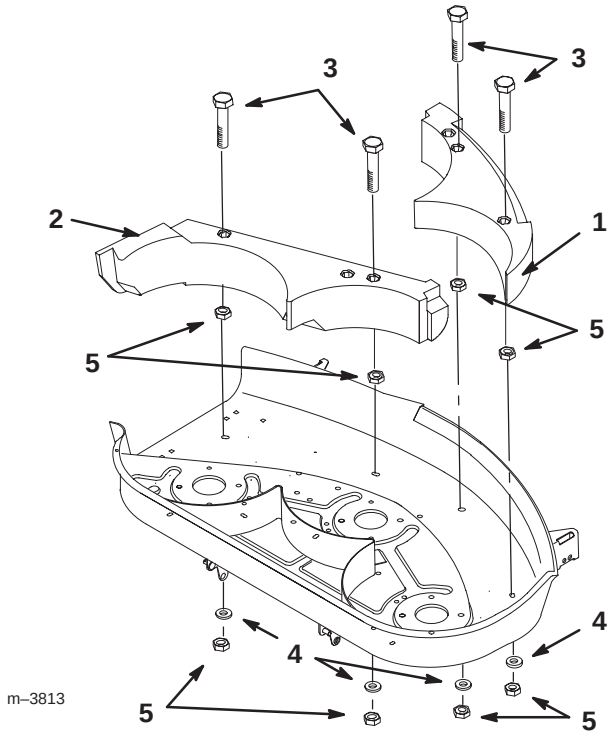


Figure 14

1. Baffle left side
2. Baffle right side
3. Bolt, 5/16 x 1-1/4 in.
4. Lock washer
5. Locknut, 5/16 in.

3. Tighten all mounting hardware securely.
4. Rotate the blades to ensure that there is at least 1/8 in. (3 mm) clearance between the blades and baffles.
5. Using existing hardware, make sure all holes in deck are plugged with a nut and bolt.

Danger

Open holes in the mower expose you and others to thrown debris which could cause injury.

- **Never operate mower without hardware mounted in all holes in mower.**
- **Install hardware in mounting holes when mulching baffle is removed.**

Installing and Removing Kickers

The following instructions are for removing and installing kickers. The kickers are used for mulching only. The following procedures are written as though you were to install the kickers. Reverse the procedures to remove them.

Important The kickers are used only for mulching. The kickers must be removed when in side discharge mode.

1. Place the kicker plate into position (Fig. 15).

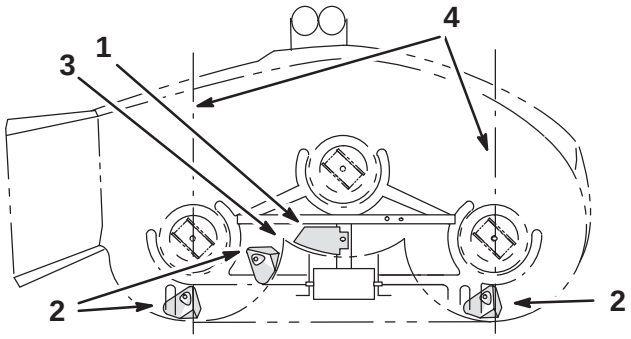


Figure 15

1. Kicker plate
2. Kicker
3. Right/center joint
4. Center line

2. Secure the kicker plate with a bolt (5/16 x 1 in.), flat washer, and locknut.

3. Position kickers (Fig. 15) and secure them with 3 bolts (5/16 x 1 in.), spacers, flat washers, and locknuts (Fig. 16).

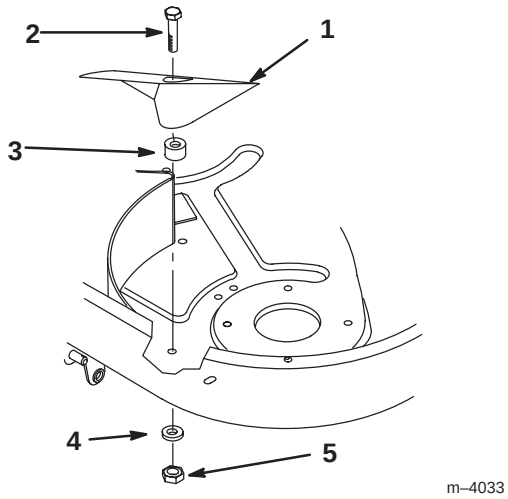


Figure 16

1. Kicker
2. Bolt, 5/16 x 1 in.
3. Spacer
4. Flat washer
5. Locknut, 5/16 in.

4. Tighten all mounting hardware securely.

5. Rotate the blades to ensure that there is at least 1/8 in. (3 mm) clearance between the blades and kickers.

Note: If a kicker interferes with a blade, reposition it further up into the mower.

6. Turn mower deck over and install belt covers.

7. Install mower deck onto traction unit.

Warning

A blade that is bent or damaged could break apart and could seriously injure or kill you or bystanders.

- **Always replace a bent or damaged blade with a new blade.**
- **Never file or create sharp notches in the edges or surfaces of the blade.**

8. Using existing hardware, make sure all holes in deck are plugged with a nut and bolt.

Danger

Open holes in the mower expose you and others to thrown debris which could cause injury.

- **Never operate mower without hardware mounted in all holes in mower.**
- **Install hardware in mounting holes when mulching baffle is removed.**

Installing and Removing Blowout Baffles

The following instructions are for removing and installing blowout baffles. The blowout baffles are used for side discharge only. The following procedures are written as though you were to install the baffles. Reverse the procedures to remove them.

Blowout baffles are used when in side discharge mode only.

Important Do not use blowout baffles while in recycling mode.

Warning

Contact with sharp blade can cause serious injury.

Wear gloves or wrap sharp edges of the blade with a rag.

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to off. Remove the key.
2. Remove belt covers from mower deck.
3. Remove mower unit.
4. Tip mower deck upside down and block up ends to ease installation of baffle components.
5. Thoroughly clean mower deck. All debris must be removed to ensure baffle will fit properly against mower deck.
6. Repair all bent or damaged areas of mower deck and replace any missing parts.

Note: All holes for installing Blowout baffles are drilled (Fig. 17).

7. Place baffles as shown in figure 17.

Note: The baffle edges need to be centered between front roller brackets (Fig. 17).

8. Install screws and tighten securely (Fig. 17).
9. Rotate blades to ensure the blades do not hit the blowout baffles.
10. Turn deck over, reinstall deck and deck covers.

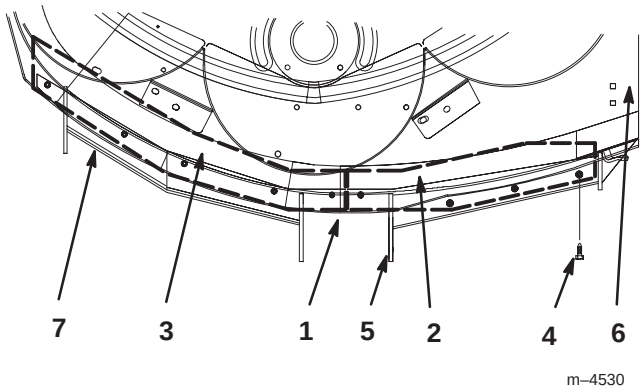


Figure 17

1. Baffles centered between brackets
2. Righthand baffle
3. Lefthand baffle
4. Tapping screw
5. Front roller brackets
6. Side discharge
7. Deck shown upside down

Warning

A blade that is bent or damaged could break apart and could seriously injure or kill you or bystanders.

- **Always replace a bent or damaged blade with a new blade.**
- **Never file or create sharp notches in the edges or surfaces of the blade.**

Starting and Stopping the Engine

Starting the Engine

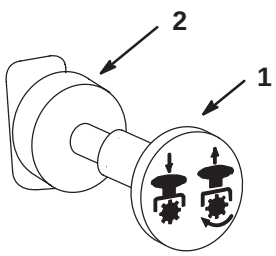
1. Sit down on the seat and move the motion controls to neutral locked position.
2. Set the parking brake; refer to Setting the Parking Brake, page 20.
3. Move the PTO (power take off) to the off position (Fig. 18).
4. Move the choke control to the on position before starting a cold engine (Fig. 19).

Note: A warm or hot engine may require choking. After engine starts, move choke control to the off position.

5. Move the throttle control to the fast position before starting a cold engine (Fig. 20).
6. Turn ignition key to start to energize starter. When engine starts, release key (Fig. 21).

Important Do not engage starter for more than 10 seconds at a time. If engine fails to start allow 30 second cool-down period between attempts. Failure to follow these instructions can burn out starter motor.

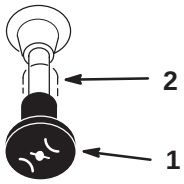
7. After the engine starts, move the choke to the off position (Fig. 19). If the engine stalls or hesitates, move the choke back to on for a few seconds. Then move the throttle lever to desired setting. Repeat this as required.



m–4201

Figure 18

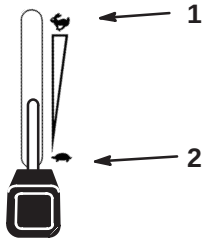
1. PTO—On
2. PTO—Off



m–2719

Figure 19

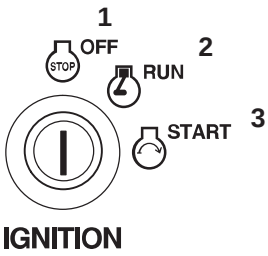
1. Choke—On
2. Choke—Off



m–2720

Figure 20

1. Fast
2. Slow



M–4268

Figure 21

1. Off
2. Run
3. Start

Stopping the Engine

1. Push the PTO to off (Fig. 20).
2. Move the throttle lever midway between the slow and fast positions (Fig. 20).
3. Let the engine idle for 60 seconds (Fig. 21).
4. Turn the ignition key to off (Fig. 21).
5. Pull wire off spark plugs to prevent possibility of someone accidentally starting the machine before transporting or storing machine.
6. Close fuel shut off valve, on front panel before transporting or storing machine.

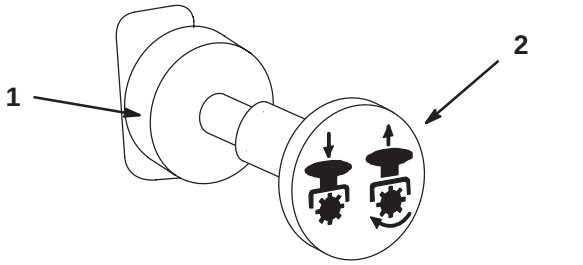
Important Make sure fuel shut off valve is closed before transporting or storing machine, as fuel leakage may occur. Set parking brake before transporting.

Operating the Power Take Off (PTO)

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

Engaging the PTO

1. While seated in the seat, release pressure on the traction control levers and place in neutral.
2. Place throttle to the fast position.
3. Pull out on the power take off (PTO) switch to engage (Fig. 22).



m–4201

Figure 22

1. PTO—Off
2. PTO—On

Disengaging the PTO

1. To disengage push the PTO switch to the off position (Fig. 22).

The Safety Interlock System

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.**

Understanding the Safety Interlock System

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

- You are sitting on the seat.
- The parking brake is engaged.
- The power take off (PTO) is disengaged.
- The motion control levers are in neutral locked position.

The safety interlock system also is designed to stop the engine when the traction controls are moved from the locked position with the parking brake **engaged** or if you rise from the seat when the PTO is **on** or engaged.

Testing the Safety Interlock System

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

1. Sitting on the seat, engage the parking brake and move the PTO to on. Try starting the engine; the engine should not crank.
2. Sitting on the seat, engage the parking brake and move the PTO to on. Move either motion control lever (out of neutral locked position). Try starting the engine; the engine should not crank. Repeat for other control lever.
3. Sitting on the seat, engage the parking brake, move the PTO switch to off and move the motion control levers to neutral lock position. Now start the engine. While the engine is running, release the parking brake, engage the PTO and rise slightly from the seat; the engine should stop.
4. Sitting on the seat, engage the parking brake, move the PTO switch to off, and move the motion control levers to neutral lock position. Now start the engine. While the engine is running, center either motion control and move (forward or reverse); the engine should stop. Repeat for other motion control.
5. Sitting on the seat, disengage the parking brake, move the PTO switch to off and move the motion control levers to neutral lock position. Try starting the engine; the engine should not crank.

Driving Forward or Backward

The throttle control regulates the engine speed as measured in rpm (revolutions per minute). Place the throttle control in the *fast* position for best performance. Always operate in the full throttle position.

Caution

Machine can spin very rapidly. Operator may lose control of machine and cause personal injury or damage to machine.

