Service Manual

Bolens 683 Series Box Frame Tractor

NOTE: These materials are for use by trained technicians experienced in the service and repair of outdoor power equipment of the kind described in this publication, and are not intended for use by untrained or inexperienced individuals. These materials are intended to provide supplemental information to assist the trained technician. Untrained or inexperienced individuals should seek the assistance of an experienced and trained professional. Read, understand, and follow all instructions and use common sense when working on power equipment. This includes the contents of the product's Operators Manual, supplied with the equipment. No liability can be accepted for any inaccuracies or omission in this publication, although care has been taken to make it as complete and accurate as possible at the time of publication. However, due to the variety of outdoor power equipment and continuing product changes that occur over time, updates will be made to these instructions from time to time. Therefore, it may be necessary to obtain the latest materials before servicing or repairing a product. The company reserves the right to make changes at any time to this publication without prior notice and without incurring an obligation to make such changes to previously published versions. Instructions, photographs and illustrations used in this publication are for reference use only and may not depict actual model and component parts.

MTD Products LLC - Product Training and Education Department

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Servicing the 2003
Bolens Box Frame Lawn Tractor

BOLENS LAWN TRACTOR

- Model 13AQ683G163
- 20 HP Briggs & Stratton V-Twin OHV I/C Engine
- Deck 42" Twin Blade Cutting Deck
- Cast Aluminum Spindle Housings
- 6 position Single-Lever Blade/Deck Engagement
- Transmission: 8-Speed Transaxle Shift-on the-go Drive
- Heavy-Duty Box Frame
- Positive Caster Wheel Design
- Tires: 15" x 6" Front and 20´x 8" Rear Tires

Other models Bolens models based on this frame style:

- Model 13AN683G163 - 17 hp
- Model 13AO683G163 - 18 hp
- Model 13AQ683H163 - 22 hp

1. SEAT STYLES

- The seat styles vary by the tractor model. These models use three different styles; Standard Adjustment, Quick Adjustment and Knob Adjustment. Refer to the owners manual for proper adjustment.

2. BATTERY HOLD DOWN

- The battery is held in place by a flexible steel rod that loops around a tab on the rear frame and clips to a stamped opening at the front of the battery. See Figure 1.

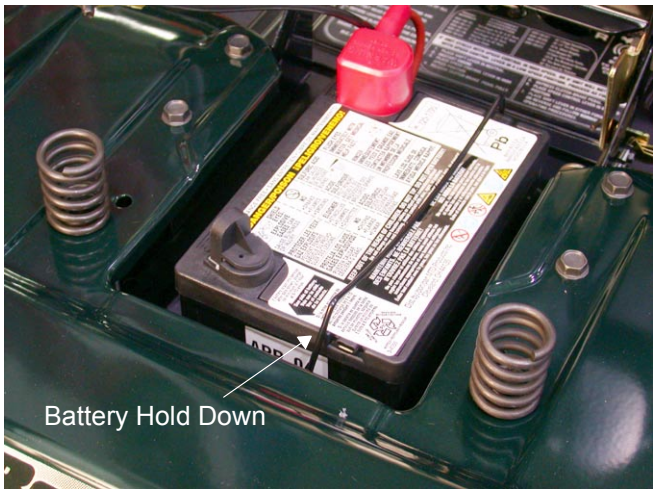

Figure 1

3. STEERING WHEEL

- This unit features a new three spoke steering wheel that mounts to the steering shaft with a 1/2” hex bolt, bell washer and steering wheel cap. See Figure 2.

Figure 2

4. SPEED CONTROL

If the unit stalls with the speed control in the high speed position, or if the unit will not operate with the speed

control in the low speed position, proceed as follows.

4.1. Place the shift lever in NEUTRAL

4.2. Restart the engine.

4.3. Place speed control lever in the high speed position. See Figure 3.

Figure 3

4.4. Release the clutch-brake pedal fully.

4.5. Depress the clutch-brake pedal.

4.6. Place the speed control in the desired operating position.

4.7. Place the shift lever in either FORWARD or REVERSE, and follow normal operating procedures.

5. DECK LEVELING ADJUSTMENT

NOTE: The cutting deck is attached to the frame with steel rod hanger links. The left front rod is threaded and has a ferrule which is used for deck leveling. See Figure 4.

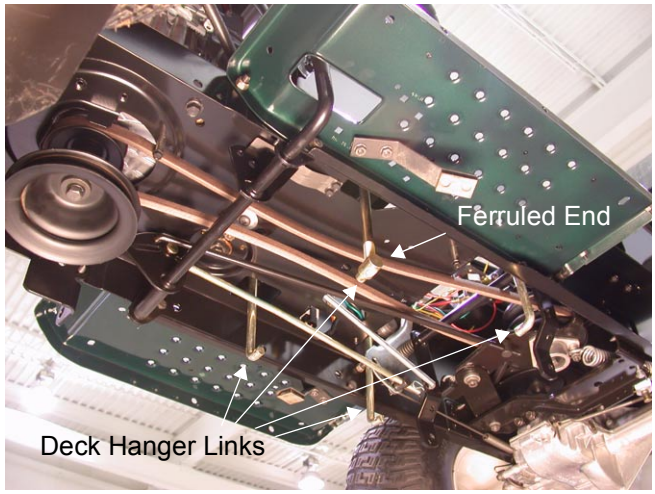

Figure 4

NOTE: There is also a Deck Hanger Link/Anti-Sway Rod that attaches from the front center of the deck to the bracket on the right side of the frame. See Figure 5.

Figure 5

NOTE: There has been some issues with the deck belt rubbing on the Deck Hanger Link/Anti-Sway Rod on tractors with the 46” cutting deck. (Model 13AQ683H163) This has been corrected on later production by moving the deck anti-sway bracket higher. If you are experiencing belt damage contact MTD Customer Service for a hanger link with a bend in it. See Figure 6.

Figure 6

NOTE: Check the tractors tire pressure before performing any deck leveling adjustments.

5.1. Perform deck leveling by removing the hairpin clip from the front left hanger bracket and adjust the ferrule up or down to set side to side level. See Figure 7.

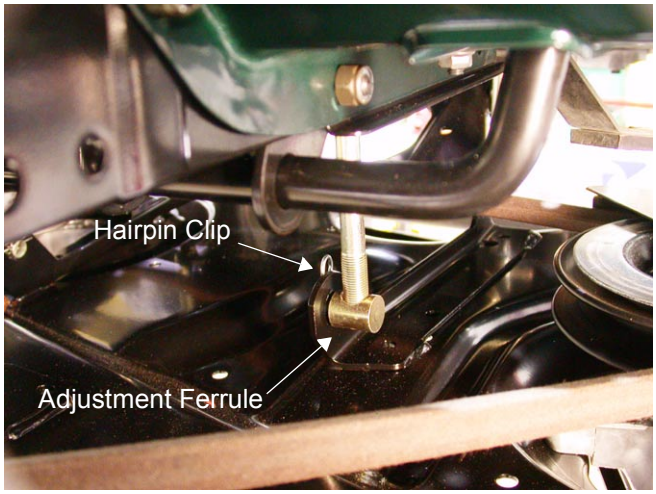

Figure 7

6. SETTING THE DECK WHEEL HEIGHT (ON MODELS SO EQUIPPED).

6.1. Select the height position of the cutting deck by placing the Deck Engagement / Lift Lever in any of the five different cutting height notches on the right side of the frame.

6.2. Adjust the deck wheels so that they are between 1/4 inch and 1/2-inch above the ground when the tractor is on a smooth, flat surface such as a driveway and the height adjuster is in the lowest position.

WARNING: Keep hands and feet away from the discharge opening of the cutting deck

NOTE: The deck wheels, on models so equipped, are an anti-scalp feature of the deck and are not designed to support the weight of the cutting deck.

7. DECK ENGAGEMENT ADJUSTMENT

NOTE: The deck must disengage when the deck engagement/lift lever is in the blade stop position.

Adjust as follows.

7.1. With the engine off, place the deck engagement/ lift lever in the top cutting position (not BLADES STOP position). See Figure 8.

