



# Service Manual

## 2166 Lawn Tractor

**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.

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***MTD Products Inc. - Product Training and Education Department***

**THE CUB CADET SERIES 2000 TRACTOR MODEL # 2166 – 13A-214G100 SERIAL # 1E04G30005**

**1. GENERAL INFORMATION**

1.1. Removing the tractor out of the crate requires a Electric Drill or suitable air tool with a short extension and a 1/4 inch socket, to remove the wood-screws that hold the top on the crate. After removal of the top it is easy to use a pry bar to remove both ends and sides. Remove the wheel blocks and cut the tie straps that secures the tractor to the pallet. See Figures Below.



**CUB 2166**

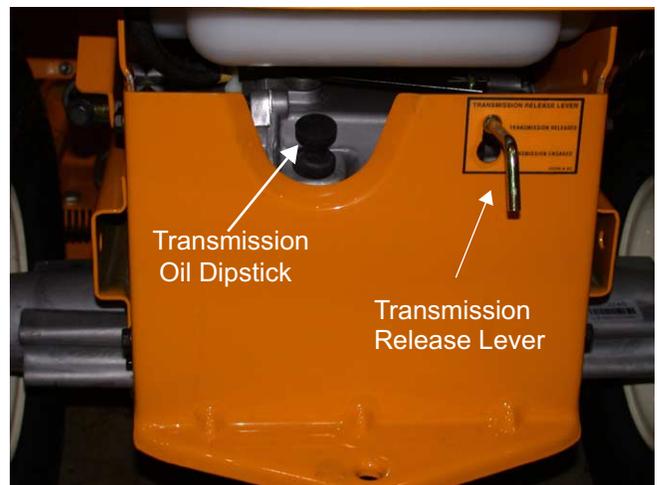


**TRACTOR IN CRATE**



**MISSILE DEFLECTOR**

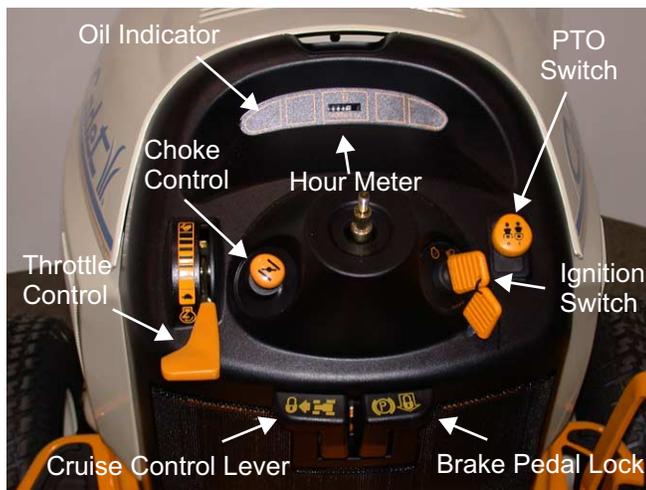
1.2. The missile deflector for the cutting deck is under the tractor and is tied to the steering rod. Cut the strap and secure the missile deflector to the cutting deck. The cutting deck comes already installed on the tractor. Release the parking brake, check the transmission is in the released position in order to roll the tractor off the pallet. The tractor is shipped with gas and oil in the engine, but it is always a good practice before starting to check the oil. See Figure 1.2.



**Figure 1.2**

## Cub Cadet 2166

- 1.3. With the steering wheel removed for clarity, you are able to view the dash controls, moving from left to right you can see the throttle control, choke control, low oil indicator, hour meter that operates whenever the ignition switch is on. The hour meter records the actual hours of operation to ensure all maintenance procedures are completed according to the schedule in the owner's manual. The PTO switch is next which operates the front PTO clutch to the cutting deck. The ignition switch is a combination four-position switch: lights, on-off and start. See Figure 1.3.

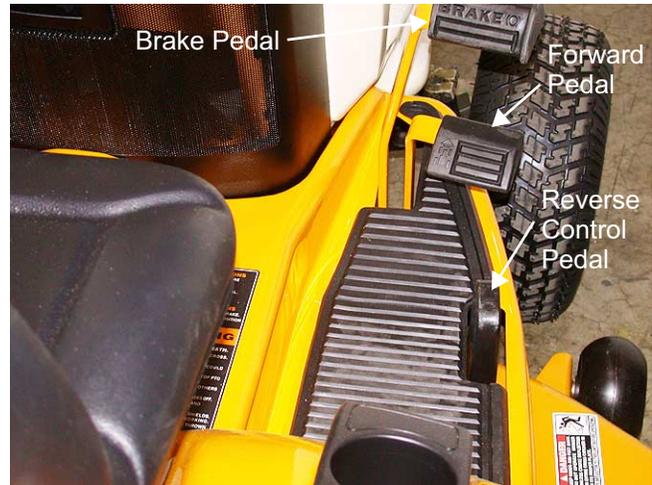


**Figure 1.3**

- 1.4. In the lower left center of the dash is the cruise control lever. This lever can be used to maintain a desired "foot free" forward speed in areas where constant speed changes are not required.
- 1.5. To set the cruise control, slowly depress the forward control pedal until the desired speed is achieved. Lightly push the cruise control lever downward as far as possible and hold in this position. While continuing to hold the lever down, lift your foot from the forward control pedal, (you should feel the cruise latch engage.)
- 1.6. Disengage the cruise control one of three ways,  
1. Depress the brake pedal and stop the tractor.  
2. Lightly depress the forward control pedal.  
3. Lift the cruise control lever upward.
- 1.7. The brake lock lever, located right of center of the dash panel below the steering wheel, is identified with the (P) symbol. Always engage the brake pedal lock when dismounting the tractor. To engage the brake pedal lock, depress the brake pedal and push down on the brake pedal lock lever. Hold the lever down while releasing

the brake pedal. The lever should lock in the down position.

- 1.8. On the right side of the running board is the reverse control pedal. Press the pedal downward to move in reverse. See Figure 1.8.



**Figure 1.8**

- 1.9. The left rear fender has the deck lift handle and height indicator; inside the left rear fender is an adjustable lift assist spring; the effort required to operate the implement lift handle can be varied by loosening or tightening the lift assist spring adjusting bolt. The bolt can be accessed from the rear of the tractor. See Figure 1.9.



**Figure 1.9**

- 1.10. You can also view the five position, seat adjustment lever in front of the seat.

1.11. The fuses are located under the hood between the indicator lamps and the hour meter. The fuses are to protect the harness against excessive amperage caused by a short in the wiring harness or in the safety interlock system. Should a malfunction occur they are easily accessible. See Figure 1.11.

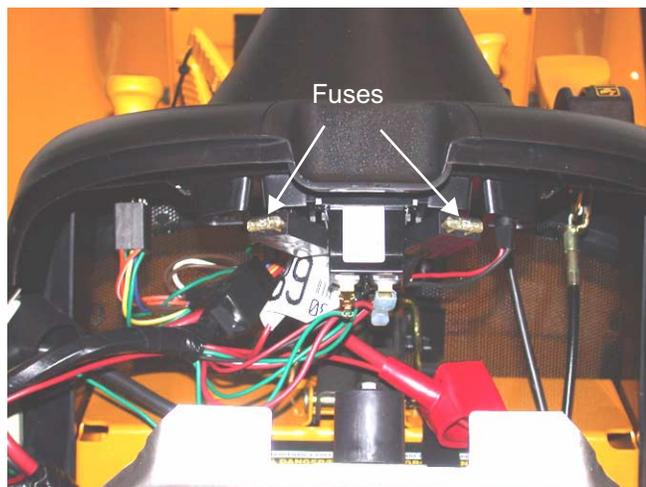


Figure 1.11

1.12. The side panels can easily be removed by just loosening the top two wing nuts inside at the top of the panel. Grasp the side panel just behind the grille and pull outward to release the panel from the tapered bushings on the grille. Slide the panel forward out of the grooves on back of the dash, and lift upwards. See the Owner's Manual for more information, if required. See Figure 1.12.

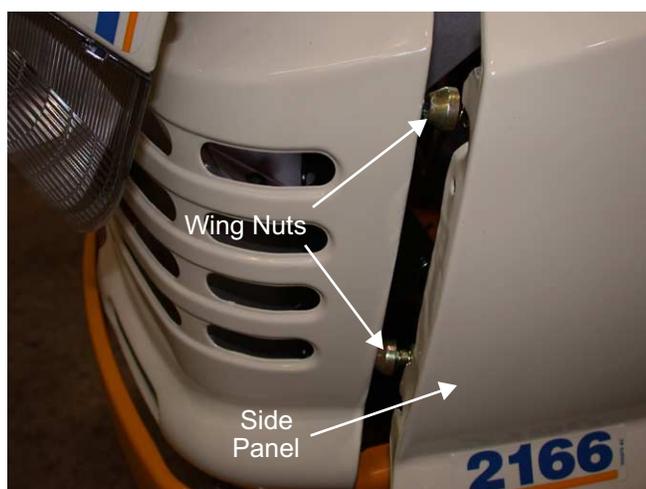


Figure 1.12

## 2. ADJUSTING THE BRAKES:

- 2.1. Engage the brake pedal lock, if the tractor can be pushed forward or rearward, the braking force needs to be increased. Release the pedal lock, if the tractor can not be pushed forward or rearward the force should be decreased.
- 2.2. The brake adjustment for the customer is difficult with the cutting deck assembly attached. It can not be viewed as shown in the owner's manual unless the fender assembly is removed. The location is inside the right running board. With the cutting deck all the way down it can be viewed from the rear. When the tractor is on a lift it could be adjusted by reaching over the deck, from the rear, pull the hair pin and adjust the ferule in or out as is necessary. There is no adjustment from the rear on the side of the transaxle as are found on other transaxles.
- 2.3. In order to further clarify the adjustment of the brakes we will remove the cutting deck.

