



Wide Area Mower 1600 Series III Turbo

(Serial No. 650001 -)



JOHN DEERE



OPERATOR'S MANUAL

Wide Area Mower 1600 Series III Turbo

OMUC24763 ISSUE J9 (ENGLISH)



John Deere Turf Care

Export Edition
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.

MX00654,000020B-19-10MAY17

Professional Use Only

This non-road mobile machinery is to be made available exclusively for professional use.

MK71445,0000004-19-29AUG18

Emissions Performance and Tampering

Operation and Maintenance

The engine, including the emissions control system, shall be operated, used, and maintained in accordance with the instructions provided in this manual to maintain the emissions performance of the engine within the requirements applicable to the engine's category/certification.

Tampering

No deliberate tampering with or misuse of the engine emissions control system shall take place; in particular with regard to deactivating or not maintaining an exhaust gas recirculation (EGR) or a DEF dosing system. Tampering with an engine's emissions control system will void the European Union (EU) type approval and applicable emissions-related warranties.

DX,EMISSIONS,PERFORM-19-12JAN18

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 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 that 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.

MX00654,000020C-19-05JUN17

Machine Use

This machine is designed as a traction unit, with the intended use as a multi-purpose implement carrier, in the application of primarily customary lawn and turf mowing operations, and highway maintenance, and winter work. 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.

OUMX068,0000307-19-05OCT13

Special Messages

Your manual contains special messages to bring attention to potential safety concerns and 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.**

Introduction

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.

MX00654,000020D-19-05JUN17

Attachments for Your Machine

There is a John Deere attachment or kit to make your new machine perform more tasks or be more versatile, whether your machine is a lawn tractor, compact utility tractor, or a utility vehicle.

You can check out the entire line of attachments for your machine at JohnDeere.com or ask your John Deere dealer. From aerators to electric lift kits to tillers, there is a John Deere attachment or kit to fill every need.

OUMX068,000051C-19-05JUN17

Service Literature

If you would like to purchase a copy of the Parts Catalog or Technical Manual for this machine, visit The John Deere Technical Information Store at:

https://techpubs.deere.com/?cid=VURL_TechInfoStore

or call:

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

TH84124,0000199-19-15AUG17

Parts

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

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

Order Service Parts Online

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

TC00531,00000E9-19-06MAR15

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Original Instructions. All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

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Product Identification

Record Identification Numbers

Wide Area Mower 1600 Turbo PIN (650001-)

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

You will need to locate the identification numbers for the product. Record the information in the spaces provided below.

DATE OF PURCHASE:

DEALER NAME:

DEALER PHONE:



TCT015184—UN—16MAR17

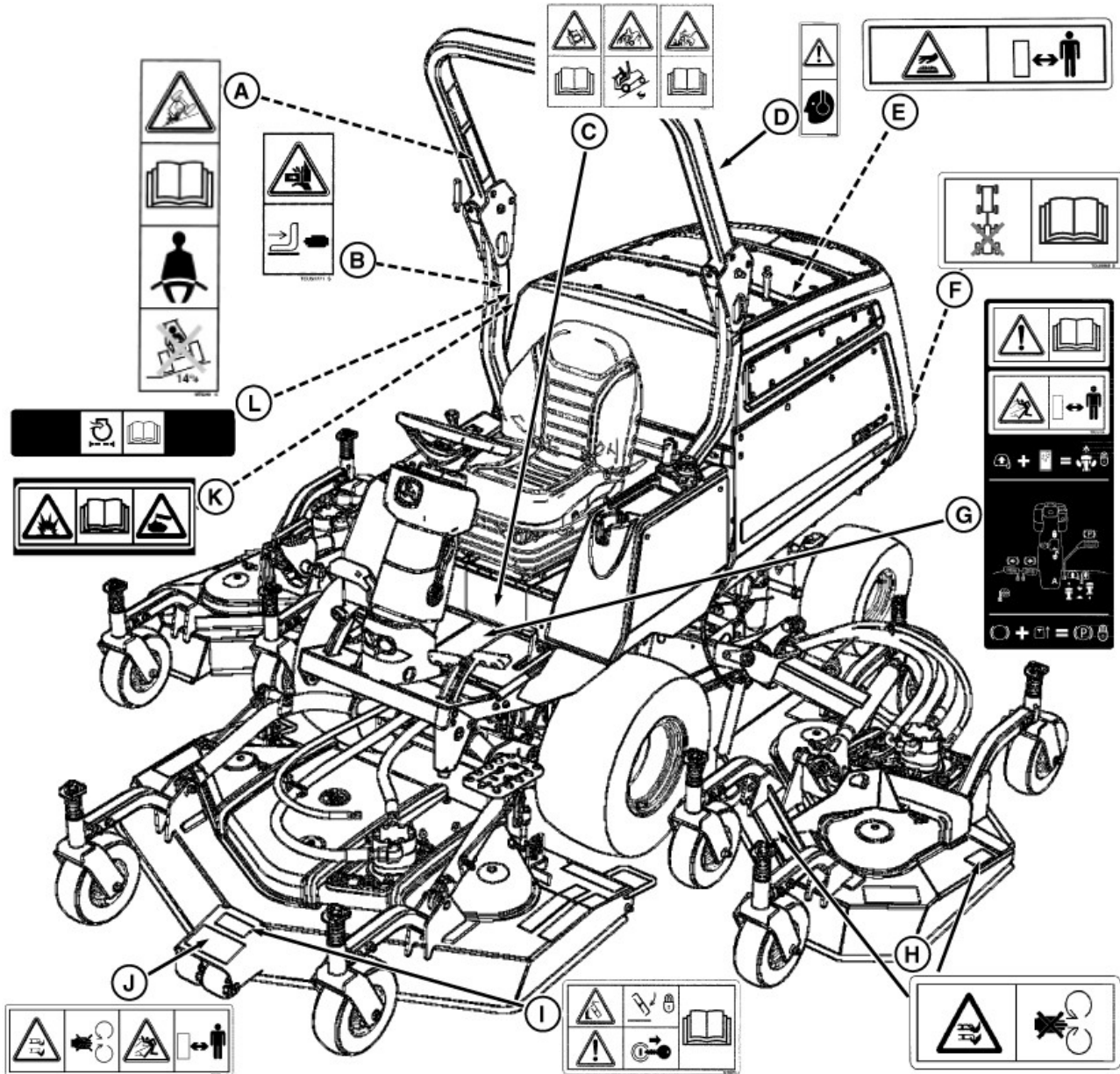
PRODUCT IDENTIFICATION NUMBER (A):

ENGINE SERIAL NUMBER (B):

MX00654,0000230-19-24SEP19

Safety Labels without Text

Safety Label Location



TCT016789—UN—01NOV18

- A—Avoid Injury from Tipping MT6349
- B—Avoid Injury from Pinch Point TCU51771
- C—Avoid Injury from Transporting TCU51737
- D—Avoid Injury From Exposure to Loud Noise TCU27739
- E—Hot Surface M137684
- F—Read Operator's Manual, Avoid Damage From Towing With Bumper TCU25655
- G—Read Operator's Manual, Avoid Injury From Thrown Objects TCU16115

- H—Avoid Injury From Rotating Blades M118041
- I—Avoid Injury From Driven Parts M139475
- J—Avoid Injury From Rotating Blades and Thrown Objects M118040
- K—Read Operator's Manual, Avoid Injury From Explosive Gases and Corrosive Liquids MT6350
- L—Avoid Engine Damage MT6351

OUO2004,00005DB-19-01NOV18

Safety Labels without Text

Understanding the Machine Safety Labels without Text



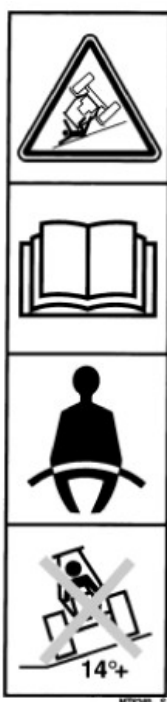
TCT005498—UN—11SEP12

At several important places on this machine, safety signs are affixed which signify potential danger. The hazard is identified by a pictorial in a warning triangle. An adjacent pictorial provides information on how to avoid personal injury. These safety signs, their placement on the machine, and a brief explanatory text are shown in this Safety section.

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

MX00654,0000389-19-21JUN18

Avoid Injury From Tipping

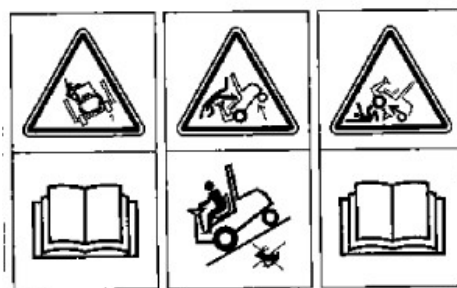


TCT008746—UN—17SEP13

- Do not drive where machine could slip or tip. Do not jump from machine.
- Read Operator's Manual before operating machine.
- To avoid injury from crushing always wear seat belt.
- Do not drive on a slope with more than a 14° incline.

OUO2004,00005DF-19-18SEP13

Avoid Injury From Transporting



TCT008749—UN—17SEP13

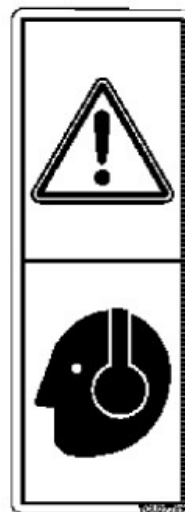
To avoid injury while transporting, keep front attachment low and avoid sharp turns with side attachments in transport position.

To avoid injury, avoid quick stops and reduce speed on slopes.

All wheels drive. To avoid injury from crushing, do not operate with only one axle raised.

OUO2004,00005E6-19-18SEP13

Avoid Injury from Exposure to Loud Noise



TCT008750—UN—17SEP13

- Prolonged exposure to loud noises can cause impairment or loss of hearing.
- Wear suitable hearing protection.

OUO2004,00005E7-19-14OCT15

Hot Surface



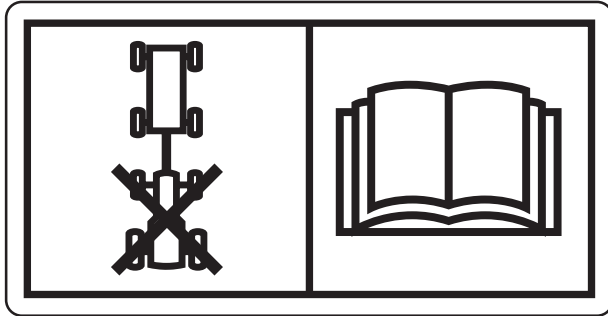
TCT008751—UN—17SEP13

Hot surface

OUO2004,00005E0-19-18SEP13

Safety Labels without Text

Read Operator's Manual, Do Not Tow or Secure With Bumper



TCT015309—UN—21MAR17

- Do not tow or secure with bumper.
- Damage will occur.
- Read Operator's Manual.

MX52301,0001388-19-21MAR17

- Use seat belt unless machine is operated without ROPS
- Before leaving machine:
 - Stop engine
 - Set park brake
 - Remove key

OUC02004,00005E3-19-14OCT15

Avoid Injury From Rotating Blades



TCT008757—UN—17SEP13

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

OUC02004,00005EB-19-18SEP13

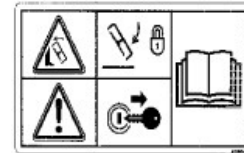
Read Operator's Manual, Avoid Injury From Thrown Objects



TCT008756—UN—17SEP13

- Operator training required
- Read operator's manual
- Know all controls
- Keep shields in place
- Maintain all safety devices
- Look behind before backing
- Keep people a safe distance away
- Stay clear of power driven parts
- Do not operate where machine could tip
- Never carry riders
- Roll-over protection structure (ROPS) should be installed unless prohibited by low clearance operation

Avoid Injury Keep Shields In Place



TCT008759—UN—17SEP13

Avoid Injury

- Do not operate mower with shields removed.
- Keep hands and feet away from mower deck when engine is running.
- Remove ignition key before leaving mower.
- Blades are sharp, use caution when deck is raised.
- Read, understand, and follow all instructions in the operator's manual.

Before Servicing

- Lower or secure mower in raised position with service lock.
- Shut off engine and remove ignition key before performing service.

OUC02004,00005ED-19-14OCT15

Avoid Injury From Rotating Blades And Thrown Objects



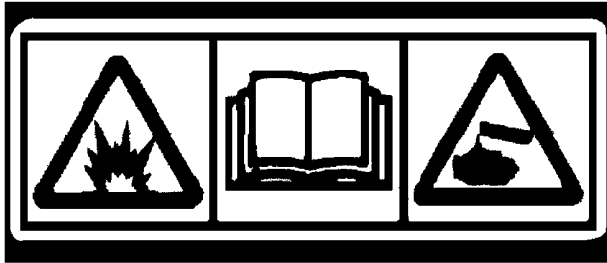
TCT008754—UN—17SEP13

Safety Labels without Text

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

OUO2004,00005F2-19-18SEP13

Read Operator's Manual, Avoid Injury From Explosive Gases and Corrosive Liquids

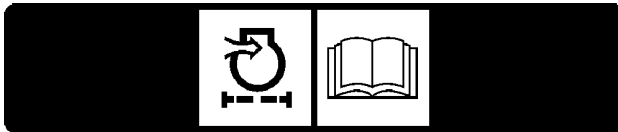


TCT015310—UN—21MAR17

- Do not smoke or have open flame near battery.
- Wear eye protection and gloves.
- Always shield eyes and face from battery.
- Do not charge or use booster cables or adjust post connections without proper instruction and training.
- Keep vent caps tight and level.

MX52301,0001389-19-21MAR17

Avoid Engine Damage



TCT015311—UN—21MAR17

- Do not use starting fluid
- Service air cleaner only when gauge reaches red line

MX52301,000138A-19-21MAR17

Avoid Injury from Pinch Point



TCU51771 S

TCT008758—UN—17SEP13

Hands or fingers may be pinched when lowering seat. Keep hands and fingers away from back of seat when lowering.

OUO2004,00005F1-19-14OCT15

Safety

Operator Training Required

- Read the operator's manual, attachment manuals, and other training material carefully. If the operator or mechanic cannot read English, it is the responsibility of the owner to explain this material to them. This publication is available in other languages.
- Become familiar with the safe operation of the equipment, operator controls, and safety signs.
- All operators and mechanics should be trained. The owner of the machine is responsible for training the users.
- Age, physical ability, and mental capacity can be factors in equipment-related injuries. Operators must be mentally and physically capable of operating the machine properly and safely.
- Never let children or untrained people operate or service the equipment. Local regulations may restrict the age of the operator.
- The owner/user can prevent and is responsible for accidents or injuries occurring to themselves, other people, or property.
- Operate the machine in an open, unobstructed area under the direction of an experienced operator.
- Test drive area with attachment lowered, if equipped, but not running. Slow down when you travel over rough ground.

OUO1082,000657E-19-15MAY18

Preparation

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

OUO1082,000657F-19-15MAY18

Operating Safely

- Never run an engine in an enclosed area where dangerous carbon monoxide fumes can collect.
- Only operate in good light, keeping away from holes, and hidden hazards.
- Be sure that all drives are in neutral and parking brake is engaged before starting engine. Only start engine from the operator's position. Use seat belts if provided.
- Slow down and use extra care on hillsides. Be sure to travel in the recommended direction on hillsides. For this machine, drive up and down hillsides, not across. Turf conditions can affect the machine's stability. Use caution while operating near drop-offs.
- Slow down and use caution when making turns and when changing directions on slopes.
- Never raise cutting units with reels rotating or deck with the blades running.
- Never operate without PTO shield or other guards securely in place. Be sure that all interlocks are attached, adjusted properly, and functioning properly.
- If equipped with a mower deck, never operate with the discharge deflector raised, removed, or altered, unless using a grass catcher. Do not operate mower without discharge chute or entire grass catcher in place.
- Do not change the engine governor setting or overspeed the engine. Operating the engine at excessive speed can increase the hazard of personal injury.
- Stop on level ground, lower implements, disengage drives, engage parking brake, and shut off engine before leaving the operator's position for any reason including emptying the grass catchers, clearing blockages or unclogging discharge chutes.
- Stop equipment and inspect blades or reels after striking objects or if an abnormal vibration occurs. Make necessary repairs before resuming operations.
- Keep hands and feet away from the cutting units.
- Look behind and down before backing up to be sure of a clear path.
- Never carry passengers and keep pets and bystanders away.
- Slow down and use caution when making turns and crossing roads and sidewalks. Stop blades or reels if not mowing. Watch for traffic when operating near or crossing roadways.
- If equipped with a mower deck, be aware of the mower discharge direction and do not point it at anyone.
- Do not operate the machine while under the influence of alcohol or drugs.
- Use care when loading or unloading the machine into or off of a trailer or truck.
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

Safety

- Inspect machine before you operate. Be sure that hardware is tight. Repair or replace damaged, badly worn, or missing parts. Be sure that guards and shields are in good condition and fastened in place. Make any necessary adjustments before you operate.
- If equipped with a mower deck, before using, always visually inspect to see that the blades, blade bolts and the mower assembly are not worn and damaged. To preserve balance replace worn and damaged blades and bolts in sets.
- Keep safety labels visible when installing accessories and attachments.
- Do not wear radio or music headphones. Safe service and operation require your full attention.
- When machine is left unattended, stored, or parked, lower the cutting units or mower deck unless a positive mechanical lock is used.
- 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.
- Clean grass and debris from cutting units, drives, mufflers, and engine to help prevent fires. Clean up oil or fuel spillage.
- 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.
- Park machine on level ground. Never allow untrained personnel to service machine. Understand service procedure before doing work.
- Use jack stands or lock service latches to support components when required. Securely support any machine elements that must be raised for service work.

TH84124,0000165-19-29SEP15

Using a Spark Arrestor

The California Public Resources Code, Section 4442.5 provides as follows:

No person shall sell, offer for sale, lease, or rent to any person any internal combustion engine subject to Section 4442 or 4443, and not subject to Section 13005 of the Health and Safety Code, unless the person provides a written notice to the purchaser or bailee, at the time of sale or at the time of entering into the lease or rental contract, stating that it is a violation of Section 4442 or 4443 to use or operate the engine on any forest-covered, brush-covered, or grass-covered land unless the engine is equipped with a spark arrestor, as defined in Section 4442, maintained in effective working order or the engine is constructed, equipped, and maintained for the prevention of fire pursuant to Section 4443. Cal. Pub. Res. Code 4442.5.

Other states or jurisdictions may have similar laws. A spark arrestor for your machine may be available from your authorized dealer. An installed spark arrestor must be maintained in good working order by the operator.

OUC2005,0000213-19-05JUL17

Maintenance and Storage



TCT005713—UN—01FEB14

- Never operate machine in a closed area where dangerous carbon monoxide fumes can collect.
- If equipped with mower decks, keep all nuts and bolts tight, especially blade attachment bolts, to be sure the equipment is in safe working condition.
- Check brake operation frequently. Adjust and service as required.
- On multi-bladed machines, take care as rotating one blade or reel can cause other blades or reels to rotate.
- If equipped with reel mowers, be careful during adjustment of the machine to prevent entrapment of

Safety

the fingers between moving blades and fixed parts of the machine.

TH84124,0000173-19-12SEP12

Checking Mowing Area



MXAL41932—UN—22MAY13

- Clear mowing area of objects that might be thrown. Keep people and pets out of mowing area.
- Low-hanging branches and similar obstacles can injure the operator or interfere with mowing operation. Before mowing, identify potential obstacles, such as low-hanging branches, and trim or remove those obstacles.
- Study mowing area. Set up a safe mowing pattern. Do not mow where traction or stability is doubtful.
- Test drive area with mower lowered (if equipped) but not running. Slow down when you travel over rough ground.
- Survey all mowing sites to determine which slopes are safe for machine operation and which slopes should be maintained through other maintenance techniques.

MP47322,00F4617-19-05JUL17

Parking Safely

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

OOU02004,0000612-19-20SEP13

Rotating Blades Are Dangerous



TCT012793—UN—06JUL15

- Rotating cutting units 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 units when engine is running.
- Be alert at all times, drive forward and in reverse carefully. People, especially children can move quickly into the mowing area before you know it.
- Before backing up, stop cutting units and look down and behind the machine carefully, especially for children.
- Do not mow in reverse.
- Shut off cutting units when you are not mowing.
- Park machine safely before leaving the operator's station for any reason including emptying the grass catchers or unplugging the chute, if equipped.
- Keep all parts of the body away from the cutting edges. Residual hydraulic pressure or other stored energy source in the system can cause cutting unit rotation when the blockage is released.
- If applicable, use a long-handled brush when applying reel sharpening compound.
- Keep bystanders away from cutting units when adjusting or servicing.
- Always wear gloves when manually rotating cutting units.
- Manually rotating one cutting unit can cause another to rotate if operated hydraulically.
- The cutting unit should stop in approximately five seconds when disengaged. If you believe that your cutting units may not be stopping in that period of time, take your machine to your authorized dealer where they can safely check and service your machine.

OOU02005,0000216-19-15JUL15

Protect Children

- Death or serious injury can occur when young children associate having fun with a lawn mowing machine simply because someone has given them a ride on a machine.
- Children are attracted to lawn mowing machines and mowing activities. They don't understand the dangers

Safety

of rotating blades or the fact that the operator is unaware of their presence.

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

OUO2005.0000217-19-05FEB13

Avoid Tipping



TCAL42360—UN—08MAR13

Identify Slopes for Safe Operation

- Establish your own special procedures and rules for operating on slopes. These procedure must include a survey of all mowing sites to determine which slopes are safe for machine operation. Always use common sense and good judgement when performing this survey.
- Lay a straight piece of sturdy lumber 1.2 m (4 ft) long on the slope and measure the angle of the slope with an angle indicator or protractor level.
- Never mow or operate machine on slope angles greater than 25°.
- Exceeding the maximum recommended slope angle of 25° increases the risk of rollover accidents that can result in serious injury or death.
- Always consider potential turf conditions and slope angles when determining the risk of loss-of-control and tip-over accidents.
- On slope angles of 15° or less the risk of rollover is low, but as the slope angle increases to the John

Deere recommended maximum of 25° the risk increases to a moderate level.

Operate Safely on Slopes

- Slopes are a major factor related to loss-of-control and tip-over accidents, which can result in severe injury or death. Operation on all slopes requires extra caution.
- Use lower speeds while mowing and operating on slopes.
- If you feel uneasy on a hillside, do not mow it.
- Mow up and down slopes, not across.
- Watch for holes, ruts, bumps, rocks, or other hidden objects. Uneven terrain could overturn the machine. Tall grass can hide obstacles.
- Choose a low ground speed so you will not have to stop or shift while on a slope.
- Rollover can occur before the tires lose traction.
- Use caution if mowing when grass is wet or slippery. Tires may lose traction. Tires may lose traction or slip on slopes even though the brakes are functioning properly.
- Avoid starting, stopping or turning on a slope. If the tires lose traction, disengage the cutting units and proceed slowly, straight down the slope.
- Keep all movement on slopes slow and gradual. Do not make sudden changes in speed or direction, which could cause the machine to roll over.
- Do not mow near drop-offs, ditches, embankments, or bodies of water. The machine could suddenly roll over if a wheel goes over the edge or the edge caves in. Leave a safety area between the machine and any hazard.
- Drive machine very slowly and avoid quick stops when cutting units are removed.
- Keep cutting units lowered to ground while operating on slopes. Raising cutting units while operating on slopes can cause machine to become unstable.
- Transport machine with cutting units lowered to improve stability.

OUO2005.0000218-19-06JUN18

Use Seat Belt Properly



TCAL42361—UN—08MAR13

- Use a seat belt when you operate with a Roll-Over Protective Structure (ROPS) to minimize chance of injury from an accident, such as an overturn.
- Do not use a seat belt if operating with an optional folding ROPS in the folded position. Return the

Safety

folding ROPS to the upright position as soon as possible.

- Never modify, disassemble or attempt to repair the seat belt.
- Replace entire seat belt if mounting hardware, buckle, belt, or retractor show signs of damage.
- Inspect seat belt and mounting hardware at least once a year. Look for signs of loose hardware or belt damage, such as cuts, fraying, extreme or unusual wear, discoloration, or abrasion. Replace only with John Deere-approved replacement parts.
- Layers of heavy clothing can interfere with proper positioning of the seat belt and can reduce the effectiveness of the seat belt.

OUO2004,0000616-19-20SEP13

Rollover Protection System (ROPS) - Use and Maintenance

- Conforms to ISO21299:2009 for energy absorbing ROPs requirements.
- Never operate the machine without the ROPS installed.
- DO NOT remove the ROPS.
- The ROPS is an integral and effective safety device. Keep a folding ROPS in the raised and locked position and use the seat belt when operating the machine.
- Lower a folding ROPS temporarily only when absolutely necessary. Do not wear the seat belt when folded down.
- Be aware there is no rollover protection when a folded ROPS is in the down position.
- Be certain that the seat belt can be released quickly in the event of an emergency.
- Check the area to be mowed and never fold down a folding ROPS in areas where there are slopes, drop offs, ditches or embankments or bodies of water.
- Check carefully for overhead clearances (i.e. branches, doorways, electrical wires) before driving under any objects and do not contact them.
- Keep the ROPS in safe operating condition by periodically thoroughly inspecting for damage and keeping all mounting hardware tight. Make certain all parts of the ROPS are installed correctly if the ROPS structure is loosened or removed for any reason. All ROPS hardware should be tightened to the proper torque per manufacturer's recommendations.
- Replace a damaged ROPS. Do not repair or revise. The protection provided by the ROPS will be impaired if the ROPS is subjected to structural damage, is involved in an overturn incident, or is in any way altered by welding, bending, drilling, or cutting. It must be replaced to maintain the manufacturer's certification of the structure

- Any alteration of ROPS must be approved by manufacturer.
- The seat is part of the ROPS safety zone. Replace only with John Deere-approved seat.

BB87125,00011CF-19-01NOV18

Towing Loads Safely

- Stopping distance increases with speed and weight of towed load. Travel slowly and allow extra time and distance to stop.
- Total towed weight must not exceed combined weight of pulling machine, ballast and operator. Use counterweights or wheel weights as described in the attachment or pulling machine operator's manual.
- Excessive towed load can cause loss of traction and loss of control on slopes. Reduce towed weight when operating on slopes.
- Never allow children or others in or on towed equipment.
- Use only approved hitches. Tow only with a machine that has a hitch designed for towing. Do not attach towed equipment except at the approved hitch point.
- Follow the manufacturer's recommendations for weight limits for towed equipment and towing on slopes.
- If you cannot back up a slope with a towed load, the slope is too steep to operate on with the towed load. Reduce the towed load or do not operate.
- Do not turn sharply. Use additional caution when turning or operating under adverse surface conditions. Use care when reversing.
- Do not shift to neutral and coast downhill.

OUO2004,0000616-19-20SEP13

Stay Clear of Rotating Drivelines



TCAL41687—UN—21JAN13

Entanglement in rotating driveline can cause serious injury or death.

- Wear close fitting clothing.
- Stop the engine and be sure PTO driveline is stopped before getting near it.

OUO2004,0000616-19-20SEP13

Safety

Keep Riders Off

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

OUC02005,000021B-19-05FEB13

Driving Safely on Public Roads

Avoid personal injury or death resulting from a collision with another vehicle on public roads:

- Use safety lights and devices. Slow moving machines when driven on public roads are hard to see, especially at night.
- Whenever driving on public roads, use flashing warning lights and turn signals according to local regulations. Extra flashing warning lights may need to be installed.

OUC02005,000021C-19-05FEB13

Checking Wheel Hardware

- A serious accident could occur causing serious injury if wheel hardware is not tight.
- Check wheel hardware tightness often during the first 100 hours of operation.
- Wheel hardware must be tightened to specified torque using the proper procedure anytime it is loosened.

OUC02005,000021D-19-05FEB13

Wear Appropriate Clothing



TCT015572—UN—24MAY18

- 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.

TC00531,000021E-19-17MAY18

Avoid High Pressure Fluids



TCAL25960—UN—24MAY12

- Hydraulic hoses and lines can fail due to physical damage, kinks, age, and exposure. Check hoses and lines regularly. Replace damaged hoses and lines.
- Hydraulic fluid connections can loosen due to physical damage and vibration. Check connections regularly. Tighten loose connections.
- Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.
- Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.
- If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A. Information may be obtained in the United States and Canada only by calling 1-800-822-8262.

OUC02005,0000220-19-05FEB13

Prevent Fires

- Please review these recommendations with all operators. See your John Deere dealer with questions.
- Always follow all safety procedures posted on the machine and in this operator's manual. Before carrying out any inspection or cleaning, always shut off engine, set parking brake, and remove ignition key.
- Besides routine maintenance, one of the best ways to keep your John Deere equipment running efficiently and to reduce fire risk is to regularly remove debris buildup from the machine.
- After operating, allow machine to cool in an open area before cleaning or storing. Do not park machine near flammable materials, such as wood, cloth, or chemicals, or near an open flame or other sources of ignition, such as a water heater or furnace.
- Completely remove any combustible materials from

Safety

equipment before storing by emptying any grass catcher bags, containers, and cargo boxes.

- Debris can accumulate anywhere on the machine, especially on horizontal surfaces. Remove grass and debris completely from engine compartment, muffler area, and from the mower deck or cutting units both before and after operating machine. Additional cleaning may be necessary when mowing or mulching in dry conditions.
- In addition to cleaning machine before using and storing, keeping engine area clean provides the greatest impact on fire prevention. Other areas requiring regular inspection and cleaning include behind wheel rims, wire harness, hose or line routing, mowing attachments, etc. Compressed air, leaf blowers, or water assists in keeping these areas clean.
- Frequency of these inspections and cleaning will vary depending on a number of factors, including operating conditions, machine configuration, operating speeds, and weather conditions (particularly dry, hot, and windy conditions). When you are operating in these conditions, inspect and clean these areas frequently throughout the day.
- Excess lubrication or fuel/oil leaks or spills on the machine can also serve as collection sites for debris. Prompt machine repair and oil and fuel clean-up reduces the potential for debris collection.
- Bearing failures or overheating can result in a fire. To reduce this risk, always follow the instructions in the machine operator's manual regarding lubrication intervals and locations. Contact your local dealer if you have any questions about the lubrication intervals or location and if any unusual noises are coming from areas where bearings might be located. Washing the machine while warm may also reduce bearing life and increase potential for premature bearing failure.
- Always shut off fuel when storing or transporting machine, if the machine has a fuel shutoff.
- Check fuel lines, tank, cap, and fittings frequently for cracks or leaks. Replace if necessary.

OUO2005.0000221-19-27MAR19

Tire Safety



TCAL25965—UN—24MAY12

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

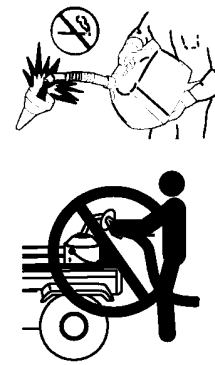
- Do not attempt to mount a tire without the proper equipment and experience to perform the job.
- Always maintain the correct tire pressure. Do not

inflate the tires above the recommended pressure. Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion. Welding can structurally weaken or deform the wheel.

- When inflating tires, use a clip-on chuck and extension hose long enough to allow you to stand to one side and NOT in front of or over the tire assembly.
- Check tires for low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.

OUO2005.0000222-19-10MAY17

Handling Fuel Safely



MXAL41938—UN—18FEB13

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 an approved fuel container. Use only non-metal, portable fuel containers approved by the Underwriter's Laboratory (U.L.) or the American Society for Testing & Materials (ASTM). 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.

Safety

- 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.

OUO2005,0000223-19-12OCT16

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.
- A Safety Data Sheet (SDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques. The seller of the chemical products used with your machine is responsible for providing the SDS for that product.

OUO2005,0000224-19-11OCT18

Machine Cleanout

General Cleaning Guidelines

Machine must be inspected periodically throughout the day. Buildup of debris must be removed to ensure proper machine function and to reduce the risk of fire. Frequency of these inspections and cleanings vary depending on a number of factors including operating conditions, machine configuration, operating speeds, and weather conditions. Inspections and cleanings may be required multiple times throughout the day particularly in dry, hot, and windy conditions.

IMPORTANT: Regular and thorough cleaning of machine combined with other routine maintenance procedures listed in the Operator's Manual greatly reduce the risk of fire, downtime and improve machine performance.

Besides proper maintenance the condition of the material being handled is the most significant factor contributing to fires. Dry, light and fluffy materials that can create a dust cloud are the most likely to catch fire. Debris can accumulate in various areas especially on horizontal surfaces. Conditions such as wind speed and direction can change where the material accumulates. Be aware of these changing conditions and adjust your cleaning schedule and practices to ensure proper machine function and to reduce the risk of fire.

Always follow all safety procedures posted on the machine and in the Operator's Manual. Before carrying out any inspection or cleaning, always shut OFF engine, set parking brake and remove key.

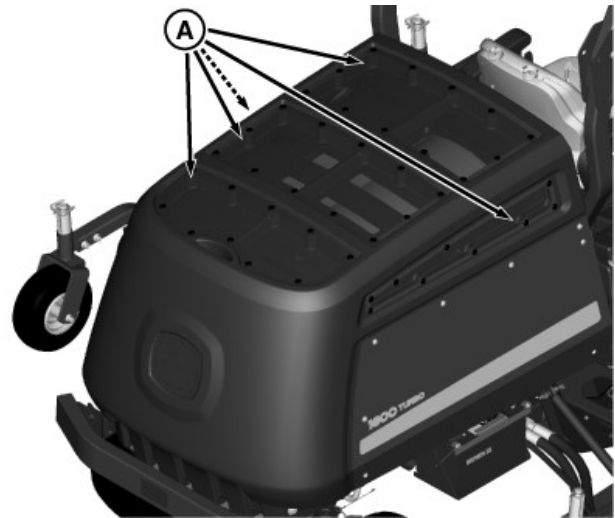
The entire machine should be inspected, with extra attention given to the areas noted below.

OUMX068,0001043-19-27MAR19

Cleanout Areas

Clean and inspect the entire machine (See Safety Label Section). Primary areas that must be inspected and cleaned include the following:

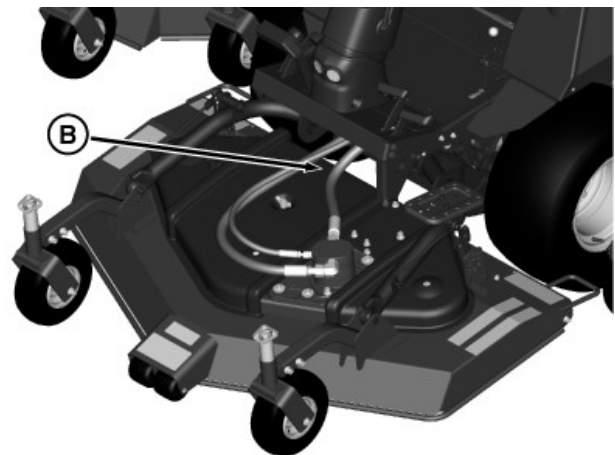
Hood Screen



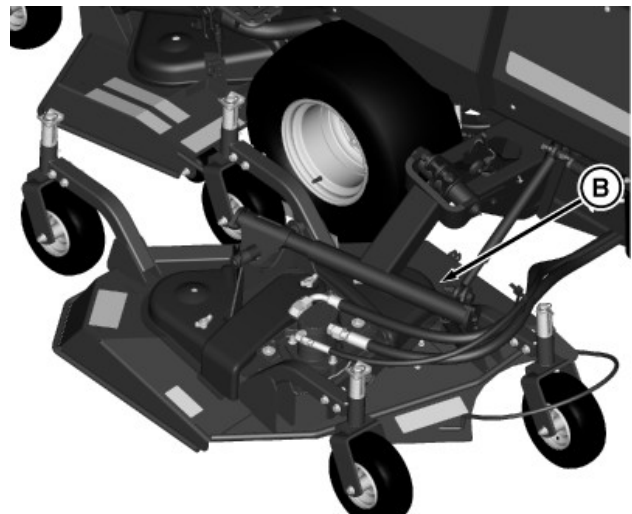
TCT015185—UN—17MAR17

- Protective screen (A).