- **Use caution when making turns.**
- **Slow the machine down before making sharp turns.**

Driving Forward

1. Release the parking brake; refer to Releasing the Parking Brake, page 20.
2. Move levers to the center, un-locked position.
3. To go forward, slowly push the motion control levers forward (Fig. 23).

Note: Engine will kill if traction control levers are moved with parking brake engaged.

To go straight, apply equal pressure to both motion control levers (Fig. 23).

To turn, release pressure on the motion control lever toward the direction you want to turn (Fig. 23).

The farther you move the traction control levers in either direction, the faster the machine will move in that direction.

To stop pull the motion control levers to neutral.

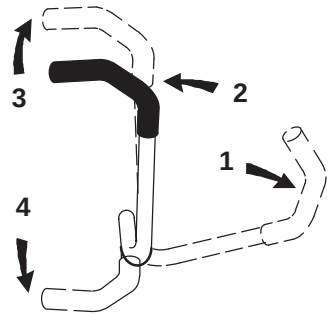


Figure 23

1. Motion control lever—neutral lock position
2. Center unlock position
3. Forward
4. Backward

Driving Backward

1. Move levers to the center, unlocked position.
2. To go backward, slowly pull the motion control levers rearward (Fig. 23).

To go straight, apply equal pressure to both motion control levers (Fig. 23).

To turn, release pressure on the motion control lever toward the direction you want to turn (Fig. 23).

To stop push the motion control levers to neutral.

Stopping the Machine

To stop the machine, move the traction control levers to neutral and move to locked position, disengage the power take off (PTO), and turn the ignition key to off. Also set the parking brake when you leave the machine; refer to Setting the Parking Brake, page 20. Remember to remove the key from the ignition switch.

Caution

Children or bystanders may be injured if they move or attempt to operate the tractor while it is unattended.

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

Adjusting Height-of-Cut

The height-of-cut is adjusted from 1-1/2 to 4-1/2 in. (38 to 114 mm) in 1/4 in. (6 mm) increments by relocating clevis pin in different hole locations.

1. Raise the height-of-cut lever to the transport position (also the 4-1/2 in. (114 mm) cutting height position) (Fig. 24).
2. To adjust, remove hairpin cotter and clevis pin from height-of-cut bracket (Fig. 24).
3. Select hole in height-of-cut bracket corresponding to the height-of-cut desired, and insert clevis pin (Fig. 24).
4. Secure clevis pin with hairpin cotter (Fig. 24).

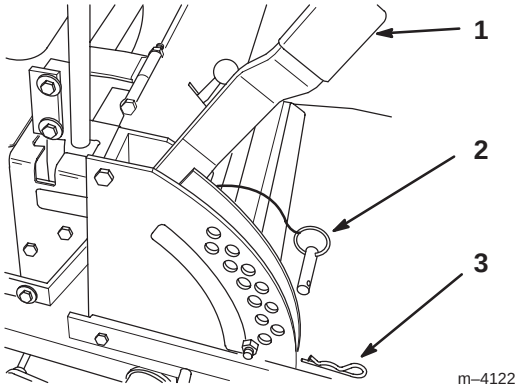


Figure 24

1. Height-of-cut lever
2. Clevis pin
3. Hairpin cotter

5. Lower height-of-cut lever onto clevis pin.

Adjusting Anti-Scalp Rollers

Whenever you change the height-of-cut it is recommended to adjust the height of the anti-scalp rollers.

1. Disengage the power take off (PTO) and turn the ignition key to off. Move controllers to neutral locked position and apply parking brake. Remove the key.
2. After adjusting height-of-cut remove nut and washer while holding stud with wrench (Fig. 25).

Note: Do not remove the wheel nut and washer (Fig. 25).

3. Select hole so gage wheel is positioned to the nearest corresponding height-of-cut desired (Fig. 25).
4. Reinstall the stud nut and washer (Fig. 25).
5. Repeat adjustment on other gage wheels.

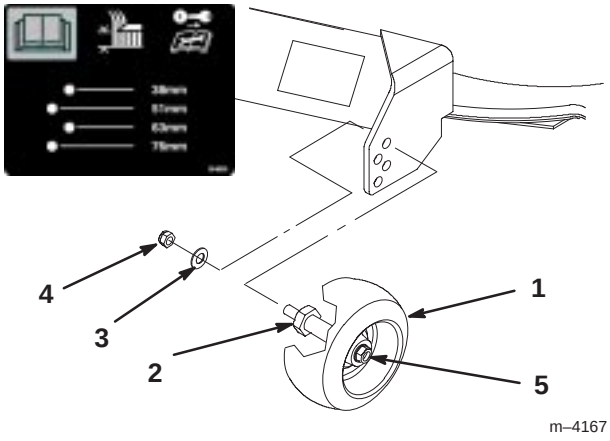


Figure 25

1. Gage wheel
2. Stud
3. Washer
4. Nut
5. Wheel nut and washer. Do not remove.

Center Rollers

1. Disengage the power take off (PTO) and turn the ignition key to off. Move controllers to neutral locked position and apply parking brake.

2. After adjusting height-of-cut, remove bolt and nut (Fig. 26).

3. Select hole so gage wheel is positioned to the nearest corresponding height-of-cut desired (Fig. 26).

Note: Do not adjust rollers to support the deck.

4. Reinstall the bolt, center rollers and nut (Fig. 26).

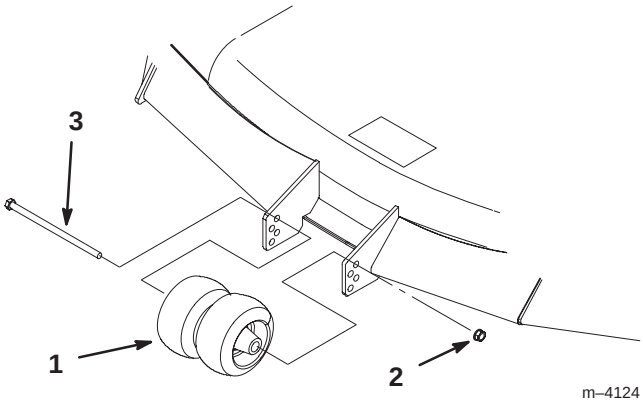


Figure 26

1. Center rollers and spacer
2. Nut
3. Bolt

Positioning the Seat

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

1. To adjust, move the lever sideways to unlock seat (Fig. 27).

2. Slide the seat to the desired position and release lever to lock in position.

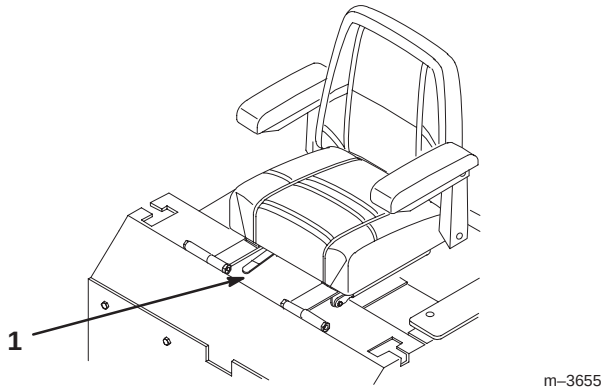


Figure 27

1. Adjustment lever

Pushing the Machine by Hand

Important Always push the machine by hand. Never tow the machine because hydraulic damage may occur.

To Push the Machine

1. Disengage the power take off (PTO) and turn the ignition key to off.

2. Rotate the by-pass valves counterclockwise 1 turn to push. This allows hydraulic fluid to by-pass the pump enabling the wheels to turn (Fig. 28).

Important Do not rotate by-pass valves more than 1 turn. This prevents valves from coming out of the body and causing fluid to run out.

To Operate the Machine

Turn the by-pass valves in to operate (Fig. 28).

Note: The machine will not drive unless by-pass valves are turned in.

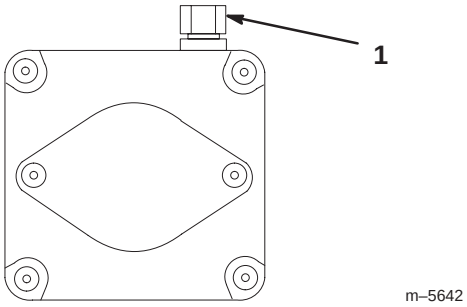


Figure 28

1. By-pass valve

Using a Rollover Protection System

Rollover protection systems (ROPS) are available for many riding machines. Contact an Authorized Service Dealer for information on obtaining ROPS for your machine.

Operating with Grass Deflector

The mower has a hinged grass deflector that disperses clippings to the side and down toward the turf. Refer to Installing the Grass Deflector on page 17.

Make sure the side discharge blades are used when in side discharge mode.

Important Do not use side discharge blades while in recycling mode.

Danger

Without the grass deflector, discharge cover, or complete grass catcher assembly mounted in place, you and others are exposed to blade contact and thrown debris. Contact with rotating mower blades and thrown debris will cause injury or death.

- **Never remove the grass deflector from the mower because the grass deflector routes material down toward the turf. If the grass deflector is ever damaged, replace it immediately.**
- **Never put your hands or feet under the mower.**
- **Never try to clear discharge area or mower blades unless you move the power take off (PTO) to off and rotate the ignition key to off. Also remove the key and pull the wire off the spark plugs.**

Transporting Machines

Use a heavy-duty trailer or truck to transport the machine. Ensure that the trailer or truck has all necessary lighting and marking as required by law. Please carefully read all the safety instructions and decals. Knowing this information could help you, your family, pets or bystanders avoid injury.

To transport the machine:

- Lock brake and block wheels.
- Securely fasten the machine to the trailer or truck with straps, chains, cable, or ropes.
- Secure a trailer to towing vehicle with safety chains.

Warning

Driving on street or roadway without turn signals, lights, reflective markings, or a slow moving vehicle emblem is dangerous and can lead to accidents causing personal injury.

Do not drive machine on a public street or roadway.

Loading Machines

Use extreme caution when loading units on trailers or trucks. One full width ramp that is wide enough to extend beyond the rear tires is recommended instead of individual ramps for each side of the unit. The lower rear section of the tractor frame extends back between the rear wheels and serves as a stop for tipping backward. Having a full width ramp provides a surface for the frame members to contact if the unit starts to tip backward. If it is not possible to use one full width ramp, use enough individual ramps to simulate a full width continuous ramp.

Ramp should be long enough so that the angles between the ramp and the ground and the ramp and the trailer or truck do not exceed 15 degrees. A steeper angle may cause mower deck components to get caught as the unit moves from ramp to trailer or truck. Steeper angles may also cause the unit to tip backward. If loading on or near a slope, position the trailer or truck so it is on the down side of the slope and the ramp extends up the slope. This will minimize the ramp angle. The trailer or truck should be as level as possible.

Important **Do not** attempt to turn the unit while on the ramp; you may lose control and drive off the side.

Avoid sudden acceleration when driving up a ramp and sudden deceleration when backing down a ramp. Both maneuvers can cause the unit to tip backward.

Warning

Loading a unit onto a trailer or truck increases the possibility of backward tip-over and could cause serious injury or death.

- **Use extreme caution when operating a unit on a ramp.**
- **Use only a single, full width ramp; *Do not* use individual ramps for each side of the unit.**
- **If individual ramps must be used, use enough ramps to create an unbroken ramp surface wider than the unit.**
- ***Do not* exceed a 15 degree angle between ramp and ground or between ramp and trailer or truck.**
- **Avoid sudden acceleration while driving unit up a ramp to avoid tipping backward.**
- **Avoid sudden deceleration while backing unit down a ramp to avoid tipping backward.**

Tips for Mowing Grass

Fast Throttle Setting

For best mowing and maximum air circulation, operate the engine at fast. Air is required to thoroughly cut grass clippings, so do not set the height-of-cut so low as to totally surround the mower by uncut grass. Always try to have one side of the mower free from uncut grass, which allows air to be drawn into the mower.

Cutting a Lawn for the First Time

Cut grass slightly longer than normal to ensure the cutting height of the mower does not scalp any uneven ground. However, the cutting height used in the past is generally the best one to use. When cutting grass longer than six inches tall, you may want to cut the lawn twice to ensure an acceptable quality of cut.

Cut 1/3 of the Grass Blade

It is best to cut only about 1/3 of the grass blade. Cutting more than that is not recommended unless grass is sparse, or it is late fall when grass grows more slowly.

Mowing Direction

Alternate mowing direction to keep the grass standing straight. This also helps disperse clippings which enhances decomposition and fertilization.

Mow at Correct Intervals

Normally, mow every four days. But remember, grass grows at different rates at different times. So to maintain the same cutting height, which is a good practice, mow more often in early spring. As the grass growth rate slows in mid summer, mow less frequently. If you cannot mow for an extended period, first mow at a high cutting height; then mow again two days later at a lower height setting.