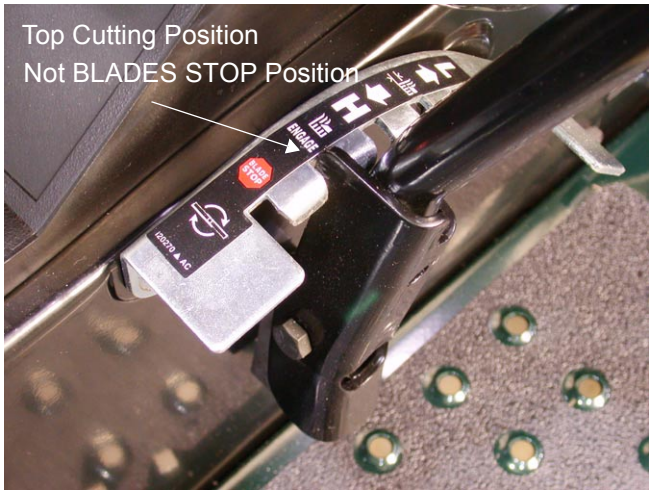

Figure 8

7.2. Unthread the shift knob and remove the two flange screws securing the shift cover panel in place. See Figure 9.

Figure 9

7.3. Remove the shift cover panel.

NOTE: Remove the yellow wire that is attached to the spring switch on the underside of the shift cover panel.

7.4. Locate the deck disengagement rod and remove the hairpin clip securing the rod to the stabilizer shaft assembly. See Figure 10.

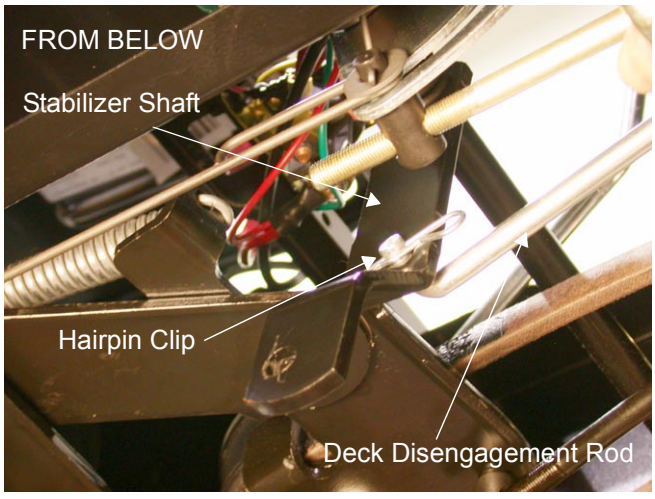

Figure 10

7.5. Pull the rod toward the rear of the tractor (to take up any slack in the rod), then thread the rod in or out until the rod lines up with the hole in the stabilizer shaft.

7.6. Insert the stabilizer shaft through the stabilizer shaft assembly and secure it with the hairpin clip.

7.7. Check the adjustment by placing the deck lift lever in the BLADES STOP position. The deck should move up and forward and the belt should become loose.

7.8. Attach the yellow wire removed earlier and reassemble the shift cover panel.

7.9. Start the unit and test the deck engagement/lift lever to be certain that the blades fully disengage when in the BLADES STOP position.

7.10. Repeat the adjustment if needed.

8. PARKING BRAKE ADJUSTMENT

WARNING: Never attempt to adjust the brakes while the engine is running.

If the tractor does not come to a complete stop when the clutch brake pedal is depressed or the unit rolls when the parking brake is applied, the brake needs to be adjusted.

The brake is located on the right side of the transmission.

8.1. Locate the hex nut on the right side of the brake assembly. See Figure 11.

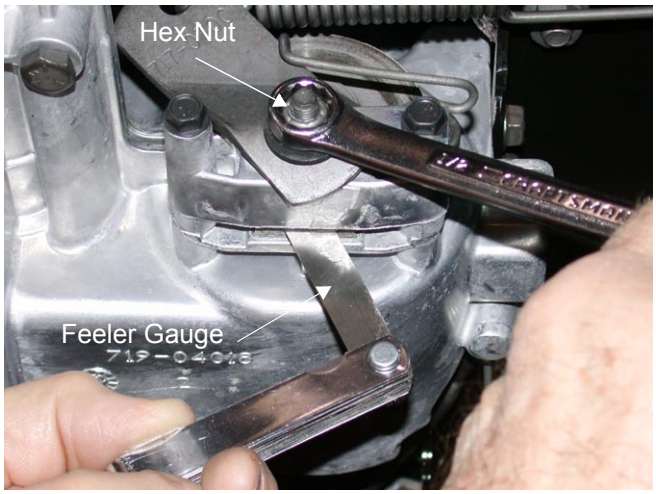

Figure 11

8.2. Using a 1/2” wrench and a feeler gauge, set the gap between the brake disk and brake puck at .011” See Figure 11.

9. SPEED CONTROL ADJUSTMENT

NOTE: When operating the unit initially or after replacing the belts, there will be little difference between the highest two speeds until after the belts have gone through a break-in period and have seated themselves in the pulleys.

If the full range of speeds cannot be reached on the tractor, adjust the speed control as follows.

9.1. Unthread the shift knob and remove the two flange screws securing the shift cover panel in place.

9.2. Remove the shift cover panel.

NOTE: Remove the yellow wire that is attached to the spring switch on the underside of the shift cover panel.

9.3. Remove the cotter pin that secures the speed control rod ferrule to the speed bracket. During reassembly use a new cotter pin. Part # 714-0111. See Figure 12.

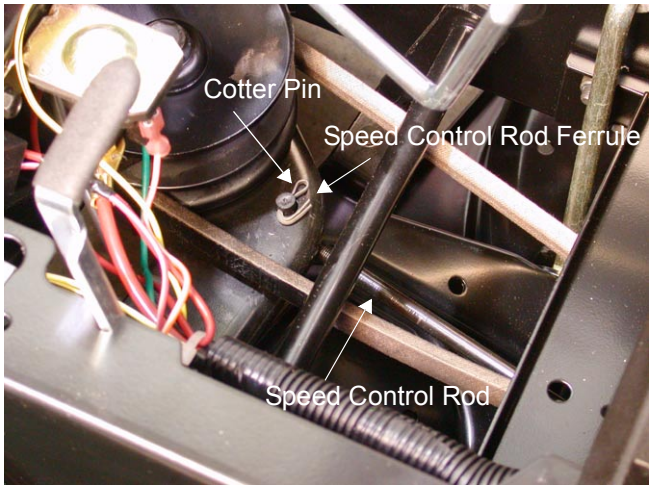

Figure 12

NOTE: At the factory, the speed control rod is adjusted so that 5/8" of the rod is exposed beyond the ferrule.

9.4. Adjust the speed control by threading the ferrule inward so that no more than 3/4" of the rod is exposed beyond the ferrule. See Figure 13.

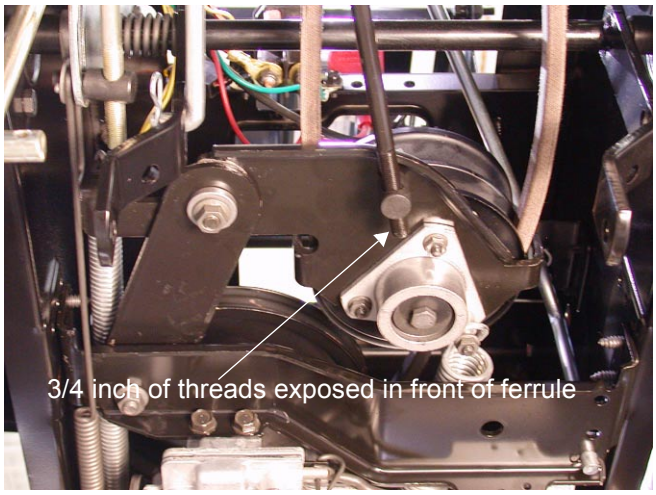

Figure 13

9.5. Reinsert the ferrule and secure it with a new cotter pin.

9.6. Reassemble the shift cover panel and test the unit for full range of speeds.

10. STEERING ADJUSTMENT

Some units have an adjustable tie rod, others do not. If an adjustable tie rod or ferrule is replaced, the toe-in of the front wheels must be checked. See Figure 14.