Cutting Units



TCT015186—UN—17MAR17

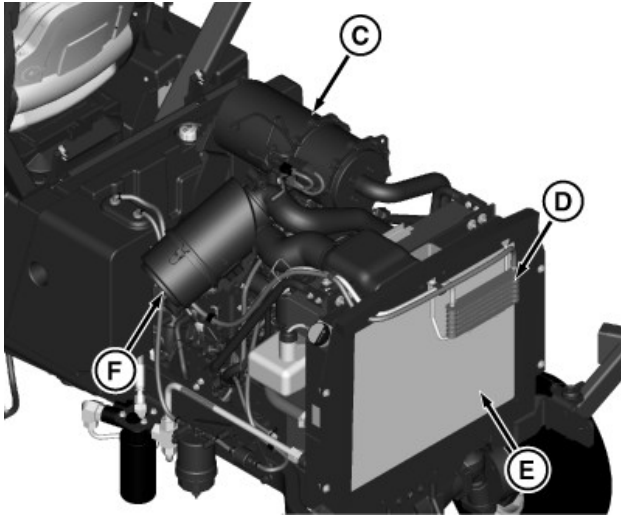


TCT015187—UN—17MAR17

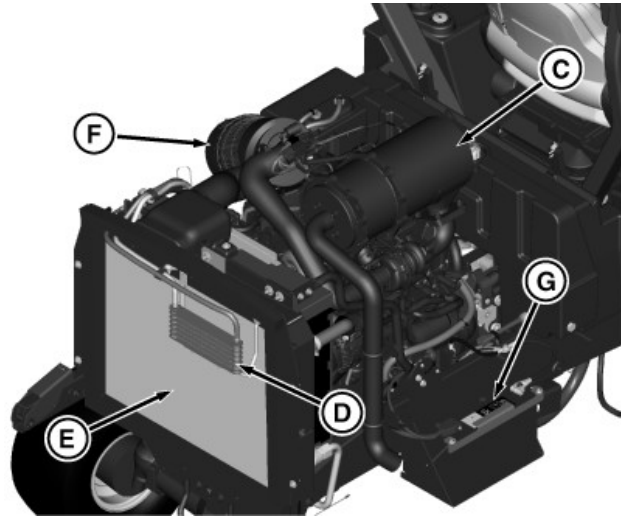
Machine Cleanout

- Cutting units (B) and linkages.

Diesel Particulate Filter (DPF) and Exhaust Pipe



TCT015188—UN—17MAR17



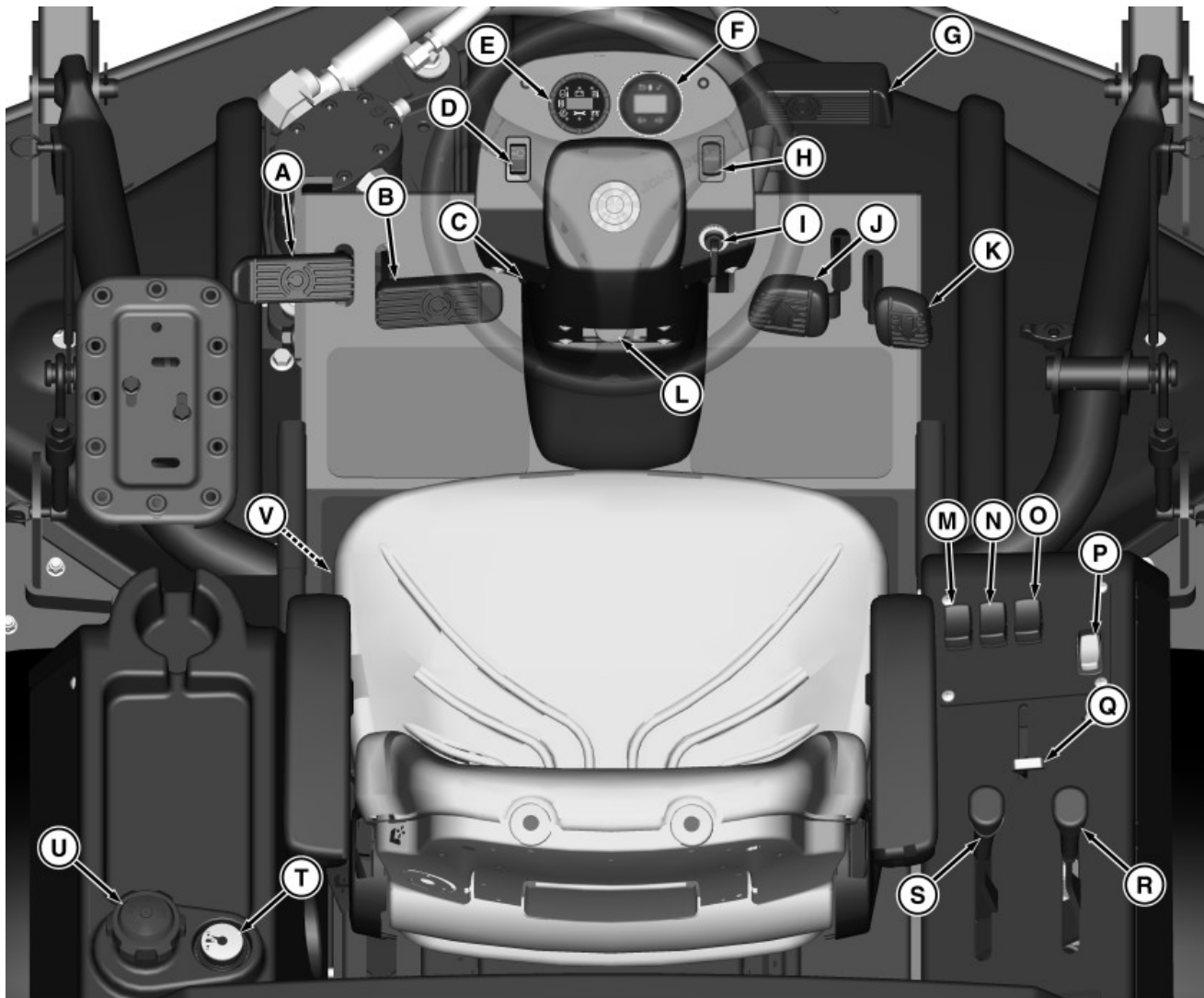
TCT015189—UN—17MAR17

- Area around Diesel Particulate Filter (DPF) (C).
- Fuel cooler (D) and radiator fins (E).
- Air cleaner (F) and air intake.
- Battery (G) and related harnesses.

MX52301,0001375-19-02NOV18

Operating Controls

Operator Station Controls



TC101235—UN—16SEP19

A—Left Turn Brake Pedal
B—Right Turn Brake Pedal
C—Steering Column Tilt Lock
D—Headlight Switch
E—Indicator Lights/Hour Meter
F—CAN Display
G—Park Brake Pedal
H—Cruise Control Switch
I—Key Switch
J—Forward Drive Pedal
K—Reverse Drive Pedal

L—Park Brake Lock
M—Left Mower Deck Lift Switch
N—Front Mower Deck Lift Switch
O—Right Mower Deck Lift Switch
P—PTO Switch
Q—Throttle Lever
R—Speed Range Lever
S—Four Wheel Drive Lever
T—Fuel Gauge
U—Fuel Cap
V—Differential Lock Pedal

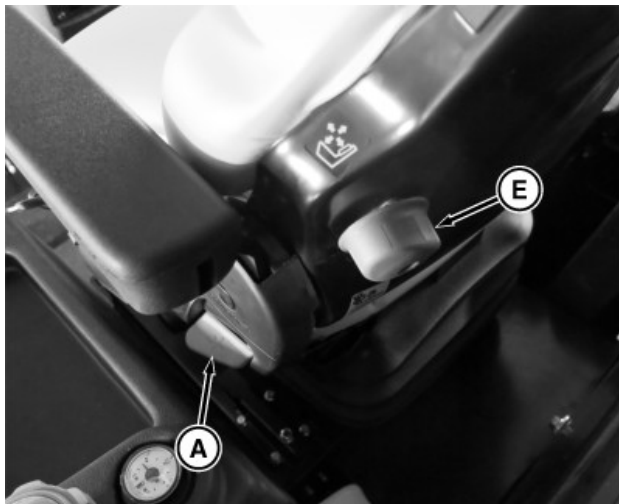
MX00654,0000223-19-13SEP19

Operating Controls

Seat Controls



TCT015178—UN—15MAR17

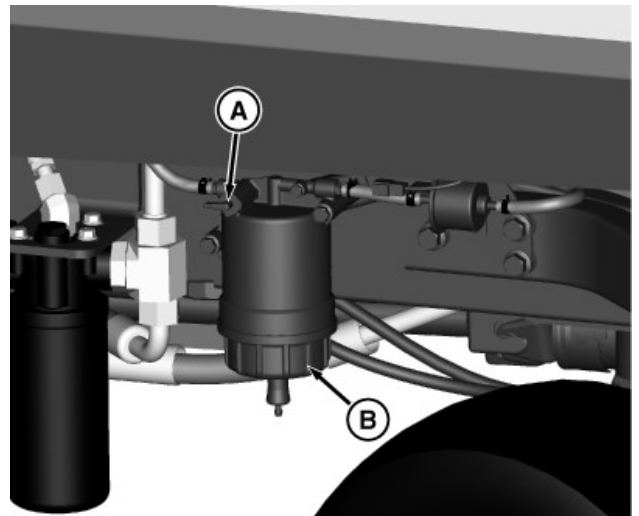


TCT015179—UN—16MAR17

- A—Seat Tilt Handle
- B—Seat Raise/Lower Handle
- C—Fore/Aft Seat Adjustment Lever
- D—Suspension Lock
- E—Lumbar Support Knob

MX52301,000136D-19-16MAR17

Miscellaneous Controls



TCT015042—UN—15MAR17

- A—Fuel Shutoff Valve
- B—Water Separator

OUC02004,00004AF-19-16MAR17

Operating Machine

Daily Operating Checklist

- ☐ Test safety systems.
- ☐ Check tire pressure.
- ☐ Check fuel level.
- ☐ Check engine, transmission, and hydraulic oil levels.
- ☐ Remove grass and debris from engine compartment and muffler area, before and after operating machine.
- ☐ Clean air intake screen.
- ☐ Check area below machine for leaks.
- ☐ Check air restriction indicator.
- ☐ Check engine coolant level.

OUO2004,00004B0-19-17SEP13

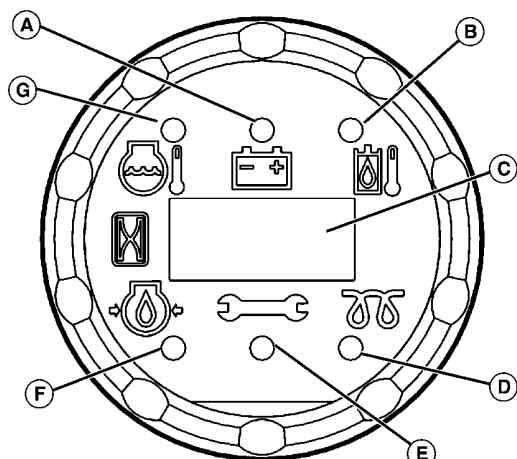
Avoid Damage to Plastic and Painted Surfaces

- Do not wipe plastic parts until they are rinsed first. Using a dry cloth causes scratches.
- Insect repellent spray damages plastic and painted surfaces. Do not spray insect repellent near machine.
- Be careful not to spill fuel on the machine. Fuel damages surfaces. Wipe up spilled fuel immediately.
- Prolonged exposure to sunlight damages some surfaces.

MP47322,00F4630-19-15APR19

Indicator Lights

IMPORTANT: Avoid Damage! If an indicator lamp turns on while the engine is running, stop the engine to avoid engine damage. Before you restart the engine, find and correct the cause.



TCAL44837—UN—28MAR13

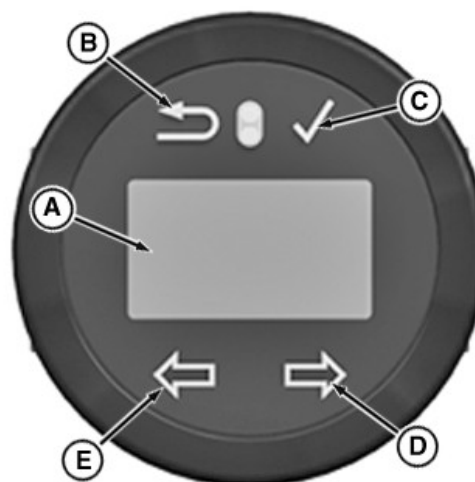
- Battery Discharge Indicator (A) will glow when

alternator is not producing adequate current. Stop engine and determine cause.

- Hydraulic Oil Temperature Indicator (B) will glow when hydraulic oil temperature is high. Stop all hydraulic functions immediately. Let hydraulic oil temperature cool by allowing engine to idle under a no-load situation. This keeps the oil flowing through the oil cooler and cools the oil. Check oil level and make sure oil cooler coils are clean. Continued operation may cause higher temperatures, resulting in damage.
- Hourmeter (C) records the number of hours the engine has run. Use the hour meter and the periodic service chart (located in the engine compartment) to determine when service procedures need to be performed on the machine and mower deck.
- Engine Preheat Light (D) will glow when key switch is turned to the run position. After approximately three seconds the light will glow out.
- Malfunction Indicator Light (MIL) (E) will glow steady when there is a problem with the engine, and flash a code when there is an issue with the vehicle. It will also flash codes when trying to start the machine and the interlocks are not met. (See VCU Codes in the TROUBLESHOOTING section.)
- Engine Oil Pressure Indicator (F) will glow when engine oil pressure is low. If lamp glows when engine is running, stop engine immediately. See your John Deere distributor.
- Engine Coolant Temperature Indicator (G) will glow if engine temperature becomes excessive. When engine overheats, the engine power is reduced to 50% while maintaining engine speed. Stop engine and determine cause.

OUO2004,00004BD-19-15MAY17

PDU Display Navigation



PY44597—UN—07SEP17

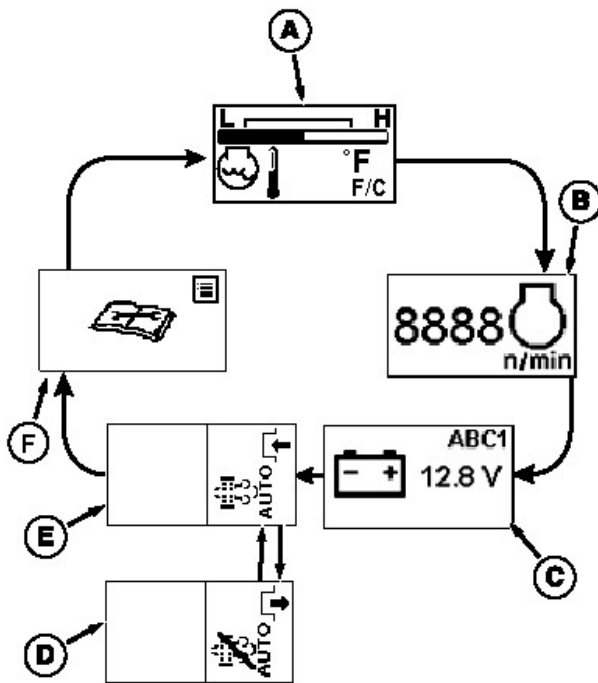
Operating Machine

- A—LCD Screen
- B—Return Button
- C—Acknowledge Button
- D—Right Arrow Button
- E—Left Arrow Button

The operator should become familiar with the basic capabilities of the Operator Display. The Operator Display is located in the control console on the right side of the seat. This display consists of the LCD Screen (A) and four buttons (B, C, D and E).

The Operator Display has five (5) main screens. The operator can display each of the four main screens by pressing the right or left arrow key (D or E). Each of these four screens has some functionality:

Top Level Screens



TC101226—UN—14OCT19

- A—ECT: Engine Coolant Temperature Screen
- B—Erpm: Engine RPM Screen
- C—SV: System Voltage Screen
- D—DPF: Diesel Particulate Filter Screen (Active Regeneration Off)
- E—DPF: Diesel Particulate Filter Screen
- F—IServ: Service Menu Screen

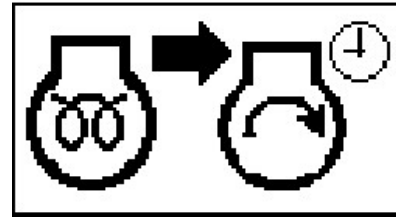
NOTE: If a pre-heat is required, the Pre-Heat Countdown Screen will pop up first.

The top-level screens are shown in order of display. To navigate to next top-level screen, press right or left arrow button on PDU.

On these top-level screens, if ABC1 appears, the current language setting is displayed as the 1st language set in Display Set-up menu. By pressing the acknowledge button, the display switches to ABC2, the 2nd language defined in the Display Set up menu.

HPH: Pre-Heat Countdown Screen

NOTE: HPH screen is only displayed at power up when a pre-heat is active, and will be the first screen displayed.



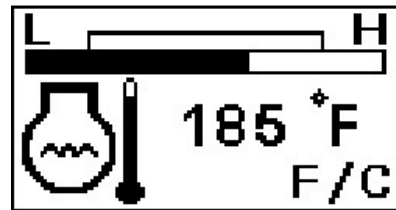
TC101206—UN—16SEP19

Pre-Heat Countdown Screen

The Pre-Heat Countdown Screen only appears when the engine Pre-Heat option is active. The screen displays the hour-glass icon until pre-heat is complete. Pressing the return button navigates back to the ECT screen.

ECT: Engine Coolant Temperature Screen (A)

During power-up, the JD logo is briefly displayed followed by the initial ECT Screen.

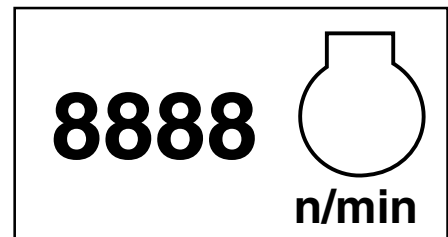


TC101205—UN—10OCT19

Engine Coolant Temperature Screen

The current engine coolant temperature between 60-110°C (140-230°F) is displayed. Press the acknowledge button to toggle between Fahrenheit (°F) or Celsius (°C) units. Right arrow button will navigate to Erpm screen. left arrow button will navigate to IServ screen.

Erpm: Engine RPM Screen (B)



PY46268—UN—07SEP17

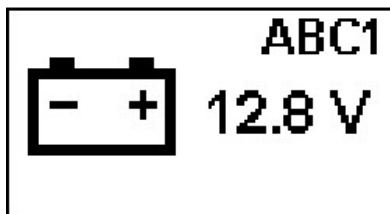
Engine RPM Screen

The Engine RPM Screen displays the engines current revolutions per minute. Pressing left arrow returns to

Operating Machine

ECT screen. Pressing right arrow goes to the SV screen. Pressing the return button goes back to ECT screen.

SV: System Voltage Screen (C)

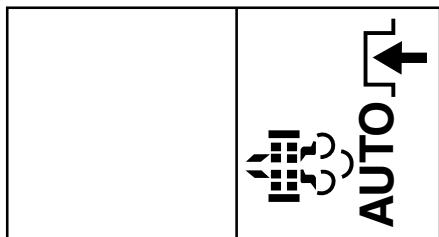


TC101208—UN—16SEP19

System Voltage Screen

The System Voltage Screen displays the machines current voltage. Pressing left arrow returns to RPM screen. Pressing right arrow goes to the DPF screen. Pressing the acknowledge button changes the language, the language options are set under the display menu. Pressing the return button goes back to ECT screen.

DPF: Diesel Particulate Filter Status Screens (D and E)



PY46269—UN—07SEP17

DPF Status Screen

The Diesel Particulate Filter Status Screen shows if Auto Regeneration is enabled or disabled. The screens that appear are condition dependent. The screens will display the current state of any active DPF regeneration. Sub-menus include options of Auto Regeneration, Parked Regeneration, and Service Recovery.

Pressing left arrow returns to SV screen. Pressing right arrow goes to the IServ screen.

Pressing and holding the acknowledge button enables or disables Active Regen. When toggled, the On-Off arrow changes direction and the AUTO filter icon changes from active to off. (See Inhibiting Active Regeneration.)

Pressing the return button goes back to ECT screen.

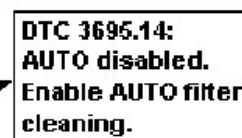
Service Mode (F)

Pressing the acknowledge button displays the Pass Code Entry screen. Default pass code is "000". See your John Deere dealer for more information on entering pass codes.

Pressing the acknowledge button of the service mode screen displays the first top menu screen.

Auto Regeneration

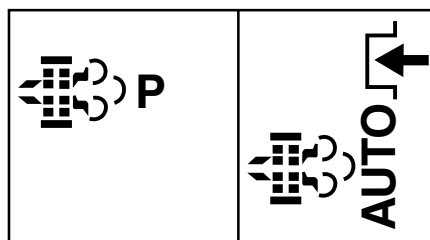
A machine will run until reaching a point where the ECU decides that Auto Regeneration is required. At this point, the Auto Regen icon will be displayed on the primary display unit (PDU) and the ECU will take steps to clean the diesel particulate filter. If Auto Regen is currently disabled, the operator will be instructed to re-enable Auto Regeneration.



TC101210—UN—30SEP19

IMPORTANT: Avoid machine damage! Unless absolutely necessary, avoid shutting machine down when in regeneration.

Auto Regeneration takes place during normal operation (mowing) as long as certain conditions are met. Engine coolant temperature must be up to a normal operating range and engine speed must be maintained above a set rate (1000-1200 rpm). When Auto Regen is initiated, the operator will be reminded to maintain the engine speed required to facilitate cleaning of the diesel particulate filter. If auto regeneration is disabled or ignored, soot level in the filter will continue to rise until it reaches a level which requires Parked Regeneration.



PY46290—UN—07SEP17

Parked Regeneration

IMPORTANT: Avoid machine damage! Do not shut machine down when in Parked Regeneration.

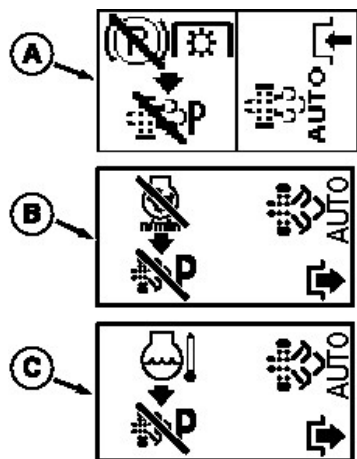
When diesel particulate filter soot level is low or moderate, Parked Regeneration becomes necessary and possible. In order to perform a Parked Regeneration, the following conditions must be met:

- Throttle lever set to lowest idle position

Operating Machine

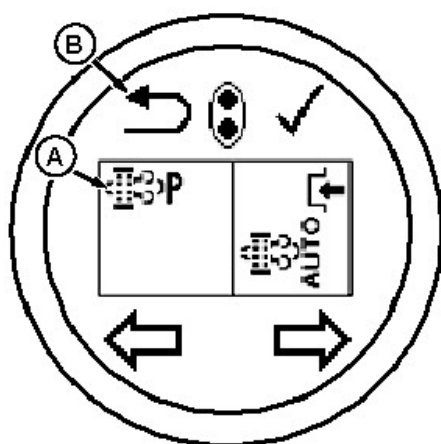
- Coolant temperature above 140°F (60°C)
- Parking brake engaged
- Transmission in Neutral (vehicle not in motion)
- PTO disengaged

If these conditions are not met, the appropriate regen interlock popup will be displayed.



TC101212—UN—24SEP19

- A—PTO ON/Parking Brake OFF
B—Engine Speed Too High
C—Engine Coolant Temperature Too Low

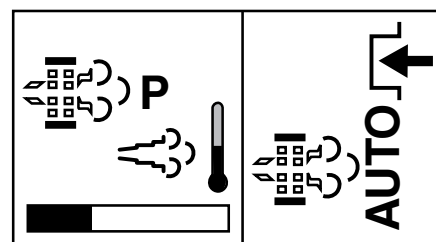


TC101237—UN—13OCT19

- A—Parked Regeneration Icon (flashing)
B—Return Button

The Parked Regeneration icon (A) will appear in the upper left portion of the screen. If the icon is solid this means the interlocks have NOT been met. If the icon is flashing this means the interlocks have been met and a Parked Regeneration can be initiated.

To start Parked Regeneration, press and HOLD (2 seconds) the Return Button (B) on the PDU.



PY46289—UN—07SEP17

Once Parked Regeneration is activated, the ECU increases engine RPM automatically. Higher exhaust gas temperatures are necessary during regeneration. The display will include the high exhaust temperature icon – this is normal. A progress bar appears on screen. Once Parked Regeneration is complete, the progress bar disappears and engine RPM returns to low idle.

Interrupting a Parked Regeneration

NOTE: Avoid stopping a Parked Regeneration if at all possible.

Just as Parked Regeneration can be prevented from starting due to an interlock violation, it will also be interrupted (stopped) by the same actions:

- Releasing the parking brake
- Engaging the PTO
- Increasing engine speed more than 10%
- Press and HOLD the right arrow button on the PDU will also stop a regeneration in process

The PDU will then display the appropriate screen that triggered the interruption.

Service Recovery

If the diesel particulate filter soot reaches an elevated level, a Service Only state will occur. Parked Regeneration is no longer an available option. Contact John Deere Dealer Service.



TC101214—UN—16SEP19

A DTC fault occurs, an internal (4 hour) timer begins countdown until engine power is reduced 50% with engine RPM reduced to low idle. The operator will continue to receive warnings as the countdown progresses. If the warnings continue to be ignored, the machine will eventually shutdown and require towing. A

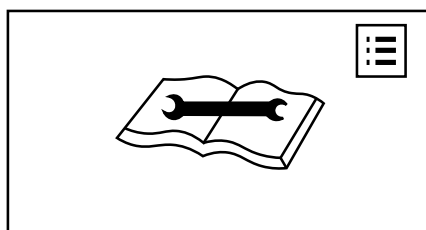
Operating Machine

forced regeneration (service recovery) by a qualified John Deere service technician is required.

Ash Cleaning/Removal

IMPORTANT: Ash cleaning and removal should only be done by a John Deere dealer.

IServ: Service Screen

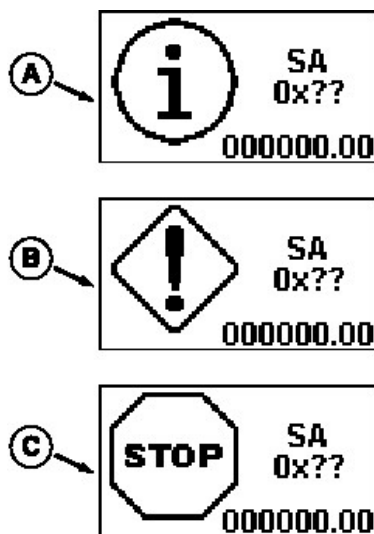


PY46270—UN—07SEP17

Service Menu Screen

The Service Screen is pass-code protected. Default pass code is "000". Sub-menus permit access to active and stored DTC messages, DPF level, service timers, and display set-up. See Service Menu.

Warning Indicator Icons



TC101216—UN—16SEP19

A—Information Icon
B—Warning Icon
C—Stop Icon

A - Low-level warning for informational purposes.

B - Caution: The issue should be addressed as soon as possible by a technician.

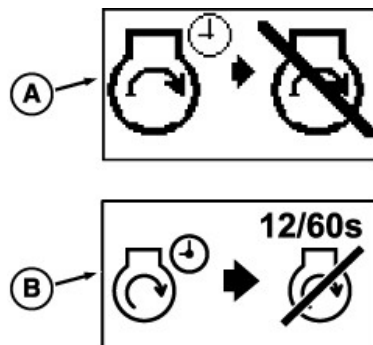
C - Turn off the engine immediately. The machine must be hauled to a service shop.

The icons are displayed when DTCs are active on the

CAN bus. The displayed icon is selected based on priority.

When arrow buttons are pressed with active faults, and there are more than one fault, the faults are viewed one at a time. The order of display is based on priority.

Start Interlock Pop-Ups



TC101217—UN—16SEP19

A—Cranking Time Exceeded

B—Starting Motor 60 second Cool Down

These indicators show a condition that prevents the machine from starting.

The Malfunction Indicator Lamp (MIL) will flash a code indicating if the following conditions are present. (See VCU Codes in the TROUBLESHOOTING section.)

Code	Condition
1-2	Brake OFF
1-3	PTO switch ON
2-1	Pedals out of NEUTRAL

MX00654,0000224-19-14OCT19

Understanding Diesel Particulate Filter (DPF) Regeneration

Your machine is equipped with an emission-compliant engine, which cleans and filters the engine exhaust.

Regeneration

Regeneration is the process of increased exhaust temperatures to oxidize the accumulated particulate matter, or soot, from the walls of the DPF. There are five types of regeneration that can occur. Passive Regeneration, Enhanced Passive Regeneration, Active Regeneration, Parked Regeneration, and DPF Recovery.

Passive Regeneration

Passive regeneration occurs naturally in the DPF when the operating conditions produce sufficient exhaust gas temperatures for the oxidation of soot to occur. The engine ECU takes no action during passive regeneration. There is no fuel dosing or closing of the air throttle to increase exhaust gas temperatures. No

Operating Machine

indicators are present on the operators interface during the passive regeneration.

Enhanced Passive Regeneration

When the soot level in the DPF reaches a predetermined level and the vehicle operating conditions are not resulting in sufficient exhaust gas temperatures to promote sufficient passive regeneration, the engine ECU activates the enhanced passive regeneration strategy. During enhanced passive regeneration, the engine ECU closes the air throttle and changes injection timing to increase the exhaust gas temperature to a level that promotes passive regeneration. The engine is allowed to be operated normally and no fuel is dosed during the enhanced passive regeneration. No indicators are present on the operators interface during the enhanced passive regeneration.

Active Regeneration

When the soot level in the DPF reaches a predetermined level or soot is accumulating at a rate greater than can be managed by the enhanced passive regeneration, an active regeneration will be initiated. During an active regeneration, the ECU initiates the in-cylinder fuel dosing strategy, modifies fuel injection timing, and closes the air throttle to increase exhaust gas temperatures to promote rapid oxidation and removal of the soot in the DPF. The exhaust gas temperatures during the active regeneration are higher than the temperatures in the enhanced passive regeneration. During this regeneration, the engine is allowed to be operated normally.

Parked Regeneration

When the soot level reaches a predetermined level, the ECU mandates a parked regeneration be performed. When a parked regeneration is needed, the ECU derates the engine to encourage the parked regeneration be performed. During a parked regeneration, the ECU increased the engine speed to 2200 rpm, initiates the in-cylinder fuel dosing strategy, modifies fuel injection timing, and closes the air throttle to increase exhaust gas temperatures to promote rapid oxidation and removal of the soot in the DPF. The vehicle must remain parked until the parked regeneration has ended.

Recovery Regeneration

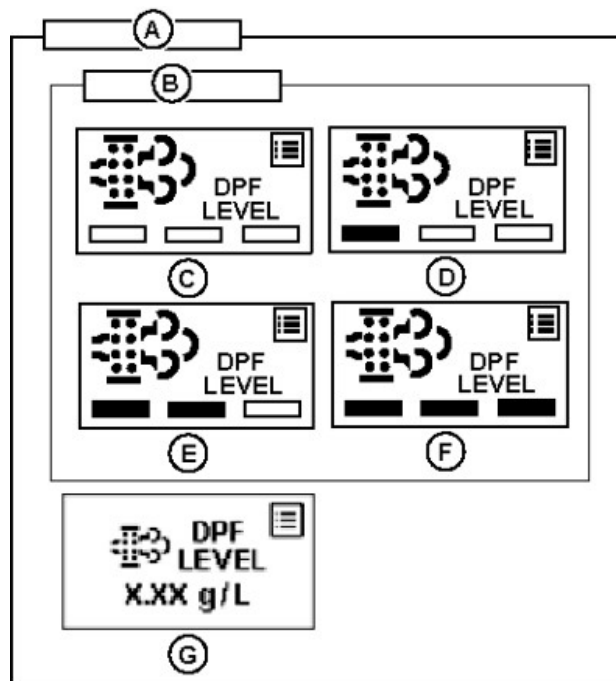
If the soot in the DPF reaches a severe level, a recovery regeneration is required to reduce the soot level. Running the vehicle with the regenerations inhibited or not performing a parked regeneration when needed can cause the recovery regeneration to be needed. During a recovery regeneration, the vehicle must be parked, the ECU closes the air throttle, and changes injection timing to increase the exhaust gas temperature to a level that promotes passive regeneration. No fuel is dosed during this portion of the recovery. After sufficient time has passed and the soot level is at a low level, a parked

regeneration is performed before the recovery regeneration is complete. The vehicle must remain parked until the recovery regeneration has ended.

MX00654.0000225-19-14OCT19

Diesel Particulate Filter Load Level and Value

From the Service Menu, cycle through the screens until you reach the DPF Level screen. (See Using Service Menu Displays)



TC101218—UN—10OCT19

- A—DPF Load Level Screen
- B—DPF Bar Graph States
- C—Regen not needed
- D—DPF state low
- E—DPF state moderate
- F—DPF state high
- G—Soot Load Level Screen

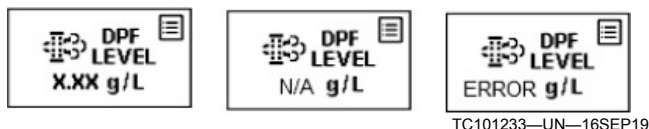
The DPF load level screen informs the operator of the state of the diesel particulate filter status. There are four states that this status can be in, but the progress bars are not linearly related to the actual soot loading value. If the notepad button is selected, the actual soot loading value is displayed.

Specific DPF load value can be obtained by pressing the acknowledge.

Pressing the right arrow button of the DPF Level screen navigates to the Active DTC screen. Pressing left arrow button will take you to Display Set Up and Return button will take you to the Service Screen.

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DPF Load Value



- A—Represents 4.5 g per liter
- B—Represents out of range
- C—Represents an error in determining DPF loading

MX00654,0000226-19-13OCT19

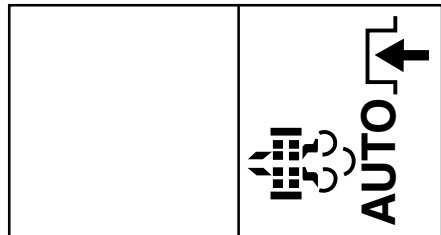
Diesel Particulate Filter (DPF) Regeneration Functionality

Status Detection

The screen icons are determined by the state of the Diesel Particulate Filter and whether the machine is parked.

No Regeneration Required

- Left Arrow: Return to Previous Screen
- Right Arrow: Proceed to Main Screen
- Acknowledge Button: Enable/Disable Auto Regeneration
- Return Button: Return to ECT Screen



PY46269—UN—07SEP17
Auto Regeneration Enabled

- DPF Auto Icon: when Auto Regeneration is enabled, above image is shown. When disabled, a line crosses through the icon.

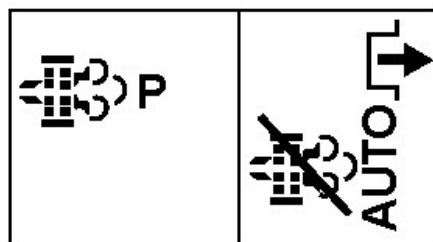
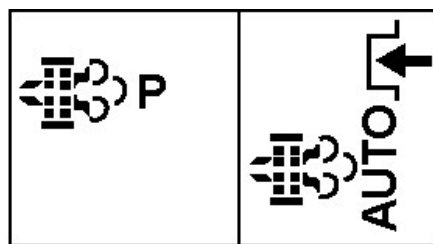
Parked Regeneration Available

CAUTION: Avoid injury! To prevent fires, be sure to clear any combustible materials from the area of the engine and exhaust filter. Regeneration uses high temperature.

- Before starting a Parked Regeneration cleaning, the operator should:
 - a. Park the vehicle on a paved surface.
 - b. Ensure that the vehicle is in neutral.
 - c. Engage the park brake (ON).
 - d. Disengage the cutting units (PTO Switch OFF).

e. Move the throttle lever to the low idle position.

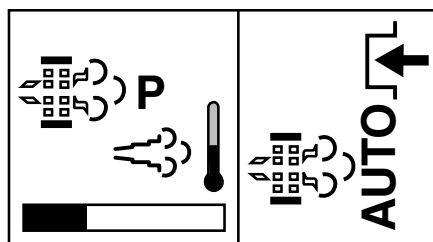
NOTE: If the engine is not at low idle, a parked regeneration will not start.



TC101238—UN—13OCT19
Parked Regeneration (Top) Auto Regeneration Enabled
(Bottom) Auto Regeneration Disabled

- When the P icon is flashing, press and hold the return button for two seconds to initiate the Parked Regeneration operation.

NOTE: A delay occurs before the engine rpm increases and the parked regeneration begins.



