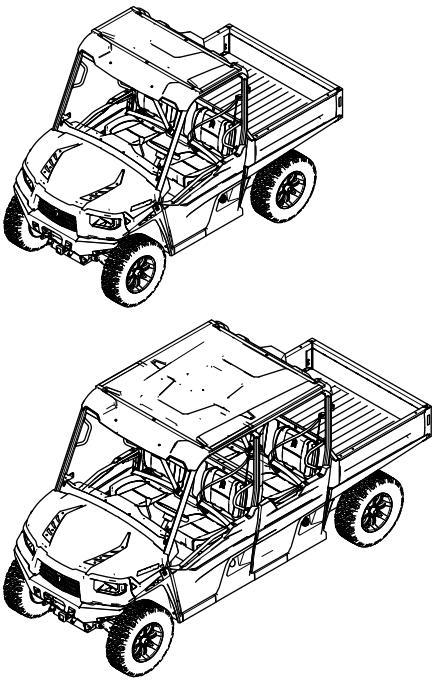
Form No. 3471-872 Rev A

SPARTAN®

Intimidator® FRX Utility Vehicle

Model No. INS1H1C—Serial No. 400000000 and Up
Model No. INS1H1M—Serial No. 400000000 and Up
Model No. INS1H1S—Serial No. 400000000 and Up
Model No. INC1H1C—Serial No. 400000000 and Up
Model No. INC1H1M—Serial No. 400000000 and Up
Model No. INC1H1S—Serial No. 400000000 and Up



Operator's Manual

Register at www.joinspartannation.com.
Original Instructions (EN)

3471-872

Note: The removal or modification of evaporative emission-related parts on this OHRV is illegal. Violators may be subject to civil and/or criminal penalties as provided under California and federal law.

It is a violation of California Public Resource Code Section 4442 or 4443 to use or operate the engine on any forest-covered, brush-covered, or grass-covered land unless the engine is equipped with a spark arrester, as defined in Section 4442, maintained in effective working order or the engine is constructed, equipped, and maintained for the prevention of fire.

An enclosed statement is supplied with information regarding the US Environmental Protection Agency (EPA) and the California Emission Control Regulation of emission systems, maintenance, and warranty.

⚠ WARNING

CALIFORNIA
Proposition 65 Warning

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

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

Introduction

This utility vehicle is intended to be used by residential homeowners and primarily used off-highway to transport people and material loads. 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.

Visit www.joinspartannation.com for product safety and operation training materials, 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 number of your product ready. Figure 1 identifies the location of the model and serial number on the product. Write the number in the space provided.

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

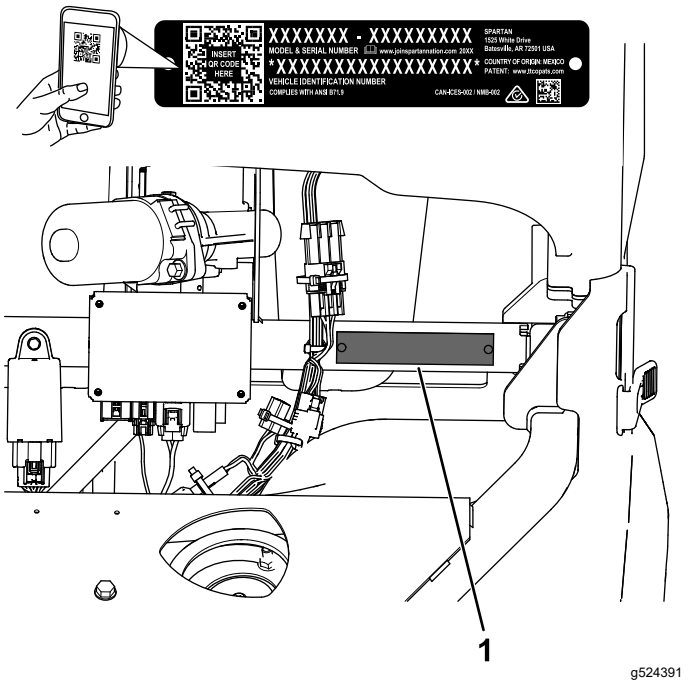


Figure 1

1. Model and serial number located under the hood.

Model No. _____

Serial No. _____

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

g000502

Figure 2
Safety-alert symbol

The safety-alert symbol appears above information that alerts you to unsafe actions or situations and is followed by the word **Danger**, **Warning**, or **Caution**.

- **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 two other words to highlight information. **Important** calls attention to special mechanical information and **Note** emphasizes general information worthy of special attention.

Contents

Safety

Preparation

- Ensure that operators are 16 years old or older and have a valid motor vehicle driver's license. Do not allow people who are not trained or physically capable to safely operate or service the machine. The owner is responsible for training all operators and mechanics.
- This product is capable of causing personal injury. Always follow all safety instructions to avoid serious personal injury.
- Read and understand the contents of this *Operator's Manual* before you start the machine. Ensure that everyone using this product knows how to use it and understands the warnings.
- Keep bystanders and children out of the operating area. Never allow children to operate the machine.
- Become familiar with the safe operation of the equipment, operator controls, and safety signs.
- Shut off the machine, remove the key, and wait for all movement to stop before you leave the operator's position. Allow the machine to cool before fueling, adjusting, servicing, cleaning, or storing it.
- Know how to stop and shut off the machine quickly.
- Do not exceed the maximum number of passengers allowed on the vehicle. Passengers should sit only in the designated seating positions with each seating position having a seatbelt, with one person in each seating position. Do not allow small children to be carried on a lap.
- Check that all safety devices and decals are in place. Repair or replace all safety devices and replace all illegible or missing decals. Do not operate the machine unless they are present and functioning properly.

Fuel Safety

- Use extreme care in handling fuel. It is flammable and its vapors are explosive.
- Extinguish all cigarettes, cigars, pipes, and other sources of ignition.
- Use only an approved fuel container.
- Do not remove the fuel cap or fill the fuel tank while the engine is running or hot.
- Do not add or drain fuel in an enclosed space.
- 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.
- If you spill fuel, do not attempt to start the engine; avoid creating any source of ignition until the fuel vapors have dissipated.

Operation Safety

- The owner/operator can prevent and is responsible for accidents that may cause personal injury or property damage.
- Passengers should sit only in the designated seating positions, with each seating position having a seat belt. Do not carry passengers in the cargo bed. Keep bystanders and children out of the operating area.
- All passengers must be able to sit with their backs against the seat, their feet flat on the floor, and their hands grasping the handholds.
- Wear appropriate clothing, including eye protection; long pants; substantial, slip-resistant footwear; and hearing protection (diesel machines only). Tie back long hair and do not wear loose clothing or loose jewelry.
- Also wear a helmet whenever you are driving on rough, uneven terrain or at high speeds.
- 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.
- Operate the machine outdoors or in a well-ventilated area only.
- Do not exceed the maximum gross vehicle weight (GVW) of the machine. You can find the GVW of the machine in the Specifications section of this *Operator's Manual*.
- Always wear your seat belt and ensure that every one of your passengers wears a seat belt to prevent injuries in the event of an accident.
- Use extra caution when operating, braking, or turning the machine with a heavy load in the cargo bed.
- Carrying oversized loads in the cargo bed reduces the stability of the machine. Do not exceed the carrying capacity of the bed.
- Carrying material that cannot be bound to the machine adversely affects the steering, braking, and stability of the machine. When you carry material that cannot be bound to the machine, use caution when steering or braking.
- Carry a reduced load and reduce the ground speed of the machine when operating on rough,

uneven terrain, and near curbs, holes, and other sudden changes in terrain. Loads may shift, causing the machine to become unstable.

- Do not exceed the rated load capacity for each cargo area.
- Before you start the machine, ensure that the transmission is in the PARK position, and you are in the operating position.
- You and your passengers should remain seated with your seat belts on whenever the machine is moving. Keep your hands on the steering wheel; your passengers should use the handholds provided. Keep arms and legs within the machine body at all times.
- Operate the machine only in good visibility. Watch for holes, ruts, bumps, rocks, or other hidden objects. Uneven terrain could overturn the machine. Tall grass can hide obstacles. Use care when approaching blind corners, shrubs, trees, or other objects that may obscure your vision.
- Drive carefully. Making abrupt turns and stops, driving on steep slopes, and driving too fast for the conditions increase the risk of a tip-over or rollover.
- Do not drive the machine near drop-offs, ditches, or embankments. The machine could suddenly roll over if a wheel goes over the edge or if the edge gives way.
- Always watch out for and avoid low overhangs such as tree limbs, door jambs, overhead walkways, etc.
- Operating the machine on a paved surface in different modes, such as 2-wheel drive and 4-wheel drive and carrying passengers and cargo may affect the handling of the machine.
- Look behind and down before reversing the machine to be sure of a clear path.
- This vehicle is intended for off-highway use only. Using this vehicle on public roadways may violate local laws and be hazardous.
- If the machine ever vibrates abnormally, stop and shut off the machine immediately, wait for all movement to stop, and inspect for damage. Repair all damage to the machine before resuming operation.
- It can take longer to stop the machine on wet surfaces than on dry surfaces. To dry out wet brakes, drive slowly on a level surface while putting light pressure on the brake pedal.
- Operating the machine at high speed and then quickly stopping may cause the rear wheels to lock up, which impairs your control of the machine.
- Do not touch the engine, transmission, muffler, or exhaust manifold while the engine is running, or soon after you shut off the engine, because these areas may be hot enough to cause burns.
- Do not leave a running machine unattended.
- Before you leave the operating position, do the following:
  - Park the machine on a level surface.
  - Shift the transmission to the PARK position.
  - Shut off the machine and remove the key.
  - Wait for all movement to stop.
- Do not operate the machine when there is the risk of lightning.
- Follow all loading and towing instructions in this *Operator's Manual*.
- Use accessories and attachments approved by Spartan only.

Maintenance Safety

- Regularly inspect and maintain the vehicle to keep it in safe operating condition.
- Before you leave the operating position, do the following:
  - Park the machine on a level surface.
  - Shift the transmission to the PARK position.
  - Shut off the machine and remove the key.
  - Wait for all movement to stop.
- Allow the machine to cool before fueling, adjusting, servicing, cleaning, or storing it.
- Do not put your hands or feet near moving components of the machine.
- Support the machine with jack stands whenever you work under the machine.
- Do not work under a raised bed without the proper bed safety support in place.
- Carefully release pressure from components with stored energy.
- Do not allow untrained personnel to service the machine.
- Do not charge the batteries while servicing the machine.
- To ensure that the entire machine is in good condition, keep all hardware properly tightened.
- To reduce the potential fire hazard, keep the machine area free of excessive grease, grass, leaves, and accumulation of dirt.
- If possible, do not perform maintenance while the machine is running. Keep away from moving parts.
- If you must run the machine to perform a maintenance adjustment, keep your hands, feet, clothing, and any parts of the body away from any moving parts. Keep bystanders away from the machine.
- Clean up oil and fuel spills.

- Keep all parts of the machine in good working condition and all the hardware properly tightened. Replace all worn or damaged decals.
- Never interfere with the intended function of a safety device or reduce the protection provided by a safety device.
- Do not overspeed the engine by changing the governor settings. To ensure safety and accuracy, have an Authorized Service Dealer check the maximum engine speed with a tachometer.
- If major repairs are ever necessary or assistance is required, contact an Authorized Service Dealer.
- Altering this machine in any manner may affect the operation of the machine, performance, durability, or its use may result in injury or death.
- Shut off the engine, remove the key, and wait for all moving parts to stop before checking the oil or adding oil to the crankcase.
- Keep your hands, feet, face, clothing, and other body parts away from the muffler and other hot surfaces.
- Disconnect the battery before repairing the machine. Disconnect the negative terminal first and the positive last. Connect the positive terminal first and the negative last.
- 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.
- Ensure that the tires are properly inflated.
- Swallowing engine coolant can cause poisoning; keep out of reach from children and pets.
- Discharge of hot, pressurized coolant or touching a hot radiator and surrounding parts can cause severe burns.
  - Always allow the engine to cool at least 15 minutes before removing the radiator cap.
  - Use a rag when opening the radiator cap and open the cap slowly to allow steam to escape.
- Do not operate the machine without the covers in place.
- Keep your fingers, hands and clothing clear of any rotating fans and belts.
- Shut off the engine and remove the key before performing maintenance.
- Seek immediate medical attention if fluid is injected into skin. Injected fluid must be surgically removed within a few hours by a doctor.
- Before disconnecting or performing any work on the hydraulic system, relieve all pressure in the system by shutting off the engine, cycling the dump valve from raise to lower, and/or lowering the cargo bed and attachments. Place the remote hydraulics lever in the float position. Do not work under a raised bed without the proper bed safety support in place.
- Ensure that all hydraulic-fluid hoses and lines are in good condition and that all hydraulic connections and fittings are tight before applying pressure to the hydraulic system.
- Keep your hands and body away from pinhole leaks or nozzles that eject high-pressure hydraulic fluid.
- Use cardboard or paper to find hydraulic leaks.

Storage Safety

- Allow the machine to cool before fueling, adjusting, servicing, cleaning, or storing it.
- Do not store the machine where there is an open flame, spark, or pilot light, such as on a water heater or other appliance.

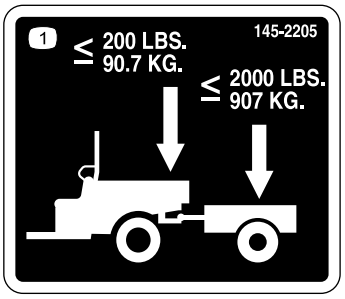
Safety and Instructional Decals

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.

decal161-5218

161-5218

1. Engine coolant under pressure
2. Explosion hazard—read the *Operator's Manual*.
3. Warning—do not touch the hot surface.
4. Warning—read the *Operator's Manual*.



decal145-2205

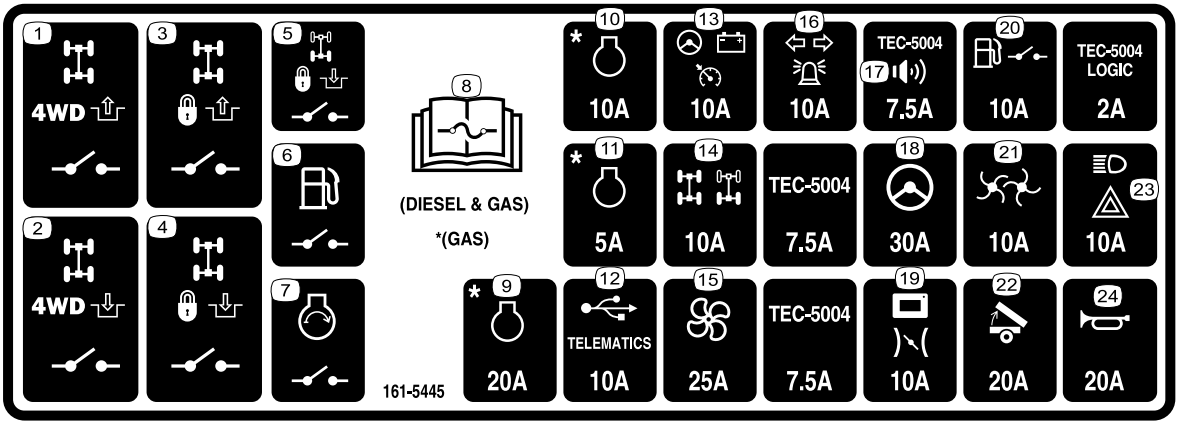
145-2205

1. Do not exceed a tongue weight of 90.7 kg (200 lb); do not exceed a transport load of 907 kg (2,000 lb).

decal161-5426

161-5426

1. Warning—read the *Operator's Manual*.
2. Warning—all operators should be trained before operating the machine.
3. Warning—wear a helmet on rough or uneven terrain or at high speeds.
4. Warning—wear eye protection.
5. Warning—wear hearing protection (diesel models only).
6. Warning—do not wear open-toed shoes.
7. Collision hazard—do not operate the machine on public streets, roads, or highways.
8. Warning—do not allow people who are not at least 16 years old or without valid driver's licenses to operate the machine.
9. Warning—do not operate the machine under the influence of drugs or alcohol.
10. Falling hazard—do not carry passengers in the bed; do not carry extra passengers in between the seats.
11. Fire hazard—shut off the engine when adding fuel to the machine.
12. Warning—each rider must sit with their back against the seat, position their feet flat on the floor, and grasp the handholds.
13. Warning—shift the transmission lever to the P (PARK) position, turn the key to the OFF position, and remove the key before leaving the machine.

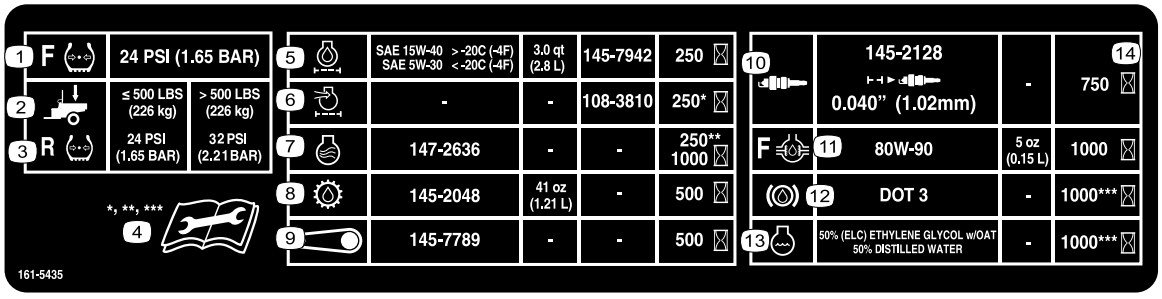


decal161-5445

161-5445

Note: * Gasoline models only

1. Front differential lock and 4-wheel drive disengage relay
2. Front differential lock and 4-wheel drive engage relay
3. Front differential lock disengage relay
4. Front differential lock engage relay
5. Rear differential lock engage relay
6. Fuel-pump relay
7. Starter relay
8. Read the *Operator's Manual* for fuse information.
9. Engine ignition power
10. Engine—ECM power
11. Engine—vehicle-switch power
12. USB/telematics
13. Alternator, power steering, and speed sensor enable
14. Front and rear differentials
15. Cooling fan
16. Position lights and turn-signal lights
17. Alarm
18. Power steering
19. Display and throttle
20. Fuel-pump relay power
21. Salt spreader
22. Bed lift
23. Headlights and hazard lights
24. Horn



decal161-5435

161-5435

Note: * Replace more frequently in dusty or dirty conditions

** Check at 250 hours, replace at 1,000 hours

*** 1,000 hours or 5 years; whichever comes sooner

1. Front tire pressure
2. Rear tire pressure (varies depending on cargo load)
3. Rear tire pressure
4. Read the *Operator's Manual* before performing maintenance.
5. Engine oil and filter
6. Engine-air filter
7. Positive crankcase ventilation (PCV) valve
8. Transaxle fluid
9. Drive belt
10. Spark plug and gap distance
11. Front differential fluid
12. Brake fluid
13. Engine coolant
14. Hours

decal145-2215

145-2215

1. Warning—Read the *Operator's Manual*, wear a seat belt, avoid tipping the machine.
2. Warning—do not drill or weld.

For Standard (2-Person) Models

decal144-1144

144-1144

1. Runover/backover hazard—do not carry passengers.
2. Attention—read the *Operator's Manual*; maximum weight 567 kg (1,250 lb).

For Crew (4-Person) Models

decal144-2293

144-2293

1. Runover/backover hazard—do not carry passengers.
2. Attention—read the *Operator's Manual*; maximum weight 453 kg (1,000 lb).

decalbatterysymbols

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

Setup

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

1

Changing the Blinker Mode from United States (US) to European (EU)

International Models Only

No Parts Required

Procedure

Disconnect the default US jumper connection located underneath the hood (Figure 3).

Note: Use a cable tie to secure the loose connection.

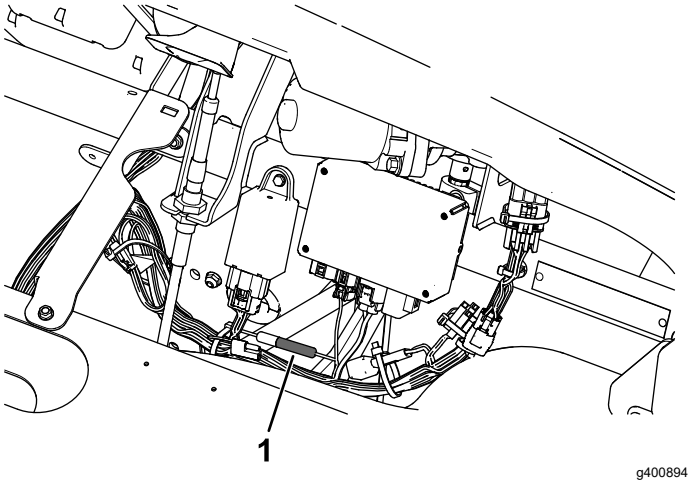


Figure 3

1. Default US jumper connection

2

Converting the Speedometer From Mph to Km/h

No Parts Required

Procedure

1. Shift the transmission lever to the P (PARK) position.
2. Rotate the key switch to the ON position.
3. Press and hold the display button between 3 to 6 seconds to convert the speedometer from mph to km/h.

