



Count on it.

Operator's Manual

**Z Master[®] Commercial 2000
Series Riding Mower**

**with 48in, 52in, or 60in TURBO FORCE[®] Side
Discharge Mower**

Model No. 74141—Serial No. 313000001 and Up

Model No. 74143—Serial No. 313000001 and Up

Model No. 74145—Serial No. 313000001 and Up



G010244



WARNING

CALIFORNIA Proposition 65 Warning

This product contains a chemical or chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

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

This spark ignition system complies with Canadian ICES-002

Because in some areas there are local, state, or federal regulations requiring that a spark arrester be used on the engine of this machine, a spark arrester is available as an option. If you require a spark arrester, contact your Authorized Toro Dealer.

Genuine Toro spark arresters are approved by the USDA Forestry Service.

Note: It is a violation of California Public Resource Code Section 4442 to use or operate the engine on any forest-covered, brush-covered, or grass-covered land without a spark arrester muffler maintained in working order, or the engine constricted, equipped, and maintained for the prevention of fire. Other states or federal areas may have similar laws.

▲ WARNING

Removing standard original equipment parts and accessories may alter the warranty, traction, and safety of the machine. Failure to use original Toro parts could cause serious injury or death. Making unauthorized changes to the engine, fuel or venting system, may violate EPA and CARB regulations.

Replace all parts including, but not limited to, tires, belts, blades, and fuel system components with original Toro parts.

The enclosed *Engine Owner's Manual* is supplied for information regarding the US Environmental Protection Agency (EPA) and the California Emission Control Regulation of emission systems, maintenance, and warranty. Replacements may be ordered through the engine manufacturer.

Introduction

This rotary-blade, riding lawn mower is intended to be used by residential homeowners or professional, hired operators. It is designed primarily for cutting grass on well-maintained lawns on residential or commercial properties. It is not designed for cutting brush or for agricultural uses.

Read this information carefully to learn how to operate and maintain your product properly and to avoid injury and product damage. You are responsible for operating the product properly and safely.

You may contact Toro directly at www.Toro.com for product and accessory information, help finding a dealer, or to register your product.

Whenever you need service, genuine Toro parts, or additional information, contact an Authorized Service Dealer or Toro Customer Service and have the model and serial numbers of your product ready. [Figure 1](#) identifies the location of the model and serial numbers on the product. Write the numbers in the space provided.

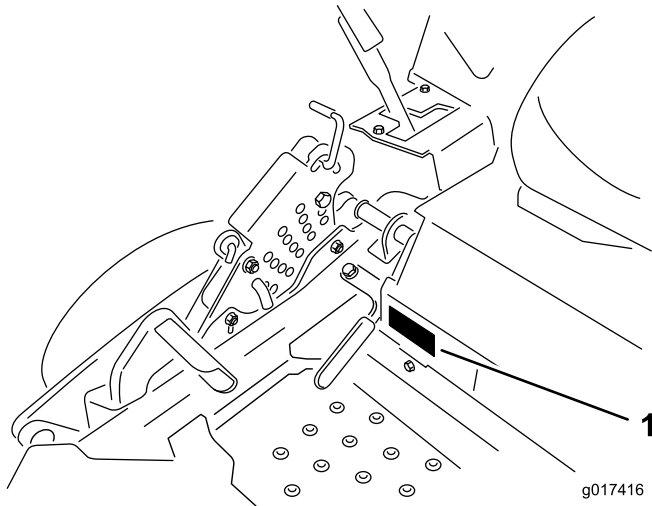


Figure 1

1. Model and serial number location

Model No. _____
Serial No. _____

This manual identifies potential hazards and has safety messages identified by the safety alert symbol ([Figure 2](#)), which signals a hazard that may cause serious injury or death if you do not follow the recommended precautions.



Figure 2

1. Safety alert symbol

This manual uses 2 other words to highlight information. **Important** calls attention to special mechanical information and **Note** emphasizes general information worthy of special attention.

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Safety

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

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

This product is designed for cutting and recycling grass or, when equipped with a grass bagger, for catching cut grass. Any use for purposes other than these could prove dangerous to user and bystanders.

Safe Operating Practices

The following instructions are from ANSI standard B71.4-2012.

Training

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

Preparation

- Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job. Only use accessories and attachments approved by the manufacturer.
- Wear appropriate clothing including hard hat, safety glasses and hearing protection. Long hair, loose clothing or jewelry may get tangled in moving parts.
- Inspect the area where the equipment is to be used and remove all objects such as rocks, toys and wire which can be thrown by the machine.
- Use extra care when handling gasoline and other fuels. They are flammable and vapors are explosive.
 - Use only an approved container
 - Never refuel or drain the machine indoors.

- Never remove gas cap or add fuel with engine running. Allow engine to cool before refueling. Do not smoke.

- Check that operator's presence controls, safety switches and shields are attached and functioning properly. Do not operate unless they are functioning properly.

Operation

- Lightning can cause severe injury or death. If lightning is seen or thunder is heard in the area, do not operate the machine; seek shelter.
- Never run an engine in an enclosed area.
- Only operate in good light, keeping away from holes and hidden hazards.
- Be sure all drives are in neutral and parking brake is engaged before starting engine. Start the engine only from the operator's position. Use seat belts.
- Never raise mower with the blades running.
- Never operate without the PTO shield, or other guards securely in place. Be sure all interlocks are attached, adjusted properly, and functioning properly.
- Never operate with the discharge deflector raised, removed or altered, unless using a grass catcher.
- Do not change the engine governor setting or overspeed the engine.
- Stop on level ground, lower implements, disengage drives, engage parking brake, shut off engine before leaving the operator's position for any reason including emptying the catchers or unclogging the chute.
- Stop equipment and inspect blades after striking objects or if an abnormal vibration occurs. Make necessary repairs before resuming operations.
- Keep hands and feet away from the cutting units.
- Never carry passengers and keep pets and bystanders away.
- Be alert, slow down and use caution when making turns. Look behind and to the side before changing directions.
- Slow down and use caution when crossing roads and sidewalks. Stop blades if not mowing.
- Be aware of the mower discharge direction and do not point it at anyone.
- Do not operate the mower under the influence of alcohol or drugs.
- Use extreme care when loading or unloading the machine into a trailer or truck.
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

Slope Operation

- Do not mow slopes greater than 15 degrees.
- Do not mow near drop-offs, ditches, steep banks or water. Wheels dropping over edges can cause rollovers, which may result in serious injury, death or drowning.

- Do not mow slopes when grass is wet. Slippery conditions reduce traction and could cause sliding and loss of control.
- Do not make sudden turns or rapid speed changes.
- Use a walk behind mower and/or a hand trimmer near drop-offs, ditches, steep banks or water.
- Reduce speed and use extreme caution on slopes.
- Remove or mark obstacles such as rocks, tree limbs, etc. from the mowing area. Tall grass can hide obstacles.
- Watch for ditches, holes, rocks, dips, and rises that change the operating angle, as rough terrain could overturn the machine.
- Avoid sudden starts when mowing uphill because the mower may tip backwards.
- Be aware that operating on wet grass, across steep slopes, or down hill may cause the mower to lose traction. Loss of traction to the drive wheels may result in sliding and a loss of braking and steering.
- Always avoid sudden starting or stopping on a slope. If tires lose traction, disengage the blades and proceed slowly off the slope.
- Follow the manufacturer's recommendations for wheel weights or counterweights to improve stability.
- Use extreme care with grass catchers or other attachments. These can change the stability of the machine and cause loss of control.
- Let engine cool before storing and do not store near flame.
- Shut off fuel while storing or transporting. Do not store fuel near flames or drain indoors.
- Park machine on level ground. Never allow untrained personnel to service machine.
- Use jack stands to support components when required.
- Carefully release pressure from components with stored energy.
- Disconnect battery or remove spark plug wire before making any repairs. Disconnect the negative terminal first and the positive last. Reconnect positive first and negative last.
- Use care when checking blades. Wrap the blade(s) or wear gloves, and use caution when servicing them. Only replace damaged blades; never straighten or weld them.
- Keep hands and feet away from moving parts. If possible, do not make adjustments with the engine running.
- Charge batteries in an open well ventilated area, away from spark and flames. Unplug charger before connecting or disconnecting from battery. Wear protective clothing and use insulated tools.
- Keep all parts in good working condition and all hardware tightened. Replace all worn or damaged decals.
- Use only Toro approved attachments. Warranty may be voided if used with unapproved attachments.

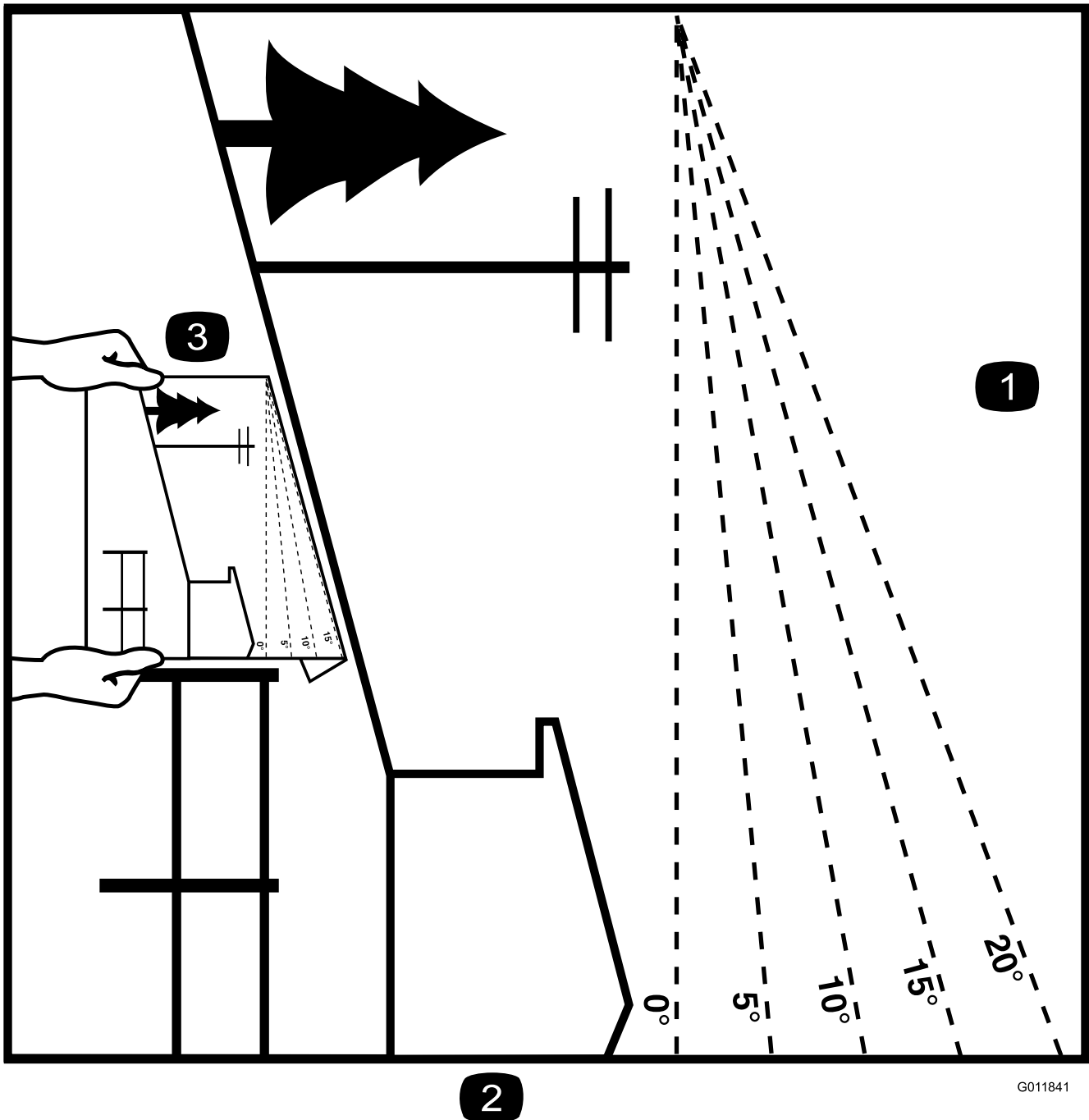
Using the Rollover Protection System (ROPS)

- Keep the roll bar in the fully raised and locked position and use the seat belt when operating the machine.
- Be certain that the seat belt can be released quickly in the event of an emergency.
- Be aware there is no rollover protection when the roll bar is down.
- Check the area to be mowed and never fold the ROPS in areas where there are slopes, drop offs or water.
- Lower the rollbar only when absolutely necessary. Do not wear the seat belt with the roll bar folded down.
- Check carefully for overhead clearances (i.e. branches, doorways, electrical wires) before driving under any objects and do not contact them.

Maintenance and storage

- Disengage drives, lower implement, set parking brake, stop engine and remove key or disconnect spark plug wire. Wait for all movement to stop before adjusting, cleaning or repairing.
- Clean grass and debris from cutting units, drives, mufflers, and engine to help prevent fires. Clean up oil or fuel spillage.

Slope Indicator



2

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Figure 3

This page may be copied for personal use.

1. The maximum slope you can safely operate the machine on is **15 degrees**. Use the slope chart to determine the degree of slope of hills before operating. **Do not operate this machine on a slope greater than 15 degrees**. Fold along the appropriate line to match the recommended slope.
2. Align this edge with a vertical surface, a tree, building, fence pole, etc.
3. Example of how to compare slope with folded edge.

Safety and Instructional Decals



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



1-403005



68-8340



54-9220



98-5954



103-2076



1
58-6520

1. Grease

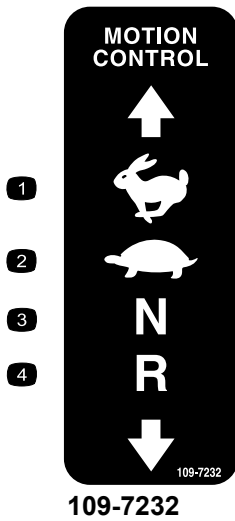


Manufacturer's Mark

1. Indicates the blade is identified as a part from the original machine manufacturer.



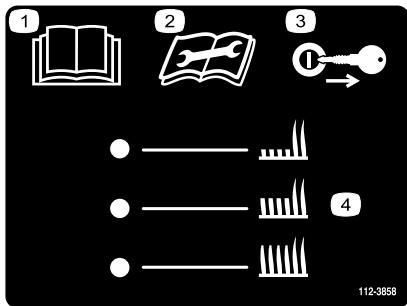
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109-7232

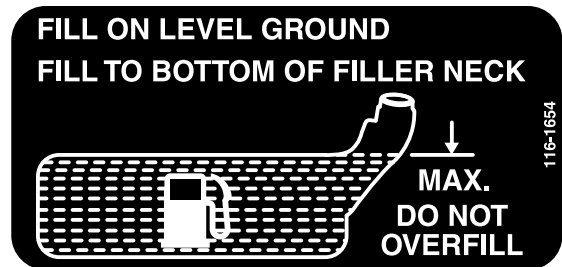


116-0205



112-3858

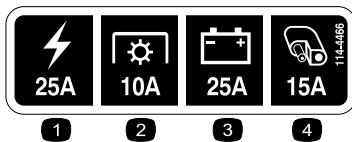
1. Read the *Operator's Manual*.
2. Read the instructions before servicing or performing maintenance.
3. Remove the ignition key before adjusting the height of cut.
4. Height of cut settings.



116-1654



116-3303

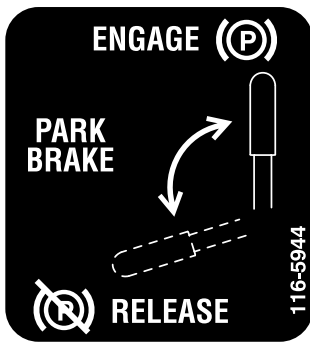


114-4466

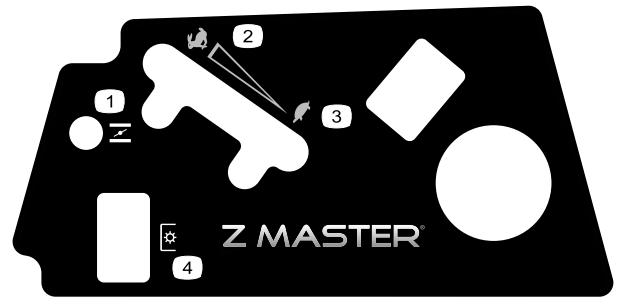
1. Main, 25A
2. PTO, 10A
3. Charge, 25A
4. Auxiliary, 15A



116-4858



116-5944



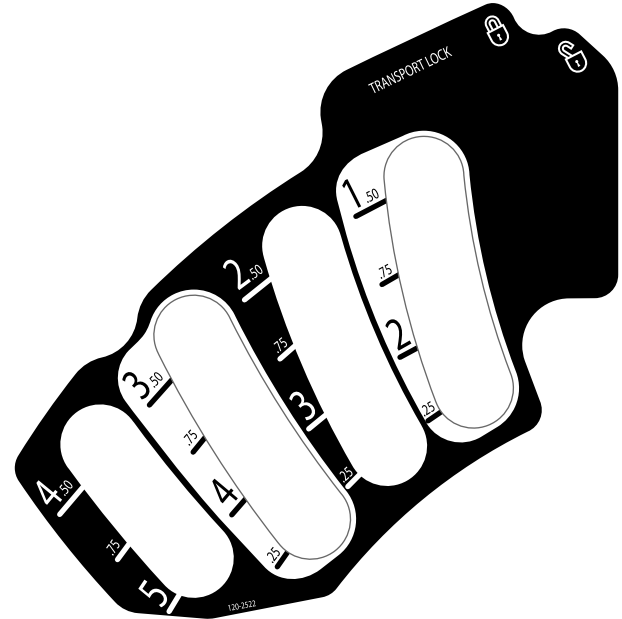
119-2501

- 1. Choke
- 2. Fast
- 3. Slow
- 4. PTO (Power Take-off)

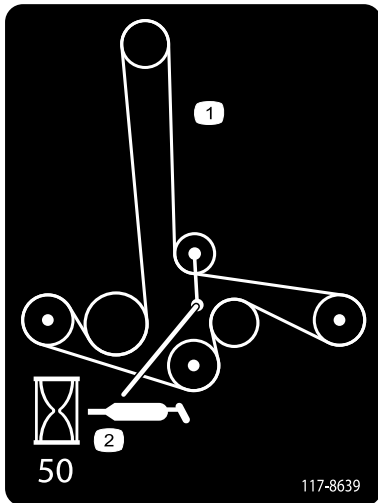


117-1158

- 1. Bypass lever position for operating the machine.
- 2. Bypass lever position for pushing the machine.

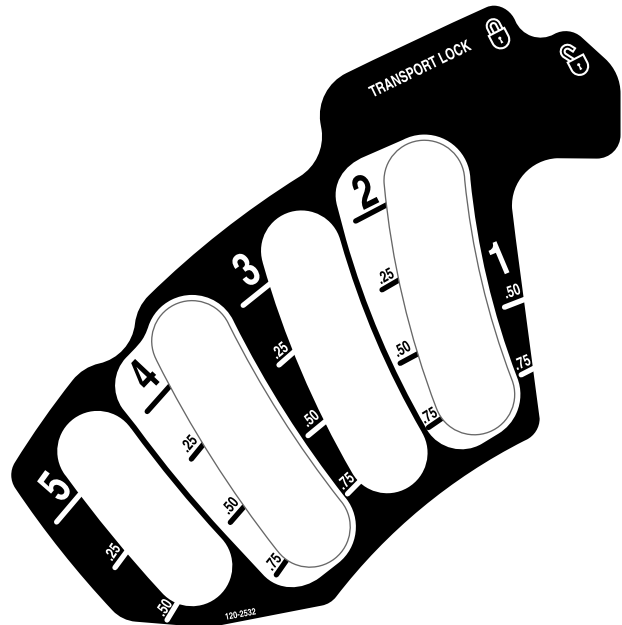


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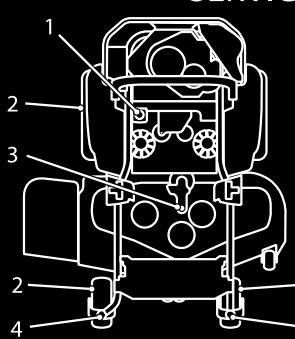
117-8639

- 1. Belt routing
- 2. Grease pulley, maintenance interval—50 hours



120-2532

SERVICE AID 121-3223




EVERY 25 HOURS:
1. Check hydraulic oil
(Only use recommended hydro oil)

EVERY 50 HOURS:
2. Check tire pressure
in pneumatic tires - 13 psi

3. Grease belt idler

YEARLY:
4. Grease front caster pivots

 See operator's manual
for additional details.

121-3223



Battery Symbols

Some or all of these symbols are on your battery

- | | |
|--|--|
| 1. Explosion hazard | 6. Keep bystanders a safe distance from the battery. |
| 2. No fire, open flame, or smoking. | 7. Wear eye protection; explosive gases can cause blindness and other injuries |
| 3. Caustic liquid/chemical burn hazard | 8. Battery acid can cause blindness or severe burns. |
| 4. Wear eye protection | 9. Flush eyes immediately with water and get medical help fast. |
| 5. Read the <i>Operator's Manual</i> . | 10. Contains lead; do not discard. |

WARNING



TO AVOID INJURY OR DEATH FROM ROLLOVER:
Keep roll bar in the raised and locked position and use seat belt.



THERE IS NO ROLL OVER PROTECTION WHEN THE ROLL BAR IS DOWN.
Lower the roll bar only when absolutely necessary.
Do not wear seat belt when the roll bar is down.
Drive slowly and carefully.
Raise the roll bar as soon as clearance permits.
Read and follow slope operation instructions and warnings.

