

# **GREAT** **DANE**<sup>TM</sup>

**Chariot**  
**GDRZ25KAE, GDRZ25KHE, GDRZ26KHE**



## **OPERATOR'S MANUAL**

**⚠ WARNING:** The Engine Exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

California Proposition 65 Warning

**OMGD10001 B2**

**D02-105**

North American Version  
Litho in U.S.A.

# INTRODUCTION

## Using Your Operator's Manual

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

An engine manufacturer's owner's manual has been provided with your machine. This will provide maintenance and troubleshooting information for the engine installed in your machine.

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.

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.

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

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

## Special Messages

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



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

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

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

## Record Identification Numbers

### Chariot

**GDRZ25KAE** Serial No. (455000 - 455999)

**GDRZ25KHE** Serial No. (457000 - 458999)

**GDRZ26KHE** Serial No. (459000 - 460999)

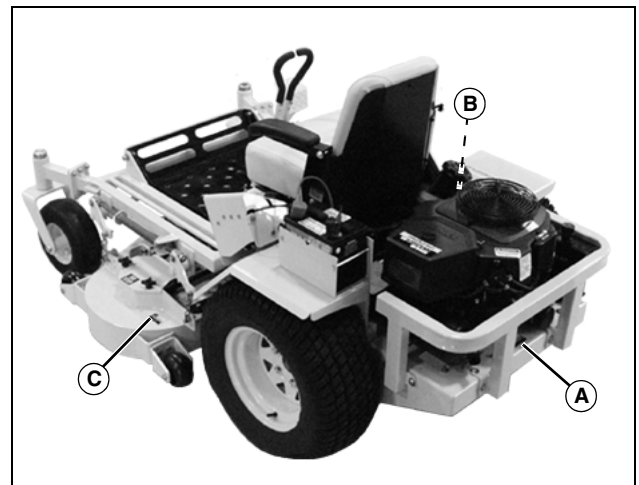
If you need to contact an Authorized Service Center for information on servicing, always provide the product model and serial numbers.

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

DATE OF PURCHASE:

DEALER NAME:

DEALER PHONE:



MX9204

MODEL NUMBER (A):

SERIAL NUMBER (POWER UNIT) (B):

ENGINE SERIAL NUMBER (B):

ENGINE SPECIFICATION NUMBER (C):

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OMGD10001 B2 - English

# SAFETY

## Understanding The Machine Safety Labels



MIF

The machine safety labels shown in this section are placed in important areas on your machine to draw attention to potential safety hazards.

On your machine safety labels, the words DANGER, WARNING, and CAUTION are used with this safety-alert symbol. DANGER identifies the most serious hazards.

The operator's manual also explains any potential safety hazards whenever necessary in special safety messages that are identified with the word, CAUTION, and the safety-alert symbol.

## DANGER/POISON



MX9292 MX9204

- Shield eyes, explosive gases can cause blindness or injury.
- No sparks, flames, smoking.
- Sulfuric acid can cause blindness or severe burns.
- Flush eyes immediately with water, get medical help fast.
- Keep out of the reach of children.
- Do not tip.
- Keep vent caps tight and level.

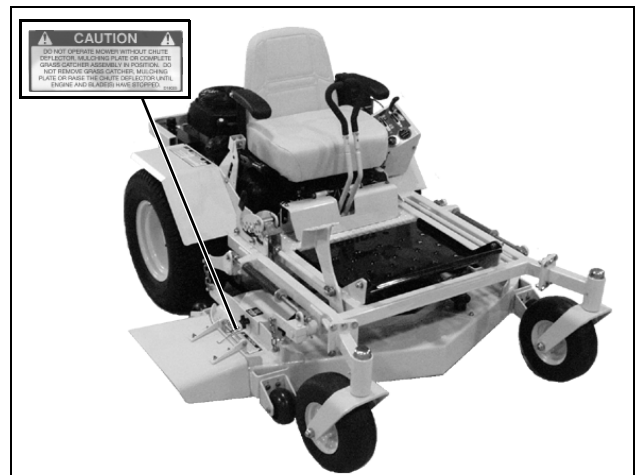
## DANGER



MX9293 MX9214

- Keep hands and feet away.

## CAUTION

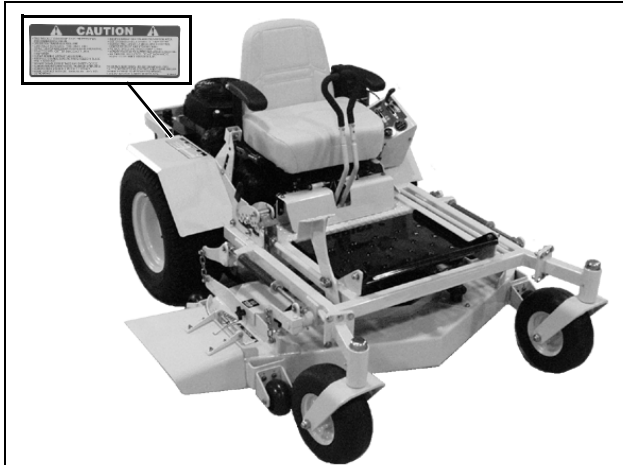


MX9294 MX9214

- Do not operate mower without chute deflector, mulching plate or complete grass catcher assembly in position.
- Do not remove grass catcher, mulching plate or raise the chute deflector until engine and blade(s) have stopped.

# SAFETY

## CAUTION



MX9295 MX9214

- This product is designed for professional and commercial users.
- Operation training is required.
- Carefully read safety instructions.
- Know function of controls before operating.
- Practice with cutter blades off until confident.
- Clear mowing area of all debris.
- Keep all guards, covers and shields in place while working.
- Do not disable or bypass any safety device.
- Always wear safety goggles while operating.
- Always park machine on level surface.
- Avoid contact with cutter blades. They may be rotating.
- Keep children and others clear from area.
- Set ground speed control to safe speed.
- Slowly and smoothly move speed control levers to start and stop machine.
- Reduce speed and avoid sharp turns.
- Be careful on slopes, do not mow where stability or traction is in doubt.
- To obtain additional operator manual and safety instructions, contact your Great Dane dealer or write Great Dane Power Equipment, 4700 New Middle Rd., Jeffersonville, IN 47130, USA.

## Emission Control System Certification Label (Small Off-Road Gas Engines)

**NOTE: Tampering with emission controls and components by unauthorized personnel may result in severe fines or penalties. Emission controls and**

**components can only be adjusted by EPA and/or CARB authorized service centers. Contact your Great Dane Equipment Retailer concerning emission controls and component questions.**

The presence of an emissions label signifies that the engine has been certified with the United States Environmental Protection Agency (EPA) and/or California Air Resources Board (CARB).

The emissions warranty applies only to those engines marketed by Great Dane that have been certified by the EPA and/or CARB; and used in the United States and Canada in off-road mobile equipment.

## Emission Compliance Period (Small Off-Road Gas Engines)

If your engine has the emission compliance category listed on the emission control system certification or air index label, this indicates the number of operating hours for which the engine has been certified to meet EPA and/or CARB emission requirements. The following table provides the engine compliance period in hours associated with the category found on the certification label.

Agency	Category	Hours
EPA	C	250
EPA	B	500
EPA	A	1000
CARB	Moderate	125
CARB	Intermediate	250
CARB	Extended	500

## Operating Safely

- Inspect machine before you operate. Be sure hardware is tight. Repair or replace damaged, badly worn, or missing parts. Be sure guards and shields are in good condition and fastened in place. Make any necessary adjustments before you operate.
- Do not operate mower without discharge chute or entire grass catcher in place.
- Check before each use that operator presence controls are functioning correctly. Test safety systems. Do not operate unless they are functioning correctly.
- Do not change the engine governor setting or overspeed the engine.
- Check brake action before you operate. Adjust or service brakes as necessary.

# SAFETY

- Stop machine if anyone enters the area.
- Never raise mower decks when blades are running.
- If you hit an object, stop and inspect the machine. Make repairs before you operate. Keep machine and attachments properly maintained and in good working order.
- Do not leave machine unattended when it is running.
- Only operate during daylight or with good artificial light.
- Slow down and be careful of traffic when operating near or crossing roadways. Stop blades before crossing roads or sidewalks. Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.
- Be aware of the mower discharge direction and make sure that no one is in the path of the discharge direction.
- Use only accessories and attachments approved by the manufacturer of the machine.
- Wear close fitting clothing and safety equipment appropriate for the job.
- Always wear safety goggles or safety glasses with side shields when operating the mower.
- Wear a suitable protective device such as earplugs. Loud noise can cause impairment or loss of hearing.
- Do not wear radio or music headphones. Safe service and operation requires your full attention.

## Checking Mowing Area

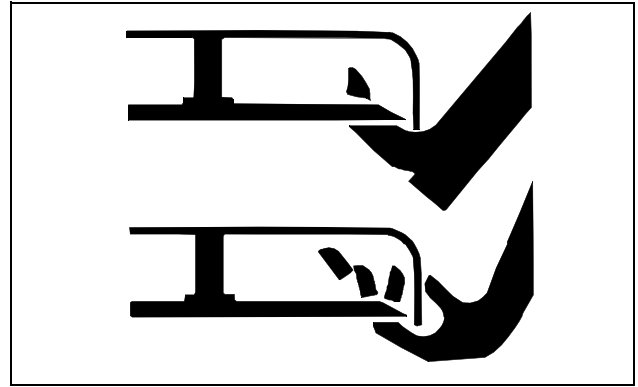
- Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job.
- Clear mowing area of objects that might be thrown. Keep people and pets out of mowing area.
- Study mowing area. Set up a safe mowing pattern. Do not mow where traction or stability is doubtful.
- Test drive area with mower lowered but not running. Slow down when you travel over rough ground.

## Parking Safely

1. Stop machine on a level surface, not on a slope.
2. Disengage PTO.
3. Lower attachments to the ground.
4. Lock park brake.
5. Stop engine.
6. Remove key.
7. Wait for engine and all moving parts to stop before you leave the operator's station.

## Rotating Blades are Dangerous

### HELP PREVENT SERIOUS OR FATAL ACCIDENTS:



MIF

- Rotating blades can cut off arms and legs.
- Keep hands, feet and clothing away from mower deck when engine is running.
- Be alert at all times, drive forward carefully. People, especially children can move quickly into the mowing area before you know it.
- Before backing up, shut off PTO and look down and behind the machine carefully, especially for children.
- Do not mow in reverse.
- Shut off blades when you are not mowing.
- Do not operate machine if you are under the influence of drugs or alcohol.
- Park machine safely before inspecting or unplugging mower or bagger.

### PROTECT CHILDREN:

- Never assume that children will remain where you last saw them. Children are attracted to mowing activity, stay alert to the presence of children.
- Keep children indoors when you are mowing. Turn the machine off if a child enters the mowing area.
- Use extra care when you come to blind corners, shrubs, trees, or other objects that may block your vision.
- Do not let children or an untrained person operate the machine.
- Do not carry or let children ride on any attachment or machine even with the blades off. Do not tow children in a cart or trailer.

## Avoid Tipping

- Slopes are a major factor related to loss-of-control and tip-over accidents, which can result in severe injury or death.

# SAFETY

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- Drive across a hill - not up and down. If necessary, turn slowly and in the downhill direction. Do not shift to neutral and coast downhill.
- Avoid starting and stopping on a slope. If machine stops, disengage mower blades and back down slowly.
- Do not drive where machine could slip or tip.
- Stay alert for holes and other hidden hazards in the terrain.
- Keep away from drop-offs, ditches, and embankments.
- Slow down before you make a sharp turn or operate on a slope. On gear models, choose a low gear so that shifting and stopping will not be necessary while on the slope.
- Transport machine with decks lowered to improve stability.
- Drive machine very slowly and avoid quick stops when attachment is removed.
- Mowing when grass is wet can cause reduced traction and sliding.

