Annual Service

for

MERCURY SPORT JET 175 HP, 200 HP, 240 HP Drives

v 1.1

Disclaimer:

Servicing the Mercury Jetdrive requires disassembly of steering and thrust control components. Utmost care must be taken to reinstall all those components as directed by Mercury.

Failure to correctly reassemble drive and steering components can result in serious injury or death as control over steering or thrust could be lost. This in return may result in a loss of control of the boat and power.

Incorrect disassembly or reassembly of drive components can also result in irreversible damage to the Jet drive or its components.

The instructions as described here are not intended for the inexperienced mechanic but rather provide an overview over all steps required to service the Mercury Sport Jet.

You agree to use these instructions solely on your own risk and acknowledge that you will not hold the author liable for any damage or injury resulting from use of these instructions.

The author cannot guarantee that these instructions do not contain errors. It is highly recommended to use these instructions together with a Mercury Factory Service Manual.

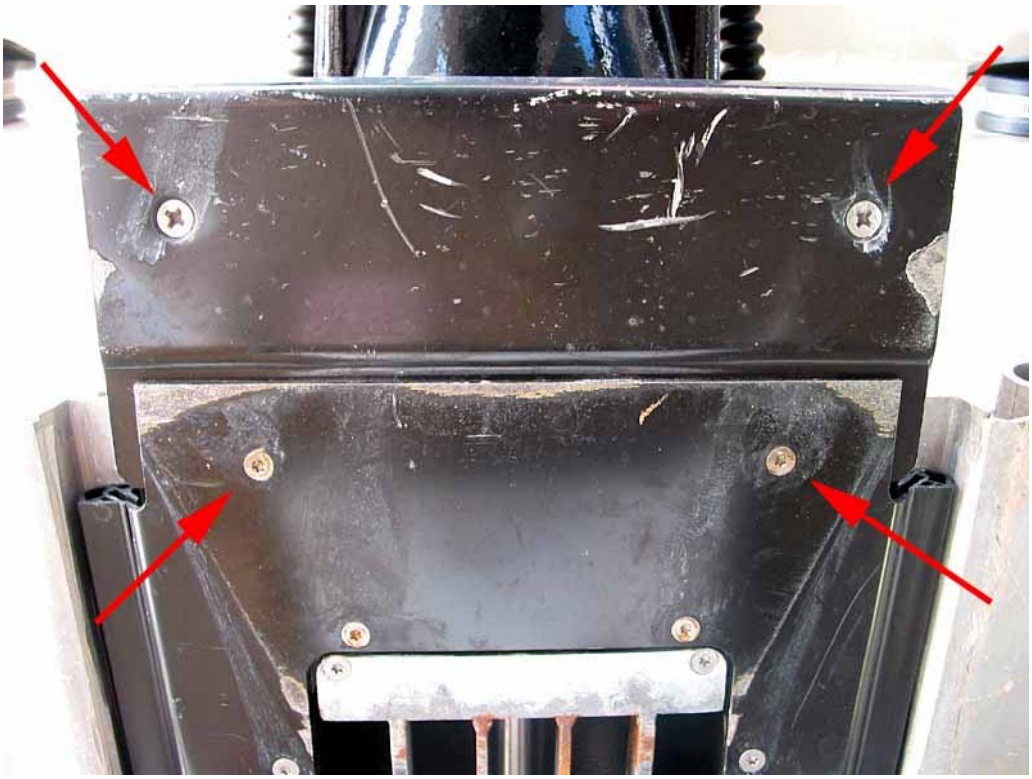
The drive is the same for all 2.5l drives (175, 200, 240). The impeller of the 175 is different. The 175 HP Sportjet uses a 3 blade impeller, where as the 200 and 240 HP models use a 4 blade impeller.

I have not seen a 250 HP drive but assume it is similar.

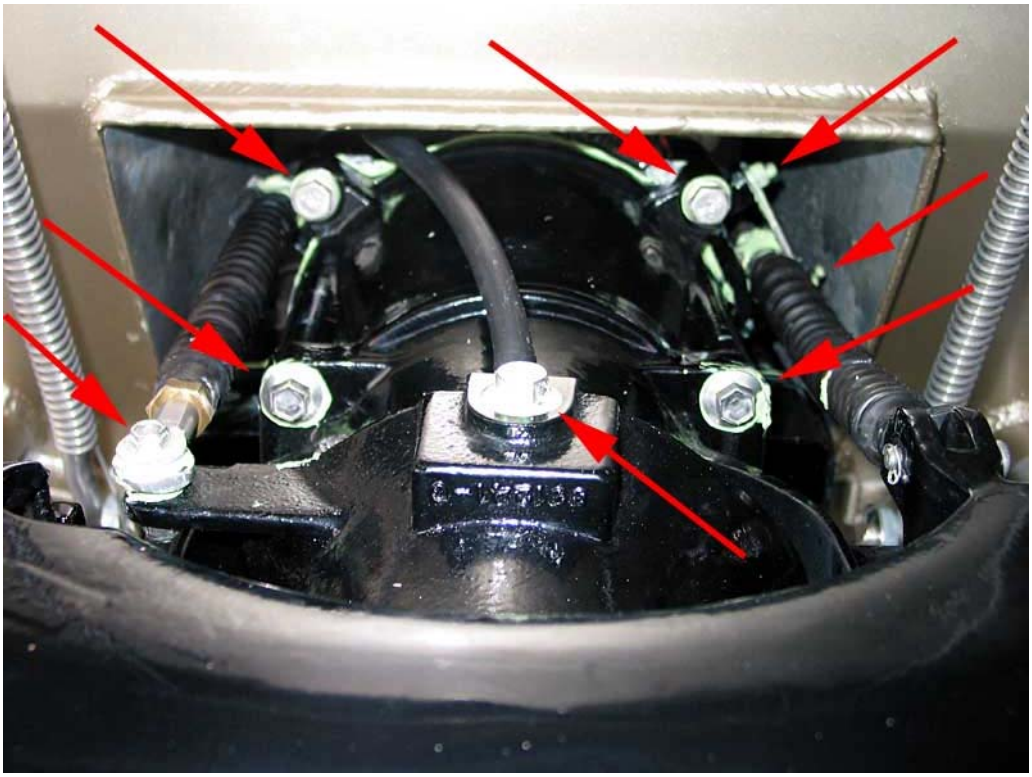
The pictures were taken of a Harbercraft 1975XL-200. Some details, especially the easy clean grate may be different between other models and brands.

A day or more before performing any service that requires disassembly of drive components, spray penetrating oil on all the mounting bolts. This will make removing the bolts much easier, especially if some corrosion is present.

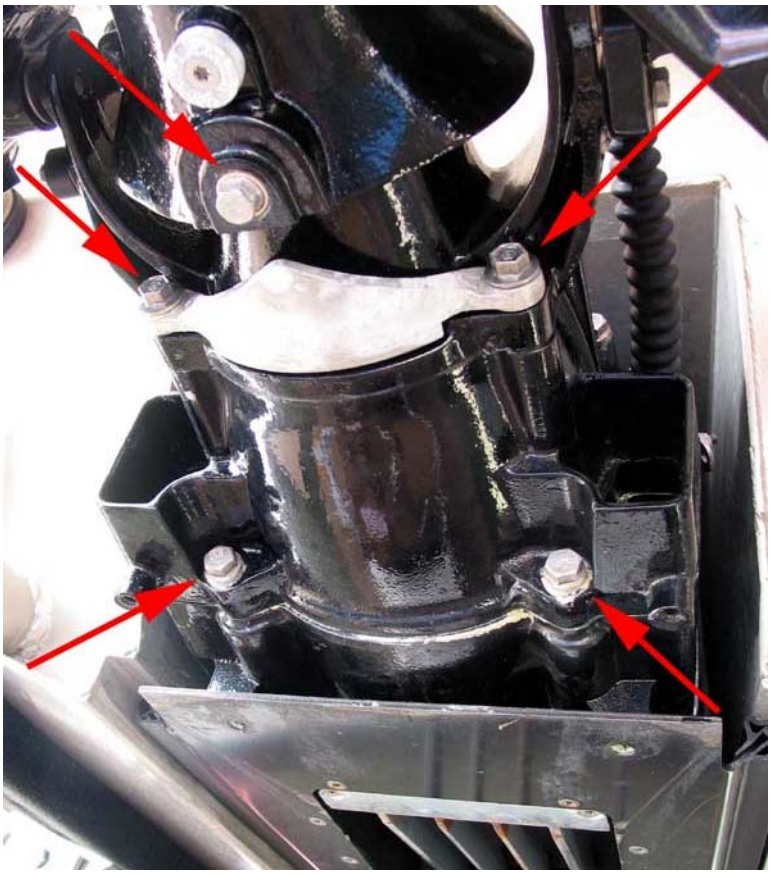
The pictures below show the locations, where penetrating oil or WD40 may be applied.



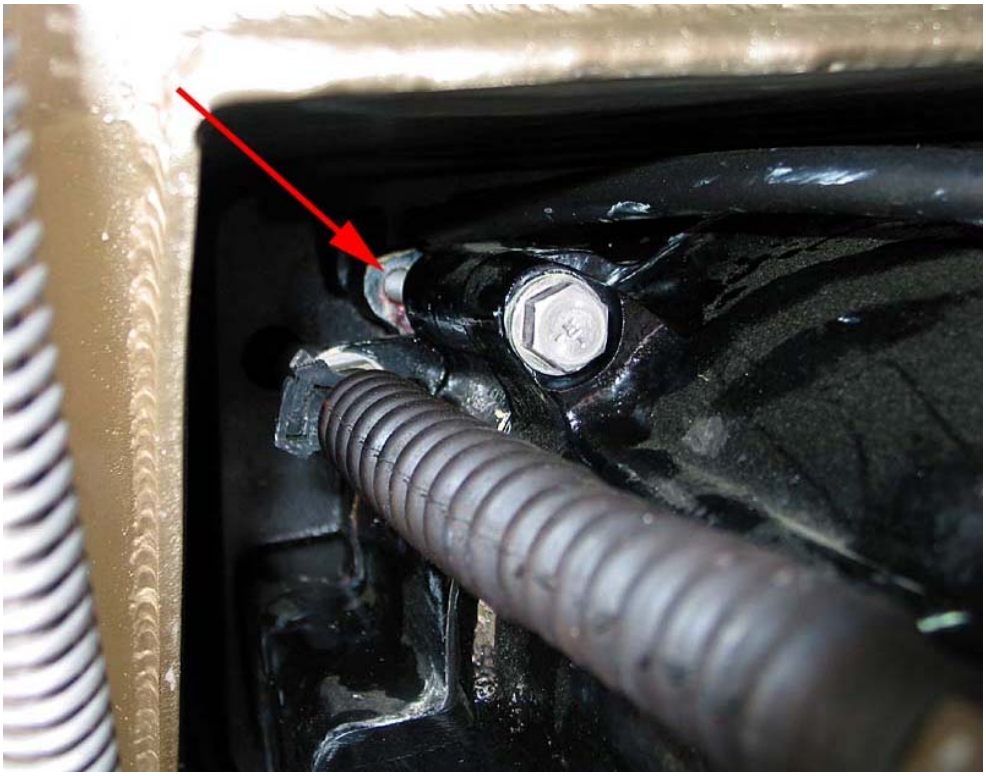
Picture 1: Spray WD40 or penetrating oil where indicated.



