

JOHN DEERE
AG & TURF DIVISION

John Deere Tractor
X125, X145, X165

OMGX24638 G2
OPERATOR'S MANUAL



JOHN DEERE

Original Instruction

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John Deere Worldwide Commercial and Consumer Equipment Division

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Previous Editions

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INTRODUCTION

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Introduction

Thank You for Purchasing a John Deere Product

We appreciate having you as a customer and wish you many years of safe and satisfied use of your machine.

Using Your Operator's Manual

This manual is an important part of your machine and should remain with the machine when you sell it.

Reading your operator's manual will help you and others avoid personal injury or damage to the machine. Information given in this manual will provide the operator with the safest and most effective use of the machine. Knowing how to operate this machine safely and correctly will allow you to train others who may operate this machine.

If you have an attachment, use the safety and operating information in the attachment operator's manual along with the machine operator's manual to operate the attachment safely and correctly.

This manual and safety signs on your machine may also be available in other languages (see your authorized dealer to order).

Sections in your operator's manual are placed in a specific order to help you understand all the safety messages and learn the controls so you can operate this machine safely. You can also use this manual to answer any specific operating or servicing questions. A convenient index located at the end of this book will help you to find needed information quickly.

The machine shown in this manual may differ slightly from your machine, but will be similar enough to help you understand our instructions.

RIGHT-HAND and LEFT-HAND sides are determined by facing in the direction the machine will travel when going forward. When you see a broken line (-----), the item referred to is hidden from view.

Before delivering this machine, your dealer performed a predelivery inspection to ensure best performance.

Machine Use

This machine is designed solely for use in customary lawn mowing and light grounds care operations. Use in any other way is considered as contrary to the intended use.

This machine is not intended for use in spraying operations where hazardous substances may be used.

The manufacturer accepts no liability for damage or injury resulting from this misuse, and these risks must be borne solely by the user. Compliance with and strict adherence to the conditions of operation, service and repair as specified by the manufacturer also constitute essential elements for the intended use.

This machine should be operated, serviced and repaired only by persons familiar with all its particular characteristics and acquainted with the relevant safety rules (accident prevention). The accident prevention regulations, all other generally recognized regulations on safety and occupational medicine and the road traffic regulations must be observed at all times.

Setting fuel delivery beyond published factory specifications or otherwise overpowering will result in loss of warranty protection for this machine.

Any arbitrary modifications carried out on this machine will relieve the manufacturer of all liability for any resulting damage or injury.

Special Messages

Your manual contains special messages to bring attention to potential safety concerns, machine damage as well as helpful operating and servicing information. Please read all the information carefully to avoid injury and machine damage.

PRODUCT IDENTIFICATION



CAUTION: Avoid injury! This symbol and text highlight potential hazards or death to the operator or bystanders that may occur if the hazards or procedures are ignored.

IMPORTANT: Avoid damage! This text is used to tell the operator of actions or conditions that might result in damage to the machine.

NOTE: General information is given throughout the manual that may help the operator in the operation or service of the machine.

Product Identification

Record Identification Numbers

Lawn Tractors

X125, X145, X165 PIN (020001-)

If you need to contact an Authorized Service Center for information on servicing, always provide the product model and identification numbers.

You will need to locate the product identification number (PIN) for the machine and engine serial number. Record the information in the spaces provided below.

DATE OF PURCHASE:

DEALER NAME:

DEALER PHONE:

PRODUCT IDENTIFICATION NUMBER:

ENGINE SERIAL NUMBER:

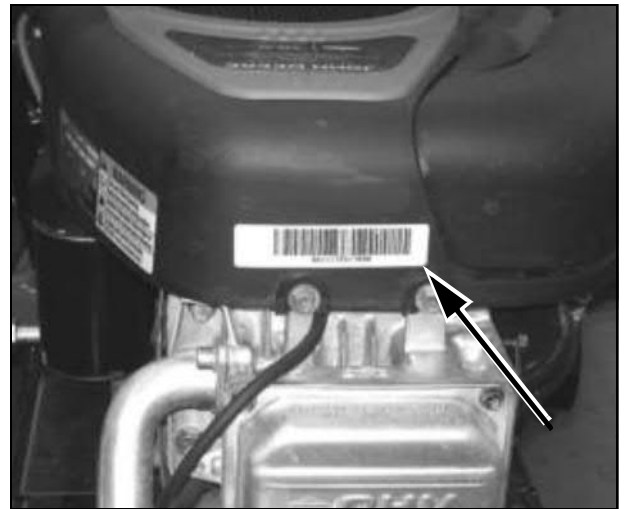
Machine Product Identification Number Location



MX46486

Picture Note: Located on left side of frame.

Engine Serial Number Location



MX25599

Picture Note: Single Cylinder Engines



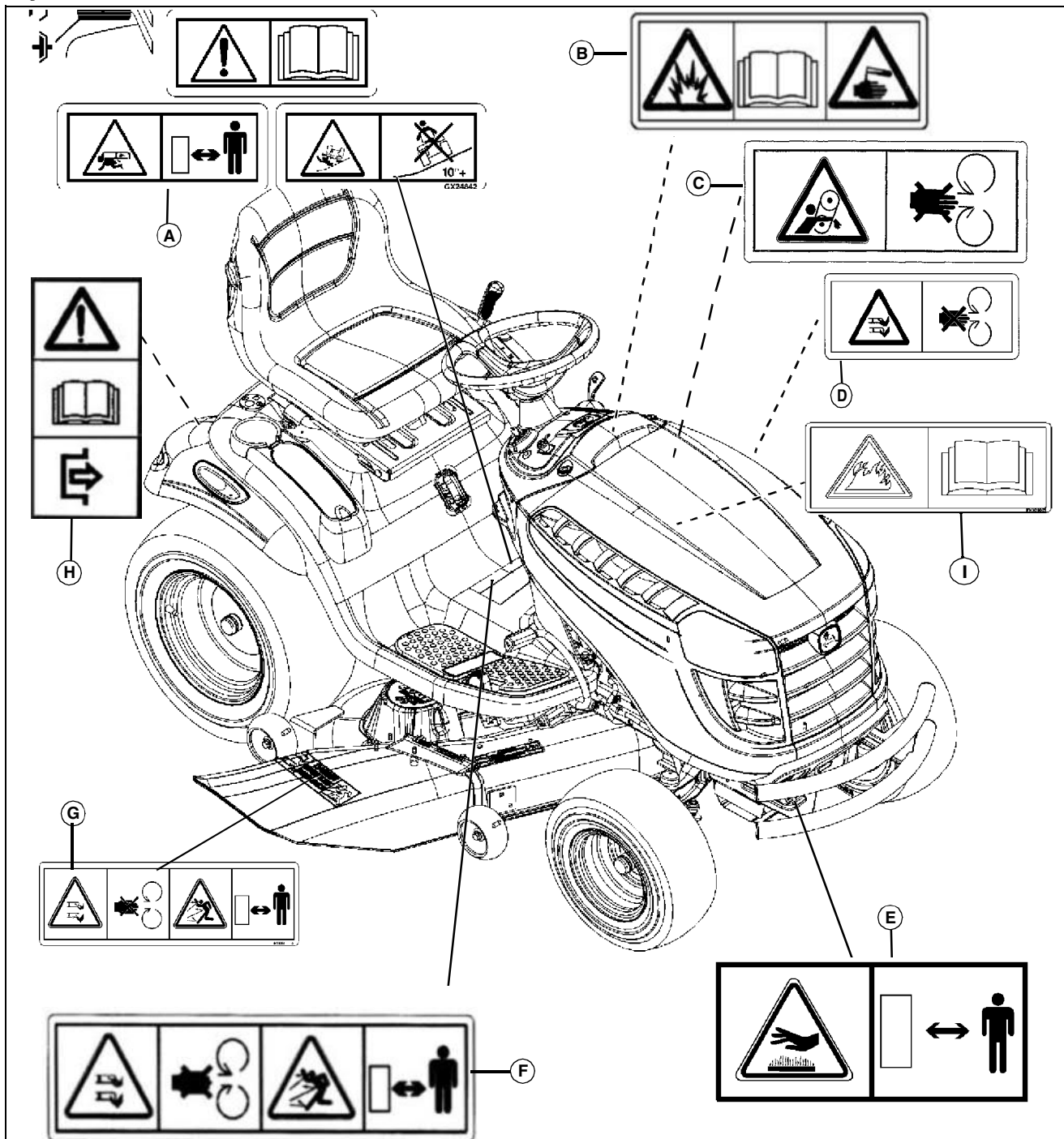
MX49394

Picture Note: V-Twin Engines

SAFETY LABELS

Safety Label Location

Safety Labels



MX46490

Picture Note: Use label number listed in table below to locate complete text of safety label message following this illustration.

- A- WARNING GX24842
- B- WARNING M133159
- C- WARNING M136436
- D- DANGER M118041
- E- WARNING GX21121
- F- DANGER M148522

G- DANGER M118040

H- WARNING (Bypass Rod) GX21086

I - CAUTION GX24503



Pictorial Safety Signs

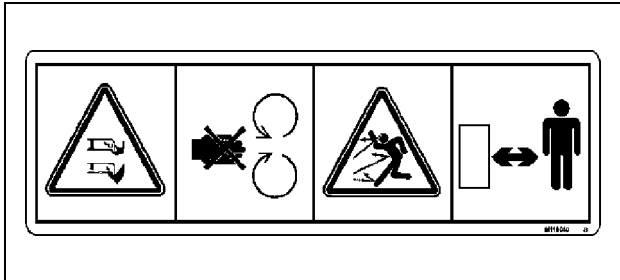
At several important places on this machine safety signs are affixed intended to signify potential danger. The hazard is identified by a pictorial in a warning triangle. An adjacent pictorial provides information how to avoid personal injury.

SAFETY LABELS

These safety signs, their placement on the machine and a brief explanatory text are shown in this Safety section.

There can be additional safety information contained on parts and components sourced from suppliers that is not reproduced in this operator's manual.

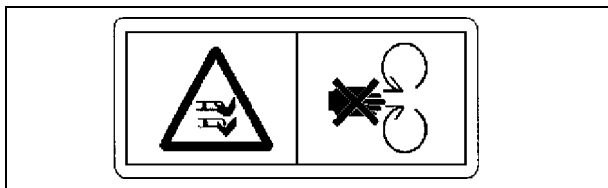
Avoid Injury From Rotating Blades and Thrown Objects - M118040



M118040

- Do not put hands or feet under or into mower when engine is running.
- Do not operate mower without discharge chute or entire grass catcher in place.
- Before mowing, clear area of objects that may be thrown by blade.
- Stay clear while engine is running.

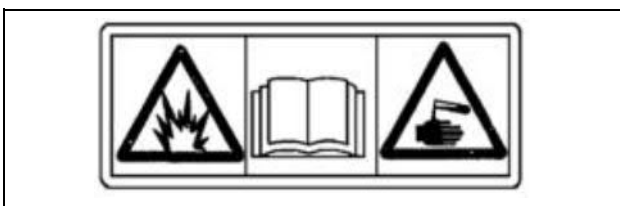
Avoid Injury From Rotating Blades - M118041



M118041

- Do not put hands or feet under or into mower when engine is running.
- Do not operate mower without discharge chute or entire grass catcher in place.

WARNING M133159

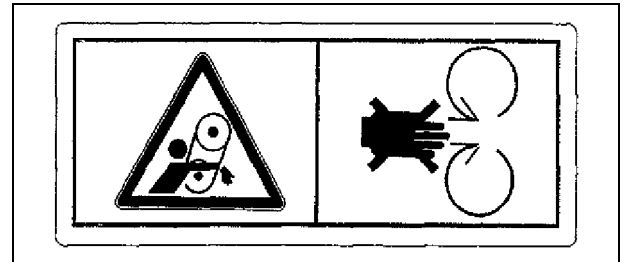


M133159

Avoid Injury From Battery Gases and Acids

- Batteries contain explosive gases and sulfuric acid. Use extreme caution when handling battery.
- Read operator's manual for all safety information before handling battery.
- Use extreme caution when handling battery.

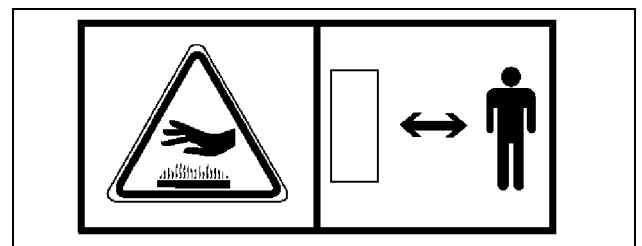
Avoid Injury From Getting Caught in Belt - M136436



M136436

- Stay clear of belts.
- Do not operate mower without shields in place.

WARNING GX21121

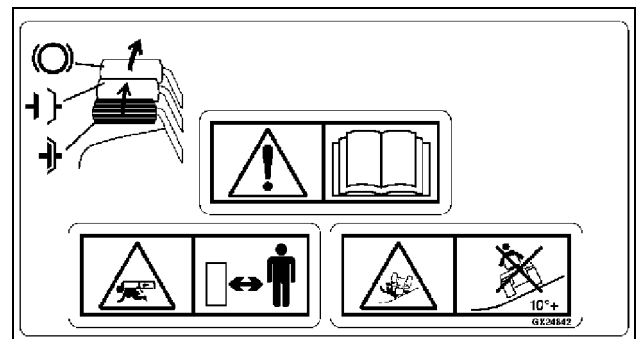


GX21121

Warning - Hot Surfaces

- Keep away from hot surfaces.

Avoid Injury



GX24842

Picture Note: Located on fenderdeck in front of seat.

Read Operators Manual

- This operator's manual contains important information necessary for safe machine operation. Observe all safety warnings to avoid accidents.

Keep Children Away From Mower

- Do not mow when children or others are around.
- Do not mow in reverse.
- Look down and behind before and while backing.
- Never carry children even with blades off.

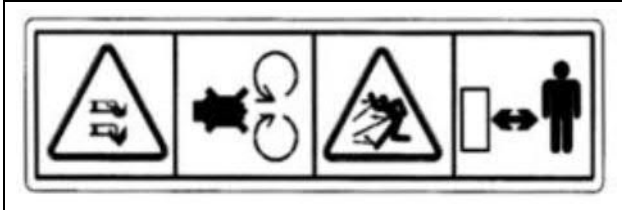
Avoid Injury From Tipping

- In some configurations, do not drive or operate on a slope of more than 10 degrees.

SAFETY LABELS

- Refer to the Operating on Slopes section for more information.
- Drive up and down slopes, not across.
- Avoid sudden turns.

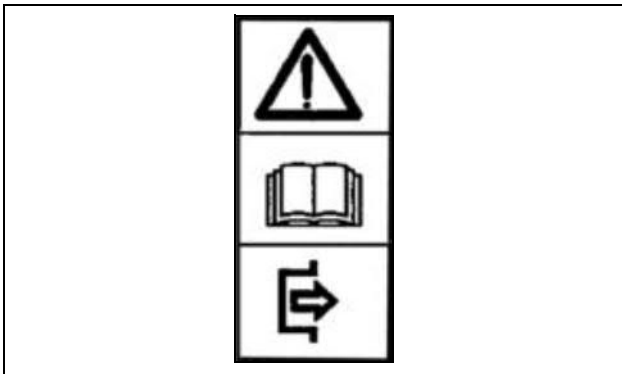
Avoid Injury From Rotating Blades and Thrown Objects



M148522

- Do not put hands or feet under or into mower when engine is running.
- Keep away from rotating parts. Do not open or remove safety shields while engine is running.
- Thrown Objects - Before mowing, clear area of objects that may be thrown by blade. Do not operate mower without discharge chute or entire grass catcher in place.
- Stay a safe distance from machine.

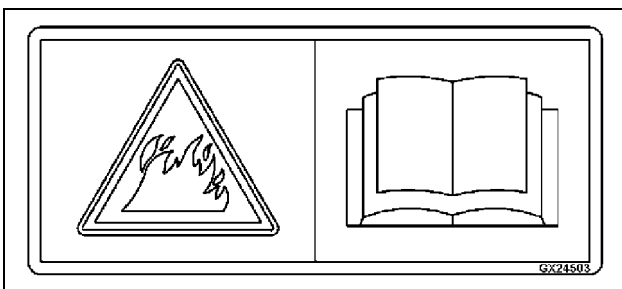
Avoid Injury: Use Transmission Bypass Rod Safely



GX21086

- Carefully read operator's manual for safe operation of transmission bypass rod.

WARNING GX24503

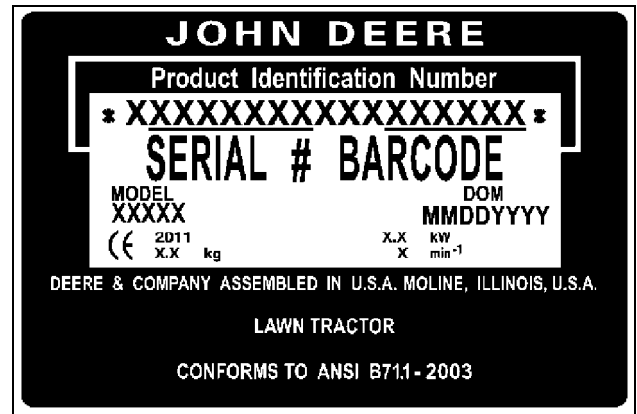


GX24503

Clean and inspect the entire machine.

Carefully read Operator's Manual Machine Cleanout section for details.

CE Certification Label



GX23911f

This information is provided on your machine to indicate the machine is certified and in compliance with European Directive Standards: 98/37/EC (before December 29, 2009) or 2006/42/EC (89/392/EEC).

SAFETY

Safety

Training

- Read the instructions carefully. Be familiar with the controls and the proper use of the equipment.
- Never allow children or people unfamiliar with these instructions to use the lawnmower. Local regulations can restrict the age of the operator.
- Never mow while people, especially children, or pets are nearby.
- Keep in mind that the operator or user is responsible for accidents or hazards occurring to other people or their property.
- Do not carry passengers.
- All drivers should seek and obtain professional and practical instruction. Such instruction should emphasize:
 - the need for care and concentration when working with ride-on machines.
 - control of a ride-on machine sliding on a slope will not be regained by the application of the brake.
- The main reasons for loss of control are:
 - insufficient wheel grip;
 - being driven too fast;
 - inadequate braking;
 - the type of machine is unsuitable for its task;
 - lack of awareness of the effect of ground conditions, especially slopes;
 - incorrect hitching and load distribution.

Preparation

- While mowing, always wear substantial footwear and long trousers. Do not operate the equipment when barefoot or wearing open sandals.
- Thoroughly inspect the area where the equipment is to be used and remove all objects which can be thrown by the machine.
- **WARNING-Fuel is highly flammable.**
 - store fuel in containers specifically designed for this purpose.
 - refuel outdoors only and do not smoke while refueling.
 - add fuel before starting the engine. Never remove the cap of the fuel tank or add fuel while the engine is running or when the engine is hot.
 - 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 and container caps securely.
- Replace faulty silencers.
- Before using, always visually inspect to see that the blades, blade bolts and cutter assembly are not worn or damaged. Replace worn or damaged blades and bolts in sets to preserve balance.
- On multi-bladed machines, take care as rotating one blade can cause other blades to rotate.

Operation

- Do not operate the engine in a confined space where dangerous carbon monoxide fumes can collect.
- Mow only in daylight or in good artificial light.
- Before attempting to start the engine, disengage all blade attachment

clutches and shift into neutral.

- Do not use on slopes of degrees more than recommended by the manufacturer.
- Remember there is no such thing as a safe slope. Travel on grass slopes requires particular care. To guard against overturning:
 - do not stop or start suddenly when going up or downhill;
 - engage clutch slowly, always keep machine in gear, especially when traveling downhill;
 - machine speeds should be kept low on slopes and during tight turns;
 - stay alert for humps and hollows and other hidden hazards;
 - never mow across the face of a slope, unless the machine is designed for this purpose.
- Use care when pulling loads or using heavy equipment:
 - use only approved drawbar hitch points;
 - limit loads to those you can safely control;
 - do not turn sharply. Use care when reversing;
 - use counterweights or wheel weights when suggested in the operator's manual.
- Watch out for traffic when crossing or near roadways.
- Stop the blades from rotating before crossing surfaces other than grass.
- Never direct discharge of material toward bystanders nor allow anyone near the machine while in operation.
- Never operate the machine with defective guards, or without safety protective devices in place.
- Do not change the engine governor settings or overspeed the engine. Operating the engine at excessive speed can increase the hazard of personal injury.
- Before leaving the operator's position:
 - disengage the drive to any attachments and lower them;
 - change into neutral and lock the parking brake;
 - stop the engine and remove the key.
- Disengage drive to attachments, stop the engine, disconnect the spark plug wires and remove the ignition key:
 - before clearing blockages or unclogging chute;
 - before checking, cleaning, or working on the machine;
 - after striking a foreign object. Inspect the machine for damage and make repairs before restarting and operating the equipment;
 - if the machine starts to vibrate abnormally (check immediately).
- Disengage drive to attachments when transporting or not in use.
- Stop the engine and disengage drive to attachment:
 - before refueling;
 - before removing the grass catcher;
 - before making height adjustment unless adjustment can be made from the operator's position.
- Reduce the throttle setting during run-out and, if the engine is provided with a shut-off valve, turn the fuel off at the conclusion of mowing.
- Read, understand and follow all instructions in the manual and on the machine before starting.
- Inspect machine before you operate. Repair or replace damaged, badly worn, or missing parts. Make any necessary adjustments before you

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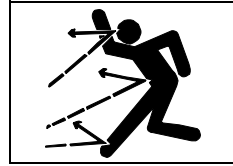
operate.

- Be sure all drives are in neutral and parking brake is locked before starting engine. Only start engine from the operator's position.
- Do not operate mower without discharge chute or entire grass catcher in place. Never operate with the discharge deflector raised, removed, or altered, unless using a grass catcher.
- Check brake action before you operate. Adjust or service brakes as necessary.
- Stop machine if anyone enters the area.
- Do not leave machine unattended when it is running.
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.
- Use only accessories and attachments approved by the manufacturer of the machine. Keep safety labels visible when installing accessories and attachments.
- Do not operate machine if you are under the influence of drugs or alcohol.
- Data indicates operators 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.
- Do not wear radio or music headphones. Safe service and operation requires your full attention.

Maintenance and Storage

- Keep all nuts, bolts and screws tight to be sure the equipment is in safe working condition.
- Never store the equipment with fuel in the tank inside a building where fumes can reach an open flame or spark.
- Allow the engine to cool before storing in any enclosure.
- To reduce the fire hazard, keep the engine, silencer, battery compartment and fuel storage area free of grass, leaves, or excessive grease.
- Check the grass catcher frequently for wear or deterioration.
- Replace worn or damaged parts for safety.
- If the fuel tank has to be drained, this should be done outdoors.
- On multi-bladed machines, take care as rotating one blade can cause other blades to rotate.
- When machine is to be parked, stored or left unattended, lower the cutting means unless a positive mechanical lock is used.
- Use jack stands or lock service latches to support components when required. Securely support any machine elements that must be raised for service work.
- Before servicing machine or attachment, carefully release pressure from any components with stored energy, such as hydraulic components or springs.
- Release hydraulic pressure by lowering attachment or cutting units to the ground or to a mechanical stop and move hydraulic control levers back and forth.
- Disconnect battery or remove spark plug (for gas engines) 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 blades or wear gloves, and use caution when servicing them. Only replace blades. Never straighten or weld them.

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



Checking Mowing Area

- Clear mowing area of objects that might be thrown. Keep people and pets out of mowing area.

- Low-hanging branches and similar obstacles can injure the operator or interfere with

mowing operation. Before mowing, identify potential obstacles such as low-hanging branches, and trim or remove those obstacles.

- Study mowing area. Set up a safe mowing pattern. Do not mow where traction or stability is doubtful.

- Test drive area with mower lowered but not running. Slow down when you travel over rough ground.

Parking Safely

1. Stop machine on a level surface, not on a slope.
2. Disengage mower blades or any other attachments.
3. Lower attachments to the ground.
4. Lock the park brake.
5. Stop the engine.
6. Remove the key.
7. Wait for engine and all moving parts to stop before you leave the operator's seat.
8. Close fuel shut-off valve, if your machine is equipped.
9. Disconnect the negative battery cable or remove the spark plug wire(s) (for gasoline engines) before servicing the machine.



Rotating Blades are Dangerous

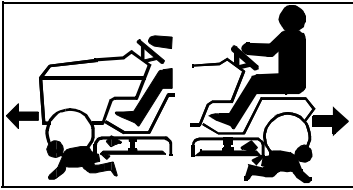
HELP PREVENT SERIOUS OR FATAL ACCIDENTS:

- Rotating blades can cut off arms and legs, and throw objects. Failure to observe safety instructions could result in serious injury or

death.

