



Mid-Size Mower

ProLine Gear 15 HP with 44 in. Side Discharge Mower

Model No. 30291TE—210000001 and Up

Operator's Manual



English (GB)

This spark ignition system complies with Canadian ICES-002.

Ce système d'allumage par étincelle de véhicule est conforme à la norme NMB-002 du Canada.

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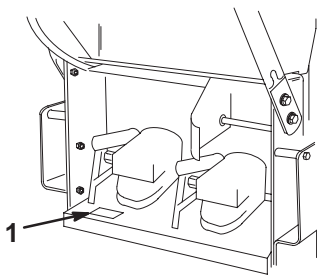
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Introduction

Read this manual carefully to learn how to operate and maintain your product properly. The information in this manual can help you and others avoid injury and product damage. Although Toro designs and produces safe products, you are responsible for operating the product properly and safely.

Whenever you need service, genuine Toro parts, or additional information, contact an Authorized Service Dealer or Toro Customer Service and have the model and serial numbers of your product ready. Figure 1 illustrates the location of the model and serial numbers on the product.



m-3097

Figure 1

1. Location of the model and serial numbers

Write the product model and serial numbers in the space below:

<p>Model No. _____</p> <p>Serial No. _____</p>
--

This manual identifies potential hazards and has special safety messages that help you and others avoid personal injury and even death. **Danger**, **Warning**, and **Caution** are signal words used to identify the level of hazard. However, regardless of the hazard, be extremely careful.

Danger signals an extreme hazard that *will* cause serious injury or death if you do not follow the recommended precautions.

Warning signals a hazard that *may* cause serious injury or death if you do not follow the recommended precautions.

Caution signals a hazard that may cause minor or moderate injury if you do not follow the recommended precautions.

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

Safety

Improperly using or maintaining this lawn mower can result in injury. To reduce the potential for injury, comply with these safety instructions.

Toro designed and tested this lawn mower for to offer reasonably safe service; however, *failure to comply with the following instructions may result in personal injury.*

To ensure maximum safety, best performance, and to gain knowledge of the product, it is essential that you and any other operator of the lawn mower read and understand the contents of this manual before the engine is ever started. Pay particular attention to the safety alert symbol ⚠ which means *caution, warning,*

or danger — “personal safety instruction.” Read and understand the instruction because it has to do with safety. Failure to comply with the instruction may result in personal injury.

General Lawn Mower Safety

The following instructions have been adapted from the ISO standard 5395.

This cutting machine is capable of amputating hands and feet and throwing objects. Failure to observe the following safety instructions could result in 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 mower. Local regulations can restrict the age of the operator.
- Keep in mind that the operator or user is responsible for accidents or hazards occurring to other people or their property.
- Understand explanations for all pictograms used on the lawn mower or in the instructions.

Gasoline

- **WARNING**—Gasoline is highly flammable. Take the following precautions.
 - Store fuel in containers specifically designed for this purpose.
 - Refuel outdoors only and do not smoke while refueling.
 - Add fuel before starting the engine. Never remove the cap of the fuel tank or add gasoline while the engine is running or when the engine is hot.
 - If gasoline is spilled, do not attempt to start the engine but move the lawn mower away from the area of spillage and avoid creating any source of ignition until gasoline vapors have dissipated.
 - Replace all fuel tank and container caps securely.

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 stones, sticks, wires, bones and other foreign objects.

- Before using, always visually inspect to see that guards, and safety devices, such as deflectors and/or grass catchers, are in place and working correctly.
- 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.

Starting

- Disengage all blade and drive clutches and shift into neutral before starting the engine.
- Do not tilt mower when starting the engine or switching on the motor, unless the mower has to be tilted for starting. In this case, do not tilt it more than absolutely necessary and lift only the part, which is away from the operator.
- Start the engine or switch on the motor carefully according to instructions and with feet well away from the blade(s) and not in front of the discharge chute.

Operation

- Never mow while people, especially children, or pets are nearby.
- Mow only in daylight or in good artificial light.
- Stay alert for holes in the terrain and other hidden hazards.
- Never direct discharge of material towards bystanders.
- Avoid operating the equipment in wet grass, where feasible.
- Do not put hands or feet near or under rotating parts. Keep clear of the discharge opening at all times.
- Never pick up or carry a lawn mower while the engine is running.
- Use extreme caution when reversing or pulling a pedestrian controlled lawn mower towards you.
- Walk, never run.

Slopes:

- Do not mow excessively steep slopes.
- Exercise extreme caution when on slopes.
- Mow across the face of slopes, never up and down and exercise extreme caution when changing direction on slopes.
- Always be sure of your footing on slopes.

Use low throttle settings when engaging the traction-clutch, especially in high gears. Reduce speed on slopes and in sharp turns to prevent overturning or loss of control.

Stop the blades if the lawn mower has to be tilted for transportation when crossing surfaces other than grass and when transporting the lawn mower to and from the area to be mowed.

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

Stop the engine

- whenever you leave the lawn mower.
- before refueling.
- before removing the grass catcher.
- before making height adjustment unless adjustment can be made from the operator's position.

Stop the engine and disconnect the spark-plug lead or turn off and remove key

- before clearing blockages or unclogging chute.
- before checking, cleaning or working on the lawn mower.
- after striking a foreign object, inspect the lawn mower for damage and make repairs before restarting and operating the lawn mower.
- if lawn mower starts to vibrate abnormally (check immediately).

Use care when using sulkies, and

- use only approved drawbar hitch points.
- limit loads to those you can safely control.
- do not turn sharply; use care when reversing.
- do not carry passengers.

Watch out for traffic when crossing or near roadways.

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.

Maintenance and storage

- Keep all nuts, bolts and screws tight to be sure the equipment is in safe working condition.
- Do not use pressure cleaning equipment on machine.
- Never store the equipment with gasoline in the tank and 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 gasoline storage are free of grass, leaves, or excessive grease.
- Check the grass catcher frequently and replace if worn or deteriorated.
- Replace worn or damaged parts for safety.
- Replace faulty silencers.
- If the fuel tank has to be drained, do this out-doors.
- Do not change the engine governor settings or overspeed the engine. Operating an engine at excessive speed can increase the hazard of personal injury.
- On multibladed lawn mowers, take care as rotating one blade may cause others to rotate.
- Be careful during adjustment of the lawn mower to prevent entrapment of the fingers between moving blades and fixed parts of the lawn mower.
- To ensure the best performance and safety, purchase only genuine Toro replacement parts and accessories. **Do not use “will fit” parts and accessories; they may cause a safety hazard.**

Sound Pressure Level

This unit has an equivalent continuous A-weighted sound pressure at the operator ear of: 86 dB(A), based on measurements of identical machines per Directive 84/538/EEC.

Sound Power Level

This unit has a sound power level of: 100 Lwa, based on measurements of identical machines per procedures outlined in Directive 84/538/EEC and amendments.

Vibration Level

This unit has a maximum hand-arm vibration level of 8.3 m/s², based on measurements of identical machines per EN 1033 and EN 1032.

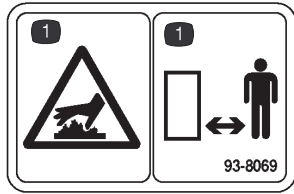
Slope Chart



Safety and Instruction Decals



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



93-8069

1. Warning hot surface—stay away.



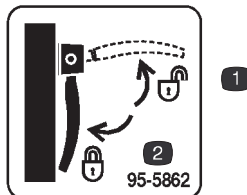
100-3952

1. Hydraulic oil level
2. Hot surface hazard—stay away.



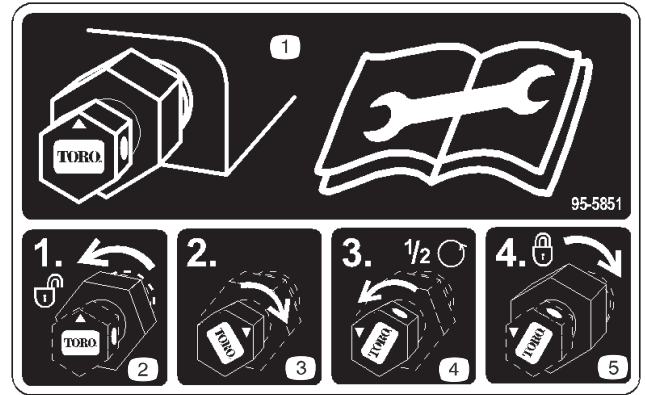
93-9353

1. Disengage and shut fuel valve off before transporting



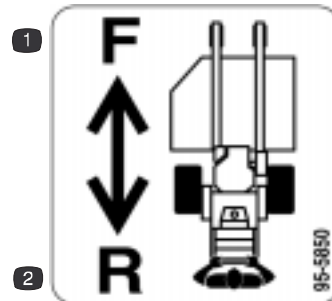
95-5862

1. Unlock control bar
2. Lock control bar



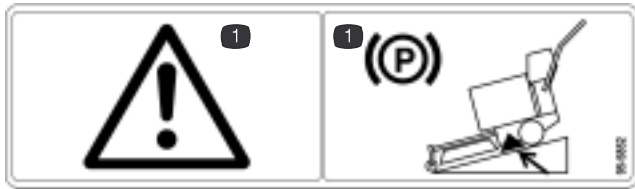
95-5851

1. Read the operator's manual before adjusting by-pass valve.
2. Unlock jam nut.
3. Close by-pass valve.
4. Open by-pass valve counterclockwise, a 1/2 turn.
5. Lock jam nut by tightening



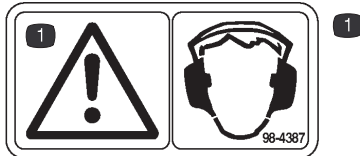
95-5850

1. Pull back to reverse machine traction
2. Push forward to move machine traction forward



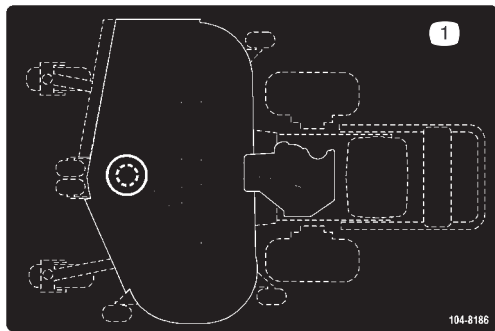
95-5852

1. Warning—Chock or block wheels when parking on slope



98-4387

1. Caution—wear hearing protection.



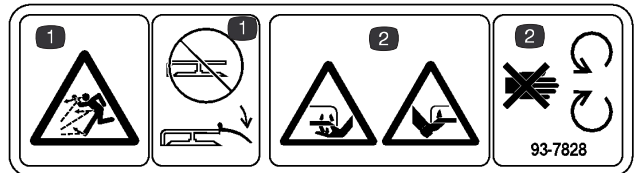
104-8186

1. Belt routing



93-7010

1. Thrown object hazard—keep bystanders away.
2. Thrown object hazard—keep the deflector in place.
3. Cutting/dismemberment hazard of hands or feet—stay away from rotating blades and moving parts.



93-7828

1. Thrown object hazard—keep the deflector in place.
2. Cutting/dismemberment hazard of hands or feet—stay away from rotating blades and moving parts.



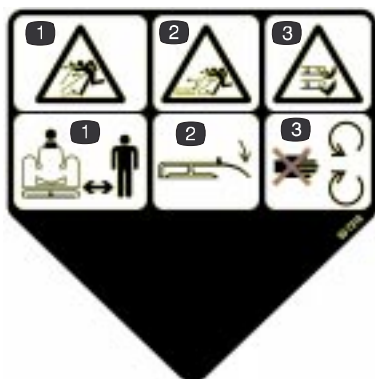
98-1977

1. Entanglement hazard—stay away from moving parts.



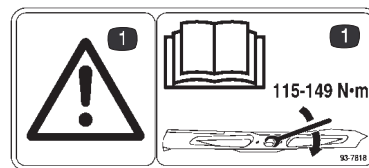
93-7824

1. Thrown object hazard—keep bystanders away.
2. Thrown object hazard—keep the deflector in place.
3. Cutting/dismemberment hazard of hands or feet—stay away from rotating blades and moving parts.



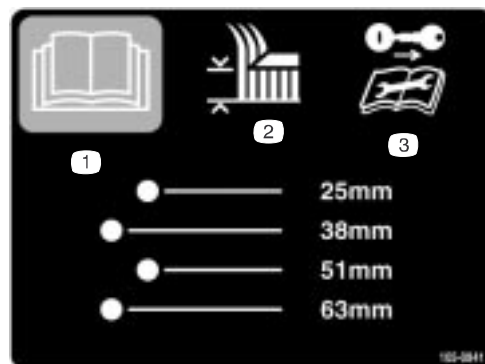
93-7316

1. Thrown object hazard—keep bystanders away.
2. Thrown object hazard—keep the deflector in place.
3. Cutting/dismemberment hazard of hands or feet—stay away from rotating blades and moving parts.



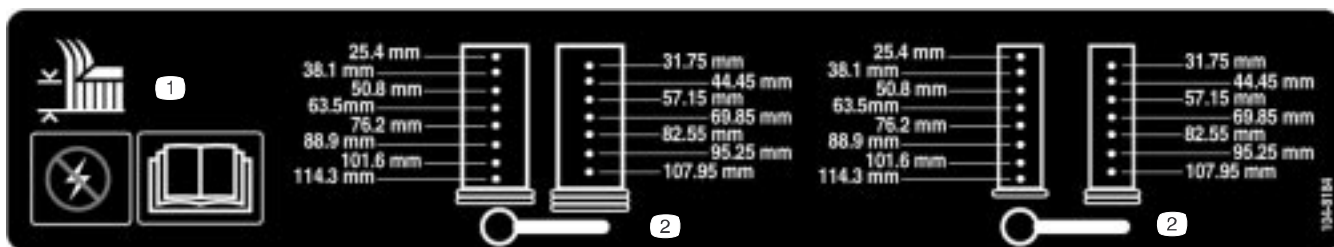
93-7818

1. Warning—read the operator's manual for proper blade bolt torque.



105-0841

1. Read the operator's manual for proper procedure.
2. Anti-scalp roller height adjustment
3. Read the operator's manual before performing maintenance.



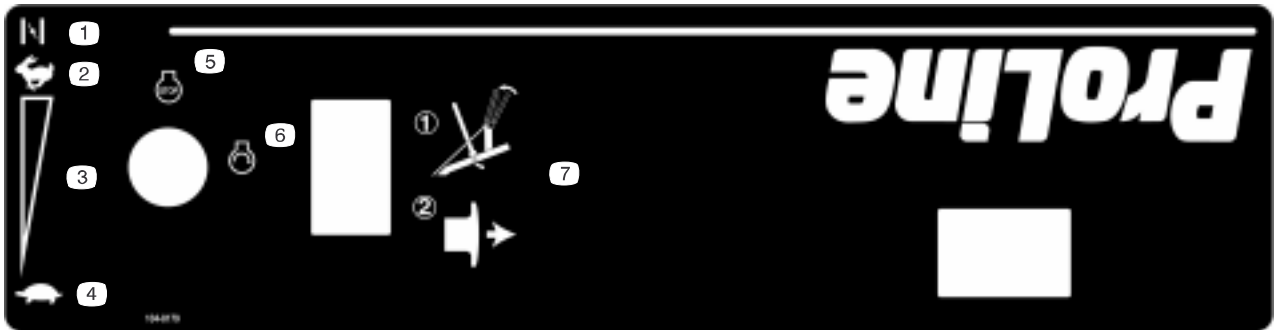
104-8184

1. Read the operator's manual for proper procedure. Stop electric clutch before changing machines height-of-cut.
2. Insert pin at desired height-of-cut.