Picture 2: Spray WD40 or penetrating oil where indicated.

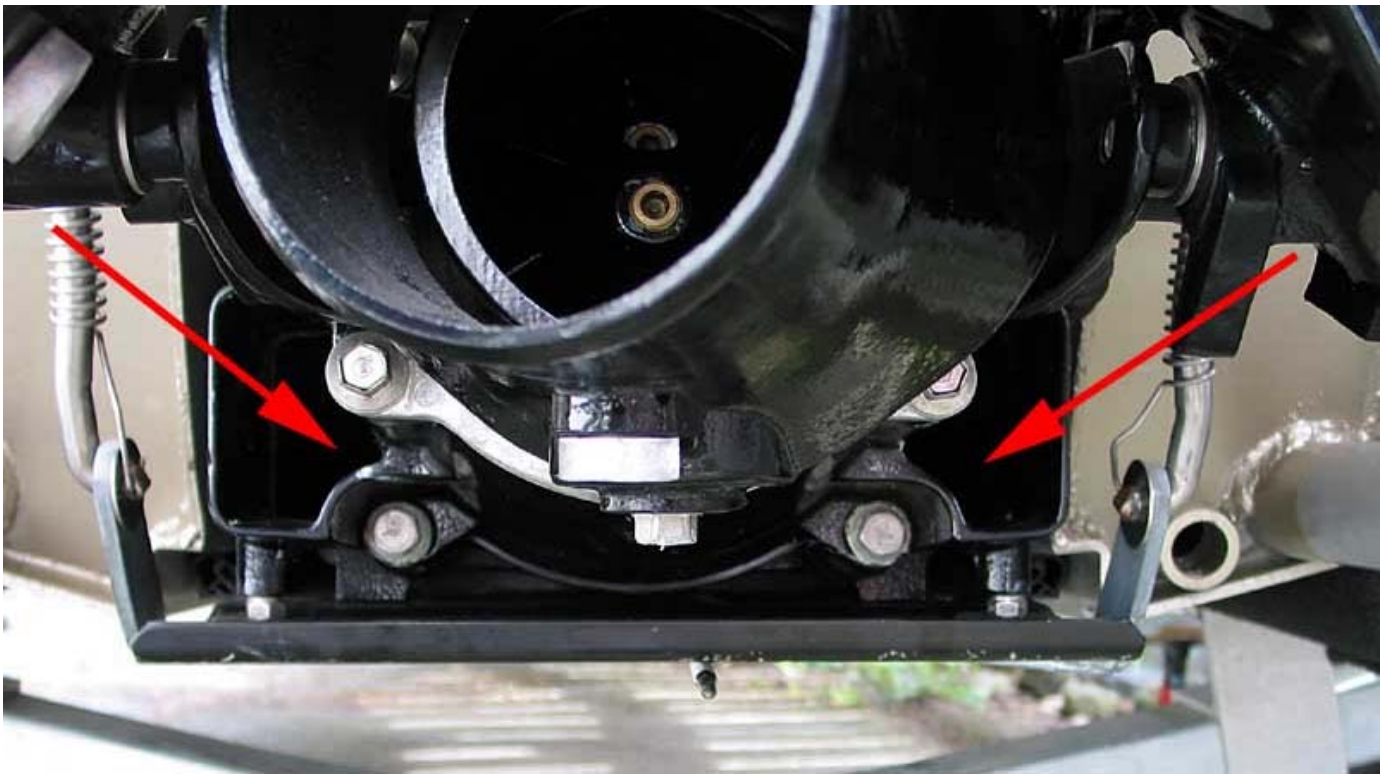


Picture 3: Spray WD40 or penetrating oil where indicated.



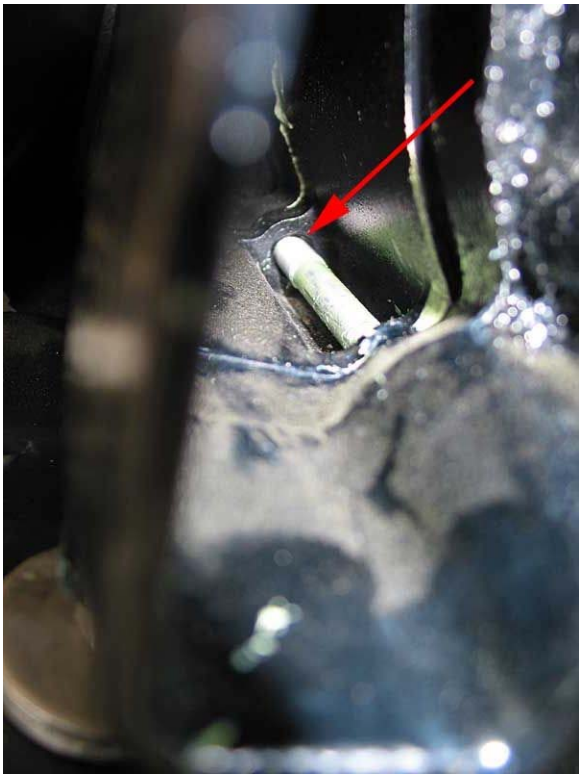
Picture 4: Spray WD40 or penetrating oil where indicated.

There is the same bolt on the other side of the drive, which should get a spray of WD40.



Picture 5: Spray WD40 or penetrating oil where indicated.

The lower 150mm Wear ring bolts are hidden, the picture shows the pocket where they are.



Picture 6: Spray WD40 or penetrating oil where indicated.

Here a detail of the 150mm Wear Ring bolt. It is important to get some WD40 on the threads. You can see the green Mercury 101 that I apply to the shank of the bolt to prevent it from corroding. The bolt is 2 years old and I run the boat in salt.

Before diving into the job, I recommend placing the gear oil you will be using in the sun or in a warm place. This makes pumping it in the drive much easier.

Picture 7: Lay out all parts that you remove in the order you removed and together with the nuts and bolts that go with them. This will make reassembly much more efficient.

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Be sure to use an oil drain pan and recycle all oil.

Wipe off any oil spills and excess grease of the drive to protect the water from contamination.

Refer to Mercury's Factory Service Manual, pages 5-8 to 5-12.

Required Tools:

You will require the following tools:

- Imperial and Metric socket set with extensions
- Imperial and Metric open wrench set
- Torque Wrench
- Wire Brush
- Mercury Impeller Socket (Special Tool No# 91-850297)
- 1 1/8 Wrench
- Large Flathead Screwdriver
- Torx 30 Driver
- Large Philips Screw Driver

You will require the following parts:

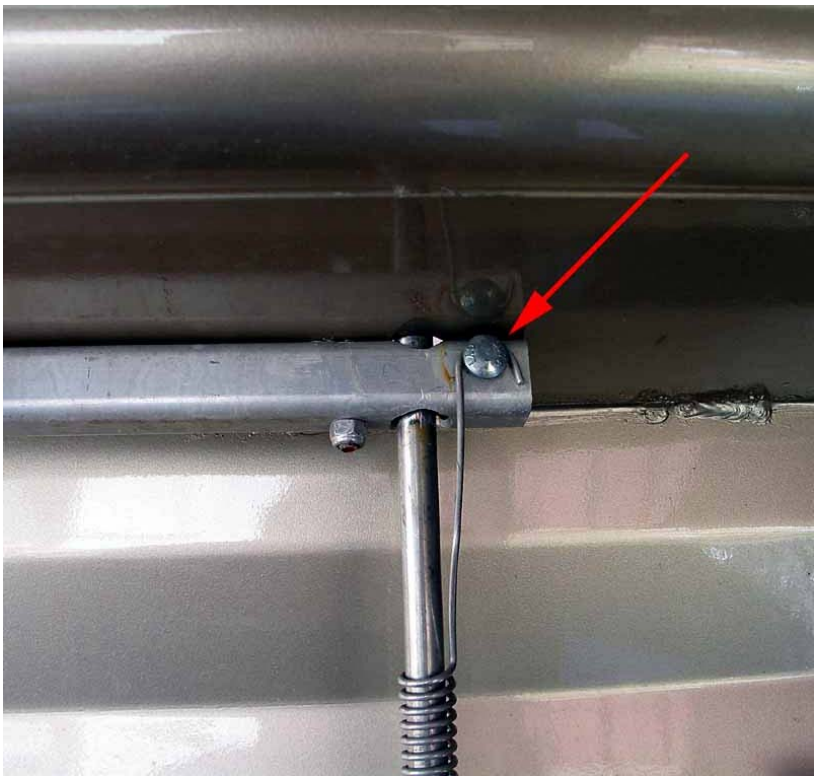
- 1400 ml Mercury High Performance Gear oil
- Mercury Special Lube 1-0-1
- Loctite PST or Permatex Pipe Sealant
- Loctite 271
- Loctite 242
- Silicone Grease
- SS Cotter Pin
- Plastic Clip for steering cable
- Washer for Steel Cable

Disassembly

Removal of the Easy Clean Grate

1. Remove the two springs that pull the easy clean grate up. Do so by loosening the screws that hold the spring (see picture) up.

Then pull the spring up and lift it over the head of the screw. Be careful as the spring is under tension.



Picture 8: Springs of the Easy Clean Grate.

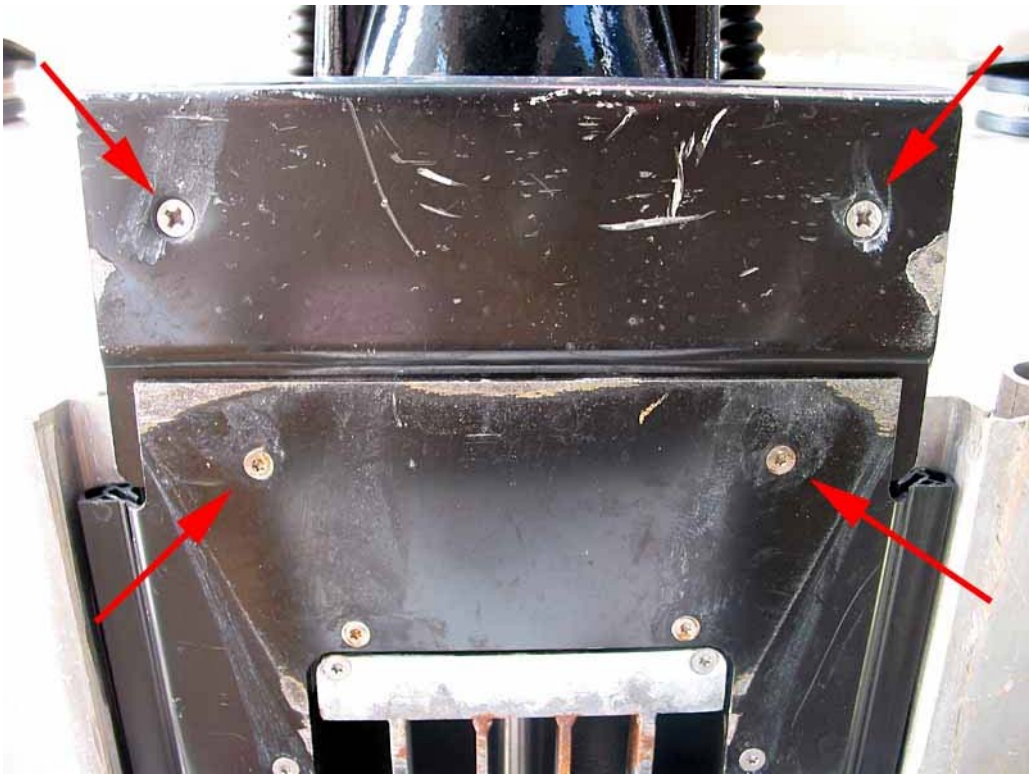
2. Remove the two screws (one on each side) of the stomp grate handle and carefully let the easy clean grate drop to the ground.

