



Count on it.

Operator's Manual

Dingo® TX 413 Compact Utility Loader

Model No. 22308—Serial No. 28000001 and Up



Warning

CALIFORNIA Proposition 65 Warning

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



There may be buried power, gas, and/or telephone lines in the work area. Shock or explosion may occur if you dig into them.

Have the property or work area marked for buried lines and do not dig in marked areas. Contact your local marking service or utility company to have the property marked (for example, in the United States, call 811 for the nationwide marking service).

Because in some areas there are local, state, or federal regulations requiring that a spark arrester be used on the engine of this machine, a spark arrester is available as an option. If you require a spark arrester, contact your Authorized Service Dealer.

Genuine Toro spark arresters are approved by the USDA Forestry Service.

Important: It is a violation of California Public Resource Code Section 4442 to use or operate the engine on any forest-covered, brush-covered, or grass-covered land without a spark arrester muffler maintained in working order, or the engine constricted, equipped, and maintained for the prevention of fire. Other states or federal areas may have similar laws.

This spark ignition system complies with Canadian ICES-002.

The enclosed *Engine Owner's Manual* is supplied for information regarding the US Environmental Protection Agency (EPA) and the California Emission Control Regulation of emission systems, maintenance, and warranty. Replacements may be ordered through the engine manufacturer.

Introduction

Read this information carefully to learn how to operate and maintain your product properly and to avoid injury and product damage. You are responsible for operating the product properly and safely.

You may contact Toro directly at www.Toro.com for product and accessory information, help finding a dealer, or to register your product.

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

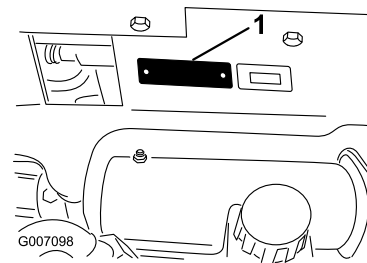


Figure 1

1. Model and serial number plate

Model No.	_____
Serial No.	_____

This manual identifies potential hazards and has safety messages identified by the safety alert symbol (Figure 2), which signals a hazard that may cause serious injury or death if you do not follow the recommended precautions.



Figure 2


1. Safety alert symbol

This manual uses 2 other words to highlight information. **Important** calls attention to special mechanical information and **Note** emphasizes general information worthy of special attention.

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Safety

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

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



Engine exhaust contains carbon monoxide, an odorless, deadly poison that can kill you.

Do not run the engine indoors or in an enclosed area.

Training

- Read the *Operator's Manual* and other training material. If the operator(s) or mechanic(s) can not read English, it is the owner's responsibility to explain this material to them.
- Become familiar with the safe operation of the equipment, operator controls, and safety signs.
- All operators and mechanics should be trained. The owner is responsible for training the users.
- Never let children or untrained people operate or service the equipment. Local regulations may restrict the age of the operator.
- The owner/user can prevent and is responsible for accidents or injuries occurring to himself or herself, other people or property.

Preparation

- Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job. Only use accessories and attachments approved by the manufacturer.
- Wear appropriate clothing including hard hat, safety glasses, long pants, safety shoes, and hearing protection. Long hair, loose clothing or jewelry may get tangled in moving parts.

- Inspect the area where the equipment is to be used and remove all objects such as rocks, toys, and wire which can be thrown by the machine.
- Use extra care when handling gasoline and other fuels. They are flammable and vapors are explosive.
 - Use only an approved container
 - Never remove the gas cap or add fuel with the engine running. Allow the engine to cool before refueling. Do not smoke.
 - Never refuel or drain the machine indoors.
- Check that the operator's presence controls, safety switches, and shields are attached and functioning properly. Do not operate unless they are functioning properly.

Operation

- Never run an engine in an enclosed area.
- Only operate in good light, keeping away from holes and hidden hazards.
- Be sure all drives are in neutral and parking brake is engaged before starting the engine. Only start the engine from the operator's position.
- Slow down and use extra care on hillsides. Be sure to travel in the recommended direction on hillsides. Turf conditions can affect the machine's stability.
- Slow down and use caution when making turns and when changing directions on slopes.
- Never operate with the guards not securely in place. Be sure all interlocks are attached, adjusted properly, and functioning properly.
- Do not change the engine governor setting or overspeed the engine.
- Stop on level ground, lower implements, disengage the auxiliary hydraulics, engage parking brake, shut off the engine before leaving the operator's position for any reason.
- Keep hands and feet away from moving attachments.
- Look behind and down before backing up to be sure of a clear path.
- Never carry passengers and keep pets and bystanders away.
- Slow down and use caution when making turns and crossing roads and sidewalks.
- Do not operate the machine under the influence of alcohol or drugs.
- Use care when loading or unloading the machine into a trailer or truck.
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

- Read all attachment manuals.
- Ensure that the area is clear of other people before operating the traction unit. Stop the traction unit if anyone enters the area.
- Never leave a running traction unit unattended. Always lower the loader arm, stop the engine, set the parking brake, and remove the key before leaving.
- Do not exceed the rated operating capacity, as the traction unit may become unstable which may result in loss of control.
- Do not carry a load with the arm raised. Always carry loads close to the ground.
- Do not over-load the attachment and always keep the load level when raising the loader arm. Logs, boards, and other items could roll down the loader arm, injuring you.
- Never jerk the controls; use a steady motion.
- Watch for traffic when operating near or crossing roadways.
- Do not touch parts which may be hot from operation. Allow them to cool before attempting to maintain, adjust, or service.
- Check for overhead clearances (i.e. branches, doorways, electrical wires) before driving under any objects and do not contact them.
- Ensure that you operate the traction unit in areas where there are no obstacles in close proximity to the operator. Failure to maintain adequate distance from trees, walls, and other barriers may result in injury as the traction unit backs up during operation if the operator is not attentive to the surroundings. Only operate the unit in areas where there is sufficient clearance for the operator to safely maneuver the product.
- Before digging, have the area marked for underground utilities, and do not dig in marked areas.
- Locate the pinch point areas marked on the traction unit and attachments and keep hands and feet away from these areas.
- Before operating the traction unit with an attachment, ensure that the attachment is properly installed.

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.

- Do not operate the traction unit on hillsides or slopes exceeding the angles recommended in the

Stability Data section and those in the attachment *Operator's Manual*. See also the Slope Chart , page 7.

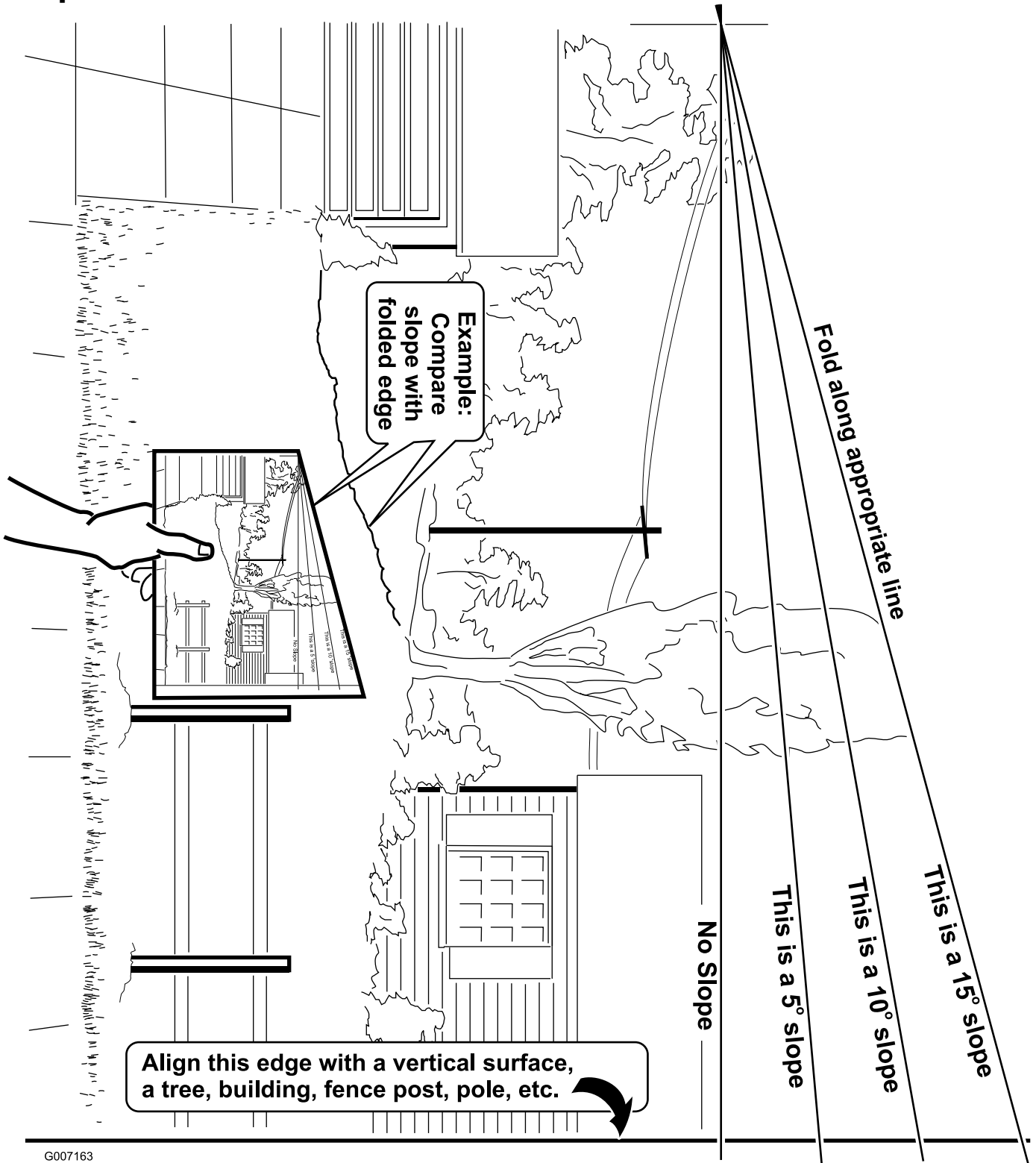
- **Operate up and down slopes with the heavy end of the traction unit uphill.** Weight distribution changes. An empty bucket will make the rear of the traction unit the heavy end, and a full bucket will make the front of the traction unit the heavy end. Most other attachments will make the front of traction unit the heavy end.
- Raising the loader arm on a slope will affect the stability of the machine. Whenever possible, keep the loader arm in the lowered position when on slopes.
- Removing an attachment on a slope will make the rear of the traction unit heavy. Refer to the Stability Data section to determine whether the attachment can be safely removed on the slope.
- Remove obstacles such as rocks, tree limbs, etc. from the work area. Watch for holes, ruts, or bumps, as uneven terrain could overturn the traction unit. Tall grass can hide obstacles.
- Use only Toro-approved attachments. Attachments can change the stability and the operating characteristics of the traction unit. Warranty may be voided if used with unapproved attachments.
- Keep all movements on slopes slow and gradual. Do not make sudden changes in speed or direction.
- Avoid starting or stopping on a slope. If the traction unit loses traction, proceed slowly, straight down the slope.
- Avoid turning on slopes. If you must turn, turn slowly and keep the heavy end of the traction unit uphill.
- Do not operate near drop-offs, ditches, or embankments. The traction unit could suddenly turn over if a track goes over the edge of a cliff or ditch, or if an edge caves in.
- Do not operate on wet grass. Reduced traction could cause sliding.
- Do not park the traction unit on a hillside or slope without lowering the attachment to the ground, setting the parking brake, and chocking the tracks.

Maintenance and Storage

- Disengage the auxiliary hydraulics, lower the attachment, set the parking brake, stop the engine, and remove the key. Wait for all movement to stop before adjusting, cleaning, or repairing.
- Clean debris from attachments, drives, mufflers, and engine to help prevent fires. Clean up oil or fuel spillage.

- Let the engine cool before storing and do not store near flame.
- Do not store fuel near flames or drain indoors.
- Park the machine on level ground. Never allow untrained personnel to service the machine.
- Use jack stands to support components when required.
- Carefully release pressure from components with stored energy.
- Disconnect the battery or remove the spark plug wires before making any repairs. Disconnect the negative terminal first and the positive last. Reconnect positive first and negative last.
- Keep hands and feet away from moving parts. If possible, do not make adjustments with the engine running.
- Charge batteries in an open, well ventilated area, away from spark and flames. Unplug the charger before connecting or disconnecting it from the battery. Wear protective clothing and use insulated tools.
- Keep all parts in good working condition and all hardware tightened. Replace all worn or damaged decals.
- If any maintenance or repair requires the loader arm to be in the raised position, secure the arm in the raised position with the hydraulic cylinder lock.
- Keep nuts and bolts tight. Keep equipment in good condition.
- Never tamper with safety devices.
- Keep the traction unit free of grass, leaves, or other debris build-up. Clean up oil or fuel spillage. Allow the traction unit to cool before storing.
- Use extra care when handling gasoline and other fuels. They are flammable and vapors are explosive.
 - Use only an approved container.
 - Never remove the gas cap or add fuel when the engine is running. Allow the engine to cool before refueling. Do not smoke.
 - Never refuel the traction unit indoors.
 - Never store the traction unit or fuel container inside where there is an open flame, such as near a water heater or furnace.
 - Never fill a container while it is inside a vehicle, trunk, pick-up bed, or any surface other than the ground.
 - Keep container nozzle in contact with the tank during filling.
- Stop and inspect the equipment if you strike an object. Make any necessary repairs before restarting.
- Use only genuine Toro replacement parts to ensure that original standards are maintained.
- 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 the battery.
- Keep your body and hands away from pin hole leaks or nozzles that eject high pressure hydraulic fluid. Use cardboard or paper to find hydraulic leaks; never use your hands. Hydraulic fluid escaping under pressure can penetrate skin and cause injury requiring surgery within a few hours by a qualified surgeon or gangrene may result.