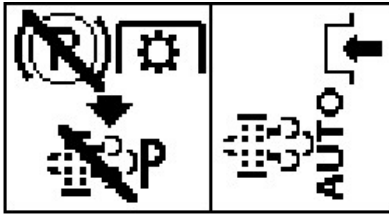
The above graphic shows the DPF top-level screen during a Parked Regeneration. The progress bar reflects the percentage complete of the Parked Regeneration process.

Parked Regeneration Interlock Notification Pop-Ups

If user presses and holds the return button when Parked Regeneration is not flashing (when regeneration is required, but interlocks are not met), then one of the following machine status notifications will appear:

Park Brake Off

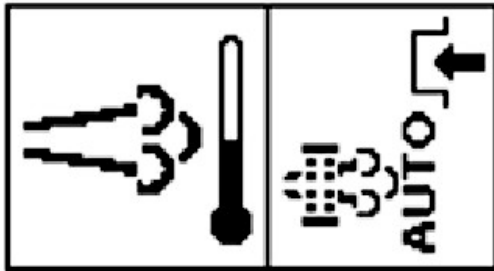
Operating Machine



TC101220—UN—24SEP19

Park brake must be set to start a Parked Regeneration.
PTO must not be on to start a Parked Regeneration.

Warning Indicator



TC101229—UN—16SEP19

Exhaust Gas Temp Elevated

When regeneration is occurring and exhaust temperatures are above normal, the above icon (cloud with thermometer in center-left area) displays.

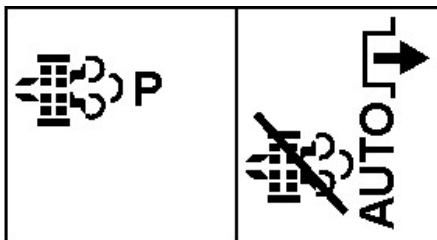
Cleaning Required



PY44599—UN—08SEP17

DTC 3695.14

The above pop-up screen will display when the 'Auto' Regeneration is disabled and the filter needs cleaning. This can be remedied by setting the 'Auto' Regeneration to 'Enabled'.



TC101222—UN—13OCT19

Cleaning Required - Auto Regeneration Disabled

The above icon (filter in center-left area) indicates that an active cleaning is required, but the Auto Regeneration feature is disabled. The user should enable Auto Regeneration via the acknowledge button ('Enable' icon).

Cleaning Required Engine Power Limited

The following DTC's are displayed when the DPF soot has reached an elevated level and cleaning is required. Engine power is limited until a cleaning is performed.

Parked Cleaning Required (Amber Warning Lamp)



TC101223—UN—17SEP19

DTC 3719.16

The above pop-up screen displays when the filter particulate level is too high. A parked cleaning operation is required. See Parked Regeneration Available section.

Ash Cleaning Required (Amber Warning Lamp)



TC101224—UN—16SEP19

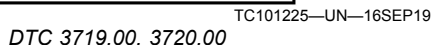
DTC 3720.16

The above pop-up screen will display when the filter particulate level is too high. A parked cleaning operation is required. Additional service may be required. See Parked Regeneration Available section.

Cleaning Required Engine Power and PTO Power Limited

The following DTC's are displayed when the DPF has reached its maximum soot levels and requires immediate service. Engine power is extremely limited.

Service Regeneration Required (Red Stop Lamp)



MX00654.0000227-19-14OCT19

Service Mode

Pressing the acknowledge button of the service mode screen (G) displays the first top menu screen (A).



This display feature will allow the user to view a list of active diagnostic trouble codes (Active DTCs). Upon entering the Active DTC sub-menu, the display will

Operating Machine

either tell the user there are no active DTC's or will list the source device list (i.e. Engine (ECU)). The user will then be able to examine specific Active DTC's from each of the sources. Some DTCs will use special icons and/or a detailed description ('DTC long text'). Most generic DTCs will only display as a DTC number along with its source address.

Stored DTC

This display feature will allow the user to view a list of stored diagnostic trouble codes (Stored DTCs). Stored DTCs are DTCs that were in existence when power was removed from the controllers. The operator also has the ability to clear Stored DTCs in each module. This clear feature is performed using the display module in the SubScreens of the Stored DTCs menu.

Service Timers

When entering the service reminders from the service menu, the engine oil reminder should show up first, followed by the hydraulic oil reminder. The number next to the target symbol on the top level screen is the target number of hours for the service timer to expire. The number next to the clock symbol is the accumulated number of hours since the last time the timer was reset to '000'.

Once the accumulated number of hours reaches the target number of hours, there will be a 'pop up screen' to alert the operator. The operator will be able to acknowledge the alert by pressing any button on the display. This only temporarily clears the alert. The alert will pop again after the next power cycle to the display.

Any changes made to the service timer duration will not affect the accumulated number of hours since the last time the timer was reset to '000'.

Display Setup

Display Setup Subscreens include:

- Owner Passcode
- Text Enable/Disable Mode
- 1st Language Selection Screen
- 2nd Language Selection Screen
- Software Part Number Screens

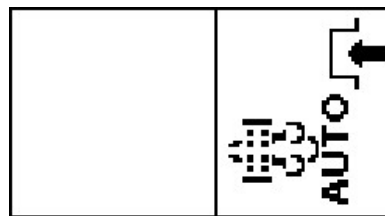
DPF Level Screen

Pressing the acknowledge button (D) on any of the service sublevel screens will display the detailed information relative to that screen.

MX00654,0000228-19-14OCT19

Diesel Particulate Filter Operator Display

Status Detection

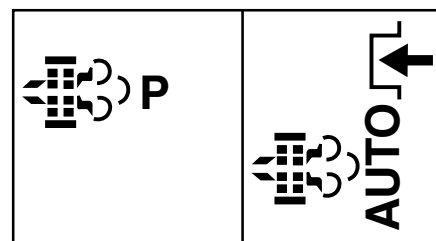


TC101228—UN—16SEP19

The state of the Diesel Particulate Filter and whether the machine is parked determine screen icons.

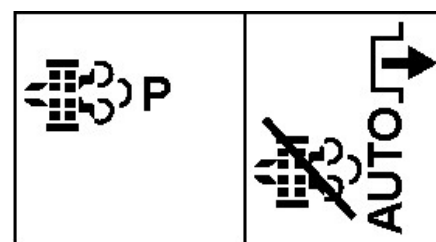
No Regeneration Required

- Left Arrow: Go to Previous Screen
- Right Arrow: Go to Next Screen
- Acknowledge Button: Enable/Disable Active Regen
- Return Button: Go to ECT
- DPF Auto Icon: When Auto Regeneration is enabled, an image is shown. When disabled, a line crosses through the icon.



PY46290—UN—07SEP17

Parked Regeneration Enabled - Flashing Filter P Icon



TC101222—UN—13OCT19

Parked Regeneration Disabled - Solid Filter P Icon

Parked Regeneration Available

NOTE: Acknowledge button has the same function for all DPF Status Screens in section.

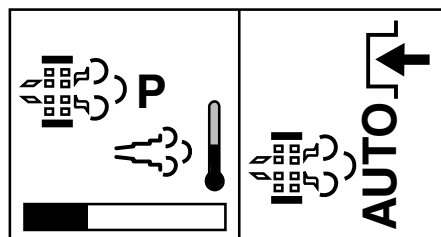
- Conditions (interlocks) must be met before you will get the flashing filter P icon and are able to start a Parked Regeneration Cleaning. (See Parked Regeneration.)
- When the Filter with "P" is flashing, press and hold

Operating Machine

the return button for two seconds to initiate a Parked Regeneration operation.

NOTE: A delay occurs before the engine RPMs increase and the parked regeneration starts.

- When the Filter with "P" icon shown is solid, and operator presses and holds the return button for two seconds, an interlock regeneration notification displays. The display indicates that regeneration is available to be performed but is not required. The machine must be parked with the cutting units turned off to begin regeneration.



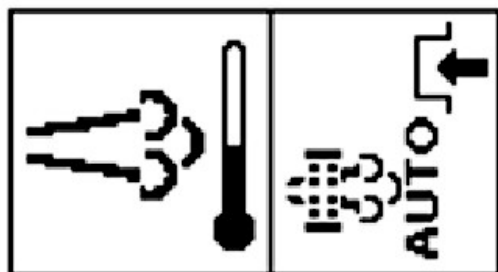
PY46289—UN—07SEP17
Top-Level Parked Regeneration

This icon (cloud with thermometer in center-left area) shows as the top-level screen during Parked Regeneration. The progress bar shows the percentage complete of the Parked Regeneration process.

Parked Regeneration Interlock Notification Pop-Ups

When the operator initiates the Parked Regeneration by pressing the return button when it is not flashing a machine status notification appears. (See Parked Regeneration Interlocks.)

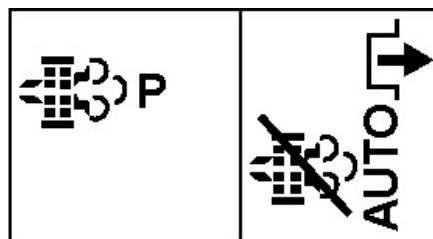
Warning Indicators



TC101229—UN—16SEP19
Exhaust Temperature High



PY44599—UN—08SEP17
Auto Cleaning Required, Regeneration Disabled



TC101222—UN—13OCT19
Active Cleaning Required, Auto Regeneration Disabled

When regeneration is occurring and exhaust temperatures are higher than normal, the cloud with thermometer in the center area displays.

Auto Cleaning Required, Regeneration Disabled

The pop-up screen displays when the 'Auto' Regeneration is disabled and the filter needs cleaning. This fault can be remedied by setting the 'Auto' Regeneration to 'Enabled'.

The acknowledge button displays additional information:

- ☐ DTC 003695.14: Filter cleaning required.

Active Cleaning Required, Auto Regeneration Disabled

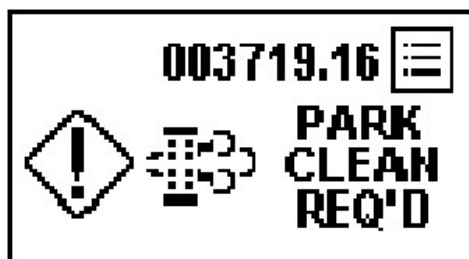
The icon (filter in center-left area) indicates that an active cleaning is required, but the Auto Regeneration feature is disabled. The operator should enable Auto Regeneration via acknowledge button ('Enable' icon).

Cleaning Required, Engine Power Limited

The following DTCs are displayed when the DPF soot has reached an elevated level and cleaning is required. Engine power is limited until a cleaning is performed.

Parked Cleaning Required (Amber Warning Lamp)

Operating Machine



DTC 003719.16

TC101223—UN—17SEP19

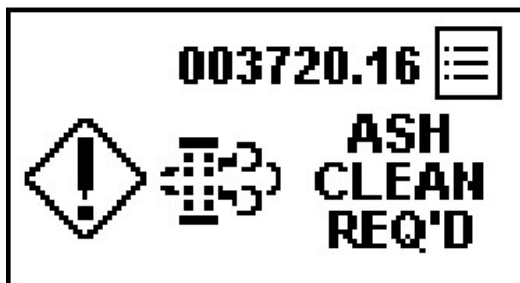
The pop-up screen displays when the filter particulate level is too high. A parked cleaning operation is required. See Parked Regeneration Available section.

The icon on the left-hand side indicates that a warning light DTC exists. Parked cleaning is required. (See Parked Regeneration.)

The acknowledge button displays additional information:

- ☐ DTC 003719.16: Parked cleaning required. Engine power limited.

Ash Cleaning Required (Amber Warning Lamp)



DTC 003720.16

TC101224—UN—16SEP19

The pop-up screen displays when the filter particulate level is too high. A parked cleaning operation is required. More service may be required. See Parked Regeneration Available section.

The acknowledge button displays additional information:

- ☐ DTC 003720.16: Ash cleaning required.

The icon on the left-hand side indicates that a warning light DTC exists. Parked cleaning is required. (See Parked Regeneration.)

Cleaning Required, Engine Power and PTO Power Limited

The following DTCs are displayed when the DPF has reached its maximum soot levels and requires service. Engine power is limited and PTO power is disabled.

The acknowledge button: Enables or Disables Auto Regeneration



DTC 000000.00

TC101225—UN—16SEP19

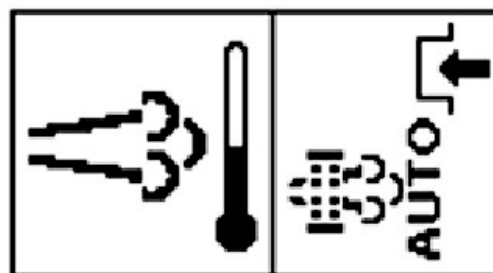
- ☐ DTC 003719.00: Service regeneration required. Engine power limited.
- ☐ DTC 003720.00: Ash cleaning required. Engine power limited.

MX00654,0000229-19-14OCT19

Active Regeneration

Active regeneration starts when soot in the exhaust filter reaches a certain level. Cleaning occurs less frequently if the engine is operated for long periods under conditions where passive regeneration takes place.

If the system determines that soot buildup in the exhaust filter requires cleaning, an active regeneration is initiated. Active regeneration is performed without any intervention on the part of the operator. High exhaust temperature indicator remains visible on the diesel particulate filter status screen during the exhaust filter cleaning.



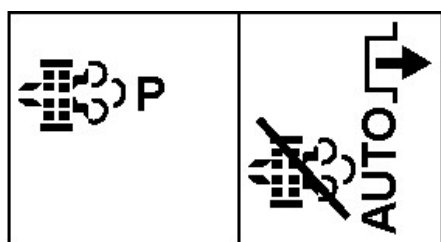
TC101229—UN—16SEP19

CAUTION: Avoid injury! To prevent fires, be sure to clear any combustible materials from the area of the engine and exhaust filter. Regeneration uses high temperature.



PY44599—UN—08SEP17

Auto Cleaning Required, Regeneration Disabled



TC101222—UN—13OCT19

Active Cleaning Required, Auto Regeneration Disabled

Auto Cleaning Required, Regeneration Disabled

The pop-up screen displays when the 'Auto' Regeneration is disabled and the filter needs cleaning. This fault can be remedied by setting the 'Auto' Regeneration to 'Enabled'. (See Accessing Diesel Particulate Filter Displays.)

The information menu from the acknowledge button displays:

- ☐ DTC 003695.14: Filter cleaning required.

Active Cleaning Required, Auto Regeneration Disabled

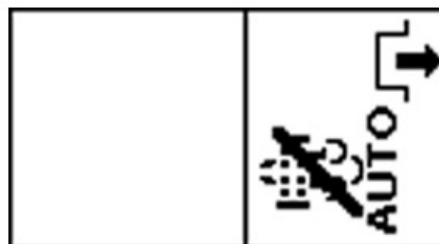
The icon (filter in center-left area) indicates that an active cleaning is required, but the Auto Regeneration feature is disabled. The operator should enable Auto Regeneration via acknowledge button ('Enable' icon).

MX00654,000022A-19-14OCT19

Inhibiting Active Regeneration

IMPORTANT: Avoid damage! Under normal machine operation, the system is in auto regeneration mode and requires minimal operator interaction.

If your vehicle must be used in a situation not suited for higher temperatures created during active regeneration, temporarily disable the system.



PY44598—UN—08SEP17

To disable the auto regeneration function temporarily, press the acknowledge button on the top menu Active Regeneration status screen. The auto regeneration symbol appears with a line through the symbol indicating auto regeneration is disabled. To avoid soot buildup in the exhaust filter, be sure to return to auto regeneration mode as soon as possible. (See Accessing Diesel Particulate Filter Displays.)

NOTE: Auto regeneration is enabled whenever the key switch is cycled off.



PY44599—UN—08SEP17

While active regeneration is inhibited, if the system determines that soot buildup in the exhaust filter requires cleaning, the AUTO Disabled Regen Rqd DTC 003695.14 appears on the PDU. To enable the automatic Active Regeneration cycle through the PDU screens to the active regeneration enable-disable screen. (See Accessing Diesel Particulate Filter Displays.)

Do not disable active regeneration unless it is necessary. If active regeneration is disabled frequently, the system eventually activates a parked regeneration. This means that the engine performance is reduced,

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machine function is limited, and does not return to normal until a parked regeneration is performed.

MX00654,000022B-19-14OCT19

NOTE: When the previous criteria are met, the parked regeneration icon blinks indicating parked regeneration can be initiated.

Parked Regeneration

IMPORTANT: Avoid damage! If operator disregards indicators and continues to operate machine without allowing an automatic cleaning, engine performance is reduced and machine function limited. A parked regeneration procedure must be performed.



TC101224—UN—16SEP19

Parked Cleaning Required (Amber Light)

The following occurs when exhaust filter becomes restricted:

- PDU alert with DTC 003719.16 or DTC 003720.16 active.
- Engine power is reduced and machine function limited.

A parked exhaust filter cleaning is required.

NOTE: The engine must be at operating temperature to perform a parked regeneration. The parked regeneration symbol and "P" do not display unless the engine has reached temperature.

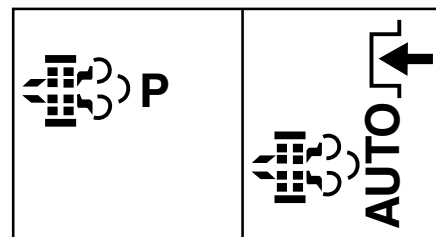
Before starting a parked exhaust filter cleaning, the following criteria must be met:

- Engine running at low idle.
- Coolant temperature **Must** be above 60°C (140°F).
- Park brake **Must** be engaged.
- PTO **Must** be turned off.

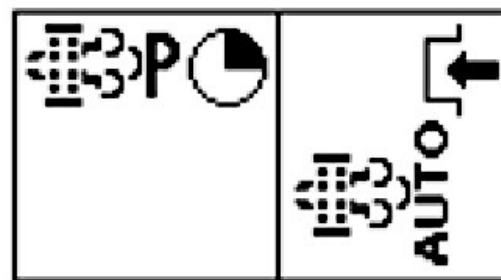
IMPORTANT: Avoid damage! No other machine functions are able to be used while regeneration is taking place with the machine parked. Excluded are functions that are required for an emergency shutdown of the machine.

Do not start regeneration if the fuel gauge has been showing a low fuel level for a long time.

Only stop engine if necessary due to heat build up in the engine compartment.



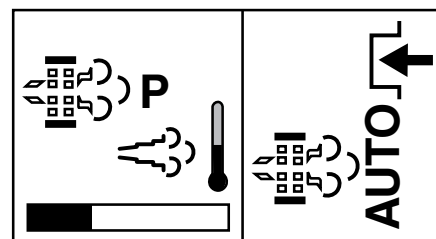
PY46290—UN—07SEP17



TC101230—UN—16SEP19

1. Press and hold return button for 2 seconds.

NOTE: While the button is being pressed and held, an animated "hold" icon appears and counts up to provide feedback to continue holding the button until regeneration is initiated. After the icon disappears, the button may be released.



PY46289—UN—07SEP17

2. During parked regeneration process, the high exhaust temperature icon with progress bar appears on the DPF status screen as shown.
3. The engine speed elevates to 2200 rpm.
4. After completion of parked regeneration process, the system defaults to auto regeneration mode and the machine operates as normal.

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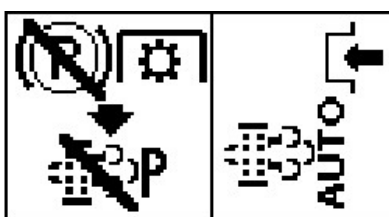
NOTE: If not returning machine to operation, allow engine time to return to normal operating temperature before stopping engine.

IMPORTANT: Avoid damage! If operator disregards indicators and continues to operate machine without allowing a parked regeneration, engine performance is reduced and machine function limited. A recovery regeneration procedure is required.

MX00654,000022C-19-14OCT19

Parked Regeneration Interlocks

Parked Regeneration Interlock Notification Pop-Ups



TC101220—UN—24SEP19

When the operator initiates a Parked Regeneration when it is not flashing one of the following machine status notifications appear:

Park Brake Off

Park brake must be set to start a Parked Regeneration.

Out of Neutral

Machine must be in neutral to start a Parked Regeneration

PTO Engaged

PTO must be OFF to start a Parked Regeneration.

Engine Coolant Temperature

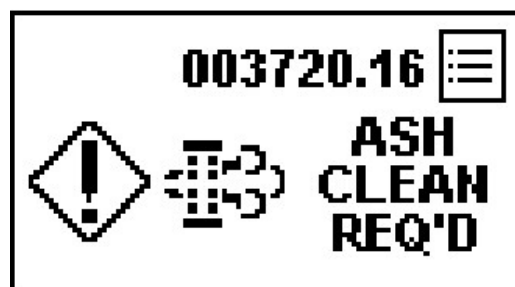
Engine coolant temperature is too high, allow to cool.

Engine RPM

Engine RPM too high.

MX00654,000022D-19-14OCT19

Recovery Regeneration



TC101224—UN—16SEP19

Parked Cleaning Required (Amber Light)

The following occurs when exhaust filter becomes restricted:

- PDU alert with DTC 003719.16 or DTC 003720.16 active.
- Engine power is reduced and machine function limited.

Before completing a recovery regeneration, the following criteria must be met:

- Engine running at low idle.
- Coolant temperature **Must** be above 60°C (140°F).
- Park brake **Must** be engaged.
- PTO **Must** be turned off.

A DPF recovery situation is always accompanied by one or more DTCs.

Recovery regeneration for diesel particulate filter occurs when DTC 3719.00 or DTC 3720.00 is active.

Service ADVISOR Procedure:

Follow on-screen instructions under the Tests and Calibrations tab.

1. Select Tests and Calibrations in the left-hand shortcut bar.
2. Select Connected Calibrations.
3. Select Interactive Calibrations.
4. Select ECU.
5. Select Service Regeneration.



TC101232—UN—16SEP19

Primary Display Unit (PDU) Procedure:

DPF Recovery or Regeneration Pass Code

- Pass-code entry screens follow the same format as

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the Owner/Operator pass-codes, but with an 'R' icon instead of the '1' or '2'.

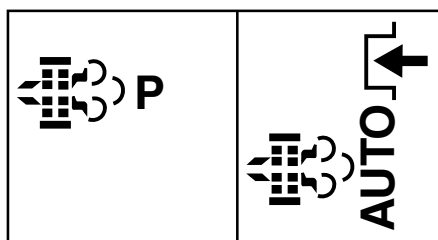
- The code required is hard-coded as "463".

IMPORTANT: Avoid damage! No other machine functions are able to be used while regeneration is taking place with the machine parked. Excluded are functions that are required for an emergency shutdown of the machine.

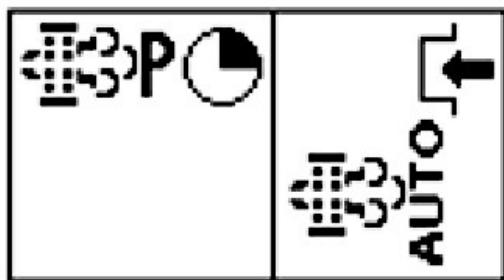
Do not start regeneration if the fuel gauge has been showing a low fuel level for a long time.

Only stop engine if necessary due to heat build up in the engine compartment.

NOTE: When the previous criteria are met, the regeneration icon blinks indicating regeneration can be initiated.



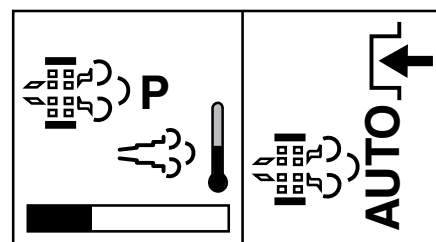
PY46290—UN—07SEP17



TC101230—UN—16SEP19

1. Press and hold return button under the blinking parked regeneration icon for 2 sec.

NOTE: While the button is being pressed and held, an animated "hold" icon appears and counts up to provide feedback to continue holding the button until regeneration is initiated. After the icon disappears, the button may be released.



PY46289—UN—07SEP17

2. During parked regeneration process, the high exhaust temperature icon with progress bar appears on the DPF status screen as shown.
3. The engine speed elevates to 2200 rpm.
4. After completion of parked regeneration process, the system defaults to auto regeneration mode and the machine operates as normal.

NOTE: If not returning machine to operation, allow engine time to return to normal operating temperature before stopping engine.

MX00654,000022E-19-14OCT19

Testing Safety Systems



TCT005796—UN—08NOV12

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

Operating Machine

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.

OUMX068,0000775-19-08MAY14

Testing PTO Switch

1. Sit on the seat.
2. Lock the park brake.
3. Pull PTO switch up to the on position.
4. Try to start the engine. Engine must not start. If engine starts, there is a problem with your safety interlock circuit.
5. Unlock park brake. Try and start engine. Engine must not start. If engine starts, there is a problem with your safety interlock circuit.

OUC02004,00004B3-19-17SEP13

Testing Seat and Park Brake Switch

1. Sit on seat.
2. Push the PTO switch down to the off position.
3. Depress the park brake foot pedal.
4. Start the engine.
5. Release the park brake foot pedal.
6. Raise up off of the seat, but do not get off of the machine.

Result:

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

OUC02004,00004B4-19-17SEP13

Testing Park Brake

1. Stop the machine on a 17° slope (30% grade). Stop the engine and lock the park brake.
2. Put transmission in N (neutral).
3. Check to be sure the park brake will hold the machine without rolling.

Result:

The park brake must prevent machine from moving. If machine moves, brakes need to be adjusted. See your John Deere Distributor.

OUC02004,00004B5-19-17SEP13

Mounting and Dismounting Machine Safely

NOTE: Always mount and dismount from left side of machine to avoid bumping controls and pedals.

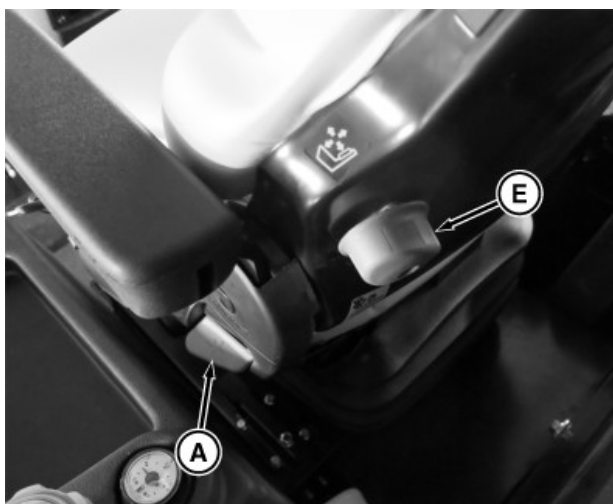
1. Place right foot on mower deck and use steering wheel to balance yourself while stepping up onto machine.
2. Use step on lift arm to get up to operator's platform.

OUC02004,00004B6-19-17SEP13

Adjusting Seat



TCT015178—UN—15MAR17



TCT015179—UN—16MAR17

1. Tilt and lumbar adjustment:

Operating Machine

- a. Seat Back Tilt Adjustment (A) adjusts tilt of seat back.
- b. Lumbar Adjustment (E) provides desired back support.
2. Lift or press handle (B) until window shows the color green to raise or lower seat.
 - a. Lift lever (B) to raise seat.
 - b. Push lever (B) to lower seat.
3. Lift lever (C) to move seat forward or rearward to desired position. Release lever to lock into position.
4. Seat suspension adjustment:
 - a. Rotate lever forward (D) to lockout fore/aft suspension. Only vertical suspension is available with lever in the forward position.
 - b. To enable fore/aft, and vertical suspension, rotate lever to the rear (D).

MX52301,000136E-19-24MAR17

Using Seat Belt

Fasten Belt

CAUTION: Always wear seat belt when operating machine with a Roll-Over Protective Structure (ROPS). Do not jump from machine if machine tips.

1. Sit in seat.



TCT015180—UN—15MAR17

2. Pull out seat belt buckle (A) and stretch across your lap in one nonstop motion.
3. Insert seat belt buckle into latch (B) until it locks.

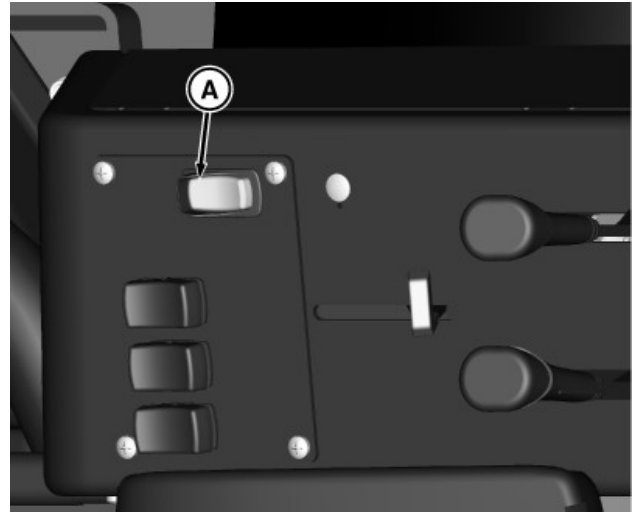
Release Seat Belt

1. Press red button (C) to release seat belt.

MX52301,000136F-19-16MAR17

Using PTO Switch

NOTE: Starter will not crank if PTO is engaged. PTO will disengage when master brake pedal is pressed.



TCT015043—UN—15MAR17

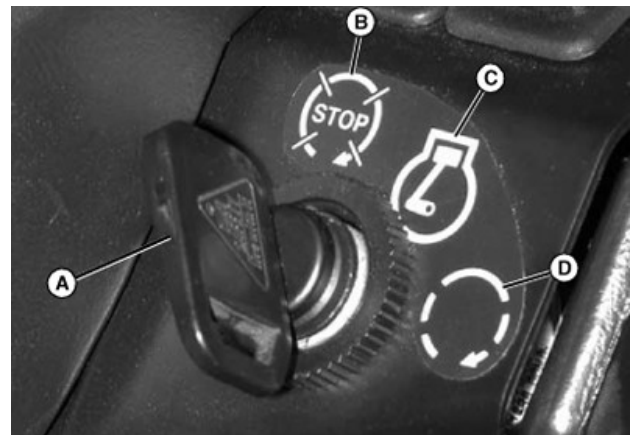
- Push PTO switch (A) forward to engage the PTO.
- Push PTO switch (A) rearward to disengage the PTO.

OUC02004,00004B9-19-16MAR17

Using Key Switch

NOTE: Starter will not crank if any of the following conditions exist:

- PTO is engaged.
- Hydrostatic drive pedals are not in centered (neutral) position.
- Park brake is not locked.



TCAL44834—UN—28MAR13

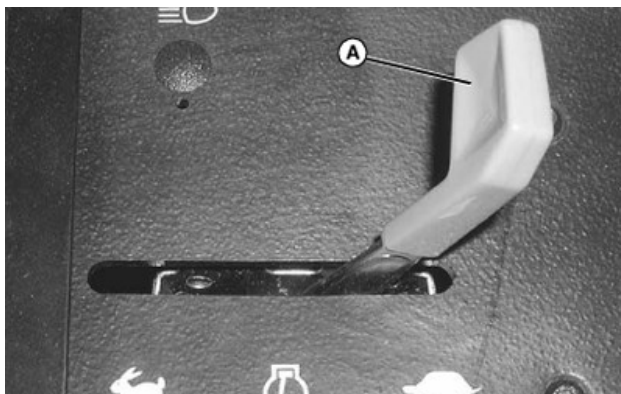
- To turn ignition off, turn the key switch (A) to the STOP position (B).
- To turn ignition on, turn key switch to the run position (C). Indicator lights on instrument panel should go on, and beeper will sound.

Operating Machine

- To start engine, wait for engine manifold heater light to turn off, turn key switch to the start position (D). Once engine begins to run, release key switch back to the run position.

OUC2004,00004BA-19-17SEP13

Using Throttle Lever

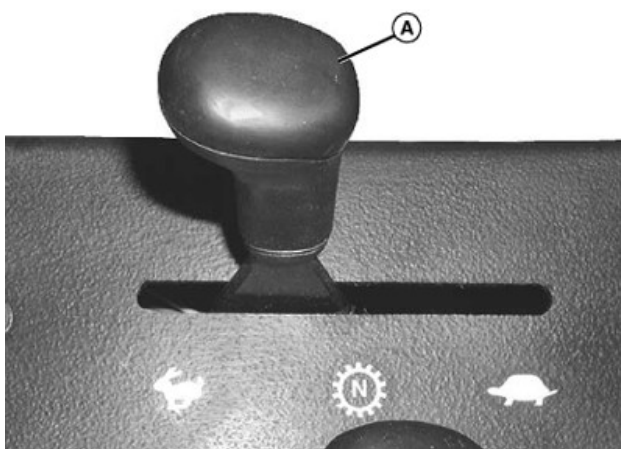


TCAL44835—UN—28MAR13

- Pull the throttle lever (A) to the rear for slow idle. Use this position to start engine and maneuver the mower in confined spaces.
- Push throttle lever fully forward to the fast idle position for transporting and mowing.

OUC2004,00004BB-19-17SEP13

Using Speed Range Lever



TCAL44836—UN—28MAR13

- Place speed range lever (A) in centered neutral position (N) to prevent machine from being driven.
- Pull speed range lever to rear for low speed range for mowing and low speed transport.
- Push lever to front position for high speed range used for high speed transport.

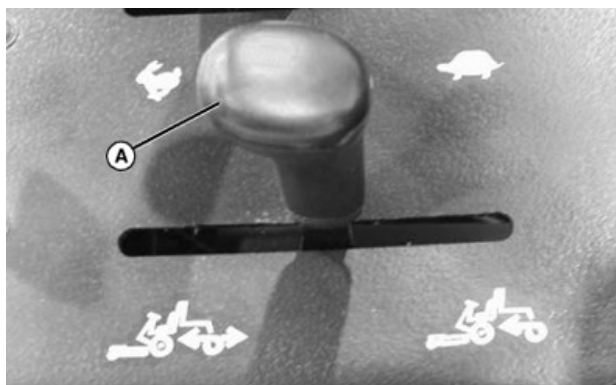
OUC2004,00004BC-19-17SEP13

Using Four Wheel Drive Lever

⚠ CAUTION: To avoid loss of control or damage to turf, do not turn suddenly or at high speeds while machine is in four wheel drive. Do not use four wheel drive any longer than required.

NOTE: “On-demand” operates only forward.

The four wheel drive lever is spring loaded and stays in off position unless held forward. The four wheel drive on-demand is automatic at all times and will engage the four wheel drive system if slippage occurs.



TCAL44838—UN—28MAR13

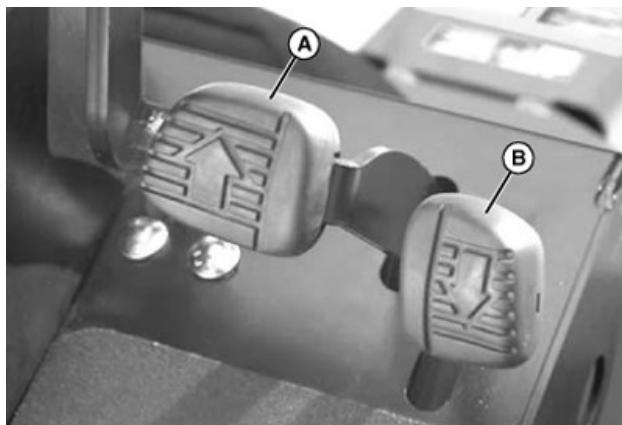
IMPORTANT: Damage can result if driven in full-time four wheel drive while mowing or transporting. Only use four wheel drive as needed during reverse travel.

- Push forward on four wheel drive lever (A) to use “on-demand” four wheel drive when traveling in reverse. When driving forward, rear wheels will engage automatically whenever front wheel slip is detected, and will also disengage automatically.
- Release four wheel drive lever to disengage four wheel drive. Lever is spring loaded and will return to the off position.

OUC2004,00004BE-19-15OCT15

Operating Machine

Using Hydrostatic Pedals



TCAL44839—UN—28MAR13

Using Forward Travel Pedal:

1. Push the forward travel pedal (A) down to begin driving machine. Push the pedal down more to travel faster.
2. Release the pedal to return to neutral and stop the mower.

Using Reverse Travel Pedal:

⚠ CAUTION: Rotating blades are dangerous. Children or bystanders may be injured by run over and rotating blades.

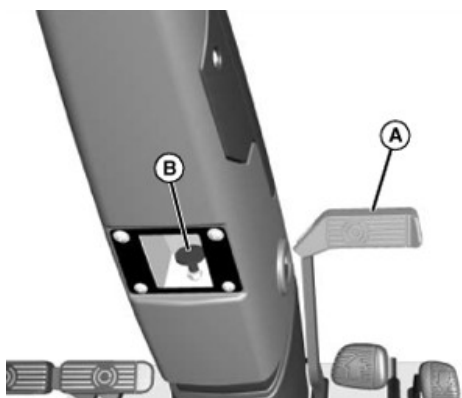
Before backing up, carefully check the area around the machine.

