

JOHN DEERE
AG & TURF DIVISION

Walk Greens Mower
180 E-Cut Hybrid
220 E-Cut Hybrid

OMTCU32631 B2

OPERATOR'S MANUAL



JOHN DEERE

Export Version
Printed in U.S.A.



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 and turf mowing operations. Use in any other way is considered as contrary to the intended use.

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.



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

Walk Greens Mower

180 E-Cut Hybrid PIN (010001-)

220 E-Cut Hybrid PIN (040001-)

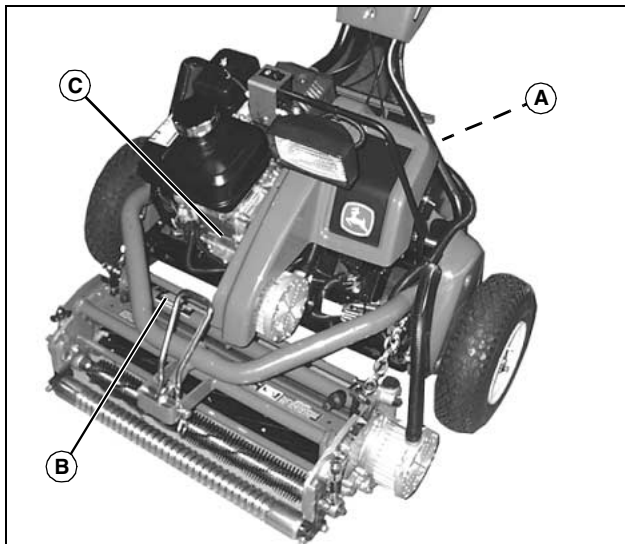
If you need to contact an Authorized Service Center for information on servicing, always provide the product model and serial number.

You will need to locate the model and serial number for the machine and for the engine of your machine and record the information in the spaces provided below.

DATE OF PURCHASE:

DEALER NAME:

DEALER PHONE:



MX42308

PRODUCT IDENTIFICATION NUMBER, MOWER (A):

PRODUCT IDENTIFICATION NUMBER, REEL (B):

ENGINE SERIAL NUMBER (C):

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Original Instruction

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John Deere Ag & Turf Division

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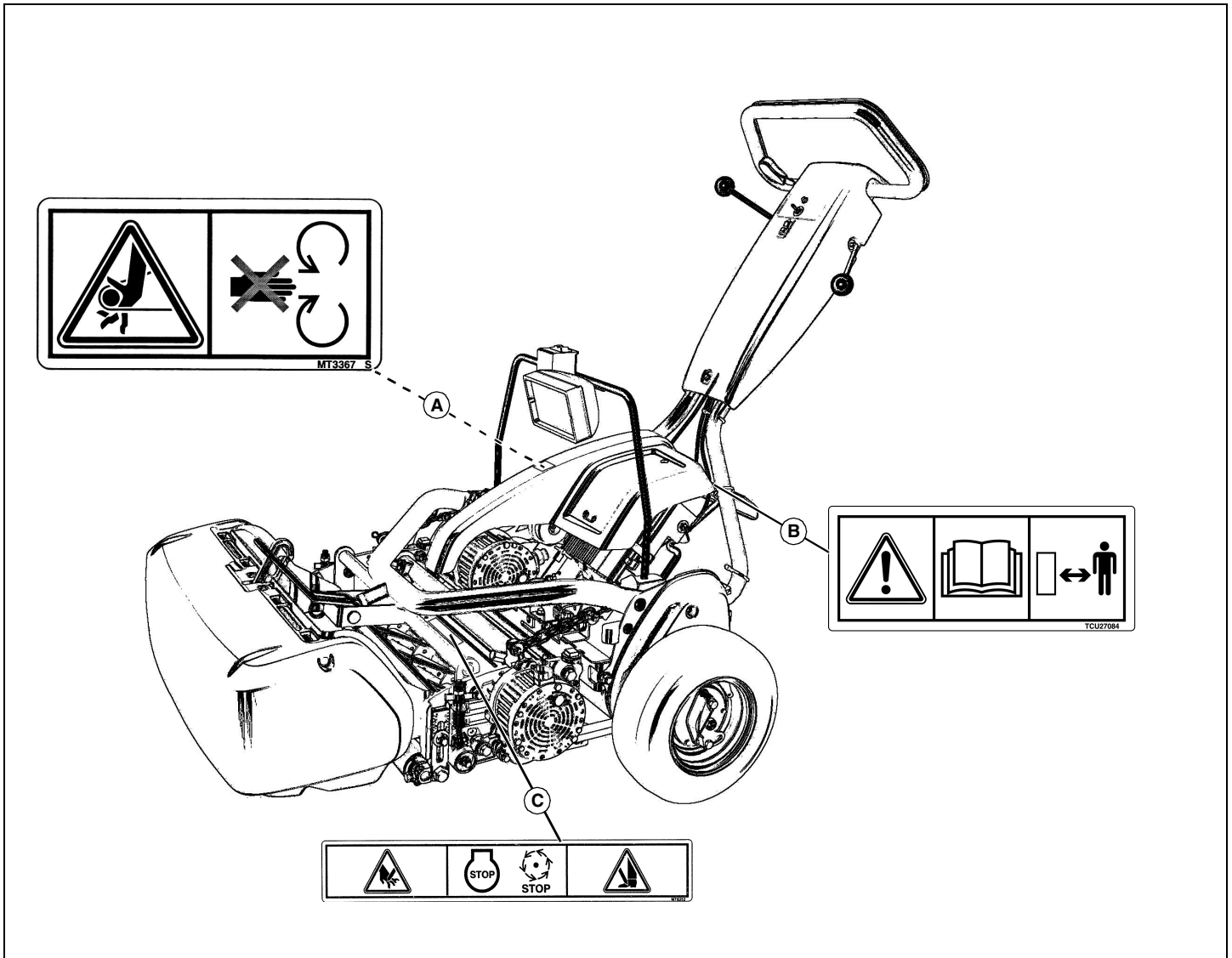
Previous Editions

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OMTCU32631 B2 -

Safety Labels

Safety Label Location



MX42307

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

- A - WARNING MT3367**
- B - CAUTION TCU27084**
- C - DANGER MT6732**

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

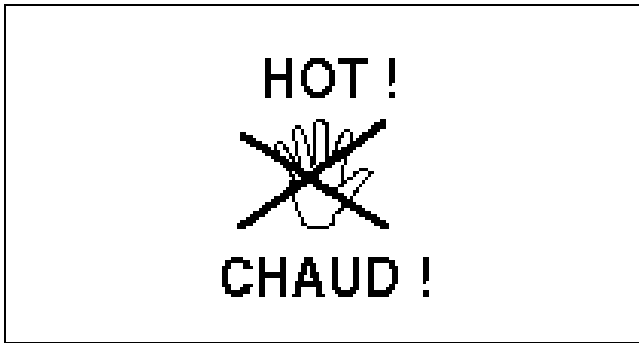


Pictorial Safety Signs

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

Safety Labels

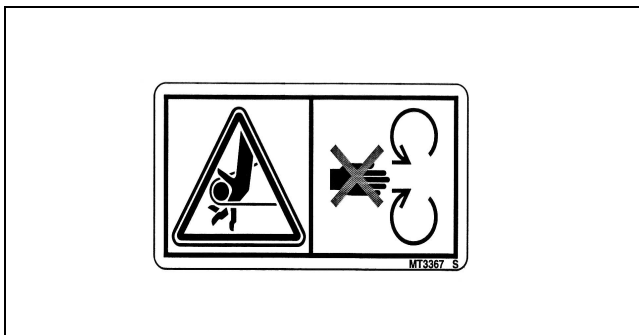
Warning



- Hot surface

Warning MT3367

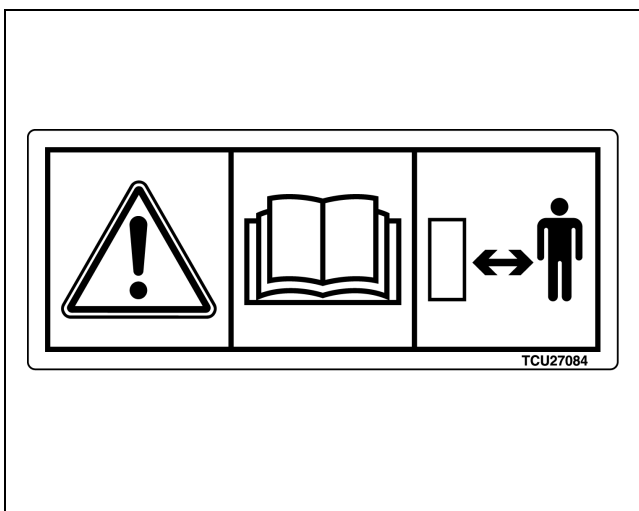
Keep All Shields In Place



MT3367

- Do not operate machine without shield in place.

Warning TCU27084



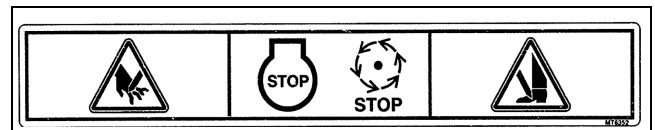
TCU27084

Help Avoid Injury

- Read operator's manual for operating and training instructions.
- Keep shields in place.
- Keep people a safe distance away.
- Maintain all safety devices.
- Stop engine whenever you leave the mower.

Danger - MT6732

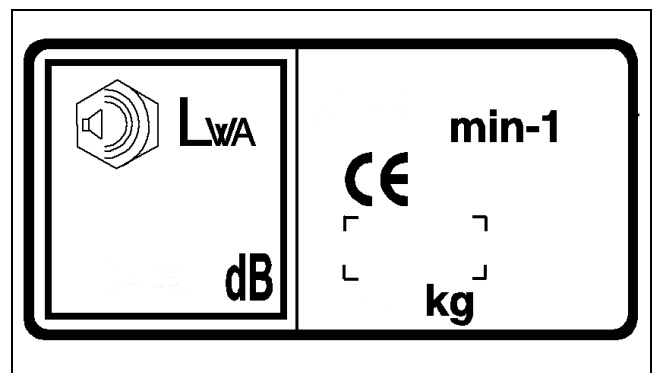
Avoid Injury From Rotating Blades



MT6732

- Keep hands and feet away from rotating blades.
- Shut off engine before servicing, lubricating or removing cutting units.

CE Certification Label



MT7210

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.

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.

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.

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.
- Avoid operating the equipment in wet grass, where feasible.
- Always be sure of your footing on slopes.
- Walk, never run.
- For wheeled rotary machines, mow across the face of slopes, never up and down.

- Exercise extreme caution when changing direction on slopes.
- Do not mow on excessively steep slopes.
- Use extreme caution when reversing or pulling the machine towards you.
- Stop the blades if the lawnmower has to be tilted for transportation when crossing surfaces other than grass, and when transporting the lawnmower to and from the area to be mowed.
- Never operate the machine with defective guards, or without safety devices, for example deflectors and/or grasscatchers, in place.
- Disengage all blade and drive clutches before starting the engine.
- Start the engine or switch on the motor carefully according to instructions and with feet well away from the blade.
- Never pick up or carry a lawnmower while the engine is running.
- Reduce the throttle setting during engine shutdown and, if the engine is provided with a shut-off valve, turn the fuel off at the conclusion of mowing.
- Do not change the engine governor settings or overspeed the engine. Operating an engine at excessive speed can increase the hazard of personal injury.
- Do not put hands or feet near rotating parts while the mower is being operated.
- Stop the engine and disconnect the spark plug wire, make sure that all moving parts have come to a complete stop and, where a key is fitted, remove the key:
 - before checking, cleaning, or working on the mower;
 - after striking a foreign object. Inspect the mower for damage and make repairs before restarting and operating the mower;
 - if the mower starts to vibrate abnormally (check immediately).
- Stop the engine and disconnect the spark plug wire, make sure that all moving parts have come to a complete stop and, where a key is fitted, remove the key:
 - whenever you leave the mower;
 - before refueling;
 - before clearing blockages.
- 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 operate.

Safety

- 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.
- Stop machine if anyone enters the area.
- 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.
- Do not operate machine if you are under the influence of drugs or alcohol.
- Do not wear radio or music headphones. Safe service and operation requires your full attention.

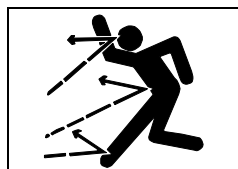
Parking Safely

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

Maintenance and Storage

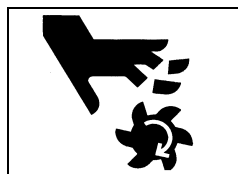
- Keep all nuts, bolts and screws tight to be sure the equipment is in safe working condition.
- Never store the equipment with fuel in the tank inside a building where fumes can reach an open flame or spark.
- Allow the engine to cool before storing in any enclosure.
- To reduce the fire hazard, keep the engine, silencer, battery compartment and fuel storage area free of grass, leaves, or excessive grease.
- Check the grasscatcher frequently for wear and deterioration.
- Replace worn or damaged parts for safety.
- If the fuel tank has to be drained, this should be done outdoors.
- Be careful during adjustment of the machine to prevent entrapment of the fingers between moving blades and fixed parts of the machine.

- Never allow untrained personnel to service machine. Understand service procedure before doing work.
- Disengage drives, lower implement, lock parking brake, stop engine and remove key or disconnect spark plug (for gas engines). Wait for all movement to stop before adjusting, cleaning or repairing.
- Let engine cool before storing and do not store near flame.
- Shut off fuel while storing or transporting. Do not store fuel near flames or drain indoors.
- 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.
- Keep all parts in good working condition and all hardware tightened. Replace all worn or damaged decals.



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.



Avoid Injury From Contacting Blades

- Rotating cutting cylinders 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 rotating cutting cylinders when engine is running.
- Be alert at all times, operate machine carefully. People, especially children can move quickly into the mowing area before you know it.
- Shut off cutting cylinders when you are not mowing.
- Park machine safely before leaving the operator's station for any reason including emptying the grasscatchers.
- Always wear gloves when manually rotating reel.

Safety

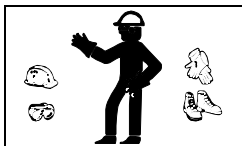
- Use a long-handled brush when applying reel-sharpening compound.

- Check fuel lines, tank, cap, and fittings frequently for cracks or leaks. Replace if necessary.

Rotating Blades are Dangerous - Protect Children and Prevent Accidents

Protect Children:

- Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to lawn-mowing machines and mowing activity. Stay alert to the presence of children. Never assume that children will remain where you last saw them.
- 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.
- Be alert and turn mower off if a child enters the work area. They don't understand the dangers of rotating blades or the fact that the operator is unaware of their presence.

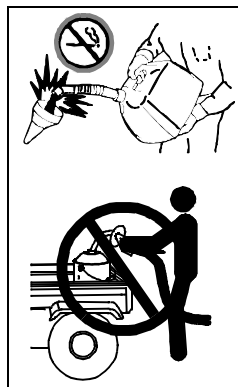


Wear Appropriate Clothing

- Always wear safety goggles, or safety glasses with side shields when operating the machine.
- Wear close fitting clothing and safety equipment appropriate for the job.
- While mowing, 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.

Prevent Fires

- Machine fires and structure fires can occur if a machine is stored before allowing it to cool, if debris is not removed from critical areas of the machine, or if machine is stored near combustible materials.
- Remove grass and debris completely from engine compartment and muffler area, and from on top of the mower deck, before and after operating machine, especially after mowing or mulching in dry conditions.
- Empty any grasscatcher bags or containers completely before storing.
- Always shut off fuel when storing or transporting machine, if the machine has a fuel shutoff.
- Do not store machine near an open flame or source of ignition, such as a water heater or furnace.



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.

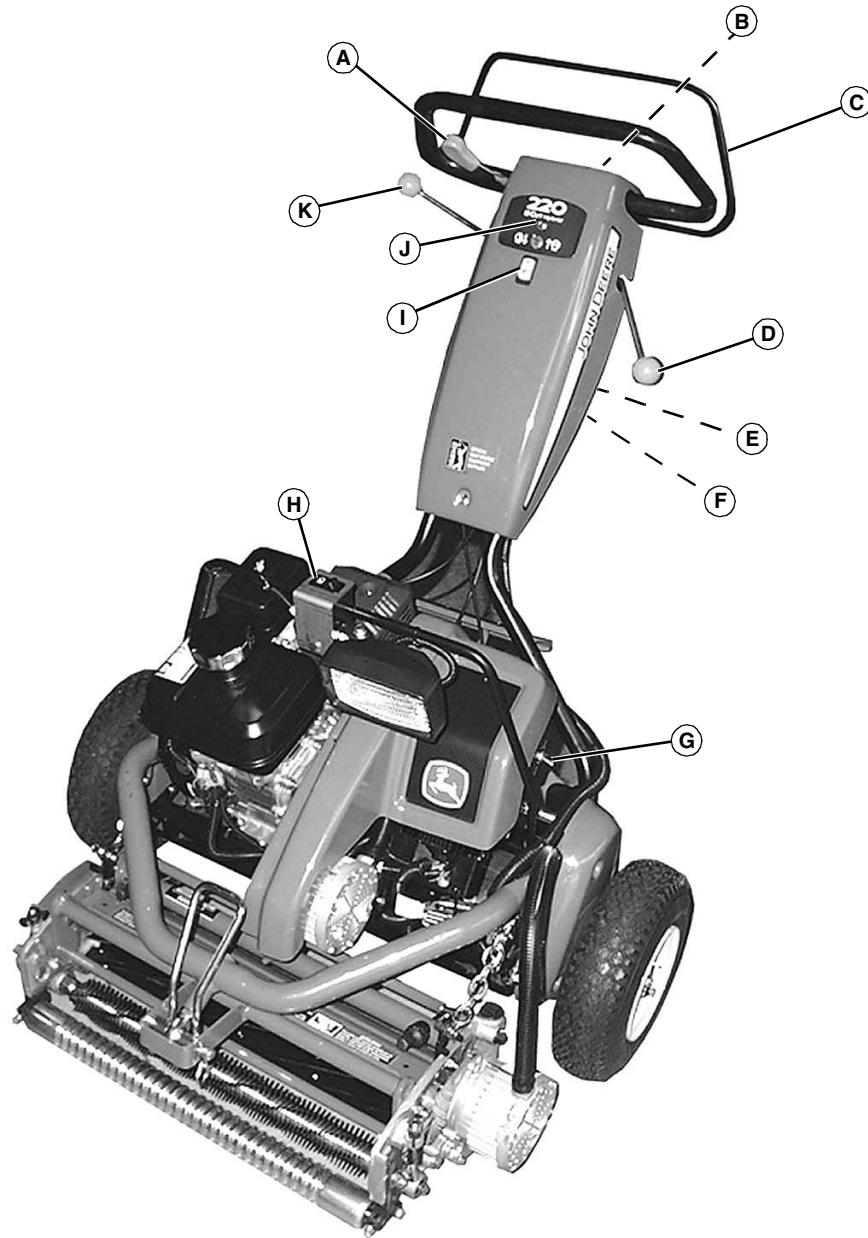
Handling Waste Product and Chemicals

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.

Operating Controls

Operating Controls



MX42546

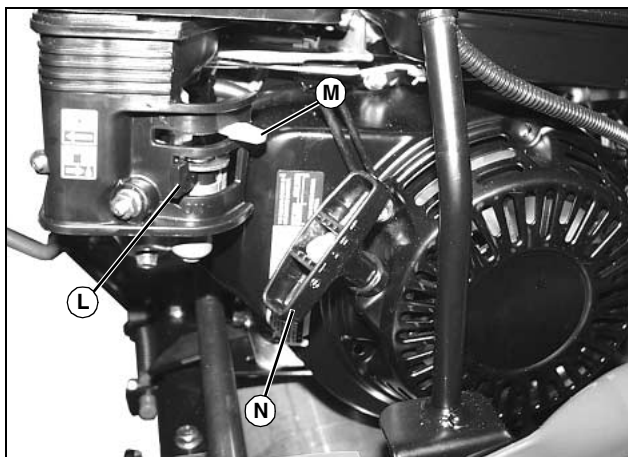
Key	Description
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A	Throttle Lever
B	Diagnostic Indicator Light
C	Operator Presence Bail
D	Park Brake Lever
E	Frequency Of Clip (FOC) Control
F	Hourmeter

Key	Description
-----	-------------

G	Mow/Backlap Switch
H	Light Switch (Optional)
I	PTO Switch
J	Run/Stop Switch
K	Travel Clutch Lever

Operating Controls



MX42309

Picture Note: Engine Controls

Key	Description
L	Fuel Shut-Off Valve
M	Choke Lever
N	Starter Handle

Operating

Daily Operating Checklist

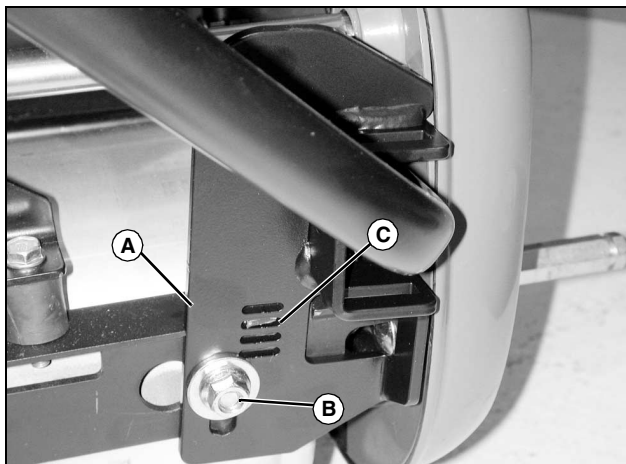
- ☐ Test safety systems.
- ☐ Check tire pressure.
- ☐ Check fuel level.
- ☐ Check engine oil level.
- ☐ Remove grass and debris from engine compartment and muffler area, and on top of cutting unit, before and after operating machine.
- ☐ Clean air intake screen.
- ☐ Check area below machine for leaks.

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 Handlebar Height

NOTE: Make sure bracket (A) is straight up and down, and not at an angle.



MX12973

1. Loosen nut (B) on each side of machine.
2. Move handlebar to desired position with tab (C) in one of four available slots and tighten nut (A).

Using Operator Controls

Using Run Switch

- Push run/stop toggle switch forward to run engine.
- Pull run/stop toggle switch back (toward operator) to stop engine.

Using Operator Presence Bail



CAUTION: Avoid injury! This machine is equipped with an operator presence system to protect the operator and bystanders. Do not attempt to alter the function of the operator presence system.

The operator presence bail stops the machine forward travel and cutting unit when released.

The operator presence bail when squeezed with handlebar permits engagement of the travel lever and cutting unit.

Using Travel Lever (Forward Travel)

1. Hold operator presence bail to handlebar.
2. Push travel lever forward to engage drive.
3. Release bail to stop travel.

Using Park Brake Lever

Release operator presence bail and pull brake lever back to stop mower movement.

Using Throttle Lever

Use throttle lever to adjust engine speed and rate of travel.

Pull lever back (toward operator) to reduce engine speed.

Adjust throttle lever depending on rate of travel, cutting height, and ground contour.

Using Choke Lever

Move choke lever left toward the decal for the choke position.

Using Fuel Shut-Off Valve

This unit is equipped with a 2-position fuel shut-off valve. Slide lever to the right to open or to the left to close the fuel shut-off valve.

Closed (OFF) position:

- When performing any type of service.
- When transporting.
- During storage.

Operating

Open (ON) position:

- Fuel shut-off valve must be in the full open (ON) position for proper fuel delivery when operating the engine.

Using Mow/Backlap Switch

The Mow/Backlap switch should be in the MOW position for all mowing and transport operation. The BACKLAP position is only used during machine service. (See Backlapping Cutting Units in SERVICE section.)

Using PTO Switch



MX42460

Pushing the PTO switch to the engaged (A) position will start the cutting unit for mowing operation only if all the following conditions are met:

- the operator presence bail is pushed forward and held with the handlebar.
- the parking brake is released.
- the travel lever is pushed forward into the engaged position.
- the backlap/mow switch is in MOW position.

Pushing the PTO switch to the engaged position will start the cutting unit for backlapping service only if all following conditions are met:

- the backlap/mow switch is in BACKLAP position.
- the parking brake is engaged.
- the travel lever is released.

Pushing the PTO switch to the disengaged position will stop mowing and backlapping reel rotation.

Machine Hourmeter



MX42306

The machine hourmeter (A) records actual run time of the engine and is graduated in 1/10 hour intervals. It can be used to schedule service for the machine and document when service was performed.

To check the hourmeter, park machine safely (see Parking Safely in SAFETY section), engage park brake and turn PTO switch to the disengaged position. Look under handlebar to read display.

Removing Transport Wheels



MX42310

1. Place machine on stand (A).
2. Release latch (B) and slide wheel from shaft. Repeat procedure for other side.

Operating

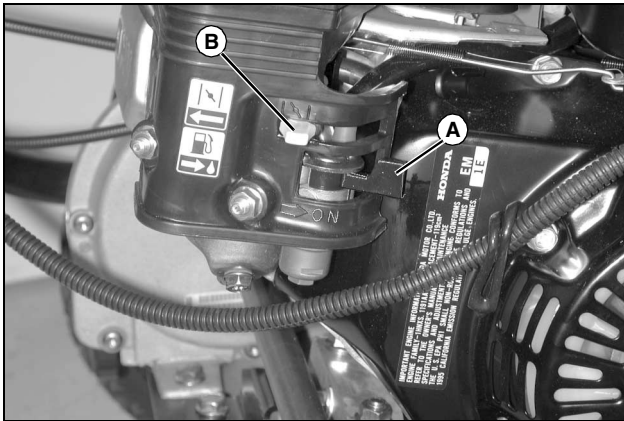
Starting the Engine



CAUTION: Avoid injury! Engine exhaust fumes contain carbon monoxide and can cause serious illness or death.

- Move the machine to an outside area before running the engine.
- Do not run an engine in an enclosed area without adequate ventilation.
- Connect a pipe extension to the engine exhaust pipe to direct the exhaust fumes out of the area.
- Allow fresh outside air into the work area to clear the exhaust fumes out.

1. Lock park brake lever.
2. Disengage drive clutches.
3. Push run/stop switch forward to the run position.
4. Move throttle lever to half open position.



MX11246

5. Turn fuel shut-off valve (A) to the ON position.
6. Set choke (B) at closed position.
7. Pull starter handle.

NOTE: If engine fails to start after three attempts, return choke to open.

8. Move choke to the open position after engine has started.
9. Allow engine to warm up before applying load.

Stopping the Engine

1. Release operator presence bail.
2. Pull throttle lever all the way back (toward operator). Let engine idle 2-4 minutes to allow engine to cool down.

NOTE: If mower will not be used for a long period, close fuel shut-off valve (A) and allow engine to run until remaining fuel in carburetor is exhausted and engine stops running (The engine will continue to run for a few minutes).

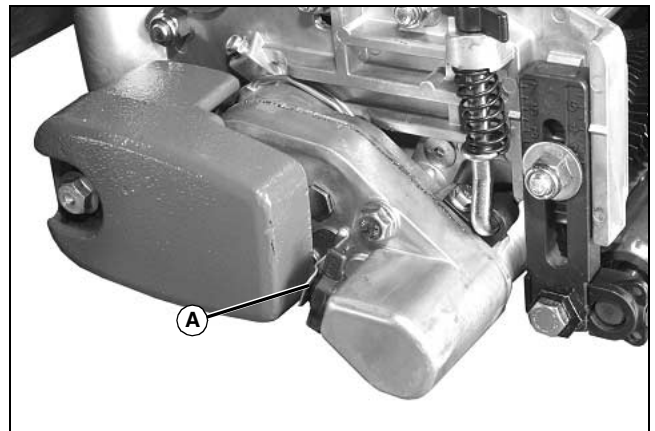
3. Pull run/stop switch back (toward operator) to STOP position.



MX11246

4. Turn fuel shut-off valve (A) to the OFF position.

Operating Turf Conditioner or Rotary Turf Brush (Optional)

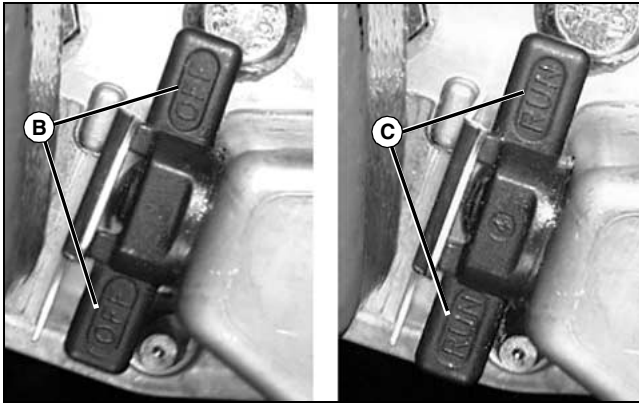


MX42311

The rotary brush is controlled by a knob (A) on the cutting unit gearcase.

NOTE: Before operating, always release the operator presence bail, engage the park brake, and place the PTO switch into the disengaged position. Verify the reel has completely stopped spinning.

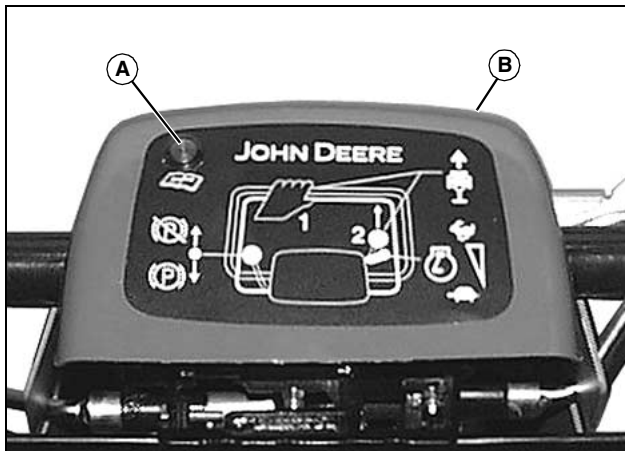
Operating



MX42692

- The turf conditioner or rotary turf brush is not engaged (neutral) when the control knob is placed in a vertical position and the word OFF (B) is visible on both ends.
- To engage the turf condition or rotary turf brush, rotate the knob 180° until the word RUN (C) is visible on both ends.

E-Cut Hybrid System Operation



MX42514

After starting engine, the diagnostic indicator light (A) on the handlebar cover (B) will illuminate momentarily (one quick flash, followed by a 2-3 second flash). This indicates the E-Cut Hybrid 48-Volt System controller has been activated.

If the E-Cut Hybrid System controller detects an abnormal condition or malfunction during operation of the machine, it will flash a diagnostic code number on the indicator light (A) while the engine is running. The code number will appear as one or a series of pulses, followed by a short pause and another single or series of pulses. The code or codes will continue to repeat until the engine is stopped.

NOTE: If an E-Cut Diagnostic code is displayed while the engine is running at less than full throttle, increase the throttle fully and continue machine use. If the displayed code continues, record the code (or codes)

and stop the machine. See the Service Electrical and Troubleshooting sections of this manual for additional information.

The controller may automatically shut down and stop reel rotation depending on the type of code detected. The diagnostic indicator light will display a quick flash, followed by a 2-3 second flash. The controller may be reset with the following method:

1. Turn the PTO switch to the disengaged position and then engaged position. If no codes are displayed and reel rotation is restored, continue machine operation. If the indicator light displays a quick flash, followed by a 2-3 second flash, proceed to the next step.
2. Pull the run/stop switch to STOP position to stop the engine. Push the run/stop switch to the run position, start the engine and engage the cutting unit. If no codes are displayed and reel rotation is restored, continue machine operation.

If any code is displayed or reel rotation cannot be restored, stop the machine. See the Service Electrical and Troubleshooting sections of this manual for additional information.

Frequency of Clip (FOC) Adjustment

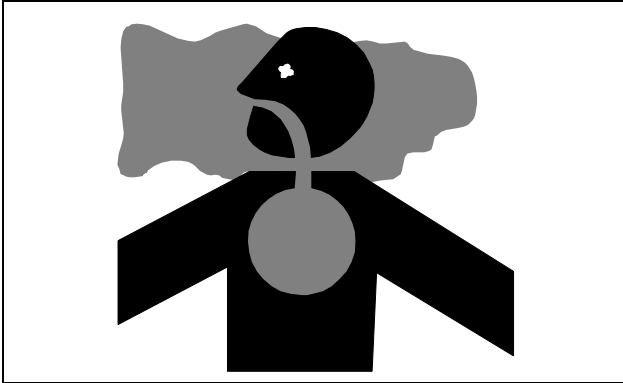


MX42458

Reel speed can be adjusted depending on the type of application for your greensmower, the type of cutting unit used and grass and height conditions. Adjust the FOC control (A) as required for your specific application. (See Adjusting Frequency of Clip in the SERVICE section.)