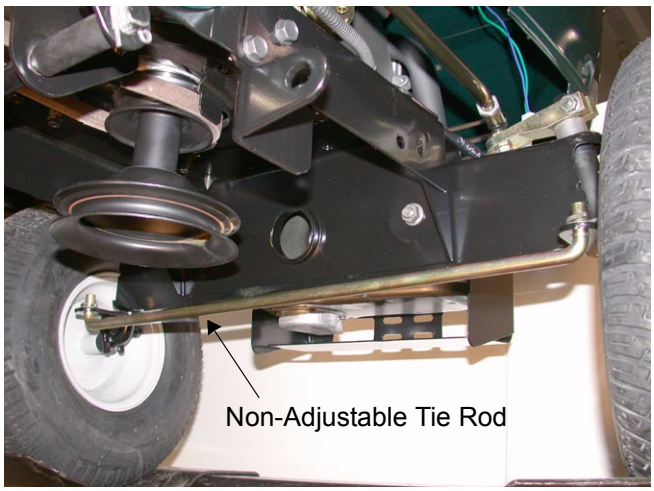

Figure 14

NOTE: Make sure the steering wheel and front tires are in position for straight ahead travel.

10.1. Measure the distance between the front tire rims in front of the pivot bar.

10.2. Measure the distance between the front tire rims behind the pivot bar. The measurement taken in front of the pivot bar should be between 1/16" and 5/16" less than the measurement taken behind the pivot bar. If not, loosen or tighten the ferrule on the right end of the tie rod until the correct toe-in is achieved.

NOTE: Lengthening the tie rod increases toe-in, shortening the tie rod decreases toe-in.

IMPORTANT: Do not reuse the original cotter pin. Part Number 714-0470.

11. BALL JOINT SERVICING

NOTE: If replacement of ball joint is required, count the number of threads showing behind the jam nut in order to maintain the correct steering alignment. See Figure 15.

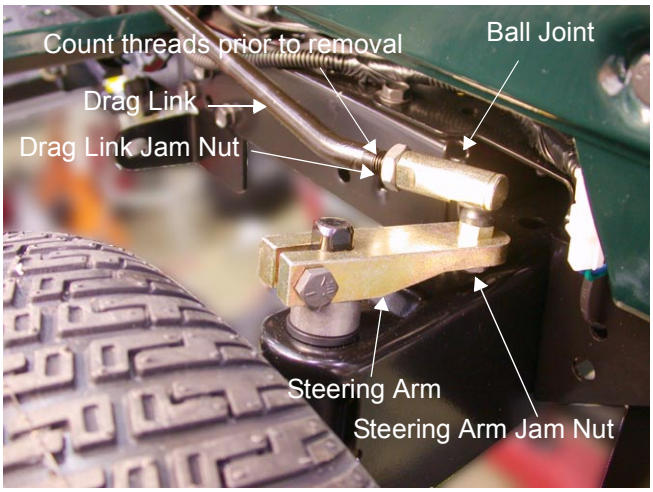

Figure 15

11.1. Using a 11/16 inch combination wrench, loosen the drag link jam nut but do not back it away from the ball joint.

11.2. Use a 1/2 inch open end wrench to hold the ball joint while using a 9/16 inch open end wrench to loosen the steering arm jam nut securing the ball joint to the steering arm.

11.3. Remove the ball joint from the steering drag link.

11.4. Replace the ball joint in the reverse order.

12. CUTTING DECK REMOVAL

12.1. Place the deck engagement lever in the engaged position (lowest cutting position).

12.2. Using a spring puller or recoil rope disconnect the spring that is attached to the small hook found on the left rear portion of the transmission. Note the location of the hook where it attaches to the transmission before removal. See Figure 16.

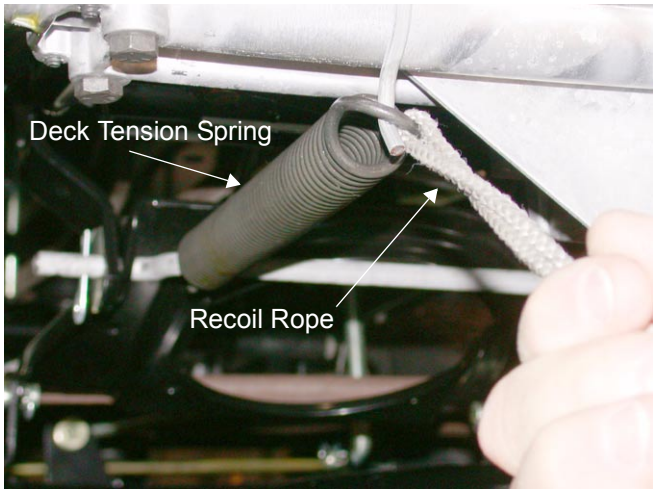

Figure 16

12.3. Using a 1/4 inch wrench remove the two belt keepers on each side of the engine pulley. See Figure 17.

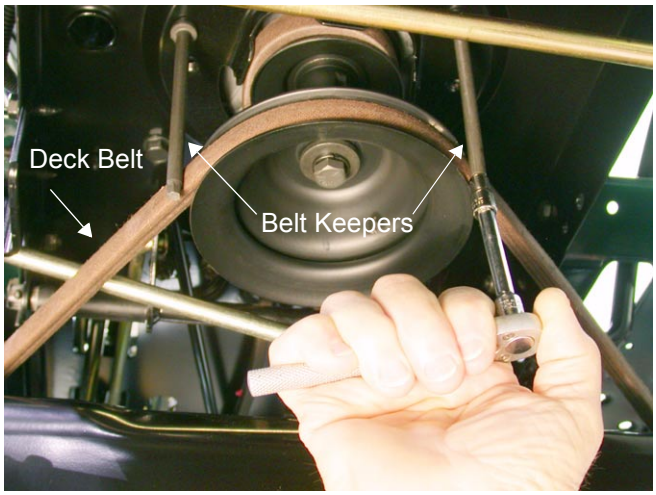

Figure 17

12.4. Remove the deck belt from the engine pulley.

12.5. Remove the hairpin clip securing the deck hanger link/anti-sway bar to the frame. See Figure 18.

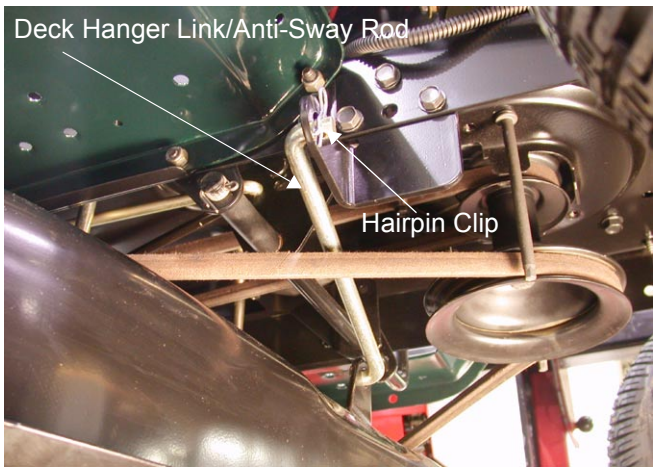

Figure 18

NOTE: There has been some issues with the deck belt rubbing on the Deck Hanger Link/Anti-Sway Rod on tractors with the 46” cutting deck. This has been corrected on later production by moving the frame mounting bracket higher. If you are experiencing belt damage contact MTD Customer Service for a Hanger Link with a bend in it. See Figure 19.

Figure 19

12.6. Remove the two hairpin clips securing the front hanger rods to the deck brackets and carefully lower the front of the deck to the ground. See Figure 20.

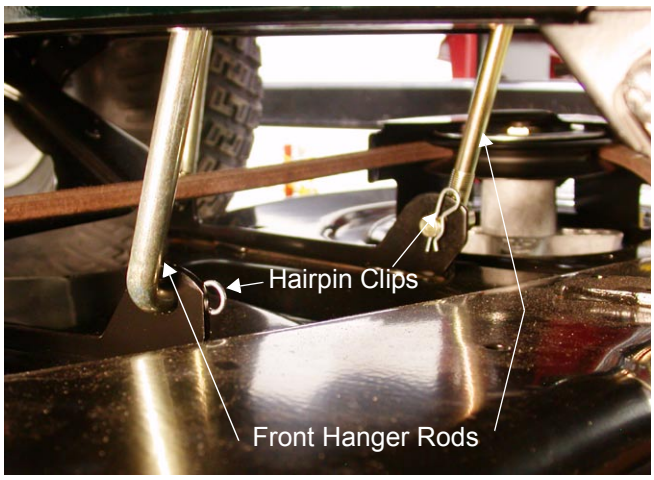

Figure 20

12.7. Remove the two hairpin clips that secure the two rear deck hangers to the deck stabilizer bracket and lower the deck to the ground. See Figure 21.

