2011 BAD BOY MOWERS SERVICE MANUAL

This Manual contains general maintenance and service procedures that may not be specific to your model.

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SECTION 1: HYDROSTATIC SYSTEM

To change hydro oil on Pup, Lightning, AOS, and Diesel models, remove oil return lines from top of hydro tank and place them in a disposable oil container. Start and run mower until oil level is reduced down to about 2" of oil remaining in the tank. Do not allow air to enter the oil lines in the bottom of the tank. Keep in mind that only about 75% of the hydro oil can be changed at a time. Use only 20w50 motor oil in the hydro system.

(conventional or synthetic oil may be used)

Bad Boy recommends that the hydro oil and filters be changed within the first 50 hours of usage and every 500 hours thereafter or once a year.

(Pup, Lightning, AOS, and Diesel Models)

Change hydro oil filters by unscrewing them from the filter head. Fill new filters with 20w50 motor oil before installing. Use only bad boy replacement filters. Using any other filter will result in damage to the hydro system and void the warranty.

(Pup, Lightning, AOS, and Diesel Models)

Once the system is refilled with oil, lift rear of mower until tires are off the ground. Start engine, release parking brake, stay clear of moving rear tires, loosen bypass bolt ½ to ¾ turns, move drive arms forward and backward 4 to 6 times slowly. This will purge the air from the system.

(the bypass bolt has a hole drilled through the side of the bolt head). This valve also serves as a neutral for moving the mower without the engine running.

(ZT and Outlaw Models)

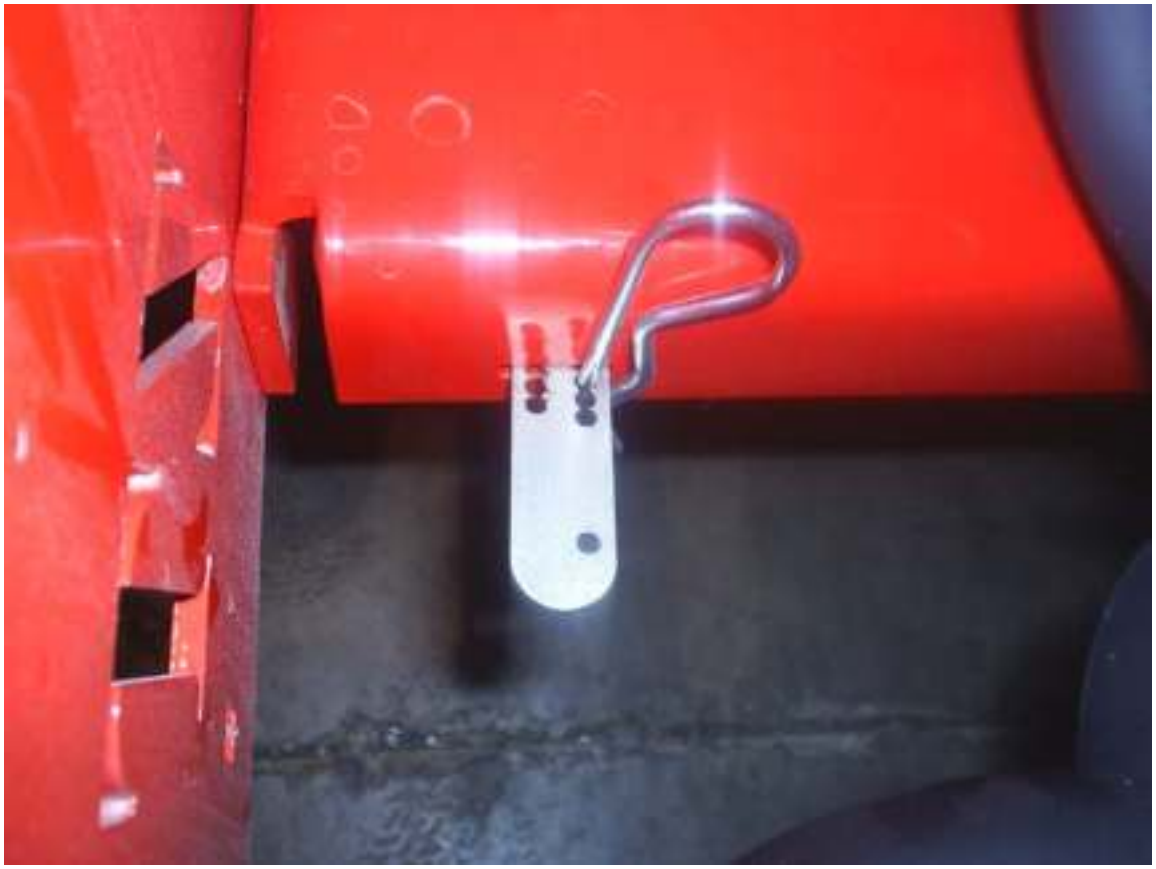
The hydro overflow tank on a zt or outlaw model is located behind the seat. Notice the "full cold" line at the bottom of the tank. Use only 20w50 motor oil in this tank. Conventional or synthetic oil may be used.