107-2102

107-2102

<p style="text-align: center;">WARNING</p> <p>To avoid serious injury or death:</p> <ul style="list-style-type: none"> • Read and understand the operator's manual before using this machine. • Do NOT operate unless trained to safely use this machine. • Do NOT operate under the influence of alcohol or drugs. • Hearing protection is recommended. • Do NOT operate without shields, guards, and safety devices in place and working. • Check the function of the operator presence controls (OPC) safety system daily. Do NOT defeat the OPC system. • Stop engine and remove key before adjusting, servicing or cleaning machine and attachments. 	<p style="text-align: center;">DANGER</p> <p>To avoid serious injury or death:</p> <ul style="list-style-type: none"> • Avoid blades unless engine and blades are stopped.  <p style="text-align: center; font-size: small;">109-7069</p>	<p style="text-align: center;">WARNING</p> <p>To avoid serious injury or death:</p> <ul style="list-style-type: none"> • Pick up objects that could be thrown by the blades. • Do NOT mow when people and pets are in the area. • Do NOT carry passengers. Look behind and to the side before changing directions. • Before leaving the operator's position: <ul style="list-style-type: none"> - Disengage PTO. - Move drive levers out to neutral lock position. - Engage park brake. - Stop engine. 
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109-7069

Product Overview

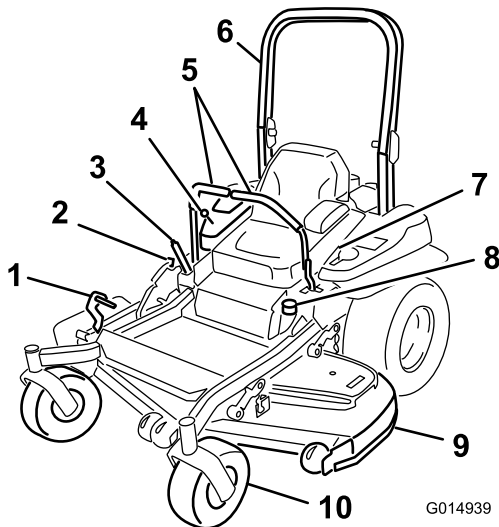


Figure 4

- | | |
|----------------------------------|------------------|
| 1. Height-of-cut deck lift pedal | 6. Roll bar |
| 2. Transport lock | 7. Seat belt |
| 3. Parking brake lever | 8. Fuel cap |
| 4. Controls | 9. Mower deck |
| 5. Motion control levers | 10. Caster wheel |

Controls

Become familiar with all the controls before you start the engine and operate the machine (Figure 4 and Figure 5).

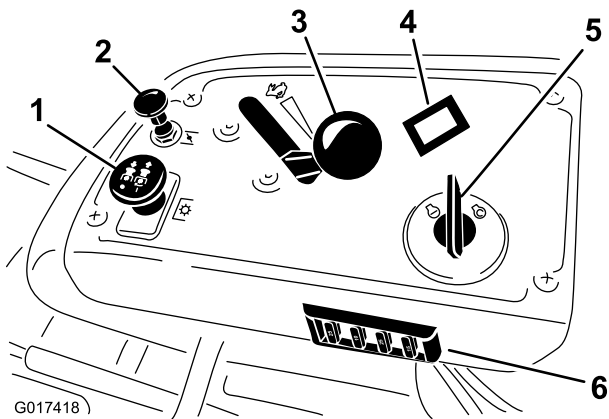


Figure 5

- | | |
|---------------------|--------------------|
| 1. PTO Switch | 4. Hour meter |
| 2. Choke | 5. Ignition switch |
| 3. Throttle control | 6. Fuses |

Hour Meter

The hour meter records the number of hours the engine has operated. It operates when the engine is running. Use these times for scheduling regular maintenance (Figure 5).

Throttle Control

The throttle control is variable between **Fast** and **Slow**.

Choke

Use the choke to start a cold engine. Pull the choke knob up to engage it.

Blade Control Switch (PTO)

The blade control switch (PTO) is used to engage the electric clutch and drive the mower blades. Pull the switch up to engage the blades and release. To disengage the blades, push the blade control switch (PTO) down or move a motion control lever into the neutral lock position.

Ignition Switch

This switch is used to start the mower engine and has three positions: **Start**, **Run** and **Off**.

Motion Control Levers

The motion control levers are used to drive the machine forward, reverse, and turn either direction.

Neutral Lock Position

The neutral lock position is used with the safety interlock system to engage and to determine neutral position.

Fuel Shut-off Valve

Close the fuel shut-off valve (under the seat) when transporting or storing the mower.

Attachments/Accessories

A selection of Toro approved attachments and accessories is available for use with the machine to enhance and expand its capabilities. Contact your Authorized Service Dealer or Distributor or go to www.Toro.com for a list of all approved attachments and accessories.

Specifications

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

Width:

	48 inch Deck	52 inch Deck	60 inch Deck
Without Deck	45.3 inches (115.1 cm)	47.0 inches (119.4 cm)	50.5 inches (134.6 cm)
Deflector Up	51.5 inches (130.8 cm)	53.3 inches (135.4 cm)	61.4 inches (156.0 cm)
Deflector Down	63.1 inches (160.3 cm)	67.2 inches (171.8 cm)	75.3 inches (191.3 cm)

Length:

	48 inch Deck	52 inch Deck	60 inch Deck
Roll Bar - Up	78.6 inches (199.6 cm)	79.4 inches (201.7 cm)	83.0 inches (210.8 cm)
Roll Bar - Down	80.4 inches (204.2 cm)	81.2 inches (206.2 cm)	84.8 inches (215.4 cm)

Height:

Roll Bar - Up	Roll Bar - Down
70.2 inches (178.3 cm)	46.5 inches (118.1 cm)

Weight:

Model	Weight
74141	926 lb (420 kg)
74143	944 lb (428 kg)
74145	988 lb (448 kg)

Operation

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

Adding Fuel

- For best results, use only clean, fresh, unleaded gasoline with an octane rating of 87 or higher ((R+M)/2 rating method).
- Oxygenated fuel with up to 10% ethanol or 15% MTBE by volume is acceptable.
- **Do Not** use ethanol blends of gasoline (such as E15 or E85) with more than 10% ethanol by volume. Performance problems and/or engine damage may result which may not be covered under warranty.
- **Do Not** use gasoline containing methanol.
- **Do Not** store fuel either in the fuel tank or fuel containers over the winter unless a fuel stabilizer is used.
- **Do Not** add oil to gasoline.

⚠ DANGER

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

- **Fill the fuel tank outdoors on level ground, in an open area, when the engine is cold. Wipe up any gasoline that spills.**
- **Never fill the fuel tank inside an enclosed trailer.**
- **Do not fill the fuel tank completely full. Fill the fuel tank to the bottom of the filler neck. The empty space in the tank allows gasoline to expand. Overfilling may result in fuel leakage or damage to the engine or emission system (if equipped).**
- **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.**
- **Do not operate without entire exhaust system in place and in proper working condition.**

⚠ DANGER

In certain conditions during fueling, static electricity can be released causing a spark which can ignite the gasoline vapors. A fire or explosion from gasoline can burn you and others and can damage property.

- Always place gasoline containers on the ground away from your vehicle before filling.
- Do not fill gasoline containers inside a vehicle or on a truck or trailer bed because interior carpets or plastic truck bed liners may insulate the container and slow the loss of any static charge.
- When practical, remove gas-powered equipment from the truck or trailer and refuel the equipment with its wheels on the ground.
- If this is not possible, then refuel such equipment on a truck or trailer from a portable container, rather than from a gasoline dispenser nozzle.
- If a gasoline dispenser nozzle must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.

⚠ WARNING

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

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

Using Stabilizer/Conditioner

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

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

Important: Do not use fuel additives containing methanol or ethanol.

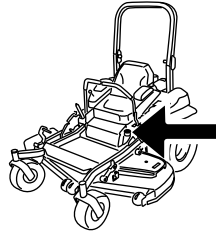
Add the correct amount of gas stabilizer/conditioner to the gas.

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

Filling the Fuel Tank

Note: Do not fill the fuel tank completely full. Fill the fuel tank to the bottom of the filler neck. The empty space in the tank allows the gasoline to expand.

1. Park the machine on level ground.
2. Shut the engine off and set the parking brake.
3. Clean around the fuel tank cap.
4. Fill the fuel tank to the bottom of the filler neck. Ensure there is empty space in the tank to allow the gasoline to expand (Figure 6).



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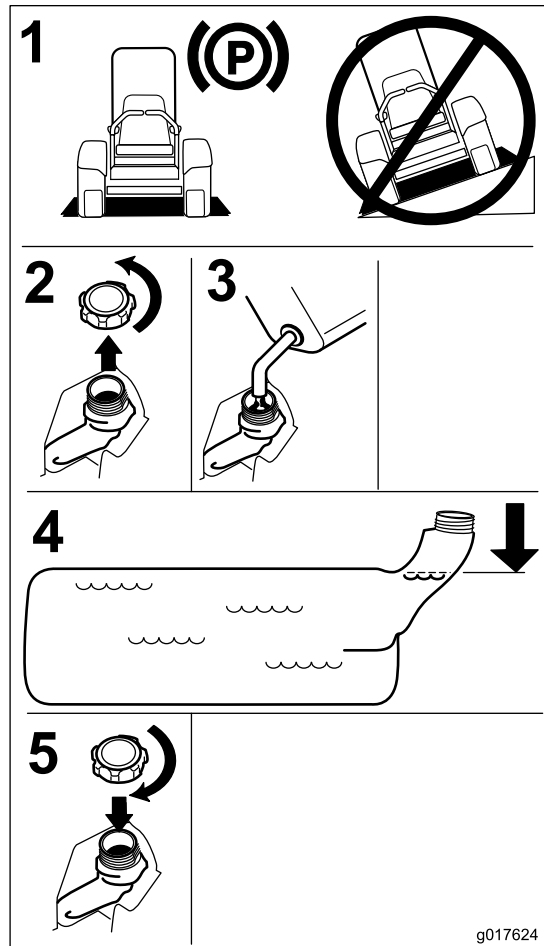


Figure 6

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Checking the Engine Oil Level

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

Breaking In a New Machine

New engines take time to develop full power. Mower decks and drive systems have higher friction when new, placing additional load on the engine. Allow 40 to 50 hours of break-in time for new machines to develop full power and best performance.

Using the Rollover Protection System (ROPS)

⚠ WARNING

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

Ensure the seat is secured to the machine.

⚠ WARNING

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

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

Important: Lower the roll bar only when absolutely necessary.

Important: Ensure the seat is secured to the machine.

1. To lower the roll bar, apply forward pressure to the upper part of the roll bar.
2. Pull both knobs out and rotate them 90° so they are not engaged (Figure 7).
3. Lower the roll bar to the down position (Figure 7).

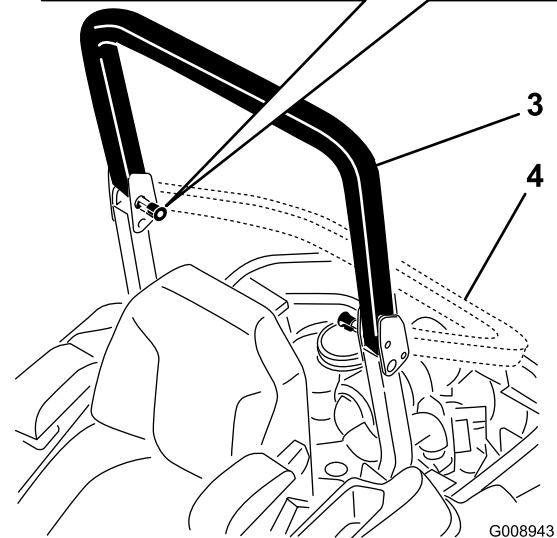
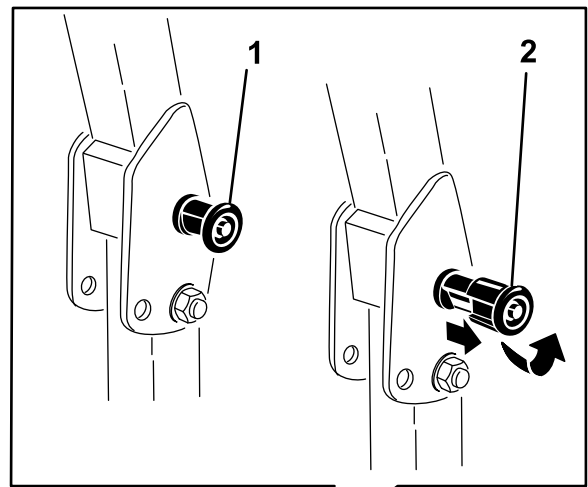


Figure 7

1. ROPS knob
2. Pull ROPS knob out and rotate 90 degrees
3. Roll bar in the upright position
4. Roll bar in the folded position

4. To raise the roll bar, raise the roll bar to the operate position, rotate the knobs so they move partially into the grooves (Figure 7).
5. Raise the roll bar to the full upright position while pushing on the upper roll bar and the pins will snap into position when the holes align with the pins (Figure 7). Push on the roll bar and ensure that both pins are engaged.

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

Think Safety First

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

⚠ DANGER

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

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

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

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

Read and follow the rollover protection instructions and warnings.

To avoid loss of control and possibility of rollover:

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

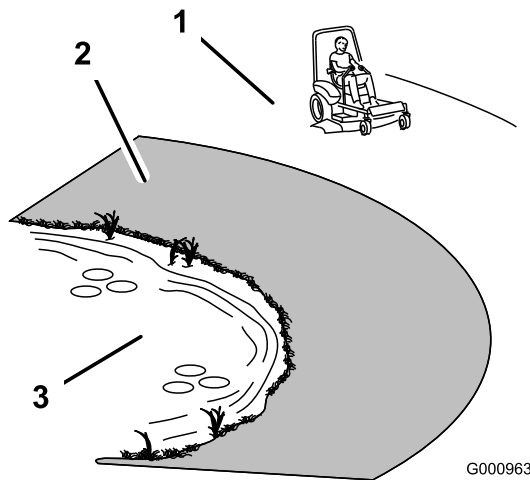


Figure 8

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

⚠ CAUTION

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

Wear hearing protection when operating this machine.

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

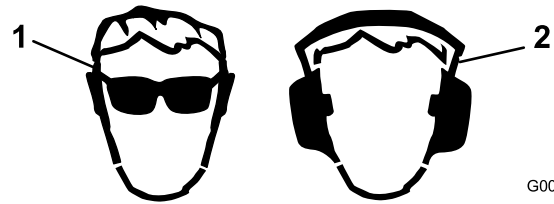


Figure 9

1. Wear safety glasses
2. Wear hearing protection

Operating the Parking Brake

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

Setting the Parking Brake

⚠ WARNING

Parking brake may not hold machine parked on a slope and could cause personal injury or property damage.

Do not park on slopes unless wheels are chocked or blocked

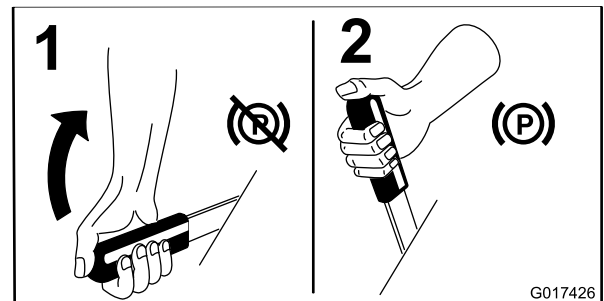


Figure 10

Releasing the Parking Brake

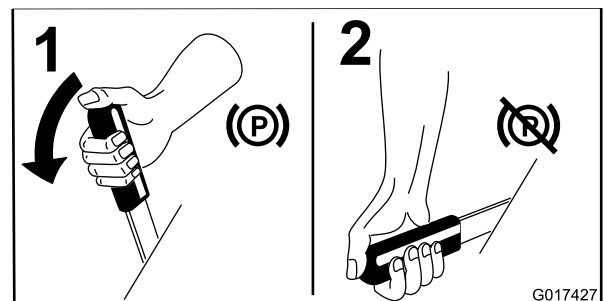


Figure 11

Operating the Mower Blade Control Switch (PTO)

The blade control switch (PTO) starts and stops the mower blades and any powered attachments.

Engaging the Blade Control Switch (PTO)

Note: Engaging the blade control switch (PTO) with the throttle position at half or less will cause excessive wear to the drive belts.

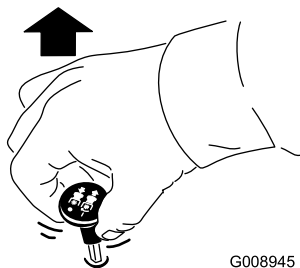


Figure 12

Disengaging the Blade Control Switch (PTO)

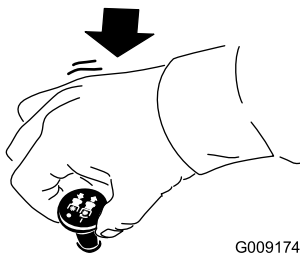


Figure 13

Operating the Throttle

The throttle control can be moved between **Fast** and **Slow** positions (Figure 14).

Always use the fast position when turning on the mower deck with the blade control switch (PTO).

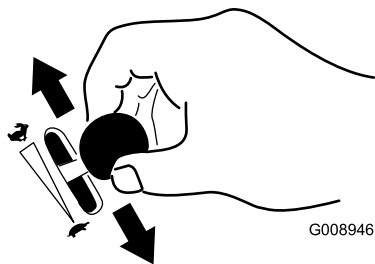


Figure 14

Operating the Choke

Use the choke to start a cold engine.

1. If the engine is cold, use the choke to start the engine.
2. Pull up on the choke knob to engage the choke before using the ignition switch (Figure 15).
3. Push down on the choke to disengage the choke after the engine has started (Figure 15).

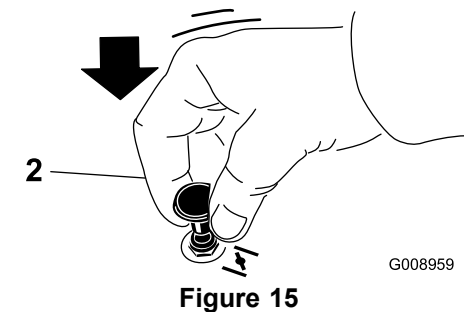
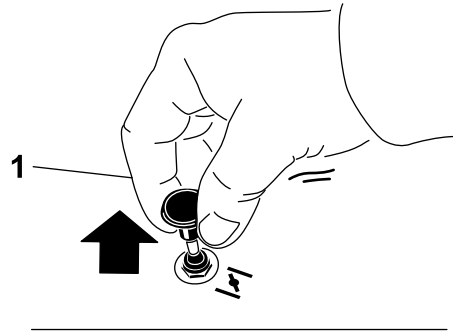


Figure 15

1. On

2. Off

Operating the Ignition Switch

1. Turn the ignition key to the Start position (Figure 16). When the engine starts, release the key.

Important: Do not engage starter for more than 5 seconds at a time. If the engine fails to start allow a 15 second cool-down period between attempts. Failure to follow these instructions can burn out the starter motor.

Note: Additional starting cycles may be required when starting the engine for the first time after the fuel system has been without fuel completely.

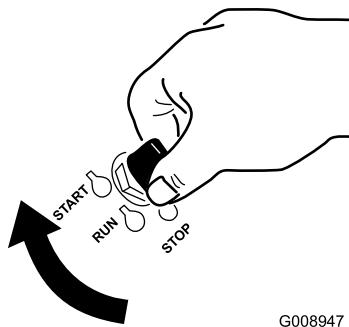


Figure 16

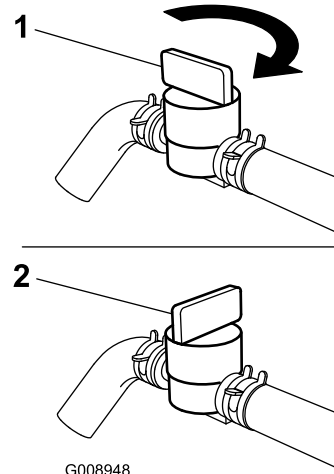
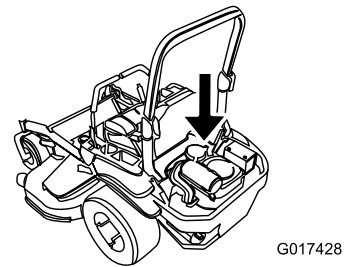


Figure 17

1. On

2. Off

2. Turn the ignition key to stop to stop the engine.

Using the Fuel Shut-Off Valve

The fuel shut-off valve is located behind the seat.

Close the fuel shut-off valve for transport, maintenance, and storage.

Ensure the fuel shut-off valve is open when starting the engine.

Starting and Stopping the Engine

Starting the Engine

1. Raise the ROPS up and lock into place, sit on the seat and fasten the seat belt.
2. Move the motion controls to neutral locked position.
3. Set the parking brake; refer to Setting the Parking Brake.
4. Move the blade control switch (PTO) to the Off position (Figure 18).
5. Move the throttle lever midway between the Slow and Fast positions.