Slope Chart

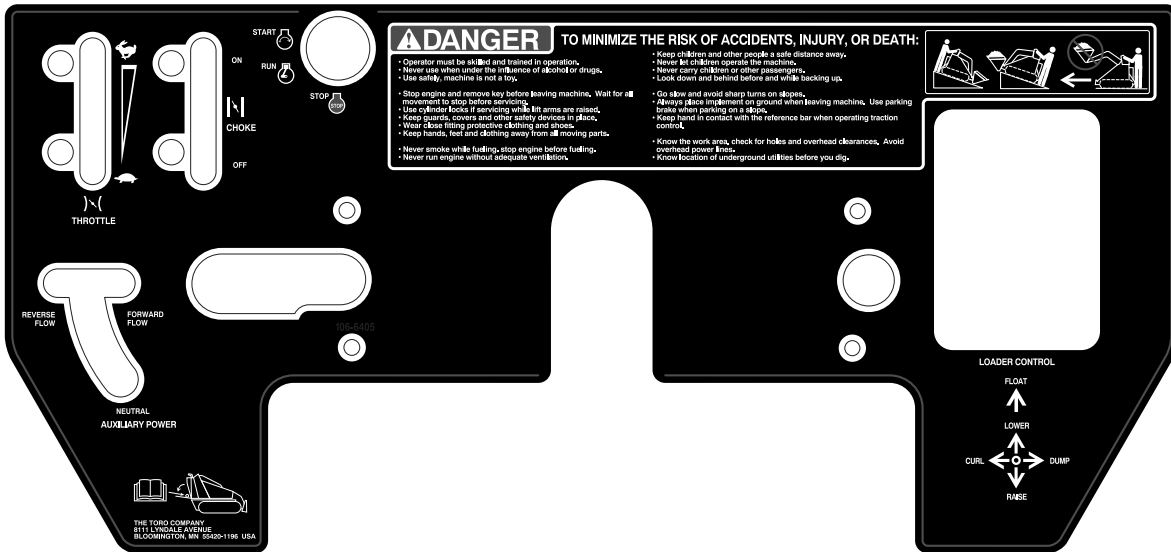


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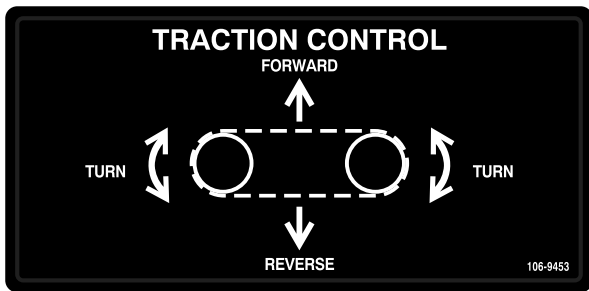
Safety and Instructional Decals



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.



106-9450



106-9453



100-6141



98-5954



100-6101



80-9350



100-6135



105-8432

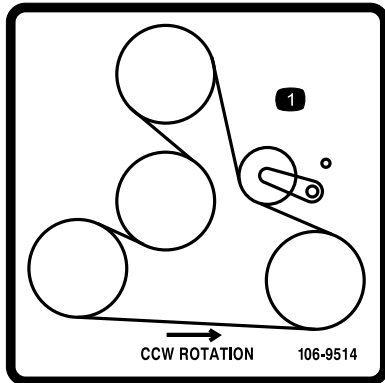


104-2838



93-9084

- 1. Lift point
- 2. Tie-down point



106-9514

- 1. Belt routing



Battery Symbols

Some or all of these symbols are on your battery

- 1. Explosion hazard
- 2. No fire, open flame, or smoking.
- 3. Caustic liquid/chemical burn hazard
- 4. Wear eye protection
- 5. Read the *Operator's Manual*.
- 6. Keep bystanders a safe distance from the battery.
- 7. Wear eye protection; explosive gases can cause blindness and other injuries
- 8. Battery acid can cause blindness or severe burns.
- 9. Flush eyes immediately with water and get medical help fast.
- 10. Contains lead; do not discard.

Setup

Charging the Battery

Warning

CALIFORNIA Proposition 65 Warning

Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

1. Open the rear access cover.
2. Remove the caps from the battery posts.
3. Connect a charger to the battery (Figure 3) and charge it for a minimum of 1 hour at 6 to 10 amps. Do not overcharge the battery.

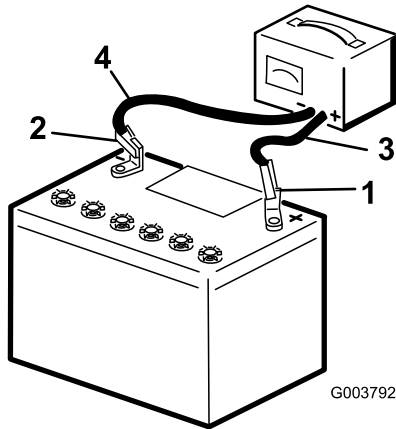


Figure 3

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

Important: Connect the *positive (red)* cable first.

6. Ensure that the protective boot covers the positive cable.
7. Close the rear access cover.

Checking Fluid Levels

Before starting the engine for the first time, check the engine oil and hydraulic fluid levels. Refer to Operation for more information.



Charging the battery produces gasses that can explode.

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

4. When the battery is fully charged, unplug the charger from the electrical outlet, then disconnect the charger leads from the battery posts (Figure 3).
5. Install the battery cables to the positive and negative posts of the battery using the battery post bolts and nuts provided.

Product Overview

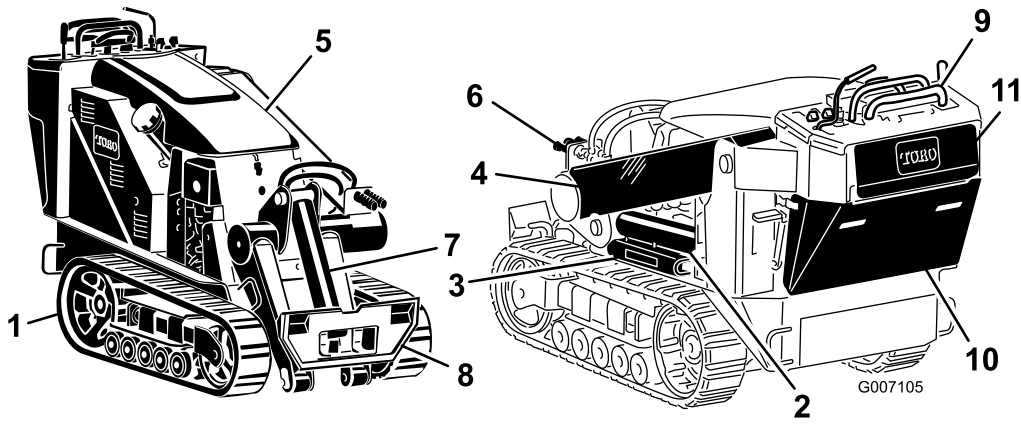


Figure 4

- | | | | |
|------------------|---------------------------------|------------------|--------------------------|
| 1. Track | 4. Loader arm | 7. Tilt cylinder | 10. Rear access cover |
| 2. Lift cylinder | 5. Hood | 8. Mount plate | 11. Reverse safety plate |
| 3. Cylinder lock | 6. Auxiliary hydraulic couplers | 9. Control panel | |

Controls

Become familiar with all the controls (Figure 5) before you start the engine and operate the traction unit.

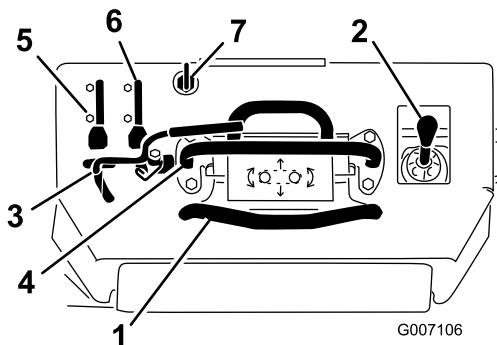


Figure 5

- | | |
|-------------------------------------|-------------------|
| 1. Traction control | 5. Throttle lever |
| 2. Loader arm/attachment tilt lever | 6. Choke lever |
| 3. Auxiliary hydraulics lever | 7. Key switch |
| 4. Reference bar | |

Throttle Lever

Move the control forward to increase the engine speed and rearward to decrease speed.

Choke Lever

Before starting a cold engine, move the choke lever forward. After the engine starts, regulate the choke to keep the engine running smoothly. As soon as possible, move the choke lever all the way rearward.

Note: A warm engine requires little or no choking.

Reference Bar

When driving the traction unit, use the reference bar as a handle and a leverage point for controlling the traction control and the auxiliary hydraulics lever. To ensure smooth, controlled operation, do not take both hands off of the reference bar while operating the traction unit.

Key Switch

The key switch, used to start and stop the engine, has three positions: off, run, and start.

To start the engine, rotate the key to the start position. Release the key when engine starts and it will move automatically to the run position.

To stop the engine, rotate the key to the off position.

Traction Control

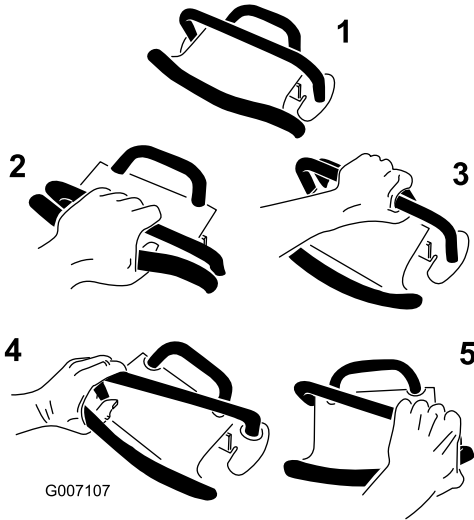


Figure 6

1. Neutral/stop
2. Forward
3. Reverse
4. Turn right
5. Turn left

- To move forward, move the traction control forward (number 2 in Figure 6).
- To move rearward, move the traction control rearward (number 3 in Figure 6). **When reversing, look behind for obstructions and keep your hands on the reference bar (Figure 5).**
- To turn, rotate the traction control in the desired direction (number 4 and 5 in Figure 6).
- To stop, release the traction control (number 1 in Figure 6).

Note: The farther you move the traction control in any direction, the faster the machine will move in that direction.

Loader Arm/Attachment Tilt Lever

To tilt the attachment forward, slowly move the lever to the right (Figure 7).

To tilt the attachment rearward, slowly move the lever to the left (Figure 7).

To lower the loader arm, slowly move the lever forward (Figure 7).

To raise the loader arm, slowly move the lever rearward (Figure 7).

You can also push the lever fully forward into a detent position (Figure 7) to release the loader arm so that the attachment rests on the ground. This allows attachments such as the leveler and the hydraulic blade to follow the contours of the ground (i.e., float) when grading.

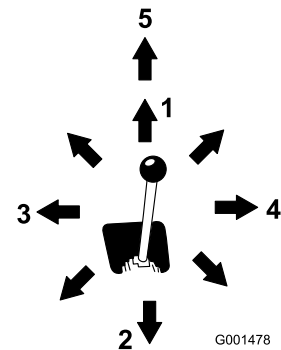


Figure 7

1. Lower the loader arm
2. Raise the loader arm
3. Tilt the attachment rearward
4. Tilt the attachment forward
5. Detent (Float) position

By moving the lever to an intermediate position (such as, forward and left), you can move the loader arm and tilt the attachment at the same time.

Auxiliary Hydraulics Lever

To operate a hydraulic attachment in the forward direction, rotate the auxiliary hydraulics lever rearward and pull it down to the reference bar (Figure 8, number 1).

To operate a hydraulic attachment in reverse direction, rotate the hydraulics lever rearward, then move it left into the upper slot (Figure 8, number 2).

If you release the lever while in the forward position, the lever will automatically return to the neutral position (Figure 8, number 3). If it is in the reverse position, it will remain there until you pull it out of the slot.

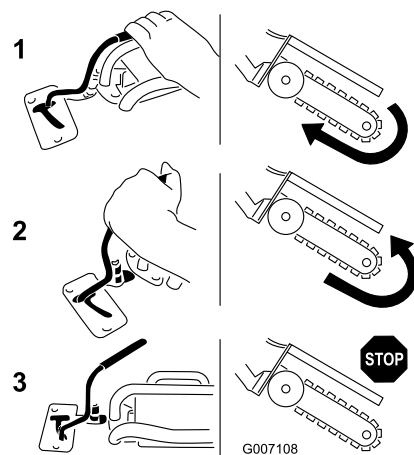


Figure 8

1. Forward flow hydraulics
2. Reverse flow hydraulics
3. Neutral

Parking Brake Lever

To set the parking brake, push the brake lever forward and to the left and then pull it rearward (Figure 9).

Note: The traction unit may roll slightly before the brakes engage in the drive sprocket.

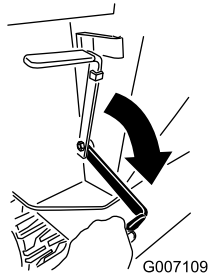


Figure 9

To release the brake, push the lever forward and then right, into the notch.

Fuel Valve Lever

Important: Use the cylinder lock when raising the loader arm to access the fuel valve lever.

The fuel valve lever opens and closes the passage between the fuel tank and the carburetor. The fuel valve lever is shipped from the factory in the open position.

The traction unit is equipped with an electric fuel solenoid that is connected to the ignition switch. The solenoid automatically shuts the fuel off when the ignition key is in the Off position. **The manual fuel lever should remain in the On position.**

The fuel valve lever is located on the left hand side of the traction unit (Figure 10). Raise the loader arm and secure it with the cylinder lock to access the lever.

