

Shop Handbook



830-860 Series mowers

NOTE: These materials are for use by trained technicians who are 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.

© Copyright 2006 MTD Products Inc. All Rights Reserved

MTD Products Inc - Product Training and Education Department

FORM NUMBER - 769-03727

12/2007

www.mymowerparts.com



Chapter 1: Introduction	1
830 series	
860 series	2
Chapter 2: Front wheels and axle	3
Front wheels	3
Front axle	3
Chapter 3: Cutting blade	
Chapter 4: Drive belt and baffles	7
Chapter 5: Speed control system	10
How the speed control works	10
Speed control cable and lever	11
Clutch cable replacement	
Chapter 6: Transmission and rear wheels	16
Transmission replacement	16
Low wheel mower	
Large-wheel mowers	21

CHAPTER 1: INTRODUCTION

The 830 and 860 Series lawn mowers are rear-wheel drive self-propelled mowers with a unique variable ground speed feature. They are both capable of mulching, bagging or side-discharging grass clippings. Both mowers have a 21" (53cm) cutting swath.

NOTE: This manual was prepared using preproduction mowers. The information contained in the manual is true at the time of writing, but the equipment may change without notice.

NOTE: This manual is intended to help professional technicians become acquainted with newly introduced equipment, so that they can do their jobs faster, better, and more easily. If the user of this manual lacks tools or expertise necessary to safely perform the tasks described, they should seek the assistance of a trained professional.

NOTE: As should be standard operating procedure for any professional, test the operation of the mower after any repair work, before returning it to service.

CAUTION: Disconnect and ground the spark plug wire whenever there is a risk of injury from rotating parts. Working on the cutting blade or drive system are two examples of situations that could place a technician at risk.

CAUTION: Take measures to avoid the creation of a fire hazard when working around equipment that would normal contain fuel:

- Drain and store fuel in safe containers.
- Clean any fuel spills immediately.
- Avoid exposing fuel to heat sources or open flame.

NOTE: Replace any worn or damaged fasteners. If a lock washer or bellville washer has lost its tension, replace it. If the locking feature of a self-locking nut has worn, replace the nut, or install it using releasable thread-locking compound such as LoctiteTM 242 (blue).

830 series

The 830 series is identified by and eleven digit model number, e.g.: 12A-<u>83X</u>-XXX.

"12" indicates that it is a self-propelled mower,
"A" identifies the first generation of the model series.

"A" identifies the first generation of the model series.
"A" may be followed by an engine identifier.
The "X"s will be style and retailer identifiers. Engines from different manufacturers may be used on different models. The models depicted here are in Troy-Bilt livery, but similar models may be produced in different lines and for different retailers. See Figure 1.1.



Figure 1.1

860 series

The 860 series is very similar to the 830 Series except for large rear wheels and some engineering differences that are necessary to accommodate the large rear wheels. See Figure 1.2.



Figure 1.2

Differences include:

- Lower handlebars are longer on the 860 Series than they are on the 830 Series.
- The single-point height adjust lever is on the lefthand side on the 830 Series, but it is on the right-hand-side on the 860 Series.
- The handlebar brackets are different between the two models.
- The 860 Series has different final-drive gears, including an idler gear between the transmission axle and the ring gear in the rear wheel.

CHAPTER 2: FRONT WHEELS AND AXLE

Front wheels

The front wheels fit over the ends of the axle, and are held to the axle by nuts. See Figure 2.1.



Figure 2.1

To remove the front wheels:

- 1. Loosen the wheel nuts using a 9/16" wrench.
- 2. Tilt the mower up so that the weight of the mower is not resting on the front wheels.
- 3. Remove the nuts, and pull the front wheels off of the mower. See Figure 2.2.



Figure 2.2

4. When reinstalling the front wheels, tighten the nuts to a torque of 12 ft.-lb.(166.3 N-m).

Front axle

To remove the front axle:

- 1. Remove the front wheels.
- 2. Set the height adjuster lever to the highest position, relieving the load on the lift-assist torsion spring on the front axle. See Figure 2.3.

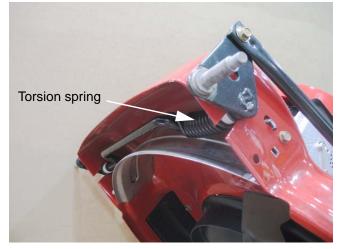


Figure 2.3

3. Remove the shoulder screw that holds the height adjuster connecting link to the front axle. Use a 3/8" wrench. See Figure 2.4.



Figure 2.4

CAUTION: The torsion spring on the front axle will be under tension, even in the highest cutting position.