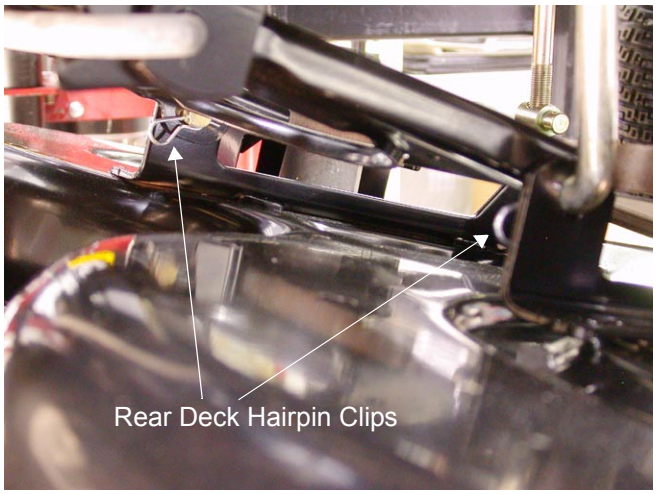

Figure 21

12.8. Raise the deck lift lever to its highest position to raise the lift links out of the way.

12.9. Remove the deck from under the unit.

13. DECK STABILIZER BRACKET REMOVAL

NOTE: For normal service and maintenance, the deck stabilizer bracket does not need to be removed. If mounting a snow thrower attachment however, the stabilizer will need to be removed.

13.1. Remove the hairpin clip that secures the stabilizer rod to the stabilizer bracket. See Figure 22.

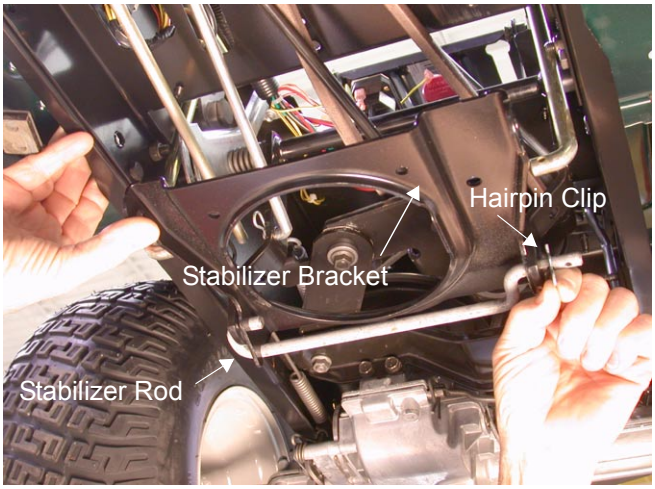

Figure 22

13.2. Slide the stabilizer rod out of the bracket and remove the bracket.

NOTE: Make note of the orientation of the stabilizer rod and stabilizer bracket prior to disassembly. The stabilizer bracket can be incorrectly installed upside down and/or the stabilizer rod can be installed backwards during reassembly.

14. DECK BELT REMOVAL (38” AND 42” DECKS)

14.1. Remove the cutting deck from the tractor by following the procedures in the cutting deck removal section.

14.2. Using a 1/2 inch socket, remove the belts guards (located over each spindle) by removing the self tapping screws securing them in place.

14.3. Remove and replace the belt.

14.4. Reassemble in reverse order.

15. UPPER DECK BELT REMOVAL (46” DECKS)

15.1. Remove the cutting deck from the tractor by following the procedures in the cutting deck removal section.

NOTE: On 46” decks you must also remove both the deck stabilizer bracket and stabilizer rod. See deck stabilizer bracket removal section.

15.2. The upper deck belt is removed by simply lifting it off the double pulley located at the rear of the cutting deck.

16. LOWER DECK BELT REMOVAL (46” DECKS)

16.1. Remove the upper deck belt. See above.

16.2. Using a 1/2 inch socket, remove the belt guards.

16.3. Using a spring puller or recoil rope, remove the spring from the belt idler bracket. This will relieve tension on the belt.

16.4. Remove the belt from around the idler pulleys and the three spindle pulleys.

16.5. Install new belts and reassemble in the reverse order.

17. DECK SPINDLE REPLACEMENT

17.1. Remove the deck from the tractor following the deck removal procedures in this manual.

17.2. Using a 1/2 inch socket, remove the belts guards (located over each spindle) by removing the self tapping screws securing them in place.

17.3. Using a air impact wrench and 15/16 inch socket, remove the spindle pulley hex flange nut.

NOTE: Use a blade stop or a “C” clamp to hold the blade in place during nut removal. See Figure 23.

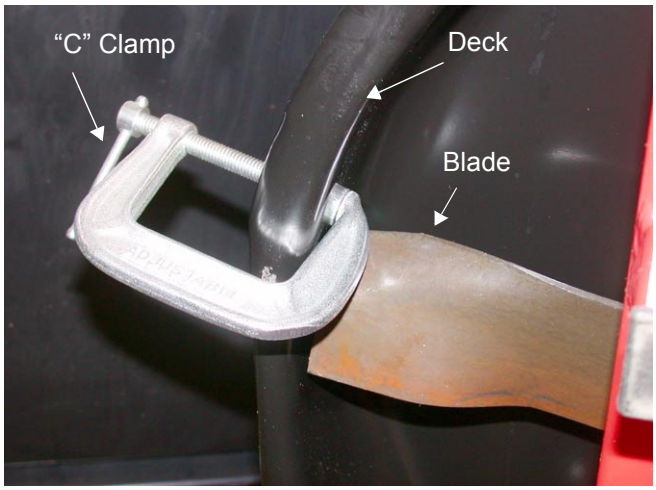

Figure 23

17.4. Remove the pulley.

17.5. Using a air impact wrench and 15/16 inch socket, remove the cutting blade hex flange nut.

17.6. Remove the cutting blade.

17.7. Using a 1/2 inch socket remove the four self tapping hex screws securing the spindle assembly to the cutting deck. See Figure 24.

Figure 24

17.8. Install the new spindle in the reverse order above.

NOTE: During reassembly, torque the self tapping hex screws to between 90 and 110 inch-pounds.

NOTE: Torque the blade spindle hex flange nut to between 70 and 90 foot-pounds.

18. DRIVE BELT REMOVAL (UPPER AND LOWER)

NOTE: An air impact wrench will be required to remove the engine pulley during this procedure.

It is recommended that both drive belts be changed at the same time.

18.1. Place the deck engagement/lift lever in the fully forward position.

18.2. Set the parking brake on the unit.

18.3. Unthread the shift knob and remove the two flange screws securing the shift cover panel in place. See Figure 25.

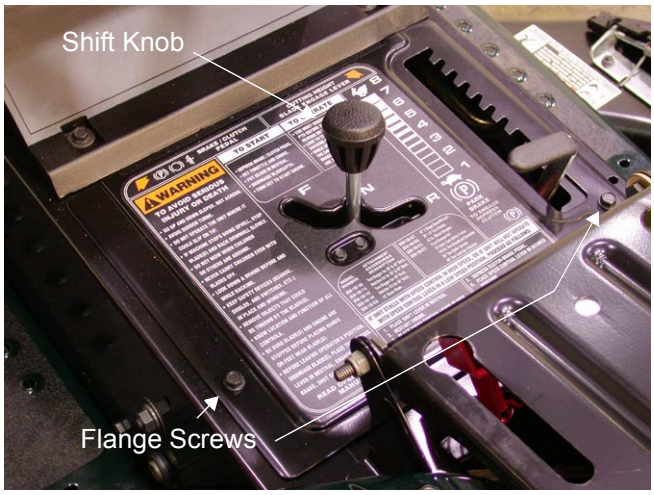

Figure 25

18.4. Remove the shift cover panel.

NOTE: Remove the yellow wire that is attached to the spring switch on the underside of the shift cover panel.