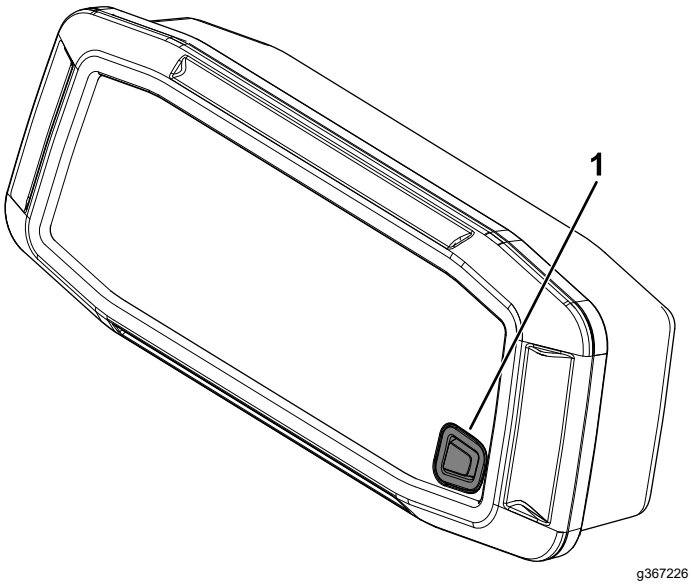


Figure 4

1. Button

3

Checking the Fluid Levels and Tire Pressure

No Parts Required

Procedure

1. Check the engine-oil level before you first start the engine; refer to Checking the Engine-Oil Level (page 37).
2. Check the transaxle-fluid level before you first start the engine; refer to Checking the Transaxle-Fluid Level (page 51).
3. Check the front differential oil level before you first start the engine; refer to Checking the Front Differential Oil Level (page 52).
4. Check the engine-coolant level before you first start the engine; refer to Checking the Engine-Coolant Level (page 54).
5. Check the brake-fluid level before you first start the engine; refer to Checking the Brake-Fluid Level (page 57).
6. Check the air pressure in the tires; refer to Checking the Tire Pressure (page 20).

Product Overview

Controls

Become familiar with all the controls before you start the engine and operate the machine.

Control Panel

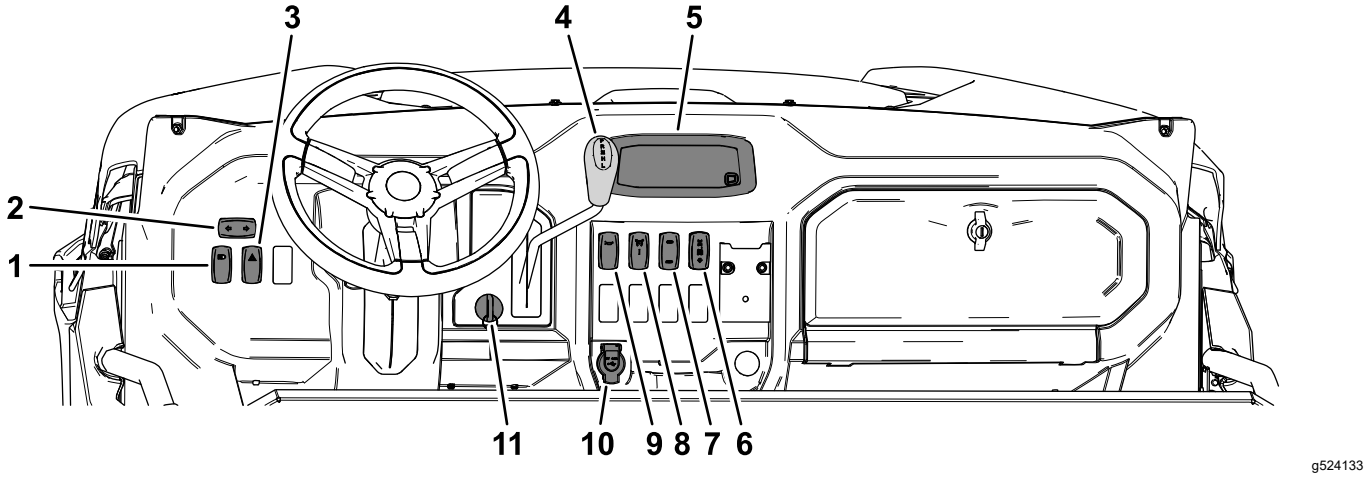


Figure 5

1. Headlight switch
2. Turn-signal switch
3. Hazard-light switch
4. Gear selector
5. Display
6. Differential-lock switch
7. 2-wheel drive/4-wheel drive switch
8. Cruise-control switch
9. Horn switch
10. USB power point
11. Key switch

Key Switch

Use the key switch (Figure 5) to start and shut off the engine. To shut off the engine, rotate the key switch counterclockwise to the OFF position.

The key switch has 3 positions: OFF, RUN, and START. Rotate the key switch clockwise to the START position to engage the starter motor. Release the key switch when the engine starts. The key switch moves automatically to the ON position.

Headlight Switch

Push the headlight switch (Figure 5) up to turn on the headlights or down to turn off the headlights.

Turn-Signal Switch

Press the left side of the turn-signal switch (Figure 5) to activate the left-turn signal and the right side of the switch to activate the right-turn signal.

Note: The center position is off.

Hazard-Light Switch

Press the hazard-light switch (Figure 5) up to turn on the hazard lights or down to turn off the hazard lights.

Cruise-Control Switch

Press the cruise-control switch (Figure 5) up to set the desired drive speed; refer to Using the Cruise Control (page 24).

Differential-Lock Switch

Use the differential-lock switch (Figure 5) to engage or disengage the front and/or rear differentials; refer to Using the 4-Wheel Drive/Differential Lock(s) (page 26).

2-Wheel Drive/4-Wheel Drive Switch

Use the 2-wheel drive/4-wheel drive switch (Figure 5) to toggle between 2-wheel drive and 4-wheel drive; refer to Using the 4-Wheel Drive/Differential Lock(s) (page 26)

Horn Switch

Press the horn switch (Figure 5) to sound the horn.

USB Power Point

Use the power point (Figure 5) to power mobile devices.

Gear Selector

Use the gear selector (Figure 5) to shift the transmission between **P** (PARK), **R** (REVERSE), **N** (NEUTRAL), **H** (HIGH FORWARD), and **L** (LOW FORWARD) ground operation.

Important: **Do not shift the transmission to the REVERSE, HIGH, or LOW gear unless the machine is motionless and the engine is at low-idle; otherwise, you could damage the transmission.**

Display

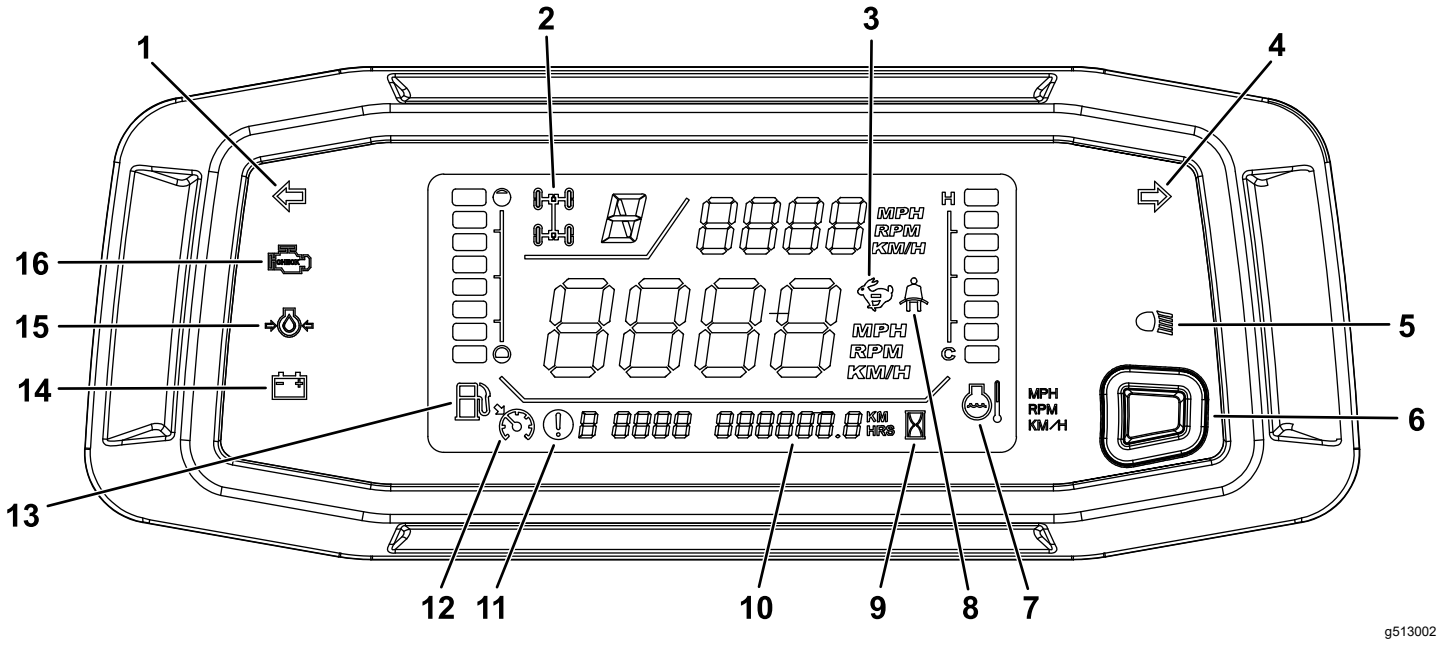


Figure 6

1. Left-turn signal indicator
2. 2-wheel drive/4-wheel drive/differential lock indicator
3. Speed-limited indicator
4. Right-turn signal indicator
5. Headlights indicator
6. Display button/ground-speed governor control
7. Coolant-temperature gauge and indicator
8. Seat-belt indicator
9. Hour meter
10. Odometer/hour meter
11. Fault-code indicator
12. Cruise-control indicator
13. Fuel gauge
14. Charge indicator
15. Oil-pressure warning light
16. Check-engine light

Turn-Signal Indicators

The left or right turn signal blinks when you press the turn-signal switch to the left or right (Figure 6).

2-Wheel Drive/4-Wheel Drive/Differential Lock Indicator

Note: If the indicator (Figure 6) is blinking, it means that the setting is not engaged/inactive; when it becomes solid, it is engaged/active.

Refer to Figure 7 and the corresponding table for using the 2-wheel drive/4-wheel drive switch and differential lock switch together.

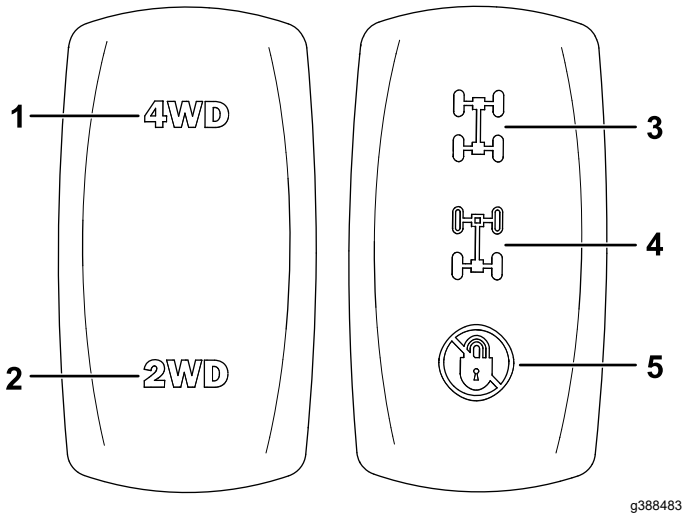
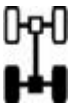
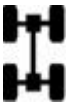
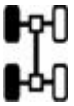
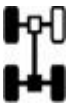
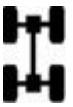


Figure 7

1. Up position—engages 4-wheel drive
2. Down position—engages 2-wheel drive
3. Up position—engages both the front and rear differential locks
4. Mid position—engages the rear differential lock only
5. Down position—disengages the differential lock(s)

2-Wheel Drive/4-Wheel Drive Switch Position	Differential Lock Switch Position	Result
2	5	No indicator
2	4	
2	3	 (blinking—inactive configuration)
1	5	
1	4	
1	3	

Cruise-Control/Speed-Limited Indicator

If the cruise control is set, the indicator illuminates (Figure 6).

If the top speed of the machine is limited, the indicator illuminates. The speed is limited if the following occurs:

- The cruise control is set.
- There is a fault code.
- A seat belt is not buckled.

Headlights Indicator

The headlights indicator illuminates when the headlights are in the ON position.

Seat-Belt Indicator

The seat-belt indicator illuminates when the operator does not have their seat belt fastened.

Note: If the seat belt is not fastened, the machine speed will be limited.

Fault-Code Indicator

The fault-code indicator illuminates and the corresponding fault code number appears when a machine fault occurs.

Important: **Do not operate the machine if a fault code appears; otherwise, serious damage could occur. Contact your Authorized Service Dealer.**

Odometer and Hour Meter

The odometer and hour meter indicates the total hours of machine operation. The hour meter (Figure 6) starts to function whenever the engine is running.

Oil-Pressure-Warning Light

The oil-pressure-warning light (Figure 6) illuminates if the engine-oil pressure drops below a safe level while the engine is running.

Important: **If the light flickers or remains on, stop the machine, shut off the engine, and check the oil level. If the oil level is low, but adding oil does not cause the light to go out when the engine is started, shut off the engine immediately, and contact your Authorized Service Dealer for assistance.**

Check the operation of the warning light as follows:

1. Ensure that the machine is in the P (PARK) position.
2. Turn the key switch to the ON position, but do not start the engine.

   Note: The oil-pressure light should illuminate. If the light does not turn on, then there is a potential malfunction in the display and/or signal.

   Note: If you just started or shut off the engine, it may take a few seconds for the light to turn off or on.

Coolant-Temperature Gauge and Light

The coolant-temperature gauge registers the coolant temperature in the engine and operates only when the key switch is in the ON position (Figure 6).

The 8 coolant bars blink and a fault code appears if the engine overheats.

Charge Indicator

The charge indicator illuminates when the battery discharges. If the light illuminates during operation, stop the machine, shut off the engine, and check for possible causes, such as the alternator belt (Figure 6).

Important: **If the alternator belt is loose or broken, do not operate the machine until the adjustment or repair is complete. Failure to observe this precaution may damage the engine.**

Check the operation of the warning lights as follows:

- Shift the transmission lever to the P (PARK) position.
- Turn the key switch to the ON position, but do not start the engine. The coolant temperature, charge indicator, and oil-pressure lights should glow. If any light does not function, there is a malfunction in the system that you must repair.

Fuel Gauge

The fuel gauge shows the amount of fuel in the tank. It displays only when key switch is in the ON position (Figure 6).

A single bar indicates a low fuel level and 1 flashing bar indicates that the fuel tank is nearly empty.

Tachometer

The tachometer displays the speed of the engine (Figure 6).

Speedometer

The speedometer registers the ground speed of the machine (Figure 6).

Display Button/Ground-Speed Governor Control

Press the button (Figure 6) between 0 to 3 seconds to switch between the odometer and hour meter display.

Press and hold the button (Figure 6) between 3 to 10 seconds to convert the speedometer from mph to km/h.

Press and hold the button for 10 seconds or more to adjust the ground-speed governor; refer to Adjusting the Ground-Speed Governor (page 25).

Check-Engine Light

The check-engine light illuminates to indicate an engine malfunction; refer to Troubleshooting (page 61).

Accelerator Pedal

Use the accelerator pedal (Figure 8) to vary the ground speed of the machine when the transmission is in gear. Pressing down the accelerator pedal increases the engine speed and ground speed. Releasing the pedal decreases the engine speed and ground speed.

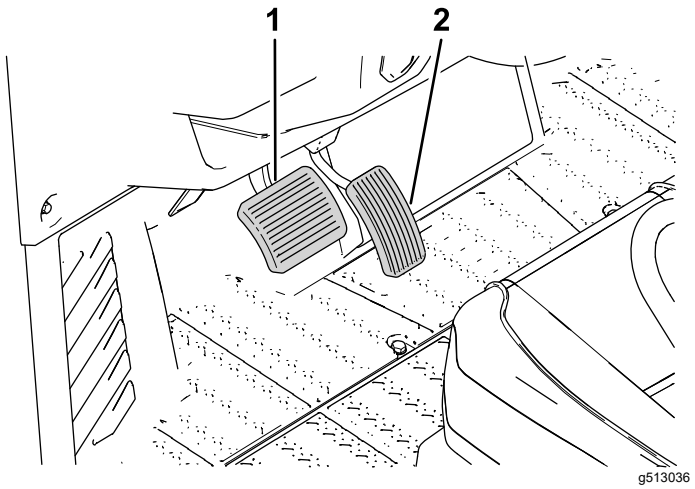


Figure 8

1. Brake pedal
2. Accelerator pedal

Brake Pedal

Use the brake pedal to stop or slow the machine (Figure 8).

⚠ CAUTION

Operating a machine with worn or incorrectly bled brakes may result in personal injury.

If the brake pedal travels to within 25 mm (1 inch) of the machine floor board, bleed and/or repair the brakes.

Specifications

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

Overall width	154 cm (60-1/2 inches)
Overall length	Model INS1H1*: 314 cm (123-1/2 inches) Model INC1H1*: 405 cm (159-1/2 inches)
Curb weight—The total weight of an operational vehicle with original equipment as manufactured; filled to the maximum capacity of engine fuel, engine oil, transmission, differential fluids, and coolant; but without the weight of the operator, passenger(s), accessories, attachments, and cargo.	Model INS1H1*: 939 kg (2,070 lb) Model INC1H1*: 1075 kg (2,370 lb)
Gross vehicle weight (GVW)—The maximum allowable total vehicle weight, including the vehicle's curb weight plus the combined weights of all vehicle occupants, any cargo loads, the trailer tongue weight, and the weights of any installed options, attachments and/or accessories. Installation of options, attachments, and/or accessories may reduce the allowable cargo capacity below the stated limit.	1814 kg (4,000 lb)
Cargo bed capacity—Maximum cargo load, not including attachments and/or accessories.	Model INS1H1*: 567 kg (1,250 lb) Model INC1H1*: 454 kg (1,000 lb)
Tow capacity	Tongue weight: 91 kg (200 lb) Maximum trailer weight: 907 kg (2,000 lb)
Ground clearance	25 cm (10 inches) with no load or operator
Wheel base	Model INS1H1*: 203 cm (80 inches) Model INC1H1*: 295 cm (116 inches)
Height	203 cm (80 inches) to top of ROPS
Cargo bed length	Inside: 113 cm (44-1/2 inches) Outside: 127 cm (50 inches)
Cargo bed width	Inside: 142 cm (56 inches) Outside: 151 cm (59-1/2 inches)
Cargo bed inside height	28 cm (11 inches)
Engine speed	Low idle: 800 to 900 rpm High idle: 4,700 to 4,900 rpm

Attachments/Accessories

A selection of Spartan-approved attachments and accessories is available for use with the machine to enhance and expand its capabilities. Contact your Authorized Service Dealer or Spartan Customer Service, or go to www.joinspartannation.com for a list of all approved attachments and accessories.

To ensure optimum performance and continued safety certification of the machine, use only genuine Spartan replacement parts and accessories.

Operation

Before Operation

Performing Daily Maintenance

Service Interval: Before each use or daily

Before starting the machine each day, perform the Each Use/Daily procedures listed in Maintenance (page 30).

Checking the Tire Pressure

Service Interval: Before each use or daily

⚠ DANGER

Low tire pressure decreases the side-hill stability of the machine. This could cause a rollover, which may result in personal injury or death.

Do not under-inflate the tires.

