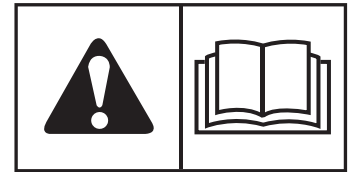




# ***OPERATOR'S MANUAL***

## ***F800X Series***

### ***Zero-Turn Riding Mower***



#### **Zero-Turn Rider**

<b>Model Number</b>	<b>Description</b>
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5901236	F800XB31
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#### **Mower Deck**

5901237	F800X/61, 61" Mower Deck
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5901238	F800X/72, 72" Mower Deck
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This manual is available in Spanish. For a copy, contact your Ferris dealer or [www.ferrisindustries.com](http://www.ferrisindustries.com).  
Este manual está disponible en Español. Para obtener una copia, póngase en contacto con su distribuidor Ferris o [www.ferrisindustries.com](http://www.ferrisindustries.com).

**Thank you** for purchasing this quality-built FERRIS product. We're pleased that you've placed your confidence in the FERRIS brand. When operated and maintained according to the instructions in this manual, your FERRIS product will provide many years of dependable service.

**This manual contains** safety information to make you aware of the hazards and risks associated with this machine and how to avoid them. This machine is designed and intended to be used and maintained according to the manual and operated by trained professionals for finish cutting of established lawns and is not intended for any other purpose. It is important that you read and understand these instructions thoroughly before attempting to start or operate this equipment. **Save these original instructions for future reference.**

The images in this document are representative, and are meant to compliment the instructional copy they accompany. Your unit may vary from the images displayed.

The Illustrated Parts List for this machine can be downloaded from [ferrisindustries.com](http://ferrisindustries.com). Please provide model and serial number when ordering replacement parts.

## Product Identification Numbers

PRODUCT REFERENCE DATA	
Unit Model Number	Unit SERIAL Number
Mower Deck Model Number	Mower Deck SERIAL Number
Dealer Name	Date Purchased
ENGINE REFERENCE DATA	
Engine Make	Engine Model
Engine Type/Spec	Engine Code/Serial Number

See *Features and Controls* for the location of Identification Numbers

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Reproduction

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Contact Information:

Briggs & Stratton Power Products Group, LLC.  
5375 N. Main St.  
Munnsville, NY 13409-4003  
(800) 933-6175  
[www.ferrismowers.com](http://www.ferrismowers.com)

### WARNING

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

### 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.

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*NOTE: In this manual, “left” and “right” are referred to as seen from the operating position.*

## OPERATOR SAFETY



## Operating Safety

Congratulations on purchasing a superior-quality piece of lawn and garden equipment. Our products are designed and manufactured to meet or exceed all industry standards for safety.

Do not operate this machine unless you have been trained. Reading and understanding this operator's manual is a way to train yourself.

Power equipment is only as safe as the operator. If it is misused, or not properly maintained, it can be dangerous! Remember, you are responsible for your safety and that of those around you.

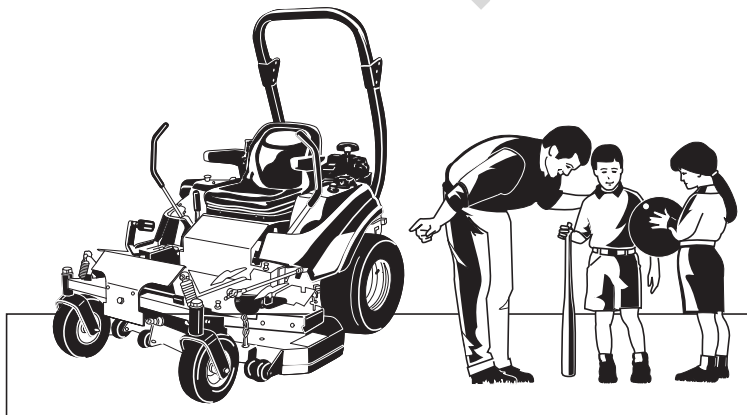
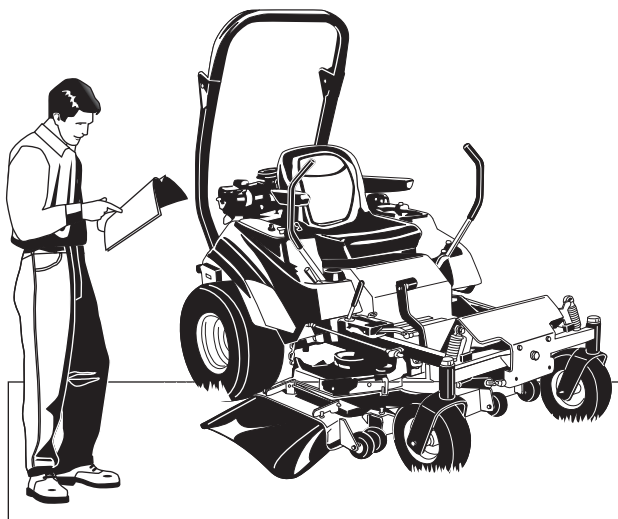
Use common sense, and think through what you are doing. If you are not sure that the task you are about to perform can be safely done with the equipment you have chosen, ask a professional: contact your local authorized dealer.

## Read the Manual

The operator's manual contains important safety information you need to be aware of BEFORE you operate your unit as well as DURING operation.

Safe operating techniques, an explanation of the product's features and controls, and maintenance information is included to help you get the most out of your equipment investment.

Be sure to completely read the Safety Rules and Information found on the following pages. Also completely read the Operation section.



## Children

Tragic accidents can occur with children. Do not allow them anywhere near the area of operation. Children are often attracted to the unit and mowing activity. Never assume that children will remain where you last saw them. If there is a risk that children may enter the area where you are mowing, have another responsible adult watch them.

## Slope Operation



Operation on slopes can be dangerous. Using the unit on a slope that is too steep where you do not have adequate wheel traction (and control) can cause sliding, loss of steering, control, and possible rollover. You should not operate on a slope greater than a 5.4 foot rise over a 20 foot length (15 degrees).

Always mow across slopes, not up and down (to maintain traction on the wheels) and avoid sudden turns or rapid speed changes. Reduce speed and use extreme caution on ALL slopes.

Also, note that the surface condition you are on can greatly impact your ability to safely operate this machine. Operating on wet or slippery slopes can cause sliding and loss of steering and control. Do not operate on slopes that are slippery, wet, or have soft soil conditions.

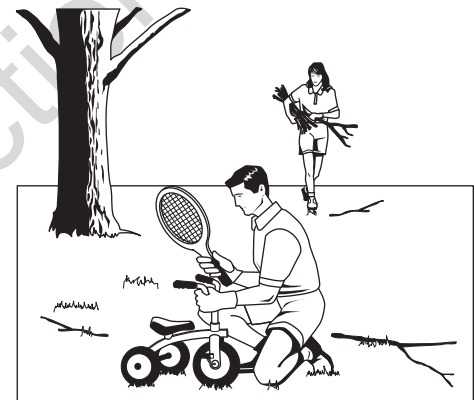
If you feel unsure about operating the unit on a slope, don't do it. It's not worth the risk.

## Thrown Objects

This unit has spinning mower blades. These blades can pick up and throw debris that could seriously injure a bystander. Be sure to clean up the area to be mowed and remove objects that could be thrown by the blade **BEFORE** you start mowing.

Do not operate this unit without the entire grass catcher or discharge guard (deflector) in place.

Also, do not allow anyone in the area while the unit is running! If someone does enter the area, shut the unit off immediately until they leave.

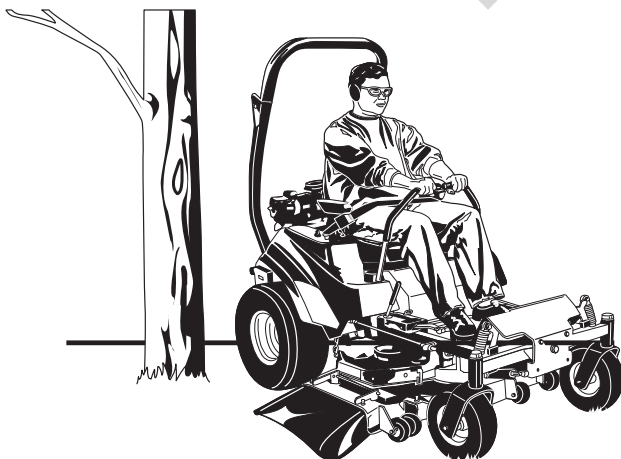


## Moving Parts

This equipment has many moving parts that can injure you or someone else. However, if you stay in the operator zone (stay seated in the seat), and follow the safety rules in this operator's manual, the unit is safe to operate.

The mower deck has spinning mower blades that can amputate hands and feet. Do not allow anyone near the unit while it is running! Keep safety devices (guards, shields, and switches) in place and working.

To help you, the operator, use this equipment safely, it is equipped with an operator-present safety system. Do **NOT** attempt to alter or bypass the system. See your dealer immediately if the system does not pass all the safety interlock system tests found in this manual.

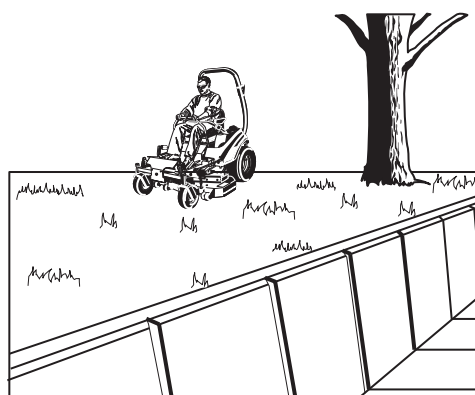




## Roll Bar Use

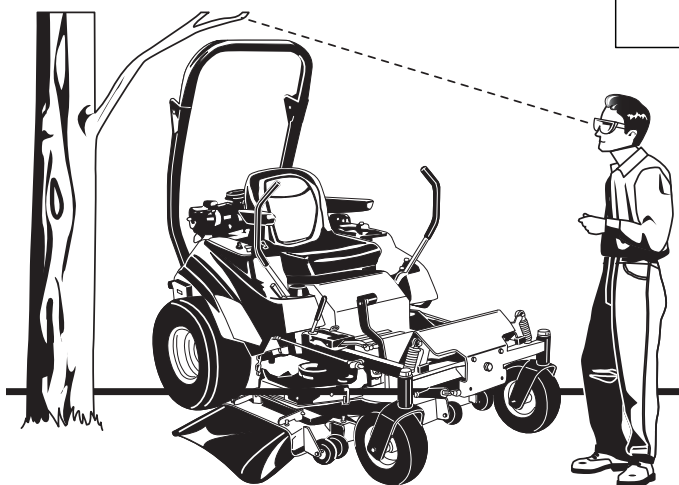
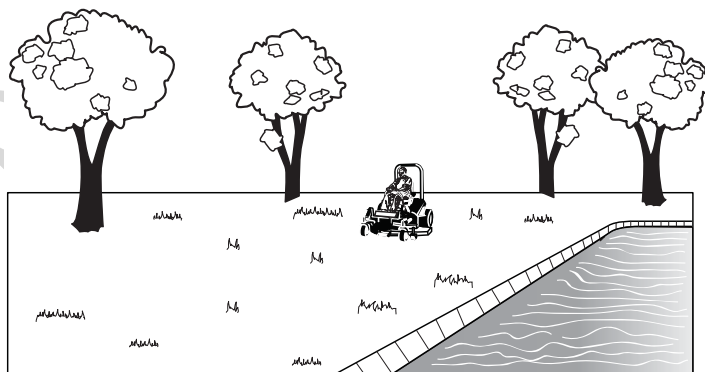
Keep the roll bar in the raised position and fasten the seat belt. There is no roll over protection when the roll bar is down! Do not jump off if the mower tips (it is safer to be secured by the seat belt with the roll bar raised.)

Lower the roll bar only when necessary (such as to temporarily clear a low overhanging obstacle) and NEVER remove it. Do NOT use the seat belt when the roll bar is down. Raise the roll bar as soon as clearance permits.



## Retaining Walls, Drop-offs, and Water

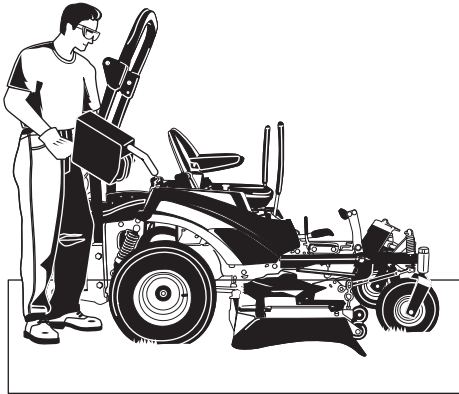
Retaining walls and drop-offs around steps and water are a common hazard. Give yourself a minimum of two mower widths of clearance around these hazards and hand-trim with a walk behind mower or string trimmer. Wheels dropping over retaining walls, edges, ditches, embankments, or into water can cause rollovers, which may result in serious injury, death, or drowning.



## Overhead Obstacles

Check for overhead clearances before driving under any objects. Do not allow the roll bar to contact low overhanging obstacles such as tree branches and guide wires.





## Fuel and Maintenance

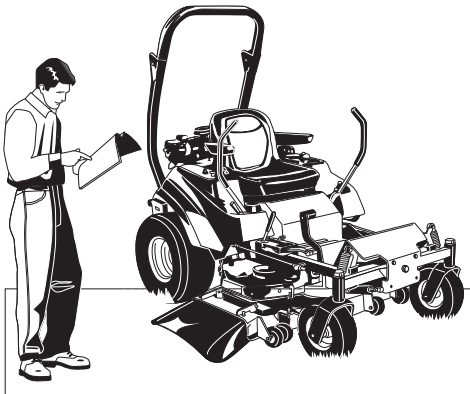
Always disengage all drives, shutoff the engine, and remove the key before doing any cleaning, refueling, or servicing.

Gasoline and its vapors are extremely flammable. Do not smoke while operating or refueling. Do not add fuel while engine is hot or running. Allow engine to cool for at least 3 minutes prior to adding fuel.

Do not add fuel indoors, in an enclosed trailer, garage, or any other enclosed area that is not well ventilated. Gasoline spills should be cleaned up promptly and before operation begins.

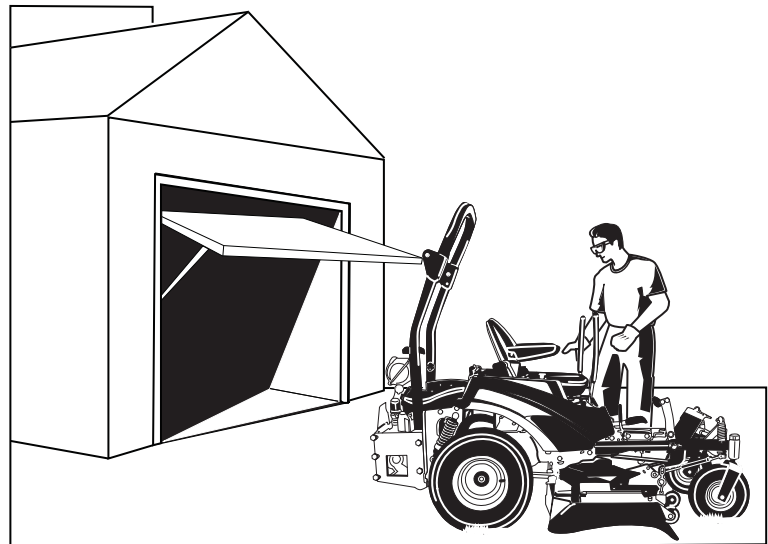
Gasoline should be stored only in sealed containers approved for fuel.

Proper maintenance is critical to the safety and performance of your unit. Keep the unit free of grass, leaves, and excess oil. Be sure to perform the maintenance procedures listed in this manual, especially periodically testing the safety system.



## Enclosed Areas

Only operate this unit outdoors and away from unventilated areas such as inside garages or enclosed trailers. The engine emits poisonous carbon monoxide gas and prolonged exposure in an enclosed area can result in serious injury or death.



## SLOPE IDENTIFICATION GUIDE

How to measure the slope of a lawn surface with a smartphone or an angle finder tool:

### **⚠️ WARNING**

Do not operate on slopes greater than 15 degrees.

1. Use a straight edge at least two (2) feet long (A, Figure Slope Identification Guide). A 2x4 or a straight piece of metal works well.
2. Angle finder tools.
  - a. Use your smartphone: Many smartphones (B, Figure Slope Identification Guide) have an inclinometer (angle finder) located under the compass application (app). Or, search an app store for an Inclinometer app.
  - b. Use angle finder tools: Angle finder tools (C & D, Figure Slope Identification Guide) are available at local hardware stores or online (also called inclinometer, protractor, angle meter, or angle gauge). Dial type (C) or digital type (D) work, others may not. Follow user instructions with the angle finder tool.
3. Place the two (2) feet long straight edge along the steepest part of the lawn slope. Place the board up and down the slope.
4. Lay the smartphone or angle finder tool on the straight edge and read the angle in degrees. This is the slope of your lawn.

*Note: A paper gauge slope identification guide is included in your product literature packet and is also available to download from the manufacturer's website ([ferrismowers.com](http://ferrismowers.com)).*

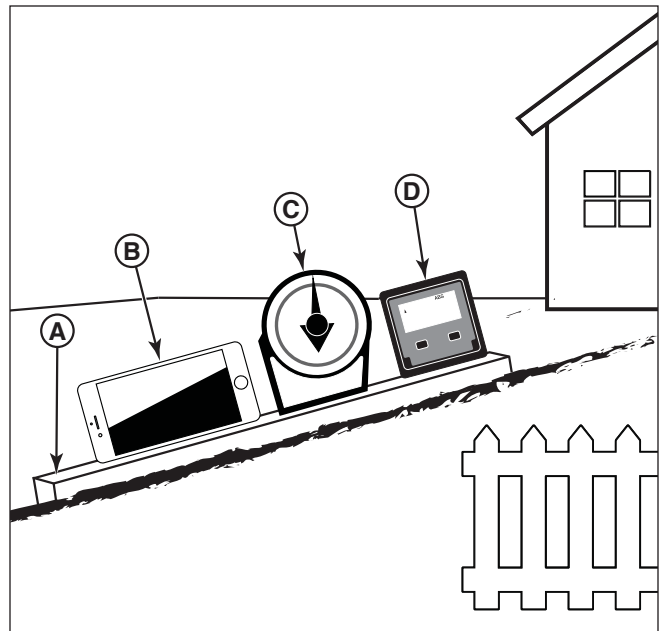



Figure - Slope Identification Guide



## SAFETY RULES AND INFORMATION



Read these safety rules and follow them closely. Failure to obey these rules could result in loss of control of unit, severe personal injury or death to you, or bystanders, or damage to property or equipment. **This mowing deck is capable of amputating hands and feet and throwing objects.** The triangle  in text signifies important cautions or warnings which must be followed.

### TRAINING

1. Read, understand, and follow all instructions in the manual and on the unit before starting. If the operator(s) or mechanic(s) can not read English it is the owner's responsibility to explain this material to them.
  2. Become familiar with the safe operation of the equipment, operator controls, and safety signs.
  3. All operators and mechanics should be trained. The owner is responsible for training the users.
  4. Only allow responsible adults, who are familiar with the instructions, to operate the unit.
  5. Never let children or untrained people operate or service the equipment. Local regulations may restrict the age of the operator.
  6. The owner/user can prevent and is responsible for accidents or injuries occurring to themselves, other people or property.
  7. Data indicates that operators, age 60 years and above, are involved in a large percentage of riding mower-related injuries. These operators should evaluate their ability to operate the riding mower safely enough to protect themselves and others from serious injury.
2. Mow only in the daylight or with good artificial light, keeping away from holes and hidden hazards.
  3. Be sure all drives are in neutral and parking brake is engaged before starting engine. Only start engine from the operator's position. Use seat belts if provided.
  4. Be sure of your footing while using pedestrian controlled equipment, especially when backing up. Walk, don't run. Reduced footing could cause slipping.
  5. Slow down and use extra care on hillsides. Be sure to travel in the recommended direction on hillsides. Turf conditions can affect the machines stability. Use caution when operating near drop-offs.
  6. Do not mow in reverse unless absolutely necessary. Always look down and behind before and while traveling in reverse.
  7. Be aware of the mower discharge direction and do not point it at anyone. Do not operate the mower without either the entire grass catcher or the deflector in place.
  8. Slow down and use caution when making turns and when changing directions on slopes.
  9. Never raise deck with the blades running.
  10. Never leave a running unit unattended. Always disengage the PTO, set parking brake, stop engine, and remove keys before dismounting. Keep hands and feet away from the cutting units.
  11. Turn off the PTO switch to disengage the blades when not mowing.
  12. Never operate with guards not securely in place. Be sure all interlocks are attached, adjusted properly and functioning properly.
  13. Never operate with the discharge deflector raised, removed or altered, unless using a grass catcher.
  14. Do not change the engine governor setting or overspeed the engine.
  15. Stop on level ground, lower implements, disengage drives, engage parking brake, shut off engine before leaving the operator's position for any reason including emptying the grass catchers or unclogging the chute.
  16. Stop equipment and inspect blades after striking objects or abnormal vibration occurs. Make necessary repairs before resuming operations.
  17. Keep hands and feet away from the cutting units.
  18. Look behind and down before backing up to be sure of a clear path.
  19. Never carry passengers and keep pets and bystanders away.
  20. Do not operate the unit while under the influence of alcohol or drugs.
  21. Slow down and use caution when making turns and crossing roads and sidewalks. Stop blades if not mowing.
  22. Use care when loading or unloading the machine into a trailer or truck.

### PREPARATION

1. Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job. Use only accessories and attachments approved by the manufacturer.
2. Wear appropriate clothing including safety shoes, safety glasses and ear protection. Long hair, loose clothing or jewelry may get tangled in moving parts.
3. Inspect the area where the equipment is to be used and remove all objects such as rocks, toys and wire, which can be thrown by the machine.
4. Use extra care when handling gasoline and other fuels. They are flammable and vapors are explosive.
  - a) Use only an approved container.
  - b) Never remove fuel cap or add fuel with the engine running. Allow engine to cool before refueling. Do not smoke.
  - c) Never refuel or drain the machine indoors.
5. Check that operator's presence controls, safety switches and shields are attached and functioning properly. Do not operate unless they are functioning properly.

### OPERATION

1. Never run an engine in an enclosed area.

# Operator Safety

23. Use care when approaching blind corners, shrubs, trees or other objects that may obscure vision.
24. To reduce fire hazard, keep unit free of grass, leaves & excess oil. Do not stop or park over dry leaves, grass or combustible materials.

## WARNING

**It is a violation of California Public Resource Code, Section 4442, to use or operate the engine on any forest-covered, brush-covered or grass-covered land unless the exhaust system is equipped with a spark arrester, as defined in Section 4442, maintained in effective working order. Other states or federal jurisdictions may have similar laws. Contact an Authorized Service Dealer to obtain a spark arrester designed for the exhaust system installed on this engine.**

25. OSHA regulations may require the use of hearing protection when exposed to sound levels greater than 85 dBA for an 8 hour time period.

## CAUTION



**This machine produces sound levels in excess of 85 dBA at the operator's ear and can cause hearing loss though extended periods of exposure.**

**Wear hearing protection when operating this machine.**

## SLOPE OPERATION

Slopes are a major factor related to loss-of-control and tip-over accidents, which can result in severe injury or death. All slopes require extra caution. If you cannot back up the slope or if you feel uneasy on it, do not drive on it.

## WARNING

**Do not use this machine on slopes greater than 15°.\***

**Select slow ground speed before driving onto slope. Use extra caution when operating on slopes with rear-mounted grass catchers.**

**Mow across the face of slopes, not up and down, use caution when changing directions and DO NOT START OR STOP ON SLOPE.**

### Do

1. Mow across slopes, not up and down.
2. Remove obstacles such as rocks, tree limbs, etc.
3. Watch for holes, ruts, or bumps. Uneven terrain could overturn the unit. Tall grass can hide obstacles.
4. Use slow speed. Choose a slow speed so that you will not have to stop or change speed while on the slope.

\*This limit was determined per International Standard ISO 5395-3:2013, Section 4.6 and is based on the ISO 5395-3 Stability Test procedure described in Annex A. The 15 degree "limit of stability" is equal to 60% of the angle at which machine lift-off occurred in static tests. Actual dynamic stability may vary depending on operating conditions.

5. Use extra care with grass catchers or other attachments. These can change the stability of the unit.
6. Keep all movement on the slopes slow and gradual. Do not make sudden changes in speed or direction.
7. See your authorized dealer for recommendations of available weights to improve stability.