Operating

Testing Safety Systems



CAUTION: Avoid injury! Engine exhaust fumes contain carbon monoxide and can cause serious illness or death.

- Move the machine to an outside area before running the engine.
- Do not run an engine in an enclosed area without adequate ventilation.
- Connect a pipe extension to the engine exhaust pipe to direct the exhaust fumes out of the area.
- Allow fresh outside air into the work area to clear the exhaust fumes out.

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

1. Lock park brake.
2. Run engine at low idle.
3. Engage operator presence bail.
4. Slowly engage travel clutch lever.

Result: Engine should stall with no movement of the mower.

Testing Run Switch

1. Flip run switch rearward (toward operator) to STOP position.
2. Pull start handle.

Result: Engine should not start.

Testing Operator Presence Bail

1. Operate machine in clear open area.
2. Release operator presence bail.

Result: Cutting reel should stop rotating and machine should stop moving forward. Engine should continue to run.

Emergency Stopping



CAUTION: Avoid injury! The machine may be unstable if stopped suddenly. Do not stop suddenly unless it is an emergency.

1. Release operator presence bail.
2. Engage parking brake lever.
3. Turn run/off switch to off position.

Transporting Machine on Trailer

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



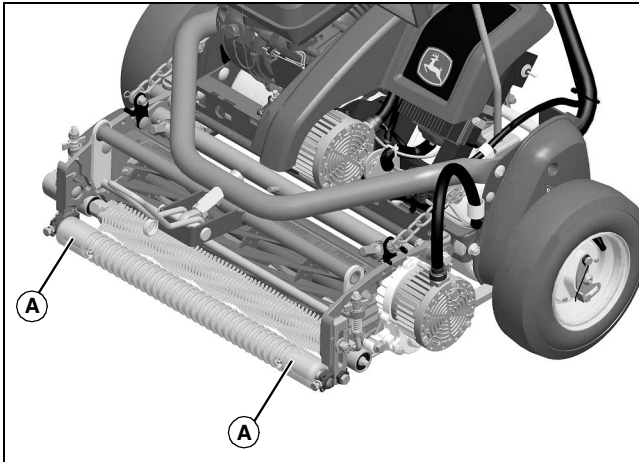
CAUTION: Avoid injury! Use extra care when loading or unloading the machine into a trailer or truck.

Close fuel shut-off valve, if your machine is equipped.

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

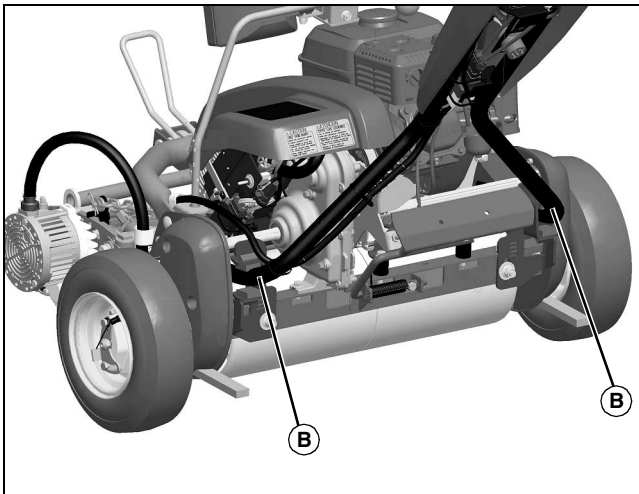
1. Park trailer on a level surface.
2. Move forward onto heavy-duty trailer.
3. Lock park brake.
4. Turn off machine.
5. Machines with fuel shut-off: Turn fuel shut-off to off position.

Operating



MX44430

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



MX44431

7. Fasten rear of machine at both sides of the handlebars at points (B) to trailer with heavy-duty straps, chains, or cables. Straps must be directed down and outward from machine.

Operating - Cutting Units

Engaging Cutting Unit



CAUTION: Avoid injury! Blades are sharp and rotate quickly:

- Keep hands and feet away from cutting reels while machine is running.
- Check and clear area of bystanders and children before engaging cutting reels.

NOTE: During machine transport, the PTO switch must be in the disengaged position.

1. Engage the Greens Tender Conditioner (if equipped and is to be used).
2. With the engine running, push the operator presence bail against the handlebar and move throttle lever forward to the fast position.
3. Release the park brake and press the PTO switch to the engaged position.
4. Push the travel lever forward to engage the cutting unit and begin forward travel.

NOTE: Do not reduce throttle more than 50%. If a low voltage trouble code appears, increase throttle position.

5. In areas where engine noise is restricted or of other concern, the engine speed can be reduced to lower the noise. As engine speed is reduced, ground speed will also reduce.

The frequency of clip (FOC) control on this machine will maintain synchronization of ground and reel speeds at any engine speed selected.

Emergency Stopping - Cutting Unit

NOTE: While mowing, there are three methods of stopping reel rotation in case of an emergency:

- Release the operator presence bail. Reel rotation and forward travel will stop.
- Push the PTO switch into the disengaged position. Reel rotation will stop and machine will continue forward travel.
- Push Run/Stop switch into the STOP position. Engine will stop. Reel rotation and forward travel will stop.

NOTE: When backlapping the cutting unit, there are four methods of stopping reel rotation in case of an emergency:

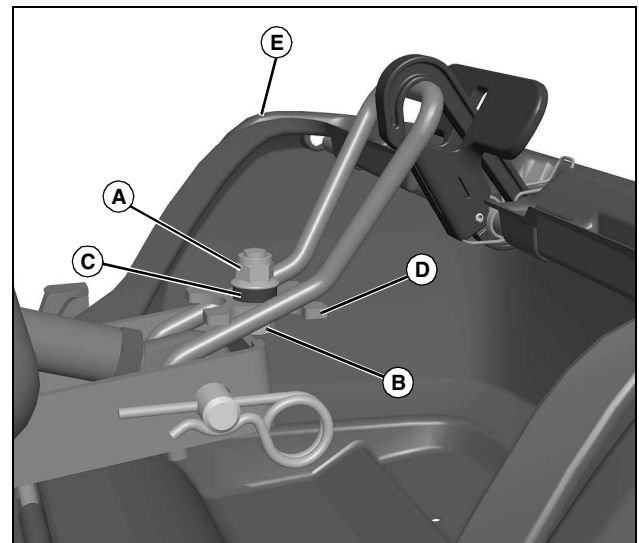
- Press the mow/backlap switch into the MOW position. Reel rotation will stop.
- Release the park brake. Reel rotation will stop.

- Push the PTO switch into the disengaged position. Reel rotation will stop.
- Push Run/Stop switch into the STOP position. Engine and reel rotation will stop.

Adjusting Catcher Basket Height

IMPORTANT: Avoid damage! Adjustment ensures basket will not drag on turf/ground.

NOTE: Secure bolt (B) with wrench while loosening or tightening locknut (A).



MX51211

1. Loosen and remove locknut (A) from bolt (B).
2. Reposition washers (C) above or below hanger plate (D) as needed to adjust catcher basket (E) to desired height.
3. Install and tighten locknut.

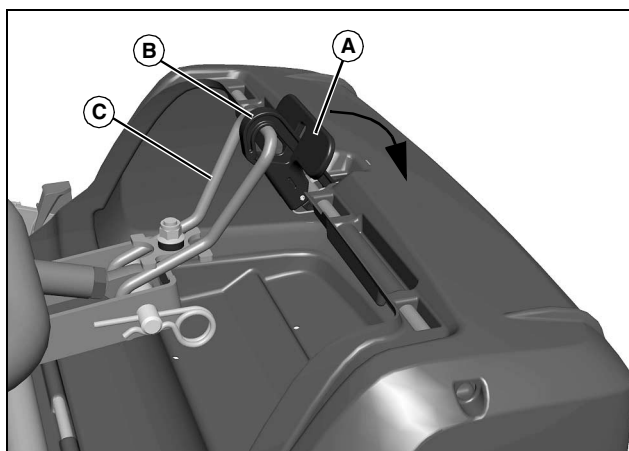
Removing and Emptying Grass Catcher Basket

Removing

IMPORTANT: Avoid damage! Proper orientation of the basket hanger is shown below. If the hanger is installed in the opposite orientation, the basket will drag on the turf/ground.

1. Release operator presence bail to release travel clutch lever and stop reel rotation.
2. Lock park brake.
3. Push PTO switch into the disengaged position, and verify that reel has come to a complete stop.

Operating - Cutting Units



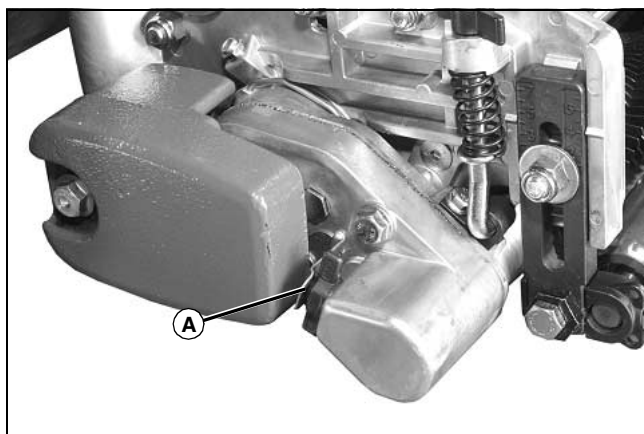
MX51210

4. Compress arm (A) on retaining bracket (B) to release grass catcher basket from hanger (C).
5. Raise and remove retaining bracket from hanger.
6. Pivot basket upward from cutting unit frame and empty.

Installing

1. Guide alignment rods in basket into slots in cutting unit side panels.
2. Secure retaining bracket (B) onto hanger (C).

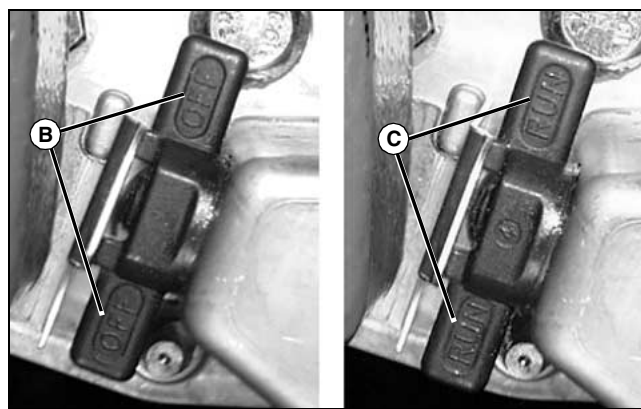
Operating Rotary Brush (Optional)



MX42311

The rotary brush is controlled by a knob (A) on the cutting unit gearcase.

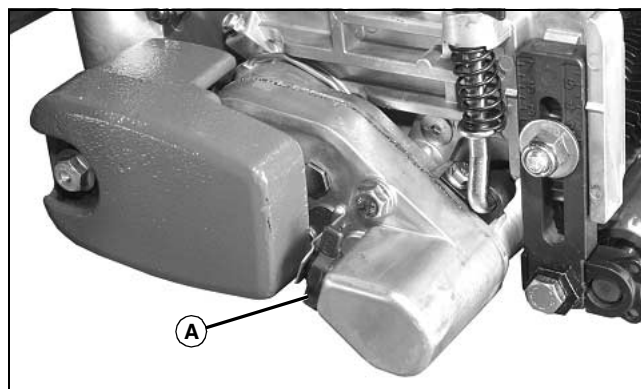
NOTE: Before operating, always release the operator presense bail, engage the park brake and turn the PTO switch to the disengaged position, and verify that the reel has come to a complete stop.



MX42692

- The rotary brush is in neutral (not engaged) with the control knob in the vertical position and the word OFF (B) is visible on both sides of the knob.
- To engage the rotary brush, rotate the knob 180° until the word RUN (C) is visible on both sides of the knob.

Operating Greens Tender Conditioner (GTC) (Optional)



MX42311

- The GTC is disengaged with the control knob (A) in the vertical position.
- To engage the GTC, turn the control knob 90° to the horizontal position.

IMPORTANT: Avoid damage! The blades may be dulled if the Greens Tender or Fairway Tender Conditioner (GTC or FTC) is used immediately after applying top dressing. Wait for at least three days following top dressing before using GTC or FTC.

The conditioner process involves shallow vertical cutting. The blades are adjusted to cut runners and lift horizontal leaf material. It is important that frequent and thorough observations be performed or stress to the plants may occur. Make adjustments as necessary.

Operating - Cutting Units

NOTE: The initial setting should be the same as Height Of Cut to prevent damage to the turf.

For a deeper cut, set approximately 0.79 mm (.032 in.) below Height Of Cut.

1. Set the GTC blades the same height as the Height of Cut when conditioning greens for the first time.
2. While cutting with GTC, closely examine each green for any inconsistencies or appearance of over-aggressiveness. Decrease GTC penetration if necessary.
3. Check each green 1–2 hours after cutting. Look for any tendency toward a yellow or brown tint. This indicates over-stress.
4. If visible stress is observed, decrease GTC penetration to 0.39 mm (0.016 in.) for next cutting.
5. Continue cutting/conditioning at this setting for three to five days. Check frequently for stress.
6. If no stress is observed, increase GTC penetration by 0.25 mm (0.010 in.). Check for obvious over-aggressiveness. Observe for two to three days, watching for signs of stress.
7. Mow with GTC at this setting until stress becomes visible. Back off the GTC adjusted penetration by 0.25 mm (0.010 in.).

NOTE: Stress is a cumulative result of many factors such as irrigation, temperature, humidity, chemical application, disease and thatch.

Conditioning aggressiveness will require adjustment and monitoring as these factors vary.

Conditioning frequency may also need to be reduced in some cases.

compressed air to less than 210 kPa (30 psi) when using for cleaning purposes.

- Clean grease fittings before lubricating. Replace lost or broken fittings immediately.

Cleaning Cutting Unit

IMPORTANT: Avoid damage! Grease after washing to purge fittings and bearings of water.

Do not use high-pressure water to clean grass from cutting units.

- When cleaning do not direct high pressure water at the cutting unit motor seals. Water may be drawn into bearings as they cool.
- Use high volume, low-pressure water to clean exterior of machine and the reels.
- Do not use water to wash where electrical components are located. If water penetrates electrical connections it may create problems.
- Use compressed air not water to clean air filters. Reduce

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.

Item	Part Number
Fairway Bed Knives:	
• 18 Inch	• TCU25299
• 22 Inch	• ET17532

Parts

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

Part numbers may change, use part numbers listed below when you order. If a number changes, your dealer will have the latest number.

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.

Part Numbers

Item	Part Number
Air Cleaner	AM123909
Spark Plug	M128206
Spark Arrestor	MIU13886
Clutch Belt	TCU25209
Alternator Belt	TCU24803
Standard Bed Knives:	
• 22 Inch	• ET17533
• 22 Inch with hardened insert	• ET11066
Tournament Bed Knives:	
• 18 Inch	• MT4846
• 22 Inch	• ET17534
Low-Cut Bed Knives:	
• 18 Inch	• MT7350
• 22 Inch	• MT7351

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.

Break-in - After First 5 Hours

- Test safety systems
- Check and adjust drive belt tension as needed.

Break-in - After First 20 Hours

- Change engine oil.
- Check for loose, missing or damaged parts, replace and tighten as needed.
- Clean fuel sediment bowl.
- Check for loose wiring and wiring connectors, secure as needed.

Break-in - After 50 Hours

- Check and adjust reel and roller drive chain tension.
- Change gear case oil.

Daily

- Test safety systems.
- Grease GTC or rotary brush (2 places).
- Grease cutting unit front and rear rollers (4 places).
- Grease reel (2 places).
- Check engine oil level.
- Check for loose wiring and wiring connectors, secure as required.

- Check for loose, missing or damaged parts, replace and tighten as needed.

Every 50 Hours

- Clean air cleaner foam element.
- Check air cleaner paper element.
- Grease drive control linkage.
- Grease operator presence pawl and cam.
- Grease height of cut adjuster (2 places).
- Grease drive drum (2 places).
- Grease input drives to ground drive chain (2 places).
- Change engine oil.
- Inspect transport tires and check air pressure (if equipped).

Every 100 Hours

- Clean spark plug and adjust gap.
- Clean cylinder and cylinder head cooling fins.
- Check gear case oil.
- Check drive belt for proper tension, adjust as needed.
- Check clutch and park brake switch operation, adjust if necessary.
- Check and clean spark arrestor.
- Clean fuel sediment bowl and fuel filter.
- Clean fuel filter in fuel tank fitting. (See the Technical Manual or your John Deere Dealer.)

Every 200 Hours

- Tighten collet nut on Turf Conditioner or Rotary Turf Brush shaft.

Every 300 Hours

- Change air cleaner paper element. (More often in dusty conditions.)
- Check and adjust roller drive chain tension.
- Replace and gap spark plug.
- Check alternator belt for proper tension, adjust as needed.
- Check and adjust idle speed.

Service Intervals

Yearly or every 500 Hours

- Remove carbon from cylinder, cylinder head, and piston.
(See the Technical Manual or your John Deere Dealer.)
- Check valves. Reface or replace as necessary.
(See the Technical Manual or your John Deere Dealer.)
- Check and adjust valve clearance. (See the Technical Manual or your John Deere Dealer.)

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:

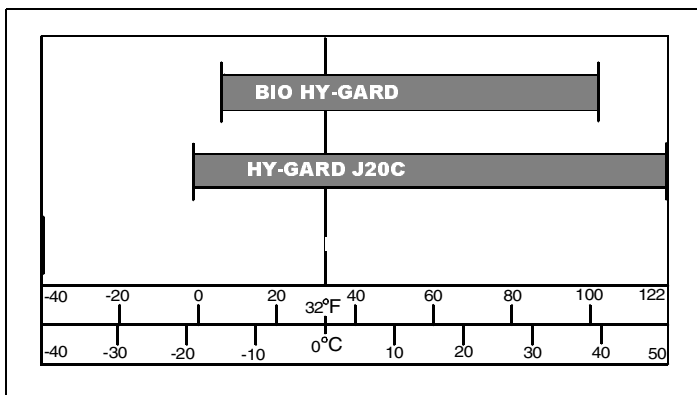
- John Deere Multi-Purpose SD Polyurea Grease
- John Deere Golf & Turf Cutting Unit Grease

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.

Transmission and Hydraulic Oil

IMPORTANT: Avoid damage! Machine is filled with John Deere HY-GARD™ (J20C) Transmission/Hydraulic Oil at the factory. DO NOT mix oils. DO NOT use type “F” automatic transmission fluid.



MIF

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

John Deere J20C HY-GARD Transmission/Hydraulic Oil is recommended.

Use John Deere BIO HY-GARD™ oil when a biodegradable fluid is required.

Biodegradable Oil

Application

IMPORTANT: Avoid damage! Biodegradable oils, other than BIO HY-GARD™, are not recommended.

When use of a biodegradable lubricant is desired or required, BIO HY-GARD is recommended. BIO HY-GARD may be used under normal mowing conditions.

DO NOT USE biodegradable lubricants in machines for the following operations:

- Any machine used for scalping procedure.
- Any verticut operation in temperatures exceeding 32°C (90°F).
- Mixing of biodegradable oil and mineral oil will reduce the biodegradability of the lubricant in the machine. Mixing of HY-GARD and BIO HY-GARD will not result in performance deterioration.

Cold Weather Operation

Precautions should be taken if BIO HY-GARD containers or equipment are stored for long periods of time in extremely cold temperatures. Freezing should be expected if BIO HY-GARD is subjected to the following temperatures:

- Stored for six months at -18° to -23°C (-1° to -10°F)
- Stored for seven days at -23° to -26°C (-10° to -15°F)
- Stored for three days at -26° to -29°C (-15° to -20°F)
- Stored for two days at -29° to -34°C (-20° to -30°F)
- Stored for one day at -34°C (-30°F) and below.

IMPORTANT: Avoid damage! Equipment should not be started or any operation attempted until BIO HY-GARD™ has reached a safe operating viscosity.

If freezing of BIO HY-GARD is suspected, the container or equipment MUST be warmed to at least 0°C (32°F) and maintained for 24-48 hours to ensure the fluid has reached a safe operating viscosity.

Converting From HY-GARD to BIO HY-GARD

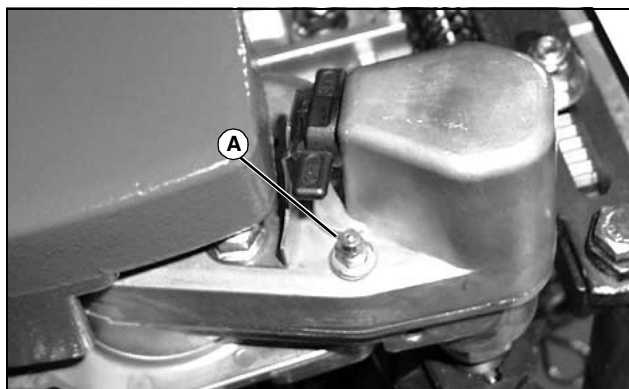
Systems being converted from HY-GARD to BIO HY-GARD should follow the procedure listed below to obtain maximum lubricant biodegradability.

1. Park machine on a level surface.
2. Stop engine and set park brake.
3. Drain gearcase.

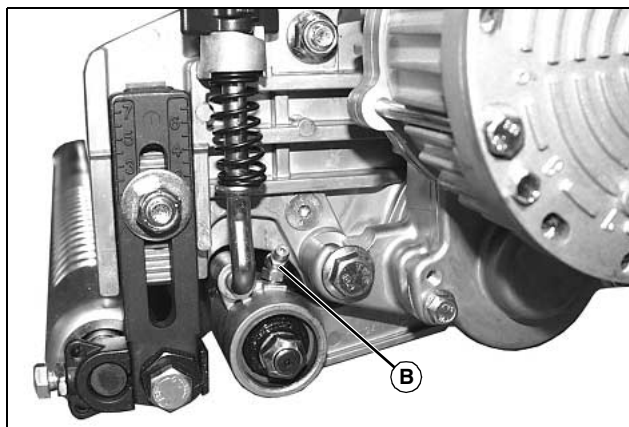
Service Lubrication

4. Fill gearcase with BIO HY-GARD to appropriate level.
5. Start engine and bring to medium idle.
6. Cycle traction drive clutch several times with PTO off.
7. Stop engine and check gearcase level. Add BIO HY-GARD to appropriate level.
8. Operate machine under normal operating conditions for a minimum of two hours.
9. Repeat steps 1-7.
10. Follow recommended maintenance schedules.

Lubricating Turf Conditioner or Rotary Turf Brush Drive



MX42447

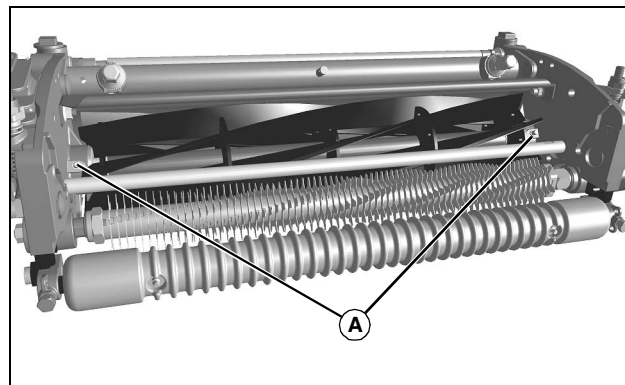


MX42365

IMPORTANT: Avoid damage! Only use John Deere Golf and Turf Cutting Unit Grease to lubricate the GTC or rotary brush gearcase (A) and support arm bearing (B).

Lubricate GTC or rotary brush gearcase (A) and support arm bearing (B) with John Deere Golf and Turf Cutting Unit Grease.

Lubricating Reel

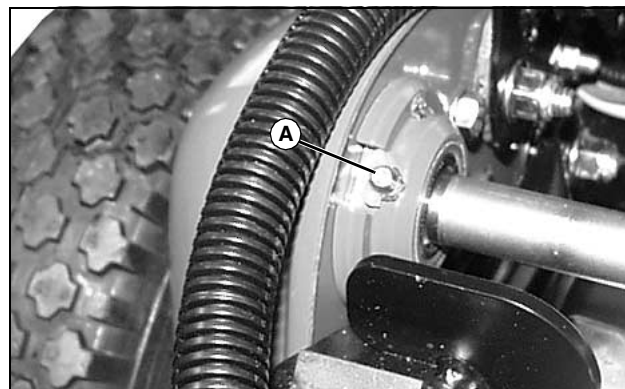


MX41164

IMPORTANT: Avoid damage! Only use John Deere Golf and Turf Cutting Unit Grease to lubricate the reel bearings.

Lubricate reel bearing grease fittings (A) on both ends with John Deere Golf and Turf Cutting Unit Grease.

Lubricating Input Drives

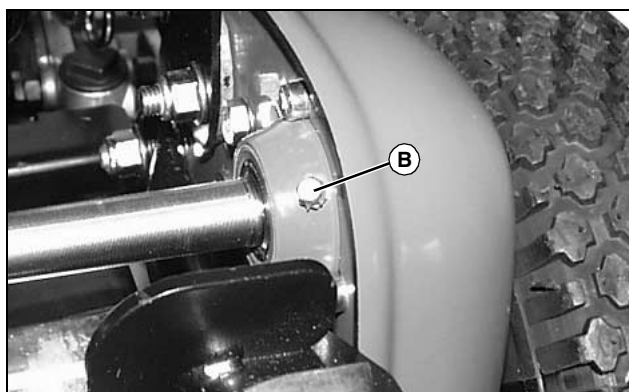


MX42360

Picture Note: Left side shown from rear.

1. Lubricate input drive to left side drive chain at point (A) with John Deere Multi-Purpose SD Polyurea Grease or equivalent SAE multipurpose grease.

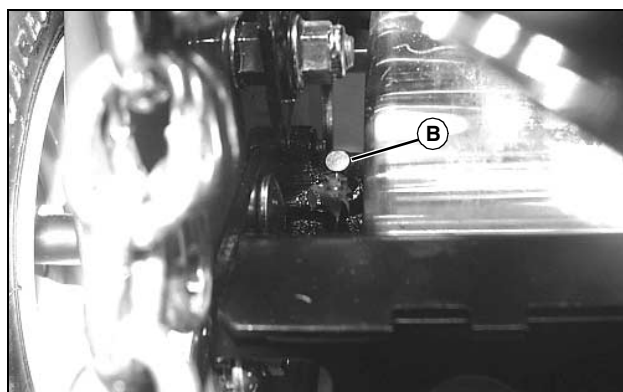
Service Lubrication



MX42361

Picture Note: Right side shown from rear.

2. Lubricate input drive to right side drive chain at point (B) with John Deere Multi-Purpose SD Polyurea Grease or equivalent SAE multipurpose grease.

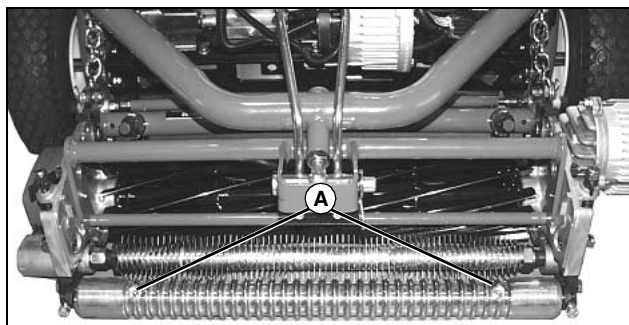


MX42359

Picture Note: Right side shown from front.

Lubricate drive roller at points (A and B) with John Deere Multi-Purpose SD Polyurea Grease or equivalent SAE multipurpose grease.

Lubricating Front Roller

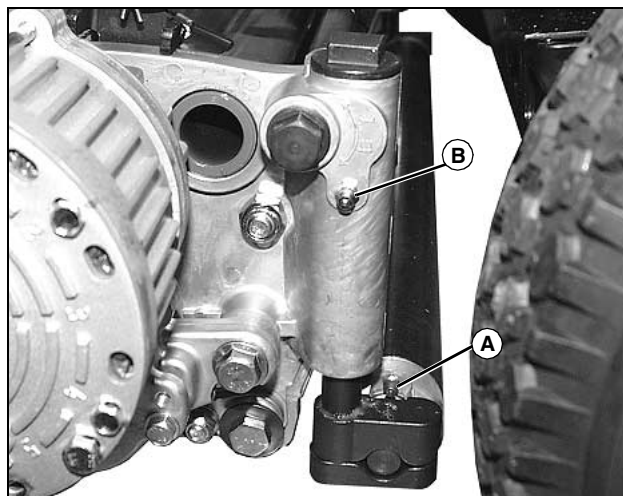


MX42364

Picture Note: Grooved Roller Shown

Lubricate roller at points (A) with John Deere Multi-Purpose SD Polyurea Grease or equivalent SAE multipurpose grease.

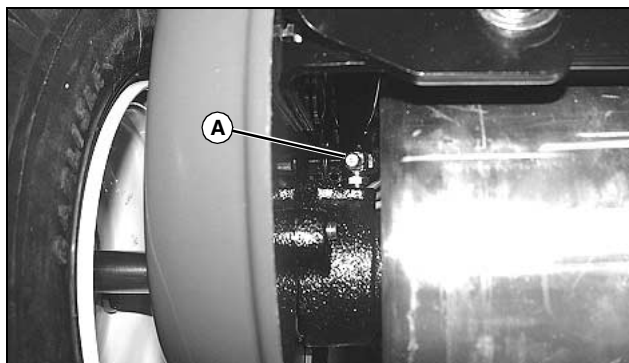
Lubricating Rear Roller and Height of Cut Adjusters



MX42449

Picture Note: Left side shown.

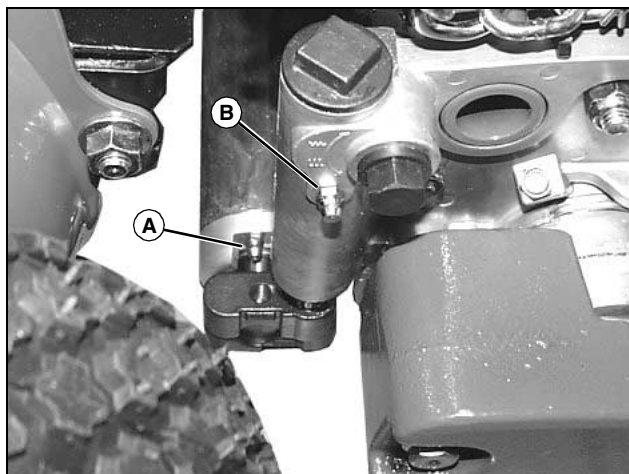
Lubricating Drive Roller



MX42358

Picture Note: Left side shown from rear.

Service Lubrication



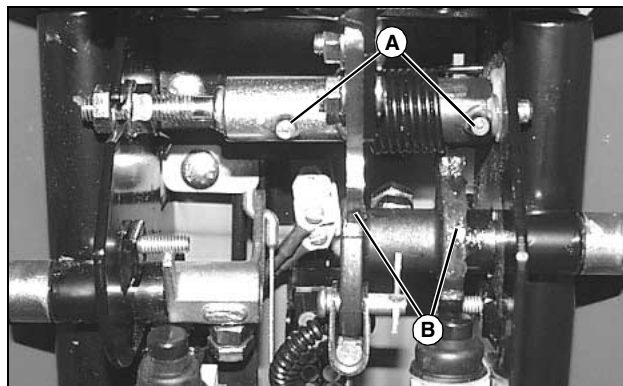
MX42450

Picture Note: Right side shown.

Lubricate rear roller at two points (A) and height of cut adjusters at two points (B) with John Deere Multi-Purpose SD Polyurea Grease or equivalent SAE multipurpose grease.

6. Remove block used to level unit.

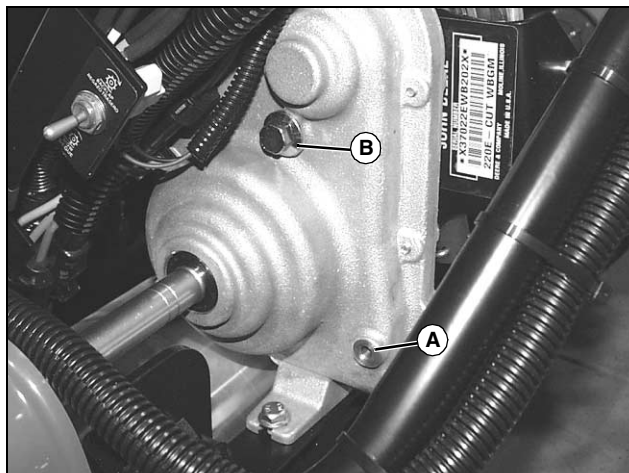
Lubricating Drive Control Linkage



MX42356

1. Lubricate drive control linkage at points (A and B) with John Deere Multi-Purpose SD Polyurea Grease or equivalent SAE multipurpose grease.