Refer to the following list for the recommended tire pressure specifications:

- **Front tire pressure:** approximately 165 kPa (24 psi)
- **Rear tire pressure with a cargo load of 227 kg (500 lb) or less:** approximately 165 kPa (24 psi)
- **Rear tire pressure with a cargo load of more than 227 kg (500 lb):** approximately 221 kPa (32 psi)

Important: **Do not over-inflate the tires according to the specification listed on the sidewall of the tire.**

Important: **Check the tire pressure frequently to ensure proper inflation. If the tires are not inflated to the correct pressure, the tires will wear prematurely and may cause the 4-wheel drive to bind.**

Figure 9 shows an example of tire wear caused by **under-inflation**.

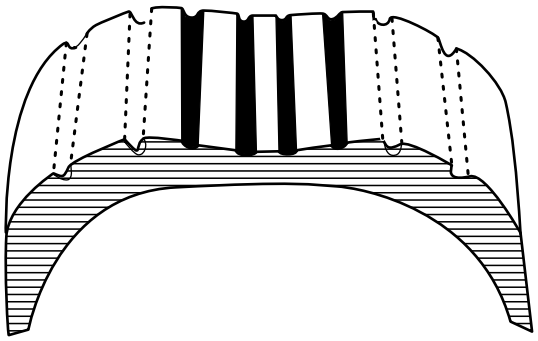


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Figure 9

Figure 10 shows an example of tire wear caused by **over-inflation**.

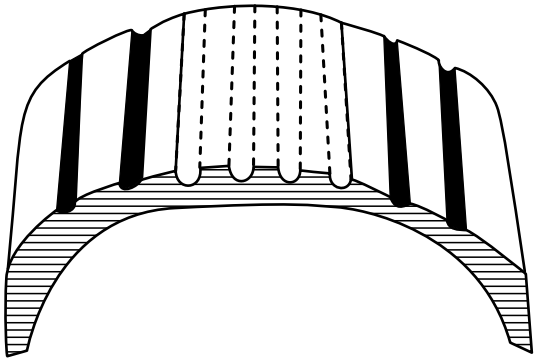

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Figure 10

Adding Fuel

Recommended Fuel

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.**

Refer to your engine owner's manual for additional information.

Filling the Fuel Tank

Fuel-tank capacity: 32 L (8.5 US gallons)

1. Clean the area around the fuel-tank cap.
2. Remove the fuel-tank cap.
3. Fill the tank to approximately 25 mm (1 inch) below the bottom of the filler neck and install the cap.

   Note: Do not overfill the fuel tank.
4. Install the fuel-tank cap securely.
5. Wipe up any spilled fuel.

Breaking in a New Machine

During the first 50 hours, perform the following guidelines to provide proper performance for the machine:

- After starting a cold engine, let it warm up for about 15 seconds before using the machine.

  Note: Allow more time for the engine to warm up when operating in cold temperatures.
- After using the machine, allow the engine to cool down for about 15 seconds before shutting the engine off.
- Check the fluid levels more often during this process.
- Vary the machine speed during operation and avoid fast accelerations.
- A break-in oil for the engine is not required. Original engine oil is the same type specified for regular oil changes.

During Operation

Operating the Cargo Bed

Raising the Cargo Bed

⚠ WARNING

A raised bed could fall and injure persons that are working beneath it.

- **Remove any load material from the bed before raising it.**
- **Ensure that the cargo bed is fully up and stable before working under the bed.**

⚠ WARNING

Driving the machine with the cargo bed raised could cause the machine to tip or roll easier. You could damage the structure of the cargo bed if you operate the machine with the bed raised.

- **Operate the machine when the cargo bed is down.**
- **After emptying the cargo bed, lower it.**

⚠ CAUTION

If a load is concentrated near the back of the cargo bed when you release the lever, the bed may unexpectedly tip open, injuring you or bystanders.

- **Center loads in the cargo bed, if possible.**
- **Hold the cargo bed down and ensure that no one is leaning over the bed or standing behind it when releasing the lever.**
- **Remove all cargo from the bed before lifting the bed up to service the machine.**

Lift the lever to raise the cargo bed (Figure 11).

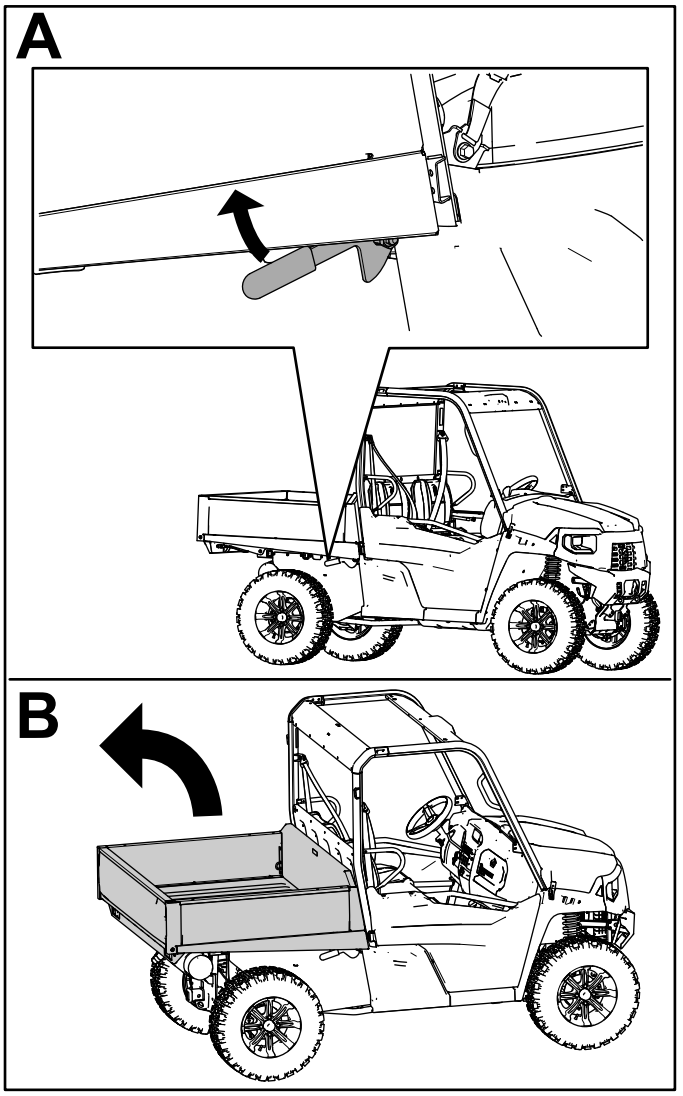

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Figure 11

Lowering the Cargo Bed

⚠ WARNING

The weight of the bed may be heavy. Hands or other body parts could be crushed.

Keep your hands and other body parts away when lowering the bed.

Slowly push down the cargo bed until it latches securely.

Opening the Tailgate

1. Ensure that the cargo bed is down and latched.
2. Using both hands, raise the tailgate using the ridge near the top of the tailgate (Figure 12).

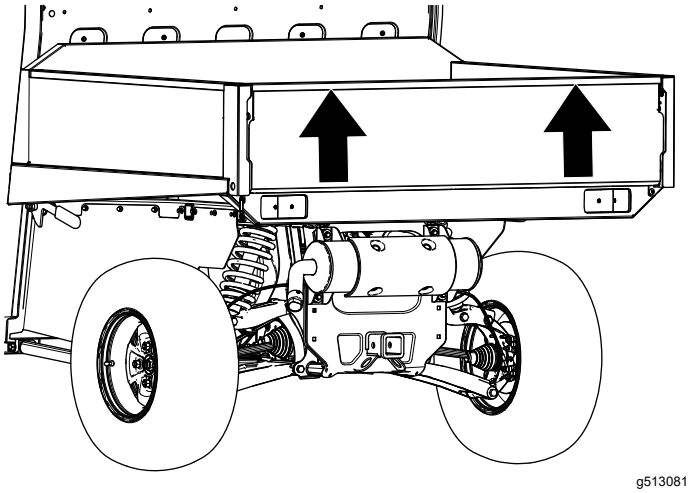

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Figure 12

3. Lower the tailgate until it is flush with the bottom of the cargo bed (Figure 13).

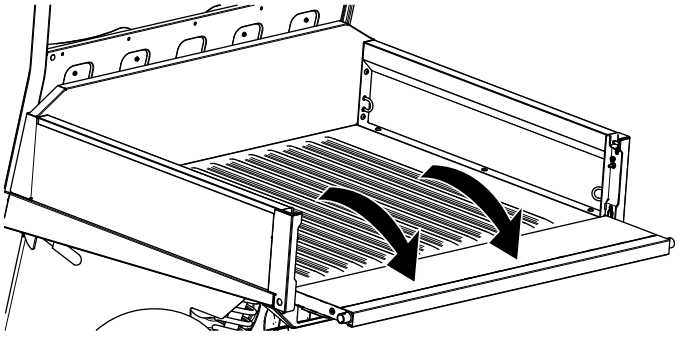

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Figure 13

Closing the Tailgate

If you unloaded loose material such as sand, landscaping rock, or wood chips from the cargo bed of the machine, some of the material that you unloaded may have lodged in the hinge area of the tailgate. Perform the following steps before closing the tailgate.

1. Use your hands to remove as much of the material from the hinge area as possible.
2. Rotate the tailgate to approximately the 45° position (Figure 14).

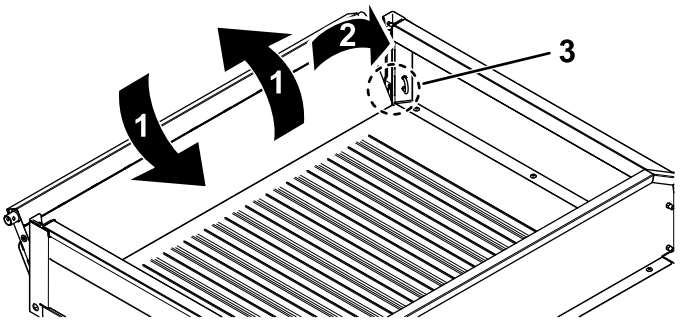

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Figure 14

1. Rotate the tailgate back and forth several times.
2. Rotate the tailgate to approximately the 45° position.
3. Hinge area

3. Use a short, shaking motion to rotate the tailgate back and forth several times (Figure 14).

   Note: This action helps move material away from the hinge area.
4. Lower the tailgate and check for material remaining in the hinge area.
5. Repeat steps 1 through 4 until the material is removed from the hinge area.
6. Rotate the tailgate up and lift the tailgate into the notches in the cargo bed.

Driving the Machine

⚠ WARNING

Overloading may cause a loss of control and accidents.

Do not exceed the gross vehicle weight (GVW) of the machine. Refer to the listed GVW in the Specifications section.

⚠ WARNING

Positioning you and your passenger's arms or legs outside of the machine can cause personal injury.

Keep you and your passenger's arms and legs within the machine at all times.

1. Press the brake pedal.
2. Move the gear selector to the desired gear.
3. Release the brake pedal and gradually press the accelerator pedal.

   Important: **Always stop the machine before shifting gears.**

   Use the chart below to determine the ground speed of each gear when operating the machine.

Gear	Maximum speed (km/h)	Maximum speed (mph)
R (REVERSE)	0 to 24	0 to 15
H (HIGH FORWARD)	0 to 72	0 to 45
L (LOW FORWARD)	0 to 24	0 to 15

Note: Leaving the key switch in the ON position for long periods of time without starting the engine discharges the battery.

Using the Cruise Control

In order to use cruise control, your seat belt must be fastened, and you need to be driving at the following ground speed based on your selected gear:

- **H (High Forward) gear—**6 km/h (4 mph) or greater
- **L (Low Forward) gear—**3 km/h (2 mph) or greater

1. Move the cruise-control switch to the ON position (Figure 15).
2. When you reach the desired drive speed, press the cruise-control switch up to engage/set the cruise control (Figure 15).

   To increase the cruise control speed, press the switch up until you reach the desired speed (Figure 15).

   Note: Press the button 1 time to increase the ground speed by an increment of 1 km/h (1 mph).

   To disengage cruise control, press the switch to the down, OFF position (Figure 15).

   Note: When you press the brake pedal, the cruise control disengages.

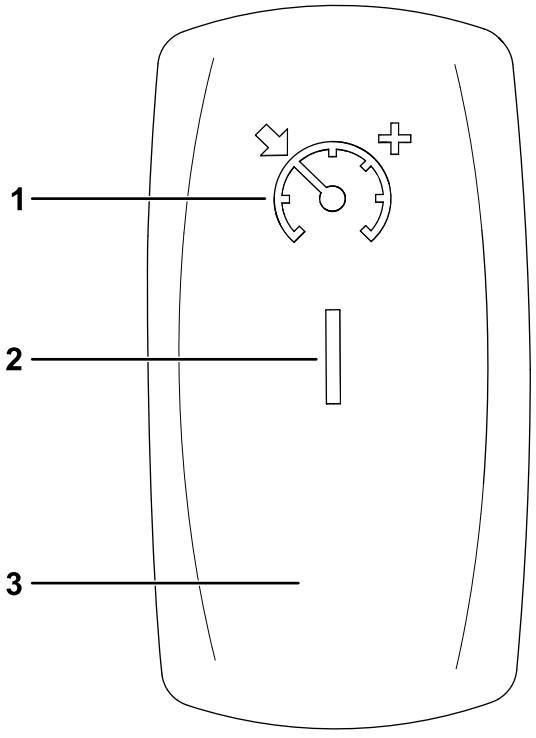

Figure 15

1. Set cruise control/increase cruise speed
2. ON position
3. OFF positon

Adjusting the Ground-Speed Governor

1. Press and hold the button (Figure 16) for at least 10 seconds.

   The set speed will blink.

2. Press the button 1 time to increase the ground speed by an increment of 1 km/h (1 mph).

   Note: The default maximum speed that you can increase to is 72 km/h (45 mph).

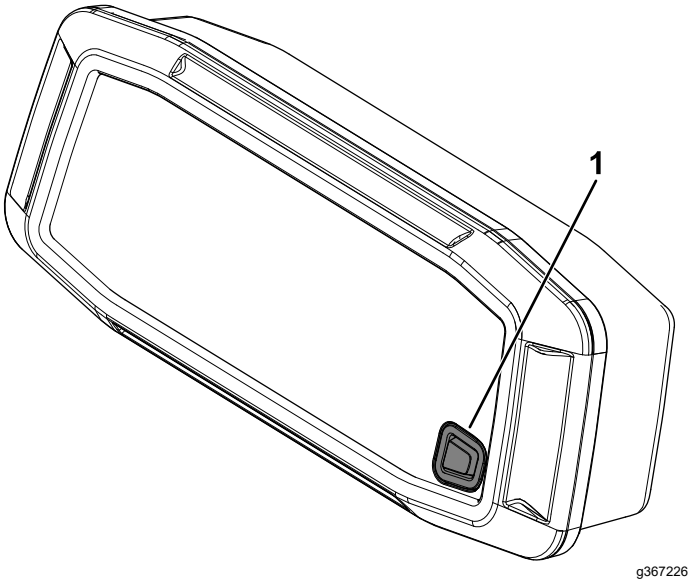

Figure 16

1. Button

Stopping the Machine

To stop the machine, remove your foot from the accelerator pedal, then press the brake pedal.

Shutting Off the Engine

1. Stop the machine.
2. Shift the transmission lever to the P (PARK) position.
3. Rotate the key switch to the OFF position and remove the key.

Using the 4-Wheel Drive/Differential Lock(s)

⚠ WARNING

Loss of control or damage to the machine or turf can happen if you do not properly use the 4-wheel drive/differential lock(s).

- **The machine speed must be at 16 km/h (10 mph) or less to engage the 4-wheel drive.**
- **The machine speed must be at 8 km/h (5 mph) or less to engage the differential lock(s).**
- **You can release the 4-wheel drive/differential lock(s) while the machine is in motion. The 4-wheel drive/differential lock(s) may stay engaged while an axle load is present. The 4-wheel drive/differential lock(s) releases once you remove an axle load.**
- **Use 4-wheel drive/differential lock(s) only when necessary for improved ground engagement.**

⚠ WARNING

Tipping or rolling the machine on a hill will cause serious injury.

- **The extra traction available with the 4-wheel drive/differential lock(s) can be enough to get you into dangerous situations, such as climbing slopes that are too steep to turn around. Be careful when operating with the 4-wheel drive/differential lock(s) on, especially on steeper slopes.**
- **If the 4-wheel drive/differential lock(s) are on when making a sharp turn at a higher speed and the inside rear wheel lifts off the ground, there may be a loss of control, which could cause the machine to skid. Use the 4-wheel drive/differential lock(s) only at slower speeds.**

Engaging 4-Wheel Drive

1. Ensure that the machine speed is 16 km/h (10 mph) or less and your foot is off the accelerator pedal.
2. Press the 2-wheel drive/4-wheel drive switch (Figure 17) up to engage 4-wheel drive.

   Note: You can disengage 4-wheel drive at any speed.

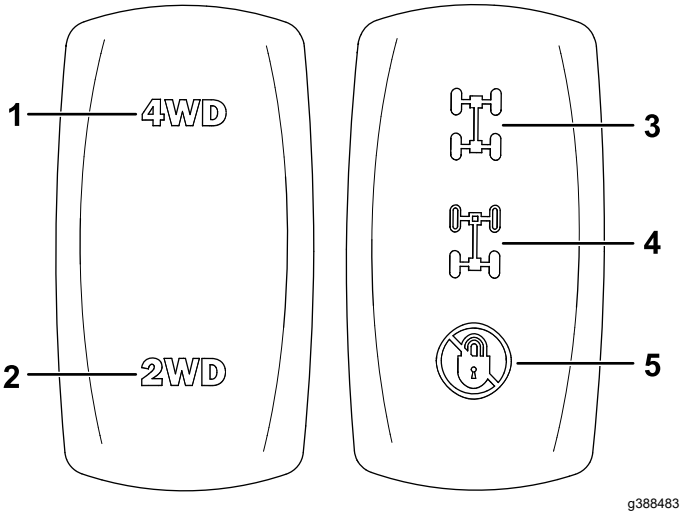

Figure 17

1. Up position—engages 4-wheel drive
2. Down position—engages 2-wheel drive
3. Up position—engages the front and rear differential locks
4. Mid position—engages the rear differential lock
5. Down position—disengages the differential lock(s)

Disengaging 4-Wheel Drive

With your foot off the accelerator pedal, disengage 4-wheel drive by pressing the 2-wheel drive/4-wheel drive switch to the down position (Figure 17).

Note: The 4-wheel drive icon will not be illuminated on the display when the switch is disengaged.

Note: You can release 4-wheel drive while the machine is in motion. 4-wheel drive may stay engaged while an axle load is present. 4-wheel drive releases once you remove an axle load.

Engaging the Differential Lock(s)

1. Ensure that the machine speed is 8 km/h (5 mph) or less and your foot is off the accelerator pedal.
2. Press the differential-lock switch to the mid position to engage the rear differential lock (Figure 17).

   Press the differential-lock switch to the up position to engage the front and rear differential locks (Figure 17).

   Note: The differential lock(s) are only active when the differential-lock switch is pushed.

   Note: The differential-lock(s) icon appears on the display when you engage the differential lock.

Disengaging the Differential Lock(s)

With your foot off the accelerator pedal, disengage the differential lock(s) by pressing the differential-lock switch to the down position (Figure 17).

Note: The differential-lock(s) icon will not be illuminated on the display when the switch is disengaged.

Note: You can release the differential lock(s) while the machine is in motion. The differential lock(s) may stay engaged while an axle load is present. The differential lock(s) release once you remove an axle load.

Controlling the Engine Throttle While in the P (PARK) Position

If you are warming up the engine in cold weather or if you need to charge your battery using the engine, do the following:

1. Shift the transmission lever to the P (PARK) position.
2. With a foot on the brake pedal, simultaneously press your other foot on the accelerator pedal.

   Note: There is no throttle control while in the N (NEUTRAL) position.

Loading the Cargo Bed

Use the following guidelines when loading the cargo bed and operating the machine:

- Observe the weight capacity of the machine and limit the weight of the load that you carry in the cargo bed as described in Specifications (page 19) and on the gross vehicle weight tag of the machine.

  Note: The load rating is specified for machine operation on a level surface only.

- Reduce the weight of the load that you carry in the cargo bed when operating the machine on hills and rough terrain.
- Reduce the weight of the load that you carry when the materials are tall (and have a high center of gravity), such as a stack of bricks, landscaping timbers, or fertilizer bags. Distribute the load as low as possible to ensure that the load does not reduce your ability to see behind the machine when operating it.
- Keep loads centered by loading the cargo bed as follows:
  - Evenly position the weight in the cargo bed from side to side.

    Important: **Tipping over is more likely to occur if the cargo bed is loaded to 1 side.**

  - Evenly position the weight in the cargo bed from front to back.

