



**Z147**

**Z–Master<sup>®</sup> with 112cm Mower**

**Model No. 74161TE—Serial No. 240000001 and Up**

**Operator's Manual**

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

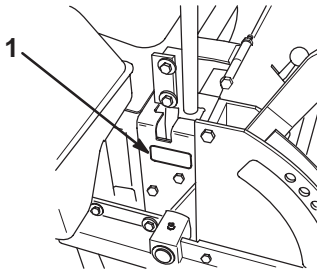
	Page
Introduction .....	3
Safety .....	3
Safe Operation Practices for Ride-on (riding) Rotary Lawnmower Machines .....	3
Safe Operating Practices .....	3
Sound Pressure .....	6
Sound Power .....	6
Vibration .....	6
Slope Chart .....	7
Safety and Instruction Decals .....	9
Gasoline and Oil .....	15
Recommended Gasoline .....	15
Using Stabilizer/Conditioner .....	15
Filling the Fuel Tank .....	15
Checking Engine Oil Level .....	15
Operation .....	16
Using the Rollover Protection System (ROPS) ..	16
Think Safety First .....	17
Controls .....	18
Operating the Parking Brake .....	18
Installing or Removing Baffles .....	19
Installing and Removing Blowout Baffles .....	21
Starting and Stopping the Engine .....	22
Operating the Power Take Off (PTO) .....	23
The Safety Interlock System .....	23
Testing the Safety Interlock System .....	23
Driving Forward or Backward .....	23
Stopping the Machine .....	24
Adjusting Height-of-Cut .....	24
Adjusting Anti-Scalp Rollers .....	25
Positioning the Seat .....	26
Unlatching the Seat .....	26
Pushing the Machine by Hand .....	26
Operating with Grass Deflector .....	26
Transporting Machines .....	27
Loading Machines .....	27
Tips for Mowing Grass .....	28
Maintenance .....	30

	Page
Recommended Maintenance Schedule .....	30
Servicing the Cutting Blades .....	31
Servicing the Air Cleaner .....	33
Servicing the Engine Oil .....	34
Servicing the Spark Plug .....	35
Servicing the Fuel Filter .....	36
Servicing the Fuel Tank .....	37
Cleaning the Cooling System .....	37
Greasing and Lubrication .....	38
Greasing the Bearings .....	38
Checking the Tire Pressure .....	39
Adjusting the Caster Pivot Bearing .....	39
Wheel Hub Slotted Nut .....	40
Servicing the Hydraulic System .....	40
Adjusting the Handle Neutral .....	42
Setting the Hydraulic Pump Neutral .....	43
Adjusting the Tracking .....	44
Adjusting the Parking Brake .....	45
Servicing the Fuse .....	45
Servicing the Battery .....	46
Leveling the Mower at Three Positions .....	48
Adjusting the Push Arms .....	50
Cleaning Under the Deck .....	51
Inspecting the Belts .....	51
Replacing the Deck Belt .....	51
Replacing the Pump Drive Belt .....	52
Replacing the Grass Deflector .....	52
Waste Disposal .....	52
Wiring Diagram .....	53
Cleaning and Storage .....	54
Troubleshooting .....	55

# 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 control levers. The main reasons for loss of control are:
    - insufficient wheel grip, especially on wet grass;
    - 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**—Fuel 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 fuel while the engine is running or when the engine is hot.
  - If fuel is spilled, do not attempt to start the engine but move the machine away from the area of spillage and avoid creating any source of ignition until fuel vapors have dissipated.
  - Replace all fuel tanks and container caps securely.
- Replace faulty silencers.
- 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

- Be alert, slow down and use caution when making turns. Look behind and to the side before changing directions.
- 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.
- 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.

- Watch out for traffic when crossing or near roadways.
- Stop the blades rotating before crossing surfaces other than grass.
- When using any attachments, never direct discharge of material toward bystanders nor allow anyone near the machine while in operation.
- Never operate the machine with damaged guards 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 wire(s) 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.
- Keep hands, feet, hair and loose clothing away from attachment discharge area, underside of mower and any moving parts while engine is running.
- Use only Toro-approved attachments. Warranty may be voided if used with unapproved attachments.

## Slope Operation

- Do not mow slopes greater than 15 degrees.
- Do not mow near drop-offs, ditches, steep banks or water. Wheels dropping over edges can cause rollovers, which may result in serious injury, death or drowning.
- Do not mow slopes when grass is wet. Slippery conditions reduce traction and could cause sliding and loss of control.
- Do not make sudden turns or rapid speed changes.
- Use a walk behind mower and/or a hand trimmer near drop-offs, ditches, steep banks or water.
- Reduce speed and use extreme caution on slopes.
- Remove or mark obstacles such as rocks, tree limbs, etc. from the mowing area. Tall grass can hide obstacles.
- Watch for ditches, holes, rocks, dips, and rises that change the operating angle, as rough terrain could overturn the machine.
- Avoid sudden starts when mowing uphill because the mower may tip backwards.
- Be aware that loss of traction may occur going downhill. Weight transfer to the front wheels may cause drive wheels to slip and cause loss of braking and steering.
- Always avoid sudden starting or stopping on a slope. If tires lose traction, disengage the blades and proceed slowly off the slope.
- Follow the manufacturer's recommendations for wheel weights or counterweights to improve stability.
- Use extreme care with grass catchers or other attachments. These can change the stability of the machine and cause loss of control.

## Using the Rollover Protection System (ROPS)

- Keep the roll bar in the raised and locked position and use the seat belt when operating the machine.
- Be certain that the seat belt can be released quickly in the event of an emergency.
- Be aware there is no rollover protection when the roll bar is down.
- Check the area to be mowed and never fold the ROPS in areas where there are slopes, drop offs or water.
- Lower the rollbar only when absolutely necessary. Do not wear the seat belt with the roll bar folded down.

- Check carefully for overhead clearances (i.e. branches, doorways, electrical wires) before driving under any objects and do not contact them.

## Maintenance and Storage

- Keep all nuts, bolts and screws tight to be sure the equipment is in safe working condition.
- Never store the equipment with fuel in the tank inside a building where fumes 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 fuel 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.
- Do not touch equipment or attachment parts which may be hot from operation. Allow to cool before attempting to maintain, adjust, or service.
- Battery acid is poisonous and can cause burns. Avoid contact with skin, eyes and clothing. Protect your face, eyes, and clothing when working with a battery.
- Battery gases can explode. Keep cigarettes, sparks and flames away from battery.
- Use only genuine Toro replacement parts to ensure that original standards are maintained.

## Sound Pressure

This unit has a maximum sound pressure level at the operator's ear of 87 dBA, based on measurements of identical machines per Directive 98/37/EC.

## Sound Power

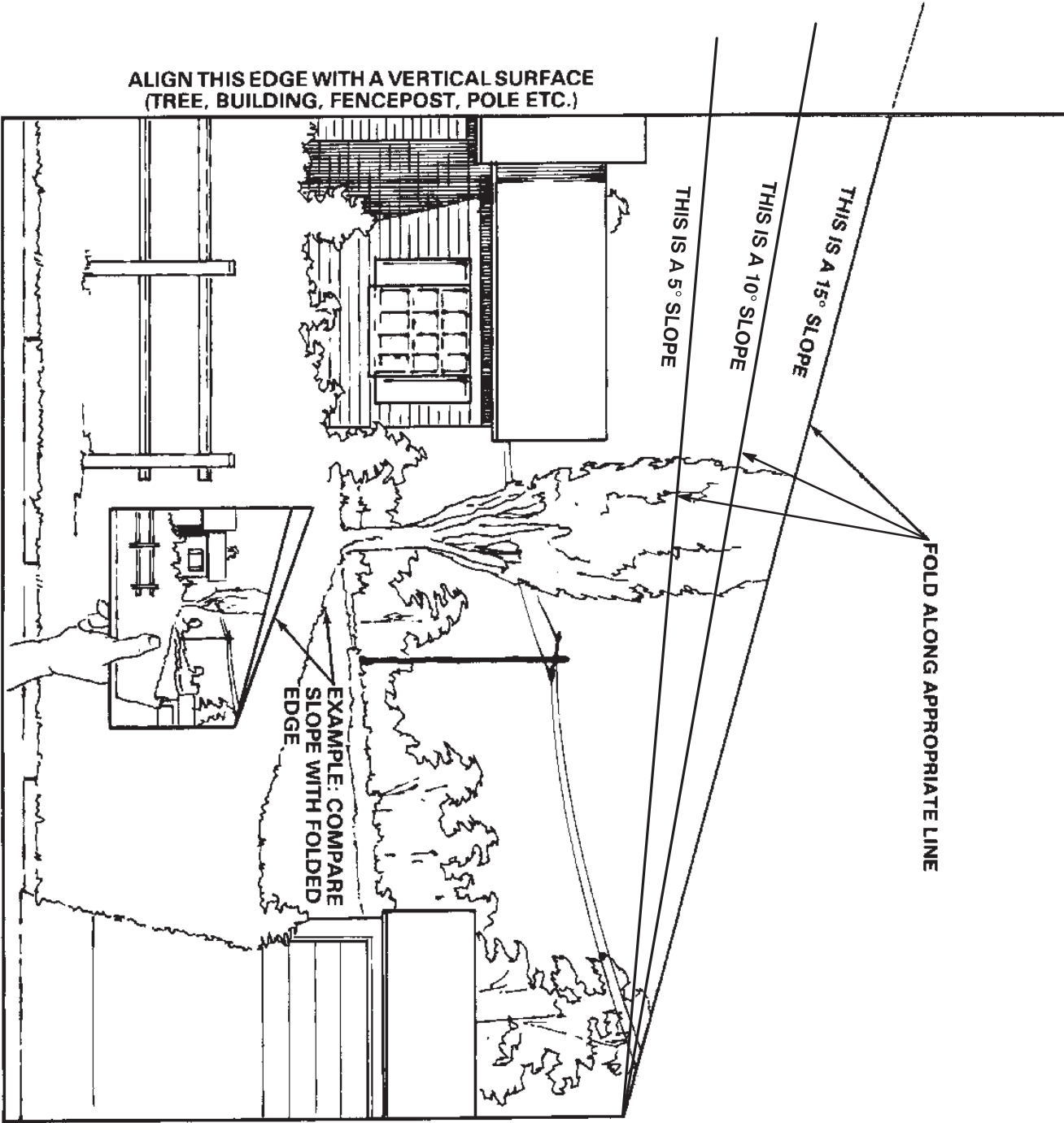
This unit has a guaranteed sound power level of 100 dBA, based on measurements of identical machines per Directive 2000/14/EC.

## Vibration

This unit does not exceed a hand/arm vibration level of  $3.9 \text{ m/s}^2$ , based on measurements of identical machines per Directive 98/37/EC.

This unit does not exceed a whole body vibration level of  $0.1 \text{ m/s}^2$ , based on measurements of identical machines per Directive 98/37/EC.

# Slope Chart







## Safety and Instruction Decals



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



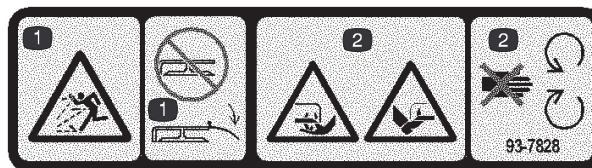
93-7316

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.



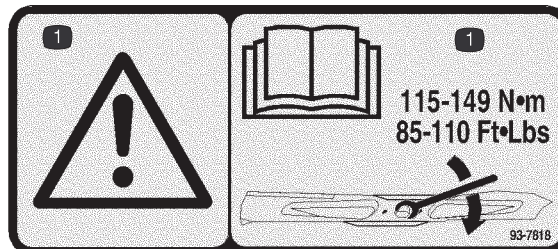
93-7824

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.



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.



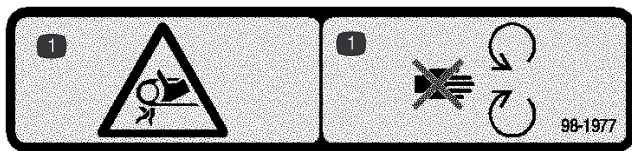
93-7818

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



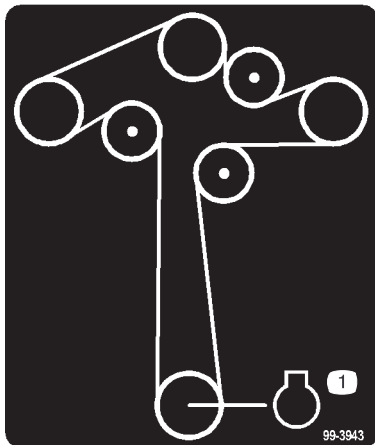
93-7010

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.



