

ProLine Mid-Size 16 HP Traction Unit

Model No. 30180 - 590001 thru 690001 & UP

Operator's Manual

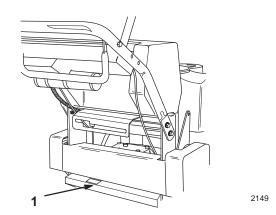
IMPORTANT: Read this manual carefully. It contains information about your safety and the safety of others. Also become familiar with the controls and their proper use before you operate the product.

Introduction

Thank you for purchasing a Toro product.

All of us at Toro want you to be completely satisfied with your new product, so feel free to contact your local Authorized Service Dealer for help with service, genuine replacement parts, or other information you may require.

Whenever you contact your Authorized Service Dealer or the factory, always know the model and serial numbers of your product. These numbers will help the Service Dealer or Service Representative provide exact information about your specific product. You will find the model and serial number plate located in a unique place on the product as shown below.



1. Model and Serial Number Plate

For your convenience, write the product model and serial numbers in the space below.

Model No:	
Serial No	

Read this manual carefully to learn how to operate and maintain your product correctly. Reading this manual will help you and others avoid personal injury and damage to the product. Although we design, produce and market safe, state-of-the-art products, you are responsible for using the product properly and safely. You are also responsible for training persons, who you allow to use the product, about safe operation.

The warning system in this manual identifies potential hazards and has special safety messages that help you and others avoid personal injury, 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 the recommended precautions are not followed.

WARNING signals a hazard that may cause serious injury or death if the recommended precautions are not followed.

CAUTION signals a hazard that may cause minor or moderate injury if the recommended precautions are not followed.

Two other words are also used to highlight information. "Important" calls attention to special mechanical information and "Note" emphasizes general information worthy of special attention.

The left and right side of the machine is determined by sitting on the seat in the normal operator's position.



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

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Safety

Safe Operation Practices for Ride-on (riding) Rotary Lawnmower Machines

Training

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

Preparation

- While mowing, always wear substantial footwear and long trousers. Do not operate the equipment when barefoot or wearing open sandals.
- 2. Thoroughly inspect the area where the equipment is to be used and remove all objects which may be thrown by the machine.
- **3.** WARNING Petrol is highly flammable.
 - Store fuel in containers specifically designed for this purpose.
 - Refuel outdoors only and do not smoke while refuelling.
 - Add fuel before starting the engine. Never remove the cap of the fuel tank or add petrol while the engine is running or when the engine is hot.
 - If petrol is spilled, do not attempt to start the engine but move the machine away from the area of spillage and avoid creating any source of ignition until petrol vapors have dissipated.
 - Replace all fuel tanks and container caps securely.
- **4.** Replace faulty silencers.
- 5. 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.
- **6.** On multi-bladed machines, take care as rotating one blade can cause other blades to rotate.

Operation

- Do not operate the engine in a confined space where dangerous carbon monoxide fumes can collect.
- 2. Mow only in daylight or in good artificial light.
- **3.** Before attempting to start the engine, disengage all blade attachment clutches and shift into neutral.
- **4.** Do not use on slopes of more than:
 - Never mow side hills over 5°
 - Never mow uphill over 10°
 - Never mow downhill over 15°

Note: Slope angle is calculated as in 5.4.2.3.2.

- **5.** Remember there is no such thing as a "safe" slope. Travel on grass slopes requires particular care. To guard against overturning:
 - do not stop or start suddenly when going up or downhill:
 - engage clutch slowly, always keep machine in gear, especially when travelling downhill:
 - machine speeds should be kept low on slopes and during tight turns;
 - stay alert for bumps and hollows and other hidden hazards;
 - never mow across the face of the slope, unless the lawnmower is designed for this purpose.
- **6.** Use care when pulling loads or using heavy equipment.
 - Use only approved drawbar hitch points.
 - Limit loads to those you can safely control.
 - Do not turn sharply. Use care when reversing.
 - Use counterweight(s) or wheel weights when suggested in the instruction handbook.

- **7.** Watch out for traffic when crossing or near roadways.
- **8.** Stop the blades rotating before crossing surfaces other than grass.
- **9.** When using any attachments, never direct discharge of material toward bystanders nor allow anyone near the machine while in operation.
- **10.** Never operate the lawnmower with defective guards, shields or without safety protective devices in place.
- 11. Do not change the engine governor settings or overspeed the engine. Operating the engine at excessive speeds may increase the hazard of personal injury.
- **12.** 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.
- **13.** Disengage drive to attachments, stop the engine, and disconnect the spark plug wire(s) or remove the ignition key
 - before cleaning blockages or unclogging chute:
 - before checking, cleaning or working on the lawnmower;
 - after striking a foreign object. Inspect the lawnmower for damage and make repairs before restarting and operating the equipment;
 - if the machine starts to vibrate abnormally (check immediately).
- **14.** Disengage drive to attachments when transporting or not in use.

- **15.** Stop the engine and disengage drive to attachment
 - before refuelling;
 - before removing the grass catcher;
 - before making height adjustment unless adjustment can be made from the operator's position.
- **16.** Reduce the throttle setting during engine run-out and, if the engine is provided with a shut-off valve, turn the fuel off at the conclusion of mowing.

Maintenance and Storage

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

Sound Pressure

This unit has an equivalent continuous A-weighted sound pressure at the operator ear of: 100 dB(A), based on measurements of identical machines per ANSI B71.5–1984 procedure.

