



**GREAT DANE**

# Scamper

Owner/Operator Manual

Manuel Du Propriétaire/Utilisateur

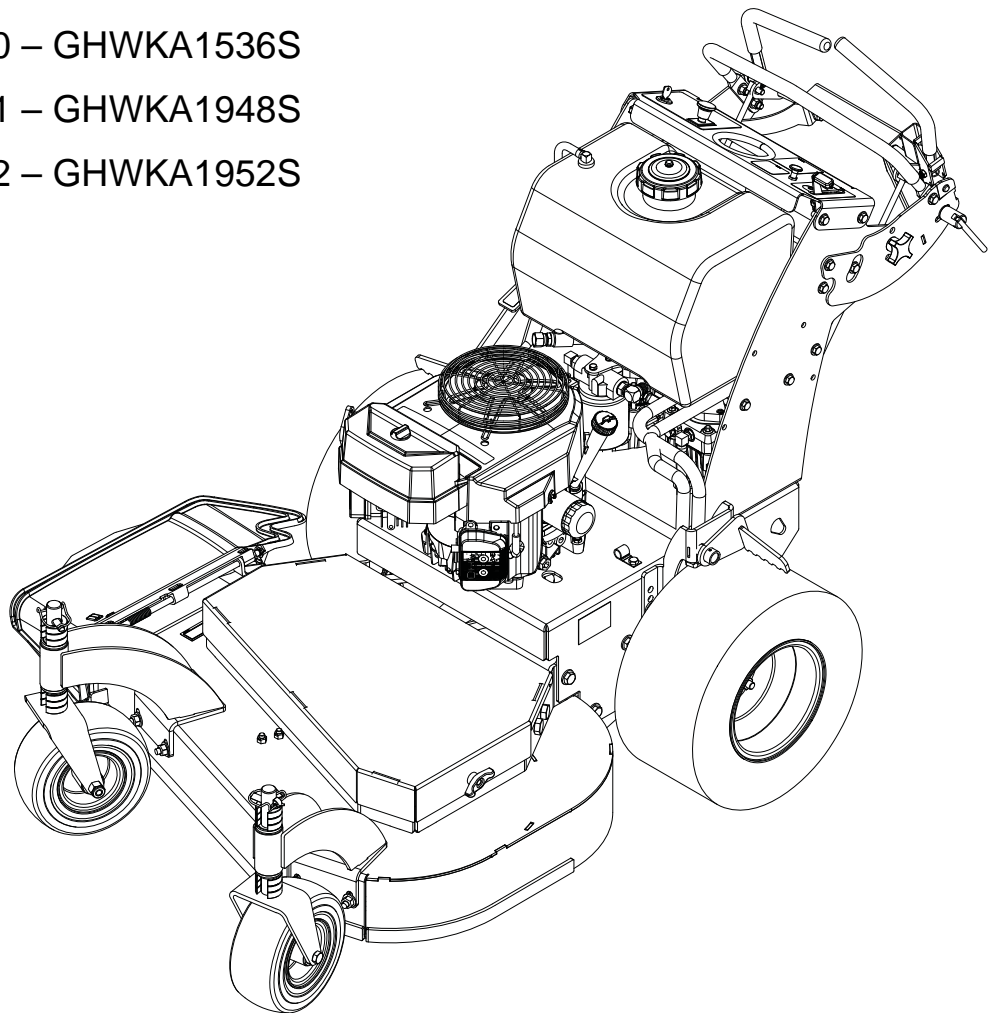
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## Models

988640 – GHWKA1536S

988641 – GHWKA1948S

988642 – GHWKA1952S



(GB) ENGLISH  
(F) FRANÇAIS

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## INTRODUCTION

### NON-ENGLISH MANUALS



Manuals in languages other than English may be obtained from your Dealer. Visit your dealer or [www.ariens.com](http://www.ariens.com) for a list of languages available for your equipment.



Manuals printed in languages other than English are also available as a free download on our website: <http://www.greatdanemower.com>

### MANUALES EN IDIOMAS DIFERENTES DEL INGLÉS



Puede obtener manuales en idiomas diferentes del inglés en su distribuidor. Visite a su distribuidor o vaya a [www.ariens.com](http://www.ariens.com) para obtener una lista de idiomas disponibles para su equipo.



También puede imprimir manuales en idiomas diferentes del inglés descargándolos gratuitamente de nuestra página Web:

<http://www.greatdanemower.com>

### MANUELS NON ANGLAIS



Des manuels dans différentes langues sont disponibles chez votre revendeur. Rendez-vous chez votre revendeur ou allez sur le site [www.ariens.com](http://www.ariens.com) pour consulter la liste des langues disponibles pour votre équipement.



Les manuels imprimés dans des langues différentes de l'anglais sont également disponibles en téléchargement gratuit sur notre site Web :

<http://www.greatdanemower.com>

### The Manual

**DANGER:** Before operation of unit, carefully and completely read your manuals. The contents will provide you with an understanding of safety instructions and controls during normal operation and maintenance.

All reference to left, right, front, or rear are given from operator standing in operation position and facing the direction of forward travel.

### ENGINE MANUAL

The engine manufacturer is responsible for all engine-related issues with regards to performance, power rating, specifications, warranty and service. Please refer to the engine manufacturer's owner's/operator's manual, packed separately with your unit.

### MODEL AND SERIAL NUMBERS

When ordering replacement parts or making service inquiries, know

the Model and Serial numbers of your unit and engine.

Numbers are located on the product registration form in the unit literature package. They are printed on a serial number label, located on the frame of your unit.

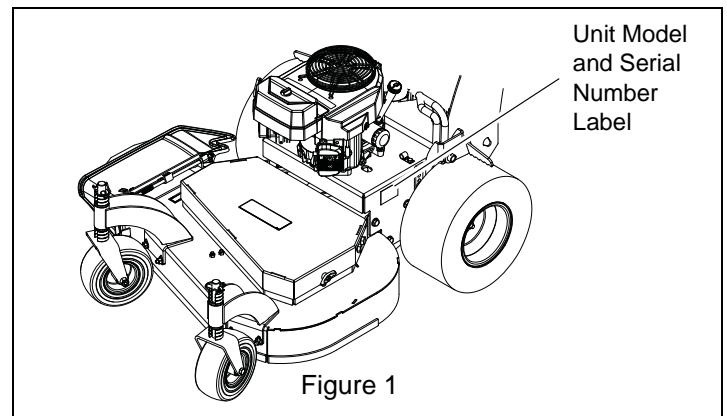


Figure 1

- Record Unit Model and Serial numbers here.

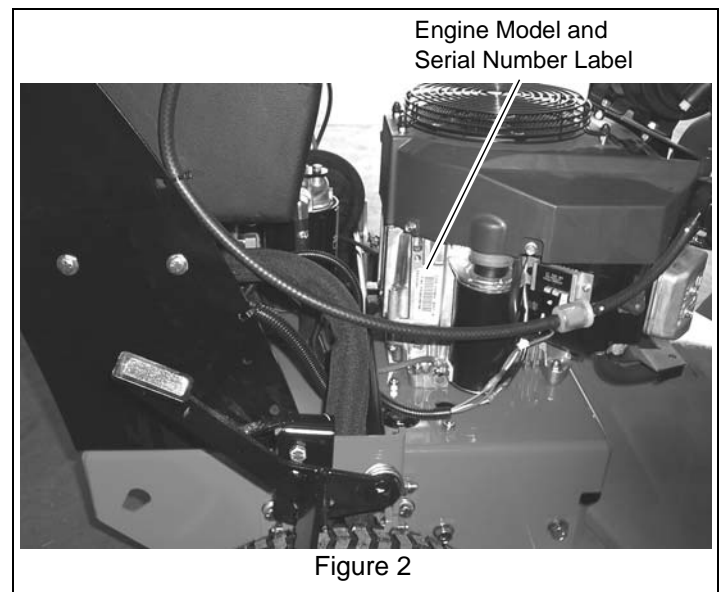


Figure 2

- Record Engine Model and Serial numbers here.

### PRODUCT REGISTRATION

The Great Dane dealer must register the product at the time of

purchase. Registering the product will help the company process warranty claims or contact you with the latest service information. All claims meeting requirements during the limited warranty period will be honored, whether or not the product registration card is returned. Keep a proof of purchase if you do not register your unit.

**Customer Note:** If the Dealer does not register your product, please fill out, sign and return the product registration card to Great Dane or go to [www.greatdanemower.com](http://www.greatdanemower.com) on the internet.

## UNAUTHORIZED REPLACEMENT PARTS

Use only Great Dane replacement parts. The replacement of any part on this vehicle with anything other than a Great Dane authorized replacement part may adversely affect the performance, durability, or safety of this unit and may void the warranty. Great Dane disclaims liability for any claims or damages, whether warranty, property damage, personal injury or death arising out of the use of unauthorized replacement parts. To locate your nearest Great Dane Dealer, go to [www.greatdanemower.com](http://www.greatdanemower.com) on the internet.

## DISCLAIMER

Great Dane reserves the right to discontinue, make changes to,

and add improvements upon its products at any time without public notice or obligation. The descriptions and specifications contained in this manual were in effect at printing. Equipment described within this manual may be optional. Some illustrations may not be applicable to your unit.

## DEALER DELIVERY

Dealer should:

1. Check all controls for proper function.
2. Check the safety interlock system to make sure that it is functioning properly. (See "Test Operator Presence Safety Interlock System" on page 8.)
3. Fill out Original Purchaser Registration Card and return the card to Great Dane.
4. Explain Limited Warranty Policy.
5. Explain recommended lubrication and maintenance. Advise customer on adjustments.
6. Instruct customer on controls and operation of unit. Discuss and emphasize the Safety Precautions. Give customer Owner/Operator, Parts, and Engine Manuals. Advise customer to thoroughly read and understand them.

# SAFETY



**WARNING:** This cutting unit is capable of amputating hands and feet and throwing objects. Failure to observe the safety instructions in the manuals and on decals could result in serious injury or death.

Slopes are a major factor related to loss-of-control and tip-over accidents. Operation on all slopes requires extra caution.

Tragic accidents can occur if the operator is not alert to the presence of children. Never assume that children will remain where you last saw them.

Gasoline is extremely flammable and the vapors are explosive, handle with care.

Disengage attachment, stop unit and engine, remove key, engage parking brake, and allow moving parts to stop before leaving operator's position.



**WARNING: POTENTIALLY HAZARDOUS SITUATION!** If not avoided, **COULD RESULT** in death or serious injury.



**CAUTION: POTENTIALLY HAZARDOUS SITUATION!** If not avoided, **MAY RESULT** in minor or moderate injury. It may also be used to alert against unsafe practices.

### Notations

**NOTE:** General reference information for proper operation and maintenance practices.

**IMPORTANT:** Specific procedures or information required to prevent damage to unit or attachment.

### Practices and Laws

Practice usual and customary safe working precautions, for the benefit of yourself and others. Understand and follow all safety messages. Be alert to unsafe conditions and the possibility of minor, moderate, or serious injury or death. Learn applicable rules and laws in your area, including those that may restrict the age of the operator.

### Required Operator Training

Original purchaser of this unit was instructed by the seller on safe and proper operation. If unit is to be used by someone other than original purchaser; loaned, rented or sold, **ALWAYS** provide this manual and any needed safety training before operation.

### Safety Decals and Locations

**ALWAYS** replace missing or damaged Safety Decals. Refer to figures below for Safety Decal locations.

## SAFETY ALERTS



Look for these symbols to point out important safety precautions. They mean:

**Attention!**



**Personal Safety Is Involved!**

**Become Alert!**

**Obey The Message!**

The safety alert symbols above and signal words below are used on decals and in this manual.

Read and understand all safety messages.



