



Count on it.

Operator's Manual

Commercial Walk-Behind Mower

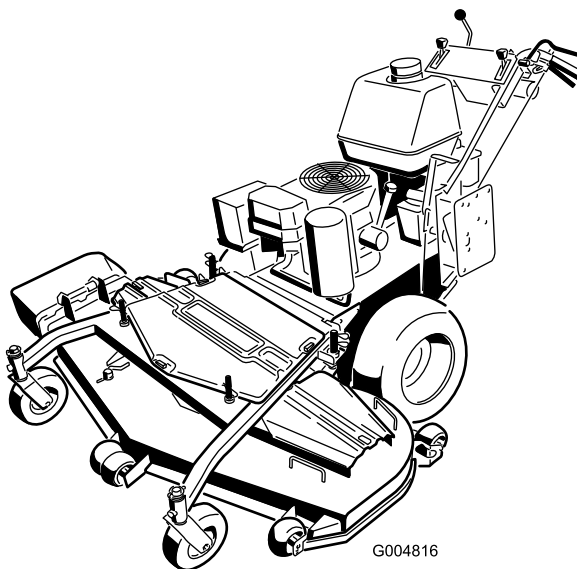
For Floating Deck, Pistol Grip, Hydro with 36in, 40in, 48in or 52in TURBO FORCE[®] Cutting Unit

Model No. 30284—Serial No. 270000001 and Up

Model No. 30286—Serial No. 270000001 and Up

Model No. 30288—Serial No. 270000001 and Up

Model No. 30289—Serial No. 270000001 and Up



Warning

CALIFORNIA Proposition 65 Warning

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

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

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

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.

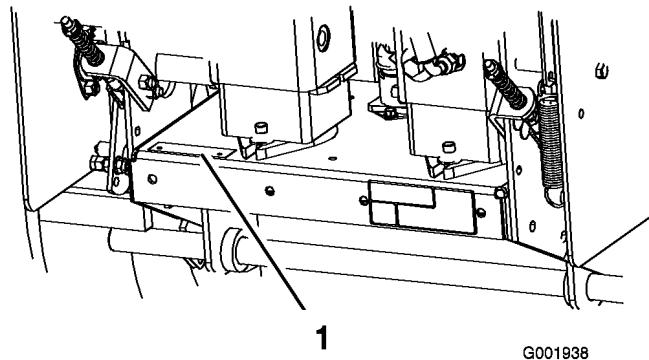


Figure 1

1. Location of the model and serial numbers

Model No. _____
Serial No. _____

This manual identifies potential hazards and has safety messages identified by the following words:

- **Danger** signals an extreme hazard that **will** cause serious injury or death if you do not follow the recommended precautions.
- **Warning** signals a hazard that **may** cause serious injury or death if you do not follow the recommended precautions.
- **Caution** signals a hazard that may cause minor or moderate injury if you do not follow the recommended precautions.

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


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Safety

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

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

Safe Operating Practices

The following instructions are from ANSI standard B71.4-2004.

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 remove gas cap or add fuel with engine running. Allow engine to cool before refueling. Do not smoke.
 - Never refuel or drain the machine indoors.
- Check that operator's presence controls, safety switches and shields are attached and functioning properly. Do not operate unless they are functioning properly.

Operation

- Never run an engine in an enclosed area.
- Only operate in good light, keeping away from holes and hidden hazards.
- Be sure all drives are in neutral and parking brake is engaged before starting engine. Only start engine from the operator's position.
- Be sure of your footing while using this machine, especially when backing up. Walk, don't run. Never operate on wet grass. Reduced footing could cause slipping.
- Slow down and use extra care on hillsides. Be sure to travel side to side on hillsides. Turf conditions can affect the machine's stability. Use caution while operating near drop-offs.
- Slow down and use caution when making turns and when changing directions on slopes.
- Never raise deck with the blades running.
- Never operate with the PTO shield, or other guards not 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, disengage drives, engage parking brake (if provided), 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 unit.
- Look behind and down before backing up to be sure of a clear path.
- Keep pets and bystanders away.
- Slow down and use caution when making turns and 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 care when loading or unloading the machine into or from a trailer or truck.
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

Maintenance and storage

- Disengage drives, 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 unit, drives, mufflers, and engine to help prevent fires. Clean up oil or fuel spillage.
- Let engine cool before storing and do not store near flame.
- Shut off fuel while storing or transporting. Do not store fuel near flames or drain indoors.
- Park machine on level ground. Set parking brake. Never allow untrained personnel to service machine.
- Use jack stands to support components when required.
- Carefully release pressure from components with stored energy.
- Disconnect the battery or remove spark plug wire before making any repairs. Disconnect the negative terminal first and the positive last. Reconnect the 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 blades. Never straighten or weld them.

- Keep hands and feet away from moving parts. If possible, do not make adjustments with the engine running.
- Keep all parts in good working condition and all hardware tightened. Replace all worn or damaged decals.

Toro Mower Safety

The following list contains safety information specific to Toro products and other safety information you must know.

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.

General Operation

- Be sure the area is clear of other people before mowing. Stop the machine if anyone enters the area.
- Do not touch equipment or attachment parts which may be hot from operation. Allow to cool before attempting to maintain, adjust or service.
- Use only Toro approved attachments. Warranty may be voided if used with unapproved attachments.
- Check carefully for overhead clearances (i.e. branches, doorways, electrical wires) before operating under any objects and do not contact them.

Slope Operation

All slopes and ramps require extra caution. If you feel uneasy on a slope, do not mow it.

- Remove obstacles such as rocks, tree limbs, etc. from the mowing area.
- Watch for holes, ruts or bumps. Tall grass can hide obstacles.
- Use caution near drop-offs, ditches, or embankments. The machine could suddenly

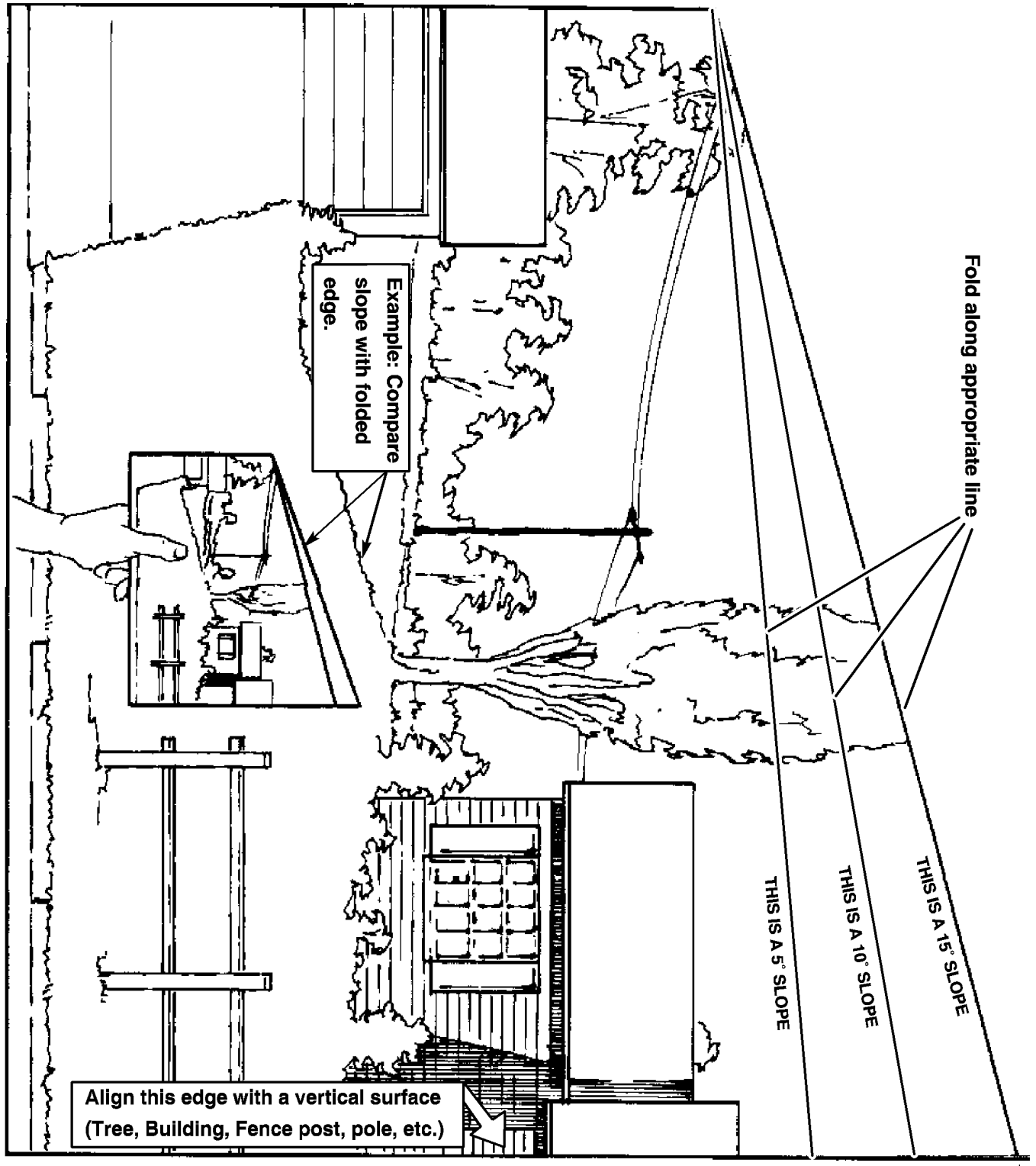
turn over if a wheel goes over the edge of a cliff or ditch, or if an edge caves in.

- Use extra care with grass catchers or other attachments. These can change the stability of the machine.
- Keep all movement on slopes slow and gradual. Do not make sudden changes in speed or direction.
- Mow slopes side to side.
- Do not mow slopes greater than 15 degrees.

Service

- Never store the machine or fuel container inside where there is an open flame, such as near a water heater or furnace.
- Keep nuts and bolts tight, especially the blade attachment bolts. Keep equipment in good condition.
- Never tamper with safety devices. Check safety systems for proper operation before each use.
- Use only genuine replacement parts to ensure that original standards are maintained.
- Check brake operation frequently. Adjust and service as required.

Slope Chart



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.



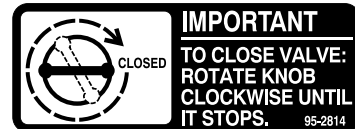
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43-8480



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98-4387

1. Warning—wear hearing protection.



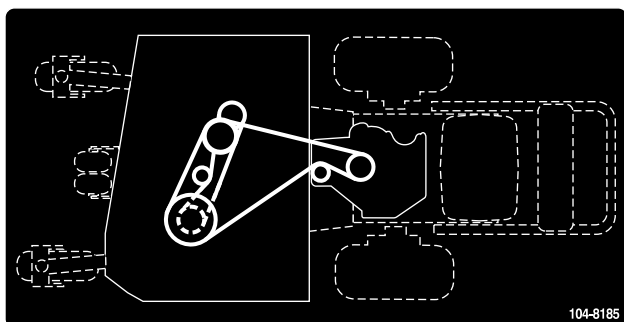
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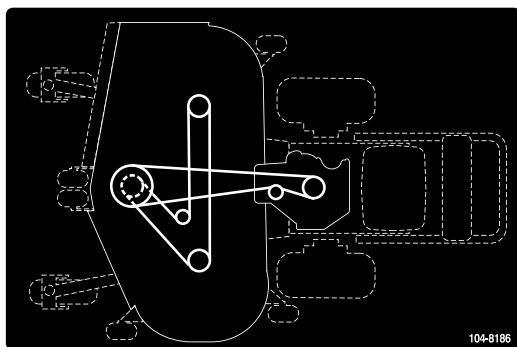
Battery Symbols

Some or all of these symbols are on your battery

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



104-8185



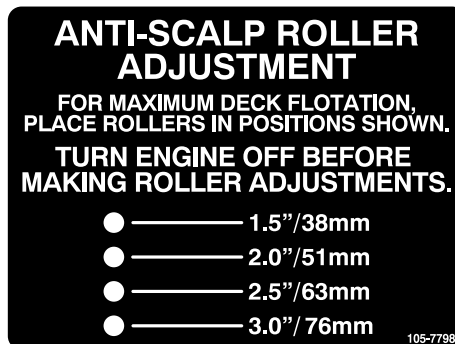
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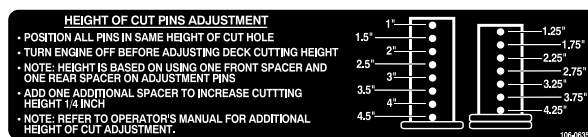
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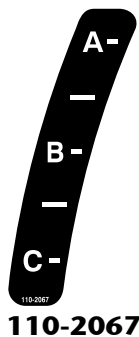


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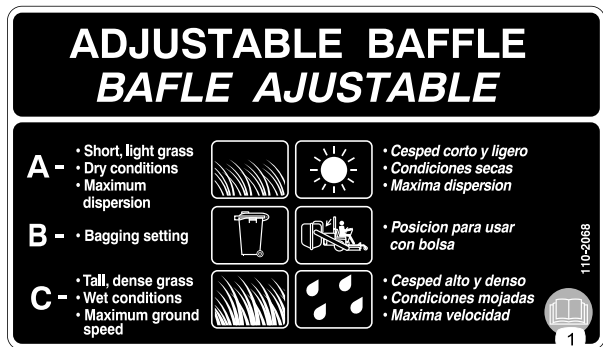


Manufacturer's Mark

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



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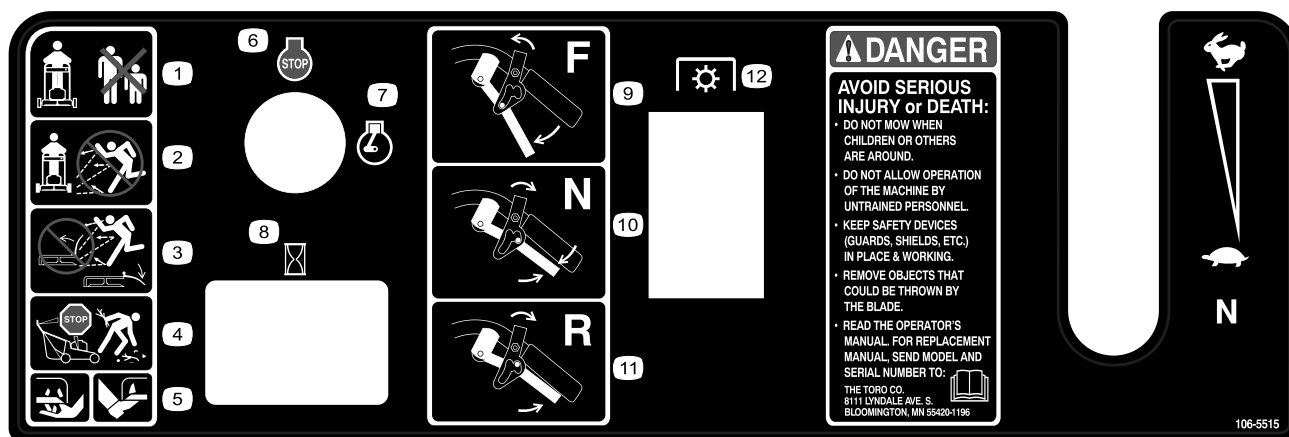


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1. Read the *Operator's Manual*.

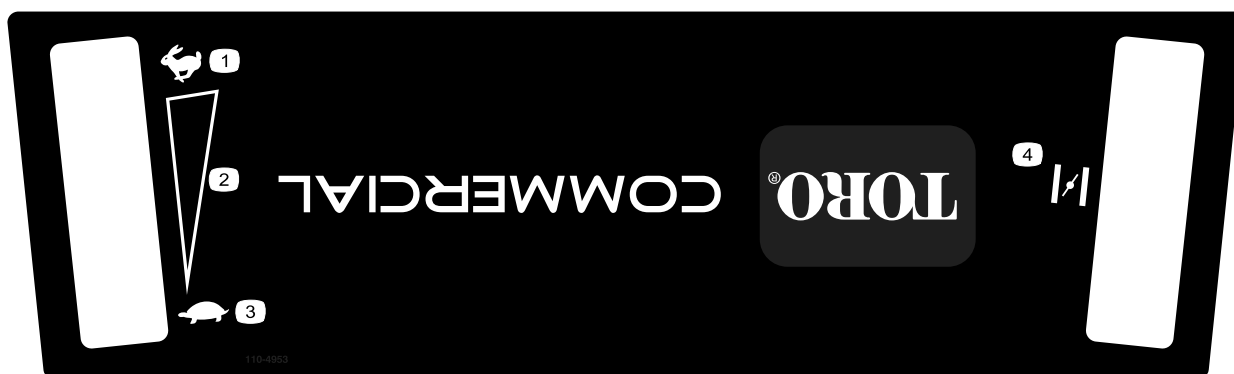


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106-5515

1. Keep bystanders a safe distance from the machine.
2. Do not allow bystanders to be hit by thrown objects.
3. Do not operate the mower with the deflector up or removed.
4. Stop the engine and pick up debris before operating.
5. Mower can cut hands or feet.
6. Engine—stop
7. Engine—run
8. Hour meter
9. To park, squeeze the drive levers and rotate the neutral locks forward.
10. To drive, rotate the neutral locks and slowly release the drive levers.
11. To place the machine in neutral, squeeze the drive levers and rotate the neutral locks backward.
12. Power take-off (PTO)



110-4953

1. Fast
2. Continuous variable setting
3. Slow
4. Choke

Product Overview

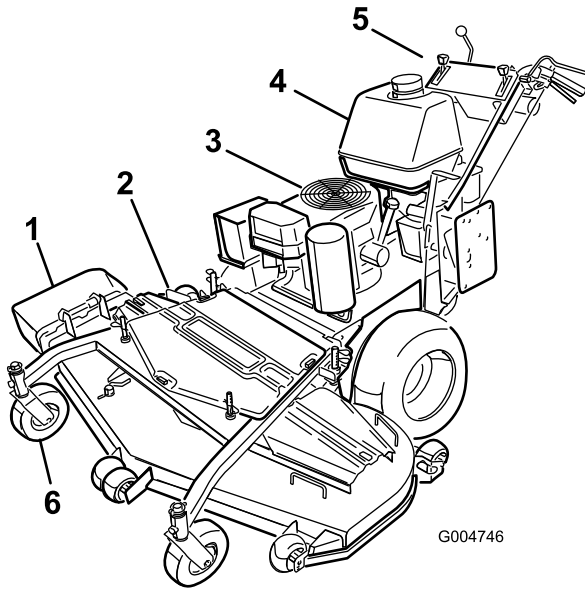


Figure 2

- | | |
|-------------------------|-----------------|
| 1. Side discharge chute | 4. Gas tank |
| 2. Mower deck | 5. Controls |
| 3. Engine | 6. Front caster |

Controls

Become familiar with all the controls (Figure 3) before you start the engine and operate the machine.

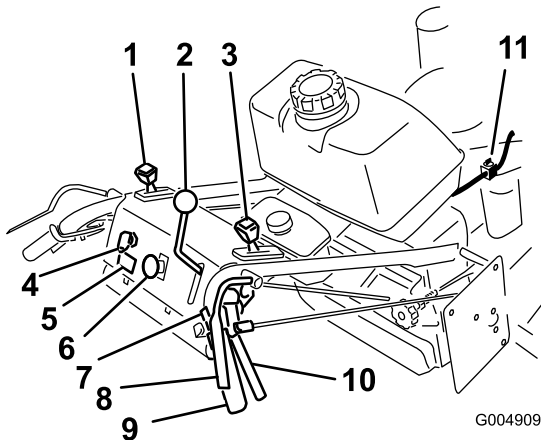


Figure 3

- | | |
|-------------------------------|---|
| 1. Throttle control | 7. Neutral lock |
| 2. Speed control lever | 8. Operator Presence Control levers (OPC) |
| 3. Choke | 9. Handle |
| 4. Ignition switch | 10. Drive Lever |
| 5. Hour meter | 11. Fuel shut-off valve |
| 6. Blade control switch (PTO) | |

Throttle Control

The throttle control has two positions: **Fast** and **Slow**.

Choke

Use the choke to start a cold engine.

Operator Presence Control (OPC) Levers

When you squeeze the OPC levers against the handles, the OPC system senses that the operator is in the normal operating position. When you release the OPC levers, the OPC system senses that the operator has left the normal operating position, and the system will stop the engine if either the speed control lever is not in the **neutral** position or the blade control (PTO) switch is engaged.

Blade Control Switch (PTO)

The blade control switch (PTO) is used to engage the electric clutch to drive the mower blades with the OPC levers pressed against the handles. Pull the switch up to engage the blades. To disengage the blades, briefly release the OPC levers.

Ignition Switch

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

Speed Control Lever

This machine has a variable speed control with a neutral position. This controls how fast or slow the machine will travel forward.

Drive Levers

Release drive levers to engage forward traction operation and squeeze the levers until an increase in force is felt to go into neutral position and continue to squeeze to go in reverse. Squeeze right side of drive lever to turn right and left side to turn left.

Neutral Lock

Squeeze drive levers back until an increase in force is felt and move locks to the rear for neutral lock.

Fuel Shut-off Valve

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

Hour Meter

Shows the total hours the machine has been operated. This operates only when the mower blades are operating.

The hour meter will flash 3 hours before and after a service interval. The service intervals are set for the first 8 hours, every 100 hours there after, and every 400 hours.

Note: Make sure maintenance is done at all recommended intervals shown in the Recommended Maintenance Schedule.

Attachments/Accessories

A selection of Toro approved attachments and accessories are 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.