- Keep hands, feet and clothing away from mower deck when engine is running.
- Be alert at all times, drive forward and in reverse carefully. People, especially children can move quickly into the mowing area before you know it.
- Before backing up, stop mower blades or attachments and look down and behind the machine carefully, especially for children.
- Do not mow in reverse.
- Shut off blades when you are not mowing.
- Park machine safely before leaving the operator's station for any reason including emptying the grasscatchers or unplugging the chute.
- The mower blades should stop in approximately five seconds when the mower is disengaged. If you believe that your blades may not be stopping in that period of time, take your machine to your authorized dealer where they can safely check and service your machine.

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Protect Children

- Death or serious injury can occur when young children associate having fun with a lawn mowing machine simply because someone has given them a ride on a machine.

- Children are attracted to lawn mowing machines and mowing activities. They don't understand the dangers of rotating blades or the fact that the operator is unaware of their presence.
- Children who have been given rides in the past may suddenly appear in the mowing area for another ride and be run over or backed over by the machine.
- Tragic accidents with children can occur if the operator is not alert to the presence of children, especially when a child approaches a machine from behind. Before and while backing up, stop mower blades and look down and behind the machine carefully, especially for children.
- Never carry children on a machine or attachment, even with the blades off. Do not tow children in a cart or trailer. They can fall off and be seriously injured or interfere with safe machine operation.
- Never use the machine as a recreational vehicle or to entertain children.
- Never allow children or an untrained person operate the machine. Instruct all operators not to give children a ride on the machine or in an attachment.
- Keep children indoors, out of the mowing area, and in the watchful eye of a responsible adult, other than the operator, when a mower is being operated.
- Stay alert to the presence of children. Never assume that children will remain where you last saw them. Turn the machine off if a child enters the work area.
- Use extreme care when approaching blind corners, shrubs, trees, or other objects that may block your view of a child.

Operating on Slopes

NOTE: Make a photocopy of this page and cut out angle chart (A) to use for measuring slope angle.

- Slopes are a major factor related to loss-of-control and tipover accidents, which can result in severe injury or death. Operation on all slopes requires extra caution.

Identify Slopes for Safe Operation

- Follow safe procedures for operation on slopes. Measure slopes of all mowing sites to determine which slopes are safe for mowing with a ride-on mower. Always use common sense and good judgement when performing this survey.

Measuring Slopes

- Suggested Method 1: Lay a straight piece of sturdy lumber 1.2 m (4 ft) long on the slope and measure the angle of the slope with an angle indicator or protractor level.
- Suggested Method 2: Refer to the slope gauge provided with this manual.

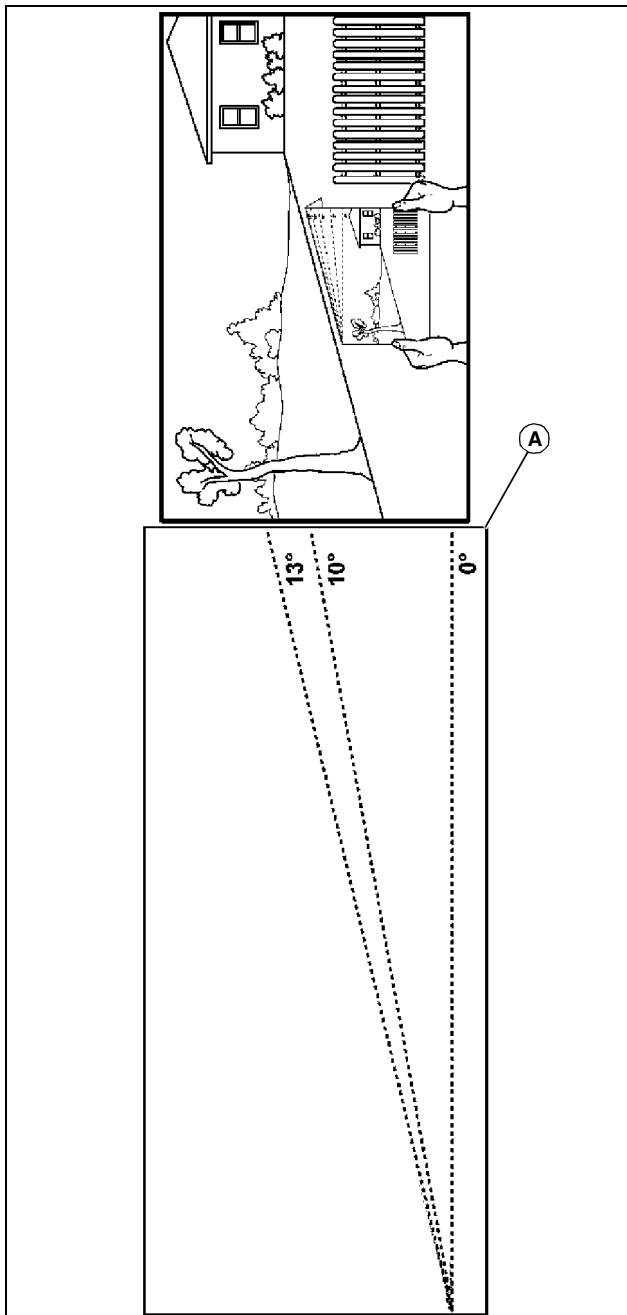
Operate Safely on Slopes

- Exceeding the recommended maximum slope angle increases the risk of rollover accidents that can result in serious injury or death.
- Never mow or operate ride-on mower on slope angles greater than 13° with the lawn ride-on mower in its basic configuration. The basic configuration is the ride-on mower with mower deck and not other

attachments. (A 13° slope is a slope that rises 1.4 m (4.6 ft) over a horizontal distance of 6.1 m (20 ft).)

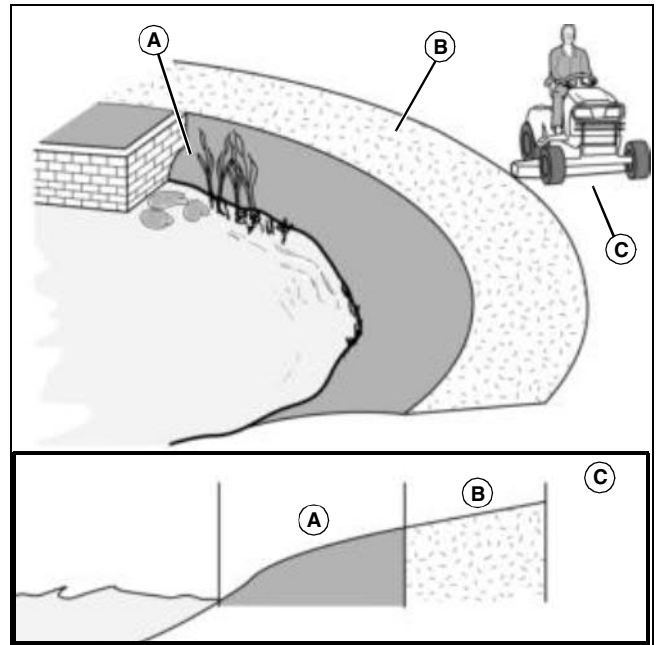
- When using attachments, never mow or operate the ride-on mower on slope angles greater than 10°. The addition of a weather enclosure, material collection system, or other attachments will increase the risk of a rollover. (A 10° slope is a slope that rises 1 m (3.5 ft) over a horizontal distance of 6.1 m (20 ft).)
- On slope angles of 10° or less, the risk of rollover is low, but as the slope angle increases to the recommended maximum, the risk increases to a medium level.
- Always consider potential turf conditions and slope angles when determining the risk of loss-of-control and tip-over accidents.
- Drive slowly when mowing or operating on slopes.
- If you feel uneasy on a hillside, do not mow or operate on it.
- Mow up and down slopes, not across.
- Watch for holes, ruts, bumps, rocks, or other hidden objects. Uneven terrain could overturn the ride-on mower. Tall grass can hide obstacles.
- Drive slowly so you will not have to stop while on a slope.
- Do not mow on wet grass. Tires may lose traction. Tires may slip on slopes even though the brakes are functioning properly.
- Avoid starting, stopping or turning on a slope. If the tires lose traction, disengage the PTO and proceed slowly, straight down the slope.
- Keep all movement on slopes slow and gradual. Do not make sudden changes in speed or direction, which could cause the ride-on mower to roll over.

SAFETY



MX51667

Operating Near Hazards



MX51888

Picture Note: Example side view of slope and hazards, showing areas (A), (B), and (C).

- Do not mow or operate machine in areas adjacent to hazards that may cause the machine to roll over. The machine could suddenly lose traction, slide, and/or roll over if a wheel goes over the edge or if the edge breaks away.
- Hazards (A) include but are not limited to:
 - Drop-offs, ditches, embankments, or bodies of water.
 - Areas of unsafe slope, soft ground, edges along bodies of water, or area with holes, ruts, bumps, or other hidden objects.
- Maintain a buffer area (B) at least as wide as the machine between hazards (A) and the mowing area (C). Do not mow or operate the machine in the hazard area or buffer area.
- Only mow or operate the machine in the mowing area (C). Do not exceed the recommended slope operating angle. Refer to the "Operate Safely on Slopes" section.
- Use a walk-behind mower or string trimmer in and around areas (A) and (B).



Keep Riders Off

- Only allow the operator on the machine. Keep riders off.
- Riders on the machine or attachment may be struck by foreign objects or thrown off the machine causing serious injury.
- Riders obstruct the operator's view resulting in the machine being operated in an unsafe manner.

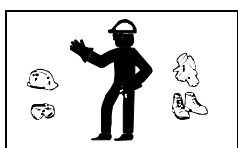
Towing Loads Safely

- Stopping distance increases with speed and weight of towed load. Travel slowly and allow extra time and distance to stop.
- Total towed weight must not exceed combined weight of pulling machine, ballast and operator. Use counterweights or wheel weights as described in

SAFETY

the attachment or pulling machine operator's manual.

- Excessive towed load can cause loss of traction and loss of control on slopes. Reduce towed weight when operating on slopes.
- Never allow children or others in or on towed equipment.
- Use only approved hitches. Tow only with a machine that has a hitch designed for towing. Do not attach towed equipment except at the approved hitch point.
- Follow the manufacturer's recommendations for weight limits for towed equipment and towing on slopes.
- Towed attachments will increase the risk of rollover. Refer to the "Operating on Slopes" section for more information.
- Do not turn sharply. Use additional caution when turning or operating under adverse surface conditions. Use care when reversing.
- Do not shift to neutral and coast downhill.



Wear Appropriate Clothing

- Always wear eye protection when operating the machine.
- Wear close fitting clothing and safety equipment appropriate for the job.

- While operating this machine, always wear substantial footwear and long trousers. Do not operate the equipment when barefoot or wearing open sandals.
- Wear a suitable protective device such as earplugs. Loud noise can cause impairment or loss of hearing.



Practice Safe Maintenance

- Only qualified, trained adults should service this machine. Understand service procedure before doing work.
- Never operate machine in a closed area

where dangerous carbon monoxide fumes can collect.

- Keep all nuts and bolts tight, especially blade attachment bolts, to be sure the equipment is in safe working condition.
- Never tamper with safety devices. Check their proper operation regularly.
- Keep machine free of grass, leaves or other debris build-up. Clean up oil or fuel spillage and remove any fuel-soaked debris. Allow the machine to cool before storing.
- If you strike a foreign object, stop and inspect the machine. Repair, if necessary, before restarting.
- Never make any adjustments or repairs with the engine running. Wait for all movement to stop on machine before adjusting, cleaning or repairing.
- Check grasscatcher components and the discharge guard frequently and replace with manufacturer's recommended parts, when necessary. Grasscatcher components are subject to wear, damage, and deterioration which could expose moving parts or allow objects to be thrown.
- Mower blades are sharp. Wrap the blade or wear gloves, and use extra care when servicing them. Only replace blades. Never straighten or weld them.
- Check brake operation frequently. Adjust and service as required.
- Maintain or replace safety and instruction labels, as necessary.
- On multi-bladed machines, take care as rotating one blade can cause other blades to rotate.
- Keep hands, feet, clothing, jewelry, and long hair away from any moving parts, to prevent them from getting caught.

- Lower any attachments to the ground before cleaning or servicing machine. Disengage all power and stop the engine. Lock park brake and remove the key. Let machine cool.

- Securely support any machine elements that must be raised for service work. Use jack stands or lock service latches to support components when needed.

- Disconnect battery or remove spark plug wire (for gasoline engines) before making any repairs. Disconnect negative terminal first and positive last. Install positive terminal first and negative last.

- Before servicing machine or attachment, carefully release pressure from any components with stored energy, such as hydraulic components or springs.

- Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts.

- Charge batteries in an open, well-ventilated area, away from sparks. Unplug battery charger before connecting or disconnecting from the battery. Wear protective clothing and use insulated tools.

- Do not strike the flywheel with a hammer or hard object because the flywheel may later shatter during operation.

- If equipped with hydraulic lift - release hydraulic pressure by lowering attachment or cutting units to the ground or to a mechanical stop and move hydraulic control levers back and forth.



Avoid High Pressure Fluids

- Hydraulic hoses and lines can fail due to physical damage, kinks, age, and exposure. Check hoses and lines regularly. Replace damaged hoses and lines.

- Hydraulic fluid connections can loosen due to physical damage and vibration. Check connections regularly. Tighten loose connections.

- Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

- Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

- If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A. Information may be obtained in the United States and Canada only by calling 1-800-822-8262.



Prevent Fires

- Besides routine maintenance, one of the best ways to keep your John Deere equipment running efficiently and to reduce fire risk is to regularly remove debris buildup from the machine.

- Please review these recommendations with all operators. See your John Deere dealer with

questions.

- Always follow all safety procedures posted on the machine and in this operator manual. Before carrying out any inspection or cleaning, always shut off engine, set parking brake and remove ignition key.

- After operating, allow machine to cool in an open area before cleaning or storing. Do not park machine near flammable materials such as wood, cloth or chemicals.

MACHINE CLEANOUT

- Empty any grasscatcher bags or containers completely before storing.
- Frequency of these inspections and cleaning will vary depending on a number of factors including operating conditions, machine configuration, operating speeds and weather conditions particularly dry, hot and windy conditions. When you are operating in these conditions, inspect and clean these areas frequently throughout the day.
- Wind direction, terrain type and moisture content of surrounding vegetation can effect where and how much debris accumulates.
- Debris can accumulate anywhere on the machine, especially on horizontal surfaces.
- Keeping engine area clean will provide the greatest impact on fire prevention. Other areas requiring regular inspection and cleaning include behind wheel rims, wire harness, hose/line routings, mowing attachments, etc. Compressed air, leaf blowers or high pressured water can assist keeping these areas clean.
- Excess lubrication or fuel/oil leaks or spills on the machine can also serve as collection sites for debris. Prompt machine repair and oil/fuel cleanup will minimize the potential for debris collection and reduced cooling throughout machine life.
- Bearing failures or overheating can result in a fire. To reduce this risk, always follow the instructions in the machine operator's manual regarding lubrication intervals and locations. Washing the machine while warm may also reduce bearing life and increase potential for premature bearing failure.
- Always shut off fuel when storing or transporting machine, if the machine has a fuel shutoff.

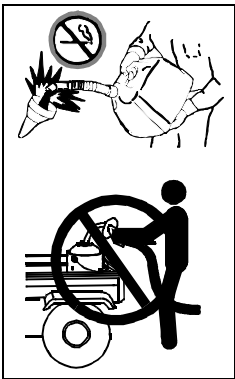


Tire Safety

Explosive separation of a tire and rim parts can cause serious injury or death:

- Do not attempt to mount a tire without the proper equipment and experience to perform the job.

- Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure. Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion. Welding can structurally weaken or deform the wheel.
- When inflating tires, use a clip-on chuck and extension hose long enough to allow you to stand to one side and NOT in front of or over the tire assembly.
- Check tires for low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.



Handling Fuel Safely

To avoid personal injury or property damage, use extreme care in handling fuel. Fuel is extremely flammable and fuel vapors are explosive:

- Extinguish all cigarettes, cigars, pipes, and other sources of ignition.
- Use only approved non-metal, portable fuel containers. If using a funnel, make sure it is plastic and has no screen or filter.
- Never remove the fuel tank cap or add fuel with the engine running. Allow engine to cool before refueling.

- Never add fuel to or drain fuel from the machine indoors. Move machine outdoors and provide adequate ventilation.

- Clean up spilled fuel immediately. If fuel is spilled on clothing, change clothing immediately. If fuel is spilled near machine, do not attempt to start the engine but move the machine away from the area of spillage. Avoid creating any source of ignition until fuel vapors have dissipated.
- Never store the machine or fuel container where there is an open flame, spark, or pilot light such as on a water heater or other appliance.
- Prevent fire and explosion caused by static electric discharge. Static electric discharge can ignite fuel vapors in an ungrounded fuel container.
- Never fill containers inside a vehicle or on a truck or trailer bed with a plastic liner. Always place containers on the ground away from your vehicle before fueling.
- Remove fuel-powered equipment from the truck or trailer and refuel it on the ground. If this is not possible, then refuel such equipment with a portable container, rather than from a fuel dispenser nozzle.
- Keep the nozzle in contact with the rim of the fuel tank or container opening at all times until the fueling is complete. Do not use a nozzle lock-open device.
- Never overfill fuel tank. Replace fuel tank cap and tighten securely.
- Replace all fuel container caps securely after use.
- For gasoline engines, do not use gas with methanol. Methanol is harmful to your health and to the environment.

Handling Waste Product and Chemicals

Waste products, such as, used oil, fuel, coolant, brake fluid, and batteries, can harm the environment and people:

- Do not use beverage containers for waste fluids - someone may drink from them.
- See your local Recycling Center or authorized dealer to learn how to recycle or get rid of waste products.
- See your local Recycling Center or authorized dealer to learn how to put your machine out of service at the end of the machine's service life.

Machine Cleanout

Prevent Fires

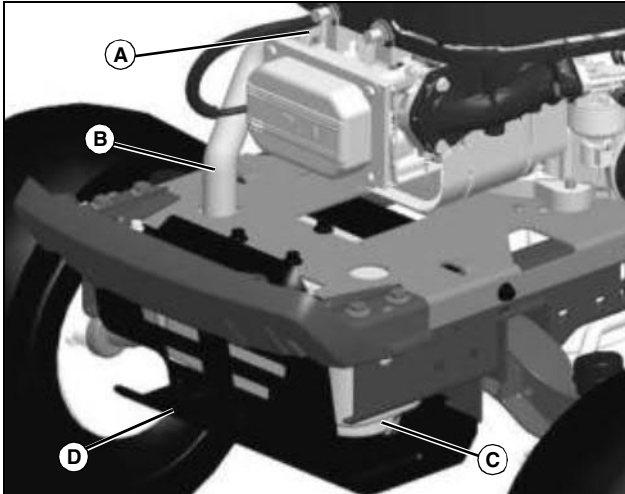
- Besides routine maintenance, one of the best ways to keep your John Deere equipment running efficiently and to reduce fire risk is to regularly remove debris buildup from the machine.
- Please review these recommendations with all operators. See your John Deere dealer with questions.
- Always follow all safety procedures posted on the machine and in this operator manual. Before carrying out any inspection or cleaning, always shut off engine, set parking brake and remove ignition key.
- After operating, allow machine to cool in an open area before cleaning or storing. Do not park machine near flammable materials such as wood, cloth or chemicals.
- Empty any grasscatcher bags or containers completely before storing.
- Frequency of these inspections and cleaning will vary depending on a number of factors including operating conditions, machine configuration, operating speeds and weather conditions particularly dry, hot and windy conditions. When you are operating in these conditions, inspect and clean these areas frequently throughout the day.
- Wind direction, terrain type and moisture content of surrounding vegetation can effect where and how much debris accumulates.
- Debris can accumulate anywhere on the machine, especially on

MACHINE CLEANOUT

horizontal surfaces.

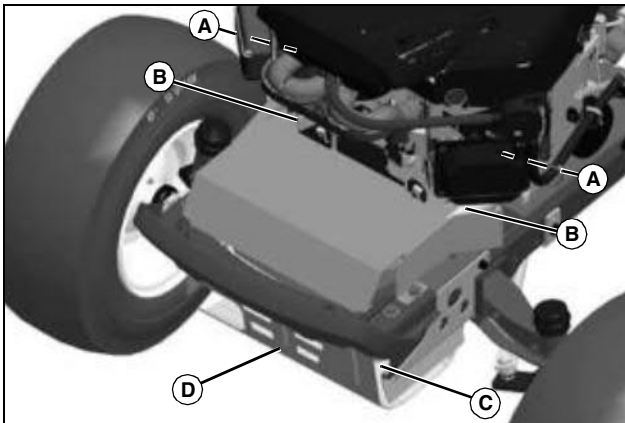
- Keeping engine area clean will provide the greatest impact on fire prevention. Other areas requiring regular inspection and cleaning include behind wheel rims, wire harness, hose/line routings, mowing attachments, etc. Compressed air, leaf blowers or high pressured water can assist keeping these areas clean.

- Primary areas that must be inspected and cleaned on the machine include (See Safety Label Section):



MX48341

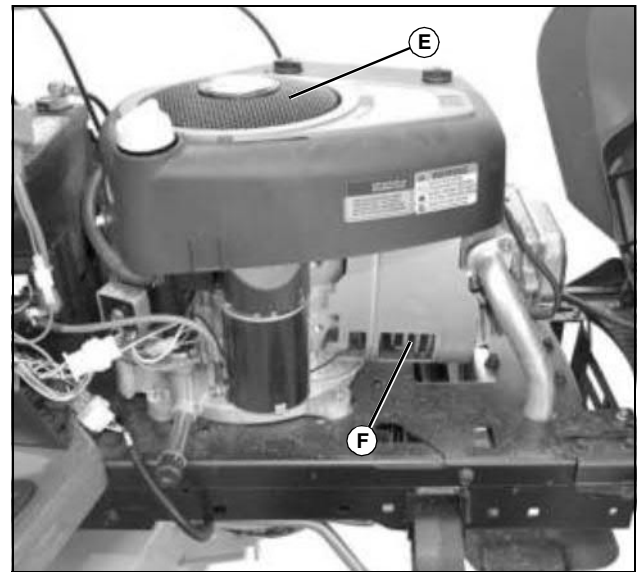
Picture Note: Single cylinder shown.



MX48340

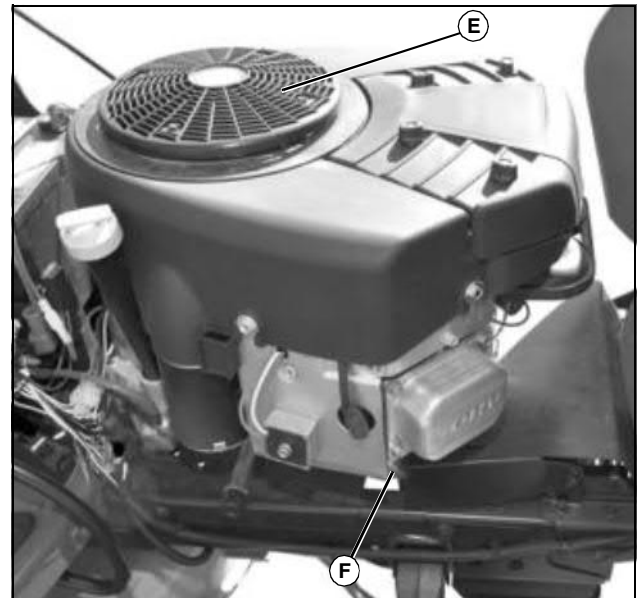
Picture Note: Twin cylinder shown.

a.Exhaust manifold (A), muffler pipe (B), muffler (C) and muffler shield (D).



MX49847

Picture Note: Single cylinder shown.



MX49848

Picture Note: Twin cylinder shown.

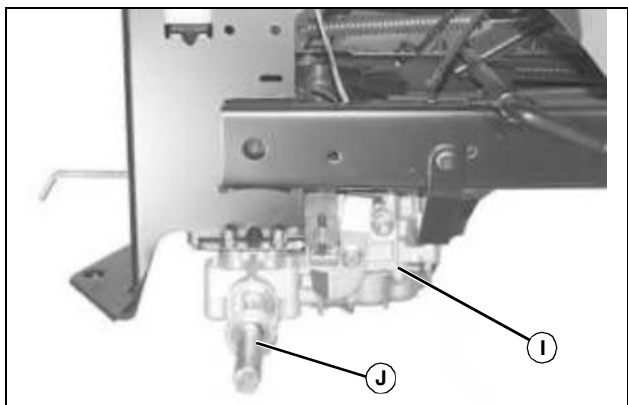
b.Engine intake screens (E), cooling fins (F), and oil cooler (if equipped).

