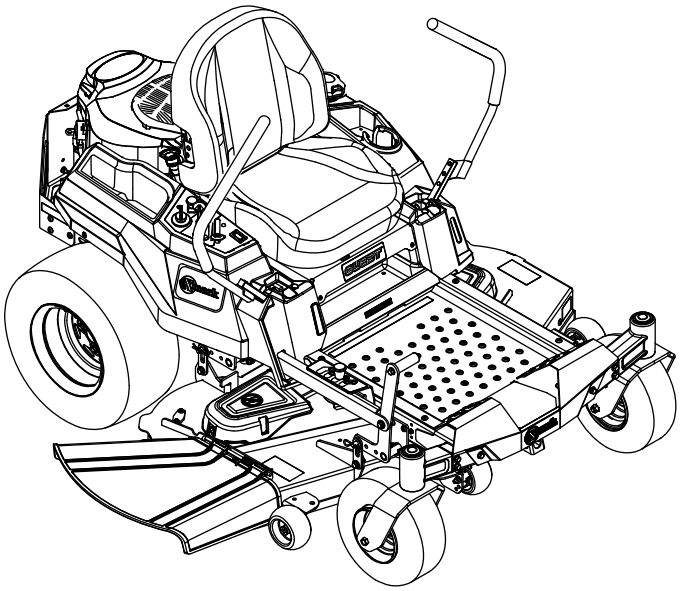
eXmark®



QUEST®

X-, S-, AND E-SERIES

Operator's Manual

For Serial Nos.
417,930,746 & Higher
Part No. 4507-491 Rev. A

⚠ 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.

Use of this product may cause exposure to chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

Important: 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.

To acquire a spark arrester for your unit, see your Engine Service Dealer.

For all models that do not have Exmark engines, please refer to the engine manufacturer's information included with the machine.

For models with Exmark engines, refer to this manual for information.

The gross or net horsepower (or torque) of this engine was laboratory rated by the engine manufacturer in accordance with the Society of Automotive Engineers (SAE) J1940 or J2723. As configured to meet safety, emission, and operating requirements, the actual engine horsepower (or torque) on this class of mower will be significantly lower.

Introduction

CONGRATULATIONS on the purchase of your Exmark Mower. This product has been carefully designed and manufactured to give you a maximum amount of dependability and years of trouble-free operation.

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

This manual contains operating, maintenance, adjustment, and safety instructions for your Exmark mower.

BEFORE OPERATING YOUR MOWER, CAREFULLY READ THIS MANUAL IN ITS ENTIRETY.

By following the operating, maintenance, and safety instructions, you will prolong the life of your mower, maintain its maximum efficiency, and promote safe operation.

To maximize safety, performance, and proper operation of this machine, it is essential that all operators carefully read and fully understand the contents of the Operator's manual provided with the product. Failure to comply with the operating instructions or receive proper training may result in injury. Go to https://www.Exmark.com for additional safe operation information, such as safety tips, training materials, and Operator's manuals.

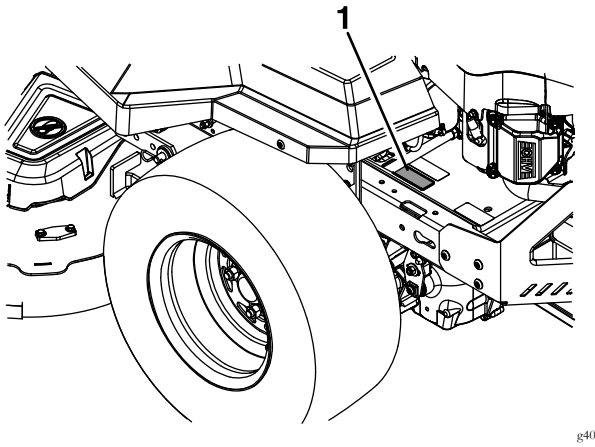
If additional information is needed, or should you require trained mechanic service, contact your authorized Exmark equipment dealer or distributor.

All Exmark equipment dealers and distributors are kept informed of the latest methods of servicing and are equipped to provide prompt and efficient service in the field or at their service stations. They carry ample stock of service parts or can secure them promptly for you from the factory.

All Exmark parts are thoroughly tested and inspected before leaving the factory, however, attention is required on your part if you are to obtain the fullest measure of satisfaction and performance.

Whenever you need service, genuine Exmark parts, or additional information, contact an Authorized Service Dealer or Exmark Customer Service and have the model and serial numbers of your product ready.

Figure 1 identifies the location of the model and serial numbers on the product. Write the numbers in the space provided.



g402818

Figure 1

1. Model and serial number location

Model No. _____

Serial No. _____

For complete warranty details, see https://www.Exmark.com. You may also call us 402-223-6375 to request a written copy of the product's warranty.

Contents

Safety

Safety Alert Symbol

This Safety Alert Symbol (Figure 2) is used both in this manual and on the machine to identify important safety messages which must be followed to avoid accidents.

This symbol means: **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**

g000502

Figure 2
Safety Alert Symbol

The safety alert symbol appears above information which alerts you to unsafe actions or situations and will be 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.

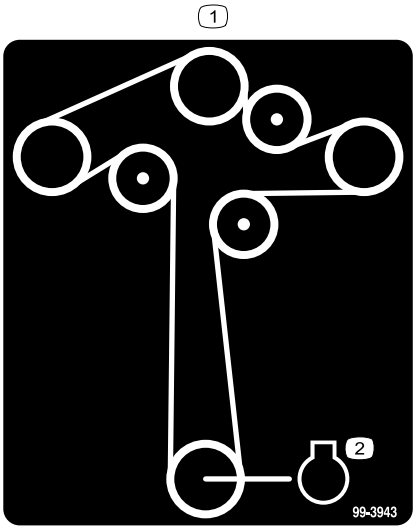
General Safety

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

- Read, understand, and follow all instructions and warnings in the Operator's Manual and on the machine, engine, and attachments. All operators and mechanics should be trained. If the operator(s) or mechanic(s) can not read this manual, it is the owner's responsibility to explain this material to them; other languages may be available on our website.
- Only allow trained, responsible, and physically capable operators that are familiar with the safe operation, operator controls, and safety signs and instructions to operate the machine. Never let children or untrained people operate or service the equipment. Local regulations may restrict the age of the operator.
- Always keep the roll bar in the fully raised and locked position and use the seat belt.
- Do Not operate the machine near drop-offs, ditches, embankments, water, or other hazards, or on slopes greater than 15 degrees.
- Keep bystanders and children out of the operating area.
- Do Not put your hands or feet near moving parts.
- Do Not operate the machine without all safety shields, guards, switches, and other devices in place and in proper working condition.
- Park machine on level ground, disengage drives, set parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position. Allow the machine to cool before servicing, adjusting, fueling, cleaning, or storing.

Safety and Instructional Decals

Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or lost.

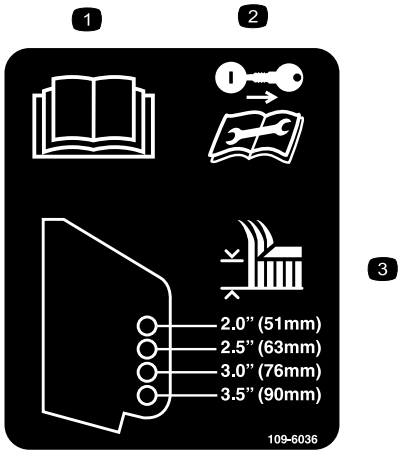


decal99-3943

99-3943

For Models with 50 or 54 Inch Mower Decks

1. Belt routing
2. Engine

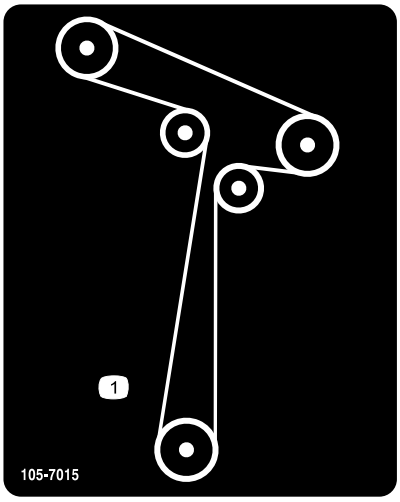


decal109-6036

109-6036

X-Series Models

1. Read the Operator's manual
2. Remove the ignition key and read the instructions before servicing or performing maintenance.
3. Height of cut

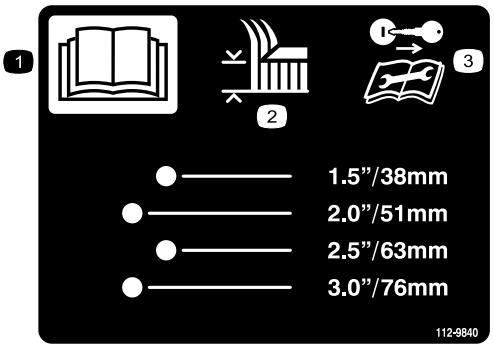


decal105-7015

105-7015

42 Inch Models

1. Belt routing



decal112-9840

112-9840

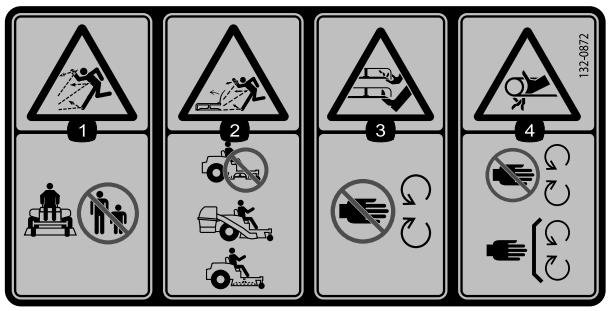
50 and 54 Inch Models

1. Read the *Operator's Manual*.
2. Height of cut
3. Remove the ignition key and read the instructions before servicing or performing maintenance.

decal130-0731

130-0731

1. Warning—thrown object hazard; keep the deflector shield in place.
2. Cutting hazard of hand or foot, mower blade—keep away from moving parts.



decal132-0872

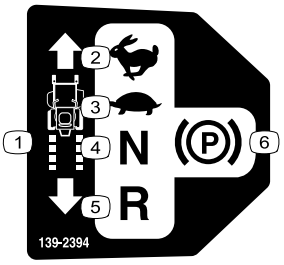
132-0872

1. Thrown object hazard—keep bystanders away.
2. Thrown objects hazard, mower—do not operate without the deflector, discharge cover or grass collection system in place.
3. Cutting/dismemberment of hand or foot—stay away from moving parts.
4. Pinch hazard—stay away from moving parts, keep shields in place.

decal139-2392

139-2392

For E-Series Models

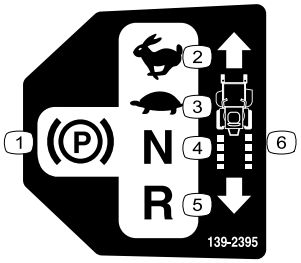


decal139-2394

139-2394

E- and S-Series Models

1. Traction controls
2. Fast
3. Slow
4. Neutral
5. Reverse
6. Parking brake

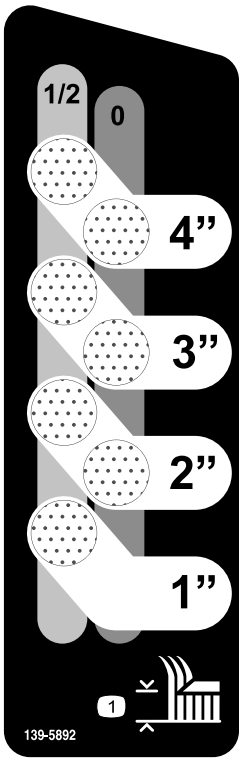


decal139-2395

139-2395

E- and S-Series Models

1. Parking brake
2. Fast
3. Slow
4. Neutral
5. Reverse
6. Traction controls

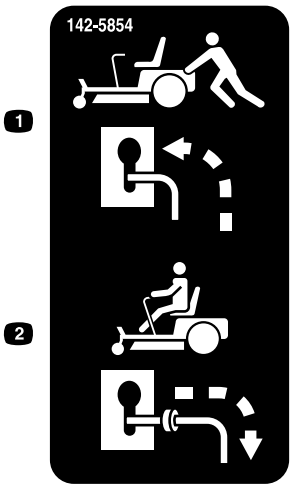


decal139-5892

139-5892

For All Models Except E-Series

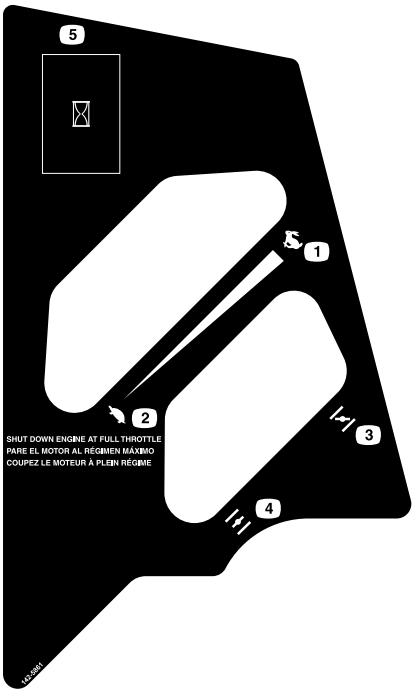
1. Height of cut



decal142-5854

142-5854

1. Bypass lever position for pushing the machine
2. Bypass lever position for operating the machine

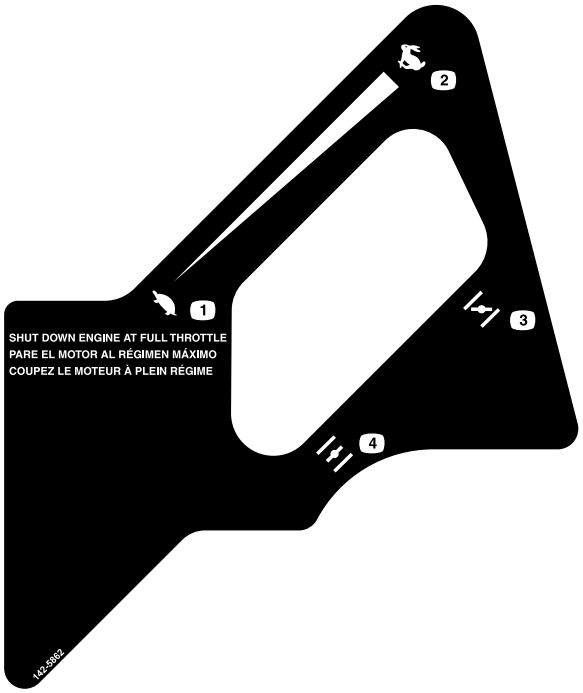


decal142-5861

142-5861

Models without Hour Meter

1. Fast
2. Slow
3. Choke–On
4. Choke–Off
5. Optional hour meter accessory



decal142-5862

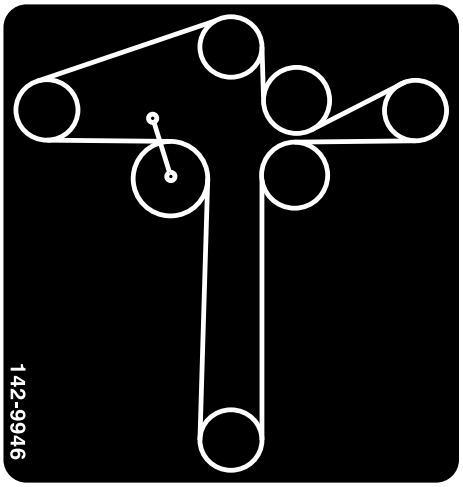
142-5862

Models with Hour Meter

1. Fast
2. Slow
3. Choke–On
4. Choke–Off

decal142-5864

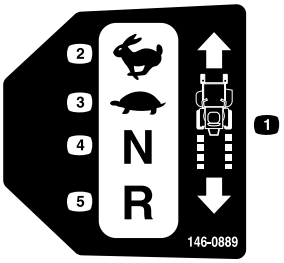
142-5864



decal142-9946

142-9946

X-Series Models

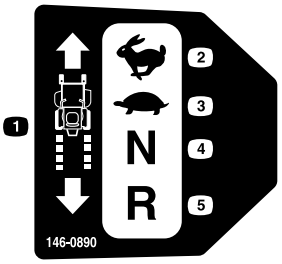


decal146-0889

146-0889

X-Series Models

1. Traction controls
2. Fast
3. Slow
4. Neutral
5. Reverse

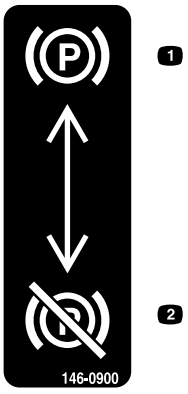


decal146-0890

146-0890

X-Series Models

1. Traction controls
2. Fast
3. Slow
4. Neutral
5. Reverse

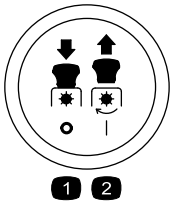


decal146-0900

146-0900

X-Series Models

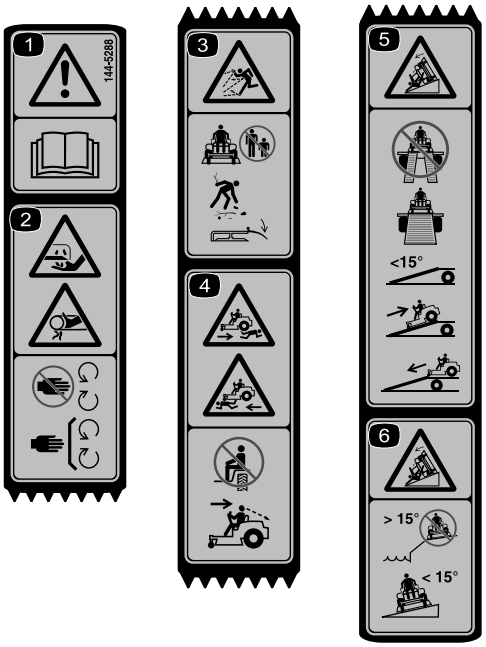
1. Parking brake-engaged
2. Parking brake-disengaged



decalptosymbols

PTO Switch Symbols

1. PTO–disengage
2. PTO–engage



decal144-5288

144-5288

This machine complies with the industry standard stability test in the static lateral and longitudinal tests with the maximum recommended slope indicated on the decal. It is important that each operator review the slope operation instructions in the operator's manual and review the conditions in which the machine is being operated to determine if the machine may be operated in the conditions that day and on that site. Changes to terrain can result in a change in slope operation for any machine.

1. Warning—Read the Operator's Manual.
2. Cutting/dismemberment hazard of the fingers or hand—keep hands and feet away from moving parts; keep all guards and shields in place.
3. Thrown object hazard—Keep bystanders away, pick up debris before operating, and keep the deflector shield down.
4. Runover/backover hazard—Do Not carry passengers; look behind and down when mowing in reverse.
5. Ramp hazard—when loading onto a trailer, do not use dual ramps; only use a singular ramp wide enough for the machine and that has an incline less than 15 degrees; back up the ramp (in reverse) and drive forward off the ramp.
6. Tipping hazard on slopes—Do Not use on slopes near open water; Do Not use on slopes greater than 15 degrees.

decalbatterysymbols

Battery Symbols

Some or all of these symbols are on your battery.

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

Specifications

Systems

Engine

- Engine Specifications: See your Engine Owner's Manual
- Engine Oil Type: Exmark 4-Cycle Premium Engine Oil
- RPM:
  - **All Models Except X-Series:**

    Full Speed: 3300 ±100 (max) RPM (No Load)
    Idle: 1650 (min) RPM
  - **X-Series Models:**

    Full Speed: 3600 ±75 (max) RPM (No Load)
    Idle: 1650 (min) RPM

Fuel System

- Capacity: 3.0 gal. (11 L)
- Fuel Recommendations:
  - For best results, use only clean, fresh, unleaded gasoline with an octane rating of 87 or higher ((R+M)/2 rating method).
  - Oxygenated fuel with up to 10% ethanol or 15% MTBE by volume is acceptable.
  - **Do Not** use ethanol blends of gasoline (such as E15 or E85) with more than 10% ethanol by volume. Performance problems and/or engine damage may result which may not be covered under warranty.
  - **Do Not** use gasoline containing methanol.
  - **Do Not** store fuel either in the fuel tank or fuel containers over the winter unless a fuel stabilizer is used.
  - **Do Not** add oil to gasoline.
- Fuel Filter: In-line

Electrical System

- Charging System: Flywheel Alternator
- Charging Capacity: 12 amps
- Battery Type: 230 CCA
- Battery Voltage: 12 Volt
- Polarity: Negative Ground
- Fuses: One 25 amp, one 15 amp; blade type

Safety Interlock System

- PTO must be disengaged and the parking brake engaged to start engine. (It is not necessary for the operator to be in the seat to start the engine.)
- Operator must be in seat when PTO is engaged or engine will stop.

Operator Controls

- Steering and Motion Control:

  Note: Motion control levers are adjustable to two heights.
  - Separate levers, on each side of the console, control speed and direction of travel of the respective drive wheels.
  - Steering is controlled by varying the position of the levers relative to each other.
  - Moving motion control levers outward into the T-slots:
    - ◊ engages the parking brake on the drive wheels (E- and S-Series Models)
    - ◊ locks the drive system in neutral (X-Series Models)
- PTO Engagement Switch: Engages electric clutch (to drive belt) which engages mower blades.
- Parking Brake Lever (X-Series Models): Engages/Disengages parking brake.
- Deck Height Adjustment Lever: Sets cutting height to desired position.
- Deck Lift Assist Lever: Foot pedal that assists in raising the deck.

Seat

- Type:
  - **E-Series Models:**Two tone upholstered high back, foam padded with spring suspension.
  - **S- and X-Series Models:** Two tone upholstered high back, foam padded seat with spring suspension.
- Mounting: Hinged to tilt up for access to battery and other components. Adjustable fore and aft.
- Armrests: Molded flip-up armrests.
  - **S-Series Models:** Optional
  - **X-Series Models:** Standard
- Seat Safety Switch: Incorporated into the Safety Interlock System.

Hydrostatic Ground Drive System

- Hydrostatic Pumps:
  - **42 and 50 inch E-Series Model:** Two Hydro Gear ZT2100 Integrated drive systems.
  - **54 inch S-Series Model:** Two Hydro Gear ZT2200 Integrated drive systems.
  - **48 inch X-Series Model:** Two Hydro Gear ZT2800 Integrated drive systems.
- Hydraulic Oil Type: Exmark Premium Hydro Oil.
- Hydraulic Oil Capacity–ZT 2800: 56.6 oz (1.7 L) per side
- Hydraulic Filter–ZT 2800: 109-3321
- Speeds:
  - **E- and S-Series Models:**

    0-7.0 mph (11.3 km/hr) forward.

