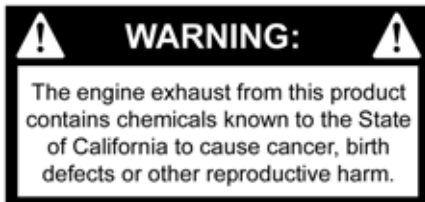


***BigDog<sup>®</sup> Mowers  
A Series  
General Service Manual***

**EXCEL**  
INDUSTRIES

.....  
P.O. Box 7000  
...  
Hesston, Kansas  
.  
67062-2097



**NOTICE OF REQUIREMENT OF SPARK ARRESTER MUFFLER**

This equipment may create sparks that can start fires around dry vegetation. California Public Resources Code Section 4442.6 provides that it is unlawful to use or operate an internal combustion engine on any forest-covered, brush-covered, or grass-covered land unless the engine is equipped with a spark arrester maintained in effective working order. A spark arrester is a device constructed of nonflammable materials specifically for the purpose of removing and retaining carbon and other flammable particles over 0.0232 of an inch in size from the exhaust flow of an internal combustion engine that uses hydrocarbon fuels or which is qualified and rated by the United States Forest Service. Other states or federal areas may have similar laws. The Operator Should Contact Local Fire Agencies For Laws or Regulations Relating to Fire Prevention Requirements. **THIS EQUIPMENT DOES NOT HAVE A SPARK ARRESTER AND YOU SHOULD CONTACT YOUR AUTHORIZED DEALER FOR THE PURCHASE OF A SPARK ARRESTER.**

Inspect spark arrester daily; replace every 500 hours or as needed.

The Engine Owner's Manual provides information regarding the U.S. Environmental Protection Agency (EPA) and the California Emission Control Regulation of emission systems, maintenance and warranty.

Keep Engine Owner's Manual with your unit. Should the Engine Owner's Manual become damaged or illegible, replace immediately. Replacements may be ordered per the information found in the Product Information section of the owner's manual.

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# GENERAL INFORMATION

## BigDog® Mowers A Series Service Program

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This manual is part of a service package for the BigDog® A Series mowers. Use of this manual in conjunction with other BigDog® A Series mower and component manuals will provide the information necessary to service and maintain BigDog® A Series mowers.

This General Service Manual is a service guide for use by Service Technicians. It provides the necessary information needed to perform normal maintenance requirements on these units.

The Parts Manual provides a complete parts listing for the unit. Use this manual when ordering parts.

The Operator's Manual provides fundamental operational information and operational safety that is needed when operating the mower.

The component manuals are furnished by the various manufacturers to be used for the troubleshooting and servicing of their products.

## Maintenance Introduction

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Regular maintenance is the best prevention for costly downtime or expensive, premature repair. The following pages contain suggested maintenance information and schedules which the operator/mechanic should follow on a routine basis.

Remain alert for unusual noises, they could be signaling a problem. Visually inspect the machine for any abnormal wear or damage. A good time to detect potential problems is while performing scheduled maintenance service. Correcting the problem as quickly as possible is the best insurance.

Clear away heavy build-up of grease, oil and dirt, especially in the engine and under the seat platform areas; minute dust par-

ticle are abrasive to close-tolerance engine and hydraulic assemblies.

**Daily inspect** mower for grass clippings and wire and string tangles. The underside of the mower deck will collect a build-up of grass clippings and dirt, especially when grass is wet or has high moisture content. This build-up will harden, restricting blade and air movement and will probably show a poorer quality of cutting. Therefore it should be removed routinely.

To do this it will be necessary to raise and block the deck, using jack stands or blocks, in the full up position and scrape the build-up from underneath.

Some repairs require the assistance of a trained service mechanic and should not be attempted by unskilled personnel. Consult your BigDog® Mowers service center when assistance is needed.

Information included in this manual was current at the time of printing, but subsequent production changes may cause your machine to vary slightly in detail. BigDog® Mowers reserves the right to redesign and change the machine as deemed necessary, without notification. If a change has been made to your machine which is not reflected in this service manual contact the Customer Service Department at BigDog® Mowers for additional information.

## Warranty

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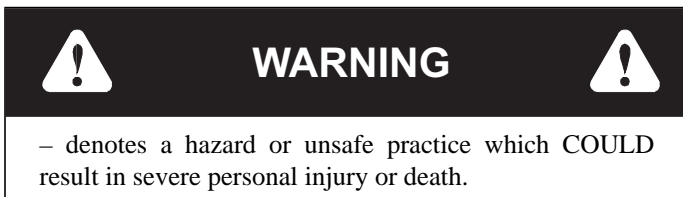
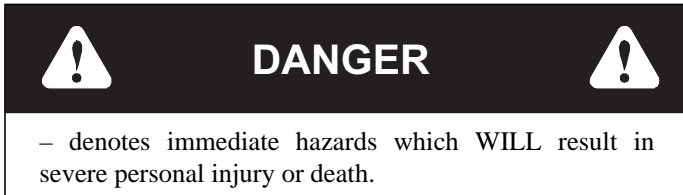
Warranty repair must be performed by a BigDog® Mowers Authorized Dealer before warranty credit can be allowed. Work performed by anyone other than an Authorized Dealer will invalidate the warranty claim and warranty credit will not be approved.



# SAFETY



This safety alert symbol is used to call attention to a message intended to provide a reasonable degree of PERSONAL SAFETY for operators and other persons during the normal operation and servicing of this equipment.



## Safe Servicing Practices

This product is capable of amputating hands and feet and throwing objects. Always follow all safety instructions to avoid serious injury or death.

### Understand Correct Service

- ▲ Be sure you understand a service procedure before you work on the machine.
- ▲ Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.
- ▲ If it is necessary to make checks with the engine running, always use two people - with the operator at the controls, able to see the person doing the checking.

## Pre-Operation Precautions

### Fuel Handling

- ▲ To avoid personal injury or property damage, use extreme care in handling fuel. Fuel is extremely flammable and the vapors are explosive.
- ▲ Observe usual fuel handling precautions:
  - Do not smoke while refueling. Extinguish all cigarettes, cigars, pipes and other sources of ignition.
  - **Do not remove fuel cap or fill tank with engine running or while engine is hot. Clean up any fuel spills.**
  - Allow engine to cool before storing machine inside a building.
  - Keep fuel away from open flame or spark and store machine away from open flame or spark or pilot light such as on a water heater or appliances.
  - Use extreme care when handling gasoline and other fuels. They are extremely flammable and vapors are explosive. A fire or explosion from fuel can burn you and others and can damage property.

- Refuel outdoors. Never refuel or drain the fuel from the machine indoors.
- Never attempt to start engine when there is a strong odor of gasoline or diesel fuel fumes present. Locate and correct cause.
- Store fuel in an approved container and keep it out of the reach of children. Never buy more than a 30 day supply of fuel.
- Do not fill fuel containers inside a vehicle or on a truck or trailer bed with interior carpets or plastic truck bed liners. Always place fuel containers on the ground away from your vehicle before filling.
- When practical, remove gas or diesel fuel powered equipment from the truck or trailer and refuel the equipment with its wheels on the ground. If this is not possible, then refuel such equipment on the truck or trailer using a portable container and not a fuel dispenser nozzle. If a fuel dispenser nozzle must be used, 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.
- Never use gasoline or diesel fuel for cleaning parts.
- Read and observe safety precautions elsewhere in this manual.
- ▲ Gasoline and diesel fuel is harmful or fatal if swallowed.
  - Long-term exposure to vapors can cause serious injury and illness.
  - Avoid prolonged breathing of vapors.
  - Keep face away from nozzle and gas tank or fuel container opening.
  - Keep fuel away from eyes and skin.
  - If fuel is spilled on clothing, change clothing immediately.

### Understand Machine Operation

- ▲ Only qualified and trained personnel should operate the equipment.
- ▲ Carefully read the owner's manual and all manuals furnished with the attachments. Learn the location and purpose of all controls, instruments, indicators and labels.

### Wear Protective Clothing

- ▲ Do not operate or service the equipment while wearing sandals, tennis shoes, sneakers, shorts or any type of loose fitting clothing. Long hair, loose clothing or jewelry may get tangled in moving parts. Always wear long pants, safety glasses, ear protection and safety shoes when operating or servicing this machine.
- ▲ Always wear adequate eye protection when servicing the hydraulic system and battery, or when grinding mower blades and removing accumulated debris.
- ▲ Prolonged exposure to loud noise can cause impairment or loss of hearing.
  - Always wear adequate ear protection, such as earplugs, when operating this equipment as prolonged exposure to uncomfortable or loud noises can cause impairment or loss of hearing.

- Do not wear radios or music headphones while operating the machinery. Safe operation requires your full attention.

## Operation Precautions

---

### Avoid Fire Hazards

- ▲ **Clean flammable material from machine. Prevent fires by keeping engine compartment, top of deck, exhaust area, battery, hydraulic lines, fuel line, fuel tank and operator's station clean of accumulated trash, grass clippings, and other debris. Always clean up spilled fuel and oil.**

### Start Engine Safely

- ▲ Avoid possible injury or death from machine runaway.
- ▲ Do not start engine by shorting across starter terminals.
- ▲ Before you start the engine:
  - Sit on the operator's seat.
  - Move control levers to the neutral/brake position.

### Operate Machine Safely

---

- ▲ Refer to the unit's operator's manual for complete safety information on safe machine operation.
- ▲ Always maintain a safe distance from people and pets when mowing
- ▲ Always be aware of what is behind the machine before backing up.
- ▲ Never leave machine unattended with ignition key in switch, especially with children present.
- ▲ Follow daily and weekly checklists, making sure hoses are tightly secured and bolts are tightened.
- ▲ Always keep engine and machine clean, removing accumulated dirt, trash and other material from machine.
- ▲ Never put hands or feet under any part of the machine while it is running.
- ▲ Never attempt to start engine when there is a strong odor of gasoline fumes present. Locate and correct cause.
- ▲ Keep all safety shields and covers in place, except for servicing.
- ▲ Do not touch hot parts of machine.

### General Maintenance Precautions

---

- ▲ **Repairs or maintenance requiring engine power should be performed by trained maintenance personnel only.**
- ▲ Never run the engine in an enclosed area unless exhaust is vented to the outside. Exhaust gases contain carbon monoxide which is an odorless and deadly poison.
- ▲ Unless specifically required, **DO NOT** have engine running when servicing or making adjustments to mower. Park the machine on level ground. Place steering control levers in the park brake position, disengage deck clutch, lower deck, remove ignition switch key and disconnect negative battery cable before doing any maintenance. Wait for all movement to stop before adjusting, cleaning or repairing. To prevent carbon monoxide poisoning, be sure proper ventilation is available when engine must be operated in an enclosed area.

- ▲ Before working on or under the deck, make certain engine cannot be accidentally started. Shut engine off, remove ignition switch key and disconnect negative battery cable for maximum safety.
- ▲ Except when changing or checking belt, **always** keep belt covers on mower deck for safety as well as cleanliness.
- ▲ Use a stick or similar instrument to clean under the mower making sure that no part of the body, especially arms and hands are under mower.
- ▲ Keep your machine clean and remove any deposits of trash and clippings, which can cause engine fires and hydraulic overheating as well as excessive belt wear. Clean up oil or fuel spillage. Allow machine to cool before storing.
- ▲ Always wear adequate eye protection when servicing the hydraulic system and battery, or when grinding mower blades and removing accumulated debris.
- ▲ Never attempt to make any adjustments or repairs to the mower drive system, mower deck or any attachment while the engine is running or deck clutch is engaged.
- ▲ Never work under the machine or attachment unless it is safely supported with jack stands. Make certain machine is secure when it is raised and placed on the jack stands. The jack stands should not allow the machine to move when the engine is running and the drive wheels are rotating. **Use only certified jack stands.** Use only appropriate jack stands, with a minimum weight rating of 2000 pounds to block the unit up. Use in pairs only. Follow the instructions supplied with the vehicle stands.
- ▲ Keep nuts and bolts tight, especially the blade attachment bolts. Keep equipment in good working condition.
- ▲ Never tamper with safety devices. Check their proper operation regularly.
- ▲ Exercise caution when working under the deck as the mower blades are extremely sharp. Wrap the blade(s) or wear gloves and use extra caution when servicing them.
- ▲ Use only genuine BigDog<sup>®</sup> Mower replacement parts to ensure that original standards are maintained.