## 3. DECK REMOVAL:

- 3.1. Idler arm lever location. Left side of the cutting deck. See Figure 3.1.

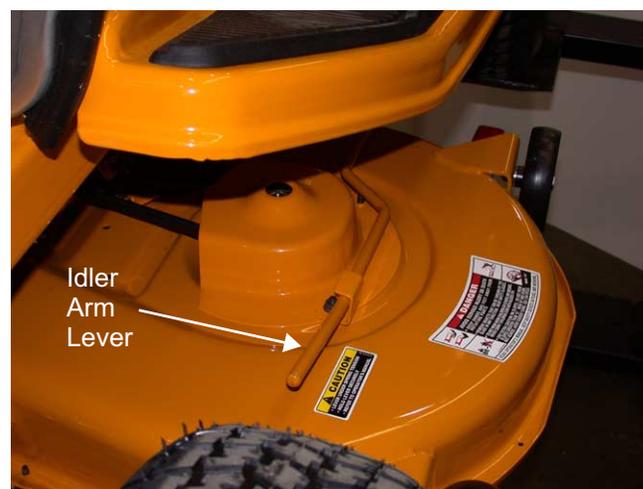
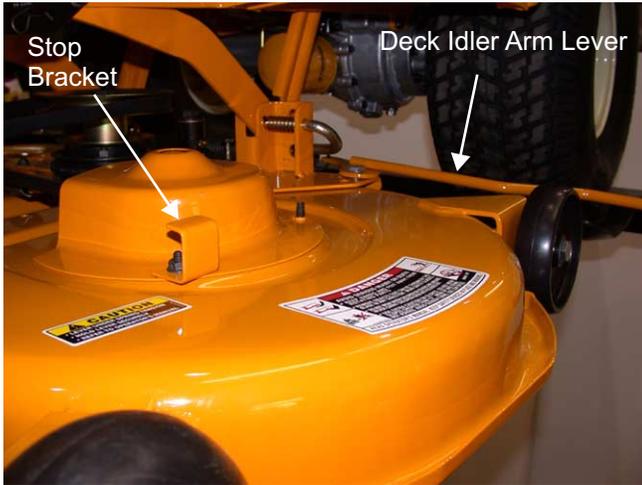


Figure 3.1

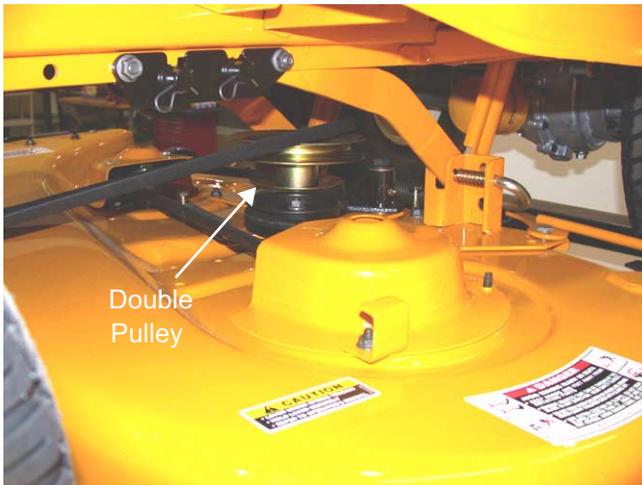
## Cub Cadet 2166

- 3.2. Disengage the deck idler arm lever from the stop bracket and release the spring tension by rotating the lever out and rearward. See Figure 3.2.



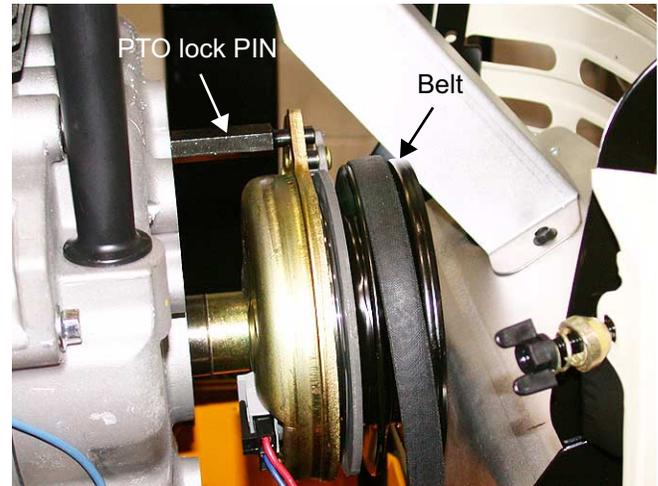
**Figure 3.2**

- 3.3. Remove the rear end of the belt from the upper pulley of the deck center double pulley. Return the idler arm back into its stop bracket. See Figure 3.3.



**Figure 3.3**

- 3.4. Open the tractor hood and remove the forward end of the belt from the PTO clutch pulley, pass the belt downward, inside the tractor frame, until the belt is below the two front lower pulleys and pull the belt clear of the tractor. See Figures Below.



**PTO CLUTCH PULLEY**



**TWO FRONT PULLEYS**

- 3.5. Pull the deck support J pins outward, turn downward and release so both spring-loaded pins are held in the disengaged position against the outer surface of the deck brackets. See Figure 3.5.



Figure 3.5

- 3.6. Raise the tractor implement lift handle to the highest setting. Slide the mower deck forward, so the front lift rod rests to the rear of, and free of, the front slots at the top of the roller bracket. See Figures Below.
- 3.7. Raise the front lift rod upward and slide the mower deck rearward. Lower the front lift rod so it rests on the front roller bracket of the deck, forward of the slots. See Figure 3.7.

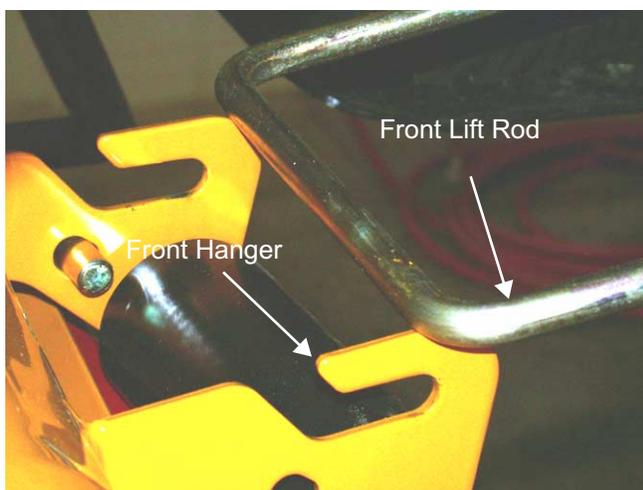
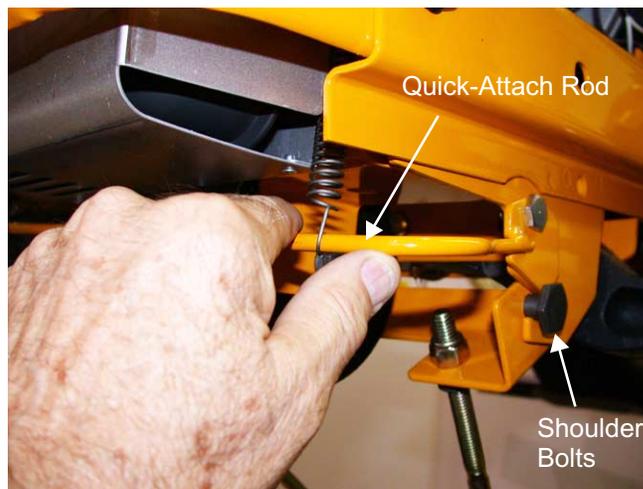
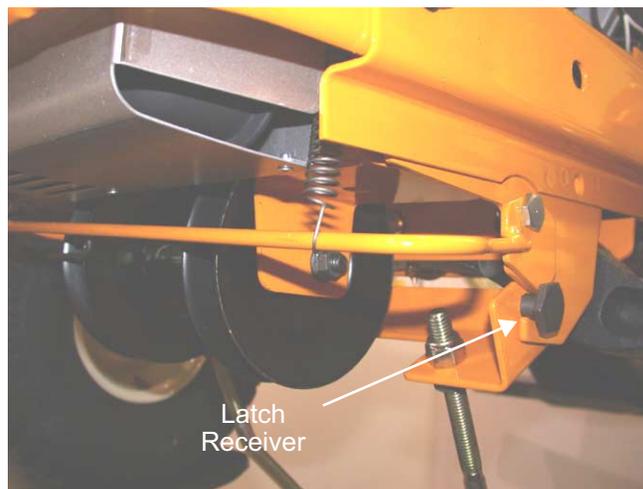


Figure 3.7

- 3.8. From the front of the tractor, push downward and hold the tractor quick-attach rod. Pull the front lift rod bracket assembly forward to release the shoulder bolts on each side of the bracket from the left and right tractor latch receivers. Release the tractor quick-attach rod. See Figures Below.



