FORM NO. 3323–395

TORO®

## Z–320

# OUT FRONT Z

**Model No. 74191 – 895001 & Up**

# Operator’s Manual

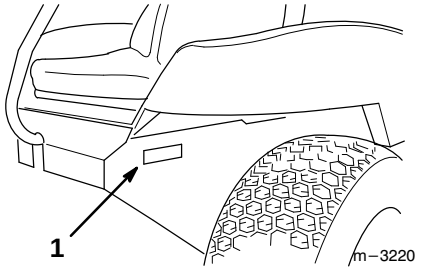
**IMPORTANT:** Read this manual carefully. It contains information about your safety and the safety of others. Also become familiar with the controls and their proper use before you operate the product.

# Introduction

Thank you for purchasing a Toro product.

All of us at Toro want you to be completely satisfied with your new product, so feel free to contact your local Authorized Service Dealer for help with service, genuine replacement parts, or other information you may require.

Whenever you contact your Authorized Service Dealer or the factory, always know the model and serial numbers of your product. These numbers will help the Service Dealer or Service Representative provide exact information about your specific product. You will find the model and serial number plate located in a unique place on the product as shown below.




1. Model and Serial Number Plate

For your convenience, write the product model and serial numbers in the space below.

**Model No:** _____

**Serial No.** _____

Read this manual carefully to learn how to operate and maintain your product correctly. Reading this manual will help you and others avoid personal injury and damage to the product. Although we design, produce and market safe, state-of-the-art products, you are responsible for using the product properly and safely. You are also responsible for training persons, who you allow to use the product, about safe operation.

The warning system in this manual identifies potential hazards and has special safety messages that help you and others avoid personal injury, 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 the recommended precautions are not followed.

**WARNING** signals a hazard that may cause serious injury or death if the recommended precautions are not followed.

**CAUTION** signals a hazard that may cause minor or moderate injury if the recommended precautions are not followed.

Two other words are also used to highlight information. “Important” calls attention to special mechanical information and “Note” emphasizes general information worthy of special attention.

The left and right side of the machine is determined from the normal operator’s position.

**⚠ WARNING: ⚠**

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

**IMPORTANT: This engine is not equipped with a spark arrester muffler. It is a violation of California Public Resource Code Section 4442 to use or operate this engine on any forest–covered, brush–covered or grass–covered land. Other states or federal areas may have similar laws.**

# Contents

**The enclosed Engine Owner’s Manual is supplied for information regarding The U.S. Environmental Protection Agency (EPA) and the California Emission Control Regulation of emission systems, maintenance and warranty.**

**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.**

# Safety

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

### Training

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

        insufficient wheel grip;

        being driven too fast;

        inadequate braking;

        the type of machine is unsuitable for its task;

        lack of awareness of the effects of ground conditions, especially slopes;

        incorrect hitching and load distribution.

### Preparation

1. While mowing, always wear substantial footwear and long trousers. Do not operate the equipment when barefoot or wearing open sandals.
2. Thoroughly inspect the area where the equipment is to be used and remove all objects which may be thrown by the machine.
3. WARNING – Petrol is highly flammable.
    - Store fuel in containers specifically designed for this purpose.
    - Refuel outdoors only and do not smoke while refuelling.
    - Add fuel before starting the engine. Never remove the cap of the fuel tank or add petrol while the engine is running or when the engine is hot.
    - If petrol is spilled, do not attempt to start the engine but move the machine away from the are of spillage and avoid creating any source of ignition until petrol vapors have dissipated.
    - Replace all fuel tanks and container caps securely.
4. Replace faulty silencers.
5. 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.
6. On multi–bladed machines, take care as rotating one blade can cause other blades to rotate.

## Operation

**1.** Do not operate the engine in a confined space where dangerous carbon monoxide fumes can collect.

**2.** Mow only in daylight or in good artificial light.

**3.** Before attempting to start the engine, disengage all blade attachment clutches and shift into neutral.

**4.** Do not use on slopes of more than:

- Never mow side hills over 5°
- Never mow uphill over 10°
- Never mow downhill over 15°

**Note:** Slope angle is calculated as in 5.4.2.3.2.

**5.** Remember there is no such thing as a “safe” slope. Travel on grass slopes requires particular care. To guard against overturning:

- do not stop or start suddenly when going up or downhill;
- engage clutch slowly, always keep machine in gear, especially when travelling downhill;
- machine speeds should be kept low on slopes and during tight turns;
- stay alert for bumps and hollows and other hidden hazards;
- never mow across the face of the slope, unless the lawnmower is designed for this purpose.

**6.** Use care when pulling loads or using heavy equipment.

- Use only approved drawbar hitch points.
- Limit loads to those you can safely control.
- Do not turn sharply. Use care when reversing.
- Use counterweight(s) or wheel weights when suggested in the instruction handbook.

**7.** Watch out for traffic when crossing or near roadways.

**8.** Stop the blades rotating before crossing surfaces other than grass.

**9.** When using any attachments, never direct discharge of material toward bystanders nor allow anyone near the machine while in operation.

**10.** Never operate the lawnmower with defective guards, shields or without safety protective devices in place.

**11.** Do not change the engine governor settings or overspeed the engine. Operating the engine at excessive speeds may increase the hazard of personal injury.

**12.** 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.

**13.** Disengage drive to attachments, stop the engine, and disconnect the spark plug wire(s) or remove the ignition key

- before cleaning 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).

**14.** Disengage drive to attachments when transporting or not in use.

**15.** 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.

**16.** Reduce the throttle setting during engine run-out and, if the engine is provided with a shut-off valve, turn the fuel off at the conclusion of mowing.

## Maintenance and storage

**1.** Keep all nuts, bolts and screws tight to be sure the equipment is in safe working condition.

**2.** Never store the equipment with petrol in the tank inside a building where fumes may reach an open flame or spark.

**3.** Allow the engine to cool before storing in any enclosure.

**4.** To reduce the fire hazard, keep the engine, silencer, battery compartment and petrol storage area free of grass, leaves, or excessive grease.

**5.** Check the grass catcher frequently for wear or deterioration.

**6.** Replace worn or damaged parts for safety.

**7.** If the fuel tank has to be drained, this should be done outdoors.

**8.** On multi-bladed machines, take care as rotating one blade can cause other blades to rotate.

**9.** When machine is to be parked, stored or left unattended, lower the cutting means unless a positive mechanical lock is used.

## Sound Pressure

This unit has an equivalent continuos A-weighted sound pressure at the operator ear of: 90 dB(A), based on measurements of identical machines per 81/1051/EEC.

## Sound Power

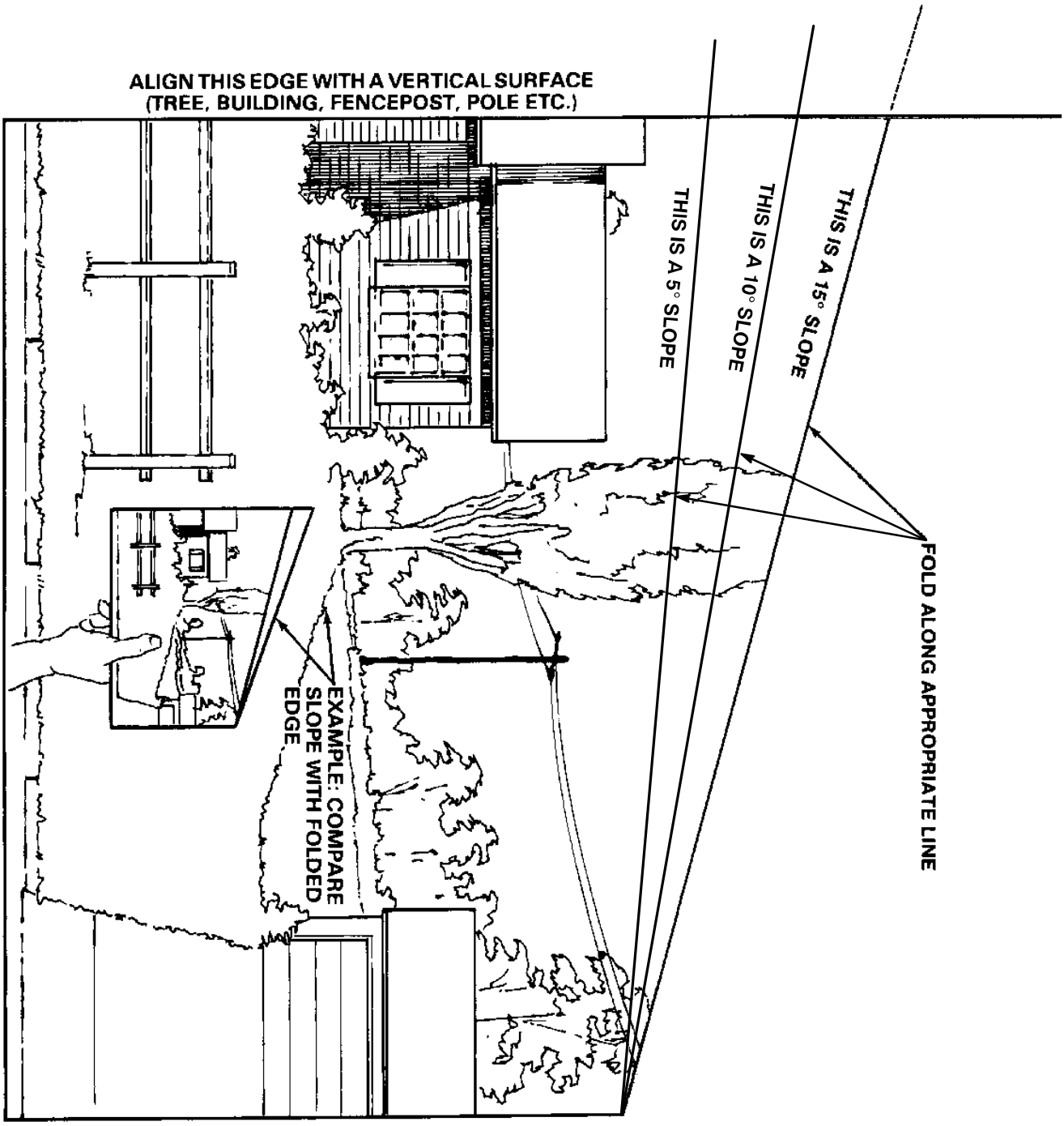
This unit has a power level of: 105 dB(A)/1pW, based on measurements of identical machines per Directive 84/539/EEC.

## Vibration Level

This unit has a maximum hand-arm vibration level of XX $m/s^2$, and whole body vibration level of XX $m/s^2$, based on measurements of identical machines per EN 1032 and EN 1033.

# Slope Chart

**Read all safety instructions on pages 3–10.**



# Symbols Glossary

**Safety alert triangle– symbol within triangle indicates a hazard**

**Safety alert symbol**

**Read operator's manual**

**Consult technical manual for proper service procedures**

**Shut off engine & remove key before preforming maintenance or repair work**

**Caustic liquids, chemical burns to fingers or hand**

**Caution, toxic risk**

**Eye protection must be worn**

**Hearing protection must be worn**

**First aid, flush with water**

**Fire, open light & smoking prohibited**

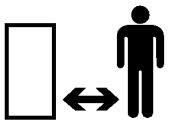
**Fire or open flame**

**Explosion**

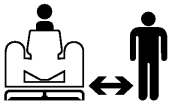
**Keep children away from battery**

**Do not dispose of lead battery in garbage**

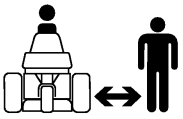

**Stay a safe distance from the machine**



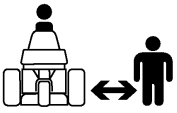
**Stay a safe distance from the machine**



**Stay safe distance from machine, out front Z**



**Keep children a safe distance from machine**



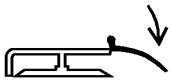
# Symbols Glossary

**Do not open or remove safety shields while engine is running**

**Thrown or flying objects, whole body exposure**

**Thrown or flying objects, whole body exposure**

**Keep guards and safety sheilds in place**



**Severing of toes & fingers, rotary mower blade**

**Hand & arm engagement, belt drive**

**Whole body entanglement, implement input drive line**

**Finger & hand engagement, belt drive**

**Hot surface, burns to fingers or hands**

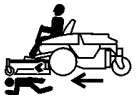
**Severing of fingers or hand-engine fan**

**Stored energy hazard, kickback or upward motion**

**Dismemberment, rider backing**

**Do not carry passengers**

**Dismemberment, Out Front Z in forward motion**



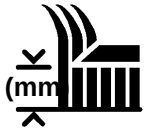
**Machine rollover, Out Front Z**

**Machine rollover, do not use on side hill slope greater than 5 degrees**

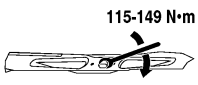

**Machine rollover, do not use on down hill slope greater than 10 degrees**


**Machine rollover, do not use on up hill slope greater than 15 degrees**


**Blade cutting element-height adjustment**




**Blade retaining bolts must be Torqued to 115–149 N.m**



# Symbols Glossary

**Fast**

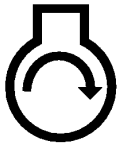
**Slow**

**Decreasing/Increasing**

**On/Run**

**Off/stop**

**Engine start**



**Engine run**

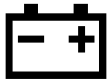
**Engine stop**


**Choke**

**Brake system**

**Parking brake**

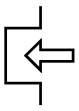

**Battery**



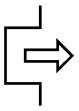
**Oil Lubrication Point**

**Power take off (PTO)**

**Engage**



**Disengage**



**Elapsed Operating Hours**

**Alarm**

# 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**

**POTENTIAL HAZARD**
- **In certain conditions gasoline is extremely flammable and highly explosive.**

**WHAT CAN HAPPEN**
- **A fire or explosion from gasoline can burn you, others, and cause property damage.**

**HOW TO AVOID THE HAZARD**
- **Use a funnel and fill the fuel tank outdoors, in an open area, when the engine is cold. Wipe up any gasoline that spills.**
- **Do not fill the fuel tank completely full. Add gasoline to the fuel tank until the level is 1/4” to 1/2” (6 mm 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.**

**⚠ DANGER**

**POTENTIAL HAZARD**
- **When fueling, under certain circumstances, a static charge can develop, igniting the gasoline.**

**WHAT CAN HAPPEN**
- **A fire or explosion from gasoline can burn you and others and cause property damage.**

**HOW TO AVOID THE HAZARD**
- **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.**

## Stabilizer/Conditioner

Add the correct amount of gas stabilizer/conditioner to the gas. Using a stabilizer/conditioner in the machine:

- 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 buildup in the fuel system, which causes hard starting

  **IMPORTANT: Never use fuel additives containing methanol or ethanol.**

## Filling the Fuel Tank

1. Shut the engine off and set the parking brake.
2. Clean around the fuel tank cap and remove the cap. Add unleaded regular gasoline until the level is to the bottom of the filler neck. Do not fill the neck completely full, this space in the tank allows gasoline to expand.
3. Install fuel tank cap securely. Wipe up any gasoline that may have spilled.

## Check Engine Oil Level

Before you start the engine and use the machine, check the oil level in the engine crankcase; refer to Checking Oil Level, page 33.

# Assembly

## Loose Parts

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

| DESCRIPTION | QTY. | USE |
|---|---|---|
| Wheel assembly–castor | 1 | Install castor wheel |
| Bolt 1/2–13 x 9” (228 mm) | 1 | |
| Locknut 1/2–13 | 1 | |
| Washer 1/2” (13 mm) | 2 | |
| Spacer | 1 | |
| Battery | 1 | Install battery |
| Battery clamp | 1 | |
| Battery support rod | 2 | |
| Wing nut 1/4–20 | 4 | |
| Terminal boot | 1 | |
| Bolt 1/4–20 x 3/4” (19 mm) | 2 | |
| Washer 1/4” | 2 | |
| Shoulder bolt | 1 | Secure power take off (PTO) cover |
| Locknut | 1 | |
| Recycler® baffle – left | 1 | Install Recycler® baffles |
| Recycler® baffle – right | 1 | |
| Carriage bolt 5/16–18 x 3/4” (19 mm) | 6 | |
| Locknut 5/16” | 6 | |
| Key | 2 | |
| Safety Booklet | 1 | Read before operating machine |
| Operator’s Manual | 1 | |
| Engine Operator’s Manual | 1 | |
| Parts Catalog | 1 | For ordering parts |
| Registration card | 1 | Fill out and return to Toro |

## Install Castor Wheel

1. Remove nut, washers, spacer and axle shaft from fork (Fig. 1).
2. Jack up rear of unit and install rear wheel into castor fork (Fig. 1).
3. Place wheel with spacer installed and washers between fork and slide bolt through bearings (Fig. 1).
4. Secure bolt with 1/2” locknut (Fig. 1).
5. Torque nut to 75 ft–lb (55 N·m).
6. Grease castor wheel bearings (Fig. 1).

