Form No. 3355-163 Rev A

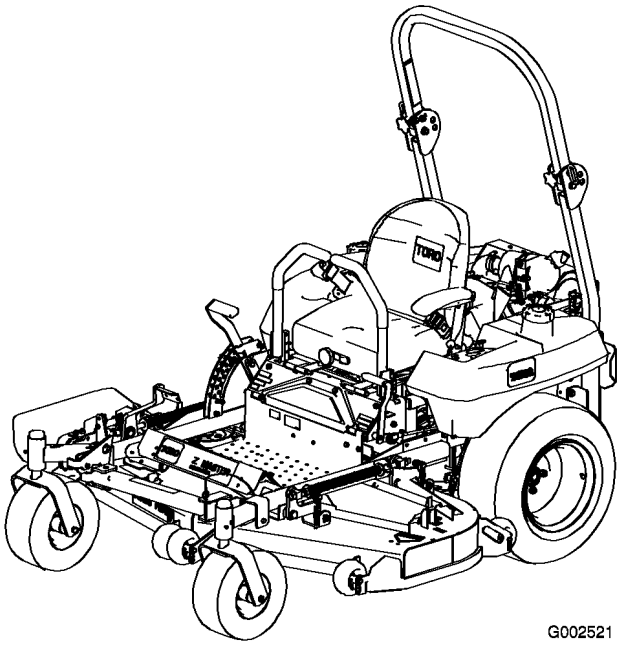
TORO®

Count on it.

Operator's Manual

Z500 Z Master, With 152cm Turbo Force® Side Discharge Mower

Model No. 74262TE—Serial No. 260000001 and Up



G002521

CE

Register your product at www.Toro.com

Original Instructions (EN)

This spark ignition system complies with Canadian ICES-002

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.

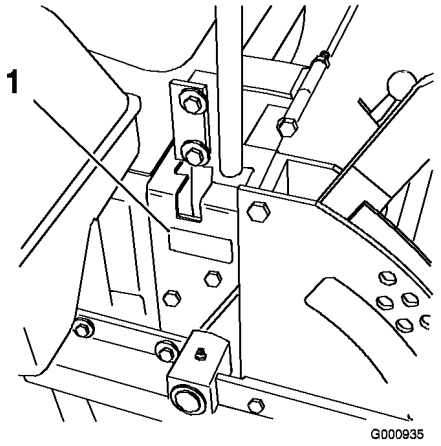


Figure 1

1. Model and serial number location

Model No. _____

Serial No. _____

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



Figure 2

1. Safety alert symbol

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

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Safety

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

Safe Operating Practices

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

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

Training

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

Preparation

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

Operation

- Be alert, slow down and use caution when making turns. Look behind and to the side before changing directions.
- Do not operate the engine in a confined space where dangerous carbon monoxide fumes can collect.

- Mow only in daylight or in good artificial light.
- Before attempting to start the engine, disengage all blade attachment clutches and shift into neutral.
- Do not use on slopes greater than 15 degrees.
- Remember there is no such thing as a safe slope. Travel on grass slopes requires particular care. To guard against overturning:
  - - do not stop or start suddenly when on a slope;
  - - use slow speeds on slopes and during tight turns;
  - - stay alert for humps and hollows and other hidden hazards;
- Use care when pulling loads or using heavy equipment.
  - - Use only approved drawbar hitch points.
  - - Limit loads to those you can safely control.
  - - Do not turn sharply. Use care when reversing.
- Watch out for traffic when crossing or near roadways.
- Stop the blades rotating before crossing surfaces other than grass.
- When using any attachments, never direct discharge of material toward bystanders nor allow anyone near the machine while in operation.
- Never operate the machine with damaged guards or without safety protective devices in place.
- Do not change the engine governor settings or overspeed the engine. Operating the engine at excessive speed can increase the hazard of personal injury.
- Before leaving the operator's position:
  - disengage the power take-off and lower the attachments;
  - change into neutral and set the parking brake;
  - stop the engine and remove the key.
- Disengage drive to attachments, stop the engine, and disconnect the spark plug wire(s) or remove the ignition key
  - before clearing blockages or unclogging chute;
  - before checking, cleaning or working on the lawnmower;
  - after striking a foreign object. Inspect the lawnmower for damage and make repairs before restarting and operating the equipment; if the machine starts to vibrate abnormally (check immediately).
- Disengage drive to attachments when transporting or not in use.
- Stop the engine and disengage drive to attachment
  - before refuelling;
  - before removing the grass catcher;
  - before making height adjustment unless adjustment can be made from the operator's position.
- Reduce the throttle setting during engine run-out and, if the engine is provided with a shut-off valve, turn the fuel off at the conclusion of mowing.

Maintenance and Storage

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

Toro Riding Mower Safety

The following list contains safety information specific to Toro products or other safety

information that you must know that is not included in the CEN standard.

- Engine exhaust contains carbon monoxide, which is an odorless, deadly poison that can kill you. Do not run engine indoors or in an enclosed area.
- Keep hands, feet, hair and loose clothing away from attachment discharge area, underside of mower and any moving parts while engine is running.
- Do not touch equipment or attachment parts which may be hot from operation. Allow to cool before attempting to maintain, adjust, or service.
- Battery acid is poisonous and can cause burns. Avoid contact with skin, eyes and clothing. Protect your face, eyes, and clothing when working with a battery.
- Battery gases can explode. Keep cigarettes, sparks and flames away from battery.
- Use only genuine Toro replacement parts to ensure that original standards are maintained.
- Use only Toro-approved attachments. Warranty may be voided if used with unapproved attachments.

Slope Operation

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

Sound Pressure

This unit has a maximum sound pressure level at the operator's ear of 90 dBA, based on measurements of identical machines per EN 11094 and EN 836.

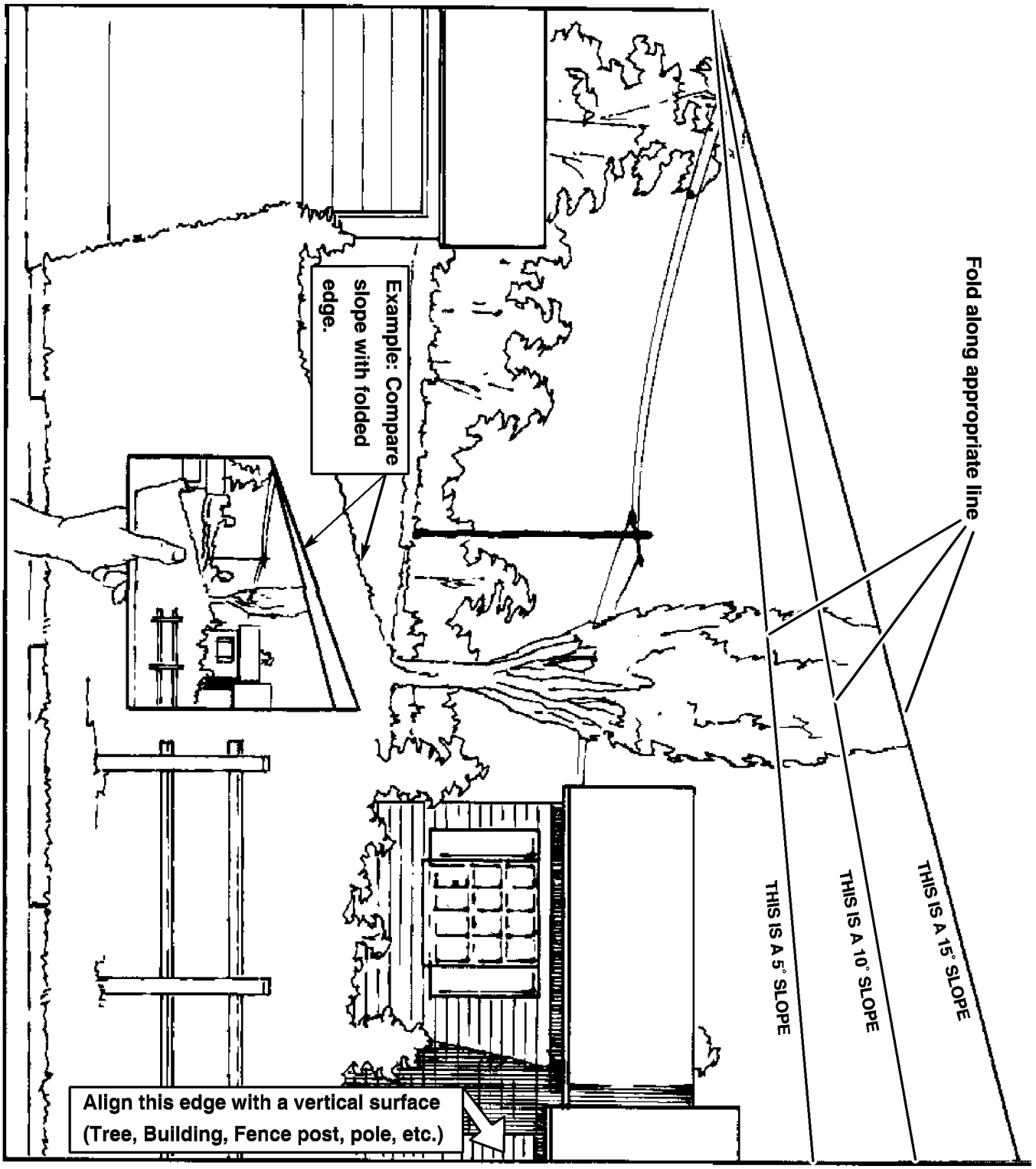
Sound Power

This unit has a guaranteed sound power level of 105 dBA, based on measurements of identical machines per EN 11094.

Vibration

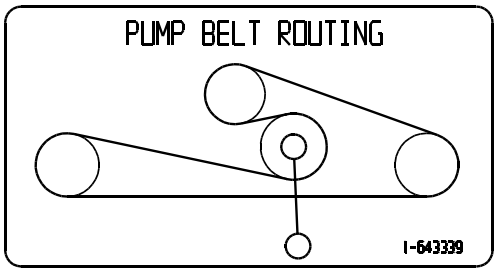
This unit does not exceed a hand/arm vibration level of 2.15 m/s^2, based on measurements of identical machines per EN 1033. This unit does not exceed a whole body vibration level of 0.08 m/s^2, based on measurements of identical machines per EN 1032.

Slope Chart


Fold along appropriate line
Example: Compare slope with folded edge.
THIS IS A 5° SLOPE
THIS IS A 10° SLOPE
THIS IS A 15° SLOPE
Align this edge with a vertical surface
(Tree, Building, Fence post, pole, etc.)

Safety and Instructional Decals

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



1-643339



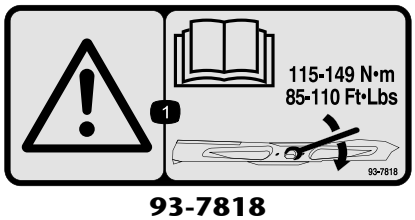
58-6520

1. Grease



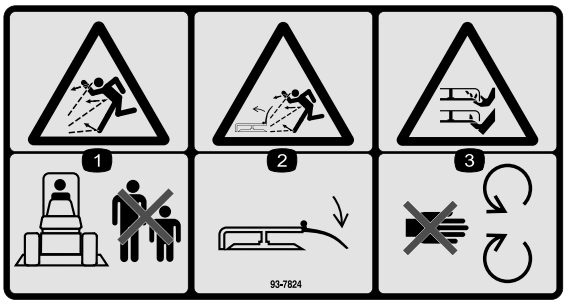
93-7010

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



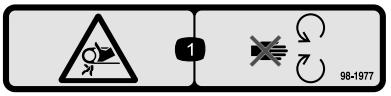
93-7818

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



93-7824

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



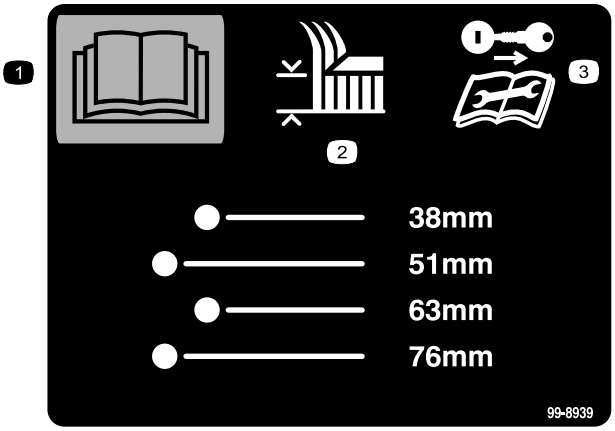
98-1977

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



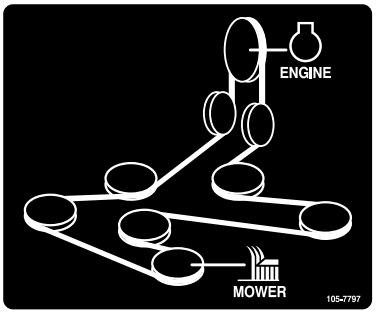
98-4387

1. Warning—wear hearing protection.

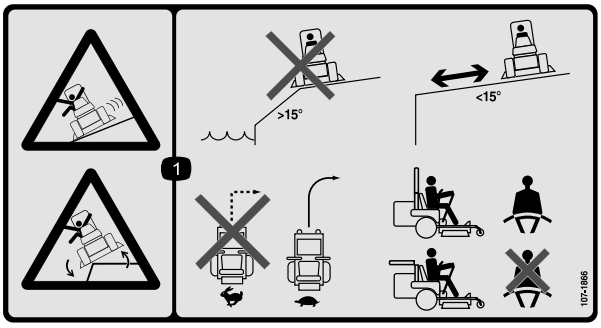


99-8939

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



105-7797



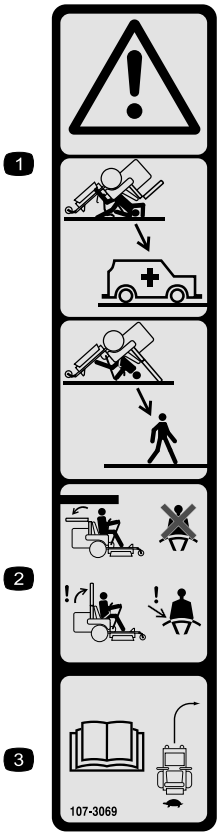
107-1866

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



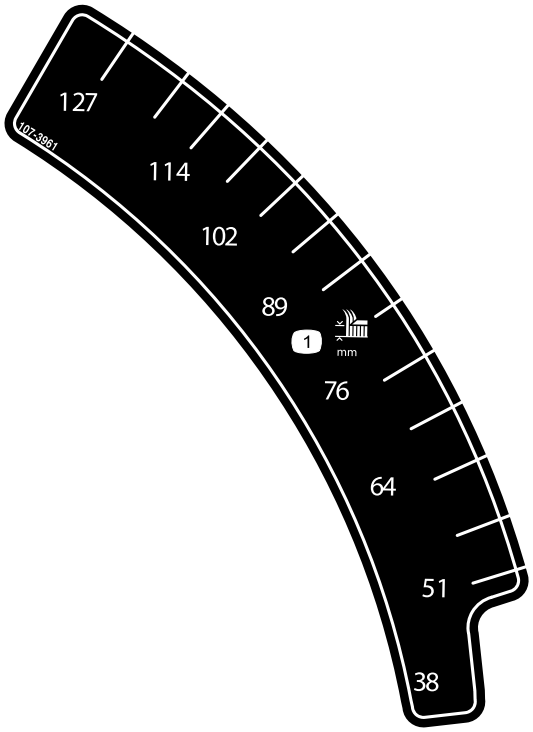
107-2131

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



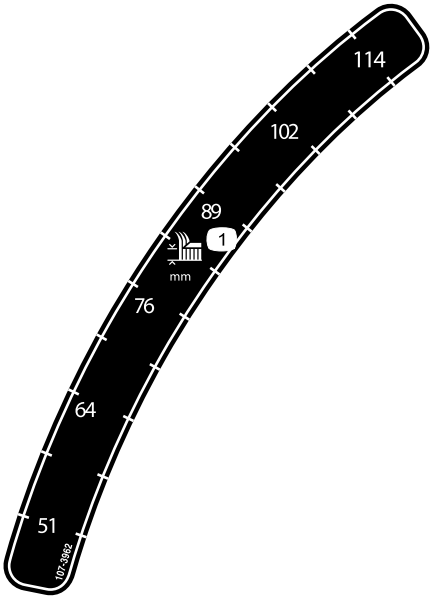
107-3069

1. Warning—there is no rollover protection when the roll bar is down.
2. To avoid injury or death from a rollover accident, keep the roll bar in the raised and locked position and wear the seat belt. Lower the roll bar only when absolutely necessary; do not wear the seat belt when the roll bar is down.
3. Read the *Operator's Manual*; drive slowly and carefully.