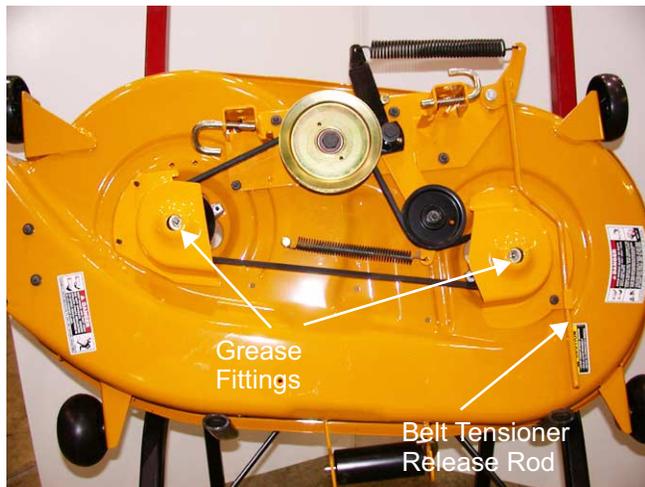
QUICK ATTACH ROD



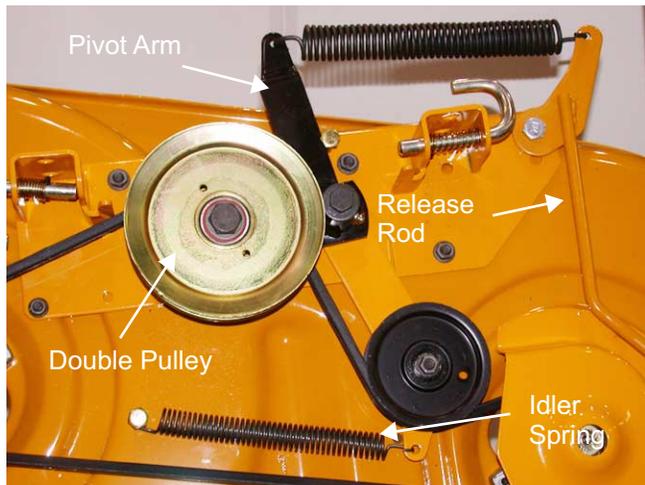
LATCH RECEIVER

## Cub Cadet 2166

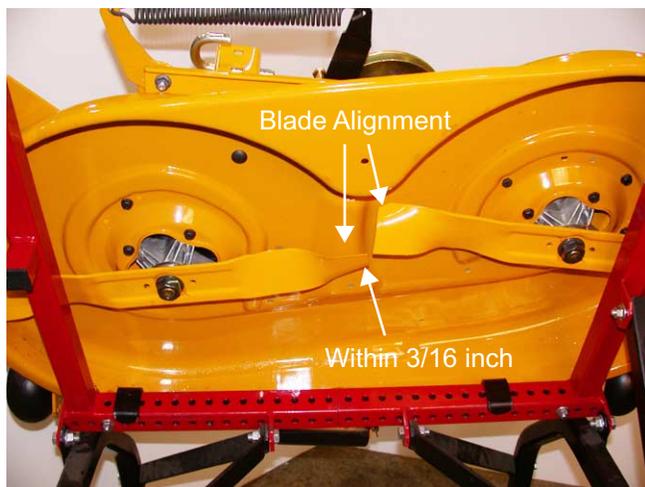
3.9. Cutting deck pictures. See Figures Below.



**GREASE FITTINGS**



**PULLEY AND SPRING**



**BLADE ALIGNMENT**

3.10. Reverse the procedure for installation

3.11. Viewing the brake adjustment rod from under the tractor with the cutting deck removed. The spring lever that pushes on the brake interlock switch is also visible from this position. The brake switch can be removed if replacement is necessary with a screwdriver prying up on the plastic spring tabs that hold the switch; it will then come out of the frame for checking or replacement. See Figure 3.11.



**Figure 3.11**

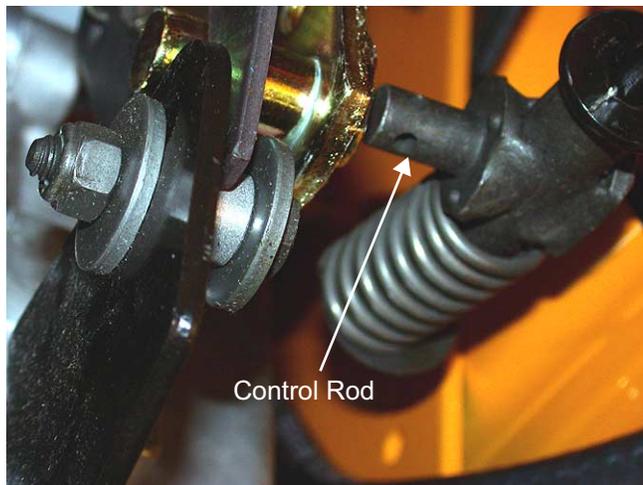
#### 4. HYDROSTATIC NEUTRAL ADJUSTMENT

**NOTE:** The following adjustments will be necessary if the tractor creeps forward when neither the forward or reverse pedals are depressed.

- 4.1. Checking the Transmission Neutral Setting:
- 4.2. Drive the tractor for approximately 5-10 minutes to warm up the transmission, then stop the engine and engage the parking brake.
- 4.3. To check and adjust the transmission neutral setting, proceed as follows:
- 4.4. Raise the rear of the tractor so that the tires are at least one inch from a surface, making sure the tractor is stable either on jack stands or hanging from straps on a lift assembly.
- 4.5. Start the tractor and release the parking brake. Observe both rear wheels for rotation on either direction.
- 4.6. If wheel rotation is observed, adjust the neutral setting as follows:
- 4.7. The control rod, Neutral control arm and Hydro-adjustment bracket assembly is found on the inside of the left running board area of the trac-

tor. To make adjustments it is best to remove the cutting deck.

- 4.8. Viewing the control rod, cruise control bracket, and the dampener connected to the drive pedal rod assembly. See Figure 4.8.



**Figure 4.8**

- 4.9. Shows the location of the Hydro pump and adjustment rods.
- 4.10. Shows the brake in the locked position for the final adjustment on the control rods as you center the rod without any pull on the control arm. See Figure 4.10.



**Figure 4.10**

- 4.11. Shows the tractor in a position for neutral adjustment. Using the Hefftee Lift with straps and the exhaust connected to an exhaust ventilating system. Also note some suitable weight on the seat is necessary because the safety switch button is in the center of the seat, therefore you are not able to just tie the seat down. See Figure 4.11.

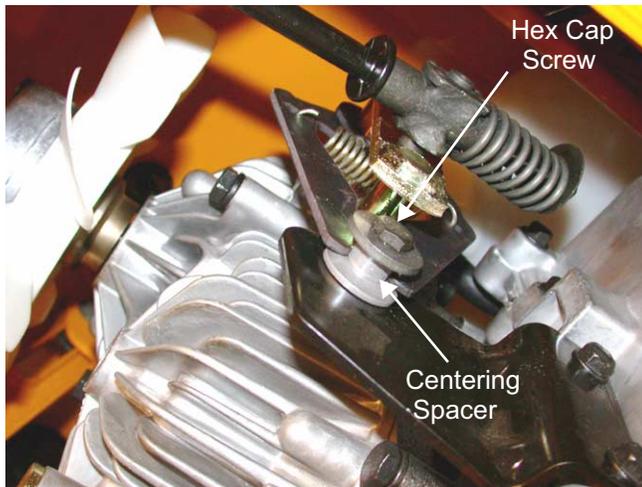


**Figure 4.11**

- 4.12. Carefully start the tractor engine and release the parking brake. Observe both rear wheels for rotation in either direction.
- 4.13. If rotation is observed, adjust the neutral setting as follows:
- 4.14. Disconnect the rear control rod from the control arm by removing the hairpin cotter from the pivot sleeve.
- 4.15. If wheel rotation stops when the rod is disconnected, check and readjust the control rod.