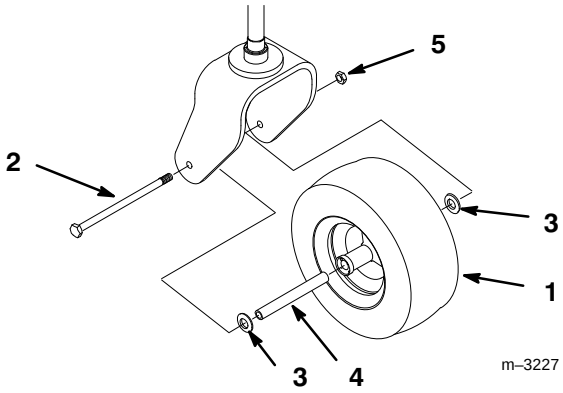



**Figure 1**

1. Wheel assembly
2. Bolt 1/2–13 x 9” (227 mm)
3. Washer 1/2” (13 mm)
4. Spacer
5. Locknut 1/2”

## Check Tire Pressure

Check the air pressure in all tires: refer to Tire Pressure in Maintenance section on page 42.

## Secure PTO Cover

To lower mower refer to: Tilting the Mower in Operation section on page 27.

## Activate the Battery

Bulk electrolyte with 1.260 specific gravity must be purchased from a local battery supply outlet.

**1.** Remove the battery from the machine.

**IMPORTANT: Be careful not to damage the long vent tube when removing the battery box.**

**⚠ DANGER**

**POTENTIAL HAZARD**

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

**WHAT CAN HAPPEN**

- **If you carelessly drink electrolyte you could die or if it gets onto your skin you will be burned.**

**HOW TO AVOID THE HAZARD**

- **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.**

**2.** Remove filler caps from the battery. Slowly pour electrolyte into each cell until the electrolyte level is up to the lower part of the tube (Fig. 2).

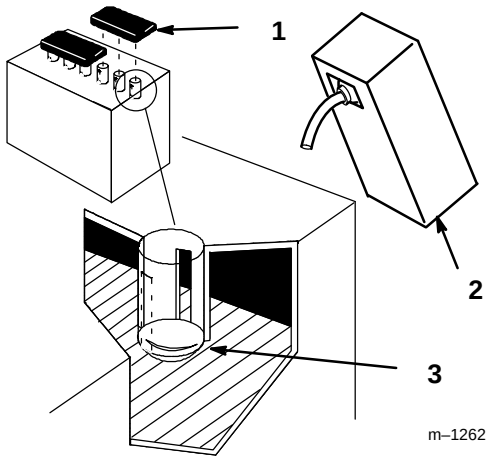



**Figure 2**

1. Filler caps
2. Electrolyte
3. Lower part of the tube

**3.** Leave the covers off and connect a 3 to 4 amp battery charger to the battery posts (Fig. 3). Charge the battery at a rate of 4 amperes or less for 4 hours (12 volts).

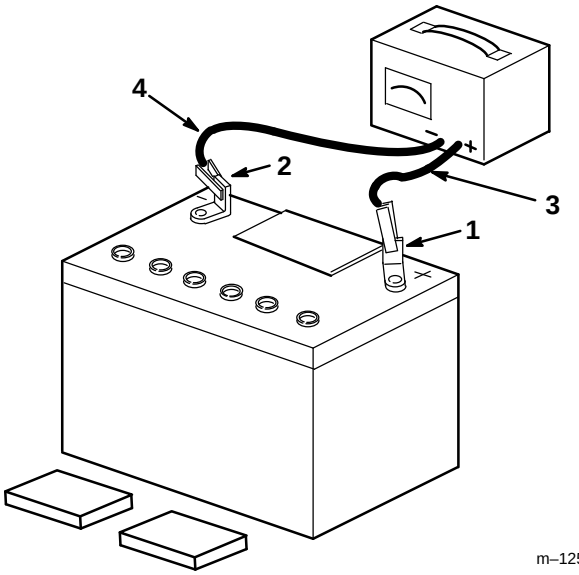



**Figure 3**

1. Positive post
2. Negative post
3. Charger red (+) wire
4. Charger black (–) wire

**⚠ WARNING**

**POTENTIAL HAZARD**
- **Charging battery produces gasses.**

**WHAT CAN HAPPEN**
- **Battery gasses can explode.**

**HOW TO AVOID THE HAZARD**
- **Keep cigarettes, sparks and flames away from battery.**

**4.** When the battery is fully charged, disconnect the charger from the electrical outlet then from the negative and positive battery posts (Fig. 3).

**5.** Slowly pour electrolyte into each cell until the level is once again up to the “UPPER” line on the battery case (Fig. 2) and install covers.

## Install Battery

**1.** Fill battery with electrolyte and charge, refer to BATTERY, page 50.

**2.** Position battery in tray with terminal posts toward the engine (Fig. 4).

**3.** Slide the red terminal boot onto the red battery cable.

**4.** Install the positive (red) battery cable to positive (+) battery terminal then negative battery cable to the negative (–) battery terminal. Secure cables with (2) 1/4 x 3/4” (19 mm) bolts 1/4” washers, 1/4” lock washers and 1/4” locknuts.

**IMPORTANT: Route cables so they do not contact metal edges or frame members.**

**5.** Secure battery with (2) support rods, a battery clamp and (2) 1/4” wing nuts. Position support rods in mounting holes (Fig. 4). Tighten wing nuts so battery is held securely in position and will not slide. DO NOT OVERTIGHTEN.

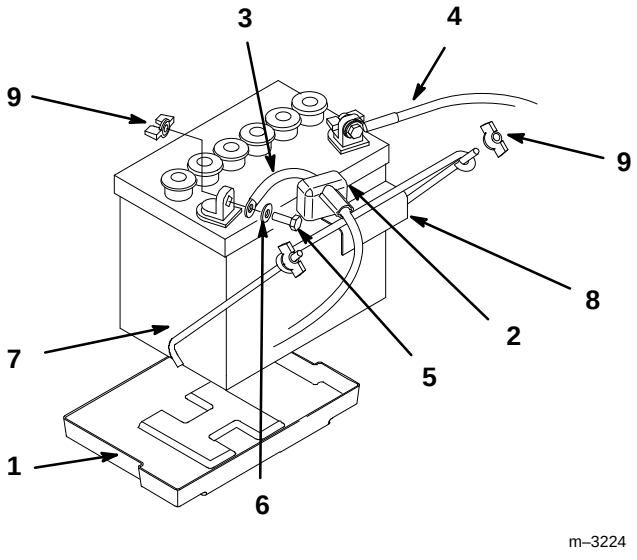



**Figure 4**

1. Battery tray
2. Terminal boot
3. Positive battery cable
4. Negative battery cable
5. Bolt 1/4–20 x 3/4” (19 mm)
6. Washer 1/4”
7. Battery support rod
8. Battery clamp
9. Wing nut 1/4”

## Install Recycler® Baffles

1. Tilt mower into the vertical position, refer to; Tilting the Mower, page 27.

2. Remove cap screws, left and right bagger baffles locknuts, carriage bolts, and left and right discharge baffles from the mower (Fig. 7).

   **Note:** Save all hardware for use when installing bagger.

3. Locate the left and right Recycler® baffles inside mower and secure with (6) 1/4–20 x 3/4" (19 mm) cap screws, through from the bottom of mower, washers, (4) 1/4"–20 retained nuts and 1/4–20 locknuts (Fig. 5).

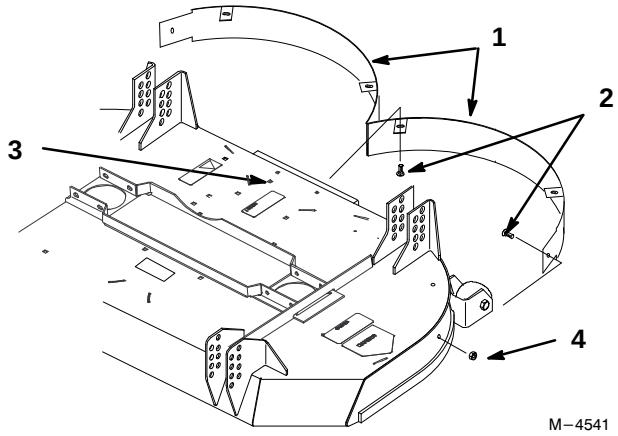



**Figure 5**

1. Recycler® baffle
2. Cap Screw
3. Retainer Nut
4. Washer (.344x.688)

## Recycler® Operation

When operating the mower with Recycler® baffles installed you must disengage the blower drive belt.

1. Stop the engine, remove the key and disconnect the spark plug wire(s) from the spark plug(s).

2. Remove hairpin cotter and clevis pin from idler arm (Fig. 6).

3. Push up on the spring loaded idler arm, behind PTO (power take off) gearbox, to relax pressure on blower belt (Fig. 6).

4. Align hole in idler arm with slot in frame and insert clevis pin. Secure with hairpin cotter to hold in position.

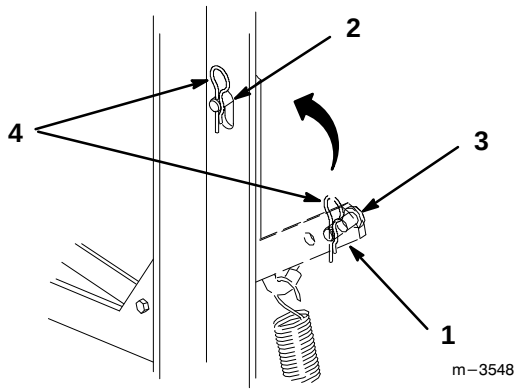



**Figure 6**

1. Idler arm
2. Frame slot
3. Clevis pin
4. Hairpin cotter

# Install Bagger and Discharge Baffles

When changing between bagging and recycling, baffles must be removed and replaced

1. Tilt mower into the vertical position, refer to; Tilting the Mower, page 27.
2. Remove capscrews ,locknuts, carriage bolts and Recycler® baffles from the mower (Fig. 5).

   **Note:** Save all hardware for use when installing Recycler® baffles.
3. Locate the left and right bagger baffles inside the mower and secure with (6) 5/16–18 x 3/4" (19 mm) carriage bolts, through from the top of mower, and (6) 5/16" locknuts (Fig. 7).
4. Locate the left and right discharge baffles inside the mower and secure with (4) 5/16–18 x 3/4" (19 mm) carriage bolts, through from the bottom and inside of mower, washers, and (4) 5/16" locknut.(Fig. 7).

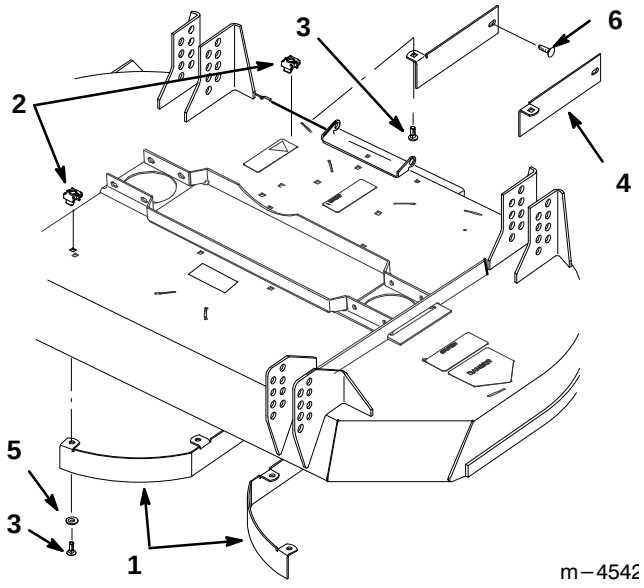



**Figure 7**

1. Bagger baffle
2. Retainer Nut
3. Cap Screw
4. Discharge baffle
5. Washer (.344x.688)
6. Carriage Bolt

# Bagger Operation

When operating the mower with bagger baffles installed you must engage the blower drive belt.

1. Stop the engine, remove the key and disconnect the spark plug wire(s) from the spark plug(s).
2. Place belt around blower, idler and PTO pulleys.
3. Push up on the spring loaded idler arm, behind PTO (power take off) gearbox, to relax pressure on spring (Fig. 6).
4. Remove hairpin cotter and clevis pin from slot in frame and allow idler to tension belt (Fig. 6).
5. Install hairpin cotter and clevis pin in outer hole of idler arm for storage (Fig. 6).

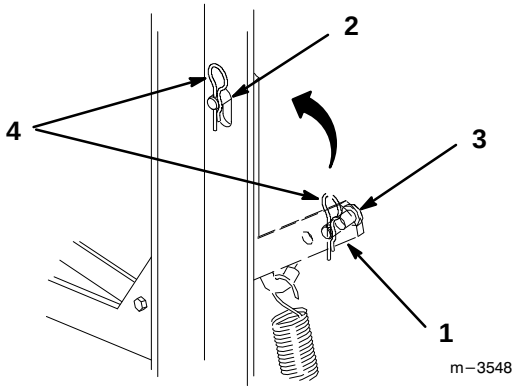



**Figure 8**

1. Idler arm
2. Frame slot
3. Clevis pin
4. Hairpin cotter

# Operation

## Think Safety First

Please carefully read all the safety instructions on pages 3–8. Knowing this information could help you, your family, pets or bystanders avoid injury.

**⚠ CAUTION**

**POTENTIAL HAZARD**

- **Loud sounds can cause ear damage and loss of hearing.**

**WHAT CAN HAPPEN**

- **Ear damage or hearing loss may occur.**

**HOW TO AVOID THE HAZARD**

- **Wear ear protection when operating this machine.**

## Controls

Become familiar with all the controls before you start the engine and operate the machine (Fig. 1).

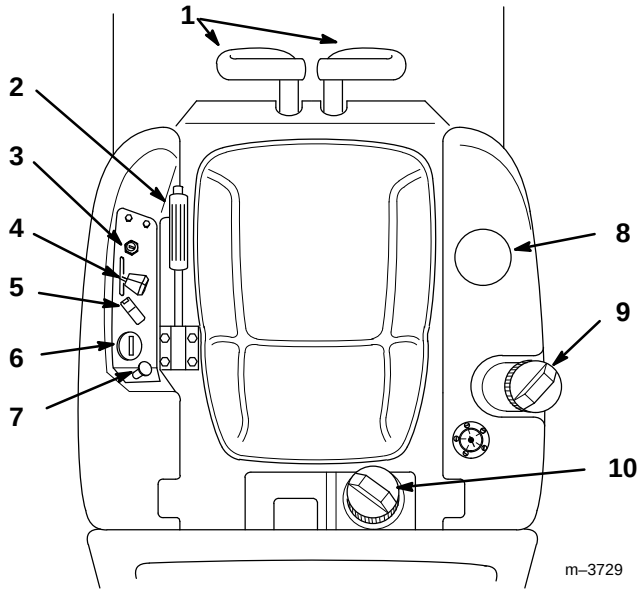



**Figure 1**

1. Motion control lever
2. Parking brake
3. Ignition switch
4. Throttle
5. Power take off (PTO)
6. Hourmeter
7. Choke
8. Drink holder
9. Fuel cap
10. Hydro reservoir cap

# Parking Brake

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

## Setting the Parking Brake

**1.** Move the motion control levers to neutral (Fig. 1).

**2.** Pull up on the parking brake lever to set the parking brake (Fig. 2). The parking brake lever should stay firmly in the “SET” position.