Checking and Filling Gear Case



MX42357

1. Remove transport wheels and position machine so traction drum and front and rear rollers are on a level surface.
2. Remove drain plug (A).
3. Check level of lubricant. Oil should be at the bottom of drain hole.
4. Add oil if required through the upper hole (B) using John Deere Hy-Gard Oil.
 - Oil Capacity: 140 mL (4.8 oz.)
5. Install drain plug with gasket in hole (A) and tighten securely.

Service Engine

Avoid Fumes

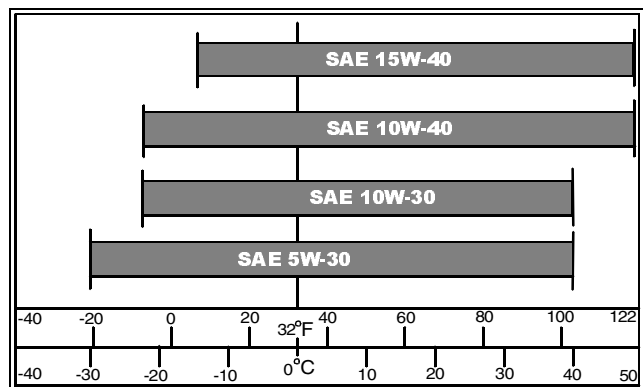


CAUTION: Avoid injury! Engine exhaust fumes contain carbon monoxide and can cause serious illness or death.

- Move the machine to an outside area before running the engine.
- Do not run an engine in an enclosed area without adequate ventilation.
- Connect a pipe extension to the engine exhaust pipe to direct the exhaust fumes out of the area.
- Allow fresh outside air into the work area to clear the exhaust fumes out.

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™
- 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

Using Proper Fuel

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, or add fuel stabilizer.

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 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 fuel tank at the end of daily use and store fuel in plastic containers to reduce condensation.

For best year-round performance and fuel-handling, add stabilizer to fuel immediately after fuel purchase. Such practice helps prevent engine performance problems and allows fuel storage in the machine all year without draining.

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 Engine

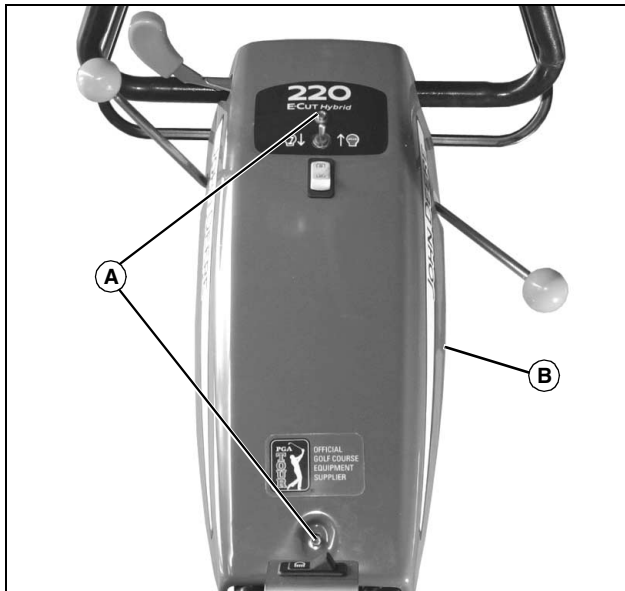
IMPORTANT: Avoid damage! Dirt and water in fuel can cause engine damage:

- 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.

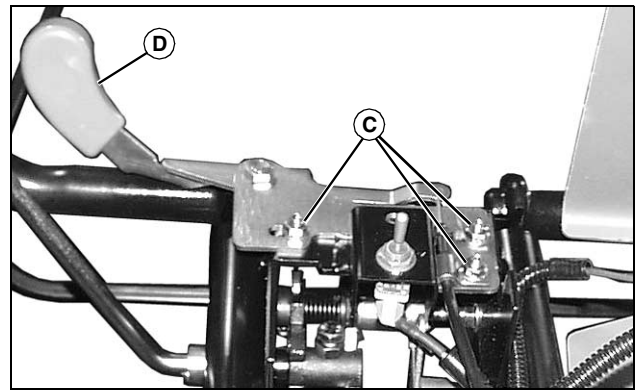
1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Allow engine to cool.
3. Remove any trash from area around fuel tank cap.
4. Remove fuel tank cap slowly to allow any pressure built up in tank to escape.
5. Fill fuel tank only to bottom of filler neck. Do not overfill.
6. Install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

Adjusting Throttle Lever Location



MX42346

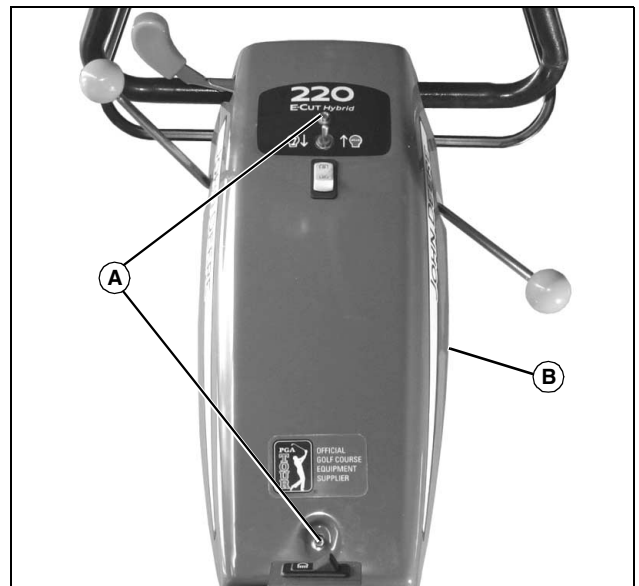
1. Remove two hex head bolts (A).
2. Remove handlebar cover (B).



MX42348

3. Loosen three nuts (C).
4. Move throttle lever plate (D) to where the throttle lever location is most comfortable for the operator.
5. Tighten nuts.
6. Install handlebar cover with two hex head bolts and tighten.

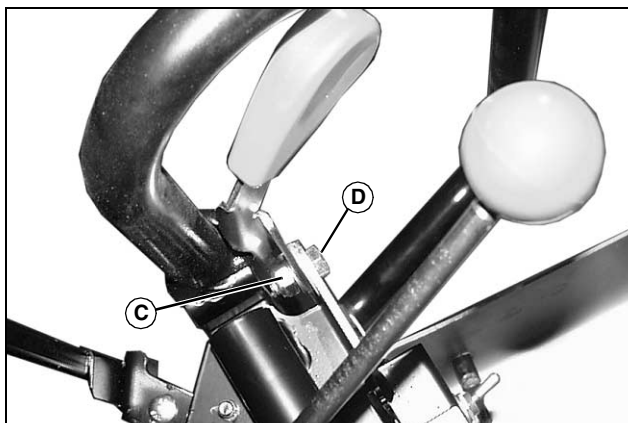
Adjusting Throttle Lever Tension



MX42346

1. Remove two hex head bolts (A).
2. Remove handlebar cover (B).

Service Engine



MX42347

3. Using two wrenches, tighten or loosen the lock nut (C) on the throttle pivot hex bolt (D). At the proper tension, the throttle lever is easy to move, yet maintains the desired throttle setting during operation.

4. Install handlebar cover with two hex head bolts and tighten.

Cleaning Air Cleaner

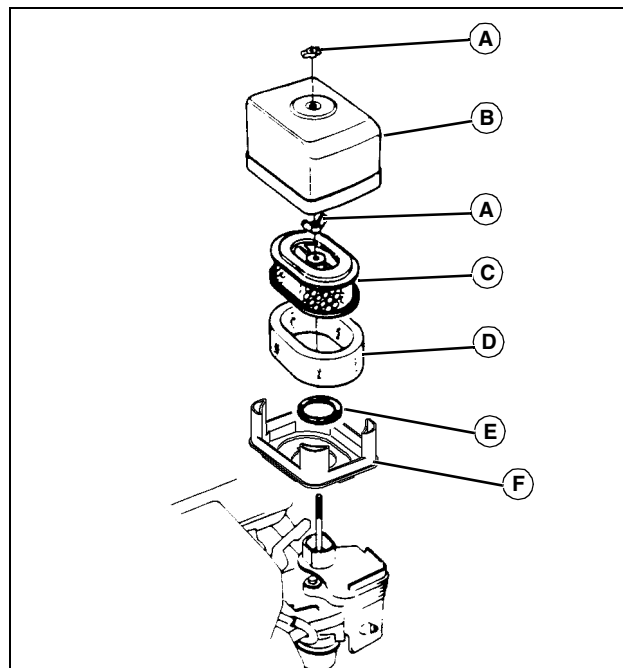


CAUTION: Avoid injury! Touching hot surfaces can burn skin. The engine, components, and fluids will be hot if the engine has been running. Allow the engine to cool before servicing or working near the engine and components.

IMPORTANT: Avoid damage! 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.

1. Remove wing nut (A) to remove air cleaner cover (B).



MX21103

2. Remove second wing nut (A) to remove air cleaner element (C) and precleaner (D).

3. Check housing, precleaner, element and rubber gasket (E) for damage. Housing must seat well and permit only filtered air to reach carburetor. Replace if necessary.

IMPORTANT: Avoid damage! Do not clean precleaner with solvent or compressed air.

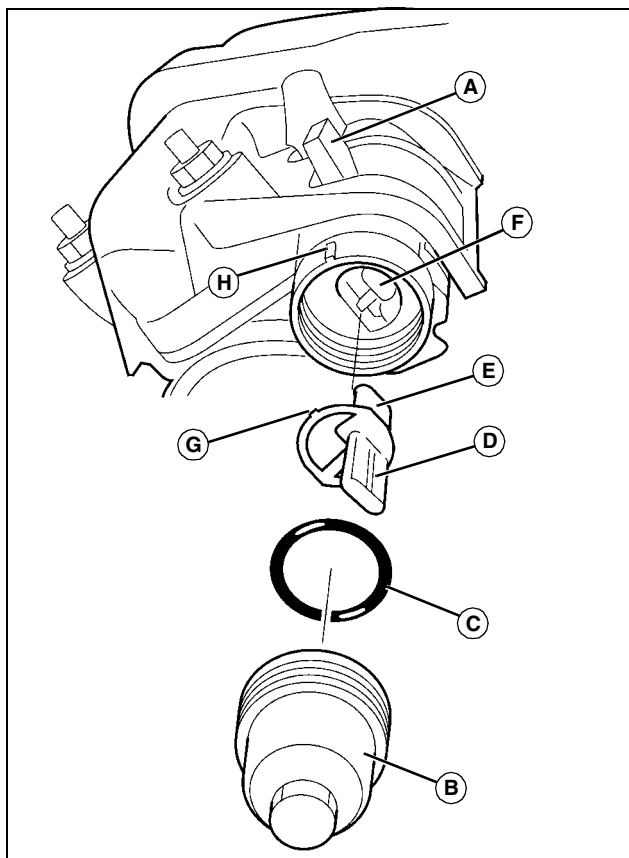
4. Be sure nothing is obstructing the air passage.

5. Precleaner (D) - Clean every 25 hours of operation:

- Wash in detergent and water, rinse in clean water.
- Dry thoroughly.
- Air cleaner element (C) - Clean or replace every 100 hours of operation:
 - If element is extremely dirty or damaged, install new element.
- Assemble air cleaner assembly and install two wing nuts. Ensure base (F) is properly installed prior to assembly.

Service Engine

Cleaning Fuel Sediment Bowl and Fuel Filter



MX51212

1. Turn fuel shut-off valve (A) to the OFF position.
2. Unscrew and remove sediment bowl (B) and O-ring (C).
3. Remove fuel filter screen (D).
4. Thoroughly clean sediment bowl (B) and fuel filter screen (D) with John Deere degreasing solvent or equivalent.
5. Install fuel filter screen (D) with tab (E) aligned with slot (F), and tab (G) aligned with notch (H) on carburetor.
6. Install O-ring (C) and sediment bowl (B). Securely tighten sediment bowl.
7. Turn fuel shut-off valve to the full open (ON) position and check for leaks.

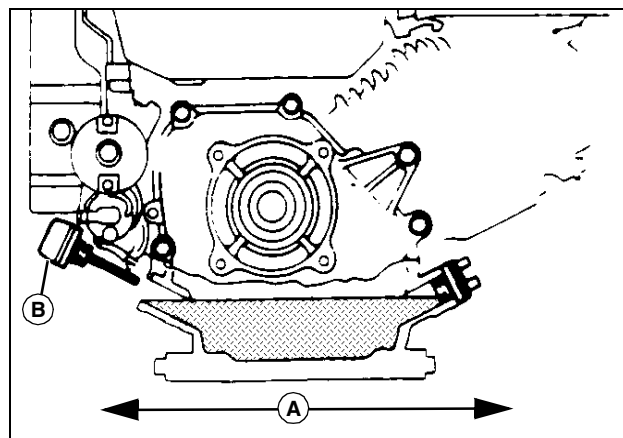
Checking Engine Oil Level

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:

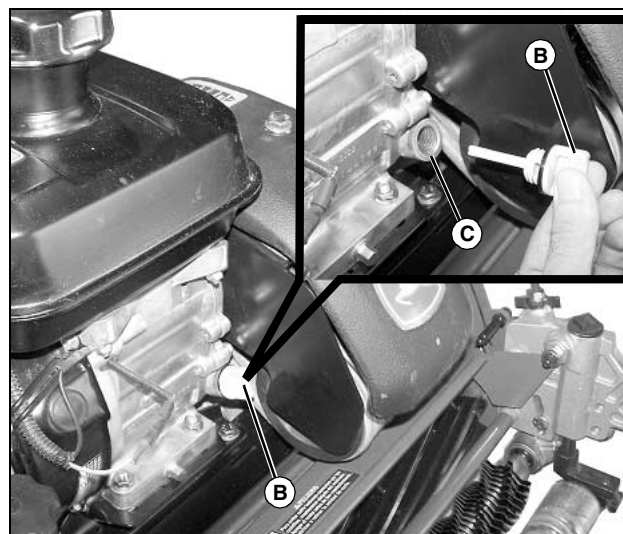
- Engine should be level prior to checking oil level.
- Check oil level before operating.
- Check oil level when the engine is cold and not running.
- Keep oil level between the dipstick marks.
- Shut off engine before adding oil.

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.



M86629



MX46594

1. Be sure engine is in a level (horizontal) position (A). If necessary, put a block under front roller to level engine.

Service Engine

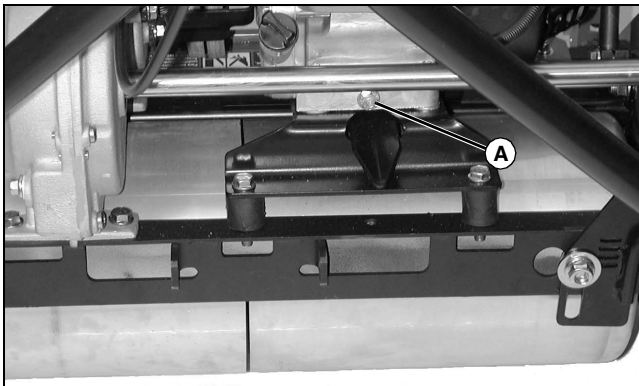
NOTE: Do not screw dipstick into engine to check oil level.

2. Remove dipstick (B), wipe clean, and install dipstick loosely into filler port.
3. Remove dipstick and inspect oil level. If no oil or only a slight amount is seen on dipstick, add to full level (C). Do not overfill.
4. Wipe any spilled oil off mower.

Changing Engine Oil

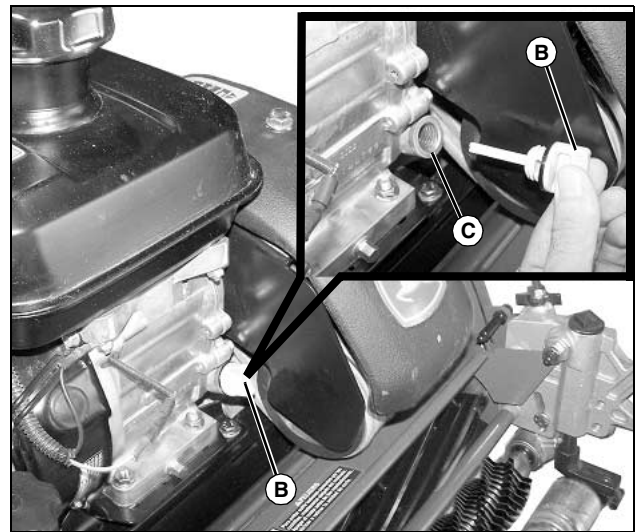
NOTE: Change engine oil after first 20 hours of operation, then every 50 hours. Check and fill plugs are located in front and rear of machine.

1. Run engine a few minutes to warm oil.
2. Be sure engine is in a level (horizontal) position, if necessary, put a block under front roller to level engine.
3. Stop engine.



MX11253

4. Remove drain plug (A) and drain oil into container.
5. Install drain plug.



MX46594

6. Remove dipstick (B), and wipe clean.
7. Add approximately 0.6 L (0.63 qt) of oil to full level (C). Do not overfill. (See "Checking Oil Level".)
8. Wipe any spilled oil off mower.

Cleaning Spark Plug And Adjusting Electrode Gap



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.



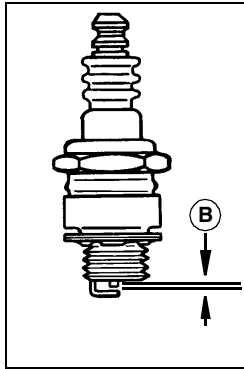
MX11268

1. Disconnect plug wire (A) and remove plug.
2. Thoroughly clean plug using high flash-point solvent and wire brush.
3. Inspect plug for cracked porcelain, pitted or damaged electrodes, or other damage.

Service Engine

NOTE: In Canada, replace plug with a resistor plug.

4. Replace plug if necessary.



M85200

5. Check plug gap (B) with a round wire-type feeler gauge.

- Gap must be 0.7–0.8mm (0.028–0.031 in.).
- Change gap by moving only the outer electrode toward center electrode.

6. Install and tighten plug to 25 N•m (18 lb-ft).

7. Connect spark plug wire.

Adjusting Carburetor

NOTE: The carburetor is calibrated by the engine manufacturer and should not require any adjustments.

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

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

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

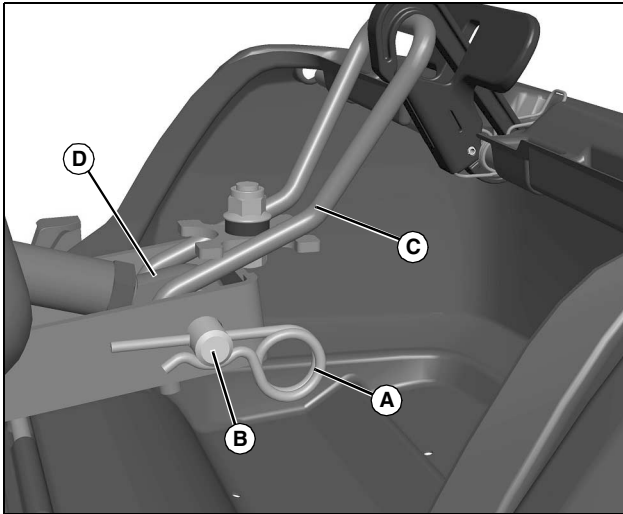
Service - Cutting Units

Removing and Installing Cutting Units

Removing Cutting Unit

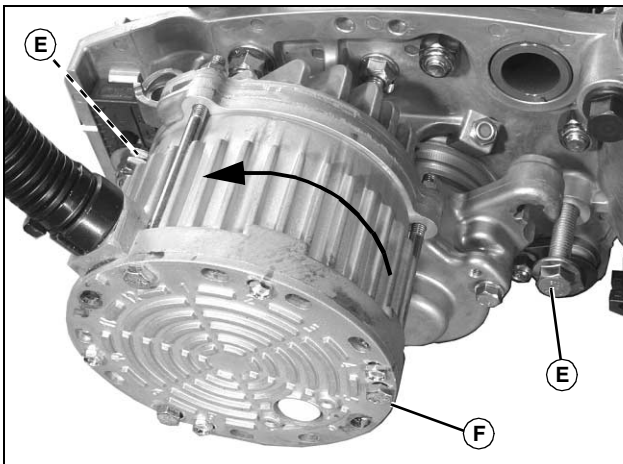
IMPORTANT: Avoid damage! Support the machine handlebar before removal of the cutting unit to prevent uncontrolled tipping of the machine.

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

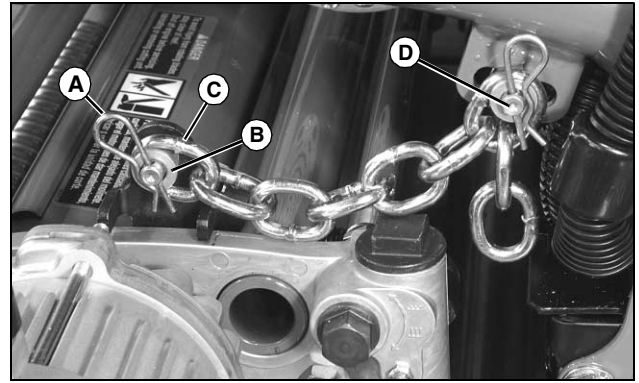


2. Remove spring locking pin (A) and clevis pin (B) securing cutting unit and basket hanger (C) to support arm (D). Roll cutting unit away from machine.

IMPORTANT: Avoid damage! NEVER lift or carry motor by wires.



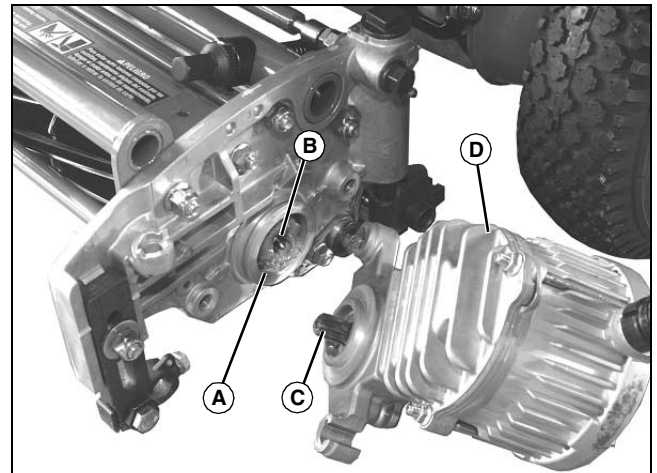
3. Loosen two hex flange head bolts (E), and rotate and remove drive motor assembly (F) from cutting unit.



4. Remove spring locking pin (A) flat washer (B) and limit chain (C) from anchor pin on each side of cutting unit.

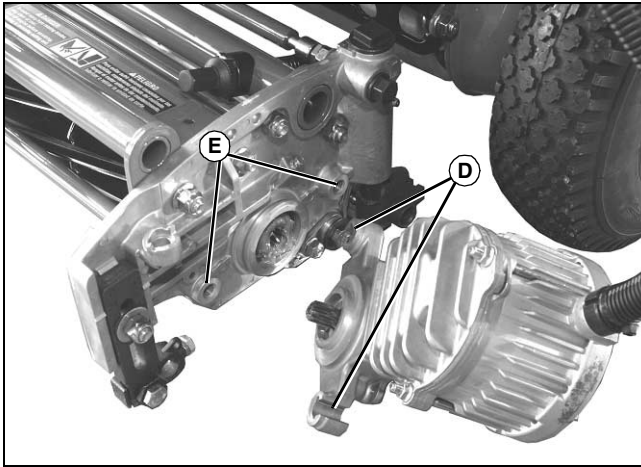
NOTE: If chains are removed from the support arm pin (D), mark the link so lift chains can be installed correctly.

Installing Cutting Units



1. Inspect inside of cutting unit bearing housing (A) for grease. Add John Deere Golf and Turf Cutting Unit Grease to housing (A) and internal reel splines (B) if additional lubrication is needed.
2. Align splines (C) on drive motor shaft with internal reel splines (B). Install drive motor assembly (D) onto the cutting unit.

Service - Cutting Units



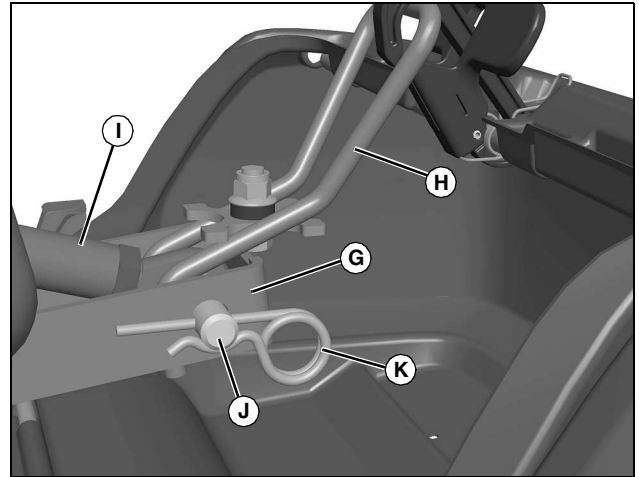
MX42341

3. Rotate drive motor as required to align slotted holes (D) in housing with threaded holes (E) in cutting unit.



MX42454

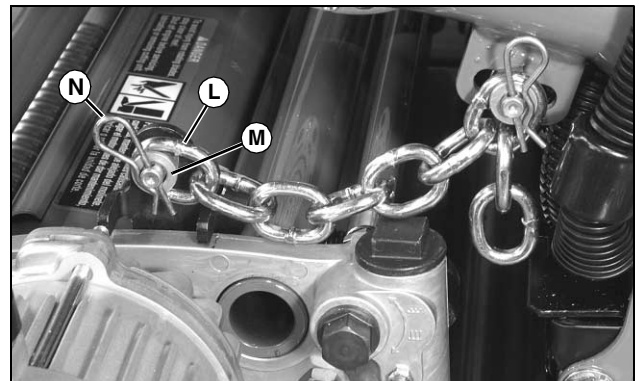
4. Install and tighten hex flange head bolts (F).
5. Roll cutting unit under machine.



MX51211

Picture Note: Grass catcher basket installed to show proper orientation of basket hanger (H).

6. Align holes in front yoke (G), basket hanger (H), and cutting unit support arm (I).
7. Ensure proper orientation of basket hanger (H). Fully insert clevis pin (J) and secure with spring locking pin (K).



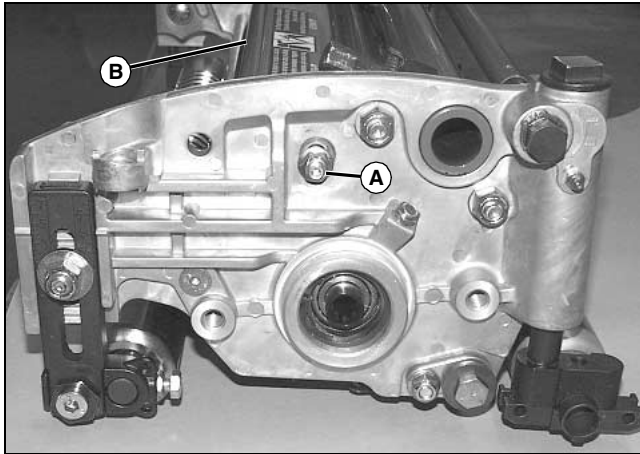
MX42456

8. Install lift chains (L) on cutting unit housing pins. Ensure chains are not kinked.
9. Install flat washers (M) and spring locking pins (N) on each cutting unit housing pin. (See Adjusting Cutting Unit Limit Chains in this section.)

Service - Cutting Units

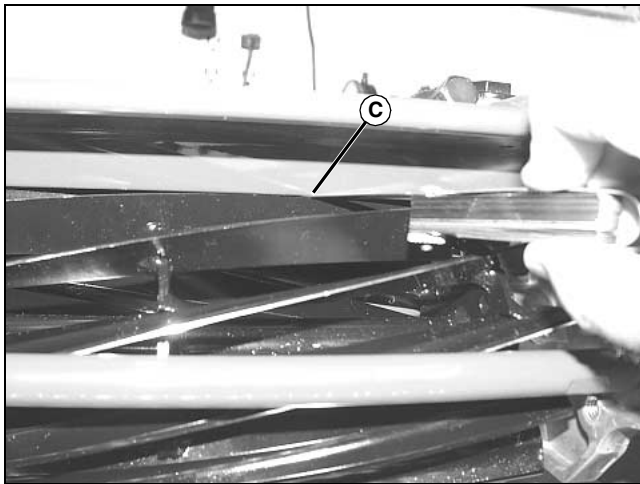
Adjusting Cutting Unit Shield

NOTE: Keeping the shield close to the cutting blades improves the performance of the grass catcher in most conditions.



MX41170

1. Loosen two bolts (A) and locknuts on each side of cutting unit.

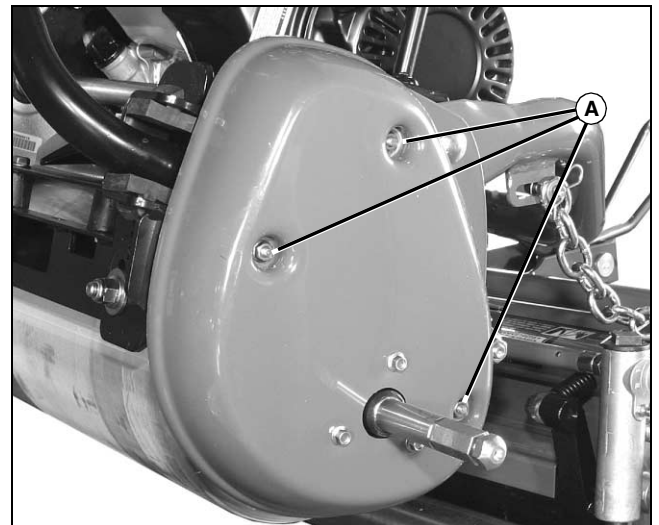


MX41171

2. Raise or lower shield (B) to adjust clearance (C) between bottom of shield and the top of cutting blades to 1.5 mm (0.06 in.).
3. Tighten bolts.

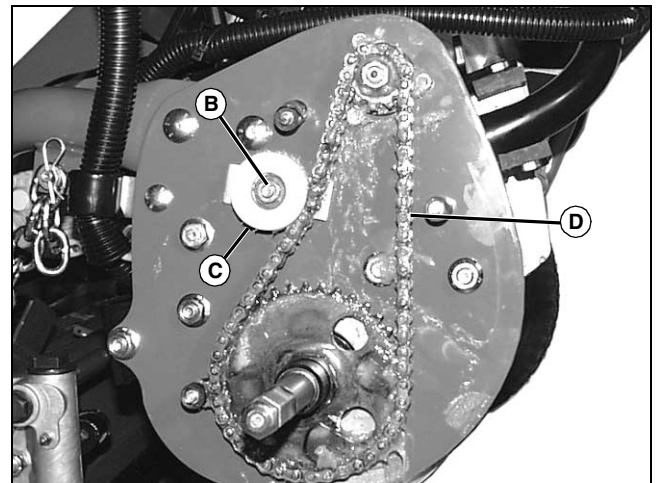
Adjusting Roller Drive Chains

1. Raise machine on kick stand and remove transport wheel.



MX42349

2. Remove three nuts on drive cover (A) and remove cover from machine.



MX42515

3. Loosen nut (B) on idler wheel.
4. Slide idler (C) as required to provide 6.35 mm (1/4 in.) maximum deflection at mid point (D) of drive chain.
5. Tighten nut (B).
6. Lubricate drive chain using John Deere Multi-Purpose SD Polyurea Grease or equivalent SAE multipurpose grease.
7. Install cover and secure with original hardware.
8. Install transport wheel.
9. Repeat steps on opposite side.
10. Lower machine from kick stand.

Service - Cutting Units

Adjusting Bed Knife to Reel (QA-5 Cutting Units)

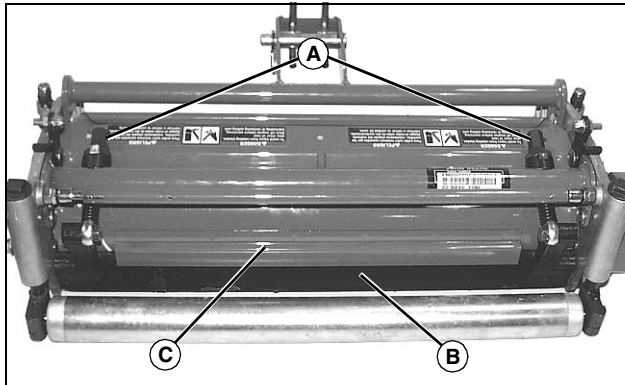


CAUTION: Avoid injury! Blades are sharp. Always wear gloves when handling blades or working near blades.