Cutting Speed

To improve cut quality, use a slower ground speed.

Avoid Cutting Too Low

If the cutting width of the mower is wider than the mower you previously used, raise the cutting height to ensure that uneven turf is not cut too short.

Long Grass

If the grass is ever allowed to grow slightly longer than normal, or if it contains a high degree of moisture, raise the cutting height higher than usual and cut the grass at this setting. Then cut the grass again using the lower, normal setting.

When Stopping

If the machine's forward motion must be stopped while mowing, a clump of grass clippings may drop onto your lawn. To avoid this, move onto a previously cut area with the blades engaged.

Keep the Underside of the Mower Clean

Clean clippings and dirt from the underside of the mower after each use. If grass and dirt build up inside the mower, cutting quality will eventually become unsatisfactory.

Blade Maintenance

Maintain a sharp blade throughout the cutting season because a sharp blade cuts cleanly without tearing or shredding the grass blades. Tearing and shredding turns grass brown at the edges, which slows growth and increases the chance of disease. Check the cutter blades daily for sharpness, and for any wear or damage. File down any nicks and sharpen the blades as necessary. If a blade is damaged or worn, replace it immediately with a genuine Toro replacement blade.

Maintenance

Recommended Maintenance Schedule

Maintenance Service Interval	Maintenance Procedure
After First Use	• Check hydraulic fluid level • Change engine oil • Change hydraulic filter
Each Use	• Check oil level • Check safety system • Clean cooling systems • Clean mower housing
Every 5 Hours	• Check cutting blades • Grease blade spindle bearings
Every 25 Hours	• Check hydraulic fluid level • Grease chassis[1] • Oil linkage bushings[1] • Service foam air cleaner[1] • Check belts for wear/cracks • Check battery electrolyte • Check tire pressure • Idler pulley pivot
Every 100 Hours	• Change oil[1] • Service paper air cleaner[1] • Check spark plugs • Check hydraulic lines
Every 200 Hours	• Change oil filter • Change hydraulic filter • Replace fuel filter
Every 300 Hours	• Replace paper air cleaner[1]
Every 500 Hours or Storage	• Adjust castor pivot • Adjust wheel hub slotted nut
Before Storage	• Perform all maintenance procedures listed above before storage • Drain gasoline • Charge battery, disconnect cables • Paint chipped surfaces

[1]More often in dusty, dirty conditions

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

Caution

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

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

Servicing the Cutting Blades

Maintain sharp blades throughout the cutting season because sharp blades cut cleanly without tearing or shredding the grass blades. Tearing and shredding turns grass brown at the edges, which slows growth and increases the chance of disease.

Check the cutter blades daily for sharpness, and for any wear or damage. File down any nicks and sharpen the blades as necessary. If a blade is damaged or worn, replace it immediately with a genuine Toro replacement blade. For convenient sharpening and replacement, you may want to keep extra blades on hand.

Danger

A worn or damaged blade can break, and a piece of the blade could be thrown into the operator's or bystander's area, resulting in serious personal injury or death.

- **Inspect the blade periodically for wear or damage.**
- **Replace a worn or damaged blade.**

Before Inspecting or Servicing the Blades

Park the machine on a level surface, disengage the blade control (PTO) and set the parking brake. Turn the ignition key to off. Remove the key and disconnect the spark plug wires from the spark plugs.

Inspecting the Blades

1. Inspect the cutting edges (Fig 29). If the edges are not sharp or have nicks, remove and sharpen the blades. Refer to Sharpening the Blades on page 32.
2. Inspect the blades, especially the curved area (Fig. 29). If you notice any damage, wear, or a slot forming in this area (item 3 in Fig. 29), immediately install a new blade.

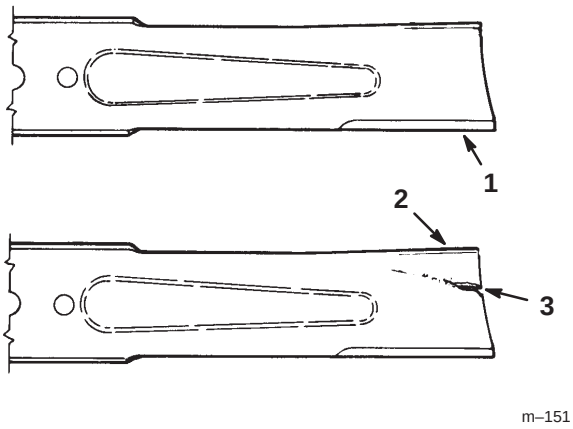


Figure 29

1. Cutting edge
2. Curved area
3. Wear/slot forming

Checking for Bent Blades

1. Stop the engine, set the parking brake, remove the key and disconnect the spark plug wires from the spark plugs.
2. Rotate the blades until the ends face forward and backward (Fig. 30). Measure from a level surface to the cutting edge of the blades (Fig. 31). Note this dimension.

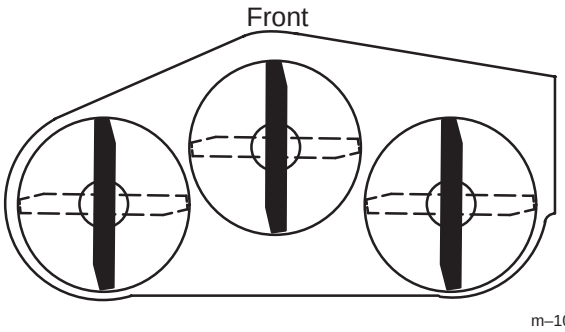


Figure 30

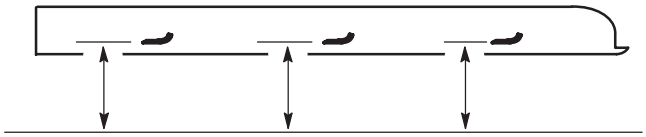


Figure 31

3. Rotate the opposite ends of the blades forward.
4. Measure from a level surface to the cutting edge of the blades at the same position as in step 2 above. The difference between the dimensions obtained in steps 2 and 3 must not exceed 1/8 in. (3 mm). If this dimension exceeds 1/8 in. (3 mm), the blade is bent and must be replaced; refer to Removing the Blades, and Installing the Blades, page 33.

Warning

A blade that is bent or damaged could break apart and could seriously injure or kill you or bystanders.

- **Always replace bent or damaged blade with a new blade.**
- **Never file or create sharp notches in the edges or surfaces of blade.**

Removing the Blades

Blades must be replaced if a solid object is hit, if the blade is out of balance or is bent. To ensure optimum performance and continued safety conformance of the machine, use genuine Toro replacement blades. Replacement blades made by other manufacturers may result in non-conformance with safety standards.

Warning

Contact with sharp blade can cause serious injury.

Wear gloves or wrap sharp edges of the blade with a rag.

Hold the blade end using a rag or thickly-padded glove. Remove the blade bolt, flat washer, split lock washer, and blade from the spindle shaft (Fig. 32).

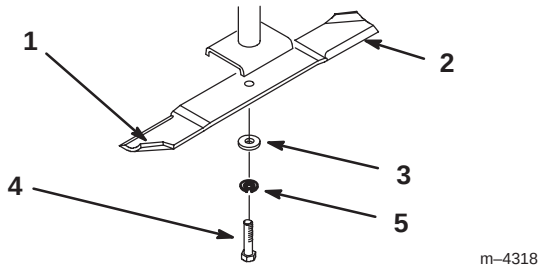


Figure 32

1. Sail area of blade
2. Blade
3. Flat washer
4. Blade bolt
5. Split lock washer

Sharpening the Blades

Warning

When sharpening blade, pieces of blade could be thrown and cause serious injury.

Wear proper eye protection when sharpening blade.

1. Use a file to sharpen the cutting edge at both ends of the blade (Fig. 33). Maintain the original angle. The blade retains its balance if the same amount of material is removed from both cutting edges.

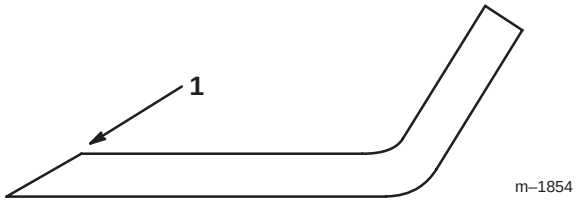


Figure 33

1. Sharpen at original angle

2. Check the balance of the blade by putting it on a blade balancer (Fig. 34). If the blade stays in a horizontal position, the blade is balanced and can be used. If the

blade is not balanced, file some metal off the end of the sail area only (Fig. 32). Repeat this procedure until the blade is balanced.

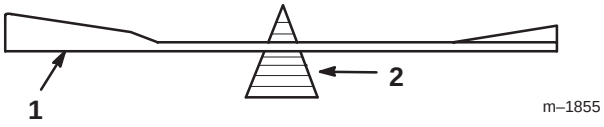


Figure 34

1. Blade
2. Balancer

Installing the Blades

1. Install the blade onto the spindle shaft (Fig. 32).

Important The curved part of the blade must be pointing upward toward the inside of the mower to ensure proper cutting.

2. Install the flat washer, lock washer and blade bolt (Fig. 32). Torque the blade bolt to 85–110 ft.-lb. (115–150 N•m).

Servicing the Air Cleaner

Foam Element: Clean and re-oil after every 25 operating hours.

Paper Element: Clean after every 100 operating hours. Replace after every 300 operating hours or yearly. Which ever comes first.

Note: Service the air cleaner more frequently (every few hours) if operating conditions are extremely dusty or sandy.

Removing the Foam and Paper Elements

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to off. Remove the key.

2. Clean around the air cleaner to prevent dirt from getting into the engine and causing damage. Unlatch two side latches and remove the air cleaner cover (Fig. 35).

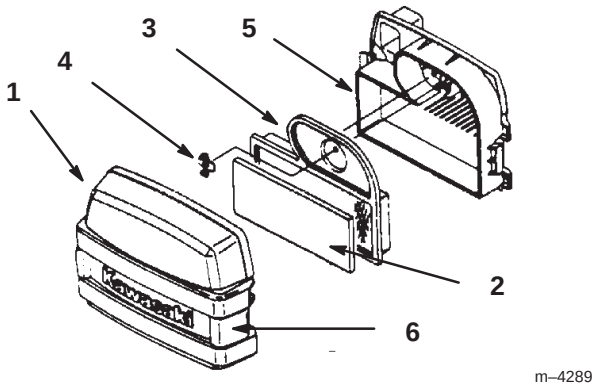


Figure 35

1. Cover
2. Foam element
3. Paper element
4. Wing nut
5. Air cleaner base
6. Latches

3. Carefully remove the foam element from the paper element (Fig. 35).

4. Unscrew the wing nut and remove the paper element (Fig. 35).

Cleaning the Foam Element

1. Wash the foam element in liquid soap and warm water. When the element is clean, rinse it thoroughly.

2. Dry the element by squeezing it in a clean cloth. Do not wring.

3. Soak element in new engine oil. (Fig. 36). Squeeze the element to remove excess oil.

Important Replace the foam element if it is torn or worn.

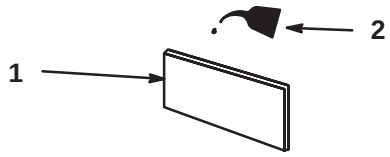


Figure 36

1. Foam element
2. Oil

Cleaning the Paper Element

1. Lightly tap the element on a flat surface to remove dust and dirt (Fig. 37).

2. Inspect the element for tears, an oily film, and damage to the rubber seal.

Important Never clean the paper element with pressurized air or liquids, such as solvent, gas, or kerosene. Replace the paper element if it is damaged or cannot be cleaned thoroughly.

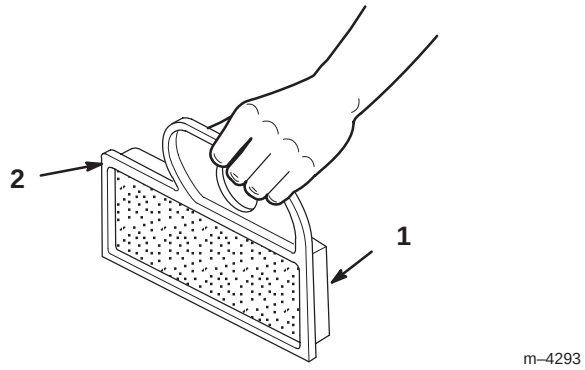


Figure 37

1. Paper element
2. Rubber seal

Servicing the Engine Oil

Change oil:

- After the first 8 operating hours.
- After every 100 operating hours.