## Releasing the Parking Brake

**1.** Push in on the button and lower parking brake lever to “OFF” (Fig. 2).

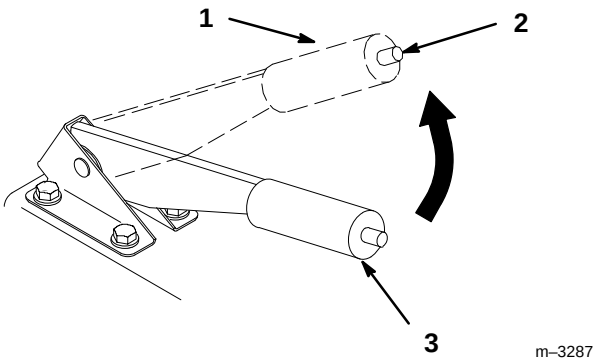



**Figure 2**

1. Parking brake–SET
2. Button
3. Parking brake-OFF

# Starting and Stopping Engine

## Starting

1. Sit down on the seat and set the parking brake; refer to Setting the Parking Brake, page 20.
2. Move the motion control levers to neutral.
3. Move the PTO (power take off) to “OFF” (Fig. 3).
4. Move the throttle control midway between “SLOW” and “FAST” positions before starting a cold engine.
5. Move the choke control to “ON” position before starting a cold engine.

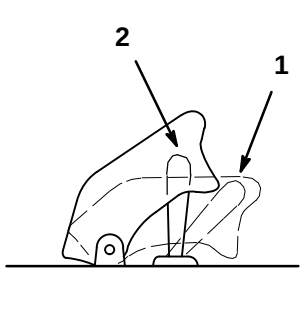
   **Note:** A warm or hot engine may require choking. After engine starts, move choke control to “OFF” position.

6. Turn ignition key to “START” to energize starter. When engines starts, release key.

   **Note:** If starter does not crank, move the motion control levers slightly to locate neutral.

   **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.**

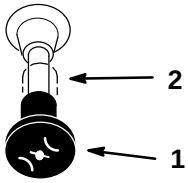
7. After the engine starts, gradually move the choke to “OFF” (Fig. 4). If the engine stalls or hesitates, move the choke back to “ON” for a few seconds. Then move the throttle lever to desired setting. Repeat this as required.




m–2721

**Figure 3**

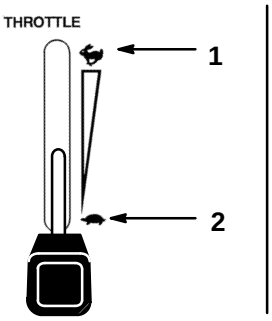
1. PTO-Off
2. PTO-On




m–2719

**Figure 4**

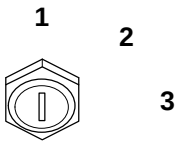
1. Choke–On
2. Choke–Off




m–

**Figure 5**

1. Fast
2. Slow




m–2718

**Figure 6**

1. Off
2. Run
3. Start

### Stopping

1. Move the throttle lever to “SLOW” (Fig. 5).
2. Set the parking brake.
3. Turn the ignition key to “OFF” (Fig. 6).

   **Note:** If the engine has been working hard or is hot, let it idle for a minute before turning the ignition key “OFF.” This helps cool the engine before it is stopped. In an emergency, the engine may be stopped by turning the ignition key to “OFF.”

4. Pull wire off spark plug(s) to prevent possibility of accidental starting before transporting or storing machine.
5. Close fuel shut off valve, under fuel tank before transporting or storing machine.

   **IMPORTANT: Make sure fuel shut off valve is closed before transporting or storing machine, as fuel leakage may occur.**

## Operating Power Take Off (PTO)

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

### Engaging the Power Take Off (PTO)

1. With engine running, move motion control levers to neutral to stop the machine.
2. Raise the cover and move the power take off (PTO) switch to the “ON” position to engage (Fig. 7).

   **Note:** To prevent engine stalling, from heavy load, move throttle to “FAST” position.

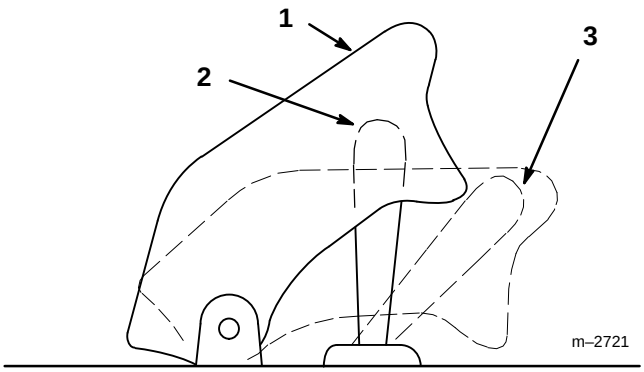



**Figure 7**

1. Cover
2. ON-Engaged
3. OFF-Disengaged

### Disengaging the Power Take Off (PTO)

1. Move motion control levers to neutral to stop the machine.
2. Lower the cover of the power take off (PTO) switch. This moves the switch to the “OFF” position to disengage (Fig. 7).

# The Safety Interlock System

## Understanding the Safety Interlock System

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

- The parking brake is “SET”
- The power take off (PTO) is disengaged “OFF”
- The motion control levers are in neutral

The safety interlock system also is designed to stop the engine when:

- The motion control levers are moved out of neutral with the parking brake on “SET”
- You rise from the seat when the power take off (PTO) is “ON” or the motion control levers are not in neutral
- The motion control levers are moved out of neutral or PTO is engaged with the hopper tilted up

## 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.** “SET” the parking brake and move power take off (PTO) to “ON”. Try starting the engine; the engine should not crank.

**2.** “SET” the parking brake and move power take off (PTO) to “OFF”. Move one then the other motion control lever forward or reverse. Try starting the engine; the engine should not crank.

**3.** “SET” the parking brake, move power take off (PTO) to “OFF” and hold the motion control levers in neutral. Now start the engine. While the engine is running engage the power take off (PTO) and rise slightly from the seat; the engine should stop.

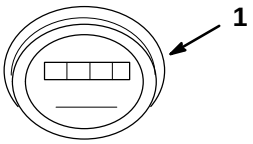
**4.** “SET” the parking brake, move power take off (PTO) to “OFF” and hold the motion control levers in neutral. Now start the engine. While the engine is running, move the motion control levers forward or reverse; the engine should stop.

**5.** Tilt the hopper up, “SET” the parking brake, move power take off (PTO) to “OFF” and hold the motion control levers in neutral. Now start the engine. While the engine is running, move the motion control levers forward or reverse; the engine should stop.

# Instruments

## 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.




m–2717

**Figure 8**

1. Hour meter

# 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 attachment performance. Always operate in the full throttle position when operating attachments.

## Forward

**1.** Release the parking brake; refer to Setting the Parking Brake, page 20.

**2.** To go forward, slowly push the motion control levers forward (Fig. 9).

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

To go straight, move both motion control levers the same distance (Fig. 9).

To turn move the motion control lever toward neutral, on the side you want to turn toward (Fig. 9).

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

**Note:** The mowing speed reference position can be felt as extra spring force when pushing motion controls forward. Motion control levers return to this pre-set position, approximately 5 mph, when forward pressure is reduced. Below the pre-set speed the motion control levers remain in their placed location. For adjusting reference speed refer to; Adjusting Mowing Speed Reference Position page 46.

To slow or stop move the motion control levers to neutral.

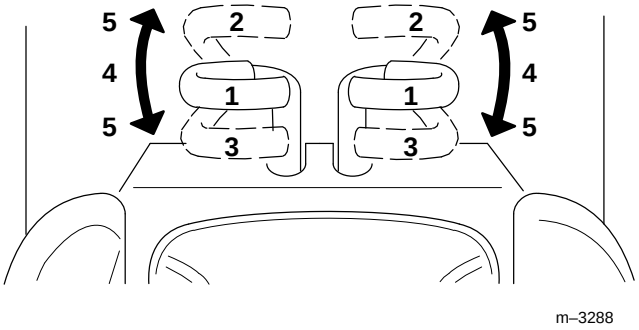



**Figure 9**

1. Motion control lever-neutral position
2. Forward
3. Backward
4. Slow
5. Fast

### Backward

1. Release the parking brake; refer to Setting the Parking Brake, page 20.
2. To go backward, slowly pull the motion control levers rearward (Fig. 9).

To go straight, move both motion control levers the same distance (Fig. 9).

To turn move the motion control lever toward neutral, on the side you want to turn toward (Fig. 9).

To slow or stop move the motion control levers to neutral.

## Stopping the Machine

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

**⚠ CAUTION**

**POTENTIAL HAZARD**

- **Someone could move or attempt to operate the tractor while it is unattended.**

**WHAT CAN HAPPEN**

- **Children or bystanders may be injured if they use the tractor.**

**HOW TO AVOID THE HAZARD**

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

## 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, remove the locknut and washer, and tip seat forward (Fig. 10).

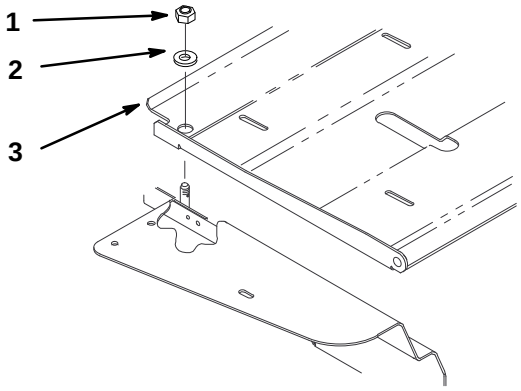



**Figure 10**

1. Locknut
2. Washer
3. Seat base

2. Loosen the seat mounting bolts slide seat to the desired position in the adjusting slots and tighten the mounting bolts (Fig. 11).
3. Lower seat and secure with washer and locknut (Fig. 10).

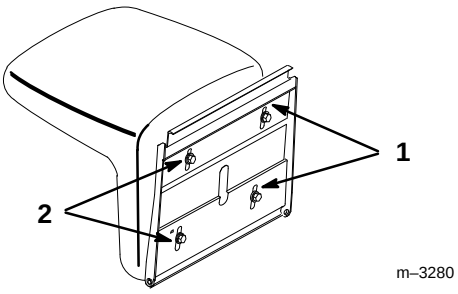



**Figure 11**

1. Adjustment slot
2. Mounting bolt

## Adjusting Height-of-Cut

The height-of-cut is adjusted from 1” to 4-1/2” (25 to 115 mm) in 1/2” (13 mm) increments by relocating four clevis pins in different hole locations.

**1.** To adjust, remove hairpin cotter and clevis pin from mower hanger bracket (Fig. 17).

**2.** Select hole in mower hanger bracket corresponding to the height-of-cut desired. Lift on side and front handles to align holes and insert clevis pin (Fig. 17).

**3.** Secure clevis pin with hairpin cotter (Fig. 17).

**Note:** All four clevis pins should be in the same hole location for a level cut.

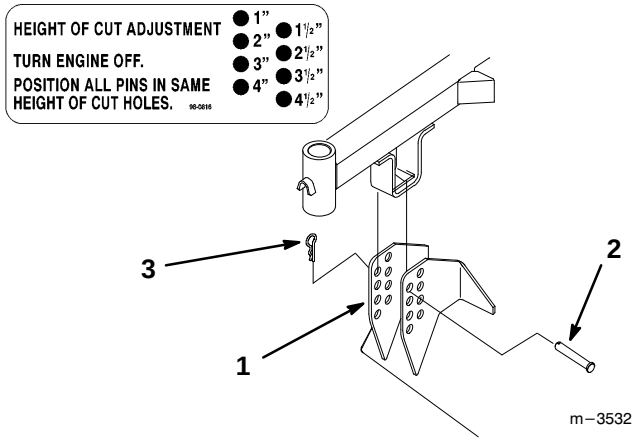



**Figure 12**

1. Mower Hanger Bracket
2. Clevis Pin
3. Hairpin Cotter

## Adjusting Rollers

The rollers are preset for heights-of-cut above 2” (51 mm) If the height-of-cut is set to the 1”or 1–1/2” (25 mm or 39 mm) the rollers must be adjusted to the upper hole location.

**1.** After adjusting height-of-cut, tilt mower to adjust rollers, refer to; Tilting Mower.

**2.** Remove the locknut and bolt to change hole location (Fig. 13).

**3.** Select the proper hole position for the height-of-cut to be used (Fig. 13).

**4.** Insert bolt through roller and secure with locknut.

**5.** Repeat adjustment on remaining rollers.

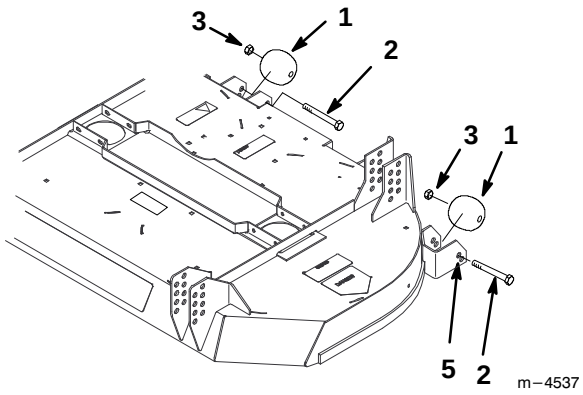



**Figure 13**

1. Roller
2. Bolt
3. Locknut
4. Spacer
5. Holes

# Tilting the Mower

The mower can be tilted up for ease of service or to shorten unit length for transport and storage.

## To Raise Mower

**1.** Lift or push down on side of carrier frame to release weight on latch pin.

**2.** Pull out on latch pin to release and rotate into notch to hold in the open position (Fig. 14). Repeat on the other side. Lower rear of mower onto rollers.

**3.** Rotate latch pins into released position after deck has been lowered onto rear rollers.

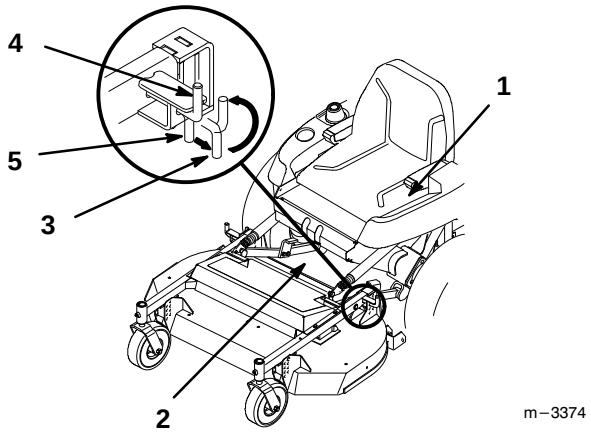



**Figure 14**

1. Parking brake
2. PTO cover
3. Latch pin
4. Notch–open
5. Locked Position

**4.** Standing in front of the mower, lift up and push rearward on front to raise mower (Fig. 15).

**5.** Raise mower until it contacts stops and latch pins snap into locked position.

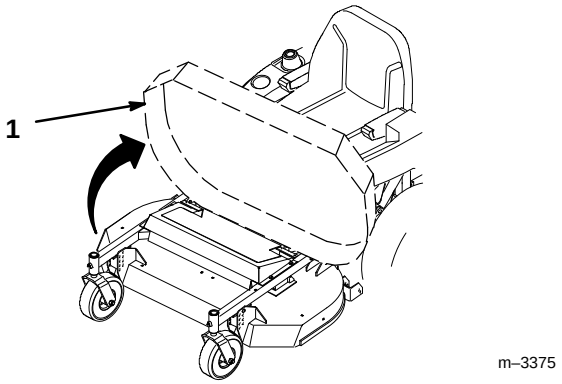



**Figure 15**

1. Mower up

### To Lower Mower

1. Pull out latch pins and rotate into notch to hold in the open position (Fig. 14).
2. Standing in front of the mower, pull forward on front and lower mower (Fig. 15).
3. Rotate latch pins into released position and lift on side of carrier frame until latch pin engages (Fig. 14). Repeat on the other side.
4. Secure PTO cover down with 5/16–18 x 7/8" (11 mm) shoulder bolt and 5/16" flange nut (Fig. 16).

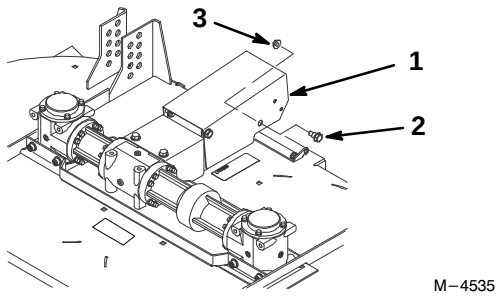



**Figure 16**

1. PTO cover
2. Shoulder bolt 5/16–18 x 7/8" (11 mm)
3. Flange nut 5/16"

## Dumping the Hopper

The hopper is equipped with a "hopper full" sensor that checks for a full condition. When the alarm buzzer sounds the hopper needs to be emptied.

1. Locate the traction unit so the hopper door is located where you want to dump the clippings.
2. Move the power take off (PTO) switch to off, move the traction controls to neutral and set the parking brake.

