Form No. 3327–502

TORO®

Mid–Size Traction Unit

Proline Gear 12.5hp

Model No. 30165—Serial No. 220000001 and Up

Operator’s Manual

CE

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.

Keep this engine Owner's Manual with your unit. Should this engine Owner's Manual become damaged or illegible, replace immediately. Replacements may be ordered through the engine manufacturer.

Contents

	Page
Introduction	2
Safety	3
General Lawn Mower Safety	3
Sound Pressure Level	5
Sound Power Level	5
Vibration Level	5
Slope Chart	7
Safety and Instruction Decals	9
Gasoline and Oil	11
Recommended Gasoline	11
Using Stabilizer/Conditioner	11
Filling the Fuel Tank	11
Check Engine Oil Level	11
Setup	12
Loose Parts	12
Installing the Shift Lever	12
Installing the Control Panel and Fuel Tank	13
Installing the Upper Handle	14
Connecting the Throttle Cable	14
Connecting the Wire Harness	14
Installing the Control Rods	14
Operation	16
Think Safety First	16
Controls	16
Operating the Parking Brake	16
Starting and Stopping the Engine	17
Operating the Mower Blade Control (PTO)	17
The Safety Interlock System	18
Driving Forward or Backward	18
Operating the Lower Control Bar	19
Stopping the Machine	19
Maintenance	20
Recommended Maintenance Schedule	20
Servicing the Air Cleaner	20
Servicing the Engine Oil	22
Servicing the Spark Plug	23
Cleaning the Cooling System	24
Greasing and Lubrication	24
Cleaning the Cooling System	25
Checking the Tire Pressure	25
Servicing the Brake	25
Servicing the Fuel Tank	26
Servicing the Fuel Filter	26
Replacing the Drive Belt	27
Replacing the Traction Belt	27
Adjusting the Electric Clutch	27
Wiring Diagram	29
Cleaning and Storage	30
Troubleshooting	30
The Toro Total Coverage Guarantee	32

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.

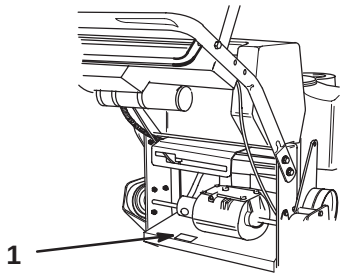


Figure 1

1. Location of the model and serial numbers

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

Model No. _____

Serial No. _____

8111 Lyndale Avenue South
Bloomington, MN 55420-1196

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 ad 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.
- Do not carry passengers.
- 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 pulling loads or using heaving equipment, and

  – use only approved drawbar hitch points.

  – limit loads to those you can safely control.

  – do not turn sharply; use care when reversing.

Watch out for traffic when crossing or near roadways.

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 clean 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 or multicylinder lawn mowers, take care as rotating one blade or cylinder may cause others to rotate.
- When lawn mower is to be parked, stored or left unattended lower the cutting means unless a positive mechanical lock is provided.
- 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: 100 dBA, based on measurements of identical machines per Directive 98/37/EC.

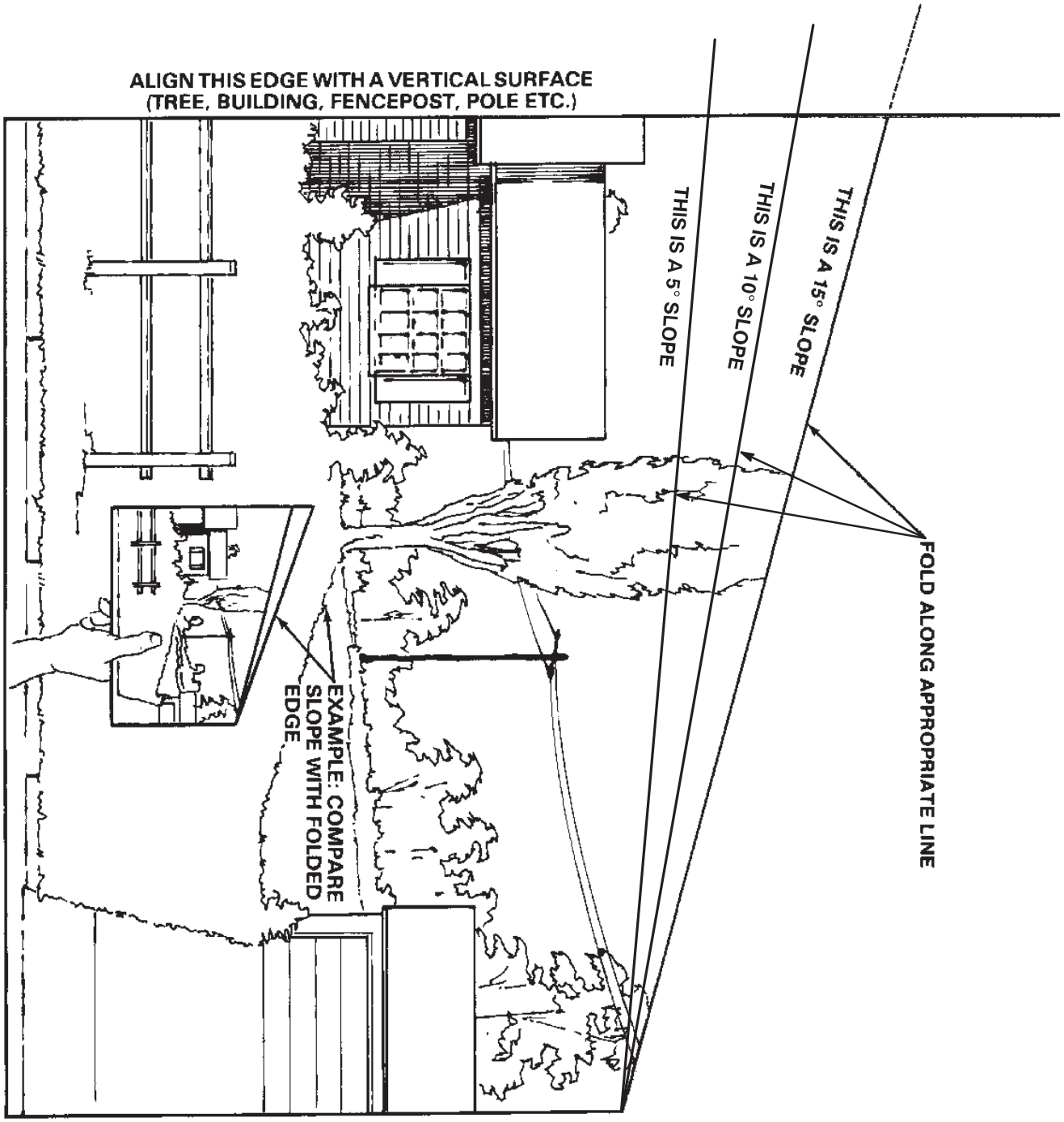
Sound Power Level

This unit has a sound power level of: 100 dBA, based on measurements of identical machines per procedures outlined in Directive 2000/14/EC and amendments.

Vibration Level

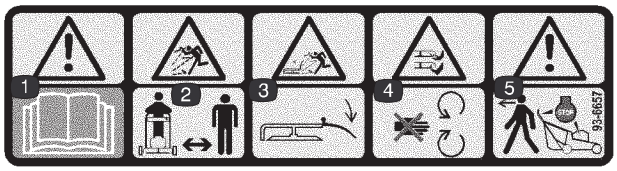
This unit has a maximum hand-arm vibration level of 6.44 m/s^2, based on measurements of identical machines per Directive 98/37/EC.

Slope Chart


ALIGN THIS EDGE WITH A VERTICAL SURFACE
(TREE, BUILDING, FENCEPOST, POLE ETC.)
THIS IS A 5° SLOPE
THIS IS A 10° SLOPE
THIS IS A 15° SLOPE
FOLD ALONG APPROPRIATE LINE
EXAMPLE: COMPARE SLOPE WITH FOLDED EDGE

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.



93-6657

1. Warning—read the *Operator's Manual.*
2. Thrown object hazard—stay a safe distance from the the machine.
3. Thrown object hazard, mower—keep the deflector in place.
4. Cutting/dismemberment hazard of hand or foot, mower blade—stay away from moving parts.
5. Warning—stop the engine before leaving the machine.