4. Just inside of the deck shell, near each end of the axle is a white plastic "C" clip. Remove both "C" clips. See Figure 2.5.

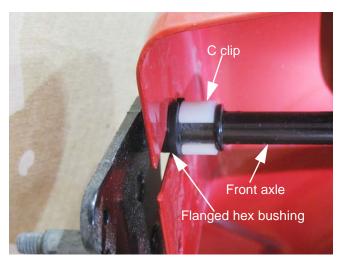


Figure 2.5

 The "C" clips hold flanged hex bushings into keyhole slots in the deck shell. Slide the hex bushings in to release them from the deck shell. See Figure 2.6.

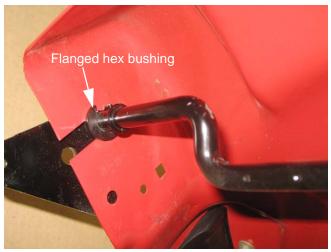


Figure 2.6

 As the flanged hex bushings are released from the deck shell, the axle will come free of the shell. Maneuver the front axle to unhook the torsion spring from the deck shell. See Figure 2.7.



Figure 2.7

 The torsion spring is captive on the front axle. If either is damaged, both must be replaced. See Figure 2.8.

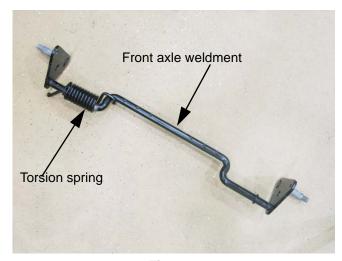


Figure 2.8

- 8. Reinstall the front axle by reversing the steps used to remove it.
- Replace the "C" clips if they have lost their tension.
- Replace the flanged hex bushings if they are worn.
- Do not trim the flanged hex bushings to ease installation. They should be tight.

CHAPTER 3: CUTTING BLADE

To remove the cutting blade:

- 1. Disconnect and ground the spark plug wire.
- If the level of gasoline in the fuel tank is great enough that it will spill if the mower is tipped, remove the fuel filler cap, place a plastic bag over the neck of the fuel tank, and reinstall the cap.
- 3. Tip the mower with the muffler side down, or tilt the mower back on a work bench, with the front wheels up. See Figure 3.1.

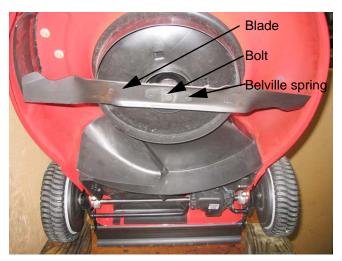


Figure 3.1

- 4. Block the blade form rotating using a block of wood or a blade holder tool.
- 5. Remove the blade bolt and diamond-shaped bellville blade spring using a 5/8" wrench.

6. Lift away the blade. See Figure 3.2.



Figure 3.2

- 7. Inspect the blade. If it is bent or worn beyond proper sharpening, replace it with a new blade.
- 8. Sharpen and balance the blade if it is not badly worn.

NOTE: The 830 and 860 Series mowers have a 3-in-1 blade. The outer part of the leading edge cuts the grass. A wing behind it lifts the grass for the next blade and propels clippings toward the bag or side discharge chute if the path to either is open. A stepped-up cutting edge just in-board of the outer cutting edge mulches clippings as they fall, if the side discharge chute is closed and the mulch plug is in place.

9. Check the blade adaptor for damage. There is a wave washer on the crankshaft, directly above the wave washer. See Figure 3.3.

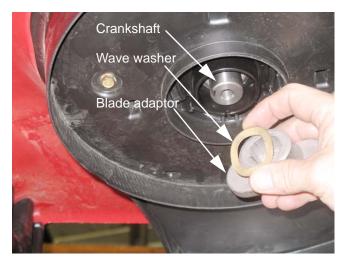


Figure 3.3

Install the blade with wave washer, blade adaptor, and bellville spring washer properly positioned. Tighten the blade bolt to a torque of 38-50 ft.-lb. (51-68 N-m).

CHAPTER 4: DRIVE BELT AND BAFFLES

To remove the drive belt:

1. First remove the mulch plug. See Figure 4.1.

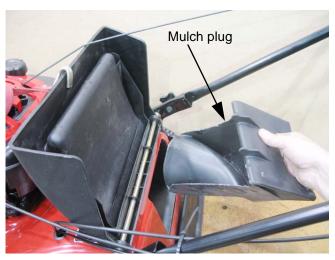


Figure 4.1

- 2. Remove the blade as described in Chapter 2: Cutting blade..
- 3. Remove the baffle extension cover using a 3/8" wrench. See Figure 4.2.