**98-1977**

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



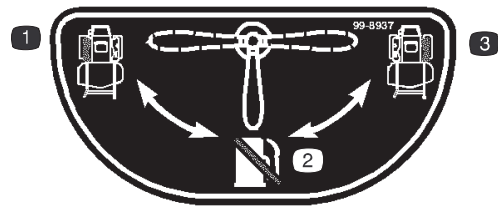
**99-3943**

1. Engine



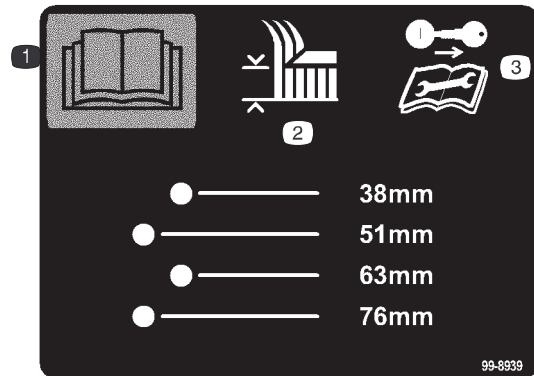
**99-8936**

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



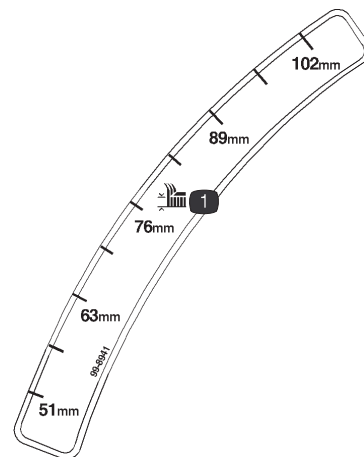
**99-8937**

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



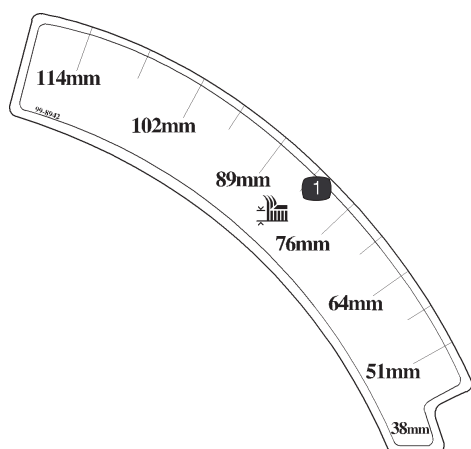
**99-8939**

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



**99-8941**

1. Height of cut



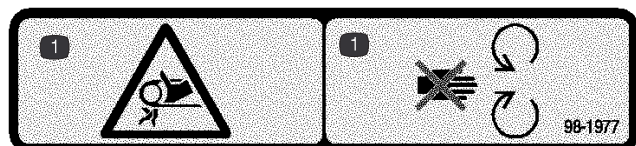
99-8942

1. Height of cut



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.



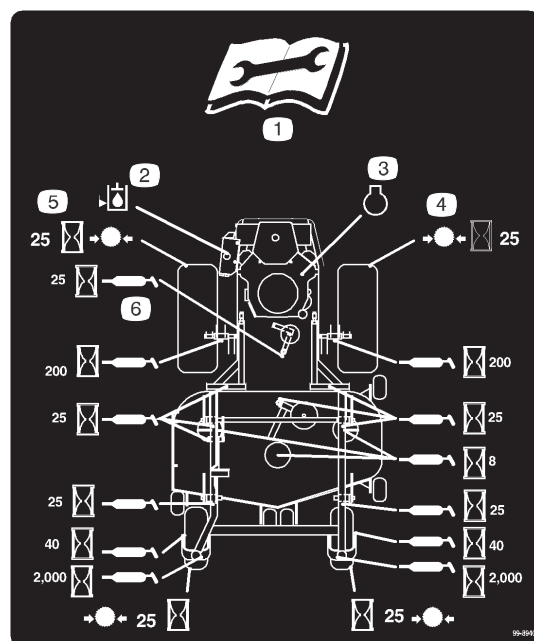
98-1977

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



98-4387

1. Warning—wear hearing protection.



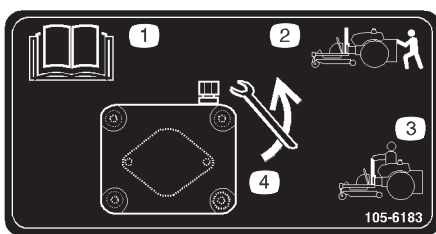
99-8940

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



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.



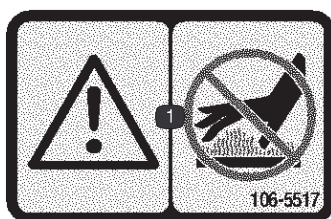
**105-6183**

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.



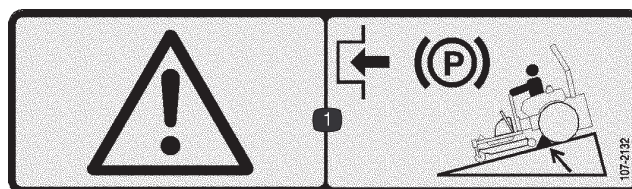
**107-2131**

1. Hydraulic oil level
2. Warning—do not touch the hot surface.



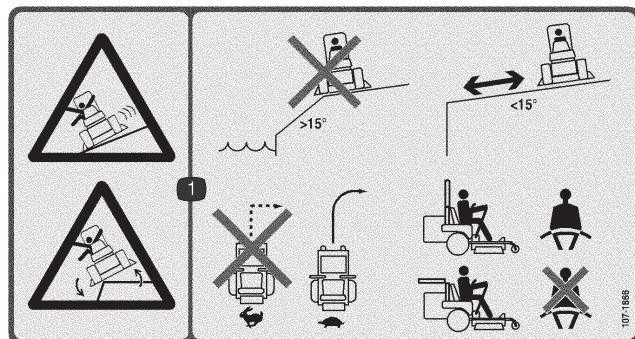
**106-5517**

1. Warning—do not touch the hot surface.



**107-2132**

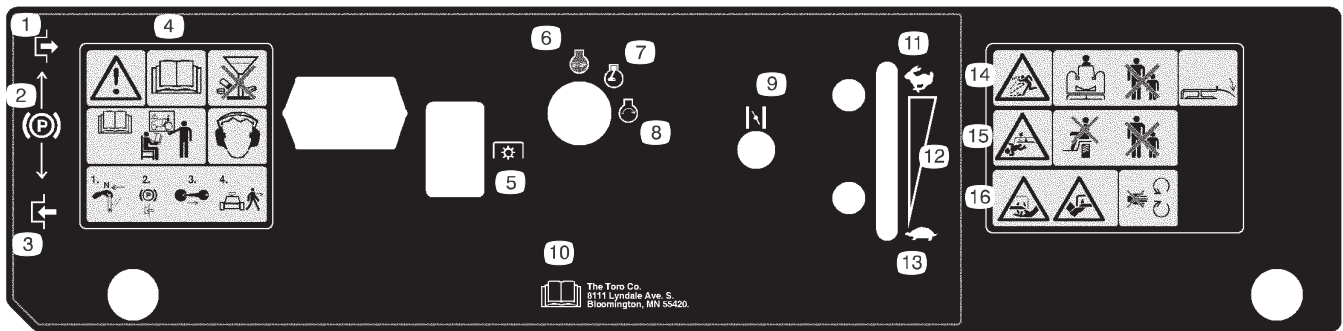
1. Warning—engage the parking brake and chock the wheels when parking on a hill.



**107-1866**

1. Sliding and loss of control hazard and tipping hazard, drop-offs—do not operate the machine near drop-offs, slopes greater than 15 degrees, or water; keep a safe distance from drop-offs; do not turn sharply while traveling fast, instead, slow down and turn gradually; if the roll bar is up, wear the seat belt; if the roll bar is down, do not wear the seat belt.





## 106-6590

- |  |   |  |   |
|--|---|--|---|
| 1. Disengage   | 5. Power takeoff (PTO)                  | 11. Fast   | 15. Cutting/dismemberment hazard, mower blade—do not carry passengers and keep bystanders away. |
| 2. Parking brake   | 6. Engine—stop                          | 12. Continuous variable setting  | 16. Cutting/dismemberment hazard of hand or foot, mower blade—stay away from moving parts.      |
| 3. Engage  | 7. Engine—run                           | 13. Slow   |   |
| 4. Warning—read the <i>Operator's Manual</i> ; do not use drugs or alcohol; receive training; wear hearing protection; and, before leaving the machine, set the control levers in the Neutral position, engage the parking brake, and remove the ignition key. | 8. Engine—start                         | 14. Thrown object hazard—keep bystanders a safe distance from the machine and keep the deflector in place. |   |
|  | 9. Choke                                |  |   |
|  | 10. Read the <i>Operator's Manual</i> . |  |   |

MAINTENANCE FREE • SANS ENTRETIEN • LIBRE DE MANTENIMIENTO

NIVEAU MAXIMUM  
NIVEAU MINIMUM

MAXIMUM FILL  
MINIMUM FILL

CAPACIDAD MAXIMA  
CAPACIDAD MINIMA

**! DANGER/POISON ! PELIGRO/VENENO !**

**1** SHIELD EYES. EXPLOSIVE GASES CAN CAUSE BLINDNESS OR INJURY.

**2** PROTEGER LOS OJOS. GASES EXPLOSIVOS PUEDEN CAUSAR CEGUERA O DAÑO.

**3** NO SPARKS • FLAMES • SMOKING

**4** ÉLOIGNER • ÉTINCELLES • FLAMMES • CIGARETTES

**5** SULFURIC ACID CAN CAUSE BLINDNESS OR SEVERE BURNS.

**6** ACIDE SULFURIQUE PEUT RENDRE AVEUGLE OU PROVOQUER DES BRULURES GRAVES.

**7** FLUSH EYES IMMEDIATELY WITH WATER. GET MEDICAL HELP FAST.

**8** RINCER IMMEDIATEMENT LES YEUX A GRANDE EAU. CONTACTER RAPIDEMENT UN MEMBRE DE LA PROFESSION MEDICALE.

**9** HOW TO ACTIVATE DRY CHARGED BATTERIES

1. Use only battery electrolyte (1.265 Sp. Gr.) to fill battery initially.

2. Do not overfill. Let stand for 15 minutes.

3. Charge battery at 4-5 amps until specific gravity is 1.250 or higher and temperature is at least 60°F. — all cells gassing freely.

4. After battery has been activated, add only water to replace normal loss.

**KEEP OUT OF THE REACH OF CHILDREN. DO NOT TIP. DO NOT OPEN BATTERY!**

**MAINTENIR HORS DE LA PORTÉE DES ENFANTS. NE RENVERSEZ PAS. N'OUVREZ PAS LA BATTERIE!**

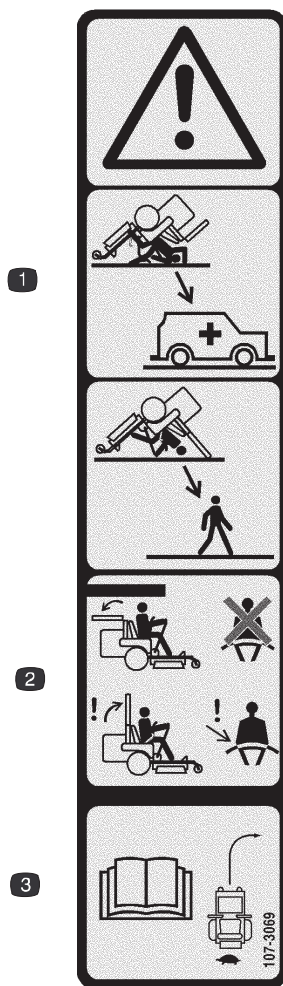
**MANTENGASE FUERA DEL ALCANCE DE LOS NIÑOS. NO INCLINE. NO ABRA LA BATERIA!**

Dist. by:/por:/par: The Toro Company, Bloomington, MN 55420

MADE IN U.S.A. • FABRIQUE AUX E.U.A. • HECHO EN E.U.A.

## 104-4164

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



### 107-3069

1. Warning—in a roll over accident without the roll bar raised and seat belt used, you will be injured or killed; in a roll over accident with the roll bar raised and seat belt used, you may be uninjured.
2. To mow under obstacles, lower the roll bar and do not wear the seat belt; at all other times, always raise the roll bar and wear the seat belt.
3. Read the *Operator's Manual*, and slow down and turn gradually.

# 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 inch (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.
- Do not operate without entire exhaust system in place and in proper working condition.



### 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.

# Operation

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

## Using the Rollover Protection System (ROPS)



### Warning



To avoid injury or death from rollover: keep the roll bar in the raised locked position and use the seat belt.

Ensure that the rear part of the seat is secured with the seat latch.



### Warning

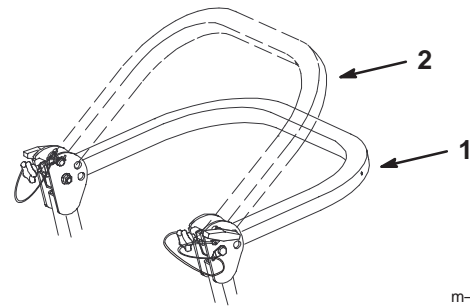


There is no rollover protection when the roll bar is in the down position.

- Lower the roll bar only when absolutely necessary.
- Do not wear the seat belt when the roll bar is in the down position.
- Drive slowly and carefully.
- Raise the roll bar as soon as clearance permits.
- Check carefully for overhead clearances (i.e. branches, doorways, electrical wires) before driving under any objects and do not contact them.

**Important** Lower the roll bar only when absolutely necessary.

1. To lower the roll bar, loosen the front handles (Fig. 4).
2. Remove the hairpin cotter pins and remove the two pins (Fig. 3).
3. Lower the the roll bar to the down position. There are two down positions. See Figure 2 for the positions.
4. Install the two pins and secure them with the hairpin cotter pins (Fig. 3).



m-6836

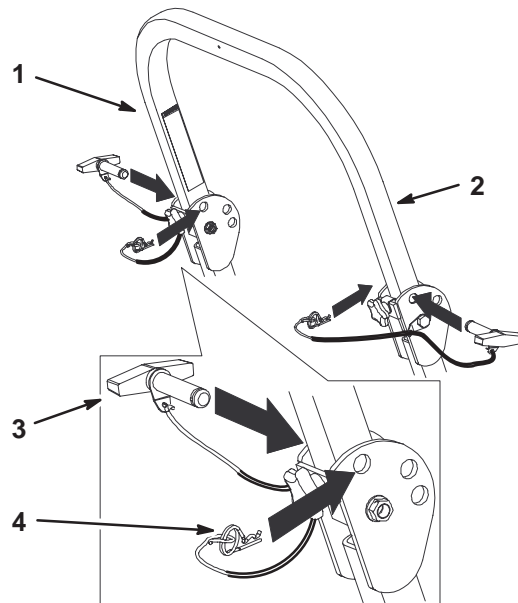
**Figure 2**

1. Full down position
2. Down position with bagger installed

**Important** Always use the seat belt with the roll bar in the raised position.

**Important** Ensure that the rear part of the seat is secured with the seat latch.

5. To raise the roll bar, remove the hairpin cotter pins and remove the two pins (Fig. 3).
6. Raise the roll bar to the upright position and install the two pins and secure them with the hairpin cotter pins (Fig. 3).



