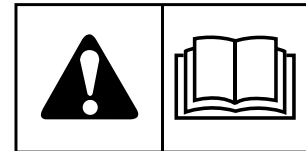
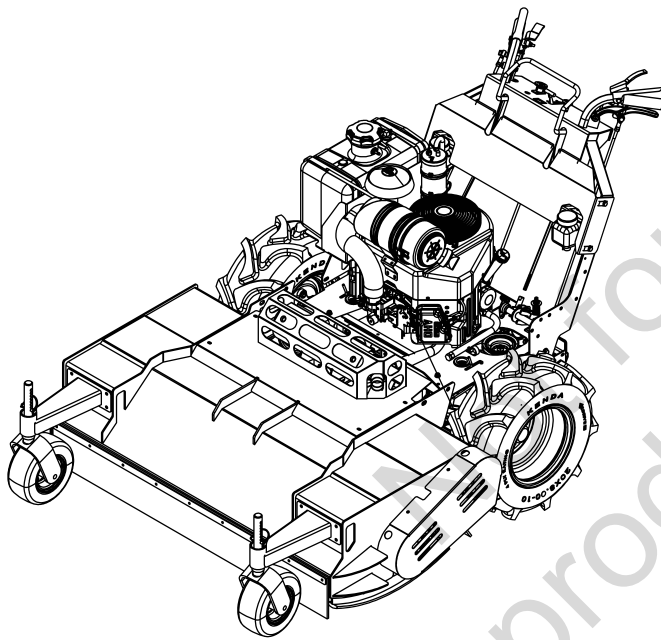




DEALER SERVICE MANUAL

FM Series

Walk-Behind Flail Mower



Model
5900520

Description
FMKAV2448CE

BRIGGS & STRATTON POWER PRODUCTS GROUP, LLC
5375 NORTH MAIN STREET
MUNNSVILLE NY 13409
800 933 6175

5103472
Rev D

Table of Contents :

Identification Tag Location - Flail Mower	3
Product Identification Tag (Stamped)	3
CE Identification Tag Markings - EN12733	4
Operator Safety	4
Operator Safety	4
Safety Decals	9
CE Safety Icons	9
Safety Alert Symbol and Signal Words	10
Safety Interlock System	10
Features and Controls	10
Control Locations & Functions	10
Operation	12
Before First-Time Use	12
Checks Before Starting	13
Starting the Engine	13
Stopping the Mower	13
Driving the Mower	13
Cutting Height Adjustment	14
Skid Shoe Height Adjustment	15
Mowing	15
Pushing the Unit by Hand	16
Storage	16
Maintenance Schedule	17
Maintenance Schedule	17
Maintenance Procedures	17
Service and Maintenance Safety	17
Checking Tire Pressures	17
Checking / Adding Fuel	17
Replacing the Fuel Filter	18
Check Engine Oil Level	18
Change Engine Oil & Filter	18
Engine Maintenance	19
Service Air Filter	19
Lubrication	19
Rotor Blade Inspection / Replacement	20
Rubber Discharge Guard Inspection	20
Check / Fill Transmission Oil	21
Transmission Oil Filter Change	21
Gearbox Maintenance	22
Neutral Adjustment & Tracking Adjustment	22
Handle Placement Adjustment	23
Parking Brake Adjustment	24
Rotor Drive Belt Replacement	24
Gearbox Drive Belt Replacement	25
Transmission Drive Belt Replacement	25
Battery Maintenance	27
Battery Service	27

Troubleshooting	29
Troubleshooting Charts	29
Specifications	29
Specifications	29

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

The manuals contain safety information to make you aware of the hazards and risks associated with the unit and how to avoid them. This Commercial Walkbehind Mower was designed to be used as described in operator's manual and is not intended for any other purpose. It is important that you read and understand the instructions thoroughly before attempting to start or operate this equipment. Save these original instructions for future reference.

This product requires final assembly before use. Refer to the setup guide for instructions on final assembly procedures. Follow the instructions completely.

Products Covered by This Manual

The following products are covered by this manual:

5900520

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. *LEFT* and *RIGHT* are as seen from the operator's position.

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Briggs & Stratton Power Products Group, LLC.

5375 N. Main Street

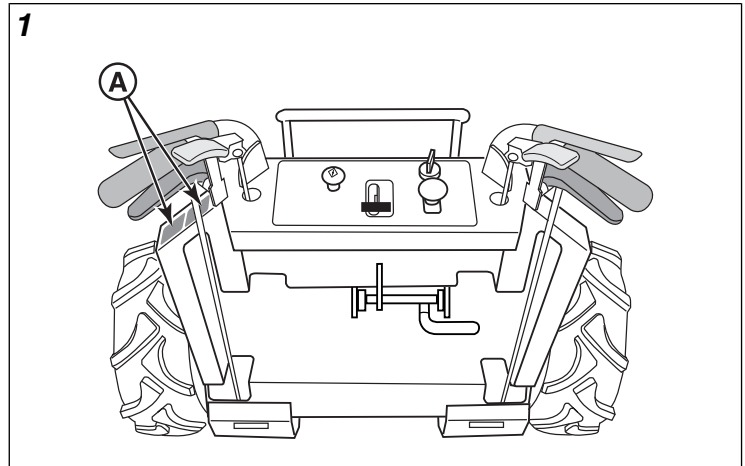
Munnsville, NY 13409-4003

(800) 933-6175

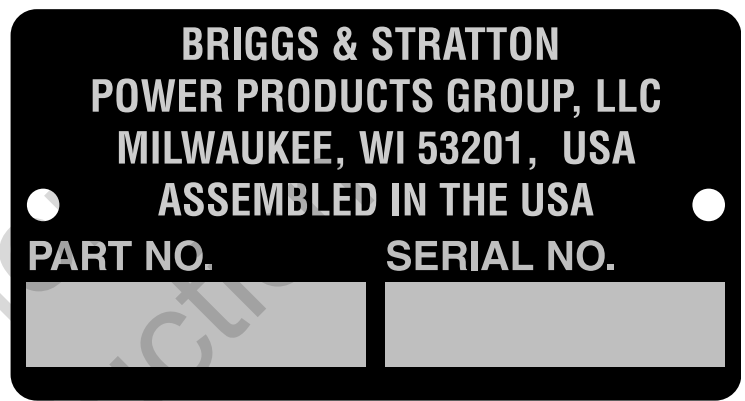
ferrisindustries.com

Identification Tag Location - Flail Mower

The Product Identification tag (A, Figure 1) can be found in the location shown.



Product Identification Tag (Stamped)

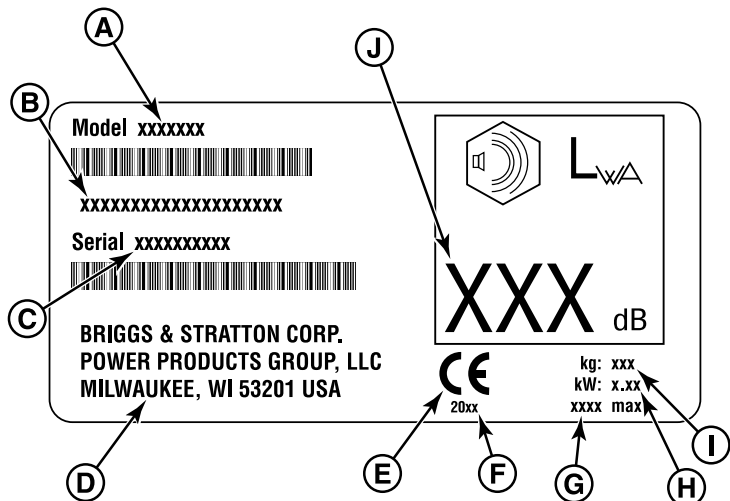


PRODUCT REFERENCE DATA	
Unit Model Number:	
Unit Serial Number:	
Mower Deck Model Number:	
Mower Deck Serial Number:	
Dealer Name:	
Date Purchased:	
ENGINE REFERENCE DATA	
Engine Make:	
Engine Model:	
Engine Type/Spec:	
Engine Code/Serial Number	

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

The Illustrated Parts List for this machine can be downloaded from ferrisindustries.com. Please provide model and serial number when ordering replacement parts.

CE Identification Tag Markings - EN12733



A.	Manufacturer's Identification Number
B.	Product Description
C.	Serial Number
D.	Manufacturer's Address
E.	CE Compliance Logo
F.	Year of Manufacture
G.	Maximum Engine Speed in Rotations per Minute
H.	Power Rating in Kilowatts
I.	Mass of Unit of Kilograms
J.	Sound Power in Decibels

This unit complies with European Harmonized Lawn Mower Standard EN 12733, European Machinery Directive 2006/42/EC, and European EMC Directive 2004/108/EEC.


"Vibration measurement uncertainty - machine vibration was recorded using methods and procedures outlined in the appropriate International Standards in effect at the time of manufacture. The uncertainties due to the measurement may result in a variance of up to 5% from the published value shown in the Declaration of Conformity."

Operator Safety

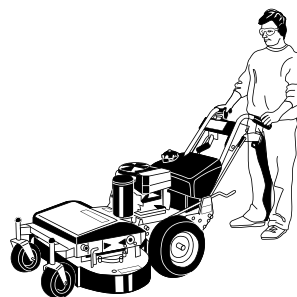
Operator Safety



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 safety alert triangle  in text signifies important cautions or warnings which must be followed.

Operating Safety



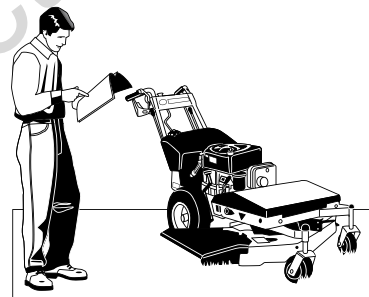
Congratulations on purchasing a superior-quality piece of lawn and garden equipment. Our products are designed and manufactured to meet or exceed all industry standards for safety.

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

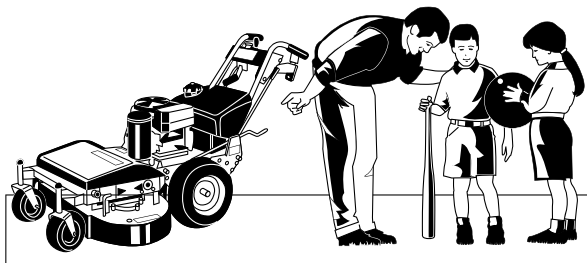


The operator's manual contains important safety information you need to be aware of BEFORE you operate your unit as well as DURING operation.

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

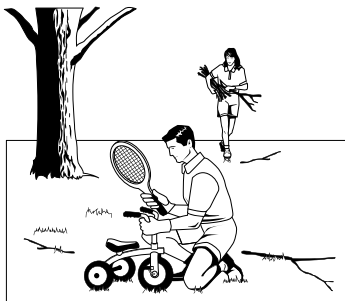


You could be seriously injured if you use this unit on too steep of a slope. Using the unit on a slope that is too steep where you do not have adequate footing and unit traction (and control) can cause you to lose control and possibly slip and fall or roll the unit over.

Always mow across slopes, not up and down (you could slip and fall.)

Also, note that the surface you are on can greatly impact your ability to safely operate this machine. Wet grass or soft soil can seriously affect your footing and traction of the unit. Do not operate on slopes that are slippery, wet, or have soft soil.

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

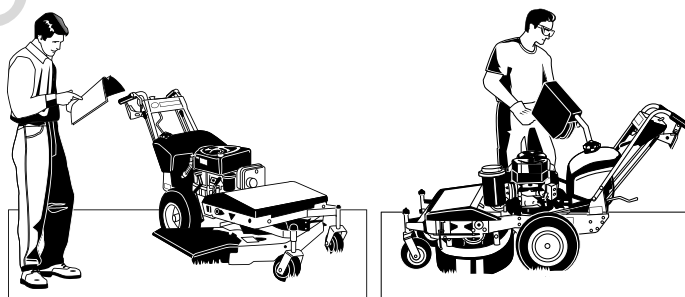


This equipment has many moving parts that can injure you or someone else. However, if you stay in the operator zone (area behind the handles and controls), and follow the safety rules in this operator's manual, the unit is safe to operate.

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.

Fuel and Maintenance



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

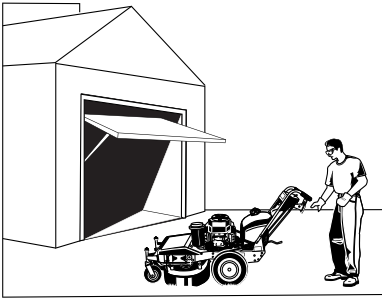
Gasoline and its vapors are extremely flammable. Do not smoke while operating or refueling. Do not add fuel while engine is hot or running. Allow engine to cool for at least 3 minutes prior to adding fuel.

Do not add fuel indoors, in an enclosed trailer, garage or 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.

Training

- 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.
- Become familiar with the safe operation of the equipment, operator controls, and safety signs.
- All operators and mechanics should be trained. The owner is responsible for training the users.
- Only allow responsible adults, who are familiar with the instructions, to operate the unit.
- Never let children or untrained people operate or service the equipment. Local regulations may restrict the age of the operator.
- The owner/user can prevent and is responsible for accidents or injuries occurring to themselves, other people or property.
- 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.

Preparation

- 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.
- Wear appropriate clothing including safety shoes, safety glasses and ear protection. Long hair, loose clothing or jewelry may get tangled in moving parts.
- 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.

- Use extra care when handling gasoline and other fuels. They are flammable and vapors are explosive.
- Use only an approved container.
- Never refuel or drain the machine indoors.
- Never remove fuel cap or add fuel with the engine running. Allow engine to cool before refueling. Do not smoke.
- Check that operator's presence controls, safety switches and shields are attached and functioning properly. Do not operate unless they are functioning properly.