93-7297

1. Reverse
2. Neutral
3. Transmission speeds
4. Read the *Operator's Manual.*

93-7298

1. Traction drive—forward
2. Brake

93-7299

1. Traction drive—reverse

93-7442

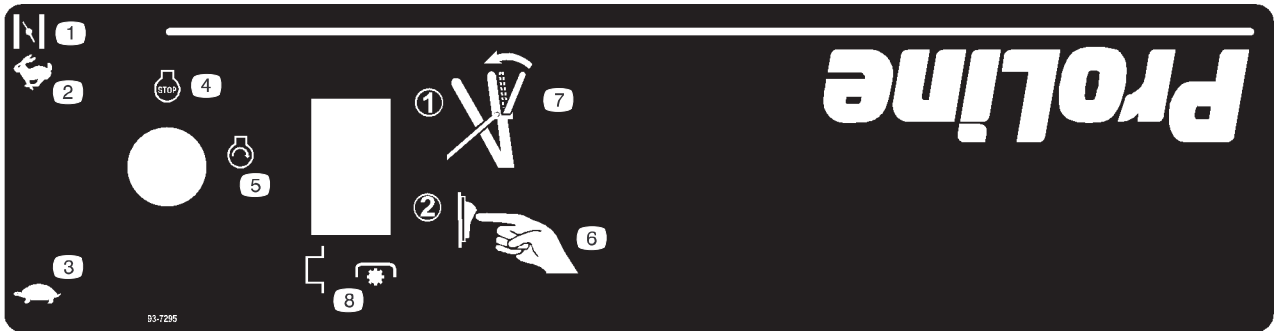
1. Parking brake

93-9353

1. Shut off the fuel by turning the fuel shutoff valve clockwise before transporting the machine.

98-4387

1. Warning—wear hearing protection.



93-7295

1. Choke
2. Fast
3. Slow
4. Engine—stop
5. Engine—start
6. Power take-off (PTO) engagement
7. Squeeze the blade control bail.
8. Press the switch.

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.**
- **Never fill the fuel tank inside an enclosed trailer.**
- **Do not fill the fuel tank completely full. Add gasoline to the fuel tank until the level is 1/4 to 1/2 in. (6 to 13 mm) below the bottom of the filler neck. This empty space in the tank allows gasoline to expand.**
- **Never smoke when handling gasoline, and stay away from an open flame or where gasoline fumes may be ignited by a spark.**
- **Store gasoline in an approved container and keep it out of the reach of children. Never buy more than a 30-day supply of gasoline.**
- **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 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 the Engine Oil Level, page 22.

Setup

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

Loose Parts

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

DESCRIPTION	QTY.	USE
Shift lever	1	Installing the shift lever
Shift lever mounting bracket	1	
Washer, 1/4 in.	1	
Bolt, 1/4 x 2 in.	1	
Fuel tank	1	Installing the control panel and fuel tank
Control panel	1	
Bolt, 5/16 x 7/8 in.	4	
Lock washer, 5/16 in.	4	
Washer, 5/16 in.	4	
Hose clamp	2	
Upper handle	1	Installing the upper handle
Flanged bolt, 3/8 x 1 in.	4	
Flange nut, 3/8 in.	4	
Wire tie	1	Connecting the wire harness
Rod fitting	2	Installing the control rods
Clevis pin	2	
Washer, 1/4 in.	2	
Hairpin cotter	2	
Operator's Manual	1	Read before operating machine
Engine Operator's Manual	1	
Parts Catalog	1	
Registration card	1	Fill out and return to Toro

Installing the Shift Lever

1. Align mounting block with flats of shaft on top of transmission and slide onto shaft (Fig. 2).

Note: Do not remove rubber washer on transmission shaft.

2. Align mounting hole in lever with mounting block on transmission. Secure lever to transmission with 51 mm (2 in.) bolt and washer. Torque bolt to 13 N•m (115 in.–lb.).

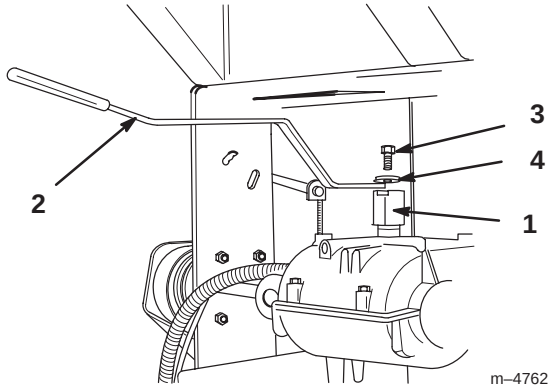


Figure 2

1. Mounting block
2. Shift lever
3. Bolt, 1/4 x 2 in.
4. Washer

Installing the Control Panel and Fuel Tank

1. Slide control panel over shift lever and under bottom of rear frame (Fig. 3). Align fuel tank to top of rear frame (Fig. 3).

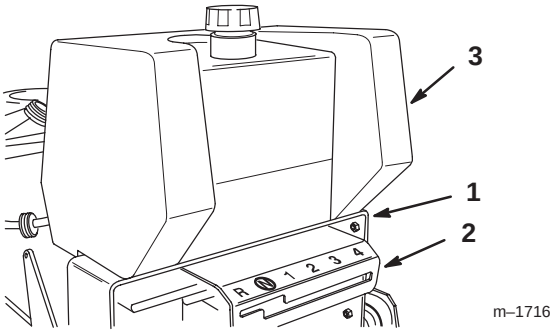


Figure 3

1. Rear frame
2. Control panel
3. Fuel tank

2. Secure control panel and fuel tank to rear frame with 4 bolts (5/16 x 7/8 in.), 4 lock washers (5/16 in.) and washers (Fig. 4).

3. Slide hose clamp onto fuel line (Fig. 4). Push fuel line onto fuel tank fitting and secure with hose clamp (Fig. 4).

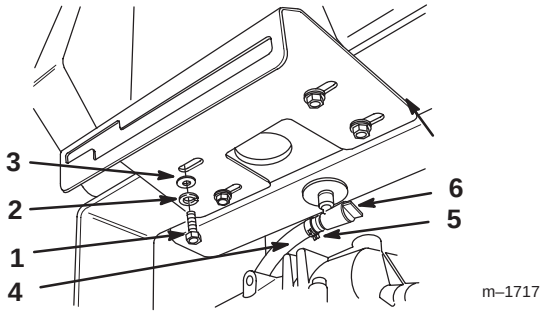


Figure 4

1. Bolt, 5/8 x 7/8 in.
2. Lock washer
3. Washer
4. Fuel line
5. Hose clamp
6. Fuel fitting

4. Shift lever to second gear and check alignment of lever in shifter plate slot. The clearance between top and bottom of the shift lever should be equal (Fig. 5).

5. If clearance is not correct, remove lever and bend it slightly to adjust (Fig. 2).

Note: Do not bend lever while attached to transmission shaft or damage may occur.

6. Shift lever to neutral and check alignment of lever in slot of shifter plate. The clearance on the sides of shift lever should be equal (Fig. 5).

7. If clearance is not correct, loosen control panel and adjust it side–to–side. Tighten the control panel.

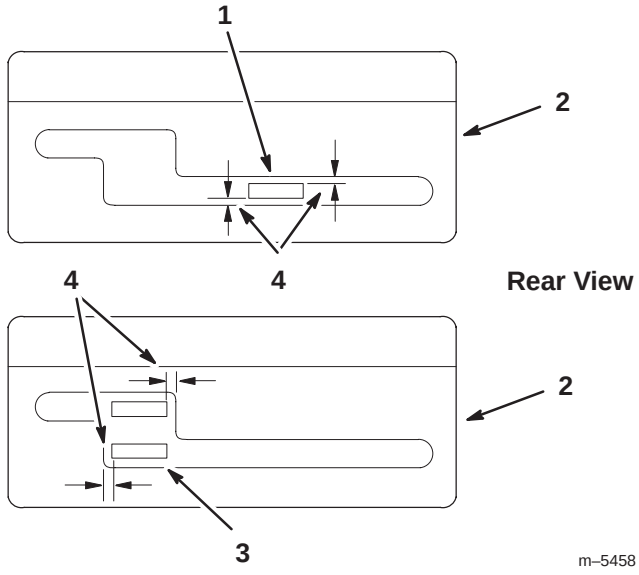


Figure 5

1. Shift lever, 2nd gear
2. Control panel
3. Shift lever, neutral
4. Equal distance

Installing the Upper Handle

1. Align upper handle with upper mounting holes in rear frame (Fig. 6).
2. Secure each upper mounting hole with a flange bolt (3/8 x 1 in.) and flange nut (Fig. 6). Torque bolts to 34 N•m (25 ft.–lb.).
3. Select high, medium or low position for the lower mounting hole (Fig. 6). This allows the upper handle to be adjusted to the user's height preference.
4. Secure each lower mounting hole with a flange bolt (3/8 x 1 in.) and flange nut (Fig. 6). Torque bolts to 34 N•m (25 ft.–lb.).