Figure 4.2

- 4. Remove the rear baffle:
 - 4a. Remove the two screws that hold the rear of the baffle to the mower deck. The screws are located just in front of the handlebar brackets, and can be removed using a 3/ 8" wrench. There is one on the left and one on the right. See Figure 4.3.



Figure 4.3

4b. Remove the two nuts and bolts that hold the right handlebar bracket to the mower deck using a pair of 1/2" wrenches. They do not hold the baffle in place, but they get in the way of its removal. See Figure 4.4.

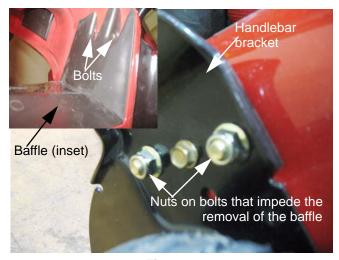


Figure 4.4

- 5. Remove the single screw that holds the front of the baffle to the mower deck, using a 3/8" wrench.
- 6. Pull the front edge of the baffle down, and remove it from the mower. See Figure 4.5.



Figure 4.5

- 7. Crankshaft pulley cover removal:
 - 7a. Remove the three screws that hold the crankshaft pulley cover to the mower deck using a 3/8" wrench.
 - 7b. Pull the crankshaft pulley cover and the lower sheave of the crankshaft pulley down, freeing the belt from the crankshaft pulley. See Figure 4.6.

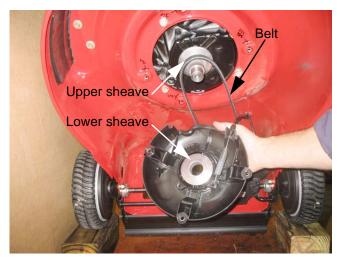


Figure 4.6

- 8. Remove the belt by:
 - 8a. Pull the belt down off of the crankshaft. See Figure 4.7.



Figure 4.7

8b. Slip the belt out of the transmission pulley, and remove it. See Figure 4.8.



Figure 4.8

9. Check the crankshaft pulley:

9a. The splines in both sheaves of the crankshaft pulley should be clean and smooth, so that they slide together easily. See Figure 4.9.

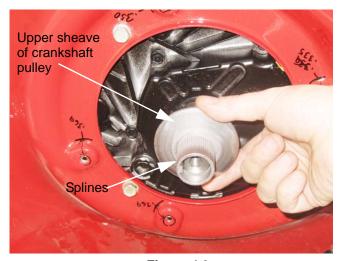


Figure 4.9

NOTE: The splines should not need lubrication. If any lubrication is applied, use a dry PTFE (TeflonTM) or graphite based lubricant in very sparing quantities.

9b. The upper sheave of the crankshaft pulley should slide off of the crankshaft. There is a spacer above the sheave. The length of the spacer will vary with the engine model. If one end of the I.D. of the spacer is rounded or beveled, that is the end that goes up, toward the engine. See Figure 4.10.



Figure 4.10

10. Replace the belt:

- 10a. Reverse the removal process.
- 10b. It will help to spread the sheaves on the transmission pulley, and tug the belt deep into the sheaves of the transmission pulley. This will leave the maximum amount of slack in the belt, so it is easier to slip around the crankshaft pulley. See Figure 4.11.

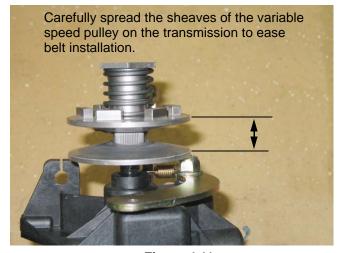


Figure 4.11

NOTE: Use only the Original Equipment belt. Other belts of slightly different size or profile will effect the grounds speed of the mower. Belts of different material may wear-out faster.

CHAPTER 5: SPEED CONTROL SYSTEM

How the speed control works

1. The red lever on the control panel applies tension to a cable. See Figure 5.1.



Figure 5.1

2. The cable runs down into the crankshaft pulley cover, where it pulls on an arm that rotates a cam. See Figure 5.2.

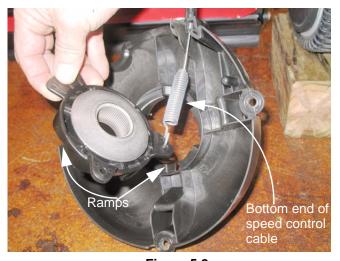


Figure 5.2

- The cam has a series of ramps that work against ramps in the crankshaft pulley cover, forcing the two sheaves of the crankshaft pulley together.
- 4. When the crankshaft pulley sheaves squeeze together, the force the contact patch of the drive belt further out on the pulley. The outer part of the pulley travels at a higher linear speed than the part closer to the crankshaft, shifting the drive ratio in the direction of greater speed.
- 5. The belt does not stretch any significant amount. When the engine end pulley effectively grows, the tension on the belt increases.
- 6. The sheaves on the transmission pulley are spring-loaded to react to the added belt tension. See Figure 5.3.