   **IMPORTANT: The hopper is interlocked with the engine ignition and the engine will stop if these steps are not followed before dumping the hopper or getting out of the seat.**
3. Unhook the door latches on the rear sides and the hopper latch on the front left side of the hopper (Fig. 17).
4. Lift up on the hopper at the lower front and dump the clippings (Fig. 17).

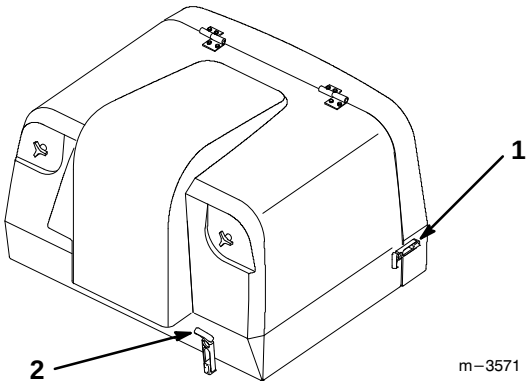



**Figure 17**

1. Door latch
2. Hopper latch

5. Lower the hopper and secure the door latches on the rear sides and the hopper latch on the front left side of the hopper (Fig. 17).

   **IMPORTANT: Front left latch must be secured to prevent hopper from accidently tilting during transport.**

# Pushing the Machine by Hand

**IMPORTANT: Always push the machine by hand. Never tow the machine because hydraulic damage may occur.**

## To Push the Machine

1. Disengage the power take off (PTO) and turn the ignition key to “OFF” to stop the engine.
2. Rotate pump by-pass valves counterclockwise 2 turns to push. This allows hydraulic fluid to by-pass the pump enabling the wheels to turn (Fig. 18).

   **IMPORTANT: Rotate by-pass valve a maximum of 2 turns so the valve does not come out of the body causing fluid to run out.**
3. Release the parking brake.

## To Operate the Machine

1. Turn the by-pass valves in to operate (Fig. 18).

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

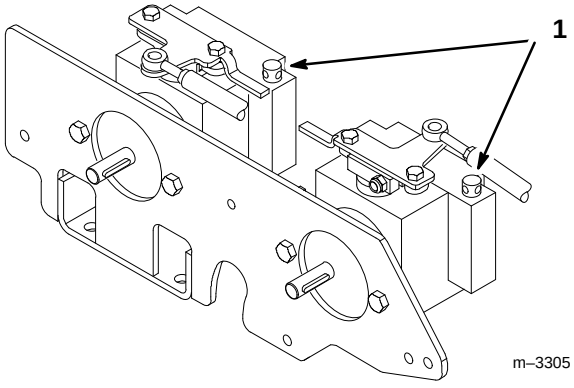



**Figure 18**

1. By-pass valve

# Maintenance

## Service Interval Chart

| Service Operation | Each Use | 8 Hours | 25 Hours | 50 Hours | 100 Hours | 200 Hours | Storage Service |
|---|---|---|---|---|---|---|---|
| Hydraulic fluid–check level | Initial | X | | | | | X |
| Oil—check level | X | | | | | | X |
| Oil—change* | | Initial | | | X | | X |
| Oil Filter–change (200 hours or every other oil change) | | | | | | X | X |
| Hydraulic filter–change | | Initial | | | | X | X |
| Safety System—check | X | | | | | | X |
| Hopper – clean | X | | X | | | | X |
| Screens – clean (as required) | | | | | | | X |
| Mower Housing – clean | X | X | | | | | X |
| Cutting Blades – check | | X | | | | | X |
| Chassis—grease* | | X | | | | | X |
| Drive Shaft—grease* | | X | | | | | X |
| Push arm bushings – grease | | X | | | | | X |
| Castor Wheels – grease | | | X | | | | X |
| Mower Gearbox – check | | | | | X | | X |
| Mower Gearbox– change | | | | | Initial | | |
| Foam Air Cleaner—service* | | | X | | | | X |
| Paper Air Cleaner—replace* | | | | | X | | X |
| Spark Plug(s)—check | | | | | | X | X |
| Belts—check for wear/cracks | | | | X | | | X |
| Gasoline—drain | | | | | | | X |
| Cooling systems–clean | X | | | | X | | X |
| Hydraulic lines–check | | | | | X | | X |
| Battery–check electrolyte | | X | | | | | X |
| Battery–charge, Disconnect cables | | | | | | | X |
| Fuel Filter—replace | | | | | | X | X |
| Tires—check pressure | | | | X | | | X |
| Chipped Surfaces—paint | | | | | | | X |
| * More often in dusty, dirty conditions | | | | | | | |

**⚠ CAUTION**

**POTENTIAL HAZARD**
- **If you leave the key in the ignition switch, someone could start the engine.**

**WHAT CAN HAPPEN**
- **Accidental starting of the engine could seriously injure you or other bystanders.**

**HOW TO AVOID THE HAZARD**
- **Remove the key from the ignition switch and pull the wire(s) off the spark plug(s) before you do any maintenance. Also push the wire(s) aside so it does not accidentally contact the spark plug(s).**

# Air Cleaner

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

Paper Element: Replace after every 100 operating hours.

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

## Removing the Foam and Paper Elements

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

**2.** Clean around the air cleaner to prevent dirt from getting into the engine and causing damage. Unscrew the knob and remove the air cleaner cover (Fig. 19).

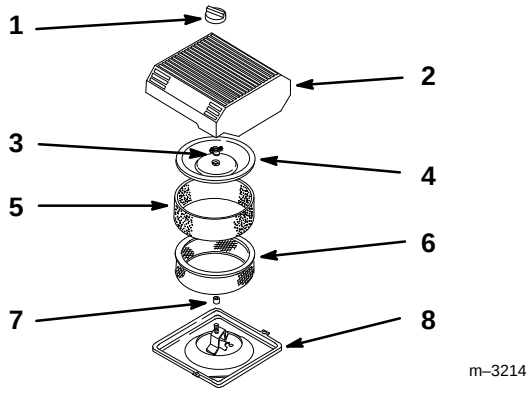



**Figure 19**

1. Knob
2. Air cleaner cover
3. Cover nut
4. Cover
5. Foam element
6. Paper element
7. Rubber seal
8. Air cleaner base

**3.** Carefully slide the foam element off the paper element (Fig. 19).

**4.** Unscrew the cover nut and remove the cover and paper element (Fig. 19).

## Cleaning the Foam and Paper Elements

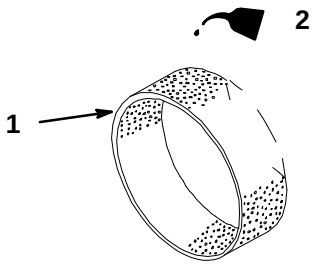
**1.** Foam Element

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

B. Dry the element by squeezing it in a clean cloth (do not wring).

C. Put one or two ounces of oil on the element (Fig. 20). Squeeze the element to distribute the oil.

**IMPORTANT: Replace the foam element if it is torn or worn.**




m–1213

**Figure 20**

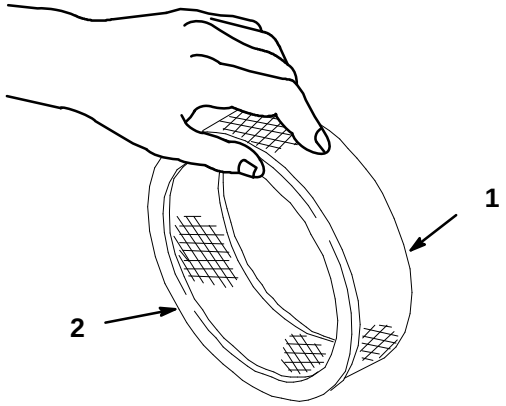
1. Foam element 2. Oil

**2.** Paper Element

A. Lightly tap the element on a flat surface to remove dust and dirt (Fig. 21).

B. 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, defective, or cannot be cleaned thoroughly.**




m–1213

**Figure 21**

1. Paper element 2. Rubber seal

## Installing the Foam and Paper Elements

**1.** Installing the Foam and Paper Elements

**IMPORTANT: To prevent engine damage, always operate the engine with the complete foam and paper air cleaner assembly installed.**

**1.** Carefully slide the foam element onto the paper air cleaner element (Fig. 19).

**2.** Place the air cleaner assembly onto the air cleaner base (Fig. 19).

**3.** Install the air cleaner cover and secure with cover nut (Fig. 19).

# Engine Oil

Change oil:

- After the first 5 operating hours.
- After every 100 operating hours.

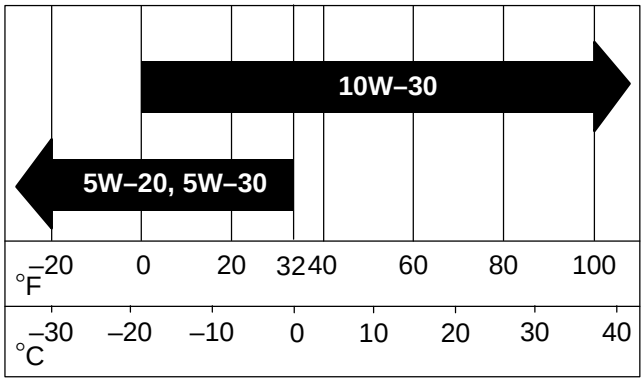
  **Note:** Change oil more frequently when operating conditions are extremely dusty or sandy.

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

Crankcase Capacity: w/filter, 2.1 qt. (2 l)

Viscosity: See table below

**USE THESE SAE VISCOSITY OILS**




## Checking Oil Level

**1.** Park the machine on a level surface, disengage the power take off (PTO) and turn the ignition key to “OFF” to stop the engine. Remove the key.

**2.** Clean around the oil dipstick (Fig. 22) so dirt cannot fall into the filler hole and damage the engine.

**3.** Unscrew the oil dipstick and wipe the metal end clean (Fig. 22).

**4.** Slide the oil dipstick fully into the filler tube, do not thread onto tube (Fig. 22). Pull the dipstick out and look at the metal end. If oil level is low, slowly pour only enough oil into the filler tube to raise the level to the “FULL” mark.

**IMPORTANT: Do not overfill the crankcase with oil because the engine may be damaged.**

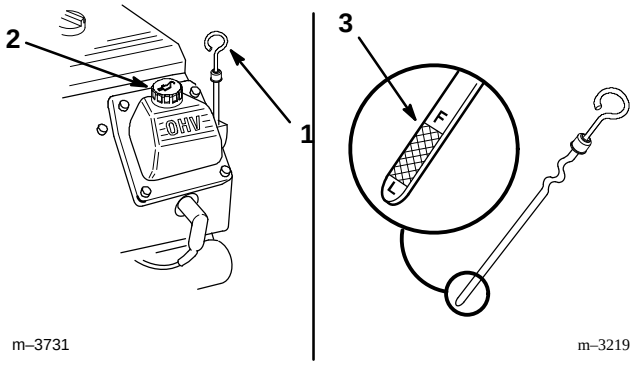



**Figure 22**

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

## Changing/Draining 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 assure the oil drains completely. Then disengage the power take off (PTO), set the parking brake, and turn the ignition key to “OFF” to stop the engine. Remove the key.

3. Place a pan below the oil drain. Remove the oil drain cap (Fig. 23).

4. When oil has drained completely, install the drain cap.

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

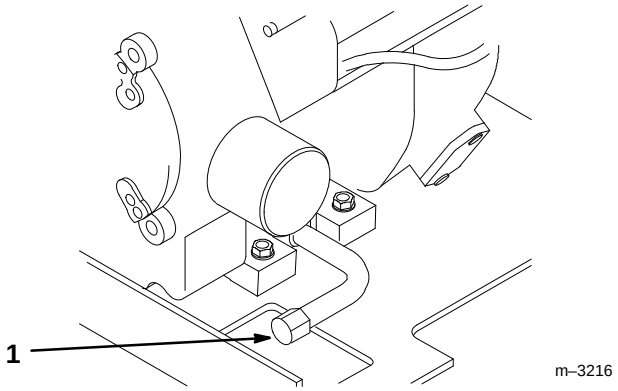



**Figure 23**

1. Oil drain cap

5. Slowly pour approximately 80% of the specified amount of oil specified, page 33, into the filler tube (Fig. 22). Now check the oil level; refer to Checking Oil Level, page 33. Slowly add additional oil to bring to “FULL” mark on dipstick.

## Change Oil Filter

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

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

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

2. Remove the old filter and wipe the filter adapter (Fig. 24) gasket surface.

3. Pour new oil of the proper type in through the center hole. Stop pouring when the oil reaches the bottom of the threads. Allow a minute or two for the oil to be absorbed by filter material.

4. Apply a thin coat of new oil to the rubber gasket on the replacement filter (Fig. 24).

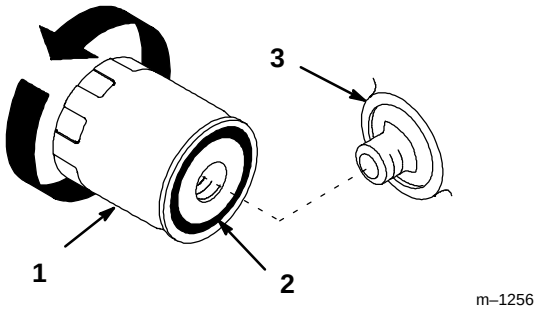



**Figure 24**

1. Oil filter
2. Gasket
3. Adapter

5. Install the replacement oil filter to the filter adapter. Turn the oil filter clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 1/2 turn (Fig. 24).

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

# Spark Plug

Check the spark plug(s) after every 200 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 plug(s) and a gapping tool/feeler gauge to check and adjust the air gap. Install a new spark plug(s) if necessary.

Type: Champion RC12YC (or equivalent) Air Gap: 0.030 in. (0.76 mm)

## Removing the Spark Plug(s)

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

**2.** Pull the wire(s) off the spark plug(s) (Fig. 25). Now clean around the spark plug(s) to prevent dirt from falling into the engine and potentially causing damage.

**3.** Remove the spark plug(s) and metal washer.

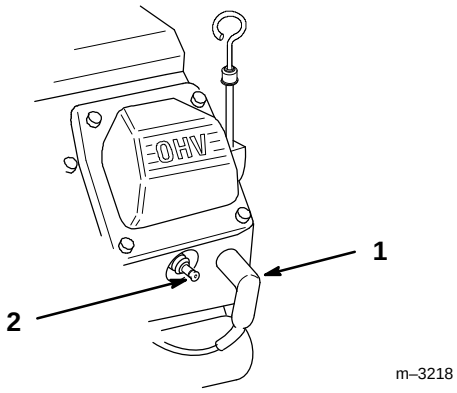



**Figure 25**

1. Spark plug wire
2. Spark plug

## Checking the Spark Plug

**1.** Look at the center of the spark plug(s) (Fig. 26). 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 plug(s). Always replace the spark plug(s) when it has: a black coating, worn electrodes, an oily film, or cracks.**

**2.** Check the gap between the center and side electrodes (Fig. 26). Bend the side electrode (Fig. 26) if the gap is not correct.

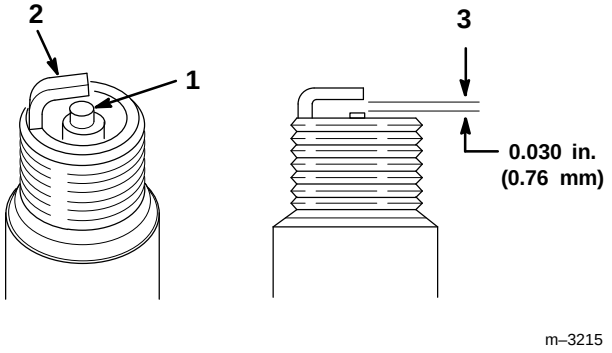



**Figure 26**

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

## Installing the Spark Plug(s)

**1.** Install the spark plug(s). Make sure the air gap is set correctly.

**2.** Tighten the spark plug(s) to 20 ft-lb (27 N.m).

**3.** Push the wire(s) onto the spark plug(s) (Fig. 25).

# Greasing and Lubrication

The unit must be lubricated regularly. Refer to the Service Interval Chart on page 30.

Grease Type: No. 2 general purpose lithium base or molybdenum base grease.

## How to Grease

1. Disengage the power take off (PTO) and turn the ignition key to “OFF” to stop the engine. Remove the key.
2. Clean the grease fittings with a rag. Make sure to scrape any paint off the front of the fitting(s).
3. Connect a grease gun to the fitting. Pump grease into the fittings until grease begins to ooze out of the bearings.
4. Wipe up any excess grease.

