



Operator's Manual

RZ-XD BLACKOUT and KGZ Series Riding Mowers

Model—Serial Range

RSKXD161994VO—400000000 and Up

RSKXD172994VO—400000000 and Up

RSZB3154FX801—400000000 and Up

RSZB3160FX801—400000000 and Up

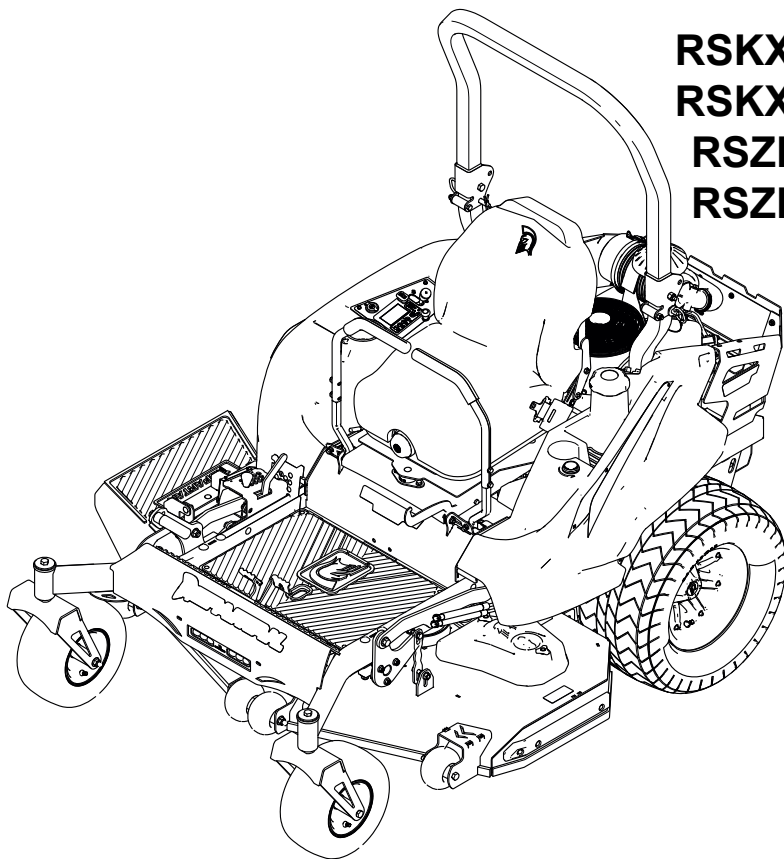


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Intended Use

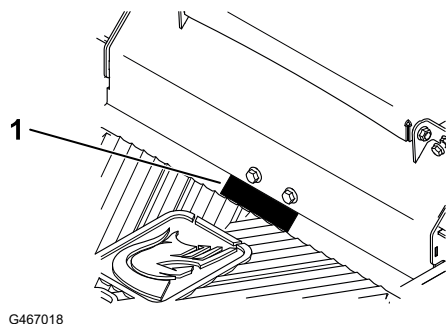
This rotary-blade, riding lawn mower is intended to be used by professional, hired operators. It is designed primarily for cutting grass on well-maintained lawns on residential or commercial properties. Using this product for purposes other than its intended use could prove dangerous to you and bystanders.

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.

Getting Help

Visit www.spartanmowers.com for product safety and operation training materials, specifications, accessory information, help finding a dealer, or to register your product.

Whenever you need service, genuine Spartan parts, or additional information, contact an Authorized Service Dealer or Spartan Customer Service and have the model and serial numbers of your product ready. These numbers are located on the serial plate on your product ①. Write the numbers in the space provided.



IMPORTANT

With your mobile device, you can scan the QR code on the serial number decal (if equipped) to access warranty, parts, and other product information.

Model Number:		Serial Number:	
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Safety-Alert Symbol

The safety-alert symbol shown in this manual and on the machine identifies important safety messages that you must follow to prevent accidents.



DANGER indicates an imminently hazardous situation which, if not avoided, **will** result in death or serious injury.

WARNING indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury.

CAUTION indicates a potentially hazardous situation which, if not avoided, **may** result in minor or moderate injury.

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.

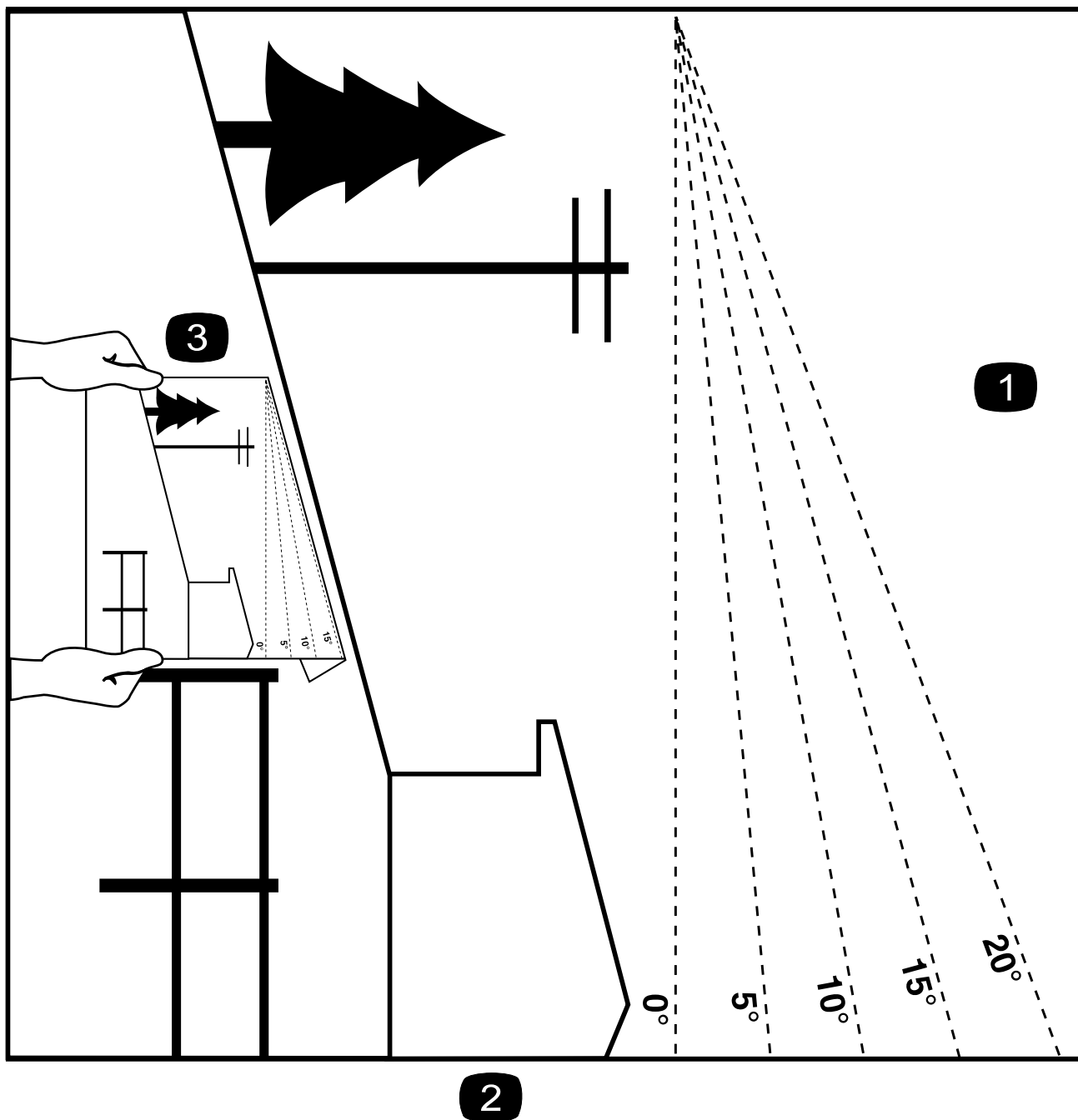
General Safety

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

- Read, understand, and follow the instructions and warnings in this *Operator's Manual* and on the machine, engine, and attachments before starting the engine.
- Do not allow children or untrained people to operate or service the machine. Allow only people who are responsible, trained, familiar with the instructions, and physically capable to operate or service the machine.
- Keep bystanders, particularly children, away from the operating area.
- Always keep the roll bar in the fully raised and locked position and use the seat belt.
- Do not operate the machine near drop-offs, ditches, embankments, water, or other hazards, or on slopes greater than 15°.
- Do not put your hands or feet near moving parts.
- Do not operate the machine without all safety shields, guards, switches, and other devices in place and working properly.
- Park the machine on a level surface, disengage the drives, engage the parking brake, shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operator's position.
- Wait for the machine to cool before servicing, adjusting, fueling, cleaning, or storing it.

Slope Indicator

You may copy this page for personal use.



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- ① The maximum slope you can operate the machine on is 15 degrees. Use the slope chart to determine the degree of slope of hills before operating. **Do not operate this machine on a slope greater than 15 degrees.** Fold along the appropriate line to match the recommended slope.
- ② Align this edge with a vertical surface, a tree, building, fence pole, etc.
- ③ Example of how to compare slope with folded edge

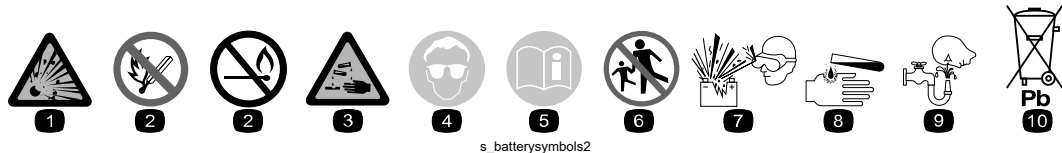
Safety and Instructional Decals



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 missing.

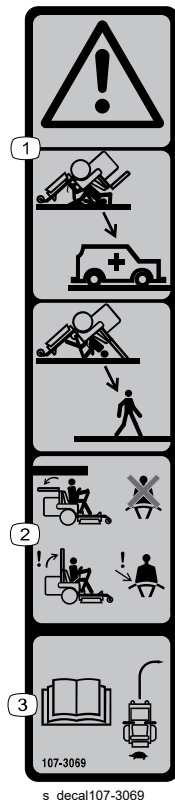
Battery Symbols

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 away 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

Decal Part: 107-3069



- ① Warning—there is no rollover protection when the roll bar is down.
- ② To avoid injury or death from a rollover accident, keep the roll bar in the fully raised and locked position and wear the seat belt. Lower the roll bar only when absolutely necessary; do not wear the seat belt when the roll bar is down.
- ③ Read the *Operator's Manual*; drive slowly and carefully.

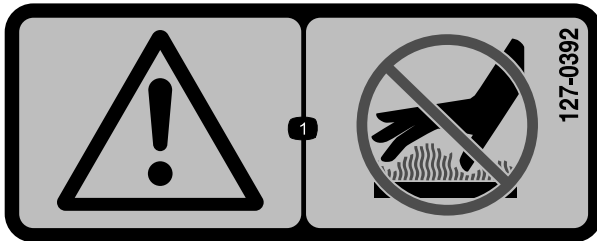
Decal Part: 125-8473



s_decal125-8473

- ① Explosion hazard—wear eye protection.
- ② Caustic liquid/chemical burn hazard—rinse affected area and seek medical assistance.
- ③ Fire hazard—keep open flames away.
- ④ Poison hazard—do not tamper with the battery.

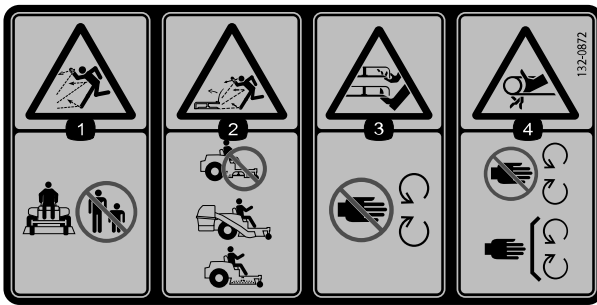
Decal Part: 127-0392



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- ① Warning—stay away from hot surfaces.

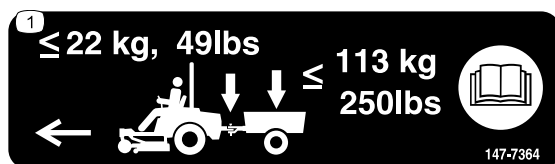
Decal Part: 132-0872



s_decal132-0872

- ① Thrown object hazard—keep bystanders away.
- ② Thrown object hazard, mower—do not operate the machine with an open deck; use a bagger or a deflector.
- ③ Cutting/dismemberment hazard of hands or feet, mower blade—stay away from moving parts.
- ④ Entanglement hazard of hands, belt—stay away from moving parts; keep all guards and shields in place.

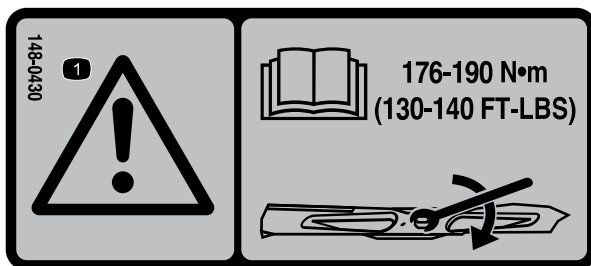
Decal Part: 147-7364



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① Do not exceed a tongue weight of 22 kg (49 lb); do not exceed a gross towing weight of 113 kg (250 lb); read the *Operator's Manual*.

Decal Part: 148-0430

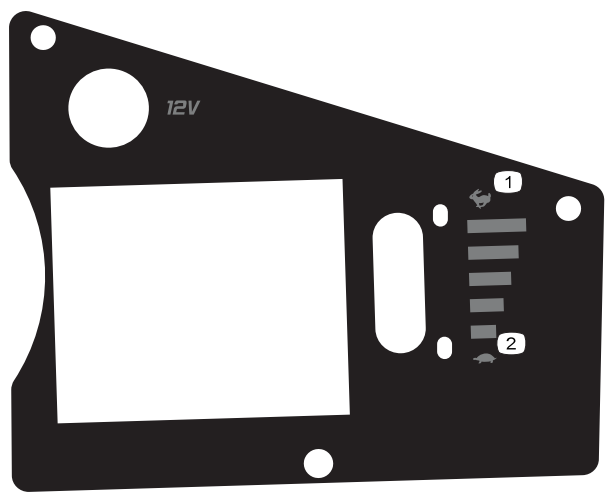


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① Warning—read the *Operator's Manual* for instructions on torquing the blade bolt/nut to 176 to 190 N•m (130 to 140 ft-lb).

Decal Part: 148-0229

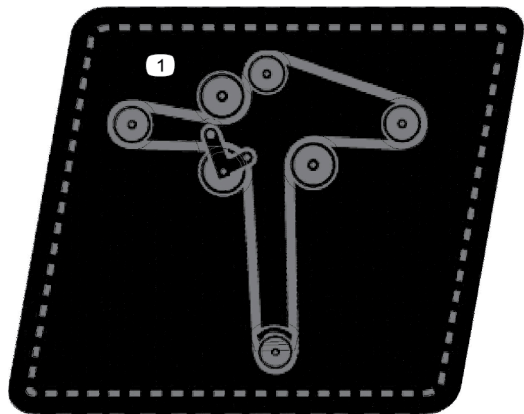
RZ-XD models only



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- 1 Fast
- 2 Slow

Decal Part: 148-0260

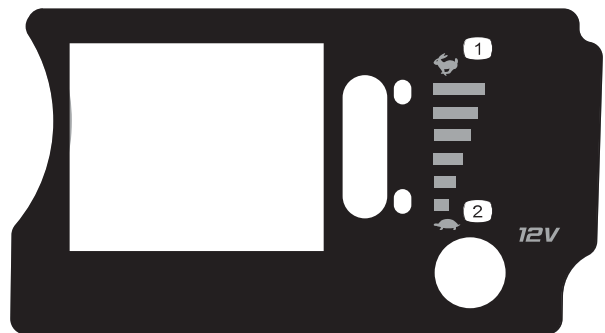


dec148-0260

- 1 Belt routing

Decal Part: 148-0414

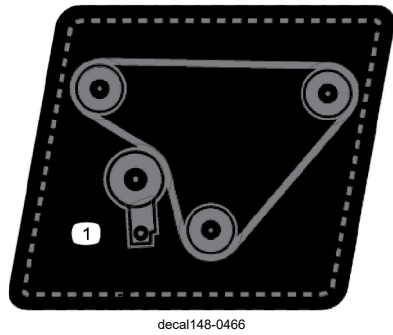
KGZ models only



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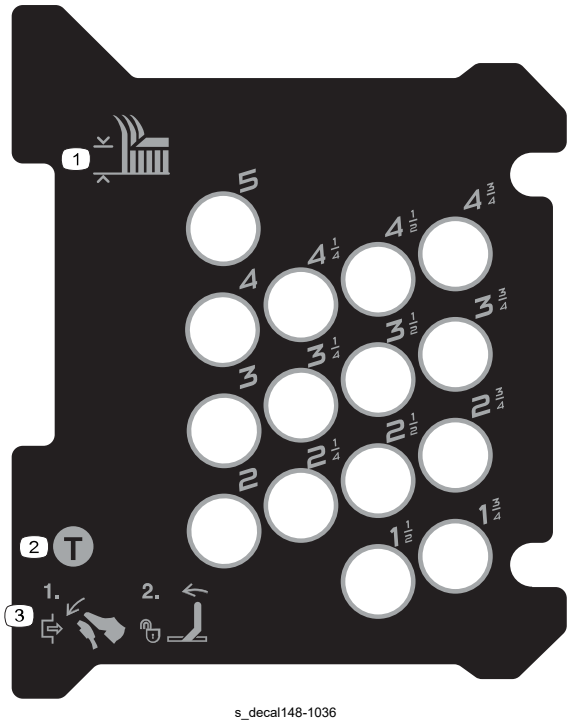
- 1 Fast
- 2 Slow

Decal Part: 148-0466



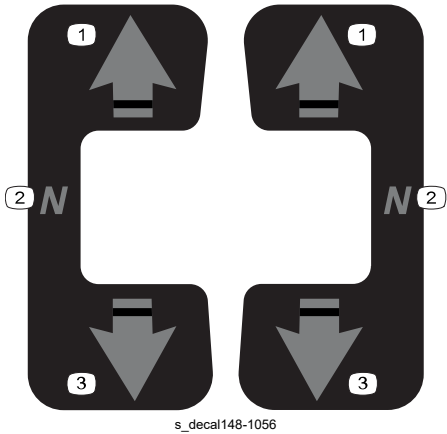
- ① Belt routing

Decal Part: 148-1036



- ① Height of cut (inches)
- ② Transport position
- ③ To unlock the deck from the transport position—push the deck-lift pedal fully forward, then push the transport lock lever forward.