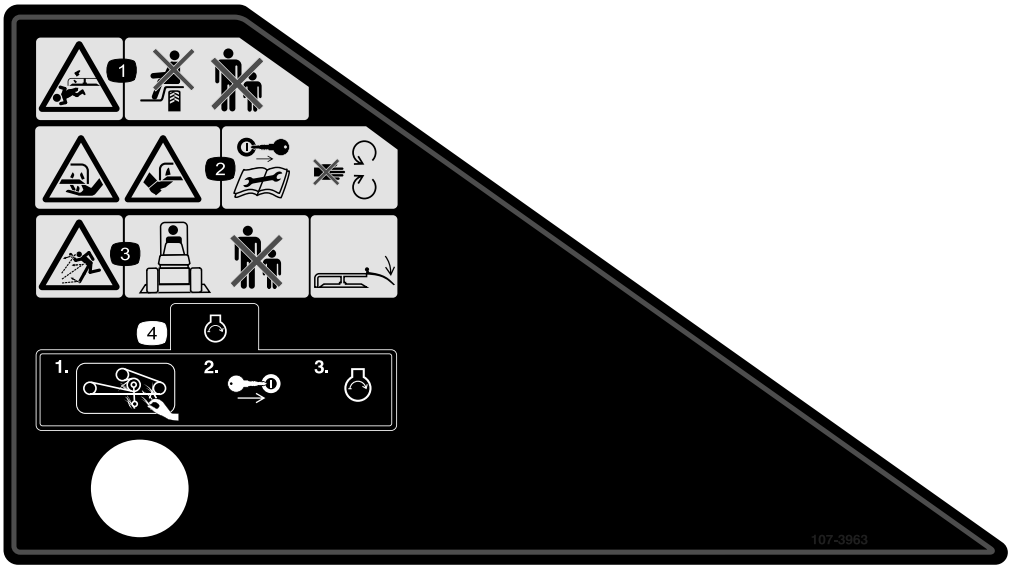
107-3961

1. Height of cut in millimeters



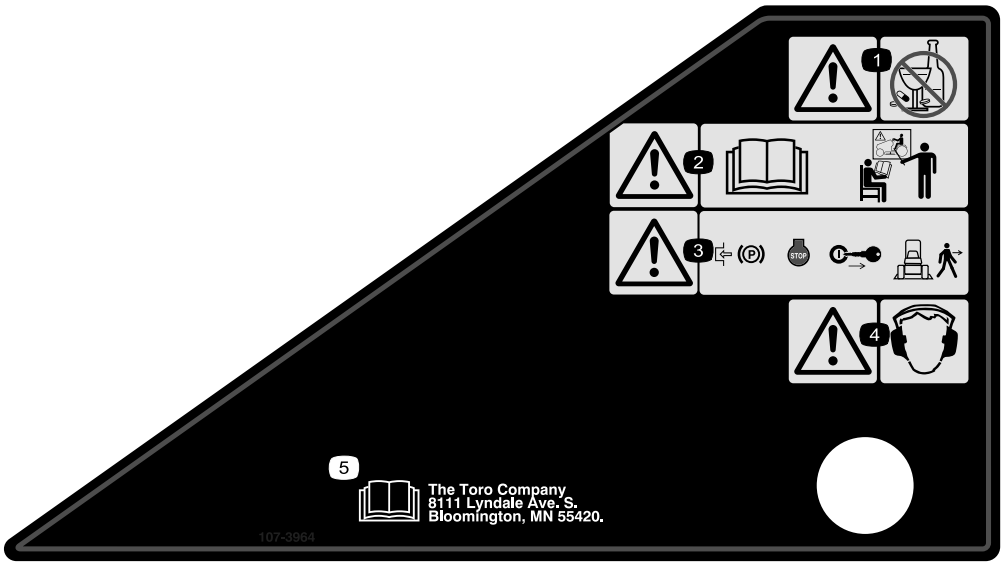
107-3962

1. Height of cut in millimeters



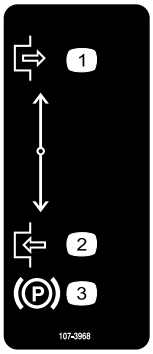
107-3963

1. Cutting/dismemberment hazard, mower blade—do not carry passengers and keep bystanders away.
2. Cutting/dismemberment hazard of hand or foot, mower blade—remove the ignition key and read the instructions before servicing or performing maintenance; stay away from moving parts.
3. Thrown object hazard—keep bystanders a safe distance from the machine and keep the deflector in place.
4. Before starting the engine, clean grass and debris from the mower belt and pulleys, insert the ignition key, and start the engine.



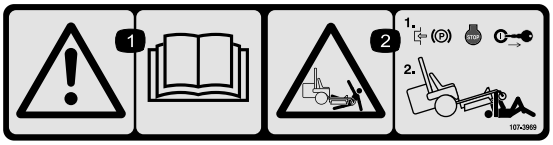
107-3964

1. Warning—do not use drugs or alcohol.
2. Warning—read the *Operator's Manual* and receive training.
3. Warning—engage the parking brake, stop the engine, and remove the ignition key before leaving the machine.
4. Warning—wear hearing protection.
5. Read the *Operator's Manual*.



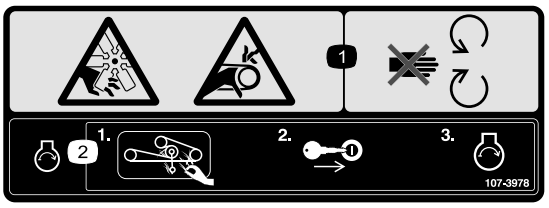
107-3968

1. Disengage
2. Engage
3. Parking brake



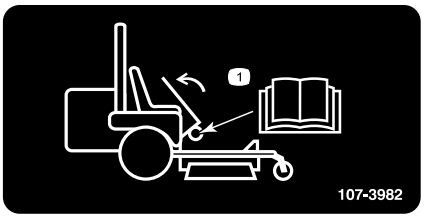
107-3969

1. Warning—read the *Operator's Manual*.
2. Crushing hazard, mower—engage the parking brake, stop the engine, and remove the ignition key before working under the mower.



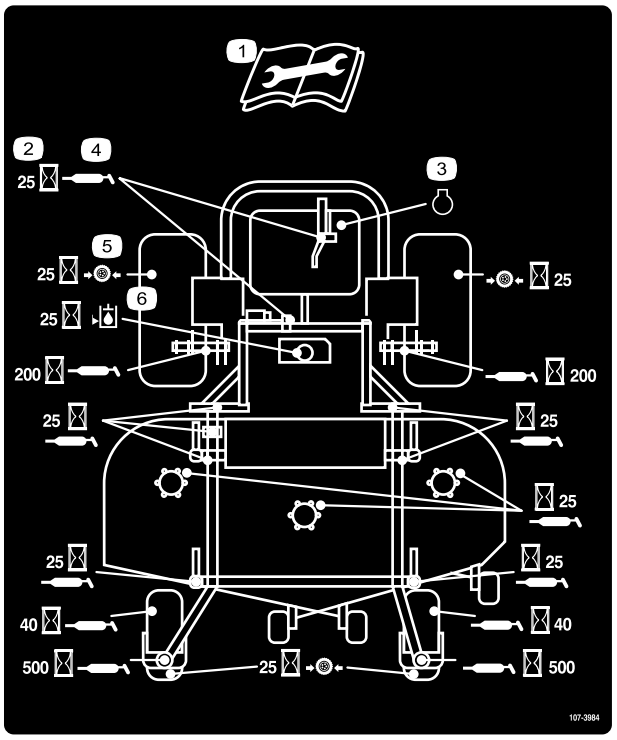
107-3978

1. Cutting/dismemberment hazard, fan and entanglement hazard, belt—stay away from moving parts.
2. Before starting the engine, clean grass and debris from the mower belt and pulleys, insert the ignition key, and start the engine.



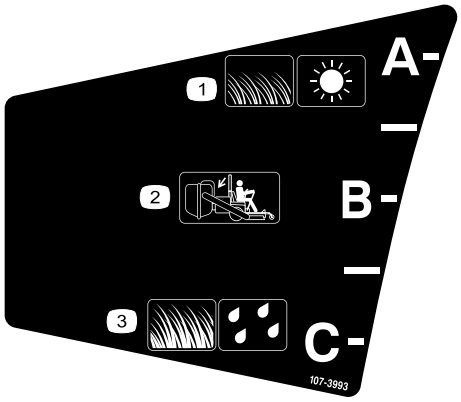
107-3982

1. *Operator's Manual* location



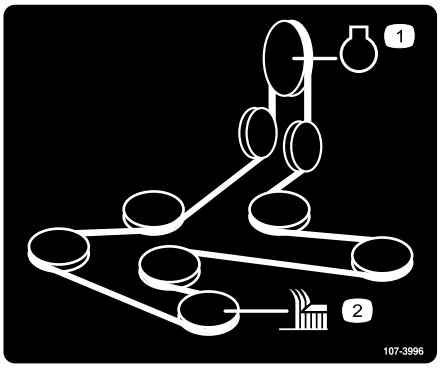
107-3984

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



107-3993

1. Short, sparse grass and dry conditions.
2. Bagging
3. Long, thick grass and wet conditions.



107-3996

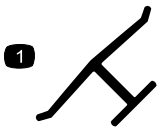
1. Engine
2. Cutting blade



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.



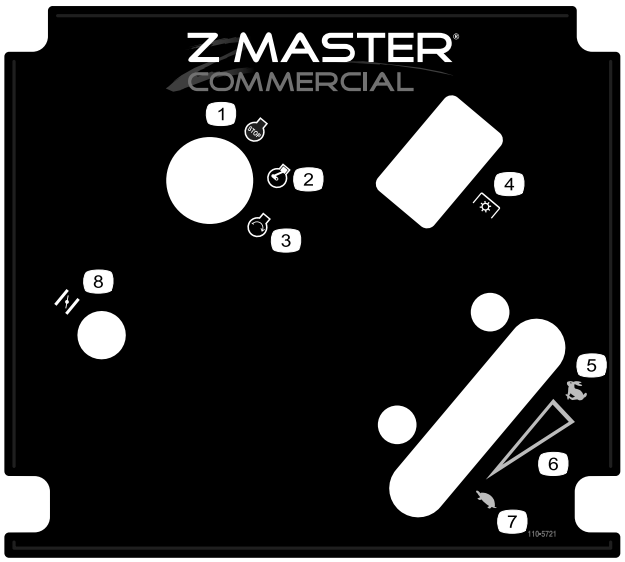
Manufacturer's Mark

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



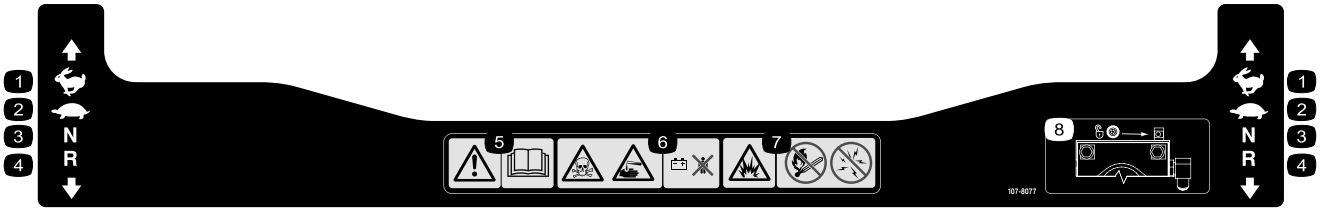
108-5278

1. Read the *Operator's Manual*.



110-5721

1. Engine—stop
2. Engine—run
3. Engine—start
4. Power take-off (PTO)
5. Fast
6. Continuous variable setting
7. Slow
8. Choke



107-8077

1. Fast
2. Slow
3. Neutral
4. Reverse
5. Warning-read— the *Operator's Manual.*
6. Poison and caustic liquid/chemical burn hazard—keep children a safe distance from the battery.
7. Explosion hazard—no fire, open flames, or smoking; avoid sparks.
8. To unlock the traction drive, turn the by-pass valve 1 complete revolution counterclockwise using a 5/8 inch or 16 mm wrench.

Product Overview

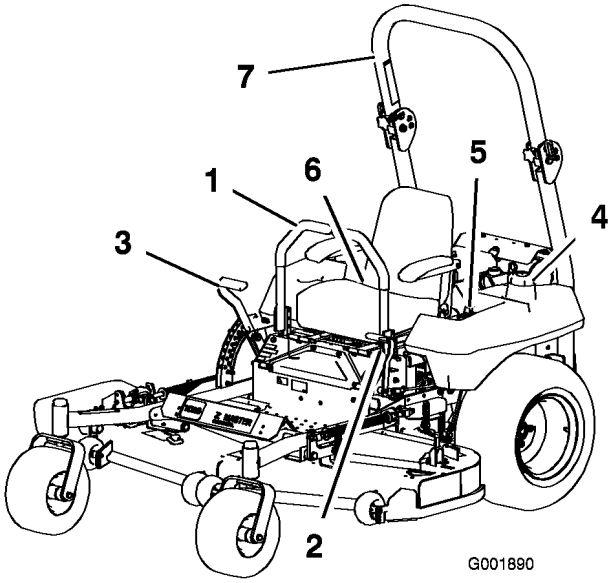


Figure 3

1. Motion control lever
2. Parking brake lever
3. Height-of-cut lever
4. Fuel cap (both sides)
5. Controls
6. Seat belt
7. Roll bar

Controls

Become familiar with all the controls before you start the engine and operate the machine (Figure 3 and Figure 4).

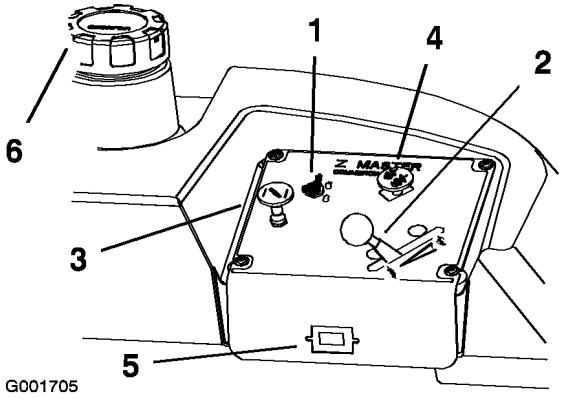


Figure 4

1. Ignition switch
2. Throttle
3. Choke
4. Power take off (PTO)
5. Hour meter
6. Gas cap

Hour Meter

The hour meter records the number of hours the engine has operated. It operates when the engine is running. Use these times for scheduling regular maintenance (Figure 4).

Operation

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

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 each fuel tank cap and remove the cap.
3. Add unleaded regular gasoline to both fuel tanks, until the level is 1/4 to 1/2 inch (6 mm to 13 mm) below the bottom of the filler neck.

   This space in the tank allows gasoline to expand. Do not fill the fuel tanks completely full.
4. Install fuel tank caps securely.
5. 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 the Oil Level in Engine Maintenance, page 33

Using the Rollover Protection System (ROPS)

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

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

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

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

Important: Lower the roll bar only when absolutely necessary.

1. To lower the roll bar, loosen the front knobs (Figure 7).
2. Remove the hairpin cotter pins and remove the two pins (Figure 6).
3. Lower the roll bar to the down position. There are two down positions. See Figure 5 for the positions.
4. Install the two pins and secure them with the hairpin cotter pins (Figure 6).

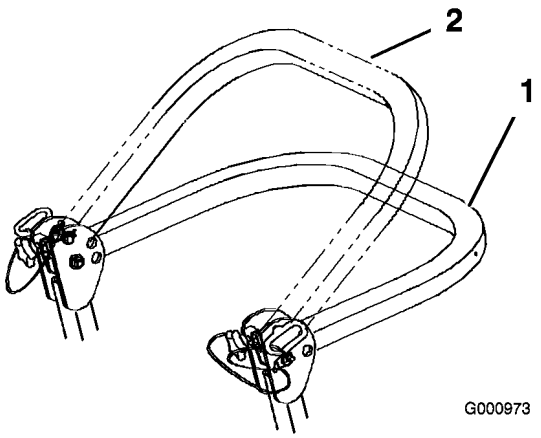


Figure 5

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

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

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

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

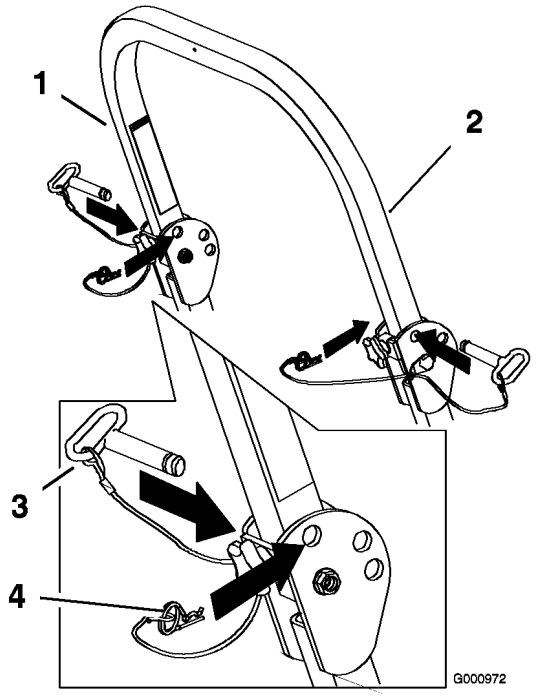


Figure 6

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

Important: Tighten the front knobs against the center roll bar ends (Figure 7).