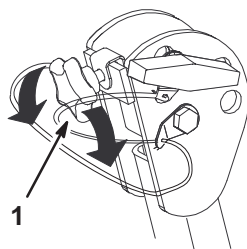
m-6893

**Figure 3**

1. Roll bar
2. Raised position
3. Pin
4. Hairpin cotter pin



7. Tighten the front handles against the center roll bar ends (Fig. 3).



**Figure 4**

1. Front handle

## Think Safety First

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



### Danger



**Operating on wet grass or steep slopes can cause sliding and loss of control.**

**Wheels dropping over edges can cause rollovers, which may result in serious injury, death or drowning.**

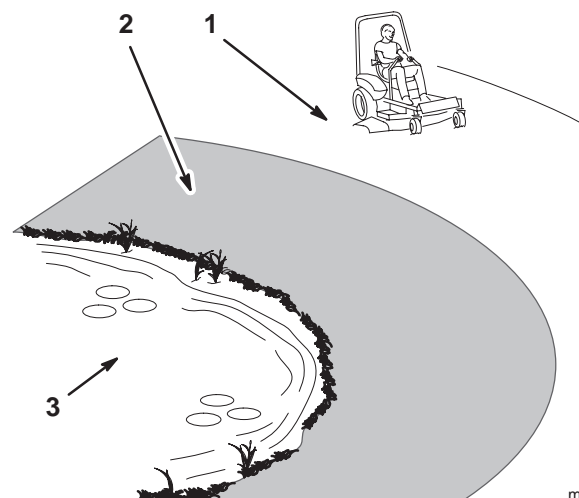
**There is no rollover protection when the roll bar is down.**

**Always keep the roll bar in the raised and locked position and use the seat belt.**

**Read and follow the rollover protection instructions and warnings.**

**To avoid loss of control and possibility of rollover:**

- Do not operate near drop-offs or near water.
- Do not operate on slopes greater than 15 degrees.
- Reduce speed and use extreme caution on slopes.
- Avoid sudden turns or rapid speed changes.



**Figure 5**

1. Safe Zone—use the Z Master here on slopes less than 15 degrees or flat areas.
2. Use walk behind mower and/or hand trimmer near drop-offs and water.
3. Water

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



### Caution



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

**Wear hearing protection when operating this machine.**



**Figure 6**

1. Warning—wear hearing protection.

## Controls

Become familiar with all the controls (Fig. 7) before you start the engine and operate the machine.

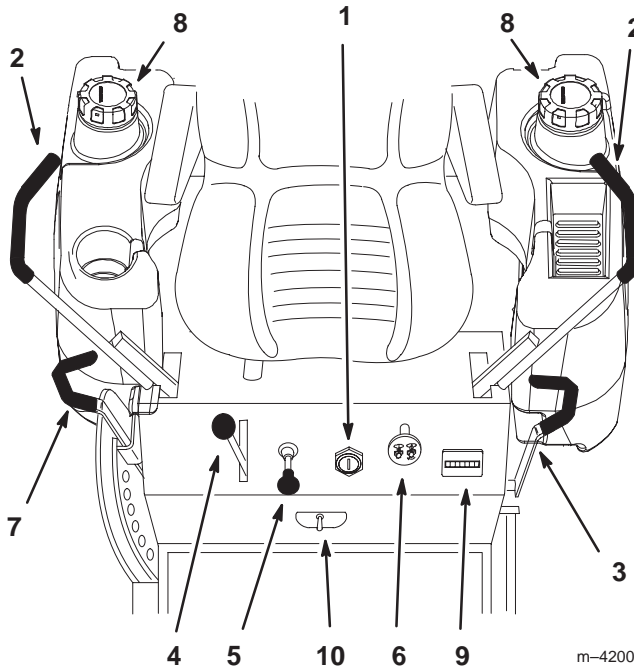


Figure 7

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

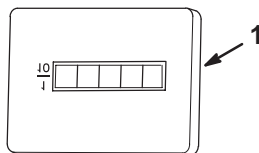


Figure 8

1. Hour meter

## Switching the Fuel Tanks

The fuel shut off valve is located under the seat.

The unit has two fuel tanks. One tank is 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. 7).

To use the left side fuel tank rotate the fuel shut off valve to the LH, lefthand location. To use the right side fuel tank rotate the fuel shut off valve to the RH, righthand location (Fig. 9).

Close fuel shut off valve before transporting or storing machine.

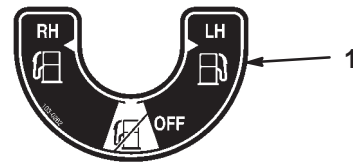


Figure 9

1. Shut-off valve

## Operating the Parking Brake

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

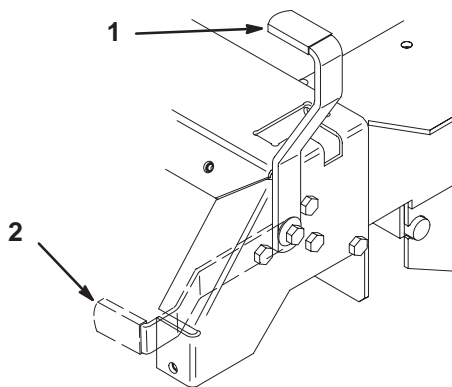
**Important** Do not park on slopes unless wheels are chocked or blocked.

## Setting the Parking Brake

1. Move the motion control levers (Fig. 7) out to the neutral lock position.
2. Pull back and up on the parking brake lever to set the parking brake (Fig. 10). 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. 10). The parking brake is disengaged.



m-4121

**Figure 10**

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 PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove belt covers from mower deck.
4. Remove the mower deck.
5. Tip mower deck upside down and block up ends to ease installation of baffle components.

6. Thoroughly clean mower deck. All debris must be removed to ensure baffle will fit properly against mower deck.
7. 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.

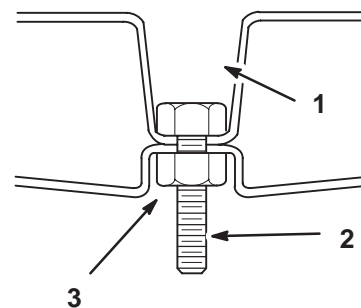
**Important** The sail part of the blades (i.e., the turned up section) must face the inside of the mower.

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

## 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 inch) into the deep recessed holes in the left and right baffles. Secure the bolts with 4 locknuts (5/16 inch) in the shallow recesses. Refer to Figures 11 and 12 for correct assembly and hole usage.

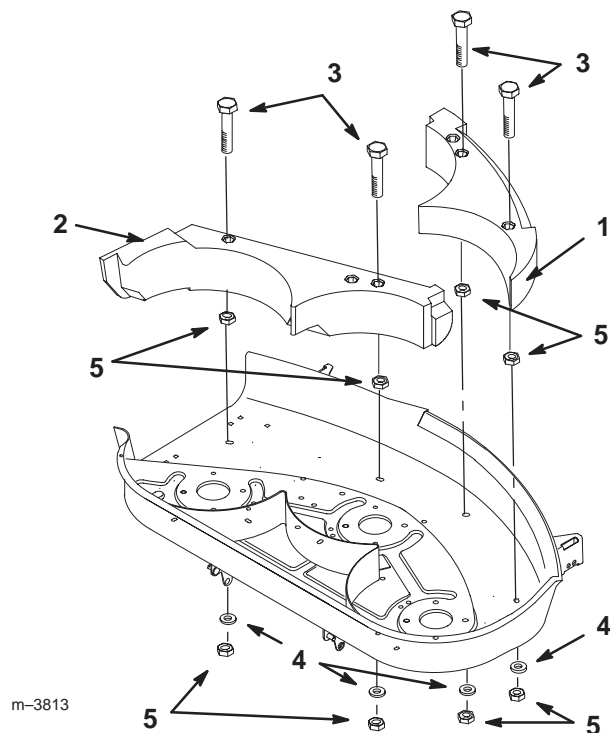


2033

**Figure 11**

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

- 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 inch) and 4 lock washers (Fig. 12).



**Figure 12**

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

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



## Warning



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

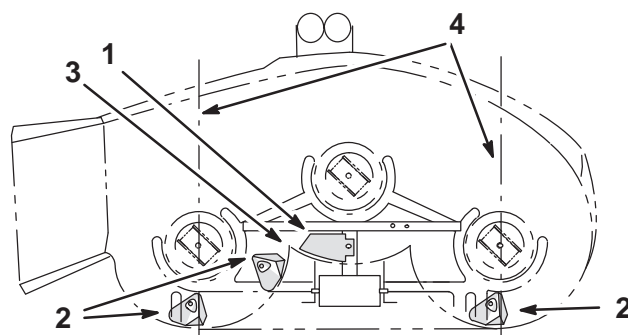
- Never operate mower without hardware mounted in all holes in mower.
- Install hardware in mounting holes when mulching baffle is removed.

## 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.

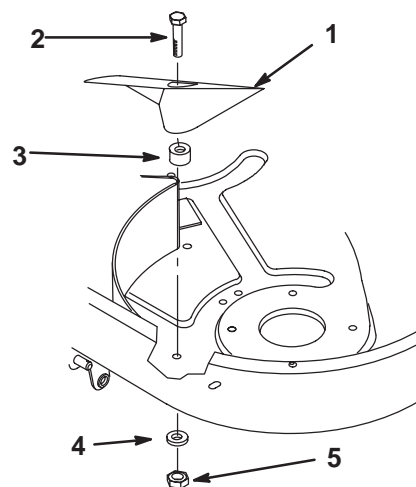
- Place the kicker plate into position (Fig. 13).



**Figure 13**

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

- Secure the kicker plate with a bolt (5/16 x 1 inch), flat washer, and locknut.
- Position the kickers (Fig. 13) and secure them with 3 bolts (5/16 x 1 inch), spacers, flat washers, and locknuts (Fig. 14).



**Figure 14**

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

- Tighten all mounting hardware securely.

5. Rotate the blades to ensure that there is at least an 1/8 inch (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.

! **Warning** !

**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.**

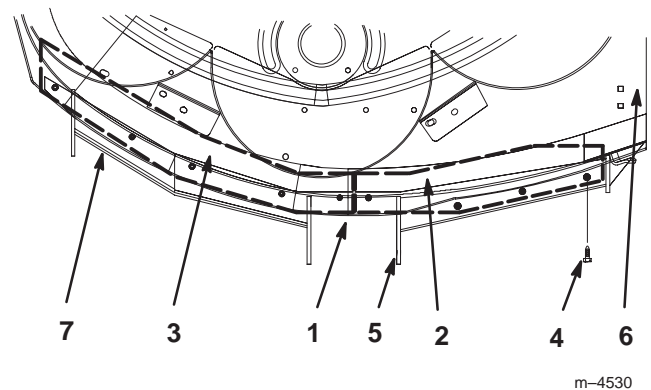
1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove belt covers from mower deck.
4. Remove mower unit.
5. Tip mower deck upside down and block up ends to ease installation of baffle components.
6. Thoroughly clean the mower deck. All debris must be removed to ensure baffle will fit properly against mower deck.
7. Repair all bent or damaged areas of mower deck and replace any missing parts.

**Note:** All holes for installing Blowout baffles are drilled (Fig. 15).

8. Place baffles as shown in figure 15.

**Note:** The baffle edges need to be centered between front roller brackets (Fig. 15).

9. Install screws and tighten securely (Fig. 15).
10. Rotate blades to ensure the blades do not hit the blowout baffles.
11. Turn deck over, reinstall deck and deck covers.



**Figure 15**

- |                                      |                           |
|--------------------------------------|---------------------------|
| 1. Baffles centered between brackets | 4. Tapping screw          |
| 2. Righthand baffle                  | 5. Front roller brackets  |
| 3. Lefthand baffle                   | 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

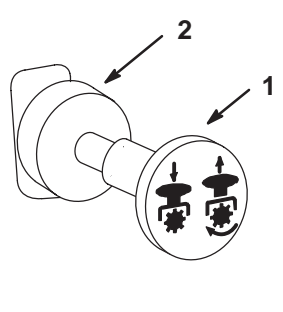
1. Sit down on the seat and move the motion controls to neutral locked position.
2. Set the parking brake; refer to Setting the Parking Brake, page 18.
3. Move the PTO (power take off) to the off position (Fig. 16).
4. Move the choke control to the on position before starting a cold engine (Fig. 17).

**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. 18).
6. Turn ignition key to start to energize starter. When engine starts, release key (Fig. 19).

**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.

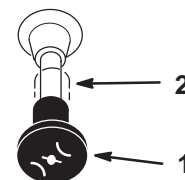
7. After the engine starts, move the choke to the off position (Fig. 17). If the engine stalls or hesitates, move the choke back to on for a few seconds. Then move the throttle lever to desired setting. Repeat this as required.



m-4201

**Figure 16**

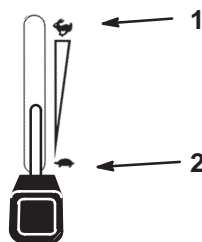
1. PTO—On
2. PTO—Off



m-2719

**Figure 17**

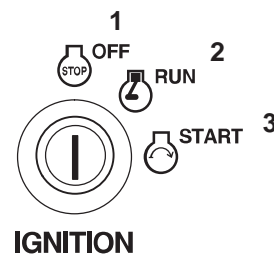
1. Choke—On
2. Choke—Off



m-2720

**Figure 18**

1. Fast
2. Slow



M-4268

**Figure 19**

1. Off
2. Run
3. Start

### Stopping the Engine

1. Push the PTO to off (Fig. 18).
2. Move the throttle lever midway between the slow and fast positions (Fig. 18).
3. Let the engine idle for 60 seconds (Fig. 19).
4. Turn the ignition key to off (Fig. 19).
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.