**DANGER: IMMINENTLY HAZARDOUS SITUATION!** If not avoided, **WILL RESULT** in death or serious injury.

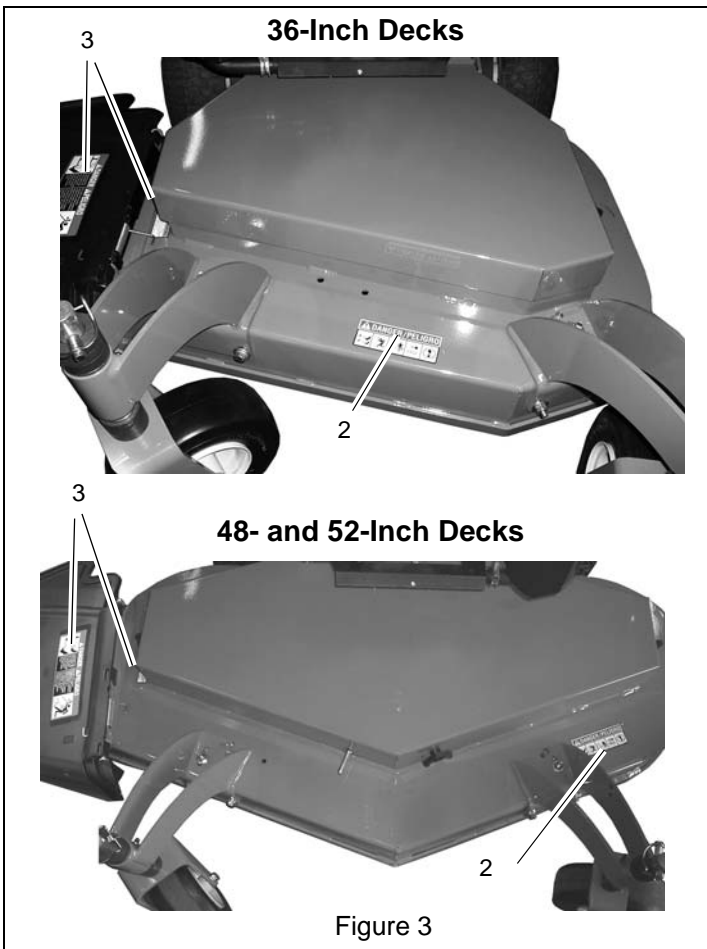


Figure 3

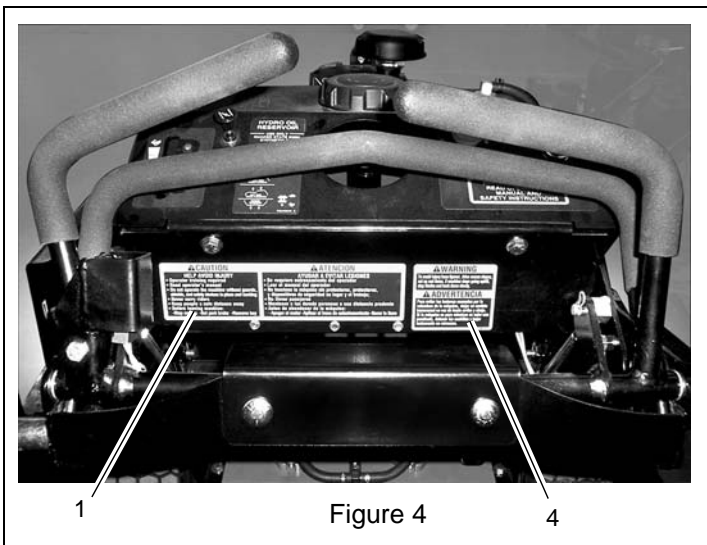


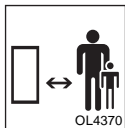
Figure 4

### 1. Danger! To avoid serious injury or death



OL1801

Read the operator's manual.



OL4370

Keep children and others away from unit while operating.



OL0910

Never direct discharge toward other people. Thrown objects can cause injury.

- Keep safety devices (guards, shields, switches, etc.) in place and working.
- Check interlock system per manual before use.
- Never allow operation by untrained persons.
- When parking on a slope always engage parking brake.
- Disengage PTO, stop unit and engine, set parking brake and remove key before making any inspections, repairs, etc.

### 2. Danger! Rotating Blades



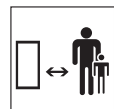
OL3030

ROTATING BLADE! Keep hands and feet away.



OL0910

Always stand clear of discharge area. DO NOT direct discharge toward other people. Remove objects that could be thrown by the blade. DO NOT operate mower over gravel and hard surfaces.



OL4370

Keep people and pets away when operating unit. Keep children out of the work area and under the watchful care of a responsible adult.



OL4010

Shut off engine, remove key, read manual before you unplug, adjust or repair unit.



OL4420

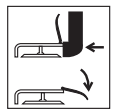
NO STEP! Always keep feet away from rotating parts.

### 3. Warning!



OL0910

Always stand clear of discharge.



OL3320

DO NOT operate mower unless guards are in operating position or bagger is attached.

### 4. Danger!



To avoid injury from tipover, drive across slopes, not up and down. If machine stops going uphill, stop blades and back down slowly.

## Safety Rules

Read, understand and follow all safety practices in Owner/Operator Manual before beginning assembly. Failure to follow instructions could result in personal injury and/or damage to unit.

ALWAYS remove key (if equipped) and disconnect wire from spark plug before assembly. Unintentional engine start up can cause death or serious injury.

Complete a walk around inspection of unit and work area to understand:

- Work area
- Your unit
- All safety decals

ALWAYS check overhead and side clearances carefully before operation.

ALWAYS be aware of traffic when operating along streets or curbs.

Keep children and people away.

Keep children out of work area and under watchful care of a responsible adult.

Keep area of operation clear of all toys, pets, and debris. Thrown objects can cause injury.

Check for weak spots on docks, ramps or floors. Avoid uneven work areas and rough terrain.

ALWAYS be sure of your footing. Keep a firm hold on handlebar. Walk, NEVER run.

DO NOT operate on wet grass.

Dust, smoke, fog, etc. can reduce vision and cause an accident. Operate unit only when there is good visibility and light.

Read the entire Owner/Operator manual and other training material. If the operator or the mechanic cannot read the manual, it is the owner's responsibility to explain it to them. Only the user can prevent and is responsible for accidents or injuries occurring to themselves, other people or property.

- Only trained adults may operate or service unit
- Training includes actual operation

NEVER allow children to operate or play on or near unit.

Be alert and shut off unit if children enter area.

Never carry passengers.

NEVER operate unit after or during the use of medication, drugs or alcohol. Safe operation requires your complete and unimpaired attention at all times.

NEVER allow anyone to operate this unit when their alertness or coordination is impaired.

Wear adequate safety gear, protective gloves and footwear.

NEVER wear open sandals or canvas shoes during operation.

Protect eyes, face and head from objects that may be thrown from unit. Wear appropriate hearing protection.

Sharp edges can cut. Moving parts can cut off fingers or a hand. Wrap blade(s), wear sturdy gloves and use extreme caution when servicing. On multi-blade mowers, rotation of one blade will cause all blades to rotate.

ALWAYS keep hands and feet away from all rotating parts during operation. Rotating parts can cut off body parts.

ALWAYS keep hands away from all pinch points.

DO NOT touch unit parts which might be hot from operation. Allow parts to cool before attempting to maintain, adjust or service.

NEVER place your hands or any part of your body or clothing inside or near any moving part while unit is running.

DO NOT wear loose clothing or jewelry. Tie back hair that may get caught in rotating parts.

Keep children and people away from unit during operation.

Fumes from engine exhaust can cause injury or death.

DO NOT run engine in an enclosed area. Always provide good ventilation.

Thrown objects can cause injury and property damage. DO NOT point discharge at anyone or discharge directly onto paved or gravel surfaces.

Always stand clear of the discharge area when operating this unit.

Read, understand, and follow all instructions in the manual and on the machine before starting. Understand:

- How to operate all controls
- The functions of all controls
- How to STOP in an Emergency
- Braking and steering characteristics
- Turning radius and clearance

ALWAYS keep protective structures, guards, and panels in good repair, in place and securely fastened.

NEVER modify or remove safety devices.

ALWAYS keep discharge cover or complete grass catcher in place and in proper working condition.

Check steering control operation frequently. Adjust and service as required.

Always hold on to safety bar while operating.

Safety Interlock System must function properly. DO NOT operate unit if operator presence control is damaged or disabled.

If you strike an object, or if equipment vibrates abnormally, stop engine at once, disengage PTO, wait for all moving parts to stop, and remove key. Check for any damage or loose parts. Repair before restart.

Before starting engine: disengage PTO, engage parking brake and place unit in neutral.

DO NOT operate at too fast a rate. DO NOT change engine governor settings or over-speed engine. Slow down and turn corners slowly.

Disengage PTO when attachment is not in use. DO NOT raise deck with blades running. ALWAYS turn off power to attachment when travelling, crossing driveways, etc.

Avoid uneven and rough terrain. DO NOT operate near drop-offs, ditches, or embankments. Unit can suddenly turn over if a wheel is over the edge of a cliff or ditch, or if an edge caves in.

When engine is running and speed control lever is forward, holding only one steering lever will cause unit to circle around one drive wheel.

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

ALWAYS disengage PTO, stop unit and engine, set parking brake, remove key and allow moving parts to stop before clearing clogs or cleaning unit.

Never leave a running unit unattended. ALWAYS shut off engine before leaving unit.

ALWAYS remove key to prevent unauthorized use.

DO NOT operate in reverse unless absolutely necessary. ALWAYS backup slowly. ALWAYS look down and behind, before and while backing.

DO NOT operate on steep slopes. DO NOT operate on slopes of more than 10°. Operate across the face of slopes, not up and

down.

Turf conditions can affect the unit's stability.

Keep all movement on slopes slow and gradual. DO NOT make sudden changes in speed or direction. Use a slow speed to avoid stopping or shifting on slopes. Avoid starting or stopping on a slope. DO NOT park unit on a slope unless absolutely necessary. When parking on a slope always engage parking brake and block wheels. Use extra care when loading or unloading unit onto trailer or truck. Secure unit chassis to transport vehicle. NEVER secure from rods or linkages that could be damaged.

DO NOT transport machine while engine is running.

Keep unit free of grass, leaves, or other debris. Clean up oil or fuel spills.

This product is equipped with an internal combustion engine. DO NOT use on or near any unimproved, forest covered or brush covered land unless the exhaust system is equipped with a spark arrester meeting applicable local, state or federal laws. A spark arrester, if used, must be maintained in effective working order by the operator.

Fuel is highly flammable and its vapors are explosive. Handle with care. Use an approved fuel container.

No smoking, No sparks, No flames. ALWAYS allow engine to cool before servicing.

NEVER fill fuel tank when engine is running or hot from operation. NEVER fill or drain fuel tank indoors.

Replace fuel cap securely and clean up spilled fuel.

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 filling.

When practical, remove gas-powered equipment from the truck or trailer and refuel it on the ground. If this is not possible, then refuel such equipment on a trailer with a portable container, rather than from a gasoline dispenser nozzle.

Keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do not use a nozzle lock-open device.

If fuel is spilled on clothing, change clothing immediately.

NEVER store fuel inside where there is an open flame, such as a water heater.

Avoid Electric Shock. Objects contacting both battery terminals at the same time may result in injury and unit damage. DO NOT reverse battery connections.

Reverse connections may result in sparks which can cause serious injury. Always connect positive (+) lead of charger to positive (+) terminal, and negative (-) lead to negative (-) terminal.

ALWAYS disconnect negative (-) cable FIRST and positive (+) cable SECOND. ALWAYS connect positive (+) cable FIRST, and negative (-) cable SECOND.

Explosive Gases from battery can cause death or serious injury. Poisonous battery fluid contains sulfuric acid and its contact with skin, eyes or clothing can cause severe chemical burns.

No flames, No sparks, No smoking near battery.

ALWAYS wear safety glasses and protective gear near battery. Use insulated tools.

DO NOT TIP battery beyond a 45° angle in any direction.

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

Reverse connections may cause sparks which may result in injury. ALWAYS connect/disconnect cables in proper order.

Poisonous battery fluid contains sulfuric acid and its contact with skin, eyes, or clothing can cause severe burns.

Explosive Gases! No flames, No sparks, No smoking near battery. ALWAYS wear safety glasses and protective gear near battery. ALWAYS keep batteries out of reach of children.

Before making any inspections, repairs, etc.: disengage PTO, stop unit and engine, set parking brake, remove key, allow moving parts to stop.

ALWAYS keep body and hands away from pin holes or nozzles which eject hydraulic fluid under pressure.

Allow hot parts to cool.

ALWAYS block wheels, engage parking brake and know all jack stands are strong, secure and will hold weight of unit during maintenance.

An extension spring, when extended, stores energy and can be dangerous. Always use tools specifically designed for installing or removing an extension spring. Always compress or extend springs slowly.

ALWAYS maintain unit in safe operating condition. Damaged or worn out muffler can cause fire or explosion.

Keep hardware, especially blade attachment bolts, tight.

Maintain or replace safety and instruction labels, as necessary.

For unit storage or extended storage:

- NEVER store with fuel in fuel tank, inside a building where any ignition sources are present.
- Allow engine to cool completely.

Use only attachments or accessories designed for your unit and that can be used safely on your terrain.

Check attachment components frequently for wear, damage or deterioration. Replace with manufacturer's recommended parts for safety.

To reduce fire hazard and overheating, keep equipment free of grass, leaves, debris or excessive lubricants.

Use extra care with grass catchers and other attachments. These can change the stability of the unit. Use only approved hitch points. ALWAYS be aware of attachments when turning. ALWAYS allow adequate clearance between attachments, personnel, and other objects.

# ASSEMBLY

## Check Engine Oil Level

1. Remove dipstick from tube by unscrewing it. Wipe it clean.
2. Install dipstick and allow the cap to rest on the end of the tube. Do not tighten the cap.
3. Remove dipstick. Check oil level on dipstick; oil level should be between the ADD and FULL marks.
  - If oil is low, add oil to bring oil level no higher than the FULL mark on dipstick.
  - If oil level is above the FULL mark, drain to proper level.
4. Install and tighten dipstick.

## Check Tire Pressure



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

- Do not attempt to mount a tire without the proper equipment and experience to perform the job.
- Do not inflate the tires above the recommended pressure.
- Do not weld or heat a wheel and tire assembly. Heat can cause an increase in air pressure resulting in an explosion. Welding can structurally weaken or deform the wheel.
- 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 rear tire pressure with an accurate gauge. Add air if necessary:

Tire Size	Pressure
Front: 9 x 3.5-4	Solid
Rear: 16 x 6.5-8	10 – 12 psi (69 – 83kPa)

## Lubricate Unit

Lubricate all moving parts before operating the unit. See “*Lubrication Points*” on page 12.

## Check Mower Deck Level

The mower deck is assembled and adjusted at the factory. After unit is completely assembled, check the mower front-to-rear and side-to-side deck level.

## Check Safety System

Check the operation of the safety interlock system. See “*Test Operator Presence Safety Interlock System*” on page 8.

## Initial Adjustments



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

1. Raise the rear of the unit until the drive wheels are off the ground. Support the unit with jack stands.
2. Start and run the engine until it reaches normal operating temperature.
3. Move control levers to the forward position and observe drive wheel rotation; the drive wheels should rotate in the correct direction.
4. Move the control levers to the reverse position and observe drive wheel rotation; the drive wheels should rotate in the correct direction.