### Do Not

1. Avoid starting, stopping, or turning on a slope. If tires lose traction (i.e. machine stops forward motion on a slope), disengage the blade(s) (PTO) and drive slow off the slope.
2. Do not turn on slopes unless necessary, and then, turn slowly and gradually uphill, if possible. Never mow down slopes.
3. Do not mow near drop-offs, ditches, or embankments. The operator could lose footing or balance or mower could suddenly turn over if a wheel is over the edge of a cliff or ditch, or if an edge caves in.
4. Do not mow on wet grass. Reduced footing or traction could cause sliding.
5. Do not try to stabilize the unit by putting your foot on the ground. (ride-on units)
6. Do not mow excessively steep slopes.
7. Do not use grass catcher on steep slopes.
8. Do not mow slopes if you cannot back up them.

## TOWED EQUIPMENT (RIDE-ON UNITS)

1. Tow only with a machine that has a hitch designed for towing. Do not attach towed equipment except at the hitch point.
2. Follow the manufacturer's recommendations for weight limit for towed equipment and towing on slopes. See attaching a trailer under OPERATION.
3. Never allow children or others in or on towed equipment.
4. On slopes, the weight of the towed equipment may cause loss of traction and loss of control.
5. Travel slowly and allow extra distance to stop.
6. Do not shift to neutral and coast down hill.

## CHILDREN

Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the unit and the mowing activity. Never assume that children will remain where you last saw them.

1. Keep children out of the mowing area and under the watchful care of another responsible adult.
2. Be alert and turn unit off if children enter the area.
3. Before and during reverse operation, look behind and down for small children.
4. Never carry children, even with the blade(s) off. They may fall off and be seriously injured or interfere with safe unit operation. Children who have been given rides in the past may suddenly appear in the mowing area for another ride and be run over or backed over by the machine.
5. Never allow children to operate the unit.
6. Use extra care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

## EMISSIONS

1. Engine exhaust from this product contains chemicals known, in certain quantities, to cause cancer, birth defects, or other reproductive harm.
2. Look for the relevant Emissions Durability Period and Air Index information on the engine emissions label.

## IGNITION SYSTEM (GASOLINE MODELS)

1. This spark ignition system complies with Canadian ICES-002.

## SERVICE AND MAINTENANCE

**To avoid personal injury or property damage, use extreme care in handling gasoline. Gasoline is extremely flammable and the vapors are explosive.**

### Safe Handling of Gasoline

1. Extinguish all cigarettes, cigars, pipes, and other sources of ignition.
2. Use only approved gasoline containers.
3. Never remove the gas cap or add fuel with the engine running. Allow the engine to cool before refueling.
4. Never fuel the machine indoors.
5. Never store the machine or fuel container where there is an open flame, spark, or pilot light such as near a water heater or other appliance.
6. Never fill containers inside a vehicle or on a truck bed with a plastic bed liner. Always place containers on the ground away from your vehicle before filling.
7. Remove gas-powered equipment from the truck or trailer and refuel it on the ground. If this is not possible, then refuel such equipment on a trailer with a portable container, rather than from a gasoline dispenser nozzle.
8. Keep nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do not use a nozzle lock-open device.
9. If fuel is spilled on clothing, change clothing immediately.
10. Never over-fill the fuel tank. Replace gas cap and tighten securely.
11. Use extra care in handling gasoline and other fuels. They are flammable and vapors are explosive.
12. If fuel is spilled, do not attempt to start the engine but move the machine away from the area of spillage and avoid creating any source of ignition until fuel vapors have dissipated.
13. Replace all fuel tank caps and fuel container caps securely.

### Maintenance and Storage

1. Always observe safe refueling and fuel handling practices when refueling the unit after transportation or storage.
2. Always follow the engine manual instructions for storage preparations before storing the unit for both short and long term periods.
3. Always follow the engine manual instructions for proper start-up procedures when returning the unit to service.
4. Never store the machine or fuel container inside

- where there is an open flame, such as in a water heater. Allow unit to cool before storing.
5. Shut off fuel while storing or transporting. Do not store fuel near flames or drain indoors.
6. Keep all hardware, especially blade attachment bolts, tight and keep all parts in good working condition. Replace all worn or damaged decals.
7. Never tamper with safety devices. Check their proper operation regularly.
8. Disengage drives, lower implement, set parking brake, stop engine and remove key or disconnect spark plug wire. Wait for all movement to stop before adjusting, cleaning or repairing.
9. Clean grass and debris from cutting units, drives, mufflers, and engine to prevent fires. Clean up oil or fuel spillage.
10. Let engine cool before storing and do not store near flame.
11. Stop and inspect the equipment if you strike an object. Repair, if necessary, before restarting.
12. Park machine on level ground. Never allow untrained personnel to service machine.
13. Use jack stands to support components when required.
14. Carefully release pressure from components with stored energy.
15. Disconnect battery or remove spark plug wire before making any repairs. Disconnect the negative terminal first and the positive last. Reconnect positive first and negative last.
16. Use care when checking blades. Wrap the blade(s) or wear gloves, and use caution when servicing them. Only replace blades. Never straighten or weld them.
17. Keep hands and feet away from moving parts. If possible, do not make adjustments with the engine running.
18. Charge batteries in an open well ventilated area, away from spark and flames. Unplug charger before connecting or disconnecting from battery. Wear protective clothes and use insulated tools.
19. Grass catcher components are subject to wear, damage, and deterioration, which could expose moving parts or allow objects to be thrown. Frequently check components and replace with manufacturer's recommended parts, when necessary.
20. Check brake operation frequently. Adjust and service as required.
21. Use only factory authorized replacement parts when making repairs.
22. Always comply with factory specifications on all settings and adjustments.
23. Only authorized service locations should be utilized for major service and repair requirements.
24. Never attempt to make major repairs on this unit unless you have been properly trained. Improper service procedures can result in hazardous operation, equipment damage and voiding of manufacturer's warranty.
25. Units with hydraulic pumps, hoses, or motors: **WARNING:** Hydraulic fluid escaping under pressure may have sufficient force to penetrate skin and cause serious injury. If foreign fluid is injected into the skin it must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result. Keep body and hands away from pin holes or nozzles that eject hydraulic fluid under high pressure. Use paper or cardboard, and not hands, to search for



leaks. Make sure all hydraulic fluid connections are tight and all hydraulic hoses and lines are in good condition before applying pressure to the system. If leaks occur, have the unit serviced immediately by your authorized dealer.

26. **WARNING:** Stored energy device. Improper release of springs can result in serious personal injury. Springs should be removed by an authorized technician.
27. Models equipped with an engine radiator: **WARNING:** Stored energy device. To prevent serious bodily injury from hot coolant or steam blow-out, never attempt to remove the radiator cap while the engine is running. Stop the engine and wait until it is cool. Even then, use extreme care when removing the cap.

## ROLL BAR INSTRUCTIONS

For models equipped with factory-installed Roll Over Protection System (ROPS).

### **WARNING**

In order to avoid serious injury or death from roll over, it is important to follow the warnings listed below.

#### OPERATIONAL WARNINGS

- Always use the seat belt when the roll bar is in the raised position.
- Never use the seat belt when the roll bar is in the down position.
- Remember there is no roll over protection when the roll bar is in the down position so it is very important to always keep the roll bar in the raised position whenever possible.
- Lower the roll bar to the down position only when it is absolutely necessary.
- Check for overhead clearances before driving under any objects. Do not allow roll bar to contact low overhanging obstacles such as tree branches and guide wires.
- Never remove the roll bar from the vehicle.
- Do not exceed the machine weight rating of the roll bar.
- Read and follow all of the instructions shown below regarding the inspection and maintenance of the roll bar structure and the seat belt.

#### INSPECTION OF THE ROLL BAR PROTECTIVE STRUCTURE

### **WARNING**

Failure to properly inspect and maintain the ROLL BAR protective structure can cause serious injury or death.

A ROLL BAR, like any other safety device, needs to be periodically inspected to verify that the integrity of the device has not been compromised through normal machine use, misuse, age degradation, modifications, or a roll over.

To maintain operator roll over protection and roll bar effectiveness:

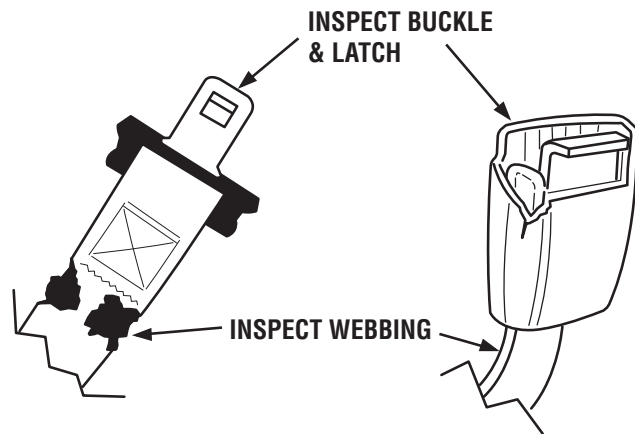
- If a ROLL BAR becomes damaged for any reason, such as a collision, roll over or impact, the ROLL BAR must be replaced. Small undetectable cracks can reduce the effectiveness of the ROLL BAR. Never weld, straighten, or repair the ROLL BAR.
- Never alter the ROLL BAR by welding anything to it or by drilling additional holes.
- **BEFORE FIRST TIME USE** - Inspect the ROLL BAR structure and mounting hardware for:
  - 1) Check to make sure the machine GVW (Gross Vehicle Weight), including attachments, restrained payload, fuel and operator, is not in excess of the maximum weight specified on the ROLL BAR label.
  - 2) Make sure there isn't any missing, damaged, or loose mounting hardware.
  - 3) Make sure the ROLL BAR has been correctly and completely installed.
- **EVERY 100 HOURS** - Inspect the ROLL BAR structure and mounting hardware for:
  - 1) Any cracks in the structure (structural members and/or welds).
  - 2) Significant corrosion on any part of the ROLL BAR structure or hardware.
  - 3) Missing, damaged, or loose mounting hardware
  - 4) Mounting hardware that is of a grade lesser than specified.
  - 5) Machine GVW (Gross Vehicle Weight), including attachments, restrained payload, fuel and operator, in excess of the maximum weight specified on the ROLL BAR label.
  - 6) Any modifications that have been made, such as unauthorized welds and holes.
  - 7) Any permanent deformation or twisting of the ROLL BAR structure.
  - 8) That the ROLL BAR label is still in place and is readable.
  - 9) That the ROLL BAR on-product warning labels are still on the ROLL BAR and are readable.
- If there is any doubt as to the condition of the ROLL BAR, remove the machine from service and contact your dealer for assistance.

## **! WARNING**

Failure to properly inspect and maintain the seat belt can cause serious injury or death.

### **INSPECTION AND MAINTENANCE OF THE ROLL BAR SEAT BELT**

- The seat belt like the ROLL BAR, needs to be periodically inspected to verify that the integrity has not been compromised through normal machine use, misuse, age degradation, modifications, or a roll over. If the seat belt does not pass all of the following tests, it should be replaced.
- **BEFORE EACH USE** – Conduct the following inspections/maintenance of the seat belt and retraction mechanism:
  - 1) Check for dirt or debris in the retraction mechanism. If dirt or debris is found, it should be removed.
  - 2) Check to make sure the retraction mechanism retracts easily and completely.
  - 3) Check for damage to any part of the seat belt such as nicks, cuts, loose stitching, or fraying.
  - 4) Check that the buckle and latch operate properly and that the latch plate is not excessively worn, deformed, or the buckle is damaged or cracked. The seat belt should latch and release easily.



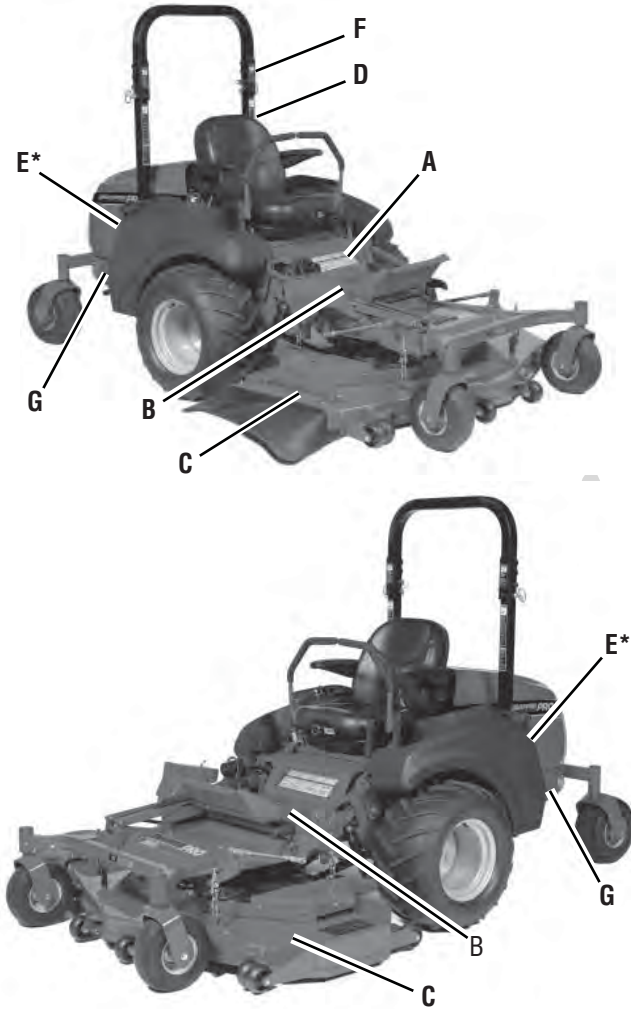
# Operator Safety

## Safety Decals

Before operating your unit, read the safety decals. The cautions and warnings are for your safety. To avoid a personal injury or damage to the unit, understand and follow all safety decals.

**⚠ WARNING**

If any safety decals become worn or damaged, and cannot be read, order replacement decals from your local dealer.



\* This decal is located behind the ROPS on the frame of the unit.

<p><b>⚠ WARNING</b></p> <p><b>Avoid serious injury or death</b></p> <ul style="list-style-type: none"> <li>Read operator's manual before using this product.</li> <li>Do NOT operate this machine unless you are trained.</li> <li>Know the location and function of all controls.</li> <li>Keep safety devices (guards, shields, switches, etc.) in place and working.</li> <li>Remove objects that could be thrown by the blades.</li> <li>Be sure blades and engine are stopped before placing hands or feet near blades.</li> <li>When leaving machine, shut off, remove key and set parking brake.</li> </ul> <p><b>Fire Hazard</b></p> <p>Gasoline is flammable. Debris is combustible.</p> <ul style="list-style-type: none"> <li>Allow engine to cool for at least 3 minutes before refueling.</li> <li>Keep unit clear of debris.</li> <li>This equipment may create sparks that can start fires around dry vegetation. A spark arrester may be required. Contact local fire agencies for regulations relating to the prevention requirements.</li> </ul>	<p><b>⚠ DANGER</b></p> <p><b>Amputation hazard</b></p> <p>Rotating blades cut off arms and legs.</p> <ul style="list-style-type: none"> <li>Stop the mower when children or others are near.</li> <li>Do not carry riders (especially children) even with the blades off. They may fall off or return for another ride when you are not expecting it.</li> <li>Look down behind and to the side before changing direction.</li> </ul> <p><b>Loss of control and roll-over hazard</b></p> <p>Operating on slopes can be hazardous and cause loss of control and roll-overs.</p> <ul style="list-style-type: none"> <li>Avoid sudden turns or sharp speed changes.</li> <li>Reduce speed and use extreme caution on slopes.</li> <li>Do across slopes, NOT up and down.</li> <li>Do not operate on slopes over 15 degrees.</li> <li>If machine stops forward motion on a slope, stop the blades and drive slowly off the slope.</li> </ul>	<p><b>⚠ DANGER</b></p> <p><b>Water, retaining walls and drop-off hazards</b></p> <p>Blades dropping over edges may result in serious injury, death or drowning.</p> <ul style="list-style-type: none"> <li>Do NOT operate near water, retaining walls or drop-offs.</li> <li>Give yourself a minimum of two mower widths of clearance around these hazards.</li> </ul> <p><b>Wet or soft slope hazard</b></p> <p>Wet or soft slopes can cause sliding and loss of control.</p> <ul style="list-style-type: none"> <li>Do NOT operate on slopes when grass is wet.</li> <li>Do NOT operate on slopes when soil is soft (such as after heavy rains).</li> </ul>
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**⚠ WARNING**

**PINCH POINT**

To avoid hand or finger injury, keep fingers and hands clear of moving parts, including the deck cover.

**⚠ DANGER**

**Amputation and thrown objects hazard**

- Keep hands and feet away from deck.
- Do not operate mower unless discharge chute or entire grass catcher is in its proper place.

**⚠ WARNING**

**AVOID SERIOUS INJURY OR DEATH FROM ROLL OVER:**

Keep roll bar in the raised position and use seat belt.

THERE IS NO ROLL OVER PROTECTION WHEN THE ROLL BAR IS DOWN

Lower the roll bar only when necessary and NEVER remove it.

Do NOT use seat belt when the roll bar is down.

Raise the roll bar as soon as clearance permits.

Do NOT jump off if mower tips.

Read and follow all operating instructions and warnings in the operator's manual.

**⚠ CAUTION**

**ROLL OVER PROTECTIVE STRUCTURE**

To maintain operator protection and roll bar certification:

Replace a damaged roll bar, do NOT attempt to repair or modify.

Any alteration of the roll bar must be approved by the manufacturer.

DO NOT exceed the machine weight rating of the roll bar.

3-18427

**⚠ WARNING**

**Avoid serious injury or death from rollover.**

Do not operate without the rollbar installed and operational.

**⚠ WARNING**

**LOW OVERHANGING OBSTACLES HAZARD**

Check for overhead clearances before driving under any objects. Do NOT allow roll bar to contact low overhanging obstacles, such as tree branches and guide wires.

**⚠ WARNING**

**Amputation and Pinch Point Hazard**

To avoid injury from rotating parts, stay clear of parts and keep all shields and guards in place.





## Safety Interlock System

This unit is equipped with safety interlock switches. These safety systems are present for your safety, do not attempt to bypass safety switches, and never tamper with safety devices. Check their operation regularly.

### Operational SAFETY Checks

#### Test 1 — Engine should NOT crank if:

- PTO switch is engaged, OR
- Parking brake is not engaged, OR
- Ground speed control levers are not in the NEUTRAL position, OR

#### Test 2 — Engine SHOULD crank if:

- PTO switch is NOT engaged, AND
- Parking brake is engaged, AND
- Ground speed control levers are locked in the NEUTRAL position, AND

#### Test 3 — Engine should SHUT OFF if:

- Operator rises off the seat with the PTO engaged, OR
- Operator rises off the seat with the parking brake disengaged.
- Operator moves the ground speed control levers out of their NEUTRAL positions before disengaging the parking brake.
- Operator moves the ground speed control levers out of the NEUTRAL position by positioning the mower deck in the operating position.

#### Test 4 — PTO SHOULD shut off if:

- Operator raises the deck from the operating position with the PTO engaged.

#### Test 5 — PTO should NOT engage if:

- Operator engages the PTO before the mower deck is in the operating position.

#### Test 6 — Blade Brake Check

Mower blades and mower drive belt should come to a complete stop within seven (7) seconds after electric PTO switch is turned off (or operator raises from the seat). If mower drive belt does not stop within seven (7) seconds, see your dealer.

*NOTE: Once the engine has stopped, the PTO switch must be turned off, parking brake must be engaged, the ground speed control levers must be locked in the NEUTRAL position, after the operator returns to the seat to start the engine.*

## WARNING

If the unit does not pass a safety test, do NOT operate it. See your authorized dealer. Under no circumstance should you attempt to defeat the purpose of the safety interlock system.

### Safety Alert Symbol & Signal Words

The alert symbol () is used to identify safety information about hazards that can result in personal injury. A signal word (DANGER, WARNING, or CAUTION) is used with the alert symbol to indicate the likelihood and the potential severity of the injury. In addition, a hazard icon may be used to represent the type of hazard. An explanation of hazard levels and icons are as follows:

## DANGER

This indicates a hazard which, if not avoided, **will result in serious injury or death.**

## WARNING

This indicates a hazard which, if not avoided, **could result in serious injury or death.**

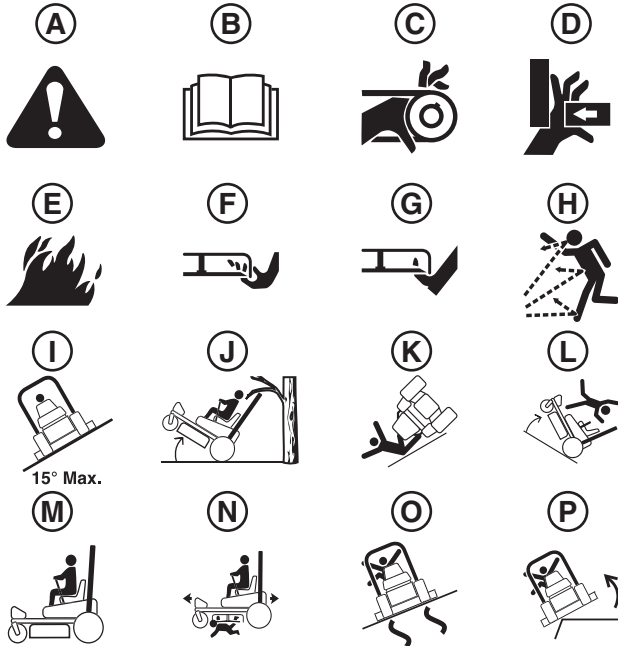
## CAUTION

This indicates a hazard which, if not avoided, **might result in serious injury or death.**

## NOTICE

This message presented without the alert symbol indicates a situation where the unit or property could be damaged.

## Safety Icons



Callout	Description
A	Alert
B	Read the Manual
C	Amputation - Rotating Parts
D	Pinch Point
E	Fire Hazard
F	Amputation - Hand in Blade
G	Amputation - Foot in Blade
H	Thrown Objects
I	Maximum Slope Angle for Safe Operation
J	Overhead Obstacles
K	Rollover Hazard
L	Tipover
M	Keep ROPS in Raised Position
N	Keep Children Away
O	Slippery Slopes
P	Dropoffs

## Features and Controls

### Identification Numbers

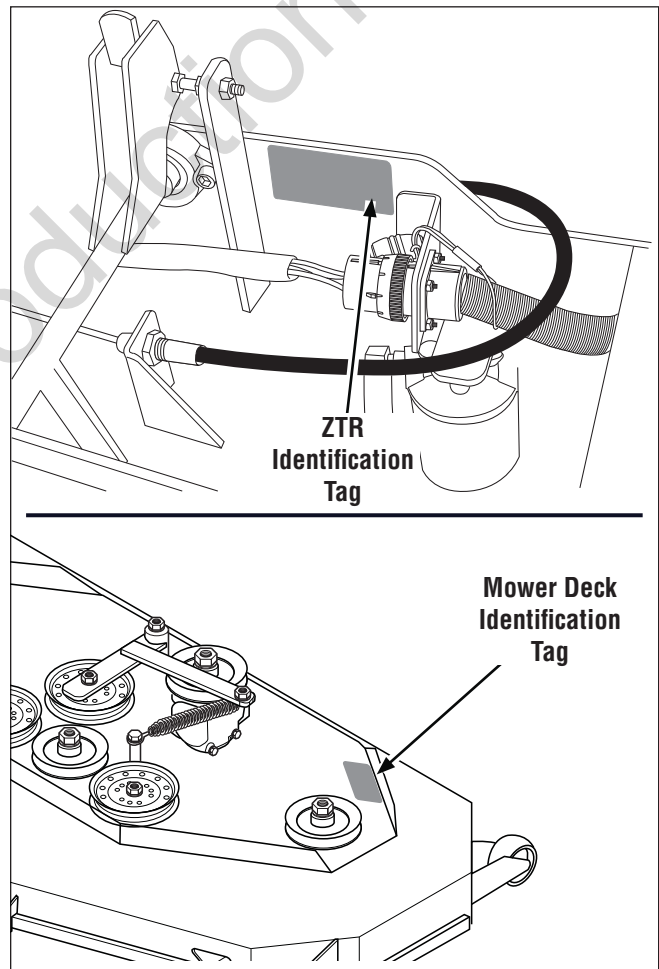


North American Models

When contacting your authorized dealer for replacement parts, service, or information you **MUST** have these numbers.