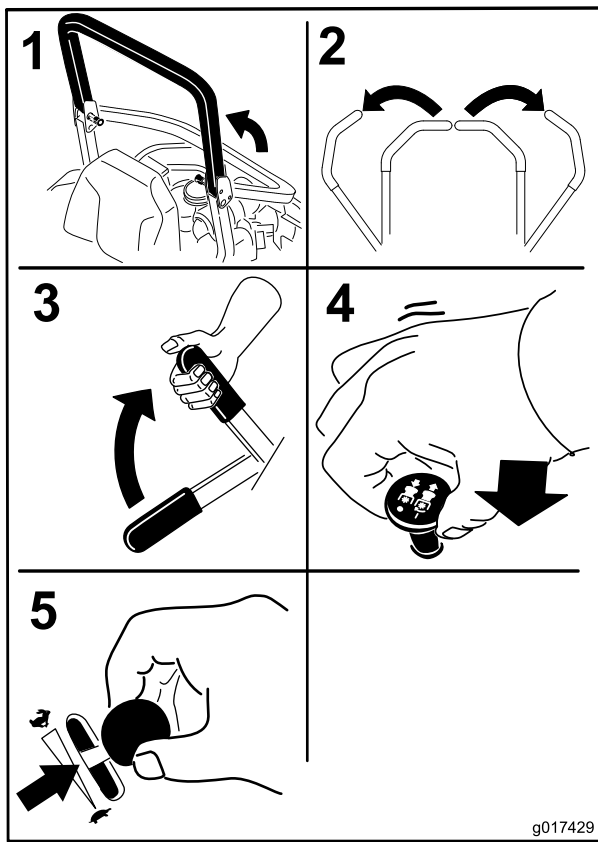


Figure 18

Stopping the Engine

⚠ CAUTION

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

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

Let the engine idle at slow throttle (turtle) for 60 seconds before turning the ignition switch off.

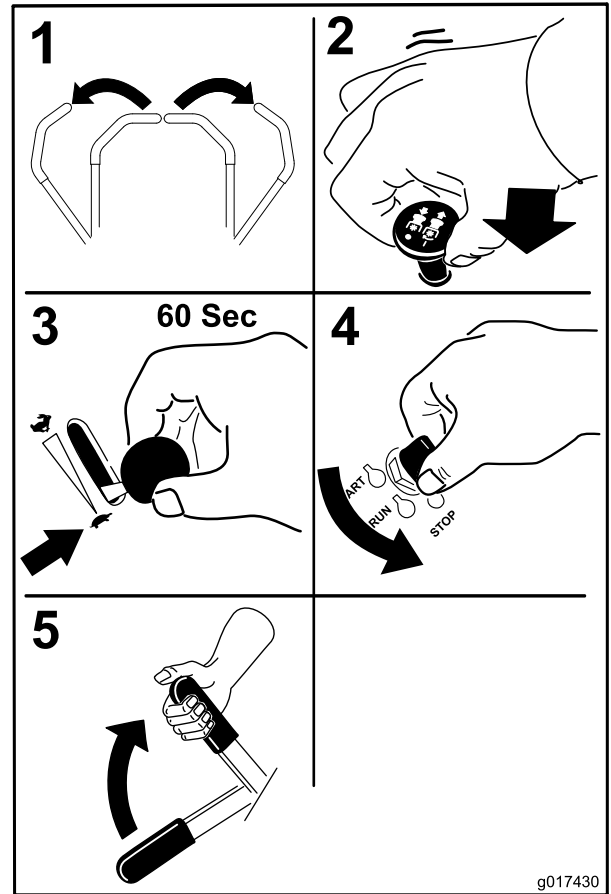


Figure 20

- Turn the ignition key to the Start position (Figure 16). When the engine starts, release the key.

Important: Do not engage starter for more than 5 seconds at a time. If the engine fails to start allow a 15 second cool-down period between attempts. Failure to follow these instructions can burn out the starter motor.

Note: Additional starting cycles may be required when starting the engine for the first time after the fuel system has been without fuel completely.

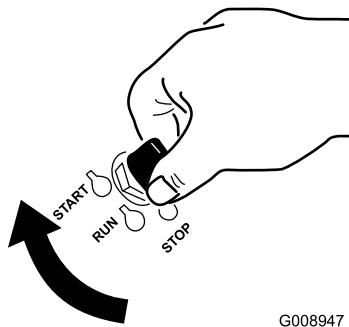


Figure 19

- Off
- Run
- Start

Important: Make sure that the fuel shut off valve is closed before transporting or storing the machine, as fuel leakage may occur. Set the parking brake before transporting. Make sure to remove the key as the fuel pump may run and cause the battery to lose charge.

The Safety Interlock System

⚠ CAUTION

If safety interlock switches are disconnected or damaged the machine could operate unexpectedly causing personal injury.

- Do not tamper with the interlock switches.
- Check the operation of the interlock switches daily and replace any damaged switches before operating the machine.

Understanding the Safety Interlock System

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

- The parking brake is engaged.
- The blade control switch (PTO) is disengaged.
- The motion control levers are in the neutral locked position

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

Testing the Safety Interlock System

Service Interval: Before each use or daily

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

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

motion control levers to neutral lock position. Try starting the engine; the engine should not crank.

Driving Forward or Backward

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

⚠ CAUTION

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

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

Using the Motion Control Levers

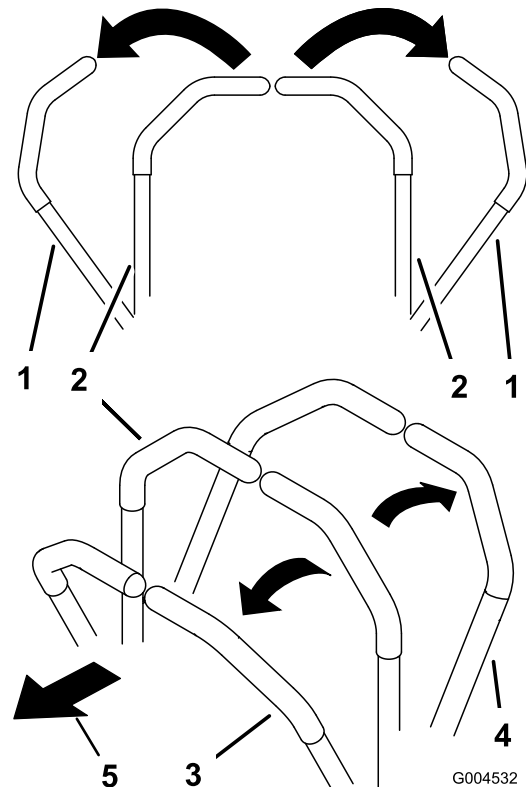


Figure 21

1. Motion control lever-neutral lock position
2. Center, unlocked position
3. Forward
4. Backward
5. Front of machine

Driving Forward

Note: The engine will kill if the traction control levers are moved with the parking brake engaged.

To stop, pull the motion control levers to the neutral position.

1. Release the parking brake; refer to Releasing the Parking Brake in Operation.
2. Move the levers to the center, unlocked position.
3. To go forward, slowly push the motion control levers forward (Figure 22).

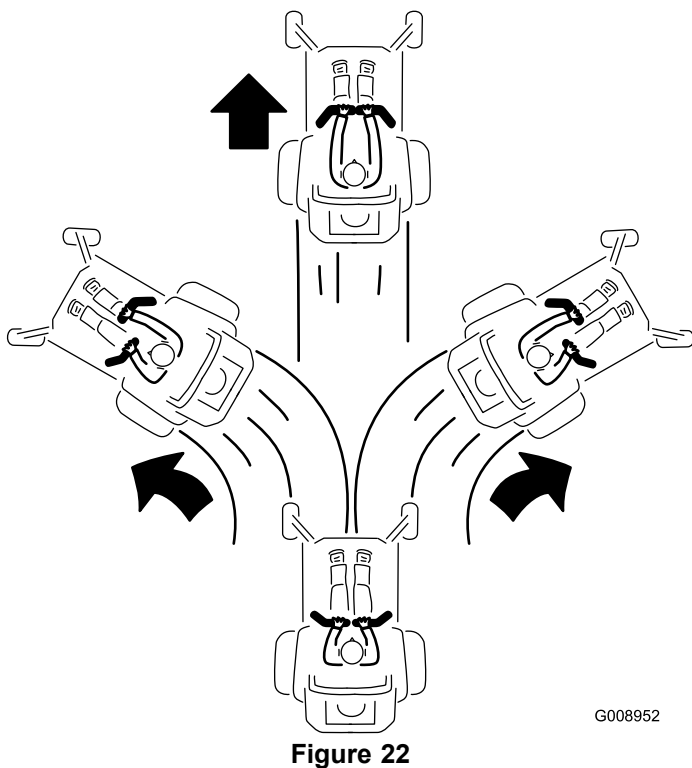


Figure 22

G008952

Driving Backward

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

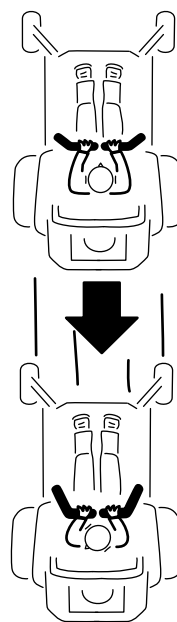


Figure 23

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Stopping the Machine

To stop the machine, move the traction control levers to neutral and move to locked position, disengage the power take off (blade control switch (PTO)), and turn the ignition key to off.

Set the parking brake when you leave the machine; refer to Setting the Parking Brake in Operation. Remember to remove the key from the ignition switch.

⚠ CAUTION

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

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

Adjusting the Height of Cut

Using the Transport Lock

The transport lock has two positions and is used with the deck lift pedal. There is a lock position and a unlock position for the transport position. The transport lock is used with the deck lift pedal. Refer to Figure 24

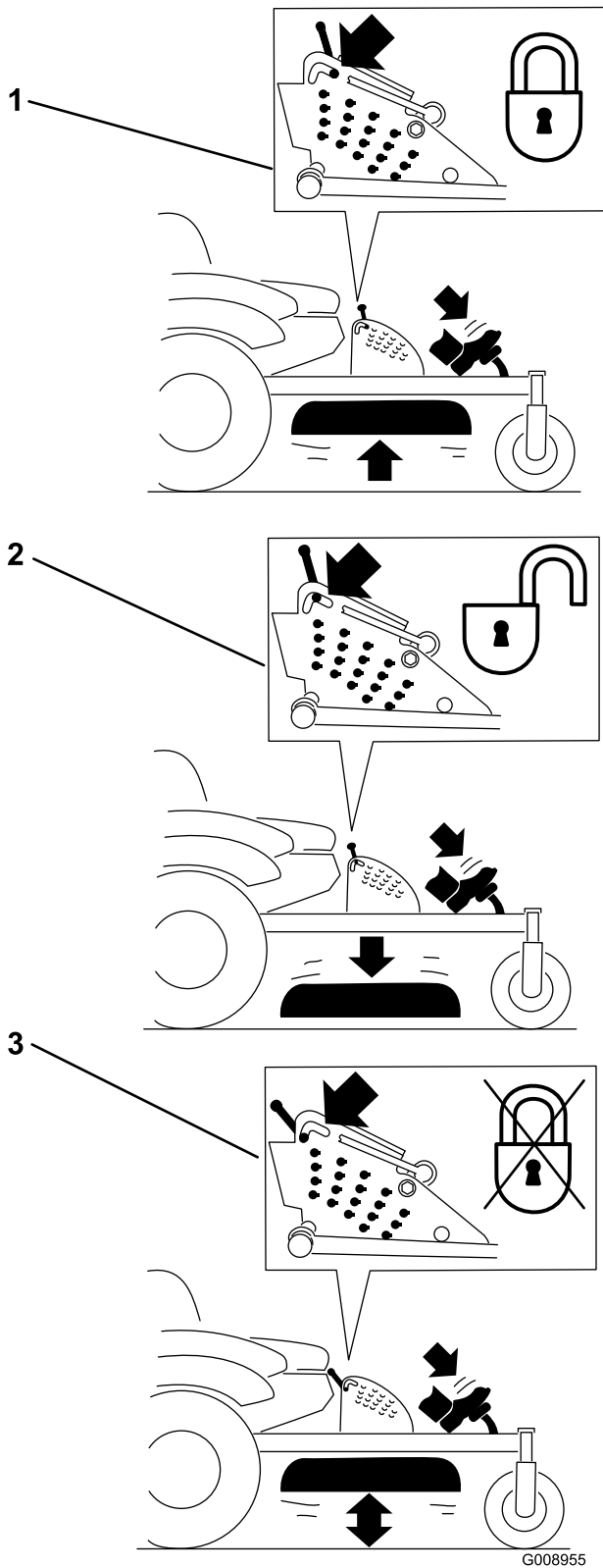


Figure 24

Transport Lock Positions

1. Transport lock
2. Lock position—mower deck will lock into transport position
3. Unlock position—does not lock the mower deck into transport position

Adjusting the Height-of-Cut Pin

Mower deck size	Height-of-cut range	Increments
48 inch	1-1/2 to 5 inches (38 to 127 mm)	1/4 inch (6 mm)
52 inch and 60 inch	1-1/2 to 5-1/2 inches (38 to 140 mm)	1/4 inch (6 mm)

The height-of-cut is adjusted by relocating the clevis pin into different hole locations.

1. Move the transport lock to the lock position.
2. Push on the deck lift pedal with your foot and raise the mower deck to the transport position (also the 5-1/2 inch (140 mm) cutting height position) (Figure 25).
3. To adjust, rotate the pin 90 degrees and remove the pin from the height-of-cut bracket (Figure 25).
4. Select a hole in the height-of-cut bracket corresponding to the height-of-cut desired and, insert the pin (Figure 25).
5. Push on the deck lift, pull back on the transport lock, and slowly lower the mower deck.

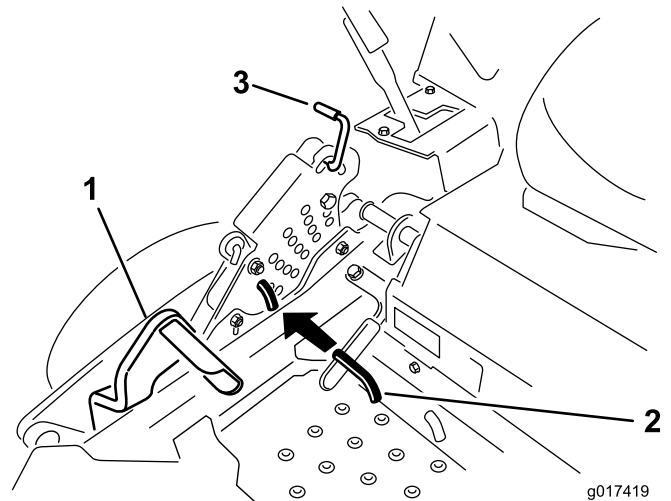


Figure 25

1. Deck lift pedal
2. Cut of height pin
3. Transport lock

Adjusting the Anti-Scalp Rollers

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

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

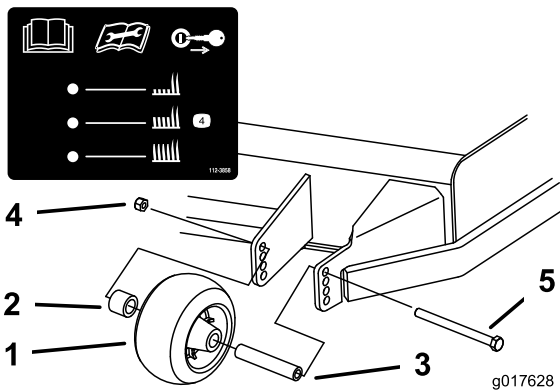


Figure 26

- | | |
|----------------------|---------------|
| 1. Anti-scalp roller | 4. Flange Nut |
| 2. Spacer | 5. Bolt |
| 3. Bushing | |

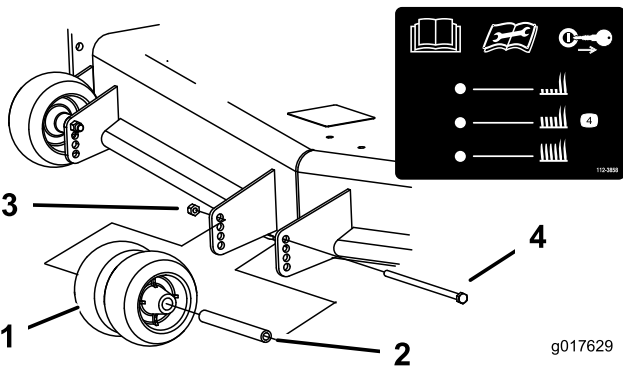


Figure 27

- | | |
|----------------------|---------------|
| 1. Anti-scalp roller | 3. Flange Nut |
| 2. Bushing | 4. Bolt |

Positioning the Seat

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

To adjust, move the lever sideways to unlock seat (Figure 28).

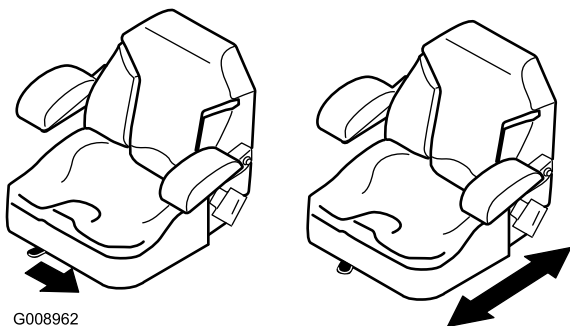


Figure 28

Using the Drive Wheel Release Valves

⚠ WARNING

Hands may become entangled in the rotating drive components below the engine deck, which could result in serious injury.

Stop the engine, remove the key, and allow all moving parts to stop before accessing the drive wheel release valves.

⚠ WARNING

The engine and hydraulic drive units can become very hot. Touching a hot engine or hydraulic drive units can cause severe burns.

Allow the engine and hydraulic drive units to cool completely before accessing the drive wheel release valves.

The drive wheel release valves are located behind the seat and down in the engine compartment.

1. Disengage the PTO (blade control switch) and turn the ignition key to off. Move the levers to neutral locked position and apply parking brake. Remove the key.
2. Locate the bypass levers behind the seat, down on the left and right side of the frame.
3. To push the machine, move the bypass levers rearward and out to lock them in place as shown in Figure 29. Repeat this on each side of the machine.
4. Disengage parking brake before pushing.

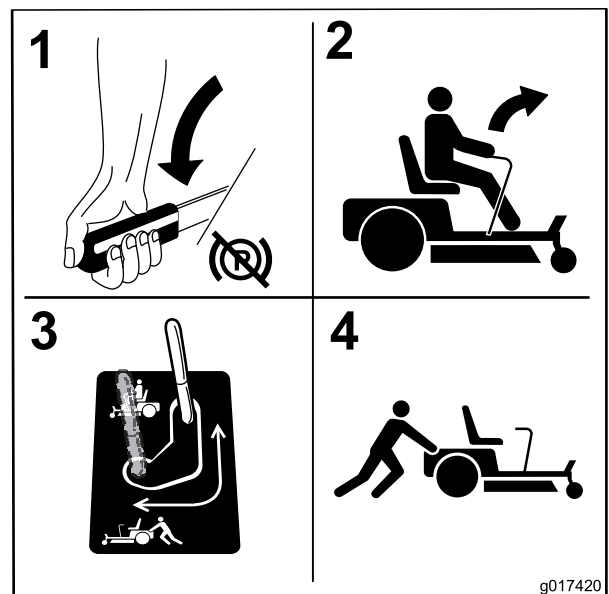


Figure 29

- To run the machine, move the bypass levers to the forward position (Figure 29).

Using the Side Discharge

The mower has a hinged grass deflector that disperses clippings to the side and down toward the turf.

⚠ DANGER

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

- Never remove the grass deflector from the mower because the grass deflector routes material down toward the turf. If the grass deflector is ever damaged, replace it immediately.
- Never put your hands or feet under the mower.
- Never try to clear the discharge area or mower blades unless you move the power take off (blade control switch (PTO) to the off position, rotate the ignition key to off and remove the key.
- Make sure the grass deflector is in the down position.

Loading Machines

Use extreme caution when loading units on trailers or trucks. One full width ramp that is wide enough to extend beyond the rear tires is recommended instead of individual ramps for each side of the unit (Figure 30). The lower rear section of the machine frame extends back between the rear wheels and serves as a stop for tipping backward. Having a full width ramp provides a surface for the frame members to contact if the unit starts to tip backward. If it is not possible to use one full width ramp, use enough individual ramps to simulate a full width continuous ramp.

The ramp should be long enough so that the angles do not exceed 15 degrees (Figure 30). A steeper angle may cause mower components to get caught as the unit moves from ramp to trailer or truck. Steeper angles may also cause the unit to tip backward. If loading on or near a slope, position the trailer or truck so it is on the down side of the slope and the ramp extends up the slope. This will minimize the ramp angle. The trailer or truck should be as level as possible.

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

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

⚠ WARNING

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

- Use extreme caution when operating a unit on a ramp.
- Ensure the ROPS is in the up position while using the seat belt when loading the machine. Ensure the ROPS will clear the top of an enclosed trailer.
- Use only a single, full width ramp; Do Not use individual ramps for each side of the unit.
- If individual ramps must be used, use enough ramps to create an unbroken ramp surface wider than the unit.
- Do not exceed a 15 degree angle between ramp and ground or between ramp and trailer or truck.
- Avoid sudden acceleration while driving unit up a ramp to avoid tipping backward.
- Avoid sudden deceleration while backing unit down a ramp to avoid tipping backward.

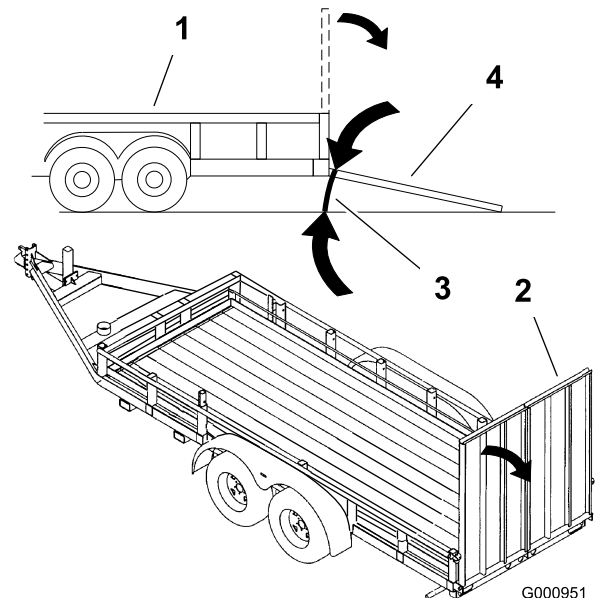


Figure 30

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

Transporting Machines

Use a heavy-duty trailer or truck to transport the machine. Ensure that the trailer or truck has all necessary brakes,

lighting, and marking as required by law. Please carefully read all the safety instructions. Knowing this information could help you, your family, pets or bystanders avoid injury.