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

5. 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 for each wheel motor.
6. Move PTO/clutch switch to ON position; mower clutch should engage. Run blades for several minutes.
7. Move PTO/clutch switch to OFF position and shut the engine off.
8. Check all belts for proper tension.
9. Start the engine and test drive the unit in an open area. Drive the unit forward. If the unit drifts to the right or left, adjust the transmission control linkage. See “*Adjust Tracking*” on page 15.

# OPERATION

## DAILY OPERATING CHECKLIST

- Remove mower deck belt shields. Clean grass and debris from belt area.
- Remove grass and debris from machine and mower deck.
- Make sure all necessary guards and shields are safely and securely attached. Check for loose, missing, or damaged parts.
- Test parking brake.
- Test safety systems.
- Inspect for oil leaks.

- Check engine and hydraulic oil levels.
- Inspect all belts for damage or cracking.
- Inspect engine air filter.
- Inspect mower level.
- Adjust cutting height if necessary.
- Inspect wheel bolt torque. Tighten if necessary.
- Check tire air pressure. Check tires for damage or cracking.
- Inspect front caster spindles/wheels.

# CONTROLS

## CONSOLE CONTROLS

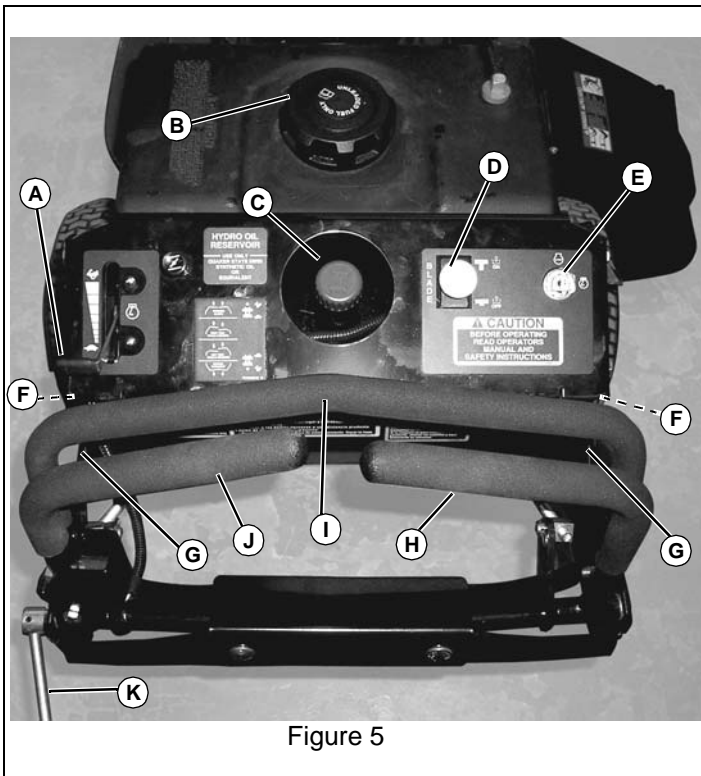


Figure 5

- A. Throttle Lever/Choke Control (choke may be individual control on some models)
- B. Fuel Fill
- C. Hydraulic Oil Reservoir Fill
- D. PTO/Clutch Switch
- E. Key Switch
- F. Neutral Adjustment Knob (2 used)
- G. Control Height Knob (2 used)
- H. Right Control Lever
- I. Speed Control/Safety Bar
- J. Left Control/Operator Presence Lever
- K. Speed Control Adjustment Lock

## Miscellaneous Controls

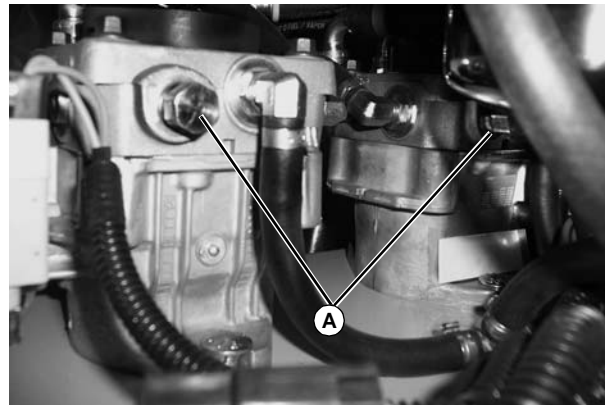


Figure 6

- A. Bypass Valves

## TEST SAFETY SYSTEMS



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

Move the unit 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 unit should be checked before each use. Read the operator manual and be completely familiar with the operation of the unit before performing these checks.

Use the following procedures to check for normal operation. If there is a malfunction during one of these procedures, do not operate unit. **See dealer for service.**

Perform tests in a clear open area with no bystanders.

### Test Operator Presence Safety Interlock System

1. Start engine.
2. Unlock parking brake.
3. Move throttle to mid-open position.



4. Move left control lever in to engage the operator presence switch.
5. Move PTO/clutch switch to ON position.

**Result:** Mower deck should engage.



**CAUTION:** Avoid injury! Keep bystanders away. The mower will engage as soon as the left control lever is moved in.

1. Release left control lever to disengage the operator presence safety switch.

**Result:** The mower deck MUST stop.

### Test PTO/Clutch Safety Switch

1. Engage parking brake.
2. Move the control levers to the neutral position and release the left control lever.
3. Move the PTO/clutch switch to the ON position.
4. Turn the key to the ON position and pull recoil starter.

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

### Test Parking Brake

Stop the unit on a maximum 17° slope. Stop the engine and engage the parking brake.

**Result:** Parking brake must hold the unit stationary. If the unit moves more than 24-In (61 cm) in one hour, brake needs to be adjusted. See your Great Dane dealer.

### Using the Parking Brake

1. To lock brake, press pedal firmly until it locks into place.
2. To unlock, push pedal and lock lever at the same time.

### Starting 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 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. Adjust the safety bar halfway back and tighten the left side lever for moderate mowing speed.
2. Lock parking brake.
3. Move PTO/clutch switch to OFF position.
4. Move throttle lever to half-speed position (full detent for integrated choke models).
5. Adjust choke as required.
6. Recoil start units: Turn key switch to run position. Pull recoil starter until the engine starts.

Non-recoil start units: Turn the key to the START position and then release the key to the RUN position when the engine starts.

**IMPORTANT:** Excessive engine idling can cause engine overheating, carbon build-up leading to engine damage and poor performance.

7. Let the engine run at half-speed position for several minutes to warm-up, before operating the unit. Open choke setting as the engine warms up.

### Stopping Engine

1. Move the throttle lever to the slow idle position, and let the engine run at that speed for a few seconds.
2. Turn the key switch to the STOP position.
3. Remove key.
4. Engage parking brake.

### Operating the Unit



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

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 unit.

1. Adjust mower deck to desired cutting height.
2. Start and warm up engine.
3. Release parking brake.
4. Move throttle lever to fast idle.
5. Move PTO/clutch switch to ON position.
6. Move the left control lever in to engage the operator presence safety switch.
7. Grasp safety bar.

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

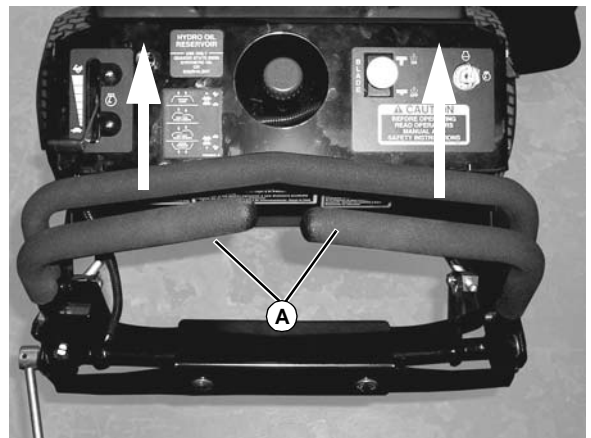


Figure 7

8. Drive the unit:

**To drive the unit forward:** Push both control levers (A) forward smoothly and evenly.

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

**To stop the unit:** Allow both control levers to return to the neutral position.

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

### Stopping Unit



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

Always engage the parking brake and remove the key before leaving unit unattended.

1. Allow both control levers to return to the neutral position.
2. Move the PTO/clutch switch to the OFF position.
3. Move the throttle lever to the slow idle position, and let the engine run at that speed for a few seconds.
4. Turn the key switch to the STOP position.
5. Engage parking brake.
6. Remove key.

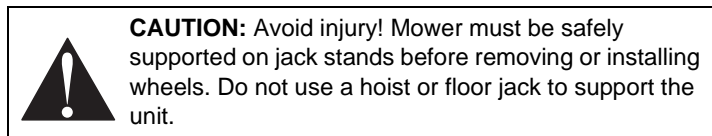
### Emergency Stop

To stop blades and unit drive in an emergency, release operator presence control levers.

### Adjusting Cutting Height

Cutting height can be adjusted from approximately 1-1/2 – 5 in. (38 – 127 mm). Each hole adjusts the height of cut (HOC) in 1/2 in. (12 mm) increments.

1. Check rear tire pressure. Inflate to 10 – 12 psi (69 – 83 kPa).



2. Using a suitable lifting device, lift the rear of the unit.
3. Remove rear wheels.

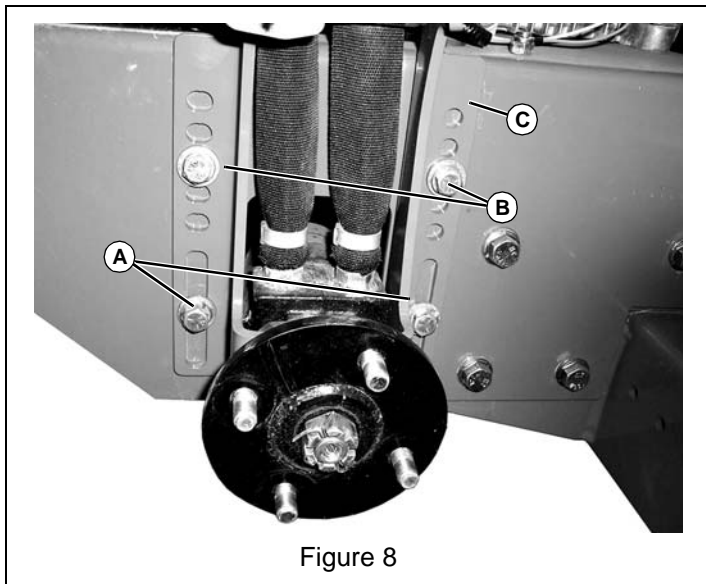


Figure 8

4. Loosen lower mounting bolts (A). Do not remove.
5. Loosen and remove upper mounting bolts (B).
6. Move wheel motor slide bracket (C) up or down to desired height and tighten lower bolts (A) to 35 – 40 lbf-ft (47 – 54 N•m).

## CUTTING HEIGHT CHART – HYDRO COMMERCIAL WALKS

Approx. Cutting Height	1/4" Blade Spacers		1/2" Caster Spacers		Motor Mount Hole Position
	Stored	Between Spindle and Blade	Below Weldment	Above Weldment	
3.81 (1.50)	0	3	1	5	1
6.35 (2.50)	0	3	3	3	2
7.62 (3.00)	0	3	4	2	3
9.25 (3.75)	0	3	5	1	4
10.80 (4.25)	0	3	6	0	5

These cutting heights are recommended due to blade pitch relative to cutting height.

Cutting height can be adjusted in 0.635 cm (0.25") increments by removing the 0.25" spacers between the blade and the spindle or by changing the position of the spacers on the front caster.

Cutting grass at a steep blade pitch will produce a poor quality of cut.

7. Insert upper mounting bolts (B) into holes and tighten to 35 – 40 lbf-ft (47 – 54 N•m).
8. Install wheels and place unit back on ground.
9. Using a suitable lifting device, lift the front of the unit.