    0-5.0 mph (8.0 km/hr) reverse.
  - **X-Series Models:**

    0-8.0 mph (12.9 km/hr) forward.

    0-5.0 mph (8.0 km/hr) reverse.
- Drive wheel releases, located on left and right sides of engine deck, allow machine to be moved when the engine is not running and brake is off.

Tires and Wheels

	Drive	
	Pneumatic (Air-Filled)	
Deck Size	42	48
Quantity	2	2
Tread	Turf	K3012
Size	18 x 7.50-8	22 x 11-10
Ply Rating	2	4
Pressure	13 psi (90 kPa)	13 psi (90 kPa)

	Drive	
	Pneumatic (Air-Filled)	
Deck Size	50	54
Quantity	2	2
Tread	K500	Turf
Size	18 x 9.5-8	20 x 10-10

	Drive	
Ply Rating	4	2
Pressure	13 psi (90 kPa)	13 psi (90 kPa)

	Front Caster	
	Pneumatic (Air-Filled)	
Deck Size	42	48
Quantity	2	2
Tread	Smooth	Smooth
Size	11 x 4-5	13 x 6.5-6
Ply Rating	2	4
Pressure	13 psi (90 kPa)	13 psi (90 kPa)

	Front Caster	
	Pneumatic (Air-Filled)	
Deck Size	50	54
Quantity	2	2
Tread	Smooth	Smooth
Size	11 x 6.0-5	13 x 6.5-6
Ply Rating	2	4
Pressure	13 psi (90 kPa)	13 psi (90 kPa)

Cutting Deck

- Cutting Width:
  - 42 inch Deck: 42 inches (107 cm)
  - 48 inch Deck: 48 inches (122 cm)
  - 50 inch Deck: 50 inches (127 cm)
  - 54 inch Deck: 54 inches (138 cm)
- Discharge: Side
- Blade Size:
  - 42 inch Deck: 21.60 inches (54.9 cm)–Qty: 2
  - 48 inch Deck: 16.25 inches (41.3 cm)–Qty: 3
  - 50 inch Deck: 17.50 inches (44.5 cm)–Qty: 3
  - 54 inch Deck: 18.75 inches (47.6 cm)–Qty: 3
- Blade Spindles: Solid steel spindles with no maintenance bearings.
- Deck Drive: Electric clutch mounted on vertical engine shaft. Blades are driven by one belt (w/self-tensioning idler) direct from the engine.

- Deck: Full floating deck is attached to out-front support frame. Maximum turf protection is provided with anti-scalp rollers.

  Deck design allows for bagging, mulching or side discharge.
- Deck Depth:
  - 42 inch Deck: 4.0 inches (10.2 cm)
  - 48 inch Deck: 5.0 inches (12.7 cm)
  - 50 inch Deck: 4.0 inches (10.2 cm)
  - 54 inch Deck: 4.0 inches (10.2 cm)
- Cutting Height Adjustment: Cutting height can be adjusted from 1 1/2 inch (3.8 cm) to 4 1/2 inches (11.4 cm) in 1/2 inch (1.3 cm) increments.
  - 42 Inch Models: Hand deck lift lever only
  - 48 Inch Model: Foot pedal only
  - 54 Inch Model: Foot pedal only
  - 50 Inch Model: Hand deck lift lever with foot pedal assist
- Mulching Kit: Optional.

Dimensions

Overall Width:

E-Series

	42 inch Deck	50 inch Deck
Without Deck	40.4 inches (103 cm)	43.1 inches (110 cm)
Deflector Up	45.8 inches (116 cm)	50.9 inches (130 cm)
Deflector Down	53.8 inches (137 cm)	61.7 inches (157 cm)

S-Series

	54 inch Deck
Without Deck	47.2 inches (120 cm)
Deflector Up	54.7 inches (139 cm)
Deflector Down	65.2 inches (166 cm)

X-Series

	48 inch Deck
Without Deck	48.0 inches (122 cm)
Deflector Up	52.3 inches (133 cm)
Deflector Down	59.5 inches (151 cm)

Overall Length:

42 inch Deck	48 inch Deck	50 inch Deck	54 inch Deck
75.0 inches (191 cm)	76.0 inches (193 cm)	75.0 inches (191 cm)	76.0 inches (193 cm)

Overall Height:

42 and 50 inch Deck	54 inch Deck
45.6 inches (116 cm)	46.6 inches (119 cm)

48 inch Deck
47.6 inches (121 cm)

Tread Width: (Center to Center of Tires, Widthwise)

	42 inch Deck	48 inch Deck
Drive Wheels	33.0 inches (84 cm)	37.3 inches (95 cm)
Caster Wheels	30.5 inches (78 cm)	35.8 inches (91 cm)

	50 inch Deck	54 inch Deck
Drive Wheels	34.8 inches (88 cm)	36.9 inches (94 cm)
Caster Wheels	30.5 inches (78 cm)	35.8 inches (91 cm)

Wheel Base: (Center of Caster Tire to Center of Drive Tire)

42 and 50 inch Decks	45.6 inches (116 cm)
54 inch Deck	45.4 inches (115 cm)

48 inch Decks	45.4 inches (115 cm)

Curb Weight:

E-Series

42 inch Deck	50 inch Deck
515 lb (233 kg)	576 lb (261 kg)

S-Series

54 inch Deck
616 lb (279 kg)

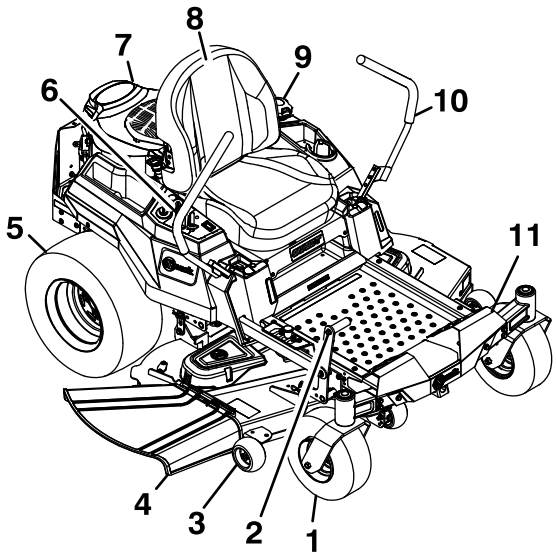
X-Series

48 inch Deck
680 lb (308 kg)

Torque Requirements

Bolt Location	Torque
Spindle Pulley Nut E- and S-Series	35-65 ft-lb (47-88 N-m)
Spindle Pulley Nut X-Series	75-85 ft-lb (102-115 N-m)
Blade Mounting Bolt E- and S-Series	60-80 ft-lb (81-108 N-m)
Blade Mounting Bolt X-Series	50-60 ft-lb (68-81 N-m)
Engine Mounting Bolts	400-500 in-lb (45-56 N-m)
Wheel Lug Nuts	70-90 ft-lb (95-122 N-m)
Clutch Mounting Bolt (secured with threadlocker)	50-60 ft-lb (68-81 N-m)

Product Overview



g454384

Figure 3

1. Front caster wheel
2. Deck height adjustment foot pedal
3. Anti-scalp roller
4. Discharge deflector
5. Rear drive wheel
6. Control panel
7. Engine
8. Seat
9. Fuel tank
10. Motion control levers
11. Footrest

Operation

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

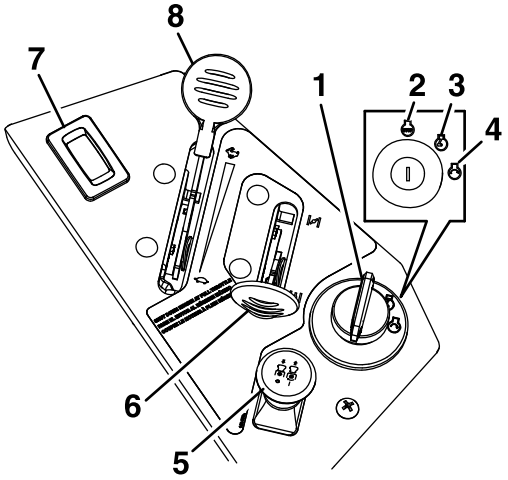
Controls

Become familiar with all the controls before starting the engine and operating the machine.

Ignition Switch

Located on control panel.

The ignition switch is used to start and stop the engine. The switch has three positions "OFF", "RUN" and "START" (Figure 4). Insert key into switch and rotate clockwise to the "ON" position. Rotate clockwise to the next position to engage the starter (key must be held against spring pressure in this position).



g333787

Figure 4

1. Ignition switch
2. Off
3. Run
4. Start
5. Blade control switch (Power Take-Off)
6. Choke control
7. Hour meter (if equipped)
8. Throttle lever

Note: Brake must be engaged and PTO switch "OFF" to start engine. (It is not necessary for the operator to be in the seat to start the engine.)

Turning the key to the "OFF" position will stop the engine; however, always remove the key when leaving

the machine to prevent someone from accidentally starting the engine.

Blade Control Switch (Power Take-Off)

Located on control panel.

The blade control switch, represented by a power take-off (PTO) symbol, engages and disengages power to the mower blades (see Figure 4).

Pull up on the blade control switch to "ON" to engage the blades.

Push down on the blade control switch to "OFF" to disengage the blades.

Throttle Lever

Located on control panel.

The throttle is used to control engine speed. Moving throttle lever forward will increase engine speed and moving throttle lever to the rear will decrease engine speed. Moving the throttle forward until it stops is full throttle.

Choke Control

The choke is used to aid in starting a cold engine. Do Not run a warm engine with the choke in the "ON" position. Moving the choke lever forward will put the choke in the "ON" position and moving the choke lever to the rear will put the choke in the "OFF" position.

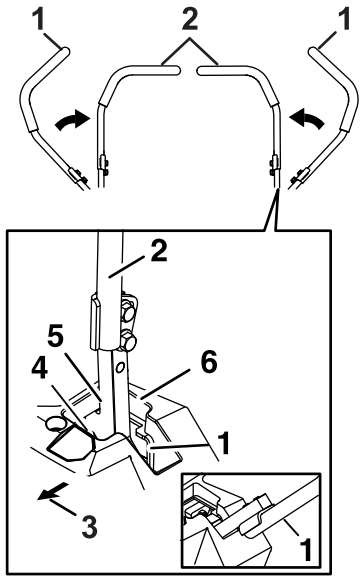
Motion Control Levers

The motion control levers located on each side of the seat (Figure 5).

The motion control levers are speed sensitive controls of independent wheel motors. Moving a lever forward or backward turns the wheel on the same side forward or in reverse; wheel speed is proportional to the amount the lever is moved.

Moving the control levers outward from the center into the T-slots:

- engages the parking brake on the drive wheels for E- and S-Series Models.
- locks them in the neutral position for X-Series Models.



g333788

Figure 5

1. Motion control levers–outward position:
   E and S-Series–Parking brake
   X-Series–Neutral lock position
2. Motion control levers–inward/center position:
   Neutral operate position
3. Front of machine
4. Forward
5. Neutral (operate)
6. Reverse

Park Brake

For E- and S-Series Models, moving the control levers outward from the center into the T-slots engages an electric parking brake on the drive wheels.

For X-Series Models, the brake lever is located on the right side of the machine, just to the front of the RH motion control lever. The brake lever engages a parking brake on the drive wheels.

- Pull the lever up and rearward to engage the brake.
- Push the lever forward and down to disengage the brake.

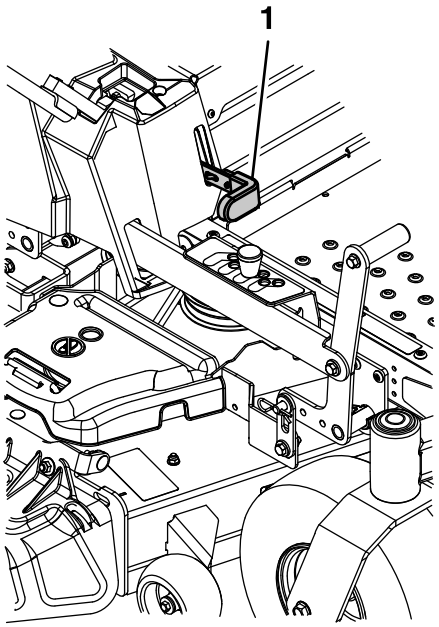


Figure 6
X-Series Models

1. Park brake

The machine must be tied down and brake engaged when transporting.

Deck Height Adjustment Hand Lever—For 42 Inch E-Series Models

Note: 50 inch models have both deck height adjustments: hand lever and foot assist pedal.

Located below the RH motion control lever.

Pull the lever inward and rearward to raise the cutting deck. Allow the handle to move forward to lower the cutting deck. Move the deck height adjustment lever outward at the desired height of cut. Only adjust the height of cut while the machine is not moving.

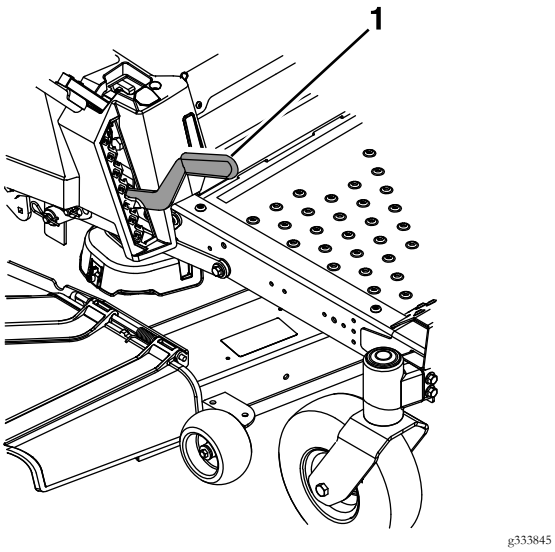


Figure 7

1. Deck height adjustment hand lever

Deck Height Adjustment Foot Pedal—For 48, 50, and 54 Inch Models

Note: 50 inch models have both deck height adjustments: hand lever and foot assist pedal.

Locate at the right front corner of the floor pan (reference Figure 6).

The deck height adjustment foot pedal allows the operator to use their leg to assist in lowering and raising the deck from the seated position. Push the pedal forward with your foot to raise the cutting deck. Allow the pedal to move rearward to lower the cutting deck to the cut height that has been set.

Fuel Window

Located on the left side of the machine (see Figure 8).

The fuel window can be used to determine the amount of fuel in the tank.

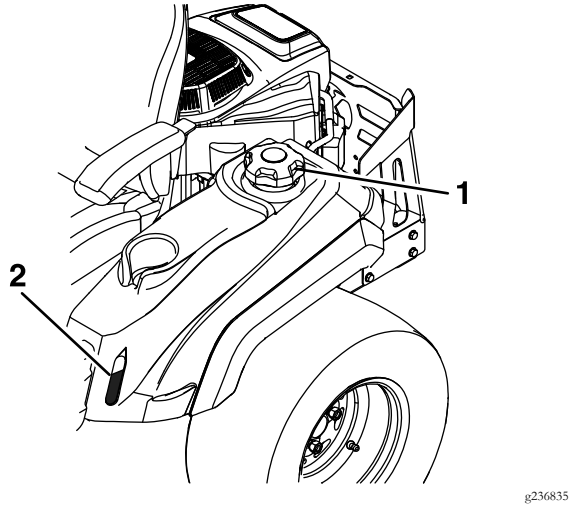


Figure 8

1. Fuel cap
2. Fuel window

Hour Meter
X- and S-Series Models Only

Located on control panel.

The hour meter records the number of hours when the operator is in the seat and the ignition switch is in the "ON" position.

Before Operation

Before Operation Safety

- Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job. Only use accessories and attachments approved by Exmark.
- Inspect the area where the machine is to be used and remove all rocks, toys, sticks, wires, bones, and other foreign objects. These can be thrown or interfere with the operation of the machine and may cause personal injury to the operator or bystanders.
- This mower was designed for one operator only. Do not carry passengers.
- Wear appropriate personal protective equipment such as safety glasses, long pants, substantial slip-resistant footwear, and hearing protection. Tie back long hair and avoid loose clothing and loose jewelry which may get tangled in moving parts.
- This machine produces sound levels in excess of 85 dBA at the operator's ear and can cause hearing loss through extended periods of exposure. Wear hearing protection when operating this machine.
- Check that the following items are in place and in proper working condition: the operator presence controls, safety switches, guards, shields, discharge deflector and/or the entire grass catcher system. Do not operate the machine unless they are in proper working condition. Replace worn or deteriorated parts with genuine Exmark parts when necessary.

⚠ DANGER

It is essential that operator safety mechanisms be connected and in proper operating condition prior to use. Contacting the blade will result in serious personal injury.

Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position. When the key is turned to the "OFF" position, the engine should shut off and the blade should stop. If not, stop using the machine immediately and contact an Authorized Service Dealer.

- Do Not operate the mower when people, especially children, or pets are in the area. Shut off the machine and attachment(s) if anyone enters the area.
- Do Not operate the machine without the entire grass collection system, discharge deflector, or other safety devices in place and in proper working condition. Grass catcher components are subject to wear, damage and deterioration, which could expose moving parts or allow objects to be thrown. Frequently check for worn or deteriorating components and replace them with the manufacturer's recommended parts when necessary.

Fuel Safety

⚠ DANGER

Gasoline is extremely flammable and vapors are explosive.

A fire or explosion from gasoline can burn you, others, and cause property damage.

- **Fill the fuel tank outdoors on level ground, in an open area, when the engine is cold. If fuel is spilled, Do Not attempt to start the engine. Move away from the area of the spill and avoid creating any source of ignition until fuel vapors have dissipated.**
- **Do Not refill the fuel tank or drain the machine indoors or inside an enclosed trailer.**
- **Never smoke when handling gasoline, and stay away from an open flame or where gasoline fumes may be ignited by spark.**
- **Add fuel before starting the engine. Never remove the cap of the fuel tank or add fuel when engine is running or when the engine is hot.**
- **Store gasoline in an approved container and keep it out of the reach of children.**
- **Do Not operate without entire exhaust system in place and in proper working condition.**

- In certain conditions during fueling, static electricity can be released causing a spark which can ignite gasoline vapors.
  - Do Not fill containers inside a vehicle or on a truck or trailer bed with a plastic liner. Always place containers on the ground and away from your vehicle before filling.
  - When practical, remove gas-powered equipment from the truck or trailer and refuel the equipment with its wheels on the ground. If this is not possible, then refuel such equipment on a truck or trailer from a portable container, rather than from a gasoline dispenser nozzle.
  - If a gasoline dispenser nozzle is used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do Not use a nozzle lock open device.
- Do Not overfill the fuel tank. Fill the fuel tank to the bottom of the filler neck. The empty space in the tank allows gasoline to expand. Overfilling may result in fuel leakage or damage to the engine or emission system.
- Gasoline is harmful or fatal if swallowed. Long-term exposure to vapors may cause serious injury and illness.
  - Avoid prolonged breathing of vapors.
  - Keep face away from nozzle and gas tank/container opening.
  - Keep away from eyes and skin.
- To help prevent fires:
  - Keep engine and engine area free from accumulation of grass, leaves, excessive grease or oil, and other debris which can accumulate in these areas.
  - Clean up oil and fuel spills and remove fuel soaked debris.
  - Allow the machine to cool before storing the machine in any enclosure. Do Not store the machine or fuel container, or refuel, where there is an open flame, spark, or pilot light such as on a water heater or other appliance.

Filling the Fuel Tank

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

- Keeps gasoline fresh during storage of 30 days or less. For longer storage it is recommended that the fuel tank be drained.
- Cleans the engine while it runs.
- Eliminates gum-like varnish buildup in the fuel system, which causes hard starting Add the correct amount of gas stabilizer/conditioner to the gas.

  Note: A fuel stabilizer/conditioner is most effective when mixed with fresh gasoline. To minimize the chance of varnish deposits in the fuel system, use fuel stabilizer at all times.

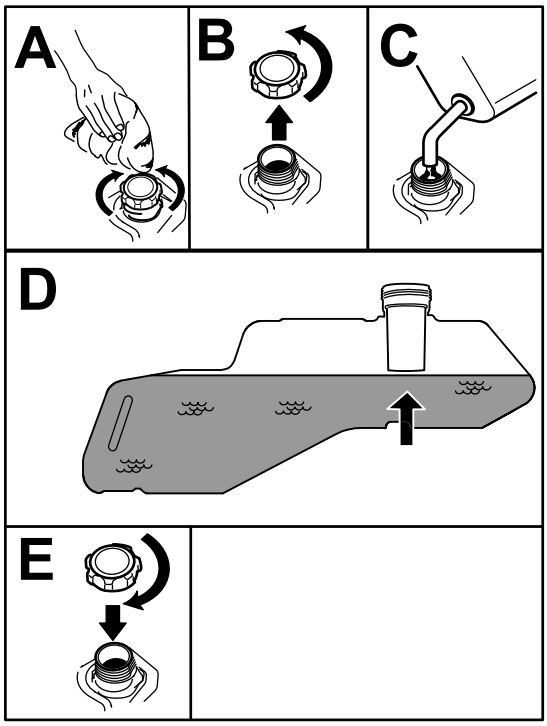
Make sure the engine is shut off and the parking brake is engaged. Tank maximum capacity is 3 gallons (11 L).

Note: Use the fuel window to verify the presence of gasoline before filling the tank.

Important: Do Not overfill fuel tank. Fill the fuel tank to the bottom of the filler neck. The

empty space in the tank allows the fuel to expand. Overfilling may result in fuel leakage or damage to the engine or emission system.

1. Shut the engine off and engage the parking brake.
2. Clean around the fuel tank cap and remove the cap.



g237149

Figure 9

3. Add unleaded regular gasoline until the fuel reaches the base of the filler neck and does not fill the neck of the tank. This space at the base of the filler neck allows gasoline to expand. Do Not fill the fuel tank completely full. Overfilling may result in fuel leakage or damage to the engine or emissions system.
4. Install the fuel tank cap securely and tighten until it "clicks". Wipe up any gasoline that may have spilled.

Operating Instructions

During Operation Safety

General Safety

The operator must use their full attention when operating the machine. **Do Not** engage in any activity that causes distractions; otherwise, injury or property damage may occur.

⚠ WARNING

Operating engine parts, especially the muffler, become extremely hot. Severe burns can occur on contact and debris, such as leaves, grass, brush, etc. can catch fire.

Clean the machine as stated in the Maintenance section. Keep engine and engine area free from accumulation of grass, leaves, excessive grease or oil, and other debris which can accumulate in these areas.