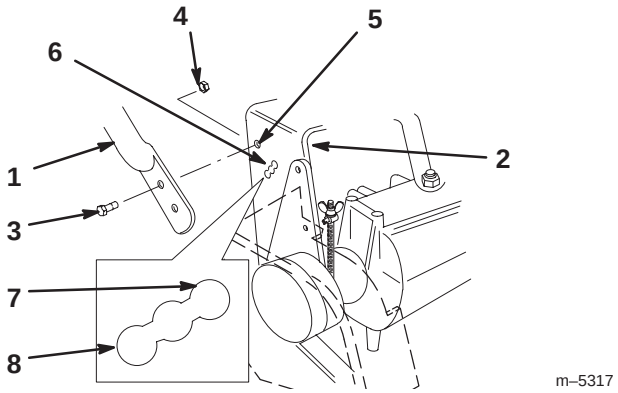


Figure 6

1. Upper handle
2. Rear frame
3. Flange bolt, 3/8 x 1 in.
4. Flange nut, 3/8 in.
5. Upper mounting hole
6. Lower mounting holes
7. Low position
8. High position

Connecting the Throttle Cable

1. Place throttle control lever in the fast position.(Fig. 7).
2. Hook wire Z–bend into hole of speed control lever (Fig. 7).
3. Loosen cable clamp screw allowing cable installation, but do not tighten (Fig. 7).
4. Move control cable casing and wire until hole in speed control lever is aligned with hole in base plate. Insert a 1/4 in. (6 mm) diameter pin or bolt into aligned holes to hold adjustment.
5. Pull throttle cable slightly to remove any slack and tighten cable clamp screw to lock adjustment in place.
6. Remove alignment pin and check control operation.

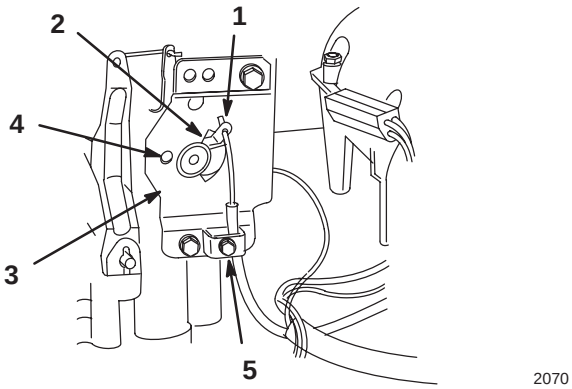


Figure 7

1. Wire Z-bend
2. Speed control lever
3. Base plate
4. Alignment holes, 1/4 in. (6 mm)
5. Cable clamp

Connecting the Wire Harness

1. Secure clutch and engine in–line wire connectors (Fig. 8).

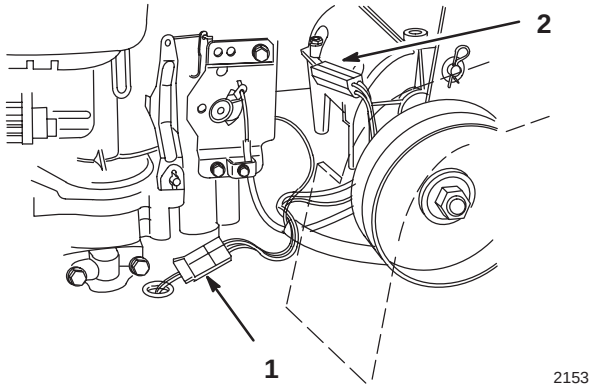


Figure 8

1. Clutch wire connector
2. Engine wire connector

2. Remove top jam nut from right rear engine mounting bolt located behind oil dipstick.
3. Mount remaining wire to engine bolt and secure with jam nut.

Installing the Control Rods

1. Thread a rod fitting onto each control rod approximately 2 in. (51 mm) (Fig. 9) or until upper control bar is approximately perpendicular to the ground (Fig. 10).

2. Mount rod fitting ends to mounting holes in idler brackets (from outside) with clevis pins, washers and hairpin cotters (Fig. 9).

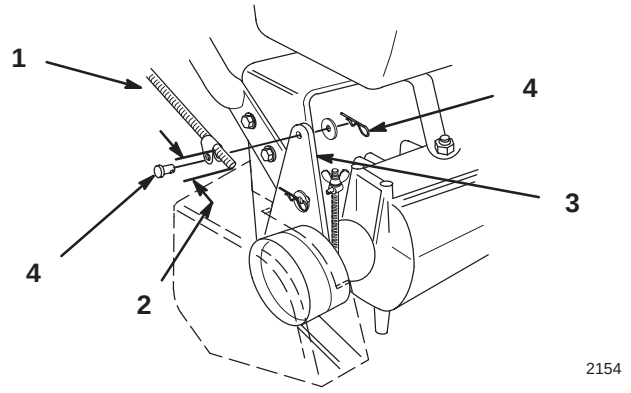


Figure 9

1. Control rod and fitting
2. 2 in. (51 mm)
3. Idler bracket
4. Clevis pin, washer and hairpin cotter

3. Check gap between upper control bar and upper handle when fully engaging wheel belts. Gap should be approximately 1 to 1-1/4 in. (25–32 mm) (Fig. 10).

Note: The control bar and upper handle must be parallel when in relaxed drive and brake positions.

4. Check operation. If adjustment is required, remove hairpin cotter securing rod to upper control bar. Thread rod in or out of fitting for proper position and install into upper control bar with hairpin cotter.

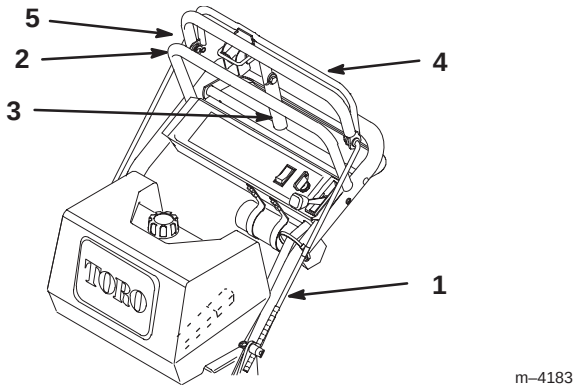


Figure 10

1. Control rod
2. Fixed control bar
3. Parking brake lever
4. Upper control bar
5. 1 to 1–1/4 in. (25–32 mm)

5. Check parking brake adjustment. Brake rods should be adjusted so parking brake lever is tight when swung into position against the fixed bar while pulling back on upper control bar (Fig. 11).

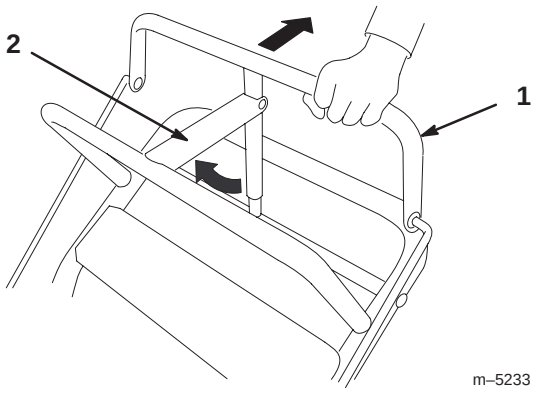


Figure 11

1. Upper control bar
2. Parking brake lever

6. If brake adjustment is required, remove hairpin cotter and washer securing brake rod fitting to idler bracket (Fig. 12).

7. Adjust wing nut up or down on brake rod and secure fitting to idler bracket (Fig. 12). Check adjustment and readjust if necessary.

