

## **LAZER Z® DS-SERIES**

**For Serial Nos.  
312,000,000 & Higher  
Lazer Z (LZDS) Units**  
Part No. 4501-041 Rev. A

# **Operator's Manual**

**⚠ 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.

**Important:** The engine in this product is not equipped with a spark arrester muffler. It is a violation of California Public Resource Code (CPRC) Section 4442 to use or operate this engine on any forest-covered, brush-covered, or grass-covered land as defined in CPRC 4126. Other states or federal areas may have similar laws.

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

This spark ignition system complies with the Canadian standard ICES-002. Ce système d'allumage par étincelle de véhicule est conforme à la norme NMB-002 du Canada.

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

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

Exmark reserves the right to make changes or add improvements to its products at any time without incurring any obligation to make such changes to products manufactured previously. Exmark, or its distributors and dealers, accept no responsibility for variations which may be evident in the actual specifications of its products and the statements and descriptions contained in this publication.



If your Exmark dealer does not have the Exmark part in stock, Exmark will get the parts to the dealer the next business day or the part will be FREE Guaranteed!! (Some restrictions apply. See your participating Exmark Dealer for details.)

# 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 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.

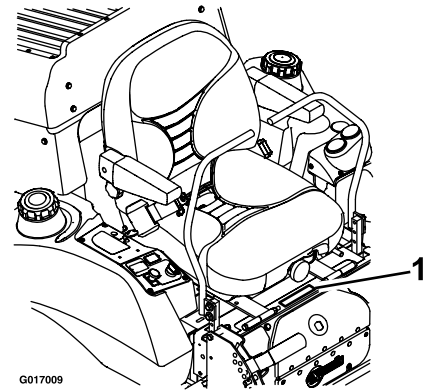
If additional information is needed, or should you require trained mechanic service, contact your authorized Exmark equipment dealer or distributor. Exmark parts manuals are available online at <http://www.exmark.com>

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.



**Figure 1**

1. Model and serial number location

<b>Model No.</b> _____
<b>Serial No.</b> _____

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# Safety

## Safety Alert Symbol

This lawn mower meets or exceeds the B71.4 specifications of the American National Standards Institute in effect at the time of production.

Exmark designed and tested this lawn mower to offer reasonably safe service; however, failure to comply with the following instructions may result in personal injury.

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!**



**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:** White lettering / Red background. Indicates an imminently hazardous situation which, if not avoided, **Will** result in death or serious injury.

**WARNING:** Black lettering / Orange background. Indicates a potentially hazardous situation which, if not avoided, **Could** result in death or serious injury.

**CAUTION:** Black lettering / Yellow background. 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.

## Safe Operating Practices

### Training

- Read the Operator's Manual and other training material. If the operator(s) or mechanic(s) can not read English it is the owner's responsibility to explain this material to them.
- Become familiar with the safe operation of the equipment, operator controls, and safety signs.
- All operators and mechanics should be trained. The owner is responsible for training the users.
- Never let children or untrained people operate or service the equipment. Local regulations may restrict the age of the operator.
- Only adults and mature teenagers should operate a mower, and even mature teenagers should have adult supervision. Be sure a teenager:
  1. has read and understands the Operator's Manual and recognizes the risks involved;
  2. is sufficiently mature to use caution; and
  3. is of sufficient size and weight to operate the controls comfortably and to manage the mower without taking risks.
- The owner/user can prevent and is responsible for accidents or injuries occurring to himself or herself, other people or property.

### Preparation

- Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job. Only use accessories and attachments approved by Exmark.
- Wear appropriate clothing including safety glasses, substantial footwear, long trousers, and hearing protection. Do Not operate when barefoot or when wearing open sandals. Long hair, loose clothing or jewelry may get tangled in moving parts.

### **▲ CAUTION**

**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.**

# Safety

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- Inspect the area where the equipment is to be used and remove all rocks, toys, sticks, wires, bones, and other foreign objects which can be thrown by the machine and may cause personal injury to the operator or bystanders.

## **⚠ DANGER**

In certain conditions diesel fuel is extremely flammable and vapors are explosive.

A fire or explosion from diesel fuel 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. Wipe up any diesel fuel that spills.
- Never refill the fuel tank or drain the machine indoors or inside an enclosed trailer.
- Do Not fill the fuel tank completely full. Fill the fuel tank to the bottom of the filler neck. The empty space in the tank allows diesel fuel to expand. Overfilling may result in fuel leakage or damage to the engine or emission system.
- Never smoke when handling diesel fuel, and stay away from an open flame or where diesel fuel fumes may be ignited by spark.
- Store diesel fuel in an approved container and keep it out of the reach of children.
- 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.
- 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 operate without entire exhaust system in place and in proper working condition.

## **⚠ WARNING**

Diesel fuel is harmful or fatal if swallowed. Long-term exposure to vapors has caused cancer in laboratory animals. Failure to use caution may cause serious injury or illness.

- Avoid prolonged breathing of vapors.
  - Keep face away from nozzle and gas tank/container opening.
  - Keep away from eyes and skin.
  - Never siphon by mouth.
- Check that the operator's presence controls, safety switches, and shields are attached and functioning properly. Do Not operate unless they are functioning properly.

## Operation

### **⚠ 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.

- Allow engine parts, especially the muffler, to cool before touching.
- Remove accumulated debris from muffler and engine area.
- Install and maintain in working order a spark arrester before using equipment on forest-covered, grass-covered, or brush-covered unimproved land.

### **⚠ WARNING**

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

Do Not run engine indoors or in a small confined area where dangerous carbon monoxide fumes can collect.

- Operate only in daylight or good artificial light, keeping away from holes and hidden hazards.
- Be sure all drives are in neutral and parking brake is engaged before starting engine. Use seat belts with the roll bar in the raised and locked position.
- Never operate the mower with damaged guards, shields, or covers. Always have safety shields,

guards, switches and other devices in place and in proper working condition.

- Never mow with the discharge deflector raised, removed or altered unless there is a grass collection system or mulch kit in place and working properly.
- Do Not change the engine governor setting or overspeed the engine.
- Park machine on level ground. Stop engine, wait for all moving parts to stop, remove key and engage parking brake:
  - 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.
- Stop engine, wait for all moving parts to stop, and engage parking brake:
  - Before refueling.
  - Before dumping the grass catcher.

## **▲ WARNING**

Hands, feet, hair, clothing, or accessories can become entangled in rotating parts. Contact with the rotating parts can cause traumatic amputation or severe lacerations.

- Do Not operate the machine without guards, shields, and safety devices in place and working properly.
- Keep hands, feet, hair, jewelry, or clothing away from rotating parts.
- NEVER carry passengers. DO NOT operate the mower when people, especially children, or pets are in the area.
- Be alert, slow down and use caution when making turns. Look behind and to the side before changing directions.
- 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 aware of the mower discharge path and direct discharge away from others.
- Do Not operate the mower under the influence of alcohol or drugs.
- Use extreme care when loading or unloading the machine into a trailer or truck.
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

## Slope Operation

Use **Extreme** caution when mowing and/or turning on slopes as loss of traction and/or tip-over could occur. The operator is responsible for safe operation on slopes.

## **▲ DANGER**

Operating on wet grass or steep slopes can cause sliding and loss of control. Wheels dropping over edges, ditches, steep banks, or water can cause rollovers, which may result in serious injury, death or drowning.

- Do Not mow slopes when grass is wet.
- Do Not mow near drop-offs or near water.
- Do Not mow slopes greater than 15 degrees.
- Reduce speed and use extreme caution on slopes.
- Avoid sudden turns or rapid speed changes.
- Keep the roll bar in the raised and locked position and use seat belt.
- See inside the back cover to determine the approximate slope angle of the area to be mowed.
- Use a walk behind mower and/or a hand trimmer near drop-offs, ditches, steep banks or water. (Figure 3).

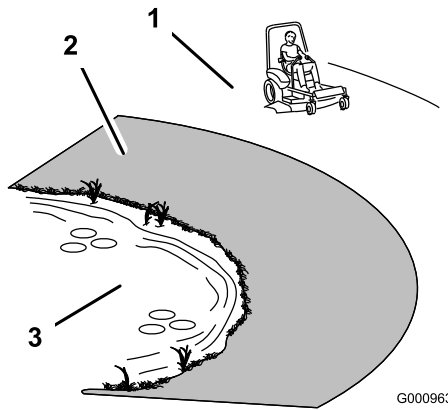


Figure 3

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, near drop-offs and water.
3. Water

- Remove or mark obstacles such as rocks, tree limbs, etc. from the mowing area. Tall grass can hide obstacles.
- Watch for ditches, holes, rocks, dips and rises that change the operating angle, as rough terrain could overturn the machine.
- Avoid sudden starts when mowing uphill because the mower may tip backwards.
- Be aware that operating on wet grass, across steep slopes or downhill may cause the mower to lose traction. Loss of traction to the drive wheels may result in sliding and a loss of braking and steering.
- Always avoid sudden starting or stopping on a slope. If tires lose traction, disengage the blades and proceed slowly off the slope.
- Follow the manufacturer's recommendations for wheel weights or counter weights to improve stability.
- Use extreme care with grass catchers or attachments. These can change the stability of the machine and cause loss of control.

## Using the Rollover Protection System (ROPS)

A Rollover Protection System (roll bar) is installed on the unit.

## ⚠ WARNING

There is no rollover protection when the roll bar is down. Wheels dropping over edges, ditches, steep banks, or water can cause rollovers, which may result in serious injury, death or drowning.

- Keep the roll bar in the raised and locked position and use seat belt.
- Lower the roll bar only when absolutely necessary.
- Do Not wear seat belt when the roll bar is down.
- Drive slowly and carefully.
- Raise the roll bar as soon as clearance permits.
- Check carefully for overhead clearances (i.e. branches, doorways, and electrical wires) before driving under any objects and Do Not contact them.
- In the event of a rollover, take the unit to an Authorized Service Dealer to have the ROPS inspected.

## Maintenance and Storage

- Disengage drives, lower implement, set parking brake, stop engine and remove key. Wait for all movement to stop before adjusting, cleaning or repairing.
- Keep engine and engine area free from accumulation of grass, leaves, excessive grease or oil, and other debris which can accumulate in these areas. These materials can become combustible and may result in a fire.
- Let engine cool before storing and Do Not store near flame or any enclosed area where open pilot lights or heat appliances are present.
- Shut off fuel while storing or transporting. Do Not store fuel near flames or drain indoors.
- Park machine on level ground. Never allow untrained personnel to service machine.
- Use jack stands to support components when required.
- Carefully release pressure from components with stored energy.
- Disconnect battery before making any repairs. Disconnect the negative terminal first and the



positive last. Reconnect positive first and negative last.

- 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.
- Keep hands and feet away from moving parts. If possible, Do Not make adjustments with the engine running.
- Charge batteries in an open well ventilated area, away from spark and flames. Unplug charger before connecting or disconnecting from battery. Wear protective clothing and use insulated tools.

## **▲ 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.**

- Keep all guards, shields and all safety devices in place and in safe working condition.
- Check all bolts frequently to maintain proper tightness.
- Frequently check for worn or deteriorating components that could create a hazard.

## **▲ WARNING**

**Removing standard original equipment parts and accessories may alter the warranty, traction, and safety of the machine. Failure to use original Exmark parts could cause serious injury or death. Making unauthorized changes to the engine, fuel or venting system, may violate EPA and CARB regulations.**

**Replace all parts including, but not limited to, tires, belts, blades, and fuel system components with original Exmark parts.**

## **⚠ 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.

## **⚠ WARNING**

Fuel system components are under high pressure. The use of improper components can result in system failure, fuel leakage and possible explosion.

Use only approved fuel lines and fuel filters for high pressure systems.

## Safety and Instructional Decals

- Keep all safety signs legible. Remove all grease, dirt and debris from safety signs and instructional labels.
- Replace all worn, damaged, or missing safety signs.
- When replacement components are installed, be sure that current safety signs are affixed to the replaced components.
- If an attachment or accessory has been installed, make sure current safety signs are visible.
- New safety signs may be obtained from your authorized Exmark equipment dealer or distributor or from Exmark Mfg. Co. Inc.
- Safety signs may be affixed by peeling off the backing to expose the adhesive surface. Apply only to a clean, dry surface. Smooth to remove any air bubbles.
- Familiarize yourself with the following safety signs and instruction labels. They are critical to the safe operation of your Exmark commercial mower.



1-303508



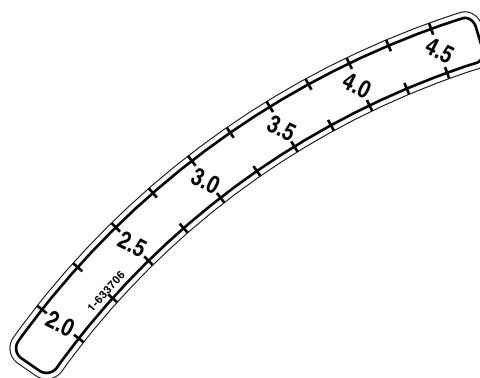
1-403005



1-513742



1-513748




1-633706



98-5954

This cooling system protected by:




**Shell DEX-COOL®\***  
Extended Life Antifreeze/Coolant

- Top off only with Shell DEX-COOL® Extended Life Antifreeze/Coolant
- Suggested change interval is at 4-years or 4,000 hours of service
- Do not mix with conventional coolants
- Shell DEX-COOL® Extended Life Antifreeze/Coolant is available at your local auto parts store

\* DexCool is a registered trademark of General Motors Corp.

Another Product Innovation From:



P/N 103-0223

103-0223



**CAUTION**  
**HOT SURFACE**

103-2076

103-2076



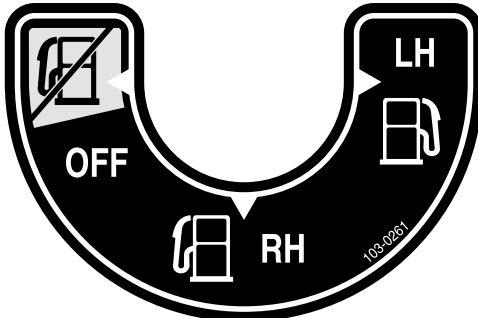
**WARNING**

**ROTATING FAN BLADES**  
Can cause serious injury.

- DO NOT operate without guards in place.
- Stop engine before removing guards.

103-7218

103-7218



**OFF** **LH** **RH**

103-0261

103-0261



**THROTTLE**

103-1798

103-1798



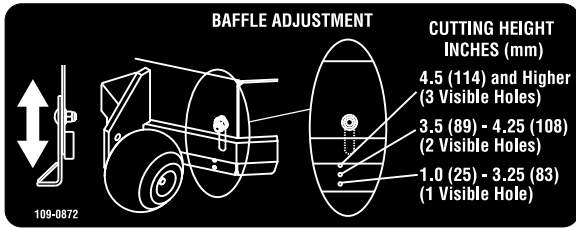
**WARNING**

**TO AVOID INJURY OR DEATH FROM ROLLOVER:**  
Keep roll bar in the raised and locked position and use seat belt.

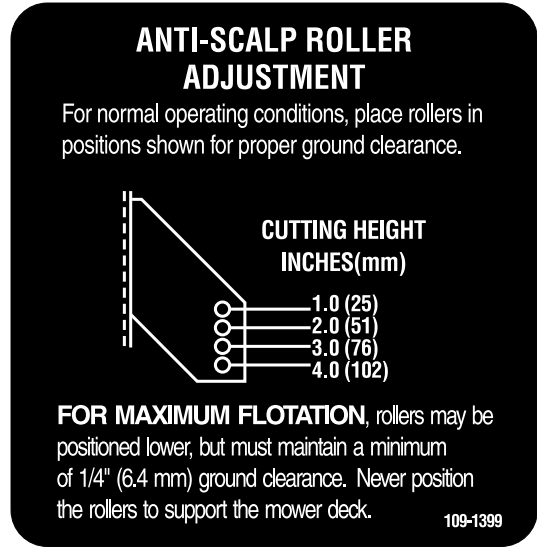
**THERE IS NO ROLL OVER PROTECTION WHEN THE ROLL BAR IS DOWN.**  
Lower the roll bar only when absolutely necessary.  
Do not wear seat belt when the roll bar is down.  
Drive slowly and carefully.  
Raise the roll bar as soon as clearance permits.  
Read and follow slope operation instructions and warnings.