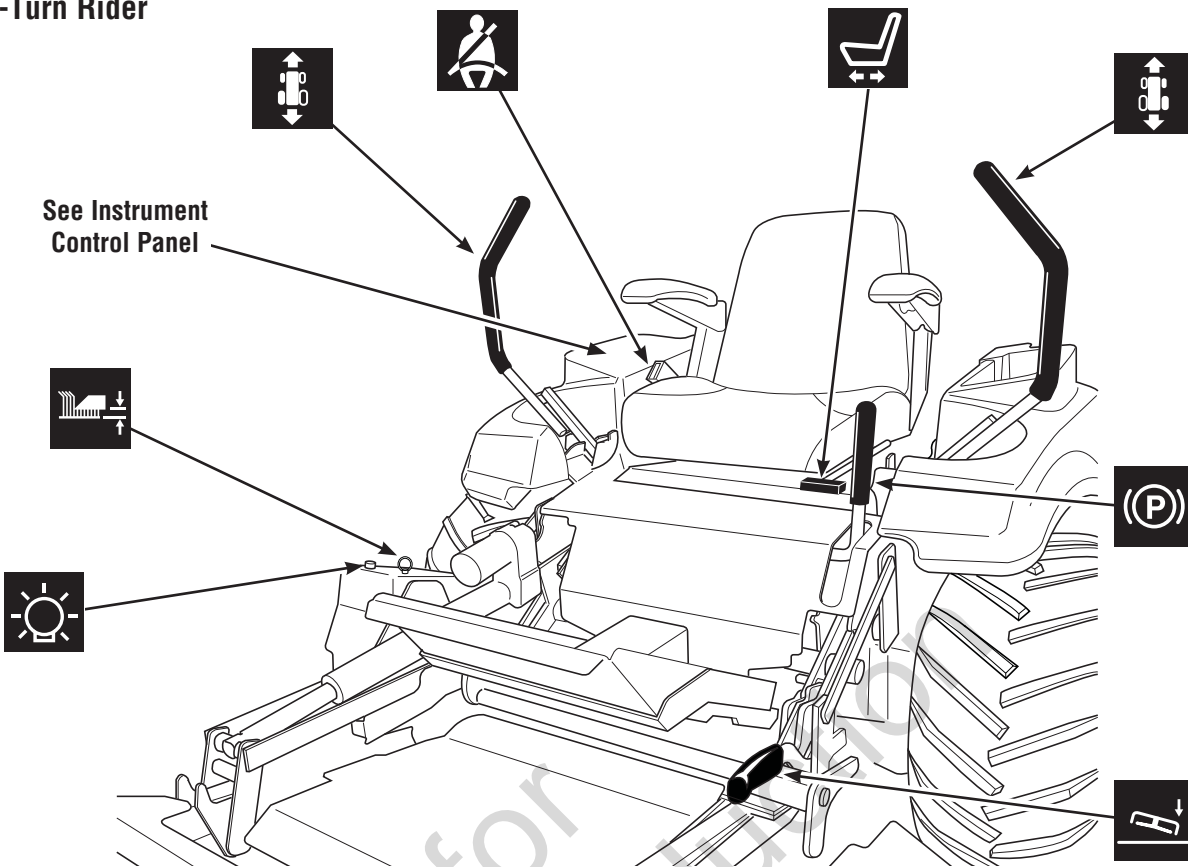
Record your model / serial number and engine serial numbers on the space provided on the inside front cover for easy access. These numbers can be found in the locations shown.

*NOTE: For location of engine identification numbers, refer to engine owner's manual.*



## Features and Controls

### Zero-Turn Rider



### Control Functions

The information below briefly describes the function of individual controls. Starting, stopping, driving, and mowing require the combined use of several controls applied in specific sequences. To learn what combination and sequence of controls to use for various tasks see the OPERATION section.



#### Cutting Height Adjustment Pin

With the actuator fully extended move the cutting height adjustment pin to the desired cutting height. Retract the actuator until it makes contact with the cutting height adjustment pin to set the cutting height.



#### Ground Speed Control Levers

These levers control the ground speed of the rider. The left lever controls the left drive wheel and the right lever controls the right drive wheel.

Moving a lever forward increases the FORWARD speed of the associated wheel, and pulling back on a lever increases the REVERSE speed.

*Note: The further a lever is moved away from the neutral position the faster the drive wheel will turn.*

See *Zero-Turn Driving Practice* section for steering instructions.



#### Seat Adjustment Lever

The seat can be adjusted forward and back. Twist the lever counter-clockwise, position the seat as desired, and release the lever to lock the seat in position.



#### Operating Position Indicator Lamp

The operating position indicator lamp will flash when the mower deck is not properly positioned in the operating position. When the mower deck is properly positioned the operating position indicator lamp will stop flashing and shut off. See *Positioning the Mower Deck for Operation* for instructions on properly positioning the mower deck.



#### Retractable Seat Belt


The seat belt is used to secure the operator to the seat. The seat belt should ALWAYS be worn when the Roll Bar is in the raised position. The seat belt should NEVER be worn when the Roll Bar is in the down position.

# Features and Controls

## Parking Brake

Pull the parking brake handle up to engage the parking brake. Push the parking brake handle down to disengage the parking brake. **NOTE:** *To start the unit the parking brake must be engaged.*

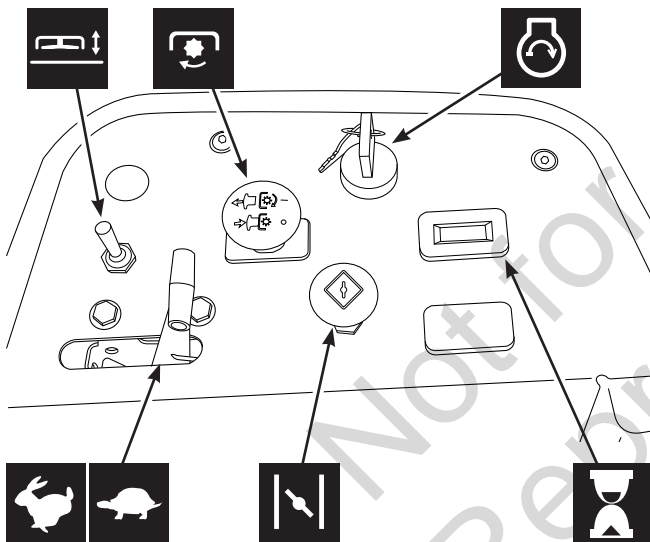
 **DISENGAGE** Releases the parking brake.

 **ENGAGE** Locks the parking brake

## Deck Attachment Lever

The deck attachment lever is used to assist in the process of removing and installing the mower deck to the zero-turn rider. See the *Attachment Removal and Installation* section.

## Instrument Control Panel



## Throttle Control

The throttle controls the engine speed. Move the throttle control forward toward the FAST position to increase the engine speed and back towards the SLOW position to decrease the engine speed. Always operate at FULL throttle.

 **FAST** Speeds up the engine speed.

 **SLOW** Slows down the engine speed.

## Mower Deck Lift Actuator Switch

Pulling back on the switch will lower the mower deck. Pushing forward on the switch will raise the deck.

**Driving the Mower:** The mower deck **MUST** either be positioned in the Operating position or the Service position **BEFORE** you move the ground speed control levers out of the NEUTRAL position.

**Operating the Mower:** The mower deck **MUST** be positioned in the Operating position **BEFORE** engaging the PTO clutch.

See *Positioning the Mower Deck for Service* and *Positioning the Mower Deck for Operation* for the proper positioning of the mower deck.


## PTO (Power Take Off) Switch


The PTO switch engages and disengages the mower. Pull UP on the switch to engage, and push DOWN to disengage.


**IMPORTANT NOTE:** *If you attempt to position the mower deck for service with the PTO switch engaged, the PTO will shut off and remain shut off until the deck is properly positioned for operation and the PTO switch is disengaged and then re-engaged.*

## Ignition Switch

The ignition switch starts and stops the engine, it has three positions:

 **OFF** Stops the engine and shuts off the electrical system.

 **RUN** Allows the engine to run and powers the electrical system.

 **START** Cranks the engine for starting

Note: Never leave the ignition switch in the RUN position with the engine stopped-this drains the battery.

## Hour Meter

Measures the time of the PTO being engaged.

## Choke

Close the choke for cold starting. Open the choke once the engine starts. A warm engine may not require choking. Pull the knob UP to close the choke. Push the knob DOWN to open the choke.

## Operation

### General Operating Safety

Before first time operation:

- Be sure to read all information in the Safety and Operation sections before attempting to operate this unit.
- Become familiar with all of the controls and how to stop the unit.
- Drive in an open area without mowing to become accustomed to the unit.

#### ⚠ WARNING

Do NOT load this zero-turn rider on a trailer or truck using two separate ramps. Only use a single ramp that is at least one foot wider than the width of the rear wheels of this rider. This rider has a zero turning radius and the rear wheels could fall off the ramps, or the rider could tip over injuring the operator or bystanders.



#### ⚠ WARNING



**Operating on steep slopes can be dangerous.**

- Never operate on slopes greater than 15°.
- Select slow ground speed before driving onto a slope. Use extra caution when operating on slopes with a rear-mounted grass catcher.
- Mow across the face of slopes, not up and down, use caution when changing directions and **DO NOT START OR STOP ON A SLOPE.**

#### ⚠ WARNING



- Never allow passengers to ride on the unit.
- Before leaving the operator's position for any reason, engage the parking brake, disengage the PTO, stop the engine and remove the key.
- To reduce fire hazard, keep the engine, zero-turn rider and mower free of grass, leaves and excess grease. Do NOT stop or park zero-turn rider over dry leaves, grass or combustible materials.
- Gasoline is highly flammable and must be handled with care. Never fill the tank when the engine is still hot from recent operation. Do NOT allow open flame, smoking or matches in the area. Avoid over-filling and wipe up any spills.

## Checks Before Starting

- Check that crankcase is filled to full mark on the engine oil dipstick (**A, Figure 1**). See the engine Operator's Manual for instructions and oil recommendations.
- Fill the fuel tank (**B**) with fresh fuel. Refer to engine manual for fuel recommendations.
- Make sure all nuts, bolts, screws and pins are in place and tight.
- Check the tire pressures. See *Check Tire Pressures*.
- Check the hydraulic oil tank (**C**) and make sure that the oil level is up to the FULL COLD mark.
- Adjust the height of the mower deck to the desired position. See *Mowing Height Adjustment*.
- Adjust the seat position, and make certain you can reach all controls from the operator's position.
- Make sure that the fuel valve (**D**) is in the ON position.

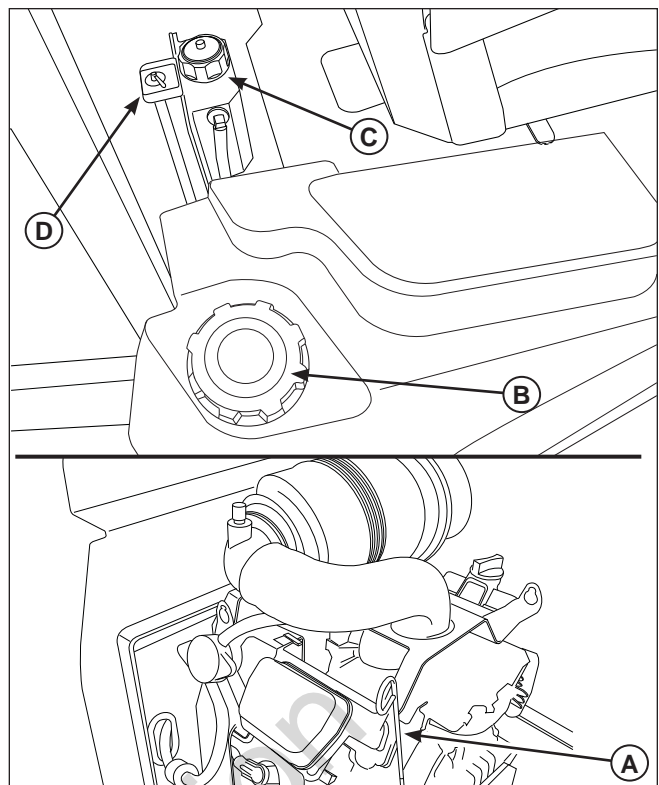


Figure 1. Pre-start Checks (Unit Shown With Hood Raised)

- A. Engine Oil Dipstick
- B. Fuel Tank Cap
- C. Hydraulic Oil Fill
- D. Fuel Selector Valve

## Seat Adjustment - Suspension Seat

In addition to the forward and backward seat adjustment, models equipped with a suspension seat can be adjusted for lumbar support, suspension and back angle.

### Forward and Backward Adjustment:

Twist the forward / backward seat adjustment lever (**A, Figure 2**) counter-clockwise, position the seat as desired, and release the lever to lock the seat into position.

### Lumbar Adjustment:

Turn the lumbar adjustment knob (**B**) until the desired amount of lumbar is achieved.

### Back Angle Adjustment:

Turn the back angle adjustment knob (**C**) until the desired amount of back angle is achieved.

### Suspension Adjustment:

Turn the suspension adjustment knob (**D**) until the display scale has a reading that matches the weight of the operator.

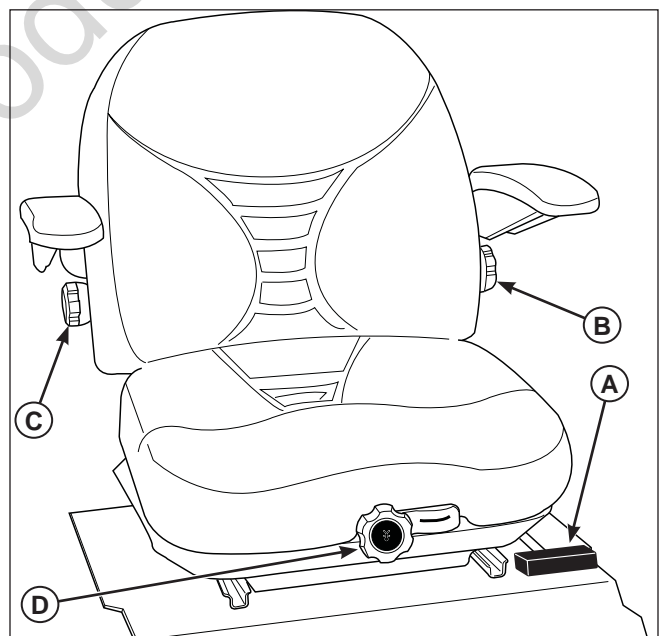


Figure 2. Seat Adjustment

- A. Forward / Backward Seat Adjustment Lever
- B. Lumbar Adjustment Knob
- C. Back Angle Adjustment Knob
- D. Suspension Adjustment Knob



## Check Tire Pressures

Tire pressure should be checked periodically, and maintained at the levels shown in the chart. Note that these pressures may differ slightly from the “Max Inflation” stamped on the side-wall of the tires. The pressures shown provide proper traction, improve cut quality, and extend tire life.

Tire	Pressure
Deck Caster Tires	25 psi (1,03 bar)
Drive Tires	10 psi (0,69 bar)
Zero-turn rider Caster Tires	25 psi (1,03 bar)

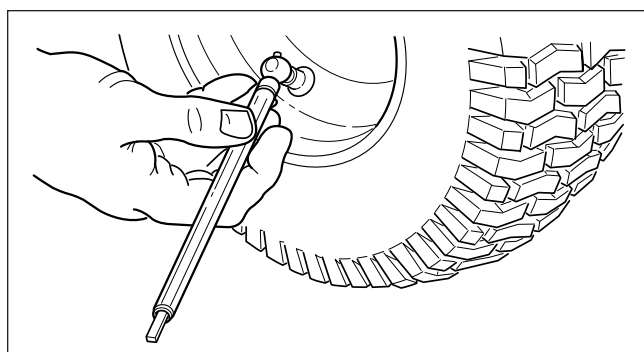


Figure 3. Checking Tire Pressure

## Mowing Height Adjustment

The cutting height adjustment pin (A, Figure 4) controls the mower cutting height. The cutting height is adjustable between 1-1/2” (3,37 cm) and 5” (12,7 cm) in 1/4” (0,64 cm) increments.

1. Turn the ignition key (C) to the RUN position.
2. Press the mower deck lift actuator switch (B) forward (away from the operator) to remove the pressure from the deck height adjustment pin.
3. Place the deck height adjustment pin in the desired location.
4. Press the mower deck lift actuator switch backwards (towards the operator) until contact is made with the deck height adjustment pin. Continue to retract the actuator until the operating position indicator lamp (D) stops flashing and shuts off.

**NOTE:** The actuator **MUST** be positioned correctly before attempting to move the ground speed control levers out of their NEUTRAL positions. If the actuator is not positioned as described in the above step the mower’s safety interlock system will cause the engine to shut off.

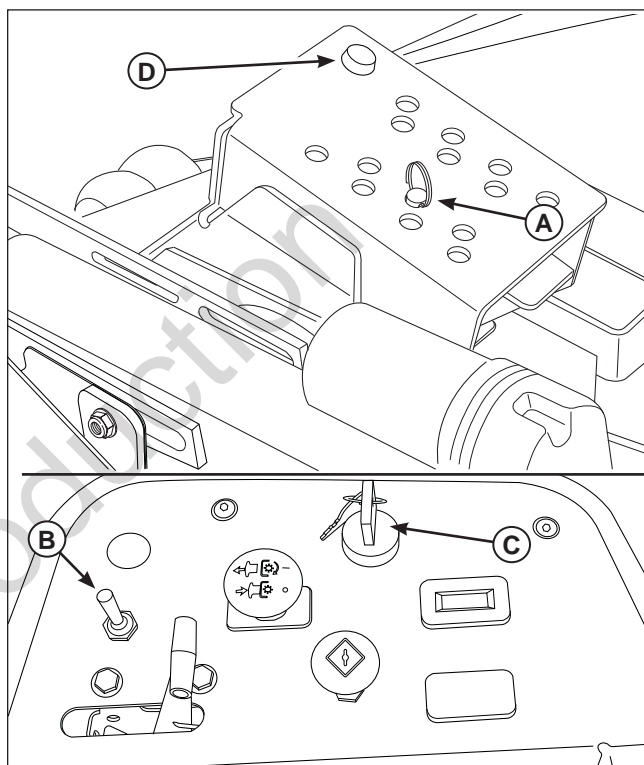


Figure 4. Mowing Height Adjustment

- A. Cutting Height Adjustment Pin
- B. Actuator Deck Height Toggle Switch
- C. Ignition Switch Key
- D. Operating Position Indicator Lamp

## Starting the Engine

### **WARNING**



**Read the Operator's Manual before attempting to operate the machine.**

- If you do not understand how a specific control functions, or have not yet thoroughly read the FEATURES and CONTROLS section, do so now.
- Do NOT attempt to operate the zero-turn rider without first becoming familiar with the location and function of ALL controls.

1. While sitting in the operator's seat, engage the parking brake by pulling the parking brake lever up, make sure that the PTO switch is disengaged (pressed fully down) and the ground speed control levers are locked in the NEUTRAL position.
2. NOTE: A warm engine may not require choking.  
Set the engine throttle control to FULL throttle position. Then fully close the choke by pulling the knob OUT fully.
3. Insert the key into the ignition switch and turn it to the START position.
4. After the engine starts, gradually open the choke (push knob down fully). Reduce to half throttle speed and allow the engine to warm up.

*Warm up the engine by running it for at least a minute before engaging the PTO switch or driving the unit.*

5. **After warming the engine, ALWAYS operate the unit at FULL THROTTLE when mowing.**

**In the event of an emergency the engine can be stopped by simply turning the ignition switch to OFF.** Use this method only in emergency situations. For normal engine shut down follow the procedure given in *Stopping the Mower*.

## Stopping the Mower

1. Returning the ground speed control levers to the middle position will stop rider movement. Pivot the levers outward and lock them in NEUTRAL.
2. Disengage the PTO by pushing down on the PTO switch.
3. Engage the parking brake by pulling the handle up until it locks into position.
4. Move the throttle control to mid-throttle position and turn the ignition key to OFF. Remove the key.

## Safety Interlock and Mower Deck Positioning Instructions

This unit is equipped with a safety interlock system to help keep the operator safe while running the unit. Please read and understand the SAFETY INTERLOCK SYSTEM and FEATURES AND CONTROLS sections before attempting to drive or operate the mower. In order for the unit to operate properly, the controls must be in the correct positions and used in the correct sequence.

### Driving the Mower:

The mower deck **MUST** either be positioned in the Operating position or the Service position **BEFORE** you move the ground speed control levers out of the NEUTRAL position. If not, the safety interlock system will cause the engine to shut off. The safety interlock system will prevent you from driving the mower **UNTIL** the mower deck is positioned in either the Operating or Service position.

### Operating the Mower:

The mower deck **MUST** be positioned in the Operating position **BEFORE** engaging the PTO clutch. If not, the PTO will **NOT** engage and remain off **UNTIL** the mower deck is properly positioned in the operating position, the PTO switch is **DISENGAGED** and then **RE-ENGAGED**.

If you raise the mower deck from the operating position with the PTO clutch **ENGAGED** the PTO will shut off and remain off **UNTIL** the mower deck is properly positioned in the operating position, the PTO switch is **DISENGAGED** and then **RE-ENGAGED**.

## Zero-Turn Driving Practice

The lever controls of the Zero Turn rider are responsive, and learning to gain a smooth and efficient control of the rider's forward, reverse, and turning movements will take some practice.

Spending some time going through the maneuvers shown and becoming familiar with how the unit accelerates, travels, and steers — before you begin mowing — is absolutely essential to getting the most out of the Zero Turn rider.

**Locate a smooth, flat area of your lawn** — one with plenty of room to maneuver. (Clear the area of objects, people and animals before you begin.) Operate the unit at mid-throttle during this practice session (ALWAYS operate at full throttle when mowing), and turn slowly to prevent tire slippage and damage to your lawn.

We suggest you begin with the Smooth Travel procedure to the right, and then advance through the forward, reverse, and turning maneuvers.

You must release the parking brake prior to moving the control levers inward.

## Smooth Travel

The lever controls of the Zero Turn rider are responsive.

The BEST method of handling the ground speed control levers is in three steps — as shown in Figure 5.

FIRST place your hands onto the levers as shown.

SECOND, to go forward gradually push the levers forward with your palms.

THIRD, to speed up move the levers farther forward. To slow down smoothly, slowly move the levers toward neutral.

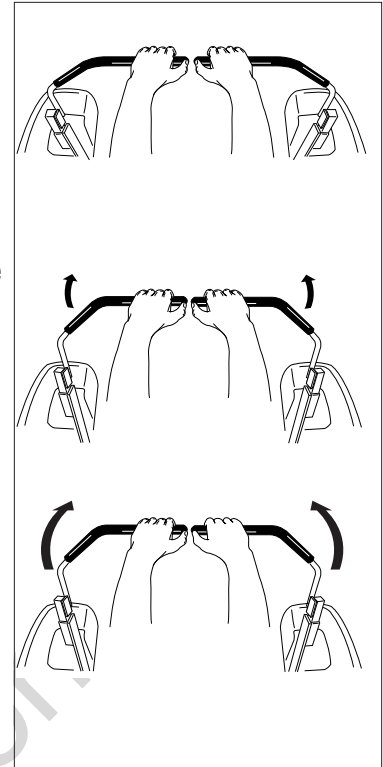


Figure 5. Move Control Levers Gradually

## Basic Driving

### Forward Travel Practice

Gradually move both ground speed control levers — evenly FORWARD from neutral. Slow down and repeat.

*NOTE: Straight forward travel takes practice. If necessary, top speed can be balance-adjusted — see the Speed Balancing Adjustment in the Adjustments section near the back of this manual.*

### Reverse Travel Practice

LOOK DOWN & BEHIND, then gradually move both ground speed control levers evenly BACK from neutral. Slow down and repeat.

*NOTE: Practice backing up for several minutes before attempting to do so near objects. The rider turns sharply in reverse as well as forward, and backing up straight takes practice.*

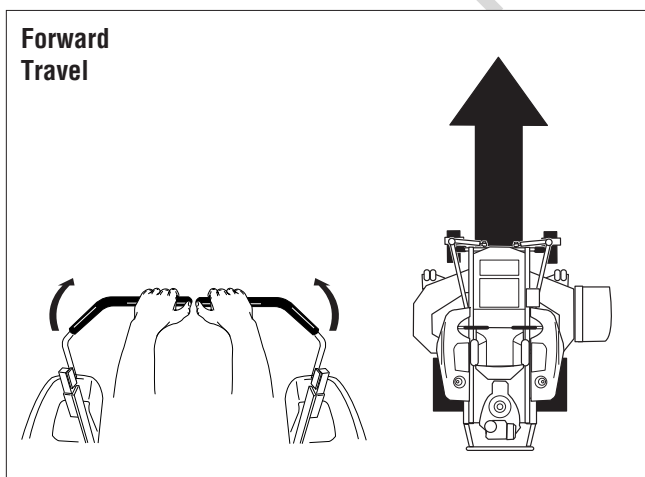


Figure 6. Forward Travel

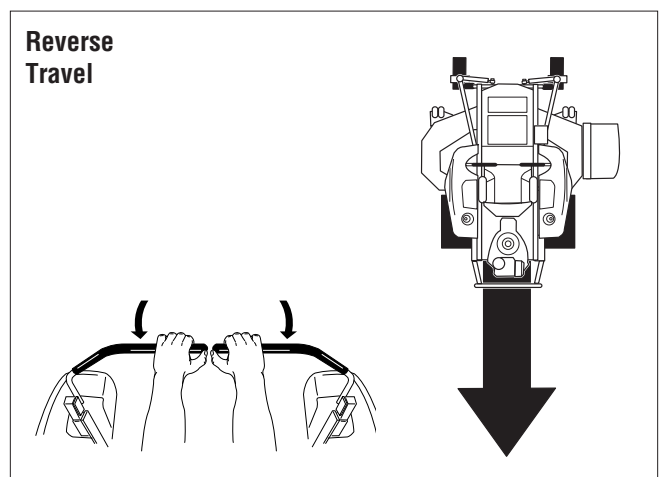


Figure 7. Reverse Travel

## Practice Turning Around a Corner

While traveling forward allow one handle to gradually return back toward neutral. Repeat several times.