1. Push the reverse travel pedal (B) down to back the machine. Push the pedal down more to travel faster.
2. Release pedal to return to neutral and stop the machine.

OUC2004,00004BF-19-17SEP13

Using Brakes

Using Master Brake Pedal



TCAL44840—UN—28MAR13

1. Push the master brake pedal (A) down to hold the machine stationary on a slope or for an emergency stop.

PTO will disengage when master brake pedal is pressed, and PTO switch will have to be recycled to restart PTO once brake is released.

Using Park Brake

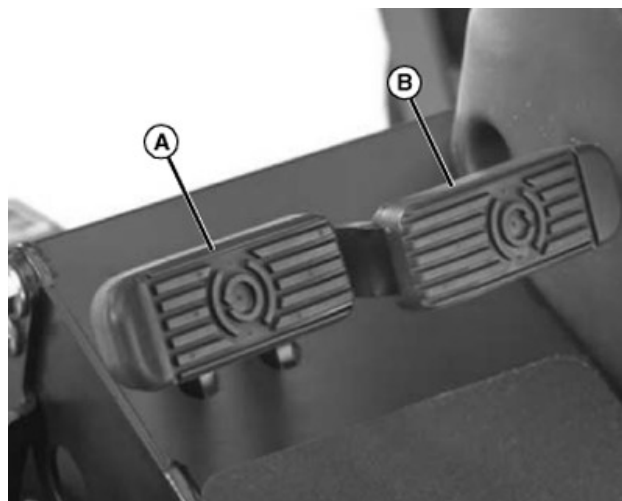
⚠ CAUTION: Children or bystanders may attempt to move or operate an unattended machine.

Always lock the park brake and remove the key before leaving the machine unattended.

1. Lock the park brake by pulling the park brake knob (B) fully upwards. Press the master brake pedal (A) down fully. The park brake should now be locked.
2. Unlock the park brake by pushing the park brake knob (B) down fully. Fully press and release the master brake pedal (A). The park brake should now be unlocked.

Using Turn Brakes

The turn brakes are used to change direction quickly within the width of machine. Avoid locking the tire with the turn brake in areas where turf damage is not acceptable. The turn brakes will not turn the machine if the differential lock is engaged.



TCAL44841—UN—28MAR13

1. Press down on the left turn brake pedal (A) to slow or stop the rotation of the left front tire, while power is applied to the right wheel. The machine will turn to the left. Release the turn brake pedal to resume driving in a straight line.
2. Press down on the right turn brake pedal (B) to turn to the right.

OUC2004,00004C0-19-17SEP13

Using Differential Lock Pedal

The differential lock is used to help improve traction on slopes and in slippery surfaces. The front drive axle will lock so that the front wheels turn together.

Operating Machine

IMPORTANT: Use the pedal only when you need more traction. Do not lock the differential at high speed or make sharp turns when the differential is locked, or turf damage may result.

To lock the differential:



TCAL44842—UN—28MAR13

Push the pedal (A) down with the left foot and hold it.

To unlock the differential:

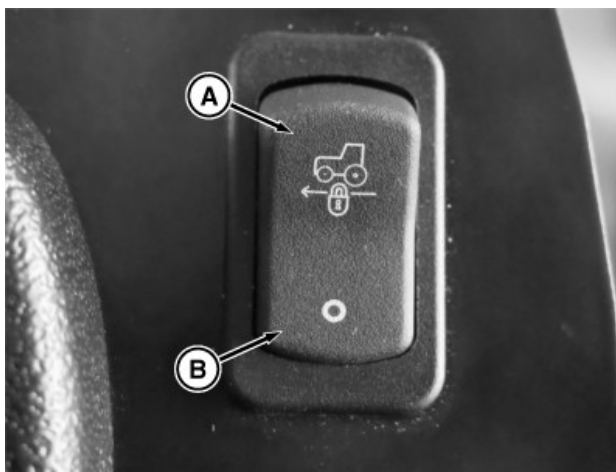
1. Release the pedal.
2. The differential will stay locked as long as wheel slip is unequal. Once the load on the transmission is equalized and reduced, the differential lock will disengage.

OOU2004.00004C1-19-17SEP13

Using Cruise Control

Engaging Cruise Control

1. Push the forward travel pedal down until the machine has reached the desired travel speed.



TCT015177—UN—15MAR17

2. Push the cruise control switch fully forward (A), then release. Allow switch to spring back to the centered position.
3. Remove foot pressure from forward travel pedal. Machine should continue to run at desired speed.

Disengaging Cruise Control

To disengage the cruise control, do one of the following:

- Push down on the master brake pedal.
- Push down on the bottom (B) of the cruise control switch.

OOU2004.00004C2-19-16MAR17

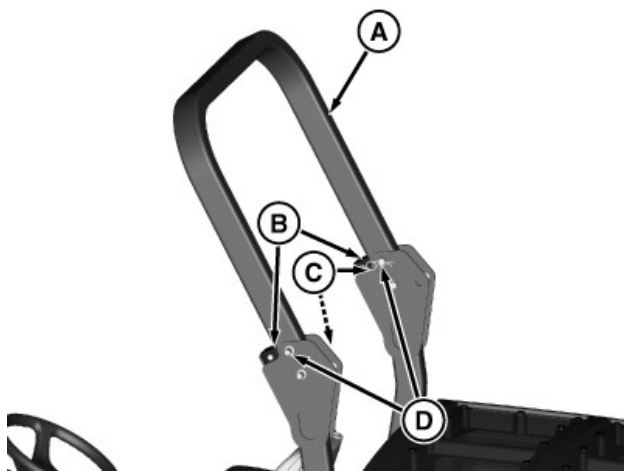
Raising and Lowering ROPS

CAUTION: Always wear seat belt when operating machine with folding Roll-Over Protective Structure (ROPS) in upright position. Do not jump from machine if machine tips.

If ROPS must be folded to operate in a low clearance area, do not use seat belt. Raise ROPS and use seat belt as soon as conditions permit.

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

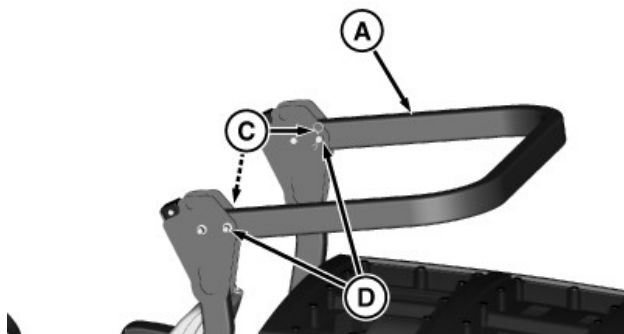
Operating Machine



TCT015044—UN—15MAR17

2. Pull ROPS (A) forward to compress isolators (B).
3. Remove spring pin (C) from drilled pin (D) on side of ROPS.
4. Remove drilled pin (D) from ROPS.
5. Repeat procedure for opposite side of machine.

CAUTION: Fingers and hands can be pinched or crushed. Be aware of potential pinch points and keep hands away.



TCT015045—UN—15MAR17

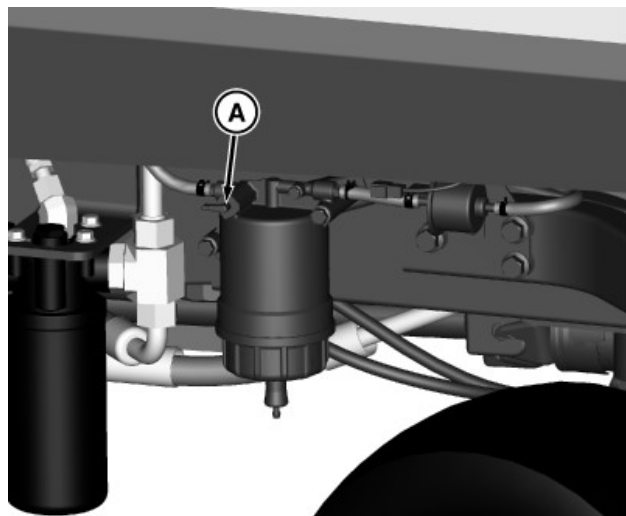
6. Pull ROPS (A) rearward to lowered position .
7. Install drilled pins (D) and spring pins (C) back into holes in ROPS to secure in place.

OUC02004,00004C3-19-16MAR17

Using Fuel Shutoff Valve

NOTE: Shut off fuel flow when transporting machine on a trailer or storing machine.

1. Lift and open the engine cover.
2. Rotate the fuel shutoff valve to the open or closed position as follows:



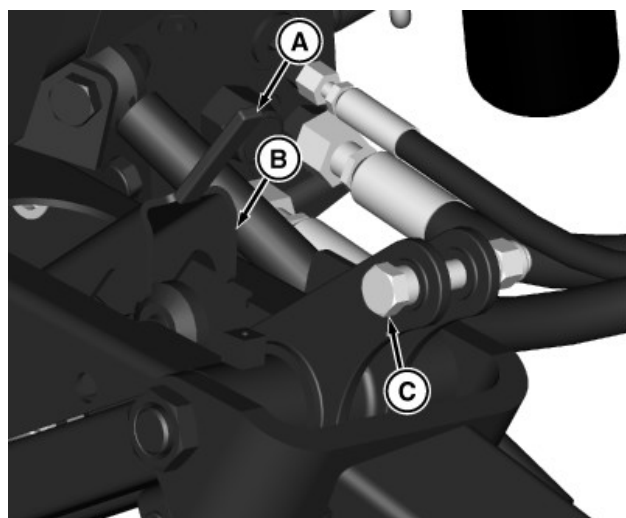
TCT015046—UN—15MAR17

- To open, rotate handle (A) rearward
- To close, rotate handle so the pointer is facing to the rear as shown.

OUC02004,00004C4-19-16MAR17

Using Mower Deck Transport Locks

1. Bring machine to a stop.
2. Raise side decks to top of travel.



TCT015158—UN—15MAR17

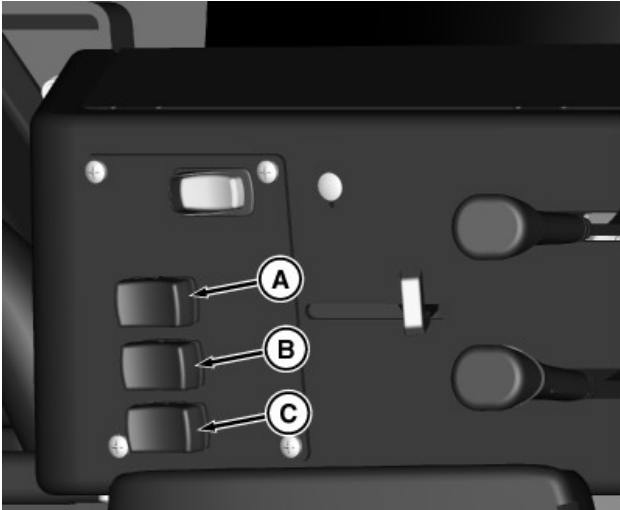
3. Push left and right side transport lock levers (A) down until hooks (B) are over pivot pins (C).
4. Lift transport lock handle to unlock. If mower deck has been lowered while lock is engaged, it will be necessary to raise deck up to unlock transport lock.

OUC02004,00004C5-19-16MAR17

Operating Machine

Raising and Lowering Mower Decks

CAUTION: Avoid Injury! Do not raise the mower decks on slopes or when traveling at high speeds, as the machine could become unstable. Deck lowers quickly when deck lift switch is pushed forward.



TCT015159—UN—15MAR17

A—Right Mower Deck Lift Switch
B—Front Mower Deck Lift Switch
C—Left Mower Deck Lift Switch

1. To raise a mower deck, push the correct mower deck lift switch rearward. Mower deck will raise up until the switch is released, or the mower deck reaches the top of its travel, whichever occurs first.
2. To lower a mower deck, momentarily push switch forward. Mower deck will drop fully down to the ground. If deck needs to be stopped before it lowers completely, momentarily push the lift switch rearward, and then allow it to return to center.
 - Raising a side deck will stop the blades for that deck. Lowering the side deck will restart the blades.
 - Raising the front deck will stop the blades for all decks. To restart blades, lower the front mower deck, and cycle the PTO switch from on to off, to on again.
 - The engine high idle speed will change depending on the position of the front deck. It will be approximately 3150 rpm with the deck raised, and 3030 rpm with deck lowered. This is normal operation.

- 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.

NOTE: Engine will not start unless the PTO is off, park brake is locked, and the hydrostatic pedals are in the centered (neutral) position.

1. Open the fuel shutoff valve (if closed).
2. Sit on the operator's seat. Put on seat belt.
3. Lock the park brake.
4. Push the PTO switch to the off position.
5. Pull the throttle lever back to the slow idle position.
6. Turn the key switch to the run position. Wait for the engine preheat light to turn off.

IMPORTANT: Avoid Damage! Do not overheat starter. Do not operate starter more than ten seconds at a time. Wait two minutes before trying again if engine does not start.

7. Turn the key switch to the start position for no longer than ten seconds. Release key to run position after engine starts.
 - If starter engages, but engine does not start, wait two minutes and try again for no longer than ten seconds.
 - If starter does not engage, the Malfunction Indicator Lamp (MIL) will blink starting trouble codes while the key switch is in the start position. See Using Starter Trouble Codes to help determine why the engine will not start.

IMPORTANT: Avoid Damage! Unnecessary engine idling may cause engine damage. Excessive idling can cause engine overheating, carbon buildup, and poor performance.

8. Let engine run at half-speed position for two minutes to allow it to warm up before operating machine.

OUC2004.00004C8-19-15MAY17

OUC2004.00004C6-19-15MAY17

Starting Engine

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

Stopping Engine

1. Stop PTO by moving PTO switch to off position.
2. Move throttle lever to slow idle position.
3. Lock the park brake.

Operating Machine

4. Lower the mower decks to the ground.

IMPORTANT: Allow engine to idle for two minutes before shutting down after running under load to avoid damage to turbocharger.

5. Turn key switch to STOP position.
6. Remove key.

OUO2004,00004C9-19-17SEP13

Transporting Machine

1. Turn PTO switch to off position.
2. Lower front mower deck.
3. Lower left and right side mower decks. (If necessary to transport with side decks raised, engage transport locks and keep transport speeds low).
4. Move speed range lever forward to transport position.

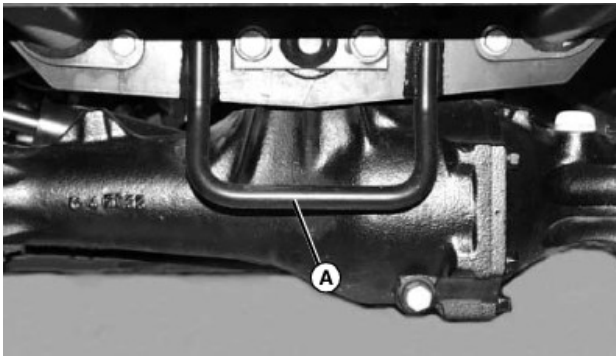
OUO2004,00004CA-19-17SEP13

Towing Machine

IMPORTANT: Do not tow machine faster than 15 mph. Steering will be more difficult with engine off. Do not tow machine unnecessarily.

1. Unlock the park brake.
2. Put range shift lever in neutral (N) position.

IMPORTANT: Do not tow or pull with rear bumper of machine.



TCAL44850—UN—28MAR13

3. Attach heavy chain or tow strap to tow loop (A) of machine at rear axle.
4. Pull machine slowly, using brakes when necessary.
5. Do not use machine to pull or tow any other vehicle or trailer.

OUO2004,00004CB-19-24MAR17

Transporting Machine on Trailer

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

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

- Park trailer on a level surface.
- Use of a trailer with sides is recommended.
- Keep wheels away from drop-offs and edges.
- Back slowly and in a straight line.
- Close fuel shut-off valve, if your machine is equipped.

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

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

1. Raise side decks and engage transport locks.
2. Drive forward onto heavy-duty trailer with front deck raised.
3. Lower front deck down to platform of trailer.
4. Stop engine, remove key, lock park brake.
5. Close the fuel shutoff valve.
6. Fasten machine to trailer with heavy-duty straps, chains, or cables. Fasten rear straps to rear tow loop behind rear axle. Fasten front straps to tie down holes on operator's platform. Both front and rear straps must be directed down and outward from machine.
7. Check that engine cover latches are locked down.

OUO2004,00004CC-19-17SEP13

Operating - Mower

Adjusting Cutting Height

1. Stop machine on level surface, PTO off, park brake locked.
2. Raise all mower decks. Engage left and right side deck transport locks. Stop engine.
3. Check tire pressures on all machine tires according to specifications.

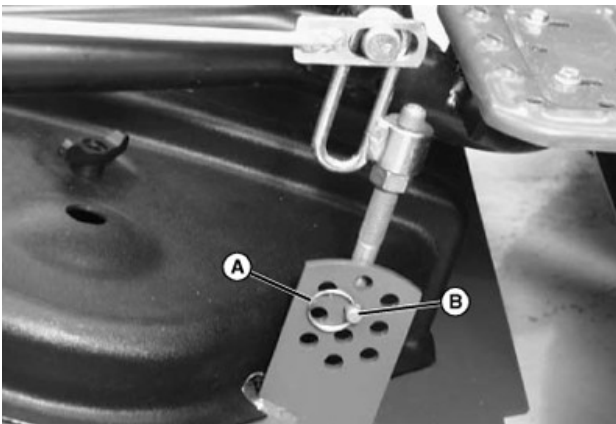
Specification

Front Tires—Pressure. 207 kPa (30 psi)

Specification

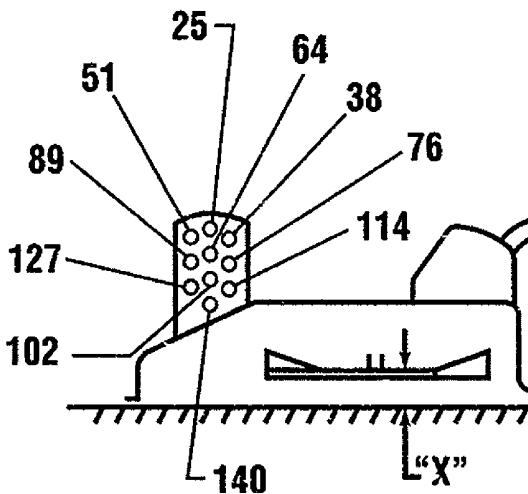
Rear Tires—Pressure. 193 kPa (28 psi)

Adjusting Front Deck Cutting Height



TCAL44851—UN—28MAR13

1. Remove retainer ring (A) from deck hanger pin (B) on left and right side of front deck.



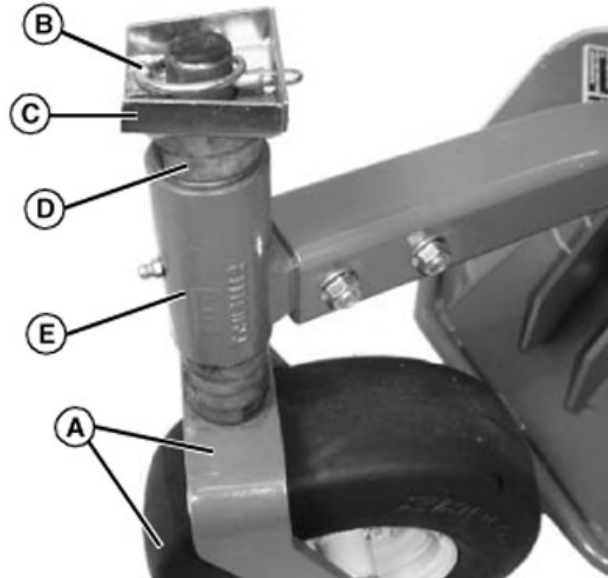
TCAL44852—UN—28MAR13

2. Using the figure above, or decal mounted on front deck, place deck hangers into holes that match desired cutting height.
3. Install retainer rings into hanger pins.
4. Adjust caster wheels on front deck to match cutting height selected on hanger.

Adjusting Caster Wheels Cutting Height

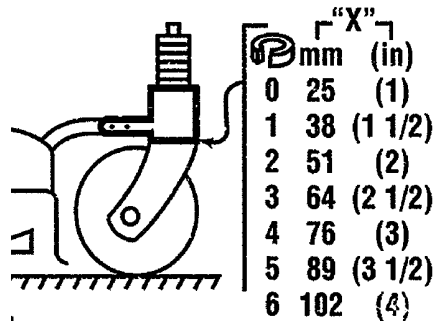
NOTE: This adjustment is for all caster wheels on front and side mower decks.

1. Raise mower decks.



TCAL44853—UN—28MAR13

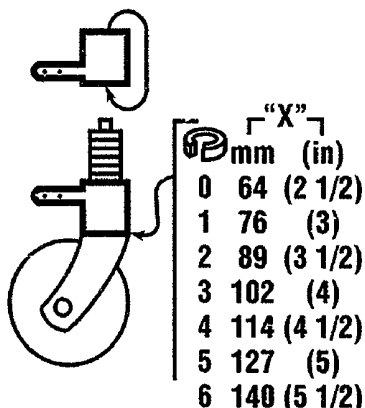
2. Support the caster wheel and bracket (A) with one hand, while removing quick-lock pin (B) and spacer guard (C).
3. Remove the spacers (D) from the top of the caster pivot shaft.
4. Lower the caster and pivot shaft out of the caster support bracket (E).



TCAL44854—UN—28MAR13

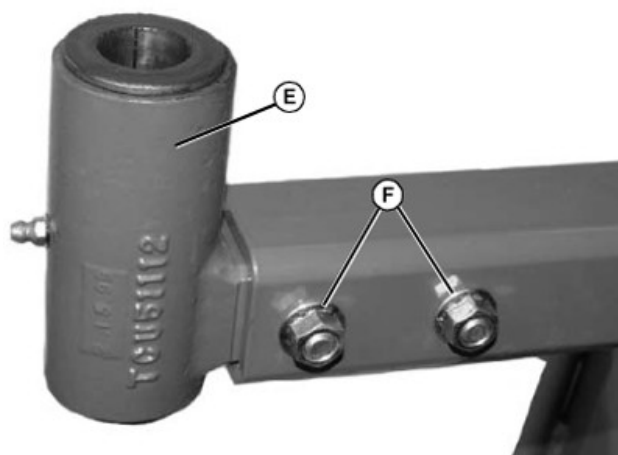
5. Use the figures above, or decal mounted on front mower deck to select the number of spacers needed to set caster wheel to desired height.

Operating - Mower



TCAL44855—UN—28MAR13

6. Flip caster support brackets over to adjust blades to higher than 102 mm (4 in) cutting height.



TCAL44856—UN—28MAR13

- To flip the caster support brackets (E), remove two cap screws, nuts, and bushings (F), holding support bracket to mower deck arm. Remove bracket from arm, flip over bracket, and install back into arm.
7. Install cap screws and nuts, but do not tighten nuts at this time.
 8. Install the proper number of spacers onto the bottom of the caster shaft.
 9. Install the caster wheel and bracket up through the caster support bracket.
 10. Install remaining spacers onto the top of the caster shaft.

NOTE: When adjusting side decks to 25 mm (1 in) height of cut, do not install spacer guard on inside caster wheel pivot. Spacer guard may contact engine cover when side deck is raised.

11. Install the spacer guard with open end facing forward (as shown).
12. Install quick-lock pin into caster shaft and hole in spacer guard. Snap retainer loop over caster shaft.

13. If cutting height was adjusted above 102 mm (4 in) perform the follow steps:

- Lower mower deck to ground.
- Turn caster wheels so they are trailing to the rear (as would happen during normal forward travel).
- Tighten caster support bracket hardware.

OJ02004,00004CD-19-24MAR17

Checking Mower Deck Level

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Lower all mower decks completely to ground.
3. Check pressures on all machine tires, according to specifications.

Specification

Machine Front Tires—Pressure. 207 kPa (30 psi)

Specification

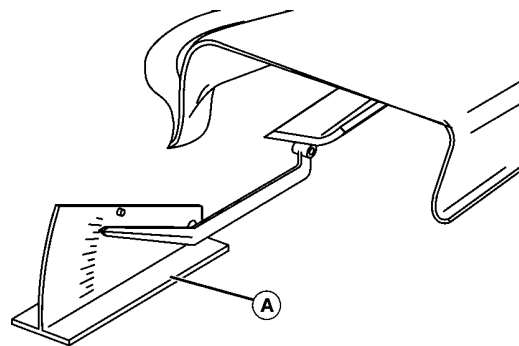
Machine Rear Tires—Pressure. 193 kPa (28 psi)

4. Set the mower decks at the desired cutting height.

CAUTION: Rotating blades are dangerous. Before adjusting or servicing mower:

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

5. Check that the front mower deck caster wheels and rear hangers are all set to the same height.
6. Check that all caster wheels are trailing towards the rear, as they would be during normal forward travel.
7. Turn the blades until parallel to the front axle.



TCAL44857—UN—28MAR13

Leveling gauge (A) is available from your John Deere dealer that will slip under the lip of the deck and measure blade height.

A—Leveling Gauge

8. Measure distance from tip of outside blade to the

Operating - Mower

ground. Repeat for blade on other side of deck.
Mower blades should be level on both sides of deck.

9. Turn outer mower blades to face front-to-rear.
10. Measure height of front and rear of outer blade to ground. Repeat for other side.

Results:

- The blade cutting heights should be level side-to-side.
- The rear tips of the blades should be 6 mm (0.25 in) higher than the front blade tips.

OUO2004,00004CE-19-23AUG18

Adjusting Mower Deck Level

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Lower all mower decks completely to ground.
3. Check pressures on all machine tires, according to specifications.

Specification

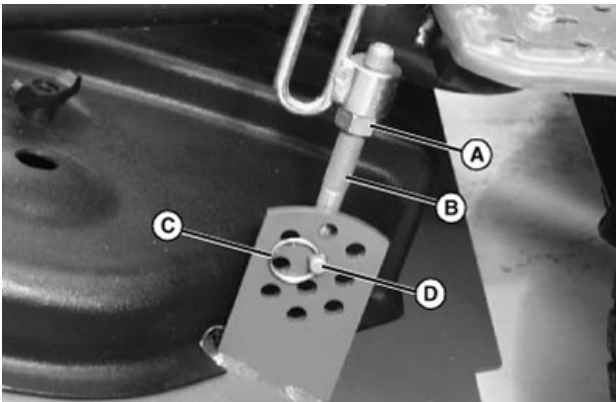
Front Tires—Pressure. 207 kPa (30 psi)

Specification

Rear Tires—Pressure. 193 kPa (28 psi)

4. Set the mower decks at the desired cutting height.
5. Turn all caster wheels so they are trailing to the rear (as would happen during normal forward travel).

Adjusting Front Mower Deck Level



TCAL44858—UN—28MAR13

1. Loosen locknut (A) on deck hanger (B).
2. Remove retainer ring (C) on hanger pin (D).
3. Turn rear hanger up or down to adjust deck height until blades are level side-to-side and front-to-rear.
4. Insert hanger pin (D) back into proper height adjuster hole, and secure with retainer ring.
5. Tighten locknut (A).

Adjusting Side Mower Deck Level

See your John Deere dealer.

OUO2004,00004CF-19-23AUG18

Engaging Blades

CAUTION: Clear mowing area of all bystanders when operating this machine. Thrown objects could cause serious injury or death.

Keep hands and feet away from blades and discharge opening.

Do not mow in reverse unless necessary.

NOTE: Operate engine at full throttle while mowing.

1. Start engine and warm up.
2. Move the speed range lever to the low speed position.
3. Unlock the park brake.
4. Lower the mower decks to ground. If the decks are already in the lowered position, toggle the deck lift lever switches to the lower position (forward), then allow them to return to the center position. This sequence must be repeated every time the engine is started.
5. Move throttle forward to full throttle position.
6. Pull up on PTO switch.
 - Blades should start.
 - If one side deck is not lowered, the blades for that deck will not start up until deck is lowered.
 - If front deck is not lowered, none of the blades will start up.
7. Raise decks to disengage blades:
 - If a side deck is raised while mowing, the blades for that deck will stop. Blades will start up again once the deck is lowered.
 - If the front deck is raised while mowing, all blades on all decks will stop. Once front deck is lowered, the PTO switch will have to be cycled on-off-on to restart blades.
 - Move the PTO switch to the off position to stop all blades.

OUO2004,00004D0-19-17SEP13

Service Intervals

Servicing Your Machine

IMPORTANT: Avoid Damage! High-pressure washing can damage to machine components.

Operating in extreme conditions require more frequent service intervals:

- **Engine components 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.**

Use the following timetables to perform routine maintenance on your machine.

Park the vehicle safely. (See the Safety section.)

OUMX068,000052F-19-12APR19

Service Intervals

Before Each Use

- Check engine oil.
- Check hydraulic oil.
- Check coolant
- Check transaxle fluid.
- Check for leaks.
- Inspect tires and check air pressure.
- Check safety interlock system.
- Check brake system.
- Check air filtration system.
- Check for loose, missing, or damaged parts.
- Check all safety guards and shields.
- Check fuel / water separator.
- Check belts.
- Check pedals and / or steering control.
- Check seat belt.
- Check and clean hood sealing surfaces.

After Each Use

- Check / fill fuel.
- Clean debris from machine.
- Clean debris from cooling system.
- Clean debris from mower and / or attachment drive systems.
- Clean debris from cutting units and attachments.
- Clean debris from underside of mower deck.
- Check mower deck drive belts.
- Check mower blades.
- Lubricate machine after washing.

Break-In - After First 5 Hours

- Check and tighten wheel hardware.

Break-In - After First 50 Hours:

- Change hydraulic oil filter.

Every 50 Hours or Yearly

- Lubricate deck components.
- Lubricate cutting unit or mower lift components.
- Lubricate drive shafts.
- Clean battery terminals and check battery fluid level (if applicable).
- Lubricate rear axle components.
- Lubricate steering cylinder.
- Check mower deck belts.
- 4WD Model: Check rear axle oil level.
- Check and tighten wheel hardware.

Every 100 Hours

- Lubricate rockshaft pivots.
- Lubricate rear axle pivot.
- Lubricate hydrostatic linkage.
- Lubricate turn brake pedals.

Every 250 Hours

- Change engine oil and filter.

Every 500 Hours

- Change transmission oil and filter (Every 500 Hours after Initial Break In).
- Check torque on ROPS hardware.
- Replace fuel filter.
- Change hydraulic oil and filter.
- 4WD Model: Change rear axle oil.
- Inspect rear axle pivot pin.

Every 1000 Hours

- Check valve clearance.

Every 2000 Hours

- Check fuel injectors.
- Change engine coolant and thermostat.

MX00654,0000235-19-10OCT19

Service Intervals

Service Intervals When Using BioDiesel Fuel

IMPORTANT: Only use biodiesel fuel that complies with EN14214 (European Standards) or ASTM D-7467 (USA Standards) in B6 through B20 blends.

Biodiesel fuel must be used within three months of the date of production by the fuel supplier.

NOTE: The use of John Deere Biodiesel Fuel Conditioner is recommended whenever a biodiesel blended fuel is used.

Use the service procedures below at the intervals listed for machines using biodiesel B6-B20 fuel blends:

Daily

- Check and drain water separator as required.
- Check engine oil. If oil level rises, change engine oil immediately.

Engine Oil and Filter Change Interval

- Change at 50% of Service Interval listed in Operator Manuals for regular diesel fuel usage.

Fuel Filter Change Interval

- Change at 50% of Service Interval listed in Operator Manuals for regular diesel fuel usage.

Every 1000 Hours

- Clean, inspect and adjust fuel injectors.

MX00654,0000236-19-10OCT19

Service Intervals After Converting to Bio Hy-Gard

Use the service procedures below at the intervals listed for machines converted to use Bio Hy-Gard:

Every 250 Hours

- Change hydraulic oil and filter.

Yearly

- Replace Bio Hy-Gard lubricant.

OUO2004,00004D7-19-17SEP13

Service Lubrication

Grease

IMPORTANT: 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:

High Speed Applications

Use John Deere Multi-Purpose SD Polyurea Grease or John Deere Multi-Purpose HD Lithium Complex Grease for the following high speed applications:

- Mower Spindles (7 places).
- Rear Axle Bearings (1 place).
- Mechanical Four Wheel Drive Shaft Universal Joints (2 places).

Other Applications

Use John Deere Multi-Purpose HD Lithium Complex Grease or John Deere Moly High Temperature EP Grease for all other applications:

- Caster Wheels (10 places).
- Caster Arm Bushings (10 places).
- Mower Deck Lift Arms (4 places).
- Rockshaft (2 places).
- Side Mower Deck Lift Cylinders (4 places).
- Hydraulic Steering Cylinder (2 places).
- Rear Tie Rod (2 places).
- Hydrostatic Creep Adjustment Eccentric (1 place).

If not using any of the preferred greases, be sure to use a general purpose grease with a NLGI grade No. 2 rating. Avoid use of John Deere Moly High Temperature EP Grease on high speed applications such as mower spindles and the rear axle.

Operating in extremely wet conditions may require use of special purpose greases. See your John Deere dealer.

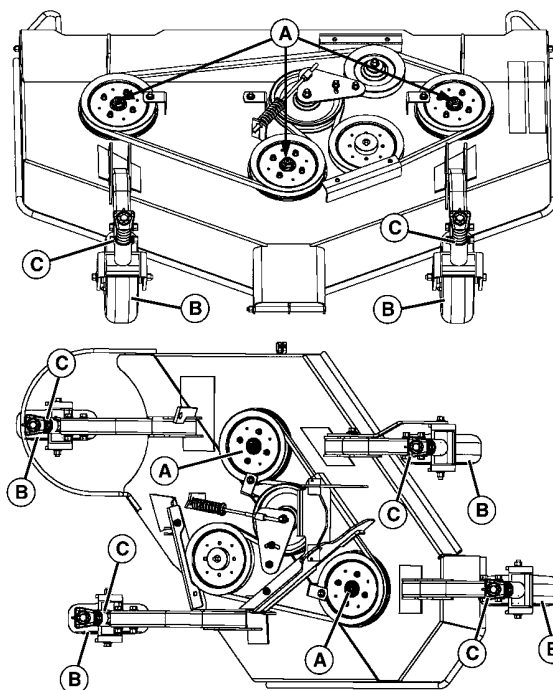
Wipe off all grease fittings before and after lubrication to prevent contamination.

OUO2004,00004D8-19-17SEP13

Lubricating Mower Spindles, Caster Wheels, and Caster Wheel Yokes

1. Lower mower decks completely.

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



TCAL44859—UN—28MAR13

Front deck shown upper, side deck shown lower. Belt shields shown removed for clarity.

3. Lubricate mower deck grease fittings:

NOTE: Do not use John Deere Moly High Temperature EP Grease on mower spindles.

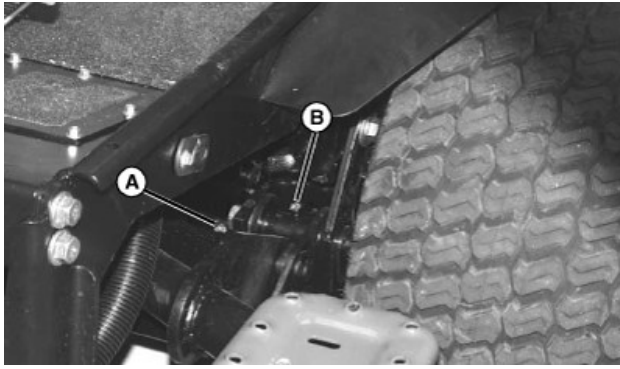
- Mower blade spindles (A) with John Deere Multi-Purpose SD Polyurea grease or John Deere Multi-Purpose HD Lithium Complex Grease.
- Caster wheels (B) and caster arm bushings (C) with John Deere Multi-Purpose HD Lithium Complex Grease or John Deere Moly High Temperature EP Grease.

OUO2004,00004D9-19-17SEP13

Lubricating Mower Lift Arms, Rockshaft, and Lift Cylinders

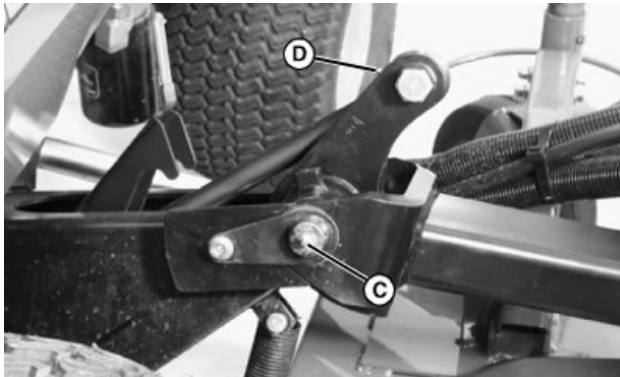
1. Lower mower decks completely.
2. Park machine safely. (See Parking Safely in the SAFETY section.)