107-2102

107-2102



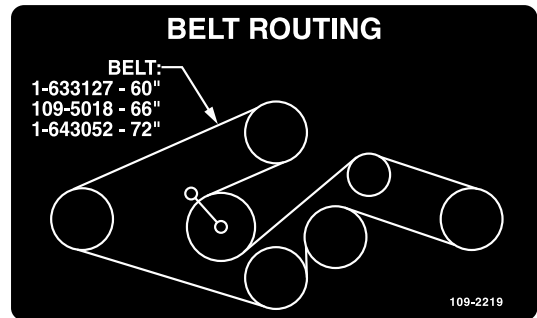
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109-1399



109-1214



109-2219



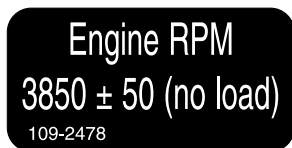
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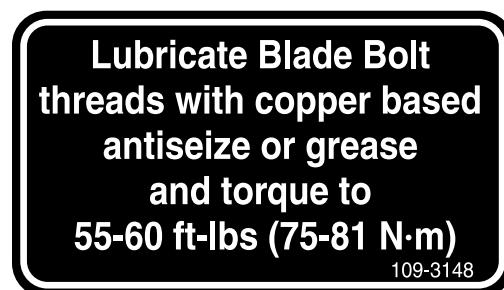
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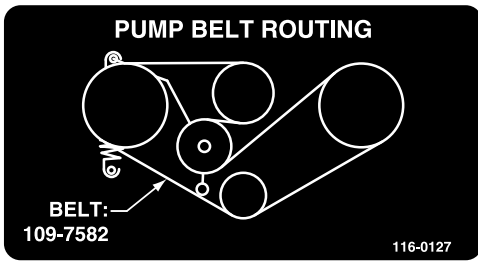
109-2478



109-2951



109-3148



116-0127

**WARNING**

- Operating on wet grass or steep slopes can cause sliding and loss of control.
- Wheels dropping over edges can cause rollovers.
- Going up or backing down steep slopes or ramps can result in backward rollovers.

To avoid loss of control and possibility of rollover resulting in serious injury or death:

- Do not operate near drop-offs or water.
- Do not operate on slopes or ramps greater than 15°.
- Do not use split ramps; use full width ramps to load a unit for transport.
- Reduce speed and use extreme caution on slopes or ramps.
- Avoid sudden turns and rapid speed changes.

There is no rollover protection when the roll bar is down. Always keep roll bar in the raised and locked position and use seat belt. Read and follow rollover protection instructions and warnings.

116-3303

ONLY USE  
**EXMARK HYDRO OIL**  
FILL TO TOP OF BAFFLE

**CAUTION**

**HOT SURFACE**

116-0404

PTO  
KILL  
RELAY

PTO  
RELAY

116-5074

**SERVICE AID**

**Every 8 hours:**  
1. Check engine oil.

**Every 40 hours:**  
2. Check hydraulic oil. (Only use recommended hydro oil)  
3. Check tire pressure – 10 psi.  
4. Grease deck pivots.  
5. Grease deck struts.  
6. Grease deck lift pivot.

**Every 200 hours:**  
7. Grease brake brackets.

**Yearly:**  
8. Grease front caster pivots.  
9. Grease front caster wheel bearings.  
10. Grease belt idlers.

See operator's manual for additional details.

116-0997

116-5185

1. PTO–engage
2. PTO–disengage

Torque Wheel Lug Nuts to 90-95 ft-lbs (122-129 N-m). Check after first 100 hrs then every 500 hrs thereafter.

Torque Wheel Hub Slotted Nut to 211-260 ft-lbs (286-352 N-m). See Operator's Manual for more details.

116-2643

**CALIFORNIA SPARK ARRESTER WARNING**

Operation of this equipment may create sparks that can start fires around dry vegetation. A spark arrester may be required. The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.

117-2718

# Safety

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## CAUTION

A solution of 50% antifreeze and 50% water must be used in this engine. (Freezing point about -34°F) Do not use 100% antifreeze, or severe damage will occur.

19426-87881

19426-87881

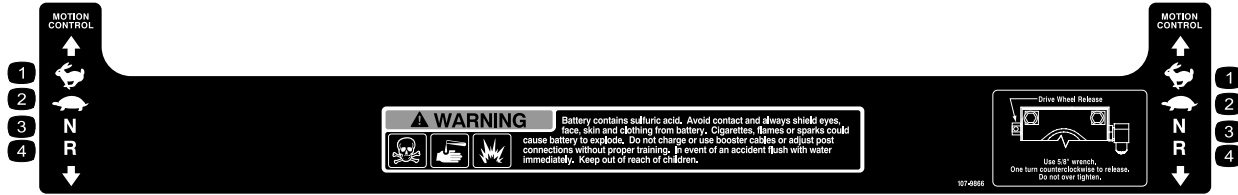
## CAUTION

Do not use ether or starting fluid. Severe engine damage will occur.

19426-87903

19426-87903

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107-9866

- |         |            |
|---------|------------|
| 1. Fast | 3. Neutral |
| 2. Slow | 4. Reverse |
-



# Specifications

## Model Numbers

Serial Nos: 312,000,000 and Higher

LZDS902K605; LZDS902K725

## Systems

### Engine

- Engine Specifications: See your Engine Owner's Manual
- Engine Oil Type: Exmark 4-Cycle Premium Engine Oil
- RPM: Full Speed: 3850  $\pm$ 50 RPM (PTO not engaged) Idle: 1400  $\pm$ 100 RPM

### Fuel System

- Capacity: 15.5 gal. (58.6 L)
- Type of Fuel: Diesel fuel, 40 cetane or higher or biodiesel up to B20 (20% biodiesel, 80% petrodiesel).
- Fuel Filter: In-line 113 Micron Exmark P/N 112-7836.
- Fuel Shut-Off Valve: 1/4 turn increments ("OFF", right tank, left tank, )
- Fuel gauge in left hand fuel tank.

### Electrical System

- Charging System: External Alternator
- Charging Capacity: 60 amps
- Battery Type: BCI Group 26
- Recommended Minimum Battery CCA: 540 CCA
- Battery Voltage: 12 Volt
- Polarity: Negative Ground
- Fuses: One 20 amp blade type; One 30 amp blade type

### Safety Interlock System

- PTO must be disengaged, brake engaged, and motion control levers out (neutral lock) 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, brake is disengaged, or motion control levers are moved in or engine will stop.
- Engine will stop if either the left, the right, or both levers are moved from neutral lock position while brake is engaged.

### Engine Overheat Protection System

PTO will disengage, an alarm will sound, and the coolant temperature gauge will be in the red area when the engine temperature reaches an overheat condition. The PTO will not re-engage until the engine has cooled and the PTO switch is manually shut-off and re-engaged.

**Note:** If the engine coolant level is below the indicator line on the overflow bottle when the engine is cold, the coolant temperature gauge may not register correctly during operation and/or the warning buzzer may not sound if the engine overheats. Refer to **Check Engine Coolant Level** in Maintenance.

### Cooling System

- Fan: Electric with continuous operation with engine running.
- Coolant Liquid: 50/50 mix of DexCool<sup>®</sup> extended life antifreeze and water.
- Coolant Capacity: 4 quarts

### 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.

# Specifications

- Moving motion control levers outward (in slots) locks the drive system in neutral.
- PTO Engagement Switch: Engages electric clutch (to drive belt) which engages mower blades.
- Parking Brake Lever: Engages parking brake.
- Deck Height Adjustment Lever: Sets cutting height to desired position.
- Deck Lift Assist Pedal: Foot pedal that assists in raising the deck.

## Seat

- Type: Deluxe suspension seat high back, low profile foam-in-place cushion (dampened, adjustable spring suspension) and armrests, adjustable back angle.
- Mounting: Hinged to tilt up for access to hydraulic pumps, battery and other components. Held in tilted position with scissor—type links. Adjustable fore and aft seat track.
- Armrests: Molded adjustable flip-up armrests.
- Seat Safety Switch: Integrated seat switch. Time delay seat switch eliminates rough ground cut-outs.

## Hydrostatic Ground Drive System

- Hydrostatic Pumps: Two Hydro Gear PW variable displacement piston pumps.
- Wheel Motors: Two Parker/Ross with 1 1/4 inch tapered shafts.
- Hydraulic Oil Type: Exmark Premium Hydro oil.
- Hydraulic Oil Capacity: 5.5 qt. (5.2 L)
- Hydraulic Filter: Replaceable cartridge type. P/N 103-2146: 25 microns, No bypass
- Speeds:
  - 0-12.0 mph (19.3 km/hr) forward.
  - 0-8.0 mph (12.9 km/hr) reverse.
- Drive wheel release valves allow machine to be moved when engine is not running.

## Tires & Wheels

	Drive	Front Caster
	Pneumatic (Air-Filled)	Semi-Pneumatic
Quantity	2	2

	Drive	Front Caster
Tread Size	“Multi-Trac C/S”	Smooth
Size	26 x 12.00-12	13 x 6.50-6
Ply Rating	4	
Pressure	10 psi (69 kPa)	

## Cutting Deck

- Cutting Width:
  - 60 inch (152.4 cm)
  - 72 inch (182.9 cm)
- Discharge: Side
- Blade Size: (3 ea.)
  - 60 inch Deck: 20.75 inches (52.7 cm)
  - 72 inch Deck: 24.75 inches (62.9 cm)
- Blade Spindles: Solid steel spindles with 1.18 inch (30 mm) I.D. bearings.
- Deck Drive:
  - Electric clutch mounted on horizontal engine shaft. “B” Section belt (with self-tensioning idler) from electric clutch to transfer shaft mounted on deck.
  - Blades are driven by one “B” Section belt (w/self-tensioning idler) from transfer shaft on deck to blade spindles.
- Deck:
 

Full floating deck is attached to out-front support frame. Six anti-scalp rollers provide maximum turf protection. Deck design allows for bagging, mulching or side discharge.
- Deck Depth:
  - 60 inch Deck: 6.0 inches (15.2 cm)
  - 72 inch Deck: 6.0 inches (15.2 cm)
- Cutting Height Adjustment:
 

An extra-long cushioned lever is used to adjust the cutting height from 1 inch (2.5 cm) to 5 inches (12.7 cm) in 1/4 inch (6.4 mm) increments. The cutting height adjustment handle has a transport position and all adjustments can be made while the operator remains seated. Units also have a foot operated deck lift assist lever to aid in raising the deck.
- Mulching Kit: Optional.

## Dimensions

### Overall Width:

	60 inch Deck	72 inch Deck
Without Deck	53.5 inches (135.9 cm)	61.5 inches (156.2 cm)
Deflector Up	61.4 inches (156.0 cm)	74.3 inches (188.7 cm)
Deflector Down	72.8 inches (184.9 cm)	85.8 inches (217.9 cm)

### Overall Length:

	60 inch Deck	72 inch Deck
Roll Bar - Up	81.9 inches (208.0 cm)	85.8 inches (217.9 cm)
Roll Bar - Down	92.5 inches (235.0 cm)	96.4 inches (244.9 cm)

### Overall Height:

Roll Bar - Up	Roll Bar - Down
72.7 inches (184.7 cm)	53.8 inches (136.7 cm)

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

	60 inch Deck	72 inch Deck
Drive Wheels	41.9 inches (106.4 cm)	45.9 inches (116.6 cm)
Caster Wheels	37.3 inches (94.7 cm)	47.3 inches (120.1 cm)

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

60 inch Deck	72 inch Deck
56.0 inches (142.2 cm)	60.2 inches (152.9 cm)

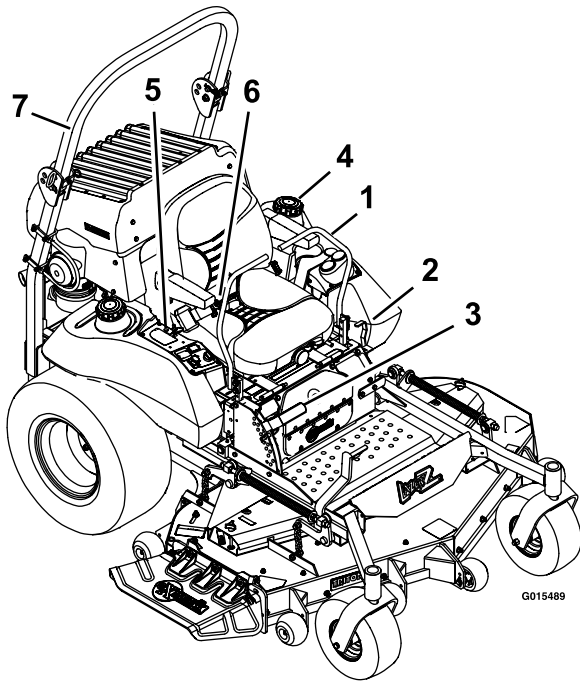
### Curb Weight:

60 inch Deck	72 inch Deck
1545 lb (701 kg)	1645 lb (746 kg)

## Torque Requirements

Bolt Location	Torque
Blade Drive Sheave Mounting Nut	90-110 ft-lb (122-149 N-m)
Cutter Housing Spindle Nut	160-185 ft-lb (217-251 N-m)
Blade Mounting Bolt (lubricate with anti-seize)	55-60 ft-lb (75-81 N-m)
Engine Deck/Front Frame Mount Bolts	30-35 ft-lb (41-47 N-m)
Anti-Scalp Roller Nyloc Nut See Figure 12	30-35 ft-lb (41-47 N-m)
Anti-Scalp Roller Hex Capscrew See Figure 12	50-55 ft-lb (68-75 N-m)
Engine Mounting Bolts 1/2-13 inch screws M10 screws	67-83 ft-lb (99-113 N-m) 30 ft-lb (41 N-m)
Wheel Lug Nuts	90-95 ft-lb (122-129 N-m)
Wheel Motor Mounting Bolts	72-77 ft-lb (98-104 N-m)
Wheel Hub Slotted Nut	211-260 ft-lb (286-352 N-m)
Rollover Protection System (Roll Bar) Mounting Bolts	30-35 ft-lb (41-47 N-m)
Deck Drive Jackshaft Nut	75-80 ft-lb (102-108 N-m)
Clutch Retaining Bolt (secured with threadlocker)	55-60 ft-lb (75-81 N-m)
Exhaust Muffler Nuts and Mounting Bolts	228 in-lb (26 N-m)

## Product Overview



**Figure 4**

- |                             |                                      |
|-----------------------------|--------------------------------------|
| 1. Motion control levers    | 5. Engine Controls (right console)   |
| 2. Parking brake            | 6. Seat belt                         |
| 3. Height of cut adjustment | 7. Rollover Protection System (ROPS) |
| 4. Fuel cap (both sides)    |                                      |

## Operation

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

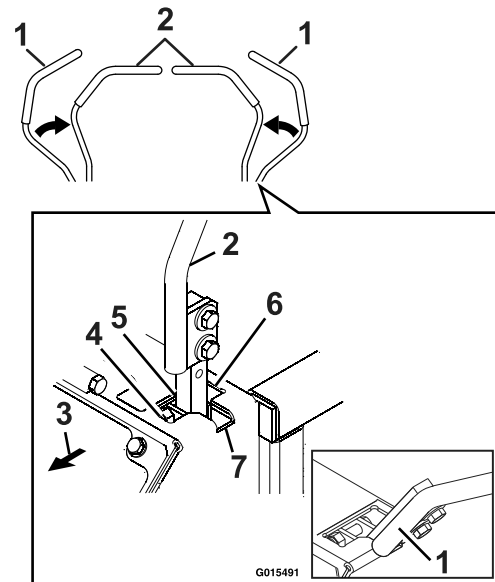
### Controls

#### Motion Control Levers

The motion control levers located on each side of the console control the forward and reverse motion of the machine.

Moving the levers forward or backward turns the wheel on the same side forward or reverse respectively. Wheel speed is proportional to the amount the lever is moved.

Moving the levers outward from the center position into the T-slot locks them in the neutral position (Figure 5).



**Figure 5**

- |  |                      |
|--|----------------------|
| 1. Neutral lock position (handles out)   | 5. Neutral (operate) |
| 2. Neutral operate position (handles in) | 6. Reverse           |
| 3. Front of Unit                         | 7. Neutral lock      |
| 4. Forward                               |                      |

#### Throttle Control

Located on right fuel tank.

The throttle is used to control engine speed. Moving the throttle lever forward will increase engine speed

and moving the throttle lever to the rear will decrease engine speed. Moving the throttle forward into the detent is full throttle.

## Brake Lever

Located on left side of unit, just to the front of the console.

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.

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

## Ignition Switch

Located on right fuel tank.

The ignition switch is used to start and stop the engine. The switch has three positions “OFF”, “ON” and “START”. 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).

**Note:** Brake must be engaged, motion control levers out (neutral lock position) and PTO switch “OFF” to start engine. (It is not necessary for the operator to be in the seat to start the engine.)

## Hour Meter

Located on the right fuel tank.

The hour meter is connected to a pressure switch installed in the engine block and it records the number of hours that the engine has run. If the ignition switch is left on without engine running, hour meter will not run.

**Note:** This switch is not a low oil sensor and will not alert the operator if the engine oil is low.

## Fuel Shut-Off Valve

Located directly below the right side of console, next to the cubby.

The fuel shut-off valve is used to shut off the fuel when the machine will not be used for a few days, during transport to and from the jobsite, and when parked inside a building.

The valve has three positions, each position made in 1/4 turn increments.

Fuel Flow	Valve Handle Position
“Off”	Right
Right Tank	Down
Left Tank	Left

## Fuel Gauge

Located on the left fuel tank.

The fuel gauge monitors the amount of fuel in the left tank only. Use the fuel from the right fuel tank first. When the right fuel tank is empty, switch to the left fuel tank. Fuel gauge will monitor the remaining fuel.

## Drive Wheel Release Valves

Located on the top right front corner of hydrostatic pumps.

Drive wheel release valves are used to release the hydrostatic drive system to allow the machine to be pushed without the engine running. Unhook seat latch and tilt seat up to gain access to pumps.