Picture 9: Removal of the Easy Clean Grate Handle.

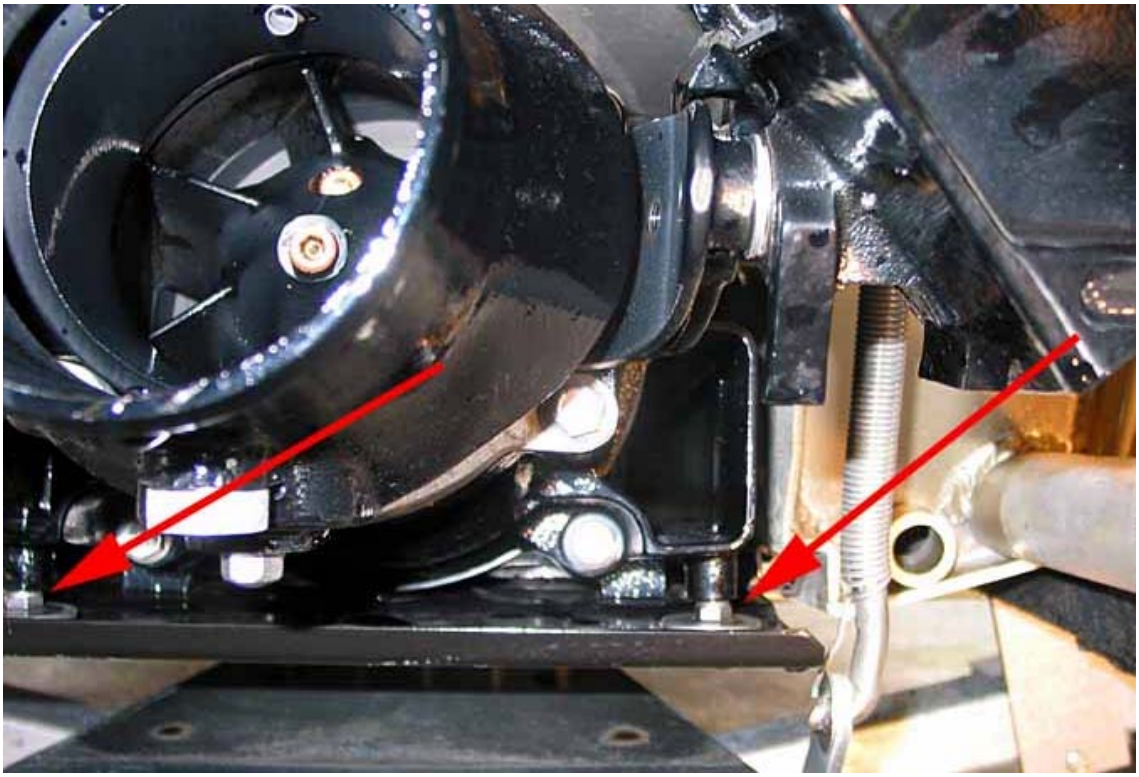
Removal of the Trim Plate

3. Remove the two Torx 30 screws that hold the trim plate to the ride plate.

4. Remove the two screws that hold the trim plate to the stator. The screw does not thread in the stator, it is held by a posilock nut on top. Hold the nut with a wrench and remove the screw with a large Philips screwdriver.



Picture 10: Bolts that hold the Trim Plate. 2 x Torx 30 and 2 x Philips

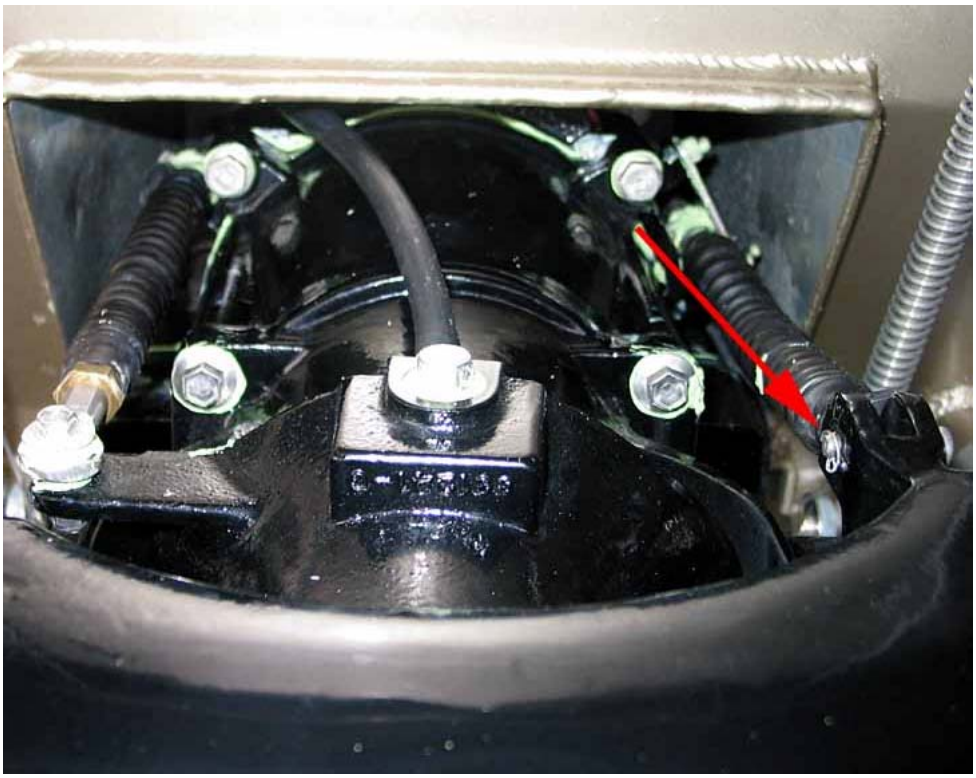


Picture 11: Here are the two nuts that hold the two Philips bolts.

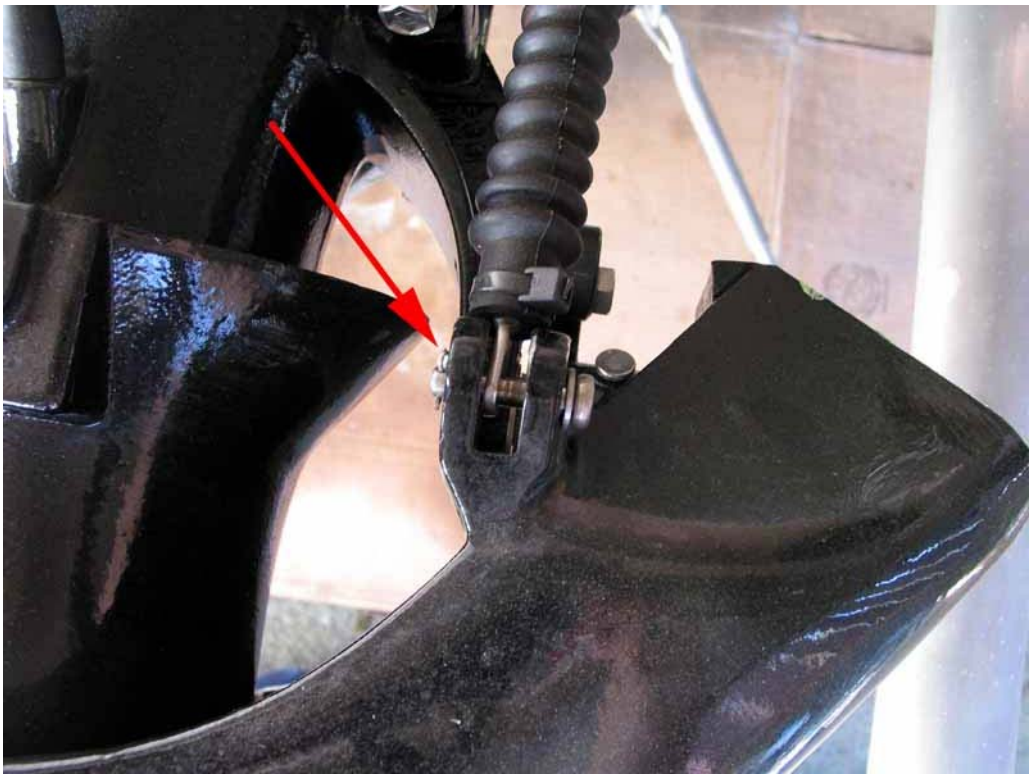
5. Pull the trim plate out.

Disconnecting the Steering Cables

6. Disconnect the reverse gate cable from the gate by removing the SS cotter pin. Be sure that you don't rotate the cable end or you will change the idle thrust adjustment. Be careful not to scratch the paint when removing the cotter pin. Paint damage will increase electrolytic corrosion.

