Form No. 3351–466

417XT and 419XT

Wheel Horse® Garden Tractor

Model No. 72211—Serial No. 240000001 and Up

Model No. 72212—Serial No. 240000001 and Up

Operator’s Manual

Register your product at www.Toro.com

CE

Translation of the Original (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.

Contents

	Page
Introduction	2
Safety	3
Safe Operation Practices for Ride-on (riding) Rotary Lawnmower Machines	3
Safe Operating Practices	3
Toro Riding Mower Safety	5
Sound Pressure	5
Sound Power	5
Vibration	5
Slope Chart	6
Safety and Instruction Decals	8
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 Steering Wheel	13
Installing the Seat	13
Installing the Front Tires	14
Installing the Rear Wheels	14
Checking the Tire Pressure	14
Activating and Installing the Battery	14
Checking the Engine Oil	15
Checking the Tractor Lubrication	15
Learn to Operate the Tractor	15
Test Driving the Tractor	16
Checking the Safety System	16
Operation	16
Think Safety First	16
Controls for Model 417XT	16
Controls for Model 419XT	17
Operating the Parking Brake	17
Starting and Stopping the Engine	17
Operating the Power Take Off (PTO)	18
The Safety Interlock System	18
Indicator Control Module	20
Driving Forward or Backward	21
Stopping the Machine	21
Using the Attachment Power Lift	21
Operating the Attachment Lift Lever	22
Positioning the Seat	22
Headlights	23
Positioning the Tilt Steering Wheel	23
Using the Cruise Control	23
Pushing the Machine by Hand	24
Maintenance	25
Recommended Maintenance Schedule	25
Servicing the Engine Oil	26
Cleaning the Cooling System	27
Servicing the Air Cleaner	27
Servicing the Spark Plug	28
Greasing and Lubrication	29
Checking the Tire Pressure	30
Servicing the Brake	30
Servicing the Fuel Tank	30
Servicing the Fuel Filter	31
Servicing the Front Wheel Toe-In	31
Transaxle Fluid	32
Servicing the Fuses	32
Servicing the Headlights	32
Servicing the Battery	33
Wiring Schematic	36
Wiring Schematic	37
Cleaning and Storage	38
Troubleshooting	39

Introduction

Important The engine in this product is not equipped with a spark arrester muffler. It is a violation of California Public Resource Code Section 4442 to use or operate this engine on any forest-covered, brush-covered, or grass-covered land as defined in CPRC 4126. Other states or federal areas may have similar laws.

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 at the location shown in Figure 1.

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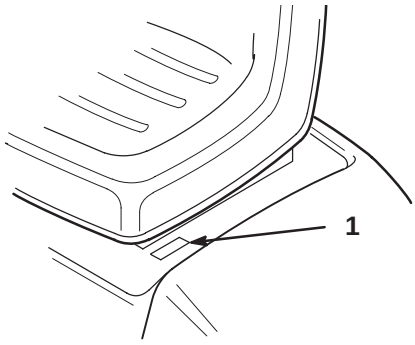


Figure 1

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.

Determine the left and right side of the machine from the normal operating position.

Safety

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

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

Safe Operating Practices

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

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

Training

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

Preparation

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

Operation

- Do not operate the engine in a confined space where dangerous carbon monoxide fumes can collect.
- Mow only in daylight or in good artificial light.
- Before attempting to start the engine, disengage all blade attachment clutches and shift into neutral.
- Do not use on slopes of more than
  - 5° when mowing on side hills;
  - 10° when mowing uphill;
  - 15° when mowing downhill.
- 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 humps and hollows and other hidden hazards;
  - never mow across the face of the slope, unless the lawnmower is designed for this purpose.
- 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.
- Watch out for traffic when crossing or near roadways.
- Stop the blades rotating before crossing surfaces other than grass.
- When using any attachments, never direct discharge of material toward bystanders nor allow anyone near the machine while in operation.
- Never operate the machine with damaged guards or without safety protective devices in place.
- Do not change the engine governor settings or overspeed the engine. Operating the engine at excessive speed can increase the hazard of personal injury.
- Before leaving the operator's position:
  - disengage the power take-off and lower the attachments;
  - change into neutral and set the parking brake;
  - stop the engine and remove the key.
- Disengage drive to attachments, stop the engine, and disconnect the spark plug wire(s) or remove the ignition key
  - before clearing blockages or unclogging chute;
  - before checking, cleaning or working on the lawnmower;
  - after striking a foreign object. Inspect the lawnmower for damage and make repairs before restarting and operating the equipment;
  - if the machine starts to vibrate abnormally (check immediately).

- Disengage drive to attachments when transporting or not in use.
- Stop the engine and disengage drive to attachment
  - before refuelling;
  - before removing the grass catcher;
  - before making height adjustment unless adjustment can be made from the operator's position.
- Reduce the throttle setting during engine run-out and, if the engine is provided with a shut-off valve, turn the fuel off at the conclusion of mowing.

Maintenance and Storage

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

Toro Riding Mower Safety

The following list contains safety information specific to Toro products or other safety information that you must know that is not included in the CEN standard.

- Use only Toro-approved attachments. Warranty may be voided if used with unapproved attachments.

Sound Pressure

This unit has a maximum sound pressure level at the operator's ear of 91 dBA, based on measurements of identical machines per Directive 98/37/EC.

Sound Power

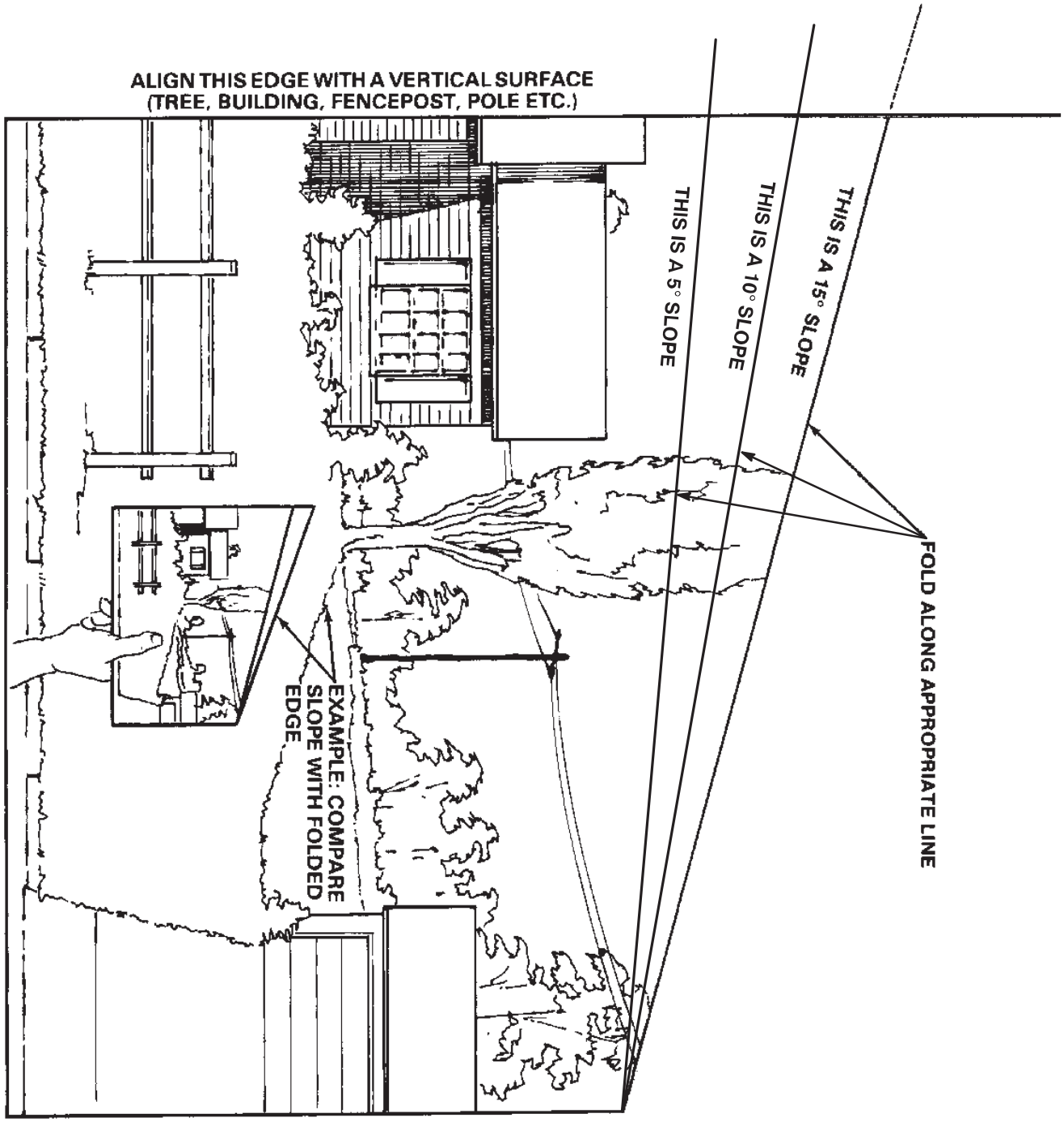
This unit has a guaranteed sound power level of 105 dBA, based on measurements of identical machines per Directive 2000/14/EC.

Vibration

This unit does not exceed a hand/arm vibration level of 2.29 m/s^2, based on measurements of identical machines per Directive 98/37/EC.

This unit does not exceed a whole body vibration level of 0.33 m/s^2, based on measurements of identical machines per Directive 98/37/EC.

Slope Chart

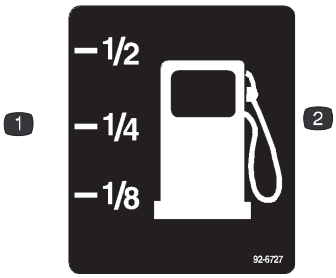

ALIGN THIS EDGE WITH A VERTICAL SURFACE
(TREE, BUILDING, FENCEPOST, POLE ETC.)
THIS IS A 5° SLOPE
THIS IS A 10° SLOPE
THIS IS A 15° SLOPE
FOLD ALONG APPROPRIATE LINE
EXAMPLE: COMPARE SLOPE WITH FOLDED EDGE

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.



112168



92-6727

1. Fuel levels
2. Fuel



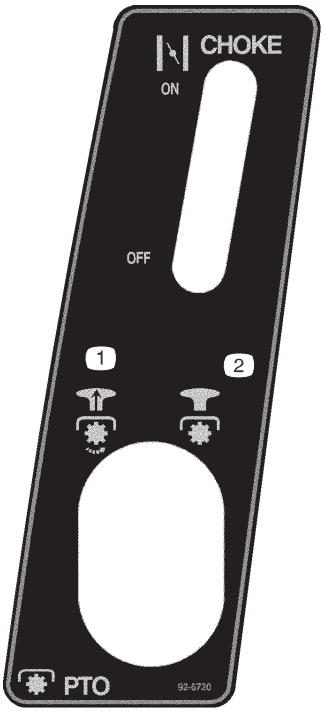
99-2986

1. Crushing/dismemberment hazard of bystanders—do not turn the key while children are present; keep children a safe distance from the machine.