With a 5/8 inch wrench, turn both valves one turn counterclockwise to release drive system. Turn clockwise to reset system. **Do Not overtighten. Do Not tow machine.**

## Tracking Adjustment Knob

Located under the seat on the LH pump control link.

Rotating this knob allows fine tuning adjustments so that the machine tracks straight with the drive levers in the full forward position.

Stop machine and wait for all moving parts to stop. Engage park brake. Unhook seat latch and tilt seat forward to gain access to the tracking knob. Rotate the knob clockwise (as viewed from the rear of the machine) to cause the machine to track more to the right and counterclockwise to cause the machine to track more to the left. Adjust in quarter-turn increments until the machine tracks straight. Check that the machine does not creep when in neutral with the park brake disengaged.

**Important: Do Not rotate the knob too far, as this may cause the machine to creep in neutral. Refer to the Motion Control Linkage Adjustment section in Maintenance.**

# Operation

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## PTO Engagement Switch

Located on right fuel tank.

Switch must be pulled out (up) to engage the blades. Switch is pushed in to disengage the blades.

**Note:** If the engine overheats, the PTO will automatically disengage. The PTO cannot be engaged until the engine has cooled down. To re-engage the PTO, push PTO switch in to the disengaged position and then pull out to engage. Refer to the **Engine overheats** in the Troubleshooting section.

## Coolant Temperature Gauge

Located at the front of the left fuel tank.

The coolant temperature gauge monitors the temperature of the engine coolant. An engine overheating condition is indicated by the red area on the gauge. An alarm will sound and the PTO will disengage. Refer to the **Warning Buzzer** in the Troubleshooting section.

**Note:** If the engine coolant level is below the indicator line on the overflow bottle when the engine is cold, the coolant temperature gauge may not register correctly during operation. Refer to **Check Engine Coolant Level** in Maintenance.

## Voltmeter

Located next to the Coolant Temperature Gauge at the front of the left fuel tank.

The voltmeter measure the voltage output of the alternator. Both high and low voltages will potentially damage the battery.

## Glow Plug Switch and Light

Located on the right fuel tank.

Depress and hold the switch to heat the glow plugs. The glow plug light comes on when the glow plug switch is depressed. The glow plug light indicates the glow plugs are preheating the combustion chamber.

## Low Oil Pressure Light

Located on the right fuel tank.

Light will come on when engine oil pressure is low or lost.

## Warning Buzzer

Located behind the seat under the air deflector on the electrical panel.

The buzzer is a warning signal that the engine is overheating or the oil pressure is low. See the Troubleshooting section.

**Note:** If the engine coolant level is below the indicator line on the overflow bottle when the engine is cold, the warning buzzer may not sound if the engine overheats. Refer to **Check Engine Coolant Level** in Maintenance.

## Deck Lift Pedal

Located at the right front corner of the floor pan.

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.

## Pre-Start

Fill fuel tank on level ground.

Make sure you understand the controls, their locations, their functions, and their safety requirements.

Refer to the Maintenance section and perform all the necessary inspection and maintenance steps.

## Determining Fuel

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

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

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

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

**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.

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

## Biodiesel Ready

This machine can also use a biodiesel blended fuel of up to B20 (20% biodiesel, 80% petrodiesel). The petrodiesel portion should be low or ultra low sulfur.

Observe the following precautions:

- The biodiesel portion of the fuel meets specification ASTM D6751 or EN14214.
- The blended fuel composition should meet ASTM D975 or EN590.
- Painted surfaces may be damaged by biodiesel blends.
- Use B5 (biodiesel content of 5%) or lesser blend in cold weather.
- Monitor seals, hoses, gaskets in contact with fuel as they may degrade over time.
- Fuel filter plugging maybe expected for a time after converting to biodiesel blends.
- Contact your distributor if you wish for more information on biodiesel.

## Operating Instructions

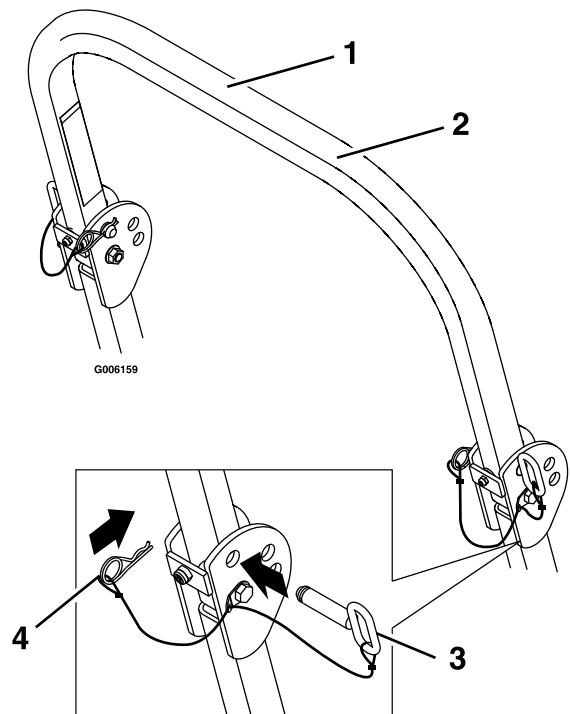
### Raise the Rollover Protection System (ROPS)

**Important:** Lower the roll bar only when absolutely necessary.

1. Remove the hairpin cotter pins and remove the two roll bar pins (Figure 6).
2. Raise the roll bar to the upright position and install the two pins and secure them with the hairpin cotter pins (Figure 6).

**Important:** Always use the seat belt with the roll bar in the raised position. Ensure that the

rear part of the seat is secured with the seat latch.



**Figure 6**

- |                    |                       |
|--------------------|-----------------------|
| 1. Roll bar        | 3. Pin                |
| 2. Raised position | 4. Hairpin cotter pin |

### Open the Fuel Shut-Off Valve

Turn the valve to the LH or RH tank.

### Starting the Engine

1. Move the motion control levers out to the neutral lock position.
2. Pull up and back on the parking brake lever to engage the parking brake.
3. Push down on the PTO switch to the “disengage” position.

**Note:** It is not necessary for the operator to be in the seat to start the engine.

4. Place the throttle midway between the “SLOW” and “FAST” positions.
5. On a warm engine, place the throttle in the “SLOW” position.
6. On a cold engine, (below 14°F (-10°C)), place the throttle in the “MIDWAY” position.

**Note:** Do Not use fuel left over from summer.

# Operation

- Turn ignition switch to the “ON” position. Depress the glow plug switch and the glow plug light will turn on. Hold switch as required by chart below. Turn the ignition switch to the “START” position. Release the ignition switch as soon as the engine starts.

## Glow Plug Chart

Ambient Temperature	Hold Glow Plugs On
Above 50°F (10°C)	NO NEED
50°F (10°C) to 23°F (-5°C)	Approximately 5 seconds
Below 23°F (-5°C)	Approximately 10 seconds
Limit of continuous use	20 seconds

The glow plug light, located near the glow plug switch, will illuminate when the switch is depressed. The glow plug light indicates the glow plugs are preheating the combustion chamber.

**Important: Do Not crank the engine continuously for more than ten seconds at a time. If the engine does not start, allow a 30 second cool-down period between starting attempts. Failure to follow these guidelines can burn out the starter motor and/or fuel solenoid.**

- Move the throttle to the “SLOW” (if in “MIDWAY”) and let the engine warm up a few minutes before moving the throttle to the “FAST” position.

## Engaging the PTO

### **▲ DANGER**

The rotating blades under the mower deck are dangerous. Blade contact can cause serious injury or kill you.

**Do Not put hands or feet under the mower or mower deck when the blades are engaged.**

### **▲ DANGER**

An uncovered discharge opening will allow objects to be thrown in an operator’s or bystander’s direction. Also, contact with the blade could occur. Thrown objects or blade contact can cause serious injury or death.

Never operate the mower with the discharge deflector raised, removed, or altered unless there is a grass collection system or mulch kit in place and working properly.

The PTO push-pull switch engages the cutting blades. Be sure that all persons are clear of the mower deck and discharge area before engaging PTO.

**Important: Operator must be in seat before the PTO can be engaged.**

- Set the throttle midway between the “SLOW” and “FAST” positions.
- Pull the PTO switch outward to engage the blades.
- Place the throttle in the “FAST” position to begin mowing.

## Disengaging the PTO

- Set the throttle midway between the “SLOW” and “FAST” positions.
- Push the PTO switch in to disengage the blades.

## Stopping the Engine

- Bring the unit to a full stop.
- Move the motion control levers out to the neutral lock position.
- Engage the parking brake.
- Place the throttle midway between the “SLOW” and “FAST” positions.
- Disengage the PTO.
- Allow the engine to run for a minimum of 15 seconds, then turn the ignition switch to the “OFF” position to stop the engine.
- Remove the key to prevent children or other unauthorized persons from starting engine.
- Close the fuel shut-off valve when the machine will not be in use for a few days, when transporting, or when the unit is parked inside a building.



## Driving the Machine

### ⚠ 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.

**Important:** To begin movement (forward or backward) the operator must be in the seat, the brake lever must be disengaged (pushed down) before the motion control levers can be moved in or the engine will stop.

When the motion control levers are positioned fully outward (apart) in the T-slot, the drive system is in the neutral lock position (Figure 7).

When the motion control levers are moved directly inward (together) the drive system is in the neutral operate position.

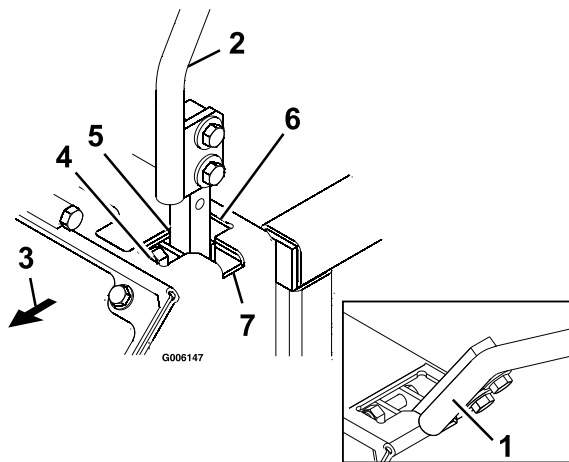


Figure 7

- |  |                      |
|--|----------------------|
| 1. Neutral lock position (handles out)   | 5. Neutral (operate) |
| 2. Neutral operate position (handles in) | 6. Reverse           |
| 3. Front of Unit                         | 7. Neutral lock      |
| 4. Forward                               |                      |

### Driving Forward

1. Release the parking brake.
2. Move the motion control levers inward to the center to the neutral position.

3. To move forward in a straight line, move both levers forward with equal pressure.

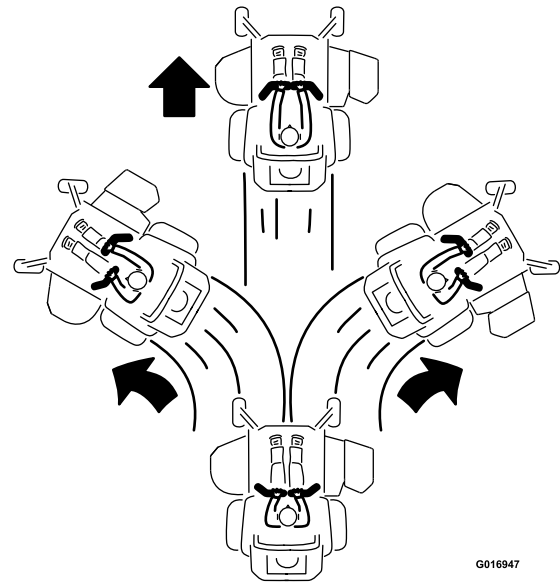


Figure 8

To turn left or right, pull the motion control lever back toward neutral in the desired turn direction.

The machine will move faster the farther the motion control levers are moved from the neutral position.

4. To stop, position both motion control levers in the neutral operate position.

### Driving in Reverse

1. Move the motion control levers inward to the neutral operate position.
2. To move rearward in a straight line, move both levers rearward with equal pressure.

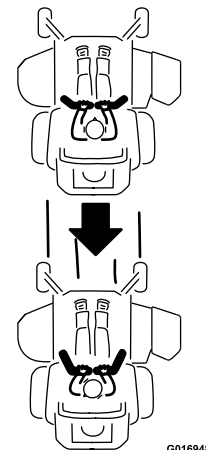


Figure 9

# Operation

To turn right, release pressure on the RH motion control lever and the rear of the machine will move towards the rear and to the right.

To turn left, release pressure on the LH motion control lever and the rear of the machine will move towards the rear and to the left.

3. To stop, position both motion control levers in the neutral operate position.

## Adjusting the Cutting Height

The cutting height of the mower deck is adjusted from 1 to 5 inches (2.54 cm to 12.7 cm) in 1/4 inch (6.4 mm) increments.

1. Stop the machine and move the motion control levers outward to the neutral locked position.
2. Disengage the PTO.
3. Raise the deck height lever to the transport position (also the 5 inch (12.7 cm) cutting height position)(Figure 10).

The deck can be raised by pulling the deck lever up and/or by pushing down on the foot operated deck lift assist lever located at the front right corner of the floor pan.

**Note:** When changing the cutting height positions, always come to a complete stop and disengage the PTO.

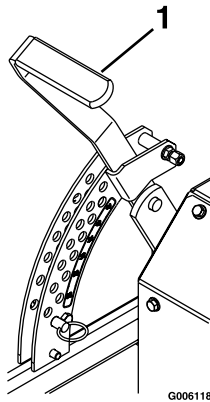


Figure 10

1. Lever in transport and 5 inch (12.7 cm) cutting height position
- 
4. Insert the height adjustment pin into the hole corresponding to the desired cutting height and install the hairpin cotter pin.

See the decal on the side of the deck lift plate for cut heights.

5. Move the deck height lever out of the transport position (or 5 inch (12.7 cm) cutting height) and down onto the height adjustment pin to mow at selected height.

**Note:** The foot operated deck lift assist lever can be used to momentarily lift the deck to clear objects. Be sure that PTO is disengaged.

## Adjusting the Anti-Scalp Rollers

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

1. Stop the machine and move the motion control levers outward to the neutral locked position.
2. Disengage the PTO.
3. Engage the park brake.
4. Stop the engine, remove the key and wait for all moving parts to stop.
5. After adjusting the height of cut, adjust the anti-scalp rollers by removing the bolt and spring disc washer.
6. Place the rollers in one of the positions shown (Figure 11). Rollers will maintain 3/4 inch (19 mm) clearance to the ground to minimize gouging and roller wear or damage.

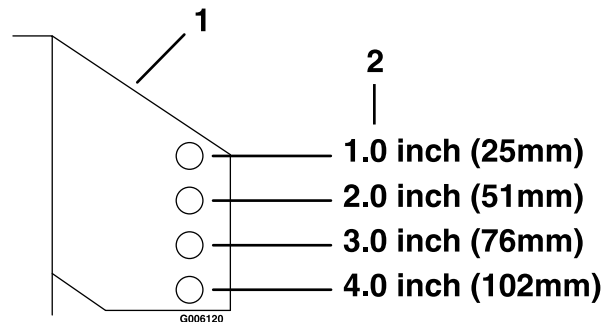


Figure 11

For cutting heights above 4.0 inches (102 mm) use the bottom hole. The rollers will still be effective against scalping.

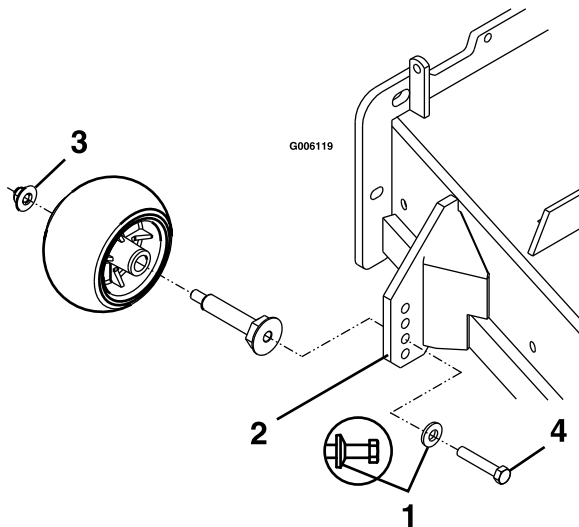
1. Anti-scalp roller mounting bracket
2. Cutting height

**For Maximum Deck Flotation,** place the rollers one hole position lower. Rollers should maintain 1/4 inch (6.4 mm) clearance to the ground. **Do Not** adjust the rollers to support the deck.

- Be sure the roller bolts are installed with the spring disc washer between the head of the bolt and the mounting bracket.

**Note:** The foot operated deck lift assist lever can be used to momentarily lift the deck to clear objects. Be sure that PTO is disengaged.

- Torque the 3/8–24 x 2 Gr 8 hex capscrew to 50–55 ft-lb (68–75 N-m) (Figure 12).



**Figure 12**

- |  |   |
|--|---|
| 1. Spring disc washer (cone towards bolt head) | 3. 3/8 nyloc-torque to 30-35 ft-lb (41-47 N-m)      |
| 2. Front right anti-scalp bracket shown        | 4. 3/8-24 x 2 GR8 torque to 50-55 ft-lb (68-75 N-m) |

- If the 3/8 nyloc nut has been removed, re-install and torque to 30–35 ft-lb (41–47 N-m) (Figure 12).