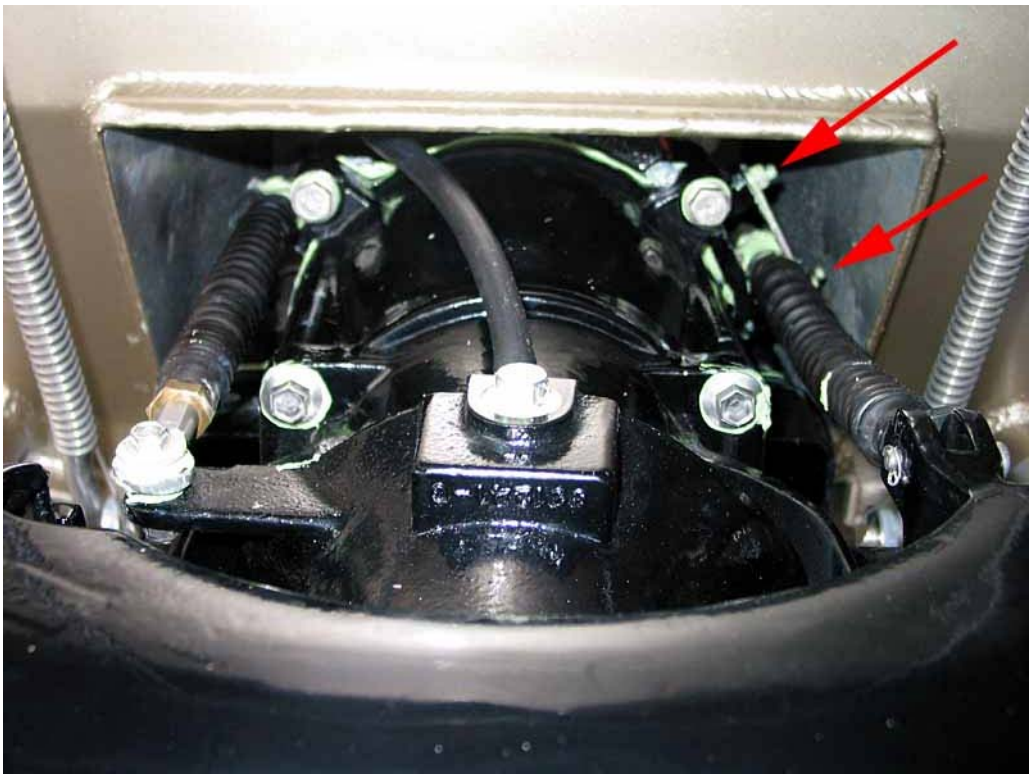


Picture 12: Removal of Reverse Gate Cable.



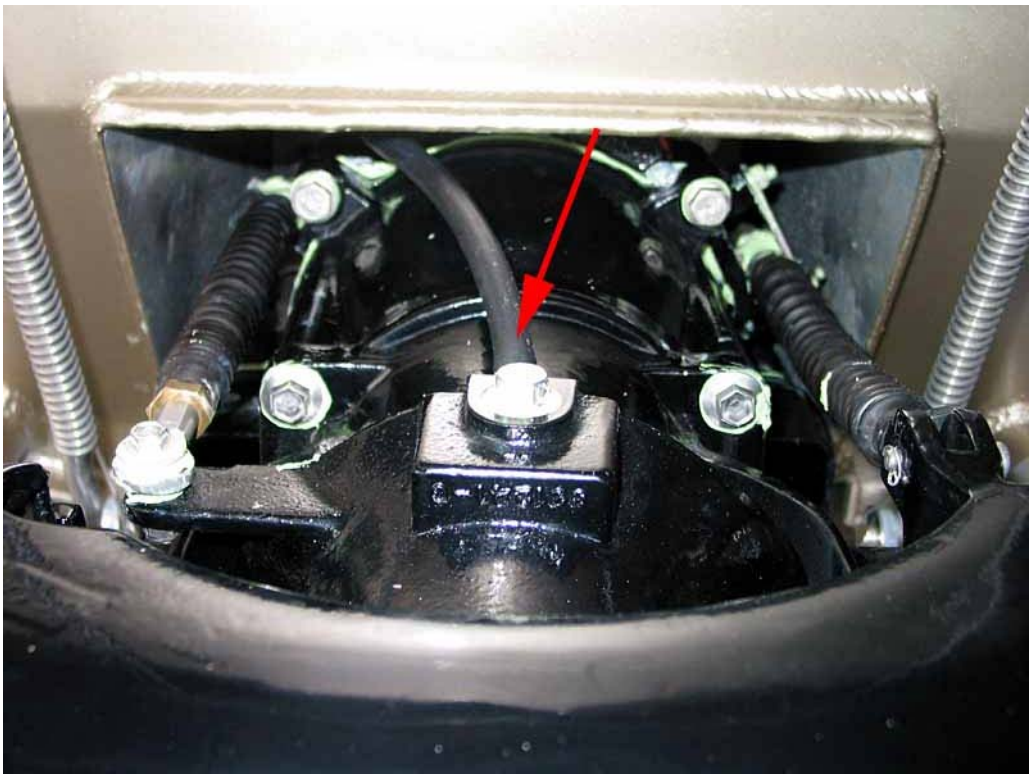
Picture 13: Removal of Reverse Gate Cable.

7. Disconnect the Reverse Gate cable adjuster.



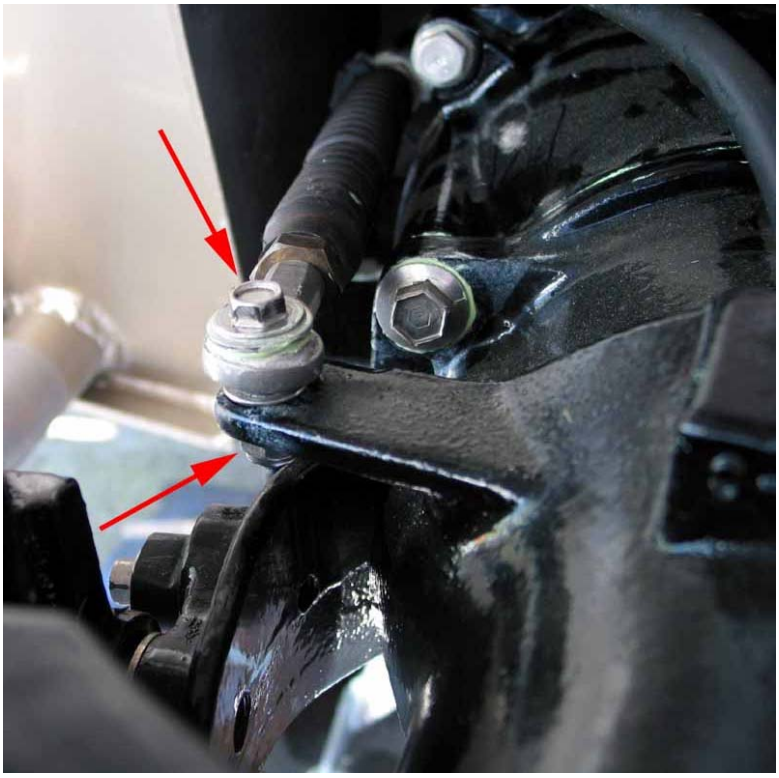
Picture 14: Removal of Reverse Gate Cable Adjuster.

8. Disconnect the bilge vacuum hose from the nozzle.



Picture 15: Removal of Bilge Pump Vacuum.

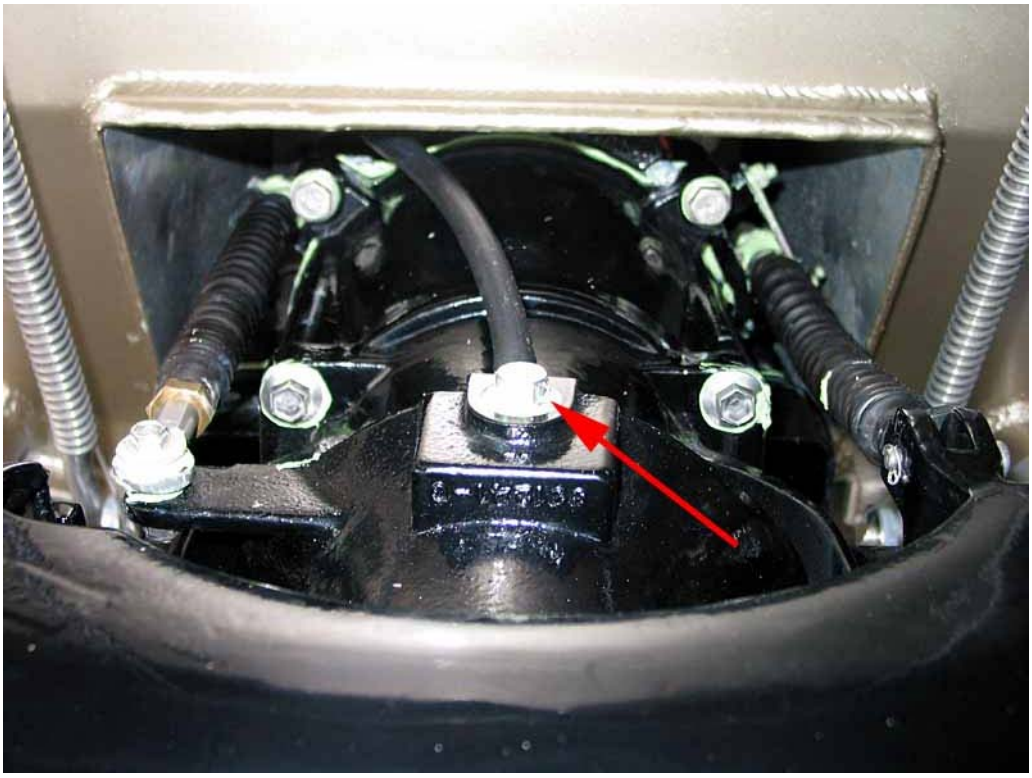
9. Disconnect the steering cable from the rudder. Be careful not to lose the washers.

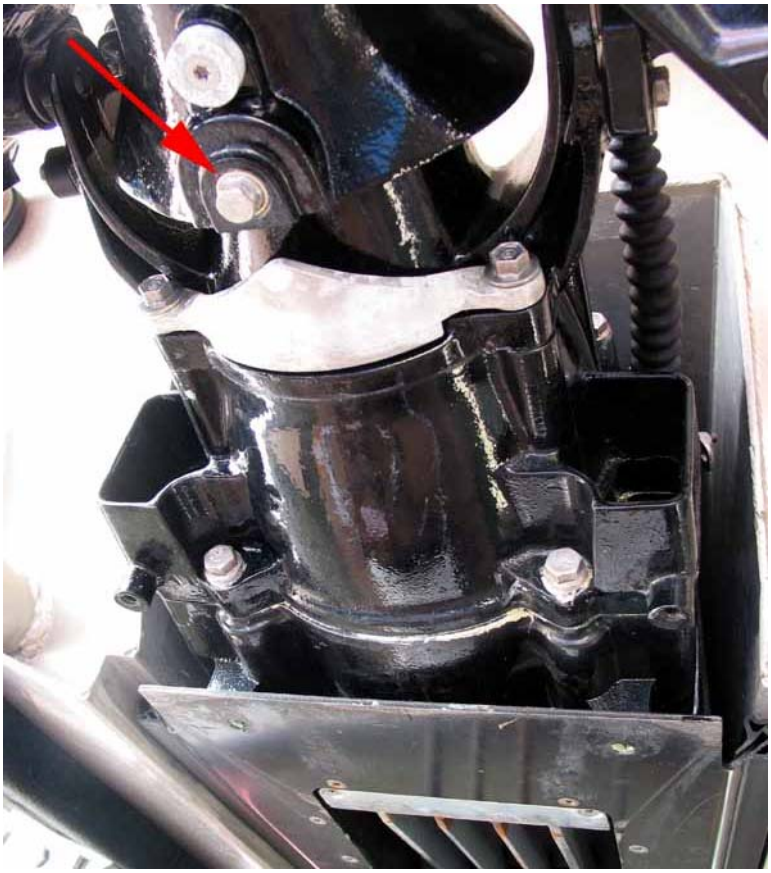


Picture 16: Removal of Steering Cable.