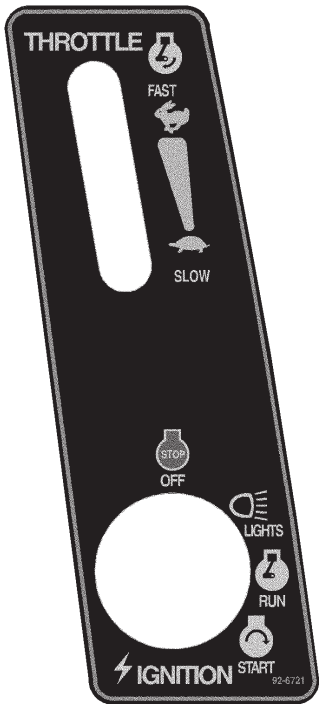
99-5340

1. KeyChoice—turn to enable reverse mowing.



92-6720

1. Pull the knob out to start the PTO.
2. Push the knob in to stop the PTO.



92-6721



92-7090

1. Push the lever in to ride on the machine.
2. Pull the lever out to push the machine.
3. Do not tow the machine



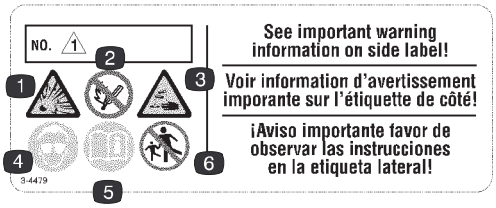
99-8036 (Model 417XT)

1. Mowing in reverse enabled.
2. Battery
3. Engine oil pressure
4. Power Take-off (PTO)



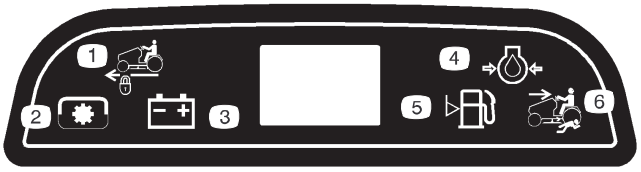
104-7634

1. Read the *Operator's Manual.*



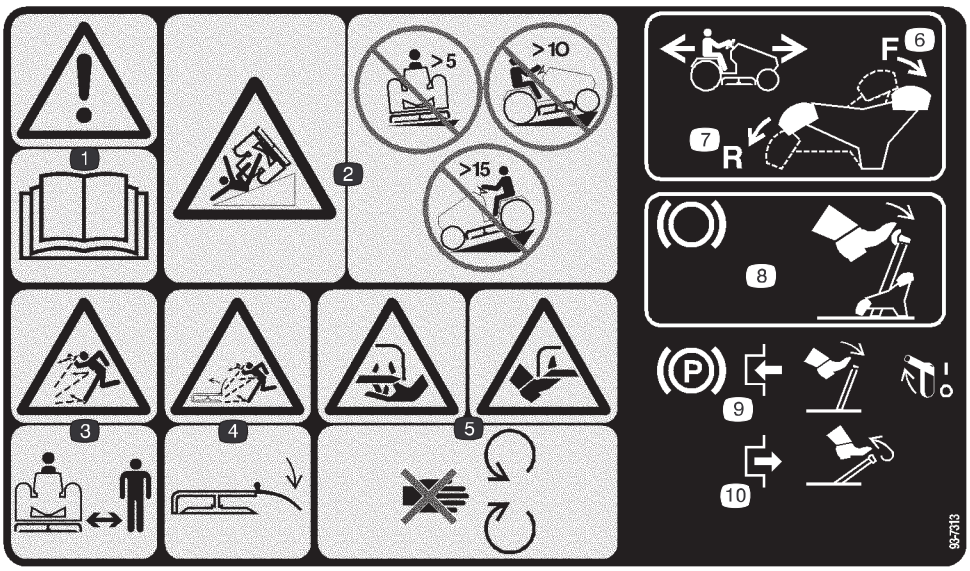
104-4163

1. Explosion hazard
2. No fire, open flames, or smoking.
3. Caustic liquid/chemical burn hazard
4. Wear eye protection
5. Read the *Operator's Manual.*
6. Keep bystanders a safe distance from the battery.



106-9871 (Model 419XT)

1. Cruise control, locked
2. Power Take-off (PTO)
3. Battery discharge indicator
4. Engine oil pressure
5. Fuel level
6. Mowing in reverse enabled.



93-7313

1. Warning—read the *Operator's Manual.*
2. Tipping hazard—do not drive across slopes greater than 5 degrees, up slopes greater than 10 degrees, or down slopes greater than 15 degrees.
3. Thrown objects hazard—keep bystanders a safe distance from the machine.
4. Thrown objects hazard, mower—keep the deflector in place.
5. Cutting/dismemberment hazard of hand or foot, mower blade—stay away from moving parts.
6. To drive the machine forward, press the ground speed selector forward.
7. To drive the machine in reverse, press the ground speed selector rearward.
8. To brake, press the brake pedal.
9. To engage the parking brake, press the beaked pedal and move the parking brake lever to the On position.
10. To disengage the parking brake, press and release the brake pedal.



104-5091

1. Contains lead; do not discard.
2. Recycle
3. Wear eye protection; explosive gases can cause blindness and other injuries
4. No sparks, flame, or smoking
5. Sulfuric acid can cause blindness or severe burns.
6. Flush eyes immediately with water and get medical help fast.
7. Maximum fill line
8. Minimum fill line
9. Instructions for activating the battery

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 inch (6 to 13 mm) below the bottom of the filler neck. This empty space in the tank allows gasoline to expand.**
- **Never smoke when handling gasoline, and stay away from an open flame or where gasoline fumes may be ignited by a spark.**
- **Store gasoline in an approved container and keep it out of the reach of children. Never buy more than a 30-day supply of gasoline.**
- **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 26.

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
Steering Wheel	1	Install the steering wheel
Lock Washer, 1/2 inch	1	
Nut, 1/2 inch	1	
Logo Cover	1	
Seat	1	Install the seat
Spacer, small inside diameter	2	
Spacer, large inside diameter	2	
Shoulder Bolt	2	
Knob	2	
Flat Washer, 11/32 inch	2	
Bolt, 1/4 x 3/4 inch	2	Activating and installing the battery
Hex Nut, 1/4 inch	2	
Key	1	Use in ignition switch.
Operator's Manual	1	Read before operating tractor
Riding Mower Safety Video	1	View before operating tractor
Cotterpin	2	Install the front tires
Shim washers	4	
Washers, thick	2	
Washers,	2	
Cap	2	
Lug nuts	10	Installing the rear tires

Installing the Steering Wheel

1. Position the front wheels straight ahead.
2. Remove the logo cover by releasing the 3 latches from the back side with a screwdriver.
3. Line up the center spoke toward the seat and position the steering wheel onto the shaft spline (Fig. 2).
4. Secure the steering wheel with a lockwasher (1/2 inch) and nut (1/2 inch) (Fig. 2).
5. Torque the steering wheel nut to 50 ft-lb (37 N·m).
6. Snap the logo cover into place (Fig. 2).

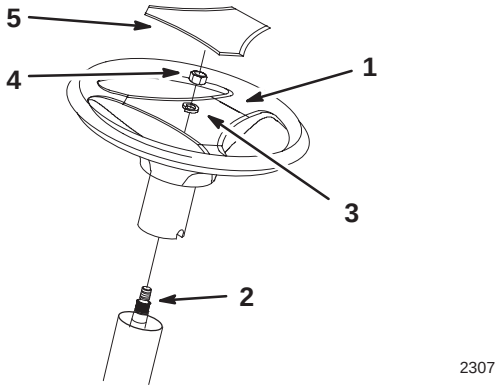


Figure 2

1. Center spoke
2. Shaft spline
3. Lock washer, 1/2 inch
4. Nut, 1/2 inch
5. Logo cover

Installing the Seat

1. Install the large inside diameter spacer and the 2 shoulder bolts into the rear holes of the seat (Fig. 3).
2. Position the seat onto the seat base by inserting the 2 shoulder bolts through the key hole openings at the end of both slots (Fig. 3).
3. Locate the small inside diameter spacer between the seat and the seat base, thread the 2 knobs and 2 flat washers (11/32 inch) into the front holes in the seat (Fig. 3). Adjust the seat and tighten the knobs.
4. Route the seat switch wire and connector through the center opening in the seat base. Push the seat switch connector fully into the wire harness connector (Fig. 3).
5. Secure the seat switch wire cable to the fender opening (Fig. 3).

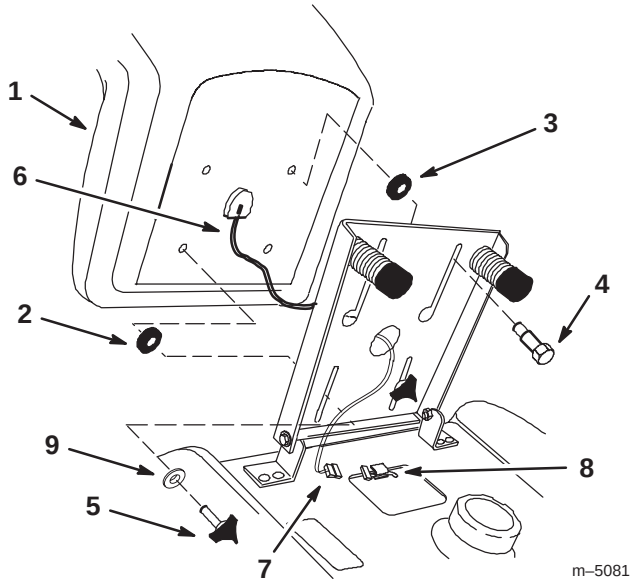


Figure 3

1. Seat
2. Spacer-small ID
3. Spacer-large ID
4. Shoulder bolt
5. Knob
6. Wire and connector
7. Wire harness connector
8. Wire clip
9. Flat washer, 11/32 inch

Installing the Front Tires

1. Remove the tires from the crate (Fig. 4).
2. Install a thin washer (3/4 inch) onto the axle (Fig. 4).
3. Slide wheel onto axle with valve stem in (Fig. 4).
4. Wheel end play should be 0 to 0.015 inch (0 to 0.4 mm). Install the shim washers (as required) and thick flat washer (3/4 inch) for spacing on the axle.
5. Insert cotter pin through the axle and bend the ends of the pin open (Fig. 4).
6. Push the cap onto the end of the axle so it snaps over washer (Fig. 4).
7. Repeat steps 2–6 on opposite side.
8. Grease the wheel bearings.

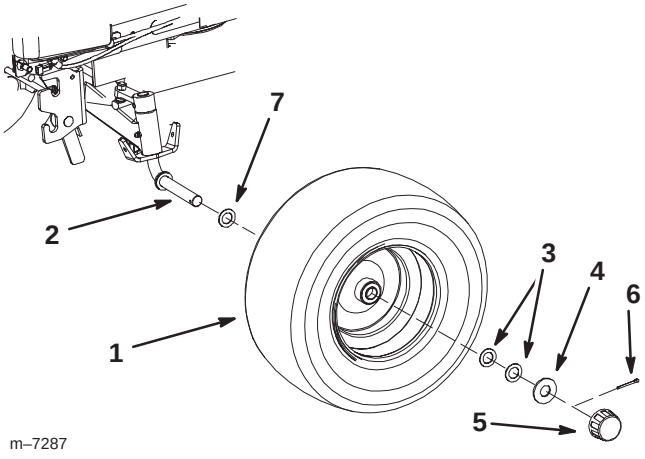


Figure 4

1. Front wheel
2. Axle
3. Shim washer
4. Thick washer, 3/4 inch
5. Cap
6. Cotterpin
7. Thin Washer, 3/4 inch

Installing the Rear Wheels

1. Install the rear wheel onto the wheel hub with the valve stem to the inside (Fig. 5).
2. Torque the wheel bolts to 75-80 ft-lb (105-112 N·m).

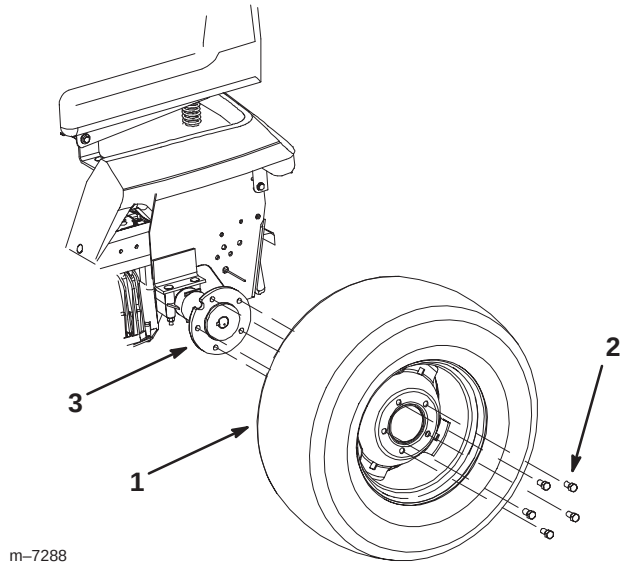


Figure 5

1. Rear wheel
2. Wheel bolts
3. Wheel hub

Checking the Tire Pressure

Refer to Checking the Tire Pressure on page 30. Check the front and rear tire pressure. The recommended front and rear tire pressure is 20 psi (83 kPa).