Note: Make sure brake rod is installed in front (**F**) mounting hole in idler bracket.

8. Repeat procedure on opposite side if adjustment is required to keep control bar and fixed bar.

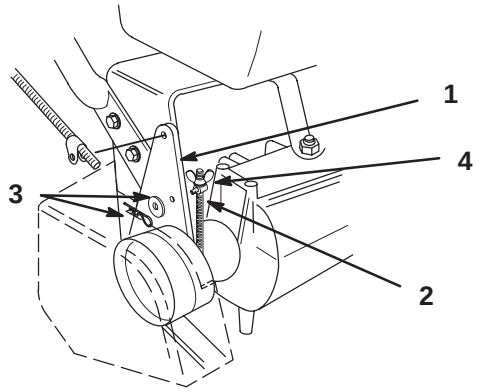


Figure 12

1. Idler bracket
2. Brake rod fitting
3. Hairpin cotter and washer
4. Wing nut

Operation

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

Think Safety First

Please carefully read all the safety instructions and symbols 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 and head is recommended.

Caution

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

Wear hearing protection when operating this machine.

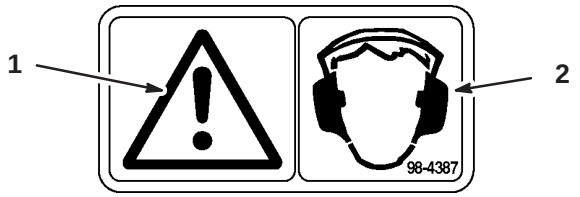


Figure 13

1. Caution
2. Wear hearing protection

Controls

Become familiar with all the controls (Fig. 14) before you start the engine and operate the machine.

Throttle Control – The throttle control has three positions: Choke, Fast and Slow.

Deck Engagement 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) – Rocker switch used in conjunction with control bail to release blade brake and engage clutch to drive mower blades.

Gear Shift Lever – Transmission has four forward speeds, neutral and reverse, and has an in-line shift pattern. Do not shift while unit is moving, as transmission damage may occur.

Upper Control Bar – Shift to desired gear and push forward on control bar to engage forward traction operation and pull back to brake. Pull right side of control bar to turn right and left side to turn left.

Lower Control Bar – Shift transmission to reverse and squeeze the lower control bar and handle together to engage rearward traction operation.

Parking Brake Lever – Pull back on upper control bar and swing brake lever up against the upper handle.

Ignition Switch – Key switch is used in conjunction with recoil starter. Switch has two positions: run and off.

Recoil Starter – Pull recoil Starter handle to start engine.

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

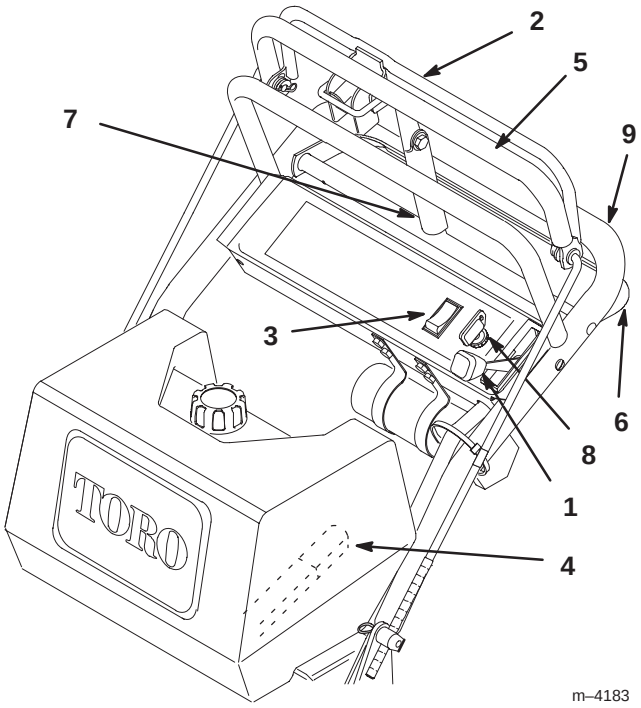


Figure 14

1. Throttle control
2. Blade control bail
3. Blade control switch (PTO)
4. Gear shift lever
5. Upper control bar
6. Lower control bar
7. Parking brake lever
8. Ignition switch
9. Handle

Operating the Parking Brake

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

Setting the Parking Brake

1. Pull the upper control bar rearward and hold it in this position (Fig. 15).

2. Lift the parking brake lock (Fig. 15) up and gradually release the upper control bar. The brake lock should stay in the set (locked) position.

Releasing the Parking Brake

1. Pull rearward on the upper control bar (Fig. 15). Lower the parking brake lock to the released position.
2. Gradually release the upper control bar.

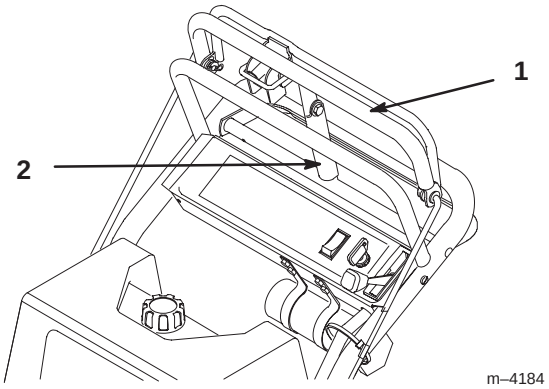


Figure 15

1. Upper control bar
2. Parking brake lock

Stopping the Engine

1. Move the throttle lever to slow (Fig. 16).

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

2. Turn the ignition key to off. (Fig. 16).

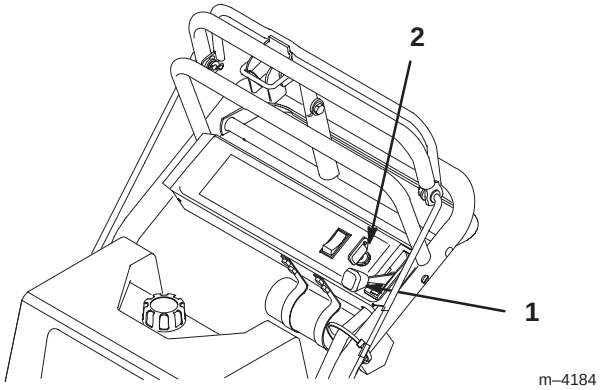


Figure 16

1. Throttle lever
2. Ignition key

Starting and Stopping the Engine

Starting the Engine

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 the run position.
3. Move the throttle control to the 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 the 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.

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

Operating the 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. Pull on the upper control bar to stop the machine (Fig. 17).
2. To engage blade, squeeze blade control bail against upper control bar
3. Press rocker switch forward to on and release. Hold blade control bail against control bar while operating.

4. Repeat procedure to engage mower blades if blade control bail is released.

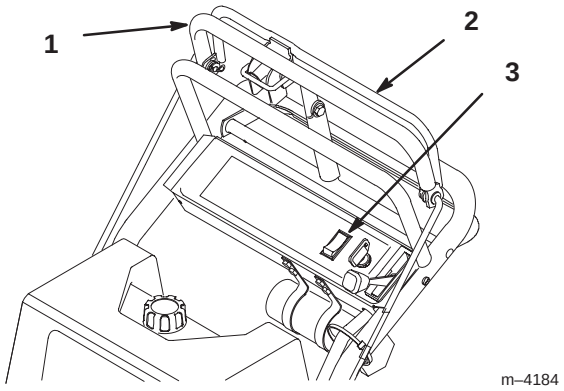


Figure 17

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

Disengaging the Mower Blades (PTO)

1. Releasing blade control bail to disengage blades (PTO) (Fig. 17).

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 blades from rotating unless:

- The control bail is depressed.
- The blade control switch (PTO) is pressed on.

The safety interlock system is designed to stop the mower blades if you released the blade control bail.

Testing the Safety Interlock System

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

1. Set the parking brake and start the engine :refer to Starting and Stopping the Engine, page 17.
2. Squeeze the blade control bail against upper control bar. The blades should not rotate.
3. Then continue holding the blade control bail and press the rocker switch forward to on and release. The clutch should engage and the mower blades begin rotating.
4. Release the blade control bail. The blades should stop rotating.
5. Then push the blade control switch (PTO) to on without holding the blade control bail. The blades should not rotate.