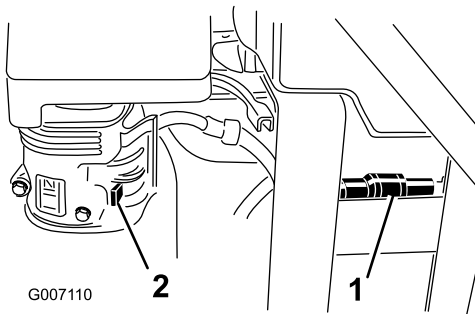


Figure 10

1. Manual fuel valve lever
2. Electric fuel solenoid

The fuel valve lever must be in the On position for the engine to run (Figure 11).

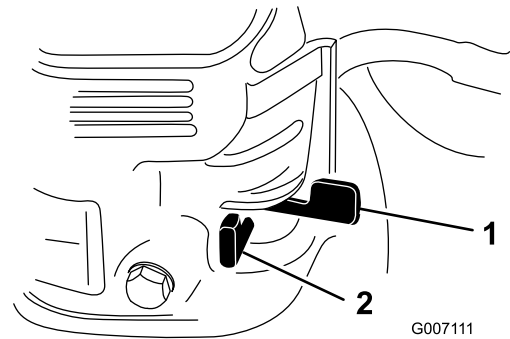


Figure 11

1. Fuel valve in On position
2. Fuel valve in the Off position

Hour Meter

When the engine is off, the hour meter displays the number of hours of operation that have been logged on the traction unit.

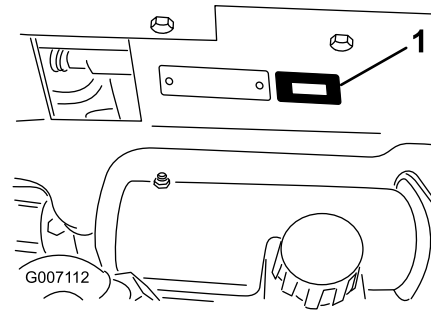


Figure 12

1. Hour meter

After the first 8 hours the screen displays CHG OIL to remind you to change the **hydraulic filter**. Every 99 hours thereafter the screen displays CHG OIL to remind you to change the **engine oil**. After every 399 hours, the screen displays SVC to remind you to perform the other maintenance procedures based on a 400 hour schedule. These reminders come on starting three hours prior to the service interval time and flash at regular intervals for six hours.

Specifications

Note: Specifications and design are subject to change without notice.

Width	34 inches (86 cm)
Length	67.8 inches (172.2 cm)
Height	44.6 inches (113.3 cm)
Weight	1365 lb (619.2 Kg)
Operating capacity	420 lb (190.5 Kg)
Tipping capacity	1200 lb (544 Kg)
Wheelbase	31.2 inches (79 cm)
Dump height (with narrow bucket)	30.6 inches (77.2 cm)
Reach—fully raised (with narrow bucket)	21.5 inches (54.6 cm)
Height to hinge pin (narrow bucket in highest position)	50.8 inches (129 cm)

Attachments/Accessories



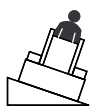
A selection of Toro approved attachments and accessories are available for use with the machine to enhance and expand its capabilities. Contact your Authorized Service Dealer or Distributor or go to www.Toro.com for a list of all approved attachments and accessories.

Important: Use only Toro approved, TX 413 attachments. Other attachments may create an unsafe operating environment or damage the traction unit.

Stability Data

The following tables list the maximum slope recommended for the traction unit in the positions listed in the tables. Slopes over the listed degree may cause the traction unit to become unstable. The data in the tables assume that the loader arm are fully lowered; raised arm may affect the stability.

In each attachment manual is a set of three stability ratings, one for each hill position. To determine the maximum slope you can traverse with the attachment installed, find the degree of slope that corresponds to the stability ratings of the attachment. Example: If the attachment installed on a TX 413 traction unit has a Front Uphill rating of B, a Rear Uphill rating of D, and a Side Uphill rating of C, then you could drive forward up a 20° slope, rearward up a 12° slope, or sideways on a 15° slope, as listed in the following table for the TX 420 traction unit.

Configuration	Maximum Recommended Slope when Operating with:		
	Front Uphill	Rear Uphill	Side Uphill
			
Traction unit without attachment	12°	20°	19°
Traction unit with an attachment rated with one of the following stability ratings for each slope position:			
A	25°	25°	22°
B	20°	20°	19°
C	18°	16°	15°
D	12°	12°	12°
E	5°	5°	5°

Operation

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

Important: Before operating, check the fuel and oil level, and remove debris from the traction unit. Also, ensure that the area is clear of people and debris. You should also know and have marked the locations of all utility lines.

Adding Fuel

Use unleaded gasoline (87 pump octane minimum). Leaded, regular gasoline may be used if unleaded is not available.



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

- Fill the fuel tank outdoors, in an open area, when the engine is cold. Wipe up any gasoline that spills.
- Never fill the fuel tank inside an enclosed trailer.
- Do not fill the fuel tank completely full. Add gasoline to the fuel tank until the level is 1/4 to 1/2 inch (6 to 13 mm) below the bottom of the filler neck. This empty space in the tank allows gasoline to expand.
- Never smoke when handling gasoline, and stay away from an open flame or where gasoline fumes may be ignited by a spark.
- Store gasoline in an approved container and keep it out of the reach of children. Never buy more than a 30-day supply of gasoline.
- Do not operate without entire exhaust system in place and in proper working condition.



In certain conditions during fueling, static electricity can be released causing a spark which can ignite the gasoline vapors. A fire or explosion from gasoline can burn you and others and can damage property.

- Always place gasoline containers on the ground away from your vehicle before filling.
- Do not fill gasoline containers inside a vehicle or on a truck or trailer bed because interior carpets or plastic truck bed liners may insulate the container and slow the loss of any static charge.
- When practical, remove gas-powered equipment from the truck or trailer and refuel the equipment with its wheels on the ground.
- If this is not possible, then refuel such equipment on a truck or trailer from a portable container, rather than from a gasoline dispenser nozzle.
- If a gasoline dispenser nozzle must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.

Important: Do not use methanol, gasoline containing methanol, or gasohol containing more than 10% ethanol because the fuel system could be damaged. Do not mix oil with gasoline.

Using Stabilizer/Conditioner

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

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

Important: Do not use fuel additives containing methanol or ethanol.

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

Note: A fuel stabilizer/conditioner is most effective when mixed with fresh gasoline. To minimize the

chance of varnish deposits in the fuel system, use fuel stabilizer at all times.

Filling the Fuel Tank

1. Park the traction unit on a level surface, lower the loader arm, and stop the engine.
2. Remove the key and allow the engine to cool.
3. Clean around the fuel tank cap and remove it.

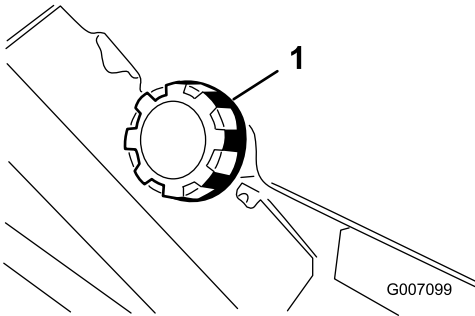


Figure 13

1. Fuel tank cap

4. Add unleaded gasoline to the fuel tank, until the level is 1/4 to 1/2 inch below the bottom of the filler neck.

Important: This space in the tank allows gasoline to expand. Do not fill the fuel tank completely full.

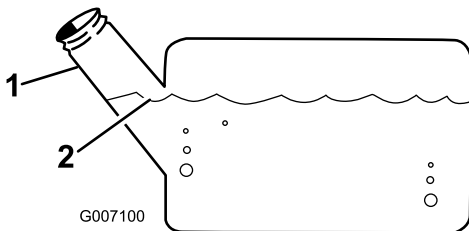


Figure 14

1. Filler neck
2. Fill to 1/4 to 1/2 inch below the filler neck

5. Install the fuel tank cap securely.
6. Wipe up any gasoline that may have spilled.

Checking the Engine Oil Level

Service Interval: Before each use or daily

1. Park the traction unit on a level surface, lower the loader arm, and stop the engine.
2. Remove the key and allow the engine to cool.
3. Clean around the oil dipstick (Figure 15).

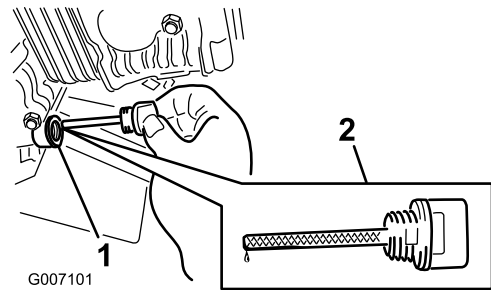


Figure 15

1. Oil filler hole
2. Oil dipstick

4. Remove the dipstick and wipe the end clean (Figure 15).
5. Slide the dipstick fully into the dipstick tube without threading it into the filler neck (Figure 15).
6. Pull the dipstick out and look at the end. There should be oil on the dipstick (Figure 16).

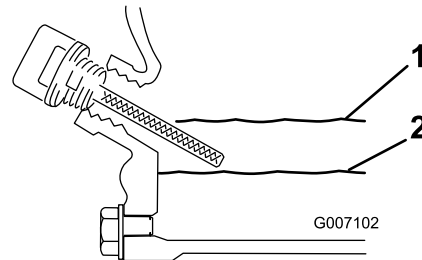


Figure 16

Oil Pan Cross-section

1. Maximum oil level
2. Low oil level

7. If there is no or little oil on the dipstick, add 10w30 engine oil to the filler hole until it comes to the edge of the filler hole.
8. Slowly pour only enough oil into the valve cover to raise the level to the F (full) mark.
9. Replace the dipstick.

Checking the Hydraulic Fluid Level

Service Interval: Every 25 hours

Hydraulic Tank Capacity: 10 US gallons (37.8 l)

Use 10W-30 or 15W-40 detergent, diesel engine oil (API service CH-4 or higher).

1. Remove the attachment, if one is installed; refer to Removing an Attachment.
2. Park the traction unit on a level surface, lower the loader arm, and fully retract the tilt cylinder.
3. Stop the engine, remove the key, and allow the engine to cool.

- Clean the area around the filler neck of the hydraulic tank and remove the cap from the filler neck (Figure 17).

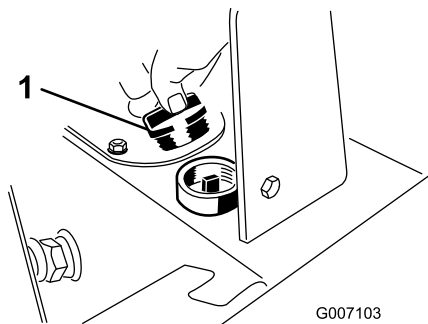


Figure 17

- Filler neck cap

- Check the fluid level on the dipstick (Figure 18).
The fluid level should be between the marks on the dipstick.

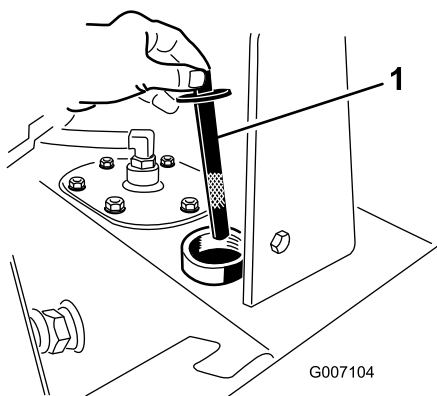


Figure 18

- Dipstick

- If the level is low, add enough fluid to raise it to the proper level.
- Install the cap on the filler neck.

Starting and Stopping the Engine

Starting the Engine

- Ensure that the auxiliary hydraulics lever is in neutral.
- Move the throttle lever midway between Slow and Fast positions.

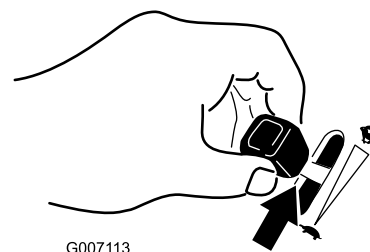


Figure 19

- Move the choke lever to the On position.

Note: A warm or hot engine may not require choking.

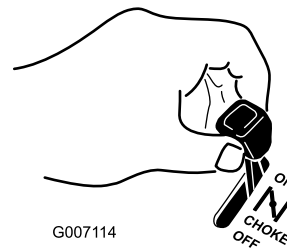


Figure 20

- Turn the ignition key to the Start position (Figure 21). When the engine starts, release the key.

Important: Do not engage the starter for more than 10 seconds at a time. If the engine fails to start, allow a 30 second cool-down period between attempts. Failure to follow these instructions can burn out the starter motor.

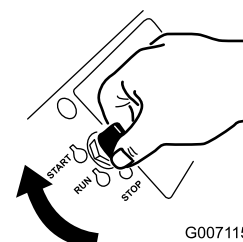


Figure 21

- Gradually move the choke lever to the Off position (Figure 22). If the engine stalls or hesitates, engage the choke again until the engine warms up.

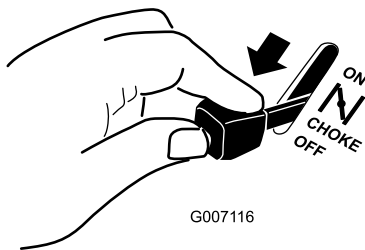


Figure 22

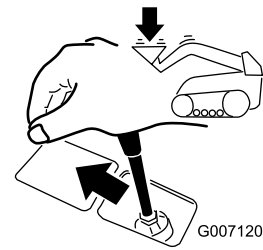


Figure 25

6. Move the throttle lever to the desired setting (Figure 23).

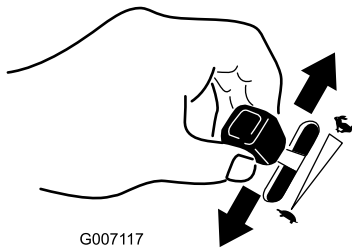


Figure 23

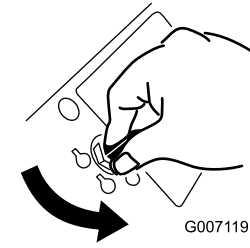


Figure 26

Important: If the engine is run at high speeds when the hydraulic system is cold (i.e., when the ambient air temperature is near freezing or lower), hydraulic system damage could occur. When starting the engine in cold conditions, allow the engine to run in the middle throttle position for 2 to 5 minutes before moving the throttle to fast (rabbit).