- Operate the engine only in well-ventilated areas. Exhaust gases contain carbon monoxide, which is an odorless deadly poison.
- Do Not operate the machine while ill, tired, or under the influence of alcohol or drugs.
- Operate the machine only in good visibility and appropriate weather conditions. Do Not operate the machine when there is the risk of lightning.
- Keep away from holes, ruts, bumps, rocks, and other hidden hazards. Use care when approaching blind corners, shrubs, trees, tall grass or other objects that may hide obstacles or obscure vision. Uneven terrain could overturn the machine.
- Start the engine with your feet well away from the blades.
- Do Not operate the machine without all safety shields, guards, switches, and other devices in place and in proper working condition.
- Keep your hands and feet away from the moving parts. Keep clear of the discharge opening.
- Do Not mow with the discharge deflector raised, removed, or altered unless there is a grass-collection system or mulch kit in place and working properly.
- Be aware of the mower discharge path and direct discharge away from others. Avoid discharging material against a wall or obstruction as the material may ricochet back toward the operator. Stop the blades, slow down, and use caution when crossing surfaces other than grass and when transporting the mower to and from the area to be mowed.

- Be alert, slow down and use caution when making turns. Do Not mow in reverse unless it is absolutely necessary. Always look down and behind you before moving the machine in reverse.
- Park the machine on level ground. Stop engine, wait for all moving parts to stop, and remove key.
  - Before checking, cleaning or working on the mower.
  - After striking a foreign object or abnormal vibration occurs (inspect the mower for damage and make repairs before restarting and operating the mower).
  - Before clearing blockages.
  - Whenever you leave the mower. Do Not leave a running machine unattended.
- Stop engine, wait for all moving parts to stop:
  - Before refueling.
  - Before dumping the grass catcher.
  - Before making height adjustments.
- Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the machine and the mowing activity. Never assume that children will remain where you last saw them.
  - Keep children out of the mowing area and under the watchful care of another responsible adult, not the operator.
  - Be alert and turn the machine off if children enter the area.
  - Before and while backing or changing direction, look behind, down, and side-to-side for small children.
  - Never allow children to operate the machine.
  - Do Not carry children, even with the blades shut off. Children could fall off and be seriously injured or interfere with the safe operation of the machine. Children that have been given rides in the past could suddenly appear in the working area for another ride and be run over or backed over by the machine.
- Do Not use the machine as a towing vehicle unless it has a hitch installed. Attach towed equipment to the machine only at the hitch point.

Slope Safety

- Slopes are a major factor related to loss of control and rollover accidents, which can result in severe injury or death. The operator is responsible for safe slope operation. Operating the machine on any slope requires extra caution. Before using the machine on a slope, the operator must:
  - Review and understand the slope instructions in the manual and on the machine.
  - Use an angle indicator to determine the approximate slope angle of the area.
  - Never operate on slopes greater than 15 degrees.
  - Evaluate the site conditions of the day to determine if the slope is safe for machine operation. Use common sense and good judgment when performing this evaluation. Changes in the terrain, such as moisture, can quickly affect the operation of the machine on a slope.
- Identify hazards at the base of the slope. Do Not operate the machine near drop offs, ditches, embankments, water or other hazards. The machine could suddenly roll over if a wheel goes over the edge or the edge collapses. Keep a safe distance (twice the width of the machine) between the machine and any hazard. Use a walk behind machine or a hand trimmer to mow the grass in these areas.

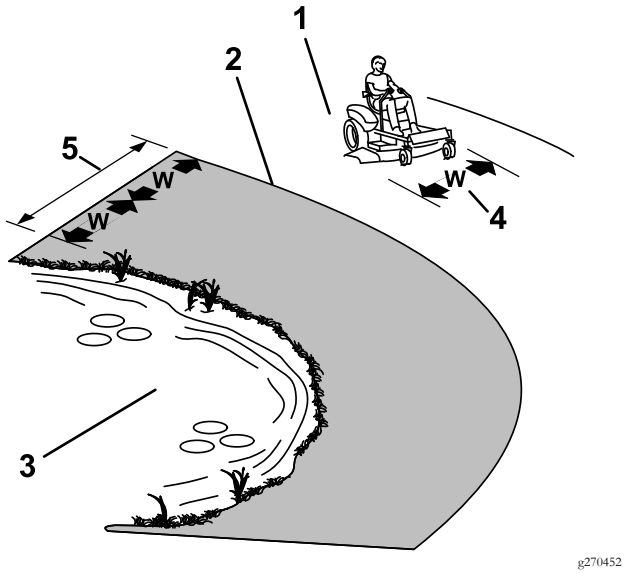


Figure 10

1. Safe Zone-Use the mower here on slopes less than 15 degrees
2. Danger Zone-Use a walk-behind mower and/or hand trimmer on slopes greater than 15 degrees
3. Water
4. W=width of the machine
5. Keep a safe distance (twice the width of the machine) between the machine and any hazard.

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

Checking the Engine Oil Level

Before you start the engine and use the machine, check the oil level in the engine crankcase; refer to **Checking the Oil Level** in Engine Maintenance section.

Starting the Engine

1. Sit down on the seat. Engage the parking brake.
   - For E- and S-Series Models, move the control levers outward from the center into the T-slots.
   - For X-Series Models, pull the brake lever up and rearward.
2. Disengage the blades by pushing down the blade control switch to "OFF".

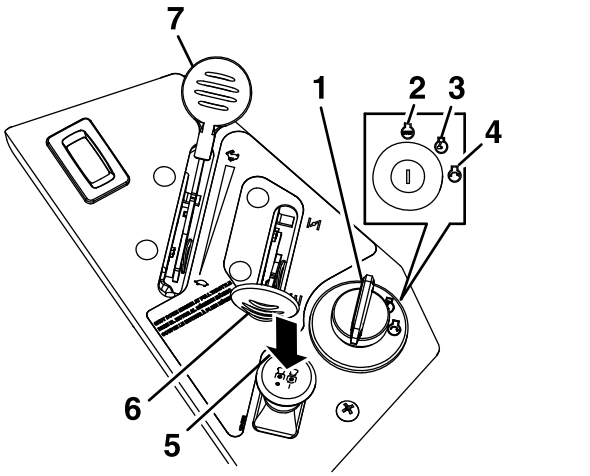


Figure 11

1. Ignition
2. Off
3. Run
4. Start
5. Blade control switch–OFF position
6. Choke control
7. Throttle lever

3. Engage the choke before starting a cold engine (if applicable).

   Note: A warm or hot engine may not require choking.
4. Turn the ignition key to "START" to energize the starter. When the engine starts, release the key.

   Important: Do Not engage the starter for more than 5 seconds at a time. If the engine fails to start, allow a 60 second cool-down

period between attempts. Failure to follow these instructions can burn out the starter motor.

5. Once the engine starts, gradually move the choke control rearward (if applicable) as the engine warms. If the engine stalls or hesitates, slightly move the control forward for a few seconds.

Operating the Blades

The blade control switch, represented by a power take-off (PTO) symbol, engages and disengages power to the mower blades. This switch controls power to any attachments that draw power from the engine, including the mower deck and cutting blades.

Engaging the Blades

1. Release the parking brake.
   - For E- and S-Series Models, move the control levers inward from the center T-slot positions.
   - For X-Series Models, push the brake lever forward and down.
2. Move the throttle midway between the "SLOW" and "FAST" positions.

   Note: Always engage the blades with the throttle in the midway position.
3. Pull out on the blade control switch, to the "ON" position, to engage the blades.

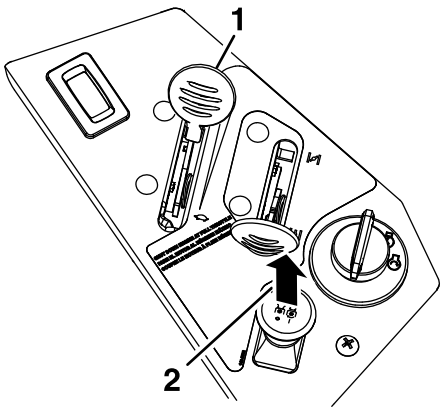


Figure 12

1. Throttle–Midway position 2. Blade control switch—ON position

4. Move throttle to full forward position before mowing.

Disengaging the Blades

Set the throttle to the midway position. Push the blade control switch to "OFF" to disengage the blades.

Stopping the Engine

1. Bring the machine to a full stop.
2. Move the motion control levers to the center T-slot (neutral operate position).
3. Disengage the blade control switch.
4. Engage the parking brake.
   - For E- and S-Series Models, move the control levers outward from the center into the T-slots.
   - For X-Series Models, pull the lever up and rearward.
5. Place the throttle in the "FAST" position.
6. Allow the engine to run for a minimum of 15 seconds, then turn the ignition switch to the "OFF" position to stop the engine.
7. Remove the key to prevent children or other unauthorized persons from starting engine.

The Safety Interlock System

⚠ CAUTION

If the safety interlock switches are disconnected or damaged the machine could operate unexpectedly causing personal injury.

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

Understanding the Safety Interlock System

The safety interlock system is designed to prevent the engine from starting unless:

- The blades are disengaged.
- The parking brake is engaged.

The safety interlock system is designed to initiate engine shutdown when:

- The parking brake is disengaged and the operator gets off machine.
- The PTO is engaged and the operator gets off machine.

Check Safety Interlock System

Service Interval: Before each use or daily

Important: It is essential that operator safety mechanisms be connected and in proper operating condition prior to use.

Note: If machine does not pass any of these tests, **Do Not** operate. Contact an Authorized Service Dealer.

Note: To prevent engine cut-outs on rough terrain, the seat has a 1/2 second time delay before the engine begins to shutdown.

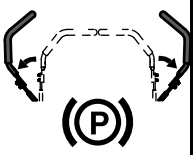
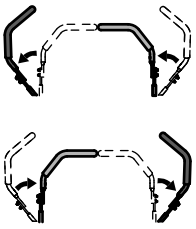
E and S-Series Models

Check the Normal Engine Starting Chart

	System			
	Parking Brake	**PTO**	**Operator**	**Outcome**
State of System	Engaged (Both motion control levers out) 	Disengaged (Blades) 	In seat or out of the seat 	Starter should crank 

Check Engine Starting Circuit Chart

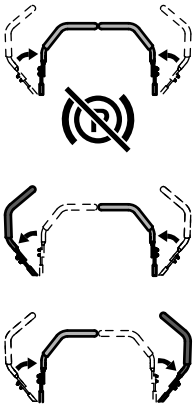
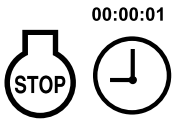
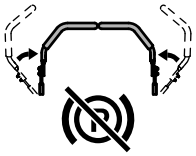
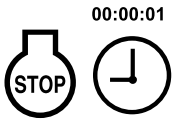
Note: In the **Check Engine Starting Circuit Chart**, the state of system item that is bold is being checked in each scenario.

	System				
	Parking Brake	**PTO (Blades)**	**Motion Control Levers**	**Operator**	**Outcome**
State of System	Engaged (Both motion control levers out) 	Disengaged 	**Right lever in, left out** **Left lever in, right out** 	Operator in seat 	Starter must not crank 

	System			
	Parking Brake	**PTO**	**Operator**	**Outcome**
State of System	Engaged (Both motion control levers out) 	**Engaged** 	Operator in seat 	Starter must not crank 

Check Shutdown Circuit Chart

Note: The state of system item(s) that is bold is being checked in each scenario.

	System				
	Engine	**Parking Brake**	**PTO (Blades)**	**Operator**	**Outcome**
State of System	Running idle (1/3 throttle) 	**Disengaged** (Both motion control levers in Right lever in, left out Left lever in, right out) 	Disengaged 	Raise off of seat (but don't get off) 	Engine must begin shutdown within 1 second 
	Running idle (1/3 throttle) 	Disengaged (Both motion control levers in) 	**Engaged** 	Raise off of seat (but don't get off) 	Engine must begin shutdown within 1 second 

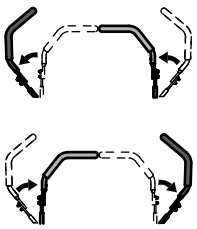
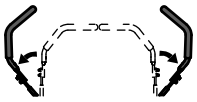
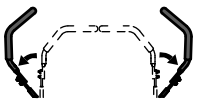
X-Series Models

Check the Normal Engine Starting Chart

	System				
	Parking Brake	**PTO**	**Motion Control Levers**	**Operator**	**Outcome**
State of System	Engaged 	Disengaged (Blades) 	Both levers out (neutral lock) 	In seat or out of the seat 	Starter should crank 

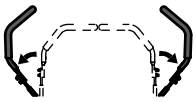
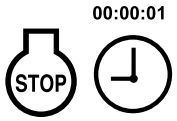
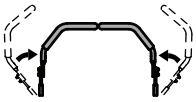
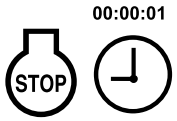
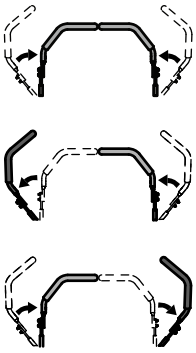
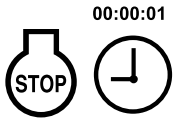
Check Engine Starting Circuit Chart

Note: In the **Check Engine Starting Circuit Chart**, the state of system item that is bold is being checked in each scenario.

	System				
	Parking Brake	**PTO (Blades)**	**Motion Control Levers**	**Operator**	**Outcome**
State of System	Engaged 	Disengaged 	**Right lever in, left out** **Left lever in, right out** 	Operator in seat 	Starter must not crank 
	Disengaged 	Disengaged 	Both levers out (neutral lock) 	Operator in seat 	Starter must not crank 
	Engaged 	**Engaged** 	Both levers out (neutral lock) 	Operator in seat 	Starter must not crank 

Check Shutdown Circuit Chart

Note: The state of system item(s) that is bold is being checked in each scenario.

	System					
	Engine	**Parking Brake**	**PTO (Blades)**	**Motion Control Levers**	**Operator**	**Outcome**
State of System	Running idle (1/3 throttle) 	**Disengaged** 	Disengaged 	Both levers moved out 	**Raise off of seat (but don't get off)** 	Engine must begin shutdown within 1 second 
	Running idle (1/3 throttle) 	Disengaged 	**Engaged** 	Both levers moved in 	Raise off of seat (but don't get off) 	Engine must begin shutdown within 1 second 
	Running idle (1/3 throttle) 	Engaged 	Disengaged 	**Both motion control levers in Right lever in, left out Left lever in, right out** 	Operator in seat 	Engine must begin shutdown within 1 second 

Driving Forward or Backward

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

⚠ CAUTION

Machine can spin very rapidly by positioning one lever too much ahead of the other. Operator may lose control of the machine, which may cause damage to the machine or injury.

- **Use caution when making turns.**
- **Slow the machine down before making sharp turns.**

Forward

1. Move the levers to the center, unlocked position (neutral operate).
2. To go forward, slowly push the motion control levers forward.

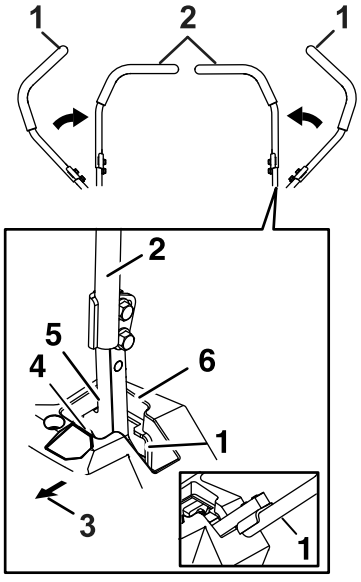


Figure 13

1. Motion control levers–outward position:
   E and S-Series–Parking brake
   X-Series–Neutral lock position
2. Motion control levers–inward/center position:
   Neutral operate position
3. Front of machine
4. Forward
5. Neutral (operate)
6. Reverse

To go straight, apply equal pressure to both motion control levers Figure 14).

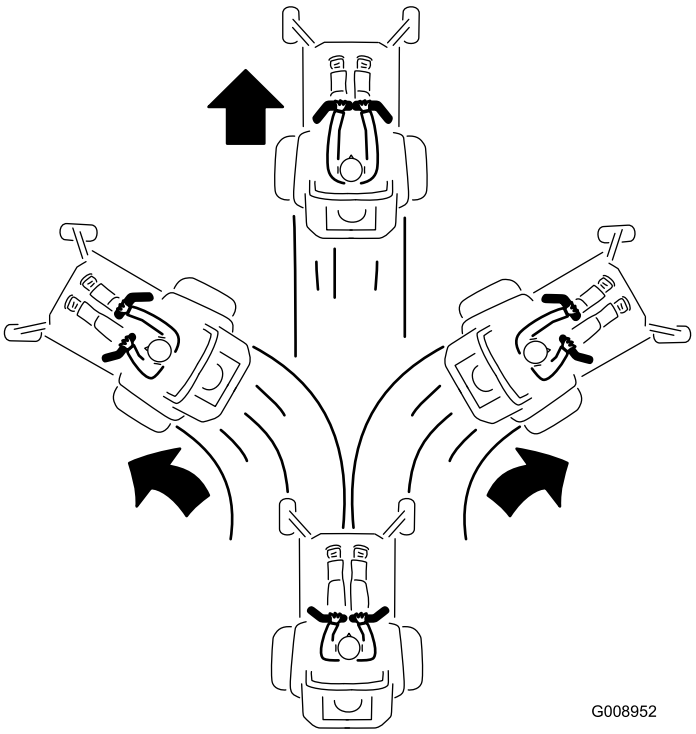


Figure 14

To turn, pull back on the motion control lever toward the direction you want to turn.

The farther you move the motion control levers in either direction, the faster the machine will move in that direction.

To stop, place the motion control levers in the center position (neutral operate) (reference Figure 13).

Backward

Note: Always use caution when backing up and turning.

1. Move the levers to the center, unlocked position.
2. To go backward, slowly pull the motion control levers rearward (Figure 15).

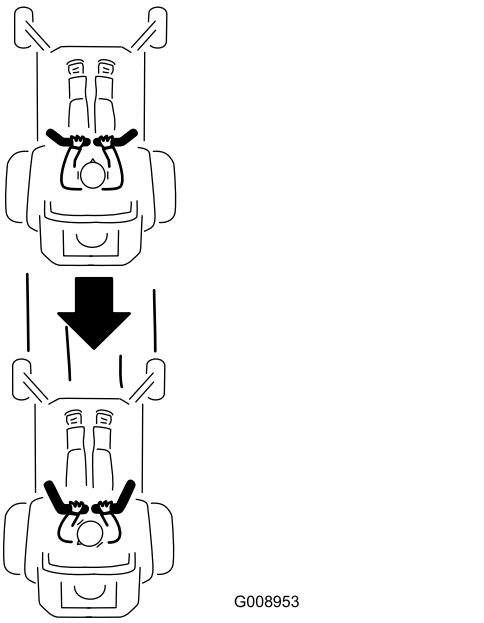


Figure 15

To go straight, apply equal pressure to both motion control levers.

To turn, release the pressure on the motion control lever toward the direction you want to turn.

To stop, push the motion control levers to neutral.

Stopping the Machine

To stop the machine:

1. Move the motion control levers to the center (neutral operate position).
2. Disengage the blade control switch.
3. Engage the parking brake.
   - For E- and S-Series Models, move the control levers outward from the center into the T-slots.
   - For X-Series Models, pull the lever up and rearward.
4. Place the throttle in the "FAST" position.
5. Allow the engine to run for a minimum of 15 seconds, then turn the ignition switch to the "OFF" position. Remember to remove the key from the ignition switch.

⚠ CAUTION

Children or bystanders may be injured if they move or attempt to operate the mower while it is unattended.

Always disengage the blade control switch, engage the parking brake, and remove the key when leaving the machine unattended, even if just for a few minutes.

Adjusting the Anti-Scalp Rollers

It is recommended to change the anti-scalp roller position when the height of cut has changed.

1. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.
2. After adjusting the height of cut, adjust the anti-scalp rollers by removing the nyloc nut.
3. Adjust the anti-scalp rollers for the normal operating conditions. Place rollers in one of the positions shown in Figure 18. Rollers will maintain 3/4 inches (19 mm) clearance to the ground to minimize gouging and roller wear or damage.

   Note: For Maximum Deck Flotation, place the rollers one hole position lower. Rollers should maintain 1/4 inch (6.35 mm) clearance to the ground. Do Not adjust rollers to support the deck.

   - For 42 Inch Models:

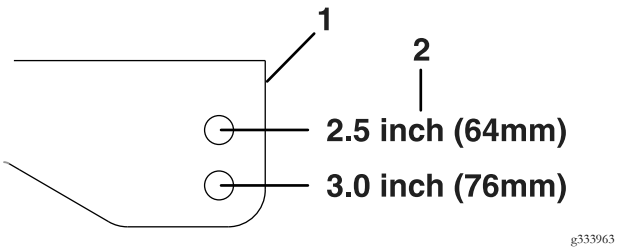


Figure 16

For cutting heights above 3 1/2 inches (90 mm) use the bottom hole. The rollers will still be effective against scalping.

   - For 48 Inch Models:

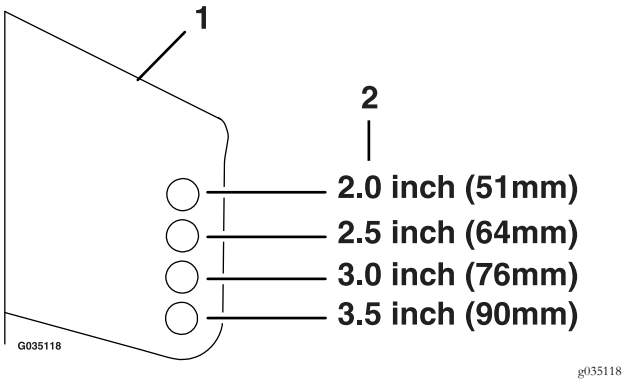


Figure 17

For cutting heights above 3.5 inches (90 mm) use the bottom hole. The rollers will still be effective against scalping.

1. Anti-scalp roller mounting bracket
2. Cutting height

- For 50 and 54 Inch Models:

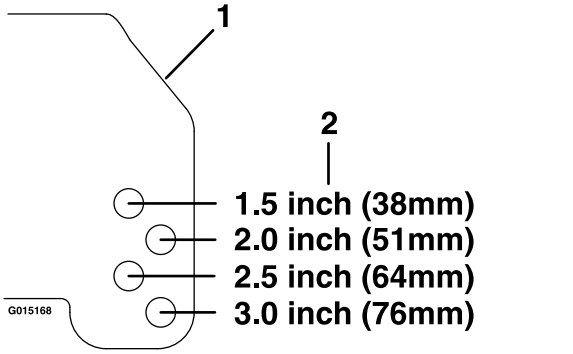


Figure 18

For cutting heights above 3 1/2 inches (90 mm) use the bottom hole. The rollers will still be effective against scalping.