## Cub Cadet 2166

- 4.16. If wheel rotation continues, loosen the locknut securing the hex cap screw and centering spacer to the neutral bracket, using a 7/16 wrench. See Figure 4.16.

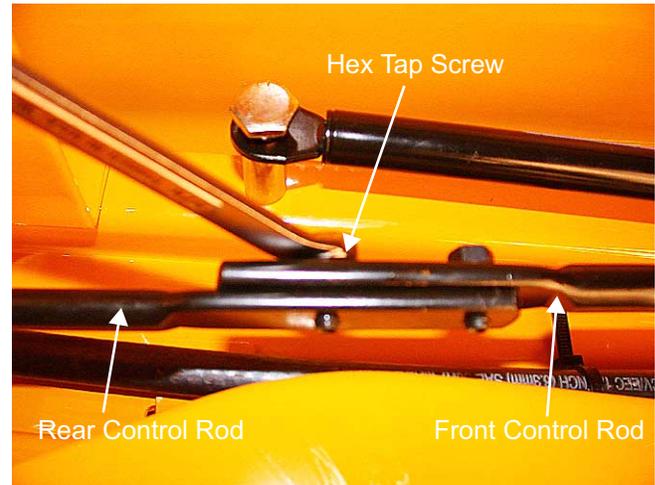


**Figure 4.16**

- 4.17. If the rotation is in the forward direction, slide the centering spacer rearward until the wheels just begin to rotate in the reverse direction. Then slowly slide the spacer slightly forward until wheel rotation stops.
- 4.18. If the rotation is in the reverse direction, slowly slide the centering spacer until the rotation stops.
- 4.19. Carefully tighten the hex cap screw and locknut, using a 7/16 socket and 7/16 wrench making certain the centering spacer does not move.
- 4.20. Stop the engine and engage the parking brake.

## 5. ADJUSTING THE CONTROL ROD:

- 5.1. The brake pedal lock must be engaged to properly adjust the control rod.
- 5.2. Loosen, but do not remove, the hex tap screws using a 3/8 wrench, that fastens the front and rear control rods together. See Figure 5.2.



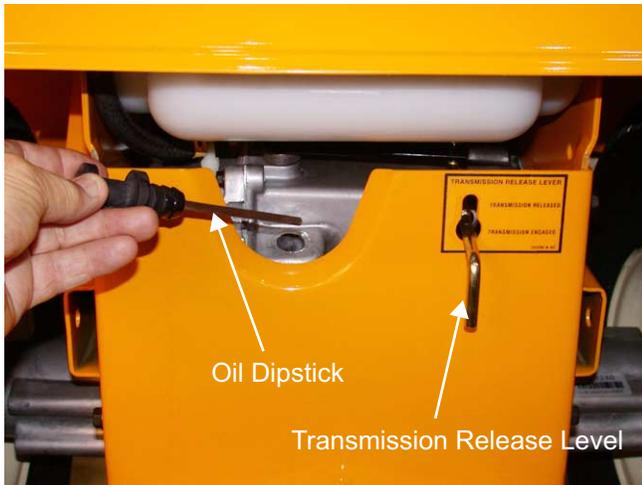
**Figure 5.2**

- 5.3. While making certain to not move the front control rod, control cam or control arm, slide the rear control rod in the direction necessary to directly align the pin of the sleeve with the lower hole of the control arm.
- 5.4. Insert the pivot pin into the control arm and secure with the hairpin cotter, then tighten the 3/8 hex tap screws. Make sure to maintain the adjusted position of the control rods when tightening the screws.
- 5.5. Raise the rear of the tractor; remove jack stands, ties, weights and exhaust hose.

**6. CHECKING TRANSMISSION OIL LEVEL:**

- 6.1. Check the oil level of the transmission case before each use to see that it is filled to the correct level. Always keep the oil level between the "Full" and the "Add" marks
- 6.2. On the dipstick. The transmission requires approximately 6 quarts of oil. See Figure 6.2.

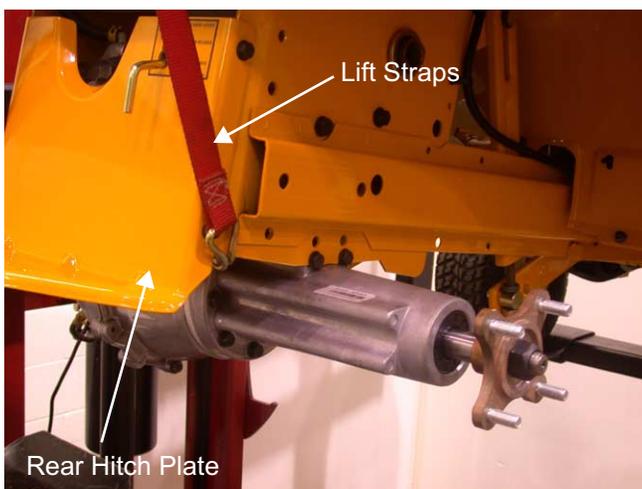
**NOTE:** Use only Cub Cadet oil – 1 quart # 737-3120 / 1 gallon # 737-3121



**Figure 6.2**

**7. TRANSMISSION REMOVAL**

- 7.1. Secure lift straps at corner of rear hitch plate and position at a comfortable work height. Pull the wheels using a 1/2" inch impact wrench and a 3/4" inch socket. See Figure 7.1.



**Figure 7.1**

- 7.2. Drain the oil in a clean container to inspect the oil for particles or contamination. Using a 3/8" inch ratchet and a 5/8" inch socket. See Figure 7.2.



**Figure 7.2**

- 7.3. While the oil is draining place transmission support stands under the R.H. and L.H. axle housings. See Figure 7.3.



**Figure 7.3**

- 7.4. Replace the drain plug and tighten to avoid question later on. If oil is clean, cover for re-use.
- 7.5. Remove the transmission release lever and hair-pin cotter, with needle nose pliers.
- 7.6. Remove the brake rod and tape the adjustment ferrule so that the adjustment doesn't change. The spring can now be easily disconnected from the brake lever on the right side of the transmission.

## Cub Cadet 2166

- 7.7. Remove the hair-pin cotter from the Hydro-control rod at the pivot assembly.
- 7.8. Remove the (4) 1/4 x 20 bolts from the drive shaft at the fan assembly. See Figure 7.8.

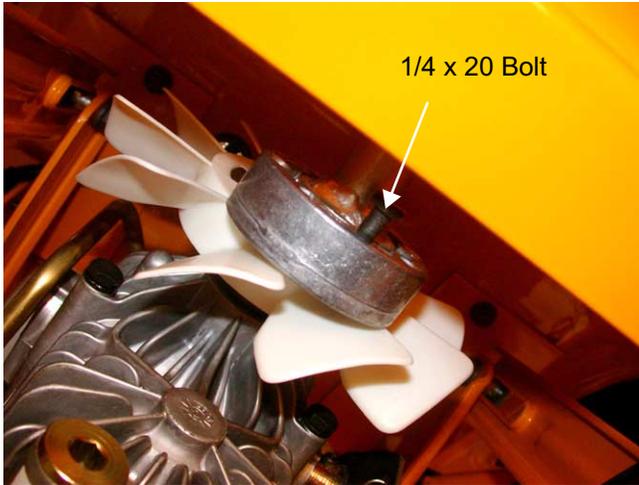


Figure 7.8

- 7.9. Remove the (4) upper transmission mounting bolts, (2) on each side 3/8-16x1.25 using a 9/16 socket and ratchet. The forward bolt on the left side is difficult to remove due to the handle and large deck assist spring is in the way. Raise the lift handle to the highest position, at this point the spring has the least amount of tension on it. Before loosening the spring tension, measure the length so that you will be able to re-adjust to approximately the same amount of tension upon re-assembly. See Figure 7.9.

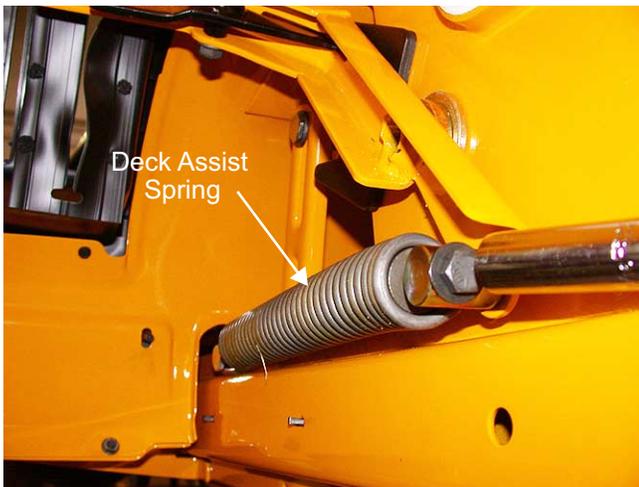


Figure 7.9

- 7.10. With the tension bolt loosened and placing the deck height adjustment handle in the fifth position you are now able to gain access to the forward bolt for removal. See Figure 7.10.



