Form No. 3323-506

TORO®

Wheel Horse® 523Dxi Tractor

Model No. 73552—200000001 & Up

Operator's Manual

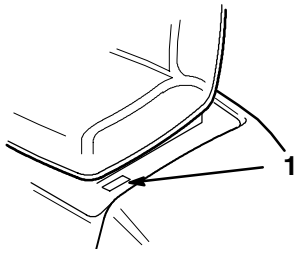
Domestic English (EN)

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.

⚠ WARNING: ⚠

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

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.

Contents

The enclosed Engine Owner's Manual is supplied for information regarding The U.S. Environmental Protection Agency (EPA) and the California Emission Control Regulation of emission systems, maintenance and warranty.

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

Safety

This machine meets or exceeds the B71.1-1998 specifications of the American National Standards Institute, 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 ANSI standard B71.1—1998.

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

General Operation

- Read, understand, and follow all instructions in the operator's manual and on the machine before starting.
- Allow only responsible adults who are familiar with the instructions to operate the machine.
- Clear the area of objects such as rocks, toys, wire, etc., which could be picked up and thrown by the blade.
- Be sure the area is clear of other people before mowing. Stop the machine if anyone enters the area.
- Never carry passengers.
- Do not mow in reverse unless absolutely necessary. Always look down and behind before and while backing.
- Be aware of the mower discharge direction and do not point it at anyone. Do not operate the mower without either the entire grass catcher or the guard in place.
- Slow down before turning.
- Never leave a running machine unattended. Always turn off blades, set parking brake, stop engine, and remove keys before dismounting.
- Turn off blades when not mowing.
- Stop the engine before removing the grass catcher or unclogging the chute.
- Mow only in daylight or good artificial light.
- Do not operate the machine while under the influence of alcohol or drugs.
- Watch for traffic when operating near or crossing roadways.
- Use extra care when loading or unloading the machine into a trailer or truck.
- Always wear safety goggles or safety glasses with side shields when operating mower.
- Data indicates that operators, age 60 years and above, are involved in a large percentage of riding mower-related injuries. These operators should evaluate their ability to operate the riding mower safely enough to protect themselves and others from serious injury.

Slope Operation

Slopes are a major factor related to loss-of-control and tip-over accidents, which can result in severe injury or death. All slopes require extra caution. If you cannot back up the slope or if you feel uneasy on it, do not mow it.

- Mow up and down slopes, not across.
- Remove obstacles such as rocks, tree limbs, etc.
- Watch for holes, ruts or bumps. Uneven terrain could overturn the machine. Tall grass can hide obstacles.
- Use slow speed. Choose a low gear so that you will not have to stop or shift while on the slope.
- Follow Toro's recommendations for wheel weight or counterweights to improve stability.
- Use extra care with grass catchers or other attachments. These can change the stability of the machine.
- Keep all movement on slopes slow and gradual. Do not make sudden changes in speed or direction.
- Avoid starting or stopping on a slope. If tires lose traction, disengage the blades and proceed slowly straight down the slope.
- Do not turn on slopes unless necessary, and then, turn slowly and gradually downhill, if possible.
- Do not mow near drop-offs, ditches, or embankments. The machine could suddenly turn over if a wheel goes over the edge of a cliff or ditch, or if an edge caves in.
- Do not mow on wet grass. Reduced traction could cause sliding.
- Do not try to stabilize the machine by putting your foot on the ground.
- Do not use a grass catcher on steep slopes.

Children

Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the machine and the mowing activity. Never assume that children will remain where you last saw them.

- Keep children out of the mowing area and under the watchful care of another responsible adult.
- Be alert and turn the machine off if children enter the area.
- Before and while backing, look behind and down for small children.
- Never carry children, even with the blades off. They may fall off and be seriously injured or interfere with safe machine operation.
- Never allow children to operate the machine.
- Use extra care when approaching blind corners, shrubs, trees, the end of a fence or other objects that may obscure vision.

Service

- Use extra care when handling gasoline and other fuels. They are flammable and vapors are explosive.
  A. Use only an approved container.
  B. Never remove the gas cap or add fuel when the engine is running. Allow the engine to cool before refueling. Do not smoke.
  C. Never refuel the machine indoors.
  D. Never store the machine or fuel container inside where there is an open flame, such as near a water heater or furnace.
- Never run a machine inside a closed area.
- Keep nuts and bolts tight, especially the blade attachment bolts. Keep equipment in good condition.
- Never tamper with safety devices. Check their proper operation regularly.
- Keep the machine free of grass, leaves, or other debris build-up. Clean up oil or fuel spillage. Allow the machine to cool before storing.
- Stop and inspect the equipment if you strike an object. Repair, if necessary, before restarting.

- Grass catcher components are subject to wear, damage and deterioration, which could expose moving parts or allow objects to be thrown. Frequently check components and replace with manufacturer's recommended parts, when necessary.
- Mower blades are sharp and can cut. Wrap the blade(s) or wear gloves, and use extra caution when servicing them.
- Use only genuine Toro replacement parts to ensure that original standards are maintained.

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 ANSI standard.

⚠ WARNING

POTENTIAL HAZARD

- **Engine exhaust contains carbon monoxide, which is an odorless, deadly poison.**

WHAT CAN HAPPEN

- **Carbon monoxide can kill you and is also known to the State of California to cause birth defects.**

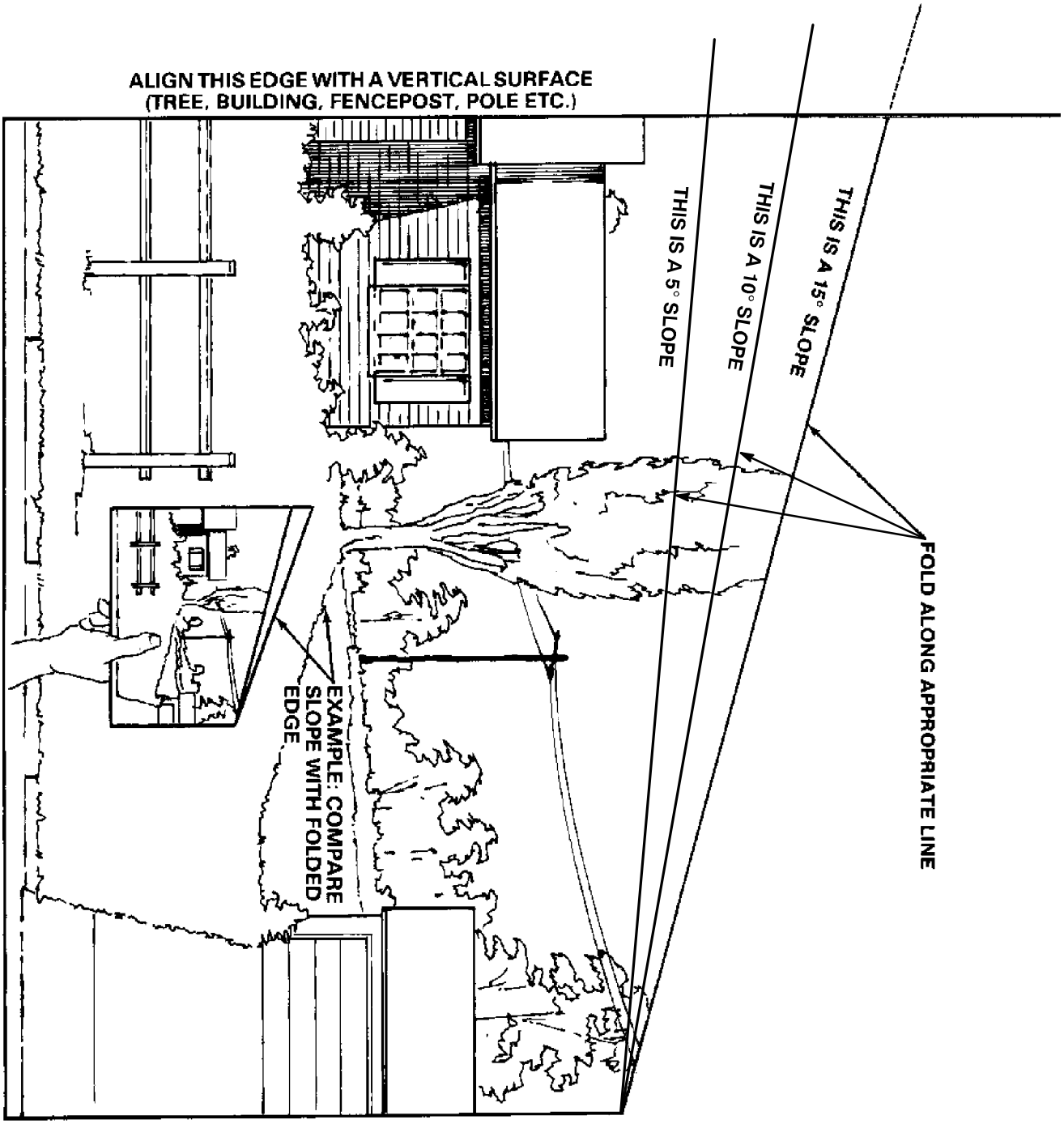
HOW TO AVOID THE HAZARD

- **Do not run engine indoors or in an enclosed area.**

- Stop the engine, disconnect spark plug wire(s) and remove key before performing any service, repairs, maintenance or adjustments.
- Slow down before turning. Sharp turns on any terrain may cause loss of control.
- Never leave a running machine unattended. Always turn off blades, set parking brake, stop engine, and remove the ignition and "Key Choice" keys before dismounting.
- Keep hands, feet, hair and loose clothing away from attachment discharge area, underside of mower and any moving parts while engine is running.
- Do not touch equipment or attachment parts which may be hot from operation. Allow to cool before attempting to maintain, adjust or service.
- Remove obstacles such as rocks, tree limbs, etc. from the mowing area. Watch for holes, ruts or bumps, as uneven terrain could overturn the machine. Tall grass can hide obstacles.
- Battery acid is poisonous and can cause burns. Avoid contact with skin, eyes and clothing. Protect your face, eyes and clothing when working with a battery.
- Battery gases can explode. Keep cigarettes, sparks and flames away from battery.
- Use only genuine replacement parts to ensure that original standards are maintained.
- Mow up and down slopes greater than 5°, not across.
- Mow downhill only on slopes above 10°, never mow uphill. If a steep slope must be ascended, back up the hill, and drive forward down the hill, keeping the machine in gear.
- Do not operate machine on hillsides or slopes exceeding 15°.
- Avoid turning on slopes. If you must turn, turn slowly and gradually downhill, if possible.
- Do not use a grass catcher on steep slopes. Heavy grass bags could cause loss of control or overturn the machine.
- Use only Toro-approved attachments. Warranty may be voided if used with unapproved attachments.

Slope Chart

Read all safety instructions in this manual and on the traction unit.

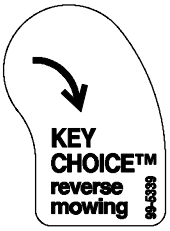


Safety and Instruction Decals

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.

On the drive shaft cover (Part No. 99-6090)

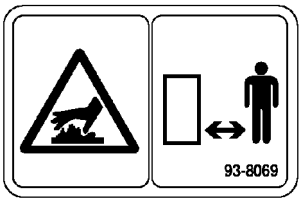
On the front of the seat bracket (Part No. 99-5339)



On the radiator fan shroud (Part No.95-4143)

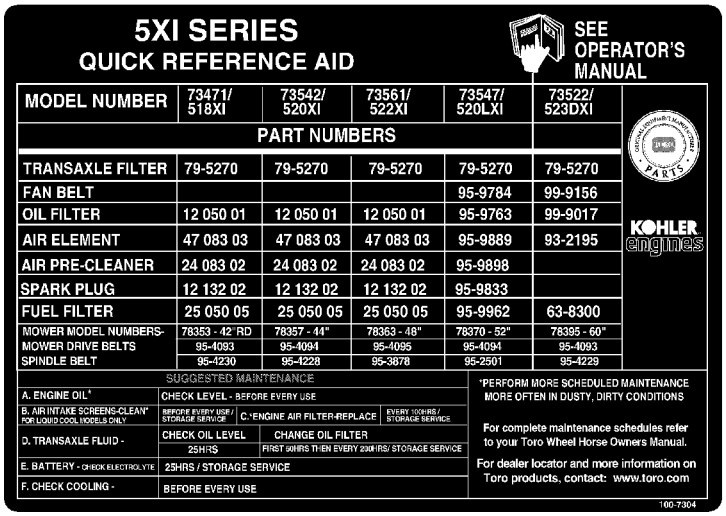
On the front of the seat bracket (Part No. 99-2985)

On the rear fender (Part No. 98-3088)



(2) Inside the front grill (Part No. 93-8069)

On the drive shaft tunnel (Part No. 80-8760)



Under the hood (Part No. 100-7304)

(2) Under the side shield (Part No. 98-5014)

Check Before Operating

Each time before operating your tractor, check the following:

- Fuel level
- Water drained from the fuel filter
- Engine oil level
- Cooling system fluid level and radiator screen
- Debris on the (3) air intake screens
- Debris in the engine area
- Debris on the rear transaxle cover
- The safety interlock system
- The brake

Some of these steps will require that you open the hood or remove the side panels on the tractor.

Opening the Hood

To open the hood:

1. Park the machine on a level surface, disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to “STOP” to stop the engine. Remove the ignition key.
2. Push the hood latch (Fig. 1), located just above the indicator light panel, to the left.
3. Raise the hood to full height.

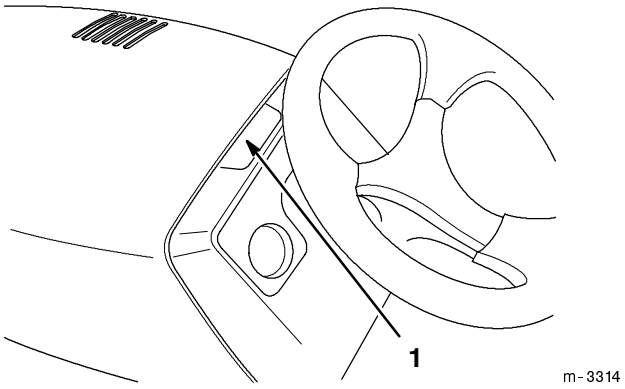


Figure 1

1. Hood latch

⚠ CAUTION

POTENTIAL HAZARD
- **Components under the hood will be hot if the tractor has been running.**

WHAT CAN HAPPEN
- **Touching hot components can cause burns.**

HOW TO AVOID THE HAZARD
- **Allow the tractor to cool before performing maintenance or touching components under the hood.**

Closing the Hood

The hood catch is located at the left hand corner of the grill.