*NOTE: To prevent pivoting directly on the tire tread, it is best to keep both wheels going at least slightly forward.*

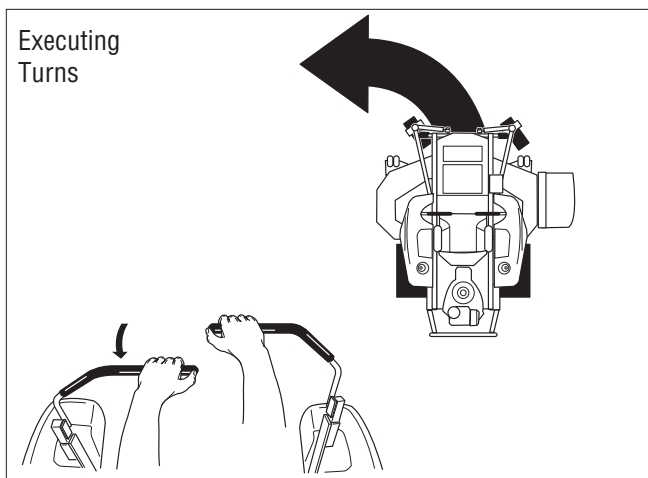


Figure 8. Turning Around a Corner

## Practice Turning In Place

To turn in place, “Zero Turn,” gradually move one ground speed control lever forward from neutral and one lever back from neutral simultaneously. Repeat several times.

*NOTE: Changing the amount each lever is pulled—forward or back, changes the “pivot point” you turn on.*

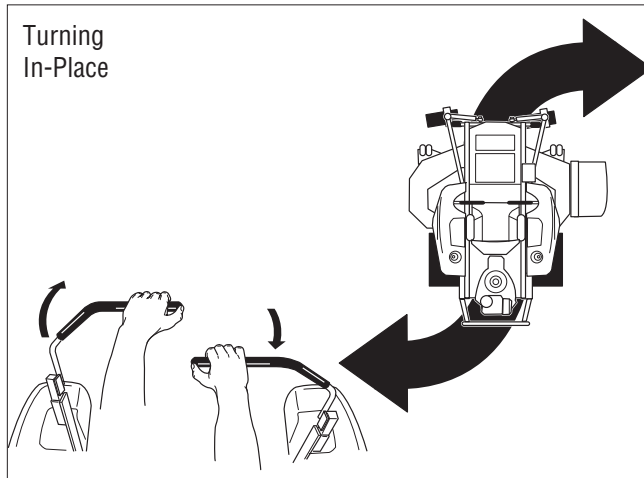


Figure 9. Turning in Place

## Advanced Driving

### Executing an End-Of-Row Zero Turn

Your Zero Turn Rider’s unique ability to turn in place allows you to turn around at the end of a cutting row rather than having to stop and Y-turn before starting a new row.

For example, to execute a left end-of row zero turn:

1. Slow down at the end of the row.
2. Move the RIGHT ground speed control lever forward slightly while moving the LEFT ground speed control lever back to center and then slightly back from center.
3. Begin mowing forward again.

This technique turns the rider LEFT and slightly overlaps the row just cut—eliminating the need to back up and re-cut missed grass.

*As you become more familiar and experienced with operating the Zero Turn rider, you will learn more maneuvers that will make your mowing time easier and more enjoyable.*

Remember, the more you practice, the better your control of the Zero Turn will be!

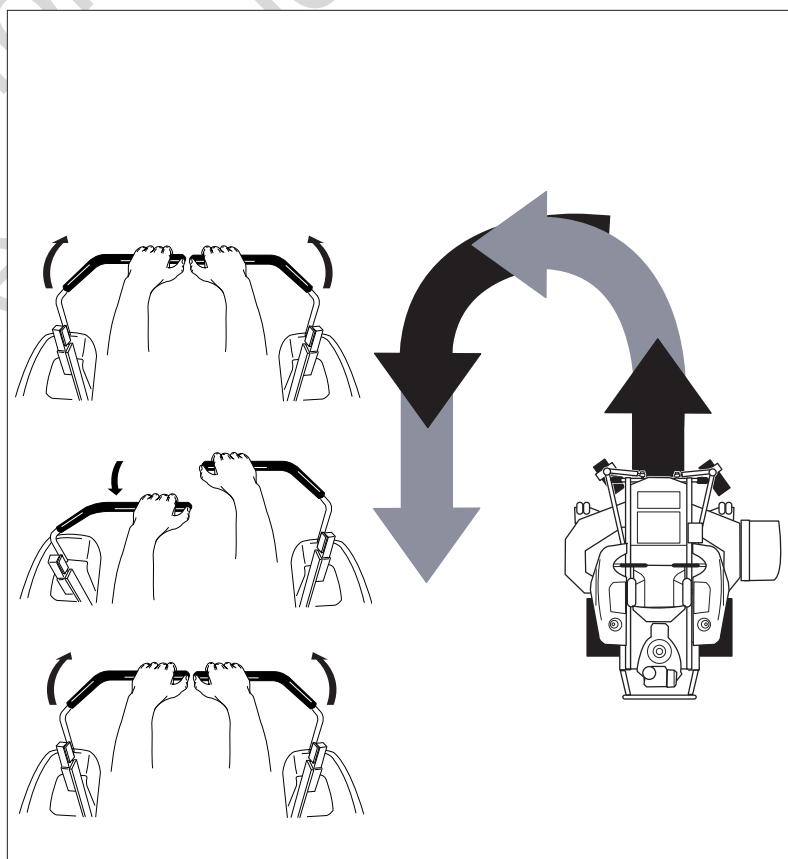
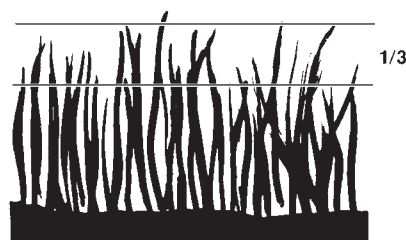


Figure 10. Executing an End-Of-Row Turn

## Mowing

Before mowing, set the cutting height as described in the *Operation* section.

1. Engage the parking brake. Make sure the PTO switch is disengaged and the ground speed control levers are in the NEUTRAL position.
2. Start the engine (see *Starting the Engine*).
3. Set the throttle to FULL.
4. Make sure that the mower deck is positioned in the Operating position. (See *Positioning the Mower Deck for Operation*.)
5. Engage the PTO by pulling up on the PTO switch.
6. Begin mowing. See *Mowing Recommendations* section for tips on mowing patterns and lawn care. See *Troubleshooting* section for information on troubleshooting common cutting problems.
7. When finished, shut off the PTO.
8. Stop the engine (see *Stopping the Rider and Engine*).



*Proper Cutting Height*

### Tall Grass Requires Incremental Cutting

For extremely tall grass, set the cutting height at maximum for the first pass, and then reset it to the desired height and mow a second or third time.

Don't cover the grass surface with a heavy layer of clippings. Consider using a grass collection system and starting a compost pile.

## Mowing Recommendations

Several factors can affect how well your machine cuts grass. Following proper mowing recommendations can improve the performance and life of your machine.

### Height of Grass

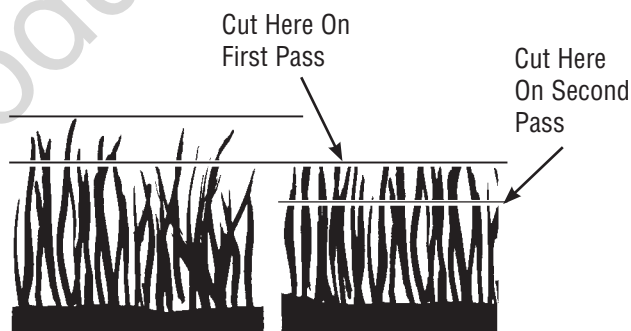
Often cutting height is a matter of personal preference. Typically, you should mow the grass when it is between three and five inches high. The proper cutting height range for a specific lawn will depend upon several factors, including the type of grass, the amount of rainfall, the prevailing temperature, and the lawn's overall condition.

Cutting the grass too short causes weak, thin grass plants, which are easily damaged by dry periods and pests. Cutting too short is often more damaging than allowing the grass to be slightly higher.

Letting grass grow a bit longer—especially when it is hot and dry—reduces heat build-up, preserves needed moisture and protects the grass from heat damage and other problems. However, allowing grass to grow too high can cause thin turf and additional problems.

Cutting off too much at one time shocks the plant's growth system and weakens the grass plants. **A good rule of thumb is the 1/3 rule: to cut no more than one third of the grass height, and never more than 1 inch at a time.**

The amount of grass you are able to cut in one pass is also effected by the type of mowing system you are using (for example, broadcasting with side discharge decks can process a much larger volume of grass than mulching does).



*Incremental Cutting*

## When and How Often to Mow

The time of day and condition of the grass greatly affect the results you'll get when mowing. For the best results, follow these guidelines:

1. Mow when the grass is between three and five inches high.
2. Mow with sharp blades. Short clippings of grass one inch or shorter decompose more quickly than longer blades. Sharp mower blades cut grass cleanly and efficiently, preventing frayed edges which harm the grass.
3. Mow at time of day when the grass is cool and dry. Late afternoon or early evening often provide these ideal mowing conditions.
4. Avoid mowing after rain or even heavy dew, and never mulch when the grass is wet (moist grass does not mulch well, and clumps beneath the mower deck).

## Mowing Patterns

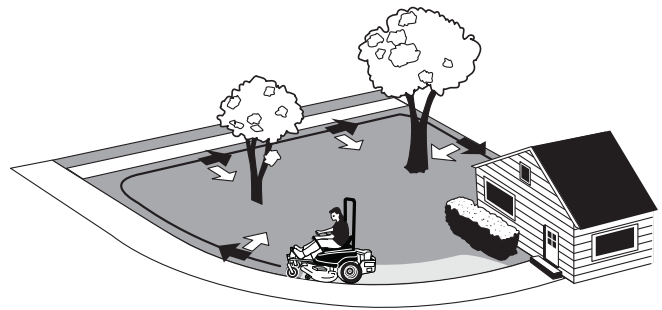
Always start mowing on a smooth, level area.

The size and type of area to be mowed will determine the best mowing pattern to use. Obstructions such as trees, fences and buildings, and conditions such as slopes and grades must also be considered.

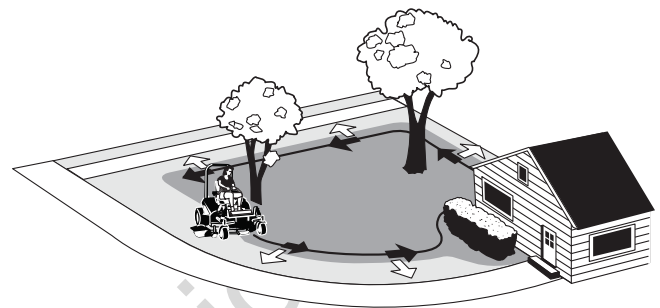
1. Cut long straight strips overlapping slightly.
2. Where possible, change patterns occasionally to eliminate matting, graining or a corrugated appearance.
3. For a truly professional cut, mow across the lawn in one direction, then recut the lawn by mowing perpendicular to the previous cut.

**Note: Always operate the engine at full throttle when mowing.**

If you hear the engine slowing down, you are mowing too fast—using a slower ground speed will improve the cutting efficiency of the blades and prevents many common cutting problems. Use an appropriate ground speed for the thickness and height of the grass you are cutting (3rd gear or slower for manual gear models). If you hear the engine slowing down you are mowing too fast, use a slower ground speed.



*Where possible, make one or two passes around the outside of the area discharging the grass INTO the lawn to keep the cut grass off fences and walks.*



*The remainder of the mowing should be done in the opposite direction so that the clippings are dispersed OUT onto the area of lawn previously cut.*

## Mowing Methods

### Proper Broadcast Mowing

Broadcasting, or side-discharging, disperses fine clippings evenly over the entire lawn. Many golf courses use this method. Your mower has a deep dish deck to allow freer circulation of clippings so they are broadcast evenly over the lawn.

### Engine Speed & Ground Speed for Broadcasting

Always operate the engine at full throttle when mowing. If you hear the engine slowing down, you are mowing too fast—using a slower ground speed will improve the cutting efficiency of the blades and prevents many common cutting problems.

ALWAYS use an appropriate ground speed for the thickness and height of the grass you are cutting (3rd gear or slower for manual gear models). If you hear the engine slowing down you are mowing too fast, use a slower ground speed.

### How Much Grass to Cut Off When Broadcasting

Mow when the grass is 3-5 inches long. Do not cut the grass shorter than 2 to 2-1/2 inches. Do not cut off more than 1 inch of grass in a single pass.



## Proper Mulching

Mulching consists of a mower deck which cuts and recuts clippings into tiny particles and which then blows them down INTO the lawn. These tiny particles decompose rapidly into by-products your lawn can use. UNDER PROPER CONDITIONS, your mulching mower will virtually eliminate noticeable clippings on the lawn surface.

*NOTE: When mulching under heavy cutting conditions, a rumbling sound may be present and is normal.*

## Mulching Requires EXCELLENT Mowing Conditions

Mulching mowers cannot function properly if the grass is wet, or if the grass is simply too high to cut. Even more than normal mowing, mulching requires that the grass be dry and the appropriate amount is cut.

Do not use the mower as a mulching mower during the first two or three mowings in the spring. The long grass blades, quick growth, and often wetter conditions are more suitable for broadcasting (side-discharging) or grass bagging operation.

## Engine Speed & Ground Speed for Broadcasting

Use full engine throttle matched with a slow ground speed so that clippings will be finely cut. Ground speed while mulching should be HALF of the speed that would be used when broadcasting (side discharging) under similar conditions. Since mulching requires more horsepower than broadcasting, using a slower ground speed is vitally important for proper mulching operation.

## How Much Grass to Mulch

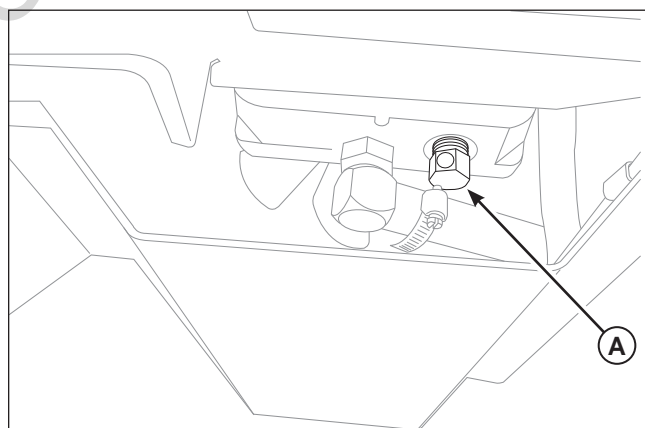
The best mulching action typically results from cutting only the top 1/2 inch to 3/4 inch of grass blade. This provides short clippings which decompose properly (much more quickly than longer clippings). The ideal cutting height will vary with climate, time of year, and quality of your lawn. We recommend that you experiment with both the cutting height and ground speed until you achieve the best cut. Start with a high cutting height and using progressively lower settings until you find a cutting height that is matched to your mowing conditions and preferences.



*Mulching Action*

## Pushing the Rider by Hand

1. Disengage the PTO, engage the parking brake, turn the ignition OFF, and remove the key.
2. Locate the hydraulic release valves (**A, Figure 11**) on the bottom side of the hydraulic pumps.
3. To disengage the pumps (free-wheel position), turn the hydraulic release valves located on the pumps COUNTER-CLOCKWISE a maximum of 2 full turns.
4. Disengage the parking brake.  
The rider can now be pushed by hand.
5. After moving the rider, re-engage the pumps (drive position) by turning the release valves CLOCKWISE and tighten to 80-120 in. lbs. (9.04 - 13.56 Nm) of torque.




*Figure 11. Hydraulic System By-Pass  
A. Hydraulic Release Valve (right-hand pump shown)*

## NOTICE

- Towing the unit will cause hydraulic pump and wheel motor damage.
- Do NOT tow rider.
- Do NOT use another vehicle to push or pull this unit.

## Raise and Lower the Roll Bar

<b>⚠ WARNING</b>	
	<b>Avoid serious injury or death from roll over.</b>
<ul style="list-style-type: none"><li>• Keep the roll bar in the raised position and use seat belt.</li><li>• <b>There is no roll over protection when the roll bar is down.</b></li><li>• Lower the roll bar only when necessary and NEVER remove it.</li><li>• Do NOT use the seat belt when the roll bar is down.</li><li>• Raise the roll bar as soon as clearance permits.</li><li>• Do NOT jump off if mower tips.</li></ul>	

### To Lower the Roll Bar:

1. Pull the hair pin clips (**A**, **Figure 12**) out of the retainer pins (**B**).
2. Push or pull the top of the roll bar (**C**) forward against the rubber stops (**D**) and remove the retainer pins (**B**).
3. Lower the roll bar and reinstall the retainer pins and hair pin clips to secure the roll bar in the down position (**see insert, Figure 12**).

### To Raise the Roll Bar:

1. Pull the hair pin clips (**A**) out of the retainer pins (**B**) and remove the retainer pins.
2. Raise the roll bar (**C**) until the rubber stops (**D**) contact the upright tubes.
3. Push or pull the top of the roll bar forward against the rubber stops and reinstall the retainer pins and hair pin clips to secure the roll bar in the raised position.

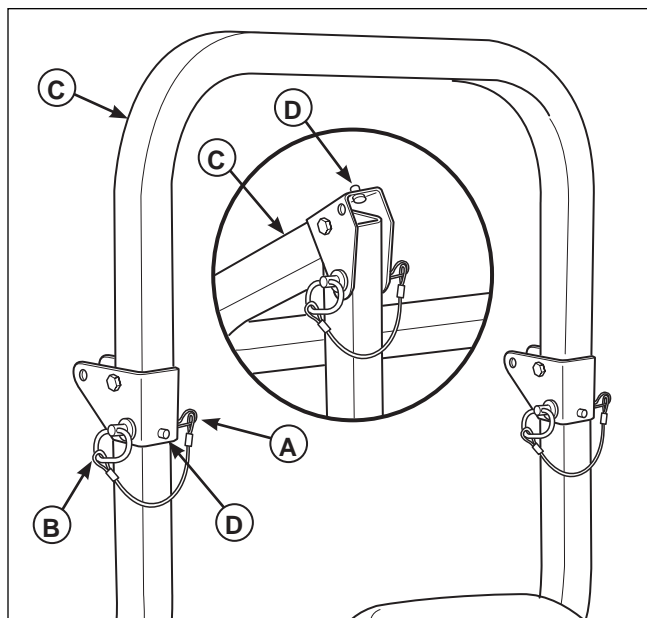


Figure 12. Raise & Lower the Roll Bar

- A. Hair Pin Clip
- B. Retainer Pin
- C. Roll Bar
- D. Rubber Stop

## Attachment Removal and Installation Procedure

### Positioning the Mower Deck for Service

1. Park the machine on a smooth, level surface such as a concrete floor. Engage the parking brake, disengage the PTO, and turn off the ignition key.
2. Turn the ignition key to the RUN position and push the mower deck lift actuator switch forward (away from the operator's position) to extend the actuator until you hear a ratcheting noise.
3. Move the cutting height adjustment pin to the lowest cutting position.
4. Remove the pins with lanyards (**B, Figure 13**) from the attachment lift arms (**A**).
5. Retract the actuator completely by pulling the mower deck lift actuator switch backwards (towards the operator's position).
6. If you are not removing the deck, proceed to *Positioning the Mower Deck for Operation*.

### Removing the Attachment

1. Disconnect the two (2) spring links (**C, Figure 13**) from the zero-turn rider connection point (**F**).
2. Extend the actuator until the front wheels contact the ground.
3. Reinstall the pins with lanyards through the rear hole (**G**) of the attachment latches (**D**).
4. Extend the actuator until the load is removed from the actuator. Turn the ignition key to the OFF position.
5. Raise the seat and disconnect the actuator wire harness (**A, Figure 14**) on the right side of the machine by rotating the connector dial (**B**) and pulling apart.
6. Pull the mower deck end of the actuator wire harness from the zero-turn rider.
7. Disconnect the rear of the actuator (**A, Figure 15**) from the zero-turn rider by removing the pin with lanyard (**B**).
8. Locate the drive shaft (**A, Figure 16**) under the machine and disconnect it by pulling the drive shaft collar (**B**) toward the universal joint.
9. Pull the deck attachment lever (**E, Figure 13**) up and back.
10. Back the zero-turn rider away from the mower deck.

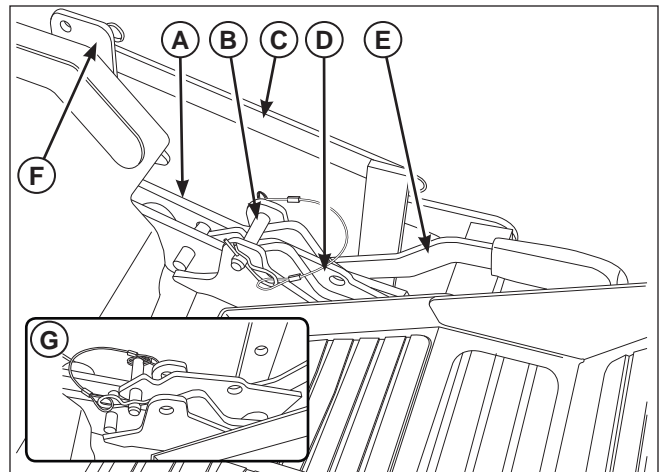


Figure 13. Attachment Lift Arms

- A. Attachment Lift Arms
- B. Pin with Lanyard
- C. Spring Links
- D. Attachment Latches
- E. Deck Attachment Lever
- F. Zero-turn Rider Connection Point
- G. Attachment Latch in Raised Position

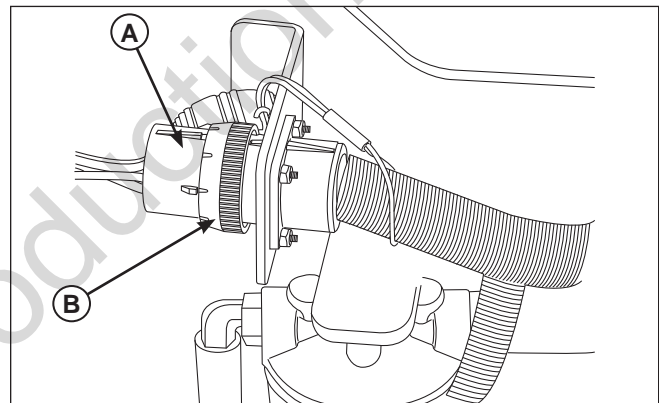


Figure 14. Actuator Wire Harness

- A. Actuator Wire Harness
- B. Connector Dial

## Installing the Attachment

1. Remove the pins with lanyards (**B, Figure 13**) from the rear holes of the attachment latches (**D**).
2. Drive the zero-turn rider into the mower deck.
3. Push the deck attachment lever (**E**) forward and down. Make sure the attachment latches latch into place.
4. Reconnect the actuator to the zero-turn rider.
5. Reconnect the actuator wire harness (**A, Figure 14**) to the main harness of the zero-turn rider.
6. Reconnect the drive shaft.
7. Retract the actuator completely.
8. Reconnect the two (2) spring links (**C, Figure 13**) to the zero-turn rider.

## Positioning the Mower Deck for Operation

1. Extend the actuator fully.
2. Install the pins with lanyards into the attachment lift arms (**A, Figure 13**).
3. Reposition the cutting height adjustment pin to the desired cutting height.
4. Retract the actuator until contact is made with the cutting height adjustment pin (**A, Figure 17**). Continue to retract the actuator until the operating position indicator lamp (**B**) stops flashing and shuts off.

**NOTE:** The actuator **MUST** be positioned correctly before attempting to move the ground speed control levers out of their **NEUTRAL** positions. If the actuator is not positioned as described in the above step the mower's safety interlock system will cause the engine to shut off.