## 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.

## Checking Wheel Bolts

- A serious accident could occur causing serious injury if wheel bolts are not tight.
- Check wheel bolt 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.

## 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.
- Use extra care when loading or unloading the machine into a trailer or truck.
- 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.

## Practice Safe Maintenance

- Only qualified, trained adults should service this machine.
- Understand service procedure before doing work. Keep area clean and dry.
- Never lubricate, service, or adjust machine while it is moving. Keep safety devices in place and in working condition. Keep hardware tight.
- Keep hands, feet, clothing, jewelry, and long hair away from any moving parts, to prevent them from getting caught.
- Lower attachments to the ground before servicing machine. Disengage all power and stop the engine. Lock park brake and remove the key. Let machine cool.
- Disconnect battery or remove spark plug wire before making any repairs.
- Before servicing machine, carefully release pressure from components with stored energy such as hydraulic components.
- Keep all nuts and bolts tightened, especially blade attachment bolts.
- Securely support any machine elements that must be raised for service work. Lock service latches before working on machine with raised attachments.
- Never run engine unless park brake is locked.
- Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Replace all worn or damaged safety and instruction decals.
- To prevent fires, remove any buildup of grease, oil, or debris from the machine, especially the engine compartment.
- Charge batteries in an open, well-ventilated area, away from sparks. Unplug battery charger before connecting or disconnecting from the battery. Wear protective clothing and use insulated tools.
- Do not modify machine or safety devices. Unauthorized modifications may impair its function and safety.
- Do not wear radio or music headphones while servicing the machine. Safe service requires your full attention.

## Avoid High Pressure Fluids

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

# SAFETY

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.

## Prevent Fires

- Never remove fuel cap, or add fuel with engine running or hot. Allow engine to cool for several minutes.
- Never store equipment with fuel in the tank inside a building where fumes may reach an open flame or spark.
- Allow engine to cool before storing in any enclosure.
- To reduce fire hazard, keep engine free of grass, leaves, or excessive grease.

## Tire Safety

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

- Do not attempt to mount a tire without the proper equipment and experience to perform the job.
- Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure. Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion. Welding can structurally weaken or deform the wheel.
- When inflating tires, use a clip-on chuck and extension hose long enough to allow you to stand to one side and not in front of or over the tire assembly.
- Check tires for low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.

## Handling Fuel Safely

**Fuel and fuel vapors are highly flammable and explosive:**

- Do not refuel machine while you smoke, when machine is near an open flame or sparks, or when engine is running. Stop engine and allow to cool before filling.
- Never remove the fuel cap or add fuel with the engine

running.

- Never fill fuel tank or drain fuel from a machine in an enclosed area. Fill fuel tank outdoors.
- Prevent fires. Clean up spilled fuel immediately.
- Do not store machine with fuel in tank in a building where fumes may reach an open flame or spark.
- Prevent fire and explosion caused by static electric discharge. 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.



MIF

- Static electric discharge can ignite gasoline vapors in an ungrounded fuel container. Remove the fuel container from the bed of a vehicle or the trunk of a car and place on the ground away from the vehicle before filling. Keep nozzle in contact with container opening while filling.
- When practical, remove equipment from trailers or truck beds and refuel them on the ground. If this is not possible, use a portable, plastic fuel container to refuel equipment on a truck bed or trailer.
- For gasoline engines, do not use gas with methanol. Methanol is harmful to your health and to the environment.

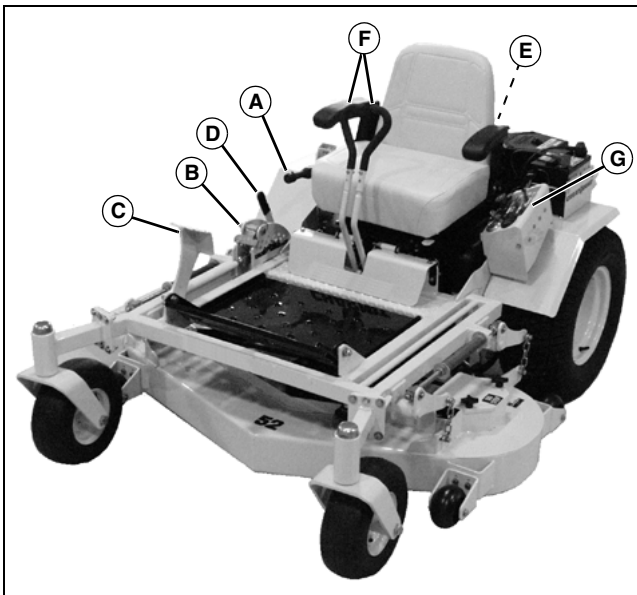


# OPERATING

## Daily Operating Checklist

- Test safety systems.
- Check tire pressure.
- Check fuel level.
- Check engine oil level.
- Remove and clean engine air filter.
- Check transmission oil reservoir level.
- Remove grass and debris from machine.
- Clean engine cooling air intake screen and cooling fins.
- Inspect all belts for damage.
- Sharpen and balance mower blades.
- Check area below machine for any fuel or oil leaks.

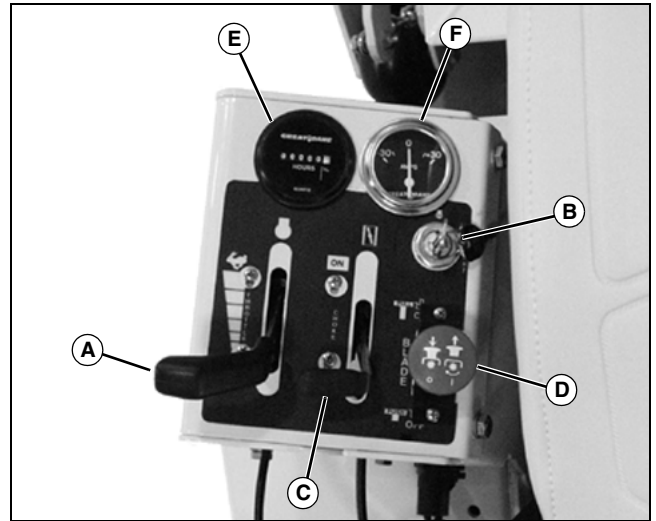
## Operating Controls



MX9206

- A - Park Brake Lever**
- B - Height-of-Cut (HOC) Adjustment Pin**
- C - Mower Deck Lift/Lower Pedal**
- D - Mower Deck Transport Position Lock Lever**
- E - Fuel Shutoff Valve**
- F - Steering Control Levers**
- G - Console**

## Console Controls



MX9205

- A - Throttle Lever**
- B - Key Switch**
- C - Choke Lever**
- D - PTO/Clutch Switch**
- E - Hourmeter**
- F - Ammeter**

## Testing Safety Systems



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

**Move the vehicle 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.**

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

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

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

# OPERATING

## Testing Park Brake Safety Switch

1. Operator must be seated in the seat (seat safety switch engaged).
2. Move control levers to neutral position.
3. Move PTO/clutch switch to off position.
4. Unlock park brake.
5. Turn key switch to start position.

**Result:** The engine must not crank.

## Testing Park Brake

Stop the machine on a maximum 17° slope. Stop the engine and lock the park brake.

**Result:** Park brake must hold the machine stationary. If the machine moves more than 61 cm [24 in.] in one hour, brakes need to be adjusted. See your Great Dane dealer.

## Testing Neutral Start Safety Switch

1. Operator must be seated in the seat (seat safety switch engaged).
2. Move control levers to forward travel position.
3. Move PTO/clutch switch to off position.
4. Lock park brake.
5. Turn key switch to start position.

**Result:** The engine must not crank.

## Testing Seat Safety Switch

1. Operator must be seated in the seat (seat safety switch engaged).
2. Move control levers to neutral position.
3. Start the engine.



**CAUTION: Avoid injury! Before engaging mower, clear area of bystanders, especially children.**

4. Move PTO/clutch switch to on position.
5. Operator rises slightly off the seat.

**Result:** The engine must stop.

## Testing PTO/Clutch Safety Switch

1. Operator must be seated in the seat (seat safety switch engaged).

2. Unlock park brake.
3. Move PTO/clutch switch to on position (mower deck drive engaged).
4. Turn key switch to start position.

**Result:** The engine must not crank.

## Using the Park Brake

Move park brake lever to the raised (locked) position to lock the park brake. This will also engage the park brake safety switch.

## Starting the Engine



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

**Move the vehicle to an outside area before running the engine.**

**Do not run an engine in an enclosed area without adequate ventilation.**

- **Connect a pipe extension to the engine exhaust pipe to direct the exhaust fumes out of the area.**
- **Allow fresh outside air into the work area to clear the exhaust fumes out.**

1. Open the fuel shutoff valve.
2. Operator must be seated in the seat (seat safety switch engaged).
3. Lock park brake.
4. Move control levers to neutral position.
5. Move PTO/clutch switch to off position.
6. Move throttle lever to half-speed position.
7. Adjust choke as required.

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

- **Wait 2 minutes before trying again if the engine does not start.**

8. Turn key switch to start position for no more than 5 seconds. Release key to the run position when engine starts.

- If the engine does not start, wait 10 seconds.
- Turn key to start position again for no more than 5

# OPERATING

seconds.

- Repeat the procedure if necessary.

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

9. Let the engine run at half-speed position for several minutes to warm up before operating the machine. Reduce choke setting as the engine warms up.

## Operating the Machine

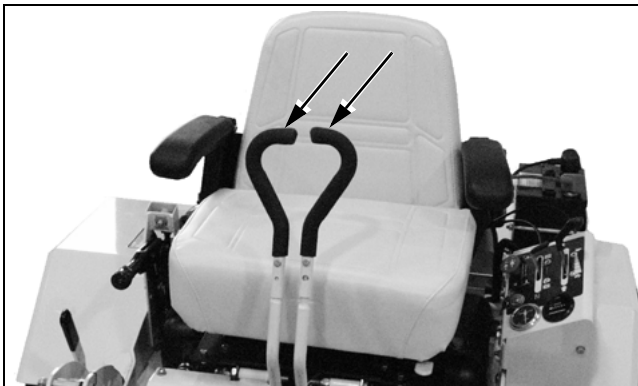


**CAUTION: Avoid injury! Learn the use of the control levers. Practice at half throttle until becoming proficient and comfortable with the operation of the machine.**

**Do not move control levers from forward to reverse or reverse to forward position rapidly. Sudden direction changes could cause loss of control or damage the machine.**

1. Adjust mower deck to desired cutting height.
2. Start and warm up engine at half throttle.
3. Move PTO/clutch switch to on position.
4. Move throttle lever to wide open position.
5. Unlock park brake.

**NOTE: The travel speed and turn rate will vary with the amount that the control levers are moved.**



MX9220

6. Drive the machine:

**To drive the machine forward:** Push both control levers forward smoothly and evenly.

**To turn the machine:** Pull the control lever back on the same side as the direction of the desired turn. Push the other lever forward.

**To stop the machine:** Return both control levers to the

neutral position.