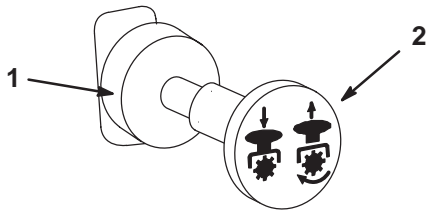
**Important** Make sure fuel shut off valve is closed before transporting or storing machine, as fuel leakage may occur. Set parking brake before transporting.

# 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. 20).



m-4201

Figure 20

1. PTO—Off
2. PTO—On

## Disengaging the PTO

1. To disengage push the PTO switch to the off position (Fig. 20).

## The Safety Interlock System



### Warning



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.





## Warning



**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 18.
2. Move levers to the center, un-locked position.
3. To go forward, slowly push the motion control levers forward (Fig. 21).

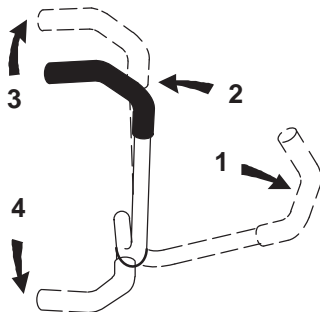
**Note:** Engine will kill if traction control levers are moved with parking brake engaged.

To go straight, apply equal pressure to both motion control levers (Fig. 21).

To turn, release pressure on the motion control lever toward the direction you want to turn (Fig. 21).

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.



m-2715

**Figure 21**

- |   |                           |
|---|---------------------------|
| 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. 21).

To go straight, apply equal pressure to both motion control levers (Fig. 21).

To turn, release pressure on the motion control lever toward the direction you want to turn (Fig. 21).

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 18. Remember to remove the key from the ignition switch.



## Warning



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

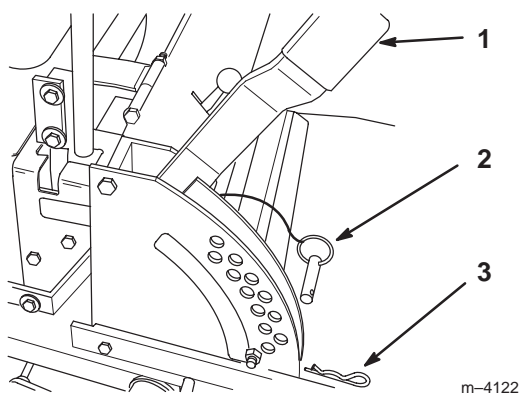
**Always remove the ignition key and set the parking brake when leaving the machine unattended, even if just for a few minutes.**

## Adjusting Height-of-Cut

The height-of-cut is adjusted from 1-1/2 to 4-1/2 inch (38 to 114 mm) in 1/4 inch (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 inch (114 mm) cutting height position) (Fig. 22).
2. To adjust, remove hairpin cotter and clevis pin from height-of-cut bracket (Fig. 22).
3. Select hole in height-of-cut bracket corresponding to the height-of-cut desired, and insert clevis pin (Fig. 22).
4. Secure clevis pin with hairpin cotter (Fig. 22).





**Figure 22**

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

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

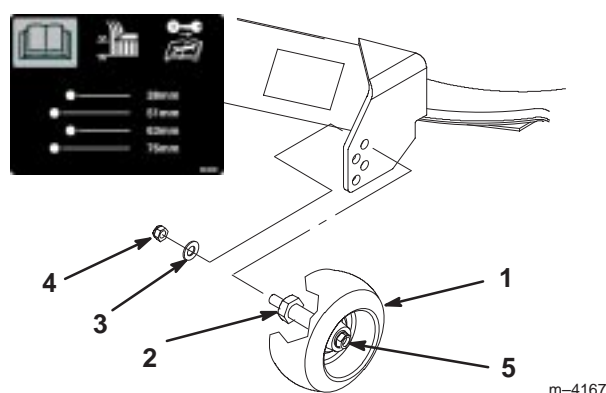
## Adjusting Anti-Scalp Rollers

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

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. After adjusting height-of-cut remove nut and washer while holding stud with wrench (Fig. 23).

**Note:** Do not remove the wheel nut and washer (Fig. 23).

4. Select hole so gage wheel is positioned to the nearest corresponding height-of-cut desired (Fig. 23).
5. Reinstall the stud nut and washer (Fig. 23).
6. Repeat adjustment on other gage wheels.

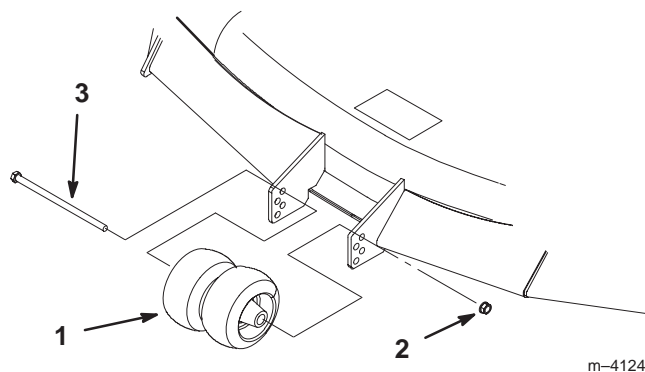


**Figure 23**

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

## Center Rollers

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
  2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
  3. After adjusting height-of-cut, remove bolt and nut (Fig. 24).
  4. Select hole so gage wheel is positioned to the nearest corresponding height-of-cut desired (Fig. 24).
- Note:** Do not adjust rollers to support the deck.
5. Reinstall the bolt, center rollers and nut (Fig. 24).



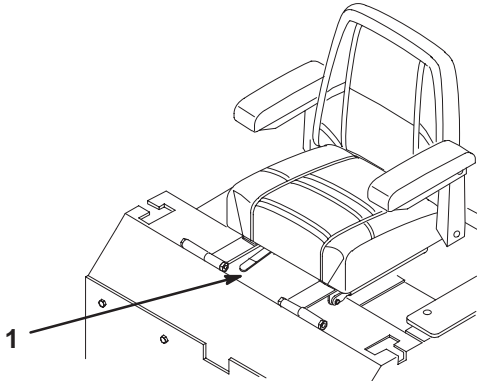
**Figure 24**

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. 25).
2. Slide the seat to the desired position and release lever to lock in position.



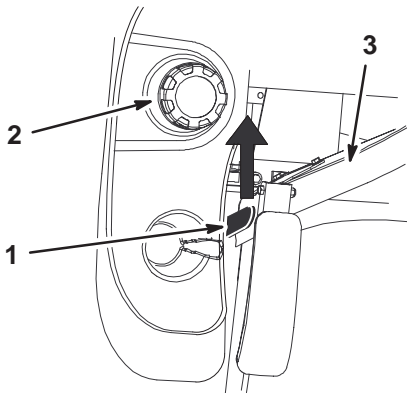
m-3655

**Figure 25**

1. Adjustment lever

## Unlatching the Seat

Push the seat latch rearward to unlatch the seat. This will allow access to the machine under the seat.



m-7038

**Figure 26**

1. Seat latch
2. Gas cap
3. Seat

## 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 PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. 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. 27).

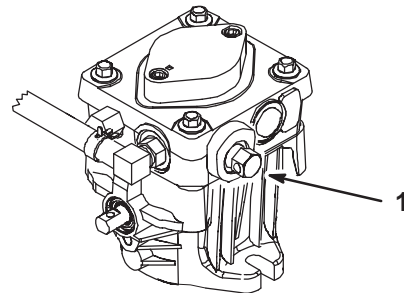
**Important** Do not rotate by-pass valves more than 1 turn. This prevents valves from coming out of the body and causing fluid to run out.

### To Operate the Machine

Turn the by-pass valves in to operate (Fig. 27).

**Note:** Do not over tighten the by-pass valves.

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



m-6279

**Figure 27**

1. By-pass valve

## Operating with Grass Deflector

The mower has a hinged grass deflector that disperses clippings to the side and down toward the turf. Refer to Replacing the Grass Deflector on page 52.

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, rotate the ignition key to off and 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 (Fig. 28). 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.

The ramp should be long enough so that the angles do not exceed 15 degrees (Fig. 28). 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.

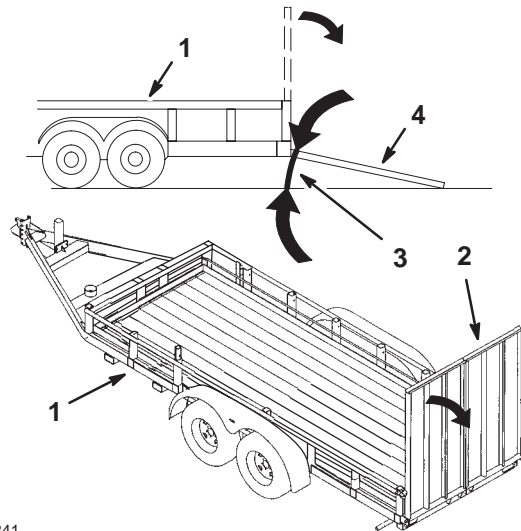


## Warning



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.



m-6841

Figure 28

1. Trailer
2. Full width ramp
3. Not greater than 15 degrees
4. Full width ramp—side view

## 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 5 Hours	<ul style="list-style-type: none"> <li>• Check hydraulic fluid level</li> <li>• Change engine oil</li> <li>• Change hydraulic filter</li> </ul>
Each Use	<ul style="list-style-type: none"> <li>• Check engine oil level</li> <li>• Check safety system</li> <li>• Clean engine air intake<sup>1</sup></li> <li>• Clean mower housing</li> </ul>
Every 5 Hours	<ul style="list-style-type: none"> <li>• Check cutting blades</li> <li>• Grease blade spindle bearings</li> </ul>
Every 25 Hours	<ul style="list-style-type: none"> <li>• Check hydraulic fluid level</li> <li>• Grease mower support and push arms</li> <li>• Grease brake lever</li> <li>• Oil linkage bushings<sup>1</sup></li> <li>• Service foam air cleaner<sup>1</sup></li> <li>• Check battery electrolyte</li> <li>• Check tire pressure</li> <li>• Grease both idler pulley pivots</li> </ul>
Every 40 Hours	<ul style="list-style-type: none"> <li>• Grease front tires</li> </ul>
Every 50 Hours	<ul style="list-style-type: none"> <li>• Check belts for wear/cracks</li> </ul>
Every 100 Hours	<ul style="list-style-type: none"> <li>• Change engine oil<sup>1</sup></li> <li>• Service paper air cleaner<sup>1</sup></li> <li>• Check spark plug(s)</li> <li>• Check hydraulic lines</li> </ul>
Every 200 Hours	<ul style="list-style-type: none"> <li>• Change hydraulic filter</li> <li>• Change oil filter<sup>1</sup></li> <li>• Replace fuel filter</li> <li>• Grease brake lever pivot</li> </ul>
Every 300 Hours	<ul style="list-style-type: none"> <li>• Clean cooling system<sup>1</sup></li> <li>• Replace paper air cleaner<sup>1</sup></li> </ul>
Every 500 Hours or at Storage	<ul style="list-style-type: none"> <li>• Adjust and grease caster pivot</li> <li>• Adjust wheel hub slotted nut</li> </ul>
Before Storage	<ul style="list-style-type: none"> <li>• Perform all maintenance procedures listed above before storage</li> <li>• Drain gasoline</li> <li>• Charge battery, disconnect cables</li> <li>• Paint chipped surfaces</li> </ul>

<sup>1</sup>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 accidentally 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.



## Warning



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.

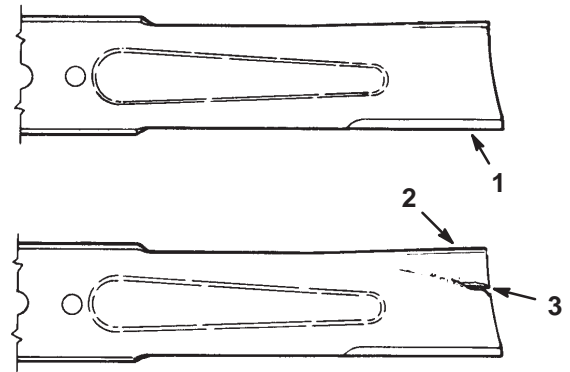
- Inspect the blade periodically for wear or damage.
- Replace a worn or damaged blade.

## 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.



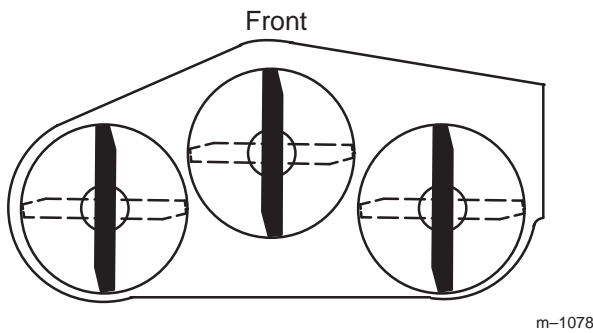
m-151

Figure 29

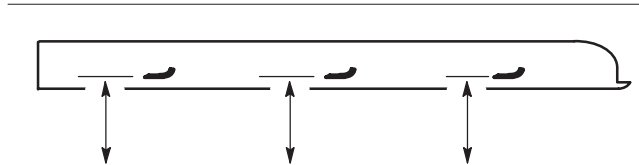
1. Cutting edge
2. Curved area
3. Wear/slot forming

## Checking for Bent Blades

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. 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**



**MEASURE FROM CUTTING EDGE TO A LEVEL SURFACE**

**Figure 31**

4. Rotate the opposite ends of the blades forward.
5. Measure from a level surface to the cutting edge of the blades at the same position as in step 3 above.