1. Press rearward on the hood catch as you begin to lower the hood.
2. Push the hood down until the latch closes.

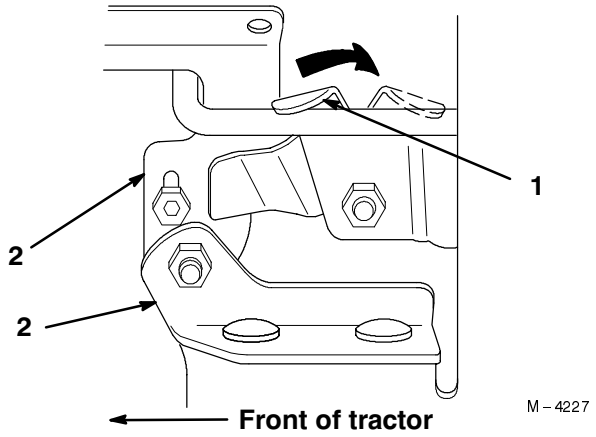


Figure 2

1. Hood catch
2. Hood hinges

Removing the Side Panels

1. Park the machine on a level surface, disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to "STOP" to stop the engine. Remove the ignition key.
2. Raise the hood.
3. To remove a side panel:

   A. Lift up and twist each of the two side panel latches 90˚, or until they line up with the open slot (Fig. 3).

   B. Pull the top of the side panel toward you until the side panel latches pass through the open slot.

   C. Lift the side panel from the tractor.

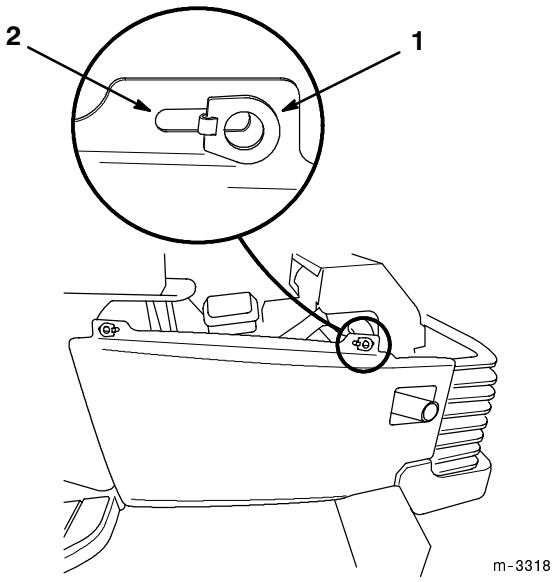


Figure 3

1. Side panel latch
2. Open slot

⚠ DANGER

POTENTIAL HAZARD
- **Rotating fan and drive shaft can cause injury.**

WHAT CAN HAPPEN
- **Fingers, hands or loose clothing can get caught by rotating fan and drive shaft.**

HOW TO AVOID THE HAZARD
- **Do not operate the tractor without the side panels and hood in place.**
- **Keep fingers, hands and clothing clear of rotating fan and drive shaft.**
- **Shut off the engine and remove the key before performing maintenance.**

Adding Fuel

The engine runs on clean, fresh diesel fuel with a minimum cetane rating of 40. Purchase fuel in quantities that can be used within 30 days to ensure fuel freshness.

Use summer grade diesel fuel (No. 2-D) at temperatures above 20° F (-7° C) and winter grade diesel fuel (No. 1-D or No. 1-D/2-D blend) below 20° F (-7° C). Use of winter grade diesel fuel at lower temperatures provides lower flash point and pour point characteristics, therefore easing starting and lessening chances of chemical separation of the fuel due to lower temperatures (wax appearance, which may plug filters).

Use of summer grade diesel fuel above 20° F (-7° C) will contribute toward longer life of the pump components.

IMPORTANT: Do not use kerosene or gasoline instead of diesel fuel. Failure to observe this caution will damage the engine.

⚠ DANGER

POTENTIAL HAZARD

- **Under certain conditions, fuel is extremely flammable and highly explosive.**

WHAT CAN HAPPEN

- **A fire or explosion from fuel 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 fuel that spills.**
- **Do not fill the fuel tank completely full. Add fuel 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 fuel to expand.**
- **Never smoke when handling fuel, and stay away from an open flame or where fuel fumes may be ignited by a spark.**
- **Store fuel in an approved container and keep it out of the reach of children. Never buy more than a 30-day supply.**

1. Park the machine on a level surface, disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to "STOP" to stop the engine. Remove the ignition key.

2. Clean around the fuel tank cap and remove the cap. Use a funnel and add fuel until the fuel 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 for expansion of the fuel. When filling the tank, make sure that the machine is on a level surface so that adequate air space is allowed. Do not fill the fuel tank completely.

3. Install the fuel cap securely. Wipe up any fuel that may have spilled.

4. If possible, fill the fuel tank after each use. This will minimize possible buildup of condensation inside the fuel tank.

Draining Water from the Fuel Filter/Water Separator

Any water accumulation should be drained from the fuel filter/water separator before each use.

1. Park the machine on a level surface, disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to “STOP” to stop the engine. Remove the ignition key.
2. Open the hood.
3. Remove the left-hand side panel.
4. Open the drain valve on the fuel filter/water separator and drain any accumulated water (Fig. 4).

   Note: Because the accumulated water will be mixed with diesel fuel, drain the fuel filter into a suitable container and dispose of properly.

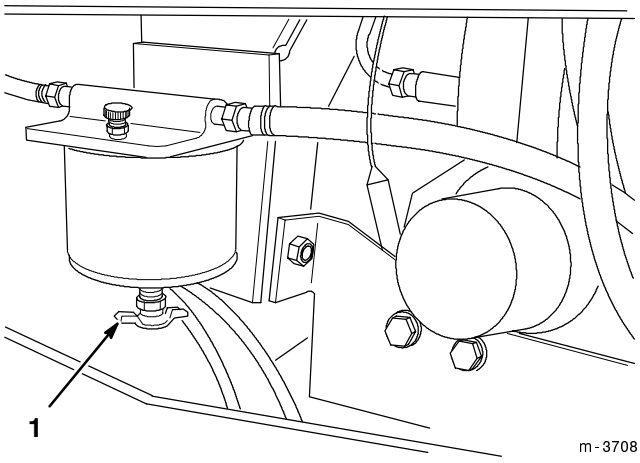


Figure 4

1. Fuel filter drain valve

Check the Engine Oil Level

1. Park the machine on a level surface, disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to “STOP” to stop the engine. Remove the ignition key.
2. Open the hood.
3. Clean around the oil dipstick (Fig. 5) so dirt cannot fall into the dipstick hole and damage the engine.
4. Pull out the oil dipstick and wipe the metal end clean (Fig. 6).
5. Slide the oil dipstick fully into the tube. Pull the dipstick out and look at the metal end. If the oil level is near or below the lower hole on the dipstick, remove the filler cap and add oil only to the upper hole on the dipstick. (Refer to Engine Oil, page 26, for the correct oil type and viscosity to use in different temperature conditions).
6. After filling with or changing the oil, close the hood, start the engine, and run it at idle for 30 seconds. Shut off the engine. Wait 30 seconds and check the oil level. Add oil, if required, to bring the level to the upper hole on the dipstick.

   IMPORTANT: Do not overfill the crankcase with oil because this may result in engine damage.

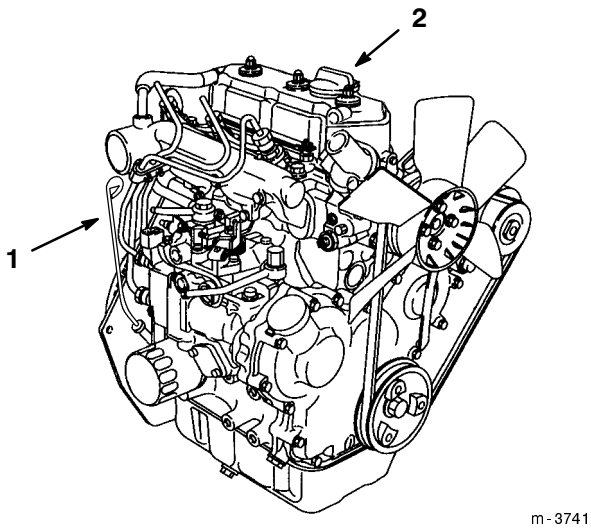


Figure 5

1. Dipstick
2. Filler Cap

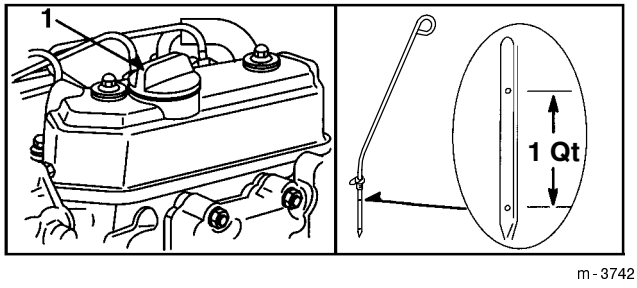


Figure 6

1. Filler Cap

Check the Cooling System

Check Radiator Coolant

The cooling system is filled with a 50/50 solution of water and permanent ethylene glycol anti-freeze. Check the level of coolant at the beginning of each day before starting the engine.

⚠ DANGER

POTENTIAL HAZARD
- **Coolant is hot and pressurized.**

WHAT CAN HAPPEN
- **Discharge of hot pressurized coolant can cause severe burns.**

HOW TO AVOID THE HAZARD
- **Do not remove the radiator cap to check coolant. Follow the directions below for checking coolant.**
- **Do not remove the radiator cap when the engine is hot. Always allow the engine to cool at least 15 minutes or until the radiator cap is cool enough to touch without burning your hand before removing the radiator cap.**

1. Park the machine on a level surface, disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to “STOP” to stop the engine. Remove the ignition key.
2. Open the hood.
3. Check coolant level. Coolant should be between the two lines on the reserve tank when the engine is cold (Fig. 7).

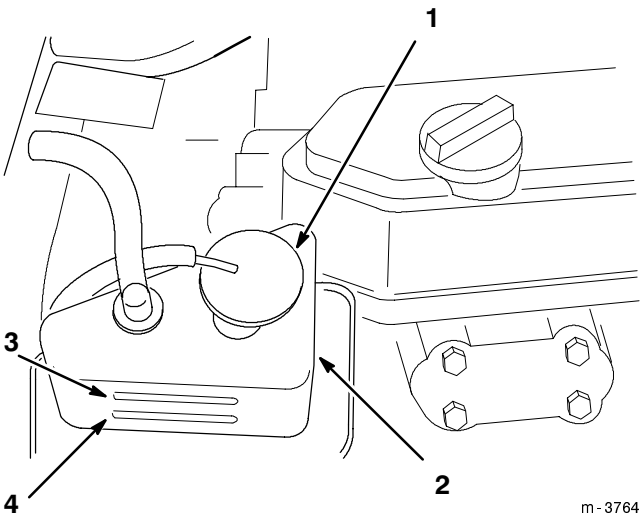


Figure 7

1. Reserve tank cap
2. Reserve tank
3. Maximum level line (cold)
4. Minimum level line (cold)

4. If coolant is low, remove the reserve tank cap and add a 50/50 mixture of water and permanent ethylene glycol anti-freeze. DO NOT OVERFILL.

5. Install the reserve tank cap.

Check for Debris

IMPORTANT: Operating the engine with a blocked grass screen and/or cooling shrouds removed, will result in engine damage from overheating.

1. Park the machine on a level surface, disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to “STOP” to stop the engine. Remove the ignition key.

2. Check for debris on the (3) air intake screens (Fig. 8). Wipe away debris before each use and/or during use, if required.

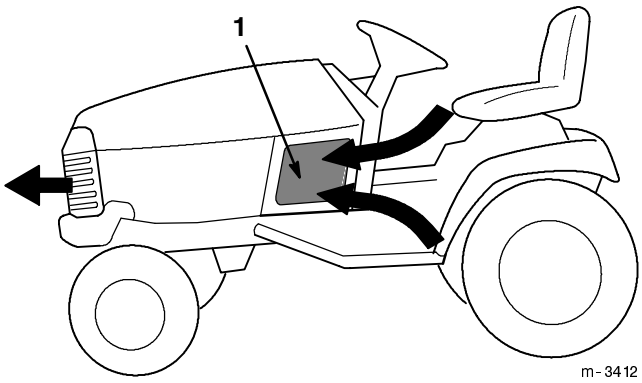


Figure 8

Arrows show air intake and exhaust path

1. Air intake screens (1 of 3 shown)

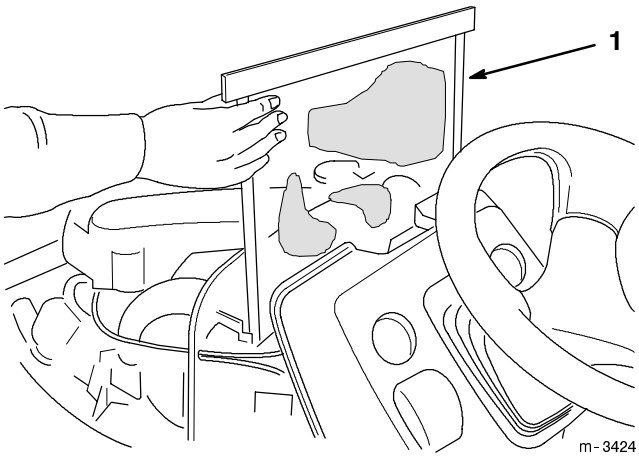


Figure 9

1. Radiator screen

3. The radiator screen (Fig. 9) is located between the radiator and the dash in the tractor. To remove it, pull it up from its retention slot. Wipe or wash off all accumulated debris from the screen, then reinstall it.

4. In dry or dusty conditions, dust can build up on the radiator fins and reduce cooling efficiency. Remove the radiator screen and blow (or low pressure wash) the radiator cooling fins.

5. Debris can build up in the engine area. Clean any debris build-up with a brush or blower before each use.

IMPORTANT: It is preferable to blow dirt out (Fig. 10), rather than washing it out. If water is used, keep it away from electrical items.

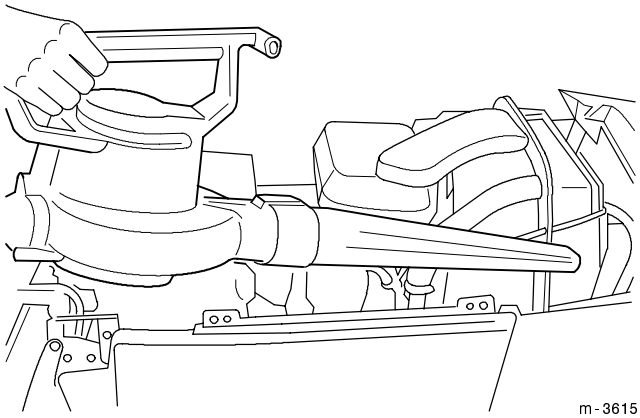


Figure 10

IMPORTANT: DO NOT HIGH-PRESSURE WASH. High-pressure washing can damage the electrical system or deplete grease.