## Where to Add Grease

1. Lubricate the castor wheel bearings and motion control lever pivots until grease begins to ooze out of the bearings (Fig. 27).

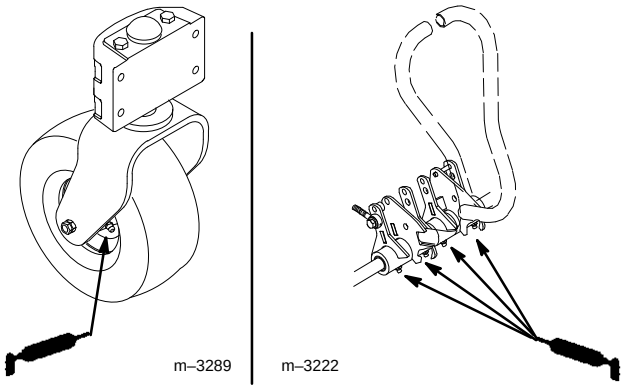



**Figure 27**

2. Grease the fittings on drive shaft and universal joints (Fig. 28).

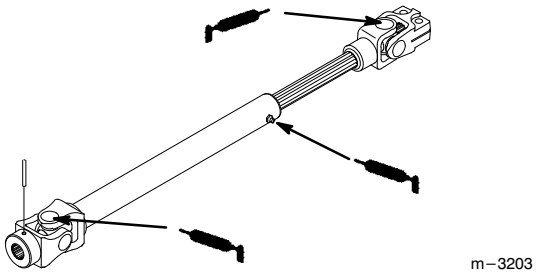



**Figure 28**

1. PTO Driveshaft
2. Universal Joint

3. Grease the fittings on push arms (Fig. 29).

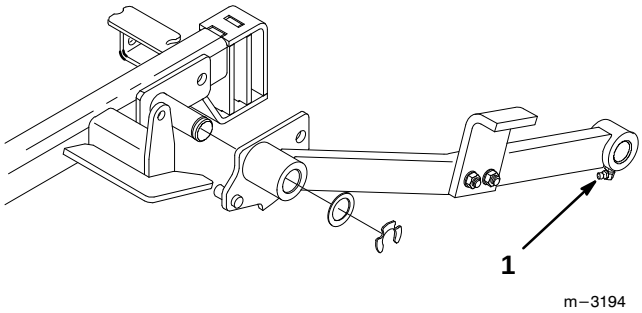



**Figure 29**

1. Push arm bearing

4. Grease the fittings on the carrier frame mounting tubes and castor wheels (Fig. 30).

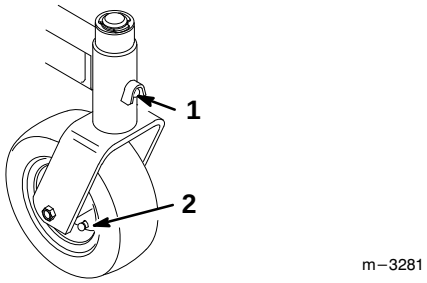



**Figure 30**

1. Carrier Frame Mounting Tube Grease Fitting
2. Castor Wheel Grease Fitting

## Gearbox Fluid

Change fluid:

- After initial 100 operating hours.

  **Note:** Fluid will not have to be changed again after initial 100 hour fluid change.

Fluid Type: Automatic Transmission Fluid (Dexron® III or equivalent)

**IMPORTANT: Do not mix fluids. Use only Automatic Transmission Fluid.**

Gearbox Capacity: 5–1/2 oz. (129.6 ml) each box

Check fluid: After every 100 operating hours.

## Changing Gearbox Fluid

The gearbox fluid must be changed after first 100 operating hours. Change all three gearboxes.

**IMPORTANT: Do not mix fluids. Use only Automatic Transmission Fluid.**

1. Warm the fluid in gearbox. Run the mower deck for a few minutes.
2. Remove two shields that cover gearbox and PTO shaft (Fig. 31).

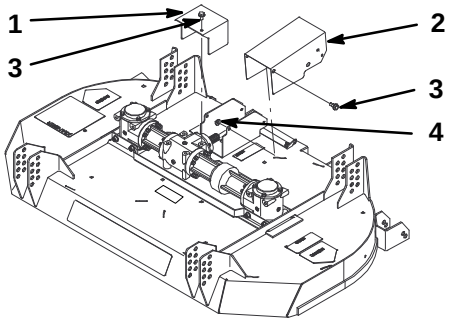



**Figure 31**

1. Gearbox Sheild
2. PTO Shield
3. Screw
4. Nut

3. Raise deck to upright position.
4. With deck raised, remove plug on the bottom side of the gearbox. Let fluid fully drain into a pan. (Fig. 32).
5. Reinstall the bottom plug into the gearbox (Fig. 32).
6. Remove the top plug to fill gearbox (Fig. 32).
7. Fill gearbox with 5–1/2 (129.6 ml) ounces of automatic transmission fluid (Dexron® III or equivalent).
8. Reinstall the top plug into the gearbox (Fig. 32).
9. Repeat for remaining gearboxes.

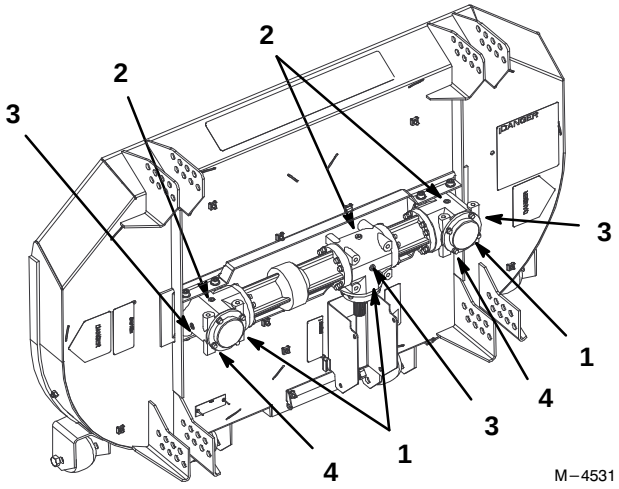



**Figure 32**

1. Gearbox
2. Top plug
3. Side plug
4. Bottom plug

## Checking Gearbox Fluid

The gearbox fluid must be checked after every 100 operating hours. Check all three gearboxes.

1. Warm the fluid in gearbox. Run the mower deck for a few minutes.
2. Raise deck to upright position.
3. Remove plug on the side of the gearbox. The fluid level must be up to side hole in gearbox (Fig. 32).
4. If needed, fill automatic transmission fluid (Dexron® III or equivalent) into top hole until it runs out the side hole in gearbox. It is full when it runs out the side hole (Fig. 32).

   **IMPORTANT: Do not mix fluids. Use only Automatic Transmission Fluid.**
5. Reinstall the top and side plugs into gearbox using pipe sealant (Fig. 32).
6. Fill gearbox with automatic transmission fluid (Dexron® III or equivalent).
7. Repeat for remaining gearboxes.

## Replacing the Castor Wheel Fork Bushings

The castor wheel forks are mounted in bushings pressed into the top and bottom of the carrier frame mounting tubes. To check the bushings, move the castor forks back and forth and side-to-side. If a castor fork is loose, the bushings are worn and must be replaced.

1. Raise the cutting unit to the vertical position.
2. Remove the retaining ring and thrust washer(s) from the top of the castor wheel fork (Fig. 33).
3. Pull the castor wheel fork out of the mounting tube, leaving the spacer and thrust washers on the bottom of the fork. Remember the location of thrust washers on each fork to ensure correct installation, and to maintain a level deck.

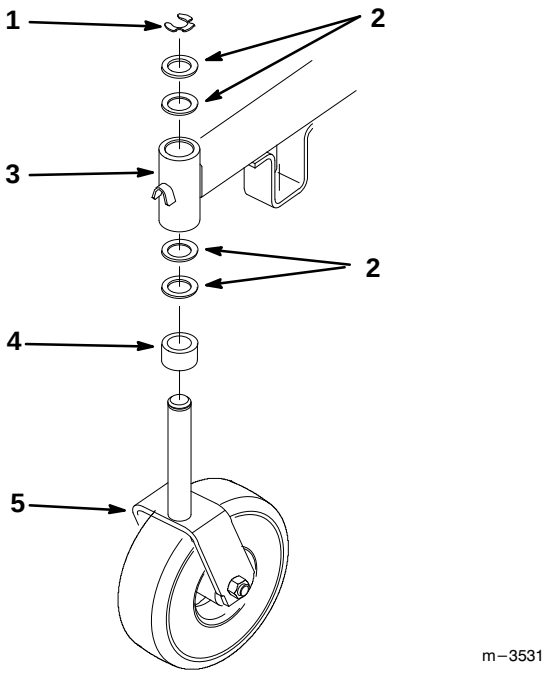



**Figure 33**

1. Retaining ring
2. Thrust Washer (4)
3. Carrier Frame Mounting Tube
4. Spacer
5. Castor Wheel Fork

4. Insert a pin punch into the mounting tube and carefully drive out the bushings (Fig. 34). Clean the inside of the mounting tube.

5. Grease the inside and outside of the new bushings. Use a hammer and flat plate to carefully drive the bushings into the mounting tube (Fig. 34).

6. Inspect the castor wheel fork for wear and replace if necessary (Fig. 33).

7. Slide the castor wheel fork through the bushings in the mounting tube. Replace the thrust washer(s) onto the fork and secure with the lynch pin (Fig 33).

   **IMPORTANT: The inside diameter of the bushings may collapse slightly when installed. If the castor wheel fork does not slide into the new bushings, ream both bushings to an inside diameter of 1.126 in. (28.6mm).**

8. Grease the fitting on the carrier frame mounting tube using No. 2 general purpose lithium base or molybdenum base grease.

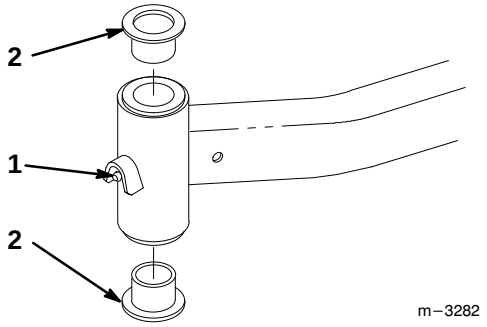



**Figure 34**

1. Carrier Frame Mounting Tube
2. Bushing

## Servicing the Castor Wheels and Bearings

The castor wheels rotate on a roller bearing supported by a spanner bushing. If the bearing is kept well lubricated, wear will be minimal. Failure to keep the bearing well lubricated will cause rapid wear. A wobbly castor wheel usually indicates a worn bearing.

1. Remove the locknut and wheel bolt holding the castor wheel to the castor fork (Fig. 35).

2. Remove the washer and bushing, then pull the spanner bushing and roller bearing out of the wheel hub (Fig. 35).

3. Remove the other bushing from the wheel hub and clean any grease and dirt from the wheel hub (Fig. 35).

4. Inspect the roller bearing, bushings, spanner bushing and inside of the wheel hub for wear. Replace any defective or worn parts (Fig. 35).

**5.** To assemble, place one (1) bushing into the wheel hub. Grease the roller bearing and spanner bushing and slide them into the wheel hub. Place the second bushing into the wheel hub (Fig. 35).

**6.** Install the castor wheel into the castor fork and secure with the wheel bolt and locknut. Tighten the locknut until the spanner bushing bottoms against the inside of the castor forks (Fig. 35).

**7.** Grease the fitting on the castor wheel.

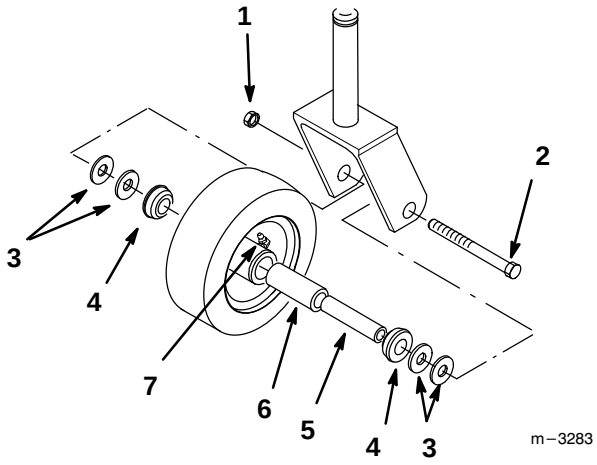



**Figure 35**

1. Locknut
2. Wheel Bolt
3. Washer
4. Bushing
5. Spanner Bushing
6. Roller Bearing
7. Grease fitting

## Replacing Push Arm Bushings

The push arms have pressed in bushings on the end mounted to the traction unit. To check the bushings, move the push arms side-to-side and examine for wear. If a push arm is loose, the bushings are worn and must be replaced.

**1.** Remove the mower: refer to Removing the Mower in the Installation section.

**2.** Inspect the pivot pin assembly for wear and replace if necessary.

**3.** Remove the retaining ring and flat washer securing the push arm to the mower (Fig. 36).

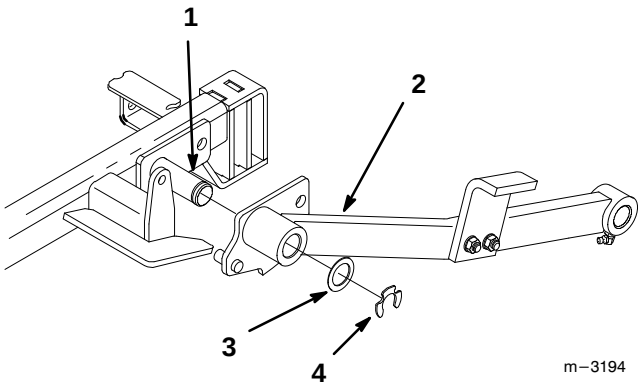



**Figure 36**

1. Pin
2. Push arm
3. Flat washer 1-1/2” (38 mm)
4. Retaining ring

**4.** Insert a pin punch into the push arm and carefully drive out the bushings (Fig. 37). Clean the inside of the push arm.

**5.** Use a hammer and flat plate to carefully drive new bushings into the end of push arm (Fig. 37).

**6.** Place push arm onto carrier frame pin and secure with 1-1/2" (38 mm) flat washer and retaining ring (Fig 36).

**7.** Grease the fitting on the push arm using No. 2 general purpose lithium base or molybdenum base grease.

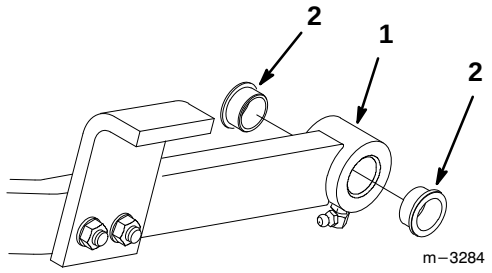



**Figure 37**

1. Push arm
2. Bushing

## Cleaning the Cooling Systems

Before each use, check and clean cooling screen. Remove any build–up of grass, dirt or other debris from the oil cooler screen and engine air intake. Every 100 hours clean oil cooler, engine cylinder and cylinder head cooling fins. Also clean around carburetor, governor levers and linkage. This will help insure adequate cooling to hydraulic pumps, motors and engine and will reduce the possibility of overheating and mechanical damage.

**1.** To remove cooling screen remove lower bolts and loosen top bolts. Slide screen down and rearward to expose oil cooler (Fig. 38). Save all mounting hardware.

**2.** Blow out fins of oil cooler and area between fins and screen with compressed air. If area between screen and fins is tightly packed, remove oil cooler.

**3.** Clean off engine air intake (Fig. 38).

**4.** Install screen from rear and raise over oil cooler. Secure with previously removed hardware (Fig. 38).

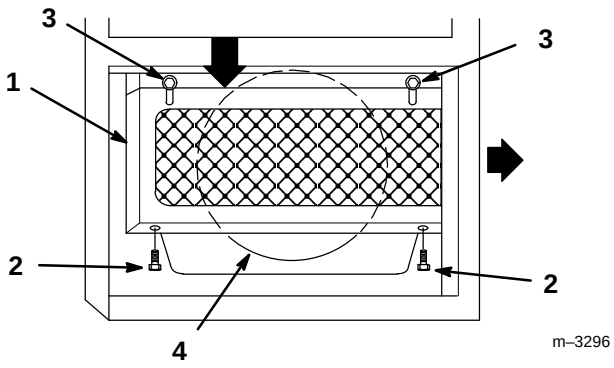



**Figure 38**

1. Oil cooler screen
2. Lower bolts
3. Top bolts
4. Engine air intake

# 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. 39). Check the tires when they are cold to get the most accurate pressure reading.