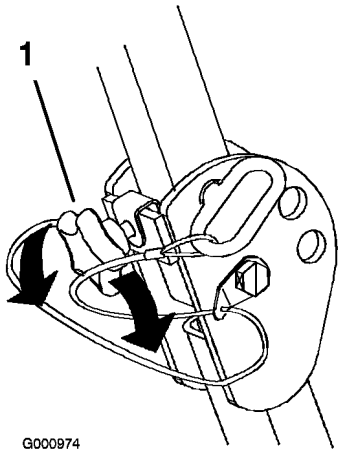


Figure 7

1. Front handle

Think Safety First

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

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

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

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

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

Read and follow the rollover protection instructions and warnings.

To avoid loss of control and possibility of rollover:

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

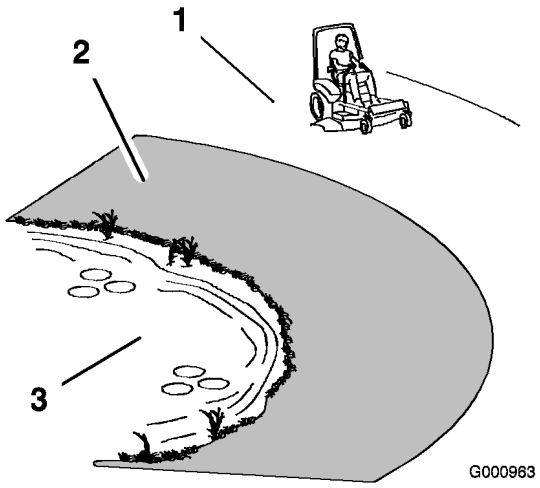


Figure 8

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

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

Wear hearing protection when operating this machine.

Wear protective equipment for your eyes, ears, feet, and head when using this machine.

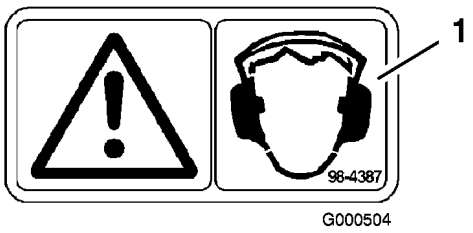


Figure 9

1. Warning— wear hearing protection

Operating the Parking Brake

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

Setting the Parking Brake

1. Move the motion control levers (Figure 16) out to the neutral lock position.
2. Pull up and back on the parking brake lever to set the parking brake (Figure 10). The parking brake lever should stay firmly in the engaged position.

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

Do not park on slopes unless wheels are chocked or blocked

Releasing the Parking Brake

Push forward and down on the parking brake lever to release the parking brake (Figure 10). The parking brake is disengaged and the lever will rest against the brake stop.

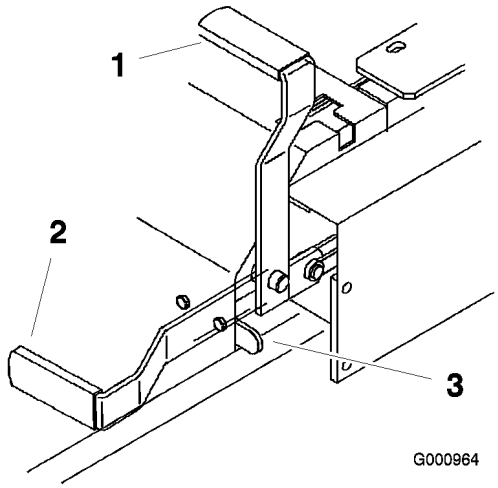


Figure 10

1. Parking brake-ON
2. Parking brake-OFF
3. Brake Stop

Starting and Stopping the Engine

Starting the Engine

1. Sit on the seat and move the motion controls to neutral locked position.
2. Set the parking brake; refer to Setting the Parking Brake.

3. Move the PTO (power take off) switch to the Off position (Figure 11).

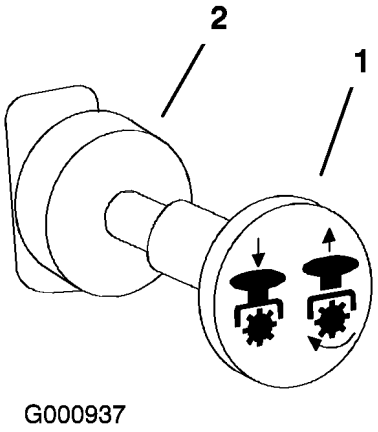


Figure 11

1. PTO—on
2. PTO—off

4. Move the choke control to the on position before starting a cold engine (Figure 12).

   Note: A warm or hot engine may not require choking. After engine starts, move choke control to Run position.

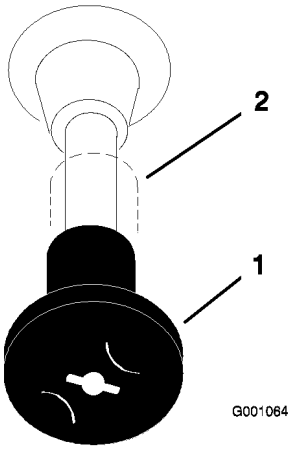


Figure 12

1. Choke—on
2. Choke—off

5. Move the throttle control to the Fast position before starting a cold engine (Figure 13).

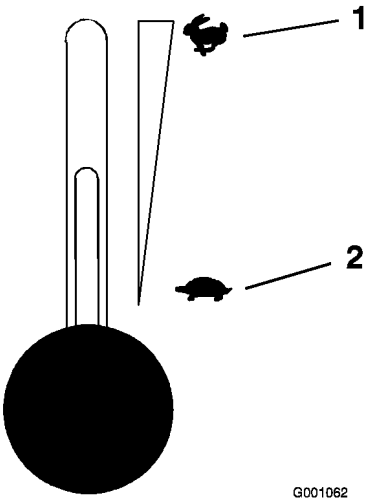


Figure 13

1. Throttle—fast
2. Throttle—slow

6. Turn the ignition key to Start (Figure 14). When the engines starts, release the key.

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

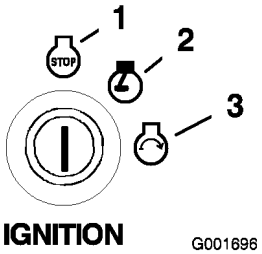


Figure 14

1. Off
2. Run
3. Start

7. After the engine starts, move the choke to off (Figure 12). If the engine stalls or hesitates, move the choke back to on for a few seconds, then move the throttle lever to desired setting. Repeat this as required.

Stopping the Engine

1. Push the PTO to the off position (Figure 11).
2. Move the throttle lever midway between the slow and fast positions (Figure 13).
3. Let the engine idle for 60 seconds.

4. Turn the ignition key to the off position and remove the key (Figure 14).
5. Close the fuel shut off valve before transporting or storing the machine. Refer to Fuel System Maintenance, page 36.

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

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

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

Operating the Power Take Off (PTO)

The power take off (PTO) switch starts and stops the mower blades and any powered attachments.

Engaging the PTO

1. If the engine is cold, allow the engine to warm up 5 to 10 minutes before engaging the PTO.
2. While seated in the seat, release the pressure on the traction control levers and place in neutral.
3. Place the throttle in the fast position.

   Note: Engaging the PTO with the throttle at the half or less position will cause excessive wear to the drive belts.
4. Pull out on the power take off (PTO) switch to engage it (Figure 15).

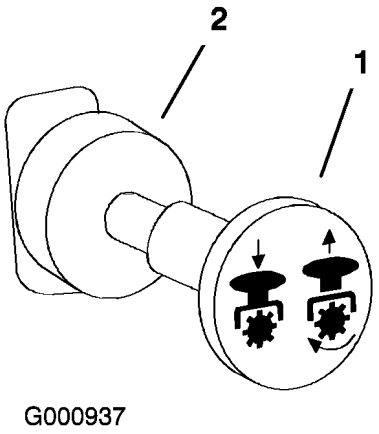


Figure 15

1. PTO-On
2. PTO-Off

Disengaging the PTO

To disengage, push the PTO switch to the **off** position (Figure 15).

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 engine from starting unless:

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

The safety interlock system also is designed to stop the engine when the traction controls are moved from the locked position with the parking brake

engaged or if you rise from the seat when the PTO is engaged.

Testing the Safety Interlock System

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

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

Driving Forward or Backward

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

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

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

Driving Forward

1. Release the parking brake; refer to Releasing the Parking Brake.
2. Move the levers to the center, un-locked position.
3. To go forward, slowly push the motion control levers forward (Figure 16).

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

   To go straight, apply equal pressure to both motion control levers (Figure 16).

   To turn, move the motion control lever toward neutral in the direction you want to turn (Figure 16).

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

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

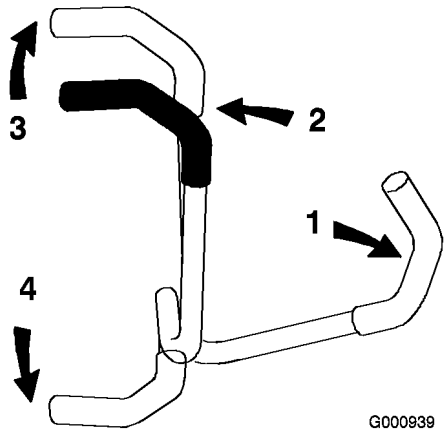


Figure 16

1. Motion control lever-neutral lock position
2. Center un-lock position
3. Forward
4. Backward

Driving Backward

1. Move the levers to the center, un-locked position.
2. To go backward, slowly pull the motion control levers rearward (Figure 16).

   To go straight, apply equal pressure to both motion control levers (Figure 16).

   To turn, release pressure on the motion control lever toward the direction you want to turn (Figure 16).

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

Stopping the Machine

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

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

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

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

Adjusting the Height-of-Cut

The height-of-cut is adjusted from 1-1/2 to 5 inch (38 to 127 mm) in 1/4 inch (6 mm) increments by relocating the clevis pin into different hole locations.

1. Raise the height-of-cut lever to the transport position (also the 5 inch (127 mm) cutting height position) (Figure 17).

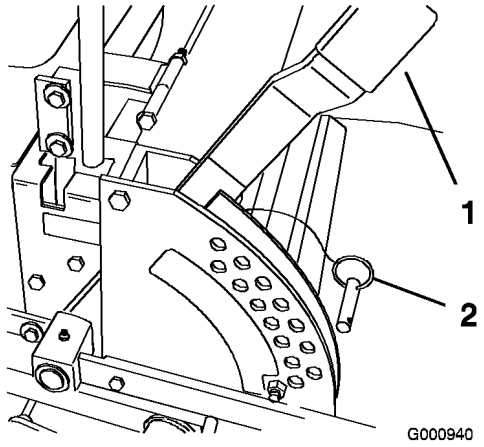


Figure 17

1. Height of cut lever
2. Clevis Pin

2. To adjust, remove the clevis pin from the height-of-cut bracket (Figure 17).
3. Select a hole in the height-of-cut bracket corresponding to the height-of-cut desired and, insert the clevis pin (Figure 17).
4. Move the lever to the selected height.

Adjusting the Anti-Scalp Rollers

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

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. After adjusting the height-of-cut, adjust the rollers by removing the flange nut, bushing, spacer, and bolt (Figure 18 , Figure 19 and Figure 20).

   Note: The two middle rollers will not have a spacer (Figure 19).
4. Select a hole so the anti-scalp roller is positioned to the nearest corresponding height-of-cut desired.

5. Install the flange nut bushing, spacer, and bolt. Torque to 40-45 ft-lb (54-61 N•m) (Figure 18 , Figure 19 and Figure 20).
6. Repeat this adjustment on the other anti-scalp rollers.

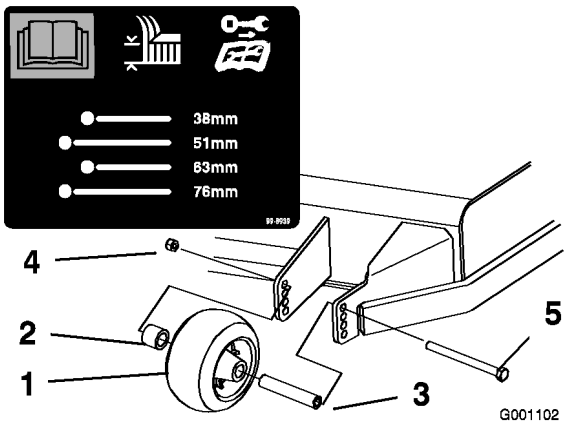


Figure 18

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

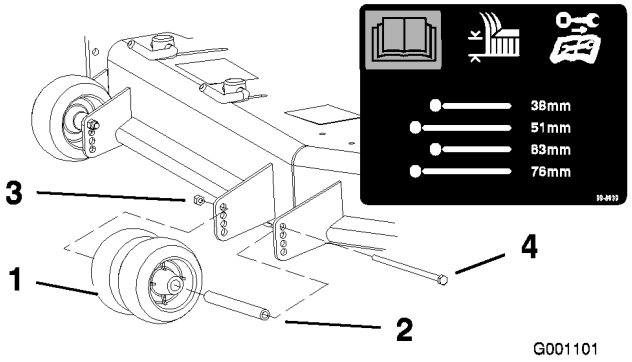


Figure 19

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

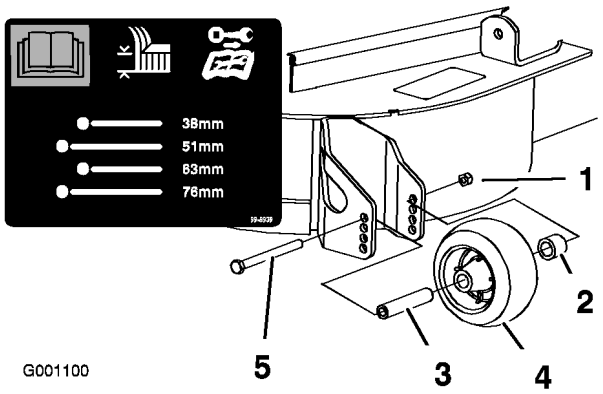


Figure 20

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

Adjusting the Flow Baffle

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

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. To adjust the cam locks, swing the lever up to loosen the cam lock (Figure 21).
4. Adjust the baffle and cam locks in the slots to the desired discharge flow.
5. Swing the lever back over to tighten the baffle and cam locks (Figure 21).
6. If the cams do 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.

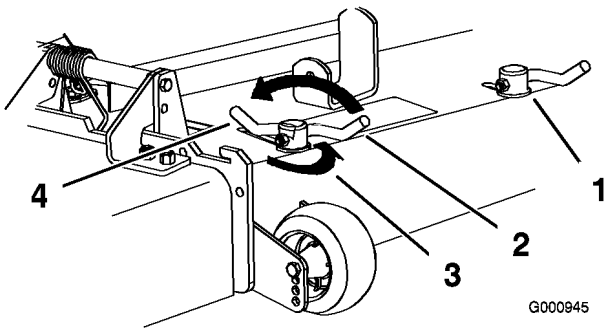


Figure 21

1. Cam lock
2. Lever
3. Rotate cam to increase or decrease locking pressure
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. The suggested use for this position is a follows.

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

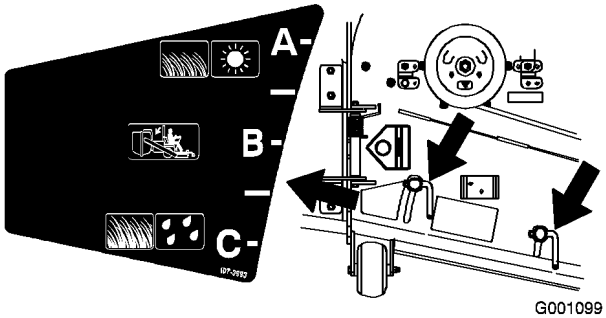


Figure 22

Position B

Use this position when bagging.