### Maintenance Precautions

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#### Avoid Fire Hazards

- ▲ Be prepared if an accident or fire should occur. Know where the first aid kit and the fire extinguishers are located and how to use them.
- ▲ Provide adequate ventilation when charging batteries.
- ▲ Do not smoke near battery.
- ▲ Never check fuel level with an open flame.
- ▲ Never use an open flame to look for leaks anywhere on the equipment.
- ▲ Never use an open flame as light anywhere on or around the equipment.
- ▲ When preparing engine for storage, remember that fuel stabilizer is volatile and therefore dangerous. Seal and tape openings after adding the inhibitor. Keep container tightly closed when not in use.
- ▲ Inspect electrical wiring for worn or frayed insulation. Install new wiring if wires are damaged.



## Prepare For Emergencies

- ▲ Be prepared if a fire starts.
- ▲ Keep a first aid kit and fire extinguishers available.
- ▲ Keep emergency numbers for doctor, ambulance service, hospital, and fire department near the telephone.

## Prevent Battery Explosions

- ▲ 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.
- ▲ Charge batteries in an open well ventilated area, away from sparks and flames. Unplug charger before connecting or disconnecting from battery. Wear protective clothing and use insulated tools.
- ▲ Avoid skin and clothing contact with battery acid.
  - Always wear eye protection when checking the battery, acid can cause serious injury to skin and eyes. If contact occurs, flush area with clean water and call physician immediately. Acid will also damage clothing.
  - Do not drink the battery electrolyte.
  - Do not allow open flame near the battery when charging.
  - Hydrogen gas forms inside the battery. This gas is both toxic and flammable and may cause an explosion if exposed to flame. Always **disconnect** the negative (black) battery cable(s) before disconnecting the positive (red) cable(s). Always **connect** the positive (red) battery cable(s) before connecting the negative (black) cable(s).
  - Do not overfill battery.
  - Electrolyte may overflow and damage paint, wiring or structure. When cleaning the battery, use soap and water. Be careful not to get soap and water into the battery. Clean the battery terminals with a solution of four parts water and one part baking soda when they become corroded.
- ▲ Shorts caused by battery terminals or metal tools touching metal mower components can cause sparks. Sparks can cause a battery gas explosion which will result in personal injury.
  - Prevent the battery terminals from touching any metal mower parts when removing or installing the battery.
  - Do not allow metal tools to short between the battery terminals and metal mower parts.
- ▲ Incorrect battery cable routing could cause damage to the mower and battery cables. This can cause sparks which can cause a battery gas explosion which will result in personal injury. Always **disconnect** the negative (black) battery cable(s) before disconnecting the positive (red) cable(s). Always **connect** the positive (red) battery cable(s) before connecting the negative (black) cable(s).

## Avoid Acid Burns

- ▲ Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing and cause blindness if splashed in eyes.

### Avoid the hazard by:

- Filling batteries in a well-ventilated area.
- Wearing eye protection and rubber gloves.
- Avoiding breathing fumes when electrolyte is added.

- Avoiding spilling or dripped electrolyte.

### If you spill acid on yourself:

- Flush your skin with water.
- Apply baking soda or lime to help neutralize the acid.
- Flush your eyes with water for 10-15 minutes. Get medical attention immediately.

### If acid is swallowed:

- Drink large amounts of water or milk.
  - Then drink milk of magnesia, beaten eggs or vegetable oil.
- ▲ Get medical attention immediately.



# TORQUE

## Standard Torques

The following chart lists the standard torque values for the threaded fasteners found in this manual. Torque all cap screws, nuts and set screws to these values unless a different torque is shown in the Special Torques section.



Size	Ft-lbs	N-m	Size	Ft-lbs	N-m
#10	32.4 IN.-LBS.	3.6	M3	12 IN.-LBS.	1.3
.250	98.4 IN.-LBS.	11.1	M4	26.4 IN.-LBS.	3
.312	204 IN.-LBS.	23	M5	54 IN.-LBS.	6.1
.375	30	40	M6	92.4 IN.-LBS.	10.4
.438	48	65	M8	222 IN.-LBS.	25
.500	73	99	M10	37	50
.562	105	143	M12	64	87
.625	145	200	M14	103	140
.750	260	350	M16	160	215
.875	420	565	M20	320	435

## Special Torques

Description	Ft-lbs.	N-m
Wheel (lug) nuts <sup>1</sup>	65 – 75	88.14 – 101.7
Blade spindle bolt top	73	99
Blade spindle bolt bottom	118	160.01
Electric Clutch mounting bolt <sup>3</sup>	45 – 48	61 – 65
Front wheel axle bolt	73	99
Transaxle hub nut <sup>4</sup>	275	339
Transaxle pump pulley nut	45 – 55	61 – 74.6

### NOTE:

- Lug nuts only** – It is recommended that these be checked after the first 2 hours of operation and every 50 hours and following removal for repair or replacement.
- Engine torque values** – Refer to the respective engine owner's manual.
- If clutch mounting bolt is loosened or removed, **do not re-use**. Replace with a new bolt. Use only hand tools to install this fastener.
- If using pin locknut, 250 ft.-lbs.

	<b>WARNING</b>	
Particular attention must be given to tightening the drive wheel lug nuts and blade spindle bolts. Failure to correctly torque these items may result in the loss of a wheel or blade, which can cause serious damage or personal injury.		



# POWER UNIT MAINTENANCE

## Steering Adjustments

### Steering control lever neutral adjustment

The mower's steering has been factory adjusted to eliminate creeping when the steering control levers are in the neutral position. However, should the mower begin to creep, the steering control lever linkage can be adjusted.



Before considering any adjustment, check the tire air pressure. Unequal tire pressure will cause the mower to drift to one side. Refer to tire pressure information in the *Tires* section for detailed information.

**NOTE:** Proper park brake adjustment must be completed before the steering control lever neutral adjustment can be done. Refer to the *Park Brake Spring Adjustment* section for detailed information.



Fine adjustment to the unit's steering is made with the transmission's control rod.

Neutral is properly adjusted when the steering control levers are in the park brake position and the transmissions do not "whine".



If this occurs, the steering control linkage may be adjusted as follows:

**WARNING**

This procedure will require that the unit to be raised and blocked up off of the ground. It is necessary for the wheels to rotate without coming in contact with the floor or any object that would permit the unit to propel itself. Stay clear and exercise caution when rotating wheels to prevent injury. Use only appropriate vehicle stands, with a minimum weight rating of 2000 pounds to block the unit up. Use in pairs only. Follow the instructions supplied with the vehicle stands.

**WARNING**

Keep hands, hair, clothing, etc., clear of the cooling fans on top of the transmissions. Exercise extreme caution.

**WARNING**

Untrained maintenance personnel should never attempt to make any adjustments or repairs to the mower's drive system while the engine is running. **The following procedures should be performed by trained maintenance personnel only.**

1. Raise the rear of the mower and block with certified jack stands. The rear wheels need to be able to rotate freely and clear of all obstructions.
2. Chock the front tires.

3. Raise the seat platform and disconnect the mower harness from the seat switch. Bypass the seat switch by connecting the two mower harness female spades together. Figure 4-1

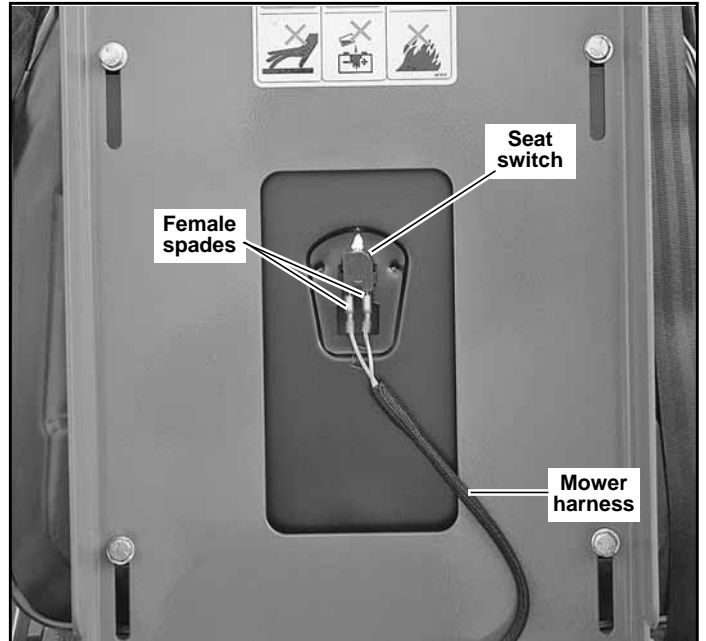


Figure 4-1

4. Loosen the jam nuts on each end of the steering control rod assemblies. Figure 4-5
5. Set both steering control levers in the park brake position. Figure 4-2

**NOTE:** Both steering control levers need to be in the park brake position when starting the engine but need to be moved rapidly out of the park brake position once engine is started so that the brakes do not fight the transmissions since they have not yet been adjusted.



Figure 4-2

6. Loosen the nuts on the rear steering damper ball studs. The dampers must be allowed to slide in the slots in the mower frame. Figure 4-5
7. Start the engine. Move the steering control lever to barely engage the brake (neutral) slot and hold it in that position (Do not engage the steering control lever far enough to

engage the brakes in the brake slot) (Figure 4-3).

! **WARNING** !

**This operation is extremely dangerous.** Pay close attention when adjusting the transmission control rod so you do not get your fingers, tools, or anything else close to the transmission's cooling fans.

8. Beginning with the right side of the mower, adjust the steering control rod so that the right side wheel starts rotating forward while holding the steering control lever in the neutral position. Now, adjust the steering rod back the opposite direction to the point when the wheel stops rotating. From that point, turn the steering rod an additional ½ turn in the same direction. This ensures that the steering rod is adjusted so that the transmission control arm is centered in the neutral band of the transmission. Figure 4-5

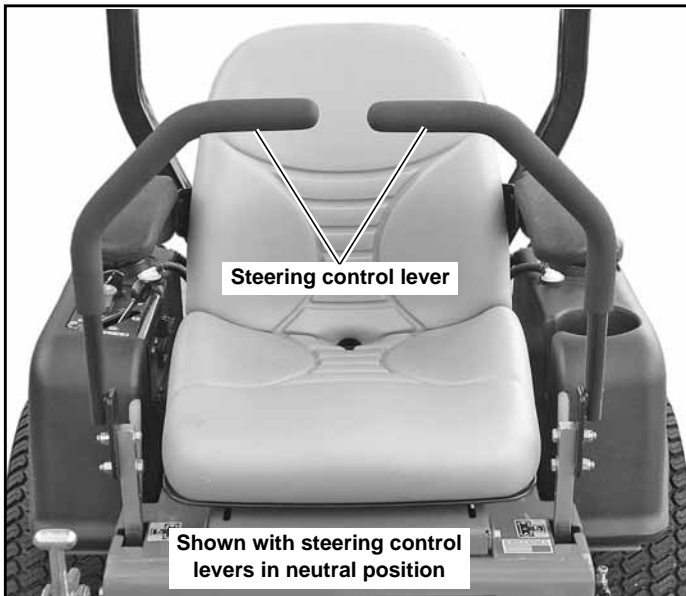


Figure 4-3

9. Move the steering control lever forward and backward making sure that the wheel rotates forward and backward correctly. Return the steering control lever to neutral and re-check to make sure the wheel has stopped in the neutral position. Place the steering control lever in the park brake position.  
**NOTE:** If neutral is set properly, you should not hear the transmission whine.
10. Turn the engine off.
11. Tighten jam nuts on steering control rod. Figure 4-5
12. With the engine off, move the right side steering control lever into the neutral position and pull the lever to the full reverse position. Now, slowly bring the steering control lever back to the neutral position and then place it in the park brake position. This sets the steering damper in the correct neutral position.  
Tighten the nut on the damper's rear ball stud. Once this nut is tightened, when the steering control lever is in the reverse position and then released, the steering control

lever should return to the neutral position. Figure 4-5

13. Check to make sure you have all fasteners tightened to the correct torque specifications.
14. Repeat steps 4 thru 12 for the left side.
15. Once both sides are properly adjusted, check them together to make sure everything is working properly.
16. **IMPORTANT:** With the engine off, disconnect the two female spade connectors from each other (from step #3) and reconnect them to the seat switch. This must be completed so that the safety circuit is functioning properly. Figure 4-1

! **WARNING** !