Pressure: 12 psi (83 kPa) drive wheels and castor wheels.

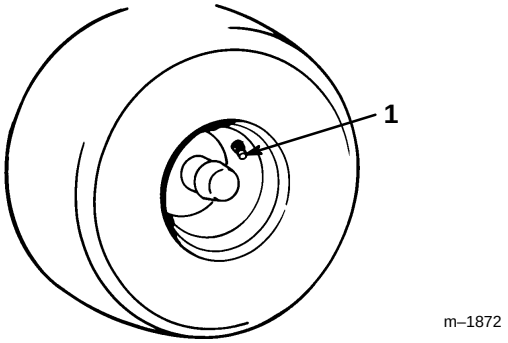



**Figure 39**

1. Valve stem

# Fuel Filter

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

## Replacing the Fuel Filter

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

**1.** Disengage the power take off (PTO), set the parking brake, and turn the ignition key to “OFF” to stop the engine. Remove the key.

**2.** Close fuel shut–off valve at fuel tank (Fig. 41).

**3.** Squeeze the ends of the hose clamps together and slide them away from the filter (Fig. 40).

**4.** Remove the filter from the fuel lines.

**5.** Install a new filter and move the hose clamps close to the filter.

**6.** Open fuel shut-off valve at fuel tank (Fig. 41).

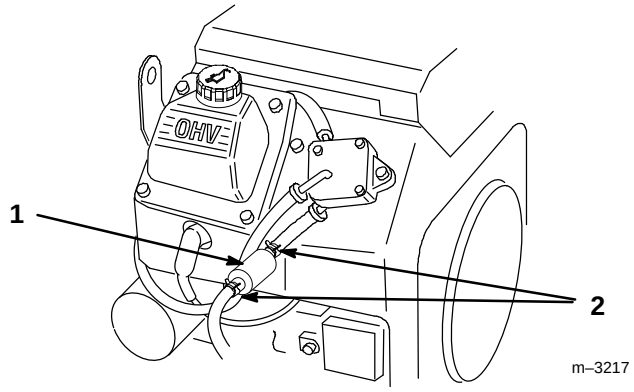



**Figure 40**

1. Filter
2. Hose clamp

# Fuel Tank

## Draining The Fuel Tank

**⚠ DANGER**

**POTENTIAL HAZARD**
- **In certain conditions gasoline is extremely flammable and highly explosive.**

**WHAT CAN HAPPEN**
- **A fire or explosion from gasoline can burn you, others, and cause property damage.**

**HOW TO AVOID THE HAZARD**
- **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 drain gasoline near an open flame or where gasoline fumes may be ignited by a spark.**
- **Never smoke a cigarette, cigar or pipe.**

**1.** Park the machine on a level surface, to assure fuel tank drains completely. Then disengage the power take off (PTO), set the parking brake, and turn the ignition key to “OFF” to stop the engine. Remove the key.

**2.** Close fuel shut–off valve at fuel tank (Fig. 41).

**3.** Loosen the hose clamp and slide it up the fuel line away from the fuel shut-off valve (Fig. 41).

**4.** Pull the fuel line off fuel shut-off valve (Fig. 41). Open fuel shut-off valve and allow gasoline to drain into a gas can or drain pan.

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

**5.** Install the fuel line onto the fuel shut-off valve. Slide the hose clamp close to the fuel shut-off valve to secure the fuel line (Fig. 41).

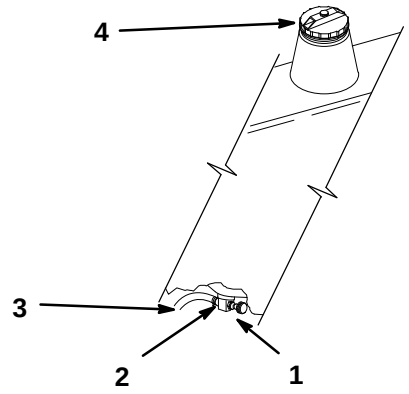



**Figure 41**

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

# Hydraulic System

## Checking the Hydraulic Fluid

Check the hydraulic fluid level before engine is first started and after every 8 operating hours.

Fluid Type: Mobil Fluid 424 (ISO 46) or equivalent anti–wear hydraulic fluid.

**IMPORTANT: Use only hydraulic oils specified. Other fluids could cause system damage.**

Tank Capacity: 6 qt. (5.7 l)

**1.** Position machine on a level surface and stop the engine and set the parking brake.

**2.** Clean area around filler neck of hydraulic tank (Fig. 42).

**3.** Remove cap from filler neck and look inside to check fluid level. Fluid level should be above the bottom of the screen (Fig. 42).

**4.** If level is low, add fluid to raise level to above the bottom of the screen (Fig. 42).

**5.** Install cap on filler neck.

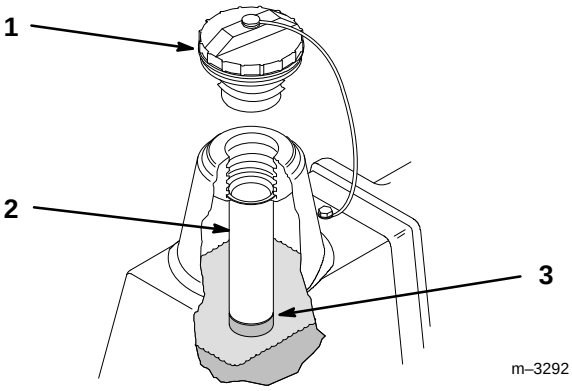



**Figure 42**

1. Hydraulic reservoir cap
2. Screen
3. Fluid level-Full

## Replacing the Hydraulic Filter

Change the hydraulic filter:

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

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

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

**2.** Remove hydro cap and temporarily cover opening with a plastic bag and rubber band to prevent all hydro fluid from draining out.

**3.** Place drain pan under filter, remove the old filter and wipe the filter adapter gasket surface clean (Fig. 43).

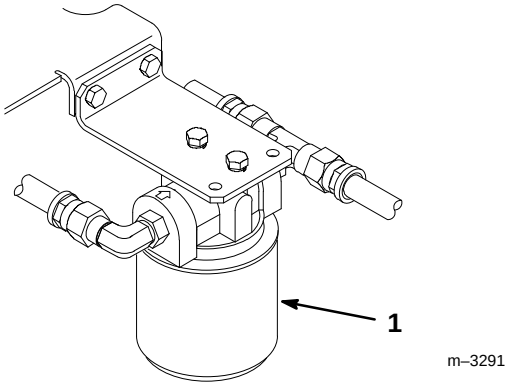



**Figure 43**

1. Hydraulic filter

**4.** Apply a thin coat hydro fluid to the rubber gasket on the replacement filter (Fig. 44).

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

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

**7.** When fluid overflows filter turn the oil filter clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 1/2 turn (Fig. 44).

**8.** Clean up any spilled fluid.

**9.** Start engine and let run for about two minutes to purge air from the system. Stop the engine and check for leaks. If one or both wheels will not drive, refer Bleeding Hydraulic System, page 45.

**10.** Check fluid level in hydraulic tank and add to raise level to cover bottom of screen. DO NOT OVER FILL.

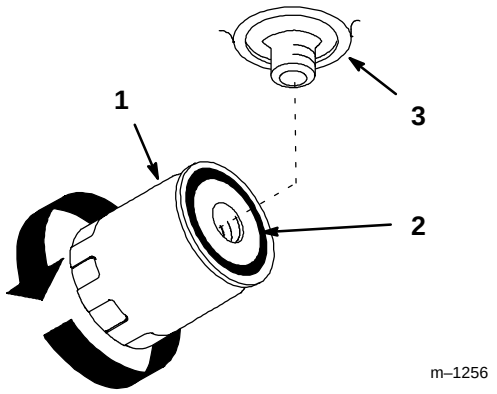



**Figure 44**

1. Hydraulic filter
2. Gasket
3. Adapter

### Bleeding 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 front of the machine so wheels are off the ground and support with jack stands.

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

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

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

**5.** Repeat procedure on opposite wheel.

### Check 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.

**⚠ WARNING**

**POTENTIAL HAZARD**

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

**WHAT CAN HAPPEN**

- **Fluid accidentally injected into the skin must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.**

**HOW TO AVOID THE HAZARD**

- **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.**

## Adjust Motion Controls

If motion control levers do not align, adjustment is required. Adjust each rod separately.

**1.** Loosen jam nuts on pump control rod (Fig. 45).

**2.** Push and firmly hold motion control lever against forward stop (Fig. 45).

**3.** Rotate pump control rod until pump control plate is in the full forward position (Fig. 45). Motion control lever will lift off forward stop.

**IMPORTANT: Hold motion control lever firmly against forward stop to determine when pump control reaches stop.**

4. Rotate control rod 1 turn, to lengthen rod, and tighten jam nuts (Fig. 45).

   **IMPORTANT: Motion control lever must contact forward stop before pump contacts internal stop or pump damage may occur.**

5. If motion control levers do not line up in neutral, identify control rod of handle closer to the seat. Rotate to lengthen this control rod a little. Tighten jam nuts.

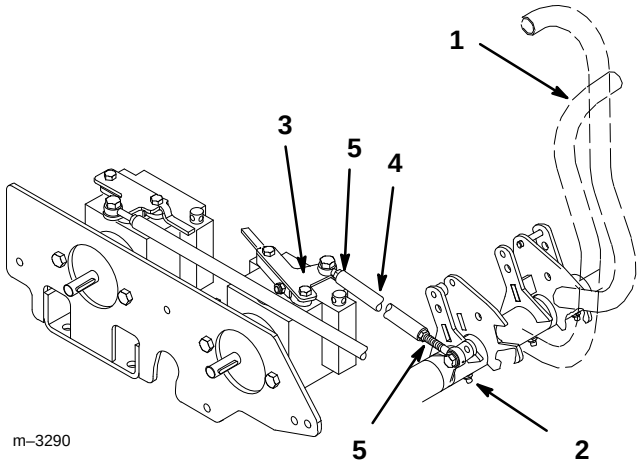



**Figure 45**

1. Motion control lever
2. Forward stop
3. Pump control plate
4. Control rod
5. Jam nut

# Adjust Mowing Speed Reference Position

The mowing speed reference position is a spring loaded stop that can be felt, as extra spring force when, pushing motion controls forward. The motion control levers return to this pre-set position when forward pressure is reduced. Below the pre-set speed the motion control levers remain in their placed location. The reference position is factory set for cutting grass at approximately 5 mph.

## Adjusting Reference Speed

1. Loosen nuts on stop bolt below control assembly (Fig. 46).

2. Thread bolt in to decrease pre-set speed or out to increase speed. Tighten nuts to hold new set position.

3. Repeat adjustment on other control stop bolt adjusting as close to the same length as possible.

4. Test drive the unit to evaluate reference speed and note location of traction control levers. If levers are not at the same position against stops, turn longest bolt in to make them the same.

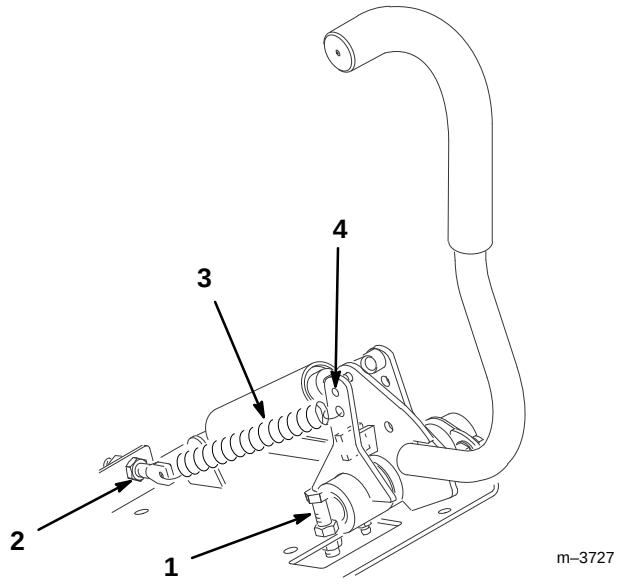



**Figure 46**

1. Reference speed bolt
2. Eye bolt
3. Spring
4. Outer hole

### Adjusting Reference Stop Spring Tension

The resistance felt against the traction control levers can be adjusted to make the feel less or more sensitive.

**1.** To adjust tension loosen nuts on the eye bolts holding the springs to mounting plate (Fig. 46).

**2.** To reduce tension thread nuts off eye bolts (Fig. 46). Tighten nuts to hold new set position.

**3.** To increase tension thread nuts onto eye bolts (Fig. 46). Tighten nuts to hold new set position.

**Note:** Adjust springs to the same length so tension will be the same on both motion control levers.

**4.** If greater tension is desired, the front hook of the springs can be moved to the outer hole in the control assemblies (Fig. 46).

## Replacing Power Take Off (PTO) Belts

Check power take off (PTO) belts for wear after every 50 hours of operation.

**1.** Hold spring loaded idler against belts and pull spring down to remove from lower bolt mount (Fig. 47).

**2.** Lower idler to relax tension on PTO belts and remove belts from gear box pulley (Fig. 47).

**3.** Remove clutch stop mounting bolts and unplug clutch wire harness (Fig. 47). Remove belts over clutch.

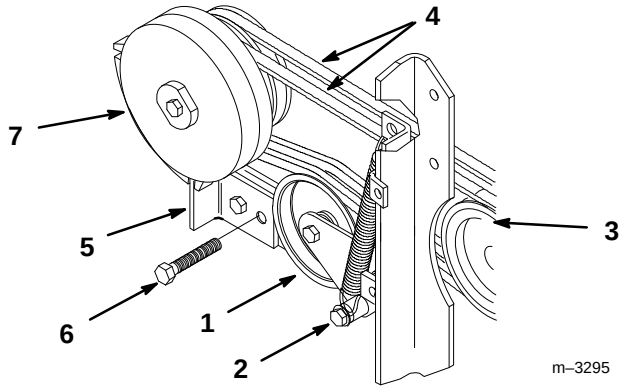



**Figure 47**

1. Idler
2. Spring
3. Gr box pulley
4. PTO belt
5. Clutch stop
6. Bolt
7. Clutch

4. Install new PTO belts over clutch and route around gearbox pulleys and above spring loaded idler (Fig. 48).

5. Hold spring loaded idler against belts and pull spring down to install on lower bolt mount (Fig. 47).

6. Install clutch stop (Fig. 47). Tighten mounting bolts securely.

7. Plug clutch wire into wire harness.

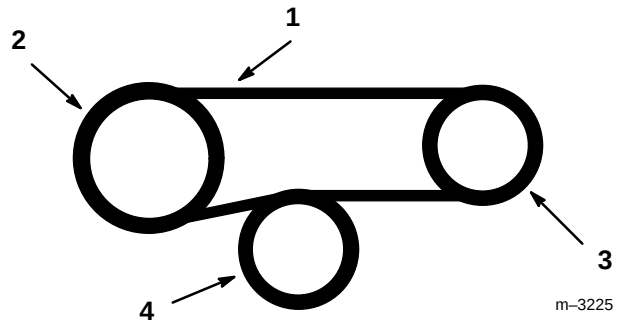



**Figure 48**

1. PTO belt
2. Clutch pulleys
3. Gearbox pulley
4. Spring loaded idler

## Replacing the Traction Belt

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

1. Remove PTO belts; refer to Replacing Power Take Off (PTO) Belts.

2. Push spring loaded idler down and remove traction belt from the engine, fixed idler and hydro pump pulleys (Fig. 49). Remove belt over clutch.