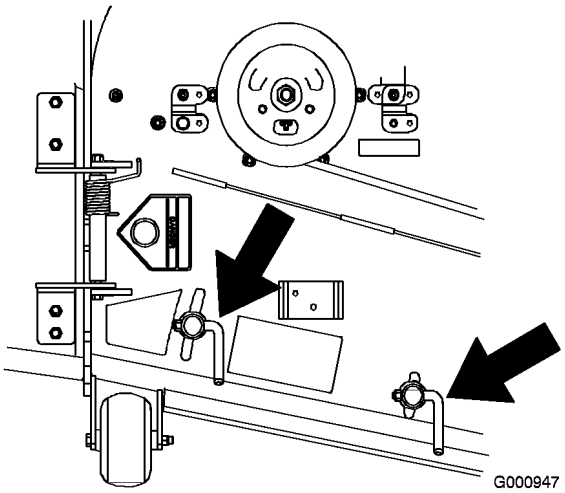


Figure 23

Position C

This is the full open position. The suggested use for this position is as follows.

- 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.

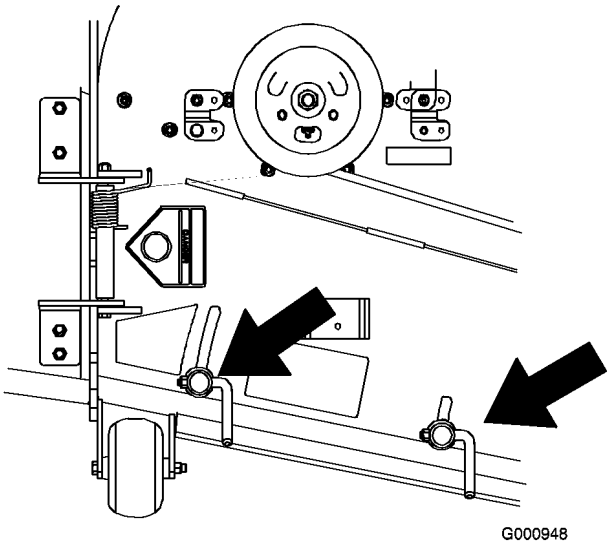


Figure 24

Using the Lift Assist Lever

The lift assist lever is used along with the height-of-cut lever for raising the mower. This allows for easier raising of the mower.

1. Place your foot onto lift assist lever.
2. Press on the lift assist lever while pulling up on the height-of-cut lever (Figure 25).

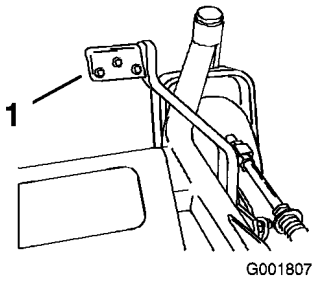


Figure 25

1. Lift Assist Lever

Positioning the Seat

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

Important: To adjust, move the lever sideways to unlock seat (Figure 26).

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

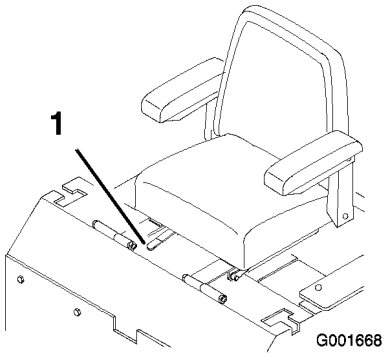


Figure 26

1. Adjustment lever

Unlatching the Seat

Push the seat latch rearward to unlatch the seat. This will allow access to the machine under the seat (Figure 27).

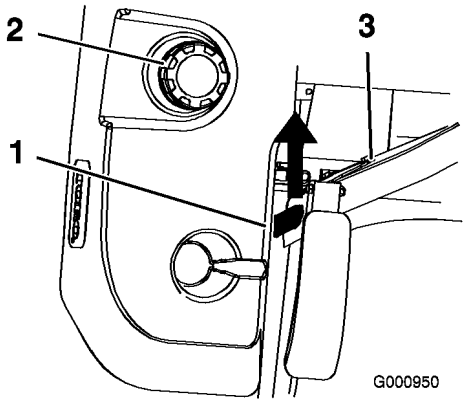


Figure 27

1. Seat latch
2. Fuel cap
3. Seat

Pushing the Machine by Hand

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

Pushing the Machine

1. Disengage the power take off (PTO) and turn the ignition key to off. Move the levers to neutral locked position and apply parking brake. Remove the key.
2. Rotate the by-pass valves counterclockwise 1 turn to push. This allows hydraulic fluid to by-pass the pump enabling the wheels to turn (Figure 28).

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

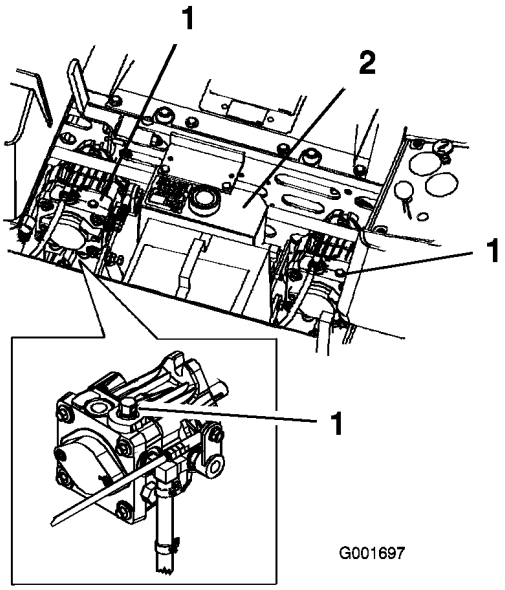


Figure 28

1. By-pass valve
2. Hydraulic tank

3. Disengage parking brake before pushing.

Changing to Machine Operation

Rotate the by-pass valves clockwise 1 turn to operate machine (Figure 28).

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

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

Using the Side Discharge

The 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 the discharge area or mower blades unless you move the power take off (PTO) to the off position, rotate the ignition key to off and remove the key.**
- **Make sure the grass deflector is in the down position.**

Breaking In a New Machine

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

Transporting Machines

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

To transport the machine:

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

Important: **Do not use the motion control levers as anchors for tieing the machine down.**

- Secure a trailer to the towing vehicle with safety chains.

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

Do not drive machine on a public street or roadway.

Loading Machines

Use extreme caution when loading units on trailers or trucks. One full width ramp that is wide enough to extend beyond the rear tires is recommended instead of individual ramps for each side of the unit (Figure 29). The lower rear section of the tractor frame extends back between the rear wheels and serves as a stop for tipping backward. Having a full width ramp provides a surface for the frame members to contact if the unit starts to tip backward. If it is not possible to use one full width ramp, use enough individual ramps to simulate a full width continuous ramp.

The ramp should be long enough so that the angles do not exceed 15 degrees (Figure 29). A steeper angle may cause mower components to get caught as the unit moves from ramp to trailer or truck. Steeper angles may also cause the unit to tip backward. If loading on or near a slope, position the trailer or truck so it is on the down side of the slope and the ramp extends up the slope. This will minimize the ramp angle. The trailer or truck should be as level as possible.

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

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

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

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

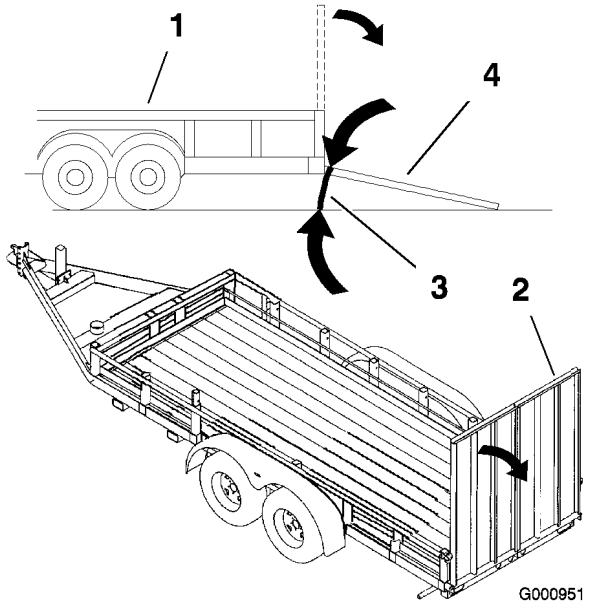


Figure 29

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

Using the Z Stand®

The Z Stand raises the front end of the machine to allow you to clean the mower and remove the blades.

The machine could fall onto someone and cause serious injury or death.

- **Use extreme caution when operating the machine on the Z Stand®.**
- **Use only for cleaning the mower and removing the blades.**
- **Do not keep the machine on the Z Stand for extended periods of time.**
- **Always turn the engine off, set the parking brake, and remove the key before performing any maintenance to the mower.**

Driving up onto the Z Stand

Important: Use the Z Stand on a level surface.

1. Raise the mower to the transport position.
2. Remove the bracket pin (Figure 30).

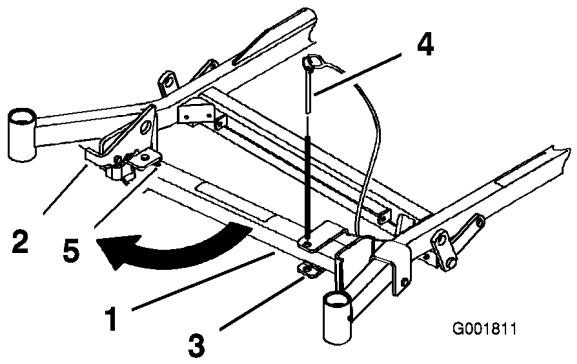


Figure 30

1. Z Stand
2. Latch
3. Bracket
4. Bracket Pin
5. Bottom of slot

3. Raise the latch. Swing the stand foot out front and slide stand toward machine, into the bottom of slot (Figure 30 and Figure 31).

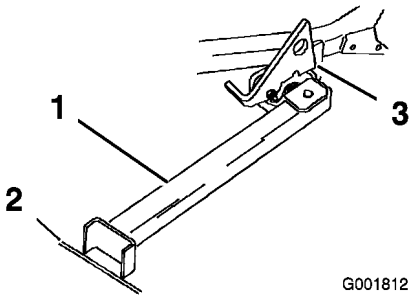


Figure 31

1. Z Stand (Positioned in slot)
2. Crack in side walk or turf
3. Latch resting on pivot tab

4. Set the foot of stand on the ground and rest the latch on the pivot tab (Figure 31).
5. Start the engine and put it at half throttle.

   Note: For best results, place the foot of stand into seams in sidewalks or into the turf (Figure 31).
6. Drive onto the stand. Stop when the latch drops over the tab into the locked position (Figure 31). Once onto the stand, engage the parking brake and tun off the engine.
7. Chock or block the drive wheels.

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

Do not park on Z Stand unless wheels are chocked or blocked.

8. Perform the maintenance.

Driving off the Z Stand

1. Remove the chocks or blocks.
2. Raise the latch to the unlocked position (Figure 32).

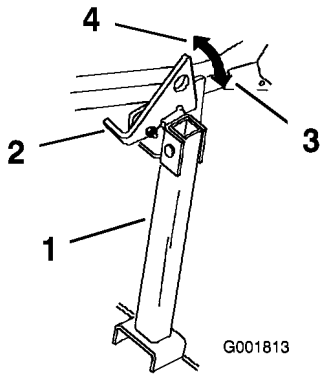


Figure 32

1. Z Stand
2. Latch
3. Locked position
4. Unlocked position

3. Start the engine and place it at half throttle. Disengage the parking brake.
4. Slowly drive backwards off of the stand.
5. Return the stand to its rest position (Figure 30).

Operating Tips

Fast Throttle Setting

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

Cutting a Lawn for the First Time

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

Cut 1/3 of the Grass Blade

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

Mowing Direction

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

Mow at Correct Intervals

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

Cutting Speed

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

Avoid Cutting Too Low

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

Long Grass

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

When Stopping

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

Keep the Underside of the Mower Clean

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

Blade Maintenance

Maintain a sharp blade throughout the cutting season because a sharp blade cuts cleanly without tearing or shredding the grass blades. Tearing and

shredding turns grass brown at the edges, which slows growth and increases the chance of disease. Check the cutter blades daily for sharpness, and for any wear or damage. File down any nicks and sharpen the blades as necessary. If a blade is damaged or worn, replace it immediately with a genuine TORO replacement blade.

Maintenance

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 8 operating hours	• Check the hydraulic fluid level.
After the first 25 operating hours	• Change the hydraulic filter and oil.
Before each use or daily	• Check the safety interlock system. • Check the engine oil level. • Check the mower blades. • Clean the mower deck.
Every 25 hours	• Check the hydraulic fluid level.
Every 50 hours	• Grease the mower bearings. • Check the tire pressure. • Check the pump drive belt.
Every 100 hours	• Change the engine oil. • Clean the engine cylinder and cylinder head cooling fins • Inspect the belts for cracks and wear. • Check the hydraulic hoses.
Every 150 hours	• Lubricate the machine with light oil.
Every 200 hours	• Check and/or replace the primary air filter. • Replace the oil filter. • Check the spark plugs. • Replace the fuel filter. • Grease the brake pivot and lever.
Every 500 hours	• Check the wheel hub slotted nut. • Adjust the caster pivot bearing.
Every 600 hours	• Replace the safety filter.
Yearly	• Grease the front caster pivots (more often in dirty or dusty conditions). • Change the hydraulic filter and oil.

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

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

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

Lubrication

Greasing and Lubrication

Lubricate the machine when shown on the *Check Service Reference Aid decal* (Figure 33). Grease more frequently when operating conditions are extremely dusty or sandy.

Grease Type: General-purpose grease.

How to Grease

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Clean the grease fittings with a rag. Make sure to scrape any paint off the front of the 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.

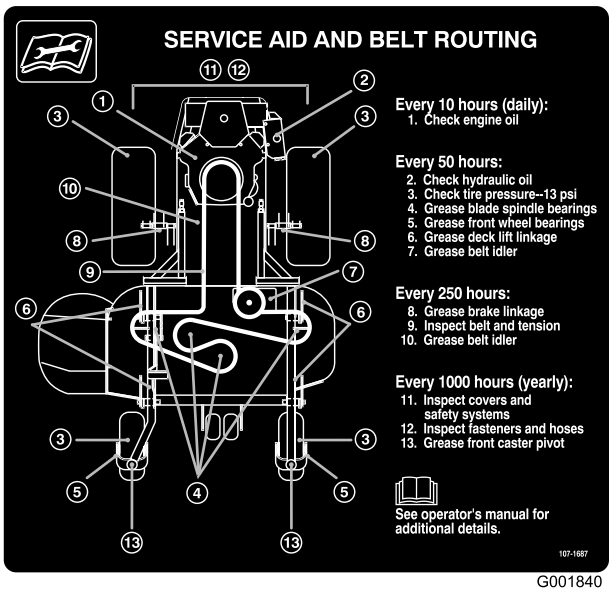
Greasing the Front Caster Pivots

Lubricate the front caster pivots once a year.

1. Remove the dust cap and adjust the caster pivots. Keep the dust cap off until greasing is done. Refer to Adjusting the Caster Pivot Bearing in Drive System Maintenance, page 39.
2. Remove the hex plug. Thread a grease zerk into the hole.
3. Pump grease into the zerk until it oozes out around the top bearing.
4. Remove the grease zerk in the hole. Install the hex plug and cap.

Where to Add Grease

Lubricate the grease fittings as shown on the Check Service Reference Aid decal (Figure 33).



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Figure 33

Where to Add Light Oil or Spray Lubrication

Lubricate the machine in the following areas with spray type lubricant or light oil. Lubricate every 150 hours.

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

Greasing the Bearings

Lubricate the cutting machine after every 50 operating hours. Grease with No. 2 general-purpose lithium-base or molybdenum-base grease.

1. Disengage the PTO, move the motion control levers to the neutral locked position, and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Grease the fittings on the 3 spindle bearings (Fig. 38).

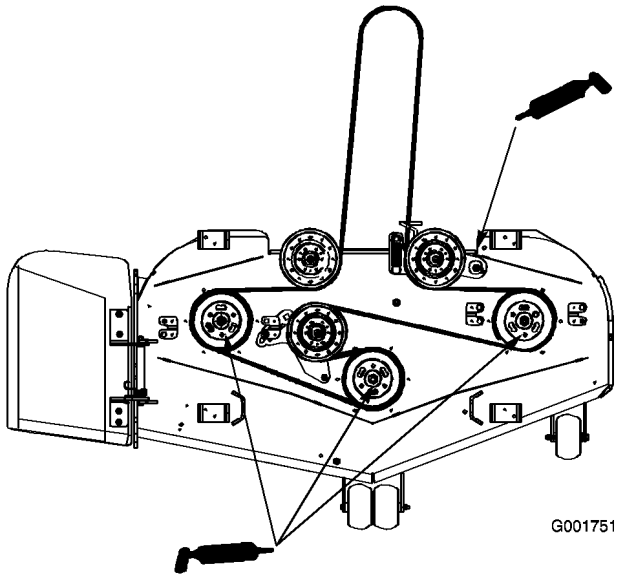


Figure 34

4. Grease the idler pulley pivot (Fig. 38).

Engine Maintenance

Servicing the Air Cleaner

Primary Filter: Check and/or replace it after every 200 operating hours or more often in dusty conditions.