## Transporting

### Transporting a Unit

Use a heavy-duty trailer or truck to transport the machine. Lock brake and block wheels. Securely fasten the machine to the trailer or truck with straps, chains, cable, or ropes. Be sure that the trailer or truck has all necessary lighting and marking as required by law. Secure a trailer with a safety chain.

### ⚠ CAUTION

This unit does not have proper turn signals, lights, reflective markings, or a slow moving vehicle emblem. Driving on a street or roadway without such equipment is dangerous and can lead to accidents causing personal injury. Driving on a street or roadway without such equipment may also be a violation of State laws and the operator may be subject to traffic tickets and/or fines.

Do Not drive a unit on a public street or roadway.

### ⚠ WARNING

Loading a unit on a trailer or truck increases the possibility of backward tip-over. Backward tip-over could cause serious injury or death.

- Use extreme caution when operating a unit on a ramp.
- Use only a single, full width ramp; Do Not use individual ramps for each side of the unit.
- If individual ramps must be used, use enough ramps to create an unbroken ramp surface wider than the unit.
- Do Not exceed a 15° angle between ramp and ground or between ramp and trailer or truck.
- Avoid sudden acceleration while driving unit up a ramp to avoid tipping backward.
- Avoid sudden deceleration while backing unit down a ramp to avoid tipping backward.

### Loading a Unit

Use extreme caution when loading units on trailers or trucks. One full width ramp that is wide enough to extend beyond the rear tires is recommended instead of individual ramps for each side of the unit. The lower rear section of the tractor frame extends back between the rear wheels and serves as a stop for tipping backward. Having a full width ramp provides a surface for the frame members to contact if the unit starts to tip backward. If it is not possible to use one full width ramp, use enough individual ramps to simulate a full width continuous ramp.

Ramp should be long enough so that the angles between the ramp and the ground and the ramp and the trailer or truck Do Not exceed 15°. A steeper angle may cause mower deck components to get caught as the unit moves from ramp to trailer or

## Operation

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truck. Steeper angles may also cause the unit to tip backward. If loading on or near a slope, position the trailer or truck so it is on the down side of the slope and the ramp extends up the slope. This will minimize the ramp angle. The trailer or truck should be as level as possible.

**Important: Do Not attempt to turn the unit while on the ramp, you may lose control and drive off the side.**

Avoid sudden acceleration when driving up a ramp and sudden deceleration when backing down a ramp. Both maneuvers can cause the unit to tip backward.

# Maintenance

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

## ⚠ WARNING

While maintenance or adjustments are being made, someone could start the engine. Accidental starting of the engine could seriously injure you or other bystanders.

Remove the key from the ignition switch and engage parking brake before you do any maintenance.

## ⚠ WARNING

The engine can become very hot. Touching a hot engine can cause severe burns.

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

## Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 5 hours	<ul style="list-style-type: none"> <li>Change the engine oil.</li> </ul>
After the first 100 hours	<ul style="list-style-type: none"> <li>Check the wheel hub slotted nut torque specifications.</li> <li>Check the wheel lug nuts.</li> <li>Check the park brake adjustment.</li> </ul>
After the first 250 hours	<ul style="list-style-type: none"> <li>Change the hydraulic filter.</li> </ul>
Before each use or daily	<ul style="list-style-type: none"> <li>Check the engine oil level.</li> <li>Check the mower blades.</li> <li>Check the safety interlock system.</li> <li>Check the rollover protections systems (roll bar) pins.</li> <li>Check the seat belt.</li> <li>Check for loose hardware.</li> <li>Check engine coolant level.</li> <li>Clean the engine cooling system.</li> <li>Clean the engine and exhaust system area.</li> <li>Clean the grass and debris build-up from the machine and cutting deck.</li> <li>Clean the grass build-up from under the cutting deck.</li> </ul>
Every 40 hours	<ul style="list-style-type: none"> <li>Check the hydraulic oil level.</li> <li>Check the tire pressures.</li> <li>Check the condition of the belts.</li> <li>Grease the height adjustment shaft bearings.</li> <li>Grease the rear deck struts.</li> <li>Drain fuel filter/water separator.</li> </ul>
Every 50 hours	<ul style="list-style-type: none"> <li>Service the air cleaner. (May need more often under severe conditions. See the Engine Owner's Manual for additional information.)</li> <li>Check spark arrester (if equipped).</li> <li>Clean the engine cooling system.</li> </ul>
Every 100 hours	<ul style="list-style-type: none"> <li>Change the engine oil. (May need more often under severe conditions.)</li> </ul>
Every 160 hours	<ul style="list-style-type: none"> <li>Lubricate the brake handle pivot.</li> <li>Lubricate the brake rod bushings.</li> <li>Lubricate the motion control bronze bushings.</li> </ul>
Every 200 hours	<ul style="list-style-type: none"> <li>Grease the brake brackets.</li> </ul>
Every 400 hours	<ul style="list-style-type: none"> <li>Replace the fuel filter/water separator (more often in dirty or dusty conditions).</li> </ul>

# Maintenance

Maintenance Service Interval	Maintenance Procedure
Every 500 hours	<ul style="list-style-type: none"> <li>• Check the wheel hub slotted nut torque specifications.</li> <li>• Check the wheel lug nuts.</li> <li>• Change the hydraulic filter (Every 250 hours/yearly if using Mobil 1 15W50)</li> <li>• Check the park brake adjustment.</li> </ul>
Every 600 hours	<ul style="list-style-type: none"> <li>• Replace the air cleaner elements. (May need more often under severe conditions. See the Engine Owner's Manual for additional information.)</li> </ul>
Every 4,000 hours	<ul style="list-style-type: none"> <li>• Change engine coolant. Dex-Cool© extended life coolant (orange color)</li> </ul>
Monthly	<ul style="list-style-type: none"> <li>• Check the battery charge.</li> </ul>
Yearly	<ul style="list-style-type: none"> <li>• Change the engine oil if operated less than 100 hours.</li> <li>• Grease the front caster wheel hubs.</li> <li>• Grease front caster pivots.</li> <li>• Grease the deck drive belt idler arm.</li> <li>• Grease the mule drive belt idler arm.</li> <li>• Grease the pump drive belt idler arm.</li> </ul>

## Periodic Maintenance

### Check Engine Oil Level

**Service Interval: Before each use or daily**

1. Stop engine and wait for all moving parts to stop. Make sure unit is on a level surface.
2. Check with engine cold.
3. Raise radiator to gain access to dipstick.

#### **⚠ CAUTION**

**If the radiator prop rod is not securely positioned in the notch the radiator may fall. Falling radiator could cause serious injury.**

**Be sure the prop rod is engaged securely in the notch at the far right side of the slot.**

4. Clean area around dipstick. Remove dipstick and wipe oil off. Reinsert the dipstick and push it all the way down into the tube. Remove the dipstick and read the oil level.
5. If the oil level is low, wipe off the area around the oil fill cap, remove cap and fill to the "FULL" mark on the dipstick. Exmark 4-Cycle Premium Engine Oil is recommended; refer to the Engine Owner's manual for an acceptable alternative. **Do Not** overfill.

**Important: Do Not operate the engine with the oil level below the "LOW" (or "ADD") mark on the dipstick, or over the "FULL" mark.**

### Check Battery Charge

**Service Interval: Monthly**

#### **⚠ WARNING**

#### **CALIFORNIA Proposition 65 Warning**

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

Allowing batteries to stand for an extended period of time 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.

Check the voltage of the battery with a digital voltmeter. Locate the voltage reading of the battery in the table 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 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

### Service Interval: As required

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 13.

# Maintenance

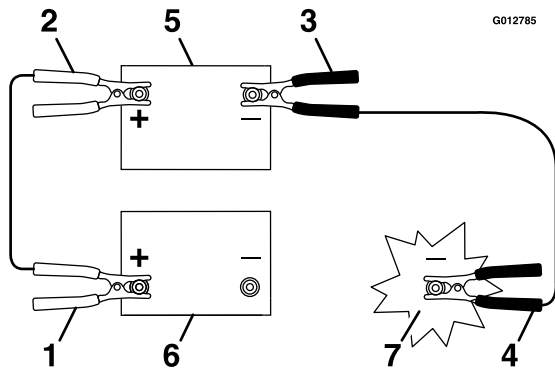


Figure 13

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).

## Check Mower Blades

### Service Interval: Before each use or daily

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Lift deck and secure in raised position as stated in the **Clean Grass Build-Up Under Deck** procedure.
3. Inspect blades and sharpen or replace as required.
4. Reinstall the blades (if they were removed) in the following order:
  - A. Install bushing through blade with bushing flange on bottom (grass) side of blade.

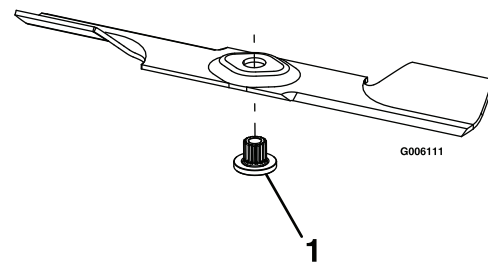


Figure 14

1. Install bushing in blade prior to installing bushing in spindle.

### B. Install bushing/blade assembly into spindle.

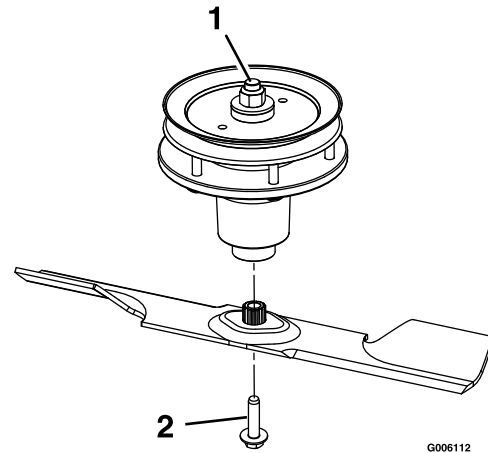


Figure 15

1. Use wrench here for blade installation. This nut has been torqued to 90–110 ft-lb (122–149 N-m)
2. Torque to 55-60 ft-lb (75-81 N-m) Apply lubricant to threads as needed to prevent seizing. Copper-based anti-seize preferable. Grease acceptable substitute.

- C. Apply lubricant to threads of blade bolt as needed to prevent seizing. Copper-based anti-seize preferable. Grease acceptable substitute. Install blade bolt finger tight. Place wrench on the top spindle nut then torque the blade bolts to 55-60 ft-lb (75-81 N-m).



## **▲ WARNING**

**Incorrect installation of the blade or components used to retain the blade can be dangerous. Failure to use all original components and assembled as shown could allow a blade or blade component to be thrown out from under the deck resulting in serious personal injury or death.**

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

## Check Safety Interlock System

**Service Interval: Before each use or daily**

**Note:** To prevent engine cut-outs on rough terrain the seat kill switch has a 1/2 second delay.

1. Check starting circuit. Starter **should** crank with, parking brake **engaged**, PTO **disengaged** and motion control levers moved out in the **neutral lock** position. The operator does not need to be in the seat to start the engine.

Try to start with **operator in seat**, parking brake disengaged, PTO disengaged and motion control levers in the **neutral lock** position - starter **must not crank**.

Try to start with **operator in seat**, parking brake engaged, PTO **engaged** and motion control levers in the **neutral lock** position - starter **must not crank**.

Try to start with **operator in seat**, parking brake **engaged**, PTO **disengaged**, and the **left motion control lever in**, starter **must not crank**, repeat again with the **right lever in**, then with **both levers in** - starter **must not crank**.

2. Check the kill circuits. Run engine at one-third throttle, **disengage** parking brake and **raise off** of seat (but do not get off of machine) engine **must initiate shutdown** after approximately 1/2 second has elapsed (seat has time delay kill switch to prevent cut-outs on rough terrain).

Run engine at one-third throttle, **engage** PTO and **raise off** of seat (but do not get off of machine) engine **must initiate shutdown** after one second has elapsed if the handles are in. The delay will be 1/2 second if the handles are out.

Run engine at one-third throttle, with brake disengaged, move levers in and raise off seat (but do not get off of machine) engine **must initiate shutdown** after 1/2 second has elapsed.

Again, run engine at one-third throttle, brake **engaged**, and move **left motion control lever in** - engine **must initiate shutdown** after 1/2 second has elapsed.

Repeat again moving the **right lever in**, then moving **both levers in** - engine **must initiate shutdown** after 1/2 second has elapsed whether operator is **on seat or not**.

**Note:** If machine does not pass any of these tests, do not operate. Contact your authorized **EXMARK SERVICE DEALER**.

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

## Check Rollover Protections Systems (Roll Bar) Pins

**Service Interval: Before each use or daily**

Make sure latch pin and hair pin are fully installed and lanyard is in good condition.

## Check Seat Belt

**Service Interval: Before each use or daily**

Visually inspect seat belt for wear, cuts, and proper operation of retractor and buckle. Replace before operating if damaged.

## Check for Loose Hardware

**Service Interval: Before each use or daily**

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Visually inspect machine for any loose hardware or any other possible problem. Tighten hardware or correct the problem before operating.

## Service Air Cleaner

**Service Interval: Every 50 hours—Service the air cleaner. (May need more often under severe conditions. See**

**the Engine Owner's Manual for additional information.)**

**Every 600 hours— Replace the air cleaner elements. (May need more often under severe conditions. See the Engine Owner's Manual for additional information.)**

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Unhook two air filter canister latches to gain access to the air cleaner element.
3. Remove air cleaner canister cover and remove outer element.
4. Check the condition of the paper element. Replace if dirty, bent or damaged.
5. Check the condition of the inner element. Replace whenever it appears dirty, typically every other time the paper element is replaced. Clean the base around the inner element before removing, so dirt does not get into the engine.
6. **Do Not** wash or use pressurized air to clean paper element or inner element.
7. Reinstall elements. Position the cover so that the rubber dust ejector is pointing downward and secure with retaining clips.

## Change Engine Oil

**Service Interval: After the first 5 hours**

**Every 100 hours/Yearly (whichever comes first) (May need more often under severe conditions.)**  
**Yearly if operated less than 100 hours.**

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Drain oil while engine is warm from operation.
3. Fasten deck belt spans together with mechanics wire or tie wrap to prevent oil from draining onto belt.
4. Place pan under machine to catch oil. Remove the oil drain plug. Allow oil to drain and replace oil drain plug.

5. Replace the oil filter every other oil change. Clean around oil filter and unscrew filter to remove. Before reinstalling new filter, apply a thin coating of Exmark 4-Cycle Premium Engine Oil on the surface of the rubber seal. Turn filter clockwise until rubber seal contacts the filter adapter then tighten filter an additional 1 full turn.
6. Unlatch radiator and lift it up to access oil fill. Clean around oil fill cap and remove cap. Fill to specified capacity and replace cap. Use oil recommended in the **Check Engine Oil Level** section. **Do Not** overfill. Start the engine and check for leaks.
7. Remove wire or tie wrap from belt spans
8. Start the engine at idle for 5 minutes. Stop engine and wait three minutes, then check the oil level. If required, add oil to bring level to the "FULL" mark on the dipstick. **Do Not** overfill.
9. Check for leaks, including around the oil filter.
10. Wipe up any spilled oil.

## Check Hydraulic Oil Level

**Service Interval: Every 40 hours**

1. Stop engine and wait for all moving parts to stop. Engage parking brake.
2. Clean area around hydraulic reservoir cap and remove cap. Oil level should be to the top of the baffle inside the tank. If not, add oil. Use Exmark Premium Hydro oil. Replace hydraulic reservoir cap and tighten until snug. Do Not overtighten.

**Note:** The baffle is labeled "HOT" and "COLD". The oil level varies with the temperature of the oil. The "HOT" level shows the level of oil when it is at 225°F (107°C). The "COLD" level shows the level of the oil when it is at 75°F (24°C). Fill to the appropriate level depending upon the temperature of the oil. For example: If the oil is about 150°F (65°C), fill to halfway between the "HOT" and "COLD" levels. If the oil is at room temperature (about 75°F (24°C)), fill only to the "COLD" level.

## Check Tire Pressures

**Service Interval: Every 40 hours**

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.

2. Check tire pressure in drive tires.
3. Inflate drive tires to 10 psi (69 kPa).
4. Semi-pneumatic caster tires do not need to be inflated.

**Note: Do Not add any type of tire liner or foam fill material to the tires.** Excessive loads created by foam filled tires may cause failures to the hydro drive system, frame, and other components. Foam filling tires will void the warranty.

## Check Condition Of Belts

### Service Interval: Every 40 hours

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Unhook seat latch and tilt seat up. Remove the air detector panel on front side of the engine compartment to check pump drive belt and alternator belt.
3. Remove left and right belt shields on deck and lift up floor pan to inspect deck drive belt.
4. Check under machine to inspect the mule drive belt. Refer to **Mule Drive Belt Tension Adjustment** section in Adjustments.