IMPORTANT: Avoid damage! Adjust bed knife to reel by lowering and raising the bed knife evenly.

Do not adjust more than one flat on the adjuster nut at a time, alternating side to side.

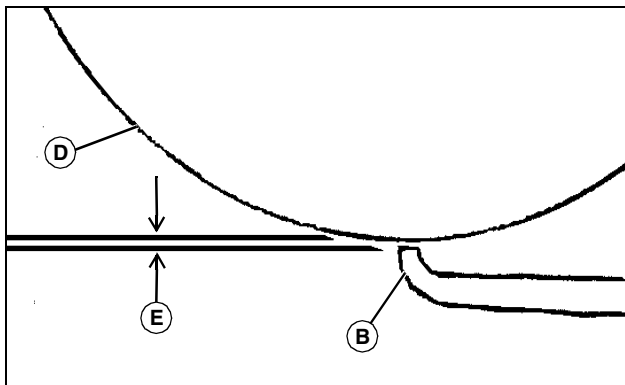
NOTE: Stand cutting unit upright on workbench.



MX42697

1. Turn bed knife tower adjuster (A) on both sides of cutting unit counterclockwise until bed knife (B) is tight against cutting unit (C).
2. Slowly tighten tower adjuster (A) clockwise, alternating from side to side until bed knife begins to pull away from the cutting reel. Cutting reel should rotate freely.

NOTE: Make sure that the final adjustment to the bed knife is pulling the bed knife away from the cutting reel.



E35559

3. Alternately turn adjusters (A) no more than one flat at a time until bed knife (B) to reel (D) clearance (E) measures 0.025 mm to 0.050 mm (0.001 in. to 0.002 in.).
4. Check the bed knife to reel clearance (E). Adjust again if necessary.

Adjusting Front Roller Parallel with Bed Knife (QA-5 Cutting Units)



CAUTION: Avoid injury! Blades are sharp and rotate quickly:

- Keeps hands and feet away from cutting units while machine is running.
- Always wear gloves while working on cutting units.
- Watch for rotation of cutting reel. Rotating one cutting reel can cause another blade or cutting reel to rotate.

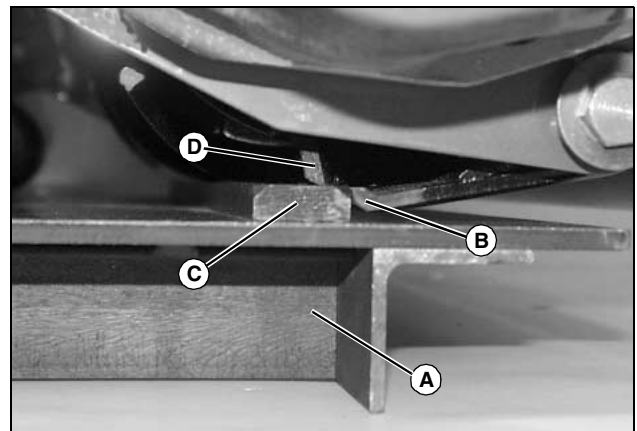
NOTE: Use of a bench plate or a two or three bolt height of cut gauge bar is recommended when adjusting front roller parallel with the bed knife.

Always adjust bed knife-to-reel before adjusting front roller for parallelism.

Always make parallelism adjustment after adjusting front roller height of cut range.

Parallelism Adjustment with Bench Plate

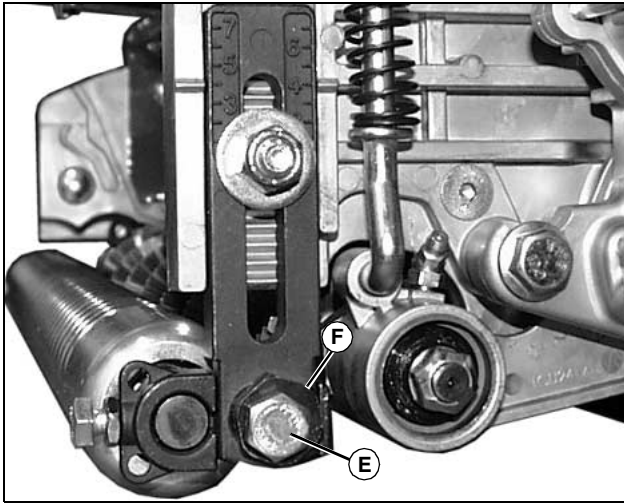
1. Position cutting unit upright on flat surface or workbench.



M97254

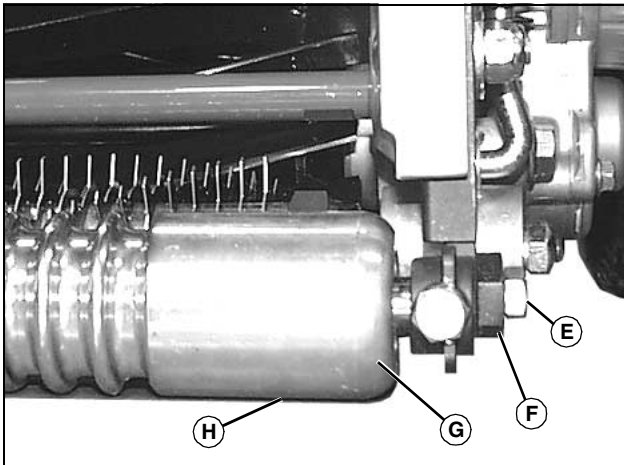
2. Set bench plate on a level surface. Set cutting unit on top of bench plate (A). Bed knife (B) must rest firmly against plate stop (C) with cutting reel blade (D) on top of plate stop.

Service - Cutting Units



MX42451

3. Loosen hex head bolt (E) on one of the roller brackets.

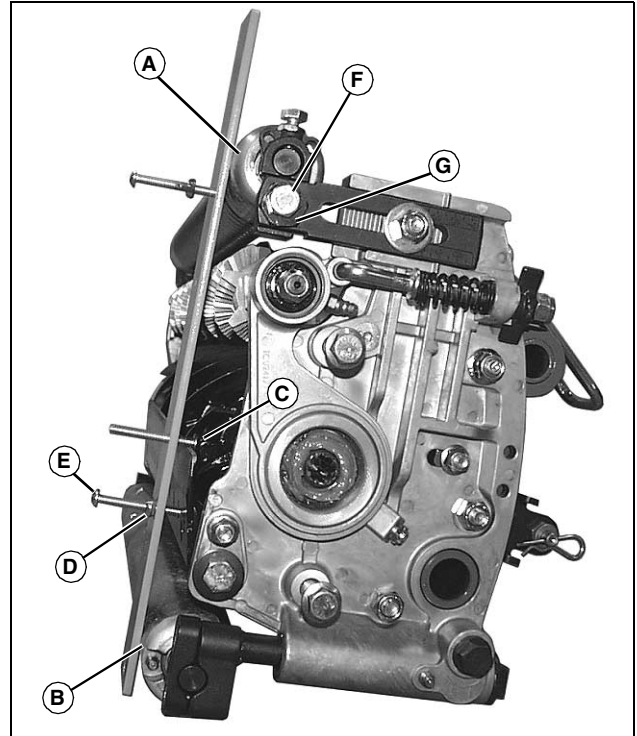


MX42452

4. Rotate eccentric adjuster (F) until the front roller (G) sits flat and parallel with the bench plate. Gap (H) should not exceed 0.050 mm (0.002 in.) maximum.

5. Hold roller eccentric adjuster (F) and tighten hex head bolt (E) to 81.3 N•m (60 lb-ft).

Parallelism Adjustment with Height of Cut Gauge Bar



MX42693

1. Position cutting unit upright on flat surface or workbench.

2. Rest height of cut gauge bar against front (A) and rear rollers (B) approximately 51 mm (2 in.) from the outside end of the bed knife.

3. Set the inside of the screw head (C) against the front edge of the bed knife to hold the gauge bar in position.

4. Loosen wing nut (D). Turn lower gauge screw (E) clockwise until top of screw makes contact with flat edge of bed knife.

5. Tighten wing nut (D).

6. Adjust position of front roller:

- Loosen bolt (F) and rotate eccentric adjuster (G) until top of lower gauge screw (E) makes contact with the bed knife.
- Hold roller eccentric adjuster (G) and tighten hex head bolt (F) to 81.3 N•m (60 lb-ft).

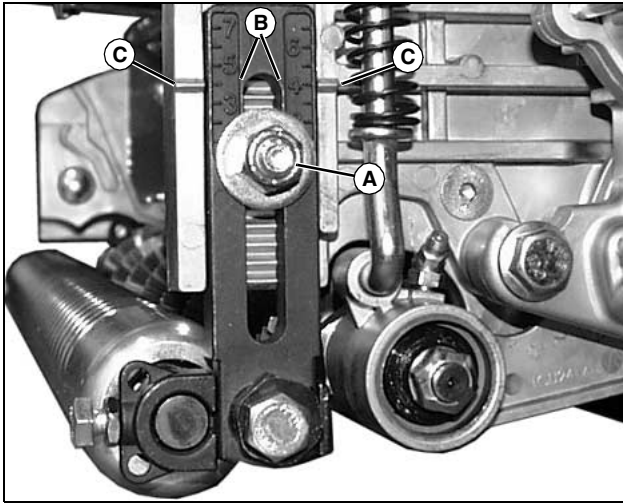
7. Repeat procedure for opposite side.

Adjusting Height Of Cut Range (QA5 Cutting Units)

Adjust front roller brackets for the height of cut range desired.

1. Select height of cut adjustment range by adjusting the position of both front roller brackets.

Service - Cutting Units



MX42451

2. Loosen nut (A) on each roller bracket.
3. Alignment of roller bracket (B) and cutting unit frame (C) adjustment marks will determine height of cut adjustment range.

NOTE: Height of cut range for the 180 E-Cut Hybrid and 220 E-Cut Hybrid mowers is 0-19 mm (0.00-0.75 in.).

- Refer to chart for desired setting.

Height of Cut Range (2-Inch Front Roller With Out GTC)		Front Roller Setting
mm	in.	
Not Recommended	Not Recommended	1
0.0 - 4	0.00 - 0.160	2
1 - 9.5	0.04 - 0.37	3
6 - 15	0.24 - 0.60	4
11 - 21	0.43 - 0.83	5
16 - 27	0.63 - 1.06	6
21 - 33	0.83 - 1.30	7

Height of Cut Range (2-Inch Front Roller With GTC)		Front Roller Setting
mm	in.	
Not Recommended	Not Recommended	1
0.0 - 5	0.00 - 0.20	2
0 - 11	0.00 - 0.43	3

Height of Cut Range (2-Inch Front Roller With GTC)		Front Roller Setting
mm	in.	
5 - 17	0.20 - 0.67	4
10 - 24	0.40 - 0.94	5
15 - 30	0.60 - 1.18	6
20 - 36	0.80 - 1.42	7

Adjusting Height of Cut (QA-5 Cutting Units)

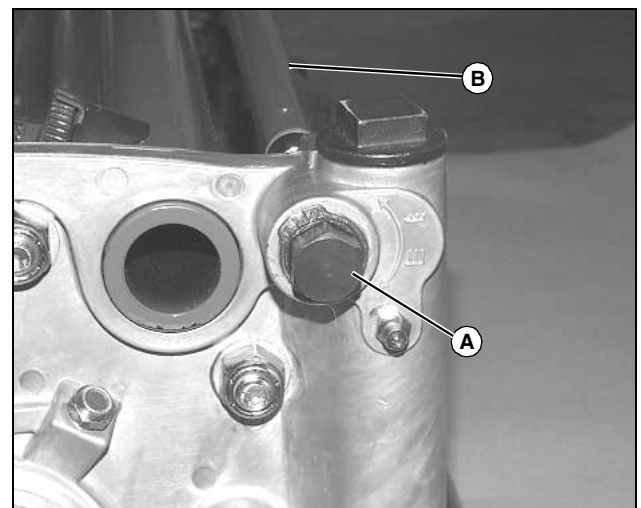


CAUTION: Avoid injury! Blades are sharp and rotate quickly:

- Keeps hands and feet away from cutting units while machine is running.
- Always wear gloves while working on cutting units.
- Watch for rotation of cutting reel. Rotating one cutting reel can cause another blade or cutting reel to rotate.

NOTE: Do not use any type of pneumatic drill or impact wrench to make height of cut adjustments.

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

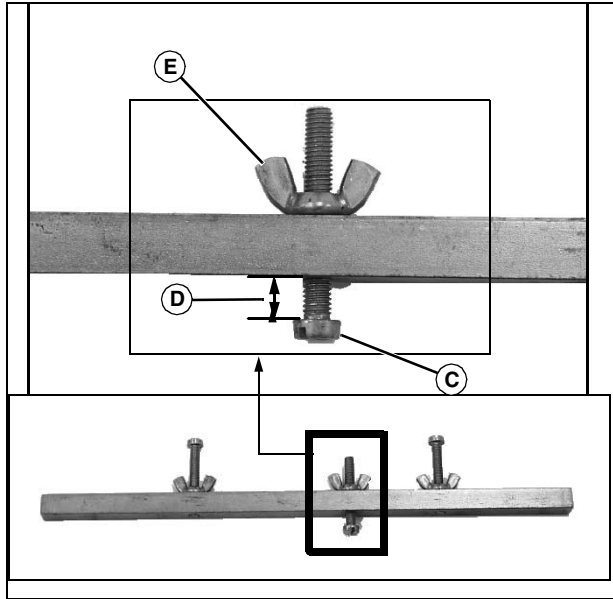


MX41000

2. Locate the height of cut adjuster (A) on top rear of reel side casting (either side).
3. Turn the height of cut adjustment (A) to decrease or increase height of cut.

Service - Cutting Units

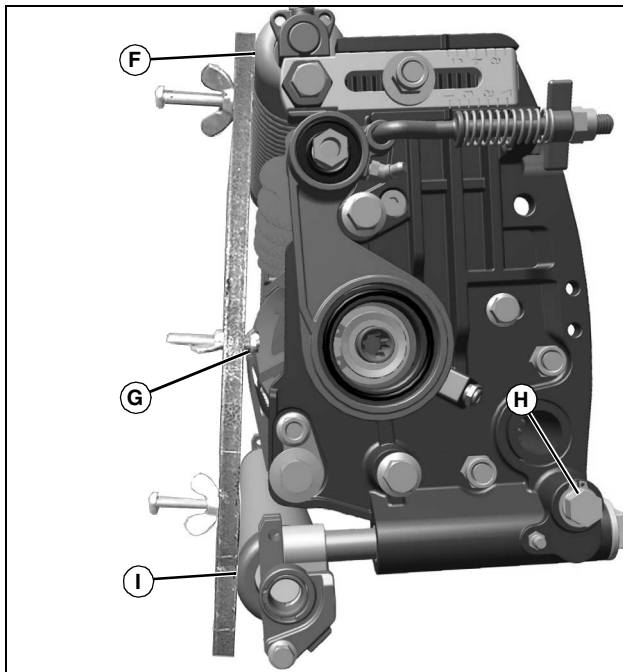
NOTE: Adjusters are connected with cross shaft (B) so turning one side simultaneously turns the other.



M97423, M97422

4. On the height of cut gauge bar, set center adjustment bolt head (C) at the desired height of cut (D). Lock wing nut (E).

NOTE: Effective height of cut could be less than bench setting, based on turf and soil conditions and front roller option.



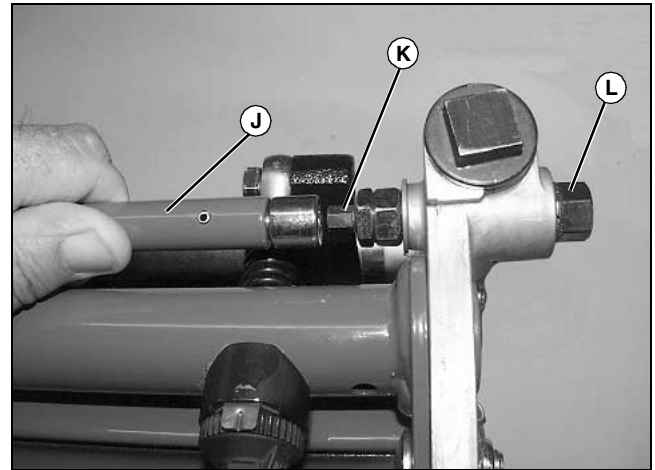
MX42517

5. Rest height of cut gauge bar against front roller (F) approximately 51 mm (2 in.) from either end of the bed knife. Set the inside of the bolt head (G) against the edge of the bed knife.

NOTE: Bottom of screw head on gauge bar should be engaged with cutting edge of bed knife.

6. Turn adjuster (H) to move the rear roller (I) away from gauge bar slightly. Turn adjuster in the opposite direction until the rear roller contacts the height of cut gauge bar. Repeat for the other side of the cutting reel.

7. Check height of cut adjustment setting from side to side.



MX41001

8. If side to side height of cut adjustment is necessary, pull against spring tension on cross shaft (J) to disconnect it from hex coupling (K). Remove the cross shaft.

9. Turn the adjuster (L) on the side requiring adjustment to move the rear roller away from the gauge bar slightly. Turn the adjuster in the opposite direction until the side to side height of cut is equal for both. Reinstall the cross shaft.

Removing and Installing Bed Knife Shoe



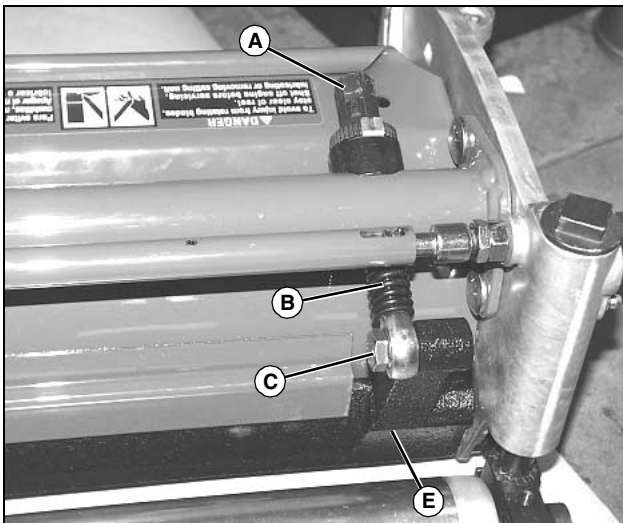
CAUTION: Avoid injury! Blades are sharp and rotate quickly:

- Keeps hands and feet away from cutting units while machine is running.
- Always wear gloves while working on cutting units.
- Watch for rotation of cutting reel. Rotating one cutting reel can cause another blade or cutting reel to rotate.

Removing Bed Knife Shoe

1. Remove the cutting unit from machine.
2. Position cutting unit with the bottom side down on a flat surface or workbench.
3. Increase clearance of bed knife and reel on both sides of cutting unit.

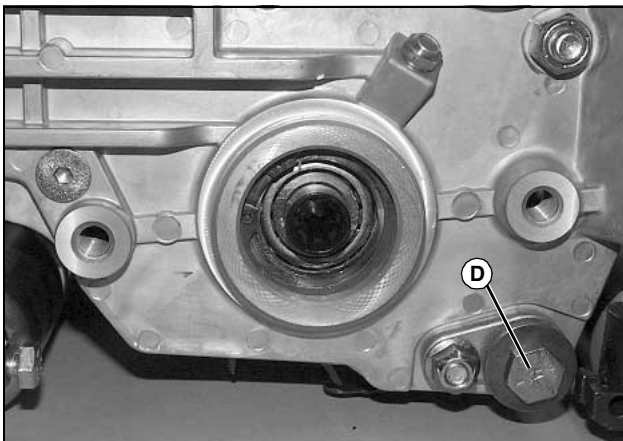
Service - Cutting Units



MX41169

- Turn hex head bolt (A) clockwise until spring (B) is completely compressed. Repeat on opposite side.

4. Remove hex head bolt (C) on each side.



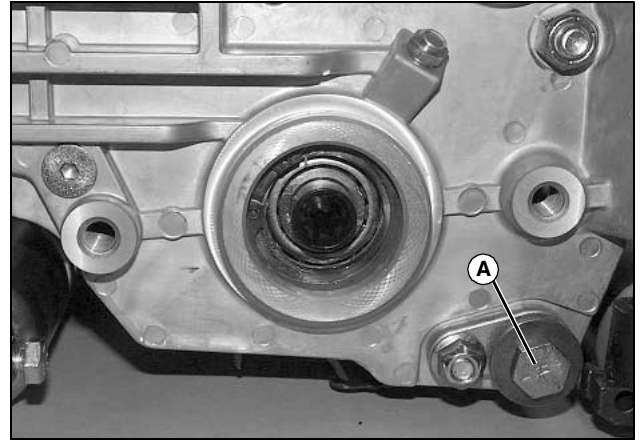
MX41003

5. Remove hex head bolt (D) from each end of cutting unit, and remove bed knife shoe (E).

6. Inspect bed knife for wear or damage. Replace bed knife, if necessary. (See Replacing Bed Knife in this section.)

7. If original bed knife is to be used again, grind the bed knife. (See Grinding Reel and Bed Knife in this section.)

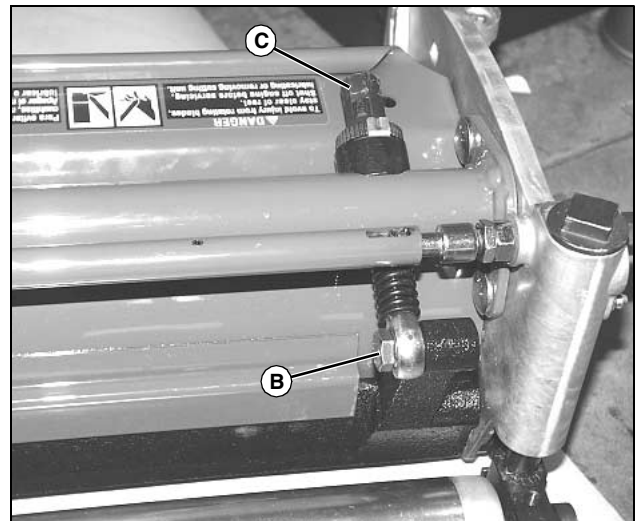
Installing Bed Knife Shoe



MX41003

1. Slide bed knife shoe into position within cutting unit and secure with hex head bolt (A) on each side. Tighten hardware to 55 N•m (40 lb-ft).

2. Position cutting unit with bottom side down on flat surface or workbench.



MX41169

3. Install hex head bolt (B) through eyebolt into bed knife shoe.

4. Adjust bed knife-to-reel.

5. Adjust front roller parallel to bed knife.

6. Set height of cut.

7. Backlap reel.

8. Check height of cut and adjust as necessary.

Service - Cutting Units

Replacing Bed Knife (QA-5 Cutting Units)



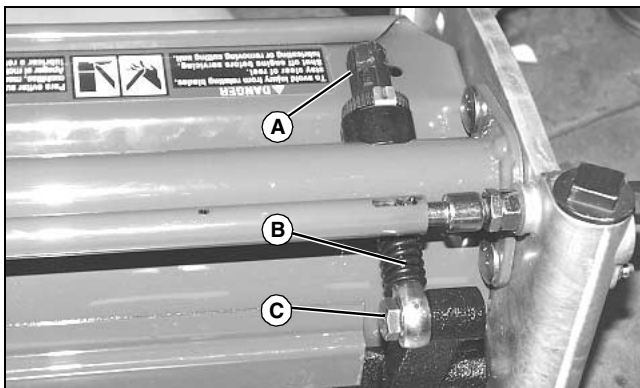
CAUTION: Avoid injury! Blades are sharp and rotate quickly:

- Keeps hands and feet away from cutting units while machine is running.
- Always wear gloves while working on cutting units.
- Watch for rotation of cutting reel. Rotating one cutting reel can cause another blade or cutting reel to rotate.

NOTE: If the original bed knife is to be ground and used again, do not remove it from the bed knife shoe. The bed knife and bed knife shoe are machined as an assembly. (See *Removing and Installing Bed Knife Shoe and Grinding the Bed Knife* in this section.)

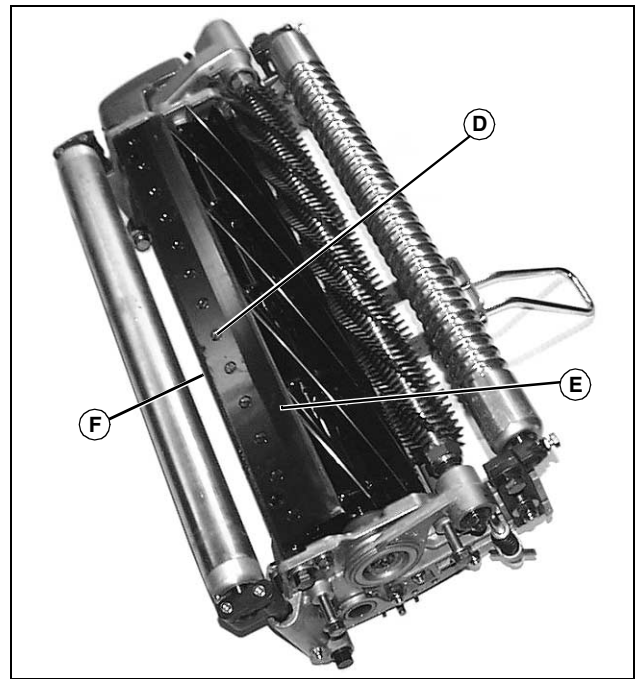
Removing Bed Knife

1. Position cutting unit with the bottom side down on a flat surface or workbench.
2. Remove the cutting unit from machine.
3. Increase clearance of bed knife and reel on both sides of cutting unit.



MX41169

- Turn hex head bolt (A) clockwise until spring (B) is completely compressed. Repeat on opposite side.



MX42695

4. Rotate cutting unit and position with bottom side up on flat surface or workbench as shown.
5. Remove and discard thirteen screws (D) attaching bed knife (E) to bed knife shoe (F). Discard bed knife.

Installing Bed Knife

NOTE: Remove debris, corrosion, and rust from bottom surface of bed knife support.

1. Install bed knife using new screws. Alternate tightening by starting with center screws and working out to the ends. Tighten screws to 7 N•m (62 lb-in).
2. If installing a used bed knife, grind the bed knife. (See *Grinding the Bed Knife* in this section.)
3. Adjust front roller parallel to bed knife.
4. Adjust bed knife-to-reel.
5. Set height of cut.
6. Backlap reel.
7. Check height of cut and adjust as necessary.

Service - Cutting Units

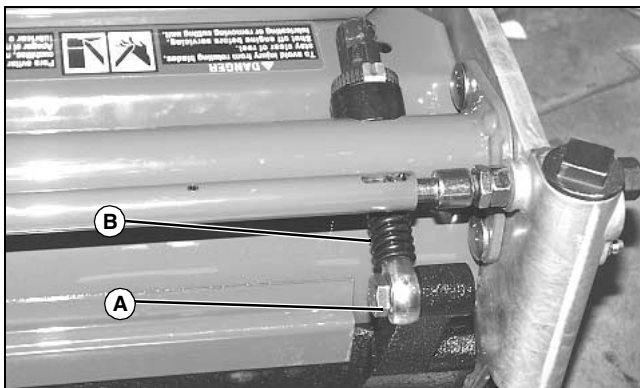
Adjusting Bed Knife and Bed Knife Shoe Position for Worn Reel (QA5 Cutting Units)

IMPORTANT: Avoid damage! Reduce front roller setting by 1 if bedbar eccentrics have been flipped. (See “Adjusting Height of Cut Range (QA5 Cutting Units)” in the SERVICE Section.

If a reel has been replaced due to excessive wear, eccentrics must be flipped to nominal (new reel) position.

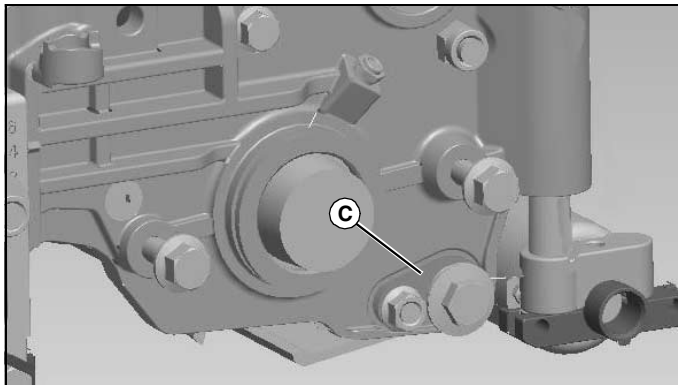
NOTE: When the reel diameter is reduced to about 4.8 in. (122 mm) flipping the eccentric will increase the useful life of the reel.

1. Remove the cutting unit from machine.
2. Position cutting unit with the bottom side down on a flat surface or workbench.
3. Increase clearance of bed knife and reel on both sides of cutting unit.



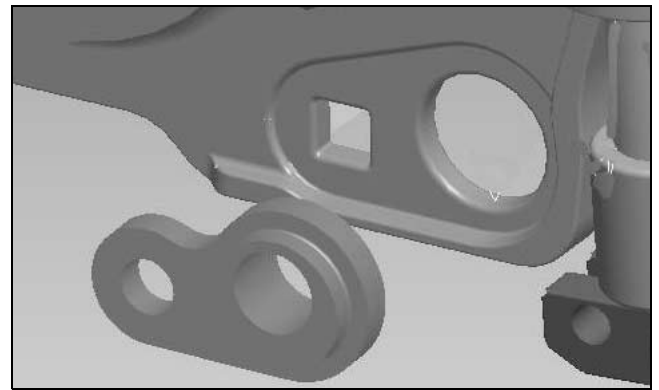
MX41169

- Turn hex head bolt (A) clockwise until spring (B) is completely compressed. Repeat on opposite side



MX26068

4. Remove hardware on eccentric (C).
5. Remove eccentric.



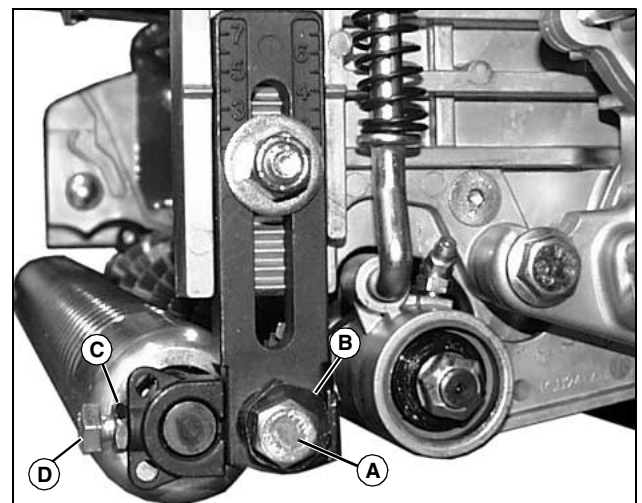
MX26069

6. Flip eccentric 180 degrees as shown.
7. Insert eccentric back into cutting unit.
8. Re-install and tighten hardware.
9. Repeat procedure for opposite side eccentric.
10. Adjust bed knife-to-reel.
11. Adjust front roller parallel to bed knife.
12. Set height of cut.
13. Backlap reel.
14. Check height of cut and adjust as necessary.

Removing and Installing Front Roller (QA-5 Cutting Units)

Removing Front Roller

1. Remove cutting unit from machine.
2. Position cutting unit upright on a flat surface or workbench.



MX42451

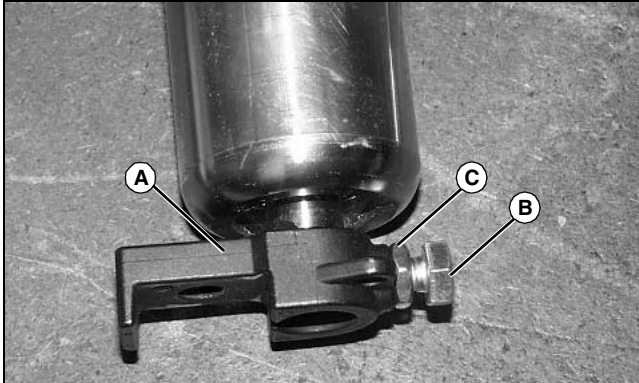
3. Remove hex head bolt (A), and eccentric adjuster (B) on both sides of roller.