Safety Filter: Replace it after every 600 operating hours.

Note: Check the filters more frequently if the operating conditions are extremely dusty or sandy.

Removing the Filters

1. Disengage the PTO, move the motion control levers to the neutral locked position, and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Release the latches on the air cleaner and pull the air cleaner cover off the air cleaner body (Figure 35).

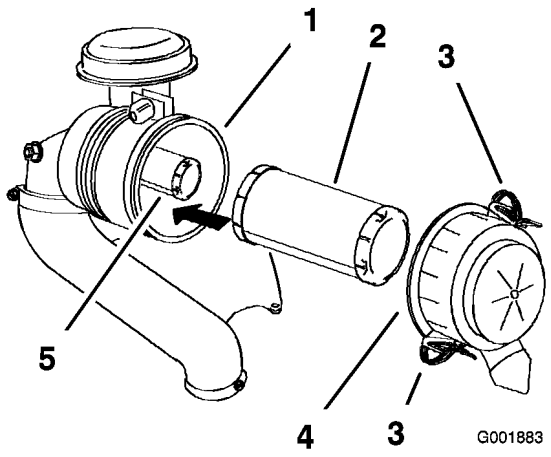


Figure 35

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

4. Clean the inside of the air cleaner cover with compressed air.
5. Gently slide the primary filter out of the air cleaner body (Figure 35).

   Note: Avoid knocking the filter into the side of the body.
6. Remove the safety filter only if you intend to replace it.

   Important: Never attempt to clean the safety filter. If the safety filter is dirty, then the primary filter is damaged. Replace both filters.
7. Inspect the primary filter for damage by looking into the filter while shining a bright light on the outside of the filter. Holes in the filter will appear as bright spots. If the filter is damaged, discard it.

Servicing the Primary Filter

- Check and/or replace the primary filter after 200 operating hours.
- If the primary filter is dirty, bent, or damaged, replace it.
- Do not clean the primary filter.

Servicing the Safety Filter

Replace the safety filter after 600 operating hours.

Important: Never attempt to clean the safety filter. If the safety filter is dirty, then the primary filter is damaged. Replace both filters.

Installing the Filters

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

1. If installing new filters, check each filter for shipping damage. Do not use a damaged filter.
2. If the safety filter is being replaced, carefully slide it into the filter body (Figure 35).
3. Carefully slide the primary filter over the safety filter (Figure 35).

   Note: Ensure that the primary filter is fully seated by pushing on its outer rim while installing it.

   Important: Do not press on the soft inside area of the filter.
4. Install the air cleaner cover with the side indicated as **up** facing upward and secure the latches (Figure 35).

Servicing the Engine Oil

Change the engine oil 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 or SH)

Crankcase Capacity: w/filter, 67 oz. (2 l)

Viscosity: See the table below.

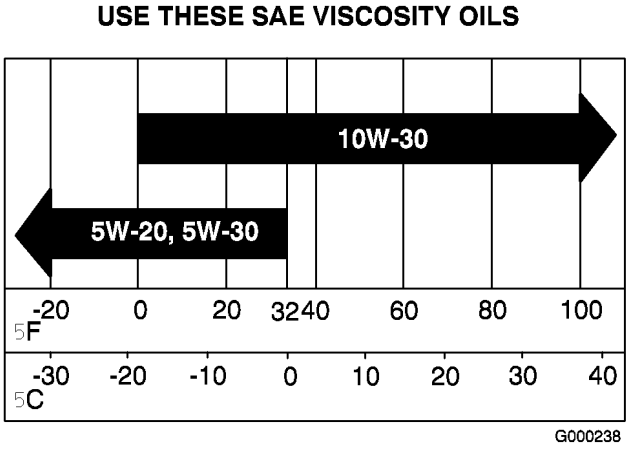


Figure 36

Checking the Engine Oil Level

1. Park the machine on a level surface.
2. Disengage the PTO, turn the ignition key to off, and remove the key.
3. Wait for all moving parts to stop before leaving the operating position and then chock or block tires.
4. Clean around the oil dipstick (Figure 37) so that dirt cannot fall into the filler hole and damage the engine.

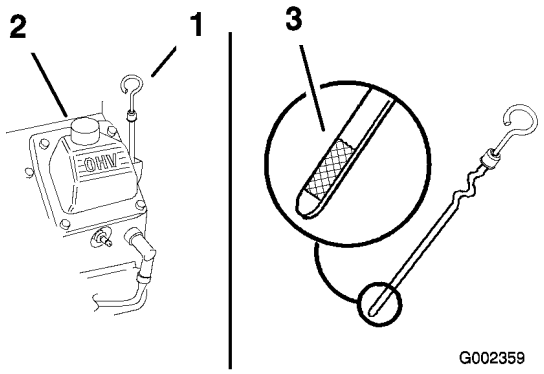


Figure 37

1. Oil dipstick
2. Filler tube

5. Unscrew the oil dipstick and wipe the end clean (Figure 37).
6. Slide the oil dipstick fully into the filler tube, but do not thread onto tube (Figure 37).
7. Pull the dipstick out and look at the metal 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 ensure 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. Place a pan below the drain. Rotate oil drain valve to allow oil to drain (Figure 38).

6. When oil has drained completely, close the drain valve.

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

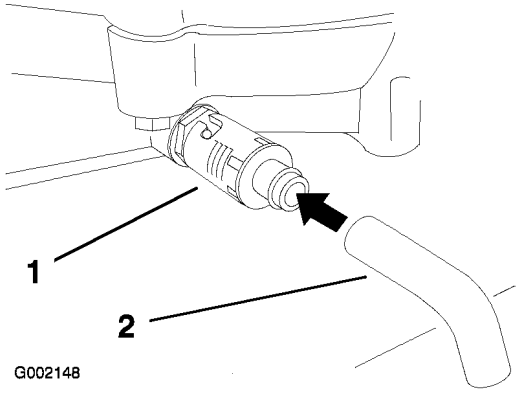


Figure 38

1. Oil drain valve
2. Oil drain hose

7. Slowly pour approximately 80% of the specified oil into the filler tube (Figure 37).
8. Check the oil level; refer to Checking the Engine Oil Level.
9. 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 and wipe the filler adapter gasket surface (Figure 39).

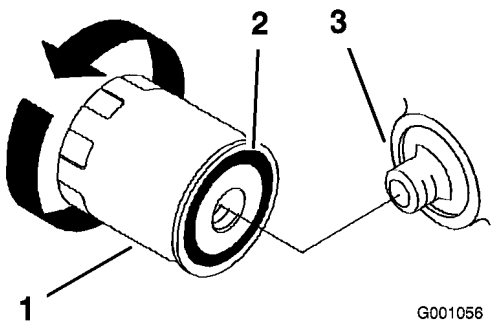


Figure 39

1. Oil filter
2. Adapter gasket
3. Adapter

3. Pour new oil in through the center hole of the filter. Fill it up to the bottom of the threads inside.
4. Allow the filter material to absorb the new oil for 1 to 2 minutes.
5. Apply a thin coat of new oil to the rubber gasket on the replacement filter (Figure 39).
6. 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 2/3 to 1 turn (Figure 39).
7. Fill the crankcase with the proper type of new oil; refer to Servicing the Engine Oil.
8. Run the engine for about 3 minutes, stop the engine, and check for oil leaks around the oil filter.
9. Check the engine oil level and add oil if needed.

Servicing the Spark Plugs

Check the spark plugs after every 200 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® RC12YC, Champion® Platinum 3071 or equivalent

Air Gap: 0.030 inch (0.76 mm)

Checking the Spark Plugs

1. Look at the center of the spark plugs (Figure 40). 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.

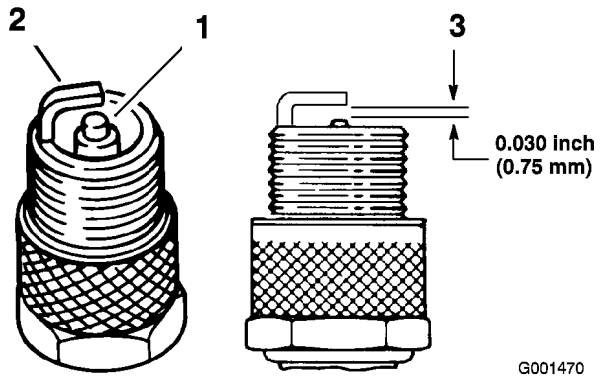


Figure 40

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

Important: Always replace the spark plugs when it has a black coating, worn electrodes, an oily film, or cracks.

2. Check the gap between the center and side electrodes (Figure 40). Bend the side electrode (Figure 40) if the gap is not correct.

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 41).

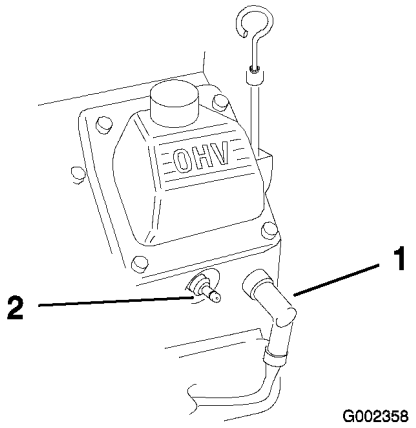


Figure 41

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.

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 18 to 22 ft-lb (24.4 to 29.8 N·m).
3. Connect the wires to the spark plugs (Figure 40).

Fuel System Maintenance

Replacing the Fuel Filter

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

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

1. Disengage the PTO, move the motion control levers to the neutral locked position, and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Allow the machine to cool down.
4. Close the fuel shutoff valve (Figure 42).

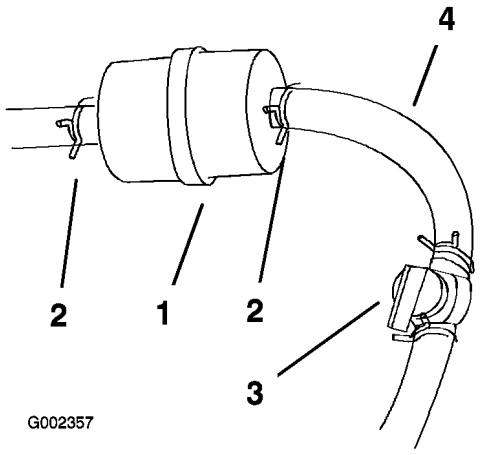


Figure 42

1. Fuel filter
2. Hose clamp
3. Fuel shutoff valve

5. Squeeze the ends of the hose clamps together and slide them away from the filter (Figure 42).
6. Remove the filter from the fuel lines.
7. Install a new filter and move the hose clamps close to the filter (Figure 42).
8. Open the fuel shutoff valve.

Servicing 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 ensure that the fuel tanks drain completely.
2. Disengage the power takeoff (PTO), set the parking brake, stop the engine, and remove the key.
3. Close the fuel shutoff valve (Figure 42).
4. Loosen the hose clamp at the fuel filter and slide it up the fuel line away from the fuel filter (Figure 42).
5. Disconnect the fuel line from the fuel filter (Figure 42).
6. Open the fuel shutoff valve.

   Note: Allow gasoline to drain into a fuel container can or drain pan (Figure 42).

   Note: Now is the best time to install a new fuel filter because the fuel tank is empty.
7. Install the fuel line onto the fuel filter. Slide the hose clamp close to the fuel filter to secure the fuel line (Figure 42).

Electrical System Maintenance

Servicing the Battery

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, 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. Unlatch the seat and tilt the seat up.
4. First disconnect the negative battery cable and ground wire from the negative (-) battery terminal (Figure 43).
5. Slide the red terminal boot off the positive (red) battery terminal. Then remove the positive (red) battery cable (Figure 43).

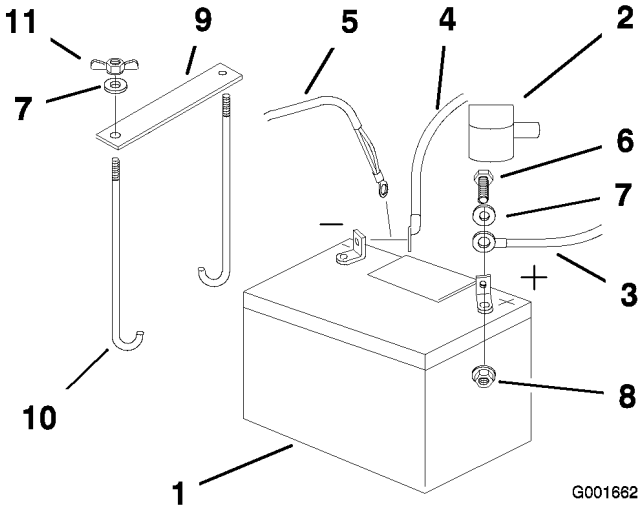


Figure 43

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

6. Remove both wing nuts (1/4 inch) securing the battery clamp (Figure 43).
7. Remove the battery.

Installing the Battery

1. Position battery in the tray with the terminal posts toward the engine (Figure 43).
2. First, install the positive (red) battery cable to positive (+) battery terminal.
3. Then install the negative battery cable and ground wire to the negative (-) battery terminal.
4. Secure the cables with 2 bolts (1/4 x 3/4 inch), 2 washers (1/4 inch), and 2 locknuts (1/4 inch) (Figure 43).
5. Slide the red terminal boot onto the positive (red) battery post.
6. Secure battery with J-bolts, hold down clamp and 2 washers (1/4 inch), and 2 wing nuts (1/4 inch) (Figure 43).

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.
2. Charge battery for 10 to 15 minutes at 25 to 30 amps or 30 minutes at 4-6 amps.
3. When the battery is fully charged, unplug the charger from the electrical outlet, then disconnect the charger leads from the battery posts (Fig. 67).

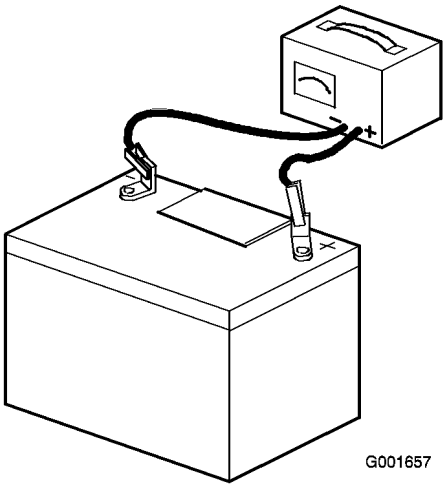


Figure 44

4. Install the battery in the machine and connect the battery cables; refer to Installing the Battery.

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

Servicing the Fuses

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

The fuses are as follows:

- Main F1-30 amp, blade-type
- Alternator F2-25 amp, blade-type

1. Unlatch the seat and raise the seat to gain access to fuse holder (Figure 45).

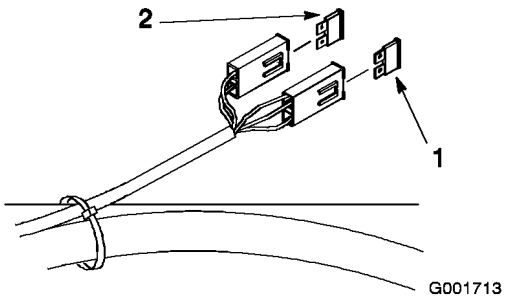


Figure 45

1. Main F1-30 amp
2. Alternator F2-25 amp

2. To replace the fuses, pull out on the fuse to remove it.
3. Install a new fuse (Figure 45).

Drive System Maintenance

Adjusting the Tracking

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

The right hand pump has a knob for adjusting the tracking.

Important: Adjust the handle neutral and hydraulic pump neutral before adjusting the tracking. Refer to Adjusting the Handle Neutral and Adjusting the Hydraulic Pump Neutral.

1. Push both control levers forward the same distance.
2. Check if the machine pulls to one side. If it does, stop the machine and set the parking brake.
3. Unlatch the seat and tip the seat up to access the tracking knob.
4. Adjust the tracking as follows (Figure 46):
   - To make the machine go right, turn the knob towards the right side of the machine.
   - To make the machine go left, turn the knob towards the left side of the machine.

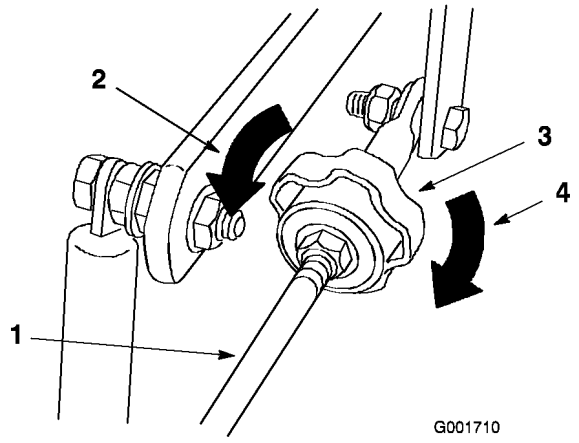


Figure 46

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

5. Repeat this adjustment until the tracking is correct.

Checking the Tire Pressure

Check the pressure at the valve stem after every 50 operating hours or monthly, whichever occurs first (Figure 47).