36 inch mowers:

Width with deflector down	51–1/8 inches (130 cm)
Length	84–1/2 inches (215 cm)
Height with handle in lowest position	41–1/2 inches (106 cm)
Weight	677 lb (307 kg)

40 inch mowers:

Width with deflector down	55–1/2 inches (141 cm)
Length	81–1/3 inches (207 cm)
Height with handle in lowest position	41–1/2 inches (106 cm)
Weight	677 lb (307 kg)

48 inch mowers:

Width with deflector down	63–1/2 inches (161 cm)
Length	83–3/4 inches (213 cm)
Height with handle in lowest position	41–1/2 inches (106 cm)
Weight	692 lb (314 kg)

52 inch mowers:

Width with deflector down	67–5/8 inches (171.7 cm)
Length	83–3/4 inches (213 cm)
Height with handle in lowest position	41–1/2 inches (106 cm)
Weight	731 lb (332 kg)

Operation

Adding Fuel

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

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



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

- Fill the fuel tank outdoors, in an open area, when the engine is cold. Wipe up any gasoline that spills.
- Never fill the fuel tank inside an enclosed trailer.
- Do not fill the fuel tank completely full. Add gasoline to the fuel tank until the level is 1/4 to 1/2 inch (6 to 13 mm) below the bottom of the filler neck. This empty space in the tank allows gasoline to expand.
- Never smoke when handling gasoline, and stay away from an open flame or where gasoline fumes may be ignited by a spark.
- Store gasoline in an approved container and keep it out of the reach of children. Never buy more than a 30-day supply of gasoline.
- Do not operate without entire exhaust system in place and in proper working condition.



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.



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

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

Using Stabilizer/Conditioner

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

- Keeps gasoline fresh during storage of 90 days or less. For longer storage it is recommended that the fuel tank be drained.

- Cleans the engine while it runs
- Eliminates gum-like varnish buildup in the fuel system, which causes hard starting

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

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

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

Filling the Fuel Tank

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

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 Oil Level in Engine Maintenance.

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

Think Safety First

Carefully read all the safety instructions and decals in the safety section. Knowing this information could help you or any bystanders avoid injury.

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



Figure 4

1. Warning—wear hearing protection.

Operating the Parking Brake

Always set the parking brake when you stop the machine or leave it unattended. Before each use, check the parking brake for proper operation.

If the parking brake does not hold securely, adjust it. Refer to Servicing the Parking Brake.



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.

Setting the Parking Brake

Pull the parking brake lever rearward (Figure 5).



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

Wear hearing protection when operating this machine.

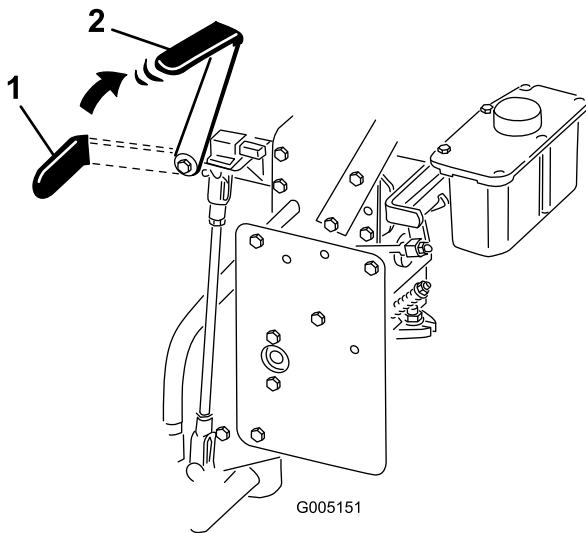


Figure 5

1. Parking brake lever (in the released position)
2. Parking brake lever (in the engaged position)

Releasing the Parking Brake

Push the parking brake lever forward.

Starting and Stopping the Engine

Starting the Engine

1. Connect the wires to the spark plugs.
2. Open the fuel valve.
3. Move the speed control lever to neutral.
4. Set the neutral locks.
5. Set the parking brake.
6. Move the throttle control to fast and move the choke lever to the on position before starting a cold engine (Figure 6).

Note: A warm or hot engine may not require choking. To start a warm engine, move throttle control to the fast position.

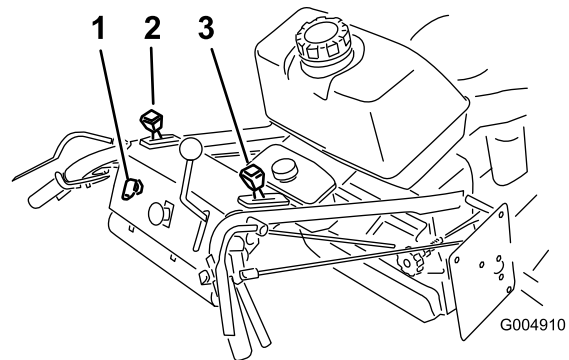


Figure 6

1. Ignition switch
2. Throttle lever
3. Choke

7. Turn the ignition key to the start position to energize the starter. When the engine starts, release the key.

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

8. When engine starts, move the throttle control between the fast and slow position and move the choke lever to the off position. Allow the engine to warm up and then move the throttle control to the fast position.

Stopping the Engine

1. Move drive levers to neutral and set neutral locks.
2. Move the throttle lever to slow (Figure 6).
3. Move the speed control lever to neutral and release the OPC levers to disengage the mower.
4. If the engine has been working hard or is hot, let the engine idle for 30 to 60 seconds before turning the engine off.
5. To stop the engine, turn the ignition key to off.

Important: Make sure fuel shut off valve is closed before transporting or storing machine, as fuel leakage may occur. Before storing machine, pull wire off spark plug(s) to prevent possibility of accidental starting.

Operating the Neutral Locks

Always set the neutral lock when you stop the machine. Set the parking brake if it is left unattended.

Setting the Neutral Lock

1. Squeeze the drive levers back until an increase in force is felt.
2. Place thumbs on the upper part of the locks and move them back (Figure 7).

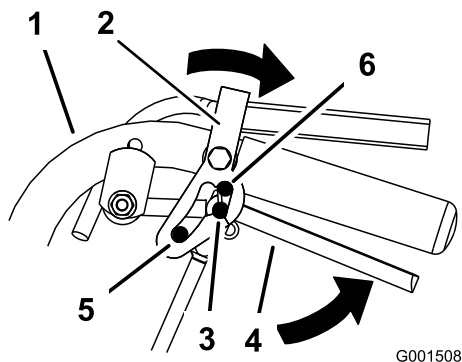


Figure 7

- | | |
|---------------------|--------------------------------|
| 1. Handle | 4. Drive lever |
| 2. Neutral lock | 5. Full speed forward position |
| 3. Neutral position | 6. Reverse position |

Releasing the Neutral Lock

1. Squeeze the drive levers back until an increase in force is felt.
2. Place thumbs on the upper part of locks and move them forward until the pins are in the forward slot (Figure 8).

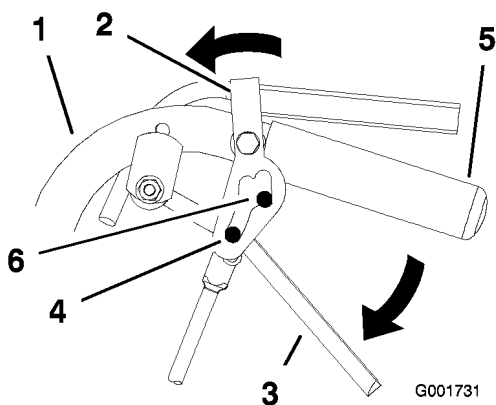


Figure 8

- | | |
|-----------------|---------------------------------------|
| 1. Handle | 4. Pin in full speed forward position |
| 2. Neutral lock | 5. Handle |
| 3. Drive lever | 6. Forward slot |

Operating the Mower Blade Control (PTO)

The blade control knob (PTO) is used in conjunction with the Operator Presence Control (OPC) levers to engage and disengage the mower blades.

Engaging the Mower Blades (PTO)

1. To engage blades, squeeze the Operator Presence Control (OPC) levers against handle grips (Figure 9).
2. Pull the blade switch (PTO) up and release it while holding the OPC levers against handle grip.

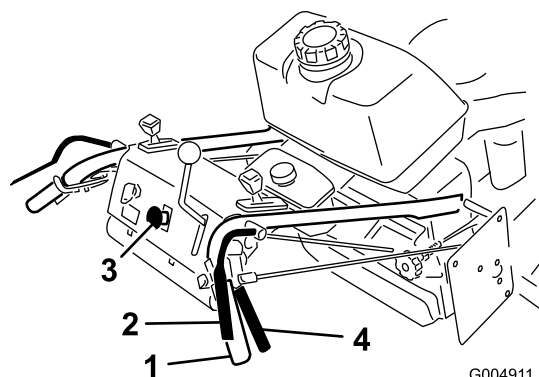


Figure 9

- | | |
|---|-------------------------------|
| 1. Handle | 3. Blade control switch (PTO) |
| 2. Operator Presence Control levers (OPC) | 4. Drive Lever |

Disengaging the Mower Blades (PTO)

Release the Operator Presence Control (OPC) levers to stop the blades (Figure 9).

Note: The engine will kill if the OPC levers are released with the mower running and the speed control lever is not in neutral position.

The Safety Interlock System



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 mower from starting unless:

- The blade control switch (PTO) is off.
- The speed control lever is in neutral.

The safety interlock system is designed to kill the engine when:

- The Operator Presence Control (OPC) levers are released with the mower engaged and/or the speed control is out of neutral.
- The speed control lever is shifted out of neutral without holding OPC levers or with the brake engaged.
- The blade control switch (PTO) is pulled up without holding the OPC levers.

Testing the Safety Interlock System

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



While testing the safety interlock system, the machine may move forward and cause personal injury or property damage.

- Perform the safety interlock test in an open area.
- Ensure no one is standing in front of the machine while performing the safety interlock test.

1. Set the neutral locks and place speed control lever in neutral. Start the engine; refer to Starting and Stopping the Engine.
2. Without holding the Operator Presence Control (OPC) levers, pull the blade control knob (PTO) up. The engine should kill.
3. With engine running, hold down the OPC levers. Pull the blade control switch (PTO) up. The drive belt should engage and the mower blades begin rotating.
4. Release the OPC levers. The engine should kill.
5. With the engine running, move the speed control lever forward. Release the OPC levers. The engine should kill.
6. With the engine running, set the parking brake and hold down the OPC levers. Move the speed control lever forward. The engine should kill.
7. If all the above conditions are not met have an Authorized Service Dealer repair the safety system immediately.

Driving the Machine Forward and 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.

The forward speed of the machine can be increased or decreased by moving the speed control lever while the machine is in motion.

Driving Forward

1. Release the parking brake.
2. To go forward, move the speed control lever to desired speed.
3. Release the neutral lock. Refer to Releasing the Neutral Lock.
4. Slowly release the drive levers to move forward (Figure 10).

To go straight, release drive levers equally (Figure 10).

To turn, squeeze the drive lever on the side and direction you want to turn (Figure 10).

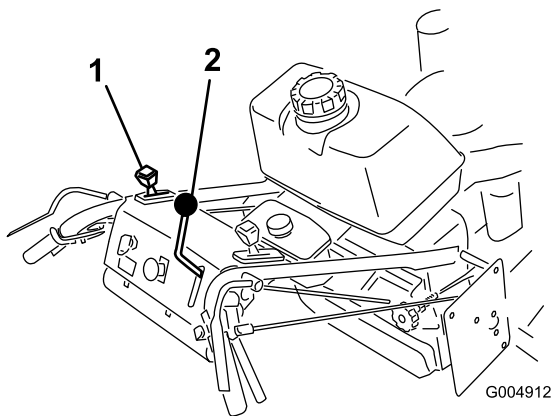


Figure 10

1. Drive lever

2. Speed control lever

Driving Backward

From neutral position, slowly squeeze the drive levers to move rearward (Figure 10).

Bringing the Machine to the Neutral Position

Always set the neutral lock and parking brake when you stop the machine.

1. Squeeze the drive levers to neutral position.
2. Set the neutral locks. Refer to Operating Neutral Locks.
3. Move speed control lever to neutral position.

Note: The speed control lever can also be used to bring the mower to neutral position and then set the neutral locks.

Stopping the Machine

1. To stop the machine, squeeze the drive levers to neutral position and engage neutral locks.
2. Move speed control lever into neutral.
3. Stop the engine by turning the ignition key to off.
4. Wait for all moving parts to stop before leaving the operating position. Set the parking brake.



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.

Pushing the Machine by Hand

The by-pass valves allow the machine to be pushed by hand without the engine running.

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

To Push the Machine

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Open the by-pass valve on both pumps by turning them counter clockwise 1 to 2 turns. This allows hydraulic fluid to by-pass the pumps and the wheels to turn (Figure 11).

Note: Rotate the by-pass valves a maximum of 2 turns so the valve does not come out of the body causing fluid to run out.

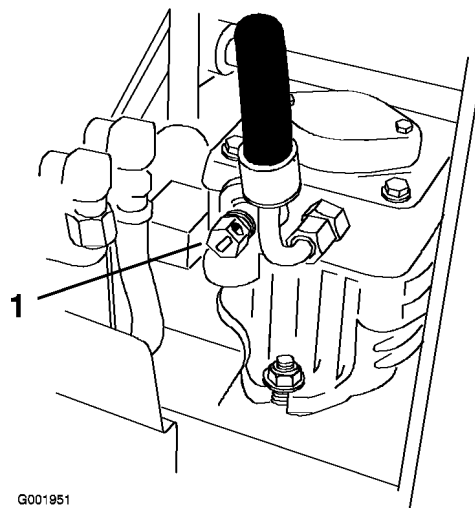


Figure 11

1. Pump by-pass valve

3. Release the parking brake.

4. Push the machine to the desired location.
5. Set the parking brake.
6. Close the by-pass valves, but do not overtighten them.

Important: Do not start or operate the machine with the by-pass valves open. Damage to system may occur.

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.

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 12).

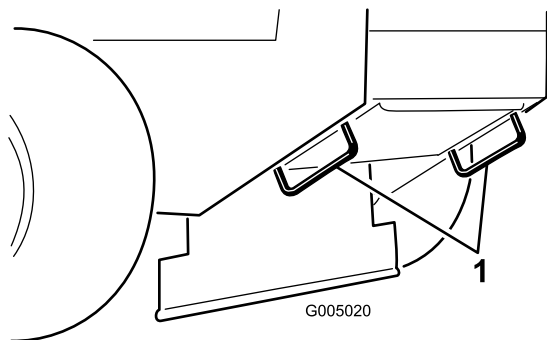


Figure 12

1. Traction unit tie down loop

Side Discharging or Mulching the Grass

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



Without the grass deflector, discharge cover, or complete grass catcher assembly mounted in place, you and others are exposed to blade contact and thrown debris. Contact with rotating mower 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 discharge area or mower blades unless you release the bail and the power take off (PTO) is off. Rotate the ignition key to Off. Also remove the key and pull the wire(s) off the spark plug(s).

Adjusting the Height-of-Cut

The height-of-cut can be adjusted from 1 to 4-1/2 inch (25 to 114 mm) in 1/4 inch (6 mm) increments. Adjustment is done by relocating four hairpin cotter pins in different hole location and by adding or removing spacers.

Note: All height-of-cut pins need at least one spacer or damage can occur to bushing if none are used.

Note: All height-of-cut pins can use two spacers maximum.

1. Select hole in height-of-cut post and number of spacers corresponding to the height-of-cut desired (Figure 13).
2. Using the lift handle, raise side of deck and remove hairpin cotter (Figure 13).
3. Add or remove spacers if needed and then align holes and insert hairpin cotter (Figure 13).

Note: Spare height-of-cut spacers may be stored on posts and retained by a hairpin cotter.

Important: All four hairpin cotter pins must be in the same hole location and with the correct number of spacers for a level cut.

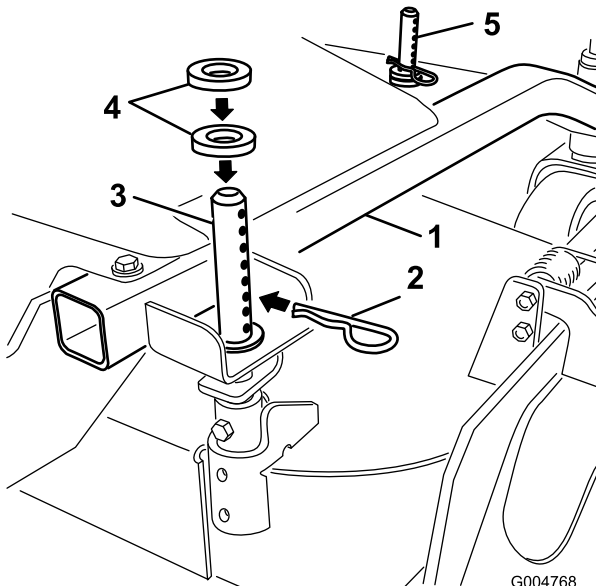
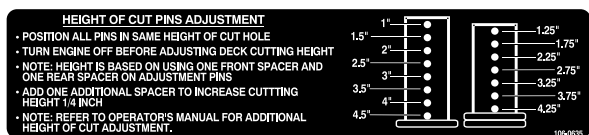


Figure 13

- | | |
|----------------------------|-----------------------------|
| 1. Carrier Frame | 4. Spacers |
| 2. Hairpin Cotter | 5. Front height-of-cut post |
| 3. Back height-of-cut post | |

Adjusting the Anti-Scalp Rollers

The anti-scalp rollers need to be adjusted in the proper hole location for each height-of-cut position. There needs to be 3/8 inch (10 mm) minimum clearance above the ground.

Note: If the anti-scalp rollers are adjusted too low it can cause excess wear of the rollers.

1. After adjusting height-of-cut, check the anti-scalp rollers so that there is a minimum of 3/8 inch (10 mm) clearance above the ground (Figure 14, Figure 15, Figure 16).
2. If adjustment is needed, remove the bolt, washers and nut (Figure 14, Figure 15, Figure 16).
3. Select a hole position so the anti-scalp rollers are a minimum of 3/8 inch (10 mm) off the ground (Figure 14, Figure 15, Figure 16).
4. Install the bolt and nut (Figure 14, Figure 15, Figure 16).

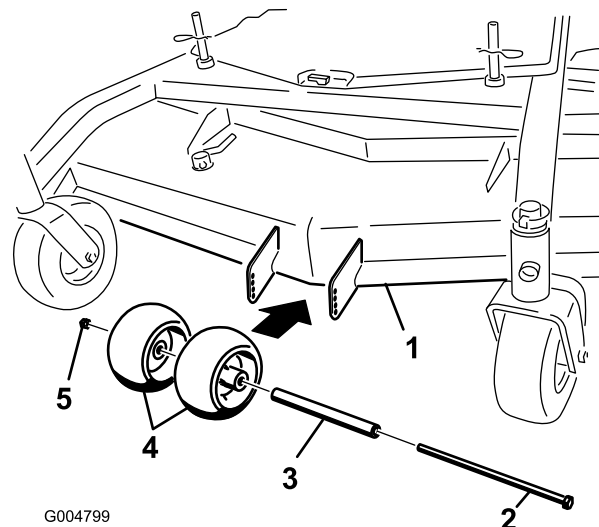


Figure 14

40 inch, 48 inch, and 52 inch Mower Decks

- | | |
|---------------|-----------------------|
| 1. Mower deck | 4. Anti-Scalp Rollers |
| 2. Bolt | 5. Nut |
| 3. Spacer | |

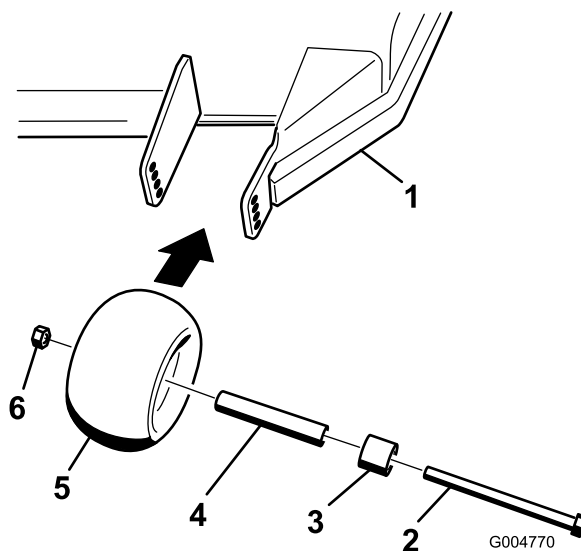


Figure 15

40 inch, 48 inch, and 52 inch Mower Decks

- | | |
|---------------|-----------------------|
| 1. Mower deck | 4. Bushing |
| 2. Bolt | 5. Anti-Scalp Rollers |
| 3. Spacer | 6. Nut |

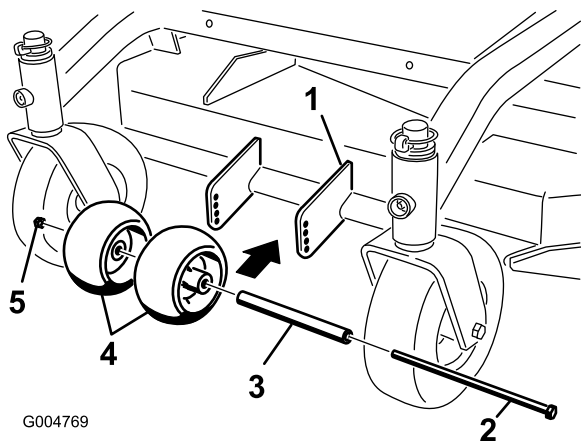


Figure 16

36 inch Mower Deck

- | | |
|---------------|-----------------------|
| 1. Mower deck | 4. Anti-Scalp Rollers |
| 2. Bolt | 5. Nut |
| 3. Spacer | |

5. In certain mowing conditions and terrain, a mismatch of cutting height may be seen. Adjusting the outside anti-scalp rollers to the minimum setting of 3/8 inch (10 mm) will help prevent the mower deck cutting too low on the outside and minimize the mismatch.

Adjusting the Handle Height

The handle position can be adjusted to match the operator's height preference.