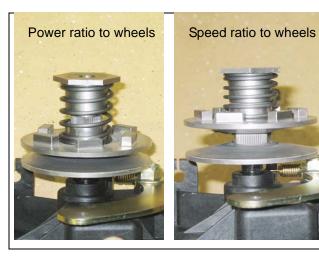


Figure 5.3

 The driven pulley (transmission) reaction is opposite of the driving (engine) pulley. As a given linear belt speed is applied to an effectively smaller pulley, the drive ratio shifts in the direction of increased speed. See Figure 5.4.

Power ratio to wheels Speed ratio to wheels

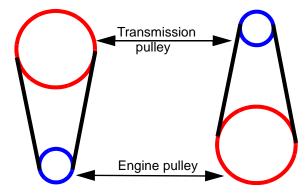


Figure 5.4

Speed control cable and lever

- Remove the crankshaft pulley cover, as described in the "DRIVE BELT" section of this manual.
- 2. Un-hook the spring from the arm on the speed control cam. See Figure 5.5.



Figure 5.5

3. Release the barbed fitting on the end of the cable housing from the clutch housing. A 9mm open-end wrench or a Ford fuel line tool can be used to release the barbs. See Figure 5.6.



Figure 5.6

4. Draw the cable and spring up through the opening in the deck that the cables pass through. See Figure 5.7.

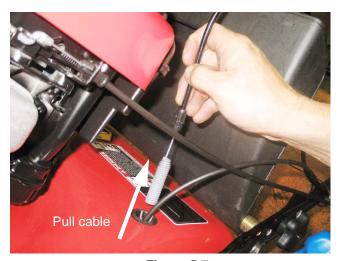


Figure 5.7

5. Remove the three screws holding the cover to the bottom of the control panel using a 1/4" wrench or driver. Pull-down the cover to remove it. See Figure 5.8.

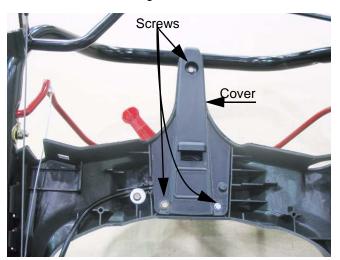


Figure 5.8

6. Beneath the control panel on the handlebar, remove the cable clamp screw that holds the speed control cable in place. Use a 5/16" wrench or driver. See Figure 5.9.



Figure 5.9

Pull the cable housing free of the control panel.
 The stop at the end of the cable housing is usually placed in the notch that is second-nearest the control lever assembly. See Figure 5.10.

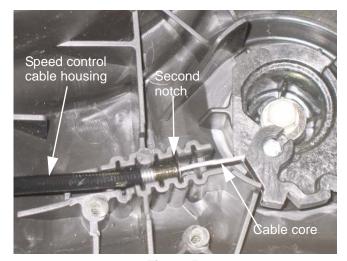


Figure 5.10

NOTE: Moving the cable to a notch that is closer to the control lever will shift the range of available ground speeds in a slower direction. Moving the cable to a notch that is further from the control lever will shift the range of available ground speeds in the faster direction.

8. From this point, the cable-end can be maneuvered out of the control lever assembly, and the cable can be removed completely.

See Figure 5.11.



Figure 5.11

- 9. Install the replacement cable by reversing the removal process.
- 10. Speed Control lever:
 - 10a. Disconnect the top end of the speed control cable, as described in the "Speed Control Cable" section of this chapter.
 - 10b. Remove the detent spring: See Figure 5.12.

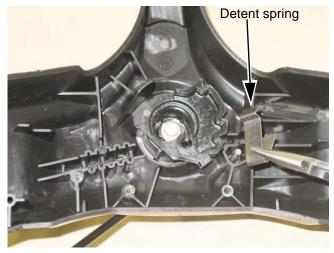


Figure 5.12

10c. Separate the control lever from the cable quadrant by removing the screw that connects them. Use a 5/16" wrench or driver. See Figure 5.13.

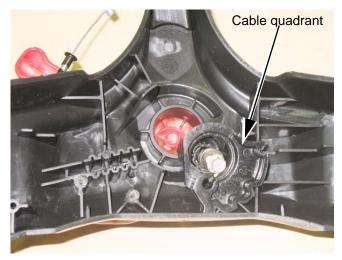


Figure 5.13

10d. Pay attention to the orientation of the lever to the control panel and the quadrant during reassembly. See Figure 5.14.