The difference between the dimensions obtained in steps 3 and 4 must not exceed 1/8 inch (3 mm).

If this dimension exceeds 1/8 inch (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.

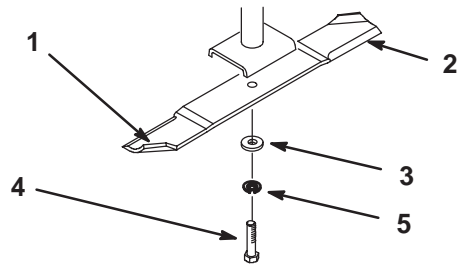


## Warning



**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



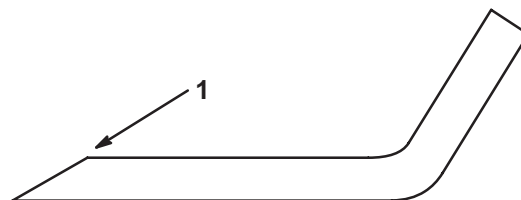
## Warning



**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.



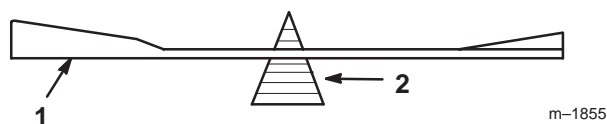
**Figure 33**

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

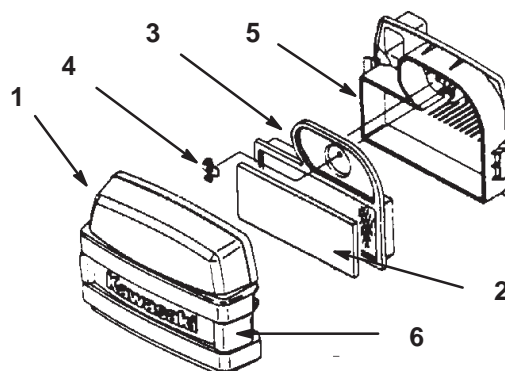
**Foam Element:** Clean and re-oil after every 25 operating hours.

**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 PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. 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**

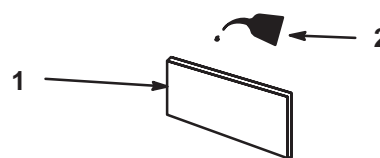
1. Cover  
2. Foam element  
3. Paper element  
4. Wing nut  
5. Air cleaner base  
6. Latches

4. Carefully remove the foam element from the paper element (Fig. 35).
5. 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.



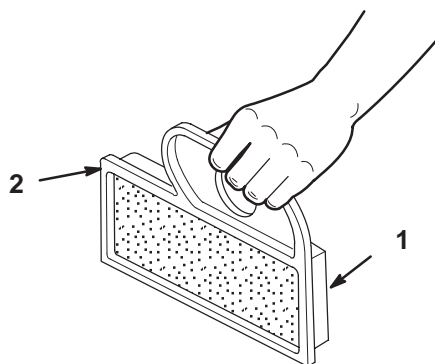
**Figure 36**

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.



m-4293

**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.

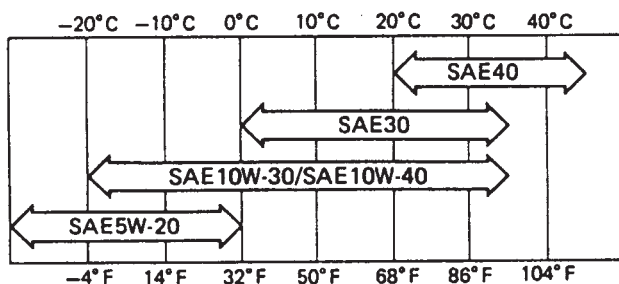
**Note:** Change oil more frequently when operating conditions are extremely dusty or sandy.

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

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

Viscosity: See table below

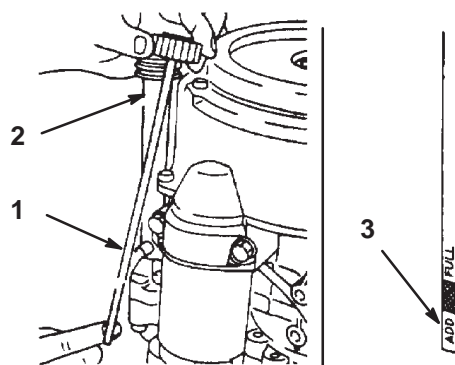
### USE THESE SAE VISCOSITY OILS



## Checking the Engine Oil Level

1. Park the machine on a level surface.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Clean around the oil dipstick (Fig. 38) so dirt cannot fall into the filler hole and damage the engine.
4. Unscrew the oil dipstick and wipe the end clean (Fig. 38).
5. 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.



m-4291

**Figure 38**

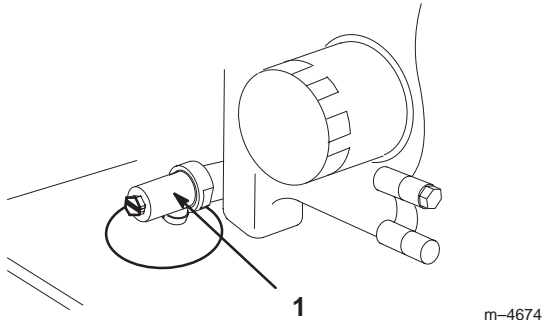
1. Oil dipstick                      3. Dipstick end  
2. Filler tube

## Changing the Engine 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 inch 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

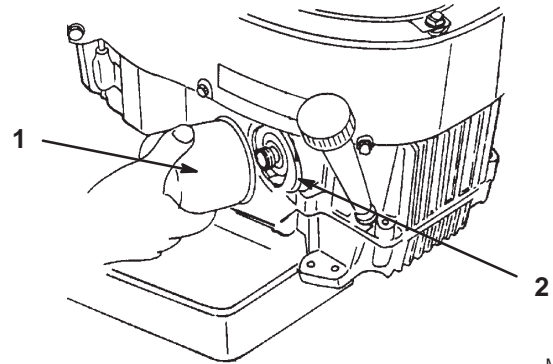
6. Slowly pour approximately 80% of the specified oil into the filler cap (Fig. 38). Refer to Servicing the Engine Oil, page 34.
7. Check the oil level; refer to Checking the Oil Level, page 34.
8. Slowly add additional oil to bring it to the full mark.

## Changing the 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).



M-4288

**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

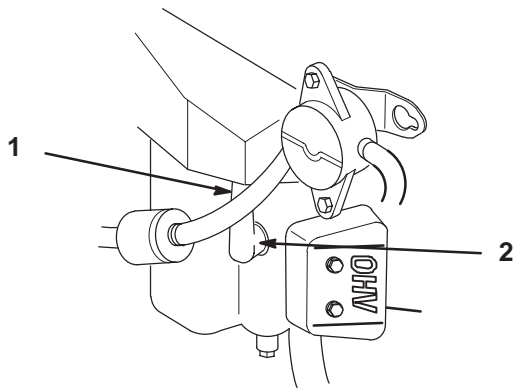
Check the spark plugs after every 100 operating hours. Make sure the air gap between the center and side electrodes is correct before installing the spark plug. Use a spark plug wrench for removing and installing the spark plugs and a gapping tool/feeler gauge to check and adjust the air gap. Install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

Type: Champion RCJ8Y or equivalent

Air Gap: 0.040 in. (1.0 mm)

## Removing the Spark Plugs

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. 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.
4. Remove the spark plugs.



M-4294

**Figure 41**

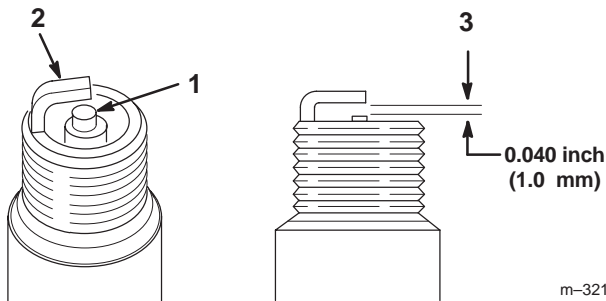
1. Spark plug wire installed      2. Spark plug

## Checking the Spark Plugs

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.



m-3215

**Figure 42**

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

## 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).

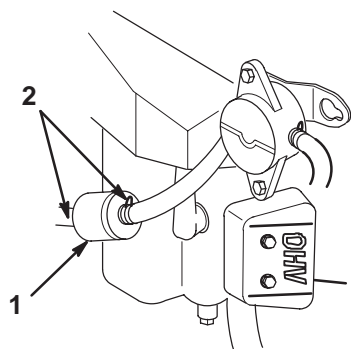
## Servicing the Fuel Filter

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 PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Allow the machine to cool down
4. Close fuel shut-off valve on console.
5. Squeeze the ends of the hose clamps together and slide them away from the filter (Fig. 43).
6. Remove the filter from the fuel lines.
7. Install a new filter and move the hose clamps close to the filter (Fig. 44).
8. Open fuel shut-off valve on console.



M-4294

**Figure 43**

1. Filter                      2. Hose clamp

## Servicing the Fuel Tank

### Draining The Fuel Tank



**Danger**



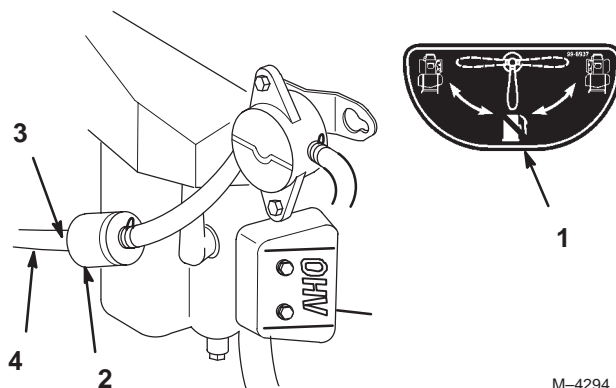
In certain conditions, gasoline is extremely flammable and highly explosive. A fire or explosion from gasoline can burn you and others and can damage property.

- 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).



M-4294

**Figure 44**

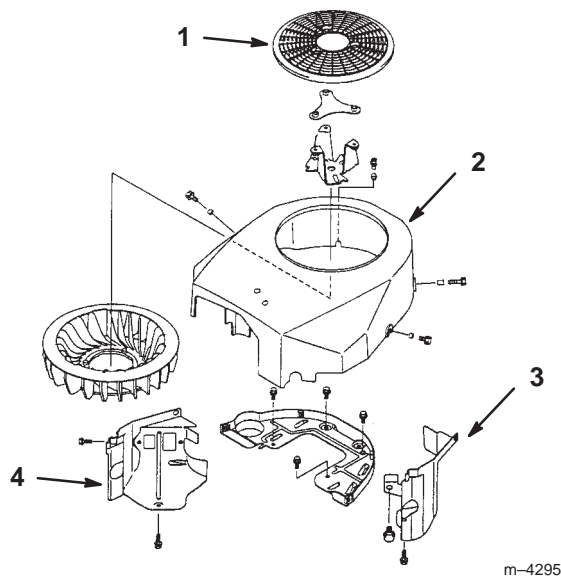
1. Fuel shut-off valve                      3. Hose clamp  
2. Fuel filter                                  4. Fuel line

## 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, whichever comes first.

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove air intake screen, cylinder covers and fan housing.
4. Clean debris and grass from parts.
5. Reinstall air intake screen, cylinder covers, and fan housing.



**Figure 45**

- |                      |                   |
|----------------------|-------------------|
| 1. Air intake screen | 3. Cylinder cover |
| 2. Fan housing       | 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.

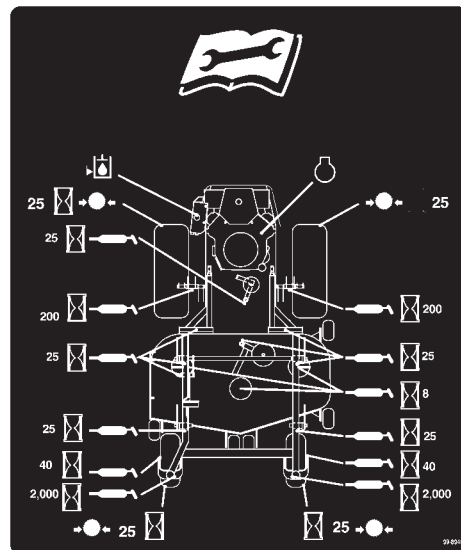
Grease with No. 2 general purpose lithium base or molybdenum base grease.

### How to Grease

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Clean the grease fittings with a rag. Make sure to scrape any paint off the front of the fittings.
4. Connect a grease gun to the fitting. Pump grease into the fittings until grease begins to ooze out of the bearings.
5. 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**

## Grease Front Caster Pivots

Lubricate the front caster pivots once a year.

1. Remove the dust cap and adjust the caster pivots. Keep dust cap off until greasing is done.
2. Adjust the caster pivot bearing. Refer to Adjusting the Caster Pivot Bearing, page 39.
3. Remove the hex plug. Thread a grease zerk into hole.
4. Pump grease into zerk until it oozes out around top bearing.
5. 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 NO TAG. Grease with No. 2 general purpose lithium base or molybdenum base grease.

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Grease the fittings on the three spindle bearings (Fig. 47).
4. Grease the idler pulley pivot (Fig. 47).