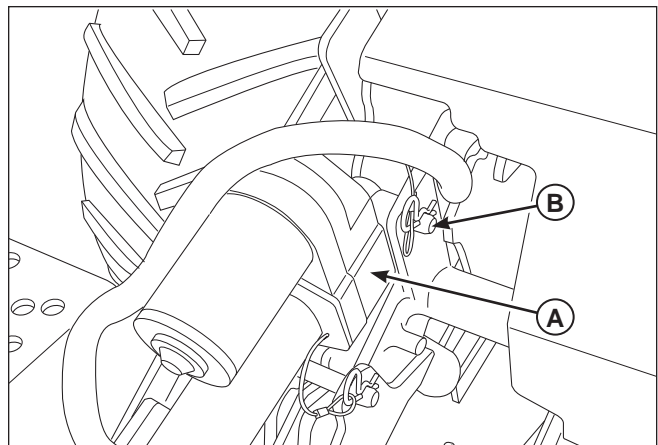


Figure 15. Actuator  
A. Actuator  
B. Pin with Lanyard

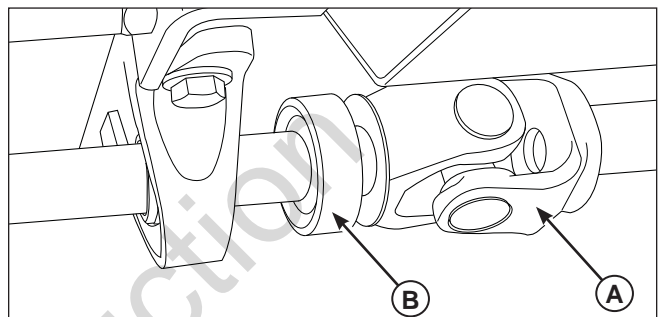


Figure 16. Drive Shaft  
A. Drive Shaft Universal Joint  
B. Drive Shaft Coupler

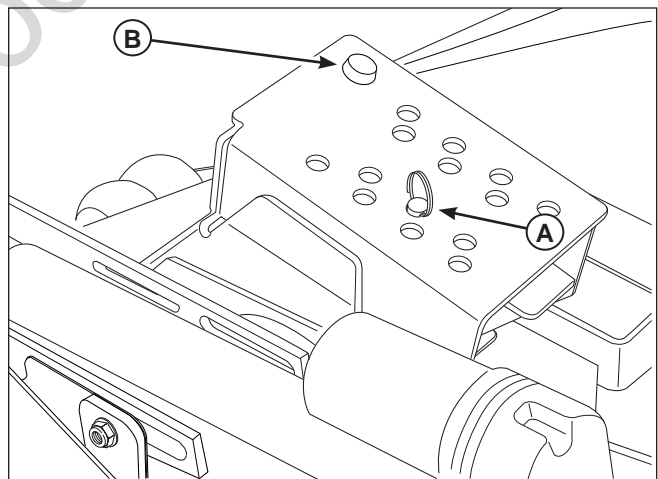


Figure 17. Mowing Height Adjustment  
A. Cutting Height Adjustment Pin  
B. Operating Position Indicator Lamp

## Regular Maintenance

### Maintenance Schedule

The following schedule should be followed for normal care of your rider and mower. You will need to keep a record of your operating time. Determining operating time is easily accomplished by observing the elapsed time recorded by the hour meter.

<b>Safety Items</b>	<b>Before Each Use</b>	<b>Every 5 Hours</b>	<b>Every 25 Hours</b>	<b>Every 100 Hours</b>	<b>Every 250 Hours</b>	<b>Spring &amp; Fall</b>
Check Safety Interlock System	•					•
Check Rider Brakes	•					•
Check Mower Blade Stopping Time				•		•
<b>Rider Maintenance</b>	<b>Before Each Use</b>	<b>Every 5 Hours</b>	<b>Every 25 Hours</b>	<b>Every 100 Hours</b>	<b>Every 250 Hours</b>	<b>Spring &amp; Fall</b>
Check Rider / Mower for loose hardware	•	•				
Clean Deck & Check / Replace Mower Blades**			•			
Lubricate Rider & Mower **			•			
Clean Battery & Cables				•		
Check Tire Pressure			•			
Check Hydraulic Oil Level	•				•	
Change Hydraulic Oil Filter **					•	
Check Gearbox Oil Level					•	•
<b>Engine Maintenance</b>	<b>Before Each Use</b>	<b>Every 5 Hours</b>	<b>Every 25 Hours</b>	<b>Every 100 Hours</b>	<b>Every 250 Hours</b>	<b>Spring &amp; Fall</b>
Check Engine Oil Level	•					
Check / Clean Cooling Fins & Intake **			•			
Service Air Filter *						
Change Oil & Filter *						
Check / Replace Spark Plugs *						
Check / Replace Fuel Filter *						
Check / Clean Spark Arrester***				Every 50 hours		

\* Refer to engine owner's manual. Change original engine oil after initial break-in period.

\*\* More often in hot (over 85° F: 30° C) weather or dusty operating conditions.

\*\*\* If equipped. Replace if damaged.

\*\*\*\* Change gearbox oil after first 100 hrs. and every 500 hrs. thereafter (See *Gearbox Maintenance*).

## Checking / Adding Fuel

To add fuel:

1. Remove the fuel cap.
2. Fill the tank to about 1-1/2" (3,81 cm) from the bottom of the filler neck. This will allow for fuel expansion.

*NOTE: Do not overfill. Refer to your engine manual for specific fuel recommendations.*

3. Install and hand tighten the fuel cap.

## Fuel Filter

The fuel filter is located in the fuel line between the fuel tank and the carburetor, near the fuel pump. If filter is dirty or clogged, replace as follows:

1. Disconnect the negative battery cable.
2. Place a container below the filter to catch any spilled fuel.
3. Using pliers, open and slide the hose clamps from the fuel filter (**C, Figure 18**).
4. Remove the hoses from the fuel filter.
5. Install the new fuel filter in the proper flow direction in the fuel line.
6. Secure with the hose clamps.
7. Reconnect the negative battery cable when finished.

## Change Oil & Filter

1. Warm engine by running for a few minutes. (Refer to the engine operator's manual for oil and filter replacement instructions.)
2. Locate the oil drain hose (**A, Figure 18**) on the left side of the engine and route the oil drain hose down through the frame towards the ground.
3. Place a small pan under the oil drain hose to catch the oil. Using the appropriate tools, remove the cap (**B**) from the oil drain hose (**A**) and drain the engine oil into the pan.
4. After draining, replace the cap and wipe up any spilled oil. Route the oil drain through the hose clamp and towards the rear of the machine so the oil drain hose is retained during normal operation.
5. Place an absorbent shop cloth under the engine oil filter (**D**). Remove the engine oil filter and replace with a new one.
6. Remove the engine oil fill cap (**F**) that is located on the right side of the engine and refill with new oil (Refer to the engine operator's manual for oil recommendations.)
7. Remove the shop cloth and wipe up any spilled oil.

## ⚠ WARNING



**Fuel and its vapors are extremely flammable and explosive.**



**Fire or explosion can cause severe burns or death.**

- Gasoline is highly flammable and must be handled with care. Never fill the tank when the engine is still hot from recent operation. Do NOT allow open flame, smoking or matches in the area. Avoid over-filling and wipe up any spills.
- Do NOT remove fuel filter when engine is hot, as spilled gasoline may ignite. Do NOT spread hose clamps further than necessary. Ensure clamps grip hoses firmly over filter after installation.

## NOTICE

Do not use gasoline containing METHANOL, gasohol containing more than 10% ethanol, gasoline additives, premium gasoline, or white gas because engine/fuel system damage could result.

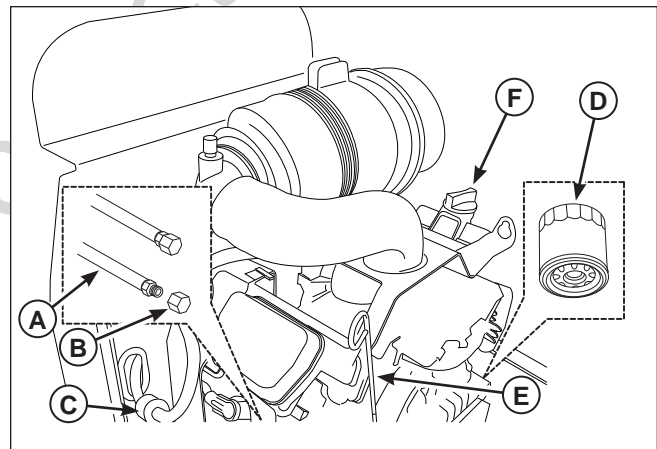


Figure 18. Engine Oil Drain

- A. Engine Oil Drain Hose
- B. Cap
- C. Fuel Filter
- D. Engine Oil Filter
- E. Engine Oil Dipstick
- F. Engine Oil Fill



## Inspect Muffler and Spark Arrester

Inspect the muffler for cracks, corrosion, or other damage. Remove the spark arrester, if equipped, and inspect for damage or carbon blockage. If replacement parts are required, make sure to use only original equipment replacement parts.

## Engine Maintenance

Refer to the engine owner's manual for all engine maintenance procedures and recommendations.

### **⚠ WARNING**

Replacement parts must be the same and installed in the same position as the original parts or fire could result.

## Lubrication

Lubricate the unit at the location shown in Figures 19 through 25 as well as the following lubrication points:

### Grease:



- front caster wheel axles & yokes
- drive shaft pillow blocks
- deck lift pivot blocks
- mower deck spindles & idler arm
- rear pivoting axle
- hydraulic pump drive and PTO clutch idler arms

Use grease fitting when present. Disassemble parts to apply grease to moving parts when grease fittings are not installed.

Not all greases are compatible. Red grease (p/n 5022285) is recommended, automotive-type high temperature, lithium grease may be used when this is not available.

### Oil:



- control handle pivots
- seat plate pivots
- deck lift pivots
- discharge chute pivots
- attachment lift arm pivots

Generally, all moving metal parts should be oiled when contact is made with other parts. Keep oil and grease off of belts and pulleys. Remember to wipe fittings and surfaces clean both before and after lubrication.

### Lubricating the Casters:

*NOTE: Casters should be lubricated annually.*

1. Remove the 1/4-28 bolt (A, Figure 20) screwed into the caster and install a 1/4-28 grease fitting.
2. Grease the front caster.
3. Remove the 1/4-28 grease fitting and reinstall the 1/4-28 bolt.
4. Repeat the process for the other side of the machine.

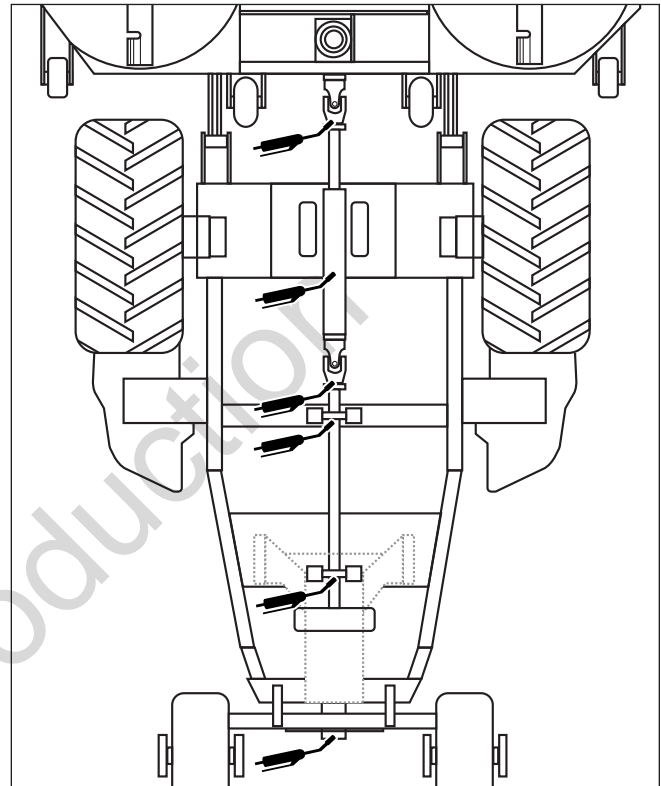


Figure 19. Drive Shaft and Pivoting Axle

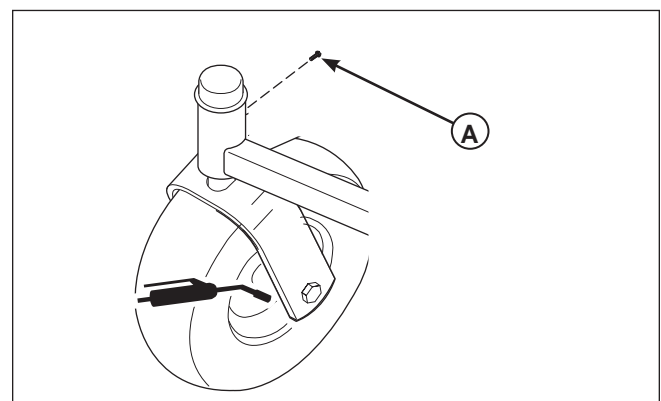


Figure 20. Front Caster & Wheel  
A. 1/4-28 Bolt

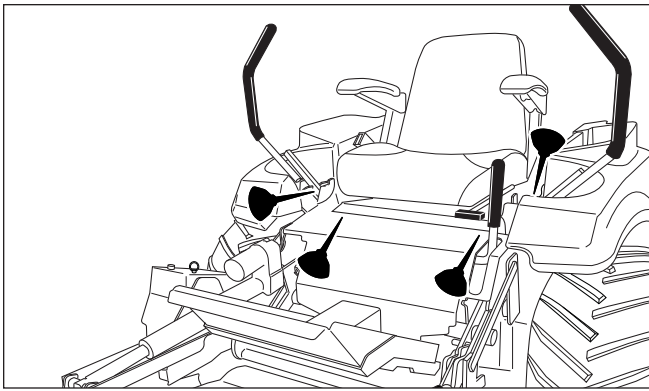


Figure 21. Control Handle Pivots & Seat Plate Pivot

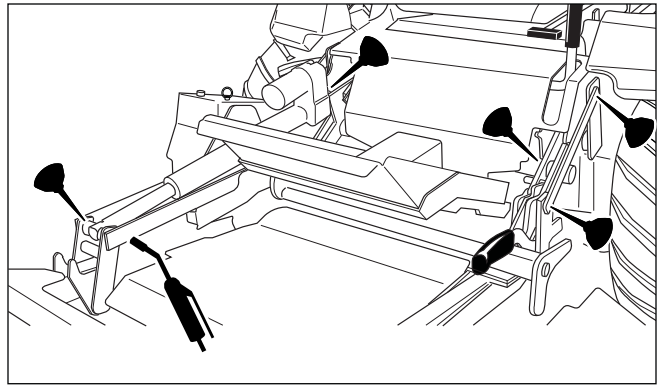


Figure 24. Attachment Lift Arms & Actuator

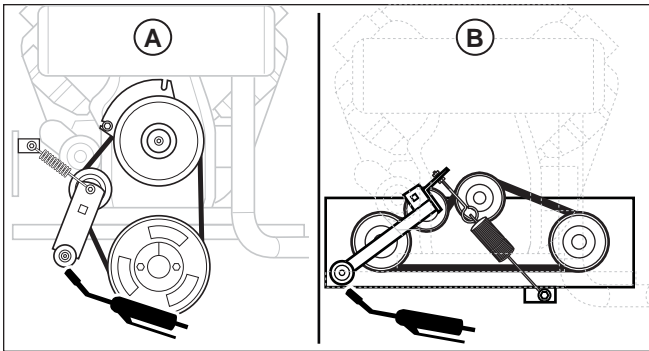


Figure 22. Idler Arms

A. PTO Clutch Drive Belt Idler Arm

B. Hydraulic Pump Drive Belt Idler Arm

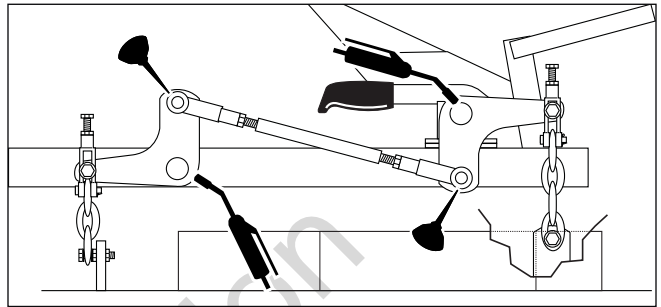


Figure 25. Deck Lift Rods

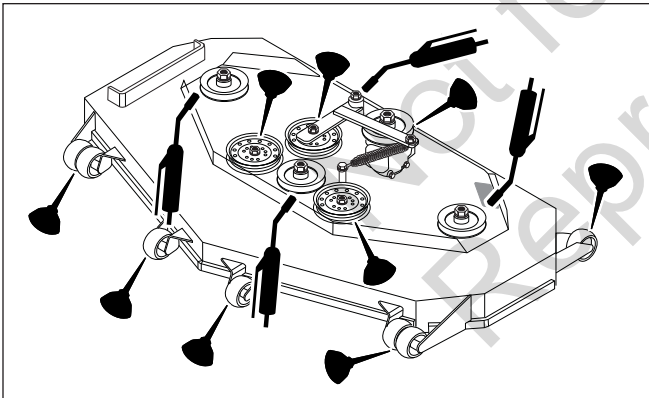



Figure 23. Mower Deck Lubrication Points

## Servicing The Mower Blades

### Removing the Mower Blade

<b>⚠ CAUTION</b>	
	<b>Avoid injury! Mower blades are sharp.</b>
Always wear gloves when handling mower blades or working near blades.	

- To remove the mower blade, use a 1" wrench on the flats of the spindle shaft and remove the mower blade mounting bolt with a 15/16" wrench (**Figure 26**).
- If there are no flats on the spindle shaft, wedge a wooden block between the mower blade and the mower deck housing to keep the mower blade from turning.

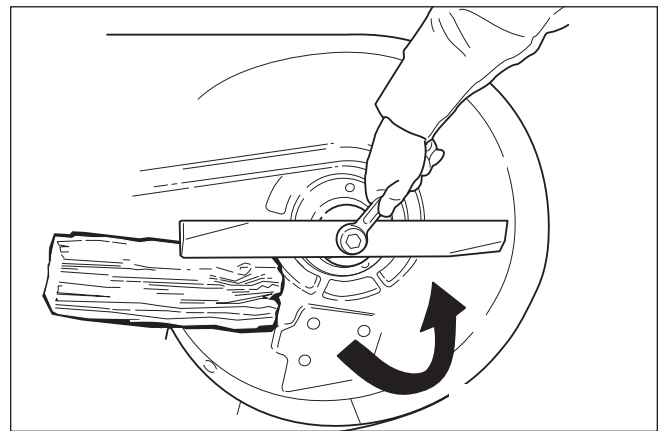



Figure 26. Loosening the Mower Blade for Removal

### Inspecting the Mower Blades

<b>⚠ DANGER</b>	
	<b>Avoid injury! A worn or damaged blade can break, and a piece of the mower blade could be thrown into the operator's or bystander's area, resulting in serious personal injury or death.</b>
<ul style="list-style-type: none"> <li>Inspect the mower blade every 25 hours or at least once a year.</li> <li>If the mower blade hits a solid object, stop the engine immediately and inspect the mower blades.</li> <li>Never weld or straighten bent mower blades.</li> </ul>	

- Remove the mower blade from the unit.
- Inspect the mower blade (**Figures 27 & 28**). **Discard the mower blade if it has any of the below conditions.**
  - Has more than .5" (12,7 mm) of the mower blade metal removed from previous sharpening or wear (**D**, **Figure 27**)
  - The air lifts are excessively eroded (**B & C**, **Figure 28**) and the notch (**C**) is .25" (6,35 mm) deep or greater.
  - Mower blades is bent or broken.
- If the cutting edges are not sharp or have nicks, sharpen the blades. See *Sharpening the Mower Blades*.

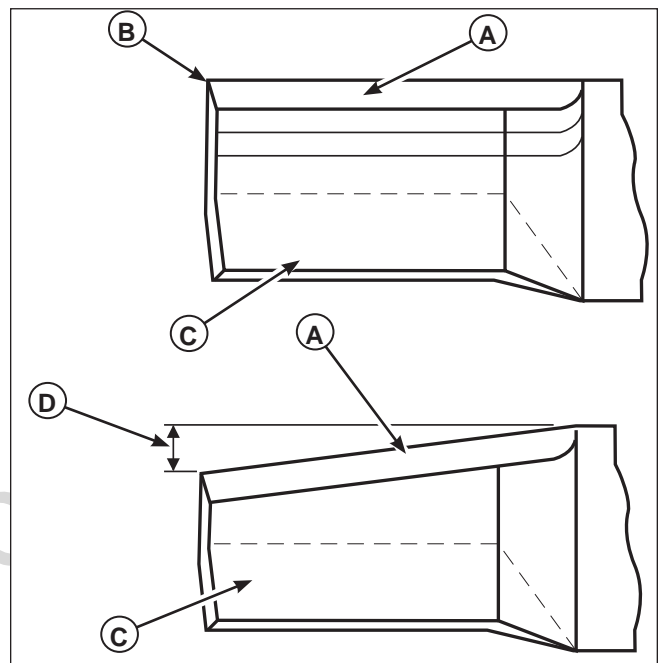


Figure 27. Inspecting the Mower Blade Tips

- Mower Blade Cutting Edge
- Square Corner
- Air Lift
- Wear Measurement - **DISCARD Mower Blade If greater than .5" (12,7 mm)**

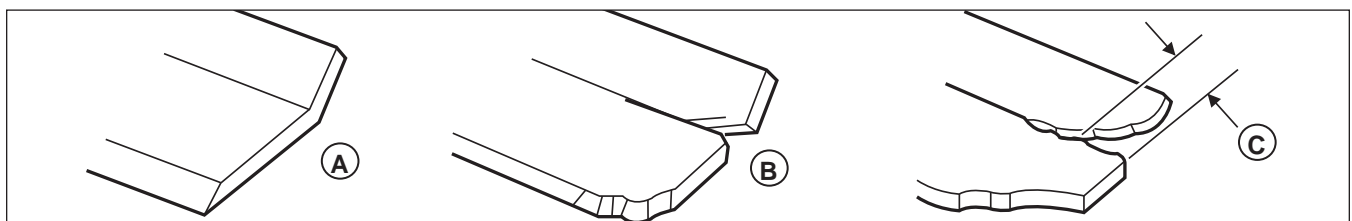



Figure 28. inspecting the Mower Blade Air Lifts

- New Mower Blade
- Mower Blade at Wear Limit (A notch begins to form)

**C. Mower Blade in Dangerous Condition (Notch measures .25" (6,35 mm) or greater DO NOT USE. Replace with new mower blade.)**


# Maintenance

## Sharpening the Mower Blade

<b>⚠ CAUTION</b>	
	<b>Avoid injury! Mower blades are sharp.</b>
<ul style="list-style-type: none"> <li>• Always wear gloves when handling mower blades or working near blades.</li> <li>• Always wear safety eye protection when grinding.</li> </ul>	

1. Sharpen the mower blades with grinder, hand file, or electric blade sharpener.
2. Sharpen the mower blade by removing an equal amount of material from each end of the mower blade.
3. Keep the original bevel (**A, Figure 29**) when grinding. **DO NOT** change the mower blade bevel.
4. The mower blade should have a maximum 1/64" (0,40 mm) cutting edge (**B**) or less.
5. Balance the mower blades before installing.

## Balancing the Mower Blades

<b>⚠ WARNING</b>	
	<b>Avoid injury! Keep mower blades balanced.</b>
An unbalanced mower blade can create excessive vibration and damage the unit or cause mower blade failure.	

1. Clean the mower blade to remove any dried grass or other debris.
2. See Figure 30. Put the mower blade on a nail in a vise and turn the mower blade to the horizontal position.
3. Check the balance of the mower blade:  
If either end of the mower blade moves downward, sharpen the heavy end until the mower blade is balanced. See *Sharpening the Mower Blades* for proper sharpening instructions.
4. Repeat the process until the mower blade remains in the horizontal position.

## Reinstalling the Mower Blades

1. Reinstall each mower blade with the air lifts pointing up towards the mower deck as shown in Figure 31. Secure with the mower blade mounting bolt and flat washer (**A & B, Figure 31**) and torque to 120 ft. lbs (163 Nm).
2. If there are no flats on the spindle shaft, wedge a wooden block between the mower blade and the mower deck housing to keep the mower blade from turning.