Activating and Installing the Battery

Bulk electrolyte with 1.265 specific gravity must be purchased from a local battery supply outlet.

Danger

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

- **Do not drink electrolyte and avoid contact with skin, eyes or clothing. Wear safety glasses to shield your eyes and robber 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.**

1. Remove the battery from the tractor.
2. Clean the top of the battery with a paper towel.

Note: Never fill the battery with electrolyte while the battery installed in the tractor. Electrolyte could be spilled on other parts and cause corrosion.

3. Remove the vent caps from the battery (Fig. 6).
4. Slowly pour electrolyte into each battery cell until the level is up to the upper line on the battery case (Fig. 6).

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

5. Wait five to ten minutes after filling the battery cells. Add electrolyte, if necessary, until the electrolyte level is up to the upper line on the battery case (Fig. 6).
6. Install battery filler caps.

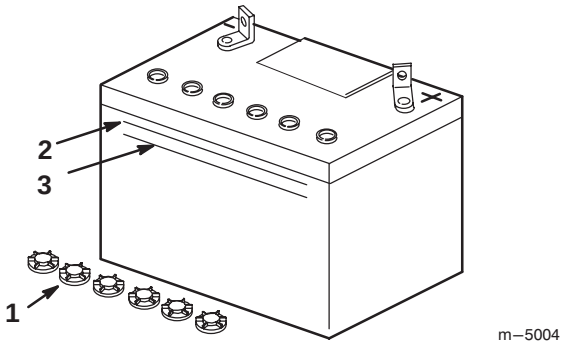


Figure 6

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

Warning

Charging the battery produces gasses that can explode.

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

Note: Make sure the vent caps are installed in battery.

7. Charge the battery for 1 hour at 10 amps or 2 hours at 5 amps.
8. When the battery is fully charged, unplug the charger from the electrical outlet, then disconnect the charger leads from the battery posts (Fig. 7).

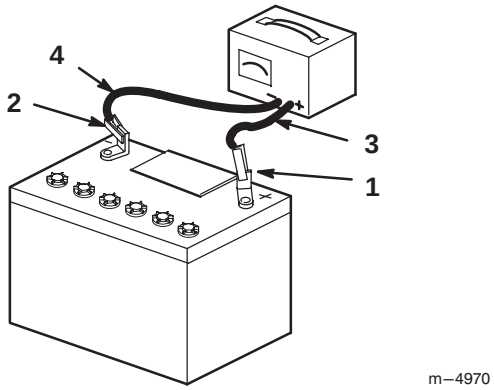


Figure 7

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

9. Install the battery in the tractor and connect the battery cables. Refer to the Installing the Battery on page 34.

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

Checking the Engine Oil

Important The tractor is shipped from the factory with oil in the engine crankcase

Check the oil level and add only enough oil to raise the level to the full mark on the dipstick. Refer to Checking the Engine Oil on page 26.

Checking the Tractor Lubrication

Check the tractor to ensure it is lubricated. Refer to Greasing and Lubrication on page 29.

Learn to Operate the Tractor

Learn how to operate the tractor. Read the Operation section starting on page 16.

Test Driving the Tractor

1. Fill the tank with unleaded regular gasoline; Gasoline and Oil, page 11. Open the fuel shutoff valve and check the fuel hose and fittings for leaks.
2. As applicable, check and test the operation of the following:
   - Engine, choke and throttle controls
   - Headlights
   - Indicator lights
   - PTO clutch and brake
   - Lift system
   - Parking brake
   - Steering
   - Tractor operation in forward and reverse

Checking the Safety System

Refer to Checking the Safety Interlock System on page 18.

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.**

Operation

Think Safety First

Please carefully read all the safety instructions. Knowing this information could help you, your family, pets or bystanders avoid injury.

Controls for Model 417XT

Become familiar with all the controls (Fig. 1) before you start the engine and operate the machine.

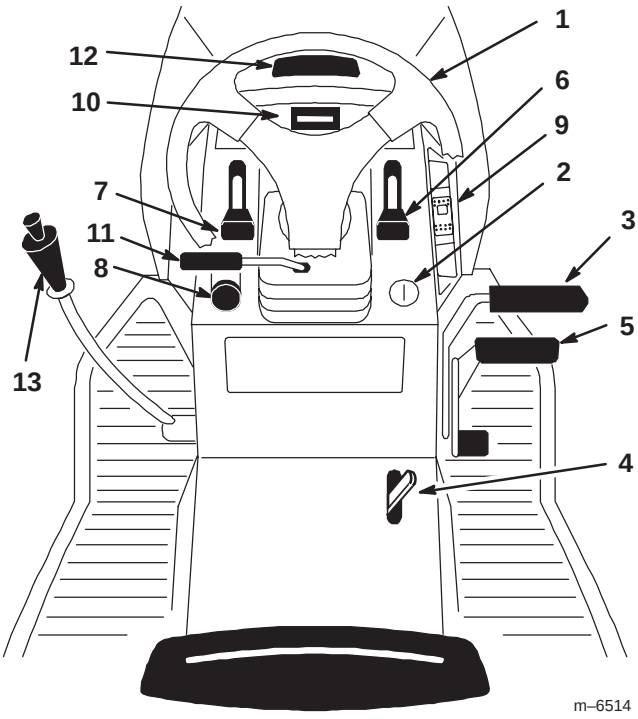


Figure 1

1. Steering wheel
2. Ignition switch
3. Brake pedal
4. Parking brake lever
5. Ground speed selector
6. Throttle lever
7. Choke lever
8. Power take off (PTO)
9. Cruise control switch
10. Indicator control module/Hourmeter
11. Tilt wheel lever
12. Hood opening
13. Attachment lift

Controls for Model 419XT

Become familiar with all the controls (Fig. 2) before you start the engine and operate the machine.

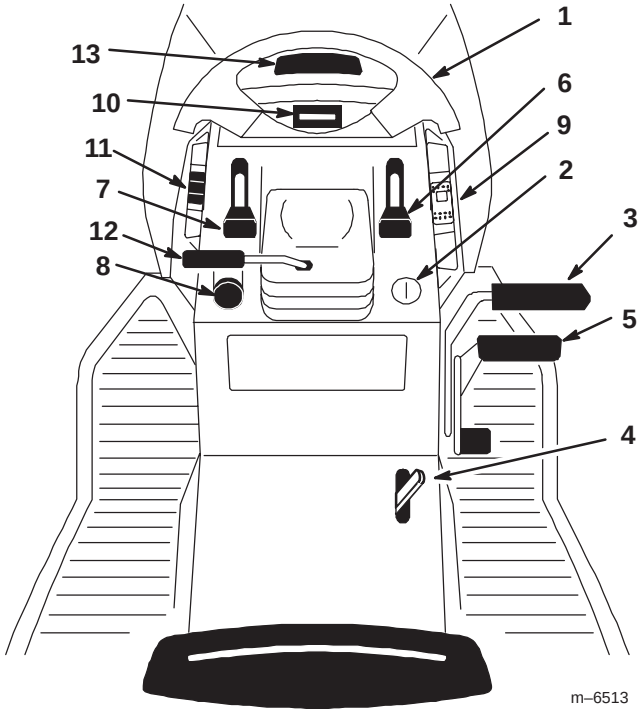


Figure 2

1. Steering wheel
2. Ignition switch
3. Brake pedal
4. Parking brake lever
5. Ground speed selector
6. Throttle lever
7. Choke lever
8. Power take off (PTO)
9. Cruise control switch
10. Indicator control module/Hourmeter
11. Attachment lift switch
12. Tilt wheel lever
13. Hood opening

Operating the Parking Brake

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

Setting the Parking Brake

1. Push the brake pedal (Fig. 3) down and hold it in the depressed position.
2. Push the parking brake lever (Fig. 3) forward and gradually take your foot off the brake pedal. The brake pedal should stay in the depressed (locked) position.

Releasing the Parking Brake

1. Push down on the brake pedal (Fig. 3). The parking brake lever should release.
2. Gradually release the brake pedal.

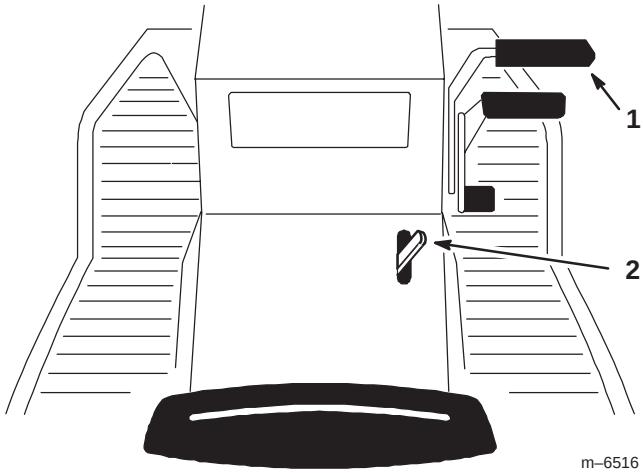


Figure 3

1. Brake pedal
2. Parking brake lever

Starting and Stopping the Engine

Starting the Engine

1. Sit down on the seat.
2. Set the parking brake; refer to Setting the Parking Brake, page 17.

Note: The engine will not start unless you set the parking brake or fully depress the brake pedal.

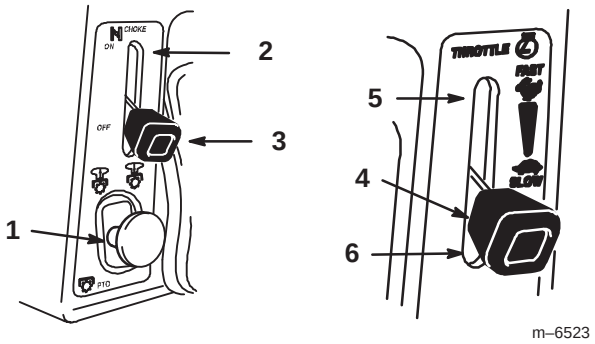
3. Push the PTO (power take off) to the off position (Fig. 4).
4. Move the choke lever to the on position (Fig. 4).

Note: An engine that has been running and is warm may not require step 4.

5. Move throttle lever to the fast position (Fig. 4).
6. Turn the ignition key and hold it in the start position (Fig. 5). When the engine starts, release the key.

Important If the engine does not start after 10 seconds of continuous cranking, turn the ignition key to off and let the starter motor cool for 60 seconds; refer to Troubleshooting, page 39.

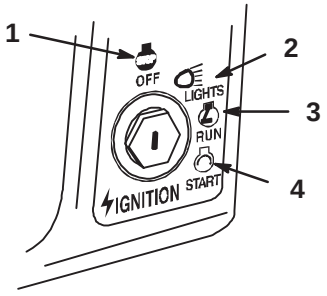
7. After the engine starts, move the choke lever to off (Fig. 4). If the engine stalls or hesitates, move the choke lever back to **on** for a few seconds. Then move the throttle lever to desired setting. Repeat this as required.



m–6523

Figure 4

1. PTO—Off
2. Choke–On
3. Choke–Off
4. Throttle lever
5. Fast
6. Slow



1208

Figure 5

1. Off
2. Lights
3. Run
4. Start

Stopping the Engine

1. Push the PTO (power take off) to off (Fig. 4).

2. Move the throttle lever between half and full throttle (Fig. 4).

3. Turn the ignition key to off (Fig. 5).

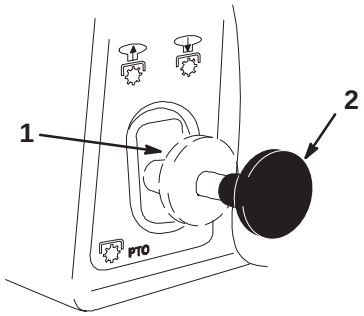
Operating the Power Take Off (PTO)

The power take off (PTO) engages and disengages power to the electric clutch.

While the ignition key is in **run** or **lights** position and the power take off (PTO) is engaged **on**, the PTO light, in the Indicator Module, will be **on**. When this light is **on** it is a reminder; the starter will not crank and to turn the off PTO before getting off.