Operation

- Never run an engine in an enclosed area.
- Mow only in the daylight or with good artificial light, keeping away from holes and hidden hazards.
- Be sure all drives are in neutral and parking brake is engaged before starting engine. Only start engine from the operator's position. Use seat belts if provided.
- Be sure of your footing while using pedestrian controlled equipment, especially when backing up. Walk, don't run. Reduced footing could cause slipping.
- 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.
- Do not mow in reverse unless absolutely necessary. Always look down and behind before and while traveling in reverse.
- 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.
- Slow down and use caution when making turns and when changing directions on slopes.
- Never raise deck with the blades running.
- 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.
- Turn off the PTO switch to disengage the blades when not mowing.
- Never operate with guards not securely in place. Be sure all interlocks are attached, adjusted properly and functioning properly.
- Never operate with the discharge deflector raised, removed or altered, unless using a grass catcher.
- Do not change the engine governor setting or over-speed the engine.
- 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.
- Stop equipment and inspect blades after striking objects or abnormal vibration occurs. Make necessary repairs before resuming operations.

- Keep hands and feet away from the cutting units.
- Look behind and down before backing up to be sure of a clear path.
- Never carry passengers and keep pets and bystanders away.
- Do not operate the unit while under the influence of alcohol or drugs.
- Slow down and use caution when making turns and crossing roads and sidewalks. Stop blades if not mowing.
- Use care when loading or unloading the machine into a trailer or truck.
- Use care when approaching blind corners, shrubs, trees or other objects that may obscure vision.
- 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

Fire hazard

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.

- 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

Loud noise hazard

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

Wear hearing protection when operating this machine.

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

Equipment roll-over crushing hazard

Operating on steep slopes can cause sliding and loss of steering, control, and rollover.

Select a slow ground speed before driving onto slopes. Use extra caution when operating on slopes with grass catchers. Mow across the face of slopes, not up and down. Use caution when changing directions and **DO NOT START OR STOP ON A SLOPE.**

Do:

- Mow across slopes, not up and down.
- Remove obstacles such as rocks, tree limbs, etc.
- Watch for holes, ruts, or bumps. Uneven terrain could overturn the unit. Tall grass can hide obstacles.
- Use slow speed. Choose a slow speed so that you will not have to stop or change speed while on the slope.
- Use extra care with grass catchers or other attachments. These can change the stability of the unit.
- Keep all movement on the slopes slow and gradual. Do not make sudden changes in speed or direction.
- See your authorized dealer for recommendations of available weights to improve stability.

Do not:

- 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.
- Do not turn on slopes unless necessary, and then, turn slowly.
- 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.
- Do not mow on wet grass. Reduced footing or traction could cause sliding.
- Do not mow excessively steep slopes.
- Do not use grass catcher on steep slopes.

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.

- Keep children out of the mowing area and under the watchful care of another responsible adult.
- Be alert and turn unit off if children enter the area.
- Before and during reverse operation, look behind and down for small children.
- Never allow children to operate the unit.

- Use extra care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.


Emissions

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

Ignition System (Gasoline Models)

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

Service and Maintenance Safety



WARNING

Amputation and crushing hazard


Specific steps must be taken in order to perform service and maintenance procedures safely.

Read and follow all the applicable safety and instructional messages in this manual.

Always disengage the mower blades, set the parking brake, turn the engine OFF, remove the ignition key, and wait for all movement to stop prior to performing service and maintenance procedures.

Always disconnect the spark plug wire(s) and fasten it away from the plug before beginning any maintenance or service procedures on order to prevent accidental ignition.

Safe Handling of Gasoline



DANGER

Fire and explosion hazard

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

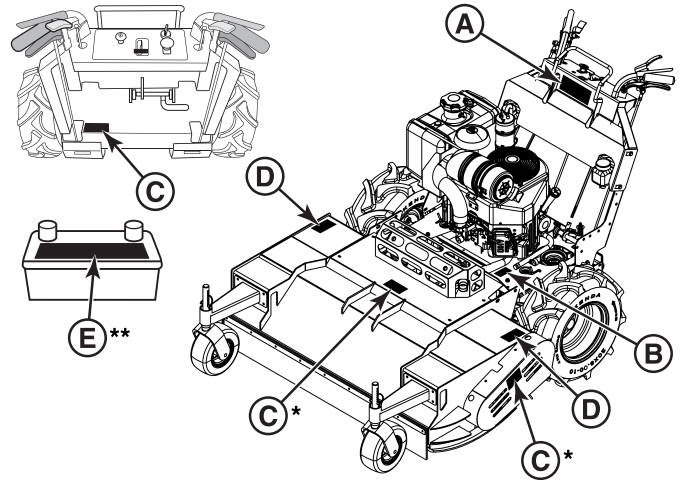
- Extinguish all cigarettes, cigars, pipes, and other sources of ignition.
- Use only approved gasoline containers.
- Never remove the gas cap or add fuel with the engine running. Allow the engine to cool before refueling.
- Never fuel the machine indoors.
- Never store the machine or fuel container where there is an open flame, spark, or pilot light such as near a water heater or other appliance.
- 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.

- 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.
- 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.
- If fuel is spilled on clothing, change clothing immediately.
- Never over-fill the fuel tank. Replace gas cap and tighten securely.
- Use extra care in handling gasoline and other fuels. They are flammable and vapors are explosive.
- 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.
- Replace all fuel tank caps and fuel container caps securely.

Maintenance and Storage

- Always observe safe refueling and fuel handling practices when refueling the unit after transportation or storage.
- Always follow the engine manual instructions for storage preparations before storing the unit for both short and long term periods.
- Always follow the engine manual instructions for proper start-up procedures when returning the unit to service.
- 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.
- Shut off fuel while storing or transporting. Do not store fuel near flames or drain indoors.
- Keep all hardware, especially blade attachment bolts, tight and keep all parts in good working condition. Replace all worn or damaged decals.
- Never tamper with safety devices. Check their proper operation regularly.
- 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.
- Clean grass and debris from cutting units, drives, mufflers, and engine to prevent fires. Clean up oil or fuel spillage.
- Let engine cool before storing and do not store near flame.
- Stop and inspect the equipment if you strike an object. Repair, if necessary, before restarting.
- Park machine on level ground. Never allow untrained personnel to service machine.
- Use jack stands to support components when required.
- Carefully release pressure from components with stored energy.

- Disconnect battery or remove spark plug wire before making any repairs. Disconnect the negative terminal first and the positive last. Reconnect positive first and negative last.
- Use care when checking blades. Wrap the blade(s) or wear gloves, and use caution when servicing them. Only replace blades. Never straighten or weld them.
- Keep hands and feet away from moving parts. If possible, do not make adjustments with the engine running.
- Charge batteries in an open well ventilated area, away from spark and flames. Unplug charger before connecting or disconnecting from battery. Wear protective clothes and use insulated tools.
- 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.
- Check brake operation frequently. Adjust and service as required.
- Use only factory authorized replacement parts when making repairs.
- Always comply with factory specifications on all settings and adjustments.
- Only authorized service locations should be utilized for major service and repair requirements.
- 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.
- 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.
- **WARNING:** Stored energy device. Improper release of springs can result in serious personal injury. Springs should be removed by an authorized technician.



A	Main Safety Decal	
B	Hot Surface Decal	
C	Hand in Belt Decal	
D	Rotating Parts Decal	
E	Battery Safety Decal	

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.








* Decals located under guards.





** Decal located on battery.

CE Safety Icons





Warning: Read Operator's Manual
- Read and understand the operator's manual before using this machine.


	Danger: Fire Hazard - Keep the unit free of grass, leaves and excess oil. Do not add fuel while engine is hot or running. Stop engine and allow to cool for at least 3 minutes prior to adding fuel. Do not add fuel indoors, in an enclosed trailer, garage or other enclosed areas. Clean up spilled fuel. Do not smoke while operating this machine.
	Danger: Thrown Objects - This machine is capable of thrown objects and debris. Keep bystanders away.
	Danger: Dismemberment - This mower deck can amputate limbs. Keep hands and feet away from blades.
	Danger: Carbon Monoxide Poisoning - Do not operate the engine in an unventilated area.
	Danger: Machine Rollover - Operating on steep slopes can cause sliding and loss of steering, control and rollover.
	Danger: Dismemberment - This machine can crush and cut. Keep hands away from belts and pulleys.
	Warning: Hot Surface - Avoid contact with engine and hot surfaces. Wait for unit to cool before touching.


	Warning: Fire Hazard - Keep children, open flames and sparks away from the battery, which could ignite explosive gases.
	Warning: Sulfuric acid can cause blindness or severe burns - Always wear safety goggles or a face shield when working on or near a battery.
	Warning: Batteries produce explosive gases - Read and understand the Operator's Manual before using this machine.
	Important: Do not discard a battery in the trash - Contact local authorities for disposal and/or recycling of batteries.

Safety Alert Symbol and Signal Words

The safety alert symbol  indicates a potential personal injury hazard. A signal word (DANGER, WARNING, or CAUTION) is used with the alert symbol to designate a degree or level of hazard seriousness. A safety symbol may be used to represent the type of hazard. The signal word NOTICE is used to address practices not related to personal injury.

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

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

 **CAUTION** indicates a hazard which, if not avoided, *could* result in minor or moderate injury.

NOTICE addresses practices not related to personal injury.

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
- Forward speed control lever is not in the NEUTRAL position.

Test 2 — Engine SHOULD crank if:

- PTO switch is NOT engaged, AND
- Parking brake is engaged, AND
- Forward speed control lever is in the NEUTRAL position.

Test 3 — Engine should SHUT OFF if:

- Operator releases the operator presence handles with the PTO engaged OR
- Operator releases the operator presence handles with the parking brake disengaged.

Test 4 — Blade Brake Check:

Rotor blades and rotor and gearbox drive belts should come to a complete stop within five (5) seconds after electric PTO switch is turned off (or operator releases the operator presence handles). If rotor and gearbox drive belts does not stop within five (5) seconds, see your dealer.

NOTE: Once the engine has stopped, PTO switch must be turned off, parking brake must be engaged, the forward speed control lever must be locked in the NEUTRAL position, and the operator must engage the operator presence handles in order to start the engine.

WARNING

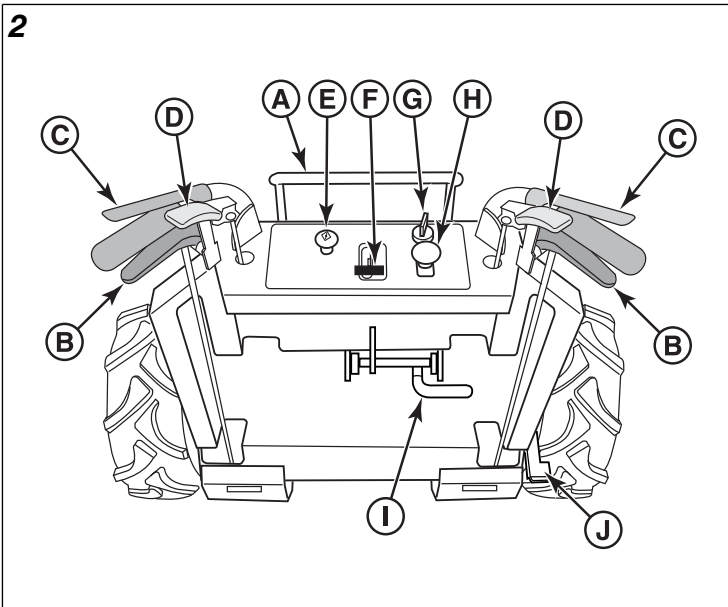
If the unit does not pass a safety test, do NOT operate it. See your authorized dealer. Under no circumstance should you attempt to defeat the purpose of the safety interlock system.

Features and Controls

Control Locations & 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.

Control Locations & Functions - Operator's Position



Callout	Control Name
A	Forward Speed Control Lever
B	Reverse Speed Control Levers
C	Engine Kill / Operator Presence Handles
D	Forward Speed Override Levers
E	Choke
F	Throttle Control
G	Ignition Switch
H	PTO (Power Take Off) Switch
I	Parking Brake
J	Neutral Return Pedal

Forward / Reverse Speed Control Levers: These levers control the ground speed of the mower.

Icon	Control Name
	Forward Speed Control Levers
	Reverse Speed Control Levers

The forward speed control lever controls the forward ground speed of both drive wheels.

The left reverse speed control lever controls the steering and reverse ground speed of the left drive wheel. The right reverse speed control lever controls the steering and reverse ground speed of the right drive wheel.

See the *Driving the Mower* section for proper steering instructions.

Engine Kill / Operator Presence Handles: These handles are a major factor in the safety interlock system of the mower. Both handles are tied together so depressing one handle depresses both. The operator must depress the handles in order to deactivate the engine kill system. Handles must be depressed to disengage the parking brake and engage the PTO switch.

Forward Speed Override Control Levers: The forward speed override levers were designed to provide increased traction and controllability for operation on slopes and side hills.

To increase the speed of the left drive tire press the Left Hand Forward Speed Override Lever down.

To increase the speed of the right drive tire press the Right Hand Forward Speed Override Lever down.

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 to knob DOWN to open the choke.

Throttle Control: The throttle controls engine speed. Move the throttle forward to increase engine speed and back to decrease engine speed. Always operate at FULL throttle.

Icon	Position
	Fast throttle speed.
	Slow throttle speed.



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

Icon	Name	Description
	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.

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.