95-1545

1. Read the operator's manual for proper procedure.
2. Thrown object hazard—keep bystanders away.
3. Thrown object hazard—keep the deflector in place.
4. Cutting/dismemberment hazard of hands or feet—stay away from rotating blades and moving parts.
5. Warning—stop engine before leaving the machine.
6. Use lever to lock reference bar in desired speed
7. Slow
8. Fast



104-8179



1. Choke
2. Fast
3. Variable speed
4. Slow
5. Engine stop
6. Engine start
7. Engage the control bar first and then engage PTO.

Gasoline and Oil

Recommended Gasoline



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

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

 **Danger** 

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

- Fill the fuel tank outdoors, in an open area, when the engine is cold. Wipe up any gasoline that spills.
- Do not fill the fuel tank completely full. Add gasoline to the fuel tank until the level is 1/4 in. to 1/2 in. (6 mm to 13 mm) below the bottom of the filler neck. This empty space in the tank allows gasoline to expand.
- Never smoke when handling gasoline, and stay away from an open flame or where gasoline fumes may be ignited by a spark.
- Store gasoline in an approved container and keep it out of the reach of children. Never buy more than a 30-day supply of gasoline.
- Always place gasoline containers on the ground away from your vehicle before filling.
- Do not fill gasoline containers inside a vehicle or on a truck or trailer bed because interior carpets or plastic truck bed liners may insulate the container and slow the loss of any static charge.
- When practical, remove gas-powered equipment from the truck or trailer and refuel the equipment with its wheels on the ground.
- If this is not possible, then refuel such equipment on a truck or trailer from a portable container, rather than from a gasoline dispenser nozzle.
- If a gasoline dispenser nozzle must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.

 **Warning** 

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

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

Using Stabilizer/Conditioner

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

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

Important Do not use fuel additives containing methanol or ethanol.

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

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

Filling the Fuel Tank

1. Shut the engine off and set the parking brake.
2. Clean around fuel tank cap and remove the cap. Add unleaded regular gasoline to fuel tank, until the level is 1/4 to 1/2 inch (6 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 tank completely full.
3. Install fuel tank cap securely. Wipe up any gasoline that may have spilled.

Check Engine Oil Level

Before you start the engine and use the machine, check the oil level in the engine crankcase; refer to Checking Oil Level, page 27.

Assembly

Loose Parts

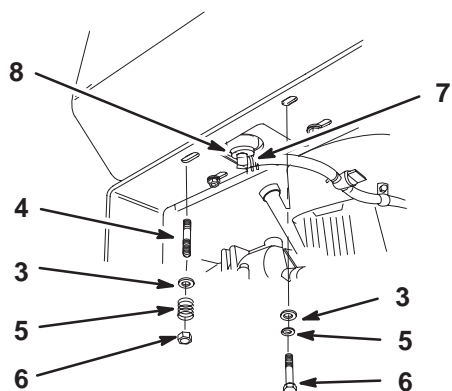
Note: Use the chart below to verify all parts have been shipped.

DESCRIPTION	QTY.	USE
Fuel tank	1	Install fuel tank and fuel line
Bolt 5/16 x 7/8 in. (22.5 mm)	2	
Lock washer 5/16 in.	2	
Washer 5/16 in.	4	
Stud	2	
Spring	2	
Hose clamp	1	
Upper handle	1	Install upper handle to frame
Flanged bolt 3/8 x 1 in. (26 mm)	4	
Flange nut 3/8 in.	4	
Clevis pin	2	Install control rods
Washer	2	
Hairpin cotter	2	
Hairpin cotter pin	2	Install hairpin cotter pins
Operator's Manual	1	Read before operating machine
Engine Operator's Manual	1	Read before operating machine
Parts Catalog	1	
Registration card	1	Fill out and return to Toro

Installing Fuel Tank and Fuel Line

1. Align fuel tank to top of rear frame and secure fuel tank right side with 2 bolts (5/16 x 7/8 in. (22mm)), 2 lock washers (5/16 in.) and 2 washers (5/16) (Fig. 2).
2. Secure fuel tank left side to frame with 2 studs, 2 washers (5/16 in.), 2 springs and 2 locknuts (5/16 in.) (Fig. 2).

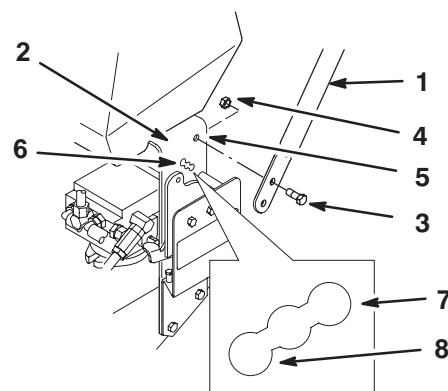
Note: Tighten left side until it is completely tight and then unscrew locknut one full turn. This will allow the spring to work.



m-5339

Figure 2

- | | |
|-----------------------------------|-------------------------|
| 1. Bolt, 5/16 x 7/8 in. (22.5 mm) | 5. Spring |
| 2. Lock washer, 5/16 in. | 6. Locknut |
| 3. Washer, 5/16 in. | 7. Hose clamp |
| 4. Stud | 8. Fuel tank connection |



m-5336

Figure 3

- | | |
|------------------------------------|------------------------|
| 1. Upper handle | 5. Upper mounting hole |
| 2. Rear frame | 6. Lower mounting hole |
| 3. Flange bolt, 3/8 x 1 in. (26mm) | 7. Low position |
| 4. Flange nut, 3/8 in. | 8. High position |

- Slide the hose clamp onto the fuel line (Fig. 2).
- Push the fuel line onto the fuel tank connection and secure it with a hose clamp (Fig. 2).

Install Upper Handle

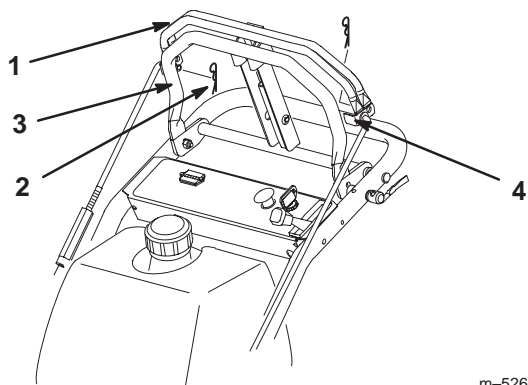
- Align upper handle with upper mounting holes in rear frame (Fig. 3).
- Secure each upper mounting hole with a flange bolt (3/8 x 1 in. (26mm)) and flange nut (Fig. 3). Torque bolts to 25 ft. lbs. (34 N.m).
- Select high, medium or low position for the lower mounting hole (Fig. 3). This allows the upper handle to be adjusted to the user's height preference.
- Secure each lower mounting hole with a flange bolt (3/8 x 1 in. (26mm)) and flange nut (Fig. 3). Torque bolts to 25 ft. lbs. (34 N.m).

Install Control Rods

Before installing and adjusting control rods loosen quick release levers and move reference control bar all the way forward.

Left Control Rod

- Slide clevis pin through rod fitting and mounting hole in control bracket (from outside). Secure with washer and hairpin cotter (Fig. 5).
- Remove hairpin cotter and rod from upper control bars (Fig. 4).
- Press and hold upper control bars against reference bar, so stop hits (Fig. 4).



m-5264

Figure 4

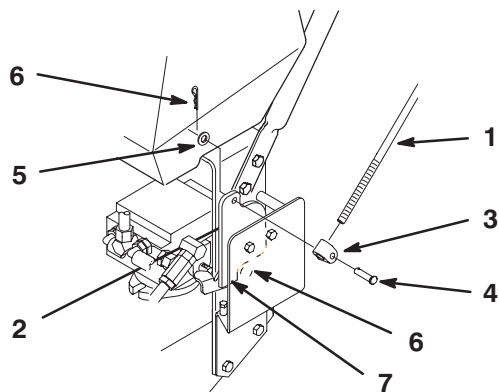
- | | |
|-----------------------|------------------|
| 1. Upper control bars | 3. Reference bar |
| 2. Hairpin cotter | 4. Stop |

4. Push rod full forward until bearing is against control bracket stop. Thread rod in or out of fitting on control bracket until rod aligns with holes in upper control bars (Fig. 5).

5. When rod and holes in upper control bars line up, turn rod one additional turn, so rod is shorter.

Note: Upper control bar stop must hit reference bar before roller bearing hits control bracket stop.

6. Connect rod to upper control bars with previously removed hairpin cotter (Fig. 4).



m-5263

Figure 5

- | | |
|---------------------|-------------------------|
| 1. Control rod-left | 5. washer |
| 2. Control bracket | 6. Hairpin cotter |
| 3. Rod fitting | 7. Control bracket stop |
| 4. Clevis pin | 8. Roller bearing |

Right Control Rod

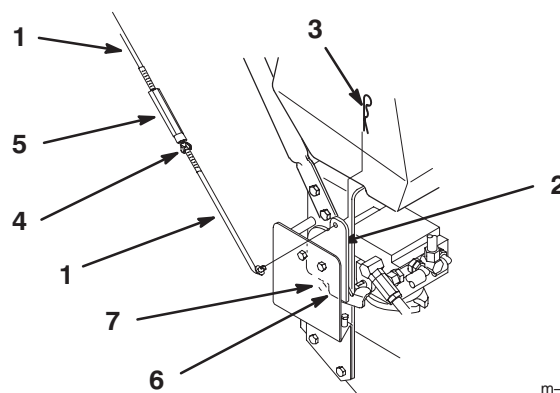
1. Slide rod into control bracket and secure with hairpin cotter (Fig. 6).

2. Remove hairpin cotter and rod from upper control bars (Fig. 4).
3. Press and hold upper control bars against reference bar, so stop hits (Fig. 4).
4. Push rod full forward until bearing is against control bracket stop. Loosen wing nut and thread turnbuckle in or out until rod aligns with holes in upper control bars (Fig. 6).

5. When rod and holes in upper control bars line up, rotate turnbuckle one additional turn, so rod is shorter.

Note: Upper control bar stop must hit reference bar before roller bearing hits control bracket stop.

6. Connect rod to upper control bars with previously removed hairpin cotter, tighten wing nut and turnbuckle (Fig. 4).



m-5262

Figure 6

- | | |
|----------------------|-------------------------|
| 1. Control rod-right | 5. Turnbuckle |
| 2. Control bracket | 6. Control bracket stop |
| 3. Hairpin cotter | 7. Roller bearing |
| 4. Wing nut | |

Adjust Tracking

1. After completing assembly check machine tracking. Operate machine by holding upper control bar against reference bar with wheel drive engaged.
2. If machine does not track straight, moves more right or left, adjustment is required.
3. Loosen wing nut on right control rod and rotate turnbuckle in or out to change tracking. Secure turnbuckle in position with wing nut (Fig. 6).
4. Check for proper tracking.

Note: Control rods must be adjusted if handle height position is changed.

5. Make sure the vent caps are installed in the battery. Charge the battery for 1 hour at 25 to 30 amps or 6 hours at 4 to 6 amps. Do not overcharge the battery.

Checking the Hydraulic Fluid

Check the hydraulic fluid level before engine is first started.

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)

1. Position machine on a level surface and set the parking brake.
2. Clean area around filler neck of hydraulic tank (Fig. 7).
3. Remove cap from filler neck. Look inside to check if there is fluid in the reservoir (Fig. 7).
4. If there is no fluid, add fluid to reservoir approximately a 1/4 in. (6mm) below the top of baffle.
5. Run the machine 15 minutes to allow any air to purge out of the system and warm fluid.
6. Recheck level while fluid is warm. Add fluid to raise level to top of the baffle, if required.

Note: Fluid level should be to the top of the baffle when fluid is warm (Fig. 7).

7. Install cap on filler neck.

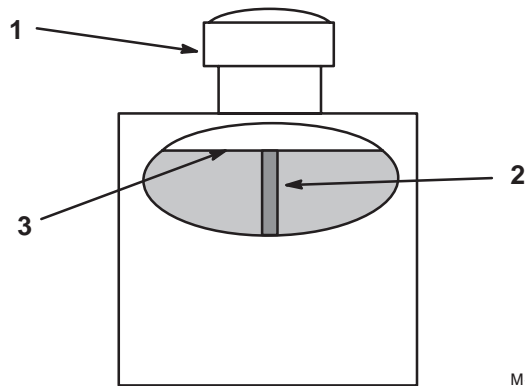


Figure 7

1. Cap
2. Baffle
3. Fluid level—full

M-4280



Warning



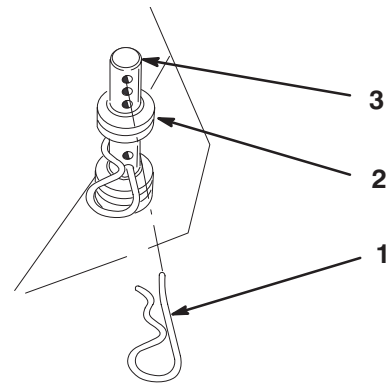
Hydraulic fluid escaping under pressure can penetrate skin and cause injury.

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

Install Hairpin Cotter Pins

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

1. On opposite side of muffler, install extra hairpin cotter pins into front and rear height-of-cut pins (Fig. 8).



m-5314

Figure 8

1. Hairpin cotter
2. Extra spacers
3. Height-of-cut post

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

Operation

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

Think Safety First

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

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

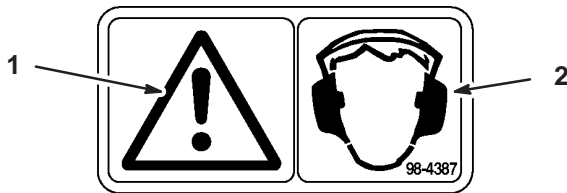
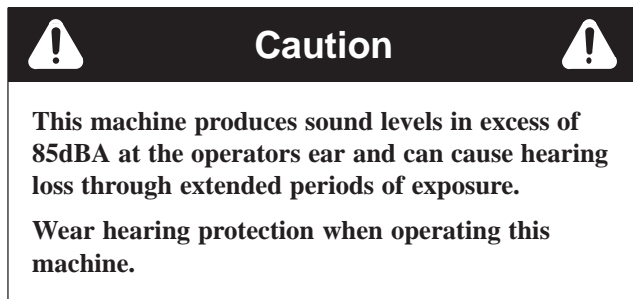


Figure 9

1. Caution

2. Wear hearing protection

Controls

Become familiar with all the controls (Fig. 10) before you start the engine and operate the machine.

Throttle Control – The throttle control has three positions: “FAST”, “SLOW” and “CHOKE”.

Blade Control Bail – Control bail used in conjunction with deck engagement switch (PTO) to release blade brake and engage clutch to drive mower blades. Release bail to disengage mower blades.

Blade Control Switch (PTO) – Pull switch used in conjunction with control bail to release blade brake and engage clutch to drive mower blades.