Engaging the Power Take Off (PTO)

1. Pull the power take off (PTO) to **on** (Fig. 6).



m–6524

Figure 6

1. Off—disengaged
2. On—engaged

Disengaging the Power Take Off (PTO)

1. Push the power take off (PTO) to off (Fig. 6).

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 engine from starting unless:

- You are sitting on the seat.
- The brake pedal is depressed.
- The power take off (PTO) is off.
- The hydro control pedal is in the neutral position.

The safety interlock system is designed to stop the engine if:

- You rise from the seat when the brake pedal is released
- You rise from the seat when the power take off (PTO) is on.

The safety interlock system is designed to stop the power take off (PTO) if:

- You shift into reverse with the power take off (PTO) engaged.

Testing the Safety Interlock System

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

1. Set the parking brake. Move the power take off (PTO) to the On position. Now turn the ignition key to start while sitting on the seat; **the engine should not crank.**
2. Push the power take off (PTO) to the off position and release the parking brake. Now turn the ignition key to the Start position while sitting on the seat; **the engine should not crank.**
3. Set the parking brake and move the power take off (PTO) to the Off position. Rise from the seat and turn the ignition key to the Start position; **the engine should not crank.**
4. Set the parking brake and move the power take off (PTO) to the Off position. While sitting in the seat, start the engine. While the engine is running, release the parking brake and rise slightly from the seat; **the engine should stop.**
5. et the parking brake and move the power take off (PTO) to the Off position. While sitting in the seat, start the engine. While the engine is running, move the power take off (PTO) to the On position and rise slightly from the seat; **the engine should stop.**
6. With the parking brake released, turn the ignition key to the RUN run position without starting the engine. Pull the PTO switch to on. You should hear an audible click indicating the PTO is activated and the PTO light will illuminate. Move the foot pedal to reverse. You should hear an audible click indicating the PTO is deactivated and the PTO light should turn off.
7. With the parking brake released, turn the ignition switch to RUN without starting the engine. Pull the PTO switch to on. Turn the KeyChoice key and release. The Operating-in-Reverse warning light should illuminate. Move the foot pedal to reverse. The PTO and PTO light on the dash should remain on. Push the PTO switch to off. The PTO light and the Operating-in-Reverse warning light should turn off.

Setting the KeyChoice® Switch to Operate in Reverse

An interlock feature on the tractor prevents the power take off (PTO) from operating when backing up. If you shift into reverse with the PTO engaged (i.e., with mower blades or other attachment running), the PTO will disengage. **Do not mow in reverse unless absolutely necessary.**

If you need to use the PTO while backing up, you can turn off this interlock feature using the KeyChoice switch located near the seat bracket (Fig. 7).

Danger

You could back over a child or bystander while the mower blade(s) or other attachment is engaged and cause serious injury or death.

- **Do not mow in reverse unless absolutely necessary.**
- **Do not insert the KeyChoice key unless it is absolutely necessary.**
- **Always look backward and down before backing up.**
- **Use the KeyChoice switch only if you are certain no children or other bystanders will enter the mowing area.**
- **Be very observant after deactivating the interlock because the sound of the engine may prevent you from noticing that a child or bystander has entered the work area.**
- **Always remove both the ignition and KeyChoice keys and put them in a safe place out of the reach of children or unauthorized users when leaving the unit unattended.**

1. Engage the PTO.

2. Insert the KeyChoice key into the switch (Fig. 7).

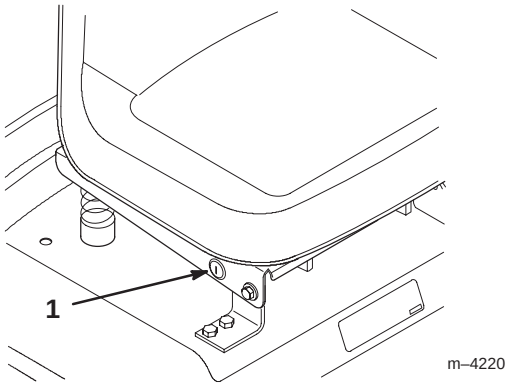


Figure 7

1. KeyChoice switch

3. Turn the KeyChoice key.

A red light on the front console (Fig. 8 and 9) turns on, indicating that the interlock is disabled.

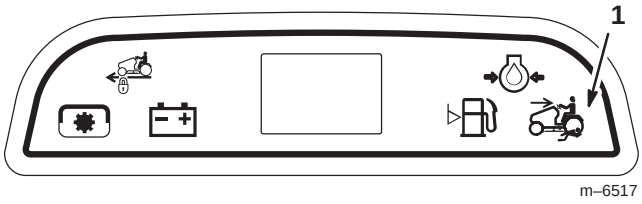


Figure 8

1. Operating-in-reverse light—Model 419XT

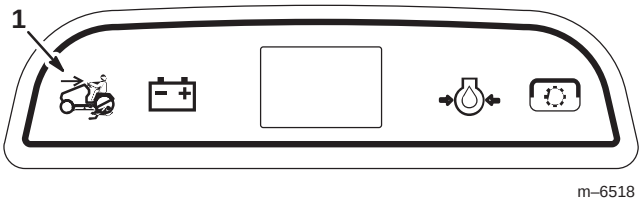


Figure 9

1. Operating-in-reverse light—Model 417XT

4. Shift into reverse and complete your task.

5. Stop the PTO, which will turn off the red light on the console, to activate the interlock.

6. Remove the KeyChoice key and put it in a safe place out of reach of children.

Indicator Control Module

The indicator control module (Fig. 10 and 11) contains lights for:

- Operating in reverse
- Power take off (PTO)
- Battery
- Oil pressure
- Hourmeter (LED)
- Cruise control (Model 419XT only)
- Fuel level (Model 419XT only)

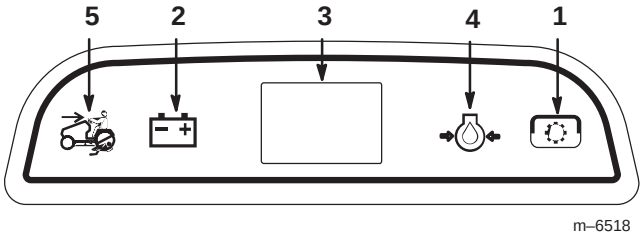


Figure 10 (Model 417XT)

1. Power take off (PTO)
2. Battery
3. Hourmeter
4. Oil pressure
5. Operating-in-Reverse

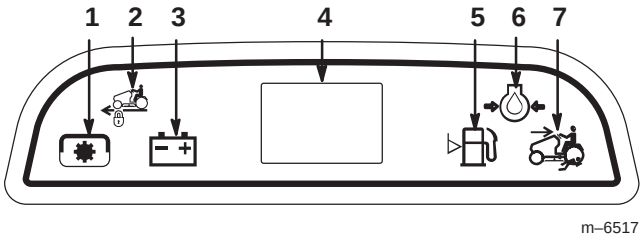


Figure 11 (Model 419XT)

1. Power take off (PTO)
2. Cruise control
3. Battery
4. Hourmeter
5. Fuel level
6. Oil Pressure
7. Operating-in-Reverse

Following are the conditions when indicator lights will be **on**. At other times the lights should be off.

Operating in Reverse

The Operating–in–Reverse light will illuminate whenever the KeyChoice switch is used to deactivate the operating-in-reverse interlock. It is a reminder that the interlock system is deactivated. The light goes out whenever the power take off (PTO) is disengaged or the engine is shut off.

PTO (Power Take Off)

The PTO (power take off) light will be **on** when the ignition key is in the **run** or **lights** positions and the PTO (power take off) is engaged **on**. When this light is **on** it is a reminder; the starter will not crank and turn off the PTO before getting off.

Hourmeter

The hourmeter records the number of hours the engine has operated (Fig. 11). It is turned on when the ignition switch is in the **run** or **lights** positions. Use the times for scheduling regular maintenance.

Battery

The battery light will be **on** when the ignition key is in the **run** or **lights** positions if the battery voltage is below 11.2 volts. When this light comes on it is important to have your battery and electrical system checked and the problem corrected.

Fuel Level

The fuel level light will be **on** when the ignition key is in the **run** or **lights** positions and the fuel level is low, approximately one pint remaining.

Oil

The oil light will be **on** when the ignition key is in the **run** or **lights** positions and the engine is not running, after the engine is started the light should go out. When the engine is running if the oil pressure drops below a safe operating level the light comes **on**. When the light comes on while the engine is running, **Stop engine immediately and correct the cause of low oil pressure.**

Driving Forward or Backward

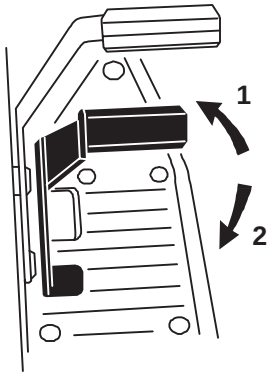
The throttle control regulates the engine speed as measured in rpm (revolutions per minute). Place the throttle control in the fast position for best performance.

To go forward or backward, release the parking brake: refer to Releasing the Parking Brake, page 17. Place your foot on the traction control pedal and slowly press on the top of the traction control pedal to move forward or on the bottom of the traction control pedal to move backward (Fig. 12). The farther you move the traction control pedal in either direction, the faster the machine will move in that direction.

Note: For reverse motion, with the PTO engaged, the operating-in-reverse interlock must be deactivated by the KeyChoice switch located on the seat bracket on the right hand side just below the seat.

To slow down, release the pressure on the traction control pedal.

Important To avoid transmission damage, always release the parking brake before moving the traction control pedal.



1210

Figure 12

1. Forward
2. Backward

Stopping the Machine

To stop the machine, release the traction control pedal, disengage the power take off (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 17. 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 KeyChoice keys and set the parking brake when leaving the machine unattended, even if just for a few minutes.

Using the Attachment Power Lift

The attachment power lift (Fig. 13) is used to raise and lower attachments.

Raising Attachments

1. Turn key to the **on** or **run** position (Fig. 13).

2. Push the lift switch in the **up** direction to raise the attachment lift (Fig. 13). This will lift and hold the attachment in the up, or raised position.

Lowering Attachments

1. Turn key to the **on** or **run** position (Fig. 13).
2. Push the lift switch in the down direction to lower the attachment lift (Fig. 13). This will lower the attachment lift.

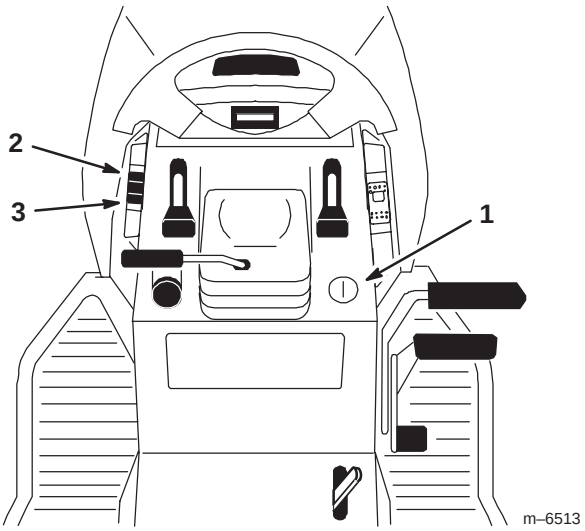


Figure 13

1. Key
2. Lift switch —up
3. Lift switch —down

Operating the Attachment Lift Lever

The attachment lift lever (Fig. 14) is used to raise and lower various attachments.

Raising an Attachment

1. Depress the clutch and brake pedals to stop the machine.
2. Pull attachment lift lever rearward until latch locks. In this position the lift will hold the attachment in the up, or raised position.

Lowering an Attachment

1. Depress the clutch and brake pedals to stop the machine.
2. Pull attachment lift lever rearward, to release lift pressure, and push the button on top to release the latch. Move lift lever forward to lower attachment.