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

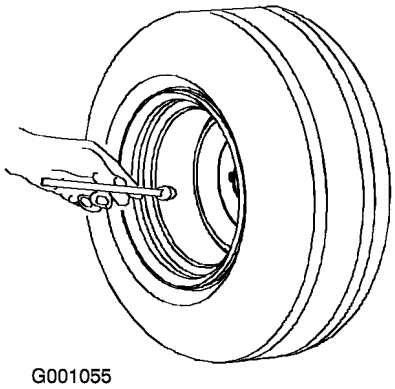


Figure 47

Checking the Wheel Hub Slotted Nut

Check after every 500 operating hours.

The slotted nut needs to be torqued to 125 ft-lb (170 N·m).

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the cotter pin.
4. Torque the slotted nut to 125 ft-lb (170 N·m) (Figure 48).

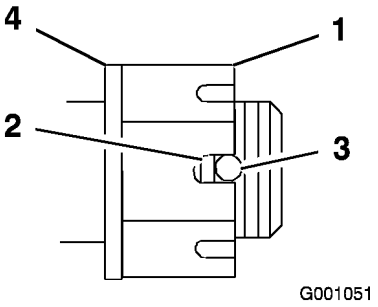


Figure 48

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

5. Check the distance from bottom of slot in nut to inside edge of hole. Two threads or less should be showing (Figure 48).
6. If more than two threads are showing remove nut and install washer between hub and nut.
7. Torque the slotted nut to 125 ft-lb. (170 N·m) (Figure 48).
8. Tighten the nut until the next set of slots line up with the hole in the shaft (Figure 48).
9. Replace the cotter pin.

Adjusting the Caster Pivot Bearing

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

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

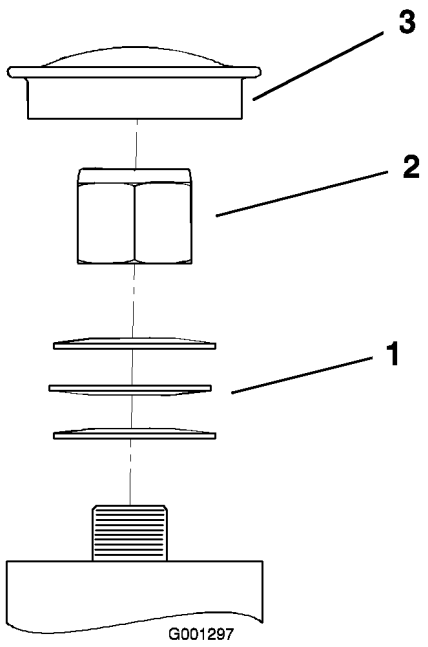


Figure 49

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

4. Tighten the locknut until the spring washers are flat and then back off a 1/4 turn to properly set the pre-load on the bearings (Figure 49).

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

5. Install the dust cap (Figure 49).

Cooling System Maintenance

Cleaning the Engine Screen and the Oil Cooler

Before each use, check and clean engine screen and oil cooler. Remove any build-up of grass, dirt or other debris from the oil cooler screen and engine screen (Figure 50 and Figure 51).

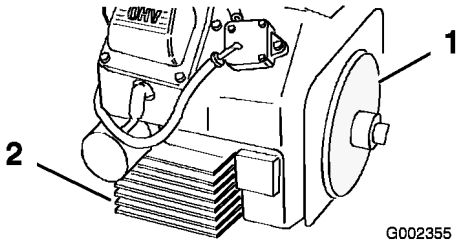


Figure 50

1. Engine screen
2. Oil cooler

Cleaning the Engine Fins

Every 100 hours clean the engine cylinder and cylinder head cooling fins. Also clean around carburetor, governor levers and linkage. This will make sure adequate cooling to hydraulic pumps, motors and engine and will reduce the possibility of overheating and mechanical damage.

1. Remove the engine shroud.
2. Clean the engine cooling fins.
3. Install the engine shroud.

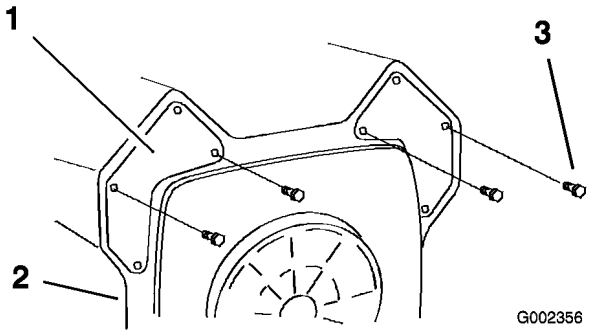


Figure 51

1. Panel
2. Engine shroud
3. Screws

Brake Maintenance

Adjusting the Parking Brake

Check the parking brake for proper adjustment.

1. Disengage brake lever (lever down).
2. Measure the length of the spring.

   The measurement should be 2-3/4 inch (70 mm) between washers (Figure 52).

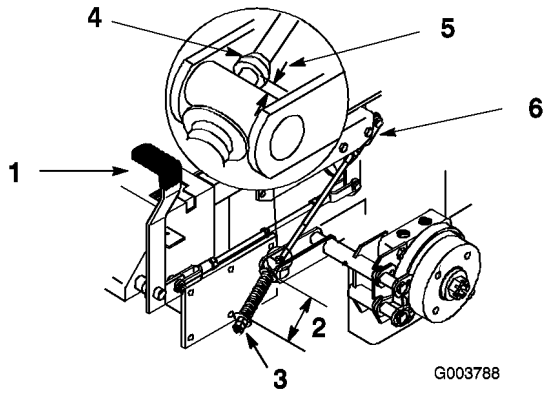


Figure 52

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

3. If adjustment is necessary, loosen the jam nut below the spring and tighten the nut directly below the yoke (Figure 52). Turn the nut until the correct measurement is obtained. Tighten the two nuts together and repeat on opposite side of unit.
4. Turn nuts clockwise to shorten spring length and turn counter-clockwise to lengthen the spring.
5. Engage parking brake, lever up.
6. Measure the distance between the trunnion roller and the collar on brake rod.

   The measurement should be 3/16-1/4 inch (5-7 mm) (Figure 52).
7. If adjustment is necessary, loosen the jam nut directly below the yoke. Turn the bottom rod until the correct measurement is obtained (Figure 52). Tighten jam nut at yoke

Belt Maintenance

Inspecting the Belts

Inspect all belts every 100 hours.

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

Replacing the Mower Belt

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

1. Disengage the PTO, move the motion control levers to the neutral locked position, and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the bolts holding the belt covers in place and remove the belt covers.
4. Loosen the nut securing the idler plate and move the idler plate to relieve the belt tension on the idler pulley (Figure 53).
5. Remove the nut, washer and belt guide from the rear leftside pulley.
6. Remove the mower belt from the belt guides and remove the belt (Figure 53).
7. Install the new mower belt around the mower spindle pulleys, mower idler pulley, into the belt guides, into rear idler arm assembly, and the clutch (Figure 53).
8. Install the belt guide with a washer and nut onto the rear leftside pulley.

   Note: Check the amount of twist in the belt between the pulleys. Ensure it is only what is specified in Figure 53.

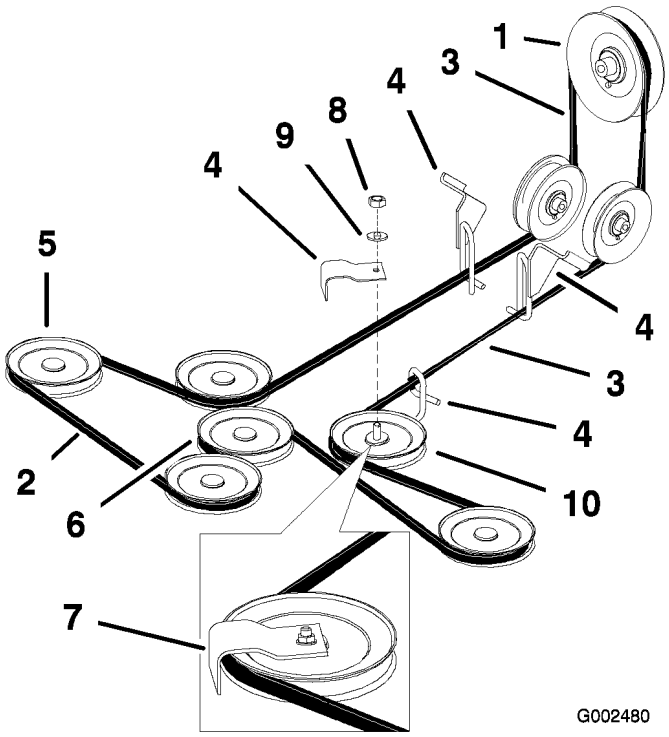


Figure 53

1.	Clutch	4.	Belt guide	7.	Belt guide installed	10.	Rear left side pulley
2.	Mower belt	5.	Mower spindle pulley	8.	Nut		
3.	1/4 trun belt twist	6.	Mower idler pulley	9.	Washer		

9. Adjust the belt tension, refer to Adjusting the Mower Belt Tension
10. Install the belt covers by sliding the cover into the tab, install the bolts, and close the latches (Figure 54).

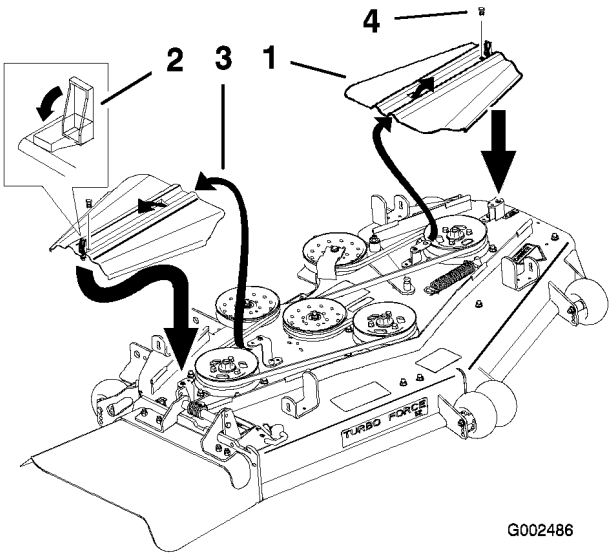


Figure 54

1.	Belt cover	3.	Insert slot into the tab
2.	Latch	4.	Bolt

Adjusting the Mower Belt Tension

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 mower to the transport position.

   Important: Check the amount of twist in the belt between the pulleys. Make sure it is only what is specified in Figure 53.

   Important: Check and make sure the belt is installed into both the front and rear belt guides (Figure 55).

4. Check the belt tension. The spring loaded idler center bolt needs to be near the top alignment hole in left support plate (Figure 55).

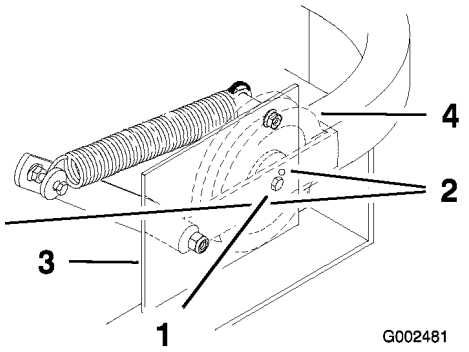


Figure 55

1. Center bolt
2. Alignment hole
3. Left support plate
4. Spring loaded idler

5. If adjustment is required, loosen the mower idler plate and adjust it (Figure 56).
6. Insert a ratchet or breaker bar into the square hole in the mower idler plate to adjust the tension (Figure 56).
7. To increase belt tension, rotate the mower idler plate until resistance is felt and rotation stops. Do not go past when it stops (Figure 56).
8. Tighten the idler plate bolts (Figure 56).

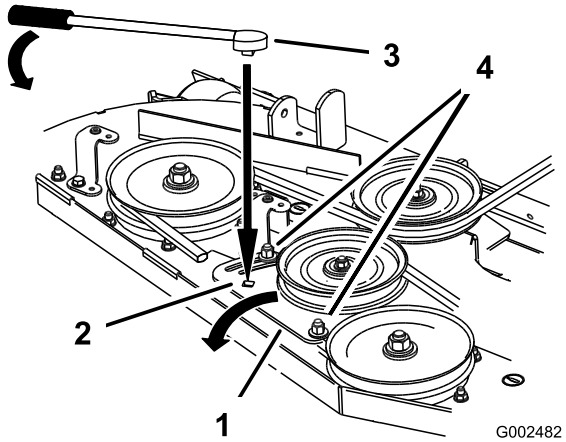


Figure 56

1. Mower idler plate
2. Square hole
3. Ratchet or breaker bar
4. Idler plate bolt

9. Check the distance from the rubber stop and the arm of the spring loaded idler pulley when the idler plate is tightened. It needs to be 0 to 1/4 inch (0 to 6 mm) from the rubber stop (Figure 57).

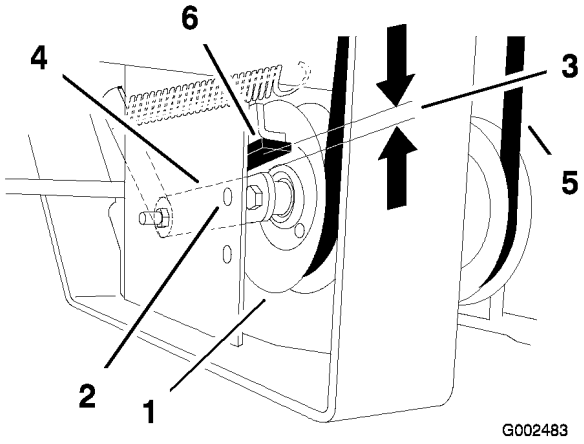


Figure 57

1. Spring loaded idler pulley
2. Top alignment hole
3. 0 to 1/4 inch gap (0 to 6 mm)
4. Idler pulley arm
5. Belt
6. Rubber bumper

10. Adjust the belt tension and the idler plate, if necessary, and tighten all hardware securely (Figure 56).
11. If the mower idler plate contacts the end of the adjustment slot and more belt tension is required, a small change to the right side fixed idler can create more belt tension adjustment (Figure 58).

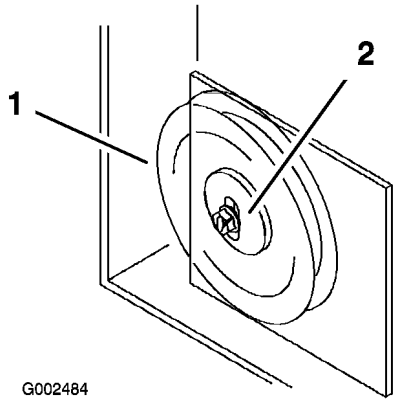


Figure 58

1. Fixed idler
2. Adjustment slot

Replacing the Pump Drive Belt

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

1. Pull the spring loaded idler down and remove traction belt from the engine and hydro pump

pulleys (Figure 59). Remove belt between pulleys.

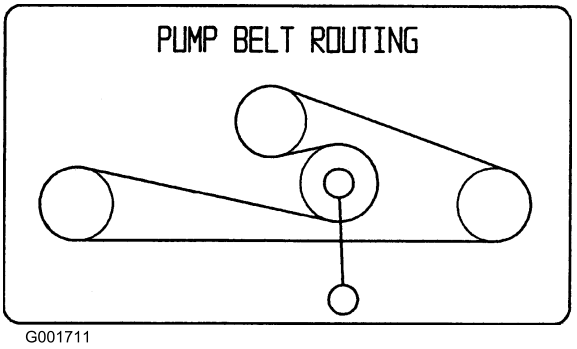


Figure 59

2. Install new belt around engine and hydro pump pulleys (Figure 59).
3. Pull spring loaded idler down and align below traction belt. Release the pressure on the spring loaded idler (Figure 59).

Controls System Maintenance

Adjusting the Control Handle Neutral Position

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

Note: Motion control levers must be installed correctly. See Installing the Motion Control Levers in the set up instructions.

1. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Unlatch the seat and tilt the seat forward.
4. Begin with either the left or right motion control lever.
5. Move the lever to the neutral position but not locked (Figure 60).