**To drive the machine in reverse:** Pull both control levers back evenly.

## Stopping the Machine

**NOTE: If the operator leaves the seat without placing the PTO switch in the off position, the mower blades will stop as soon the operator leaves the seat.**

1. Move the PTO/clutch switch to the off position.
2. Return both control levers to the neutral position.



**CAUTION: Avoid injury! Children or bystanders may attempt to move or operate an unattended machine.**

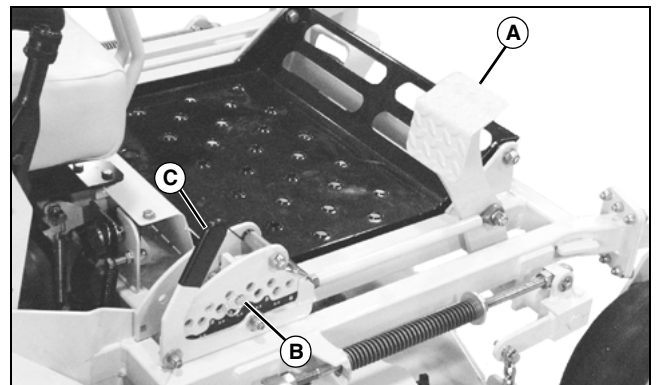
**Always lock the park brake and remove the key before leaving the machine unattended.**

3. Lock park brake.
4. Move the throttle lever to the half-speed position, and let the engine run at low throttle for a few seconds.
5. Turn the key switch to the stop position.
6. Remove key.

## Adjusting Cutting Height

Cutting height can be adjusted from approximately 25-152 mm (1-6 in.). Each hole adjusts the height of cut (HOC) in 13 mm (1/2 in.) increments.

The deck can also be raised and locked in a transport position to provide maximum ground clearance when moving the machine from one area to another.



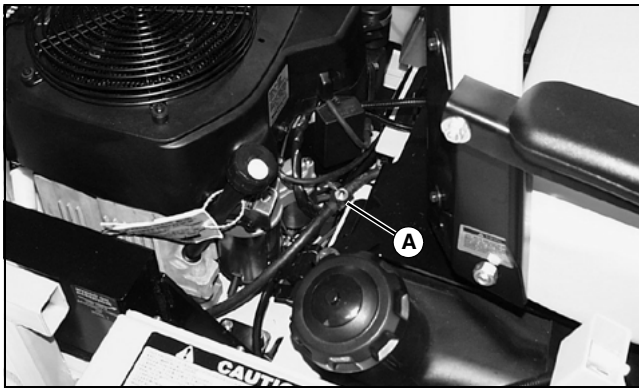
MX9215

1. Push the mower deck lift/lower pedal (A) forward to raise and latch the deck in the transport position.
2. Position the HOC adjustment pin (B) in the proper hole for the desired height of cut.

# OPERATING

3. Depress and hold the mower deck lift/lower pedal (A) and release the transport position lock lever (C).
4. Release the mower deck lift/lower pedal (A) and allow the pedal to rest against the HOC pin.

## Using the Fuel Shutoff Valve



MX9409

Move the fuel shutoff valve (A) to the on position for normal operation. Move the valve to the off position when the machine is not in use and during transport.

## Moving the Machine Manually



**CAUTION: Avoid injury! With the free-wheeling valve open, the machine will have unrestricted motion.**

- The machine may free-wheel out of control if the free-wheeling valve is opened with the machine on an incline.
- Park the machine on a level surface before opening the free-wheeling valve.

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

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

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

**NOTE: The pumps are located under the machine, behind the mower deck.**



MX9226

**Picture Note: Left pump shown.**

2. Turn free-wheeling valves (A) on both pumps one full turn counterclockwise (open position).
3. Unlock park brake.
4. Push machine to desired location. Due to internal hydraulic system resistance, the machine will move slowly.
5. Turn free-wheeling valves (A) on both pumps one full turn clockwise (closed position). Tighten the valves to 9-14 N•m (80-120 lb-in.).
6. Lock park brake.

# REPLACEMENT PARTS

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## Parts

We recommend Great Dane quality parts available at your Great Dane dealer.

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

When you order parts, your Great Dane dealer needs your machine model and serial numbers and engine serial number. These are the numbers that you recorded in the Product Identification section of this manual.

## Part Numbers

Item	Part Number
Battery	D18169
Fuel Tank Cap	D18097
Oil Reservoir Cap	D18081
Oil Filter (Hydraulic System)	D18094
Traction (Hydro) Drive Belt	D28030
<b>Engine to Blade Belts:</b>	
• 1,32 m (52 in.) Deck	D28032
• 1,55 m (61 in.) Deck	D28029
<b>Mower Deck Drive Belts:</b>	
• 1,32 m (52 in.) Deck	D28031
• 1,55 m (61 in.) Deck	D28028
<b>Mower Blades:</b>	
• 53 cm (21 in.)	D18036
• 45 cm (18 in.)	D18037

(Part numbers are subject to change without notice. Part Numbers may be different outside the U.S.A.)

# SERVICE INTERVALS

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## Servicing Your Machine

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

- Engine components may become dirty or plugged when operating in extreme heat, dust or other severe conditions.
- Engine oil and spark plugs may lose efficiency if vehicle is operated constantly at slow or low engine speeds or with frequent short trips.

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

**NOTE: The following initial break-in items must be performed and verified to validate the warranty (dealer service invoice accepted).**

### Break-In (After First 8 Hours of Operation)

Change engine oil and filter.

Check drive belt tension.

Check transmission neutral adjustment.

Check wheel nut torque.

### Break-In (After First 24 Hours of Operation)

Check drive belt tension.

### Break-In (After First 40 Hours of Operation)

Change transmission oil and filter.

### Every 40 Hours

Change engine oil.

Grease HOC shafts (five places).

Grease caster wheel pivot bearings (two places).

Grease caster wheel bearings (two places).

Grease mower deck thrust arms (two places).

Grease mower deck spindle bearings (three places) if equipped.

Remove debris from the underside of the mower deck.

Check drive belt tension.

Check tire pressure.

Check battery electrolyte level.

Clean engine air filter.

Check wheel nut torque.

### Every 160 Hours

Clean and inspect spark plugs.

Change engine oil filter.

Check transmission oil level.

Lubricate mower deck idler pulley pivots (three places).

Lubricate seat platform hinges (two places)

Lubricate pump control arms (five places).

Lubricate control lever pivot shafts (two places).

Lubricate throttle cable.

Lubricate choke control cable.

### Every 500 Hours

Change transmission oil and filter.

### Annually

Replace all spindle bearings (6).

Replace all mower deck idler pulleys (3).

Remove caster wheel roller bearings, clean and lubricate.

Replace drive belts. Run-in and adjust tension.

Clean power unit.

Replace hydraulic oil filter.

Check all bolts and nuts; tighten as needed.

Remove battery. Clean battery and holder.

Replace spark plugs.

# SERVICE LUBRICATION

## Grease

**IMPORTANT: Avoid damage! If operating outside that temperature range, contact your Servicing dealer for a special-use grease.**

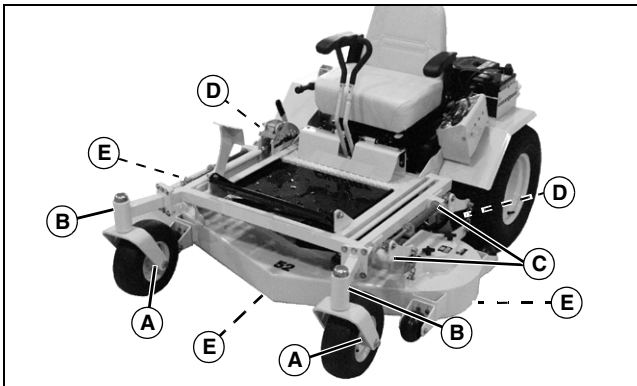
Use a general all-purpose grease with an NLGI grade No.2 rating.

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

## Spray Lubricant

Use a general-purpose petroleum-based spray lubricant.

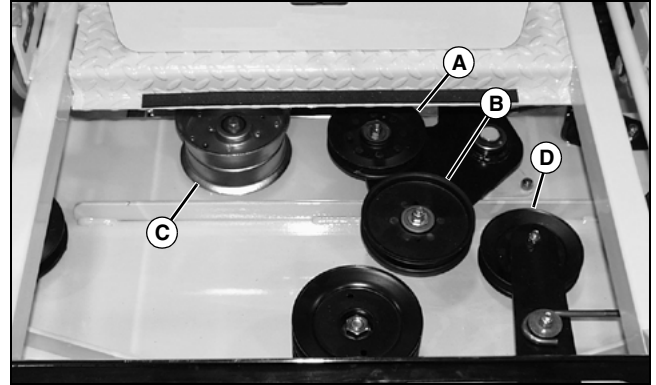
## Lubrication Points



MX9206

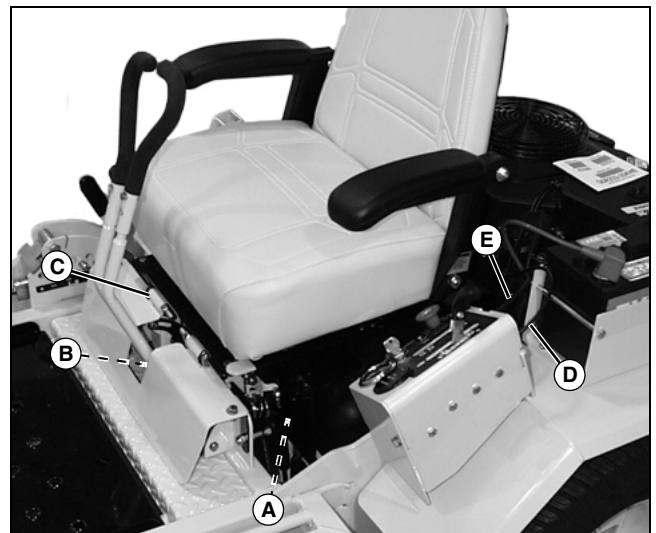
- Grease caster wheel bearings (A).
- Grease caster wheel pivot bearings (B).
- Grease HOC shafts (C).
- Grease mower deck thrust arms (D), located at the rear of the mower deck.
- Grease mower deck spindle bearings (E) if equipped.

**NOTE: Use spray lubricant to lubricate the following items:**



MX9252

- Lubricate mower deck idler pulleys (A-D).



MX9408

- Lubricate hydraulic pump control arms (A).
- Lubricate control lever pivot shaft (B).
- Lubricate seat platform hinges (C).
- Lubricate throttle control cable (D).
- Lubricate choke control cable (E).

# SERVICE ENGINE

## Avoid Fumes



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

**Move the vehicle to an outside area before running the engine.**

**Do not run an engine in an enclosed area without adequate ventilation.**

- **Connect a pipe extension to the engine exhaust pipe to direct the exhaust fumes out of the area.**
- **Allow fresh outside air into the work area to clear the exhaust fumes out.**

## Engine Oil

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

**Use oil that meets the following specification:**

- API Service Classification SG or higher

## Checking Engine Oil Level

**IMPORTANT: Avoid damage! Failure to check the oil level regularly could lead to serious engine problems if oil level is low:**

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

**NOTE: Check oil twice a day if you run engine over 4 hours in a day.**

**Make sure engine is cold when checking engine oil level.**

1. Park machine safely. (See Parking Safely in the Safety section.)
2. Clean area around dipstick to prevent debris from falling into crankcase.
3. Remove dipstick. Wipe with a clean cloth.
4. Install and tighten dipstick.
5. Remove dipstick and check oil level on dipstick. Oil must be between ADD and FULL marks. If oil is low, add oil to bring oil level no higher than FULL mark on dipstick. Do not

overfill.

6. Install and tighten dipstick.

## Changing Engine Oil and Filter



MX9413

**NOTE: An oil drain tube is provided with your machine. Attach the tube to the oil drain fitting on your engine, and open the valve (A) to drain the used oil. Close the valve, and remove the drain tube from the fitting after the oil has been drained. Store the drain tube after use.**

Change engine oil and filter at the intervals recommended in the Service Intervals section. See the engine manufacturer's owner's manual provided with your machine for the complete procedure.