ASSEMBLY



MX49849

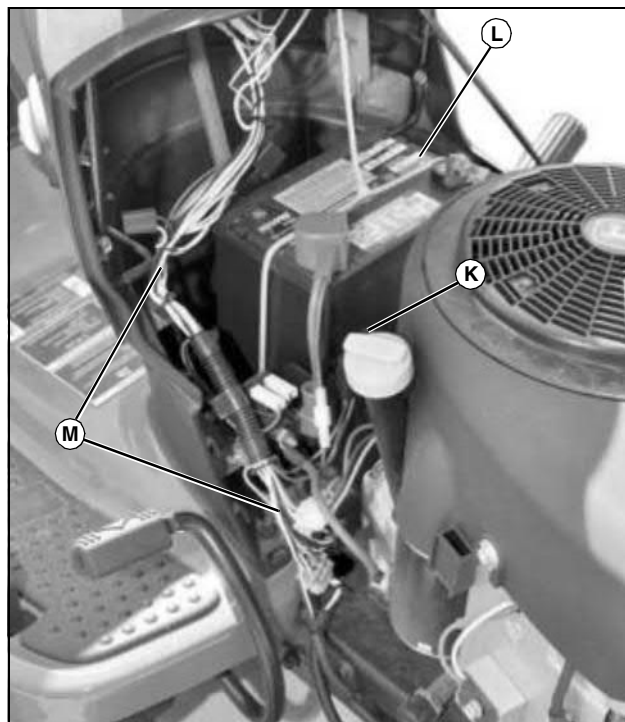
c. Top of mower deck, under shields (G), including spindle (H) and belt areas.



MX38694

Picture Note: Shown with wheel removed.

d. On or near transmission (I) and driveline (J).



MX49850

e. Under left side panel near fuse block (K), and all wiring, including the battery (L) and related wiring harnesses (M).

- Excess lubrication or fuel/oil leaks or spills on the machine can also serve as collection sites for debris. Prompt machine repair and oil/fuel cleanup will minimize the potential for debris collection and reduced cooling throughout machine life.
- Bearing failures or overheating can result in a fire. To reduce this risk, always follow the instructions in the machine operator's manual regarding lubrication intervals and locations. Washing the machine while warm may also reduce bearing life and increase potential for premature bearing failure.
- Always shut off fuel when storing or transporting machine, if the machine has a fuel shutoff.

Assembly

Charge and Connect Battery



CAUTION: Avoid injury! The battery produces a flammable and explosive gas. The battery may explode:

- Do not smoke or have open flame near battery.
- Wear eye protection and gloves.
- Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.
- Do not jump start or charge a frozen battery. Warm battery to 16°C (60°F).

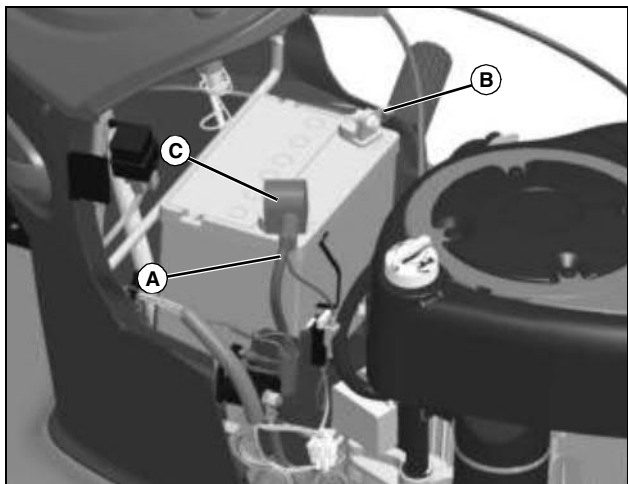
1. Remove and discard the tie strap from the positive (+) battery terminal.
2. Remove and discard the black protective cap from the negative (-)

ASSEMBLY

battery terminal.

3. Charge the battery.

- Battery is fully charged at 12.6 volts.



MX46480

4. Connect positive (+) battery cable (A) to battery.
5. Connect negative (-) battery cable (B).
6. Apply general purpose grease or silicone spray to terminal to help prevent corrosion.
7. Slide red cover (C) over positive battery cable.

Check Tire Pressure

Check tire pressure. (See Checking Tire Pressure in the SERVICE MISCELLANEOUS section.)

Adjust Mower Deck Level

Adjust mower deck level. (See Adjusting Mower Level in the OPERATING section.)

Check Engine Oil Level

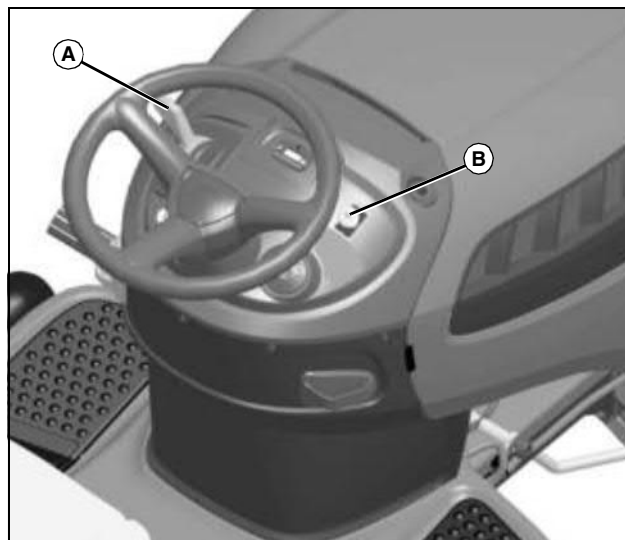
Check engine oil level. (See Checking Engine Oil Level in the SERVICE ENGINE section.)

Check Machine Safety System

Perform safety system check to make sure the electronic safety interlock circuit is functioning properly. Perform all tests. (See Testing Safety System in the OPERATING section.)

Break In Electric Engagement Clutch (If Equipped)

1. Start engine and move machine to flat level surface.



MX46478

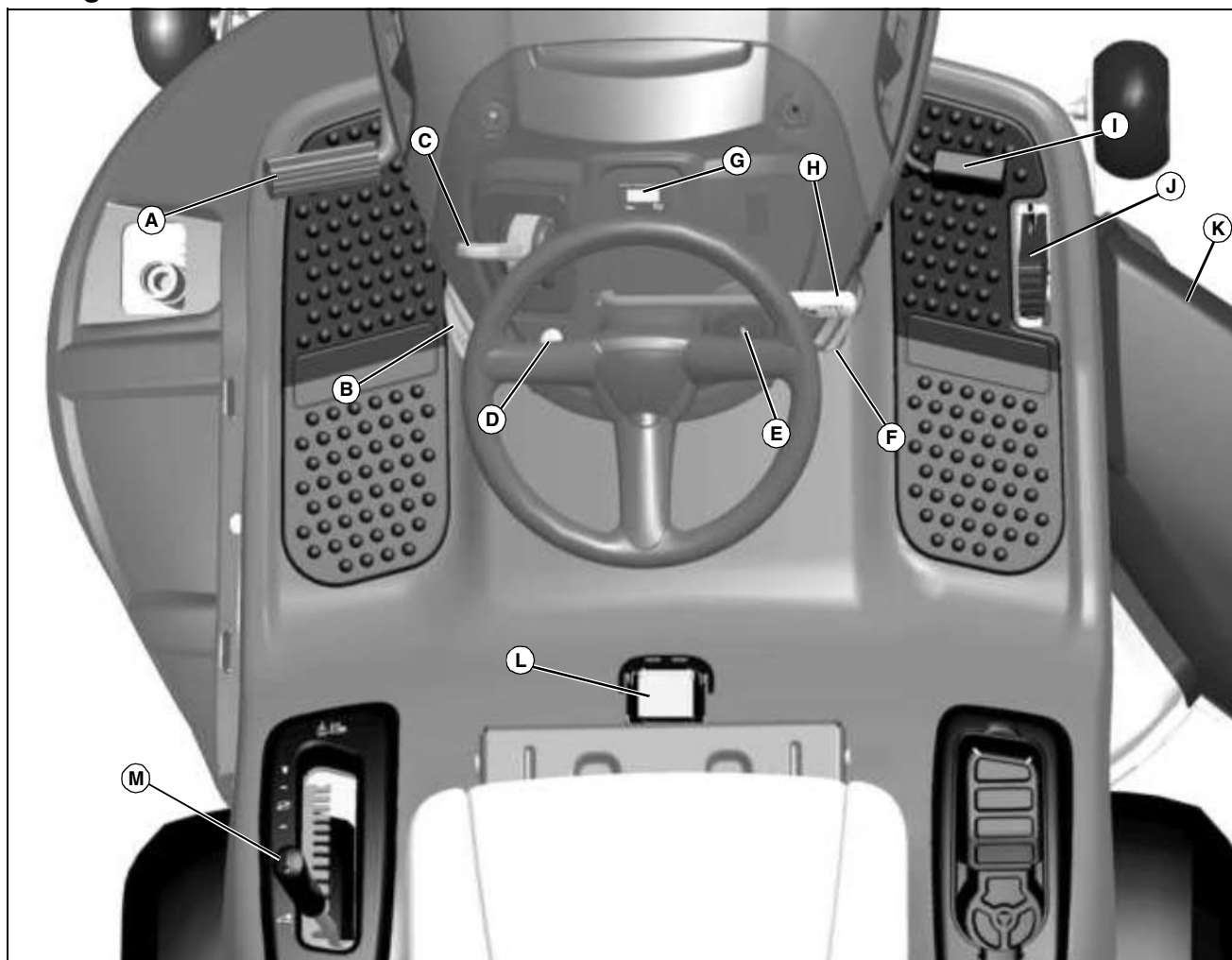
2. Push throttle lever (A) up to full throttle position.
3. Engage attachment engagement switch (B) and allow mower to run for 10 seconds.
4. Disengage attachment engagement switch and wait 10 seconds.
5. Repeat steps 3 and 4 for 12-15 cycles.

NOTE: Clutch is now properly burnished.

OPERATING CONTROLS

Operator Station Controls (X125, X145)

Operating Controls



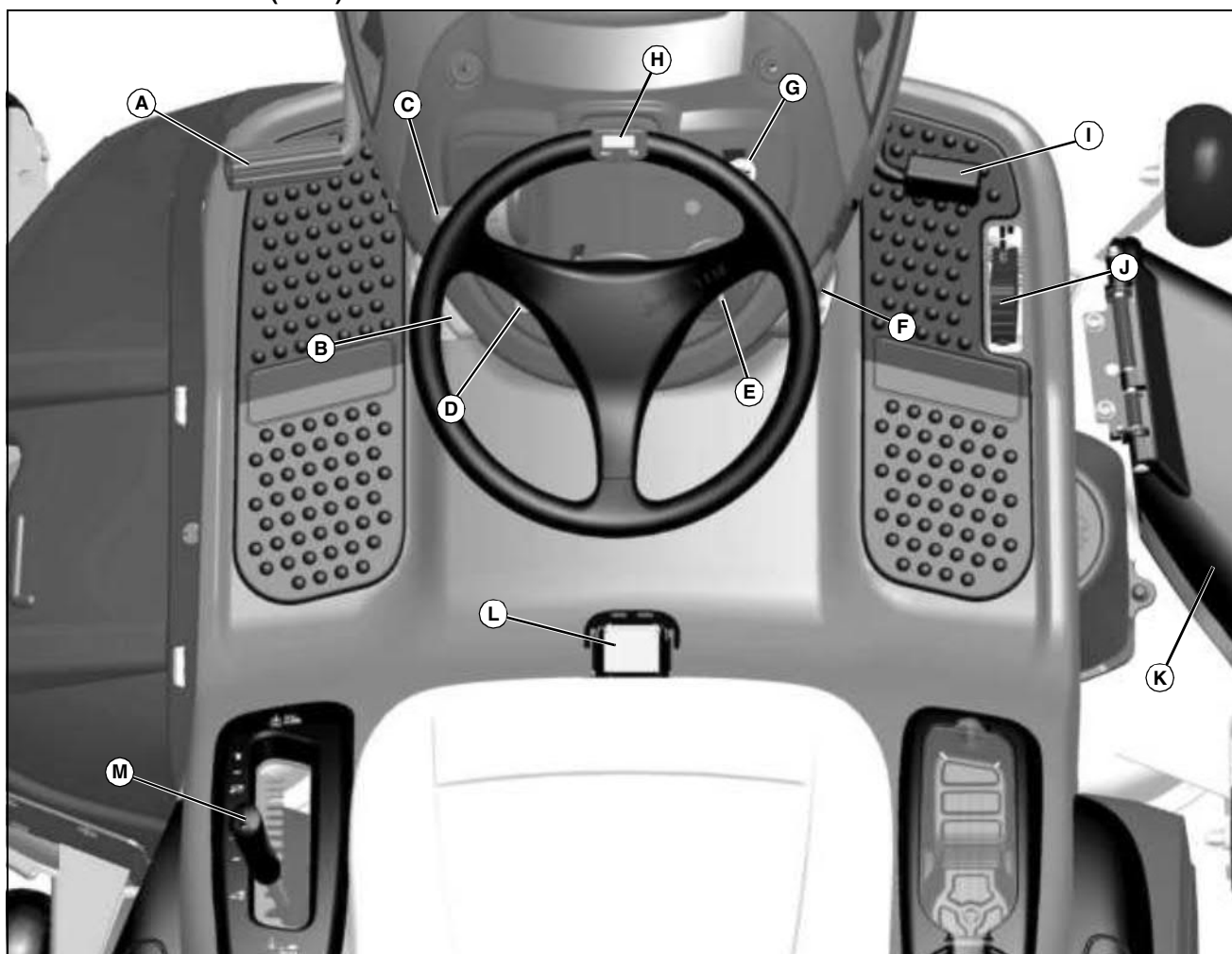
MX49398

Picture Note: Machine shown with step 2 shielding kit installed.

- A Brake Pedal
- B Park Brake Lock Lever
- C Throttle/Choke Lever
- D Reverse Implement Option (RIO) Switch
- E Key Switch
- F Cruise Control Lever (X145)
- G Service Reminder/Hour Meter
- H Attachment Engagement Lever
- I Forward Travel Pedal
- J Reverse Travel Pedal
- K Deflector Shield
- L Fuel Level Window
- M Attachment Lift Lever

OPERATING CONTROLS

Operator Station Controls (X165)



MX49399

Picture Note: Machine shown with step 2 shielding kit installed.

- A Brake Pedal
- B Park Brake Lock Lever
- C Throttle/Choke Lever
- D Reverse Implement Option (RIO) Switch
- E Key Switch
- F Cruise Control Lever
- G Attachment Engagement Switch
- H Service Reminder/Hour Meter
- I Forward Travel Pedal
- J Reverse Travel Pedal
- K Deflector Shield
- L Fuel Level Window
- M Attachment Lift Lever

OPERATING

Operating

Daily Operating Checklist

- ☐ Test safety systems.
- ☐ Check tire pressure.

IMPORTANT: Avoid damage! Using stale, contaminated or improper fuel can result in engine and fuel system damage. Repairs caused by stale, contaminated or improper fuel are not covered by warranty.

- ☐ Check fuel level. (See SERVICE MISCELLANEOUS section, Using Proper Fuel and Stabilizer)
- ☐ Check engine oil level.
- ☐ Remove grass and debris from engine compartment and muffler area, and on top of mower deck, before and after operating machine.
- ☐ Clean air intake screen.
- ☐ Check area below machine for leaks.

Avoid Damage to Plastic and Painted Surfaces

- Do not wipe plastic parts unless rinsed first. Using a dry cloth may cause scratches.
- Insect repellent spray may damage plastic and painted surfaces. Do not spray insect repellent near machine.
- Be careful not to spill fuel on machine. Fuel may damage surface. Wipe up spilled fuel immediately.
- Prolonged exposure to sunlight will damage hood surfaces.

Adjusting Seat

1. Sit in seat.



MX46483

2. Lean forward and slide seat forward or rearward to desired position. Do not lean back on top of seat to push rearward.
3. Release seat adjustment lever to lock in position.

Lumbar Seat Adjustment (X165)

- Turn lumbar seat adjustment dials (B) on either side of seat to adjust firmness of seat.

Adjusting Cutting Height

Cutting height can be adjusted from approximately 25 - 100 mm (1 - 4 in.) in 6.4 mm (1/4 in.) increments. When mower deck is in transport position, cutting height is approximately 100 mm (4 in.).

Detents allow the adjustment lever to be positioned at each indicated mower setting, as well as the mid-point between each setting.

Mower Setting	Approximate Cutting Height
1	25 mm (1 in.)
—	38 mm (1 1/2 in.)
2	50 mm (2 in.)
—	65 mm (2 1/2 in.)
3	75 mm (3 in.)
—	90 mm (3 1/2 in.)
4 (Transport)	100 mm (4 in.)

1. Put attachment lift lever into the slot adjacent to desired cutting height.
2. Adjust mower deck wheels.

Transporting or Getting On and Off Machine

- Pull attachment lift lever all the way back to transport position or 100 mm (4 in.) cutting height.

Checking Mower Deck Level



CAUTION: Avoid injury! Rotating blades are dangerous.

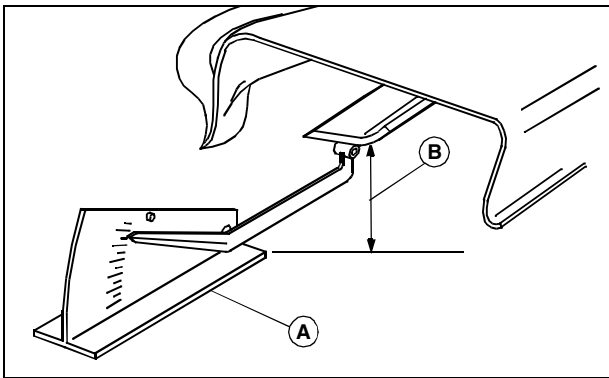
Before adjusting or servicing mower:

- Disconnect spark plug wire(s) or battery negative (-) cable to prevent engine from starting accidentally.
- Always wear gloves when handling mower blades or working near blades.

NOTE: Mower deck wheels should not contact the ground when leveling the mower deck.

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Inflate tires to the correct pressure.
3. Move mower lift handle to preferred cutting height.
4. Measure mower deck level (side-to-side).

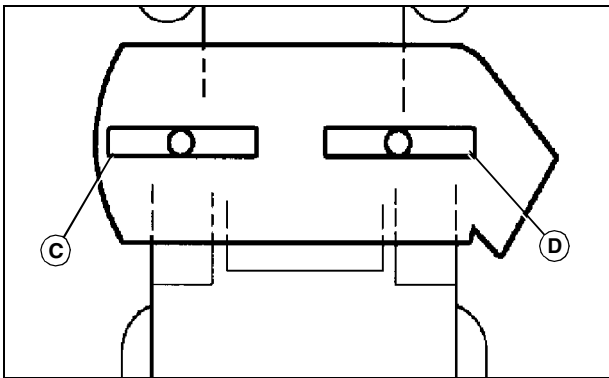
OPERATING



MX4871

Picture Note: A convenient leveling gauge (A) (AM130907) is available from your dealer.

a. Position mower blades as follows and measure from each outside blade tip (B) to the level surface.



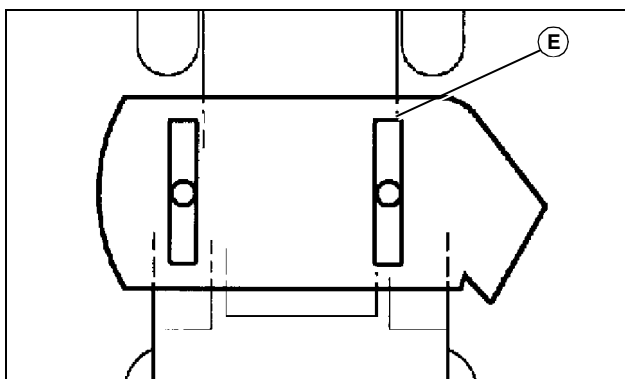
MX4896

b. Turn left blade (C) as shown. Hold drive belt and turn right blade (D) as shown. Take measurement for both blades.

The difference between blade measurements must not be more than 3 mm (1/8 in.).

c. Adjust mower deck level, if necessary.

5. Measure mower level (front-to-rear).



MX4896a

a. Turn right blade (E) so blade tip points straight forward.

b. Measure from blade tip to the surface. Take measurement for both blades.

The front blade tip must be 3–6 mm (1/8 - 1/4 in.) lower than rear blade tip.

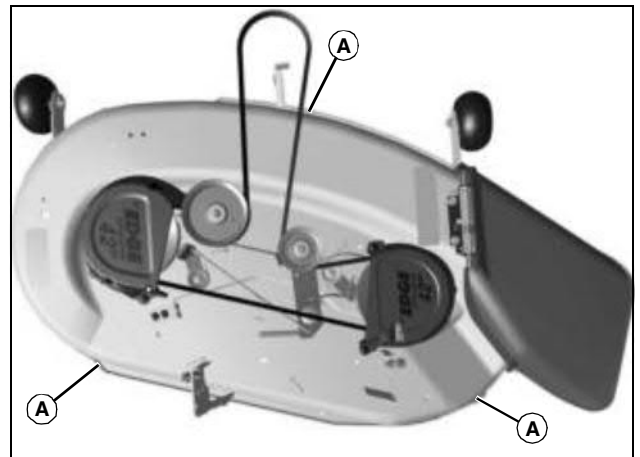
c. Adjust mower deck level if necessary.

Adjusting Mower Deck Level

NOTE: Mower deck wheels should not contact the ground when leveling the mower deck.

Method One

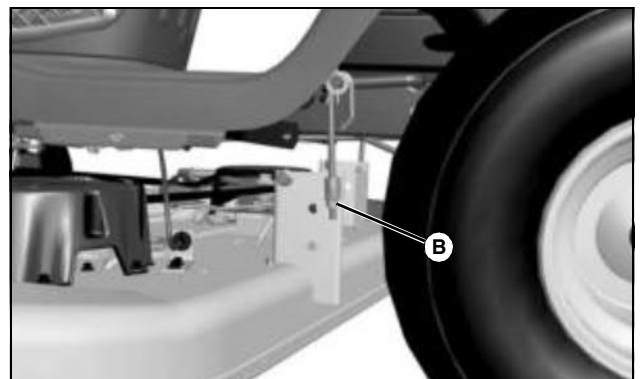
1. Make sure machine is on a flat, level surface.
2. Check that tires are inflated to correct tire pressure. Tire pressure is marked on the side of the tire.
3. Remove rear machine shields (See "Removing and Installing Machine Shields" in the Service Mower section).



MX43727

Picture Note: 107 cm (42 in.) mower deck shown

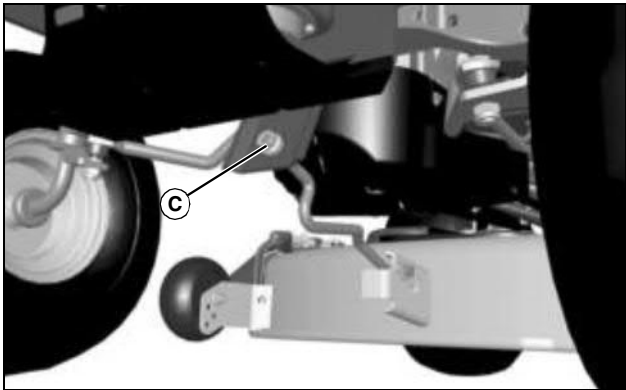
4. Place three short 51 mm (2 in.) blocks of wood under the edges (A) of the mower deck.
5. Lower mower deck to the 65 mm (2.5 in.) cutting height position.
6. Check that the mower deck is level and lightly touching each of the three wooden blocks.



MX43728

- If the rear of the mower deck is not touching the rear blocks, or is sitting heavily on the blocks, adjust the rear lift links by turning the leveling nut (B) on each lift link. The blocks should be able to easily slide in and out beneath the mower deck when the mower deck is correctly adjusted.

OPERATING



MX43729

Picture Note: 107 cm (42 in.) mower deck shown

- If the front of the mower deck is not lightly touching the front block, adjust the front draft arm by turning the nut (C).

7. Raise the cutting height to the next highest position and remove the three wooden blocks.

8. Turn the nut (C) on the front draft arm counterclockwise 1-2 full turns so that the front of the deck is 3-6 mm (1/8-1/4 in.) lower than the rear. This adjustment prevents "double cutting," which wastes horsepower and causes brown grass tips.

Method Two

NOTE: An optional mower deck leveling gauge (AM130907) is available from your John Deere dealer. It allows for precision mower deck leveling by measuring mower deck level at the blade tips.

1. Make sure machine is on a flat, level surface.
2. Check that tires are inflated to correct tire pressure. Tire pressure is marked on the side of the tire.
3. Lower mower deck to the 50 mm (2 in.) cutting height position.
4. With a tape measure or ruler, measure the left rear and right rear edge of the mower deck at points (A). If the two measurements are not equal, turn the leveling nut (B) on each rear lift link to adjust. Repeat procedure until rear corners of the mower deck are level.
5. Measure the front edge of the mower deck directly below the front draft arm hanger at point (A).
 - If necessary, turn the front draft arm nut (C) counterclockwise so the front edge of the mower deck is 3-6 mm (1/8-1/4 in.) lower than the rear corners of the mower deck.