Decal Part: 148-1056



- ① Forward
- ② Neutral
- ③ Reverse

Decal Part: 148-1094

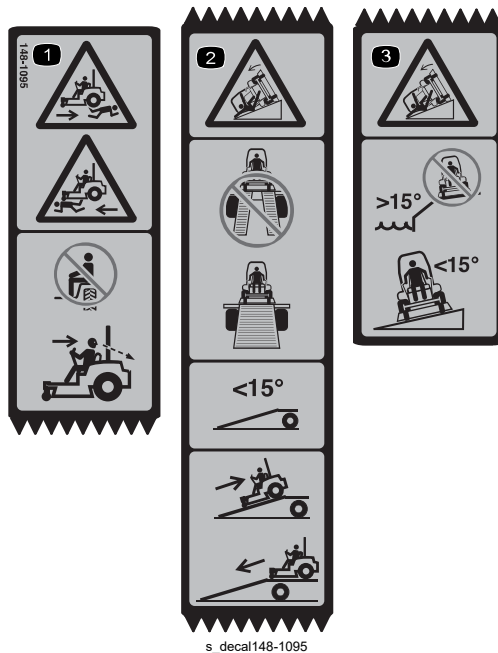


① Warning—read the *Operator's Manual*. Do not operate this machine unless you are trained. Wear hearing protection.

② Cutting and pinching hazard—keep hands and feet away from moving parts; keep all guards and shields in place.

③ Thrown object hazard—keep bystanders away.

Decal Part: 148-1095

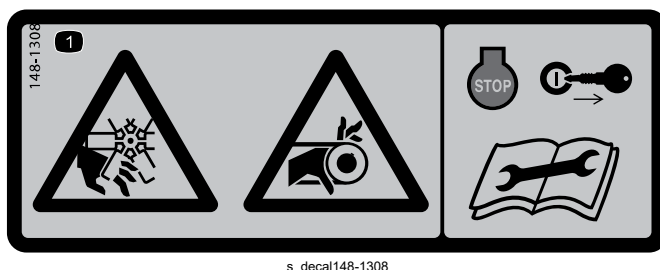


① Bodily harm hazard—Do not carry passengers. Look behind you and down when mowing in reverse.

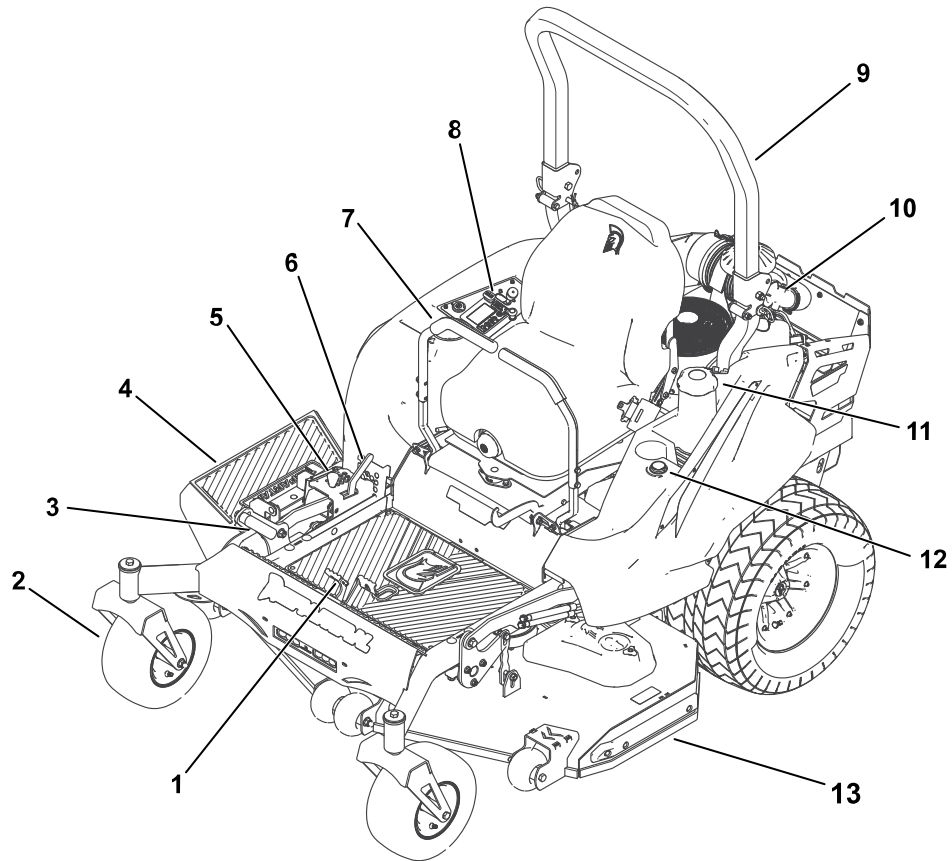
② Ramp hazard—when loading onto a trailer, do not use dual ramps; only use a singular ramp wide enough for the machine and that has an incline less than 15 degrees; back up the ramp (in reverse) and drive forward off the ramp.

③ Tipping hazard on slopes—Do not use on slopes near open water; Do not use on slopes greater than 15 degrees.

Decal Part: 148-1308



① Cutting/dismemberment hazard, fan and entanglement hazard, belt. Shut off the engine and remove the key before adjusting, servicing or cleaning the machine.

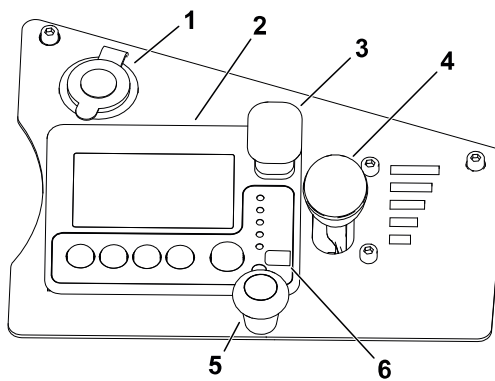


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|---------------------|-------------------------|--------------|
| ① Parking brake | ⑥ Transport-lock lever | ⑪ Fuel cap |
| ② Caster wheel | ⑦ Motion-control levers | ⑫ Fuel gauge |
| ③ Deck-lift pedal | ⑧ Control panel | ⑬ Mower deck |
| ④ Grass deflector | ⑨ Roll bar | |
| ⑤ Height-of-cut pin | ⑩ Engine | |

Controls

Control Panel



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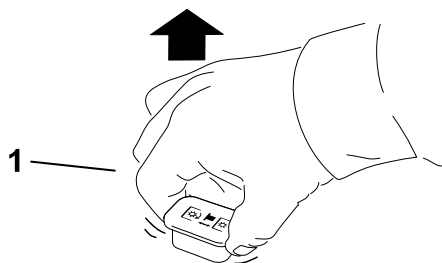
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|-------------------|--------------------|
| ① 12 V adapter | ④ Throttle control |
| ② Console display | ⑤ Choke control |
| ③ PTO switch | ⑥ Key fob |

Key Fob

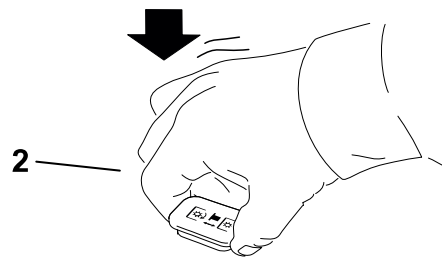
Use the key fob with the start/stop button on the console to start the machine.

Power-Takeoff (PTO) Switch

The power-takeoff (PTO) switch engages and disengages power to the mower blades.



- ① Engaged

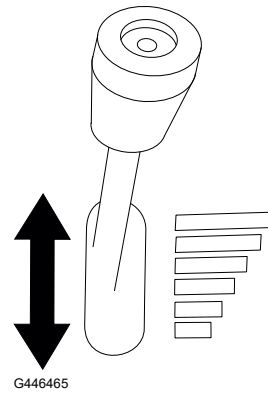


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- ② Disengaged

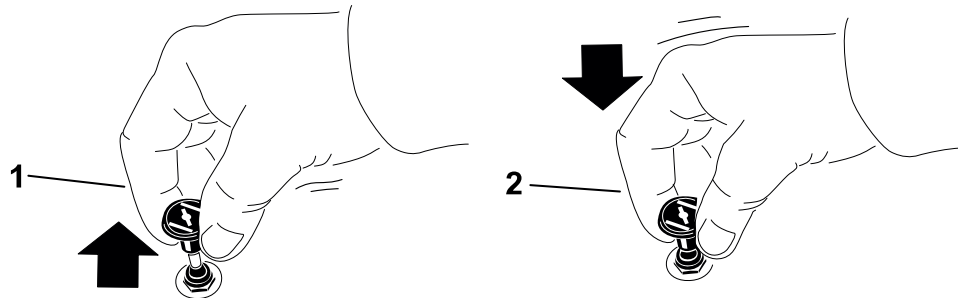
Throttle Control

The throttle controls the engine speed, and it has a continuous-variable setting from the SLOW to FAST position.



Choke Control

Use the choke control to aid in starting a cold engine.



① Engaged

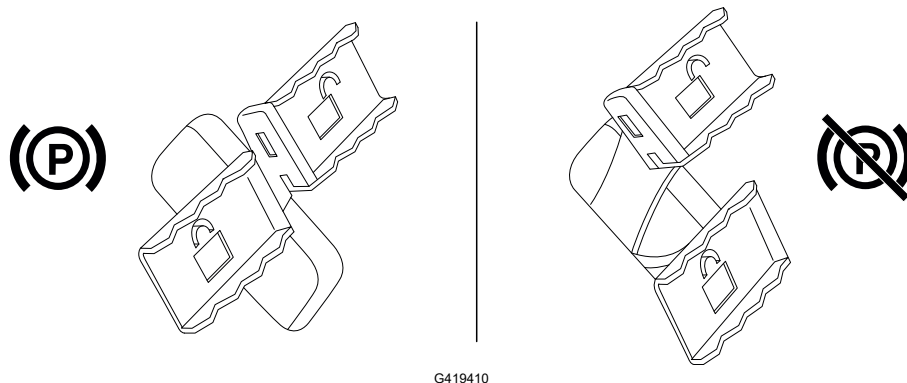
② Disengaged

Motion-Control Levers

Use the motion-control levers to drive the machine forward, reverse, and turn either direction.

Parking Brake

Whenever you shut off the engine, engage the parking brake to prevent accidental movement of the machine.

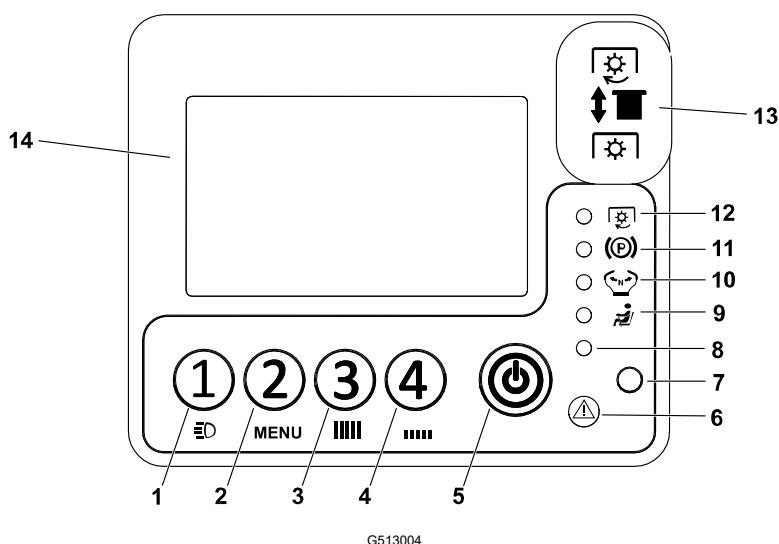


Console Display

The console display shows information about your machine, such as the operating status, various diagnostics, and other information about the machine.

IMPORTANT

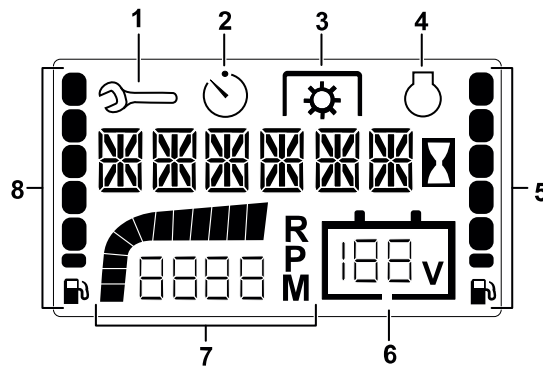
Refer to the software guide for the console display, available at www.spartanmowers.com, for more specific operating and troubleshooting information.



- | | | |
|---------------------------|---|-------------------------------------|
| ① Button 1—Headlight | ⑦ Key fob | ⑪ Operator presence indicator light |
| ② Button 2—Menu toggle | ⑧ “Okay to start” indicator light | ⑫ PTO status indicator light |
| ③ Button 3—Raise deck | ⑨ Parking brake indicator light | ⑬ PTO switch |
| ④ Button 4—Lower deck | ⑩ Motion-control levers indicator light | ⑭ LCD screen |
| ⑤ Start/stop button | | |
| ⑥ Warning indicator light | | |

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LCD Screen



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- ① Service alerts
- ② Job timer
- ③ Mower hour meter
- ④ Engine hour meter
- ⑤ Right fuel tank level
- ⑥ Battery voltage
- ⑦ Engine RPM
- ⑧ Left fuel tank level






- Press the menu button (button 2) to toggle between the clock, service alerts, job timer, mower hour meter, and engine hour meter. Hold the menu button while the service alerts or job timer is active to reset the screen.

Note: The display shows 000000 after a reset.

- The last bar for each fuel tank level flashes when the corresponding tank is empty. The tank level automatically hides when a sender is not installed.

LED Indicators

The LED indicators light up when their respective conditions do not meet requirements to start the machine.

					
No light	The PTO is disengaged.	The operator is in the seat.	The motion-control levers are in the NEUTRAL-LOCK position.	The parking brake is engaged.	Not applicable
Solid red light	The PTO is engaged.	The operator is not in the seat.	The motion-control levers are not in the NEUTRAL-LOCK position.	The parking brake is not engaged.	Not applicable
Flashing red light	The safety-interlock switch for the component has been bypassed or has failed.				The oil level is low or the battery voltage is too high or low.

The “okay to start” indicator light illuminates green when you meet all safety-interlock requirements to start the machine; the light illuminates red when 1 or more requirements are not met.

Unlocking the Console Display

The factory-default method to unlock the console display does not require a key code. You can add a key code requirement, if desired; refer to the *VersaGuard Advance User's Manual* for the console.

Fully insert the key fob into the console to unlock the console. If the key fob is already in the console, press any button.

Note: When you press button **1** through **4**, the display will show the corresponding function for that button.

If you press a button without inserting the key fob, the display will show the corresponding number for that button.

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

Before Operation

Before Operation Safety

- Do not allow children or untrained people to operate or service the machine. Local regulations may restrict the age of the operator. The owner is responsible for training all operators and mechanics.
- Inspect the area where you will use the machine and remove all objects that could be thrown or could interfere with the operation of the machine.
- Evaluate the terrain to determine the appropriate equipment and any attachments or accessories required to operate the machine properly and safely.
- Do not carry passengers on the machine.
- Become familiar with the safe operation of the equipment, operator controls, and safety signs.
- Check that operator-presence controls, safety switches, and guards are attached and working properly. Do not operate the machine unless they are functioning properly.
- Wear appropriate clothing, including eye protection; long pants; substantial, slip-resistant footwear; and hearing protection. Tie back long hair and do not wear loose clothing or loose jewelry.
- Do not operate the machine unless all guards and safety devices, such as the deflectors and the entire grass catcher, are in place and functioning properly. Replace worn or deteriorated parts when necessary.
- Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operator's position. Wait for the machine to cool before servicing, adjusting, fueling, cleaning, or storing it.