Service - Cutting Units

4. Loosen locknut (C) and loosen hex head bolt (D) to remove roller bracket from shaft.
5. Replace roller.

Installing Front Roller

NOTE: Roller brackets are offset. For standard use, the bracket should be installed to the roller with the offset to the rear of the base cutting unit to allow close proximity of front roller to rear roller. If GTC or Rotary Brush is being installed, offset should be to the front to allow the GTC or Rotary Brush to be installed behind the front roller.



1. Install roller brackets (A) onto each bearing spindle shaft end.
2. Install set screws (B) and locknuts (C) loosely. Do not tighten.

NOTE: Make sure the roller bracket set screw locations are not aligned with the holes in each bearing spindle shaft end. Set screws must engage the bearing spindle shaft at each end.

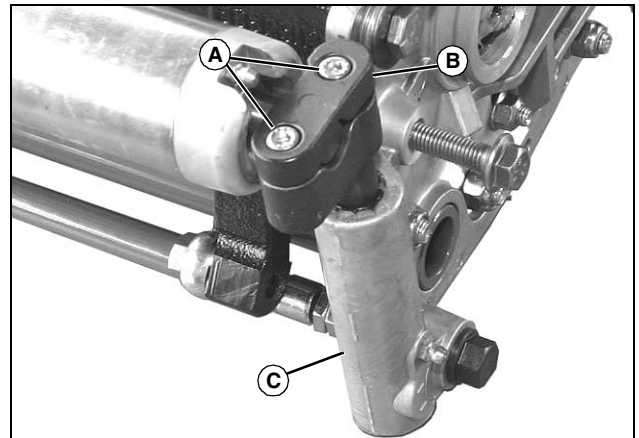
3. Install roller with eccentric adjuster and hex head bolt on each side. Center front roller. Tighten set screws (B) and jam nuts (C) on both roller brackets.
4. Tighten roller bracket attaching hardware.
5. Adjust front roller for parallelism.
6. Adjust height of cut.
7. Tighten eccentric to 60 ft-lb.

Removing and Installing Rear Roller (QA5)

NOTE: The 180 E-Cut Hybrid and 220 E-Cut Hybrid mowers use a unique rear roller retaining clamp (item B in pictures that follow). This type of clamp must be used on any QA5 cutting unit attached to these mowers.

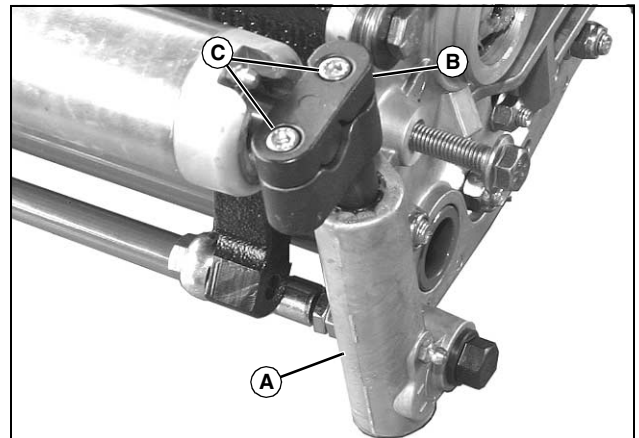
Removing Rear Roller

1. Remove cutting unit from machine.
2. Position cutting unit with bottom side up on a flat surface or workbench.



3. Remove hex socket head bolts (A) and clamp (B) on each side of roller assembly. Remove roller from each height of cut bracket (C).

Installing Rear Roller



1. Install roller shaft into each height of cut bracket (A).
2. Install clamp (B) and M6 hex socket head bolts (A) on each side.
3. Center roller between clamps.
4. Torque four M6 bolts to 19 N•m (14 lb-ft).
5. Adjust height of cut.

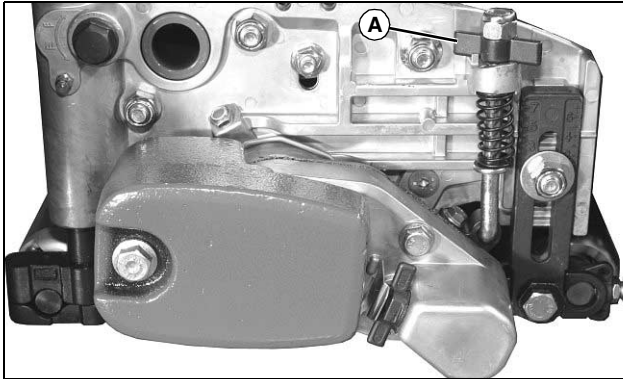
Adjusting Rotary Turf Brush

Refer to "Adjusting Greens Tender Conditioner (GTC) (QA5)" below and use identical adjustment procedure to adjust rotary turf brush.

Service - Cutting Units

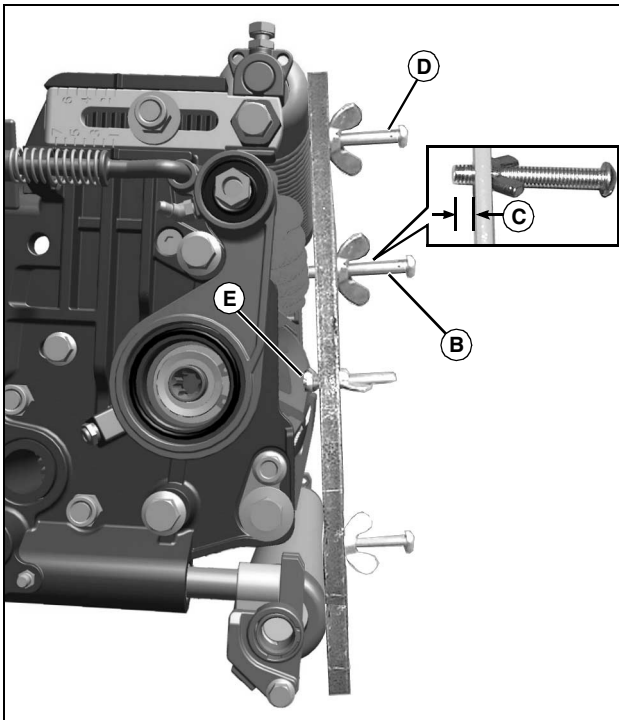
Adjusting Greens Tender Conditioner (GTC) (QA5)

NOTE: Height of Cut must be adjusted prior to adjusting the Greens Tender Conditioner.



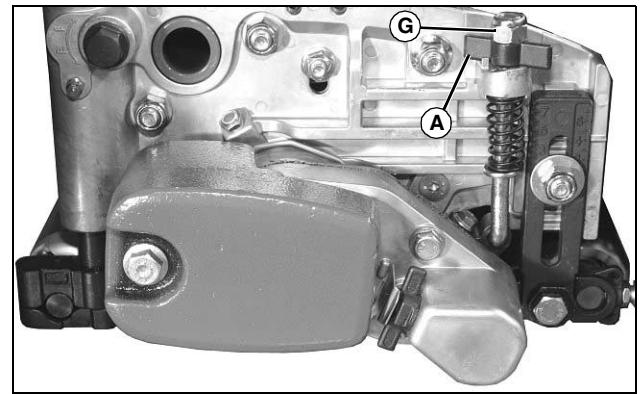
MX42342

1. Rotate GTC adjuster wing nut (A) to lower GTC shaft. Repeat on opposite side.
2. Position cutting unit to make height of cut adjustment.



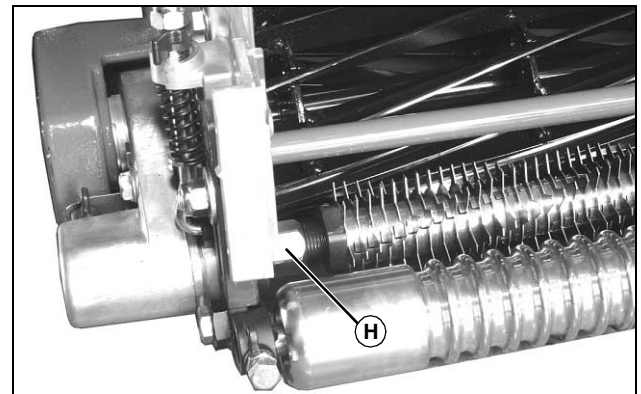
MX42516, MX42699

3. Set GTC adjustment screw (B) on the gauge bar to the desired operating height (C).
 - Adjustment screw (D) may need to be loosened so that the gauge bar can rest on both the front and rear rollers.
4. Place preset gauge bar on cutting unit. Hook height of cut screw (E) on bed knife. The ends of the bar should rest firmly on the front and rear rollers.



MX42342

5. Adjust locknut (G) to raise or lower GTC shaft (Tightening locknut will raise GTC shaft). Alternate from end to end until the teeth touch the screw on the gauge bar.
6. Remove gauge bar.
7. Rotate GTC adjuster wing nut (A) on both sides to raise GTC shaft.



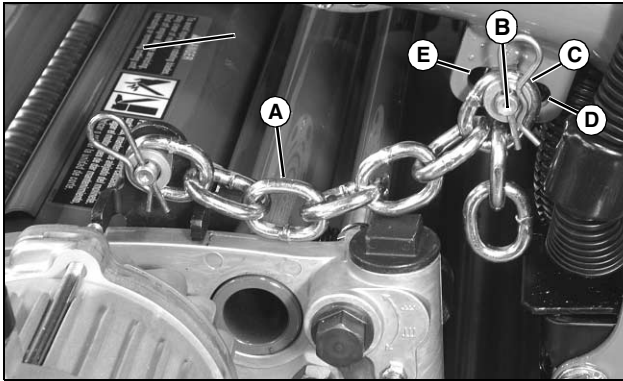
MX42342

8. Check and tighten GTC collet (H) whenever the GTC is adjusted or every 200 hours.

Adjusting Cutting Unit Limit Chains

Limit chains on each side of the cutting unit controls the amount of cutting unit steering while mowing and the amount of rear roller drop when the unit is lifted for turns.

Service - Cutting Units



MX42456

- Initial setting should be each chain (A) shortened to 7 links, with the upper chain anchor studs (B) in center of slots (C). This will provide maximum float and maximum rear roller drop when lifted. The majority of greens will not require maximum float. Turning and maneuvering will be easiest if float is limited to the requirements of the greens surface.

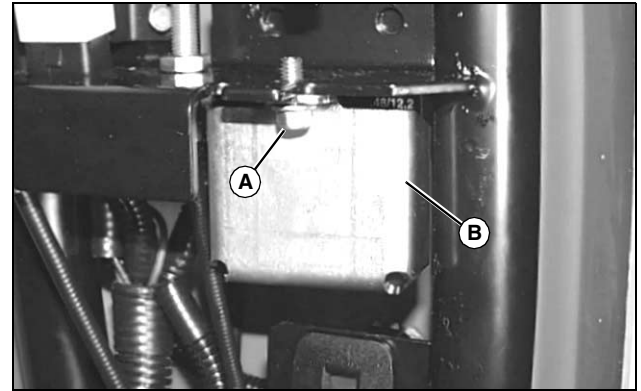
NOTE: Use care not to exceed maximum float setting. If excessive chain slack is permitted, rear roller adjustment towers may contact front frame cross bar causing damage. Minimum clearance on flat ground, with cutting unit rotated to limit is 6.5 mm (1/4 in.) between rear roller tower and frame.

- To limit float for relatively flat or non-undulating greens, adjust upper chain anchor studs (B) rearward in slots (D). This will also reduce rear roller drop.
- Further tightening can be achieved after reaching rear of slot, by shortening chain to 6 links and re-positioning upper chain anchor studs (B) to front of slots (E).

Adjusting Frequency of Clip (FOC)

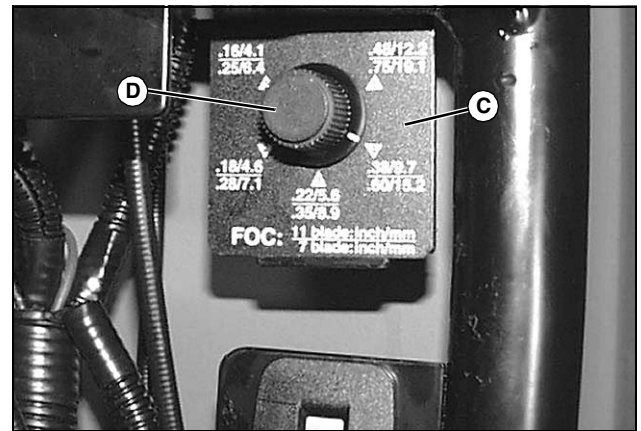
IMPORTANT: Avoid damage! Operating the reels at a high speed can cause excessive bed knife and reel wear. Operate the reels at the appropriate frequency of clip.

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



MX42457

2. Remove 6 mm screw (A) and cover (B) from rear of handle bar.



MX42458

3. Locate reel speed Frequency of Clip (FOC) control box (C).

NOTE: FOC can be adjusted depending on the type of application for the greens mower, which type of cutting units are used, and grass height and conditions.

FOC is infinitely variable between positions 1 and 5 on the control label (C). FOC specifications for each control position are listed on the control label and in the table that follows.

Control Position	11 Blade Reel FOC	7 Blade Reel FOC
1	4.1 mm (0.16 in.)	6.4 mm (0.25 in.)
2	4.6 mm (0.18 in.)	7.1 mm (0.28 in.)
3	5.6 mm (0.22 in.)	8.9 mm (0.35 in.)
4	9.7 mm (0.38 in.)	15.2 mm (0.60 in.)
5	12.2 mm (0.48 in.)	19.1 mm (0.75 in.)

4. Adjust FOC control dial (D) to desired setting for reel type, greens and conditions. (Turning the control counter-clockwise from position 1 will reduce the reel speed.)

Service - Cutting Units

Turning the control clockwise from position 5 will increase the reel speed.)

- **For mowing greens**, set the control (D) to the desired FOC (Greens typically use 4.1-4.6 mm (0.16-0.18 in.) with an 11 blade reel).
- **For mowing approaches and teeboxes**, reel speed may be reduced by turning the speed control knob counterclockwise.

NOTE: FOC is automatically maintained at selected setting regardless of throttle position and ground speed.

5. Install FOC cover (B) and secure with 6 mm screw (A).

FOC has no control over backlap reel speed. Controller override keeps backlap to 156 RPM.

Grinding Reel and Bed Knife

Reel and Bed Knife Relationship

Reel mowers are precision machines requiring daily maintenance to maintain the well-groomed appearance of turfgrass. The scissor-like shearing action, that only a reel mower is capable of achieving, is only possible if the reel and bed knife are sharp and the reel-to-bed knife clearance is maintained.

Close examination of the reel-to-bed knife relationship reveals two square edges passing one another with approximately 0.025 - 0.051 mm (0.001 - 0.002 in.) clearance. There are several reasons why this clearance is necessary.

- When the reel is allowed to contact the bed knife, the square (sharp) edges of the reel and bed knife will roll over, becoming dull.
- Contact between the reel and bed knife generates heat. Heat generated through this contact will distort the shape of the bed knife. Distortion causes the bed knife to draw closer to the reel, resulting in more rollover of the cutting surfaces and more heat generated in the bed knife.
- Drag produced by an improperly adjusted cutting unit may result in an unacceptable clip ratio, undue strain on drive mechanisms and premature wear of the cutting unit.

Reasons for Grinding

- To restore the cylindrical shape of a reel that has become cone-shaped due to improper adjustment of the reel-to-bed knife clearance or worn reel bearings.
- To restore the edge when the grass is not being cut across the entire length of the bed knife, evidenced by streaks of grass left after the mower has passed. Usually the result of nicked blades caused by hitting foreign objects in the grass.

- To restore the edge when the lack of frequent backlapping allowed the edge to be rounded beyond the capability of the backlapping procedure to restore the edge.
- To restore the edge when the reel-to-bed knife clearance has been improperly adjusted (reel contacting bed knife).

Cutting action begins as the bed knife positions the grass to be cut at the cutting edge. The reel then pulls the grass toward the bed knife where it is sheared by the cutting edges as they pass one another.

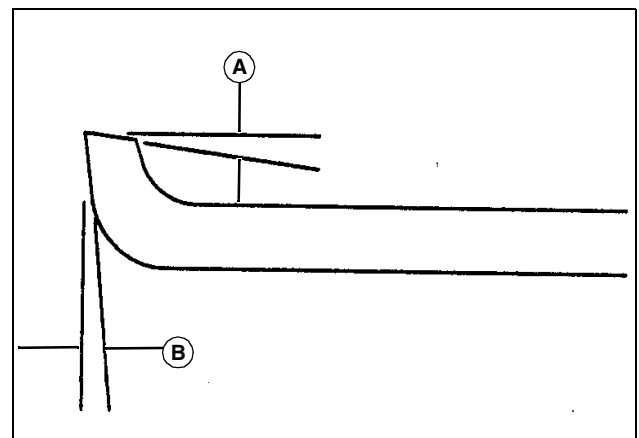
In order for the grass to be cut at the proper height, it must contact the bed knife at the cutting edge. This is accomplished by grinding a 15° relief angle on the front face of the bed knife. Without a relief angle, the blade of grass will contact the lower edge of the bed knife and be bent over at too much of an angle prior to being cut. In the case of mowing greens, where very small cuts are being taken, the reel may not capture the grass at all, and no grass will be cut.

Although some spin grinding machine manufacturers say backlapping is not necessary, John Deere recommends backlapping after spin grinding to remove burrs and rough edges left from the spin grinding procedure. Backlapping produces a honed edge that will cut the grass evenly and leave the tops of the grass with clean, straight edges.

It is important to note, dull cutting edges will tear rather than shear the grass drawn into the bed knife. This will shock the grass plant and retard its growth.

Grinding the Bed Knife

NOTE: Bed knife and support assembly must be ground as a complete unit.



M47199

1. When grinding the bed knife, it is important to have a 6.5° relief angle on the top surface (A) and on the front surface (B):

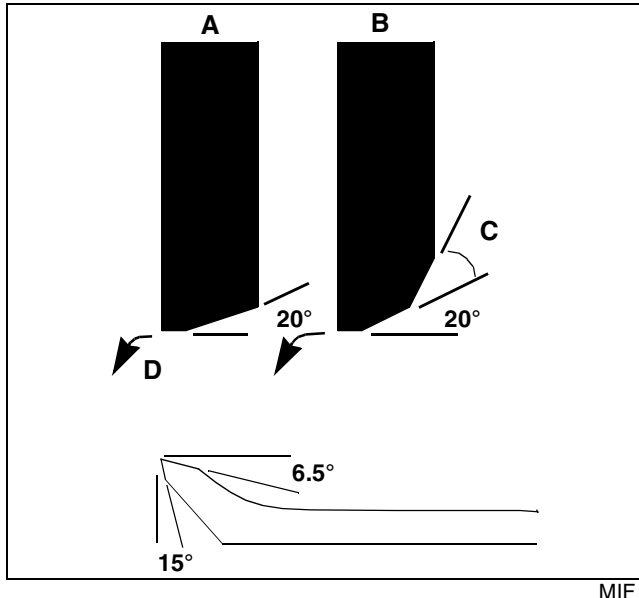
- 56 cm (22 in.) QA5 except ET17767 - a 15° relief angle on the front surface (B).
- 56 cm (22 in.) ET17767 high cut - a 5° relief angle on the front surface (B).

Service - Cutting Units

2. Put entire bed knife support and bed knife in a suitable grinder and grind until material is consistently removed from the entire length of the top and front surfaces of the bed knife.

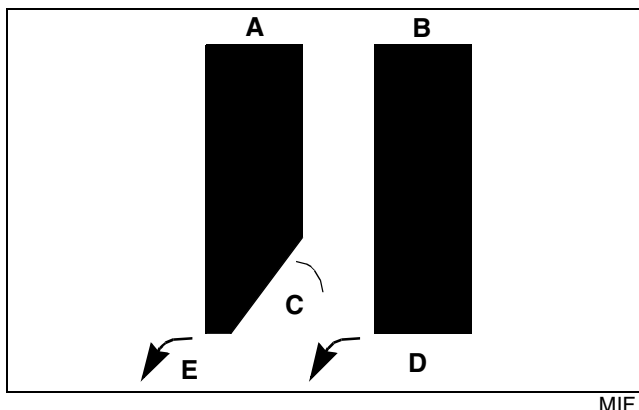
Grinding the Reel

CORRECT way to grind the reel:



- A - Relief Grind
- B - Double Relief Grind
- C - Secondary Relief
- D - Cutting Edge

INCORRECT way to grind the reel:



- A - Relief Grind
- B - Flat Ground
- C - Excessive Relief
- D - No Relief
- E - Cutting Edge

John Deere recommends relief grinding the reels after spin grinding for these reasons:

- Reduced blade contact area results in less friction, requiring less horsepower to drive the reel and increases fuel efficiency.
- Ensures longer wear life.
- Less time is required to backlap.
- Reduces pulling and tearing of the grass as the unit gets dull by use.
- Provides an area for backlapping compound to be trapped to more effectively backlap reels.
- Relief grinding removes metal from the trailing edge of the blade, forming an angle (relief angle) to reduce the contact area of the cutting edges.
- Because of the relief grind it is possible, with backlapping, to true a reel (make it round) if a blade is 0.025-0.051 mm (0.001-0.002 in.) too high.

Backlapping Cutting Unit



CAUTION: Avoid injury! Rotating blades are dangerous and can cut fingers and toes. Keep hands and feet away while greensmower is running.

Disengage greens tender conditioner (GTC) before backlapping.

IMPORTANT: Avoid damage! Backlapping cutting units should be done by trained personnel as needed. Backlap intervals will vary depending on conditions. Backlapping is done to prolong reel life, prevent downtime and provide a consistently sharp cutting action.

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

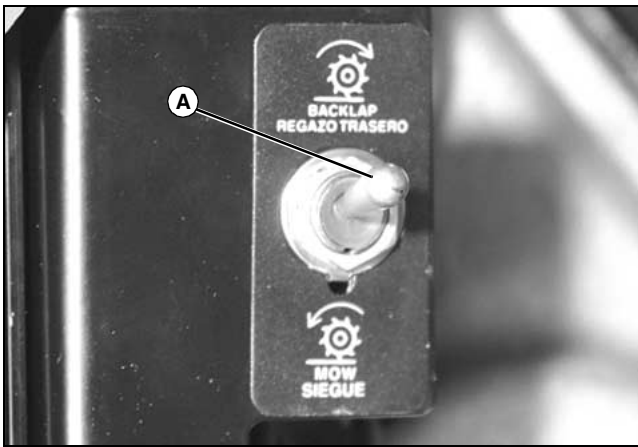
NOTE: To help maintain sharp edges required on cutting reels, bed knife to reel clearance should be checked before the backlapping function begins. The bed knife must be adjusted properly to ensure light, even contact over the length of the cutting blades.

2. Check bed knife to reel clearance on cutting reel. Adjust if necessary.

3. Start engine and adjust throttle to a low or middle position.

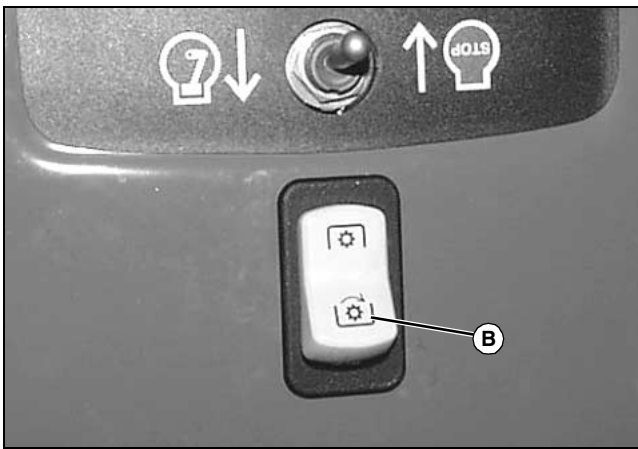
4. Lock park brake.

Service - Cutting Units



MX42459

5. Place mow/backlap switch in the raised BACKLAP (A) position



MX42460

6. Press PTO switch to engaged (B) position to start reel rotation.

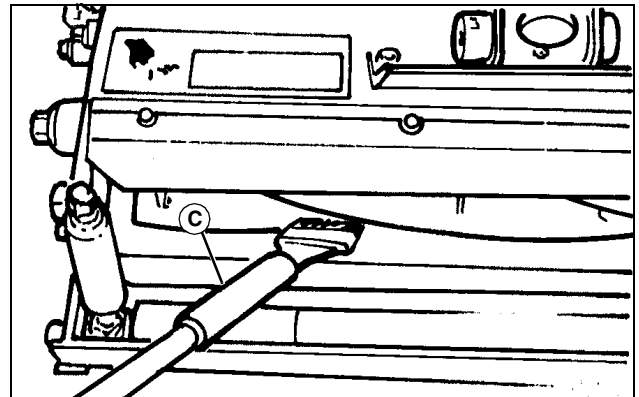


CAUTION: Avoid injury! Rotating blades are dangerous. Keep hands and feet away while greensmower is operating.

Use a brush with a long handle when performing backlapping procedure to keep fingers and hands from rotating blades.

NOTE: To stop reel rotation at any time during the backlap operation, place engine run/stop switch in STOP position, place PTO switch in disengaged position, place mow/backlap switch in MOW position, or lock the park brake.

If reel rotation is stopped by any action other than the PTO switch, it may be necessary to turn the PTO switch off, then on to resume reel rotation,



M79054

7. Using a long-handled brush (C), carefully apply an initial course grit reel sharpening compound, uniformly from one end of the cutting reel to the other. Repeat application in opposite direction. Allow cutting reel to continue running backwards until reel is quiet.



CAUTION: Avoid injury! Rotating blades are danerous and can cut fingers and toes. Keep hands and feet away while greensmower is operating.

Do not attempt to disengage the cutting units using the reel speed control knob. Reels can continue to rotate if engine is running.

NOTE: Course compounds are used initially, followed by a fine "tournament grade" abrasive for final honing. Recommended grits for greens and tees are 120, 180, and 220.

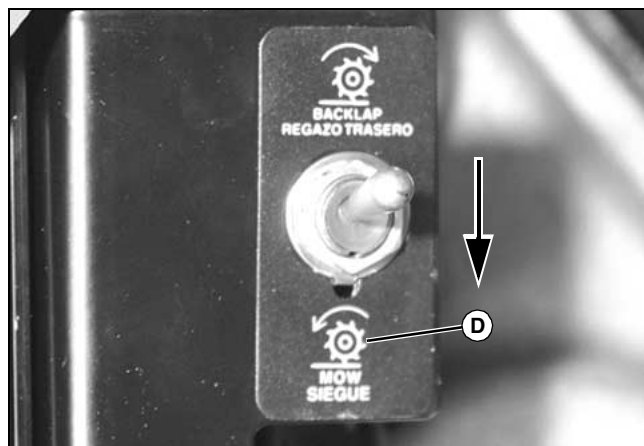
8. Periodically disengage cutting units by pressing the PTO switch to the disengaged position and turning the run/stop switch to the STOP position to shut down the machine. Visually check the blade appearance.

Service - Cutting Units

9. Check for uniform clearance across entire bed knife. If clearance is not uniform, repeat backlapping procedure until clearance is uniform across entire bed knife.
10. Repeat lapping process using progressively finer lapping compounds as required until the bed knife and reel are returned to a sharp condition.

IMPORTANT: Avoid damage! Do not operate cutting reels in the forward direction until reel sharpening compound is washed from the unit. Unless properly washed, the reels can be dulled by the compound.

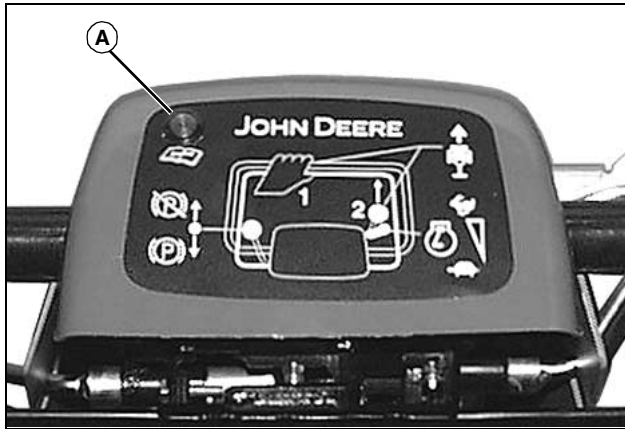
11. Use water to thoroughly wash off all reel sharpening compound while cutting reels are turning in reverse.
12. Stop reel and shut down engine. Adjust reel to bed knife clearance.



MX42459

13. Place mow-backlap switch in the lowered MOW (D) position.

E-Cut Hybrid System Service



MX42514

The E-Cut Hybrid System controller is mounted to the machine frame under the belt cover. It monitors the status and control of the machine electrical system (including the cutting unit reel motor) whenever the engine is running, and may stop reel rotation if certain conditions exist. It does not control the machine engine. The controller communicates diagnostic information to the operator through the diagnostic indicator light (A) on the handlebar cover.

The indicator light can flash a code number that will appear as one or a series of pulses, followed by a short pause and another single or series of pulses.

IMPORTANT: Avoid damage! A displayed diagnostic code indicates that an abnormal condition or malfunction exists on the machine. Record the displayed code (or codes) before stopping the machine. Codes will not appear again after engine has been shut off. Diagnose and correct the condition before attempting further operation.

Multiple diagnostic codes can be identified and displayed on the indicator light. The code or codes will repeat until the PTO switch is cycled (disengaged; then engaged) or the engine is shut off and started again. If a continuing condition exists, the diagnostic code or codes will be displayed again when the engine is started until the original condition is corrected.

The controller is configured to store any diagnostic code it has identified. Stored diagnostic codes can only be accessed by your John Deere Service Technician using specialized service equipment.

Numerous operating conditions can occur that are capable of increasing the load on the engine. The controller is capable of detecting these increased loads, and will display a diagnostic code to notify the operator and protect the machine.

Operating conditions easily corrected by the operator include:

- Improper reel or frequency of clip (FOC) adjustments.
- Plugged reels.
- Lack of scheduled maintenance.
- Dirt or debris on controller, alternator or motor cooling fins.
- Loose alternator belt.

NOTE: Refer to E-Cut Hybrid System Diagnostic Codes in TROUBLESHOOTING section for complete Diagnostic Code information.

For additional E-Cut Hybrid System Service information, see the Technical Manual for this machine or contact your John Deere Dealer.

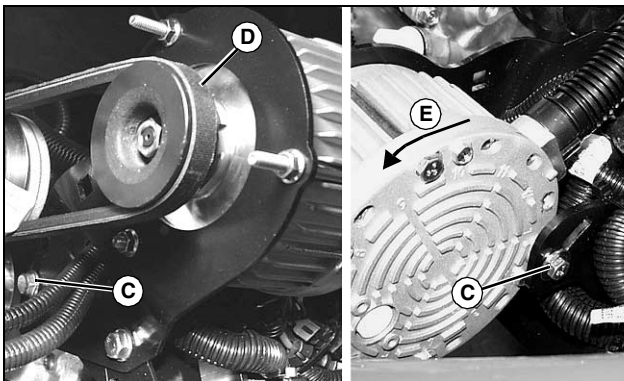
Service - Belts

Removing Belts



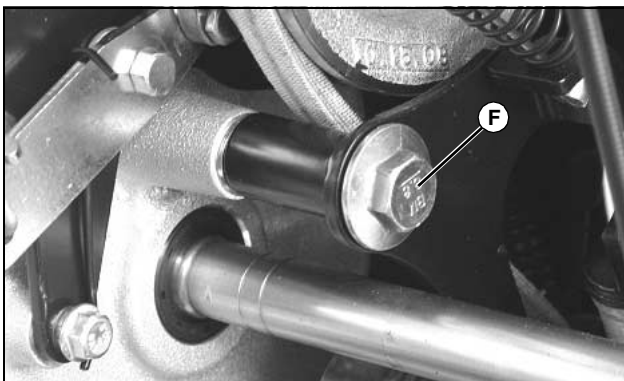
M42343

1. Loosen and remove three screws (A) and cover (B).



MX42696

2. Loosen two hex bolts (C) on alternator brackets, relieve tension on alternator belt (D) and remove belt from alternator pulley.
3. Tilt alternator fully forward (E) in adjustment slots to provide clearance for drive belt removal.