Note: If the outdoor temperature is below freezing, store the traction unit in a garage to keep it warmer and aid in starting.

Stopping the Engine

1. Move the throttle lever to the Slow position (Figure 24).

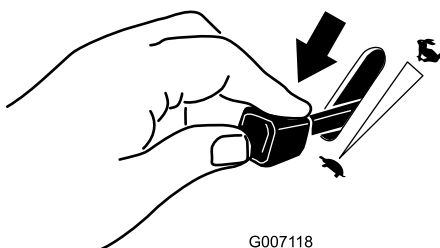


Figure 24

2. Lower the loader arm (Figure 25).

3. Turn the ignition key off (Figure 26).

4. Remove the ignition key (Figure 27).

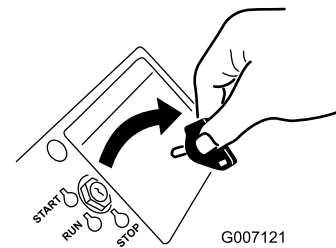


Figure 27

Stopping the Traction Unit

To stop the traction unit, release the traction control, move the throttle lever to slow (turtle), lower loader arm to the ground, and stop the engine. Set the parking brake and remove the key.



A child or untrained bystander could attempt to operate the traction unit and be injured.

Remove the key from the switch when leaving the traction unit, even if just for a few seconds.

Moving a Non-functioning Traction Unit

Important: Do not tow or pull the traction unit without first opening the tow valves, or the hydraulic system will be damaged.

1. Stop the engine.
2. Open the hood.
3. Using a wrench, turn the tow valves on the hydraulic pumps twice counter-clockwise (Figure 28).

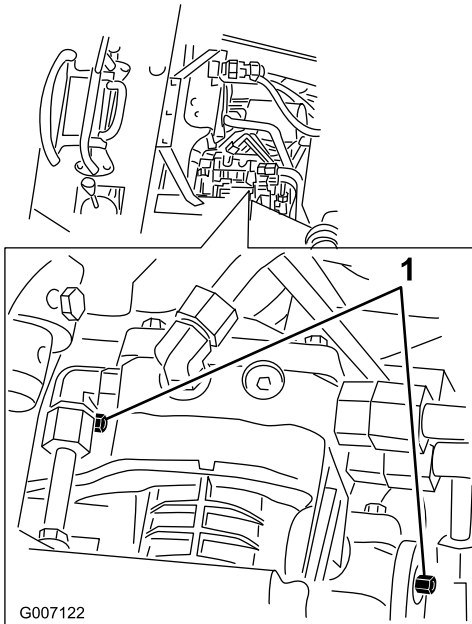


Figure 28

1. Tow valves

4. Close the hood and tow the traction unit as required.
5. When the traction unit has been repaired, close the tow valves before operating it.

Using the Cylinder Lock



The loader arm may lower when in the raised position, crushing anyone under them.

Install the cylinder lock before performing maintenance that requires you to raise the loader arm.

Installing the Cylinder Lock

1. Remove the attachment.
2. Raise the loader arm to the fully raised position.

3. Stop the engine.
4. Remove the hairpin cotter and clevis pin securing the cylinder lock to the frame (Figure 29).

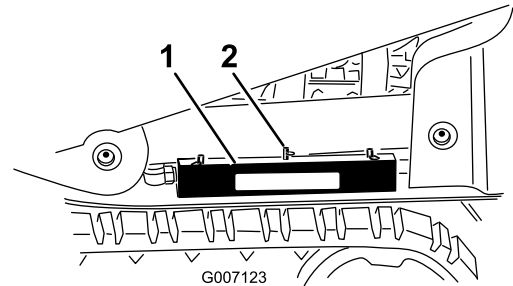


Figure 29

1. Cylinder lock
2. Clevis pin and hairpin cotter

5. Place the cylinder lock over the cylinder rod and secure it with the clevis pin and hairpin cotter (Figure 30).

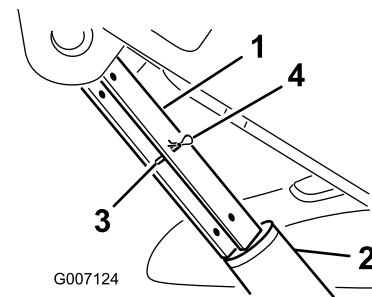


Figure 30

1. Cylinder lock
2. Lift cylinder
3. Clevis pin
4. Hairpin cotter

6. **Slowly** lower the loader arm until the cylinder lock contacts the cylinder body and rod end.

Removing/Storing the Cylinder Lock

Important: Ensure that the cylinder lock is removed from the rod and fully secured in the storage position before operating the traction unit.

1. Start the engine.
2. Raise the loader arm to the fully raised position.
3. Stop the engine.
4. Remove the clevis pin and cotter pin securing the cylinder lock.
5. Place the cylinder lock in its storage location on the frame and secure it with the clevis pin and hairpin cotter (Figure 29).
6. Lower the loader arm.

Using Attachments

Important: Use only Toro-approved, TX 413 attachments. Attachments can change the stability and the operating characteristics of the traction unit. The warranty of the traction unit may be voided if used with unapproved attachments.

Installing an Attachment

Important: Before installing the attachment, ensure that the mount plates are free of any dirt or debris and that the pins rotate freely. If the pins do not rotate freely, grease them.

1. Position the attachment on a level surface with enough space behind it to accommodate the traction unit.
2. Start the engine.
3. Tilt the attachment mount plate forward.
4. Position mount plate into the upper lip of the attachment receiver plate (Figure 31).

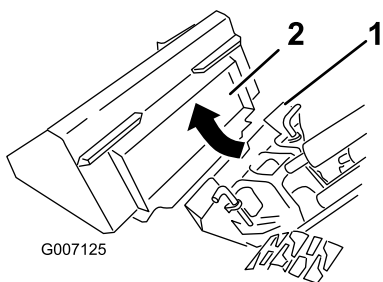


Figure 31

1. Mount plate
2. Receiver plate

5. Raise the loader arm while tilting back the mount plate at the same time.

Important: The attachment should be raised enough to clear the ground, and the mount plate should be tilted all the way back.

6. Stop the engine.
7. Engage the quick attach pins, ensuring that they are fully seated in the mount plate (Figure 32).

Important: If the pins do not rotate to the engaged position, the mount plate is not fully aligned with the holes in the attachment receiver plate. Check the receiver plate and clean it if necessary.

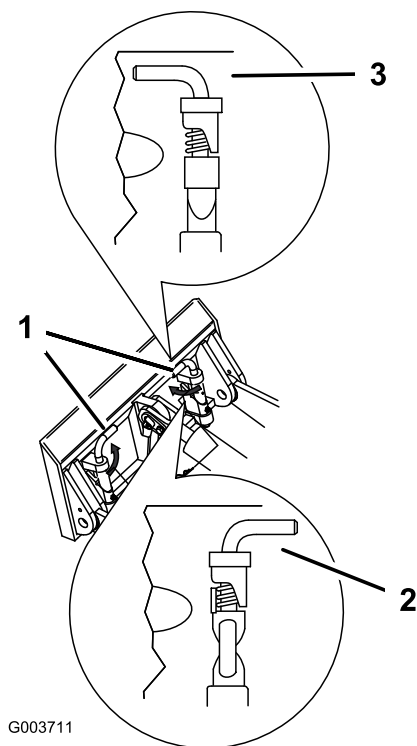


Figure 32

1. Quick attach pins (shown in engaged position)
2. Disengaged position
3. Engaged position



If you do not fully seat the quick attach pins through the attachment mount plate, the attachment could fall off of the traction unit, crushing you or bystanders.

Ensure that the quick attach pins are fully seated in the attachment mount plate.

Connecting the Hydraulic Hoses



Hydraulic fluid escaping under pressure can penetrate skin and cause injury. Fluid injected into the skin must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.

- Keep your body and hands away from pin hole leaks or nozzles that eject high pressure hydraulic fluid.
- Use cardboard or paper to find hydraulic leaks, never use your hands.



Hydraulic couplers, hydraulic lines/valves, and hydraulic fluid may be hot. If you contact hot components you may be burned.

- Wear gloves when operating the hydraulic couplers.
- Allow the traction unit to cool before touching hydraulic components.
- Do not touch hydraulic fluid spills.

If the attachment requires hydraulics for operation, connect the hydraulic hoses as follows:

1. Stop the engine.
2. Move the auxiliary hydraulics lever forward, backward, and back to neutral to relieve pressure at the hydraulic couplers.
3. Move the auxiliary hydraulics lever into the reverse position.
4. Remove the protective covers from the hydraulic couplers on the traction unit.
5. Ensure that all foreign matter is cleaned from the hydraulic connectors.
6. Push the attachment male connector into the female connector on the traction unit (Figure 33).

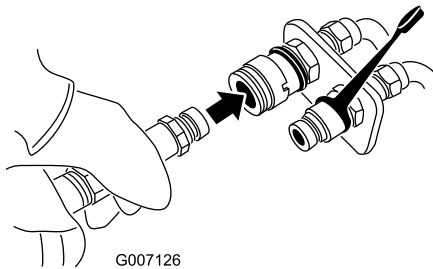


Figure 33

Note: When you connect the attachment male connector first, you will relieve any pressure built up in the attachment.

7. Push the attachment female connector into the male connector on the traction unit (Figure 34).

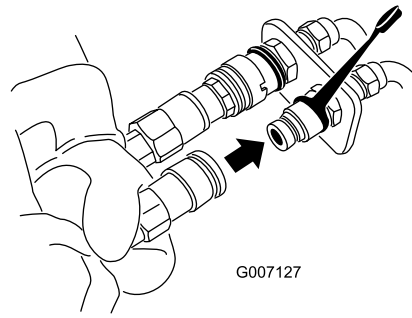


Figure 34

8. Confirm that the connection is secure by pulling on the hoses.
9. Move the auxiliary hydraulics lever to neutral.
10. Connect the protective covers of the hydraulic couplers to each other to ensure the inside of the covers stay clean when the unit is in use (Figure 35).

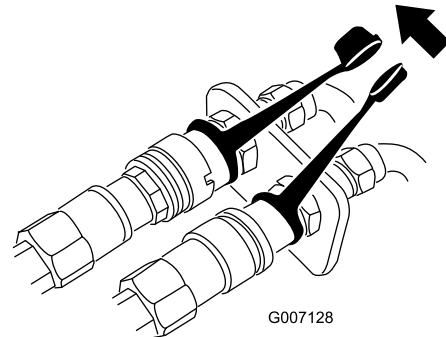


Figure 35

Removing an Attachment

1. Lower the attachment to the ground.
2. Stop the engine.
3. Disengage the quick attach pins by turning them to the outside.
4. If the attachment uses hydraulics, move the auxiliary hydraulics lever forward, backward, and back to neutral to relieve pressure at the hydraulic couplers.
5. If the attachment uses hydraulics, slide the collar back on the hydraulic couplers and disconnect them.

Important: Connect the attachment hoses together to prevent hydraulic system contamination during storage.

6. Install the protective covers onto the hydraulic couplers on the traction unit.
7. Start the engine, tilt the mount plate forward, and back the traction unit away from the attachment.

Securing the Traction Unit for Transport

When transporting the traction unit on a trailer, always use the following procedure:

Important: Do not operate or drive the traction unit on roadways.

1. Lower the loader arm.
2. Stop the engine.
3. Secure the traction unit to the trailer with chains or straps using the tie-down/lift loops at the front and rear of the traction unit (Figure 36 and Figure 37).

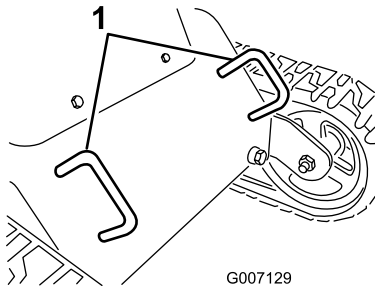


Figure 36

1. Front tie-down loops

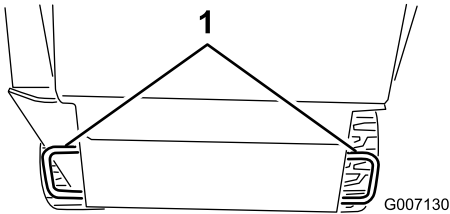


Figure 37

1. Rear tie-down loops

Lifting the Traction Unit

You can lift the traction unit using the tie-down/lift loops as lift points (Figure 36 and Figure 37).