▲ WARNING

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

Do not drive machine on a public street or roadway.

To transport the machine:

1. If using a trailer, connect it to the towing vehicle and connect the safety chains.
2. If applicable, connect the trailer brakes.
3. Load the machine onto the trailer or truck.
4. Stop the engine, remove the key, set the brake, and close the fuel valve.
5. Use the metal tie down loops on the machine to securely fasten the machine to the trailer or truck with straps, chains, cable, or ropes (Figure 31).

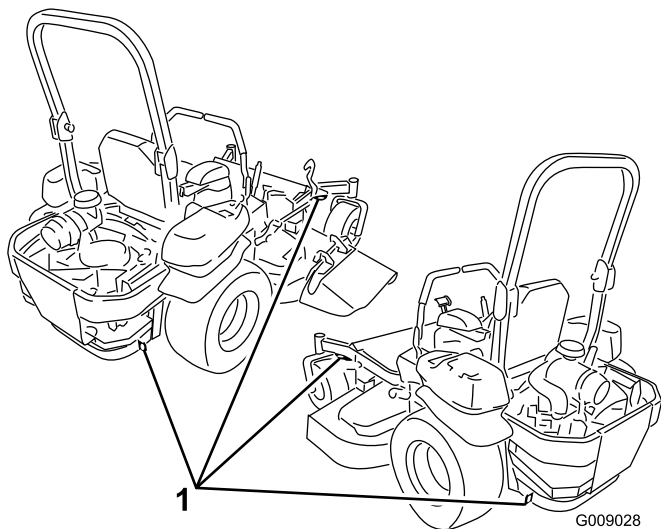


Figure 31

1. Traction unit tie down loops

Operating Tips

Fast Throttle Setting

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

Cutting a Lawn for the First Time

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

Cut 1/3 of the Grass Blade

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

Mowing Direction

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

Mow at Correct Intervals

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

Cutting Speed

To improve cut quality, use a slower ground speed in certain conditions.

Avoid Cutting Too Low

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

Long Grass

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

When Stopping

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

Keep the Underside of the Mower Clean

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

Blade Maintenance

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

Maintenance

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 8 hours	<ul style="list-style-type: none"> • Change the engine oil. • Check the torque on the wheel lug nuts.
After the first 50 hours	<ul style="list-style-type: none"> • Change the hydraulic system filter and oil.
Before each use or daily	<ul style="list-style-type: none"> • Check the safety system. • Check the engine oil level. • Check the seat belt. • Check the rollover protection system (ROPS) knobs. • Clean the engine screen. • Check the mower blades. • Clean the mower deck.
Every 25 hours	<ul style="list-style-type: none"> • Check the hydraulic oil level in the expansion tank.
Every 50 hours	<ul style="list-style-type: none"> • Grease the mower deck idler arm. • Check spark arrester (if equipped). • Check the tire pressure. • Inspect the belts for cracks and wear.
Every 100 hours	<ul style="list-style-type: none"> • Lubricate the mower deck lift pivots. • Change the engine oil. (more often in dirty or dusty conditions) • Check, clean and regap the spark plug. • Check and clean engine cooling fins and shrouds.
Every 200 hours	<ul style="list-style-type: none"> • Change the engine oil filter.
Every 250 hours	<ul style="list-style-type: none"> • Replace the primary air filter. • Check the secondary air filter.
Every 400 hours	<ul style="list-style-type: none"> • Change the hydraulic system filter and oil.
Every 500 hours	<ul style="list-style-type: none"> • Replace the secondary air filter. • Replace the fuel filter. (more often in dirty or dusty conditions). • Adjust the caster pivot bearing. • Check the electric clutch.
Monthly	<ul style="list-style-type: none"> • Check the battery.
Yearly	<ul style="list-style-type: none"> • Grease the front caster pivots (more often in dirty or dusty conditions). • Lubricate the caster wheel hubs (more often in dirty or dusty conditions). • Check the torque on the wheel lug nuts.
Yearly or before storage	<ul style="list-style-type: none"> • Paint chipped surfaces. • Check all maintenance procedures listed above before storage.

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

⚠ CAUTION

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

Remove the key from the ignition before you do any maintenance.

Lubrication

Greasing and Lubrication

Grease more frequently when operating conditions are extremely dusty or sandy.

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

How to Grease

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

Where to Add Light Oil or Spray Lubrication

Service Interval: Every 100 hours

Lubricate the deck lift pivots.

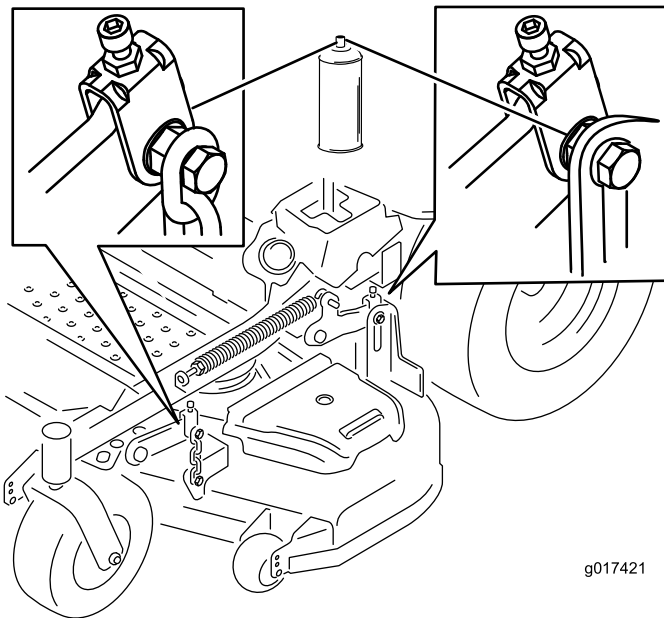


Figure 32

Where to Grease the Mower

Service Interval: Every 50 hours—Grease the mower deck idler arm.

Yearly—Grease the front caster pivots (more often in dirty or dusty conditions).

1. Disengage the blade control switch (PTO), move the motion control levers to the neutral locked position, and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Grease the mower deck idler pulley pivot until grease come out the bottom (Figure 33).

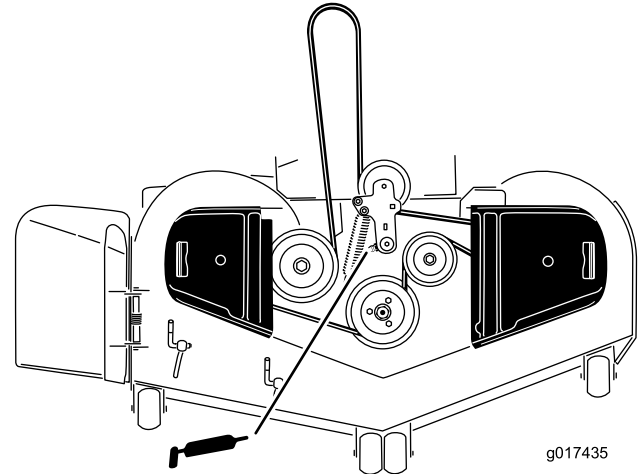


Figure 33

4. Remove the dust cap and adjust the caster pivots. Keep the dust cap off until greasing is done. Refer to Adjusting the Caster Pivot Bearing in Maintenance.
5. Remove the hex plug. Thread a grease zerk into the hole.
6. Pump grease into the zerk until it oozes out around the top bearing.
7. Remove the grease zerk in the hole. Install the hex plug and dust cap (Figure 34).

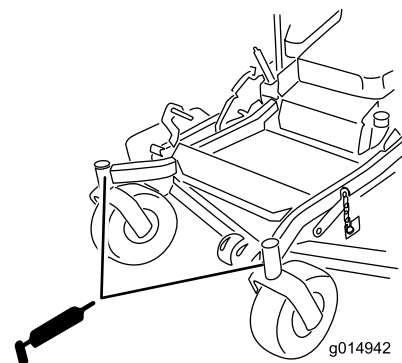


Figure 34

Lubricate the Caster Wheel Hubs

Service Interval: Yearly—Lubricate the caster wheel hubs (more often in dirty or dusty conditions).

1. Stop the engine, wait for all moving parts to stop, and remove the key. Engage the parking brake.

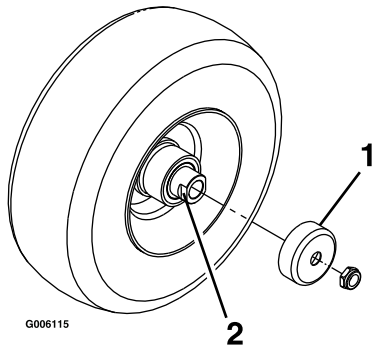


Figure 35

1. Seal guard
2. Spacer nut with wrench flats

14. Reinstall the seal guards over the wheel hub and insert wheel into caster fork. Reinstall caster bolt and tighten nut fully.

Important: To prevent seal and bearing damage, check the bearing adjustment often. Spin the caster tire. The tire should not spin freely (more than 1 or 2 revolutions) or have any side play. If the wheel spins freely, adjust torque on spacer nut until there is a slight amount of drag. Reapply thread locking adhesive.

2. Remove the caster wheel from the caster forks.
3. Remove the seal guards from the wheel hub.
4. Remove one of the spacer nuts from the axle assembly in the caster wheel. Note that thread locking adhesive has been applied to lock the spacer nuts to the axle. Remove the axle (with the other spacer nut still assembled to it) from the wheel assembly.
5. Pry out seals, and inspect bearings for wear or damage and replace if necessary.
6. Pack the bearings with a general-purpose grease.
7. Insert one bearing, one new seal into the wheel.
Note: The seals must be replaced.
8. If the axle assembly has had both spacer nuts removed (or broken loose), apply a thread locking adhesive to one spacer nut and thread onto the axle with the wrench flats facing outward. Do Not thread spacer nut all of the way onto the end of the axle. Leave approximately 1/8 inch (3 mm) from the outer surface of the spacer nut to the end of the axle inside the nut.
9. Insert the assembled nut and axle into the wheel on the side of the wheel with the new seal and bearing.
10. With the open end of the wheel facing up, fill the area inside the wheel around the axle full of general-purpose grease.
11. Insert the second bearing and new seal into the wheel.
12. Apply a thread locking adhesive to the 2nd spacer nut and thread onto the axle with the wrench flats facing outward.
13. Torque the nut to 75-80 in-lb (8-9 N-m), loosen, then re-torque to 20-25 in-lb (2-3 N-m). Make sure axle does not extend beyond either nut.

Engine Maintenance

⚠ WARNING

Contact with hot surfaces may cause personal injury.

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

Servicing the Air Cleaner

Service Interval: Every 250 hours—Replace the primary air filter.

Every 250 hours—Check the secondary air filter.

Every 500 hours—Replace the secondary air filter.

Note: Service the air cleaner more frequently if operating conditions are extremely dusty or sandy.

Removing the Filters

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Push down to release the retaining clamps on the air cleaner and pull the air cleaner cover off of the air cleaner body (Figure 36).
4. Clean the inside of the air cleaner cover with compressed air.
5. Gently slide the primary filter out of the air cleaner body (Figure 36). Avoid knocking the filter into the side of the body.
6. Remove the secondary filter only if you intend to replace it.

Important: Never attempt to clean the secondary filter. If the secondary filter is dirty, then the primary filter is damaged and you should replace both filters.

7. Inspect the primary filter for damage by looking into the filter while shining a bright light on the outside of the filter. Holes in the filter will appear as bright spots. If the filter is damaged discard it.

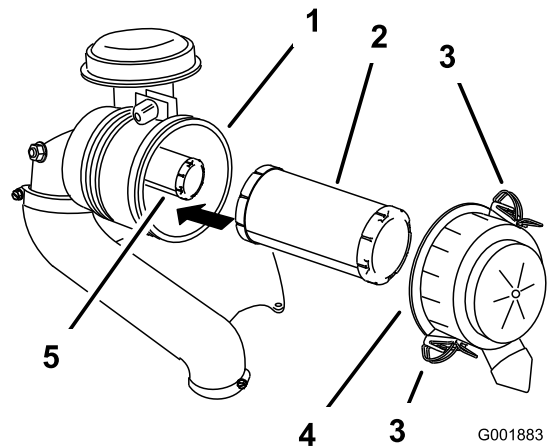


Figure 36

- | | |
|-----------------------|----------------------|
| 1. Air cleaner body | 4. Air cleaner cover |
| 2. Primary air filter | 5. Safety filter |
| 3. Latch | |

Servicing the Primary Filter

1. Do not clean the paper filter, replace it (Figure 36).
2. Inspect the element for tears, an oily film, or damage to the rubber seal.
3. Replace the paper element if it is damaged.

Servicing the Secondary Filter

Do not clean the secondary filter, replace it.

Important: Never attempt to clean the secondary filter. If the secondary filter is dirty, then the primary filter is damaged and you should replace both filters.

Installing the Filters

Important: To prevent engine damage, always operate the engine with both air filters and cover installed.

1. If installing new filters, check each filter for shipping damage. Do not use a damaged filter.
2. If the secondary filter is being replaced, carefully slide it into the filter body (Figure 36).
3. Carefully slide the primary filter over the secondary filter (Figure 36). Ensure that it is fully seated by pushing on the outer rim of the filter while installing it.

Important: Do not press on the soft inside area of the filter.

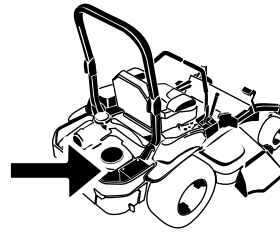
4. Install the air cleaner cover with the breather cap down and rotate so the retaining clamps lock the cover in place (Figure 36).

Servicing the Engine Oil

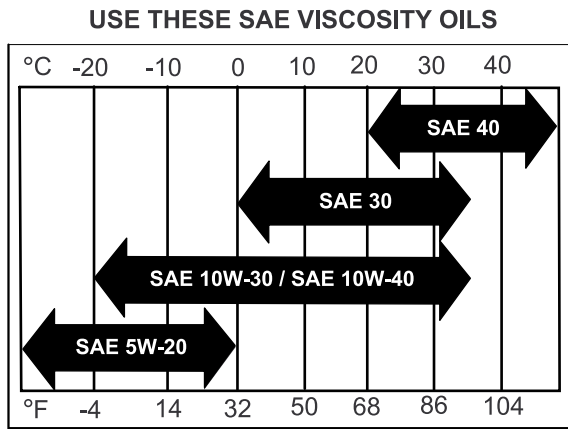
Oil Type: Detergent oil (API service SF, SG, SH, SJ, or SL)

Crankcase Capacity: with a filter change, 71 ounces (2.1 L); without a filter change, 61 ounces (1.8 L)

Viscosity: See the table below.



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Figure 37

Note: Use of multi-grade oils (5W-20, 10W-30, or 10W-40) will increase oil consumption. Check the oil level more frequently when using them.

Checking the Engine Oil Level

Service Interval: Before each use or daily

Note: Check the oil when the engine is cold.

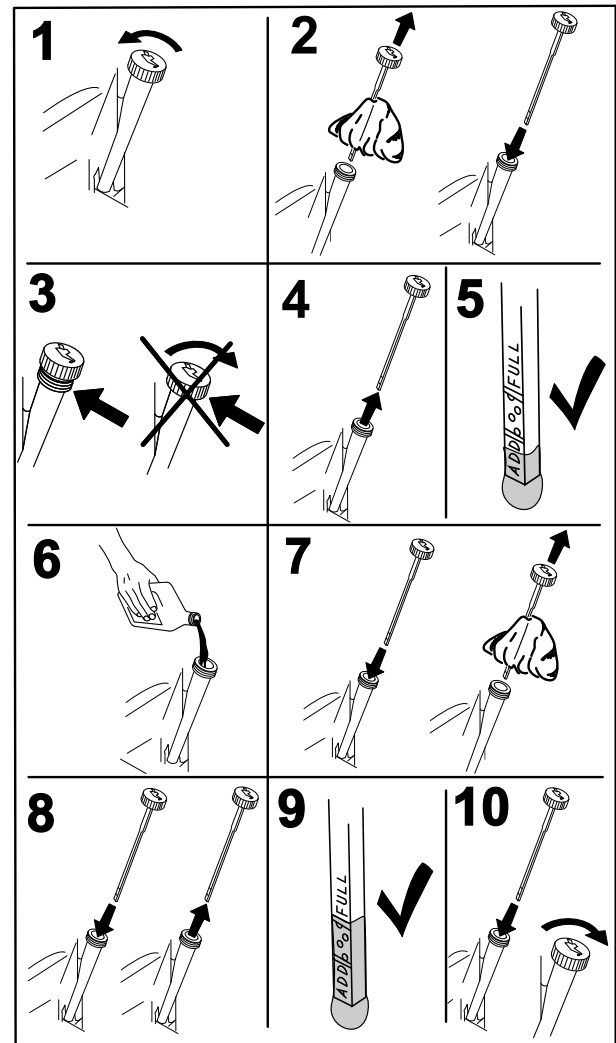
⚠ WARNING

Contact with hot surfaces may cause personal injury.

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

Important: Do not overfill the crankcase with oil because damage to the engine may result. Do not run engine with oil below the low mark because the engine may be damaged.

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position (Figure 38).



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Figure 38

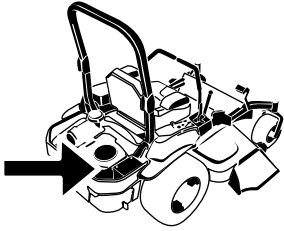
Changing the Engine Oil

Service Interval: After the first 8 hours

Every 100 hours (more often in dirty or dusty conditions)

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

1. Park the machine so that the rear is slightly lower than the front to ensure the oil drains completely.
2. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
3. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
4. Change the engine oil (Figure 39).



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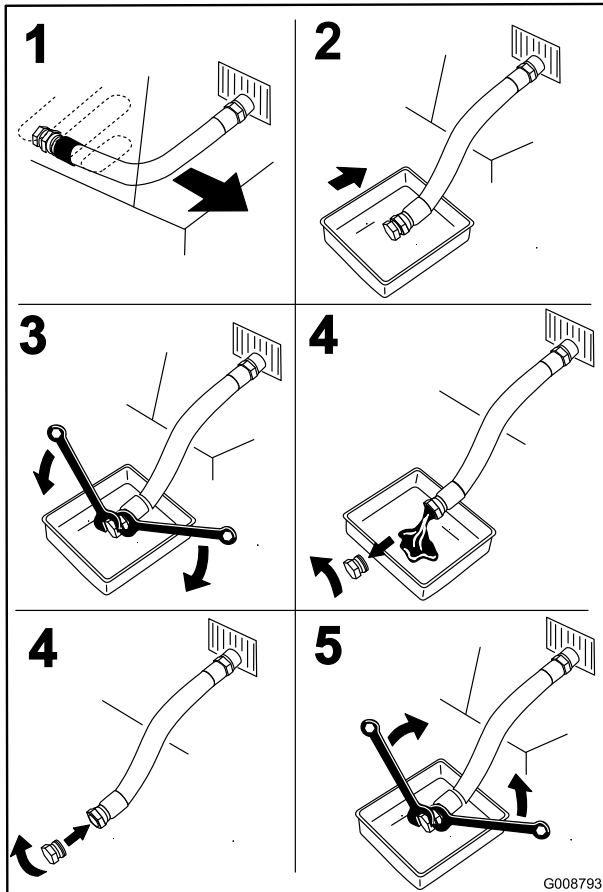


Figure 39

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5. Slowly pour approximately 80% of the specified oil into the filler tube and slowly add the additional oil to bring it to the **Full** mark (Figure 40).

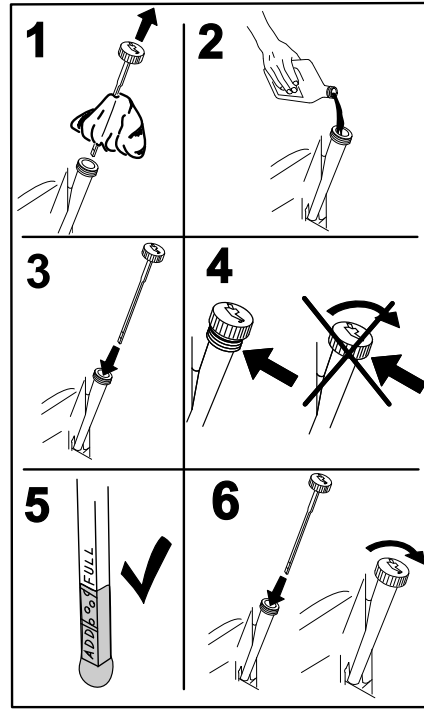


Figure 40

G008796

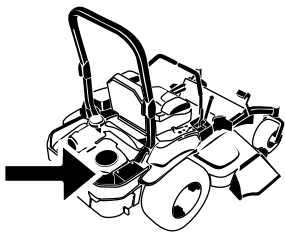
6. Start the engine and drive to a flat area. Check the oil level again.