18.5. Using a spring puller or recoil rope disconnect the spring that is attached to the small hook found on the left rear portion of the transmission. (Rear Deck Stabilizer Spring) See Figure 26.

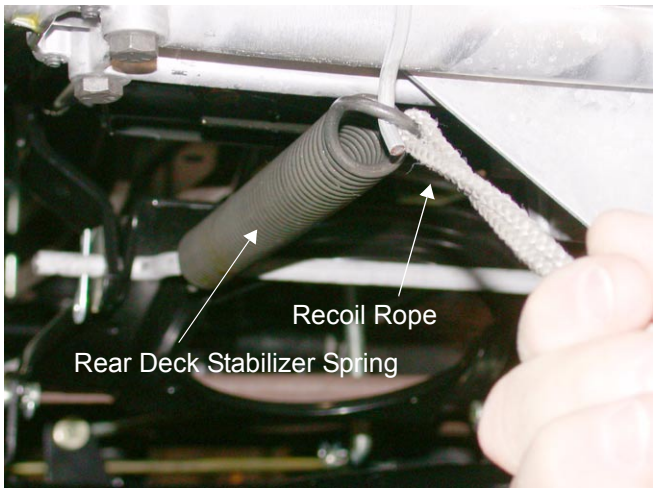

Figure 26

18.6. Using a spring puller (MTD Part number 732-0571), disconnect the two springs which are attached to the rear portion of the tractor frame.(Torque Bracket Extension Springs) See Figure 27.

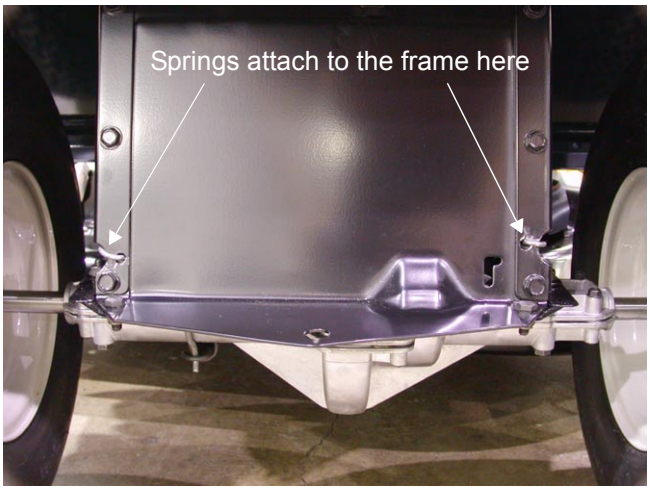

Figure 27

NOTE: When re-installing the extension springs after completing the repairs, install the right hand spring first.

18.7. Place the deck engagement/lift lever in the BLADES STOP position.

18.8. Using a 1/4 inch socket, remove both belt keepers on either side of the engine pulley. See Figure 28.

NOTE: There are four belt keeper mounting holes in the frame. Mark the holes prior to removal to insure proper reassembly.

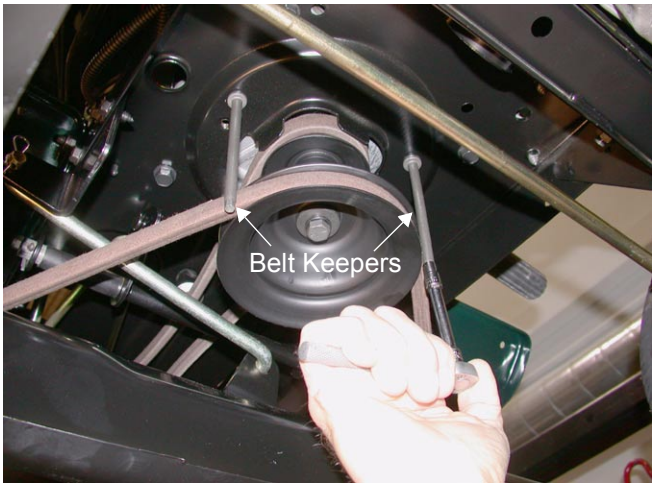

Figure 28

18.9. Using an air impact gun with a 5/8 inch socket, remove the hex screw that secures the engine pulley to the engine crankshaft.

18.10. Carefully lower the pulley off the crankshaft and remove the belt from around it.

NOTE: A spacer is located between the engine pulley and engine. Be careful not to lose the spacer and be certain NOT to reinstall the spacer upside down. See Figure 29.

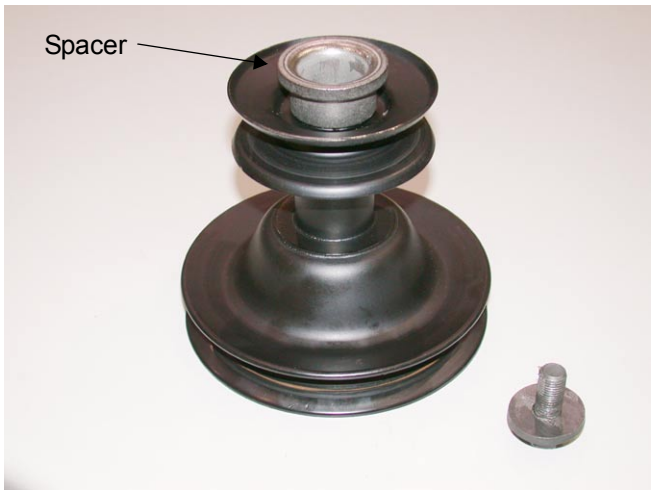

Figure 29

18.11. Disconnect the NEGATIVE (black) battery cable from the battery, followed by the POSITIVE (red) cable. See Figure 30.

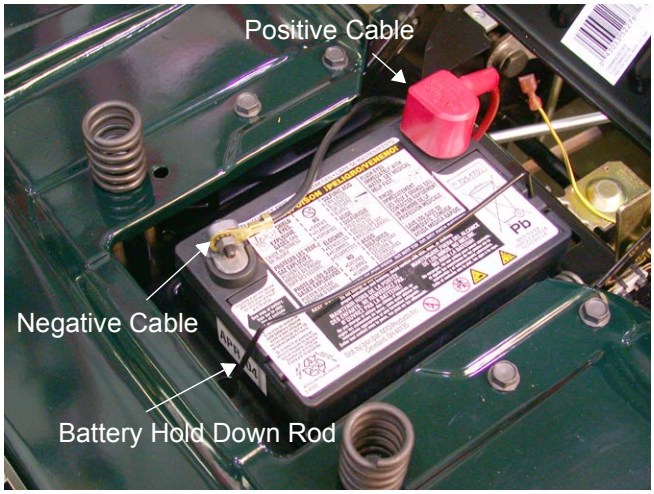

Figure 30

18.12. Detach the battery hold down rod and remove both the battery and battery tray from the tractor. See Figure 30.

18.13. Using an impact gun with a 7/8 inch socket, remove the flange nut securing the transmission pulley to the transmission. See Figure 31.

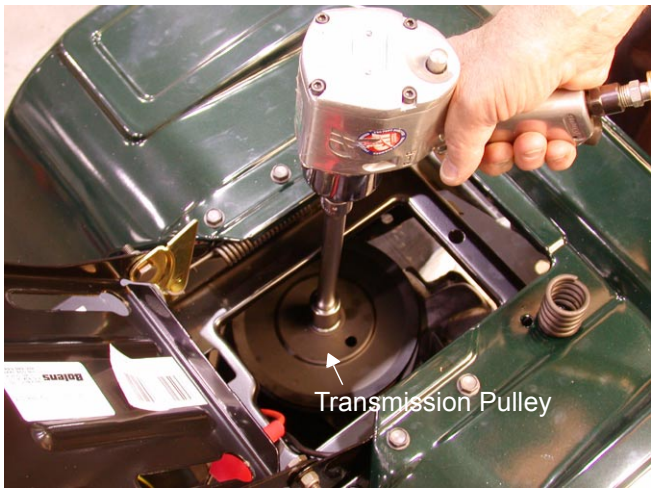

Figure 31

NOTE: Depending upon when the tractor was built, there may be a washer between the flange nut and the transmission pulley. If washer is present, install during assembly. See Figure 32.