Maintenance

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

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 8 hours	<ul style="list-style-type: none"> • Replace the hydraulic filter.
After the first 50 hours	<ul style="list-style-type: none"> • Change the engine oil. • Check and adjust the track tension.
Before each use or daily	<ul style="list-style-type: none"> • Check the engine oil level. • Grease the traction unit. (Grease immediately after every washing.) • Check the condition of and clean the tracks. • Remove debris from the traction unit. • Check for loose fasteners.
Every 25 hours	<ul style="list-style-type: none"> • Check the hydraulic fluid level.
Every 50 hours	<ul style="list-style-type: none"> • Clean the foam and paper air filter elements. (Service the air cleaner more frequently if operating conditions are extremely dusty or sandy.)
Every 100 hours	<ul style="list-style-type: none"> • Replace the paper air filter element. • Change the engine oil (more frequently when operating conditions are extremely dusty or sandy). • Check the battery electrolyte level (replacement battery only). • Check the battery cable connections. • Check and adjust the track tension. • Check the hydraulic lines for leaks, loose fittings, kinked lines, loose mounting supports, wear, weather, and chemical deterioration and repair if necessary.
Every 200 hours	<ul style="list-style-type: none"> • Check the spark plugs. • Replace the hydraulic filter.
Every 250 hours	<ul style="list-style-type: none"> • Check and grease the road wheels.
Every 400 hours	<ul style="list-style-type: none"> • Change the hydraulic fluid.
Every 1,500 hours	<ul style="list-style-type: none"> • Replace all moving hydraulic hoses.
Yearly or before storage	<ul style="list-style-type: none"> • Check and adjust the track tension. • Touch up chipped paint

Important: Refer to your *Engine Operator's Manual* for additional maintenance procedures.

Note: After the first 8 hours the hour meter displays CHG OIL to remind you to change the **hydraulic filter**. Every 99 hours thereafter the screen displays CHG OIL to remind you to change the **engine oil**. After every 399 hours, the screen displays SVC to remind you to perform the other maintenance procedures based on a 400 hour schedule. These reminders come on starting three hours prior to the service interval time and flash at regular intervals for six hours.



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

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

Premaintenance Procedures

Before opening any of the covers, stop the engine, remove the key, and allow the engine to cool.

Opening the Hood

Turn the hood latch clockwise and swing the hood up (Figure 38).

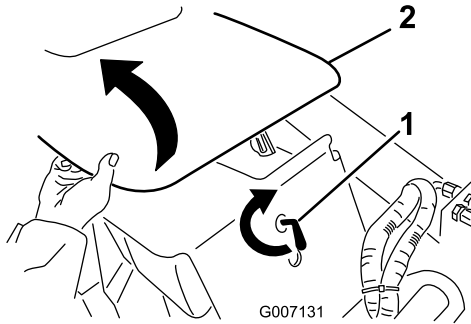


Figure 38

1. Hood latch, turn clockwise
2. Hood, swing up

Closing the Hood

Lower the hood and secure it by pushing down front of the hood until it locks in place.

Opening the Rear Access Cover

1. Pull out and forward on the latches on both sides of the traction unit (Figure 39).

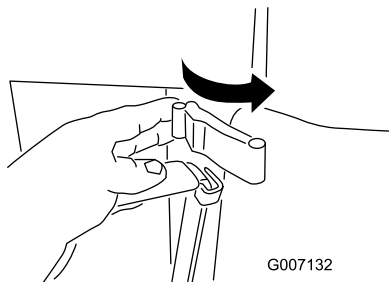


Figure 39

2. Swing the rear access cover down and pull it away from the traction unit (Figure 40).

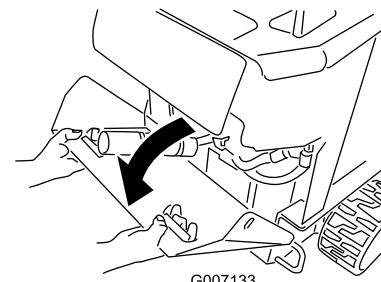


Figure 40

Closing the Rear Access Cover

1. Insert the bottom of the rear access cover into the frame and swing it up.
2. Place the latches over the locking brackets on each side and secure them (Figure 39).

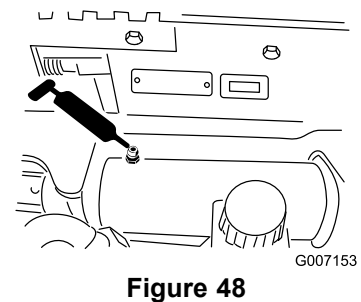
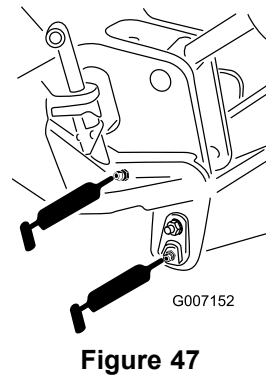
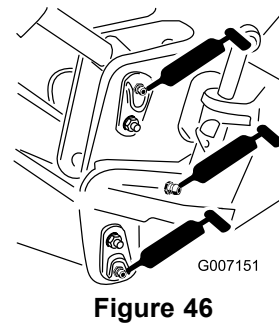
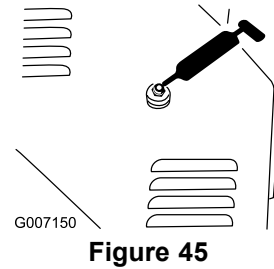
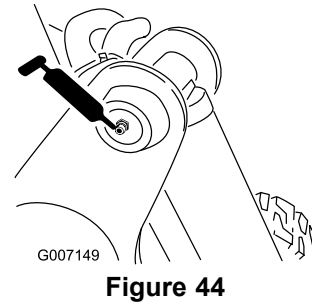
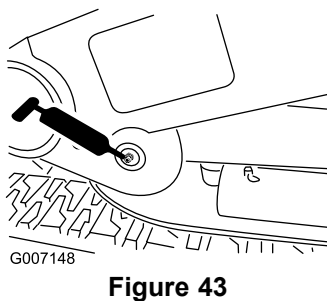
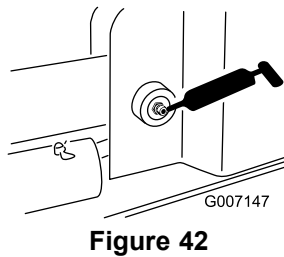
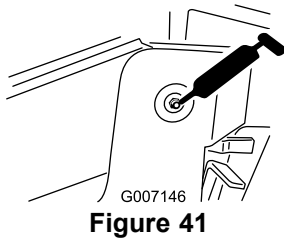
Lubrication

Greasing the Traction Unit

Service Interval: Before each use or daily (Grease immediately after every washing.)

Grease Type: General-purpose grease.

1. Lower the loader arm and stop the engine. Remove the key.
2. Clean the grease fittings with a rag.
3. Connect a grease gun to each fitting (Figure 41 through Figure 48).
4. Pump grease into the fittings until grease begins to ooze out of the bearings (approximately 3 pumps).
5. Wipe up any excess grease.



Engine Maintenance

Servicing the Air Cleaner

Service Interval: Every 50 hours—Clean the foam and paper air filter elements. (Service the air cleaner more frequently if operating conditions are extremely dusty or sandy.)

Every 100 hours—Replace the paper air filter element.

Removing the Filters

1. Lower the loader arm, stop the engine, and remove the key.
2. Open the hood.
3. Clean around the air cleaner to prevent dirt from getting into the engine and causing damage.
4. Remove the wingnut from the air cleaner cover and remove the cover (Figure 49).

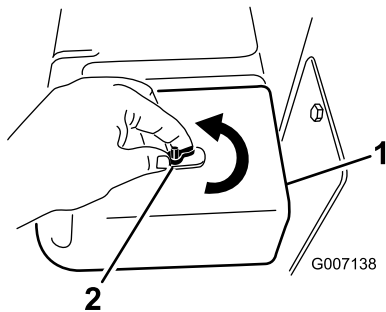


Figure 49

1. Air cleaner cover
2. Wingnut

5. Remove the wingnut from the air filters and remove the filters (Figure 50).

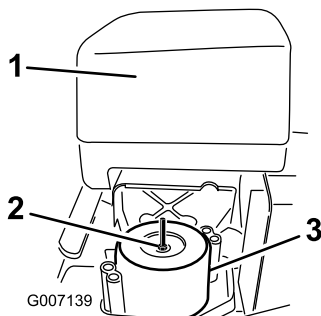


Figure 50

1. Air cleaner cover
2. Wingnut
3. Air filter assembly

6. Carefully slide the foam filter off of the paper filter (Figure 51).

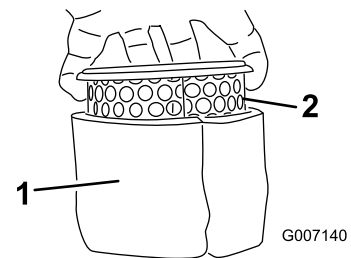


Figure 51

1. Foam filter
2. Paper filter

7. Inspect the foam filter and replace if it is torn or worn.
8. Inspect the paper filter for tears, an oily film, or damage to the rubber seal and replace it if you find any damage.

Cleaning the Filters

1. Wash the foam pre-filter in liquid soap and warm water. When clean, rinse it thoroughly.
2. Allow the foam filter to dry thoroughly.
3. Dip the foam filter in clean engine oil, then squeeze out the excess oil.

Important: Ensure that you thoroughly squeeze out the oil. The engine will smoke if you leave too much oil in the filter.

4. Lightly tap the paper filter on a flat surface to remove dust and dirt or blow compressed air, not exceeding 30 psi (207 kPa), from the inside.

Important: Never clean the paper element by brushing it or with liquids, such as solvent, gas, or kerosene. Replace the paper element if it is damaged, or cannot be cleaned thoroughly (i.e., after approximately 100 operating hours).

Installing the Filters

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

1. Carefully slide the foam pre-filter onto the paper filter (Figure 51).
2. Place the filter assembly onto the air cleaner base and secure it with a wingnut (Figure 50).
3. Install the air cleaner cover and secure it with the wingnut (Figure 49).
4. Close the hood.

Changing the Engine Oil

Service Interval: After the first 50 hours

Every 100 hours

Oil Type: Detergent oil (API service SJ or higher)

Crankcase Capacity: 1.16 US qt (1.1 l)

Viscosity: See table below

USE THESE SAE VISCOSITY OILS

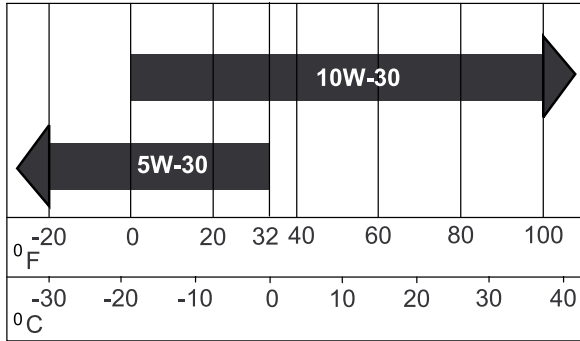


Figure 52

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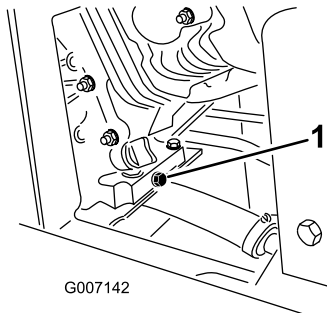
1. Start the engine and let it run for five minutes. This warms the oil so it drains better.
2. Lower the loader arm, set the parking brake, stop the engine, and remove the key.



Components will be hot if the traction unit has been running. If you touch hot components you may be burned.

Allow the traction unit to cool before performing maintenance or touching components under the hood.

3. Place a pan under the drain plug to catch the oil.
4. Remove the drain plug (Figure 53).

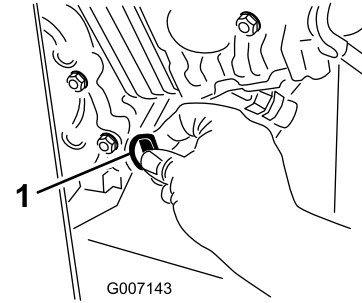


G007142

Figure 53

1. Oil drain plug

5. When the oil has drained completely, replace the plug.
- Note:** Dispose of the used oil at a certified recycling center.
6. Remove the dipstick (Figure 54) and slowly pour oil into the filler hole until the oil pours out of the filler hole.



G007143

Figure 54

1. Dipstick

7. Replace and secure the dipstick.

Servicing the Spark Plug

Service Interval: Every 200 hours—Check the spark plugs.

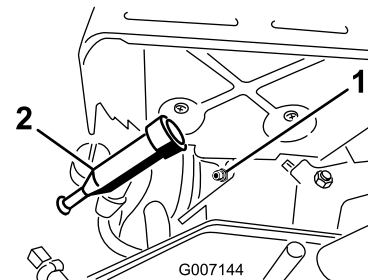
Ensure that the air gap between the center and side electrodes is correct before installing each spark plug. Use a spark plug wrench for removing and installing the spark plugs and a gapping tool/feeler gauge to check and adjust the air gap. Install new spark plugs if necessary.

Type: NGK BPR6ES, Denso W20EPR-U, or equivalent.

Air Gap: 0.03 inch (0.75 mm)

Removing the Spark Plug

1. Lower the loader arm, stop the engine, and remove the key.
2. Open the hood.
3. Pull the wire off of the spark plugs (Figure 55).



G007144

Figure 55

1. Spark plug wire
2. Spark plug

4. Clean around the spark plug.
5. Remove the spark plug and metal washer.

Note: There is a hole in the front panel through which you can gain access to the spark plug with a socket (Figure 56).

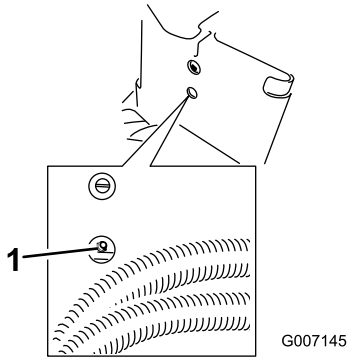


Figure 56

1. Spark plug

2. Tighten the spark plug until it compresses the metal washer and then seat it as follows:
 - If you are installing a used spark plug, tighten it another 1/8 to 1/4 turn.
 - If you are installing a new spark plug, tighten it another 1/2 turn.
3. Push the wire onto the spark plug (Figure 55).
4. Close the hood.