    Important: **Loss of steering control or the machine may tip over if you position the load behind the rear axle and the traction on the front tires is reduced.**

- Use extra caution when transporting oversized loads in the cargo bed, particularly when you cannot center the weight of the oversize load to the cargo bed.
- Whenever possible, secure the load by binding it to the cargo bed so that it does not shift.
- When transporting liquids, use caution when driving the machine uphill or downhill, when suddenly changing speed or stopping, or when driving over rough surfaces.

The capacity of the cargo bed is 0.45 m^3 (15.9 ft^3). The amount (volume) of material that you can place in the bed without exceeding the load ratings of the machine can vary greatly depending on the density of the material.

Refer to the following table for load volume limits with various materials:

Material	Density	Maximum Cargo Box Capacity (on level ground)
Gravel, dry	1522 kg/m^3 (95 lb/ft^3)	Full
Gravel, wet	1922 kg/m^3 (120 lb/ft^3)	3/4 Full
Sand, dry	1442 kg/m^3 (90 lb/ft^3)	Full
Sand, wet	1922 kg/m^3 (120 lb/ft^3)	3/4 Full
Wood	721 kg/m^3 (45 lb/ft^3)	Full
Bark	<721 kg/m^3 (<45 lb/ft^3)	Full
Earth, packed	1602 kg/m^3 (100 lb/ft^3)	3/4 Full (approximately)

After Operation

Hauling the Machine

- Use care when loading or unloading the machine into a trailer or a truck.
- Use full-width ramps for loading the machine into a trailer or a truck.
- Tie the machine down securely.

Refer to Figure 18 and Figure 19 for the tie-down locations on the machine.

Note: Load the machine on the trailer with the front of the machine facing forward.

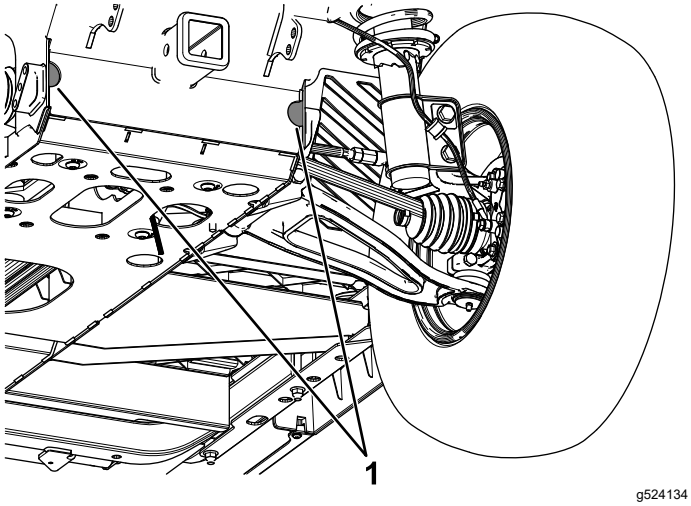

Figure 18

1. Front tie-down locations

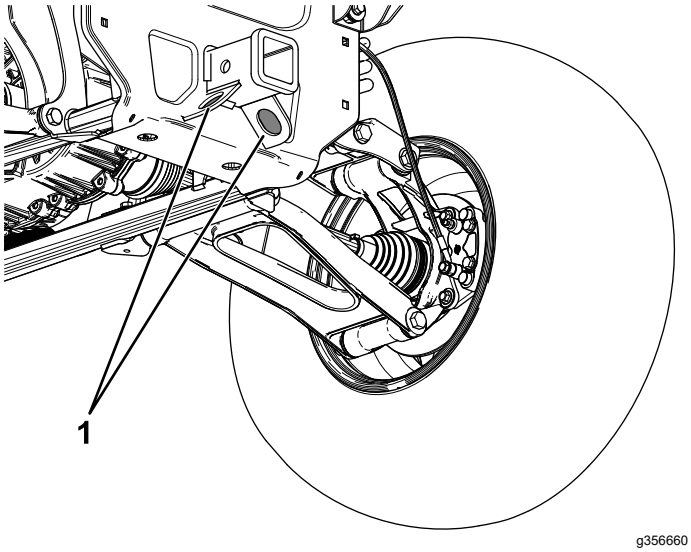

Figure 19

1. Rear tie-down locations

Towing the Machine

In case of an emergency, you can tow the machine for a short distance; however, this is not the standard operating procedure.

⚠ WARNING

Towing at excessive speeds could cause a loss of steering control, resulting in personal injury.

Never tow the machine at faster than 8 km/h (5 mph).

Note: The power steering may not function, making it difficult to steer.

Towing the machine is a 2-person job. If you must move the machine a considerable distance, transport it on a truck or trailer.

1. Affix a tow line to the tongue at the front of the frame of the machine (Figure 18).
2. Move the gear selector to the N (NEUTRAL) position.

Towing a Trailer

The machine is capable of pulling trailers and attachments. Contact your Authorized Service Dealer for the available tow hitches.

Your machine can tow trailers with a maximum gross trailer weight (GTW) up to 907 kg (2,000 lb).

Always load a trailer with approximately 60% of the trailer cargo weight toward the front of the trailer axle. Do not exceed 91 kg (200 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 brakes, axle, engine, transaxle, steering, suspension, body structure, or tires.

Important: **To reduce the potential for drive belt damage, use the L (LOW RANGE) position when towing.**

Maintenance

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 50 hours	• Check the tension of the alternator belt. If necessary, adjust the belt tension. • Check the intake/exhaust-valve end clearance. Adjust, if necessary. • Torque the wheel-lug nuts.
Before each use or daily	• Check the seat belt(s) for wear, cuts, and other damage. Replace the seat belt(s) if any component does not operate properly. • Check the tire pressure. • Check the engine-oil level. • Check the level of the coolant. • Remove debris from the engine area and radiator as needed. • Check the brake-fluid level. Check the brake-fluid level before you start the engine.
Every 100 hours	• Check the condition of the wheels and tires. • Check the steering and suspension for loose or damaged components. • Check the front wheel alignment. • Check the brakes.
Every 250 hours	• Grease the machine (lubricate more frequently in heavy-duty applications). • Change the air-cleaner filter (more frequently in dusty or dirty conditions). • Change the engine oil and filter. • Check the tension of the alternator belt. If necessary, adjust the belt tension. If the belt is worn or damaged, replace the belt. • Check the positive crankcase ventilation (PCV) valve. Clean, if necessary. • Torque the wheel-lug nuts. • Check the transaxle-fluid level. • Check the condition of the drive belt and clean the clutches.
Every 500 hours	• Check the spark-plug wires. • Check the intake/exhaust-valve end clearance. Adjust, if necessary. • Check the fuel lines and connections. • Change the transaxle fluid. • Check the front differential oil level. • Check the coolant hoses for cracks, swelling, or deterioration. • Replace the drive belt.
Every 750 hours	• Change the spark plugs.
Every 1,000 hours	• Change the front differential oil. • Change the engine coolant. • Change the brake fluid.

Note: Download a free copy of the electrical schematic by visiting www.joinspartannation.com and searching for your machine from the Manuals link on the home page.

Important: **Refer to your engine owner's manual for additional maintenance procedures.**

⚠ WARNING

Failing to properly maintain the machine could result in premature failure of machine systems, causing possible harm to you or bystanders.

Keep the machine well maintained and in good working order as indicated in these instructions.

⚠ CAUTION

Only qualified and authorized personnel should maintain, repair, adjust, or inspect the machine.

- **Avoid fire hazards and have fire-protection equipment present in the work area. Do not use an open flame to check fluid levels or leakage of fuel, battery electrolyte, or coolant.**
- **Do not use open pans of fuel or flammable cleaning fluids for cleaning parts.**

⚠ CAUTION

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

Shut off the engine and remove the key from the switch before you perform any maintenance.

Daily Recommended Maintenance Checklist

Duplicate this page for routine use.

Maintenance Check Item	For the week of:						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Check the operation of the gear selector.							
Check the fuel level.							
Check the engine-oil level.							
Check the brake-fluid level.							
Check the transaxle-fluid level.							
Check the air filter.							
Check the radiator fins.							
Check for unusual engine noises.							
Check for unusual operating noises.							
Check the tire pressure.							
Check for fluid leaks.							
Check the instrument operation.							
Check the accelerator operation.							
Wash the machine.							
Touch up any damaged paint.							

Maintaining the Machine under Special Operating Conditions

Important: **If the machine is subjected to any of the conditions listed below, perform maintenance twice as frequently:**

- Desert operation
- Cold climate operation—below 10°C (50°F)
- Trailer towing
- Frequent operation in dusty conditions
- Construction work
- After extended operation in mud, sand, water, or similar dirty conditions, do the following:
  - Have your brakes inspected and cleaned as soon as possible. This prevents any abrasive material from causing excessive wear.
  - Wash the machine using water alone or with a mild detergent.

    Important: **Do not use brackish or reclaimed water to clean the machine.**

Pre-Maintenance Procedures

Preparing the Machine for Maintenance

1. Park the machine on a level surface.
2. Shift the transmission lever to the P (PARK) position.
3. Raise and empty the cargo bed.
4. Shut off the engine and remove the key.
5. Allow the machine to cool before performing maintenance.
6. Disconnect the negative (-) battery cable from the battery post.

Raising the Machine

⚠ DANGER

A machine on a jack may be unstable and slip off the jack, injuring anyone beneath it.

- **Do not start the machine while the machine is on a jack, as the engine vibration or wheel movement could cause the machine to slip off the jack.**
- **Always remove the key from the key switch before getting off the machine.**
- **Block the tires when the machine is on a jack.**

When jacking up the front of the machine, always place a wooden block (or similar material) between the jack and the machine frame.

The jacking point at the front of the machine is located at the front-frame bottom plate (Figure 20).

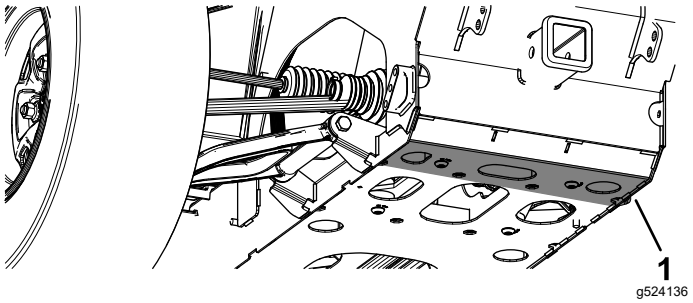

Figure 20

1. Front jacking point

The jacking point at the rear of the machine is located at the rear cradle bracket (Figure 21).

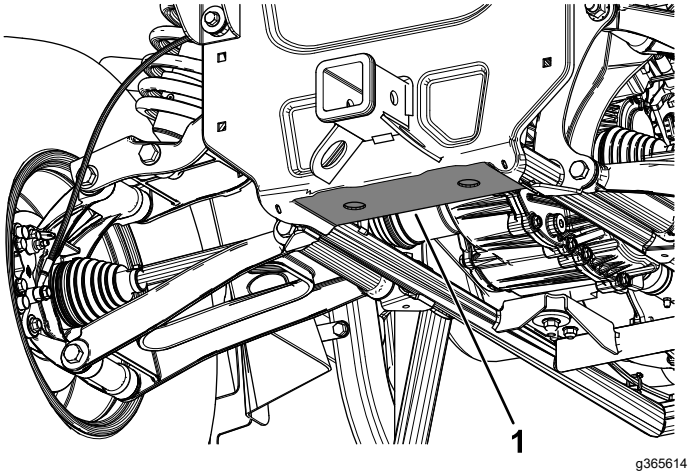

Figure 21

1. Rear jacking point

Accessing the Hood

Raising the Hood

1. Lift up the handle of the rubber latches on each side of the hood.
2. Raise the hood.

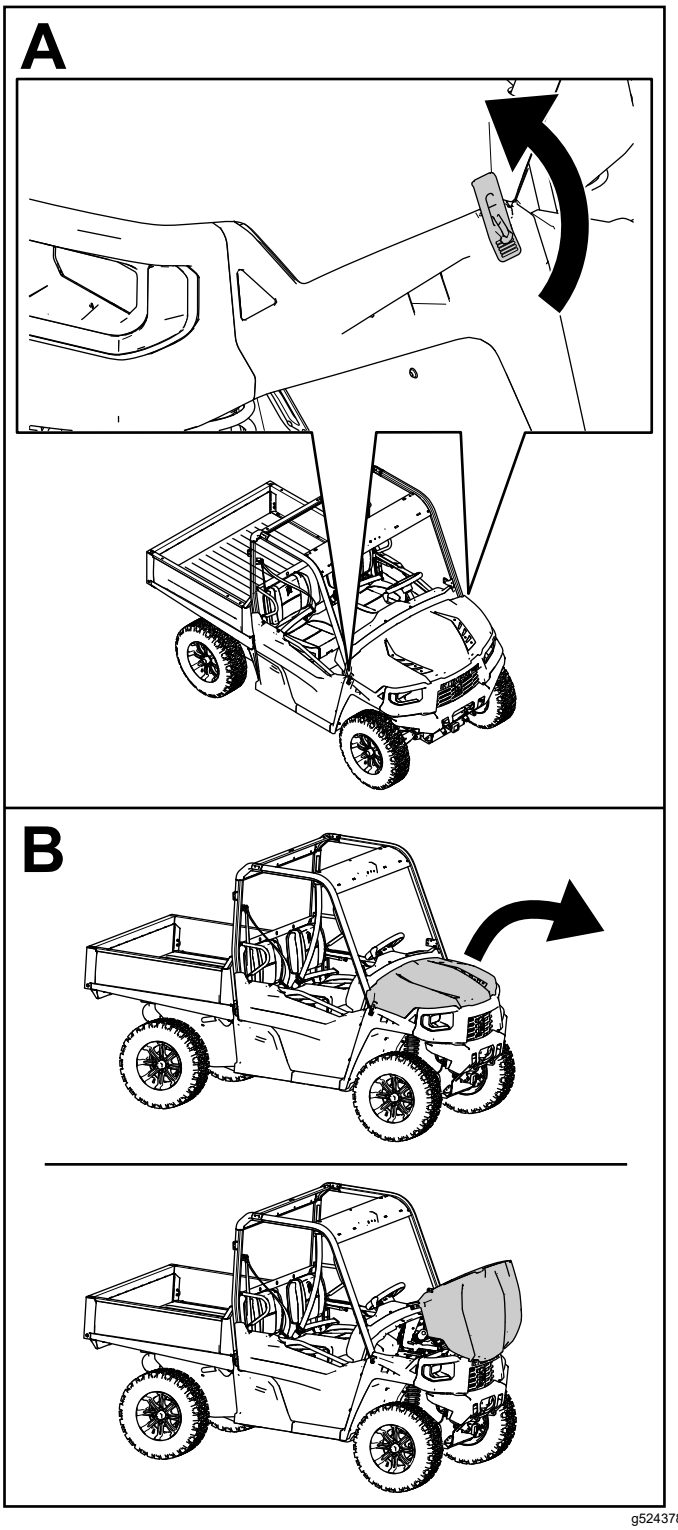

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Figure 22

Closing the Hood

1. Gently lower the hood.
2. Secure the hood by aligning the rubber latches onto the latch anchors on each side of the hood (Figure 22).

Lubrication

Greasing the Machine

Service Interval: Every 250 hours—Grease the machine (lubricate more frequently in heavy-duty applications).

Grease Type: No. 2 lithium grease

1. Use a rag to wipe the grease fitting clean so that foreign matter cannot be forced into the bearing or bushing.
2. With a grease gun, apply grease into the grease fittings on the machine.
3. Wipe any excess grease off the machine.

The grease-fitting locations and quantities are as follows:

- **Front-control-arm pivots (2)**; refer to Figure 23

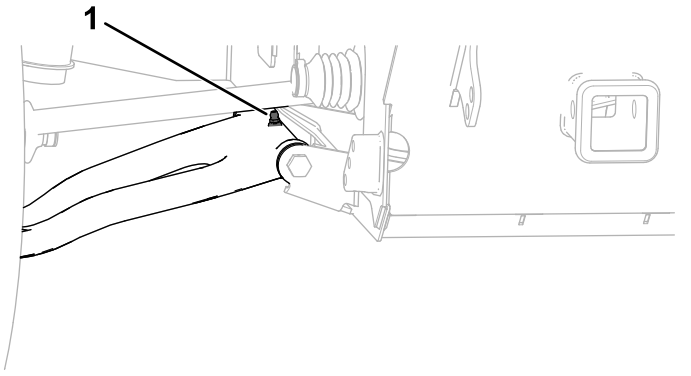

Figure 23
Right side shown

1. Grease fitting—front-control-arm pivot

- **Rear-control-arm pivots (4)**; refer to Figure 24

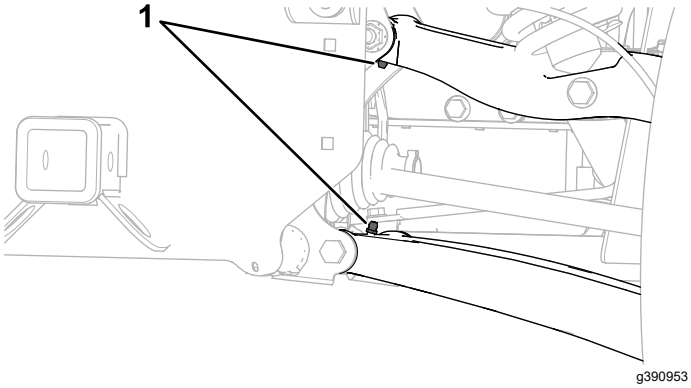

Figure 24
Right side shown

1. Grease fittings—rear-control-arm pivots

- **Ball joints (2)**; refer to Figure 25

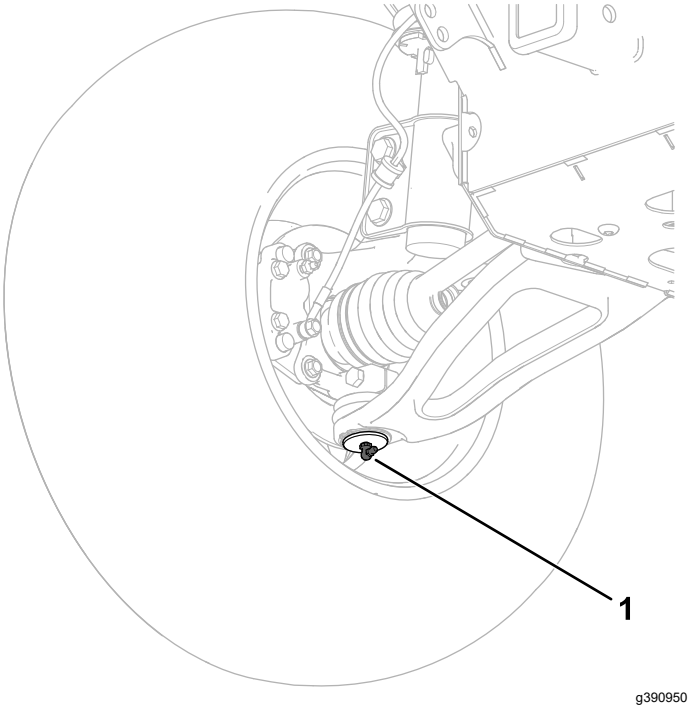

Figure 25
Right side shown

1. Grease fitting—ball joint

- **Rear-knuckle pivots (4)**; refer to Figure 26

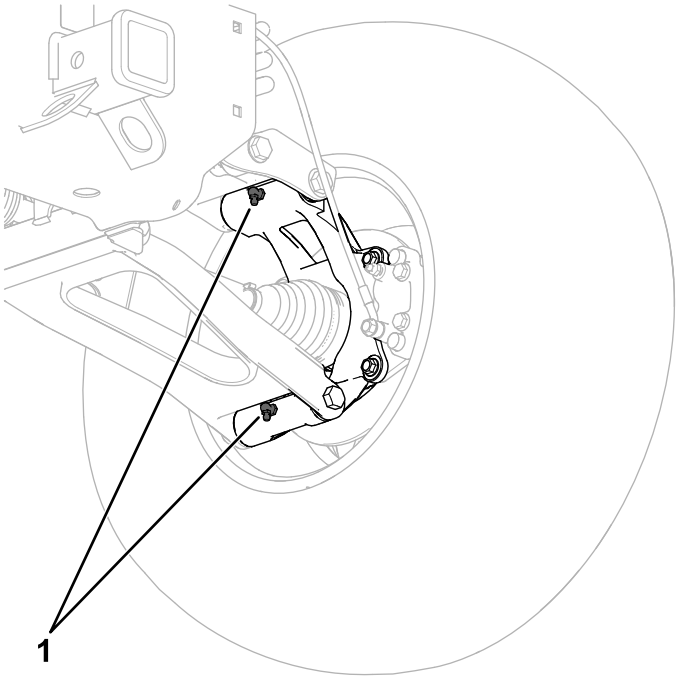

Figure 26
Right side shown

1. Grease fittings—rear-knuckle pivots

- **Driveshaft (2)**; refer to Figure 27

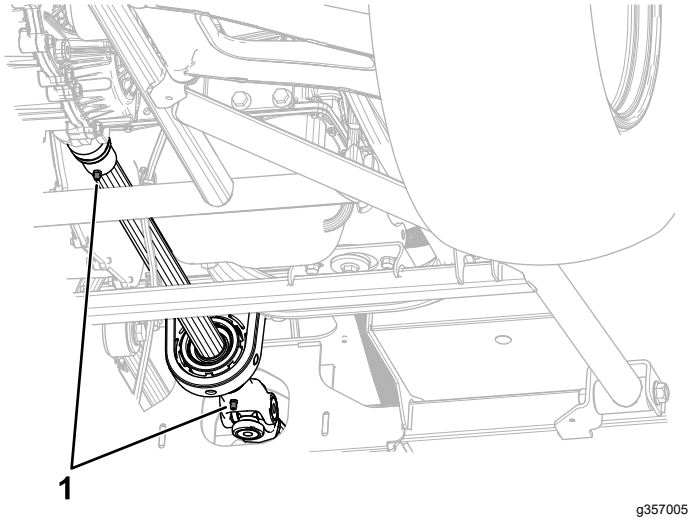

Figure 27

1. Grease fitting—driveshaft

Engine Maintenance

Servicing the Air Cleaner

Service Interval: Every 250 hours—Change the air-cleaner filter (more frequently in dusty or dirty conditions).