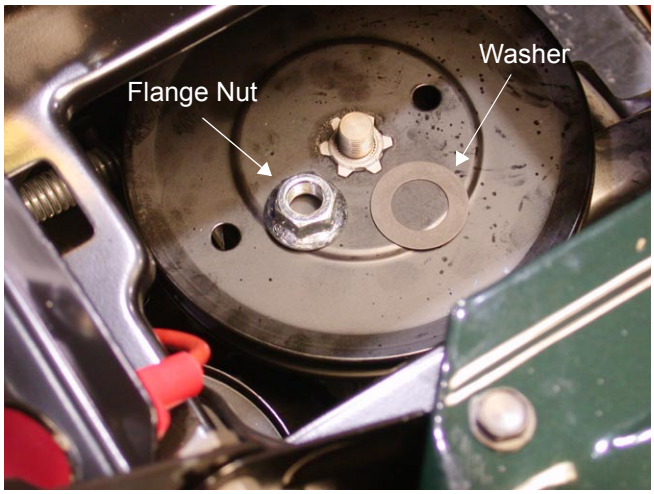

Figure 32

18.14. Carefully lift the pulley off the transmission's input shaft and remove the upper drive belt from around it and the variable speed pulley.

NOTE: Maintain the proper orientation of the pulley. Tractors with a 46" cutting deck have spacers between the transmission and tractor frame to provide increased clearance for the cutting deck. The transmission pulley is manufactured with a dish (or concave) shape. The dish side should be facing DOWN on tractors with a 38" or 42" cutting deck and facing UP on tractors with a 46" cutting deck.

NOTE: A pulley hub is located beneath the transmission pulley. See Figure 33.

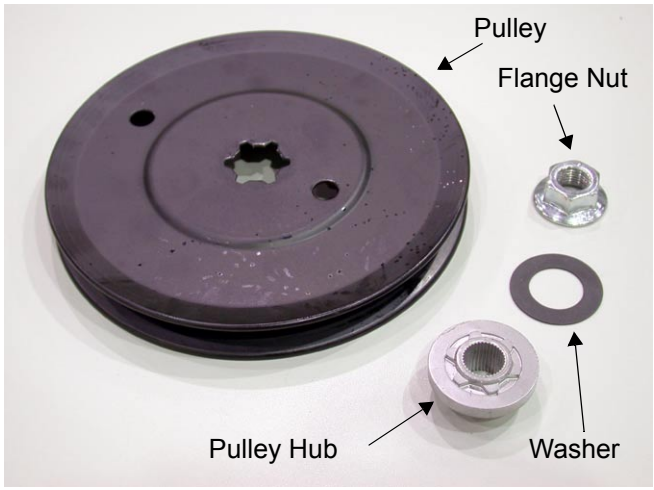

Figure 33

NOTE: If you find wear or damage to the pulley and/or pulley hub, replace both components. A redesigned pulley hub (718-0758A) is being used on current production. The new hub DOES NOT require the use of the washer.

18.15. Remove the lower drive belt from around the lower portion of the variable speed pulley. See Figure 34.

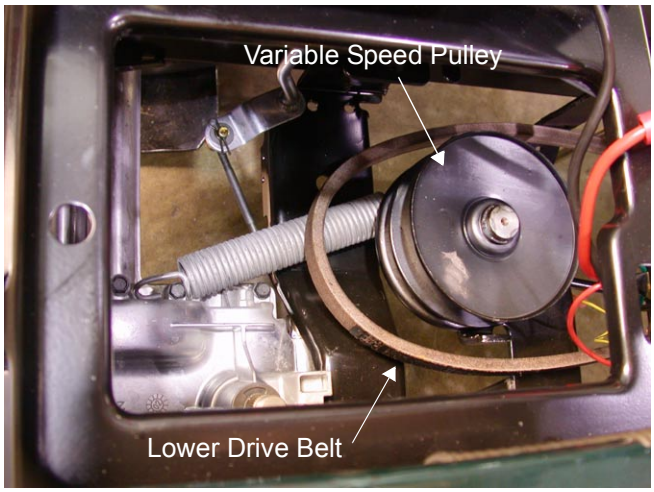

Figure 34

18.16. Remove the lower drive belt by lifting it through the cover panel opening.

18.17. Install new belts following the previous instructions in the reverse order.

IMPORTANT: When installing the engine pulley, torque the hex bolt to between 38 and 50 foot-pounds.

IMPORTANT: When installing the transmission pulley make sure that the pulley is properly seated on the pulley hub and torque the flange nut to between 25 and 33 foot-pounds.

NOTE: Torquing the transmission pulley will be made easier by placing a 1/4 inch tapered punch through the hole in the pulley and holding it against the transmission. See Figure 35.

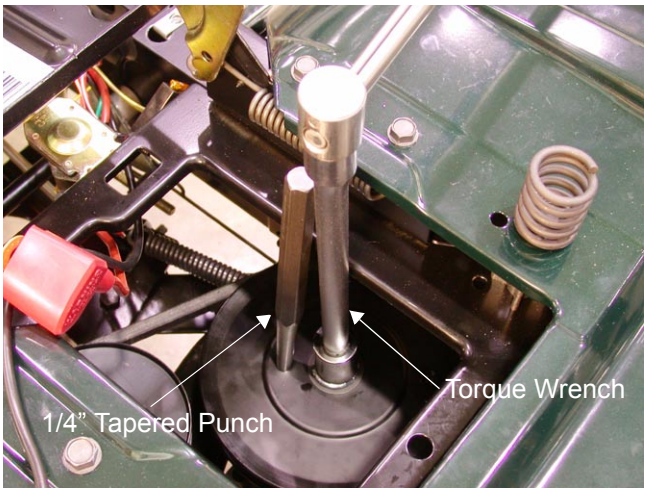

Figure 35

19. VARIABLE SPEED PULLEY REMOVAL

19.1. Remove the cutting deck following the procedures in the cutting deck removal section.

19.2. Remove both upper and lower drive belts by following the procedures in the drive belt removal section.

19.3. Using an impact wrench and a 1/2 inch socket, remove the hex cap screw securing the variable speed pulley assembly to the variable speed bracket.

NOTE: Use the transmission belt to place tension on the variable speed pulley in order to hold it in place while removing the hex cap screw. See Figure 36.

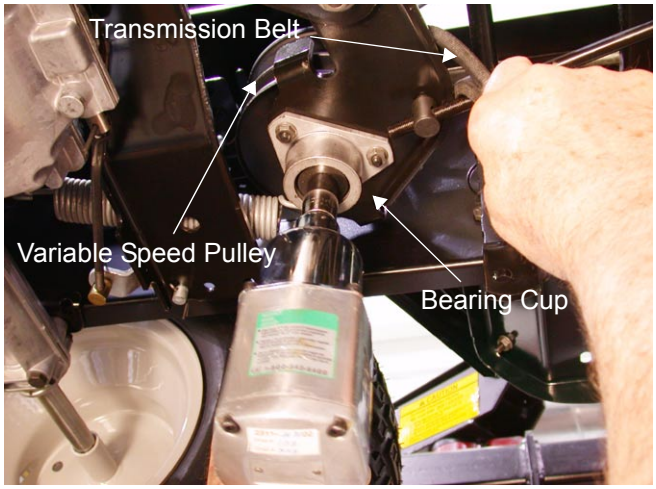

Figure 36

NOTE: There is a flat washer under the hex cap screw.

19.4. Slide the variable speed pulley assembly up and out of the bearing cup.

NOTE: The variable speed pulley is a welded assembly and is not serviceable. See Figure 37.