6. The rear transaxle cover is an air intake area for cooling the transaxle. Clean debris from the rear transaxle cover before operating the tractor (Fig. 11).

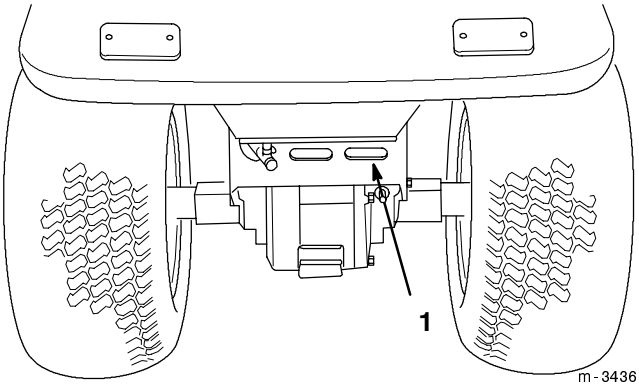


Figure 11

1. Rear transaxle cover

Check the Safety Interlock System

Always check the interlock system before operating the tractor. Instructions for checking the interlock system are found in the Operation section, page 14.

Check the Brake

Refer to Checking and Adjusting the Brake, page 30.

Operation

Think Safety First

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

Controls

Become familiar with all the controls (Fig. 12) before you start the engine and operate the machine.

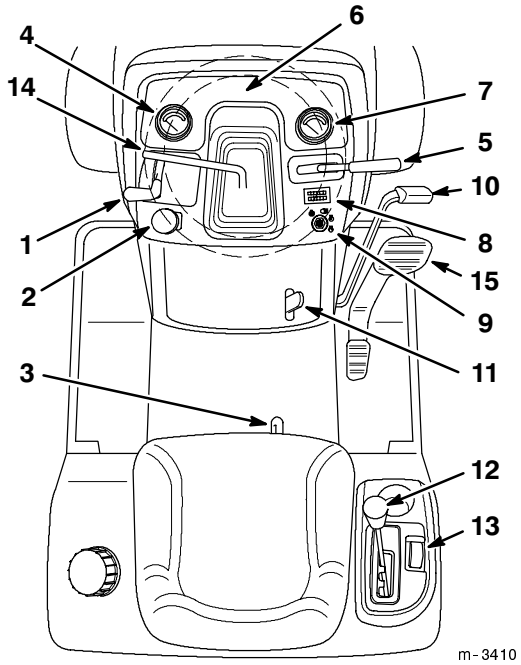


Figure 12

1. Throttle
2. PTO switch
3. Seat adjustment lever
4. Engine coolant temperature gauge
5. Attachment lift lever
6. Indicator lights
7. Fuel gauge
8. Hour meter
9. Ignition switch
10. Brake pedal
11. Parking brake lever
12. High-Low range lever
13. Cruise control switch
14. Steering wheel tilt lever
15. Traction control pedal

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. 12) down and hold it in the depressed position.
2. Lift the parking brake lever (Fig. 12) up 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. 12). The parking brake lever should release.
2. Release the brake pedal.

Starting and Stopping the Engine

Starting in Normal Weather

1. Sit down on the seat.
2. Depress the brake pedal.

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

3. Push the PTO (power take off) switch to OFF (Fig. 13).
4. Move the throttle lever to SLOW (Fig. 13).
5. Turn the ignition key clockwise to the RUN position (Fig. 14). The glow plug indicator light will come on.

6. After the glow plug indicator light goes out, turn the key to the START position. When the engine starts, release the key.

   IMPORTANT: Use starting cycles of no more than 30 seconds per minute to avoid overheating the starter motor.

7. If the engine does not start immediately, move the throttle control to FAST and turn the key to the START position.

   Note: Additional starting cycles may be required when starting the engine for the first time after the fuel system has been completely without fuel.

8. Move the throttle to the SLOW position (if in FAST) and let the engine warm up a few minutes before applying load.

Starting in Cold Weather (Below 20˚F or -7˚C)

Note: Use the correct engine oil for the starting temperature; refer to Engine Oil, page 26.

1. Start the engine with the throttle in the FAST position.

   Note: Do not use fuel left over from summer. Use only fresh winter grade diesel fuel.

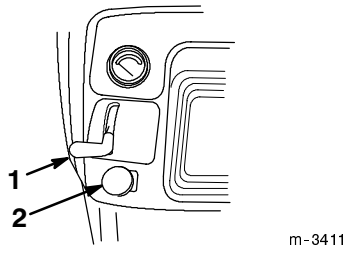


Figure 13

1. Throttle
2. PTO switch

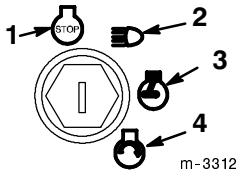


Figure 14

1. Stop
2. Run with lights
3. Run (and glow plug)
4. Start

Stopping

1. Move the throttle lever to SLOW (Fig. 13).
2. Allow the engine to run for a short time to cool down.
3. Turn the ignition key to STOP (Fig. 14).
4. Always remove both the ignition and “Key Choice” keys from the starter switch when equipment is not in use or unattended.

Operating the Power Take Off (PTO)

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

If the ignition key is in the RUN or LIGHTS position and the power take off (PTO) is engaged, the PTO indicator light will be on. When this light is on, it is a reminder: the implement is being powered and the starter will not crank while the PTO is engaged. Always turn off the PTO before getting off the seat.

Engaging the Power Take Off (PTO)

1. Depress the brake pedal to stop the machine.
2. Move the throttle lever to FAST.

   IMPORTANT: For best performance, always use full throttle when the power take off (PTO) switch is ON.

3. Pull the power take off (PTO) switch to ON (Fig. 15).

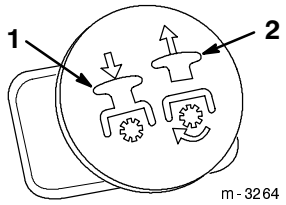


Figure 15

1. Push (off-disengaged) 2. Pull (on-engaged)

Disengaging the Power Take Off (PTO)

1. Push the power take off (PTO) switch to OFF.

The Safety Interlock System

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 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.

Operating–in–Reverse

An interlock feature is provided that prevents the Power Take Off (PTO) from operating while the tractor is traveling in reverse. If the unit is shifted into reverse while the mower blade or other PTO driven attachment is engaged, the PTO will stop.

Do not mow while backing up unless it is absolutely necessary. If you need to mow while in reverse gear or use other PTO driven attachments (such as a snowthrower or tiller), this no operating-in-reverse interlock may be temporarily deactivated.

Before deactivating this interlock, be sure there are no children present on or near the property where you are using the tractor, and that none are likely to appear while you are mowing or operating an attachment. Be extra observant after you have chosen to deactivate the interlock because the sound of the tractor’s engine might prevent you from being aware that a child or a bystander has entered the area where you are operating the tractor.

If you are certain that you can safely mow in reverse or operate an attachment, deactivate the no operating-in-reverse interlock by turning the “Key Choice” switch (Fig. 16), located on the seat bracket on the right hand side just below the seat, after engaging the blade (PTO). A red light on the front console (Fig. 17) will turn on as a reminder that the no operating-in-reverse interlock has been deactivated. Once the interlock is deactivated it stays in this mode—with your mower blade or PTO-driven attachment operating whenever you back up—and the console light stays on until either the blade (PTO) is disengaged, or the engine is turned off.

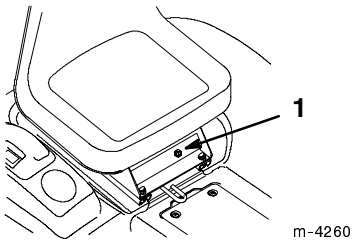


Figure 16

1. Reverse interlock key

Note: Do not insert the "Key Choice" key unless it is absolutely necessary to mow in reverse or operate an attachment. The "Key Choice" key should also be removed from the unit if it will be operated by someone other than a responsible, experienced operator. This will prevent the unit from operating in reverse with the mower blade or other PTO attachment engaged. Always remove both the ignition and the "Key Choice" keys and put them in a safe place out of the reach of children when leaving the unit unattended.

⚠ DANGER

POTENTIAL HAZARD
- **A child or bystander could be backed over by a riding mower with its blade(s) engaged.**

WHAT CAN HAPPEN
- **Blade contact will cause serious personal injury or death.**

HOW TO AVOID THE HAZARD
- **Do not mow in reverse unless absolutely necessary.**
- **Always look backward and down before backing up.**
- **Use "Key Choice" key only if you are certain no children or other bystanders will appear in the mowing area.**
- **Always remove both the ignition and "Key Choice" keys and put them in a safe place out of the reach of children or unauthorized users when leaving the unit unattended.**

Testing the Safety Interlock System

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

1. Fully depress the brake pedal. Pull the power take-off (PTO) switch to ON. Now turn the ignition key to START. The starter should not crank.

2. Push the power take-off (PTO) switch to OFF and release the brake pedal. Now turn the ignition key to START; the starter should not crank.

3. Fully depress the brake pedal and set the parking brake. Push the PTO switch to OFF and rise from the seat. Now turn the ignition key to START. The starter should not crank.

4. Fully depress the brake pedal and set the parking brake. Push the power take-off (PTO) switch to OFF. Now start the engine. While the engine is running, release the parking brake and rise slightly from the seat; the engine should stop.

5. Fully depress the brake pedal, set the parking brake, push the PTO switch to OFF and start the engine. Pull the PTO switch to ON. Rise slightly from the seat; the engine should stop.

6. With the parking brake released, turn the ignition key to RUN 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 "Key Choice" 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.

Gauges and Indicator Lights

The indicator lights (Fig. 17) illuminate when certain controls are activated and when major malfunctions occur that need immediate attention.

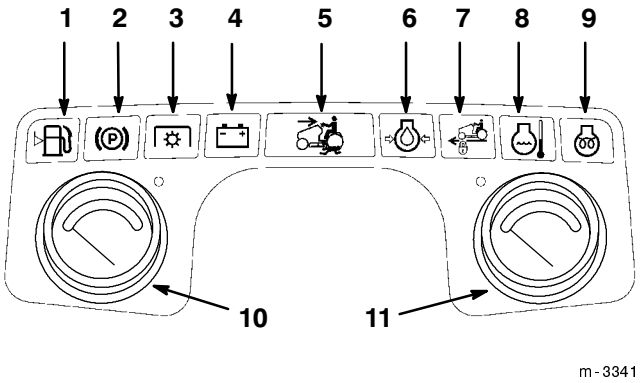


Figure 17

1. Low fuel warning light
2. Parking brake light
3. PTO (power take off) light
4. Battery light
5. Operating–in–Reverse warning light
6. Oil pressure light
7. Cruise control light
8. Coolant temperature light
9. Glow plug indicator light
10. Engine coolant temperature gauge
11. Fuel gauge

Parking Brake Light

When the parking brake light is ON it indicates the parking brake is set. The machine will not drive while the parking brake is set.

PTO (Power Take Off) Light

When the PTO (power take off) light is ON it indicates the implement is being powered. The PTO clutch must be disengaged before the engine will start.

Battery Light

The battery light will be ON when the key is in the RUN or LIGHTS positions if the battery voltage is below 12.1 volts or above 15.0 volts. If the light comes on at a higher RPM, it is important to have your battery and electrical system checked and the problem corrected.

Operating–in–Reverse Warning Light

The operating–in–reverse warning light will illuminate whenever the “Key Choice” key 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. **When the light is on, look behind and use extra caution when backing. Be especially watchful for children and pets.**

Oil Pressure Light

When the oil light is ON it indicates the engine oil pressure is low. After the engine starts the light should go out. When the engine is running, the light comes ON if the oil pressure drops below a safe operating level. If the light comes on while the engine is running, **stop the engine immediately and correct the cause of low oil pressure.**

Cruise Control Light

The cruise control light indicates that the cruise control system is activated.

Coolant Temperature Light

The coolant temperature light shows when the engine cooling system is overheated. The light indicates to check the gauge and follow the cautions, below.

Engine Coolant Temperature Gauge

This gauge shows the coolant temperature in the engine. If the gauge enters the red zone, disengage the PTO and allow the engine to cool while continuing to run the engine.

If the gauge does not show temperatures dropping, **stop the engine immediately, clean the air intake screens, clean the radiator screen, and/or correct the cause of high temperature**.

Glow Plug Indicator Light

The glow plug indicator light comes on when the ignition switch is in the RUN or RUN WITH LIGHTS position but should be out when the engine is running.

Fuel Level Gauge

This gauge shows the level of fuel remaining.

Low Fuel Light

The low fuel light comes on when the fuel level is low.

Hour Meter

The hour meter (Fig. 12) records the amount of time the engine has run. Use it to schedule regular maintenance.

Driving Forward or Backward

1. Stop the tractor.

   IMPORTANT: Never attempt to shift gears with the tractor in motion. Internal transmission damage may result.

   IMPORTANT: Do not force the shift lever. Applying slight pressure to the traction control pedal while shifting will help the gears engage.

2. Shift into high “H” or low “L” forward speed with the High-Low lever (Fig. 12). Use Low for best mowing performance and smoothest operation with all attachments. Use High for transporting or where conditions permit higher speed.

⚠ DANGER

POTENTIAL HAZARD
- **Excessive speed on slopes can result in rollover accidents or loss of control.**

WHAT CAN HAPPEN
- **Rollover accidents or loss of control can result in serious injury or death.**

HOW TO AVOID THE HAZARD
- **Never shift into neutral while moving.**
- **Never allow tractor to roll freely in neutral on slopes.**
- **Read, understand, and follow all instructions in the operator’s manual and on the machine before starting.**

3. Place the throttle control in the FAST position for best performance. (The throttle control regulates engine revolutions per minute.)

4. Place your foot on the traction control pedal and slowly press on the top of the pedal to move forward, or on the bottom of the pedal to move backward (Fig. 18). The farther you move the pedal in either direction, the faster the machine will move in that direction.