Do not operate the mower without plugging the mower's wiring harness into the seat switch. This switch is an important part of the safety start interlock system. Serious injury can result if the seat switch is not plugged into the mower's wiring harness.

! **WARNING** !

**Never operate the mower with a non-functioning seat switch. Always reconnect the seat switch to the mower harness.**

17. The steering control levers should be adjusted so that they align vertically with each other when in the neutral position (Figure 4-3). Space between ends of steering control handles to be  $.50'' \pm .25''$ . Figure 4-4
18. Check to make sure all tools or obstructions are removed from under the mower.
19. Raise the rear of the mower and remove the jack stands. Lower the mower.

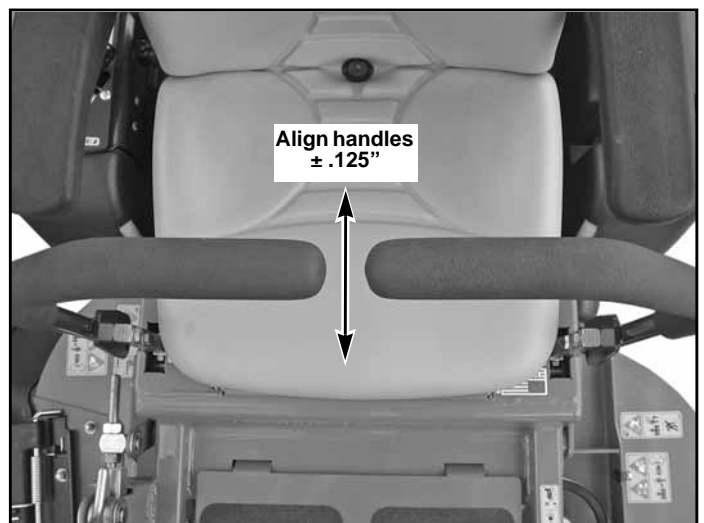


Figure 4-4

#### Steering damper

The steering damper is spring loaded to return the steering control levers to the neutral position from the reverse position. This gives the operator a sense of neutral during operation.

If the mower does not return to neutral from reverse then

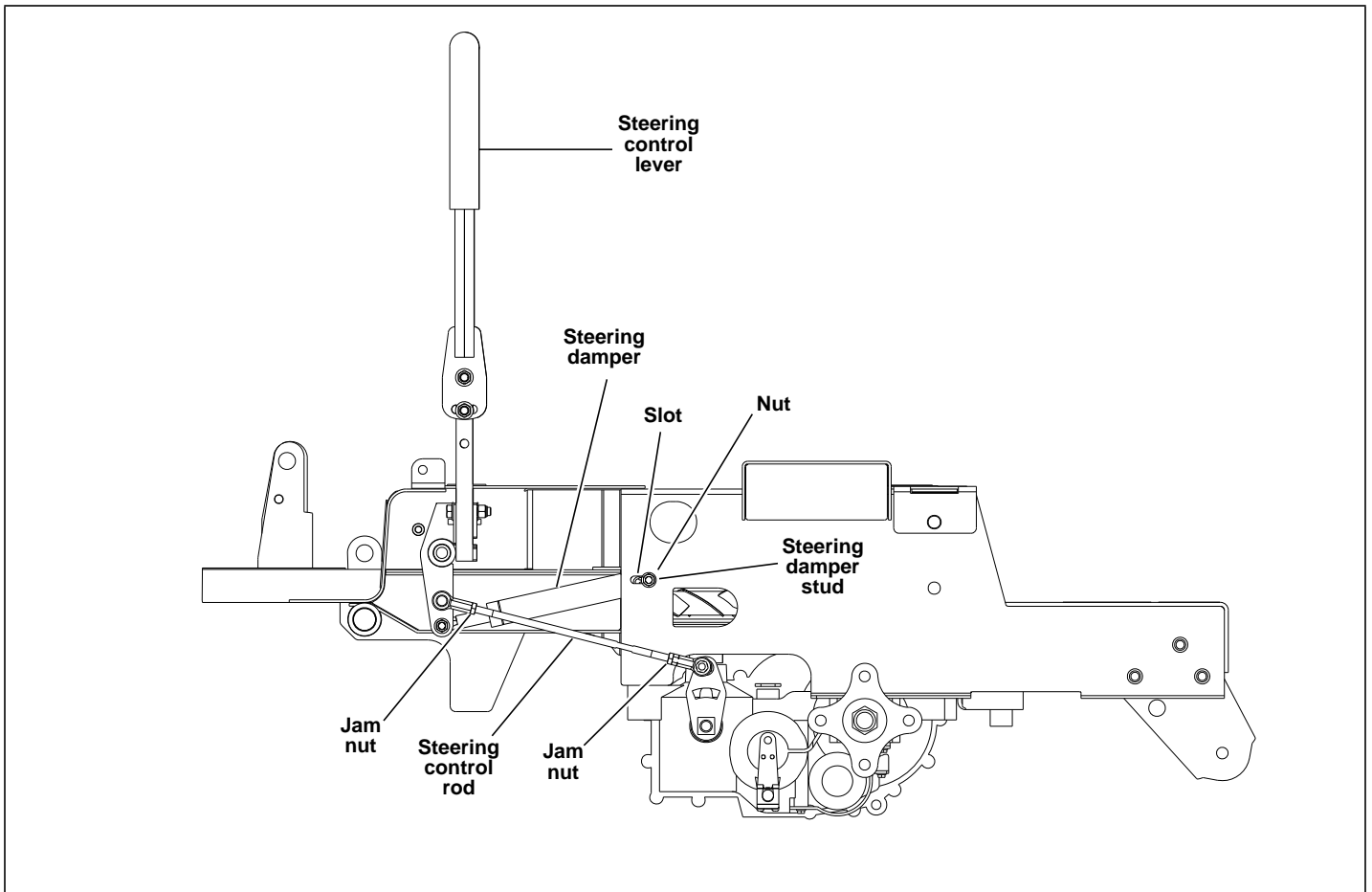


Figure 4-5

adjust as follows:

To set the steering dampers in the correct operating position follow these steps:

1. Shut engine off, place steering control levers in the park brake position, disengage deck clutch, and remove ignition switch key.
2. Raise seat platform and disconnect negative battery cable before doing any adjustments.
3. Place the steering control lever in the neutral position. Figure 4-3
4. Loosen the steering damper's rear ball stud. Figure 4-6
5. Pull the damper spring housing, to the rear, past the point that the internal spring is engaged.
6. Release the damper spring housing and allow the internal spring to bring the housing back to the neutral position.
7. Tighten the nut on the steering damper's rear ball stud. Figure 4-6
8. Reconnect the negative battery cable.
9. Lower the seat platform making sure that it is secured properly with the latch.
10. To check, move the steering control lever to the reverse position and release. The steering control lever should return to the neutral position. If not, repeat steps 1 through 7..

### Park Brake Spring Adjustment

Occasionally check the park brake spring adjustment using the following method:

1. Shut engine off, place steering control levers in the park

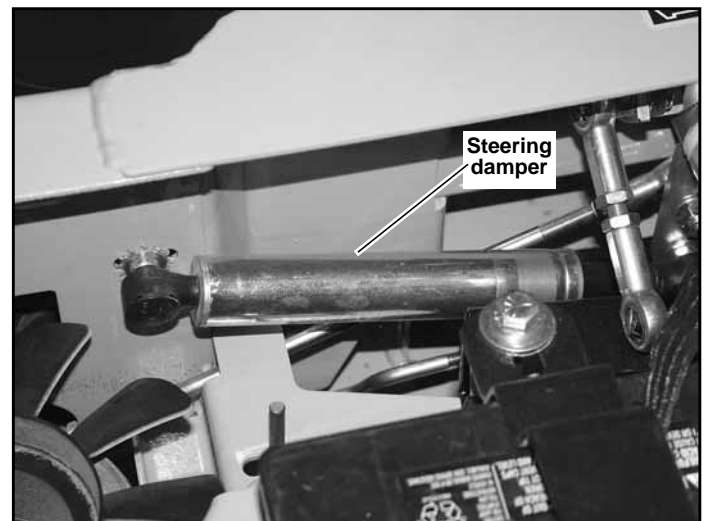
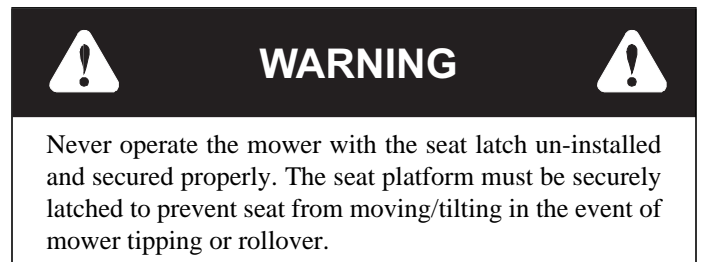


Figure 4-6

brake position, disengage deck clutch, remove ignition switch key and disconnect negative battery cable before doing any adjustments.

2. On one side measure the park brake spring. It should be compressed to .85" – .95". If it is not, adjust the nylock nut until the proper spring compression is achieved. Figure 4-7
3. Repeat for other side.
4. Reconnect the negative battery cable.

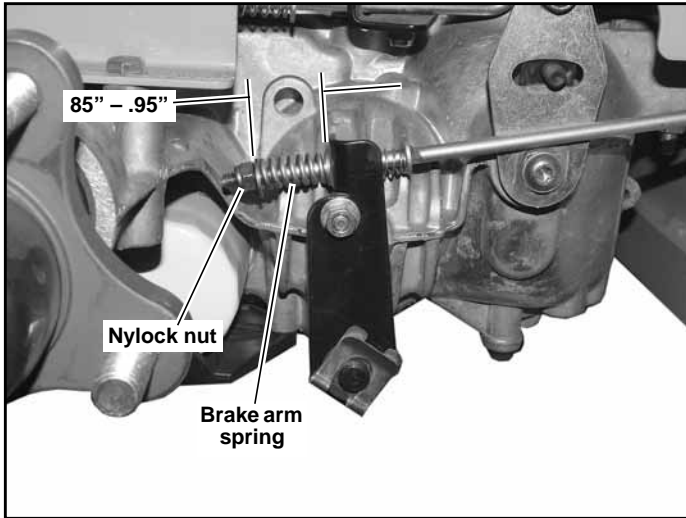


Figure 4-7

## Belts

Inspect belts frequently for wear and serviceability. Replace a belt that shows signs of severe cuts, tears, separation, weather checking and cracking, or burns caused by slipping. Slight raveling of belt covering does not indicate failure, trim ravelings with a sharp knife.

! **WARNING** !

If the pump belt fails, loss of control will occur especially when operating on a slope. **If you lose steering control while operating the machine, place the steering control levers in the park brake position immediately. Inspect the machine and involve your BigDog® Mowers dealer to resolve the problem before continuing to operate.**

Inspect the belt pulley grooves and flanges for wear. A new belt, or one in good condition, should never run against the bottom of the groove. Replace the pulley when this is the case, otherwise belt will lose power and slip excessively.

Never pry a belt to get it on a pulley as this will cut or damage the fibers of the belt covering.

Keep oil and grease away from belts, and never use belt dressings. Any of these will destroy the belt composition in a very short time.

## Hydraulic Pump Belt Adjustment

The transmission drive belt tension remains constant by

means of a tension idler and spring. There is no tension adjustment of this belt. Figure 4-8

**NOTE:** Inspect the belt every 100 hours and replace as needed. Replace the belt every 200 hours or every two (2) years whichever comes first.

! **WARNING** !

If the transmission belt fails, loss of control will occur especially when operating on a slope. If you lose steering control while operating the machine, place the steering control levers in the park brake position immediately. Inspect the machine and involve your dealer to resolve the problem.