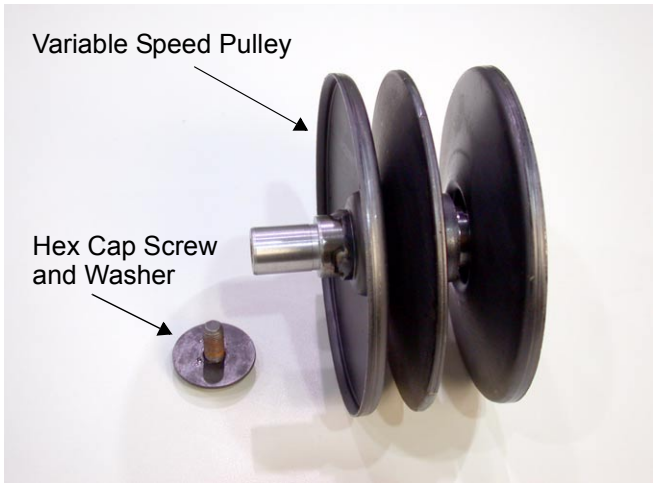

Figure 37

NOTE: During reassembly Locktite the hex cap screw securing the variable speed pulley to the bearing cup with locktite 242. Torque to between 190 and 235 inch-pounds.

NOTE: There is a bearing cup attached to the variable speed bracket that holds the variable speed pulley. The cup holds two bearings which are replaceable. See Figure 38.

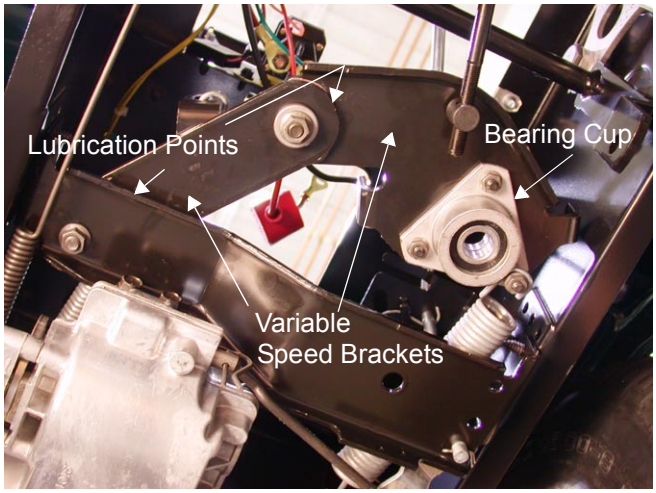

Figure 38

NOTE: Lubricate the pivot points of the variable speed bracket with Never-Seize. See Figure 38.

20. TRANSMISSION REMOVAL

NOTE: The transmission can be removed without removing the cutting deck.We have removed the deck for clarity of pictures.

20.1. Place the deck engagement lever in the engaged position (lowest cutting position).

20.2. Disconnect the NEGATIVE (black) battery cable from the battery, followed by the POSITIVE (red) cable. See Figure 39.

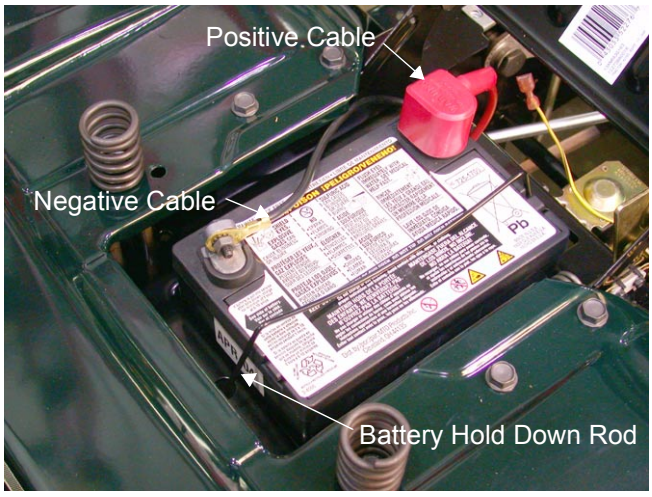

Figure 39

20.3. Detach the battery hold down rod and remove both the battery and battery tray from the tractor. See Figure 39.

20.4. Raise the rear of the tractor off the ground and support it in a way to allow removal of the rear wheels. See Figure 40.

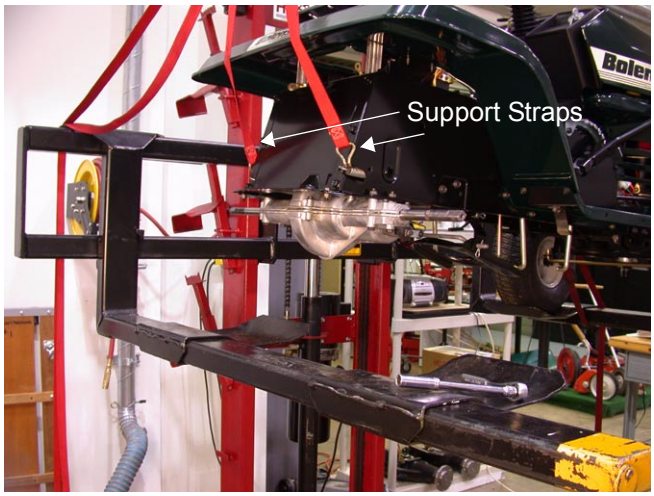

Figure 40

20.5. Remove both rear wheels. See Figure 40.

20.6. Release the parking brake.

20.7. Using a spring puller (MTD Part number 732-0571), disconnect the two springs which are attached to the rear portion of the tractor frame. (Torque Bracket Extension Springs) See Figure 41.

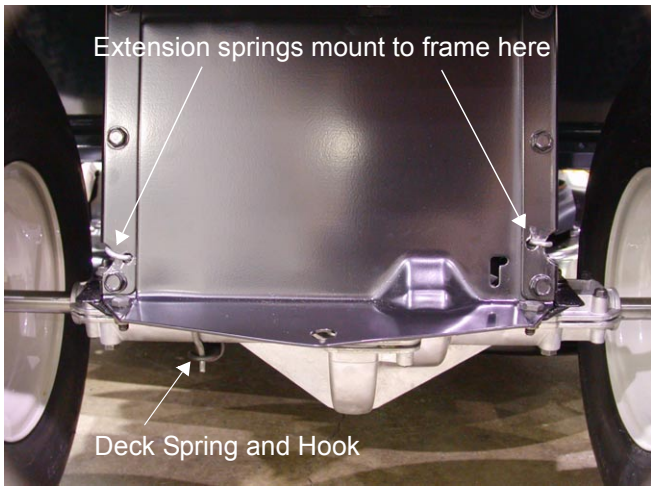

Figure 41

20.8. Using a spring puller or recoil rope disconnect the spring that is attached to the small hook found on the left rear portion of the transmission.

Note the location of the hook during disassembly.

20.9. Using an impact gun with a 7/8 inch socket, remove the flange nut securing the transmission pulley to the transmission. See Figure 42.

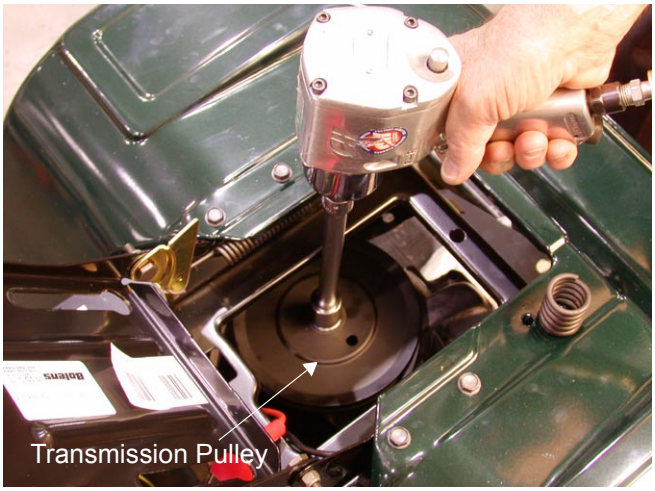

Figure 42

NOTE: Depending upon when the tractor was manufactured. there may be a washer between the flange nut and the transmission pulley.

20.10. Carefully lift the pulley off the transmission's input shaft and remove the upper drive belt from around it and the variable speed pulley. See Figure 43.