5. To slow down, release the pressure on the traction control pedal and step on the brake pedal.

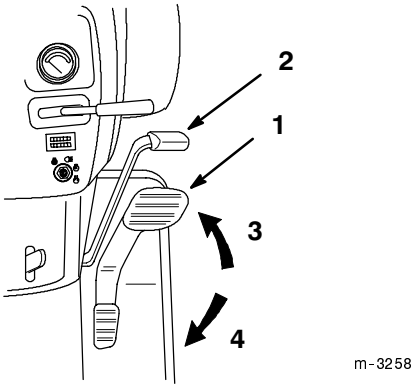


Figure 18

1. Traction control pedal
2. Brake pedal
3. Forward
4. Backward

Stopping the Machine

To stop the machine, release the traction control pedal, step on the brake pedal, disengage the power take off (PTO), lower the attachment lift, and turn the ignition key to STOP. Also set the parking brake if you leave the machine unattended; refer to Setting the Parking Brake, page 14. Remember to remove both the ignition and "Key Choice" keys from the switches.

⚠ CAUTION

POTENTIAL HAZARD
- **Someone could move or attempt to operate the tractor while it is unattended.**

WHAT CAN HAPPEN
- **Children or bystanders may be injured if they use the tractor.**

HOW TO AVOID THE HAZARD
- **Always remove both the ignition and "Key Choice" keys and set the parking brake when leaving the machine unattended, even if just for a few minutes.**

Re-centering the Steering Wheel

The power steering will not always return the steering wheel to the centered position. When this happens, the steering wheel will appear to be un-centered when the front wheels return to the straight-ahead position.

This is not a mechanical problem, but if it happens to your vehicle and you wish to re-center the steering wheel, you may do so:

1. Note the degree to which the steering wheel is out of center, then turn the steering wheel all the way in the opposite direction until the front wheels no longer turn.

2. Continue turning the steering wheel by the degree to which it is off center.

3. Now turn the steering wheel in the other direction until the front wheels aim straight ahead. The steering wheel should now be centered.

Attachment Power Lift

The attachment power lift (Fig. 19) is used to raise and lower attachments.

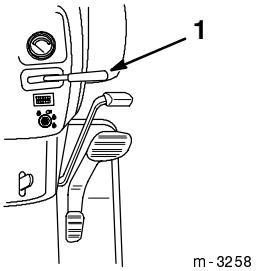


Figure 19

1. Attachment power lift

Raising Attachments

1. Start the tractor.

2. Pull the lift lever UP to raise the attachment (Fig. 20). This will lift and hold the attachment in the raised position.

⚠ WARNING

POTENTIAL HAZARD
- **When the engine is off, attachments in the raised position can gradually lower.**

WHAT CAN HAPPEN
- **Someone nearby may be pinned or injured by the attachment as it lowers.**

HOW TO AVOID THE HAZARD
- **Always lower the attachment lift each time you shut off the tractor.**

Lowering Attachments

1. Start the tractor.

2. Push the lift lever DOWN to lower the attachment (Fig. 20).

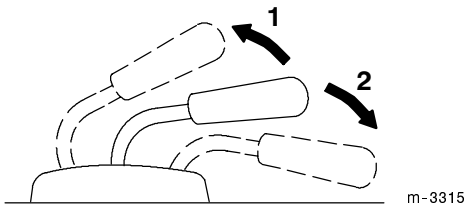


Figure 20

1. Lift lever-Up
2. Lift lever-Down

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. To adjust, move the lever sideways to unlock seat (Fig. 21).

2. Slide the seat to the desired position and release the lever to lock the seat into position.

IMPORTANT: Be sure that the seat is locked in position before operating.

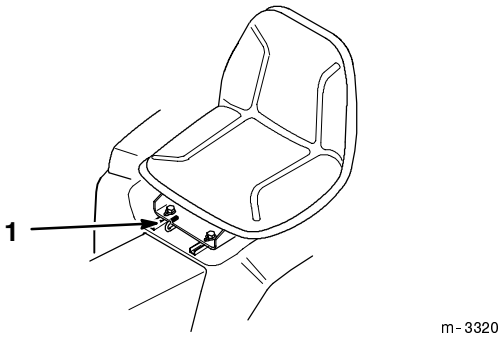


Figure 21

1. Adjustment lever

Headlights and Taillights

The headlights and taillights are turned on by turning the ignition key to the LIGHTS position. They can be turned on even if the engine is not running.

Remove the ignition key when leaving the machine unattended so that the headlights cannot be turned on and discharge the battery.

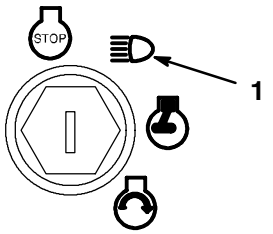


Figure 22

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. 23).

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

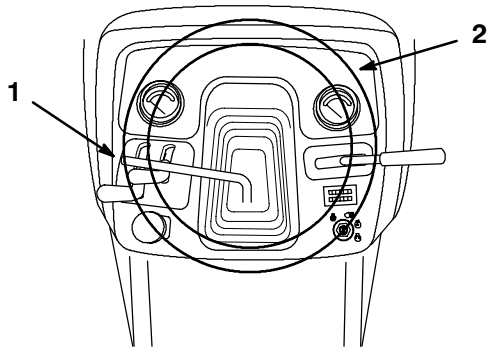


Figure 23

1. Tilt lever
2. Steering wheel

Using the Cruise Control

The cruise control is a switch (Fig. 24) on the right fender that maintains a set traction control position without foot pressure. The cruise control only operates when moving forward.

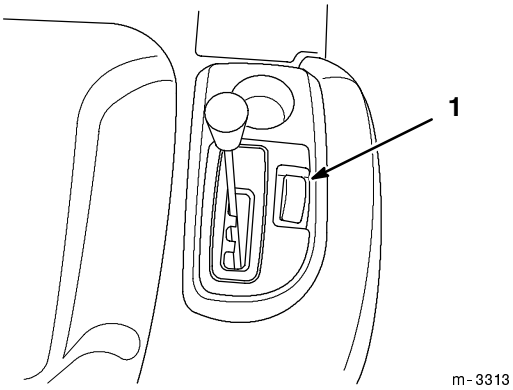


Figure 24

1. Cruise control

Engaging the Cruise Control

1. Begin driving the tractor; refer to Driving Forward or Backward, page 19. While holding your foot steady on the traction control pedal, push the cruise control switch (Fig. 24) to the "SET" position. This locks the traction control in position and your foot can then be removed from the traction control. A constant pedal position will be maintained.

2. The cruise control has a "speed-up" feature: If you initially set it to any speed other than full speed, you can speed up with your foot on the traction pedal for as long as you wish. When you release the traction pedal, the pre-selected cruise speed resumes automatically.

Disengaging the Cruise Control

1. While holding your foot steady on the traction control pedal, move the cruise control switch (Fig. 12) to the "OFF" position.

2. This unlocks the traction control. You must now use the traction control to move forward.

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

   IMPORTANT: If you accidentally press the cruise control while the engine is running and you are not moving, the machine will subsequently operate at partial speed in forward and will not operate in reverse.

   To correct this situation, press the cruise control switch to "OFF," or press the brake pedal to disengage the cruise control.

The Smart Turn™ Steering Feature

The Smart Turn™ Steering feature automatically lowers the speed of the tractor in tight turns. The decrease in speed is directly proportional to the sharpness of the turn, up to a maximum speed reduction of 40 percent. This allows you to make turns at higher speeds without having to change the speed control position. After the turn, the original speed is automatically restored.

The Smart Turn™ Steering feature does not affect engine speed.

This system was set at the factory and should not need adjustment.

⚠ DANGER

POTENTIAL HAZARD
- **Excessive speed when turning can result in rollover accidents.**

WHAT CAN HAPPEN
- **Rollover accidents can result in serious injury or death.**

HOW TO AVOID THE HAZARD
- **Do not rely on the Smart Turn™ Steering feature to avoid accidents while turning.**
- **Do not set the cruise control at higher speeds when operating on uneven terrain or slopes.**
- **Read, understand, and follow all instructions in the operator's manual and on the machine before starting.**

Pushing the Machine by Hand

IMPORTANT: Always push the machine by hand. Never tow the machine because transmission damage may occur.

To Push the Machine

1. Disengage the power take off (PTO) and turn the ignition key to "STOP" to stop the engine.

2. Move the High-Low range lever to the neutral position "N." This allows the rear wheels to turn freely.

3. Place the lever back in High or Low after moving the machine, and set the parking brake.

Maintenance

Service Interval Chart

Service Operation	Each Use	25 Hours	50 Hours	100 Hours	200 Hours	400 Hours	600 Hours	Yearly Storage Service
Engine Oil—check level and for leaks	X							
Engine Coolant—check level	X							
Radiator Screen—check for debris[1]	X							X
Brake—check	X							X
Safety System—check	X							X
(3) Air Intake Screens—clean[1]	X							X
Engine Area—clean[1]	X							X
Rear Transaxle Cover—clean[1]	X							X
Fuel Filter—drain water	X							X
Tires—check pressure		X						X
Battery—check electrolyte level		X						X
Transaxle—check oil level		X						
Lubrication			X					X
PTO Belt—check tension[2]			X					X
Engine Oil—change			Initial	X				X
Engine Air Filter—clean[1]			Initial	X				X
Fan Belt—check				X				
Engine Oil Filter—change			Initial		X			
Transaxle—change oil			Initial		X			X
Transaxle—change oil filter			Initial		X			X
Power Steering Filter—clean			Initial		X			X
Radiator and Hoses—inspect					X			X
Chipped Surfaces—paint					X			X
Fuel Filter—replace						X		
Engine Air Filter—replace[1]							X	
Valve clearance—check[3]							X	
Cylinder head bolt—check torque[3]							X	
Radiator—flush/change coolant								X

[1] More often in dusty, dirty conditions
[2] Check tension initially after 5 hours.
[3] Refer to your engine operator's manual for more information.

⚠ 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
- **Set the parking brake and remove the key from the ignition switch before you do any maintenance.**

Air Cleaner

Service Interval/Specification

Clean the air filter cartridge after every 100 operating hours. Service it more often (every few hours) if operating conditions are extremely dusty or sandy.

Replace the cartridge after every 600 operating hours.

Removing the Air Cleaner Cartridge

1. Disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to "STOP" to stop the engine. Remove the ignition key.
2. Open the hood.
3. Unlock the clamps and remove the cover.
4. Remove the cartridge from the air cleaner body.

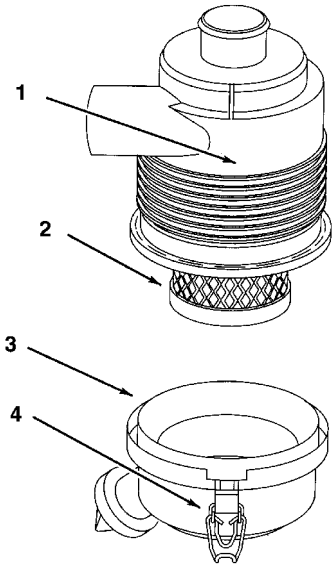


Figure 25

1. Air cleaner body
2. Cartridge
3. Cover
4. Clamps

Cleaning the Air Filter Cartridge

Clean the cartridge by tapping gently on its end with the handle of a screwdriver. Replace the cartridge if it is very dirty or damaged.

Installing the Air Filter Cartridge

1. Install the cartridge in the body.
2. Install the cover and lock the clamps.

Engine Oil

Service Interval/Specification

Change oil:

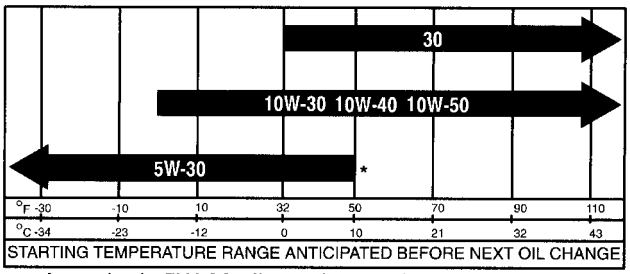
- After the first 50 operating hours.
- After every 100 operating hours.

Oil Type: High-quality detergent oil classified "API Service CD" or higher for diesel engines. Use no special additives with recommended oils.

Crankcase Capacity: 3.5 quarts (3.3 liters)

Viscosity: See the table below.

USE THESE SAE VISCOSITY OILS



* A synthetic 5W-30 oil may be used.

Changing/Draining the Engine Oil

1. Start the engine and let it run for five minutes. This warms the oil so it drains better.

2. Park the machine so that the drain side is slightly lower than the opposite side to ensure that the oil drains completely. Then disengage the power take off (PTO), set the parking brake, and turn the ignition key to "STOP" to stop the engine. Remove the ignition key.

3. Open the hood.

⚠ CAUTION

POTENTIAL HAZARD
- **Components under the hood will be hot if the tractor has been running.**

WHAT CAN HAPPEN
- **Touching hot components can cause burns.**

HOW TO AVOID THE HAZARD
- **Allow the tractor to cool before performing maintenance or touching components under the hood.**

4. Place a pan below the oil drain. Remove the drain plug and let the oil drain completely (Fig. 26).

5. Install the drain plug and tighten it to 220 in-lbs.

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

6. Remove the oil filler cap (Fig. 27) and refill the engine with a high-quality, CD class engine oil (see viscosity chart).

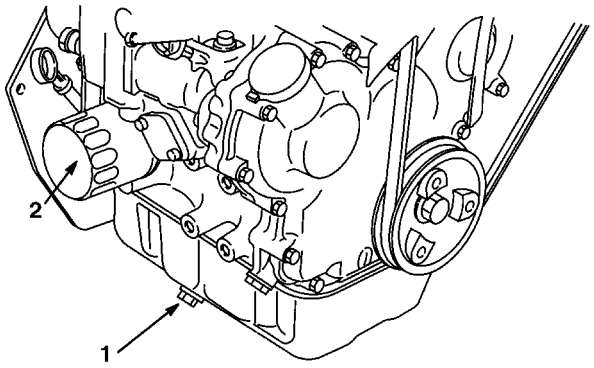


Figure 26

1. Drain plug
2. Oil filter

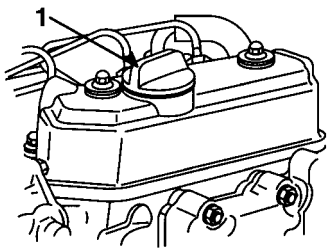


Figure 27

1. Oil filler cap

7. Replace the filler cap.

8. Start the engine and let it run at idle for 5 minutes. Then stop the engine.

9. Wait 3 minutes and recheck the oil level. If required, add oil to bring the level to the upper hole on the dipstick. Do not overfill.

10. Check for leaks.

IMPORTANT: Do not overfill the crankcase with oil because this may cause engine damage.

Changing the Engine Oil Filter

Service Interval/Specification

Replace the oil filter after the initial 50 hours of operation and then after every 200 hours.