Checking the Spark Plug

1. Look at the center of the spark plug (Figure 57).
If you see light brown or gray on the insulator, the engine is operating properly. A black coating on the insulator usually means the air cleaner is dirty.

Important: Never clean the spark plugs. Always replace the spark plugs when they have a black coating, worn electrodes, an oily film, or cracks.

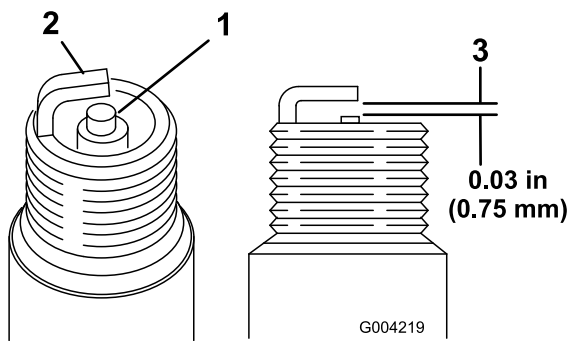


Figure 57

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

2. Check the gap between the center and side electrodes (Figure 57).
3. Bend the side electrode (Figure 57) if the gap is not correct.

Installing the Spark Plug

1. Thread the spark plug into the spark plug hole.

Fuel System Maintenance

Draining the Fuel Tank



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

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

1. Lower the loader arm, stop the engine, and remove the key.
2. Syphon the gasoline from the tank using a pump type syphon.

Electrical System Maintenance

Servicing the Battery

Service Interval: Every 100 hours—Check the battery electrolyte level (replacement battery only).

Every 100 hours—Check the battery cable connections.

Warning

CALIFORNIA Proposition 65 Warning

Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm.

Wash hands after handling.

Important: The following procedures apply when servicing a (dry) battery that has replaced the original battery. The original (wet) battery does not require service.

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 reduce corrosion.

Voltage: 12 v, 340 Cold Cranking Amps

Checking the Electrolyte Level

1. Stop the engine and remove the key.
2. Open covers to see into the cells. The electrolyte must be up to the lower part of the tube (Figure 58).

Important: Do not allow the electrolyte to fall below the Lower line (Figure 58).

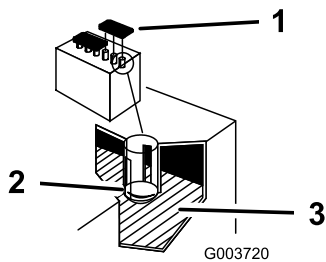


Figure 58

1. Filler caps
2. Lower part of tube
3. Plates

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

Adding Water to the Battery

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



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

- Do not drink electrolyte and avoid contact with skin, eyes or clothing. Wear safety glasses to shield your eyes and rubber gloves to protect your hands.
- Fill the battery where clean water is always available for flushing the skin.

1. Clean the top of the battery with a paper towel.
2. Remove the filler caps from the battery (Figure 58).
3. Slowly pour distilled water into each battery cell until the level is up to the lower part of the tube (Figure 58).

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

4. Install the battery filler caps.

Charging the Battery



Charging the battery produces gasses that can explode.

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

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

1. Check the electrolyte level; refer to Checking Electrolyte Level.
2. Remove the filler caps from the battery and connect a battery charger to the battery posts. Charge the battery at a rate of 6 to 10 amperes for a minimum of 1 hour (12 volts).
3. When the battery is fully charged, unplug the charger from the electrical outlet, then disconnect the charger leads from the battery posts.
4. Install the filler caps after the battery is fully charged.

Replacing the Fuses

There are 4 fuses in the electrical system. They are located inside the rear access cover (Figure 59).

Start Circuit	30 amp
Charge Circuit	25 amp
Interlock Circuit	10 amp
Headlight (optional)	10 amp

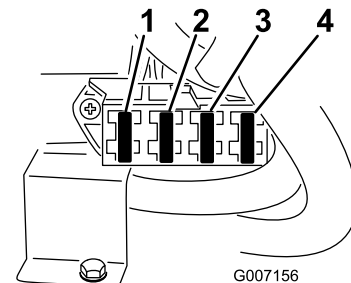


Figure 59

1. Start circuit
2. Charge circuit
3. Headlight
4. Interlock circuit

Drive System Maintenance

Servicing the Tracks

Cleaning the Tracks

Service Interval: Before each use or daily

Check the tracks for excessive wear and clean them periodically. If the tracks are worn, replace them.

1. With a bucket on the loader arm, lower the bucket to the ground so that the front of the traction unit lifts off of the ground a few inches.
2. Stop the engine, and remove the key.
3. Using a water hose or pressure washer, remove dirt from each track system.

Important: Ensure that you use high-pressure water to wash only the track area. Do not use a high-pressure washer to clean the rest of the traction unit. High-pressure washing can damage the electrical system and hydraulic valves or deplete grease.

Important: Ensure that you fully clean the road wheels, the tension wheel, and the drive sprocket (Figure 60). The road wheels should rotate freely when clean.

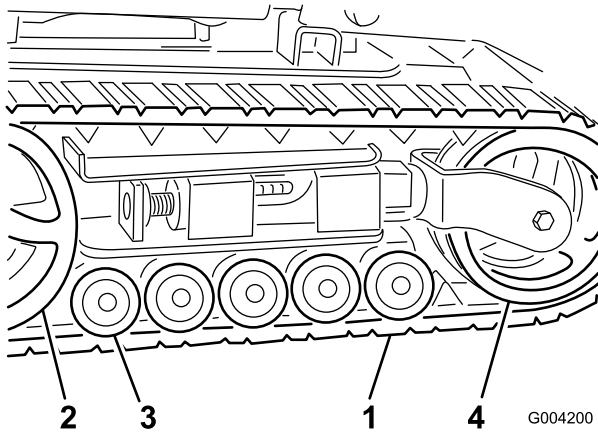


Figure 60

- | | |
|------------------|-------------------|
| 1. Track | 3. Road wheels |
| 2. Tension wheel | 4. Drive sprocket |

Checking and Adjusting the Track Tension

Service Interval: After the first 50 hours

Every 100 hours

There should be 2-3/4 inches (7 cm) between the tension nut and the back of the tension tube (Figure 61). If not, adjust the track tension using the following procedure:

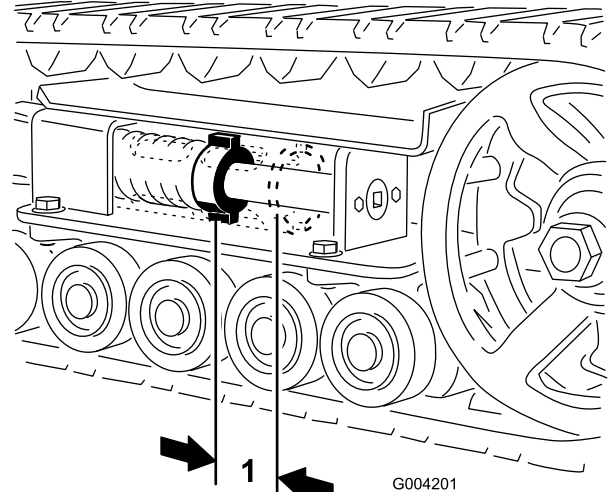


Figure 61

1. 2-3/4 inches (7 cm)

1. Lower the loader arm, stop the engine, and remove the key.
2. Lift/support the side of the unit to be worked on so that the track is off of the ground.
3. Remove the locking bolt and nut (Figure 62).

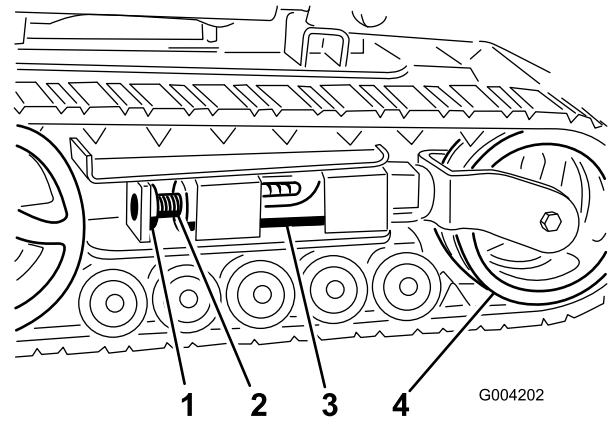


Figure 62

- | | |
|---------------------|------------------|
| 1. Locking bolt | 3. Tension tube |
| 2. Tensioning screw | 4. Tension wheel |

4. Using a 1/2 inch drive socket (Figure 63), turn the tensioning screw counter-clockwise until the distance between the tension nut and the back of the tension tube (Figure 61) is 2-3/4 inches (7 cm).

- Align the closest notch in the tension screw to the locking bolt hole and secure the screw with the locking bolt and nut (Figure 62).
- Lower the traction unit to the ground.

Replacing the Tracks

When the tracks are badly worn, replace them.

- Lower the loader arm, stop the engine, and remove the key.
- Lift/support the side of the unit to be worked on so that the track is 3 to 4 inches (7.6 to 10 cm) off of the ground.
- Remove the locking bolt and nut (Figure 62).
- Using a 1/2 inch drive socket, release the drive tension by turning the tensioning screw clockwise (Figure 62 and Figure 63).

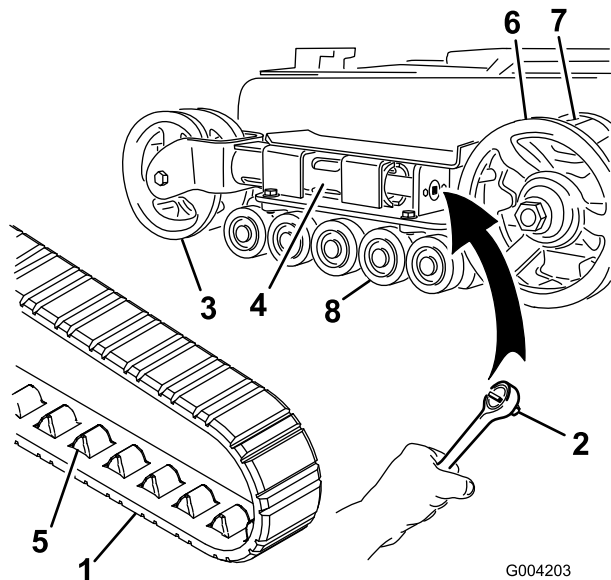


Figure 63

- | | |
|--------------------|--------------------|
| 1. Track | 5. Track lug |
| 2. 1/2 inch socket | 6. Drive sprocket |
| 3. Tension wheel | 7. Sprocket spacer |
| 4. Fork tube | 8. Road wheels |

- Push the tension wheel toward the rear of the unit to move the fork tube against the frame (Figure 63). (If it does not touch the frame, continue turning the tensioning screw until it does.)
- Begin removing the track at the top of the tension wheel, peeling it off of the wheel while rotating the track forwards.
- When the track is off of the tension wheel, remove it from the drive sprocket and road wheels (Figure 63).
- Beginning at the drive sprocket, coil the new track around the sprocket, ensuring that the lugs on

the track fit between the spacers on the sprocket (Figure 63).

- Push the track under and between the road wheels (Figure 63).
- Starting at the bottom of the tension wheel, install the track around the wheel by rotating the track rearward while pushing the lugs into the wheel.
- Turn the tensioning screw counter-clockwise until the distance between the tension nut and the back of the fork tube (Figure 61) is 2-3/4 inches (7 cm).
- Align the closest notch in the tension screw to the locking bolt hole and secure the screw with the locking bolt and nut.
- Lower the traction unit to the ground.
- Repeat steps 2 through 13 to replace the other track.

Checking and Greasing the Road Wheels

Service Interval: Every 250 hours

- Remove the tracks; refer to Replacing the Tracks.
- Remove the 4 bolts securing each lower track guide which contains the road wheels, and remove them (Figure 64).

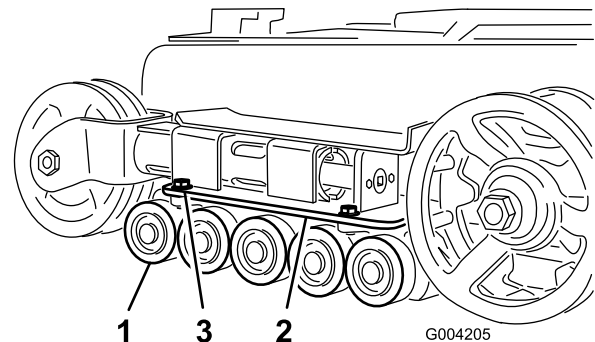


Figure 64

- | | |
|----------------------|---------------------------------------|
| 1. Road wheels | 3. Track guide bolts (only two shown) |
| 2. Lower track guide | |

- Remove the snap ring and cap from a road wheel (Figure 65).

Controls System Maintenance

The factory adjusts the controls before shipping the traction unit. However, after many hours of use, you may need to adjust the traction control alignment, the neutral position of the traction control, and the tracking of the traction control in the full forward position.

Important: To adjust the controls properly, complete each procedure in the order listed.

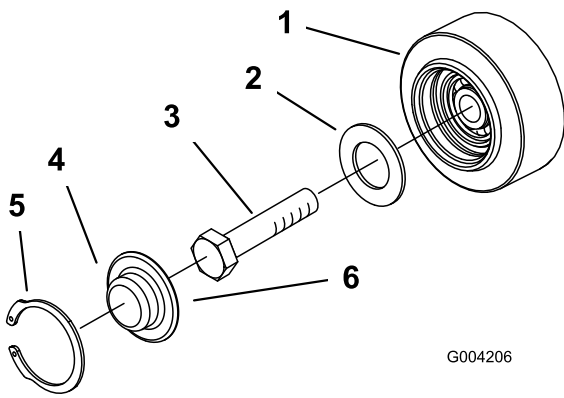


Figure 65

- | | |
|---------------|-----------------------------|
| 1. Road wheel | 4. Road wheel cap |
| 2. Gasket | 5. Snap ring |
| 3. Bolt | 6. Add grease under the cap |

4. Check the grease under the cap and around the gasket (Figure 65). If it is dirty, gritty, or depleted, clean out all of the grease, replace the gasket, and add new grease.
5. Ensure that the road wheel turns smoothly on the bearing. If it is frozen, replace the road wheel as described in the *Road Wheel Kit Installation Instructions* or contact your Authorized Service Dealer for repair.
6. Place the greased road wheel cap over the bolt head (Figure 65).
7. Secure the road wheel cap with the snap ring (Figure 65).
8. Repeat steps 3 through 7 for the other road wheels.
9. Install each track guide to the traction unit frame using the fasteners you removed previously. Torque the bolts to 67 to 83 ft-lb (91 to 112 N-m).
10. Install the tracks; refer to Replacing the Tracks.