Service Lubrication



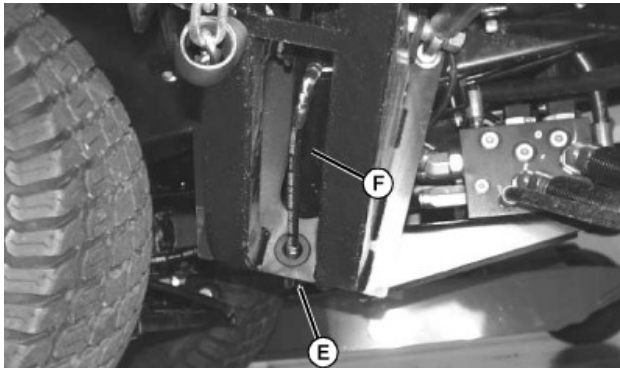
TCAL44860—UN—28MAR13

3. Lubricate front mower deck lift arm pivot joint (A) and rockshaft pivot joint (B) at both sides of machine with John Deere Multi-Purpose HD Lithium Complex Grease or John Deere Moly High Temperature EP Grease.



TCAL44861—UN—28MAR13

4. Lubricate the side deck lift arm pivot joint (C) and lift cylinder pivot joint (D) at both sides of machine with John Deere Multi-Purpose HD Lithium Complex Grease or John Deere Moly High Temperature EP Grease.
5. Start machine. Raise side decks completely.
6. Engage both side deck transport locks.
7. Stop engine and remove the key.



TCAL44862—UN—28MAR13

8. Lubricate grease fitting (E) at the base end of side deck lift cylinder (F) at both sides of machine with John Deere Multi-Purpose HD Lithium Complex

Grease or John Deere Moly High Temperature EP Grease.

OUO2004.00004DA-19-17SEP13

Lubricating Rear Axle Pivot Pin

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



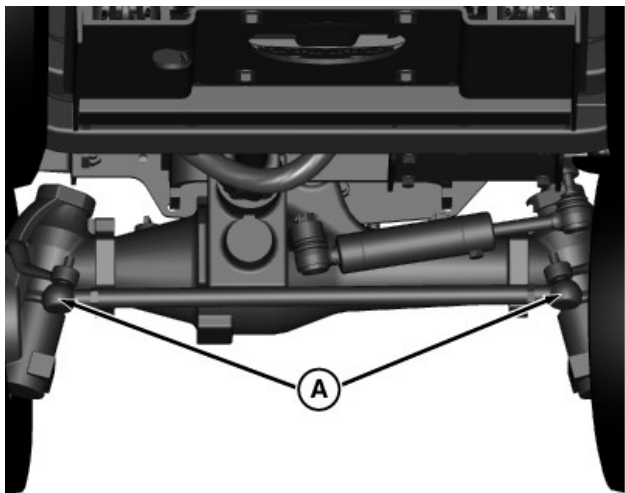
TCAL44863—UN—28MAR13

2. Lubricate grease fitting (A) at left side of rear axle with John Deere Multi-Purpose SD Polyurea Grease or John Deere Multi-Purpose HD Lithium Complex Grease.

OUO2004.00004DB-19-17SEP13

Lubricating Rear Tie Rod

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



TCT015307—UN—20MAR17

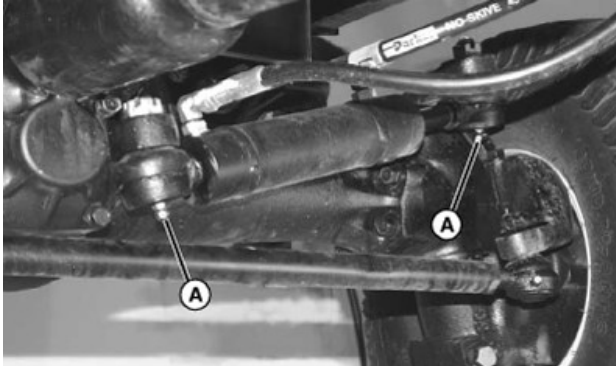
2. Lubricate rear tie rod ends (A) with John Deere Multi-Purpose HD Lithium Complex Grease or John Deere Moly High Temperature EP Grease.

OUO2004.00004DC-19-21MAR17

Service Lubrication

Lubricating Hydraulic Steering Cylinder

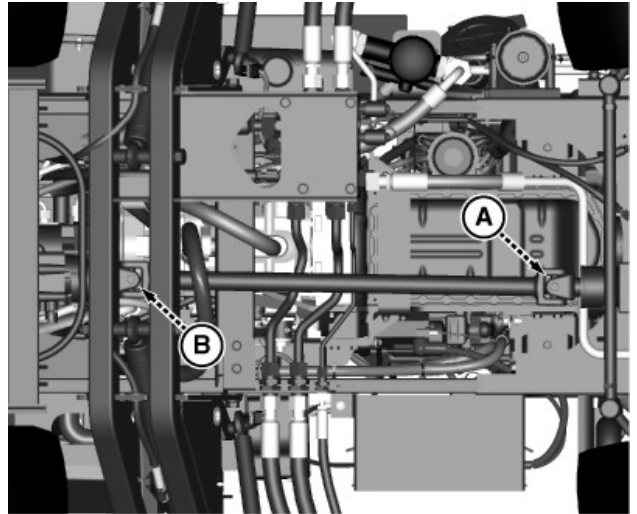
1. Park machine safely. (See Parking Safely in the SAFETY section.)



TCAL44865—UN—28MAR13

2. Lubricate hydraulic steering cylinder ends (A) at rear of machine with John Deere Multi-Purpose HD Lithium Complex Grease or John Deere Moly High Temperature EP Grease.

OOU2004,00004DD-19-17SEP13



TCT015308—UN—20MAR17

4. Lubricate rear universal joint (A) with John Deere Multi-Purpose SD Polyurea Grease or John Deere Multi-Purpose HD Lithium Complex Grease.
5. Lubricate front universal joint (B) with John Deere Multi-Purpose SD Polyurea Grease or John Deere Multi-Purpose HD Lithium Complex Grease.

OOU2004,00004DF-19-21MAR17

Lubricating Hydrostatic Control Arm

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



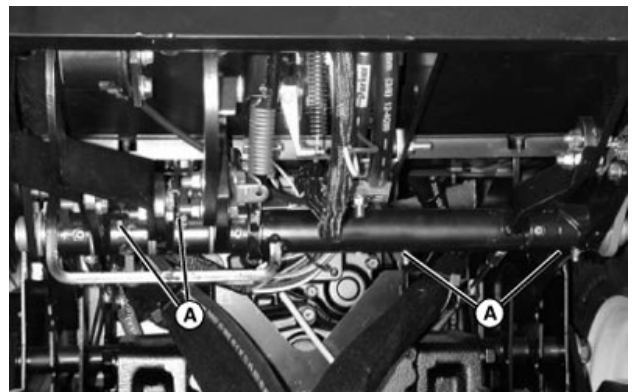
TCAL44866—UN—28MAR13

2. Lubricate hydrostatic creep adjustment eccentric (A) with John Deere Multi-Purpose HD Lithium Complex Grease or John Deere Moly High Temperature EP Grease.

OOU2004,00004DE-19-17SEP13

Lubricating Pedal Linkages

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



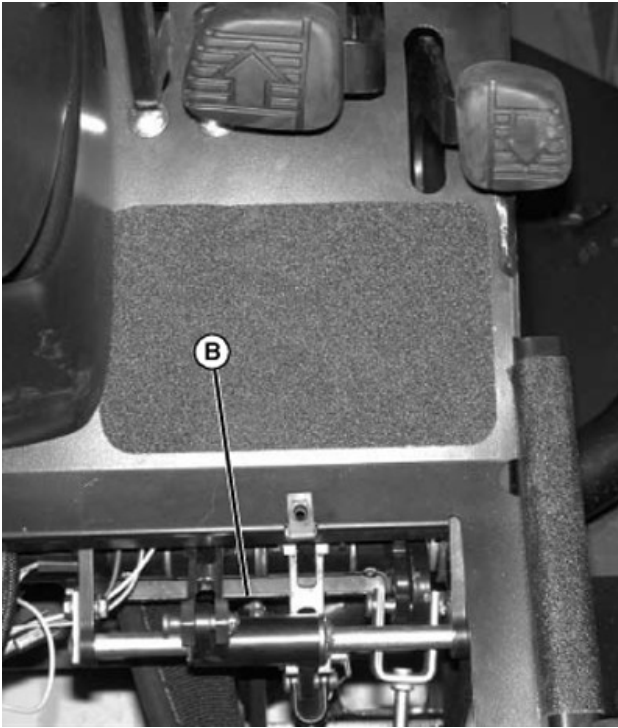
TCAL44869—UN—28MAR13

2. Lubricate four grease fittings (A) located on brake pivot shaft located under operator's platform.

Lubricating Drive Shaft

1. Raise side mower decks completely.
2. Engage both side deck transport locks.
3. Park machine safely. (See Parking Safely in the SAFETY section.)

Service Lubrication



TCAL44870—UN—28MAR13

3. Remove the service hatch on the floor of the operator's platform, and lubricate the hydrostatic pedal linkage at (B).

OUO2004.00004E0-19-17SEP13

Service Engine

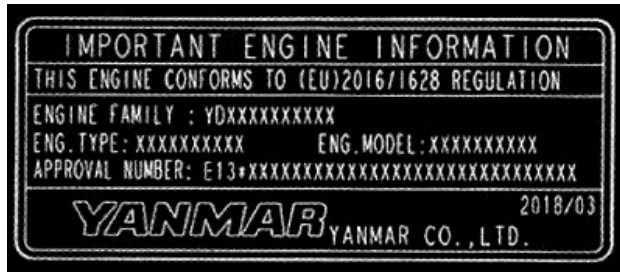
Avoid Fumes

CAUTION: 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.

OUO2004,00004E2-19-17SEP13

Carbon Dioxide Emissions (CO₂)



TCT015573—UN—17MAY18

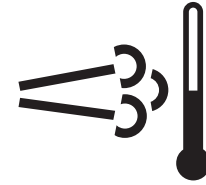
To identify the carbon dioxide (CO₂) output, locate the engine emissions label. Find the appropriate family on the emissions label and reference the chart.

Engine Family	CO ₂ Output
YD099PNLNV2A	1048 g/kWh
YD085PNLNV2A	995 g/kWh
YD112PNLNV2A	932 g/kWh
YD127PNLVN2A	1017 g/kWh
YD219DNCDEV3A	837 g/kWh
YD209DTCDV4A	839 g/kWh
YD209DHCDV4A	758 g/kWh
YD332DNCDEV4A	792 g/kWh
YD332DTCDV4A	738 g/kWh
YD305DHCSV5A	732 g/kWh

This CO₂ measurement results from testing over a fixed test cycle under laboratory conditions a(n) (parent) engine representative of the engine type (engine family) and shall not imply or express any guarantee of the performance of a particular engine.

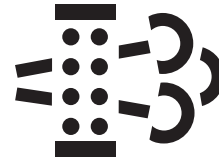
MK71445,000007B-19-01NOV18

Aftertreatment Indicators Overview



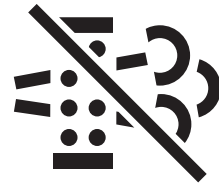
RG22488—UN—21AUG13

Engine Emissions Temperature Indicator



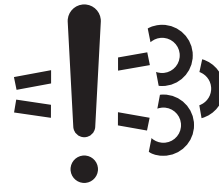
RG22489—UN—21AUG13

Exhaust Filter Indicator



RG22490—UN—21AUG13

Auto Cleaning Disabled Indicator



RG22491—UN—21AUG13

Engine Emissions System Malfunction Indicator



RG22492—UN—21AUG13

Warning Indicator



RG22493—UN—21AUG13

Engine Stop Indicator

Service Engine

IMPORTANT: The operator will be informed by the operator warning system when the emission control system does not function correctly and/or an engine malfunction is detected by the engine control unit. Ignoring the operator warning signals will lead to an emission related derate, resulting in an effective disablement of non-road mobile machinery operation.

It is essential to take prompt action to rectify any incorrect operation, use or maintenance of the emissions control system in accordance with the rectification measures indicated by the warnings referenced below.

When engine emissions temperature indicator illuminates exhaust gas temperature is high, exhaust filter cleaning is in process. The machine can be operated as normal unless the operator determines the machine is not in a safe location for high exhaust temperatures and disables auto cleaning.

When the exhaust filter indicator illuminates the exhaust filter cleaning is in process, aftertreatment system has a fault, or the exhaust filter is in need of cleaning and the operator has disabled auto exhaust filter cleaning. If conditions are safe, the operator should enable the auto exhaust filter clean setting or perform manual service regeneration or follow DTC procedure.

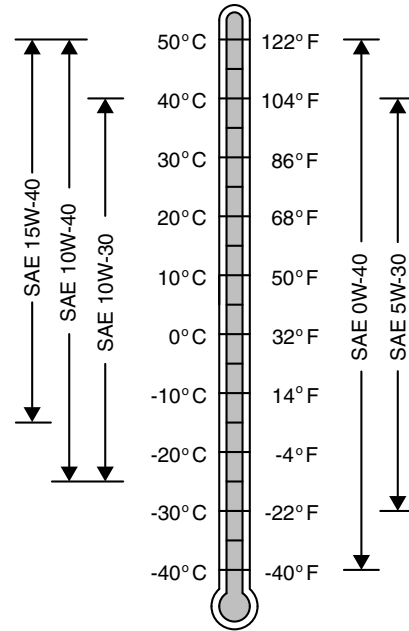
The auto cleaning disabled indicator illuminates when the operator has engaged the request to disable the auto exhaust filter cleaning function. This icon remains illuminated until the operator re-engages automatic exhaust filter cleaning from the diagnostic gauge. Disabling auto mode is not recommended for any situation unless it is safety-related or if the fuel tank lacks the required fuel to complete the cleaning process.

The engine emissions system malfunction indicator illuminates when engine emissions are outside of normal operating range or engine emissions system fault. Follow DTC procedure or see your authorized servicing dealer.

When the engine emissions system malfunction indicator is combined with the warning indicator or engine stop indicator, engine performance is reduced by the ECU because the engine emissions are outside of normal operating range or engine emissions system fault. Follow DTC procedure or see your authorized servicing dealer.

MK71445,00000B1-19-10OCT18

Diesel Engine Oil — Final Tier 4, Stage IIIB, and Stage V



TS1691—UN—18JUL07

Oil Viscosities for Air Temperature Ranges

Failure to follow applicable oil standards and drain intervals can result in severe engine damage that might not be covered under warranty. Warranties, including any emissions warranty, are not conditioned on the use of John Deere oils, parts, or service.

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

John Deere Plus-50™ II is the recommended engine oil.

If John Deere Plus-50™ II engine oil is not available, engine oil meeting one or more of the following may be used:

- API Service Category CJ-4 or higher
- ACEA Oil Sequence E6 or higher
- JASO Service Category DH-2 or higher

DO NOT use engine oil containing more than 1.0% sulfated ash, 0.12% phosphorus, or 0.4% sulfur.

Multi-viscosity diesel engine oils are preferred.

Diesel fuel quality and fuel sulfur content must comply with all existing emissions regulations for the area in which the engine operates.

IMPORTANT: Use only ultra low sulfur diesel (ULSD) fuel with a maximum sulfur content of 15 mg/kg (15 ppm).

MK71445,00000B3-19-18OCT18

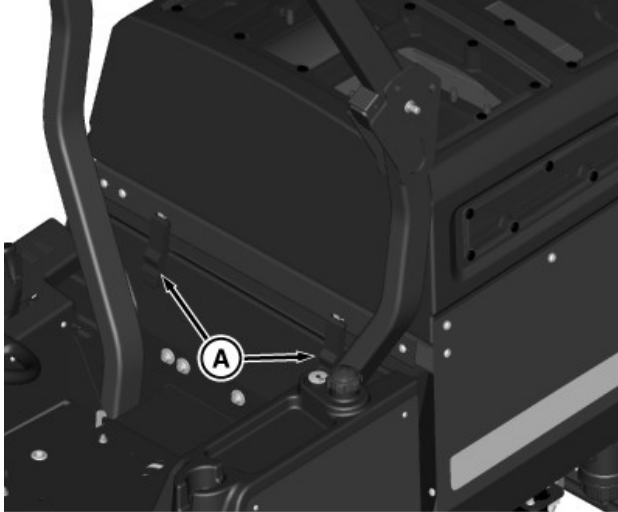
Plus-50 is a trademark of Deere & Company

Service Engine

Raising and Lowering the Engine Cover

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

IMPORTANT: Do not operate the machine with the engine cover in the raised position.



TCT015181—UN—15MAR17

2. Pull out on the bottom of engine cover latches (A) on left and right side of machine, behind operator's seat.
3. Unhook tops of the engine cover latches from the hooks on engine cover.



TCT015182—UN—15MAR17

4. Push down on lever (B) and rotate bumper (C) to the right side of the machine.
5. Raise engine cover using handle (D). Open engine cover completely until it comes to rest.
6. Carefully lower engine cover using handle (D).
7. Hook the tops of the engine cover latches onto engine cover, and press in on bottom of latches to lock closed.

OUC2004,00004E4-19-16MAR17

Raising and Lowering Seat Platform

To Raise the Operator's Seat Platform:

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

CAUTION: Fingers and hands can be pinched or crushed. Be aware of potential pinch points and keep hands away.

2. Stand on the operator's platform facing the operator's seat.



TCT015336—UN—24MAR17

3. Pull forward on the lift release knob (A), while pulling forward and upward on the backrest of the operator's seat.

To Lower the Operator's Seat Platform:

1. Rotate seat platform rearward.
2. Verify seat platform locks in the lowered position.

OUC2004,00004E5-19-24MAR17

Checking Engine Oil

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

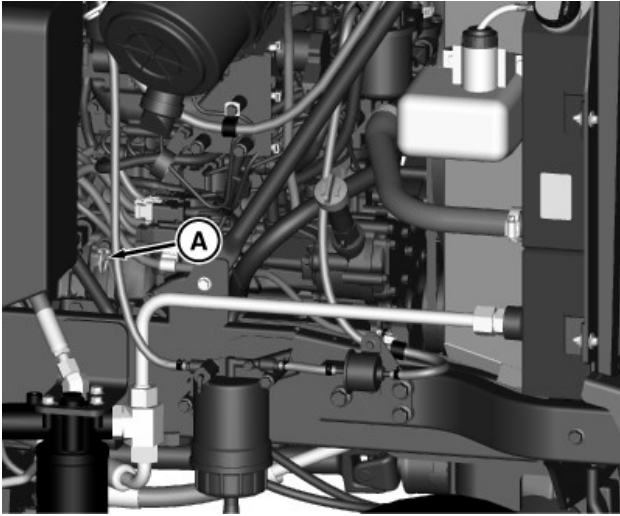
IMPORTANT: Failure to check the oil level regularly could lead to serious engine problems if oil level is out of the operating range:

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

2. Raise engine cover.

Service Engine

IMPORTANT: Avoid dirt and other contaminants from entering the oil dipstick tube location. Clean area around dipstick before removing.



TCT015160—UN—15MAR17

3. Remove dipstick (A) located on the left side of the engine. Wipe dipstick with a clean cloth.
4. Install dipstick.



TCAL44877—UN—28MAR13

5. Remove dipstick. Check oil level. Oil should be between levels (B) and (C) on the dipstick.
 - If oil is low, add oil to bring oil level no higher than level (B) on the dipstick.
 - If oil is above level (B) on the dipstick, drain to proper level.
6. Install dipstick.
7. Lower engine cover.

OUC02004,00004E6-19-16MAR17

Changing Engine Oil and Filter

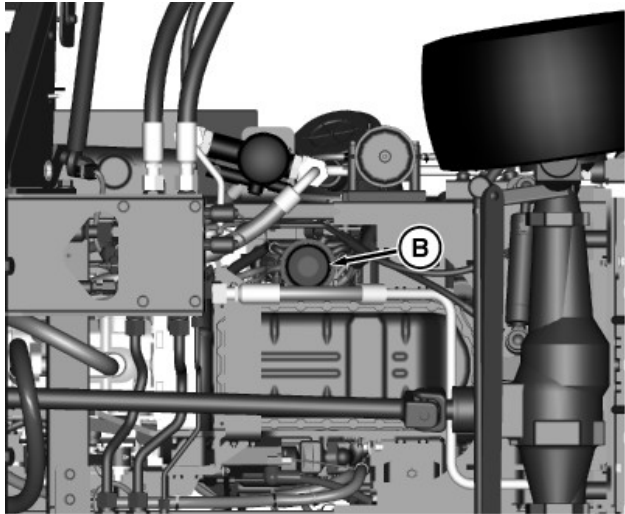
1. Run engine to warm oil.
2. Park machine safely. (See Parking Safely in the SAFETY section.)
3. Raise engine cover.
4. Place a drain pan under the oil drain location.

IMPORTANT: Dirt and debris in oil may cause damage to the engine. Clean area around opening before removing plug or dipstick.



TCAL44878—UN—28MAR13

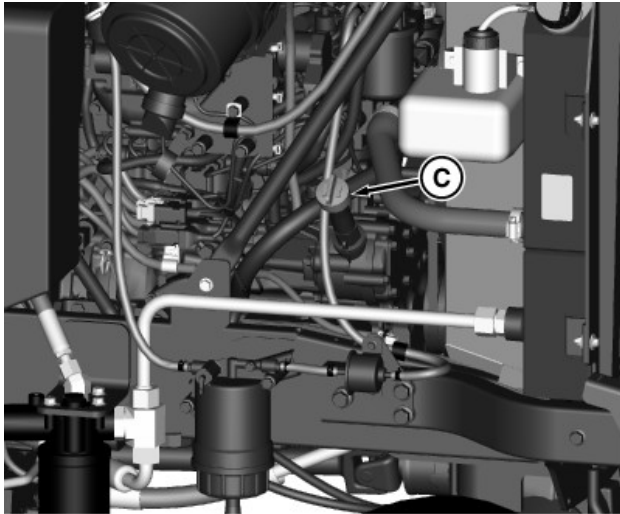
5. Remove drain plug (A) located under the engine.



TCT015161—UN—15MAR17

6. Remove oil filter (B) located under the left side of the engine. Turn filter counterclockwise to remove.
7. Clean filter mounting surface on engine with a clean cloth.
8. Apply a film of clean engine oil on gasket of new filter.
9. Install new filter.
 - Turn filter clockwise until filter makes contact with the mounting surface. Tighten 1/2 - 3/4 turn after gasket contact.
10. Install oil drain plug. Do not overtighten.

Service Engine



TCT015162—UN—15MAR17

11. Remove oil fill cap (C) on top of engine.

IMPORTANT: Do not overfill crankcase with oil. Oil capacities given are with engine and crankcase completely dry. Some oil will remain in engine after draining.

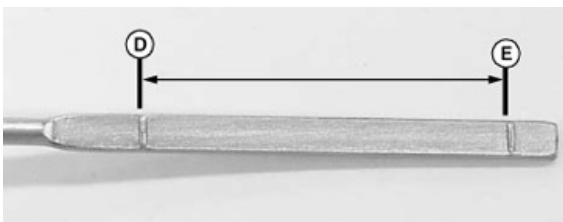
12. Add oil, according to specification. (See Engine Oil under Capacities in the Specifications section.)
13. Install oil fill cap.
14. Start engine.
 - Run engine at a slow throttle speed for approximately two minutes.
 - Check area under engine for oil leaks.

15. Stop engine.

16. After approximately two minutes check engine oil level.

IMPORTANT: Avoid dirt and other contaminants from entering the oil dipstick tube location. Clean area around dipstick before removing.

17. Remove dipstick. Wipe with a clean cloth.
18. Install dipstick.



TCAL44881—UN—28MAR13

19. Remove dipstick. Check oil level. Oil should be between levels (D) and (E) on the dipstick.
 - If oil is low, add oil to bring oil level no higher than level (D) on the dipstick.

- If oil is above level (D) on the dipstick, drain to proper level.

20. Install dipstick.

21. Lower engine cover.

MX00654,0000237-19-10OCT19

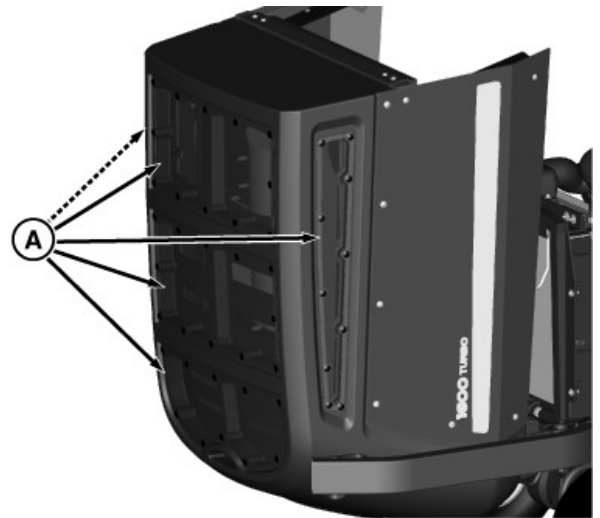
Cleaning Hood Screens

⚠ CAUTION: Compressed air can cause debris to fly a long distance.

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

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

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



TCT015163—UN—15MAR17

3. Clean all five hood screens (A) with a brush, compressed air, or water.
4. Check for debris inside engine cover.
5. Close engine cover and latch.

OUC02004,00004E8-19-16MAR17

Service Engine

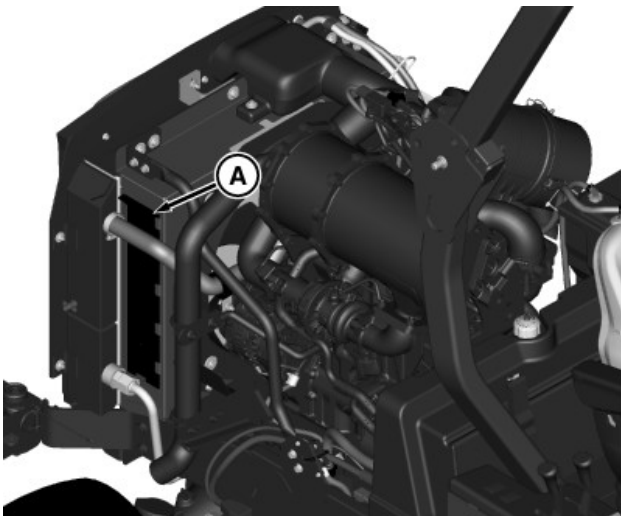
Cleaning Oil Cooler and Radiator

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

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

IMPORTANT: Oil cooler coils and radiator cooling fins must be clean to prevent the engine from overheating and to allow adequate air intake.

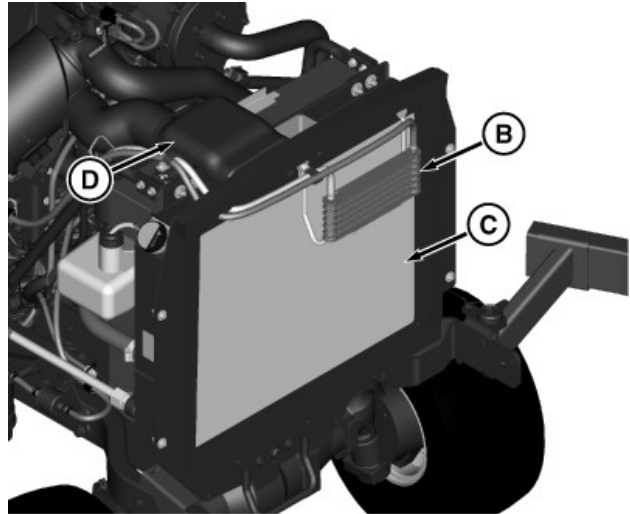
1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Allow engine to cool.
3. Open engine cover.



TCT015165—UN—15MAR17

4. Raise radiator shroud cover (A).

IMPORTANT: When cleaning the oil cooler and radiator fins do not allow water and debris to enter air cleaner intake hose. Keep compressed air nozzle at least 150 mm (6 in.) away from fins while cleaning.



TCT015166—UN—16MAR17

5. Remove dirt and debris from oil cooler (B) and radiator (C) by directing a stream of compressed air or water from the front side of radiator to the rear, being certain not to allow water or debris to enter air cleaner intake hose (D).
6. Check oil cooler coils and radiator fins for damage.
7. Lower radiator shroud cleanout cover.
8. Lower engine cover.

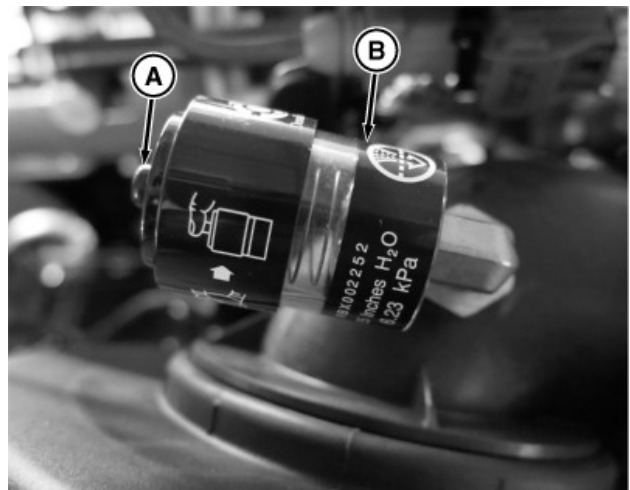
OUO2004,00004E9-19-24MAR17

Checking Air Restriction Indicator

Air Restriction Indicator

1. Park machine safely. (See Parking Safely in the SAFETY Section.)
2. Raise engine cover.

NOTE: Indicator will not signal correctly if indicator case is cracked or broken.



TCT015173—UN—16MAR17

3. Push reset button (A) on end of indicator.

Service Engine

4. Start engine. Run at full throttle.
5. Check air filter restriction indicator.
6. Change primary element only when red plunger is visible in window (B).

OUO2004,00004EA-19-24MAR17

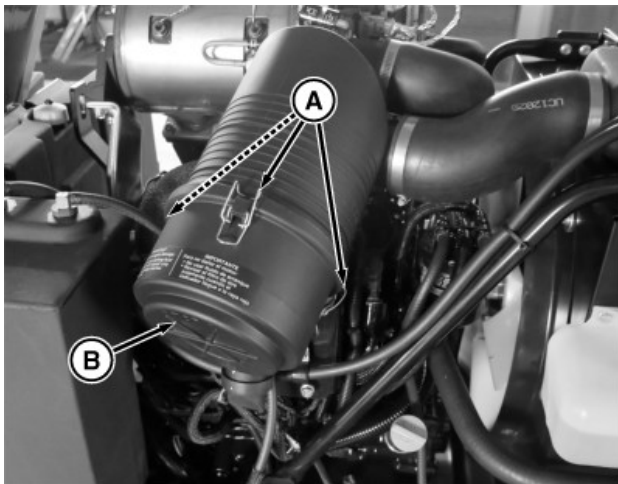
Changing Air Cleaner Elements

IMPORTANT: Do not disturb filter unless air filter restriction indicator shows red plunger in window.

Dirt and debris can enter engine when air cleaner canister is opened. Do not open canister unless required for scheduled service. This will keep contamination of the intake system to a minimum.

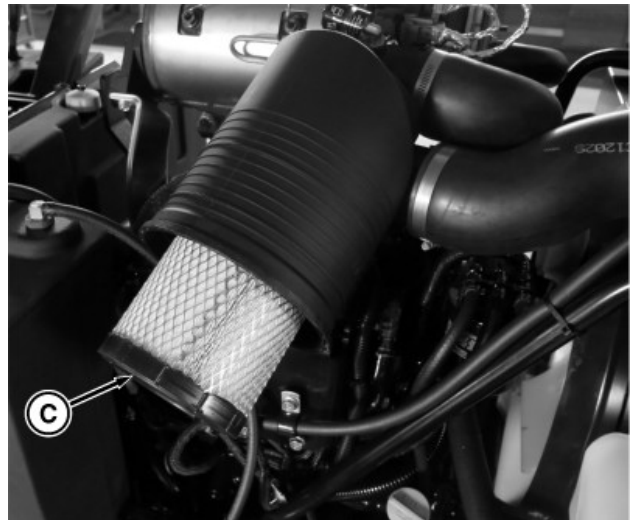
Check air filter restriction indicator more frequently if operating in dusty conditions.

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Allow engine to cool.
3. Raise engine cover.



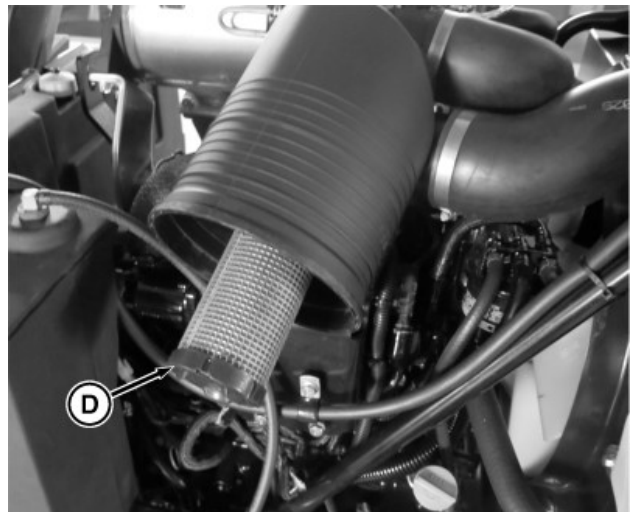
TCT015174—UN—15MAR17

4. Release the three latches (A) and remove air cleaner canister cover (B).



TCT015175—UN—15MAR17

5. Remove and discard primary element (C).



TCT015176—UN—15MAR17

6. Remove and discard secondary element (D).
7. Install new elements into housing.
8. Install cover, and reset air filter restriction indicator.
9. Start engine. Check air filter restriction indicator. If indicator shows red plunger in window, change secondary element.
10. If indicator still shows red plunger after resetting and running engine, check for blockage in air cleaner housing or in hose from radiator bulkhead to air cleaner.

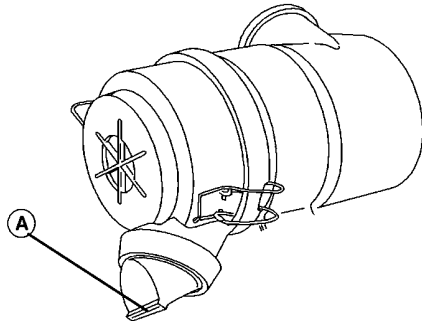
OUO2004,00004EB-19-23AUG18

Cleaning Dust Unloading Valve

IMPORTANT: Do not operate engine without air cleaner element and rubber dust unloading valve installed.

Service Engine

1. Park the vehicle safely. (See Parking Safely in the SAFETY section.)
2. Allow engine to cool.
3. Access the engine compartment.



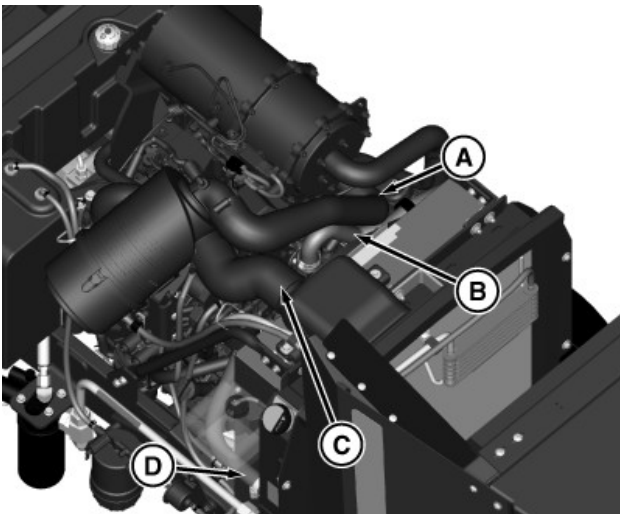
TCAL44893—UN—28MAR13

4. Squeeze dust unloading valve (A) to clean. Remove and replace if damaged.

OUC02004,00004ED-19-17SEP13

Checking Radiator Hoses, Air Intake Hoses and Clamps

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Allow engine to cool.
3. Raise engine cover.