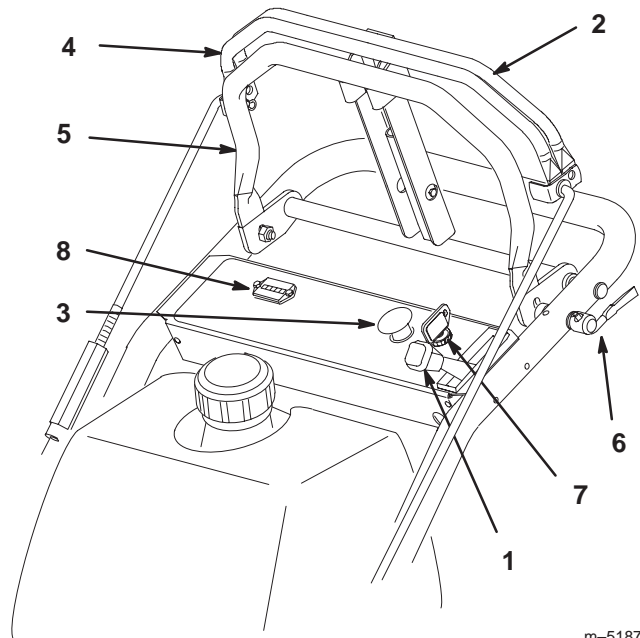
Upper Control Bar – Push forward on control bar to engage forward traction operation, release to stop. Pull back on control bar to go backwards. Release either side of control bar to turn right or left.

Reference Handle – Limits forward travel of control bar to pre-set position to help maintain desired ground speed and direction of travel. It is locked in position with quick release levers.

Ignition Switch – Key switch is used with the electric starter. Switch has three positions: “START”, “RUN” and “OFF”.

Fuel Shut-off Valve – (Under fuel tank) Close fuel shut-off valve when transporting or storing mower.

Hour Meter – Shows total hours that blades have been operated. This operates only when the mower blades are operating.



m-5187

Figure 10

- | | |
|-------------------------------|------------------------|
| 1. Throttle control | 5. Reference handle |
| 2. Blade control bail | 6. Quick release lever |
| 3. Blade control switch (PTO) | 7. Ignition switch |
| 4. Upper control bar | 8. Hourmeter |

Starting and Stopping the Engine

Starting

1. Make sure spark plug wire(s) are installed on spark plug(s) and fuel valve is open.
2. Move the shift lever to neutral, set the parking brake and turn ignition key to RUN.
3. Move the throttle control to CHOKE position before starting a cold engine.

Note: A warm or hot engine usually does not require any choking. To start a warm engine, move throttle control to FAST position.

4. Grasp recoil starter handle firmly and pull out until positive engagement results; then pull handle vigorously to start engine and allow rope to recoil slowly.

Important Do not pull recoil rope to its limit or let go of the starter handle when rope is pulled out because rope may break or recoil assembly may be damaged.

Stopping

1. Move the throttle lever to “SLOW” (Fig. 11).
2. Let engine idle for 30 to 60 seconds before turning the ignition key “OFF.”
3. Turn the ignition key to “OFF” (Fig. 11).

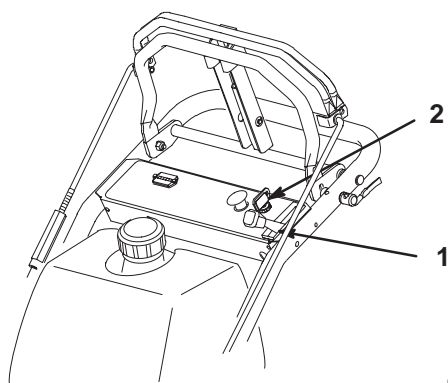


Figure 11

1. Throttle lever
2. Ignition key

4. Set the parking brake.
5. Pull wire off spark plug(s) to prevent possibility of accidental starting before storing machine.
6. Close fuel shut off valve before storing machine.

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

Parking Brake

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

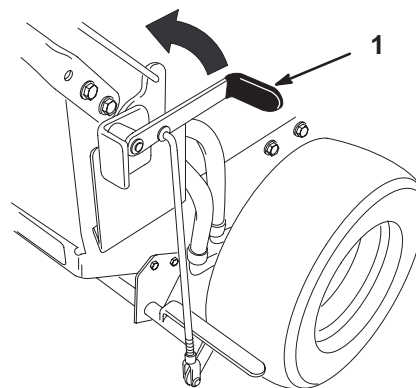
If the parking brake does not hold securely, an adjustment is required. Refer to Brake Service on page 34.

Setting the Parking Brake

1. Pull the brake handle rearward (Fig. 12).

Releasing the Parking Brake

1. Push the brake handle forward (Fig. 12).



m-5383

Figure 12

1. Parking brake lever (released position)

Operating Mower Blade Control (PTO)

The blade control switch (PTO) in conjunction with the blade control bail engages and disengages power to the electric clutch and mower blades.

Engaging the Mower Blades (PTO)

1. Release the upper control bar to stop the machine (Fig. 13).
2. To engage blade, squeeze blade control bail against upper control bar (Fig. 13).

3. Pull blade switch (PTO) up and release. Hold blade control bail against control bar while operating.
4. Repeat procedure to engage mower blades if blade control bail is released.

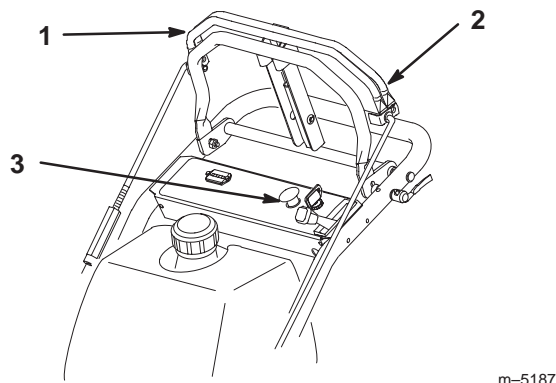


Figure 13

1. Upper control bar
2. Blade control bail
3. Blade switch (PTO)

Disengaging the Mower Blades (PTO)

1. Release blade control bail to disengage blades (Fig. 13).

The Safety Interlock System



Caution



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

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

Understanding the Safety Interlock System

The safety interlock system is designed to prevent the mower from starting unless the control bar is in the neutral position and to prevent the blades from rotating when the blade control is released.

Testing the Safety Interlock System

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

1. Set the machine on a flat, open area.
2. Push the control bar full forward.
3. Rotate the ignition key to "START" and slowly move control bar back to neutral. Engine should not crank until control bar is within 5° of neutral position.
4. Start the engine, refer to Starting and Stopping the Engine on page 18. With engine running and control bar in neutral position, squeeze control bail against control bar (Do not pull up on blade switch), clutch should not engage and **blades must not rotate**.
5. Continue holding the blade control bail and pull the blade switch (PTO) up. The clutch should engage and the mower blades begin rotating.
6. Release the blade control bail. The clutch must disengage and the blades stop rotating.
7. Release the blade control bail (PTO), then pull up the blade switch without holding the blade control bail. The clutch must not engage and the **blades must not rotate**.
8. If all the above conditions are not met have an Authorized Service Dealer repair the safety system immediately.

Driving Forward or Backward

The Enhanced T-Bar control system is designed to provide easy and comfortable operation of the hydrostatic drive. The control regulates ground speed, as well as forward, reverse and neutral functions, as well as steering direction.

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.

Operate the machine with the engine speed set at slow or medium when learning how to use the controls. Practice driving the machine in a level open area.

Ground Speed

1. Place the quick release levers in the unlock position (Fig. 14).
2. Move the reference bar forward or backward to set the desired forward speed. The pointer indicates approximate ground speed. When the bar is in the full forward position the ground speed is approximately 6.5 mph. When the reference bar is in the middle position the ground speed is approximately 3 mph.

Note: In normal conditions, a 2.5 to 3.5 mph ground speed (middle position of the reference bar) is best for cutting performance. Use a faster ground speed for light cutting or transport. Use a slower ground speed in heavy cutting loads.

3. Place the quick release levers in the lock position (Fig. 14).

Forward

1. To go forward, slowly press on the upper control bar against the reference bar (Fig. 14).
2. To go straight, apply equal pressure to both ends of the upper control bar (Fig. 14).
3. To turn, release pressure on the upper control bar side toward the direction you want to turn (Fig. 14).
4. Adjust reference bar to maintain a comfortable pre-set ground speed (Fig. 14).
5. To stop, release the upper control bar to stop both wheels (Fig. 14).

Note: If the front of the deck lifts off the ground when the upper control bar is quickly pushed forward or the machine is unable to drive uphill, an adjustment may be needed. Refer to: Adjusting By-pass Valve.

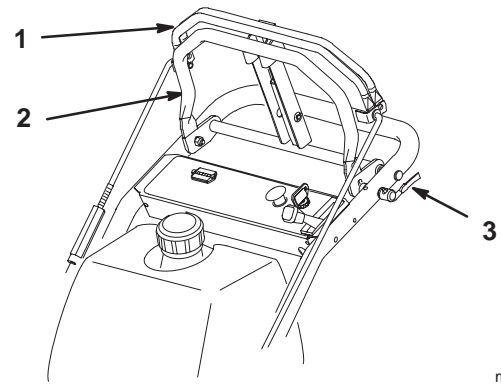


Figure 14

- | | |
|--------------------------|------------------------|
| 1. Upper control bar | 3. Quick release lever |
| 2. Reference control bar | (locked position) |

Backward

1. To go backward, slowly pull the upper control bar rearward (Fig. 14).
2. To go straight, apply equal pressure to both ends of the upper control bar (Fig. 14).
3. To turn, release pressure on the upper control bar side away from the direction you want to turn (Fig. 14).
4. To stop, release the upper control bar to stop both wheels (Fig. 14).

Bringing Machine to Neutral Position

Release the upper control bar to stop. The machine will automatically return to neutral. When in neutral, the hydrostatic drive system will provide dynamic braking so the machine will not roll.

Note: Very slow drive motion with engine running and the control in neutral is normal. Excessive drive motion when the control is in neutral may indicate adjustment is needed. Refer to: Adjusting Neutral procedure.

Stopping the Machine

1. To stop, release the upper control bar to stop both wheels (Fig. 14).
2. Release the blade control bail (PTO), to stop the mower blades. Move the engine speed throttle control to "SLOW".
3. Turn the ignition key to "OFF" to stop the engine. Remember to remove the key from the ignition switch.

Important If the machine is on a slope, set the parking brake to prevent the machine from slowly rolling.

Important If the machine will be left unattended, close the fuel shut off valve and disconnect the wire(s) from the spark plug(s).

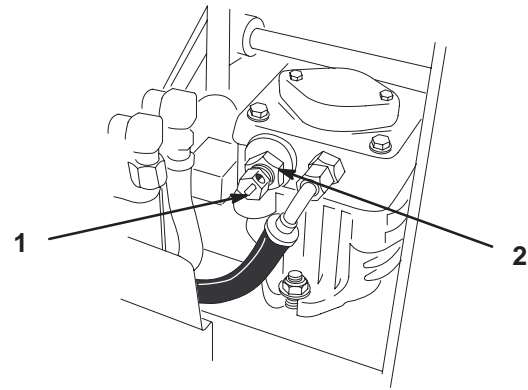


Caution



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

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



m-5209

Figure 15

1. By-pass valve

2. Jam nut

Pushing the Machine by Hand

The by-pass valve also allows the machine to be pushed by hand with the engine not running for easier servicing. If the by-pass valve is opened to push the machine by hand, adjustment is required for operation.

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

To Push the Machine

1. Disengage the power take off (PTO) and turn the ignition key to “OFF” to stop the engine.
2. Loosen jam nuts and rotate by-pass valves open 5 turns to push. This allows hydraulic fluid to by-pass the pump and the wheels to turn (Fig. 15).

Important Rotate by-pass valve a maximum of 5 turns so the valve does not come out of the body causing fluid to run out.

To Operate the Machine

If the by-pass valve is opened to push the machine by hand, adjustment is required for operation. Refer to: “Adjusting By-pass Valve” on page 32.

Note: The machine will not drive unless by-pass valves are properly adjusted.

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:

- Chock or block wheels.
- Securely fasten the machine to the trailer or truck with straps, chains, cable, or ropes.
- Secure a trailer to towing vehicle with safety chains.

Side Discharge or Mulch Grass

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



Danger



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

- Never remove the grass deflector from the mower because the grass deflector routes material down toward the turf. If the grass deflector is ever damaged, replace it immediately.
- Never put your hands or feet under the mower.
- Never try to clear discharge area or mower blades unless you release the bail and the power take off (PTO) is off. Rotate the ignition key to "OFF." Also remove the key and pull the wire off the spark plug(s).

Adjusting Height-of-Cut

The height-of-cut can be adjusted from 1 to 4-1/2 in. (25.4 to 114.3 mm) in 1/4 in. (6 mm) increments. Adjustment is done by relocating four hairpin cotter pins in different hole location and by adding or removing spacers.

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

1. To adjust, remove hairpin cotter from height-of-cut post (Fig. 16).
2. Select hole in height-of-cut post corresponding to the height-of-cut desired (Fig. 16).
3. Lift on side of deck and remove hairpin cotter (Fig. 16).
4. Add or remove spacers if needed and then align holes and insert hairpin cotter (Fig. 16).

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

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

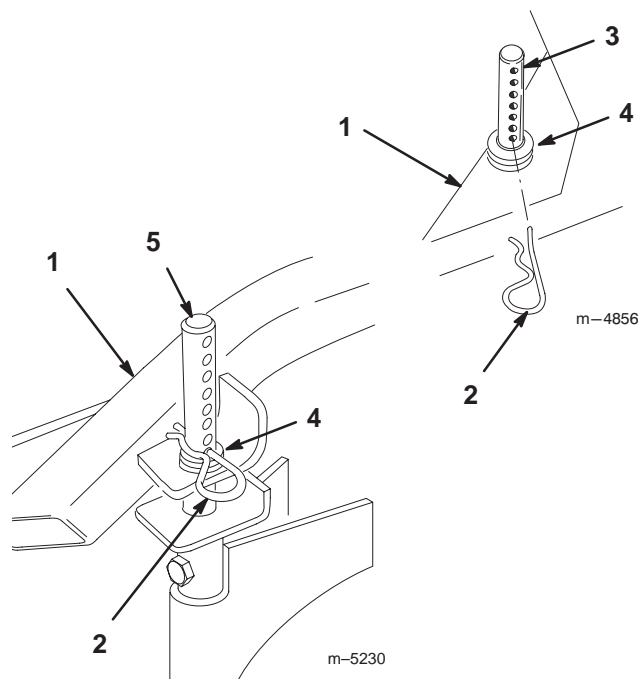
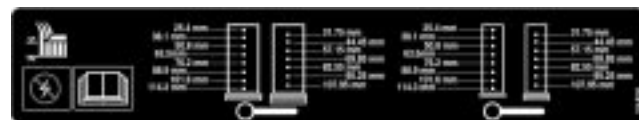


Figure 16

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

Adjusting Gage Wheels

The gage wheels must be adjusted in the proper hole location for each height-of-cut position.

1. After adjusting height-of-cut, remove nut and washer while holding stud with wrench (Fig. 17).

Note: Do not remove the wheel nut and washer (Fig. 17).