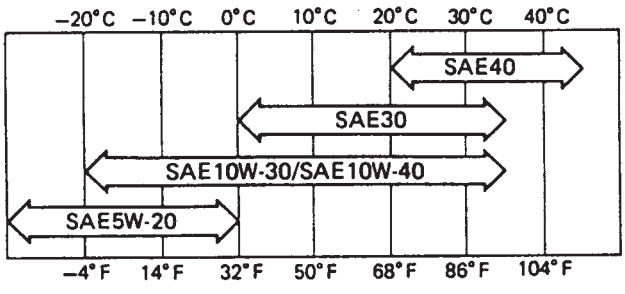
Note: Change oil more frequently when operating conditions are extremely dusty or sandy.

Oil Type: Detergent oil (API service SG or SH)

Crankcase Capacity: w/filter, 61 oz. (1.8 l)

Viscosity: See table below

USE THESE SAE VISCOSITY OILS



Checking Oil Level

1. Park the machine on a level surface, disengage the power take off (PTO) and turn the ignition key to off. Remove the key.
2. Clean around the oil dipstick (Fig. 38) so dirt cannot fall into the filler hole and damage the engine.
3. Unscrew the oil dipstick and wipe the end clean (Fig. 38).
4. Slide the oil dipstick fully into the filler tube, do not thread onto tube (Fig. 38). Pull the dipstick out and look at the end. If oil level is low, slowly pour only enough oil into the filler tube to raise the level to the full mark.

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

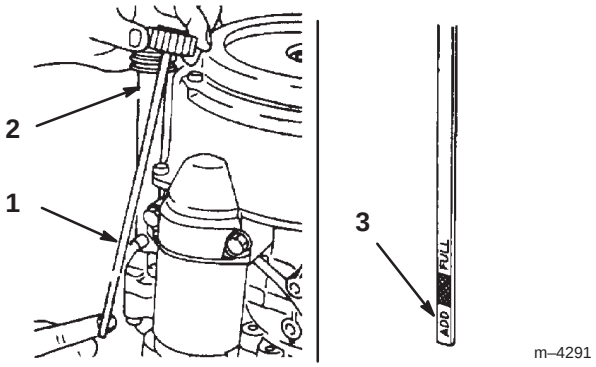


Figure 38

1. Oil dipstick
2. Filler tube
3. Dipstick end

Changing the Oil

1. Start the engine and let it run five minutes. This warms the oil so it drains better.
2. Park the machine so that the drain side is slightly lower than the opposite side to ensure the oil drains completely. Then disengage the power take off (PTO), set the parking brake, and turn the ignition key to off. Remove the key.
3. Place a pan below the oil drain. Use either a flat screw driver, 3/8 in. wrench or 10 mm wrench to open valve (Fig. 39).
4. Rotate valve end clockwise to close valve. Rotate valve end counterclockwise to open valve (Fig. 39).
5. When oil has drained completely, close the drain valve (Fig. 39).

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

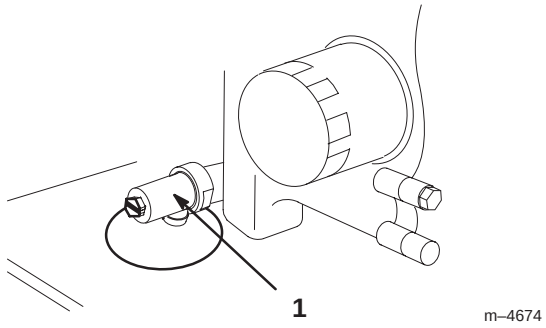


Figure 39

1. Oil drain valve

6. Slowly pour approximately 80% of the specified oil, on page 34, into the filler cap (Fig. 38). Now check the oil level; refer to Checking Oil Level, page 34. Slowly add additional oil to bring it to the full mark.

Change Oil Filter

Replace the oil filter every 200 hours or every other oil change.

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

1. Drain the oil from the engine; refer to Changing/Draining Oil, page 34.

2. Remove the old filter (Fig. 40).

3. Apply a thin coat of new oil to the rubber gasket on the replacement filter (Fig. 40).

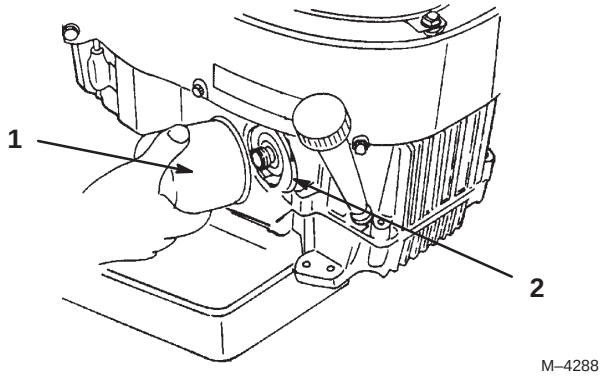


Figure 40

1. Oil filter
2. Adapter

4. Install the replacement oil filter to the adapter. Turn the oil filter clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 3/4 turn (Fig. 40).

5. Fill the crankcase with the proper type of new oil; refer to Changing/Draining Oil, page 34.

Servicing the Spark Plug

Check the spark plugs after every 100 operating hours. Make sure the air gap between the center and side electrodes is correct before installing the spark plug. Use a spark plug wrench for removing and installing the spark plugs and a gapping tool/feeler gauge to check and adjust the air gap. Install a new spark plugs if necessary.

Type: Champion RCJ8Y or equivalent

Air Gap: 0.040 in. (1.0 mm)

Removing the Spark Plugs

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to off. Remove the key.

2. Pull the wires off the spark plugs (Fig. 41). Now clean around the spark plugs to prevent dirt from falling into the engine and potentially causing damage.

3. Remove the spark plugs.

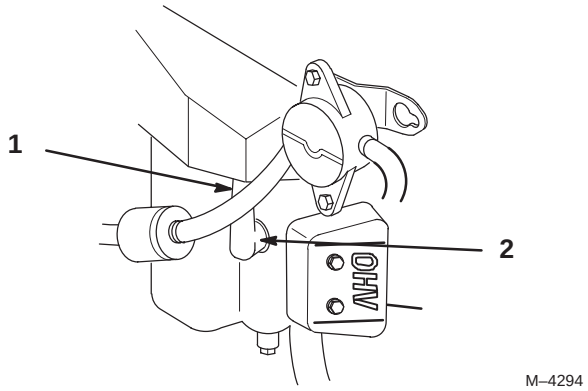


Figure 41

1. Spark plug wire installed
2. Spark plug

Checking the Spark Plug

1. Look at the center of the spark plugs (Fig. 42). If you see light brown or gray on the insulator, the engine is operating properly. A black coating on the insulator usually means the air cleaner is dirty.

Important Never clean the spark plugs. Always replace the spark plugs when it has a black coating, worn electrodes, an oily film, or cracks.

2. Check the gap between the center and side electrodes (Fig. 42). Bend the side electrode (Fig. 42) if the gap is not correct.

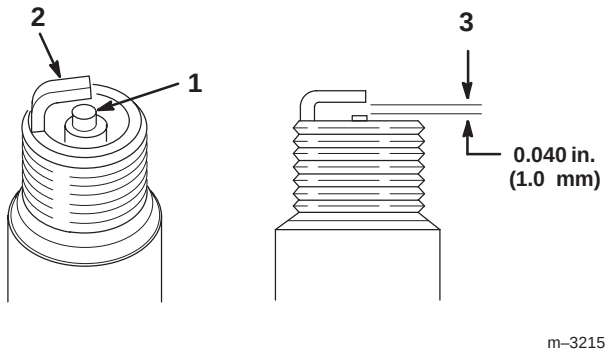


Figure 42

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

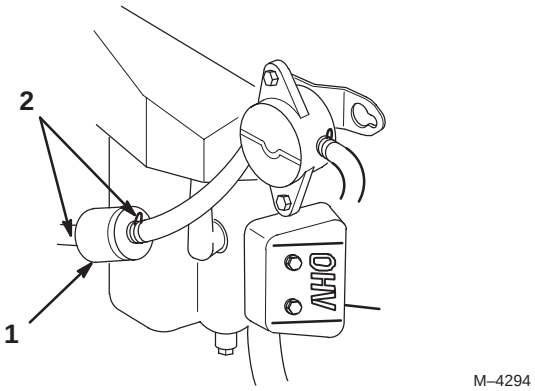


Figure 43

1. Filter
2. Hose clamp

Installing the Spark Plugs

1. Install the spark plugs. Make sure the air gap is set correctly.
2. Tighten the spark plugs to 11 ft.-lb. (15 N.m).
3. Push the wires onto the spark plugs (Fig. 41).

Servicing the Fuel Filter

Replace the fuel filter after every 200 operating hours or yearly, whichever occurs first.

Replacing the Fuel Filter

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

1. Disengage the power take off (PTO), set the parking brake, stop the engine, and remove the key.
2. Close fuel shut-off valve on console.
3. Squeeze the ends of the hose clamps together and slide them away from the filter (Fig. 43).
4. Remove the filter from the fuel lines.
5. Install a new filter and move the hose clamps close to the filter (Fig. 44).
6. Open fuel shut-off valve on console.

Servicing the Fuel Tank

Draining The Fuel Tank

Danger

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

- **Drain gasoline from the fuel tank when the engine is cold. Do this outdoors in an open area. Wipe up any gasoline that spills.**
- **Never smoke when draining gasoline, and stay away from an open flame or where a spark may ignite the gasoline fumes.**

1. Park the machine on a level surface, to ensure fuel tanks drain completely. Then disengage the power take off (PTO), set the parking brake, and turn the ignition key to off. Remove the key.
2. Close fuel shut-off valve (Fig. 44).
3. Loosen the hose clamp at the fuel filter and slide it up the fuel line away from the fuel filter (Fig. 44).
4. Pull the fuel line off fuel filter (Fig. 44).
5. Open fuel shut-off valve for left and right tanks. Allow gasoline to drain into a gas can or drain pan. (Fig. 44).

Note: Now is the best time to install a new fuel filter because the fuel tank is empty.

6. Install the fuel line onto the fuel filter. Slide the hose clamp close to the fuel filter to secure the fuel line (Fig. 44).

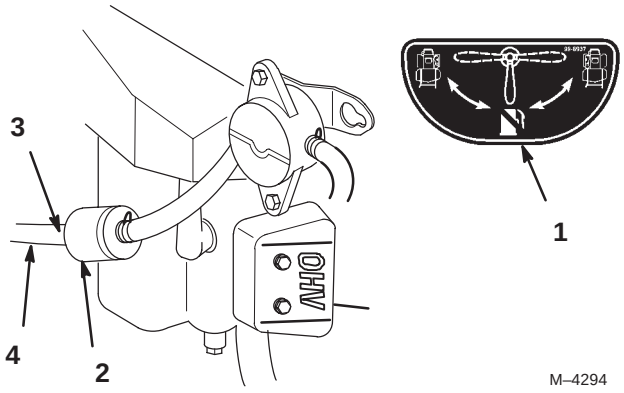


Figure 44

1. Fuel shut-off valve
2. Fuel filter
3. Hose clamp
4. Fuel line

Cleaning the Cooling System

Clean the air intake screen from grass and debris before each use.

Clean cooling fins and engine shrouds every 300 hours or yearly, which ever comes first.

1. Stop the engine, set the parking brake, remove the key, and disconnect the spark plug wires from the spark plugs.

2. Remove air intake screen, cylinder covers and fan housing.

3. Clean debris and grass from parts.

4. Reinstall air intake screen, cylinder covers, and fan housing.

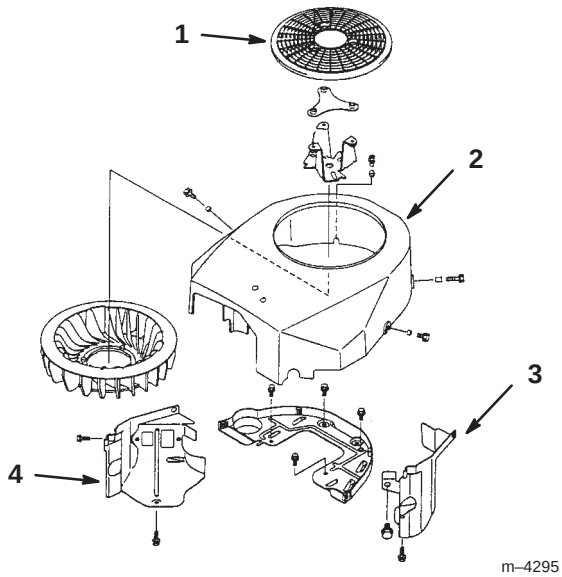


Figure 45

1. Air intake screen
2. Fan housing
3. Cylinder cover
4. Cylinder cover

Greasing and Lubrication

Lubricate the machine when shown on the **Check Service Reference Aid** decal (Fig. 46). Grease more frequently when operating conditions are extremely dusty or sandy.