1. Remove the hairpin cotter pins and clevis pins from the drive levers and neutral locks (Figure 17).

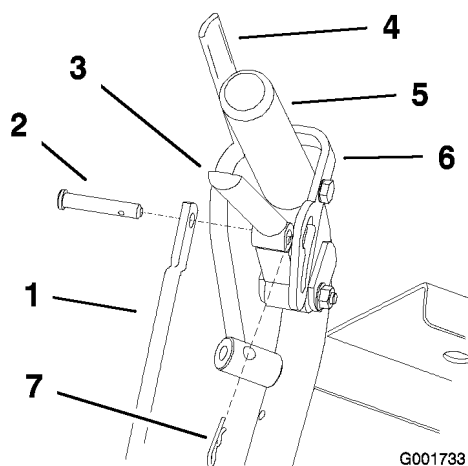


Figure 17

- | | |
|--|-----------------------|
| 1. Control rod | 5. Left handle shown |
| 2. Clevis pin | 6. Neutral lock |
| 3. Drive lever | 7. Hairpin cotter pin |
| 4. Operator Presence Control lever (OPC) | |

2. Loosen the nuts holding the swivel connected to the speed control crank (Figure 18).

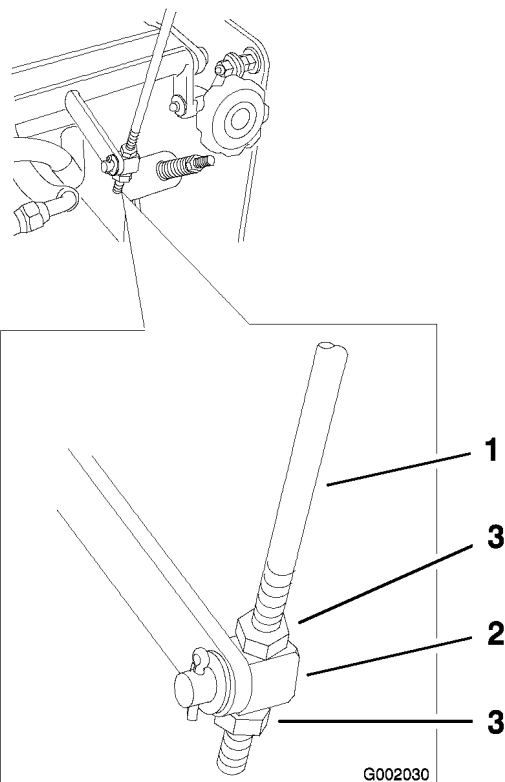


Figure 18

- | | |
|----------------------|--------|
| 1. Speed control rod | 3. Nut |
| 2. Swivel | |

- Loosen the upper flange bolts (3/8 x 1-1/4 inches) and flange nut securing handle to rear frame (Figure 19).
- Remove the lower flange bolts (3/8 x 1 inch) and flange nuts securing handle to rear frame (Figure 19).
- Pivot handle to desired operating position and install lower flange bolts (3/8 x 1 inch) and flange nuts into mounting holes. Tighten all flange bolts.

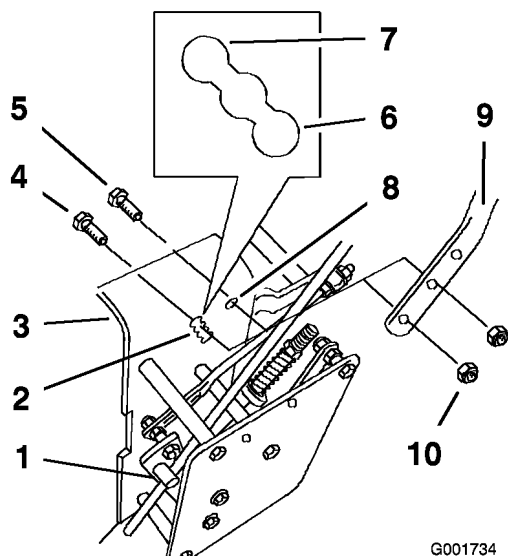


Figure 19

- | | |
|---|---------------------------|
| 1. Control rod fitting | 6. High position |
| 2. Lower mounting holes | 7. Lower position |
| 3. Rear frame | 8. Upper mounting hole |
| 4. Lower flange bolt (3/8 x 1 inch) | 9. Handle |
| 5. Upper flange bolt (3/8 x 1-1/4 inches) | 10. Flange nut (3/8 inch) |

- Adjust the swivel on the speed control rod and tighten the nuts against the swivel (Figure 18).
- Adjust the control rod length by rotating the control rod in the rod fitting (Figure 18).
- Install hairpin cotter between drive levers and neutral locks and into clevis pins (Figure 17).

Note: Make sure the clevis pins are inserted into the neutral locks.

- Perform the hydraulic linkage adjustments when the handle height is changed; refer Hydraulic Linkage Adjustments.

Adjusting the Flow Baffle

The mower discharge flow can be adjusted for different types of mowing conditions. Position the cam lock and baffle to give the best quality of cut.

- Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
- Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
- To adjust the cam lock, swing the lever up to loosen the cam lock (Figure 20).
- Adjust the baffle and cam lock in the slot to the desired discharge flow.
- Swing the lever back over to tighten the baffle and cam lock (Figure 20).
- If the cam does not lock the baffle into place or it is too tight, loosen the lever and then rotate the cam lock. Adjust the cam lock until the desired locking pressure is achieved.

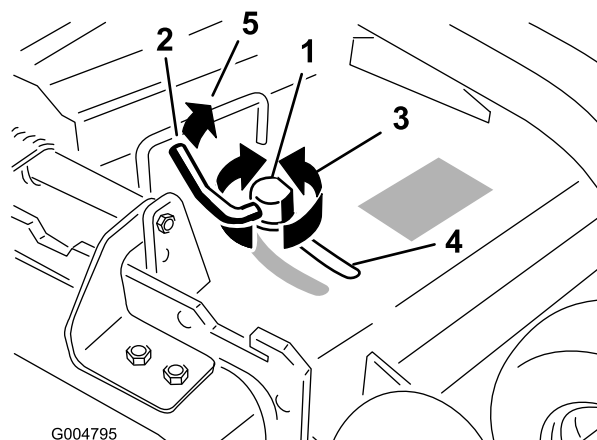


Figure 20

- | | |
|-------------|--|
| 1. Cam lock | 3. Rotate cam to increase or decrease locking pressure |
| 2. Lever | 4. Slot |

Positioning the Flow Baffle

The following figures are only recommendations for use. Adjustments will vary by grass type, moisture content, and height of grass.

Note: If the engine power draws down and the mower ground speed is the same, open up the baffle.

Position A

This is the full rear position (see Figure 21). The suggested use for this position is as follows.

- Use for short, light grass mowing conditions.
- Use in dry conditions.
- For smaller grass clippings.
- Propels grass clippings farther away from the mower.

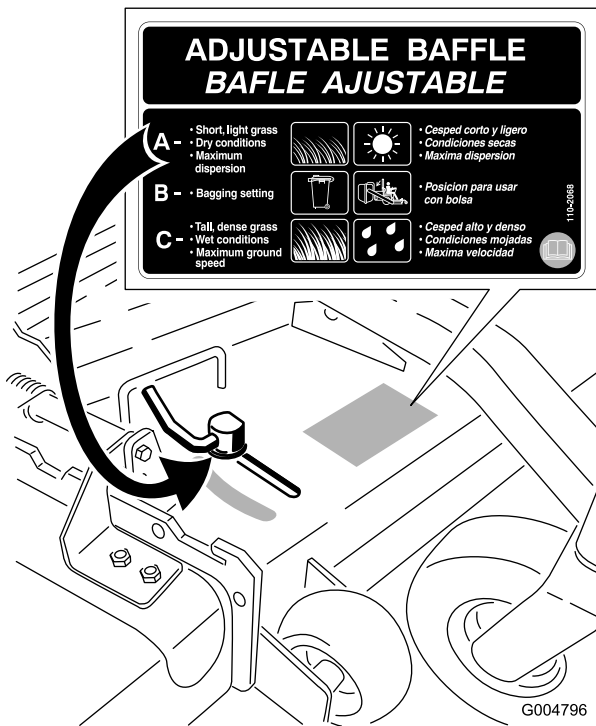


Figure 21

Position B

Use this position when bagging (Figure 22).

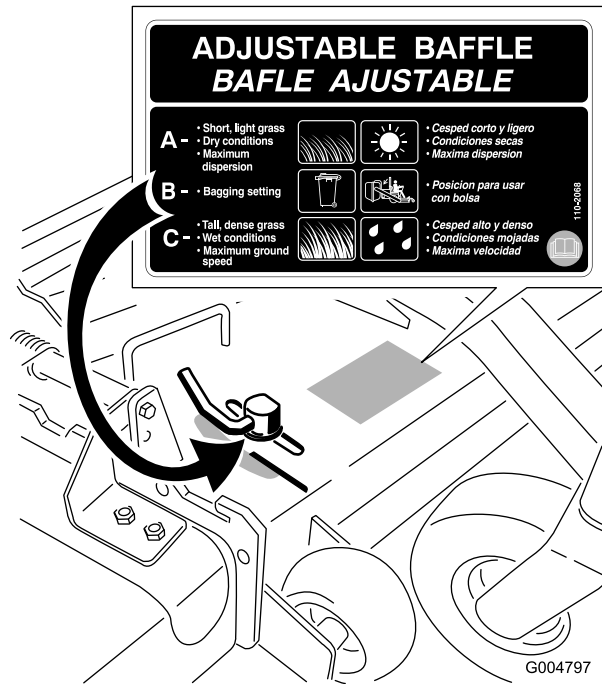


Figure 22

Position C

This is the full open position. The suggested use for this position is as follows (Figure 23).

- Use in tall, dense grass mowing conditions.
- Use in wet conditions.
- Lowers the engine power consumption.
- Allows increased ground speed in heavy conditions.
- This position is similar to the benefits of the Toro SFS mower.

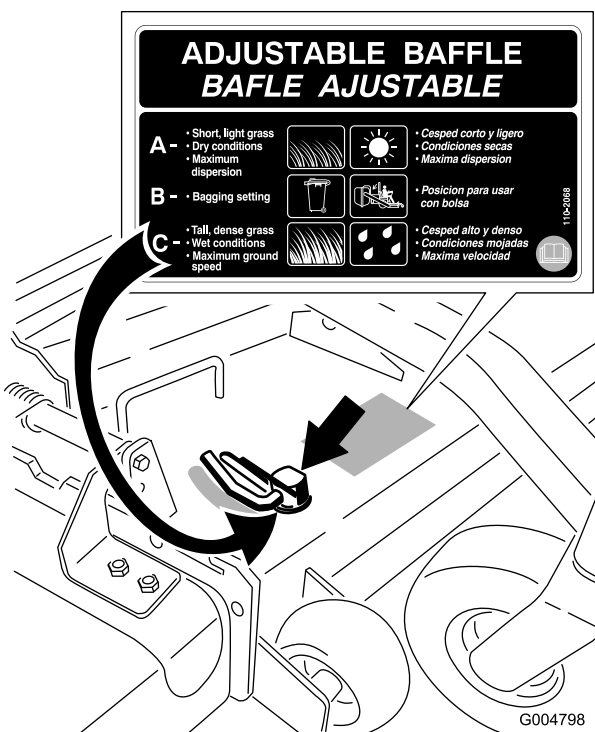


Figure 23

Using the Mid-Size Weight

Weights are installed on certain mowers to improve balance and improve performance. The weights can be moved or removed to create optimized performance under different mowing conditions and for operator preference (Figure 24 or Figure 25).

The following table indicates the position of the weight as installed at the factory.

Mower Deck Size	Number of weights install	Position of the weight
36 inches	1	Front
40 inches	1	Front
48 inches	none	none
52 inches	1	Rear

- Any rear weight must be removed when a Tru-Track® Sulky is installed.
- When a Tru-Track® Sulky is installed front weights are needed. Contact an Authorized Service Dealer for the correct quantity of weights and placement.



The front end of the machine can rapidly rise up when the mower is removed. This could cause serious injury to you or bystanders.

Support the rear of the machine when removing the mower from the carrier frame.

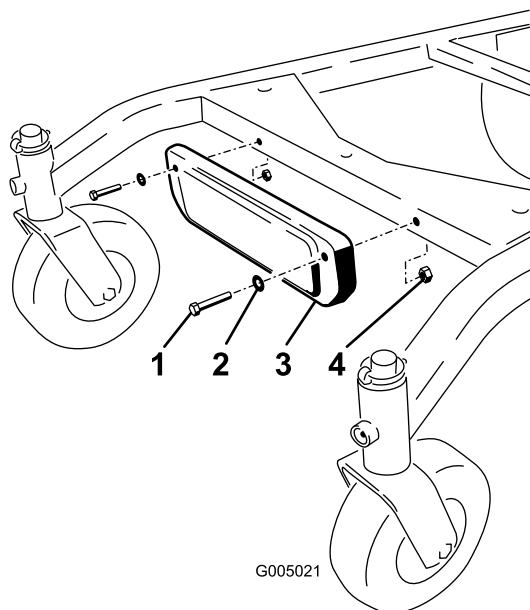


Figure 24

Installing the front weight.

- | | |
|-----------|-----------|
| 1. Bolt | 3. Weight |
| 2. Washer | 4. Nut |

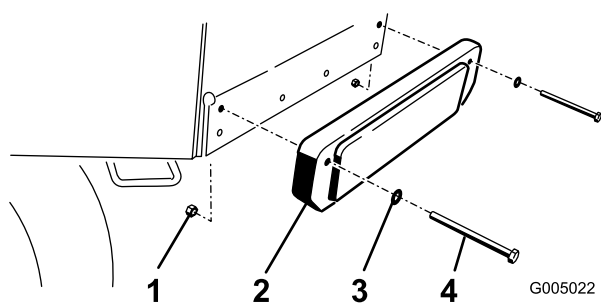


Figure 25

Installing the rear weight.

- | | |
|-----------|-----------|
| 1. Nut | 3. Washer |
| 2. Weight | 4. Bolt |

Maintenance

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

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 8 operating hours	<ul style="list-style-type: none"> • Change the engine oil. • Check the hydraulic fluid level. • Change the hydraulic filter.
Before each use or daily	<ul style="list-style-type: none"> • Check the safety system. • Grease the front caster pivot bearing. • Check the engine oil level. • Clean the air intake screen. • Check the brakes. • Inspect the blades. • Clean the mower deck.
Every 25 hours	<ul style="list-style-type: none"> • Clean foam air cleaner element. • Check the battery electrolyte level. • Check the hydraulic fluid level.
Every 50 hours	<ul style="list-style-type: none"> • Grease the side bearings. • Grease the PTO belt idler. • Grease the mower deck belt idler. • Check the paper air cleaner element. • Check the tire pressure. • Check the mower belt. • Check the PTO drive belt. • Check the pump drive belt.
Every 100 hours	<ul style="list-style-type: none"> • Change the engine oil. • Check the spark plugs. • Adjust the electric clutch. • Check the hydraulic lines.
Every 200 hours	<ul style="list-style-type: none"> • Replace the paper air cleaner element. • Change the oil filter. • Replace the fuel filter. • Change the hydraulic filter.
Every 400 hours	<ul style="list-style-type: none"> • Grease the front wheel bearings (more often in dirty or dusty conditions).
Before storage	<ul style="list-style-type: none"> • Paint chipped surfaces. • Perform all maintenance procedures listed above before storage.

Important: Refer to your Engine Operator's Manual for additional maintenance procedures.



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

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

Lubrication

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

How to Grease

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. 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.

Lubricating the Bearings

1. Lubricate the front caster wheel bearings and front pivots (Figure 26).

Note: Make sure the rear wheel grease caps are removed before lubricating rear wheels.

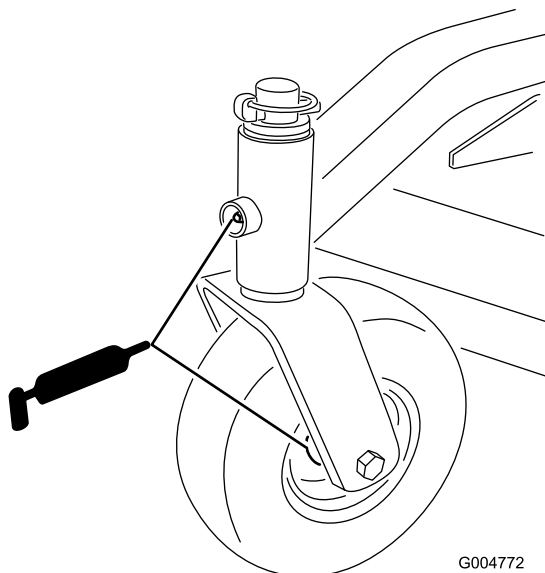


Figure 26

2. Grease the bearings on both sides of the machine (Figure 27).

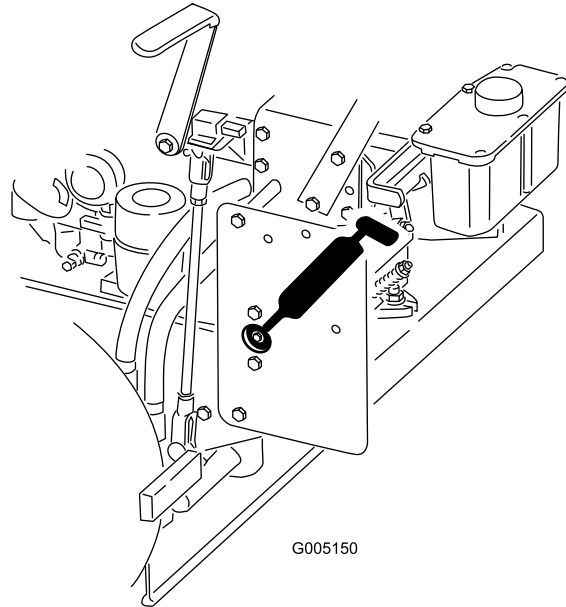


Figure 27

Greasing the PTO Drive Belt Idler and Mower Deck Belt Idler

Grease the idler pulley pivots (Figure 28 or Figure 29).

Note: You will have to remove the carrier covers to access the grease fitting for the mower deck.

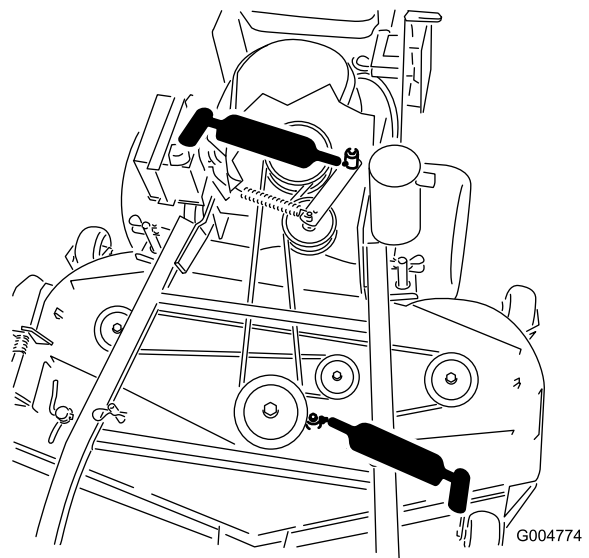


Figure 28

40 inch, 48 inch, and 52 inch Mower Deck shown

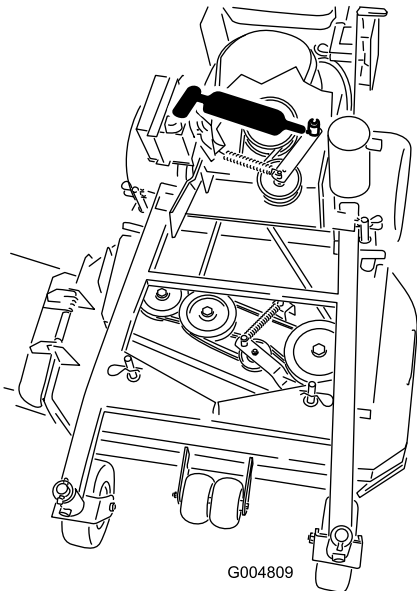


Figure 29

36 inch Mower Deck shown

Engine Maintenance

Servicing the Air Cleaner

Service Interval/Specification

Foam element: Clean it after every 25 operating hours.

Paper element: Check it after every 50 operating hours. Replace it after every 200 operating hours or yearly, which ever comes first.

Inspect the foam and paper elements and replace them if they are damaged or excessively dirty.

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

Important: Do not oil the foam or paper element.

Removing the Foam and Paper Elements

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. Clean around the air cleaner to prevent dirt from getting into the engine and causing damage (Figure 30).
4. Unscrew the cover knob and remove the air cleaner cover (Figure 30).
5. Remove the 2 wing nuts and remove the air cleaner assembly (Figure 30).
6. Carefully pull the foam element off the paper element (Figure 30).

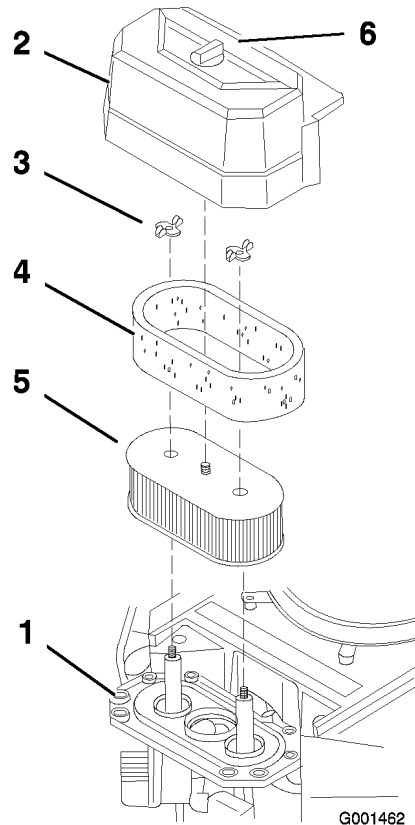


Figure 30

- | | |
|-------------|------------------|
| 1. Engine | 4. Foam element |
| 2. Cover | 5. Paper element |
| 3. Wing nut | 6. Cover knob |

Cleaning the Foam Air Cleaner Element

1. Wash the foam element in liquid soap and warm water. When the element is clean, rinse it thoroughly.
2. Dry the element by squeezing it in a clean cloth.