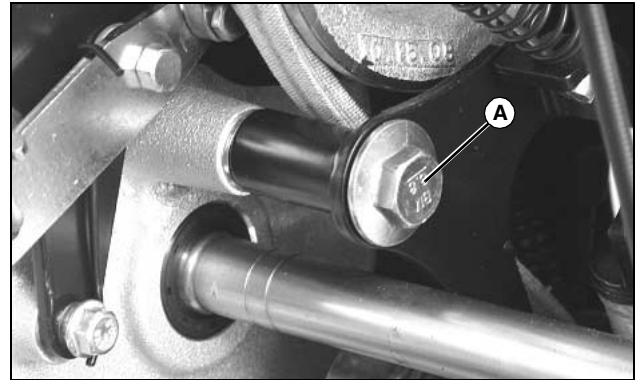


MX42701

4. Loosen the travel clutch arm hex bolt (F).
5. Remove drive and alternator belts from machine.

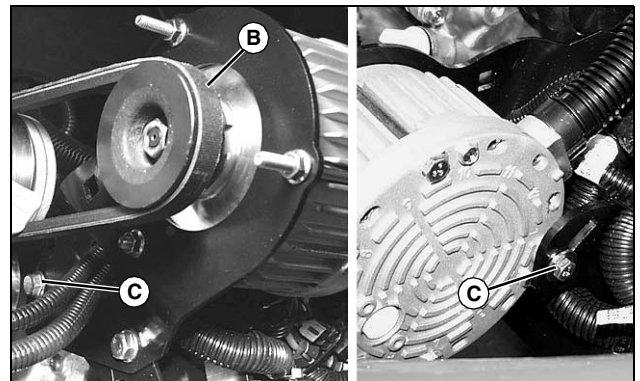
Installing Belts

1. Place alternator belt on engine pulley only.



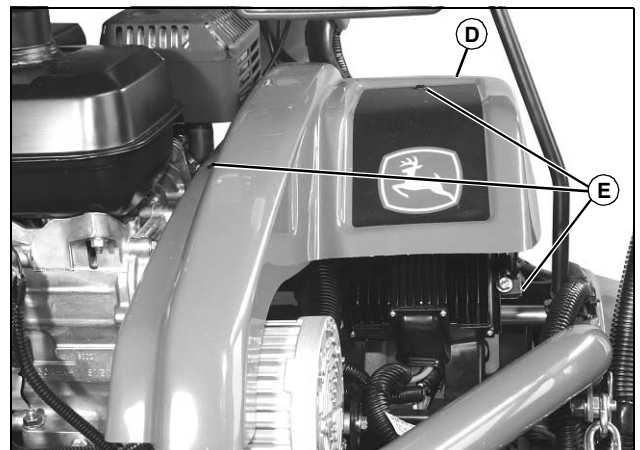
MX42701

2. Loosen the travel clutch arm hex bolt (A) if not already done.
3. Install drive belt on transmission and engine pulleys.



MX42696

4. Install alternator belt (B) on alternator pulley.
5. Adjust alternator belt tension and tighten two hex bolts (C).
6. Tighten travel clutch arm hex bolt (A).



M42343

7. Install cover (D) and secure with three screws (E).

Service - Belts

Drive Belt Tension Check and Adjustment

NOTE: Press PTO switch in the disengaged position for all checks and adjustments in this section.

When controls are properly adjusted, the machine will respond as follows:

- With engine stopped and clutch disengaged, machine should move freely.
- With engine stopped and travel clutch applied, traction roller should not move.
- With engine running and set at slow idle, brake released and travel clutch released, machine should not move.
- With engine running and set at slow idle, brake released, travel clutch lever engaged and holding machine by handlebars, transport wheels should spin on gravel or concrete surface.
- With engine running, brake released, and travel clutch applied, unit should propel itself up an incline.

Check Procedure

1. Park machine on a level surface.
2. Move run/stop switch to STOP position.
3. Release travel clutch lever and park brake.
4. Pull the machine backward: transport wheels and roller should turn freely.
 - If roller and transport wheels turn freely, proceed to next step.
 - If roller and transport wheels do not turn, adjust belt tension and repeat step.
5. Move travel clutch lever to engaged position and pull the machine backward: transport wheels and roller should not turn.
 - If transport wheels or roller turn, or if excessive force is required to engage clutch, adjust drive belt tension.
 - If transport wheels and roller do not turn, proceed to next step.
6. Release travel clutch lever. Start engine and run at slow idle. The machine should not move forward. If it does, adjust drive belt tension.
 - If machine moves forward, adjust drive belt tension.
 - If the machine does not move forward, proceed to the next step.
7. With engine running at slow idle, hold machine by the handlebars to prevent it from moving. Engage the travel clutch lever.
 - If transport wheels will not spin on gravel or concrete, belt adjustment is required.

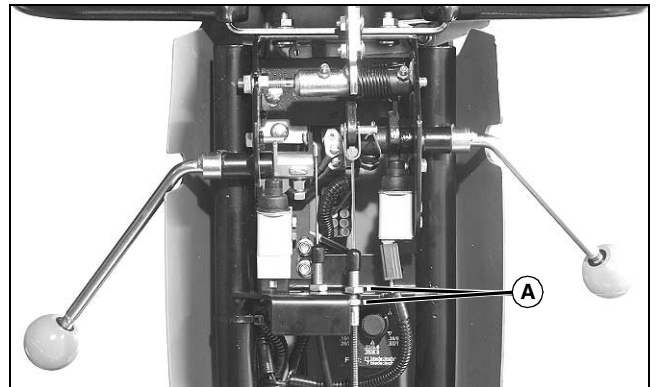
- If transport wheels spin on gravel or concrete, proceed to next step.

8. With engine running at slow idle, engage the travel clutch lever to begin forward travel. Release the operator presence bail.

- If forward travel stops, belt is properly adjusted.
- If forward travel does not stop, see Adjusting Operator Presence Bail in this section or your John Deere Dealer.

Adjustment Procedure

1. Park machine on a level surface.
2. Move run/stop switch to stop position.
3. Release travel clutch lever.

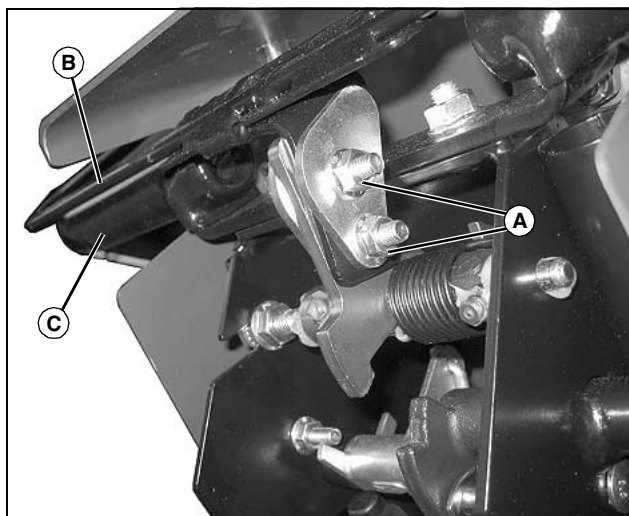


MX42345

4. Loosen upper cable jam nuts (A) and lengthen (decrease belt tension) or shorten (increase belt tension) ferrule length to change belt tension.
5. Tighten jam nuts to 11 N•m (96 lb-in.).
6. Repeat check procedure. (See "Check Procedure.") If additional adjustment is required, repeat previous steps. If proper adjustment cannot be obtained, reference the Technical Manual for additional service information.

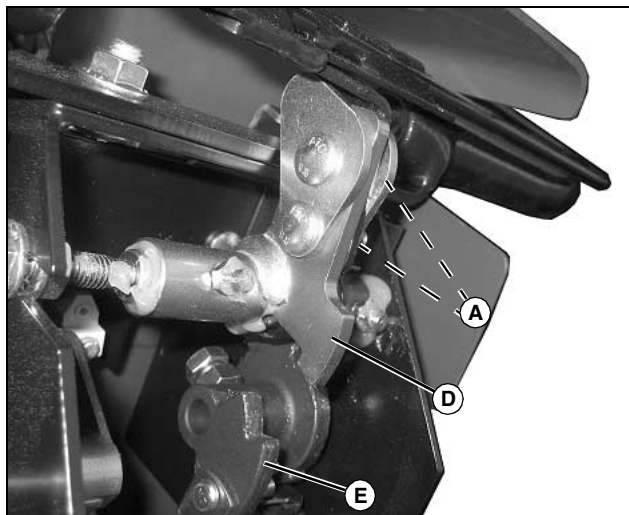
Service - Belts

Adjusting Operator Presence Bail



MX51217

1. Loosen two nuts (A).
2. Press and hold the bail (B) against the loop handlebar (C).



MX51218

3. Rotate the engagement arm (D) upward as far as possible.
4. Tighten two nuts (A).
5. Check bail for proper operation:
 - When bail is released, the engagement arm (D) must return and fully engage travel clutch lever linkage (E) and the travel clutch lever must return to the released position.
 - With the engine running, PTO on and travel clutch lever engaged, the machine forward travel and reel rotation must stop when the bail is released.

If release of the bail does not result in the operations listed above, do not operate the machine until further diagnosis

and corrective actions are taken. (See Drive Belt Tension Check and Adjustment in this section, Lubricating Drive Control Linkage in the SERVICE LUBRICATION section or your John Deere Dealer.)

Troubleshooting

Using Troubleshooting Chart

If you are experiencing a problem that is not listed in this chart, see your John Deere distributor for service.

When you have checked all the possible causes listed and you are still experiencing the problem, see your John Deere distributor.

Engine

IF	CHECK
ENGINE WILL NOT START OR IS HARD TO START	Run/Off Switch in off position. Fuel shut-off valve closed (OFF). Improper fuel / fuel level. Stale fuel. Plugged fuel filter or fuel filter screen. Plugged air intake filter. Spark plug wire is loose or disconnected. Spark plug not gapped correctly. Choke not functioning - See your John Deere Dealer.
ENGINE WILL NOT SLOW IDLE	Carburetion problems - See your John Deere Dealer.
ENGINE RUNS ROUGH	Fuel shut-off valve partially closed. Plugged fuel filter or fuel filter screen. Plugged air intake filter. Fuel cap vent dirty. Stale or improper fuel / fuel level. Spark plug not gapped correctly. Replace spark plug. Choke not functioning - See your John Deere Dealer. Carburetion problems - See your John Deere Dealer.
ENGINE OVERHEATS	Clean cooling fins. Low oil level. Plugged air intake filter.
ENGINE KNOCKS	Reduce load. Fuel is bad. Fill tank with fresh fuel, correct octane. Operate engine at FAST idle. Low oil level.

Troubleshooting

IF	CHECK
ENGINE LACKS POWER	Reduce load. Plugged air intake filter. Plugged fuel filter or fuel filter screen. Drain and fill tank with correct fuel. Clean cooling fins to help prevent overheating. Spark plug. Clean spark arrestor. Throttle lever travel.
ENGINE USES TOO MUCH OIL	Find and correct oil leaks. Incorrect engine oil. Plugged air intake filter. Worn rings.
ENGINE BACKFIRES THROUGH MUFFLER	Carburetion problems - See your John Deere Dealer.

Mower

IF	CHECK
POOR CUTTING	FOC not set correctly for conditions. Bed knife to reel out of adjustment. Reel or bed knife dull. Grass too tall.
MOWS UNEVENLY	Grass too tall, check grass type and grass grain. Height of cut not properly set. Front or drive roller not parallel to bed knife.
MOWER DOES NOT MOVE	Drive belt out of adjustment or broken. Roller chain broken.
REEL DOES NOT ENGAGE	PTO switch off or Mow/Backlap switch set to BACKLAP position. Adjust cables. Switch on travel clutch lever out of adjustment - See your John Deere Dealer.
CUT GRASS LEFT ON GREEN	Grass catcher basket or basket hanger incorrectly installed. Reel shield clips not secured to bed knife support. Adjust shield.
MARKING GRASS ON TURNS	Excess play in limit chains. Incorrect rear roller clamps.

Troubleshooting

E-Cut Hybrid System Diagnostic Codes

If	Check
Code 1-5 (One pulse followed by a short pause followed by five pulses.) Indicates motor failed to start.	Jammed reels. Tight reel to bed knife clearance. Failed bearings.
Code 1-6 (One pulse followed by a short pause followed by six pulses.) Indicates motor stalled while running.	Jammed reels. Bed knife to reel adjusted too tight. Failed bearings.
Code 1-7 or 1-8 (One pulse followed by a short pause followed by seven or eight pulses.) Indicates low alternator voltage.	Engine RPM too low. Low or no voltage output from alternator. Poor connections on alternator or alternator harness. Alternator belt slippage. Alternator malfunction. Excessive reel load from items mentioned in Code 1-6.
Code 1-10 (One pulse followed by a short pause followed by ten pulses.) Indicates reel direction reversed for 1/4 turn of motor.	Jammed reel. Jammed or Failed Greens Tender Conditioner or Rotary Brush. Damaged bed knife or reel.
Code 2-5 or 2-8 (Two pulses followed by a short pause followed by five, six or eight pulses.) Indicates motor current over the limit, due to excessive load or jammed reel.	Jammed Reel. Bed knife to reel adjusted too tight. Failed bearings.
Code 2-9 (Two pulses followed by a short pause followed by nine pulses.) Indicates Internal controller temperature resulted in controller shutting down motor.	Tight reel to bed knife clearance. Bed knife to reel adjusted too tight. Overheated controller. Controller cooling fins plugged with debris. Heavy load on motor.
Code 2-10 (Two pulses followed by a short pause followed by ten pulses.) Indicates Internal motor temperature resulted in controller shutting down motor.	Disconnected connectors. Reel motor wires are damaged. Cutting unit not turning freely. Dull reel and bed knife. Heavy load on reel motor.
Code 6-4 (Six pulses followed by a short pause followed by four pulses.) Indicates motor position sensor error at start.	Disconnected connectors. Damaged or broken wires.

Troubleshooting

If	Check
Code 6-6 (Six pulses followed by a short pause followed by Six pulses.) Indicates motor position sensor error while running.	Overheated reel motor. Cutting reel jammed by debris. Reel drive system not turning freely. Tight reel to bed knife clearance. Disconnected connectors. Dull reel and bed knife. Jammed or failed attachment. Broken or damaged wires between motor and controller.
Code 7-2 (Seven pulses followed by a short pause followed by two pulses.) Indicates phase short to ground.	Debris in connectors. Wires from controller to motor shorted. Internal short in motor. Internal short in controller.
Code 7-3 (Seven pulses followed by a short pause followed by three pulses.) Indicates high current to motor.	Broken or damaged wires between motor and controller. Contaminated connections between motor and controller.
Code 7-4 (Seven pulses followed by a short pause followed by four pulses.) Indicates open high-amperage wire between motor and controller.	Broken or damaged wires between motor and controller. Open connector between motor and controller.
Code 7-5 (Seven pulses followed by a short pause followed by five pulses.) Indicates frequency of cut potentiometer speed control voltage is low.	Poor connection between the controller and speed control potentiometer. Damaged wires between controller and speed controller potentiometer. Potentiometer malfunction.
Code 8-1 (Eight pulses followed by a short pause followed by one pulses.) Indicates internal alternator temperature resulting in shutting down motor.	Disconnected wiring connectors. Broken or damaged wires between alternator and controller. Poor connection on 48-volt power or ground connections. Cutting unit not turning freely. Dull reel and bed knife. Excessive load on reel motor.
Code 8-2 (Eight pulses followed by a short pause followed by two pulses.) Indicates failure to hold frequency of clip due to excessive load or jammed reel.	Cutting unit jammed with debris. Cutting unit not turning freely. Tight reel to bed knife clearance. Dull reel and bed knife. Jammed or failed attachment.
Code 8-3 (Eight pulses followed by a short pause followed by three pulses.) Indicates alternator speed sensor error resulting in shutting down motor.	Disconnected wiring connectors. Broken or damaged wires between alternator and controller.

Troubleshooting

If	Check
Code 8-4 (Eight pulses followed by a short pause followed by four pulses.) Indicates Incorrect controller for this machine.	Wrong controller on machine. Need to replace with proper controller for model of machine.
Code 9-2 (Nine pulses followed by a short pause followed by two pulses.) Indicates alternator output too high.	Alternator internal regulator. Alternator over speed.
Code 9-3 (Nine pulses followed by a short pause followed by three pulses.) Internal controller failure.	Call John Deere Dealer.
Code 9-5 (Nine pulses followed by a short pause followed by five pulses.) Indicates signal wires shorted to external power line or ground.	Broken or damage wires between motor and controller. Signal wires shorted to ground. Contaminated connector.
Code 9-7 (Nine pulses followed by a short pause followed by seven pulses.) Indicates supply voltage from controller to frequency of clip (FOC) speed control potentiometer voltage is low.	Poor connection between the controller and speed control potentiometer. Damaged wires between controller and speed controller potentiometer. Shorted ground on speed controller potentiometer. Potentiometer malfunction.

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.

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. Wash the machine with low pressure water and apply wax to metal and plastic surfaces.
5. Run machine for five minutes to dry belts and pulleys.
6. Apply light coat of engine oil to pivot and wear points to prevent rust.
7. Lubricate grease points.
8. Check tire pressure.

Preparing Fuel and Engine For Storage

Fuel Usage with Stabilizers or Conditioners.

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

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.

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

2. Mix fresh fuel and fuel stabilizer in separate container. Follow stabilizer label instructions for mixing.
3. Fill fuel tank with stabilized fuel.
4. Run engine for a few minutes to allow fuel mixture to circulate through carburetor.
5. Turn run/stop switch to STOP position.

Fuel Usage without Stabilizers or Conditioners.

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

IMPORTANT: Avoid damage! Stale fuel can produce varnish and plug carburetor components affecting engine components.

- The use of a fuel stabilizer or conditioner is recommended for this machine.

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. Turn run/stop switch to STOP position.

Engine:

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

1. Change engine oil while engine is warm.
2. Service air filter if necessary.
3. 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.
4. Clean the engine and engine compartment.
5. Close fuel shut-off valve, if your machine is equipped.

Storage

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

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

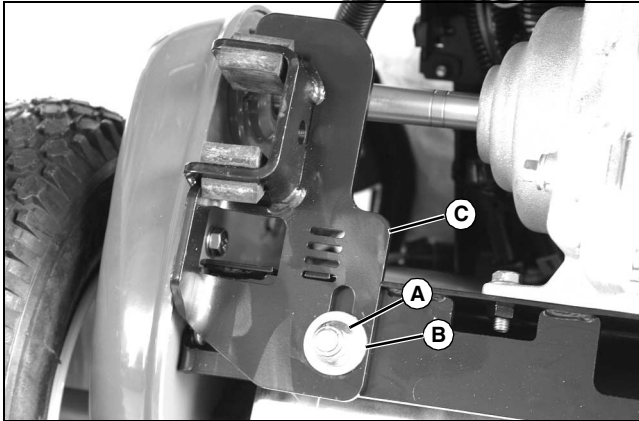
Removing Machine From Storage

1. Check tire pressure.
2. Check engine oil level.
3. Check spark plug gap. Install and tighten plug to specified torque.
4. Lubricate all grease points.
5. Open fuel shut-off valve, if your machine is equipped.
6. Be sure all shields and guards or deflectors are in place.

Assembly

Attach Handlebar

NOTE: If Lighting Kit (optional equipment) is to be added to machine, installation prior to handlebar attachment will ease assembly.

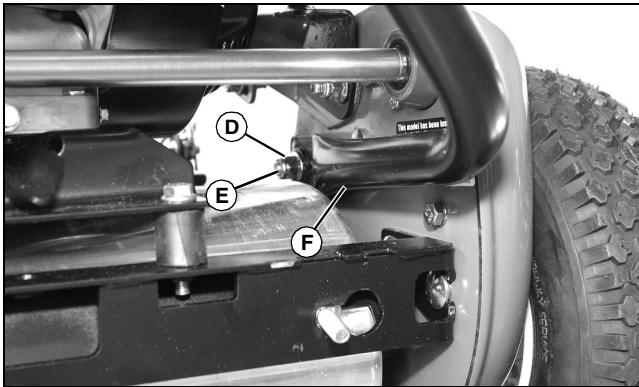


MX42242

1. Remove locking hex nuts (A) and washers (B) securing left and right handlebar height adjustment brackets (C) to machine frame.

2. Remove left and right handlebar brackets.

NOTE: Loosening the right side handlebar pivot bolt in the machine frame will ease handlebar installation.

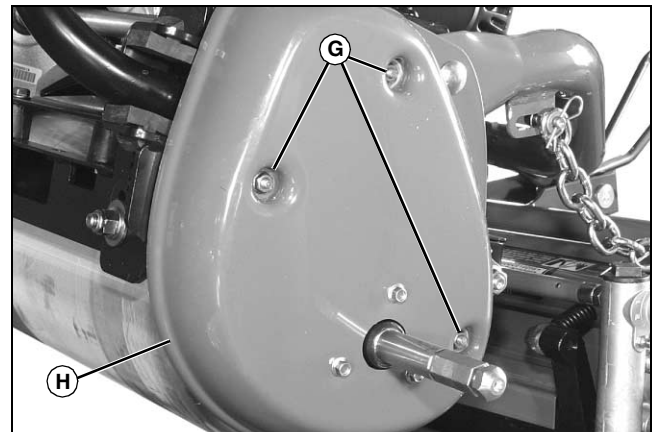


MX42243

Picture Note: View from rear of machine.

3. Remove locknuts (D) if installed to handlebar pivot bolts (E).

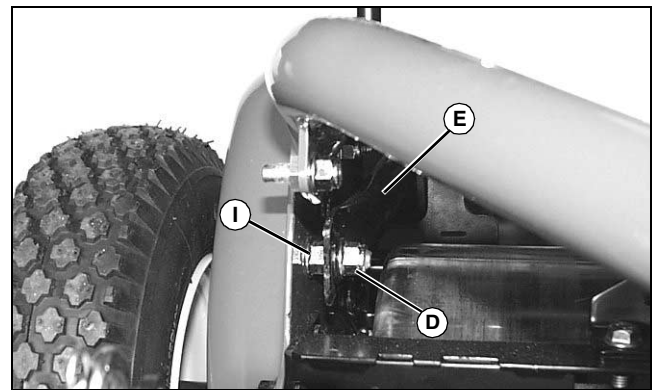
4. Assemble handlebar (F) onto left and then right side pivot bolts (E). If necessary, loosen pivot bolt in right side frame to install handlebar to bolt.



MX42349

a. Remove right transport wheel. Remove three flanged hex nuts (G) securing side cover (H) to right side frame.

b. Remove side cover for access to handlebar pivot bolt.



MX42806

Picture Note: View from front of machine.

c. Loosen lock nut (I) on pivot bolt. Install handlebar (E) over bolt and tighten locknut (I) against side plate securely.

d. Install side cover (H) and secure with three flanged hex nuts (G).

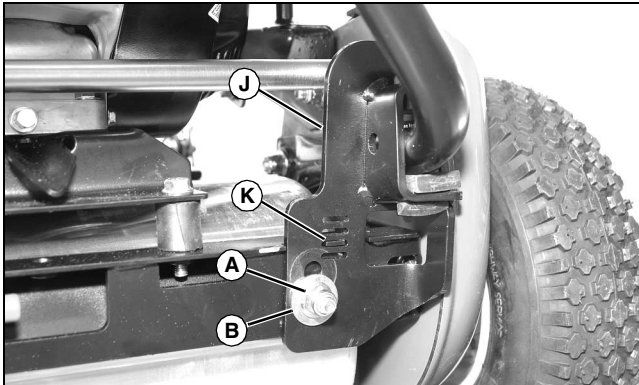
e. Install right transport wheel.

NOTE: Do not over tighten lock nuts into handlebar. The handlebar needs to move freely.

5. Install lock nuts (D) to pivot bolts on left and right sides to secure handlebar to machine. Tighten lock nuts as required to eliminate play, but ensure that handlebar pivots freely on bolts.

Assembly

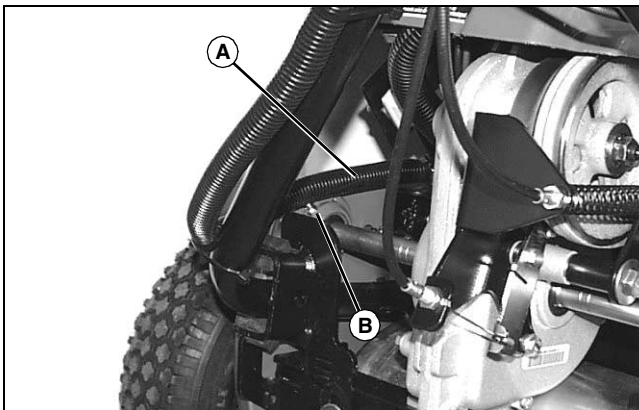
NOTE: Before tightening fasteners in the following step, ensure that the height adjustment brackets (J) are positioned straight up and down (not at an angle) and that the frame tabs (K) engage the same height adjustment slot on each side of the machine.



MX42244

6. Install left and right handlebar height adjustment brackets to machine rear frame at desired height. Ensure that the height adjustment brackets (J) are straight up and down and that the frame tabs (K) are engaged in same slot in left and right brackets. Secure brackets to frame with locknuts (A) and washers (B). Tighten fasteners securely.

Connect Wiring Harness



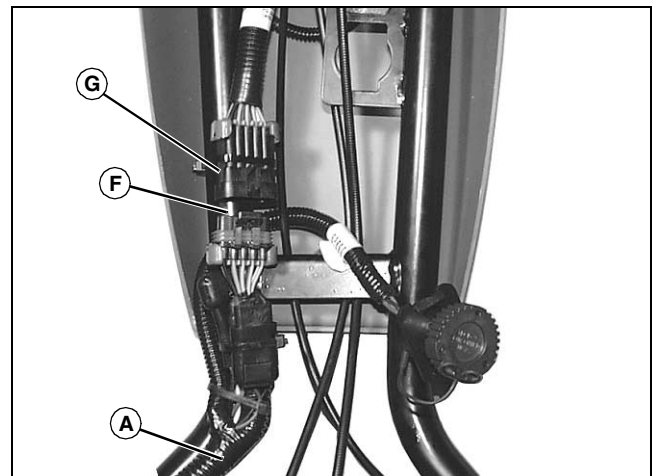
MX42807

1. After installing handlebar assembly to machine, route main harness (A) above drive shaft and over grease fitting (B) on left side of machine.



MX42462

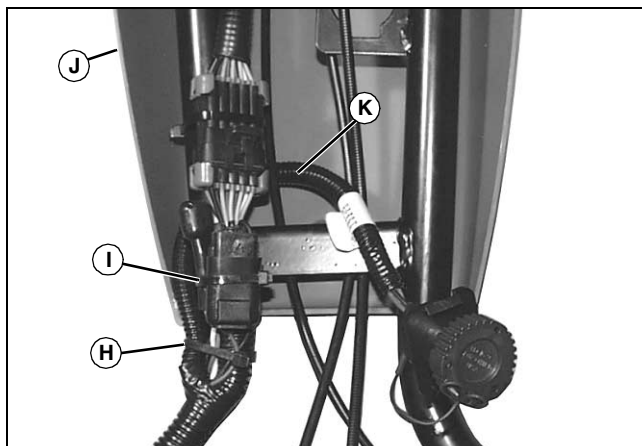
2. Route main harness up left handlebar tube. Ensure that it does not contact the left drive shaft (C) and secure with two tie straps (D). If a light kit has been added, ensure that a tie strap (E) has been added to the harness at the light bar.



MX42463

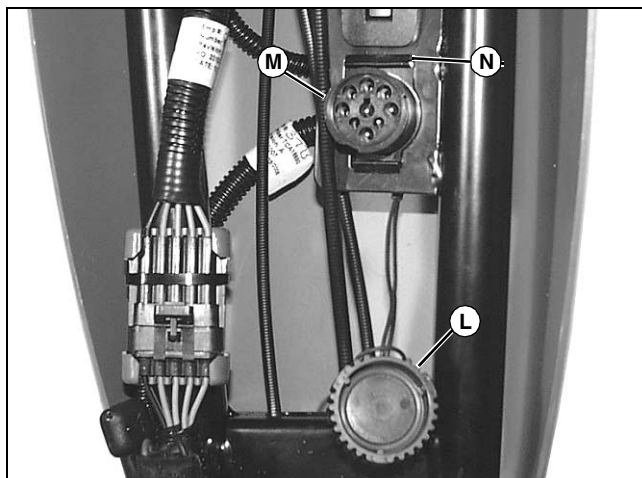
3. Extend machine wiring harness (A) up handlebar to connection points under handlebar cover. Apply dielectric grease to terminals (F) in main harness connector and plug into mating connector (G). Ensure that connector lock tab is fully seated.

Assembly



MX42464

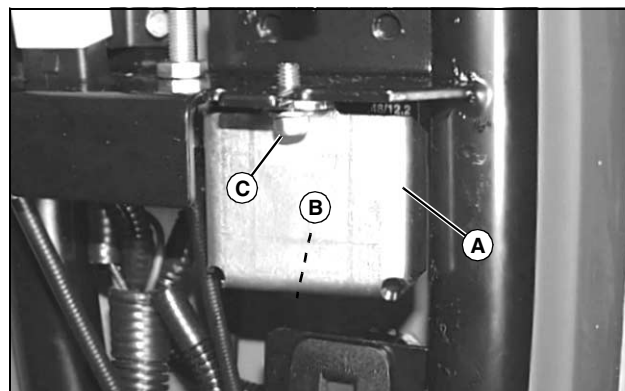
4. Install tie strap to harness (H) and connector bundle (I).
5. Loosen two screws on front of handlebar cover (J). Route diagnostic connector harness (K) between handlebar and cover as shown. Tighten two handlebar cover screws.



MX42465

6. Remove dust cap (L) from diagnostic connector (M). Install diagnostic connector (M) in handlebar frame bracket. Ensure that larger locking tab (N) on connector is indexed to the top and both tabs are firmly seated in bracket. Install dust cap (L) on connector, turning firmly clockwise to lock in position.

Install Frequency of Clip (FOC) Control Cover



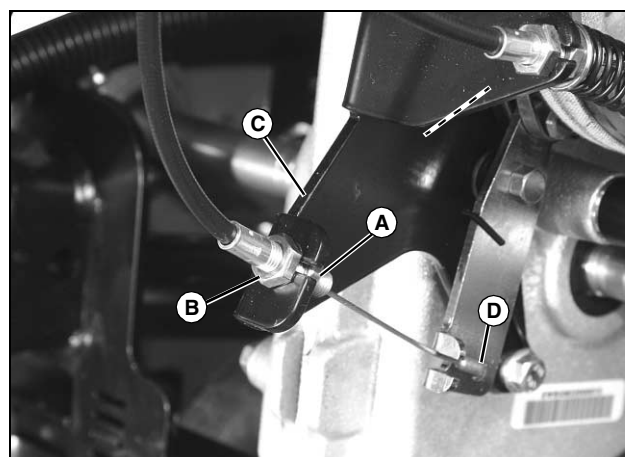
MX42457

- Install cover (A) over FOC control on rear of handlebar. Engage tab on bracket below control knob with slot (B) in bottom of cover and secure with 6 mm screw (C).

Install Control Cables

Install Park Brake Cable

1. The park brake cable is assembled to the handlebar.
2. Loosen the outer nut completely (A) from the threaded end of the cable ferrule.
3. Rotate jam nut (B) until it bottoms against the threads on the ferrule body.
4. Insert the cable through the anchor bracket (C) and attach the cable end to the brake arm (D).

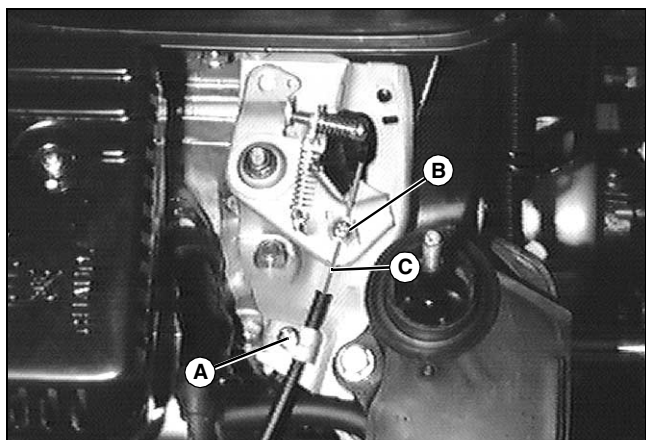


MX42352

5. Hold the cable end jam nut (B) against the bracket (C) and tighten outer nut (A).
6. Check operation of park brake (see Testing Park Brake, in Operating section).
7. Adjust park brake cable tension (if required) on the upper cable ferrule (see Adjusting Brake in this section).