2. Select a hole position so the gage wheel is a minimum of 3/8 in. (9.5 mm) off the ground for the height-of-cut to be used (Fig. 17).
3. Reinstall the stud nut and washer (Fig. 17).
4. Repeat adjustment on other gage wheels.

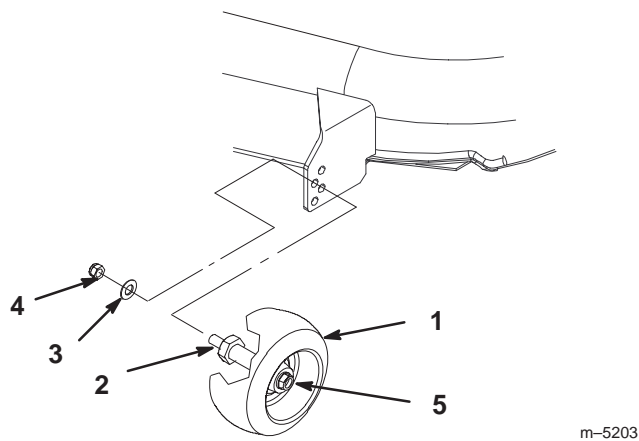


Figure 17

- | | |
|---------------|--|
| 1. Gage Wheel | 4. Nut |
| 2. Stud | 5. Wheel nut and washer.
Do Not Remove. |
| 3. Washer | |

Adjusting Center Gage Wheels

The gage wheels must be adjusted in the proper hole location for each height-of-cut position.

1. After adjusting height-of-cut remove bolt, washers and nut (Fig. 18).
2. Select a hole position so the gage wheels are a minimum of $\frac{3}{8}$ in. (9.5 mm) off the ground for the height-of-cut to be used (Fig. 18).
3. Reinstall the bolt, washers and nut (Fig. 18).

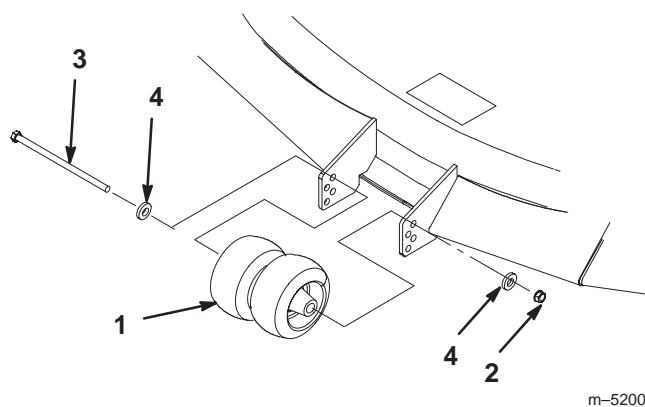


Figure 18

- | | |
|-------------------------------------|-----------|
| 1. Center Gage Wheels and
Spacer | 3. Bolt |
| 2. Nut | 4. Washer |

Maintenance

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

Recommended Maintenance Schedule

Maintenance Service Interval	Maintenance Procedure
Each Use	<ul style="list-style-type: none">• Oil—check level• Safety System—check• Brake—check• Engine—clean outside• Mower Housing—clean
After first 5 hours	<ul style="list-style-type: none">• Oil—change
8 Hours	<ul style="list-style-type: none">• Mower Housing—clean• Caster Wheels—grease
25 Hours	<ul style="list-style-type: none">• Foam Air Cleaner—clean¹• Paper Air Cleaner—clean¹
40 Hours	<ul style="list-style-type: none">• Tires—check pressure
50 Hours	<ul style="list-style-type: none">• Oil—change¹• Belts—check
100 Hours	<ul style="list-style-type: none">• Spark Plug(s)—check• Electric Clutch—adjust• Engine—clean outside• Oil Filter—change (100 hours or every other oil change)
200 Hours	<ul style="list-style-type: none">• Fuel Filter—replace
250 Hours	<ul style="list-style-type: none">• Transmission Couplings—grease¹
300 Hours	<ul style="list-style-type: none">• Paper Air Cleaner—replace¹
400 Hours	<ul style="list-style-type: none">• Wheel Bearings—grease¹
At storage	<ul style="list-style-type: none">• Chipped Surfaces—paint• Perform all maintenance procedures listed above before storage

¹More often in dusty, dirty conditions.

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



Caution



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

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

Air Cleaner Service

Service Interval/Specification

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

Paper Element: Clean after every 25 operating hours.
Replace after every 100 operating hours.

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

Removing the Foam and Paper Elements

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to "OFF" to stop the engine. Remove the key.
2. Clean around the air cleaner to prevent dirt from getting into the engine and causing damage. Unscrew the cover nut and remove the air cleaner cover (Fig. 19).
3. Remove the air cleaner assembly (Fig. 19).
4. Carefully slide the foam element off the paper element (Fig. 19).

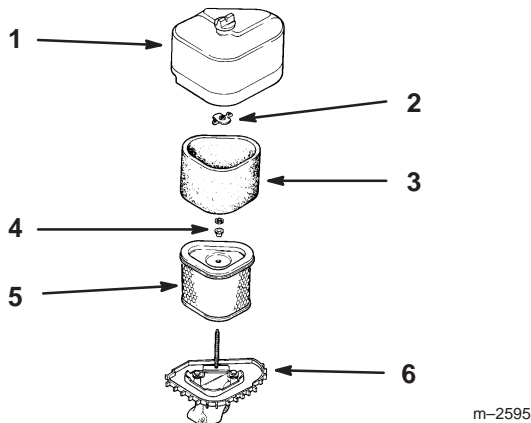


Figure 19

- | | |
|------------------|-----------------------|
| 1. Cover and nut | 4. Washer and grommet |
| 2. Wing nut | 5. Paper element |
| 3. Foam element | 6. Air cleaner base |

Cleaning the Foam Elements

1. Wash the foam element in liquid soap and warm water. When the element is clean, rinse it thoroughly.
2. Dry the element by squeezing it in a clean cloth.
3. Put one or two ounces of oil on the element (Fig. 20). Squeeze the element to distribute the oil.

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

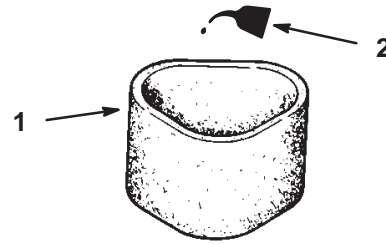


Figure 20

- | | |
|-----------------|--------|
| 1. Foam element | 2. Oil |
|-----------------|--------|

Cleaning the Paper Element

1. Lightly tap the element on a flat surface to remove dust and dirt (Fig. 21).
2. Inspect the element for tears, an oily film, and damage to the rubber seal.

Important Never clean the paper element with pressurized air or liquids, such as solvent, gas, or kerosene. Replace the paper element if it is damaged, defective, or cannot be cleaned thoroughly.

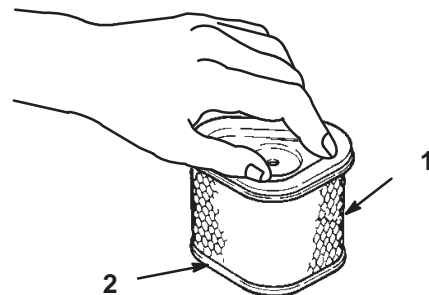


Figure 21

- | | |
|------------------|----------------|
| 1. Paper element | 2. Rubber seal |
|------------------|----------------|

Installing the Foam and Paper Elements

1. Installing the Foam and Paper Elements

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

1. Carefully slide the foam element onto the paper air cleaner element (Fig. 19).
2. Place the air cleaner assembly onto the air cleaner base (Fig. 19).

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

5. Slowly pour approximately 80% of the specified oil on page 27, into the filler tube (Fig. 22). Now check the oil level; refer to Checking Oil Level, page 27. Slowly add additional oil to bring to "FULL" mark on dipstick.

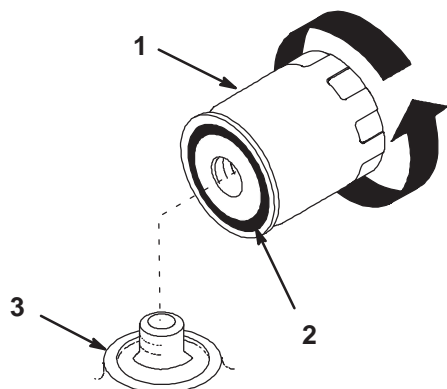
Change Oil Filter

Service Interval/Specification

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

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

1. Drain the oil from the engine; refer to Changing/Draining Oil, page 27.
2. Remove the old filter and wipe the filter adapter (Fig. 24) gasket surface.
3. Apply a thin coat of new oil to the rubber gasket on the replacement filter (Fig. 24).



m-1256

Figure 24

1. Oil filter
2. Gasket
3. Adapter

4. Install the replacement oil filter to the filter adapter. Turn the oil filter clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 1/2 turn (Fig. 24).
5. Fill the crankcase with the proper type of new oil; refer to Changing/Draining Oil, page 27.

Spark Plug Service

Service Interval/Specification

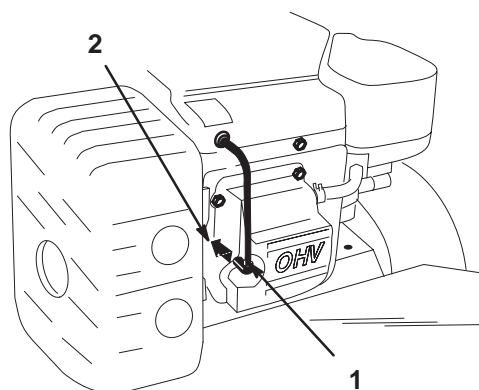
Check the spark plug(s) after every 200 operating hours. Make sure the air gap between the center and side electrodes is correct before installing the spark plug. Use a spark plug wrench for removing and installing the spark plug(s) and a gapping tool/feeler gauge to check and adjust the air gap. Install a new spark plug(s) if necessary.

Type: Champion® RC12YC or Champion® Premium Gold 2071 (or equivalent)

Air Gap: 0.040 in. (1.0 mm)

Removing the Spark Plug(s)

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to "OFF" to stop the engine. Remove the key.
2. Pull the wire(s) off the spark plug(s) (Fig. 25). Now clean around the spark plug(s) to prevent dirt from falling into the engine and potentially causing damage.
3. Remove the spark plug(s) and metal washer.



m-5361

Figure 25

1. Spark plug wire
2. Spark plug

Checking the Spark Plug

1. Look at the center of the spark plug(s) (Fig. 26). If you see light brown or gray on the insulator, the engine is operating properly. A black coating on the insulator usually means the air cleaner is dirty.

Important Never clean the spark plug(s). Always replace the spark plug(s) when it has: a black coating, worn electrodes, an oily film, or cracks.

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

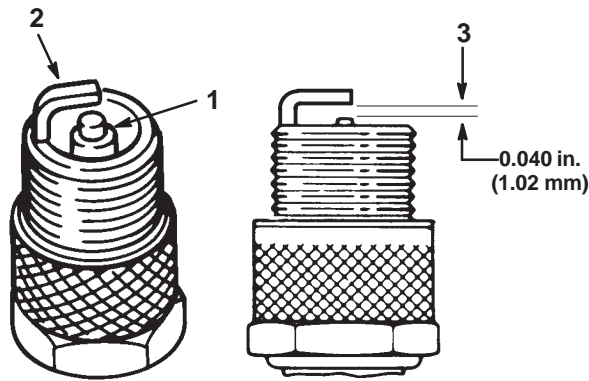


Figure 26

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

Installing the Spark Plug(s)

1. Install the spark plug(s) and metal washer. Make sure the air gap is set correctly.
2. Tighten the spark plug(s) to 20 ft-lb (27 N.m).
3. Push the wire(s) onto the spark plug(s) (Fig. 25).

Greasing and Lubrication

Service Interval/Specification

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

How to Grease

1. Disengage the power take off (PTO), chock or block tires, and turn the ignition key to "OFF" to stop the engine. Remove the key.
2. Clean the grease fittings with a rag. Make sure to scrape any paint off the front of the fitting(s).
3. Connect a grease gun to the fitting. Pump grease into the fittings.
4. Wipe up any excess grease.

Lubricate the caster and wheel bearings

1. Lubricate the front and back wheel bearings and front spindles until grease begins to ooze out of the bearings (Fig. 27).

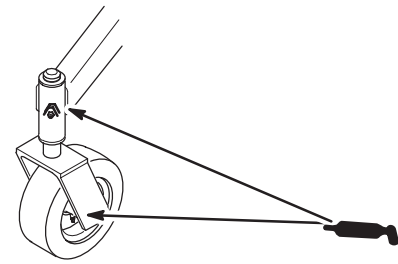


Figure 27

Greasing the Belt Idlers

1. Stop the engine, chock or block tires, remove the key and disconnect the spark plug wire(s) from the spark plug(s).
2. Grease the idler pulley pivot for the deck belt (Fig. 28).
3. Grease the idler pulley pivot for the PTO drive belt (Fig. 28).

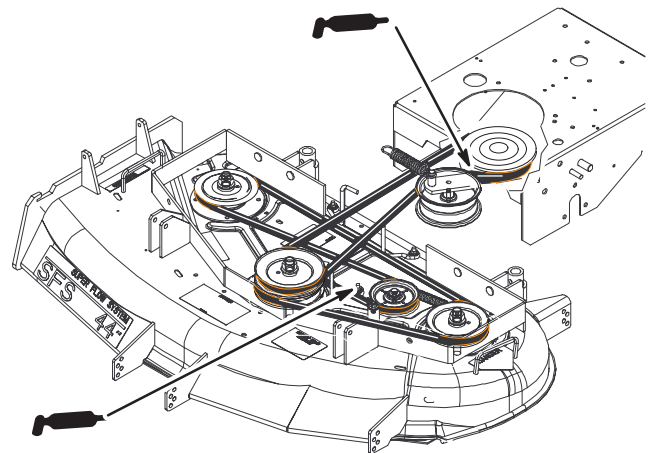


Figure 28

Cleaning the Cooling System

Service Interval/Specification

Before each use, check and clean engine cooling system. Remove any build-up of grass, dirt or other debris from the cylinder and cylinder head cooling fins, air intake screen on flywheel end, and carburetor-governor levers and linkage. This will help insure adequate cooling and correct engine speed and will reduce the possibility of overheating and mechanical damage to the engine.

Checking Tire Pressure

Service Interval/Specification

Maintain the air pressure in the front and rear tires as specified. Check the pressure at the valve stem after every 40 operating hours or monthly, whichever occurs first (Fig. 29). Check the tires when they are cold to get the most accurate pressure reading.

Rear Tire Pressure: 12–14 psi (83–97 kPa)

Caster Tire Pressure: 20–24 psi (138–165 kPa)

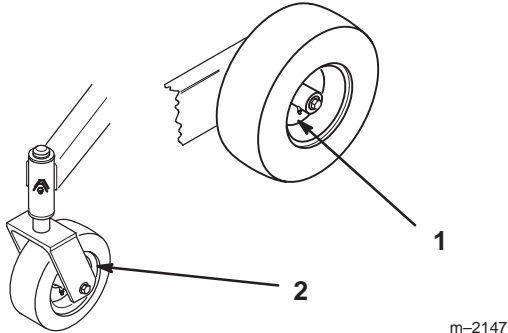


Figure 29

1. Rear Tire

2. Caster tire

Fuel Tank Service



Danger



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

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

Draining The Fuel Tank

1. Park the machine on a level surface, to assure fuel tank drains completely. Then disengage the power take off (PTO), set the parking brake, and turn the ignition key to “OFF” to stop the engine. Remove the key.
2. Close fuel shut-off valve at fuel tank (Fig. 30).