1. Drain the oil from the engine; refer to Changing/Draining Oil, page 26.

2. Place a drip pan beneath the oil drip tray to receive oil from the oil filter and oil passages in the engine.

3. Turn the filter counterclockwise to remove it.

Note: Dispose of oil filter properly. Recycle in accordance with local codes.

4. Before installing the filter, lightly oil the gasket on the filter with fresh, clean oil. Screw the filter on by hand until the gasket contacts the oil filter adapter. Tighten 1/2 to 3/4 turn more.

5. Remove the oil filler cap and refill the engine with a high-quality, CD class engine oil (see viscosity chart, page 26).

6. Replace the filler cap.

7. Start the engine and let it run at idle for 5 minutes. Then stop the engine.

8. Wait 3 minutes and recheck the oil level. If required, add oil to bring the level to the upper hole on the dipstick. Do not overfill.

9. Check for leaks.

Changing the Engine Coolant

⚠ DANGER

POTENTIAL HAZARD
- **Coolant is hot and pressurized.**

WHAT CAN HAPPEN
- **Discharge of hot pressurized coolant can cause severe burns.**

HOW TO AVOID THE HAZARD
- **Do not remove the radiator cap when the engine is hot. Always allow the engine to cool at least 15 minutes or until the radiator cap is cool enough to touch without burning your hand before removing the radiator cap.**

1. Park the machine on a level surface, disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to “STOP” to stop the engine. Remove the ignition key.

2. Remove the radiator cap and reserve tank cap (Fig. 28).

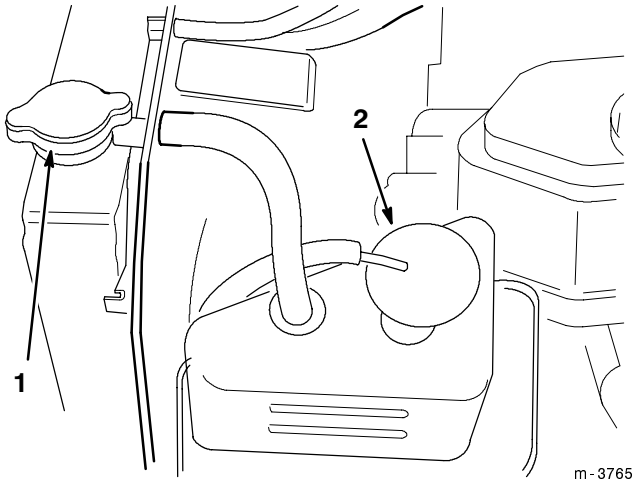


Figure 28

1. Radiator cap 2. Reserve tank cap

Note: If you wish, you can attach a 3/8 ID hose to each of the two drain valves.

3. Open both coolant drain valves at the bottom of the radiator and allow coolant to flow into a drain pan. When coolant stops flowing, close the drain valves and dispose of the coolant properly.

4. Slowly fill the radiator with a 50/50 mixture of water and permanent ethylene glycol anti-freeze. Fill the radiator completely. Install the radiator cap.

5. Slowly fill the reserve tank until the level reaches the upper line. DO NOT OVERFILL. Install the reserve tank cap.

6. Start the engine. To properly bleed air from the coolant system, park the tractor on a slope with the rear wheels approximately 6 inches (152 mm) higher than the front wheels. Set the parking brake. Run the engine until it is warm.

7. Park the tractor on a level surface and recheck the coolant level in the reserve tank after the engine has cooled down. Replenish the coolant, if required; refer to Check the Cooling System, page 11.

Greasing and Lubrication

Service Interval/Specification

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, lower the attachment lift, and turn the ignition key to “STOP” to stop the engine. Remove the ignition key.

2. Clean the grease fittings with a cloth. Make sure to scrape off any paint from 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 left-hand and right-hand spindles until grease begins to ooze out of the bearings (Fig. 29).

2. Lubricate the front axle pivot (Fig. 29).

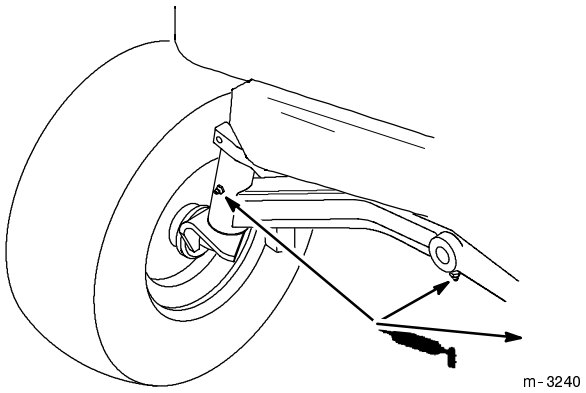


Figure 29

3. Open the drive shaft maintenance cover on the tractor tunnel near the seat by unscrewing the two screws securing it, then raising it (Fig. 30).

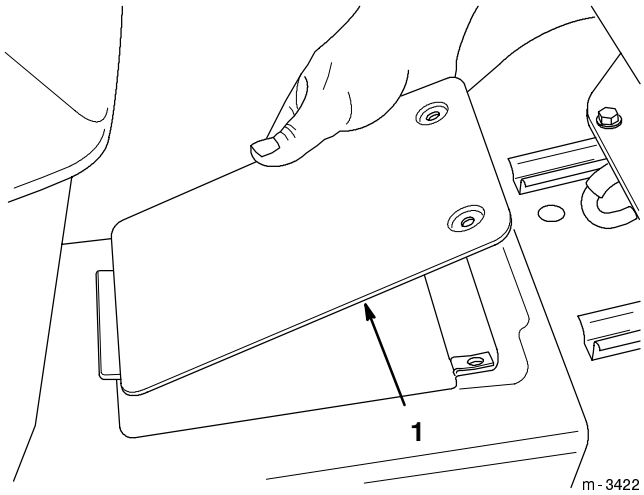


Figure 30

1. Drive shaft maintenance cover

DANGER

POTENTIAL HAZARD
- **Rotating shaft can cause injury.**

WHAT CAN HAPPEN
- **Fingers, hands, feet, hair, etc. can get caught by shaft.**
- **Loose clothing can get caught by shaft.**

HOW TO AVOID THE HAZARD
- **Do not operate the tractor without the drive shaft cover in place.**
- **Keep hands and arms clear of rotating shaft.**

4. Lubricate the three grease fittings (Fig. 31).

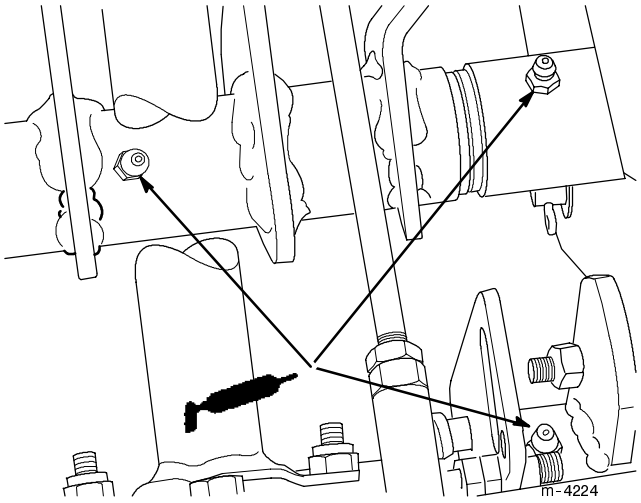


Figure 31

5. Replace and secure the cover.

6. Grease the fitting on the brake pedal (Fig. 32).

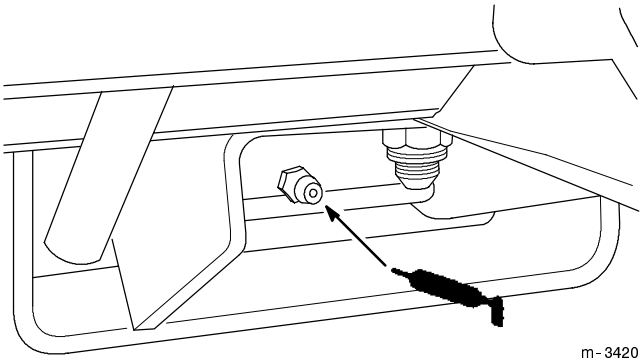


Figure 32

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 25 operating hours or monthly, whichever occurs first (Fig. 33). Check the tires when they are cold to get the most accurate pressure reading.

Pressure: 20 psi (138 kPa) front and rear

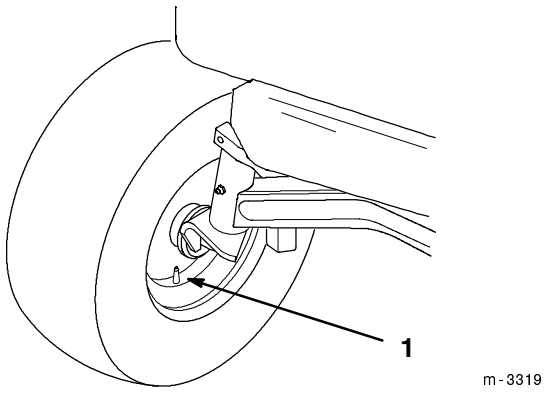


Figure 33

1. Valve stem

Brake

Always set the parking brake when you stop the machine or leave it unattended. Check the brake before each use. 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), put the High-Low range lever in "N," set the parking brake, and turn the ignition key to "STOP" to stop the engine. Remove the ignition key.

2. The 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.

Adjusting the Brake

The brake adjustment is behind the left side cover (Fig. 35). 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.

2. Place the transmission in neutral.

3. Depress the brake pedal. There should be 2" (51 mm) of free travel (Fig. 34) before the brake begins to engage.

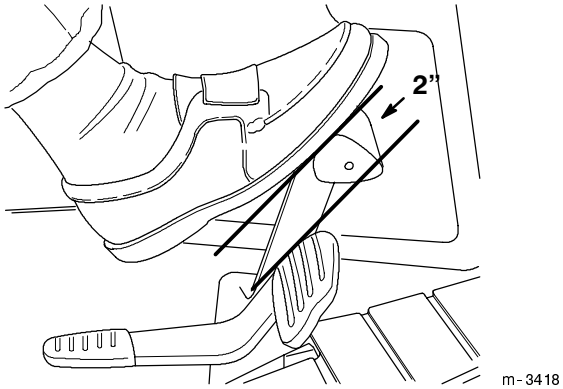


Figure 34

4. Turn the brake adjustment nut (Fig. 35) until there is 2" (51 mm) of free travel.

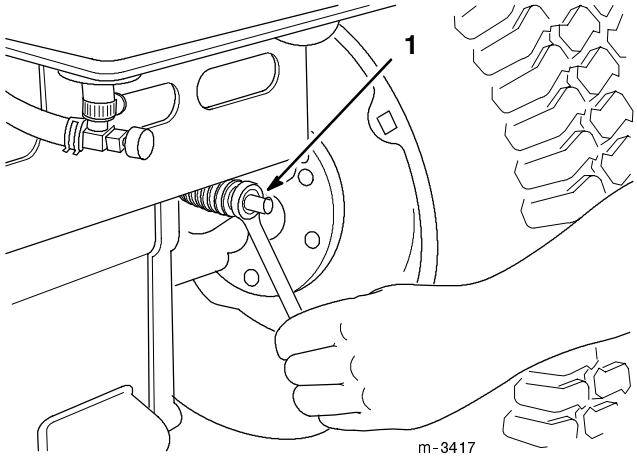


Figure 35

1. Brake adjustment nut

IMPORTANT: Do not overtighten the adjustment nut.

IMPORTANT: With the parking brake released, the rear wheels must rotate freely when you push the tractor. If brake action and free wheel rotation cannot be achieved, contact your Authorized Service Dealer immediately.

Fuel Tank

Draining the Fuel Tank

⚠ DANGER

POTENTIAL HAZARD
- **In certain conditions fuel is extremely flammable and highly explosive.**

WHAT CAN HAPPEN
- **A fire or explosion from fuel can burn you, others, and cause property damage.**

HOW TO AVOID THE HAZARD
- **Drain fuel from the fuel tank when the engine is cold. Do this outdoors in an open area. Wipe up any fuel that spills.**
- **Never drain fuel near an open flame or where fuel fumes may be ignited by a spark.**
- **Never smoke a cigarette, cigar or pipe near the tractor.**

1. Park the machine on a level surface to ensure that the fuel tank drains completely. Then disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to “STOP” to stop the engine. Remove the ignition key.

2. Close the fuel shut-off valve at the fuel tank (Fig. 36 & 37).

IMPORTANT: Do NOT run the engine until it uses up all of the fuel and stops. The fuel injector pump on the engine requires fuel for lubrication.

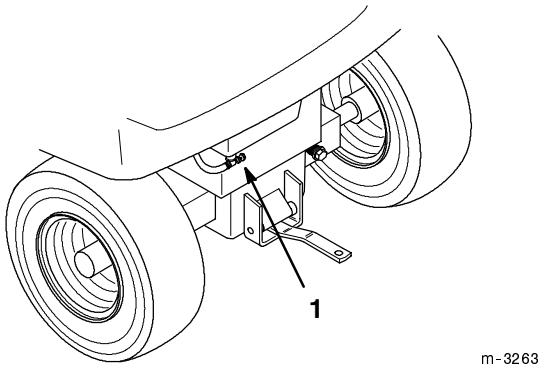


Figure 36

1. Fuel shut-off valve

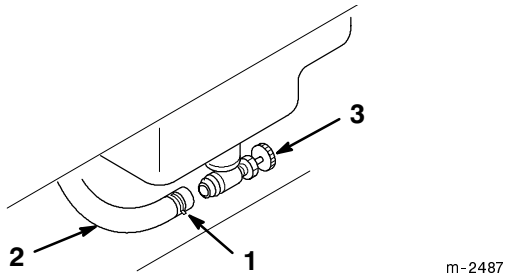


Figure 37

1. Hose clamp
2. Fuel line
3. Fuel shut-off valve

3. Loosen the hose clamp and slide it up the fuel line away from the fuel shut-off valve (Fig. 37).

4. Pull the fuel line off the fuel shut-off valve (Fig. 37). Some fuel will flow out from the hose as it is disconnected from the valve. Attach a 5/16 ID hose to the valve to help drain the fuel into a container. Open the valve and allow fuel to drain into a fuel can or drain pan. Dispose of fuel properly.

IMPORTANT: Do not turn or unscrew the fuel shut-off valve.

5. Install the fuel line onto the fuel shut-off valve. Slide the hose clamp close to the valve to secure the fuel line (Fig. 37). The fuel shut-off valve should normally be left open, except for service on the fuel system or when the tractor is transported on a trailer.

Fuel Filter

Service Interval/Specification

Replace the fuel filter after every 400 operating hours.