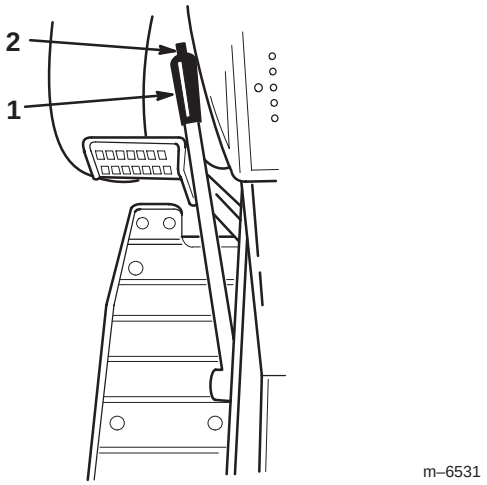


Figure 14

1. Lift lever
2. Button

Positioning the Seat

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

1. Raise the seat and loosen the adjustment knobs (Fig. 15).
2. Slide the seat to the desired position and tighten the knobs.

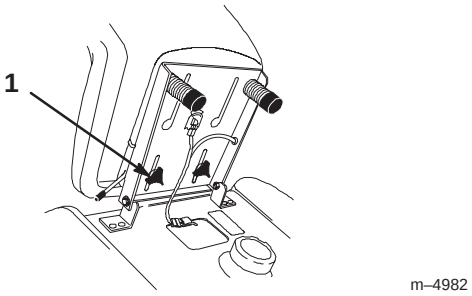


Figure 15

1. Adjustment knob

Headlights

The headlights are turned on with a separate position, lights, of the ignition switch (Fig. 16). The lights are on while the ignition switch is in the lights position even with the engine off. Remove the key when the machine is left unattended so lights can not be turned or discharging the battery.

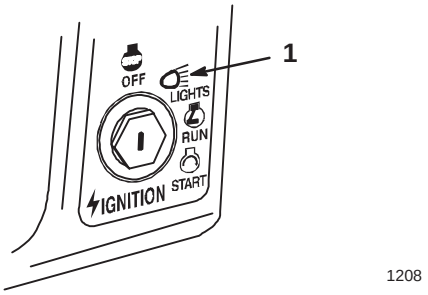


Figure 16

1. Lights

Positioning the Tilt Steering Wheel

The steering wheel has four tilt locations. Position the steering wheel where you have the best control of the machine and are most comfortable.

1. Lift the tilt lever to release the lock (Fig. 17).

2. Move the steering wheel to a comfortable position; then release the lever to lock.

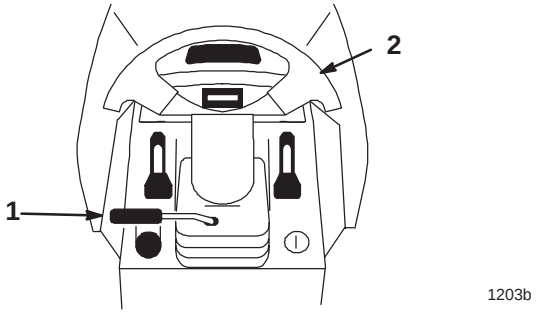


Figure 17

1. Tilt lever
2. Steering wheel

Using the Cruise Control

A three position switch, located on the dash (Fig.18), with the functions of: Lock–Set (spring loaded), On and Unlock–Off controls the engagement. Cruise control maintains the traction control position without foot pressure. Cruise control is intended for operation in the forward direction only. Do not use cruise control in reverse.

Engaging the Cruise Control

1. Begin driving tractor: Refer to Driving Forward or Backward, page 21. While holding your foot steady on the traction control, push the cruise control switch (Fig. 18) to the **lock–set** position.

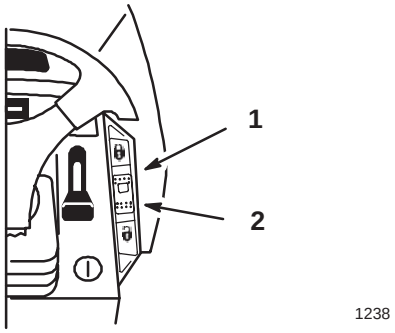


Figure 18

1. Lock–Set
2. Unlock–Off

2. This locks the traction control in position and your foot can then be removed from the traction control. A constant ground speed will be maintained.

Disengaging the Cruise Control

1. While holding your foot steady on the traction control, move the cruise control switch (Fig. 18) to the **unlock–off** position.

2. This unlocks the traction control and your foot then operates the traction control.

3. For quick stops, just press on the brake pedal. This automatically disengages the cruise control and applies the brake at the same time.

Pushing the Machine by Hand

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

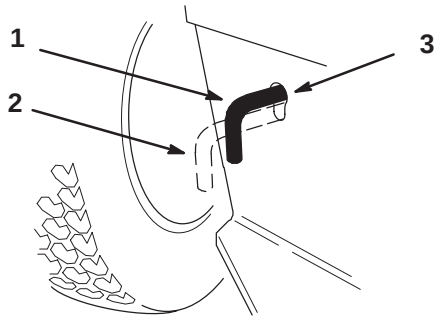
To Push the Machine

1. Disengage the power take off (PTO) and turn the ignition key to off.
2. Move the drive control rod to the **push** position. This disengages the drive system and allows the wheels to turn freely (Fig. 19).

To Operate the Machine

1. Move the drive control rod to the **operate** position (Fig. 19).

Note: The machine will not drive unless the drive control rod is in the **operate** position.



M–4566

Figure 19

1. Operate position
2. Push position
3. Drive control rod

Maintenance

Recommended Maintenance Schedule

Maintenance Service Interval	Maintenance Procedure
After First 8 Hours	• Change oil[1]
Each Use	• Check oil level • Check safety system • Check brake • Clean air intake screen • Check battery electrolyte
Every 25 Hours	• Clean foam air cleaner[1] • Check tire pressure
Every 50 Hours	• Grease chassis[1] • Check belts for wear/cracks • Clean paper air cleaner
Every 100 Hours	• Check spark plug(s) • Change oil[1] • Replace fuel filter • Clean outside of engine
Every 200 Hours	• Change oil filter[1] • Replace paper air cleaner
Before Storage	• Perform all maintenance procedures listed above before storage • Drain gasoline • Paint chipped surfaces • Charge battery and disconnect cables • Check front wheel toe-in
After Storage	• Check safety system • Check brake • Check spark plug(s) • Check battery electrolyte • Check tire pressure

[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 before you do any maintenance. Set the wire aside so that it does not accidentally contact the spark plug.

Servicing the Engine Oil

Change the oil after the first 8 operating hours and every 100 operating hours thereafter.

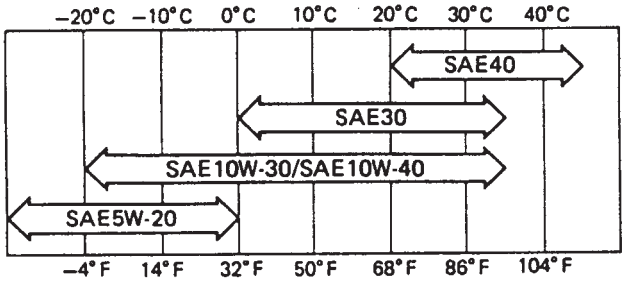
Oil Type: Detergent oil (API service SF, SG, SH or SJ)

Crankcase Capacity:

- when the oil filter is not removed, 51 oz. (1.5 l)
- when the oil filter is removed, 58 oz. (1.7 l)

Viscosity: See the table below.

USE THESE SAE VISCOSITY OILS



Checking the Oil Level

1. Park the machine on a level surface, disengage the PTO, stop the engine, and remove the key.
2. Clean around the oil dipstick (Fig. 20) so that dirt cannot fall into the filler hole and damage the engine.
3. Unscrew the oil dipstick and wipe the metal end clean (Fig. 20).
4. Slide the oil dipstick fully into the filler tube, but do not thread it onto the tube (Fig. 20). Pull the dipstick out and look at the metal end. If the oil level is low, slowly pour only enough oil into the filler tube to raise the level to the **full** mark on the dipstick.

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

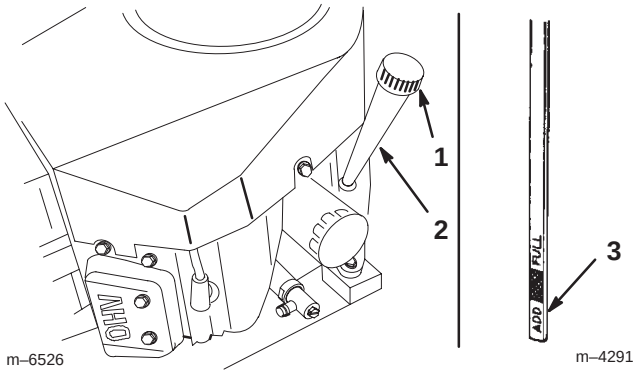


Figure 20

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

Changing and Draining the Oil

1. Start the engine and let it run for five minutes. This warms the oil so that it drains better.
2. Park the machine so that the drain side is slightly lower than the opposite side to ensure that the oil drains completely. Then disengage the PTO, set the parking brake, stop the engine, and remove the key.
3. Place a pan below the oil drain. Use either a flat screw driver, 3/8 inch (10 mm) wrench to open valve (Fig. 21).
4. Rotate valve end counterclockwise to open valve (Fig. 21).
5. When oil has drained completely, rotate valve end clockwise to close the valve (Fig. 21).

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

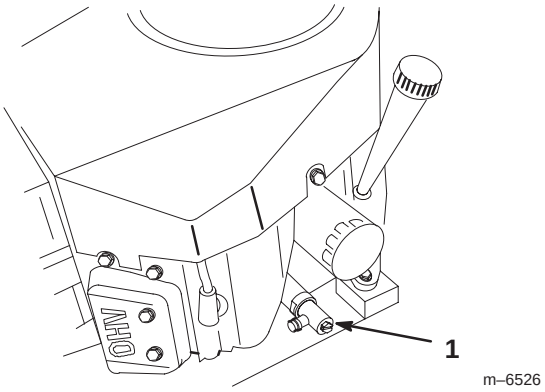


Figure 21

1. Oil drain

6. Clean around the oil dipstick and unscrew the cap (Fig. 20).

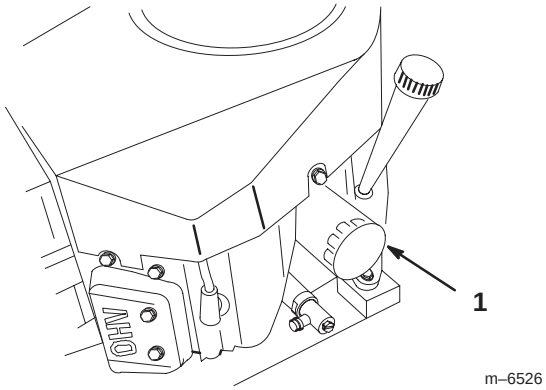
7. Slowly pour approximately 80% of the specified oil into the filler cap (Fig. 20). Refer to Servicing the Engine Oil, page 26.
8. Check the oil level; refer to Checking the Oil Level, page 26.
9. Slowly add additional oil to bring it to the full mark.

Changing the Oil Filter

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

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

1. Drain the oil from the engine; refer to Changing and Draining the Oil, page 26.
2. Remove the old filter (Fig. 22).
3. Apply a thin coat of new oil to the rubber gasket on the replacement filter.



m–6526

Figure 22

1. Oil filter

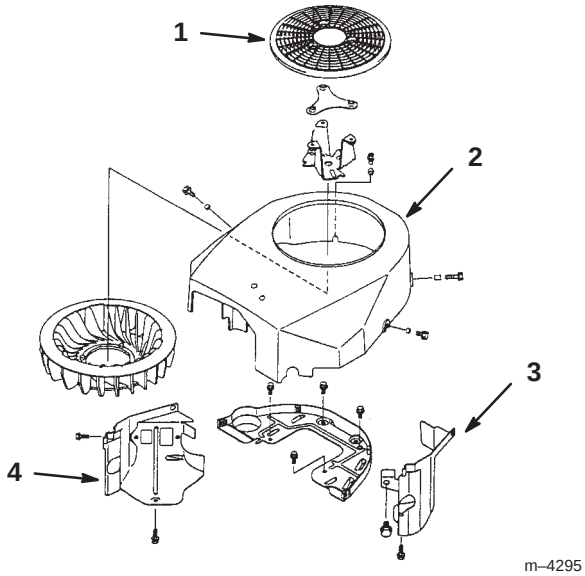
4. Install the replacement oil filter to the adapter. Turn the oil filter clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 3/4 turn (Fig. 22).
5. Fill the crankcase with the proper type of new oil; refer to Changing and Draining the Oil, page 26.