3. Install new belt over clutch and around engine, fixed idler and hydro pump pulleys (Fig. 49).

4. Push spring loaded idler down and align below traction belt. Release pressure on spring loaded idler (Fig. 49).

5. Install PTO belts; refer to Replacing Power Take Off (PTO) Belts.

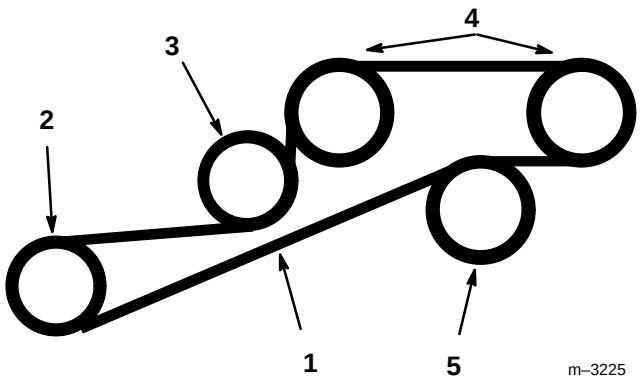



**Figure 49**

1. Traction belt
2. Engine pulley
3. Fixed idler pulley
4. Hydro pump pulley
5. Spring loaded idler

# Replacing the Blower Belt

Squealing when the belt is rotating, blower slipping causing frequent clogging of chute and blower, frayed belt edges, burn marks and cracks are all signs of a worn blower belt. Replace the blower belt if any of these conditions are evident.

**1.** Stop the engine, remove the key and disconnect the spark plug wire(s) from the spark plug(s).

**2.** Push up on the spring loaded idler pulley behind PTO (power take off) gearbox to relax pressure on blower belt (Fig. 50). Lock into frame slot, refer to (Fig. 6).

**3.** Remove worn blower belt.

**4.** Install new blower belt around PTO gearbox and blower pulleys. Then push up on the idler and place belt above idler pulley (Fig. 50).

**5.** Check that belt aligns with PTO, blower and idler pulleys (Fig. 50).

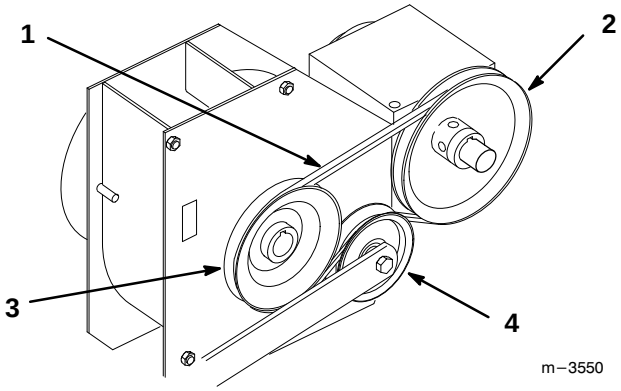



**Figure 50**

1. Blower belt
2. PTO Gearbox pulley
3. Blower pulley
4. Idler pulley

# 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 F1–30 amp, blade-type
Alternator F2–25 amp, blade-type
Safety Interlock and Clutch F3–15 amp, blade-type

**1.** Remove dash panel screws to gain access to fuse holder (Fig. 51).

**2.** To replace fuses pull out on the fuse to remove it (Fig. 51).

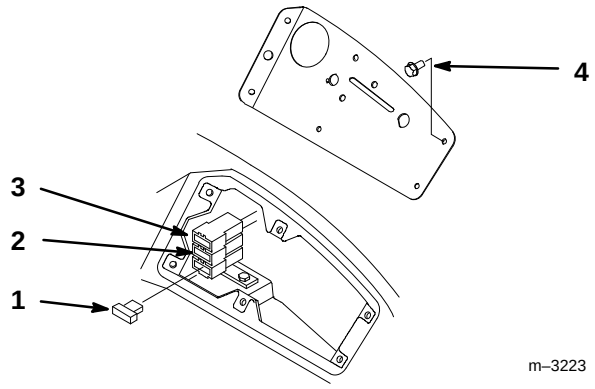



**Figure 51**

1. Main-30 amp
2. Alternator-25 amp
3. Safety interlock and clutch-15 Amp
4. Screw

# Battery

Check the electrolyte level in the battery every 8 hours. Always keep the battery clean and fully charged. Use a paper towel to clean the battery case. If the battery terminals are corroded, clean them with a solution of four parts water and one part baking soda. Apply a light coating of grease to the battery terminals to prevent corrosion.

Voltage: 12 v, 380 Cold Cranking Amps

## Checking Electrolyte Level

1. Open covers to see into the cells. The electrolyte must be up to the lower part of the tube (Fig. 52). Do not allow the electrolyte to get below the plates. (Fig. 52).
2. If the electrolyte is low, add the required amount of distilled water; refer to Adding Water to the Battery, page 50.

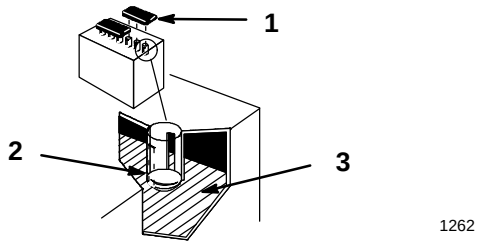



**Figure 52**

1. Filler caps
2. Lower part of tube
3. Plates

## Adding Water to the Battery

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

1. Clean the top of the battery with a paper towel.
2. Lift off the filler caps (Fig. 52).
3. Slowly pour distilled water into each battery cell until the level is up to the lower part of the tube (Fig. 52).

   **IMPORTANT: Do not overfill the battery because electrolyte (sulfuric acid) can cause severe corrosion and damage to the chassis.**
4. Press the filler caps onto the battery.

## Charging the Battery

**IMPORTANT: Always keep the battery fully charged (1.260 specific gravity). This is especially important to prevent battery damage when the temperature is below 32°F (0°C).**

1. Check the electrolyte level; refer to Checking Electrolyte Level, page 50.
2. Remove the filler caps from the battery and connect a 3 to 4 amp battery charger to the battery posts. Charge the battery at a rate of 4 amperes or less for 4 hours (12 volts). Do not overcharge the battery. Install the filler caps after the battery is fully charged.

**⚠ WARNING**

**POTENTIAL HAZARD**
- **Charging the battery produces gasses.**

**WHAT CAN HAPPEN**
- **Battery gasses can explode.**

**HOW TO AVOID THE HAZARD**
- **Keep cigarettes, sparks and flames away from battery.**

## Cleaning Hopper Screens

For best clipping collection, maximum air flow through the hopper is required. To provide maximum air flow, the hopper screens must be kept clean.

1. To clean the hopper screens dump the hopper to remove grass clippings.
2. With the door open, remove the knobs at the upper front of the hopper and slide the screens out the rear of the hopper (Fig. 53).
3. Clean the screen by brushing off with your hand, blowing with compressed air or spraying with a stream of water.
4. Replace the screens and secure with knobs (Fig. 53). Close and latch the hopper door.

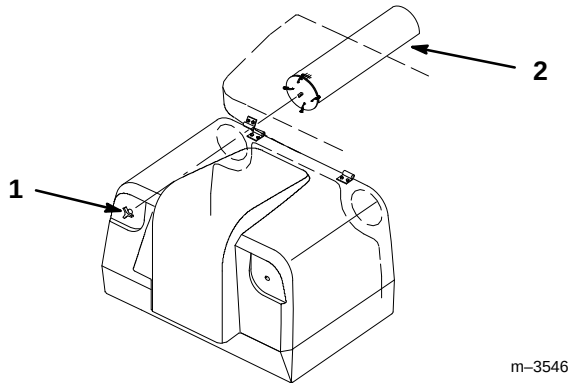



**Figure 53**

1. Knob
2. Screen

## Cleaning the Hopper Full Sensor

The hopper full sensor, inside the top right side of the hopper, detects a beam of light from the transmitter to the receiver. If the light beam is blocked the sensor buzzer sounds. If the lenses are covered with clippings or debris it may give false hopper full signals and needs to be cleaned.

1. To clean the hopper full sensor dump the hopper to remove grass clippings.
2. With the door open, wipe off the lenses of both the transmitter and receiver with a soft cloth or paper towel (Fig. 54).
3. To test the hopper full sensor for proper operation turn the ignition key and PTO switch to “ON”, but do not start the engine. Place a piece of heavy cardboard in front of the transmitter to block the light beam (Fig. 54). The alarm buzzer should sound.

   **Note:** Do not use your hand to test for proper sensor operation as the light beam may pass through or around your hand and not properly activate the sensor.

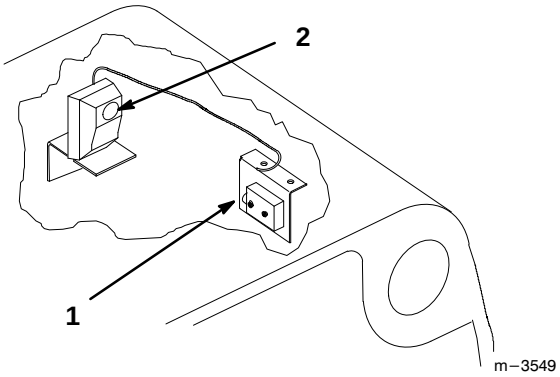



**Figure 54**

1. Transmitter
2. Receiver

# Cutting Blades

To ensure a superior quality of cut, keep the blades sharp. For convenient sharpening and replacement, you may want to keep extra blades on hand.

**⚠ WARNING**

**POTENTIAL HAZARD**

- **A blade that is worn or damaged could break apart and pieces could be thrown at bystanders or at you as you use the mower.**

**WHAT CAN HAPPEN**

- **Pieces of blade that may be thrown could seriously injure or kill you or bystanders.**

**HOW TO AVOID THE HAZARD**

- **Periodically inspect the blade for wear and damage. Immediately install a new blade if it is worn or damaged.**

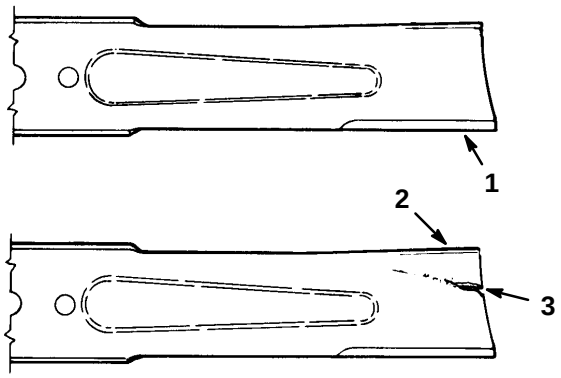
## Before Inspecting or Servicing the Blades

Park the machine on a level surface, disengage the blade control (PTO) and set the parking brake. Turn the ignition key to “OFF” to stop the engine. Remove the key and disconnect the spark plug wire(s) from the spark plug(s).

## Inspecting the Blades

**1.** Inspect the cutting edges (Fig 55). If the edges are not sharp or have nicks, remove and sharpen the blades. Refer to Sharpening the Blades on page 54.

**2.** Inspect the blades, especially the curved area (Fig. 55). If you notice any damage, wear, or a slot forming in this area (item 3 in Fig. 55), immediately install a new blade.




m–151

**Figure 55**

1. Cutting Edge
2. Curved Area
3. Wear/slot Forming

## Checking for Bent Blades

1. Rotate the blades until the ends face forward and backward (Fig. 56). Measure from a level surface to the cutting edge of the blades (Fig. 56). Note this dimension.

2. Rotate the opposite ends of the blades forward. Measure from a level surface to the cutting edge of the blades at the same position as in step 1 above. The difference between the dimensions obtained in steps 1 and 2 must not exceed 1/8” (3 mm). If this dimension exceeds 1/8” (3 mm), the blade is bent and must be replaced. Refer to Removing the Blades, and Installing the Blades on page 53.

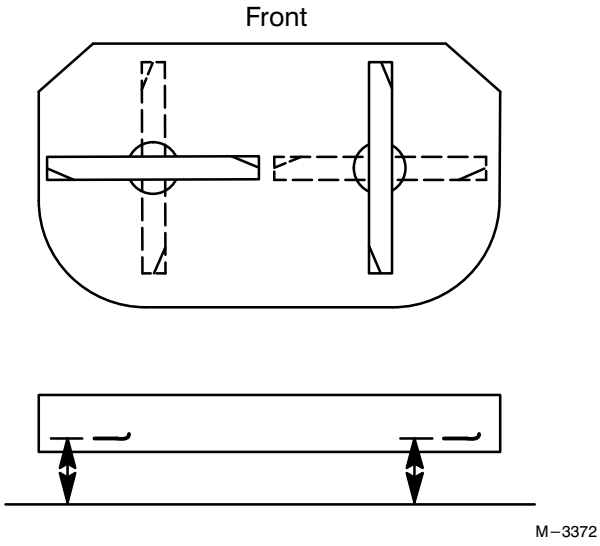



**Figure 56**

**⚠ WARNING**

**POTENTIAL HAZARD**
- **A blade that is bent or damaged could break apart and pieces could be thrown at bystanders or at you as you use the mower.**

**WHAT CAN HAPPEN**
- **Pieces of blade that may be thrown could seriously injure or kill you or bystanders.**

**HOW TO AVOID THE HAZARD**
- **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.

Hold the blade end using a rag or thickly-padded glove. Remove the retainer bolt with its washer and spacer, and the blade bolts and locknuts from the blade retainer (Fig. 53).

## Installing the Blades

**IMPORTANT: The blades are different for each side and rotate in opposite directions forcing clippings to the center rear of the mower. Align cutting edges properly when installing.**

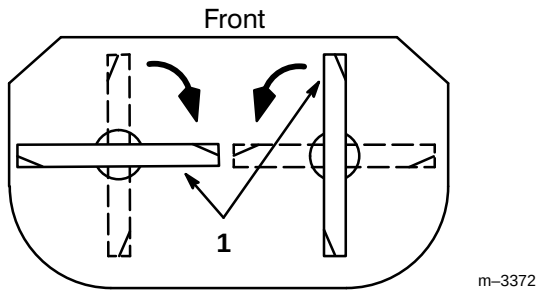



**Figure 57**

1. Cutting edge

**1.** Install the blade onto the blade retainer and secure with retainer bolt, spacer and washer (Fig. 53).

**IMPORTANT: The curved part of the blade, the sail, must be pointing upward toward the top of the mower to ensure proper cutting.**

**2.** Install the blade shear bolts and locknuts (Fig. 53).

**3.** Torque blade shear bolts to 80–90 in-lb (9–10.2 N•m).

**4.** Torque the retainer bolt to 85–110 ft-lb (115–140 N•m).

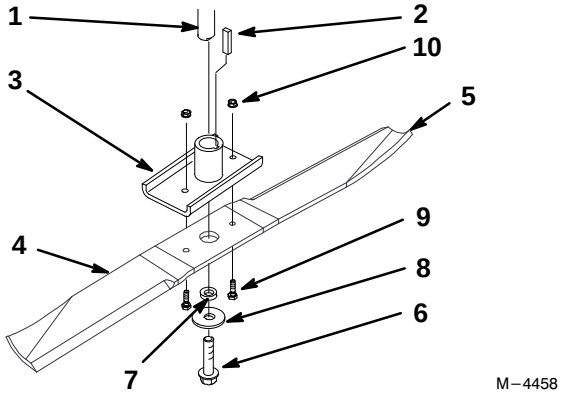



**Figure 58**

1. Spindle
2. Key
3. Blade retainer
4. Blade
5. Sail Area of Blade
6. Retainer bolt
7. Spacer
8. Washer
9. Shear Bolt
10. Locknut

## Sharpening the Blades

**1.** Use a file to sharpen the cutting edge at both ends of the blade (Fig. 59). Maintain the original angle. The blade retains its balance if the same amount of material is removed from both cutting edges.

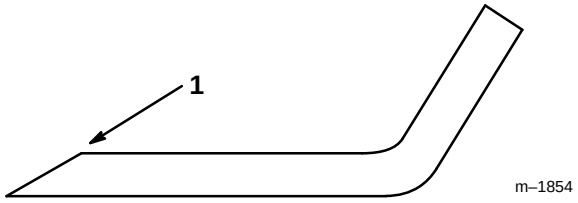



**Figure 59**

1. Sharpen at original angle

**2.** Check the balance of the blade by putting it on a blade balancer (Fig. 60). 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. 53). Repeat this procedure until the blade is balanced.

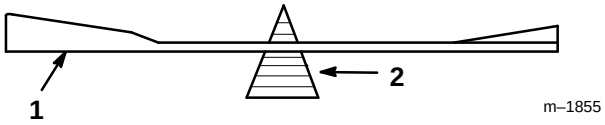



**Figure 60**

1. Blade
2. Balancer

# Correcting Cutting Unit Mismatch

If one cutter blade cuts lower than the other, correct as follows:

1. Stop the engine, remove the key and disconnect the spark plug wire(s) from the spark plug(s).
2. Adjust the tire pressure in all tires to specifications and check that the blades are not bent. Refer to Checking for Bent Blades on page 53.
3. Set the height-of-cut to the 2-1/2” position. Refer to Adjusting the Height-Of-Cut in the Operation section. Make sure the clevis pins are resting on the frame cushions and there is no excessive wear push arm pivot points.