Changing the Engine Oil Filter

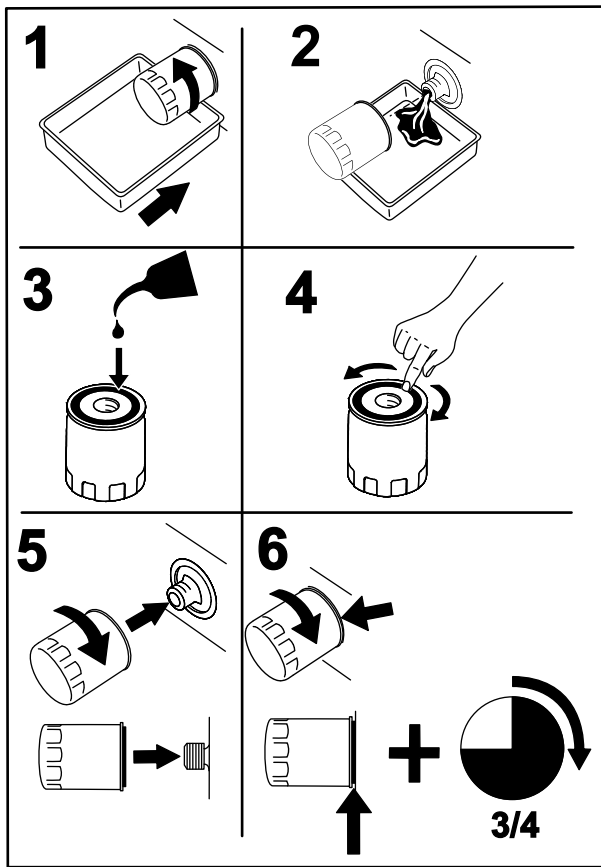
Service Interval: Every 200 hours

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

1. Drain the oil from the engine; refer to Changing the Engine Oil.
2. Change the engine oil filter (Figure 41).



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Figure 41

Note: Ensure the oil filter gasket touches the engine and then an extra 3/4 turn is completed.

3. Fill the crankcase with the proper type of new oil; refer to Changing the Oil.

Servicing the Spark Plug

Service Interval: Every 100 hours

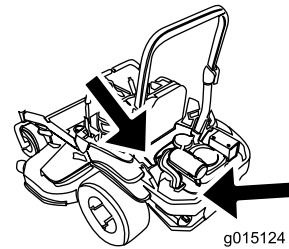
Make sure the air gap between the center and side electrodes is correct before installing the spark plug. Use a spark plug wrench for removing and installing the spark plug(s) and a gapping tool/feeler gauge to check and adjust the air gap. Install a new spark plug(s) if necessary.

Type of Spark Plug: NGK® BPR4ES or equivalent

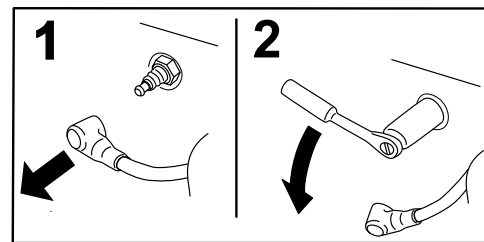
Air Gap: 0.030 inch (0.75 mm)

Removing the Spark Plug

1. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
3. Locate and remove the spark plugs (Figure 42).



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Figure 42

Checking the Spark Plug

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.

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.

Set the gap to 0.030 inches (0.76 mm).

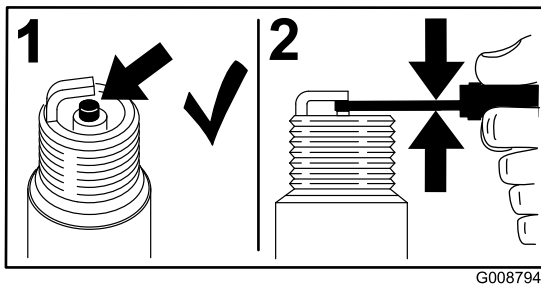


Figure 43

G008794

Check Spark Arrester (if equipped)

Service Interval: Every 50 hours

⚠ WARNING

Hot exhaust system components may ignite gasoline vapors even after the engine is stopped. Hot particles exhausted during engine operation may ignite flammable materials. Fire may result in personal injury or property damage.

Do Not refuel or run engine unless spark arrester is installed.

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Wait for muffler to cool.
3. If any breaks in the screen or welds are observed, replace the arrester.
4. If plugging of the screen is observed, remove the arrester and shake loose particles out of the arrester and clean screen with a wire brush (soak in solvent if necessary). Reinstall arrester on exhaust outlet.

Installing the Spark Plug

Tighten the spark plug(s) to 16 ft.-lb (22 N-m).

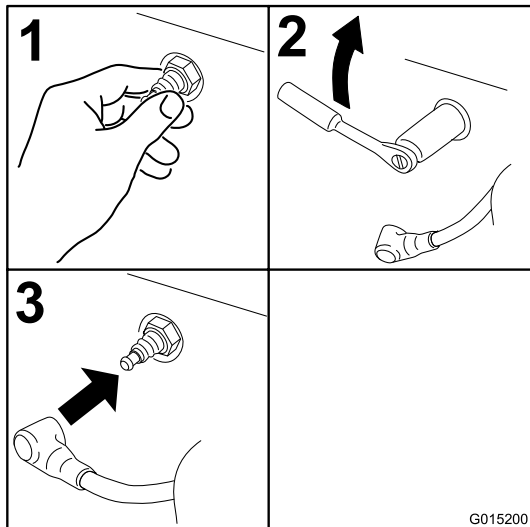


Figure 44

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Fuel System Maintenance

Servicing the Fuel Tank

Do not attempt to drain the fuel tank. Ensure that an Authorized Service Dealer drains the fuel tank and services any components of the fuel system.

Replacing the Fuel Filter

Service Interval: Every 500 hours/Yearly (whichever comes first) (more often in dirty or dusty conditions).

The fuel filter is located near the engine on the front or rear side of the engine.

1. Disengage the PTO, move the motion control levers to the neutral locked position, and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Allow the machine to cool down.
4. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
5. Close the fuel shutoff valve behind the seat (Figure 45).

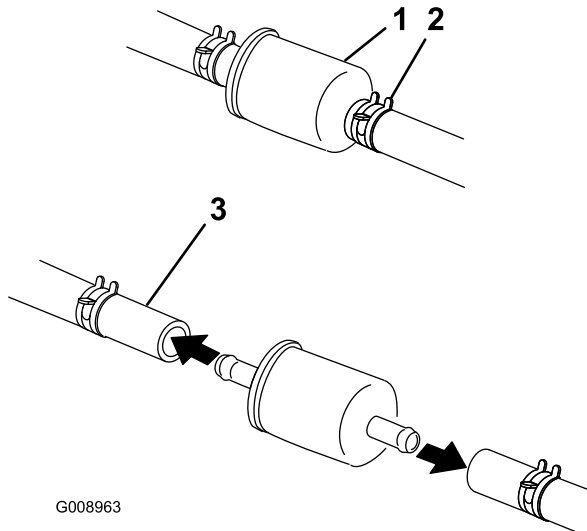


Figure 45

- | | |
|----------------|--------------|
| 1. Fuel filter | 3. Fuel line |
| 2. Hose clamp | |

6. Squeeze the ends of the hose clamps together and slide them away from the filter (Figure 45).
7. Remove the filter from the fuel lines.
8. Install a new filter and move the hose clamps close to the filter (Figure 45).
9. Open the fuel shutoff valve.

Note: It is important to reinstall the fuel line hoses and secure with plastic ties the same as they were originally installed at the factory to keep the fuel line away from components that could cause fuel line damage.

Electrical System Maintenance

Servicing the Battery

Service Interval: Monthly

WARNING

CALIFORNIA Proposition 65 Warning

Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm.
Wash hands after handling.

⚠ DANGER

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

Do not drink electrolyte and avoid contact with skin, eyes or clothing. Wear safety glasses to shield your eyes and rubber gloves to protect your hands.

Removing the Battery

⚠ WARNING

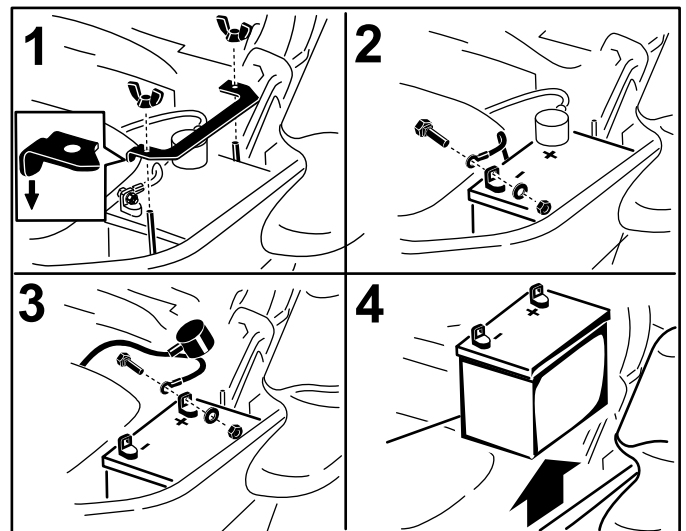
Battery terminals or metal tools could short against metal machine components causing sparks. Sparks can cause the battery gasses to explode, resulting in personal injury.

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

⚠ WARNING

Incorrect battery cable routing could damage the machine and cables causing sparks. Sparks can cause the battery gasses to explode, resulting in personal injury.

- Always Disconnect the negative (black) battery cable before disconnecting the positive (red) cable.
 - Always Reconnect the positive (red) battery cable before reconnecting the negative (black) cable.
1. Disengage the blade control switch (PTO), move the motion control levers to the neutral locked position and set the parking brake.
 2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
 3. First disconnect the negative battery cable (black) from the negative (-)(black) battery terminal (Figure 46).
 4. Slide the red terminal boot off the positive (red) battery terminal and remove the positive (+)(red) battery cable (Figure 46).
 5. Remove the wing nut securing the battery clamp (Figure 46).
 6. Remove the clamp (Figure 46).
 7. Remove the battery.



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Figure 46

1. Remove the wing nut and clamp
2. Remove the negative battery cable before the positive
3. Remove the positive battery cable
4. Remove battery

Installing the Battery

1. Position battery in the tray with the terminal posts opposite from the hydraulic tank (Figure 46).
2. First, install the positive (red) battery cable to positive (+) battery terminal.
3. Then install the negative (black) battery cable and ground wire to the negative (-) battery terminal.
4. Secure the cables with 2 bolts, 2 washers, and 2 locknuts (Figure 46).
5. Slide the red terminal boot onto the positive (red) battery post.
6. Install the clamp and secure it with the wing nut (Figure 46).

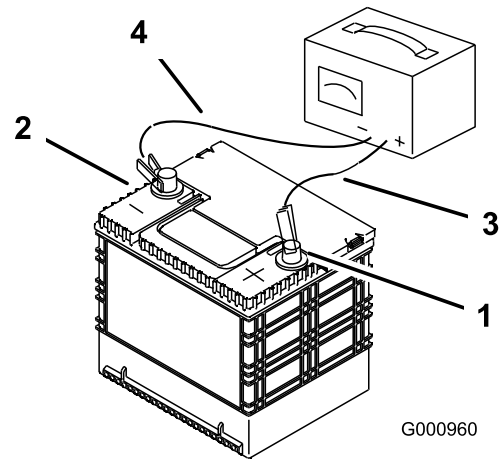


Figure 47

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

Charging the Battery

⚠ WARNING

Charging the battery produces gasses that can explode.

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

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

1. Charge battery for 10 to 15 minutes at 25 to 30 amps or 30 minutes at 10 amps.
2. When the battery is fully charged, unplug the charger from the electrical outlet, then disconnect the charger leads from the battery posts (Figure 47).
3. Install the battery in the machine and connect the battery cables, refer to Installing the Battery.

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

Servicing the Fuses

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

1. The fuses are located on right hand console next to the seat (Figure 48).
2. To replace the fuses, pull out on the fuse to remove it.
3. Install a new fuse (Figure 48).

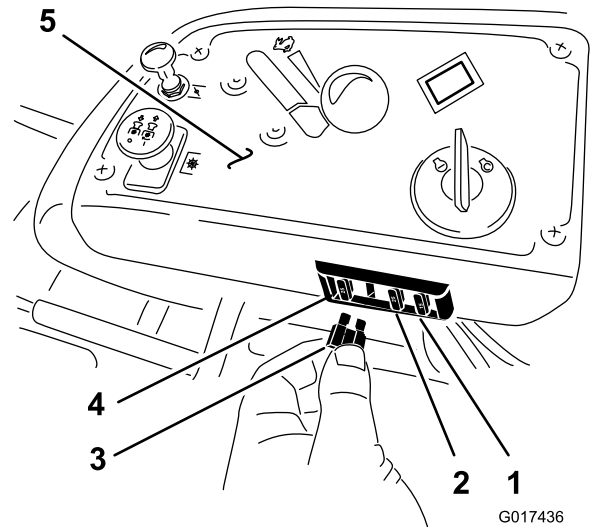


Figure 48

1. Optional accesory-15 amp
2. Charge-25amp
3. PTO-10amp
4. Main-25amp
5. Console

Drive System Maintenance

Checking the Seat Belt

Service Interval: Before each use or daily

Visually inspect seat belt for wear, cuts, and proper operation of retractor and buckle. Replace before operating if damaged.

Checking the Rollover Protection System (ROPS) Knobs

Service Interval: Before each use or daily

⚠ WARNING

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

Ensure the seat is secured to the machine.

Check that both the mounting hardware and the knobs are in good working condition. Make sure the knobs are fully engaged with the ROPS in the raised position. The upper hoop of the roll bar may need to be pushed forward or pulled rearward to get both knobs fully engaged.

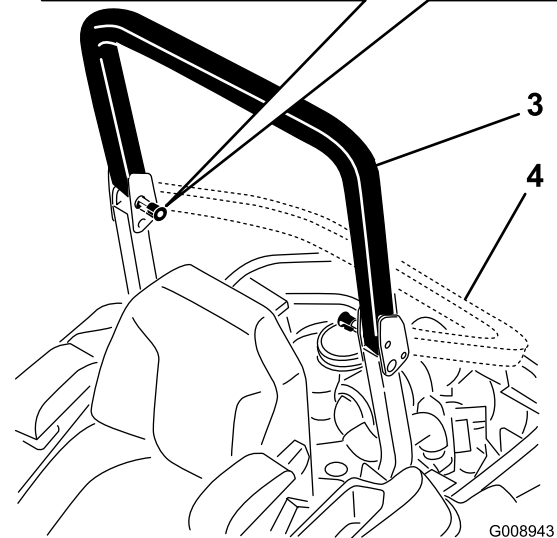
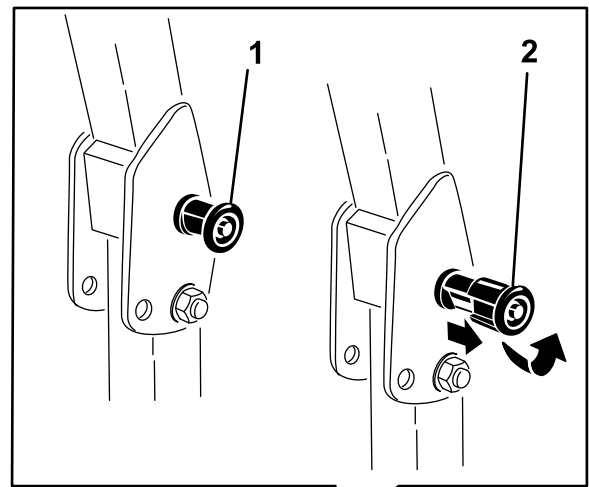


Figure 49

1. ROPS knob (locked position)
2. Pull ROPS knob out and rotate 90 degrees to change roll bar position
3. Roll bar in the upright position
4. Roll bar in the folded position

Adjusting the Tracking

1. Disengage the blade control switch (PTO).
2. Drive to an open flat area, move the motion control levers to the neutral locked position.
3. Move the throttle midway between fast and slow.
4. Move both motion control levers all the way forward until they both hit the stops in the T-slot.
5. Check which way the machine tracks.
6. If it tracks to the right, loosen the bolts and adjust the left stop plate rearward on the left T-slot until the machine tracks straight (Figure 50).
7. If it tracks to the left, loosen the bolts and adjust the right stop plate rearward on the right T-slot until the machine tracks straight (Figure 50).
8. Tighten the stop plate (Figure 50).

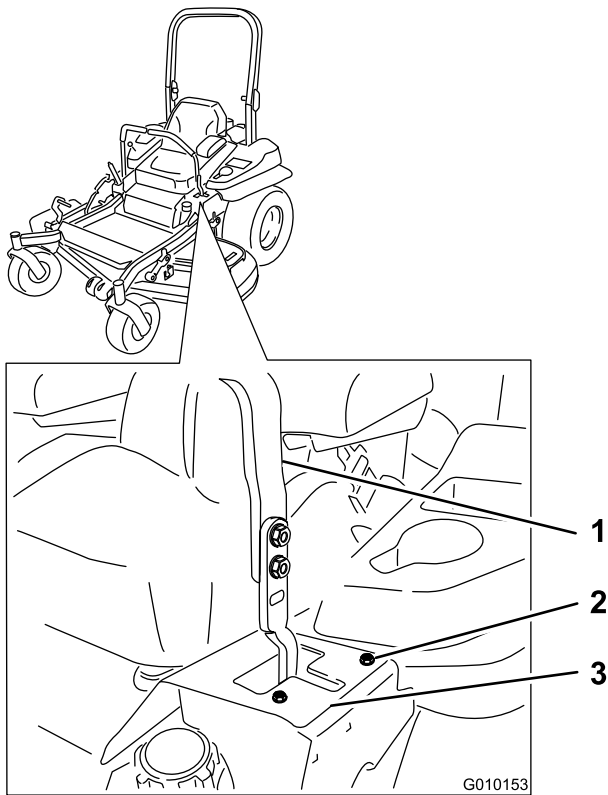


Figure 50

Left control lever shown

- | | |
|------------------|---------------|
| 1. Control lever | 3. Stop plate |
| 2. Bolt | |

Checking the Tire Pressure

Service Interval: Every 50 hours/Monthly (whichever comes first)

Maintain the air pressure in the front and rear tires at 90 kPa (13 psi). Uneven tire pressure can cause uneven cut. Check the tires when they are cold to get the most accurate pressure reading.

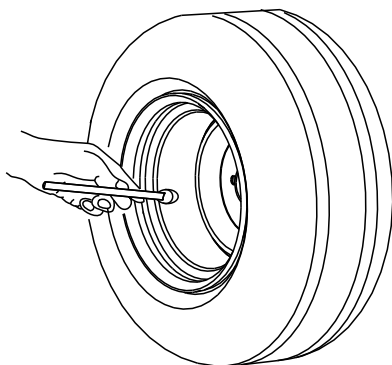


Figure 51

Checking the Wheel Lug Nuts

Service Interval: After the first 8 hours

Yearly

Check and torque the wheel lug nuts to 90-100 ft-lb (122-136 N-m).

Adjusting the Caster Pivot Bearing

Service Interval: Every 500 hours/Yearly (whichever comes first)

1. Disengage the blade control switch (PTO), move the motion control levers to the neutral locked position and set the parking brake.
 2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
 3. Remove the dust cap from caster and tighten lock nut (Figure 52).
 4. Tighten the locknut until the spring washers are flat and then back off a 1/4 turn to properly set the pre-load on the bearings (Figure 52).
- Important:** Make sure the spring washers are installed correctly as shown in Figure 52.
5. Install the dust cap (Figure 52).

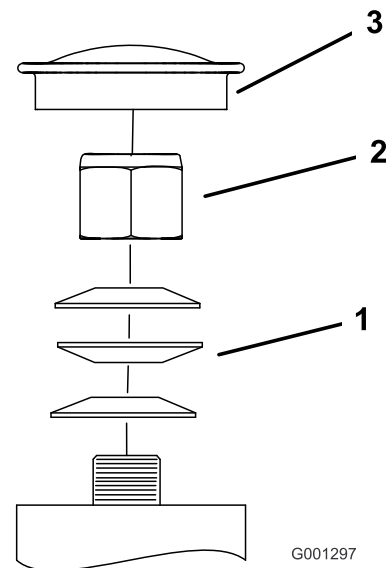


Figure 52

- | | |
|-------------------|-------------|
| 1. Spring Washers | 3. Dust Cap |
| 2. Lock Nut | |

Adjusting the Electric Clutch

Service Interval: Every 500 hours—Check the electric clutch.

The clutch is adjustable to ensure proper engagement and proper braking.

1. Insert a 0.015–0.021 inch (0.381–0.533 mm) feeler gauge through one inspection slot in the side of the assembly. Make sure it is between the armature and the rotor friction surfaces.

The gap needs to be at least .015 inches (0.381 mm) and not more than .021 inches (0.533 mm).
2. If adjustment is needed, then set at .015 inches (0.381 mm) for each of the three adjustment slot positions. Tighten the lock nuts until there is slight binding on the feeler gauge but it can be moved easily within the air gap (Figure 53).
3. Repeat this for the remaining slots.
4. Check each slot again and make slight adjustments until the feeler gauge between the rotor and armature with very slight contact between them.

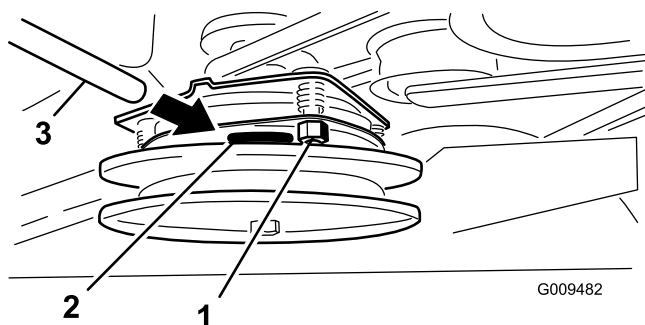


Figure 53

- | | |
|------------------|-----------------|
| 1. Adjusting nut | 3. Feeler gauge |
| 2. Slot | |

Cooling System Maintenance

Cleaning the Engine Screen

Service Interval: Before each use or daily

Before each use remove any build-up of grass, dirt or other debris from the engine screen. This will help insure adequate cooling and correct engine speed and will reduce the possibility of overheating and mechanical damage to the engine (Figure 54).