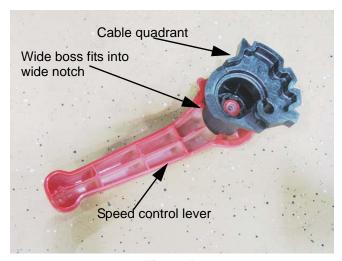


Figure 5.14

10e. Reassemble the control panel by reversing the order of disassembly.

NOTE: Some technicians find it easier too instal the detente spring before installing the lever and quadrant.

Clutch cable replacement

- 1. Preparation:
 - Remove the baffle as described in Chapter 4: Drive belt and baffles.
 See Figure 5.15.



Figure 5.15

1b. Disconnect either end of the speed control cable as described in the "SPEED CON-TROL CABLE AND LEVER" section of this chapter, and pull it through the opening in the deck.

NOTE: The spring on the end of the clutch cable is large enough that it is extremely difficult to pull through the opening in the deck with the speed control cable in place.

 A barbed fitting and a spring connect the bottom end of the clutch cable to the transmission. See Figure 5.16.

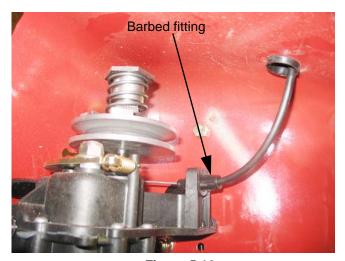


Figure 5.16

 Squeeze the barbs on the cable housing to release it from the bracket on the transmission. A 9mm open-end wrench or a Ford fuel line removal tool may be handy for this task. See Figure 5.17.

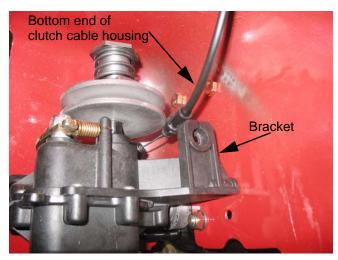


Figure 5.17

4. Once the cable housing is released from the bracket, the spring on the end of the cable core can be un-hooked from the clutch arm on the transmission. See Figure 5.18.

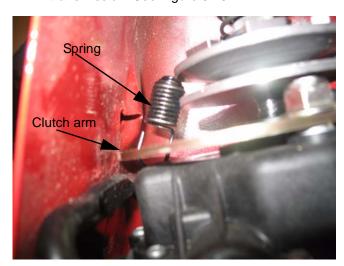


Figure 5.18

5. Pull the cable and spring through the opening in the deck. See Figure 5.19.

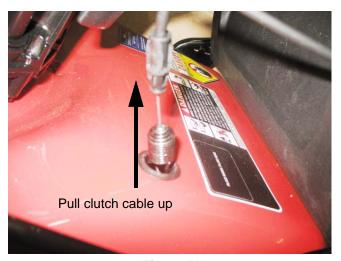


Figure 5.19

6. Remove the push-barb fasteners that hold the control panel to the upper handlebar. See Figure 5.20.

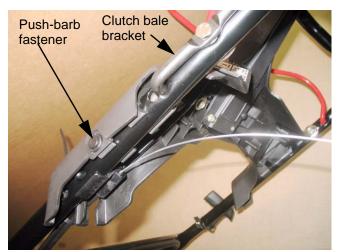


Figure 5.20

7. Pry the cable bracket loose from the upper handlebar. See Figure 5.21.

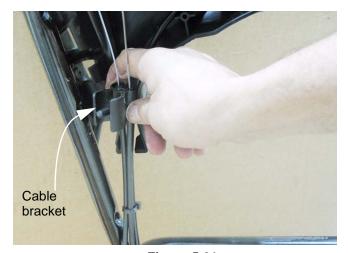


Figure 5.21

8. With the cable slack, the Z-fitting at the top end of the cable core can be un-hooked from the clutch bale. See Figure 5.22.

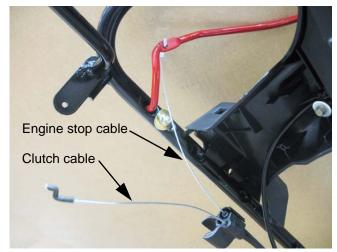


Figure 5.22

NOTE: Depending on parts availability, the cable may have to be replaced in tandem with the engine stop cable.

9. Install the replacement cable by reversing the removal process.

CHAPTER 6: TRANSMISSION AND REAR WHEELS

Transmission replacement

NOTE: The internal parts of the transmission are not serviceable.