Assembly

Install Throttle Cable

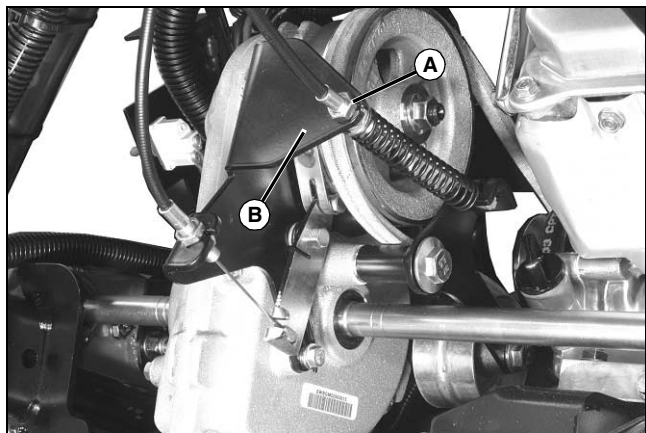


MX42354

1. The throttle cable is assembled to the handlebar.
2. On handlebar console, move throttle lever to the slow position.
3. Remove the air cleaner assembly.
4. Loosen screws (A and B) on carburetor.
5. Route throttle cable (C) under bracket and screw (A) and through swivel and screw (B).
6. Tighten screws (A and B).
7. Move the throttle lever on the handlebar to ensure full movement at the carburetor.
8. Install the air cleaner assembly.

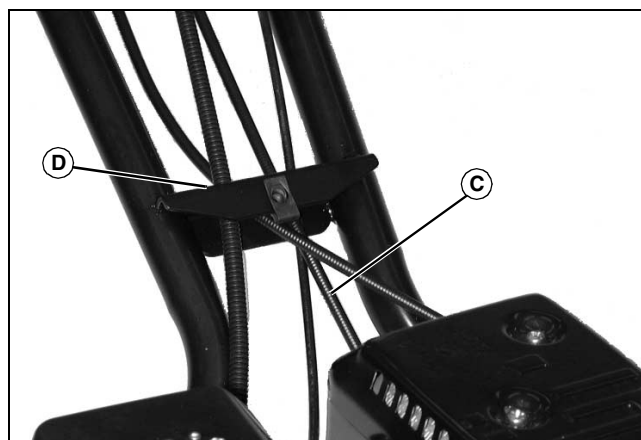
Install Travel Clutch Cable

1. The travel clutch cable is assembled to the machine base.



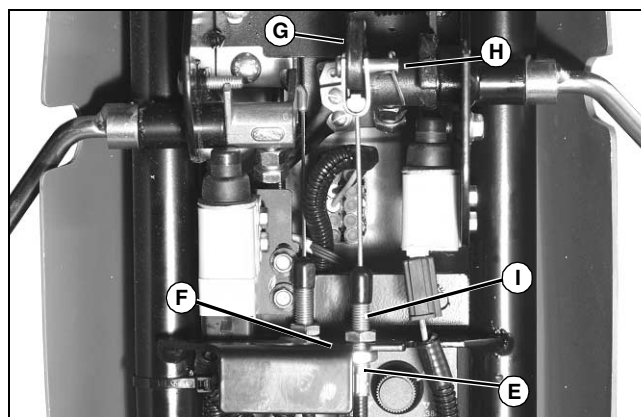
MX42344

2. Ensure that the rear nut (A) on the bottom cable ferrule is threaded against the base of the ferrule.



MX11277

3. Run the cable (C) through the slotted hole in the lower handlebar bracket (D).



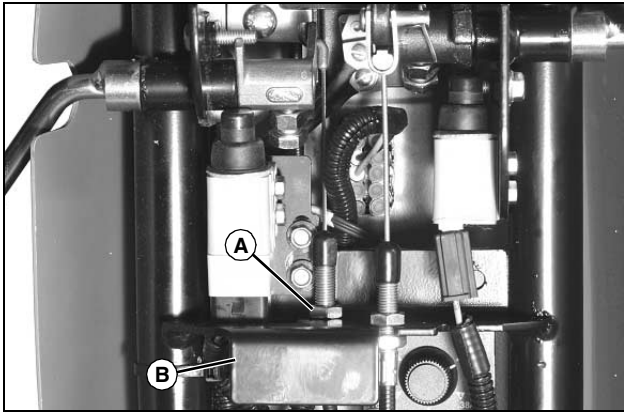
MX42353

4. Insert the cable (E) through the anchor bracket (F) and attach the cable end to the throttle lever assembly (G) with a pin and cotter pin (H).
5. Adjust the cable upper ferrule position (I) to a point just short of deflection in lower cable bracket (B) with the travel lever fully engaged.
6. Check operation of travel clutch lever (see Drive Belt Tension Check and Adjustment in this section).

Adjusting Brake

1. Check operation of park brake (see Testing Park Brake, in Operating section).
2. If adjustment is needed do the following:

Assembly



MX42353

- Loosen jam nut (A) holding brake cable in the handlebar bracket (B).
- Shorten ferrule length on cable side of ferrule.
- Tighten jam nut (A).
- Repeat step 1.
- If proper operation cannot be obtained, additional adjustment can be made at the lower cable ferrule.

Drive Belt Tension Check and Adjustment

- When properly adjusted, with engine stopped and travel clutch lever disengaged, the machine should move freely. With travel clutch lever applied, the traction roller should not move.
- When properly adjusted, with engine running and set at low idle, park brake released and travel clutch lever disengaged, machine should not move.
- With engine running and set at low idle, park brake released, travel clutch lever applied and holding machine by handlebars, transport wheels should spin on gravel or concrete surface.
- With engine running, park brake released, travel clutch lever applied, unit should propel itself up an incline.

Check Procedure

- Park machine on a level surface.
- Move run/stop switch to stop position.
- Move travel clutch lever to released position.
- Pull the machine backward: transport wheels and roller should turn freely.
 - If transport wheels and roller turn freely, proceed to next step.
 - If transport wheels or roller do not turn, adjust belt tension.
- Move travel clutch lever to applied position.

- Pull the machine backward: transport wheels and roller should not turn.
 - If transport wheels or roller turn, or excessive force is required to engage clutch, adjust belt tension.
 - If transport wheels and roller do not turn, proceed to next step.

- Move travel clutch lever to released position.

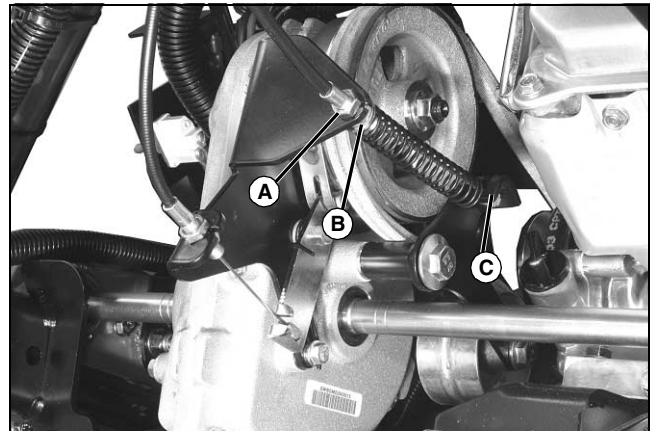
- Ensure PTO switch is in the disengaged position. Start engine and run at low idle. The machine should not move forward. If it does, adjust belt tension.

- With engine running at low idle, hold machine by the handlebars to prevent it from moving. Release the brake and engage the clutch.

- If transport wheels spin on gravel or concrete, belt is properly adjusted.
- If transport wheels will not spin on gravel or concrete, belt adjustment is required.

Adjustment Procedure

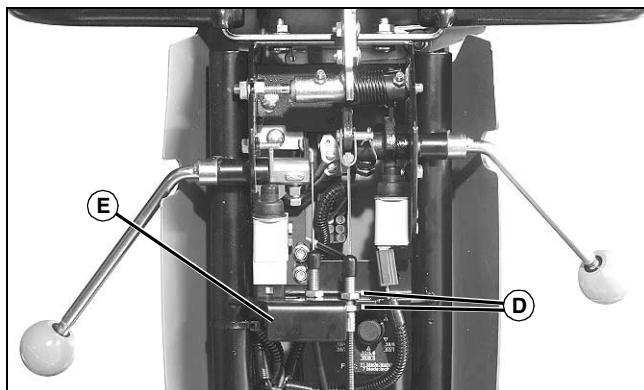
- Park machine on a level surface.
- Move run/stop switch to stop position.
- Move travel clutch lever to released position.



MX42344

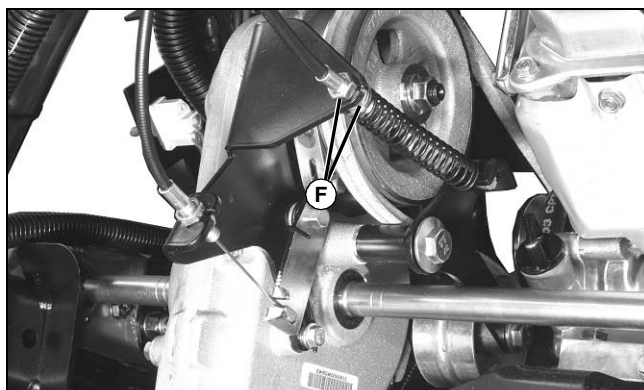
- Bottom nut (A) on the travel clutch cable. Insert the cable through the rear of the bracket, install the front jam nut (B) and tighten to 11 N•m (96 lb-in.). Install the free end of the cable in the clutch pulley bellcrank (C).

Assembly



MX42345

5. Adjust the upper cable anchor (D) to a point just short of deflection in cable bracket (E) with the travel lever fully engaged.
6. If the adjustment is excessively tight, the clutch may randomly disengage while mowing. Release the cable tension by two turns of the cable ferrule and tighten the jam nuts to correct.
7. Repeat check procedure.
8. If adjusting upper cable is not adequate, proceed to next step.
9. If adjusting upper cable is not adequate, center jam nuts (D) on upper cable ferrule.



MX42344

10. Loosen jam nuts (B) on lower end of cable.
11. Lengthen (decrease belt tension) or shorten (increase belt tension) ferrule length to change belt idler tension.
12. Tighten jam nuts to 11 N•m (96 lb-in.).
13. Repeat check procedure and readjust as necessary.

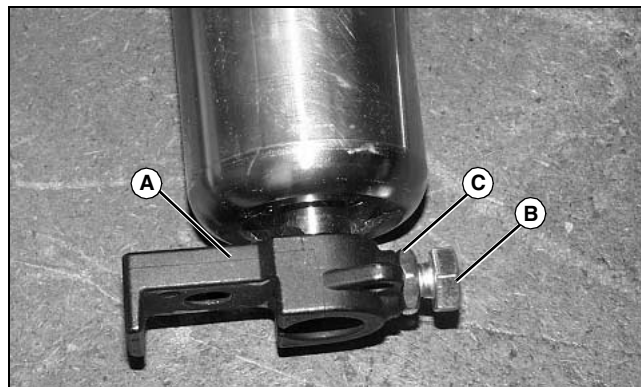
Prepare Cutting Unit



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

Install Front Roller

NOTE: Front roller brackets are offset. For standard use, the bracket should be installed to the roller with the offset to the rear of the base cutting unit to allow close proximity of front roller to rear roller. If GTC or Rotary Brush will be installed, offset should be to the front to allow the GTC or Rotary Brush to be installed behind the front roller.



MX41004

1. Install roller brackets (A) onto each bearing spindle shaft end.
2. Install set screws (B) and locknuts (C) loosely. Do not tighten.

NOTE: Make sure the roller bracket set screw locations are not aligned with the holes in each bearing spindle shaft end. Set screws must engage the bearing spindle shaft at each end.

3. Install roller with eccentric adjuster and hex head bolt on each side. Center front roller. Tighten set screws (B) and jam nuts (C) on both roller brackets.
4. Tighten roller bracket attaching hardware.
5. Adjust front roller for parallelism.
6. Tighten eccentric to 81 N•m (60 lb-ft).

Prepare Rear Roller

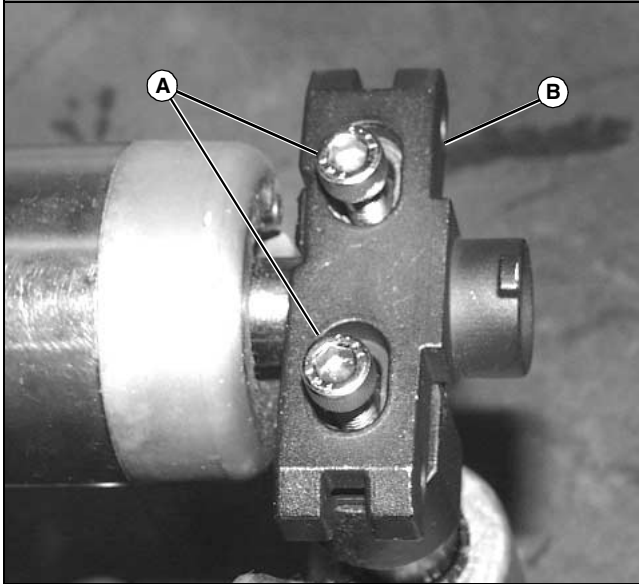


CAUTION: Avoid injury! Blades are sharp. Always wear gloves when handling blades or working near blades.

NOTE: The 180 E-Cut Hybrid and 220 E-Cut Hybrid use unique clamps (item C in the pictures that follow) to

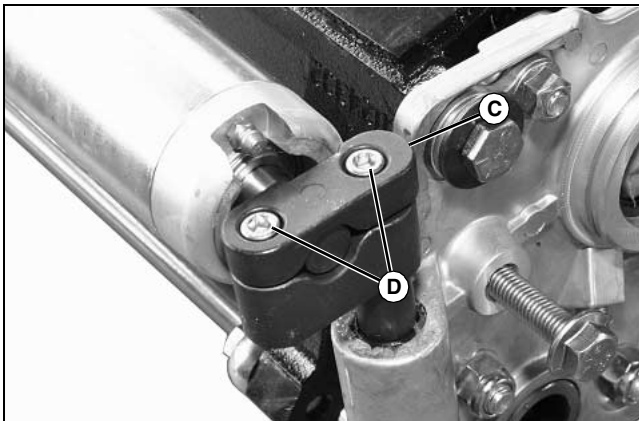
Assembly

retain the rear roller to the cutting unit. This type of clamp must be used on any QA5 cutting unit attached to these machine.



MX41005

1. Place cutting unit on a flat surface or workbench with bottom surface pointing up. Remove hex socket head bolts (A) and rear roller clamp (B). Repeat on other side. Removed clamps can be discarded.



MX42502

2. Install rounded clamp (C) (from bag of parts) with two M6 hex socket head bolts (D). Repeat on opposite side.
3. Center roller between clamps and torque four M6 bolts to 19 N•m (14 lb-ft).

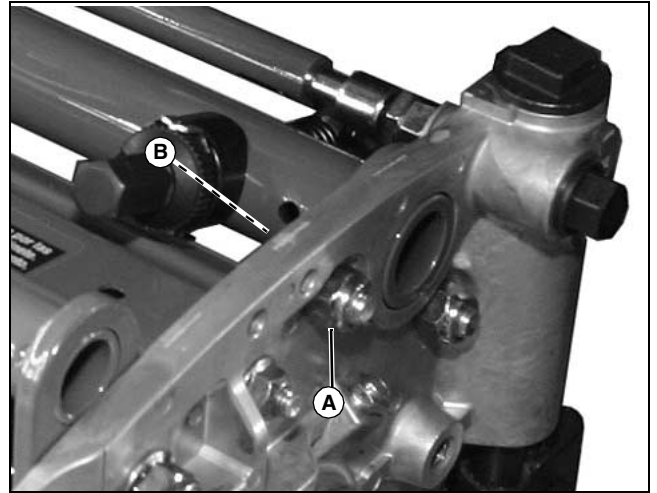
NOTE: If an optional Greens Tender Conditioner or Rotary Brush is to be installed on this cutting unit, install it now (see Installation Instructions with GTC or Rotary Brush Kit).

Assemble Cutting Unit Mounting Hardware



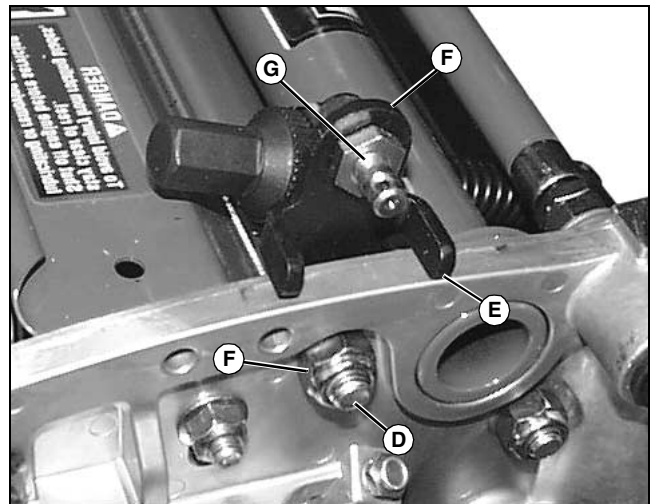
CAUTION: Avoid injury! Blades are sharp. Always wear gloves when handling blades or working near blades.

1. Position cutting unit upright.



MX42504

2. Remove lock nut (A) and discard carriage bolt (B) from both sides of cutting unit.



MX42473

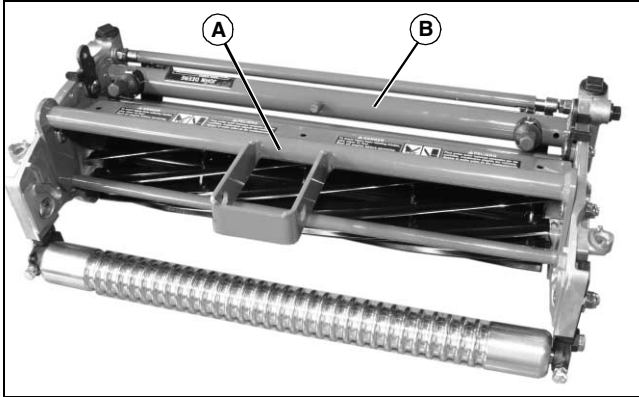
3. Install limit chain anchor plate (C) on housing with replacement M10X30 carriage head bolt (D). Rotate anchor so tab facing rear of cutting unit rests against top of housing (E). Secure anchor with original lock nut (F). Repeat on opposite side.
4. Install lower chain limit anchor pin (G) in anchor plate (F). Rotate anchor pin to provide 90° angle between chain pull direction and spring clip hole and secure with M8 lock nut. Torque lock nut to 34 N•m (25 lb-ft). Repeat for opposite side.

Assembly

Install Lift Yoke

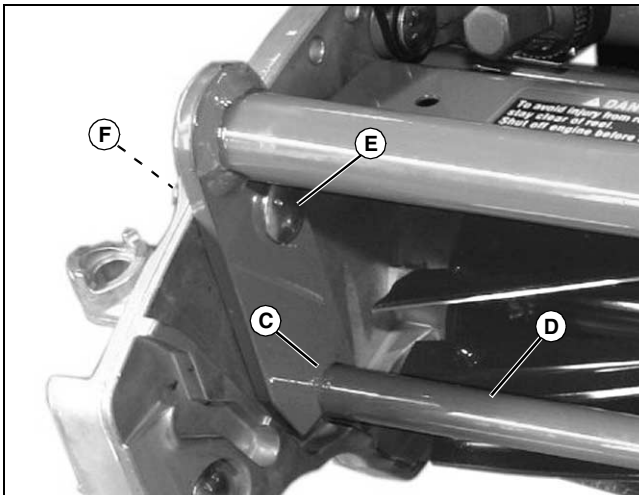


CAUTION: Avoid injury! Blades are sharp. Always wear gloves when handling blades or working near blades.



MX42980

1. Position the lift yoke (A) on the front of the cutting unit (B) as shown.



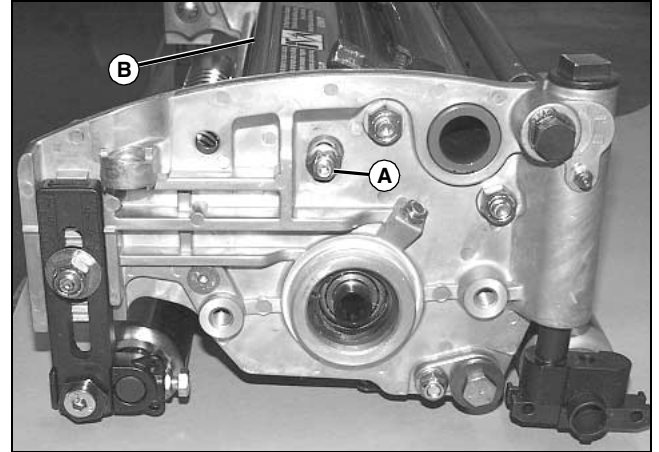
MX42981

Picture Note: Right side shown for detail.

2. Ensure that notches (C) in the bottom of left and right yoke flanges engage the frame rod (D) and install a M10X35 carriage bolt (E) through each flange and frame end housing. Secure each bolt with a M10 lock nut (F).

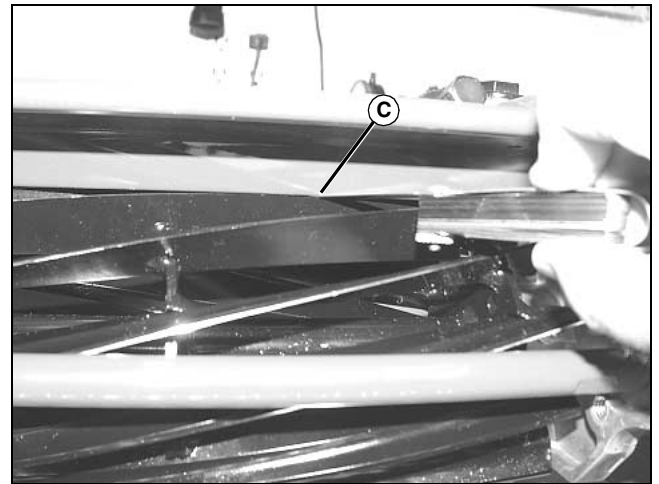
Adjusting Cutting Unit Shield

NOTE: Keeping the shield close to the cutting blades improves the performance of the grass catcher in most conditions.



MX41170

1. Loosen two bolts (A) and locknuts on each side of cutting unit.



MX41171

2. Raise or lower shield (B) to adjust clearance (C) between bottom of shield and the top of cutting blades to 1.5 mm (0.06 in.).
3. Tighten bolts.

Adjusting Bed Knife to Reel (QA-5 Cutting Units)



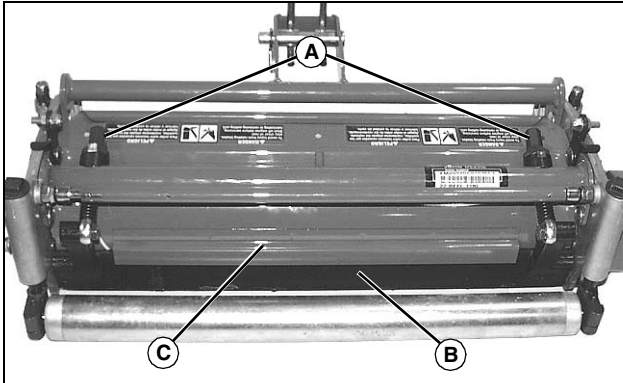
CAUTION: Avoid injury! Blades are sharp. Always wear gloves when handling blades or working near blades.

Assembly

IMPORTANT: Avoid damage! Adjust bed knife to reel by lowering and raising the bed knife evenly.

Do not adjust more than one flat on the adjuster nut at a time, alternating side to side.

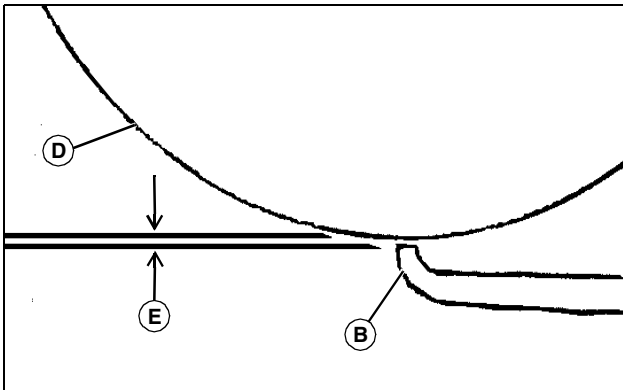
NOTE: Stand cutting unit upright on workbench.



MX42697

1. Turn bed knife tower adjuster (A) on both sides of cutting unit counterclockwise until bed knife (B) is tight against cutting unit (C).
2. Slowly tighten tower adjuster (A) clockwise, alternating from side to side until bed knife begins to pull away from the cutting reel. Cutting reel should rotate freely.

NOTE: Make sure that the final adjustment to the bed knife is pulling the bed knife away from the cutting reel.



E35559

3. Alternately turn adjusters (A) no more than one flat at a time until bed knife (B) to reel (D) clearance (E) measures 0.025 mm to 0.050 mm (0.001 in. to 0.002 in.).
4. Check the bed knife to reel clearance (E). Adjust again if necessary.

Adjusting Front Roller Parallel with Bed Knife (QA-5 Cutting Units)



CAUTION: Avoid injury! Blades are sharp and rotate quickly:

- Keeps hands and feet away from cutting units while machine is running.
- Always wear gloves while working on cutting units.
- Watch for rotation of cutting reel. Rotating one cutting reel can cause another blade or cutting reel to rotate.

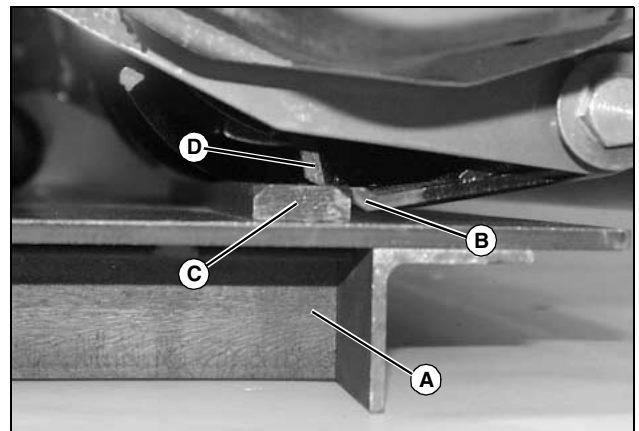
NOTE: Use of a bench plate or a two or three bolt height of cut gauge bar is recommended when adjusting front roller parallel with the bed knife.

Always adjust bed knife-to-reel before adjusting front roller for parallelism.

Always make parallelism adjustment after adjusting front roller height of cut range.

Parallelism Adjustment with Bench Plate

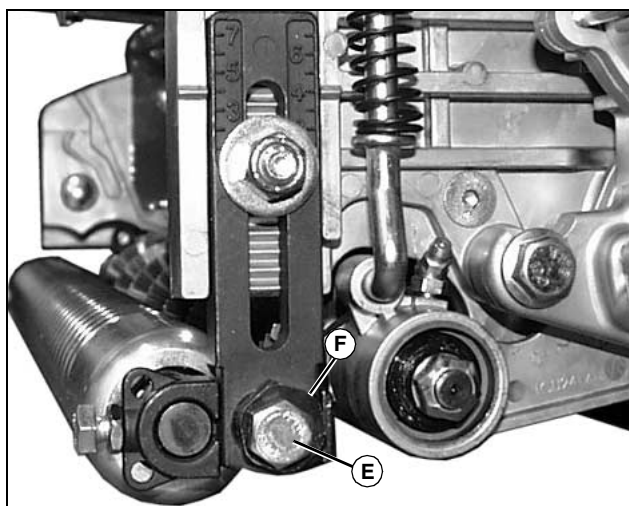
1. Position cutting unit upright on flat surface or workbench.



M97254

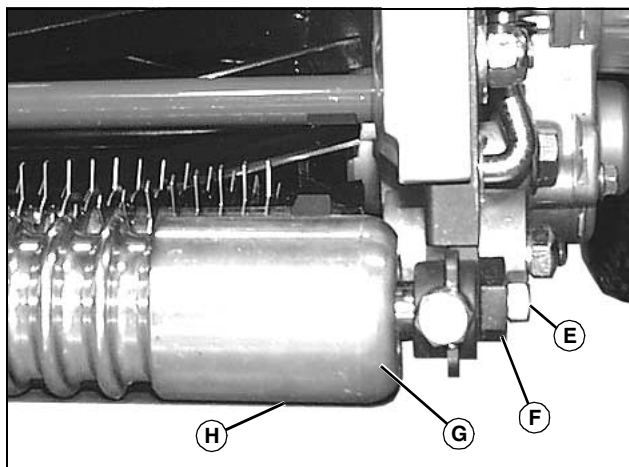
2. Set bench plate on a level surface. Set cutting unit on top of bench plate (A). Bed knife (B) must rest firmly against plate stop (C) with cutting reel blade (D) on top of plate stop.

Assembly



MX42451

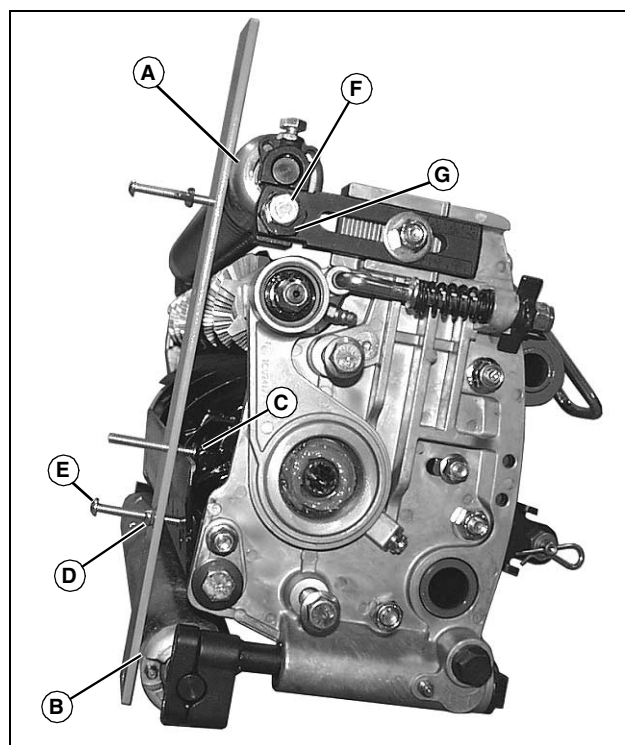
3. Loosen hex head bolt (E) on one of the roller brackets.



MX42452

4. Rotate eccentric adjuster (F) until the front roller (G) sits flat and parallel with the bench plate. Gap (H) should not exceed 0.050 mm (0.002 in.) maximum.
5. Hold roller eccentric adjuster (F) and tighten hex head bolt (E) to 81.3 N•m (60 lb-ft).

Parallelism Adjustment with Height of Cut Gauge Bar



MX42693

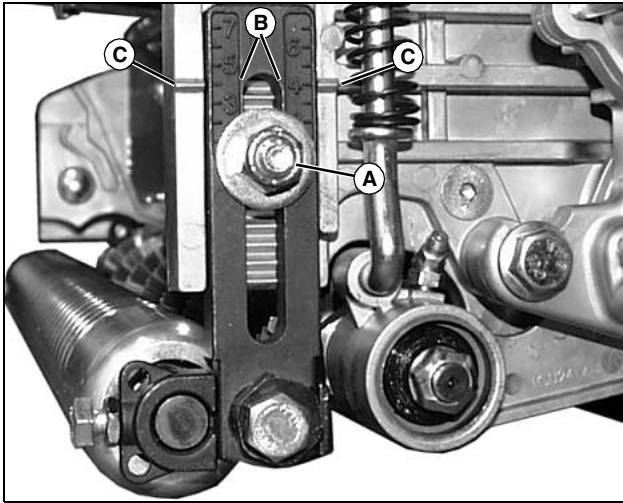
1. Position cutting unit upright on flat surface or workbench.
2. Rest height of cut gauge bar against front (A) and rear rollers (B) approximately 51 mm (2 in.) from the outside end of the bed knife.
3. Set the inside of the screw head (C) against the front edge of the bed knife to hold the gauge bar in position.
4. Loosen wing nut (D). Turn lower gauge screw (E) clockwise until top of screw makes contact with flat edge of bed knife.
5. Tighten wing nut (D).
6. Adjust position of front roller:
 - Loosen bolt (F) and rotate eccentric adjuster (G) until top of lower gauge screw (E) makes contact with the bed knife.
 - Hold roller eccentric adjuster (G) and tighten hex head bolt (F) to 81.3 N•m (60 lb-ft).
7. Repeat procedure for opposite side.

Adjusting Height Of Cut Range (QA5 Cutting Units)

Adjust front roller brackets for the height of cut range desired.

1. Select height of cut adjustment range by adjusting the position of both front roller brackets.

Assembly



MX42451

2. Loosen nut (A) on each roller bracket.
3. Alignment of roller bracket (B) and cutting unit frame (C) adjustment marks will determine height of cut adjustment range.