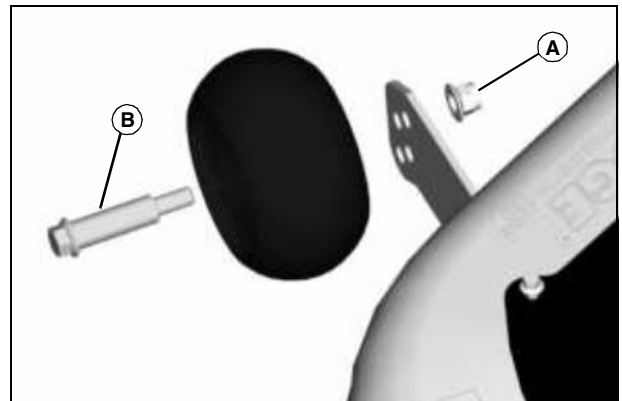
Adjusting Mower Deck Wheels

IMPORTANT: Avoid damage! The mower deck can be damaged if mower wheels are adjusted wrong:

- Wheels must not ride on ground supporting mower weight.
- Check wheel adjustment each time cutting height is changed.

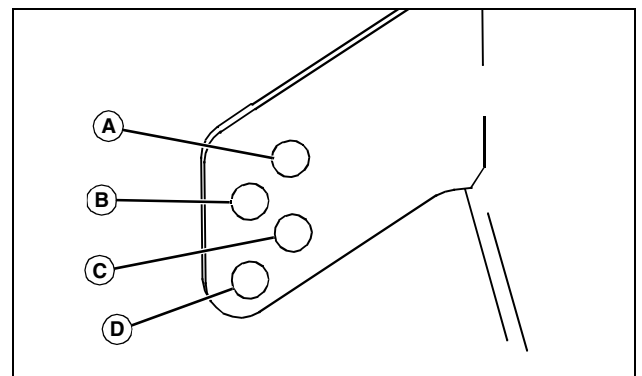
1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Inflate tires to the correct pressure.
3. Lower mower deck to the desired mowing position.

NOTE: Bottom of wheels should be approximately 3-13 mm (1/8-1/2 in.) from the ground.



MX10509a

4. Check each mower wheel position. Remove nut (A) and bolt (B), and move mower wheel to proper hole.

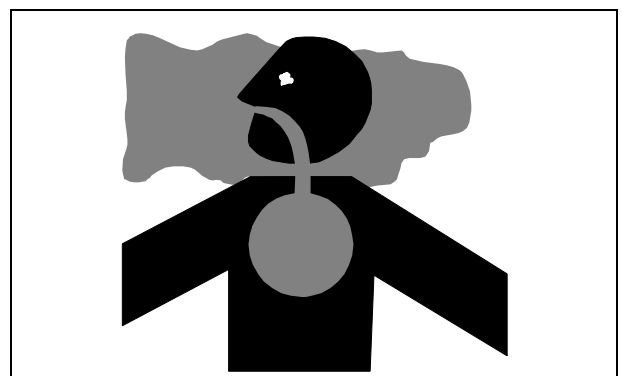


MIF

- A- 38 mm (1.5-in.)
- B- 51 mm (2-in.)
- C- 64 mm (2.5-in.)
- D- 76 mm (3-in.) and above

5. Install bolts and nuts to lock wheels in position. Tighten nuts to 34 N•m (25 lb-ft).

Testing Safety Systems



OPERATING



CAUTION: Avoid injury! Engine exhaust fumes contain carbon monoxide and can cause serious illness or death. Do not run an engine in an enclosed area, such as a garage, even with doors or windows opened. Move the machine to an outside area before running the engine.

The safety systems installed on your machine should be checked before each machine use. Be sure you have read the machine operator manual and are completely familiar with the operation of the machine before performing these safety system checks.

Use the following checkout procedures to check for normal operation of machine.

If there is a malfunction during one of these procedures, do not operate machine. **See your authorized dealer for service.**

Perform these tests in a clear open area. Keep bystanders away.

Testing Park Brake Switch

1. Park machine safely. (See Parking Safely in the SAFETY Section.)
2. Sit on seat.
3. Unlock the park brake.
4. Try to start engine.

Result: Engine must not start. If engine starts, there is a problem with your safety interlock circuit.

Testing Park Brake

1. Park machine safely. (See Parking Safely in the SAFETY Section.)
2. Lock the park brake.
3. Pull out bypass rod located at rear of machine.
4. Try to push machine manually.

Result: Park brake must prevent machine from moving. If machine moves, parking brake needs to be adjusted.

Testing Attachment Engagement Switch or Lever



CAUTION: Avoid injury! The mower blades should stop in approximately five seconds when the mower or PTO is disengaged. If you believe that your blades may not be stopping in that period of time, take your machine to your authorized dealer where they can safely check and service your machine.

1. Park machine safely. (See Parking Safely in the SAFETY Section.)
2. Sit on seat.
3. Lock the park brake.
4. Engage mower:
 - On models with electric attachment engagement switch, pull switch up.
 - On models with mechanical attachment engagement lever, push lever forward.
5. Try to start engine.

Result: Engine must not start. If engine starts, there is a problem with your safety interlock circuit.

Testing Seat Switch

1. Park machine safely. (See Parking Safely in the SAFETY Section.)
2. First test:
 - a. Start engine.
 - b. Move throttle lever up to maximum engine speed.
 - c. Unlock park brake.
 - d. Engage mower.
 - e. Raise up off seat. Do not get off machine.

Result: Engine and mower blades should stop. If engine and mower blades do not stop, there is a problem with your safety interlock circuit.

3. Second test:
 - a. Lock park brake.
 - b. Disengage mower.
 - c. Start engine.
 - d. Unlock park brake.
 - e. Raise up off seat. Do not get off machine.

Result: Engine should stop. If engine does not stop, there is a problem with your safety interlock circuit.

4. Third test:
 - a. Disengage mower.
 - b. Start engine.
 - c. Lock park brake.
 - d. Raise up off seat. Do not get off machine.

Result: Engine should continue to run. If engine stops, there is a problem with your safety interlock circuit.

Testing Reverse Implement Option (RIO)

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Start engine.
3. Engage attachment engagement switch or lever to start attachment.



CAUTION: Avoid injury! Rotating blades are dangerous. Children or bystanders may be injured by runover and rotating blades. Before backing up, carefully check the area around the machine.

4. Look behind the vehicle to be sure there are no bystanders.
5. Begin reverse travel by depressing reverse foot pedal.

Result: Attachment and engine should stop operation. If attachment or engine continues to operate as machine begins travel in reverse, do not continue to operate machine.

OPERATING

Using the Park Brake



CAUTION: Avoid injury! Children or bystanders may attempt to move or operate an unattended machine. Always lock the park brake and remove the key before leaving the machine unattended.

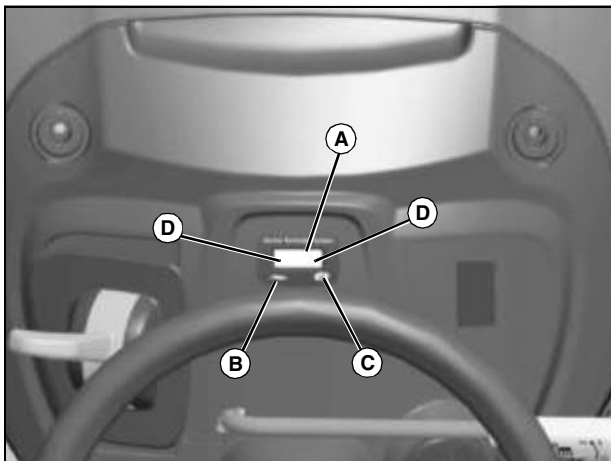
Locking park brake:

1. Push and hold brake pedal down.
2. Pull park brake lever up to lock park brake.
3. Release brake pedal. Pedal should stay down and park brake lever should stay locked.

Unlocking park brake:

1. Push and hold brake pedal down.
2. Push park brake lever down to unlock park brake.
3. Release brake pedal.

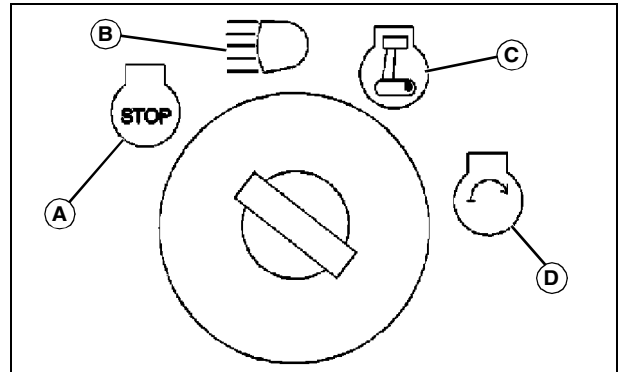
Using the Hourmeter and Service Reminder



MX49388

- The hourmeter (A) shows the number of hours the engine has run. The service reminder will indicate that a general lubrication (B) or mower/engine (C) service interval has been reached. When service is required, the service "SVC" arrows (D) will periodically flash for two hours. Follow the service timetable on the maintenance schedule located under the seat. For specific service procedures, see the Service section of this manual.
- Hourmeter cannot be reset.
- The hourmeter display will always be on.
- The decimal point will flash while the hourmeter is accumulating time.

Using Key Switch and Headlights



M94336a

A- STOP Position

B- Headlights On Position

C- Run Position

D- Start Position

Engine Off

NOTE: Headlights will drain the battery rapidly if key switch is left in headlights on position (B) with the engine off.

- To turn headlights on, turn key switch to headlights on position (B).
- To turn headlights off, turn key switch to STOP position (A).

Engine On

- To turn headlights on, start engine, then turn key switch from run position (C) to headlights on position (B).
- To turn headlights off, turn key switch from headlights on position (B) to run position (C).

Starting the Engine

IMPORTANT: Avoid damage! The transmission might be damaged if the bypass rod is not pushed back to operating position before attempting to start the engine. Do not start or operate the machine with the bypass rod in the push position.

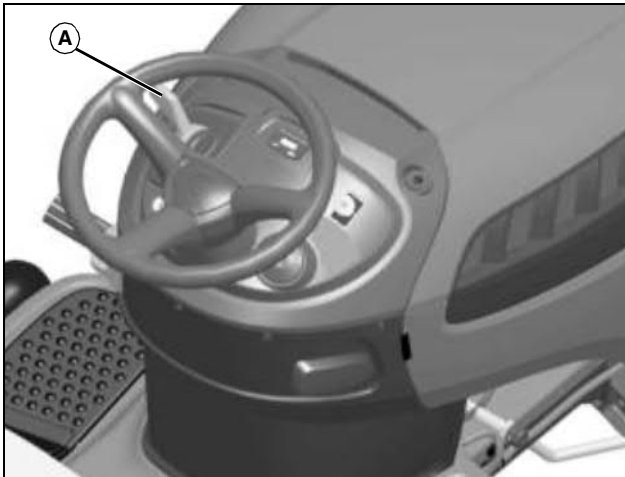
1. Make sure bypass rod is pushed in.



CAUTION: Avoid injury! Engine exhaust fumes contain carbon monoxide and can cause serious illness or death. Do not run an engine in an enclosed area, such as a garage, even with doors or windows opened. Move the machine to an outside area before running the engine.

2. Sit in seat.
3. Make sure mower is disengaged. (See Engaging and Disengaging Mower in the OPERATING section.)
4. Lock the park brake.
5. Check starting conditions:

OPERATING



MX49386

- If engine is cold: Move throttle/choke lever (A) up to the choke position.
- If engine is warm: Move throttle/choke lever (A) to the half-speed position.

IMPORTANT: Avoid damage! Starter may be damaged if starter is operated for more than 20 seconds at a time:

- Wait two minutes before trying again if engine does not start.

6. Turn key to start position for no more than five seconds.
7. Release key to run position when engine starts, and gradually move choke lever down to the off position.
 - If engine does not start, wait 10 seconds.
 - Turn key to start position again for no longer than 5 seconds.
 - Repeat procedure if necessary.

IMPORTANT: Avoid damage! Unnecessary engine idling may cause engine damage. Excessive idling can cause engine overheating, carbon build-up, and poor performance.

8. Let engine run at high idle for a couple of minutes to warm-up before operating machine.

Idling the Engine

IMPORTANT: Avoid damage!

Unnecessary engine idling may cause engine or transmission damage. Excessive idling can cause engine overheating, carbon build-up, and poor performance.

Idling or low throttle operation while mowing, climbing hills, or towing could result in transmission overheating. Always operate at full throttle once the engine is warm.

Do not operate machine with hood open. Hood must be closed for proper engine cooling and exhaust.

- Engine is air cooled and needs a large volume of air to keep cool. Keep air intake screen on top of engine clean.
- Keep hood closed when engine is idling.

Stopping the Engine

IMPORTANT: Avoid damage! Do not stop the engine by moving choke control to the choke position. Backfire, fire or engine damage can occur. Follow recommended procedure for stopping engine.

1. Let engine run at high throttle without load for a few seconds.
2. Turn key to STOP position. Engine will stop and headlights will turn off.
3. Remove key.
4. Lock the park brake.

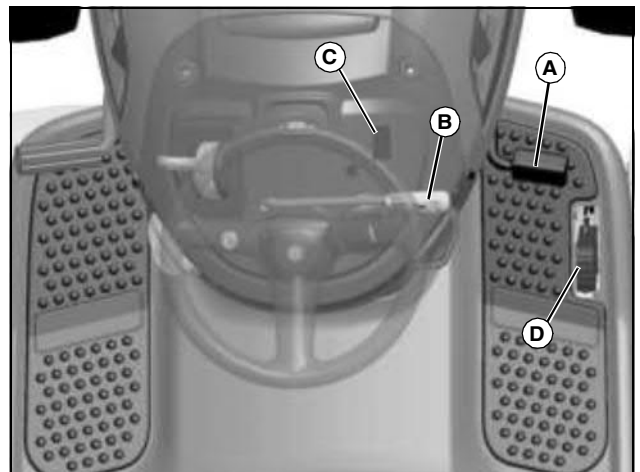
Using Travel Controls on Hydrostatic Transmission



CAUTION: Avoid injury! Children or bystanders may be injured by runover and rotating blades. Before traveling forward or rearward:

- Carefully check the area around the machine.
- Disengage the mower before backing up.

Travel Forward



MX46484

- Push down the forward travel pedal (A).

Travel in Reverse

NOTE: Any operating attachment and the engine will stop as the reverse foot pedal is pressed with attachment engaged.

1. Disengage attachment:
 - On models with mechanical attachment engagement lever (B), pull lever back to the off position.
 - On models with electric attachment engagement switch, push switch in location (C) (not shown above) down to the off position.
2. Look behind the machine to be sure there are no bystanders nearby.
3. Touch the reverse travel pedal (D) with front of foot and slide foot over pedal from front to rear.

Emergency Stopping

- Push down brake pedal.

OPERATING

Using The Reverse Implement Option (RIO)



CAUTION: Avoid injury! Children or bystanders may be injured by runover and rotating blades. Before traveling forward or rearward:

- Carefully check the area around the machine.
- Disengage the mower before backing up.

NOTE: Backing up while the mower is engaged is strongly discouraged. The Reverse Implement Option should be used only when operating another attachment or when the operator deems it necessary to reposition the machine with the mower engaged.

1. Stop forward travel.
2. Look behind the machine to be sure there are no bystanders.



MX46484

3. Push and hold in the reverse implement switch (A) while depressing reverse foot pedal slightly.

NOTE: If the engine and mower stop while repositioning the machine, return the attachment engagement lever/switch to the off position. Start engine and engage mower. Begin again with Step 2.

4. Release the reverse implement switch and reposition the machine as the machine begins to move rearward.
5. Resume forward travel. The mower should continue operating.
6. Repeat procedure to position the machine again.

Using Cruise Control (X145, X165))



CAUTION: Avoid injury! Do not use cruise control when going down hills. Machine speed will increase. Operate machine in a large, open area to learn how the cruise control works.

Use cruise control when you want to maintain travel speed without having to hold the forward travel pedal down. Cruise control operates only for forward travel.

Engage Cruise Control

1. Push forward pedal down until you reach desired travel speed.
2. Pull cruise control lever up and release forward pedal to lock the cruise

control.

Disengage Cruise Control

- Depress brake pedal, tap on forward pedal or push cruise control lever down to the off position.

Engaging and Disengaging Mower

NOTE: Put attachment lift lever in transport position to transport machine or when parking machine.

1. Start engine and run at half speed for a couple of minutes to warm up.
2. Lower mower deck to desired cutting height position.

NOTE: Throttle lever should be at full throttle position before engaging mower to avoid stalling engine.

3. Push throttle lever up to the full throttle position.
4. Engage mower.

- On models with electric attachment engagement switch: Pull switch up.
- On models with mechanical attachment engagement lever: Push lever forward.

NOTE: The mower and engine will stop as the reverse foot pedal is pressed for Hydrostatic Transmission

5. Disengage mower blades before moving in reverse or stopping engine.
 - Machines with mechanical attachment engagement lever: Pull lever back.
 - Machines with electric attachment engagement switch: Push switch down.

Using Mulch Cover (107 cm (42 in.) and 122 cm (48 in.) Mower Decks (If Equipped)



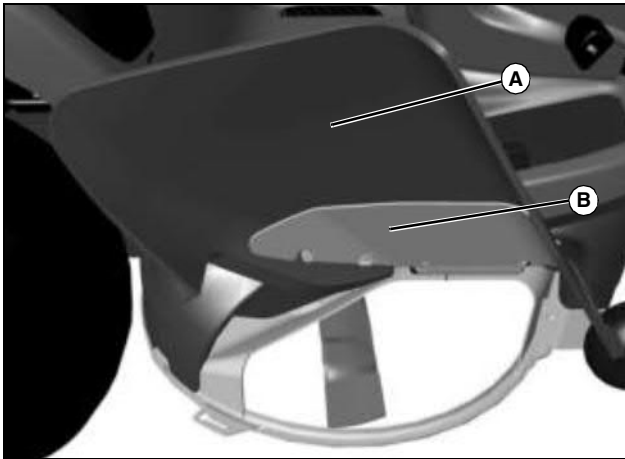
CAUTION: Avoid injury! Rotating blades are dangerous.

Before adjusting or servicing mower:

- Disconnect spark plug wire(s) or battery negative (-) cable to prevent engine from starting accidentally.
- Always wear gloves when handling mower blades or working near blades.

NOTE: Remove mulch cover for side discharge operation.

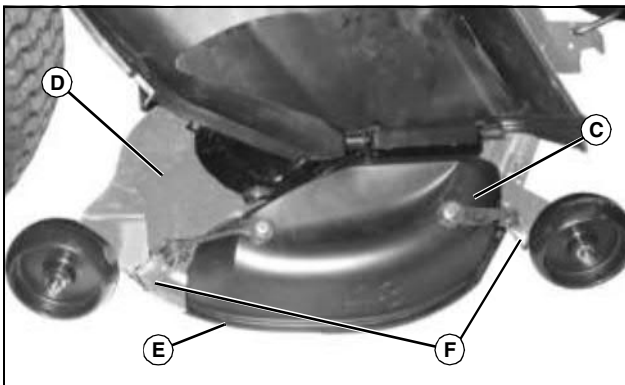
OPERATING



MX43726

Picture Note: 107 cm (42 in.) used for illustration.

1. Raise discharge chute (A) and metal deflector (B).

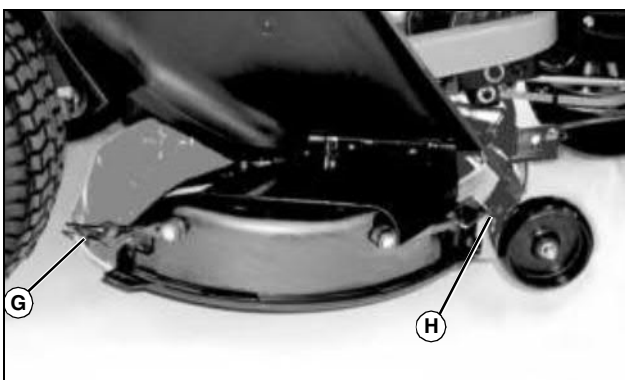


MX10440Y

2. Install mulch cover (C) onto mower deck (D). Mulch cover lip (E) must be seated in mower deck groove.

3. Hook mulch cover to mower deck:

- On 122 cm (48 in.) deck, wheel bracket grooves (F).



MX8868Y

- On 107 cm (42 in.) deck, slot (G) on left side and wheel bracket hole (H).

4. Lower discharge chute and metal deflector.
5. Make sure bagger blades are not installed for maximum mulching operation.

Unplugging Mower, Bagger, or Material Collection System



CAUTION: Avoid injury! Do not attempt to unplug attachment with machine running.

- Rotating blades are dangerous. Shut off the engine and remove the key before getting off the seat to inspect the machine and attachment.
- Thrown objects can cause serious injury. Make sure all machine parts are stopped before raising hopper top or removing chutes.

Checking For Plugging While Driving

If grass builds up in front of mower discharge chute, check for plugged chute or problems with blower assembly (if equipped).

If there is a trail of clippings behind mower or clippings blow to the side, check for plugged chute, full collector bags, or problems with blower assembly.

Removing Debris From Inspection Points:



CAUTION: Avoid injury! Do not use hands or feet to clear plugged mower deck or blower assembly. Stored energy can cause blades to rotate.

1. Park machine safely. Wait for all moving parts to stop before getting off to inspect machine.
2. Open hopper cover. Check chute outlet.
3. Remove chute from mower deck or blower assembly. Check chute inlet.
4. Check under mower deck for debris.

Pushing Machine



CAUTION: Avoid injury! When the bypass rod is pulled out, the machine will have unrestricted motion.

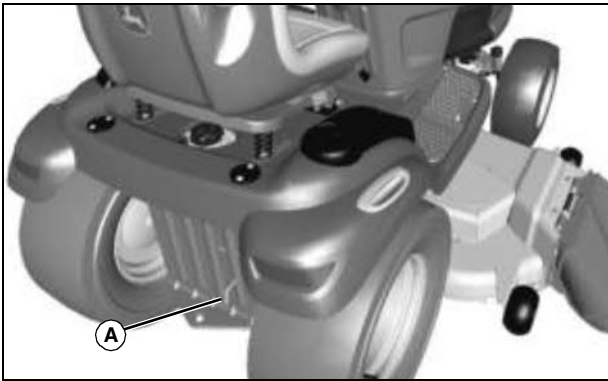
- Do not pull out the bypass rod when the machine is stopped on an incline to prevent it from going downhill out of control.

IMPORTANT: Avoid damage! Transmission damage may occur if the machine is towed or moved incorrectly:

- Move machine by hand only.
- Do not use another vehicle to move machine.
- Do not tow machine.

1. Unlock the park brake.

OPERATING



MX138456

2. Pull out bypass rod (A).
3. Push machine to desired location.

IMPORTANT: Avoid damage! The transmission might be damaged if the bypass rod is not pushed back to operating position before attempting to start the engine. Do not start or operate the machine with the bypass rod in the push position.

4. Push bypass rod back in.

Transporting Machine on Trailer

NOTE: Trailer capacity must exceed combined machine weight and attachment weight. (See Specifications section in operator's manual.)

Be sure the trailer has all necessary lights and signs required by law.



CAUTION: Avoid injury! Use extra care when loading or unloading the machine onto a trailer or truck.

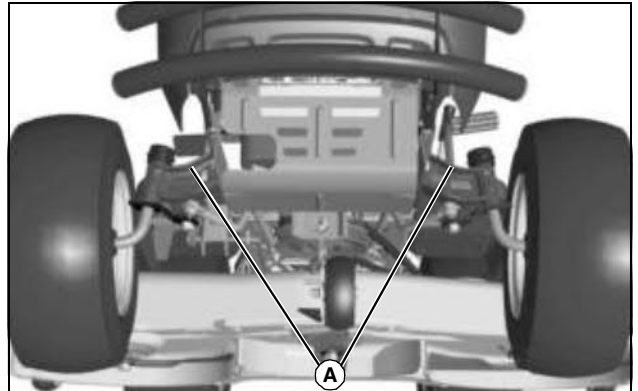
- Park trailer on a level surface.
- Use of a trailer with sides is recommended.
- Keep wheels away from drop-offs and edges.
- Back slowly and in a straight line.
- Close fuel shut-off valve, if your machine is equipped.
- Do not secure machine using optional bumper as this can dislodge during transport.

IMPORTANT: Avoid damage! Transporting a machine on a trailer or on a truck bed at high speeds can result in hood or engine cover raising and possibly coming off machine if not secured.

- Position machine on trailer so hood or engine cover opens from rear of trailer to prevent wind from blowing hood or cover open.
- Secure hood or engine cover with existing machine locks or latches.
- Secure hood or engine cover with tie down straps if no locks or latches exist.