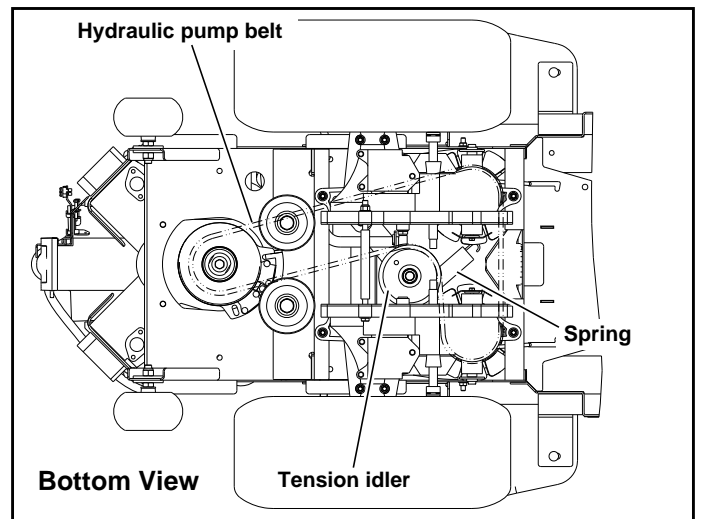


Figure 4-8

## Hydraulic system

This mower is equipped with two integrated hydrostatic transmissions. Figure 4-9

**IMPORTANT:** Never use hydraulic or automatic transmission fluid in this system; use only motor oil as specified. Remember, dirt is the primary enemy of any hydraulic system.

The hydraulic expansion tank is located in front of the engine and under the operator's platform. Figure 4-9

Check oil level in hydraulic system after every 50 hours of operation or weekly, whichever occurs first. Check more often if system appears to be leaking or otherwise malfunctioning.

Fluid level should be at the "Full Cold" line on the expansion tank. Use only SAE 20W50 SL/SM service motor oil.

Initial system oil and filter change **must** be after the first 75 hours of use or 1 year whichever comes first. Thereafter, replace filter and oil in each transmission every 2 years or 200 hours, whichever comes first. **NOTE:** The filter guard must be removed to access filter.

Each transmission's filter is located per Figure 4-10. A standard oil filter wrench is used to change filter, threads are right handed. **Use a BigDog® Mowers approved filter element**



only.

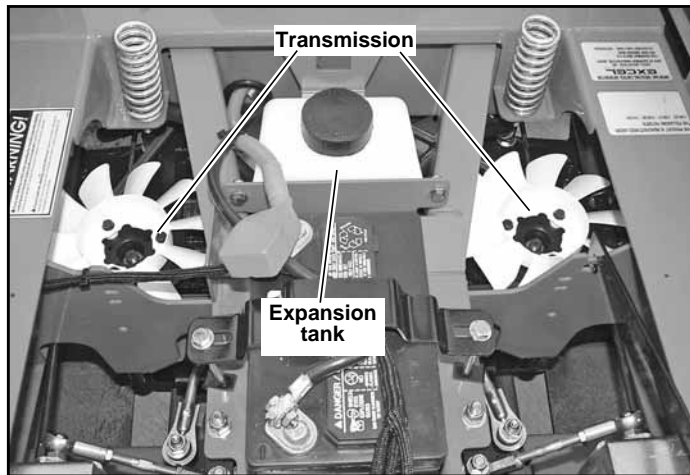
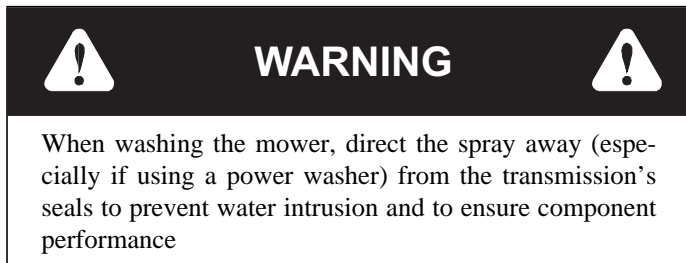


Figure 4-9

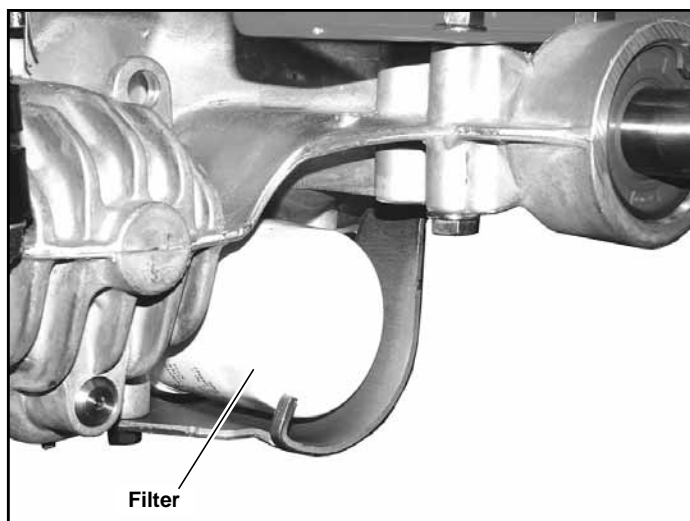


Figure 4-10

### Fluid changing procedure

1. Park the unit on a level surface. Place control levers in the park brake position, disengage deck clutch, remove ignition switch key and disconnect negative battery cable.
2. Remove the three 1/4" filter guard screws and filter guard. Clean any loose debris from around the filter. Figure 4-11
3. Place an oil drain pan beneath the oil filter and remove the oil filter from the transaxle.
4. After the oil has been drained, wipe the filter base surface off and apply a film of new oil to the gasket of the new replacement filter.
5. Install the new filter by hand, turn 3/4 to one full turn after the filter gasket contacts the filter base surface.

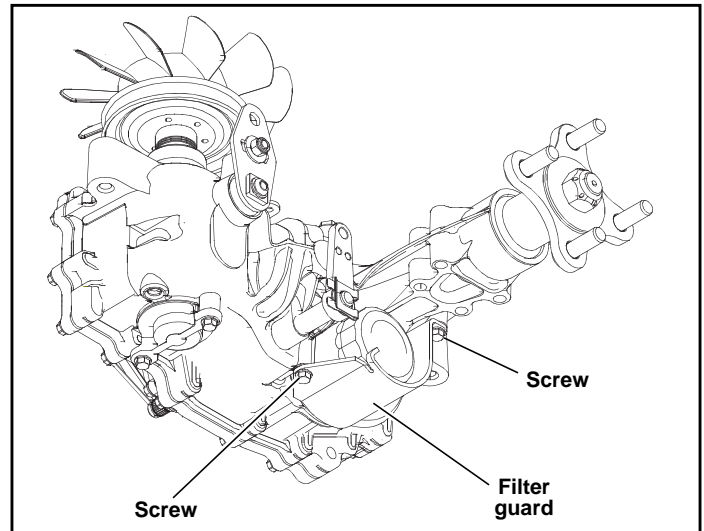


Figure 4-11

6. Re-install the filter guard with three 1/4" screws. Torque the screws to 65 in.-lbs. each. Figure 4-11
7. Repeat steps 2 - 6 for the opposite side transaxle.
8. Drain oil filters of all free flowing oil prior to disposal. Place used oil in appropriate containers.
9. **IMPORTANT:** Remove the top port plug from both transaxles prior to filling with oil. This will allow the transaxles to vent during oil fill. Figure 4-12
10. Remove the cap from the transaxle's expansion tank.
11. Fill with 20W50 motor oil until oil just appears at the bottom of each transaxles top port (approximately 2 qts. per transaxle). Install the top port plug into each transaxle. Torque plugs to 180 in. lbs. Clean up any oil that leaked from the ports. Figure 4-12
12. Continue to fill the transaxles through the expansion tank until the "Full Cold" line is reached on the expansion tank.
13. Re-install the expansion tank cap by hand. Be careful not to overtighten.
14. Proceed to the purge procedure.

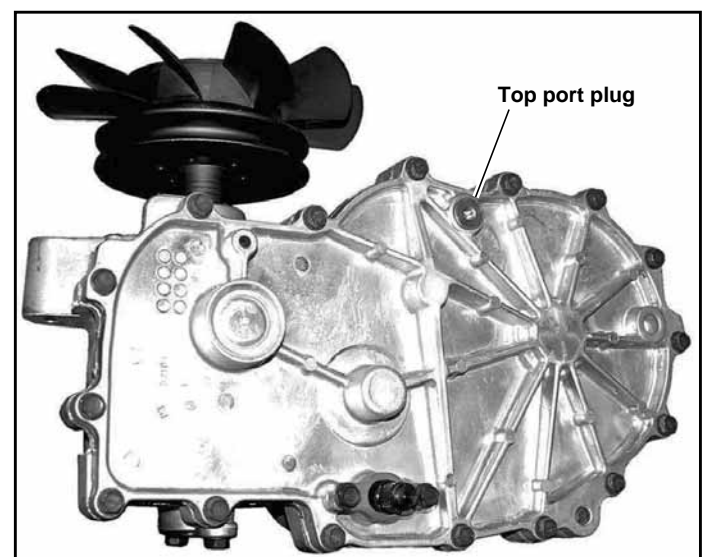


Figure 4-12

### Purging procedure

Due to the affects air has on efficiency in hydrostatic drive

applications, it is critical that it is purged from the system.

Air creates inefficiency because its compression and expansion rate is higher than that of the oil approved for use in hydrostatic drive systems.

These purge procedures should be implemented any time a hydrostatic system has been opened to facilitate maintenance or the oil has been changed.



The resulting symptoms in hydrostatic systems may be:

1. Noisy operation.
2. Lack of power or drive after short term operation.
3. High operation temperature and excessive expansion of oil.

Before starting, make sure the transaxle is at the proper oil level. If it is not, fill to the specifications outlined in this manual.

The following procedures are best performed with the vehicle drive wheels off the ground. Then repeated under normal operating conditions. If this is not possible, then the procedure should be performed in an open area free of any objects or bystanders.

1. Raise and block the mower up so the drive wheels are off of the floor.

 **WARNING** 

Never work under the machine or attachment unless it is safely supported with jack stands. Make certain machine is secure when it is raised and placed on the jack stands. The jack stands should not allow the machine to move when the engine is running and the drive wheels are rotating. **Use only certified jack stands.** Use only appropriate jack stands, with a minimum weight rating of 2000 pounds to block the unit up. Use in pairs only. Follow the instructions supplied with the vehicle stands.

2. Position the control lever in the neutral position. Disengage the deck clutch switch. Figure 4-13
3. With the bypass valve open and the engine running, slowly move the directional control in both forward and reverse directions (5 or 6 times). Figure 4-14
4. With the bypass valve closed and the engine running, slowly move the control lever in both forward and reverse directions (5 or 6 times). Check the oil level, and add oil as required after stopping the engine.
5. It may be necessary to repeat Steps 3 and 4 until all the air is completely purged from the system. When the transaxle operates at normal noise levels and moves smoothly forward and reverse at normal speeds, then the transaxle is considered purged.