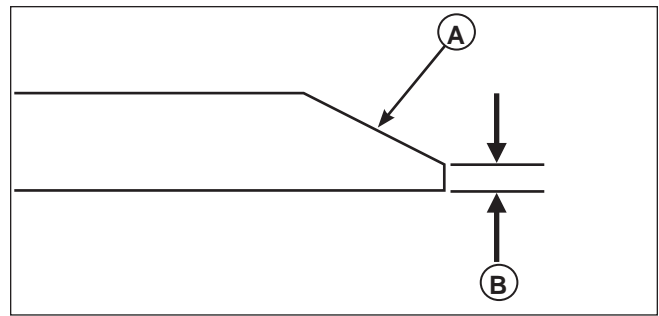


Figure 29. Sharpening the Mower Blade  
A. Mower Blade Bevel  
B. Mower Blade Cutting Edge

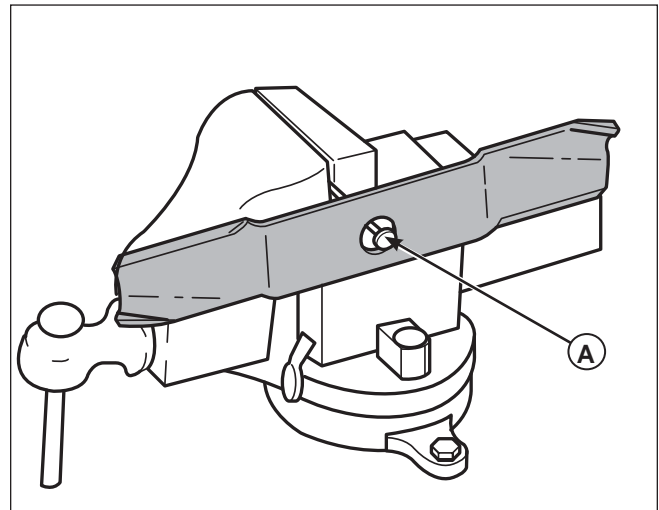


Figure 30. Balancing the Mower Blade  
A. Nail

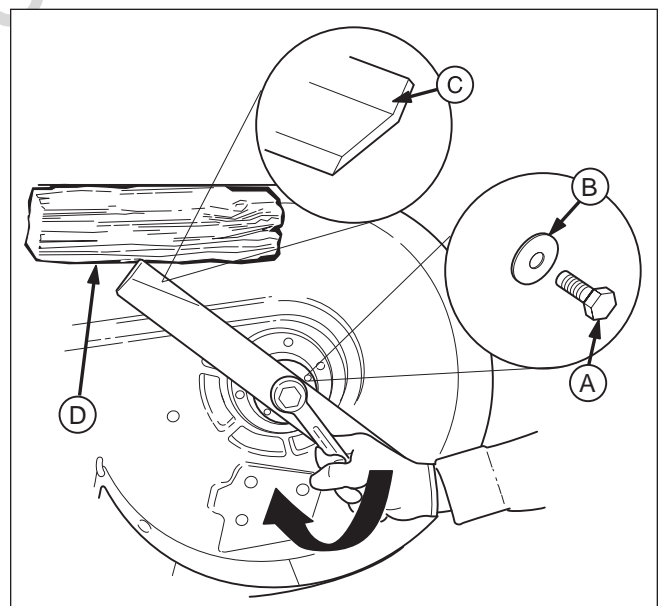


Figure 31. Tightening the Mower Blade for Installation  
A. Mower Blade Mounting Bolt  
B. Flat Washer  
C. Mower Blade Air Lift (Points Up For Installation)  
D. 4 X 4 Wooden Block

## Check Hydraulic Oil Level

1. Before removing the reservoir cap, make sure the area around the reservoir and fill neck of the reservoir is free of dust, dirt or other debris.
2. Unscrew the reservoir cap (**B, Figure 32**).
3. Look down the filler neck of the hydraulic oil reservoir (**A**) and observe the oil level. When cold, the oil level should be approximately 4" (10 cm) below the top of the filler neck.
4. If necessary, add either Mobil 1™ 15W-50 synthetic oil or Castrol Syntec™ 5W-50 oil. **DO NOT** use conventional oils.
5. Reinstall the reservoir cap.

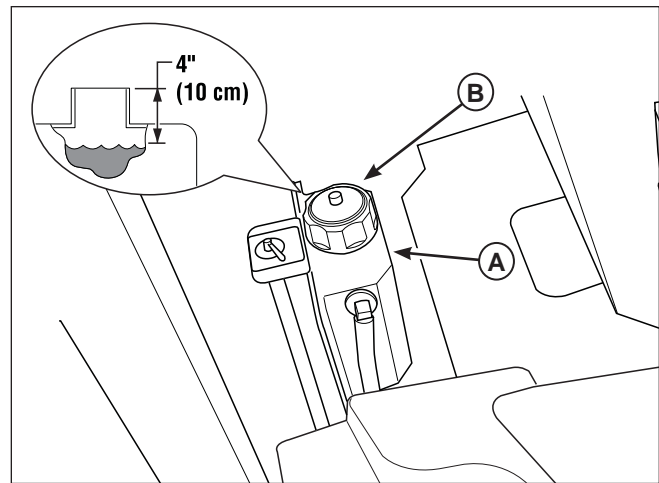


Figure 32. Checking Hydraulic Oil Level  
 A. Hydraulic Oil Reservoir  
 B. Reservoir Cap

## Change Hydraulic Oil Filter

**Change Interval:** Every 250 hours

**Filter Part Number:** 1719168

*NOTE: Removing the oil filter from the filter base will drain the oil reservoir. Have a suitable container ready to catch any spilled oil. It is recommended that this be a dealer-only service item.*

1. Locate the transmission oil filter (**A, Figure 33**).
2. Lubricate the new filter base with a few drops of transmission oil. Fill the filter half full of oil.
3. Clean the area around the filter base and remove the filter. Do NOT drain the hydraulic oil system.
4. Thread the new filter onto the filter base until the gasket makes contact, then tighten 3/4 of a turn more.
5. Run the unit for several minutes and check the transmission oil level.

*IMPORTANT NOTE: Use caution after changing the filter; air in the hydraulic system may affect the responsiveness of the ground speed control levers. Repeat step 5 until all of the air is out of the system.*

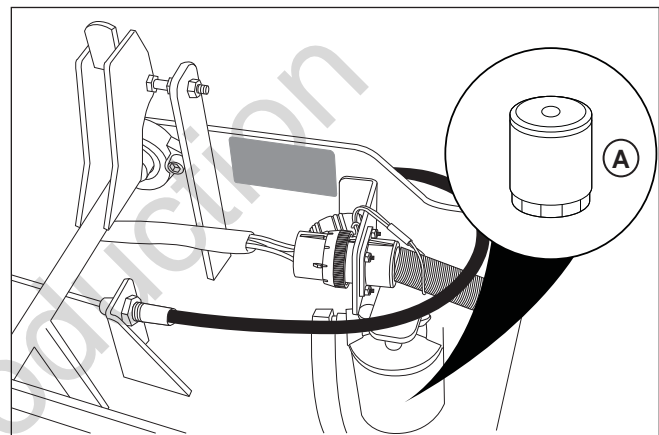


Figure 33. Changing the Hydraulic Oil Filter  
 A. Hydraulic Oil Filter

## Ground Speed Control Lever Adjustment

The control levers can be adjusted in three ways. The alignment of the control levers, the placement of the levers (how close the ends are to one another) and the height of the levers can be adjusted.

### To Adjust the Handle Alignment

Loosen the ground speed control lever mount bolts (**D**, **Figure 34**) and pivot the lever(s) (**C**) to align with each other.

### To Adjust the Handle Placement

Loosen the jam nuts and adjust the placement bolt (**B**) in or out to properly adjust the lever end spacing.

### To Adjust the Handle Height

Remove the mounting hardware (**D**) and reposition the handle either up or down from its original position. You will need to readjust the handle alignment as described above.

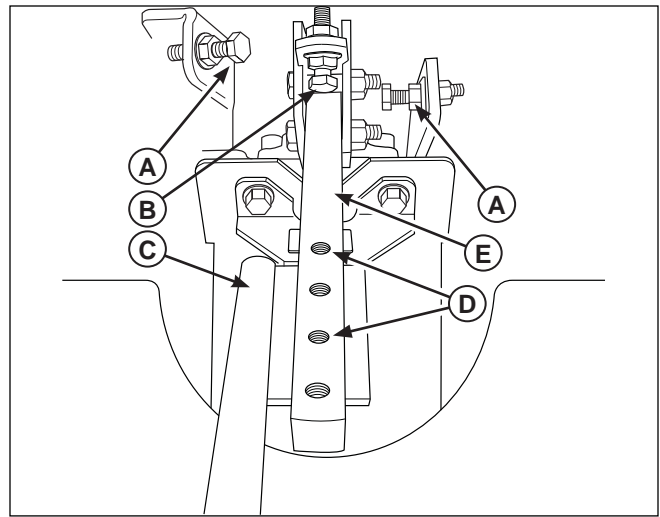


Figure 34. Top Speed Adjustment

- A. Top Speed Adjustment Bolt
- B. Handle Placement Hardware
- C. Alignment Hardware
- D. Ground Speed Control Lever Mount Bolts
- E. Control Lever Base

## Speed Balancing Adjustment

If the rider veers to the right or left when the ground speed control levers are in the maximum forward position, the top speed of each of these levers can be balanced by adjusting the top speed adjustment bolt(s) (**A**, **Figure 34**). Only adjust the speed of the wheel that is traveling faster.

### To Reduce the Speed of the Faster Wheel

1. Loosen the securing nut.
2. Turn the top speed adjustment bolt COUNTER-CLOCKWISE to reduce the speed.
3. Retighten the securing nut when adjustment is complete.

### **WARNING**

Do NOT adjust the zero-turn rider for a faster overall speed forward or reverse than it was designed for.



## Neutral Adjustment

If the zero-turn rider “creeps” while the ground speed control levers are locked in NEUTRAL, then it may be necessary to adjust the linkage rod.

1. Park the machine on a hard, level surface such as a concrete floor. Disengage the PTO, engage the parking brake, and turn off the engine.

### CAUTION

This adjustment should not be performed while the machine is running.

2. The locking nuts (**A**, **Figure 35**) are to be used together to turn the rod. Loosen the jam nut that locks against the ball joint (**B**) and turn the linkage rod (**C**) to adjust:
  - If the machine creeps forward, turn the rod **CLOCKWISE** (while standing at the rear of the machine facing forward).
  - If the machine creeps backward, turn the rod **COUNTER-CLOCKWISE** (while standing at the rear of the machine, facing forward).
3. Lock the jam nut (**D**) against the ball joint (**B**) when neutral is achieved.
4. Start the engine.
5. Disengage the parking brake and lock the ground speed control levers in the neutral position.
6. If the machine still “creeps,” repeat the *Neutral Adjustment* procedure. It may take several attempts to achieve neutral, depending on how much the machine creeps.

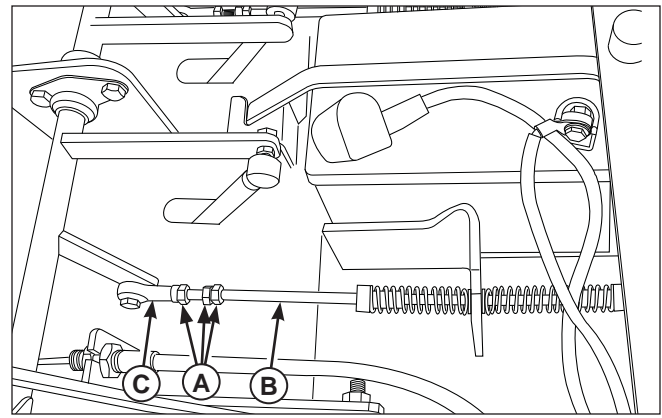


Figure 35. Neutral Adjustment

- A. Locking Nuts
- B. Ball Joint
- C. Linkage Rod

Not for  
Reproduction

## Return-to-Neutral Adjustment

### Checking the Adjustment:

To determine if it is necessary to adjust the neutral return, perform the following steps.

1. Disengage the PTO, engage the parking brake and turn off the engine.
2. Move the ground speed control levers into the operating position, pull the levers rearward and release.
3. Move the ground speed control levers out towards the neutral position. If the levers do not align with the notches in the neutral lock plate, it is necessary to adjust the neutral return rod.

### Adjustment:

1. Loosen the set collar (B, Figure 36) locked against the return spring (A).
2. Lock the ground speed control levers in neutral.
3. Tighten the set collar snug against the return spring
4. Pull the ground speed control levers rearward and release to check that the lever stops aligned with the notch in the neutral lock plate.

*NOTE: It is important to note that after every adjustment of the neutral return spring, the lever must be returned to the locked position to properly check the neutral position.*

## Parking Brake Adjustment

1. Disengage the PTO, engage the parking brake, stop the engine and remove the ignition key.
2. Remove the kick plate (A, Figure 37)
3. Locate the brake spring (A, Figure 38).
4. With the parking brake engaged, measure the compressed spring length. The spring should be 2-1/4" (5,72 cm) when compressed.
5. If the spring does not measure 2-1/4" (5,72 cm), release the parking brake and turn the adjustment nut (B) to compress or relax the spring.
6. Engage the parking brake and re-measure the spring.
7. Once the measurement of 2-1/4" (5,72 cm) is achieved, re-install the kick plate.

### NOTICE

Do NOT adjust the spring to be shorter than 2-1/4" (5,72 cm) when compressed. This may damage the brake mechanism.

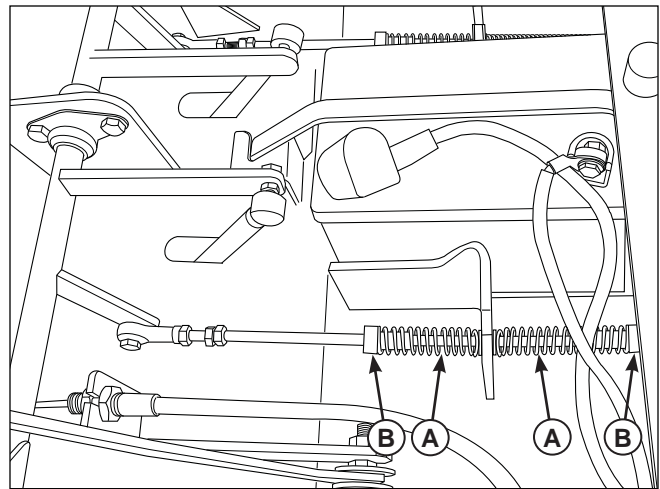


Figure 36. Return-to-Neutral Adjustment

- A. Return Spring
- B. Set Collar

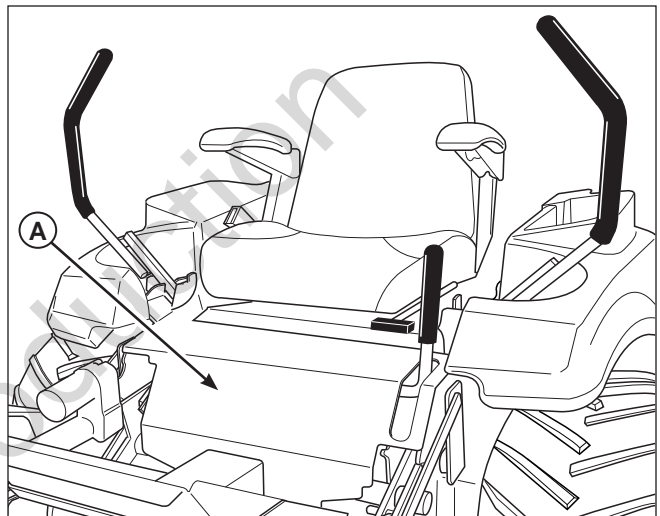


Figure 37. Remove the Kick Plate

- A. Kick Plate

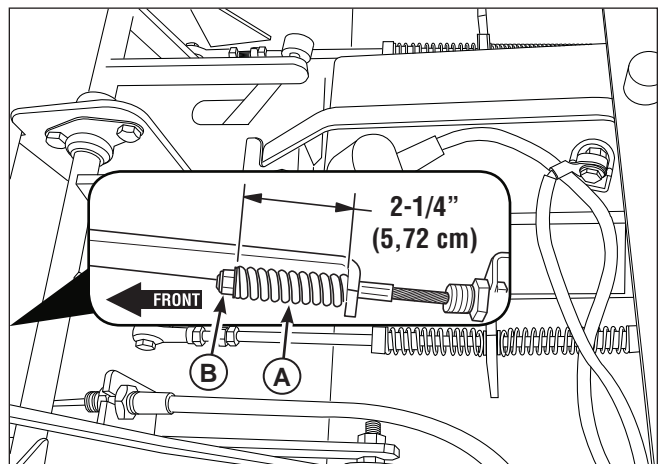


Figure 38. Parking Brake Adjustment

- A. Brake Spring
- B. Adjustment Nut

## Deck Lift Rod Timing Adjustment

1. Park the machine on a flat, level surface. Disengage the PTO, engage the parking brake, turn off the engine, and remove the ignition key. Drive tires must be inflated to 10 psi (0,69 bar); zero-turn rider caster tires to 25 psi (1,72 bar); mower deck caster tires to 25 psi (1,72 bar).
2. To check the deck lift rod timing, set the cutting height adjustment to 3-1/4" (8,26 cm). Both the front and rear rod pivots should be straight up and down. See Figure 39.
3. If the front and back rod pivots are straight up and down, no further adjustment is required. If the front and back rod pivots are NOT straight up and down, adjustment is required, continue with Step 4.
4. Block up the mower deck until all hanger chains are slack. Refer to Figure 40.
5. See Figure 41. To adjust the lift rod, loosen the jam nut (**B**, **Figure 41**) on the front clevis (**C**) and then remove the 1/2" clevis pin fastening the clevis to the lift pivot arm.
  - Turn the clevis CLOCKWISE to cause the rod pivot to pivot backwards;
  - Turn the clevis COUNTER-CLOCKWISE to cause the rod pivot to pivot forwards.

Reinstall the clevis on the lift pivot arm and secure with the 1/2" clevis pin previously removed. Tighten the jam nut against the clevis.

6. Remove the blocks from under the mower deck.
7. Remove the cutting height adjustment pin, extend the actuator, reinstall the cutting height adjustment pin in the desired cutting height location and retract the actuator until contact is made with the cutting height adjustment pin.

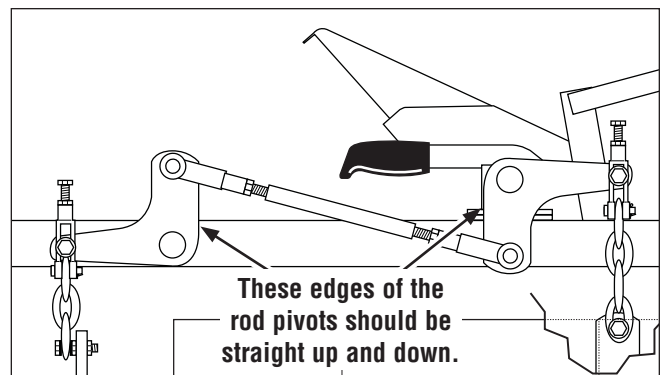


Figure 39. Checking the Deck Lift Rod Timing

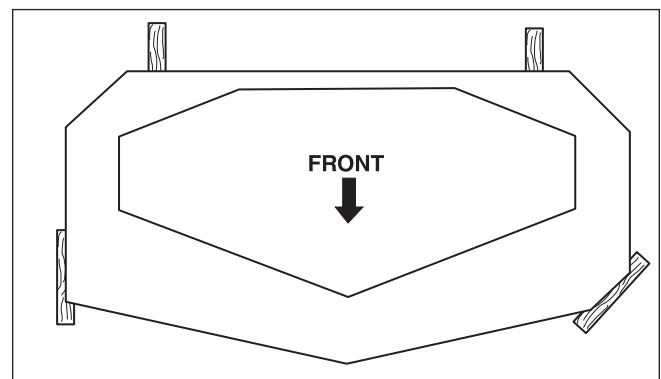


Figure 40. 2 x 4 Locations

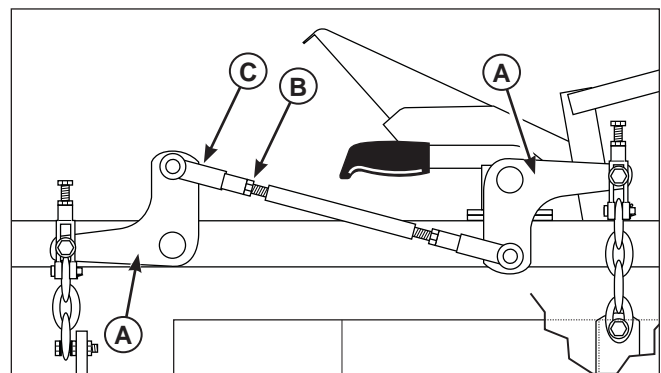


Figure 41. Deck Lift Rod Timing Adjustment

- A. Rod Pivots
- B. Jam Nut
- C. Clevis

## Deck Leveling Adjustment

**NOTE:** Before adjusting the deck level, the deck lift rod timing must be checked and/or adjusted.

### Coarse Adjustment Procedure

When adjusting the deck level, the coarse adjustment procedure should be used to make the majority of the adjustment and the fine adjustment procedure should be used to complete the adjustment.

1. Park the machine on a flat, level surface. Disengage the PTO, stop the engine and engage the parking brake. Drive tires must be inflated to 10 psi (0,69 bar); zero-turn rider caster tires to 25 psi (1,72 bar); mower deck caster tires to 25 psi (1,72 bar).
2. Extend the actuator until the pressure is removed from the cutting height adjustment pin. Place the cutting height adjustment pin in the 4" position and retract the actuator until contact is made with the cutting height adjustment pin.
3. Place 2 x 4 blocks under each corner of the mower deck with the 3-1/2" sides being vertical. See Figure 42.
4. Loosen the nuts (A, Figure 43) and allow the front of the deck to rest on the 2 x 4's. Slide the chains down in the slots until the chains are tight and tighten the nuts. See Figure 43.
5. Loosen the nuts (A) and allow the rear of the deck to rest on the 2 x 4's. Slide the chains down in the slots until the chains are tight and tighten the nuts. See Figure 43.
6. Remove all 2 x 4 blocks from under the mower deck.

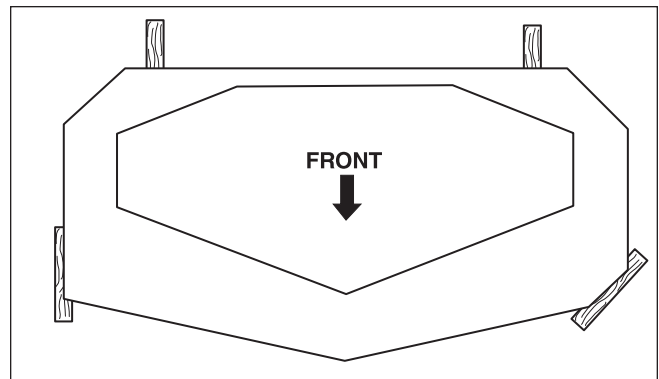


Figure 42. 2 x 4 Locations

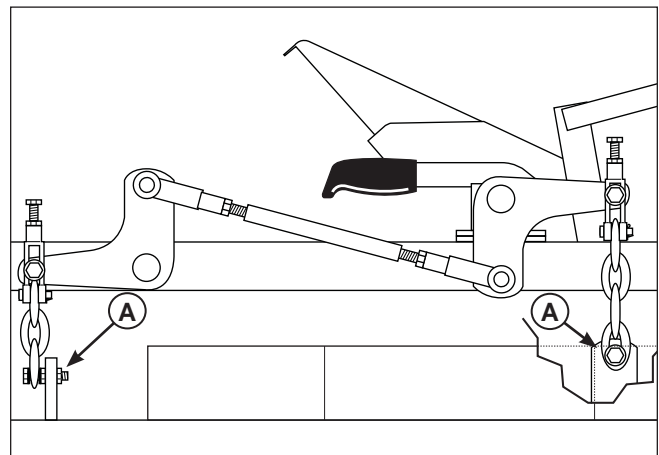


Figure 43. Hanger Chain Adjustment  
A. Adjustment Point

<b>⚠ CAUTION</b>	
	<b>Avoid injury! Mower blades are sharp.</b>
Always wear gloves when handling mower blades or working near blades.	

7. Position the outside mower blades so that they face front-to-back (Figure 44).
8. Measure from the front tip of the blade from the cutting edge to the ground. Measure from the rear tip of the blade from the cutting edge to the ground. Repeat this process for the other side of the machine.
  - The front measurement should be 4" (10,2 cm);
  - The back measurement should be 4" (10,2 cm).

If the above measurements are achieved not further adjustment is necessary. If the above measurements are NOT achieved proceed with *Fine Adjustment Procedure*.

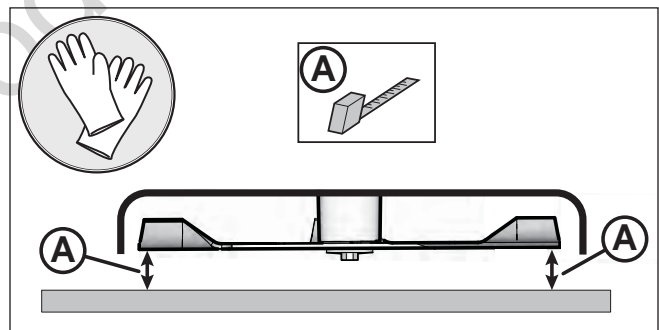


Figure 44. Checking The Blade Height Adjustment

## Fine Adjustment Procedure

- Loosen the jam nut (**A**, **Figure 45**) and turn the fine adjustment bolt (**B**) to adjust the deck height until the front measurement equals 4" (10,2 cm) and the back measurement equals 4" (10,2 cm)
  - Turn the bolt **CLOCKWISE** to raise the deck.
  - Turn the bolt **COUNTER-CLOCKWISE** to lower the deck.
- Position the outside mower blades so that they face front-to-back.
- Re-measure from the front tip of the blade from the cutting edge to the ground. Measure from the rear tip of the blade from the cutting edge to the ground. Repeat the process for the other side of the machine.
- Once the front measurement equals 4" (10,2 cm) and the back measurement equals 4" (10,2 cm), re-tighten the jam nut.