Grease with No. 2 general purpose lithium base or molybdenum base grease.

How to Grease

1. Disengage the power take off (PTO) and turn the ignition key to off. Remove the key.

2. Clean the grease fittings with a rag. Make sure to scrape any paint off the front of the fittings.

3. Connect a grease gun to the fitting. Pump grease into the fittings until grease begins to ooze out of the bearings.

4. Wipe up any excess grease.

Where to Add Grease

Lubricate the grease fittings as shown on the **Check Service Reference Aid** decal (Fig. 46).

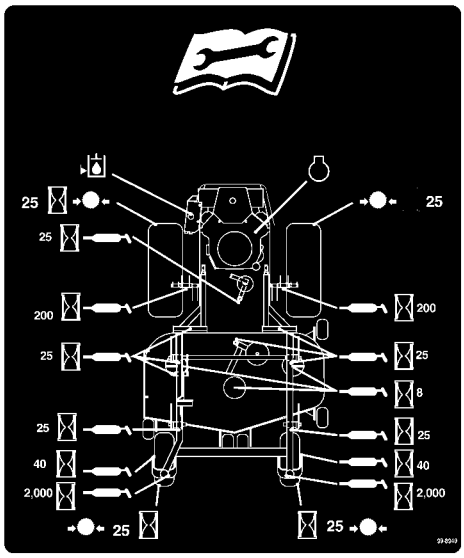


Figure 46

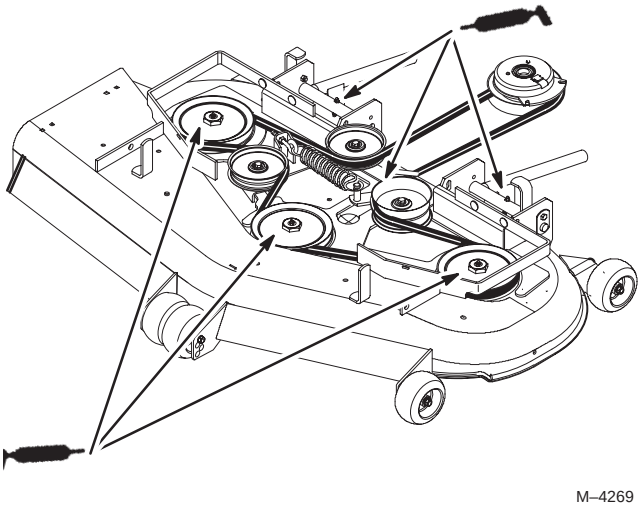


Figure 47

Grease Front Castor Pivots

Lubricate the front castor pivots once a year.

1. Remove hex plug and cap. Thread a grease zerk into hole.
2. Pump grease into zerk until it oozes out around top bearing.
3. Remove grease zerk in hole. Reinstall hex plug and cap.

Greasing the Bearings

The cutting unit must be lubricated regularly. Refer to the Recommended Maintenance Schedule on page 30. Grease with No. 2 general purpose lithium base or molybdenum base grease.

1. Stop the engine, set the parking brake, remove the key and disconnect the spark plug wires from the spark plugs.
2. Grease the fittings on the three spindle bearings (Fig. 47).
3. Grease the idler pulley pivot (Fig. 47).
4. Grease the fittings on the push arms (Fig. 47).

Where to Add Light Oil or Spray Lubrication

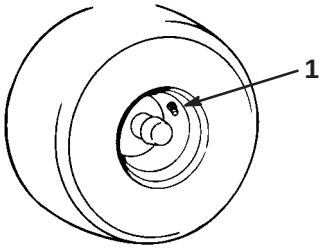
Lubricate the machine in the following areas with spray type lubricant or light oil. Lubricate every 160 hours.

- Seat switch actuator.
- Brake handle pivot.
- Brake rod bushings.
- Motion control bronze bushings.

Checking the Tire Pressure

Maintain the air pressure in the front and rear tires as specified. Uneven tire pressure can cause uneven cut. Check the pressure at the valve stem after every 50 operating hours or monthly, whichever occurs first (Fig. 48). Check the tires when they are cold to get the most accurate pressure reading.

Pressure: 13 psi (90 kPa) drive wheels and castor wheels.



m–1872

Figure 48

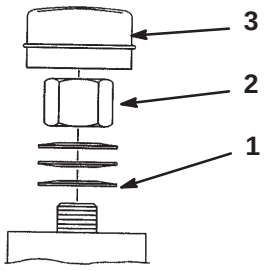
1. Valve stem

Adjusting the Castor Pivot Bearing

Check after every 500 operating hours or at storage, which ever comes first.

1. Stop the engine, set the parking brake, remove the key and disconnect the spark plug wires from the spark plugs.
2. Remove dust cap from castor and tighten lock nut (Fig. 49).
3. Tighten until spring washers are flat and then back off a 1/4 turn to properly set the pre–load on the bearings (Fig. 49).
4. Grease castor pivot. Refer to Greasing and Lubrication on 37.

Important Make sure spring washers are installed correctly as shown in figure 49.



M–4640

Figure 49

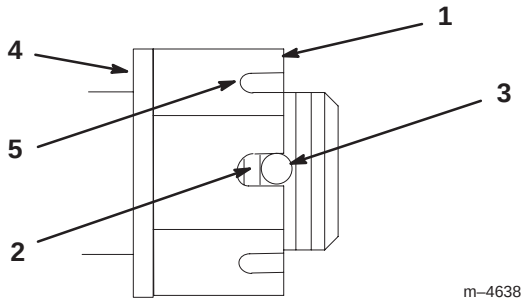
1. Spring washers
2. Lock nut
3. Dust cap

Wheel Hub Slotted Nut

Check after every 500 operating hours.

The slotted nut needs to be torqued to 125 ft.-lb. (169.5 N•m).

1. Stop the engine, set the parking brake, remove the key and disconnect the spark plug wires from the spark plugs.
2. Remove cotter pin.
3. Torque slotted nut to 125 ft.-lb. (169.5 N•m) (Fig. 50).
4. Check the distance from bottom of slot in nut to inside edge of hole. Two threads or less should be showing (Fig. 50).
5. If more than two threads are showing remove nut and install washer between hub and nut (Fig. 50).
6. Torque the slotted nut to 125 ft.-lb. (169.5 N•m) (Fig. 50).
7. Tighten nut until the next set of slots line up with the hole in the shaft (Fig. 50).
8. Replace cotter pin.



m–4638

Figure 50

1. Slotted nut
2. Two threads or less showing
3. Hole in threaded shaft
4. Washer (if needed)
5. Slot

Servicing the Hydraulic System

Checking the Hydraulic Fluid

Check the hydraulic fluid level before engine is first started.

Check the hydraulic fluid level after first 8 operating hours.

Check the hydraulic fluid level after every 25 operating hours.

Fluid Type: Mobil 1 15W-50 synthetic motor oil or equivalent synthetic oil.

Important Use oil specified or equivalent. Other fluids could cause system damage.

Hydraulic System Oil Capacity: 67 oz. (2.0 l)

Note: There are two ways of checking the hydraulic oil. One is when the oil is warm and one is when the oil is cold. The baffle inside the tank has two levels depending if the oil is warm or cold.

1. Position machine on a level surface and set the parking brake.
2. Clean area around filler neck of hydraulic tank (Fig. 51).
3. Remove cap from filler neck. Look inside to check if there is fluid in the reservoir. (Fig. 51).
4. If there is no fluid, add fluid to the reservoir until it reaches the ***cold*** level of the baffle.
5. Run the machine at low idle for 15 minutes to allow any air to purge out of the system and warm fluid. Refer to Starting and Stopping the Engine on page 23.
6. Recheck the fluid level while the fluid is warm. If required, add fluid to the reservoir until it reaches the ***hot*** level of the baffle.

Note: The fluid level should be to the top of the ***hot*** level of the baffle, when the fluid is warm (Fig. 51).

7. Install cap on filler neck.

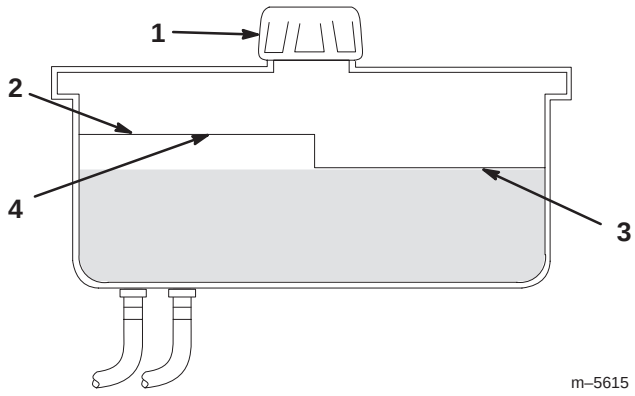


Figure 51

1. Cap
2. Baffle
3. Cold fluid level—full
4. Hot fluid level—full

Warning

Hydraulic fluid escaping under pressure can penetrate skin and cause injury.

- **If hydraulic fluid is injected into the skin it must be surgically removed within a few hours by a doctor familiar with this type of injury. Gangrene may result if this is not done.**
- **Keep body and hands away from pin hole leaks or nozzles that eject high pressure hydraulic fluid.**
- **Use cardboard or paper to find hydraulic leaks.**
- **Safely relieve all pressure in the hydraulic system before performing any work on the hydraulic system.**
- **Make sure all hydraulic fluid hoses and lines are in good condition and all hydraulic connections and fittings are tight before applying pressure to hydraulic system.**

Replacing the Hydraulic Filter

Change the hydraulic filter:

- After the first 8 operating hours.
- After every 200 operating hours.

1. Position machine on a level surface, stop the engine, and remove key from ignition switch.

Important Do not substitute automotive oil filter or severe hydraulic system damage may result.

2. Remove hydro cap and temporarily cover opening with a plastic bag and rubber band to prevent all hydro fluid from draining out.
3. Place drain pan under filter, remove the old filter and wipe the filter adapter gasket surface clean (Fig. 52).

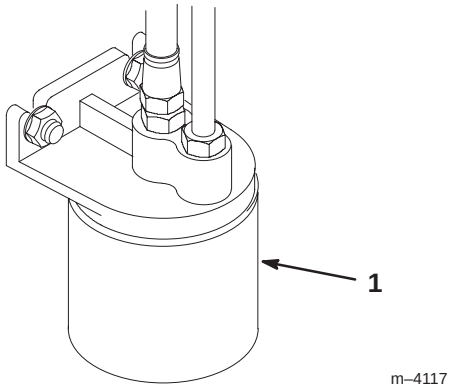


Figure 52

1. Hydraulic filter

4. Apply a thin coat hydro fluid to the rubber gasket on the replacement filter (Fig. 53).

5. Install replacement hydraulic filter onto the filter adapter. Do not tighten.

6. Remove plastic bag from tank opening and allow filter to fill with hydro fluid.

7. When fluid overflows filter turn the oil filter clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 1/2 turn (Fig. 53).

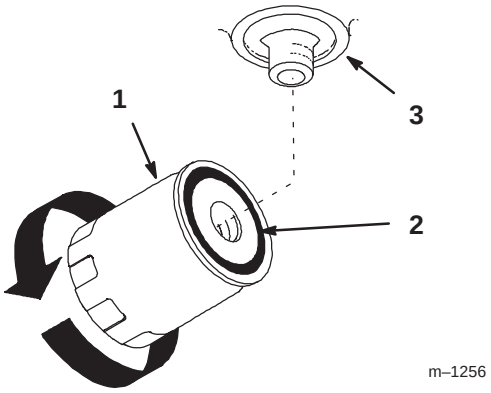


Figure 53

1. Hydraulic filter
2. Gasket
3. Adapter

8. Clean up any spilled fluid.

9. If there is no fluid, add fluid to reservoir approximately a 1/4 in. (6 mm) below the top of baffle.

10. Start engine and let run for about two minutes to purge air from the system. Stop the engine and check for leaks. If one or both wheels will not drive, refer to Bleeding Hydraulic System, page 41.

11. Recheck level while fluid is warm. Add fluid to raise level to top of the baffle, if required. **Do not overfill.**

Bleeding the Hydraulic System

The traction system is self bleeding, however, it may be necessary to bleed the system if fluid is changed or after work is performed on the system.