(ZT and Outlaw models)

When servicing a mower with a sealed transaxle unit, start by removing the filter skid plate on the bottom of each unit. The skid is held on by three 10mm bolts. Next, remove the filter (Outlaws have one large nut on the filter cover). The filter also serves as the oil drain. Each transaxle holds about 2 quarts of hydro oil. (Outlaw holds 4 quarts in each transaxle) reinstall new filters and skid plates. Use only hydro-gear filters. Use of any other type of filter will result in damage to the hydro system and void the warranty. Transaxle service recommended within the first 50 hours of usage and every 250 hours thereafter or once a year.

(ZT and Outlaw Models)

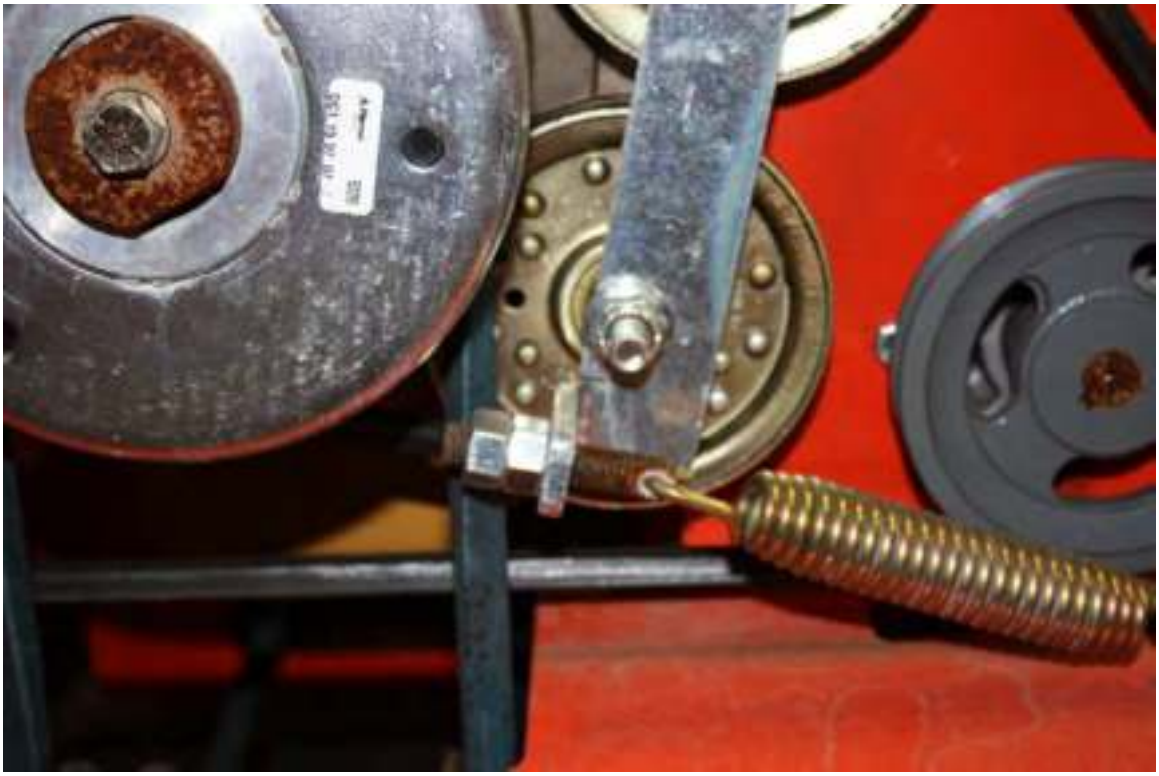
The check plug is located at the top center of the inside case of each transaxle (outlaw transaxles have this plug on the top). The transaxle can be filled with oil by removing these check plugs from both transaxles and pouring the oil in the hydro overflow tank, located behind the seat. Oil will begin to run out of the check plug holes when the transaxles are full. Use only 20w50 motor oil in the hydro system.