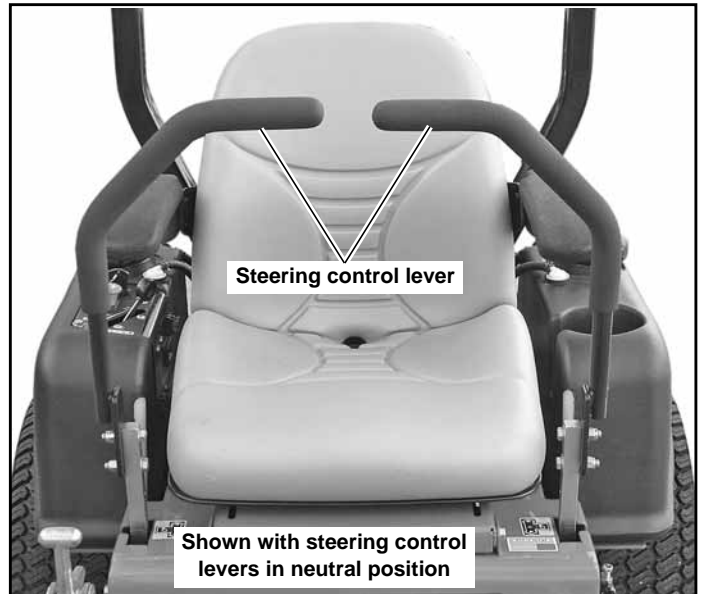


Figure 4-13

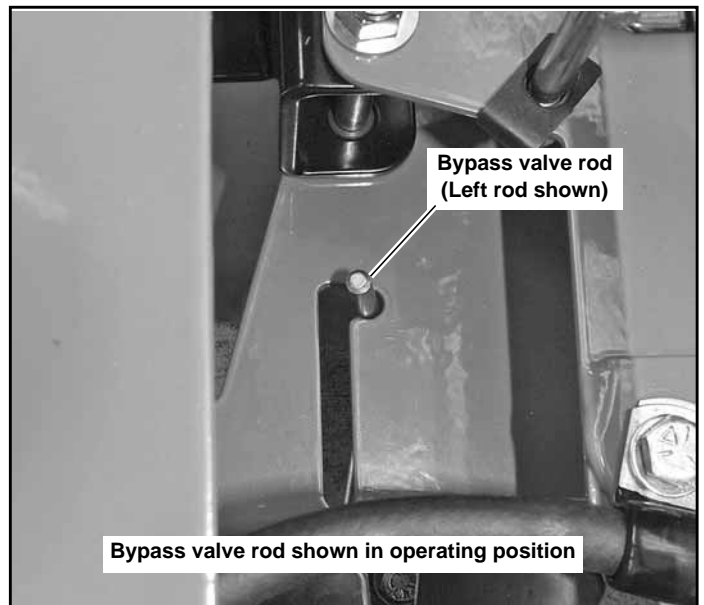


Figure 4-14

## Tires

It is important for level mowing that the tires have the same amount of air pressure. The recommended pressures are:

- Drive wheels . . . . . 8-12 psi (55-83 KPa)
- Gauge wheels . . . . . 8-12 psi (55-83 KPa)

If you wish to use non-pneumatic tires on your BigDog<sup>®</sup> mower the tires must be an approved tire purchased from Big-Dog<sup>®</sup> Mowers. Warranty claims will be denied on any mower equipped with unapproved non-pneumatic tires.

# ENGINE MAINTENANCE

## General Engine Maintenance

Detailed instructions and recommendations for break-in and regular maintenance are specified in the Engine Owner's manual. Please refer to this manual for engine servicing, lubricating oil levels with quality and viscosity recommendations, bolt torques, etc. The engine warranty is backed by the manufacturer.

## Engine Oil and Filter



### WARNING



If the engine has been running and is up to operating temperature, allow the engine to cool before changing the oil. Engine and engine oil will be very hot, so be very careful when changing oil and wear the appropriate protective gear to avoid being burned or exposed to engine oil.

Check engine oil daily and after every 4 hours of operation. Machine must be setting level when checking oil. Refer to engine manual and maintenance schedule for oil recommendation and capacities.

Change the engine oil and filter after the first 5 hours of operation and per the engine manufacturer's recommendations after that. If mower is being operated in extremely dirty conditions, then it is recommended oil be changed more frequently. **IMPORTANT:** When removing the oil filter take precautions to minimize oil spillage on the exhaust system.

### Draining the engine oil:

1. Locate the oil drain valve on the engine. Figure 5-1,
2. Position a suitable oil drain container under the machine below the oil drain valve.
3. Twist the valve counterclockwise to open the valve. Allow 10 minutes for engine oil to adequately drain.
4. After oil is drained, close the valve by twisting it clockwise.
5. Once the valve is closed, clean up any spilled oil.

**IMPORTANT:** All oil drips or spills **must** be cleaned off of the exhaust system before operating the machine.

## Engine Air Filter

Perform engine air filter maintenance per the engine's owner's manual.

## Fuel evaporation system filter

All BigDog® A Series mowers have a fuel evaporation system filter. This filter must be checked and replaced every 300 hours or annually whichever comes first. Figure 5-2

## Fuel & evaporative system line routings

There are two rubber hoses that are connected to each fuel tank. One is the fuel hose that is part of the fuel system. The other is the vapor line that is part of the fuel evaporative system.

The fuel hose is connected to the port on the side wall of the



Figure 5-1

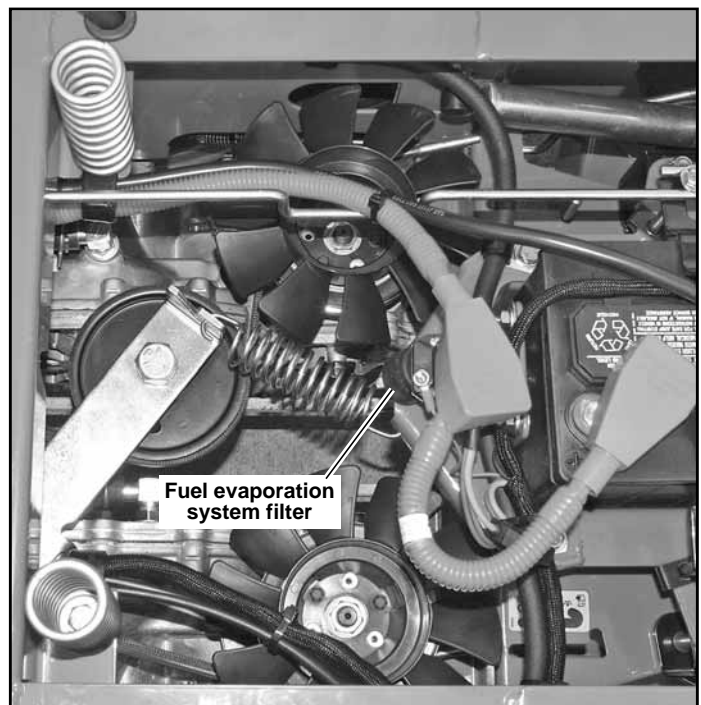
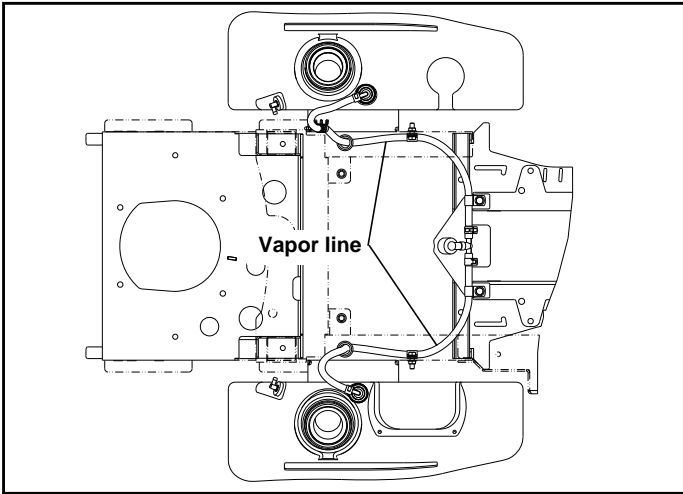


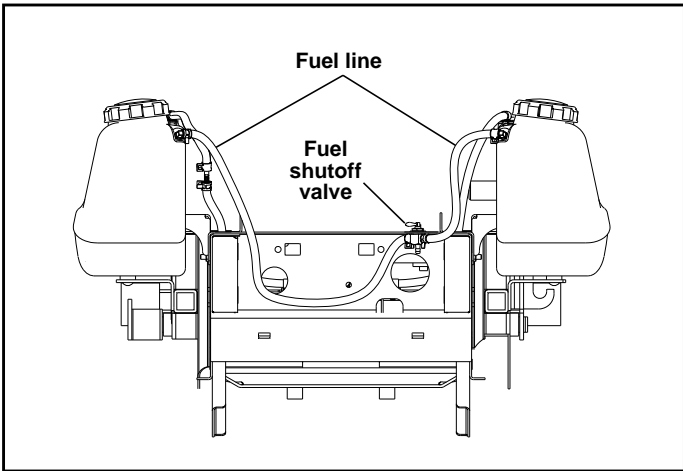
Figure 5-2

fuel tank. It connects the fuel tank to the fuel shutoff valve. Figure 5-4

The vapor line is connected to the port in the top of the fuel tank. It connects the fuel tank to the engine's vapor port. Figure 5-3



**Figure 5-3**



**Figure 5-4**

## Engine RPM Settings

---

The engine rpm's are set at the factory for maximum mowing efficiency. Occasionally it may be necessary to check and adjust the settings. The idle speeds should be set as follows:

Kawasaki FR541/FR600/FR651	
ENGINE SPEED	
MODEL NO. ENDING WITH:	HIGH IDLE
MODEL NO. WITHOUT EXTENSION MODEL NO. WITH <b>EX</b> EXTENSION MODEL NO. WITH <b>US</b> EXTENSION	3600 ± 50 RPM

**NOTE:** Model numbers may or may not end with an extension after the number. There are several different extensions that may be shown; i.e. EX or CE.

**Example:** 922222 (no extension)  
922222 EX  
922222 CE  
922222 US



# DECK ADJUSTMENTS

## Deck Leveling

Leveling the deck must be done in the following manner and order:

1. Check tire pressures to make certain they are properly inflated before starting to level deck. The recommended pressures are as follows:  
Drive wheels tire pressure 8 - 12 psi  
Gauge wheels tire pressure 8 - 12 psi



### WARNING



Stop engine. Make sure deck clutch switch is **in the down (OFF) position**. Place steering control levers in the park brake (engaged) position.

2. Place the 3.08" blocks under all four lift points. Figure 6-1
3. Place the height stop pin in hole "D" with the flat side of the height stop against the stop handle.

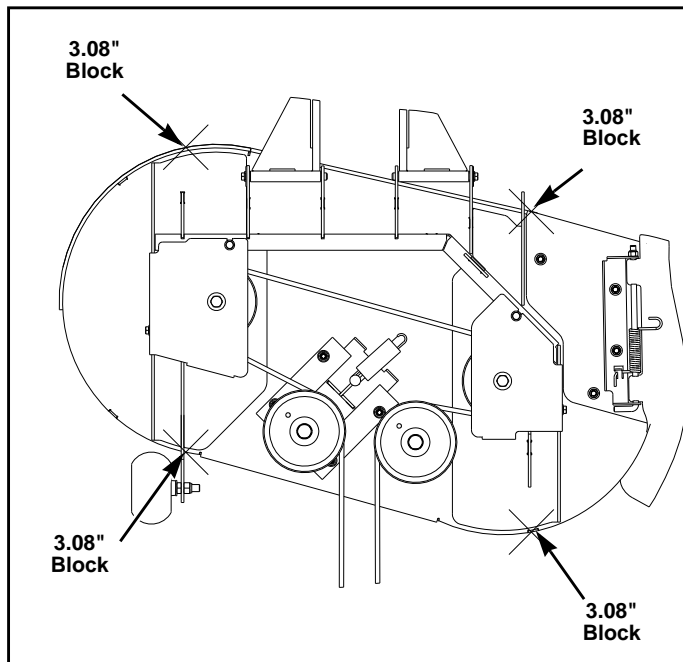


Figure 6-1

4. Clamp the height stop against the stop handle. Figure 6-2
5. Loosen the front and rear nuts on the deck lift indicator so that the foot pedal is free. Figure 6-3
6. Loosen the two nuts at the rear of the deck lift spring. Figure 6-4.
7. Loosen the deck leveler yoke on the front left side of the deck by loosening the flange nuts. Figure 6-5.
8. Loosen the jam nut and back out the 5/16" bolt on top of the deck leveler yoke to allow the adjuster to move up and down freely. Figure 6-5
9. Repeat steps 7 and 8 for the rear left deck leveler yoke. Check that **all** deck lift chains are loose and the deck is sitting firmly on all four deck installation blocks.