WARNING



Contacting the blade can result in serious personal injury.

When you shut off the engine, the blade(s) should stop. If not, stop using your machine immediately and contact an Authorized Service Dealer.

- Before mowing, inspect the machine to ensure that the cutting assemblies are working properly.

Before Operation Safety (continued)

- Keep bystanders, particularly children, and pets away from the machine during operation. Shut off the machine and attachment(s) if anyone enters the area.

Fuel Safety

- Fuel is extremely flammable and highly explosive. A fire or explosion from fuel can burn you and others and can damage property.
 - To prevent a static charge from igniting the fuel, place the container and/or machine directly on the ground before filling, not in a vehicle or on an object.
 - Fill the fuel tank outdoors on level ground, in an open area, and when the engine is cold. Wipe up any fuel that spills.
 - Do not handle fuel when smoking or around an open flame or sparks.
 - Do not remove the fuel cap or add fuel to the tank while the engine is running or hot.
 - If you spill fuel, do not attempt to start the engine. Avoid creating a source of ignition until the fuel vapors have dissipated.
 - Store fuel in an approved container and keep it out of the reach of children.
- Do not overfill the fuel tank. Replace the fuel cap and tighten it securely.
- In certain conditions during fueling, static electricity can be released, causing a spark that can ignite fuel vapors.
- Do not fill containers inside a vehicle or on a truck or trailer bed with a plastic liner. Always place containers on the ground and away from your vehicle before filling.
- Remove the equipment from the truck or trailer and refuel it while it is on the ground. If this is not possible, then refuel from a portable container rather than from a fuel-dispenser nozzle.
- Keep the fuel-dispenser nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do not use a nozzle lock-open device.
- Fuel is harmful or fatal if swallowed. Long-term exposure to vapors can cause serious injury and illness.
 - Avoid prolonged breathing of vapors.
 - Keep your hands and face away from the nozzle and the fuel-tank opening.
 - Keep fuel away from your eyes and skin.
- Clean up any spilled fuel.
- Do not store the machine or fuel container where there is an open flame, spark, or pilot light, such as on a water heater or on other appliances.
- Do not operate the machine without the entire exhaust system in place and in proper working condition.

Fuel

Fuel Specifications

Capacity	43.2 L (9.5 US gallons) for RZ-XD machines; 72.7 L (16 US gallons) for KGZ machines
Type	Unleaded gasoline
Minimum octane rating	87 (US) or 91 (research octane; outside the US)
Ethanol	No more than 10% by volume
Methanol	None
MTBE (methyl tertiary butyl ether)	Less than 15% by volume
Oil	Do not add to the fuel

Use only clean, fresh (no more than 30 days old), fuel from a reputable source.

IMPORTANT

To reduce starting problems, add fuel stabilizer/conditioner to fresh fuel as directed by the fuel-stabilizer/conditioner manufacturer.

Filling the Fuel Tank

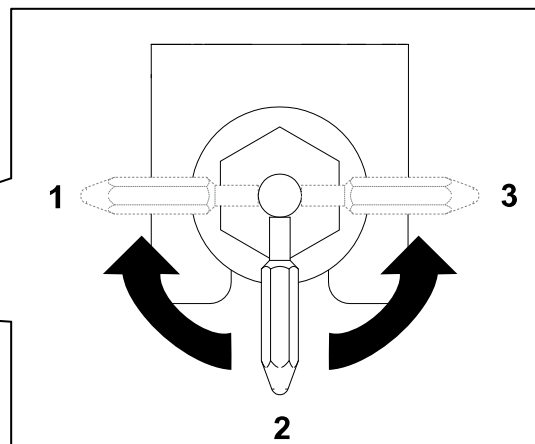
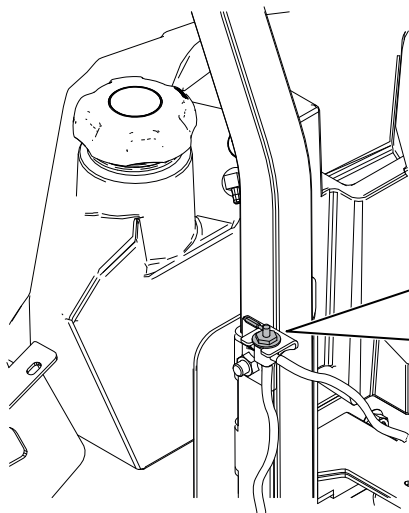
1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Clean around the fuel-tank cap.
4. Fill the fuel tank to the bottom of the filler neck. Do not fill the fuel tank completely full.

Fuel (continued)

Using the Fuel-Selector Valve

KGZ Machines Only

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Turn the fuel-selector valve to the desired tank to use fuel from that tank, or turn it to the OFF position to shut off the fuel.



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- ① Left fuel tank
- ② OFF position

- ③ Right fuel tank

Using the Rollover-Protection System (ROPS)



WARNING



To avoid injury or death from rollover: keep the roll bar in the fully raised, locked position and use the seat belt.

Ensure that the seat is secured to the machine.



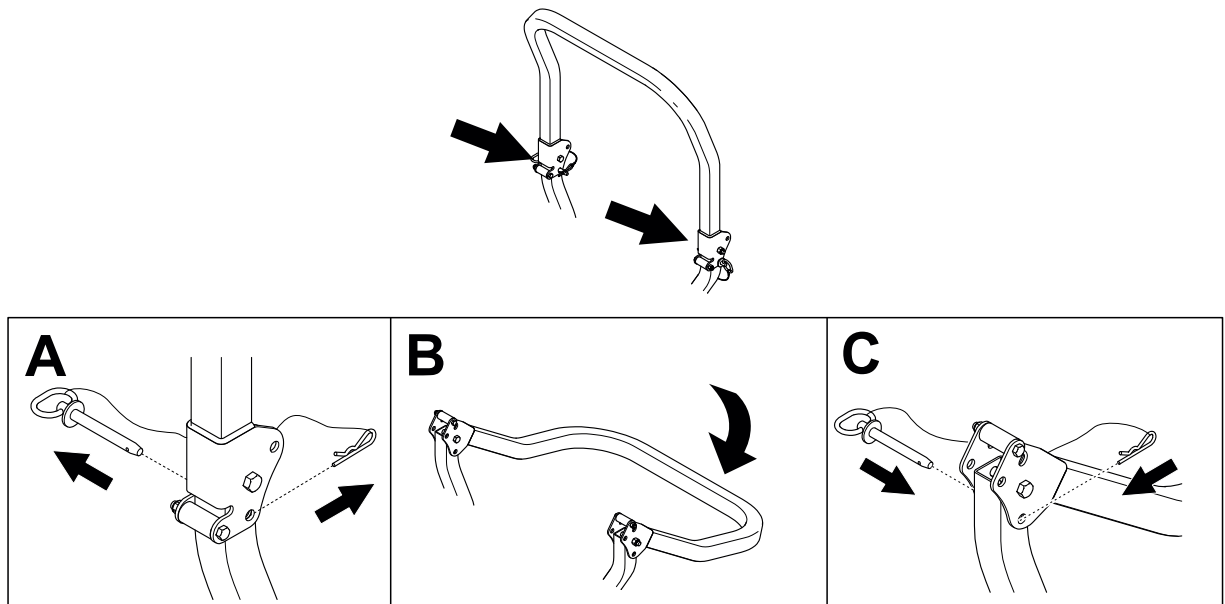
WARNING



There is no rollover protection when the roll bar is in the down position.

- Lower the roll bar only when absolutely necessary.
- Do not wear the seat belt when the roll bar is in the down position.
- Drive slowly and carefully.
- Raise the roll bar as soon as clearance permits.
- Check carefully for overhead clearances (i.e., branches, doorways, electrical wires) before driving under any objects, and do not contact them.

Lowering the Roll Bar

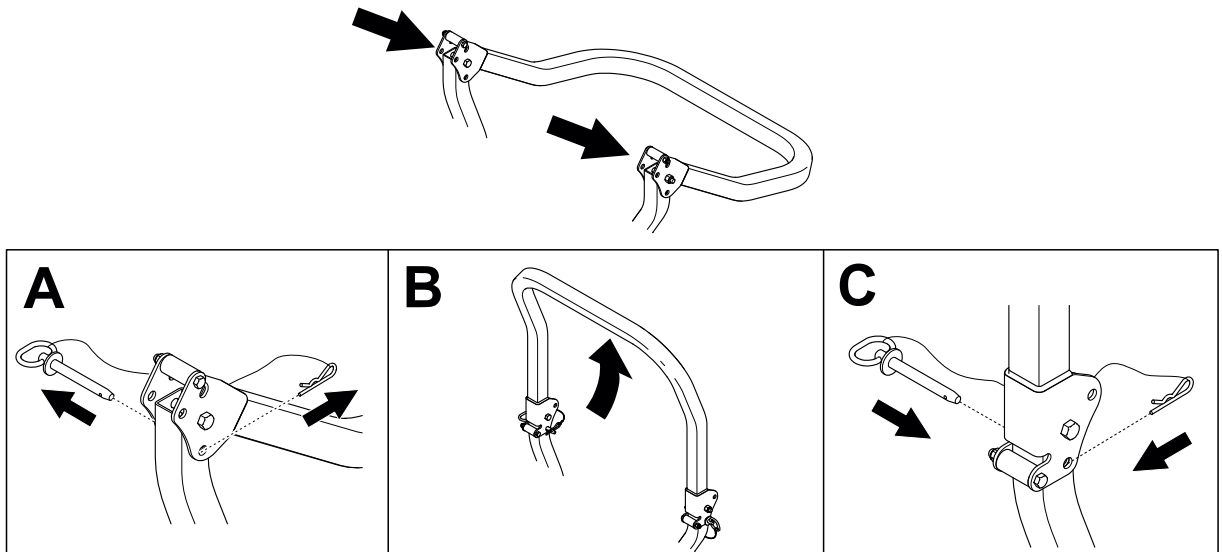


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1. Remove the hairpin cotters and pin from both sides of the roll bar.
2. Lower the roll bar.
3. Install the 2 pins and secure them with the hairpin cotters.

Using the Rollover-Protection System (ROPS) (continued)

Raising the Roll Bar



G515236

1. Remove the hairpin cotters and pin from both sides of the roll bar.
2. Raise the roll bar.
3. Install the 2 pins and secure them with the hairpin cotters.

Safety-Interlock System

⚠





DANGER

⚠

If safety-interlock switches are disconnected or damaged, the machine could operate unexpectedly, which will result in serious injury or death.

- Do not tamper with the interlock switches.
- Check the operation of the interlock switches daily, and replace any damaged switches before operating the machine.

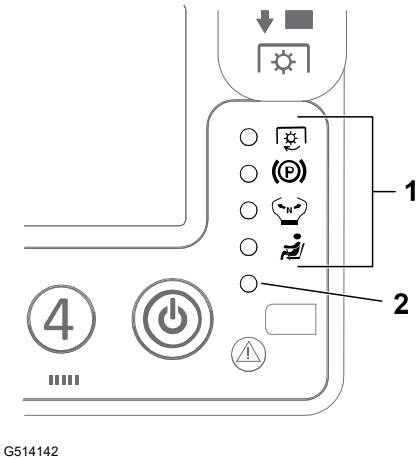
The safety-interlock system prevents the engine from starting unless the conditions in the table occur:

			
The PTO is disengaged.	The parking brake is engaged.	The motion-control levers are in the NEUTRAL-LOCK position.	The operator is in the seat.

LED lights ① illuminate on the control panel to notify the user when each interlock switch is in the correct position. The “okay to start” indicator light ② changes from red to green when you meet all safety-interlock requirements to start the machine.

The safety-interlock system also shuts off the engine when the following occurs:

- You rise from the seat when the PTO is engaged.
- You rise from the seat when the motion-control levers are not in the NEUTRAL-LOCK position or the parking brake is disengaged.
- You engage the parking brake when the motion-control levers are not in the NEUTRAL-LOCK position.



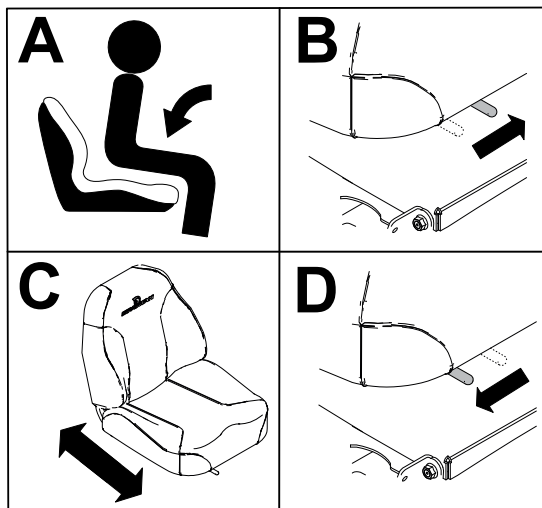
Performing Daily Maintenance

Before starting the machine each day, perform the Each Use/Daily procedures listed in the Maintenance Schedule.

Break-In Time

New engines take time to develop full power. Mower decks and drive systems have higher friction when new, placing additional load on the engine. Allow 40 to 50 hours of break-in time for new machines to develop full power and best performance.

Positioning the Seat

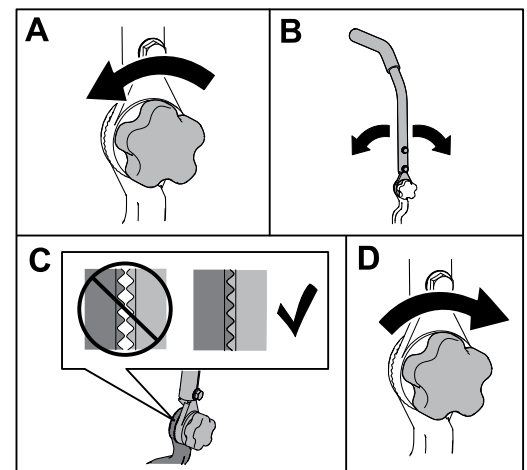


G419351

Adjusting the Motion-Control Lever Tilt

Machines with Soft-Knob Adjustable Arms Only

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before making adjustments.
3. Loosen the knob (A).
4. Pivot the control lever forward or rearward (B).
5. Ensure that the teeth are fully seated (C) and tighten the knob (D).
6. Move the lever through the full range of motion several times to ensure that the lever is adjusted properly and is secure.
7. Repeat the adjustment for the other control lever; ensure that the levers are even in the neutral position.



G535100

During Operation

During Operation Safety

- The owner/operator can prevent and is responsible for accidents that may cause personal injury or property damage.

During Operation Safety (continued)

- Use your full attention while operating the machine. Do not engage in any activity that causes distractions; otherwise, injury or property damage may occur.
- Do not operate the machine while ill, tired, or under the influence of alcohol or drugs.
- Do not operate the machine unless all guards and safety devices, such as the deflectors and the entire grass catcher, are in place and functioning properly. Replace worn or deteriorated parts with genuine Spartan parts when necessary.
- Operating engine parts, especially the muffler, can become extremely hot. Severe burns can occur on contact and debris, such as leaves, grass, brush, etc. can catch fire. Keep the engine area free from debris and excessive oil and grease.
- Operate the engine only in well-ventilated areas. Exhaust gases contain carbon monoxide, which is lethal if inhaled.
- Operate the machine only in good visibility and appropriate weather conditions. Do not operate the machine when there is the risk of lightning.
- Start the engine with your feet well away from the blades.
- Keep your hands and feet away from moving parts. Keep clear of the discharge opening.
- Keep away from holes, ruts, bumps, rocks, and other hazards. Use care when approaching blind corners, shrubs, trees, tall grass or other objects that may hide obstacles or obscure your view.
- Do not mow with the discharge deflector raised, removed, or altered unless there is a grass-collection system or mulch kit in place and working properly.
- Do not mow in reverse unless it is absolutely necessary. Always look down and behind you before moving the machine in reverse.
- Stop the blades whenever you are not mowing. Slow down the machine, and use caution when crossing surfaces other than grass or when transporting the machine to and from the operating area.
- Be aware of the mower discharge path and direct the discharge away from others. Avoid discharging material against a wall or obstruction because the material may ricochet back toward you.
- If the machine strikes an object or starts to vibrate, immediately shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before examining the machine for damage. Make all necessary repairs before resuming operation.
- Slow down and use caution when making turns and crossing roads and sidewalks with the machine. Always yield the right-of-way.
- Never leave a running machine unattended.
- Before you leave the operating position, do the following:
 - Park the machine on a level surface.
 - Disengage the power takeoff and lower the attachments.
 - Engage the parking brake.
 - Shut off the engine and remove the key (if equipped).
 - Wait for all moving parts to stop.
- Never carry children on the machine.