Cleaning the Cooling System

Clean the air intake screen from grass and debris before each use.

Clean the cooling fins and engine shrouds every 100 hours.

1. Disengage the PTO, set the parking brake, stop the engine, and remove the key.
2. Remove the air intake screen, cylinder covers, and fan housing.
3. Clean debris and grass from the parts.
4. Install the air intake screen, cylinder covers, and fan housing.



m–4295

Figure 23

1. Air intake screen
2. Fan housing
3. Cylinder cover
4. Cylinder cover

Servicing the Air Cleaner

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

Paper Element: Clean after every 50 operating hours. Replace after every 200 operating hours or yearly, whichever comes first.

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 PTO and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Clean around the air cleaner to prevent dirt from getting into the engine and causing damage. Unlatch the two side latches and remove the air cleaner cover (Fig. 24).
4. Carefully remove the foam element from the paper element (Fig. 24).
5. Unscrew the wing nut and remove the paper element (Fig. 24).

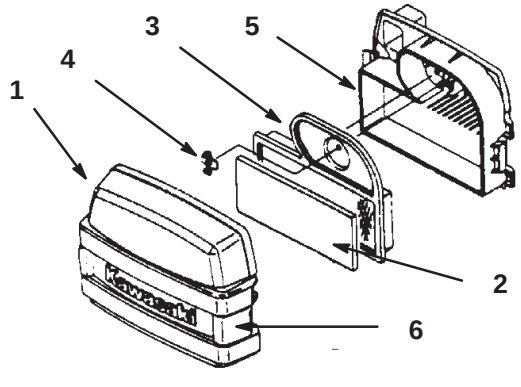


Figure 24

1. Cover
2. Foam element
3. Paper element
4. Wing nut
5. Air cleaner base
6. Latches

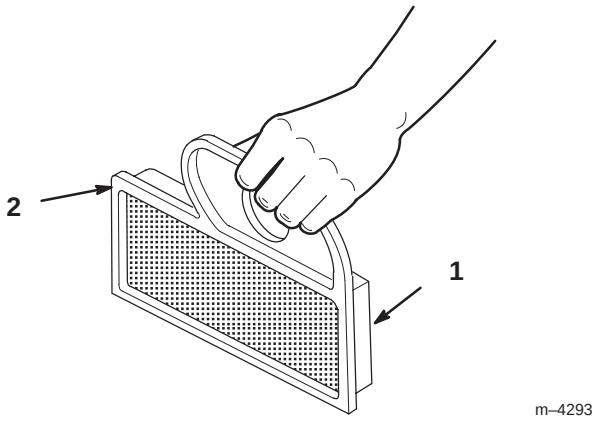


Figure 25

1. Paper element
2. Rubber seal

Cleaning the Foam Element

1. Wash the foam element in liquid soap and warm water (Fig. 24). When the element is clean, rinse it thoroughly.

2. Dry the element by squeezing it in a clean cloth (do not wring). Allow the element to air dry.

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

Cleaning the Paper Element

1. Lightly tap the element on a flat surface to remove dust and dirt (Fig. 25).

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 or cannot be cleaned thoroughly.

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 into the paper air cleaner element (Fig. 24).

2. Place the air cleaner assembly onto the air cleaner base and install the wing nut (Fig. 24).

3. Install the air cleaner cover and latch it (Fig. 24).

Servicing the Spark Plug

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 RCJ8Y (or equivalent)

Air Gap: 0.030 inch (0.75 mm)

Removing the Spark Plug(s)

1. Disengage the PTO and set the parking brake.

2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.

3. Pull the wire(s) off of the spark plug(s) (Fig. 26). Clean around the spark plug(s) to prevent dirt from falling into the engine and potentially causing damage.

4. Remove the spark plug(s) and metal washer.

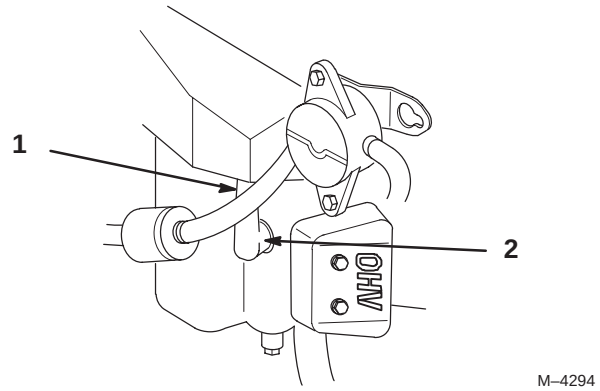


Figure 26

1. Spark plug wire installed
2. Spark plug

Checking the Spark Plug

1. Look at the center of the spark plug(s) (Fig. 27). 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. 27). Bend the side electrode (Fig. 27) if the gap is not correct.

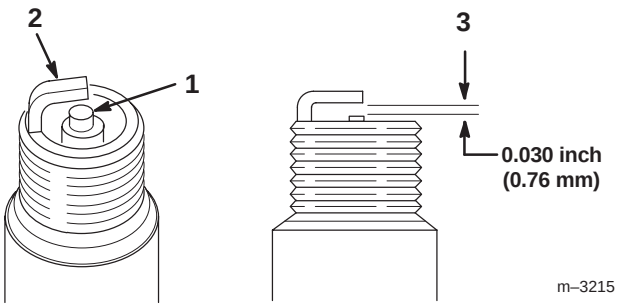


Figure 27

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 that the air gap is set correctly.

2. Tighten the spark plug(s) to 16 ft-lb (22 N·m).

3. Push the wire(s) onto the spark plug(s) (Fig. 26).

Greasing and Lubrication

Grease the machine after every 50 operating hours or yearly, whichever occurs first. 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 ignition 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 front wheels and spindles until grease begins to ooze out of the bearings (Fig. 28).

2. Lubricate the front axle pivot (Fig. 28).

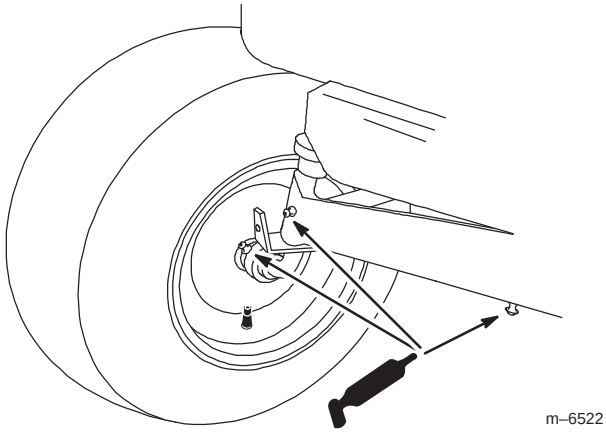


Figure 28

Checking the Tire Pressure

Maintain the air pressure in the front and rear tires as specified. Check the pressure at the valve stem after every 25 operating hours or monthly, whichever occurs first (Fig. 29). Check the tires when they are cold to get the most accurate pressure reading.

Pressure: 20 psi (138 kPa) front and rear tires

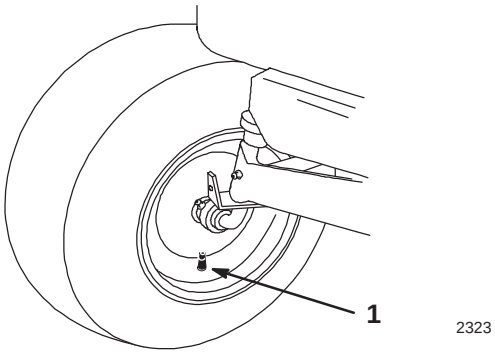


Figure 29

1. Valve stem

Servicing the 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 PTO, and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Rear wheels must lock and skid when you try to push the tractor forward. Adjustment is required if the wheels turn and do not lock; refer to Adjusting the Brake, page 30.
4. Release the brake and move the drive control rod to the push position; refer to Pushing the Machine by Hand, page 24. Wheels should rotate freely.
5. If both conditions are met no adjustment is required.

Adjusting the Brake

1. Check the brake before you adjust it; refer to Checking the Brake, page 30.
2. Release the parking brake; refer to Releasing the Parking Brake, page 17.
3. To adjust the brake remove the cotter pin and loosen the brake adjusting nut slightly (Fig. 30).
4. Carefully insert a 0.015 inch (0.38 mm) feeler gauge between the outer brake pad and rotor disk (Fig. 30).
5. Tighten the brake adjusting nut until slight resistance is felt on the feeler gauge when sliding it in and out. Install the cotter pin.
6. Check the brake operation again; refer to Checking the Brake, page 30.

Important With the parking brake released, the rear wheels must rotate freely when you push the mower. If the 0.015 inch (0.38 mm) clearance and free wheel rotation cannot be achieved contact your service dealer immediately.

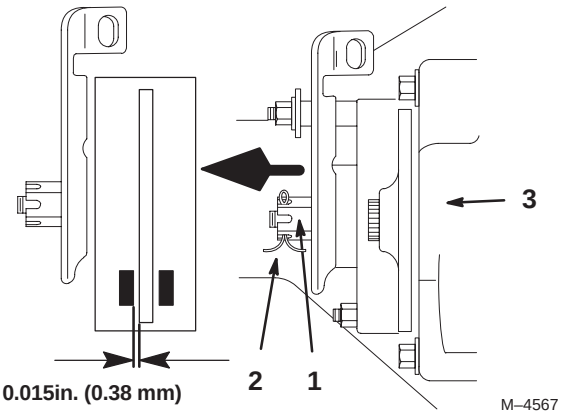


Figure 30

1. Brake adjusting nut
2. Cotter pin
3. Right Front of Transaxle

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 ensure the fuel tank drains completely. Disengage the PTO and set the parking brake.

2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.

3. Close the fuel shut–off valve at the fuel tank (Fig. 31).

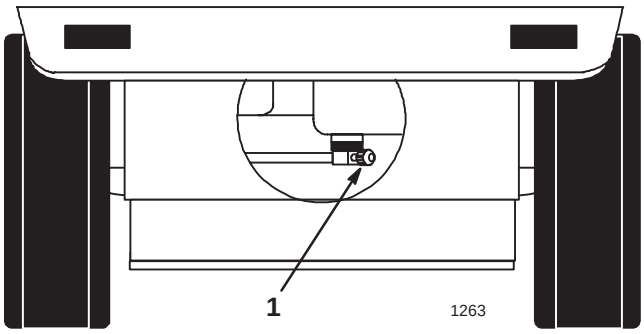


Figure 31

1. Fuel shut-off valve

4. Open the hood.

5. Squeeze the ends of the hose clamp together and slide it up the fuel line toward the fuel tank (Fig. 32).

6. Pull the fuel line off the filter (Fig. 32). Open fuel shut-off valve and allow gasoline to drain into an approved gas can.

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

7. Install the fuel line onto the filter. Slide the hose clamp close to the filter to secure the fuel line and filter; Refer to Replacing the Fuel Filter, page 31.

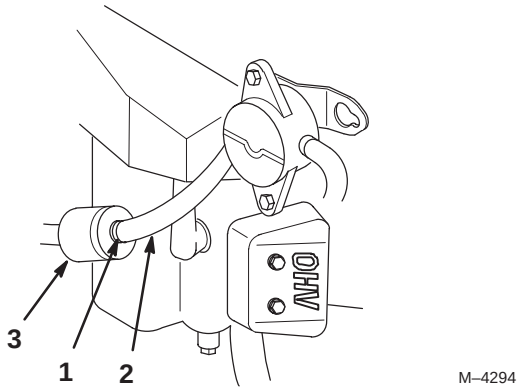


Figure 32

1. Hose clamp
2. Fuel line
3. Filter

Servicing the Fuel Filter

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 PTO and set the parking brake.

2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.