Removal of the Rudder

10. Remove the two Rudder pivot bolts with a13 mm socket.





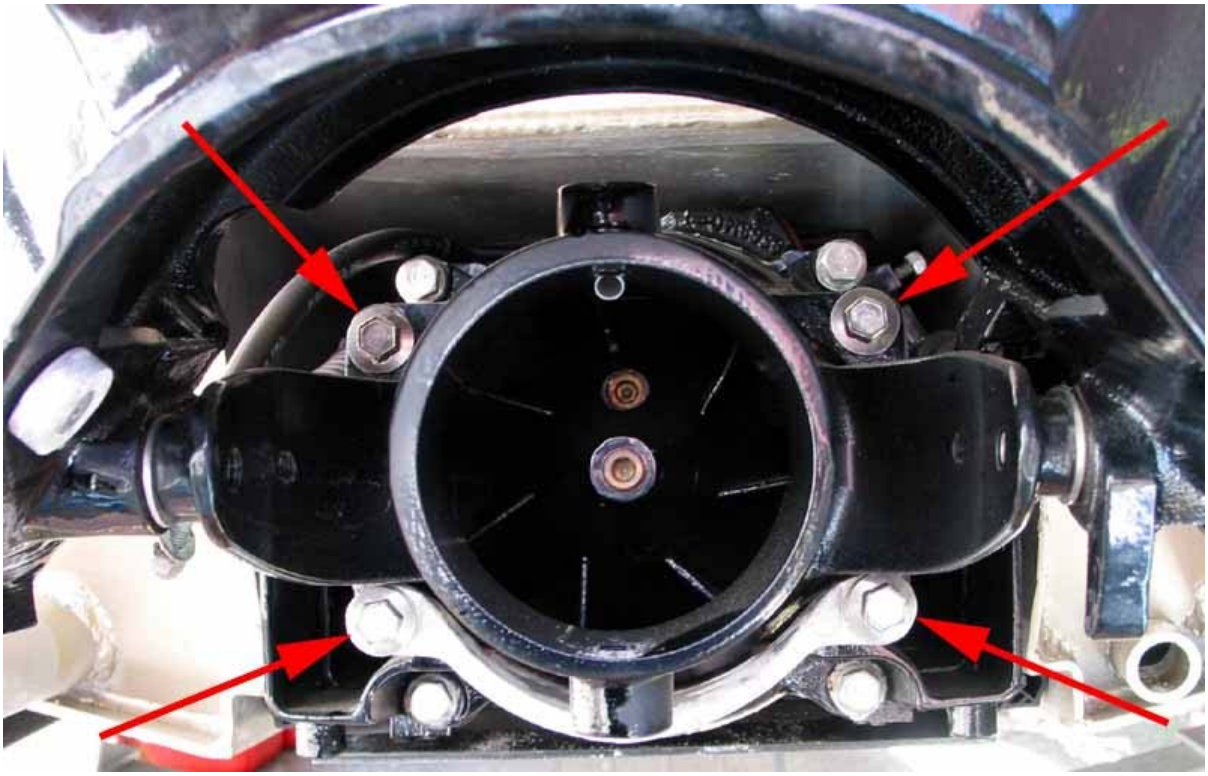
11. Carefully remove the Rudder by pulling it straight back.

Removal of the Nozzle

Note:
You may remove the actual reverse bucket from the nozzle before continuing. This will make removing bolts from the stator easier but is otherwise not required. I leave the reverse gate attached to the nozzle.

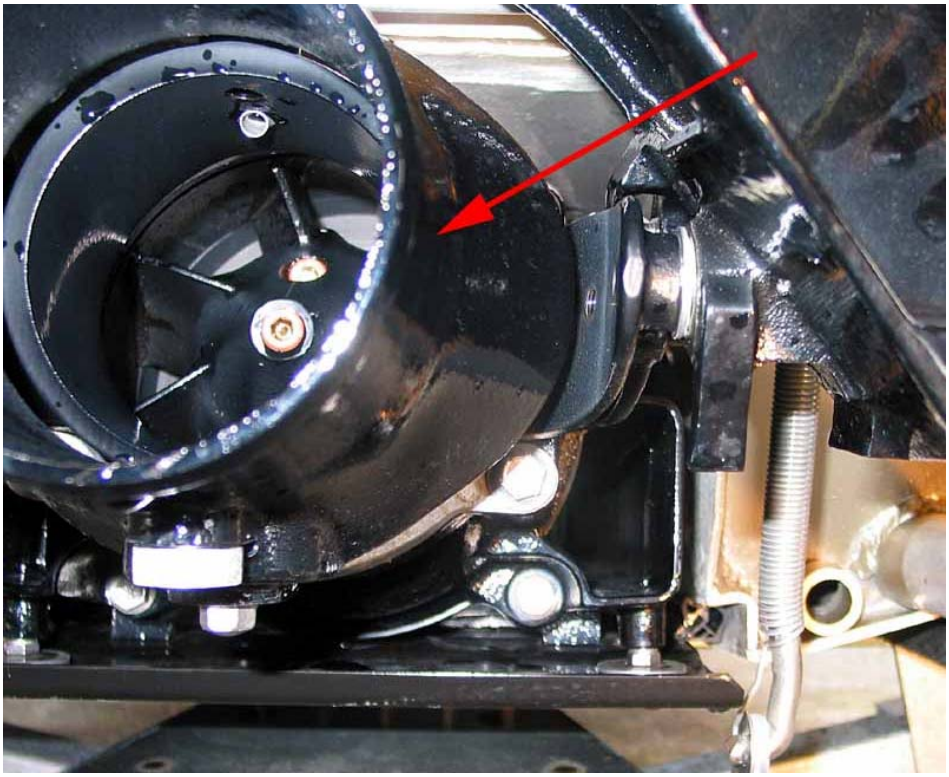
12. Remove the four M10 bolts that secure the Nozzle assembly to the Stator. Be very careful, as it is easy to slip with the socket and damage the socket heads.

Make sure you set your socket straight on the bolt when removing them. Usually those bolts come off quiet easily … If not, the use of impact tools may help.



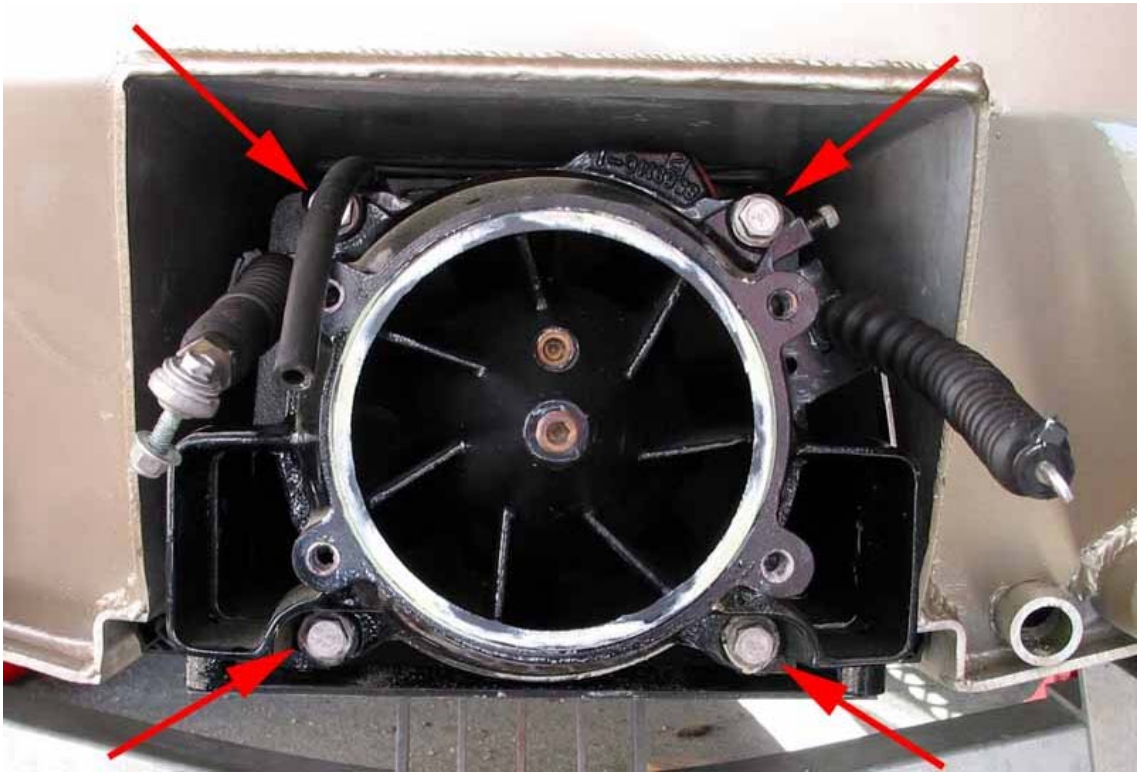
Be careful as not to damage the paint on the reverse bucket. Put a cloth over your socket and tool.

13. Remove the Nozzle by pulling it back gently. If it cannot be removed, gently tap it with a rubber hammer.



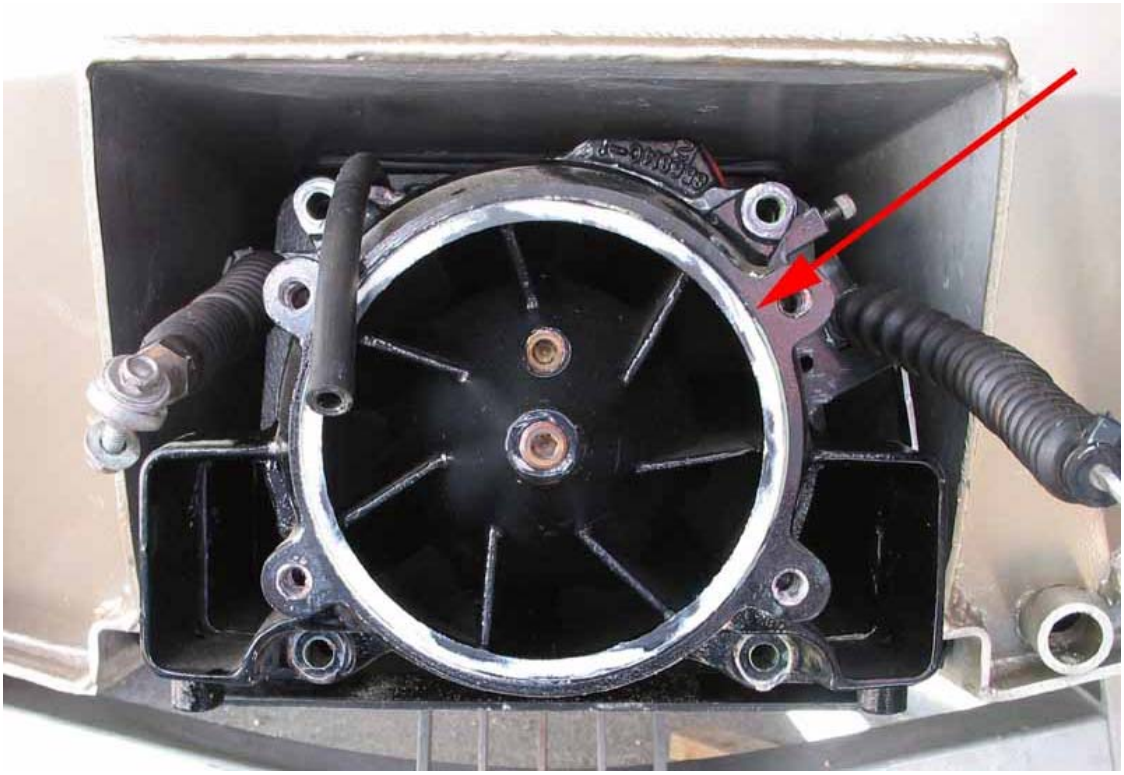
Removal of the Stator

14. Remove the four M10 150 mm bolts that secure the Stator and Wear Ring to the Drive Housing.



Be careful as it easy to round the heads on these bolts, so as before, use a 15 mm socket. Make sure to keep the socket straight on to the bolts. If the bolts do not come lose, use an impact gun. Be careful as you are working on aluminum parts. Corrosion can make those bolts hard to remove.