1. Anti-scalp roller mounting bracket
2. Cutting height

4. Torque hardware to 27-33 ft-lb (37-45 N-m) or loss of roller may result.

Positioning the Seat

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

- E-Series Models:
  1. Tip the seat forward.
  2. Loosen the adjustment bolts.

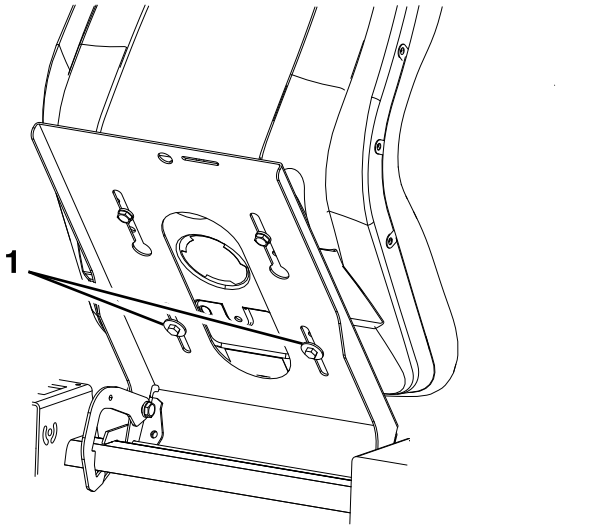


Figure 19

1. Adjustment bolt

  3. Move the seat to the desired position and tighten bolts.
  4. Tip the seat back to the closed position.

- X- and S-Series Models:
  1. Push the adjustment lever towards the center of the machine to release the seat adjuster track (Figure 20).

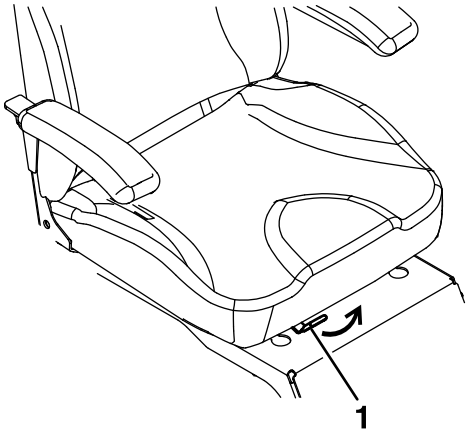


Figure 20

1. Adjustment lever

  2. Move the seat to the desired position and release the lever to lock in that position.

Changing the Seat Ride Suspension

The number of seat springs can be changed to maximize rider comfort. More springs should be used with heavier operators and on rough terrain. Fewer springs should be used with lighter operators and when mowing smooth, well established lawns. Always keep the number of springs on the left and right side the same when adding and removing springs.

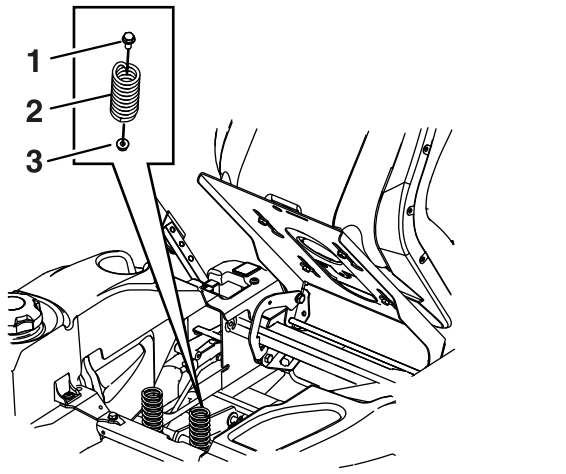


Figure 21

1. Bolt
2. Spring
3. Nut
4. Additional mounting holes

Up to five springs can be secured to the seat box with a nut and bolt, see Figure 21.

Refer to your Parts Manual for spring and hardware part numbers.

Adjusting the Motion Control Levers

Adjusting the Height

The motion control levers can be adjusted higher or lower for maximum operator comfort.

1. Remove the hardware holding the control lever to the control arm shaft (Figure 22).

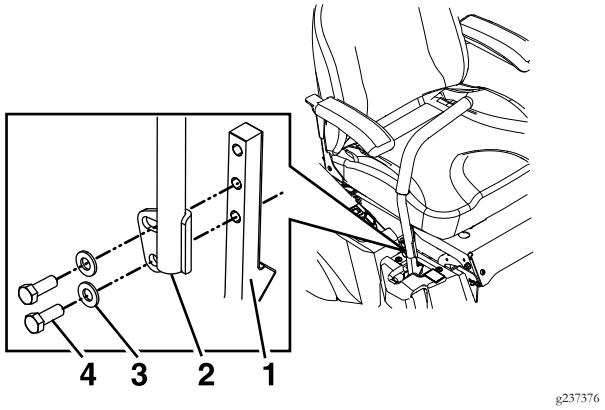


Figure 22

1. Control arm shaft
2. Control lever
3. Washer
4. Bolt

2. Move the control lever to the next set of holes. Secure the lever with the hardware.
3. Repeat the adjustment for the opposite control lever.

Adjusting the Tilt

The motion control levers can be tilted fore or aft for maximum operator comfort.

1. Loosen the upper bolt holding the control lever to the control arm shaft.
2. Loosen the lower bolt just enough to pivot the control lever fore or aft (Figure 22). Tighten both bolts to secure the control in the new position.
3. Repeat the adjustment for the opposite control lever.

Adjusting the Tracking

When driving the machine forward full speed across a flat, level surface, if the machine pulls to one side, adjust the tracking.

If the machine pulls to the left, adjust the right motion-control lever; if the machine pulls to the right, adjust the left motion-control lever.

Note: You can only adjust the tracking for driving forward.

1. Park machine on level ground, engage the parking brake, disengage the blade control switch, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.

2. Locate the tracking adjustment bolt near the motion control lever on the side that needs adjusting (Figure 23).

   Note: Raise the seat for easier access to the adjustment bolt.

3. Rotate the bolt to decrease the speed for the wheel.

   Note: Rotate the bolt a small amount to make minor adjustments.

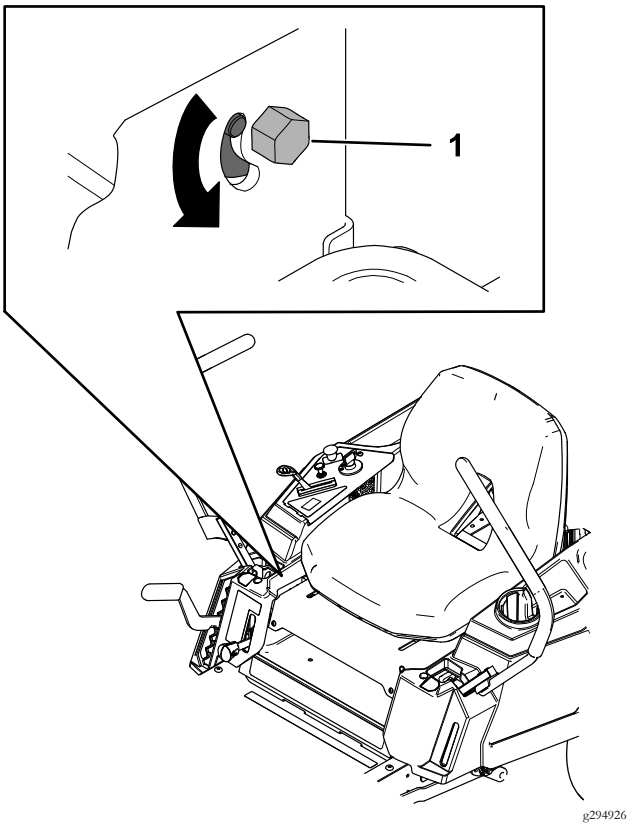


Figure 23

1. Bolt

4. Start the machine and drive forward across a flat, level surface with the motion control levers fully forward to check if the machine tracks straight. Repeat the procedure as needed.

Pushing the Machine by Hand

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

To Push the Machine

1. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.
2. Locate the bypass levers on the frame on both sides of the engine.
3. Move the bypass levers forward through the key hole and down to lock them in place as shown in Figure 24. Ensure this is done for each lever.
4. Turn the ignition key "ON" but Do Not start the engine. Release the parking brake.
   - For E- and S-Series Models, move both control levers inward to the neutral operate position.
   - For X-Series Models, push the brake lever forward and down.

   The machine is now able to be pushed by hand.

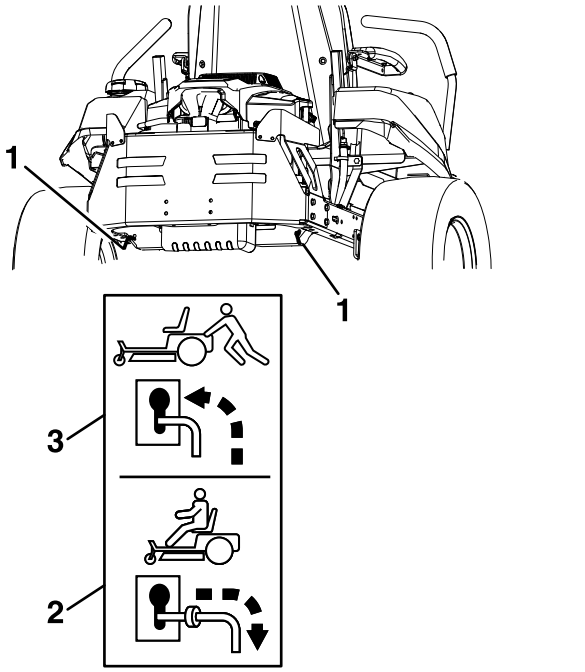


Figure 24

1. Bypass lever location
2. Lever position for operating the machine
3. Lever position for pushing the machine

5. When finished, ensure the key has been returned to the "OFF" position to avoid draining the battery charge.

To Operate the Machine

Move the bypass levers rearward through the key hole and down to lock them in place as shown in Figure 24. Ensure this is done for each lever.

Side Discharge

The mower has a hinged discharge deflector that disperses clippings to the side and down toward the turf.

⚠ DANGER

Without the discharge deflector, mulch kit, or entire grass collection system mounted in place, you and others are exposed to blade contact and thrown debris. Contact with rotating mower blade(s) and thrown debris will cause injury or death.

- **Never remove the discharge deflector from the mower because the discharge deflector routes material down toward the turf. If the discharge deflector is ever damaged, replace it immediately.**
- **Never put your hands or feet under the mower.**
- **Never try to clear discharge area or mower blades unless you move the blade control switch to Off and rotate the ignition key to Off. Also remove the key and pull the wire off the spark plug(s).**

After Operation

General Safety

- Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position. Allow the machine to cool before servicing, adjusting, fueling, cleaning, or storing.
- Clean grass, leaves, excessive grease or oil, and other debris from the mower deck, muffler, drives, grass catcher, and engine area to help prevent fires.
- Close the fuel shut-off valve before storing or transporting the machine.

Transporting

Transporting the Machine

Use a heavy-duty trailer or truck to transport the machine. Ensure that the trailer or truck has all necessary lighting and marking as required by law. Thoroughly read all of the safety instructions. Knowing this information could help you, your family, pets, or bystanders avoid injury.

To transport the machine:

- Lock the brake and block the wheels.
- Be sure the fuel shut-off valve is closed.
- Securely fasten the machine to the trailer or truck with straps, chains, cable, or ropes. Only use the designated tie-down locations on the mower as shown in Figure 25. Use these locations even when transporting the mower with an attached accessory. Using non-designated locations may cause damage to the mower and/or attachment.

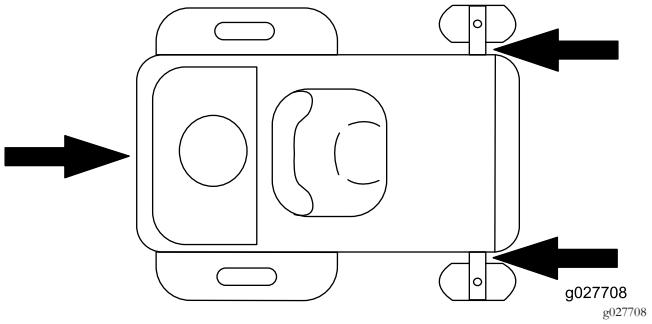


Figure 25

- Secure a trailer to the towing vehicle with safety chains.

⚠ WARNING

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

Do not drive machine on a public street or roadway.

Loading the Machine

Use extreme caution when loading or unloading machines onto a trailer or a truck. Use a full-width

ramp that is wider than the machine for this procedure. Back up ramps and drive forward down ramps (Figure 26).

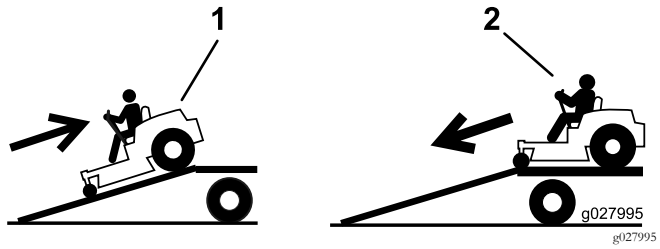


Figure 26

1. Back up ramps
2. Drive forward down ramps

Important: Do not use narrow individual ramps for each side of the machine.

Ensure the ramp is long enough so that the angle with the ground does not exceed 15 degrees (Figure 26). On flat ground, this requires a ramp to be at least four times (4X) as long as the height of the trailer or truck bed to the ground. A steeper angle may cause mower components to get caught as the unit moves from the ramp to the trailer or truck. Steeper angles may also cause the machine to tip or lose control. If loading on or near a slope, position the trailer or truck so that it is on the down side of the slope and the ramp extends up the slope. This will minimize the ramp angle.

⚠ WARNING

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

- **Use extreme caution when operating a machine on a ramp.**
- **Use only a full-width ramp; do not use individual ramps for each side of the machine.**
- **Do not exceed a 15-degree angle between the ramp and the ground or between the ramp and the trailer or truck.**
- **Ensure the length of ramp is at least four times (4X) as long as the height of the trailer or truck bed to the ground. This will ensure that ramp angle does not exceed 15 degrees on flat ground.**
- **Back up ramps and drive forward down ramps.**
- **Avoid sudden acceleration or deceleration while driving the machine on a ramp as this could cause a loss of control or a tip-over situation.**

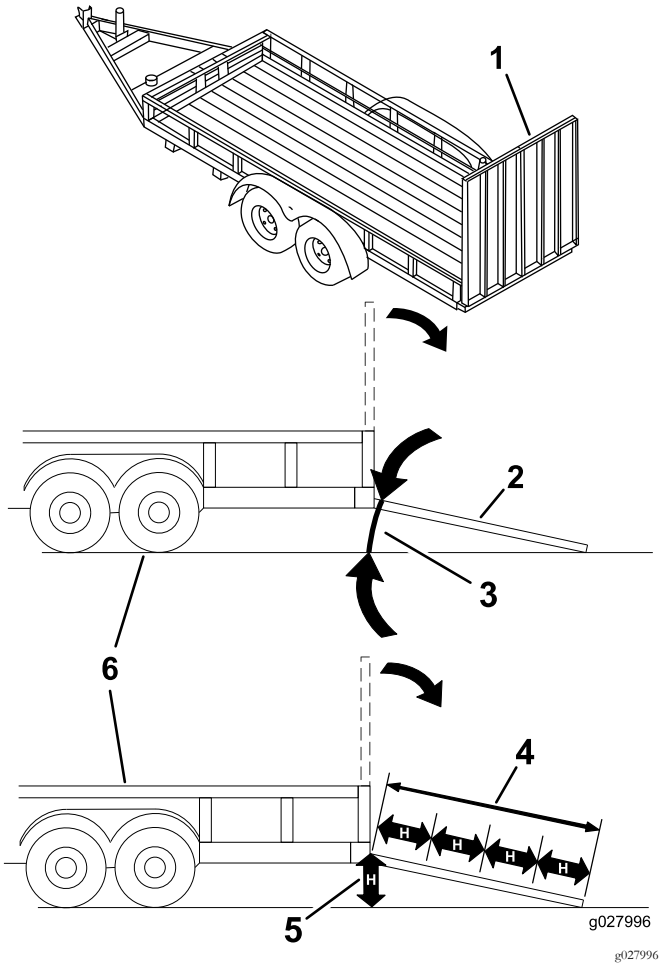


Figure 27

1. Full-width ramp in stowed position
2. Side view of full-width ramp in loading position
3. Not greater than 15 degrees
4. Ramp is at least four times (4X) as long as the height of the trailer or truck bed to the ground
5. H= height of the trailer or truck bed to the ground
6. Trailer

Towing the Machine

- Do not attach towed equipment except at the hitch point.
- Follow the attachment manufacturer's recommendation for weight limits for towed equipment and towing on slopes. Towed weight must not exceed the weight of the machine, operator, and ballast; otherwise hydrostatic transmission failure may occur. Use counterweights or wheel weights as described in the attachment manufacturer's manual.
- Never allow children or others in or on towed equipment.
- On slopes, the weight of the towed equipment may cause loss of traction, increased risk of rollover, and loss of control. Reduce the towed weight and slow down.
- Stopping distance increases with the weight of the towed load. Travel slowly and allow extra distance to stop.
- Make wide turns to keep the attachment clear of the machine.

Operating Tips

Fast Throttle Setting

For best mowing and maximum air circulation, operate the engine at the Fast position. Air is required to thoroughly cut grass clippings, so Do Not set the height-of-cut so low as to totally surround the mower by uncut grass. Always try to have one side of the mower free from uncut grass, which allows air to be drawn into the mower.

Cutting a Lawn for the First Time

Cut grass slightly longer than normal to ensure that the cutting height of the mower does not scalp any uneven ground. However, the cutting height used in the past is generally the best one to use. When cutting grass longer than six inches tall, you may want to cut the lawn twice to ensure an acceptable quality of cut.

Cut 1/3 of the Grass Blade

It is best to cut only about 1/3 of the grass blade. Cutting more than that is not recommended unless grass is sparse, or it is late fall when grass grows more slowly.

Mowing Direction

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

Mow at Correct Intervals

Normally, mow every four days. But remember, grass grows at different rates at different times. So to maintain the same cutting height, which is a good practice, mow more often in early spring. As

the grass growth rate slows in mid summer, mow less frequently. If you cannot mow for an extended period, first mow at a high cutting height; then mow again two days later at a lower height setting.

Cutting Speed

To improve cut quality, use a slower ground speed.

Avoid Cutting Too Low

If the cutting width of the mower is wider than the mower you previously used, raise the cutting height to ensure that uneven turf is not cut too short.

Long Grass

If the grass is ever allowed to grow slightly longer than normal, or if it contains a high degree of moisture, raise the cutting height higher than usual and cut the grass at this setting. Then cut the grass again using the lower, normal setting.

When Stopping

If the machine's forward motion must be stopped while mowing, a clump of grass clippings may drop onto your lawn. To avoid this, move onto a previously cut area with the blades engaged.

Keep the Underside of the Mower Clean

Clean clippings and dirt from the underside of the mower after each use. If grass and dirt build up inside the mower, cutting quality will eventually become unsatisfactory.

Blade Maintenance

Maintain a sharp blade throughout the cutting season because a sharp blade cuts cleanly without tearing or shredding the grass blades. Tearing and shredding turns grass brown at the edges, which slows growth and increases the chance of disease. Check the cutter blades daily for sharpness, and for any wear or damage. File down any nicks and sharpen the blades as necessary. If a blade is damaged or worn, replace it immediately with a genuine Exmark replacement blade. Only Exmark blades are to be used with this unit. No other blades are approved.

Maintenance

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

Maintenance Safety

- Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position. Allow the machine to cool before servicing, adjusting, fueling, cleaning, or storing.
- If you leave the key in the switch, someone could accidently start the engine and seriously injure you or other bystanders. Remove the key from the switch before you perform any maintenance.
- Never allow untrained personnel to service machine.
- Disconnect battery or remove spark plug wire before making any repairs. Disconnect the negative terminal first and the positive last. Reconnect positive first and negative last.
- Keep all guards, shields, switches, and all safety devices in place and in proper working condition. Frequently check for worn or deteriorating components and replace them with genuine Exmark parts when necessary.

⚠ WARNING

Removal or modification of original equipment, parts and/or accessories may alter the warranty, controllability, and safety of the machine. Unauthorized modifications to the original equipment or failure to use original Exmark parts could lead to serious injury or death. Unauthorized changes to the machine, engine, fuel or venting system, may violate applicable safety standards such as: ANSI, OSHA and NFPA and/or government regulations such as EPA and CARB.

⚠ WARNING

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

- **If equipped, make sure all hydraulic fluid hoses and lines are in good condition and all hydraulic connections and fittings are tight before applying pressure to hydraulic system.**
- **Keep body and hands away from pinhole leaks or nozzles that eject high pressure hydraulic fluid.**
- **Use cardboard or paper, not your hands, to find hydraulic leaks.**
- **Safely relieve all pressure in the hydraulic system by placing the motion control levers in neutral and shutting off the engine before performing any work on the hydraulic system.**

- Use care when checking blades. Wrap the blade(s) or wear gloves, and use caution when servicing them. Only replace damaged blades. Never straighten or weld them.
- Do not rely solely on mechanical or hydraulic jacks for support. Use adequate jack stands.
- Carefully release pressure from components with stored energy
- Keep your hands and feet away from moving parts or hot surfaces. If possible, do not make adjustments with the engine running.
- Keep all parts in good working condition and all hardware tightened, especially the blade-attachment hardware.

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 5 hours	• Change the engine oil (Kohler Engine).
After the first 75 hours	• Change the hydraulic filter and fluid (ZT-2800).
Before each use or daily	• Check the safety interlock system. • Check the safety interlock system. • Check the engine oil (Kohler Engine). • Check the mower blades. • Clean the grass build-up from under the cutting deck. • Clean the grass and debris build-up from the machine and cutting deck. • Clean the engine and exhaust system area.
Every 25 hours	• Grease all lubrication points. • Check the tire pressure. • Check the belts.
Every 50 hours	• Clean the air-cleaner paper element (more often in dusty, dirty conditions)(Kohler engine).
Every 100 hours	• Replace the air-cleaner paper element (more often in dusty, dirty conditions)(Kohler engine). • Change the engine oil (change it more often under a heavy load or in high temperatures)(Kohler Engine). • Check the spark plug (Kohler engine). • Clean the blower housing. More often under dirty conditions. • Replace the fuel filter.
Every 500 hours	• Replace the spark plug (Kohler engine). • Change the hydraulic filter and fluid (Every 250 hours if using Mobil 1 15W50) May need more often under severe conditions (ZT-2800).
Before storage	• Charge the battery and disconnect the battery cables.
Monthly	• Check the battery charge.

Periodic Maintenance

Raising the Seat

Service Interval: As required

Place the motion control levers out to the neutral lock position, engage the parking brake, and lift the seat forward.