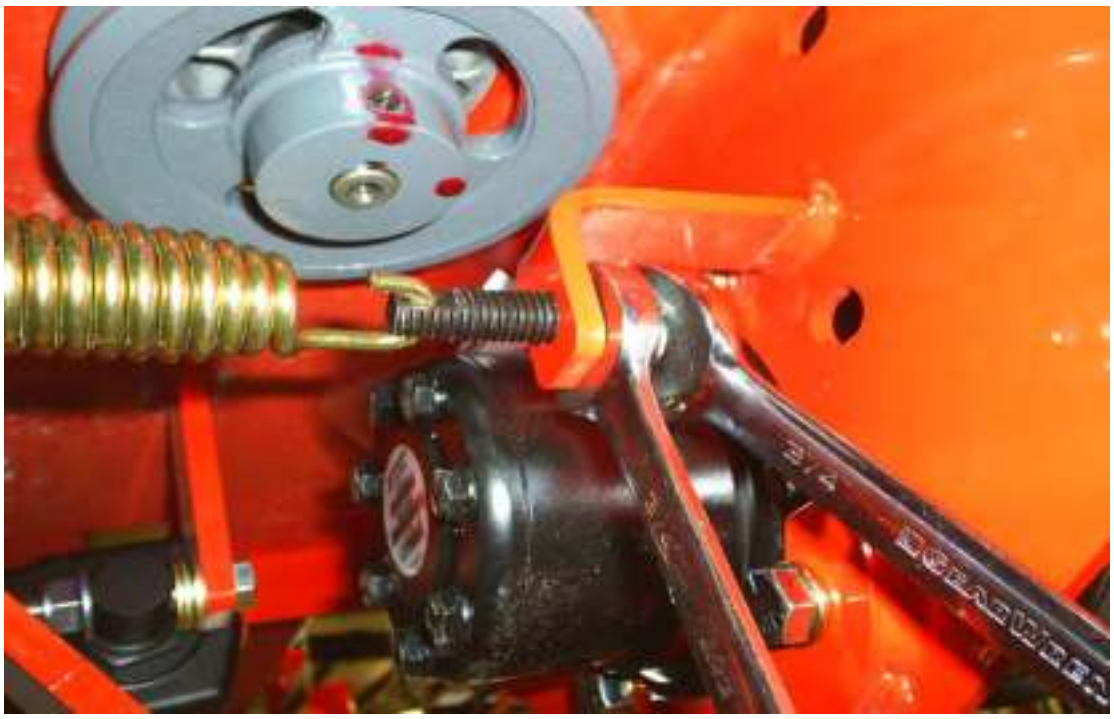
(ZT model shown)

Once the system is filled with oil, lift rear of mower until rear tires are off the ground. Start engine, release parking brake, stay clear of moving rear tires. Next, pull the neutral bypass levers (located at the rear of the frame, on either side of the muffler), move the drive arms forward and backward 4 to 6 times slowly. This relieves any air that may be trapped in the system. It may be necessary to add more oil to the hydro overflow tank after 10-15 minutes of running. These bypass levers also serve as a neutral for moving the mower without the engine running.

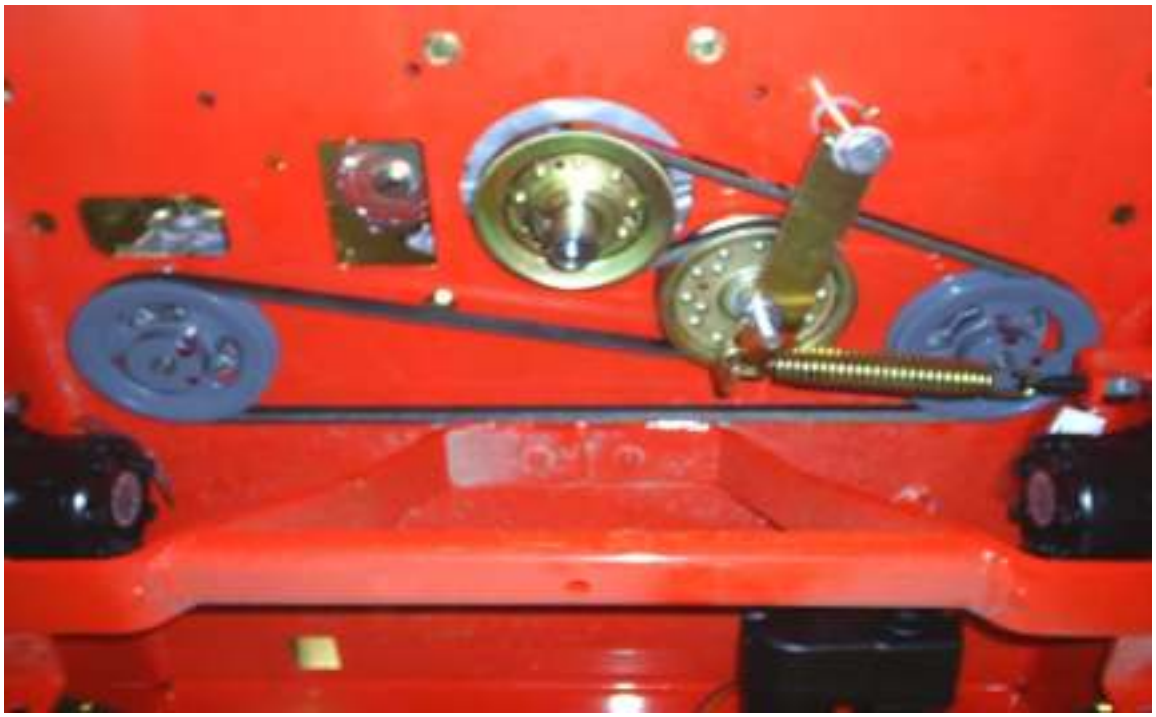
SECTION 2: DRIVE BELT



Shown above is the <u>AOS/Diesel</u> pump belt tensioner. Tightening the two ¾"jam nuts on the left side will increase the belt tension on all models. Factory setting is about .030" (about the thickness of a credit card) between coils as shown.



Shown above is a typical pump belt tesioner for ZT, Pup, Lightning, and Outlaw models.



Shown above is a typical pump belt layout for most models.