Adjusting the Traction Control Alignment

If the traction control bar does not rest flush and square with the reference bar when in the full backward position, immediately complete the following procedure:

1. Park the traction unit on a flat surface and lower the loader arm.
2. Stop the engine and remove the key.
3. Pull straight back on the traction control so the front of the control contacts the reference bar (Figure 66).

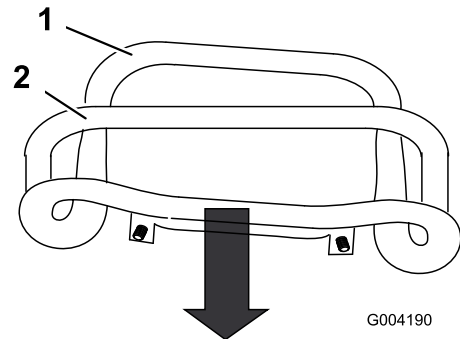


Figure 66

1. Front of the control, out of alignment
2. Reference bar

4. If the front of the traction control does not rest square and flush with the reference bar, loosen the flange nut and bolt in the stem of the traction control (Figure 67).

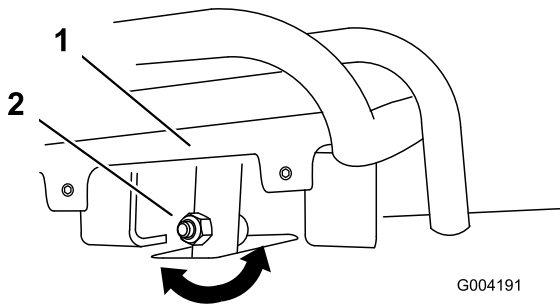


Figure 67

1. Traction control
2. Stem , bolt and nut

5. Adjust the traction control so that it rests flush against the reference bar when it is pulled straight back (Figure 67 and Figure 68).

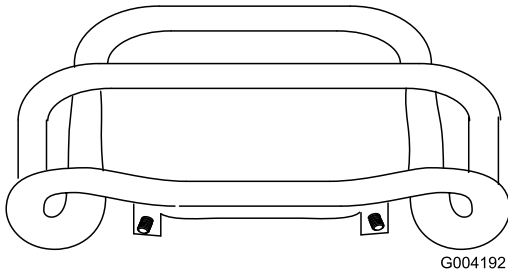


Figure 68

6. Tighten the flange nut and bolt in the traction control stem.

Adjusting the Traction Control Neutral Position

If the traction unit creeps forward or backward when the traction control is in neutral and the unit is warm, immediately complete the following procedure:

1. Lift/support the traction unit so that both tracks are off of the ground.
2. Open the rear access cover.
3. Loosen the jam nuts on the traction rods, under the control panel (Figure 69).

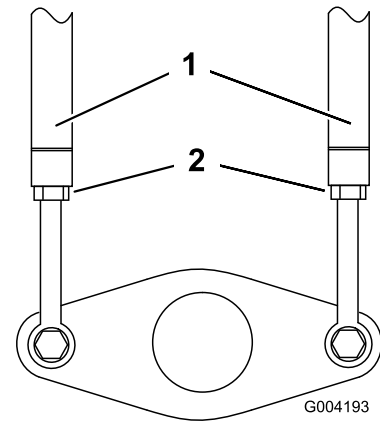


Figure 69

1. Traction rod
2. Jam nut

4. Start the traction unit and set the throttle to about 1/3 open position.



When the traction unit is running, you could be caught and injured in moving parts or burned on hot surfaces.

Stay away from pinch points, moving parts, and hot surfaces when adjusting the running traction unit.

5. If the **left** track moves, lengthen or shorten the **right** traction rod until the track stops moving.
6. If the **right** track moves, lengthen or shorten the **left** traction rod until the track stops moving.
7. Tighten the jam nuts.
8. Close the rear access cover.
9. Stop the engine and lower the traction unit to the ground.
10. Drive the traction unit in full reverse, checking to see if the unit tracks straight. If it does not, note the direction the traction unit veers. Repeat the adjustment previously described so that it tracks straight in reverse.

Adjusting the Tracking of the Traction Control, Full Forward Position

If the traction unit does not drive straight when you hold the traction control against the reference bar, complete the following procedure:

1. Drive the traction unit with the traction control against the reference bar, noting which direction the traction unit veers.
2. Release the traction control.
3. If the traction unit veers to the **left**, loosen the **right** jam nut and adjust the tracking set screw on the front of the traction control (Figure 70).
4. If the traction unit veers to the **right**, loosen the **left** jam nut and adjust the tracking set screw on the front of the traction control (Figure 70).

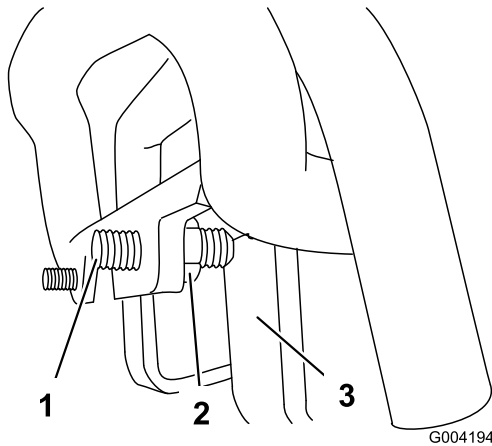


Figure 70

1. Set screw
2. Jam nut
3. Stop

5. Repeat steps 1 through 4 until the traction unit drives straight in the full forward position.

Important: Ensure the tracking set screws touch the stops in the full forward position to avoid over stroking the hydraulic pumps.

Hydraulic System Maintenance

Replacing the Hydraulic Filter

Service Interval: After the first 8 hours
Every 200 hours

Important: Do not substitute an automotive oil filter or severe hydraulic system damage may result.

1. Position traction unit on a level surface.
2. Lower the loader arm, stop the engine, and remove the key.
3. Open the hood.
4. Place a drain pan under the filter (Figure 71).

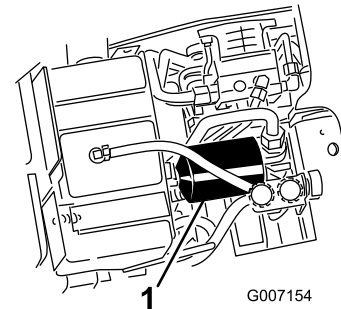


Figure 71

1. Hydraulic filter

5. Remove the old filter (Figure 71) and wipe the surface of the filter adapter gasket clean.
6. Apply a thin coat hydraulic fluid to the rubber gasket on the replacement filter.
7. Install the replacement hydraulic filter onto the filter adapter (Figure 71). Tighten it clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 3/4 turn.
8. Clean up any spilled fluid.
9. Start the engine and let it run for about two minutes to purge air from the system.
10. Stop the engine and check for leaks.



Hydraulic fluid escaping under pressure can penetrate skin and cause injury. Fluid injected into the skin must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.

- Keep your body and hands away from pin hole leaks or nozzles that eject high pressure hydraulic fluid.
- Use cardboard or paper to find hydraulic leaks, never use your hands.

11. Check the fluid level in the hydraulic tank (refer to Checking the Hydraulic Fluid) and add fluid to raise the level to the mark on the dipstick. Do not over fill the tank.
12. Close the rear access cover.

Changing the Hydraulic Fluid

Service Interval: Every 400 hours/Yearly (whichever comes first)

1. Position the traction unit on a level surface.
2. Raise the loader arm, install the cylinder lock, stop the engine, and remove the key.
3. Open the hood.
4. Install the cylinder lock, stop the engine, and remove the key.
5. Allow the traction unit to cool completely.
6. Remove the hydraulic tank cap and dipstick (Figure 72 and Figure 73).

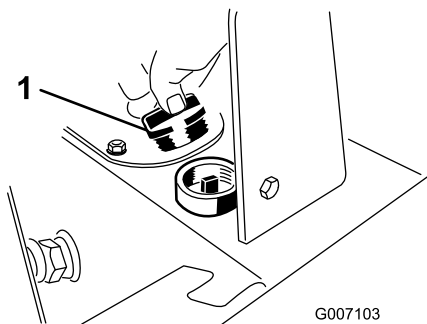


Figure 72

1. Filler neck cap

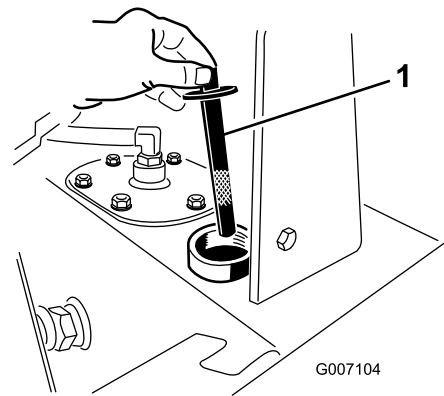


Figure 73

1. Dip stick

7. Place a large drain pan, capable of holding 15 US gallons (60 l), under the drain plug on the front of the traction unit (Figure 74).

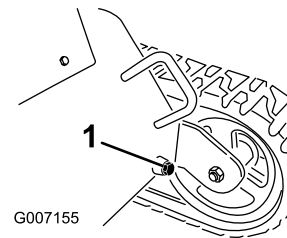


Figure 74

1. Drain plug

8. Remove the drain plug and allow the oil to drain into the pan (Figure 74).
9. When finished, install and tighten the drain plug.

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

10. Fill the hydraulic tank with approximately 10 US gallons (37.8 l) of 10W-30 or 15W-40 detergent, diesel engine oil (API service CH-4 or higher); refer to Checking Hydraulic Fluid.
11. Start the engine and let it run for a few minutes.
12. Stop the engine.
13. Check the hydraulic fluid level and top it off if necessary; refer to Checking Hydraulic Fluid.
14. Close the hood.

Checking the Hydraulic Lines

Service Interval: Every 100 hours—Check the hydraulic lines for leaks, loose fittings, kinked lines, loose mounting supports, wear, weather, and chemical deterioration and repair if necessary.

Every 1,500 hours/Every 2 years (whichever comes first)—Replace all moving hydraulic hoses.



Hydraulic fluid escaping under pressure can penetrate skin and cause injury. Fluid injected into the skin must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.

- **Keep your body and hands away from pin hole leaks or nozzles that eject high pressure hydraulic fluid.**
- **Use cardboard or paper to find hydraulic leaks, never use your hands.**

Cleaning

Removing Debris from the Traction Unit

Important: Operating the engine with blocked screens, dirty or plugged cooling fins, and/or cooling shrouds removed, will result in engine damage from overheating.

1. Park the traction unit on a level surface, lower the loader arm, and stop the engine.
2. Remove the key and allow the engine to cool.
3. Open the hood.
4. Clean any debris from the front and side screens.
5. Wipe away debris from the air cleaner.
6. Clean any debris build-up on the engine and in the oil cooler fins with a brush or blower.

Important: It is preferable to blow dirt out, rather than washing it out. If water is used, keep it away from electrical items and hydraulic valves. Do not use a high-pressure washer. High-pressure washing can damage the electrical system and hydraulic valves or deplete grease.

7. Clean debris from the cooler fan grill on the hood.
8. Close the hood.

Storage

1. Lower the loader arm, stop the engine, and remove the key.
2. Remove dirt and grime from the external parts of the entire traction unit, especially the engine. Clean dirt and chaff from the outside of the engine cylinder head fins and blower housing.

Important: You can wash the traction unit with mild detergent and water. Do not pressure wash the traction unit. Avoid excessive use of water, especially near the control panel, engine, hydraulic pumps, and motors.

3. Service the air cleaner; refer to Servicing the Air Cleaner.
4. Grease the traction unit; refer to Greasing the Traction Unit.
5. Change the crankcase oil; refer to Changing the Engine Oil.
6. Remove the spark plug and check the condition of it; refer to Servicing the Spark Plugs.
7. With the spark plug removed from the engine, pour two tablespoons of engine oil into the spark plug hole.
8. Place a rag over the spark plug hole to catch any oil spray, then use the starter to crank the engine and distribute the oil inside the cylinder.
9. Install the spark plug, but do not install the wire on the spark plug.
10. Charge the battery; refer to Servicing the Battery.
11. For storage over 30 days, prepare the traction unit as follows:

- A. Add a petroleum based stabilizer/conditioner to fuel in the tank. Follow mixing instructions from stabilizer manufacturer. (1 oz. per US gallon). **Do not use an alcohol based stabilizer (ethanol or methanol).**

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

- B. Run the engine to distribute conditioned fuel through the fuel system (5 minutes).
- C. Stop the engine, allow it to cool and drain the fuel tank using a pump type syphon.
- D. Restart the engine and run it until it stops.
- E. Choke the engine.

- F. Start and run the engine until it will not start again.
- G. Dispose of fuel properly. Recycle as per local codes.

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

12. Check and adjust the track tension; refer to Adjusting the Track Tension.
13. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged.
14. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
15. Store the traction unit in a clean, dry garage or storage area. Remove the key from the ignition switch and keep it in a memorable place.
16. Cover the traction unit to protect it and keep it clean.