Sound Power

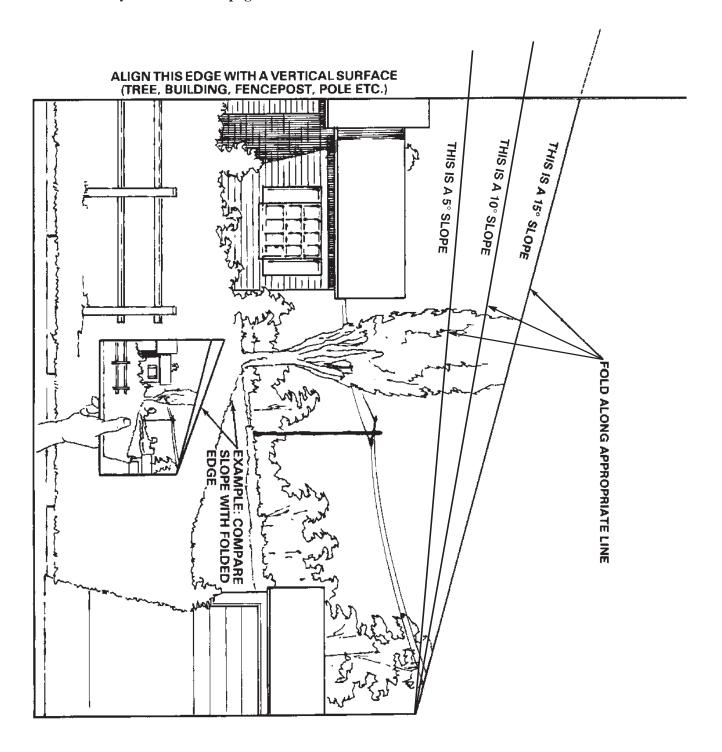
This unit has a power level of: 100 dB(A)/1pW, based on measurements of identical machines per Directive 84/538/EEC and amendments.

Vibration Level

This unit has a maximum hand-arm vibration level of 6.44 m/s², based on measurements of identical machines per ISO 5349 procedures.

Slope Chart

Read all safety instructions on pages 2-9.



Symbols Glossary

Safety alert trianglesymbol within triangle indicates a hazard



Fire, open light & smoking prohibited



Safety alert symbol



Fire or open flame



Read operator's manual



Explosion



Consult technical manual for proper service procedures



Do not dispose of lead battery in garbage



Shut off engine & remove key before preforming maintenance or repair work



Stay a safe distance from the machine



Caustic liquids, chemical burns to fingers or hand



Stay safe distance from machine



Caution, toxic risk



Stay safe distance from machine



Eye protection must be worn



Stay safe distance from machine



First aid, flush with water



Keep children away from battery



Symbols Glossary

Do not open or remove safety shields while engine is running



Machine rollover, riding mower



Thrown or flying objects, whole body exposure



To operate machine on a slope, use with 16kg weight kit & operate with deck lowered



Thrown or flying objects, whole body exposure



Stop engine before leaving operator position



Keep guards and safety shields in place



Machine being transported



Severing of toes & fingers, rotary mower blade



Blade cutting elementheight adjustment



Severing of fingers or hand, mower blade



Blade engagement control operation



Severing of toes or foot, mower blade



Discharge door lever operation



Cutting of fingers or hand



Fuel shut off control operation



Hot surface, burns to fingers or hands

Cutting of foot



Blade retaining bolts must be Torqued to 115–149 N.m



Symbols Glossary

	<i>b</i> .	Power take off (PTO)	<u> </u>
Fast		,	**
Slow		Engage	
Decreasing/Increasing		Diagram	
On/Run		Disengage	
Off/stop	0	Traction drive	9
Engine start		Forward	F
Engine stop	STOP	Reverse	R
		Neutral	Ν
Choke	X	First over	4
Brake system	(\bigcirc)	First gear	
		Second gear	2
Parking brake	(O) (P)		
	<u> </u>	Third gear	3
Battery	ت		4
Fuel		Fourth gear	4

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.

A DANGER

POTENTIAL HAZARD

• In certain conditions gasoline is extremely flammable and highly explosive.

WHAT CAN HAPPEN

• A fire or explosion from gasoline can burn you, others, and cause property damage.

HOW TO AVOID THE HAZARD

- Use a funnel and 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" to 1/2" (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.

Stabilizer/Conditioner

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

- Keeps gasoline fresh during storage
- Cleans the engine while it runs
- Eliminates gum-like buildup in the fuel system, which causes hard starting

IMPORTANT: Never use fuel additives containing methanol or ethanol.

Filling the Fuel Tank

- **1.** Shut the engine off.
- 2. Clean around the fuel tank cap and remove the cap. Use a funnel and add unleaded regular gasoline to the 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 the 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 28.

Set-up

Loose Parts

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

DESCRIPTION	QTY.	USE
Upper Handle	1	
Flanged bolt 3/8-16 x 1" (26 mm)	4	Install upper handle to frame
Flange nut 3/8-16	4	
R-clamp	1	Secure throttle and choke cables
Shift lever	1	
Shift lever mounting bracket	1	Install shift lever to transmission
Washer 1/4"	1	install stillt level to transmission
Bolt 1/4–28 x 2" (51 mm)	1	
Rod fitting	2	
Clevis pin	2	Install control rods
Washer	2	Install control rous
Hairpin cotter	2	
Fuel tank	1	
Control panel	1	
Bolt 5/16–18 x 7/8" (22.5 mm)	4	Install fuel tank and control panel
Lock washer 5/16"	4	install ruel tank and control panel
Washer 5/16"	4	
Hose clamp	2	
Lock nut 1/4–20	1	Install wire harness
Cable tie	1	Install wire harness
Wire tie	1	Retain wire harness
Lock nut 5/16–18	1	Secure negative battery cable to engine bolt
Lock nut 1/4-20	1	Secure positive battery cable to solenoid