## Lubricate Grease Fittings

**Note: See chart for service intervals.**

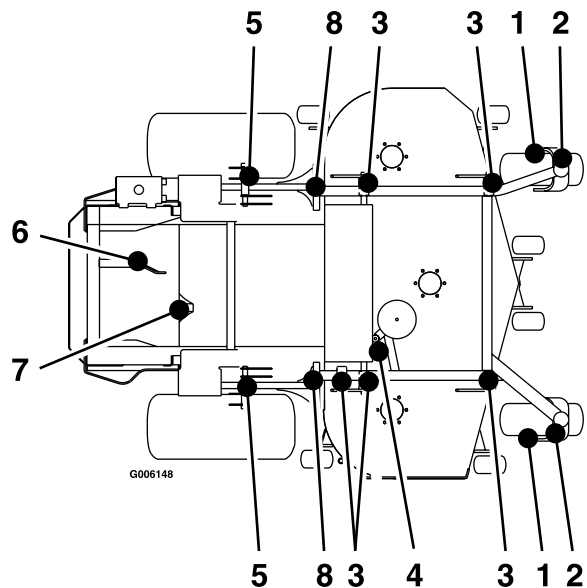
1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Lubricate fittings with one to two pumps of NGLI grade #2 multi-purpose gun grease.

Refer to the following chart for fitting locations and lubrication schedule.

Lubrication Chart			
Fitting Locations	Initial Pumps	Number of Places	Service Interval
1. Front Caster wheel hubs	*0	2	*Yearly
2. Front Caster Pivots	*0	2	*Yearly
3. Height Adjustment Shaft Bearings	1	5	40 Hours

Lubrication Chart			
Fitting Locations	Initial Pumps	Number of Places	Service Interval
4. Deck Drive Belt Idler Arm	1	1	Yearly
5. Brake Brackets	1	2	200 Hours
6. Mule Drive Belt Idler Arm	1	1	Yearly
7. Pump Drive Belt Idler Arm	1	1	Yearly
8. Deck Rear Struts	1	2	40 Hours

\* See step 3 for special lubrication instructions on the front caster pivots and the **Lubricate Caster Wheel Hubs** section for special lubrication instructions on the front casters wheel hubs.



Number 6 (Mule Drive Belt Idler Arm) Located Under Engine Frame

Number 7 (Pump Drive Belt Idler Arm) Located Under Engine Frame

3. Lubricate front caster pivots once a year. Remove hex plug and cap. Thread grease zerk in hole and pump with grease until it oozes out around top bearing. Remove grease zerk and thread plug back in. Place cap back on.

## Wheel Hub - Slotted Nut Torque Specification

**Service Interval: After the first 100 hours  
Every 500 hours thereafter**

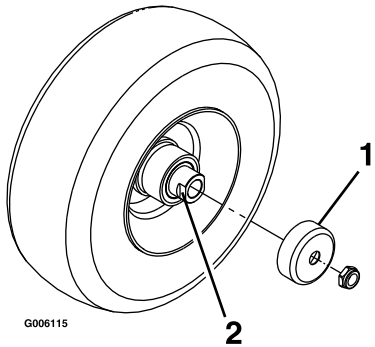
Torque the slotted nut to 211-260 ft-lb (286-352 N-m).

**Note:** Do Not use anti-seize on wheel hub.

## Lubricate Caster Wheel Hubs

**Service Interval: As required**

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.



1. Seal guard
2. Spacer nut with wrench flats

2. Remove caster wheel from caster forks.
3. Remove seal guards from the wheel hub.
4. Remove one of the spacer nuts from the axle assembly in the caster wheel. Note that thread locking adhesive has been applied to lock the spacer nuts to the axle. Remove the axle (with the other spacer nut still assembled to it) from the wheel assembly.
5. Pry out seals, and inspect bearings for wear or damage and replace if necessary.
6. Pack the bearings with a NGLI grade #1 multi-purpose grease.
7. Insert one bearing, one new seal into the wheel.  
**Note:** Seals (Exmark P/N 103-0063) must be replaced.
8. If the axle assembly has had both spacer nuts removed (or broken loose), apply a thread locking adhesive to one spacer nut and thread onto the axle with the wrench flats facing outward. Do

Not thread spacer nut all of the way onto the end of the axle. Leave approximately 1/8 inch (3 mm) from the outer surface of the spacer nut to the end of the axle inside the nut.

9. Insert the assembled nut and axle into the wheel on the side of the wheel with the new seal and bearing.
10. With the open end of the wheel facing up, fill the area inside the wheel around the axle full of NGLI grade #1 multi-purpose grease.
11. Insert the second bearing and new seal into the wheel.
12. Apply a thread locking adhesive to the 2nd spacer nut and thread onto the axle with the wrench flats facing outward.
13. Torque the nut to 75-80 in-lb (8-9 N-m), loosen, then re-torque to 20-25 in-lb (2-3 N-m). Make sure axle does not extend beyond either nut.
14. Reinstall the seal guards over the wheel hub and insert wheel into caster fork. Reinstall caster bolt and tighten nut fully.

**Important:** To prevent seal and bearing damage, check the bearing adjustment often. Spin the caster tire. The tire should not spin freely (more than 1 or 2 revolutions) or have any side play. If the wheel spins freely, adjust torque on spacer nut until there is a slight amount of drag. Reapply thread locking adhesive.

## Lubricate Brake Handle Pivot

**Service Interval: Every 160 hours**

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Lubricate bronze bushings on brake handle pivot with a spray type lubricant or light oil.

## Lubricate Brake Rod Bushings

**Service Interval: Every 160 hours**

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Unhook seat latch and tilt seat up.
3. Lubricate bronze bushings on each end of brake rod shaft with a spray type lubricant or a light oil

(bushings are located to the inside of the flange bearings).

## Lubricate Motion Control Bronze Bushings

**Service Interval: Every 160 hours**

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Unhook seat latch and tilt seat up.
3. Lubricate bronze bushings on flange bearings securing the motion control arm shafts with a light oil or a spray type lubricant.

## Drain Fuel Filter/Water Separator

**Service Interval: Every 40 hours**

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Place a drain pan under the fuel filter and loosen the drain plug approximately 1 turn.
3. Water should drain.
4. When fuel begins to flow from the filter, tighten the drain plug.

**Important:** Water or other contaminants in fuel can severely damage fuel pump and/or the other engine components.

## Change Fuel Filter/Water Separator

**Service Interval: Every 400 hours/Yearly (whichever comes first) (more often in dirty or dusty conditions).**

### **⚠ DANGER**

Use of improper components can result in system failure, fuel leakage and possible explosion.

- Ensure that an Authorized Service Dealer replace the fuel filter and any components for the fuel system.
- Use only approved fuel lines, hose clamps and fuel filters for high pressure systems.

## Change Inline Fuel Filter

**Service Interval: As required**

An inline fuel filter is installed between the fuel tank and the fuel pump. Replace when necessary.

<b>Replacement Filters</b>
Exmark P/N 112-7836

## Change Hydraulic System Filter

**Service Interval: After the first 250 hours**

**Every 500 hours/Yearly (whichever comes first) thereafter (Every 250 hours/Yearly if using Mobil 1 15W50)**

**Note:** Use only Exmark P/N 103-2146.

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Raise seat.
3. Carefully clean area around filter. It is important that no dirt or contamination enter hydraulic system.
4. Unscrew filter to remove and allow oil to drain from reservoir.

**Important:** Before reinstalling new filter, fill it with Exmark Premium Hydro oil and apply a thin coat of oil on the surface of the rubber seal.

Turn filter clockwise until rubber seal contacts the filter adapter, then tighten the filter an additional 2/3 to 3/4 turn.

5. Fill reservoir as stated in **Check Hydraulic Oil Level** section.

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

Hydro Oil	Change Interval
Exmark Premium Hydro Oil (Preferred)	500 Hours
Mobil 1 15W50	250 Hours

# Maintenance

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6. Raise the rear of machine up and support with jack stands (or equivalent support) just high enough to allow drive wheels to turn freely.
7. Start engine and move throttle control ahead to full throttle position. Move the speed control levers to the full speed and run for several minutes. Shut down machine and recheck oil level.

**Note:** Do Not change 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.

## Check Engine Coolant Level

**Service Interval: Before each use or daily**

**Note:** If the engine coolant level is below the indicator line on the overflow bottle when the engine is cold, the coolant temperature gauge may not register correctly during operation and/or the warning buzzer may not sound if the engine overheats.

1. Stop engine and wait for all moving parts to stop. Make sure unit is on a level surface.
2. Check with engine cold.
3. View coolant level in overflow bottle on the left side of the engine compartment. Coolant level should be at the indicator line on the overflow bottle.
4. If the coolant level is low, open hood or raise radiator, remove the cap to the overflow bottle and fill to the indicator line. Units should only be filled with a 50/50 mix of Dex-Cool© extended life coolant and water. Dex-Cool© can be identified by its orange color.

### **▲ WARNING**

**Engine coolant is hot and pressurized and radiator and surrounding parts are hot. Spray or steam from hot, pressurized liquid in the engine cooling system and touching a hot radiator may cause severe burns.**

**Allow the engine to cool completely before removing the radiator cap or servicing any component of the cooling system.**

### **▲ CAUTION**

**Engine coolant is toxic. Swallowing coolant can cause poisoning.**

- Do Not swallow.
- Keep out of reach of children and pets.

## Change Engine Coolant

**Service Interval: Every 4,000 hours/Every 4 years (whichever comes first) Dex-Cool© extended life coolant (orange color)**

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake. Machine must be positioned on level surface.
2. Unhook seat latch, tilt seat up and tilt hood forward to gain access to the cooling area. Do Not raise radiator, as it may not fully drain in that position.

### **▲ WARNING**

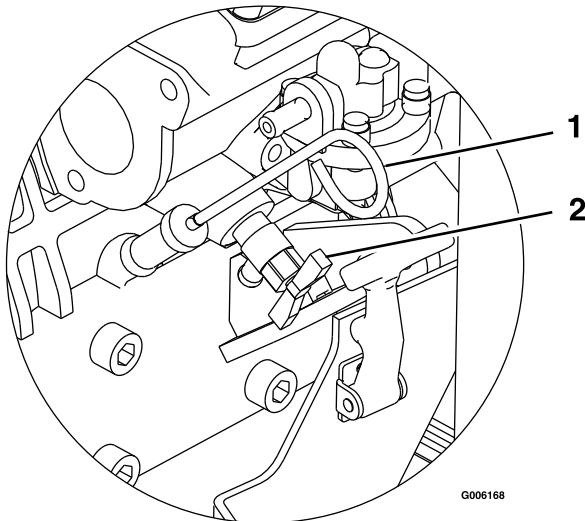
**Engine coolant is hot and pressurized and radiator and surrounding parts are hot. Spray or steam from hot, pressurized liquid in the engine cooling system and touching a hot radiator may cause severe burns.**

**Allow the engine to cool completely before removing the radiator cap or servicing any component of the cooling system.**

### **▲ CAUTION**

**Engine coolant is toxic. Swallowing coolant can cause poisoning.**

- Do Not swallow.
  - Keep out of reach of children and pets.
3. Drain coolant when engine is cool. Coolant may be drained from the radiator by removing the drain plug in the right rear corner. The engine block may be drained by removing the rear radiator hose and/or by opening the drain cock on the right-hand side of the engine block (see Figure 17).



**Figure 17**

1. Oil dipstick                      2. Drain cock

4. Reinstall all drain plugs and hoses and tighten drain cock.
5. Fill radiator with a 50/50 mix of water and Dex-Cool© coolant as specified in the **Check Engine Coolant Level** Section, allowing some room (approximately 1/2 inch (12.7 mm)) for expansion. Add 50/50 coolant mix to overflow bottle on the left side of the engine as required to bring the level up to the indicator line on the bottle.

### **▲ WARNING**

**Engine compartment contains open belt drives, fans, and other rotating components that can cause injury. Fingers, hands, loose clothing, or jewelry can get caught by the rotating fan and drive shaft.**

- **Do Not operate machine without the covers in place.**
  - **Keep fingers, hands, and clothing clear of rotating components.**
  - **Shut off engine, wait for moving parts to stop, engage parking brake and remove key, before performing maintenance.**
6. With the cap off the radiator, tilt hood closed and put the seat down. Start the engine as stated in the Operating Instructions Section. Return the seat up and hood forward to the open position.
  7. Operate engine until the engine thermostat opens and coolant is circulating through the radiator

core. As air is purged from the engine block and the coolant level drops, add additional coolant to the radiator.

8. When the radiator is completely full and no additional coolant can be added, continue running and install the radiator cap. Make sure that the cap is completely seated by pressing down firmly while turning until the cap stops. Once the cap is installed, the engine may be stopped.

## **Check Spark Arrester (if equipped)**

**Service Interval: Every 50 hours**

### **▲ WARNING**

**Hot exhaust system components may ignite fuel vapors even after the engine is stopped. Hot particles exhausted during engine operation may ignite flammable materials. Fire may result in personal injury or property damage.**

**Do Not refuel or run engine unless spark arrester is installed.**

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Wait for muffler to cool.
3. If any breaks in the screen or welds are observed, replace arrester.
4. If plugging of the screen is observed, remove arrester and shake loose particles out of the arrester and clean screen with a wire brush (soak in solvent if necessary). Reinstall arrester on exhaust outlet.

## **Thread Locking Adhesives**

Thread locking adhesives such as “Loctite 242” or “Fel-Pro, Pro-Lock Nut Type” are used on the following fasteners:

- Pump drive sheave set screws.
- Square head setscrews on Hydro pump control arms.
- Sheave retaining bolt in the end of engine crankshaft.
- Caster wheel spacer nuts.

## Maintenance

---

- Fuel tank bulkhead fitting nuts.
- Bolts retaining stub shaft to engine flywheel.

Adhesives such as “Loctite RC/609 or RC/680” or “Fel-Pro Pro-Lock Retaining I or Retaining II” are used on the following:

Fuel tank studs, where studs are inserted into tank.

### Mobil HTS Grease (Or Food-Grade Anti-seize)

Mobil HTS grease (or food-grade anti-seize) is used in the following locations:

- Between the cutter housing spindle and bearings.
- Between the cutter housing spindle and sheave.
- Under top cutter housing bearing guard.
- Between the jackshaft and bearings and the jackshaft and sheaves.

### Copper-Based Anti-seize

Copper-based anti-seize is used in the following location:

On threads of Blade Bolts. See **Check Mower Blades** section.

### Dielectric Grease

Dielectric grease is used on all blade type electrical connections to prevent corrosion and loss of contact. Dielectric grease should not be applied to sealed connectors.

## Adjustments

**Note:** Disengage PTO, shut off engine, wait for all moving parts to stop, engage parking brake, and remove key before servicing, cleaning, or making any adjustments to the unit.

### **⚠ CAUTION**

**Raising the mower deck for service or maintenance relying solely on mechanical or hydraulic jacks could be dangerous. The mechanical or hydraulic jacks may not be enough support or may malfunction allowing the unit to fall, which could cause injury.**

**Do Not rely solely on mechanical or hydraulic jacks for support. Use adequate jack stands or equivalent support.**

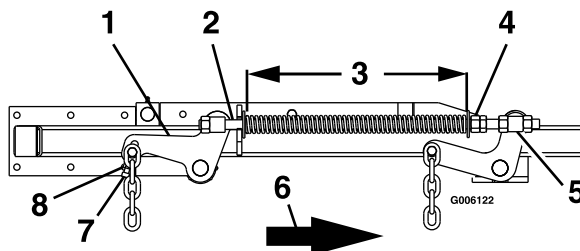
### Deck Leveling

1. Position mower on a flat surface.
2. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
3. Check tire pressure in drive tires. Proper inflation pressure for tires is 10 psi (69 kPa). Adjust if necessary.
4. Set anti-scalp rollers to top holes or remove them completely for this adjustment.
5. Raise the deck to the 5 inch (12.7 cm) height position (also transport position) and take all force off of the two large deck lift springs by loosening the nuts at the front of each spring (Figure 18).
6. Lower the deck to the 1 inch (2.54 cm) height position. Force the left rear deck support arm downward about 1/4 inch (6.4 mm) to get the deck to rest at the 1 inch height position. Place locking pliers between the rear swivel and spring stop to hold the deck in this position (Figure 18).
7. Place a 3/4 inch (19 mm) thick block of wood under each of the two rear anti-scalp roller brackets and place one under one of the front center anti-scalp roller brackets.
8. Loosen the two top chain bolts in slots in the rear deck lift arms. Loosen jam nuts and back off the socket head adjusting screws on the bottom of the arms until the chains are just loose. Turn the socket head adjusting screws in until slack is taken out of each chain. Tighten the jam nuts. Tighten



the chain bolts in the deck lift arms making sure they don't move while tightening.

9. Loosen the four nuts which secure the front swivels (two per side) until the front chains are loose and front of deck is supported by the 3/4 inch (19 mm) block. Do Not loosen the front chain hardware.
10. On left side, adjust front swivel using the locking nut behind the swivel until the front chain is tight and all slack is removed from linkage. Do Not lift front of deck off 3/4 inch (19 mm) block. Secure front swivel using locking nut in front of swivel. Repeat for right side.
11. Recheck that the 3/4 inch (19 mm) blocks fit just snugly under the brackets and that the tension on all the chains is approximately equal. Make sure all chain attachment bolts are tight. Reposition anti-scalp rollers and tighten securely.