3. Close the fuel shut–off valve at the fuel tank (Fig. 31).

4. Open the hood.

5. Squeeze the ends of the hose clamps together and slide them away from the filter (Fig. 32).

6. Remove the filter from the fuel lines.

7. Install a new filter and move the hose clamps close to the filter (Fig. 32).

8. Open the fuel shut-off valve at the fuel tank (Fig. 31).

9. Close the hood.

Servicing the Front Wheel Toe-In

Maintain toe-in of the front wheels as specified. If uneven tire wear, lawn scuffing or hard steering develop adjustment may be required. Check the toe-in every year before storage (Fig. 33).

Specification: 1/8–1/4 (3mm–6mm) inch toe-in on front wheels.

Measuring the Toe-in

1. Disengage the PTO and set the parking brake.

2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.

3. Push the front tires out, at the front, to remove normal looseness in the linkage.

4. Measure, between the rims, at the spindle level, in the front and rear of the wheels (Fig. 33).

5. The front measurement should be less than the rear, as specified.

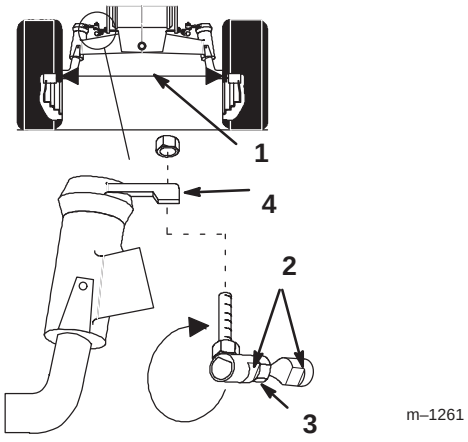


Figure 33

1. Measure here
2. Flats
3. Jam nut
4. Steering lever

Adjusting the Toe-In

1. Check the toe-in before you adjust it; refer to Measuring Toe-In, page 31.
2. Remove ball joint from one steering lever (Fig. 33).
3. Loosen jam nut securing ball joint to steering rod. Rotate ball joint one turn, clockwise to increase or counter clockwise to decrease toe-in.
4. Hold flats on ball joint to align with flats on tie rod and tighten jam nut (Fig. 33).
5. Install ball joint to steering lever and check the toe-in; refer to Measuring Toe-In, page 32.

Important If more than one turn is required to meet specifications, alternate between left and right steering rods to maintain steering wheel alignment.

Transaxle Fluid

Service Interval/Specification

The transaxle is a sealed system and no checking or changing of the fluid is required.

Important If any transaxle problems arise, contact your local Authorized Service Dealer for help and service.

Servicing the Fuses

Service Interval/Specification

The electrical system is protected by fuses. It requires no maintenance, however, if a fuse blows check component/circuit for malfunction or short. To replace fuses pull up on the fuse (Fig. 34) to remove or replace it.

Fuse: Main/Starter—F1–30 amp, blade-type
Alternator F2—25 amp, blade-type
Dash/Hour meter F3—10 amp, blade-type
Head lights F4—10 amp, blade-type
Power attachment lift F5—25 amp, blade-type (Model 419XT only)

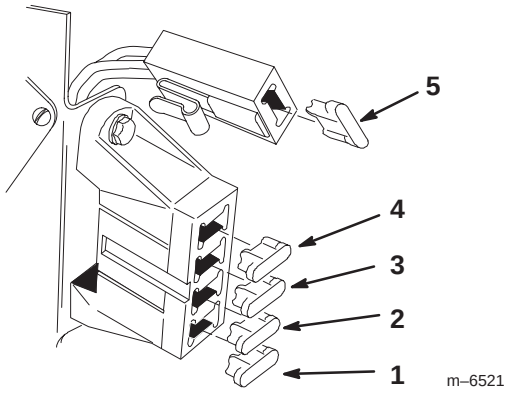


Figure 34

1. Main—30 amp
2. Alternator—25 amp
3. Dash/Hour meter—10 amp
4. Head lights—10 amp
5. Power attachment lift—25 amp (Model 419XT only)

Servicing the Headlights

Specification: Bulb #1156 Automotive Type

Removing the Bulb

1. Disengage the PTO and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Open the hood. Pull wire connectors off both bulb holder terminals.
4. Rotate the bulb holder 1/4 turn counterclockwise and remove it from the reflector (Fig. 35).

5. Push and rotate the bulb counterclockwise until it stops (approx. 1/4 turn) and remove bulb from the bulb holder (Fig. 36).

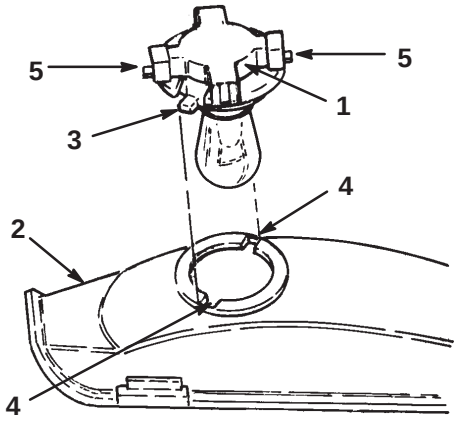


Figure 35

1. Bulb holder
2. Reflector
3. Tabs
4. Slots
5. Terminals

Installing the Bulb

1. The bulb has metal pins on the side of its base. Align the pins with the slots in the bulb holder and insert the base into the holder (Fig. 36). Push and rotate the bulb clockwise until it stops.

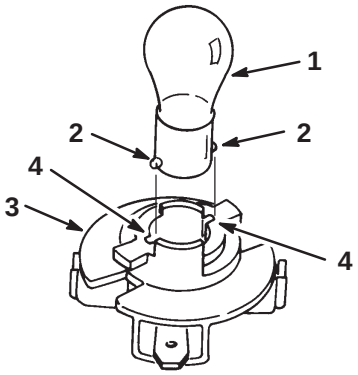


Figure 36

1. Bulb
2. Metal pins
3. Bulb holder
4. Slots

2. The bulb holder has two tabs (Fig. 35). Align the tabs with the slots in the reflector, insert the bulb holder into the reflector and rotate it 1/4 turn clockwise until it stops.
3. Push the wire connectors onto the terminals on the bulb holder.

Servicing the Battery

Service Interval/Specification

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, 340 Cold Cranking Amps

Removing the Battery

Warning

Battery terminals or metal tools could short against metal tractor components causing sparks. Sparks can cause the battery gasses to explode, resulting in personal injury.

- **When removing or installing the battery, do not allow the battery terminals to touch any metal parts of the tractor.**
- **Do not allow metal tools to short between the battery terminals and metal parts of the tractor.**

Warning

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

- **Always *disconnect* the negative (black) battery cable before disconnecting the positive (red) cable.**
- **Always *reconnect* the positive (red) battery cable before reconnecting the negative (black) cable.**

1. Disengage the PTO and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Open the hood and locate the battery.
4. Remove the right side panel for clearance when removing battery (Fig. 38). Remove the screws and lift up the panel to clear the pin and slide panel tabs out from the steering tower.
5. Disconnect the negative (black) ground cable from the battery post (Fig. 37).

6. Lift the red cover up from the positive cable. Disconnect the positive cable (red cover) from the battery post (Fig. 37).

7. Remove the battery hold down strap (Fig. 37). Remove battery from the tractor.

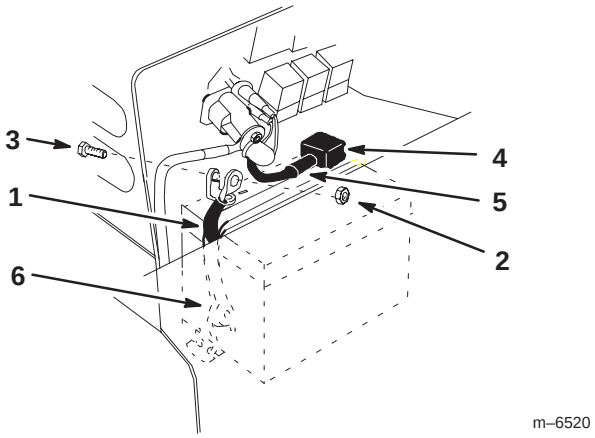


Figure 37

1. Negative cable
2. Nut
3. Bolt
4. Rubber cover (red)
5. Positive cable
6. Battery hold down strap

Installing the Battery

1. Install the battery into the tractor (Fig. 38).

2. Secure battery with hold down strap (Fig. 37).

3. Using the bolt and nut, connect the positive (red cover) cable to the positive (+) battery post (Fig. 37). Slide the rubber cover over the battery post.

4. Using the bolt and nut, connect the negative (black) cable to the negative (–) battery post (Fig. 37).

5. Install the right side panel by sliding tabs into steering tower and inserting pin into flange of footrest. Secure with screws (Fig. 38).

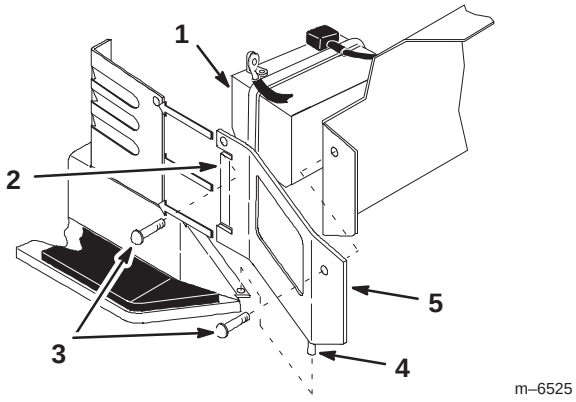


Figure 38

1. Battery
2. Side panel tabs
3. Screw
4. Pin
5. Right side panel

Checking the Electrolyte Level

1. With the engine off, open the hood to locate the battery.

2. Look at the side of the battery. The electrolyte must be up to the **upper** line (Fig. 39). Do not allow the electrolyte to get below the **lower** line (Fig. 39).

3. If the electrolyte is low, add the required amount of distilled water; refer to Adding Water to the Battery, page 35.

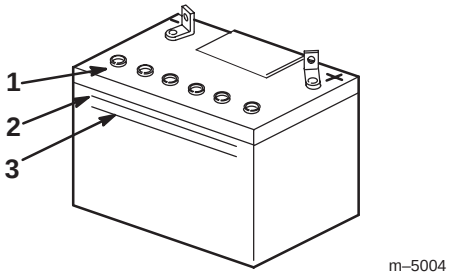


Figure 39

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

Danger

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

- **Do not drink electrolyte and avoid contact with skin, eyes or clothing. Wear safety glasses to shield your eyes and robber 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.**

Adding Water to the Battery

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

1. Remove the battery from the tractor.
2. Clean the top of the battery with a paper towel.

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

3. Remove the vent caps from the battery (Fig. 39).
4. Slowly pour distilled water into each battery cell until the level is up to the **upper** line (Fig. 39) on the battery case.

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

5. Wait five to ten minutes after filling the battery cells. Add distilled water, if necessary, until the electrolyte level is up to the **upper** line (Fig. 39) on the battery case.
6. Reinstall battery vent caps.

Charging the Battery

Warning

Charging the battery produces gasses that can explode.

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

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

1. Remove the battery from the chassis; refer to Removing the Battery, page 33.
2. Check the electrolyte level; refer to Checking Electrolyte Level, page 34.
3. Make sure the filler caps are installed in battery. Charge battery for a minimum of 6 to 10 amps for one hour. If the battery is in the fully discharged condition, then the charging requirement is 3 amps for 6 hours.

Important Never over charge the battery. Excessive charging will shorten the battery life.

4. When the battery is fully charged, unplug the charger from the electrical outlet, then disconnect the charger leads from the battery posts (Fig. 40).