Inspect the air cleaner and hoses periodically to maintain maximum engine protection and to ensure maximum service life. Check the air-cleaner body for damage that could possibly cause an air leak. Replace a damaged air-cleaner body.

Type: Spartan Part 108-3810; refer to your Authorized Service Dealer.

1. Release the latches on the air cleaner and pull the air-cleaner cover off the air-cleaner body (Figure 28).

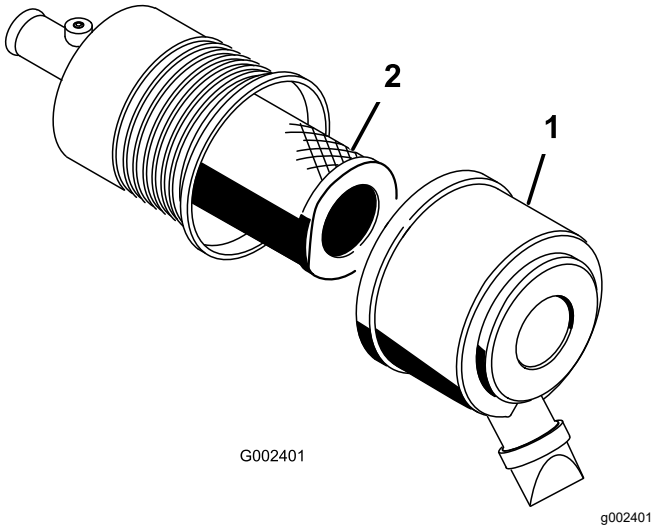

Figure 28

1. Air-cleaner cover
2. Filter

2. Squeeze the dust cap sides to open it and knock the dust out.
3. Gently slide the filter out of the air-cleaner body (Figure 28).

   Note: Avoid knocking the filter into the side of the body.

   Note: Do not attempt to clean the filter.
4. Inspect the new filter for damage by looking into the filter while shining a bright light on the outside of the filter.

   Note: Holes in the filter appear as bright spots. Inspect the element for tears, an oily film, or damage to the rubber seal. If the filter is damaged, do not use it.

Note: To prevent engine damage, always operate the engine with the air filter and cover installed.

5. Carefully slide the filter over the body tube (Figure 28).

   Note: Ensure that it is fully seated by pushing on the outer rim of the filter while installing it.

6. Install the air-cleaner cover with the side facing up, and secure the latches (Figure 28).

Servicing the Engine Oil

Service Interval: Before each use or daily

Every 250 hours—Change the engine oil and filter.

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

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

Engine-Oil Specifications

The engine ships with oil in the crankcase; however, check the oil level before you first start the engine. Check the oil level before operating the machine each day or each time you use the machine.

Oil Type: API rating of SJ or higher

Crankcase Capacity: 2.8 L (3 US qt) when the filter is changed

Oil Viscosity/Grade:

- SAE 15W-40 engine oil for ambient temperatures above -20℃ (-4°F)
- SAE 5W-30 engine oil for ambient temperatures below -20℃ (-4°F)

Checking the Engine-Oil Level

1. Park the machine on a level surface.
2. Shift the transmission lever to the P (PARK) position.
3. Shut off the engine and remove the key.
4. Raise the cargo bed.
5. Check the engine-oil level as shown in Figure 29.

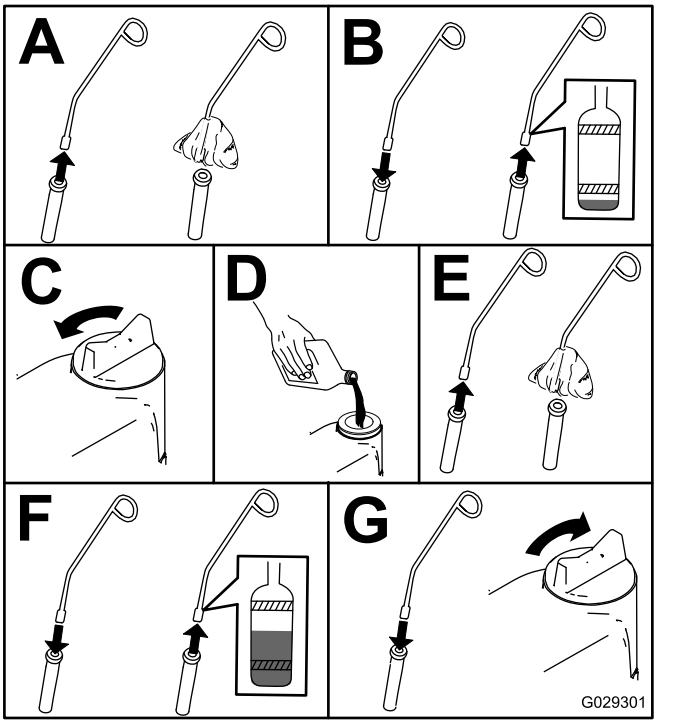

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Figure 29

Changing the Engine Oil and Filter

If possible, run the engine just before changing the oil because warm oil flows better and carries more contaminants than cold oil.

1. Park the machine on a level surface.
2. Shift the transmission lever to the P (PARK) position.
3. Shut off the engine and remove the key.
4. Raise the cargo bed.
5. Change the engine oil as shown in Figure 30.

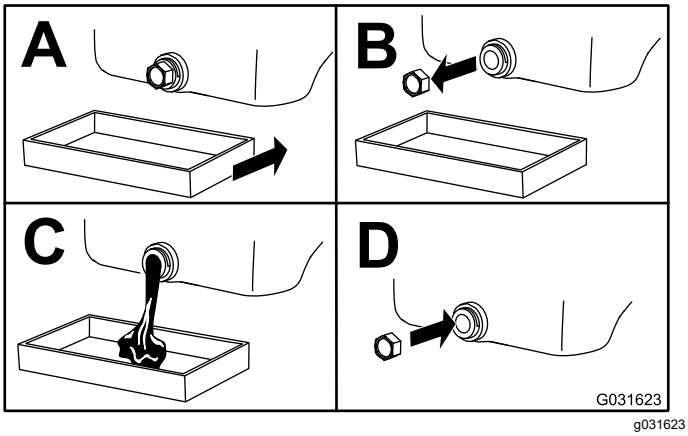

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Figure 30

6. Replace the engine-oil filter as shown in Figure 31.

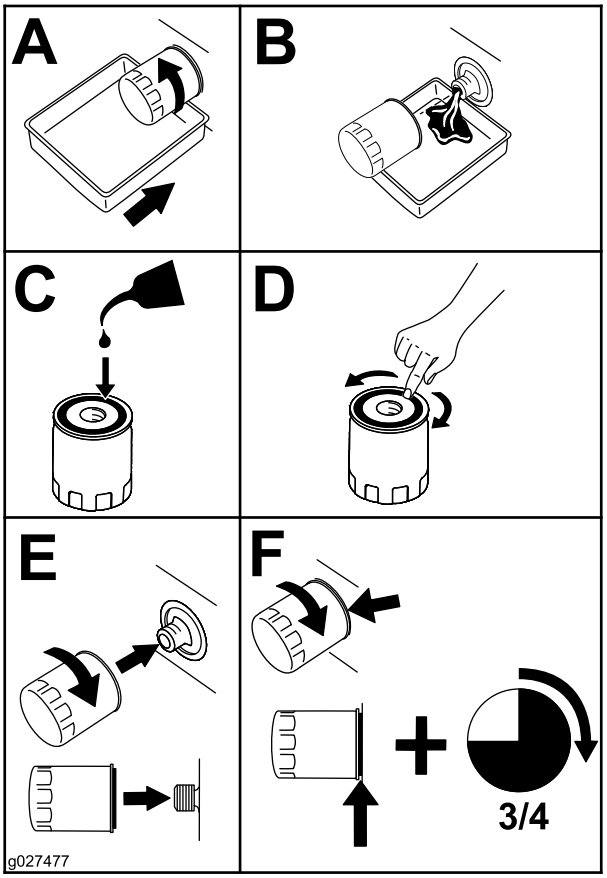

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Figure 31

7. Fill the crankcase with oil; refer to Engine-Oil Specifications (page 37).

Servicing the Spark Plugs

Service Interval: Every 750 hours—Change the spark plugs.

Type: Spartan Part 145-2128; refer to your Authorized Service Dealer.

Air Gap: 1 mm (0.04 inch)

Important: **A cracked, fouled, dirty, or malfunctioning spark plug must be replaced. Do not sand-blast, scrape, or clean electrodes by using a wire brush because grit may eventually release from the plug and fall into the cylinder. The result is usually a damaged engine.**

Note: The plug should be removed and checked whenever the engine malfunctions.

1. Clean the area around the spark plug so that foreign matter cannot fall into the cylinder when you remove the spark plug.
2. Pull the wire off the terminal of the spark plug.
3. Remove the plug from the cylinder head.
4. Check the condition of the side electrode, center electrode, and center electrode insulator to ensure that there is no damage (Figure 32).

   Note: Do not use a damaged or worn spark plug. Replace it with a new spark plug of the specified type.
5. Set the air gap between the center and side of the electrodes at 1 mm (0.04 inch) as shown in Figure 32.
6. Install the spark plug into the cylinder head, and torque the plug to 20 to 28 N·m (15 to 21 ft-lb).
7. Install the spark-plug wire.
8. Repeat steps 1 through 7 for the other spark plug.

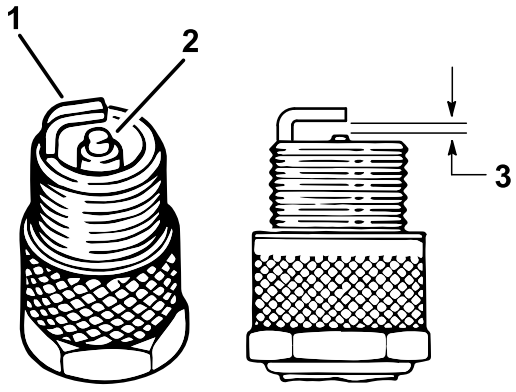

Figure 32

1. Side electrode
2. Center electrode insulator
3. Air gap (not to scale)—1 mm (0.04 inch)

Checking and Adjusting the Alternator Belt

Service Interval: After the first 50 hours—Check the tension of the alternator belt. If necessary, adjust the belt tension.

Every 250 hours—Check the tension of the alternator belt. If necessary, adjust the belt tension. If the belt is worn or damaged, replace the belt.

1. Measure the belt deflection by applying 98 N (22 lbf) to the belt between the fan pulley and alternator pulley (Figure 33).

   The belt needs to deflect 8 to 10 mm (5/16 to 3/8 inch).

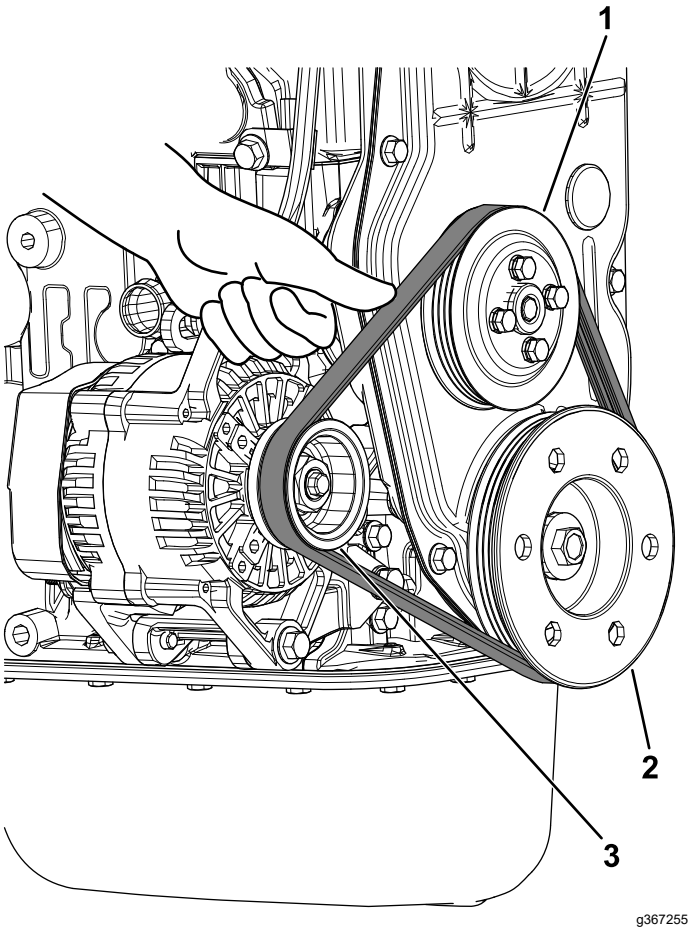

Figure 33

1. Fan pulley
2. Crankshaft pulley
3. Alternator pulley

2. If needed, adjust the belt tension as follows:
3. Loosen the upper alternator adjusting bolt.
4. Adjust the alternator until the belt is tensioned correctly.

   You may use a pry bar to assist in this step.
5. Tighten the upper alternator adjusting bolt.
6. Measure the belt deflection by applying 98 N (22 lbf) to the belt between the fan pulley and alternator pulley (Figure 33).

   The belt needs to deflect 8 to 10 mm (5/16 to 3/8 inch).
7. If the belt tension is not correct, repeat steps 3 through 6.

Checking the Spark-Plug Wires

Service Interval: Every 500 hours

Check the spark-plug wires for cuts, abrasions, hardening, and/or cracking.

Replace, if necessary.

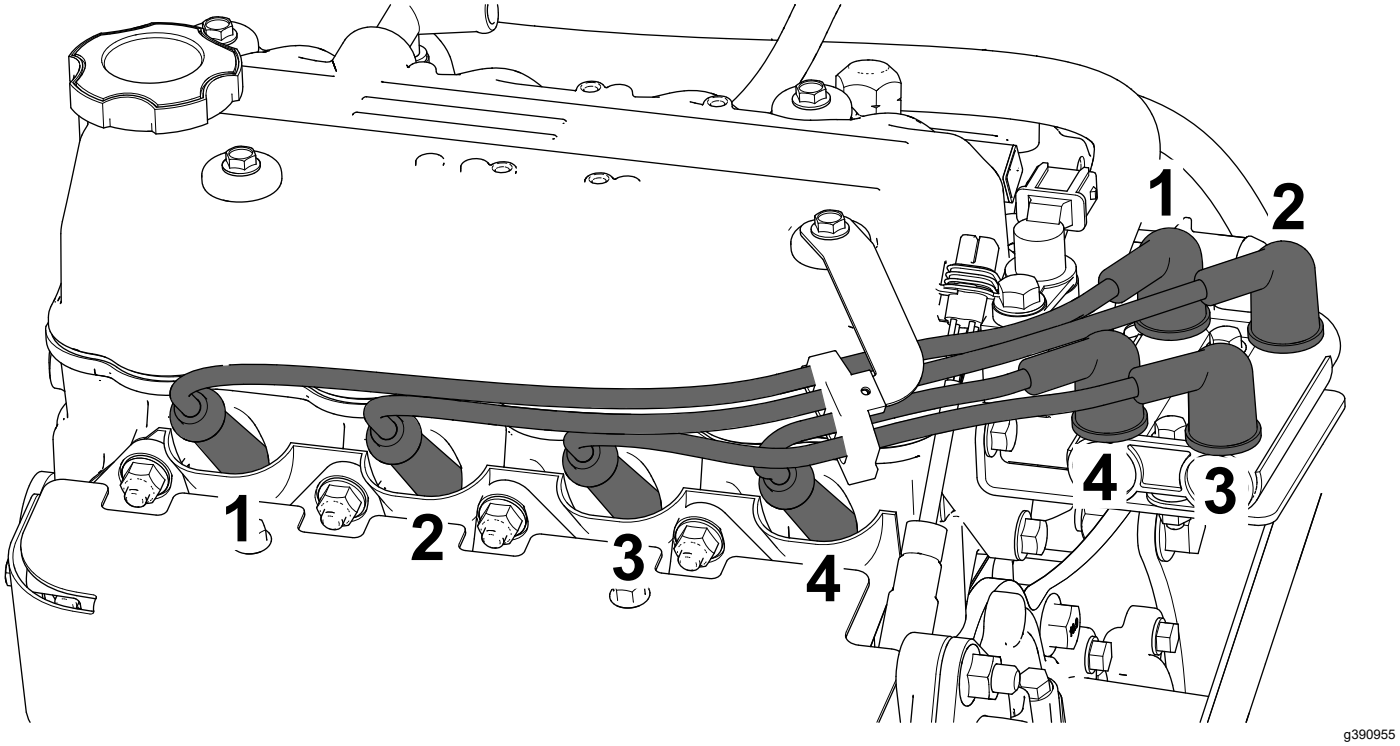

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Figure 34

1. Spark-plug wire routing for cylinder 1
2. Spark-plug wire routing for cylinder 2
3. Spark-plug wire routing for cylinder 3
4. Spark-plug wire routing for cylinder 4

Checking the Positive Crankcase Ventilation (PCV) Valve

Service Interval: Every 250 hours—Check the positive crankcase ventilation (PCV) valve. Clean, if necessary.

1. Slide the spring clamps and remove the PCV valve from the rubber hoses.
2. Shake the valve and ensure that you can hear loose parts in the valve.

   If you do not hear loose parts in the valve, clean or replace the valve; refer to the *Service Manual*.

   Note: When installing the new valve, ensure that the valve is installed with the ventilation going in the correct direction.

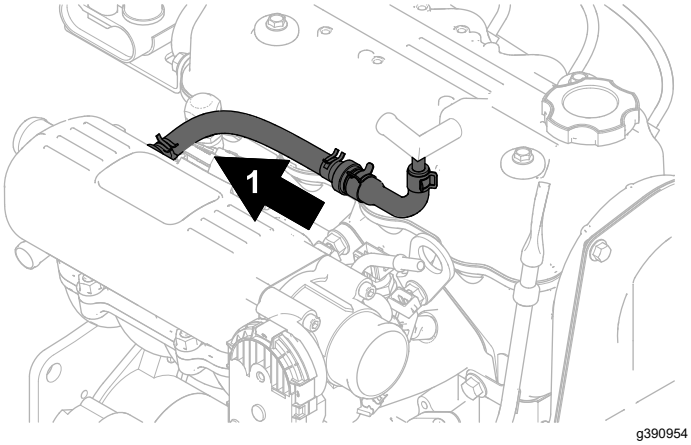

Figure 35

1. Ventilation flow direction

Checking/Adjusting the Intake/Exhaust-Valve End Clearance

Service Interval: After the first 50 hours—Check the intake/exhaust-valve end clearance. Adjust, if necessary.

Every 500 hours—Check the intake/exhaust-valve end clearance. Adjust, if necessary.

Checking/Adjusting the Intake-Valve End Clearance

Ensure that the engine is cool to touch before starting this procedure.

If the valve end clearance is in the following range, you **do not** need to adjust the end clearance.