DESCRIPTION	QTY.	USE
Battery	1	
Battery holder	2	
Bolt 3/8-16 x 1-3/4" (44 mm)	2	
Lock nut 3/8-16	2	
Battery strap	1	
Support rod	2	
Lock nut 1/4-20	2	Install hotton
Battery pad	2	Install battery
Carriage bolt 5/16–18 x 3/4" (19 mm)	2	
Lock nut 5/16-18	2	
Red battery cable-positive	1	
Terminal boot-red	1	
Black battery cable-negative	1	
Terminal boot-black	1	
Operator's Manual	1	Read before operating machine
Parts catalog	1	
Registration card	1	Fill out and return to Toro

Mount Control Panel and Fuel Tank

1. Position control panel under bottom of rear frame (Fig. 1). Align fuel tank to top of rear frame (Fig. 1).

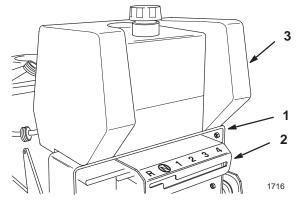


Figure 1

- 1. Rear frame
- 3. Fuel tank
- 2. Control panel
- **2.** Secure control panel and fuel tank to rear frame with (4) 7/8 in. (22.5 mm) bolts, lock washers and washers (Fig. 2).
- **3.** Slide hose clamp onto fuel line (Fig. 2). Push fuel line onto fuel tank fitting and secure with hose clamp (Fig. 2).

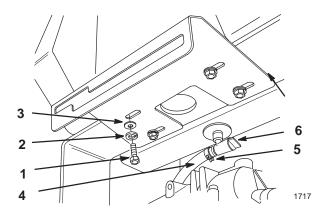


Figure 2

- Bolt 5/8–18 x 7/8" (22.5 mm)
- (22.5 mm)

 2. Lock washer
- 3. Washer

- 4. Fuel line
- 5. Hose clamp
- 6. Fuel fitting

Install Shift Lever

1. Align mounting block with flats of shaft on top of transmission and slide onto shaft (Fig. 3).

Note: DO NOT remove rubber washer on transmission shaft.

2. Slide shift lever through control panel and align mounting hole in lever with mounting block on transmission. Secure lever to transmission with 51 mm bolt and washer. Torque bolt to 115 in. lb. (155 N.m).

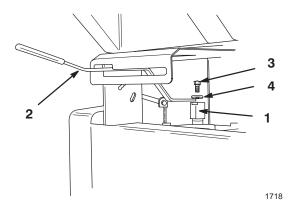


Figure 3

- 1. Mounting block
- 2. Shift lever
- 3. Bolt 1/4-28 x 2" (51 mm)
- 4. Washer

Install Upper Handle

- 1. Align upper handle mounting holes with desired mounting holes in rear frame (upper or lower set of holes)
- 2. Secure each side with (2) 3/8 –16 x 1" (26mm) flange bolts and flange nuts (Fig. 4). Torque bolts to 25 ft. lbs. (34 N.m).
- 3. Route cables and wire harness inside of frame (Fig. 4)

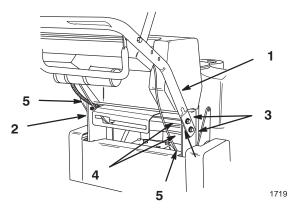


Figure 4

- 1. Upper handle
- 2. Rear frame
- 3. Flange bolt 3/8 x 16–1" (26mm)
- 4. Flange nut 3/8
- 5. Wires and cables

Connect Throttle Cable

- **1.** Route throttle cable under fuel tank supports and around right side of engine (Fig. 5).
- **2.** Move remote throttle control lever forward until there is approximately 1/8 in. (3.5 mm) between lever and front end of slot in control base.

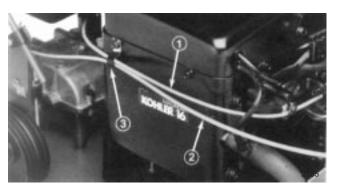


Figure 5

- 1. Throttle cable
 - Choke cable
- Cable clamp
- **3.** Hook wire Z-bend into top hole of governor arm (Fig. 6).
- **4.** Loosen cable clamp screw allowing cable installation, but do not tighten (Fig. 6).
- **5.** Pull throttle cable firmly until governor arm contacts stop and tighten cable clamp screw to lock adjustment in place (Fig. 6).

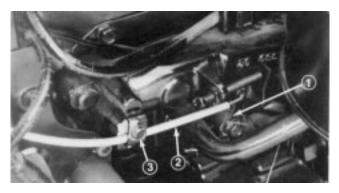


Figure 6

- 1. Governor arm
- 2. Throttle cable
- 3. Cable clamp screw

Connect Choke Cable

- 1. Route choke cable around right side of engine (Fig. 5).
- **2.** Move remote choke control into full choke position.
- **3.** Hook cable Z-bend into hole in carburetor choke lever (Fig. 7).
- **4.** Loosen cable clamping screw allowing cable installation, but do not tighten (Fig. 7).
- **5.** Pull firmly on choke cable and tighten cable clamp screw (Fig. 7).
- **6.** Secure choke and throttle cables to right side of engine with cable clamp and engine cover mounting bolt (Fig. 5).

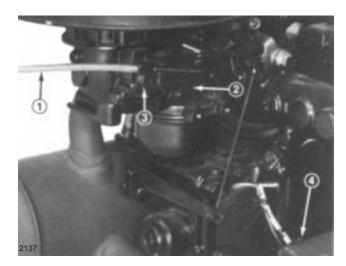


Figure 7

- 1. Choke cable
- 2. Choke lever
- 3. Cable clamp screw
- 4. Connectors

Connect Wire Harness

- **1.** Route harness around left side of engine and plug into connector at front of engine (Fig. 7).
- **2.** At left side of engine, secure clutch connectors (Fig. 8).