- If the mower suffers a drive failure that cannot be attributed to the belt, control cables, or variable speed pulleys, replace the transmission.
- If the transmission is visibly damaged (broken), replace the transmission.

Low wheel mower

- 1. Preparation:
 - 1a. Remove the baffle as described in Chapter4: Drive belt and baffles. See Figure 6.1.



Figure 6.1

1b. Set the cutting height to the highest position.

1c. Support the mower by the back of the deck, in such a way that the rear wheels can be removed. See Figure 6.2.

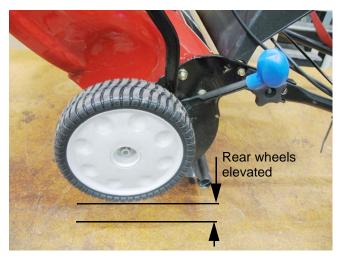


Figure 6.2

- 2. Rear wheel and dust cover removal:
 - 2a. Remove the rear wheels using a 1/2" wrench. See Figure 6.3.

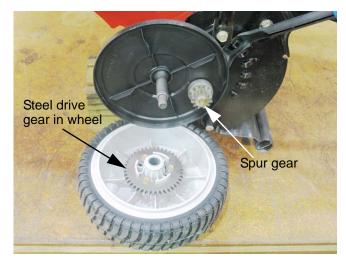


Figure 6.3

2b. Hold the rear drive axle to prevent it from rotating, and remove the spur gears using a T-20 Torx driver. See Figure 6.4.

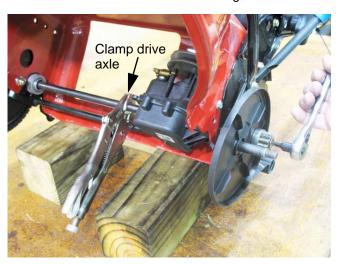


Figure 6.4

NOTE: The spur gears are side specific.

- The one that goes on the left side is stamped with and "L", and the one that goes on the right side is stamped with an "R".
- If they are mounted on the wrong sides, the wheels will not drive.

NOTE: The screws holding the spur gears to the drive axle are both conventional right-hand thread.

2c. Slip the spur gears off of the drive axle ends. See Figure 6.5.

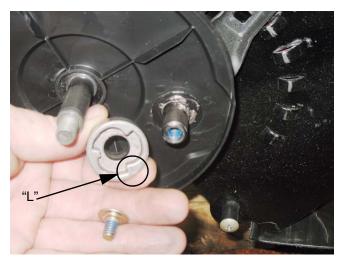


Figure 6.5

NOTE: The Torx screw that holds the spur gear to the drive axle should be installed with releasable thread locking compound such as LoctiteTM 242 (blue). Tighten it to a torque of 110-120 in.-lb. (12.5-13.6 N-m)

2d. Pull the drive pins out of the cross-holes in the drive axle. The pins should be lubricated with a small amount of anti-seize compound on reassembly. See Figure 6.6.

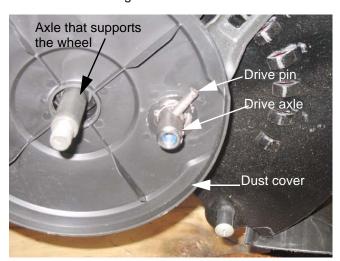


Figure 6.6

 Remove the plastic dust cover that fits between the wheel and the height adjuster bracket.

- 3. Releasing the axle bearings
 - 3a. Remove the screws that hold the height adjustment handle and the height adjuster connecting link to the left rear height adjuster. See Figure 6.7.

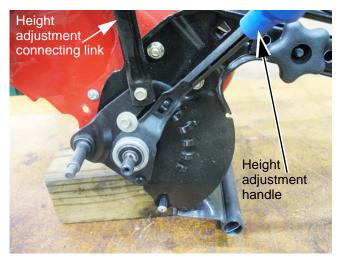


Figure 6.7

3b. From inside the cutting deck pry-off the metal "C" clips that lock the axle bearing keepers onto the axle bearings (left and right sides). See Figure 6.8.

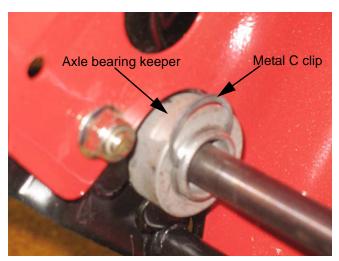


Figure 6.8

3c. Pull the bearing keepers back (inward) to release the bearings from the height adjuster brackets. See Figure 6.9.