## Cleaning Air Intake Screen and Engine Fins

**IMPORTANT: Avoid damage! The engine is air-cooled and requires a large amount of air intake when running. Reduced air intake can cause overheating:**

- **Keep air intake screen and cooling fins clean.**
- **Keep covers and screens in place.**

Keep air intake screens and engine cooling fins clear of debris to ensure proper cooling. See the engine manufacturer's owner's manual provided with your machine for the complete procedure.

## Checking and Cleaning Air Filter Elements



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



# SERVICE ENGINE

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

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

Check and clean air filter elements at the intervals recommended in the Service Intervals section. See the engine manufacturer's owner's manual provided with your machine for the complete procedure.

## Checking Spark Plug



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

Check spark plugs at the intervals recommended in the Service Intervals section. See the engine manufacturer's owner's manual provided with your machine for the complete procedure.

## Adjusting Carburetor

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

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

If engine is hard to start or runs rough, see the troubleshooting section of the engine manufacturer's owner's manual provided with your machine.

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

After performing the checks in the troubleshooting section and your engine is still not performing correctly, contact the local engine manufacturer's authorized servicing dealer.

## Replacing Fuel Filter



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

- Do not smoke while handling fuel.
- Keep fuel away from flames or sparks.
- Shut off engine before servicing.
- Cool engine before servicing.
- Work in a well-ventilated area.
- Clean up spilled fuel immediately.

1. Park machine safely. (See Parking Safely in the Safety section.)
2. Turn fuel shutoff valve to off position.
3. Disconnect the fuel hose from the outlet side of the fuel filter, and drain gasoline into a properly marked container.
4. Remove the fuel filter from the inlet fuel hose. Discard filter.

**IMPORTANT: Avoid damage! When installing a new fuel filter, the filter arrow must be pointing in the direction of fuel flow.**

5. Connect a new fuel filter to hoses.
6. Turn fuel shutoff valve to ON position.

# SERVICE TRANSMISSION

## Avoid Fumes

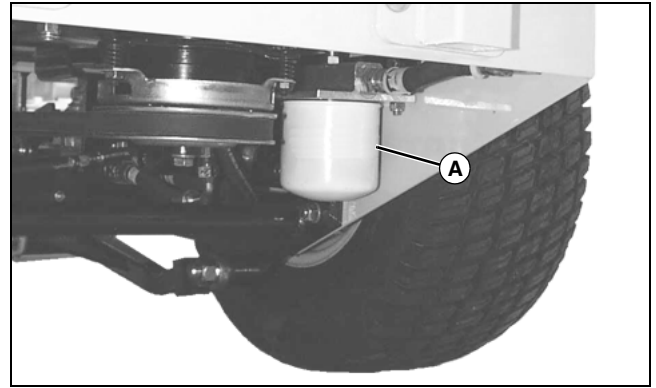


**CAUTION: Avoid injury! Engine exhaust fumes contain carbon monoxide and can cause serious illness or death.**

Move the vehicle 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.



MX9233

## Transmission Oil

Use only Quaker State® 5W-50 or Mobil-1® 15W-50 all synthetic oil.

## Checking Transmission Oil Level

1. Park machine safely. (See Parking Safely in the Safety section.)
2. Remove the hydraulic reservoir cap. The oil level should be 76 mm (3 in.) from the top of the filler pipe. Add oil as needed.

## Changing Transmission Oil and Filter

**IMPORTANT: Avoid damage! Contamination of hydraulic fluid could cause transmission damage or failure. Do not open oil reservoir cap unless absolutely necessary.**

1. Park machine safely. (See Parking Safely in the Safety section.)
2. Allow engine and hydraulic reservoir to cool.
3. Clean area around the reservoir filler cap, and remove the filler cap from the reservoir.

4. Turn hydraulic filter (A) counterclockwise to remove, and drain oil into a properly marked container with a capacity of at least 7.5 L (2.0 gal).
5. Apply a film of clean oil to gasket of new filter.
6. Install filter. Turn filter clockwise until gasket makes contact with the mounting surface. Tighten 1/2 to 3/4 turn after contact.
7. Fill reservoir with approximately 2.8 L (3 qt) (low-profile tank) or 3.8 L (4 qt) (high-profile tank) of oil.
8. Install reservoir cap.
9. Bleed air from hydraulic system.

## Adjusting Transmission Neutral Position

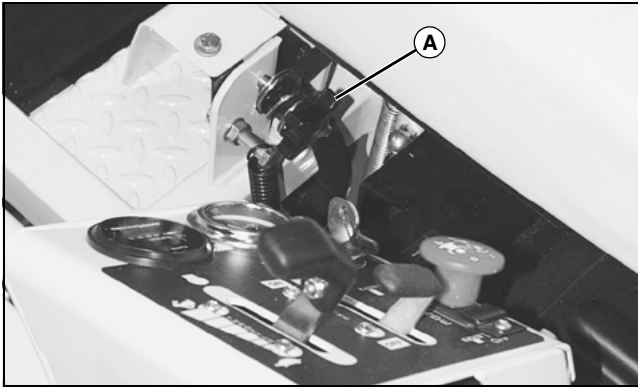
1. Park machine safely. (See Parking Safely in the Safety section.)



**CAUTION: Avoid injury! Machine must be safely supported on jackstands before removing or installing wheels. Do not use a hoist or floor jack to support the machine.**

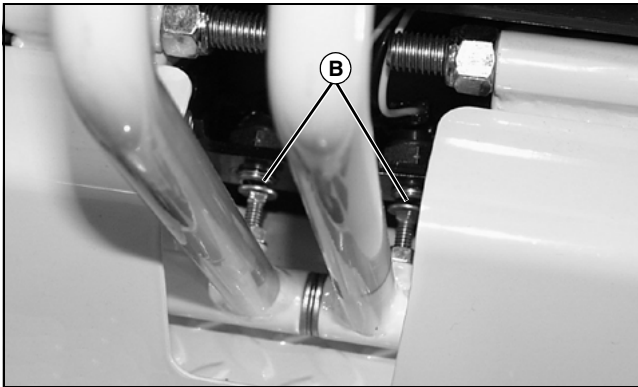
2. Raise drive wheel off the ground and securely support the machine, and block caster wheels.
3. Start and run the engine until it reaches normal operating temperature.
4. Observe wheel movement as control levers are moved back and forth. The wheels should travel in the correct direction as the levers are moved.

# SERVICE TRANSMISSION



MX9244

5. Move control levers to neutral position. The wheels should stop rotating. If the wheels continue to rotate, adjust the neutral adjustment knob(s) (A), located on each side of the seat, until wheel(s) stop rotating.



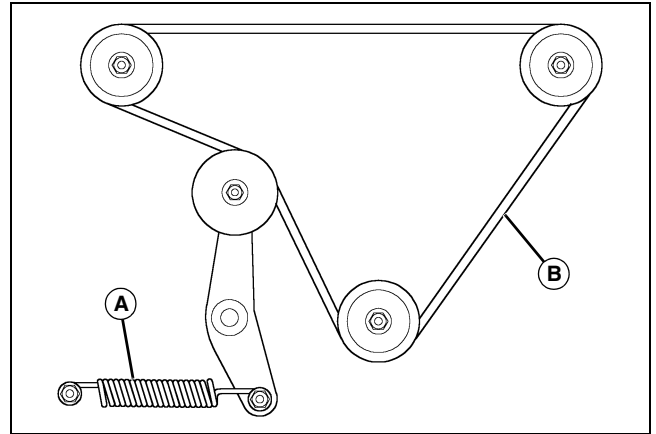
MX9250

6. Adjust neutral switch activator bolt(s) (B) as needed. The switches should be engaged when the control levers are in the neutral position.

7. Shut engine off.
8. Lower the machine to the ground.

## Removing and Installing Traction Drive Belt

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



MX9216

**Picture Note:** Drive belt routing as viewed from the top of machine.

3. Disconnect tension spring (A) from the anchor pin.
4. Remove drive belt (B).
5. Install new drive belt (B).
6. Connect tension spring (A) to anchor pin.
7. Install mower deck drive belt.

## Bleeding Hydraulic System



**CAUTION:** Avoid injury! 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.

**IMPORTANT:** Avoid damage! Contamination of hydraulic fluid could cause transmission damage or failure. Do not open oil reservoir cap unless absolutely necessary.

Severe or unusual conditions may require a more frequent service interval.

**NOTE:** Whenever hydraulic components are removed from the system, hoses are disconnected, or the system has been drained, trapped air must be removed from the hydraulic system.

# SERVICE TRANSMISSION

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1. Park machine safely. (See Parking Safely in the Safety section.)
2. Check hydraulic oil level. Adjust as necessary.



**CAUTION: Avoid injury! Machine must be safely supported on jackstands before removing or installing wheels. Do not use a hoist or floor jack to support the machine.**

3. Raise drive wheels off the ground and block caster wheels.

**NOTE: The pumps are located under the machine, behind the mower deck.**



MX9226

**Picture Note: Left pump shown.**

4. Open free-wheeling valves (A) one full turn counterclockwise and start engine.
5. Slowly move the control levers in both forward and reverse directions five to six times. As the air is purged from the unit, the oil level will drop.
6. Turn off engine and check oil level. Adjust as necessary.
7. Close the free-wheeling valves and tighten to 9-14 N•m (80-120 lb-in.).
8. Start engine and slowly move the control levers in both forward and reverse directions five to six times.
9. Turn off engine and lower machine to ground. Check oil level and adjust as necessary. Mower should move in forward and reverse at normal speed, if not, repeat procedure.

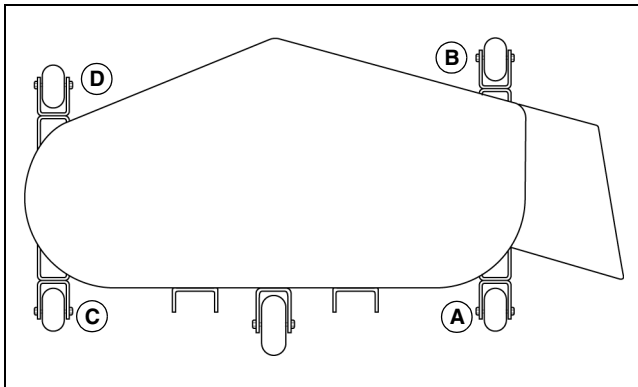
# SERVICE MOWER

## Adjusting Mower Level



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

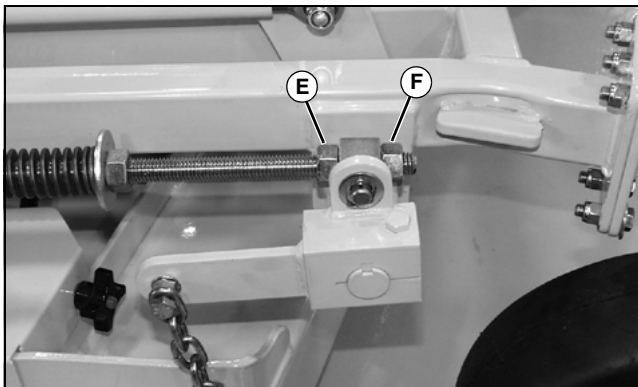
1. Park machine safely. (See Parking Safely in the Safety section.)
2. Inflate drive (rear) tires to 69-83 kPa (10-12 psi), and caster (front) tires to 110-139 kPa (16-20 psi).
3. Adjust cutting height to 50 mm (2 in.), and lower mower to cutting position.



MX9288

4. Measure the distance from the top of the mower deck to the ground at positions A and B. The height at position A must be 3-6 mm (1/8-1/4 in.) higher than position B.

- If adjustment is required, proceed to Step 5.
- If no adjustment is required, proceed to Step 6.