Note: Remove fuel line from fuel valve that is closest to the engine.

3. Squeeze the ends of the hose clamp together and slide it up the fuel line away from valve (Fig. 30).
4. Pull the fuel line off the valve (Fig. 30). Open fuel shut-off valve and allow gasoline to drain into a gas can or drain pan.

Note: Now is the best time to install a new fuel filter because the fuel tank is empty. Refer to Replacing the Fuel Filter; page 30.

5. Install the fuel line onto the valve. Slide the hose clamp close to the valve to secure the fuel line.

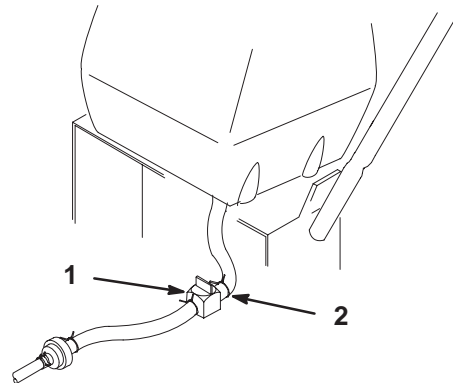


Figure 30

1. Fuel shut-off valve

2. Clamp

Fuel Filter Service

Service Interval/Specification

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

Replacing the Fuel Filter

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

Note: Note how the fuel filter is installed.

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to “OFF” to stop the engine. Remove the key.
2. Close fuel shut-off valve at fuel tank (Fig. 30).
3. Squeeze the ends of the hose clamps together and slide them away from the filter (Fig. 31).
4. Remove the filter from the fuel lines.
5. Install a new filter and move the hose clamps close to the filter.
6. Open fuel shut-off valve at fuel tank (Fig. 30).

7. Check for fuel leaks and repair if needed (Fig. 30).

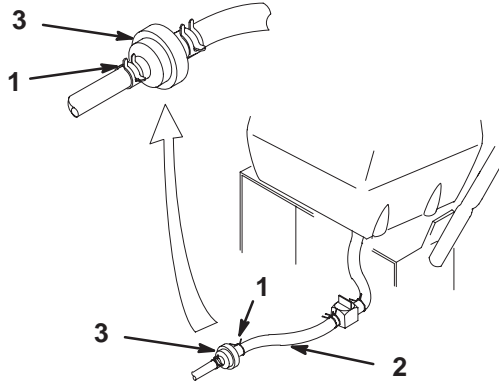


Figure 31

1. Hose clamp
2. Fuel line
3. Filter

m-5234

Hydraulic System Service

Checking the Hydraulic Fluid

Check the hydraulic fluid level:

- Before engine is first started.
- After first 8 operating hours.
- After 40 operating hours.

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

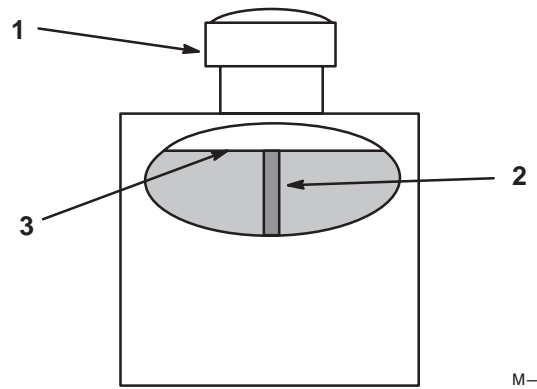
Important Use oil specified or equivalent. Other fluids could cause system damage.

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

1. Position machine on a level surface, stop the engine and chock or block tires.
2. Clean area around filler neck of hydraulic tank (Fig. 32).
3. Remove cap from filler neck. Look inside to check if there is fluid in the reservoir. (Fig. 32).
4. If there is no fluid, add fluid to reservoir approximately a 1/4 in. (6mm) below the top of baffle.
5. Run the machine 15 minutes to allow any air to purge out of the system and warm fluid.
6. Recheck level while fluid is warm. Add fluid to raise level to top of the baffle, if required.

Note: Fluid level should be to the top of the baffle when fluid is warm (Fig. 32).

7. Install cap on filler neck.



M-4280

Figure 32

1. Cap
2. Baffle
3. Fluid level—full



Warning



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

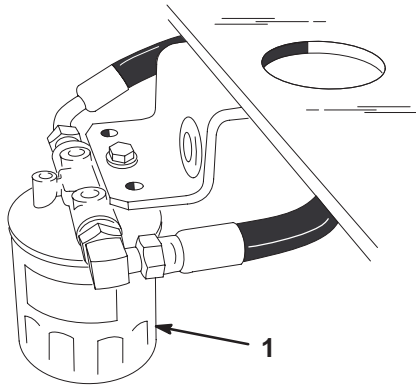
- If hydraulic fluid is injected into the skin it must be surgically removed within a few hours by a doctor familiar with this type of injury. Gangrene may result if this is not done.
- Keep body and hands away from pin hole leaks or nozzles that eject high pressure hydraulic fluid.
- Use cardboard or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

Replacing the Hydraulic Filter

Change the hydraulic filter:

- After the first 250 operating hours.
 - Yearly, before storage.
1. Position machine on a level surface, stop the engine, and remove key from ignition switch.
- Important** Do not substitute automotive oil filter or severe hydraulic system damage may result.
2. Remove hydro cap and temporarily cover opening with a plastic bag and rubber band to prevent all hydro fluid from draining out.

3. Place drain pan under filter, remove the old filter and wipe the filter adapter gasket surface clean (Fig. 33).

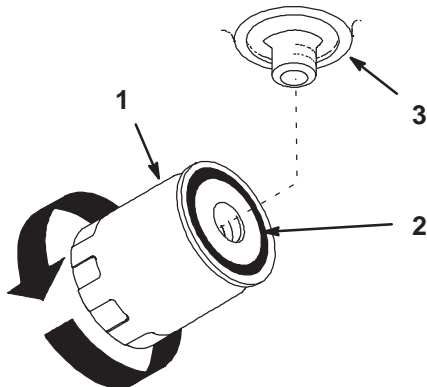


m-5208

Figure 33

1. Hydraulic filter

4. Apply a thin coat hydro fluid to the rubber gasket on the replacement filter (Fig. 34).
5. Install replacement hydraulic filter onto the filter adapter. Do not tighten.
6. Remove plastic bag from tank opening and allow filter to fill with hydro fluid.
7. When fluid overflows filter turn the oil filter clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 1/2 turn (Fig. 34).



m-1256

Figure 34

1. Hydraulic filter
2. Gasket
3. Adapter

8. If there is no fluid, add fluid to reservoir approximately a 1/4 in. (6mm) below the top of baffle.
9. Start engine and let run for about two minutes to purge air from the system. Stop the engine and check for leaks. If one or both wheels will not drive, refer Bleeding Hydraulic System, page 32.
10. Recheck level while fluid is warm. Add fluid to raise level to top of the baffle, if required. **Do not overfill.**

Bleeding Hydraulic System

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

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

Check Hydraulic Lines

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

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



Warning



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

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

Adjusting By-pass Valve

The by-pass valve is adjustable to ensure easy operation with a variety of deck sizes. If the front of the deck lifts off the ground when the upper control bar is quickly pushed forward or the machine is unable to drive up hills, an adjustment may be needed.

Test Procedure

1. Start engine and run for 5 minutes at 3/4 throttle, to warm hydraulic fluid.
2. Drive the machine to a clear and level open area such as a driveway.

Important There should be at least 10 feet of clear area in front of the machine.

3. Loosen the quick release levers and push the reference bar forward to the “FAST” position. Lock the quick release levers to secure the reference bar.
4. Move throttle control to 3/4 throttle.
5. Quickly push the upper control bar against the reference bar. The front caster wheels should almost lift off the ground. If front caster wheels lift off the ground, the machine is too aggressive and adjustment is required.
6. Move the engine throttle to the “FAST” position.
7. Quickly push the upper control bar against the reference bar. The front caster wheels should lift approximately 1 inch off the ground. If front caster wheels lift off the ground more than 2 inches (51mm), the machine is too aggressive. Adjustment is required.
8. If the machine accelerates slowly, and the front caster wheels do not lift off the ground, the machine is too un-responsive. Adjustment is required.

Adjustment Procedure

The by-pass valve should be adjusted to deliver best performance for the size (weight) mower you have. The by-pass valve factory setting is 1/2 turn out.

The following values can be used as initial settings for different size mowers:

- | | |
|-----------------|----------------|
| 52 in. (132 cm) | 1/2 turn out |
| 44 in. (112 cm) | 1 turn out |
| 36 in. (91 cm) | 1-1/6 turn out |

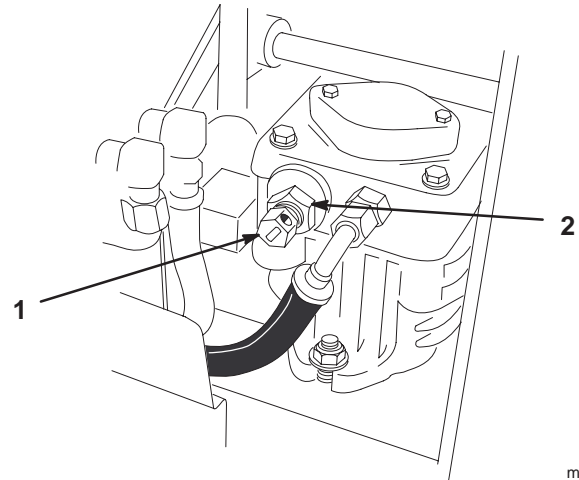
1. Loosen large jam nut several turns (Fig. 35).
2. Gently close by-pass valve (Fig. 35).

Important Do not over-tighten valve or needle and seat may be damaged. Do not exceed 50 inch pounds to close valve.

3. Open by-pass valve 1/2 turn (Fig. 35).
4. Tighten jam nut to lock the adjustment (Fig. 35).
5. Repeat “Test Procedure” to check for proper operation.

Important By-pass valve adjustment is very sensitive, do not adjust more than 1/6 turn (one flat) at a time.

6. If the machine is too aggressive or tends to jump forward, the valve needs to be opened further.
7. If the machine is slow to respond, the valve needs to be closed further.
8. Repeat “Test Procedure” to check for proper operation. Re-adjust the by-pass valves until proper performance is achieved.



m-5209

Figure 35

1. By-pass valve
2. Jam nut

Adjusting Neutral

If wheels turn when control bar is in neutral, adjustment is required

1. Raise rear of the machine so wheels are off the ground and support with jack stands.



Caution

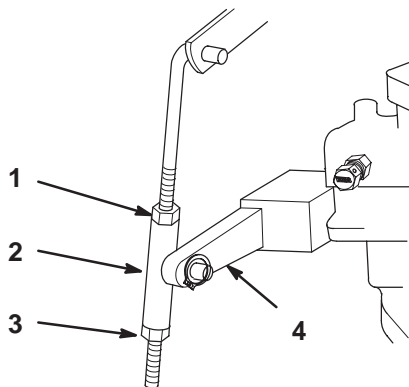


Children or bystanders may be injured if they move or attempt to operate the machine while it is unattended.

Always remove the ignition and chock or block tires when leaving the machine unattended, even if just for a few minutes.

2. Start engine and run for 5 minutes at 3/4 throttle, to warm hydraulic fluid.
3. Move control bar rearward and forward then release. If wheels rotate when control bar is in neutral, adjustment is required.
4. Loosen top and bottom jam nuts at pump arm neutral adjustment sleeve (Fig. 36).

5. Push down on Pump Arm until Sleeve contacts bottom nut (Fig. 36). Wheel should now be rotating slowly in reverse.
6. Turn bottom nut up slowly, moving sleeve and pump arm up, until wheel stops rotating (Fig. 36).
7. Turn top nut down against sleeve and tighten to lock the adjustment (Fig. 36).
8. Repeat step 3 above to check adjustment. Repeat adjustment procedure if necessary.
9. Repeat on other wheel, if necessary.



m-5204

Figure 36

- | | |
|----------------|-------------------|
| 1. Top jam nut | 3. Bottom jam nut |
| 2. Sleeve | 4. Pump arm |

Brake Service

Service Interval/Specification

Before each use, check brake for proper operation.

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

Checking the Brake

1. Set the parking brake (Fig. 37).
2. Park the machine on a level surface, disengage the power take off (PTO) and turn the ignition key to "OFF" to stop the engine. Remove the key.
3. To set the parking brake, it should take a reasonable amount of force. If it engages too hard or easily, adjustment is required. Refer to Adjusting the Brake on page 34.

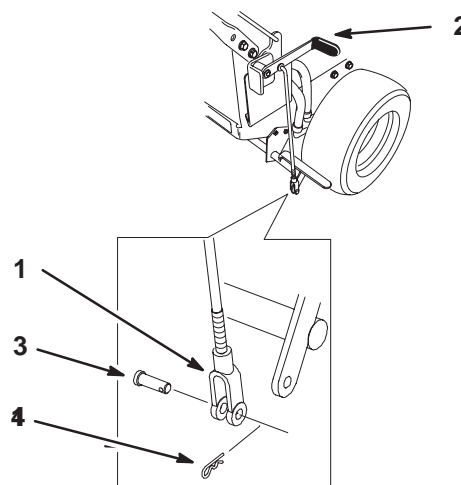
Note: When the brake is engaged, the brake handle should be close to the 11 o'clock position.

4. If there is a reasonable amount of force, no adjustment is required.

Adjusting the Brake

The brake handle is on the right side of machine (Fig. 37). If the parking brake does not hold securely, an adjustment is required.

1. Check the brake before you adjust it; refer to Checking the Brake, page 34.
2. Release the parking brake; refer to Releasing the Parking Brake, page 19.
3. To adjust the brake, remove the hair pin cotter and clevis pin from the lower brake lever (Fig. 37).
4. Rotate the yoke in to tighten the brake and rotate out to loosen the brake (Fig. 37).
5. Secure yoke to lower brake lever with the hair pin cotter and clevis pin (Fig. 37).
6. Check the brake operation again; refer to Checking the Brake, page 34.



m-5384

Figure 37

- | | |
|--|-------------------|
| 1. Yoke | 3. Clevis pin |
| 2. Parking brake lever (released position) | 4. Hairpin cotter |

Adjusting the Electric Clutch

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

1. To adjust clutch, tighten or loosen lock nuts on flange studs (Fig. 38).
2. Check adjustment by inserting feeler gauge through slots next to studs (Fig. 38).
3. The proper disengaged clearance between the clutch plates is .012-.024 in. (0.30-0.60 mm). It will be necessary to check this clearance at each of the three slots to ensure the plates are parallel to each other.