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

Servicing the Paper Air Cleaner Element

1. Do not clean the paper filter. Replace it after 200 operating hours (Figure 30).
2. Inspect the element for tears, an oily film, or damage to the rubber seal.
3. Replace the paper element if it is damaged.

Installing the Foam and Paper Elements

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

1. Carefully slide the foam element onto the paper air cleaner element (Figure 30).
2. Place the air cleaner assembly onto the air cleaner base and secure it with the 2 wing nuts (Figure 30).
3. Place the air cleaner cover into position and tighten the cover knob (Figure 30).

Servicing the Engine Oil

Service Interval/Specification

Check the engine oil level daily.

Change the engine oil as follows:

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

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

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

Crankcase Capacity: 58 ounces (1.7 liter) with the filter removed; 51 ounces (1.5 liter) without the filter removed

Viscosity: Refer to the table (Figure 31).

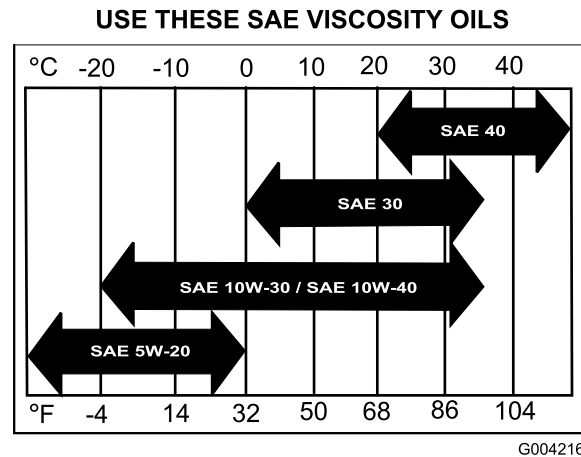


Figure 31

Checking the Engine Oil Level

1. Park the machine on a level surface.
2. Disengage the PTO 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. Clean around the oil dipstick (Figure 32) so that dirt cannot fall into the filler hole and damage the engine.

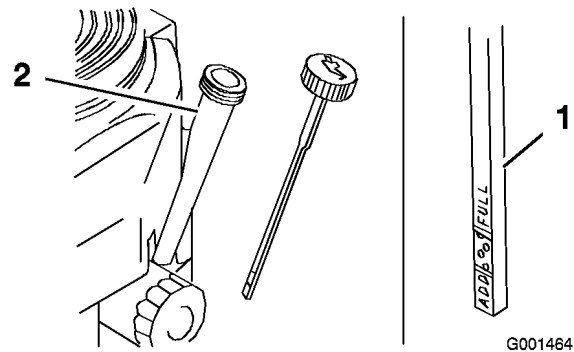


Figure 32

1. Oil dipstick
 2. Filler tube
5. Unscrew the oil dipstick and wipe the end clean (Figure 32).
 6. Slide the oil dipstick fully into the filler tube, but do not thread onto tube (Figure 32).
 7. Pull the dipstick out and look at the end. If the oil level is low, slowly pour only enough oil into the filler tube to raise the level to the Full mark.

Important: Do not overfill the crankcase with oil and run the engine; engine damage can result.

Changing the Oil

1. Start the engine and let it run five minutes. This warms the oil so it drains better.
2. Park the machine so that the drain side is slightly lower than the opposite side to assure the oil drains completely.
3. Disengage the PTO and set the parking brake.
4. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
5. Slide the drain hose over the oil drain valve.
6. Place a pan below the drain hose. Rotate oil drain valve to allow oil to drain (Figure 33).
7. When oil has drained completely, close the drain valve.
8. Remove the drain hose (Figure 33).

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

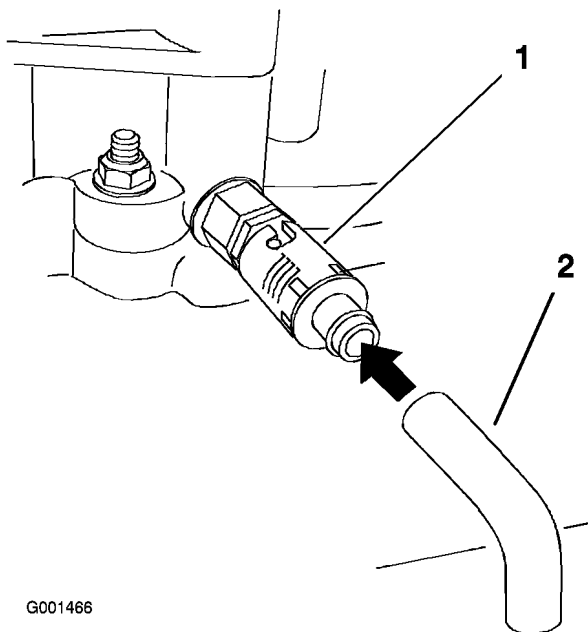


Figure 33

1. Oil drain valve 2. Oil drain hose

9. Slowly pour approximately 80% of the specified oil into the filler tube (Figure 32).

10. Check the oil level; refer to Checking the Engine Oil Level.
11. Slowly add the additional oil to bring it to the **Full** mark.

Changing the Oil Filter

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

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

1. Drain the oil from the engine; refer to Changing the Engine Oil.
2. Remove the old filter (Figure 34).

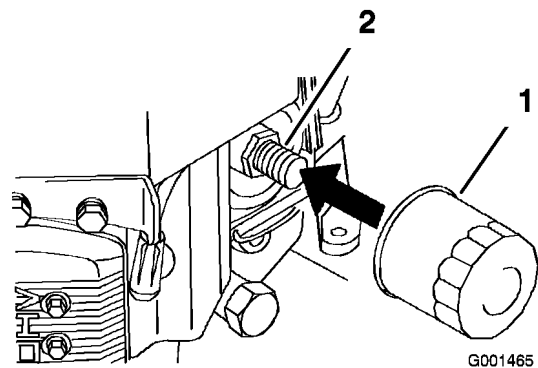


Figure 34

1. Oil filter 2. Adapter

3. Apply a thin coat of new oil to the rubber gasket on the replacement filter (Figure 34).
4. Install the replacement oil filter to the filter adapter, turn the oil filter clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 3/4 turn (Figure 34).
5. Fill the crankcase with the proper type of new oil; refer to Servicing the Engine Oil.
6. Run the engine for about 3 minutes, stop the engine, and check for oil leaks around the oil filter and drain valve.
7. Check the engine oil level and add oil if needed.
8. Wipe up any spilled oil.

Servicing the Spark Plugs

Check the spark plugs after every 100 operating hours.

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

Type: Champion® RCJ8Y or equivalent Air Gap: 0.030 inch (0.75 mm)

Removing the Spark Plugs

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. Disconnect the wires from the spark plugs (Figure 35).

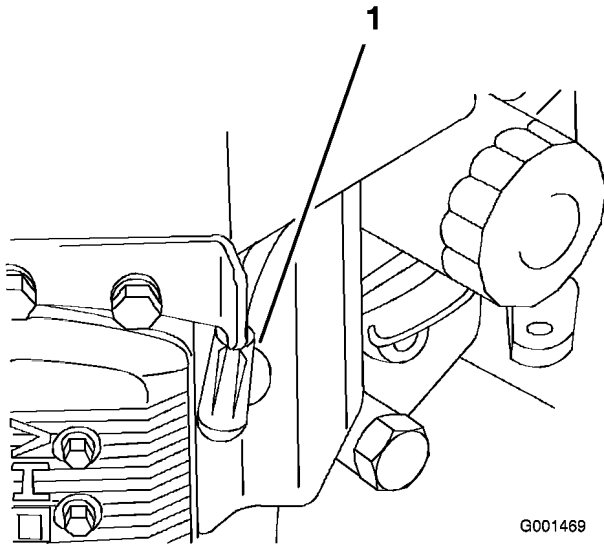


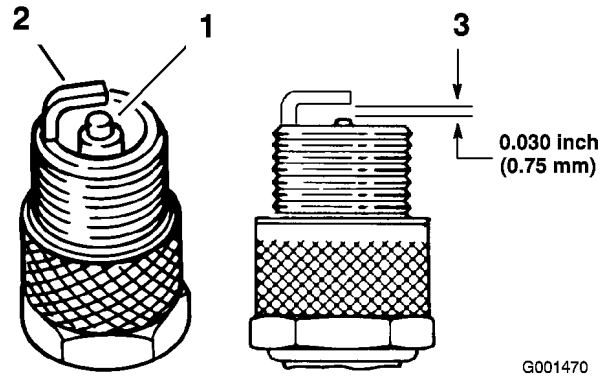
Figure 35

1. Spark-plug wire/spark plug

4. Clean around the spark plugs to prevent dirt from falling into the engine and potentially causing damage.
5. Remove the spark plugs and the metal washers.

Checking the Spark Plugs

1. Look at the center of the spark plugs (Figure 36). If you see light brown or gray on the insulator, the engine is operating properly. A black coating on the insulator usually means that the air cleaner is dirty.
2. If needed, clean the spark plug with a wire brush to remove carbon deposits.



G001470

Figure 36

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

Important: Always replace the spark plugs when it has worn electrodes, an oily film on it, or has cracks in the porcelain.

3. Check the gap between the center and side electrodes (Figure 36). Bend the side electrode (Figure 36) if the gap is not correct.

Installing the Spark Plugs

1. Install the spark plugs and the metal washer. Ensure that the air gap is set correctly.
2. Tighten the spark plugs to 16 ft-lb (22 N·m).
3. Connect the wires to the spark plugs (Figure 36).

Fuel System Maintenance

Draining the Fuel Tank



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

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

1. Park the machine on a level surface, to assure fuel tank drains completely. Then disengage the power take off (PTO), set the parking brake, and turn the ignition key to **off**. Remove the key.
2. Close the fuel shut-off valve at the fuel tank (Figure 37).
3. Squeeze the ends of the hose clamp together and slide it up the fuel line away from fuel filter (Figure 37).
4. Pull the fuel line off the fuel filter (Figure 37). Open the fuel shut-off valve and allow the gasoline to drain into a gas can or drain pan.

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

5. Install the fuel line onto the fuel filter. Slide the hose clamp close to the valve to secure the fuel line.
6. Wipe up any spilled fuel.

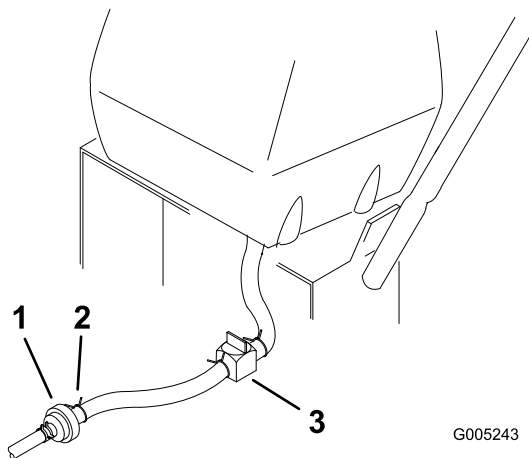


Figure 37

1. Fuel shut-off valve 2. Clamp

Servicing the Fuel Filter

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

Replacing the Fuel Filter

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

Note: Note how the fuel filter is installed in order to install the new filter correctly.

Note: Wipe up any spilled fuel.

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. Close fuel shut-off valve at the fuel tank (Figure 37).
4. Squeeze the ends of the hose clamps together and slide them away from the filter (Figure 38).

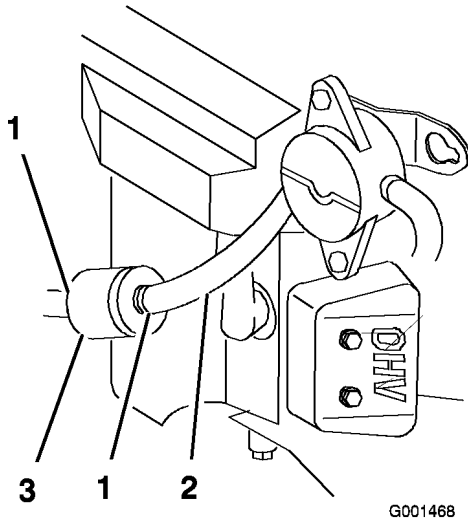


Figure 38

1. Hose clamp
2. Fuel line
3. Filter

5. Remove the filter from the fuel lines.
6. Install a new filter and move the hose clamps close to the filter.
7. Open fuel shut-off valve at fuel tank (Figure 37).
8. Check for fuel leaks and repair if needed.
9. Wipe up any spilled fuel.

Electrical System Maintenance

Servicing the Battery

Check the electrolyte level in the battery every 25 hours. Always keep the battery clean and fully charged. Use a paper towel to clean the battery case. If the battery terminals are corroded, clean them with a solution of four parts water and one part baking soda. Apply a light coating of grease to the battery terminals to prevent corrosion.

Voltage: 12 V

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.



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



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.



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

- Always Disconnect the negative (black) battery cable before disconnecting the positive (red) cable.
- Always Reconnect the positive (red) battery cable before reconnecting the negative (black) cable.

1. Disengage the PTO 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. Lift the black rubber cover on the negative cable. Disconnect the negative battery cable from the negative (-) battery terminal (Figure 39).
4. Slide the red terminal boot off the positive (red) battery terminal. Then remove the positive (red) battery cable (Figure 39).
5. Remove the battery hold down plate (Figure 39) and remove the battery.

Installing the Battery

1. Place the battery onto the machine (Figure 39).
2. Secure the battery with the hold down plate, j-bolts, and locknuts.
3. First, install the positive (red) battery cable to positive (+) battery terminal with a nut, washer and bolt (Figure 39). Slide the rubber cover over the post.
4. Then install the negative battery cable and ground wire to the negative (-) battery terminal with a nut, washer and bolt (Figure 39). Slide the rubber cover over the post.

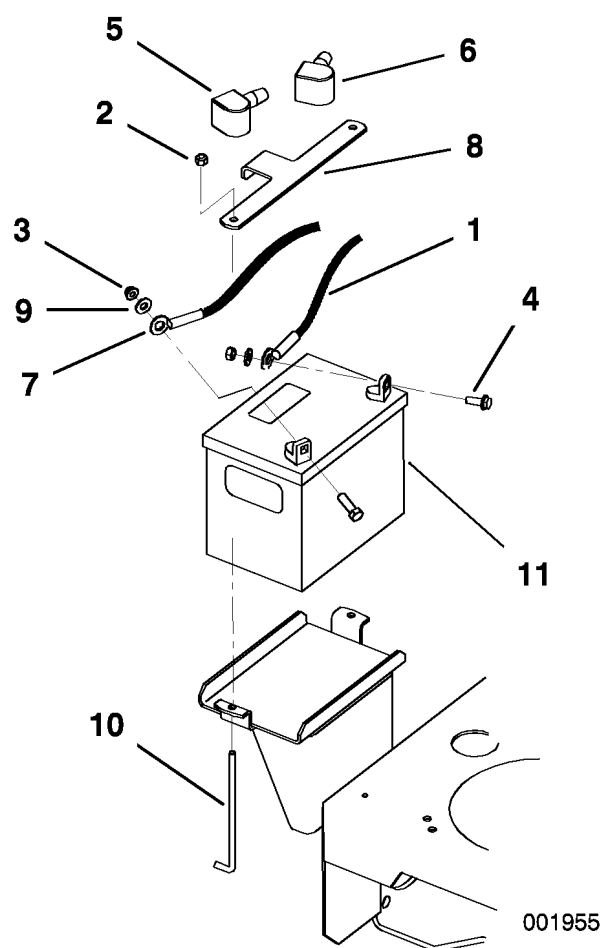


Figure 39

- | | |
|-------------------------|----------------------------|
| 1. Negative cable | 7. Positive cable |
| 2. Nut (1/4 in.) | 8. Battery hold down plate |
| 3. Nut (5/16 in.) | 9. Washer |
| 4. Bolt | 10. Battery hold down |
| 5. Rubber cover (red) | 11. Battery |
| 6. Rubber cover (black) | |

Checking the Battery Electrolyte Level



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

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

1. Look at the side of the battery. The electrolyte must be up to the **upper** line (Figure 40).

Do not allow the electrolyte to fall below the Lower line (Figure 40).

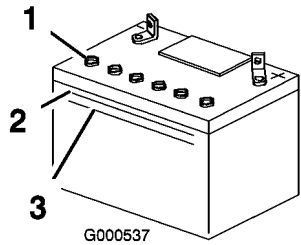


Figure 40

1. Vent caps
2. Upper line
3. Lower line

2. If the electrolyte is low, add the required amount of distilled water; refer to Adding Water to the Battery in Electrical System Maintenance, page 34.

Adding Water to the Battery

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

1. Remove the battery from the machine; refer to Removing the Battery in Electrical System Maintenance, page 34.

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

2. Clean the top of the battery with a paper towel.
3. Remove the vent caps from the battery (Figure 40).
4. Slowly pour distilled water into each battery cell until the electrolyte level is up to the Upper line (Figure 40) on the battery case.

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

5. Wait five to ten minutes after filling the battery cells. Add distilled water, if necessary, until the electrolyte level is up to the Upper line (Figure 40) on the battery case.
6. Reinstall the battery vent caps.

Charging the Battery



Charging the battery produces gasses that can explode.

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

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

1. Remove the battery from the chassis; refer to Removing the Battery.
2. Check the electrolyte level; refer to Checking the Electrolyte Level.
3. Make sure the filler caps are installed in battery. Charge battery for 1 hour at 25 to 30 amps or 6 hours at 4 to 6 amps.
4. When the battery is fully charged, unplug the charger from the electrical outlet, then disconnect the charger leads from the battery posts (Figure 41).
5. Install the battery onto 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.

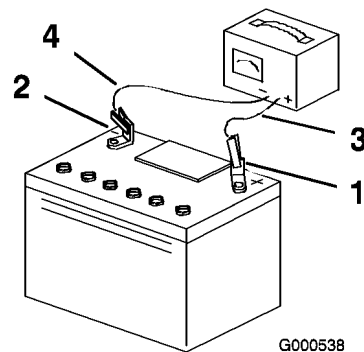


Figure 41

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

Servicing the Fuses

The electrical system is protected by fuses. It requires no maintenance. If a fuse blows, check

the component or circuit for a malfunction or short. Pull out on the fuse to remove or replace it (Figure 42).

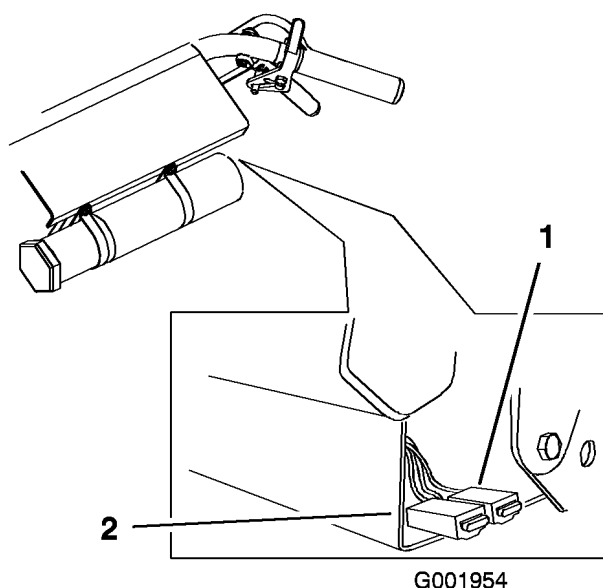


Figure 42

1. Fuse, 25 amp, blade type 2. Fuse, 30 amp, blade type

Drive System Maintenance

Perform the following linkage adjustments when the machine needs maintenance. Perform steps Adjust the Speed Control Linkage through Adjusting the Tracking. If and adjustment is needed , do them in the order that they are listed.

Adjusting the Speed Control Linkage

1. Disengage the PTO and set the parking brake.
2. Stop the engine and wait for all moving parts to stop before leaving the operating position.
3. Move the speed control lever (located on the console) to the full forward position (Figure 43).

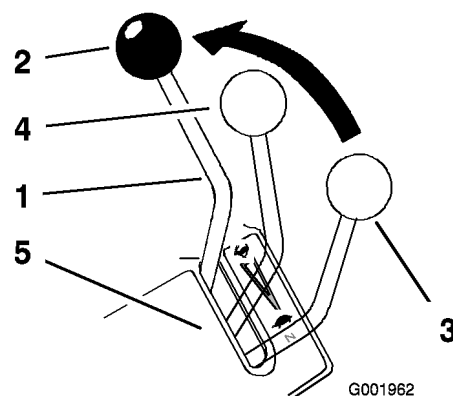


Figure 43

- | | |
|------------------------|--------------------------|
| 1. Speed control lever | 4. Medium speed position |
| 2. Full speed position | 5. Control panel |
| 3. Neutral position | |

4. Check the orientation of the tabs on the ends of the speed control crank. These tabs should be pointing straight down at the 6 o'clock position approximately (Figure 44).
5. If adjustment is needed, loosen the nuts on both sides of the swivel on the speed control rod (Figure 44).
6. Adjust the swivel until the tabs are at the 6 o'clock position (Figure 44).
7. Tighten the nuts on both sides of the swivel (Figure 44).

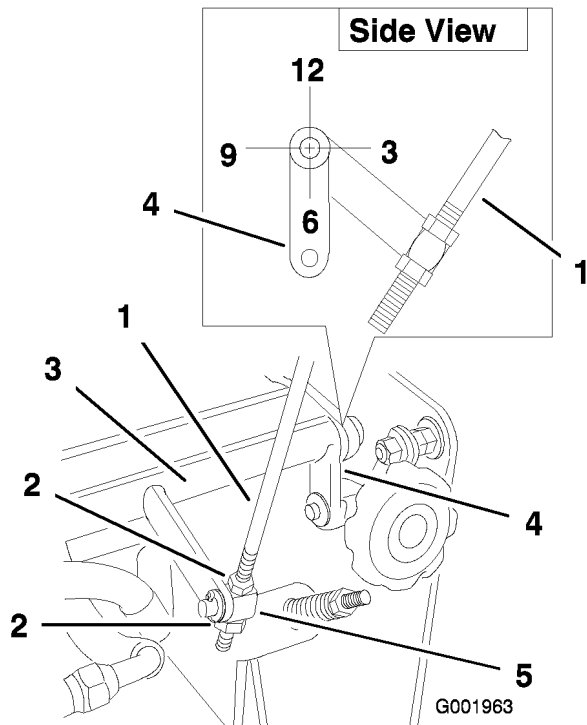


Figure 44

- | | |
|------------------------|-----------------------------|
| 1. Speed control rod | 4. Tabs, 6 o'clock position |
| 2. Jam nut | 5. Swivel |
| 3. Speed control crank | |

8. Pull the speed control lever back to neutral.
9. Check the travel of the shift lever in the control panel slot. The shift lever travel should be approximately centered in the control panel slot (Figure 45).
10. If needed, adjust the swivel on the speed control rod to center the shift lever travel (Figure 44).
11. With the speed control lever in the neutral position, check to make sure the safety switch is depressed and there is an 1/8 to 1/4 inch (3 to 6 mm) space between the actuating tab and the safety switch (Figure 45)..