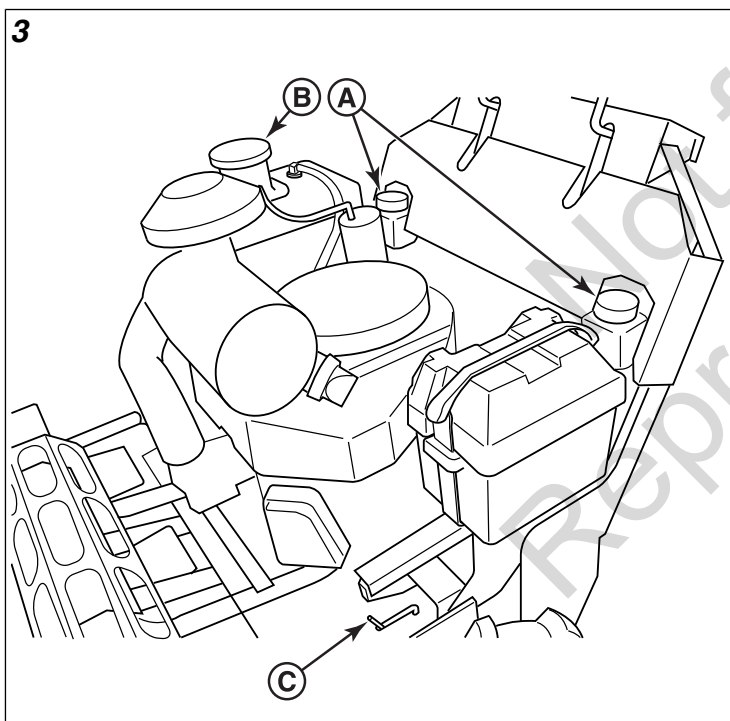
(P) Parking Brake: Pull the parking brake handle up to engage the parking brake. Push the parking brake handle down to disengage the parking brake. **NOTE:** To start the unit the parking brake must be engaged.

Icon	Name	Description
	Disengage	Releases the parking brake.
	Engage	Locks the parking brake.

Neutral Return Pedal: The neutral return pedal provides a hands-free return to neutral. The pedal is used in conjunction with the Reverse Speed Control Levers to properly stop the machine.

See the *Stopping the Mower* section for operating instructions of the neutral return pedal.

Control Locations & Functions - Left Side of Mower



Callout	Control Name
A	Transmission Oil Fill
B	Fuel Tank Cap
C	Transmission Release Levers

Transmission Oil Fill: Transmission oil is added through the transmission oil reservoirs. It also serves as extra holding capacity for oil as the transmissions heat up and the oil expands. See *Check Transmission Oil* for oil level check and fill procedures.

Fuel Tank Cap: To remove the cap, turn counterclockwise.

Transmission Release Valves: The transmission release levers deactivate the transaxle so that the unit can be pushed by hand. See *Pushing the Unit by Hand* for operational information.

Operation

Before First-Time Use

- 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.
- Operate in an open area without engaging the PTO to become accustomed to the unit.



WARNING **Read the operator's manual before attempting to operate the machine.**

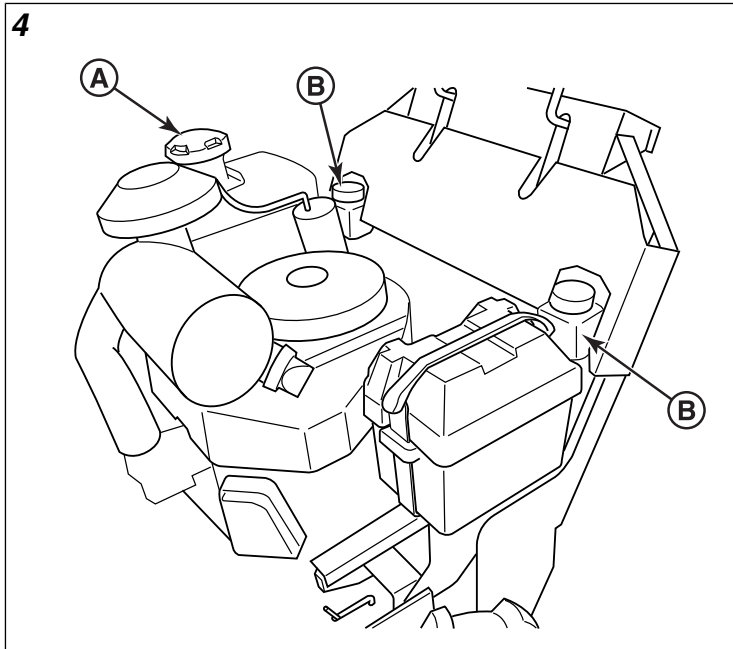
If you do not understand how a specific control functions, or have not yet thoroughly read the Features and Controls section, do so now.

Do not attempt to operate the mower without first becoming familiar with the location and function of all controls.



- WARNING**
- 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 and mower free of grass, leaves and excess grease. Do NOT stop or park unit 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 dipstick. See the engine Operator's Manual for, engine oil dipstick location, oil fill instructions and oil recommendations.
- Make sure all nuts, bolts, screws and pins are in place and tight.
- Fill the fuel tank (A, Figure 4) with fresh fuel. Refer to engine manual for fuel recommendations.
- Check the hydraulic oil tank (B) and make sure that the oil level is up to the FULL COLD mark.

Starting the Engine



WARNING

If you do not understand how a specific control functions, or have not yet thoroughly read the *Features & Controls* section, do so now.

Do NOT attempt to operate the tractor without first becoming familiar with the location and function of ALL controls.

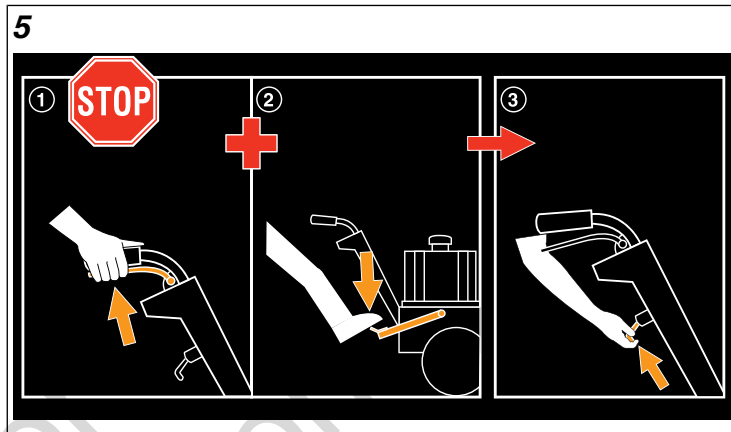
1. Engage the parking brake and make sure the PTO switch is disengaged and the forward speed control lever is in the NEUTRAL position.
2. Set the engine throttle control to FULL throttle position. Then fully close the choke by pulling the knob OUT fully. **NOTE: A warm engine may not require choking.**
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 to warm up. Warm up the engine by running it for at least a minute before engaging the PTO switch or driving the mower.

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 STOP. Use this method only in emergency situations. For normal engine shut down follow the procedure given in STOPPING THE MOWER

Stopping the Mower

1. Gently squeeze both reverse speed control levers (inset 1, Figure 5) evenly to stop the unit.



2. Once the unit is stopped, firmly depress the neutral return pedal (inset 2) to place the transmission in neutral.
3. Disengage the PTO by pushing down on the PTO switch.
4. Engage the parking brake (inset 3) by pulling the handle up until it locks into position.
5. Move the throttle control to mid-throttle position and turn the ignition key to OFF. Remove the key.

Driving the Mower

Before attempting to drive the mower make sure you have read the Features and Controls section and understand the location and function of the controls.

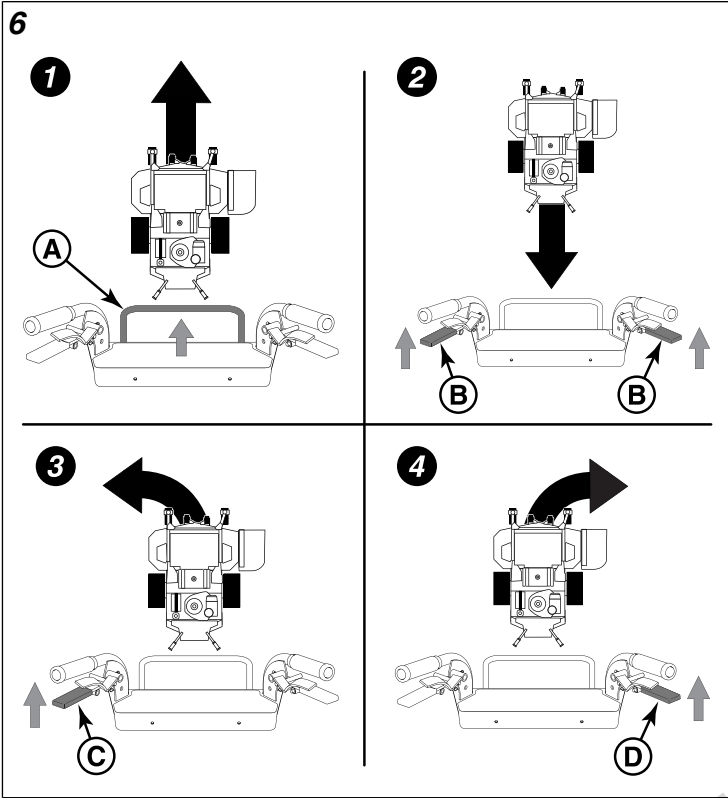
The hydrostatic transmission has an infinite number of speeds between full speed forward and reverse, with the faster speeds being achieved by moving the forward speed control lever and reverse speed control levers farthest in the direction of travel.

For normal use, the throttle should be kept fully open and the ground speed of the machine determined by the forward speed control lever. When transporting the machine or when loading or unloading from a truck or trailer, partial throttle should be used to slow the reaction time of the controls and reduce noise.

Practice maneuvering the machine at a slow engine speed on level ground with the PTO switch in the "OFF" position until you are familiar with the controls.

To Move Forward and Set Forward Speed

1. Disengage the parking brake.
2. Gently move the forward speed control lever (A, Figure 6, inset 1) forward until desired speed is achieved.



To Move Backward

1. Disengage the parking brake.
2. Gently squeeze both reverse speed control levers (B, inset 2) evenly, until desired speed is achieved.

To Slow or Stop Machine

1. Gently squeeze both reverse speed control levers evenly to slow the machine.
2. Continuing to squeeze the reverse speed control levers will stop the machine.
3. Once the machine is stopped, firmly depress the neutral return pedal to place the transmissions in neutral.
4. Engage the parking brake.

NOTE: Continuing to squeeze the reverse speed control levers after the machine is stopped, will cause the machine to move in reverse.

Turning the Machine

Note: Always reduce speed in a turn.

Turning Left:

Gently squeeze the left hand reverse speed control lever (C, inset 3). A sharp or gentle turn is determined by the amount of force applied to the steering control lever.

Turning Right:

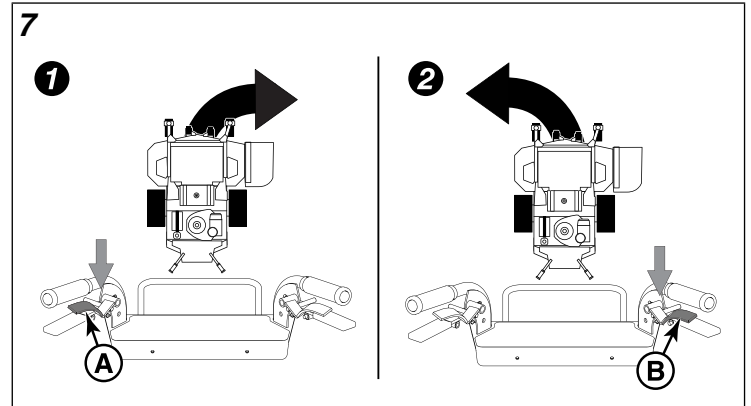
Gently squeeze the right hand reverse speed control lever (D, inset 4). A sharp or gentle turn is determined by the amount of force applied to the steering control lever.

Temporarily Increase Forward Speed

The forward override levers were designed to provide increased traction and controllability for operation on slopes and side hills.

To increase the forward speed to the left hand wheel:

Gently depress the left hand forward speed override lever (A, Figure 7, inset 1) to temporarily increase the speed to the left hand wheel.



To increase the forward speed to the right hand wheel:

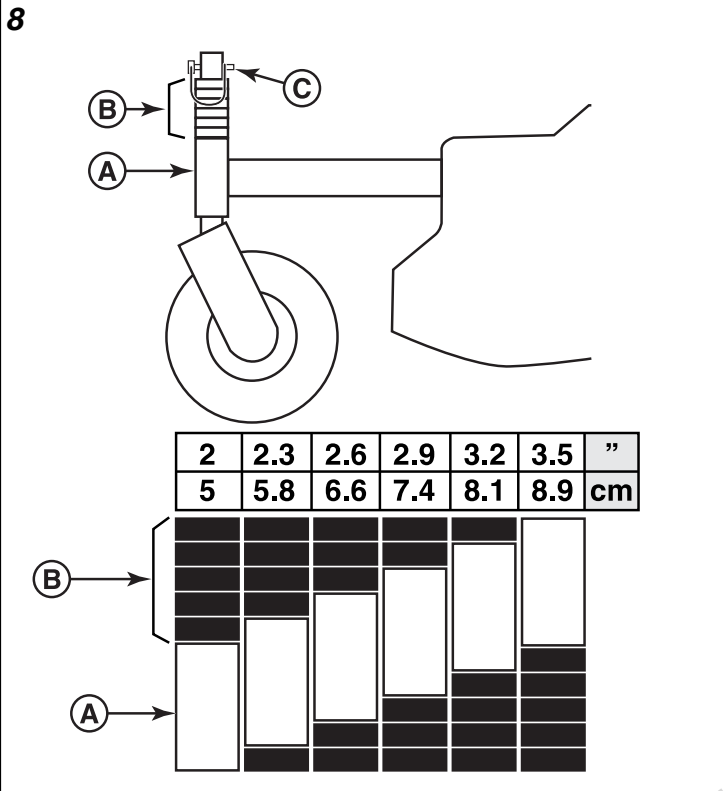
Gently depress the right hand forward speed override lever (B, inset 2) to temporarily increase the speed to the right hand wheel.

Increase forward movement speed:

Gently depress both forward speed override levers evenly to temporarily increase the forward speed of the machine.

Cutting Height Adjustment

The cutting height is adjustable between 2" and 3-1/2". The mowing height is determined by the number of caster spacers (A, Figure 8) below the caster arm (B).