- 3. Remove lock nut from left rear engine mounting bolt. Secure negative, black, battery cable and ring terminal wire from clutch connector to left rear engine mounting bolt. Secure with lock nut removed (Fig. 8).
- **4.** Secure remaining gray ring terminal wire from wire harness and positive, red battery cable to rear terminal of starter solenoid with a 1/4–20 lock nut (Fig. 8).
- **5.** Push yellow and black wire terminals onto spade terminals on starter solenoid.

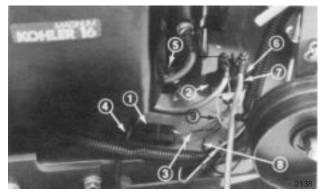


Figure 8

- 1. Clutch wire connector
- 2. Starter solenoid
- 3. Ring terminal wire
- 4. Negative battery cable
- 5. Engine mounting bolt
- 6. Gray wire
- 7. Positive battery cable
- 8. Black wire
- 9. Yellow wire
- **6.** Secure wire harness to fuel line with cable tie (Fig. 9).



Figure 9

1. Cable tie

Install Control Rods

- 1. Thread a rod fitting onto each control rod approximately 2 in. (51 mm) (Fig. 10) or until upper control bar (Fig. 11) is approximately perpendicular to the ground.
- **2.** Mount rod fitting ends to mounting holes in idler brackets (from outside) with clevis pins, washers and hairpin cotters (Fig. 10).

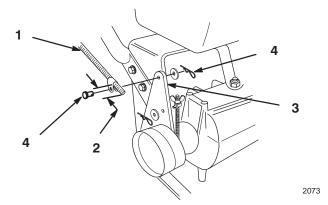


Figure 10

- 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. 11).

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 and washer securing end of control rod to upper control bar, thread rod into or out of rod fitting to proper position and reinstall to upper control bar with washer and hairpin cotter.
- 5. Brake rods should be adjusted so parking brake lever can be swung into a snug position against the inside control bar while pulling back on upper control bar (Fig. 11).

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

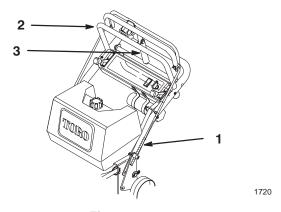


Figure 11

- 1. Control rod
- Inside control bar
- 3. Parking brake lever
- 7. Adjust wing nut up or down on brake rod and resecure to idler bracket (Fig. 12). Check adjustment and readjust if necessary.

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

8. Repeat procedure on opposite side if adjustment is required.

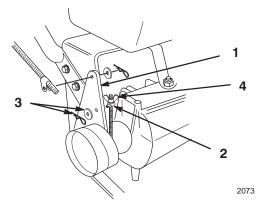


Figure 12

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

Install the Battery

- 1. Mount battery holders to left rear corner or cutting unit carrier frame with (2) 3/8–16 x 1–3/4" bolts and lock nuts.
- 2. Peel off backing from battery pads and affix pads to battery holder, positioning as shown (Fig. 13).

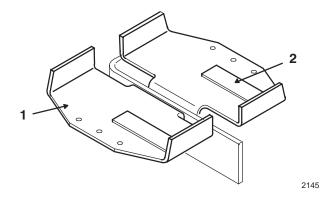


Figure 13

- 1. Battery holder
- 2. Battery pad

IMPORTANT: Activate battery with electrolyte and charge before installing.

- **3.** Position battery onto holder with terminal posts toward engine (Fig. 14).
- **4.** Slide the red terminal boot onto the red battery cable and the black terminal boot onto the the black battery cable (Fig. 14).
- **5.** Install the positive battery cable to positive (+) battery terminal and the negative battery cable to the negative (–) battery terminal and secure with carriage bolts and lock nuts.
- 6. Mount battery to holders with (2) support rods, battery clamp and (2) lock nuts. Position support rods in mounting holes as shown in (Fig. 14). Tighten lock nuts so battery is held securely in position and will not slide.

Note: DO NOT OVERTIGHTEN.

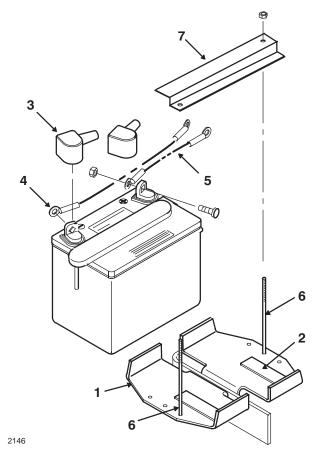


Figure 14

- Battery holder
- 2. Battery pad
- 3. Battery terminal boot
- 4. Negative battery cable
- 5. Positive battery cable
- 6. Battery support rod
- 7. Battery clamp

Activate the Battery

Bulk electrolyte with 1.260 specific gravity must be purchased from a local battery supply outlet.

1. If already installed, remove the battery from the holder.

A DANGER

POTENTIAL HAZARD

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

WHAT CAN HAPPEN

• If you carelessly drink electrolyte you could die or if it gets onto your skin you will be burned.

HOW TO AVOID THE HAZARD

- Do not drink electrolyte and avoid contact with skin, eyes or clothing. Wear safety glasses to shield your eyes and rubber gloves to protect your hands.
- Fill the battery where clean water is always available for flushing the skin.
- Follow all instructions and comply with all safety messages on the electrolyte container.
- 2. Remove filler caps from the battery. Slowly pour electrolyte into each cell until the electrolyte level is up to the lower part of the tube (Fig. 15).