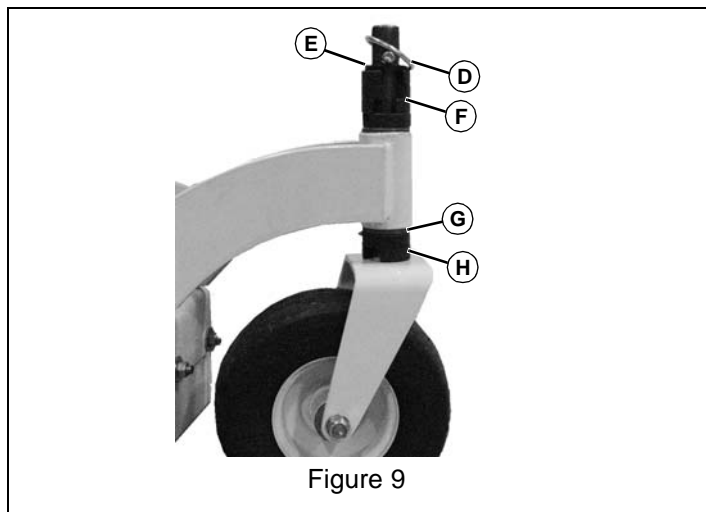


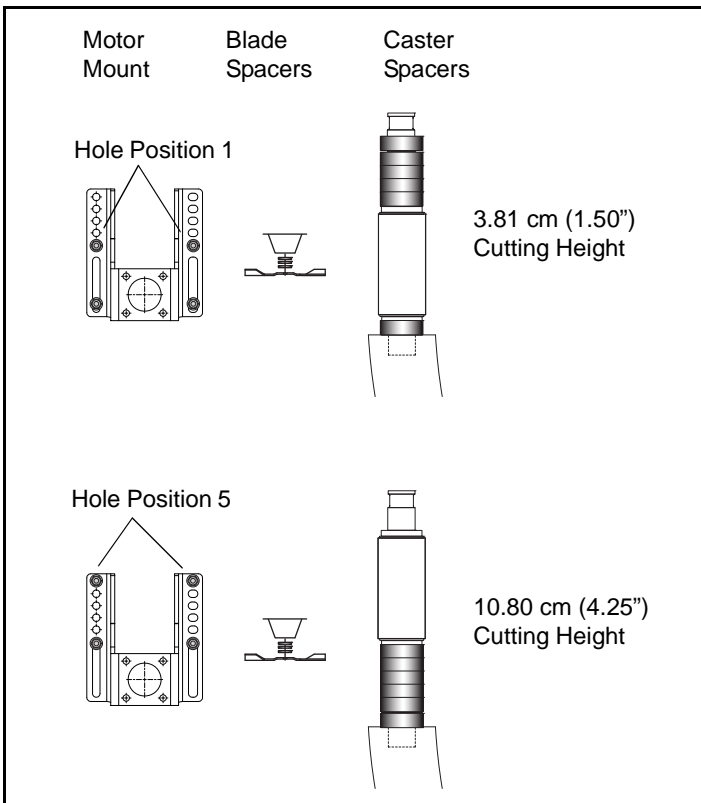
Figure 9

10. Remove lynch pin (D) and spacer bushing (E).

**IMPORTANT:** Do not position washer (G) against caster yoke. It must be installed on top of height-of-cut spacer bushings (H).

**NOTE:** Adjust caster wheel spacers to keep mower deck tilted slightly down at the front.

11. Position caster wheel spacers (F) to adjust front cutting height accordingly.



### Moving the Unit Manually

**CAUTION:** With the bypass valves open, the unit will have unrestricted motion.

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

**IMPORTANT:** *Transmission damage may occur if the unit is moved or towed incorrectly:*

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

1. Park unit safely. See "Using the Parking Brake" on page 9.

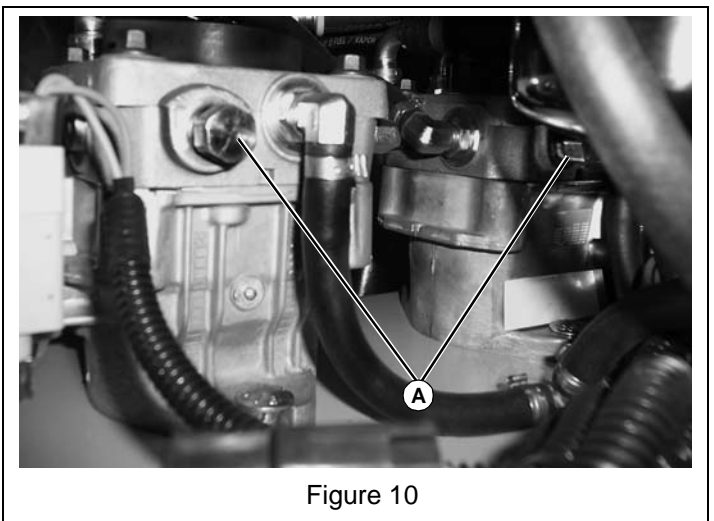


Figure 10

- Turn bypass valves (A) one full turn counterclockwise (open position).
  - Release parking brake.
  - Push unit to desired location.
- NOTE:** Due to internal hydraulic system resistance, the unit will move slowly.
- Turn bypass valves one full turn clockwise (closed position). Tighten valve to 11 N•m (100 lbf-in).
  - Lock parking brake.

### Transporting Unit

ALWAYS shut off engine, remove key and shut off fuel when transporting unit on a truck or trailer. Use extra care when loading or unloading unit.

**CAUTION:** Avoid injury! Use extra care when loading or unloading the unit into a trailer or truck. Close fuel shut-off valve, if equipped.

Engage parking brake.

Secure unit chassis to transport vehicle. NEVER secure from rods or linkages that could be damaged.

DO NOT transport machine while engine is running.

## MAINTENANCE

### Servicing

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

- Engine components may become dirty or plugged when operating in extreme 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.

Refer to the following timetables to perform routine maintenance on your unit.

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

- Change engine oil and filter.
- Check drive belt tension.
- Check mower deck drive belt tension (36 & 52-Inch Mower Decks).

- Check engine-to-deck drive belt tension (48-Inch Mower Deck).
- Check spindle drive belt tension (48-Inch Mower Deck).
- Check transmission neutral adjustment.
- Check wheel nut torque.
- Check and adjust (as needed) parking brake.
- Remove debris from the underside of the mower deck.

### Every 25 Hours or Weekly (Whichever Comes First)

- Lubricate front caster wheels.
- Lubricate front caster wheel spindles.
- Remove debris from the underside of the mower deck.

### Every 50 Hours or Weekly (Whichever Comes First)

- Change engine oil and filter. (See engine manual).
- Grease caster wheel spindle bearings (two places).
- Remove debris from the underside of the mower deck.

- Check drive belt tension.
- Check tire pressure.
- Clean engine air filter.
- Check wheel nut torque.

### Every 160 Hours or Monthly (Whichever Comes First)

- Grease spindle bearings.
- Check transmission oil level.
- Spray lubricate mower deck idler pulley pivots.
- Spray lubricate pump control linkage.
- Spray lubricate control lever pivot shafts (two places).
- Spray lubricate throttle cable.
- Spray lubricate choke control cable.

### Annually

- Inspect all spindle bearings. Replace as needed.
- Inspect all mower deck idler pulleys. Replace as needed.
- Remove and inspect caster wheel roller bearings; clean and pack with grease. Replace as needed.
- Inspect drive belts. Replace as needed. Run-in and adjust tension.
- Clean power unit.
- Check all bolts and nuts; tighten as needed.
- Replace spark plugs.

## SERVICE LUBRICATION

### 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.

### Lubrication Points

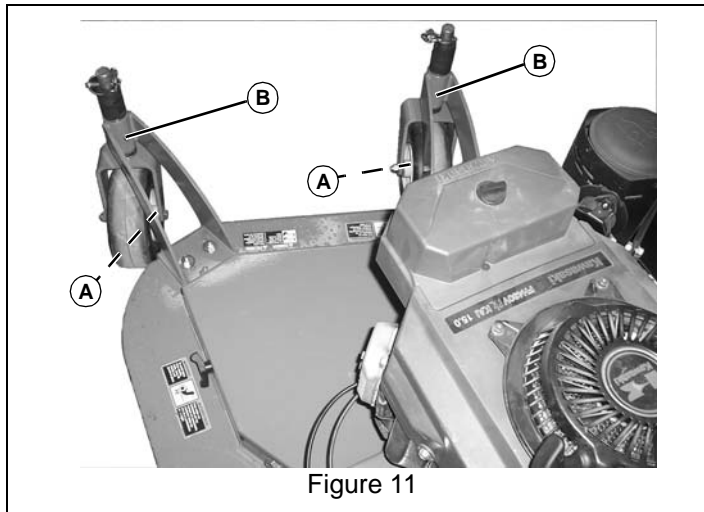


Figure 11

- Grease caster wheel bearings (A).
- Grease caster wheel pivot bushings (B).

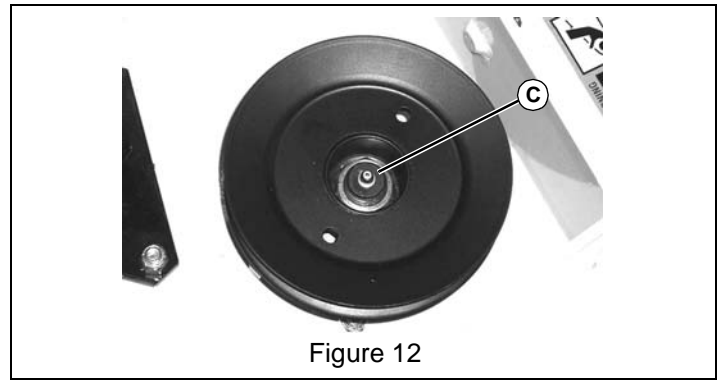


Figure 12

- Apply grease to spindle bearings (C), until grease is expelled from vent on spindle housings.

### Spray Lubricant

Use a general-purpose petroleum-based spray lubricant. Lubricate the following items:

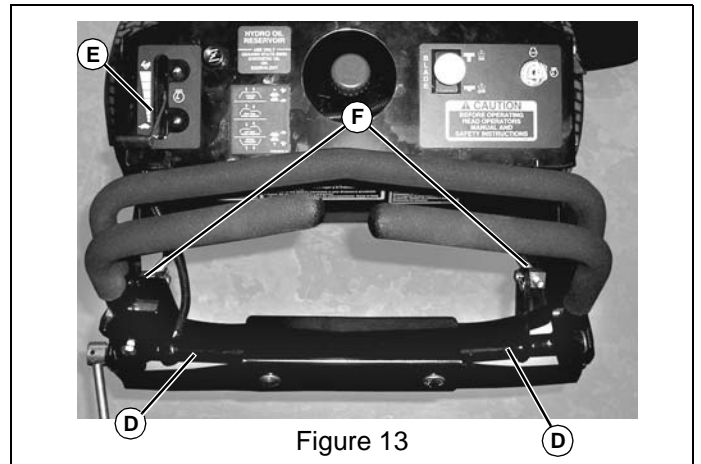


Figure 13

- Apply spray lubricant to speed control levers pivot shaft (D).
- Apply spray lubricant to throttle control cable (E).
- Apply spray lubricant to choke control cable if independent.
- Apply spray lubricant to hydro pump lower control linkages (F) on both sides.

## ENGINE SERVICE

### Avoid Fumes



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

Move the unit 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. See the engine manual for correct specifications.

## Check 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.

**IMPORTANT:** Check oil twice a day if the engine runs over four hours in a day.

1. Park unit safely. (See "Using the Parking Brake" on page 9.)
2. Allow engine to cool.



Figure 14

3. Clean area around dipstick (A) to prevent debris from falling into crankcase.
4. Remove dipstick. Wipe with a clean cloth.
5. Install dipstick and allow the cap to rest on the end of the tube. Do not tighten the cap.

**IMPORTANT:** Avoid damage! To prevent extensive engine wear or damage, always maintain the proper engine oil level. Never operate the engine with the oil level below the ADD mark or over the FULL mark.

6. Remove dipstick and check oil level on dipstick. Oil must be between the ADD and FULL marks.
  - If oil is low, add oil to bring oil level no higher than the FULL mark on dipstick.
  - If oil level is above the FULL mark, drain to proper level.
7. Install and tighten dipstick.

## Change Engine Oil and Filter

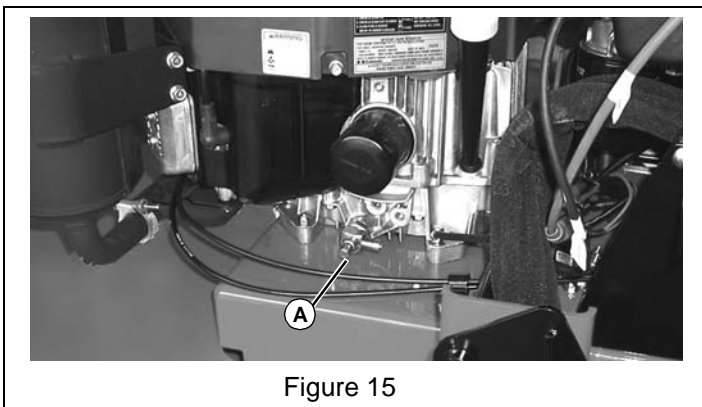


Figure 15

**NOTE:** An oil drain tube is provided with this unit. Attach the tube to the oil drain fitting on the engine, and open 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 manual for complete procedures.

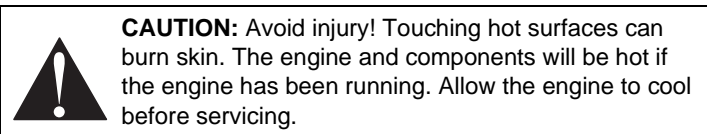
## Clean Air Intake Screen and Engine Fins

**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 manual for complete procedures.

## Check and Clean Air Filter Elements

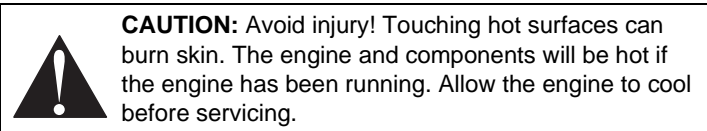


**IMPORTANT:** Avoid damage! Dirt and debris can enter the engine through a damaged filter element:

- 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 manual for complete procedures.

## Check Spark Plugs



Check spark plugs at the intervals recommended in the Service Intervals section. See the engine manual for complete procedures.

## Adjust Carburetor

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

**NOTE:** 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 manual.

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

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

## Replace 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 unit safely. (See “Using the Parking Brake” on page 9.)
2. Turn fuel shutoff valve to OFF position.