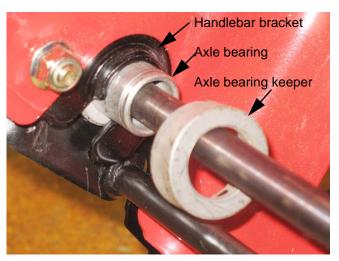


Figure 6.9

3d. Drive the axle bearing assemblies outward to release the axle. See Figure 6.10.



Figure 6.10

- 4. Transmission removal from deck
 - 4a. With the axle bearing assemblies free of the deck, the axle will move, but the transmission is still attached to the deck. See Figure 6.11.

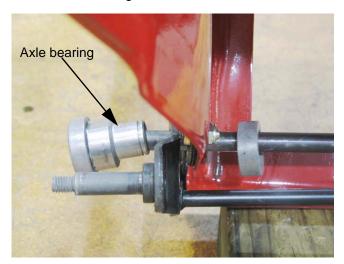


Figure 6.11

4b. Remove the last screw that holds the transmission to the deck. See Figure 6.12.

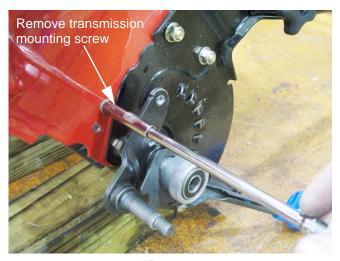


Figure 6.12

4c. Once the transmission is free of the deck, the clutch cable can be easily disconnected as described in Chapter 5: Speed control system. See Figure 6.13.



Figure 6.13

5. Remove the transmission from the wheel carrier weldment. See Figure 6.14.

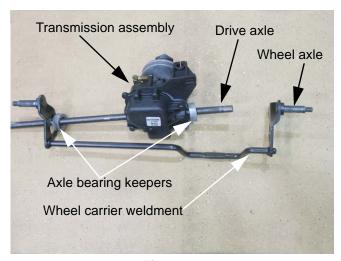


Figure 6.14

- 5a. Slip the transmission in the direction of the longer drive axle shaft, disengaging the shorter drive axle shaft from the wheel carrier assembly.
- 5b. Remove the axle bearing keepers from the axle.
- 5c. If the axle bearing keepers are in good condition, transfer them to the replacement transmission.

Removing the variable speed pulley from the top of the transmission:

NOTE: New transmissions may or may not be supplied with the variable speed pulley attached. If it is necessary to transfer the pulley to the replacement transmission, or if repair to the variable speed pulley is necessary, use the following directions as a guide.

6a. Hold the input shaft from turning using a 7/ 16" wrench while unscrewing the shouldered nut using a 1-1/8" wrench. The nut uses a conventional right-hand thread. See Figure 6.15.



Figure 6.15

6b. The nut will be under slight spring tension.

Once the nut clears the end of the threads on the input shaft, remove the nut and the spring. See Figure 6.16.

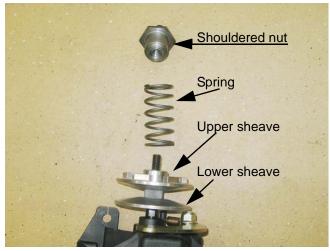


Figure 6.16

6c. With the nut and spring removed, the variable speed pulley can be lifted off of the input shaft. See Figure 6.17.



Figure 6.17

6d. The two sheaves of the variable speed pulley can be separated for cleaning or inspection. See Figure 6.18.



Figure 6.18

NOTE: The splines should not need lubrication. If any lubrication is applied, use a dry PTFE (TeflonTM) or graphite based lubricant in very sparing quantities.

- 6e. Reassemble the variable speed pulley by reversing the removal process. Tighten the shoulder nut to a torque of 110-120 in.-lbs. (12.5-13.6 N-m).
- 7. Install the replacement transmission by reversing the steps used to remove the transmission.

Large-wheel mowers

Differences between the 830 Series (small rear wheels) and the 860 Series (large rear wheels) include:

- An added reduction gear within the rear wheel to keep the ground speed within the desired range.
- Different handlebar bracket / height adjuster bracket assemblies
- Shorter lower handlebars on the 860 series.
- Different height adjuster connector link and handle.
- Height adjuster lever on opposite sides of the mower: left--hand side for 830, right-hand side for 860.
- Straight rear wheel carrier assembly (rear axle) on the 860 Vs. bowed rear wheel carrier assembly on the 830.
- The rear wheels and covers

Rear wheel removal:

1. Pry-out the outer edge of the wheel cover. See Figure 6.19.



Figure 6.19

2. The wheel cover is held to the rear wheel by a relatively small grip-ring, near the hub of the wheel. See Figure 6.20.