During Operation Safety (continued)

- Do not carry children on the machine, even when the blades are not moving. Children could fall off and be seriously injured or prevent you from safely operating the machine. Children who have been given rides in the past could appear in the operating area without warning and be run over or backed over by the machine.
- Children are often attracted to the machine and the mowing activity. Never assume that children will remain where you last saw them.
- Keep children out of the operating area and under the watchful care of a responsible adult other than the operator.
- Be alert and shut off the machine if children enter the operating area.
- Before backing up or turning the machine, look down and all around for small children.
- Do not use the machine as a towing vehicle unless it has a hitch installed. Attach towed equipment to the machine only at the hitch point.
- Use only accessories and attachments approved by Spartan Mowers.

Rollover Protection System (ROPS) Safety

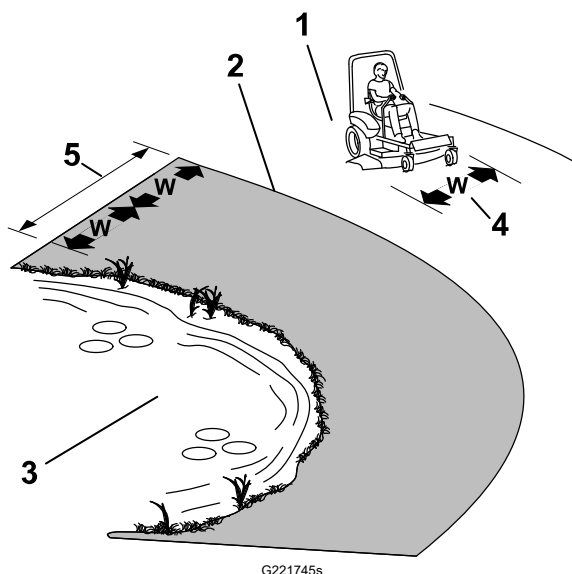
- The ROPS is an integral safety device. Do not remove any of the ROPS components from the machine.
- Ensure that the seat belt is attached and that you can release it quickly in an emergency.
- Keep the roll bar in the fully raised and locked position and always wear your seat belt whenever the roll bar is up.
- Check carefully for overhead objects before you drive under them, and do not contact them.
- Replace damaged ROPS components. Do not repair or alter them.
- There is no rollover protection when the roll bar is down.
- Wheels dropping over edges, over steep banks, or into water can cause a rollover, which may result in serious injury or death.
- Do not wear the seat belt when the roll bar is down.
- Lower the roll bar only when absolutely necessary; raise it as soon as clearance permits.
- In the event of a rollover, take the machine to an Authorized Service Dealer to inspect the ROPS.
- Use only accessories and attachments for the ROPS approved by Spartan Mowers.

Slope Safety

- Slopes are a major factor related to loss of control and rollover accidents, which can result in severe injury or death. The operator is responsible for safe slope operation. Operating the machine on any slope requires extra caution. Before using the machine on a slope, do the following:
 - Review and understand the slope instructions in the manual and on the machine.
 - Use an angle indicator to determine the approximate slope angle of the area.
 - Never operate on slopes greater than 15°.

During Operation Safety (continued)

- Evaluate the site conditions of the day to determine if the slope is safe for machine operation. Use common sense and good judgment when performing this evaluation. Changes in the terrain, such as moisture, can quickly affect the operation of the machine on a slope.
- Identify hazards at the base of the slope. Do not operate the machine near drop-offs, ditches, embankments, water, or other hazards. The machine could suddenly roll over if a wheel goes over the edge or the edge collapses. Keep a safe distance (twice the width of the machine) between the machine and any hazard. Use a walk-behind machine or a hand trimmer to mow the grass in these areas.



① Safe Zone—use the machine here on slopes less than 15° or flat areas.

② Danger Zone—use a walk-behind mower and/or a hand trimmer on slopes greater than 15° and near drop-offs or water.

③ Water

④ W = Width of the machine

⑤ Keep a safe distance (twice the width of the machine) between the machine and any hazard.

- Avoid starting, stopping, or turning the machine on slopes. Avoid making sudden changes in speed or direction; turn slowly and gradually.
- Do not operate a machine under any conditions where traction, steering, or stability is in question. Be aware that operating the machine on wet grass, across slopes, or downhill may cause the machine to lose traction. Loss of traction to the drive wheels may result in sliding and a loss of braking and steering. The machine can slide even if the drive wheels are stopped.
- Remove or mark obstacles such as ditches, holes, ruts, bumps, rocks, or other hidden hazards. Tall grass can hide obstacles. Uneven terrain could overturn the machine.
- Use extra care while operating with accessories or attachments, such as grass-collection systems. These can change the stability of the machine and cause a loss of control. Follow directions for counterweights.
- If possible, keep the deck lowered to the ground while operating on slopes. Raising the deck while operating on slopes can cause the machine to become unstable.

During Operation Safety (continued)

Towing Safety

- Do not attach towed equipment except at the hitch point.
- Do not use the machine as a towing vehicle unless it has a hitch installed.
- Do not exceed the maximum gross towing weight.
- Never allow children or others near the towed equipment.
- On slopes, the weight of the towed equipment may cause loss of traction, increased risk of rollover, and loss of control. Reduce the towed weight and slow down.
- The stopping distance may increase with the weight of a towed load. Travel slowly and allow extra distance to stop.
- Make wide turns to keep the attachment clear of the machine.

Starting the Machine

1. Sit on the seat.
2. Move the motion-control levers outward to the NEUTRAL-LOCK position.
3. Engage the parking brake.
4. Disengage the PTO switch.
5. Unlock the console display using the key fob and/or key code.
6. Verify that the “okay to start” indicator light is green.
7. Engage the choke control (if applicable).
8. Press and hold the start/stop button to start the engine. Release the button when the engine starts.
9. Disengage the choke control (if applicable).

Note: When starting the engine in cold conditions, allow the engine to warm up before disengaging the choke control

Shutting Off the Engine

Note: If the key fob is used to start the machine, removing the key fob will automatically shut off the engine.

1. Park the machine on a level surface.
2. Disengage the PTO switch.
3. Move the motion-control levers outward to the NEUTRAL-LOCK position.
4. Engage the parking brake.
5. Move the throttle control to the SLOW position.
6. Press the start/stop button to shut off the engine.
7. Remove the key fob (if equipped).
8. Wait for all moving parts to stop before leaving the operating position.

Driving the Machine



CAUTION

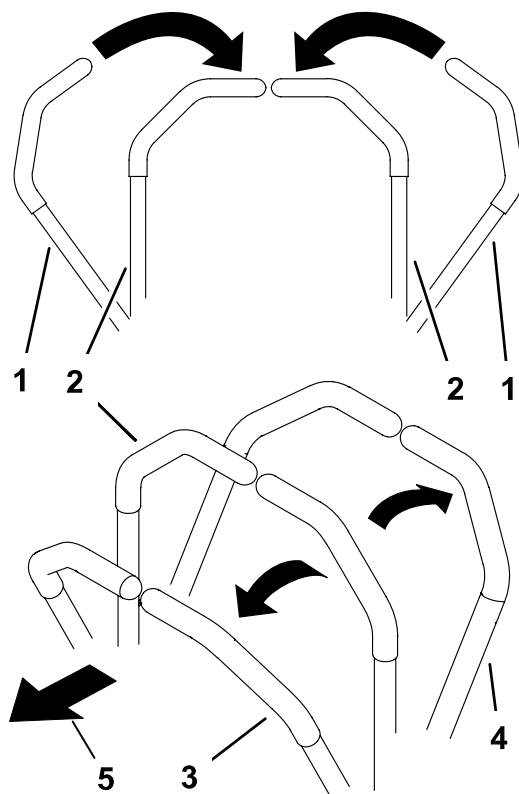


Positioning one lever too far in front of the other causes the machine to spin very rapidly. As a result, you may lose control of the machine, causing personal injury to you and damage to the machine.

Slow down the machine before making sharp turns.

The drive wheels turn independently, powered by motors on each axle. You can turn 1 side in reverse while you turn the other forward, causing the machine to spin rather than turn. This greatly improves the machine maneuverability but may require some time for you to adapt to how it moves.

1. Move the motion-control levers down to the center, unlocked position.



- ① Motion-control levers—NEUTRAL-LOCK position
- ② Center, unlocked position
- ③ Forward
- ④ Reverse
- ⑤ Front of the machine

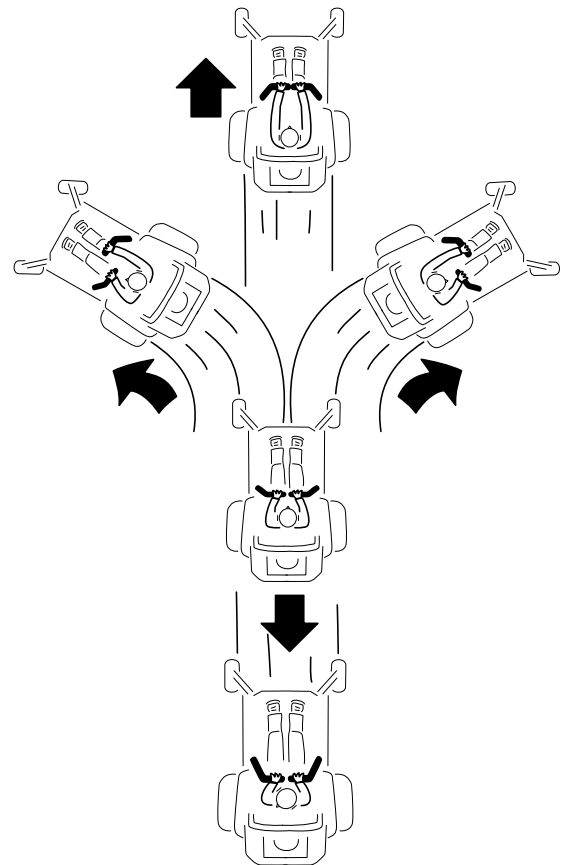
G426843s

Driving the Machine (continued)

2. Slowly push the motion-control levers forward or rearward. Move 1 lever farther than the other lever to turn.

Note: The farther you move the motion-control levers, the faster the machine moves in that direction.

3. To stop, pull the motion-control levers back to the NEUTRAL position.



G397314s

Operating the PTO Switch



DANGER



The rotating blades under the mower deck are dangerous. Blade contact will cause serious injury or death.

Do not put your hands or feet under the mower or mower deck when the blades are engaged.



DANGER



An uncovered discharge opening allows objects to be thrown toward you or bystanders. Also, contact with the blade could occur. Thrown objects or blade contact will cause serious injury or death.

Do not operate the mower with the discharge deflector raised, removed, or altered unless a grass collection system or mulch kit is in place and working properly.

The PTO switch starts and stops the mower blades and any powered attachments.

1. Increase the throttle to full throttle.
2. Engage the PTO switch.

Note: You may hear a squealing noise as the clutch plates engage. This is normal.

3. Mow as desired.
4. Disengage the PTO switch after mowing.

Side Discharge

The hinged grass deflector disperses clippings to the side and down toward the turf.



DANGER



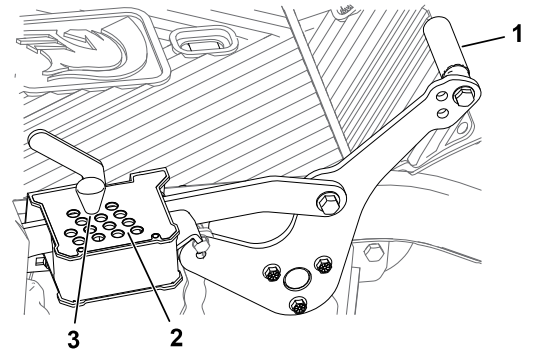
Without the grass deflector, discharge cover, or complete grass catcher assembly mounted in place, you and bystanders are exposed to blade contact and thrown debris. Contact with rotating mower blade(s) and thrown debris will cause injury or death.

- Do not remove the grass deflector from the machine, because the grass deflector routes material down toward the turf. If the grass deflector is ever damaged, replace it immediately.
 - Never try to clear the discharge area or mower blades unless the power takeoff (PTO) is off. Shut off the machine.
-

Adjusting the Height of Cut

You can adjust the height of cut from 38 to 127 mm (1-1/2 to 5 inches) in 6.4 mm (1/4 inch) increments.

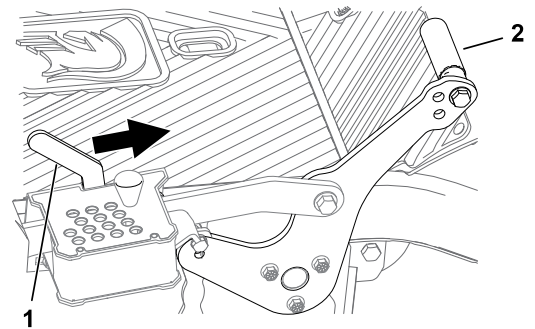
1. Push the deck-lift pedal **①** with your foot to raise the mower deck.
2. Remove the pin **③** from the height-of-cut bracket.
3. Insert the pin into the hole corresponding to the desired height of cut **②**.
4. Lower the deck slowly until the lever contacts the pin.



G514391

Using the Transport Lock

1. Push the deck-lift pedal **②** fully forward to lock the mower deck in the TRANSPORT position.
2. Push the deck-lift pedal fully forward and push the transport lock lever **①** forward to the UNLOCK position, then slowly lower the mower deck to the desired height of cut.



G514392

Towing a Trailer

Maximum Gross Towing Weight: 113 kg (250 lb)

Contact an Authorized Service Dealer for the available tow hitches.

Do not exceed 22 kg (49 lb) of tongue weight on the tow hitch of the machine.

When hauling cargo or towing a trailer, do not overload the machine or trailer. Overloading can cause poor performance or damage to the hydraulic-drive units, tires, and frame.



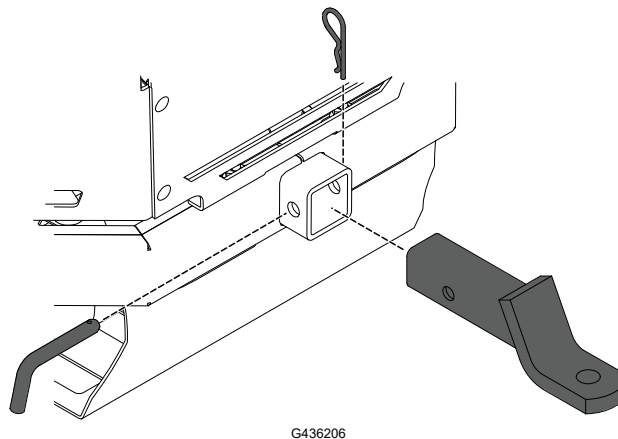
WARNING



Towing on slopes could reduce the stability of the machine and result in injury or death.

Tow equipment only on slopes less than 5°.

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Insert the hitch ball mount into the receiver located at the rear of the machine.
4. Insert the hitch pin through the hole in the receiver and the hitch ball mount.
5. Secure the hitch using the hairpin cotter.



G436206

Operating Tips

Maximize Air Circulation

For best mowing and maximum air circulation, operate the machine with the throttle in the FAST position. Air circulation is required to thoroughly cut grass clippings, so do not set the height-of-cut so low as to totally surround the mower deck in uncut grass. Always try to have 1 side of the mower deck free from uncut grass, which allows air to be drawn into the mower deck.

Operating Tips (continued)

Avoid Cutting Too Low

When mowing uneven ground, raise the cutting height to slightly higher than normal to avoid scalping the turf. However, the cutting height used in the past is generally the best one to use. When cutting grass longer than 15 cm (6 inches) tall, you may want to cut the lawn twice to ensure an acceptable quality of cut.

Cut a Third of the Grass Blade

It is best to cut only about a third of the grass blade. Cutting more than that is not recommended unless grass is sparse, or it is late fall when grass grows more slowly.

Alternate the Mowing Direction

Alternate the mowing direction to keep the grass standing straight. This also helps disperse clippings, which enhances decomposition and fertilization.

Mowing Frequency

Grass grows at different rates at different times of the year. To maintain the same cutting height, mow more often in early spring. As the grass growth rate slows in mid summer, mow less frequently. If you cannot mow for an extended period, first mow at a high cutting height, then mow again 2 days later at a lower height setting.

Mow at Slower Ground Speeds

In certain conditions, mowing at a slower ground speed can improve cut quality.

Avoid Grass Clumps

If you must stop driving forward while mowing, a clump of grass clippings may drop onto your lawn. To avoid this, move onto a previously cut area with the blades engaged or disengage the mower deck while moving forward.

Keep the Underside of the Mower Deck Clean

Clean clippings and dirt from the underside of the mower deck after each use. Grass and dirt build-up will eventually decrease the cutting quality.

Maintain the Blades

Maintain a sharp blade throughout the cutting season because a sharp blade cuts cleanly without tearing or shredding the grass blades. Tearing and shredding turns grass brown at the edges, which slows growth and increases the chance of disease. Check the mower blades after each use for sharpness, and for any wear or damage. File down any nicks and sharpen the blades as necessary. If a blade is damaged or worn, replace it.