Replacing the Fuel Filter

1. Disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to "STOP" to stop the engine. Remove the ignition key.
2. Close the fuel shut-off valve at the fuel tank (Fig. 36 & 37).
3. Open the hood and remove the side panels.
4. Drain the fuel from the fuel filter into a suitable container and dispose of it properly.
5. Remove the fuel filter with a wrench and clean the mounting surface.
6. Lubricate the gasket on the new filter with clean engine oil. Screw on the new filter by hand until the gasket contacts the housing. Then tighten it another 1/2 turn.
7. Open the fuel shut-off valve at the fuel tank (Fig. 36 & 37).
8. Start the engine and check for leaks.
9. Replace the side panels and close the hood.

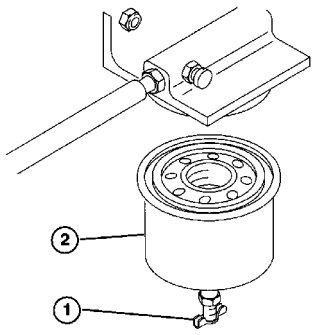


Figure 38

1. Fuel filter drain valve
2. Fuel filter

Front Wheel Toe-In

Service Interval/Specification

Maintaining correct front wheel toe-in is important for safety, Smart Turn™ Steering operation and ease of use. If uneven tire wear, lawn scuffing or hard steering develop, adjustment may be required. Check the toe-in after every 100 operating hours or once a year, whichever occurs first (Fig. 39).

Maintain the following specification: 1/8-1/4 inch (3.5-6.5 mm) toe-in on the front wheels.

Measuring Toe-In

1. Disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to "STOP" to stop the engine. Remove the ignition key.
2. Turn the wheels straight ahead.
3. Push the front of the tires out to remove normal looseness in the linkage.
4. Measure the distance between both of the front tires at spindle level (at the front and rear of the wheels) (Fig. 39).

5. The front measurement should be 1/8” to 1/4” (3 to 6 mm) less than the rear measurement. If adjustment is needed, follow the instructions in Adjusting Toe-In, page 33.

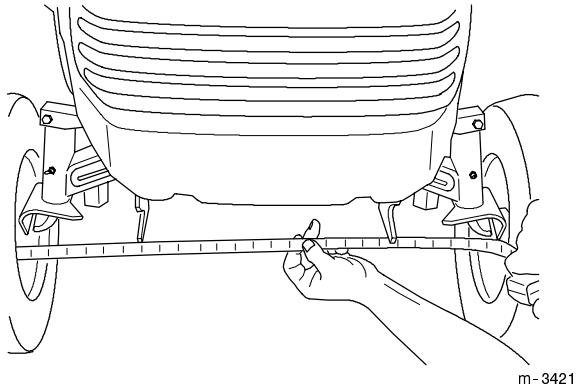


Figure 39

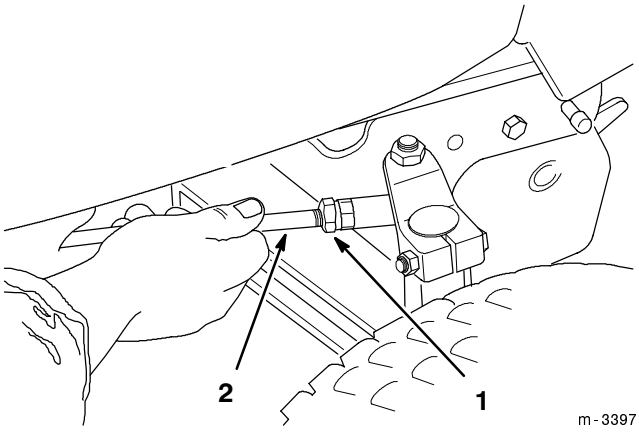


Figure 40

1. Jam nut
2. Steering rod

Adjusting Toe-In

1. Loosen the jam nuts at the ends of the steering rods (Fig. 40).
2. Rotate both steering rods equal amounts to adjust the toe-in to 1/8” to 1/4” (3 to 6 mm).
3. Hold each tie rod end with one wrench and tighten the jam nut with a second wrench.

IMPORTANT: Make sure that the flat surface on the top of the front tie rod ends is parallel to the bottom of the steering arm (Fig. 41).

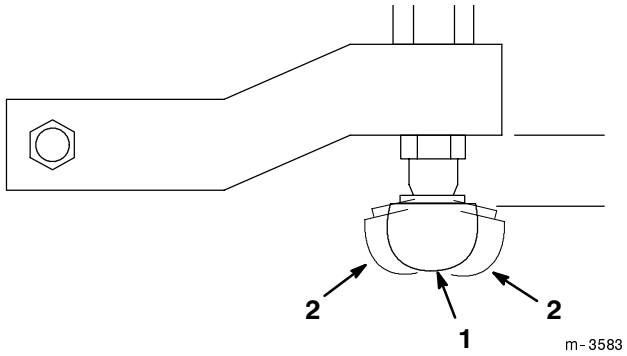


Figure 41

View from front of tractor looking at end of tie rod

1. This
2. Not this

4. Recheck the toe-in; refer to Measuring Toe-In, page 32.

Transaxle Fluid

Service Interval/Specification

Check the fluid level before every use. Always keep the fluid level in the correct operating range on the dipstick when the transaxle is cold.

Fluid Type: SAE 10W-30 Detergent oil (API service SG, SH or above)

Checking the Fluid Level

1. Park the machine on a level surface.
2. Disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to “STOP” to stop the engine. Remove the ignition key.
3. Tilt the seat up.

4. Clean around the transmission dipstick (Fig. 42) so dirt cannot fall into the filler hole and damage the transaxle.

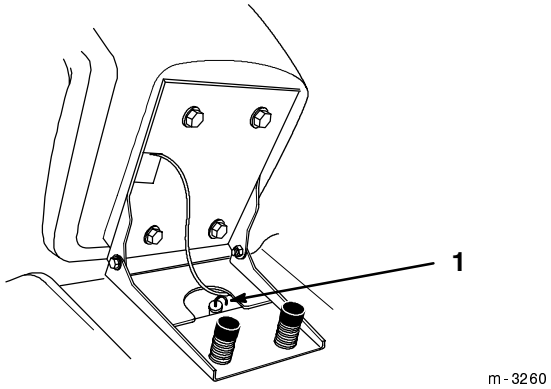


Figure 42

1. Transmission dipstick

5. Pull out the transmission dipstick and wipe the metal end clean (Fig. 42).

6. Slide the dipstick fully into the filler tube (Fig. 6). Pull the dipstick out and look at the metal end. When the transaxle is cold, oil should be in the operating range, below the FULL line on the dipstick (Fig. 43).

7. If the oil level is low, slowly pour only enough SAE 10W-30 detergent oil into the filler tube to raise the level to the FULL line.

   IMPORTANT: Do not fill above the FULL line as fluid may overflow.

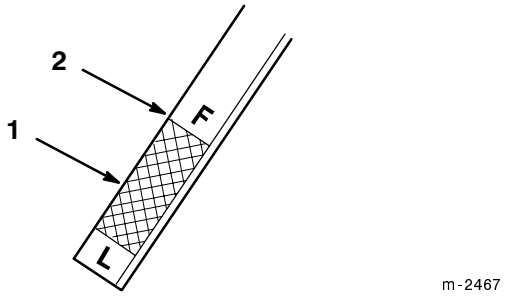


Figure 43

1. Operating range
2. FULL line

Changing Transaxle Oil

Replace the transaxle fluid at 50 hours initially, then every 200 hours thereafter.

Fluid Type: SAE 10W-30 Detergent oil (API service SG, SH or above)

Transaxle Capacity:

Total system capacity: 7.0 qts (6.6 l).

Approximate refill capacity: 4.5 qts (4.3 l).

1. Warm up the transaxle oil by driving the tractor.

2. Park the machine on a level surface to ensure that the oil drains completely. Then turn off the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to “STOP” to stop the engine. Remove the ignition key.

3. Place a pan below the transaxle drain. Open the drain by removing the plug (Fig. 44).

4. When the oil has drained completely, wipe clean. Apply pipe sealant to the plug and reinstall.

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

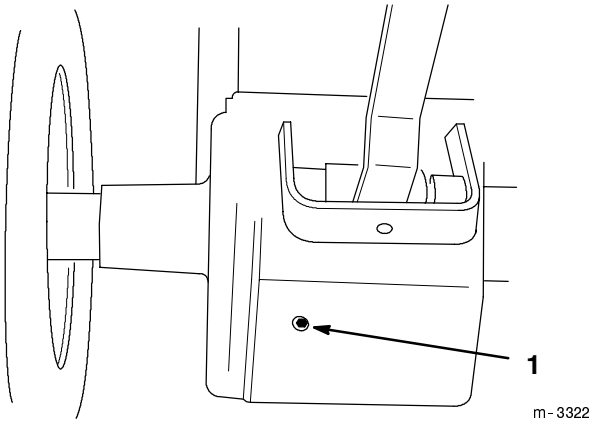


Figure 44

1. Transaxle drain plug

5. Change the transaxle filter; refer to Changing the Transaxle Filter, page 35.

6. Slowly pour the specified refill capacity of oil into the filler tube (Fig. 42).

7. Start the engine, let it run for 30 seconds at high idle, and cycle the steering wheel several times to fill the filter and hydraulic lines. Then shut off the engine.

8. Now check the fluid level; refer to Checking Transaxle Fluid Level, page 33. Slowly add additional oil to bring the oil level to the FULL mark on the dipstick.

Changing the Transaxle Filter

Service Interval/Specification

Replace the transaxle filter after the first 50 hours; then every 200 hours.

1. Drain the oil from the transaxle; refer to Changing/Draining Transaxle Fluid, page 34.

2. Remove the transaxle filter and wipe the filter adapter (Fig. 45) gasket surface.

3. Apply a thin coat of new oil to the rubber gasket on the replacement filter (Fig. 45).

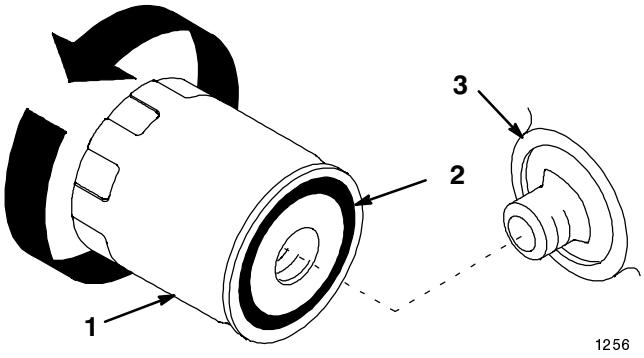


Figure 45

1. Transaxle filter
2. Gasket
3. Adapter

4. Install the replacement transaxle filter to the filter adapter. Turn the filter clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 3/4 turn (Fig. 45).

5. Fill the transaxle with the proper type of new oil; refer to Changing/Draining Transaxle Fluid, page 34.

Cleaning the Power Steering Filter

The power steering filter should be cleaned initially at 50 hours, then at 200-hour intervals thereafter. Please have your Authorized Service Dealer clean the filter.

Fuses

Service Interval/Specification

The electrical system is protected by fuses. They require no maintenance. However, if a fuse blows, check the component and circuit for a malfunction or short. To replace a fuse, pull it out of the fuse box (Fig. 46).

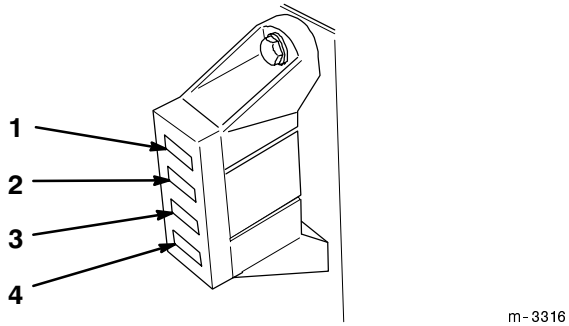


Figure 46

1. F1; main-30 amp
2. F2; glow plug timer and start circuits-15 amp
3. F3; dash, interlock, and cruise control-10 amp
4. F4; headlights and taillights-10 amp

Headlights

Specification: Bulb # 1156 Automotive Type

Removing the Bulb

1. Disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to “STOP” to stop the engine. Remove the ignition key.

2. Open the hood. Pull the wire connectors off both bulb holder terminals.

3. Rotate the bulb holder 1/4 turn counterclockwise and remove it from the reflector (Fig. 47).

4. Push and rotate the bulb counterclockwise until it stops (approx. 1/4 turn) and remove the bulb from the bulb holder (Fig. 48).

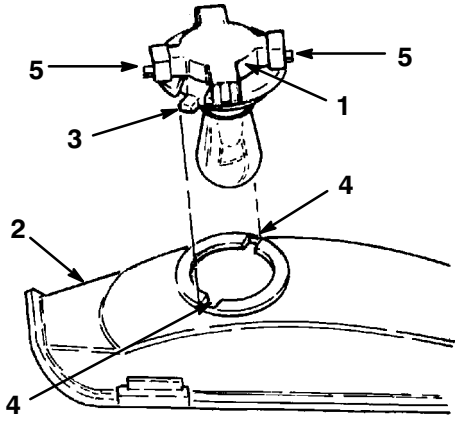


Figure 47

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. 48). Push and rotate the bulb clockwise until it stops.

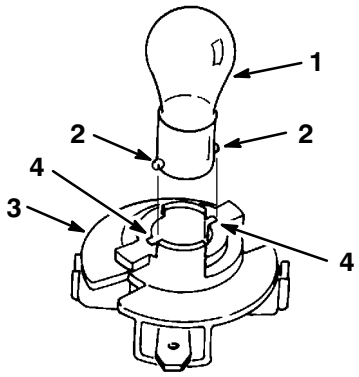


Figure 48

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

2. The bulb holder has two tabs (Fig. 47). 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.

Taillights

Bulb: GE 194

Removing the Bulb

1. Disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to “STOP” to stop the engine. Remove the ignition key.
2. Remove the two screws.
3. Pull the lens out far enough so that you can remove the bulb socket.
4. Pull the bulb from the socket.

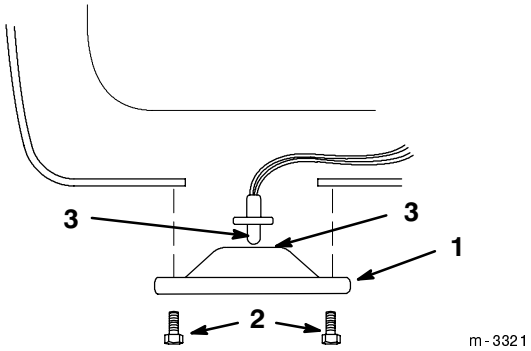


Figure 49

1. Lens
2. Screws
3. Bulb
4. Socket

Installing the Bulb

Reverse the bulb removal procedure.