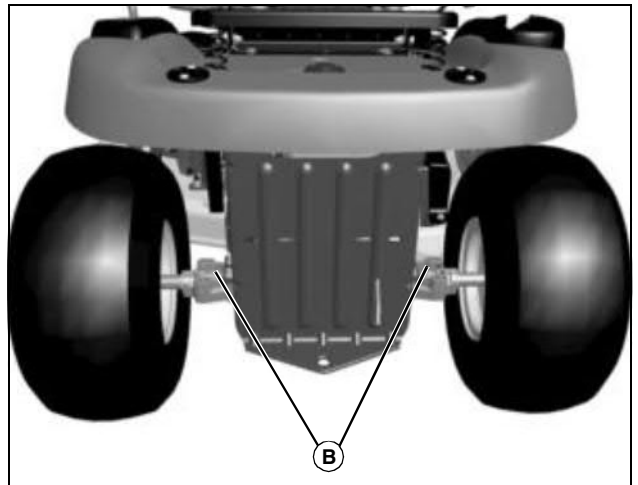
1. Park trailer on a level surface.
2. Raise mower deck, if installed, before driving machine onto trailer.
3. Drive machine onto heavy-duty trailer. Position machine on trailer so hood or engine cover will not raise in wind while being transported.

4. Lower mower deck completely.
5. Lock park brake.
6. Turn off machine and remove key.



MX49387

7. Secure front of machine at both sides of the axle at points (A) to trailer with heavy-duty straps, chains, or cables. Straps must be directed down and outward from machine.



MX43712

8. Secure rear of machine at both sides of the axle at points (B) to trailer with heavy-duty straps, chains, or cables. Straps must be directed down and outward from machine.
9. Secure hood to prevent from lifting while driving.

Using Weights



CAUTION: Avoid injury! The machine may become unstable when operating on slopes and/or with some attachments.

Use weights to improve stability when operating on slopes or using attachments.

Remove weights when not required.

OPERATING

IMPORTANT: Avoid damage! Never use liquid in tires or wheel weights as ballast. Transmission damage can occur.
When rear ballast is needed, use only the approved rear weight bracket and attaching weights.

NOTE: See your authorized dealer for recommended weights.

- Install front weights for added stability and steering control when you use equipment such as the rear-mounted grass bagger.
- Install rear weights when using the snow blade or snowblower.
- Remove weights when not required.

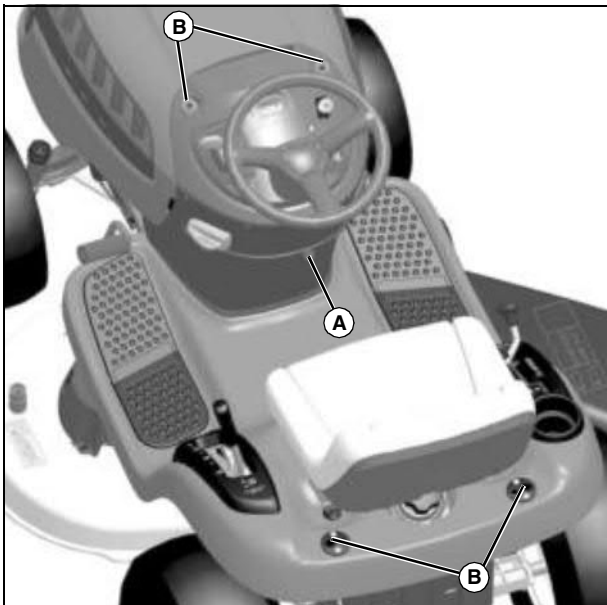
Using Tire Chains

IMPORTANT: Avoid damage! Do not use chains with mower deck or tiller.

Tire chains are recommended for use with most front attachments. Remove tire chains before installing mower deck.

See your attachment Operator's Manual for tire chain recommendation. See your authorized dealer for the chains.

Using Accessories



MX46479

Using the Power Port (If Equipped)



CAUTION: Avoid injury! Safe operation requires your full attention. Do not wear radio or music headphones while operating machine.

An electric power port (A) can be used for accessories. See your authorized dealer.

Using Cargo Mount System™

The front and rear Cargo Mount System™ brackets (B) can be used for easy attachment of selected optional equipment.

Use John Deere approved optional equipment only. See your Authorized

Service Center for approved optional equipment.

Choosing Mower Blades

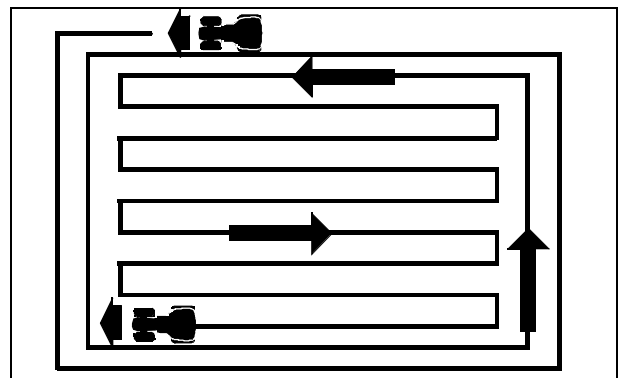
Three types of mower blades are available for use with X100 series mowers.

- 3-N-1 blades. These are general purpose blades that are best suited for side-discharge operation, but can be used with a bagger attachment, or with a mulch cover installed. They are not designed for optimal performance when bagging or mulching.
- Bagger blades. These blades are designed for optimal performance when used with bagger attachments.
- Mulching blades. These blades are designed for optimal performance when used with a mulch cover installed.

Mowing Tips

The following recommendations will produce the best lawn cut quality and appearance:

- Keep mower blades sharp. Dull blades will tear grass; tips of grass will then turn brown.
- Cutting grass too short may kill grass and let weeds grow easily. The suggested finished cut height range is 44 - 70 mm (1.75 - 2.75 in.).
- Adjust cutting height to remove only 1/3 of the grass at a time.
- Do not mow wet grass.
- Mow grass often. Short grass clippings will decay quickly.
- Mow with engine at full throttle.
- Adjust travel speed to match mowing conditions:
 - Travel at slow speed when you mow thick, tall grass, make sharp turns or trim around objects.
 - Travel at moderate speed when you mow thin grass.
- Use a different mowing pattern each time you mow. Overlap mowing paths 50 - 100 mm (2 - 4 in.).
- Drive over ridges and through shallow ditches straight-on, not at an angle.



MIF

- Mow around the outside twice, then mow inside in straight passes. Best cut is achieved when mowing in a straight line.
- When mowing or mulching near pavement, overlap the pavement by 50 mm (2 in.) to allow clippings to dispense over grass.
- A thick layer of mulched leaves can prevent sunlight from getting to grass and smother it. Taller grass heights allow mulched leaves to dispense easier in lawn. Mulch leaves several times if needed.
- Use a thatcher in late spring or summer to pull up dead grass and aerate

REPLACEMENT PARTS

ground.

- For Mulching Mower: Shorter cut heights will provide better cut quality, but may leave noticeable clippings. Higher cut heights will reduce clippings, but cut quality may decline.

Replacement Parts

Service Literature

If you would like a copy of the Parts Catalog or Technical Manual for this machine call:

- **U.S. & Canada:** 1-800-522-7448.
- **All Other Regions:** Your John Deere dealer.

Parts

We recommend John Deere quality parts and lubricants, available at your John Deere dealer.

When you order parts, your John Deere dealer needs the serial number or product identification number (PIN) for your machine or attachment. These are the numbers that you recorded in the Product Identification section of this manual.

Order Service Parts Online

Visit <http://JDParts.deere.com> for your Internet connection to parts ordering and information.

Service Intervals

Servicing Your Machine

IMPORTANT: Avoid damage! Operating in extreme conditions may require more frequent service intervals:

- Engine components may become dirty or plugged when operating in extreme heat, dust or other severe conditions.
- Engine oil can degrade if machine is operated constantly at slow or low engine speeds or for frequent short periods of time.

Please use the following timetables to perform routine maintenance on your machine.

Park the vehicle safely. See Park Safely in the SAFETY Section.

Intervals

After First 8 Hours

- Change engine oil.
- On 107 cm (42 in.) deck: Check and adjust mower deck belt tension.
- On 107 cm (42 in.) deck: Check and adjust mower deck spindle brakes.
- Lubricate mower spindles
- Lubricate mower pivot points.
- Lubricate front axle pivot.
- Lubricate front axle wheel spindles and bushings.

Every 25 Hours

- Lubricate mower spindles.
- Lubricate mower pivot points.
- Lubricate front axle pivot.

- Lubricate front axle wheel spindles and bushings.

Every 50 Hours

- Change engine oil and replace filter. (Service more frequently under dusty conditions.)
- Clean/replace air filter precleaner. (Service more frequently under dusty conditions.)
- Replace air filter element. (Service more frequently under dusty conditions.)
- Clean/replace emission filter (if equipped).
- Clean engine cooling fins.
- Replace fuel filter.
- Replace spark plug(s).
- Clean battery terminals.
- Sharpen/replace mower blades.
- Check/replace mower drive belt.
- Clean mower deck.
- Check/level mower deck.
- On 107 cm (42 in.) deck: Check/adjust mower deck belt tension.
- On 107 cm (42 in.) deck: Check/adjust mower deck spindle brakes.

Every 200 Hours

- Check/adjust valve clearance. See your John Deere dealer for this service.

Service Lubrication

Grease

IMPORTANT: Avoid damage! Use recommended John Deere greases to avoid component failure and premature wear.

The recommended John Deere greases are effective within an average air temperature range of -29 to 135 degrees C (-20 to 275 degrees F).

If operating outside that temperature range, contact your Servicing dealer for a special-use grease.

The following greases are preferred:

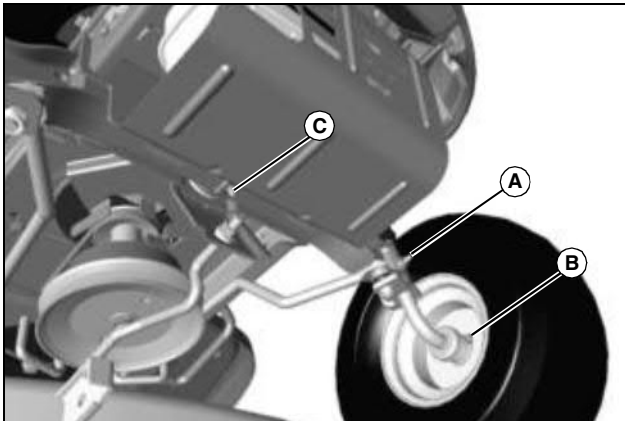
- John Deere Multi-Purpose SD Polyurea Grease
- John Deere Multi-Purpose HD Lithium Complex Grease

If not using any of the preferred greases, be sure to use a general all-purpose grease with an NLGI grade No.2 rating.

Wet or high speed conditions may require use of a special-use grease. Contact your Servicing dealer for information.

SERVICE ENGINE

Lubricating Front Axle



Wheel Spindles and Bushings

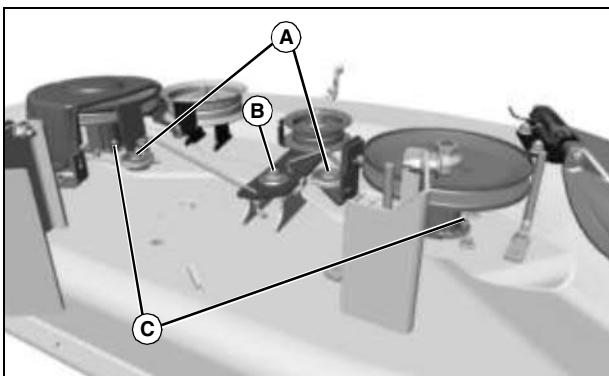
- Lubricate front wheel spindle grease fitting (A) and wheel hub grease fitting (B), one on each side, with one or two shots of general all-purpose grease.

Front Axle Pivot

- Lubricate front axle center pivot grease fitting (C) with one or two shots of general all-purpose grease.

Lubricating Pivot Points

107 cm (42 in.) Mower Deck:



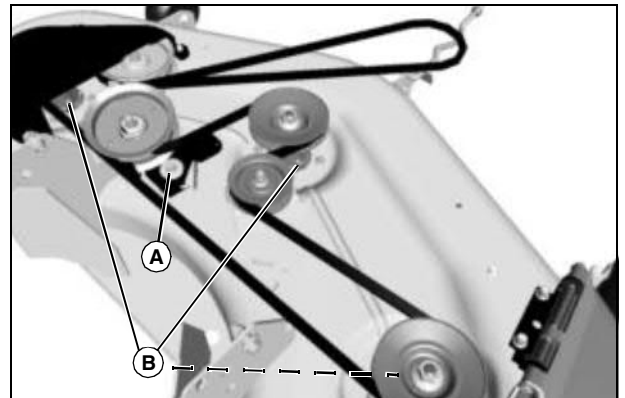
A- Blade Brake Pivots

B- Deck Idler Pivot

C- Spindle Grease Fitting (2)

- Lubricate the blade brake pivots (A) and deck idler pivot (B) with a general all-purpose spray lubricant.
- Lubricate the two spindle grease fittings (C) with one or two shots of general all-purpose grease.

122 cm (48 in.) Mower Deck:



A- Deck Idler Pivot

B- Spindle Grease Fitting (3)

- Lubricate the deck idler pivot (A) with a general all-purpose spray lubricant.
- Lubricate the three spindle grease fittings (B) with one or two shots of general all-purpose grease.

Service Engine

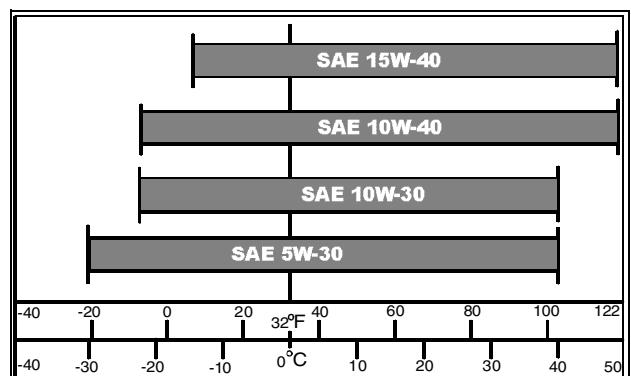
Avoid Fumes



CAUTION: Avoid injury! Engine exhaust fumes contain carbon monoxide and can cause serious illness or death. Do not run an engine in an enclosed area, such as a garage, even with doors or windows opened. Move the machine to an outside area before running the engine.

Engine Oil

Use oil viscosity based on the expected air temperature range during the period between oil changes.



The following John Deere oils are preferred:

- TURF-GARD™
- PLUS- 4™

SERVICE ENGINE

- PLUS-50™ II

Other oils may be used if above John Deere oils are not available, provided they meet the following specification:

- API Service Classification SJ or higher

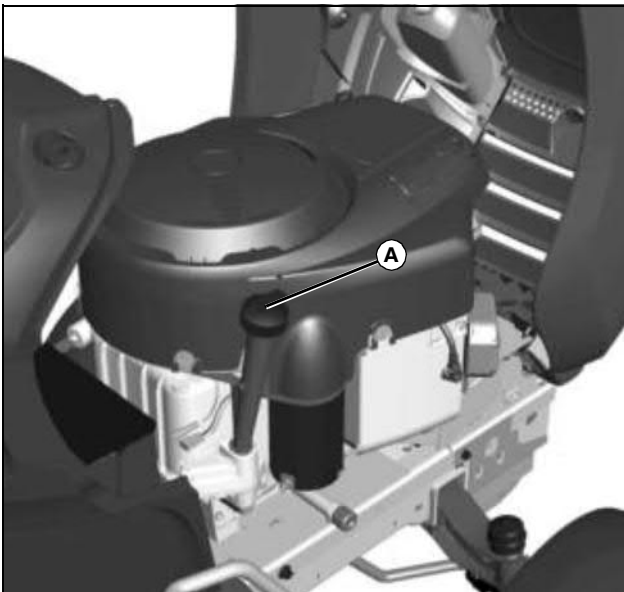
Checking Engine Oil Level

IMPORTANT: Avoid damage! Failure to check the oil level regularly could lead to serious engine problems if oil level is out of the operating range:

- Check oil level before operating.
- Check oil level when the engine is cold and not running.
- Keep oil level between the dipstick marks.
- Shut off engine before adding oil.

NOTE: Check oil twice a day if you run engine over 4 hours in a day. Make sure engine is cold when checking engine oil level.

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Lift hood.
3. Clean area around dipstick to prevent debris from falling into crankcase.



MX49394

Picture Note: Twin cylinder engine shown.

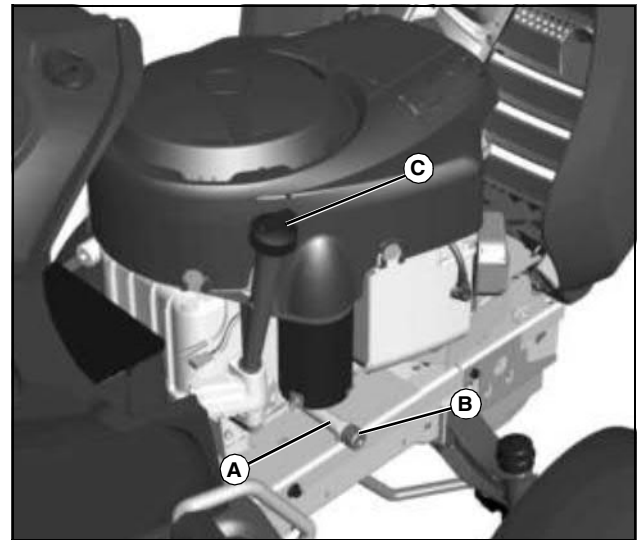
4. Remove dipstick (A). Wipe with clean cloth.
5. Install and tighten dipstick.
6. Remove dipstick.
7. Check oil level on dipstick. Oil must be between ADD and FULL marks.
8. If oil level is low, add oil to bring oil level no higher than FULL mark on dipstick. Do not overfill.
9. Install and tighten dipstick. Lower hood.

Changing Engine Oil and Filter

IMPORTANT: Avoid damage! Change the oil more often if the vehicle is used in extreme conditions:

- Extremely dusty conditions.
- Frequent slow or low-speed operation.
- Frequent short trips.

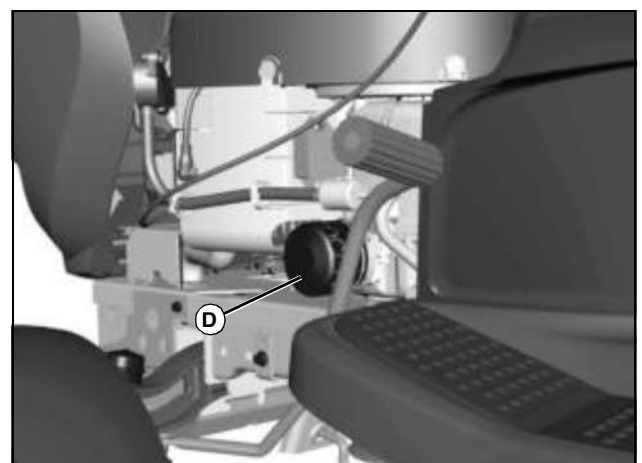
1. Run engine to warm oil.
2. Park machine safely. (See Parking Safely in the SAFETY section.)
3. Lift hood.



MX49394

Picture Note: Twin cylinder engine shown.

4. Put drain pan under drain valve (A).
5. Rotate and remove drain cap (B) and drain oil into oil drain pan. Allow oil to drain completely.
6. Remove dipstick (C).



MX49395

Picture Note: Twin cylinder engine shown.

7. Replace oil filter (D), if equipped.
 - a. Wipe dirt from around oil filter.

SERVICE ENGINE

- b. Place a drain pan or funnel under filter tray.
 - c. Remove old filter and filter gasket and dispose of properly. Wipe up any spilled oil.
 - d. Put a light coat of fresh, clean oil on the new filter gasket.
 - e. Install replacement oil filter by turning oil filter to the right (clockwise) until the rubber gasket contacts filter base. Tighten filter an additional one-half turn.
8. Install drain cap.

IMPORTANT: Avoid damage! Do not overfill. Overfilling can cause smoking, hard starting, fouling of spark plug, and oil saturation of air filter.

9. Add oil no higher than FULL mark on dipstick. Use approximately the amount of oil listed in the Specifications section. Do not overfill.
10. Install dipstick.
11. Start and run engine at idle to check for leaks. Stop engine. Fix any leaks before operating.
12. Check oil level. Add oil if necessary.

Cleaning Air Intake Screen and Engine Fins

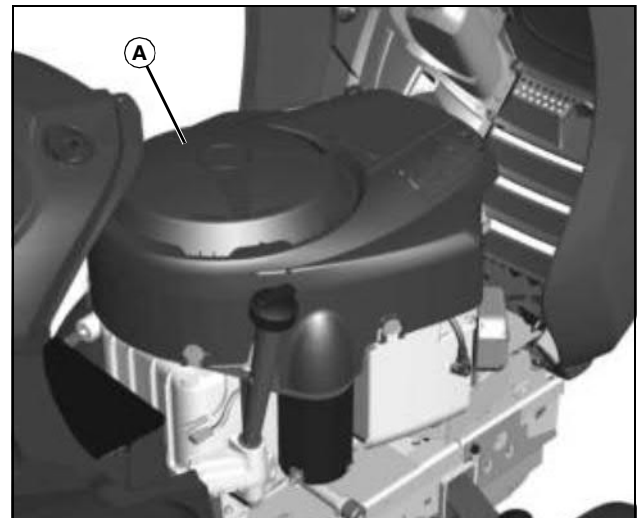


CAUTION: Avoid injury! Compressed air can cause debris to fly a long distance.

- Clear work area of bystanders.
- Wear eye protection when using compressed air for cleaning purposes.
- Reduce compressed air pressure to 210 kPa (30 psi).

IMPORTANT: Avoid damage! An obstructed air intake screen can cause engine damage due to overheating. Keep air intake screen and other external surfaces of the engine, including cooling fins, clean at all times to allow adequate air intake.

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Lift hood.



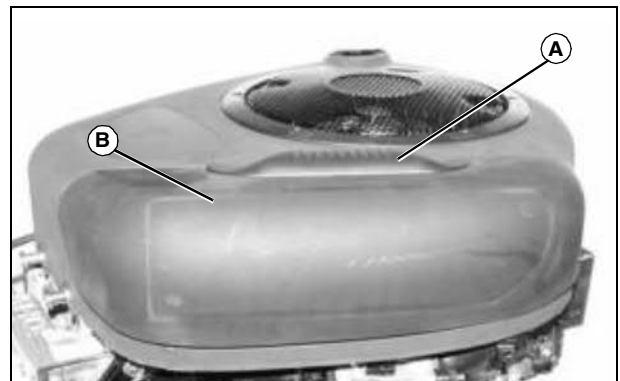
MX49394

Picture Note: Twin cylinder engine shown.

3. Clean air intake screen (A), cooling fins and external surfaces with rag, brush, vacuum or compressed air.
4. Lower hood.

Checking and Cleaning Air Cleaner Elements (Single Cylinder)

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Let engine cool.
3. Lift hood.
4. Clean dirt and debris from the air cleaner cover.



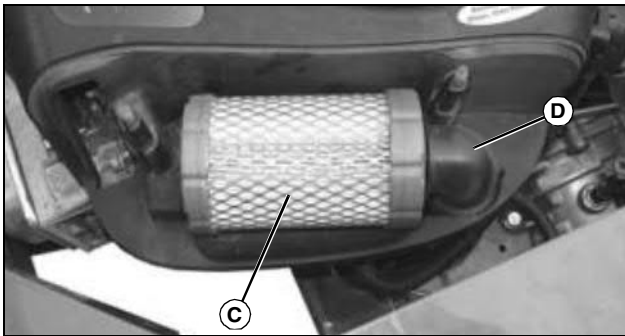
MX7680

5. Lift latch (A) to unlock cover (B). Lift cover forward and remove.

SERVICE ENGINE

IMPORTANT: Avoid damage! Dirt and debris can enter the engine through a damaged filter element:

- Do not wash paper element.
- Do not attempt to clean paper element by tapping against another object.
- Do not use pressurized air to clean element.
- Replace element only if it is very dirty, damaged or the seal is cracked.

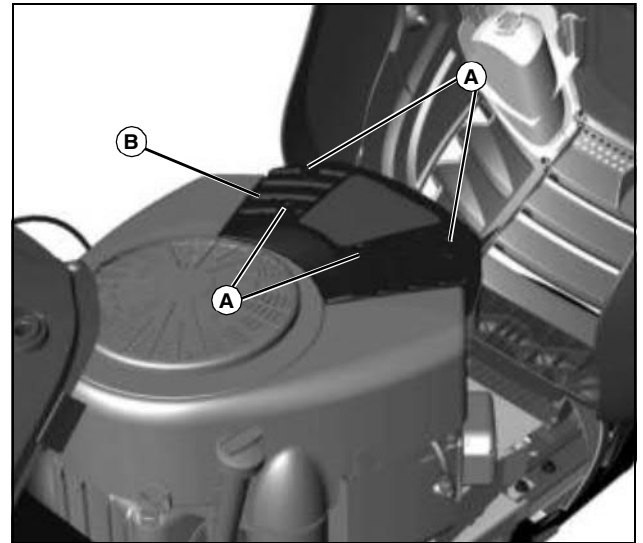


MX46573

6. Pull filter assembly (C) from air cleaner base (D).
7. Inspect the paper filter element. If the paper filter element is damaged or dirty, replace with new filter.
8. Clean air cleaner base very carefully, preventing any dirt from falling into carburetor.
9. Install new filter assembly back onto air cleaner base.
10. Install air cleaner cover and push latch down to lock.
11. Lower hood.