SECTION 3: ENGINE

Shown above is a Kawasaki engine with the “quick drain” oil drain located on the left side of the engine. Use a flat screw driver as shown to loosen the drain. (Not available on all models)

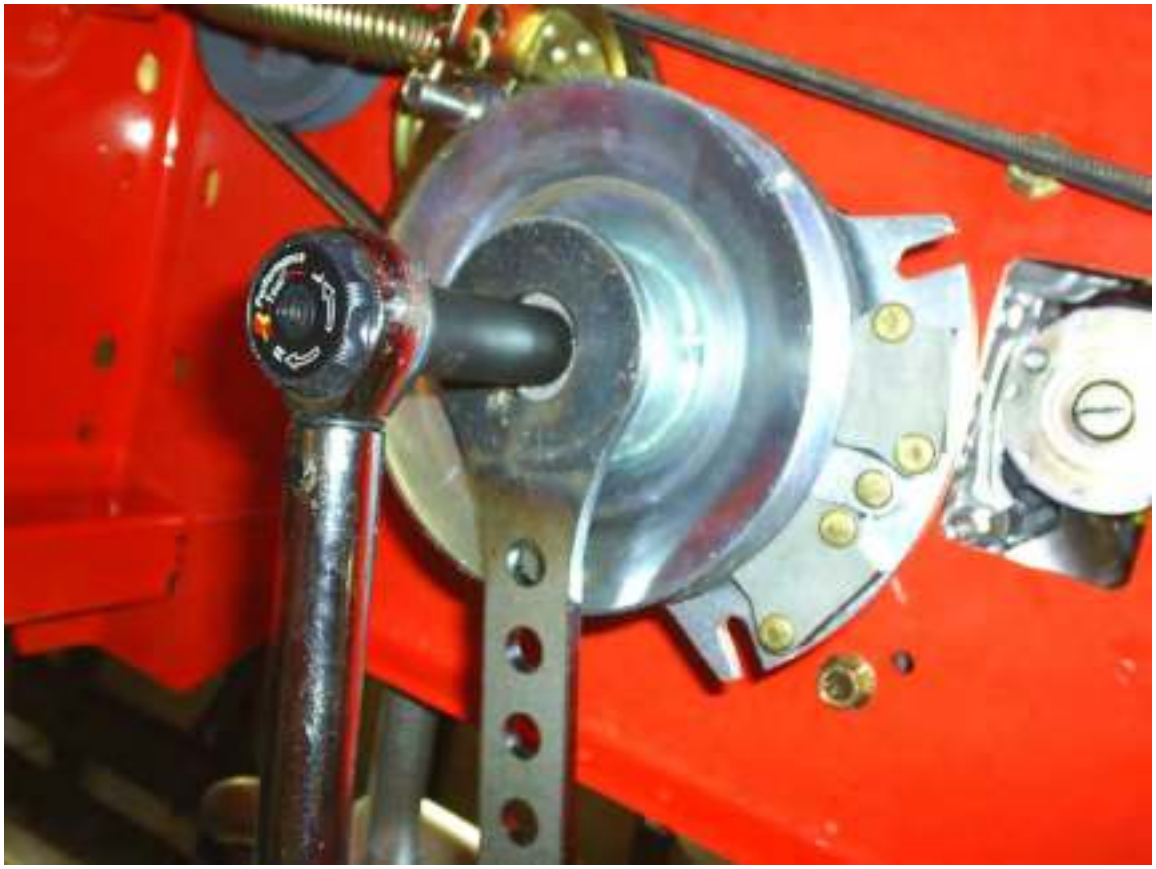
Most models have a drain hose installed on the engine, for easier oil changes. All gas engines used by Bad Boy use 10w30 and have an oil capacity of 2 quarts. Bad Boy recommends that the oil and filter be changed every 50 hours of usage.

The fuel filter is located in the fuel line about 12” from the carburator on the side of the engine. Note the direction of flow on the side of the filter. Replace once a year.

Most all models have a vacuum operated fuel pump bolted to the side or top of the engine. The pump has a "fuel in", a "fuel out", and a vacuum line coming from the engine block. Fuel flow can be checked here if the pump is suspected to be defective.

When servicing the fuel system on the CAT Diesel, it is necessary to purge the air from the system by loosening the 9/16” bolt on top of the fuel filter and pumping the fuel bulb (located underneath the radiator) until air bubbles are no longer visible.