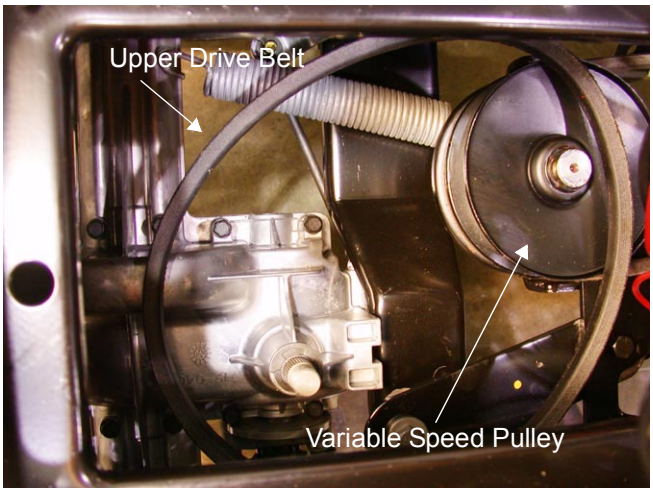

Figure 43

20.11. A pulley hub is located beneath the transmission pulley.

NOTE: Maintain the proper orientation of the transmission pulley. Tractors with a 46" cutting deck have spacers between the transmission and tractor frame to provide increased clearance for the cutting deck. The transmission pulley is manufactured with a dish (or concave) shape. The dish side should be facing DOWN on tractors with a 38" or 42" cutting deck and facing UP on tractors with a 46" cutting deck.

20.12. Remove the cotter pin from the brake rod ferrule. Use a new cotter pin during reassembly. Part # 714-0111. See Figure 44.

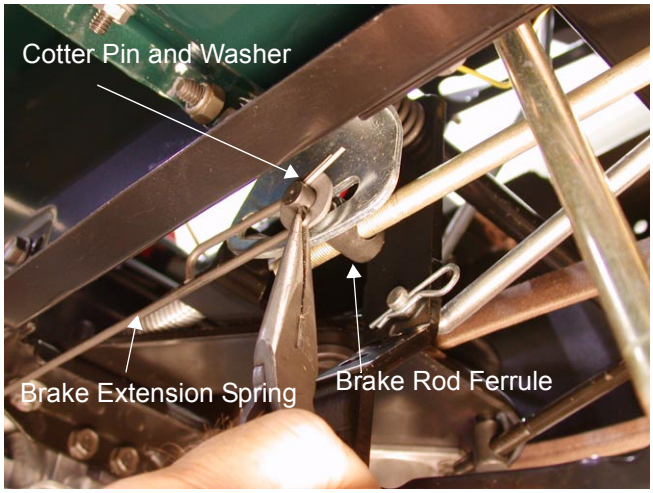

Figure 44

20.13. Remove and washer and the brake extension spring from the ferrule at the base of the speed control arm. See Figure 44.

20.14. Remove the extension spring from the brake actuation arm.

NOTE: During assembly, insert the extension spring through hole of the brake arm from the transmission side of the arm.

20.15. Remove the hair pin and washer from the ferrule attaching the shift rod to the shift lever assembly. See Figure 45.

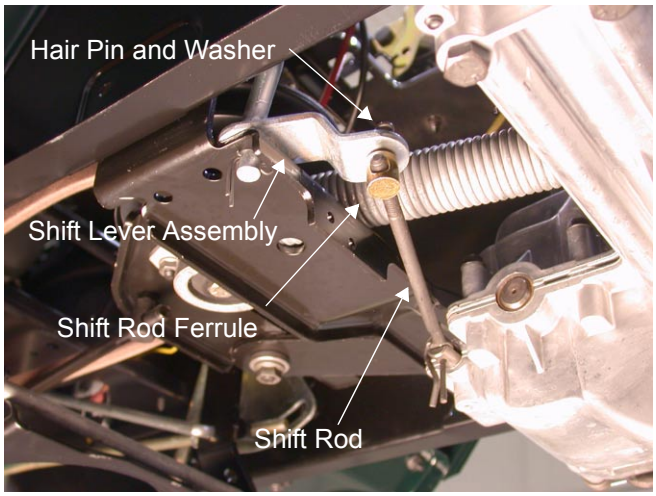

Figure 45

NOTE: To maintain adjustment, wrap a piece of tape around the ferrule and shift rod to hold it in position.

20.16. Using a 1/2 inch socket, remove the two self tapping screws securing the transmission to the torque bracket. See Figure 46.

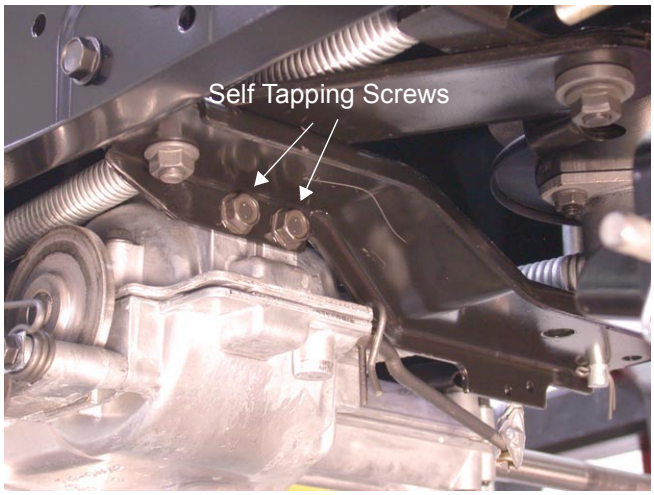

Figure 46

NOTE: There are four mounting holes machined into the transmission for mounting the transmission to the torque bracket. The LOWER holes are used when installing the transmission into a tractor that has a 38” or 42” cutting deck. The UPPER holes are used when installing the transmission into a tractor with a 46” cutting deck.

20.17. Using a 1/2 inch socket and 1/2 inch box wrench, remove the four (two on each side) hex cap screws and flange lock nuts securing the transmission to the frame. See Figure 47.

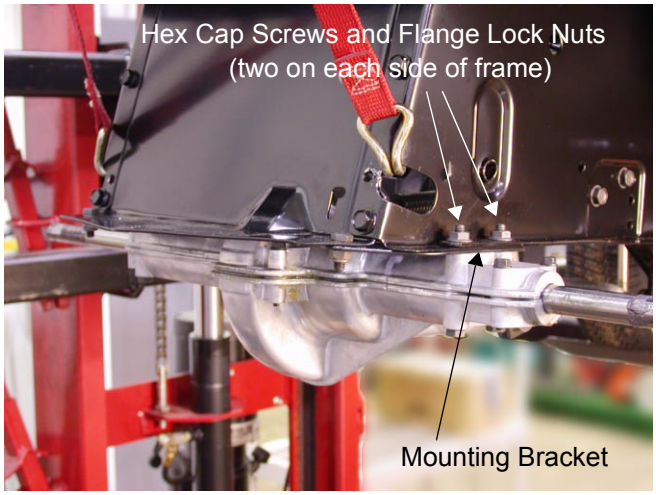

Figure 47

NOTE: There are two (one on each side) transmission mounting brackets providing additional support for the frame and transaxle.

NOTE: You will find two additional spacers (one on each side) used on tractors with a 46” cutting deck. Make sure to install these spacers during reassembly in order to provided enough clearance for the cutting deck.

20.18. Remove the transmission from the tractor. See Figure 48.

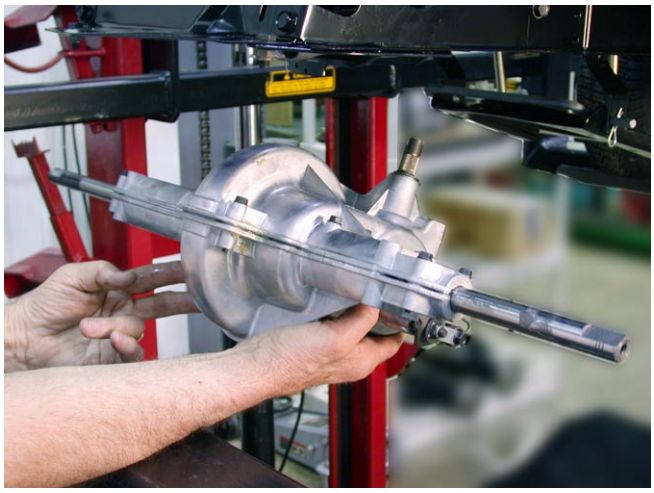

Figure 48

NOTE: When removing the final two bolts (one from each side) use an assistant or support the transmission from below to ease removal from the tractor.