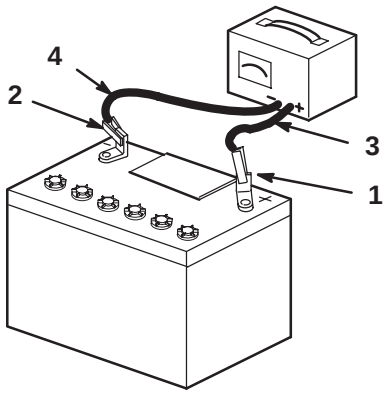


Figure 40

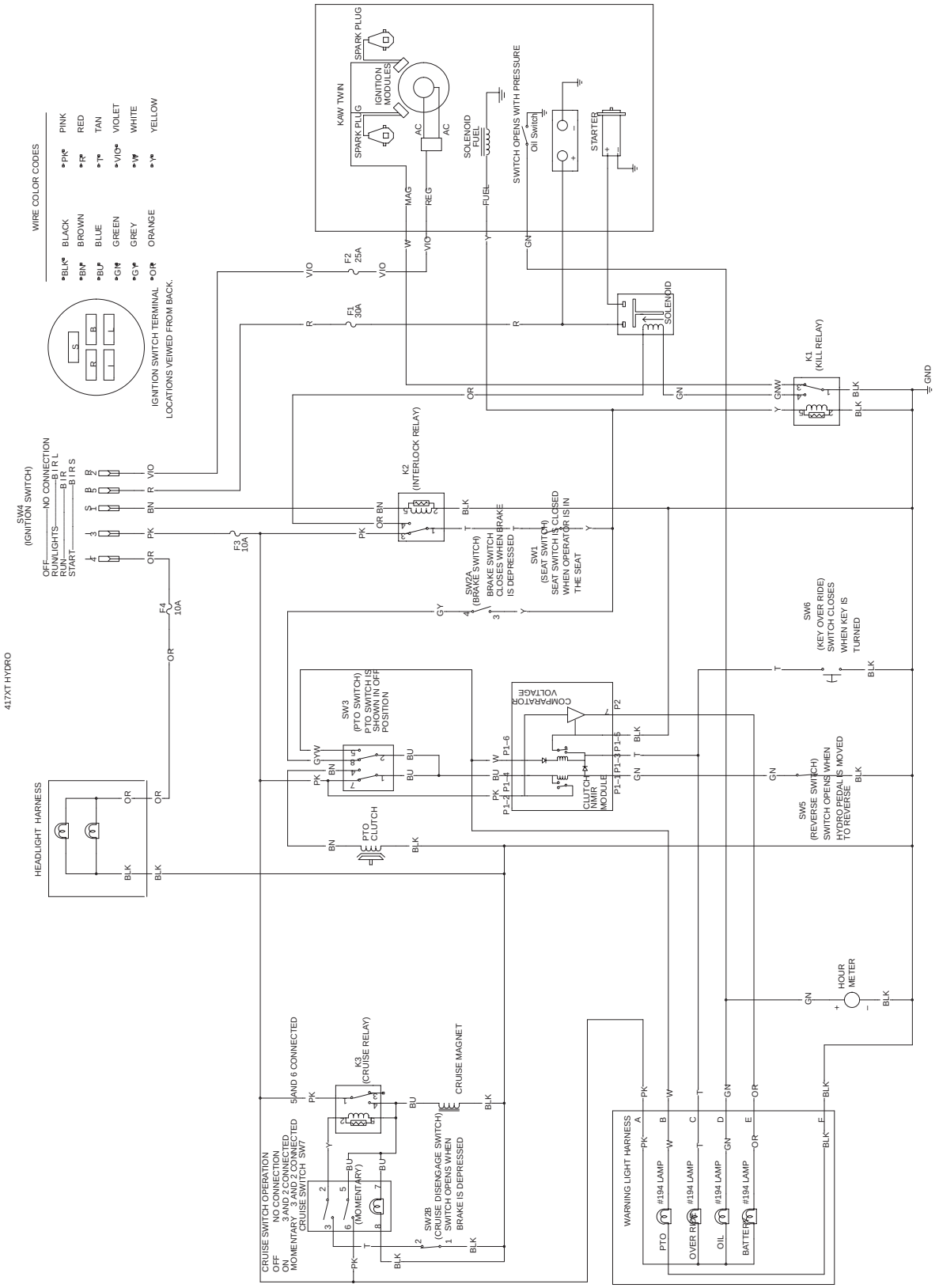
1. Positive Battery Post
2. Negative Battery Post
3. Red (+) Charger Lead
4. Black (–) Charger Lead

5. Install the battery in the tractor and connect the battery cables; refer to Installing the Battery, page 34.

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

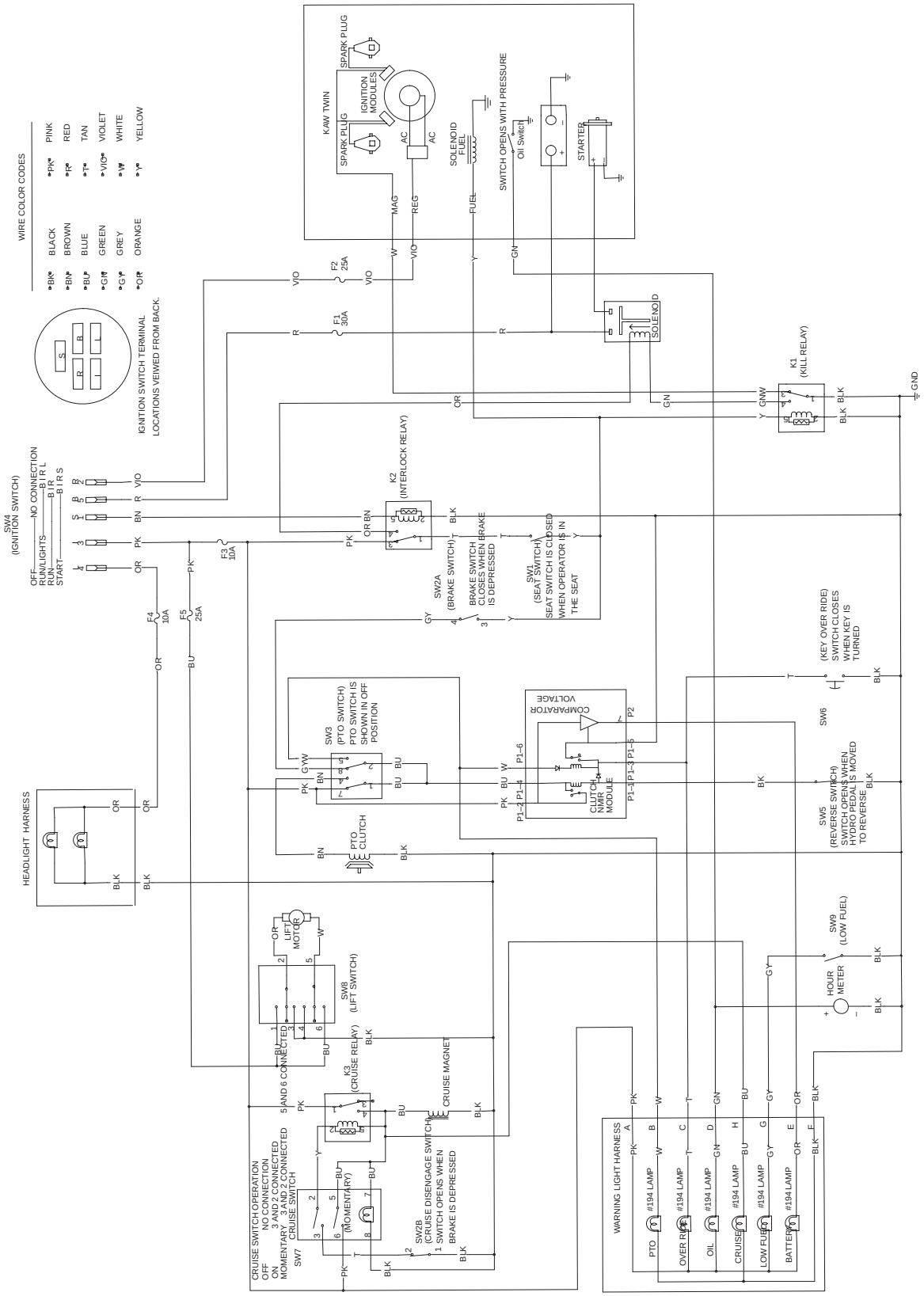
Wiring Schematic

(Model 417XT)



Wiring Schematic

(Model 419XT)



Cleaning and Storage

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to off. Remove the ignition and KeyChoice keys.
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, lights, engine, and the battery.

3. Check the brake; refer to Servicing the Brake, page 30.
4. Service the air cleaner; refer to Servicing the Air Cleaner, page 27.
5. Grease the chassis; refer to Greasing and Lubrication, page 29.
6. Change the crankcase oil and filter; refer to Servicing the Engine Oil, page 26.
7. Check the tire pressure; refer to Checking the Tire Pressure, page 30.
8. Prepare the machine for storage when non–use occurs over 30 days. Prepare machine for storage as follows.

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

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

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

   C. Stop engine, allow to cool and drain the fuel tank; refer to Servicing the Fuel Tank, page 30.

   D. Restart engine and run it until it stops.

   E. Choke or prime the engine. Start and run engine until it will not start. Operate primer, if equipped on machine, several times to ensure fuel remains in primer system.

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

Important 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 28. With the spark plug(s) removed from the engine, pour two tablespoons of engine oil into the spark plug hole. Now use the electric starter to crank the engine and distribute the oil inside the cylinder. Install the spark plug(s) and tighten it to 30 ft-lb (40 Nm). Do not install the wire on the spark plug(s).
10. Disconnect the negative battery cable. Clean the battery and battery terminals. Check the electrolyte level and charge it fully; refer to Servicing the Battery on page 33. Leave the negative battery cable disconnected from the battery during storage.

Important The battery must be fully charged to prevent it from freezing and being damaged at temperatures below 32°F (0°C). A fully charged battery can be stored one winter season without recharging.

11. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged.
12. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
13. Store the machine in a clean, dry garage or storage area. Remove the keys from the ignition and KeyChoice switches 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 crank	1. Blade control (PTO) is ENGAGED. 2. Parking brake is not on. 3. Operator is not seated. 4. Battery is dead. 5. Electrical connections are corroded or loose. 6. Fuse is blown. 7. Relay or switch is defective.	1. Move blade control (PTO) to DISENGAGED. 2. Set parking brake. 3. Sit on the seat. 4. Charge the battery. 5. Check electrical connections for good contact. 6. Replace fuse. 7. Contact Authorized Service Dealer.
Engine will not start, starts hard, or fails to keep running.	1. Fuel tank is empty. 2. Choke is not ON. 3. Air cleaner is dirty. 4. Spark plug wire is loose or disconnected. 5. Spark plug is pitted, fouled, or gap is incorrect. 6. Dirt in fuel filter. 7. Dirt, water, or stale fuel is in fuel system.	1. Fill fuel tank with gasoline. 2. Move choke lever to ON. 3. Clean or replace air cleaner element. 4. Install wire on spark plug. 5. Install new, correctly gapped spark plug. 6. Replace fuel filter. 7. Contact Authorized Service Dealer.
Engine loses power.	1. Engine load is excessive. 2. Air cleaner is dirty. 3. Oil level in crankcase is low. 4. Cooling fins and air passages under engine blower housing are plugged. 5. Spark plug is pitted, fouled, or gap is incorrect. 6. Vent hole in fuel cap is plugged. 7. Dirt in fuel filter. 8. Dirt, water, or stale fuel is in fuel system.	1. Reduce ground speed. 2. Clean air cleaner element. 3. Add oil to crankcase. 4. Remove obstruction from cooling fins and air passages. 5. Install new, correctly gapped spark plug. 6. Clean or replace the fuel cap. 7. Replace fuel filter. 8. Contact Authorized Service Dealer.
Engine overheats.	1. Engine load is excessive. 2. Oil level in crankcase is low. 3. Cooling fins and air passages under engine blower housing are plugged.	1. Reduce ground speed. 2. Add oil to crankcase. 3. Remove obstruction from cooling fins and air passages.

Problem	Possible Causes	Corrective Action
Abnormal vibration.	1. Engine mounting bolts are loose. 2. Loose engine pulley, idler pulley, or blade pulley. 3. Engine pulley is damaged.	1. Tighten engine mounting bolts. 2. Tighten the appropriate pulley. 3. Contact Authorized Service Dealer.
Machine does not drive.	1. Drive control is in the push position. 2. Traction belt is worn, loose or broken. 3. Traction belt is off pulley.	1. Move drive control to the operate position. 2. Contact Authorized Service Dealer. 3. Contact Authorized Service Dealer.