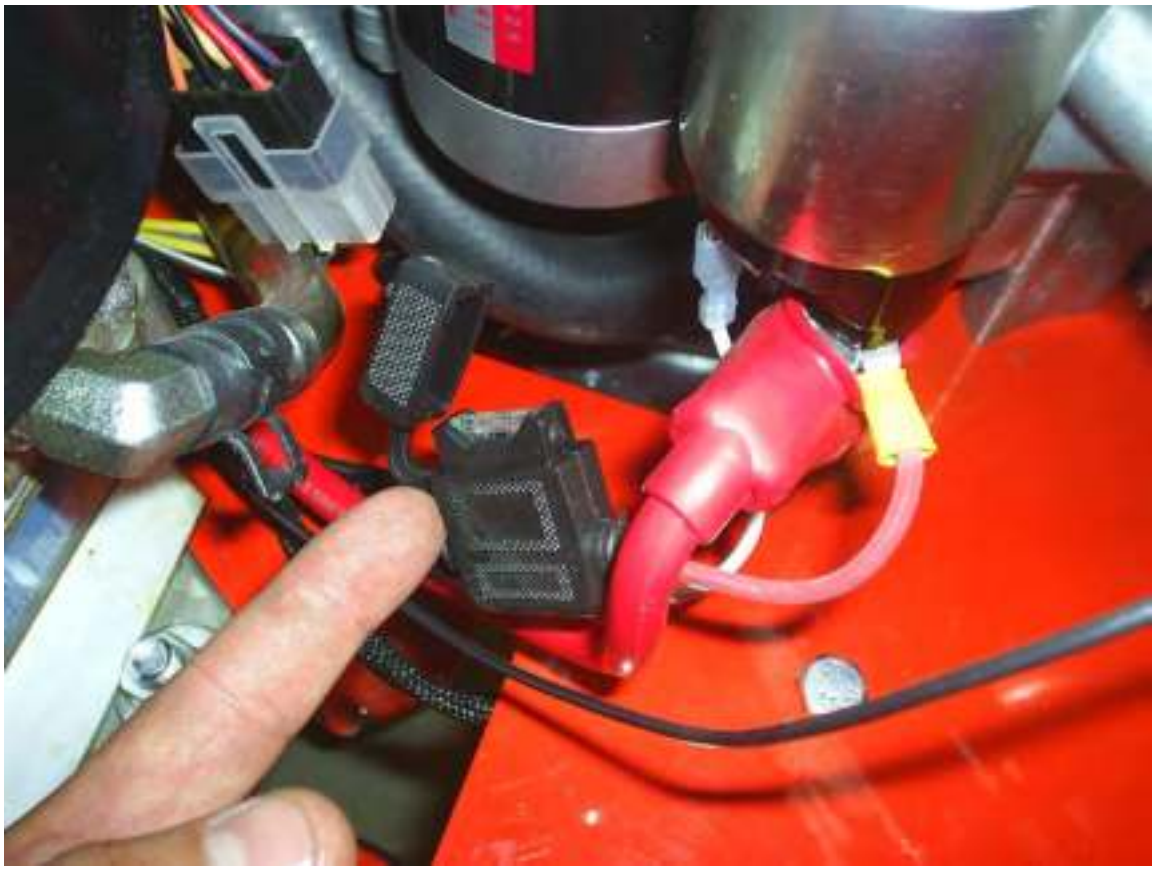
Remove and inspect air cleaner weekly. (more often in dusty conditions). Do not blow filter out with air pressure, this will cause the filter to be filled with tiny holes that will allow dirt to enter. Instead, tap filter on side to remove any debris. Replace at least once a year, more often in dusty conditions.



Torque the clutch bolt to 50 ft. Lbs. On all models. Retorque at every oil change.
(All Models)

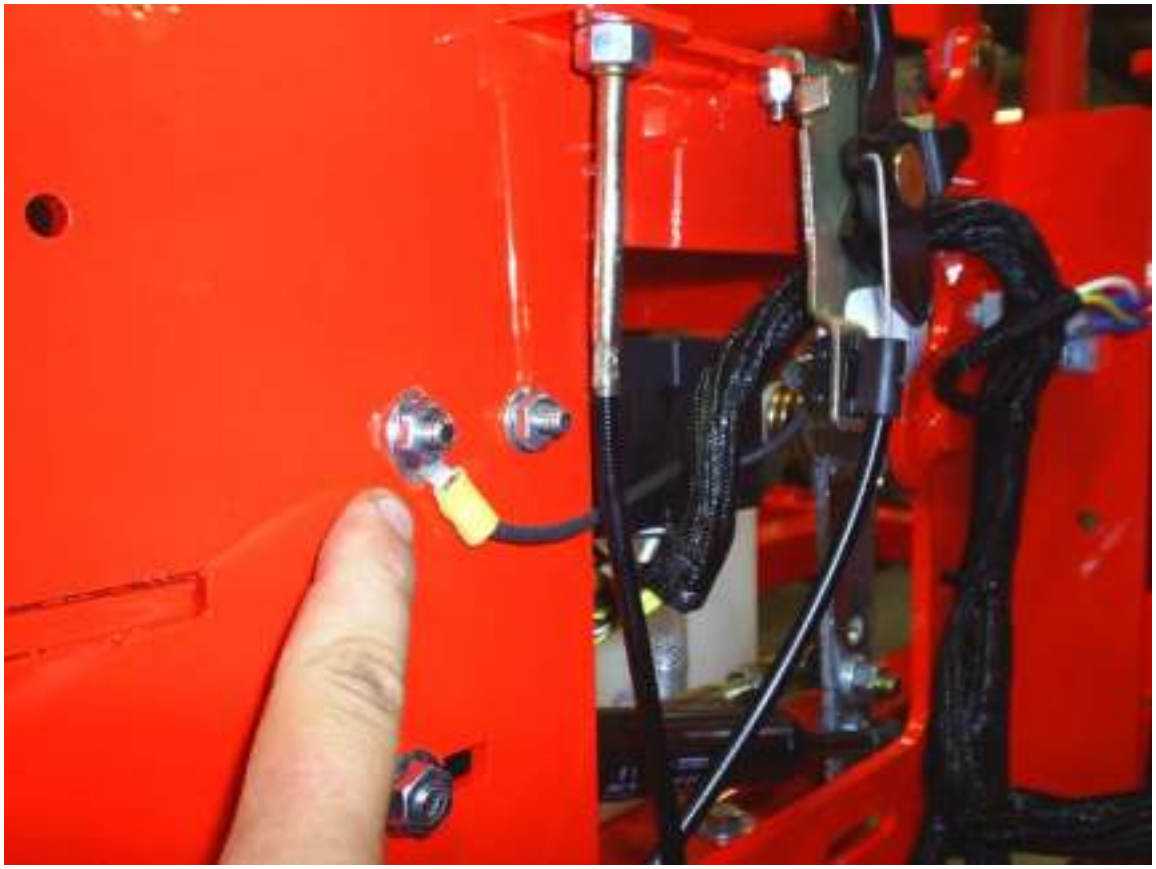
Keep radiator screen clean and free of debris on liquid cooled models. Check screen hourly during dry conditions. Slide radiator screen up to remove.