NOTE: Height of cut range for the 180 E-Cut Hybrid and 220 E-Cut Hybrid mowers is 0-19 mm (0.00-0.75 in.).

- Refer to chart for desired setting.

Height of Cut Range (2-Inch Front Roller With Out GTC)		Front Roller Setting
mm	in.	
Not Recommended	Not Recommended	1
0.0 - 4	0.00 - 0.160	2
1 - 9.5	0.04 - 0.37	3
6 - 15	0.24 - 0.60	4
11 - 21	0.43 - 0.83	5
16 - 27	0.63 - 1.06	6
21 - 33	0.83 - 1.30	7

Height of Cut Range (2-Inch Front Roller With GTC)		Front Roller Setting
mm	in.	
Not Recommended	Not Recommended	1
0.0 - 5	0.00 - 0.20	2
0 - 11	0.00 - 0.43	3

Height of Cut Range (2-Inch Front Roller With GTC)		Front Roller Setting
mm	in.	
5 - 17	0.20 - 0.67	4
10 - 24	0.40 - 0.94	5
15 - 30	0.60 - 1.18	6
20 - 36	0.80 - 1.42	7

Adjusting Height of Cut (QA5)

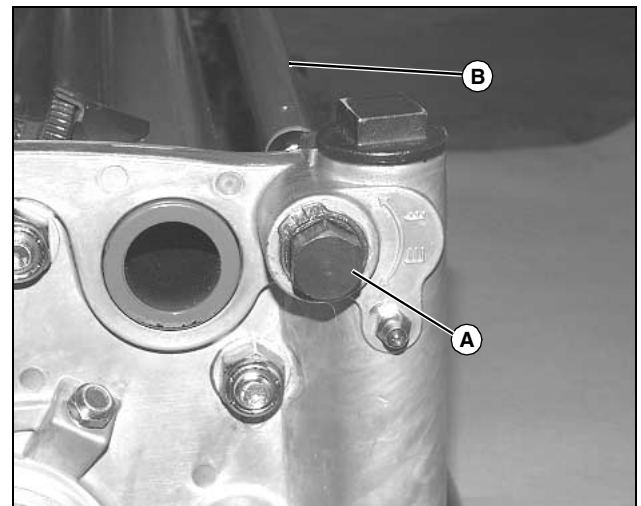


CAUTION: Avoid injury! Blades are sharp and rotate quickly:

- Keeps hands and feet away from cutting units while machine is running.
- Always wear gloves while working on cutting units.
- Watch for rotation of cutting reel. Rotating one cutting reel can cause another blade or cutting reel to rotate.

NOTE: Avoid damage! Do not use any type of pneumatic drill or impact wrench to make height of cut adjustments.

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

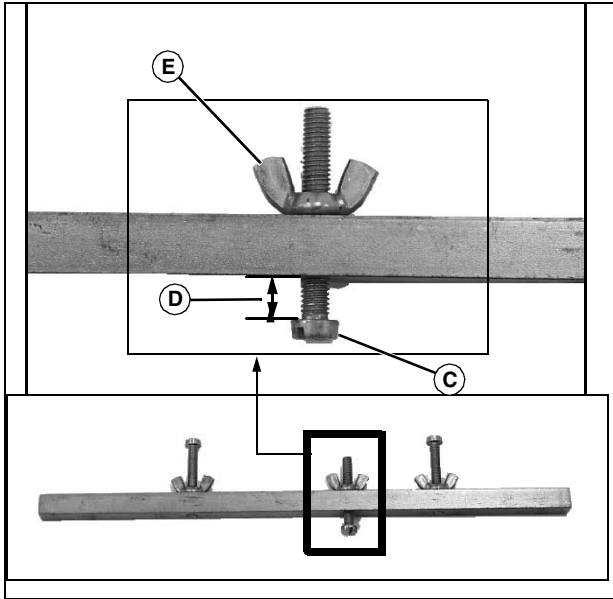


MX41000

2. Locate the height of cut adjuster (A) on top rear of reel side casting (either side).
3. Turn the height of cut adjustment (A) to decrease or increase height of cut.

Assembly

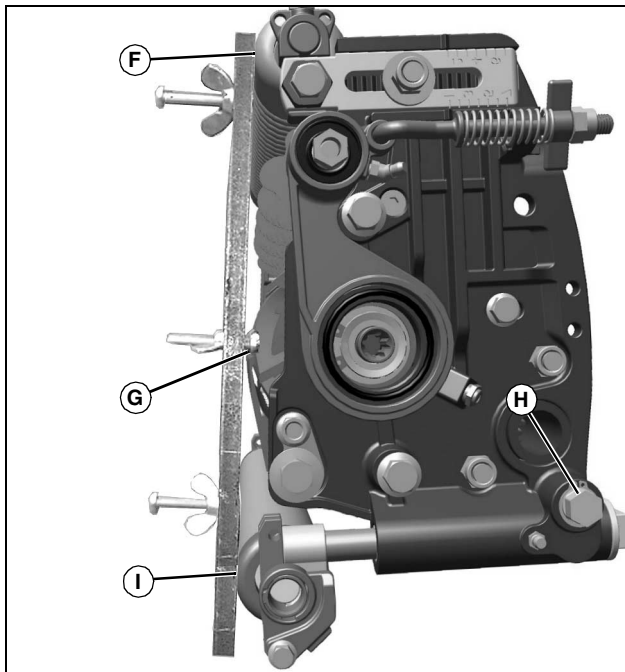
NOTE: Adjusters are connected with cross shaft (B) so turning one side simultaneously turns the other.



M97423, M97422

4. On the height of cut gauge bar, set center adjustment bolt head (C) at the desired height of cut (D). Lock wing nut (E).

NOTE: Effective height of cut could be less than bench setting, based on turf and soil conditions and front roller option.

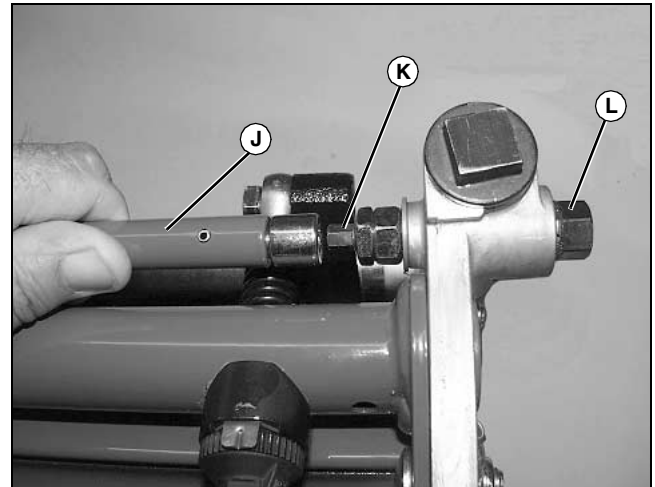


MX42517

5. Rest height of cut gauge bar against front roller (F) approximately 51 mm (2 in.) from either end of the bed knife. Set the inside of the bolt head (G) against the edge of the bed knife.

NOTE: Bottom of screw head on gauge bar should be engaged with cutting edge of bed knife.

6. Turn adjuster (H) to move the rear roller (I) away from gauge bar slightly. Turn adjuster in the opposite direction until the rear roller contacts the height of cut gauge bar. Repeat for the other side of the cutting reel.
7. Check height of cut adjustment setting from side to side.



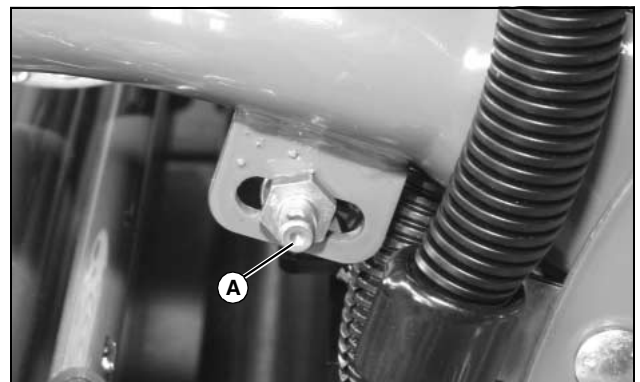
MX41001

8. If side to side height of cut adjustment is necessary, pull against spring tension on cross shaft (J) to disconnect it from hex coupling (K). Remove the cross shaft.
9. Turn the adjuster (L) on the side requiring adjustment to move the rear roller away from the gauge bar slightly. Turn the adjuster in the opposite direction until the side to side height of cut is equal for both. Reinstall the cross shaft.

Install Cutting Unit



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

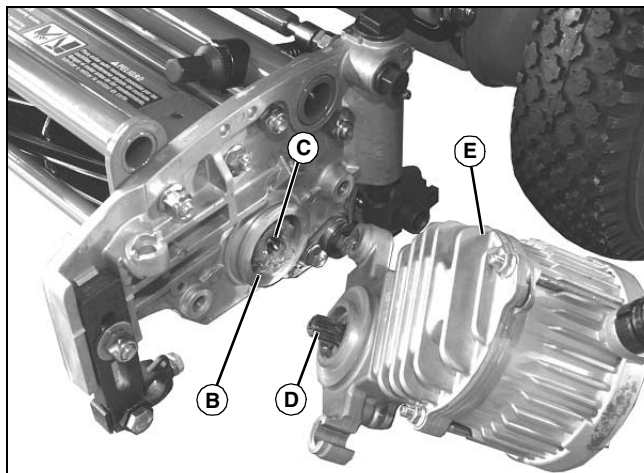


MX42455

1. Install upper chain limit anchor pin (A) in center of slot in

Assembly

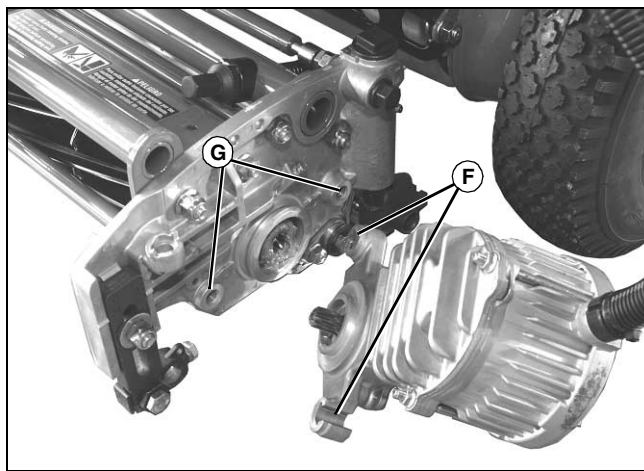
support arm bracket. Rotate anchor pin to provide 90° angle between chain pull direction and spring clip hole and secure with M8 lock nut. Torque lock nut to 34 N•m (25 lb-ft). Repeat for opposite side.



MX42341

2. Inspect inside of cutting unit bearing housing (B) for grease. Add John Deere Golf and Turf Cutting Unit Grease to housing (B) and internal reel splines (C) if additional lubrication is needed.

3. Align splines on drive motor shaft (D) with internal splines (C) on reel. Install drive motor assembly (E) onto the cutting unit.



MX42341

4. Rotate drive motor as required to align slotted holes (F) in housing with threaded holes (G) in cutting unit.

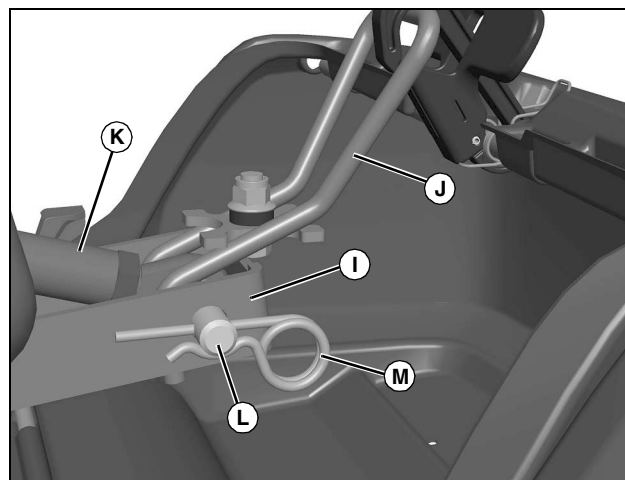


MX42454

5. Install and tighten hex flange head bolts (H).

NOTE: If an optional Greens Tender Conditioner or Rotary Brush is not being installed on this cutting unit, install cutting unit weight kit (see BM22672).

6. Roll cutting unit under machine.



MX51211

Picture Note: Grass catcher basket installed to show proper orientation of basket hanger (J).

7. Align holes in front yoke (I), basket hanger (J), and cutting unit support arm (K).

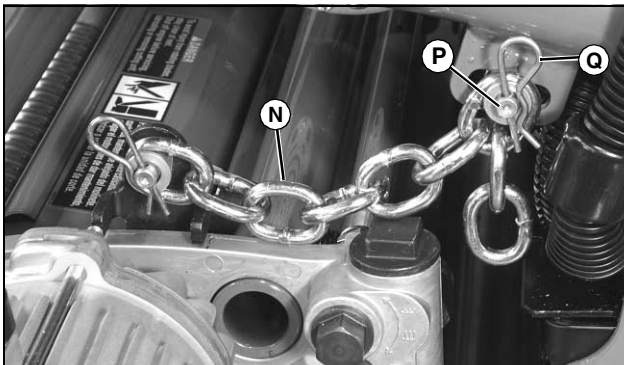
8. Ensure proper orientation of basket hanger (J). Fully insert clevis pin (L) and secure with spring locking pin (M).

Assembly



MX42456

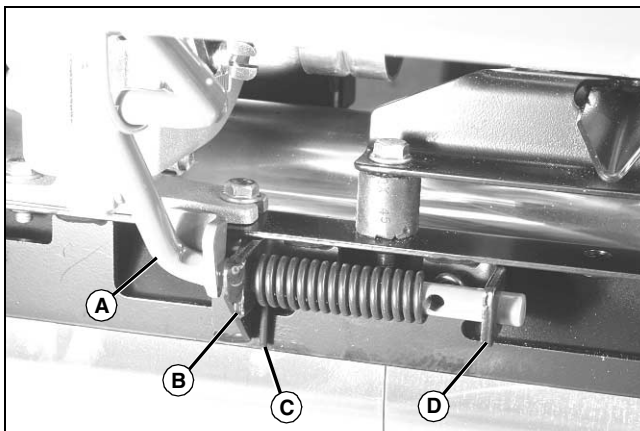
9. Install lift chains (N) on cutting unit housing pins.
10. Install flat washers and spring locking pins (O) on each cutting unit housing pin.



MX42456

11. Ensuring that chain (N) is not kinked, install seventh link of chain to upper chain anchor pin (P) and secure with flat washer and spring locking pin (Q).
12. Lubricate all grease fittings with appropriate lubricants (see Service Lubrication in the Operator's Manual).

Install Kick Stand (Optional)



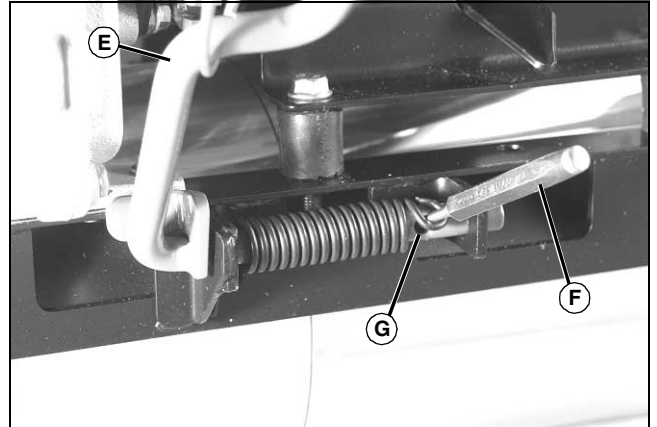
MX42468

1. Install kick stand (A) through left side tab (B) on the rear cross brace support.

2. Install spring on kick stand, with the straight leg (C) pointing down as shown. Push kickstand (A) through right side tab (D).



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

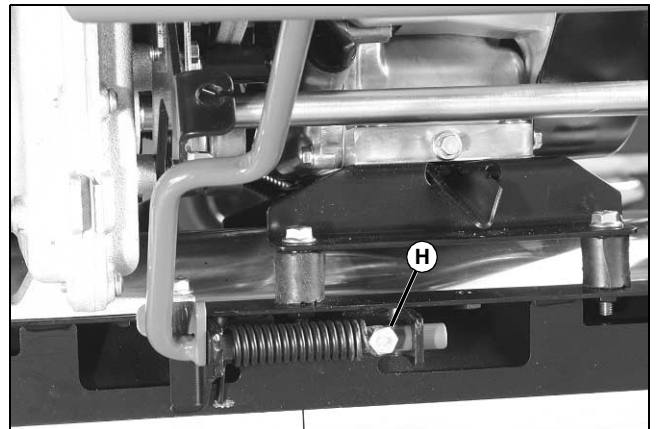


MX42469

3. Temporarily secure kick stand in raised position (E).

NOTE: Using a pin punch (F) as a guide to rotate and position the spring eyelet over the tapped hole (G) may ease installation of the hex head bolt in the following step.

4. Preload the spring by rotating the eyelet 180° over the top of the kickstand shaft and temporarily secure in this position using a vise-grip pliers or other suitable tool.



MX42470

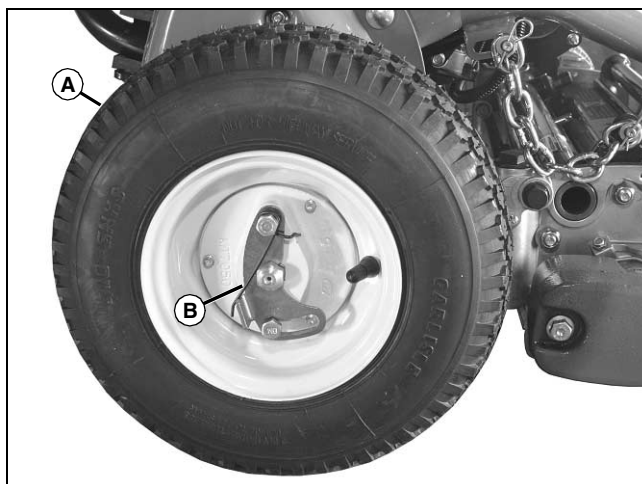
5. Secure the spring to kick stand by installing a M8 X 16 hex head bolt (H) through the spring eyelet into the tapped hole in the kick stand.

6. Release method used to secure kick stand in raised position in earlier step. Kick stand should remain in raised position.

Assembly

Install Transport Wheels (Optional)

1. Raise machine on kick stand.



MX42471

2. Slide transport wheel (A) on axle shaft.
3. Engage lock plate (B) in groove on axle shaft.
4. Repeat previous two steps to install second transport wheel.
5. Lower machine.
6. Adjust tire pressure as required, not exceeding 140 kPa (20 psi).



CAUTION: Avoid injury! Engine exhaust fumes contain carbon monoxide and can cause serious illness or death.

- Move the machine to an outside area before running the engine.
- Do not run an engine in an enclosed area without adequate ventilation.
- Connect a pipe extension to the engine exhaust pipe to direct the exhaust fumes out of the area.
- Allow fresh outside air into the work area to clear the exhaust fumes out.

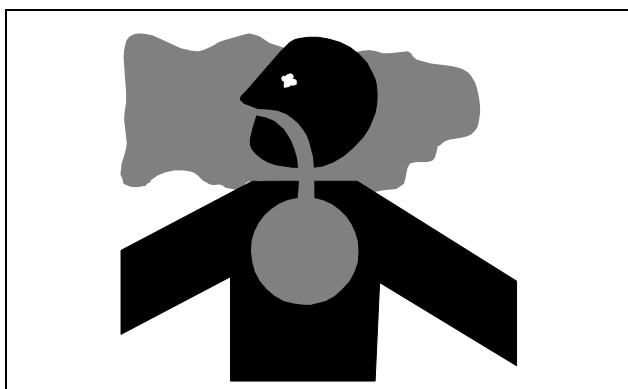
The safety systems installed on your machine should be checked before each machine use. Be sure you have read the machine operator manual and are completely familiar with the operation of the machine before performing these safety system checks.

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 Safety Systems



Testing Run Switch

1. Flip run switch rearward (toward operator) to OFF position.
2. Pull start handle.

Result: Engine should not start.

Testing Park Brake

1. Lock park brake.
2. Run engine at low idle.
3. Engage operator presence bail.
4. Slowly engage travel clutch lever.

Result: Engine should stall with no movement of the mower.

Assembly

Testing Operator Presence Bail

1. Operate machine in clear open area.
2. Release operator presence bail.

Result: Cutting reel should stop rotating and machine should stop moving forward. Engine should continue to run.

Engine Break-In



CAUTION: Avoid injury! Engine exhaust fumes contain carbon monoxide and can cause serious illness or death.

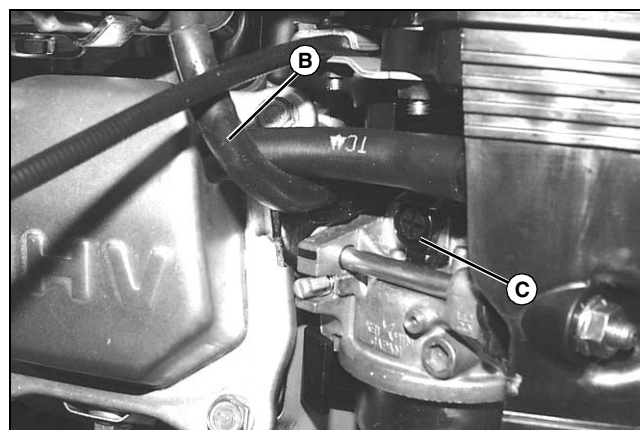
- Move the machine to an outside area before running the engine.
- Do not run an engine in an enclosed area without adequate ventilation.
- Connect a pipe extension to the engine exhaust pipe to direct the exhaust fumes out of the area.
- Allow fresh outside air into the work area to clear the exhaust fumes out.

IMPORTANT: Avoid damage! Break-in engine before using machine.



MX42304

1. Cutting unit PTO switch (A) should be in the disengaged position.
2. Start engine, and allow to run and warm up for 15 minutes at 1/2-3/4 throttle before applying load.
3. Move throttle to slow idle position



MX42808

4. Hold a JT07270 Digital Pulse Tachometer at spark plug lead (B).
5. Adjust slow idle adjustment screw (C) until the engine is running at a slow idle speed of 1700 ± 100 rpm.

Cutting Unit Break-In



CAUTION: Avoid injury! Engine exhaust fumes contain carbon monoxide and can cause serious illness or death.

- Move the machine to an outside area before running the engine.
- Do not run an engine in an enclosed area without adequate ventilation.
- Connect a pipe extension to the engine exhaust pipe to direct the exhaust fumes out of the area.
- Allow fresh outside air into the work area to clear the exhaust fumes out.

IMPORTANT: Avoid damage! Break-in cutting unit before using machine.

NOTE: Complete engine break-in procedure prior to break-in of cutting unit.

1. Remove drive belt from engine pulley (see Service - Belts in the Operator's Manual).
2. Start engine and open throttle fully.

Assembly



3. Release park brake (A) if applied, press operator presence bail (B) against handlebar and place travel clutch lever (C) into engaged position.
4. Place PTO switch (D) in engaged position to run cutting unit.
5. Allow cutting unit to run for 5 minutes, then disengage PTO to stop reel rotation.
6. Reduce throttle, stop engine, release operator presence bail (B) and place travel clutch lever (C) in the disengaged position.
7. Install drive belt on engine pulley.

Pre-Delivery

Check and perform the following on all machines. Complete the Customer Satisfaction Checklist.

1. Lubricate all grease fittings with the appropriate lubricants.
2. Check all fluid levels. Refer to the Operator's Manual as needed for location information.
 - Engine oil.
 - Gear case oil.
 - Fill fuel tank with fresh stabilized fuel to prevent gum and varnish from forming in the fuel system. Use John Deere TY15977 Fuel Stabilizer.
3. Check brake function - at low idle in forward motion, brake engagement should stall engine.
4. Check bed knife to reel adjustment.
5. Check cutting height adjustment.
6. Wash machine to remove dirt and dust. Wax handlebar and pulley covers for scratch protection.
7. Give customer the Operator's Manual and Fuel Stabilizer goodwill packet at delivery. Explain to customer the importance of using the fuel stabilizer. Remind customer to keep fuel stabilizer out of the reach of children.

Specifications

Engine

Engine Model Number Honda, GX 120
Engine Type 4-cycle, 1-cylinder, 25° cylinder incline
Piston Displacement 118 cc (7.2 cu in.)
Direction of Rotation of Output Shaft Counterclockwise viewed from shaft side

Adjustment Specifications

Spark Plug Gap 0.7-0.8 mm (0.028-0.031 in.)
Ignition Coil Air Gap 0.4 ± 0.2 mm (0.016 ± 0.008 in.)
Intake Valve Clearance (cold) 0.15 ± 0.02 mm (0.006 ± 0.001 in.)
Exhaust Valve Clearance (cold) 0.20 ± 0.02 mm (0.008 ± 0.001 in.)
Engine Speed, Low Idle 1700 ± 100 rpm
Engine Speed, High Idle 2950 ± 150 rpm

Fuel System

Fuel Types (Recommended):

..... Regular Grade 87 Octane Unleaded Fuel
..... Ethanol Blended Fuel (Up to 10%)

Fuel Delivery Carburetor

Capacities

Engine Oil 0.6 L (0.63 qt)
Fuel Tank 2.5 L (0.66 gal)
Differential Drive Capacity 0.14 L (0.3 pt)

Travel Speeds

Traveling Device (Maximum Forward Speed)

Roller (Rear) 0-5.5 Km/h (0-3.4 mph)
Transport Wheels 0-7.2 km/h (0-4.5 mph)

Tire Dimensions

Transport Tires 4.1-6 (2 pr.) (Tubeless)
Pressure (Standard Pneumatic) 125-140 kPa (18-20 psi)

Dimensions

Height (With tires installed) 119 cm (47 in.)

Specifications

Length (With tires installed) 94 cm (37 in.)

Width (With tires installed) 94.6 mm (37.3 in.)

Weight

180 E-Cut (Less grass catcher, GTC drive and transport wheels)..... 113 kg (249 lb)

180 E-Cut (With grass catcher; less GTC drive and transport wheels)..... 116 kg (256 lb)

220 E-Cut (Less grass catcher, GTC drive and transport wheels)..... 119 kg (262 lb)

220 E-Cut (With grass catcher; less GTC drive and transport wheels)..... 122.5 kg (270 lb)

Cutting Unit

Options

Gear Drive (Optional) Gear driven from reel shaft;
..... Drives Turf Conditioner or Rotary Turf Brush in opposite spin direction of reel

Greens Tender Conditioner (180 E-Cut) 60 mm (2-3/8 in.) diameter, 57 blades

Greens Tender Conditioner (220 E-Cut) 60 mm (2-3/8 in.) diameter, 75 blades

Material of GTC Cutter Blades..... Special hardened carbon steel star shaped 0.6 mm (1/32 in.)

Rotary Brush (Optional)..... 60 mm (2-3/8 in.) diameter

Adjustable Conditioner or Brush Height .. 0.8 mm (1/32 in.) below HOC max. depth to 5.5 mm (7/32 in.) above cut

Frequency of Clip

11 Blade 4.1-12.2 mm (0.16-0.48 in.)

7 Blade..... 6.4-0.25 mm (0.25-0.75 in.)

Cutting Height (Minimum)

Standard Bed Knife 3.2 mm (0.125 in.)

Optional Tournament Bed Knife 2.8 mm (0.109 in.)

Optional Low-Cut Bed Knife 2.0 mm (0.078 in.)

Cutting Width

180 E-Cut 457 mm (18 in.)

220 E-Cut 559 mm (22 in.)

Traction Drum Dual aluminum traction

Clutches

Transport..... Belt tension

Brush/GTC..... Jaw-type clutch “on/off”

Reel

Diameter 127 mm (5 in.)

Standard Number of Blades 11 blades

Optional Number of Blades 7 blades

Specifications

Sound Measurements

Averaged Sound Level at Work Station According to EN836-A2:

180 E-Cut Hybrid Walk Greens Mower	79 +/-1 dB(A) at 2740 r/min engine speed
220 E-Cut Hybrid Walk Greens Mower	79 +/-1 dB(A) at 2740 r/min engine speed

Vibration Measurements

Hand/Arm Measured Per EN836-A2

180 E-Cut Hybrid Walk Greens Mower	4.2 +/-0.1 m/s ² at 3000 r/min engine speed
220 E-Cut Hybrid Walk Greens Mower	4.2 +/-0.1 m/s ² at 3000 r/min engine speed

Miscellaneous

Park Brake	Band type brake, lever action
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Recommended Lubricants

Engine Oil	John Deere Plus-4™
Gear Case Oil	John Deere Hy-Gard™
Grease	See Service Lubrication Section

(Specifications and design subject to change without notice.)

Declaration of Conformity

EC Declaration of Conformity

Deere & Company

Moline, Illinois U.S.A.

The person named below declares that

Machine Type: E-Cut Hybrid Walk Greens Mower (WBGM)
Model: 180E
Serial Number: See Product Identification Page

fulfills all relevant provisions and essential requirements of the following directives:

DIRECTIVE	NUMBER	CERTIFICATION METHOD
Machinery Directive	98/37/EC (Until Dec. 28, 2009)	Self-Certification
Machinery Directive	2006/42/EC	Self-Certification
Electromagnetic Compatibility Directive	2004/108/EC	Self-Certification
Noise Directive	2000/14/EC (Annex VI, Procedure 2)	Third-Party Certification
		NOTIFIED BODY
Measured Sound Power Level		AV Technology Limited
180 E-Cut Hybrid	91.0 dB(A)	AVTECH House, Arkle Avenue
Guaranteed Sound Power Level		Stanley Green Trading Estate
180 E-Cut Hybrid	98 dB(A)	Handforth Cheshire
		SK9 3RW United Kingdom

Name and address of the person in the community authorized to compile the technical construction file:

Brigitte Birk
Deere & Company European Office
John Deere Strasse 70
Mannheim, Germany D-68163
EUConformity@JohnDeere.com

Signed:



The image shows a handwritten signature in black ink, which appears to read 'Elizabeth M. Harris', enclosed within a rectangular border.

Place of declaration: John Deere Turf Care

Name: Elizabeth M. Harris

Date of declaration: 1 February 2012

Title: Sr. Product Safety & Compliance Engineer

Manufacturing unit: John Deere Horicon Works

Declaration of Conformity

EC Declaration of Conformity

Deere & Company

Moline, Illinois U.S.A.

The person named below declares that

Machine Type: E-Cut Hybrid Walk Greens Mower (WBGM)
Model: 220E
Serial Number: See Product Identification Page

fulfills all relevant provisions and essential requirements of the following directives:

DIRECTIVE	NUMBER	CERTIFICATION METHOD
Machinery Directive	98/37/EC (Until Dec. 28, 2009)	Self-Certification
Machinery Directive	2006/42/EC	Self-Certification
Electromagnetic Compatibility Directive	2004/108/EC	Self-Certification
Noise Directive	2000/14/EC (Annex VI, Procedure 2)	Third-Party Certification
		NOTIFIED BODY
Measured Sound Power Level		AV Technology Limited
220 E-Cut Hybrid	91.0 dB(A)	AVTECH House, Arkle Avenue
Guaranteed Sound Power Level		Stanley Green Trading Estate
220 E-Cut Hybrid	98 dB(A)	Handforth Cheshire
		SK9 3RW United Kingdom

Name and address of the person in the community authorized to compile the technical construction file:

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The image shows a handwritten signature in black ink, which appears to read 'Elizabeth M. Harris', enclosed within a rectangular border.

Place of declaration: John Deere Turf Care

Name: Elizabeth M. Harris

Date of declaration: 1 February 2012

Title: Sr. Product Safety & Compliance Engineer

Manufacturing unit: John Deere Horicon Works

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Service Statement

John Deere Parts



We help minimize downtime by putting genuine John Deere parts in your hands in a hurry.

That's why we maintain a large and varied inventory - to stay a jump ahead of your needs.

Well-Trained Technicians



School is never out for John Deere service technicians.

Training schools are held regularly to be sure our personnel know your equipment and how to maintain it.

Result? - Experience you can count on!

The Right Tools



Precision tools and testing equipment enable our Service Department to locate and correct troubles quickly... to save you time and money.

Prompt Service



Our goal is to provide prompt, efficient care when you want it and where you want it.

We can make repairs at your place or at ours, depending on the circumstances: see us, depend on us.

JOHN DEERE SERVICE SUPERIORITY: We'll be around when you need us.

Service Record

Record Service Dates

Oil Change	Oil Filter Change (If Equipped)	Lubricate Machine	Air Cleaner Element Check/Clean	Fuel Filter Change