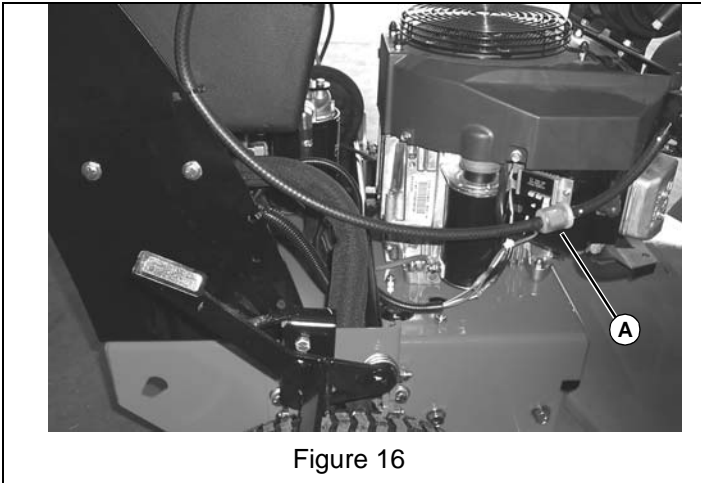


Figure 16

3. Disconnect the fuel hose from the outlet side (A) of the fuel filter, and drain gasoline into a properly marked container.
4. Remove the fuel filter from the inlet fuel hose. Discard filter in appropriate manner.

**IMPORTANT:** 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. Install hose clamps.
7. 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 unit 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.

### Hydraulic Oil

Use only 20-50 hydraulic oil.

### Check Transmission Oil Level

1. Park unit safely. See “Using the Parking Brake” on page 9.

2. Remove hydraulic reservoir cap; the oil level should be 127 mm (5 in.) from the top of the filler pipe. Add oil as needed.

### Change Transmission Oil and Filter

1. Park unit safely. (See “Using the Parking Brake” on page 9.)
2. Raise and secure the rear of the mower.
3. Allow engine and hydraulic reservoir to cool.



Figure 17

4. Clean area around reservoir filler cap, reservoir drain cap (A), and oil filter mounting base.

**NOTE:** Use properly marked container with a capacity of at least 5 qt (4.7 L) to drain oil.

5. Remove the reservoir filler cap and reservoir drain cap. Drain the reservoir oil into a proper container.



Figure 18

6. Turn hydraulic filter (B) counterclockwise to remove and drain remaining oil.
7. Apply a film of clean oil to gasket of new filter.
8. Install filter. Turn filter clockwise until gasket makes contact with the mounting surface. Tighten 1/2 to 3/4 turn after contact.
9. Install reservoir drain cap and tighten to 30 lbf-ft (41 N•m).

**NOTE:** Total system capacity is approximately 5 qt (4.7 L) however some oil will remain in the wheel motors and lines. Approximately 3.5 qt (3.3 L) is required to refill to a safe operating level.

10. Fill reservoir with approximately 3.5 qt (3.3 L) of oil.
11. Install filler cap on reservoir.
12. Start engine and run at 3/4 throttle position. Release the parking brake and cycle the control levers forward and rearward several times. Check for leaks.

13. Stop engine. Check reservoir oil fluid level. Add oil as necessary.

### Adjust Transmission Neutral Position

1. Park unit safely. See "Using the Parking Brake" on page 9.



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

2. Raise drive wheels off the ground and securely support the unit 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 forward and rearward. The wheels should travel in the correct direction as the levers are moved.

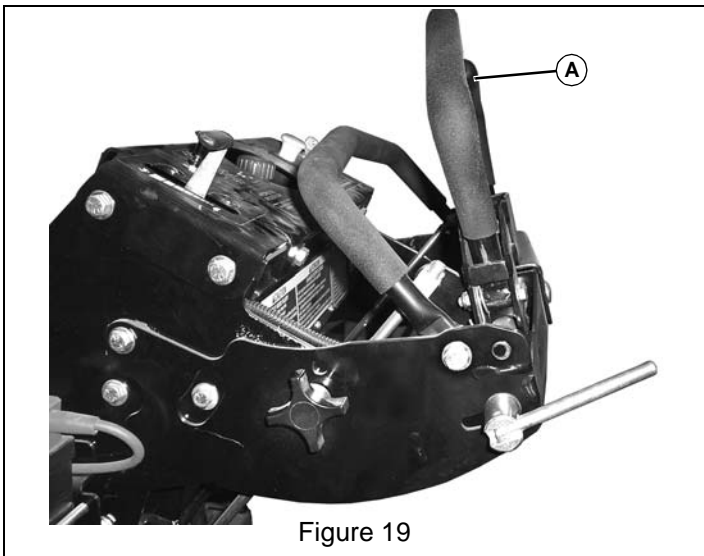


Figure 19

5. Move control levers (A) to neutral position; the wheels should stop rotating.

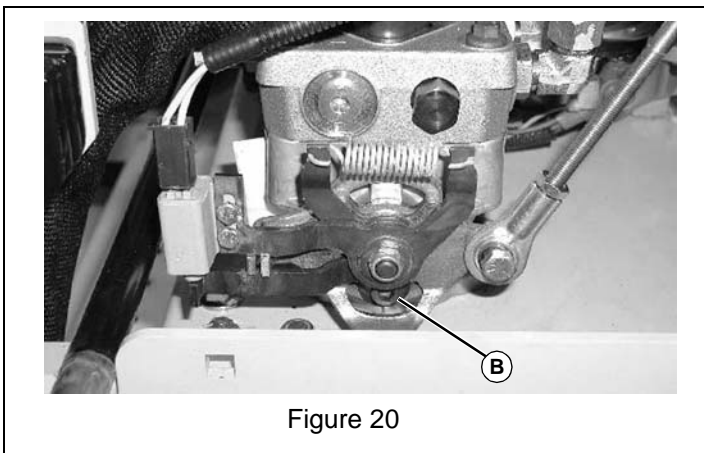


Figure 20

6. If wheels continue to rotate, adjustment is necessary.
7. Slightly loosen cap screw (B) to allow rotation of neutral return plate.
  - If wheel is rotating forward, rotate neutral return plate counterclockwise until wheel rotation stops.
  - If wheel is rotating in reverse, rotate neutral return plate clockwise until wheel rotation stops.
8. Tighten cap screw (B).
9. Recheck neutral. If wheels continue to rotate, readjust.

10. With the engine running, operate the motion control levers to verify adjustment.
  - If engine will not crank over after adjustments are made, adjust the neutral switch. Shut engine off.
11. Lower unit to the ground.

### Adjust Tracking



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

1. Park unit safely. See "Using the Parking Brake" on page 9.
2. Start and run engine until it reaches normal operating temperature.
3. Move unit to an open area for operation.
4. Mark position of safety bar on side of bracket.



**CAUTION:** Avoid injury! Do not operate unit at a high speed when checking for tracking. Adjust safety bar to limit forward speed.

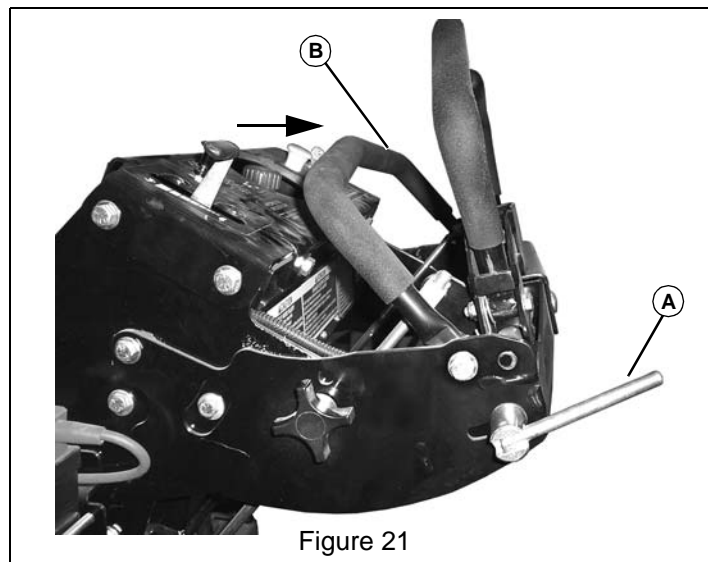


Figure 21

5. Loosen lever (A). Move safety bar (B) back away from the control panel and tighten lever (A).
6. Drive unit forward, pushing both control levers all the way to safety bar.
7. Check unit tracking.

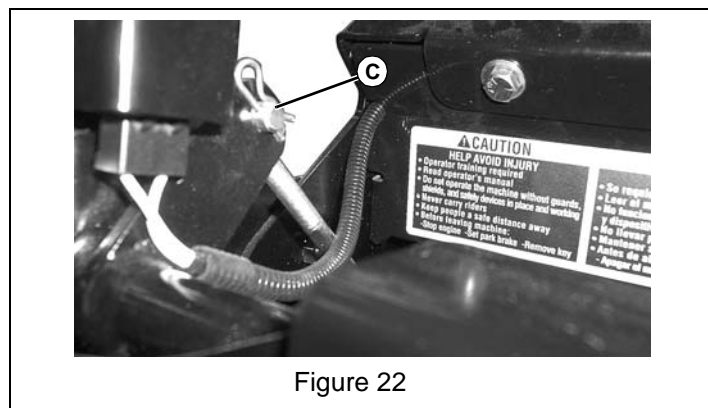


Figure 22

- If unit does not drive in straight line, adjust control rod swivel (C) located on both sides of the unit to compensate.
8. Adjust safety bar back to original operating position.

### Remove and Install Traction Drive Belt

1. Park unit safely. See "Using the Parking Brake" on page 9.
2. Remove mower deck belt guard.
3. Remove mower deck drive belt.

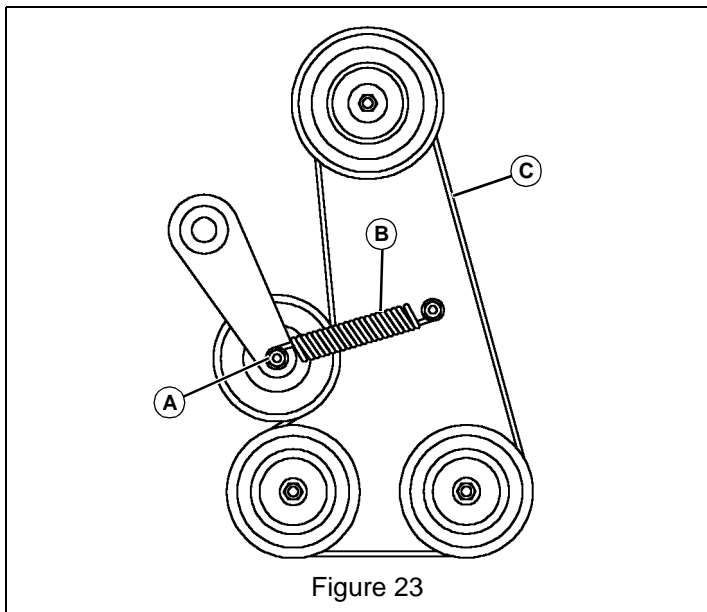


Figure 23

4. Disconnect tension spring (B) by removing nut (A) from bell crank.
5. Remove traction drive belt (C).
6. Install new traction drive belt (C).
7. Connect tension spring (B) to bell crank. Install nut (A) and tighten until 1-2 threads of bolt are visible. Do not tighten nut against spring eye.
8. Install mower deck drive belt.
9. Install mower deck belt guard.

## SERVICE MOWER

### Adjust Deck Belt Tension

1. Park unit safely. See "Using the Parking Brake" on page 9.
2. Remove belt cover.

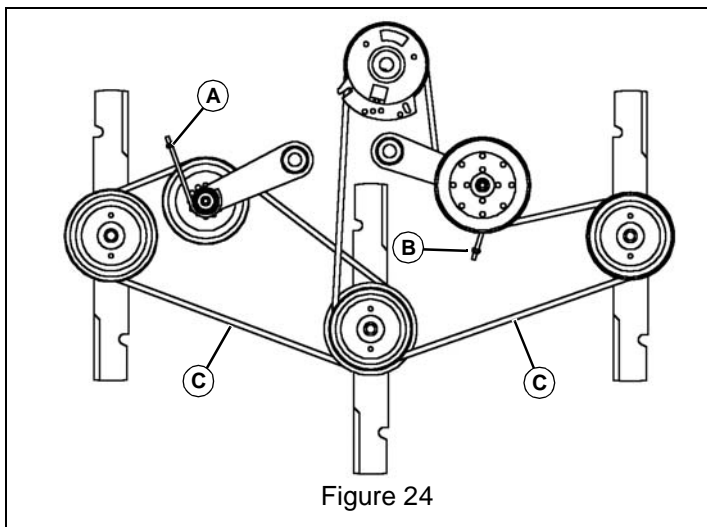


Figure 24

**NOTE:** 48-In. deck shown.

3. Adjust to proper tension. The belt should deflect a maximum of 0.5 in. (13 mm) when a force of 10 lb (4.5kg) is applied to the center of the longest span (C).