After Operation

After Operation Safety

- Park the machine on a level surface, disengage the drives, engage the parking brake, shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operator's position.
- Wait for the machine to cool before servicing, adjusting, fueling, cleaning, or storing it.
- Clean grass, leaves, excessive grease and oil, and other debris from the mower deck, muffler, drives, grass catcher, and engine area to help prevent fires.
- Close the fuel-shutoff valve (if equipped) before storing or transporting the machine.
- Use full-width ramps for loading the machine into a trailer or truck.
- Tie the machine down securely using straps, chains, cable, or ropes. Both front and rear straps should be directed down and outward from the machine.

Cleaning the Machine

Clean the machine after each use.

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Clean grass and debris from cutting unit, muffler, drives, grass catcher, and engine.

IMPORTANT

You can wash the machine with a mild detergent and water. Do not pressure wash the machine. Avoid excessive use of water, especially near the control panel, under the seat, around the engine, hydraulic pumps, and motors.

Hauling the Machine

Use a heavy-duty trailer or truck to haul the machine. Use a full-width ramp. Ensure that the trailer or truck has all the necessary brakes, lighting, and marking as required by law. Please carefully read all the safety instructions. Knowing this information could help you or bystanders avoid injury. Refer to your local ordinances for trailer and tie-down requirements.



WARNING



Driving on the street or roadway without turn signals, lights, reflective markings, or a slow-moving-vehicle emblem is dangerous and can lead to accidents causing personal injury.

Do not drive the machine on a public street or roadway.

Hauling the Machine (continued)

Trailer Requirements

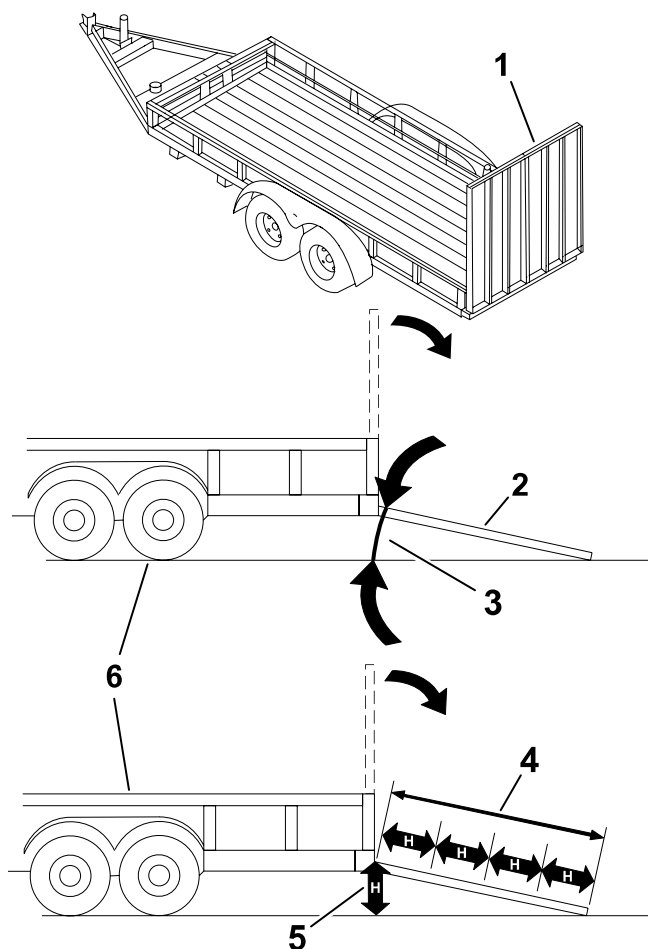


WARNING



Loading a machine onto a trailer or truck increases the possibility of tip-over and could cause serious injury or death.

- Use only a full-width ramp; do not use individual ramps for each side of the machine.
- Do not exceed a 15-degree angle between the ramp and the ground or between the ramp and the trailer or truck.
- Ensure that the length of ramp is at least 4 times as long as the height of the trailer or truck bed to the ground.



G027996s

① Full-width ramp(s) in stowed position

② Side view of full-width ramp in loading position

③ Not greater than 15 degrees

④ Ramp is at least 4 times as long as the height of the trailer or truck bed to the ground

⑤ H = height of the trailer or truck bed to the ground

⑥ Trailer

Hauling the Machine (continued)

Loading the Machine



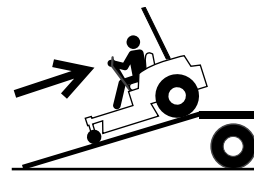
WARNING



Loading a machine onto a trailer or truck increases the possibility of tip-over and could cause serious injury or death.

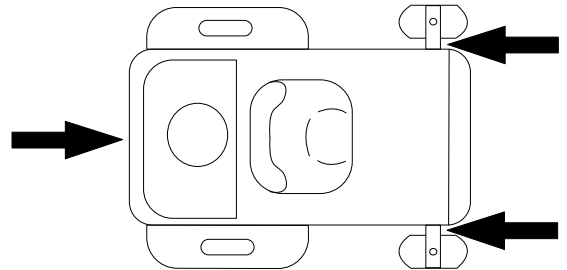
- Use extreme caution when operating a machine on a ramp.
- Back the machine up the ramp and drive it forward down the ramp.
- Avoid sudden acceleration or deceleration while driving the machine on a ramp as this could cause a loss of control or a tip-over situation.

1. If using a trailer, connect it to the towing vehicle and connect the safety chains.
2. If applicable, connect the trailer brakes.
3. Lower the ramp, ensuring that the angle between the ramp and the ground does not exceed 15 degrees.
4. Back the machine up the ramp.
5. Shut off the engine, remove the key (if equipped), and engage the parking brake.



G414594

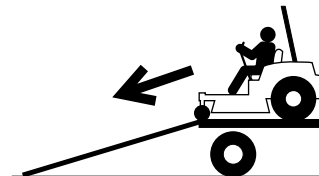
6. Tie down the machine using straps, chains, cable, or ropes. Refer to local regulations for tie-down requirements.



G027708s

Unloading the Machine

1. Lower the ramp, ensuring that the angle between the ramp and the ground does not exceed 15 degrees.
2. Drive the machine forward down the ramp.



G414595

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

Maintenance Safety

- If you leave the key in the switch, someone could accidentally start the engine and seriously injure you or other bystanders. Remove the key from the switch before you perform any maintenance.
- Before you leave the operator's position, do the following:
 - Park the machine on a level surface.
 - Disengage the drives.
 - Engage the parking brake.
 - Shut off the engine and remove the key (if equipped).
 - Wait for the machine to cool before performing maintenance.
- Do not allow untrained personnel to service the machine.
- Keep your hands and feet away from moving parts or hot surfaces. If possible, do not make adjustments with the engine running.
- Keep all guards, shields, switches, and all safety devices in place and in proper working condition. Frequently check for worn or deteriorating components and replace them with genuine Spartan parts when necessary.
- Carefully release pressure from components with stored energy.



WARNING



Removing or modifying original equipment, parts, and/or accessories may alter the warranty, controllability, and safety of the machine. Making unauthorized modifications to the original equipment or failing to use original Spartan parts could lead to serious injury or death.

- Check the parking brake operation frequently. Adjust and service it as required.
- Never tamper with safety devices. Check their proper operation regularly.
- Clean grass, leaves, excessive grease and oil, and other debris from the cutting unit, muffler, drives, grass catcher, and engine compartment to prevent fires.
- Clean up oil or fuel spills and remove fuel-soaked debris.
- Do not rely solely on mechanical or hydraulic jacks to support the machine. Use adequate jack stands.

- Keep all parts in good working condition and all hardware tightened, especially the blade-attachment hardware.
- To ensure optimum performance, use only genuine Spartan replacement parts and accessories. Replacement parts and accessories made by other manufacturers could be dangerous.

Recommended Maintenance Schedule

Maintenance Service Interval	Maintenance Procedure
Before each use or daily	Check the safety-interlock system.
	Inspect the ROPS and mounting hardware. Replace any damaged parts.
	Check the air cleaner for dirty, loose, or damaged parts.
	Clean the engine screen, engine-oil cooler, and the area around the engine..
	Check the engine-oil level.
	Check the battery for connection and damage.
	Test the parking brake.
	Check the hydraulic fluid level.
	Check the tire pressure.
	Inspect the blades.
	Inspect the grass deflector for damage.
	Clean under the mower deck.
	Check for loose fasteners.
After the first 25 hours	Change the engine oil.
After the first 50 hours	Change the hydraulic fluid; contact an Authorized Service Dealer.
Monthly	Grease the machine.
	Check the belts for wear or cracks.
	Check the mower deck belt tension and condition.
Every 100 hours	Change the engine oil and filter (more often in dirty or dusty conditions).
	Torque the wheel lug nuts.
Every 200 hours	Change the fuel filter.
Every 250 hours	Change the hydraulic fluid; contact an Authorized Service Dealer.
Yearly or before storage	Perform all maintenance procedures listed above before storage.
	Paint any chipped surfaces.

Pre-Maintenance Procedures

Moving a Non-Functioning Machine

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. On both transmissions, rotate the levers as shown for your machine to open the bypass valves.

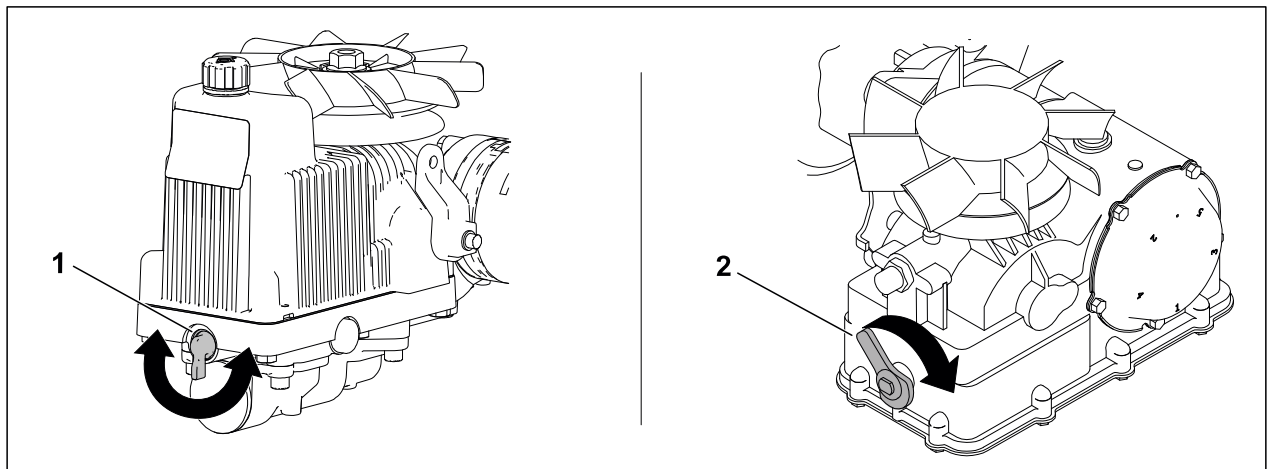
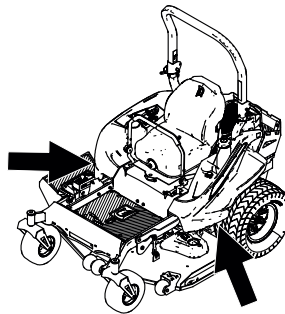


WARNING



The machine could unintentionally move while the transmissions are bypassed and injure you or bystanders.

Close the bypass valves after moving the machine.



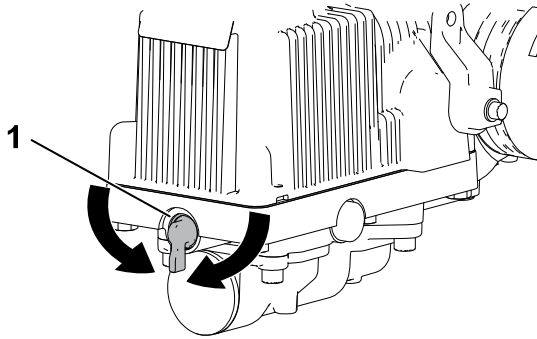
G465616

① RZ-XD machines—rotate the lever left or right.

② KGZ machines—rotate the lever left.

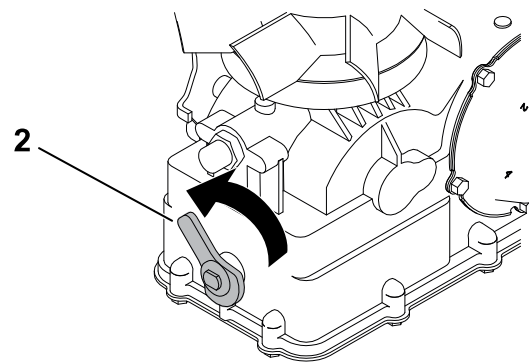
4. Disengage the parking brake.
5. Move the machine as required.
6. Immediately after moving the machine, engage the parking brake.
7. Move the bypass levers as shown to close the bypass valves.

Moving a Non-Functioning Machine (continued)



G434747

① RZ-XD machines—rotate the lever down.

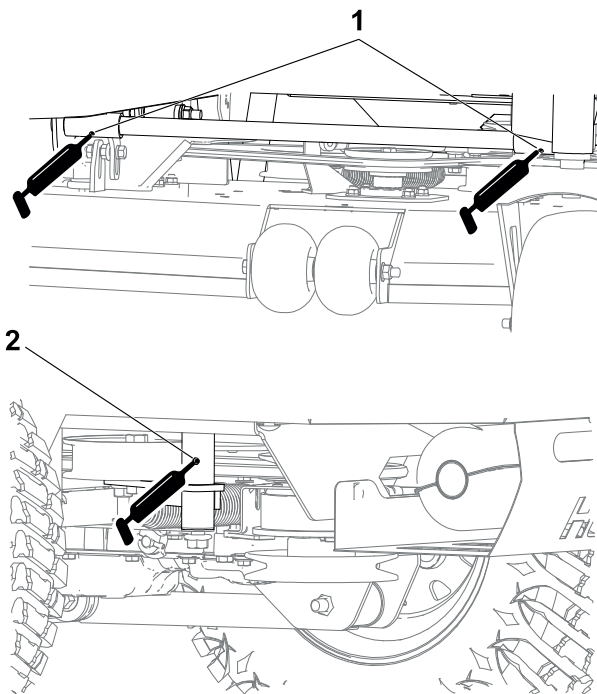


② KGZ machines—rotate the lever right.

Lubrication

Greasing the Machine

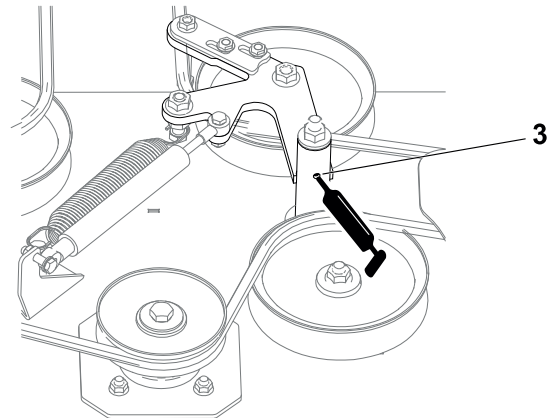
Grease type: No. 2 lithium or molybdenum grease



G464439

① Deck-lift fitting (2)

② Pump idler fitting



③ Deck idler fitting

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Allow the machine to cool.

Greasing the Machine (continued)

4. Clean the grease fittings with a rag.
Note: Scrape any paint off the front of the fitting(s).
5. Connect a grease gun to the fitting.
6. Pump grease into the fittings until grease begins to ooze out of the bearings.
7. Wipe up any excess grease.

Engine Maintenance

IMPORTANT

For more specific information about your machine's engine, refer to the engine owner's manual or visit <https://spartanmowers.com/company/owner-info/>.

Engine Safety

- Keep your hands, feet, face, other body parts, and clothing away from the muffler and other hot surfaces. Wait for the engine to cool before performing maintenance.
- Do not change the engine governor speed or overspeed the engine.

Servicing the Air Cleaner

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Release the retaining clamps on the air cleaner and pull the air-cleaner cover off the air-cleaner body.
4. Clean or replace the filter elements per the engine manufacturer's instructions.
5. Install the air-cleaner cover and secure the latches.