Checking and Cleaning Air Cleaner Elements (Twin Cylinder)

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Let engine cool.
3. Lift hood.
4. Clean dirt and debris from the air cleaner cover.

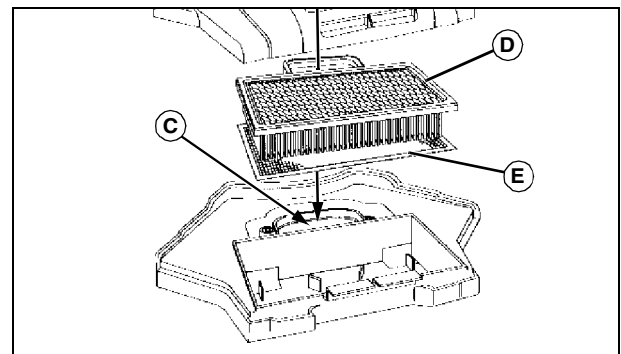


MX49397

Picture Note: Shown with closeout panel removed.

5. Loosen four knobs (A) and remove cover (B).

IMPORTANT: Avoid damage! To prevent engine damage, do not allow any foreign objects to fall into the carburetor air intake.



M96094

6. Do not drop anything into the carburetor air intake (C). If anything falls into the carburetor air intake it must be removed.
7. Lift out filter cartridge (D) and inspect it for damage.

IMPORTANT: Avoid damage! Dirt and debris can enter the engine through a damaged filter element:

- Do not wash paper element.
- Do not attempt to clean paper element by tapping against another object.
- Do not use pressurized air to clean element.
- Replace element only if it is very dirty, damaged or the seal is cracked.

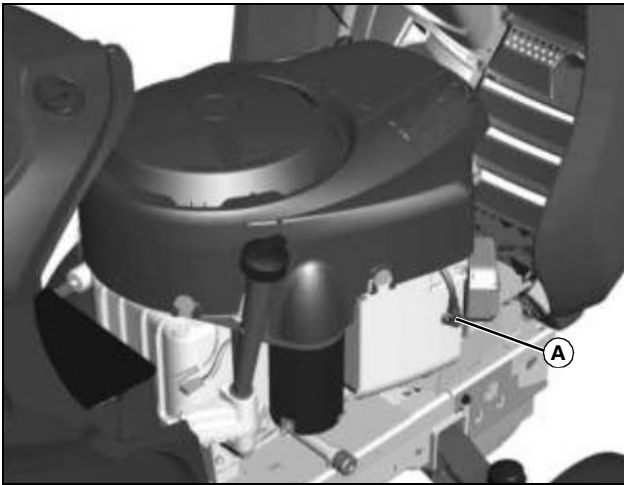
8. Inspect the foam pre-cleaner (E) without removing it. If the foam pre-cleaner is dirty:
 - a. Remove it from the filter carefully.
 - b. Wash pre-cleaner in a solution of warm water and liquid detergent.
 - c. Rinse pre-cleaner thoroughly. Squeeze out excess water in a dry cloth until pre-cleaner is completely dry.

SERVICE ENGINE

9. Clean air cleaner housing carefully. Prevent any dirt from falling into carburetor.
10. Install foam precleaner mesh side up.
11. Install cartridge. Make sure cartridge and seal are properly seated and sealing the carburetor air intake area.
12. Install air cleaner cover and tighten knobs. Do not overtighten.
13. Lower hood.

Checking Spark Plug

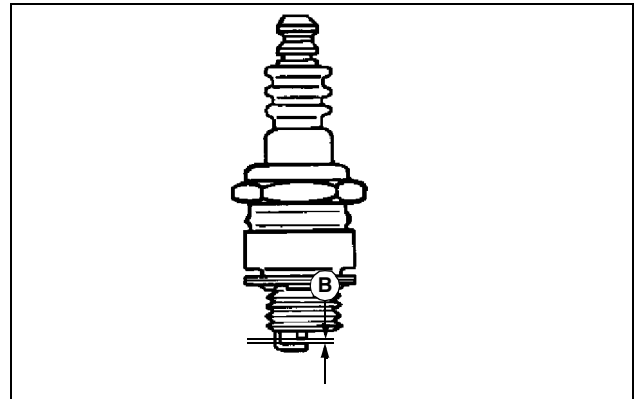
1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Let engine cool.
3. Lift hood.



MX49394

Picture Note: Twin cylinder engine shown.

4. Disconnect spark plug wire(s) (A), one on each side on V-twin engines.
5. Remove spark plug(s).
6. Clean spark plug carefully with a wire brush.
7. Inspect spark plug for:
 - Cracked porcelain.
 - Pitted or damaged electrodes.
 - Other wear or damage.
8. Replace spark plug as necessary.



M85200

9. Check plug gap (B) with a wire feeler gauge. To change gap, move the outer electrode.

- Gap must be 0.76 mm (0.030 in.).

10. Install and tighten spark plugs to 20 N•m (15 lb-ft).
11. Connect spark plug wires and lower hood.

Adjusting Carburetor

NOTE: Carburetor is calibrated by the engine manufacturer and is not adjustable.

If engine is operated at altitudes above 1829 m (6,000 ft), some carburetors may require a special high altitude main jet. See your authorized dealer.

If engine is hard to start or runs rough, check the TROUBLESHOOTING section of this manual.

Possible engine surging will occur at high throttle with transmission in N neutral and mower engagement lever disengaged. This is a normal condition due to the emission control system.

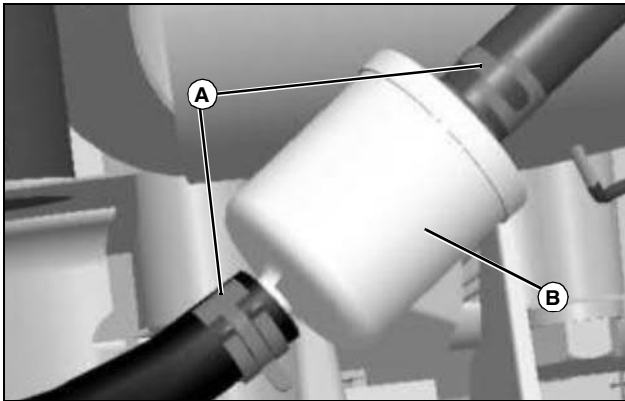
After performing the checks in the troubleshooting section and your engine is still not performing correctly, contact your authorized dealer.

Replacing Fuel Filter

NOTE: Change filter when fuel is low.

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Let engine cool.
3. Lift hood.
4. Handle fuel safely. (See Handling Fuel Safely in the SAFETY section.)
5. Put a drain pan under fuel filter.

SERVICE TRANSMISSION



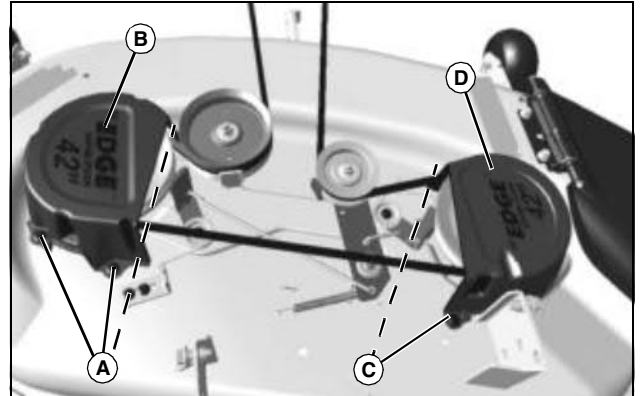
MX13768b

6. Slide hose clamps (A) away from fuel filter (B) using a pliers.
7. Disconnect hoses from filter, and raise fuel lines vertically to avoid fuel drainage.

IMPORTANT: Avoid damage! Incorrect installation of fuel filter may cause engine damage. Install the filter with the arrow pointing in the direction of fuel flow (towards the engine) for proper operation.

8. Connect hoses to new filter making sure the filter arrow is pointed in the direction of the fuel flow.
9. Install clamps and check for leaks.
10. Lower hood.

NOTE: Any time shields are removed, clean all debris from the top surface of the mower deck and under all sheaves before shield installation.



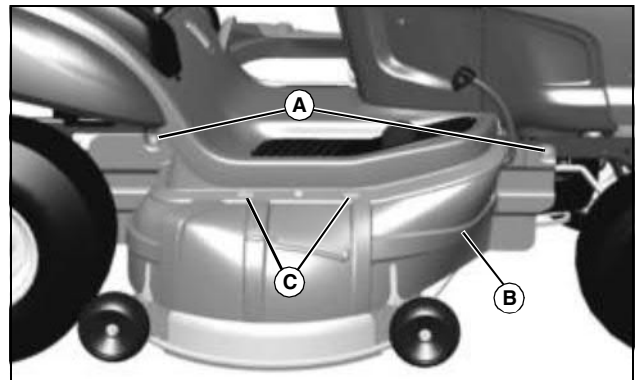
MX25906

2. On left side of machine, remove three capscrews (A) and belt shield (B).
3. On right side of machine, remove two capscrews (C) and belt shield (D).
4. To install, place shield onto machine tabs and secure with screws.

Remove and Install Rear Machine Shields (Large (step 2) Shield Kit)

1. Park machine safely. (See Parking Safely in SAFETY section.)

NOTE: Any time shields are removed, clean all debris from the top surface of the mower deck and under all sheaves before shield installation.



MX43686

2. Loosen screws (A) and remove shield (B) from machine tabs (C).
3. Repeat procedure for opposite side of machine.
4. To install, place shield onto machine tabs and secure with screws.

Service Transmission

Checking Transmission

The transmission is a sealed component. No maintenance is required on this transmission. If you suspect any transmission problems, please contact your authorized dealer.

Service Mower

Removing and Installing Machine Shields

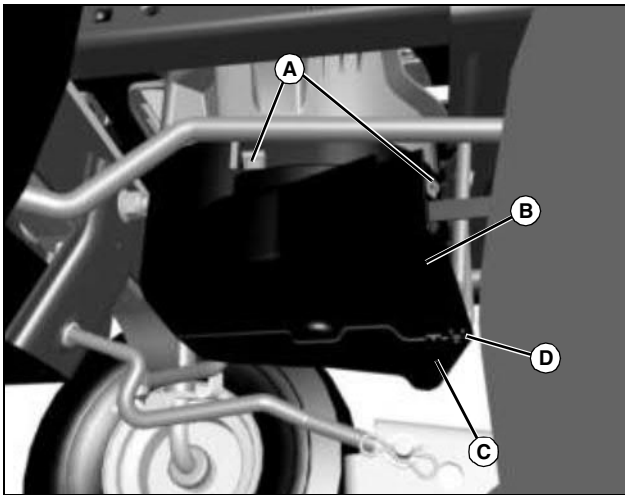
NOTE: There are two different types of shields your machine can be installed with: small (standard) shields and large shields (additional kit installation).

Remove and Install Rear Machine Shields (Small Standard Shields)

1. Park machine safely. (See Parking Safely in SAFETY section.)

SERVICE MOWER

Remove and Install Engine Drive Sheave Shield



MX43724

1. Push in two tabs (A) and remove drive sheave shield (B).
2. Repeat procedure for opposite side (C) of machine.
3. To install, install one shield, locking two tabs at top of shield. Install second shield mating tabs (D) before fully installing shield into tabs.

Removing or Installing Mower Drive Belt at Engine Drive Sheave (122 cm (48 in.) Mower Deck)

1. Park machine safely. (See Parking Safely in SAFETY section.)
2. Put lift lever in lowest position.
3. Remove engine drive shields (see "Removing and Installing Machine Shields" in the Service Mower section).



CAUTION: Avoid injury! Component is spring-assisted and under tension. Injury can occur if spring-assisted component is released suddenly.



MX10520Y

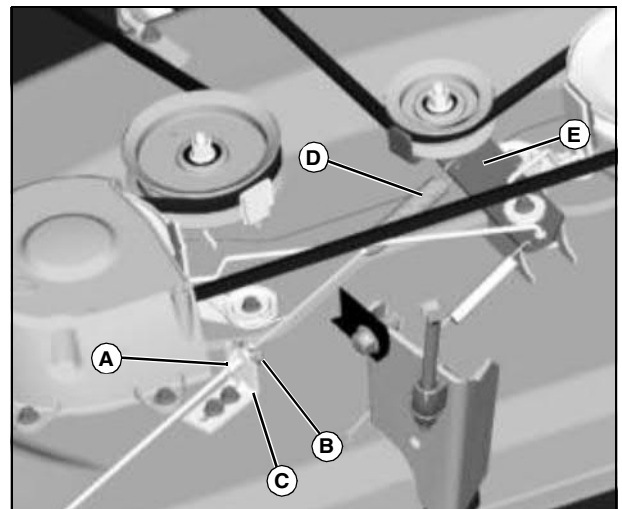
4. Put a 15 mm closed wrench or a socket on the idler sheave nut (A) and rotate clockwise to move idler sheave toward front of tractor and hold to release belt tension.
5. Remove belt (B) from drive sheave (C), and release tension on sheave nut (A).

6. To install the belt on the drive sheave, rotate idler sheave nut clockwise to move idler sheave toward front of tractor, and install belt on drive sheave.

7. Release idler sheave nut to tighten belt.

Removing Mower Deck

1. Park machine safely. (See Parking Safely in SAFETY section.)
2. Put wood blocks under each side of mower deck.
3. Put attachment lift lever in lowest position, bringing mower deck down onto blocks.
4. Remove rear machine shields and engine drive sheave shields (see "Removing and Installing Machine Shields" in the Service Mower section).



MX7681a

Picture Note: 107 cm (42 in.) mower deck only.

5. On machines with 107 cm (42 in.), disconnect mower engagement drive cable (A) on left side of mower deck.

- a. Remove spring locking pin (B), pull and hold mower engagement drive cable out, lift up and remove from bracket (C).
- b. Remove cable spring (D) from idler sheave bracket (E).

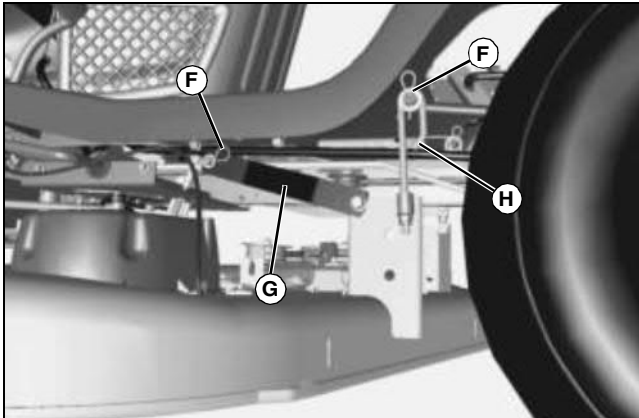
SERVICE MOWER



CAUTION: Avoid injury! Mower lift arms can pinch fingers.

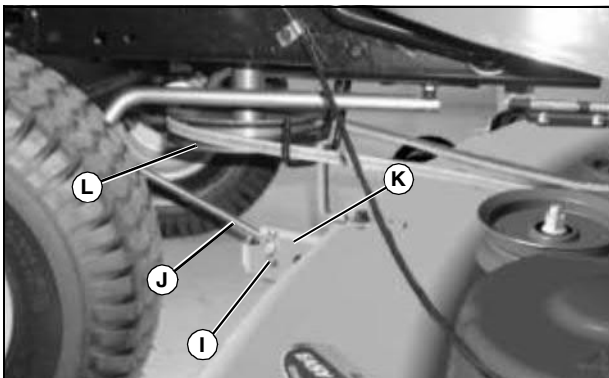
Lift arms are spring loaded and can snap back when deck is removed.

Lock lift lever before pulling pin to remove mower deck.



MX16568

6. Remove spring locking pins and washers (F) and disconnect rear draft arm (G) and adjustable lift links (H) on each side.



MX10521Y

Picture Note: 107 cm (42 in.) mower deck shown.

7. Remove spring locking pin and washer (I) and front draft rod (J) from mower deck bracket (K).

8. Remove mower drive belt from drive sheave (L).

9. Remove wood blocks from both sides and slide mower deck out from under the machine.

10. When operating the machine without the mower deck:

- Remove front draft rod from machine and attach it to the mower deck.
- On 107 cm (42 in.) mower deck only: Push mower engagement drive cable into clip (M) and hook end of cable spring with hardware (N) into peg on left side of machine frame.

Installing Mower Deck

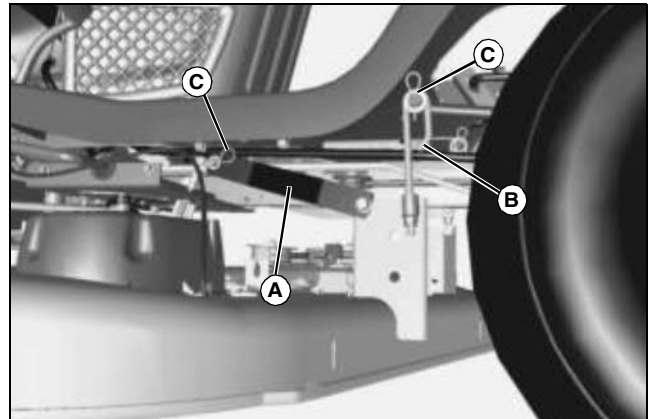
1. Park machine safely. (See Parking Safely in SAFETY section.)

2. Put attachment lift lever in the transport position.

3. Slide mower under machine.

4. Put wood blocks under each side of mower deck.

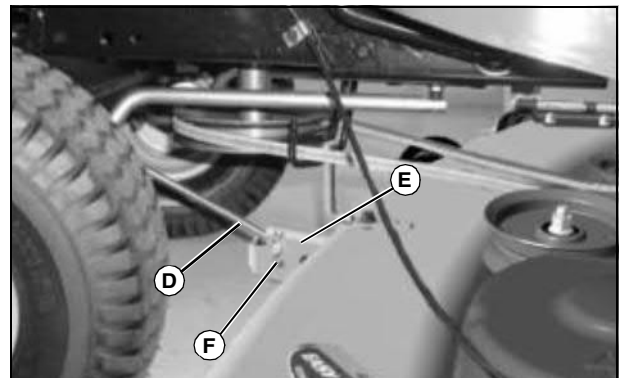
5. Put attachment lift lever in lowest position.



MX16568

6. Fasten rear draft arm (A) and adjustable lift link (B), on each side, with washers and spring locking pins (C).

IMPORTANT: Avoid damage! To prevent clutch damage, make sure front draft rod is installed correctly. Secure rod with washer and spring locking pin on the left side of mower deck bracket.



MX10521Y

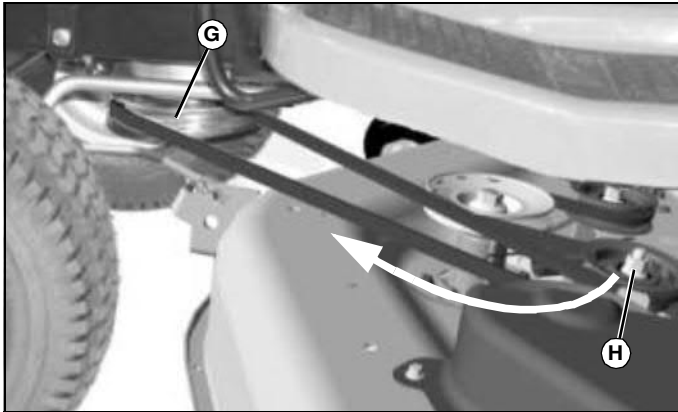
Picture Note: 107 cm (42 in.) mower deck shown.

7. Install front draft rod (D) into mower deck bracket (E) and secure with washer and spring locking pin (F) on the left side of bracket as shown.

SERVICE MOWER



CAUTION: Avoid injury! Component is spring-assisted and under tension. Injury can occur if spring-assisted component is released suddenly.

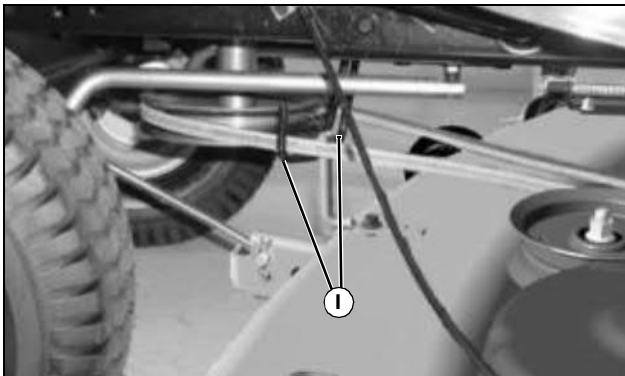


MX10520Y

Picture Note: 122 cm (48 in.) mower deck used for photo purposes.

8. Put mower drive belt on engine drive sheave (G).

- On 122 cm (48 in.) mower decks: Put a 15 mm closed wrench or a socket on the idler sheave nut (H) and rotate clockwise, moving idler sheave and tensioning arm toward front of tractor. Hold while installing belt on drive sheave.

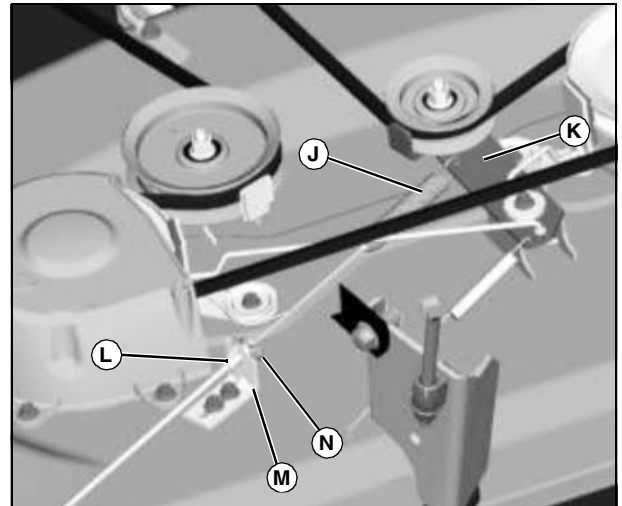


MX10521Y

- On 107 cm (42 in.) mower deck: Make sure belt is routed through both belt guides (I).

9. Remove wood blocks from both sides of mower deck.

10. On machines with 107 cm (42 in.) mower deck: Attach mower engagement drive cable.



MX7681a

Picture Note: 107 cm (42 in.) mower deck only.

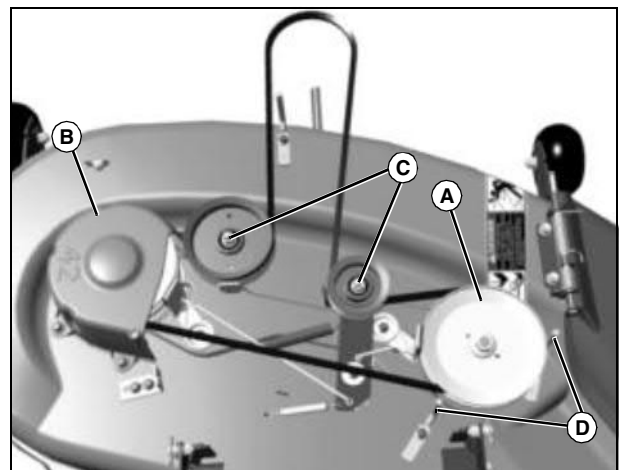
- Route cable under mower belt and brake rod and attach cable spring (J) to idler sheave bracket (K).
- Pull out on cable (L), align black end of cable with slot in bracket (M) and release cable into slot. Secure with spring locking pin (N).

11. Level mower deck.

12. Install rear machine shields and engine drive sheave shields (see "Removing and Installing Machine Shields" in the Service Mower section).

Replacing Mower Drive Belt (107 cm (42 in.) Mower Deck)

- Park machine safely. (See Parking Safely in the SAFETY section.)
- Remove mower deck. (See "Removing Mower Deck" in the Service Mower section.)
- Remove drive belt.



MX10511

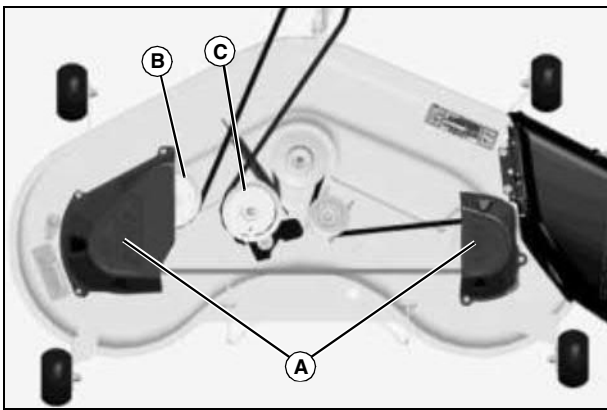
- Remove two capscrews and belt shield over spindle (A).
 - Remove three capscrews and belt shield (B).
 - Loosen sheaves (C) and belt guides (D).
 - Remove mower belt.
4. Inspect belt for wear or damage; replace as necessary.