The following components can be accessed by raising the seat:

- Serial plate
- Service decal
- Seat adjustment bolts
- Fuel filter
- Battery and battery cables

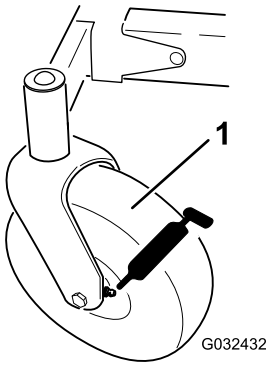
Lubrication

Greasing the Bearings

Service Interval: Every 25 hours/Monthly (whichever comes first)

Grease Type: NLGI grade #2 multi-purpose gun grease.

Grease the front caster wheels (Figure 28).



g032432

Figure 28

1. Front caster tire

1. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.
2. Clean the grease fittings with a rag. Make sure to scrape any paint off of the front of the fitting(s).
3. Wipe up any excess grease.

Engine Safety

⚠ WARNING

The engine can become very hot, especially the muffler and exhaust components. Touching a hot engine can cause severe burns.

Allow the engine to cool completely before service or making repairs around the engine area.

Do Not change the engine governor setting or overspeed the engine.

Engine Maintenance

Important: For Kohler Engines, refer to the Engine Owner's Manual for additional maintenance procedures.

Servicing a Kohler Engine

Important: Refer to the Engine Owner's Manual for additional maintenance procedures.

Servicing the Air Cleaner-Kohler Engine

Service Interval: Every 50 hours—Clean the air-cleaner paper element (more often in dusty, dirty conditions)(Kohler engine).

Every 100 hours—Replace the air-cleaner paper element (more often in dusty, dirty conditions)(Kohler engine).

Note: Operating the engine with loose or damaged air-cleaner components could allow unfiltered air into the engine, causing premature wear and failure.

Removing the Elements:

1. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.
2. Clean around the air cleaner cover to prevent dirt from getting into the engine and causing damage.
3. Rotate the latches outward.

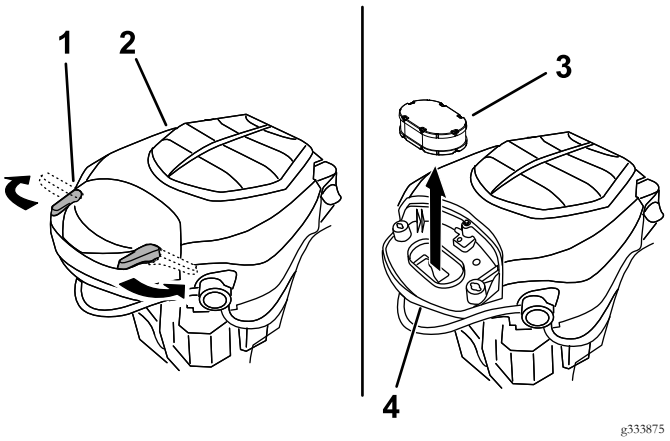
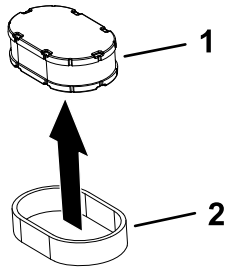


Figure 29

1. Latch
2. Engine
3. Air-cleaner elements
4. Air-cleaner base

4. Remove the cover to access the air-cleaner element.
5. Separate the foam and paper elements (Figure 30).



g333887

Figure 30

1. Paper element
2. Foam element

Cleaning the Foam and Paper Elements:

Foam Element:

1. Wash the foam element with water.
2. Dry the element by squeezing it in a clean cloth.

   Important: Replace the foam element if it is torn or worn.
3. Lightly oil the foam element using new engine oil and squeeze out any excess oil.

Paper Element:

1. Lightly tap the element on a flat surface to remove dust and dirt.
2. Inspect the element for tears, an oily film, and damage to the seal.

   Important: Do not clean the paper element with pressurized air or liquids, such as solvent, gas, or kerosene. Replace the paper element if it is damaged or cannot be cleaned thoroughly.
3. Replace the paper element if it is damaged.

Installing the Air Cleaner

1. Install the foam pre-cleaner element over the paper element.

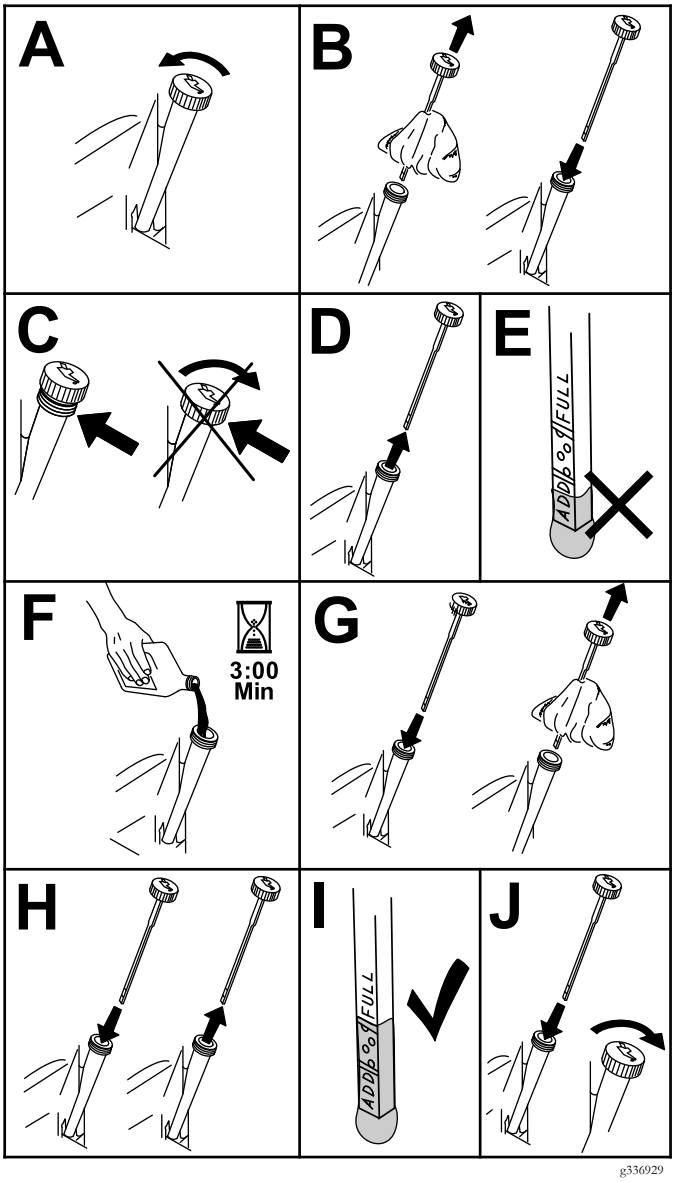
   Note: Ensure that you do not damage the elements.
2. Install the air cleaner elements onto the air cleaner base.
3. Install the cover and secure it with the retaining clamps (see Figure 29).

Checking the Engine Oil Level

Service Interval: Before each use or daily

Important: Do not overfill the crankcase with oil and run the engine; engine damage may result.

1. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.
2. Make sure the engine is stopped, level, and is cool so the oil has had time to drain into the sump.
3. To keep dirt, grass clippings, etc., out of the engine, clean the area around the oil fill cap/dipstick before removing it.
4. Check the engine oil level.



g336929

Figure 31

5. If the level is low, wipe off the area around the oil fill cap, remove cap/dipstick and add oil to the "FULL" mark on the dipstick. Exmark 4-Cycle Premium Engine Oil is recommended; refer to

the following information for an appropriate API rating and viscosity. Always check the level with the dipstick before adding more oil. **Do Not** overfill.

- Crankcase Capacity: 1.9 L (64 oz) with oil filter
- Recommended Oil Type: Exmark 4-Cycle Premium Engine Oil

  – API service SJ or higher

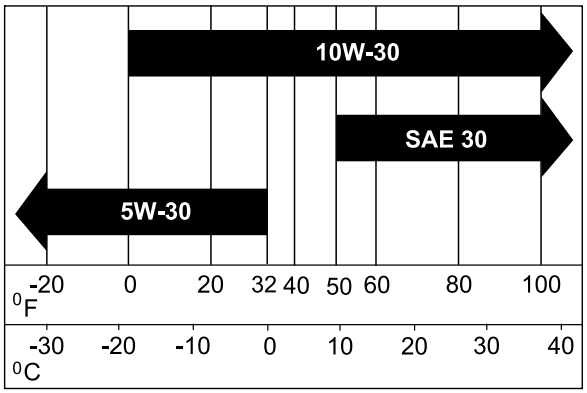


Figure 32
Viscosity table

Note: To prevent extensive engine wear or damage, always maintain the proper oil level in the crankcase. Never operate the engine with the oil level below the "ADD" mark or over the "FULL" mark on the dipstick.

Changing the Engine Oil

Service Interval: After the first 5 hours

Every 100 hours (change it more often under a heavy load or in high temperatures)(Kohler Engine).

1. Park the machine so that the drain side is slightly lower than the opposite side to ensure the oil drains completely.
2. Start the engine and let it run until warm. This warms the oil so it drains better.
3. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.

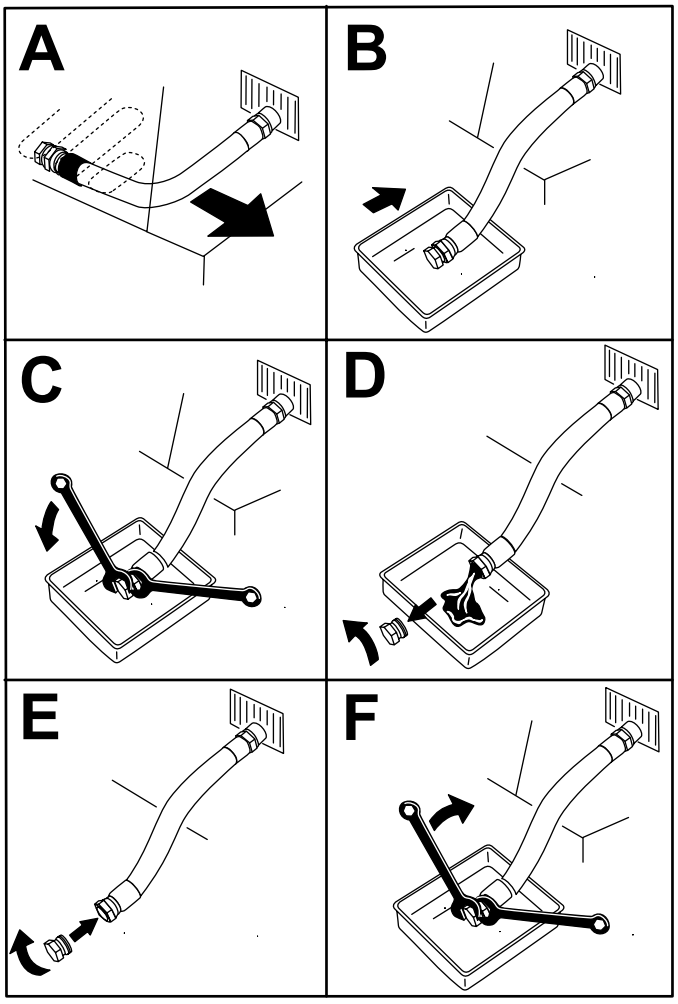


Figure 33

4. Change the engine oil filter. Apply a thin film of clean Exmark 4-Cycle Premium Engine Oil to the rubber gasket on the new filter.

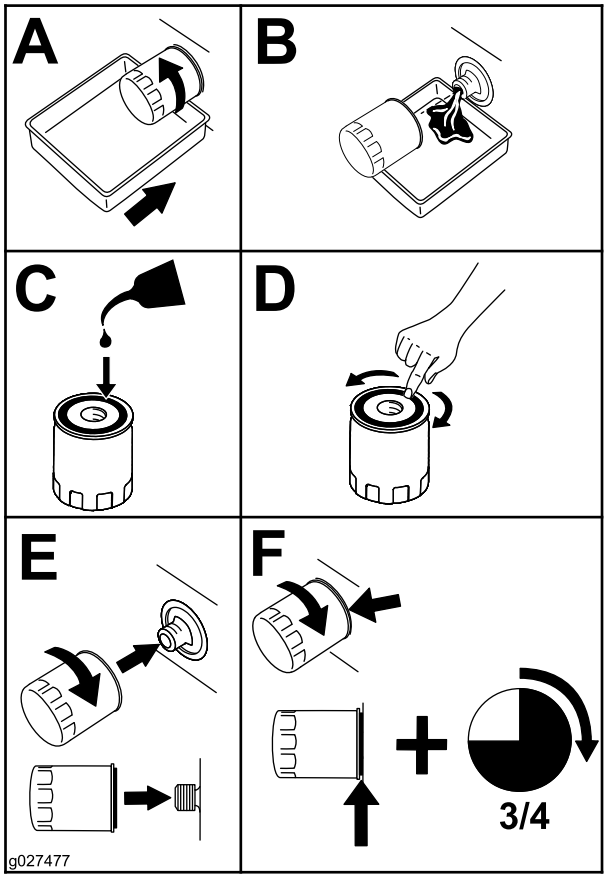


Figure 34

Note: Ensure the oil filter gasket touches the engine, then an extra 3/4 turn is completed.

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

5. Slowly pour approximately 80% of the specified oil into the filler tube—use oil recommended in the **Checking the Engine Oil Level** section.

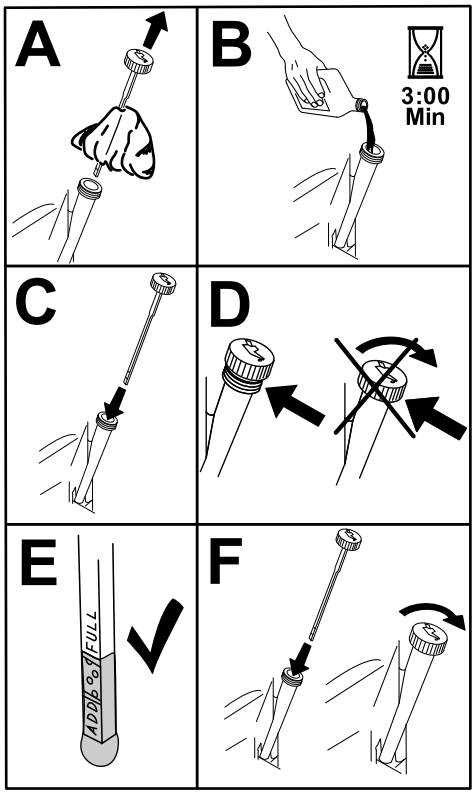


Figure 35

6. Check the oil level; refer to **Checking the Engine Oil Level** section.
7. Start the engine and check for leaks.

Servicing the Spark Plug

Service Interval: Every 100 hours/Yearly (whichever comes first)

Every 500 hours/Every 2 years (whichever comes first)—Replace the spark plug (Kohler engine).

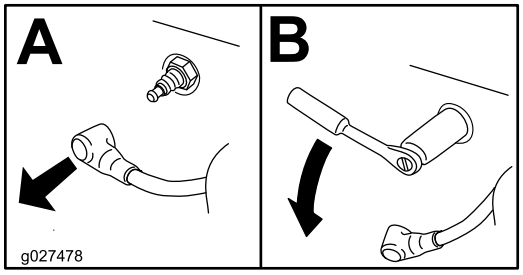
Ensure that the air gap between the center and side electrodes is correct before installing the spark plug. Use a spark plug wrench for removing and installing the spark plug and a gapping tool or feeler gauge to check and adjust the air gap. Install a new spark plug if necessary.

Type: Champion® RN9YC or equivalent

Air Gap: 0.030 inch (.76 mm)

Removing the Spark Plug

1. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.
2. Disconnect the wire from the spark plug.



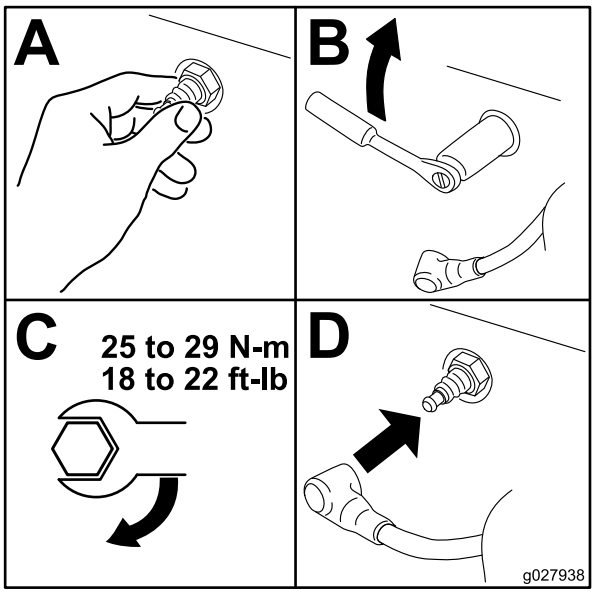
g027478

Figure 36

Due to the deep recess around the spark plug, blowing out the cavity with compressed air is usually the most effective method for cleaning. The spark plug is most accessible when the blower housing is removed for cleaning.

Installing the Spark Plug

1. Install the spark plug. Make sure that the air gap is set correctly.
2. Tighten the spark plug to 18 to 22 ft-lb (25 to 29 N-m).



g027938

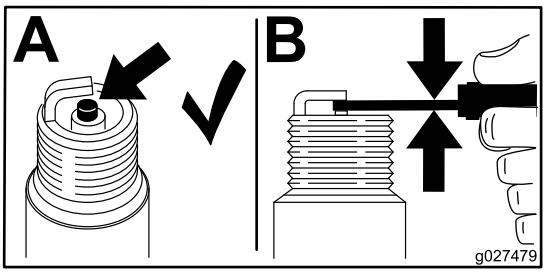
Figure 37

Checking the Spark Plug

1. Inspect the spark plug

Note: If you see light brown or gray on the insulator, the engine is operating properly. A black coating on the insulator usually means the air cleaner is dirty.

Important: Do Not clean the spark plug(s). Always replace the spark plug(s) when it has: a black coating, worn electrodes, an oily film, or cracks.



g027479

Figure 38

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

2. Check the gap between the center and side electrodes.
3. Set the gap to 0.030 inch (.76 mm).

Cleaning the Blower Housing

Service Interval: Every 100 hours/Yearly (whichever comes first) More often under dirty conditions.

To ensure proper cooling, make sure the grass screen, cooling fins, and other external surfaces of the engine are kept clean at all times.

1. Remove the blower housing and any other cooling shrouds.
2. Clean the cooling fins and external surfaces as necessary.
3. Make sure the cooling shrouds are reinstalled

Important: Operating the engine with a blocked grass screen, dirty or plugged cooling fins, and/or cooling shrouds removed, will cause engine damage due to overheating.

Fuel System Maintenance

Replacing the Fuel Filter

Service Interval: Every 100 hours/Yearly (whichever comes first)

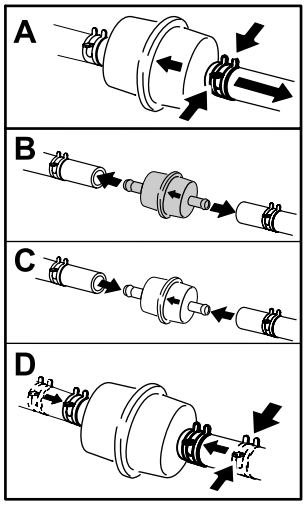
⚠ DANGER

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

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

Never install a dirty filter if it is removed from the fuel line.

1. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.
2. The fuel filter is in the fuel line between the tank and engine.
3. Squeeze the ends of the hose clamps together and slide them away from the filter.



g200004

Figure 39

4. Remove the filter from the fuel lines.
5. Install a new filter with the flow direction arrow coming from the fuel tank and pointing to the engine. Move the hose clamps close to the filter to secure it in place.

Electrical System Maintenance

Charging the Battery

Removing the Battery

⚠ WARNING

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

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

⚠ DANGER

Charging or jump starting the battery may produce explosive gases. Battery gases can explode causing serious injury.

- **Keep sparks, flames, or cigarettes away from battery.**
- **Ventilate when charging or using battery in an enclosed space.**
- **Make sure venting path of battery is always open once battery is filled with acid.**
- **Always shield eyes and face from battery.**

⚠ DANGER

Battery electrolyte contains sulfuric acid, which is poisonous and can cause severe burns. Swallowing electrolyte can be fatal or if it touches skin can cause severe burns.

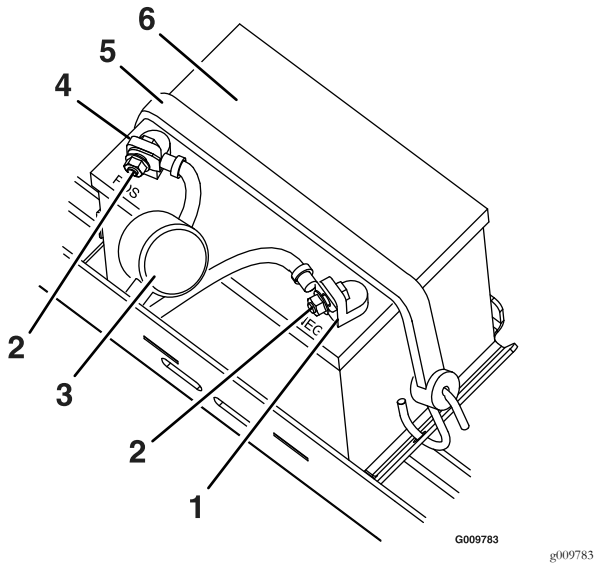
- **Wear safety glasses to shield eyes, and rubber gloves to protect skin and clothing when handling electrolyte.**
- **Do Not swallow electrolyte.**
- **In the event of an accident, flush with water and call a doctor immediately.**

⚠ CAUTION

If the ignition is in the "ON" position there is potential for sparks and engagement of components. Sparks could cause an explosion or moving parts could accidentally engage causing personal injury.

Be sure ignition switch is in the "OFF" position before charging the battery.

1. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.
2. Raise the seat.
3. Disconnect the negative (black) ground cable from the battery post (Figure 40). Retain all fasteners.



g009783

Figure 40

1. Negative battery post
2. Bolt, washer, and nut
3. Terminal boot
4. Positive battery post
5. Battery strap
6. Battery

⚠ WARNING

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

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

4. Slide the rubber cover up the positive (red) cable. Disconnect the positive (red) cable from the battery post. Retain all fasteners.
5. Remove the battery strap (Figure 40) and lift the battery from the battery tray.