1. Raise rear of the machine so wheels are off the ground and support with jack stands.

2. Start the engine and run at idle speed. Engage traction on one side and spin the wheel by hand.

3. When the wheel begins to spin on its own, keep it engaged until wheel drives smoothly (minimum 2 minutes).

4. Check hydraulic fluid level as it drops and add as required to maintain proper level.

5. Repeat procedure on opposite wheel.

Check the Hydraulic Lines

After every 100 operating hours, check hydraulic lines and hoses for leaks, loose fittings, kinked lines, loose mounting supports, wear, weather and chemical deterioration. Make necessary repairs before operating.

Note: Keep areas around hydraulic system clean from grass and debris build up.

Warning

Hydraulic fluid escaping under pressure can penetrate skin and cause injury.

- **If hydraulic fluid is injected into the skin it must be surgically removed within a few hours by a doctor familiar with this type of injury. Gangrene may result if this is not done.**
- **Keep body and hands away from pin hole leaks or nozzles that eject high pressure hydraulic fluid.**
- **Use cardboard or paper to find hydraulic leaks.**
- **Safely relieve all pressure in the hydraulic system before performing any work on the hydraulic system.**
- **Make sure all hydraulic fluid hoses and lines are in good condition and all hydraulic connections and fittings are tight before applying pressure to hydraulic system.**

Adjusting the Motion Controls

Adjusting the Handle Neutral

If motion control levers do not align, or move easily into the console notch, adjustment is required. Adjust each lever, spring and rod separately.

Note: Motion control levers must be installed correctly. See Installing the Motion Control Levers on page 16.

1. Stop engine, remove ignition key and tilt seat forward.
2. Begin with either the left or right motion control lever. Move lever to the neutral (but not locked) position and pull lever back until the clevis pin (on arm below pivot shaft) contacts the end of the slot (just beginning to put pressure on spring) (Fig. 55).
3. Check where lever is relative to notch in console (should be centered allowing lever to pivot outward to the neutral lock position (Fig. 54).

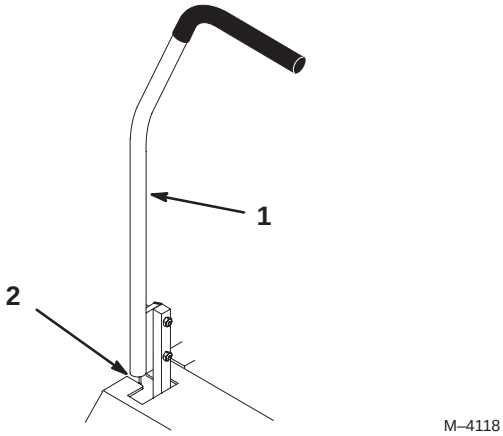


Figure 54

1. Right-hand motion control lever (shown)
2. Neutral lockout position

4. If adjustment is needed, loosen the nut against the yoke (Fig. 55).
5. Apply slight rearward pressure on the motion control lever, turn the head of the adjustment bolt in the appropriate direction until lever is centered in neutral lock position (keeping rearward pressure on the lever will keep the pin at the end of the slot and allow the adjustment bolt to move the lever to the appropriate position (Fig. 55).
6. Tighten nut and jam nut.
7. Repeat on opposite side of unit.

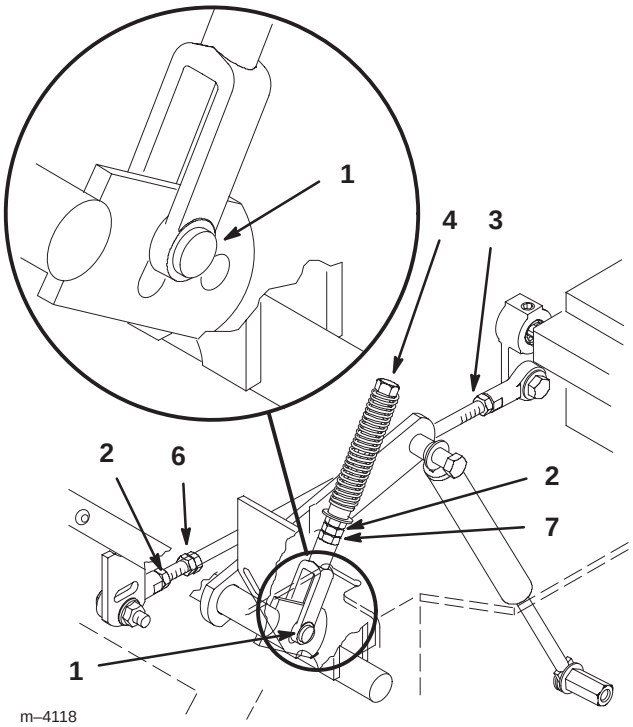


Figure 55

1. Clevis pin in slot
2. Nut
3. Nut—Left hand thread
4. Bolt
5. Pump rod
6. Double nuts
7. Jam nut

Adjusting the Hydraulic Pump Neutral

Note: Adjust handle neutral first. That has to be correct before the following adjustment can be made.

Danger

Mechanical or hydraulic jacks may fail to support machine and cause a serious injury.

- **Use jack stand when supporting machine.**
- **Do not use hydraulic jacks.**

1. This adjustment must be made with drive wheels turning. First raise the frame and block up so drive wheels can rotate freely.

Warning

Engine must be running so motion control adjustment can be performed. Contact with moving parts or hot surfaces may cause personal injury.

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

2. Slide seat forward, disconnect prop rod and tilt seat fully forward.

3. Disconnect electrical connector from the seat safety switch. ***Temporarily*** install a jumper wire across terminals in the wiring harness connector.

4. Loosen locknut at ball joint on pump control rod (Fig. 55).

Note: The front nut of each rod has left-hand threads.

5. Start engine, open throttle 1/2 way and release parking brake; refer to Starting and Stopping the Engine, page 23.

6. Adjust pump rod length by rotating double nuts on rod, in the appropriate direction, until wheel is still or slightly creeps in reverse (Fig. 55).

7. Move motion control lever forward and reverse, then back to neutral. Wheel must stop turning or slightly creep in reverse.

Note: Motion control lever must be in neutral while making any adjustments.

8. Open throttle to fast. Make sure wheel remains stopped or slightly creeps in reverse, readjust if necessary.

9. Repeat on opposite side of unit. Tighten locknuts against ball joints.

Warning

Electrical system will not perform proper safety shut off with jumper wire installed.

- **Remove jumper wire from wire harness connector and plug connector into seat switch when adjustment is completed.**
- **Never operate this unit with jumper installed and seat switch bypassed.**

10. Shut off unit. Remove jumper wire from wire harness connector and plug connector into seat switch.

11. Reinstall prop rod and lower seat.

Adjusting the Parking Brake

Check parking brake for proper adjustment.

1. Disengage brake lever (lever down).

2. Measure the length of the spring. Measurement should be 2.75 in. (70 mm) between washers (Fig. 56).

3. If adjustment is necessary, loosen the jam nut below the spring and tighten the nut directly below the yoke (Fig. 56). Turn the nut until the correct measurement is obtained. Tighten the two nuts together and repeat on opposite side of unit.

4. Turn nuts clockwise to shorten spring length and turn counterclockwise to lengthen the spring.

5. Engage parking brake, lever up.

6. Measure the distance between the trunnion roller and the collar on brake rod . Measurement should be 3/16–1/4 in. (5–7 mm) (Fig. 56).

7. If adjustment is necessary, loosen the jam nut directly below the yoke. Turn the bottom adjusting nuts until the correct measurement is obtained (Fig. 56). Tighten jam nut at yoke.

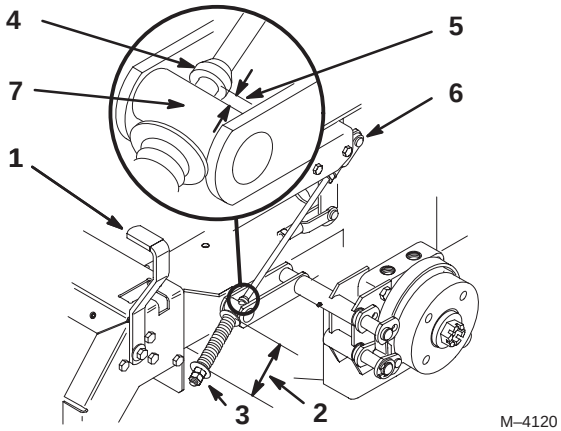


Figure 56

1. Brake lever
2. Spring, 2.75 in. (70 mm)
3. Adjusting nuts
4. Collar on brake rod
5. 3/16–1/4 in. (5–7 mm)
6. Jam nut and yoke
7. Trunion

Servicing the Fuse

Service Interval/Specification

The electrical system is protected by fuses. It requires no maintenance: however, if a fuse blows check component/circuit for malfunction or short.

Fuse: Main F1—20 amp, blade-type
Alternator F2—20 amp, blade-type

1. Raise the seat to gain access to fuse holder (Fig. 57).

2. To replace fuses pull out on the fuse to remove it (Fig. 57).

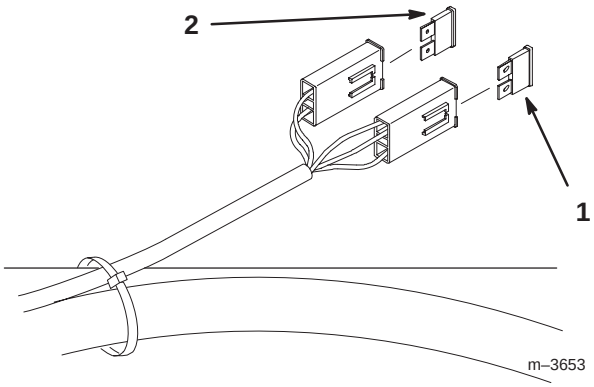


Figure 57

1. Main—20 amp
2. Alternator—20 amp

Servicing 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.*

Checking the Electrolyte Level

1. With the engine off, open the hood to locate the battery.

2. Look at the side of the battery. The electrolyte must be up to the **upper** line (Fig. 58). Do not allow the electrolyte to get below the **lower** line (Fig. 58).

3. If the electrolyte is low, add the required amount of distilled water; refer to Adding Water to the Battery, page 45.

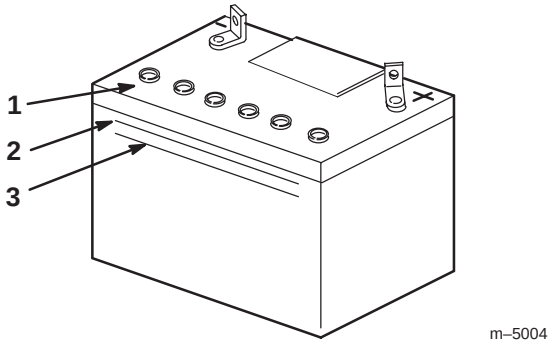


Figure 58

1. Filler caps
2. **Upper** line
3. **Lower** line

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 robber gloves to protect your hands.**
- **Fill the battery where clean water is always available for flushing the skin.**
- **Follow all instructions and comply with all safety messages on the electrolyte container.**

Installing the Battery

1. Position battery in tray with terminal posts toward the engine (Fig. 59).

2. First, install the positive (red) battery cable to positive (+) battery terminal.

3. Then install negative battery cable and ground wire to the negative (–) battery terminal.

4. Secure cables with 2 bolts (1/4 x 3/4 in.), 2 washers (1/4 in.), and 2 locknuts (1/4 in.) (Fig. 59).

5. Slide the red terminal boot onto the positive (red) battery post.

6. Secure battery with J-bolts, hold down clamp and 2 washers (1/4 in.), and 2 wing nuts (1/4 in.) (Fig. 59).

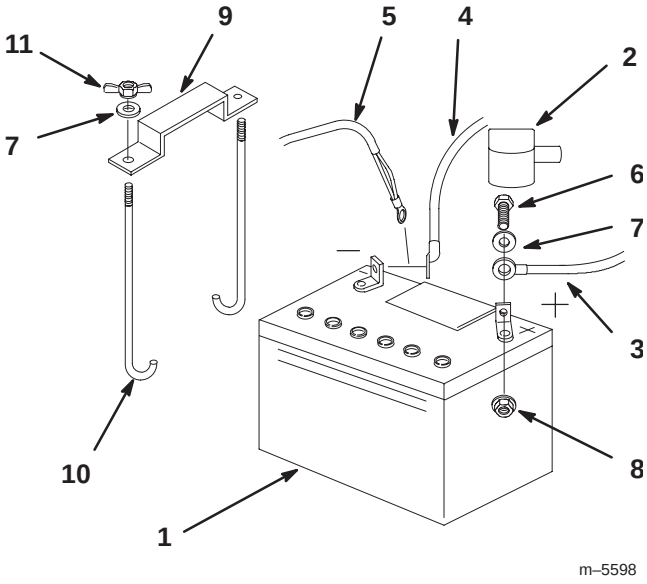


Figure 59

1. Battery
2. Terminal boot
3. Positive battery cable
4. Negative battery cable
5. Ground wire
6. Bolt, 1/4 x 3/4 in.
7. Washer, 1/4 in.
8. Locknut, 1/4 in.
9. Battery clamp
10. J-bolts
11. Wing nut, 1/4 in.