SERVICE MOWER

5. Clean top surface of mower deck and sheaves.
6. Install belt on mower deck as shown. Make sure belt is in the groove of each sheave and inside belt guides (D).
7. Tighten sheaves to 47 N•m (35 lb-ft).
8. Install both belt shields, reverse of removal.
9. Install mower deck. (See "Installing Mower Deck in the Service Mower section.")
10. Adjust mower belt tension and spindle brakes, if necessary.

Replacing Mower Drive Belt (122 cm (48 in.) Mower Deck)

1. Park machine safely. (See Parking Safely in SAFETY section.)
2. Remove mower deck. (See "Removing Mower Deck" in the Service Mower section.)

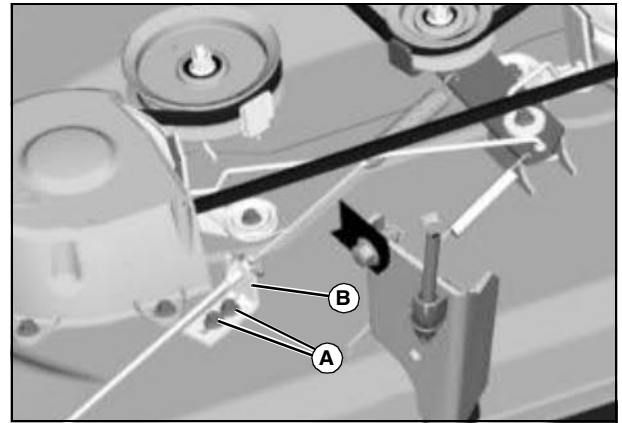


MX38398

3. Remove five capscrews and left and right belt shields (A).
4. Remove drive belt.
 - a. Loosen left side sheaves (B) and (C).
 - b. Remove mower belt.
5. Inspect belt for wear or damage; replace as necessary.
6. Clean top surface of mower deck and sheaves.
7. Install belt on mower deck as shown. Make sure belt is in the groove of each sheave.
8. Tighten sheaves to 47 N•m (35 lb-ft).
9. Install belt shields.
10. Install mower deck.

Adjusting Mower Belt Tension (107 cm (42 in.) Mower Deck)

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Move mower engagement (PTO) lever or switch to OFF position.



MX7681a

3. Loosen nuts (A) and move cable bracket (B) away from the center of mower deck to tighten belt tension. Move bracket until almost all slack is out of cable but cable is not too tight. Tighten nuts.

Adjusting Spindle Brakes (107 cm (42 in.) Mower Deck)



CAUTION: Avoid injury! The mower blades should stop in approximately five seconds when the mower or PTO is disengaged.

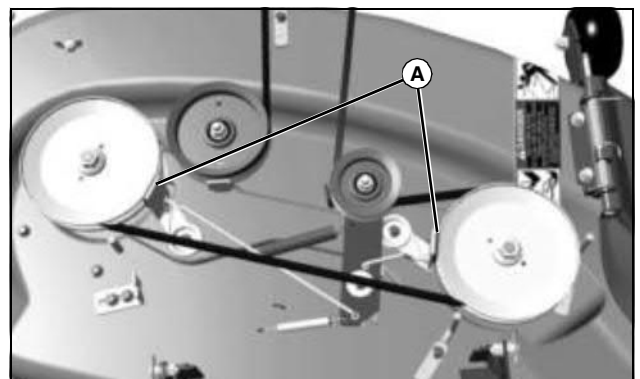
If you believe that your blades may not be stopping in that period of time, take your machine to your authorized dealer where they can safely check and service your machine.

IMPORTANT: Avoid damage! Avoid belt damage.

Spindle brake engagement should be checked and corrected every time the mower belt tension is adjusted.

Mower belt tension should be adjusted, if required, before brakes are adjusted.

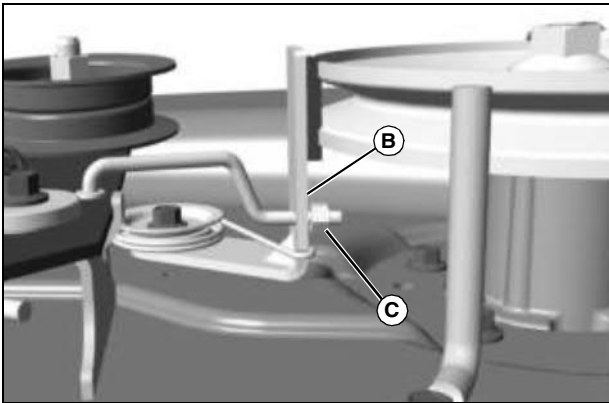
1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Remove mower deck.



MX10512

3. Remove left belt shield and adjust two blade brakes (A).

SERVICE MOWER



MX10507

4. Measure distance from spindle brake bracket (B) to nut (C) on end of brake rod.

- Bracket to nut distance should be: 2 – 3 mm (0.08 – 0.12 in.).

5. If adjustment is required, turn nut (C) on end of brake rod in correct direction to set brake at proper distance from pulley.

6. Adjust both brakes.

7. Install left belt shield.

8. Install mower deck.

Cleaning Mower Deck

1. Park machine safely. (See Parking Safely in SAFETY section.)



MX43725

Picture Note: Large (step 2) shield kit installed.

2. Attach a garden hose to wash port (A) on left side of mower deck.

3. Turn on water.

4. Start engine.

5. Push throttle lever to full throttle position.

6. Lift switch to engage mower blades.

7. Flush water under deck for approximately one minute.

8. Push switch down to stop mower.

9. Stop engine.

10. Turn off water, and remove garden hose from wash port.

NOTE: Any time shields are removed, clean all debris from the top surface of the mower deck and under all sheaves before shield installation.

11. For additional cleaning, remove machine shields and clean top of deck and around all sheaves. (See "Removing and Installing Machine Shields" in this section.)

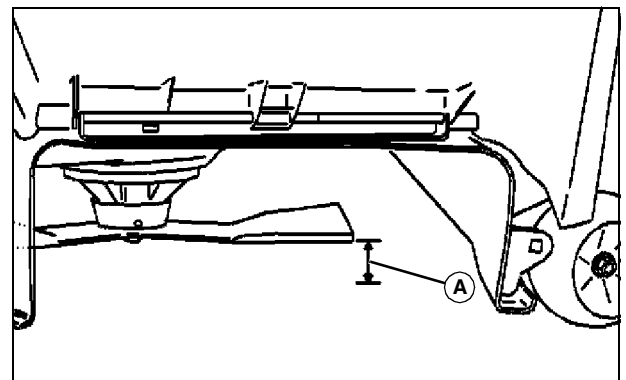
Checking for Bent Mower Blades



CAUTION: Avoid injury! Blades are sharp. Always wear gloves when handling blades or working near blades. Replace blades if defective. Never straighten or weld them.

1. Park machine safely. (See Parking Safely in the SAFETY section.)

2. Raise mower deck to highest position to access blades.



MX4897

Picture Note: Mower deck with side discharge used for illustration

3. Measure distance (A) between blade tip and flat ground surface.

4. Rotate blade 180° and measure distance between other blade tip and flat ground surface.

5. Install new blade if the difference between the two measurements is more than 3 mm (1/8 in.).

6. Repeat for all blades.

Servicing Mower Blades



CAUTION: Avoid injury! Rotating blades are dangerous.

Before adjusting or servicing mower:

- Disconnect spark plug wire(s) or battery negative (-) cable to prevent engine from starting accidentally.
- Always wear gloves when handling mower blades or working near blades.

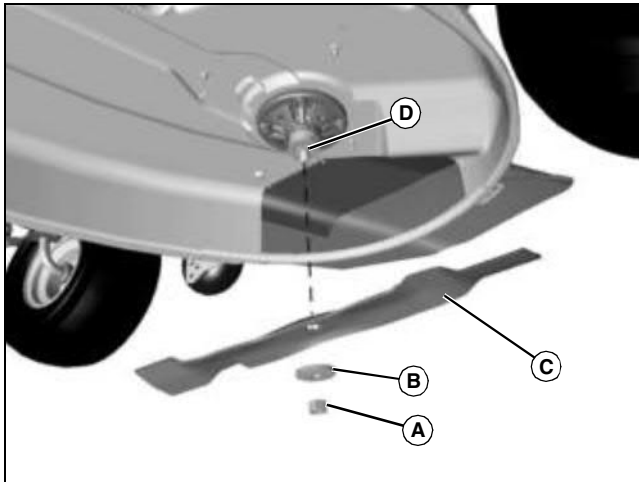
Removing Mower Blades

1. Park machine safely. (See Parking Safely in SAFETY section.)

2. Raise mower deck to gain access to mower blades. If necessary, remove mower deck.

3. Block mower blade with a piece of wood to prevent it from spinning.

SERVICE ELECTRICAL



MX16569

4. Loosen and remove nut (A), washer (B), and blade (C).
5. Inspect blades; sharpen, balance or replace blades as necessary.

Installing Mower Blades

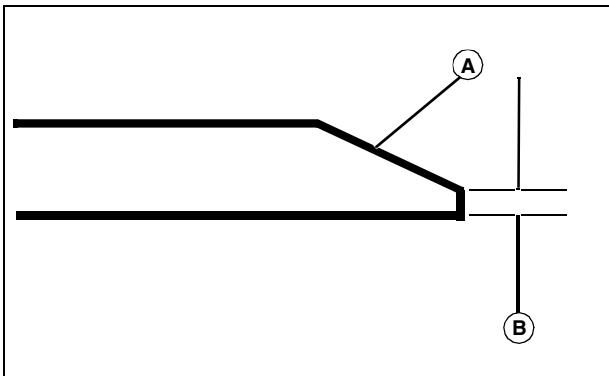
1. Position mower blade (C) with the cutting edge towards the ground.
2. Align the splined center hole in the blade with the splined spindle shaft (D) and put the blade onto the mower spindle shaft.
3. Install washer, with cupped side towards blade, and install nut to secure blade onto splined spindle shaft.
4. Block mower blade with a piece of wood to prevent spinning and tighten nut:

- 42 in. and 48 in. decks: Models with M12 nut , 75 N•m (55 lb-ft) - use 18 mm socket. Models with 5/8 in. nut, 88 N•m (65 lb-ft) - use 15/16 in. socket.

Sharpening Blades

CAUTION: Avoid injury! Blades are sharp. Always wear gloves when handling blades or working near blades. Always wear safety eye protection when grinding.

- Sharpen blades with grinder, hand file, or electric blade sharpener.



MIF

- Keep original bevel (A) when grinding.
- Blade should have 0.40 mm (1/64 in.) cutting edge (B) or less.

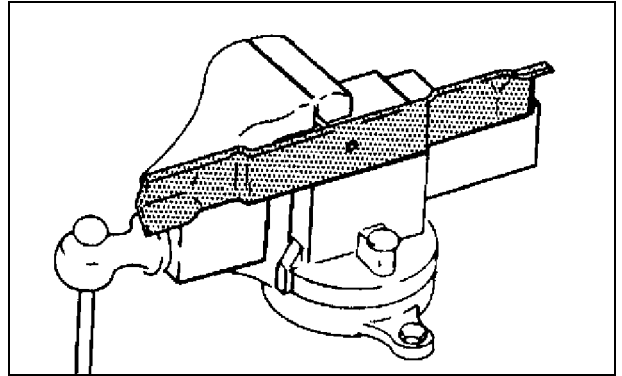
- Balance blades before installing.

Balancing Blades



CAUTION: Avoid injury! Blades are sharp. Always wear gloves when handling blades or working near blades.

1. Clean blade.



M61524

2. Put blade on nail in a vise. Turn blade to horizontal position.
3. Check balance. If blade is not balanced, heavy end of blade will drop.
4. Grind bevel of heavy end. Do not change blade bevel.

Service Electrical

Service the Battery Safely



CAUTION: Avoid injury! The battery produces a flammable and explosive gas. The battery may explode:

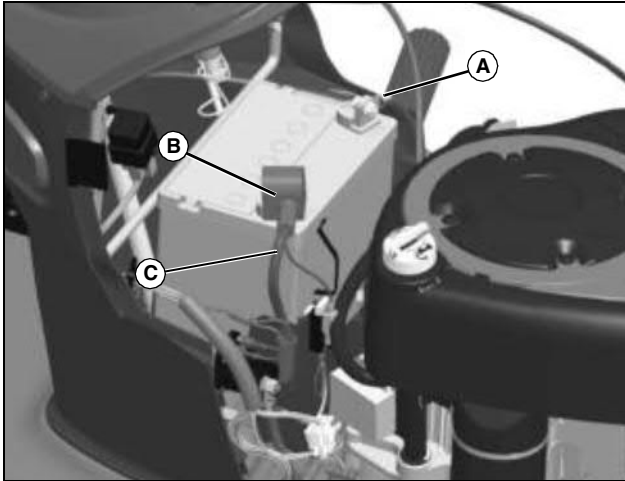
- Do not smoke or have open flame near battery.
- Wear eye protection and gloves.
- Do not allow direct metal contact across battery posts.
- Remove negative cable first when disconnecting.
- Install negative cable last when connecting.

SERVICE ELECTRICAL

Removing and Installing the Battery

Removing

1. Park machine safely and lift hood. (See Parking Safely in the SAFETY Section.)



MX49392

2. Disconnect negative (-) battery cable (A).
3. Push red cover (B) away from positive (+) battery terminal and remove cable (C) from battery.
4. Remove battery.

Installing

1. Place battery into battery tray.
2. Connect positive (+) cable to positive (+) battery terminal first, then negative (-) cable to negative (-) battery terminal.
3. Apply spray lubricant to terminal to help prevent corrosion.
4. Slide red cover over positive battery terminal.

Cleaning Battery and Terminals

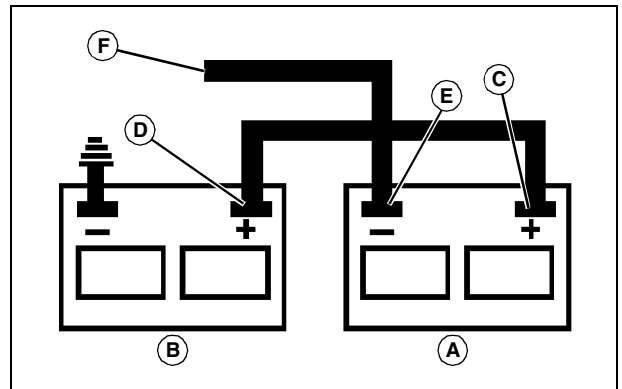
1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Disconnect and remove battery.
3. Wash battery with solution of four tablespoons of baking soda to one gallon of water. Be careful not to get the soda solution into the cells.
4. Rinse the battery with plain water and dry.
5. Clean terminals and battery cable ends with wire brush until bright.
6. Install battery.
7. Attach cables to battery terminals, beginning with the positive cable, using washers and nuts.
8. Apply spray lubricant to terminal to prevent corrosion.

Using Booster Battery



CAUTION: Avoid injury! The battery produces a flammable and explosive gas. The battery may explode:

- Do not smoke or have open flame near battery.
- Wear eye protection and gloves.
- Do not jump start or charge a frozen battery. Warm battery to 16°C (60°F).
- Do not connect the negative (-) booster cable to the negative (-) terminal of the discharged battery. Connect at a good ground location away from the discharged battery.



M71044

A- Booster Battery

B- Disabled Vehicle Battery

1. Connect positive (+) booster cable to booster battery (A) positive (+) post (C).
2. Connect the other end of positive (+) booster cable to the disabled vehicle battery (B) positive (+) post (D).
3. Connect negative (-) booster cable to booster battery negative (-) post (E).

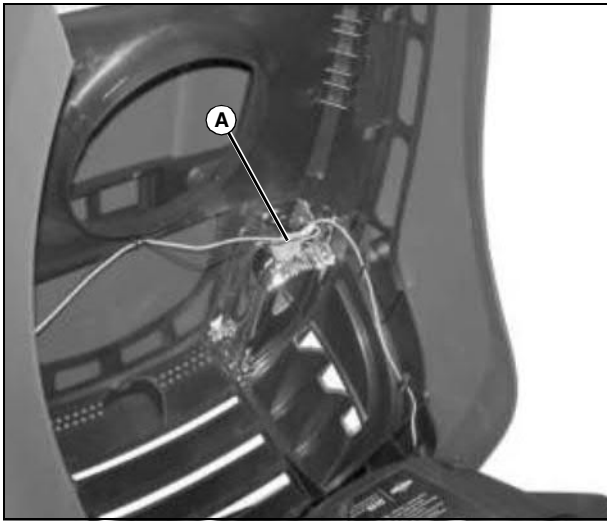
IMPORTANT: Avoid damage! Electric charge from booster battery can damage machine components. Do not install negative booster cable to machine frame. Install only to the engine block. Install negative booster cable away from moving parts in the engine compartment, such as belts and fan blades.

4. Connect the other end (F) of negative (-) booster cable to a metal part of the disabled machine engine block away from battery.
5. Start the engine of the disabled machine and run machine for several minutes.
6. Carefully disconnect the booster cables in the exact reverse order: negative cable first and then the positive cable.

Replacing Headlight Bulb

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Lift hood.

SERVICE MISCELLANEOUS

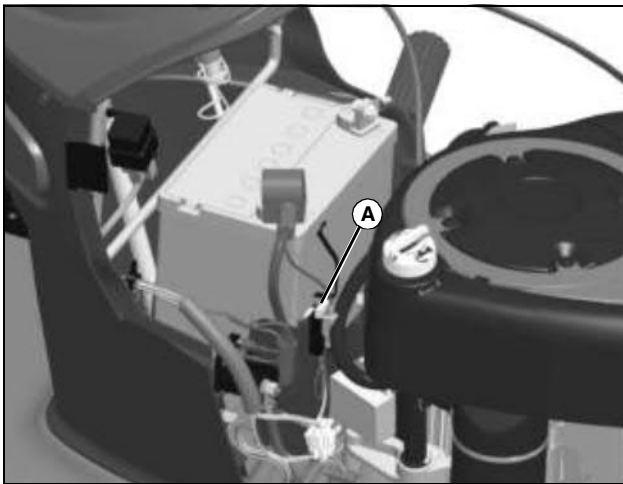


MX46488

3. Turn each bulb socket (A) 1/4 turn counterclockwise to remove.
4. Replace defective bulb with a new bulb.
5. Insert bulb socket into housing, push in and turn 1/4 turn clockwise to install.
6. Lower hood.

Replacing Fuse

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Lift hood.



MX49392

3. Pull defective fuse (A) out of socket.
4. Check metal clip in fuse window and discard fuse if clip is broken.
5. Push new 20 amp fuse into socket.
6. Lower hood.

Service Miscellaneous

Using Proper Fuel and Stabilizer

IMPORTANT: Avoid damage! Using stale, contaminated or improper fuel can result in engine and fuel system damage. Repairs caused by stale, contaminated or improper fuel are not covered by warranty.

Use regular grade unleaded fuel with an octane rating of 87 octane or higher. Fuel blends containing up to 10% ethanol or up to 15% MTBE reformulated fuel are acceptable. Do not use fuel or additives containing methanol as engine damage can occur.

Always use fresh, clean fuel that is purchased in a quantity that can be used within approximately 30 days. Fuel stabilizer should always be added to the fuel each time fuel is purchased. Add stabilizer before filling the fuel container to insure proper mixing. Such practice helps prevent engine performance problems and allows fuel storage in the machine all year without draining.

Store fuel in plastic containers to reduce condensation. Make sure the cap on the fuel container is tight to reduce fuel contamination and evaporation. For best fuel storage life, use a self-sealing gas can.

Fuel is blended to give best seasonal performance. To avoid engine performance problems such as hard starting or vapor lock, use in-season fuel. Use fuel during warm weather that was purchased during that season, and use fuel during cold weather that was purchased during that season.

Fuel can become stale in machines with engines that are used seasonally or infrequently during a season. Stale fuel can produce varnish and plug carburetor or EFI components which can affect engine performance.

Keep fuel storage container tightly covered and in a cool area out of direct sunlight. Fuel can break down and degrade if not sealed properly or exposed to sun and heat.

Condensation may collect in the fuel tank because of a variety of operating or environmental conditions and, over time, may affect your machine's operation. Fill machine fuel tank at the end of the day.

Filling Fuel Tank



CAUTION: Avoid injury! Fuel vapors are explosive and flammable:

- Shut engine off before filling fuel tank.
- Allow engine to cool before refueling.
- Do not smoke while handling fuel.
- Keep fuel away from flames or sparks.
- Fill fuel tank outdoors or in well ventilated area.
- Clean up spilled fuel immediately.
- Use clean approved non-metal container to prevent static electric discharge.

SERVICE MISCELLANEOUS

IMPORTANT: Avoid damage! Dirt and water in fuel can cause engine damage:

- Clean dirt and debris from the fuel tank opening.
- Use clean, fresh, stabilized fuel.
- Fill the fuel tank at the end of each day's operation to keep condensation out of the fuel tank.
- Use a non-metallic funnel with a plastic mesh strainer when filling the fuel tank or container.

Fill fuel tank at the end of each day's operation to prevent condensation and freezing during cold weather.

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Allow engine to cool.
3. Remove any trash from area around fuel tank cap.
4. Remove fuel tank cap slowly to allow any pressure built up in tank to escape.
5. Fill fuel tank only to bottom of filler neck. Do not overfill.
6. Install fuel tank cap.
 - Gas models: Turn cap until clicks.

Checking Tire Pressure

1. Check tires for damage.
2. Check tire pressure with an accurate gauge.
3. Service tires safely. (See Tire Safety in the SAFETY section.)
4. Check that tires have equal air pressure. Add or remove air, if necessary.
5. Refer to side of tire for correct tire inflation pressure.

Removing and Installing Hood

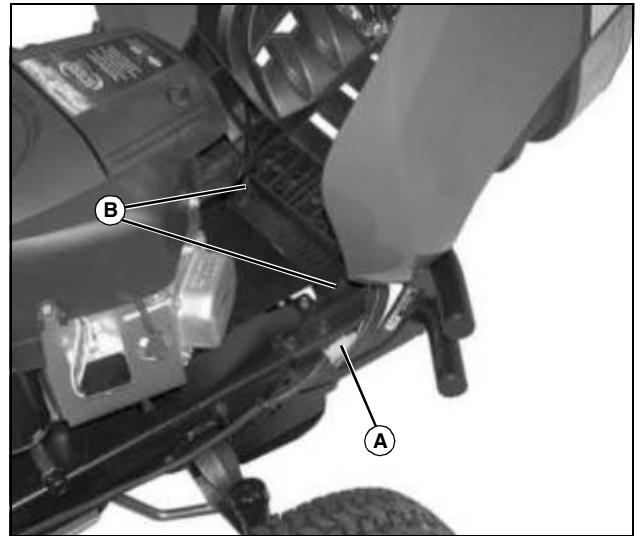
Removing



CAUTION: Avoid injury! Touching hot surfaces can burn skin. The engine, components, and fluids will be hot if the engine has been running. Allow the engine to cool before servicing or working near the engine and components.

IMPORTANT: Avoid damage! Do not operate machine with hood open. Hood must be closed for proper engine cooling and exhaust.

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Let engine cool.



MX47108

3. Open hood.
4. Disconnect wiring harness (A).
5. Apply pressure to "John" on left side of hood and slowly lower hood. Left side pivot should release after rotating closed approximately 45 degrees. Once left side pivot releases, slide out right side pivot. Lower hood slightly and lift hood from brackets (B).

Installing

1. Slide right side hood pivot into tractor bracket with hood in open position (left side pivot will slide into place as hood closes) and slowly close hood.
2. Connect wiring harness.
3. Close hood.

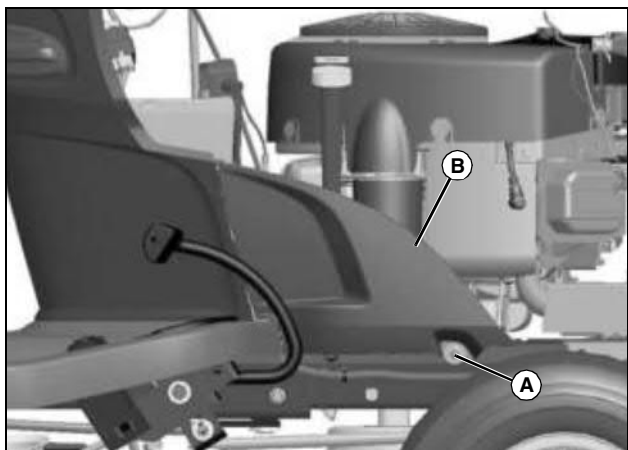
Removing and Installing Closeout Panels

Each closeout panel has two mounting tabs on the flat rear flange, and a tab hole at the lower front corner. The mounting tabs slide into attachment features at each side of the machine cowl to secure the rear of each panel, a screw and washer secures each panel at the front.