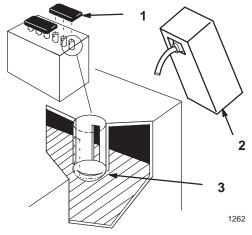


Figure 15

- 1. Filler caps
- 2. Electrolyte
- 3. Lower part of the tube
- 3. Leave the covers off and connect a 3 to 4 amp battery charger to the battery posts (Fig. 16). Charge the battery at a rate of 4 amperes or less for 4 hours (12 volts).

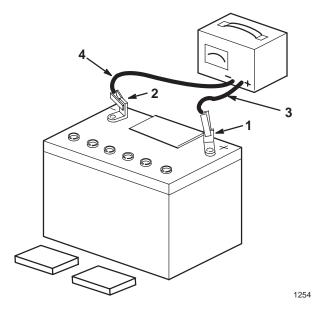


Figure 16

- 1. Positive post
- 2. Negative post
- 3. Charger red (+) wire
- 4. Charger black (-) wire

MARNING

POTENTIAL HAZARD

• Charging battery produces gasses.

WHAT CAN HAPPEN

• Battery gasses can explode.

HOW TO AVOID THE HAZARD

- Keep cigarettes, sparks and flames away from battery.
- **4.** When the battery is fully charged, disconnect the charger from the electrical outlet then from the negative and positive battery posts (Fig. 16).
- 5. Slowly pour electrolyte into each cell until the level is up to the lower part of the tube (Fig. 15) and install covers.
- **6.** Install the battery into the holder.

Operation

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.

Controls

Become familiar with all the controls (Fig. 17) before you start the engine and operate the machine.

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

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) – 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 pull rearward on lower control bar 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.

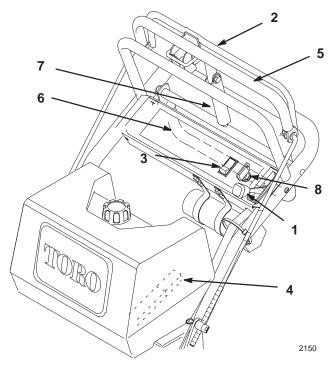


Figure 17

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

Parking Brake

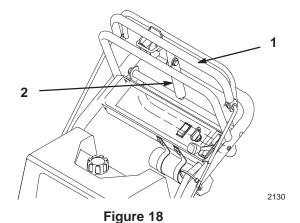
Always set the parking brake when you stop the machine or leave it unattended.

Setting the Parking Brake

- 1. Pull the upper control bar (Fig. 18) rearward and hold it in this position.
- 2. Lift the parking brake lock (Fig. 18) 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. 18). Lower the parking brake lock to the released position.
- **2.** Gradually release the upper control bar.



Upper control bar

2. Parking brake lock

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. 19).
 - 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. 19).

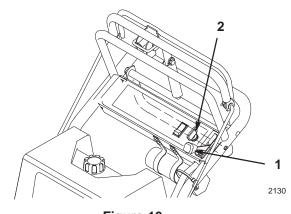


Figure 19

- 1. Throttle lever
- 2. Ignition key
- **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 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. 20).
- **2.** To engage blade, squeeze blade control bail against upper control bar
- **3.** Press rocker switch forward "ON". Hold blade control bail against control bar while operating.
- **4.** Repeat procedure to engage mower blades if blade control bail is released.

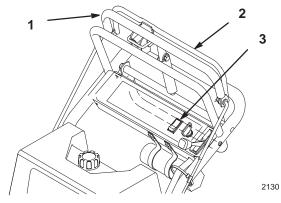


Figure 20

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

Disengaging the Mower Blades (PTO)

- 1. Releasing blade control bail to disengage blades (PTO) (Fig. 20).
- 2. Or push the blade control switch (PTO) to the "OFF" position (Fig. 20).

The Safety Interlock System

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 release 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 22
- 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. 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.

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 21.
- **3.** Slowly press on the upper control bar to move forward (Fig. 21).

To go straight, apply equal pressure to both ends of the upper control bar (Fig. 21).

To turn, release pressure on the upper control bar side away from the direction you want to turn (Fig. 21).

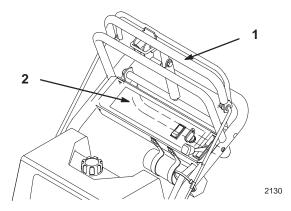


Figure 21

- 1. Upper control bar
- 2. Lower control bar

Backward

- **1.** To go backward, move the shift lever to reverse gear.
- **2.** Release the parking brake: refer to Releasing the Parking Brake, page 21.
- **3.** Slowly pull on the lower control bar to move rearward (Fig. 21).

To go straight, apply equal pressure to both ends of the lower control bar (Fig. 21).

To turn, release pressure on the lower control bar side in the direction you want to turn (Fig. 21).

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" to stop the engine. Also set the parking brake if you leave the machine unattended; refer to Setting the Parking Brake, page 21. Remember to remove the key from the ignition switch.

A CAUTION

POTENTIAL HAZARD

• Someone could move or attempt to operate the machine while it is unattended.

WHAT CAN HAPPEN

• Children or bystanders may be injured if they use the machine.

HOW TO AVOID THE HAZARD

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

Maintenance

Service Interval Chart

Service Operation	Each Use	8 Hours	25 Hours	50 Hours	100 Hours	250 Hours	Storage Service
Oil—check level	Х						Х
Oil—change*		Initial			Х		Х
Safety System—check	Х						Х
Brake—check	Х	Х					Х
Wheel Bearings—grease*		Х					Х
Transmission Couplings—grease*						Х	Х
Foam Air Cleaner—service*			Х				Х
Paper Air Cleaner—replace*					Х		Х
Spark Plug(s)—check			Х		Х		Х
Belts—check for wear/cracks				Х			Х
Gasoline—drain							Х
Engine—clean outside	Х				Х		Х
Fuel Filter—replace					Х		Х
Battery–Check electrolyte level				Х			Х
Tires—check pressure			Х				Х
Chipped Surfaces—paint							Х

A CAUTION

POTENTIAL HAZARD

• If you leave the key in the ignition switch, someone could start the engine.