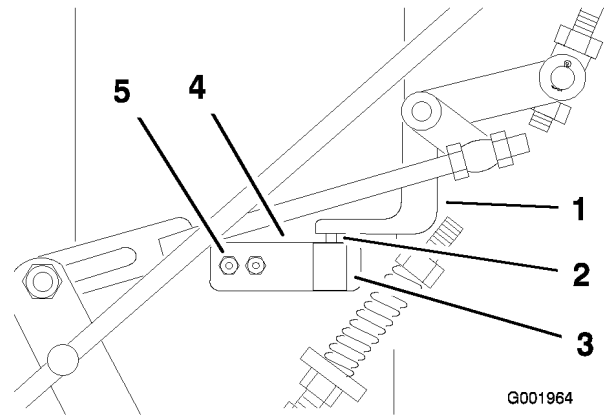


Figure 45

- | | |
|--------------------------------------|------------------|
| 1. Actuating tab | 3. Safety switch |
| 2. 1/8 to 1/4 inch (3 to 6 mm) space | |

12. To adjust the switch location, loosen the two neutral bracket screws holding the switch plate to the frame (Figure 45).
13. Adjust the switch up or down to obtain an 1/8 to 1/4 inch (3 to 6 mm) space (Figure 45).
14. Tighten the two neutral bracket screws holding the switch plate (Figure 45).

Temporary Neutral Stud Adjustment

Note: Perform the following procedures on both the left and right sides.

1. Move the left and right hand neutral lock latches to the unlatched position.
2. Move the speed control lever to the neutral position (Figure 43).
3. Loosen the nut against the yoke Figure 46).
4. Adjust the length of the neutral stud and yoke assembly so the clevis pin does not contact the back of the slot in the control arm bracket Figure 46).
5. Tighten the nut against the yoke Figure 46).

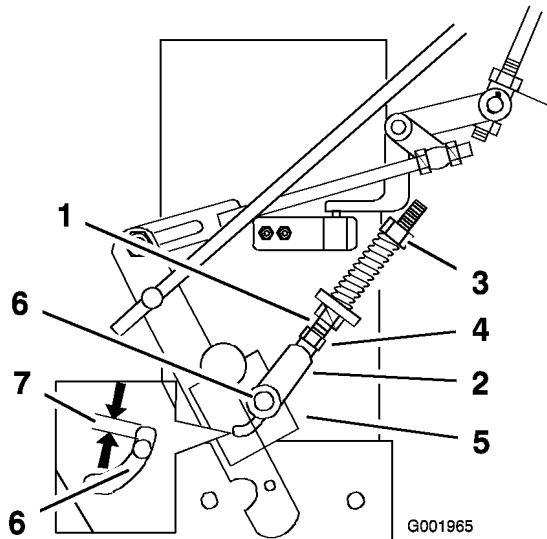


Figure 46

- | | |
|----------------------------|---|
| 1. Neutral control linkage | 5. Slot in control arm bracket |
| 2. Yoke | 6. Clevis pin |
| 3. Neutral stud | 7. Clevis pin does not contact the back of slot |
| 4. Nut against yoke | |

Adjusting the Hydro Control Linkages



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

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



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

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

Adjusting the Left Side Linkage

1. Disengage the PTO and set the parking brake.
2. Stop the engine and wait for all moving parts to stop before leaving the operating position.

3. Raise the rear of the machine onto jack stands high enough to raise the drive wheels off of the ground.
4. Disengage the parking brake.
5. Start the engine and move the throttle ahead to the full throttle position.
6. Press and hold the OPC levers down.

Note: The OPC levers must be held down whenever the speed control lever is out of the neutral position or the engine will kill.

7. Place the left drive lever in the full forward position.
8. Place the speed control lever in the neutral position.



Electrical system will not perform proper safety shut off with Operator Presence Control (OPC) levers fastened in place.

- Make sure Operator Presence Control (OPC) levers are working when adjustment is completed.
- Never operate this unit with Operator Presence Control (OPC) levers fastened in place.

9. Loosen the front adjusting nut on left hydro control linkage as shown in Figure 48.
10. Turn the left rear adjusting nut counter-clockwise until wheel rotates forward (Figure 48).
11. Turn the rear adjusting nut clockwise 1/4 of a turn at a time. Then move the speed control lever forward and back to neutral. Repeat this until left wheel stops rotating forward (Figure 48).

Note: Make sure flat part of linkage is perpendicular to the pin of swivel (Figure 47).

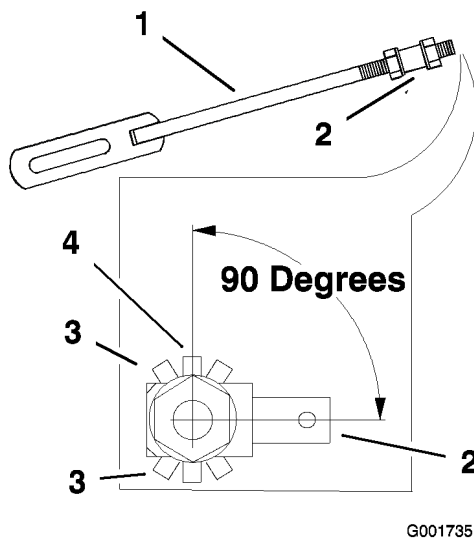


Figure 47

- | | |
|--------------------------|-----------------------|
| 1. Hydro control linkage | 3. Incorrect position |
| 2. Swivel | 4. Correct position |

12. After adjusting the left hydro control linkage, move the speed control lever forward and then back to the neutral position.
13. Make sure the speed control lever is in the neutral position and the tire does not rotate.
14. Repeat the adjustment if needed.

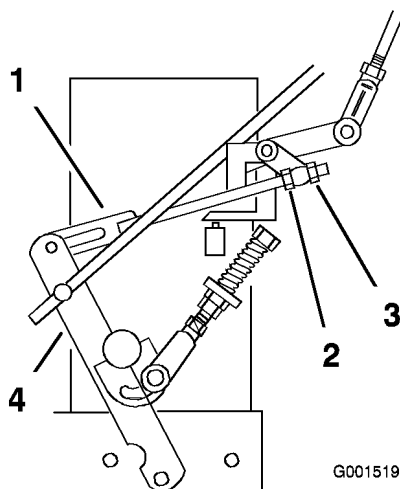


Figure 48

- | | |
|--------------------------|-----------------------|
| 1. Hydro control linkage | 3. Rear adjusting nut |
| 2. Front adjusting nut | 4. Control arm |

Note: If inconsistent neutral occurs, check to be sure both springs are properly tightened on the speed control lever under the console, especially the rear pivot spring. Repeat above adjustments if necessary (Figure 49).

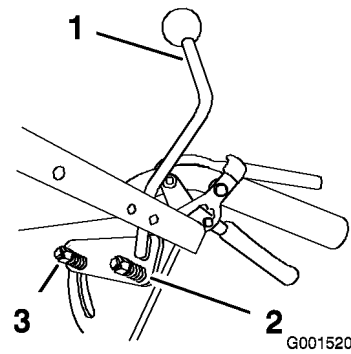


Figure 49

- | | |
|------------------------|-----------|
| 1. Speed control lever | 3. spring |
| 2. Rear pivot spring | |

15. Tighten the front nut on left hydro control linkage shown in Figure 48.

Adjusting the Right Side Linkage

1. With the machine on jack stands, place the speed control lever in the neutral position.
2. Place the right drive lever in the full forward position.
3. Hold the OPC levers down.

Note: The OPC levers must be held down whenever the speed control lever is out of the neutral position or the engine will kill.

4. Adjust the right side linkage by turning the quick track knob counterclockwise until the tire begins to rotate forward (Figure 50).
5. Turn the knob clockwise a 1/4 of a turn at a time. Then move the speed control forward and back to neutral. Repeat this until right wheel stops rotating forward (Figure 50).
6. The spring that keeps tension on the knob should normally not need adjustment. However if an adjustment is needed, adjust the length of spring to 1 inch (26 mm) between the washers (Figure 50).
7. Adjust the spring length by turning the nut at the front of spring (Figure 50).
8. After adjusting the right hydro control linkage, move the speed control lever forward and then back to the neutral position.
9. Make sure the speed control lever is in the neutral position and the tire does not rotate.
10. Repeat adjustment if needed.

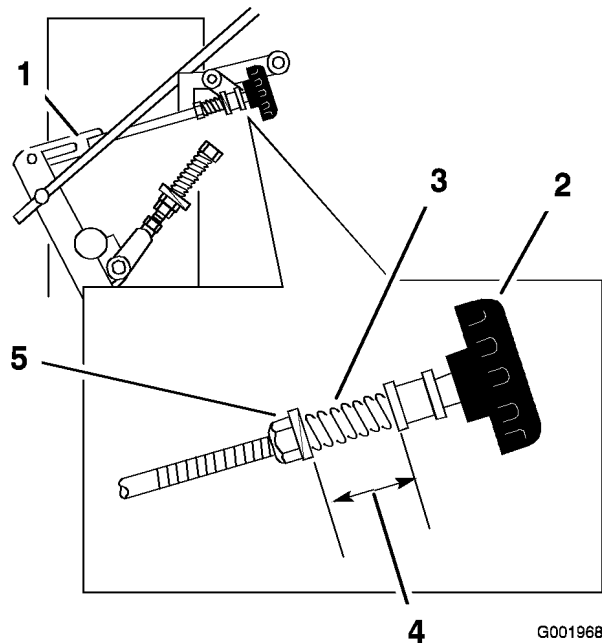


Figure 50

- | | |
|--------------------------|---------------------------|
| 1. Hydro control linkage | 4. 1 inch (26 mm) |
| 2. Quick track knob | 5. Nut in front of spring |
| 3. Spring | |

Adjusting the Neutral Stud



Electrical system will not perform proper safety shut off with Operator Presence Control (OPC) levers held in place.

- Make sure Operator Presence Control (OPC) levers are working when adjustment is completed.
- Never operate this unit with Operator Presence Control (OPC) levers held in place.



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

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

Note: The OPC levers must be held down whenever the speed control lever is out of the neutral position or the engine will kill.

3. Adjust the left and right neutral stud until the clevis pin in the yoke touches the back end of the slot in the control arm (Figure 51).
4. Move the speed control lever to the full forward position.
5. Squeeze one drive lever until an increased resistance is felt. This is neutral position. This is where the clevis pin in the yoke comes to the back end of the slot in the control arm bracket.

Note: Make sure you have not reached the end of the neutral lock slot. If you have, shorten the control lever linkage. Refer to Adjusting the Control Rod.

6. If the wheel turns while holding the drive lever in neutral, the neutral stud needs to be adjusted (Figure 51). If wheel stops then go to .
7. Loosen the nut against the yoke (Figure 51).
8. Adjust the adjustment stud until the respective drive wheel stops while holding the drive in the neutral position (increased resistance) (Figure 51).
9. Turn the adjusting bolt approximately 1/4 turn clockwise if the wheel is turning in reverse or turn the bolt approximately 1/4 turn counter-clockwise if the wheel is turning forward (Figure 51).
10. Release the drive lever to the forward drive position and squeeze back into the neutral position. Check to see if the wheel stops. If not, repeat the above adjustment procedure.
11. After adjustments are made, tighten the nuts against the yokes.
12. Repeat this procedure for the opposite side.

1. With the machine on jack stands, place the speed control lever in the neutral position.
2. Hold the OPC levers down.

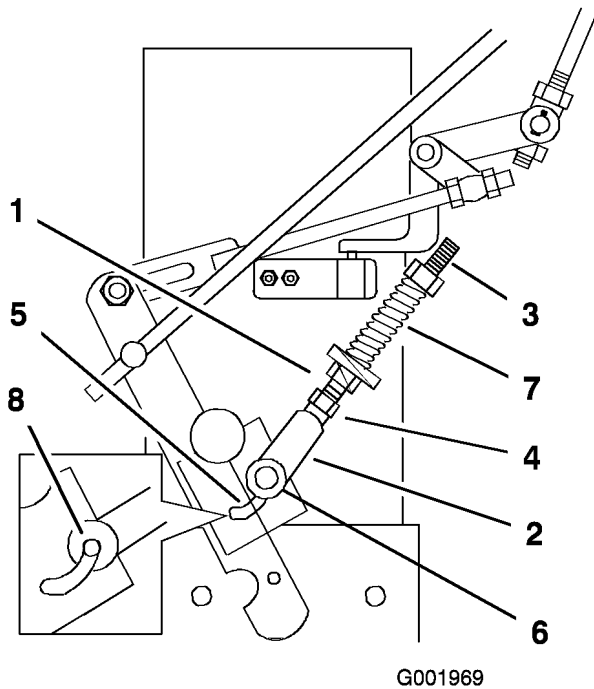


Figure 51

- | | |
|----------------------------|--------------------------------|
| 1. Neutral control linkage | 5. Slot in control arm bracket |
| 2. Yoke | 6. Clevis pin |
| 3. Neutral stud | 7. Spring |
| 4. Nut | 8. Back end of slot |

3. Rotate the rod several turns if the tire is rotating fast. Then, adjust the rod in 1/2 turn increments.
4. Place the clevis pin into the drive lever (Figure 52).

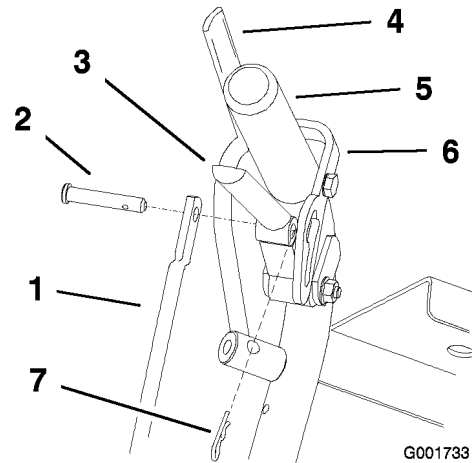


Figure 52

- | | |
|--|-----------------------|
| 1. Control rod | 5. Left handle shown |
| 2. Clevis pin | 6. Neutral lock |
| 3. Drive lever | 7. Hairpin cotter pin |
| 4. Operator Presence Control lever (OPC) | |

Adjusting the Control Rod

Checking the Control Rod

1. With rear of machine still on jack stands and engine running at full throttle, move the speed control lever to the medium speed position.

Note: The OPC levers must be held down whenever the speed control lever is out of the neutral position or the engine will kill.

2. Move the respective drive lever upward until it reaches the neutral position and engage neutral locks.
3. If the tire rotates in either direction, the length of the control rod will need to be adjusted.

Adjusting the Control Rod

1. Adjust the rod length by releasing the drive lever and removing the hairpin cotter pin and clevis pin. Rotate the rod in the rod fitting (Figure 52).
2. Lengthen the control rod if the tire is turning in reverse and shorten the rod if the tire is turning forward.

5. Release and engage neutral lock checking that the tire does not rotate (Figure 53). Continue this process until the tire does not rotate.
6. Install the hairpin cotter pin between the drive levers and the neutral locks and into the clevis pins (Figure 52).

Note: Make sure the clevis pins are inserted into the neutral locks.

7. Repeat this adjustment for the opposite side.

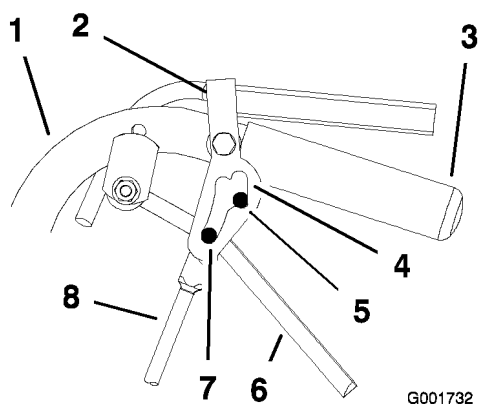


Figure 53

- | | |
|----------------------|-----------------------|
| 1. Handle | 5. Neutral position |
| 2. Neutral lock | 6. Drive lever |
| 3. Handle | 7. Full speed forward |
| 4. Neutral lock slot | 8. Control rod |

Adjusting the Tracking

1. Remove machine from any jack stands.
2. Check the rear tire pressure. Refer to Checking the Tire Pressure.
3. Start and run the machine. Observe the tracking on a level, smooth, hard surface such as concrete or asphalt.
4. If the unit tracks to one side or the other, turn the quick track knob. Turn the knob right to steer right and turn the knob left to steer left (Figure 54).

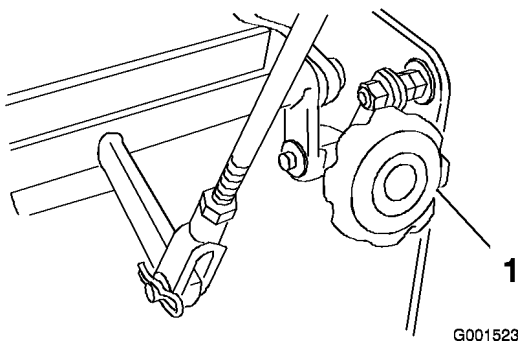


Figure 54

1. Quick track knob

Adjusting the Traction Spring

The position of the traction spring is adjustable to increase the traction as attachments, such as

a sully or bagger, are added to the mower and excessively uneven terrain.

Use Figure 55 for the traction spring options.

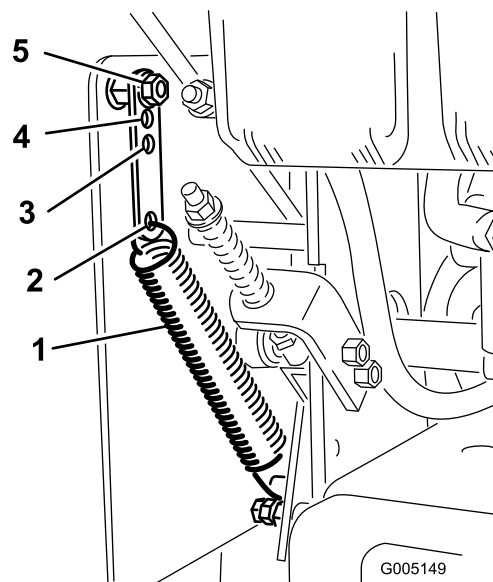


Figure 55

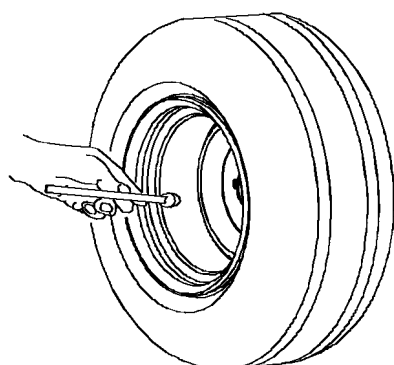
- | | |
|---|--|
| 1. Traction spring | 4. Medium traction for moderate conditions |
| 2. Left side linkage | 5. Standard traction for normal conditions |
| 3. Most traction for uneven terrain and attachments | |

Checking the Tire Pressure

Check the pressure at the valve stem after every 50 operating hours or monthly, whichever occurs first (Figure 56).

Maintain the air pressure in the rear tires at 12-14 psi (83-97 kPa). Uneven tire pressure can cause an uneven cut.

Note: The front tires are semi-pneumatic tires and do not require air pressure maintenance.



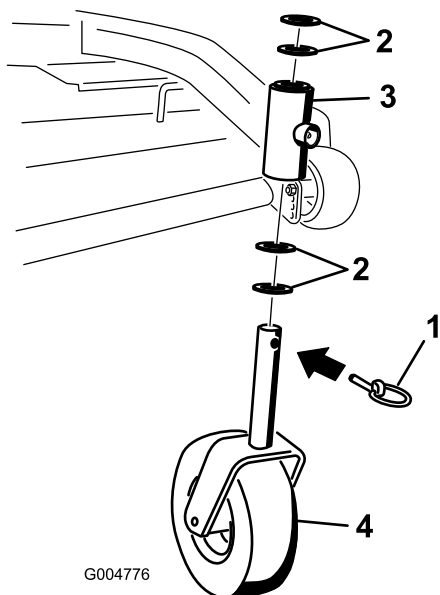
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Figure 56

Replacing the Caster Wheel Fork Bushings

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

1. Raise the cutting unit so the caster wheels are off the floor, then support the front of the mower with jack stands.
2. Remove the locking pin and spacer(s) from the top of the caster wheel fork (Figure 57).

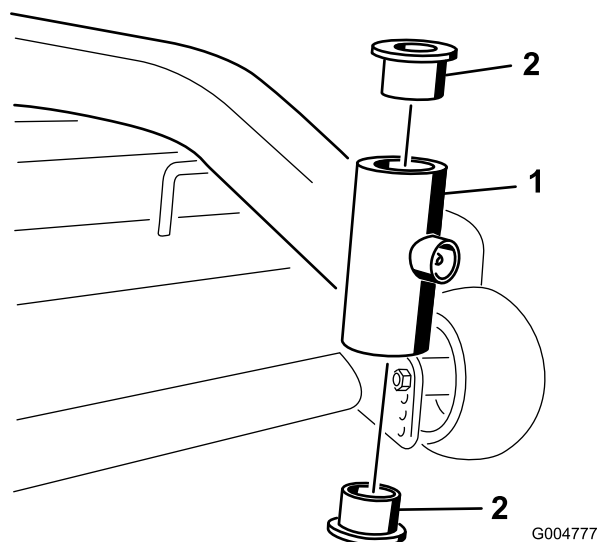


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Figure 57

- | | |
|----------------|-----------------------------|
| 1. Locking Pin | 3. Carrier frame pivot tube |
| 2. Spacers | 4. Caster wheel fork |

3. Pull the caster wheel fork out of the mounting tube, leaving the spacer(s) on the bottom of the fork. Remember the location of the spacers on each fork to ensure correct installation, and to maintain a level deck.
4. Insert a pin punch into the mounting tube and carefully drive out the bushings (Figure 58). Clean the inside of the mounting tube.