SECTION 4: ELECTRICAL SYSTEM



On most larger commercial engines (27 hp and up). The 25 amp main fuse is located about 3” from the starter on the engine.

On smaller commercial and light duty commercial mowers, the 25 amp main fuse is located just behind the battery connected to the starter solinoid.



Always check the condition of the wiring harness ground cable. The ground is located just inside of the right side fuel tank on most models. Ensure that the ground is connected, clean, and tight. On some models, this wire may be connected to the negative side of the battery.

Check the condition and connection of the relays located under the seat. Ensure that they are clean and connected. Make sure that wire terminal ends have not been pushed out of the relay block.

On most models, the red wire coming out of the engine is the charging wire from the alternator. Check for 13.6 - 14.2 volts dc at this wire with engine at full throttle.

SECTION 5: FRAME

For non-suspension models, torque front fork castle nut to 40 ft.lbs. Be sure to spin the fork while torquing the nut to ensure that no bearing damage is done.

Be sure to reinstall the cotter pin into the castle nut. Always try to go tighter on the nut to find a castlation for the pin to fit in. Never back the bearing tension off after torquing the nut, this will "spring" the bearing cage.

Pictured above is the bearing assembly for mowers equipped with suspension 2009 and newer. This setup requires a torque of 53 ft lbs. Never back the bearing tension off after torquing the nut, this will "spring" the bearing cage.

Torque rear wheel lugs to 65-75 ft.lbs. Retorque at every oil change. (All models)

There is one grease fitting in each front wheel and one in each front caster bearing housing. Grease at every engine oil change.

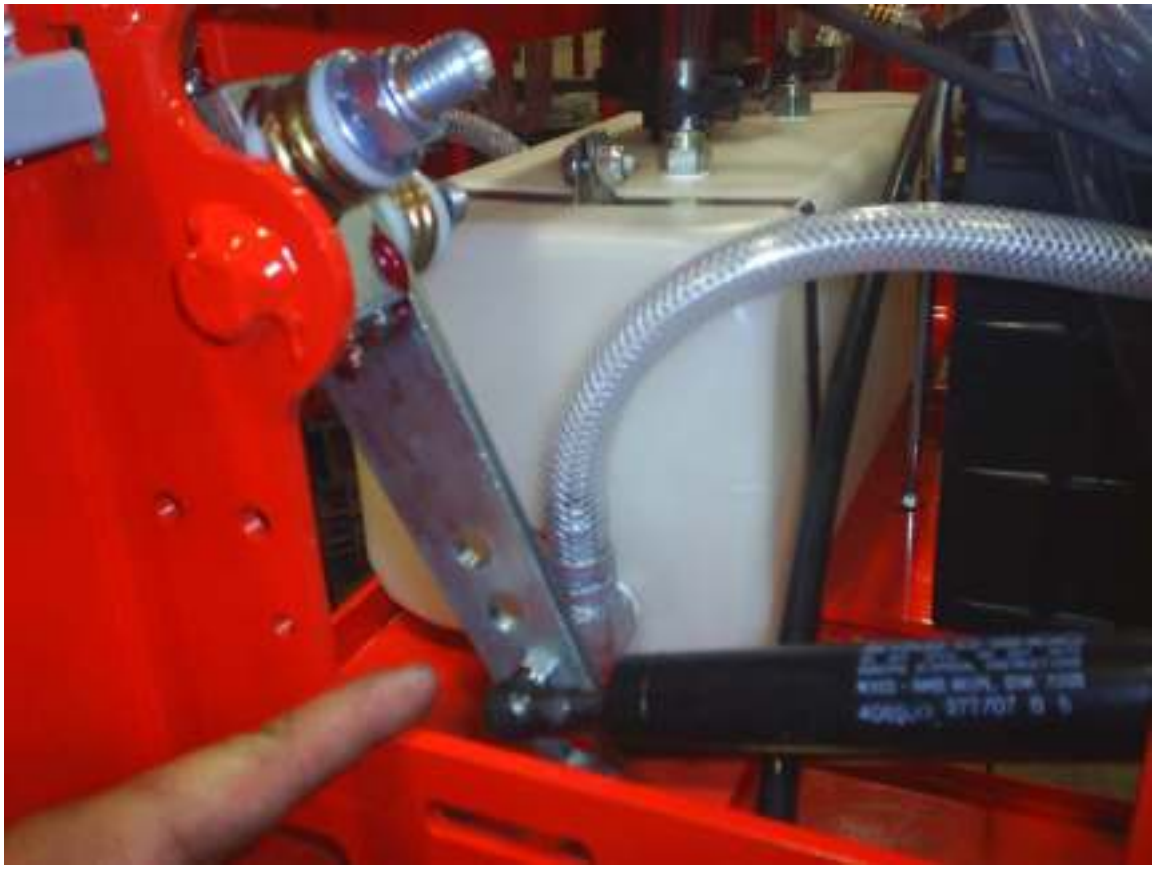
There is one grease fitting on each of the actuator bar pillow blocks located under the fuel tanks. Grease twice a season.