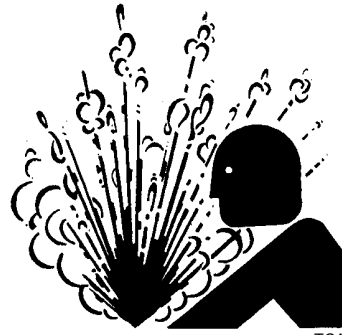
TCT015164—UN—15MAR17

4. Check air cleaner to engine intake hose (A), engine coolant return hose (B), air intake to air cleaner hose (C), and engine coolant intake hose (D).
 - Tighten hose clamps.
 - Check hoses for cracks or damage. Replace if necessary.

5. Lower engine cover.

OUC02004,00004EE-19-16MAR17

Service Cooling System Safely



TCAL44896—UN—28MAR13

CAUTION: The radiator will be hot and can burn skin. Built-up pressure may cause explosive release of coolant when the radiator cap is removed:

- Shut off the engine and allow to cool.
- Do not remove the cap unless the radiator and the engine are cool enough to touch with bare hands.
- Slowly loosen the cap to the first stop to release all pressure. Then remove the cap.

OUC02004,00004EF-19-17SEP13

Diesel Engine Coolant

Preferred coolants:

The following pre-mix engine coolants are preferred:

- John Deere Cool-Gard™ II
- John Deere Cool-Gard™ II PG

Not all Cool-Gard™ II pre-mix products are available in all countries.

Use Cool-Gard™ II PG when a non-toxic coolant formulation is required.

Additional Recommended Coolants

The following engine coolant is also recommended:

- John Deere Cool-Gard™ II Concentrate in a 40—60% mixture of concentrate with quality water.

IMPORTANT: Avoid damage! When mixing coolant concentrate with water, do not use less than 40% or greater than 60% concentration of coolant. Less than 40% gives inadequate additives for corrosion protection. Greater than 60% can result in coolant gelation and cooling system problems.

Cool-Gard is a trademark of Deere & Company

Service Engine

Other Coolants

Other ethylene glycol or propylene glycol base coolants may be used if they meet one of the following specifications:

- Pre-mix coolant meeting ASTM D6210 requirements
- Coolant concentrates meeting ASTM D6210 requirements in a 40% to 60% mixture of concentrate with quality water
- Pre-mix coolant meeting ASTM D3306 requirements
- Coolant concentrates meeting ASTM D3306 requirements in a 40% to 60% mixture of concentrate with quality water

If coolant meeting one of these specifications is unavailable, use a coolant concentrate or pre-mix coolant that has a minimum of the following chemical and physical properties:

- Is formulated with a quality nitrite-free additive package.
- Protects the cooling system metals (cast iron, aluminum alloys, and copper alloys such as brass) from corrosion.

Water Quality

Water quality is important to the performance of the cooling system. Distilled, deionized, or demineralized water is recommended for mixing with ethylene glycol base engine coolant concentrate.

Coolant Drain Intervals

Drain and flush the cooling system and refill with fresh coolant at the indicated interval, which varies with the coolant used.

When Cool-Gard™ II or Cool-Gard™ II PG is used, the drain interval is 6 years or 6000 operating hours.

If a coolant other than Cool-Gard™ II or Cool-Gard™ II PG is used, reduce the drain interval to 2 years or 2000 operating hours.

IMPORTANT: Avoid Damage!

- **Do not use cooling system sealing additives or antifreeze that contains sealing additives.**
- **Do not mix ethylene glycol and propylene glycol base coolants.**
- **Do not use coolants that contain nitrites.**

UP00731,0000022-19-17JAN19

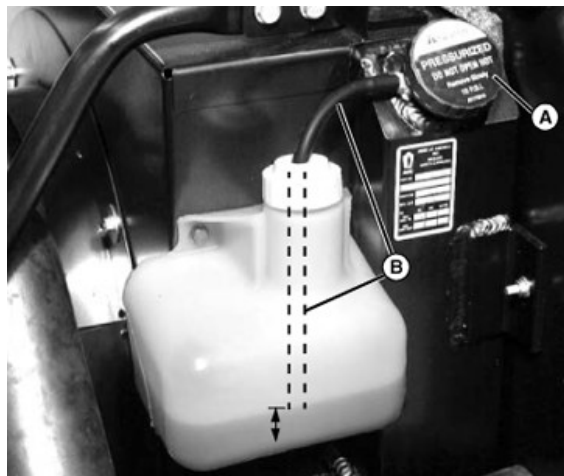
Checking Coolant Level

IMPORTANT: Using incorrect coolant mixture can damage the radiator:

- **Do not operate engine without coolant or with plain water.**

- **Use antifreeze approved for use in aluminum engines.**
- **Do not exceed a 50% antifreeze mixture for the coolant.**
- **Do not pour coolant or water into radiator when engine is hot.**
- **Do not add Stop Leak or other additives.**

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Allow engine to cool. Raise engine cover.



TCAL44897—UN—28MAR13

3. Remove radiator cap (A) and check coolant level is up to filler neck.
4. If coolant is low, add specified ratio of antifreeze and water.
5. Install radiator cap.

NOTE: Coolant recovery tank is used to catch overflow from radiator, and will be about half full during full power operation. Coolant will flow back into radiator as system cools.

6. Check coolant recovery tank. Make sure the overflow hose (B) is not touching the bottom of the recovery tank.
7. Coolant recovery tank should be half full at engine operating temperature.
8. If necessary, clean debris from the engine cover screen, oil cooler coils and radiator cooling fins.
9. Check condition of hoses and clamps. Check for leaks or loose connections.

OUO2004,00004F1-19-17SEP13

Service Engine

Servicing the Cooling System

Draining Cooling System

CAUTION: Do not remove the radiator cap unless the engine is cool. Slowly loosen cap to the first stop. Release all pressure before removing cap. When the engine is hot, the explosive release of fluids from the pressurized cooling system could cause serious burns.

Antifreeze is hazardous to the environment. Dispose of antifreeze in a proper container

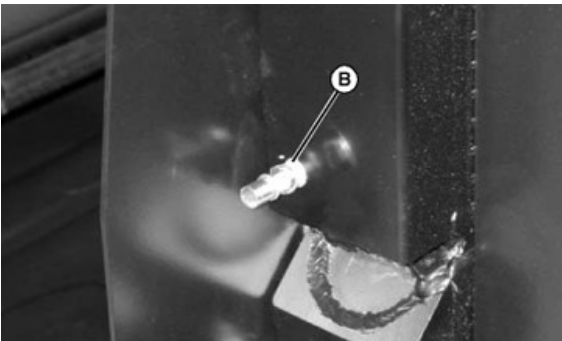
IMPORTANT:

- Do not operate engine without coolant.
 - Do not pour coolant into the radiator when the engine is hot.
1. Park machine safely. (See Parking Safely in the SAFETY section.)
 2. Allow engine to cool.
 3. Raise engine cover.



TCAL44898—UN—28MAR13

4. Slowly open radiator cap (A) to the first stop to release all pressure.



TCAL44899—UN—28MAR13

5. Open petcock (B) located on the right side of the radiator. Drain coolant into a pan.
6. Close petcock after all coolant has drained from the radiator.
7. Flush the cooling system.

Flushing Cooling System

IMPORTANT:

- Do not flush the cooling system when the engine is hot.
- Do not operate engine without coolant.

1. Drain cooling system and add John Deere Cooling System Cleaner, or John Deere Cooling System Quick Flush or equivalent. Fill system with clean water. Follow directions on can.
2. Install and tighten radiator cap.
3. Start and run engine until it reaches operating temperature.
4. Stop engine.

CAUTION: 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.

5. Open radiator petcock.
 - Drain cooling system immediately before rust and dirt settle.
6. Close radiator petcock.
7. Fill cooling system with clean water and repeat flushing until system is clean.
8. Drain system and fill with coolant.

Filling Cooling System

IMPORTANT: Using incorrect coolant mixture can damage the radiator:

- Do not operate engine without coolant or with plain water.
 - Use antifreeze approved for use in aluminum engines.
 - Do not exceed a 50% antifreeze mixture for the coolant.
 - Do not pour coolant or water into radiator when engine is hot.
 - Do not add Stop Leak or other additives.
1. With engine and cooling system cool, open radiator cap to the first stop to release all pressure. Press down on cap slightly and turn counterclockwise to remove.
 2. Fill cooling system to specification.
 - Certain geographical areas may require lower temperature protection. See the label on your antifreeze container or consult your John Deere dealer to obtain the latest information and recommendations.
 - John Deere Cooling System Sealer or its equivalent may be added to the radiator to seal

Service Engine

leaks. Do not use any other additives in the cooling system.

Specification

Cooling System —Capacity. 7.5 L (8 qt)

3. Start engine and watch coolant level in radiator. Add coolant if necessary to bring coolant level up to filler neck.
4. Install and tighten radiator cap. Run engine until at operating temperature.
5. Stop engine and allow to cool down.
6. Add coolant if necessary.
7. Check condition of hoses and clamps. Check for leaks or loose connections.

OUC02004,00004F2-19-17SEP13

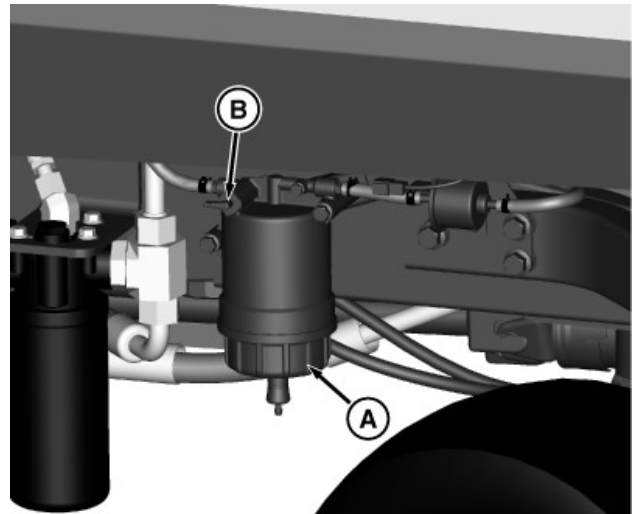
Servicing Fuel Water Separator Sediment Bowl

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

- Shut engine off and allow to cool before filling fuel tank.
- Do not smoke while handling fuel.
- Keep fuel away from flames or sparks.
- Fill fuel tank outdoors or in ventilated area.
- Clean up spilled fuel immediately.
- Use clean approved non-metal container to prevent static electric discharge.
- Use clean approved plastic funnel without screen or filter to prevent static electric discharge.
- Loosen fuel cap slowly to release pressure and to keep fuel from escaping around the cap.

Checking

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Allow engine to cool.
3. Raise engine cover.
4. Locate the fuel filter sediment bowl on the left side of the engine.



TCT015167—UN—15MAR17

5. Look for water and deposits in the sediment bowl (A).

Cleaning and Replacing

1. Close fuel shutoff valve (B) by turning to the horizontal position as shown.
2. Rotate sediment bowl (A) to remove bowl and filter. Discard filter.
3. Clean bowl and install new filter.
4. Install bowl and collar. Tighten collar hand tight.
5. Open fuel shutoff valve by turning lever to vertical position.
6. Prime fuel system.
7. Start engine and check for leaks.

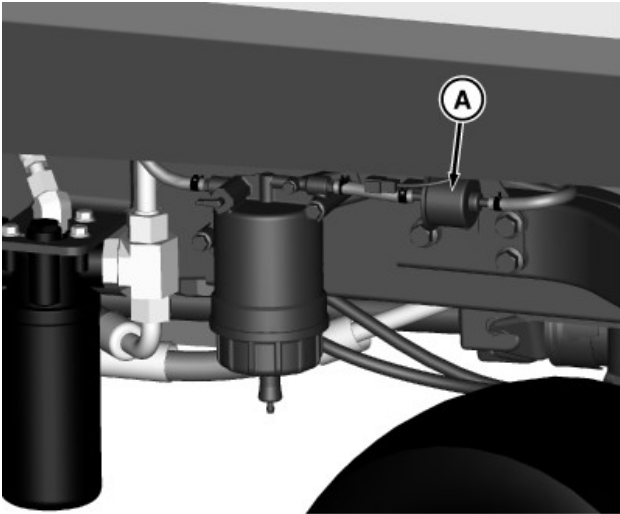
OUC02004,00004F3-19-15MAY17

Priming Diesel Fuel System

NOTE: It may be necessary to prime the fuel system after running out of fuel or changing the fuel filter.

1. Make sure the machine is on a level surface, not a slope.
2. Turn off PTO switch.
3. Lower attachments to the ground.
4. Lock the park brake.

Service Engine



TCT015168—UN—15MAR17

5. Turn key switch to RUN position for 2 minutes prior to starting engine. The fuel pump (A) will pressurize the fuel and remove any air in the system
6. Start engine. If engine will not start, repeat previous step.

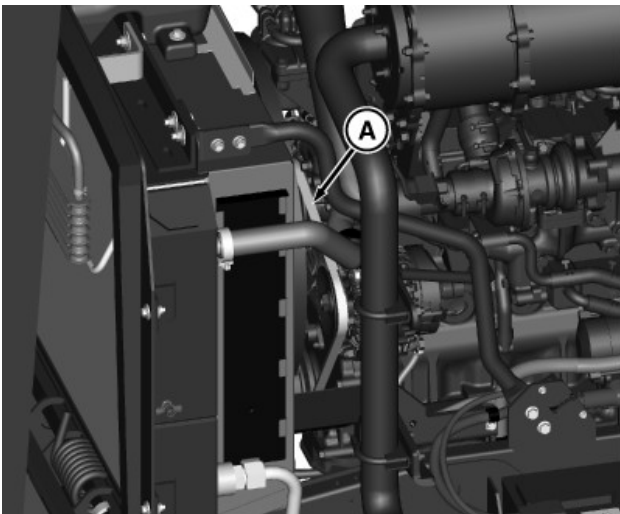
OOU02004,00004F4-19-16MAR17

Checking and Adjusting Alternator Belt

CAUTION: Rotating parts can catch fingers, loose clothing, or long hair. Wait for engine and all moving parts to stop before leaving operator's station to adjust or service machine.

Check Belt Tension

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Allow engine to cool.
3. Raise engine cover.

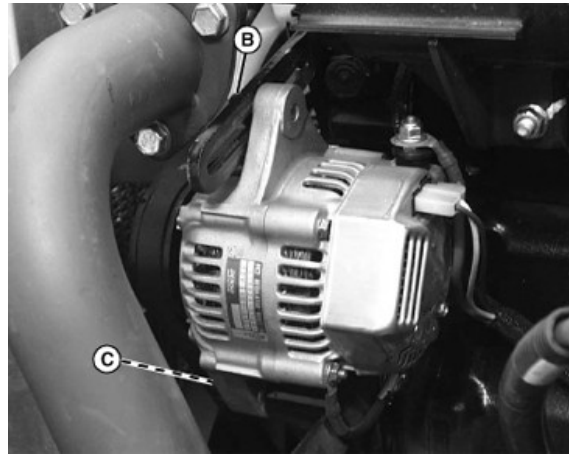


TCT015169—UN—15MAR17

4. Check alternator belt (A).

- Inspect belt for excessive wear, damage, or stretching while in position on the fan, alternator, and flywheel sheaves.
- Apply thumb pressure to the belt approximately halfway between the sheaves. Belt should deflect inward approximately 10—15 mm (3/8—1/2 in).

Adjusting Belt Tension



TCAL44903—UN—28MAR13

Alternator located on right side of engine.

1. Loosen adjustment bolt (B).
2. Loosen alternator mounting bolt (C).
3. Apply outward pressure to the alternator housing.
4. Tighten adjustment bolt (B) and mounting bolt (C).
5. Check belt tension:
 - Apply thumb pressure to the belt approximately halfway between the sheaves. Belt should deflect inward approximately 9.5 mm (3/8 in).
6. Lower engine cover.

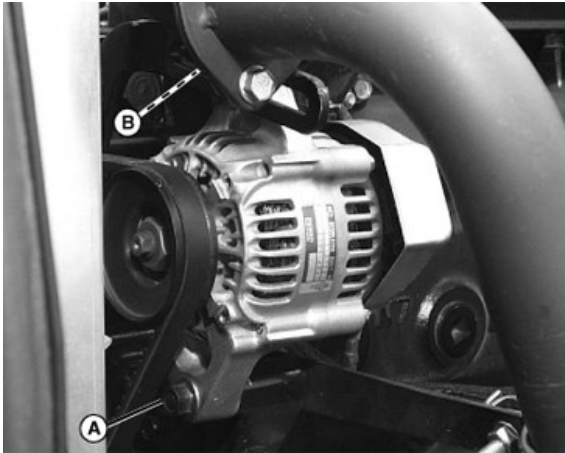
OOU02004,00004F5-19-20MAR17

Replacing Alternator Belt

CAUTION: Rotating parts can catch fingers, loose clothing, or long hair. Wait for engine and all moving parts to stop before leaving operator's station to adjust or service machine.

1. Park machine safely. (See Parking Safely in the SAFETY section.)
2. Allow engine to cool.
3. Raise engine cover.

Service Engine



TCAL44904—UN—28MAR13

Alternator located on right side of engine.

4. Loosen alternator mounting bolt (A).
5. Loosen and remove adjustment bolt (B).
6. Apply inward pressure to the alternator housing.
7. Remove worn belt from the alternator sheave and both engine sheaves.

NOTE: It may be necessary to loosen nuts holding radiator fan shroud to radiator, and to raise or lower shroud until enough clearance can be gained to pull belt between fan blades and shroud.

8. Install new belt over fan blades and engine sheaves, and over alternator pulley.
9. Adjust belt so it deflects approximate 11 mm (.5 inch) when pushed on between water pump and alternator pulleys with finger.

OUO2004,00004F6-19-17SEP13

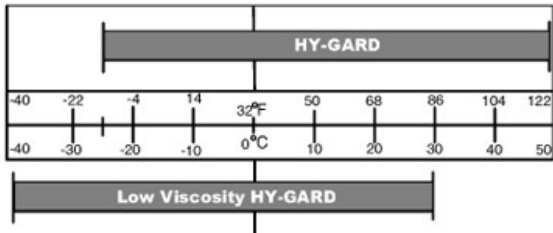
Spark Arrestor Maintenance (If Equipped)

Spark arrestor assemblies include a screen element that should be inspected and cleaned periodically. Visually inspect the screen for tears, broken wires, or loose welds. Replace the spark arrestor assembly if any of these conditions exist. If the screen is determined to be in good condition, proceed with cleaning the screen by brushing away loose dirt or carbon using a brush.

RM87422,00002DA-19-05JUL17

Service Transmission

Transmission and Hydraulic Oil



TCAL44905—UN—28MAR13

NOTE: Transaxle is filled with John Deere HY-GARD® (J20C) transmission oil at the factory. DO NOT mix oils.

Use only HY-GARD® (J20C) transmission oil.

Do not use type “F” automatic transmission fluid.

John Deere HY-GARD® (J20C) transmission oil is specially formulated to provide maximum protection against mechanical wear, corrosion, and foaming.

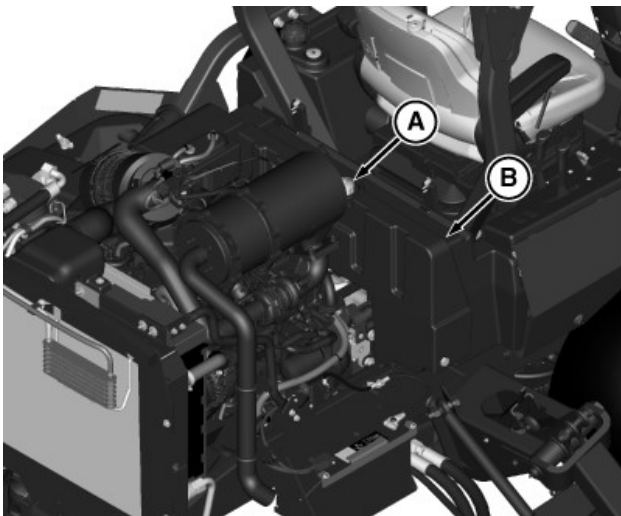
IMPORTANT: If operating temperatures are below – 18°C (0°F), you must use Low Viscosity HY-GARD® (J20D) or transmission damage will occur.

OOU2004.0000500-19-17SEP13

Checking the Hydraulic Oil Level

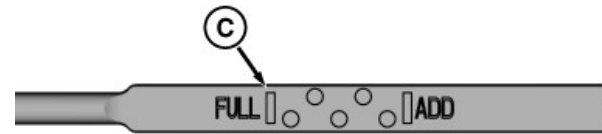
Check the oil level before you start the engine.

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



TCT015192—UN—20MAR17

3. Remove oil fill cap (A) on hydraulic reservoir (B).



TCT015193—UN—30JUN17

4. Check the oil level on the dipstick indicator (C). Oil level should be between the FULL and ADD marks on the indicator when machine is cold.
5. Install reservoir cap and close engine cover.

OOU2004.0000501-19-20MAR17

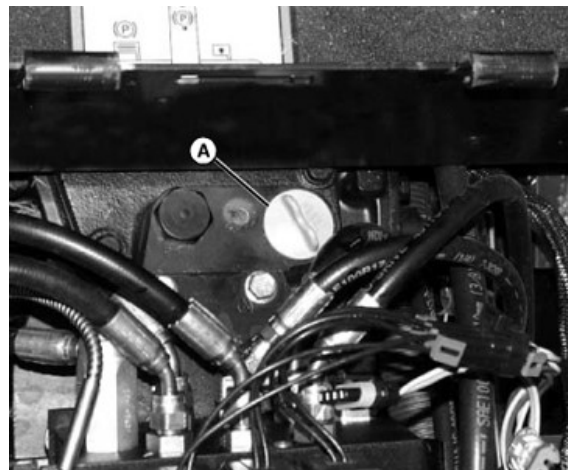
Checking the Transmission Oil Level

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

IMPORTANT: Hot hydraulic oil will expand and show incorrect oil level. Check reservoir tank:

- When oil is cold.
- Engine not running.

NOTE: The hydrostatic transmission oil is separate from the hydraulic system oil and has an oil filler cap/ dipstick located under the operator's seat platform.



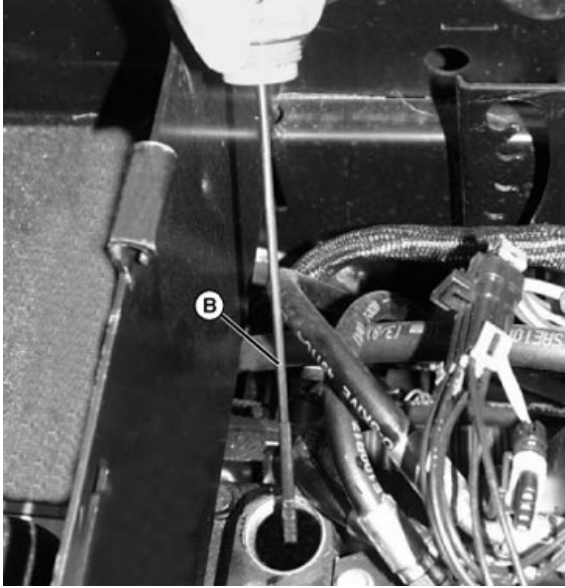
TCAL44908—UN—28MAR13

Oil filler cap (seat platform removed for clarity)

Service Transmission

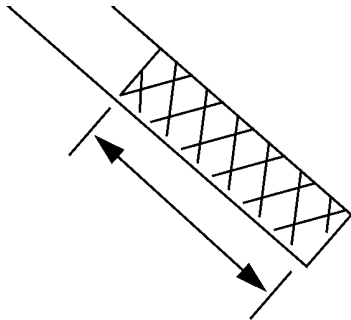
2. Lift operator's seat platform and locate the yellow oil filler cap (A) on top of transmission.

IMPORTANT: Dirt and debris in oil may cause damage to the transaxle. Clean area around opening before removing dipstick.



TCAL44909—UN—28MAR13

3. Unscrew the oil filler cap and wipe the dipstick (B) off with a clean shop towel.
4. Insert the dipstick until the cap contacts the transmission housing and remove again.



TCAL44910—UN—28MAR13

5. Oil level should be in XXX range on dipstick. Add oil to transmission if level does not show on dipstick.
6. Install dipstick and lower seat platform. If oil was added, check oil level after driving machine.

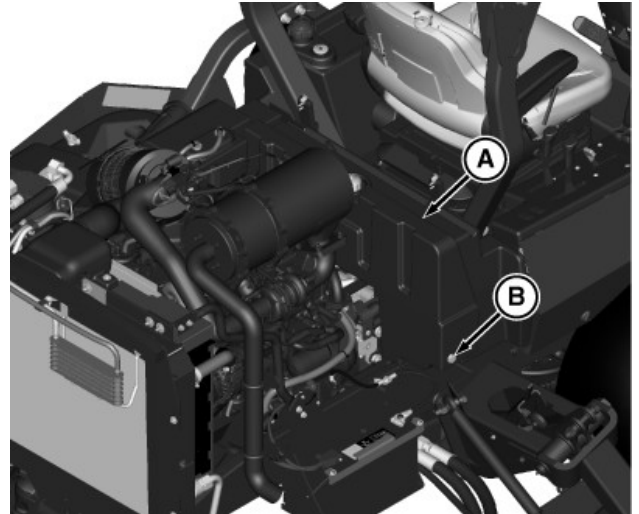
OUO2004,0000502-19-17SEP13

Changing the Hydraulic Oil and Filter

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

Use caution when filling and draining hydraulic oil. During periods of machine operation the hydraulic oil reservoir can get hot. Allow engine and oil reservoir to cool before servicing.

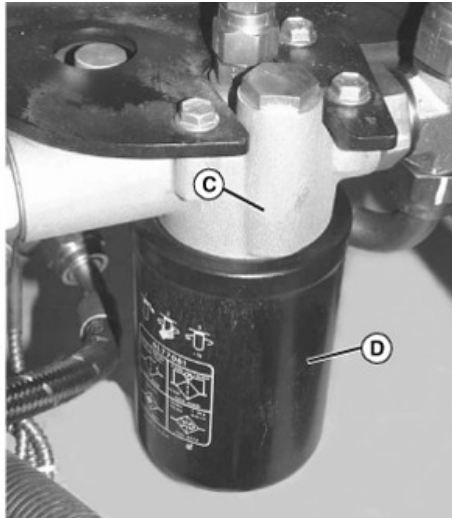
1. Lower all mower decks to ground.
2. Park machine safely. (See Parking Safely in the SAFETY section.)
3. Wait until the engine and the transmission are cool before beginning service.



TCT015194—UN—20MAR17

4. Drain the hydraulic reservoir (A) using a siphon pump and the drain plug (B) on the right side rear corner of reservoir.
5. Install drain plug.

Service Transmission



TCAL44912—UN—09APR13

6. Clean debris from around hydraulic oil filter base (C) on left side of machine.
7. Use a filter wrench to turn the filter (D) counter clockwise. Remove the filter and drain the remaining hydraulic oil.
8. Clean the filter base and put a film of clean transmission oil on the seal of the new filter.
9. Install the hydraulic oil filter. Turn it clockwise until it contacts the mounting surface, then 1/2 turn more.
10. Fill the hydraulic reservoir until up to FULL COLD mark on sight tube.
11. Run the engine a short time while checking for leaks. Stop the engine.
12. Check that the hydraulic oil level has remained up to the FULL COLD mark on the sight tube. Add oil if necessary.

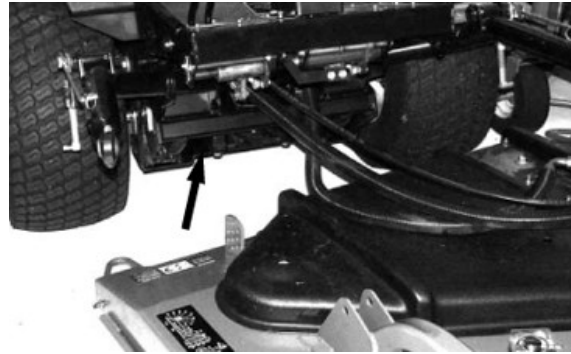
OUO2004,0000503-19-20MAR17

Changing the Transmission Oil

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

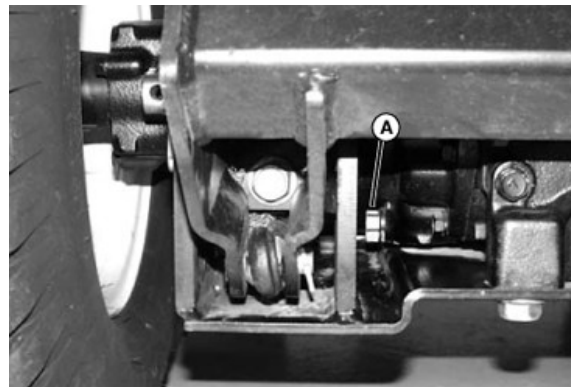
Use caution when filling and draining hydraulic oil. During periods of machine operation the hydraulic oil reservoir can get hot. Allow engine and oil reservoir to cool before servicing.

1. Lower all mower decks to ground.
2. Park machine safely. (See Parking Safely in the SAFETY section.)



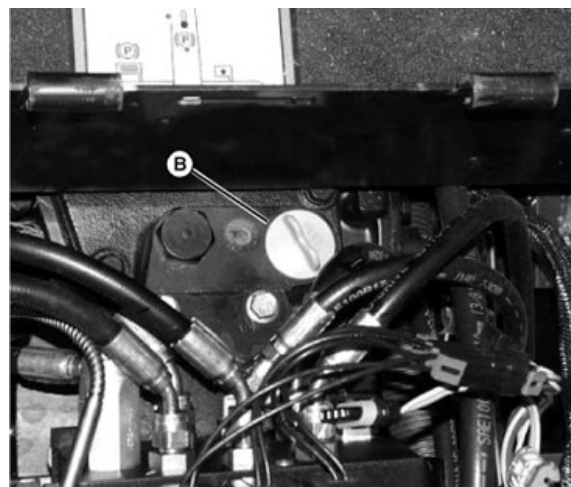
TCAL44913—UN—28MAR13

3. Remove the front deck from the lift arms, and move deck to the left to gain access to the right front side of the transmission.



TCAL44914—UN—28MAR13

4. Remove drain plug (A) and allow transmission to drain. Replace plug.
5. Install front mower deck.



TCAL44915—UN—28MAR13

Seat platform removed for clarity

6. Raise and lock seat platform.

IMPORTANT: Dirt and debris in oil may cause damage to the transaxle. Clean area around opening before removing plug or dipstick.

Service Transmission

Be sure dipstick is installed before removing drain plug. Slowly remove dipstick after plug is removed to control rate of oil flow draining into drain pan.

7. Unscrew oil filler cap and dipstick (B).
8. Fill transmission with hydraulic oil until level is up to top of XXX marks on dipstick. Transmission capacity may take less when performing oil change. Do not overfill.

Specification

Transmission—Capacity (when dry) 13.3 L (3.5 gal)

9. Run machine, cycling hydrostatic pedals to purge air from transmission. Recheck transmission oil level.

OUO2004.0000504-19-17SEP13

Adjusting Transmission Neutral

CAUTION: Do not attempt this adjustment unless you are a qualified and properly trained technician. Improper adjustment can result in an unsafe machine.

Adjust transmission neutral to assure that machine does not creep forward or rearward when pedals are in the neutral position.

1. Park machine on a firm, level surface. Place controls in following position:
 - Park brake unlocked.
 - Side decks raised and transport locks engaged.
 - Engine off.
 - PTO disengaged.
 - Differential lock disengaged.
 - Four wheel drive disengaged.
 - Range shift lever not in neutral.
2. Jack up front of machine. Place hardwood blocks under front sub frame so front tires are off of ground.

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

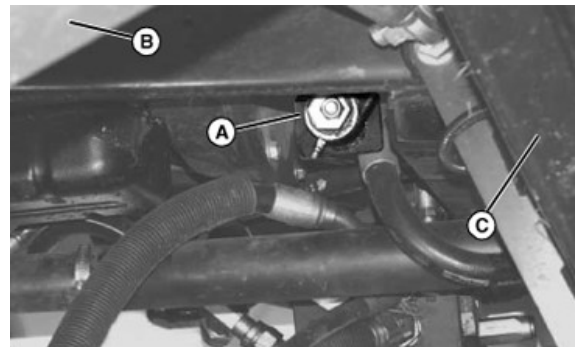
- Use a safe lifting device rated for the load to be lifted.
 - Lower machine onto jack stands or other stable supports and block wheels before servicing.
3. Jack up rear of machine. Place jack stands under rear axle so rear tires are off of ground.

CAUTION: Do not raise or lower decks, engage four wheel drive or differential lock, or turn PTO switch on during adjustment. Keep people clear of machine while running.

Always jack all four wheels off of ground. Four wheel drive is always engaged and will push machine off jack stands if any tires get traction.

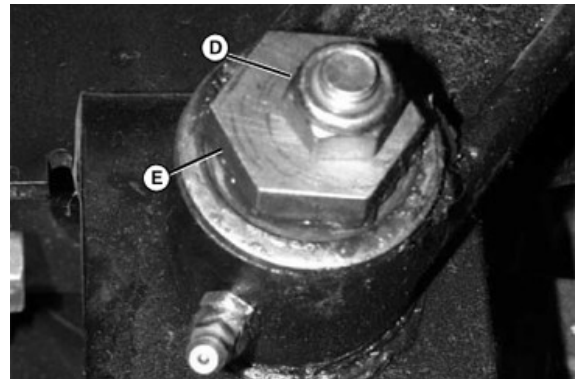
Stay away from tires while making adjustments.

4. Sit in operators seat and start engine.
5. Watch front tires for forward or rearward rotation.
6. Cycle forward and reverse hydrostatic pedals and allow to return to centered, neutral position. Check again for tire rotation while in neutral, indicating a neutral adjustment is necessary.



TCAL44916—UN—28MAR13

7. Locate neutral adjuster cam (A) on right side of machine, under right mower deck (B), behind deck subframe (C).



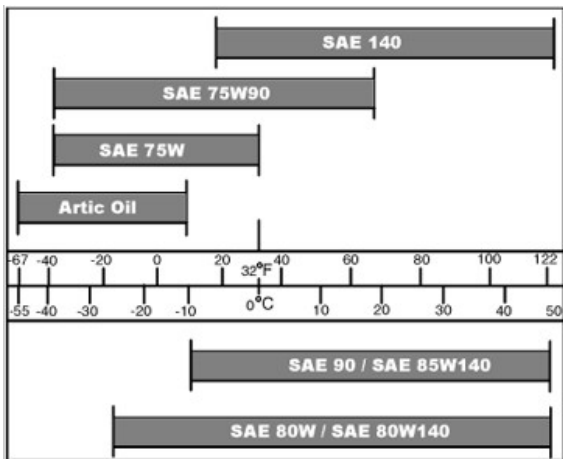
TCAL44917—UN—28MAR13

8. Loosen locknut (D).
9. Rotate cam (E) until front drive wheels do not spin.
10. Tighten locknut. Cycle hydrostatic drive pedals and allow to return to neutral. Readjust cam if necessary.

OUO2004.0000505-19-17SEP13

Service Transmission

Mechanical Four Wheel Drive (MFWD) Oil



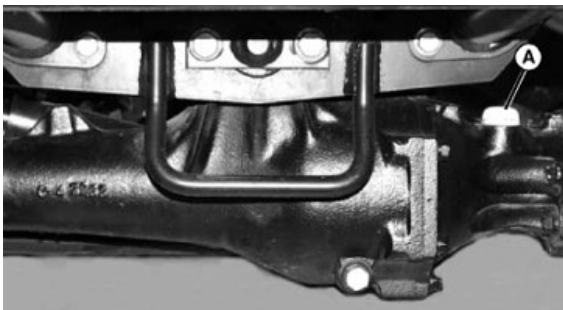
TCAL44918—UN—28MAR13

- John Deere GL-5 Gear Lubricant is recommended.
- Other oils may be used provided they meet the following specifications:
- API Class GL-5.

OUO2004,0000506-19-17SEP13

Checking the Mechanical Four Wheel Drive (MFWD) Oil Level

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



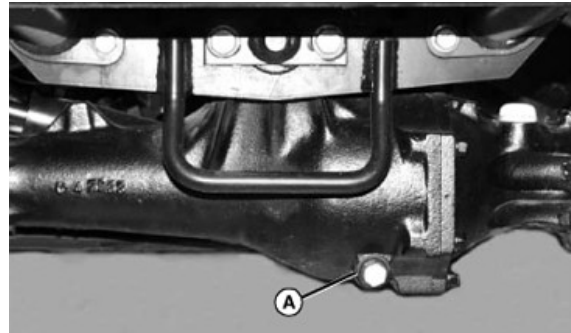
TCAL44919—UN—28MAR13

2. Locate filler cap (A) on right rear side of rear axle.
3. Unscrew filler cap and wipe dipstick clean.
4. Install filler cap back into axle housing but do not turn threads back in.
5. Remove dipstick and check oil level on it. Oil should be in XXX area on dipstick but not above top mark.
6. Add oil if needed. Do not overfill.