**Figure 18**

1. Apply downward pressure here
2. Place locking pliers here to hold spring
3. 13–1/2 inches (34.3 cm) for cut heights at 2 inches or above or 14 inches (35.6 cm) for cut heights below 2 inches
4. Remove force on deck springs by loosening nuts here
5. Swivel
6. Front of unit
7. Socket head adjusting screw
8. Jam nut

12. Raise deck lift lever to the 5 inch (12.7 cm) cutting height position (Figure 10). Adjust spring compression until proper distance is obtained between the two large washers (Figure 18). Adjustment is made by turning the nut at the front of each spring (clockwise will shorten the spring, counterclockwise will lengthen the spring). Lock in position with jam nuts.

**Note:** When above adjustments have been made, the front of the deck will be slightly lower than the rear of the deck.

## Pump Drive Belt Tension

Self-tensioning - No adjustment necessary.

## Deck Belt Tension

Self-tensioning - No adjustment necessary.

## Mule Drive Belt Tension Adjustment

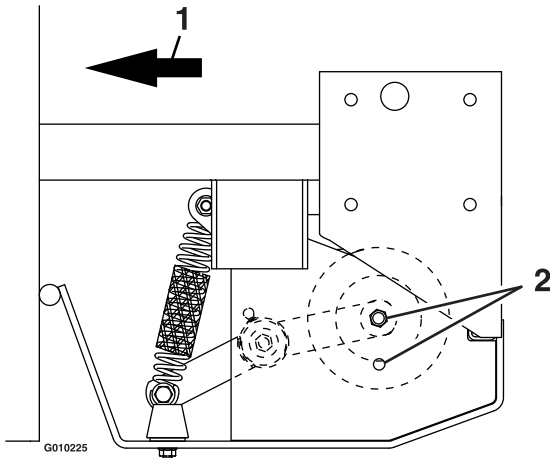
Self-tensioning idler, adjust as follows:

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Check to make sure the center of the bolt head in the center of the spring loaded pulley, on left side engine deck support, is positioned between the centers of the two alignment holes in the left support plate (Figure 19 and Figure 20). It is necessary to adjust the belt tension when the center of the bolt head is at or below the center of the bottom alignment hole.
3. When adjustment is necessary, loosen the idler pulley on the right-hand side so it can move up and down in the slot.

Place a wrench on the 3/8 inch nut in the center of the spring loaded pulley and apply upward pressure to relieve tension on the spring (a 1/2 inch drive breaker bar and 9/16 inch socket works best).

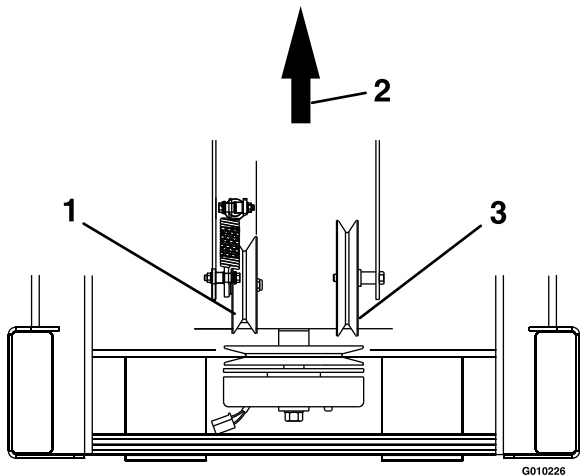
Reposition the adjusting pulley to the bottom of the slot.

**Note:** When installing a new belt, it is necessary to reposition the right adjusting pulley upward in the slot in order to position the center of the spring loaded pulley between the alignment holes.



**Figure 19**

1. Front of unit                      2. Alignment holes



**Figure 20**

1. Spring idler pulley                      3. Right side idler pulley  
(adjustable)
2. Front of unit

## Alternator Belt Tension

Stop engine, wait for all moving parts to stop and remove key. Engage parking brake.

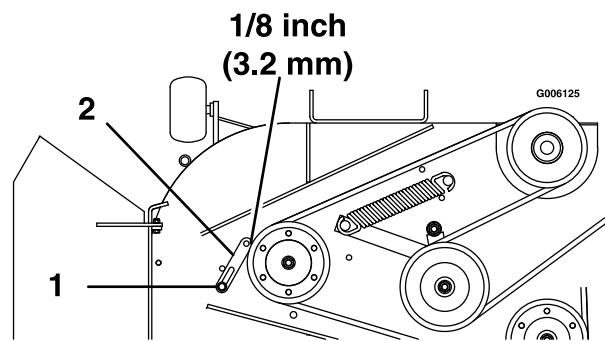
Tilt seat and remove air deflector panel

To tighten alternator belt, loosen both upper and lower alternator mounting bolts. Rotate alternator out, away from engine and retighten hardware to secure in place.

When properly tensioned, the alternator belt will deflect 1/4 to 3/8 inch (7-9 mm) while applying 22 pounds of force to the belt midway between fan and alternator.

## Belt Guide Adjustment

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Remove the belt shield on the right side of mower deck.
3. Note belt guide bolted to deck near the shield support stud and right-hand pulley. Guide should be 1/8 inch (3.2 mm) away from the belt, with bolt-end of guide near end of slot (Figure 21).
4. If adjustment is necessary, loosen the bolt securing the belt guide and make proper adjustment. Tighten hardware.



**Figure 21**

1. End of slot                      2. Belt guide

## Parking Brake Adjustment

**Service Interval: After the first 100 hours**

**Every 500 hours thereafter**

Check to make sure brake is adjusted properly. This procedure must be followed after the first 100 hours or when a brake component has been removed or replaced.

1. Drive the machine onto a level surface.
2. Disengage the blade control switch (PTO), move the motion control levers to the neutral locked position and set the parking brake.
3. Stop the engine, wait for all moving parts to stop, and remove the key.
4. Raise the back of the machine up and support the machine with jack stands.

## ▲ CAUTION

Raising the mower deck for service or maintenance relying solely on mechanical or hydraulic jacks could be dangerous. The mechanical or hydraulic jacks may not be enough support or may malfunction allowing the unit to fall, which could cause injury.

Do Not rely solely on mechanical or hydraulic jacks for support. Use adequate jack stands or equivalent support.

5. Remove the rear tires from the machine.
6. Remove any debris from the brake area.
7. Engage the parking brake (lever up).
8. Loosen the jam nut (item 9 in Figure 22) just above the trunnion roller 2-3 turns.

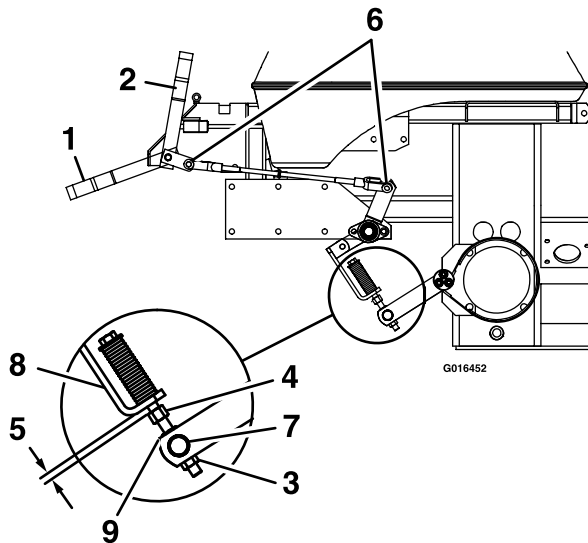


Figure 22

- |                                     |  |
|-------------------------------------|--|
| 1. Lever down (disengaged)          | 6. Remove pin to adjust rod length for additional brake adjustment |
| 2. Lever up (engaged)               | 7. Trunnion roller   |
| 3. Nyloc nut below trunnion roller  | 8. Spring retainer bracket roller                                  |
| 4. Nyloc nut below spring           | 9. Jam nut above trunnion roller                                   |
| 5. 1/8 to 3/16 inch (3.2 to 4.8 mm) |  |
9. Tighten the bottom nyloc nut (item 3 in Figure 22) until the brake spring is completely compressed, then loosen one-half turn.
  10. Tighten the jam nut against the trunnion roller
  11. Check the clearance between the bottom of the brake bracket and the nyloc nut just under the

spring. Clearance should measure 1/8 to 3/16 inch (3.2-4.8 mm). If necessary, adjust the nyloc nut accordingly.

12. If the correct gap can no longer be achieved because there is no clearance between the nyloc nut below the spring and the jam nut, or there are no threads left in the bottom nyloc nut, the length of the brake rod can be adjusted. Remove a pin from a yoke at either end of the brake rod and lengthen (or shorten) the brake rod until the correct gap can be achieved.
13. If a brake component has been removed or replaced, see the steps below; otherwise proceed to step 14.

Burnishing the Brake Procedure:

- A. Clear the area of any flammable material before starting the burnishing process.
- B. While sitting in the operator's seat, start the engine, and release the park brake.

## ▲ WARNING

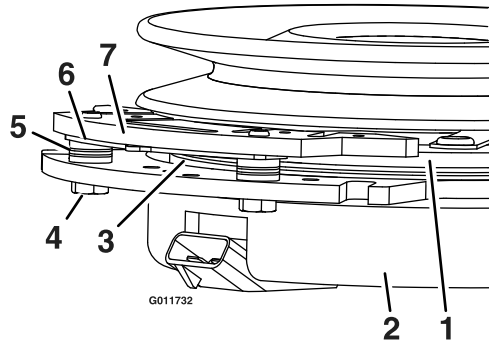
Engine must be running and drive wheels must be turning so adjustments can be performed. Contact with moving parts or hot surfaces may cause personal injury.

Keep fingers, hands, and clothing clear of rotating components and hot surfaces.

- C. Increase the throttle to high idle.
- D. Bring both drive levers out of neutral and push them into full forward position.
- E. Pull the park brake lever up until the engine rpm starts to drop. Hold the park brake lever in this position for 15 seconds.
- F. Release the brake lever.
- G. Move the drive levers into the full reverse position. Repeat steps E and F.
- H. Move the drive levers back to the neutral lock position.
- I. Return the throttle to low idle, and stop the engine.
- J. Allow the brake bands and drums to cool. Repeat steps 7 through 11.
14. Install the tires and torque the lug nuts to 90-95 ft-lb (122-129 N-m).
15. Remove the jack stands.

## Electric Clutch Adjustment

No adjustment necessary. However when the clutch brake has worn to the point where the clutch no longer engages consistently, the shim can be removed to extend the clutch life.



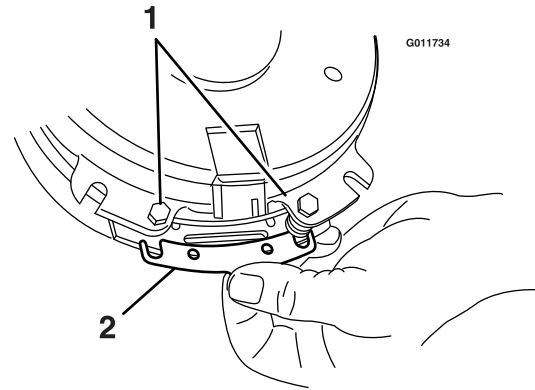
**Figure 23**

- |                        |                 |
|------------------------|-----------------|
| 1. Armature            | 5. Brake spacer |
| 2. Field shell         | 6. Re-gap shim  |
| 3. Rotor               | 7. Brake pole   |
| 4. Brake mounting bolt |                 |

### Removing the Shim:

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake. Allow the machine to cool completely before starting these instructions.
2. Using a pneumatic line, blow out any debris from under the brake pole and around the brake spacers.
3. Check the condition of the wire harness leads, connectors, and terminals. Clean or repair as necessary.
4. Verify that 12V is present at the clutch connector when the PTO switch is engaged.
5. Measure the gap between the rotor and armature. If the gap is greater than .04 inch (1 mm), proceed with the following steps:
  - A. Loosen both brake mounting bolts one-half to one full turn (see Figure 24).

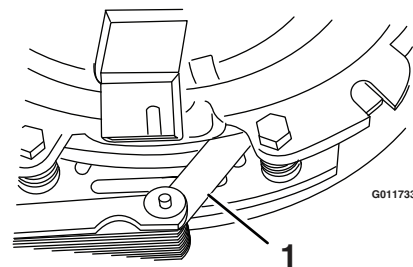
**Note:** Do Not remove the brake pole from the field shell/armature. The brake pole has worn to match the armature and needs to continue to match after the shim is removed to ensure proper brake torque.



**Figure 24**

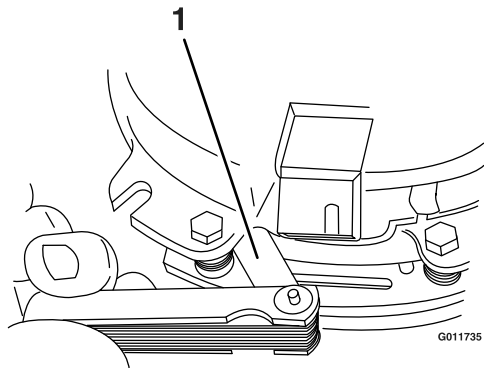
1. Brake mounting bolt      2. Shim

- B. Using needle nose pliers, or by hand, take hold of the tab and remove the shim (Do Not discard the shim until proper clutch function has been confirmed).
- C. Using a pneumatic line, blow out any debris from under the brake pole and around the brake spacers.
- D. Re-torque each bolt (M6 x 1) to 10 ft-lb (13 N-m) +/-0.5 ft-lb (0.7 N-m).
- E. Using a 0.010 inch thick feeler gauge, verify that a gap is present between the rotor and armature face on both sides of the brake pole as shown. (Due to the way the rotor and armature faces wear (peaks and valleys) it is sometimes difficult to measure the true gap.)



**Figure 25**

1. Feeler gauge



**Figure 26**

1. Feeler gauge

- If the gap is less than 0.010 inch, then reinstall the shim and reference the **Troubleshooting** section.
- If the gap is sufficient, proceed to the safety check in step F.

F. Perform the following safety check:

- a. Sit on the seat and start the engine.
- b. Make sure the blades Do Not engage with the PTO switch “off” and the clutch disengaged.

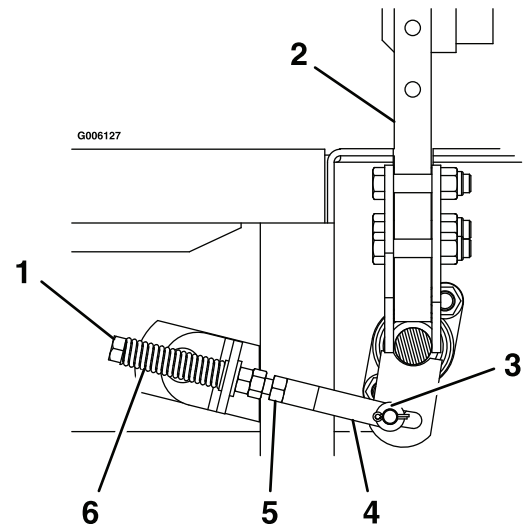
If the clutch does not disengage, reinstall the shim and reference the **Troubleshooting** section.

- c. Engage and disengage the PTO switch ten consecutive times to ensure the clutch is functioning properly. If the clutch does not engage properly, reference the **Troubleshooting** section.

## Reverse Indicator Adjustment

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Unhook seat latch and tilt seat forward.
3. Begin with either the left or right motion control lever. Move lever to the neutral position and pull lever back until the clevis pin (on arm below pivot shaft) contacts the end of the slot (just beginning to put pressure on spring). (Figure 27).
4. Check where lever is relative to notch in console (should be centered allowing lever to pivot outward to the neutral lock position).

5. If adjustment is needed, loosen the nut against the yoke and while applying slight rearward pressure on the motion control lever, turn the head of the adjustment bolt in the appropriate direction until lever is centered (keeping rearward pressure on the lever will keep the pin at the end of the slot and allow the adjustment bolt to move the lever to the appropriate position). Tighten lock nut.
6. Repeat on opposite side of unit.



**Figure 27**

- |                            |                      |
|----------------------------|----------------------|
| 1. Turn bolt here          | 4. Yoke              |
| 2. Lever centered in notch | 5. Loosen here       |
| 3. End of slot             | 6. Reverse indicator |

## Motion Control Linkage Adjustment

### ⚠ WARNING

Engine must be running and drive wheels must be turning so motion control adjustment can be performed. Contact with moving parts or hot surfaces may cause personal injury.

Keep fingers, hands, and clothing clear of rotating components and hot surfaces.

## ⚠ CAUTION

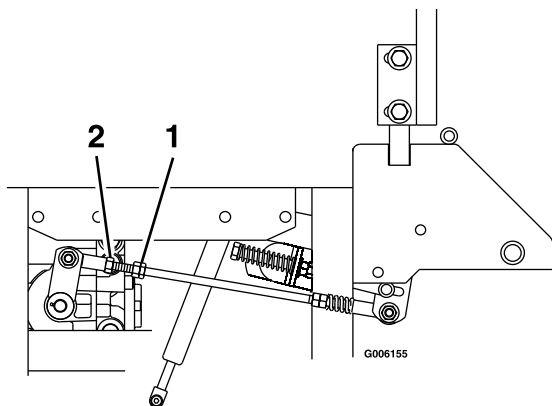
Raising the mower deck for service or maintenance relying solely on mechanical or hydraulic jacks could be dangerous. The mechanical or hydraulic jacks may not be enough support or may malfunction allowing the unit to fall, which could cause injury.