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Figure 58

- | | |
|------------------|------------|
| 1. Mounting Tube | 2. Bushing |
|------------------|------------|

5. Grease the inside and outside of the new bushings. Use a hammer and flat plate to carefully drive the bushings into the pivot tubes.
6. Inspect the caster wheel fork for wear and replace if necessary (Figure 57).
7. Slide the caster wheel fork through the bushings in the mounting tube. Replace the spacer(s) onto the fork and secure with the retaining ring (Figure 57).

Important: The inside diameter of the bushings may collapse slightly when installed. If the caster wheel fork does not slide into the new bushings, ream both bushings to an inside diameter of 1.126 inch (29 mm).

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

Servicing the Caster Wheel and Bearings

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

1. Remove the locknut and wheel bolt holding the caster wheel to the caster fork (Figure 59).

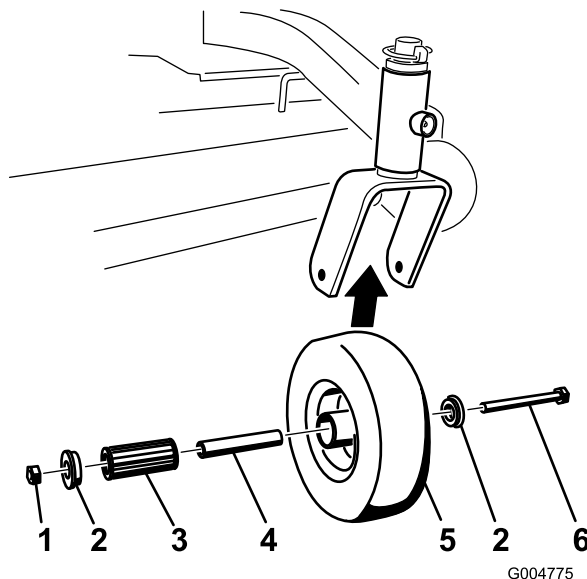


Figure 59

- | | |
|---------------|--------------------|
| 1. Locknut | 4. Spanner Bushing |
| 2. Wheel Bolt | 5. Roller Bearing |
| 3. Bushing | |

2. Remove one bushing, then pull the spanner bushing and roller bearing out of the wheel hub (Figure 59).
3. Remove the other bushing from the wheel hub and clean any grease and dirt from the wheel hub (Figure 59).
4. Inspect the roller bearing, bushings, spanner bushing and inside of the wheel hub for wear. Replace any defective or worn parts (Figure 59).
5. To assemble, place one bushing into the wheel hub. Grease the roller bearing and spanner bushing and slide them into the wheel hub. Place the second bushing into the wheel hub (Figure 59).
6. Install the caster wheel into the caster fork and secure with the wheel bolt and locknut. Tighten the locknut until the spanner bushing

bottoms against the inside of the caster forks (Figure 59).

7. Grease the fitting on the caster wheel.

Adjusting the Electric Clutch

The clutch is adjustable to ensure proper engagement and proper braking. Check adjustment after every 100 hours of operation.

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.
2. Tighten the lock nuts until there is slight binding on the feeler gauge but it can be moved easily within the air gap (Figure 60).
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.

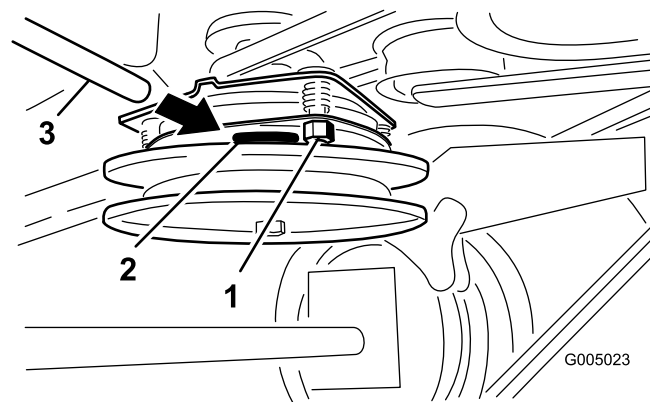


Figure 60

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

Cooling System Maintenance

Cleaning the Air Intake Screen

Before each use remove any build-up of grass, dirt or other debris from the cylinder and cylinder head cooling fins, air intake screen on flywheel end, and carburetor-governor levers and linkage. This will

help insure adequate cooling and correct engine speed and will reduce the possibility of overheating and mechanical damage to the engine.

Brake Maintenance

Servicing the Brake

Before each use, check brakes on both a level surface and slope.

Always set the parking brake when you stop the machine or leave it unattended. If the parking brake does not hold securely, an adjustment is required.

Checking the Parking Brake

1. Park the machine on a level surface, disengage the PTO.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Apply the parking brake. Setting the parking brake should take a reasonable amount of force. If the parking brake does not hold securely, an adjustment is required. Refer to Adjusting the Parking Brake.

Note: When the brake is engaged, the brake handle should be in the 1 o'clock position.

Adjusting the Brakes

The brake lever is on the upper control bar. If the parking brake does not hold securely, an adjustment is required.

1. Park the machine on a level surface, 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. Check the brake before you adjust it; refer to Checking the Brakes.
4. Release the parking brake; refer to Releasing the Parking Brake in Operation, page 14.
5. Loosen the top and bottom jam nuts (Figure 61).
6. To adjust the brake, remove the hair pin cotter and clevis pin from the lower brake lever (Figure 61).

7. Rotate the brake rod in the yokes. To tighten the brake, lengthen the rod between the yokes. To loosen the brake, shorten the rod between the yokes (Figure 61).

Note: The brake rod should be threaded into both yokes the same distance.

8. Secure the yoke to lower brake lever with the hair pin cotter and clevis pin (Figure 61).
9. Tighten the top and bottom jam nuts (Figure 61).
10. Check the brake operation again; refer to Checking the Brake.

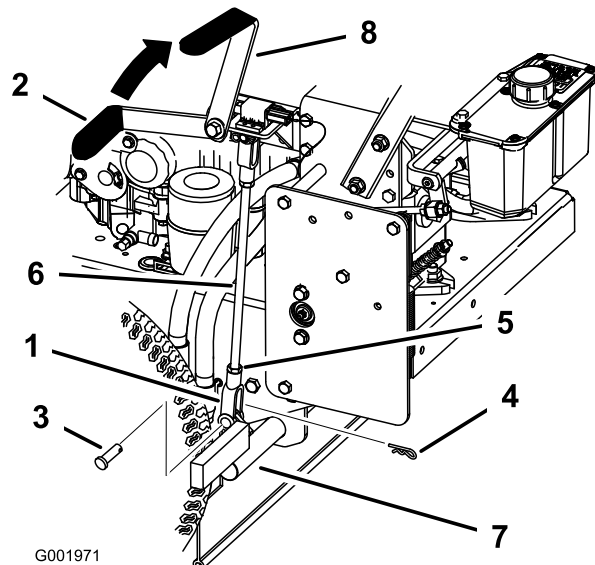


Figure 61

- | | |
|--|-----------------------|
| 1. Yoke | 5. Jam Nut |
| 2. Parking brake lever (released position) | 6. Brake rod |
| 3. Clevis pin | 7. Lower brake lever |
| 4. Hairpin cotter | 8. 1 o'clock position |

Belt Maintenance

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 deck belt. Replace the deck belt if any of these conditions are evident.

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. Unlatch and remove the carrier frame cover.

4. Unlatch and remove the belt covers.
5. Remove the PTO drive belt. Refer to Replacing the PTO Drive Belt.
6. Disconnect the idler arm spring to relieve tension on the idler arm and idler pulley, then remove the worn mower belt (Figure 62 or Figure 63).
7. Install the new mower belt around the two outside spindle pulleys, the idler pulley, and in the lower groove of the double spindle pulley (Figure 62 or Figure 63).
8. Connect the idler arm spring (Figure 62 or Figure 63).
9. Install the PTO drive belt. Refer to Replacing the PTO Drive Belt.
10. Adjust the belt guide an 1/8 inch (3 mm) from the belt (Figure 62 or Figure 63).
11. Install the belt covers onto the cutting unit and secure the latches.
12. Install the carrier frame cover onto the cutting unit and secure the latches.

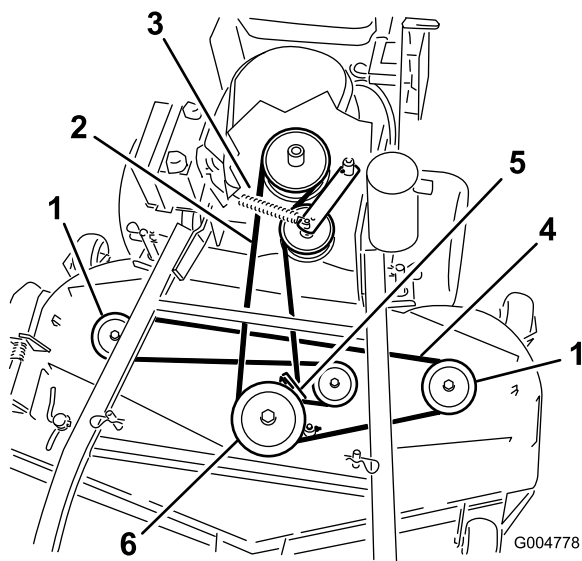


Figure 62

40 inch, 48 inch, and 52 inch Mower Deck shown

- | | |
|---------------------|--------------------------|
| 1. Outside pulley | 4. Mower deck belt |
| 2. PTO Drive Belt | 5. Belt guide |
| 3. Idler arm spring | 6. Center spindle pulley |

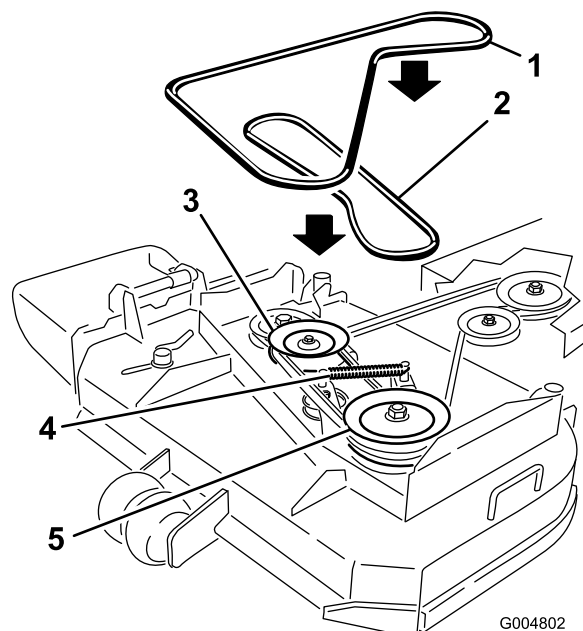


Figure 63

36 inch Mower Deck shown

- | | |
|----------------------|----------------------|
| 1. Mower deck belt | 4. Idler arm spring |
| 2. PTO Drive Belt | 5. Drive belt pulley |
| 3. Drive belt pulley | |

Replacing the PTO Drive Belt

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

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. Unlatch and remove the carrier frame cover.
4. Unlatch and remove the belt covers.
5. Remove the heat shield from the engine deck and carrier frame.
6. Roll the belt off of the center pulley on the mower deck (Figure 64). Refer to Figure 65 to roll the belt off left pulley for a 36 inch mower deck. Use caution when removing the belt as tension will increase because of the spring loaded idler pulley.
7. Remove the belt from the engine pulley and the spring loaded idler pulley (Figure 64). Refer to Figure 65 to remove the belt from the 36 inch mower deck pulleys.

8. Install the new belt onto the engine pulley and spring loaded idler pulley (Figure 64).
9. Roll the belt onto the center pulley on the mower deck (Figure 64). Use caution when install the belt as tension will increase because of the spring loaded idler pulley. Refer to Figure 65 to roll the new belt onto the left pulley for a 36 inch mower deck.
10. Install the heat shield to the engine deck and carrier frame.
11. Adjust the belt guide an 1/8 inch (3 mm) from the belt for 40, 48 and 52 inch mower decks (Figure 64).
12. Install the belt covers onto the cutting unit and secure the latches.
13. Install the carrier frame cover onto the carrier frame and secure the latches.

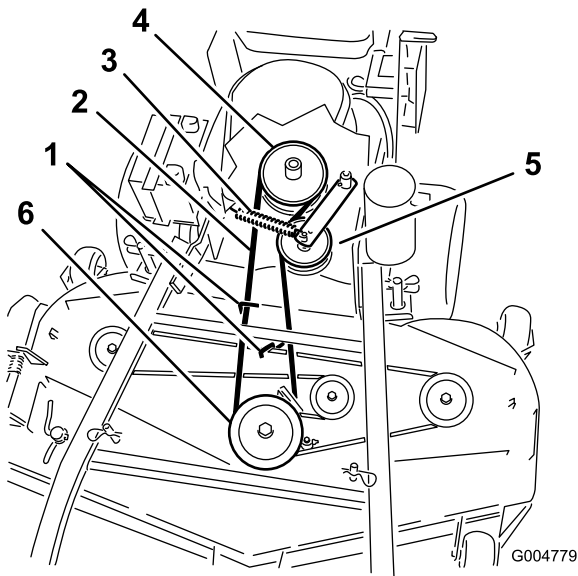


Figure 64

40 inch, 48 inch, and 52 inch Mower Deck shown

- | | |
|-------------------------|--------------------------------|
| 1. PTO drive belt guide | 4. PTO engagement pulley |
| 2. PTO drive Belt | 5. PTO drive belt idler pulley |
| 3. Idler spring | 6. Center spindle pulley |

Use Figure 66 for the idler position options.

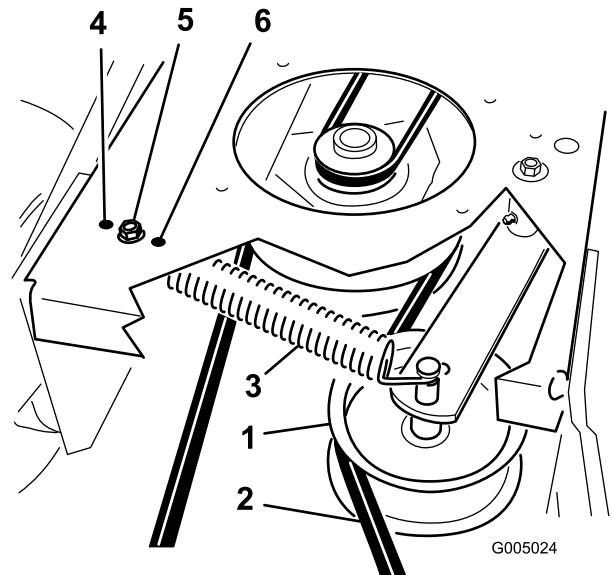


Figure 66

- | | |
|--------------------------------|--|
| 1. PTO drive belt idler pulley | 4. Most tension for worn belts |
| 2. PTO drive Belt | 5. Medium tension for normal belt conditions |
| 3. Idler spring | 6. Least tension for new belts |

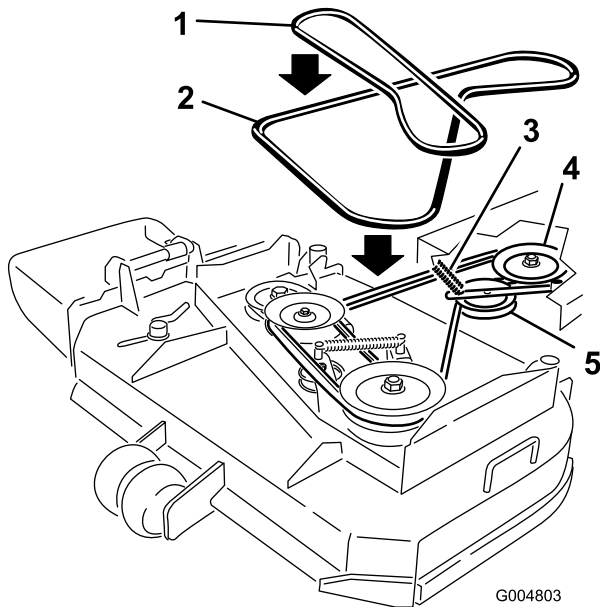


Figure 65

36 inch Mower Deck shown

- | | |
|-------------------------|------------------|
| 1. Mower deck belt | 4. Clutch pulley |
| 2. PTO Drive Belt | 5. Idler pulley |
| 3. Idler arm and spring | |

Replacing the 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 PTO drive belt. Refer to Replacing the PTO Drive Belt in the Belt Maintenance, page 46.
4. Raise the machine and support it with jack stands.
5. Disconnect the clutch wire connector from the wire harness.
6. Disconnect the clutch retainer from the engine deck (Figure 67).

Adjusting the PTO Drive Belt Idler Spring Anchor

The position of the PTO idler can be adjusted to increase or decrease belt tension.

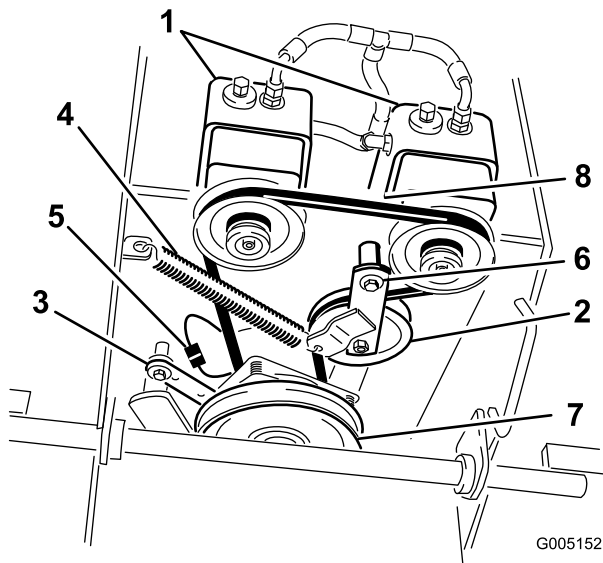


Figure 67

- | | |
|--------------------|--------------------------|
| 1. Hydraulic pumps | 5. Clutch wire connector |
| 2. Idler pulley | 6. Pivot bolt |
| 3. Clutch retainer | 7. Drive pulley |
| 4. Tension spring | 8. Pump drive belt |

7. Unhook the idler spring from the frame (Figure 67).
8. Install the new belt around clutch and the two drive pulleys.
9. Install the idler spring between idler arm and frame bracket (Figure 67).
10. Install the clutch retainer to the engine deck (Figure 67).
11. Connect the clutch wire connector to the wire harness.
12. Install the PTO drive belt.

Hydraulic System Maintenance

Servicing the Hydraulic System

Checking the Hydraulic Fluid

Check the hydraulic fluid level as follows:

- Check the hydraulic fluid level before engine is first started.
- Check the hydraulic fluid level after first 8 operating hours.
- Check the hydraulic fluid level after every 25 operating hours.

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

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

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

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

1. Position machine on a level surface.
2. Disengage the power take off (PTO) and shut off the engine.
3. Wait for all moving parts to stop before leaving the operating position and then set the parking brake.
4. Clean area around cap and filler neck of hydraulic tank (Figure 68).

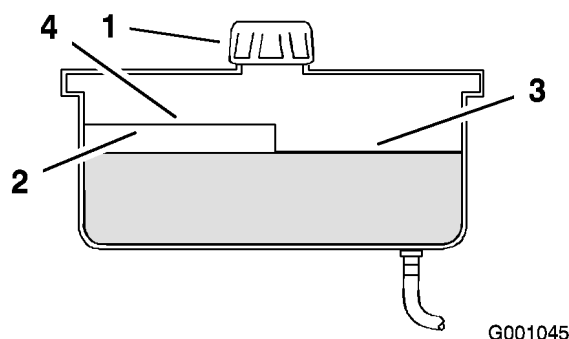


Figure 68

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

5. Remove cap from filler neck. Look inside to check the fluid level in the reservoir. (Figure 68).
6. Add fluid to the reservoir until it reaches the cold level of the baffle.
7. Run the machine at low idle for 15 minutes to allow any air to purge out of the system and warm fluid. Refer to Starting and Stopping the Engine.
8. Recheck the fluid level while the fluid is warm. If required, add fluid to the reservoir until it reaches the hot level of the baffle.

Note: The fluid level should be to the top of the hot level of the baffle, when the fluid is warm (Figure 68).

9. Install cap on filler neck.



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

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

Replacing the Hydraulic Filter



Hot hydraulic fluid can cause severe burns.

Allow the hydraulic fluid to cool before performing any maintenance to the hydraulic system.

Change the hydraulic filter as follows:

- After the first 8 operating hours.
 - After every 200 operating hours or yearly before storage.
1. Disengage the PTO and set the parking brake.
 2. Stop the engine and wait for all moving parts to stop before leaving the operating position.