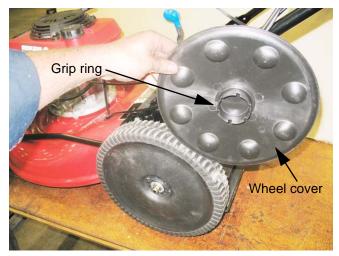


Figure 6.20

- 3. Remove the nut and flat washer from the axle using a 9/16" wrench.
- 4. Pull the wheel off of the wheel axle. See Figure 6.21.

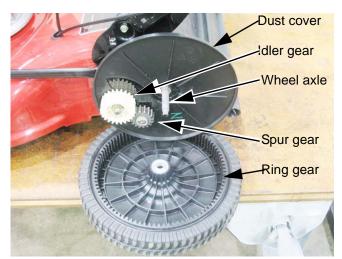


Figure 6.21

NOTE: The 830 Series employs a spur gear that drives against the outside of the gear attached to the wheel. In that arrangement, the spur gear and the wheel rotate in opposite directions. The 860 Series uses a spur gear to drive an idler in the opposite direction. The idler then drives against the inside of a ring gear on the wheel, driving the wheel in the same direction as the idler. This arrangement permits use of one transmission with two reduction ratios.

5. The idler gear is easily removed using a 9/16" wrench. See Figure 6.22.

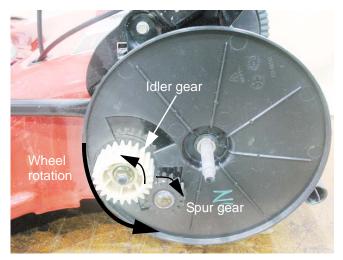


Figure 6.22

- 6. The spur gears are directional. See Figure 6.23.
- If a left gear is installed on the right side, it will not drive the right wheel.
- If a right gear is installed on the left side, it will not drive the left wheel.
- Each gear is marked with an "L" or an "R".



Figure 6.23

7. The spur gear can be removed with a T-20 Torx driver. The axle must be clamped, to prevent it from rotating. See Figure 6.24.

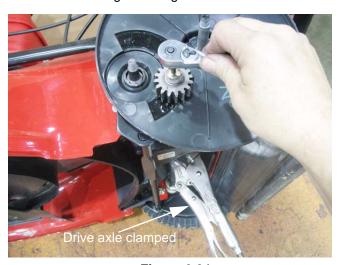


Figure 6.24

8. Beneath the spur gear is a drive pin. Lubricate the drive pin with a small amount of anti-seize compound on assembly. See Figure 6.25.

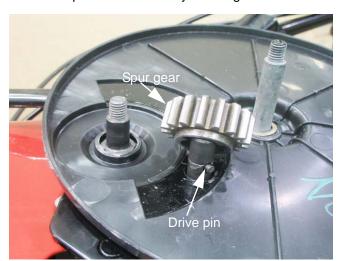


Figure 6.25

NOTE: The Torx screw that holds the spur gear to the drive axle should be installed with releasable thread locking compound such as LoctiteTM 242 (blue).

9. With the wheel, spur gear, idler gear, and drive pin removed, the dust cover can be lifted off of the axle. See Figure 6.26.



Figure 6.26

9a. With the dust covers removed, the height adjuster mechanism is exposed. See Figure 6.27.



Figure 6.27

NOTE: The height adjuster bracket pivots around the shouldered stud that carries the idler gear.

- The idler gear remains at a fixed distance from the drive axle (spur gear).
- The wheel axle, attached to the height adjuster bracket, pivots around the stud, keeping the idler gear also at a fixed distance from the wheel axle.

10. Transmission removal from the 860 Series is similar to the 830 Series: See Figure 6.28.



Figure 6.28

- 10a. Set the cutting height to the highest position.
- 10b. Support the mower, tipped-back, with the rear wheels elevated.
- 10c. Remove the baffle as described in Chapter4: Drive belt and baffles.
- 10d. Remove the rear wheels, spur gears, drive pins, idler gears, and dust covers.
- 10e. Disconnect the height adjustment connector link from the left rear height adjuster.
- 10f. Remove the height adjustment handle from the right rear height adjuster.
- 10g. Remove both idler bearing studs.
- 10h. Remove the wheel carrier weldment.
- 10i. Release the axle bearings.
- 10j. Loosen the bolts that hold the right rear height adjuster to the mowing deck.
- 10k. Slip the transmission assembly to the right to remove the axle from the left axle bearing, then move it left to free it of the right axle bearing.
- 10l. Disconnect the clutch cable, and remove the transmission.