5. Grease the fittings on the push arms (Fig. 47).

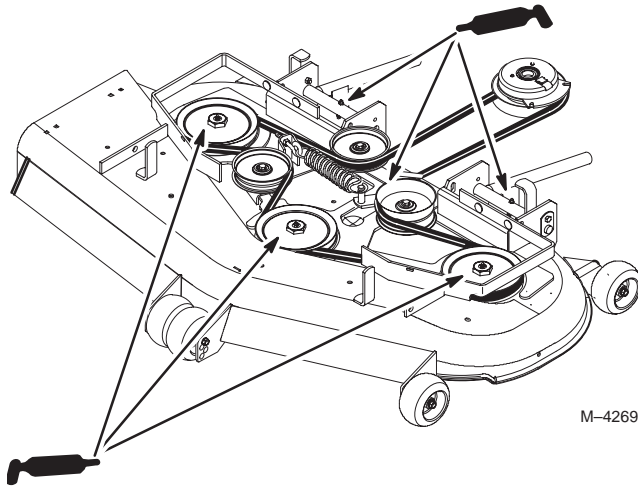


Figure 47

### 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 caster wheels.

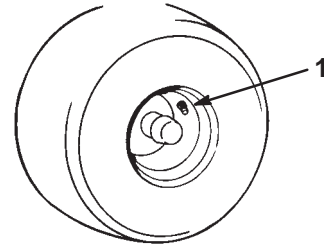


Figure 48

1. Valve stem

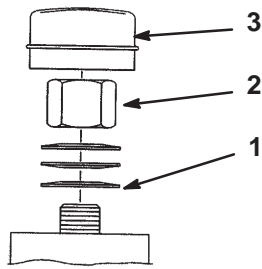
## Adjusting the Caster Pivot Bearing

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

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove dust cap from caster and tighten lock nut (Fig. 49).
4. 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).
5. Grease caster pivot. Refer to Greasing and Lubrication on 38.

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

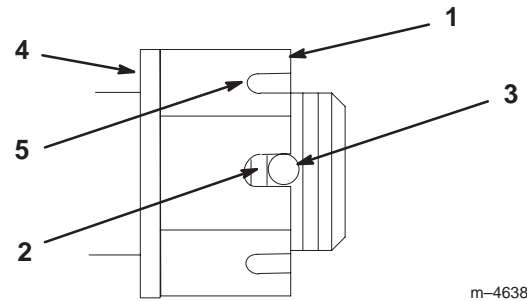




M-4640

**Figure 49**

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



m-4638

**Figure 50**

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

## 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. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove cotter pin.
4. Torque slotted nut to 125 ft.-lb. (169.5 N·m) (Fig. 50).
5. Check the distance from bottom of slot in nut to inside edge of hole. Two threads or less should be showing (Fig. 50).
6. If more than two threads are showing remove nut and install washer between hub and nut (Fig. 50).
7. Torque the slotted nut to 125 ft.-lb. (169.5 N·m) (Fig. 50).
8. Tighten nut until the next set of slots line up with the hole in the shaft (Fig. 50).
9. Replace cotter pin.

## Servicing the Hydraulic System

### Checking the Hydraulic Fluid

Check the hydraulic fluid level:

- Before the engine is first started.
- After the first 8 operating hours.
- 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 the cap from the 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.



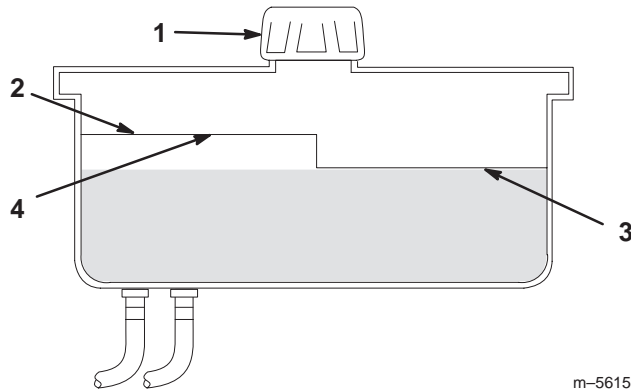
- Run the machine at low idle for 15 minutes to allow any air to purge out of the system and warm the fluid. Refer to Starting and Stopping the Engine on page 22.

- Recheck the fluid level while the fluid is warm. The fluid should be between cold and hot.

- If required, add fluid to the hydraulic tank.

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

- Install cap on filler neck.



**Figure 51**

- |           |                          |
|-----------|--------------------------|
| 1. Cap    | 3. Cold fluid level—full |
| 2. Baffle | 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.

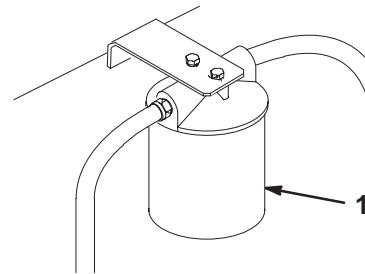
Use summer filter above 32°F (0°C)

Use winter filter below 32°F (0°C)

- Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
- Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.

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

- Place drain pan under filter, remove the old filter and wipe the filter adapter gasket surface clean (Fig. 52).



**Figure 52**

M-4763

- Hydraulic filter

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

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

- Fill the hydraulic tank with hydraulic fluid until the fluid overflows the filter and then turn the oil filter clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 1/2 turn (Fig. 53).

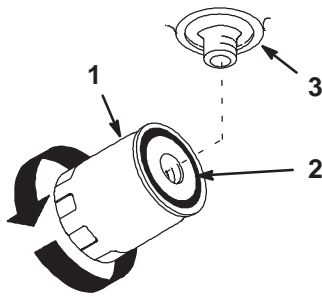
- Clean up any spilled fluid.

- Add fluid to the cold level of the baffle in the hydraulic tank.

- Start the engine and let it 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 Bleeding Hydraulic System, page 42.

- Recheck the fluid level while the fluid is warm. The fluid should be between cold and hot.

- If required, add fluid to the hydraulic tank. **Do not overfill.**



**Figure 53**

- |                     |            |
|---------------------|------------|
| 1. Hydraulic filter | 3. Adapter |
| 2. Gasket           |            |

m-1256

## 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 low idle speed. Engage the lever and 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 and add as required to maintain proper level.
5. Repeat this procedure on the opposite wheel.



### 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.

## Checking 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.

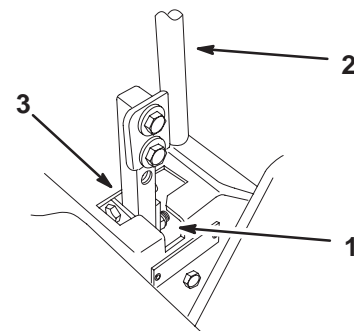
**Note:** Keep areas around hydraulic system clean from grass and debris build up.

## 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 in the setup instructions.

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Tilt the seat forward.
4. Begin with either the left or right motion control lever.
5. Move lever to the neutral position but **not locked** (Fig. 54).
6. Pull lever back until the clevis pin (on arm below pivot shaft) contacts the end of the slot (just beginning to put pressure on the spring) (Fig. 55).
7. Check where the control lever is relative to notch in console (Fig. 54). It should be centered allowing lever to pivot outward to the neutral lock position.



**Figure 54**

- |                            |                     |
|----------------------------|---------------------|
| 1. Neutral locked position | 3. Neutral position |
| 2. Control lever           |                     |

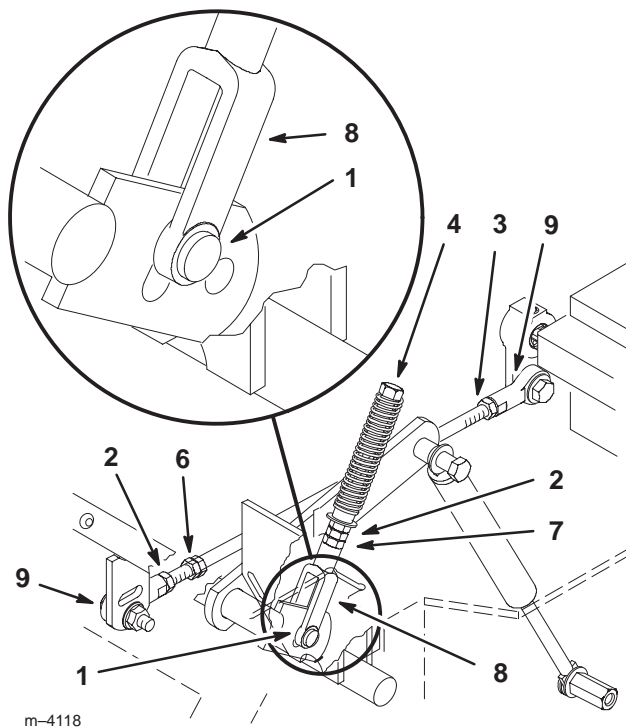
m-6282

8. If adjustment is needed, loosen the nut and jam nut against the yoke (Fig. 55).

9. Apply slight rearward pressure on the motion control lever, turn the head of the adjustment bolt in the appropriate direction until the control lever is centered in neutral lock position (Fig. 54).

**Note:** 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.

10. Tighten the nut and jam nut (Fig. 55).
11. Repeat on the opposite side of unit.



**Figure 55**

- |                         |                |
|-------------------------|----------------|
| 1. Clevis pin in slot   | 6. Double nuts |
| 2. Nut                  | 7. Jam nut     |
| 3. Nut—Left hand thread | 8. Yoke        |
| 4. Adjustment bolt      | 9. Ball joint  |
| 5. Pump rod             |                |

## Setting the Hydraulic Pump Neutral

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



### Warning



**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.



### 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.**

This adjustment must be made with drive wheels turning.

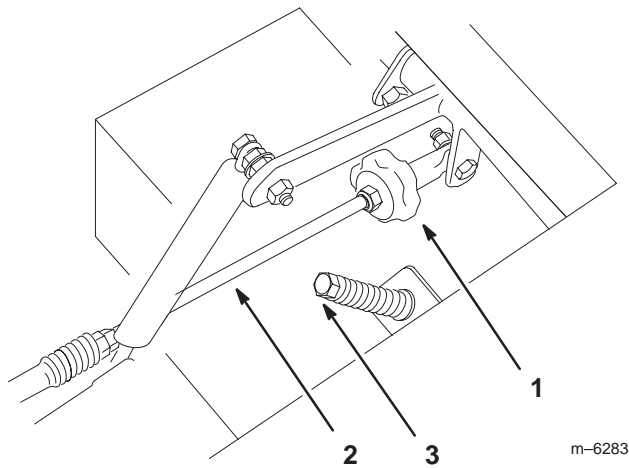
1. Raise the frame and block up the machine so drive wheels can rotate freely.
2. Disconnect electrical connector from the seat safety switch. **Temporarily** install a jumper wire across terminals in the wiring harness connector.
3. Slide seat forward, disconnect prop rod and tilt seat fully forward.

## Setting the Left-hand Hydraulic Pump Neutral

1. Start the engine, open throttle 1/2 way and release parking brake. Refer to Starting and Stopping the Engine, page 22.

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

2. Adjust pump rod length by rotating the knob, in the appropriate direction, until the wheel is still or slightly creeping in reverse (Fig. 56).
3. Move motion control lever forward and reverse, then back to neutral. Wheel must stop turning or slightly creep in reverse.
4. Open throttle to fast. Make sure wheel remains stopped or slightly creeps in reverse, adjust if necessary.



**Figure 56**

1. Tracking knob
2. Pump rod
3. Adjustment bolt

## Setting the Right-hand Hydraulic Pump Neutral

1. Loosen the locknuts at the ball joints on pump control rod (Fig. 55).
2. Start the engine, open throttle 1/2 way and release parking brake. Refer to Starting and Stopping the Engine, page 22.

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

**Note:** The front nut on the pump rod has left-hand threads.

3. 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).
4. Move motion control lever forward and reverse, then back to neutral. Wheel must stop turning or slightly creep in reverse.
5. Open throttle to fast. Make sure wheel remains stopped or slightly creeps in reverse, re-adjust if necessary.
6. Tighten the nuts at the ball joints (Fig. 55).



## 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.

7. After both pump neutrals are set, shut off the machine.
8. Remove jumper wire from wire harness connector and plug connector into seat switch.
9. Reinstall prop rod and lower the seat into position.

## Adjusting the Tracking

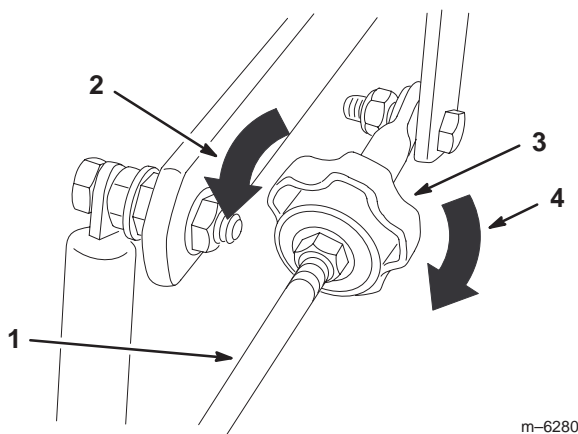
The left-hand pump has a knob for adjusting the tracking.

**Important** Adjust the handle neutral and hydraulic pump neutral before adjusting the tracking. Refer to Adjusting the Handle Neutral on page 42 and Adjusting the Hydraulic Pump Neutral on page 43.

1. Push both control levers forward the same distance.
2. Check if the machine pulls to one side. If it does, stop the machine and set the parking brake.
3. Tip the seat up to access the tracking knob.

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

4. To make the machine go right, turn the knob towards the rightside of the machine. Refer to figure 57.
5. To make the machine go left, turn the knob towards the leftside of the machine. Refer to figure 57.
6. Repeat adjustment until the tracking is correct.