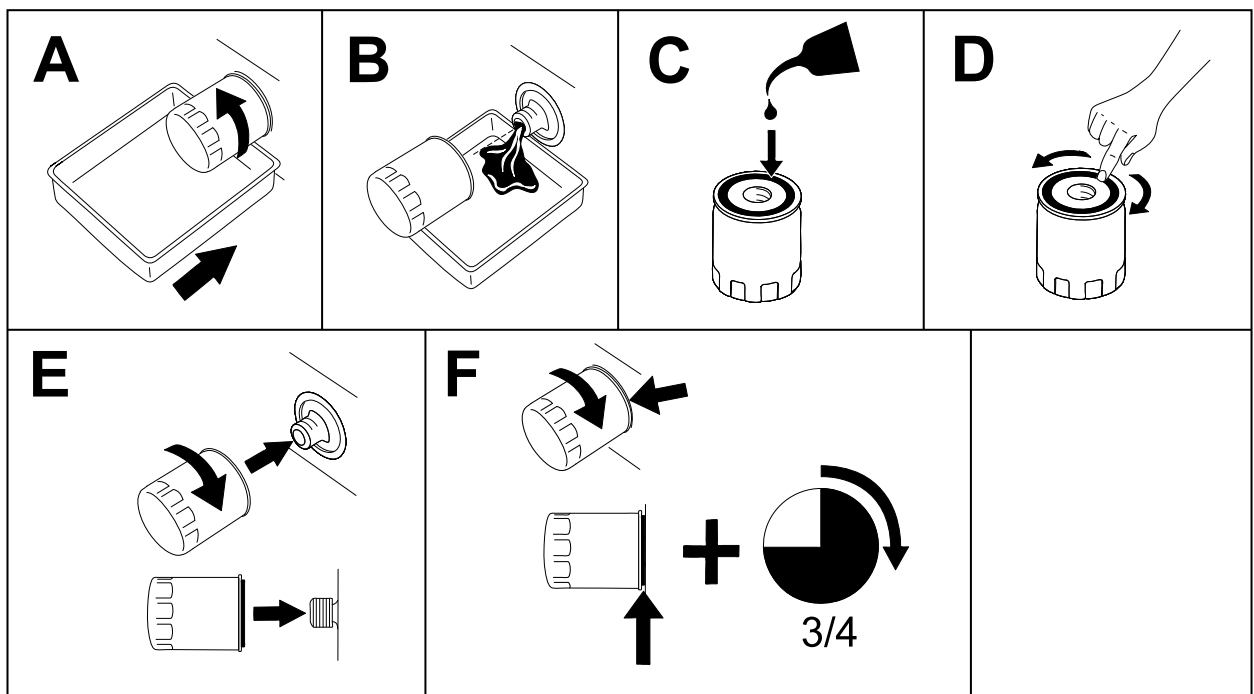
Engine Oil Service

Checking the Engine-Oil Level

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Wait for the engine to cool to allow the oil to drain into the sump.
4. Check the engine-oil level per the engine manufacturer's instructions.

Changing the Engine Oil and Filter

1. Park the machine so that the drain side is slightly lower than the opposite side to ensure that the oil drains completely.
2. Disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
3. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
4. Clean the area around the oil-fill cap. Remove the cap.
5. Place a drain pan under the drain plug.
6. Remove the plug and allow the oil to drain.
7. Install the plug.
8. Change the engine-oil filter as shown.



G398545s

9. Slowly pour approximately 80% of the oil specified by the engine manufacturer into the filler tube and slowly add the additional oil to bring it to the appropriate level.

Engine Oil Service (continued)

10. Start the engine and check for leaks.
11. Stop the engine, remove the key (if equipped), and check the oil level.
12. Dispose of the used oil at a recycling center.

Servicing the Spark Plugs

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Service the spark plugs per the engine manufacturer's instructions.

Fuel Maintenance



DANGER



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

Refer to [Fuel Safety, page 5–2](#) for a complete list of fuel related precautions.

Replacing the Fuel Filter

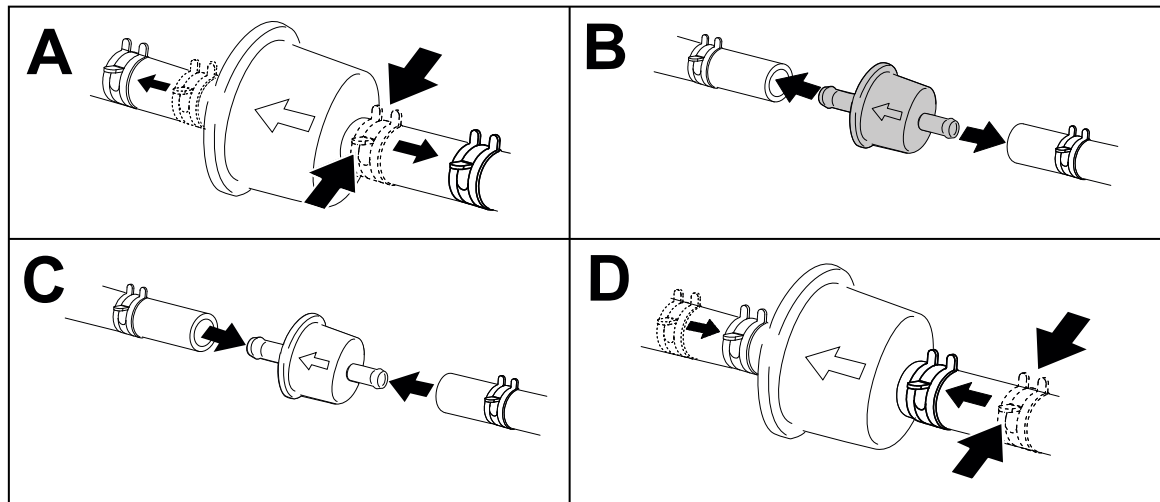
1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Clamp the fuel lines on both sides of the fuel filter.
4. Replace the filter.

Note: Ensure that the flow-direction arrow on the replacement filter points toward the engine.

IMPORTANT

Never install a dirty filter after removing it from the fuel line.

Replacing the Fuel Filter (continued)



G420323

5. Remove the clamps blocking the fuel flow.

Electrical System Maintenance

Electrical System Safety

- Disconnect the cable from the negative terminal of the battery before repairing the machine.
- Charge the battery in an open, well-ventilated area, away from sparks and flames. Unplug the charger before connecting or disconnecting the battery. Wear protective clothing and use insulated tools.

Battery Service

Removing the Battery



WARNING



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

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

Battery Service (continued)



WARNING



Incorrectly removing the cables from the battery could damage the machine and cables, causing sparks. Sparks can cause the battery gasses to explode, resulting in personal injury.

- Always disconnect the negative (black) battery cable before disconnecting the positive (red) cable.
- Always connect the positive (red) battery cable before connecting the negative (black) cable.

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.

3. Allow the machine to cool.

4. Slide the rubber cover (6) off the negative (black) cable (5).

5. Disconnect the negative (black) ground cable from the negative (-) battery post (4).

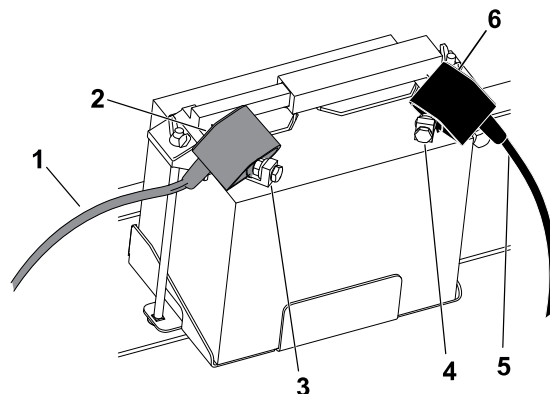
Note: Retain all fasteners.

6. Slide the rubber cover (2) off the positive (red) cable (1).

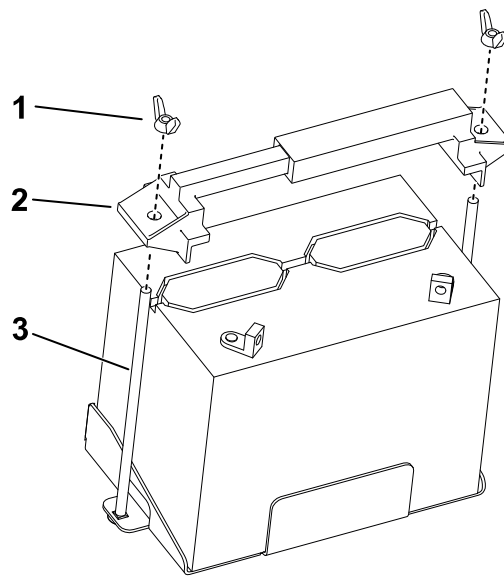
7. Disconnect the positive (red) cable from the positive (+) battery post (3).

Note: Retain all fasteners.

8. Remove the wing nuts (1) and battery hold-down (2) from the rods (3), and remove the battery.



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G421098

Battery Service (continued)

Charging the Battery



WARNING



Charging the battery produces gasses that can explode.

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

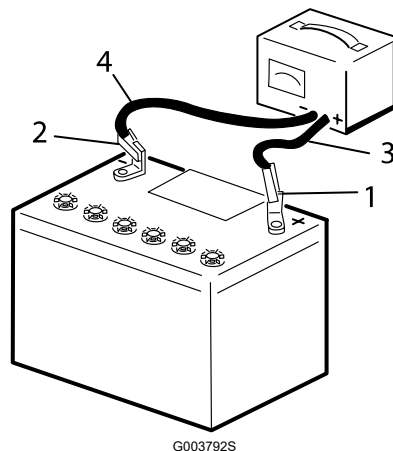
IMPORTANT

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

1. Remove the battery from the machine.
2. Charge the battery per the battery charger manufacturer's instructions.

IMPORTANT

Do not overcharge the battery; otherwise, you could damage it.



G003792S

- ① Positive battery post
- ② Negative battery post
- ③ Red (+) charger lead
- ④ Black (-) charger lead

3. When the battery is fully charged, unplug the charger from the electrical outlet (if applicable), then disconnect the charger leads from the battery posts.

Battery Service (continued)

Cleaning the Battery

Note: Keep the terminals and the entire battery case clean, because a dirty battery discharges slowly.

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Remove the battery from the machine.
4. Wash the entire case with a solution of baking soda and water.
5. Rinse the battery with clear water.
6. Coat the battery posts and cable connectors with Grafo 112X (skin-over) grease or petroleum jelly to prevent corrosion.
7. Install the battery.

Installing the Battery



WARNING



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

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



WARNING

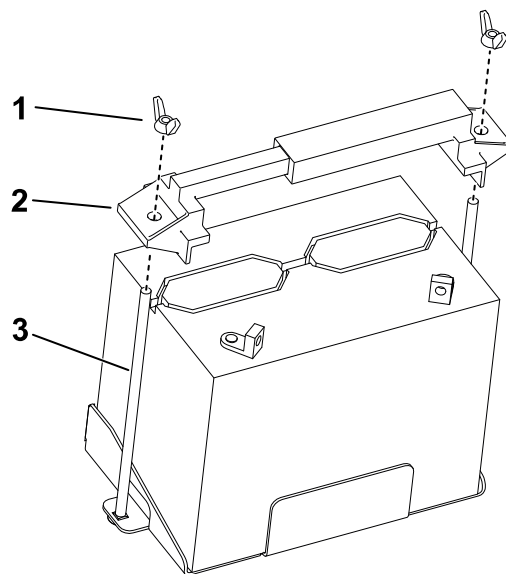


Incorrectly removing the cables from the battery could damage the machine and cables, causing sparks. Sparks can cause the battery gasses to explode, resulting in personal injury.

- Always disconnect the negative (black) battery cable before disconnecting the positive (red) cable.
- Always connect the positive (red) battery cable before connecting the negative (black) cable.

Battery Service (continued)

1. Position the battery on the tray.
2. Secure the battery with the rods (3), hold-down (2), and wing nuts (1).



G421098

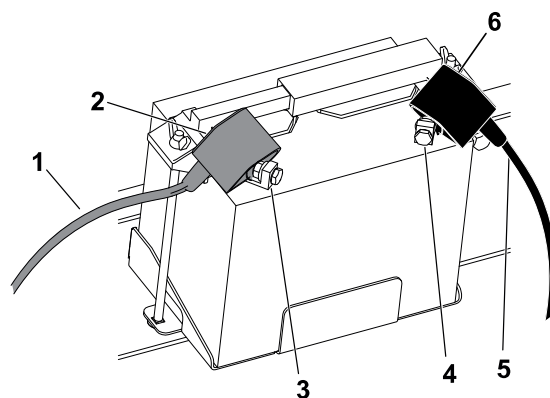
3. Using the fasteners previously removed, install the positive (red) battery cable (1) to the positive (+) battery terminal (3).

Note: The fasteners for some batteries may be different than shown.

4. Using the fasteners previously removed, install the negative (black) battery cable (5) to the negative (-) battery terminal (4).



5. Torque the bolts to **5.7 to 6.8 N·m (50 to 60 in-lb)**.



G421097

6. Slide the red terminal boot (2) onto the positive (red) battery post.
7. Slide the black terminal boot (6) onto the negative (black) battery post.

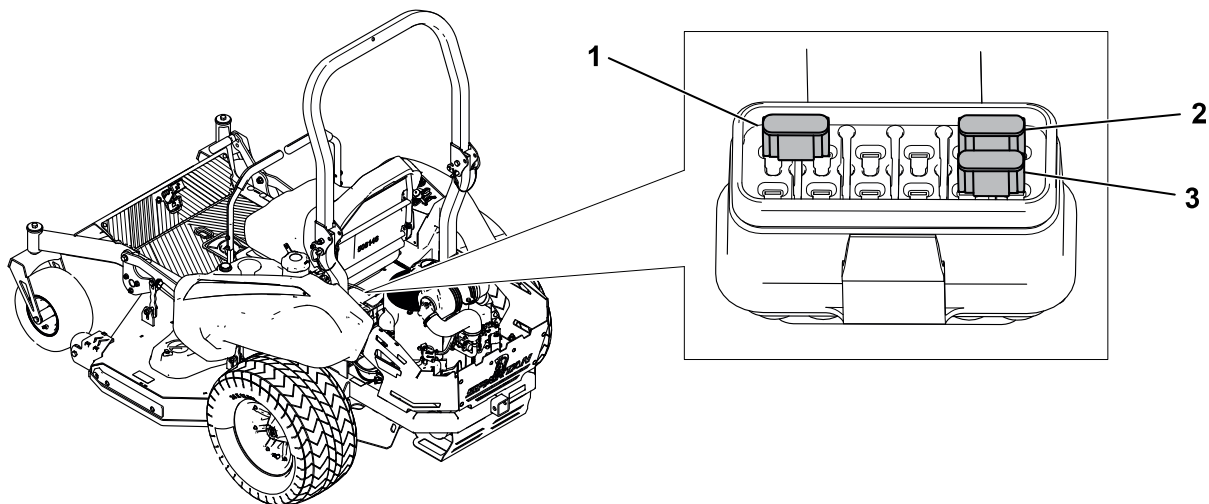
Servicing a Replacement Battery

The original battery is maintenance-free and does not require service. For servicing a replacement battery, refer to the battery manufacturer's instructions.

Replacing the Fuses

The electrical system is protected by fuses. It requires no maintenance; however, if a fuse blows, check the component/circuit for a fault.

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Pull out the fuse and replace it.



G515408

① Fuse—30 A

② Fuse—20 A

③ Fuse—10 A

Drive System Maintenance

Checking the Seat Belt

Inspect the seat belt for wear, cuts, and proper operation of the retractor and buckle. Replace the seat belt if it is damaged.

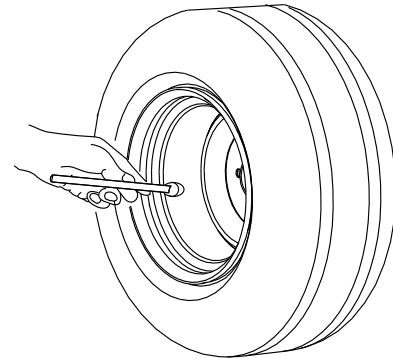
Checking the Tire Pressure

Maintain the air pressure in the front and rear tires as specified. Check the tires when they are cold to get the most accurate pressure reading.

Uneven tire pressure can cause an uneven cut.

- Front wheels: 55 kPa (8 psi)
- Rear wheels: 83 kPa (12 psi)

Note: Tweel® tires do not require inflation.



G001055s

Belt Maintenance

Inspecting the Belts

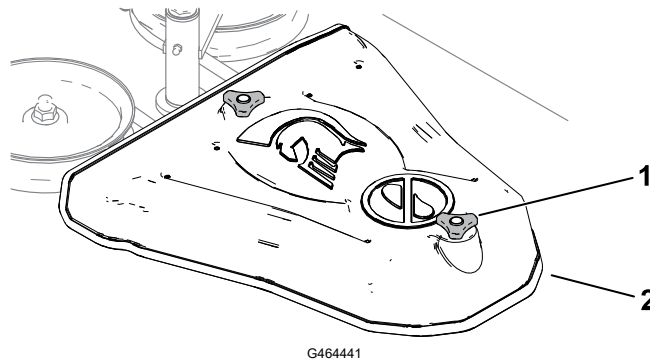
1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Set the height of cut to the lowest cutting position.
4. Inspect the belt for wear. Replace the belt if it is worn.

The signs of a worn belt include squealing while the belt is rotating; the blades slipping while cutting grass; and frayed edges, burn marks, and cracks on the belt.