0.127 to 0.178 mm (0.005 to 0.007 inch) — Cold

1. Remove the 4 bolts shown in Figure 36 from the engine.

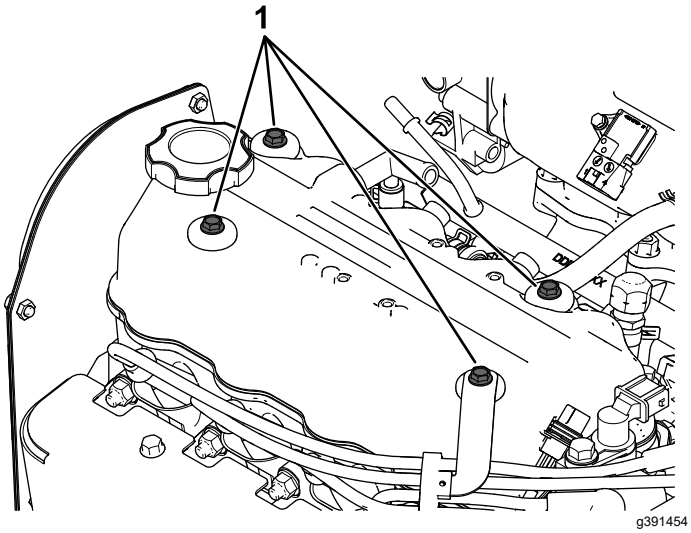

Figure 36

1. Remove these 4 bolts.

2. Remove the valve cover to access the intake and exhaust valves.

   Important: **If the seal inside the valve cover sticks, we recommend using a flat-head screwdriver to assist with removing the valve cover.**

   If the seal is damaged, replace it before you install the valve cover.

3. To rotate the engine camshaft, remove the drive belt cover to expose the primary clutch; refer to Checking the Drive Belt and Cleaning the Clutches (page 58).

4. Rotate the primary clutch (Figure 37) until the exhaust valve on cylinder 1 (Figure 38) is completely open.

   The exhaust valve is completely open when the exhaust rocker arm is in the lowest position and the exhaust valve spring is compressed (Figure 39).

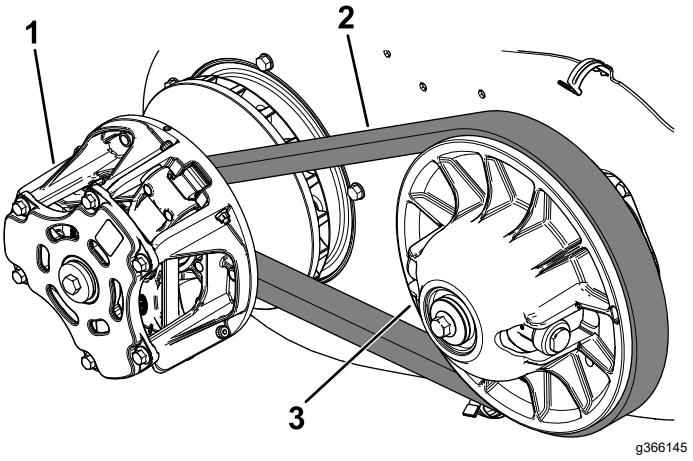

Figure 37

1. Primary clutch
2. Drive belt
3. Secondary clutch

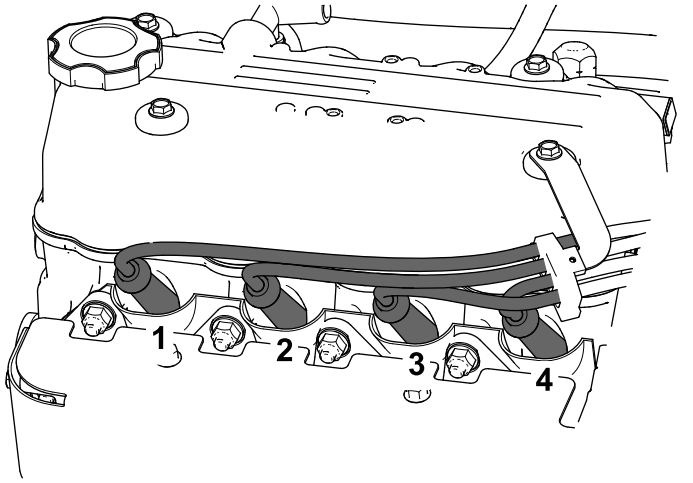

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Figure 38

1. Cylinder 1
2. Cylinder 2
3. Cylinder 3
4. Cylinder 4

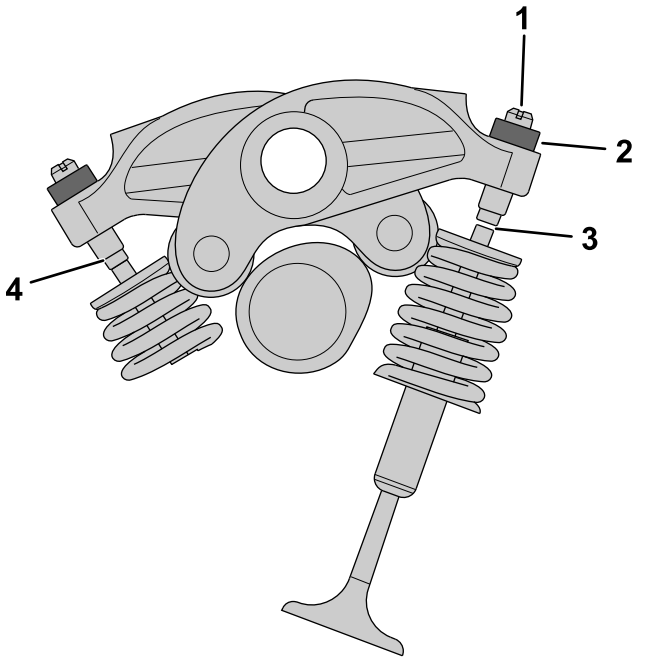

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Figure 39
Exhaust valve in the lowest position

1. Adjustment screw
2. Jam nut
3. Intake-valve end clearance (valve closed)
4. Exhaust-valve end suppression (valve open)

5. With the exhaust rocker arm in the lowest position, the intake rocker arm will be relaxed.

   Using a feeler gauge, check the clearance between the intake-valve end and the adjustment screw.

   Refer to the clearance range at the beginning of this procedure.

   Note: If the intake clearance range is within specification, you **do not** need to perform the adjustment.

6. To adjust the clearance, loosen the jam nut and rotate the adjustment screw to the correct clearance range.

   Once the valve clearance is within the correct range, hold the adjustment screw in place and tighten the jam nut.

   Check the clearance again after you tighten the jam nut and ensure that it is within range.

7. Check and/or adjust the remaining intake valves by repeating this procedure for cylinders 2, 3, and 4.

Checking/Adjusting the Exhaust-Valve End Clearance

Ensure that the engine is cool to touch before starting this procedure.

If the valve end clearance is in the following range, you **do not** need to adjust the end clearance.

0.229 to 0.279 mm (0.009 to 0.011 inch) — Cold

1. Rotate the primary clutch (Figure 37) until the intake valve on cylinder 1 (Figure 38) is completely open.

   The intake valve is completely open when the intake rocker arm is in the lowest position and the intake valve spring is compressed (Figure 40).

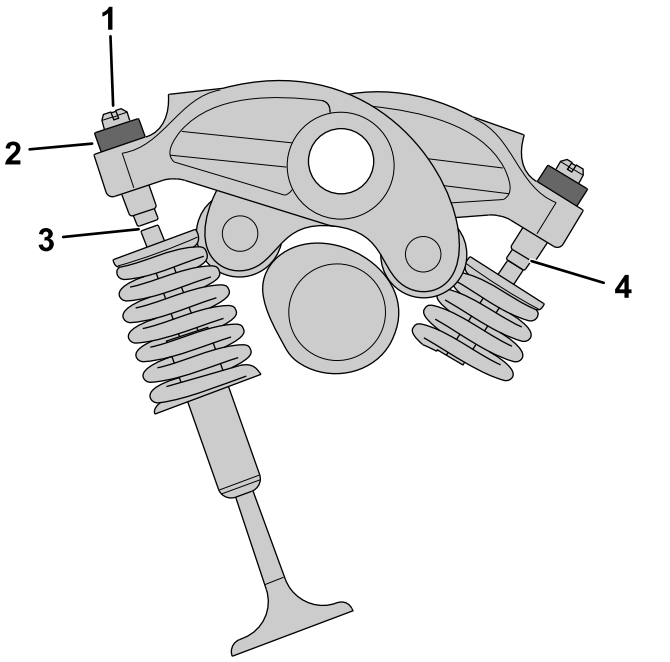

Figure 40
Intake valve in the lowest position

1. Adjustment screw
2. Jam nut
3. Exhaust-valve end clearance (valve closed)
4. Intake-valve end suppression (valve open)

2. With the intake rocker arm in the lowest position, the exhaust rocker arm will be relaxed.

   Using a feeler gauge, check the clearance between the exhaust-valve end and the adjustment screw.

   Refer to the clearance range at the beginning of this procedure.

   Note: If the exhaust clearance range is within specification, you **do not** need to perform the adjustment.

3. To adjust the clearance, loosen the jam nut and rotate the adjustment screw to the correct clearance range.

   Once the valve clearance is within the correct range, hold the adjustment screw in place and tighten the jam nut.

   Check the clearance again after you tighten the jam nut and ensure that it is within range.

4. Check and/or adjust the remaining exhaust valves by repeating this procedure for cylinders 2, 3, and 4.

5. Install the previously removed valve cover and torque the bolts to 6 to 8 N·m (53 to 71 in-lb).

6. Install the previously removed drive belt cover; Checking the Drive Belt and Cleaning the Clutches (page 58).

Fuel System Maintenance

Checking the Fuel Lines and Connections

Service Interval: Every 500 hours/Yearly (whichever comes first)

Check the fuel lines, fittings, and clamps for signs of leaking, deterioration, damage, or loose connections.

Note: Repair any damaged or leaking fuel system component before using the machine.

Electrical System Maintenance

Servicing the Battery

Battery voltage: 12 V with 300 A (cold-cranking) at -18°C (0°F).

- Always keep the battery clean and fully charged.
- If the battery terminals are corroded, clean them with a solution of 4 parts water and 1 part baking soda.
- Apply a light coating of grease to the battery terminals to prevent corrosion.

⚠ DANGER

Battery electrolyte contains sulfuric acid, which is fatal when consumed and causes severe burns.

- **Do not drink electrolyte and avoid contact with skin, eyes, or clothing. Wear eye protection and rubber gloves.**
- **Fill the battery wherever clean water is available for flushing the skin.**
- **Charge the battery in a well-ventilated place so that the gasses produced while charging can dissipate.**
- **Since the gasses are explosive, keep open flames and electrical sparks away from the battery; do not smoke near the battery.**
- **Nausea may result if you inhale the gasses.**
- **Unplug the charger from the electrical outlet before connecting the charger leads to or disconnecting them from the battery posts.**

Disconnecting 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.**

Disconnect the negative (-) battery cable from the battery post (Figure 41).

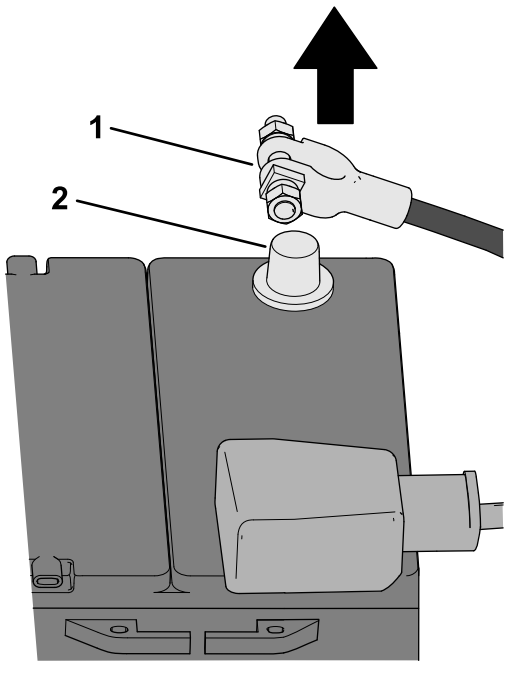

Figure 41

1. Negative (-) battery cable
2. Battery post

Removing the Battery

⚠ WARNING

Incorrect battery cable routing could damage the machine and cables, causing sparks. Sparks can cause the battery gases 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. Disconnect the battery cables (Figure 42).

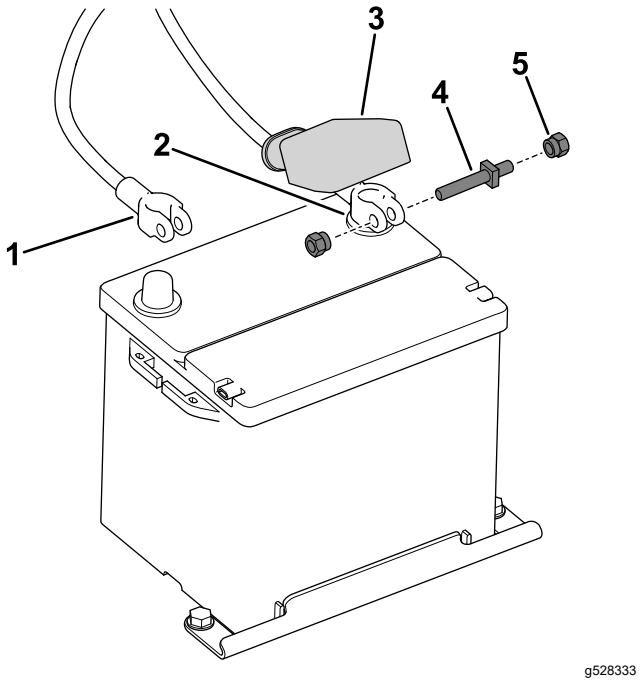

Figure 42

1. Negative battery cable (black)
2. Positive battery cable (red)
3. Insulator boot (positive battery cable)
4. Bolt
5. Nuts

2. Loosen the locknut securing the battery retainer and remove the battery from the tray (Figure 43).

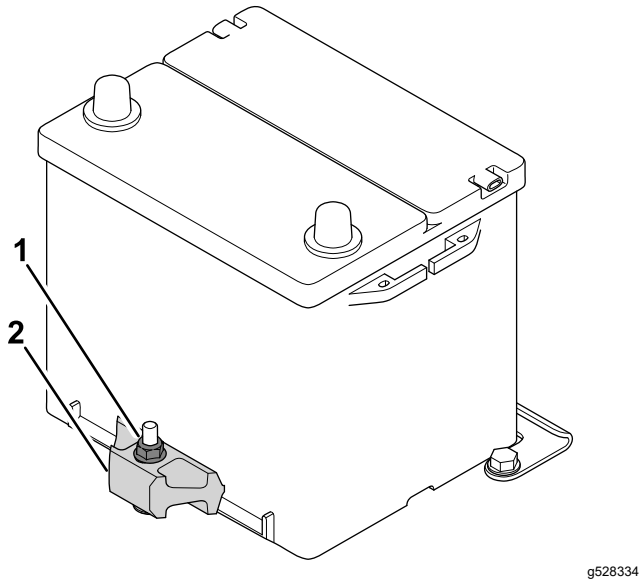

Figure 43

1. Locknut
2. Battery retainer

Installing the Battery

1. Place the battery on the battery tray and secure the battery to the retainer by tightening the locknut (Figure 43).
2. Connect the battery cables (Figure 42).

Connecting the Battery

1. Connect the negative (-) battery cable to the battery post (Figure 44).

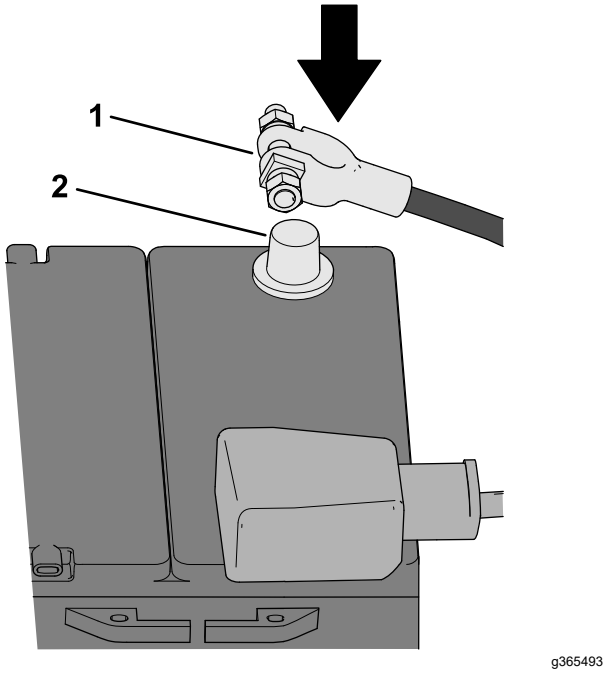

Figure 44

1. Negative (-) battery cable
2. Battery post

2. Torque the battery clamps to 11 to 13 N·m (100 to 120 in-lb).

Charging the Battery

⚠ WARNING

Charging the battery produces gasses that can explode.

- **Keep sparks and flames away from the battery.**
- **Never smoke near the 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; refer to Removing the Battery (page 46).
2. Connect a 3 to 4 A battery charger to the battery posts. Charge the battery at a rate of 3 to 4 A for 4 to 8 hours (12 V).

   Note: Do not overcharge the battery.
3. Install the battery; refer to Installing the Battery (page 47).

Storing the Battery

If you store the machine for more than 30 days, remove the battery and charge it fully. Either store it on the shelf or on the machine. Leave the cables disconnected if it is stored on the machine. Store the battery in a cool atmosphere to avoid quick deterioration of the charge in the battery. To prevent the battery from freezing, make sure it is fully charged.

Servicing the Fuses

The fuses for the electrical system are located underneath the seat (Figure 45).

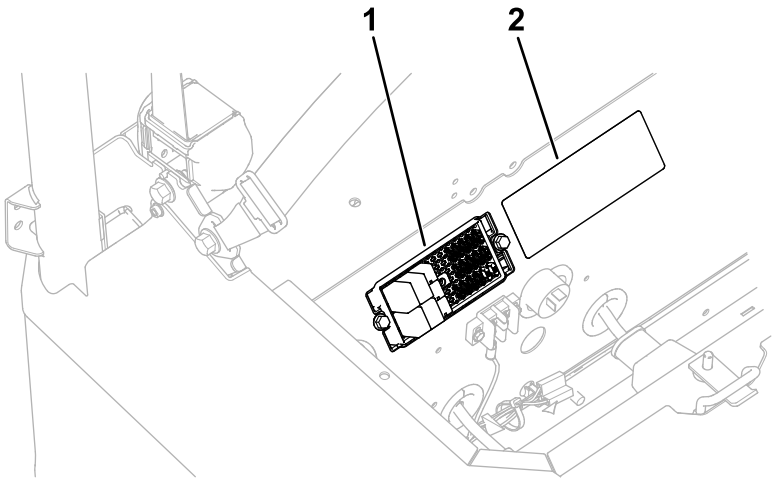

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Figure 45

1. Fuse block
2. Fuse decal

Refer to Figure 46 for the fuse locations.

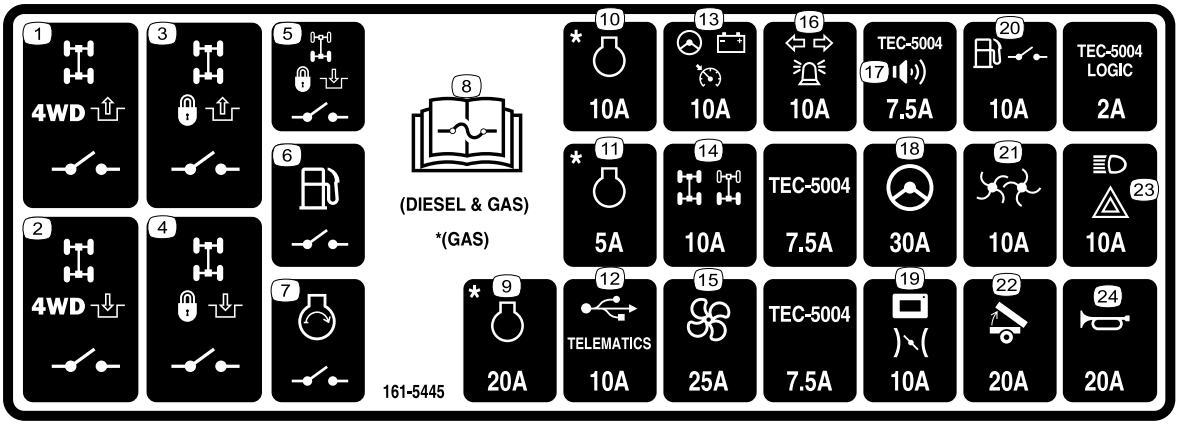

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Figure 46

1. Front differential lock and 4-wheel drive disengage relay
2. Front differential lock and 4-wheel drive engage relay
3. Front differential lock disengage relay
4. Front differential lock engage relay
5. Rear differential lock engage relay
6. Fuel-pump relay
7. Starter relay
8. Read the *Operator's Manual* for fuse information.
9. Engine ignition power
10. Engine—ECM power
11. Engine—vehicle-switch power
12. USB/telematics
13. Alternator, power steering, and speed sensor enable
14. Front and rear differentials
15. Cooling fan
16. Position lights and turn-signal lights
17. Alarm
18. Power steering
19. Display and throttle
20. Fuel-pump relay power
21. Salt spreader
22. Bed lift
23. Headlights and hazard lights
24. Horn

Drive System Maintenance

Maintaining the Tires

Service Interval: Every 100 hours—Check the condition of the wheels and tires.