1. Park the machine on a flat, level surface such as a concrete floor. Engage the parking brake, disengage the PTO, turn off the engine and remove the ignition keys
2. Use the Cutting Height Adjustment Chart to determine the number and placement of caster spacers necessary for the desired cutting height.

Cutting Height Adjustment	
Cutting Height	Number of Spacers Below Caster Arm
2" (5 cm)	0
2.3" (5.8 cm)	1
2.6" (6.6 cm)	2
2.9" (7.4 cm)	3
3.2" (8.1 cm)	4
3.5" (8.9 cm)	5

3. Have an assistant push down on the handle bars to raise the front end off of the ground.
4. Remove the pin with latch (C) from the caster axle shaft.
5. Position the correct amount of spacers for the desired cutting height below the caster arm and the rest above the caster arm.
6. Reinstall the pin with latch.
7. Repeat the process for the other side of the unit.

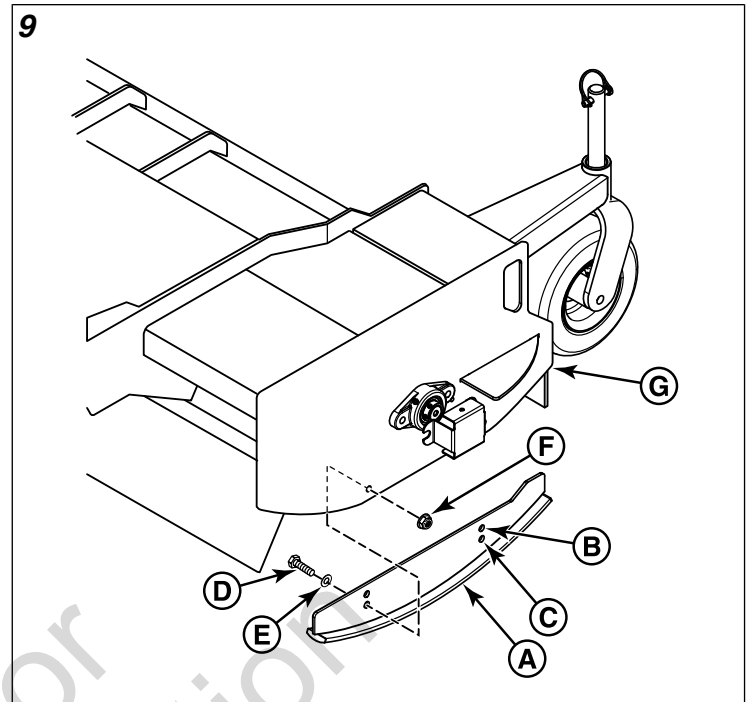
Skid Shoe Height Adjustment



WARNING

Do NOT operate the unit without the skid shoes in place.

There are two sets of holes in the skid shoes (A, Figure 9) that allow the operator to adjust the height of the skid shoes in the rotor housing to their preference.



The upper set of holes (B) can be used on smoother ground and while cutting shorter grass.

The lower set of holes (C) can be used on rougher ground and while cutting taller grass.

1. Park the machine on a flat, level surface such as a concrete floor. Disengage the PTO, engage the parking brake, turn off the ignition and remove the ignition key. Disconnect the spark plug wire(s).
2. Remove the two bolts (D), washers (E) and nuts (F) that secure the skid shoe to the rotor housing (G).
3. Reposition the skid plate to the other set of holes in the rotor housing and secure in place using the two bolts, washers and nuts.
4. Repeat process for the other side of the unit.

Mowing

Before mowing, set the cutting height as described in *Cutting Height Adjustment*.

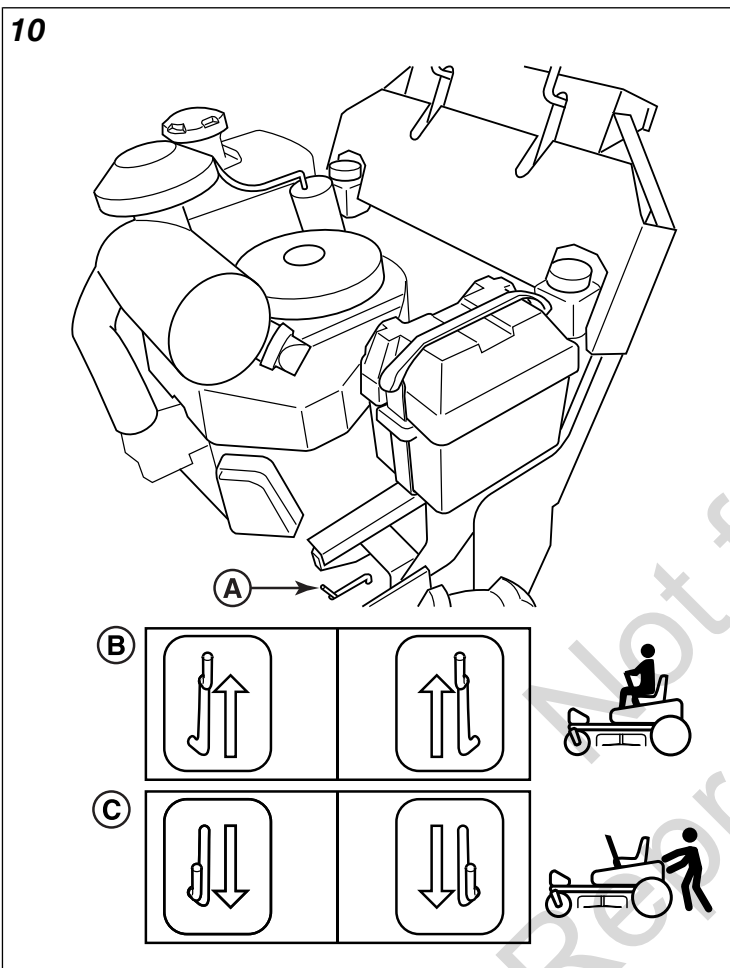
1. Engage the parking brake. Make sure that the PTO switch is disengaged and the forward speed control lever is in the neutral position.
2. Start the engine (see *Starting the Engine*).
3. Set the throttle to FULL.
4. Engage the PTO by pulling up the switch.
5. Begin mowing.
6. When finished, shut off the PTO by pushing the PTO switch down completely.
7. Stop the engine (see *Stopping the Engine*).

Pushing the Unit by Hand

NOTICE

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

1. Disengage the PTO, engage the parking brake, turn the ignition OFF, and remove the key.
2. Locate the transmission release levers (A, Figure 10) by the rear wheels of the unit.



3. To disengage the pumps (free-wheel position), pull both transmission release levers back and out (C) so they lock in the disengaged (free-wheel) position.
4. Disengage the parking brake. The unit can now be pushed by hand.
5. After moving the unit, re-engage the pumps (drive position) by pulling the transmission release levers rearward and inward (B) to release them from the disengaged position and then allow them to move to the engaged (drive) position.

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.

WARNING

Never store the unit, with gasoline in 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.

Handle gasoline carefully. It is highly flammable and careless use could result in serious fire damage to your person or property.

Drain fuel into an approved container outdoors away from open flame or sparks.

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.
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.

Maintenance Schedule

The following schedule should be followed for normal care of your unit. You will need to keep a record of your operating time.

UNIT MAINTENANCE	
Before each use	
Check safety interlock system.	
Check unit brakes.	
Check unit for loose hardware.	
Check hydraulic oil level.	
Check tire pressures.	
Every 25 Hours	
Clean debris from under rotor housing.	
Check rotor blades.	
Every 200 Hours	
Change hydraulic oil filter.*	

ENGINE MAINTENANCE	
Before each use	
Check engine oil level.	
Clean visible debris from engine compartment.	
Every 50 Hours	
Inspect / Clean spark arrester**.	
Every 100 Hours	
Check fuel filter.	

ENGINE MAINTENANCE

Refer to engine owner's manual

Service air filter.

Change engine oil and filter.

Check / Replace spark plugs.

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

**If equipped. Replace if damaged.

Maintenance Procedures

Service and Maintenance Safety



WARNING

Amputation and crushing hazard

Specific steps must be taken in order to perform service and maintenance procedures safely.

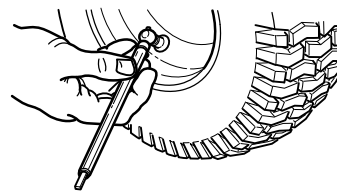
Read and follow all the applicable safety and instructional messages in this manual.

Always disengage the mower blades, set the parking brake, turn the engine OFF, remove the ignition key, and wait for all movement to stop prior to performing service and maintenance procedures.

Always disconnect the spark plug wire(s) and fasten it away from the plug before beginning any maintenance or service procedures on order to prevent accidental ignition.

Checking Tire Pressures

Tire pressure should be checked periodically, and maintained at the levels shown in the Specifications 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 and extend tire life.



Checking / Adding Fuel



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.

To add fuel:

1. Stop the engine and allow it to cool for at least 3 minutes.
2. Remove the fuel cap.
3. Fill the tank to 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.
4. Install and hand tighten the fuel cap.

Replacing the Fuel Filter



Fuel and its vapors are extremely flammable and explosive.

Fire or explosion can cause severe burns or death.

Do NOT remove the fuel filter when the 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.

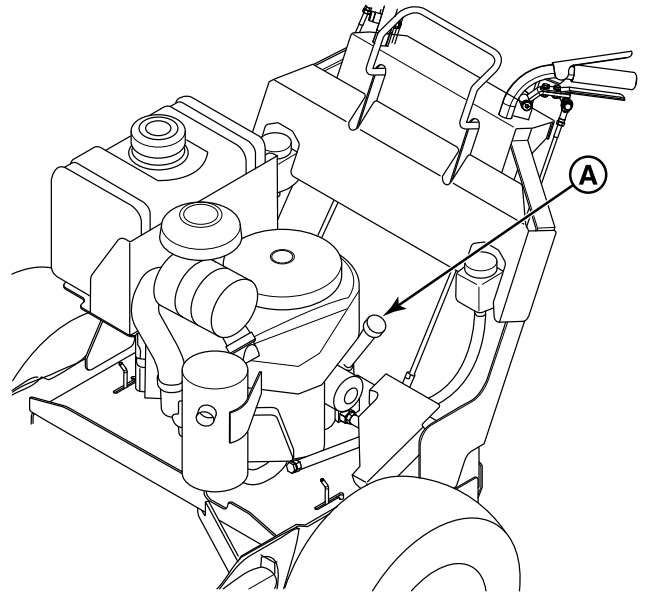
The fuel filter is located in the fuel line between fuel tank and carburetor, near the fuel pump. If filter is dirty or clogged, replace as follows:

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

Check Engine Oil Level

1. Use the dipstick (A, Figure 11) to check the engine oil level. If necessary add engine oil. Refer to the engine manufacturer's owner's manual for oil recommendations.

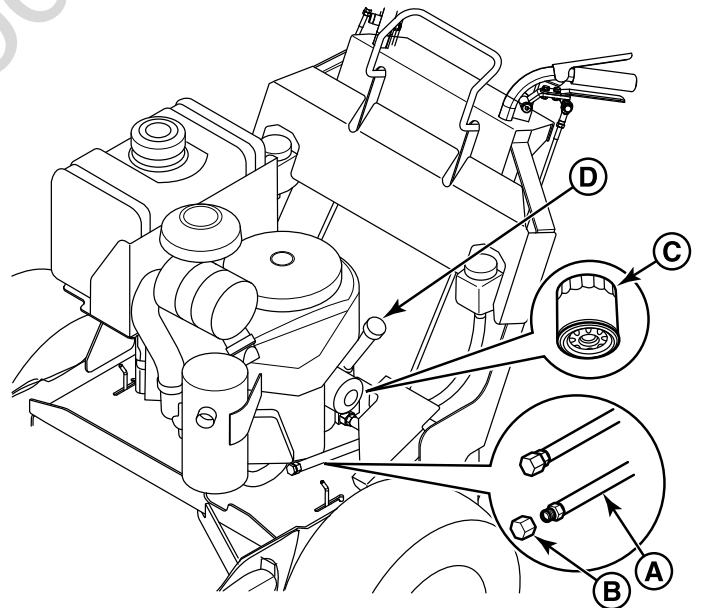
11



Change Engine 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. Route the oil drain hose (A, Figure 12) over the rear end of the engine deck.

12



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 and drain the engine oil into the pan.

4. After draining, replace the cap and wipe up any spilled oil. Reposition the oil drain hose so that it is facing towards the back of the machine.
5. Place an absorbent shop cloth under the engine oil filter (C). Remove the engine oil filter and replace with a new one
6. Remove the oil dipstick (D) and refill with oil. (Refer to the engine operator's manual for oil recommendations.)
7. Remove the shop cloth and wipe up any spilled oil.

Engine Maintenance


For engine maintenance schedules and procedures, please refer to the engine operator's manual.

Service Air Filter


Refer to the engine owner's manual for air filter service instructions.