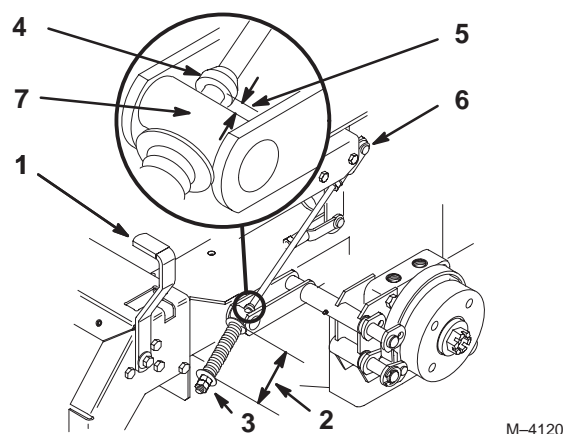
**Figure 57**

- |                                |                                 |
|--------------------------------|---------------------------------|
| 1. Pump rod                    | 3. Tracking knob                |
| 2. Turn this way to track left | 4. Turn this way to track right |

## 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 inch (70 mm) between washers (Fig. 58).
3. If adjustment is necessary, loosen the jam nut below the spring and tighten the nut directly below the yoke (Fig. 58). 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 inch (5–7 mm) (Fig. 58).
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. 58). Tighten jam nut at yoke.



**Figure 58**

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

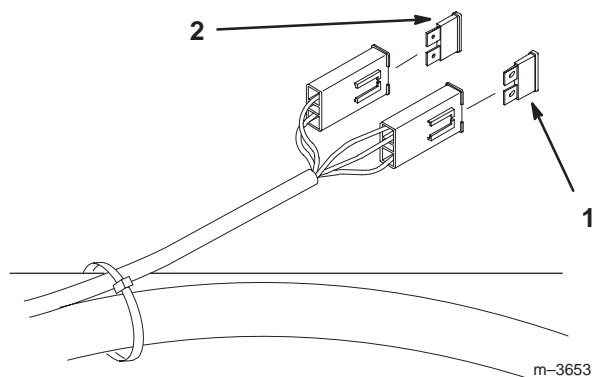
## Servicing the Fuse

### 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. 59).
2. To replace fuses pull out on the fuse to remove it (Fig. 59).



**Figure 59**

- |                |                      |
|----------------|----------------------|
| 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. 60). Do not allow the electrolyte to get below the **lower** line (Fig. 60).
3. If the electrolyte is low, add the required amount of distilled water; refer to Adding Water to the Battery, page 47.

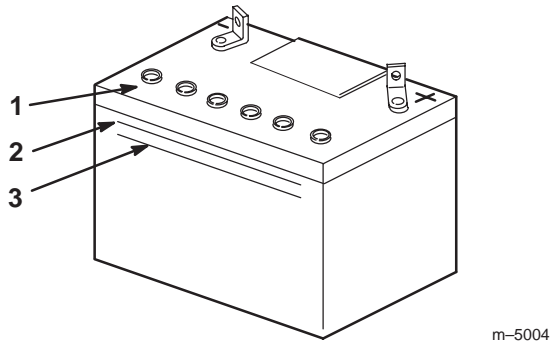


Figure 60

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

3. **Lower** line



### Danger

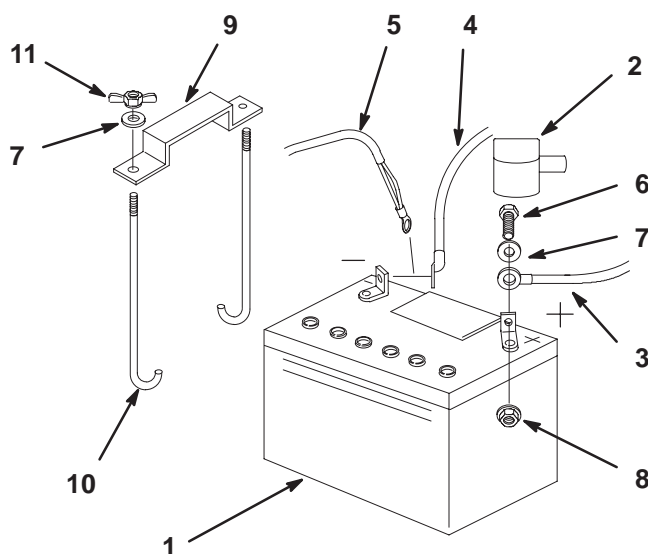


Battery electrolyte contains sulfuric acid which is a deadly poison and causes severe burns.

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

### Installing the Battery

1. Position battery in tray with terminal posts toward the engine (Fig. 61).
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 inch), 2 washers (1/4 inch), and 2 locknuts (1/4 inch) (Fig. 61).
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 inch), and 2 wing nuts (1/4 inch) (Fig. 61).



m-5598

**Figure 61**

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

## 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 PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Tilt the seat up.
4. First disconnect the negative battery cable and ground wire from the negative (-) battery terminal (Fig. 61).
5. Slide the red terminal boot off the positive (red) battery terminal. Then remove positive (red) battery cable (Fig. 61).
6. Remove both wing nuts (1/4 inch) securing the battery clamp (Fig. 61).
7. Remove the battery.

## Adding Water to the Battery

**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.

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.
3. Remove the vent caps from the battery (Fig. 60).
4. Slowly pour distilled water into each battery cell until the level is up to the **upper** line (Fig. 60) 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. 60) on the battery case.
6. Reinstall battery vent caps.

## Charging the Battery

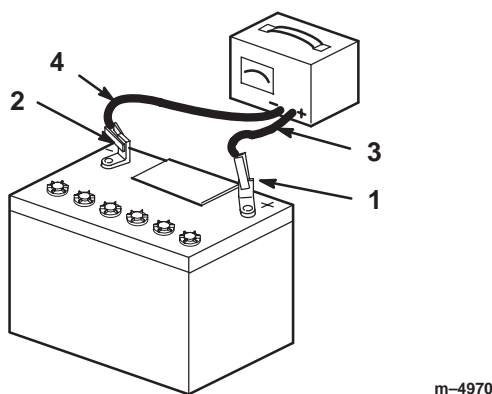
!
**Warning**
!

**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 47.
2. Check the electrolyte level; refer to Checking Electrolyte Level, page 46.
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. 62).



**Figure 62**

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

5. Install the battery in the machine and connect the battery cables; refer to Installing the Battery on page 46.

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

## Leveling the Mower at Three Positions

**Important** There are only three measuring positions needed to level the mower.

### Setting Up the Machine

1. Position mower on a flat surface.
2. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
3. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
4. Check tire pressure of all four tires. If needed, adjust to 13 psi (90 kPa)
5. Position the mower to the 3 inch (76 mm) height-of-cut position.
6. Inspect the four chains. The chains need to have tension.

**Note:** The rear chains need to be adjusted to the top of the slot, where attached to the mower.

- If one rear chain is loose, lower (loosen) the front support arm on the same side. Refer to Adjusting the Front-to-Rear Mower Pitch on page 49.
- If one front chain is loose, raise (tighten) the front support arm for that chain. Refer to Adjusting the Front-to-Rear Mower Pitch on page 49.

### Leveling the Mower Side-to-Side

1. Position the **right** blade front-to-rear (Fig. 63).
2. Measure the right blade at the **B** location (Fig. 63), from a level surface to the cutting edge of the blade tip (Fig. 64).
3. Record this measurement. This measurement needs to be 3–1/8 to 3–1/4 inches.
4. Position the **left** blade front-to-rear (Fig. 63).
5. Measure the left blade at the **C** location (Fig. 63), from a level surface to the cutting edge of the blade tip (Fig. 64).
6. Record this measurement. This measurement needs to be 3–1/8 to 3–1/4 inches.

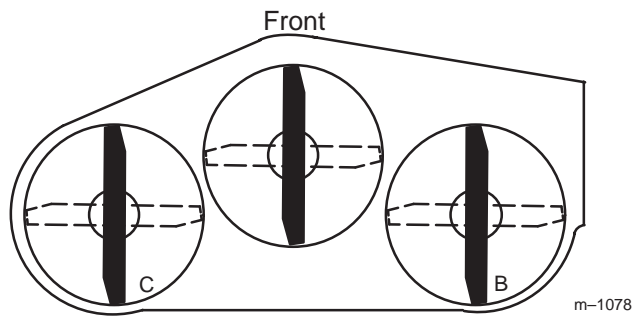


Figure 63

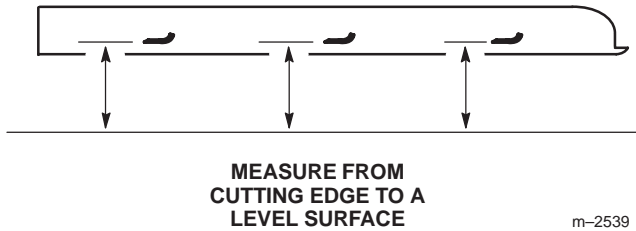


Figure 64

7. If the measurements at positions **B** or **C** are not correct, loosen the bolt attaching the rear chain to the rear support arm (Fig. 65).

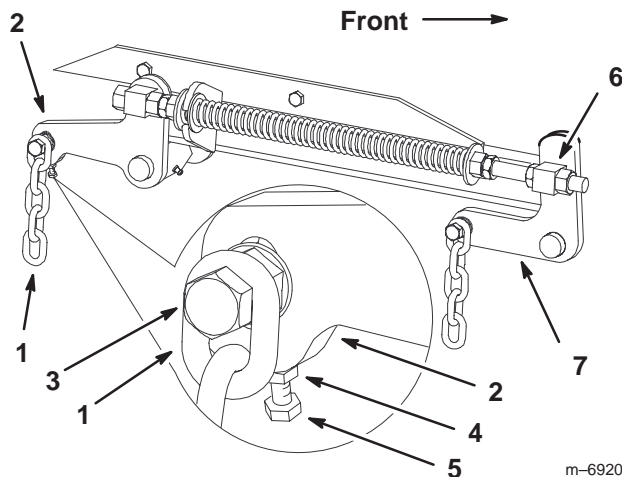


Figure 65

- |                     |                      |
|---------------------|----------------------|
| 1. Rear chain       | 5. Adjustment bolt   |
| 2. Rear support arm | 6. Front swivel      |
| 3. Bolt             | 7. Front support arm |
| 4. Jam Nut          |                      |

8. Loosen the jam nut under the rear support arm and adjust the adjustment bolt to get a measurement of 3-1/8 to 3-1/4 inches.

**Note:** It is recommended that both sides of the mower are adjusted the same distance.

9. Tighten the jam nut under the rear support arm and tighten the bolt securing the chain to the rear support arm.

10. Adjust the opposite side if needed.

## Adjusting the Front-to-Rear Mower Pitch

1. Position the **right** blade front-to-rear (Fig. 66).
2. Measure the right blade at the **A** location (Fig. 66), from a level surface to the cutting edge of the blade tip (Fig. 67).
3. Record this measurement.
4. Measure the right blade at the **B** location (Fig. 66), from a level surface to the cutting edge of the blade tip (Fig. 67).
5. Record this measurement.
6. The mower blade should be a **1/4 to 3/8 inch (6 to 10 mm) lower at position A than at position B** (Fig. 66). If it is not correct, proceed to the following steps.

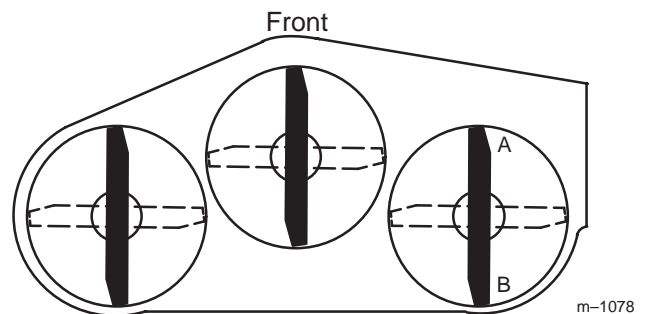


Figure 66

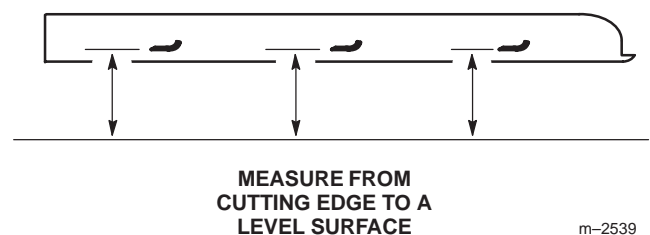


Figure 67

**Note:** Both of the front swivels need to be adjusted the same amount to maintain equal chain tension.

7. Loosen the front swivel jam nuts, at the front of the right and left swivels, approximately a 1/2 inch (13 mm) (Fig. 68).
8. Adjust the lift nuts on both the left and the right side of the machine to achieve **1/4 to 3/8 inch (6 to 10 mm) lower in front at A than in the rear at B** (Fig. 68).

9. Tighten both swivel jam nuts against the front swivel to lock the height.
10. Check to make sure there is equal tension on the chains and adjust again if needed.

## Adjusting the Compression Spring

1. Raise the mower lift lever to the transport position (Fig. 68).
2. Check the distance between the two large washers, it needs to be 10-1/4 inches (260 mm) (Fig. 68).
3. Adjust this distance, by loosening the spring jam nut and turning the nut in front of each spring (Fig. 68). Turning the nut clockwise will shorten the spring; counter-clockwise will lengthen the spring.
4. Lock the nut into position by tightening the spring jam nut (Fig. 68).