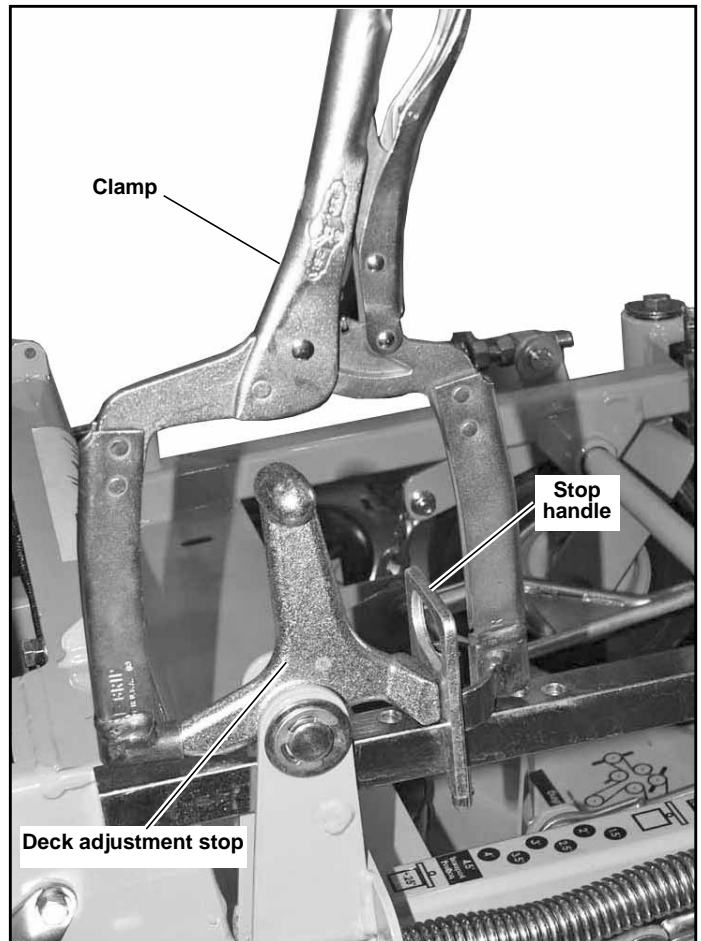


Figure 6-2

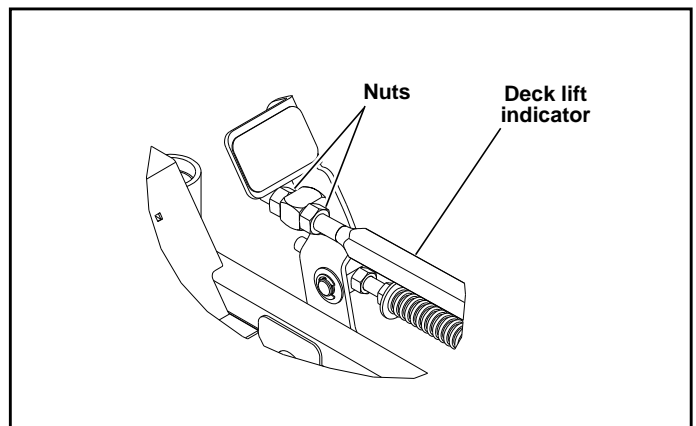


Figure 6-3

10. Set the amount of threads protruding on the deck lift spring rod from the front lift block at approximately  $2" \pm .25"$ . Jam both nuts against the front lift block. Figure 6-6
11. Turn the spring pre-load nut until it contacts the rear nut of the front lift block, reducing the amount of pre-load on the spring. Figure 6-6
12. Tighten the rear nut against the block on the deck lift indicator until the front chain is taut. Figure 6-6  
Make sure the stop handle is pushing firmly against the height adjusting stop so that there is no free play forward

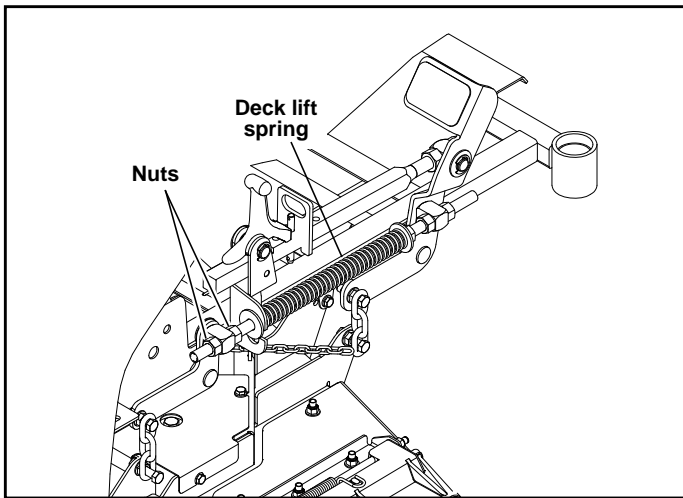


Figure 6-4

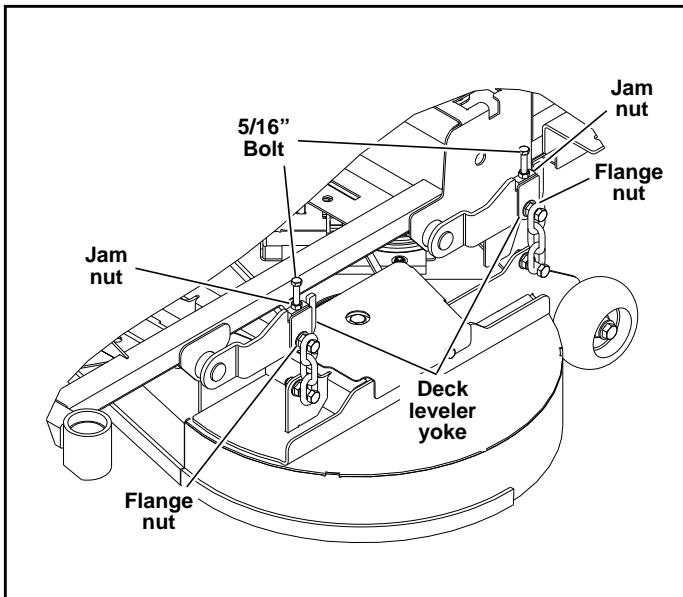


Figure 6-5

or rearward when you shake the deck lift indicator. Figure 6-3

13. Finger-tighten the front nut against the block on the deck lift indicator. Figure 6-3
14. Tighten the 5/16" bolt on the front left deck leveler yoke until the chain is taut. Tighten the jam nut against the deck leveler yoke. Tighten the two flange nuts. Verify that the front right chain remains taut while tightening the nuts. Figure 6-5
15. Adjust the rear nut on the right rear lift block until the right rear chain is taut and the deck is firmly on the installation block. Figure 6-6
16. Screw the front nut finger-tight against the rear block on the deck lift spring. Tighten these two nuts. Figure 6-6
17. Check the right front deck chain to be sure it is taut. If there is slack in the chain, adjust the rear nut forward against the square block on the deck lift indicator to gain tension. Figure 6-6
18. Tighten the 5/16" bolt on the left rear deck leveler yoke until the chain is taut. Tighten the jam nut against the deck leveler yoke. Tighten the two flange nuts. Figure 6-5

19. Tighten both the front and rear nuts on the deck lift indicator. (Figure 6-3) Check to make sure that all deck linkage hardware on the right side of the machine is tight. Figure 6-6

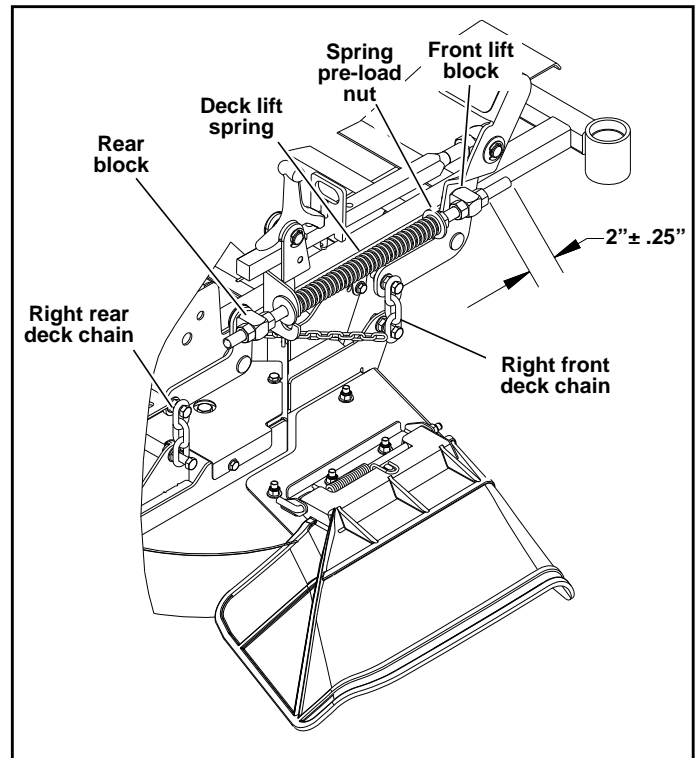


Figure 6-6

20. Raise the deck into the transport position before removing the mower from the leveling blocks. The deck should now be level and the deck cutting height properly adjusted.
21. For quality inspections measure the deck height at the three (3) locations shown in Figure 6-7

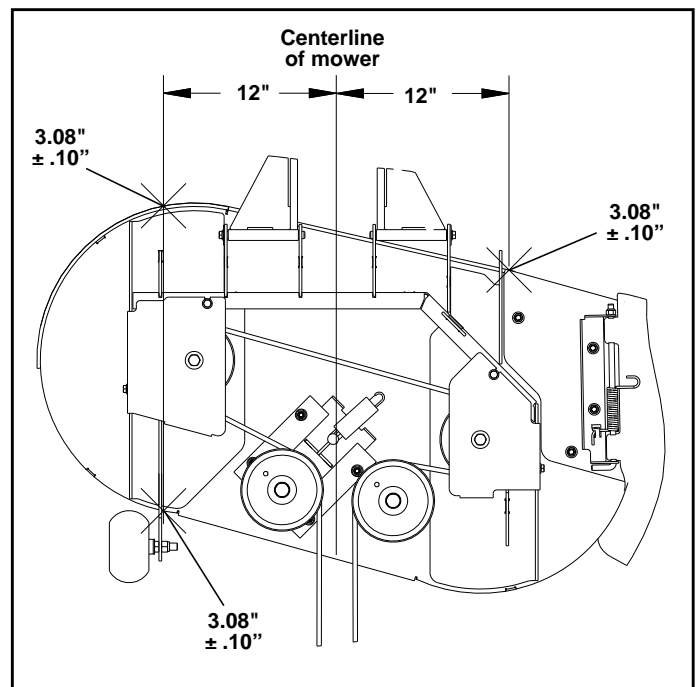


Figure 6-7





## Blades



### Mower blade maintenance

Check the mower blades daily, they are the key to power efficiency and well groomed turf. Keep them sharp, a dull blade will tear rather than cut the grass, leaving a brown ragged top on the grass within a few hours. A dull blade also requires more power from the engine.



Replace any blade which is bent, cracked or broken.

**WARNING**

Never attempt to straighten a bent blade by heating, or weld a cracked or broken blade as the blade may break and cause serious injury. Replace worn or damaged blades.

**WARNING**

Never work with blades while engine is running or deck clutch switch is engaged (on). Always place deck clutch switch in the **disengaged** position, place steering control levers in the park brake position and turn engine off and disconnect negative battery cable. Block up mower when you **must** work under it. Wear gloves when handling blades. **Always check for blade damage** if mower strikes rock, branch or other foreign object during mowing!

**WARNING**

Always wear adequate eye protection when grinding mower blades.

### Mower blade removal

Use a 15/16" wrench to remove the 5/8" cap screw holding the blade to the spindle shaft from underneath. **NOTE:** A blade holding tool (part number 381442) is available from BigDog® Mowers. It is designed to prevent the blades from rotating when they are being removed or installed on the spindle. Contact your BigDog® Mowers dealer for more information.

Sharpen the blades on a grinder following pattern as shown (Figure 6-8). Touch-up sharpening can be done with a file

Check the blades for balance following grinding. A commercial balancing tool is available through most hardware supply stores, or balancing can be done by placing the blade on an inverted line punch or 5/8" bolt. Blade should not lean or tilt. Spin the blade slowly, blade should not wobble. If blade is out of balance, true it up before reinstalling.

Lay the blade on a flat surface and check for distortion (Figure 6-9 & Figure 6-10). Replace any distorted blade.