Cleaning the Engine Cooling Fins and Shrouds

Service Interval: Every 100 hours/Yearly (whichever comes first)

1. Disengage the PTO and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the air intake screen, recoil starter and fan housing (Figure 54).
4. Clean the debris and grass from the engine parts.
5. Install air intake screen, recoil starter and fan housing (Figure 54).

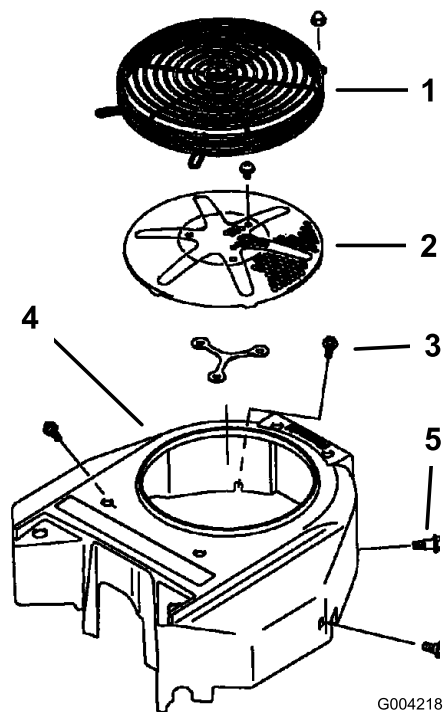


Figure 54

- | | |
|-----------------------------|----------------|
| 1. Engine guard | 4. Fan housing |
| 2. Engine air intake screen | 5. Screw |
| 3. Bolt | |

Belt Maintenance

Inspecting the Belts

Service Interval: Every 50 hours

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

Replacing the Mower Belt

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

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Lower the mower to the 3 inch (76 mm) height of cut.
4. Remove the belt covers (Figure 55).

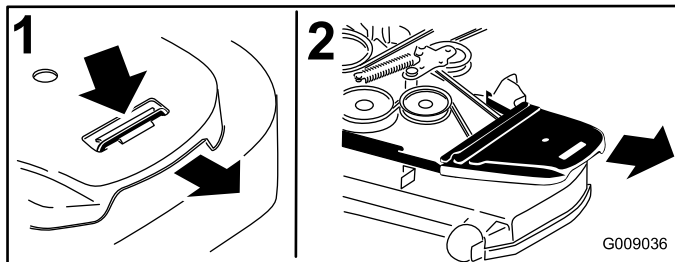


Figure 55

1. Push tab down
2. Remove belt cover

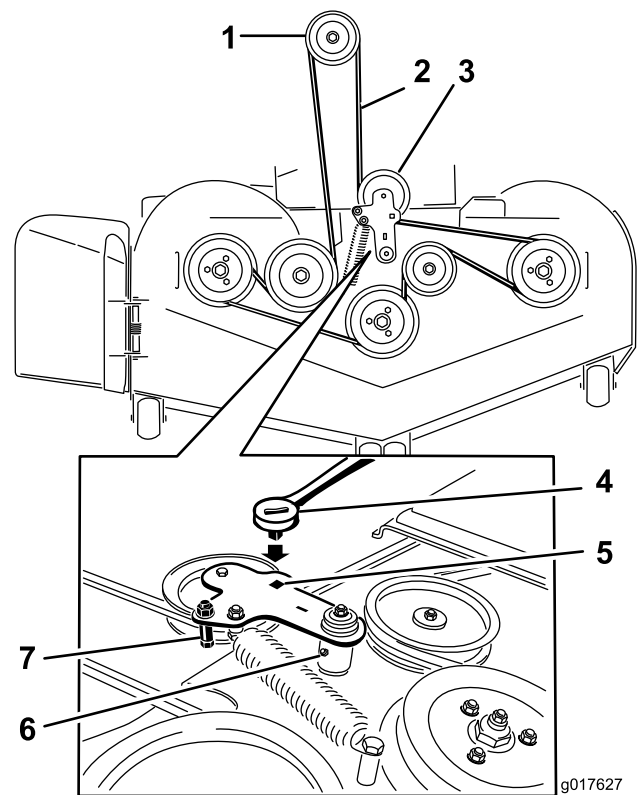


Figure 56

- | | |
|-------------------------------|---|
| 1. Clutch pulley | 5. Square hole in the idler arm for the ratchet |
| 2. Mower belt | 6. Idler grease zerk |
| 3. Spring loaded idler pulley | 7. Belt guide |
| 4. Ratchet | |
-
10. Install the belt guide on the idler arm shown in Figure 56.
 11. Using the ratchet in the square hole, install the idler spring (Figure 56).
Make sure the spring ends are seated in the anchor grooves.
 12. Install the belt covers (Figure 57).

5. Use a ratchet in the square hole in the idler arm to remove tension on the idler spring (Figure 56).
6. Remove the belt from the mower deck pulleys.
7. Remove the belt guide on the spring loaded idler arm shown in Figure 56.
8. Remove the existing belt.
9. Install the new belt around the mower pulleys and the clutch pulley under the engine (Figure 56).

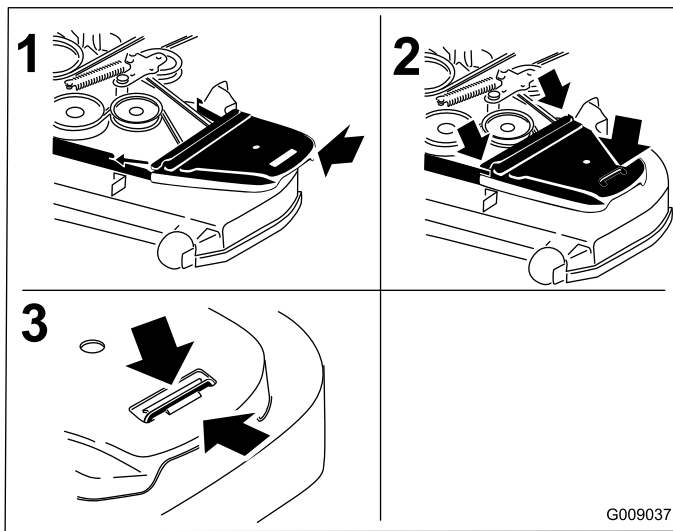


Figure 57

1. Position the belt cover
2. Slide belt cover under the side catches
3. Ensure the tab is under the metal catch

Replacing the Hydraulic Pump Drive Belt

1. Disengage the PTO and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the mower belt. Refer to Replacing the Mower Belt in Maintenance.
4. Raise the machine and support it with jack stands ([Figure 59](#)).
5. Remove the clutch stop shown in [Figure 58](#).

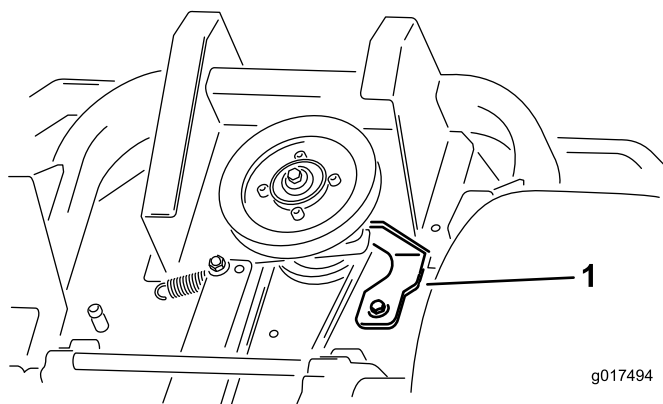


Figure 58

1. Clutch stop

6. Remove the idler spring from the post ([Figure 59](#)).
7. Remove the existing belt from the hydraulic unit drive pulleys and the engine pulley

8. Install the new belt around the engine pulley and the two drive pulleys.

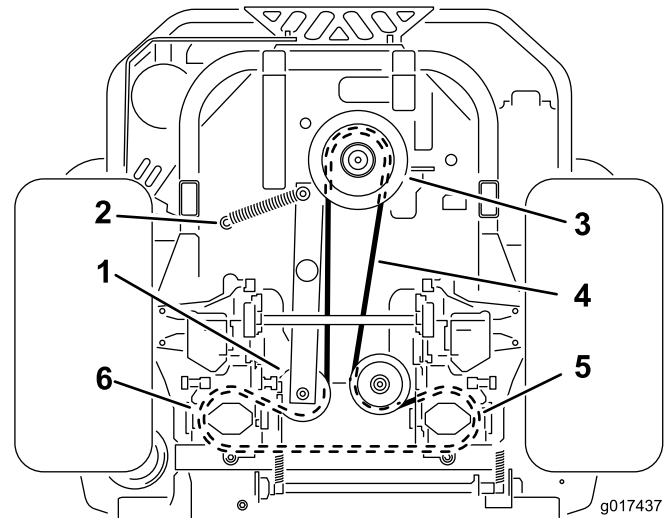


Figure 59

1. Idler pulley
2. Idler spring post
3. Engine pulley
4. Pump drive belt
5. Right hand hydraulic pump pulley
6. Left hand hydraulic pump pulley

9. Install the clutch stop shown in [Figure 58](#).
10. Install the mower belt. Refer to Replacing the Mower Belt.

Controls System Maintenance

Adjusting the Control Handle Position

There are two height positions for the control levers; high and low. Remove the bolts to adjust the height for the operator.

1. Disengage the PTO, move the motion control levers to the neutral locked position, and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Loosen the bolts and flange nuts installed in the levers (Figure 60).
4. Align the levers front to rear position by bring the levers together to the neutral position and slide them until they are aligned, then tighten the bolts (Figure 61).

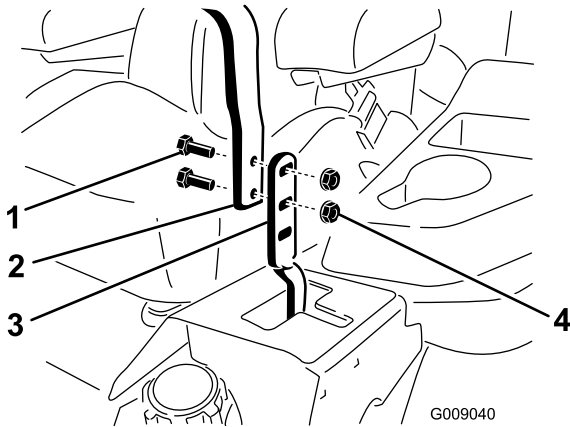


Figure 60

- | | |
|-----------|------------------|
| 1. Bolt | 3. Control lever |
| 2. Handle | 4. Nut |

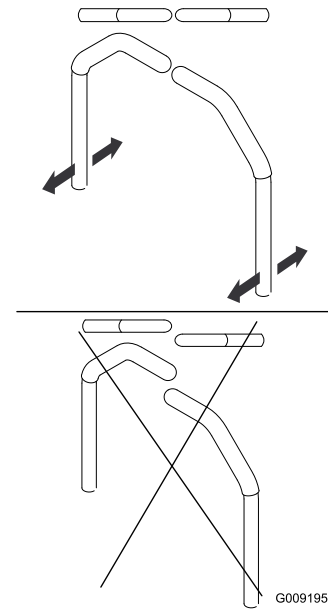


Figure 61

Adjusting the Motion Control Linkage

Located on either side of the fuel tank, below the seat are the pump control linkages. Rotating the pump linkage with a 1/2 inch wrench allows fine tuning adjustments so that the machine does not move in neutral. Any adjustments should be made for neutral positioning only.

⚠ WARNING

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

Keep fingers, hands, and clothing clear of rotating components and hot surfaces.

1. Prior to starting the engine, push the deck lift pedal and remove the height of cut pin. Lower deck to the ground.
2. Raise the rear of machine up and support with jack stands (or equivalent support) just high enough to allow drive wheels to turn freely.
3. Move the seat the furthest rear position to expose the front nuts.
4. Loosen the front nuts. The nuts do not need to be removed.
5. Move the seat the furthest forward position to expose the rear nuts.
6. Loosen the rear nuts. The nuts do not need to be removed.

- Slide the seat and seat plate forward to allow the front nuts to go through the key hole (Figure 62).

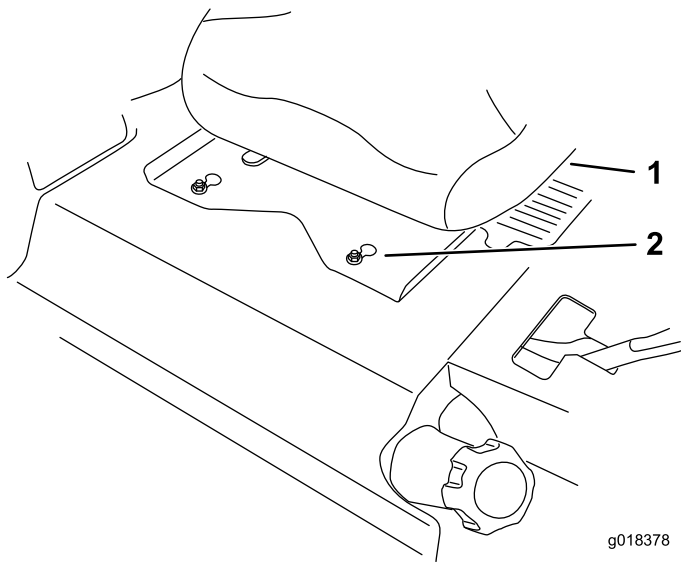


Figure 62

- Seat
- Front nuts with key hole

- Remove the seat and seat plate from the machine.
- Unplug the harness connector from the seat switch located under the seat (Figure 63).

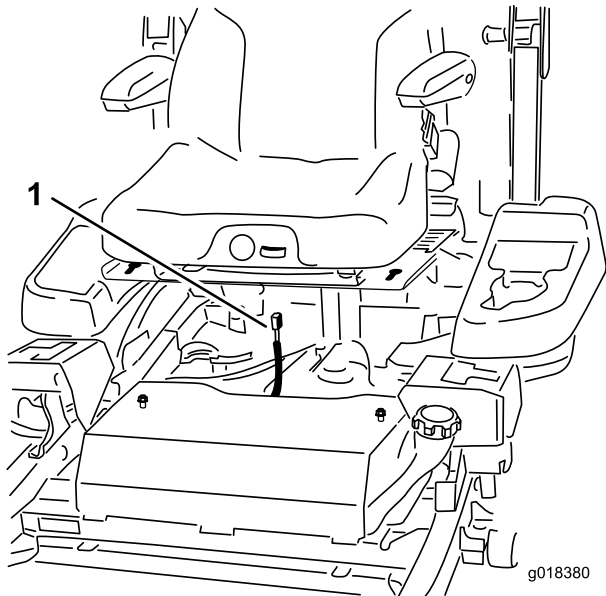


Figure 63

- Harness connector

- Loosen the bolts holding the seat to the machine and slide the seat forward in the slots to remove the seat.
- Remove the electrical connection from the seat safety switch, located under the bottom cushion of the seat. The switch is a part of the seat assembly.
- Temporarily** install a jumper wire across the terminals in the connector of the main wiring harness.

- Start engine. **Brake must be engaged and motion control levers out to start engine. Operator does not have to be in the seat because of the jumper wire being used.** Run engine at full throttle and release brake.

- Run the unit at least 5 minutes with the drive levers at full forward speed to bring hydraulic oil up to operating temperature.

Note: The motion control lever needs to be in neutral while making any necessary adjustments.

- Bring the motion control levers into the neutral position. Adjust the pump control rods by loosening the two jam nuts and rotating the adjustment nut in the appropriate direction until the wheels slightly creep in reverse (Figure 64). Move the motion control levers to the reverse position and while applying slight pressure to the lever allow the reverse indicator springs to bring the levers back to neutral. The wheels must stop turning or slightly creep in reverse.

- Tighten the two jam nuts against the adjustment nut (Figure 64).

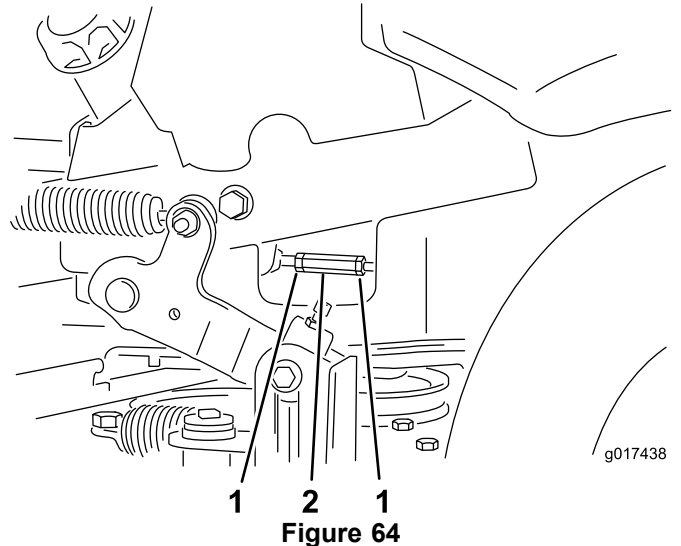


Figure 64

- Jam nut
- Adjustment nut

- Shut off unit. Remove jumper wire from wire harness and plug connector into seat switch.
- Install the seat.
- Remove the jack stands.
- Raise the deck and install the height of cut pin.
- Check that the machine does not creep in neutral with the park brakes disengaged.

Adjusting the Motion Control Damper

The top damper mounting bolt can be adjusted to obtain a more desired motion control lever resistance. See [Figure 65](#) for mounting options.

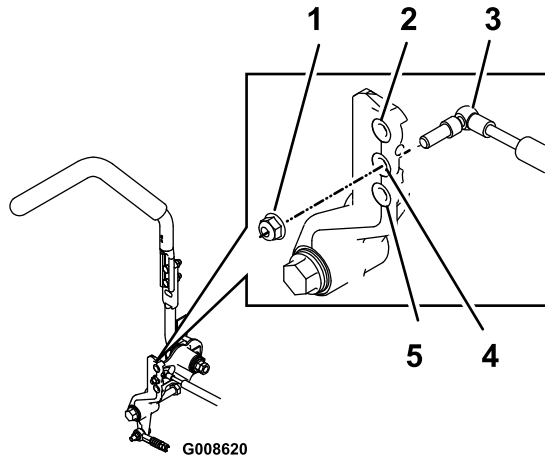


Figure 65

RH Motion Control Shown

1. Torque the lock nut to 200 in-lb (16.7 ft-lb). The bolt must protrude past end of locknut after torque.
2. Most resistance (firmest feel)
3. Damper
4. Medium resistance (medium feel)
5. Least resistance (softest feel)

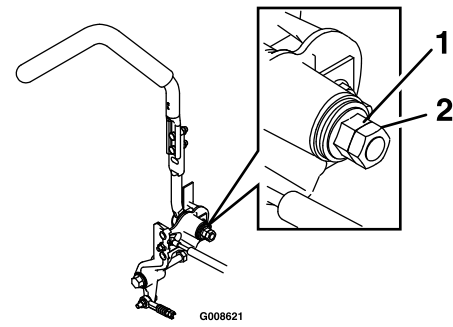


Figure 66

1. Flanged nut
2. Jam nut

Adjusting the Motion Control Neutral Lock Pivot

The flanged nut can be adjusted to obtain a more desired motion control lever resistance when moving it to the neutral lock position. See [Figure 66](#) for adjustment options.

1. Loosen the jam nut.
2. Tighten or loosen the flanged nut to the desired feel.
For more resistance, tighten the flanged nut.
For less resistance, loosen the flanged nut
3. Tighten jam nut.

Hydraulic System Maintenance

Servicing the Hydraulic System

Hydraulic Oil Type: Toro® HYPR-OIL™ 500 hydraulic oil or 20W-50 engine oil.

Important: Use oil specified. Other fluids could cause system damage.

Hydraulic System Capacity (with filters removed): 150.6 ounces (4.45 l)

Checking the Hydraulic Oil Level

Service Interval: Every 25 hours

1. Allow the hydraulic oil to cool down. Check the oil level when the oil is cold.
2. Check expansion reservoir and if necessary add Toro® HYPR-OIL™ 500 hydraulic oil to the FULL COLD line.

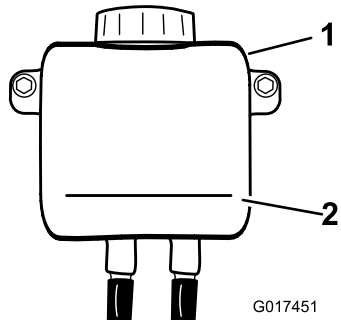
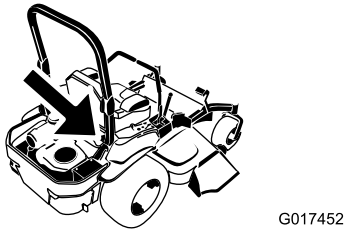


Figure 67

1. Expansion reservoir
2. FULL COLD line

Changing the Hydraulic System Filter and Oil

The filter and oil are changed at the same time. **Do Not** reuse oil. Once the new filter is installed and oil is added any air in the system must be purged.

The bleeding process is repeated until the oil remains at the FULL COLD line in the reservoir after purging. **Failure to**

properly perform this procedure can result in irreparable damage to the transaxle drive system.

Removing Hydraulic System Filters

1. Stop engine, wait for all moving parts to stop, and allow engine to cool. Remove the key and engage the parking brake.
2. Locate the filter and guards on each transaxle drive system (Figure 68). Remove three screws securing the filter guard and guard.