15. The next step is removing the stator from the drive. But before we pull the stator of there a few things to remember.

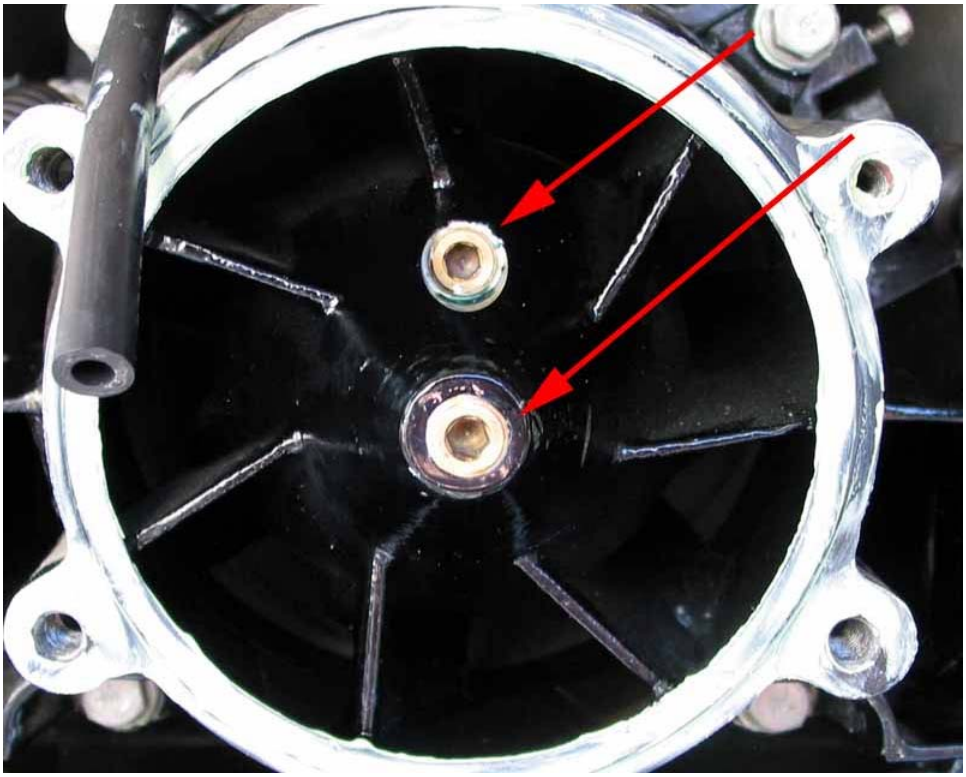


When you pull the stator off, the gear oil will spill out. Secondly, there is an oil seal that you must be careful as not to damage it.

Place an oil drain pan under the stator, then pull it straight (!) back.

16. Pour the oil that remained in the stator in an oil pan and examine the oil for water and metal chips. The oil should be blue and clear. Any foam or milk like appearance is reason for concern and indicates a leak in the gear case and may have caused bearing and gear damage.

17. Remove both drain plugs from the stator and set it upside down on your drain pan to drain all the oil out.



If you just intend to change your stator lubricant then you may now stop the disassembly to reassemble the drive in reverse order.

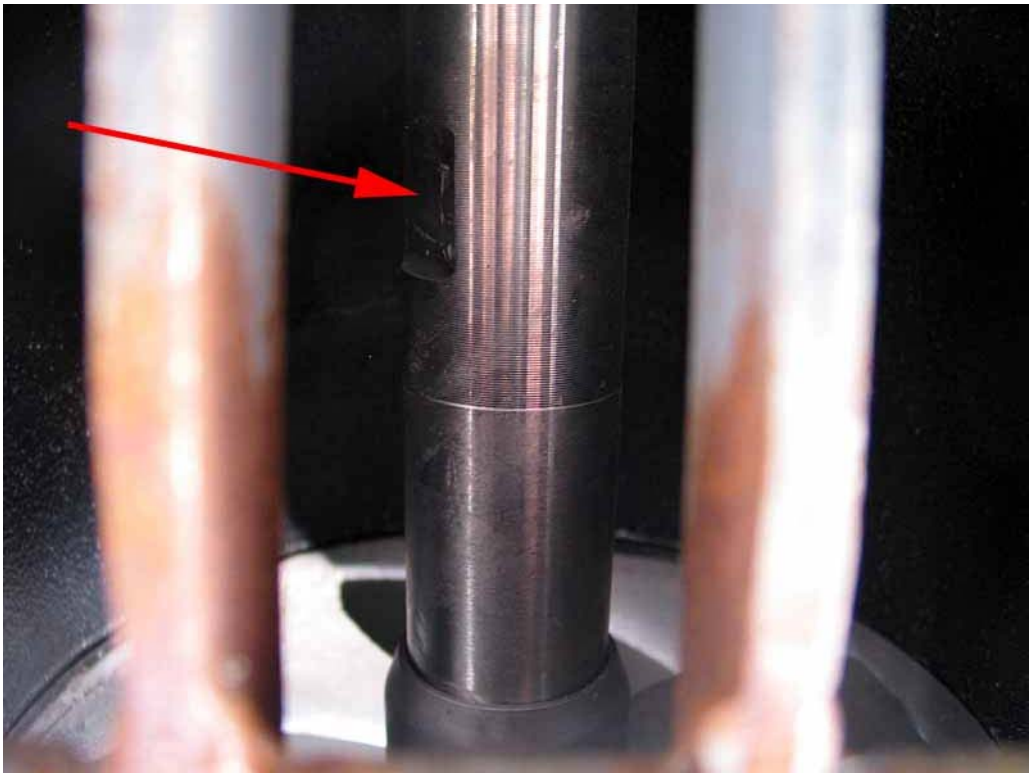
Removal of the Drive Impeller

Note that the drive impeller is also your coolant impeller. It pushes water through the pickup at the 1 'o clock position through the motor. This means the jet boater has no worries about little rubber impellers falling apart and such.

18. The Gap between Impeller and Wear ring must be 0.96 – 1.47 mm or 0.038 - 0.058. Smaller is better. If it is drastically out of spec, you may need to have the wear ring or impeller repaired or replaced.

19. To remove the drive Impeller you must hold the drive shaft and then undo the Impeller nut.

20. The drive shaft has two flat spots, where the wrench will hold on.



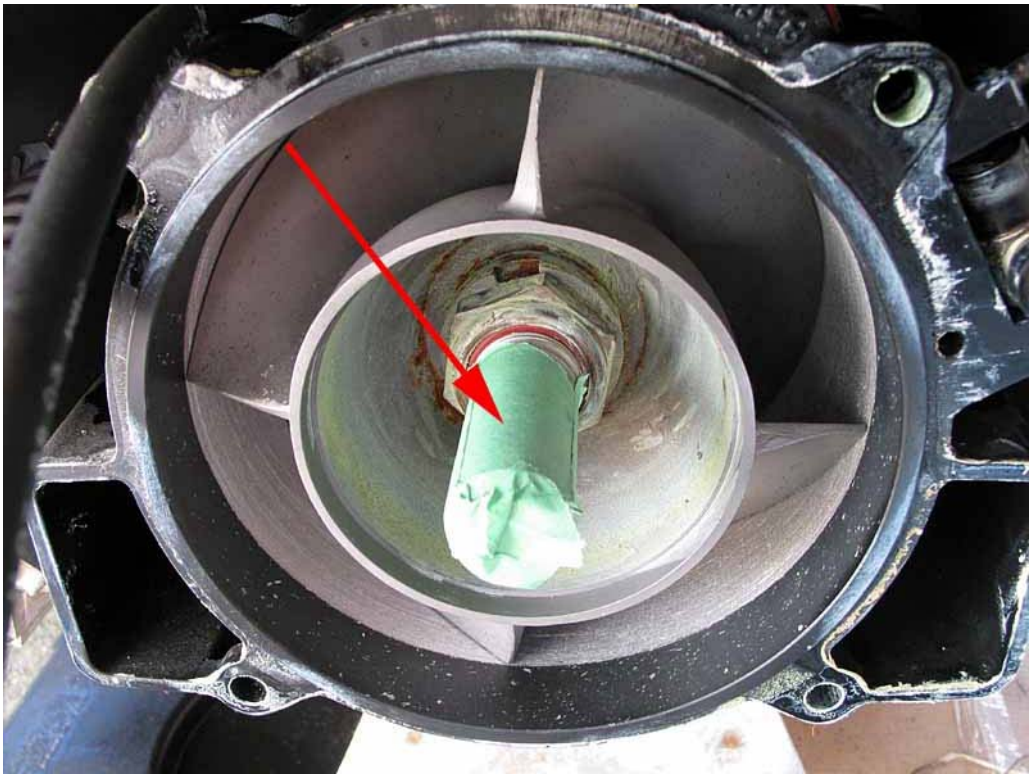
A view from the bottom through the grate of the pump unit.

21. To hold the drive shaft, grab it with a 1-1/8 inch open-end wrench through the Easy Clean grate

22. A word of caution here. It is easy to nick the surface of the drive shaft that resides in the stator bearing. This would be a critical mistake.