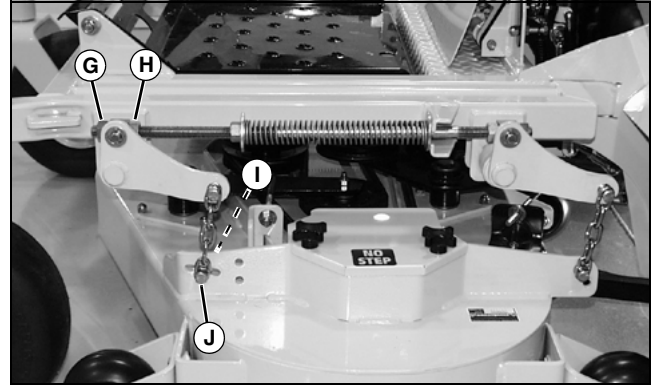


MX9284

5. Loosen jam nuts (E) and (F) on the swivel adjuster rod. Turn the jam nuts as required to obtain the desired height of position A.
6. Measure the distance from the top of the mower deck to the ground at positions B and D. The heights of position B and D should be equal,  $\pm 3$  mm (1/8 in.).

- If adjustment is required, proceed to Step 7.

- If no adjustment is required, proceed to Step 8.



MX9221

7. Loosen jam nuts (G) and (H) on the swivel adjuster rod. Turn the jam nuts as required to obtain the desired height of position D.

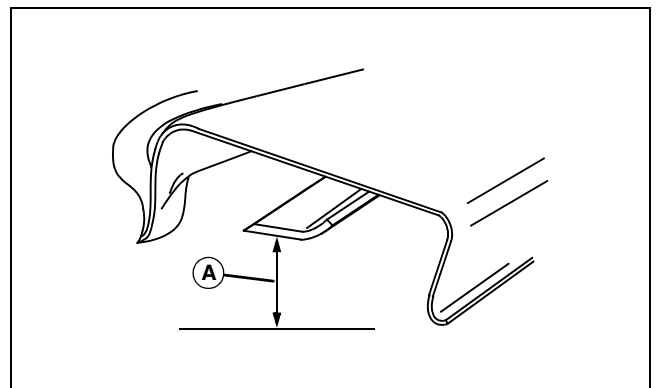
8. Measure the distance from the top of the mower deck to the ground at positions C and D. The height at position C must be 3-6 mm (1/8-1/4 in.) higher than position D.

- If adjustment is required, proceed to Step 9.
- If no adjustment is required, proceed to Adjust Cutting Height.

9. Loosen the nut (I), and slide cap screw (J) in the slot until the desired height at position C is obtained. Tighten the nut.

## Adjust Cutting Height

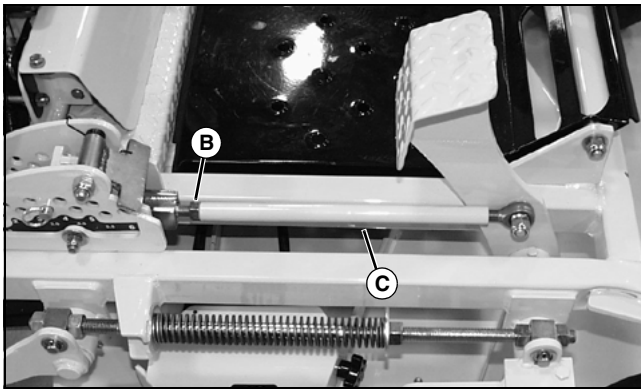
1. Set the cutting height to 89 mm (3-1/2 in.), and lower mower to cutting position.



MIF

2. Turn right blade (A) so that the blade tip is pointing out of the middle of the discharge chute.
3. Measure from outside blade tip to flat ground surface. If the blade height (A) is not 89 mm (3-1/2 in.), adjust the cutting height.

# SERVICE MOWER

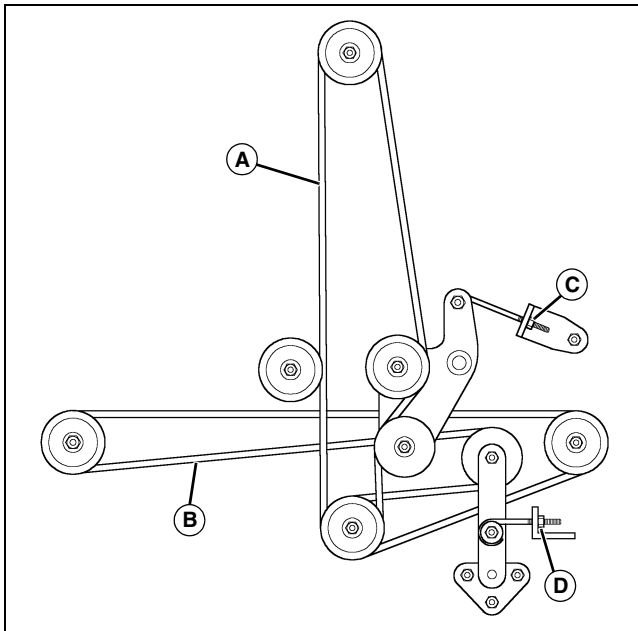


MX9285

4. Loosen the jam nut (B) on the link rod assembly, and turn the sleeve (C) until the blade height is 89 mm (3-1/2 in.). Tighten the jam nut.

## Checking and Adjusting Mower Deck Drive Belt Tension

1. Park machine safely. (See Parking Safely in the Safety section.)
2. Adjust the mower deck for the lowest cutting height, and lower the deck.



MX9217

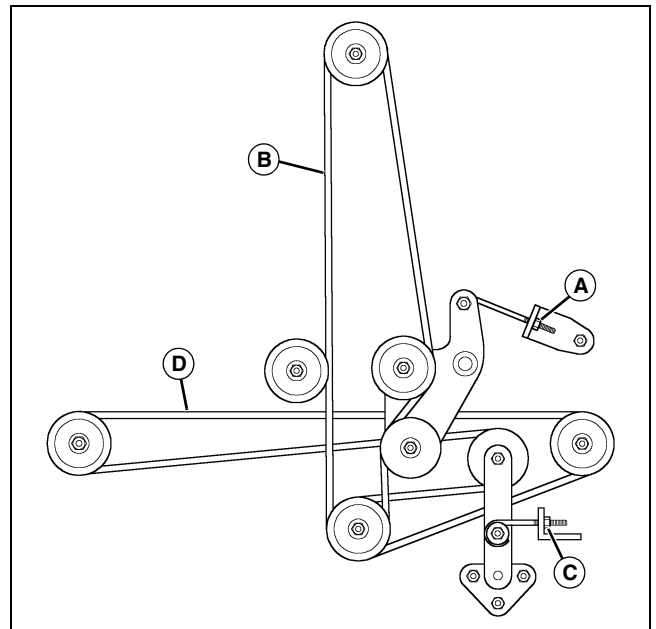
3. Check the mower deck drive (A) and spindle drive (B) belt tension. The belts should deflect a maximum of 13 mm (1/2 in.) when a force of 4.5 kg (10 lb) is applied to the center of the longest span.

- **To Increase Belt Tension:** Turn nut (C - mower deck drive belt) or (D - spindle drive belt) clockwise.
- **To Decrease Belt Tension:** Turn nut (C - mower deck drive belt) or (D - spindle drive belt)

counterclockwise.

## Removing and Installing Mower Deck Drive Belts

1. Park machine safely. (See Parking Safely in the Safety section.)
2. Raise foot platform.
3. Remove mower deck drive belt covers.



MX9217

4. Release mower deck drive belt tension, by turning the tension adjuster nut (A) counterclockwise.
5. Remove mower deck drive belt (B).
6. Release spindle drive belt tension by turning tension adjustment nut (C) counterclockwise.
7. Remove spindle drive belt (D).
8. Install new spindle drive belt (D) and adjust drive belt tension.
9. Install new mower deck drive belt (B) and adjust drive belt tension.
10. Install mower deck drive belt covers.
11. Lower foot platform.

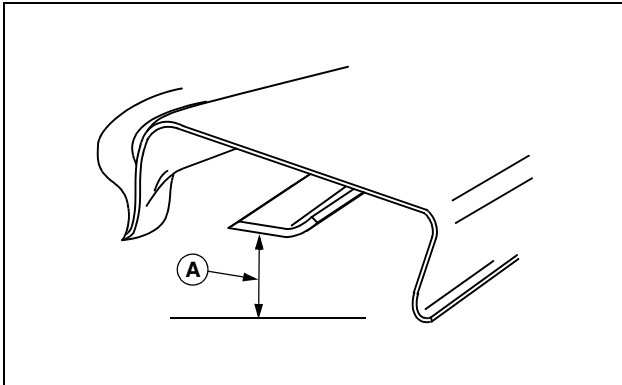
# SERVICE MOWER

## Checking for Bent Mower Blades



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

1. Park machine safely. (See Parking Safely in the Safety section.)
2. Lower mower deck to mowing position.



MIF

3. Measure distance (A) between blade tip and flat ground surface.
4. Turn blade 180°. Measure distance between the other blade tip and flat ground surface.
5. Install a new blade if the difference between the two measurements is more than 3 mm (1/8 in.).

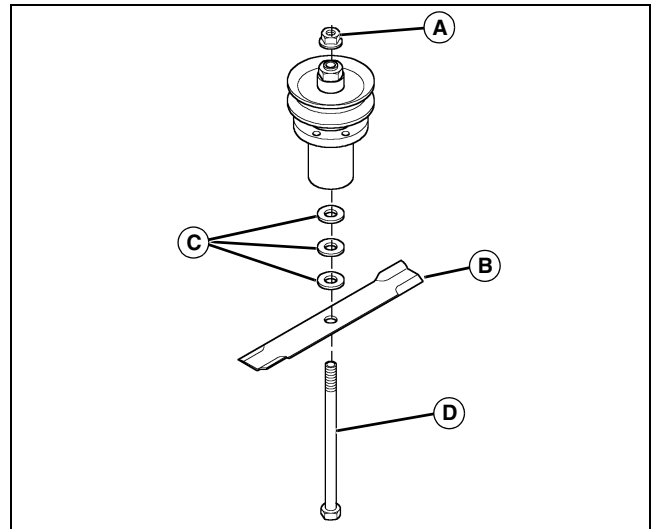
## Servicing Mower Blades



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

### Removing and Installing Mower Blades

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

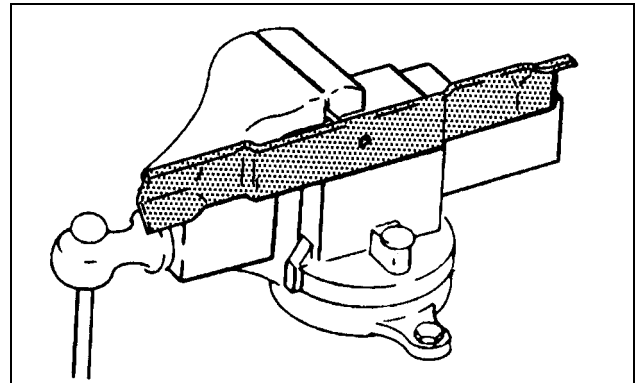


MX9231

2. Remove nut (A), blade (B), blade washers (C), and bolt (D).
3. Install blade (B), blade washers (C), bolt (D) and secure using nut (A). Tighten nut to 80 N•m (60 lb-ft).