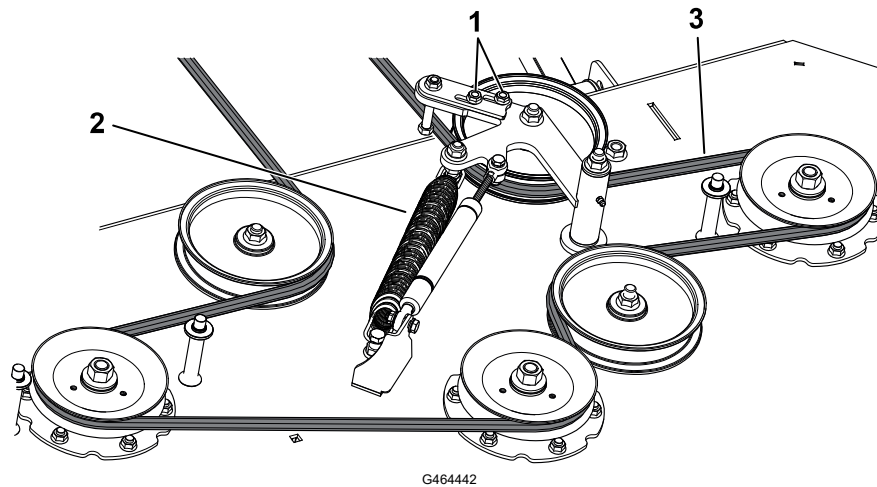
Replacing the Mower-Deck Belt

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Set the height of cut to the lowest cutting position.
4. Remove the knobs ① securing the pulley covers and remove the pulley covers ②.

Replacing the Mower-Deck Belt (continued)



5. Loosen the 2 nuts ① on the idler pulley and slide the bracket away from the pulley.



6. Using a spring-removal tool, remove the idler spring ② from the deck hook to remove tension from the idler pulley, and roll the belt ③ off the pulleys.



WARNING



The spring is under tension when installed and can cause personal injury.

Be careful when removing the belt.

7. Route the new belt around the engine pulley and mower pulleys.
8. Slide the idler bracket so that the shoulder bolt is within 4.7 mm (3/16 inch) of the belt. Tighten the nuts.
9. Use the spring-removal tool to install the idler spring over the deck hook and place tension on the idler pulley and the mower belt.
10. Install the pulley covers.

Replacing the Pump-Drive Belt

Contact an Authorized Service Dealer to replace the pump-drive belt.

Hydraulic System Maintenance

Hydraulic System Safety

- Seek immediate medical attention if hydraulic fluid is injected into the skin. Injected fluid must be surgically removed within a few hours by a doctor familiar with this form of injury; otherwise, gangrene may result.
- Ensure that all hydraulic-fluid hoses and lines are in good condition and all hydraulic connections and fittings are tight before applying pressure to the hydraulic system.
- Keep your body and hands away from pinhole leaks or nozzles that eject high-pressure hydraulic fluid.
- Use cardboard or paper, not your hands, to find hydraulic leaks.
- Safely relieve all pressure in the hydraulic system before performing any work on the hydraulic system.

Hydraulic-Fluid Specifications

Hydraulic Fluid Type: Spartan Premium Hydrostat Oil or Parker HT-1000™ Hydraulic Fluid

IMPORTANT

Use the fluid specified. Other fluids could damage the system.

Checking the Hydraulic Fluid

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Allow the machine to cool.

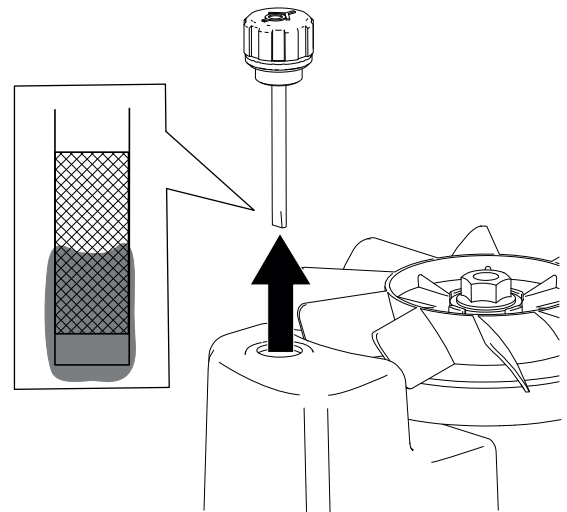
Note: Only check the hydraulic fluid when the system is cold.

Checking the Hydraulic Fluid (continued)

4. Clean the area around the dipstick cap for each transmission and remove the cap.
5. Wipe the dipstick clean, insert it into the transmission, and lightly tighten the cap.
6. Remove the cap again and check the fluid level on the dipstick.

The fluid should be within the hashed area of the dipstick.

7. If the level is low, add enough fluid to raise it to the proper level.
8. Install the dipstick and tighten the cap.



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Changing the Hydraulic Fluid

To change the hydraulic fluid, contact an Authorized Service Dealer.

Mower-Deck Maintenance

Blade Safety

- Inspect the blades periodically for wear or damage.
- Use care when checking the blades. Wrap the blade(s) or wear gloves and use caution when servicing them. Only replace damaged blades; never straighten or weld them.
- On multi-bladed machines, take care as rotating one blade can cause other blades to rotate.
- Replace worn or damaged blades and bolts in sets to preserve balance.

Blade Service

To ensure a superior quality of cut, keep the blades sharp. For convenient sharpening and replacement, keep extra blades on hand.

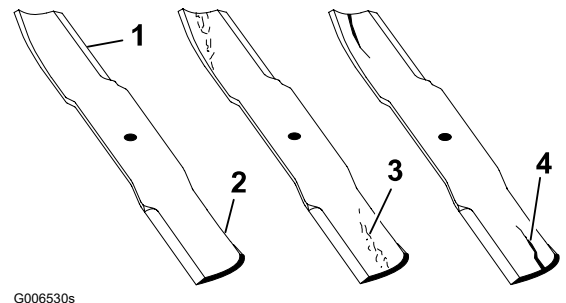
Replace the blades if they hit a solid object, or if the blade is out of balance or bent.

Before Inspecting or Servicing the Blades

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Disconnect the spark-plug wires from the spark plugs.

Inspecting the Blades

1. Inspect the cutting edges ①.
2. If the edges are not sharp or have nicks, remove and sharpen the blade.
3. Inspect the blades, especially in the curved area ②.
4. If you notice any cracks ④, wear, or a slot forming ③ in this area, immediately install a new blade.

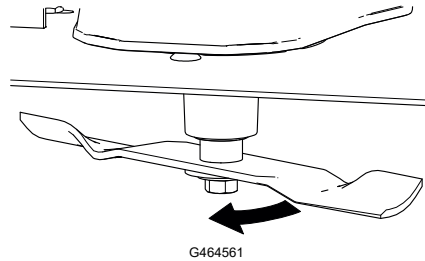


Blade Service (continued)

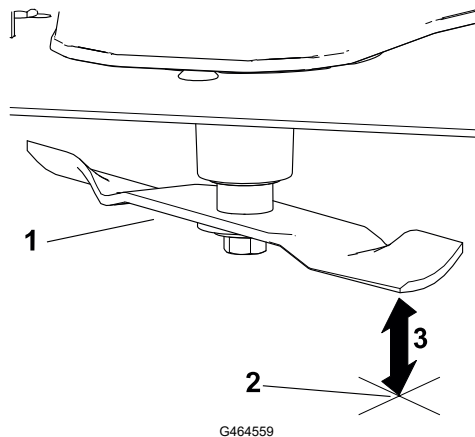
Checking for Bent Blades

The machine must be on a level surface for this procedure.

1. Raise the mower deck to the highest height-of-cut position.
2. While wearing thickly padded gloves, or other adequate hand protection, slowly rotate the blade into a position that allows you to measure the distance between the cutting edge and the level surface.

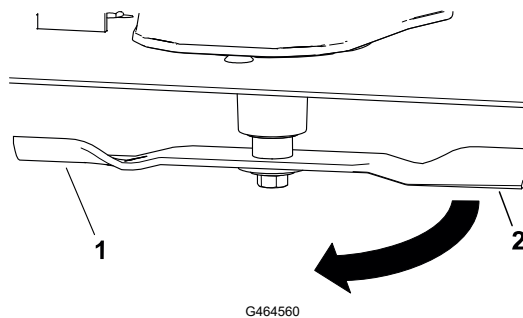


3. Measure from the tip of the blade to the level surface.



- ① Blade (in position for measuring)
- ② Level surface
- ③ Measured distance between blade and the surface (A)

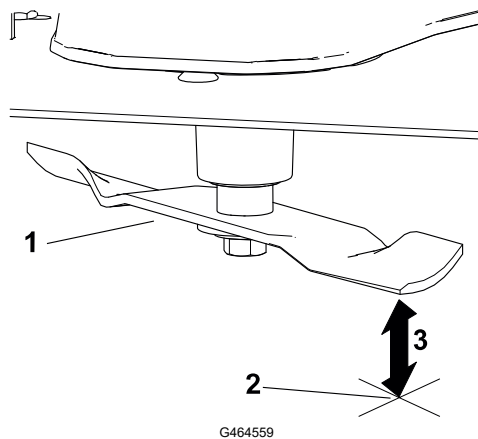
4. Rotate the same blade 180 degrees so that the opposite blade edge is now in the same position.



- ① Blade edge previous measured
- ② Opposite blade edge

5. Measure from the tip of the blade to the level surface.

Blade Service (continued)



- ① Blade (in position for measuring)
- ② Level surface
- ③ Measured distance between blade and the surface (B)

6. If the difference between A and B is greater than 3 mm (1/8 inch), replace the blade.

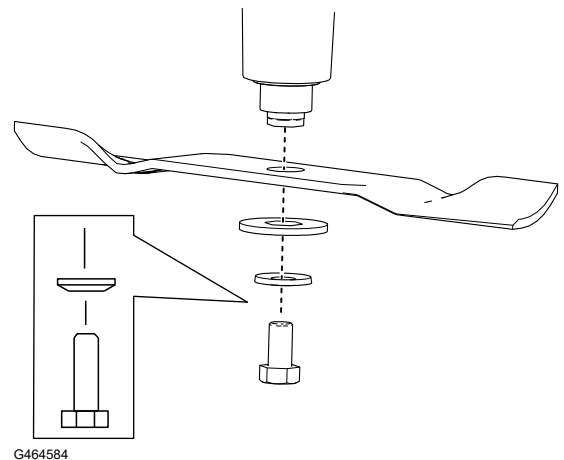
Note: If you replace the blade and the difference continues to exceed 3 mm (1/8 inch), the blade spindle could be bent. Contact an Authorized Service Dealer for service.

7. Repeat this procedure each blade.

Removing the Blades

Replace the blades if they hit a solid object, or if the blade is out of balance or bent.

1. Hold the blade end using a rag or thickly padded glove.
2. Remove the blade as shown.



Blade Service (continued)

Sharpening the Blades

1. Use a file to sharpen the cutting edge at both ends of the blade. Ensure to maintain the original angle ①.

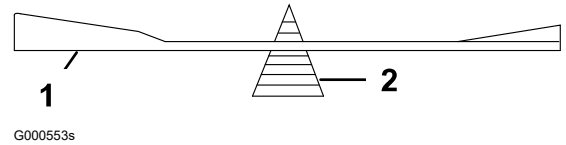
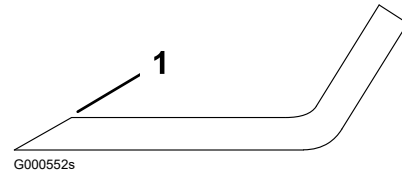
Note: Remove the same amount of material from both cutting edges so that the blade retains its balance.

2. Check the balance of the blade ① by putting it on a blade balancer ②.

Note: If the blade stays in a horizontal position, the blade is balanced and can be used.

If the blade is not balanced, file some metal off the end of the sail area only.

3. Repeat this procedure until the blade is balanced.



Installing the Blades



WARNING



Operating a machine after incorrectly installing the blade assembly and/or not using genuine Spartan blade and blade hardware could allow a blade or blade component to be thrown out from under the deck, resulting in serious injury or death.

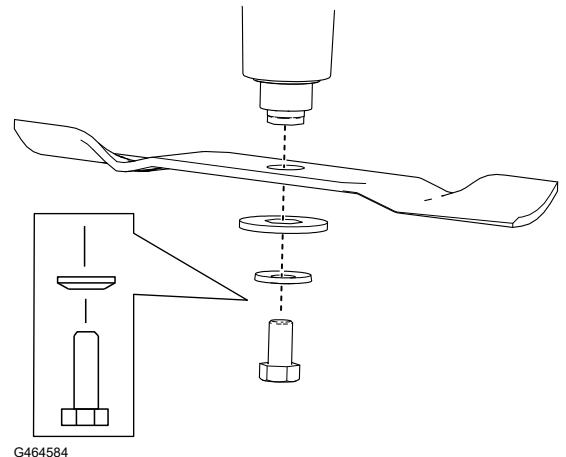
Always install genuine Spartan blades and blade hardware according to the instructions.

1. Install the blade as shown.

Note: The curved part of the blade must be pointing upward toward the inside of the mower to ensure proper cutting.



2. Torque the blade bolt to **176 to 190 N·m (130 to 140 ft-lb)**.



Leveling the Mower Deck

Ensure that the mower deck is level any time you install the mower deck or when you see an uneven cut on your lawn.

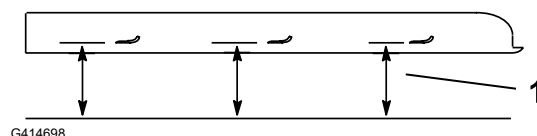
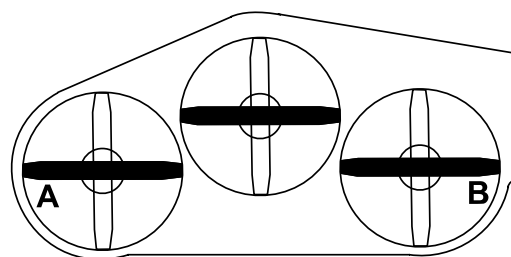
Preparing to Level the Mower Deck

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Disconnect the negative (-) battery cable from the battery.
4. Ensure that the tires are inflated to the correct specifications and the caster wheels are facing straight forward.
5. Check the mower deck for bent blades; remove and replace any bent blades.
6. Raise the mower deck to the 11.4 cm (4-1/2 inch) height-of-cut setting.

Checking the Mower Deck Level

1. Position the blades side-to-side.
2. Measure at locations (A) and (B) from a level surface to the cutting edge of the blade tips (1).

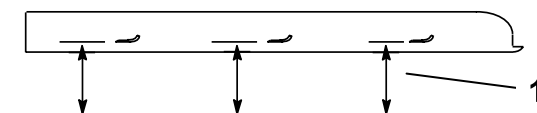
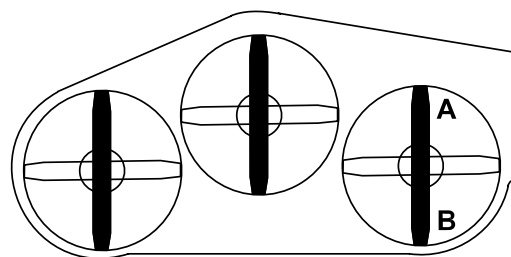
The difference between the measurements should be no more than 6 mm (1/4 inch). If the measurement is larger, adjust the side-to-side level.



G414698

3. Position 1 blade front-to-rear.
4. Measure at locations (A) and (B) from a level surface to the cutting edge of the blade tips (1).

The mower blade should be 11.4 cm (4-1/2 inches) in front at location (A) and 12.1 cm (4-3/4 inches) in the rear at location (B). If the measurements are not correct, adjust the front-to-rear level.



G414700

Leveling the Mower Deck (continued)

Leveling the Mower Deck

RZ-XD Machines Only

1. Place 2 blocks ②, each having a thickness of 3.2 cm (1-1/4 inches), under the front of the mower deck, in line with the tires.

Note: Place the blocks under a flat edge; do not place them under the anti-scalp rollers.

2. Place 2 blocks ①, each having a thickness of 3.8 cm (1-1/2 inches), under the rear of the mower deck, in line with the tires.

Note: Place the blocks under a flat edge.

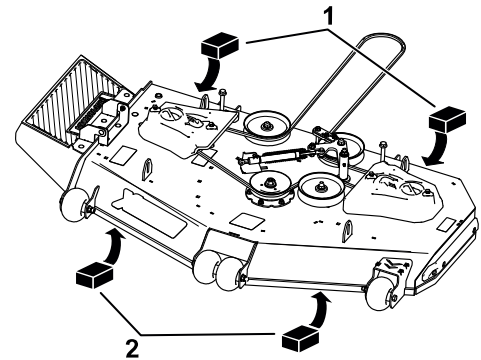
3. Lower the mower deck to the 3.2 cm (1-1/4 inch) height of cut.
4. Loosen the bolts on all 4 deck-mounting brackets.

Note: The bolt heads face outward on some mower decks.

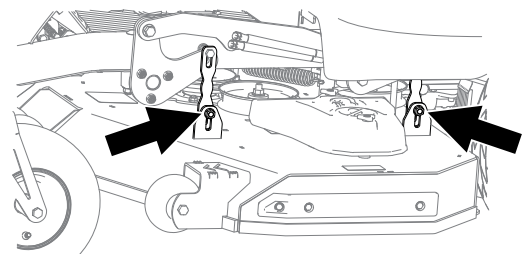
5. Using a strap, pull the deck-lift pedal fully rearward.