Lubrication

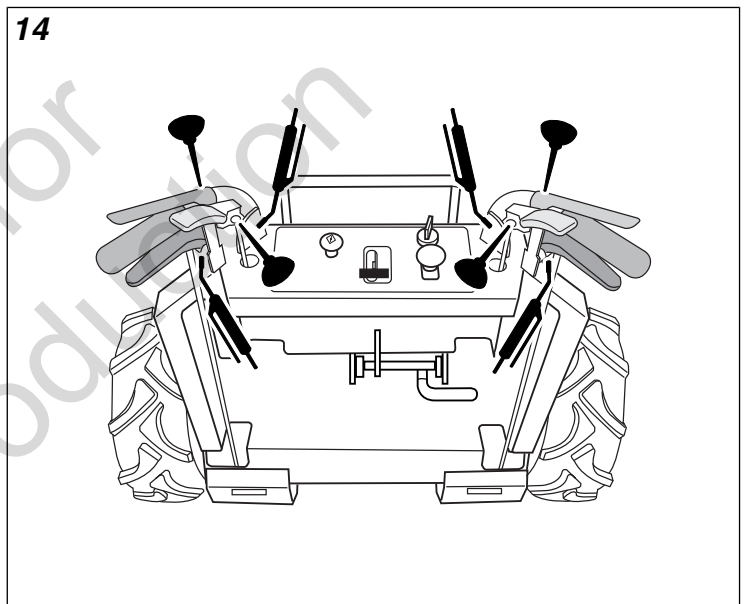
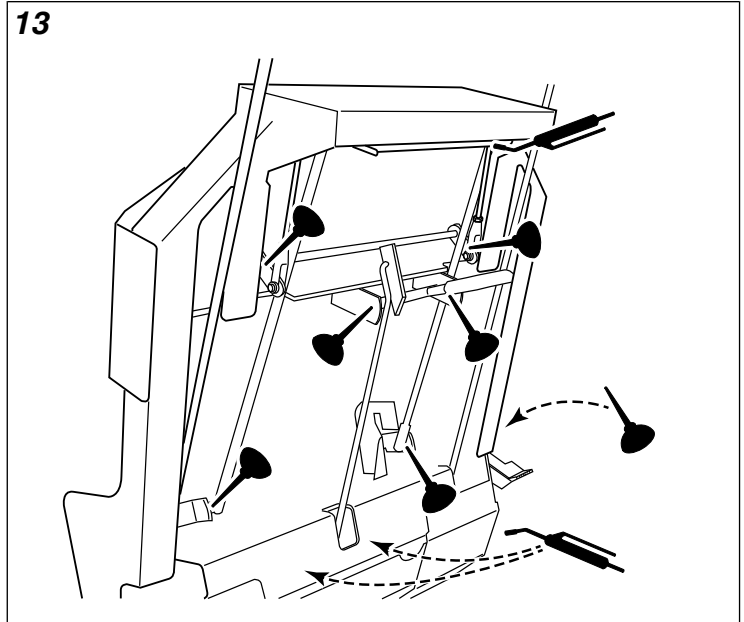
Lubricate the unit at the locations shown in Figures 13, 14 and 15 as well as the following lubrication points

Grease	
	front caster wheel axles & yokes
	reverse speed control lever pivots
	universal joints
	rotor bearings
	parking brake pivots

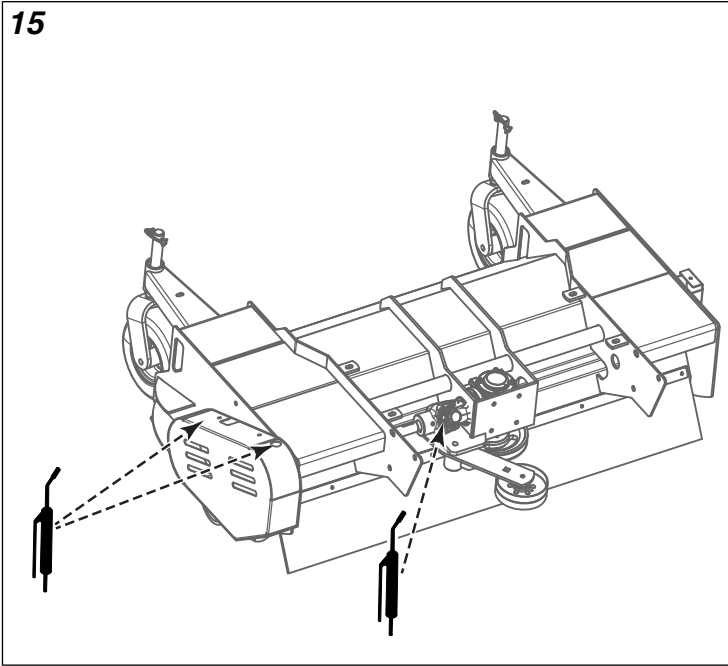
Not all greases are compatible. Red Grease (p/n 5022285) is recommended, automotive-type high-temperature, lithium grease may be used when this is not available.

Oil	
	control handle pivots
	neutral return pedal pivots
	control linkage rods
	parking brake handle pivots.

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

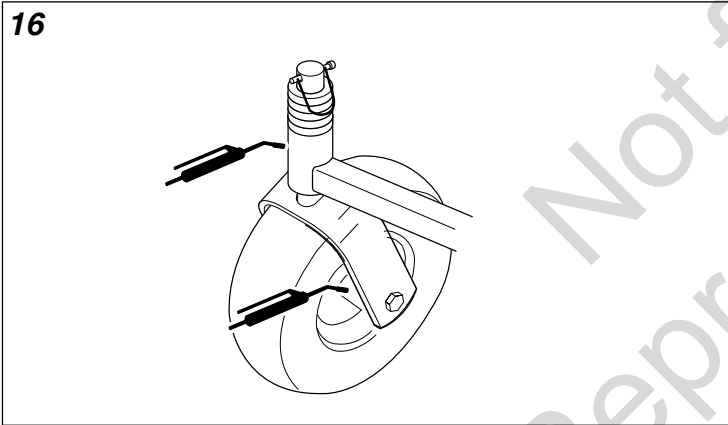


15



Lubricating the Front Casters
Interval: Daily

16



Rotor Blade Inspection / Replacement



DANGER

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

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

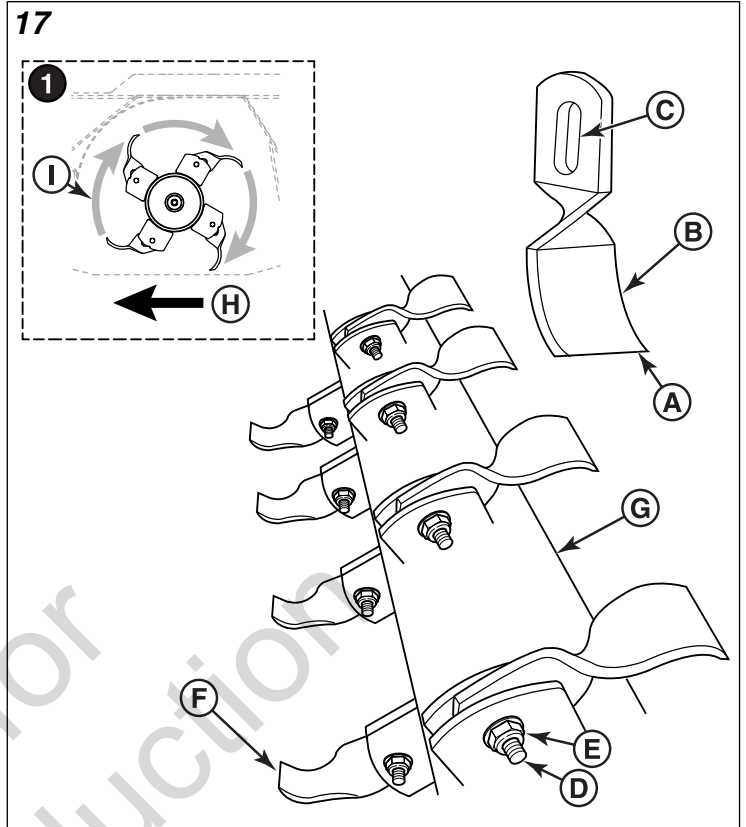
Interval: The rotor blades should be inspected daily.

To ensure a superior quality of cut, keep the rotor blades sharp.

Inspecting the Rotor Blade

- Examine the blade for excessive wear or damage, while paying specific attention to the cutting edge (A, Figure 17), curved area (B) and mounting slot (C). If the blade is excessively worn or damaged, replace the blade.

17



Replacing the Rotor Blade

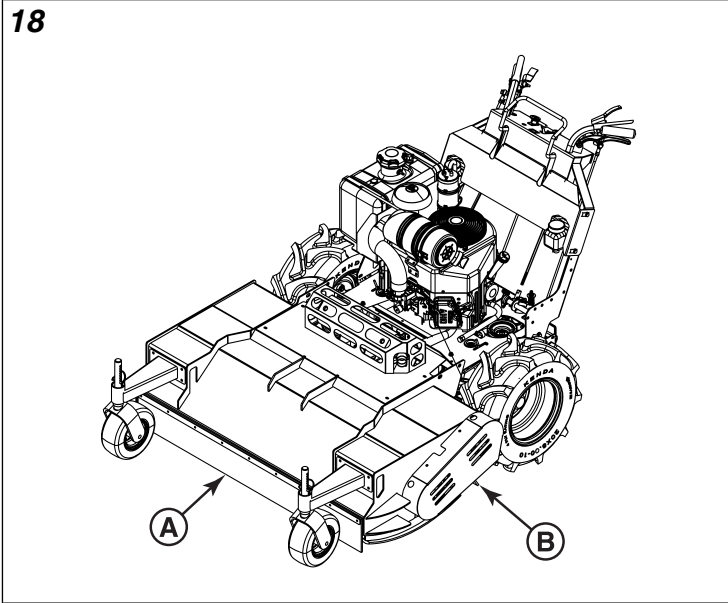
1. Park the machine on a flat, level surface such as a concrete floor. Disengage the PTO, engage the parking brake, turn off the ignition and remove the ignition key. Disconnect the spark plug wire(s).
2. Remove the bolt (D) and the nut (E) that secures the rotor blade (F) to the rotor (G).
3. Discard the old blade.
4. Install a new blade and secure in place using a new bolt and nut.
See Figure 17, inset 1 for proper blade orientation. The arrow labelled "H" indicates the front of the mower. The three curved arrows labelled "I" indicate the direction of rotation for the rotor shaft.

Rubber Discharge Guard Inspection

Interval: The rubber discharge guards should be inspected daily.

Inspect the rear rubber guard (A, Figure 18) and the front rubber guard (B) for wear or damage.

18



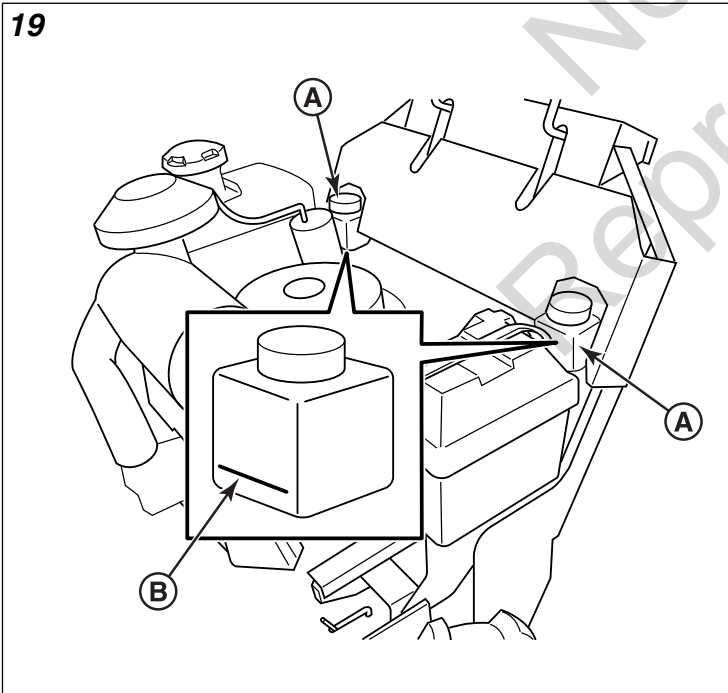
Damaged rubber guards must be replaced to prevent objects from being thrown into the operator's or bystander's area.

Check / Fill Transmission Oil

Oil Type: 20W-50 conventional detergent motor oil.

1. Check the oil level when the unit is cold. Locate the transmission oil reservoirs (A, Figure 19) located on the handle bar assembly. The oil should be up to the "FULL COLD" mark (B). If the oil is below this level, proceed to step 2.

19



2. Before removing the reservoir caps, make sure the area around the reservoir cap and fill neck of the reservoir is free of dust, dirt, or other debris. Remove the reservoir cap.
3. Add oil up to the "FULL COLD" mark (B).
4. Reinstall the reservoir caps.

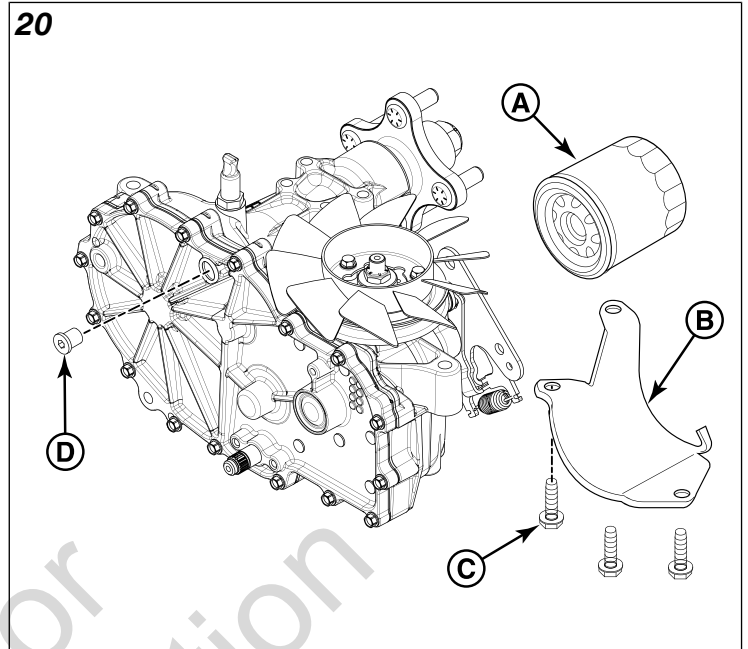
Transmission Oil Filter Change

Change Interval: Every 200 Hours

Replacement Filter Number: 5101026X1

1. Locate the transmission oil filters (A, Figure 20) underneath the rear of the machine on the transmissions.

20



2. Remove the three 1/4" filter guard screws (C) and the filter guard (B).
3. Clean the area around the filter base and remove the filter.
4. Apply a film of new oil to the gasket of the new replacement filter. After the oil has drained, thread the new filter onto the filter base until the gasket makes contact, then tighten 3/4 of a turn more.
5. Reinstall the filter guard with the three 1/4" filter guard screws
6. Using a hex bit swivel socket or a modified allen wrench remove the top port plug from the transmissions.
7. Remove the transmission reservoir cap and fill with oil until oil appears at the bottom of the transmission's top port (approximately 2 qts (1,89 L).
8. Reinstall the top port plug and tighten to 15 ft lbs (20,38 Nm).
9. Continue to add oil to the transmission oil reservoirs until the oil level reaches the "FULL COLD" mark. Reinstall the oil reservoir cap.
10. Repeat this process for the other side of the machine.
11. Run the unit for several minutes and check the transmission oil level.