Checking the Battery Charge

1. Remove the battery from the chassis; refer to **Removing the Battery**.
2. Allowing batteries to stand for an extended period without recharging them will result in reduced performance and service life. To preserve optimum battery performance and life, recharge batteries in storage when the open circuit voltage drops to 12.4 volts.

   Note: To prevent damage due to freezing, battery should be fully charged before putting away for winter storage.
3. Check the voltage of the battery with a digital voltmeter. Locate the voltage reading of the battery in the table below and charge the battery for the recommended time interval to bring the charge up to a full charge of 12.6 volts or greater.

   Important: Make sure the negative battery cable is disconnected and the battery charger used for charging the battery has an output of 16 volts and 7 amps or less to avoid damaging the battery (see chart below for recommended charger settings).

Voltage Reading	Percent Charge	Maximum Charger Settings	Charging Interval
12.6 or greater	100%	16 volts/7 amps	No Charging Required
12.4 – 12.6	75–100%	16 volts/7 amps	30 Minutes
12.2 – 12.4	50–75%	16 volts/7 amps	1 Hour
12.0–12.2	25–50%	14.4 volts/4 amps	2 Hours
11.7–12.0	0–25%	14.4 volts/4 amps	3 Hours
11.7 or less	0%	14.4 volts/2 amps	6 Hours or More

Recommended Jump Starting Procedure

1. Check the weak battery for terminal corrosion (white, green, or blue "snow"), it must be cleaned off prior to jump starting. Clean and tighten connections as necessary.

⚠ CAUTION

Corrosion or loose connections can cause unwanted electrical voltage spikes at anytime during the jump starting procedure.

Do Not attempt to jump start with loose or corroded battery terminals or damage to the engine may occur.

⚠ DANGER

Jump starting a weak battery that is cracked, frozen, has low electrolyte level, or an open/shorted battery cell, can cause an explosion resulting in serious personal injury.

Do Not jump start a weak battery if these conditions exist.

2. Make sure the booster is a good and fully charged lead acid battery at 12.6 volts or greater. Use properly sized jumper cables (4 to 6 AWG) with short lengths to reduce voltage drop between systems. Make sure the cables are color coded or labeled for the correct polarity.

⚠ CAUTION

Connecting the jumper cables incorrectly (wrong polarity) can immediately damage the electrical system.

Be certain of battery terminal polarity and jumper cable polarity when hooking up batteries.

Note: The following instructions are adapted from the SAE J1494 Rev. Dec. 2001 – Battery Booster Cables – Surface Vehicle Recommended Practice (SAE – Society of Automotive Engineers).

⚠ WARNING

Batteries contain acid and produce explosive gases.

- **Shield the eyes and face from the batteries at all times.**
- **Do Not lean over the batteries.**

Note: Be sure the vent caps are tight and level. Place a damp cloth, if available, over any vent caps on both batteries. Be sure the vehicles do not touch and that both electrical systems are off and at the same rated system voltage. These instructions are for negative ground systems only.

3. Connect the positive (+) cable to the positive (+) terminal of the discharged battery that is wired to the starter or solenoid as shown in Figure 41.

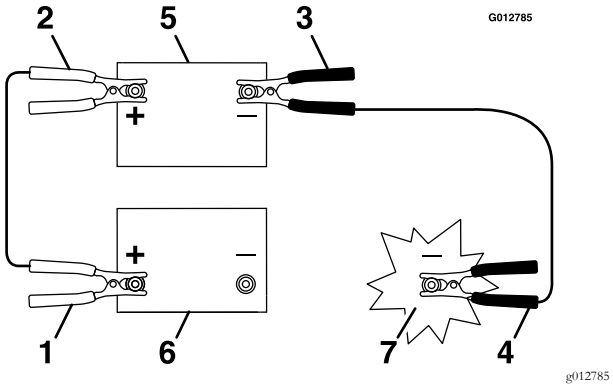


Figure 41

1. Positive (+) cable on discharged battery
2. Positive (+) cable on booster battery
3. Negative (–) cable on the booster battery
4. Negative (–) cable on the engine block
5. Booster battery
6. Discharged battery
7. Engine block

4. Connect the other end of the positive cable to the positive terminal of the booster battery.
5. Connect the black negative (–) cable to the other terminal (negative) of the booster battery.
6. MAKE THE FINAL CONNECTION ON THE ENGINE BLOCK OF THE STALLED VEHICLE (NOT TO THE NEGATIVE POST) AWAY FROM THE BATTERY. STAND BACK.
7. Start the vehicle and remove the cables in the reverse order of connection (the engine block (black) connection is the first to disconnect).

Installing the Battery

1. Position the battery in the tray with the terminal posts toward the operating position (Figure 40).
2. Install the positive (red) battery cable to the positive (+) battery terminal using the fasteners removed previously.
3. Install the negative battery cable to the negative (-) battery terminal using the fasteners removed previously.
4. Slide the red terminal boot onto the positive (red) battery post.
5. Secure the battery with the strap (Figure 40).

Servicing the Fuses

Service Interval: As required

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

Fuse:

- Main F1-25 amp, blade-type
- Charge Circuit F2-15 amp, blade-type

1. Flip up the seat to access the main wiring harness and fuse block.
2. To replace a fuse, pull out on the fuse to remove it (Figure 42).

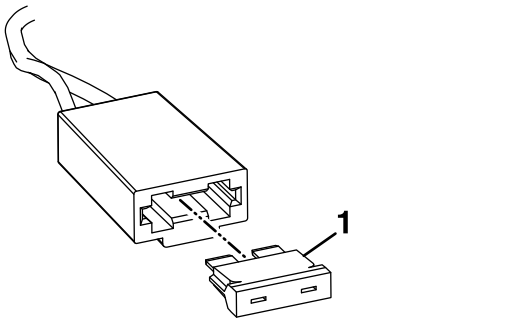


Figure 42

1. Fuse

3. Return the seat to the operating position.

Drive System Maintenance

Checking the Tire Pressure

Service Interval: Every 25 hours/Monthly (whichever comes first)

Maintain the air pressure in the front and rear tires as specified. Uneven tire pressure can cause uneven cut. Check the pressure at the valve stem (Figure 43).

Check the tires when they are cold to get the most accurate pressure reading.

Rear Tires: 13 psi (90 kPa)

Front Tires (caster wheels): 13 psi (90 kPa)

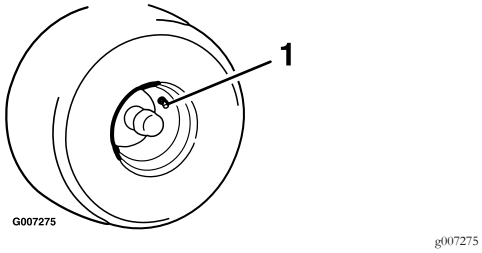


Figure 43

1. Valve stem

Releasing the Electric Brake–E- and S-Series Models

The electric brake can be manually released by rotating the link arms forward. Once the electric brake is energized, the brake resets.

1. Turn the key to the "OFF" position and remove the key.
2. Disconnect the battery.
3. Locate the shaft on the electric brake where the brake link arms are connected.

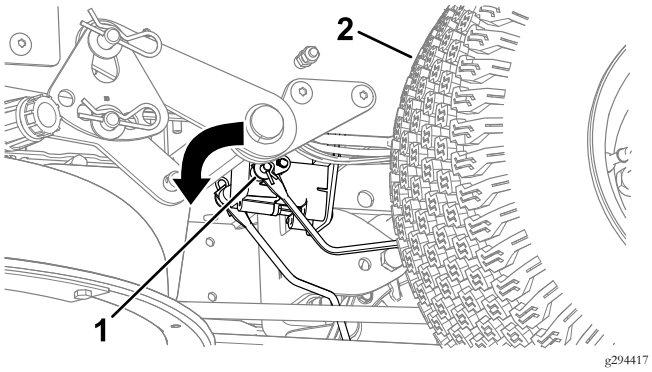


Figure 44

1. Brake link arm
2. Left rear tire

4. Rotate the shaft forward to release the brake.
5. Connect the battery after moving the machine.

Change Hydraulic System Filter and Fluid (ZT-2800)

Service Interval: After the first 75 hours

Every 500 hours thereafter (Every 250 hours if using Mobil 1 15W50 thereafter) May need more often under severe conditions (ZT-2800).

1. Park the machine on level ground. Stop engine, wait for all moving parts to stop, and allow engine to cool. Remove key and engage parking brake.

Important: Transaxles must be cool (less than 100°F (38°C)) before changing oil. Failure to allow the transaxles to cool prior to changing the oil, could result in overfilling the unit and damaging the breather assembly.

2. Locate the two filters under the transmissions. Remove filter guard screws and filter guard.
3. Carefully clean area around filters. It is important that no dirt or contamination enter hydraulic system.
4. Unscrew filters to remove and allow oil to drain from drive system.

Important: Before reinstalling new filters, apply a thin coat of Exmark Premium Hydro Oil on the surface of the filters rubber seal.

5. Install the new filter by hand; turn the filter clockwise until rubber seal contacts the filter base then tighten the filter an additional 3/4 to 1 full turn.
6. Reinstall the filter guard with the filter guard screws. Torque the screws to 65 in-lb (7 N-m).
7. Remove the top port plug. Fill the oil through the top port plug using a hand pump or through the fill port plug. Fill until it flows out of the top port opening.

   Exmark Premium Hydro Oil is recommended. Refer to the chart for an acceptable alternative:

Hydro Oil	Service Interval
Exmark Premium Hydro Oil (Preferred)	After first 75 hours *Every 500 hours thereafter
Mobil 1 15W50	After first 75 hours *Every 250 hours thereafter

*May need more often under severe conditions.

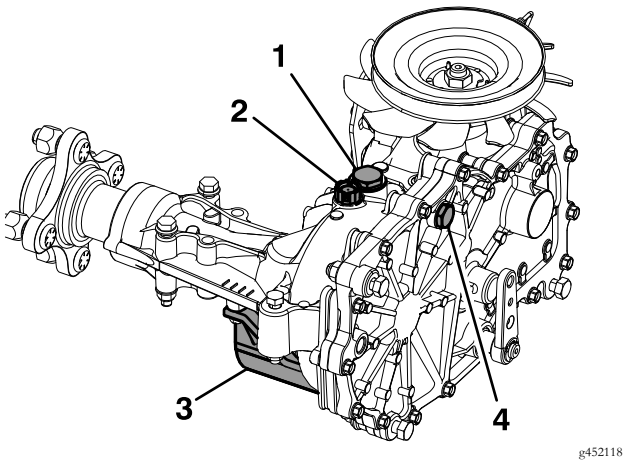


Figure 45
Right side shown

1. Fill port plug
2. Breather vent
3. Filter guard and filter
4. Top port plug

8. Torque the top port plug to 120 in-lb (14 N-m).
9. Torque the fill port plug to 210 in-lb (24 N-m), if it was removed to fill the transmission.
10. Raise the rear of machine up and support with jack stands (or equivalent support) just high enough to allow drive wheels to turn freely.
11. Start engine and move throttle control ahead to 1/2 throttle position. Disengage parking brake.
    A. With the bypass valve open and the engine running, slowly move the directional control in both forward and reverse (5 or 6 times).
    B. With the bypass valve closed and the engine running, slowly move the directional control in both forward and reverse directions (5 to 6 times). Check the oil level, and add oil as required after stopping the engine.
    C. It may be necessary to repeat steps A and B until all the air is completely purged from the system. When the transaxle operates at normal noise levels and moves smoothly forward and reverse at normal speeds, then the transaxle is considered purged.
12. Remove the jack stands.

Note: Do Not change the hydraulic system oil (except for what can be drained when changing filter), unless it is felt the oil has been contaminated or been extremely hot.

Changing oil unnecessarily could damage hydraulic system by introducing contaminants into the system.

Mower Maintenance

Servicing the Cutting Blades

Service Interval: Before each use or daily

Maintain sharp blades throughout the cutting season because sharp blades cut cleanly without tearing or shredding the grass blades. Tearing and shredding turns grass brown at the edges, which slows growth and increases the chance of disease.

Check the cutter blades daily for sharpness, and for any wear or damage. File down any nicks and sharpen the blades as necessary. If a blade is damaged or worn, replace it immediately with a genuine Exmark replacement blade. For convenient sharpening and replacement, you may want to keep extra blades on hand.

⚠ WARNING

A worn or damaged blade can break, and a piece of the blade could be thrown into the operator's or bystander's area, resulting in serious personal injury or death.

- **Inspect the blade periodically for wear or damage.**
- **Replace a worn or damaged blade.**

Before Inspecting or Servicing the Blades

Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position. Disconnect the spark plug wire(s) from the spark plug(s).

Inspecting the Blades

1. Inspect the cutting edges (Figure 46). If the edges are not sharp or have nicks, remove and sharpen the blades; refer to **Sharpening the Blades**.
2. Inspect the blades, especially the curved area. If you notice any damage, wear, or a slot forming in this area (item 3 in Figure 46), immediately install a new blade.

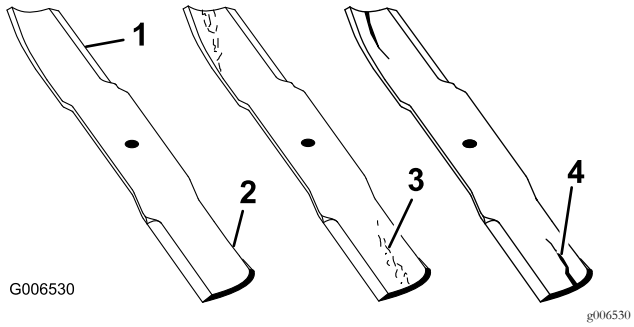


Figure 46

1. Cutting edge
2. Curved area
3. Wear/slot forming
4. Damage

Checking for Bent Blades

Note: The machine must be on a level surface for the following procedure.

1. Raise the mower deck to the highest height-of-cut position; also considered the 'transport' position.
2. While wearing thickly padded gloves or other adequate hand protection slowly rotate blade to be measure into a position that allows effective measurement of the distance between the cutting edge and the level surface the machine is on.

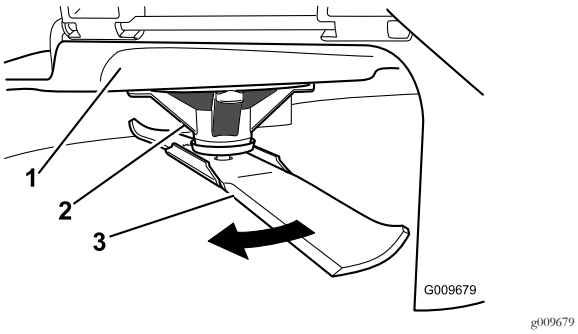


Figure 47

1. Deck
2. Spindle housing
3. Blade

3. Measure from the tip of the blade to the flat surface here.

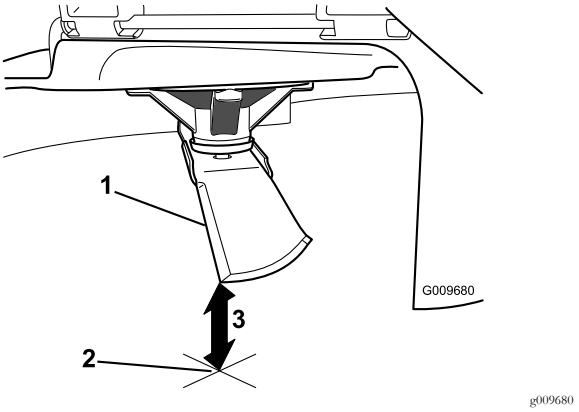


Figure 48

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

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

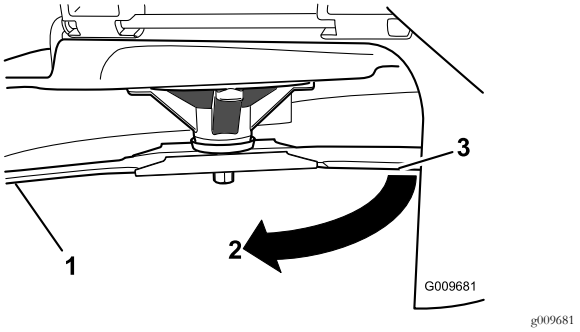


Figure 49

1. Blade, side previously measured
2. Measurement position used previously
3. Opposing side of blade being moved into measurement position

5. Measure from the tip of the blade to the flat surface here. The variance should be no more than 1/8 inch (3mm).

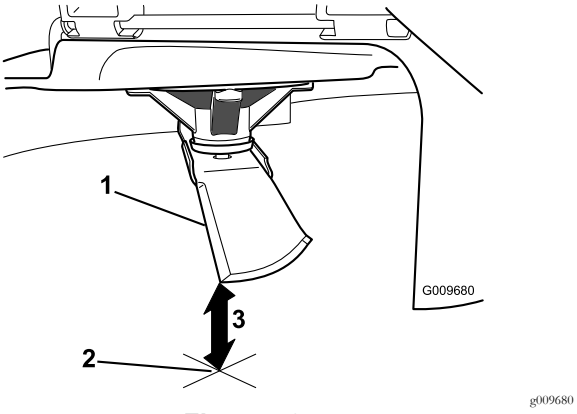


Figure 50

1. Opposing blade edge, in position for measuring
2. Level surface
3. Second measured distance between blade and surface (B)

A. If the difference between A and B is greater than 1/8 inch (3mm) replace the blade with a new blade. Refer to Removing the Blades and Installing the Blades.

Note: If a bent blade is replaced with a new one and the dimension obtained continues to exceed 1/8 inch (3mm), the blade spindle could be bent. Contact an Authorized Exmark Dealer for service.

B. If the variance is within constraints, move to the next blade.

Repeat this procedure on each blade.

Checking for Loose Blades or Damaged Spring Disc Washers

1. Place a wrench on the blade bolt and torque to:
   - 60-80 ft-lb (81-108 N-m) for E- and S-Series Models
   - 50-60 ft-lb (68-81 N-m) for X-Series Models
2. With the wrench still on the blade bolt, hold the blade spindle stationary and using a rag or thickly padded glove, try to rotate the blade. If the blade rotates relative to the spindle guard without further tightening the blade bolt, the spring disc washer has been flattened or damaged and the bolt and washer assembly must be replaced (Figure 51). Refer to **Removing the Blades** and **Installing the Blades**.
3. Once the blade has been removed, inspect the spring disc washer. If the washer appears to be damaged (the washer surface has been marred) or flattened, the bolt and washer assembly must be replaced.

Removing the Blades

The blades must be replaced if a solid object is hit, if the blade is out of balance, or the blade is bent. To ensure optimum performance and continued safety conformance of the machine, use genuine Exmark replacement blades. Replacement blades made by other manufacturers may result in an unsafe machine.

Hold the blade end using a rag or thickly-padded glove. Remove the blade bolt and washer assembly and blade from the spindle shaft (Figure 51).

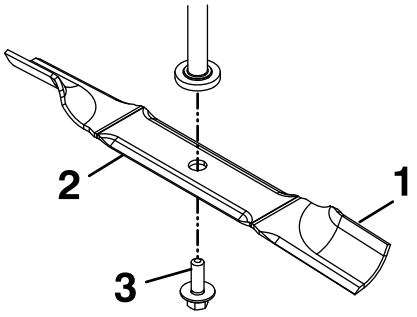


Figure 51

1. Sail area of blade
2. Blade
3. Blade bolt and washer assembly

Sharpening the Blades

1. Use a file to sharpen the cutting edge at both ends of the blade (Figure 52). Maintain the original angle. The blade retains its balance if the same amount of material is removed from both cutting edges.

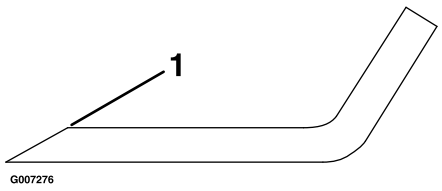


Figure 52

1. Sharpen at original angle

2. Check the balance of the blade by putting it on a blade balancer (Figure 53). If the blade stays in a horizontal position, the blade is balanced and can be used. If the blade is not balanced, file some

metal off the end of the sail area only (Figure 53). Repeat this procedure until the blade is balanced.

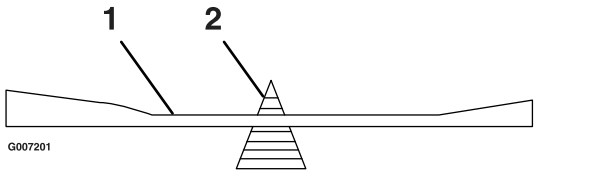


Figure 53

1. Blade
2. Balancer

Installing the Blades

1. Install the blade onto the spindle shaft (Figure 51).

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

2. Hold the blade end using a rag or thickly-padded glove (or place a wrench on the top sheave nut). Install the blade bolt and washer assembly.
3. Torque the blade bolt:
   - **For All Deck Sizes Except 48 Inch:** 60-80 ft-lb (81-108 N-m).
   - **48 Inch Models:** 50-60 ft-lb (68-81 N-m).

⚠ WARNING

Incorrect installation of the blade or components used to retain the blade cause the blade to come loose and could seriously injure or kill you or bystanders.

Always install the original Exmark blades, washers and blade bolts as shown.

Leveling the Mower Deck

Check to ensure the mower deck is level any time you install the mower or when you see an uneven cut on your lawn.

The mower deck must be checked for bent blades prior to leveling; any bent blades must be removed and replaced. Refer to the **Checking for Bent Blades** procedure before continuing.

The mower deck must be leveled side-to-side first then the front to rear slope can be adjusted.

Requirements:

- The machine must be on a level surface.
- All four tires must be properly inflated. Refer to **Checking the Tire Pressure** in the Drive System Maintenance section.

Side-to-Side Leveling

1. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.
2. Set the height of cut to 3 inches (76 mm).
3. Carefully rotate the blades so that they are all side to side (Figure 54 and Figure 55).