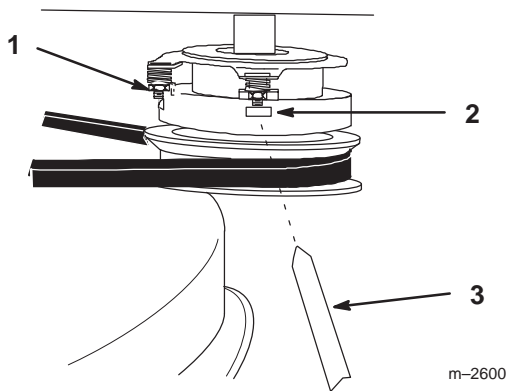


Figure 38

1. Adjusting nut
2. Slot
3. Feeler gauge

Fuse Service

Service Interval/Specification

The electrical system is protected by a fuse. It requires no maintenance. If the fuse blows check component or circuit for malfunction or short. To replace fuse pull out on the fuse (Fig. 39) to remove or replace it.

Fuse: F1-7.5 amp, blade-type

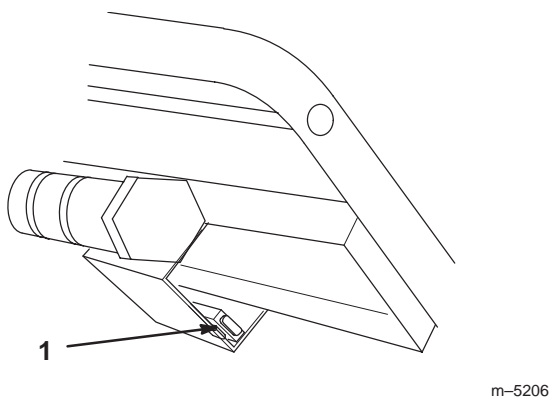


Figure 39

1. Fuse 7.5 amp

1. Disengage the power take off (PTO), chock or block tires, and turn the ignition key to "OFF" to stop the engine. Remove the key.

Cutting Blade Service

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



Danger



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

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

Before Inspecting or Servicing the Blades

Park the machine on a level surface, disengage the blade control (PTO) and chock or block tires. Turn the ignition key to "OFF" to stop the engine. Remove the key and disconnect the spark plug wire(s) from the spark plug(s).

Inspecting the Blades

1. Inspect the cutting edges (Fig 40). If the edges are not sharp or have nicks, remove and sharpen the blades. Refer to Sharpening the Blades on page 36.
2. Inspect the blades, especially the curved area (Fig. 40). If you notice any damage, wear, or a slot forming in this area (item 3 in Fig. 40), immediately install a new blade.

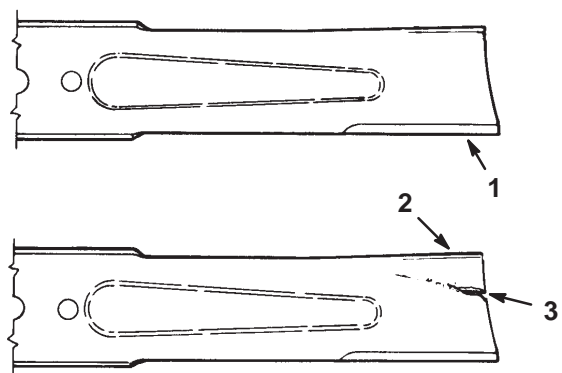


Figure 40

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

Checking for Bent Blades

1. Rotate the blades until the ends face forward and backward (Fig. 41). Measure from a level surface to the cutting edge, position "A", of the blades (Fig. 42). Note this dimension.

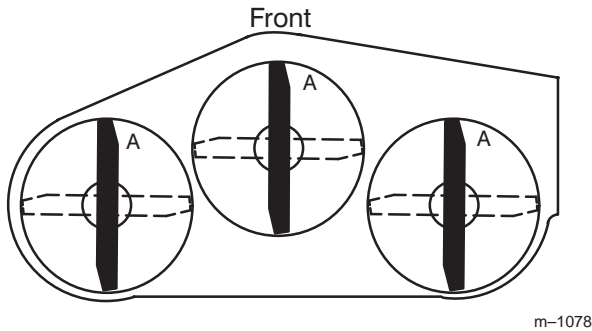
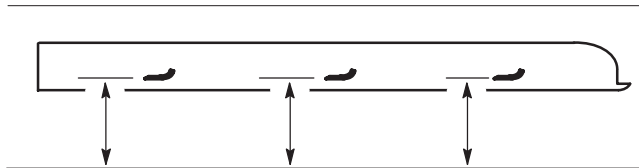


Figure 41

m-1078



MEASURE FROM
CUTTING EDGE TO A
LEVEL SURFACE

Figure 42

m-2539

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. The difference between the dimensions obtained in steps 1 and 2 must not exceed 1/8 in. (3 mm). If this dimension exceeds 1/8 in. (3 mm), the blade is bent and must be replaced. Refer to Removing the Blades, and Installing the Blades on page 37.



Warning



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

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

Removing the Blades

Blades must be replaced if a solid object is hit, if the blade is out of balance or is bent. To ensure optimum performance and continued safety conformance of the

machine, use genuine TORO replacement blades. Replacement blades made by other manufacturers may result in non-conformance with safety standards.

1. Hold the blade end using a rag or thickly-padded glove. Remove the blade bolt, lock washer, washer and blade from the spindle shaft (Fig. 43).

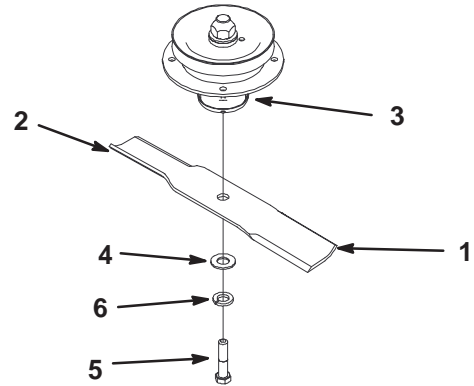


Figure 43

m-5199

- | | |
|-----------------------|----------------|
| 1. Sail Area of Blade | 4. Washer |
| 2. Blade | 5. Blade Bolt |
| 3. Blade spindle | 6. Lock washer |

Sharpening the Blades

1. Use a file to sharpen the cutting edge at both ends of the blade (Fig. 44). Maintain the original angle. The blade retains its balance if the same amount of material is removed from both cutting edges.



Figure 44

m-1854

1. Sharpen at original angle

2. Check the balance of the blade by putting it on a blade balancer (Fig. 45). If the blade stays in a horizontal position, the blade is balanced and can be used. If the blade is not balanced, file some metal off the end of the sail area only (Fig. 43). Repeat this procedure until the blade is balanced.

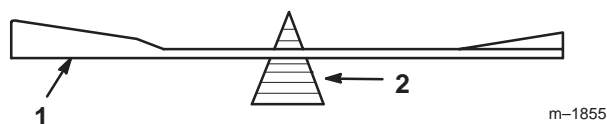


Figure 45

1. Blade
2. Balancer

Installing the Blades

1. Install the blade onto the spindle shaft (Fig. 43).

Important The sail part of the blade must be pointing upward, toward the inside of the mower to ensure proper cutting (Fig. 43).

2. Install the washer, lock washer and blade bolt (Fig. 43). Torque the blade bolt to 85–110 ft-lb (115–140 N•m).

Correcting Cutting Unit Mismatch

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

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

1. Stop the engine, remove the key and disconnect the spark plug wire(s) from the spark plug(s).
2. Adjust the tire pressure in all tires to specifications on page 30.
3. Check that the blades and spindle shafts are not bent. Refer to Checking for Bent Blades on page 36.
4. Set the height-of-cut to the 4 in. (101.6 mm) position. Refer to Adjusting the Height-Of-Cut in the Operation section.
5. Perform steps in the following sections Frame Set Up, Checking Front-to-Rear Pitch and Checking Side-to-Side Leveling.

Frame Set Up

Checking Carrier Frame and Deck Alignment

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

2. Place a long straight edge on top of the engine deck as shown in figure 46.
3. At the carrier frame cross tube, measure location “A” height (Fig. 46). This measurement must be 2–13/16 in. (71.4 mm), plus or minus a 1/4 in. (6 mm).
4. If the height at location “A” is not correct, adjustment is needed.
5. Loosen the carrier frame mounting bolts on both sides of the machine (Fig. 46).
6. Align the carrier frame and engine deck to match 2–13/16 in. (71.4 mm), plus or minus a 1/4 in. (6 mm) at location “A” (Fig. 46).
7. Tighten the carrier frame mounting bolts on both sides of the machine.

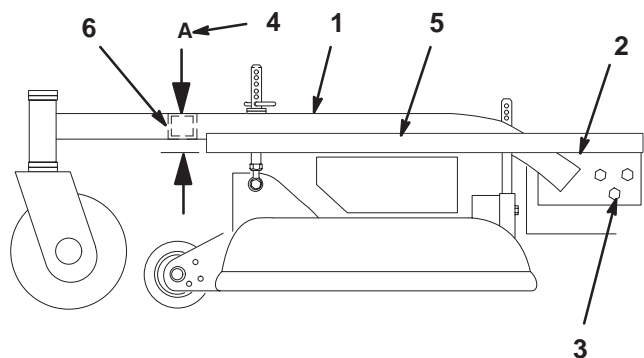


Figure 46

- | | |
|---------------------------------|--|
| 1. Carrier Frame | 4. Location A, 2–13/16 (71.4 mm) in. ±1/4 in. (6 mm) |
| 2. Top of engine deck | 5. Straight edge |
| 3. Carrier frame mounting bolts | 6. Carrier frame cross tube |

Checking Engine Deck Height

1. Stop the engine, remove the key and disconnect the spark plug wire(s) from the spark plug(s).
2. Adjust the tire pressure in all tires to specifications on page 30.
3. Measure engine deck height at location “A” (Fig. 47).
4. Measure engine deck height at location “B” (Fig. 47).
5. If the height at location “A” and “B” are not the same, change tire pressure slightly to make them the same.

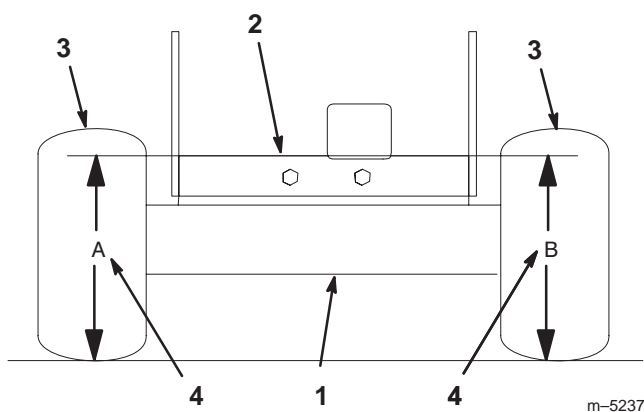
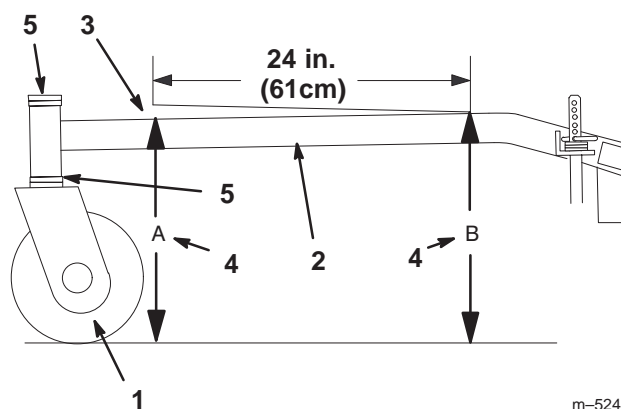


Figure 47

- | | |
|-------------------------|-------------------------------------|
| 1. Back view of machine | 4. Same height at locations A and B |
| 2. Top of engine deck | |
| 3. Tires | |



m-5242

Figure 48

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

Checking Carrier Frame Front-to-Rear Pitch

The carrier frame must have a pitch of a 1/4 in. (6 mm) over the length of 24 inches (61 cm) on the carrier frame.

1. Measure out 24 inches (61 cm) on the carrier frame (Fig. 48).
2. Measure carrier frame height at location “A” (Fig. 48).
3. Measure carrier frame height at location “B” (Fig. 48).
4. The height at location “A” must be a 1/4–3/8 in. (6 mm –10 mm) lower than location “B” (Fig. 48).
5. If the carrier frame is not correct, move caster spacers to make it a 1/4–3/8 in. (6 mm –10 mm) pitch (Fig. 48). Move spacers from top or bottom to make the correct pitch.
6. The tire pressure may also be adjusted slightly to make a 1/4–3/8 in. (6 mm –10 mm) pitch.

Checking Carrier Frame Side-to-Side

1. Stop the engine, remove the key and disconnect the spark plug wire(s) from the spark plug(s).
2. Adjust the tire pressure in all tires to specifications on page 30.
3. Measure carrier frame height at location “A” (Fig. 49).
4. Measure carrier frame height at location “B” (Fig. 49).
5. If the carrier frame height is not the same move spacers from top or bottom of caster wheel, to make it level. The tire pressure may also be adjusted slightly to make it level.

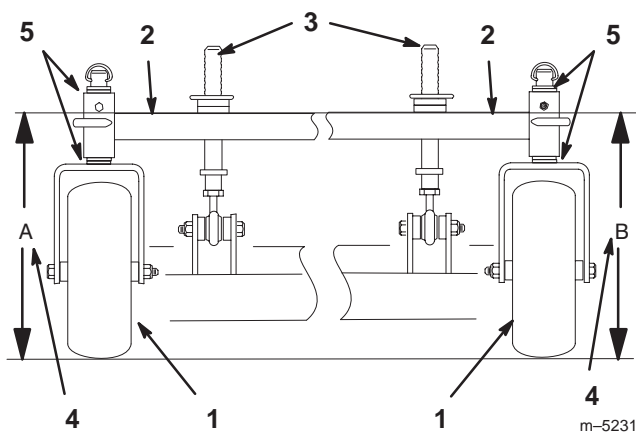


Figure 49

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

Checking the Deck Front-to-Rear Pitch

1. Check the tire pressure on both deck and traction unit.
2. Position one blade front-to-rear (Fig. 50). Measure at "C" and "D" locations (Fig. 50) from a level surface to the cutting edge of the blade tips (Fig. 51).
3. **The mower blade should be 1/4 in. (6 mm) lower in front "C" than in the rear "D".** Rotate blades and repeat for other blades. If it is not correct, proceed to Changing the Deck Front-to-Rear Pitch.

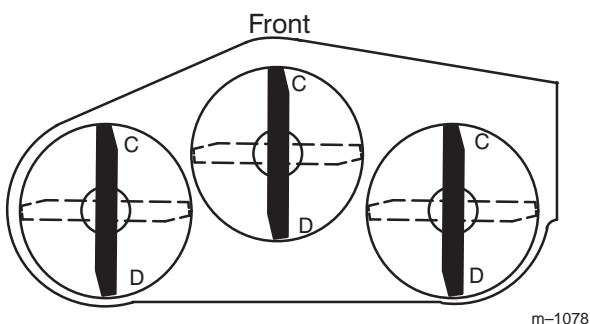


Figure 50

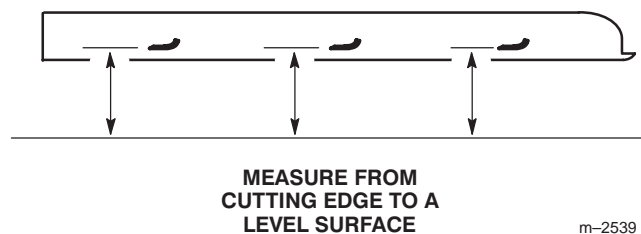


Figure 51

Changing the Deck Front-to-Rear Pitch

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

Changing the Deck Front-to-Rear Pitch by Adjusting Front Height-of-Cut Posts

1. To change the front-to-rear pitch, the front height-of-cut posts can be adjusted (Fig. 52).
2. To raise the front of the deck, loosen jam nut and rotate the front pin clockwise (Fig. 52).
3. To lower the front of the deck, loosen jam nut and rotate the front pin counter clockwise (Fig. 52).