Battery

Service Interval/Specification

Check the electrolyte level in the battery every 25 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.

Battery size: 12 v, 495 Cold Cranking Amps at 0˚ F.
Group size 45.

Checking the Electrolyte Level

1. Park the machine on a level surface. Disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to “STOP” to stop the engine. Remove the ignition key.
2. Open the hood.

⚠ CAUTION

POTENTIAL HAZARD
- **Components under the hood will be hot if the tractor has been running.**

WHAT CAN HAPPEN
- **Touching hot components can cause burns.**

HOW TO AVOID THE HAZARD
- **Allow the tractor to cool before performing maintenance or touching components under the hood.**

3. Lift off the cell cover to see into the cells. The electrolyte must be up to the lower part of the tube (Fig. 50). Do not allow the electrolyte to get below the plates.
4. If the electrolyte is low, add the required amount of distilled water; refer to Adding Water to the Battery.

5. If the fluid level is correct, press the cell cover onto the battery.

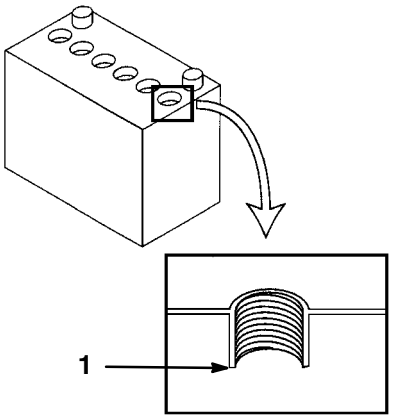


Figure 50

1. Lower part of the battery cell tube

Adding Water to the Battery

IMPORTANT: Use only distilled water.

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 cell cover (Fig. 50).
3. Slowly pour distilled water into each battery cell until the level is up to the lower part of the tube (Fig. 50).

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

Removing the Battery

1. Disengage the power take off (PTO), set the parking brake, lower the attachment lift, and turn the ignition key to “STOP” to stop the engine. Remove the ignition key.
2. Open the hood.
3. Remove the battery hold-down brackets (Fig. 51).

   IMPORTANT: Always disconnect the negative (black) cable first.
4. Disconnect the negative (black) ground cable from the battery post (Fig. 51).
5. Disconnect the positive (red) cable from the battery post (Fig. 51).
6. Remove the battery by lifting it up and out of the engine compartment.

   IMPORTANT: Always hold the battery vertical to avoid spilling battery acid.

⚠ WARNING

POTENTIAL HAZARD

- **Either the battery terminals or metal tools could short against metal tractor components.**
- **Incorrect battery cable routing could damage the cables.**

WHAT CAN HAPPEN

- **Sparks can cause the battery gasses to explode.**
- **Damaged cables could short against metal tractor components and cause sparks.**

HOW TO AVOID THE HAZARD

- **When removing or installing the battery, do not allow the battery terminals to touch any metal parts of the tractor.**
- **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.**
- **Do not allow metal tools to short between the battery terminals and metal parts of the tractor.**
- **Always keep the battery hold-down brackets in place to secure the battery.**
- **Always route battery cables as illustrated.**

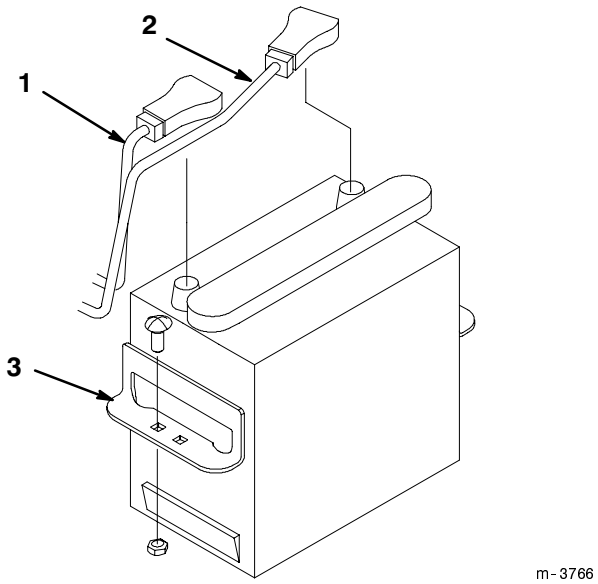


Figure 51

1. Negative cable (black)
2. Positive cable (red)
3. Hold-down bracket

Installing the Battery

1. Place the battery onto the chassis (Fig. 51).
2. Install the battery hold-down brackets.

   IMPORTANT: Always connect the positive (red) cable first.

3. Connect and tighten the positive (red) cable to the positive (+) battery post (Fig. 51).
4. Connect and tighten the negative (black) cable to the negative (-) battery post (Fig. 51).

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 32°F (0°C).

1. Remove the battery from the chassis; refer to Removing the Battery, page 38.

2. Check the electrolyte level; refer to Checking the Electrolyte Level, page 37, steps 2–4.

3. Remove the cell cover 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 cell cover 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 in the chassis; refer to Installing the Battery, page 39.

Cleaning and Storage

1. Disengage the power take off (PTO), set the parking brake, and turn the ignition key to "STOP" to stop the engine. Remove both the ignition and "Key Choice" keys.

2. Remove grass clippings, dirt, and grime from the external parts of the entire machine, especially the engine. Clean debris from the (3) air intake screens, the radiator screen, and the rear transaxle cover; refer to Check for Debris, page 12.

   IMPORTANT: You can wash the machine with mild detergent and water. DO NOT PRESSURE WASH THE MACHINE. Pressure washing may damage the electrical system or wash away necessary grease at friction points. Avoid excessive use of water, especially near the control panel, lights, engine, and the battery.

3. Perform all of the service operations that are required for storage; refer to Service Interval Chart, page 24.

4. Remove the battery from the chassis, check the electrolyte level, and charge it fully; refer to Battery, page 37. 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 32°F (0°C). A fully charged battery maintains its charge for about 50 days at temperatures lower than 40°F (4°C). If the temperatures will be above 40°F (4°C), check the water level in the battery and charge it every 30 days.

5. For long-term storage (more than 90 days) drain the fuel tank; refer to Draining the Fuel Tank, page 31. Dispose of fuel properly. Recycle in accordance with local codes.

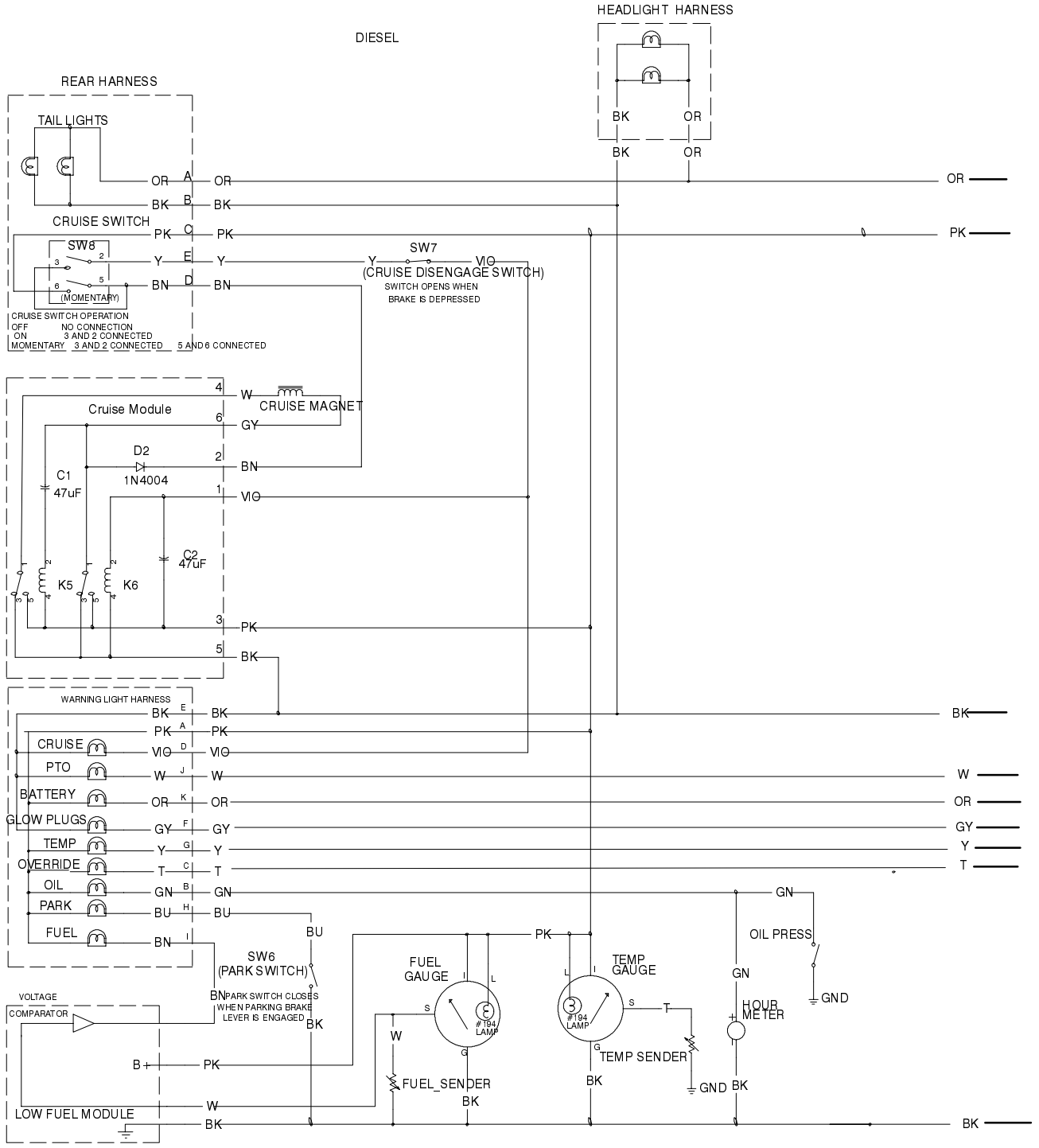
   IMPORTANT: Do NOT run the engine until it uses up all of the fuel and stops. The fuel injector pump on the engine requires fuel for lubrication.

6. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged or defective.

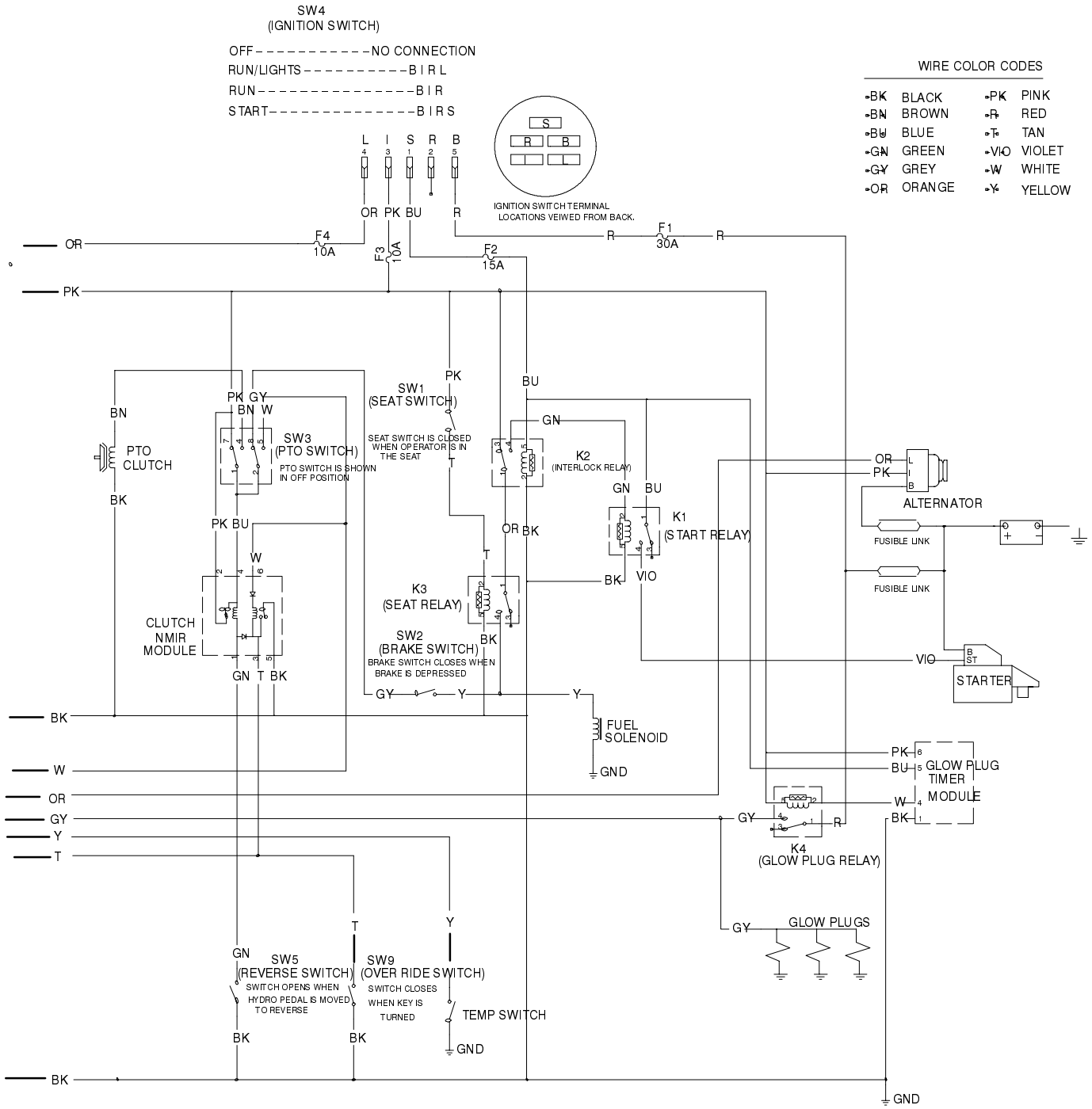
7. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.

8. Store the machine in a clean, dry garage or storage area. Remove both the ignition and "Key Choice" keys and put them in a memorable place out of the reach of children. Cover the machine to protect it and keep it clean.