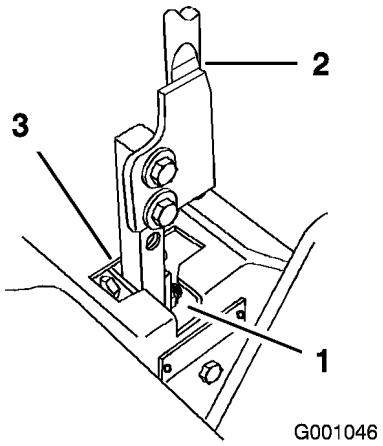


Figure 60

1. Neutral locked position
2. Control lever
3. Neutral potion

6. Pull the lever back until the clevis pin (on arm below pivot shaft) contacts the end of the slot (just beginning to put pressure on the spring) (Figure 60).
7. Check where the control lever is relative to notch in console (Figure 60). It should be centered allowing lever to pivot outward to the neutral lock position.
8. If adjustment is needed, loosen the nut and jam nut against the yoke (Figure 61).
9. Apply slight rearward pressure on the motion control lever, turn the head of the adjustment bolt in the appropriate direction until the control lever is centered in the neutral lock position (Figure 61).

   Note: Keeping rearward pressure on the lever will keep the pin at the end of the slot and allow the adjustment bolt to move the lever to the appropriate position.
10. Tighten the nut and jam nut (Figure 61).
11. Repeat for the opposite side of the machine.

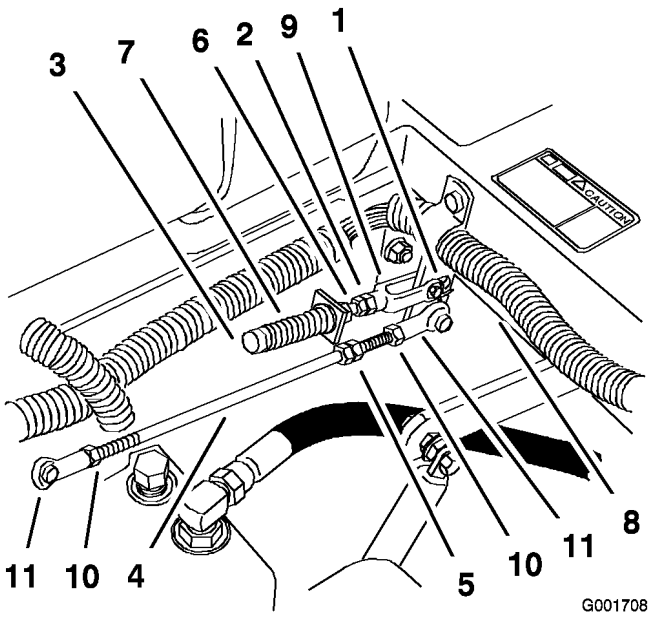


Figure 61

1. Clevis pin in slot
2. Nut against yoke
3. Adjustment bolt
4. Pump rod
5. Double nuts
6. Jam nut
7. Spring
8. Pivot shaft
9. Yoke
10. Locknut
11. Ball joint

Hydraulic System Maintenance

Checking the Hydraulic Fluid

Check the hydraulic fluid level:

- Before the engine is first started.
- After the first 8 operating hours.
- After every 25 operating hours.

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

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

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

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

1. Position the machine on a level surface and set the parking brake.
2. Clean the area around filler neck of hydraulic tank (Figure 62).

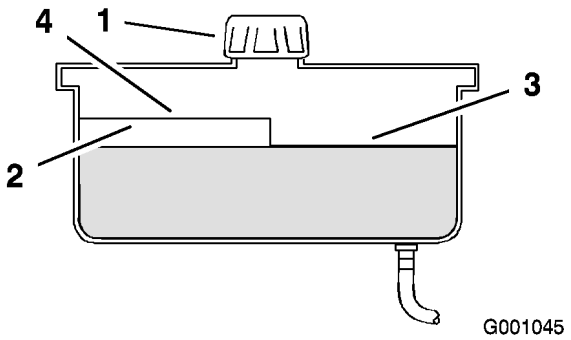


Figure 62

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

3. Remove the cap from the filler neck. Look inside to check if there is fluid in the reservoir (Figure 62).
4. If there is no fluid, add fluid to the reservoir until it reaches the cold level of the baffle.
5. Run the machine at low idle for 15 minutes to allow any air to purge out of the system and warm the fluid. Refer to Starting and Stopping the Engine in Operation, page 15.
6. Recheck the fluid level while the fluid is warm. The fluid should be between cold and hot.
7. If required, add fluid to the hydraulic tank.

   Note: The fluid level should be to the top of the hot level of the baffle, when the fluid is hot (Figure 62).
8. 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 and Oil

Change the hydraulic filter:

- After the first 25 operating hours.
- Change yearly after the first 25 operating hours.

Use summer filter above 32°F (0°C)

Use winter filter below 32°F (0°C)

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.

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

3. Place drain pan under filter, remove the old filter and wipe the filter adapter gasket surface clean (Figure 63).

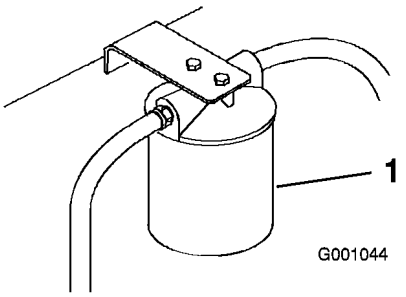


Figure 63

1. Hydraulic filter

4. Apply a thin coat hydro fluid to the rubber gasket on the replacement filter (Figure 64).

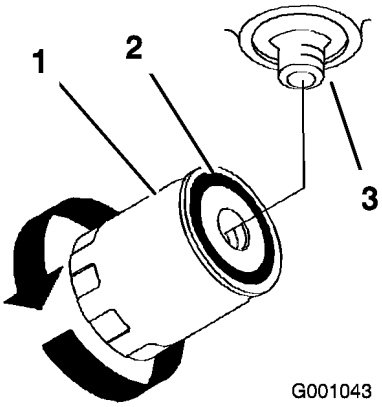


Figure 64

1. Hydraulic filter
2. Gasket
3. Adapter

5. Install the replacement hydraulic filter onto the filter adapter. Do not tighten.
6. Fill the hydraulic tank with hydraulic fluid until the fluid overflows the filter and then turn the oil filter clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 1/2 turn (Figure 64).
7. Clean up any spilled fluid.
8. Add fluid to the cold level of the baffle in the hydraulic tank.
9. Start the engine and let it run for about two minutes to purge air from the system. Stop the engine and check for leaks. If one or both wheels will not drive, refer Bleeding Hydraulic System.
10. Recheck the fluid level while the fluid is warm. The fluid should be between cold and hot.
11. If required, add fluid to the hydraulic tank. Do not overfill.

Bleeding the Hydraulic System

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

1. Raise rear of the machine so wheels are off the ground and support with jack stands.
2. Start the engine and run at low idle speed. Engage the lever and traction on one side and spin the wheel by hand.
3. When the wheel begins to spin on its own, keep it engaged until wheel drives smoothly. (minimum 2 minutes)
4. Check hydraulic fluid level and add as required to maintain proper level.
5. Repeat this procedure on the opposite wheel.

Checking the Hydraulic Hoses

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

Note: Keep areas around the 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.**

Setting the Hydraulic Pump Neutral Position

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

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

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

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

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

This adjustment must be made with drive wheels turning.

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

Setting the Right-hand Hydraulic Pump Neutral Position

1. Start the engine, open the throttle 1/2 way and release parking brake. Refer to Starting and Stopping the Engine in Operation, page 15.

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

2. Adjust the pump rod length by rotating the knob, in the appropriate direction, until the wheel is still or slightly creeping in reverse (Figure 65).

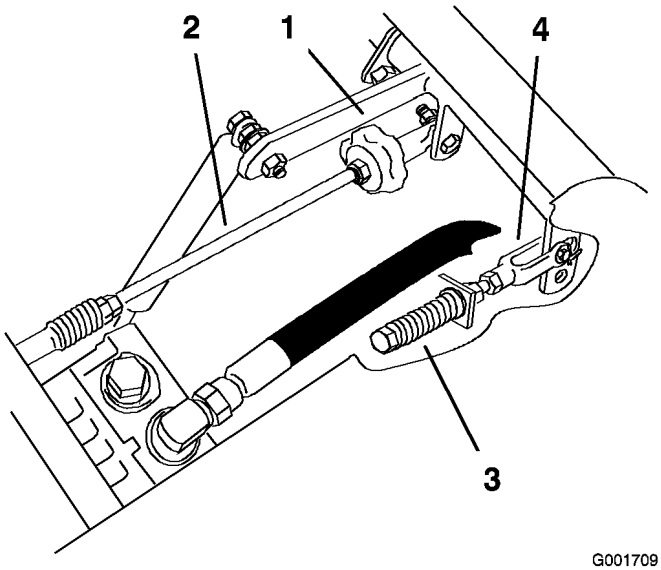


Figure 65

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

3. Move the motion control lever forward and reverse, then back to neutral. The wheel must stop turning or slightly creep in reverse.
4. Open the throttle to fast. Make sure wheel remains stopped or slightly creeps in reverse, adjust if necessary.

Setting the Left-hand Hydraulic Pump Neutral Position

1. Loosen the locknuts at the ball joints on the pump control rod (Figure 66).

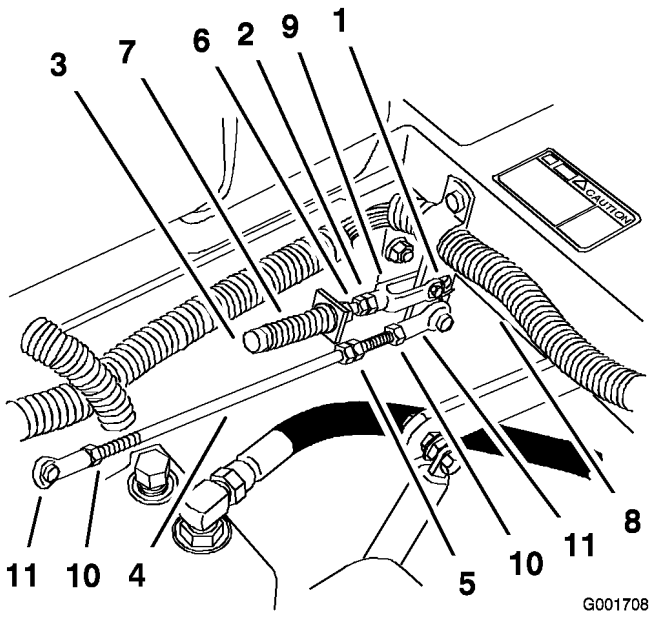


Figure 66

1. Clevis pin in slot
2. Nut against yoke
3. Adjustment bolt
4. Pump rod
5. Double nuts
6. Jam nut
7. Spring
8. Pivot shaft
9. Yoke
10. Locknut
11. Ball joint

2. Start the engine, open throttle 1/2 way, and release parking brake. Refer to Starting and Stopping the Engine in Operation, page 15.

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

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

3. Adjust the pump rod length by rotating double nuts on rod, in the appropriate direction, until wheel is still or slightly creeps in reverse (Figure 66).

4. Move the motion control lever forward and reverse, then back to neutral. The wheel must stop turning or slightly creep in reverse.
5. Open the throttle to fast. Make sure the wheel remains stopped or slightly creeps in reverse, adjust if necessary.
6. Tighten the locknuts at the ball joints (Figure 66).

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

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

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

Mower Deck Maintenance

Leveling the Mower at Three Positions

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

Setting Up the Machine

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

   Note: Adjust the rear chains to the top of the slot, where they are attached to the mower.

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

Leveling the Mower Side-to-Side

1. Position the **right** blade front-to-rear (Figure 67).

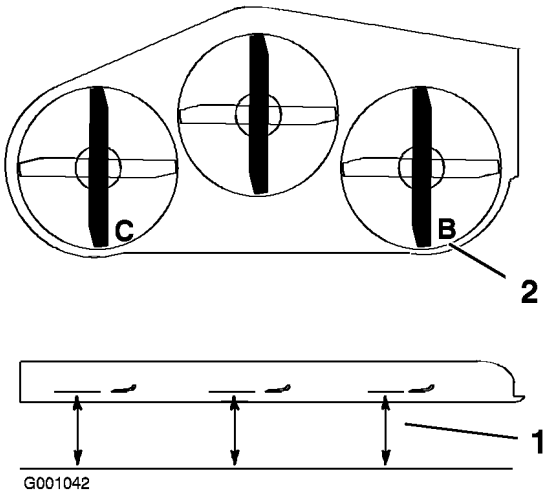


Figure 67

1. Measure here from blade to hard surface
2. Measure at B and C

2. Measure the right blade at the **B** location, from a level surface to the cutting edge of the blade tip (Figure 67).
3. Record this measurement. This measurement needs to be 3-1/8 to 3-1/4 inches.
4. Position the left blade front-to-rear (Figure 67).
5. Measure the left blade at the **C** location (Figure 67), from a level surface to the cutting edge of the blade tip .
6. Record this measurement. This measurement needs to be 3-1/8 to 3-1/4 inches.

7. If the measurements at positions **B** or **C** are not correct, loosen the bolt attaching the rear chain to the rear support arm (Figure 68).

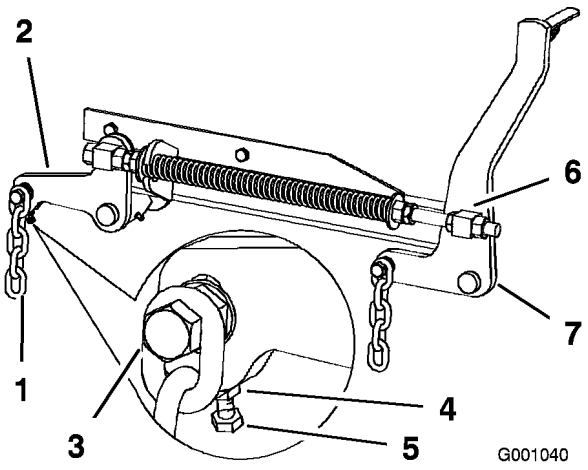


Figure 68

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

8. Loosen the jam nut under the rear support arm and adjust the adjustment bolt to get a measurement of 3-1/8 to 3-1/4 inches (Figure 68).

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

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

10. Adjust the opposite side if needed.

Adjusting the Front-to-Rear Mower Pitch

1. Position the **right** blade front-to-rear (Figure 69).

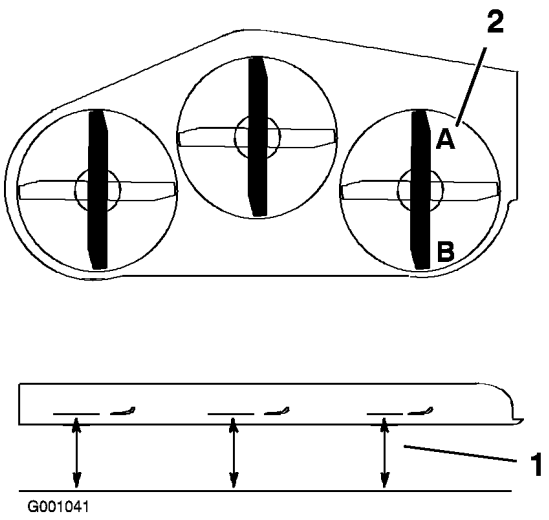


Figure 69

1. Measure here from blade to hard surface
2. Measure at A and B

2. Measure the right blade at the **A** location, from a level surface to the cutting edge of the blade tip (Figure 69).

3. Record this measurement.

4. Measure the right blade at the **B** location, from a level surface to the cutting edge of the blade tip (Figure 69).

5. Record this measurement.

6. The mower blade should be a 1/4 to 3/8 inch (6 to 10 mm) lower at position **A** than at position **B** (Figure 69). If it is not correct, proceed to the following steps.

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

7. Loosen the front swivel jam nuts, at the front of the right and left swivels, approximately a 1/2 inch (13 mm) (Figure 68).

8. Adjust the lift nuts on both the left and the right side of the machine to achieve 1/4 to 3/8 inch (6 to 10 mm) lower in front at A than in the rear at **B** (Figure 68).

9. Tighten both swivel jam nuts against the front swivel to lock the height.

10. Check to make sure there is equal tension on the chains and adjust again if needed.

Adjusting the Compression Spring

1. Raise the mower lift lever to the transport position.
2. Check the distance between the two large washers, it needs to be 10-1/2 inches (26.7 cm) (Figure 70).