After the first 50 hours—Torque the wheel-lug nuts.

Every 250 hours—Torque the wheel-lug nuts.

1. Inspect the tires and rims for signs of wear and damage.

   Note: Operating accidents, such as hitting curbs, can damage a tire or rim and also disrupt wheel alignment, so inspect tire condition after an accident.

2. Torque the wheel lug nuts to 108 to 122 N·m (80 to 90 ft-lb).

Checking the Steering and Suspension Components

Service Interval: Every 100 hours—Check the steering and suspension for loose or damaged components.

With the steering wheel at the centered position (Figure 47), turn the steering wheel to the left or right. If you turn the steering wheel more than 13 mm (1/2 inch) to the left or right, and the tires do not turn, check the following steering and suspension components to ensure that they are not loose or damaged:

- Steering shaft to the steering-rack assembly joint

  Important: **Check the condition and security of the pinion-shaft seal (Figure 48).**

- Steering-rack assembly tie rods

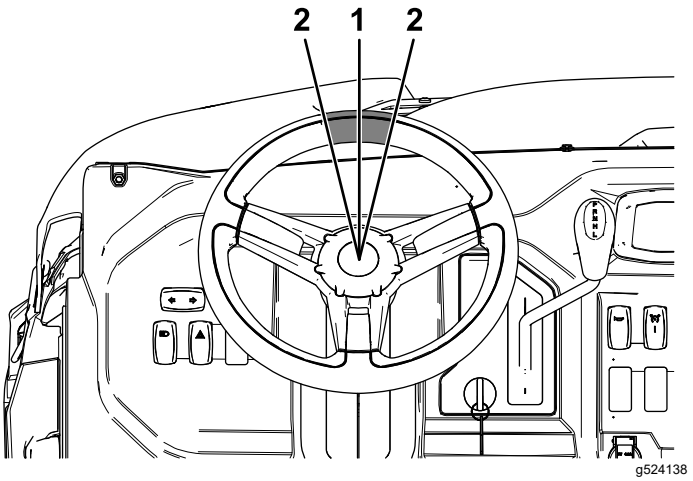

Figure 47

1. Steering wheel at the centered position
2. 13 mm (1/2 inch) from the center of the steering wheel

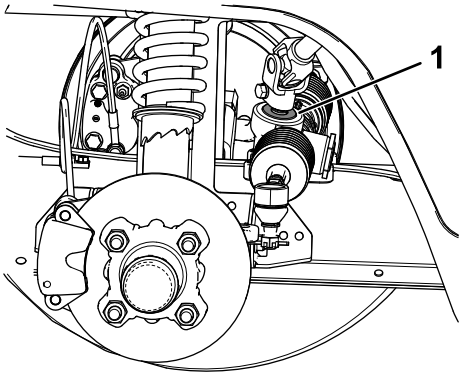

Figure 48

1. Pinion-shaft seal

Checking/Adjusting the Front Wheel Alignment

Service Interval: Every 100 hours/Yearly (whichever comes first)—Check the front wheel alignment.

Checking the Front Wheel Alignment

1. Check the tire pressure to ensure that the front tires are inflated properly; refer to Checking the Tire Pressure (page 20).
2. Either add weight to the driver's seat equal to the average operator who will run the machine, or have an operator sit on the seat. The weight or operator must remain on the seat for the duration of the adjustment procedure.
3. On a level surface, roll the machine straight back 2 to 3 m (6 to 10 ft) and then straight forward to the original starting position. This allows the suspension to settle into the operating position.
4. Ensure that the front tires are facing straight ahead.
5. Measure the distance between both of the front tires at the axle height at both the front and rear of the front tires (Figure 49).

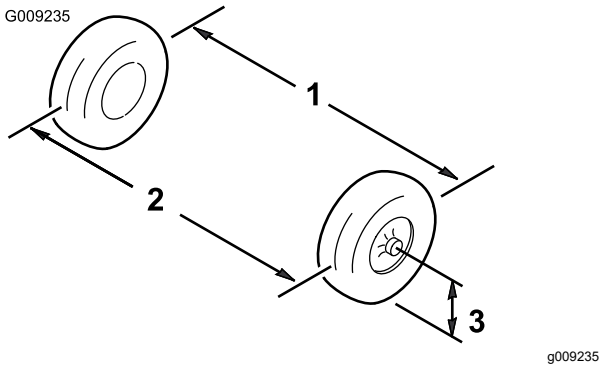

Figure 49

1. Tire center line—back
2. Tire center line—front
3. Axle center line

6. If the measurement is not within +/– 6 mm (+/– 1/4 inch) from neutral (zero), proceed to Adjusting the Front Wheel Alignment (page 50).

Adjusting the Front Wheel Alignment

Important: **Before adjusting the alignment, ensure that the height of the machine is as close to neutral as possible; refer to Adjusting the Front Ride Height (page 51).**

1. Loosen the jam nuts at the outer end of the tie rods (Figure 50).
2. Rotate both tie rods to move the front of the tire inward or outward.
3. Tighten the tie rod jam nuts when the adjustment is correct.
4. Ensure that there is full travel of the steering wheel in both directions.

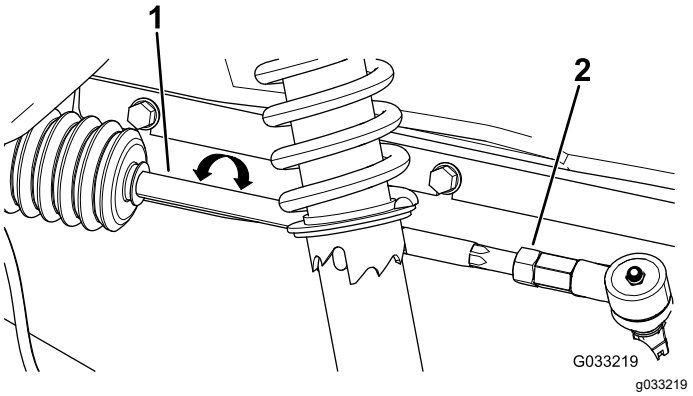

Figure 50

1. Tie rod
2. Jam nut

5. Check the measurement; refer to Checking the Front Wheel Alignment (page 50).

   If the measurement is not within +/– 6 mm (+/– 1/4 inch) from neutral (zero), repeat the steps for adjusting the front wheel alignment.

Adjusting the Front Ride Height

Owner-provided tools: spring-adjuster wrench, Spartan Part 139-4678; refer to your Authorized Service Dealer.

Important: **Make height adjustments only if there is uneven tire wear or if you are adding additional weight to the front of the machine (e.g., adding a BOSS plow).**

1. If you are adding weight to the front of the machine, adjust the ride height.

   Check the tire pressure to ensure that the front tires are inflated properly; refer to Checking the Tire Pressure (page 20).

   The ground clearance should be 23 cm (9 inches) for standard wheels and tires or 25 cm (10 inches) for the larger accessory wheels and tires.

2. If the ground clearance is not correct, use the spring-adjuster wrench to rotate the collar on the shock absorber to align the wheel (Figure 51).

   Note: If the collar is difficult to rotate, raise the front of the machine; Raising the Machine (page 33).

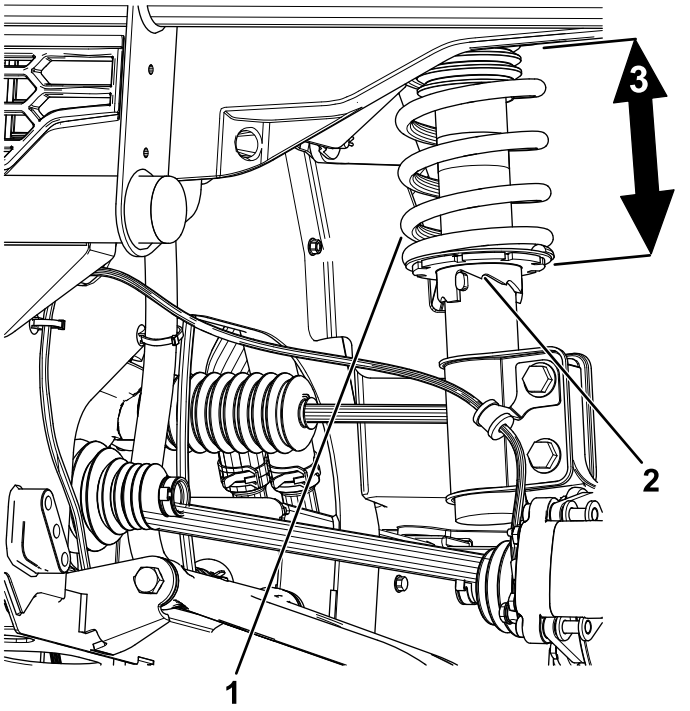

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Figure 51

1. Shock-absorber spring
2. Collar
3. Spring length

Checking the Transaxle-Fluid Level

Service Interval: Every 250 hours

Fluid Type: Spartan Premium Synthetic Transaxle Fluid **(Spartan Part 145-2048)**

1. Park the machine on a level surface.
2. Shift the transmission lever to the P (PARK) position.
3. Shut off the engine and remove the key.
4. Remove the fill plug on the transaxle (Figure 52).

   Note: The fluid level should be even with the bottom of the fill plug.

5. If the fluid level is low, remove the fill plug and add the specified fluid until it runs out of the hole (Figure 52).
6. Replace the fill plug and torque it to 14 to 30 N·m (10 to 22 ft-lb).

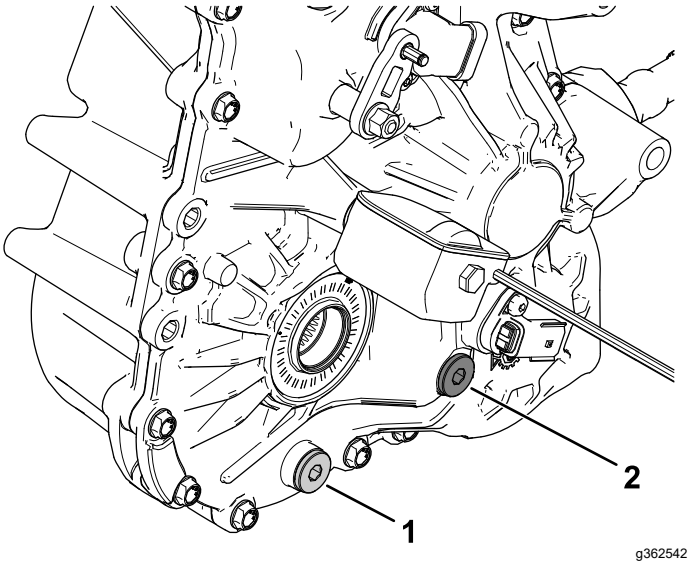

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Figure 52

1. Drain plug
2. Fill plug

Changing the Transaxle Fluid

Service Interval: Every 500 hours

Fluid Type: Spartan Premium Synthetic Transaxle Fluid **(Spartan Part 145-2048)**

Fluid Capacity: 1.21 L (41 fl oz)

1. Align a drain pan under the drain plug (Figure 52).
2. Remove the fill plug (Figure 52).

   Note: Retain the fill plug and seal for installation in step 6.
3. Remove the drain plug, and allow the fluid to drain completely (Figure 52).

   Note: Retain the drain plug for installation in step 4.
4. Install the drain plug and torque it to 14 to 30 N·m (10 to 22 ft-lb).
5. Fill the transaxle with the specified fluid and capacity until it is even with the fill hole.
6. Install the fill plug and torque it to 14 to 30 N·m (10 to 22 ft-lb).

Checking the Front Differential Oil Level

Service Interval: Every 500 hours—Check the front differential oil level.

Fluid Type: 80W-90 Gear Oil

1. Park the machine on a level surface.
2. Shift the transmission lever to the P (PARK) position.
3. Shut off the engine and remove the key.
4. Remove the check plug on the front differential (Figure 53).

   Note: The oil level should be even with the bottom of the check plug.
5. If the oil level is low, you may add the specified oil through the check plug opening (Figure 53).
6. Replace the check plug and torque it to 15 to 25 N·m (11 to 18 ft-lb).

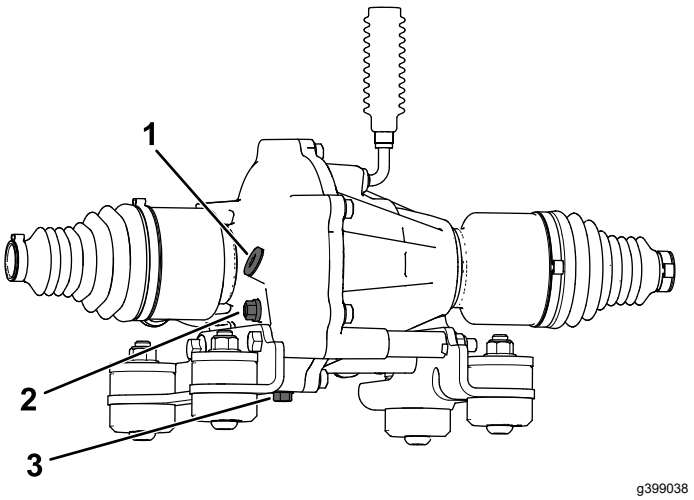

Figure 53

1. Fill plug
2. Check plug
3. Drain plug

Changing the Front Differential Oil

Service Interval: Every 1,000 hours—Change the front differential oil.

Fluid Type: 80W-90 Gear Oil

Fluid Capacity: 0.15 L (5 fl oz)

1. Park the machine on a level surface.
2. Shift the transmission lever to the P (PARK) position.
3. Shut off the engine and remove the key.
4. Align a drain pan under the drain plug (Figure 53).
5. Remove the fill plug (Figure 53).

   Note: Retain the fill plug and seal for installation in step 9.
6. Remove the drain plug and allow the fluid to drain completely (Figure 53).

   Note: Retain the drain plug for installation in step 7.
7. Install the drain plug and torque it to 15 to 25 N·m (11 to 18 ft-lb).
8. Fill the front differential with the specified fluid and capacity.
9. Install the fill plug and torque it to 15 to 25 N·m (11 to 18 ft-lb).
10. Allow the oil to settle for approximately 5 minutes, then check the level; Checking the Front Differential Oil Level (page 52).

Cooling System Maintenance

Checking the Engine-Coolant Level

Service Interval: Before each use or daily—Check the level of the coolant.

Coolant type: 50% ethylene-glycol with organic additive technology (OAT) 50% distiller water

⚠ WARNING

If the engine has been running, the pressurized, hot coolant can escape and cause burns.

- **Do not open the radiator cap when the engine is running.**
- **Use a rag when opening the radiator cap, and open the cap slowly to allow steam to escape.**

1. Park the machine on a level surface.
2. Shift the transmission lever to the P (PARK) position.
3. Shut off the engine and remove the key.
4. Check the coolant level in the coolant tank (Figure 54).

   Note: The fill level depends on the coolant temperature.

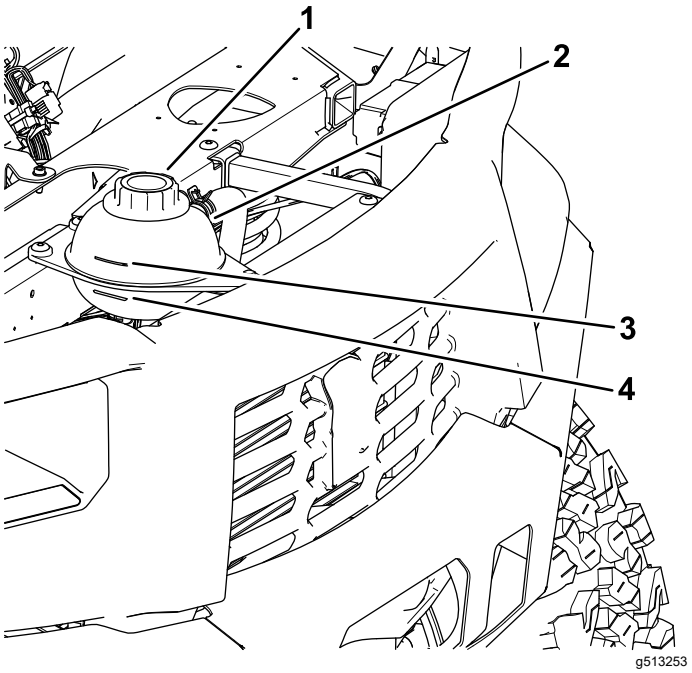

Figure 54

1. Coolant-tank cap
2. Coolant tank
3. Fill level when the coolant is hot
4. Fill level when the coolant is cold

5. If coolant is low, remove the coolant-tank cap and add a 50% ethylene-glycol with organic additive technology (OAT) 50% distiller water antifreeze.

   Do not overfill.

6. Hand-tighten the coolant-tank cap until you hear it click.

Removing Debris from the Cooling System

Service Interval: Before each use or daily—Remove debris from the engine area and radiator as needed.

1. Park the machine on a level surface.
2. Shift the transmission lever to the P (PARK) position.
3. Shut off the engine and remove the key.
4. Clean the engine area thoroughly of all debris.
5. Clean the radiator assembly through the grill using compressed air (Figure 55).

   Note: Blow debris away from the radiator.

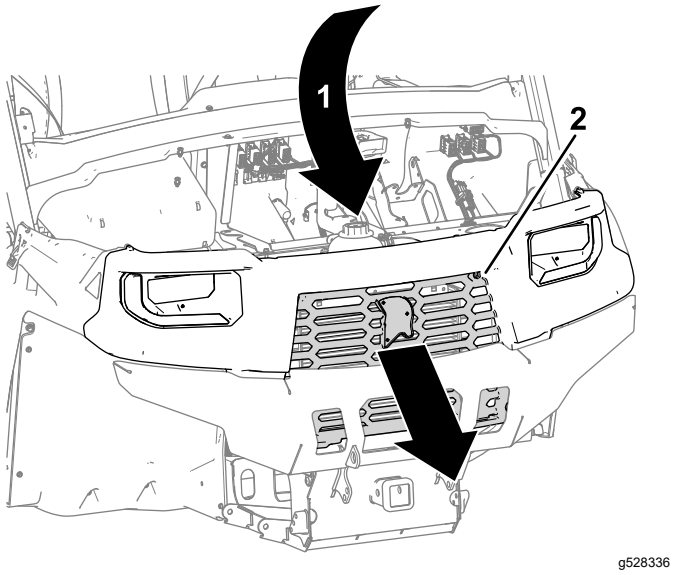

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Figure 55

1. Clean the radiator assembly using compressed air.
2. Grill

Checking the Coolant Hoses

Service Interval: Every 500 hours

Check the coolant hoses for cracks, swelling, or deterioration.

Replace the hoses if there are cracks, swelling, or deterioration.