OUO2004,0000507-19-17SEP13

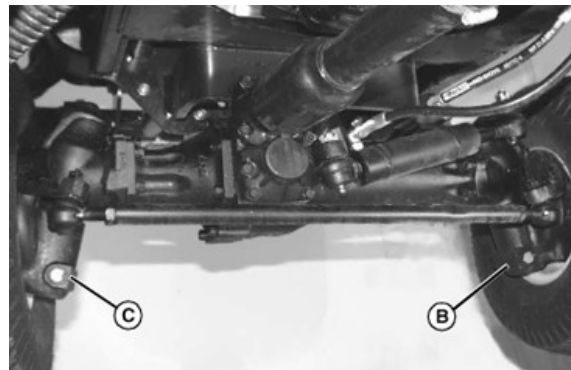
Changing the Mechanical Four Wheel Drive (MFWD) Oil Level

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



TCAL44920—UN—28MAR13

2. Place drain pan under center of rear axle housing and remove center drain plug (A).
3. Install center drain plug.



TCAL44921—UN—28MAR13

4. Remove left side final drive housing drain plug (B), and allow to drain.
5. Install drain plug.
6. Repeat for right side housing (C).
7. Fill rear axle housing to specification. Do not overfill.

Specification

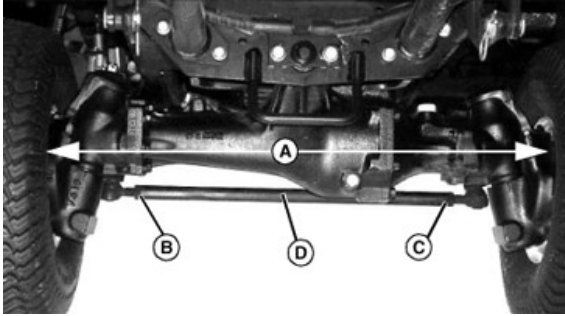
Rear Axle Housing—Capacity. 4.7 L (5 qt)

OUO2004,0000508-19-17SEP13

Service Steering & Brakes

Adjusting Toe-In

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



TCAL44922—UN—28MAR13

2. Measure the distance between rear tires at rear of tires (A).
3. Measure the distance between rear tires at front of tires.
4. Distance between tires (toe-in) should be less in front than in rear and within specification.

Specification

Toe-In—Distance. 3—4 mm (0.12—0.16 in)

5. If toe-in requires adjustment, loosen locknuts on left and right side tie-rod ends (B and C).
6. Turn body of tie-rod (D) to adjust toe-in.
7. Measure toe-in again. If correct, tighten locknuts.

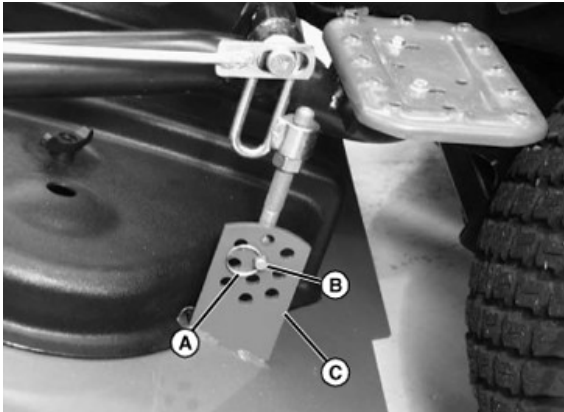
OUO2004,0000509-19-20MAR17

Service Mower

Rotating the Front Mower Deck

Rotate for Service

1. Stop machine on a level surface.
2. Lock park brake.
3. Raise front mower deck completely.
4. Stop engine and remove the key.

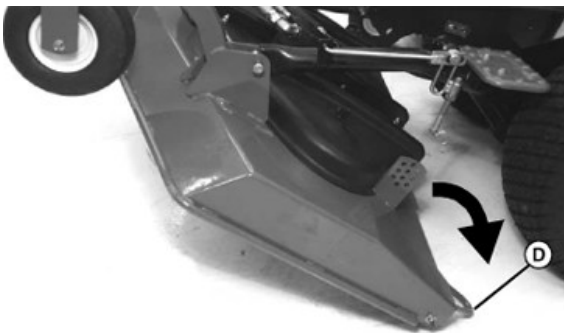


TCAL44923—UN—28MAR13

5. Remove retaining ring (A) from hanger pin (B).

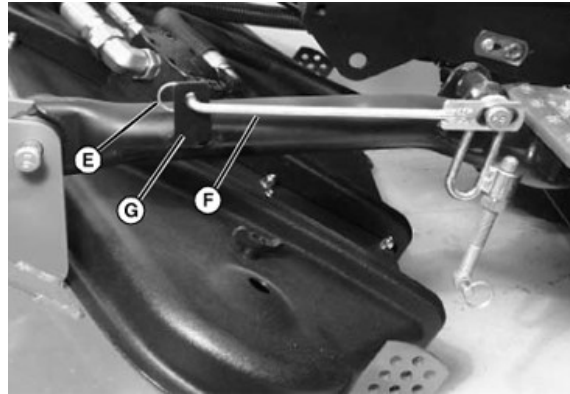
NOTE: To ensure deck can be returned to its original cutting height, note hole location in the adjustment plate before removing the hanger pin.

6. Remove hanger pin from hole in adjustment bracket. (C).
7. Install retaining ring to hanger pin for temporary storage.
8. Repeat at opposite side of mower deck.



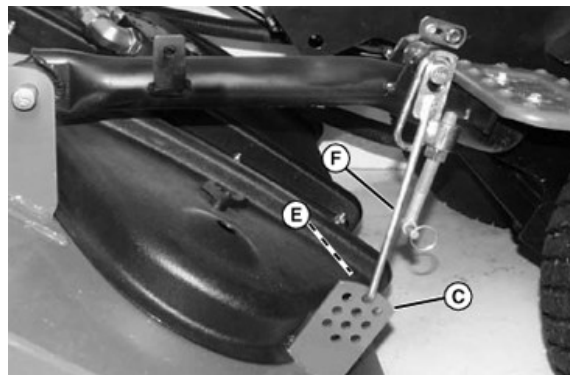
TCAL44924—UN—28MAR13

9. Grasp deck handle (D) and rotate mower deck rearward to the ground.



TCAL44925—UN—28MAR13

10. Remove retaining ring (E) from service lockout rod (F).
11. Remove service lockout rod from mower lift arm (G).



TCAL44926—UN—28MAR13

12. Insert service lockout rod (F) into hole in deck height adjustment bracket (C). Secure with retaining ring (E).
13. Repeat at opposite side of mower deck.

Rotate for Operation

1. Remove retaining ring from service lockout rod.
2. Remove service lockout rod from hole in deck height adjustment bracket.
3. Insert service lockout rod into hole in mower lift arm. Secure with retaining ring.
4. Repeat at opposite side of mower deck.
5. Remove retaining ring from hanger pin.
6. Rotate mower deck forward.
7. Insert hanger pin into original hole in adjustment plate. Secure with retaining pin.
8. Repeat at opposite side of mower deck.
9. Start engine.
10. Lower front mower deck completely.

OUC2004,000050A-19-17SEP13

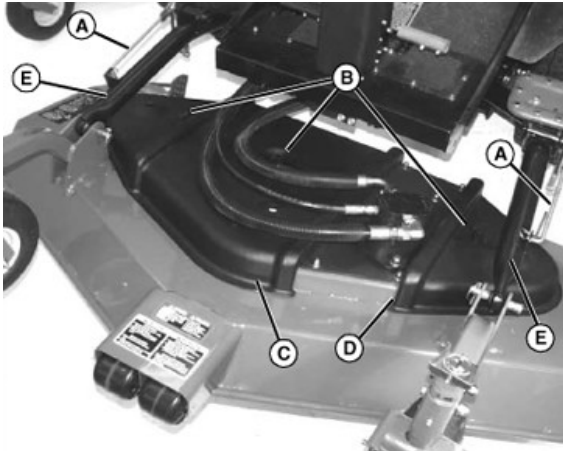
Service Mower

Removing and Installing Belt Shields

CAUTION: Rotating blades are dangerous. Before adjusting or servicing mower:

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

Front Deck Shields

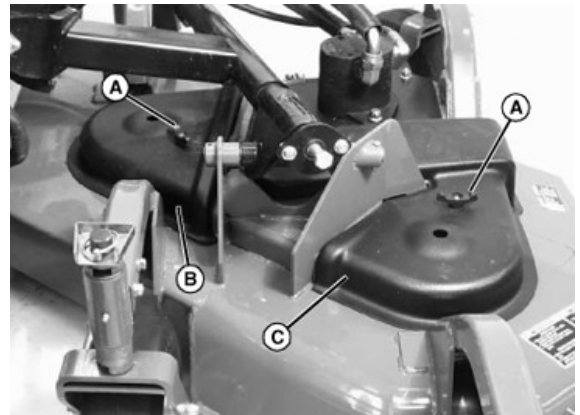


TCAL44927—UN—28MAR13

1. Rotate front mower deck for service. Do not secure service lockout rods (A) to the adjustment plates.
2. Remove threaded knobs (B) securing belt shields (C) and (D) to mower deck.
3. Lift each belt shield up off of the attaching bolts. Slide shields out from between mower lift arms (E) and mower deck.
4. Install the threaded knobs onto the attaching bolts during servicing of the deck.
5. Installation is the reverse of removal.
6. Rotate mower deck for operation.

Side Deck Shields

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

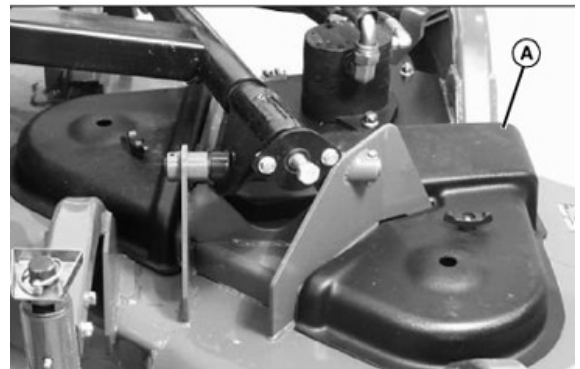
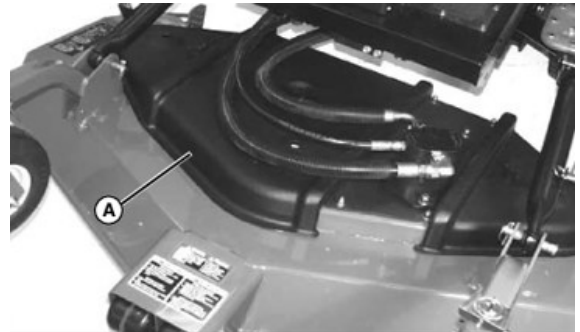


TCAL44928—UN—28MAR13

2. Remove threaded knobs (A) securing belt shields (B) and (C).
3. Lift each belt shield up off the attaching bolts.
4. Install the threaded knobs onto the attaching bolts during servicing of the deck.
5. Installation is the reverse of removal.

OUO2004.000050B-19-17SEP13

Adjusting Mower Deck Drive Belt Tension

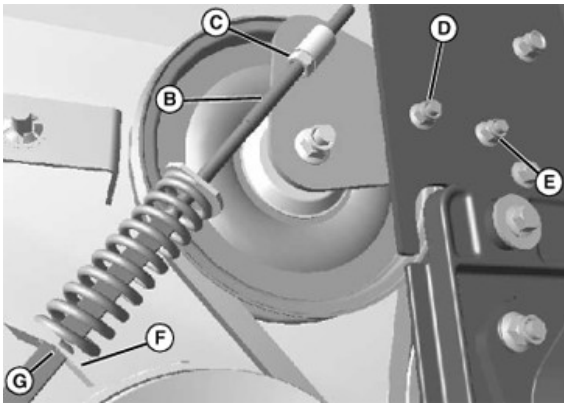


TCAL44929—UN—28MAR13

Front deck shown upper, side deck shown lower.

1. Remove belt shield (A) from mower deck.
2. Lower mower deck.

Service Mower



TCAL44930—UN—28MAR13

(Front deck shown, side deck similar)

3. Loosen hex nuts (D) and (E).
4. Adjust nut (C) until tension indicator hole (G) becomes visible on the outside of retaining plate (F) as shown.
5. Tighten hex nuts (D) and (E) to specification.

Specification

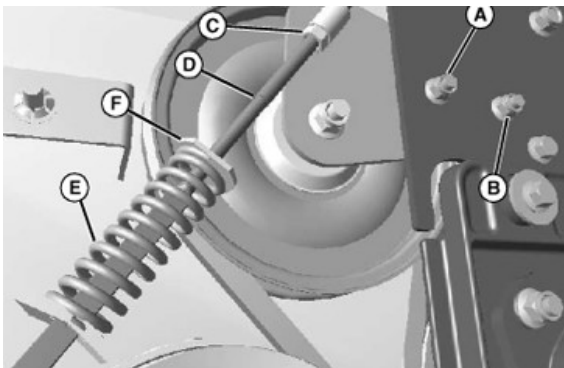
Hex Nut—Torque. 60 N·m (81 lb-ft)

OUO2004.000050C-19-17SEP13

Removing and Installing Front Mower Deck Drive Belt

Front Belt Removal

1. Remove belt shields from mower deck.
2. Lower mower deck completely.

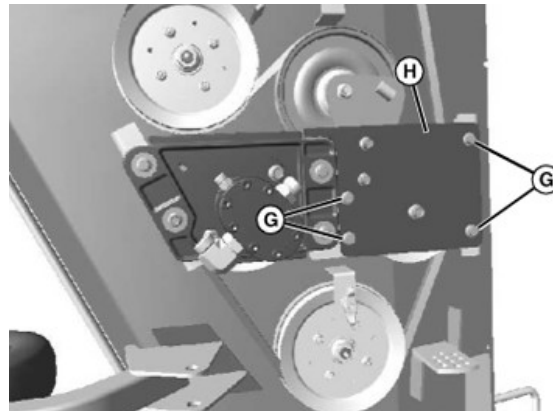


TCAL44931—UN—28MAR13

3. Loosen hex nuts (A) and (B).
4. Loosen nut (C) until all spring tension is removed.
5. Remove tension rod (D), spring (E), and spring retainer (F).

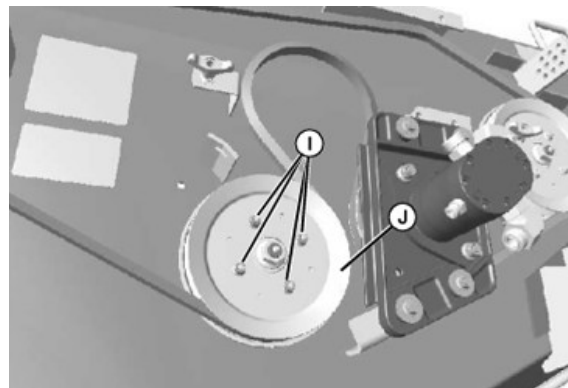
CAUTION: Avoid Injury! Rotating blades are dangerous. Before adjusting or servicing mower:

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



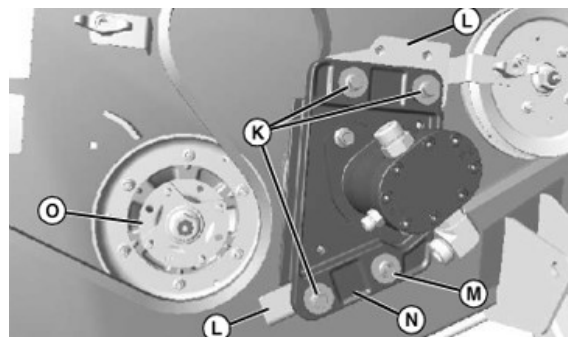
TCAL44932—UN—28MAR13

6. Remove four cap screws (G).
7. Remove sheet metal plate (H).



TCAL44933—UN—28MAR13

8. Remove four hex nuts (I) and mower deck spindle sheave (J).



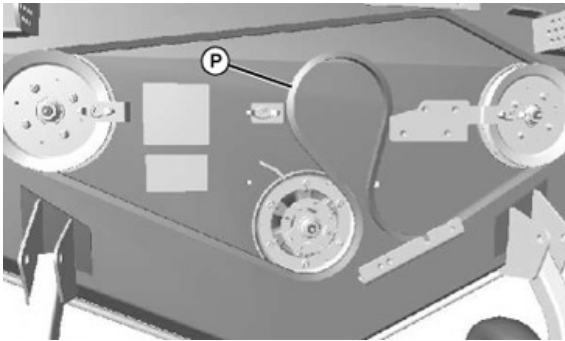
TCAL44934—UN—28MAR13

9. Remove three cap screws (K), three washers, and three upper rubber isolator halves.
10. Remove nut (M), washer, and rubber isolator half from carriage bolt.

Service Mower

NOTE: The lower halves of the rubber isolators are fit into the deck side of the cast mounting plate. Washers are glued to the bottom of each isolator. Ensure rubber isolators and washers remain installed in the mounting plate during installation of the mounting plate to the mower deck.

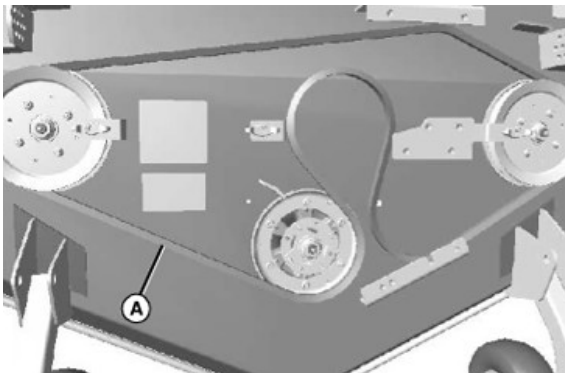
11. Slide cast mounting plate (N) towards mower deck spindle (O) to remove it from the mounting brackets (L).



12. Remove drive belt (P) from mower deck sheaves.

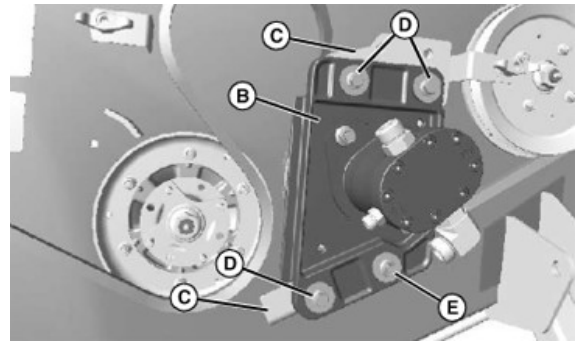
Front Belt Installation

NOTE: Belt routing diagram is affixed to mower deck.



1. Route drive belt (A) around mower deck sheaves as shown.

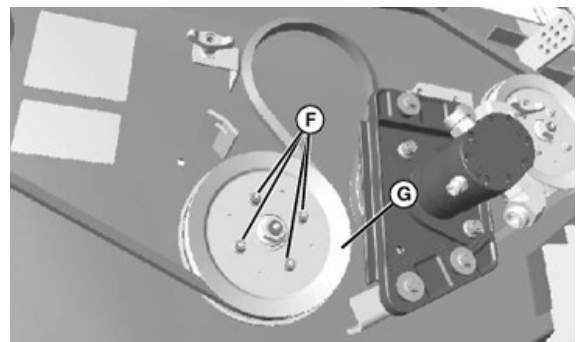
NOTE: The lower halves of the rubber isolators are fit into the deck side of the cast mounting plate. Washers are glued to the bottom of each isolator. Ensure rubber isolators and washers remain installed in the mounting plate during installation of the mounting plate to the mower deck.



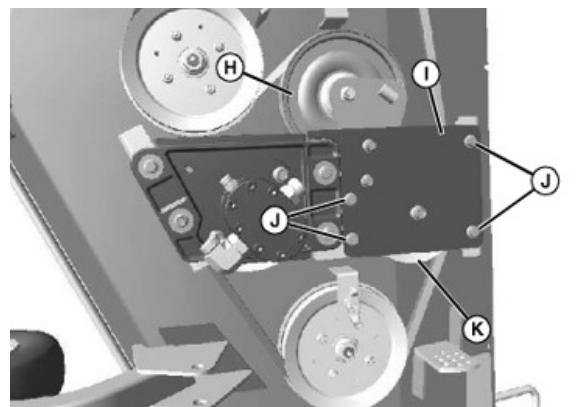
2. Position cast mounting plate (B) onto mounting brackets (C) so that belt is routed properly around drive motor sheave. Install carriage bolt, upper isolator half, washer, and nut (E). Do not tighten.
3. Install 3 upper isolator halves, washers, and cap screws (D). Tighten cap screws (D) and nut (E) to specification.

Specification

Cap Screw and Nut—Torque. 47 N·m (35 lb-ft)



4. Install mower deck spindle sheave (G) and four hex nuts (F). Route belt around spindle sheave.

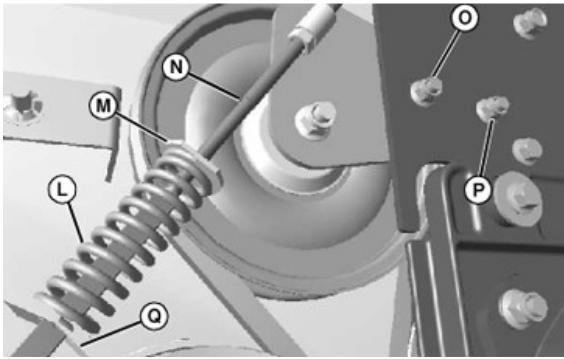


5. Install sheet metal plate (I) and route belt around tensioner sheave (H) and idler sheave (K). Install four cap screws (J). Tighten cap screws to specification.

Specification

Cap Screw—Torque. 81 N·m (60 lb-ft)

Service Mower



TCAL44940—UN—28MAR13

6. Ensure spring retainer (M) and spring (L) are installed on tension rod (N). Install tension rod into retaining plate (Q) on mower deck.
7. Adjust drive belt to proper tension.
8. Tighten hex nuts (O) and (P) to specification.

Specification

Cap Screw—Torque. 81 N·m (60 lb-ft)

9. Move the drive belt by hand to turn the sheaves. Ensure belt motion is smooth and sheaves do not rub on deck surfaces.

OJ02004,000050D-19-23AUG18

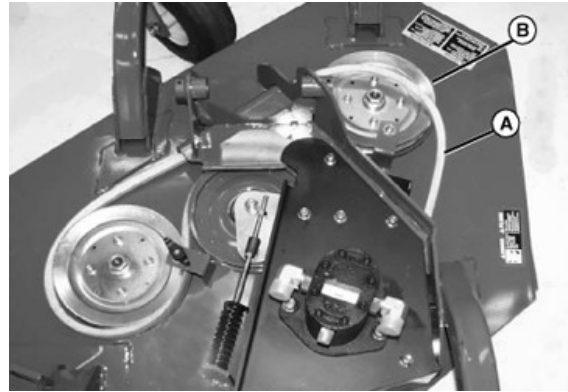
Removing and Installing Side Mower Deck Drive Belt

Side Belt Removal

1. Lower mower deck completely.
2. Remove belt shields from mower deck.
3. Release the drive belt tension completely.

CAUTION: Rotating blades are dangerous. Before adjusting or servicing mower:

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



TCAL44941—UN—28MAR13

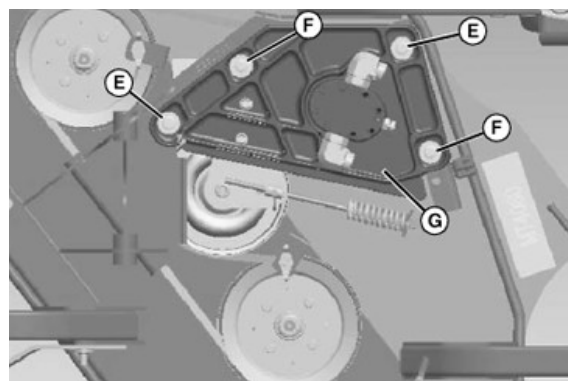
Mower deck shown removed for clarity

4. Remove drive belt (A) from sheave (B).



TCAL44942—UN—28MAR13

5. Remove drive belt (A) from sheave (C) by twisting the belt and sliding it between belt shield support bracket (D) and the sheave.

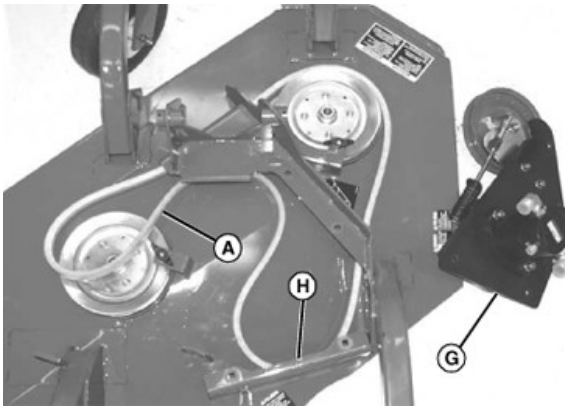


TCAL44943—UN—28MAR13

6. Remove two cap screws (E), washers, and rubber isolators from motor plate (G). Remove two cap screws (F), washers, rubber isolators, and hex nuts.

NOTE: The lower halves of the rubber isolators are fit into the deck side of the cast mounting plate. Washers are glued to the bottom of each isolator. Ensure rubber isolators and washers remain installed in the mounting plate during installation of the mounting plate to the mower deck.

Service Mower

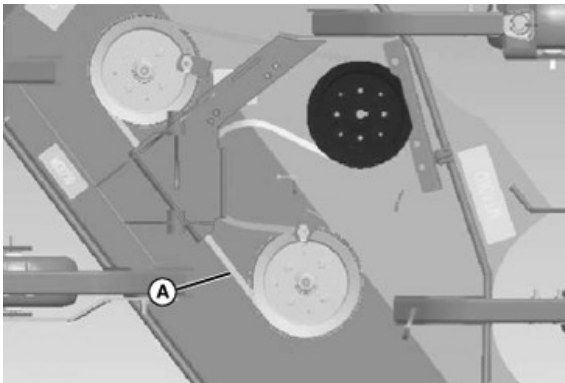


TCAL44944—UN—28MAR13

7. Slide motor plate (G) forward so sheave on bottom side clears motor plate mounting bracket (H).
8. Lift motor plate off mounting brackets and set it aside.
9. Remove drive belt (A) from deck.

Side Belt Installation

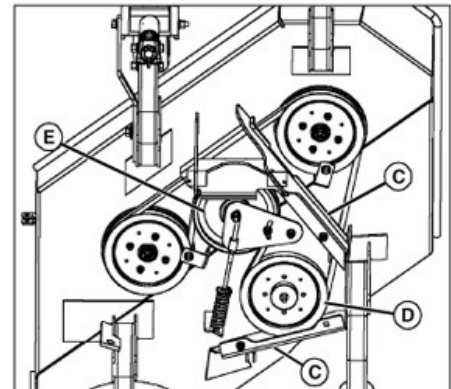
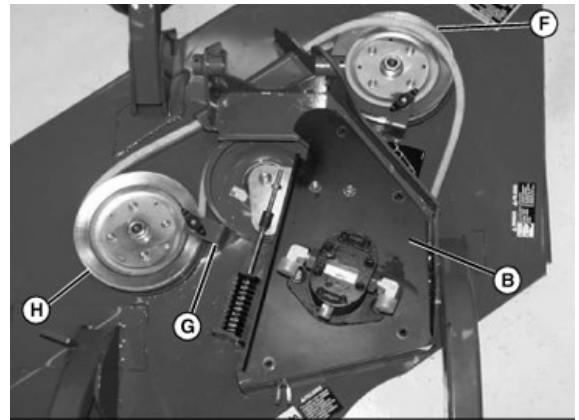
NOTE: Belt routing diagram is affixed to mower deck.



TCAL44945—UN—28MAR13

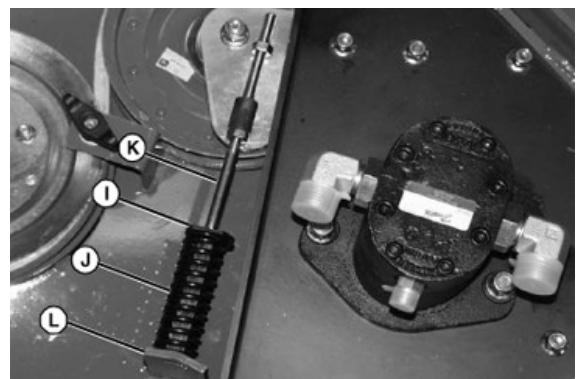
1. Route drive belt (A) as shown.

NOTE: The lower halves of the rubber isolators are fit into the deck side of the cast mounting plate. Washers are glued to the bottom of each isolator. Ensure rubber isolators and washers remain installed in the mounting plate during installation of the mounting plate to the mower deck.



TCAL44946—UN—28MAR13

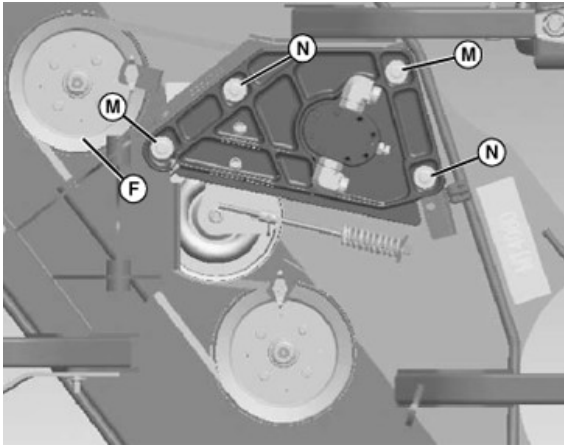
2. Position motor plate (B) onto motor plate mounting brackets (C) so drive belt is routed properly around sheaves (D) and (E).
3. Remove drive belt from sheave (F).
4. Slide drive belt between belt shield support bracket (G) and sheave (H). Ensure proper positioning of belt in the belt grooves.



TCAL44947—UN—28MAR13

5. Make sure spring retainer (I) and spring (J) are installed on tension rod (K). Insert tension rod into retaining plate (L) on mower deck.

Service Mower



6. Install two isolators, washers, and cap screws (M). Install two isolators, washers, cap screws, and hex nuts (N). Do not tighten completely.
7. Install drive belt onto sheave (F).
8. Tighten cap screws (M and N) to specification.

Specification

Cap Screw—Torque. 47 N·m (35 lb-ft)

9. Adjust drive belt to proper tension.
10. Move the drive belt by hand to turn the sheaves. Make sure belt motion is smooth and sheaves do not rub on deck surfaces.

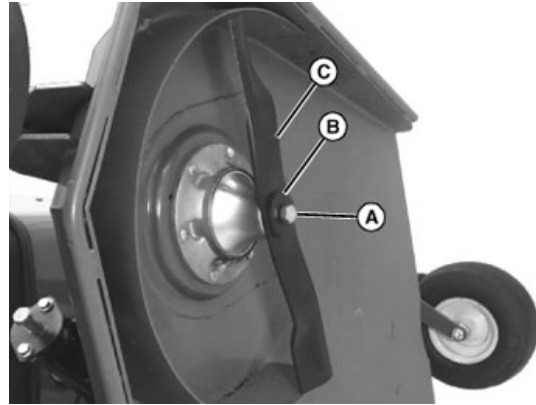
OUC02004,000050E-19-17SEP13

Removing and Installing Blades

1. Stop machine on a level surface.
2. Lock park brake.
3. Raise mower decks completely.
4. Stop engine and remove the key.
5. Rotate front mower deck for service if blades on front deck will be removed.

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

6. Insert wooden block between end of blade and edge of deck to prevent blade from turning while removing attaching hardware.



7. Remove bolt (A), washer (B), and blade (C) by turning the bolt counterclockwise until removed. Repeat for all blades requiring service.
8. Inspect the blades for damage. Replace all damaged blades.
9. Sharpen dull blades.
10. Clean blades, spindles, and hardware.
11. Balance the blades.
12. Install blade onto mower deck spindle with wings of blade facing up.

IMPORTANT: Make sure cupped side of concave washer is positioned against the mower blade or blade could be damaged.

13. Install blade bolt and washer with the cupped side of washer against the blade. Tighten blade bolt to specification. Repeat for other blades.

Specification

Bolt—Torque. 122 N·m (90 lb-ft)

14. Lower mower decks completely.

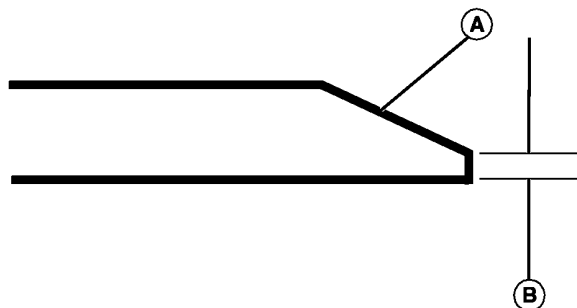
OUC02004,000050F-19-17SEP13

Sharpening Blades

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

Always wear safety eye protection when grinding.

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



GXAL42041—UN—04MAR13

- Keep original bevel (A) when grinding.
- The blade cutting edge (B) should meet specifications.

Specification

Mower Blade Cutting

Edge—Distance. 0.40 mm (1/64 in)

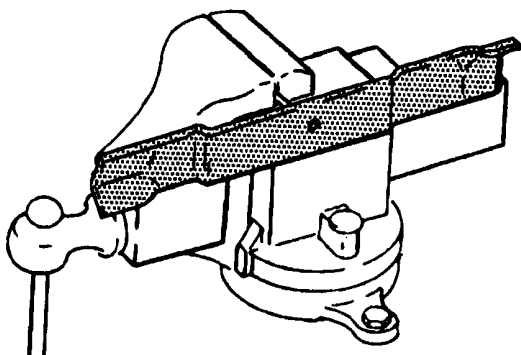
- Balance blades before installing.

MX00654,000039E-19-05JUL17

Balancing Blades

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

1. Clean blade.



GXAL42042—UN—04MAR13

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

MX00654,000039F-19-26MAY15

Service Electrical

Electrical

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

MP47322,00F466E-19-15MAR13

Service the Battery Safely



MXAL42869—UN—09APR13

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

To prevent the battery from exploding:

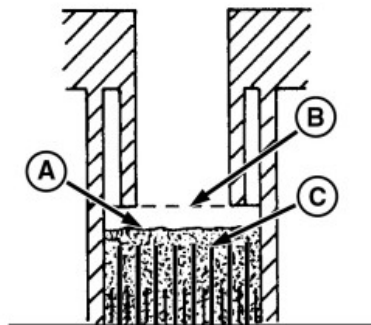
- Do not smoke or have open flame near battery.
- Wear eye protection and gloves.
- Do not allow direct metal contact across battery posts.
- Remove negative cable first when disconnecting.
- Install negative cable last when connecting.

MP47322,00F466F-19-13JAN15

Checking Battery Electrolyte Level

NOTE: Add only distilled water to replace battery electrolyte.

1. Park the machine safely. (See Parking Safely in the SAFETY section.)
2. Remove battery cell caps. Make sure cap vents are not plugged.



TCT005681—UN—11SEP12

3. Check electrolyte level. Electrolyte (A) should be approximately halfway between bottom of filler neck (B) and top of plates (C).

IMPORTANT: Avoid damage! Do not overfill battery. Electrolyte can overflow when battery is charged and cause damage.

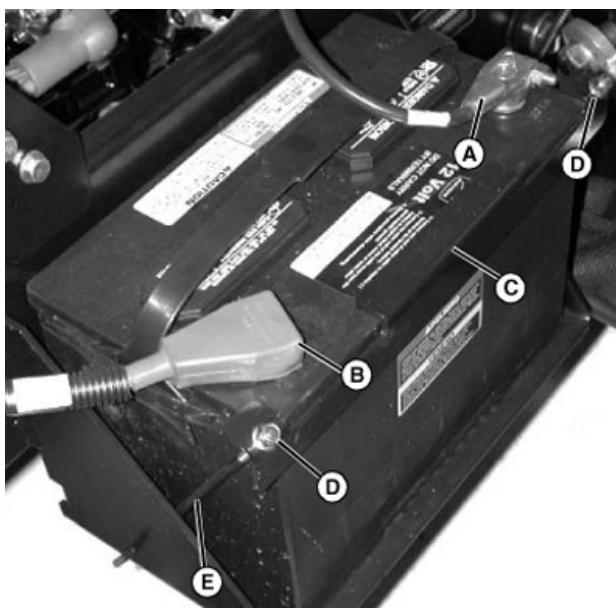
4. Add only distilled water if necessary.
5. Install battery cell caps.