WHAT CAN HAPPEN

• Accidental starting of the engine could seriously injure you or other bystanders.

HOW TO AVOID THE HAZARD

• Remove the key from the ignition switch and pull the wire(s) off the spark plug(s) before you do any maintenance. Also push the wire(s) aside so it does not accidentally contact the spark plug(s).

Air Cleaner

Service Interval/Specification

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

Paper Element: Replace after every 100 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 power take off (PTO), set the parking brake, and turn the ignition key to "OFF" to stop the engine. Remove the key.
- Clean around the air cleaner to prevent dirt from getting into the engine and causing damage.
 Unscrew the cover nut(s) and remove the air cleaner cover.
- **3.** Remove the cover seal, element cover and air cleaner assembly (Fig. 22).
- **4.** Carefully slide the foam element off the paper element (Fig. 22).



Figure 22

- 1. Foam element
- 2. Paper element
- 3. Cover seal
- 4. Element cover

Cleaning the Foam and Paper Elements

- 1. Foam Element
 - A. Wash the foam element in liquid soap and warm water. When the element is clean, rinse it thoroughly.
 - B. Dry the element by squeezing it in a clean cloth.
 - C. Put one or two ounces of oil on the element (Fig. 23). Squeeze the element to distribute the oil.

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

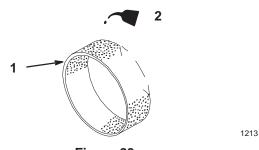


Figure 23

1. Foam element

2. Oil

2. Paper Element

- A. Lightly tap the element on a flat surface to remove dust and dirt (Fig. 24).
- B. 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.

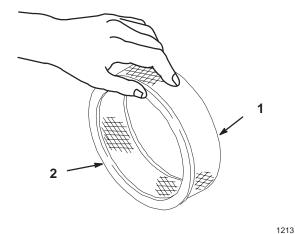


Figure 24

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. 22).
- 2. Place the air cleaner assembly onto the air cleaner base and install element cover and cover seal (Fig. 22).
- 3. Install the air cleaner cover and secure with wing nut(s).

Engine Oil

Service Interval/Specification

Change oil:

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

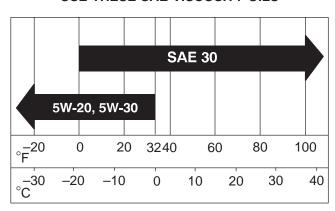
Note: Change oil more frequently when operating conditions are extremely dusty or sandy.

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

Crankcase Capacity: w/filter, 1.9 l (64 oz.) w/o filter 1.4 l (48 oz.).

Viscosity: See table below

USE THESE SAE VISCOSITY OILS



Checking Oil Level

- 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" to stop the engine. Remove the key.
- 2. Clean around the oil dipstick (Fig. 25) so dirt cannot fall into the filler hole and damage the engine.
- **3.** Unscrew the oil dipstick and wipe the metal end clean (Fig. 25).
- 4. Slide the oil dipstick fully into the filler tube (Fig. 25). 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.



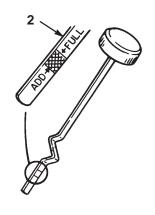


Figure 25

- 1. Oil dipstick
- 2. Metal end

Changing/Draining 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), set the parking brake, and turn the ignition key to "OFF" to stop the engine. Remove the key.
- **3.** Place a pan below the oil drain. Remove the oil drain plug (Fig. 26).
- **4.** When oil has drained completely, install the oil drain plug.

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



Figure 26

- 1. Oil drain plug
- 5. Slowly pour approximately 80% of the specified amount of oil into the filler tube (Fig. 25). Now check the oil level; refer to Checking Oil Level, page 28. Slowly add additional oil to bring to "FULL" mark on dipstick.

Spark Plug

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 RV 15YC (or equivalent) Air Gap: 0.635 mm (0.025 in.)

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. 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) and metal washer.

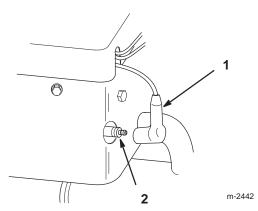


Figure 27

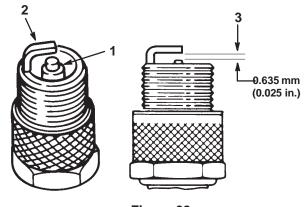
- 1. Spark plug wire
- 2. Spark plug

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 (Fig. 28) if the gap is not correct.



- Figure 28
- 1. Center electrode insulator
- 3. Air gap (not to scale)
- 2. Side electrode

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 17 N.m (12 ft. lb).
- **3.** Push the wire(s) onto the spark plug(s) (Fig. 27).

Greasing and Lubrication

Service Interval/Specification

Grease the wheel bearings every 8 operating hours and the transmission couplers every 250 operating hours. Grease more frequently when operating conditions are extremely dusty or sandy.

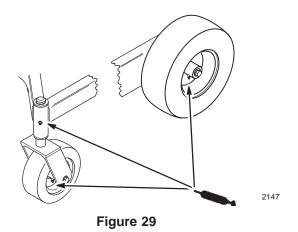
Grease Type: General-purpose grease.