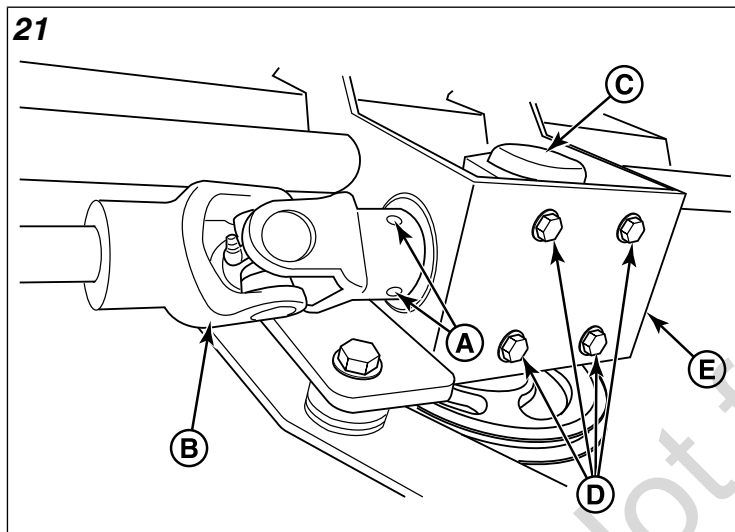
IMPORTANT NOTE: Use caution after changing the filter; air in the hydraulic system may affect the responsiveness of the ground speed control levers. Repeat step 11 until the air is out of the system.

Gearbox Maintenance

Prior to checking the level of the gearbox oil or changing the gearbox oil level, the gearbox must be removed from the machine.

Removing the Gearbox from the unit

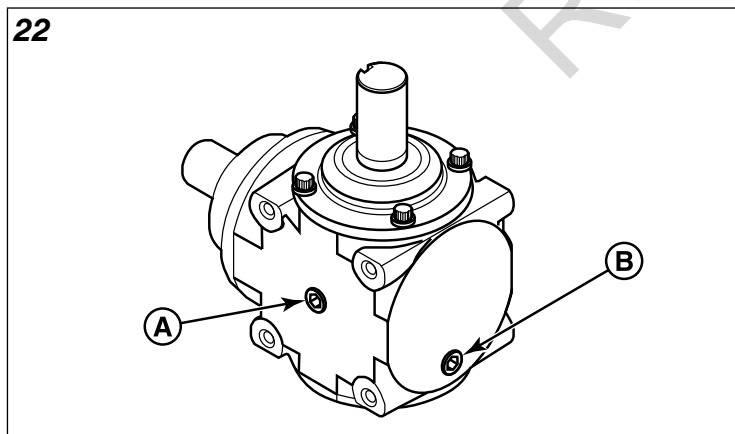
1. Park the machine on a flat, level surface such as a concrete floor. Disengage the PTO, engage the parking brake, turn off the engine.
2. Remove the gearbox drive belt. See *Gearbox Drive Belt Replacement*.
3. Loosen the two set screws (A, Figure 21) that secure the universal (B) to the shaft of the gearbox (C).



4. Remove the four bolts, washers and lockwashers (D) that secure the gearbox to the rotor housing (E).
5. Remove the gearbox from the universal and then from the unit.

Check the Gearbox Oil Level

1. Remove the oil fill plug (A, Figure 22) on the gearbox.



2. 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.

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. Remove the drain plug (B, Figure 22).
3. Place a small pan underneath the gearbox to catch the oil.
4. When all of the oil has drained from the gearbox, retract the actuator to raise the mower deck to the service position.
5. 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.
6. Reinstall the drain plug.

Reinstalling the Gearbox into the Unit

1. Position the gearbox into the unit and place the universal on the gearbox shaft.
2. Using the four bolts, washers and lockwashers (D, Figure 21), secure the gearbox to the rotor housing (E).
3. Correctly position the universal on the gearbox shaft and secure in place with the two set screws (A).
4. Re-install the gearbox drive belt. See *Gearbox Drive Belt Replacement*.

Neutral Adjustment & Tracking Adjustment

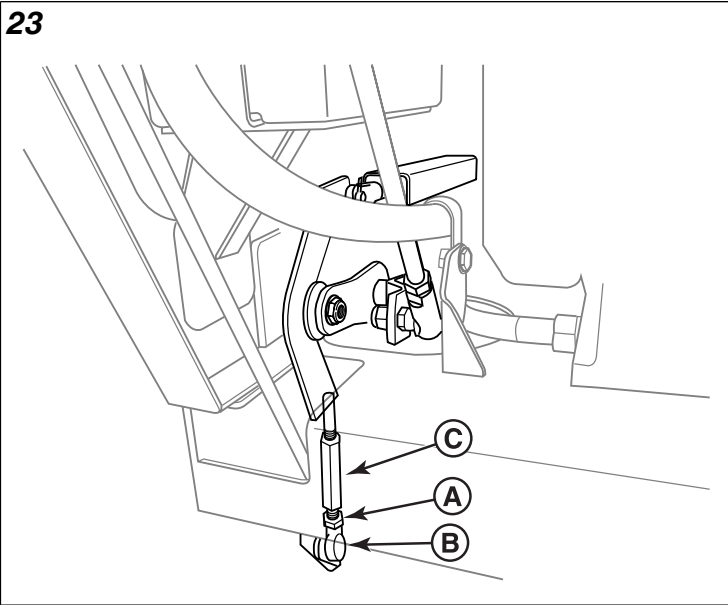
If the unit "creeps" while the forward speed control lever is in the neutral position, then it may be necessary to adjust the adjustment linkage rods.

The illustration depicts the left side of the machine.

Neutral Adjustment

1. Park the machine on a flat, level surface such as a concrete floor, away from bystanders and preferably facing a wall. Disengage the PTO, engage the parking brake, turn off the ignition and remove the ignition key.
2. Chock the front caster wheels. Raise the drive wheels off the ground and secure the machine with jackstands.
3. Start the engine and adjust the throttle control to the SLOW position. See *Starting the Engine* section for proper starting instructions.
4. Disengage the parking brake.
5. Loosen the jam nut (A, Figure 23) that is tightened against the ball joint (B).

23



6. Slowly turn the adjustment linkage rod (C) **clockwise** until the drive tire begins to rotate backwards.
7. Slowly turn the adjustment linkage rod **counter-clockwise** until the drive tire begins to rotate forward.
8. Set the adjustment halfway in between where the forward and backwards rotations begin.
9. Re-tighten the adjustment nut.
10. Perform this adjustment for the other side of the machine.
11. Adjust the throttle control to FULL (highest setting). Cycle the forward speed control lever and the neutral return pedal several times to insure an accurate adjustment has been made. If the unit still creeps, perform the adjustment procedure again. If the unit does not creep, no further neutral adjustments are necessary.

Tracking Adjustment

Before making a tracking adjustment, be sure to check the following:

- Drive tires are properly inflated.
- Caster tires are greased and turn freely.
- All controls are free from damage and operate freely.
- Machine is at full operating temperature.
- Make sure the machine is in neutral when the foot pedal is depressed. If not, adjust neutral as described above.

If machine veers to the LEFT:

1. Loosen the adjustment nut.
2. Turn the LEFT adjustment linkage rod 1/8 - 1/4 turn **counter-clockwise**.
3. Turn the RIGHT adjustment linkage rod 1/8 - 1/4 turn **clockwise**.
4. Re-tighten the jam nut.
5. Drive machine on a flat, level surface to test and repeat steps 1 - 4 as necessary.

If machine veers to the RIGHT:

1. Loosen the adjustment nut.
2. Turn the RIGHT adjustment linkage rod 1/8 - 1/4 turn **counter-clockwise**.
3. Turn the LEFT adjustment linkage rod 1/8 - 1/4 turn **clockwise**.
4. Re-tighten the jam nut.
5. Drive machine on a flat, level surface to test and repeat steps 1 - 4 as necessary.

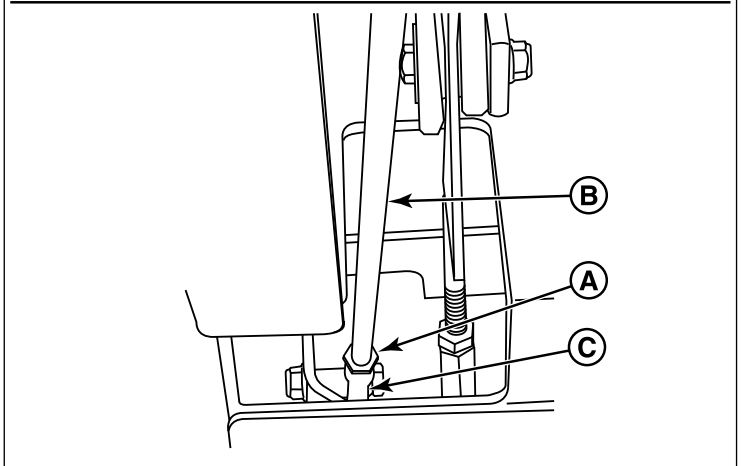
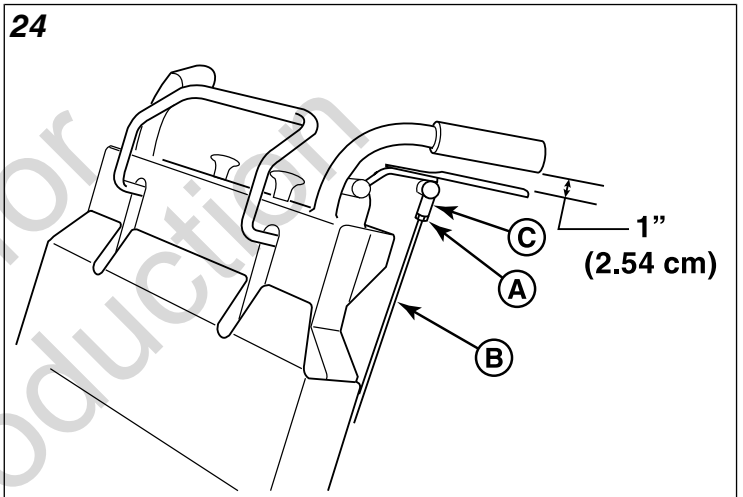
Handle Placement Adjustment

There should be approximately 1" (2.54 cm) of clearance in between the handle bars and the reverse speed control lever when the forward speed control lever is in the neutral position.

To Adjust:

1. Loosen the jam nuts (A, Figure 24) that are located on top and bottom of the reversing linkage rods (B).

24



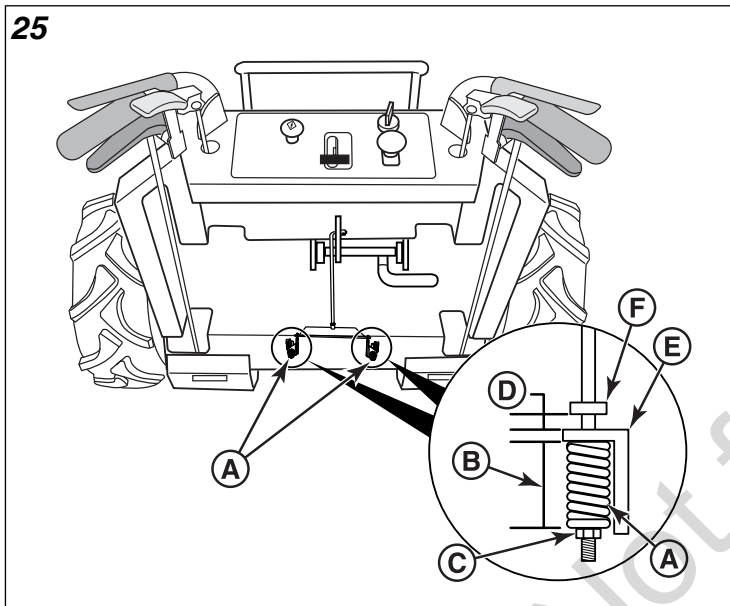
The illustration depicts the left side of the unit.

2. Adjust the linkage rod:
 - To increase the amount of clearance between the handle bars and the reverse speed control levers, turn the linkage rod (C) **clockwise**.
 - To decrease the amount of clearance between the handle bars and the reverse speed control levers, turn the linkage rod **counter-clockwise**.

- Once the measurement of 1" (2.54 cm) is achieved, tighten the jam nuts against the linkage rod ball joints.
- Repeat the process for the other side of the unit. **Both reverse speed control levers should be adjusted equally.**

Parking Brake Adjustment

- Disengage the PTO, stop the engine, remove the ignition key, and engage the parking brake.
- Locate the brake springs (A, Figure 25) underneath the rear of the machine.