### Balancing Mower Blades

1. Clean blade.



M61524

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

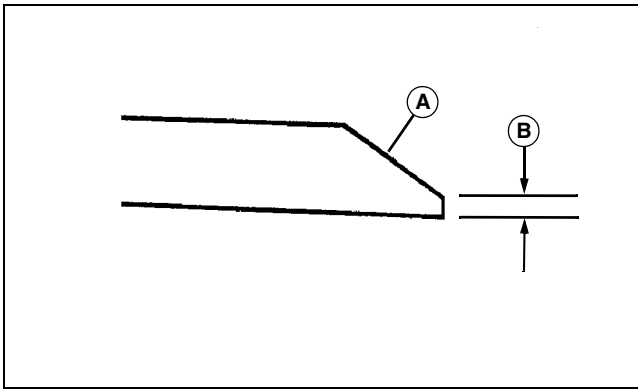
### Sharpening Blades



**CAUTION: Avoid injury! Always wear safety eye protection when grinding.**

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

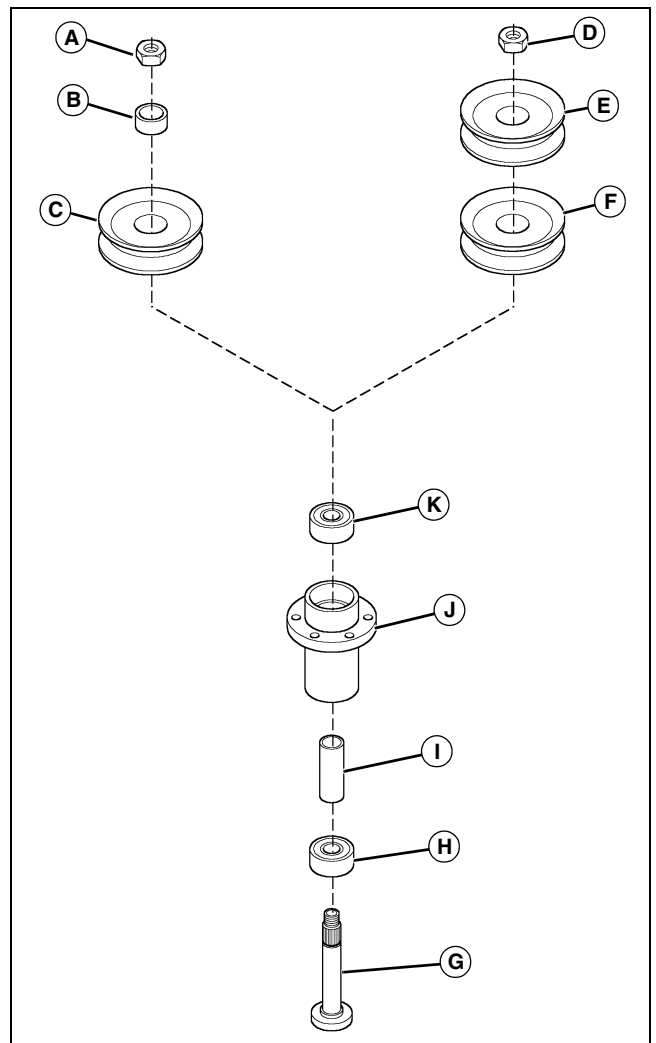
# SERVICE MOWER



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

## Replacing Mower Spindle Bearings

1. Park machine safely. (See Parking Safely in the Safety section.)
2. Remove mower deck drive and spindle drive belt.
3. Remove mower blade.



4. Remove upper pulleys:
    - **Side Spindles:** Remove nut (A), spacer (B) and pulley (C).
    - **Center Spindle:** Remove nut (D), drive pulley (E) and spindle pulley (F).
  5. Remove spindle shaft (G), lower bearing (H) and spacer (I) from spindle housing (J). Discard bearing.
  6. Remove and discard upper bearing (K).
  7. Clean entire assembly.
  8. Install a new lower bearing (H) and spacer (I) on the spindle shaft (G).
- IMPORTANT: Avoid damage! The clearance between the lower bearing and the housing is only 0.05 mm (0.002 in.). Do not force bearing into housing.**
9. Install the spindle shaft (G), lower bearing (H) and spacer (I) into the spindle housing (J).
  10. Install the upper bearing (K).



# SERVICE MOWER

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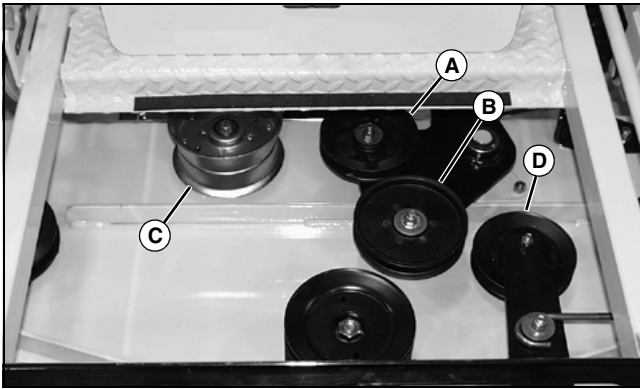
11. Install upper pulleys:

- **Side Spindles:** Install pulley (C), spacer (B) and nut (A). Tighten nut to 80 N•m (60 lb-ft).
- **Center Spindle:** Install spindle pulley (F), drive pulley (E) and nut (D). Tighten nut to 80 N•m (60 lb-ft).

12. Install mower blade. Tighten nut to 80 N•m (60 lb-ft).

## Replacing Mower Deck Idler Pulleys

1. Park machine safely. (See Parking Safely in the Safety section.)
2. Remove the mower deck drive and spindle drive belts.



MX9252

3. Remove mower deck drive tension idler pulleys (A) and (B), mower deck drive fixed idler pulley (C) and spindle drive tension idler pulley (D).
4. Install new idler pulleys.
5. Install spindle drive and mower deck drive belts.
6. Adjust belt tension.

# SERVICE 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.**

## Removing and Installing the Battery

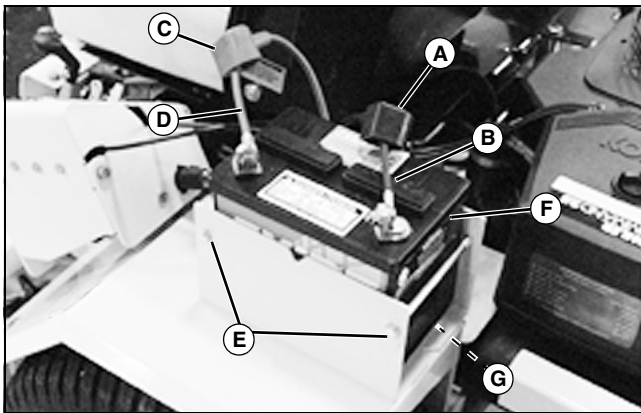


**CAUTION: Avoid injury! The battery produces a flammable and explosive gas. The battery may explode:**

- Do not smoke 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.

### Removing:

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



MX9209

2. Slide black cover (A) away from the negative (-) battery terminal and disconnect the negative (-) battery cable (B).
3. Slide red cover (C) away from the positive (+) battery terminal and disconnect the positive (+) battery cable (D).
4. Loosen the cap screws and nuts (E) on both sides of the battery tray.
5. Remove battery (F) and isolator pad (G).

### Installing:

1. Place isolator pad (G) in the battery tray.
2. Install battery (F) in the battery tray, making sure that the isolator pad (G) is between the bottom and sides of the

battery tray.

3. Tighten the cap screws and nuts (E) to secure the battery in the battery tray. Do not overtighten.
4. Connect the positive (+) battery cable (D) first, then the negative (-) cable (B).
5. Apply general purpose grease or silicone spray to the terminals to prevent corrosion.
6. Slide covers (A and C) over battery terminals.

## Checking Battery Electrolyte Level

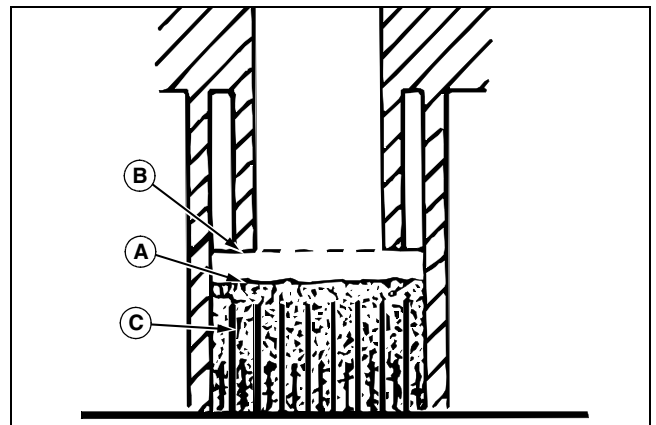


**CAUTION: Avoid injury! Battery electrolyte contains sulfuric acid. It is poisonous and can cause serious burns:**

- Wear eye protection and gloves.
- Keep skin protected.
- If electrolyte is swallowed, get medical attention immediately.
- If electrolyte is splashed into eyes, flush immediately with water for 15-30 minutes and get medical attention.
- If electrolyte is splashed onto skin, flush immediately with water and get medical attention if necessary.

**NOTE: Add only distilled water to replace normal electrolyte loss.**

1. Park the vehicle safely. (See Parking Safely in the safety section.)
2. Remove battery from vehicle and set it on a level surface.
3. Remove battery cell caps. Make sure cap vents are not plugged.



MIF

4. Check electrolyte level. Electrolyte (A) should be

# SERVICE ELECTRICAL

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.**

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

## Cleaning Battery and Terminals



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

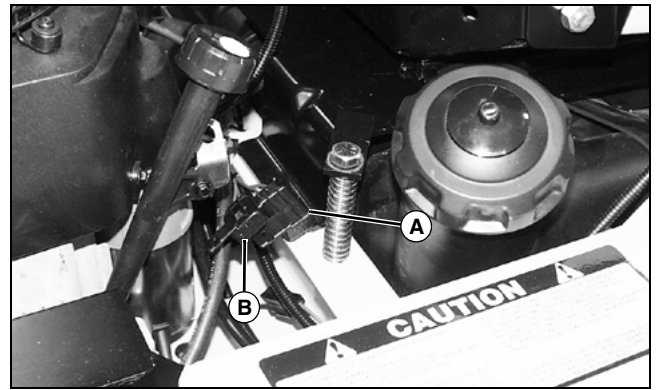
- Do not smoke near battery.
- Wear eye protection and gloves.
- Do not allow direct metal contact across battery posts.
- Remove negative cable first when disconnecting.
- Install negative cable last when connecting.

1. Disconnect and remove battery.
2. Wash battery with a solution of four tablespoons of baking soda to one gallon of water. Be careful not to get the soda solution into the battery cells.
3. Rinse the battery with plain water and dry.
4. Clean terminals and battery cable ends with wire brush until bright.
5. Install battery.
6. Attach cable clamps to battery posts.
7. Apply petroleum jelly or silicone spray to terminal to prevent corrosion.

## Replacing Fuses

**IMPORTANT: Avoid damage! When replacing fuses - use only 20-amp fuses or you may damage the circuit.**

Two 20-amp fuses to protect the electric start and charging circuit are located behind the seat area.



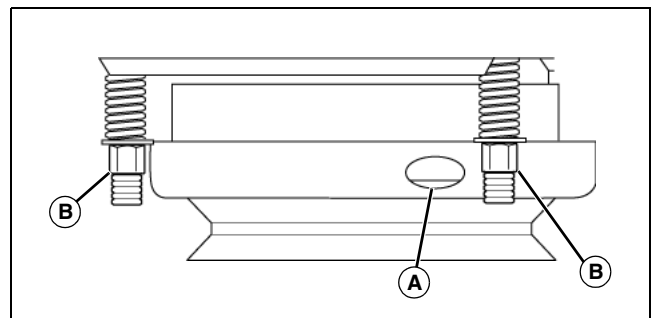
MX9245

1. Remove defective fuse (A - electric start circuit) or (B - charging circuit) from socket.
2. Check metal clip in fuse window and discard fuse if clip is broken.
3. Install new fuse into socket.