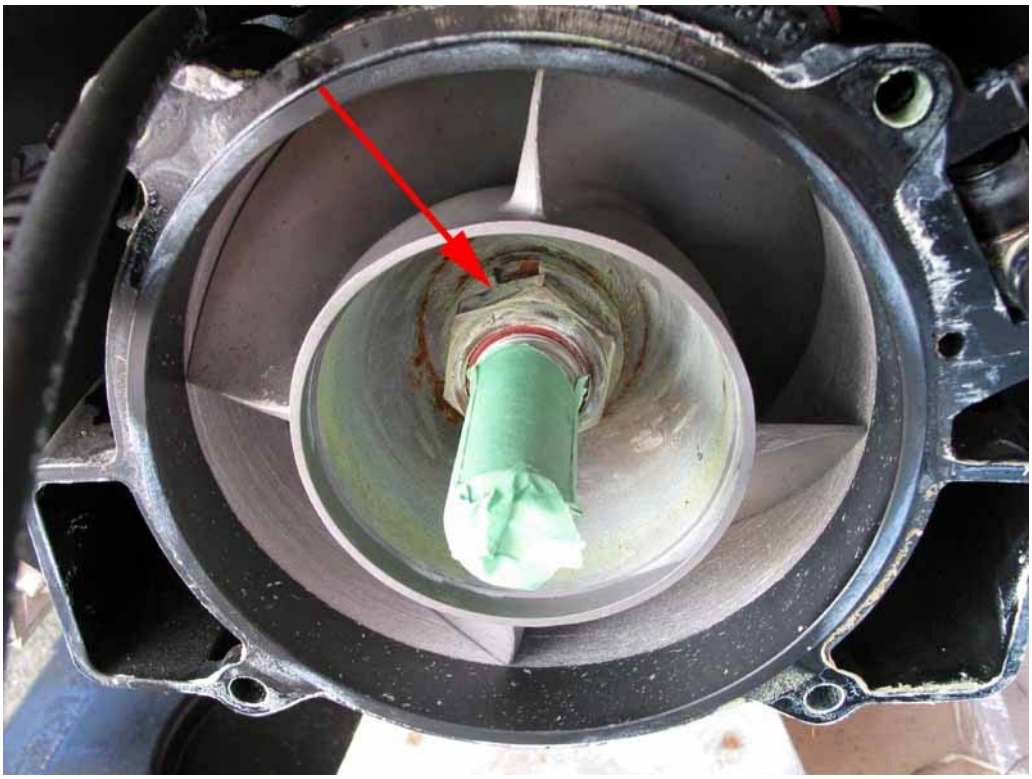
Be careful, especially if you are not using Mercury’s special socket 91-850297.

I put masking tape on the drive shaft to protect its surface from nicks. If you are using a normal deep socket I recommend, putting a piece of plastic tubing over the shaft to protect it from damage.



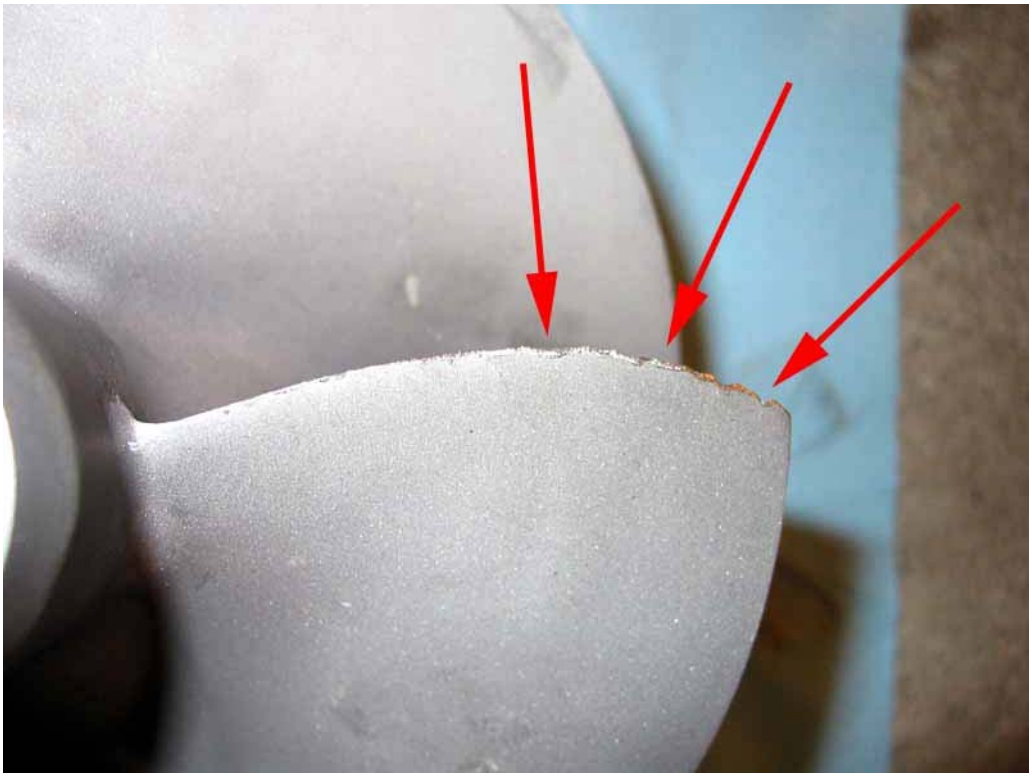
23. The impeller nut will be a little hard to remove and usually impact tools or a breaker bar will be at order. If you see a lot of rust around the impeller nut, spray it with WD40 and let it sit for a while before continuing.

If using a breaker bar to remove the nut, be careful not to bend the drive shaft when prying on the nut.



24. After removing the nut, pull the impeller off

25. Inspect the impeller. Especially the leading edges may have damage from rock ingestion. Small burrs can be filed down. But be cautious as not to imbalance the impeller.



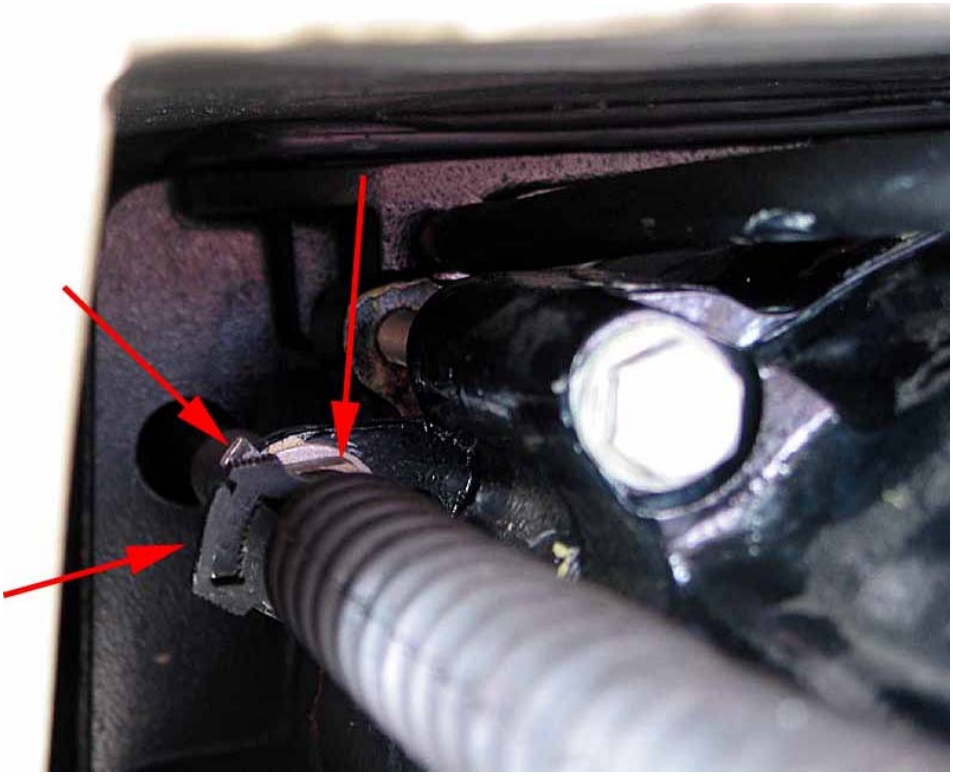
If the damage is too great, have it professionally repaired or get a new Impeller ($400).

Removal of the Wear Ring

Again, this is not necessary if you simply service the drive.

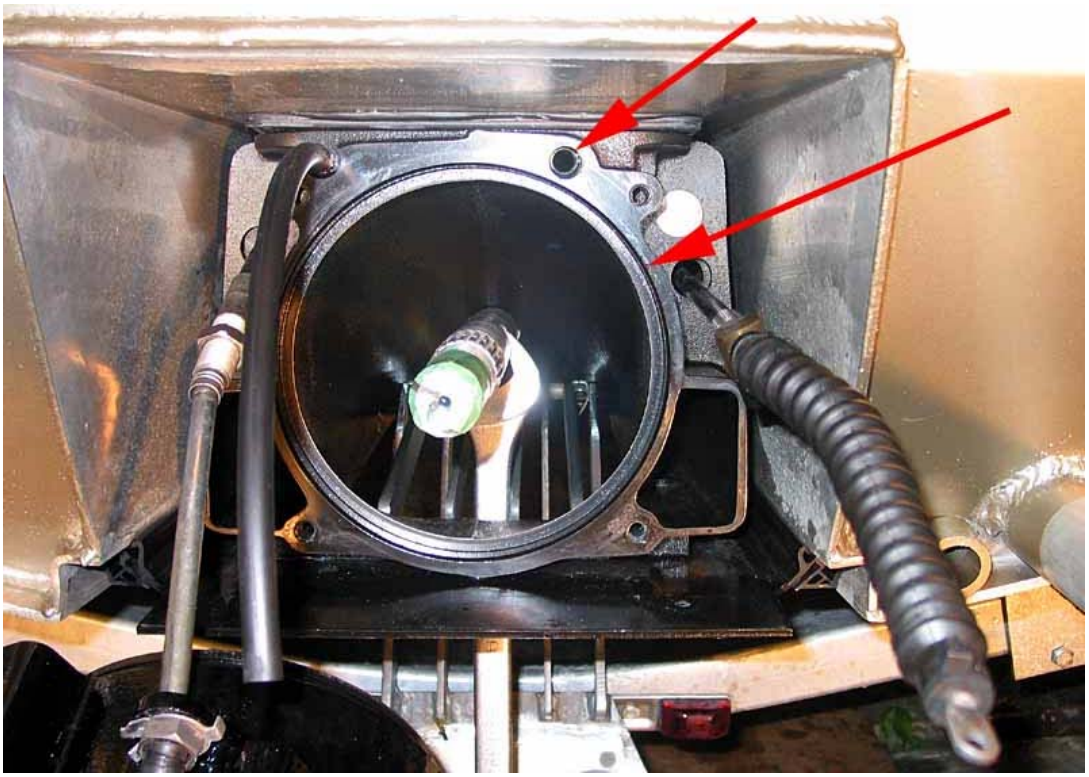
Sometimes the wear ring will come off together with the stator. If the wear ring did not come off with the stator then there is no reason to take it off.

26. If you decide to remove the wear ring you have to remove the steering cable. It is a little difficult to remove and it is a good idea to have spares of the black plastic clip and the SS clip that secures the nut.