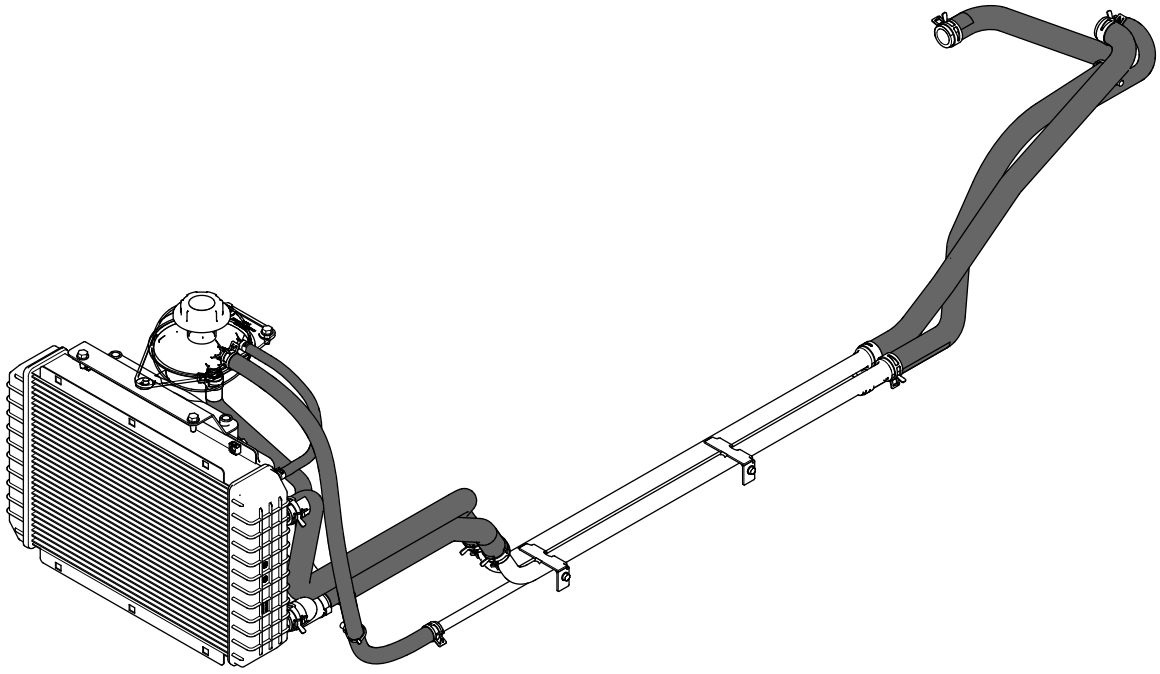

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Figure 56

Changing the Engine Coolant

Service Interval: Every 1,000 hours/Every 5 years (whichever comes first)—Change the engine coolant.

Contact your Authorized Service Dealer.

Brake Maintenance

Checking the Brakes

Service Interval: Every 100 hours

⚠ CAUTION

After operating the machine, the brake components may be hot. Touching hot brake components may burn you.

Before checking the brakes, wait for the brake components to cool down.

Important: **Brakes are a critical safety component of the machine. Closely inspect them at the recommended service interval to ensure optimum performance and safety.**

- Check the brake lining for wear or damage. If the lining (brake pad) thickness is less than 1.6 mm (1/16 inch), replace the brake lining.
- Check the backing plate and other components for signs of excessive wear or deformation. Replace any deformed components.
- Check the brake-fluid level; refer to Checking the Brake-Fluid Level (page 57).

Checking the Brake-Fluid Level

Service Interval: Before each use or daily—Check the brake-fluid level. Check the brake-fluid level before you start the engine.

Brake-fluid type: DOT 3

1. Park the machine on a level surface.
2. Shift the transmission lever to the P (PARK) position.
3. Shut off the engine and remove the key.
4. Raise the hood to access to the master brake cylinder and reservoir (Figure 57).

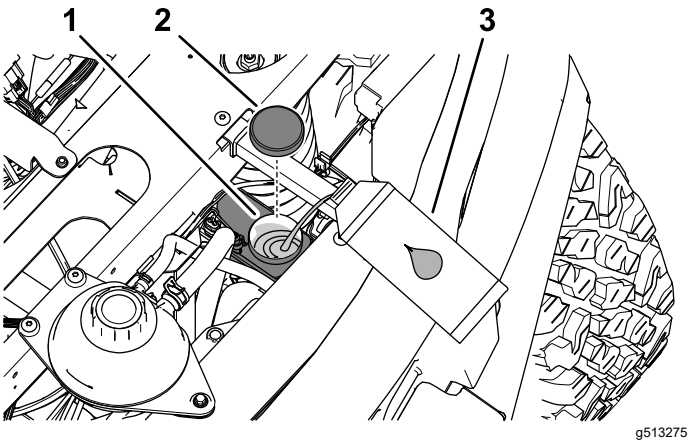

Figure 57

1. Filler neck (reservoir)
2. Reservoir cap
3. DOT 3 brake fluid

5. Look at the outline of the fluid level at the side of the reservoir (Figure 58).

   Note: The level should be above the Minimum line.

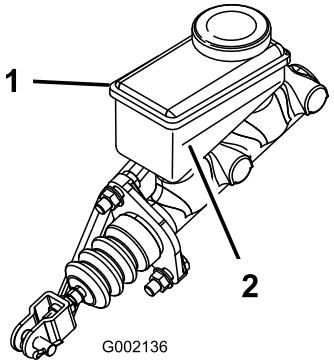

Figure 58

1. Brake-fluid reservoir
2. Minimum line

6. If the fluid level is low, preform the following:
   A. Clean the area around the reservoir cap and remove the cap (Figure 57).
   B. Add DOT 3 brake fluid to the reservoir until the fluid level is above the Minimum line (Figure 58).

      Note: Do not overfill the reservoir with brake fluid.

   C. Install the reservoir cap (Figure 57).
7. Close the hood.

Changing the Brake Fluid

Service Interval: Every 1,000 hours/Every 5 years (whichever comes first)—Change the brake fluid.

Contact your Authorized Service Dealer.

Belt Maintenance

Servicing the Drive Belt

Checking the Drive Belt and Cleaning the Clutches

Service Interval: Every 250 hours

1. Park the machine on a level surface.
2. Shift the transmission lever to the P (PARK) position.
3. Shut off the engine and remove the key.
4. Raise the cargo bed.
5. Unlatch the 6 spring clips securing the belt cover and remove the cover (Figure 59).

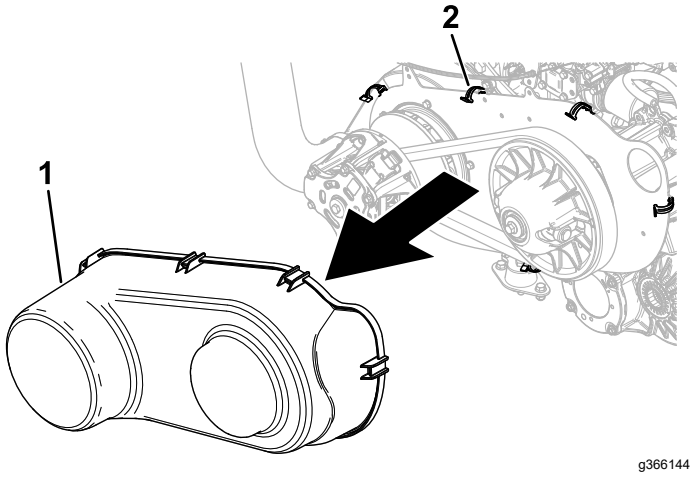

Figure 59

1. Belt cover
2. Spring clip

6. Rotate and inspect the belt (Figure 60) for signs of excessive wear or damage.

   Note: Replace the belt if it is excessively worn or damaged; refer to Replacing the Drive Belt (page 58).

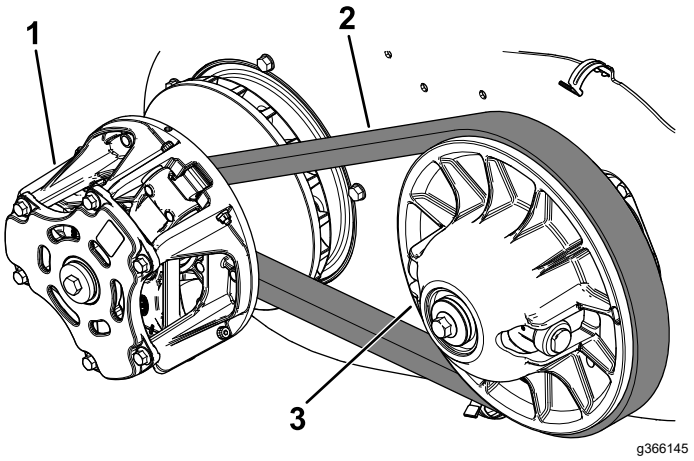

Figure 60

1. Primary clutch
2. Drive belt
3. Secondary clutch

7. Using compressed air, clean the clutches thoroughly of all debris (Figure 60).
8. Install the belt cover (Figure 59).
9. Lower the cargo bed.

Replacing the Drive Belt

Service Interval: Every 500 hours—Replace the drive belt.

1. Park the machine on a level surface.
2. Shift the transmission lever to the P (PARK) position.
3. Shut off the engine and remove the key.
4. Raise the cargo bed.
5. Unlatch the 6 spring clips securing the belt cover and remove the cover (Figure 59).
6. Pull up on the top of the belt to spread out the secondary clutch, then rotate and route the belt over the secondary clutch (Figure 60).
7. Remove the belt from the primary clutch (Figure 60).

   Note: Discard the old belt.
8. Align the new belt over the primary clutch (Figure 60).
9. Rotate and route the belt over the secondary clutch (Figure 60).
10. Install the belt cover (Figure 59).
11. Lower the cargo bed.

Cleaning

⚠ WARNING

Debris can build up near the exhaust, engine manifold, or other areas of the machine, and may cause fire.

Clean the machine after each use.

Washing the Machine

Wash the machine as needed using water alone or with a mild detergent. You may use a rag when washing the machine.

Important: **Do not use brackish or reclaimed water to clean the machine.**

Important: **Do not use power-washing equipment to wash the machine. Power-washing equipment may damage the electrical system, loosen important decals, or wash away necessary grease at friction points. Avoid excessive use of water near the control panel, engine, and battery.**

Important: **Do not wash the machine with the engine running. Washing the machine with the engine running may result in internal engine damage.**

Storage

Storing the Machine

1. Position the machine on a level surface, shift the transmission lever to the P (PARK) position, shut off the engine, and remove the key from the key switch.
2. Clean dirt and grime from the entire machine, including the engine area.

   Important: **You can wash the machine with mild detergent and water. Do not use high-pressure water to wash the machine. Pressure washing the machine may damage the electrical system or wash away necessary grease at friction points. Avoid excessive use of water, especially near the control panel, lights, engine, and battery.**
3. Service the air cleaner; refer to Servicing the Air Cleaner (page 36).
4. Grease the machine; refer to Greasing the Machine (page 35).
5. Change the engine oil and filter; refer to Servicing the Engine Oil (page 37).
6. Check the tire pressure; refer to Checking the Tire Pressure (page 20).
7. For storage over 30 days, prepare the fuel system as follows:

   A. Add a petroleum based stabilizer/conditioner to the fuel in the tank. Do not use an alcohol-based stabilizer (ethanol or methanol).

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

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

   C. Shut off the engine, allow it to cool, and drain the fuel tank.

   D. Start the engine and run it until it stops.

   E. Start and run the engine again until it does not start again.

   F. Dispose of drained fuel properly. Recycle as per local codes.
8. Remove the spark plugs and check their condition; refer to Servicing the Spark Plugs (page 38).
9. With the spark plugs removed from the engine, pour 15 ml (2 tablespoons) of engine oil into the spark-plug hole.
10. Use the starter to crank the engine and distribute the engine oil inside the cylinder.
11. Install the spark plugs and tighten each one to the recommended torque; refer to Servicing the Spark Plugs (page 38).

    Note: Do not install the spark-plug wires on the spark plugs.
12. Check the anti freeze protection and add a 50/50 solution of water and anti freeze as needed for expected minimum temperature in your area.
13. Remove the battery from the chassis, and charge it fully; refer to Removing the Battery (page 46).

    Note: Do not connect the battery cables to the battery posts during storage.

    Important: **The battery must be fully charged to prevent it from freezing and being damaged at temperatures below 0°C (32°F). A fully charged battery maintains its charge for about 50 days at temperatures lower than 4°C (40°F). If the temperatures will be above 4°C (40°F), check the water level in the battery and charge it every 30 days.**
14. Check and tighten all fasteners. Repair or replace any part that is damaged.
15. Paint all scratched or bare metal surfaces with paint available from your Authorized Service Dealer.
16. Store the machine in a clean, dry garage or storage area.
17. Remove the key from the key switch and put it in a safe place that is out of the reach of children.
18. Cover the machine to protect it and keep it clean.

Troubleshooting

Problem	Possible Cause	Corrective Action
The engine does not crank over.	1. Your foot is not on the brake pedal. 2. The battery is dead and/or there is a bad battery connection.	1. Put your foot on the brake pedal. 2. Check the battery connections. If the battery is dead, replace the battery.
The engine cranks, but does not start.	1. The fuel tank is empty. 2. There is dirt, water, or stale fuel in the fuel system. 3. The air cleaner is dirty or plugged. 4. The spark plug(s) are fouled or gapped improperly.	1. Fill the fuel tank. 2. Contact your Authorized Service Dealer or Spartan Customer Service. 3. Clean or replace the air cleaner. 4. Replace the spark plug(s).
The power steering moves hard.	1. There is a blown fuse in the electrical system. 2. The power steering controller is disconnected. 3. The power steering motor and/or controller is bad.	1. Inspect and replace the fuse. 2. Connect the power steering controller. 3. Replace the power steering motor and/or controller; contact your Authorized Service Dealer or Spartan Customer Service.
The throttle is not responding.	1. The transmission lever is in the P (PARK) position, N (NEUTRAL) position, or between gears. 2. The “no seat belt” feature is set to 0 km/h or mph. 3. The gear position sensor is non-functional or damaged.	1. Shift the transmission lever into a drive position. 2. Secure your seat belt. 3. Contact your Authorized Service Dealer or Spartan Customer Service.
The 4-wheel drive/differential locks are not working.	1. There is a blown fuse in the electrical system. 2. The feature was disabled during software setup. 3. The switches and/or differential(s) are unplugged. 4. The actuator/solenoid is bad.	1. Inspect and replace the fuse. 2. Contact your Authorized Service Dealer or Spartan Customer Service. 3. Inspect and reconnect the harness. 4. Contact your Authorized Service Dealer or Spartan Customer Service.
The cruise control feature does not engage.	1. Your seat belt is not secured. 2. You are not traveling at the minimum machine speed.	1. Secure your seat belt. 2. Increase the machine speed to set the cruise control.
The clutch engagement is abrupt.	1. The belt is new. 2. The clutches are dirty.	1. Allow 10 hours of normal operation for the belt break-in period. 2. Clean the clutches.
The acceleration seems too slow when the engine is at maximum speed (rpm).	1. The belt is slipping and/or damaged. 2. The clutches are dirty.	1. Check the belt; replace, if needed. 2. Clean the clutches.
The battery is not charging.	1. The alternator belt is loose, worn, and/or damaged. 2. There is a bad electrical connection to the alternator. 3. The alternator is bad. 4. The battery is dead and/or there is a bad battery connection.	1. Check the tension of the alternator belt. If necessary, adjust the belt tension. If the belt is worn or damaged, replace the belt. 2. Check the harness connection. 3. Contact your Authorized Service Dealer or Spartan Customer Service. 4. Check the battery connections. If the battery is dead, replace the battery.

Problem	Possible Cause	Corrective Action
The alternator belt is making a squealing noise.	1. The alternator belt is loose, worn, and/or damaged.	1. Check the tension of the alternator belt. If necessary, adjust the belt tension. If the belt is worn or damaged, replace the belt.
	2. The engine pulleys and/or bearings may be loose or damaged.	2. If needed, replace the engine pulleys and/or bearings; refer to the *Service Manual* or contact your Authorized Service Dealer or Spartan Customer Service.

Machine Fault Codes

Problem	Possible Cause	Corrective Action
A fault code appears on the display.	1. There is an issue with the machine.	1. Do not operate the machine if a fault code appears; otherwise, serious damage could occur. Contact your Authorized Service Dealer or Spartan Customer Service.

Notes:

Notes:

California Proposition 65 Warning Information

What is this warning?

You may see a product for sale that has a warning label like the following:

WARNING: Cancer and Reproductive Harm—www.p65Warnings.ca.gov.

What is Prop 65?

Prop 65 applies to any company operating in California, selling products in California, or manufacturing products that may be sold in or brought into California. It mandates that the Governor of California maintain and publish a list of chemicals known to cause cancer, birth defects, and/or other reproductive harm. The list, which is updated annually, includes hundreds of chemicals found in many everyday items. The purpose of Prop 65 is to inform the public about exposure to these chemicals.

Prop 65 does not ban the sale of products containing these chemicals but instead requires warnings on any product, product packaging, or literature with the product. Moreover, a Prop 65 warning does not mean that a product is in violation of any product safety standards or requirements. In fact, the California government has clarified that a Prop 65 warning "is not the same as a regulatory decision that a product is 'safe' or 'unsafe.'" Many of these chemicals have been used in everyday products for years without documented harm. For more information, go to https://oag.ca.gov/prop65/faqs-view-all.

A Prop 65 warning means that a company has either (1) evaluated the exposure and has concluded that it exceeds the "no significant risk level"; or (2) has chosen to provide a warning based on its understanding about the presence of a listed chemical without attempting to evaluate the exposure.

Does this law apply everywhere?

Prop 65 warnings are required under California law only. These warnings are seen throughout California in a wide range of settings, including but not limited to restaurants, grocery stores, hotels, schools, and hospitals, and on a wide variety of products. Additionally, some online and mail order retailers provide Prop 65 warnings on their websites or in catalogs.

How do the California warnings compare to federal limits?

Prop 65 standards are often more stringent than federal and international standards. There are various substances that require a Prop 65 warning at levels that are far lower than federal action limits. For example, the Prop 65 standard for warnings for lead is 0.5 µg/day, which is well below the federal and international standards.

Why don't all similar products carry the warning?

- Products sold in California require Prop 65 labelling while similar products sold elsewhere do not.
- A company involved in a Prop 65 lawsuit reaching a settlement may be required to use Prop 65 warnings for its products, but other companies making similar products may have no such requirement.
- The enforcement of Prop 65 is inconsistent.
- Companies may elect not to provide warnings because they conclude that they are not required to do so under Prop 65; a lack of warnings for a product does not mean that the product is free of listed chemicals at similar levels.

Why do we include this warning?

Our company has chosen to provide consumers with as much information as possible so that they can make informed decisions about the products they buy and use. We provide warnings in certain cases based on its knowledge of the presence of one or more listed chemicals without evaluating the level of exposure, as not all the listed chemicals provide exposure limit requirements. While the exposure from our products may be negligible or well within the "no significant risk" range, out of an abundance of caution, we have elected to provide the Prop 65 warnings. Moreover, if we do not provide these warnings, it could be sued by the State of California or by private parties seeking to enforce Prop 65 and subject to substantial penalties.

Evaporative Emission Control Warranty Statement

For the United States and Canada

374-0338

Introduction

The U.S. Environmental Protection Agency (EPA) and Spartan Mowers are pleased to explain the emission control system's warranty on your equipment. Spartan Mowers warrants to the ultimate purchaser and each subsequent purchaser that this off-road utility vehicle engine and equipment, including all parts of its emissioncontrol system was designed, built and equipped so as to conform at the time of sale with 40 CFR Part 1051 and Section 213 of the Clean Air Act and is free from defects in materials and workmanship that would cause the engine to fail to conform with applicable US EPA regulations. Spartan Mowers must warrant the 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 emission control system.

Manufacturer's Warranty Coverage

The emission-related warranty period for vehicles without an odometer is 30 months from when the engine is placed into service. The emission-related warranty period for vehicles with an odometer is 30 months from when the engine is placed into service, 500 hours after the engine and equipment is delivered to the ultimate purchaser, or 5000 kilometers after the engine and equipment is delivered to the ultimate purchaser, whichever comes first.

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 engine and equipment is delivered to an ultimate purchaser. The warranted period is 30 months from when the engine is placed into service. The emission-related warranty period for vehicles with an odometer is 30 months from when the engine is placed into service, 500 hours or 5000 kilometers, whichever comes first.

Subject to certain conditions and exclusions as stated below, the warranty on 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

I. 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:

I. For exhaust emissions, emission-related components include any engine parts related to the following systems:

1. Air Induction System
2. Fuel System
3. Ignition System

II. The following parts are also considered emission-related components for exhaust emissions:

1. Aftertreatment devices

2. Crankcase ventilation valves
3. Sensors
4. Electronic control units

III. The following parts are considered emission-related components for evaporative emissions:

1. Fuel tank
2. Fuel cap
3. Fuel line
4. Fuel line fittings
5. Clamps*
6. Pressure relief valves*
7. Control valves*
8. Control solenoids*
9. Electronic controls*
10. Vacuum control diaphragms*
11. Control cables*
12. Control linkages*
13. Purge valves
14. Vapor hoses
15. Carbon canister
16. Canister mounting brackets

*As related to the evaporative emission control system


SPARTAN®