Wiring Diagram



Wiring Diagram



Troubleshooting

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
The starter does not crank.	1. The PTO is ON.	1. Move the PTO to OFF.
	2. The brake is not depressed or the parking brake is not on.	2. Set the parking brake.
	3. The operator is not seated.	3. Sit on the seat.
	4. The electrical connections are corroded or loose.	4. Check the electrical connections for good contact.
	5. A fuse is blown or loose.	5. Correct or replace the fuse.
	6. The relay or switch is defective.	6. Contact your Authorized Service Dealer.
	7. The battery is discharged.	7. Charge the battery or replace it.
	8. The safety interlock system is malfunctioning.	8. Contact your Authorized Service Dealer.
	9. A faulty starter or starter solenoid.	9. Contact your Authorized Service Dealer.
	10. Seized internal engine components.	10. Contact your Authorized Service Dealer.
The engine cranks, but will not start.	1. Incorrect starting procedure.	1. Refer to Starting and Stopping the Engine, page 14.
	2. The fuel tank is empty.	2. Fill with fresh fuel.
	3. The fuel shut-off valve is closed.	3. Open the fuel shut-off valve.
	4. Dirt, water, stale fuel, or incorrect fuel is in the fuel system.	4. Drain and flush the fuel system; add fresh fuel.
	5. Clogged fuel line.	5. Clean or replace.
	6. The kill relay is not energized, or the fuel solenoid is inoperative.	6. Contact your Authorized Service Dealer.
	7. There is air in the fuel	7. Bleed the nozzles and check for air leaks at the fuel hose connections and fittings between the fuel tank and engine.
	8. Inoperative glow plugs.	8. Check the fuse, glow plugs and wiring.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
The engine cranks, but will not start (continued).	9. Slow cranking speed.	9. Check the battery, oil viscosity and starting motor (contact your Authorized Service Dealer).
	10. The air cleaner element is dirty.	10. Clean or replace.
	11. Low compression.	11. Contact your Authorized Service Dealer.
	12. The injection nozzles are faulty.	12. Contact your Authorized Service Dealer.
	13. The fuel filter is clogged.	13. Replace the fuel filter.
	14. The injection pump timing is incorrect.	14. Contact your Authorized Service Dealer.
	15. The injection pump is faulty.	15. Contact your Authorized Service Dealer.
	16. Improper fuel grade for cold weather use.	16. Drain the fuel system and replace the fuel filter. Add fresh fuel of proper grade for ambient temperature conditions.
The engine starts, but does not keep running.	1. The fuel tank vent is restricted.	1. Contact your Authorized Service Dealer.
	2. Dirt or water is in the fuel system.	2. Drain and flush the fuel system; add fresh fuel.
	3. The fuel filter is clogged.	3. Replace the fuel filter.
	4. The fuel pump is faulty.	4. Contact your Authorized Service Dealer.
	5. There is air in the fuel.	5. Bleed the nozzles and check for air leaks at fuel hose connections and fittings between the fuel tank and engine.
	6. Improper fuel grade for cold weather use.	6. Drain the fuel system and replace the fuel filter. Add fresh fuel of proper grade for ambient temperature conditions.
The engine runs, but knocks or misses.	1. Dirt, water, stale fuel, or incorrect fuel is in the fuel system.	1. Drain and flush the fuel system; add fresh fuel.
	2. Engine overheating.	2. See ENGINE OVERHEATS.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
The engine runs, but knocks or misses (continued).	3. There is air in the fuel.	3. Bleed nozzles and check for air leaks at the fuel hose connections and fittings between the fuel tank and engine.
	4. The injection nozzles are faulty.	4. Contact your Authorized Service Dealer.
	5. Low compression	5. Contact your Authorized Service Dealer.
	6. The injection pump timing is incorrect.	6. Contact your Authorized Service Dealer.
	7. Excessive carbon build-up.	7. Contact your Authorized Service Dealer.
	8. Internal wear or damage.	8. Contact your Authorized Service Dealer.
The engine will not idle.	1. The fuel tank vent is restricted.	1. Contact your Authorized Service Dealer.
	2. Dirt, water, stale fuel, or incorrect fuel is in the fuel system.	2. Drain and flush the fuel system; add fresh fuel.
	3. The idle speed adjusting screw is incorrectly set.	3. Contact your Authorized Service Dealer.
	4. The fuel pump is faulty.	4. Contact your Authorized Service Dealer.
	5. Low compression.	5. Contact your Authorized Service Dealer.
	6. The air cleaner element is dirty.	6. Clean or replace.
	7. The fuel filter is clogged.	7. Replace the fuel filter.
	8. There is air in the fuel.	8. Bleed the nozzles and check for air leaks at the fuel hose connections and fittings between the fuel tank and engine.
The engine overheats.	1. More coolant is needed.	1. Check and add coolant.
	2. (3) air intake screens are dirty.	2. Clean with every use.
	3. Restricted air flow to the radiator.	3. Inspect and clean the radiator screen with every use.
	4. Radiator fins are dirty.	4. Clean the radiator fins.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
The engine overheats (continued).	5. The crankcase oil level is incorrect.	5. Fill or drain to the full mark.
	6. Excessive loading.	6. Reduce load; use lower ground speed.
	7. The thermostat is faulty.	7. Contact your Authorized Service Dealer.
	8. The fan belt is loose or broken.	8. Contact your Authorized Service Dealer.
	9. Incorrect fuel is in the fuel system.	9. Drain and flush the fuel system; add fresh fuel.
	10. Injection timing is incorrect.	10. Contact your Authorized Service Dealer.
	11. Coolant pump is defective.	11. Contact your Authorized Service Dealer.
The engine loses power.	1. The crankcase oil level is incorrect.	1. Fill or drain to the full mark.
	2. The air cleaner element is dirty.	2. Clean or replace.
	3. Dirt, water, stale fuel, or incorrect fuel is in the fuel system.	3. Drain and flush the fuel system; add fresh fuel.
	4. The engine is overheated.	4. See ENGINE OVERHEATS.
	5. Low compression.	5. Contact your Authorized Service Dealer.
	6. The fuel tank vent is restricted.	6. Contact your Authorized Service Dealer.
	7. The engine load is excessive.	7. Reduce ground speed.
	8. There is air in the fuel.	8. Bleed the nozzles and check for air leaks at the fuel hose connections and fittings between the fuel tank and engine.
	9. The injection pump timing is incorrect.	9. Contact your Authorized Service Dealer.
	10. The injection pump is faulty.	10. Contact your Authorized Service Dealer.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Excessive black smoke from exhaust.	1. The air cleaner element is dirty.	1. Clean or replace.
	2. The injection pump timing is incorrect.	2. Contact your Authorized Service Dealer.
	3. Incorrect fuel is in the fuel system.	3. Drain the fuel system and refill with specified fuel.
	4. The injection nozzles are faulty.	4. Contact your Authorized Service Dealer.
	5. The injection pump is faulty.	5. Contact your Authorized Service Dealer.
	6. Excessive loading.	6. Reduce load; use lower ground speed.
Excessive white smoke from exhaust.	1. The engine temperature is low.	1. Check the thermostat.
	2. The glow plugs are inoperative.	2. Check the fuse, glow plugs and wiring.
	3. The fuel injection nozzles are faulty.	3. Contact your Authorized Service Dealer.
	4. The injection pump timing is incorrect.	4. Contact your Authorized Service Dealer.
	5. Low compression.	5. Contact your Authorized Service Dealer.
The tractor will not operate in either direction because the engine bogs down or stalls.	1. The brake is sticking.	1. Contact your Authorized Service Dealer.
The tractor goes forward only at partial speed and is slow or does not operate in reverse.	1. The cruise control was engaged when the traction pedal was in neutral.	1. Turn the cruise control off.
	2. The engine is running at partial speed.	2. Move the throttle to “FAST.”
	3. The linkage is out of adjustment.	3. Contact your Authorized Service Dealer.
	4. There is internal hydro wear.	4. Contact your Authorized Service Dealer.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
The tractor will not operate in either direction.	1. The High-Low range lever is in "N."	1. Move the High-Low range lever to "L" or "H."
	2. The transmission oil is low.	2. Fill to the full "F" mark on the transmission oil dipstick when the transmission is cold.
	3. The transmission is faulty.	3. Contact your Authorized Service Dealer.
	4. The control linkage needs adjustment or replacement.	4. Contact your Authorized Service Dealer.
	5. The parking brake was not released or the parking brake is not releasing.	5. Release the parking brake or check the linkage.
	6. The drive shaft or wheel hub key has been damaged.	6. Contact your Authorized Service Dealer.
	7. The power steering filter is dirty.	7. Contact your Authorized Service Dealer.
The tractor operates erratically.	1. The transmission oil level is low.	1. Fill to the full "F" mark on the transmission oil dipstick when the transmission is cold.
	2. The transmission control linkage needs adjustment or replacement.	2. Contact your Authorized Service Dealer.
	3. The transmission is faulty.	3. Contact your Authorized Service Dealer.
The tractor operates in both directions, but with a loss of power. This condition becomes worse as the transmission becomes hot.	1. The transmission oil level is low.	1. Fill to the full "F" mark on the transmission oil dipstick when the transmission is cold.
	2. The transmission shows signs of overheating or water contamination.	2. Replace the transmission oil and filter.
	3. The cooling fan and/or transmission cooling fins are faulty or dirty.	3. Clean the transmission and/or replace the fan (contact your Authorized Service Dealer).
	4. The engine is not operating at full throttle.	4. Increase the engine speed to full throttle.
	5. The power steering filter is dirty.	5. Contact your Authorized Service Dealer.
The front wheels do not turn with the steering wheel.	1. Air in the hydraulic system.	1. With the engine running at full throttle, operate the lift and turn the steering wheel back and forth several times.
The steering is noisy.	1. The power steering filter is dirty.	1. Contact your Authorized Service Dealer.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Abnormal vibration or noise.	1. The engine mounting bolts are loose.	1. Tighten the engine mounting bolts.
	2. The idler pulley or mower deck blade is loose.	2. Tighten the appropriate pulley or blade fastener.
	3. The transaxle cooling fan is loose.	3. Contact your Authorized Service Dealer.
	4. There is a problem with the electric clutch.	4. Contact your Authorized Service Dealer.
PTO (cutter deck) belt comes off of pulleys, slips, or fails.	1. Belt tension is incorrect.	1. See cutter deck or attachment manual.
	2. Mower level is incorrect	2. See cutter deck manual.
	3. Blade slope in transport is incorrect.	3. See cutter deck manual.
	4. Cutter deck belt guide is loose or incorrectly adjusted.	4. Adjust and tighten belt guide.
	5. Belt is worn or damaged.	5. See cutter deck or attachment manual.
	6. Pulley is damaged.	6. Contact authorized dealer.
	7. Engine is not at full throttle.	7. Always operate engine powered attachments at full throttle.
	8. PTO is being engaged when cutter deck is in tall uncut grass or weeds.	8. Engage PTO only in shorter or previously cut grass.
	9. Cutter deck is overloaded because mulching or bagging requires more power.	9. Reduce ground speed when mulching or bagging.
	10. Cutter deck is overloaded because too much grass is being cut at a time.	10. Cut tall grass and weeds with mower in its highest position, making a second pass cutting at height desired.
	11. Cutter deck is overloaded because deck is clogged with grass clippings.	11. Clean cutter deck.
	12. Cutter deck is overloaded because tractor is mowing too fast for conditions.	12. Reduce ground speed.

TORO. Consumer Riding Products

The Toro Total Coverage Guarantee

A Two-Year Full Warranty
(Limited Warranty for Commercial Use)

Conditions and Products Covered

The Toro Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly promise to repair any Toro Product used for normal residential purposes* if defective in materials or workmanship. The following time periods apply from the date of purchase:

Products	Warranty Period
• All Products	2 year full warranty
• 300 and 5xi Series Tractors:	
Chassis	5 year full warranty
Front Axle	5 year full warranty
Drive Shaft (5xi Series Only)	5 year full warranty
• All Batteries	1 year full warranty

This warranty covers both the cost of parts and labor, and transportation within a fifteen mile radius of the servicing dealer.

This warranty applies to all consumer riding products and their attachments.

* Normal residential purposes means use of the product on the same lot as your home. Use at more than one location is considered commercial use, and the commercial use warranty would apply.

Limited Warranty for Commercial Use

Toro Consumer Products and attachments used for commercial, institutional, or rental use are warranted against defects in materials or workmanship for the following time periods from the date of purchase:

Products	Warranty Period
• All Products	90 day limited warranty
• 300 and 5xi Series Tractors:	
Chassis	1 year limited warranty
Liquid Cooled Gas Engines	1 year limited warranty
Air Cooled Gas and Diesel Engines	2 year limited warranty

Instructions for Obtaining Warranty Service

Should you feel your Toro Product contains a defect in materials or workmanship, contact the retailer who sold you the product or any Authorized Service Dealer or Master Service Dealer. The Yellow Pages of your telephone directory is a good reference source. The dealer will either arrange service at his/her dealership or recommend another Authorized Service Dealer who may be more convenient. You may need proof of purchase (copy of registration card, sales receipt, etc.) for warranty validation.

If for any reason you are dissatisfied with the Service Dealer's analysis of the defect in materials or workmanship or if you need a referral to a Toro Service Dealer, please feel free to contact us at:

Customer Service Department
Toro Warranty Company
8111 Lyndale Avenue South
Bloomington, MN 55420-1196
612-888-8801
800-348-2424

Owner Responsibilities

You must maintain your Toro Product by following the maintenance procedures described in the operator's manual. Such routine maintenance, whether performed by a dealer or by you, is at your expense.

Items and Conditions Not Covered

There is no other express warranty except for special emission system coverage on some products. This express warranty does not cover:

- Cost of regular maintenance service or parts, such as filters, fuel, lubricants, tune-up parts, blade sharpening, brake and clutch adjustments.
- Any product or part which has been altered or misused or required replacement or repair due to normal wear, accidents, or lack of proper maintenance.
- Repairs necessary due to improper fuel, contaminants in the fuel system, or failure to properly prepare the fuel system prior to any period of non-use over three months.
- Pickup and delivery charges for distances beyond a fifteen mile radius from an Authorized Toro Service Dealer.

All repairs covered by this warranty must be performed by an Authorized Toro Service Dealer using Toro approved replacement parts.

General Conditions

Repair by an Authorized Toro Service Dealer is your sole remedy under this warranty.

Neither The Toro Company nor Toro Warranty Company is liable for indirect, incidental or consequential damages in connection with the use of the Toro Products covered by this warranty, including any cost or expense of providing substitute equipment or service during reasonable periods of malfunction or non-use pending completion of repairs under this warranty. Some states do not allow exclusions of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions and limitations may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Countries Other than the United States or Canada

Customers who have purchased Toro products exported from the United States or Canada should contact their Toro Distributor (Dealer) to obtain guarantee policies for your country, province, or state. If for any reason you are dissatisfied with your Distributor's service or have difficulty obtaining guarantee information, contact the Toro importer. If all other remedies fail, you may contact us at Toro Warranty Company.

Rev. 12/06/1999