Note: This ensures that the pin from the height-of-cut selector seats properly in the deck-height cam assembly.

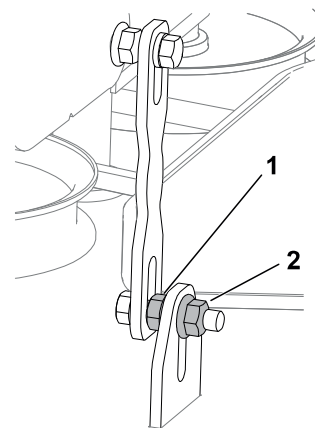
6. Ensure that the deck rests on the blocks.
7. On each bracket, ensure the bolt is straight. While holding the nut ① between the mounting bracket and hanger bracket with a wrench, tighten the nut ② at the end of the bolt.
8. Ensure that the brackets are not loose.



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G514439



G514440

Leveling the Mower Deck (continued)

Leveling the Mower Deck

KGZ Machines Only

1. Raise the mower deck to the highest setting.
2. Place 2 blocks ①, each having a thickness of 11.4 cm (4-1/2 inches), under the front of the mower deck, in line with the tires.

Note: Place the blocks under a flat edge; do not place them under the anti-scalp rollers.

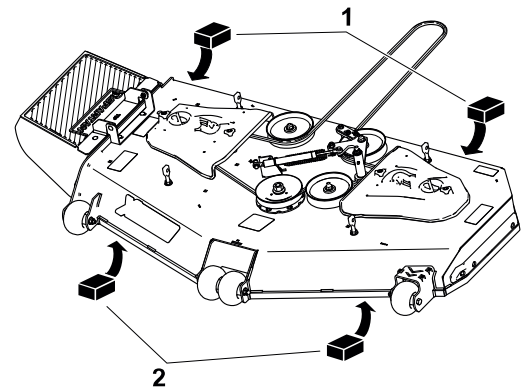
3. Place 2 blocks ②, each having a thickness of 12.1 cm (4-3/4 inches), under the rear of the mower deck, in line with the tires.

Note: Place the blocks under a flat edge.

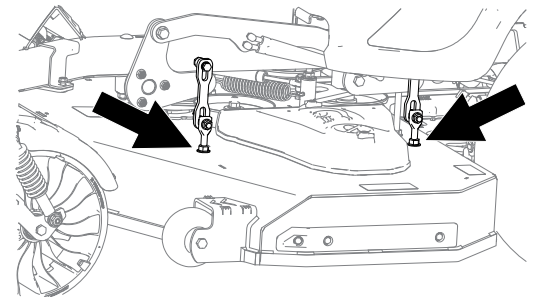
4. Lower the mower deck to the 11.4 cm (4-1/2 inch) height of cut.
5. Loosen the bolts on top of the deck at all 4 deck-adjustment linkages.
6. Using a strap, pull the deck-lift pedal fully rearward.

Note: This ensures that the pin from the height-of-cut selector seats properly in the deck-height cam assembly.

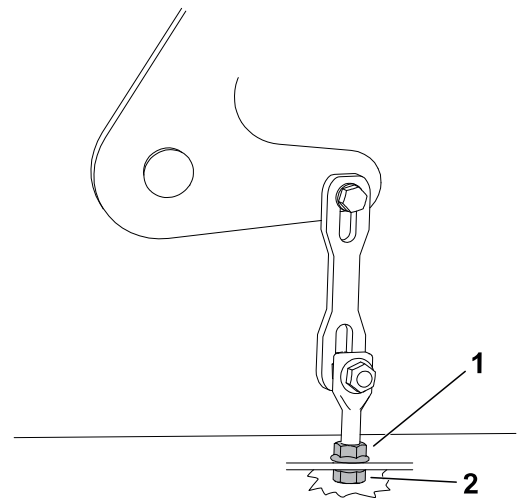
7. At each linkage, while holding the nut ① on top of the deck with a wrench, tighten or loosen the nut ② underneath the deck so that the deck rests on the blocks and the linkages are not loose.
8. Tighten the bolts on top of the deck at all 4 linkages.



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Cleaning

Disposing of Waste

Engine oil, batteries, hydraulic fluid, and engine coolant are pollutants to the environment. Dispose of these according to your state and local regulations.

Storage Safety

- Park the machine on a level surface, disengage the drives, engage the parking brake, shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operator's position.
- Wait for the machine to cool before servicing, adjusting, fueling, cleaning, or storing it.
- Clean grass and debris from the cutting unit, muffler, drives, grass catcher, and engine compartment to prevent fires.
- Clean up oil and fuel spills and remove fuel-soaked debris.
- Do not store the machine or fuel container where there is an open flame, spark, or pilot light, such as on a water heater or other appliance.

Preparing the Machine for Storage Over 30 Days

1. Park the machine on a level surface, disengage the PTO switch, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before leaving the operating position.
3. Clean the machine.

IMPORTANT

You can wash the machine with a mild detergent and water. Do not pressure-wash the machine. Avoid excessive use of water, especially near the drive system and engine. Pressure-washing can force dirt and water into critical parts, such as spindle bearings and electrical switches.

- A. Remove grass clippings, dirt, and grime from the external parts of the entire machine, especially the engine.
 - B. Scrape any heavy buildup of grass and dirt from the underside of the mower.
 - C. Run the machine with the PTO switch engaged and the engine at high idle for 2 to 5 minutes after washing.
4. Check the parking brake operation.
 5. Grease the machine.
 6. Check the tire pressure.

7. Charge the battery.
8. Check the condition of the cutting blades.
9. Prepare the fuel system.
 - A. Add a petroleum-based fuel stabilizer/conditioner to the fuel in the tank. **Do not use an alcohol-based stabilizer (ethanol or methanol).**
 - B. Run the engine to distribute conditioned fuel through the fuel system for 5 minutes.
 - C. Shut off the engine, remove the key (if equipped), allow it to cool, and drain the fuel tank using a pump-type syphon or operate the engine until it shuts off.
 - D. Dispose of fuel properly. Recycle as per local codes.

IMPORTANT

Do not store fuel containing stabilizer/conditioner longer than the duration recommended by the fuel-stabilizer manufacturer.

10. Prepare the engine.
 - A. Service the air cleaner.
 - B. Change the engine oil.
 - C. Remove the spark plugs and pour 30 ml (2 tablespoons) of engine oil into the spark plug holes.
 - D. Place a rag over the spark plug holes to catch any oil spray, then crank the engine and distribute the oil inside the cylinder.
 - E. Install the spark plugs, but do not install the wires.
11. Remove the battery or disconnect the negative (-) battery cable.

Note: Store the battery in a cool, dry location, where it will not be exposed to extreme temperatures or water. Keep the battery fully charged, especially in temperatures below 0°C (32°F).
12. Check and tighten all fasteners. Repair or replace any worn, damaged, or missing parts.
13. Paint all scratched or bare metal surfaces with paint available from your Authorized Service Dealer.
14. Store the machine in a clean, dry garage or storage area. Cover the machine to protect it and keep it clean.

The starter does not crank.

Possible Cause	Corrective Action
You have not met all safety-interlock requirements to start the machine.	Check that you meet all safety-interlock requirements.
The electrical connections are corroded or loose.	Check the electrical connections for good contact.
The battery needs charging.	Charge the battery.
A fuse is blown.	Replace the fuse.
The engine ground wire is loose.	Tighten the ground wire.
A relay or switch is damaged.	Contact an Authorized Service Dealer.

The engine does not start, starts hard, or fails to keep running.

Possible Cause	Corrective Action
Controls are not in the correct position for starting the machine.	Move the controls to the correct position for starting the machine.
The fuel tank is empty.	Fill the fuel tank.
There is incorrect fuel in the fuel tank.	Drain the tank and replace the fuel with the proper type.
Dirt, water, or stale fuel is in the fuel system.	Contact an Authorized Service Dealer.
Dirt is in the fuel filter.	Replace the fuel filter.
A spark-plug wire is loose or disconnected.	Install the wire on spark plug.
A spark plug is pitted, fouled, or the gap is incorrect.	Install a new, correctly gapped spark plug.
The air cleaner is dirty.	Service the air-cleaner element.
The oil in the crankcase is low.	Add oil to the crankcase.
The incorrect fuel tank is selected (KGZ machines only).	Select the correct fuel tank.

Possible Cause	Corrective Action
The electrical connections are corroded or loose.	Check the electrical connections for good contact.
A relay or switch is damaged.	Contact an Authorized Service Dealer.
You have not met all safety-interlock requirements to start the machine.	Check that you meet all safety-interlock requirements.

The machine does not drive.

Possible Cause	Corrective Action
A bypass valve is open.	Close the bypass valve.
The hydraulic pump-drive belt is worn, loose, or broken.	Contact an Authorized Service Dealer.
The hydraulic pump-drive belt is off a pulley.	Install the hydraulic pump-drive belt onto the pulley.
Air is in the hydraulic system.	Check the hydraulic filter and fittings.
The hydraulic pump is leaking.	Contact an Authorized Service Dealer.
The electrical connections are corroded or loose.	Check the electrical connections for good contact.
A relay or switch is damaged.	Contact an Authorized Service Dealer.

The mower does not discharge grass or cuts unevenly.

Possible Cause	Corrective Action
The engine speed is too low.	Increase the throttle.
The height of cut is set too low.	Increase the height of cut.
The blade(s) is not sharp.	Sharpen the blade(s).
A blade is damaged.	Replace the blade.
The underside of the mower deck is full of grass or debris.	Clean the underside of the mower deck.
The tire pressure is incorrect.	Adjust the tire pressure.
A blade spindle is bent.	Contact an Authorized Service Dealer.
The mower-deck belt is worn, loose, or broken.	Replace the mower-deck belt.
The mower-deck belt is off a pulley.	Install the mower-deck belt onto the pulley.
The PTO switch is not fully engaged.	Engage the PTO switch.

The engine-oil pressure is low.

Possible Cause	Corrective Action
The oil level in the crankcase is low.	Add oil to the crankcase.
The engine oil is diluted or is too light.	Change the engine oil and check for a source of contamination.
The engine oil pump is not functioning.	Contact an Authorized Service Dealer.

The machine operates in only 1 direction.

Possible Cause	Corrective Action
The steering control linkage needs adjustment.	Contact an Authorized Service Dealer.
A hydraulic pump component is faulty.	Contact an Authorized Service Dealer.
The hydraulic neutral bypass valves are not completely closed.	Close the bypass valves.
The electrical connections are corroded or loose.	Check the electrical connections for good contact.

The machine vibrates abnormally.

Possible Cause	Corrective Action
The cutting blade(s) is/are bent or unbalanced.	Install new cutting blade(s).
A blade mounting bolt is loose.	Tighten the blade mounting bolt.
The engine mounting bolts are loose.	Tighten the engine mounting bolts.
The engine pulley or blade pulley is loose.	Tighten the pulley.
The engine pulley is damaged.	Contact an Authorized Service Dealer.
The blade spindle is damaged.	Contact an Authorized Service Dealer.

The blades do not rotate.

Possible Cause	Corrective Action
The mower-deck belt is worn, loose, or broken.	Install a new mower-deck belt.
The mower-deck belt is off the pulley.	Install the mower-deck belt and check the adjusting shafts and belt guides for the correct position.
The PTO clutch is not engaging.	Contact an Authorized Service Dealer.
The electrical connections are corroded or loose.	Check the electrical connections for good contact.
A relay or switch is damaged.	Contact an Authorized Service Dealer.

The machine pulls 1 direction or moves while in neutral or parked.

Possible Cause	Corrective Action
The steering linkage needs adjustment.	Contact an Authorized Service Dealer.
The steering linkage is loose.	Contact an Authorized Service Dealer.
The tire pressure is incorrect.	Adjust the tire pressure.
A hydraulic pump component is not working.	Contact an Authorized Service Dealer.
The parking brake needs adjustment.	Contact an Authorized Service Dealer.
The electrical connections are corroded or loose.	Check the electrical connections for good contact.
A relay or switch is damaged.	Contact an Authorized Service Dealer.



Evaporative Emission Control Warranty Statement

Federal Evaporative Emission Control Warranty Statement
Your Warranty Rights and Obligations



Introduction

The United States Environmental Protection Agency (EPA) and Spartan Mowers are pleased to explain the evaporative emission control system's warranty on your equipment. New equipment that use small/large off-road spark ignition engines must be designed, built, and equipped to meet the stringent anti-smog standards. Spartan Mowers must warrant the evaporative emission control system on your equipment for the period listed below provided there has been no abuse, neglect, or improper maintenance of your equipment leading to the failure of the evaporative emission control system.

Your evaporative emission control system may include parts such as: carburetors, fuel tanks, fuel lines (for liquid fuel and fuel vapors), fuel caps, valves, canisters, filters, clamps, connectors, and other associated emission-related components.

Manufacturer's Warranty Coverage

This evaporative emission control system is warranted for two years. If any evaporative emission-related part on your equipment is defective, the part will be repaired or replaced by Spartan Mowers.

Owner's Warranty Responsibilities

As the equipment owner, you are responsible for performance of the required maintenance listed in your *Operator's Manual*. Spartan Mowers recommends that you retain all receipts covering maintenance on your equipment, but Spartan Mowers cannot deny warranty solely for the lack of receipts.

As the equipment owner, you should be aware that Spartan Mowers may deny you warranty coverage if your equipment or a part has failed due to abuse, neglect, improper maintenance, or unapproved modifications.

You are responsible for presenting your equipment to a Spartan Mowers service center as soon as the problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days. If you have a question regarding your warranty coverage, you should contact Spartan Mowers at 1-833-938-1425.

General Evaporative Emissions Warranty Coverage

Spartan Mowers warrants to the ultimate purchaser and each subsequent purchaser that the equipment is:

- Designed, built, and certified to conform with all applicable emissions regulations; and
- Identical in all material respects to the parts as described in the application for certification; and
- Free from defects in materials and workmanship that could cause the failure of a warranted part

The warranty period begins on the date the equipment is delivered to an ultimate purchaser. The warranted period is two years. Subject to certain conditions and exclusions as stated below, the warranty on evaporative emissions-related parts is as follows:

1. Any warranted part that is not scheduled for replacement as required maintenance in the written instructions supplied, is warranted for the warranty period stated above. If the part fails during the period of warranty coverage, the part will be repaired or replaced by Spartan Mowers. Any such part repaired or replaced under warranty will be warranted for the remainder of the warranty period.
2. Any warranted part that is scheduled only for regular inspection in the written instructions supplied is warranted for the warranty period stated above. Any such part repaired or replaced under the warranty will not reduce the period of warranty coverage and will be warranted for the remainder of the warranty period.
3. Any warranted part that is scheduled for replacement as required maintenance in the written instructions supplied is warranted for the period of time prior to the first scheduled replacement date for that part. If the part fails before the first scheduled replacement, the part must be repaired or replaced by Spartan Mowers. Any such part repaired or replaced under warranty will be warranted for the remainder of the period up to the first scheduled replacement point for the part.
4. Repair or replacement of any warranted part under the warranty provisions herein must be performed at an Authorized Service Dealer at no charge to the owner.
5. Warranty services or repairs will be provided at all Service Dealers authorized to service the subject equipment.
6. The equipment owner will not be charged for diagnostic labor that is directly associated with diagnosis of a defective, emission-related warranted part, provided that such diagnostic work is performed at an Authorized Service Dealer.
7. Spartan Mowers is liable for damages to other engine or equipment components proximately caused by a failure under warranty of any warranted part.
8. Throughout the evaporative emission control system's warranty period stated above, Spartan Mowers will maintain a supply of warranted parts sufficient to meet the expected demand for such parts.
9. Manufacturer approved replacement parts may be used in the performance of any warranty maintenance or repairs and must be provided without charge to the owner. Such use will not reduce the warranty obligations of Spartan Mowers.
10. Add-on or modified parts that are not approved by Spartan Mowers may not be used. The use of a non-approved, add-on, or modified part by the purchaser will be grounds for disallowing a warranty claim. Spartan Mowers will not be liable to warrant failures of warranted parts caused by the use of non-approved, add-on, or modified parts.

Warranted Parts

The repair or replacement of any warranted part otherwise eligible for warranty coverage may be excluded from such coverage if Spartan Mowers demonstrates that the equipment has been abused, neglected, or improperly maintained, and that such abuse, neglect, or improper maintenance was the direct cause of the need for repair or replacement of the part. That notwithstanding, any adjustment of a component that has a factory installed, and properly operating, adjustment limiting device is still eligible for warranty coverage. The following emission warranty parts list are covered:

- | | | |
|--|------------------------------|------------------------------------|
| • Fuel Tank | • Control Valves* | • Purge Valves |
| • Fuel Cap | • Control Solenoids* | • Gaskets |
| • Fuel Lines (for liquid fuel and fuel vapors) | • Electronic Controls* | • Liquid/Vapor Separator |
| • Fuel Lines Fittings | • Vacuum Control Diaphragms* | • Carbon Canister |
| • Clamps | • Control Cables* | • Canister Mounting Brackets |
| • Pressure Relief Valves* | • Control Linkages* | • Carburetor Purge Port Connection |

* As they relate to the installed equipment evaporative control system