Do not re-use spindle bolts which have stripped, worn or undercut threads. Torque bolts on spindles to 118 foot-pounds (160.0 Nm) when reinstalling blades.

Properly compressed cup washers maintain the correct com-



pression load on the blades. Replace the cup washers if they are cracked or flattened.

**IMPORTANT:** The blade sail (curved part) must be pointing upward toward the inside of the deck to ensure proper cutting.

**IMPORTANT:** When mounting blades, rotate them after installation to ensure blade tips do not touch each other or sides of the mower.

**WARNING**

Failure to correctly torque the bolt may result in the loss of the blade which can cause serious injury.

**WARNING**

Mower blades are sharp and can cut. Wrap the blade(s) or wear gloves and use extra caution when servicing them.

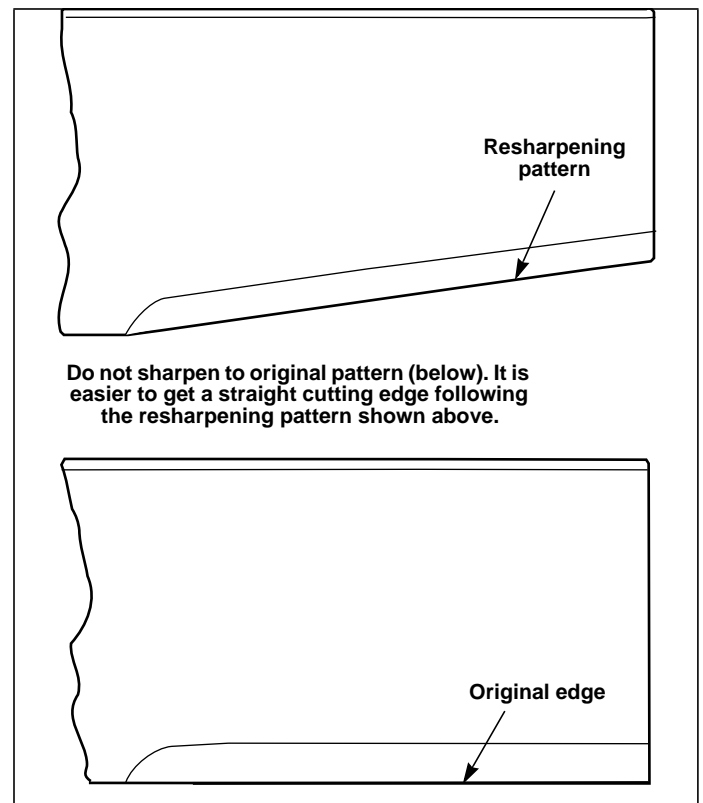


Figure 6-8

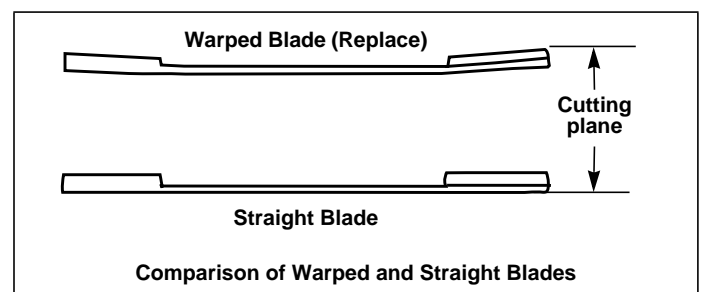


Figure 6-9

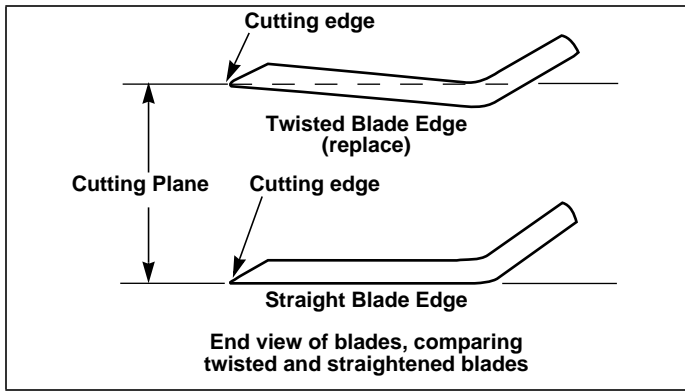


Figure 6-10

## Belts

Inspect belts frequently for wear and serviceability. Replace a belt that shows signs of severe cuts, tears, separation, weather checking and cracking, or burns caused by slipping. Slight raveling of belt covering does not indicate failure, trim ravelings with a sharp knife.

WARNING

If the pump belt fails, loss of control will occur especially when operating on a slope. **If you lose steering control while operating the machine, place the steering control levers in the park brake position immediately.** Inspect the machine and involve your BigDog® Mowers dealer to resolve the problem before continuing to operate.

Inspect the belt pulley grooves and flanges for wear. A new belt, or one in good condition, should never run against the bottom of the groove. Replace the pulley when this is the case, otherwise belt will lose power and slip excessively.

Never pry a belt to get it on a pulley as this will cut or damage

the fibers of the belt covering.

Keep oil and grease away from belts, and never use belt dressings. Any of these will destroy the belt composition in a very short time.

## Deck Belt Adjustment

The spindle belt tension remains constant by means of a tension idler and spring. The spring tension should be such that the belt does not slip under normal operating load conditions, assuming the belt is not excessively worn or damaged. As the belt stretches and wears in, adjustment may become necessary. To increase belt tension, move the spring chain one (or more) link(s) at the anchor point on the deck frame. Figure 6-11

**IMPORTANT:** Do not over tension the spring to compensate for a badly worn belt or pulley.

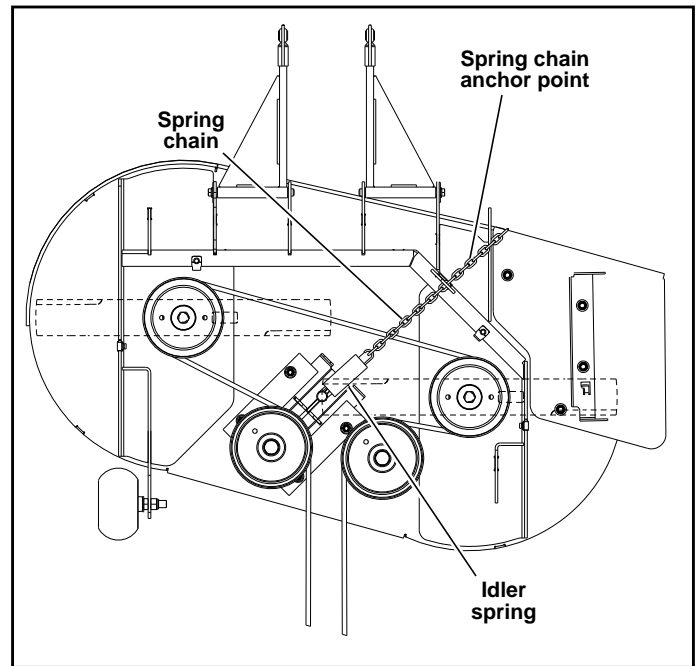


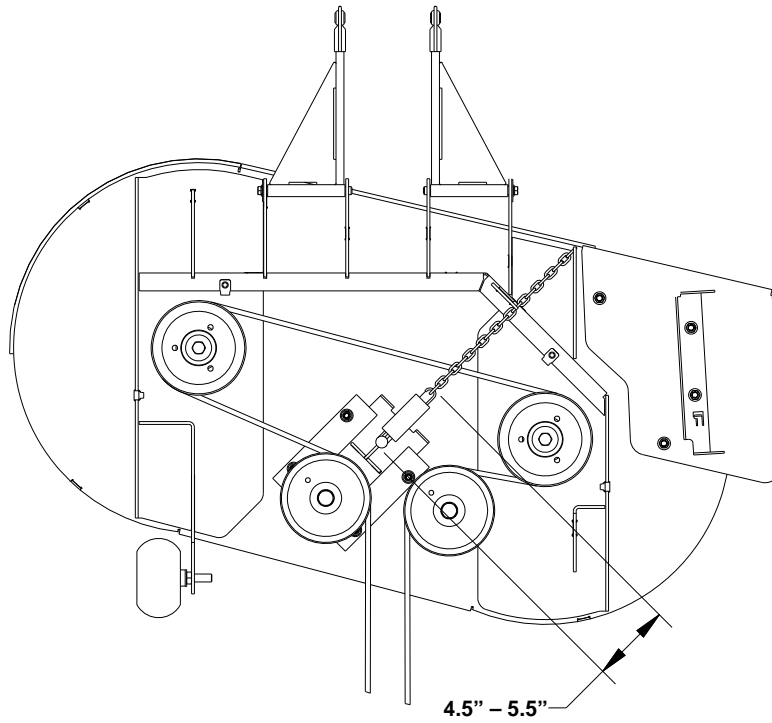
Figure 6-11

**NOTE:** The following notes are the same for the three different decks shown.

1. Spring length after tensioning new belt is measured from outside of hook to outside of hook with deck set at the “D” setting cut height.
2. Route belt as shown.

### **36"/42"/46" Deck Belt Routing & Tensioning**

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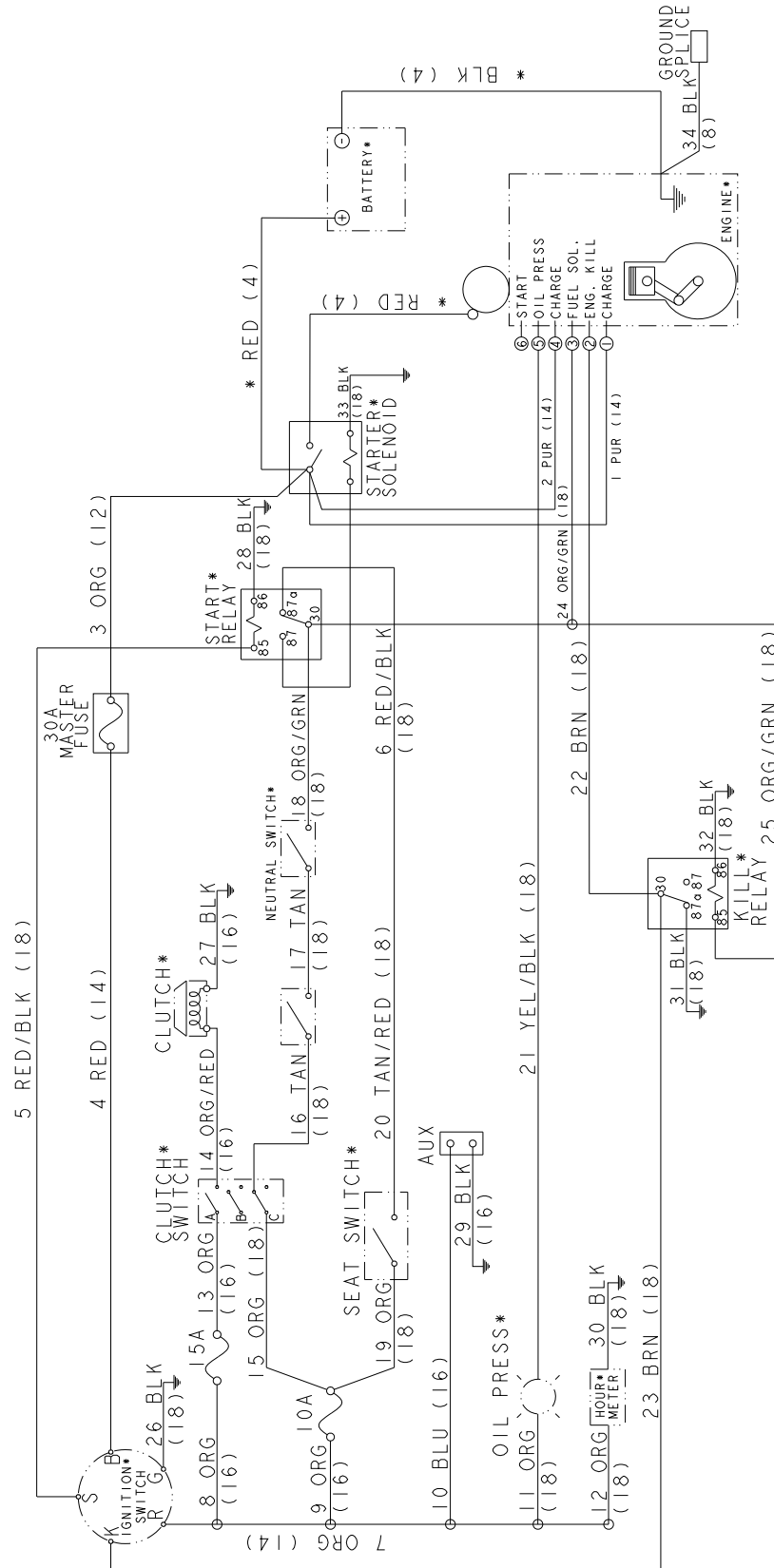