Driving Forward or Backward

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

Driving Forward

1. To go forward, move the shift lever to a forward gear.
2. Release the parking brake: refer to Releasing the Parking Brake, page 17.
3. Slowly press on the upper control bar to move forward (Fig. 18).

To go straight, apply equal pressure to both ends of the upper control bar (Fig. 18).

To turn, release pressure on the upper control bar side away from the direction you want to turn (Fig. 18).

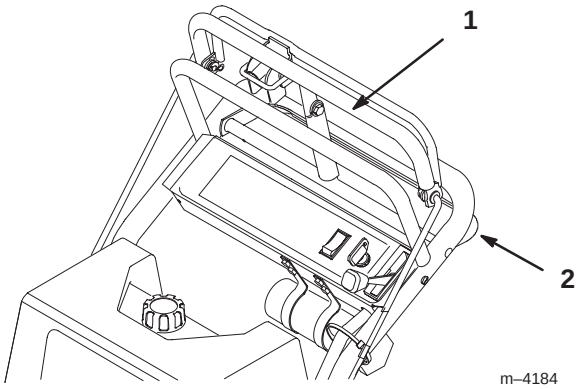


Figure 18

1. Upper control bar
2. Lower control bar

Driving Backward

1. To go backward, move the shift lever to reverse gear.

2. Release the parking brake; refer to Releasing the Parking Brake, page 17.

3. Slowly squeeze the lower control bar and handle together to move rearward (Fig. 18).

Operating the Lower Control Bar

This procedure is for driving up a curb. This can be performed while driving forward or backward.

1. Disengage the mower blades.

Warning

A blade can be bent or damaged when driving up a curb. Pieces of blade that may be thrown could seriously injure or kill you or bystanders.

- **Do not run blades while driving up a curb forward or backward.**

2. Select first gear or reverse to drive machine.

3. Drive machine until drive wheels contact curb (Fig. 20).

Note: Both drive wheels should contact the curb and caster wheels straight.

4. At the same time engage lower control bar and lift up on handle (Figures 19 and 20).

Note: Lifting up on handle will assist driving the machine up a curb and not spin the drive wheels.

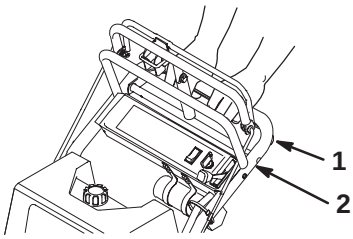


Figure 19

1. Lower Control Bar (Engaged)
1. Handle

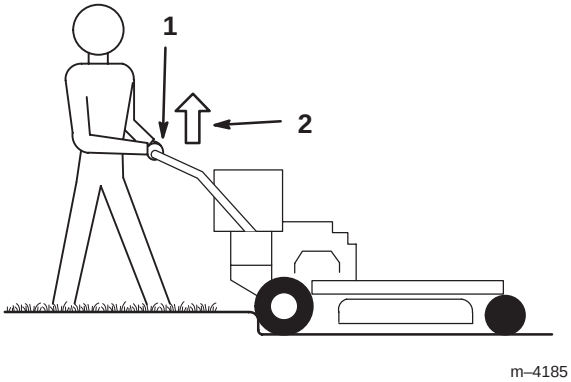


Figure 20

1. Lower Control Bar engaged and mower in reverse.
2. Pull up to assist machine

Stopping the Machine

To stop the machine, pull back on the upper control bar, release the blade control bail (PTO), and turn the ignition key to off. Also set the parking brake if you leave the machine unattended; refer to Setting the Parking Brake, page 16. Remember to remove the key from the ignition switch.

Caution

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

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

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	• Oil—check level • Safety system—check • Brake—check • Engine—clean outside
5 Hours	• Wheel bearings—grease[1]
After First 8 Hours	• Oil—change
25 Hours	• Foam air cleaner—service[1]
50 Hours	• Belts—check for wear/cracks • Tires—check pressure • Oil—change[1]
100 Hours	• Electric clutch–adjust • Engine—clean outside • Spark plug(s)—check • Paper air cleaner—clean[1] • Oil filter—change (100 hours or every other oil change)
200 Hours	• Fuel filter—replace • Transmission couplings—grease[1]
300 Hours	• Paper air cleaner—replace[1]
At storage	• Chipped surfaces—paint • Perform all maintenance procedures listed above before storage

[1]More 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 accidently start the engine and seriously injure you or other bystanders.

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

Servicing the Air Cleaner

Service Interval/Specification

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

Paper Element: Clean every 100 operating hours. Replace after every 300 operating hours.

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

Removing the Foam and Paper Elements

1. Disengage the blade control (PTO), set the parking brake and stop the engine.
2. Clean around the air cleaner to prevent dirt from getting into the engine and causing damage. Unscrew the cover nuts and remove the air cleaner cover (Fig. 21).
3. Remove the air cleaner assembly (Fig. 21).
4. Carefully slide the foam element off the paper element (Fig. 21).

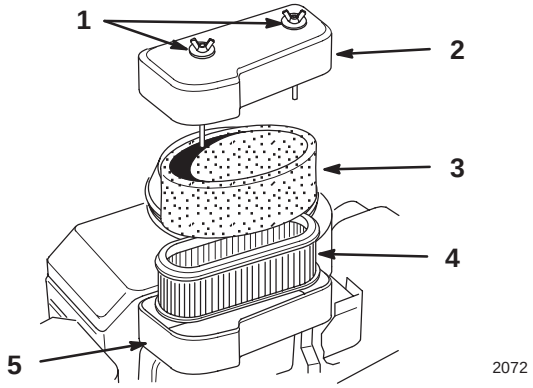


Figure 21

1. Cover nut
2. Air cleaner cover
3. Foam element
4. Paper element
5. Air cleaner base

Cleaning the Foam Element

1. Wash the foam element in liquid soap and warm water. When the element is clean, rinse it thoroughly.
2. Dry the element by squeezing it in a clean cloth.
3. Put one or two ounces of oil on the element (Fig. 22). Squeeze the element to distribute the oil.

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

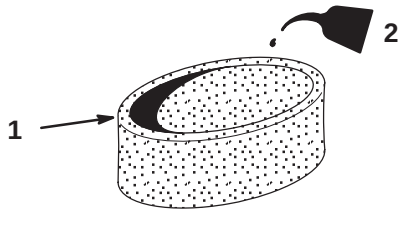


Figure 22

1. Foam element
2. Oil

Cleaning the Paper Element

1. Lightly tap the element on a flat surface to remove dust and dirt (Fig. 23).
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.

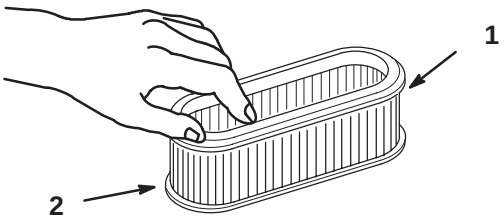


Figure 23

1. Paper element
2. Rubber seal

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. 21).
2. Place the air cleaner assembly onto the air cleaner base (Fig. 21).
3. Install the air cleaner cover and secure with cover nuts (Fig. 21).

Servicing the Engine Oil

Service Interval/Specification

Change oil:

- After the first 8 operating hours.
- After every 50 operating hours.

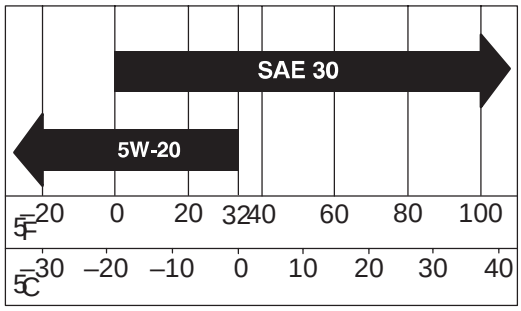
Note: Change oil more frequently when operating conditions are extremely dusty or sandy.