How to Grease

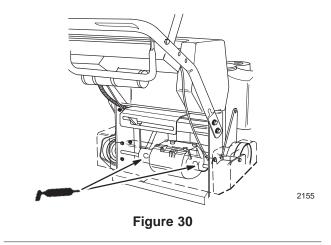
- 1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to "OFF" to stop the engine. Remove the key.
- 2. Clean the grease fittings with a rag. Make sure to scrape any paint off the front of the fitting(s).
- **3.** Connect a grease gun to the fitting. Pump grease into the fittings 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).



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



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: .103 kPa (15 psi) front and rear

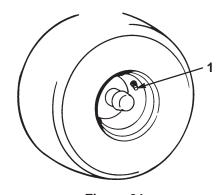


Figure 31

Valve stem

Brake

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

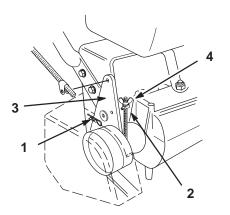
- 1. Park the machine on a level surface, disengage the power take off (PTO), set the parking brake, and turn the ignition key to "OFF" to stop the engine. Remove the key.
- 2. Rear wheels must lock when you try to push the machine forward. Adjustment is required if the wheels turn and do not lock; refer to Adjusting the Brake, page 31.
- **3.** Release the brake, 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. 17). 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 31.
- **2.** Release the parking brake; refer to Releasing the Parking Brake, page 21.
- **3.** Remove the belt cover (Fig. 32) (3) bolts.
- **4.** To adjust the brake remove the cotter pin and washer from the brake lever (Fig. 32).
- **5.** Rotate the trunnion so it smoothly slides into brake lever (Fig. 32). Tighten wing nut.
- **6.** Secure trunnion to brake lever with washer and cotter pin (Fig. 32). Replace the belt cover.
- 7. Check the brake operation again; refer to Checking the Brake, page 31.

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.



2156

Figure 32

- 1. Hairpin cotter and washer
- 3. Brake lever

2. Trunnion

4. Wing nut

Fuel Tank

Draining The Fuel Tank

A DANGER

POTENTIAL HAZARD

• In certain conditions gasoline is extremely flammable and highly explosive.

WHAT CAN HAPPEN

• A fire or explosion from gasoline can burn you, others, and cause property damage.

HOW TO AVOID THE HAZARD

- 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 drain gasoline near an open flame or where gasoline fumes may be ignited by a spark.
- Never smoke a cigarette, cigar or pipe.
- 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. 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 33.

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

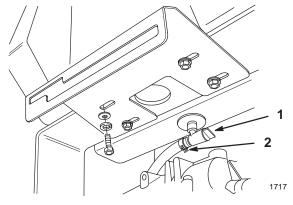


Figure 33

- 1. Fuel shut-off valve
- 2. Clamp

Fuel Filter

Service Interval/Specification

Replace the fuel filter after every 100 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" to stop the engine. 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, if the filter has an arrow, install with arrow pointing toward the carburetor. Move the hose clamps close to the filter.
- **6.** Open fuel shut-off valve at fuel tank (Fig. 33).

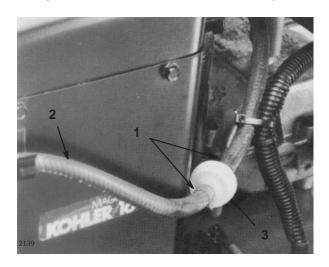


Figure 34

- 1. Hose clamp
- 2. Fuel line

3. Filter

Replacing the Drive Belt

- 1. Remove belt guard, not shown for clarity.
- **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.
- **5.** Install new belt, secure bolts and install belt cover.

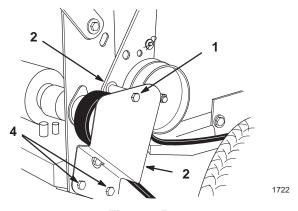


Figure 35

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

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.

Replacing the Traction Belt

- 1. Raise the front of the machine and hold with jack stands. Remove lower shield (4) bolts.
- **2.** Disconnect in–line wire connector from wire harness to electric clutch.
- 3. Remove left front engine mounting bolt securing clutch retainer to frame (Fig. 36). Unhook retainer from clutch and remove retainer.
- **4.** Unhook tension spring from side of frame (Fig. 36).
- **5.** Loosen pivot bolt enough to remove traction belt from the drive pulley and clutch.
- **6.** Install new belt around clutch and drive pulley.
- 7. Torque pivot bolt to 47-54 N.m (35-40 ft. lb.) Install tension spring between idler arm and frame bracket (Fig. 36).
- **8.** 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.)
- **9.** Connect clutch in–line wire connector to wire harness.
- 10. Install lower shield.

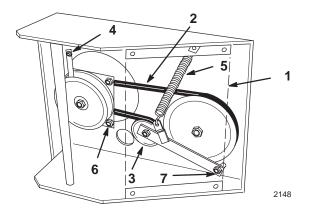


Figure 36

- 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

- **1.** To adjust clutch, tighten or loosen adjusting nuts (Fig. 36).
- **2.** Check adjustment by inserting feeler gauge thru slots next to studs.
- 3. The proper disengaged clearance between the clutch plates is 0.30-0.45 mm (.012–.018 in.). It will be necessary to check this clearance at each of the three slots to ensure the plates are parallel to each other.

Battery

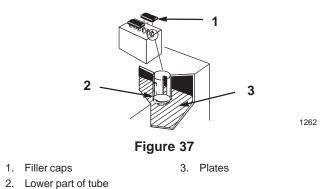
Service Interval/Specification

Check the electrolyte level in the battery every 50 hours. Always keep the battery clean and fully charged. Use a paper towel to clean the battery case. If the battery terminals are corroded, clean them with a solution of four parts water and one part baking soda. Apply a light coating of grease to the battery terminals to prevent corrosion.