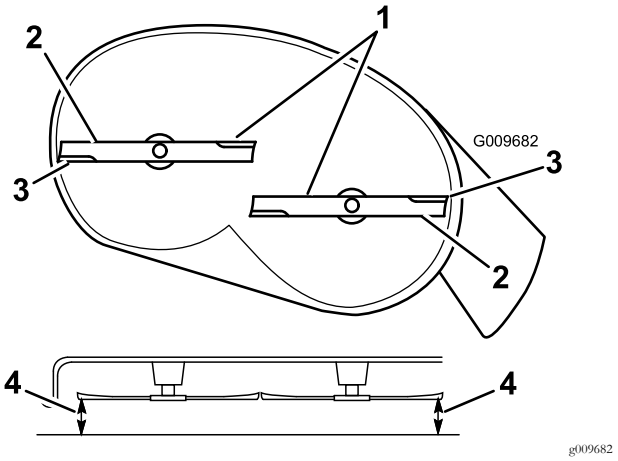


Figure 54

Mower Deck with 2 Blades

1. Blades side to side
2. Sail area of blade
3. Outside cutting edges
4. Measure from the tip of the blade to the flat surface here

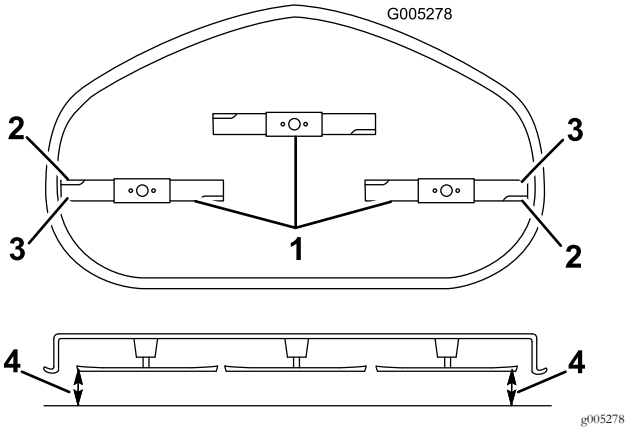


Figure 55
Mower Deck with 3 Blades

1. Blades side to side
2. Sail area of blade
3. Outside cutting edges
4. Measure from the tip of the blade to the flat surface here

4. Measure between the outside cutting edges and the flat surface (Figure 54 and Figure 55). If both measurements are not within 3/16 inch (5 mm), an adjustment is required; continue with this procedure.
5. Support the weight of mower deck by placing wood blocks under the edges of the deck.
   - Place two blocks, each having a thickness of 2 5/8 inches (6.6 cm), under each side of the front edge of the deck
   - Place two blocks, each having a thickness of 2 7/8 inches (7.3 cm), under the rear edge of the cutting deck skirt, one on each side of the deck.

   Note: Avoid placing the supports under any anti-scalp rollers if present on the deck.
6. Remove the hairpin cotter and washer from the lower lift-arm pin (Figure 56).

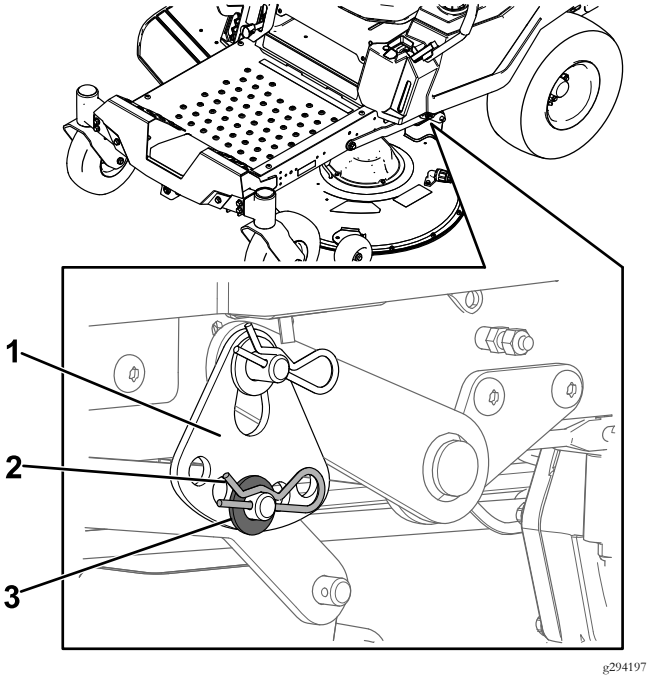


Figure 56

1. Height of cut plate
2. Hairpin cotter
3. Washer

7. Rotate the height of cut plate to a different hole so that it supports the weight of the mower deck after the plate is installed (see Figure 57).

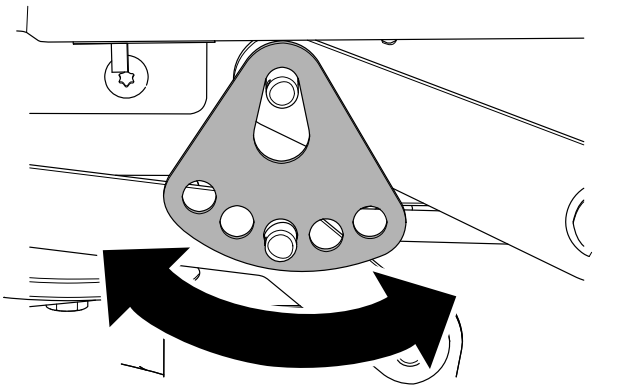


Figure 57

8. Install the washer and hairpin cotter (Figure 57).
9. Repeat steps 6 through 8 for the other side of the machine.
10. Check the side-to-side level again; repeat this procedure until the measurements are correct.
11. Continue leveling the deck by checking the front-to-rear blade slope; refer to **Adjusting the Front-to-Rear Blade Slope** section.

Adjusting the Front-to-Rear Blade Slope

Check the front-to-rear blade level any time you install the mower. If the front of the mower is more than 5/16 inch (7.9 mm) lower than the rear of the mower, adjust the blade level using the following instructions:

1. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.
2. Set the height of cut lever to middle position.

   Note: Check and adjust the side-to-side blade level if you have not checked the setting; refer to **Side-to-Side Leveling**.
3. Carefully rotate the blades so they are facing front to rear (Figure 58 and Figure 59).

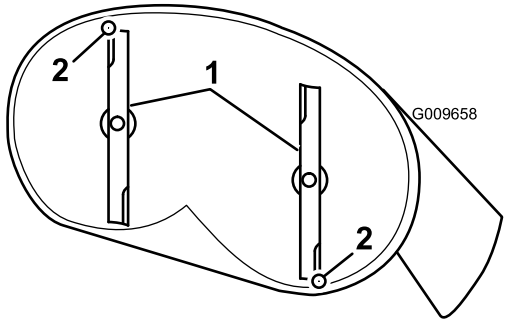


Figure 58
Mower Deck with 2 Blades

1. Blades front to rear
2. Measure from the tip of the blade to the flat surface here

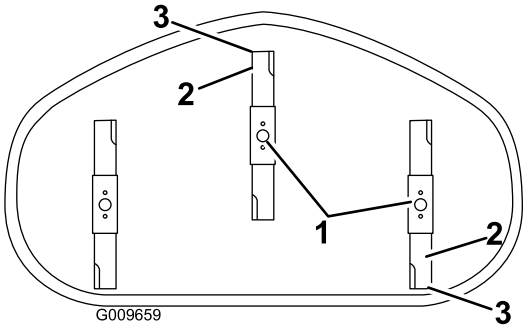


Figure 59
Mower Deck with 3 Blades

1. Blades front to rear
2. Outside cutting edges
3. Measure from the tip of the blade to the flat surface here

4. Measure from the tip of the front blade to the flat surface and the tip of the rear blade to the flat surface (Figure 58 and Figure 59). If the front blade tip is not 1/16-5/16 inch (1.6-7.9 mm) lower than the rear blade tip, adjust the front locknut.
5. To adjust the front-to-rear blade slope, rotate the adjustment nut in the front of the mower (Figure 60).

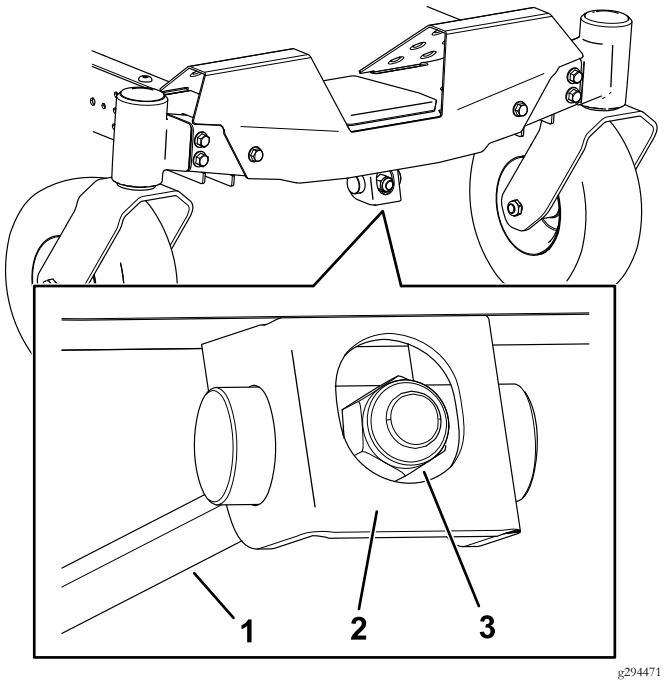


Figure 60

1. Adjusting rod
2. Adjusting block
3. Lock nut

6. To raise the front of the mower, tighten the adjustment nut. To lower the front of the mower, loosen the adjustment nut.
7. After adjustment, check the front-to-rear slope again. Continue adjusting the nut until the front blade tip is 1/16-5/16 inch (1.6-7.9 mm) lower than the rear blade tip (Figure 58 and Figure 59).
8. When the front-to-rear blade slope is correct check the side-to-side level of the mower again; refer to **Side-to-Side Leveling**.

Removing the Mower Deck

Service Interval: As required

1. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.

2. Lower the height of cut lever to the lowest position.
   - **For 42 and 50 Inch Models**
     A. Remove the hairpin cotter and washer from the front support rod and remove the rod from the deck bracket (Figure 61). Carefully lower the front of the mower deck to the ground.

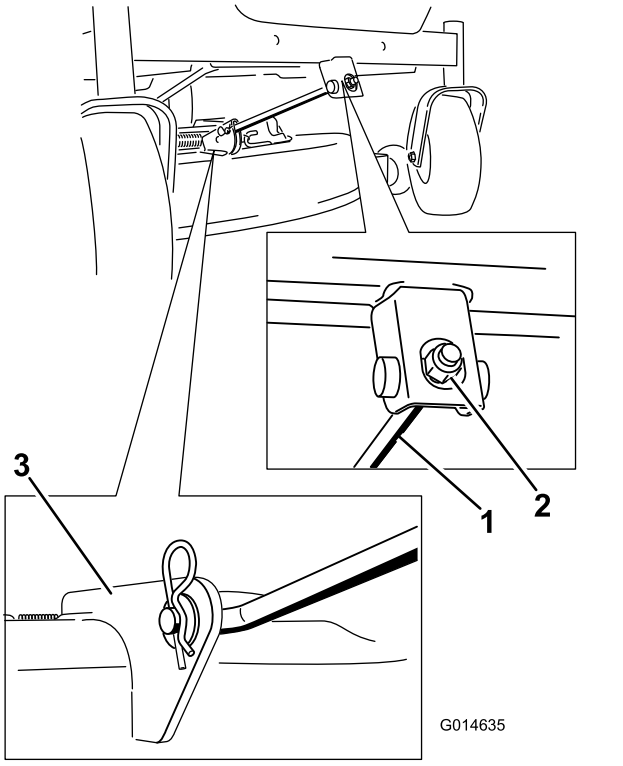


Figure 61

1. Front support rod
2. Locking nut
3. Deck bracket

B. On one side of the machine, remove the washer and hairpin cotter from the deck pin .

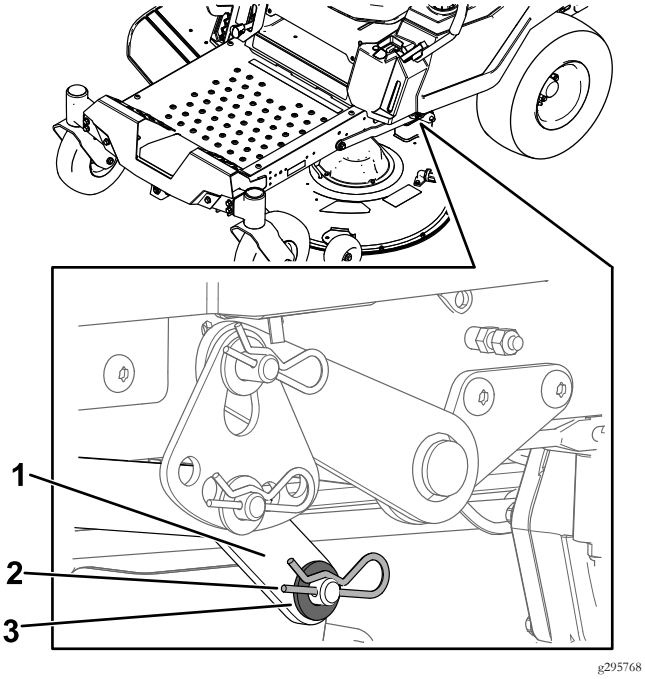


Figure 62

1. Lift arm
2. Hairpin cotter
3. Washer

C. Remove the lift arm from the deck pin.

D. Repeat steps B and C for the other side of the machine.

E. Slide the mower deck rearward to remove the mower belt from the engine pulley.

- **For 48 and 54 Inch Models**
  A. At the rear of the mower deck, remove the two shoulder bolts and nuts securing the deck to the pivot pan.

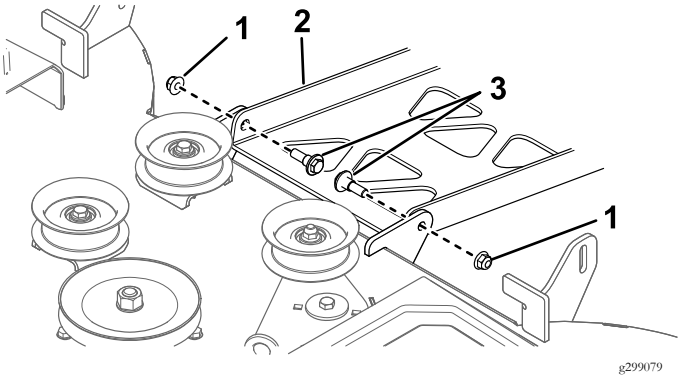


Figure 63

1. Nut
2. Pivot pan
3. Shoulder bolt

B. At all four corners of the deck, remove the hairpin cotter and washer from the deck pin

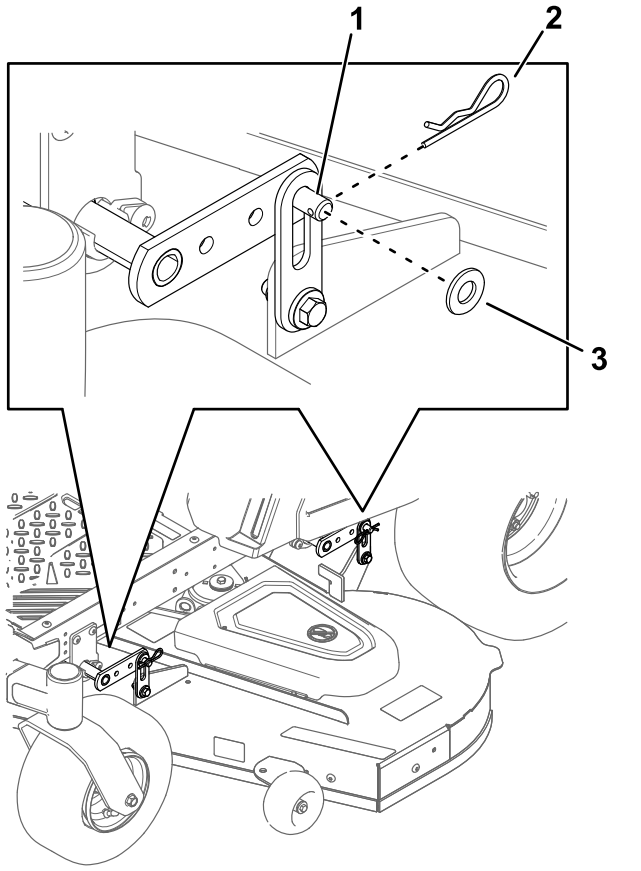


Figure 64

1. Deck pin
2. Hairpin cotter
3. Washer

C. Raise the height of cut to the highest position.

D. Remove the belt from the clutch pulley on the engine.

3. Slide the mower deck out from underneath the machine.

Note: Retain all parts for future installation.

Installing the Mower Deck

Service Interval: As required

1. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.
2. Slide the mower deck under the machine.
3. Lower the height of cut lever to the lowest position.
4. Install the mower belt onto the engine pulley; refer to **Replacing the Mower Belt**.
5. To install the mower deck:
   - **For 42 and 50 Inch Models**
     A. On one side of the machine, lift the rear of the mower deck and install the lift arm to the deck pin (Figure 62).
     B. Install the lift arm using the washer and hairpin cotter.
     C. Repeat steps A and B for the other side of the machine.
   - **For 48 and 54 Inch Models**
     A. Lift the rear of the mower deck and attach the rear deck hangers to the rear deck pins (reference Figure 64).
     B. Attach the front deck hangers to the front deck pins.
     C. Secure the deck pins with the hairpin cotters and washers removed previously.
     D. Secure the rear of the deck to the pivot pan using the shoulder bolts and nuts removed previously (reference Figure 63).
6. Level the deck; refer to **Leveling the Mower Deck** section.

Mower Belt Maintenance

Inspecting the Belts

Service Interval: Every 25 hours/Monthly (whichever comes first)

Check the belts for cracks, frayed edges, burn marks, or any other damage. Replace damaged belts.

Replacing the Mower Belt

Squealing when the belt is rotating, blades slipping when cutting grass, frayed belt edges, burn marks, and cracks are signs of a worn mower belt. Replace the mower belt if any of these conditions are evident.

1. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.
2. Set the height of cut at the lowest cutting position [1 1/2 inch (38 mm)].

3. Remove and retain the belt covers.
4. Using a spring removal tool, (P/N 92-5771), remove the idler spring from the deck hook to remove tension on the idler pulley and roll the belt off of the pulleys.

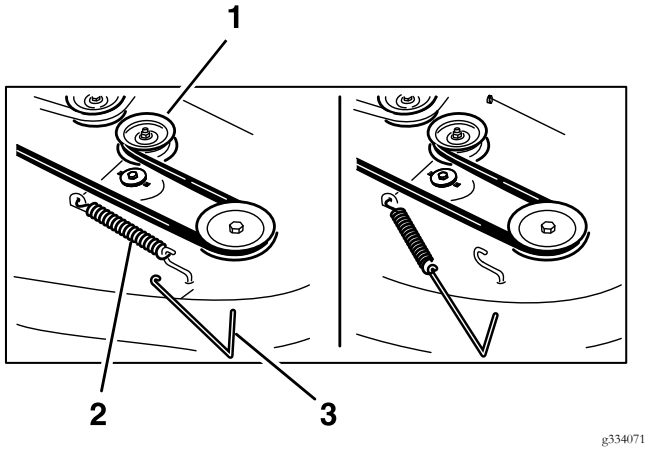


Figure 65

1. Idler pulley
2. Spring
3. Spring removal tool

⚠ WARNING

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

Be careful when removing the belt.

5. Route the new belt around the engine pulley and mower pulleys.
6. Using a spring removal tool, (P/N 92-5771), install the idler spring over the deck hook and placing tension on the idler pulley and mower belt.

Replacing the Discharge Deflector

⚠ DANGER

An uncovered discharge opening could allow the lawn mower to throw objects in the operator's or bystander's direction and result in serious injury. Also, contact with the blade could occur.

Never operate the lawn mower unless you install a mulch plate, discharge deflector, or grass collection system.

Inspect the discharge deflector for damage before each use. Replace any damaged parts before use.

Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.

- For E- and S-Series Models:

1. Remove the nut (3/8 inch) from the rod under the mower (Figure 66).

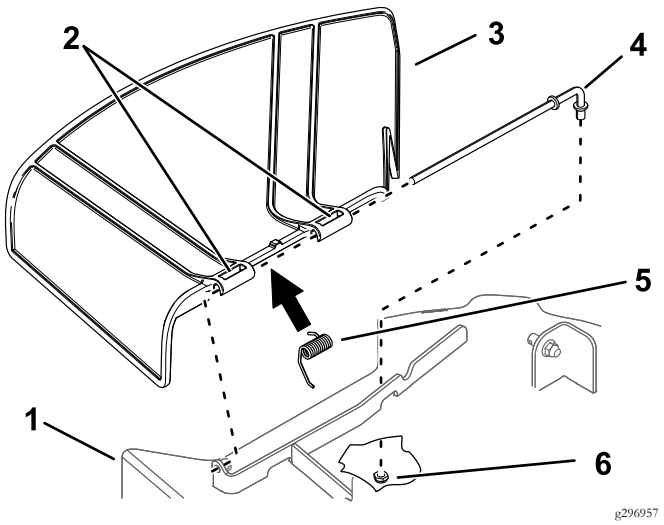


Figure 66

1. Mower deck
2. Short standoff
3. Discharge deflector bracket
4. Discharge deflector
5. Rod
6. Spring
7. Nut (3/8 inch)

2. Slide the rod out of the short standoff, spring, and discharge deflector.
3. Remove the discharge deflector.
4. Install the new discharge deflector.
5. Slide the straight end of the rod through the rear discharge deflector bracket.
6. Place the spring on the rod, with end wires down, and between the discharge deflector brackets.
7. Slide the rod through the second discharge deflector bracket.
8. Insert the rod at the front of the discharge deflector into the short standoff on the deck.
9. Secure the rear end of the rod into the mower with a nut (3/8 inch) as shown in Figure 66.

Important: The discharge deflector must be spring loaded in the down position.

Lift the deflector up to test that it snaps to the full down position.

- For X-Series Models:

1. Remove and retain the three bolts and nuts from the discharge deflector.

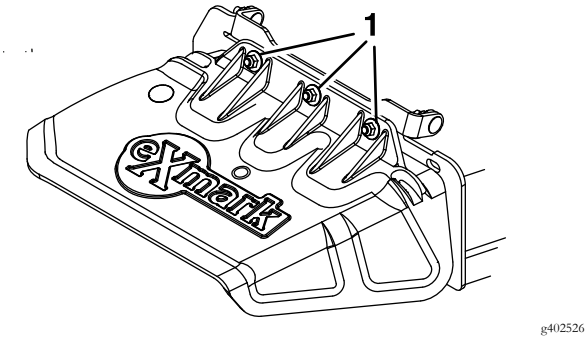


Figure 67

1. Bolt and nut

2. Install the new deflector using the hardware retained in step 1.
3. Lower the discharge deflector to the full down position.

Cleaning

Cleaning and Storing Safety

- Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position. Allow the machine to cool before servicing, adjusting, fueling, cleaning, or storing.
- Clean grass and debris from the cutting unit, muffler, drives, grass catcher, and engine compartment to prevent fires.
- Allow the machine to cool before storing the machine in any enclosure. Do Not store the machine or fuel container, or refuel, where there is an open flame, spark, or pilot light such as on a water heater or other appliance.

Clean Grass Build-Up Under Deck

Service Interval: Before each use or daily

1. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.
2. Raise deck to the transport (4 1/2 inch (114 mm) cutting height) position. Lift the front of machine and support unit using jack stands or equivalent support.
3. Clean out any grass build-up from underside of deck and in discharge deflector.