Callout	Description
A	Brake Spring
B	First Measurement - 2-1/2" (6,35 cm)
C	Lock Nut
D	Second Measurement - 1/8" (0,32 cm)
E	Brake Pivot Link
F	Set Collar

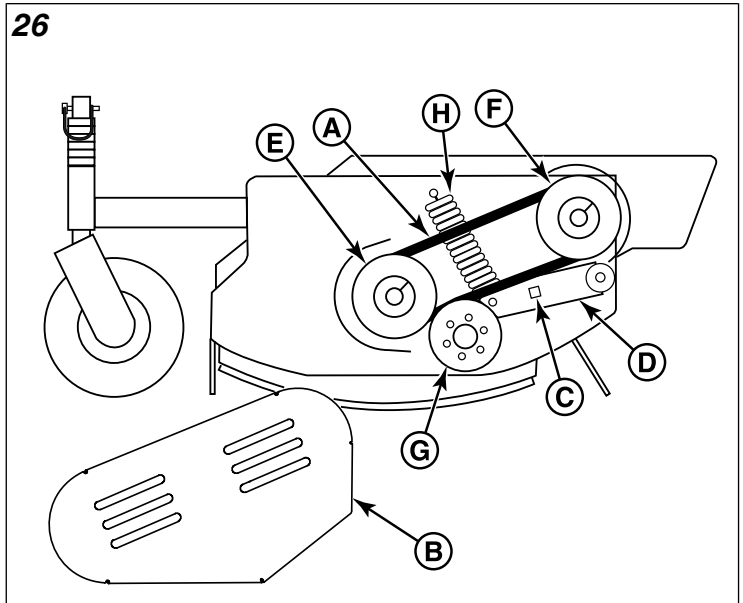
- With the parking brake engaged, measure the compressed spring length of the brake spring (B). The spring should be 2-1/2" (6,35 cm) when compressed. If not, position the lock nut (C) until the measurement equals 2-1/2" (6,35 cm).
- Measure the distance (D) between the back of the brake pivot link (E) and the front edge of the set collar (F). The measurement should be 1/8" (0,32 cm). If not, position the set collar until the measurement equals 1/8" (0,32 cm).

If this does not correct the braking problem, see your authorized dealer.

Rotor Drive Belt Replacement

Visually inspect the rotor drive belt (A, Figure 26) for dirt, wear, cracks and signs of overheating. If the belt is excessively worn or shows any signs of damage replace the belt.

26



NOTICE

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

- Park the machine on a flat, level surface such as a concrete floor. Disengage the PTO, engage the parking brake, turn off the ignition and remove the ignition key. Disconnect the spark plug wire(s).
- Remove the rotor drive belt guard (B) from the left side of the rotor housing to gain access to the rotor drive belt.



WARNING

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.

- Using a breaker bar, place the square end in the square hole (C) located in the idler arm (D). Carefully rotate the idler arm **counter-clockwise**, which will relieve the tension on the belt exerted from the idler arm.
- Slide the rotor drive belt over the edge of the rotor drive pulley (E). Carefully release the tension on the idler arm.
- Remove the old belt and replace with a new one. Make sure the V-side of the belt runs in the pulley grooves
- Install the rotor drive belt on the gearbox-driven pulley (F). Carefully rotate the breaker bar **counter-clockwise** and install the belt on the rotor drive pulley. Carefully release the tension on the 3/4" combination wrench. The back-side of the belt should contact the face of the idler arm pulley (G).

Rotor Drive Belt Tensioning Spring

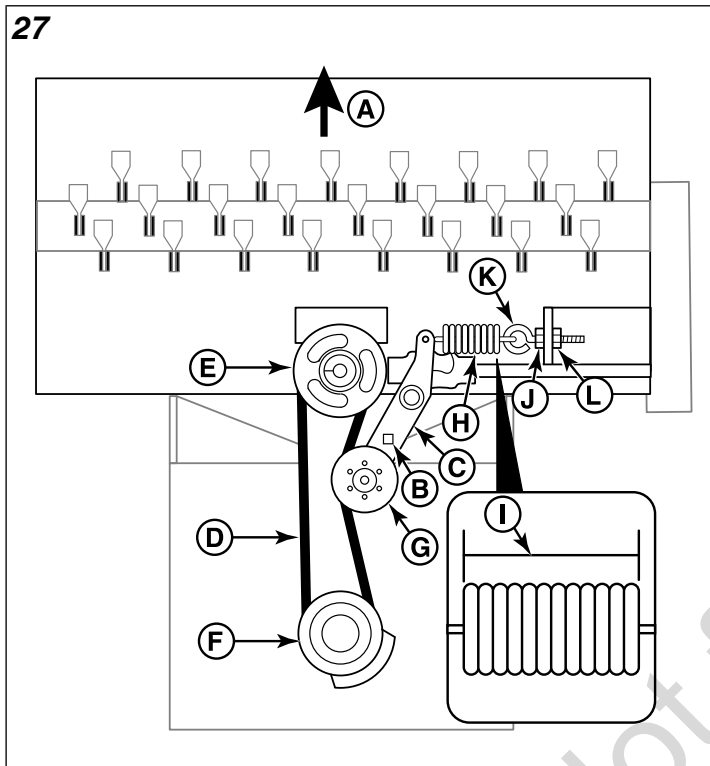
This unit is equipped with a drive belt tensioner spring (H) that connects to a fixed fastener. If you have replaced the rotor drive belt and the belt slips or has inadequate tension, inspect the belt tension spring to see if it has become worn or stretched. Replace if necessary.

Gearbox Drive Belt Replacement

NOTICE

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

The illustration depicts the bottom side of the unit and the arrow (A, Figure 27) indicates the front of 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. Remove the top rotor housing and muffler guard assembly.

WARNING

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 breaker bar, place the square end in the square hole (B) located in the idler arm (C). Carefully rotate the idler arm **counter-clockwise**, which will relieve the tension on the belt exerted from the idler arm.
4. Slide the gearbox drive belt (D) over the edge of the gearbox drive pulley (E). Carefully release the tension on the idler arm.
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 gearbox drive belt on the PTO clutch pulley (F). Carefully rotate the breaker bar **counter-clockwise** and install the belt on the gearbox drive pulley. Carefully release the tension on the breaker bar. The back-side of the belt should contact the face of the idler arm pulley (G).

Gearbox Drive Belt Tensioning Spring

This unit is equipped with an adjustable belt tensioning spring (H). Checking the length of the spring will verify the correct amount of tension is applied to the belt.

1. Measure the coil-to-coil length of the spring (I). The spring measurement should equal 6" (15.24 cm). If it does not, adjust the belt tensioner spring length. If the measurement equals 6" (15.24 cm), no adjustment is necessary. If the measurement does not equal 6" (15.24 cm), the belt tensioner spring length must be adjusted.

Adjusting the Gearbox Belt Tensioning Spring Length

1. Loosen the jam nut (J) on the eyebolt (K).
2. Turn the adjustment nut (L) until a measurement of 6" (15.24 cm) is achieved.
3. Retighten the jam nut.

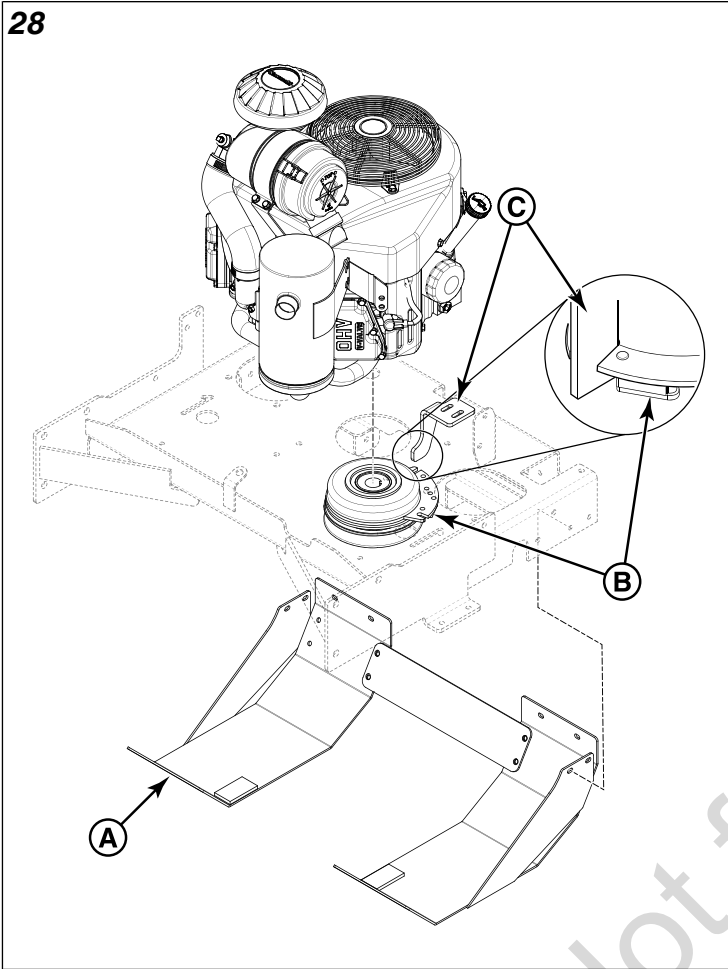
Transmission Drive Belt Replacement

NOTICE

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

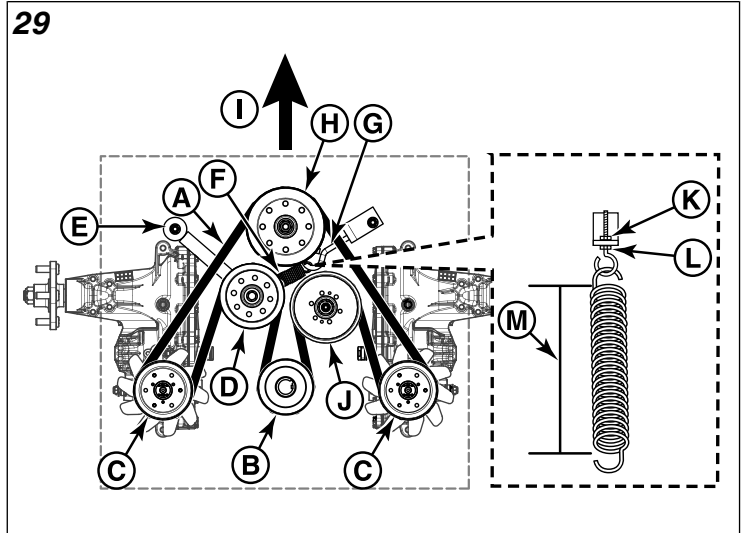
1. Park the unit on a smooth, level surface such as a concrete floor. Disengage the PTO, engage the parking brake, turn off the engine and remove the ignition key.
2. Loosen and remove the hardware that secures the skid plate assembly (A, Figure 28) to the engine deck. Remove the skid plate assembly from the engine deck.

28



3. Remove the PTO drive belt (see *Mower Belt Replacement* for removal instructions.)
4. Cut the wire tie that secures the PTO clutch wire harness to the engine deck frame.
5. Unplug the PTO clutch wire harness from the PTO clutch (B).
6. Loosen and remove the hardware that secures the PTO clutch mounting tab (C) to the engine deck. Remove the PTO clutch mounting tab.
7. Loosen the nuts on the spring anchor eyebolt (G, Figure 29) to release the majority of the belt tension. Use caution and remove the nut to completely release the tension.

29



Callout	Description
A	Transmission Drive Belt
B	Crankshaft Pulley
C	Transmission Pulleys
D	Idler Pulley
E	Idler Arm
F	Spring
G	Spring Anchor Eyebolt
H	Stationary Idler Pulley
I	Arrow Indicating the Front of the Machine

8. Remove the old belt and replace it with the new one. Make sure that the V-side of the belt runs in the grooves of the crankshaft pulley and transmission pulleys (B & C).
9. Reinstall the spring anchor eyebolt (G) into the anchor tab and loosely fasten the nut. Adjust the anchor eyebolt until the coil-to-coil length of the transmission drive belt spring measures 4-7/8" (12.4 cm). Tighten the nut.
10. Using the hardware that was previously removed reinstall the clutch anchor to the engine deck.

NOTE: Make sure that the slot in the PTO clutch lines up with the PTO clutch mounting tab (C, Figure 28) underneath the engine deck.

11. Reconnect the PTO clutch wire harness to the PTO clutch.
12. Using a new wire tie secure the PTO clutch wire harness to the frame and away from moving components.
13. Reinstall the PTO drive belt.
14. Using the hardware that was previously removed reinstall the skid plates to the engine deck.

Transmission Drive Belt Tensioning Spring

This unit is equipped with an adjustable belt tensioner spring (F, Figure 29). Checking the length of the spring will verify that the correct amount of tension is applied to the belt.

1. Measure the coil-to-coil length (M) of the transmission drive belt idler spring. The measurement should equal 4-7/8" (12.4 cm).

Adjusting the Transmission Drive Belt Tensioning Spring Length

1. Loosen the jam nut (L, Figure 29) on the spring anchor eyebolt.
2. Turn the locking nut (K) until the coil-to-coil length of the transmission drive belt idler spring measures 4-7/8" (12.4 cm).
3. Tighten the Jam nut.

Battery Maintenance

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



WARNING

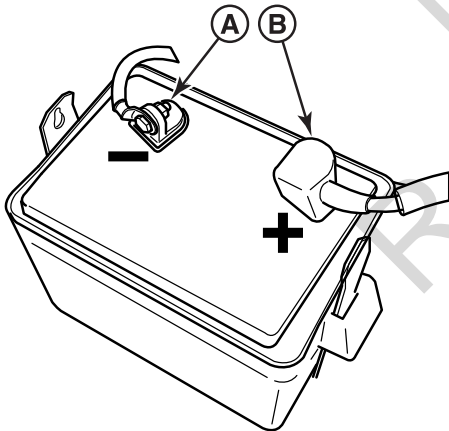
Keep open flames and sparks away from the battery.

- Be careful when handling the battery.
- Avoid spilling electrolyte.
- Keep flames and sparks away from the battery.
- 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.

Cleaning the Battery and Cables

1. Remove the rubber strap and battery box cover.
2. Disconnect the cables from the battery, negative [-] cable first (A, Figure 30).

30



3. Clean the battery terminals and cable ends with a wire brush until shiny.
4. Reinstall the battery and reattach the battery cables, positive [+] cable first (B).
5. Coat the cable ends and the battery terminals with petroleum jelly or non-conducting grease.
6. Reinstall the battery box cover and rubber strap.