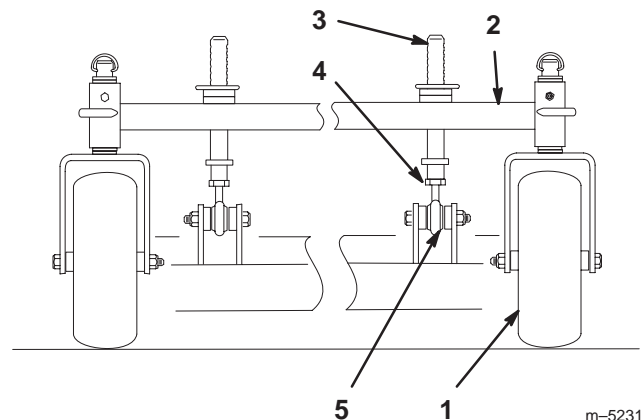


Figure 52

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

4. Position the blades front-to-rear (Fig. 50). Measure at "C" and "D" locations (Fig. 50) from a level surface to the cutting edge of the blades (Fig. 51).
5. Check the side-to-side leveling of the cutting unit.

Checking the Deck Side-to-Side Leveling

1. Check the tire pressure on both deck and traction unit.
2. Position the blades side-to-side (Fig. 53). Measure at "A" and "B" locations (Fig. 53) from a level surface to the cutting edge of blade tips (Fig. 54).
3. The difference between measurements "A" and "B" should be no more than 1/4 in. (6 mm).

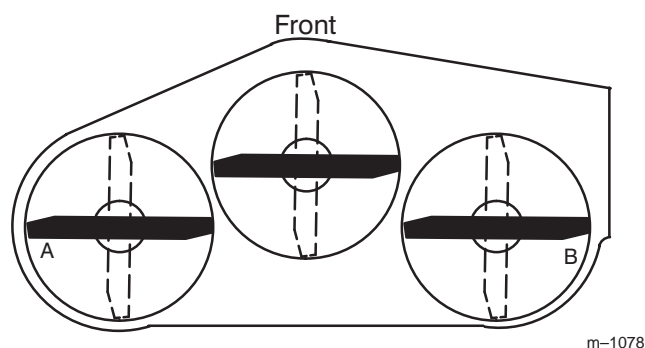
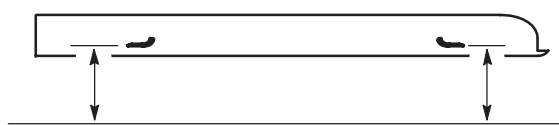


Figure 53



MEASURE FROM
CUTTING EDGE TO
A LEVEL SURFACE

Figure 54

Changing the Side-to-Side Leveling

Changing the side-to-side leveling is done by adjusting tire pressure.

Changing the Side-to-Side Leveling with Tire Pressure

1. Change the tire pressure on both deck and traction unit. Do this to the corresponding side that needs adjustment.
2. Recheck the front-to-rear pitch and side to side leveling of the cutting unit.

Matching Height of Cut

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

2. Set the height-of-cut to the 4 in. (101.6 mm) position following the height-of-cut decal.
3. With the machine on level surface, position one blade front-to-rear (Fig. 55). Measure at "A" and from level surface to the cutting edge of the blade tips (Fig. 56).
4. The measurement should be 4 in. (101.6 mm).

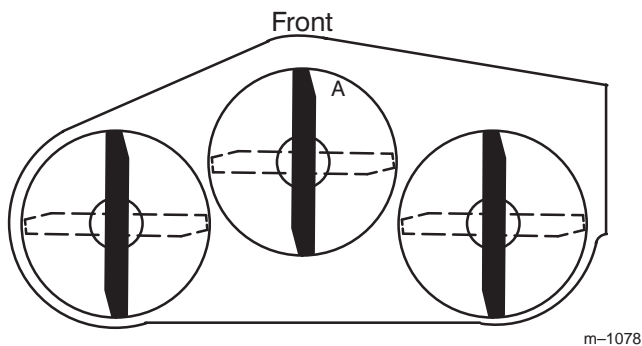
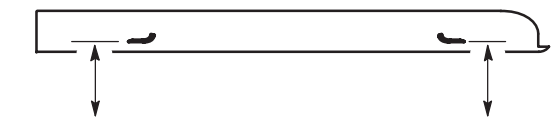


Figure 55



MEASURE FROM
CUTTING EDGE TO
A LEVEL SURFACE

Figure 56

5. If it does not measure correctly, add air pressure in rear tires to raise height-of-cut
6. If it does not measure correctly, decrease air pressure in rear tires to lower height-of-cut.
7. Check carrier frame front-to-rear pitch.

Replacing the Traction Belt

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

1. Raise the front of the machine and hold with jack stands. Remove lower shield.
2. Disconnect clutch wire connector from wire harness.
3. Remove PTO drive belt. Refer to Replacing the PTO Drive Belt on page 41.
4. Remove clutch retainer from the engine deck (Fig. 57).
5. Unhook tension spring from side of frame (Fig. 57).
6. Loosen pivot bolt enough to remove traction belt from the drive pulley and clutch.

7. Install new belt around clutch and drive pulleys.
8. Torque pivot bolt to 35-40 ft. lb. (47-54 N.m). Install tension spring between idler arm and frame bracket (Fig. 57).
9. Install clutch retainer to the engine deck (Fig. 57).
10. Connect clutch wire connector to wire harness. Install lower shield.
11. Install PTO drive belt.

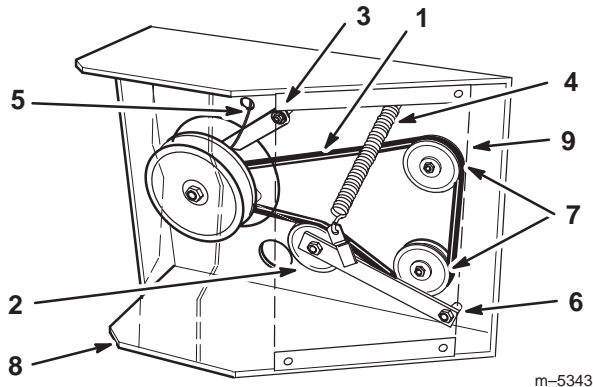


Figure 57

- | | |
|--------------------------|-----------------|
| 1. Traction belt | 6. Pivot bolt |
| 2. Idler pulley | 7. Drive pulley |
| 3. Clutch retainer | 8. Engine deck |
| 4. Tension spring | 9. Lower shield |
| 5. Clutch wire connector | |

Replacing the Deck Belt

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

1. Stop the engine, remove the key and disconnect the spark plug wire(s) from the spark plug(s).
2. Remove the knobs holding the carrier frame cover and remove the carrier frame cover.
3. Remove the knobs holding the belt covers to the cutting unit and remove the belt covers.
4. Remove the PTO drive belt. Refer to Replacing the PTO Drive Belt on page 41.
5. Disconnect the idler arm spring to relieve tension on the idler arm and idler pulley, then remove the worn deck belt (Fig. 58).
6. Install the new deck belt around the two outside spindle pulleys, the idler pulley, and in the lower groove of the center spindle pulley (Fig. 58).
7. Connect the idler arm spring (Fig. 58).

8. Adjust deck belt guide an 1/8 in. (3 mm) from belt (Fig. 58).
9. Reinstall the PTO drive belt. Refer to Replacing the PTO Drive Belt page 41.
10. Reinstall the deck covers onto the cutting unit, then reinstall and tighten the knobs.
11. Install the carrier frame cover onto the cutting unit, then install and tighten the hand knobs.

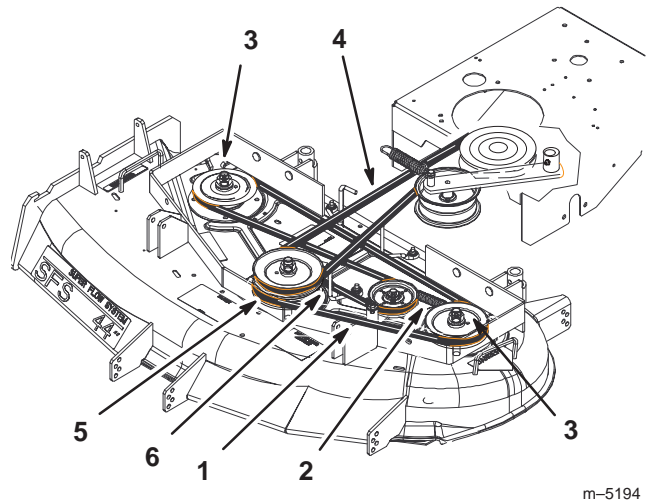


Figure 58

- | | |
|---------------------|--------------------------|
| 1. Deck belt | 4. PTO drive Belt |
| 2. Idler arm spring | 5. Center Spindle Pulley |
| 3. Outward pulley | 6. Deck belt guide |

Replacing the PTO Drive Belt

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

1. Stop the engine, remove the key and disconnect the spark plug wire(s) from the spark plug(s).
2. Remove the knobs holding the carrier frame cover and remove the carrier frame cover.
3. Remove the knobs holding the belt covers to the top of the cutting unit and remove the belt covers.
4. Remove the heat shield from the the engine deck and carrier frame.
5. Remove the idler spring from idler arm. Remove the drive belt from the PTO engagement pulley and the center spindle pulley (Fig. 59).
6. Remove the worn drive belt (Fig. 59).

7. Install the new drive belt onto the PTO engagement pulley and the top groove of the center spindle pulley (Fig. 59).
8. Install belt onto idler pulley and then install idler spring (Fig. 59).
9. Adjust PTO drive belt guides an 1/8 in. from belt (Fig. 59).
10. Install the heat shield to the the engine deck and carrier frame.
11. Install the belt covers onto the cutting unit, then install and tighten the knobs.
12. Install the carrier frame cover onto the cutting unit, then install and tighten the hand knobs.

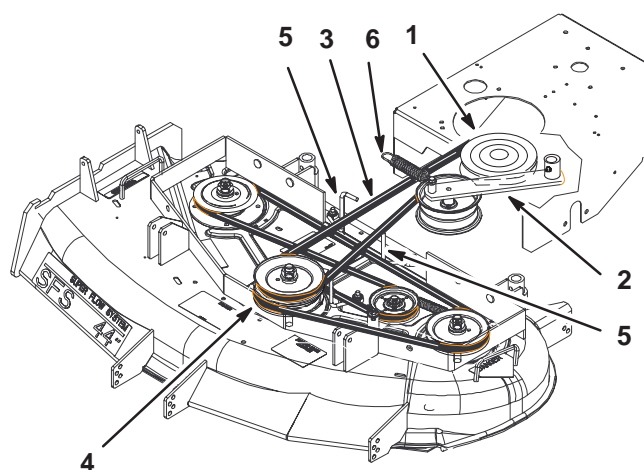


Figure 59

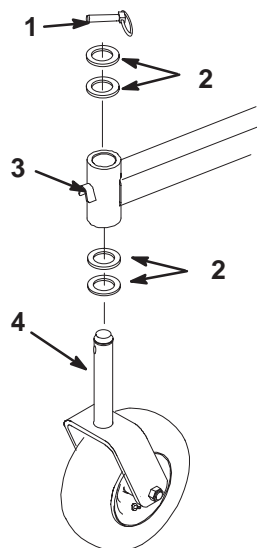
- | | |
|--------------------------|--------------------------|
| 1. PTO engagement pulley | 4. Center Spindle Pulley |
| 2. PTO drive belt idler | 5. PTO Drive belt guide |
| 3. PTO drive Belt | 6. Idler Spring |

Replacing the Caster Wheel Fork Bushings

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

1. Raise the cutting unit so the caster wheels are off the floor, then block up the front of the mower with jack stands.

2. Remove the locking pin and spacer(s) from the top of the caster wheel fork (Fig. 60).
3. Pull the caster wheel fork out of the mounting tube, leaving the spacer(s) on the bottom of the fork. Remember the location of the spacers on each fork to ensure correct installation, and to maintain a level deck.



m-5198

Figure 60

- | | |
|---------------------------------|--------------------------------|
| 1. Locking Pin | 3. Carrier Frame Mounting Tube |
| 2. Spacers (locate as required) | 4. Caster Wheel Fork |

4. Insert a pin punch into the mounting tube and carefully drive out the bushings (Fig. 61). Clean the inside of the mounting tube.
5. Grease the inside and outside of the new bushings. Use a hammer and flat plate to carefully drive the bushings into the mounting tube.
6. Inspect the caster wheel fork for wear and replace if necessary (Fig. 61).
7. Slide the caster wheel fork through the bushings in the mounting tube. Replace the spacer(s) onto the fork and secure with the retaining ring (Fig. 60).

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

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

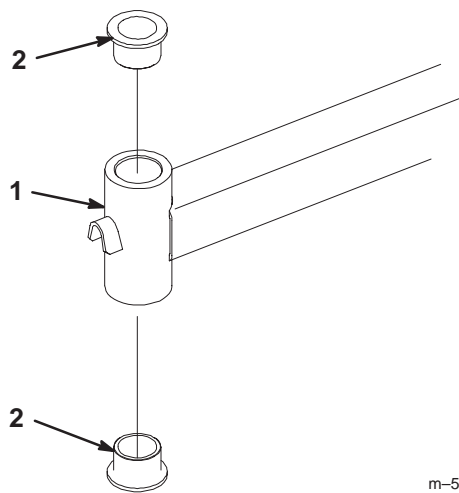


Figure 61

1. Carrier Frame Mounting Tube
2. Bushing

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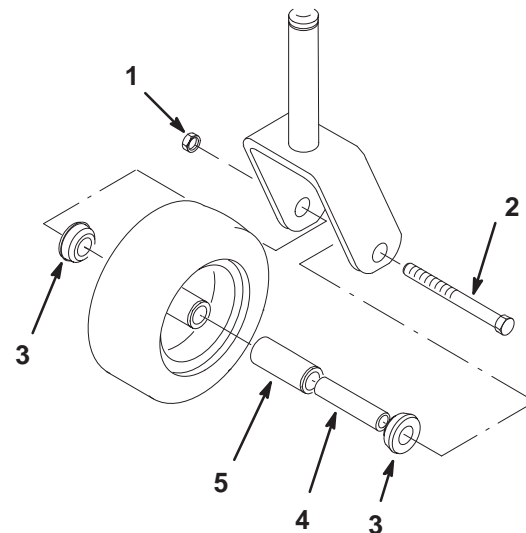


Figure 62

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

m-5210

Caster Wheel and Bearings Service

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

1. Remove the locknut and wheel bolt holding the caster wheel to the caster fork (Fig. 62).
2. Remove one bushing, then pull the spanner bushing and roller bearing out of the wheel hub (Fig. 62).
3. Remove the other bushing from the wheel hub and clean any grease and dirt from the wheel hub (Fig. 62).
4. Inspect the roller bearing, bushings, spanner bushing and inside of the wheel hub for wear. Replace any defective or worn parts (Fig. 62).