The pump belt tensioner is located under the engine and has a grease fitting at its pivot point. Grease at every engine oil change.

The deck belt tensioner is located at the rear of the deck and has a grease fitting on its pivot point. Grease at every engine oil change.

The control arm blocks have grease fittings located on the top and bottom of each block. Grease one time a year.

When adjusting the tracking on the mower, the length of the pushrods can be changed by screwing the swivel joint in or out on the ends of the rods. Shortening the overall length of the rod slows the pump down. Lengthening the rod will increase the speed of the pump.



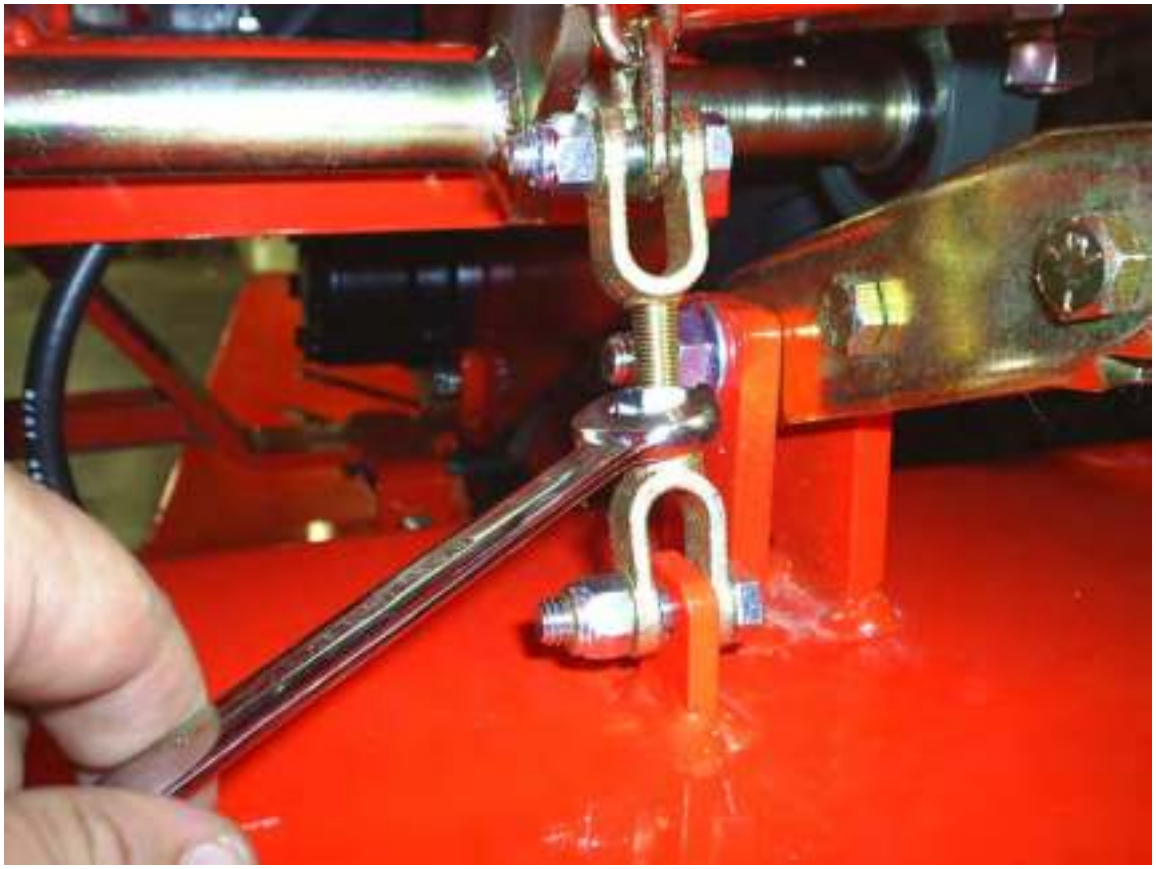
On commercial models, the reaction of the hydro pumps and the resistance felt in the control arms can be adjusted by moving the pushrods or the dampeners up or down in the mounting holes.
Moving dampeners up, less resistance.
Dampeners down, more resistance.
Moving pushrods up, slower reaction.
Pushrods down, faster reaction.