Figure 7.10

- 7.11. Cut the tie strap holding the breather hose, located at the upper left corner of the hitch plate, and next to the gas tank.
- 7.12. Before removal of the transmission from the frame; for safety be sure to use tie straps to hold the transmission to the jack stands and to the lift arm to prevent the transmission from falling forward.

7.13. Now loosen but do not remove the lower two (2) bolts 5/16-18 x.75 on the right side of the transmission, using a 1/2" socket and ratchet. See Figure 7.13.

**NOTE:** The bolt holes are cut out at the bottom of holes. This helps to realign the transmission and frame when reinstalling the transmission.

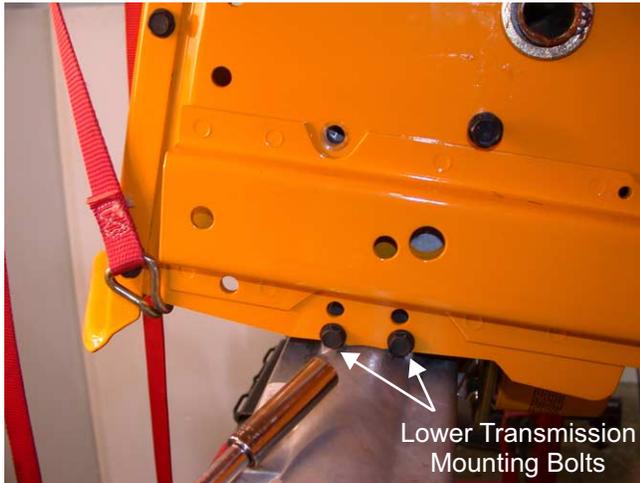


Figure 7.13

7.14. Next remove the lower and forward bolt 3/8-16 x 1.25 from the transmission on the left side. The transmission is a tight fit in the frame.

7.15. Lower the lift assembly; as the transmission comes out of the frame remove the fan from the front on the BDU 10 Hydro. to prevent damage.

7.16. The transmission is out and ready to be transferred to the workbench. See Figure 7.16.

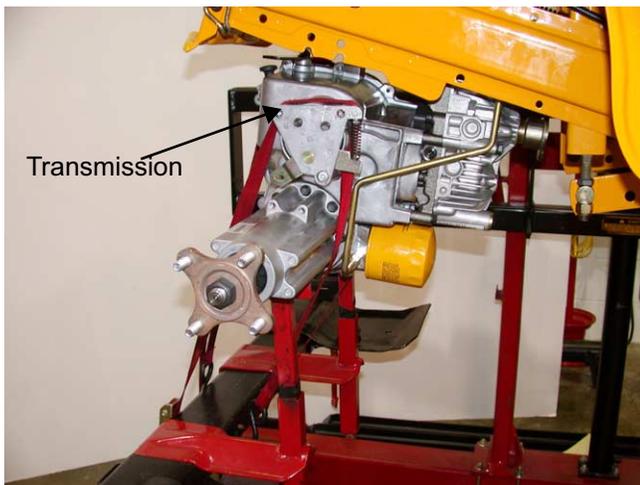


Figure 7.16

7.17. Before disassembly be sure to loosen the filter using a strap wrench and let it drain as much as possible, also open transfer line and let it drain. Maintain alignment of transmission and frame to assist in installation. See Figure 7.17.

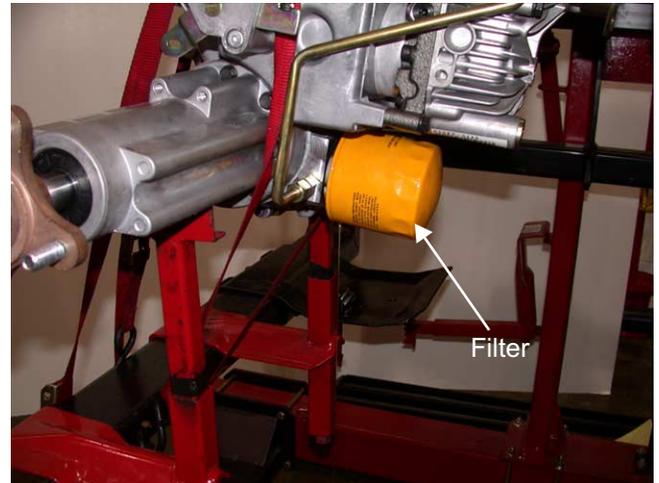


Figure 7.17

7.18. On Workbench. See Figure 7.18.

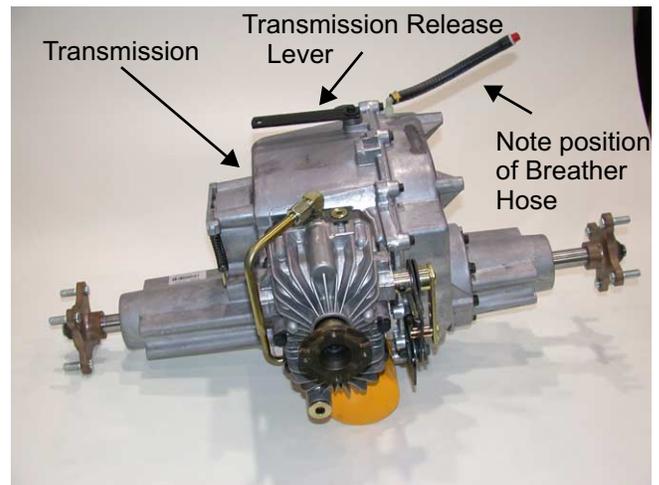


Figure 7.18

## Cub Cadet 2166

### 8. TRANSMISSION DISASSEMBLY

- 8.1. Remove the wheel hubs using a 28 mm. Socket and an impact wrench. It may be easier to remove the hubs while the transmission is still on the tractor after removing the wheels. See Figure 8.1.

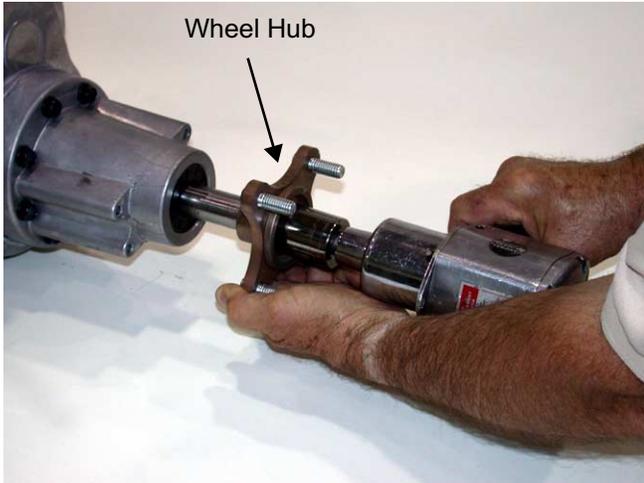


Figure 8.1

- 8.2. Using a strap wrench, remove the oil filter. See Figure 8.2.



Figure 8.2

- 8.3. Using two 11/16 inch open-end wrenches, remove the hydro pump pick up tube. See Figure 8.3.



Figure 8.3

- 8.4. Using a 1/2 inch socket with extension, remove the four hex cap screws securing the hydro pump to the transmission housing. See Figure 8.4.