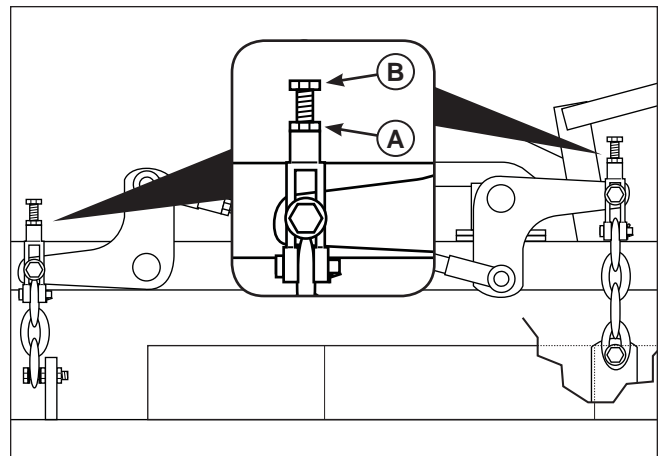


Figure 45. Fine Adjustment of the Deck Cutting Height

- A. Jam Nut  
B. Fine Adjustment Bolt

## PTO Clutch Belt Replacement

- Park the zero-turn rider on a smooth, level surface such as a concrete floor. Disengage the PTO, engage the parking brake, turn off the engine, and remove the ignition key.
- Raise the hood to gain access to the PTO clutch belts (**A**, **Figure 46**) located on the rear of the engine.
- Remove the PTO clutch anchor bolt (**B**).
- Using a 1/2" breaker bar, place the square end in the square hole located in the end of the idler arm (**C**). Carefully rotate the breaker bar **CLOCKWISE**, which will relieve the tension on the belts exerted from the idler arm.
- Slide the PTO clutch belts over the edge of the drive shaft pulley (**D**). Carefully release the tension on the breaker bar.
- Remove the old PTO clutch belts and replace with new ones. Make sure the V-side of the belts runs in the pulley grooves.
- Install the new PTO clutch belts on the PTO clutch (**E**) and the idler pulley (**F**). Carefully rotate the breaker bar **CLOCKWISE** and install the belt on the drive shaft pulley. Carefully release the tension on the breaker bar.
- Re-install the PTO clutch anchor bolt.
- Close the hood and secure with the hood latches.
- Run the mower under no-load condition for about 5 minutes to break-in the new belt.

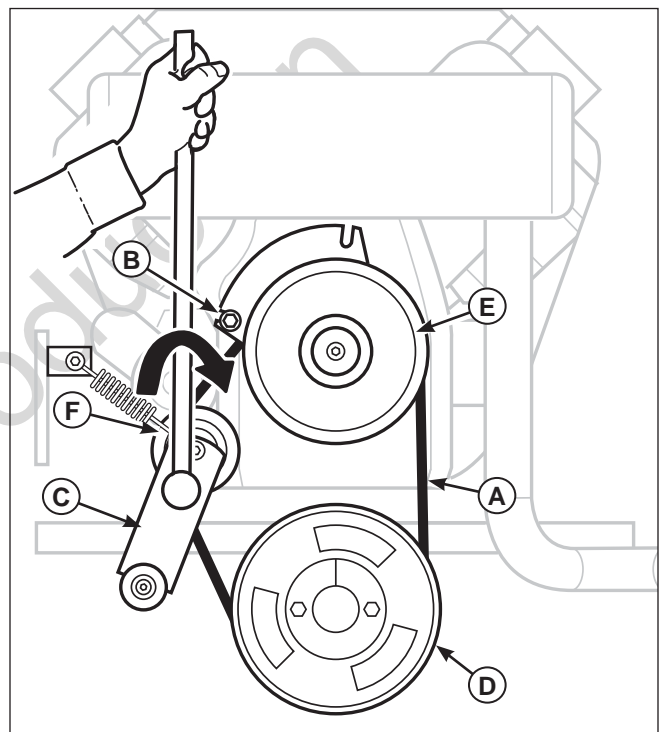


Figure 46. PTO Clutch Belt Replacement

- A. PTO Clutch Belts  
B. PTO Clutch Anchor Bolt  
C. Idler Arm  
D. Drive Shaft Pulley  
E. PTO Clutch  
F. Idler Pulley

## Hydraulic Pump Drive Belt Replacement

1. Park the zero-turn rider on a smooth, level surface such as a concrete floor. Disengage the PTO, engage the parking brake, turn off the engine, and remove the ignition key.
2. Raise the hood to gain access to the hydraulic pump drive belts (A, Figure 47).

### **⚠ WARNING**

**STORED ENERGY DEVICE:** Improper release of the belt tension spring can result in personal injury. Use extreme caution when removing this spring.

3. Loosen the nut on the spring anchor eyebolt (B) to release the majority of the belt tension. Use caution and remove the nut to completely release the tension.
4. Remove the old hydraulic pump drive belts and replace with new ones. Make sure the V-side of the belt runs in the grooves of the hydraulic pump pulleys (C) and the engine drive pulley (D).
5. Reinstall the spring anchor eyebolt into the anchor tab and loosely fasten the nut. Adjust the anchor eyebolt until a measurement of 6-1/2" (16,5 cm) is achieved from the outside of the spring hooks. See Figure 46. Tighten the nut.
6. Close the hood and secure with the hood latches.
7. Run the mower under no-load condition for about 5 minutes to break-in the new belt.

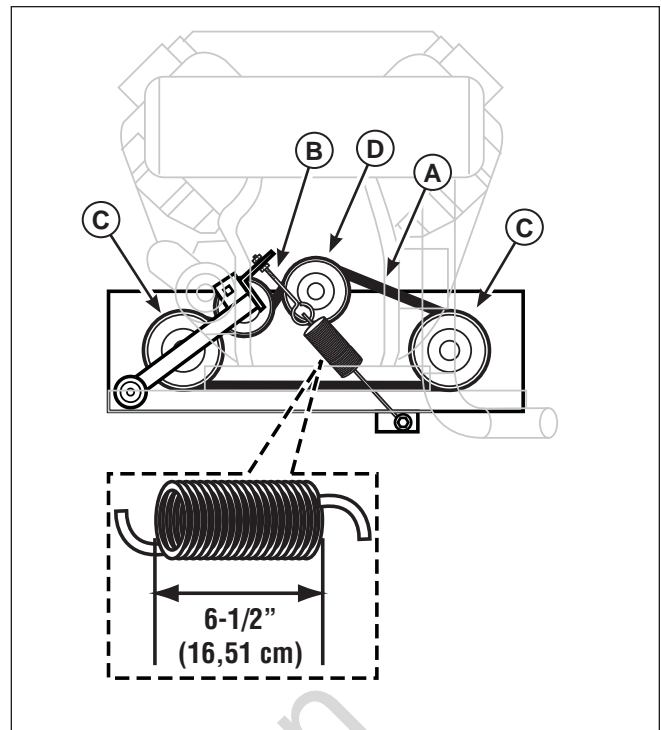


Figure 47. Hydraulic Pump Drive Belt Replacement

- A. Hydraulic Pump Drive Belts
- B. Spring Anchor Eyebolt
- C. Hydraulic Pump Pulleys
- D. Engine Drive Pulley



## Mower Belt Replacement

### NOTICE

To avoid damaging belts, do NOT pry belts over pulleys.

1. Park the zero-turn rider on a smooth, level surface such as a concrete floor. Disengage the PTO, engage the parking brake, turn off the engine, and remove the ignition key.
2. Lower the mower deck to its lowest cutting position and remove the mower deck guards.

### ⚠ WARNING



**Spring loaded components can kick back causing injury.**

Use extreme caution when rotating the idler arm with the breaker bar, due to the increased tension in the spring as the idler arm is being rotated. Injury may result in the breaker bar is prematurely release while the spring is under tension.

3. Using a 1/2" breaker bar, place the square end in the square hole located in the end of the idler arm (**A**, **Figure 48**). Carefully rotate the breaker bar COUNTER-CLOCKWISE, which will relieve the tension on the belt exerted from the idler arm.
4. Slide the drive belt over the edge of the right side stationary idler pulley (**B**). Carefully release the tension on the breaker bar.
5. Remove the old belt and replace with a new one. Make sure the V-side of the belt runs in the pulley grooves.
6. Install the drive belt on the gear box pulley, the spindle pulleys and all idler pulleys except the stationary pulley (**B**). Carefully rotate the breaker bar COUNTER-CLOCKWISE and install the belt on the stationary idler pulley (**B**). Carefully release the tension on the breaker bar.
7. Reinstall the mower deck guards.
8. Run the mower under no-load condition for about 5 minutes to break-in the new belt.

## Check the Mower Belt Idler Tensioning Spring Length (72" Models Only)

1. Remove the mower deck guards.
2. Set the mower deck to the 3-1/2" (8.9 cm) cutting height.
3. Measure the coil length (**A**, **Figure 49**) of the mower belt idler tensioning spring (**B**). The measurement should equal 7-1/4" ± 1/8" (18.42 cm ± .32 cm). If not, perform the Adjust the Mower Belt Idler Tensioning Spring Length.

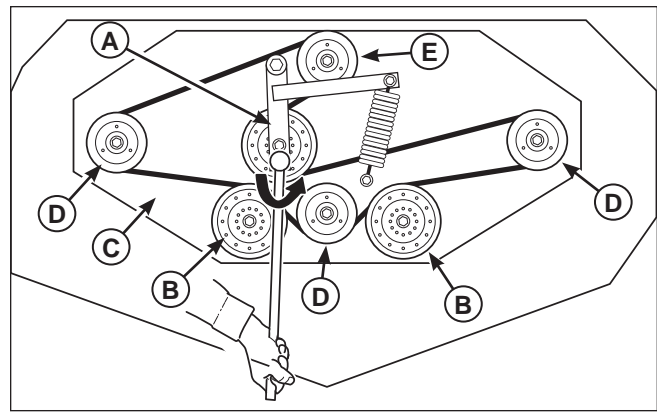


Figure 48. Mower PTO Belt

- A. Idler Arm
- B. Stationary Idler Pulley
- C. Deck Drive Belt
- D. Spindle Pulley
- E. Gearbox Pulley

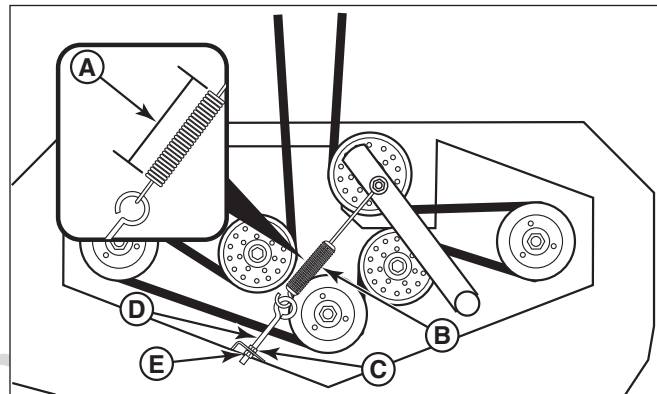


Figure 49. Mower Belt Idler Tensioning Spring (72" Models)

- A. Coil Length
- B. Idler Tensioning Spring
- C. Jam Nut
- D. Eye Bolt
- E. Adjustment Nut

## Adjust the Mower Belt Idler Tensioning Spring Length (72" Models Only)

1. Loosen the jam nut (**C**, **Figure 49**) on the eye bolt (**D**).
2. Turn the adjustment nut (**E**) until the measurement equals 7-1/4" ± 1/8" (18.42 cm ± .32 cm).
3. Re-tighten the jam nut.
4. Re-install the mower deck guards.
5. Run the mower under no-load condition for about five (5) minutes to break in the new belt.

## Gearbox Maintenance

### Check the Gearbox Oil Level

1. Park the machine on a flat, level surface such as a concrete floor. Disengage the PTO, engage the parking brake, turn off the engine.
2. Raise the mower deck to the service position. (See *Positioning the Mower Deck for Service.*)
3. Place blocks underneath the mower deck to support it in the raised position.
4. Remove the oil fill plug (**A**, **Figure 50**) on the gearbox.
5. Once the oil fill plug is removed, oil should seep out of the oil fill hole. If no oil drains out, fill with SAE 80-90 weight gear oil until oil starts to seep from the oil fill hole, then replace fill plug.
6. Remove the blocks from under the mower deck.
7. Lower the mower deck to the operating position. (See *Positioning the Mower Deck for Operation.*)

### Changing the Gearbox Oil

*NOTE: The gearbox lubricant should be changed after the first 100 hrs. or 30 days of operation, then after 500 hours or 12 months.*

1. Park the machine on a flat, level surface such as a concrete floor. Disengage the PTO, engage the parking brake, turn off the engine.
2. Position the mower deck in the highest cutting position.
3. Raise the mower deck to the service position. (See *Positioning the Mower Deck for Service.*)
4. Place blocks underneath the mower deck to support the mower deck in the service position.
5. Remove the drain plug (**B**).
6. Place a small pan underneath the gearbox to catch the oil.
7. Remove the blocks from underneath the mower deck.
8. Turn the ignition switch to the RUN position and extend the actuator to lower the mower deck to the operation position.
9. When all of the oil has drained from the gearbox, retract the actuator to raise the mower deck to the service position.
10. Place blocks underneath the mower deck to support the mower deck in the service position.
11. Reinstall the drain plug.
12. Remove the oil fill plug and fill with SAE 80-90 weight gear oil until oil starts to seep from the hole, then replace the oil fill plug.
13. Remove the blocks from underneath the mower deck.
14. Lower the mower deck to the operation position. (See *Positioning the Mower Deck for Operation.*)

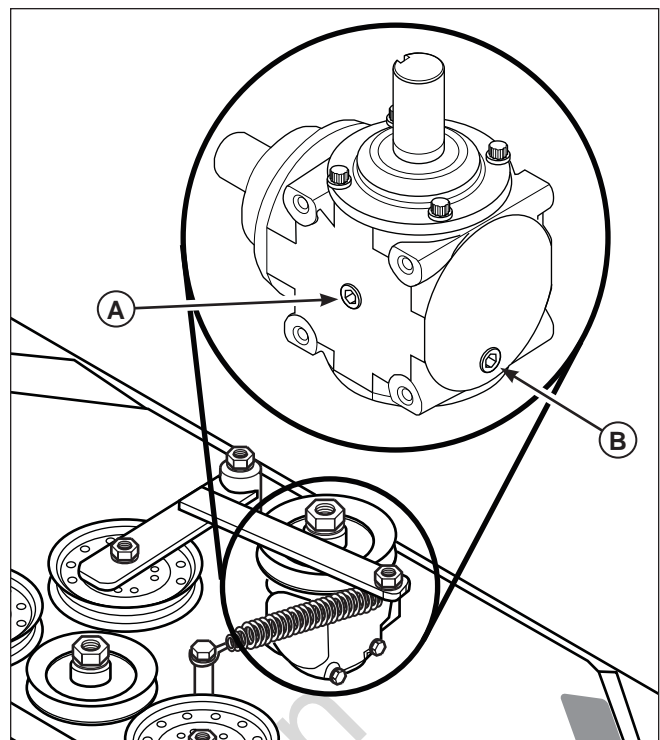


Figure 50. Gearbox Oil Level

A. Oil Fill Plug

B. Drain Plug

## Fuse Locations

The fuse blocks are located on the side of the instrument control panel installed in the right hand fuel tank. Refer to Figure 51 for the location and amperage of the fuses used in this machine.

- A. **Charge Circuit:** 20 amp fuse
- B. **Actuator:** 30 amp fuse
- C. **Accessory:** 20 amp fuse
- D. **Auxillary:** 20 amp fuse
- E. **Main:** 40 amp fuse
- F. **Spare:** 20 amp fuse
- G. **PTO Clutch:** 20 amp fuse
- H. **Fuel Solenoid:** 10 amp fuse

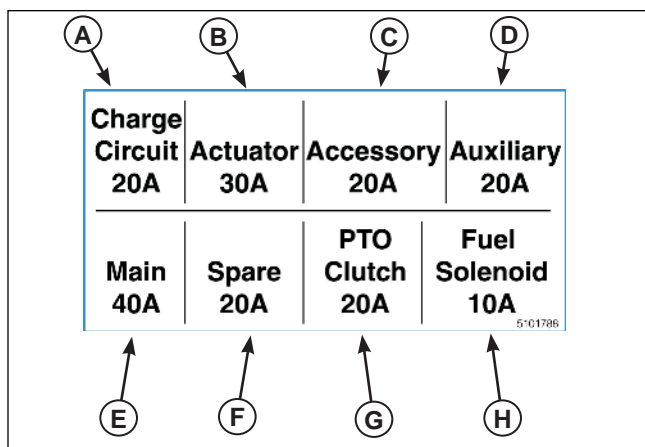



Figure 51. Fuse Location Decal

- A. Charge Circuit
- B. Actuator
- C. Accessory
- D. Auxillary
- E. Main
- F. Spare
- G. PTO Clutch
- H. Fuel Solenoid

## Battery Maintenance

*NOTE:* This unit is equipped with a maintenance-free BCIU1 battery.

### Cleaning the Battery and Cables

<b>⚠ WARNING</b>	
	<b>Keep open flames and sparks away from the battery.</b>
<ul style="list-style-type: none"> <li>• Be careful when handling the battery. Avoid spilling electrolyte. Keep flames and sparks away from the battery.</li> <li>• When removing or installing battery cables, disconnect the negative cable <b>FIRST</b> and reconnect it <b>LAST</b>. If not done in this order, the positive terminal can be shorted to the frame by a tool.</li> </ul>	

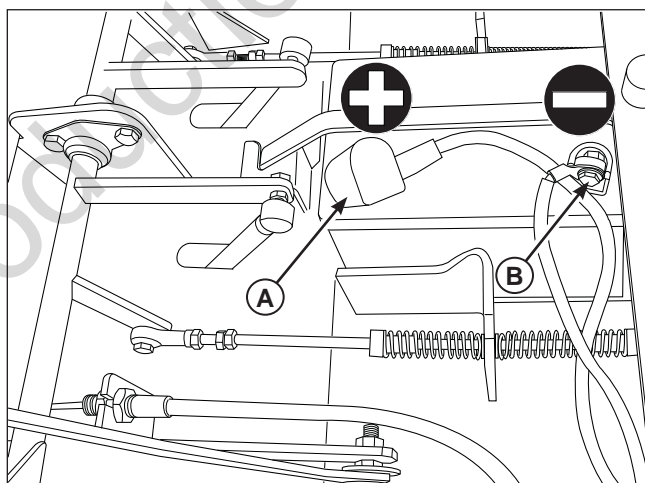


Figure 52. Battery Compartment

- A. Positive Battery Cable
- B. Negative Battery Cable

1. Disconnect the cables from the battery, negative (black) cable first (**B, Figure 52**).
2. Clean the battery terminals and cable ends with a wire brush until shiny.
3. Reinstall the battery and reattach the battery cables, positive (red) cable first (**A**).
4. Coat the cable ends and battery terminals with petroleum jelly or non-conducting grease.

## Battery Service

### **WARNING**

**Keep open flames and sparks away from the battery; the gasses coming from it are highly explosive.  
Ventilate the battery well during charging.**

### Checking Battery Voltage

A voltmeter can be used to determine condition of battery. When engine is off, the voltmeter shows battery voltage, which should be 12 volts. When engine is running, the voltmeter shows voltage of charging circuit which normally is 13 to 14 volts.

A dead battery or one too weak to start the engine may mean the battery needs to be replaced. For example, it may mean that the alternator is not charging the battery properly. If there is any doubt about the cause of the problem, see your dealer. If you need to replace the battery, follow the steps under Cleaning the Battery & Cables in the Regular Maintenance Section.

### Charging a Completely Discharged Battery

### **WARNING**

**Do NOT charge battery with key switch ON.  
Never use a quick battery charger to start engine.  
Always disconnect negative (-) battery cable before charging battery.**

1. Be aware of all the safety precautions you should observe during the charging operation. If you are unfamiliar with the use of a battery charger and hydrometer, have the battery serviced by your dealer.
2. Add distilled water sufficient to cover the plate (fill to the proper level near the end of the charge). If the battery is extremely cold, allow it to warm before adding water because the water level will rise as it warms. Also, an extremely cold battery will not accept a normal charge until it becomes warm.
3. Always unplug or turn the charger off before attaching or removing the clamp connections.
4. Carefully attach the clamps to the battery in proper polarity (usually red to [+] positive and black to [-] negative).
5. While charging, periodically measure the temperature of the electrolyte. If the temperature exceeds 125° F (51.6° C), or if violent gassing or spewing of electrolyte occurs, the charging rate must be reduced or temporarily halted to prevent battery damage.
6. Charge the battery until fully charged (until the specific gravity of the electrolyte is 1.250 or higher and the electrolyte temperature is at least 60° F). The best method of making certain a battery is fully charged, but not over charged, is to measure the specific gravity of a

cell once per hour. The battery is fully charged when the cells are gassing freely at low charging rate and less than 0.003 change in specific gravity occurs over a three hour period.

### Jump Starting With Auxiliary (Booster) Battery

Jump starting is not recommended. However, if it must be done, follow these directions. Both booster and dis-charged batteries should be treated carefully when using jumper cables. Follow the steps below EXACTLY, being careful not to cause sparks. Refer to Figure 53.

1. Both batteries must be of the same voltage.
2. Position the vehicle with the booster battery adjacent to the vehicle with the discharged battery so that booster cables can be connected easily to the batteries in both vehicles. Make certain vehicles do not touch each other.
3. Wear safety glasses and shield eyes and face from batteries at all times. Be sure vent caps are tight. Place damp cloth over vent caps on both batteries.
4. Connect positive (+) cable to positive post of discharged battery (wired to starter or solenoid).
5. Connect the other end of same cable to same post marked positive (+) on booster battery.
6. Connect the second cable negative (-) to other post of booster battery.
7. Make final connection on engine block of stalled vehicle away from battery. Do not lean over batteries.
8. Start the engine of the vehicle with the booster battery. Wait a few minutes, then attempt to start the engine of the vehicle with the discharged battery.
9. If the vehicle does not start after cranking for ten (10) seconds, STOP PROCEDURE. More than ten (10) seconds seldom starts the engine unless some mechanical adjustment is made. Allow a sixty (60) second cool down period between starting attempts. Failure to follow these guidelines can burn out starter motor.
10. After starting, allow the engine to return to idle speed. Remove the cable connection at the engine or frame. Then remove the other end of the same cable from the booster battery.
11. Remove the other cable by disconnecting at the discharged battery first and then disconnect the opposite end from the booster battery.
12. Discard the damp cloths that were placed over the battery vent caps.

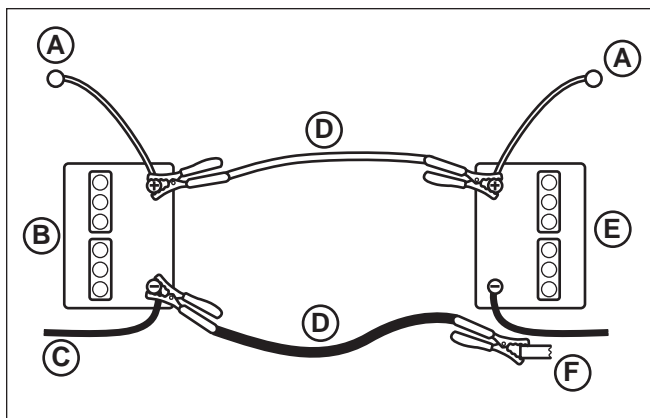


Figure 53. Jump Starting

**This hook-up is for negative grounded vehicles.**

Callout	Description
A	To Starter Switch
B	Starting Vehicle Battery
C	To Ground
D	Jumper Cable
E	Discharged Vehicle Battery
F	Engine Block

**Make sure vehicles do not touch.**

## ⚠ WARNING

Any procedure other than the proceeding could result in:

1. Personal injury caused by electrolyte squirting out of the battery vents.
2. Personal injury or property damage due to battery explosion.
3. Damage to the charging system of the booster vehicle or of the immobilized vehicle.

Do not attempt to jump start a vehicle having a frozen battery because the battery may rupture or explode. If a frozen battery is suspected, examine all fill vents on the battery. If ice can be seen or if the electrolyte fluid cannot be seen, do not attempt to start with jumper cables as long as the battery remains frozen.

## ⚠ WARNING

**For your personal safety, use extreme caution when jump starting.**

- Never expose battery to open flame or electric spark—battery action generates hydrogen gas which is flammable and explosive.
- Do not allow battery acid to contact skin, eyes, fabrics or painted surfaces. Batteries contain a sulfuric acid solution which can cause serious personal injury or property damage.
- When removing or installing battery cables, disconnect the negative cable first and reconnect it last. If not done in this order, the positive terminal can be shorted to the frame by a tool.
- To avoid engine damage, do not disconnect the battery while engine is running. Be sure terminal connections are tight before starting.