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 not 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

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

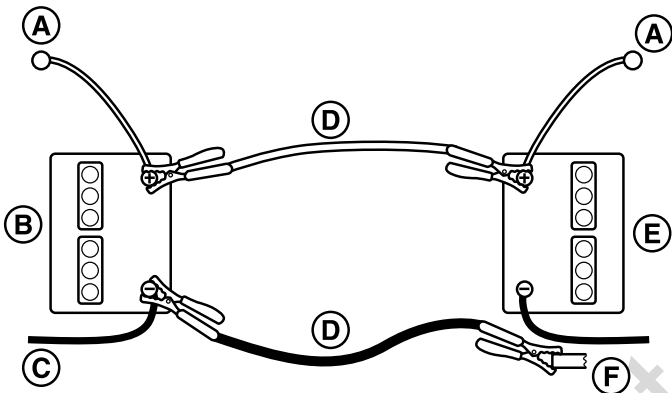
Jump starting is not recommended. However, if it must be done, follow these directions. Both booster and dis-charged batteries should be treated carefully when using jumper cables. Follow the steps below **EXACTLY**, being careful not to cause sparks. Refer to Figure 31.

WARNING

For your personal safety, use extreme care 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.

To avoid engine damage, do not disconnect battery while engine is running. Be sure terminal connections are tight before starting.

31



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.

- Both batteries must be of the same voltage.
- 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.
- 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.
- Connect positive (+) cable to positive post of discharged battery (wired to starter or solenoid).
- Connect the other end of same cable to same post marked positive (+) on booster battery.
- Connect the second cable negative (-) to other post of booster battery.
- Make final connection on engine block of stalled vehicle away from battery. Do not lean over batteries.

- 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.
- If the vehicle does not start after cranking for thirty seconds, STOP PROCEDURE. More than thirty seconds seldom starts the engine unless some mechanical adjustment is made.
- 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.
- Remove the other cable by disconnecting at the discharged battery first and then disconnect the opposite end from the booster battery.
- Discard the damp cloths that were placed over the battery vent caps.

WARNING

Any procedure other than the preceding could result in:

- personal injury caused by electrolyte squirting out the battery vents,
- personal injury or property damage due to battery explosion,
- 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.

Troubleshooting

Troubleshooting Charts

Troubleshooting the Power Head		
Problem	Cause	Remedy
Engine will not turnover or start	Parking brake not engaged.	Engage parking brake.
	PTO (electric clutch) switch in ON position.	Place in OFF position.
	Out of fuel.	If engine is hot, allow it to cool, then refill the fuel tank.
	Engine flooded.	Move choke control to closed position.
	Fuse blown.	Replace fuse.
	Battery terminals require cleaning.	Clean the battery terminals.
	Battery discharged or dead.	Recharge or replace.
	Wiring loose or broken.	Visually check wiring & replace broken or frayed wires. Tighten loose connections.
	Solenoid or starter motor faulty.	See authorized dealer.
	Safety interlock switch faulty	Replace as needed. See authorized service dealer.
	Spark plug(s) faulty, fouled or incorrectly gapped.	Clean and gap or replace. See engine manual.
	Water in fuel.	Drain fuel and replace with fresh fuel.
	Gas is old or stale.	Drain fuel and replace with fresh fuel.
Engine starts hard or runs poorly	Fuel mixture too rich.	Clean air filter. Check choke adjustment.
	Spark plug(s) faulty, fouled or incorrectly gapped.	Clean and gap or replace. See engine manual.
Engine knocks	Low oil level.	Check / Add oil as required.
	Using wrong grade oil.	See engine manual.
Excessive oil consumption	Engine running too hot.	Clean engine fins, blower screen and air cleaner.
	Using wrong weight oil.	See engine manual.
	Too much oil in crankcase.	Drain excess oil
Engine exhaust is black	Dirty air filter.	Replace air filter. See engine manual.
	Engine choke control is in closed position.	Move choke control to open position.
Engine runs but mower will not drive	Transmission release lever(s) in "disengaged" position.	Move transmission release lever(s) in "engaged" position.
	Belt is broken.	See Transmission Drive Belt Replacement.
	Drive belt slips.	See problem and cause below.
	Brake is not fully released.	See authorized service dealer.

Troubleshooting the Power Head		
Unit drive belt slips	Pulleys or belt greasy or oily.	Clean as required.
	Tension too loose	Adjust spring tension. See Transmission Drive Belt Replacement.
	Belt stretched or worn	Replace belt.
Brake will not hold	Brake is incorrectly adjusted.	See Parking Brake Adjustment.
Unit steers or handles poorly	Steering linkage is loose.	Check and tighten any loose connections.
	Improper tire inflation	See Checking Tire Pressures

Troubleshooting the Rotor		
Problem	Cause	Remedy
Engine stalls easily with rotor engaged	Engine speed too slow.	Set to full throttle.
	Ground speed too fast.	Decrease ground speed.
	Cutting height set too low.	Increase the cutting height.
Cut is uneven	Rotor blades are bent, missing or broken.	Replace with new rotor blades.
	Improper tire inflation	See Checking Tire Pressures
Excessive rotor housing vibration	Rotor is out of balance.	See authorized service dealer.
	Rotor blades are bent, missing or broken.	Replace with new rotor blades.
	Belt installed incorrectly.	Reinstall belt correctly.
Excessive belt wear or breakage	Bent or rough pulleys.	Repair or replace.
	Using incorrect belt.	Replace with correct belt.
	Incorrect belt tension.	<i>Fixed Belt Tensioners:</i> Replace spring if worn; <i>Adjustable Belt Tensioners:</i> Adjust to correct tension.
Drive belt slips or fails to drive	Incorrect belt tension.	<i>Fixed Belt Tensioners:</i> Replace spring if worn; <i>Adjustable Belt Tensioners:</i> Adjust to correct tension.
	Drive belt is broken.	Replace with new belt.
Rotor does not engage	Electrical wiring damage.	Locate & repair damaged wire.
	Battery voltage too low.	Recharge battery and check alternator. See Battery Service.

Specifications

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

ENGINE

Fits model 5900520

23.5 Gross HP† Kawasaki	
Make	Kawasaki

23.5 Gross HP† Kawasaki

Model	FX730V-DS00-S
Displacement	44.3 Cu. In (726 cc)
Electrical System	12 volt, 15 amp charging coil; Battery: 340 cca
Oil Capacity	2.2 US qt. (2.1 L) w/ filter

†**Power Ratings:** All power levels are stated gross horsepower per SAE J2723 as rated by Kawasaki and tested per the SAE J1995 test standard. The gross power curves and more information can be viewed at www.kawasaki-criticalpower.com.

CHASSIS

Fuel Tank Capacity	5 gallons (18.73 L)
Rear Wheels	
Tire Size	20.00 X 8.00 - 10
Inflation Pressure	15 psi (1.03 bar)
Front Wheels	
Tire Size	9.00 X 3.50 - 4
Inflation Pressure	N/A (Flat Free)

TRANSMISSIONS

LH	ZJ-GMFE-3B5B-1RLX (5102809)
RH	ZJ-KMFE-3C5C-1RLX (5102810)
Type	ZT3100
Hydraulic Fluid	SAE 20W-50 motor oil
Speeds	
Forward	0-7 MPH (0-11.27 km/h)
Reverse	0-3 MPH (0-4.83 km/h)

DIMENSIONS

Overall Length	80" (203 cm)
Overall Width	55" (140 cm)
Height	41" (104 cm)
Weight (aprox.)	811 lbs (368 kg)

Not for
Reproduction

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. 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, or by calling 1300 274 447, or by emailing or writing to 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.

California, U.S. EPA, and Briggs & Stratton Corporation Emissions Control Warranty Statement September 2012 Your Warranty Rights And Obligations

The California Air Resources Board, U.S. EPA, and Briggs & Stratton (B&S) are pleased to explain the emissions control system warranty on your Model Year 2012-2013 engine/equipment. In California, new small off-road engines and large spark ignited engines less than or equal to 1.0 liter must be designed, built, and equipped to meet the State's stringent anti-smog standards. B&S must warrant the emissions control system on your engine/equipment for the periods of time listed below provided there has been no abuse, neglect, or improper maintenance of your engine or equipment.

Your emissions control system may include parts such as the carburetor or fuel injection system, fuel tank, ignition system, and catalytic converter. Also included may be hoses, belts, connectors, sensors, and other emissions-related assemblies.

Where a warrantable condition exists, B&S will repair your engine/equipment at no cost to you including diagnosis, parts, and labor.

Manufacturer's Warranty Coverage:

Small off-road engines and large spark ignited engines less than or equal to 1.0 liter, and any related emissions components of the equipment, are warranted for two years*. If any emissions-related part on your B&S engine/equipment is defective, the part will be repaired or replaced by B&S.

* Two years or for the time period listed in the respective engine or product warranty statement, whichever is greater.

Owner's Warranty Responsibilities:

- As the engine/equipment owner, you are responsible for the performance of the required maintenance listed in your owner's manual. B&S recommends that you retain all receipts covering maintenance on your engine/equipment, but B&S cannot deny warranty solely for the lack of receipts or your failure to ensure the performance of all scheduled maintenance.
- As the engine/equipment owner, you should however be aware that B&S may deny you warranty coverage if your engine/equipment or a part has failed due to abuse, neglect, improper maintenance, or unapproved modifications.
- You are responsible for presenting your engine/equipment to a B&S distribution center, servicing dealer, or other equivalent entity, as applicable, as soon as a problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days. If you have any questions regarding your warranty rights and responsibilities, you should contact B&S at (414) 259-5262.

Briggs & Stratton Emissions Control Warranty Provisions

The following are specific provisions relative to your Emissions Control Warranty Coverage. It is in addition to the B&S engine warranty for non-regulated engines found in the Operator's Manual.

1. Warranted Emissions Parts

Coverage under this warranty extends only to the parts listed below (the emissions control systems parts) to the extent these parts were present on the B&S engine and/or B&S supplied fuel system.

a. Fuel Metering System

- Cold start enrichment system (soft choke)
- Carburetor and internal parts
- Fuel pump
- Fuel line, fuel line fittings, clamps
- Fuel tank, cap and tether
- Carbon canister

b. Air Induction System

- Air cleaner
- Intake manifold
- Purge and vent line

c. Ignition System

- Spark plug(s)
- Magneto ignition system

d. Catalyst System

- Catalytic converter
- Exhaust manifold
- Air injection system or pulse valve

e. Miscellaneous Items Used in Above Systems

- Vacuum, temperature, position, time sensitive valves and switches
- Connectors and assemblies

2. Length of Coverage

For a period of two years from date of original purchase, B&S warrants to the original purchaser and each subsequent purchaser that the engine is designed, built, and equipped so as to conform with all applicable regulations adopted by the Air Resources Board; that it is free from defects in material and workmanship that could cause the failure of a warranted part; and that it is identical in all material respects to the engine described in the manufacturer's application for certification. The warranty period begins on the date the engine is originally purchased.

The warranty on emissions-related parts is as follows:

- Any warranted part that is not scheduled for replacement as required maintenance in the owner's manual supplied, is warranted for the warranty period stated above. If any such part fails during the period of warranty coverage, the part will be repaired or replaced by B&S at no charge to the owner. Any such part repaired or replaced under the warranty will be warranted for the remaining warranty period.
 - Any warranted part that is scheduled only for regular inspection in the owner's manual supplied, is warranted for the warranty period stated above. Any such part repaired or replaced under warranty will be warranted for the remaining warranty period.
 - Any warranted part that is scheduled for replacement as required maintenance in the owner's manual supplied, is warranted for the period of time prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part will be repaired or replaced by B&S at no charge to the owner. Any such part repaired or replaced under warranty will be warranted for the remainder of the period prior to the first scheduled replacement point for the part.
 - Add on or modified parts that are not exempted by the Air Resources Board may not be used. The use of any non exempted add on or modified parts by the owner will be grounds for disallowing a warranty claim. The manufacturer will not be liable to warrant failures of warranted parts caused by the use of a non exempted add on or modified part.
3. Consequential Coverage
- Coverage shall extend to the failure of any engine components caused by the failure of any warranted emissions parts.
4. Claims and Coverage Exclusions

Warranty claims shall be filed according to the provisions of the B&S engine warranty policy. Warranty coverage does not apply to failures of emissions parts that are not original equipment B&S parts or to parts that fail due to abuse, neglect, or improper maintenance as set forth in the B&S engine warranty policy. B&S is not liable for warranty coverage of failures of emissions parts caused by the use of add-on or modified parts.

Look For Relevant Emissions Durability Period and Air Index Information On Your Small Off-Road Engine Emissions Label

Engines that are certified to meet the California Air Resources Board (CARB) small off-road Emissions Standard must display information regarding the Emissions Durability Period and the Air Index. Briggs & Stratton makes this information available to the consumer on our emissions labels. The engine emissions label will indicate certification information.

The **Emissions Durability Period** describes the number of hours of actual running time for which the engine is certified to be emissions compliant, assuming proper maintenance in accordance with the Operating & Maintenance Instructions. The following categories are used:

Moderate:

Engine is certified to be emissions compliant for 125 hours of actual engine running time.

Intermediate:

Engine is certified to be emissions compliant for 250 hours of actual engine running time.

Extended:

Engine is certified to be emissions compliant for 500 hours of actual engine running time. For example, a typical walk-behind lawn mower is used 20 to 25 hours per year.

Therefore, the **Emissions Durability Period** of an engine with an **intermediate** rating would equate to 10 to 12 years.

Briggs & Stratton engines are certified to meet the United States Environmental Protection Agency (USEPA) Phase 2 or Phase 3 emissions standards. The Emissions Compliance Period referred to on the Emissions Compliance label indicates the number of operating hours for which the engine has been shown to meet Federal emissions requirements.

For engines less than 225 cc displacement.

Category C = 125 hours, Category B = 250 hours, Category A = 500 hours

For engines of 225 cc or more displacement.

Category C = 250 hours, Category B = 500 hours, Category A = 1000 hours



DEALER SERVICE MANUAL

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