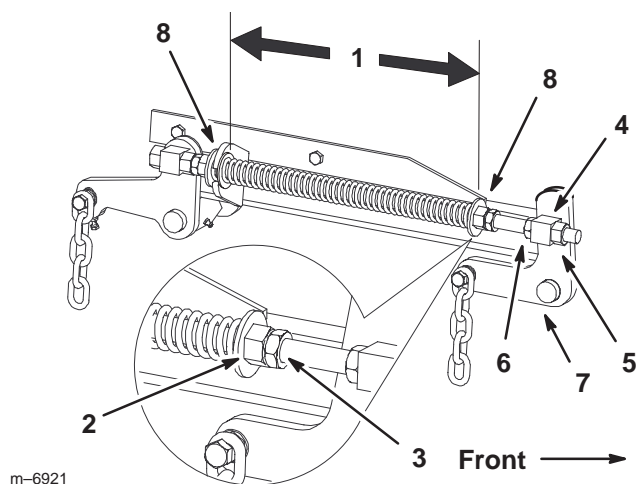


Figure 68

- |   |                      |
|---|----------------------|
| 1. 10-1/4 inch (260 mm) between the large washers | 4. Front swivel      |
| 2. Front nut                                      | 5. Swivel jam nut    |
| 3. Spring jam nut                                 | 6. Lift nut          |
|   | 7. Front support arm |
|   | 8. Large washer      |

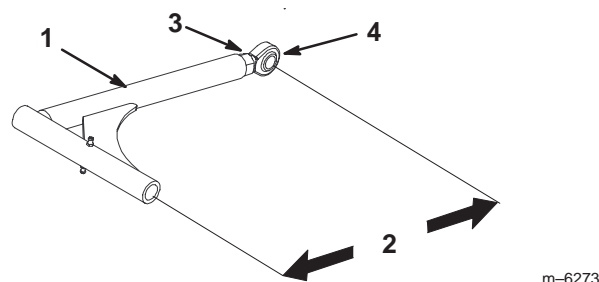


Figure 69

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

## Adjusting the Push Arms

If needed, adjust the push arms to increase or decrease the mower belt tension.

1. To adjust the push arms, loosen the jam nut and rotate the ball joint counterclockwise, one turn at a time.(Fig. 69).
2. Adjust each side the same amount. Each push arm should have a nominal length of 15-5/16 inch (389 mm) (Fig. 69).

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

## Cleaning Under the Deck

Remove grass build up under deck daily.

1. Position mower on a flat surface.
2. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
3. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
4. Raise deck to the transport position.
5. Lift the front of unit and support unit using jack stands.



### Warning



**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

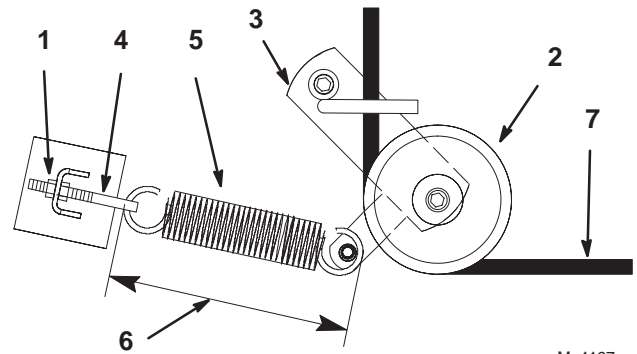
Inspect all belts every 50 hours.

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. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove belt covers over outside spindles.
4. Loosen outer nut on spring eye bolt (Fig. 70).



**Figure 70**

Top View

- |                    |  |
|--------------------|--|
| 1. Outer nut       | 5. Spring                                      |
| 2. Idler pulley    | 6. $9.375 \pm 0.125$ inch<br>( $238 \pm 3$ mm) |
| 3. Idler arm       | 7. Deck belt                                   |
| 4. Spring eye bolt |  |

5. Remove belt. Start at outside pulley and rotate off (Fig. 71).

**Note:** Do not remove spring.



### Warning



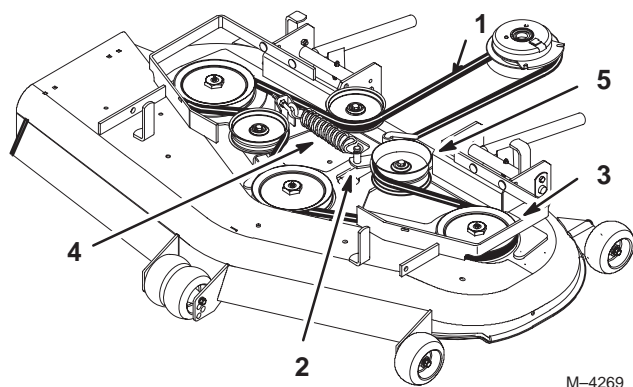
**Spring is under tension when installed and can cause personal injury.**

**Do not remove spring from spring eye bolt.**

6. Remove spring loaded idler pulley (Fig. 70).
7. Route new belt through idler arm (Fig. 70).
8. Reinstall idler pulley and route belt onto other pulleys (Fig. 71).
9. Retighten outer nut on spring eye bolt (Fig. 70).

**Note:** Check spring length. The spring should measure  $9.375 \pm .125$  inch ( $238 \pm 3$  mm) when installed. Adjust if it does not (Fig. 70).

10. Install belt covers over outside spindles.



**Figure 71**

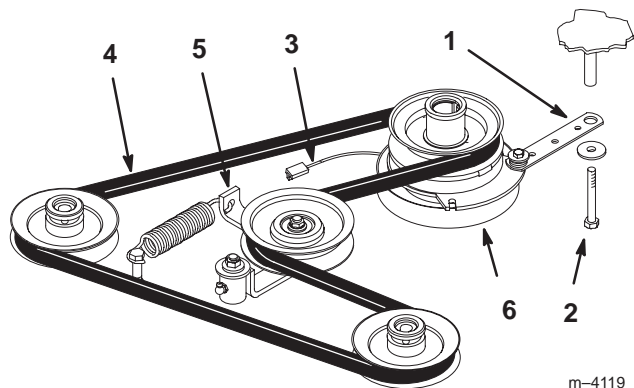
Top View

- |                   |                 |
|-------------------|-----------------|
| 1. Deck belt      | 4. Spring       |
| 2. Idler arm      | 5. Idler pulley |
| 3. Outside 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 51.
2. Remove bolt from clutch strap and unplug clutch electrical wire (Fig. 72).
3. Pull spring loaded idler to side. Remove traction belt from the engine and hydro pump pulleys (Fig. 72).
4. Install new belt around engine and hydro pump pulleys (Fig. 72).
5. Pull spring loaded idler to side and align belt. Release pressure on spring loaded idler (Fig. 72).
6. Reinstall deck belt.



**Figure 72**

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

## Replacing the Grass Deflector



### Warning

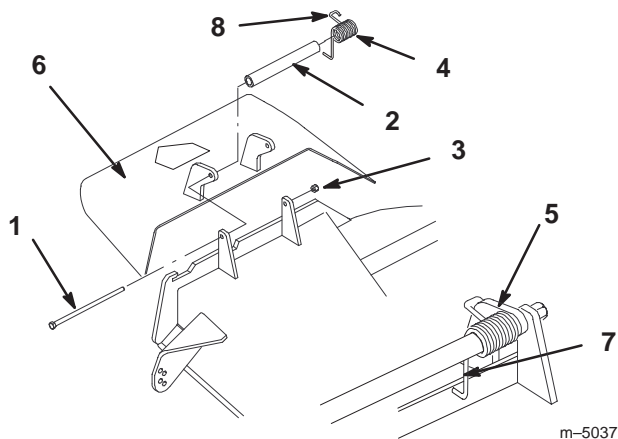


An uncovered discharge opening could allow the lawn mower to throw objects in the operator's or bystander's direction and result in serious injury. Also, contact with the blade could occur.

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. 73). Remove damaged or worn grass deflector.
2. Install grass deflector as shown in figure 73.

**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 73**

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

## Waste Disposal

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

## WIRE COLOR CODES



## 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 38.
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 NO TAG.
7. Check the tire pressure; refer to Checking the Tire Pressure, page 39.
8. Charge the battery; refer to Servicing the Battery page 46.
9. Scrape any heavy buildup of grass and dirt from the underside of the mower, then wash the mower with a garden hose.

**Note:** Run the machine with the PTO engaged and the engine at high idle for 2 to 5 minutes after washing.

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 37.
- D. Restart engine and run it until it stops.
- E. Choke the engine. Start and run the engine until it will not start.
- 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 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	<ol style="list-style-type: none"> <li>1. Blade control (PTO) is engaged.</li> <li>2. Parking brake is not on.</li> <li>3. Operator is not seated.</li> <li>4. Battery is dead.</li> <li>5. Electrical connections are corroded or loose.</li> <li>6. Fuse is blown.</li> <li>7. Relay or switch is defective.</li> </ol>	<ol style="list-style-type: none"> <li>1. Move blade control (PTO) to disengaged.</li> <li>2. Set parking brake.</li> <li>3. Sit on the seat.</li> <li>4. Charge the battery.</li> <li>5. Check electrical connections for good contact.</li> <li>6. Replace fuse.</li> <li>7. Contact Authorized Service Dealer.</li> </ol>
Engine will not start, starts hard, or fails to keep running.	<ol style="list-style-type: none"> <li>1. Fuel tank is empty.</li> <li>2. Fuel valve turned off.</li> <li>3. Choke is not on.</li> <li>4. Air cleaner is dirty.</li> <li>5. Spark plug wires are loose or disconnected.</li> <li>6. Spark plugs are pitted, fouled, or gap is incorrect.</li> <li>7. Dirt in fuel filter.</li> <li>8. Dirt, water, or stale fuel is in fuel system.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill fuel tank with gasoline.</li> <li>2. Open fuel valve.</li> <li>3. Move choke lever to on.</li> <li>4. Clean or replace air cleaner element.</li> <li>5. Install wires on spark plug.</li> <li>6. Install new, correctly gapped spark plugs.</li> <li>7. Replace fuel filter.</li> <li>8. Contact Authorized Service Dealer.</li> </ol>
Engine loses power.	<ol style="list-style-type: none"> <li>1. Engine load is excessive.</li> <li>2. Air cleaner is dirty.</li> <li>3. Oil level in crankcase is low.</li> <li>4. Cooling fins and air passages under engine blower housing are plugged.</li> <li>5. Spark plugs are pitted, fouled, or gap is incorrect.</li> <li>6. Dirt in fuel filter.</li> <li>7. Dirt, water, or stale fuel is in fuel system.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce ground speed.</li> <li>2. Clean air cleaner element.</li> <li>3. Add oil to crankcase.</li> <li>4. Remove obstruction from cooling fins and air passages.</li> <li>5. Install new, correctly gapped spark plugs.</li> <li>6. Replace fuel filter.</li> <li>7. Contact Authorized Service Dealer.</li> </ol>
Engine overheats.	<ol style="list-style-type: none"> <li>1. Engine load is excessive.</li> <li>2. Oil level in crankcase is low.</li> <li>3. Cooling fins and air passages under engine blower housing are plugged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce ground speed.</li> <li>2. Add oil to crankcase.</li> <li>3. Remove obstruction from cooling fins and air passages.</li> </ol>

<b>Problem</b>	<b>Possible Causes</b>	<b>Corrective Action</b>
Abnormal vibration.	<ol style="list-style-type: none"> <li>1. Engine mounting bolts are loose.</li> <li>2. Loose engine pulley, idler pulley, or blade pulley.</li> <li>3. Engine pulley is damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten engine mounting bolts.</li> <li>2. Tighten the appropriate pulley.</li> <li>3. Contact Authorized Service Dealer.</li> </ol>
Machine does not drive.	<ol style="list-style-type: none"> <li>1. Traction belt is worn, loose or broken.</li> <li>2. Traction belt is off pulley.</li> <li>3. Hydro fluid level low.</li> </ol>	<ol style="list-style-type: none"> <li>1. Contact Authorized Service Dealer.</li> <li>2. Contact Authorized Service Dealer.</li> <li>3. Add hydro fluid to reservoir.</li> </ol>
Abnormal vibration.	<ol style="list-style-type: none"> <li>1. Engine mounting bolts are loose.</li> <li>2. Loose engine pulley, idler pulley, or blade pulley.</li> <li>3. Engine pulley is damaged.</li> <li>4. Cutting blades are bent or unbalanced.</li> <li>5. Blade mounting bolt is loose.</li> <li>6. Loose engine pulley, idler pulley, or blade pulley.</li> <li>7. Engine pulley is damaged.</li> <li>8. Blade spindle bent.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten engine mounting bolts.</li> <li>2. Tighten the appropriate pulley.</li> <li>3. Contact Authorized Service Dealer.</li> <li>4. Install new cutting blades.</li> <li>5. Tighten blade mounting bolt.</li> <li>6. Tighten the appropriate pulley.</li> <li>7. Contact Authorized Service Dealer.</li> <li>8. Contact Authorized Service Dealer.</li> </ol>
Uneven cutting height.	<ol style="list-style-type: none"> <li>1. Blades not sharp.</li> <li>2. Cutting blades are bent.</li> <li>3. Mower is not level.</li> <li>4. Gage wheel not set correctly.</li> <li>5. Underside of mower is dirty.</li> <li>6. Tire pressure is incorrect.</li> <li>7. Blade spindle bent.</li> </ol>	<ol style="list-style-type: none"> <li>1. Sharpen blades.</li> <li>2. Install new cutting blades.</li> <li>3. Level mower from side-to-side and front-to-rear.</li> <li>4. Adjust gage wheel height.</li> <li>5. Clean the underside of the mower.</li> <li>6. Adjust tire pressure.</li> <li>7. Contact an Authorized Service Dealer.</li> </ol>
Blades do not rotate.	<ol style="list-style-type: none"> <li>1. Drive belt is worn, loose or broken.</li> <li>2. Drive belt is off pulley.</li> <li>3. Electrical clutch will not engage</li> </ol>	<ol style="list-style-type: none"> <li>1. Install new drive belt.</li> <li>2. Install drive belt and check adjusting shafts and belt guides for correct position.</li> <li>3. Contact an Authorized Service Dealer.</li> </ol>