**Figure 6-12**



# ELECTRICAL

## Electrical Schematic





**BigDog® Mowers A Series  
Maintenance Schedule**  
Refer to Figure 8-1, Figure 8-2,& Figure 8-3

SERVICE AT INTERVALS INDICATED	WEEKLY OR 40 HOURS	MONTHLY OR 100 HOURS	ANNUALLY OR 300 HOURS
Verify safety start interlock system	Prior to each use		
Visually inspect unit for loose hardware and/or damaged parts	Prior to each use		
Visually inspect tires	Prior to each use		
Check oil level, engine (1)	Prior to each use or every 4 hours		
Clean air intake screen (4)	Prior to each use or every 4 hours		
Check fuel level	Prior to each use		
Blades - sharpen & securely fastened	Prior to each use		
Discharge chute - securely in place & in lowest position	Prior to each use		
Replace air cleaner paper element (4)	As needed		
Clean engine and transaxle compartment	Daily		
Change transaxle oil and filter (7)	Every 200 hours or 2 years		
Grease deck height pivots	X		
Grease gauge wheel bearings	X		
Change engine oil and filter (1) (3)	X		
Clean cylinder and head fins (a)	X		
Check battery connections	X		
Check tire pressure with a gauge	X		
Check hydraulic oil level	X		
Clean engine exterior (a)	X		
Clean & regap spark plugs (a)		X	
Check pump and deck belt tension and condition (5)		X	
Check fuel system (6)		X	
Check hydraulic lines		X	
Tighten lug nuts on wheels (2)		X	
Change fuel filter			X
Replace spark plugs			X
Replace fuel evaporation system filter (8)			X
Check ROPS mounting hardware (9)			X

**NOTES:**

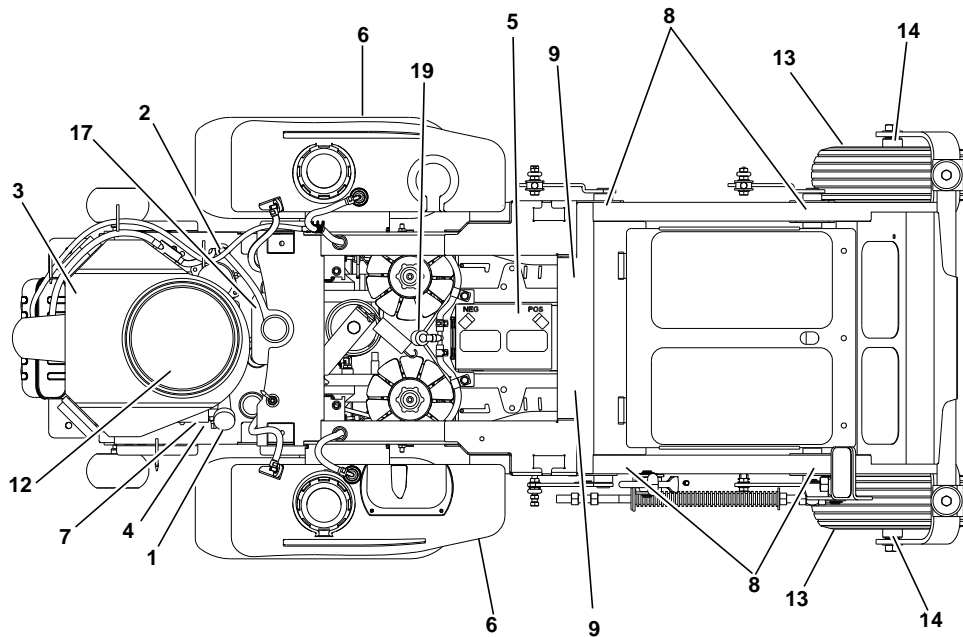
1. Initial oil change is after 5 hours of operation. Thereafter, change oil after every 40 hours operation. Change more often under dusty or dirty conditions and during hot weather periods.
2. Torque initially and after first 2 hours of operation.
3. Change engine oil filter per the engine manufacturer's recommendations. Refer to Engine Owner's Manual for recommendations and other maintenance items.
4. Service more often under dusty or dirty conditions.
5. **Pump drive belt only - Inspect every 6 months or 100 hours** and replace if worn or cracking is noticed. Otherwise, **replace every 200 hours or 2 years** whichever comes first.
6. Check fuel system for any cracks or leaks including but not limited to fuel line hoses, fuel valve, vent line hoses, vent valve, vapor valve, carbon canister and grommets.
7. Initial system oil and filter change **must** be after the first 75 hours of use or 1 year whichever comes first. Thereafter, replace filter and oil in each transaxle every 2 years or 200 hours, whichever comes first.
8. More often under dusty or dirty conditions and during hot weather.
9. Inspect ROPS after the first 20 hours of operation and then after every 500 hours of operation or yearly whichever comes first.

**REFERENCES:**

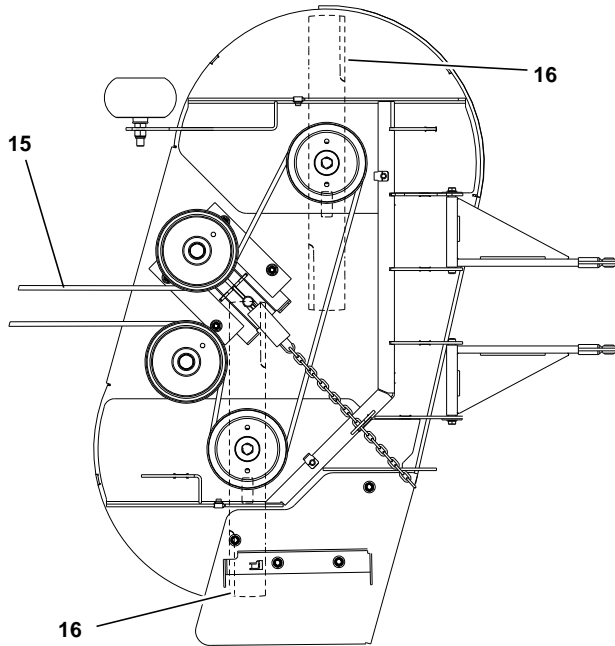
- A. Refer to Engine Owner's Manual

**NOTE:** After completing maintenance cycle (300 hours), repeat cycle.

# BigDog® Mowers A Series Maintenance Locator Chart



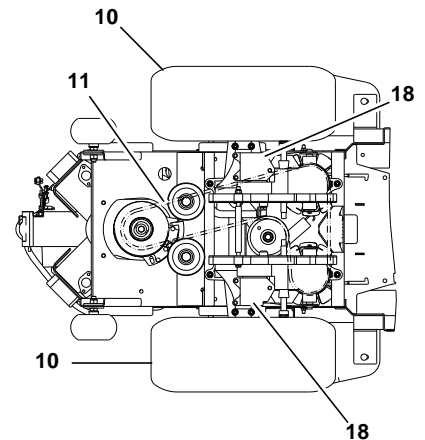
**Figure 8-1**



**Figure 8-2**

1. Engine Oil Fill & Dipstick
2. Fuel Filter
3. Engine Air Cleaner
4. Engine Oil Drain Valve
5. Battery
6. Fuel Tank
7. Engine Oil Filter
8. Deck Lift Pivot Zerk (4)
9. Park Brake Switch (2)
10. Drive Tire
11. Pump Belt
12. Engine Air Intake Screen
13. Front Gauge Wheel Tires
14. Front Gauge Wheel Zerks (2)
15. Deck Belt
16. Blades
17. Hydraulic Oil Expansion Tank
18. Hydraulic Oil Filter
19. Fuel Evaporation System Filter

**Figure 8-3**





# TROUBLESHOOTING

SYMPTOMS	PROBABLE CAUSES	SUGGESTED REMEDIES
Starting motor does not crank	Steering control levers not in park brake position or switch not adjusted	Place steering control levers in park brake position or re-adjust switch
	Deck clutch switch engaged	Disengage clutch switch
	Weak or dead battery	Recharge or replace
	Electrical connections are corroded or loose	Check the electrical connections
	15 amp fuse is blown	Replace the 15 amp fuse
	For additional causes	See engine manual
The engine will not start, starts hard or fails to keep running	No fuel or line plugged	Fill tank or replace line (See <i>Fuel System</i> section for more details)
	Fuel valve is turned off	Open the fuel valve
	There is incorrect fuel in the fuel system	Drain the tank and replace the fuel with the proper type
	There is dirt in the fuel filter	Replace the fuel filter
	Dirt, water or stale fuel in the fuel system	Contact your dealer
	The choke is not on	Move the choke lever to ON
	Numerous	See engine manual
Engine: Runs with continuous misfiring or engine runs unevenly or erratically	Numerous	See engine manual
Loss of power or system will not operate in either direction	Restrictions in air cleaner	Service air cleaner
	Poor compression	Contact your dealer
	Steering linkage needs adjustment	Adjust linkage
	Tow valve open	Close tow valve
	The traction drive belt is worn, loose or broken	Install a new traction drive belt
	Air in system	Check filter and fittings
	For additional causes	See engine manual
Air cooled engine overheating	Air intake screen or cleaning fins clogged	Clean screen and fin
	For additional causes	See engine manual
Low engine oil pressure	Low oil level	Add oil
	Oil diluted or too light	Change oil and check for source of contamination
	Failed oil pump	Contact your dealer
High oil consumption	Numerous	Contact your dealer
Mower jerky when starting or operates in one direction only	Steering control linkage needs adjustment	Adjust linkage
	Loose steering linkage	Tighten linkage
	Transaxle component faulty	Contact your dealer

SYMPTOMS	PROBABLE CAUSES	SUGGESTED REMEDIES
Mower creeps when steering control levers are in neutral	Steering linkage needs adjustment	Adjust linkage
Mower circles or veers in one direction	Steering linkage needs adjustment	Adjust linkage
	Loose steering linkage	Tighten linkage
	Tires improperly inflated	Adjust air pressure to 8 - 12 psi (55 - 83 KPa)
	Transaxle component faulty	Contact your dealer
Mower creeps when parking brake engaged	Steering linkage out of adjustment	Adjust steering linkage
	Brakes need adjustment	Adjust parking brakes
There is abnormal vibration	The engine mounting bolts are loose	Tighten the engine mounting bolts
	The engine pulley, idler pulley or blade pulley is loose	Tighten the appropriate pulley
	The engine pulley is damaged	Contact your dealer
	The cutting blade(s) is/are bent or unbalanced	Install new cutting blade(s)
	A blade mounting bolt is loose	Tighten the blade mounting bolt
	Spindle bearing is worn or loose	Replace or tighten spindle bearing
	A blade spindle is bent	Contact your dealer
	Blades do not rotate	The deck drive belt is worn, loose or broken
The deck drive belt is off the pulley		Install the deck drive belt and check for a reason
Electric clutch is not engaging		Check and/or replace 10 amp fuse. Contact your dealer
Uneven cutting height	The blade(s) are not sharp	Sharpen the blades
	A cutting blade(s) is/are bent	Install new cutting blade(s)
	The deck is not level	Level the deck per the <i>Deck leveling and height adjustment</i> section of the General Service Manual
	An anti-scalp wheel is not set correctly	Adjust the height of the anti-scalp wheel
	The underside of the deck is dirty	Clean the underside of the deck
	Tires improperly inflated	Adjust air pressure to 8 - 12 psi (55 - 83 KPa)
	A blade spindle is bent	Contact your dealer



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