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

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

4. Locate the filter under the fuel tank and place drain pan under filter (Figure 69).

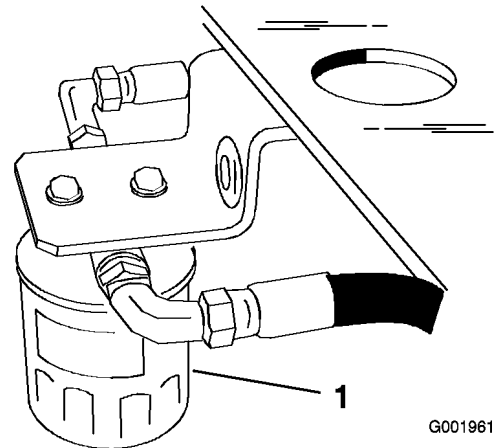


Figure 69

5. Remove the old filter and wipe the filter adapter gasket surface clean (Figure 70).
6. Apply a thin coat hydro fluid to the rubber gasket on the replacement filter.
7. Install replacement hydraulic filter onto the filter adapter. Do not tighten.
8. Remove plastic bag from reservoir opening and allow filter to fill with hydraulic fluid.
9. When the hydraulic filter is full, turn the oil filter clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 1/2 turn (Figure 70).

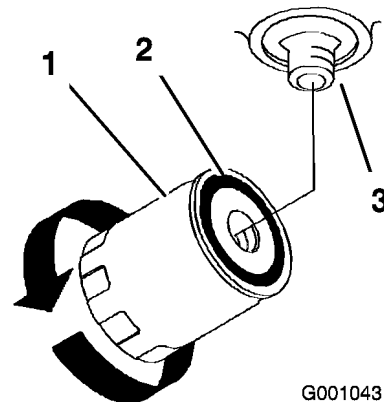


Figure 70

1. Hydraulic filter
2. Gasket
3. Adapter

10. Clean up any spilled fluid.
11. Check the fluid in the reservoir, add fluid to the tank until it reaches the cold baffle of the tank.

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

12. Start engine and let run for about two minutes to purge air from the system. Stop the engine and check for leaks. If one or both wheels will not drive, refer to Bleeding Hydraulic System.
13. Recheck level and add fluid, if required. **Do not overfill.**

Bleeding the Hydraulic System

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

1. Disengage the PTO and set the parking brake.
2. Stop the engine and wait for all moving parts to stop before leaving the operating position.
3. Raise the rear of the machine up onto jack stands high enough to raise the drive wheels off the ground.
4. Start the engine and move the throttle control to idle position. Move the speed control lever to the middle speed position and place one drive lever into the drive position.

If the drive wheel does not rotate, it is possible to assist the purging of the system by carefully rotating the tire in the forward direction.

5. Check the hydraulic fluid level as it drops add fluid as required to maintain the proper level.
6. Repeat this procedure for the opposite wheel.
7. Thoroughly clean the area around each of the charge pump housings.

Checking the Hydraulic Lines

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

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



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

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

Mower Deck Maintenance

Servicing the Cutting Blades

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



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 blades 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 blades and set the parking brake. Turn the ignition key to off. Remove the key and disconnect the spark plug wires from the spark plugs.

Inspecting the Blades

Inspect the blades every 8 hours.

1. Inspect the cutting edges (Figure 71). If the edges are not sharp or have nicks, remove and sharpen the blades. Refer to Sharpening the Blades.

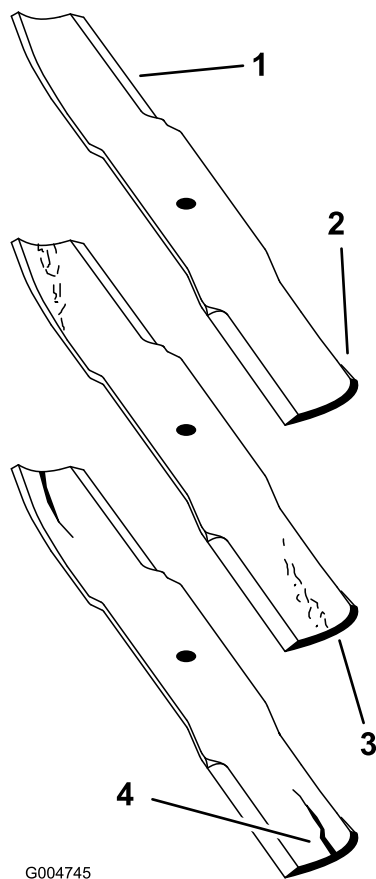


Figure 71

- | | |
|-----------------|-------------------------------------|
| 1. Cutting Edge | 3. Wear/slot forming in curved area |
| 2. Sail | 4. Crack in the curved area |

2. Inspect the blades, especially the curved area (Figure 71). If you notice any cracks, wear, or a slot forming in this area (item 3 in Figure 71), immediately install a new blade.

Checking for Bent Blades

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Rotate the blades until the ends face forward and backward. Measure from a level surface to the cutting edge, position **A**, of the blades (Figure 72). Note this dimension. For 36 inch mower decks use Figure 73.

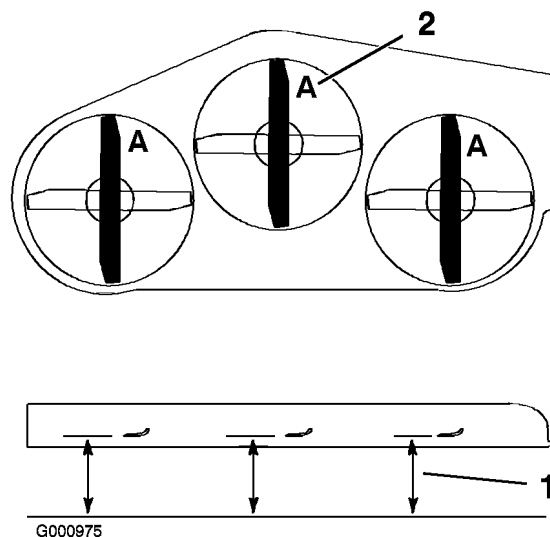


Figure 72

40 inch, 48 inch, and 52 inch Mower Deck shown

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

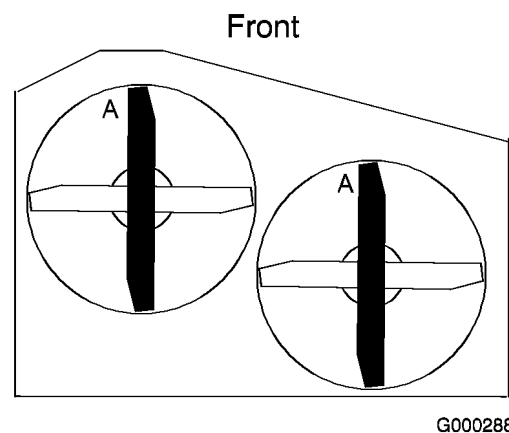


Figure 73

36 inch Mower Deck shown

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.



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. Hold the blade end using a rag or thickly-padded glove.
2. For 40 and 48 inch mower decks, remove the blade bolt, curved washer, and blade from the spindle shaft (Figure 74).

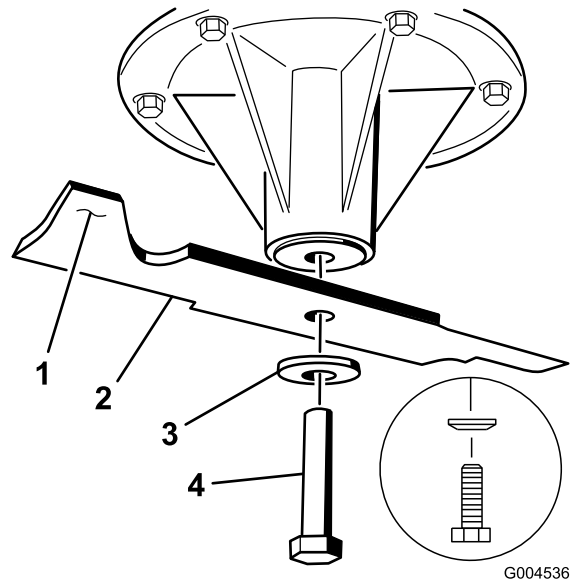


Figure 74

40 inch and 48 inch Mower Decks

- | | |
|-----------------------|------------------|
| 1. Sail Area of Blade | 3. Curved washer |
| 2. Blade | 4. Blade Bolt |

3. For 36 and 52 inch mower decks, remove the blade bolt, curved washer, blade stiffener, and blade from the spindle shaft (Figure 75).

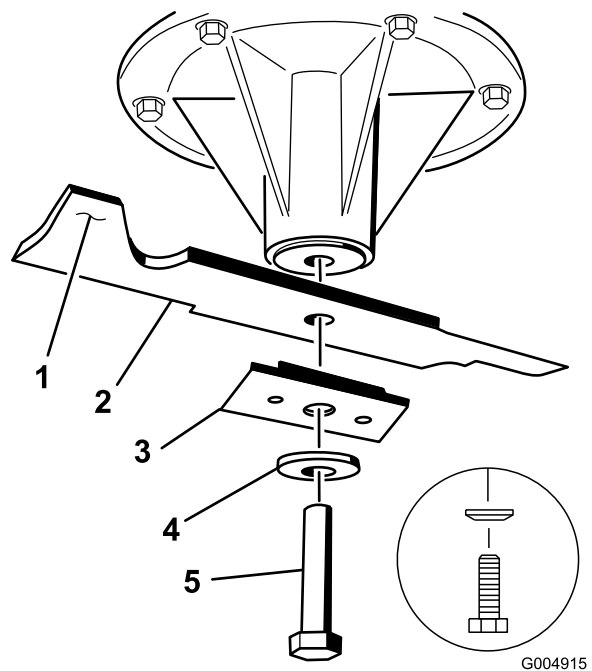


Figure 75

36 inch and 52 inch Mower Decks

- | | |
|-----------------------|------------------|
| 1. Sail Area of Blade | 4. Curved washer |
| 2. Blade | 5. Blade Bolt |
| 3. Blade stiffener | |

Sharpening the Blades

1. Use a file to sharpen the cutting edge at both ends of the blade (Figure 76). Maintain the original angle. The blade retains its balance if the same amount of material is removed from both cutting edges.

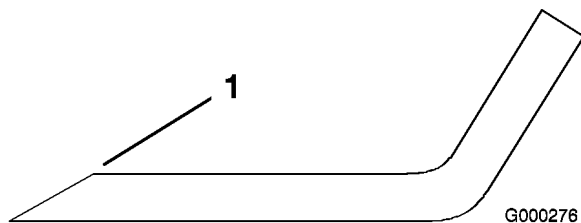


Figure 76

1. Sharpen at original angle

2. Check the balance of the blade by putting it on a blade balancer (Figure 77). If the blade stays in a horizontal position, the blade is balanced and can be used. If the blade is not balanced, file some metal off the end of the sail area only (Figure 74). Repeat this procedure until the blade is balanced.

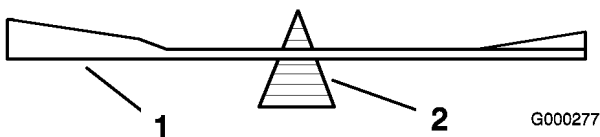


Figure 77

1. Blade
2. Balancer

Installing the Blades

1. Install the blade onto the spindle shaft (Figure 74).
- Important:** The sail part of the blade must be pointing upward, toward the inside of the mower to ensure proper cutting (Figure 74).
2. For 40 inch and 48 inch mower decks, install the blade, curved washer, and blade bolt (Figure 74).
 3. For 36 inch and 52 inch mower decks, install the blade, stiffener, curved washer, and blade bolt (Figure 75).
 4. Torque the blade bolt to 85-110 ft-lb (115-140 N•m).

Correcting the Mower Quality of Cut

If one deck blade cuts lower than the other, correct as follows.

Note: Tire air pressure is critical in these procedures. Make sure all tires have correct pressure.

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. Disconnect the spark plug wire(s) from the spark plug(s).
3. Adjust the tire pressure in the rear tires to specifications; refer to Drive System Maintenance, page 37 .
4. Check that the blades and spindle shafts are not bent. Refer to Checking for Bent Blades.
5. Set the height-of-cut to the 4 inch (101.6 mm) position. Refer to Adjusting the Height-Of-Cut in Operation, page 14.
6. Perform the steps in the following sections: Frame Set Up, Checking Front-to-Rear Pitch, and Checking Side-to-Side Leveling.

Frame Set Up

Checking the Carrier Frame and Engine Deck Alignment

Note: Misalignment can cause excess wear on the PTO 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. Place a long straight edge on top of the engine deck as shown in Figure 78.
4. At the carrier frame cross channel, measure the height at location **A** (Figure 78). This measurement must be 1-5/16 inch (33 mm), plus or minus a 1/4 inch (6 mm).
5. If the height at location **A** is not correct, adjustment is needed.

- Loosen the carrier frame mounting bolts on both sides of the machine (Figure 78).
- Align the carrier frame and engine deck to match 1-5/16 inch (33 mm), plus or minus a 1/4 inch (6 mm) at location **A** (Figure 78).
- Tighten the carrier frame mounting bolts on both sides of the machine.

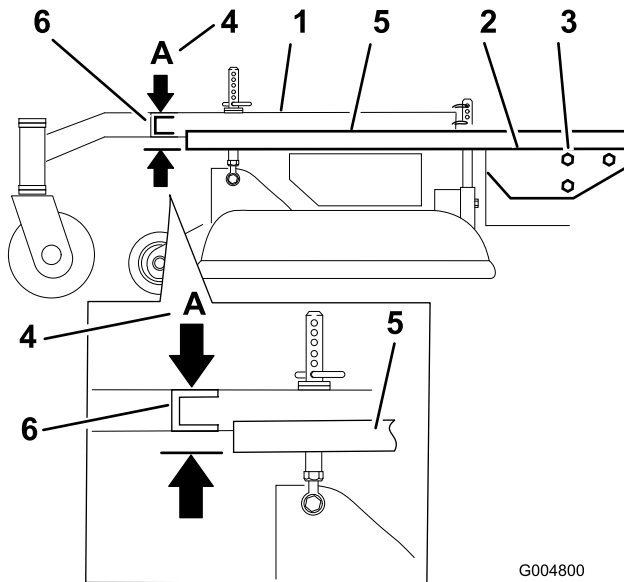


Figure 78

- | | |
|---------------------------------|--|
| 1. Carrier Frame | 4. Location A, 1-5/16 inch (33 mm) \pm 1/4 inch (6 mm) |
| 2. Top of engine deck | 5. Straight edge |
| 3. Carrier frame mounting bolts | 6. Carrier frame cross channel bolts |

Checking the Engine Deck Height

- Disengage the PTO and set the parking brake.
- Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
- Adjust the tire pressure in the rear tires to specifications; refer to Drive System Maintenance, page 37.
- Measure engine deck height at location **A** (Figure 79).

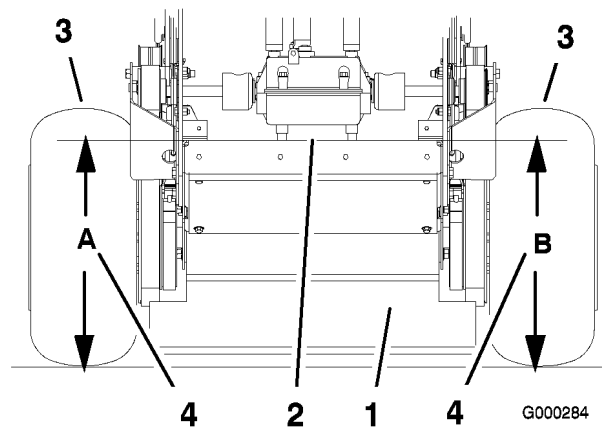


Figure 79

- | | |
|-------------------------|---|
| 1. Back view of machine | 3. Tires |
| 2. Top of engine deck | 4. Same height at locations A and B |
- Measure engine deck height at location **B** (Figure 79).
 - If the height at location **A** and **B** are not the same, change tire pressure slightly to make them the same.

Checking the Carrier Frame Front-to-Rear Pitch

The carrier frame must have a pitch between 1/8 inch (3 mm) to 3/8 inch (9 mm) over the length of 24 inches (61 cm) on the carrier frame (Figure 80).

- Measure out 24 inches (61 cm) on the carrier frame (Figure 80).

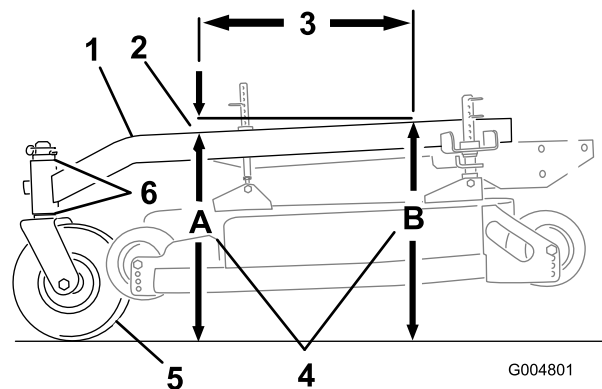


Figure 80

- | | |
|--|--|
| 1. Carrier Frame | 4. Height at locations A and B |
| 2. 1/8 inch - 3/8 inch (3-10 mm) pitch over 24 inch (61 cm) length | 5. Caster Wheel |
| 3. 24 inches (61 cm) | 6. Caster spacers |

- Measure carrier frame height at location **A** (Figure 80).

3. Measure carrier frame height at location **B** (Figure 80).
4. The height at location **A** must be an 1/8-3/8 inch (3 mm -10 mm) lower than location **B** (Figure 80).
5. If the carrier frame is not correct, move caster spacers to make it an 1/8-3/8 inch (3 -10 mm) pitch (Figure 80). Move spacers from top or bottom to make the correct pitch.
6. The tire pressure may also be adjusted slightly to make an 1/8-3/8 inch (3 -10 mm) pitch.

Checking the Carrier Frame Side-to-Side Height

The carrier frame needs to be parallel side-to-side from the ground.

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. Adjust the tire pressure in the rear tires to specifications; refer to Drive System Maintenance, page 37 .
4. Measure carrier frame height at location **A** (Figure 81).
5. Measure carrier frame height at location **B** (Figure 81).
6. If the carrier frame height is not the same move spacers from top or bottom of caster wheel, to make it level. The tire pressure may also be adjusted slightly to make it level.

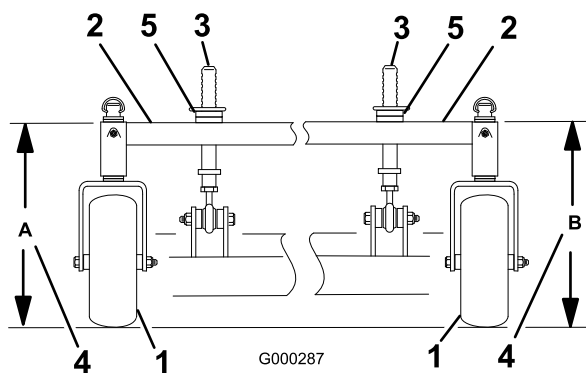


Figure 81

- | | |
|-----------------------------|-------------------------------------|
| 1. Caster Wheel | 4. Same height at locations A and B |
| 2. Carrier Frame | 5. Caster spacers |
| 3. Front height-of-cut pins | |

Checking the Mower Deck Front-to-Rear Pitch

1. Adjust the tire pressure in the rear tires to specifications; refer to Drive System Maintenance, page 37 .
2. Position one blade front-to-rear. Measure at **A** and **B** locations from a level surface to the cutting edge of the blade tips (Figure 82 or Figure 83). For 36 inch mower decks use Figure 83.
3. The mower blade should be a 1/4 inch (6 mm) lower in front at **A** than in the rear at **B**. Rotate blades and repeat for other blades. If it is not correct, proceed to Changing the Deck Front-to-Rear Pitch.

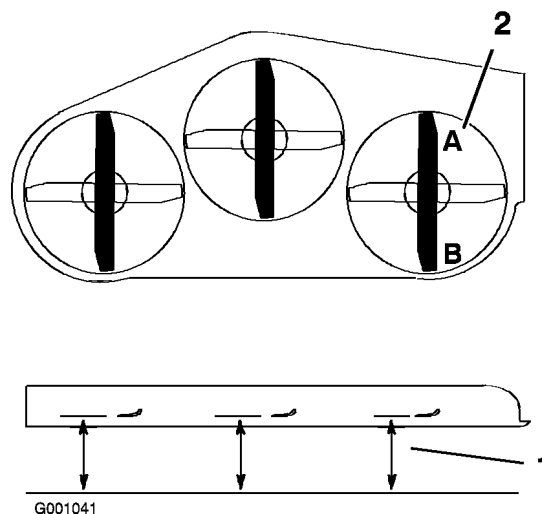


Figure 82

40 inch, 48 inch, and 52 inch Mower Deck shown

1. Measure blade at points **A** and **B**
2. Measure from a level surface

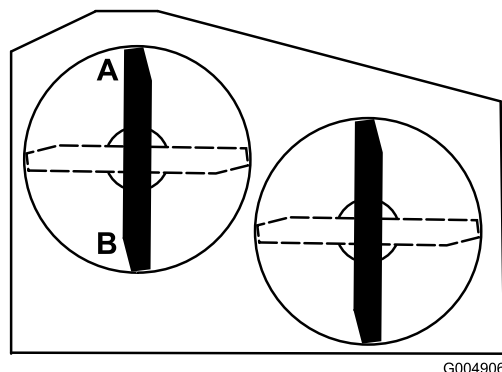


Figure 83

36 inch Mower Deck shown

Changing the Mower Deck Front-to-Rear Pitch

Changing the front-to-rear pitch is done by adjusting the front height-of-cut posts.

1. To change the front-to-rear pitch, the front height-of-cut posts can be adjusted (Figure 84).

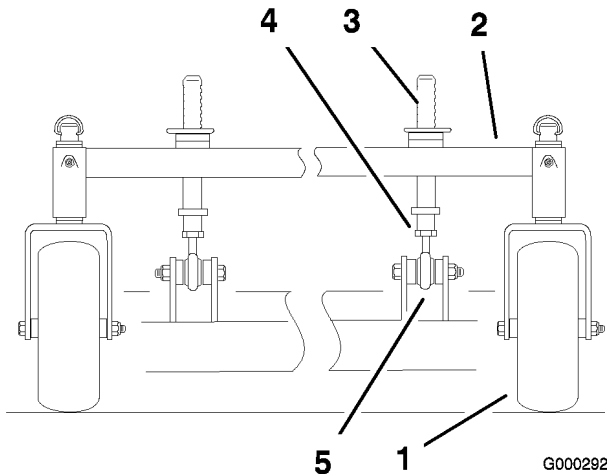


Figure 84

- | | |
|-----------------------------|---------------|
| 1. Caster Wheel | 4. Jam nut |
| 2. Carrier Frame | 5. Ball joint |
| 3. Front height-of-cut pins | |

2. To raise the front of the deck, loosen jam nut and rotate the front pin clockwise (Figure 84).
3. To lower the front of the deck, loosen jam nut and rotate the front pin counter clockwise (Figure 84).
4. Position the blades front-to-rear. Measure at C and D locations (Figure 82) from a level surface to the cutting edge of the blades.
5. Check the side-to-side leveling of the cutting unit.
6. Tighten the jam nuts (Figure 84).