**To Increase Belt Tension:** Turn nut (A - main mower deck drive belt or B - spindle drive belt) clockwise.

**To Decrease Belt Tension:** Turn nut (A - main mower deck drive belt or B - spindle drive belt) counterclockwise.

### Remove and Install Mower Deck Drive Belts

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

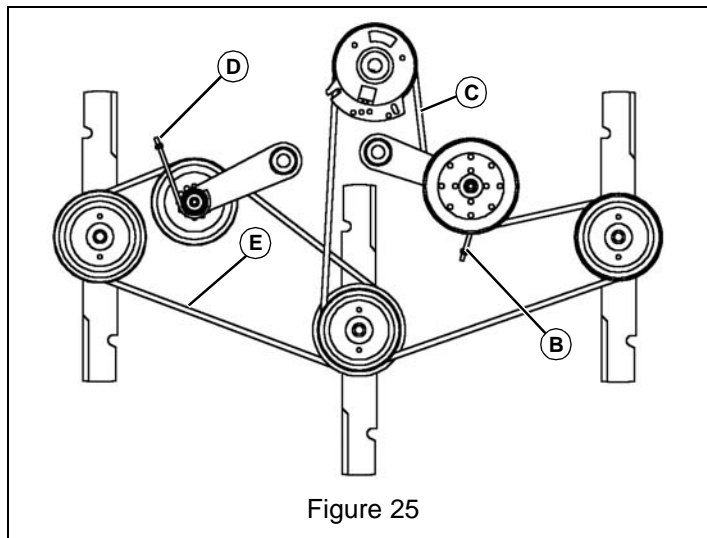


Figure 25

**NOTE:** 48-In. deck shown.

3. Release mower deck drive belt tension by turning the tension adjuster nut (B) counterclockwise.
4. Remove mower deck drive belt (C).
5. Release spindle drive belt tension by turning the tensioner adjuster nut (D) counterclockwise.
6. Remove spindle drive belt (E).
7. Install the new spindle drive belt (E) and adjust the drive belt tension.
8. Install new mower deck drive belt (C) and adjust the drive belt tension.
9. Install mower deck drive belt covers.

**NOTE:** Check and adjust mower deck drive belts after 1 hour and 6 hours.

### Check for Bent Mower Blades



**CAUTION:** Avoid injury! Mower blades are sharp. Always wear gloves when handling mower blades or working near blades. Only replace blades. Never straighten or weld them.

1. Park unit safely. See "Using the Parking Brake" on page 9.



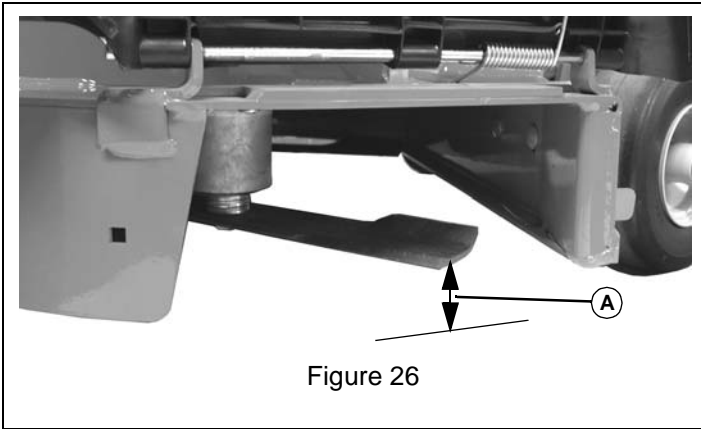


Figure 26

**NOTE:** Mower deck with side discharge used for illustration.

2. Measure distance (A) between blade tip and flat ground surface.
3. Rotate blade 180° and measure distance between other blade tip and flat ground surface.
4. Install new blade if the difference between the two measurements is more than 1/8-in. (3 mm).
5. Repeat for all blades.

## REPLACE MOWER BLADES

### Remove Mower Blades



**WARNING:** Sharp edges can cut. Moving parts can cut off fingers or a hand. Wrap blade(s), wear sturdy gloves and use extreme caution when servicing. On multi-blade mowers, rotation of one blade will cause all blades to rotate.

1. Turn the engine off. Remove the ignition key. Remove the ignition wire from the spark plugs.
2. Secure blade with a wooden block to prevent blade rotation.
3. Remove the bolts, blades and washers from the spindle shafts.

### Replace Mower Blades

1. Install the washers, blade, bolt on the spindle shaft.
2. Secure blade with a wooden block to prevent blade rotation.
3. Tighten the bolts to a torque of 120 lbf-ft (163 N•m).
4. Replace ignition wire on spark plugs.

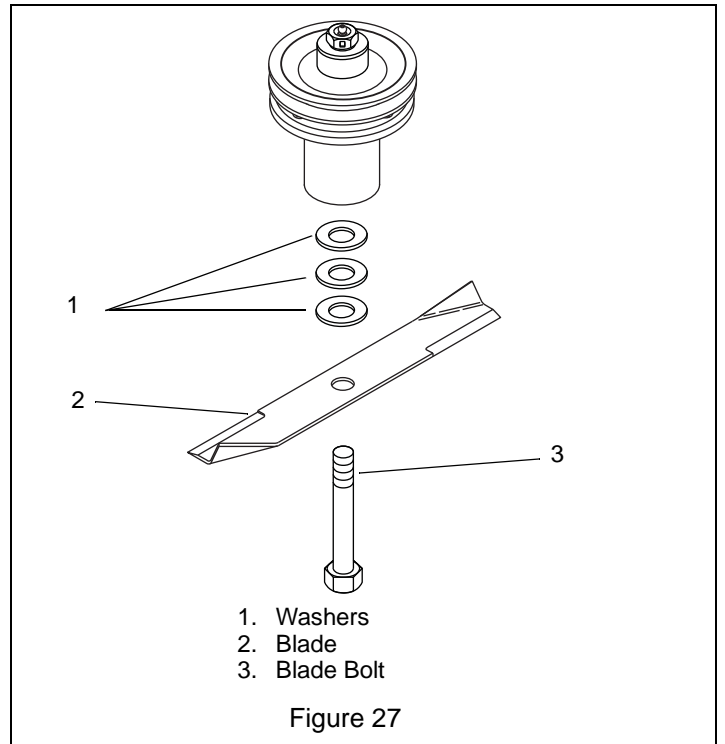


Figure 27

### Sharpen Blades



**CAUTION:** Avoid injury! Mower blades are dangerous!

- Always wear gloves while working on blades.
- Always wear safety eye protection when grinding.

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

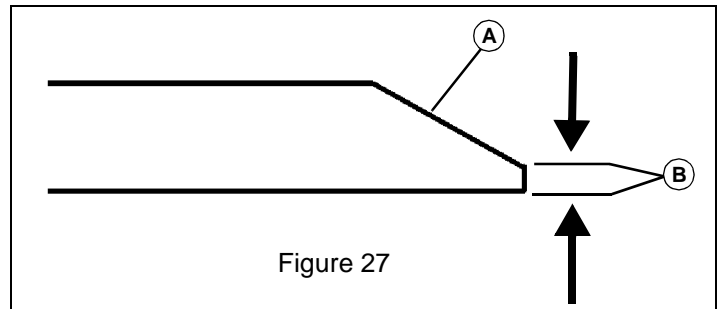


Figure 27

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

### Balancing Blades



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

1. Clean blade.

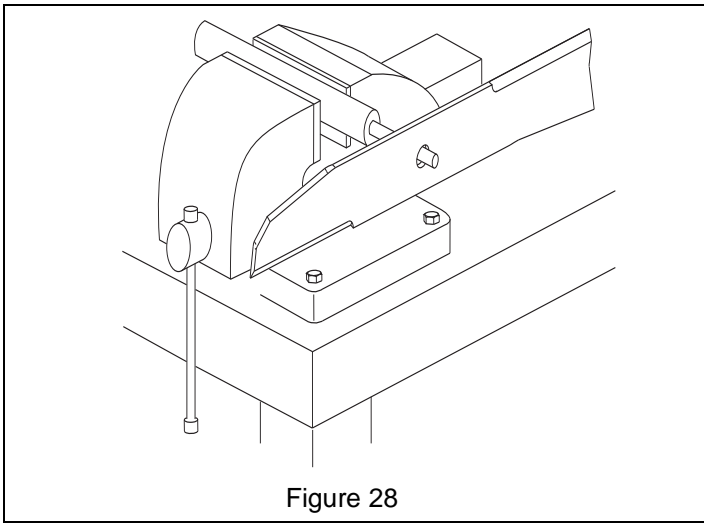


Figure 28

2. Put blade on nail or round pin 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.

### Replace Mower Spindle Bearings – 36-In. Decks

1. Park unit safely. See “Using the Parking Brake” on page 9.
2. Remove mower blade.

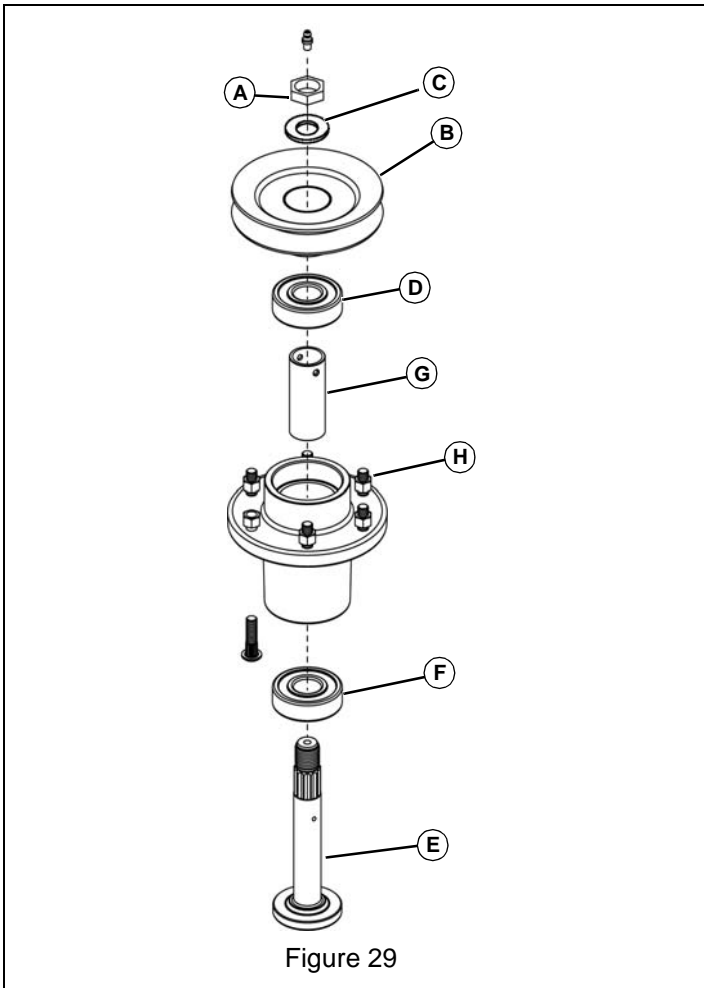


Figure 29

3. Remove nut (A), pulley (B) spacer (C), and washer (B).
4. Remove spindle shaft (E), lower bearing (F) and spacer (G) from spindle housing (H). Discard bearing.

5. Remove and discard upper bearing (D).
6. Clean entire assembly.
7. Install a new lower bearing (F) and spacer (G) on the spindle shaft (E).

**IMPORTANT:** Avoid damage! The clearance between the lower bearing and the housing is only 0.002 (0.05 mm). Do not force bearing into housing.

8. Install the spindle shaft (E), lower bearing (F) and spacer (G) into the spindle housing (H).
9. Install the upper bearing (D).
10. Install spacer (C).
11. Install pulley (B) and nut (A). Tighten nut to 85 lbf-ft (115 N•m).
12. Install mower blade, blade washers and blade bolt assembly. Tighten bolt to 120 lbf.-ft. (163 N•m). (See Checking and Replacing Mower Blades.)

### Replace Mower Spindle Bearings – 48-In. and 52-In. Mower Decks

1. Park unit safely. See “Using the Parking Brake” on page 9.
2. Remove engine-to-deck drive and spindle drive belts.
3. Remove mower blade.

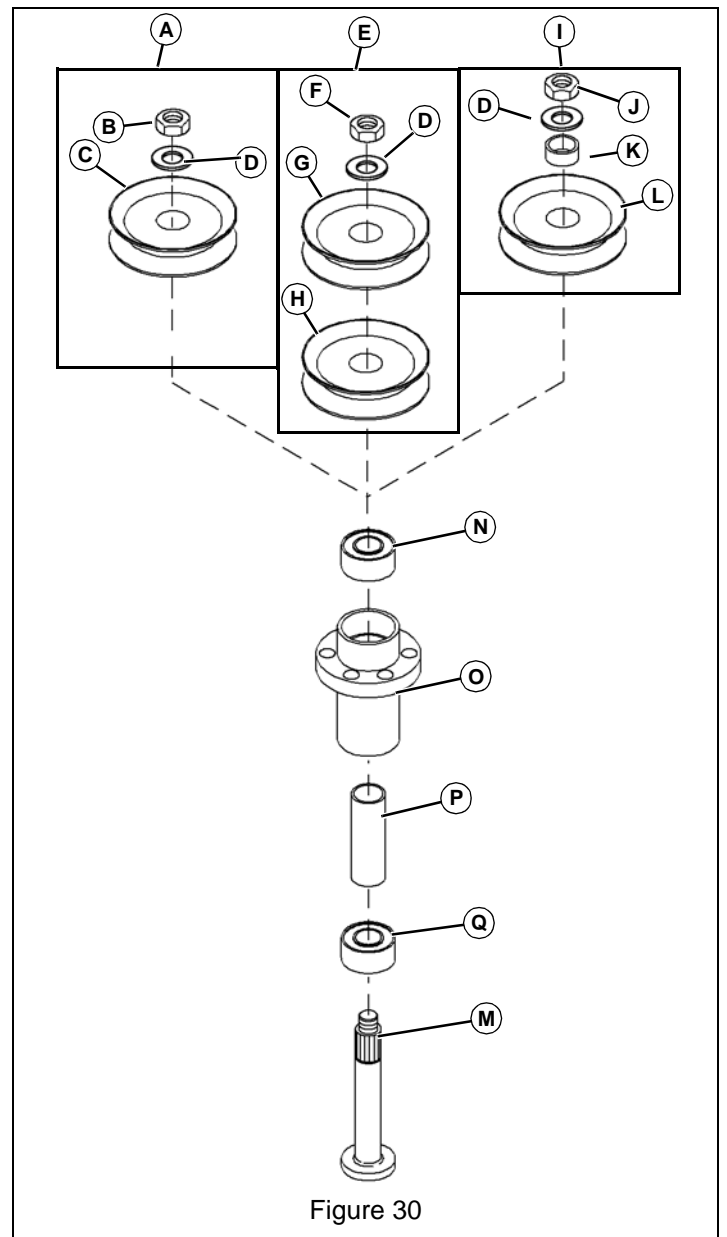


Figure 30

4. Remove pulleys:
  - Left Spindle (A) – Remove nut (B), pulley (C) and washer (D).
  - Center Spindle (E) – Remove nut (F), washer (D), drive pulley (G) and spindle pulley (H).
  - Right Spindle (I) – Remove nut (J), washer (D), spacer (K) and pulley (L).
5. Remove spindle shaft (M), lower bearing (Q) and spacer (P) from spindle housing (O). Discard bearing.
6. Remove and discard upper bearing (N).
7. Clean entire assembly.
8. Install a new lower bearing (Q) and spacer (P) on the spindle shaft (M).