**Do Not rely solely on mechanical or hydraulic jacks for support. Use adequate jack stands or equivalent support.**

1. This adjustment must be made with the drive wheels turning. First raise the rear of machine up and support with jack stands (or equivalent support) just high enough to allow the drive wheels to rotate freely.
2. Unhook seat latch and tilt seat forward.
3. Remove the electrical connection from the seat safety switch, located directly to the left of the seat switch assembly beside the hydraulic oil reservoir.

**Temporarily** install a jumper wire across the terminals in the connector of the main wiring harness.

4. Run the unit at least 5 minutes with the drive levers at full forward speed to bring hydraulic system oil up to operating temperature.
5. Loosen lock nuts from the ball joints at each end of the pump control linkage (Figure 28).



**Figure 28**

Right-Hand Side of Unit

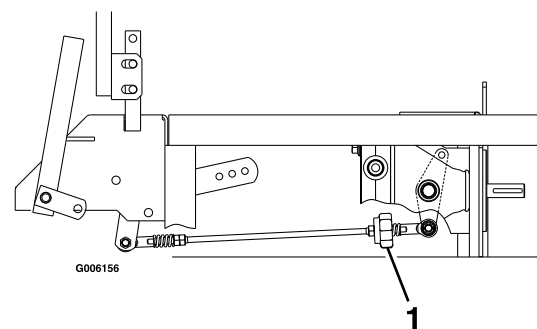
1. Turn here to adjust
2. Loosen here (right-hand thread)

because of the jumper wire being used. Run engine at full throttle and release brake.

7. The reverse indicator spring must be correct before the following adjustments can be made. See the **Reverse Indicator Adjustment** section.

**Note:** The motion control lever needs to be in neutral while making any necessary adjustments. The left rod assembly controls the left wheel and the right rod assembly controls the right wheel.

8. Bring the motion control lever into the neutral position. Adjust RH pump control rod length by rotating the double nuts on the rod in the appropriate direction until the wheels slightly creep in reverse (Figure 28). Move the motion control lever to the reverse position and while applying slight pressure to the lever allow the reverse indicator spring to bring the levers back to neutral. The wheel must stop turning or slightly creep in reverse. When adjustment is complete, tighten lock nuts onto ball joints.
9. Bring the LH motion control lever into the neutral position. Adjust the LH pump control rod length by rotating the tracking adjustment knob in the appropriate direction until the wheels slightly creep in reverse. Move the motion control lever to the reverse position and while applying slight pressure to the lever allow the reverse indicator spring to bring the levers back to neutral. The wheel must stop turning or slightly creep in reverse (Figure 29).



**Figure 29**

Left-Hand Side of Unit

1. Turn LH tracking adjustment knob. (Do Not loosen any nuts on LH side)

6. Start engine. **Brake must be engaged and motion control levers out to start engine. Operator does not have to be in the seat**

10. Shut off unit. Remove jumper wire from wire harness connector and plug connector into seat switch.

## Motion Control Damper Adjustment

The top damper mounting bolt can be adjusted to obtain a more desired motion control lever resistance. See Figure 30 for mounting options.

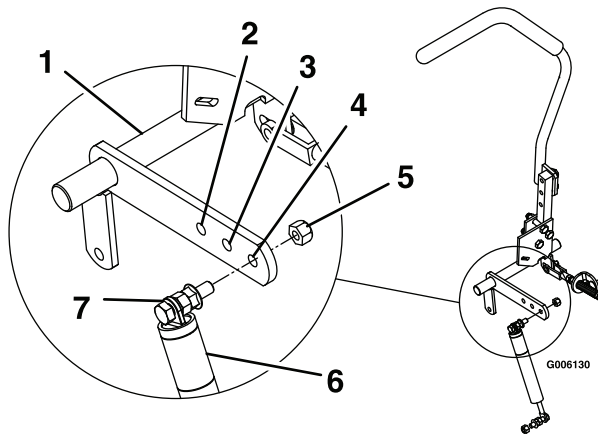


Figure 30

1. Motion control bracket
2. Least resistance (softest feel)
3. Medium resistance (medium feel)
4. Most resistance (firmest feel)
5. Torque nyloc nut to 200 in-lb (16.7 ft-lb). Bolt must protrude past end of nyloc nut after torque.
6. Damper
7. Damper must move freely on bolt.

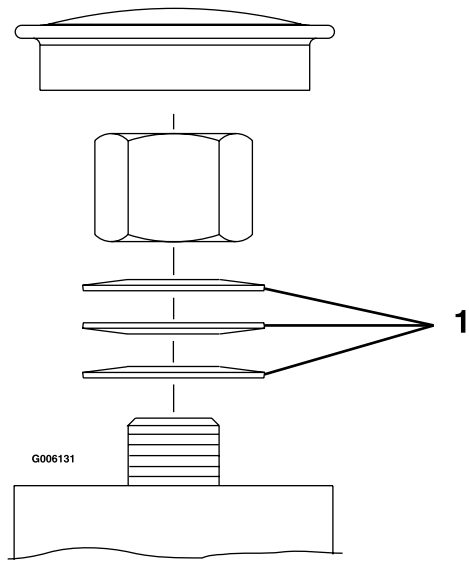


Figure 31

1. Spring disc washers

## Caster Pivot Bearings Pre-Load Adjustment

Remove dust cap from caster and tighten nyloc nut until washers are flat and back off 1/4 of a turn to properly set the pre-load on the bearings. If disassembled, make sure the spring disc washers are reinstalled as shown in Figure 31.

## Cleaning

### Clean Engine Cooling System

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

#### ⚠ CAUTION

Excessive debris around the engine cooling air intake and inside of the pump drive belt compartment and damaged or missing rubber baffles can cause the engine and hydraulic system to overheat which can create a fire hazard.

- Clean all debris from inside of pump drive belt compartment daily.
  - Clean debris from radiator screen and core daily.
1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
  2. Clean all debris from inside of pump drive belt compartment.
  3. Wipe debris from screen in engine cover.
  4. Rotate engine cover forward and wipe debris from radiator core as required.
  5. Clean debris from radiator fins with compressed air.

**Important:** If debris or air can not be blown through the radiator, see **Cleaning of the Radiator** section.

6. Inspect seals in engine cover and replace if necessary.

### 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 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. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Remove air deflector panel from behind seat.
3. Clean around flywheel, cylinder head, injectors, and injector pump.
4. Clean all debris from the exhaust system area.
5. Wipe up any excessive grease or oil around the engine and exhaust area.
6. Reinstall the air deflector panel.

**Important:** Do Not use water to clean engine. Use low pressure compressed air. See **Engine Owner's Manual**.

### Clean the Radiator

**Service Interval: Every 50 hours (May be required more often in dry or dirty conditions.)**

1. Stop engine, wait for all rotating parts to stop and remove key. Engage parking brake.
2. Allow engine to cool.
3. Rotate seat and engine cover forward.
4. While holding fan up, remove the four screws attaching the fan to the shroud. Disconnect and remove the fan.
5. Using compressed air, blow out debris stuck between the fins of the entire radiator, both from the top down and from the bottom up.
6. If debris remains, it may be necessary to use water from a low pressure hose. If the radiator is clean, proceed to step 8.
7. Cover the engine with a piece of cardboard, or a plastic sheet. Squirt water down through the fins. Blow through with low pressure air from both directions. If debris remains, repeat until clean.
8. Re-assemble the fan to the radiator. Reconnect the fan.
9. Start the engine to ensure the fan is functioning properly.



## Clean Debris From Machine

**Service Interval: Before each use or daily**

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
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.

## Clean Grass Build-Up Under Deck

**Service Interval: Before each use or daily**

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Raise deck to the transport (5 inch (12.7 cm) cutting height) position. Lift the front of unit and support unit using jack stands or equivalent support.

### **⚠ CAUTION**

Raising the mower deck for service or maintenance relying solely on mechanical or hydraulic jacks could be dangerous. The mechanical or hydraulic jacks may not be enough support or may malfunction allowing the unit to fall, which could cause injury.

**Do Not** rely solely on mechanical or hydraulic jacks for support. Use adequate jack stands or equivalent support.

3. Clean out any grass build-up from underside of deck and in discharge deflector.

## 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 adjustment 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
Starter does not crank	<ol style="list-style-type: none"> <li>1. PTO is engaged.</li> <li>2. Parking brake is not engaged.</li> <li>3. Drive levers are not in neutral lock position.</li> <li>4. Battery does not have a full charge.</li> <li>5. Electrical connections are corroded, loose or faulty.</li> <li>6. Fuse is blown.</li> <li>7. Relay or switch is defective.</li> </ol>	<ol style="list-style-type: none"> <li>1. Disengage the PTO.</li> <li>2. Set the parking brake.</li> <li>3. Ensure the drive levers are in the neutral lock position.</li> <li>4. Charge the battery. See <b>Check Battery Charge</b> and <b>Recommended Jump Starting Procedure</b> sections in Maintenance.</li> <li>5. Check the electrical connections for good contact. Clean connector terminals thoroughly with electrical contact cleaner, apply dielectric grease and reconnect.</li> <li>6. Replace the blown fuse.</li> <li>7. Contact an Authorized Service Dealer.</li> </ol>
Engine will not start, starts hard, or fails to keep running	<ol style="list-style-type: none"> <li>1. Fuel tank is empty.</li> <li>2. Fuel shutoff valve is closed.</li> <li>3. Oil level in the crankcase is low.</li> <li>4. The throttle is not in the correct position.</li> <li>5. Dirt in fuel filter.</li> <li>6. Dirt, water, or stale fuel is in the fuel system.</li> <li>7. Air cleaner is dirty.</li> <li>8. Seat switch is not functioning properly.</li> <li>9. Electrical connections are corroded, loose or faulty.</li> <li>10. Relay or switch is defective.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill the fuel tank.</li> <li>2. Open the fuel shutoff valve.</li> <li>3. Add oil to the crankcase.</li> <li>4. Be sure the throttle control is midway between the "SLOW" and "FAST" positions.</li> <li>5. Replace the fuel filter.</li> <li>6. Contact an Authorized Service Dealer.</li> <li>7. Clean or replace the air cleaner element.</li> <li>8. Check the seat switch indicator. Replace seat if needed.</li> <li>9. Check the electrical connections for good contact. Clean connector terminals thoroughly with electrical contact cleaner, apply dielectric grease and reconnect.</li> <li>10. Contact an Authorized Service Dealer.</li> </ol>
Engine loses power	<ol style="list-style-type: none"> <li>1. Engine load is excessive</li> <li>2. Air cleaner is dirty.</li> <li>3. Oil level in the crankcase is low.</li> <li>4. Cooling fins and air passages for the engine are plugged.</li> <li>5. Vent hole in the fuel cap is plugged.</li> <li>6. Dirt in fuel filter.</li> <li>7. Dirt, water, or stale fuel is in the fuel system.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce the ground speed.</li> <li>2. Clean or replace the air cleaner element.</li> <li>3. Add oil to the crankcase.</li> <li>4. Remove the obstructions from the cooling fins and air passages.</li> <li>5. Clean or replace the fuel cap.</li> <li>6. Replace the fuel filter.</li> <li>7. Contact an Authorized Service Dealer.</li> </ol>

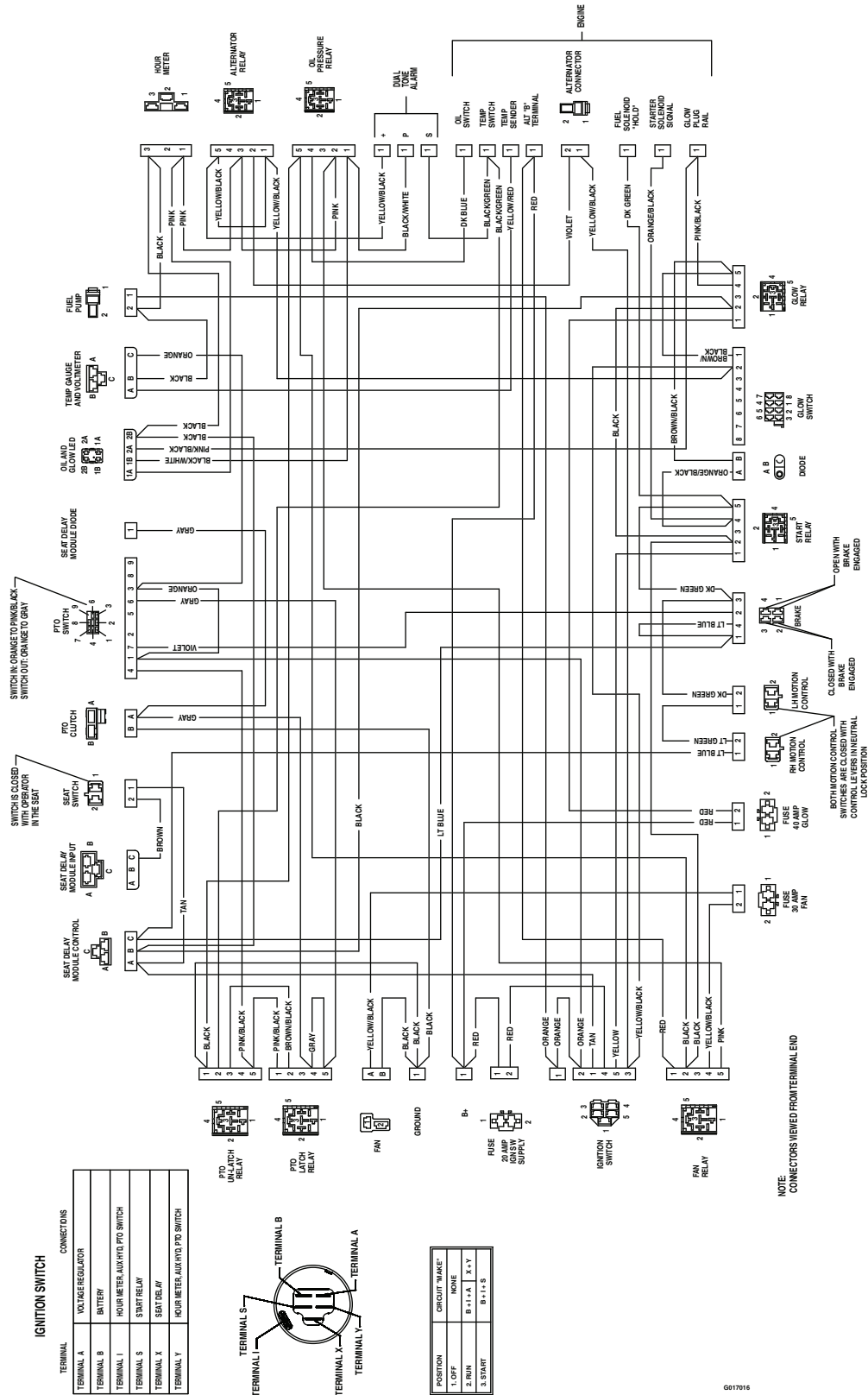
Problem	Possible Cause	Corrective Action
Engine overheats.	<ol style="list-style-type: none"> <li>1. Engine load is excessive.</li> <li>2. Oil level in the crankcase is low.</li> <li>3. Dirty air filter.</li> <li>4. Coolant level is low.</li> <li>5. Debris on or around radiator.</li> <li>6. Water pump or alternator belt is worn, loose, or broken.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce the ground speed.</li> <li>2. Add oil to the crankcase.</li> <li>3. Clean or replace the air cleaner element.</li> <li>4. Add coolant.</li> <li>5. Remove debris (see <b>Clean the Radiator</b> section in Maintenance).</li> <li>6. Contact an Authorized Service Dealer.</li> </ol>
Mower pulls left or right (with levers fully forward)	<ol style="list-style-type: none"> <li>1. Tracking needs adjustment.</li> <li>2. Tire pressure in drive tires not correct.</li> <li>3. Reverse indicator and motion control linkage need adjustment.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the tracking.</li> <li>2. Adjust tire pressure in the drive tires.</li> <li>3. Adjust the reverse indicator and the motion control linkage.</li> </ol>
Machine does not drive	<ol style="list-style-type: none"> <li>1. By pass valve is not closed tight.</li> <li>2. Drive or pump belt is worn, loose or broken.</li> <li>3. Drive or pump belt is off a pulley.</li> <li>4. Broken or missing idler spring.</li> <li>5. Hydraulic fluid level is low or too hot.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten the by pass valve.</li> <li>2. Change the belt.</li> <li>3. Change the belt.</li> <li>4. Replace the spring.</li> <li>5. Add hydraulic fluid to reservoir or let it cool down.</li> </ol>
Uneven cutting height.	<ol style="list-style-type: none"> <li>1. Blade(s) not sharp.</li> <li>2. Cutting blade(s) is/are bent.</li> <li>3. Mower deck is not level.</li> <li>4. Underside of mower is dirty.</li> <li>5. Tire pressure in drive tires not correct.</li> <li>6. Blade spindle bent.</li> <li>7. Tips of adjacent blades are at an uneven cutting height. Blades tips should be even within 3/16 inch which is approximately one blade thickness.</li> </ol>	<ol style="list-style-type: none"> <li>1. Sharpen the blade(s).</li> <li>2. Install new cutting blade(s).</li> <li>3. Level mower deck from side-to-side and front-to-rear.</li> <li>4. Clean the underside of the mower.</li> <li>5. Adjust tire pressure in the drive tires.</li> <li>6. Contact an Authorized Service Dealer.</li> <li>7. Replace blades, spindles and (or) check for damage to mower deck.</li> </ol>
Abnormal vibration	<ol style="list-style-type: none"> <li>1. Cutting blade(s) is/are bent or unbalanced.</li> <li>2. Blade mounting bolt is loose.</li> <li>3. Engine mounting bolts are loose.</li> <li>4. Loose engine pulley, idler pulley, or blade pulley.</li> <li>5. Engine pulley is damaged.</li> <li>6. Blade spindle is bent.</li> <li>7. Belt is damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Install new cutting blade(s).</li> <li>2. Tighten the blade mounting bolt.</li> <li>3. Tighten the engine mounting bolts.</li> <li>4. Tighten the appropriate pulley.</li> <li>5. Contact an Authorized Service Dealer.</li> <li>6. Contact an Authorized Service Dealer.</li> <li>7. Install new belt.</li> </ol>
Blades do not rotate.	<ol style="list-style-type: none"> <li>1. Drive belt is worn, loose or broken.</li> <li>2. Drive belt is off pulley.</li> <li>3. Deck belt is worn, loose or broken.</li> <li>4. Deck belt is off pulley.</li> <li>5. Broken or missing idler spring.</li> <li>6. Clutch has disengaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the belt tension.</li> <li>2. Check belt for damage; replace if necessary. Install drive belt and check belt guide for correct position.</li> <li>3. Install new deck belt.</li> <li>4. Install deck pulley and check the idler pulley, idler arm and spring for correct position and function.</li> <li>5. Replace the spring.</li> <li>6. Engine has overheated; determine cause of overheat (see Engine overheats).</li> </ol>