Clean Debris From Machine

Service Interval: Before each use or daily

1. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key. Wait for all moving parts to stop before leaving the operator's position.
2. Clean off any oil, debris, or grass build-up on the machine and cutting deck, especially under deck belt shields, around the fuel tank, around engine and exhaust area.

   Important: You can wash the machine with mild detergent and water. Do not pressure wash the machine. Avoid excessive use of water, especially near the control panel, under

the seat, around the engine, hydraulic pumps, and motors.

Clean Engine and Exhaust System Area

Service Interval: Before each use or daily (May be required more often in dry or dirty conditions.)

⚠ CAUTION

Excessive debris around engine cooling air intake and exhaust system area can cause engine, exhaust area, and hydraulic system to overheat which can create a fire hazard.

Clean all debris from engine and exhaust system area.

1. Park machine on level ground, disengage the blade control switch, engage the parking brake, stop engine, and remove key.
2. Clean all debris from rotating engine air intake screen, around engine shrouding, and exhaust system area.
3. Wipe up any excessive grease or oil around the engine and exhaust system area.

Waste Disposal

Motor Oil Disposal

Engine oil and hydraulic oil are both pollutants to the environment. Dispose of used oil at a certified recycling center or according to your state and local regulations.

Battery Disposal

⚠ DANGER

Battery electrolyte contains sulfuric acid, which is poisonous and can cause severe burns. Swallowing electrolyte can be fatal or if it touches skin can cause severe burns.

- **Wear safety glasses to shield eyes, and rubber gloves to protect skin and clothing when handling electrolyte.**
- **Do Not swallow electrolyte.**
- **In the event of an accident, flush with water and call a doctor immediately.**

Federal law states that batteries should not be placed in the garbage. Management and disposal practices must be within relevant federal, state, or local laws.

If a battery is being replaced or if the unit containing the battery is no longer operating and is being scrapped, take the battery to a local certified recycling center. If no local recycling is available return the battery to any certified battery reseller.

Troubleshooting

Important: It is essential that all operator safety mechanisms be connected and in proper operating condition prior to mower use.

When a problem occurs, Do Not overlook the simple causes. For example: starting problems could be caused by an empty fuel tank.

The following table lists some of the common causes of trouble. Do Not attempt to service or replace major items or any items that call for special timing of adjustments procedures (such as valves, governor, etc.). Have this work done by your **Engine Service Dealer**.

Note: When disconnecting electrical connectors Do Not pull on the wires to separate the connectors.

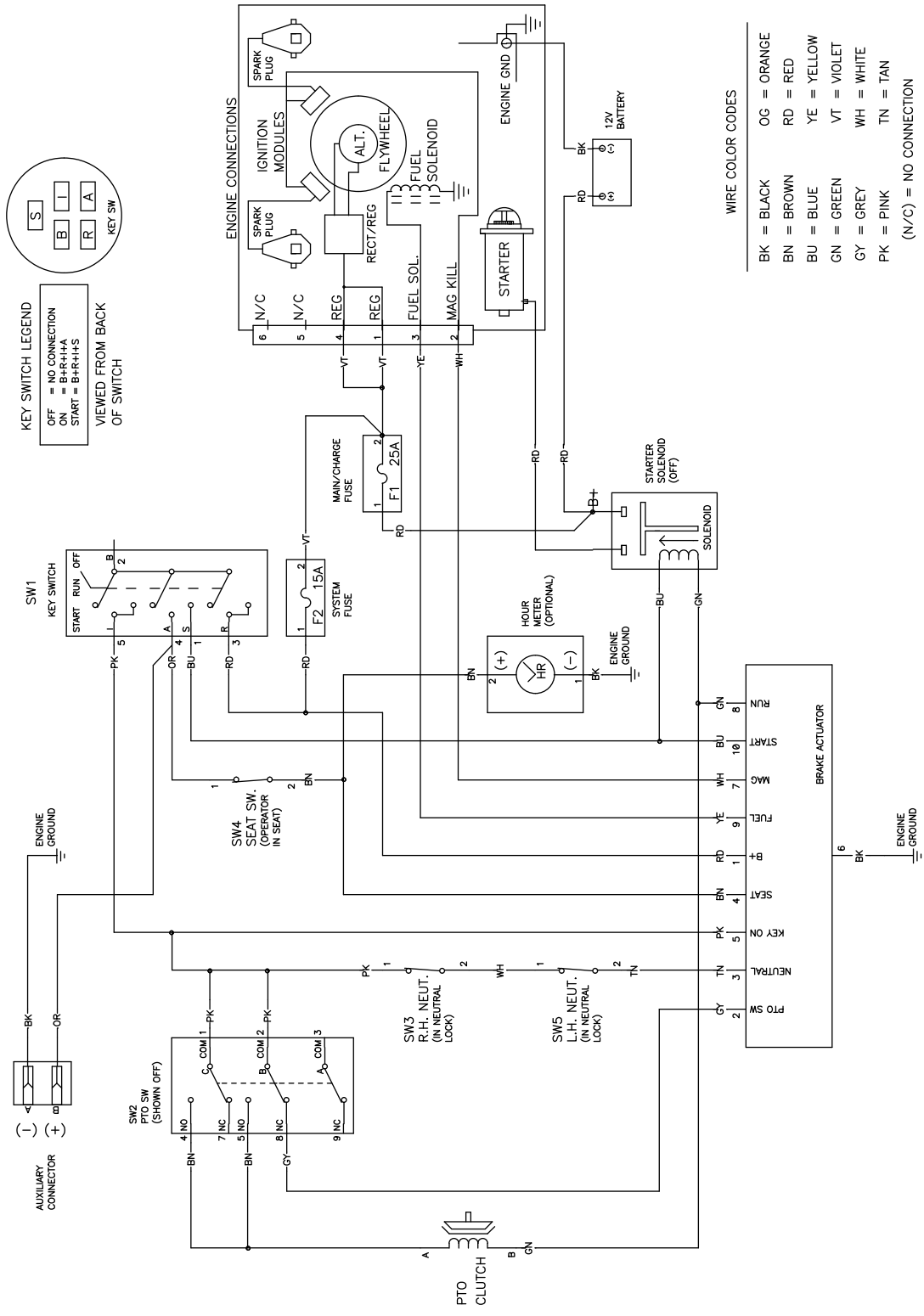
Problem	Possible Cause	Corrective Action
The engine overheats.	1. The engine load is excessive. 2. The oil level in the crankcase is low. 3. The cooling fins and air passages under the engine blower housing are plugged. 4. The air cleaner is dirty. 5. Dirt, water, or stale fuel is in fuel system.	1. Reduce ground speed. 2. Add oil to the crankcase. 3. Remove the obstruction from the cooling fins and air passages. 4. Clean or replace the air cleaner element. 5. Contact an Authorized Service Dealer.
The starter does not crank	1. The blade control switch is engaged. 2. Park brake is not engaged. 3. The operator is not seated. 4. Battery does not have a full charge. 5. The electrical connections are corroded or loose. 6. A fuse is blown. 7. A relay or switch is damaged.	1. Move the blade control switch to disengaged. 2. Engage the park brake.. 3. Sit on the seat. 4. Charge the battery. See **Check Battery Charge** and **Recommended Jump Starting Procedure** sections in Maintenance. 5. Check the electrical connections for good contact. 6. Replace the fuse. 7. Contact an Authorized Service Dealer.
Engine will not start, starts hard, or fails to keep running	1. Fuel tank is empty. 2. The choke is not on. 3. The air cleaner is dirty. 4. The spark plug wire(s) is loose or disconnected. 5. The spark plug(s) is pitted, fouled, or the gap is incorrect. 6. There is dirt in fuel filter. 7. Dirt, water, or stale fuel is in the fuel system. 8. There is incorrect fuel in the fuel tank. 9. The oil level in the crankcase is low.	1. Fill the fuel tank. 2. Move the choke lever to On (if applicable). 3. Clean or replace the air cleaner element. 4. Install the wire(s) on the spark plug. 5. Install a new, correctly gapped spark plug(s). 6. Replace the fuel filter. 7. Contact an Authorized Service Dealer. 8. Drain the tank and replace the fuel with the proper type. 9. Add oil to the crankcase.

Troubleshooting

Problem	Possible Cause	Corrective Action
Engine loses power	1. Engine load is excessive. 2. Air cleaner is dirty. 3. Oil level in the crankcase is low. 4. Cooling fins and air passages for the engine are plugged. 5. The spark plug(s) is pitted, fouled, or the gap is incorrect. 6. Dirt in fuel filter. 7. Dirt, water, or stale fuel is in the fuel system. 8. There is incorrect fuel in the fuel tank. 9. The fuel tank vent is blocked.	1. Reduce the ground speed. 2. Clean or replace the air cleaner element. 3. Add oil to the crankcase. 4. Remove the obstructions from the cooling fins and air passages. 5. Install a new, correctly gapped spark plug(s). 6. Replace the fuel filter. 7. Contact an Authorized Service Dealer. 8. Drain the tank and replace the fuel with the proper type. 9. Contact an Authorized Service Dealer.
The machine does not drive.	1. The drive belts are worn, loose, or broken. 2. The drive belts are off of the pulleys. 3. The drive is in bypass mode.	1. Contact an Authorized Service Dealer. 2. Contact an Authorized Service Dealer. 3. Take machine out of bypass mode. Refer to **Pushing the Machine by Hand** section.
Abnormal vibration	1. Engine mounting bolts are loose. 2. Loose engine pulley, idler pulley, or blade pulley. 3. Engine pulley is damaged. 4. Cutting blade(s) is/are bent or unbalanced. 5. Blade is loose. 6. Blade spindle is bent.	1. Tighten the engine mounting bolts. 2. Tighten the appropriate pulley. 3. Contact an Authorized Service Dealer. 4. Install new cutting blade(s). 5. Tighten the blade mounting bolt and inspect the blade spring disc washer for damage (See **Servicing the Cutting Blades** section). 6. Contact an Authorized Service Dealer.
Uneven cutting height.	1. Blade(s) not sharp. 2. Cutting blade(s) is/are bent. 3. A blade is loose. 4. Mower deck is not level. 5. An anti-scalp wheel is not set correctly 6. Underside of mower is dirty. 7. Tire pressure in drive tires not correct. 8. Blade spindle bent.	1. Sharpen the blade(s). 2. Install new cutting blade(s). 3. Tighten the blade mounting bolt and inspect the blade spring disc washer for damage (See **Servicing the Cutting Blades** section). 4. Level mower deck from side-to-side and front-to-rear. 5. Adjust the anti-scalp wheel height. 6. Clean the underside of the mower. 7. Adjust tire pressure. 8. Contact an Authorized Service Dealer.
Blades do not rotate.	1. Drive belt is worn, loose or broken. 2. Drive belt is off pulley. 3. The mower belt is worn, loose, or broken. 4. The Power Take Off (PTO) switch or PTO clutch is faulty.	1. Install new drive belt. 2. Install drive belt and check adjusting shafts and belt guides for correct position. 3. Install a new mower belt. 4. Contact an Authorized Service Dealer.

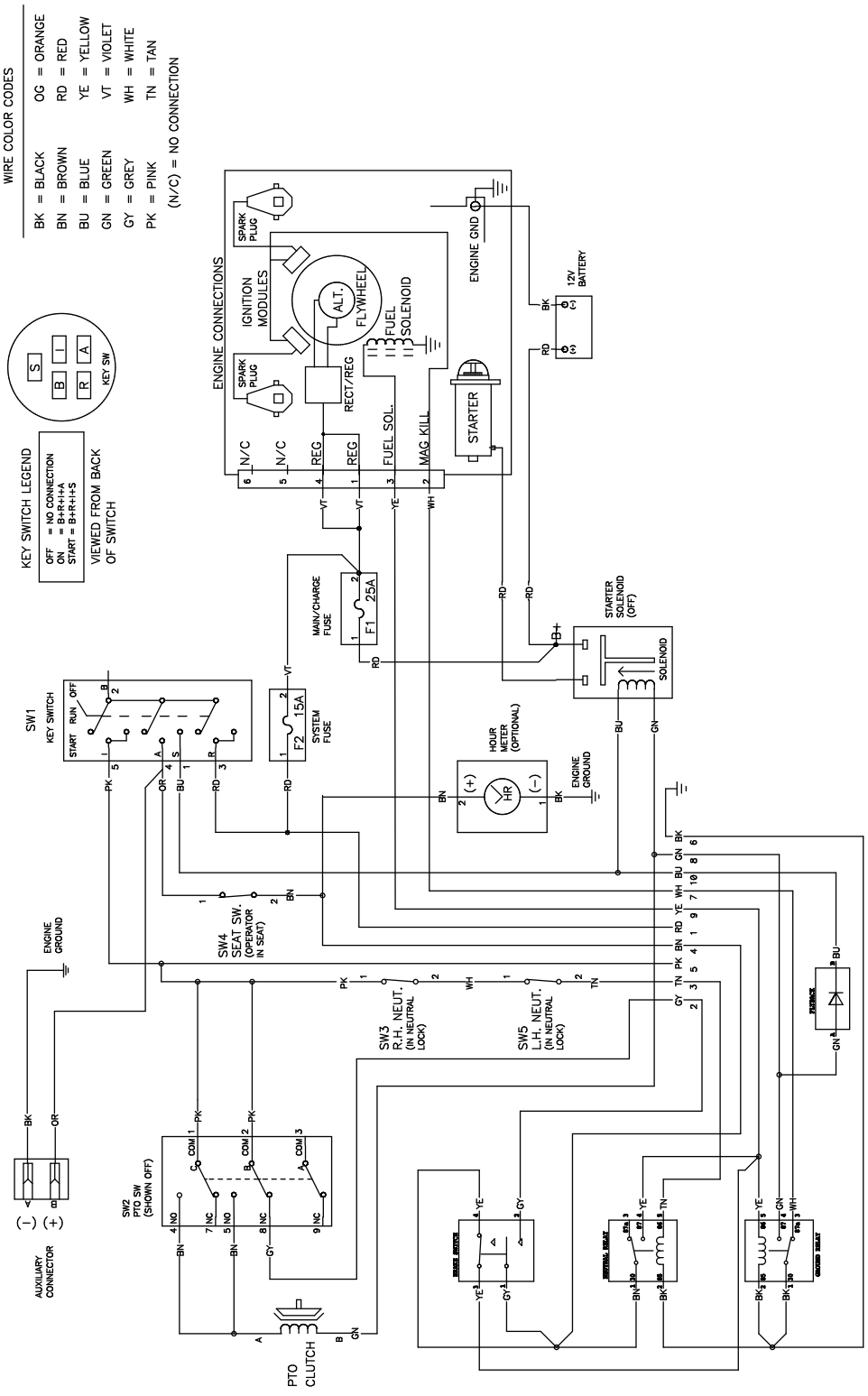
Schematics

Electrical Logic Schematic–E- and S-Series Models



g330623

Electrical Schematic–X-Series Models



g402622

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 does Exmark include this warning?

Exmark 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. Exmark provides 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 Exmark products may be negligible or well within the "no significant risk" range, out of an abundance of caution, Exmark has elected to provide the Prop 65 warnings. Moreover, if Exmark does 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.

Notes:

Service Record

Date:	Description of Work Done:	Service Done By:

MAXIMIZE THE PERFORMANCE OF YOUR EXMARK MACHINE.

EXMARK® PREMIUM ENGINE OIL

Exmark now offers a family of engine oil viscosities to perform well in any environment. Each viscosity has the same synthetic formulation to give you what you need in punishing conditions. We designed each grade to the highest quality, making it ideal even for diesel applications. Coupled with Exmark Premium Fuel Treatment, we have the performance products to make your machine hum.

EXMARK PREMIUM ENGINE OIL SAE 30/10W-30

- Meets zero shear requirements of a straight grade SAE 30 as well as the cold temp properties of a 10W-30.
- Most versatile oil in the industry.
- Superior corrosion protection over conventional oil - even in corrosive, humid environments.

EXMARK PREMIUM ENGINE OIL SAE 10W-50

- Full synthetic formulation gives you peak performance. Don't settle for less.
- Wide span multi-grade combines easy starting in cold weather with maximum protection in high temperature operation.
- Reduce friction & wear over standard mineral formulations.

EXMARK PREMIUM ENGINE OIL UTV FORMULATION

- 4-cycle high-temp formulation.
- Heavier viscosity, full synthetic, perfect for your UTV.

EXMARK PREMIUM ENGINE OIL SAE 20W-50

- Perfect for your big block engine, or any application in severe service.
- Same full synthetic formulation as all other Exmark Premium viscosities.
- Also effective for use in severe service small block engines.

EXMARK PREMIUM ENGINE OIL SAE 0W-40

- The perfect choice for when the weather turns cold or unpredictable, and your Exmark UTV has to perform.
- Commercial quality for severe service.
- Advanced additive package helps prevent corrosion from long-term storage.

EXMARK PREMIUM UTV EXTREME CONDITIONS GEAR OIL

- SAE 80W-90, designed to keep your UTV performing at its peak.
- Shear stable, hypoid gear lube.
- Includes a premium additive system to combat wear, oxidation, rust & corrosion.

Available from your local Exmark dealer. Find your closest dealer at exmark.com

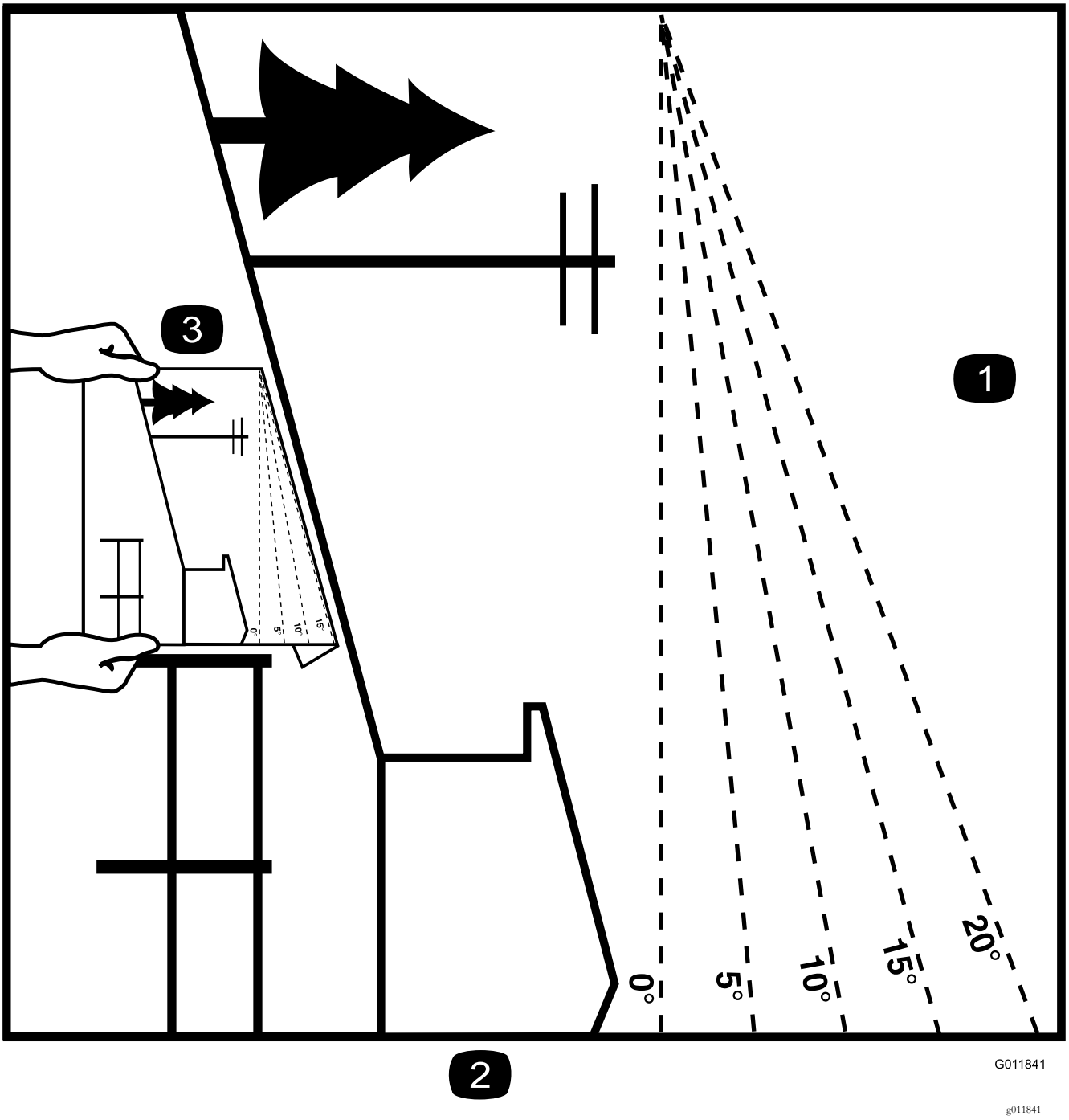


Figure 68

This page may be copied for personal use.

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

EXMARK ACCESSORIES AND OPTIONS*

MID-MOUNT RIDING ACCESSORIES AND OPTIONS

CUSTOM RIDE SEAT SUSPENSION SYSTEM
FULL SUSPENSION SEAT
DECK LIFT ASSIST KIT
HITCH KIT
LIGHT KIT
12V POWER PORT
MICRO-MULCH SYSTEM
OPERATOR CONTROLLED DISCHARGE
SUN SHADE
TRASH CONTAINER
TURF STRIPER
ULTRA VAC COLLECTION SYSTEM
ULTRA VAC QUICK DISPOSAL SYSTEM

OUT-FRONT RIDING ACCESSORIES AND OPTIONS

CUSTOM RIDE SEAT SUSPENSION SYSTEM
DUAL-TAIL WHEEL
FLOOR PAN EXTENDER
HITCH KIT
LIGHT KIT
MICRO-MULCH SYSTEM
ROLL OVER PROTECTION SYSTEM (ROPS)
SNOW BLADE
SNOWBLOWER
SUN SHADE
TRASH CONTAINER
ULTRA VAC COLLECTION SYSTEM
ULTRA VAC QUICK DISPOSAL SYSTEM
WEATHER CAB

WALK-BEHIND ACCESSORIES AND OPTIONS

GRASS CATCHER
MICRO-MULCH SYSTEM
TURF STRIPER
STANDON

*Some accessories and options not available for some models.

Place Model No. and Serial No. Label Here (Included in the Literature Pack) or Fill in Below

Model No. _____

Serial No. _____

Date Purchased _____

Engine Model No. and Spec. No. _____

Engine Serial No. (E/No) _____

415 Industrial Row
Beatrice, NE 68310
(402) 223-6300
Part No. 4507-491 Rev. A
Printed in the USA

www.exmark.com