Oil Type: Detergent oil (API service SF, SE/CC, SD or SE)

Crankcase Capacity: with filter, 54 oz. (1.6 l)
with out filter, 47 oz. (1.4 l)

Viscosity: See table below

USE THESE SAE VISCOSITY OILS



Checking the Engine Oil Level

1. Park the machine on a level surface, disengage the power take off (PTO), turn the engine off and set the parking brake.
2. Clean around the oil dipstick (Fig. 24) so dirt cannot fall into the filler hole and damage the engine.
3. Unscrew the oil dipstick and wipe the metal end clean (Fig. 24).
4. Slide the oil dipstick fully into the filler tube, do not thread onto tube (Fig. 24). Pull the dipstick out and look at the metal end. If oil level is low, slowly pour only enough oil into the filler tube to raise the level to the full mark.

Important Do not overfill the crankcase with oil because the engine may be damaged.

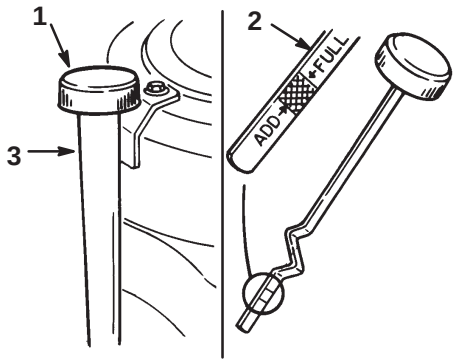


Figure 24

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

Changing the Oil

1. Start the engine and let it run five minutes. This warms the oil so it drains better.
2. Park the machine so that the drain side is slightly lower than the opposite side to assure the oil drains completely. Then disengage the power take off (PTO) and set the parking brake.
3. Place a pan below the oil drain. Remove the oil drain plug (Fig. 25).
4. When oil has drained completely, install the oil drain plug.

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

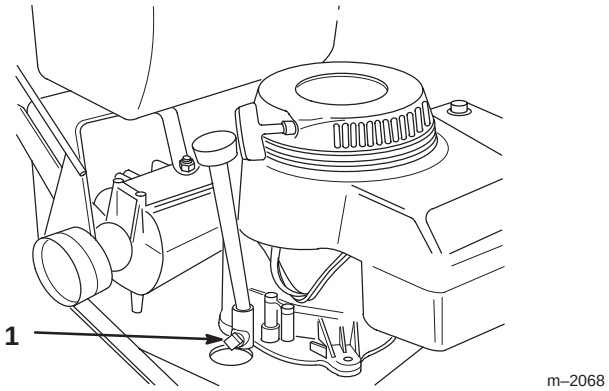


Figure 25

1. Oil drain plug

5. Slowly pour approximately 80% of the specified oil, on page 22, into the filler cap (Fig. 24). Now check the oil level; refer to Checking Oil Level, page 22. Slowly add additional oil to bring it to the full mark.

Changing the Oil Filter

Service Interval/Specification

Replace the oil filter every 100 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 22.
2. Remove the old filter and wipe the filter adapter gasket surface (Fig. 26).
3. Apply a thin coat of new oil to the rubber gasket on the replacement filter (Fig. 26).

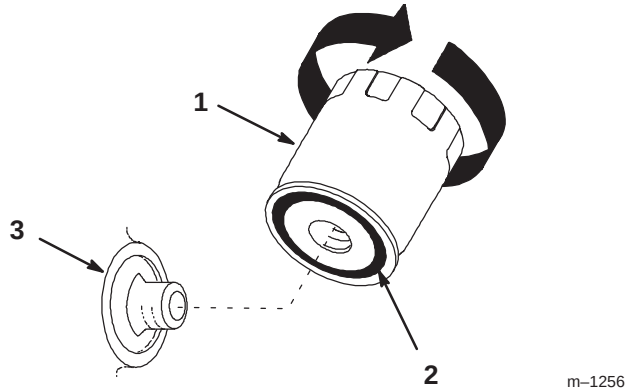


Figure 26

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 3/4 turn (Fig. 26).
5. Fill the crankcase with the proper type of new oil; refer to Changing the Engine Oil, page 22.

Servicing the Spark Plug

Service Interval/Specification

Check the spark plug(s) after every 100 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 RCJ8, NGK BMR–4A, or equivalent
Air Gap: 0.065 in. (.025 mm)

Removing the Spark Plug(s)

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to off. Remove the key.
2. Pull the wire(s) off the spark plug(s) (Fig. 27). 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).

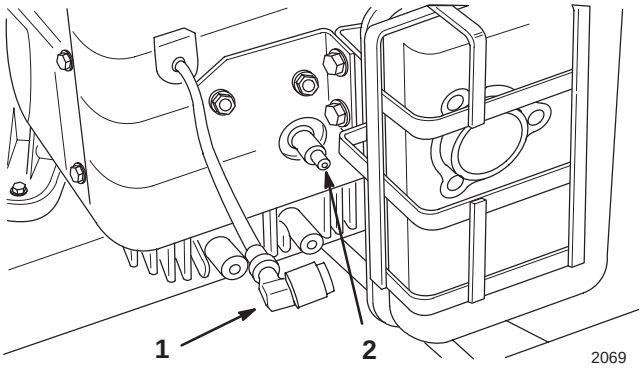


Figure 27

1. Spark plug wire
2. Spark plug

Checking the Spark Plug

1. Look at the center of the spark plug(s) (Fig. 28). 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. 28). Bend the side electrode if the gap is not correct (Fig. 28).

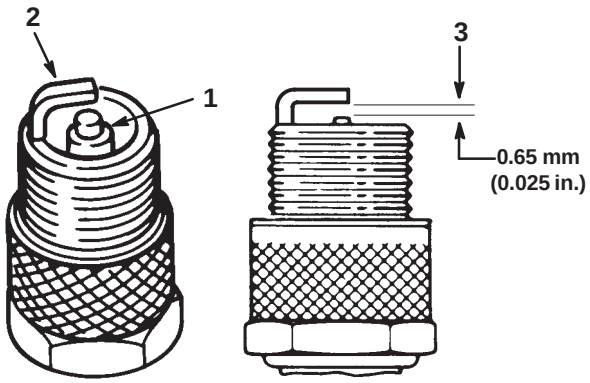


Figure 28

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

Installing the Spark Plug(s)

1. Install the spark plug(s). Make sure the air gap is set correctly.
2. Tighten the spark plug(s) to 24 N•m (18 ft.-lb.).
3. Push the wire(s) onto the spark plug(s) (Fig. 27).

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.

Greasing and Lubrication

Service Interval/Specification

Grease the wheel bearings every 8 operating hours and the transmission couplers every 200 operating hours. Grease more frequently when operating conditions are extremely dusty or sandy.

Grease Type: General-purpose grease.

How to Grease

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

Where to Add Grease

1. Lubricate the wheel bearings and front spindles until grease begins to ooze out of the bearings (Fig. 29).

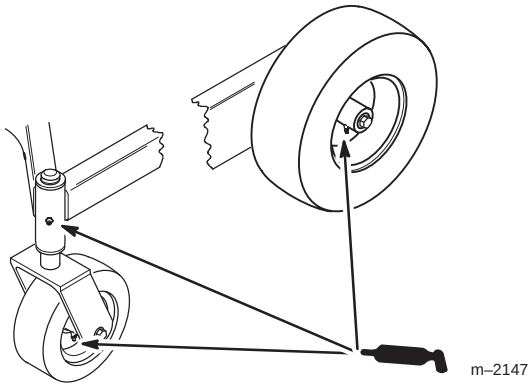


Figure 29

2. Lubricate the transmission couplers (Fig. 30).

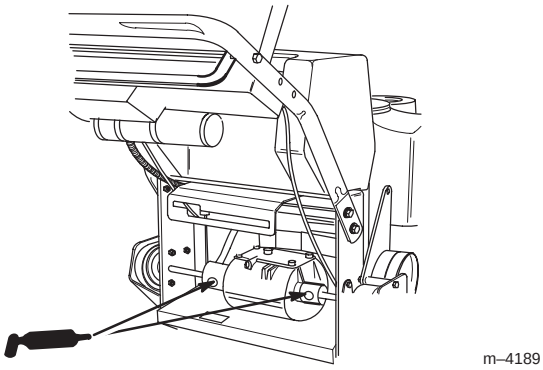


Figure 30

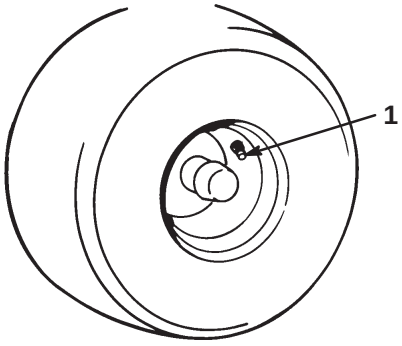


Figure 31

1. Valve stem

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 the 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 50 operating hours or monthly, whichever occurs first (Fig. 31). Check the tires when they are cold to get the most accurate pressure reading.