Removing the Battery

Warning

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

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

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 *Reconnect* the positive (red) battery cable before reconnecting the negative (black) cable .**

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to off. Remove the key.

2. Tilt seat up.

3. First disconnect the negative battery cable and ground wire from the negative (–) battery terminal (Fig. 59).

4. Slide the red terminal boot off the positive (red) battery terminal. Then remove positive (red) battery cable (Fig. 59).

5. Remove both wing nuts (1/4 in.) securing the battery clamp (Fig. 59).

6. Remove the battery.

Adding Water to the Battery

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

1. Remove the battery from the machine.

2. Clean the top of the battery with a paper towel.

Note: Never fill the battery with distilled water while the battery installed in the machine. Electrolyte could be spilled on other parts and cause corrosion.

3. Remove the vent caps from the battery (Fig. 58).

4. Slowly pour distilled water into each battery cell until the level is up to the **upper** line (Fig. 58) on the battery case.

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

5. Wait five to ten minutes after filling the battery cells. Add distilled water, if necessary, until the electrolyte level is up to the **upper** line (Fig. 58) on the battery case.

6. Reinstall battery vent caps.

Charging the Battery

Warning

Charging the battery produces gasses that can explode.

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

Important Always keep the battery fully charged (1.265 specific gravity). This is especially important to prevent battery damage when the temperature is below 32°F (0°C).

1. Remove the battery from the chassis; refer to Removing the Battery, page 45.

2. Check the electrolyte level; refer to Checking Electrolyte Level, page 44.

3. Make sure the filler caps are installed in battery. Charge battery for 10 to 15 minutes at 25 to 30 amps or 30 minutes at 4–6 amps.

4. When the battery is fully charged, unplug the charger from the electrical outlet, then disconnect the charger leads from the battery posts (Fig. 60).

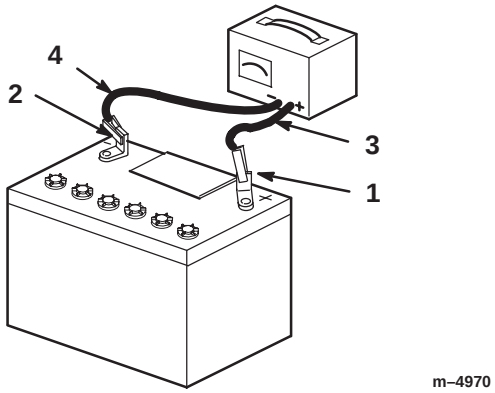


Figure 60

1. Positive Battery Post
2. Negative Battery Post
3. Red (+) Charger Lead
4. Black (–) Charger Lead

5. Install the battery in the machine and connect the battery cables; refer to Installing the Battery on page 44.

Note: Do not run the machine with the battery disconnected, electrical damage may occur.

Leveling the Mower

1. Position mower on a flat surface. Stop the engine, set the parking brake, remove the key and disconnect the spark plug wires from the spark plugs.

2. Check tire pressure of all four tires. If needed, adjust to 13 psi (90 kPa)

3. Set anti-scalp rollers to top holes or remove them completely for this adjustment.

4. Raise the deck to the transport position (Fig. 61). Take force off of the two large deck lift springs by loosening jam nut and front spring nut, in front of each spring, as far as possible (Fig. 62).

5. Place two 1-1/4 in. (35 mm) thick blocks under rear left and right lower edge of mower. Place one 1-3/8 in. (44 mm) block under front center lower edge of mower. Do not place under anti-scalp roller brackets. Lower mower to the 1-1/2 in. (38 mm) height-of-cut position (Fig. 61).

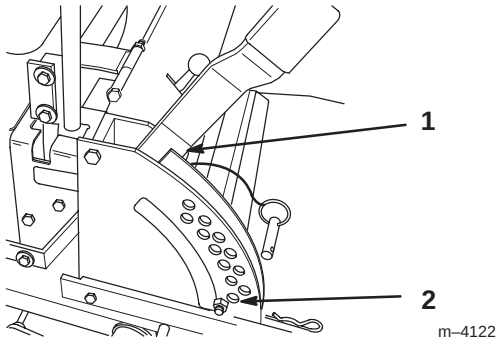


Figure 61

1. Transport position
2. 1-1/2 in. (38 mm) height-of-cut

6. Loosen bottom chain bolt in slot at rear of deck. Repeat for opposite side (Fig. 62).

Note: Do not loosen front chain hardware.

7. Loosen front and rear locking nut on either side of front swivel. Loosen until front chains are loose and deck is supported by blocks. Repeat for opposite side. (Fig. 62).

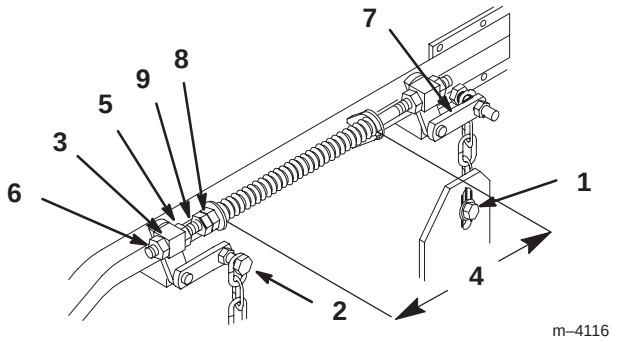


Figure 62

1. Bottom chain bolt
2. Top chain bolt
3. Front swivel
4. 10-1/4 in. (260 mm) spring compressed
5. Rear locking nut
6. Front locking nut
7. Rear deck support arm
8. Front spring nut
9. Jam nut

Note: When hardware is loose, deck will rotate the lift handle up out of position.

8. When hardware is loosened, remaining tension in the large support springs will tend to rotate the deck lift handle up, out of the 1-1/2 in. (38 mm) position. Press down on the rear deck support arm to firmly return the deck lift handle to the 1-1/2 in. (38 mm) position (Fig. 62).

Note: Do not push on deck lift handle.

9. While continuing to press down on rear deck support arm, take the slack out of the rear chain and tighten hardware at the bottom (Fig. 62). Downward pressure may now be released. Repeat for opposite side.

10. Adjust front swivel using rear locking nut until the front chain is tight and front of deck is still touching block. Tighten front locking nut. Repeat for opposite side.

11. Recheck that blocks fit just snuggly under the mower and that tension on all four chains are approximately equal.

12. Raise deck to 3 inch height of cut and measure actual height from blade tips to ground. Height of cut for the front blade tips should be 3.00±.125 in. (76±3 mm). Height of cut for rear blade tips should be 3.25±.125 in. (83±3 mm). Readjust if needed.

Note: When checking blade tip heights make sure blades are not bent and check blade pointing front to rear.

13. Install anti-scalp rollers for proper height-of-cut and tighten securely. See Adjusting Anti Scalp Rollers on page 26.

14. Raise deck lift lever to the transport position (Fig. 61).

15. Adjust compression springs by turning the front spring nuts so the distance between the two large washers is 10-1/4″ (260 mm). Then tighten jam nut (Fig. 62).

Note: Make sure all hardware is tight.

Adjusting the Push Arms

1. To adjust push arms, loosen jam nut and rotate ball joint counterclockwise, one turn at a time. (Fig. 63).

2. Adjust each side the same amount. Each push arm should have a nominal length of 15-5/16 in. (389 mm) (Fig. 63).

Note: Increase tension by lengthening the push arms and decrease tension by shortening push arms.

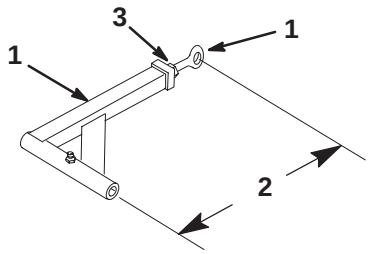


Figure 63

1. Push arm
2. 15-5/16 in. (389 mm) nominal
3. Jam nut
4. Ball joint

Cleaning Under the Deck

Remove grass build up under deck daily.

1. Position mower on a flat surface. Stop the engine, set the parking brake, remove the key and disconnect the spark plug wires from the spark plugs.

2. Raise deck to the transport position.

3. Lift the front of unit and support unit using jack stands.

Danger

Mechanical or hydraulic jacks may fail to support machine and cause a serious injury.

- **Use jack stand when supporting machine.**
- **Do not use hydraulic jacks.**

Inspecting the Belts

Inspect all belts every 100 hours.

1. Check belts for cracks, frayed edges, burn marks or any other damage. Replace damaged belts.

Replacing the Deck Belt

Squealing when the belt is rotating, blades slipping when cutting grass, frayed belt edges, burn marks and cracks are signs of a worn deck belt. Replace the deck belt if any of these conditions are evident.

1. Stop the engine, set the parking brake, remove the key and disconnect the spark plug wires from the spark plugs.
2. Remove belt covers over outside spindles.
3. Loosen outer nut on spring eye bolt (Fig. 64).

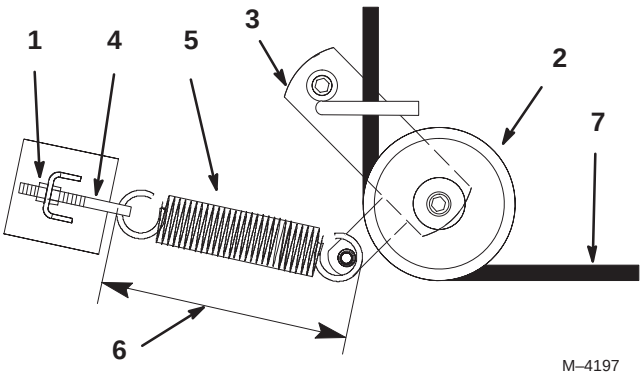


Figure 64

Top View

1. Outer nut
2. Idler pulley
3. Idler arm
4. Spring eye bolt
5. Spring
6. 9.375±.125 in. (238±.3 mm)
7. Deck belt

4. Remove belt. Start at outside pulley and rotate off (Fig. 65).

Note: Do not remove spring.

Caution

Spring is under tension when installed and can cause personal injury.

Do not remove spring from spring eye bolt.

5. Remove spring loaded idler pulley (Fig. 64).
6. Route new belt through idler arm (Fig. 64).
7. Reinstall idler pulley and route belt onto other pulleys (Fig. 65).
8. Retighten outer nut on spring eye bolt (Fig. 64).

Note: Check spring length. The spring should measure 9.375 ± .125 in. (238 ±.3 mm) when installed. Adjust if it does not (Fig. 64).

9. Install belt covers over outside spindles.

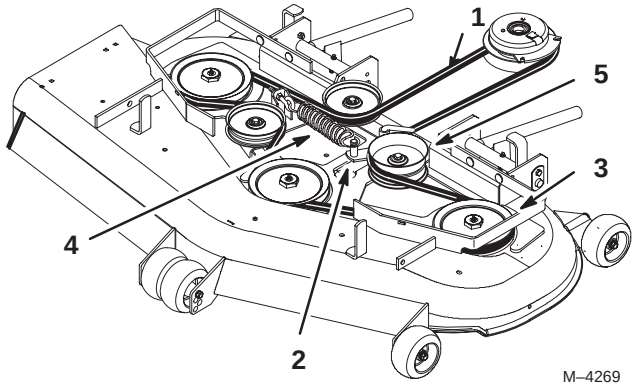


Figure 65

Top View

1. Deck belt
2. Idler arm
3. Outside pulley
4. Spring
5. Idler pulley

Replacing the Pump Drive Belt

Check pump drive belt for wear after every 50 hours of operation.

1. Remove deck belt first. See Replacing the Deck Belt on page 48.
2. Remove bolt from clutch strap and unplug clutch electrical wire (Fig. 66).
3. Pull spring loaded idler to side. Remove traction belt from the engine and hydro pump pulleys (Fig. 66).
4. Install new belt around engine and hydro pump pulleys (Fig. 66).
5. Pull spring loaded idler to side and align belt. Release pressure on spring loaded idler (Fig. 66).
6. Reinstall deck belt.