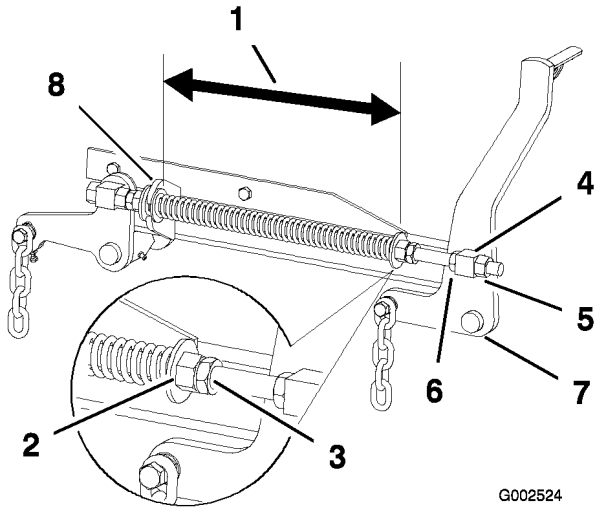


Figure 70

1. 10-1/2 inch (26.7 cm) between the large washers
2. Front nut
3. Spring jam nut
4. Front swivel
5. Swivel jam nut
6. Lift nut
7. Front support arm
8. Large washer

3. Adjust this distance, by loosening the spring jam nut and turning the nut in front of each spring (Figure 70). Turning the nut clockwise will shorten the spring; counter-clockwise will lengthen the spring.
4. Lock the nut into position by tightening the spring jam nut (Figure 70).

Servicing the Cutting Blades

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

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

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

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

Inspect and check the blades every 8 hours.

Before Inspecting or Servicing the Blades

1. Park the machine on a level surface, disengage the blade control (PTO), and set the parking brake.
2. Turn the ignition key to Off and remove the key.
3. Disconnect the spark plug wire(s) from the spark plug(s).

Inspecting the Blades

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.

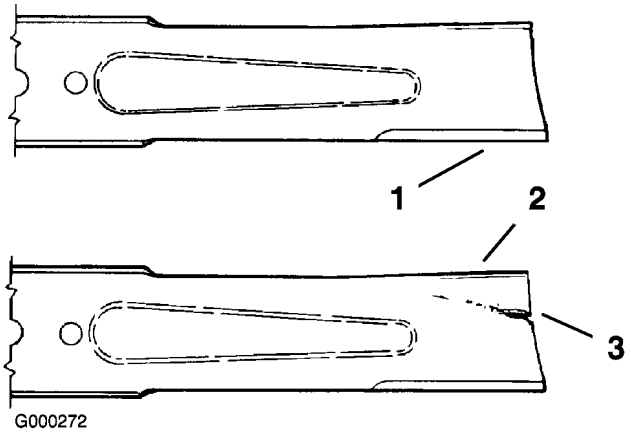


Figure 71

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

2. Inspect the blades, especially the curved area (Figure 71).

   If you notice any damage, wear, or a slot forming in this area (Figure 71), immediately install a new blade.

Checking for Bent Blades

1. Rotate the blades until the ends face forward and backward (Figure 72). Measure from a level surface to the cutting edge, position **A**, of the blades (Figure 72). Note this dimension.

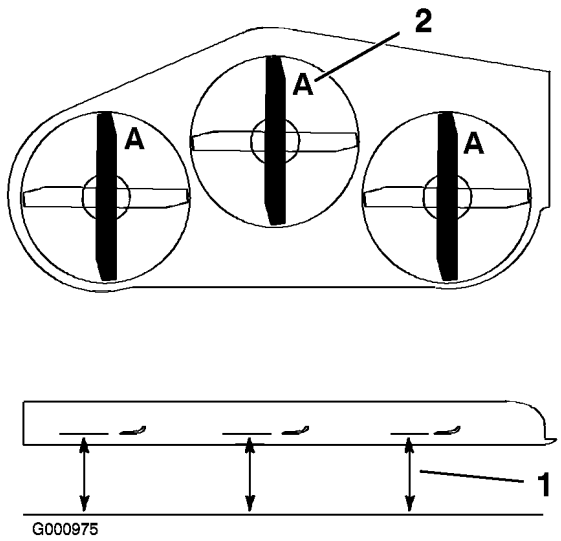


Figure 72

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

2. Rotate the opposite ends of the blades forward.
3. Measure from a level surface to the cutting edge of the blades at the same position as in step 1 above.

   The difference between the dimensions obtained in steps 1 and 2 must not exceed 1/8 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.

Contact with a sharp blade can cause serious injury.

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

1. Hold the blade end using a rag or thickly-padded glove.
2. Remove the blade bolt, spring disk and blade from the spindle shaft (Figure 75).

Sharpening the Blades

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

Wear proper eye protection when sharpening blade.

1. Use a file to sharpen the cutting edge at both ends of the blade (Figure 73). Maintain the original angle. The blade retains its balance if the same amount of material is removed from both cutting edges.

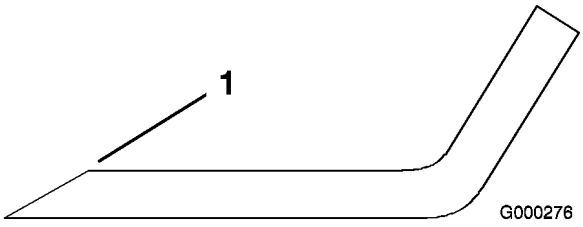


Figure 73

1. Sharpen at original angle

2. Check the balance of the blade by putting it on a blade balancer (Figure 74). 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 75). Repeat this procedure until the blade is balanced.

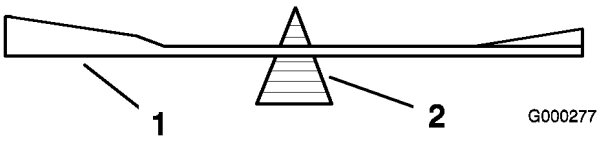


Figure 74

1. Blade
2. Balancer

Installing the Blades

1. Install the blade onto the spindle shaft (Figure 75).

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

2. Install the spring disk and blade bolt. The spring disk cone must be installed toward the bolt head (Figure 75).

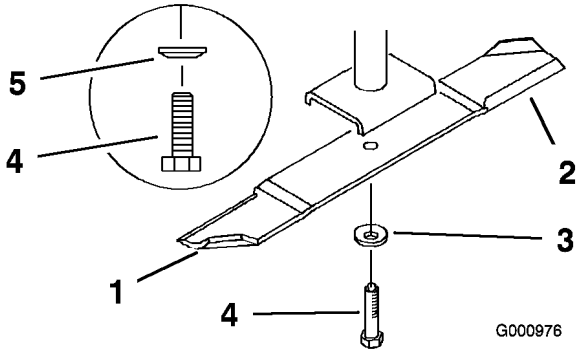


Figure 75

1. Sail Area of Blade
2. Blade
3. Spring Disk
4. Blade Bolt
5. Cone Towards Bolt Head

3. Torque the blade bolt to 85-110 ft-lb (115-150 N·m).

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, or a grass chute and catcher.**
- **Make sure the grass deflector is in the down position.**

1. Remove the locknut, bolt, spring and spacer holding the deflector to the pivot brackets (Figure 76).
2. Remove the damaged or worn grass deflector.
3. Place the spacer and spring onto the grass deflector. Place the **L** end of the spring behind the deck edge.

   Note: Make sure the L end of the spring is installed behind the deck edge before installing the bolt as shown in Figure 76

4. Install the bolt and nut.
5. Place the **J** hook end of the spring around the grass deflector (Figure 76).

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

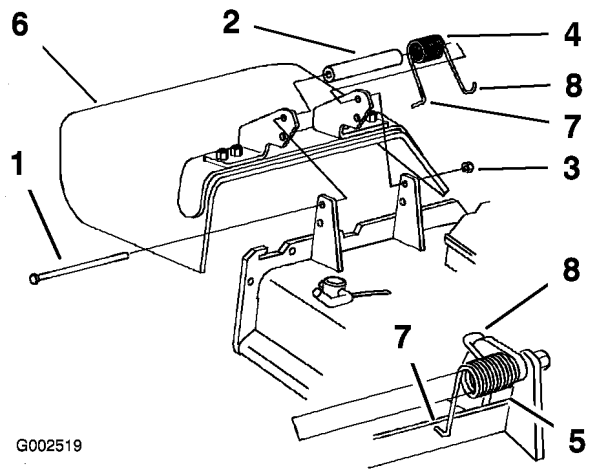


Figure 76

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

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 mower to the transport position.

Waste Disposal

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

Storage

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

   Important: You can wash the machine with mild detergent and water. Do not pressure wash the machine. Avoid excessive use of water, especially near the control panel, engine, hydraulic pumps and motors.
3. Service the air cleaner; refer to Servicing the Air Cleaner in Engine Maintenance, page 33.
4. Grease and oil the machine; refer to Greasing and Lubrication in Lubrication, page 31.
5. Change the crankcase oil; refer to Servicing the Engine Oil in Engine Maintenance, page 33.
6. Change the hydraulic filter; refer to Servicing the Hydraulic System in Hydraulic System Maintenance, page 46.
7. Check the tire pressure; refer to Checking the Tire Pressure in Drive System Maintenance, page 39.
8. Charge the battery; refer to Servicing the Battery in Electrical System Maintenance, page 37.
9. Scrape any heavy buildup of grass and dirt from the underside of the mower, then wash the mower with a garden hose.

   Note: Run the machine with the PTO engaged and the engine at high idle for 2 to 5 minutes after washing.
10. Check the condition of the blades. Refer to Servicing the Cutting Blades.
11. Prepare the machine for storage when non-use occurs over 30 days. Prepare machine for storage as follows.

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

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

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

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

    D. Restart engine and run it until it stops.

    E. Choke the engine. Start and run engine until it will not start.

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

    Important: Do not store stabilizer/conditioned gasoline over 90 days.
12. Remove the spark plug(s) and check its condition; refer to Servicing the Spark Plug in Engine Maintenance, page 33. 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).
13. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged or defective.
14. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
15. Store the machine in a clean, dry garage or storage area. Remove the key from the ignition switch and keep it out of reach of children or other unauthorized users. Cover the machine to protect it and keep it clean.

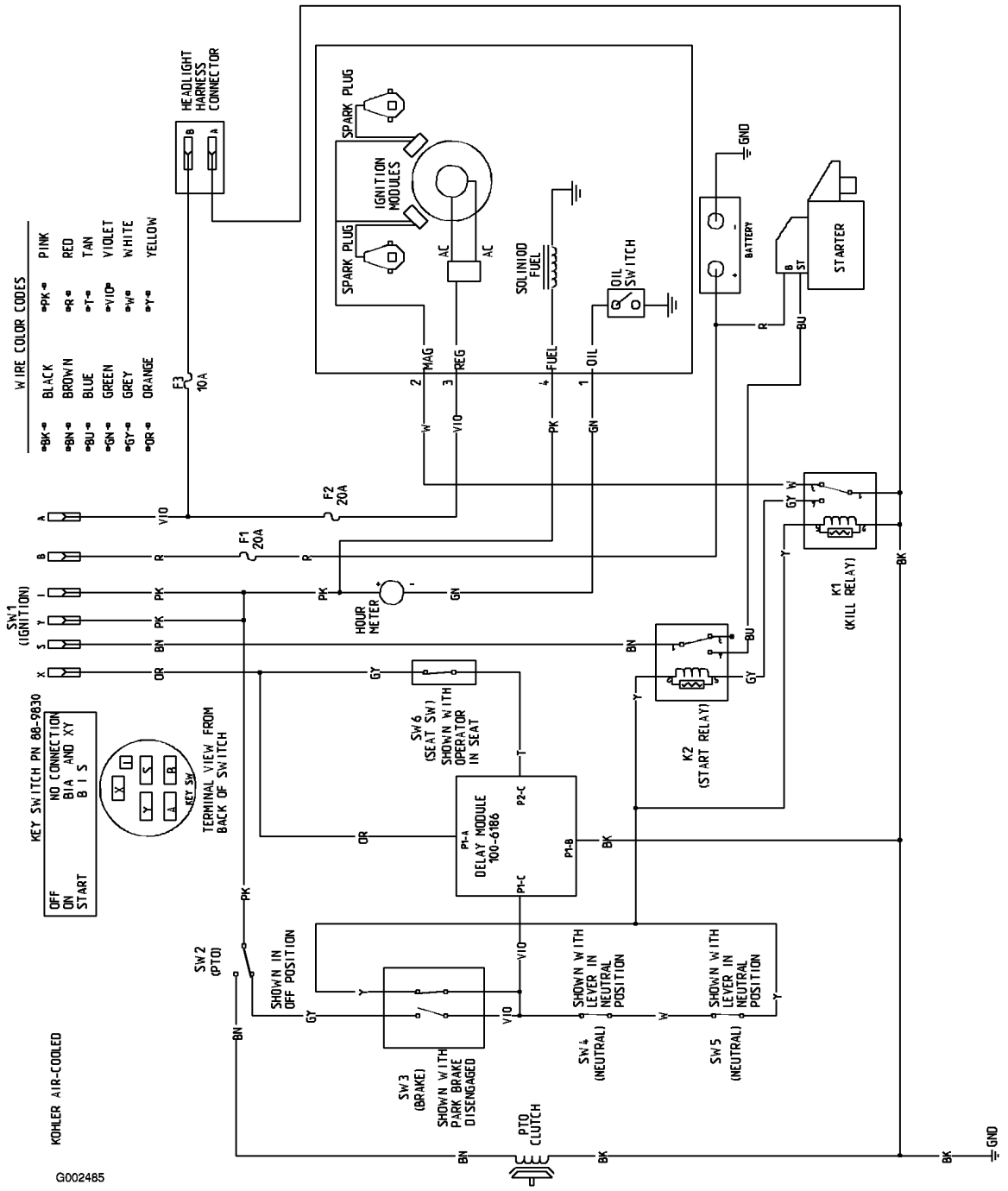
Troubleshooting

Problem	Possible Cause	Corrective Action
Starter does not crank	1. Blade control (PTO) is engaged. 2. Parking brake is not on. 3. Operator is not seated. 4. Battery is dead. 5. Electrical connections are corroded or loose. 6. Fuse is blown. 7. Relay or switch is defective.	1. Move blade contro (PTO) to disengaged. 2. Set the parking brake. 3. Sit on the seat. 4. Charge the battery. 5. Check the electrical connections for good contact. 6. Replace fuse. 7. Contact an Authorized Service Dealer.
Engine will not start, starts hard, or fails to keep running.	1. Fuel tank is empty. 2. Air cleaner is dirty. 3. Dirt in the fuel filter. 4. Dirt, water, or stale fuel is in the fuel system.	1. Fill fuel tank with fuel. 2. Clean or replace the air cleaner element. 3. Replace the fuel filter. 4. Contact an Authorized Service Dealer.
Engine loses power.	1. Engine load is excessive. 2. Air cleaner is dirty. 3. Oil level in the crankcase is low. 4. Cooling fins and air passages above the engine are plugged. 5. Vent hole in the fuel cap is plugged. 6. Dirt in the fuel filter. 7. Dirt, water, or stale fuel is in the fuel system.	1. Reduce the ground speed. 2. Clean the air cleaner element. 3. Add oil to the crankcase. 4. Remove the obstruction from the cooling fins and air passages. 5. Clean or replace the fuel cap. 6. Replace the fuel filter. 7. Contact an Authorized Service Dealer.
Engine overheats.	1. Engine load is excessive. 2. Oil level in the crankcase is low. 3. Cooling fins and air passages above the engine are plugged.	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.	1. By pass valve is not closed tight. 2. Drive or pump belt is worn, loose or broken. 3. Drive or pump belt is off a pulley. 4. Broken or missing idler spring. 5. Hydraulic fluid level is low or too hot.	1. Tighten the by pass valve. 2. Change the belt. 3. Change the belt. 4. Replace the spring. 5. Add hydraulic fluid to reservoir or let it cool down.
Abnormal vibration.	1. Cutting blade(s) is/are bent or unbalanced. 2. Blade mounting bolt is loose. 3. Engine mounting bolts are loose. 4. Loose engine pulley, idler pulley, or blade pulley. 5. Engine pulley is damaged. 6. Blade spindle is bent. 7. Motor mount is loose or worn.	1. Install new cutting blade(s). 2. Tighten the blade mounting bolt. 3. Tighten the engine mounting bolts. 4. Tighten the appropriate pulley. 5. Contact an Authorized Service Dealer. 6. Contact an Authorized Service Dealer. 7. Contact an Authorized Service Dealer.
Uneven cutting height.	1. Blade(s) not sharp. 2. Cutting blade(s) is/are bent. 3. Mower is not level. 4. Underside of the mower is dirty. 5. Tire pressure is not correct. 6. Blade spindle bent.	1. Sharpen the blade(s). 2. Install new cutting blade(s). 3. Level mower from side-to-side and front-to-rear. 4. Clean the underside of the mower. 5. Adjust the tire pressure. 6. Contact an Authorized Service Dealer.

Problem	Possible Cause	Corrective Action
Blades do not rotate.	1. Drive belt is worn, loose or broken.	1. Check the belt tension.
	2. Drive belt is off pulley.	2. Install drive belt and check adjusting shafts and belt guides for correct position.
	3. Deck belt is worn, loose or broken.	3. Install new deck belt.
	4. Deck belt is off pulley.	4. Install deck pulley and check the idler pulley, idler arm and spring for correct position and function.
	5. Broken or missing idler spring.	5. Replace the spring.

Schematics



Wire Diagram (Rev. A)