Voltage: 12 v, 280 Cold Cranking Amps

Checking Electrolyte Level

- 1. With the engine off, open the covers to see into the cells. The electrolyte must be up to the lower part of the tube (Fig. 37). Do not allow the electrolyte to get below the plates. (Fig. 37).
- **2.** If the electrolyte is low, add the required amount of distilled water; refer to Adding Water to the Battery, page 35.



Adding Water to the Battery

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

- 1. Clean the top of the battery with a paper towel.
- **2.** Lift off the filler caps (Fig. 37).

3. Slowly pour distilled water into each battery cell until the level is up to the lower part of the tube (Fig. 37).

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

4. Press the filler caps onto the battery.

Charging the Battery

IMPORTANT: Always keep the battery fully charged (1.260 specific gravity). This is especially important to prevent battery damage when the temperature is below 0°C (32°F).

- **1.** Remove the battery from the holder.
- **2.** Check the electrolyte level; refer to Checking Electrolyte Level.
- 3. Remove the filler caps from the battery and connect a 3 to 4 amp battery charger to the battery posts. Charge the battery at a rate of 4 amperes or less for 4 hours (12 volts). Do not overcharge the battery. Install the filler caps after the battery is fully charged.

WARNING

POTENTIAL HAZARD

• Charging the battery produces gasses.

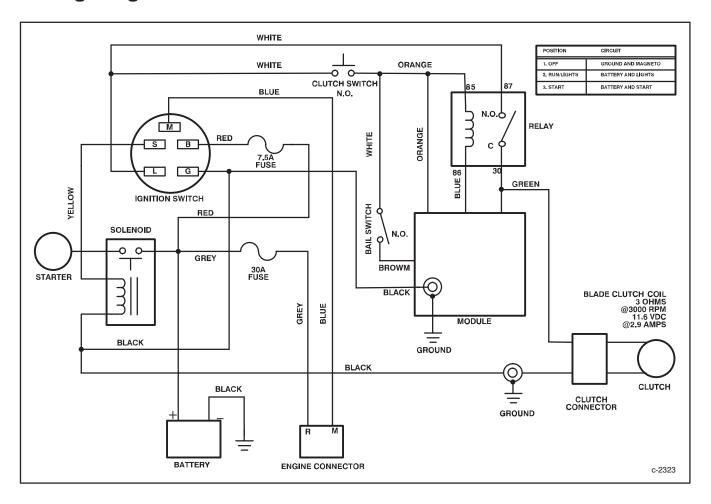
WHAT CAN HAPPEN

• Battery gasses can explode.

HOW TO AVOID THE HAZARD

- Keep cigarettes, sparks and flames away from battery.
- **4.** Install the battery into the holder.

Wiring Diagram



Cleaning and Storage

- 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.
- 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 Brake, page 31.
- **4.** Service the air cleaner; refer to Air Cleaner, page 26.
- **5.** Grease the machine; refer to Greasing and Lubrication, page 30.
- **6.** Change the crankcase oil; refer to Engine Oil, page 27.
- 7. Remove the spark plug(s) and check its condition; refer to Spark Plug, page 29. With the spark plug(s) removed from the engine, pour two tablespoons of engine oil into the spark plug hole. Now use the starter to crank the engine and distribute the oil inside the cylinder. Install the spark plug(s). Do not install the wire on the spark plug(s).
- **8.** Remove the battery from the chassis, check the electrolyte level, and charge fully; refer to Battery, page 35. Do not connect the battery cables to the battery posts during storage.

IMPORTANT: The battery must be fully charged to prevent it from freezing and being damaged at temperatures below 0° C (32° F). A fully charged battery maintains its charge for about 50 days at temperatures lower than 4° C (40° F). If temperatures will be above 4° C (40° F), check the electrolyte level in the battery and charge every 30 days.

- **9.** Check the tire pressure; refer to Tire Pressure, page 30.
- **10.** During long-term storage, either drain gasoline from the fuel tank (step 11) or add a fuel stabilizer/conditioner additive to a full tank of gasoline (step A).
- 11. Drain gasoline from the fuel tank; refer to Fuel Tank, page 32. After fuel is drained, start the engine and let it idle until all gasoline is consumed and the engine stops. This eliminates gum-like buildup in the fuel system, which causes hard starting. Try to start the engine two more times to assure that no gasoline is in the fuel system.
 - A. Add the correct amount of a fuel stabilizer/conditioner to a full tank of gasoline.

Note: Stabilizer/conditioners normally preserve gasoline for six to eight months.

- **12.** Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged or defective.
- **13.** Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
- **14.** 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
Starter does not rotate		Blade control (PTO) is ENGAGED.	1.	Move blade control (PTO) to DISENGAGED.
		Electrical connections are corroded or loose.	2.	Check electrical connections for good contact.
	3.	Fuse is blown.	3.	Replace fuse.
		Battery is dead.	4.	Charge battery.
	5.	Relay or switch is defective.	5.	Contact Authorized Service Dealer.
Engine will not start, starts hard, or	1.	Fuel tank is empty.	1.	Fill fuel tank with gasoline.
fails to keep running.	2.	Choke is not ON.	2.	Move choke lever to ON.
	3.	Air cleaner is dirty.	3.	Clean or replace air cleaner element.
		Spark plug wire is loose or disconnected.	4.	Install wire on spark plug.
		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.
		Dirt, water, or stale fuel is in fuel system.	7.	Contact Authorized Service Dealer.
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.

PROBLEM		POSSIBLE CAUSES		CORRECTIVE ACTION
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.	Contact Authorized Service Dealer.
	3.	Wheel belt(s) are worn, loose or broken.	3.	Contact Authorized Service Dealer.
	4.	Traction belt is off pulley.	4.	Contact Authorized Service Dealer.