Troubleshooting

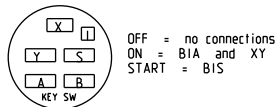
Problem	Possible Cause	Corrective Action
The starter does not crank	<ol style="list-style-type: none"> 1. The battery is discharged. 2. The electrical connections are corroded or loose. 3. The relay or switch is damaged. 	<ol style="list-style-type: none"> 1. Charge the battery or replace it. 2. Check the electrical connections for good contact. 3. Contact your Authorized Service Dealer.
The engine will not start, starts hard, or fails to keep running.	<ol style="list-style-type: none"> 1. The fuel tank is empty. 2. The choke is not on. 3. The manual fuel lever is in the Off position. 4. The air cleaner is dirty. 5. The spark plug wire is loose or disconnected. 6. The spark plug is pitted, fouled, or the gap is incorrect. 7. Dirt, water, or stale fuel is in fuel system. 	<ol style="list-style-type: none"> 1. Fill the fuel tank with gasoline. 2. Move the choke lever fully forward. 3. Move the fuel lever to the On position. 4. Clean or replace the air cleaner elements. 5. Install the wire on the spark plug. 6. Install a new, correctly gapped spark plug. 7. Contact Authorized Service Dealer.
Engine loses power.	<ol style="list-style-type: none"> 1. The engine load is excessive. 2. The air cleaner is dirty. 3. The oil level in crankcase is low. 4. The cooling fins and air passages under the engine blower housing are plugged. 5. The spark plug is pitted, fouled, or the gap is incorrect. 6. Dirt, water, or stale fuel is in fuel system. 	<ol style="list-style-type: none"> 1. Reduce ground speed. 2. Clean or replace the air cleaner elements. 3. Check and add oil to the crankcase. 4. Remove any obstructions from the cooling fins and air passages. 5. Install a new, correctly gapped spark plug. 6. Contact Authorized Service Dealer.
The engine overheats.	<ol style="list-style-type: none"> 1. The engine load is excessive. 2. The oil level in crankcase is low. 3. The cooling fins and air passages under the engine blower housing are plugged. 	<ol style="list-style-type: none"> 1. Reduce ground speed. 2. Check and add oil to the crankcase. 3. Remove any obstructions from the cooling fins and air passages.
Abnormal vibration.	<ol style="list-style-type: none"> 1. The engine mounting bolts are loose. 	<ol style="list-style-type: none"> 1. Tighten the engine mounting bolts.
The traction unit does not drive.	<ol style="list-style-type: none"> 1. The parking brake is on. 2. The hydraulic fluid level is low. 3. The tow valves are open. 4. The hydraulic system is damaged. 	<ol style="list-style-type: none"> 1. Release the parking brake. 2. Check and add hydraulic fluid. 3. Close the tow valves. 4. Contact Authorized Service Dealer.

Schematics

P/N 88-9830

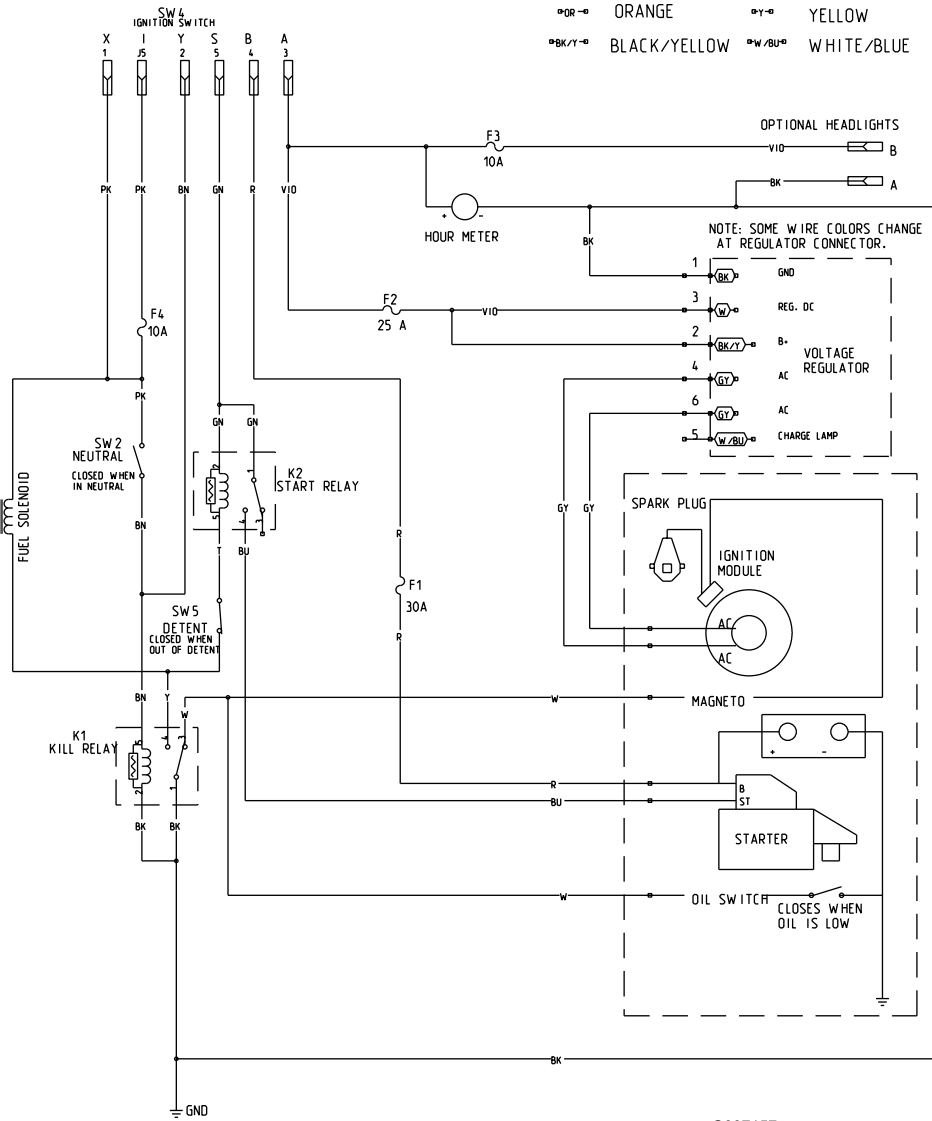
TX 413

WIRE COLOR CODES



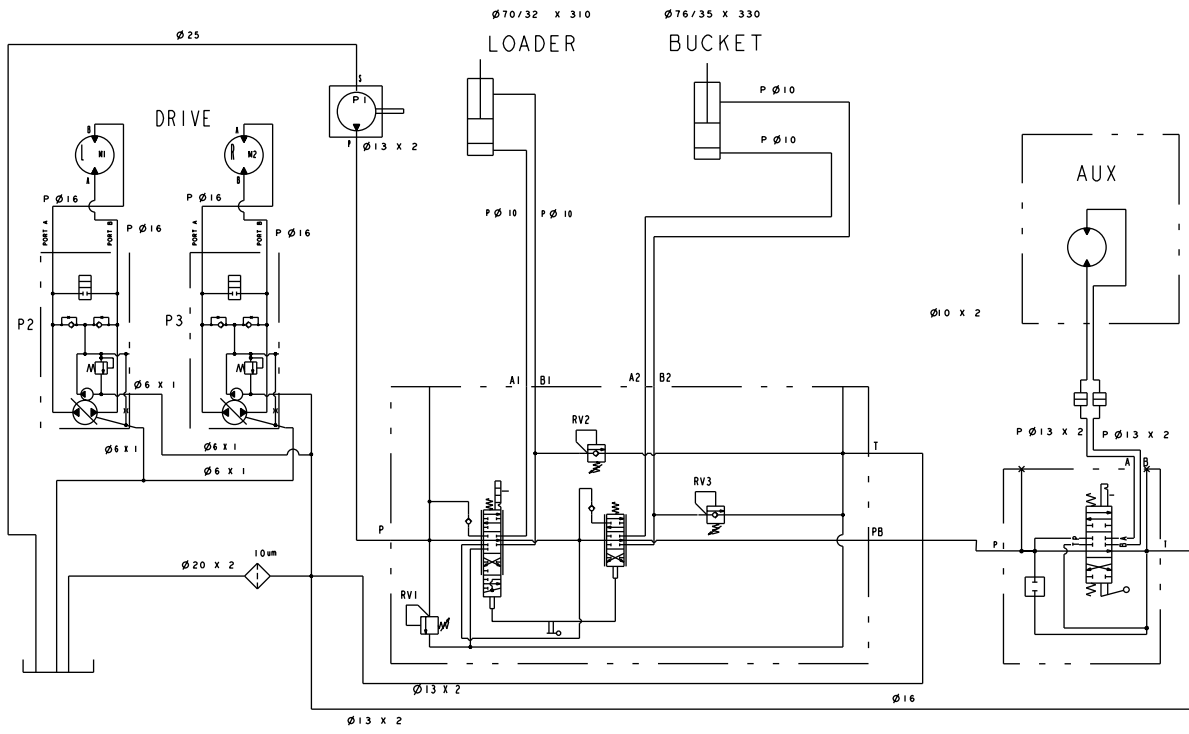
Ignition switch terminal locations viewed from back

⦿BK-⦿	BLACK	⦿PK-⦿	PINK
⦿BN-⦿	BROWN	⦿R-⦿	RED
⦿BU-⦿	BLUE	⦿T-⦿	TAN
⦿GN-⦿	GREEN	⦿VIO-⦿	VIOLET
⦿GY-⦿	GREY	⦿W-⦿	WHITE
⦿OR-⦿	ORANGE	⦿Y-⦿	YELLOW
⦿BK/Y-⦿	BLACK/YELLOW	⦿W/BU-⦿	WHITE/BLUE



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Electrical Schematic (Rev. A)



DISPLACEMENT AND PRESSURE CHART						
COMPONENT	DISPLACEMENT		PRESSURE		FLOWRATE*	
	CU IN/REV	CU CM/REV	PSI	BARS	GPM	LPM
P1	.44	7.286	3625	250	6.8	25.7
P2, P3	.61	10	2320	160	9.6	36.4
M1, M2	24.7	404	-----	-----	-----	-----
RV1	-----	-----	2540	175	-----	-----
RV2, RV3	-----	-----	2030	140	-----	-----

* FLOWRATE IS THEORETICAL. IT IS CALCULATED USING ENGINE SPEED OF 3600 RPM. IT DOES NOT ACCOUNT FOR COMPONENT EFFICIENCIES.

HYDRAULIC SCHEMATIC

G007158

Hydraulic Schematic (Rev. A)

Notes:



Compact Utility Loader
(CUL) Products

The Toro Compact Utility Loader Warranty

A One-Year Limited Warranty

Conditions and Products Covered

The Toro® Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly warrant your Toro Compact Utility Loader (CUL) ("Product") to be free from defects in materials or workmanship. The following time periods apply from the date the Product is delivered to the original retail purchaser:

The following time periods apply from the date of purchase:

Products	Warranty Period
All CUL units and attachments	1 year or 1000 operational hours, whichever occurs first
Kohler Engines	3 years
All other Engines	2 years

Where a warrantable condition exists, we will repair the Product at no cost to you including diagnosis, labor, and parts.

Instructions for Obtaining Warranty Service

If you think that your Toro Product contains a defect in materials or workmanship, follow this procedure:

1. Contact any Authorized Toro CUL Service Dealer to arrange service at their dealership. To locate a dealer convenient to you, access our website at www.Toro.com. You may also call our Toro Customer Care Department toll free at 888-577-7466 (U.S. customers) or 877-484-9255 (Canadian customers).
2. Bring the product and your proof of purchase (sales receipt) to the Service Dealer.

If for any reason you are dissatisfied with the Service Dealer's analysis or with the assistance provided, contact us at:

LCB Customer Service Department
Toro Warranty Company
8111 Lyndale Avenue South
Bloomington, MN 55420-1196
Toll Free: 888-577-7466 (U.S. customers)
Toll Free: 877-484-9255 (Canada customers)

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. Parts scheduled for replacement as required maintenance ("Maintenance Parts"), are warranted for the period of time up to the scheduled replacement time for that part. Failure to perform required maintenance and adjustments can be grounds for disallowing a warranty claim.

Items and Conditions Not Covered

Not all product failures or malfunctions that occur during the warranty period are defects in materials or workmanship. This express warranty does not cover the following:

- Product failures which result from the use of non-Toro replacement parts, or from installation and use of add-on, modified, or unapproved accessories
- Product failures which result from failure to perform required maintenance and/or adjustments
- Product failures which result from operating the Product in an abusive, negligent or reckless manner
- Parts subject to consumption through use unless found to be defective. Examples of parts which are consumed, or used up, during normal Product operation include, but are not limited to, digging teeth, tines, spark plugs, tires, tracks, filters, chains, etc.
- Failures caused by outside influence. Items considered to be outside influence include, but are not limited to, weather, storage practices, contamination, use of unapproved coolants, lubricants, additives, or chemicals, etc.
- Normal "wear and tear" items. Normal "wear and tear" includes, but is not limited to, worn painted surfaces, scratched decals or windows, etc
- Any component covered by a separate manufacturer's warranty
- Pickup and delivery charges

General Conditions

Repair by an Authorized Toro CUL 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. All implied warranties of merchantability and fitness for use are limited to the duration of this express 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.

Except for the engine warranty coverage and the Emissions warranty referenced below, if applicable, there is no other express warranty.

The Emissions Control System on your Product may be covered by a separate warranty meeting requirements established by the U.S. Environmental Protection Agency (EPA) or the California Air Resources Board (CARB).

The hour limitations set forth above do not apply to the Emissions Control System Warranty. Refer to the California Emission Control Warranty Statement printed in your operator's manual or contained in the engine manufacturer's documentation for details.

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.