Checking the Mower Deck Side-to-Side Height

1. Adjust the rear tire pressure to specifications; refer to Drive System Maintenance, page 37 .
2. Position the blades side-to-side. Measure at C and D locations from a level surface to the cutting edge of blade tips (Figure 85). For 36 inch mower decks use Figure 86.

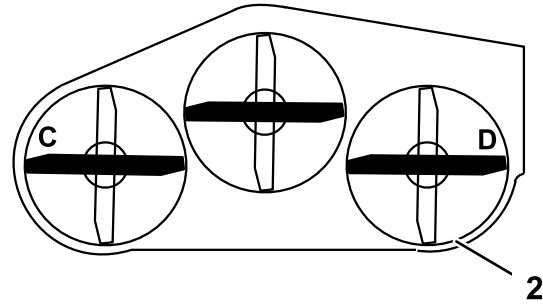


Figure 85

40 inch, 48 inch, and 52 inch Mower Deck shown

1. Measure from a level surface
2. Measure blade at points C and D

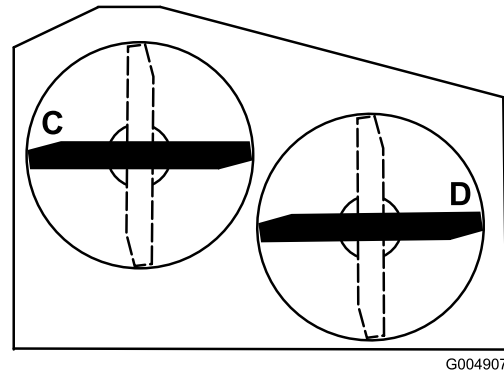


Figure 86

36 inch Mower Deck shown

3. The difference between measurements C and D should be no more than 1/4 inch (6 mm).

Changing the Mower Deck Side-to-Side Height

Changing the side-to-side height is done by adjusting the rear tire pressure and caster spacers.

1. Change the rear tire pressure. Do this to the corresponding side that needs adjustment.
2. Adjust the caster spacer.
3. Recheck the front-to-rear pitch and side to side leveling of the cutting unit.

Matching Height of Cut

1. Check the rear tire pressure.

- Set the height-of-cut to the 4 inch (101.6 mm) position following the height-of-cut decal.
- With the machine on level surface, position one blade front-to-rear. Measure at **A** and from level surface to the cutting edge of the blade tips (Figure 87). For 36 inch mower decks use Figure 88.

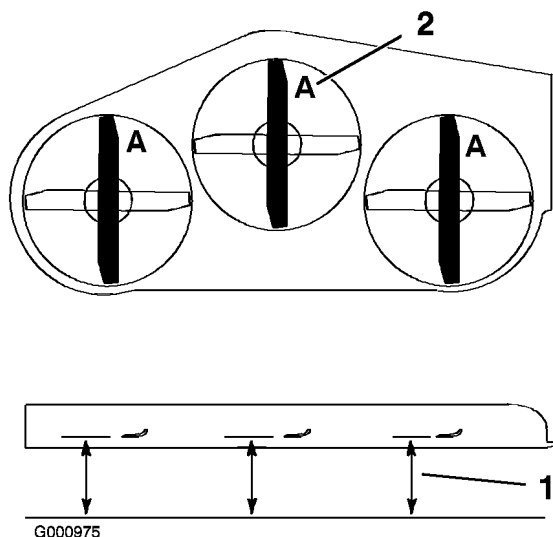


Figure 87

40 inch, 48 inch, and 52 inch Mower Deck shown

- Measure from a level surface
- Measure blade at point **A**

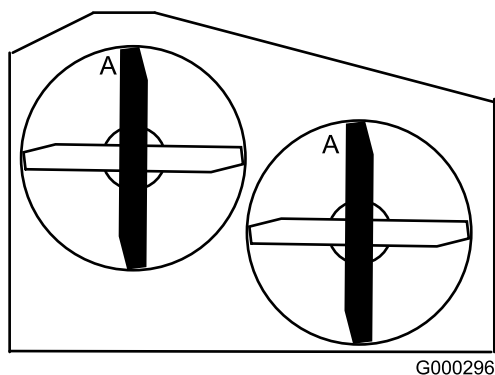


Figure 88

36 inch Mower Deck shown

- The measurement should be 4 inch (101.6 mm).
- If it does not measure correctly:
 - Adjust the rear tire pressure.
 - Adjust the caster fork spacers.

- Adjust the front mower deck support pins.
- Check the carrier frame front-to-rear pitch.

Replacing the Grass Deflector



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.

- Remove the locknut, bolt, spring and spacer holding the deflector to the pivot brackets (Figure 89). Remove damaged or worn grass deflector.

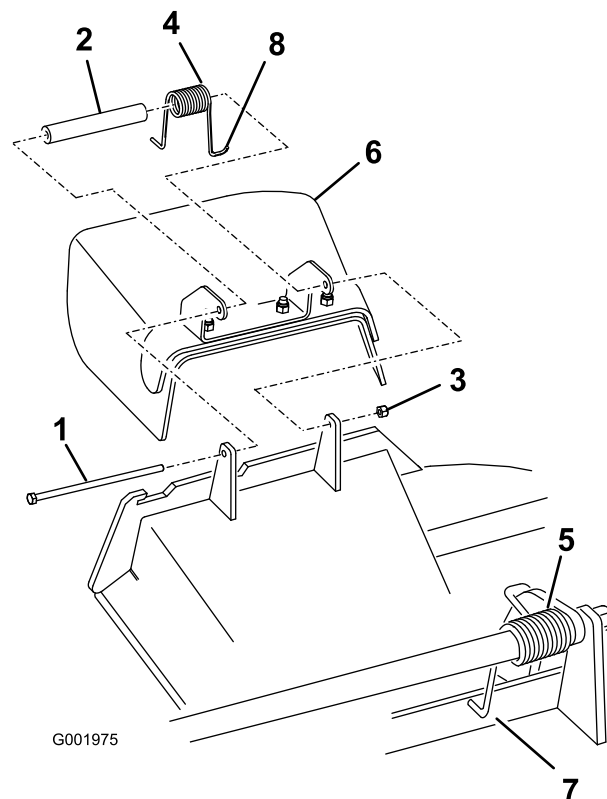


Figure 89

- Bolt
- Spacer
- Locknut
- Spring
- Spring installed
- Grass Deflector
- L end of spring, place behind deck edge before installing bolt
- J hook end of spring

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

Note: Make sure the L end of spring is installed behind deck edge before installing the bolt as shown in Figure 89.

3. Install bolt and nut. Place the **J** hook end of spring around grass deflector (Figure 89).

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

Remove the grass buildup under the mower daily.

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. Raise the front of the machine and use jack stands to support the mower.

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 (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. Clean dirt and chaff from the outside of the engine's cylinder head fins and blower housing.

Important: You can wash the machine with mild detergent and water. Do not pressure wash the machine. Avoid excessive use of water, especially near the drive system and engine. Pressure washing can force dirt and water into critical parts, such as spindle bearings and electrical switches.

3. Check the brake; refer to Servicing the Brake in Brake Maintenance, page 46.
4. Service the air cleaner; refer to Servicing the Air Cleaner in Engine Maintenance, page 29.
5. Grease the machine; refer to Greasing and Lubrication in Lubrication, page 28.
6. Change the engine oil; refer to Servicing the Engine in Engine Maintenance, page 29.
7. Check the tire pressure; refer to Checking the Tire Pressure in Drive System Maintenance, page 37.
8. For long-term storage:
 - A. Add stabilizer/conditioner additive to fuel in the tank.
 - B. Run engine to distribute conditioned fuel through the fuel system (5 minutes).
 - C. Stop engine, allow to cool and drain the fuel tank; refer to Servicing the Fuel Tank in Fuel System Maintenance, page 33, or operate engine until it stops.
 - D. Restart engine and run until it stops. Repeat, on Choke until engine will not restart.
 - E. Dispose of fuel properly. Recycle as per local codes.

Note: Do not store stabilizer/conditioned gasoline over 90 days.

9. Remove the spark plug(s) and check its condition; refer to Servicing the Spark Plug in Engine Maintenance, page 29. With the spark plug(s) removed from the engine, pour two tablespoons of engine oil into the spark plug hole. Now use the starter to crank the engine and distribute the oil inside the cylinder. Install the spark plug(s). Do not install the wire on the spark plug(s).
10. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged or defective.
11. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
12. Store the machine in a clean, dry garage or storage area. Remove the key from the ignition switch and keep it in a memorable place. Cover the machine to protect it and keep it clean.

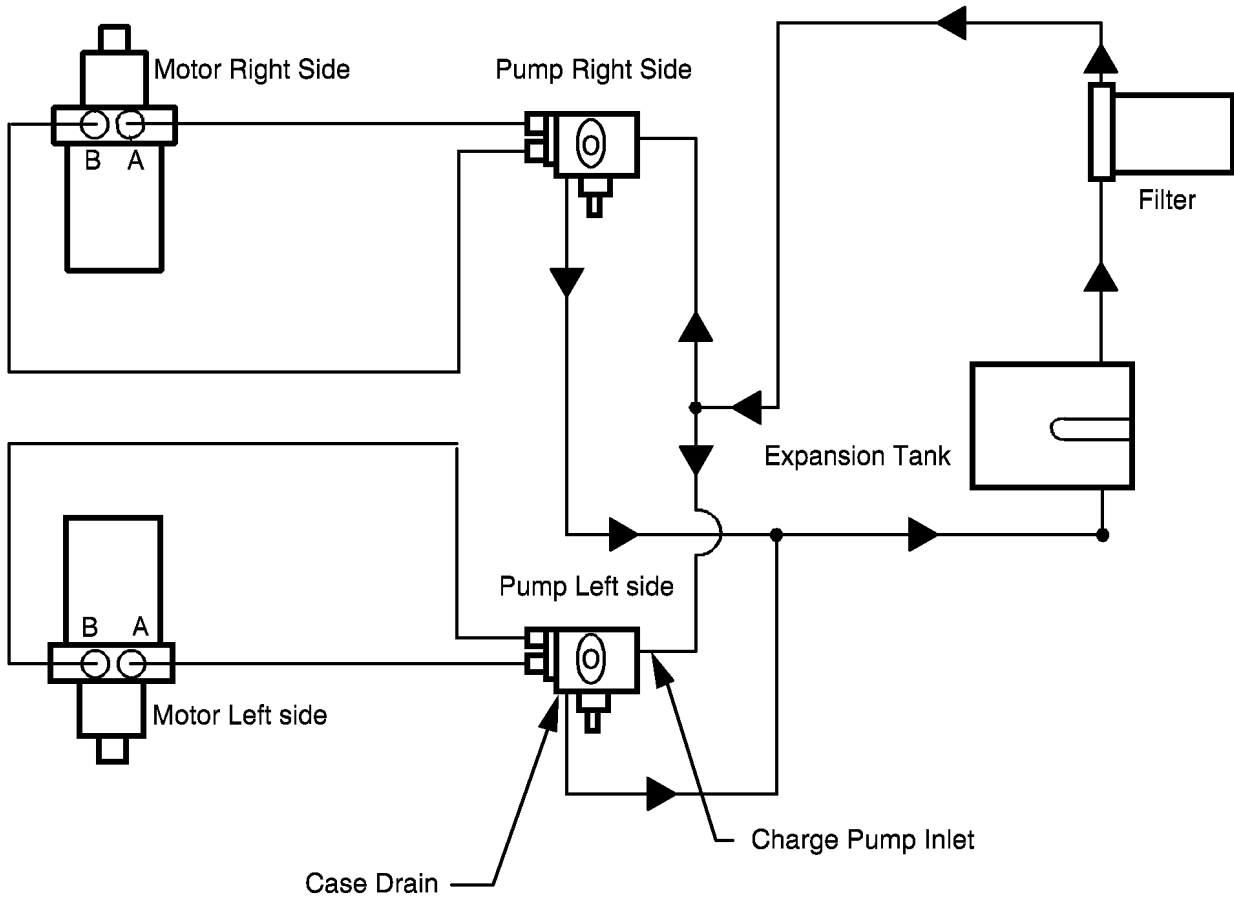
Troubleshooting

Problem	Possible Cause	Corrective Action
Engine will not start, starts hard, or fails to keep running.	<ol style="list-style-type: none"> 1. Fuel tank is empty. 2. Choke is not on. 3. Air cleaner is dirty. 4. Spark plug wire is loose or disconnected. 5. Spark plug is pitted, fouled, or the gap is incorrect. 6. Dirt in the fuel filter. 7. Dirt, water, or stale fuel is in the fuel system. 	<ol style="list-style-type: none"> 1. Fill fuel tank with gasoline. 2. Move the choke lever to choke position. 3. Service the air cleaner element. 4. Install wire on spark plug. 5. Install a new, correctly gapped spark plug. 6. Replace the fuel filter. 7. Contact an Authorized Service Dealer.
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 under the engine blower housing are plugged. 5. Spark plug is pitted, fouled, or the gap is incorrect. 6. Vent hole in the fuel cap is plugged. 7. Dirt in the fuel filter. 8. Dirt, water, or stale fuel is in the fuel system. 	<ol style="list-style-type: none"> 1. Reduce the ground speed. 2. Service the air cleaner. 3. Add oil to the crankcase. 4. Remove the obstruction from the cooling fins and air passages. 5. Install a new, correctly gapped spark plug. 6. Clean or replace the fuel cap. 7. Replace the fuel filter. 8. 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 under the engine blower housing 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.

Problem	Possible Cause	Corrective Action
Machine does not drive.	<ol style="list-style-type: none"> 1. Speed control lever is in neutral. 2. Neutral locks engaged. 3. Hydraulic oil reservoir low. 4. Air in the hydraulic system. 5. Pump drive belt slipping. 6. Pump drive belt idler spring missing. 	<ol style="list-style-type: none"> 1. Move the speed control lever to a forward position. 2. Disengage the neutral locks. 3. Add hydraulic oil to the reservoir. 4. Bleed the air out the hydraulic system. 5. Replace the pump drive belt. 6. Replace the pump drive belt idler spring.
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. 	<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.
Uneven cutting height.	<ol style="list-style-type: none"> 1. Blade(s) not sharp. 2. Cutting blade(s) is/are bent. 3. Mower is not level. 4. Mower pitch is wrong. 5. Underside of mower is dirty. 6. Tire pressure is not correct. 7. Blade spindle bent. 	<ol style="list-style-type: none"> 1. Sharpen the blade(s). 2. Install new cutting blade(s). 3. Level the mower side-to-side position. 4. Adjust the front-to-rear pitch. 5. Clean the underside of the mower. 6. Adjust the tire pressure. 7. Contact an Authorized Service Dealer.

Problem	Possible Cause	Corrective Action
Blades do not rotate.	<ol style="list-style-type: none"> 1. Drive belt is worn, loose or broken. 2. Drive belt is off pulley. 3. Deck belt is worn, loose or broken. 4. Deck belt is off pulley. 5. Broken or missing idler spring. 6. Electric clutch out of adjustment. 7. Clutch connector or wire damaged. 8. Damaged electric clutch. 9. Safety interlock system prevents blade rotation. 10. PTO switch is faulty. 	<ol style="list-style-type: none"> 1. Check the belt tension. 2. Install drive belt and check adjusting shafts and belt guides for correct position. 3. Install new deck belt. 4. Install deck pulley and check the idler pulley, idler arm and spring for correct position and function. 5. Replace the spring. 6. Adjust the clutch air gap. 7. Contact an Authorized Service Dealer. 8. Contact an Authorized Service Dealer. 9. Contact an Authorized Service Dealer. 10. Contact an Authorized Service Dealer.

Schematics



Hydraulic Schematic (Rev. A)

m-5225



Evaporative Emission Control Warranty Statement

California Evaporative Emission Control Warranty Statement
Your Warranty Rights and Obligations

Introduction

The California Air Resources Board and The Toro® Company are pleased to explain the evaporative emission control system's warranty on your 2006 model year equipment. In California, new equipment that use small off-road engines must be designed, built, and equipped to meet the State's stringent anti-smog standards. The Toro® Company must warrant the evaporative emission control system on your equipment for two years provided there has been no abuse, neglect or improper maintenance of your equipment. Your evaporative emission control system may include parts such as: fuel lines, fuel line fittings, and clamps.

Manufacturer's Warranty Coverage:

This evaporative emission control system is warranted for two years. If any evaporative emission-related part on your equipment is defective, the part will be repaired or replaced by The Toro® Company.

Owner's Warranty Responsibilities:

- As the equipment owner, you are responsible for performance of the required maintenance listed in your Operator's Manual. The Toro® Company recommends that you retain all receipts covering maintenance on your equipment, but The Toro® Company cannot deny warranty solely for the lack of receipts.
- As the equipment owner, you should however be aware that The Toro® Company may deny you warranty coverage if your emission warranty parts have failed due to abuse, neglect, or improper maintenance or unapproved modifications.
- You are responsible for presenting your equipment to an Authorized Service Dealer as soon as the problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days. If you have a question regarding your warranty coverage, you should contact The Toro® Company at 1-952-948-4027 or call us toll free at the number listed in your Toro Warranty statement.

Defects Warranty Requirements:

1. The warranty period begins on the date the engine or equipment is delivered to an ultimate purchaser.
2. General Evaporative Emissions Warranty Coverage. The emission warranty parts must be warranted to the ultimate purchaser and any subsequent owner that the evaporative emission control system when installed was:
 - A. Designed, built, and equipped so as to conform with all applicable regulations; and
 - B. Free from defects in materials and workmanship that causes the failure of a warranted part for a period of two years.
3. The warranty on evaporative emissions-related parts will be interpreted as follows:
 - A. Any warranted part that is not scheduled for replacement as required maintenance in the written instructions must be warranted for the warranty period of two years. If any such part fails during the period of warranty coverage, it must be repaired or replaced by The Toro® Company. Any such part repaired or replaced under the warranty must be warranted for a time not less than the remaining warranty period.
 - B. Any warranted part that is scheduled only for regular inspection in the written instructions must be warranted for the warranty period of two years. A statement in such written instructions to the effect of "repair or replace as necessary" will not reduce the period of warranty coverage. Any such part repaired or replaced under warranty must be warranted for a time not less than the remaining warranty period.
 - C. Any warranted part that is scheduled for replacement as required maintenance in the written instructions must be warranted for the period of time prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part must be repaired or replaced by The Toro® Company. Any such part repaired or replaced under warranty must be warranted for a time not less than the remainder of the period prior to the first scheduled replacement point for the part.
 - D. Repair or replacement of any warranted part under the warranty provisions of this article must be performed at no charge to the owner at an Authorized Service Dealer.
 - E. Notwithstanding the provisions of subsection (D) above, warranty services or repairs must be provided at an Authorized Service Dealer.
 - F. The owner must not be charged for diagnostic labor that leads to the determination that a warranted part is in fact defective, provided that such diagnostic work is performed at an Authorized Service Dealer.
 - G. Throughout the evaporative emission control system's two year warranty period, The Toro® Company must maintain a supply of warranted parts sufficient to meet the expected demand for such parts.
 - H. Manufacturer approved replacement parts must be used in the performance of any warranty maintenance or repairs and must be provided without charge to the owner. Such use will not reduce the warranty obligations of The Toro® Company.
 - I. The use of any add-on or modified parts will be grounds for disallowing a warranty claim made in accordance with this article. The Toro® Company will not be liable under this Article to warrant failures of warranted parts caused by the use of an add-on or modified part.
 - J. The Toro® Company shall provide any documents that describe the warranty procedures or policies within five working days of request by the Air Resources Board.

Emission Warranty Parts List:

The following lists includes the parts covered under this warranty:

- Fuel Lines
- Fuel Line Fittings
- Clamps



LCE

The Toro Total Coverage Guarantee

A Limited Warranty

Conditions and Products Covered

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

This warranty applies to:

- ProLine Mid-Size Walk Power Mowers and Accessories
- Z Master Mid-Mount ZRTs and Accessories
- Z Master Outfront ZRTs and Accessories
- Groundsmaster 120 OFRs and Accessories

The following time periods apply from the date of purchase:

Components	Warranty Period
Engines	2 years
Hydraulic Systems	2 years
Traction Unit Frame	2 years
Carrier Frame	2 years
Deck Shells	2 years
Deck Spindles	3 years Parts 2 years Labor
Z500 Series Clutches	2 years
Remaining Components	1 year

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

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

Instructions for Obtaining Warranty Service

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

1. Contact any Toro Authorized or Master Service Dealer to arrange service at their dealership. To locate a dealer convenient to you, access our website at www.Toro.com. You may also call our Toro Customer Care Department toll free at 888-577-7466 (U.S. customers) or 877-484-9255 (Canada customers).
2. Bring the product and your proof of purchase (sales receipt) to the Service Dealer.

If for any reason you are dissatisfied with the Service Dealer's analysis or with the assistance provided, contact us at:

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.

Countries Other than the United States or Canada

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

Items and Conditions Not Covered

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

- Cost of regular maintenance service or 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 or required 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.

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

General Conditions

Repair by an Authorized Toro Service Dealer is your sole remedy under this warranty.

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

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.

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.

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

LCB Customer Service Department
Toro Warranty Company
8111 Lyndale Avenue South
Bloomington, MN 55420-1196
888-577-7466 (U.S. customers)
877-484-9255 (Canada customers)