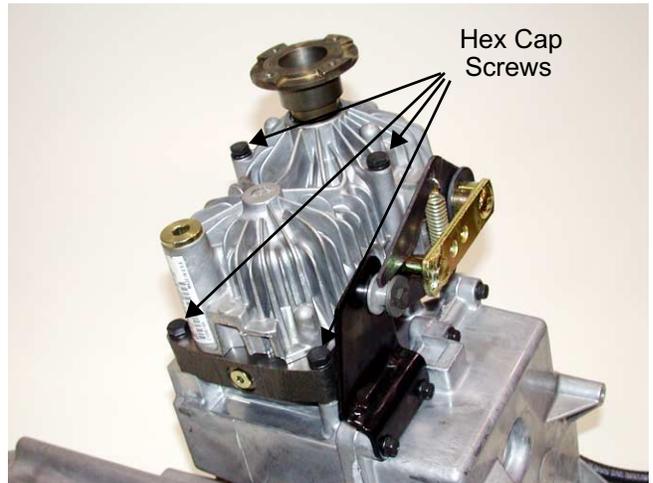


Figure 8.4

8.5. Remove the hydro pump. See Figure 8.5.



Figure 8.5

8.6. Remove and inspect the wave washer. See Figure 8.6.

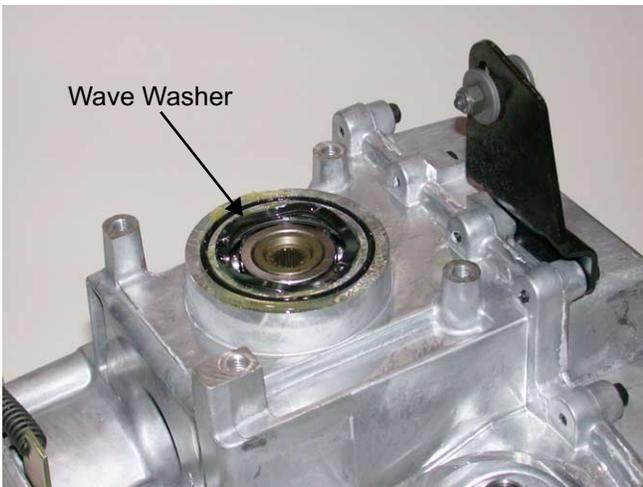


Figure 8.6

8.7. Using a small screwdriver, remove the "O" ring. During reassembly replace the "O" ring. See Figure 8.7.

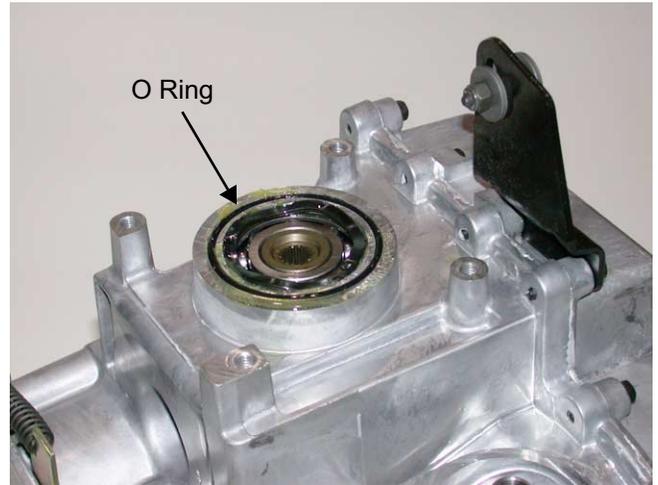


Figure 8.7

8.8. Using a 3/16 inch Allen wrench, remove the Allen head cap screw securing the brake assembly. See Figure 8.8.

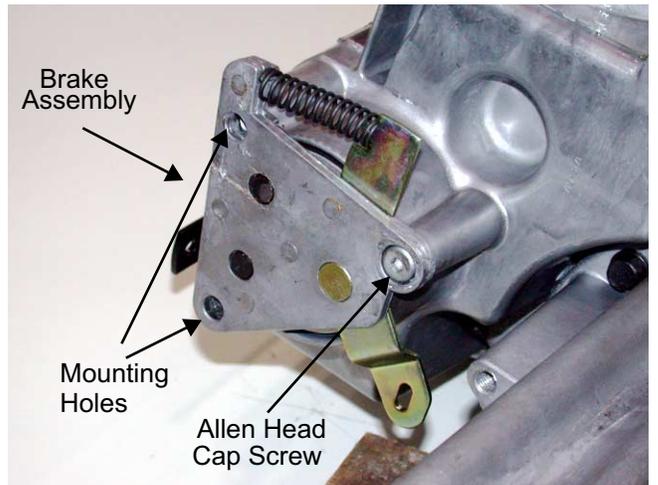
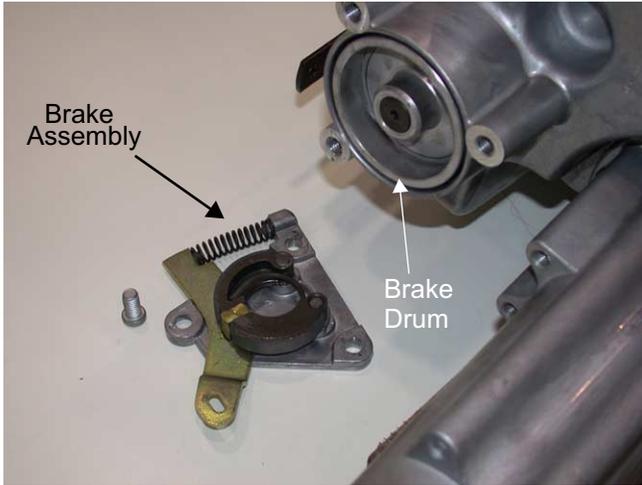


Figure 8.8

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# Cub Cadet 2166

8.9. Remove the brake assembly. See Figure 8.9.



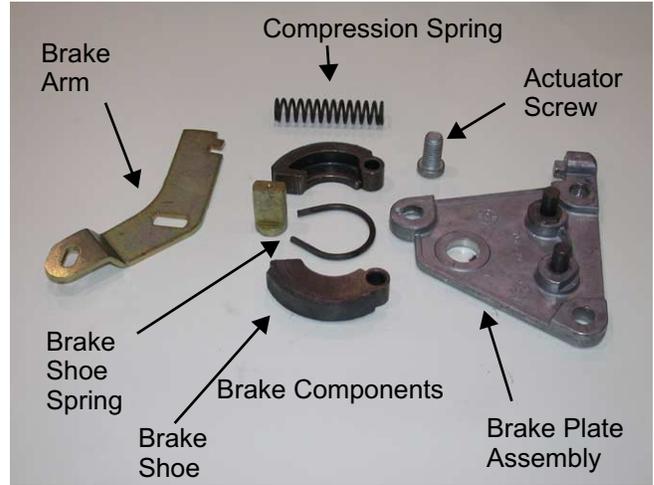
**Figure 8.9**

8.10. Remove and inspect the brake shoes for wear. See Figure 8.10.



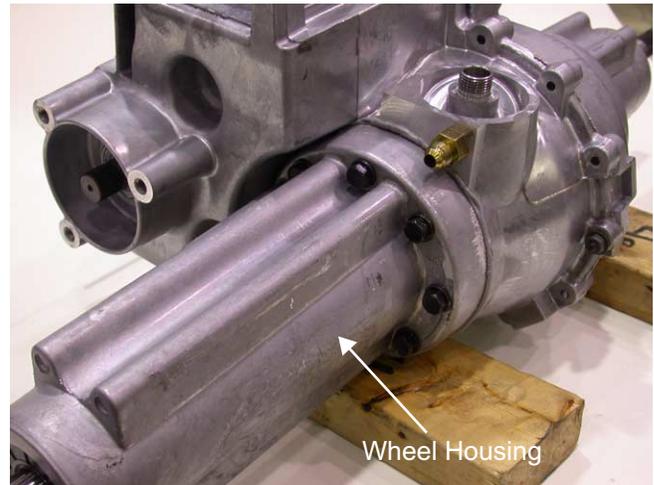
**Figure 8.10**

8.11. Inspect all brake components. See Figure 8.11.



**Figure 8.11**

8.12. The wheel housings do not have to be removed unless it is felt that they need to be inspected for debris from internal failure or inspected for damage. See Figure 8.12.



**Figure 8.12**

- 8.13. Place the transmission in a soft jawed vice with long housing down. Secure in the bench vice at the brake housing making sure that you are tightening where the bolts go into the housing and not on the rounded sides of the brake drum housing. To secure to the rounded housing would surely crack the brake housing. Position so that the longer axle housing will rest on the workbench and support the transmission, tighten with caution. See Figure 8.13.



Figure 8.13

- 8.14. Using a 7/16 inch socket and open end wrench, remove the housing alignment hex bolts.
- 8.15. Using a 3/8 inch socket and extension, remove all perimeter-housing screws.
- 8.16. Remove the hydro neutral bracket.
- NOTE:** Mark the location of the bracket for placement when assembling.
- 8.17. Using a pair of pliers, remove the vent hose.

- 8.18. Using a 1/8 inch punch and a hammer, drive the two dowel bushings out of the transmission housings. See Figure 8.18.

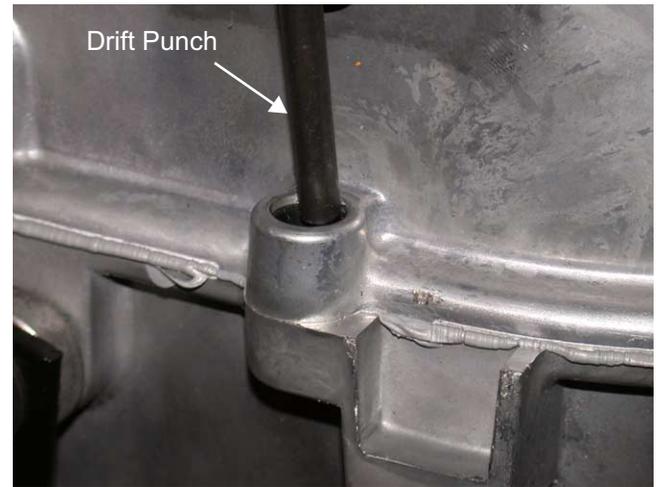


Figure 8.18

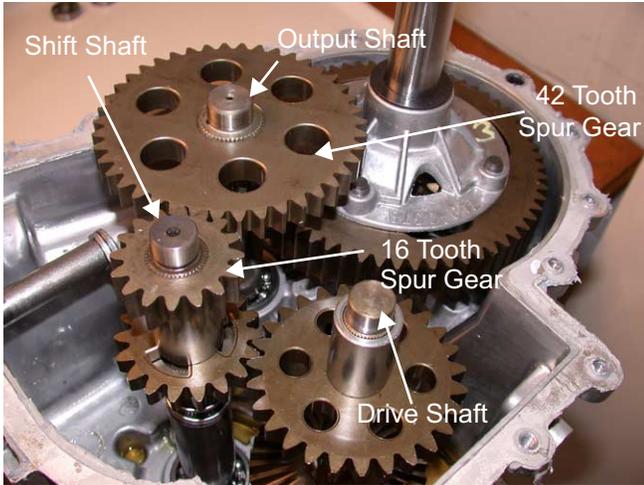
- 8.19. Separate the two housing halves. Note: three pry points, use dowel rod and an approx. 4 lb. Hammer to brake seal.
- 8.20. Remove the bearings from the housing or shafts and inspect. See Figure 8.20.