Pressure: 15 psi (103 kPa) rear tires
25–30 psi (172–207 kPa) caster tires

Servicing the Brake

Service Interval/Specification

Before each use, check brakes 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. Park the machine on a level surface, disengage the power take off (PTO), set the parking brake, and turn the ignition key to off. Remove the key.
2. Rear wheels must lock when you try to push the machine forward. Adjustment is required if the wheels turn and do not lock; refer to Adjusting the Brake, page 25.
3. Release the brake and press upper control bar very lightly, approximately 1/2 in. (13 mm), wheels should rotate freely.
4. If both conditions are met no adjustment is required.

Adjusting the Brake

The brake lever is on the upper control bar (Fig. 14). 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 25.
2. Release the parking brake; refer to Releasing the Parking Brake, page 17.

3. To adjust the brake remove the cotter pin and washer from the brake lever (Fig. 32).
4. Rotate the trunnion so it smoothly slides into brake lever (Fig. 32). Tighten wing nut.
5. Secure trunnion to brake lever with washer and cotter pin (Fig. 32).
6. Check the brake operation again; refer to Checking the Brake, page 25.

Important With the parking brake released, the rear wheels must rotate freely when you push the mower. If brake action and free wheel rotation cannot be achieved contact your service dealer immediately.

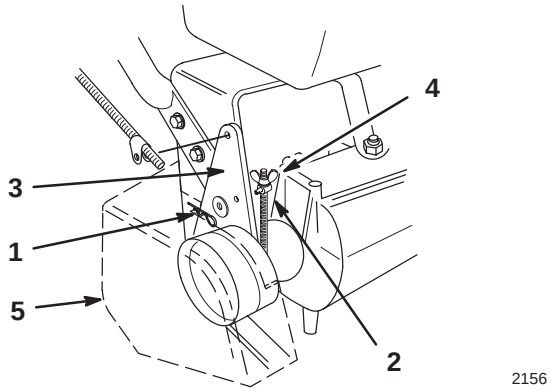


Figure 32

1. Hairpin cotter and washer
2. Trunnion
3. Brake lever
4. Wing nut
5. Belt guard

Servicing the Fuel Tank

Draining The Fuel Tank

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.**

1. Park the machine on a level surface, to assure fuel tank drains completely. Then disengage the power take off (PTO), set the parking brake, and turn the ignition key to off. Remove the key.
2. Close fuel shut–off valve at fuel tank (Fig. 33).
3. Squeeze the ends of the hose clamp together and slide it up the fuel line away from valve (Fig. 33).
4. Pull the fuel line off the valve (Fig. 33). 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 26.

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

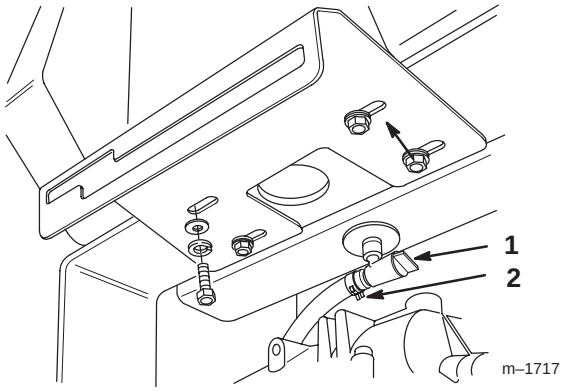


Figure 33

1. Fuel shut-off valve
2. Clamp

Servicing the Fuel Filter

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.

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to off. Remove the key.
2. Close fuel shut–off valve at fuel tank (Fig. 33).
3. Squeeze the ends of the hose clamps together and slide them away from the filter (Fig. 34).
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. 33).

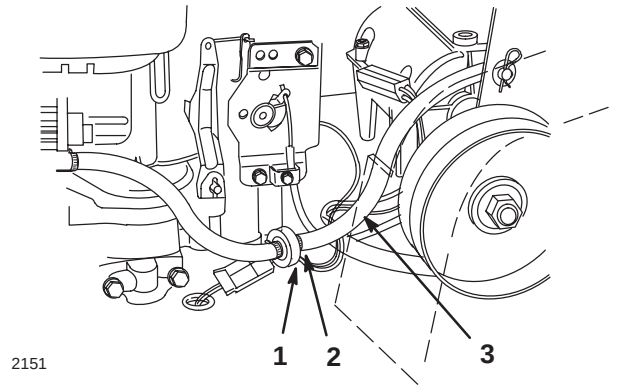


Figure 34

1. Hose clamp
2. Fuel line
3. Filter

Replacing the Drive Belt

Service Interval/Specification

Check all belts after every 50 operating hours or monthly, whichever occurs first. Look for dirt, wear, cracks and signs of overheating.

1. Remove belt guard. Refer to figure 32.

2. Remove top capscrew securing idler support and idler bracket to rear frame (Fig. 35).

3. Loosen bottom two mounting screws enough to allow belt to pass between drive pulley and idler support (Fig. 35).

4. Raise wheel off ground enough to allow belt removal.

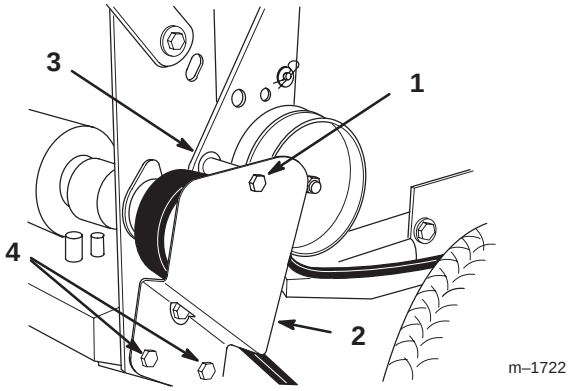


Figure 35

1. Top capscrew
2. Idler bracket
3. Idler support
4. Bottom capscrew

Replacing the Traction Belt

1. Raise the front of the machine and hold with jack stands. Remove lower shield (4) bolts.

2. Remove the lower shield (Fig. 36).

3. Disconnect in–line wire connector from wire harness to electric clutch.

4. Remove left front engine mounting bolt securing clutch retainer to frame (Fig. 36). Unhook retainer from clutch and remove retainer.

5. Unhook tension spring from side of frame (Fig. 36).

6. Loosen pivot bolt enough to remove traction belt from the drive pulley and clutch.

7. Install new belt around clutch and drive pulley.

8. Torque pivot bolt to 47-54 N•m (35-40 ft.–lb.) Install tension spring between idler arm and frame bracket (Fig. 36).

9. Hook clutch retainer into clutch and secure to frame with engine mounting bolt. Torque engine mounting bolt to 19-24 N•m (170-220 in.–lb.)

10. Connect clutch in–line wire connector to wire harness.

11. Install lower shield.

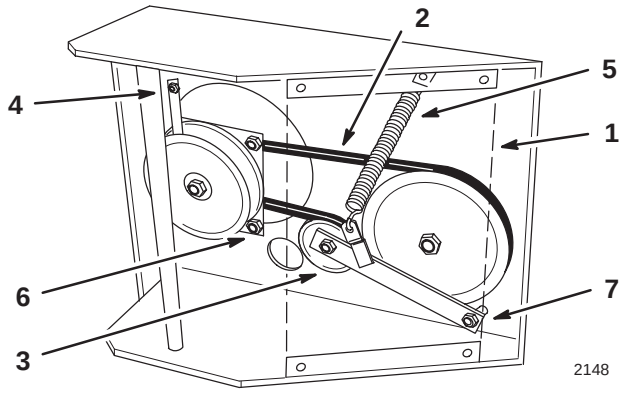


Figure 36

1. Lower Shield
2. Traction belt
3. Idler pulley
4. Clutch retainer
5. Tension spring
6. Adjusting nut
7. Pivot bolt

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. 37).