5. To assemble, place one (1) bushing into the wheel hub. Grease the roller bearing and spanner bushing and slide them into the wheel hub. Place the second bushing into the wheel hub (Fig. 62).
6. Install the caster wheel into the caster fork and secure with the wheel bolt and locknut. Tighten the locknut until the spanner bushing bottoms against the inside of the caster forks (Fig. 62).
7. Grease the fitting on the caster wheel.

Replacing the Grass Deflector



Warning



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

Never operate the lawn mower unless you install a cover plate, a mulch plate, or a grass chute and catcher.

1. Remove the locknut, bolt, spring and spacer holding the deflector to the pivot brackets (Fig. 63). Remove damaged or worn grass deflector.

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

Note: Make sure the “L” end of spring is installed behind deck edge before installing the bolt as shown in figure 63.

3. Install bolt and nut. Place “J” hook end of spring around grass deflector (Fig. 63).

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.

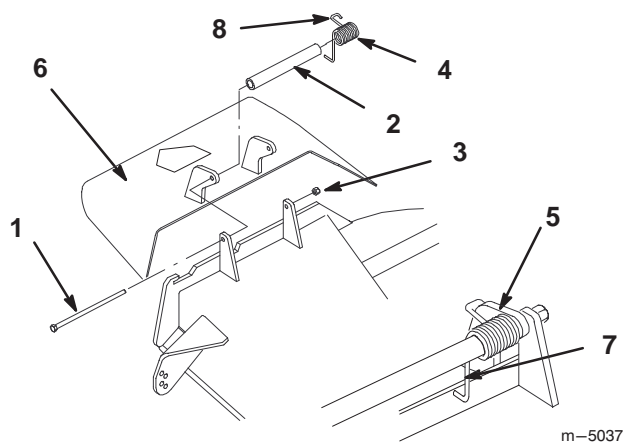
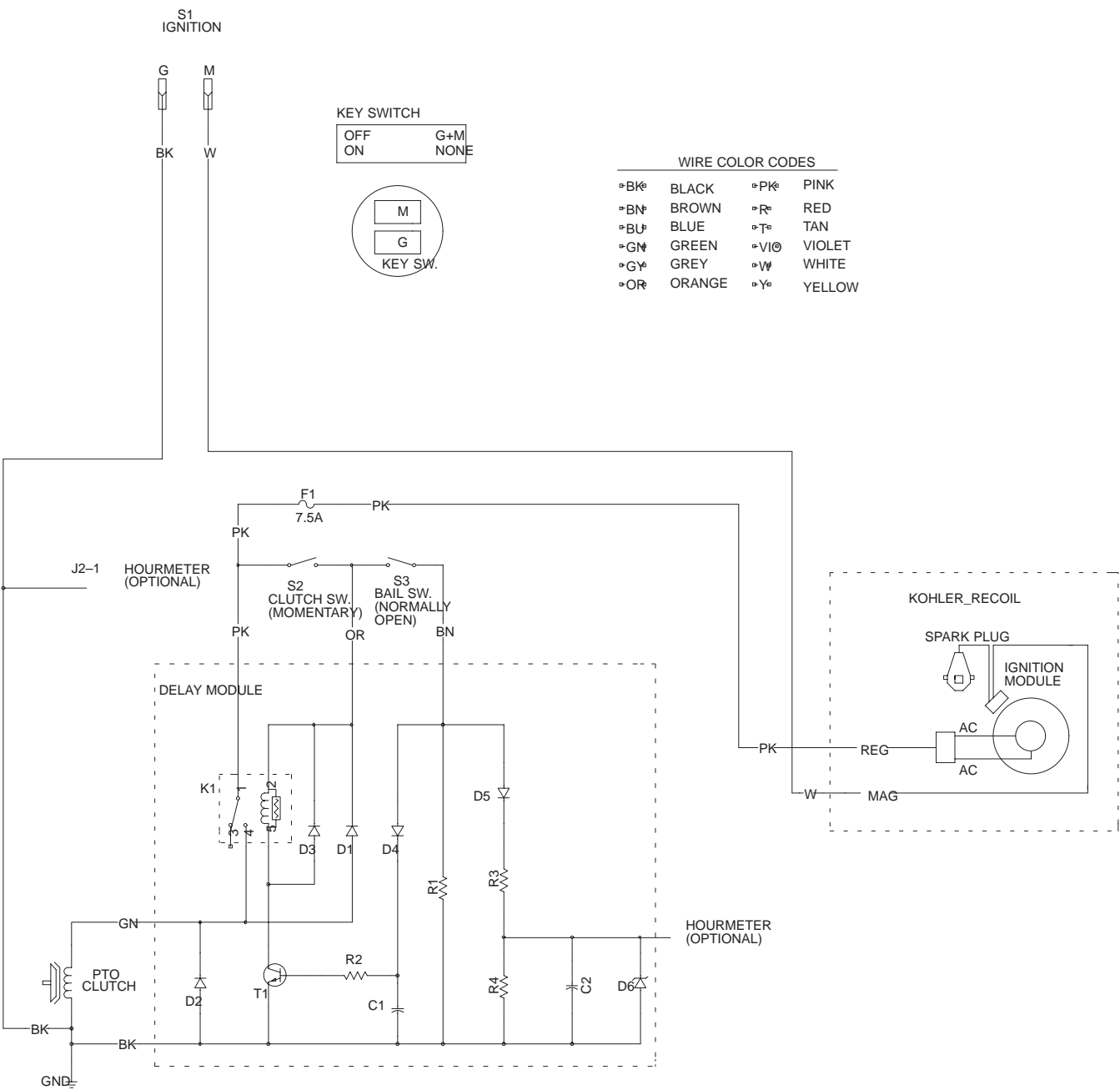


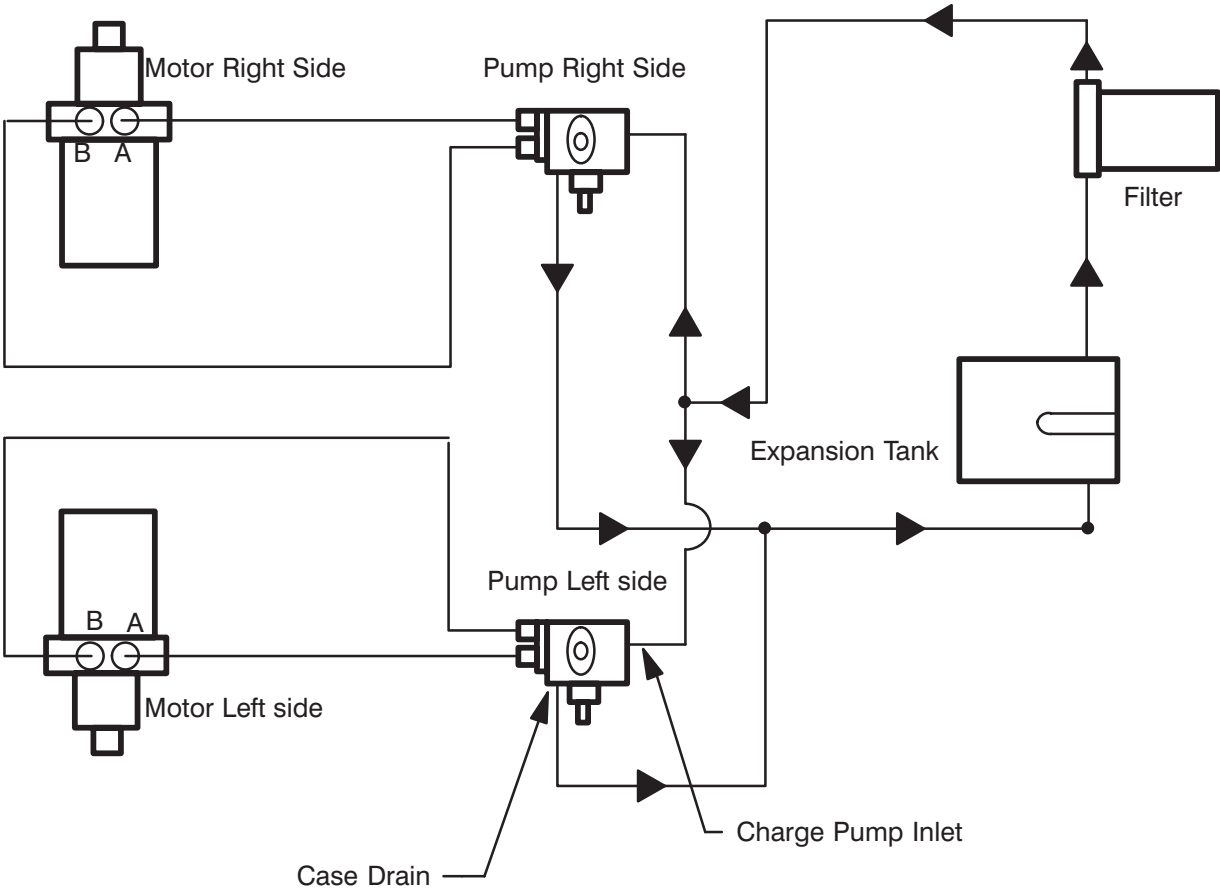
Figure 63

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

Wiring Diagram



Hydraulic Diagram



m-5225

Cleaning and Storage

1. Disengage the power take off (PTO) and turn the ignition key to “OFF” to stop the engine. Remove the key.
2. Remove grass clippings, dirt, and grime from the external parts of the entire machine, especially the engine. Clean dirt and chaff from the outside of the engine’s cylinder head fins and blower housing.

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 Air Cleaner Service, page 26.
4. Change the crankcase oil; refer to Engine Oil Service, page 27.
5. Change the hydraulic filter; refer to Hydraulic System Service on page 31.
6. Check the tire pressure; refer to Checking Tire Pressure, page 30.
7. For storage over 30 days, prepare the traction unit as follows.
 - A. Add a petroleum based stabilizer/conditioner to fuel in the tank. Follow mixing instructions from stabilizer manufacturer. (1 oz. per gallon). **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 the engine to distribute conditioned fuel through the fuel system (5 minutes).
- C. Stop the engine, allow it to cool and drain the fuel tank; refer to Draining Fuel Tank, page 30.
- D. Restart the engine and run it until it stops.
- E. Choke or prime the engine.
- F. Start and run the engine until it will not start again. Use the primer, if equipped on machine, several times to ensure no fuel remains in primer system.
- G. Dispose of fuel properly. Recycle as per local codes.

Important Do not store stabilizer/conditioned gasoline over 90 days.

8. Remove the spark plug(s) and check its condition; refer to Spark Plug Service on page 28. 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).
9. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged or defective.
10. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
11. Store the machine in a clean, dry garage or storage area. Remove the key from the ignition switch and keep it in a memorable place. Cover the machine to protect it and keep it clean.

Troubleshooting

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Engine will not start, starts hard, or fails to keep running.	<ol style="list-style-type: none">1. Fuel tank is empty.2. Battery is dead.3. Choke is not ON.4. Air cleaner is dirty.5. Spark plug wire is loose or disconnected.6. Spark plug is pitted, fouled, or gap is incorrect.7. Dirt in fuel filter.8. Dirt, water, or stale fuel is in fuel system.	<ol style="list-style-type: none">1. Fill fuel tank with gasoline.2. Charge battery.3. Move choke lever to ON.4. Clean or replace air cleaner element.5. Install wire on spark plug.6. Install new, correctly gapped spark plug.7. Replace fuel filter.8. Contact Authorized Service Dealer.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Engine loses power.	<ol style="list-style-type: none"> 1. Engine load is excessive. 2. Air cleaner is dirty. 3. Oil level in crankcase is low. 4. Cooling fins and air passages under engine blower housing are plugged. 5. Spark plug is pitted, fouled, or gap is incorrect. 6. Vent hole in fuel cap is plugged. 7. Dirt in fuel filter. 8. Dirt, water, or stale fuel is in fuel system. 	<ol style="list-style-type: none"> 1. Reduce ground speed. 2. Clean air cleaner element. 3. Add oil to crankcase. 4. Remove obstruction from cooling fins and air passages. 5. Install new, correctly gapped spark plug. 6. Clean or replace the fuel cap. 7. Replace fuel filter. 8. Contact Authorized Service Dealer.
Engine overheats.	<ol style="list-style-type: none"> 1. Engine load is excessive. 2. Oil level in crankcase is low. 3. Cooling fins and air passages under engine blower housing are plugged. 	<ol style="list-style-type: none"> 1. Reduce ground speed. 2. Add oil to crankcase. 3. Remove obstruction from cooling fins and air passages.
Machine does not drive.	<ol style="list-style-type: none"> 1. Hydrostatic fluid level low. 2. Traction belt is worn, loose or broken. 3. Traction belt is off pulley. 	<ol style="list-style-type: none"> 1. Fill hydrostatic fluid tank. 2. Change Belt. 3. Change Belt.
Machine does not drive up hills or inclines.	<ol style="list-style-type: none"> 1. By-pass valve is adjusted too far open. 	<ol style="list-style-type: none"> 1. Adjust by-pass valve
Machine moves slowly in neutral.	<ol style="list-style-type: none"> 1. Neutral is mis-adjusted. 2. Return spring is broken or missing. 3. Linkage is dirty or bent. 	<ol style="list-style-type: none"> 1. Adjust hydro pump neutral. 2. Replace return spring. 3. Clean and lubricate linkage. Replace bent or worn parts.
Machine drive is too aggressive. Mower lifts when drive is engaged.	<ol style="list-style-type: none"> 1. By-pass valve is adjusted too far closed. 	<ol style="list-style-type: none"> 1. Adjust by-pass valve
Abnormal vibration.	<ol style="list-style-type: none"> 1. Cutting blade(s) is/are bent or unbalanced. 2. Blade mounting bolt is loose. 3. Engine mounting bolts are loose. 4. Loose engine pulley, idler pulley, or blade pulley. 5. Engine pulley is damaged. 6. Blade spindle bent. 	<ol style="list-style-type: none"> 1. Install new cutting blade(s). 2. Tighten blade mounting bolt. 3. Tighten engine mounting bolts. 4. Tighten the appropriate pulley. 5. Contact Authorized Service Dealer. 6. Contact Authorized Service Dealer.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Uneven cutting height.	<ol style="list-style-type: none"> 1. Blade(s) not sharp. 2. Cutting blade(s) is/are bent. 3. Mower is not level. 4. Underside of mower is dirty. 5. Tire pressure is incorrect. 6. Blade spindle bent. 	<ol style="list-style-type: none"> 1. Sharpen 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 tire pressure. 6. Contact Authorized Service Dealer.
Blades do not rotate.	<ol style="list-style-type: none"> 1. PTO Drive belt is worn, loose or broken. 2. PTO Drive belt is off pulley. 3. Deck belt is worn, loose or broken. 4. Deck belt is off pulley. 	<ol style="list-style-type: none"> 1. Install new drive belt. 2. Install drive belt and check adjusting shafts and belt guides for correct position. 3. Install new deck belt. 4. Install deck pulley and check the idler pulley, idler arm and spring for correct position and function.