## Check and Adjust PTO Clutch Air Gap

**NOTE: If clutch is not equipped with adjusting nuts (B), no adjustment is required.**

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

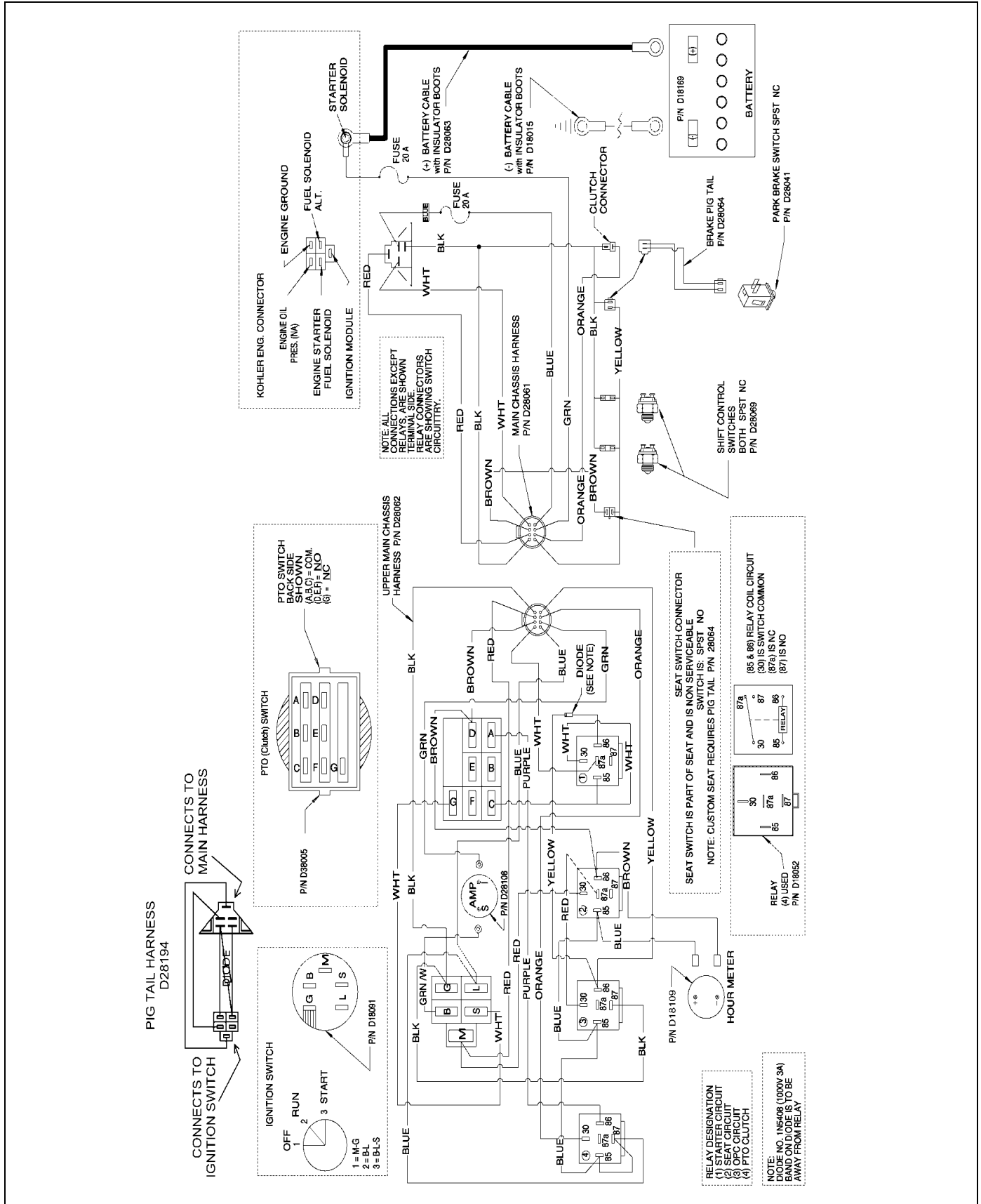


MX9290

2. Check the air gap at the three openings (A) around the clutch, using a feeler gauge. The air gap should be within 0.012-0.584 mm (0.005-0.023 in.). If the gap is not within specifications, adjust the air gap.
3. Adjust the air gap to 0.34 mm (0.12 in.), by tightening or loosening the three adjustment nuts (B).

# SERVICE ELECTRICAL

## Kohler Wiring Schematic



MX9299A

# SERVICE MISCELLANEOUS

## Filling Fuel Tank

Use regular grade 87 octane unleaded fuel.

Add fuel stabilizer to fuel before using it in your machine to prevent engine damage due to stale fuel. Follow directions on stabilizer container.



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

- Shut engine off before filling fuel tank.
- Do not smoke while handling fuel.
- Keep fuel away from flames or sparks.
- Fill fuel tank outdoors or in well-ventilated area.
- Clean up spilled fuel immediately.
- Use clean, approved non-metal container to prevent static electric discharge.
- Use clean, approved plastic funnel without screen or filter to prevent static electric discharge.

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

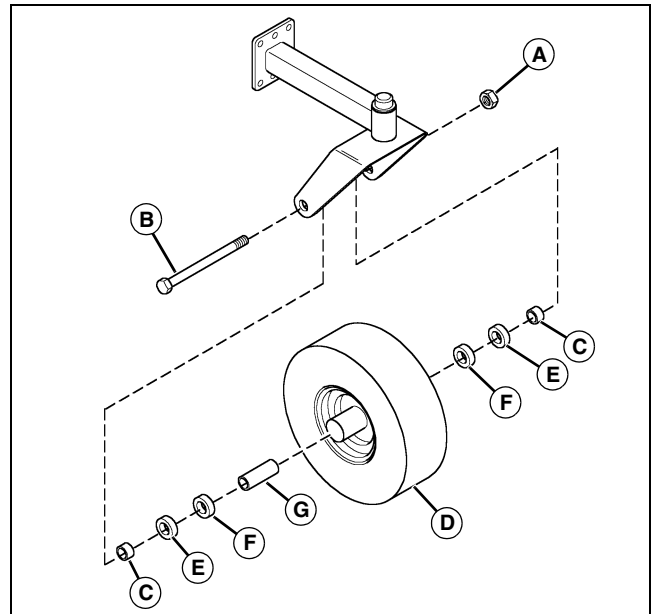
- Clean dirt and debris from the fuel tank opening.
- Use clean, fresh, stabilized fuel.
- Fill the fuel tank at the end of each day's operation to keep condensation out of the fuel tank.
- Use a non-metallic funnel with a plastic mesh strainer when filling the fuel tank or container.

## Checking Wheel Nuts

Tighten rear wheel nuts in an alternating pattern to 68 N•m (50 lb-ft.).

## Servicing Caster Wheel Roller Bearings

1. Park machine safely. (See Parking Safely in the Safety section.)
2. Raise and securely support the front of the mower deck.



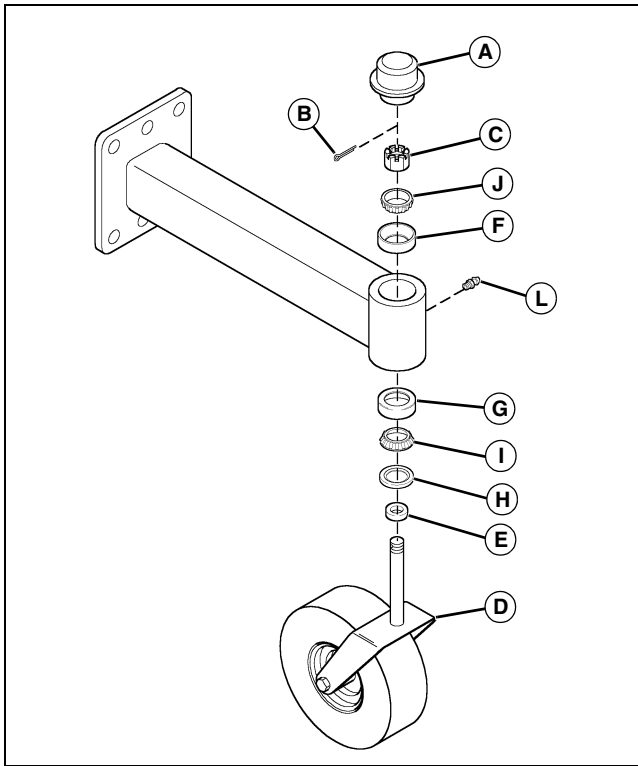
MX9223

3. Remove lock nut (A), bolt (B), two spacers (C) and wheel assembly (D).
4. Remove seals (E), bearings (F) and spacer tube (G) from wheel.
5. Clean and inspect bearings (F) and pack with clean grease. Replace bearings as needed.
6. Install spacer tube (G), bearings (F) and new seals (E).
7. Install wheel assembly (D), two spacers (C), bolt (B) and lock nut (A).

## Servicing Caster Pivot Bearings

1. Park machine safely. (See Parking Safely in the Safety section.)
2. Raise and securely support the front of the mower deck.

## SERVICE MISCELLANEOUS



MX9224

3. Remove cap (A), cotter pin (B), castle nut (C), caster yoke and wheel assembly (D) and caster bushing (E).

**NOTE: It is not necessary to remove the bearing races (F) and (G), unless the bearings need to be replaced.**

4. Remove seal (H) and lower bearing (I).

5. Remove upper bearing (J).

6. Clean and inspect bearings (I) and (J); pack with clean grease. Replace bearings if needed.

7. Install lower bearing (I) and a new seal (H).

8. Install upper bearing (J).

**NOTE: Do not overtighten castle nut (C). Tighten castle nut only enough to remove excess play from bearings. Align crossdrill and nut to allow installation of the cotter pin (B). The caster wheel yoke assembly must be free to rotate.**

9. Install caster bushing (E) on yoke shaft, and install caster yoke and wheel assembly (D), castle nut (C), and cotter pin (B).

10. Apply grease to lubrication fitting (L) until you can see grease at the top bearing (J). Install grease cap (A).

# TROUBLESHOOTING

## Using Troubleshooting Chart

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

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

## Engine

**NOTE: This engine troubleshooting chart covers items that are unique to the machine operation. See the engine manufacturer's owner's manual provided with your machine for detailed engine troubleshooting procedures.**

If	Check
Poor Engine Performance	Dirt in fuel system or fuel is old; obtain fresh fuel from another supplier before suspecting machine problems. Suppliers blend fuels differently and changing suppliers will generally solve any performance problems.  Fuel blended with alcohol or ether may contribute to performance problems by causing gum and varnish deposits, especially if fuel is stored for several weeks or more. Obtain fresh fuel.
Engine Will Not Start	Park brake not locked. Control levers are not in neutral position. PTO/clutch switch is in on position. Fuel shutoff valve in off position. Spark plug wire(s) loose or disconnected. Improper fuel. Plugged fuel filter. Electrical problem. (See Electrical Troubleshooting section)
Engine Will Not Idle	Operator rising off the seat.
Engine Stops Or Misses When Operating On Hillside	Fuel tank less than half full of fuel. Operator rising off of the seat.
Engine Backfires	Operator rising off of the seat.

# TROUBLESHOOTING

## Electrical

If	Check
Starter Does Not Work Or Will Not Turn Engine	Park brake is not locked. PTO/clutch switch is in on position. Battery terminals are corroded. Battery not charged. 20-amp fuse is blown.
Battery Will Not Charge	Dead cell in the battery. Battery cables and terminals are dirty. Low engine speed or excessive idling.