## Fault Diagnosis Lamps

This unit is equipped with an attachment module that features three fault diagnosis lamps labeled A, L and C. Checking the attachment module can help you quickly identify certain problems with the machine.

1. Park the machine on a flat, level surface such as a concrete floor. Disengage the PTO, engage the parking brake, turn off the engine.
2. Raise the seat plate to gain access to the attachment module.
3. Turn the key to the RUN / HEAT position.
4. Observe the fault indicator lamps.
  - If all three lamps are lit and the electrical problem still persists, the unit will need further diagnostics, contact your authorized dealer.
  - If any of the lamps are NOT lit, reference the chart below. If these repairs do not fix the situation, contact your authorized dealer.

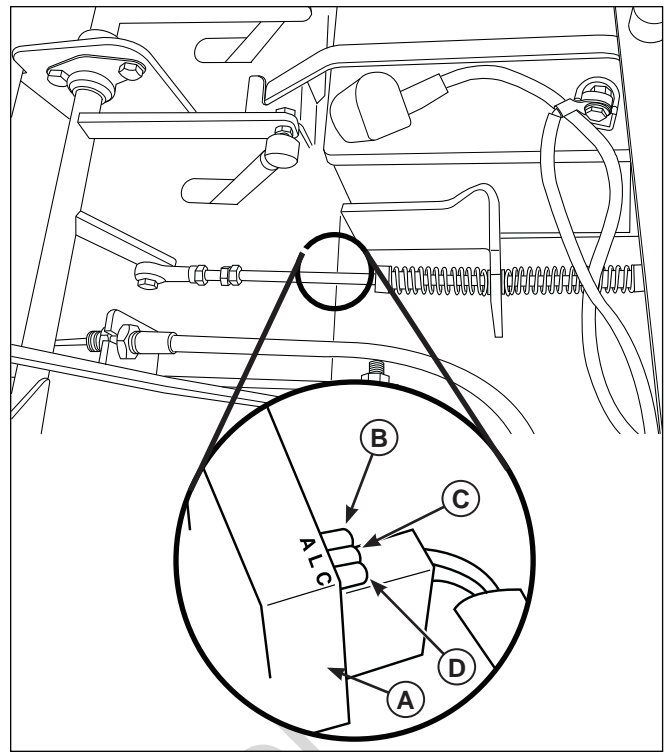


Figure 54. Fault Indicator Lamps

- A. Attachment Module
- B. Fault Indicator Lamp - "A"
- C. Fault Indicator Lamp - "L"
- D. Fault Indicator Lamp - "C"

<b>Fault Indicator Module</b>			
<b>If these lamps are NOT lit:</b>	<b>Condition</b>	<b>Cause</b>	<b>Remedy</b>
C	PTO will not engage. Mower deck will not raise or lower.	The main wire harness and mower deck wire harness are not connected.	Inspect the main wire harness and the mower deck wire harness for proper connection.
L	The operator moves the ground speed control levers out of the neutral position and the engine shuts off.	The mower deck is not fully positioned in the Operating Position	Fully position the mower deck in the Operating Position. The mower deck is fully positioned in the Operating Position when the Operating Position Indicator Lamp stops flashing.
A	PTO will not engage. Operator raises the mower deck out of the operating position while the PTO is engaged, and the PTO disengages.	The mower deck is not fully positioned in the Operating Position.	Fully position the mower deck in the Operating Position. The mower deck is fully positioned in the Operating Position when the Operating Position Indicator Lamp stops flashing.

## Storage

### Temporary Storage (30 Days Or Less)

Remember, the fuel tank will still contain some gasoline, so never store the unit indoors or in any other area where fuel vapor could travel to any ignition source. Fuel vapor is also toxic if inhaled, so never store the unit in any structure used for human or animal habitation.



Here is a checklist of things to do when storing your unit temporarily or in between uses:

- Keep the unit in an area away from where children may come into contact with it. If there's any chance of unauthorized use, remove the spark plug(s) and put in a safe place. Be sure the spark plug opening is protected from foreign objects with a suitable cover.
- If the unit can't be stored on a reasonable level surface, chock the wheels.
- Clean all grass and dirt from the mower.

### Long Term Storage (Longer Than 30 Days)

Before you store your unit for the off-season, read the Maintenance and Storage instructions in the Safety Rules section, then perform the following steps:

1. Drain crankcase oil while engine is hot and refill with a grade of oil that will be required when unit is used again.
2. Prepare the mower deck for storage as follows:
  - a. Remove mower deck from the unit.
  - b. Clean underside of mower deck.
  - c. Coat all bare metal surfaces with paint or light coat of oil to prevent rusting.
3. Clean external surfaces and engine.
4. Prepare engine for storage. See engine owner's manual.
5. Clean any dirt or grass from cylinder head cooling fins, engine housing and air cleaner element.
6. Cover air cleaner and exhaust outlet tightly with plastic or other waterproof material to keep out moisture, dirt and insects.
7. Completely grease and oil unit as outlined in the *Lubrication* section.
8. Clean up unit and apply paint or rust preventative to any areas where paint is chipped or damaged.
9. Be sure the battery is filled to the proper level with water and is fully charged. Battery life will be increased if it is removed, put in a cool, dry place and fully charged about once a month. If battery is left in unit, disconnect the negative cable.

<b>⚠ WARNING</b>	
 	<p><b>Fuel and its vapors are extremely flammable and explosive.</b></p> <p><b>Fire or explosion can cause severe burns or death.</b></p>
<ul style="list-style-type: none"> <li>• Never store the unit, with gasoline in the engine or fuel tank, in a heated shelter or in enclosed, poorly ventilated enclosures. Gasoline fumes may reach an open flame, spark or pilot light (such as a furnace, water heater, clothes dryer, etc.) and cause an explosion.</li> <li>• Handle gasoline carefully. It is highly flammable and careless use could return in serious fire damage to your person or property.</li> <li>• Drain fuel into an approved container outdoors away from open flame or sparks.</li> </ul>	

10. Drain fuel system completely or add a gasoline stabilizer to the fuel system. If you have chosen to use a fuel stabilizer and have not drained the fuel system, follow all safety instructions and storage precautions in this manual to prevent the possibility of fire from the ignition of gasoline fumes. Remember, gasoline fumes can travel to distant sources of ignition and ignite, causing risk of explosion and fire.

*NOTE: Gasoline, if permitted to stand unused for extended periods (30 days or more), may develop gummy deposits which can adversely affect the engine carburetor and cause engine malfunction. To avoid this condition, add a gasoline stabilizer to the fuel tank and run the engine a few minutes, or drain all fuel from the unit before placing it in storage.*

### Starting After Long Term Storage

Before starting the unit after it has been stored for a long period of time, perform the following steps.

1. Remove any blocks from under the unit.
2. Install the battery if it was removed.
3. Unplug the exhaust outlet and air cleaner.
4. Fill the fuel tank with fresh gasoline. See engine manual for recommendations.
5. See engine owner's manual and follow all instructions for preparing engine after storage.
6. Check crankcase oil level and add proper oil if necessary. If any condensation has developed during storage, drain crankcase oil and refill.
7. Inflate tires to proper pressure. Check fluid levels.
8. Start the engine and let it run slowly. **DO NOT** run at high speed immediately after starting. Be sure to run engine only outdoors or in well ventilated area.


## Troubleshooting

### Troubleshooting Chart

While normal care and regular maintenance will extend the life of your equipment, prolonged or constant use may eventually require that service be performed to allow it to continue operating properly.

The troubleshooting guide below lists the most common problems, their causes and remedies.

See the information in the *Maintenance* Section for instructions on how to perform most of these minor adjustments and service repairs yourself. If you prefer, all of these procedures can be performed for you by your local authorized dealer.

<b>⚠ WARNING</b>	
	<b>Remove the ignition key prior to performing maintenance on the unit.</b>
<ul style="list-style-type: none"> <li>To avoid serious injury, perform maintenance on the zero-turn rider or mower only when the engine is stopped and the parking brake is engaged.</li> <li>Always remove the ignition key, disconnect the spark plug wire and fasten it away from the plug before beginning the maintenance, to prevent accidental starting of the engine.</li> </ul>	

### Troubleshooting the Rider

PROBLEM	CAUSE	REMEDY
<b>Engine will not turnover or start.</b>	<ol style="list-style-type: none"> <li>Parking brake not engaged.</li> <li>PTO (electric clutch) switch in ON position.</li> <li>Out of fuel</li> <li>Engine flooded.</li> <li>Fuse blown.</li> <li>Battery terminals require cleaning.</li> <li>Battery discharged or dead.</li> <li>Wiring loose or broken.</li> <li>Solenoid or starter motor faulty.</li> <li>Safety interlock switch faulty.</li> <li>Spark plug(s) faulty, fouled or incorrectly gapped.</li> <li>Water in fuel.</li> <li>Gas is old or stale.</li> </ol>	<ol style="list-style-type: none"> <li>Engage parking brake.</li> <li>Place if OFF position.</li> <li>If engine is hot allow to cool, the refill the fuel tank.</li> <li>Move choke control to CLOSED position.</li> <li>Replace fuse.</li> <li>Clean the battery terminals.</li> <li>Recharge or replace.</li> <li>Visually check wiring &amp; replace broken or frayed wires. Tighten loose connections.</li> <li>Repair or replace. See authorized dealer.</li> <li>Replace as needed. See authorized service dealer.</li> <li>Clean and gap or replace. See engine manual.</li> <li>Drain fuel &amp; replace with fresh fuel.</li> <li>Drain fuel &amp; replace with fresh fuel.</li> </ol>
<b>Engine starts hard or runs poorly.</b>	<ol style="list-style-type: none"> <li>Fuel mixture too rich.</li> <li>Spark plug(s) faulty, fouled, or incorrectly gapped.</li> </ol>	<ol style="list-style-type: none"> <li>Clean air filter. Check choke adjustment.</li> <li>Clean and gap or replace. See engine manual.</li> </ol>
<b>Engine knocks</b>	<ol style="list-style-type: none"> <li>Low oil level.</li> <li>Using wrong grade engine oil.</li> </ol>	<ol style="list-style-type: none"> <li>Check/add oil as required.</li> <li>See engine manual.</li> </ol>
<b>Excessive oil consumption</b>	<ol style="list-style-type: none"> <li>Engine running too hot.</li> <li>Using wrong weight oil.</li> <li>Too much oil in crankcase.</li> </ol>	<ol style="list-style-type: none"> <li>Clean engine fins, blower screen and air cleaner.</li> <li>See engine manual.</li> <li>Drain excess oil.</li> </ol>
<b>Engine exhaust is black.</b>	<ol style="list-style-type: none"> <li>Dirty air filter.</li> <li>Engine choke control is in CLOSED position.</li> </ol>	<ol style="list-style-type: none"> <li>Replace air filter. See engine manual.</li> <li>Open choke control.</li> </ol>

## Troubleshooting the Rider continued

PROBLEM	CAUSE	REMEDY
<b>Engine runs, but rider will not drive.</b>	<ol style="list-style-type: none"> <li>1. Hydraulic release valve(s) in "open" position.</li> <li>2. Belt is broken.</li> <li>3. Drive belt slips.</li> <li>4. Brake is not fully released.</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn hydraulic release valve(s) CLOCKWISE to close.</li> <li>2. See Drive Belt Replacement.</li> <li>3. See Problem and Cause below.</li> <li>4. See authorized service dealer.</li> </ol>
<b>Rider drive belt slips.</b>	<ol style="list-style-type: none"> <li>1. Pulleys or belt greasy or oily.</li> <li>2. Tension too loose.</li> <li>3. Belt stretched or worn.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean as required.</li> <li>2. Adjust spring tension. See Drive Belt Replacement.</li> <li>3. Replace belt.</li> </ol>
<b>Brake will not hold.</b>	<ol style="list-style-type: none"> <li>1. Brake is incorrectly adjusted.</li> <li>2. Brake pads worn.</li> </ol>	<ol style="list-style-type: none"> <li>1. See Brake Adjustment.</li> <li>2. Replace with new brake pads.</li> </ol>
<b>Rider steers or handles poorly.</b>	<ol style="list-style-type: none"> <li>1. Steering linkage is loose.</li> <li>2. Improper tire inflation.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check and tighten any loose connections.</li> <li>2. See Operation section.</li> </ol>
<b>Engine shuts off when operator pulls ground speed control levers out of the NEUTRAL position.</b>	<ol style="list-style-type: none"> <li>1. Mower deck is not positioned in either the Operating or Service position.</li> <li>2. Parking brake is engaged.</li> <li>3. Operator is not sitting in the seat.</li> </ol>	<ol style="list-style-type: none"> <li>1. Position the mower deck in the Operating or Service Position. (See <i>Positioning the Mower Deck for Service</i> and <i>Positioning the Mower Deck for Operation</i>).</li> <li>2. Disengage the parking brake.</li> <li>3. Sit in the seat.</li> </ol>

## Troubleshooting the Mower

PROBLEM	CAUSE	REMEDY
<b>Mower will not raise.</b>	<ol style="list-style-type: none"> <li>1. Lift linkage not properly attached or damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. See authorized service dealer for repair.</li> </ol>
<b>Engine stalls easily with mower engaged.</b>	<ol style="list-style-type: none"> <li>1. Engine speed too slow.</li> <li>2. Ground speed too fast.</li> <li>3. Cutting height set too low.</li> <li>4. Discharge chute jamming with cut grass.</li> </ol>	<ol style="list-style-type: none"> <li>1. Set to full throttle.</li> <li>2. Decrease ground speed.</li> <li>3. Cut tall grass at maximum cutting height during first pass.</li> <li>4. Cut grass with discharge pointing towards previously cut grass.</li> </ol>
<b>Excessive mower vibration.</b>	<ol style="list-style-type: none"> <li>1. Blade mounting bolts are loose.</li> <li>2. Mower blades, arbors or pulleys are bent.</li> <li>3. Mower blades are out of balance.</li> <li>4. Belt installed incorrectly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten to 120 ft. lbs (163 Nm).</li> <li>2. Check and replace as necessary.</li> <li>3. Remove, sharpen and balance blades. See Maintenance section.</li> <li>4. Reinstall correctly.</li> </ol>
<b>Excessive belt wear or breakage.</b>	<ol style="list-style-type: none"> <li>1. Bent or rough pulleys.</li> <li>2. Using incorrect belt.</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair or replace.</li> <li>2. Replace with correct belt.</li> </ol>
<b>Mower drive belt slips or fails to drive.</b>	<ol style="list-style-type: none"> <li>1. Idler pulley spring broken or not properly attached.</li> <li>2. Mower drive belt broken.</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair or replace as needed.</li> <li>2. Replace drive belt.</li> </ol>
<b>Mower does not engage.</b>	<ol style="list-style-type: none"> <li>1. Electrical wiring damage.</li> <li>2. Battery voltage too low.</li> <li>3. Mower deck not in operating position.</li> </ol>	<ol style="list-style-type: none"> <li>1. Locate and repair damaged wire.</li> <li>2. Recharge battery and check alternator. See Battery Maintenance section.</li> <li>3. Lower deck to operating position, disengage the PTO switch then re-engage the PTO switch. See Positioning Mower Deck for Operation.</li> </ol>

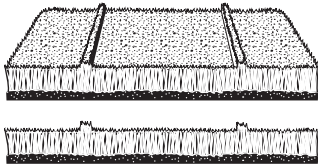
## Troubleshooting Common Cutting Problems

### PROBLEM

### CAUSE

### REMEDY

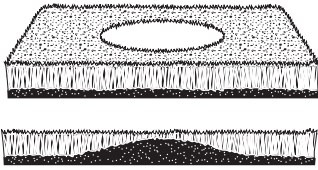
#### Streaking



1. Blades are not sharp.
2. Blades are worn down too far.
3. Engine speed is too slow.
4. Ground speed is too fast.
5. Deck is plugged with grass.
6. Not overlapping cutting rows enough.
7. Not overlapping enough when turning.

1. Sharpen your blades.
2. Replace your blades.
3. Always mow at FULL throttle.
4. Slow down.
5. Clean out the mower.
6. Overlap you cutting rows.
7. When turning your effective cutting width decreases—overlap more when turning.

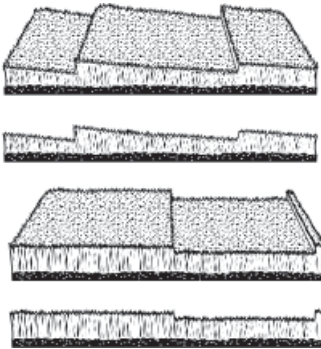
#### Scalping



1. Lawn is uneven or bumpy.
2. Mower deck cutting height is set too low.
3. Ground speed is too fast.
4. Deck is not levelled correctly.
5. Tire pressure is low or uneven.

1. Roll or level the lawn.
2. Raise the cutting height.
3. Slow down.
4. Correctly level the deck.
5. Check and inflate the tires.

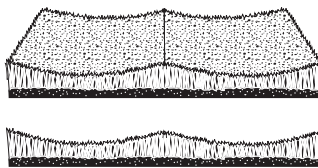
#### Stepped Cutting.



1. Deck is not leveled correctly.
2. Tires are not properly inflated.
3. Blades are damaged.
4. Deck shell is damaged.
5. Mower spindle is bent or loose.
6. Blades are installed incorrectly.

1. Level the deck correctly.
2. Check and inflate the tires.
3. Replace the blades.
4. Repair or replace the deck.
5. Repair or replace the spindle.
6. Reinstall the blades correctly.

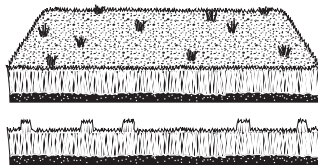
#### Uneven Cutting



1. Deck is not leveled correctly.
2. Blades are dull or worn.
3. Blades are damaged.
4. Deck is clogged with grass clippings.
5. Deck shell is damaged.
6. Mower spindle is bent or loose.
7. Blades are installed incorrectly.
8. Tires are not properly inflated.

1. Level the deck correctly.
2. Sharpen or replace the blades.
3. Replace the blades.
4. Clean out the deck.
5. Repair or replace the deck.
6. Repair or replace the spindle.
7. Reinstall the blades correctly.
8. Check and inflate the tires.

#### Stingers



1. Blades are not sharp or nicked.
2. Blades are worn down too far.
3. Engine speed is too low.
4. Ground speed is too fast.
5. Deck is plugged with grass.

1. Sharpen your blades.
2. Replace your blades.
3. Always mow at full throttle.
4. Slow down.
5. Clean out the mower.



## Specifications

Specifications are correct at time of printing and are subject to change without notice.

### ENGINE

For complete engine specifications see the engine manufacturer's operator's manual included with your unit.

Fits models: 5901236

<b>Briggs &amp; Stratton Vanguard</b>	
<b>Make</b>	Briggs & Stratton
<b>Model</b>	543477-2169-J1
<b>Electrical System</b>	12 volt, 15 amp. Alternator Battery 340 CCA

### CHASSIS

<b>Fuel Tank</b>	Capacity: 12 gallons (45,2 L) total
<b>Drive Tires</b>	Tire Size: 24 X 12 - 12 Inflation Pressure: 10 psi (0,69 bar)
<b>Front Caster Tires</b>	Tire Size: 11 x 4.00 - 5 Inflation Pressure: 25 psi (1,72 bar)
<b>Rear Caster Tires</b>	Tire Size: 13 x 6.50 - 6 Inflation Pressure: 25 psi (1,72 bar)

### TRANSMISSIONS

LH Pump: Hydro-Gear: PR-2KBQ-GV1F	
RH Pump: Hydro-Gear: PR-2HBQ-GV1F	
LH Wheel Motor: Parker: TF0000LS080AAKZ	
RH Wheel Motor: Parker: TF0000LS080AAKZ	
<b>Type</b>	Pump and Wheel Motor
<b>Hydraulic Fluid</b>	Mobil 1™ 15W-50 oil OR Castrol Syntec™ 5W-50 oil
<b>Speeds @ 3400 rpm</b>	Forward: 0-10 MPH (0-16,09 km/h) Reverse: 0-5 MPH (0-8,05 km/h)

### DIMENSIONS

Overall Length	115.5" (293,4 cm)
Overall Width	<b>61" Models:</b> 73" (185 cm) - deflector down 61.5" (156 cm) - deflector up <b>72" Models:</b> 84" (213 cm) - deflector down 72.5" (184 cm) - deflector up
Height	69" (175,3 cm) w/ Roll Bar up 57" (177,8 cm) w/ Roll Bar down
Weight (apx.)	1514 lbs (687 kg)

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# Notes

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**LIMITED WARRANTY**

Briggs & Stratton warrants that, during the warranty period specified below, it will repair or replace, free of charge, any part that is defective in material or workmanship or both. Transportation charges on product submitted for repair or replacement under this warranty must be borne by purchaser. This warranty is effective for and is subject to the time periods and conditions stated below. For warranty service, find the nearest Authorized Service Dealer in our dealer locator map at [WWW.FERRISINDUSTRIES.COM](http://WWW.FERRISINDUSTRIES.COM). The purchaser must contact the Authorized Service Dealer, and then make the product available to the Authorized Service Dealer for inspection and testing.

**There is no other express warranty. Implied warranties, including those of merchantability and fitness for a particular purpose, are limited to one year from purchase, or to the extent permitted by law. All other implied warranties are excluded. Liability for incidental or consequential damages are excluded to the extent exclusion is permitted by law.** Some states or countries do not allow limitations on how long an implied warranty lasts, and some states or countries do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation and exclusion 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 or country to country.\*\*

**WARRANTY PERIOD**

Covered Parts	Standard Warranty Period	Rental Warranty Period
Riding mowers	4 years (48 months) or 500 hours, whichever occurs first. Unlimited hours during the first 2 years (24 months) (+Except as noted below)	90 days
Walk mowers (over 30 inches of cutting width)	2 years (24 months) unlimited hours (+Except as noted below)	90 days
+Belts, Tires, Brake Pads, Hoses, Battery, Blades	90 days	90 days
+Attachments	1 year	90 days
+Engine*	See Engine Operator's Manual	See Engine Operator's Manual

\* Emissions-related components are covered by the Emissions Warranty Statement.

\*\* In Australia - Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure. For warranty service, find the nearest Authorized Service Dealer in our dealer locator map at [FERRISINDUSTRIES.COM/AU](http://FERRISINDUSTRIES.COM/AU), or by calling 1300 274 447, or by emailing or writing to [salesenquires@briggsandstratton.com.au](mailto:salesenquires@briggsandstratton.com.au), Briggs & Stratton Australia Pty Ltd, 1 Moorebank Avenue, NSW, Australia, 2170.

The warranty period begins on the date of purchase by the first retail end user, and continues for the period of time or hours stated in the table above.

**No warranty registration is necessary to obtain warranty on Briggs & Stratton products. Save your proof of purchase receipt. If you do not provide proof of the initial purchase date at the time warranty service is requested, the manufacturing date of the product will be used to determine the warranty period.**

**ABOUT YOUR WARRANTY**

We welcome warranty repair and apologize to you for being inconvenienced. Warranty service is available only through *FERRIS* Authorized Service Dealers. Most warranty repairs are handled routinely, but sometimes requests for warranty service may not be appropriate. This warranty only covers defects in materials or workmanship. It does not cover damage caused by improper use or abuse, improper maintenance or repair, normal wear and tear, or stale or unapproved fuel.

**Improper Use and Abuse** - The proper, intended use of this product is described in the Operator's Manual. Using the product in a way not described in the Operator's Manual or using the product after it has been damaged will void your warranty. Warranty is not allowed if the serial number on the product has been removed or the product has been altered or modified in any way, or if the product has evidence of abuse such as impact damage, or water/chemical corrosion damage.

**Improper Maintenance or Repair** - This product must be maintained according to the procedures and schedules provided in the Operator's Manual, and serviced or repaired using genuine Briggs & Stratton parts or equivalent. Damage caused by lack of maintenance or use of non-original parts is not covered by warranty.

**Normal Wear** - Like all mechanical devices, your unit is subject to wear even when properly maintained. This warranty does not cover repairs when normal use has exhausted the life of a part or the equipment. Except as noted in the warranty period, maintenance and wear items such as filters, belts, cutting blades, and brake pads (except engine brake pads) are not covered by warranty due to wear characteristics alone, unless the cause is due to defects in material or workmanship.

**Stale Fuel** - In order to function correctly, this product requires fresh fuel that conforms to the criteria specified in the Operator's Manual. Damage caused by stale fuel (carburetor leaks, clogged fuel tubes, sticking valves, etc) is not covered by warranty.

**Other Exclusions** - This warranty excludes damage due to accident, abuse, modifications, alterations, improper servicing, freezing or chemical deterioration. Attachments or accessories that were not originally packaged with the product are also excluded. There is no warranty coverage on equipment used for primary power in place of utility power or on equipment used in life support applications. This warranty also excludes failures due to acts of God and other force majeure events beyond the manufacturer's control.





***OPERATOR'S  
MANUAL***

***F800X Series***

***Zero-Turn Riding Mower***