# Troubleshooting

Problem	Possible Cause	Corrective Action
Warning buzzer emits continuous beep. (See also Engine overheats).	<ol style="list-style-type: none"> <li>1. Temperature is increasing on coolant temperature gauge.</li> <li>2. Coolant level is low.</li> <li>3. Debris on or around radiator.</li> <li>4. Water pump or alternator belt is worn, loose or broken.</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn unit off and allow engine and engine components to cool.</li> <li>2. Add coolant.</li> <li>3. Remove debris.</li> <li>4. Contact Authorized Service Dealer.</li> </ol>
Warning buzzer emits intermittent beep.	<ol style="list-style-type: none"> <li>1. Oil level is low.</li> <li>2. Oil leaking from engine.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check oil level.</li> <li>2. Contact Authorized Service Dealer.</li> </ol>
Clutch will not engage.	<ol style="list-style-type: none"> <li>1. Fuse is blown.</li> <li>2. Low voltage supply at the clutch.</li> <li>3. Damaged coil.</li> <li>4. Inadequate current supply.</li> <li>5. Rotor/armature airgap is too large.</li> <li>6. Engine has overheated.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace fuse. Check coil resistance, battery charge, charging system, and wiring connections and replace if necessary.</li> <li>2. Check coil resistance, battery charge, charging system, and wiring connections and replace if necessary.</li> <li>3. Replace clutch.</li> <li>4. Repair or replace clutch lead wire or electrical system. Clean connector contacts.</li> <li>5. Remove shim or replace clutch.</li> <li>6. Determine cause of overheat (see Engine overheats).</li> </ol>

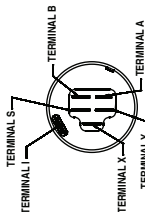
# Schematics

## Electrical Diagram



**IGNITION SWITCH**

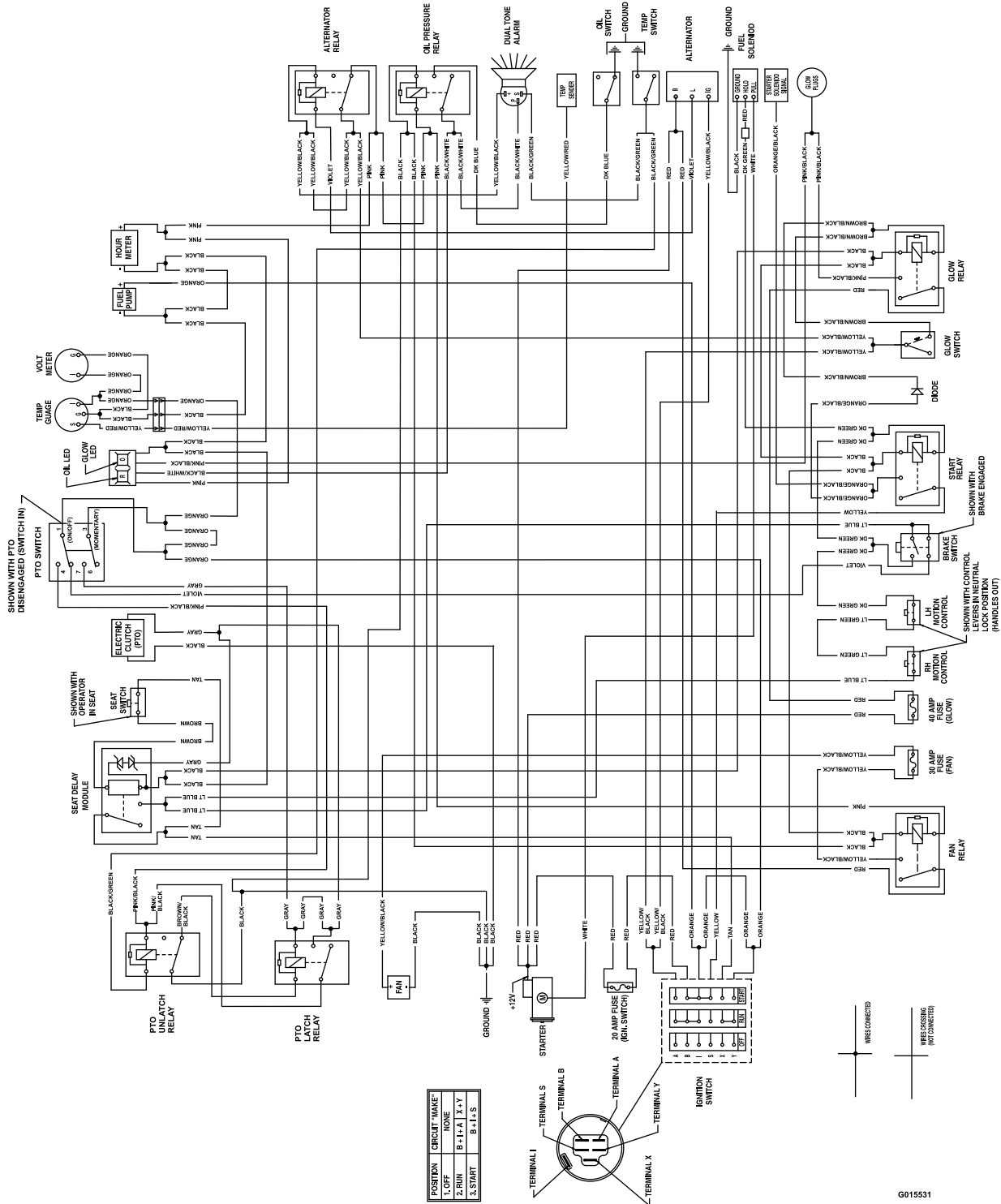
TERMINAL	CONNECTIONS
TERMINAL A	VOLTAGE REGULATOR
TERMINAL B	BATTERY
TERMINAL I	HOUR METER AND PTO SWITCH
TERMINAL S	START RELAY
TERMINAL X	SEAT RELAY
TERMINAL Y	HOUR METER AND PTO SWITCH



POSITION	CIRCUIT MAKE
1. OFF	NONE
2. RUN	B + I + A X + Y
3. START	B + I + S

NOTE  
CONNECTORS VIEWED FROM TERMINAL END

## Electrical Schematic



G015531

# Exmark Commercial Turf Equipment 2 Year Limited Warranty

## Conditions and Products Covered

Exmark Mfg. Co. Inc. and its affiliate, Exmark Warranty Company, pursuant to an agreement between them, jointly warrant on the terms and conditions herein, that we will repair, replace or adjust any part on these products and found by us (in the exercise of our reasonable discretion) to be defective in factory materials or workmanship for a period of two years.

This warranty applies to Exmark commercial turf equipment sold in the U.S. or Canada. This warranty may only be assigned or transferred to a second (or third) owner by an authorized Exmark dealer. The warranty period commences upon the date of the original retail purchase.

### Warranty Exceptions

- Bags, Belts and Tires
- Battery
- Engine

### Warranty Period

90 days  
1 Year Prorated \*

\* The Engine warranty is covered by the engine manufacturer. Please refer to the engine manufacturer's warranty statement that is included in the literature packet.

This warranty only includes the cost of parts and labor.

## Items and Conditions Not Covered

This warranty does not cover the following:

- Pickup and delivery charges to and from any authorized Exmark Service Dealer.
- Any damage or deterioration due to normal use, wear and tear, or exposure.
- Cost of regular maintenance service or parts, such as filters, fuel, lubricants, tune-up parts, and adjustments.
- Any product or part which has been altered or misused or required replacement or repair due to normal wear, accidents, or lack of proper maintenance.
- Any repairs necessary due to use of parts, accessories or supplies, including gasoline, oil or lubricants, incompatible with the turf equipment or other than as recommended in the operator's manual or other operational instructions provided by Exmark.

There are no other express warranties except for engine and special emission system coverage.

All warranty work must be performed by an authorized Exmark Service Dealer using Exmark approved replacement parts.

## Instructions for Obtaining Warranty Service

The product must be registered with original proof of purchase by an Exmark Service Dealer before obtaining any warranty service.

Contact any Exmark Service Dealer to arrange service at their dealership. To locate a dealer convenient to you, access our website at [www.exmark.com](http://www.exmark.com). U.S. or Canada customers may also call 402-223-6375.

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

Exmark Customer Service Department  
The Exmark Warranty Company  
2101 Ashland Avenue  
Beatrice, NE 68310  
402-223-6375 or  
[service@exmark.com](mailto:service@exmark.com)

## Owner's Responsibilities

If your product requires warranty service it must be returned to an authorized Exmark service dealer within the warranty period. This warranty extends only to turf equipment operated under normal conditions. You must read the operator's manual. You must also properly service and maintain your Exmark product as described in the operator's manual. Such routine maintenance, whether performed by a dealer or by you, is at your expense.

## General Conditions

The sole liability of Exmark and Exmark Warranty Company with respect to this warranty shall be repair or replacement of defective components as set forth herein. **Neither Exmark nor Exmark Warranty Company shall be liable for any incidental or consequential loss or damage.**

Such damages include but are not limited to:

- Expenses related to gasoline, oil or lubricants.
- Travel time, overtime, after hours time or other extraordinary repair charges or charges relating to repairs or replacements outside of normal business hours at the place of business of the authorized Exmark Service Dealer.
- Rental of like or similar replacement equipment during the period of any warranty, repair or replacement work.
- Any telephone or telegram charges or travel charges.
- Loss or damage to person or property other than that covered by the terms of this warranty.
- Any claims for lost revenue, lost profit or additional cost as a result of a claim of breach of warranty.
- Attorney's fees.

No Claim of breach of warranty shall be cause for cancellation or rescission of the contract of sale of any Exmark mower.

**All implied warranties of merchantability (that the product is fit for ordinary use) and fitness for use (that the product is fit for a particular purpose) are limited to the duration of the express warranty.**

**Some states do not allow exclusions of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions and limitations may not apply to you.**

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

**Notes:**





## MAXIMIZE THE PERFORMANCE OF YOUR EXMARK.

### 4-CYCLE PREMIUM ENGINE OIL

Part No. 116-3373

Both SAE 30 and SAE 10W-30 in one bottle.

Contains increased levels of zinc and phosphorus for better lubricity.

No Viscosity Index Improvers that tend to shear down in high heat.

Synthetic formulation.

Gas & Diesel compatible.

Anti-corrosion additives.

API 'SL' and JASO rated with wet clutch compatibility for other machines.

### PREMIUM HYDRO OIL

Part No. 109-9828

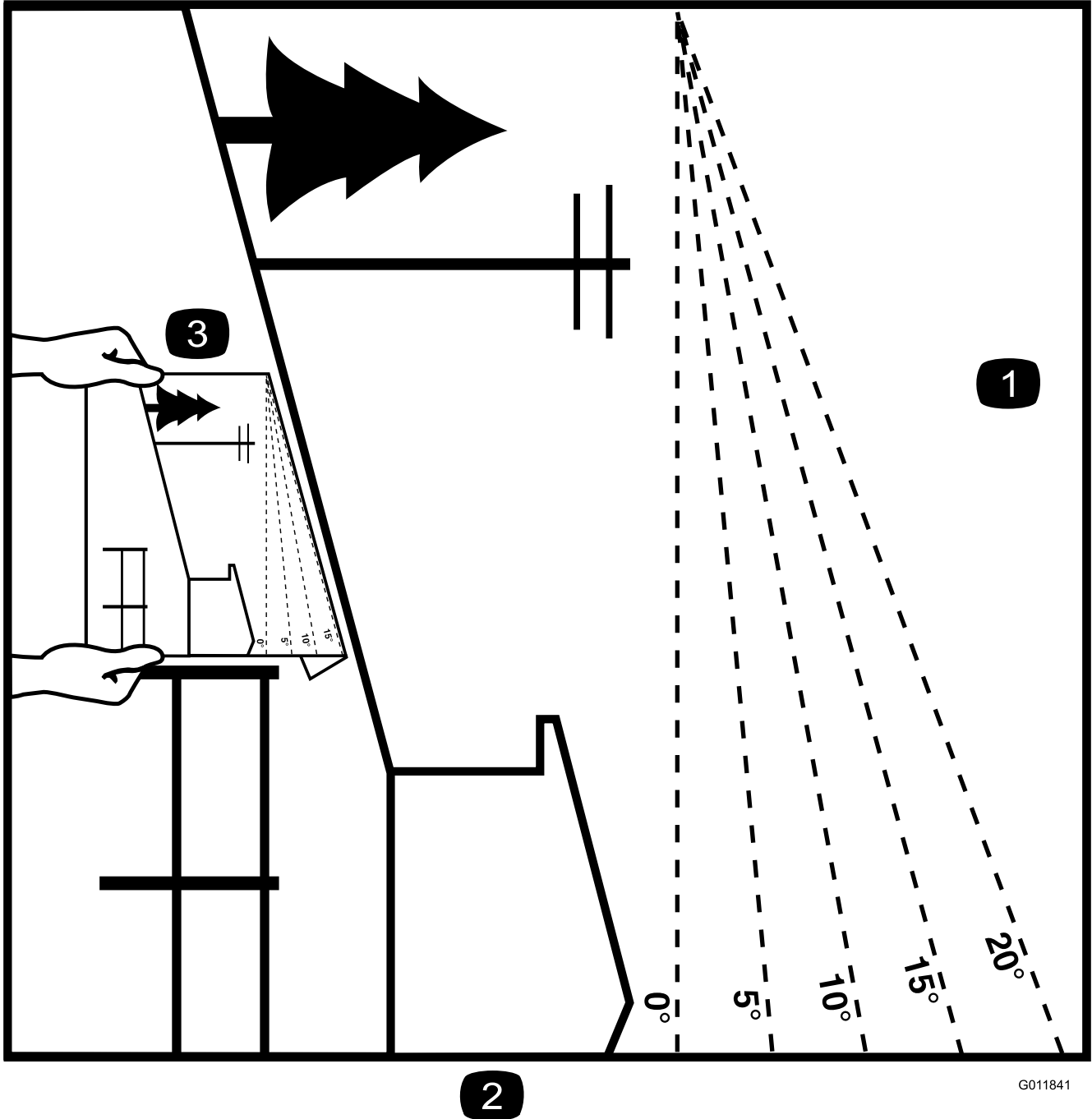
Commercial quality for tough, high-heat conditions.

Designed specifically for zero-turn mower hydraulic systems.

Superior shear resistance under heavy loads.



Available from your local Exmark dealer. Find your closest dealer at [exmark.com](http://exmark.com)



G011841

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Figure 32

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1. The maximum slope you can safely 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.

## SEE EXMARK'S COMPLETE LINE OF ACCESSORIES AND OPTIONS

### MID-MOUNT RIDING ACCESSORIES AND OPTIONS

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

### OUT-FRONT RIDING ACCESSORIES AND OPTIONS

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

### WALK-BEHIND ACCESSORIES AND OPTIONS

GRASS CATCHER	TURF STRIPER
MICRO-MULCH SYSTEM	STANDON

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) \_\_\_\_\_

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