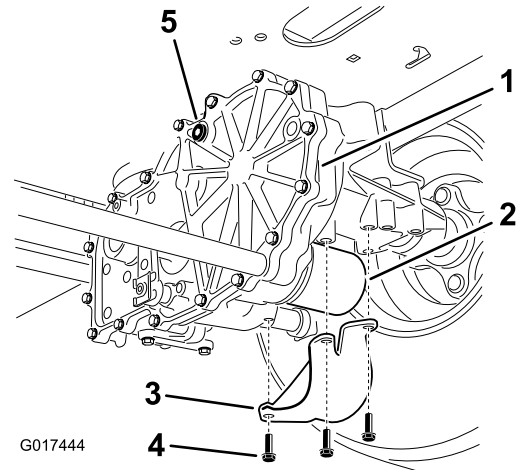


Figure 68

Right side shown

1. Transaxle drive
2. Oil filter
3. Filter guard
4. Screws
5. Vent plug

3. Carefully clean area around filters. It is important that no dirt or contamination enter hydraulic system.
4. Place a container below the filter to catch the oil that drains when the filter and vent plugs are removed.
5. Locate and remove the vent plug on each transmission
6. Unscrew the filter to remove and allow oil to drain from drive system.

Repeat this procedure for both filters.

Installing the Hydraulic System Filters

Service Interval: After the first 50 hours

Every 400 hours

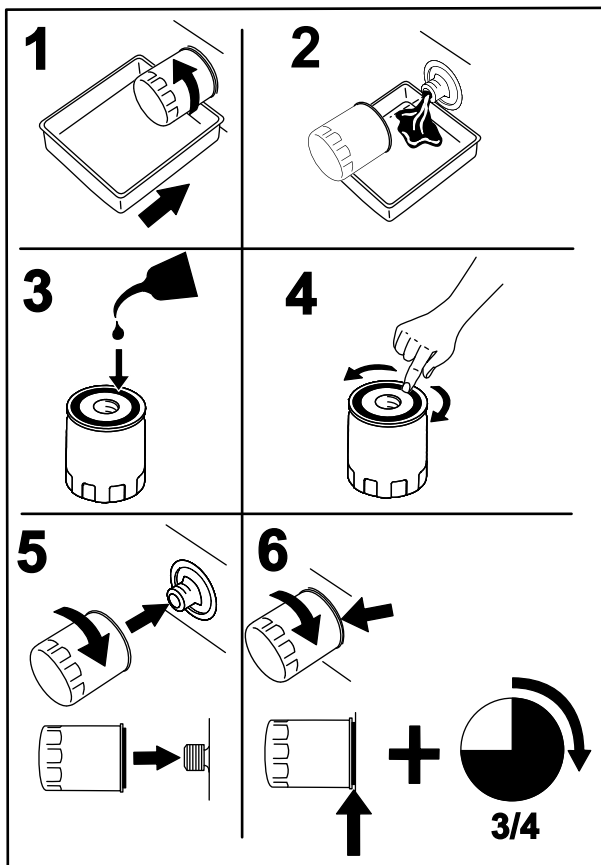


Figure 69

G008748

1. Apply a thin coat of oil on the surface of the rubber seal of each filter.
2. Turn the filter clockwise until rubber seal contacts the filter adapter then tighten the filter an additional 3/4 to 1 full turn. Repeat for the other filter
3. Install the filter guards over each filter as previously removed. Use the three screws to secure the filter guards.
4. Verify the vent plugs are removed before adding the oil.
5. Slowly pour the specified oil through expansion reservoir until oil comes out of **one** of the vent plug holes. Stop and install that vent plug. Torque the plug to 180 in-lb (20.3 N-m).
6. Continue to add oil through the expansion reservoir until oil comes out of the remaining vent plug hole on the second transmission. Stop and install that vent plug. Torque the plug to 180 in-lb (20.3 N-m).
7. Continue to add oil through the expansion reservoir until it reaches the FULL COLD line on the expansion reservoir. Proceed to the Bleeding the Hydraulic System section.

Important: Failure to perform the *Bleeding the Hydraulic System* procedure after changing hydraulic filters and oil can result in irreparable damage to the transaxle drive system.

Bleeding the Hydraulic System

1. Raise the rear of machine up and support with jack stands (or equivalent support) just high enough to allow drive wheels to turn freely.

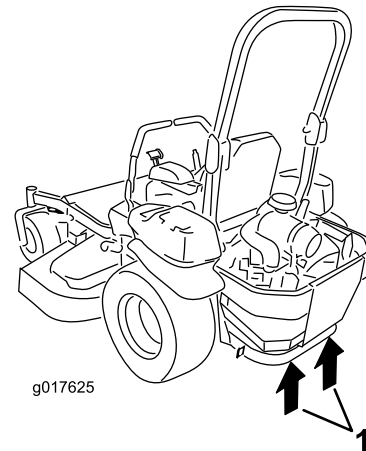


Figure 70

1. Jacking points

2. Enter the operator's position. Start engine and move throttle control ahead to 1/2 throttle position. Disengage parking brake.
 - A. Move the bypass levers into the pushing the machine position; refer to the Pushing the Machine by Hand section in Operation. With the bypass valves open and the engine running, slowly move the motion control levers in both forward and reverse (5 or 6 times).
 - B. Move the bypass levers into the operating the machine position. With the bypass valve closed and the engine running, slowly move the directional control in both forward and reverse directions (5 to 6 times).
 - C. Stop the engine and check the oil level in the expansion reservoir. Add the specified oil as until it reaches the FULL COLD line on the expansion reservoir.
3. Repeat step 2 until all the air is completely purged from the system.

When the transaxle operates at normal noise levels and moves smoothly forward and reverse at normal speeds, then the transaxle is considered purged.

4. Check the oil level in the expansion reservoir one last time. Add the specified oil as until it reaches the FULL COLD line on the expansion reservoir if necessary.

Mower Deck Maintenance

Leveling the Mower Deck

Setting Up the Machine

Note: Ensure the mower deck is leveled before matching the height-of-cut (HOC).

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

Deck Leveling

1. Position the mower on a flat surface.
2. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
3. Check the tire pressure in the drive tires. Proper inflation pressure for tires is 90 kPa (13 psi). Adjust if necessary.
4. Position the transport lock in the latching position.
5. Push the deck lift pedal all the way forward and the deck will latch at the 14 cm (5-1/2 inch) transport position (Figure 71).

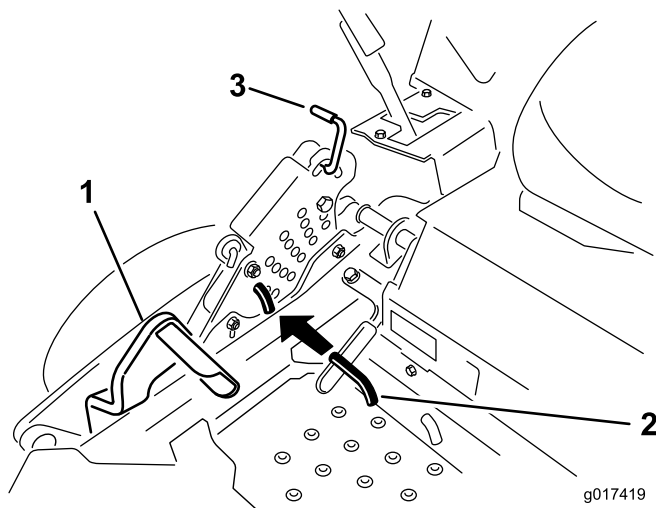


Figure 71

1. Deck lift pedal
2. Height of cut pin
3. Transport lock

6. Insert the height adjustment pin into the 3 inch (7.6 cm) cutting height location.
7. Release the transport lock and allow the deck to lower to the cutting height.
8. Raise the discharge chute.
9. On both sides of the deck, measure from the level surface to the front tip of the blade (Position A). The measurement should read 3 inches (7.6 mm) (Figure 72).

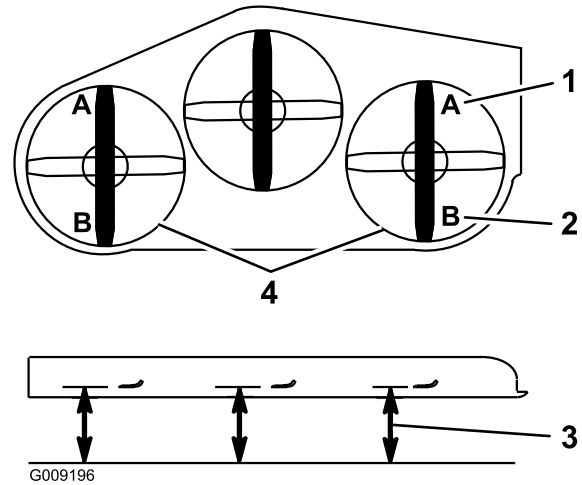


Figure 72

1. 3 inches (7.6 cm) at A is correct
 2. 3 1/4 inches (8.3 cm) at B is correct
 3. Measure here from the blade tip to hard surface
 4. Measure at A and B on both sides
-
10. If needed, loosen the whizlock nut on the side of the yoke and the jam nut on top. Fine tune the screw adjuster by turning it to get 3 inch (7.6 mm) height (see Figure 73).

To increase the height, turn the adjuster screw clockwise; to decrease, turn counterclockwise.

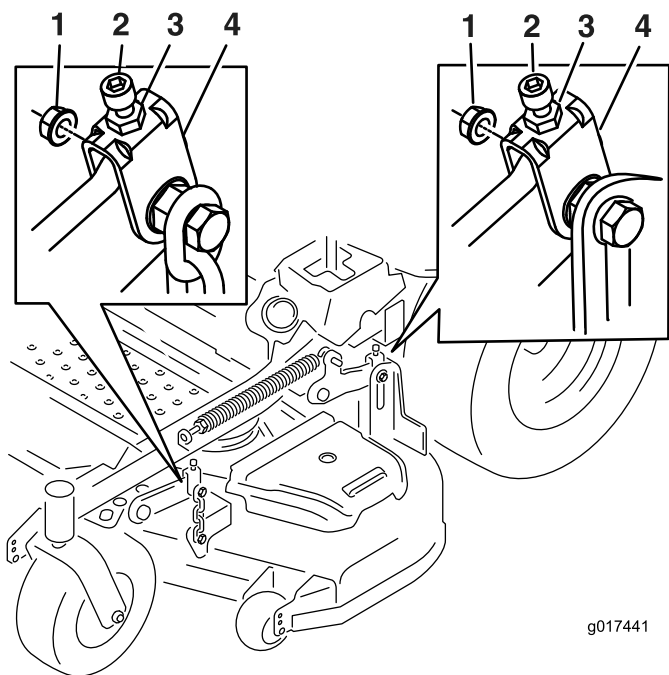


Figure 73

- | | |
|-------------------|------------|
| 1. Whizlock nut | 3. Jam nut |
| 2. Adjuster screw | 4. Yoke |

- If the front deck links do not have enough adjustment to achieve accurate cut height, the single point adjustment can be utilized to gain more adjustment.
- To adjust the single point system, loosen the two bolts at the bottom of the height of cut plate. Refer to [Figure 74](#).

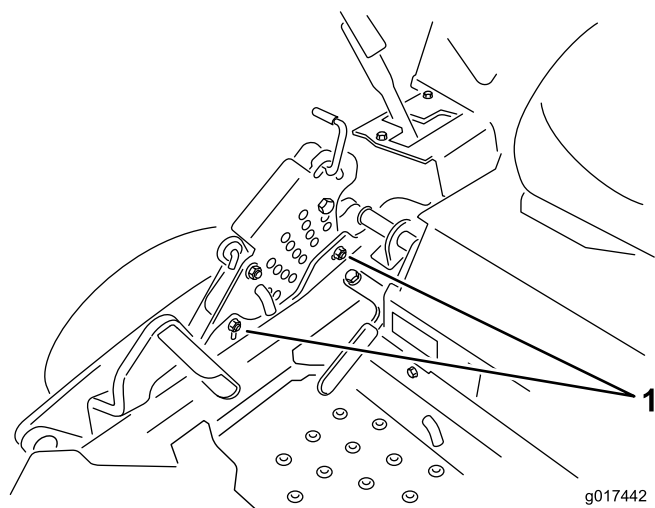


Figure 74

1. Bolts at the bottom of the height-of-cut plate

- If the deck is too low, tighten the single point adjustment bolt by rotating it clockwise. If the deck is too high, loosen the single point adjustment bolt by rotating it counterclockwise ([Figure 75](#)).

Note: Loosen or tighten the single point adjustment bolt enough to move the height-of-cut plate mounting

bolts at least 1/3 the length of the available travel in their slots. This will regain some up and down adjustment on each of the four deck links.

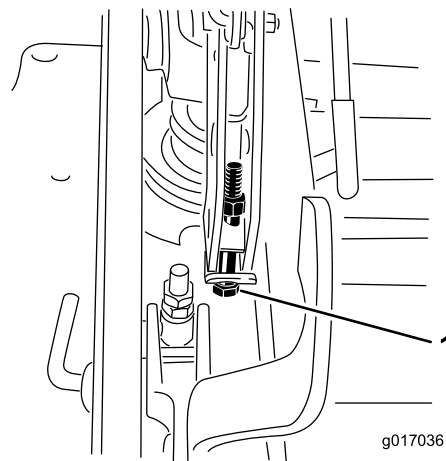


Figure 75

- Single point adjustment bolt
 - Tighten the two bolts at the bottom of the height of cut plate ([Figure 74](#)). Torque to 27-33 ft-lb (37-45 N-m).
- Note:** In most conditions, the back blade tip should be adjusted 1/4 inch (6.4 mm) higher than the front.
- On both sides of the deck, measure from the level surface to the back tip of the blade (Position B). The measurement should read 3 1/4 inches (8.3 cm) ([Figure 72](#)).
 - Fine tune the screw adjuster by turning it to get 3-1/4 inches (8.3 mm) height ([Figure 73](#)).
To increase the height, turn the adjustment nut clockwise; to decrease, turn counterclockwise.
 - Measure until all four sides are the correct height. Tighten all the nuts on the deck lift arm assemblies.
 - Lower discharge chute.

Servicing the Cutting Blades

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

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

⚠ DANGER

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

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

Before Inspecting or Servicing the Blades

Park the machine on a level surface, disengage the blade control switch (PTO), and set the parking brake. Turn the ignition key to Off. Remove the key.

Inspecting the Blades

Service Interval: Before each use or daily

1. Inspect the cutting edges (Figure 76). If the edges are not sharp or have nicks, remove and sharpen the blades. Refer to Sharpening the Blades.
2. Inspect the blades, especially the curved area (Figure 76). If you notice any damage, wear, or a slot forming in this area (Figure 76), immediately install a new blade.

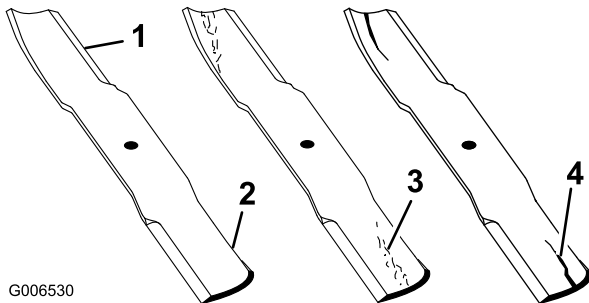


Figure 76

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

Checking for Bent Blades

1. Disengage the blade control switch (PTO), move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Rotate the blades until the ends face forward and backward (Figure 77). Measure from a level surface to the cutting edge, position A, of the blades (Figure 77). Note this dimension.

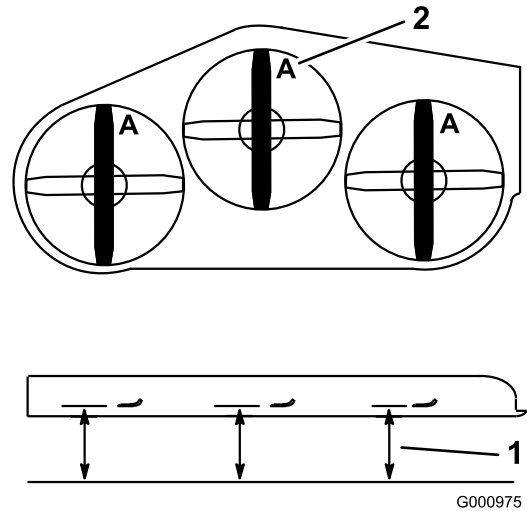


Figure 77

1. Measure here from blade to hard surface
2. Position A

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

⚠ WARNING

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

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

Removing the Blades

Blades must be replaced if a solid object is hit, if the blade is out of balance or is bent. To ensure optimum performance and continued safety conformance of the machine, use genuine Toro replacement blades. Replacement blades made

by other manufacturers may result in non-conformance with safety standards.

1. To hold the spindle shaft, use an open end wrench (1-1/2) on the spindle shaft hex end.
2. Remove the blade bolt, curved washer, and blade from the spindle shaft (Figure 78).

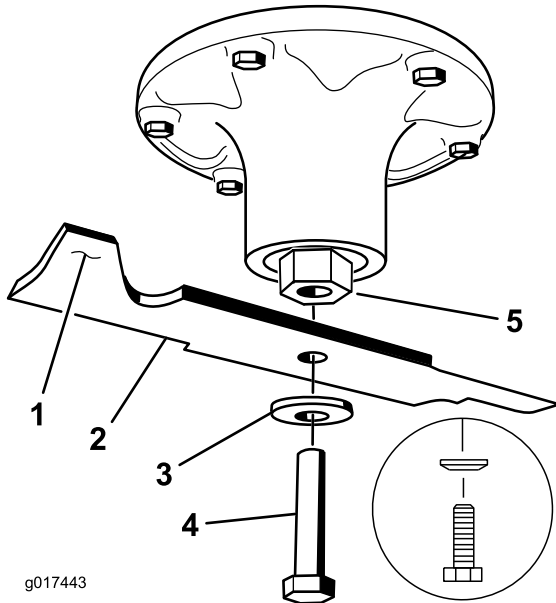


Figure 78

- | | |
|-----------------------|--------------------------|
| 1. Sail Area of Blade | 4. Blade Bolt |
| 2. Blade | 5. Spindle shaft hex end |
| 3. Curved washer | |

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 (Figure 81). Repeat this procedure until the blade is balanced.

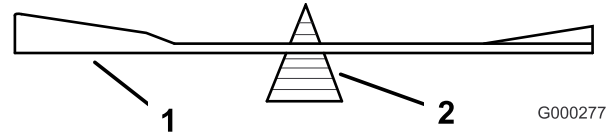


Figure 80

- | | |
|----------|-------------|
| 1. Blade | 2. Balancer |
|----------|-------------|

Sharpening the Blades

⚠ WARNING

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

Wear proper eye protection when sharpening blade.

1. Use a file to sharpen the cutting edge at both ends of the blade (Figure 79). Maintain the original angle. The blade retains its balance if the same amount of material is removed from both cutting edges.

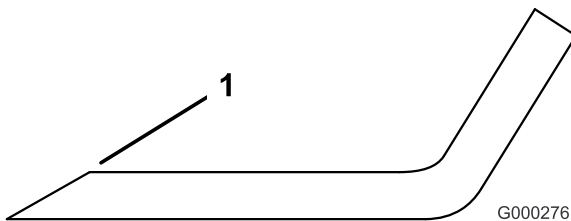


Figure 79

1. Sharpen at original angle
2. Check the balance of the blade by putting it on a blade balancer (Figure 80). If the blade stays in a horizontal

Installing the Blades

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

1. To hold the spindle shaft, use an open end wrench (1-1/2) on the spindle shaft hex end.
2. Install the blade, spring disk and blade bolt. The spring disk cone must be installed toward the bolt head (Figure 81). Torque the blade bolt to 85-110 ft-lb (115-150 N-m).

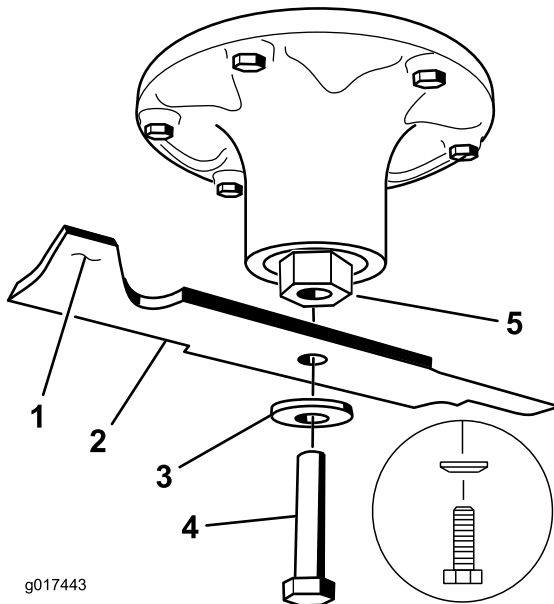


Figure 81

- | | |
|-----------------------|--------------------------|
| 1. Sail Area of Blade | 4. Blade Bolt |
| 2. Blade | 5. Spindle shaft hex end |
| 3. Spring Disk | |

Removing the Mower Deck

Before servicing or removing the mower deck, the spring loaded deck arms must be locked out.

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Remove the height adjustment pin and lower the deck to the ground.
3. Place the height adjustment pin in the 3 inch (7.6 cm) cutting height location.
4. Remove the belt covers.
5. Lift up the floor pan and insert a ratchet into the square hole in the deck idler (Figure 82).
6. Rotate the deck idler clockwise and remove the mower belt (Figure 82).