**CAUTION:** 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 (M), lower bearing (Q) and spacer (P) into the spindle housing (O).
10. Install the upper bearing (N).
11. Install upper pulleys:
  - Left Spindle (A) – Install spacer (D), pulley (C) and nut (B). Tighten nut to 85 lbf-ft (115 N•m).
  - Center Spindle (E) – Install spindle pulley (H), drive pulley (G) and nut (F). Tighten nut to 85 lbf-ft (115 N•m).
  - Right Spindle (I) – Install pulley (L), spacer (K) and nut (J). Tighten nut to 85 lbf-ft (115 N•m).
12. Install mower blade, blade washers and blade bolt assembly. Tighten nut to 120 lbf-ft (163 N•m).

### Replacing Mower Deck Idler Pulleys

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

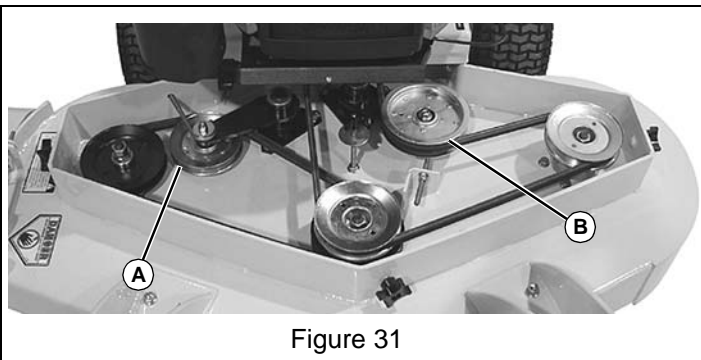


Figure 31

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

### ELECTRICAL SERVICE



**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.

### Battery Safety



**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.

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.

### Check Battery (Sealed Batteries)

**NOTE:** Do not attempt to open, add fluid or service battery. Any attempt to do so will void warranty.

- Keep battery and terminals clean.
- Keep battery bolts tight.
- Keep small vent holes open.



**CAUTION:** Avoid damage! The battery comes fully charged. If the unit is not used by the service expiration date indicated on the battery, charge the battery.

Recharge, if necessary, at 6 – 10 amperes for 1 hour.

### REMOVE AND INSTALL BATTERY

#### Removal:

1. Park unit safely. See "Using the Parking Brake" on page 9.

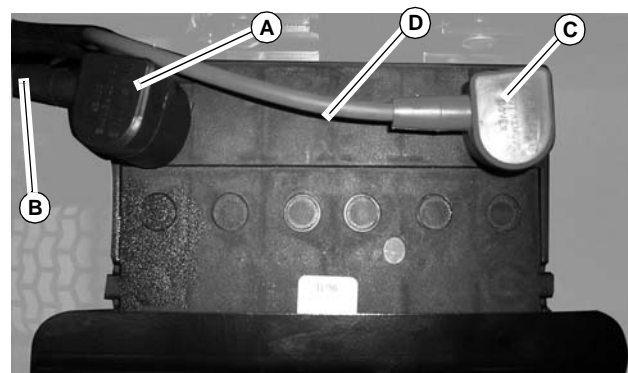


Figure 32

2. Slide back black cover (A) and disconnect negative (-) battery cable (B).
3. Slide back red cover (C) and disconnect positive (+) battery cable (D).

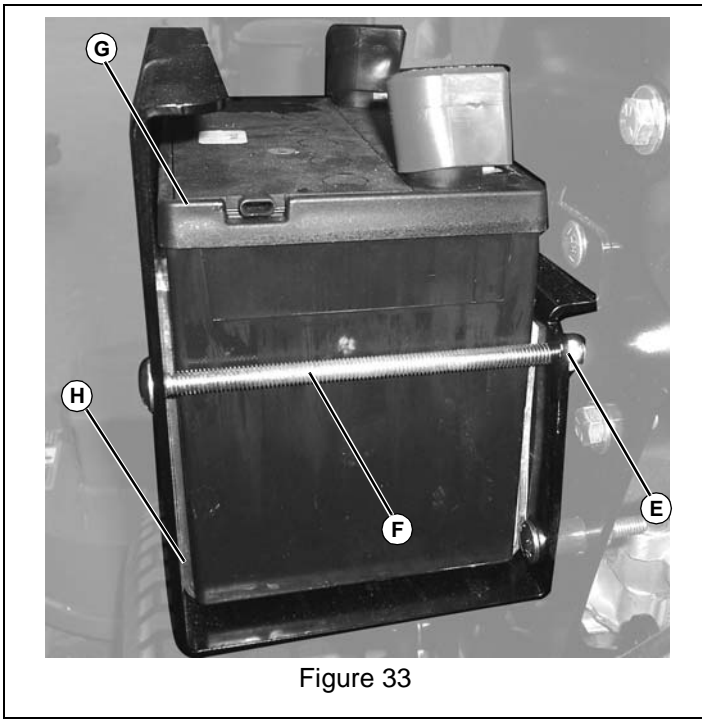


Figure 33

4. Loosen nut on front long carriage bolt (E).
5. Remove rear long carriage bolt (F) and nut.
6. Lift and slide battery (G) out from back of battery tray (H).
7. Inspect isolator pad (I). Replace as needed.

### Installation:

1. Place isolator pad (I) in battery tray (H). Ensure that isolator pad is on the bottom and sides of battery tray.
2. Install battery (G) in battery tray (H) with positive terminal in rear.
3. Install rear long carriage bolt (F) and nut. Do not overtighten.
4. Tighten nut on long carriage bolt (E) to secure battery (G) in battery tray (H). Do not overtighten.
5. Apply dielectric grease to terminals to prevent corrosion.
6. Connect the positive (+) battery cable (D) and install cover (C).
7. Connect negative (-) battery cable (B) and install cover (A).

### Clean Battery and Terminals

1. Park unit safely. See "Using the Parking Brake" on page 9.
2. Disconnect and remove battery.
3. Wash battery with solution of four tablespoons of baking soda to one gallon of water. Be careful not to get the soda solution into the cells.
4. Rinse the battery with plain water and dry.
5. Clean terminals and battery cable ends with wire brush until bright.
6. Apply general purpose grease or silicone spray to terminal to prevent corrosion.
7. Install battery.

### Jump-Starting

Great Dane does not recommend jump-starting your unit. Jump-starting can damage engine and electrical system components. See your Engine Manual for more detailed information.

### Replacing Fuses

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

The unit is equipped with one 20-amp fuse to protect the charging circuit. These fuses are located under the control panel area.

1. Remove defective fuse from socket.
2. Check metal clip in fuse window and discard fuse if clip is broken.
3. Install new fuse into socket.

## MISCELLANEOUS SERVICE

### Fill Fuel Tank



**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.

### Using Proper Fuel

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

Always use fresh, clean fuel that is purchased in a quantity that can be used within approximately 30 days, or add fuel stabilizer.

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

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

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

Condensation may collect in the fuel tank because of a variety of operating or environmental conditions and, over time, may affect your unit's operation. Fill fuel tank at the end of daily use and store fuel in plastic containers to reduce condensation.

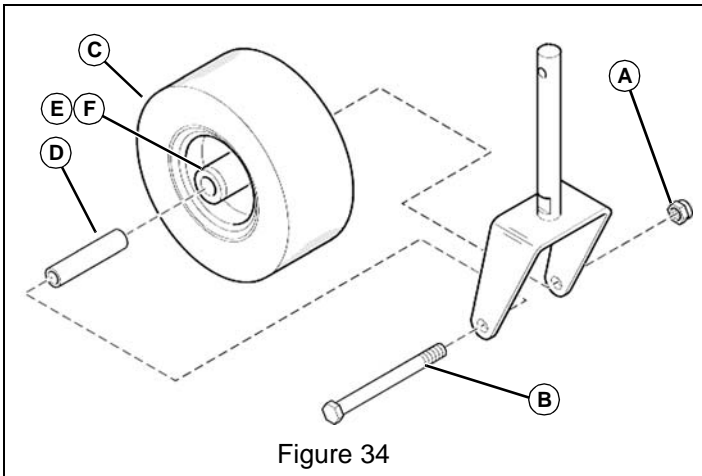
For best year-round performance and fuel-handling, add stabilizer to fuel immediately after fuel purchase. Such practice helps prevent engine performance problems and allows fuel storage in the unit all year without draining.

## To add fuel to the fuel tank:

1. Put the unit in an open area.
2. Stop the engine.
3. Allow engine to cool.
4. Clean the fuel cap and the area around the fuel cap to prevent dirt from entering the fuel tank.
5. Remove the cap from the fuel tank.
6. Fill the fuel tank. Be careful not to spill.
7. Install the cap on the fuel tank and tighten.
8. Clean up any spilled fuel before starting the engine.

## Service Caster Wheel Roller Bearings

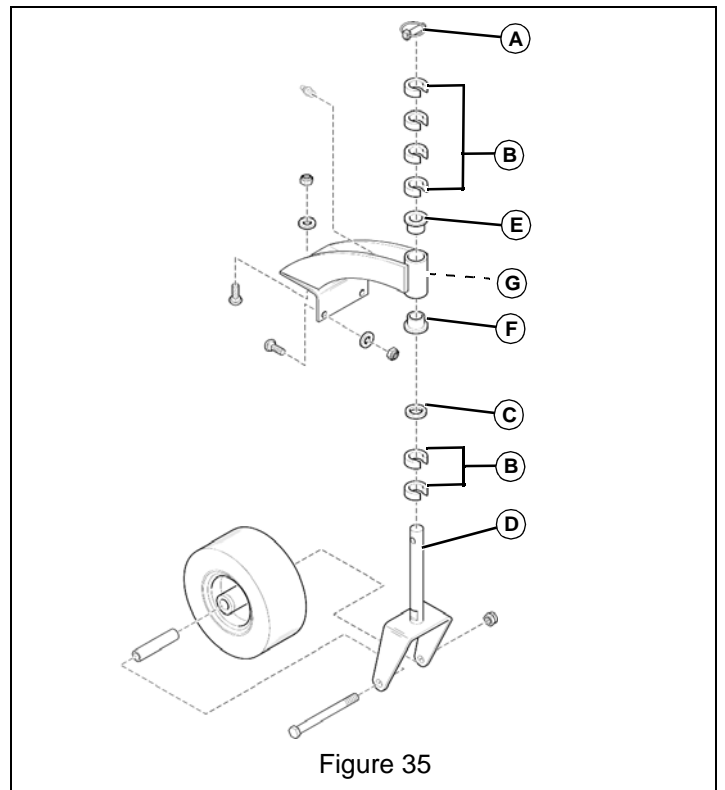
1. Park unit safely. See "Using the Parking Brake" on page 9.
2. Raise and securely support the front of the mower deck.



3. Remove nut (A), bolt (B) and wheel assembly (C).
4. Remove bearing sleeve (D), bearing retainer (E), and roller bearing (F) from wheel.
5. Clean bushing and roller bearing and pack with clean grease.
6. Install wheel assembly (C), roller bearing (F), bearing retainer (E), bearing sleeve (D), bolt (B) and nut (A).

## Replace Caster Pivot Bearing Bushings

1. Park unit safely. See "Using the Parking Brake" on page 9.
2. Raise and securely support the front of the mower deck.



3. Remove lynch pin (A), spacer bushings (B), washer (C) and castor yoke and wheel assembly (D).
4. Remove and discard upper (E) and lower (F) bushings.
5. Install new bushings (E and F).

**IMPORTANT: Avoid Damage!** Do not position washer (C) so that it is resting on castor yoke (D). It must be on top of height-of-cut spacer bushings (B).

6. Install castor yoke and wheel assembly (D), washer (C), spacer bushings (B) and lynch pin (A).
7. Apply grease to lubrication fitting (G).

## Checking Wheel Nuts

Tighten rear wheel nuts in an alternating pattern to 55 lbf-ft (75 N•m).