2. Check adjustment by inserting feeler gauge thru slots next to studs (Fig. 37).

3. The proper disengaged clearance between the clutch plates is .012–.018 in. (0.30-0.45 mm). It will be necessary to check this clearance at each of the three slots to ensure the plates are parallel to each other.

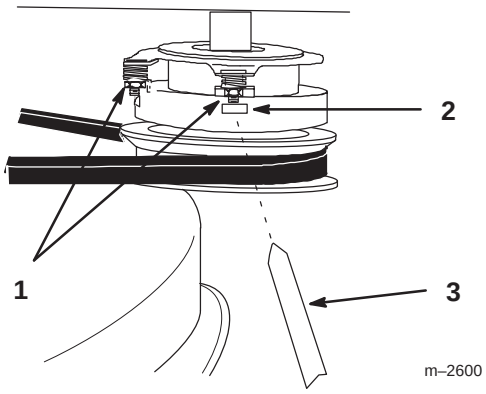
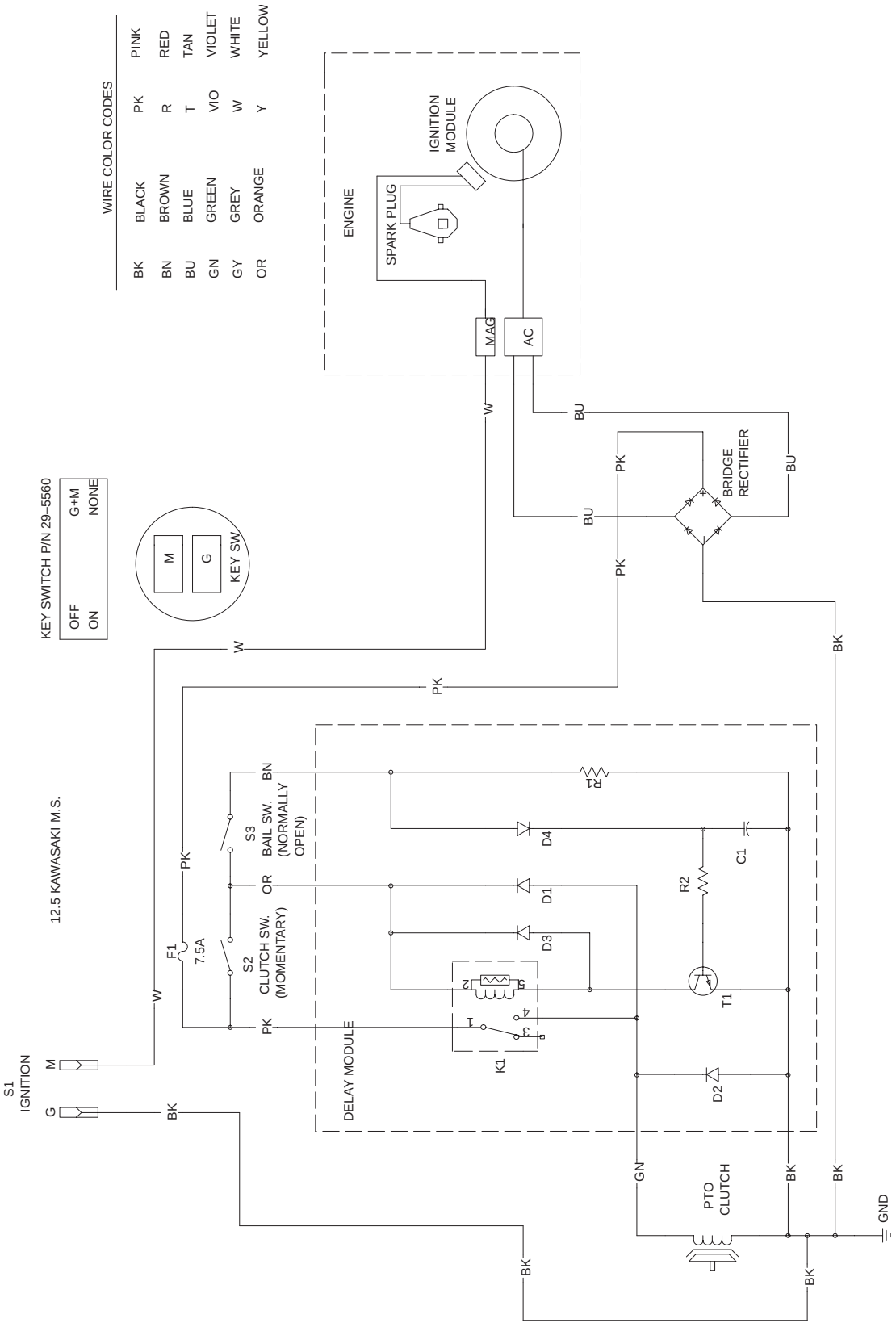


Figure 37

1. Adjusting nut
2. Slot
3. Feeler gauge

Wiring Diagram



Cleaning and Storage

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

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

3. Check the brake; refer to Servicing the Brake, page 25.
4. Service the air cleaner; refer to Servicing the Air Cleaner, page 20.
5. Grease the machine; refer to Greasing and Lubrication, page 24.
6. Change the crankcase oil; refer to Servicing the Engine Oil, page 22.
7. Check the tire pressure; refer to Checking the Tire Pressure, page 25.
8. For long-term storage (more than 90 days) add stabilizer/conditioner additive to fuel in the tank.
   A. Run engine to distribute conditioned fuel through the fuel system (5 minutes).
   B. Stop engine, allow to cool and drain the fuel tank; refer to Servicing the Fuel Tank, page 26, or operate engine until it stops.
   C. Restart engine and run until it stops. Repeat, on choke until engine will not restart.
   D. Dispose of fuel properly. Recycle as per local codes.

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

9. Remove the spark plug(s) and check its condition; refer to Servicing the Spark Plug, page 23. With the spark plug(s) removed from the engine, pour two tablespoons of engine oil into the spark plug hole. Now use the starter to crank the engine and distribute the oil inside the cylinder. Install the spark plug(s). Do not install the wire on the spark plug(s).
10. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged or defective.
11. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
12. Store the machine in a clean, dry garage or storage area. Remove the key from the ignition switch and keep it in a memorable place. Cover the machine to protect it and keep it clean.

Troubleshooting

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Engine will not start, starts hard, or fails to keep running.	1. Fuel tank is empty.	1. Fill fuel tank with gasoline.
	2. Choke is not on.	2. Move choke lever to the on position.
	3. Air cleaner is dirty.	3. Clean or replace air cleaner element.
	4. Spark plug wire is loose or disconnected.	4. Install wire on spark plug.
	5. Spark plug is pitted, fouled, or gap is incorrect.	5. Install new, correctly gapped spark plug.
	6. Dirt in fuel filter.	6. Replace fuel filter.
	7. Dirt, water, or stale fuel is in fuel system.	7. Contact Authorized Service Dealer.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Engine loses power.	1. Engine load is excessive.	1. Reduce ground speed.
	2. Air cleaner is dirty.	2. Clean air cleaner element.
	3. Oil level in crankcase is low.	3. Add oil to crankcase.
	4. Cooling fins and air passages under engine blower housing are plugged.	4. Remove obstruction from cooling fins and air passages.
	5. Spark plug is pitted, fouled, or gap is incorrect.	5. Install new, correctly gapped spark plug.
	6. Vent hole in fuel cap is plugged.	6. Clean or replace the fuel cap.
	7. Dirt in fuel filter.	7. Replace fuel filter.
	8. Dirt, water, or stale fuel is in fuel system.	8. Contact Authorized Service Dealer.
Engine overheats.	1. Engine load is excessive.	1. Reduce ground speed.
	2. Oil level in crankcase is low.	2. Add oil to crankcase.
	3. Cooling fins and air passages under engine blower housing are plugged.	3. Remove obstruction from cooling fins and air passages.
Abnormal vibration.	1. Engine mounting bolts are loose.	1. Tighten engine mounting bolts.
	2. Loose engine pulley, idler pulley, or blade pulley.	2. Tighten the appropriate pulley.
	3. Engine pulley is damaged.	3. Contact Authorized Service Dealer.
Machine does not drive.	1. Shift lever is in neutral.	1. Move shift lever to a drive gear position.
	2. Traction belt is worn, loose or broken.	2. Change Belt.
	3. Traction belt is off pulley.	3. Change Belt.


TORO®