Removing panels:

1. Tilt hood forward.

SERVICE MISCELLANEOUS

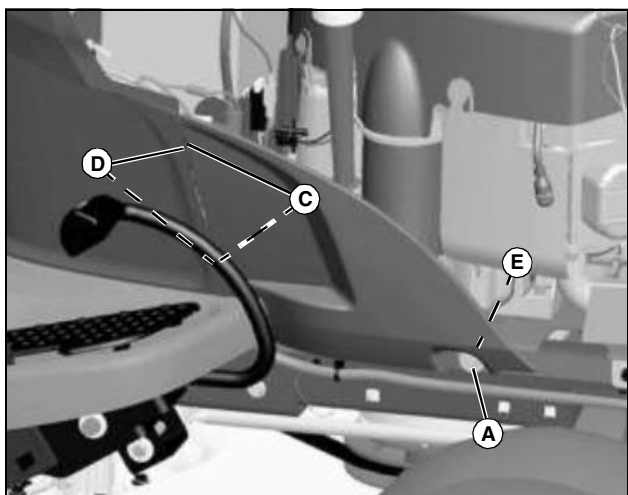


MX47157

Picture Note: Right side shown.

2. Remove retaining screw (A) and flat washer securing lower front corner of closeout panel (B) to frame.
3. Rotate closeout panel away from tractor. Mounting tabs will slide out of attachment features in machine cowl.

Installing panels:



MX47158

Picture Note: Right side shown.

1. Align mounting tabs (C) at rear of closeout panels with top of attachment features (D) at front of machine cowl.
2. Install washer and retaining screw (A) in hole (E) on closeout panel.
3. Lower hood.

Cleaning Plastic Surfaces

IMPORTANT: Avoid damage! Improper care of machine plastic surfaces can damage that surface:

- Do not wipe plastic surfaces when they are dry. Dry wiping will result in minor surface scratches.
- Use a soft, clean cloth (bath towel, diaper, automotive mitt).
- Do not use abrasive materials, such as polishing compounds, on plastic surfaces.

1. Rinse hood and entire machine with clean water to remove dirt and dust

that may scratch the surface.

2. Wash surface with clean water and a mild liquid automotive washing soap.

IMPORTANT: Avoid damage! Insect repellent spray may damage plastic and painted surfaces. Do not spray insect repellent near machine.

3. Dry thoroughly to avoid water spots.
4. Wax the surface with a liquid automotive wax. Use products that specifically say "contains no abrasives."

IMPORTANT: Avoid damage! Do not use a power buffer to remove wax.

5. Buff applied wax by hand using a clean, soft cloth.

Cleaning and Repairing Metal Surfaces

Cleaning:

Follow automotive practices to care for your vehicle painted metal surfaces. Use a high-quality automotive wax regularly to maintain the factory look of your vehicle's painted surfaces.

Repairing Minor Scratches (surface scratch):

1. Clean area to be repaired thoroughly.

IMPORTANT: Avoid damage! Do not use rubbing compound on painted surfaces.

2. Use automotive polishing compound to remove surface scratches.
3. Apply wax to entire surface.

Repairing Deep Scratches (bare metal or primer showing):

1. Clean area to be repaired with rubbing alcohol or mineral spirits.
2. Use paint stick with factory-matched colors available from your authorized dealer to fill scratches. Follow directions included on paint stick for use and for drying.
3. Smooth out surface using an automotive polishing compound. Do not use power buffer.
4. Apply wax to surface.

Removing and Installing Front Wheel Assembly

Removing:

1. Park machine safely. (See Parking Safely in the SAFETY section.)

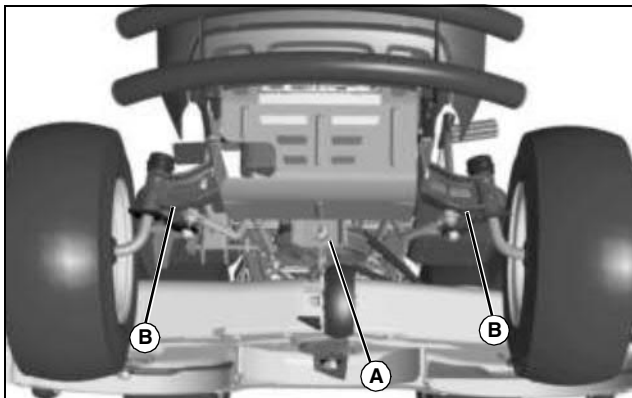
SERVICE MISCELLANEOUS



CAUTION: Avoid injury! The machine can fall or slip from an unsafe lifting device or supports.

- Use a safe lifting device rated for the load to be lifted.
- Lower machine onto jack stands or other stable supports and block wheels before servicing.

IMPORTANT: Avoid damage! Place jack stands under frame, not under transmission or engine, when raising or supporting machine.



MX49387

2. Safely lift and support machine. Place safe lifting device under end of front hanger bracket at location (A), and place jack stands or other stable supports under frame on each side at location (B). Block wheels remaining on the ground to prevent machine movement.



M89737

3. Remove plastic cap (C) from end of wheel hub.



CAUTION: Avoid injury! Components are installed under spring tension. Wear eye protection and use proper tools when installing and removing components with spring tension.



M89736

4. Remove snap ring (D) from end of axle.
5. Remove washer (E) and wheel from axle.



CAUTION: Avoid injury! Explosive separation of tire and rim parts is possible when they are serviced incorrectly:

- Do not attempt to mount a tire without the proper equipment and experience to perform the job.

6. Take wheel assembly to an authorized service dealer for repairs.

Installing

1. Grease spindles and wheel hub grease fittings with specified grease.
2. Install wheel and washer (E) on axle.
3. Install snap ring (D).
4. Install plastic cap (C).
5. Safely remove jack stands and lower machine.

Removing and Installing Rear Wheel Assembly

Removing

1. Park machine safely. (See Parking Safely in the SAFETY section.)

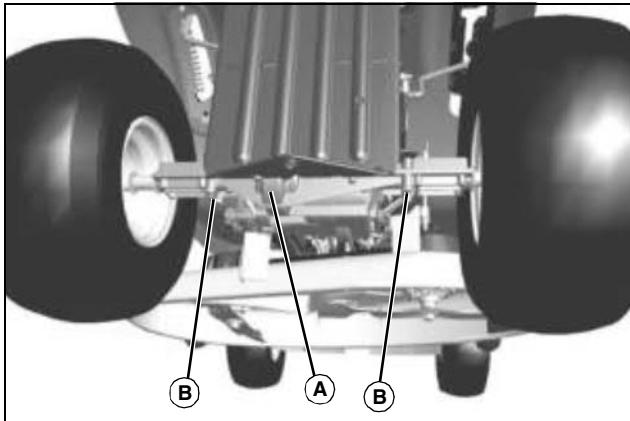
TROUBLESHOOTING



CAUTION: Avoid injury! The machine can fall or slip from an unsafe lifting device or supports.

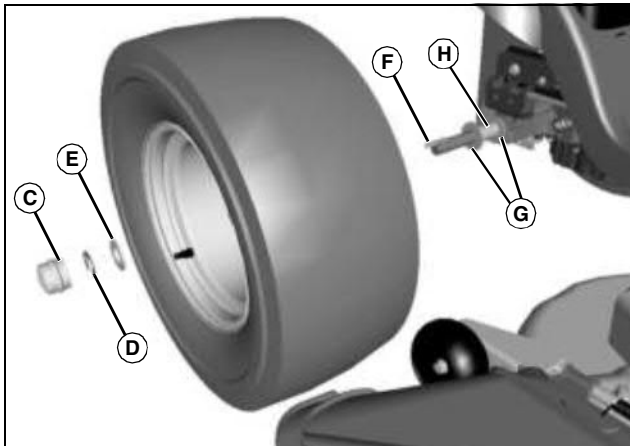
- Use a safe lifting device rated for the load to be lifted.
- Lower machine onto jack stands or other stable supports and block wheels before servicing.

IMPORTANT: Avoid damage! Place jack stands under frame, not under transmission or engine, when raising or supporting machine.



MX40761

2. Safely lift and support machine. Place safe lifting device under transmission centered under machine at location (A). Place jack stands or other stable supports on each side (B) where mounting bolts for frame come through. Block wheels remaining on the ground to prevent machine movement.



MX16572

3. Remove plastic cap (C), snap ring (D), and washer (E).

4. Remove wheel.

IMPORTANT: Avoid damage! Do not lose the shaft key. Key must be installed for wheels to rotate and tractor to move.

5. Remove shaft key (F) (shown on end of transaxle shaft), two washers (G) and spacer (H).



CAUTION: Avoid injury! Explosive separation of tire and rim parts is possible when they are serviced incorrectly:

- Do not attempt to mount a tire without the proper equipment and experience to perform the job.

6. Take wheel assembly to an authorized service dealer for repairs.

Installing

IMPORTANT: Avoid damage! Do not lose the shaft key. Key must be installed for wheels to rotate and tractor to move.

NOTE: Rear wheels are installed with valves to the outside.

1. Install two washers (G), spacer (H), and shaft key (F).
2. Install rear wheel, washer (E), snap ring (D) and plastic cap (C).
3. Safely remove jack stands and lower machine.

Troubleshooting

Using Troubleshooting Chart

If you are experiencing a problem that is not listed in this chart, see your authorized dealer for service.

When you have checked all the possible causes listed and you are still experiencing the problem, see your authorized dealer.

Engine

IF	CHECK
Poor Engine Performance	<p>Dirt in fuel system or fuel is old. Replace fuel with fresh stabilized fuel. Obtain fuel from another supplier before suspecting machine problems. Suppliers blend fuels differently and changing suppliers will generally solve any performance problems</p> <p>Fuel blended with alcohol or ether may contribute to performance problems by causing gum and varnish deposits, especially if fuel is stored for several weeks or more. Obtain fresh fuel.</p>
Engine Will Not Start	<p>Brake pedal not depressed.</p> <p>Mower is engaged.</p> <p>Spark plug wire is loose or disconnected.</p> <p>Improper fuel.</p> <p>Plugged fuel filter.</p> <p>Defective safety switch.</p> <p>Electrical problem - See Electrical Troubleshooting Section</p> <p>Hood is open - Hood must be closed for engine to operate.</p>

TROUBLESHOOTING

IF	CHECK
Engine Is Hard To Start	Carburetor is not adjusted properly or dirty. Plugged fuel filter. Faulty spark plug. Stale or improper fuel. Loose or corroded electrical connections. Improper engine oil viscosity.
Engine Runs Unevenly	Cooling fins plugged. Loose electrical connections. Choke or throttle cable sticking. Fuel line or fuel filter plugged. Stale or dirty fuel. Improper fuel. Air cleaner element plugged.
Engine Misses Under Load	Faulty spark plug. Stale or dirty fuel. Plugged fuel filter.
Engine Vapor Locks	Fuel tank vent plugged. Dirt in fuel filter. Cooling fins plugged. Loose hose connection at fuel filter or fuel pump.
Engine Overheats	Engine air intake screen plugged. Cooling fins plugged. Engine oil low or too high. Engine operated too long at a slow idle speed.
Engine Will Not Idle	Spark plug not gapped correctly. Faulty spark plug. Operator raising off the seat.
Engine Knocks	Stale or low octane fuel. Engine overloaded. Low engine speed. Oil level low.
Engine Stops Or Misses When Operating On Hillsides	Fuel tank less than half full of fuel. Operator raising off of the seat.
Engine Backfires	Faulty spark plug. Operator raising off of the seat.
Engine Loses Power	Engine overheating. Too much oil in engine. Dirty air cleaner. Faulty spark plug. Travel speed is too fast for conditions. Improper fuel.
Excessive Fuel Consumption	Choke is not fully open.
Black Exhaust Smoke	Air filter is dirty or oil soaked.

IF	CHECK
Engine Stops When REVERSE Foot Pedal Is Depressed And Attachment Is Engaged (Hydrostatic)	Normal condition. (See Using Reverse Implement Option in the OPERATING section.)

Electrical

IF	CHECK
Starter Does Not Work Or Will Not Turn Engine	Brake pedal is not depressed. Mower is engaged. Battery terminals are corroded. Battery not charged. Blown fuse. Fusible Link in starting circuit is blown - See your authorized dealer
Battery Will Not Charge	Dead cell in the battery. Battery cables and terminals are dirty. Low engine speed or excessive idling.
Lights Do Not Work	Light plug disconnected. Loose or burned out bulb.

Tractor

IF	CHECK
Tractor Vibrates Too Much Or Rattles Excessively	Attachment drive belts worn or damaged. Traction drive belt damaged or worn. Dirt on drive sheaves. Blades bent or out of balance.
Tractor Will Not Move With Engine Running	Parking brake locked. Bypass rod is engaged.

Mower

IF	CHECK
Discharge Chute Plugged	Travel speed too fast. Grass too long. Grass too wet. Engine rpm not at wide open throttle. Restricted air flow. Belt installed incorrectly.
Patches Of Grass Uncut	Travel speed too fast. Engine rpm not at wide open throttle. Mower deck needs cleaning.

STORAGE

IF	CHECK
Belt Slipping	Debris in sheaves. Worn belt. Belt tension is incorrect.
Too Much Vibration	Debris on mower deck or in sheaves. Damaged drive belt. Damaged sheaves or sheaves out of alignment. Blades out of balance.
Blades Scalping Grass	Cutting too low. Mower wheels not adjusted correctly. Turning speed too fast. Ridges in terrain. Rough or uneven terrain. Low tire pressure.
Mower Loads Down Tractor	Engine rpm too low. Travel speed too fast. Debris wrapped around mower spindles.
Uneven Cut	Mower deck not leveled properly. Travel speed too fast. Blades dull. Mower wheels not adjusted correctly. Tire pressure unequal.
Mower (Or Other Attachment) Stops When Vehicle Is Operated in REVERSE	Normal condition. (See Using Reverse Implement Option in the OPERATING section.)

Preparing Machine for Storage

1. Repair any worn or damaged parts. Replace parts if necessary. Tighten loose hardware.
2. Repair scratched or chipped metal surfaces to prevent rust.
3. Remove grass and debris from machine.
4. Clean under the deck and remove grass and debris from inside chute and bagger.
5. Wash the machine and apply wax to metal and plastic surfaces.
6. Run machine for five minutes to dry belts and pulleys.
7. Apply light coat of engine oil to pivot and wear points to prevent rust.
8. Lubricate grease points and check tire pressure.

Preparing Fuel and Engine For Storage

Fuel:

If you have been using "Stabilized Fuel," add stabilized fuel to tank until the tank is full.

NOTE: Filling the fuel tank reduces the amount of air in the fuel tank and helps reduce deterioration of fuel.

If you are not using "Stabilized Fuel:"

1. Park machine safely in a well-ventilated area. (See Parking Safely in the SAFETY section.)

NOTE: Try to anticipate the last time the machine will be used for the season so very little fuel is left in the fuel tank.

2. Turn on engine and allow to run until it runs out of fuel.
3. For machines equipped with key switch, turn key to off position.

IMPORTANT: Avoid damage! Stale fuel can produce varnish and plug carburetor or injector components and affect engine performance.

- Add fuel conditioner or stabilizer to fresh fuel before filling tank.

4. Mix fresh fuel and fuel stabilizer in separate container. Follow stabilizer instructions for mixing.

5. Fill fuel tank with stabilized fuel.

6. Run engine for a few minutes to allow fuel mixture to circulate through carburetor on gas engine or fuel injectors on diesel engine.

Engine:

Engine storage procedure should be used when vehicle is not to be used for longer than 60 days.

1. Change engine oil and filter while engine is warm.
2. Service air filter if necessary.
3. Clean debris from engine air intake screen.
4. On gas engines:
 - Remove spark plugs. Put 30 mL (1 oz) of clean engine oil in cylinder(s).
 - Install spark plugs, but do not connect spark plug wires.
 - Crank the engine five or six times to allow oil to be distributed.
5. Clean the engine and engine compartment.
6. Remove battery.
7. Clean the battery and battery posts. Check the electrolyte level, if your battery is not maintenance free.

Storage

Storing Safety



CAUTION: Avoid injury! Fuel vapors are explosive and flammable. Engine exhaust fumes contain carbon monoxide and can cause serious illness or death:

- Run the engine only long enough to move the machine to or from storage.
- Machine fires and structure fires can occur if a machine is stored before allowing it to cool, or if debris is not removed from around the engine and muffler, or if stored near combustible materials.
- Do not store vehicle with fuel in the tank inside a building where fumes may reach an open flame or spark.
- Allow the engine to cool before storing the machine in any enclosure.

SPECIFICATIONS

- Close fuel shut-off valve, if your machine is equipped.
- Store the battery in a cool, dry place where it will not freeze.

NOTE: The stored battery should be recharged every 90 days.

- Charge the battery.

IMPORTANT: Avoid damage! Prolonged exposure to sunlight could damage the hood surface. Store machine inside or use a cover if stored outside.

- Store the vehicle in a dry, protected place. If vehicle is stored outside, put a waterproof cover over it.

Removing Machine From Storage

- Check tire pressure.
- Check engine oil level.
- Check battery electrolyte level, if your battery is not maintenance free. Charge battery if necessary.
- Install battery.
- On gas engines: Check spark plug gap. Install and tighten plugs to specified torque.
- Lubricate all grease points.
- Open fuel shut-off valve, if your machine is equipped.
- Run the engine 5 minutes without the mower or any attachments running to allow oil to be distributed throughout engine.
- Be sure all shields and guards or deflectors are in place.

Specifications

Model X125

Engine Model..... Briggs & Stratton 31
Displacement 500 cc (30.5 cu in.)
Bore 90.68 mm (3.57 in.)
Stroke 77.72 mm (3.06 in.)
Ignition Module (Armature) Air Gap . . 0.253 - 0.356 mm (0.010 - 0.014 in.)
Intake Valve Clearance 0.076 - 0.127 mm (0.003 - 0.005 in.)
Exhaust Valve Clearance 0.13 - 0.18 mm (0.005 - 0.007 in.)
Spark Plug-Gap 0.76 mm (0.030 in.)
Spark Plug-Torque 20 N•m (15 lb-ft)
Cylinders Single
Oil Filter Yes
Air Filter Cartridge
Transmission Hydrostatic
Transaxle Model Tuff Torq™ T40
Travel Speed - Forward 0 - 8.9 km/h (0 - 5.5 mph)
Travel Speed - Reverse 0 - 5.2 km/h (0 - 3.2 mph)

Model X145

Engine Model..... Briggs & Stratton 31
Displacement 500 cc (30.5 cu in.)
Bore 90.68 mm (3.57 in.)
Stroke 77.72 mm (3.06 in.)
Ignition Module (Armature) Air Gap . . 0.253 - 0.356 mm (0.010 - 0.014

in.)

Intake Valve Clearance 0.076 - 0.127 mm (0.003 - 0.005 in.)
Exhaust Valve Clearance 0.13 - 0.18 mm (0.005 - 0.007 in.)
Spark Plug-Gap 0.76 mm (0.030 in.)
Spark Plug-Torque 20 N•m (15 lb-ft)
Cylinders Single
Oil Filter Yes
Air Filter Cartridge
Transmission Hydrostatic
Transaxle Model..... Tuff Torq™ T40
Travel Speed - Forward 0 - 8.9 km/h (0 - 5.5 mph)
Travel Speed - Reverse 0 - 5.2 km/h (0 - 3.2 mph)

Model X165

Engine Model..... Briggs & Stratton 40
Displacement 656 cc (40 cu in.)
Bore 75.44 mm (2.97 in.)
Stroke 73.41 mm (2.89 in.)
Ignition Module (Armature)
Air Gap 0.203 - 0.305 mm (0.008 - 0.012 in.)
Intake and Exhaust
Valve Clearance 0.102 - 0.152 mm (0.004 - 0.006 in.)
Spark Plug-Gap 0.76 mm (0.030 in.)
Spark Plug-Torque 20 N•m (15 lb-ft)
Cylinders Twin
Oil Filter Yes
Air Filter Flat Panel with Foam Precleaner
Transmission Hydrostatic
Transaxle Model..... Tuff Torq™ HD K46
Travel Speed - Forward 0 - 8.9 km/h (0 - 5.5 mph)
Travel Speed - Reverse 0 - 5.2 km/h (0 - 3.2 mph)

Electrical System (All Models)

Charging System..... Regulated Circuit
Charging System Capacity..... 9 Amp
Battery Voltage..... 12 Volts
Battery Type BCI Group U1

Capacities

Models X125

Crankcase, with Oil Filter 1.4 L (1.5 qt)
Fuel Tank 15.1 L (4 gal)

Models X145

Crankcase, with Oil Filter 1.4 L (1.5 qt)
Fuel Tank 15.1 L (4 gal)

Model X165

Crankcase, with Oil Filter 1.9 L (2.0 qt)
Fuel Tank 15.1 L (4 gal)

Fuel System (All Models)

Fuel Types (Recommended):
..... Regular Grade 87 Octane Unleaded Fuel

SPECIFICATIONS

..... Ethanol Blended Fuel (Up to 10%)
..... MTBE Reformulated Fuel (Up to 15%)

Recommended Lubricants (All Models)

Engine Oil:

..... TURF-GARD™
..... PLUS 4™

Grease:

..... John Deere Multi-Purpose SD Polyurea Grease
..... John Deere Multi-Purpose HD Lithium Complex Grease

(Specifications and design subject to change without notice)

Dimensions (All Models)

Height (X125) 108 cm (42.5 in.)
Height (X145) 113 cm (44.5 in.)
Height (X165) 114 cm (45.0 in.)
Length (Overall) (X125, X145) 175 cm (68.75 in.)
Length (Overall) (X165) 176 cm (69.25 in.)
Width (Mower Deck Chute Down)
(X125, X145) 131 cm (51.75 in.)
Width (Mower Deck Chute Down)
(X165) 152 cm (60 in.)
Weight (X125, X145) 204 kg (450 lb)
Weight (X165) 238 kg (524 lb)

Tires

Models X125

Size (Front) 15 x 6.00 - 6
Size (Rear) 20 x 8.0 - 8
Tire Pressure (Front) 97 kPa (14 psi)
Tire Pressure (Rear) 69 kPa (10 psi)

Models X145

Size (Front) 15 x 6.00 - 6
Size (Rear) 20 x 10.0 - 8
Tire Pressure (Front) 97 kPa (14 psi)
Tire Pressure (Rear) 69 kPa (10 psi)

Model X165

Size (Front) 16 x 6.5 - 8
Size (Rear) 22 x 9.5 - 12
Tire Pressure (Front) 83 kPa (12 psi)
Tire Pressure (Rear) 83 kPa (12 psi)

(Tire pressure information is also located on the sidewalls of the tires)

Mower Deck - 107 cm (42 in.)

Blades Rotary 2
Blade Nut Torque (w/ M12 Nut) 75 N•m (55 lb-ft)
Blade Nut Torque (w/ 5/8 in. Nut) 88 N•m (65 lb-ft)
Cutting Height (Approximately) 25 - 102 mm (1 - 4 in.)
Cutting Width 1067 mm (42 in.)

Mower Deck - 122 cm (48 in.)

Blades Rotary 3

Blade Nut Torque (w/ M12 Nut) 75 N•m (55 lb-ft)
Blade Nut Torque (w/ 5/8 in. Nut) 88 N•m (65 lb-ft)
Cutting Height (Approximately) 25 - 102 mm (1 - 4 in.)
Cutting Width 1219 mm (48 in.)

Fast Idle Engine Speed

X125 Without Mower Deck 3150 ± 100 r/min
X145 Without Mower Deck 3250 ± 100 r/min
X165 Without Mower Deck 3350 ± 100 r/min

Speed of Rotation of Cutting Device

X125 with 42C. 2654 r/min at 3250 r/min engine speed
X145 with 42C. 2788 r/min at 3350 r/min engine speed
X165 with 48C. 3280 r/min at 3450 r/min engine speed

Sound Measurements

Averaged Sound Level at Work Station According to EN836-A2

X125 without Mower Deck ... 83.6 dB(A) at 3250 r/min engine speed
X125 with 42C Mower Deck .. 86.0 dB(A) at 3250 r/min engine speed
X145 without Mower Deck ... 85.0 dB(A) at 3350 r/min engine speed
X145 with 42C Mower Deck .. 86.2 dB(A) at 3350 r/min engine speed
X165 without Mower Deck ... 82.4 dB(A) at 3450 r/min engine speed
X165 with 48C Mower Deck .. 89.6 dB(A) at 3450 r/min engine speed

Vibration Measurements

Hand/Arm Measured Per EN836-A2

X125 with 42C Mower Deck Below 2.5 m/s²
X145 with 42C Mower Deck Below 2.5 m/s²
X165 with 48C Mower Deck Below 2.5 m/s²

Whole Body Measured Per EN836-A2

X125 with 42C Mower Deck. 1.0 ± 0.1 m/s²
X145 with 42C Mower Deck. 0.9 ± 0.1 m/s²
X165 with 48C Mower Deck. 1.2 ± 0.1 m/s²

NOTE: The value listed above represents the weighted root means square acceleration to which the whole body is subjected on a representative machine during actual mowing and transport conditions. The acceleration value depends upon the roughness of the ground, the speed at which the tractor is operating and the operator weight and driving habits. Measurements were obtained through actual field data according to STD Procedure in EN836-A2.

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