Figure 8.20

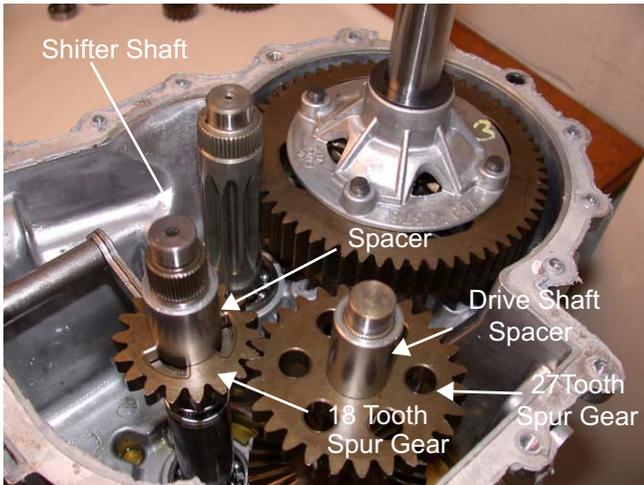
## Cub Cadet 2166

- 8.21. Remove the 42-tooth spur gear from the output shaft.
- 8.22. Remove the 16-tooth spur gear from the shift shaft. See Figure 8.22.



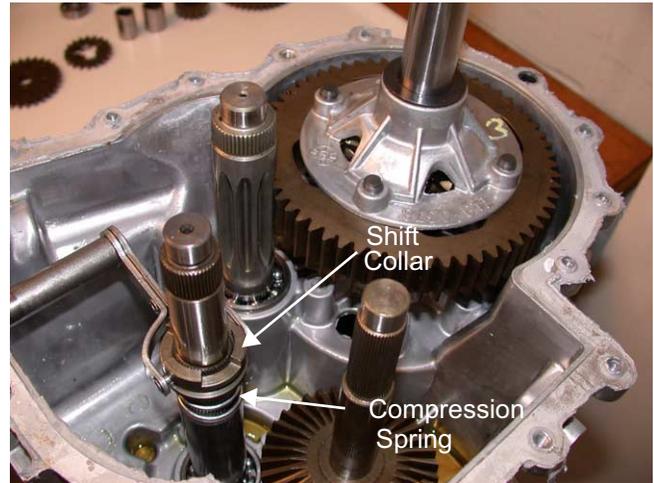
**Figure 8.22**

- 8.23. Remove the spacer and 18 tooth spur gear from the shifter shaft.
- 8.24. Remove the spacer from the drive shaft.
- 8.25. Remove the 27-tooth spur gear from the drive shaft. See Figure 8.25.



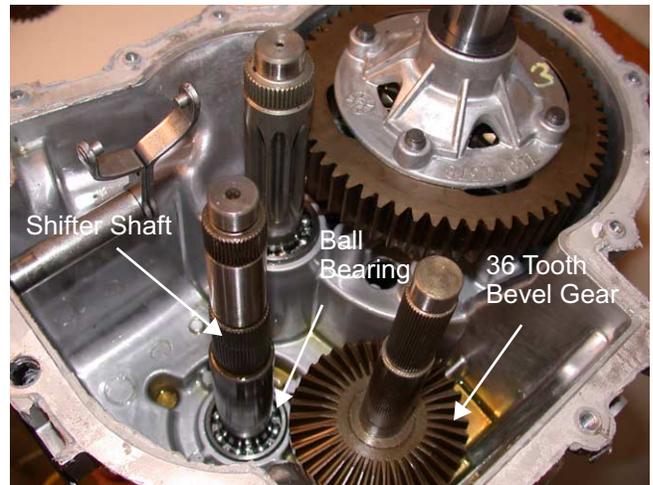
**Figure 8.25**

- 8.26. Remove the shift collar and compression spring from the shift shaft. See Figure 8.26.



**Figure 8.26**

- 8.27. Remove the all shafts and the 36-tooth bevel gear. See Figure 8.27.



**Figure 8.27**

8.28. Remove the differential assembly. See Figure 8.28.

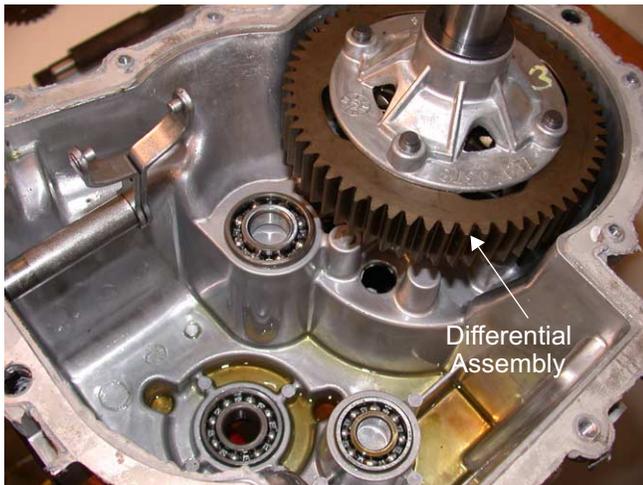


Figure 8.28

8.29. Remove the flat washer from axle shaft.

8.30. Inspect all bearings and bearing cups in housings.

8.31. Inspect the shift yoke assembly. See Figure 8.31.

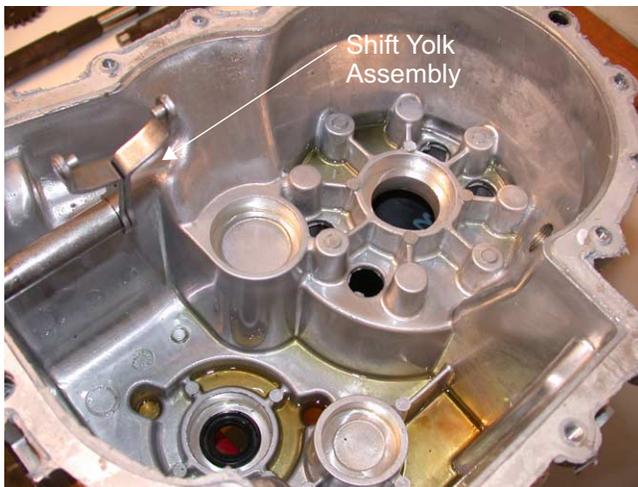


Figure 8.31

8.32. Remove and inspect the dipstick.

8.33. Remove the input pinion and inspect for damage.

8.34. Inspect all parts. See Figure 8.34.

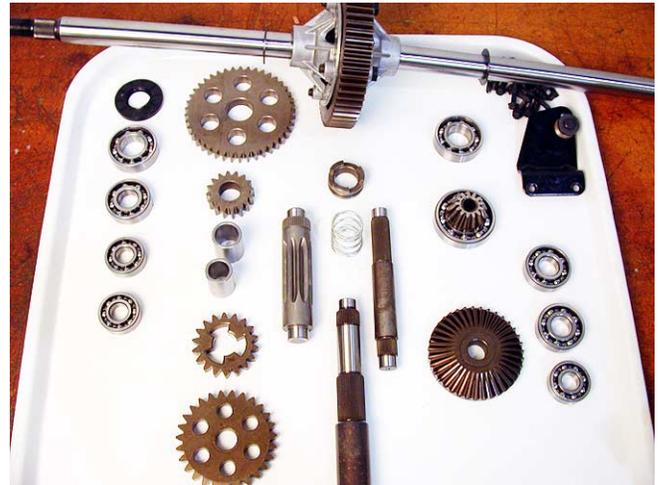


Figure 8.34

8.35. Place the 60 tooth differential spur gear into a soft jawed vice. See Figure 8.35.

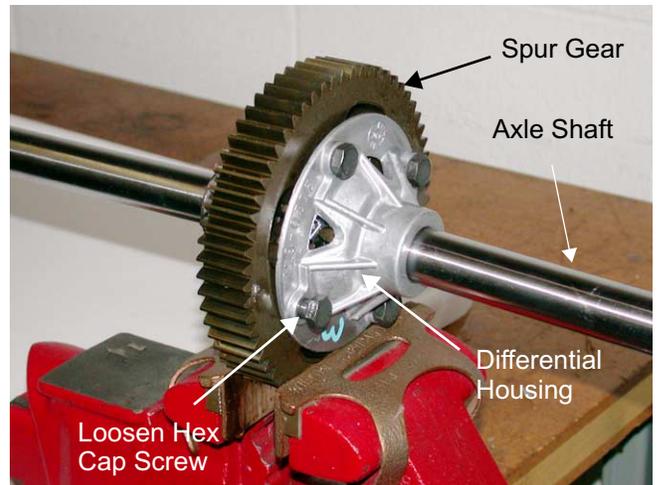


Figure 8.35

8.36. Using a 1/2 inch socket, 1/2 inch ratchet, loosen the hex cap screws securing the differential housing halves.

## Cub Cadet 2166

- 8.37. Place the axle shaft vertically in the soft jawed vice. See Figure 8.37.