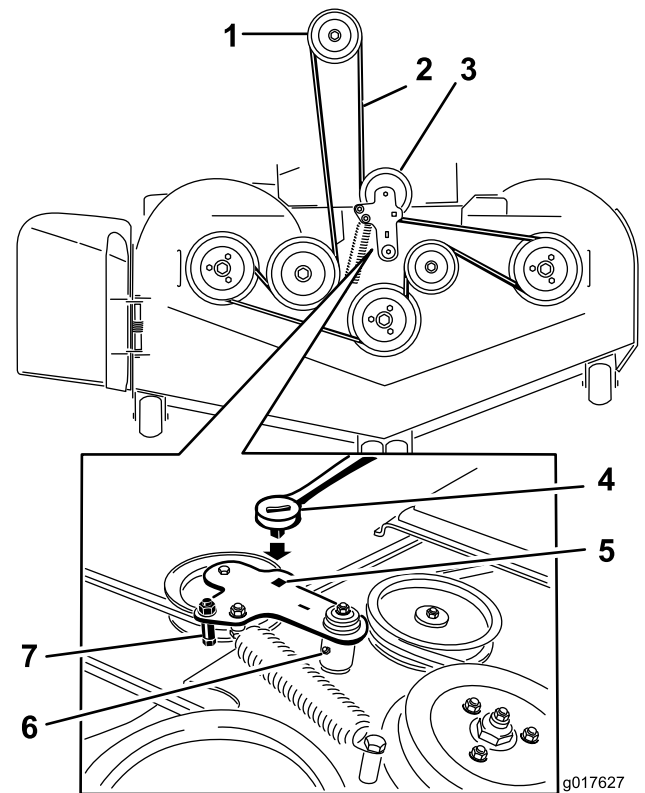


Figure 82

- | | |
|-------------------------------|---|
| 1. Clutch pulley | 5. Square hole in the idler arm for the ratchet |
| 2. Mower belt | 6. Idler grease zerk |
| 3. Spring loaded idler pulley | 7. Belt guide |
| 4. Ratchet | |

7. Remove and retain the hardware on both sides of the deck as shown in Figure 83.

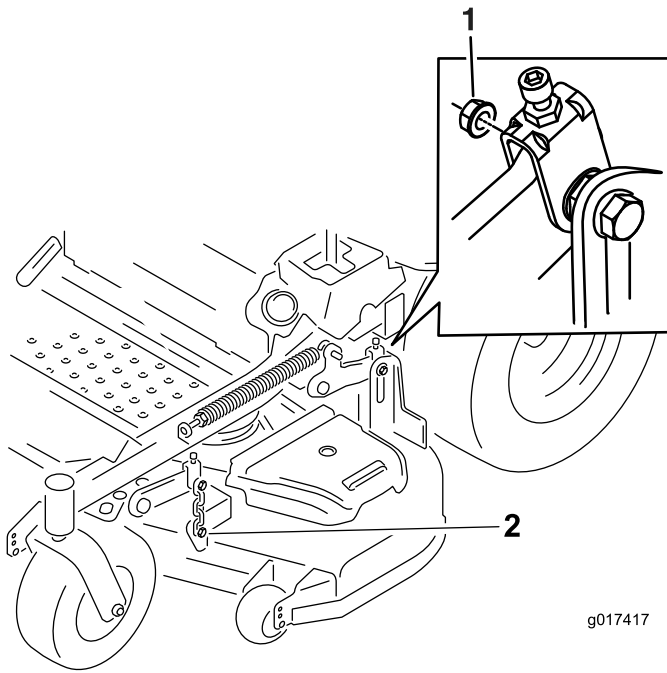


Figure 83

1. Remove the rear deck lift attachment shoulder bolt and nut.
2. Remove the front deck lift attachment shoulder bolt and nut.

8. Slide the deck out to the right side of the machine.

Replacing the Grass Deflector

⚠ WARNING

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

Never operate the lawn mower unless you install a cover plate, a mulch plate, grass deflector or bagger.

1. Remove the locknut, bolt, spring and spacer holding the deflector to the pivot brackets (Figure 84). Remove damaged or worn grass deflector.

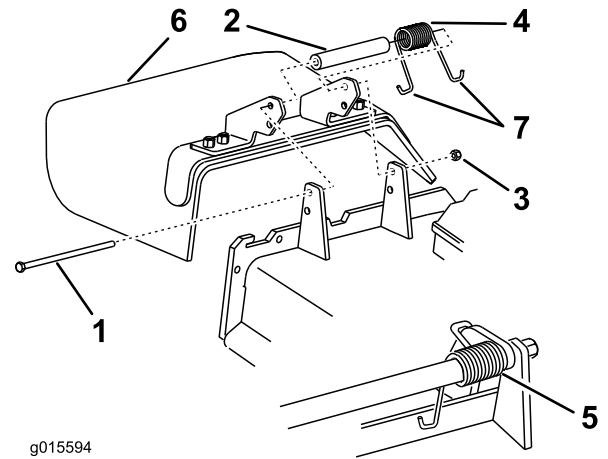


Figure 84

- | | |
|------------|-------------------------|
| 1. Bolt | 5. Spring installed |
| 2. Spacer | 6. Grass Deflector |
| 3. Locknut | 7. J hook end of spring |
| 4. Spring | |

2. Place spacer and spring onto grass deflector. Place one J end of spring behind deck edge.

Note: Make sure one J end of spring is installed behind deck edge before installing the bolt as shown in Figure 84.

3. Install bolt and nut. Place one J hook end of spring around grass deflector (Figure 84).

Important: The grass deflector must be able to rotate. Lift the deflector up to the full open position and ensure that it rotates into the full down position.

Cleaning

Cleaning Under the Mower

Service Interval: Before each use or daily

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

Waste Disposal

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

Storage

Cleaning and Storage

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

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

3. Check the brake; refer to Servicing the Brake in the Maintenance Section.
4. Service the air cleaner; refer to Servicing the Air Cleaner in the Maintenance Section.
5. Grease the machine; refer to Greasing and Lubrication in the Maintenance Section.
6. Change the crankcase oil; refer to Servicing the Engine Oil in the Maintenance Section.
7. Check the tire pressure; refer to Checking the Tire Pressure in the Maintenance Section.
8. Change the hydraulic filters; refer to Servicing the Hydraulic System in the Maintenance Section.
9. Charge the battery; refer to Servicing the Battery in the Maintenance Section.
10. Scrape any heavy buildup of grass and dirt from the underside of the mower, then wash the mower with a garden hose.

Note: Run the machine with the blade control switch (PTO) engaged and the engine at high idle for 2 to 5 minutes after washing.

11. Check the condition of the blades; refer to Servicing the Cutting Blades in the Maintenance Section.
12. Prepare the machine for storage when non-use occurs over 30 days. Prepare the machine for storage as follows:
 - A. Add a petroleum based stabilizer/conditioner to fuel in the tank. Follow mixing instructions from the stabilizer manufacturer. Do not use an alcohol based stabilizer (ethanol or methanol).

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

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

- C. Stop the engine, allow it to cool, and drain the fuel tank; refer to Servicing the Fuel Tank in the Maintenance Section.
- D. Restart the engine and run it until it stops.
- E. Dispose of fuel properly. Recycle as per local codes.

Important: Do not store stabilizer/conditioned fuel over 90 days.

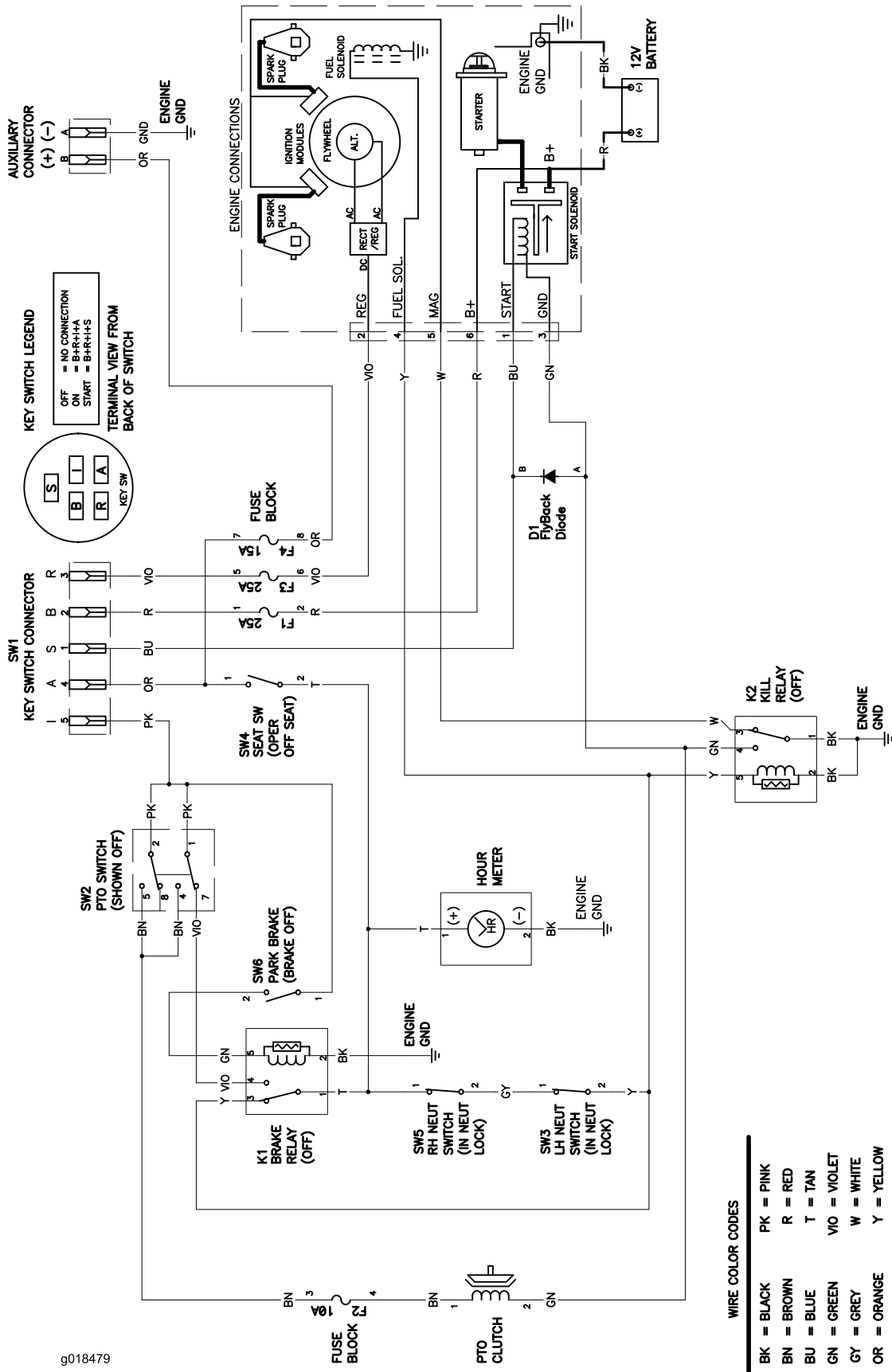
- 13. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged.
- 14. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
- 15. Store the machine in a clean, dry garage or storage area. Remove the key from the ignition switch and keep it out of reach of children or other unauthorized users. Cover the machine to protect it and keep it clean.

Troubleshooting

Problem	Possible Cause	Corrective Action
Starter does not crank	<ol style="list-style-type: none"> 1. Blade control switch (PTO) is engaged. 2. Parking brake is not on. 3. Drive levers are not in neutral lock position. 4. Operator is not seated. 5. Battery is dead. 6. Electrical connections are corroded or loose. 7. Fuse is blown. 8. Relay or switch is defective. 	<ol style="list-style-type: none"> 1. Move blade control switch (PTO) to disengaged. 2. Set the parking brake. 3. Ensure the drive levers are in the neutral lock position. 4. Sit on the seat. 5. Charge the battery. 6. Check the electrical connections for good contact. 7. Replace fuse. 8. Contact an Authorized Service Dealer.
Engine will not start, starts hard, or fails to keep running	<ol style="list-style-type: none"> 1. Fuel tank is empty. 2. Fuel shutoff valve is closed. 3. Oil level in the crankcase is low. 4. The throttle and choke are not in the correct position. 5. Dirt in fuel filter. 6. Dirt, water, or stale fuel is in the fuel system. 7. Air cleaner is dirty. 8. Seat switch is not functioning properly. 9. Electrical connections are corroded, loose or faulty. 10. Relay or switch is defective. 11. Faulty spark plug. 12. Spark plug wire is not connected. 	<ol style="list-style-type: none"> 1. Fill the fuel tank. 2. Open the fuel shutoff valve. 3. Add oil to the crankcase. 4. Be sure the throttle control is midway between the "SLOW" and "FAST" positions, and the choke is in the "ON" position for a cold engine or the "OFF" position for a warm engine. 5. Replace the fuel filter. 6. Contact an Authorized Service Dealer. 7. Clean or replace the air cleaner element. 8. Check the seat switch indicator. Replace seat if needed. 9. Check the electrical connections for good contact. Clean connector terminals thoroughly with electrical contact cleaner, apply dielectric grease and reconnect. 10. Contact an Authorized Service Dealer. 11. Clean, adjust or replace spark plug. 12. Check the spark plug wire connection.
Engine loses power.	<ol style="list-style-type: none"> 1. Engine load is excessive. 2. Air cleaner is dirty. 3. Oil level in the crankcase is low. 4. Cooling fins and air passages above the engine are plugged. 5. Vent hole in the fuel cap is plugged. 6. Dirt in the fuel filter. 7. Dirt, water, or stale fuel is in the fuel system. 	<ol style="list-style-type: none"> 1. Reduce the ground speed. 2. Clean the air cleaner element. 3. Add oil to the crankcase. 4. Remove the obstruction from the cooling fins and air passages. 5. Clean or replace the fuel cap. 6. Replace the fuel filter. 7. Contact an Authorized Service Dealer.
Engine overheats.	<ol style="list-style-type: none"> 1. Engine load is excessive. 2. Oil level in the crankcase is low. 3. Cooling fins and air passages above the engine are plugged. 	<ol style="list-style-type: none"> 1. Reduce the ground speed. 2. Add oil to the crankcase. 3. Remove the obstruction from the cooling fins and air passages.
Mower pulls left or right (with levers fully forward)	<ol style="list-style-type: none"> 1. Tracking needs adjustment 2. Tire pressure in drive tires not correct. 	<ol style="list-style-type: none"> 1. Adjust the tracking. 2. Adjust tire pressure in the drive tires.

Problem	Possible Cause	Corrective Action
Machine does not drive.	<ol style="list-style-type: none"> 1. By pass valves is not closed tight. 2. Pump belt is worn, loose or broken. 3. Pump belt is off a pulley. 4. Broken or missing idler spring. 5. Hydraulic oil level is low or too hot. 	<ol style="list-style-type: none"> 1. Tighten the by pass valves. 2. Change the belt. 3. Change the belt. 4. Replace the spring. 5. Add hydraulic oil to reservoirs or let it cool down.
Abnormal vibration.	<ol style="list-style-type: none"> 1. Cutting blade(s) is/are bent or unbalanced. 2. Blade mounting bolt is loose. 3. Engine mounting bolts are loose. 4. Loose engine pulley, idler pulley, or blade pulley. 5. Engine pulley is damaged. 6. Blade spindle is bent. 7. Motor mount is loose or worn. 	<ol style="list-style-type: none"> 1. Install new cutting blade(s). 2. Tighten the blade mounting bolt. 3. Tighten the engine mounting bolts. 4. Tighten the appropriate pulley. 5. Contact an Authorized Service Dealer. 6. Contact an Authorized Service Dealer. 7. Contact an Authorized Service Dealer.
Uneven cutting height.	<ol style="list-style-type: none"> 1. Blade(s) not sharp. 2. Cutting blade(s) is/are bent. 3. Mower deck is not level. 4. Underside of mower is dirty. 5. Tire pressure is not correct. 6. Blade spindle bent. 	<ol style="list-style-type: none"> 1. Sharpen the blade(s). 2. Install new cutting blade(s). 3. Level mower deck from side-to-side and front-to-rear. 4. Clean the underside of the mower. 5. Adjust the tire pressure. 6. Contact an Authorized Service Dealer.
Blades do not rotate.	<ol style="list-style-type: none"> 1. Mower deck belt is worn, loose or broken. 2. Mower deck belt is off pulley. 3. Pump drive belt is worn, loose or broken. 4. Broken or missing idler spring. 	<ol style="list-style-type: none"> 1. Install new deck belt. 2. Install mower deck pulley and check the idler pulley, idler arm and spring for correct position and function. 3. Check the belt tension or install new belt. 4. Replace the spring.
Clutch will not engage.	<ol style="list-style-type: none"> 1. Fuse is blown. 2. Low voltage supply at the clutch. 3. Damaged coil. 4. Inadequate current supply. 5. Rotor/armature airgap is too large. 	<ol style="list-style-type: none"> 1. Replace fuse. Check coil resistance, battery charge, charging system, and wiring connections and replace if necessary. 2. Check coil resistance, battery charge, charging system, and wiring connections and replace if necessary. 3. Replace clutch. 4. Repair or replace clutch lead wire or electrical system. Clean connector contacts. 5. Remove shim or replace clutch.

Schematics



g018479

Wire Diagram (Rev. A)

Notes:



The Toro Total Coverage Warranty

A Limited Warranty (see warranty periods below)

Landscape
Contractor
Equipment
(LCE)

Conditions and Products Covered

The Toro Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly promise to the original purchaser to repair the Toro Products listed below if defective in materials or workmanship.

The following time periods apply from the date of purchase by the original owner:

Products	Warranty Period
21 in. Mowers • Engines ⁴	1 year Commercial Use Honda – 1 years Kawasaki – 3 years
21 in. Mowers • Engines ⁴	2 years Residential Use ¹ Honda – 2 years Kawasaki – 3 years
30 in. Mowers • Engines ⁴	2 years Commercial and Residential Use ¹ Kawasaki – 3 years
Mid-Size Walk-Behind Mowers • Engines ⁴	2 years Kawasaki – 3 years
Grand Stand® Mowers • Engines ⁴	5 years or 1,200 hours ² Kawasaki – 3 years Kohler EFI – 3 years Lifetime (original owner only) ³
Z Master® 2000 Series Mowers • Engines ⁴ • Frame	4 years or 500 hours ² Kawasaki – 3 years Lifetime (original owner only) ³
Z Master® 3000 Series Mowers • Engines ⁴ • Frame	5 years or 1,200 hours ² Kawasaki – 3 years Lifetime (original owner only) ³
Z Master® 5000 Series Mowers • Engines ⁴	5 years or 1,200 hours ² Kohler Command – 2 years Kohler EFI – 3 years Lifetime (original owner only) ³
Z Master® 6000 Series Mowers • Engines ⁴	5 years or 1,200 hours ² Kawasaki – 3 years Kohler Command – 2 years Kohler EFI – 3 years Lifetime (original owner only) ³
Z Master® 7000 Series Mowers • Engines ⁴	4 years or 1,200 hours ² Kubota – 2 years Briggs & Stratton – 2 years Lifetime (original owner only) ³
All Mowers • Battery	90 days Parts and Labor 1 year Parts only
• Belts and Tires	90 days
• Attachments	1 year

¹Residential use means use of the product on the same lot as your home. Use at more than one location is considered commercial use and the commercial warranty would apply.

²Whichever occurs first.

³Lifetime Frame Warranty - If the main frame, consisting of the parts welded together to form the tractor structure that other components such as the engine are secured to, cracks or breaks in normal use, it will be repaired or replaced, at Toro's option, under warranty at no cost for parts and labor. Frame failure due to misuse or abuse and failure or repair required due to rust or corrosion are not covered.

⁴Some engines used on Toro Products are warranted by the engine manufacturer.

This warranty includes the cost of parts and labor, but you must pay transportation costs.

Instructions for Obtaining Warranty Service

If you think that your Toro Product contains a defect in materials or workmanship, follow this procedure:

- Contact any Authorized Toro Service Dealer to arrange service at their dealership. To locate a dealer convenient to you, refer to the Yellow Pages of your telephone directory (look under "Lawn Mowers") or access our web site at www.Toro.com. You may also call the numbers listed in item #3 to use the 24-hour Toro Dealer locator system.
- Bring the product and your proof of purchase (sales receipt) to the Service Dealer. The dealer will diagnose the problem and determine if it is covered under warranty.
- If for any reason you are dissatisfied with the Service Dealer's analysis or with the assistance provided, contact us at:

RLC Customer Care Department
Toro Warranty Company
8111 Lyndale Avenue South
Bloomington, MN 55420-1196
888-865-5676 (U.S. Customers)
888-865-5691 (Canada customers)

Owner Responsibilities

You must maintain your Toro Product by following the maintenance procedures described in the *Operator's Manual*. Such routine maintenance, whether performed by a dealer or by you, is at your expense.

Items and Conditions Not Covered

There is no other express warranty except for special emission system and engine warranty coverage on some products. This express warranty does not cover the following:

- Cost of regular maintenance service or wear parts, such as filters, fuel, lubricants, tune-up parts, blade sharpening, brake and clutch adjustments.
- Any product or part which has been altered or misused and requires replacement or repair due to normal wear, accidents, or lack of proper maintenance.
- Repairs necessary due to improper fuel, contaminants in the fuel system, or failure to properly prepare the fuel system prior to any period of non-use over three months.
- Pickup and delivery charges.

General Conditions

All repairs covered by these warranties must be performed by an Authorized Toro Service Dealer using Toro approved replacement parts.

Neither The Toro Company nor Toro Warranty Company is liable for indirect, incidental or consequential damages in connection with the use of the Toro Products covered by this warranty, including any cost or expense of providing substitute equipment or service during reasonable periods of malfunction or non-use pending completion of repairs under this warranty.

All implied warranties of merchantability (that the product is fit for ordinary use) and fitness for use (that the product is fit for a particular purpose) are limited to the duration of the express warranty.

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

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

Countries Other than the United States or Canada

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

Australian Consumer Law: Australian customers will find details relating to the Australian Consumer Law either inside the box or at your local Toro Dealer. 374-0252 Rev E