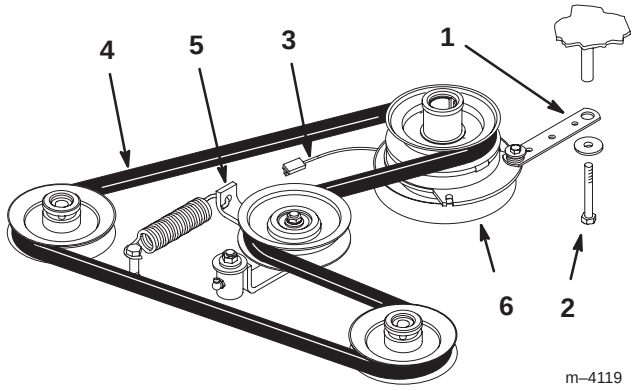


Figure 66

1. Clutch strap
2. Bolt
3. Clutch electrical wire
4. Belt
5. Idler
6. Clutch

Replacing the Grass Deflector

Warning

An uncovered discharge opening could allow the lawn mower to throw objects in the operator's or bystander's direction and result in serious injury. Also, contact with the blade could occur.

Never operate the lawn mower unless you install a cover plate, a mulch plate, or a grass chute and catcher.

1. Remove the locknut, bolt, spring and spacer holding the deflector to the pivot brackets (Fig. 67). Remove damaged or worn grass deflector.

2. Install grass deflector. Refer to Installing the Grass Deflector on page 17.

Important The grass deflector must be able to lower down into position. Lift the deflector up to test that it lowers into the full down position.

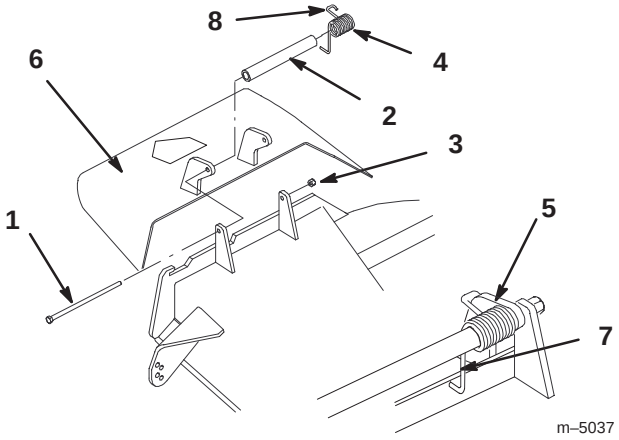


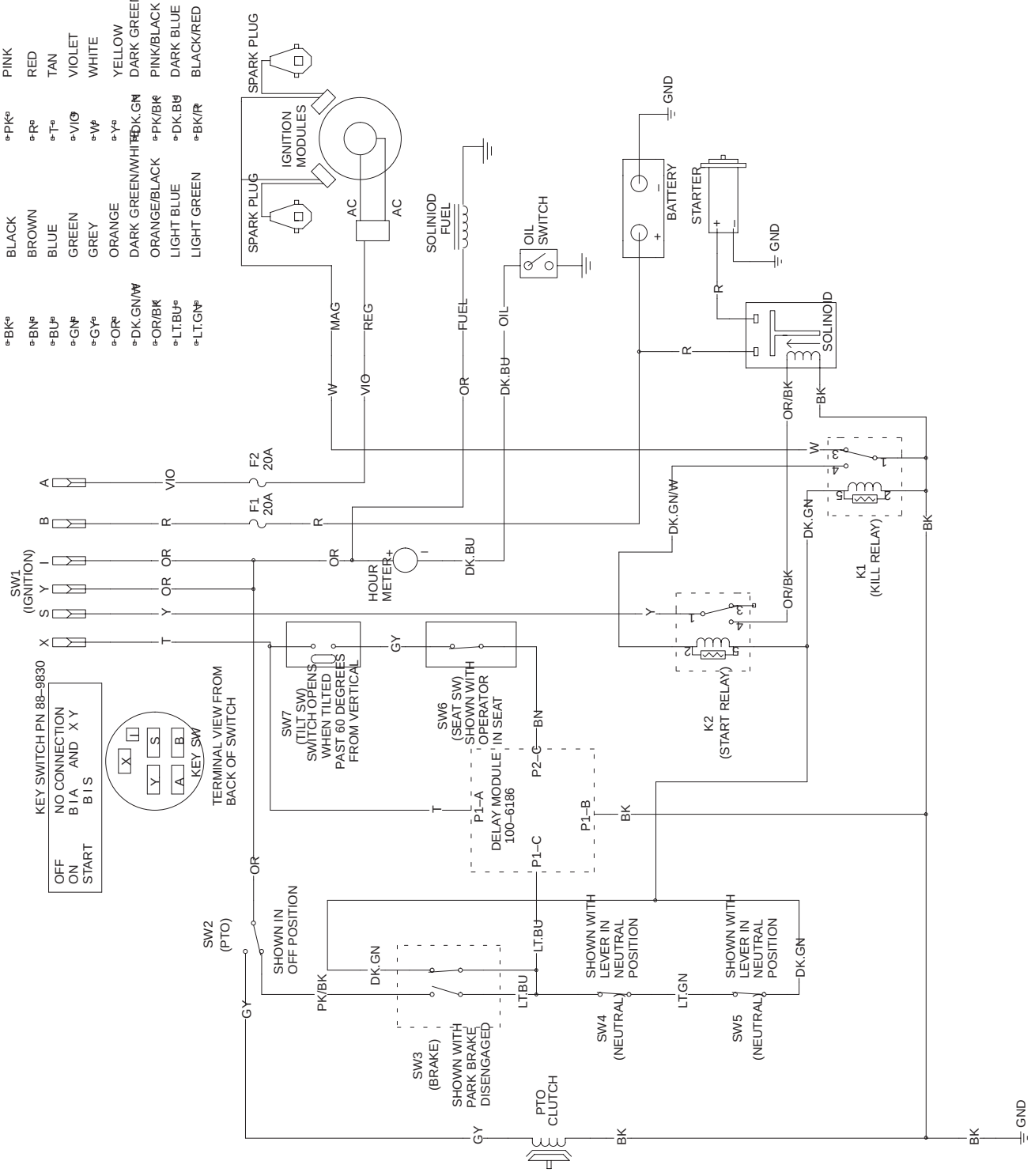
Figure 67

1. Bolt
2. Spacer
3. Locknut
4. Spring
5. Spring installed
6. Grass Deflector
7. **L** end of spring, place behind deck edge before installing bolt
8. **J** hook end of spring

Waste Disposal

Engine oil, hydraulic oil and engine coolant are pollutants to the environment. Dispose of these according to your state and local regulations.

Wiring Diagram



Cleaning and Storage

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

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

3. Service the air cleaner; refer to Servicing the Air Cleaner, page 33.
4. Grease and oil the machine; refer to Greasing and Lubrication, page 37.
5. Change the crankcase oil and filter; refer to Servicing the Engine Oil, page 34.
6. Change the hydraulic filter; refer to Servicing the Hydraulic System, page 39.
7. Check the tire pressure; refer to Checking the Tire Pressure, page 38.
8. Charge the battery; refer to Servicing the Battery page 44.
9. Scrape any heavy buildup of grass and dirt from the underside of the mower, then wash the mower with a garden hose.
10. Check the condition of the blades. Refer to Servicing the Cutting Blades on page 31.
11. Prepare the machine for storage when non–use occurs over 30 days. Prepare machine for storage as follows.

A. Add a petroleum based stabilizer/conditioner to fuel in the tank. Follow mixing instructions from stabilizer manufacture. **Do not use an alcohol based stabilizer (ethanol or methanol).**

Note: A fuel stabilizer/conditioner is most effective when mixed with fresh gasoline and used at all times.

B. Run engine to distribute conditioned fuel through the fuel system (5 minutes).

C. Stop engine, allow to cool and drain the fuel tank; refer to Servicing the Fuel Tank, page 36.

D. Restart engine and run it until it stops.

E. Choke or prime the engine. Start and run engine until it will not start. Operate primer, if equipped on machine, several times to ensure fuel remains in primer system.

F. Dispose of fuel properly. Recycle as per local codes.

Important Do not store stabilizer/conditioned gasoline over 90 days.

12. Remove the spark plugs and check its condition; refer to Servicing the Spark Plug, page 35. With the spark plugs removed from the engine, pour two tablespoons of engine oil into the spark plug hole. Now use the starter to crank the engine and distribute the oil inside the cylinder. Install the spark plugs. Do not install the wire on the spark plugs.
13. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged or defective.
14. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
15. Store the machine in a clean, dry garage or storage area. Remove the key from the ignition switch and keep it in a memorable place out of reach of children or other unauthorized users. Cover the machine to protect it and keep it clean.

Troubleshooting

Problem	Possible Causes	Corrective Action
Starter does not crank	1. Blade control (PTO) is engaged. 2. Parking brake is not on. 3. Operator is not seated. 4. Battery is dead. 5. Electrical connections are corroded or loose. 6. Fuse is blown. 7. Relay or switch is defective.	1. Move blade control (PTO) to disengaged. 2. Set parking brake. 3. Sit on the seat. 4. Charge the battery. 5. Check electrical connections for good contact. 6. Replace fuse. 7. Contact Authorized Service Dealer.
Engine will not start, starts hard, or fails to keep running.	1. Fuel tank is empty. 2. Fuel valve turned off. 3. Choke is not on. 4. Air cleaner is dirty. 5. Spark plug wires are loose or disconnected. 6. Spark plugs are pitted, fouled, or gap is incorrect. 7. Dirt in fuel filter. 8. Dirt, water, or stale fuel is in fuel system.	1. Fill fuel tank with gasoline. 2. Open fuel valve. 3. Move choke lever to on. 4. Clean or replace air cleaner element. 5. Install wires on spark plug. 6. Install new, correctly gapped spark plugs. 7. Replace fuel filter. 8. Contact Authorized Service Dealer.
Engine loses power.	1. Engine load is excessive. 2. Air cleaner is dirty. 3. Oil level in crankcase is low. 4. Cooling fins and air passages under engine blower housing are plugged. 5. Spark plugs are pitted, fouled, or gap is incorrect. 6. Vent in fuel cap is closed. 7. Dirt in fuel filter. 8. Dirt, water, or stale fuel is in fuel system.	1. Reduce ground speed. 2. Clean air cleaner element. 3. Add oil to crankcase. 4. Remove obstruction from cooling fins and air passages. 5. Install new, correctly gapped spark plugs. 6. Open vent in fuel cap. 7. Replace fuel filter. 8. Contact Authorized Service Dealer.
Engine overheats.	1. Engine load is excessive. 2. Oil level in crankcase is low. 3. Cooling fins and air passages under engine blower housing are plugged.	1. Reduce ground speed. 2. Add oil to crankcase. 3. Remove obstruction from cooling fins and air passages.

Problem	Possible Causes	Corrective Action
Abnormal vibration.	1. Engine mounting bolts are loose.	1. Tighten engine mounting bolts.
	2. Loose engine pulley, idler pulley, or blade pulley.	2. Tighten the appropriate pulley.
	3. Engine pulley is damaged.	3. Contact Authorized Service Dealer.
Machine does not drive.	1. Traction belt is worn, loose or broken.	1. Contact Authorized Service Dealer.
	2. Traction belt is off pulley.	2. Contact Authorized Service Dealer.
	3. Hydro fluid level low.	3. Add hydro fluid to reservoir.
Abnormal vibration.	1. Engine mounting bolts are loose.	1. Tighten engine mounting bolts.
	2. Loose engine pulley, idler pulley, or blade pulley.	2. Tighten the appropriate pulley.
	3. Engine pulley is damaged.	3. Contact Authorized Service Dealer.
	4. Cutting blades are bent or unbalanced.	4. Install new cutting blades.
	5. Blade mounting bolt is loose.	5. Tighten blade mounting bolt.
	6. Loose engine pulley, idler pulley, or blade pulley.	6. Tighten the appropriate pulley.
	7. Engine pulley is damaged.	7. Contact Authorized Service Dealer.
	8. Blade spindle bent.	8. Contact Authorized Service Dealer.
Uneven cutting height.	1. Blades not sharp.	1. Sharpen blades.
	2. Cutting blades are bent.	2. Install new cutting blades.
	3. Mower is not level.	3. Level mower from side-to-side and front-to-rear.
	4. Gage wheel not set correctly.	4. Adjust gage wheel height.
	5. Underside of mower is dirty.	5. Clean the underside of the mower.
	6. Tire pressure is incorrect.	6. Adjust tire pressure.
	7. Blade spindle bent.	7. Contact Authorized Service Dealer.
Blades do not rotate.	1. Drive belt is worn, loose or broken.	1. Install new drive belt.
	2. Drive belt is off pulley.	2. Install drive belt and check adjusting shafts and belt guides for correct position.
	3. Deck belt is worn, loose or broken.	3. Install new deck belt.


TORO®