TH84124,0000201-19-27FEB13

Removing and Installing the Battery

Removing:

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



TCAL44954—UN—09APR13

3. Disconnect negative (-) battery cable (A).
4. Pull up red plastic cover (B) from positive (+) battery

Service Electrical

clamp and disconnect positive (+) cable clamp from battery terminal.

- Remove battery hold down bracket (C) by removing locknuts (D) from left and right side J-bolts (E).
- Remove battery from machine.

Installing:

- Install battery with positive terminal (+) towards rear of machine.
- Install battery hold down bracket onto J-bolts and secure with locknuts.
- Install positive cable clamp (red cable) onto positive (+) battery terminal. Pull red plastic cover over positive cable clamp.
- Install negative cable clamp (black cable) onto negative (-) battery post.
- Apply spray lubricant to terminals to prevent corrosion.

OUO2004,0000515-19-17SEP13

Cleaning Battery and Terminals

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

MP47322,00F4671-19-15MAR13

Using Booster Battery

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

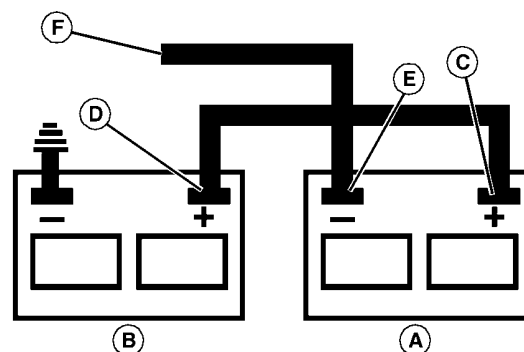
To prevent the battery from exploding:

- Do not smoke or have open flame near battery.
- Wear eye protection and gloves.
- Do not jump-start or charge a frozen battery. Warm battery to specification.

Specification

Battery—Temperature. 16°C (60°F)

- Do not connect the negative (-) booster cable to the negative (-) terminal of the discharged battery. Connect at a good ground location away from the discharged battery.



MXAL42872—UN—09APR13

A—Booster Battery
B—Disabled Vehicle Battery
C—Positive (+) Post
D—Positive (+) Post
E—Negative (-) Post
F—Negative (-) Booster Cable End

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

IMPORTANT: Avoid damage! Electric charges from the booster battery damages machine components. Do not install negative booster cable to machine frame. Install only to the engine block.

Install negative booster cable away from moving parts in the engine compartment, such as belts and fan blades.

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

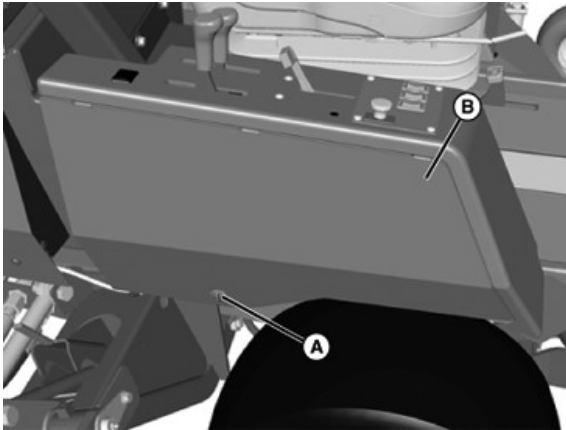
MP47322,00F4672-19-05JUN15

Checking and Replacing Fuses

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

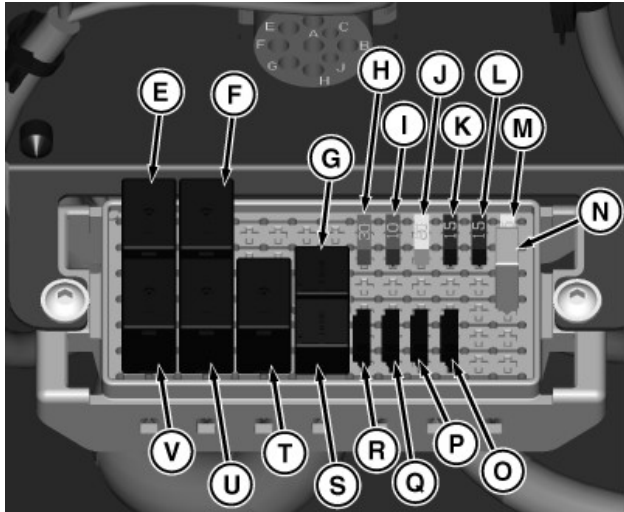
NOTE: 100A main vehicle fuse is located near battery.

Service Electrical



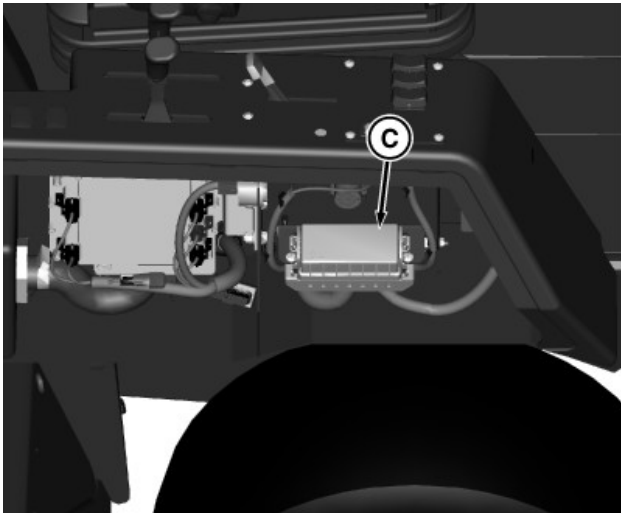
TICAL44956—UN—01APR13

- Loosen knob (A) and remove right side electrical service panel (B) to access fuse holders.



TCT015171—UN—15MAR17

E—K05 Glow Plug Relay
 F—K03 Auxiliary Lights Relay
 G—K04 Work Lights Relay
 H—F04 Auxiliary Lights Fuse, 30A
 I—F07 Kits Fuse, 10A
 J—F06 Seat Compressor Fuse, 20A
 K—F05 Work Lights Fuse, 15A
 L—F03 Ignition Fuse, 15A
 M—F02 ECU Fuse, 25A
 N—R06 Regeneration Interlock Resistor
 O—V04 Wait Lamp Output Diode
 P—V01 EGR Relay Power Diode
 Q—V03 Engine Temperature Diode
 R—V02 Oil Temperature Diode
 S—K07 Regeneration Interlock Relay
 T—K02 EGR Valve Relay
 U—K06 Seat Compressor/Kits Relay
 V—K01 Starter Motor Solenoid Relay

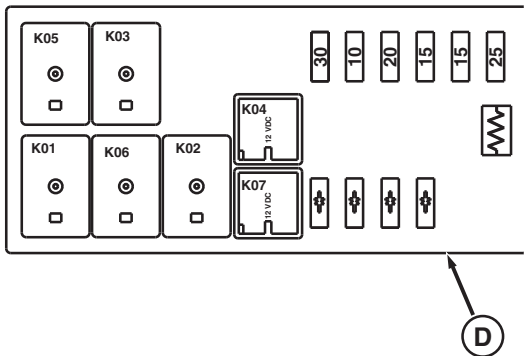


TCT015170—UN—15MAR17

- Remove fuse cover (C).

- Test components with voltmeter or test light and replace as needed. Replace blown components with new components of correct amperage.
- Replace fuse cover. Verify that all four latches have fully engaged.
- Replace electrical service panel and tighten knob to secure.

OUC0004,0000518-19-07SEP17



TCT015172—UN—15MAR17

- Locate label (D) on back side of panel for fuse and relay location reference.

Service Miscellaneous

Diesel Fuel

Consult your local fuel distributor for properties of the diesel fuel available in your area.

In general, diesel fuels are blended to satisfy the low temperature requirements of the geographical area in which they are marketed.

Diesel fuels specified to EN 590 or ASTM D975 are recommended.

Required Fuel Properties

In all cases, the fuel shall meet the following properties:

Cetane number of 45 minimum. Cetane number greater than 47 is preferred, especially for temperatures below -20°C (-4°F) or elevations above 1675 m (5500 ft).

Cloud Point should be below the expected lowest ambient temperature or **Cold Filter Plugging Point** (CFPP) should be a maximum 10°C (18°F) below the fuel cloud point.

Fuel lubricity should pass a maximum scar diameter of 0.52 mm (0.018 in) as measured by ASTM D6079 or ISO 12156-1. A maximum scar diameter of 0.45 mm (0.020 in) is preferred.

Diesel fuel quality and sulfur content must comply with all existing emissions regulations for the area in which the engine operates. DO NOT use diesel fuel with sulfur content greater than 5000 mg/kg (5000 ppm).

E-Diesel fuel

DO NOT use E-Diesel (Diesel fuel and ethanol blend). Use of E-Diesel fuel in any John Deere machine may void the machine warranty.

 **CAUTION: Avoid injury! Avoid severe injury or death due to the fire and explosion risk from using E-Diesel fuel.**

Sulfur content for Interim Tier 4, Final Tier 4, Stage III B, Stage IV Engines, and Stage V engines

- Use ONLY ultra-low sulfur diesel (ULSD) fuel with a maximum of 15 mg/kg (15 ppm) sulfur content.

Sulfur Content for Tier 3 and Stage III A Engines greater than 37 kW

- Use of diesel fuel with sulfur content less than 1000 mg/kg (1000 ppm) is REQUIRED.

Sulfur Content for other Engines

- Use of diesel fuel with sulfur content less than 2000 mg/kg (2000 ppm) is RECOMMENDED.
- Use of diesel fuel with sulfur content 2000—5000 mg/kg (2000—5000 ppm) REDUCES the oil and filter change interval. Contact your dealer.

IMPORTANT: Avoid damage! Do not mix used diesel engine oil or any other type of lubricating oil with diesel fuel.

Improper fuel additive usage may cause damage to fuel injection equipment of diesel engines.

MK71445,0000080-19-01AUG18

Biodiesel Fuel

Biodiesel fuel is comprised of monoalkyl esters of long chain fatty acids derived from vegetable oils or animal fats. Biodiesel blends are biodiesel mixed with petroleum diesel fuel on a volume basis.

Before using fuel containing biodiesel, review the Biodiesel Use Requirements and Recommendations in this Operator's Manual.

Environmental laws and regulations can encourage or prohibit the use of biofuels. Operators should consult with appropriate governmental authorities prior to using biofuels.

Stage V Engines Operating in the European Union

Where the engine is to be operated within the Union on diesel or non-road gas-oil, a fuel with a FAME content not greater than 8% volume/volume (B8) shall be used.

Engines Except Stage V Engines Operating in the European Union

Biodiesel blends up to B20 can be used ONLY if the biodiesel (100% biodiesel or B100) meets ASTM D6751, EN 14214, or equivalent specification. Expect a 2% reduction in power and a 3% reduction in fuel economy when using B20.

Biodiesel blends above B20 cannot be used.

Biodiesel Use Requirements and Recommendations

The petroleum diesel portion of all biodiesel blends must meet the requirements of ASTM D975 (US) or EN 590 (EU) commercial standard.

Biodiesel users in the U.S. are strongly encouraged to purchase biodiesel blends from a BQ-9000 Certified Marketer and sourced from a BQ-9000 Accredited Producer (as certified by the National Biodiesel Board). Certified Marketers and Accredited Producers can be found at the following website: <http://www.bq9000.org>.

Biodiesel contains residual ash. Ash levels exceeding the maximums allowed in either ASTM D6751 or EN14214 can result in more rapid ash loading and require more frequent cleaning of the exhaust filter (if present).

The fuel filter can require more frequent replacement when using biodiesel fuel, particularly if switching from diesel. Check engine oil level daily prior to starting engine. A rising oil level can indicate fuel dilution of the

Service Miscellaneous

engine oil. Biodiesel blends up to B20 must be used within 90 days of the date of biodiesel manufacture.

When using biodiesel blends up to B20, the following must be considered:

- Cold-weather flow degradation
- Stability and storage issues (moisture absorption, microbial growth)
- Possible filter restriction and plugging (usually a problem when first switching to biodiesel on used engines)
- Possible fuel leakage through seals and hoses (primarily an issue with older engines)
- Possible reduction of service life of engine components

Request a certificate of analysis from your fuel distributor to ensure that the fuel is compliant with the specifications provided in this Operator's Manual.

Consult your John Deere dealer for John Deere fuel products to improve storage and performance with biodiesel fuels.

MK71445,0000081-19-01AUG18

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 ventilated area.
- Clean up spilled fuel immediately.
- To prevent static electric discharge, use a clean, approved non-metal container.

IMPORTANT: Avoid damage! Dirt and water in fuel causes engine damage:

- Clean dirt and debris from the fuel tank opening.
- Use clean, fresh, stabilized fuel.
- To keep condensation out of the fuel tank, fill the fuel tank at the end of operation each day.
- If using a funnel, make sure it is plastic and has no screen or filter.

To prevent condensation and freezing during cold weather, fill fuel tank at the end of operation each day.

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 it clicks.

MP47322,00F4675-19-05JUL17

Cleaning Plastic Surfaces

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

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

1. Rinse hood and entire machine with clean water to remove dirt and dust that may scratch the surface.
2. Wash surface with clean water and a mild liquid automotive washing soap.
3. Dry thoroughly to avoid water spots.
4. Wax the surface with a liquid automotive wax. Use products that specifically say "contains no abrasives."

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

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

MX00654,0000005-19-26MAY15

Cleaning and Repairing Metal Surfaces

Cleaning:

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

Repairing Minor Scratches (surface scratch):

1. Clean area to be repaired thoroughly.

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

Service Miscellaneous

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

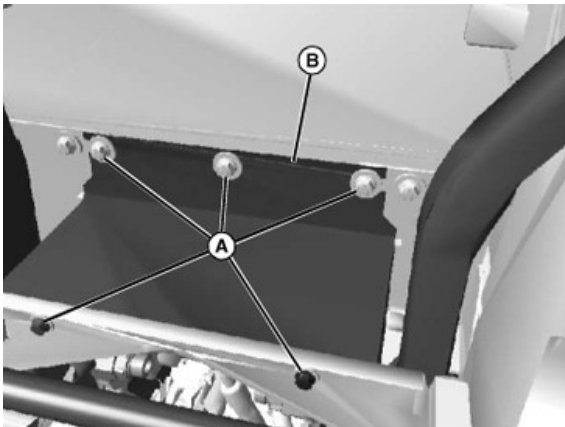
Repairing Deep Scratches (bare metal or primer showing):

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

MP47322,00F467A-19-26MAY15

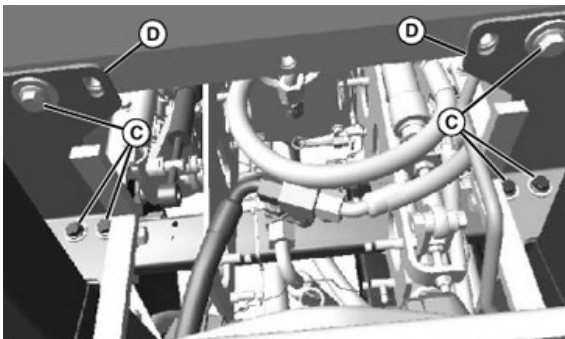
Tightening ROPS Hardware

1. Park machine safely. (See Parking Safely in SAFETY section.)
2. Raise the seat platform and engine cover.



TCAL44959—UN—28MAR13

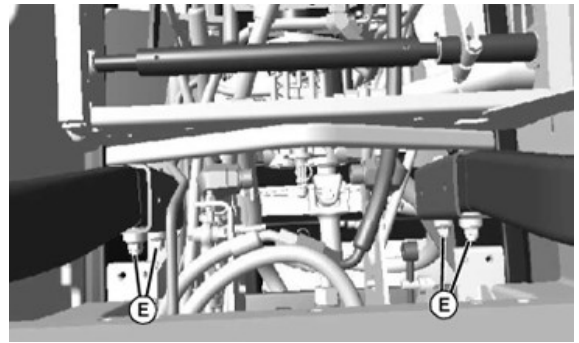
3. Remove cap screws and washers (A) securing panel (B) to machine.
4. Carefully lift panel from machine and set it aside.



TCAL44960—UN—28MAR13

5. Remove cap screws and washers (C) securing side panels (D).

6. Carefully lift panel from machine and set it aside.



TCAL44961—UN—28MAR13

7. Tighten the four ROPS attaching cap screws, washers, and hex nuts (E) to specification.

Specification

Cap Screw—Torque. 136 N·m (100 lb-ft)

8. Install panels and secure with cap screws and washers.

9. Lower seat platform and engine cover.

OUC02004,000051C-19-17SEP13

Removing and Installing Front Tires

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

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

Removing Front Tires

1. Raise side deck completely on side of machine requiring front wheel removal. Leave other side deck lowered completely.
2. Engage the side deck transport lock.
3. Raise front mower deck completely.
4. Park machine safely. (See Parking Safely in SAFETY section.)
5. Rotate front deck for service to obtain as much clearance as possible between rear of deck and ground surface.

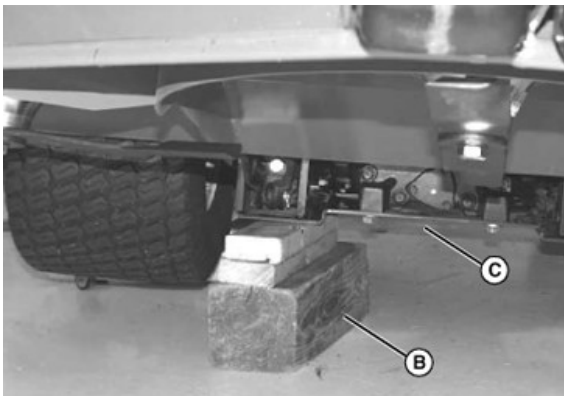
IMPORTANT: Use caution not to pinch or crush the side deck lift cylinder hydraulic hose with the lifting device.

Service Miscellaneous



TCAL44962—UN—28MAR13

6. Using a safe lifting device, jack up machine at base of lift arm bracket (A) or under the front skid plate if adequate clearance exists.



TCAL44963—UN—28MAR13

7. Install blocking material (B) under front skid plate (C).
8. Lower machine onto blocks.



TCAL44964—UN—28MAR13

9. Remove wheel bolts (D) and wheel.

Installing Front Tires



TCAL44965—UN—28MAR13

1. Install wheel onto axle hub with valve stem facing outward. Secure with wheel bolts (A).
2. Using torque wrench, Tighten front wheel bolts to specification.

Specification

Wheel Bolts—Torque. 136 - 163 N·m (100 - 120 lb-ft)

IMPORTANT: Use caution not to pinch or crush the side deck lift cylinder hydraulic hose with the lifting device.



TCAL44966—UN—28MAR13

3. Using a safe lifting device, jack up machine at base of lift arm bracket (B) or under the front skid plate if adequate clearance exists.
4. Remove blocking material from under machine.
5. Lower machine to ground.
6. Remove lifting device.
7. Check wheel bolt torque:
 - After traveling 30 m (100 ft) while changing direction.
 - After 3 to 10 hours of use.

OUO2004,000051D-19-17SEP13

Service Miscellaneous

Removing and Installing Rear Tires

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

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

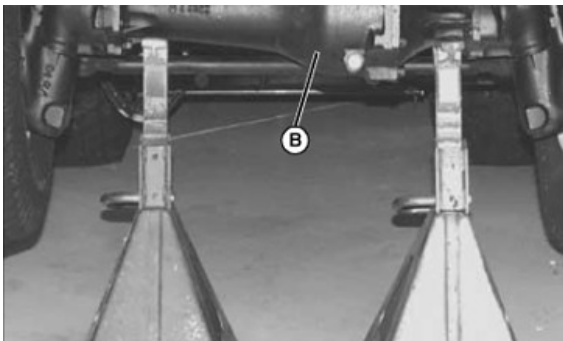
Removal

1. Raise side deck completely at side of machine requiring rear wheel removal. Leave other side deck lowered completely.
2. Engage the side deck transport lock.
3. Lower front deck completely.
4. Park machine safely. (See Parking Safely in SAFETY section.)



TCAL44967—UN—28MAR13

5. Using a safe lifting device, jack up machine under rear axle (A) so both rear wheels are above the ground.



TCAL44968—UN—28MAR13

6. Install jack stands under rear axle (B).
7. Lower machine onto jack stands.
8. Remove wheel bolts and wheel from rear axle.

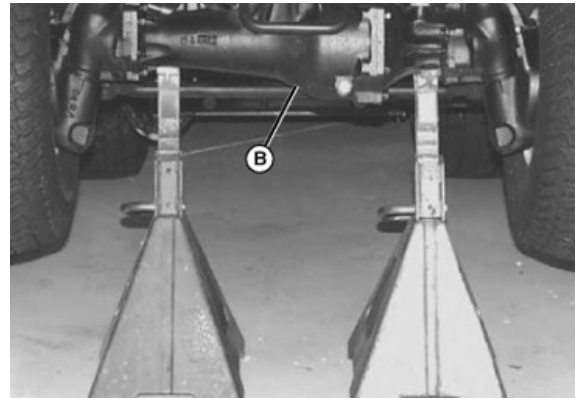
Installation

1. Install wheel onto axle hub with valve stem facing outward. Secure with wheel bolts.

2. Tighten rear wheel bolts to specification, using torque wrench.

Specification

Rear Wheel Bolt—Torque. 81—95 N·m (60—70 lb·ft)



TCAL44969—UN—28MAR13

3. Using a safe lifting device, jack up machine under rear axle (B).
4. Remove jack stands from under machine.
5. Lower machine to ground.
6. Remove lifting device.
7. Check wheel bolt torque:
 - After traveling 30 m (100 ft) while changing direction.
 - After 3—10 hours of use.

OUO2004,000051E-19-20MAR17

Troubleshooting

Using Troubleshooting Chart

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

MP47322,00F467B-19-13NOV18

Engine

IF	CHECK
Poor Engine Performance	Fuel: • Dirt in fuel system or fuel is old. Replace fuel with fresh stabilized fuel. Obtain fuel from another supplier before suspecting machine problems. Suppliers blend fuels differently and changing suppliers will generally solve any performance problems • Fuel blended for cold or warm climate may contribute to performance problems if used in the wrong season, especially if fuel is stored for several months or more. Obtain fresh fuel.
Engine Will Not Start (Starter Engages and Turns Engine)	Fuel shutoff valve is in off position. Out of fuel or improper fuel. Plugged fuel filter. Electrical problem - See Electrical Troubleshooting Section
Engine Is Hard To Start	Plugged fuel filter. Stale or improper fuel.
Engine Runs Unevenly	Fuel line or fuel filter plugged. Stale or dirty fuel. Fuel injector clogged. Air cleaner element plugged.
Engine Misses Under Load	Stale or dirty fuel. Plugged fuel filter.
Engine Overheats	Engine air intake screen plugged. Engine coolant level is low. Engine oil level is low or too high. Engine operated too long at a slow idle speed.
Engine Will Not Idle	Fuel level too low. Air cleaner element dirty. Operator raising off the seat without park brake locked.
Engine Knocks	Stale fuel. Engine overloaded. Low engine speed.
Engine Stops Or Misses When Operating On Hillsides	Fuel tank less than half full of fuel. Operator raising off the seat.
Engine Backfires	Operator raising off the seat.
Engine Loses Power	Engine overheating. Too much oil in engine. Dirty air cleaner. Travel speed is too fast for conditions. Improper fuel.
Black Exhaust Smoke	Air filter element is dirty.

OUC0004,0000520-19-17SEP13

Electrical

IF	CHECK
Starter Does Not Engage	Park brake is not locked. PTO switch is in on position. Hydrostatic pedals are not in centered neutral position. Battery terminals are corroded. Battery not charged. 15 main fuse is blown.
Battery Will Not Charge	Dead cell in the battery.

Troubleshooting

IF	CHECK
	Battery cables and terminals are dirty. Low engine speed or excessive idling.
Lights Do Not Work	Light plug disconnected. Loose or burned out bulb.

OUO2004.0000521-19-17SEP13

Machine

IF	CHECK
Vibrates Too Much or Rattles Excessively	Engine cover not latched closed. Electrical panel not latched closed.
Machine Will Not Move With Engine Running	Park brake locked. Range shift lever is in neutral position.

OUO2004.0000522-19-17SEP13

Mower Decks

IF	CHECK
Mower Deck Plugs With Grass	Grass too wet or too long. Engine not being run at full throttle while mowing. Rear of deck too low.
Patches Of Grass Uncut	Travel speed too fast. Engine should be at full throttle. Dull blades. Cutting height set too high.
Belt Slipping	Mower belt tension not set correctly. Debris in sheaves. Worn belt.
Mower Blades Do Not Stop	Belt routed incorrectly. Mower belt tension needs adjustment.
Too Much Vibration	Debris on mower deck or in sheaves. Damaged drive belt. Damaged sheaves or sheaves out of alignment. Blades out of balance.
Uneven Cut	Check procedures on Adjusting Mower Deck Level. Travel speed too fast. Blades are dull. Improperly adjusted deck rake.
Blades Scalping Grass	Turning speed too fast. Ridges in terrain. Rough or uneven terrain. Low tire pressure. Cutting too low. Bent blade(s). Improperly adjusted deck rake.
Mower Loads Down Tractor	Engine should be at full throttle. Travel speed too fast. Debris wrapped around mower spindles. Check procedure on Adjusting Mower Level Front-to-Rear. Grass conditions. Cutting height set too low. Deck spindle speed too high, spindle speed not to specification.
Uneven Clipping Distribution	Cutting height set too low. Mowing too fast. Grass too wet.

OUO2004.0000523-19-22OCT18

Troubleshooting

VCU Codes

These codes will be flashed by the Malfunction Indicator Lamp (MIL) with the wrench symbol displayed on the screen.

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

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

- **Code 2-1** (Two pulses followed by one pulse.) Indicates that traction pedals are out of neutral during an attempted start OR park brake is on while machine is out of neutral. Verify brake position.
- **Code 2-3** (Two pulses followed by three pulses.) Indicates that hood switch is open (when present). Shuts down engine and disables cranking. Verify that hood is closed (if switch present).

MX52301,0001376-19-15MAY17

Safety Interlock Diagnostic Codes

- **Code 1-2** (One pulse followed by two pulses.) Indicates that park brake switch is off while starting machine. Verify park brake engagement.
- **Code 1-3** (One pulse followed by three pulses.) Indicates that the PTO switch is ON while starting machine. Verify that PTO switch is disengaged.

Troubleshooting Guide for Common DTC's

Below is a list of most common Diagnostic Trouble Codes (DTC) with a possible solution. If the listed solution does not solve the code, or you experience a code not listed here, consult appropriate technical manual or contact your local John Deere dealer.

SPN.FMI (DTC)	Engine Control Unit Response	Fault	Diagnosis
000100.01	Engine function limited. The PDU has a pop-up screen.	Engine Oil Pressure Extremely Low	Park machine safely. Check engine oil level. Contact your local John Deere dealer.
000110.00	Engine function limited.	Engine Coolant Temperature Extremely High	Park machine safely. (See Check engine coolant level.) See your John Deere dealer.
000174.00	Normal function attempted	Fuel Temperature Extremely High.	Park machine safely. (See Cleanout Areas.)
000190.00	Engine shutdown.	Engine Speed Extremely High.	Park machine safely. See your John Deere dealer.

MX52301,0001371-19-19MAY17

Storage

Storing Safety

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

Engine exhaust fumes contain carbon monoxide and cause serious illness or death:

- **Run the engine only long enough to move the machine to or from storage.**
- **If a machine is stored before allowing it to cool, machine fires and structure fires can occur. Fires can occur 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 reach an open flame or spark.**
- **Allow the engine to cool before storing the machine in any enclosure.**

MP47322,00F4680-19-06MAY15

Preparing Machine for Storage

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

MP47322,00F4681-19-13JUL16

Preparing Fuel and Engine For Storage

Fuel:

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

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

If you are not using "Stabilized Fuel:"

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

NOTE: Try to anticipate the last usage time of the machine for the season so little fuel is left in the fuel tank.

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

IMPORTANT: Avoid damage! Stale fuel produces varnish and plugs injector components and affects engine performance.

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

4. Mix fresh fuel and fuel stabilizer in separate container. Follow stabilizer instructions for mixing.
5. Fill fuel tank with stabilized fuel.
6. To allow fuel mixture to circulate through fuel injectors, run engine for a few minutes.

Engine:

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

1. Change engine oil and filter while engine is warm.
2. Service air filter if necessary.
3. Clean debris from engine air intake screen.
4. Clean the engine and engine compartment.
5. Remove battery.
6. Clean the battery and battery posts. Check the electrolyte level, if your battery is not maintenance free.
7. Close fuel shutoff valve, if your machine is equipped.
8. Store the battery in a cool, dry place it does not freeze.

NOTE: Recharge stored battery every 60 days.

9. Charge the battery.

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

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

OUMX068,0000AFF-19-29DEC14

Removing Machine From Storage

1. Check tire pressure.

Storage

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

MP47322,00F4683-19-05JUL17

Storage for BioDiesel Fuel

IMPORTANT: Avoid damage! BioDiesel fuel must be used within three mo. of the date of production by the fuel supplier.

Before placing a BioDiesel fueled machine in long-term storage (without operating the engine):

- Drain all BioDiesel fuel from the fuel tank.
- Fill the tank with conventional petroleum fuel as indicated in the Operator's Manual.
- Start the engine and run for a minimum of 5 operating hours.

DK75838,000081C-19-26MAY15

Specifications

Engine

Engine Model Number	Yanmar 4TNV86CT
Engine Type	4-Cycle, 4-Cylinder, In-Line Turbocharged Diesel
Bore	86 mm (3.385 in.)
Stroke	90 mm (3.543 in.)
Displacement	2.091 L (127.6 cu in.)
Intake and Exhaust Valve Clearance (cold)	0.20 ± 0.05 mm (0.008 ± 0.002 in.)
Cooling	Liquid Cooled
Power Output	44 kW (59 hp)
Injection Type	Direct
Air Cleaner	Dry, Replaceable Dual Element

MX52301,000139C-19-07SEP17

Capacities

Engine Oil (with Filter)	5.8 L (6.1 qt.)
Fuel Tank	83 L (22 gal.)
Coolant	7.5 L (8 qt.)
Hydraulic System	58.7 L (15.5 gal.)
Hydrostatic Transmission	13.3 L (3.5 gal.)
Rear Axle	4.7 L (5 qt.)

MX00654,0000239-19-15OCT19

Travel Speeds

High Range

Forward	0—23.3 km/h (0—14.4 mph)
Reverse	0—11.6 km/h (0—7.2 mph)

Low Range

Forward	0—13.7 km/h (0—8.6 mph)
Reverse	0—7.2 km/h (0—4.3 mph)

MX52301,000139A-19-22MAR17

Tires

Tires Dimensions

Front Drive Tires	26x12.00-12
Rear Tires	18x9.50-8
Mower Deck Caster Tires	11x4-5

Specifications

Tire Inflation Pressures

Machine Front Tires	207 kPa (2.07 bar) (30 psi)
Machine Rear Tires	193 kPa (1.93 bar) (28 psi)

MX52301,0001399-19-22MAR17

Dimensions

Height	2 m (78 in.)
Width (Mower Decks Raised)	2.2 m (84.5 in.)
Width (Mower Decks Lowered)	3.3 m (131 in.)
Length (With Mower Deck)	3.4 m (133 in.)
Length (Without Mower Deck)	2.6 m (101 in.)
Wheelbase	1.6 m (61 in.)
Weight (With Mower Decks)	1814 kg (4000 lb.)
Ground Clearance	18 cm (7 in.)
Cutting Width	3.3 m (131 in.)

MX52301,0001398-19-22MAR17

Front Mower Deck

Cutting Width	1.6 m (62 in.)
Cutting Height	2.5—15.2 cm (1—6 in.)
Number of Blades	3

MX52301,0001397-19-22MAR17

Side Mower Decks

Cutting Width	1 m (40 in.)
Cutting Height	2.5—14 cm (1—5.5 in.)
Number of Blades	2

MX52301,0001396-19-22MAR17

Tightening Torques

Front Wheels	136—163 N·m (100—120 lb.-ft.)
Rear Wheels	81—95 N·m (60—70 lb.-ft.)
Blade Mounting Cap Screws	122 N·m (90 lb.-ft.)

MX52301,0001395-19-22MAR17

Specifications

Recommended Lubricants

Engine Oil	John Deere PLUS-50™ II
.	John Deere TORQ-GARD SUPREME™
Engine Coolant	John Deere COOL-GARD™ II
.	John Deere COOL-GARD II PG
Hydraulic Oil	John Deere HY-GARD™ J20C
Transmission Oil	John Deere HY-GARD™ J20C
Grease: (This may change for high-speed applications such as cutting units)	
.	John Deere Multi-Purpose SD Polyurea Grease
.	John Deere Multi-Purpose HD Lithium Complex Grease

MX52301,0001394-19-22MAR17

Sound Measurements

Averaged sound Level at Work station According to ISO 11201

1600 Turbo with Mower Decks 93 ± 1 db(A) at 3030 r/min engine speed

Measured Sound Power Level According to EN ISO5395-1

1600 Turbo with Mower Decks 107 ± 1 db(A) at 3030 r/min engine speed

MX52301,0001392-19-14SEP17

Vibration Measurements

Hand and arm Measured Per EN ISO5395-1

The total vibration which the “hand-arm” system is subjected does not exceed a weighted 2.5 m/s² rms.

Whole Body Measured Per EN ISO5395-1

The total vibration to which the “whole-body” is subjected does not exceed a weighted 0.5 m/s² rms.

MX52301,0001393-19-22MAR17

Declaration of Conformity

EC Declaration of Conformity

Deere & Company
Moline, Illinois U.S.A.

The person named below declares that

Machine Type: Wide Area Mower

Models: 1600 Series III Turbo

Serial Numbers: See Product Identification Page

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

DIRECTIVE	NUMBER	CERTIFICATION METHOD
Machinery Directive	2006/42/EC	Self-Certification
Electromagnetic Compatibility Directive	2014/30/EU	Self-Certification

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

Brigitte Birk
John Deere GmbH & Co. KG
Mannheim Regional Center
John Deere Strasse 70
D-68163 Mannheim

Place of Declaration: Fuquay-Varina, NC USA

Date of Declaration: 1 September 2017

Manufacturing Unit: John Deere Turf Care



DXCE01—UN—28APR09

TCT015240—UN—28MAR17

Name: Dan Thiemke

Title: Product Engineering Manager, Commercial
Mowing

MX52301,000138E-19-08SEP17

Declaration of Conformity

John Deere Quality Statement

John Deere Quality

John Deere equipment is more than just a purchase, it's an investment in quality. That quality goes beyond our equipment to your John Deere dealer's parts and service support. This support is needed to keep you a satisfied customer.

That's why John Deere has initiated a process to handle your questions or problems, should they arise. The following three steps will help guide you through the process.

Step 1

Refer to your operator's manual

- A. It has many illustrations and detailed information on the safe and proper operation of your equipment.
- B. It gives troubleshooting procedures, and specification information.
- C. It gives ordering information for parts catalogs, service and technical manuals.
- D. If your questions are not answered in the operator's manual, then go to Step 2.

Step 2

Contact your dealer

- A. Your John Deere dealer has the responsibility, authority, and ability to answer questions, resolve problems, and fulfill your parts and service needs.
- B. First, discuss your questions or problems with your dealer's trained parts and service staff.
- C. If the parts and service people are unable to resolve your problem, see the dealership manager or owner.
- D. If your questions or problems are not resolved by the dealer, then go to Step 3.

Step 3

Contact John Deere

- A. Your John Deere dealer is the most efficient source in addressing any concern, but if you are not able to resolve your problem after checking your operator's manual and contacting your dealer, contact John Deere for assistance.
- B. For prompt, effective service, please have the following ready before you call:
 - The name of the dealer with whom you've been working.
 - Your equipment model number.
 - Number of hours on machine (if applicable).
 - Your serial number which you recorded on the inside front cover of this manual.
 - If the problem is with an attachment, your attachment identification number.

C. Then call 1-800-537-8233 (United States and Canada) and our advisor will work with your dealer to investigate your concern. If you are outside the United States and Canada, visit the following website:

http://www.deere.com/globalhome/deerecom/global_home.page?CC=true

Select your country and then click on the Contact Us link.

SP66632,00043A7-19-10MAY17

Service Record

Record Service Dates

[illegible]

OUO2004,000052F-19-17SEP13

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