# TROUBLESHOOTING

## Engine

Problem	Probable Cause
Engine Will Not Start or Is Hard to Start	Motion control levers not in the neutral detent position. Key switch not in proper position. PTO engaged. Stale or improper fuel/fuel level. Plugged fuel filter. Fuel shutoff valve in off position. Plugged air intake filter. Spark plug wire is loose or disconnected. Spark plug not gapped correctly. Blown 20-amp fuse (main power circuit). Electrical problem - discharged battery. Choke adjusted incorrectly. See servicing dealer.
Engine Will Not Slow Idle	Bent or kinked throttle cable. Bent governor control. Incorrect governor idle control. Carburetor problems. See servicing dealer.
Engine Runs Rough or Stalls	Plugged fuel filter. Plugged air intake system. Fuel cap vent dirty. Stale or improper fuel/fuel level. Spark plug not gapped correctly. Replace spark plug. Choke adjusted incorrectly. See servicing dealer.
Engine Knocks	Engine oil level low. Reduce load. (Slower ground speed.) Fuel is bad. Fill tank with fresh fuel, correct octane. Idle speed too slow.
Engine Overheats	Clean cooling fins. Low oil level. Operating at slow idle – operate at full-throttle setting. Cooling air intake screen is dirty. Plugged air intake filter. Operating at too fast ground speed for conditions.

Problem	Probable Cause
Engine Lacks Power	Plugged air intake system. Plugged fuel filter. Improper type of fuel. Drain tank and fill with correct fuel. Clean cooling fins to help prevent overheating. Replace spark plug.
Engine Uses Too Much Oil	Find and correct oil leaks. Incorrect engine oil. Plugged oil filter. Plugged air intake filter.
Engine Backfires Through Muffler	Throttle should be at low idle for several seconds before turning off unit. Leaking/damaged exhaust manifold gasket.
High Fuel Consumption	Improper type of fuel. Plugged air intake system. Operating at too fast ground speed for conditions. Improper valve clearance. See servicing dealer. Restricted air intake system.

## Electrical System

Problem	Probable Cause
PTO Clutch Does Not Engage	Blown 20-amp fuse (main power circuit). Faulty PTO switch. Faulty PTO clutch. Loose PTO clutch connections.

## Machine

Problem	Probable Cause
Excessive Machine Vibration	Engine speed too slow. Deck drive belts worn or damaged. Pump drive belt worn or damaged. Dirt or debris on drive sheaves. Loose or damaged electric PTO or drive sheave. Bent or damaged cutting blades.

Problem	Probable Cause
Unit Will Not Move With Engine Running	Parking brake locked. Hydraulic oil level low. Hydraulic oil cold - allow engine to warm. Pump drive belt slipping. Pump bypass valves open. Pump drive belt damaged or worn. Wheel motor problems. See your Lesco servicing dealer.
Unit Creeps With Engine Running and Motion Control Levers in a Neutral Position	Needs control linkage adjustment.

### Parking Brake

Problem	Probable Cause
Parking Brake Not Working Correctly	Brake components damaged.

### Steering

Problem	Probable Cause
Steering Not Working	Parking brake locked. Pump bypass valves partially open. Improper tire inflation. Hydrostatic transmission oil low. Traction drive belt slipping. Traction drive belt damaged or worn.
Unit Will Not Follow a Straight Path	Steering linkage out of adjustment.
Unit Moves to the Left or Right With Engine Running and Transmission in Neutral	Pump linkage (neutral position) out of adjustment.

### Mower Deck

Problem	Probable Cause
Discharge Chute Plugged	Grass is wet - mow grass only when dry. Raise cutting height. Mow at full throttle. Ground speed too fast for conditions. Correct installation of deck drive belt.

Problem	Probable Cause
Mower Deck Vibrates	Run engine at full throttle. Loose hardware. Check/replace mower deck drive belt. Check/replace spindle drive belt. Blades bolts are loose. Blades are bent or worn. Sharpen and balance blades. Remove belt shields and check for debris on sheaves. Check sheaves for proper alignment or damage. See your dealer.
Mower Blades Do Not Engage	Mower deck drive belt slipping or broken. Spindle drive belt slipping or broken. Mower deck belt tension spring not installed or broken. PTO switch failure. 20-amp fuse is blown (main power circuit). Loose electrical connections. Faulty PTO clutch.
Mower Cuts Unevenly	Mower deck not properly leveled. Ground speed too fast for conditions. Engine speed too slow – run engine at full throttle. Reduce ground speed when making turns. Blades bent or worn. Sharpen or replace blades. Change mowing pattern. Check tire pressure.

## STORAGE

### Short Term

NEVER spray unit with high pressure water or store unit outdoors.

Close fuel shut-off valve.

Inspect unit for visible signs of wear, breakage or damage.

Keep all nuts, bolts and screws properly tightened and know unit is in safe working condition.

Store unit in a cool, dry protected area.

### Long Term

Clean unit thoroughly with mild soap and low pressure water and lubricate. See "MAINTENANCE" on page 11. Touch up all scratched painted surfaces.

Remove weight from rear wheels by putting blocks under frame or axle.

### Fuel System

Gasoline left in the fuel system for extended periods without a stabilizer will deteriorate, resulting in gum deposits in the system. These deposits can damage the carburetor and the fuel hoses, filter and tank. Prevent deposits from forming in the fuel system during storage by adding a quality fuel stabilizer to the fuel. Follow the recommended mix ratio found on the fuel stabilizer container.

To treat the fuel system for storage:

Add fuel stabilizer (Great Dane p/n 00592900) according to manufacturers' instructions.

Run engine for at least 10 minutes after adding stabilizer to allow it to reach the carburetor.

NEVER store the engine with fuel in the fuel tank inside of a building with potential sources of ignition.

## SERVICE PARTS

Order the following parts through your Dealer:

Part No.	Description
00181251	Fuel Tank Cap
D38006	Traction (Hydro) Drive Belt
GDA10137	Hydraulic Oil Filter
D38007	Belt – Engine to Blade, 36-In. Deck
D18087	Belt – Engine to Blade, 48-In. Deck
TCU18848	Belt – Engine to Blade, 52-In. Deck
D38019	Mower Deck Drive Belt, 48-In. Deck
GDU10231 or D18037	Mower Blade – 52-Inch Mower Deck (18-In. Blade)
GDU10230 or D18086	Mower Blade – 48-Inch Mower Deck (16.5-In. Blade)
GDU10231 or D18037	Mower Blade – 36-Inch Mower Decks (18-In. Blade)



## SPECIFICATIONS

Model Number	988640	988642	988641
<b>Description</b>	GHWKA1536S	GHWKA1952S	GHWKA1948S
<b>Engine</b>	Kawasaki FH430V	Kawasaki FH580V	Kawasaki FH580V
Power Max – HP (kW)	15 (11.2)	19 (14.2)	19 (14.2)
Displacement – in. (cc)	431	585	585
Starter	Recoil	Electric	Electric
<b>Fuel</b>	See Engine Manual		
Tank Capacity – Gallons (Liters)	6.6 (25)		
<b>Hydraulic System Capacity</b>			
Completely Dry System – Qt. (Liters)	5 (4.7)		
Hydraulic Reservoir With Filter Change – Qt. (L)	3.5 (3.3)		
<b>Deck</b>			
Cutting Width – in. (cm)	35.5 (90.1)	51.5 (130.8)	47.5 (120.7)
Cutting Height – in. (cm)	1-1/2 – 5 (3.8 – 12.7)		
Cutting Positions	16		
Spindles	1-In. (2.5 cm) Aluminum – Sealed		
Blade Bolt Torque lbf-ft (N•m)	120 (163)		
<b>Travel Speed – mph (kph)</b>			
Forward	0 – 7 (0 – 13.2)		
Reverse	0 – 3 (0 – 5)		
<b>Tires – in. (cm)</b>			
Front – Solid	9 x 3.5 (22.9 x 8.9)		
Rear – Pneumatic	16 x 16.5-8 (40.6 x 41.9-20.3)		
Rear Inflation – psi (kPa)	10 – 12 (69 – 83)		
<b>Size and Weight</b>			
Length – in. (cm)	72 (182.9)	69 (175.2)	66 (167.6)
Height – in. (cm)	43 (109.2)		
Width – in. (cm)	37 (94.0)	52.5 (133.4)	48.5 (123.2)
Weight – lbs (kg)	547 (248.1)	667 (302.5)	647 (293.5)



# Two-Year Limited Great Dane<sup>®</sup> Commercial Warranty

Ariens Company (Ariens) warrants to the **original purchaser** that Great Dane<sup>®</sup> brand products manufactured by Ariens, designated or labeled commercial products by Ariens, and sold after December 31, 2007 will be free from defects in material and workmanship for a period of two years after the date of purchase or 1000 hours of use, whichever comes first. An authorized Great Dane dealer will repair any defect in material or workmanship, and repair or replace any defective part, subject to the conditions, limitations and exclusions set forth herein. Such repair or replacement will be free of charge to the original purchaser (labor and parts), except as noted below.

## **Limited Lifetime Warranty on Mower Deck Shell**

The deck shell is warranted to the **original purchaser** against any defect in material or workmanship for as long as the original purchaser owns the product. Any defect in material or workmanship of the deck shell will be repaired free of charge (parts and labor) to the original purchaser for two years or 1000 hours of use, whichever comes first. After two years or 1000 hours of use, the parts required to repair a defect in material or workmanship of the deck shell, not the labor, will be provided free of charge for as long as the original purchaser owns the product.

## **Limited Lifetime Warranty on Main Frame**

The main frame is warranted to the **original purchaser** against any defect in material or workmanship for as long as the original purchaser owns the product. Any defect in material or workmanship of the main frame will be repaired free of charge (parts and labor) to the original purchaser for two years or 1000 hours of use, whichever comes first. After two years or 1000 hours of use, the parts required to repair a defect in material or workmanship of the main frame, not the labor, will be provided free of charge for as long as the original purchaser owns the product.

## **Three-Year Limited Warranty on Deck Spindles**

Mower deck spindles are warranted to the **original purchaser** for three years from the date of purchase. Any defect in material or workmanship of the mower deck spindles will be repaired free of charge (parts and labor) to the original purchaser for two years after the date of purchase. After two years, the parts required to repair a defect in material or workmanship of the deck spindles, not the labor, will be provided free of charge.

## **One-Year Limited Warranty on 21-inch Walk-Behind Lawn Mowers**

21-inch walk-behind lawn mowers labeled or designated by Ariens as a Professional/Commercial product put to any business use, agricultural, commercial, or industrial, are warranted to the **original purchaser** to be free from defects in material and workmanship for a period of one year after the date of purchase.

## **90-Day Limited Warranty on Service Parts and Accessories**

Genuine Great Dane brand service parts and accessories are warranted to be free from defects in material and workmanship for a period of 90 days after the date of purchase. An authorized Great Dane dealer will repair or replace any such part or accessory free of charge, except for labor, during that period.

If any product is rented or leased, then the duration of these warranties shall be 90 days after the date of purchase.

## **Exceptions, Limitations, Exclusions**

### **Customer Responsibilities**

**Register the product immediately at the time of sale.** If the dealer does not register the product, the customer must complete the product registration card in the literature package and return it to the Ariens Company, or register the unit online at [www.ariens.com](http://www.ariens.com).

To obtain warranty service, the **original purchaser** must:

- Perform the maintenance and minor adjustments explained in the owner's manual.
- Promptly notify Ariens or an authorized Great Dane service representative of the need for warranty service.
- Transport the product to and from the place of warranty service.
- Have the warranty service performed by an authorized Great Dane service representative.

To find a Great Dane authorized service representative, contact Ariens at:

655 W. Ryan Street  
Brillion, WI 54110  
(920) 756 - 2141  
www.greatdanemower.com

### **Limitations**

- Batteries are warranted only for a period of 12 months after date of purchase, on a prorated basis. For the first 90 days of the warranty period, a defective battery will be replaced free of charge. If the applicable warranty period is more than 90 days, Ariens will cover the prorated cost of any defective battery, for up to 12 months after the date of purchase.

### **Exclusions – Items Not Covered by This Warranty**

- Engines and engine accessories are covered only by the engine manufacturer's warranty and are not covered by this warranty.
- Parts that are not genuine Great Dane service parts are not covered by this warranty.
- The following maintenance, service and replacement items are not covered by this warranty unless they are noted in the Limitations section above: lubricants, spark plugs, oil, oil filters, air filters, fuel filters, brake linings, brake arms, shoes, runners, scraper blades, shear bolts, mower blades, mower vanes, headlights, light bulbs, knives, cutters.
- Mufflers, belts and tires on Great Dane commercial lawn and garden products are not covered by this warranty.
- Any misuse, alteration, improper assembly, improper adjustment, neglect, or accident which requires repair is not covered by this warranty.
- This warranty applies only to products purchased in the United States (including Puerto Rico) and Canada. In all other countries, contact place of purchase for warranty information.

### **Disclaimer**

Ariens may from time to time change the design of its products. Nothing contained in this warranty shall be construed as obligating Ariens to incorporate such design changes into previously manufactured products, nor shall such changes be construed as an admission that previous designs were defective.

### **LIMITATION OF REMEDY AND DAMAGES**

Ariens Company's liability under this warranty, and under any implied warranty that may exist, is limited to repair of any defect in workmanship, and repair or replacement of any defective part. Ariens shall not be liable for incidental, special, or consequential damages (including lost profits). Some states do not allow the exclusion of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

### **DISCLAIMER OF FURTHER WARRANTY**

Ariens Company makes no warranty, express or implied, other than what is expressly made in this warranty. If the law of your state provides that an implied warranty of merchantability, or an implied warranty of fitness for particular purpose, or any other implied warranty, applies to Ariens Company, then any such implied warranty is limited to the duration of this warranty. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

*This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.*

**⚠ WARNING ⚠**

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.



**GREAT DANE**

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