Figure 8.37

- 8.38. Using a 1/2 inch socket, remove the differential hex cap screws.
- 8.39. Remove the differential housing and axle.
- 8.40. Remove the differential spur gear from the cross shaft assembly.
- 8.41. Remove the cross shaft and miter gears and inspect. See Figure 8.41.

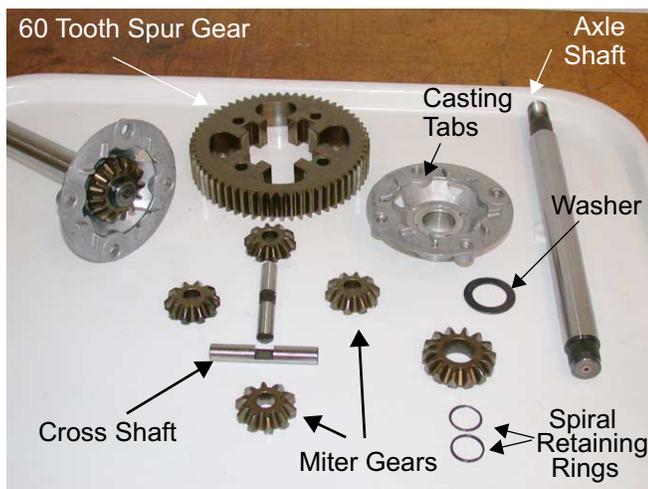


Figure 8.41

- 8.42. Using a small flat bladed screwdriver, remove the two spiral retaining rings securing the miter gear to the axle shaft.
- 8.43. Inspect the miter gear and housing.
- 8.44. Separate the miter gear and housing.

- 8.45. Remove the flat washer from the axle.

**NOTE:** New seals must be installed during reassembly. Use seal protectors to avoid damage to the seals.

**NOTE:** Axles and axle housings can be replaced individually if damaged.

**NOTE:** To remove the axle housing bearings, use a seal hook to remove the bearing seal, remove the retaining ring, and then remove the bearing.

- 8.46. Assemble in reverse order above.

**NOTE:** Align the 60 Tooth spur gear with the cast tabs on the differential housing.

**NOTE:** Using Loctite Blue #242 on the hex cap screws, assemble the housings together. Torque to 25 foot-pounds. (300 inch lbs.)

**NOTE:** Install the drive collar on the shifter shaft. Align the collar with the tabs on the shift yoke assembly. Install the 18-tooth spur gear on the shifter shaft. Align the gear with the tabs on the drive collar.

**NOTE:** Make sure that the shifter shaft gears line up with the gears on the output shaft and drive shaft.

**NOTE:** Apply Ultra-Grey 5999 sealant to the housing half mating surface.

**NOTE:** Move the shift yoke assembly lever slightly to ease mating of housing. Using a medium size ball peen hammer, drive dowel bushings into the housing to align both housings. Install hex bolts and flat washers through dowel bushings and secure with washers and hex nuts. Install hydro neutral bracket to transmission housing with hex washer tap screws. Install all

remaining perimeter tap screws. Torque to 90 – 120 inch pounds.

**NOTE:** Using a seal protector, install the axle seals. Seat with seal tool.

**NOTE:** Place the transmission on workbench.

**NOTE:** Install a new “O” ring on input pinion mating surface.

**NOTE:** Install the hydro pump. Turn the pump slightly during installation to allow alignment of the neutral bracket and arm assembly.

**NOTE:** Torque the hydro pump assembly to 180 – 200 inch pounds.

**NOTE:** Lubricate the seal on the oil filter.

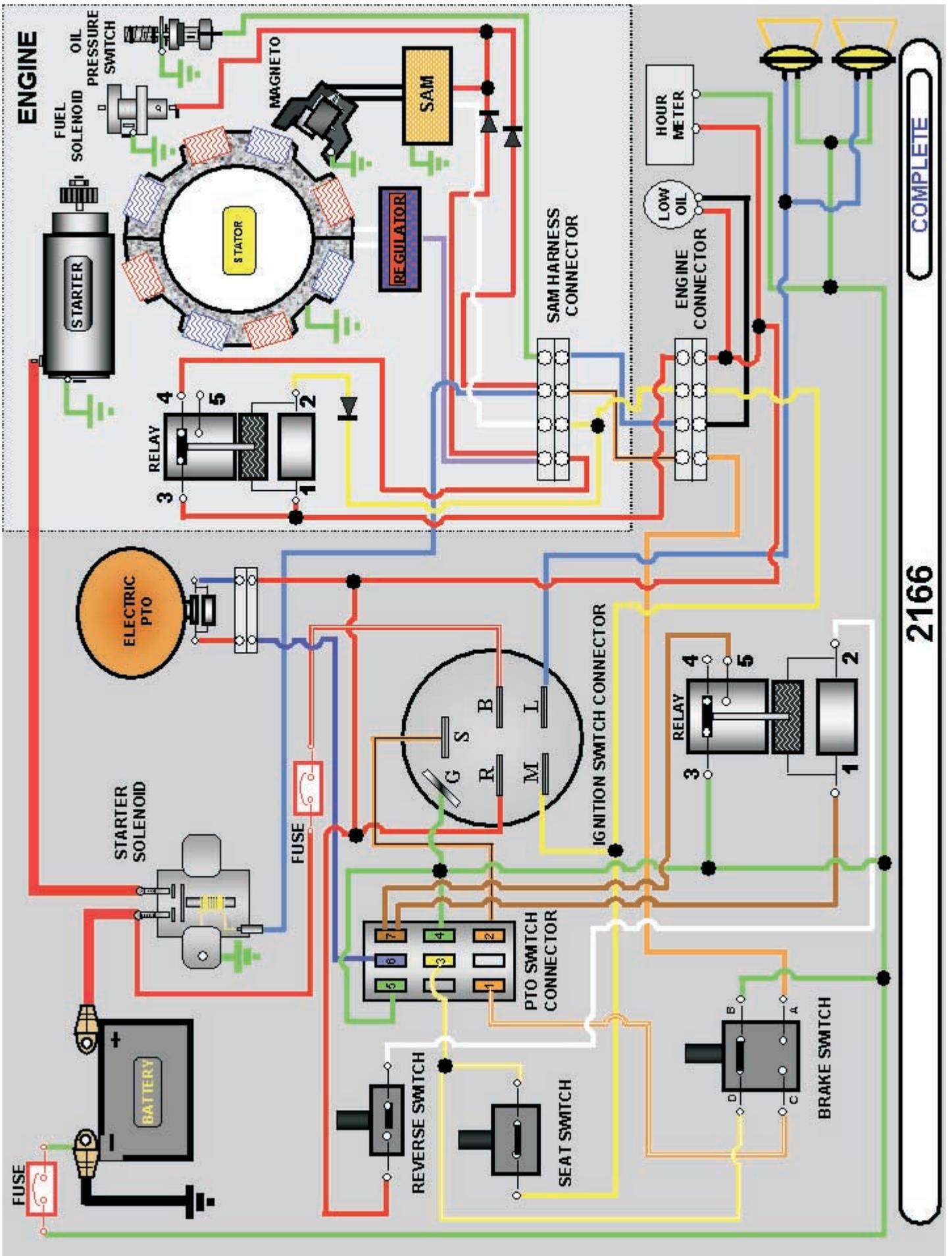
**NOTE:** Install both wheel hub assemblies with 3/4 inch hex nuts.

**NOTE:** Torque 3/4 hex nut to 295 foot pounds.

**NOTE:** Let transmission set for 24 hours to allow the Ultra-Grey sealer to cure properly.

#### **TORQUE SPECS:**

- Differential Bolts 300 Inch pounds (25) foot lbs.
- Pump Bolts 180 – 200 Inch pounds.
- Transmission perimeter bolts 90 – 120 Inch pounds.
- Hub nuts 200 – 295 Foot pounds.
- Screw on engagement lever 90 – 120 Inch pounds.
- 5/32 Allen head set screw on the Hydro control arm 180 – 200 Inch pounds.



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