To service the parking brake system, the rear brake assembly requires a hub puller to remove the brake drum as shown above. The axle nut must be replaced and torqued to 200 ft.lbs. Be sure to reinstall the cotter pin.
(Not on MZ, ZT, or Outlaw models)

SECTION 6: CUTTING DECK

To remove the deck belt, lift up on the belt while rotating the pulley to roll the belt up and off of the pulley. (be sure not to get your fingers between belt and pulley).

To check the level of the deck, start on a flat surface and set the air pressure in all four tires. Raise the deck up, and measure all four corners of the deck to see if it is level from left to right and front to back. All decks should be level from left to right and have a 1/8” pitch down in the front.



If deck adjustments are necessary, start with the chain length adjusters. These adjusters affect the overall hieght of the deck and the level from left to right.
(Not on MZ models)

The large turn buckles on the front of the deck only affect the pitch of the deck or the level from front to back. (Not on Outlaw models)

The deck spring tension is critical. If the tension is too much, it will cause the spring to break. If too loose, the belt can jump off or slip on the pulleys and cause a cut quality issue. With the deck up, the spring coil gap should be about .025” - .030” (about the thickness of a credit card). Spring tension adjustments can be made by sliding the bolt shown above forward or backward in the slot of the deck.

On an AOS/Diesel model, additional deck belt adjustments can be made by sliding the rear “v” idler pulleys up or down in their slots.

The condition of the blades can drasticly affect the cut quality of the mower deck. Replace as necessary. These blades were used considerably too long. Resharpening is recommended by professionals only to determine when the blade needs to be replaced and because of the need for rebalancing.

To change blades, it may be easier to use a piece of wood to keep the blade from turning so that the bolt can be loosened. Retorque the blade bolts to 90 - 110 ft.lbs.

The blade spindles contain a sealed ball bearing in the top and bottom of the spindle. The bearings are replaceable for a more cost effective repair.

Mowing tips:

- Mow header strips at the ends of the lawn and around flower beds first. Make them wide enough that you can turn the mower around in the already mown section. Then mow back and forth between these header strips overlapping each lap by about 1/8 the width of the mower's deck.
- Don't cut your grass too short, particular for cool season grasses. Higher heights usually provide for a deeper root system, looks better, and is less likely to have weeds invading, particularly crabgrass.
- Don't remove any more than one third of the grass leaf at any one cutting. If circumstances arise that a lawn gets too tall and you just have to lop off a bunch to get caught up, bite the bullet and break it down into several mowings to get caught up with 3 or so days between cuttings.
- NEVER SCALP YOUR LAWN. Scalping severely damages the root system to such a degree that it may die.
- Avoid mowing when the grass is wet or when it's dark
- Avoid throwing grass clippings into the street and driveway where they can be washed into the sewer system. After mowing, clean up driveway and walkways.
- When mowing remove only a third with each cutting (except for the first mowing of the season when it's ok to remove more). You can safely leave clippings that will quickly decompose and add nutrients back into the soil. Contrary to popular opinion, grass clippings do not add to thatch buildup. Grass blades are made up of about 75% water.
- Mow your lawn in a different direction with each mowing, especially with lawns of shorter grass types. Altering the direction ensures a more even cut since grass blades will grow more erect and less likely to develop into a set pattern.
- Keep your mower's blade sharp, which means having it sharpened several times during the mowing season. Keep several blades around so you'll always have a sharp one on hand. Sharp blades cut the grass cleanly and help mulch clippings into small pieces which break down quickly.
- Don't forget to change your mower's oil at least once during the mowing season. For brand new mowers, change the oil after about 5 hours of operation during the initial break-in period.
- At the end of the mowing season use a fuel stabilizer in the remaining gasoline
- In the spring, don't use that old gas unless you properly used a fuel stabilizer, it can cause a number of problems. Better to use fresh gasoline to begin the new mowing season.

- **Leaf blade A** demonstrates what a leaf blade should look like after mowing with a sharp blade.
- **Leaf blade B** demonstrates a leaf blade that was injured by a dull mower blade.
- **Leaf blade C** was cut by the mower but indicates that the mower blade is not sharp enough. The shredded white tissue protruding from the leaf blades C and D is the vascular tissue of the plant.
- **Leaf blade D** has been mown for quite some time with a dull mower blade.

To bag or mulch?

Grass clippings do not contribute to thatch buildup or increase the chances of disease. If you mow your lawn at the right height, without removing any more than 1/3 of it's total height, clippings will quickly breakdown without a trace. These clippings contribute additional nitrogen and other nutrients to the soil and supply it with additional organic materials. Clippings from a 1000 sq. ft. lawn can add as much as 1 - 2 pounds of nitrogen back into the soil.

If you have a compost pile, then you may want to bag your clippings occasionally to add much needed green-matter to the compost pile. Make sure it is mixed thoroughly with brown matter to avoid a strong ammonia odor. DO NOT COMPOST CLIPPINGS after applying any weed control or weed-feed type product. Before adding clippings to the compost pile wait at least 3 mowings after these products have been applied.