## Setting the Front-to-Rear Pitch

1. Check the tire pressure on both deck and traction unit.
2. Position one blade front-to-rear (Fig. 61). Measure at “C” and “D” locations (Fig. 61) from a level surface to the cutting edge of the blade tips (Fig. 62).
3. The mower should be 1/4”–1/2” (6–13 mm) lower in front “C” than in the rear “D”. Repeat for opposite blade.

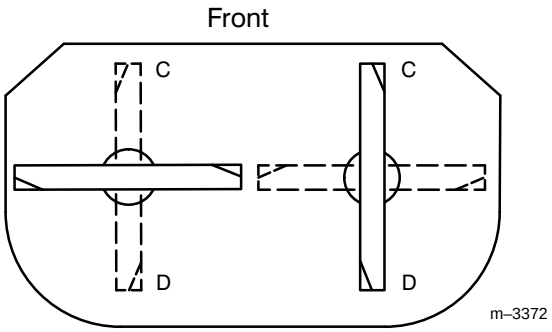



**Figure 61**

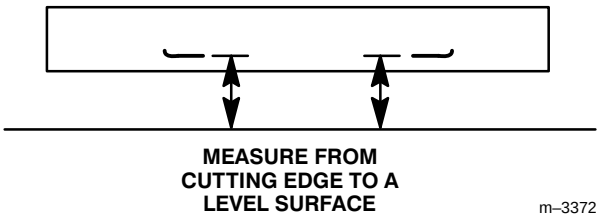



**Figure 62**

4. To change the front-to-rear pitch, remove the retaining ring and move an equal number of thrust washers on both castor wheel forks. Move the thrust washers from the top of the carrier frame mounting tube to the bottom to raise the front of the mower. Move the thrust washers from the bottom of the mounting tube to the top to lower the front of the mower (Fig. 33).
5. Check the side-to-side leveling of the cutting unit.

## Setting the Side-to-Side Leveling

**1.** Check the tire pressure on both deck and traction unit.

**2.** Position the blades side-to-side (Fig.63 ). Measure at “A” and “B” locations (Fig. 63) from a level surface to the cutting edge of blade tips (Fig.64).

**3.** The difference between measurements “A” and “B” should be no more than 1/4” (6 mm).

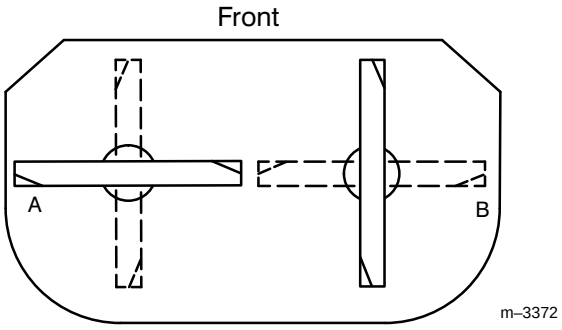



**Figure 63**

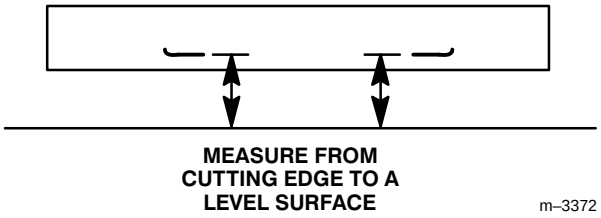
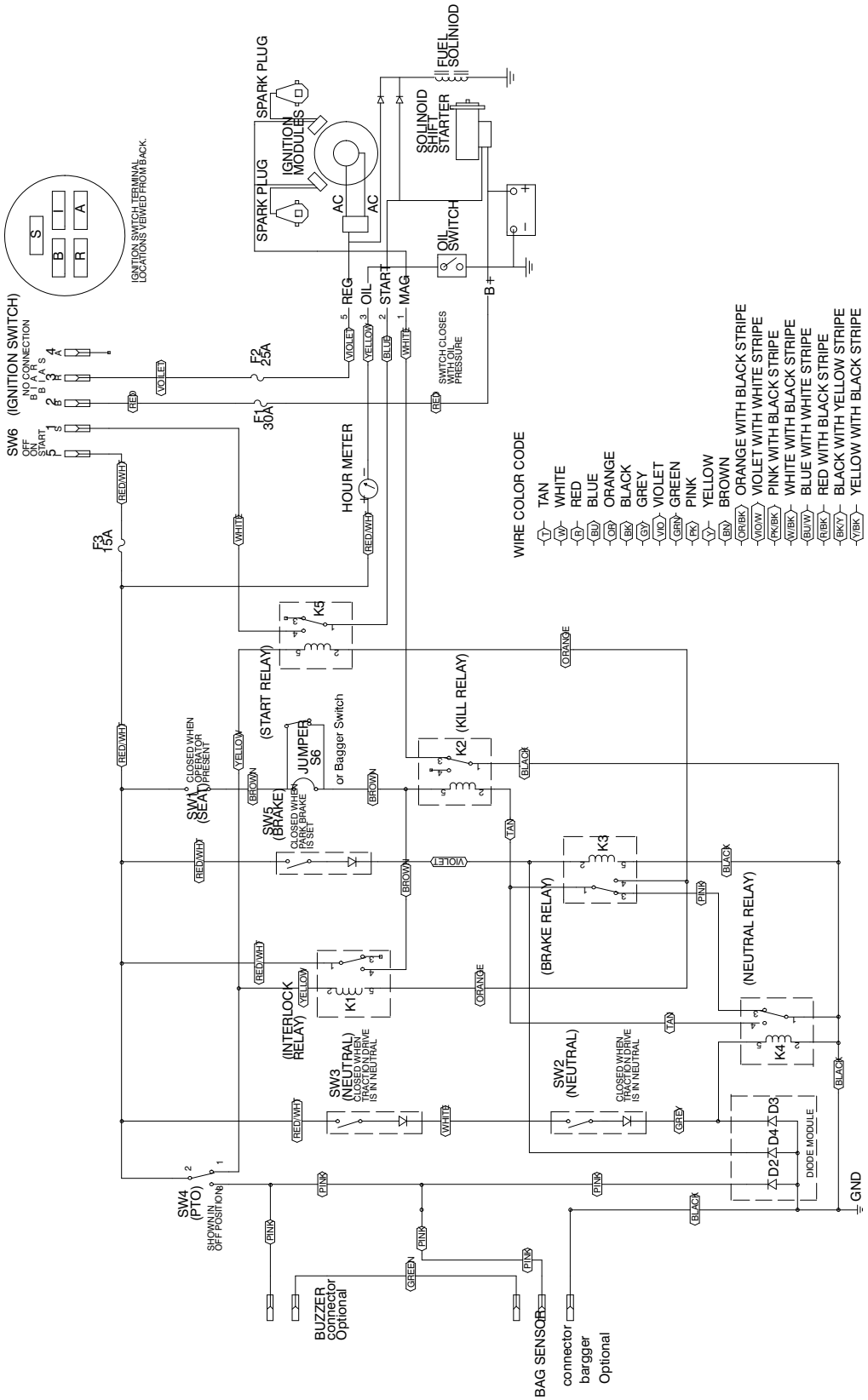



**Figure 64**

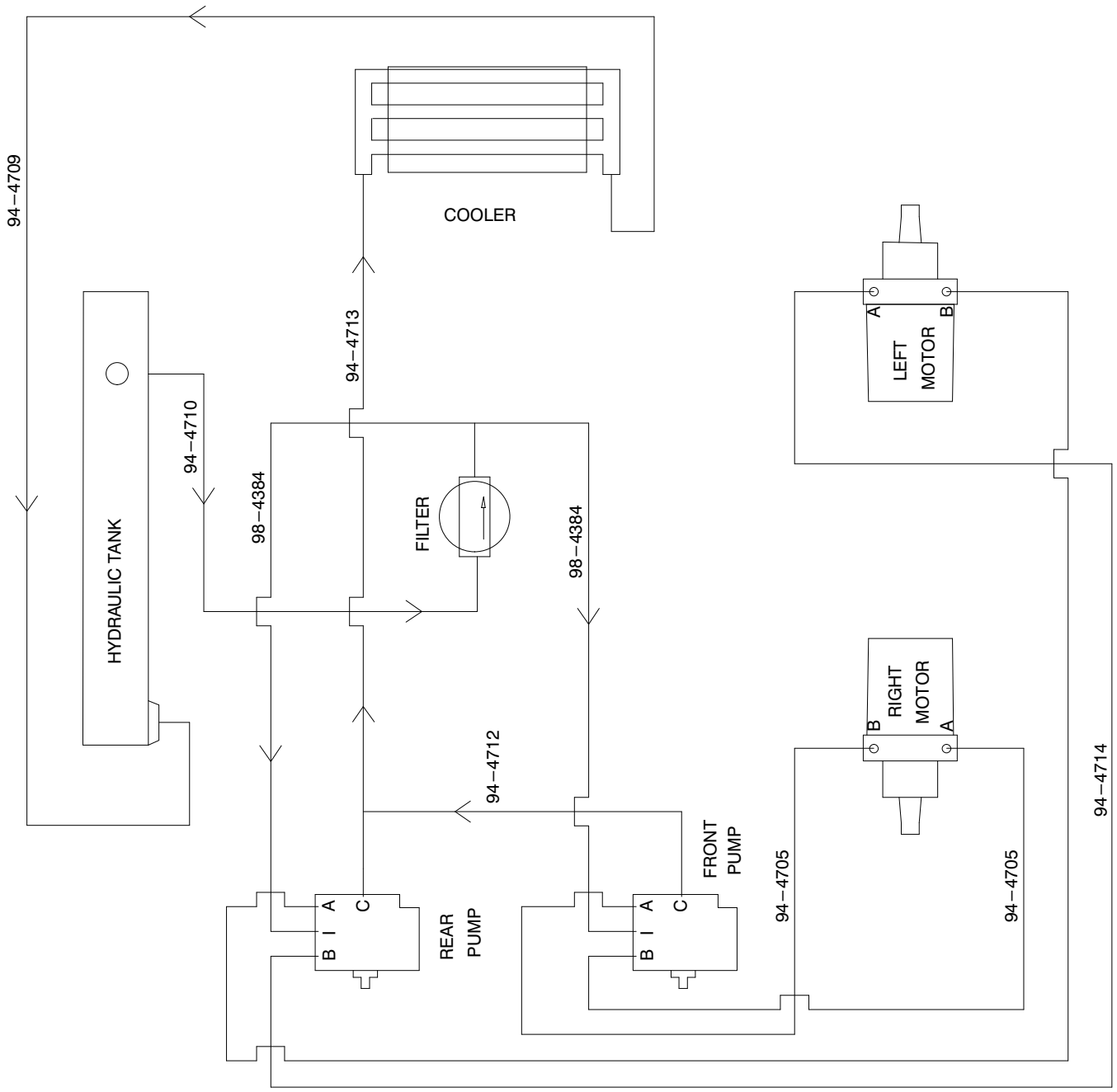
**4.** To change the side-to-side leveling, remove the retaining ring and move the thrust washers on one castor wheel fork only. Move the thrust washers from the top of the carrier frame mounting tube to the bottom to raise the corresponding side of the mower. Move the thrust washers from the bottom of the mounting tube to the top to lower the corresponding side of the mower. (Fig. 33).

**5.** Recheck the front-to-rear pitch of the cutting unit.

# Wiring Diagram



# Hydraulic Diagram



## Cleaning and Storage

1. Disengage the power take off (PTO), set the parking brake and turn the ignition key to “OFF” to stop the engine. Remove the key.
2. Remove grass clippings, dirt, and grime from the external parts of the entire machine, especially the engine. Clean dirt and chaff from the outside of the engine’s cylinder head fins and blower housing.
3. Clean any dirt and chaff from the mower, chute, blower and hopper.
4. Scrape any heavy buildup of grass and dirt from the mower, chute, blower and hopper, then wash with a garden hose.

   **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.**
5. Check the condition of the blades. Refer to Cutting Blades on page 51.
6. Service the air cleaner; refer to Air Cleaner, page 31.
7. Grease the machine; refer to Greasing and Lubrication, page 36.
8. Change the crankcase oil; refer to Engine Oil, page 33.
9. Change the hydraulic fluid; refer to Hydraulic System, page 43.
10. Remove the spark plug(s) and check its condition; refer to Spark Plug, page 35. With the spark plug(s) 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 plug(s). Do not install the wire on the spark plug(s).
11. Check the condition of all belts.
12. Check the tire pressure; refer to Tire Pressure, page 42.
13. Charge the battery; refer to Battery page 50.
14. For long-term storage (more than 90 days) add stabilizer/conditioner additive to fuel in the tank (1 oz. per gallon).

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

    B. Stop engine, allow to cool and drain the fuel tank; refer to Fuel Tank, page 43.

    C. Restart engine and run until it stops. Repeat, on “CHOKE” until engine will not restart.

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

    **Note:** Do not store stabilizer/conditioned gasoline over 90 days.
15. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged or defective.
16. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
17. Store the machine in a clean, dry garage or storage area. Remove the key from the ignition switch and keep it in a memorable place. Cover the machine to protect it and keep it clean.

# Troubleshooting

| PROBLEM | POSSIBLE CAUSES | CORRECTIVE ACTION |
|---|---|---|
| Starter does not crank | 1. Power take off (PTO) is ENGAGED. | 1. Move power take off (PTO) to DISENGAGED. |
| | 2. Parking brake is not on. | 2. Set parking brake. |
| | 3. Motion control levers are not in neutral. | 3. Move motion control levers into neutral. |
| | 4. Battery is dead. | 4. Charge the battery. |
| | 5. Electrical connections are corroded or loose. | 5. Check electrical connections for good contact. |
| | 6. Fuse is blown. | 6. Replace fuse. |
| | 7. Relay or switch is defective. | 7. Contact Authorized Service Dealer. |
| Engine will not start, starts hard, or fails to keep running. | 1. Fuel tank is empty. | 1. Fill fuel tank with gasoline. |
| | 2. Choke is not ON. | 2. Move choke lever to ON. |
| | 3. Air cleaner is dirty. | 3. Clean or replace air cleaner element. |
| | 4. Spark plug wires is loose or disconnected. | 4. Install wires on spark plug. |
| | 5. Spark plugs are pitted, fouled, or gap is incorrect. | 5. Install new, correctly gapped spark plugs. |
| | 6. Dirt in fuel filter. | 6. Replace fuel filter. |
| | 7. Dirt, water, or stale fuel is in fuel system. | 7. Contact Authorized Service Dealer. |
| Engine loses power. | 1. Engine load is excessive. | 1. Reduce ground speed. |
| | 2. Air cleaner is dirty. | 2. Clean air cleaner element. |
| | 3. Oil level in crankcase is low. | 3. Add oil to crankcase. |
| | 4. Cooling fins and air passages under engine blower housing are plugged. | 4. Remove obstruction from cooling fins and air passages. |
| | 5. Spark plugs are pitted, fouled, or gap is incorrect. | 5. Install new, correctly gapped spark plugs. |
| | 6. Dirt in fuel filter. | 6. Replace fuel filter. |
| | 7. Dirt, water, or stale fuel is in fuel system. | 7. Contact Authorized Service Dealer. |

| PROBLEM | POSSIBLE CAUSES | CORRECTIVE ACTION |
|---|---|---|
| Engine overheats. | 1. Engine load is excessive.<br>2. Oil level in crankcase is low.<br>3. Cooling fins and air passages under engine blower housing are plugged. | 1. Reduce ground speed.<br>2. Add oil to crankcase.<br>3. Remove obstruction from cooling fins and air passages. |
| Abnormal vibration. | 1. Engine mounting bolts are loose.<br>2. Loose engine pulley, idler pulley, or blade pulley.<br>3. Engine pulley is damaged. | 1. Tighten engine mounting bolts.<br>2. Tighten the appropriate pulley.<br>3. Contact Authorized Service Dealer. |
| Machine does not drive. | 1. Parking brake is on.<br>2. Traction belt is worn, loose or broken.<br>3. Traction belt is off pulley.<br>4. Hydro fluid level low. | 1. Move parking brake to off.<br>2. Contact Authorized Service Dealer.<br>3. Contact Authorized Service Dealer.<br>4. Add hydro fluid to reservoir. |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