## Machine Operation

If	Check
Machine Vibrates Too Much Or Rattles Excessively	Attachment drive belts worn or damaged. Traction drive belt damaged or worn. Dirt on drive sheaves.
Machine Will Not Move With Engine Running	Park brake locked. Transmission hydraulic oil level low. Free-wheeling valves are open. Traction drive belt damaged or worn.
Machine Will Not Follow a Straight Path	Steering tracking out of adjustment.
Machine Moves To The Left Or Right With Engine Running And Transmission In Neutral	Pump linkage (neutral position) out of adjustment.

## Mower

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



# TROUBLESHOOTING

If	Check
Belt Slipping	Debris in sheaves. Worn belt.
Too Much Vibration	Debris on mower deck or in sheaves. Damaged sheaves or sheaves out of alignment. Damaged drive belt. Blades out of balance.
Blades Scalping Grass	Cutting too low. Mower wheels not adjusted correctly. Turning speed too fast. Ridges in terrain. Rough or uneven terrain. Low tire pressure.
Mower Loads Down Engine	Engine rpm too low. Travel speed too fast. Debris wrapped around mower spindles.
Uneven Cut	Mower deck not leveled properly. Travel speed too fast. Blades dull. Mower wheels not adjusted correctly. Tire pressure unequal.
Grass Tips Are Jagged And Turn Grayish Brown After Mowing	Dull mower blades. Mower deck not leveled properly.

# STORAGE

## Storing Safety



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

- Run the engine only long enough to move the machine to or from storage.
- Do not store vehicle with fuel in the tank inside a building where fumes may reach an open flame or spark.
- Allow the engine to cool before storing the machine in any enclosure.

## Preparing Machine for Storage

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

## 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.
- NOTE: Try to anticipate the last time the machine will be used for the season so very little fuel is left in the fuel tank.**
2. Turn on engine and allow to run until it runs out of fuel.
3. Turn key to off position.
4. Mix fresh fuel and fuel stabilizer in separate container. Follow stabilizer instructions for mixing.
5. Fill fuel tank with stabilized fuel.
6. Run engine for a few minutes to allow fuel mixture to

circulate through carburetor.

### Engine:

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

1. Change engine oil and filter while engine is warm.
2. Service air filter if necessary.
3. Clean debris from engine air intake screen.
4. Remove spark plugs. Put 30 mL (1 oz.) of clean engine oil in cylinders.
5. Crank the engine five or six times to allow oil to be distributed.
6. Install spark plugs.
7. Clean the engine and engine compartment.
8. Remove battery.
9. Clean the battery and battery posts. Check the electrolyte level.
10. Move fuel shut-off valve to off position.
11. Store the battery in a cool, dry place where it will not freeze.
- NOTE: The stored battery should be recharged every 90 days.**
12. Charge the battery.
13. Store the vehicle in a dry, protected place. If vehicle is stored outside, put a waterproof cover over it.

## Removing Machine From Storage

1. Check tire pressure.
2. Check engine oil level.
3. Check battery electrolyte level. Charge battery if necessary.
4. Install battery.
5. Check spark plug gap. Install and tighten plugs to specified torque.
6. Lubricate all grease points.
7. Turn fuel shut-off valve to on position.
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.

# ASSEMBLY

## Install Seat and Control Lever Handles

1. Install seat on platform and secure using nuts provided in small parts bag.
2. Connect seat safety switch to wiring harness.
3. Install handles on control levers and secure using sleeves, cap screws and nuts provided in small parts bag.

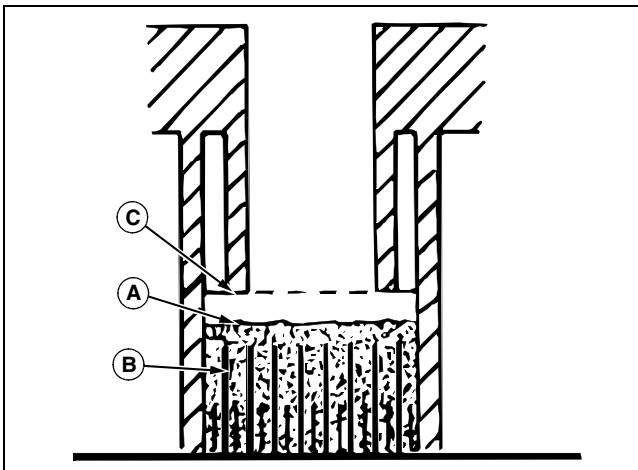
## Activate and Charge Battery



**CAUTION: Avoid injury! Battery electrolyte contains sulfuric acid. It is poisonous and can cause serious burns:**

- Wear eye protection and gloves.
- Keep skin protected.
- If electrolyte is swallowed, get medical attention immediately.
- If electrolyte is splashed into eyes, flush immediately with water for 15-30 minutes and get medical attention.
- If electrolyte is splashed onto skin, flush immediately with water and get medical attention if necessary.

1. Park the vehicle safely. (See Parking Safely in the Safety section.)
2. Remove battery from machine and set it on a level surface.
3. Remove battery cell caps. Make sure cap vents are not plugged.



MIF

4. Fill the battery:
  - Only use battery acid with a 1.265 specific gravity.
  - Slowly add acid (A) to each cell. The solution should

be 6 mm (1/4 in.) above plates (B), but NO HIGHER than 6 mm (1/4 in.) from the bottom of the filler neck (C).

5. Install the battery caps before charging the battery.

**IMPORTANT: Avoid damage! Wait 20 minutes before charging the battery to allow the plates to “absorb” the acid, so they will take a charge well.**

**Battery must be charged before operation. Adding acid without charging will result in battery damage.**

6. Charge the battery for a minimum of 30 minutes at 5-10 amps. If your battery charger has a Deep Cycle or Maintenance Free setting, use this setting to charge the battery. Failure to charge the battery before use will reduce battery performance and life.

7. Install the battery in the machine.

## Check Fluid Levels

**IMPORTANT: Avoid damage! Check all fluid levels before attempting to start the machine. Machine should be parked on a hard, level surface with the key switch in the STOP position.**

### Check Engine Oil Level

Oil level should be between the ADD and FULL marks on the dipstick. Add oil as necessary.

### Check Transmission Oil Level

Hydraulic oil level should be to the top of the FULL COLD mark on the reservoir dipstick. Add oil as necessary.

If your mower has no dipstick, make sure that oil is 76 mm (3 in.) from the top of the filler pipe.

## Lubricate Machine

Lubricate all moving parts before operating the machine, see Lubrication Points in Service Lubrication section.

## Check Safety System

For a complete checkout procedure of the safety interlock system, see Testing the Safety Interlock System in the Operating section.

# ASSEMBLY

## Check Tire Pressure



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

- Do not inflate the tires above the recommended pressure.
- Do not stand in front or over the tire assembly when inflating. Use a clip-on chuck and extension hose long enough to allow you to stand to one side.

1. Check tires for damage.
2. Check tire pressure with an accurate gauge.
3. Check that tires have equal pressure; add or remove air, if necessary.

Tire Size	Pressure
Front: 13 x 5.0 - 6	110-139 kPa (16-20 psi)
Rear: 23 x 9.5- 12	69-83 kPa (10-12 psi)

## Level Mower Deck

Before operating the machine, level the mower deck.

## Initial Adjustments



**CAUTION: Avoid injury! Clear area of bystanders before performing this service procedure.**

1. Check free-wheeling valves on both pump assemblies to make sure that the valves are closed.
2. Raise the rear of the machine until the drive wheels are off the ground. Support the machine with jackstands.



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

**Move the vehicle 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.

3. Start and run the engine until it reaches normal operating temperature.
4. Move control levers to the forward position and observe drive wheel rotation; the drive wheels should rotate in the correct direction.
5. Move the control levers to the reverse position and observe drive wheel rotation; the drive wheels should rotate in the correct direction.

**NOTE: Neutral position and transmission linkage adjustments will need to be recheck after several hours of operation.**

6. Release control levers; the levers should return to the neutral position and wheel rotation should stop. If the wheels do not stop, adjust the neutral adjustment knob on each side of the seat.
7. Move PTO/clutch switch to on position; mower clutch should engage. Run blades for several minutes.
8. Move PTO/clutch switch to off position and shut the engine off.
9. Check all belts for proper tension.
10. Start the engine and test drive the machine in an open area. Drive the machine forward; if the machine drifts to the right or left, adjust the transmission control linkage.

## PTO Clutch Run-in Procedure

1. Start and run the engine at half throttle.
2. Engage and disengage the PTO clutch five times (ten seconds on, ten seconds off).
3. Move throttle lever to 3/4 throttle.
4. Engage and disengage the PTO clutch five times (ten seconds on, ten seconds off).

# SPECIFICATIONS

## Engine

**NOTE: See engine manufacturer's owner's manual provided with your machine for engine specifications.**

## Battery

Voltage . . . . . 12 volt  
CCA . . . . . 235 amp @ 0°  
Reserve Capacity . . . . . 25 minutes  
BCI Group Size . . . . . U1

## Tires

Front . . . . . 13 x 5.0 - 6  
Rear . . . . . 23 x 9.50 - 12  
Inflation Front . . . . . 110-139 kPa (16-20 psi)  
Inflation Rear . . . . . 69-83 kPa (10-12 psi)  
Wheel Nut Torque . . . . . 68 N•m (50 lb-ft)

## Capacities

Fuel Tank . . . . . 30.2 L (8 gal)

## Hydraulic System

Low-Profile Tank . . . . . 4.3 L (4.5 qt)  
High-Profile Tank . . . . . 5.2 L (5.5 qt)

## Hydraulic Oil Reservoir

Low-Profile Tank . . . . . 2.8 L (3 qt)  
High-Profile Tank . . . . . 3.8 L (4 qt)

## Net Weight (With Mower Deck and Without Fuel)

23-hp Kawasaki engine/52 in. deck . . . . . 510 kg (1125 lb)  
25-hp Kohler engine/52 in. deck . . . . . 533 kg (1175 lb)  
23-hp Kawasaki engine/61 in. deck . . . . . 535 kg (1180 lb)  
25-hp Kawasaki engine/61 in. deck . . . . . 535 kg (1180 lb)  
25-hp Kohler engine/61 in. deck . . . . . 535 kg (1181 lb)  
26-hp Kohler engine/61 in. deck . . . . . 544 kg (1200 lb)

## Travel Speeds

Forward . . . . . 0-16 km/h (0-10 mph)  
Reverse . . . . . 0-8 km/h (0-5 mph)

## Dimensions

Wheel Base . . . . . 1,27 m (50 in.)  
Overall Height . . . . . 1,11 m (44 in.)  
Overall Length (All Models) . . . . . 1,98 m (78 in.)  
Overall Width (with 52-Inch Mower Deck) . . 1,57 m (62 in.)  
Overall Width (with 61-Inch Mower Deck) . . 1,80 m (71 in.)

## 52-Inch Mower Deck

Mower Type . . . . . Side Discharge  
Cutting Blades . . . . . 3  
Blade Bolt Torque . . . . . 80 N•m (60 lb-ft)  
Cutting Width . . . . . 1,32 m (52 in.)  
Cutting Height (approximate) . . . . . 25 to 152 mm (1 to 6-in.)  
Height Adjustment . . . . . 13 mm (1/2 in.) increments

## 61-Inch Mower Deck

Mower Type . . . . . Side Discharge  
Cutting Blades . . . . . 3  
Blade Bolt Torque . . . . . 80 N•m (60 lb-ft)  
Cutting Width . . . . . 1,55 m (61 in.)  
Cutting Height (approximate) . . . . . 25 to 152 mm (1 to 6 in.)  
Height Adjustment . . . . . 13 mm (1/2 in.) increments

(Specifications and design subject to change without notice.)

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# NOTES

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## SERVICE RECORD GD

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### Record Service Dates

<b>Engine Oil and Filter Change</b>	<b>Lubricate Machine</b>	<b>Air Cleaner Element Clean/Replace</b>



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