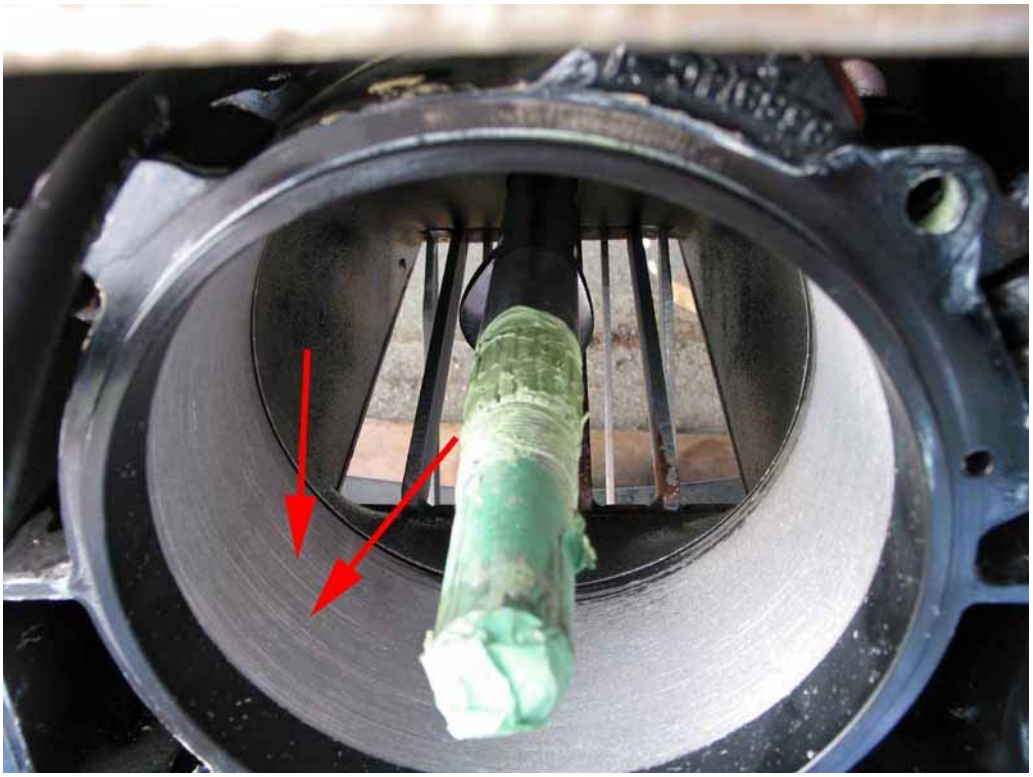


27. After removing the steering cable, pull the wear ring off. If it does not come off, gently tap it with a rubber hammer.

28. Be careful, as there are two O-Rings. One O-Ring is behind the wear ring and the other is in the pick up for the cooling water. Keep both O-Rings and inspect for damage.



29. Inspect the wear ring for gouges and other damage. If the damage is too great, replace the wear ring or have a Stainless Steel insert made.



Reassembly

Installation of the Wear Ring

30. Clean all mating surfaces between the drive housing and the wear ring. Make sure there is no sand or debris in there that could cause misalignment of those components.

31. Clean the two O-Rings and lubricate them with Silicone Grease.

32. Install the O-Rings. One into the coolant pickup and the other on the wear ring.

33. Install the Wear Ring. Ensure the two O-Rings sit exactly where they belong and did not slip and get squished.

34. Line up the bolt holes in the wear ring with the holes in the drive unit.

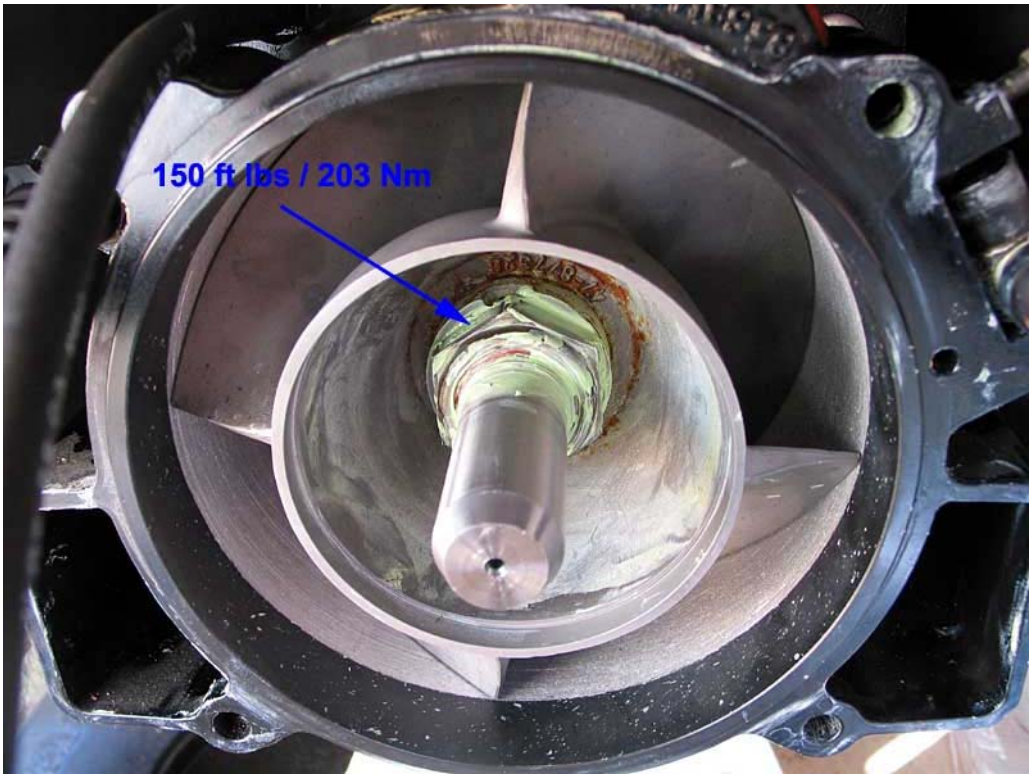
Installation of the Impeller

35. Clean the Splines of the Drive Shaft. Remove all grease and corrosion.

36. It is important to grease the splines on the drive shaft where the Impeller sits with Mercury Special Lube 101. Apply the grease generously.

37. Slide the Impeller onto the drive shaft. Make sure it aligns with the splines.

38. Install the impeller nut and tighten with 150 ft lbs. Do not bend the drive shaft while torquing down the impeller nut.



39. If you applied masking tape the drive shaft. Remove it now.

Installation of the Stator

40. Clean all mating surfaces between the wear ring and stator. Make sure there is no sand or debris in there that could cause misalignment of those components.

43. Apply Mercury Special Lube 101 to the mating surfaces.

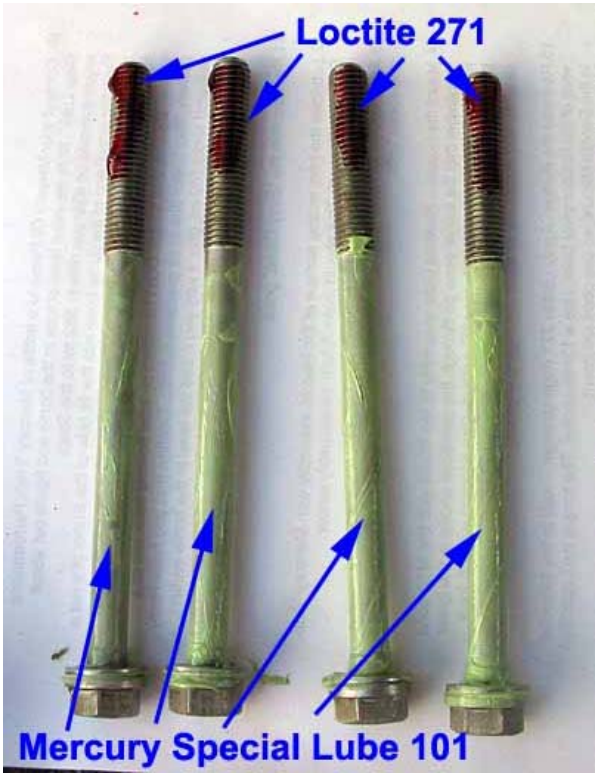
44. Make sure all oil has drained from the stator before installing. If there was water in the oil, make sure to flush all milky oil water residue out.

45. Before installing any of the bolts. Wire brush them to remove any corrosion, Loctite and anything else. Replace damaged bolts.

This is how my boat looked after one year of boating in salt and freshwater.

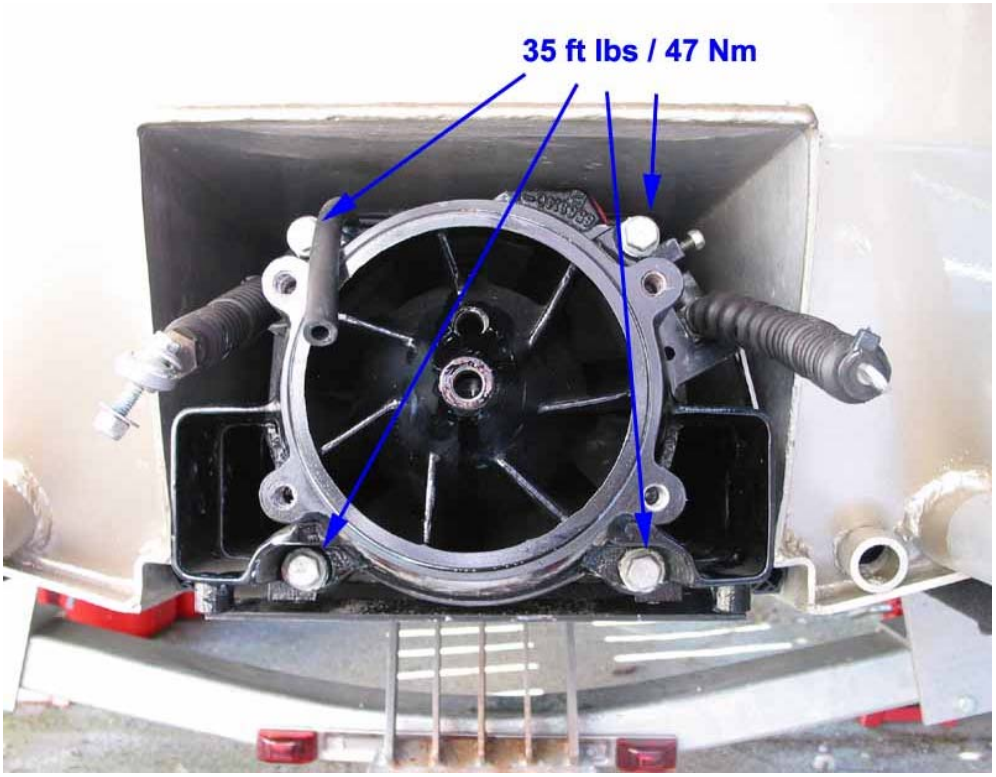
The bolts cleaned and wire brushed.

I usually cover the entire length of the bolt with Mercury Special Lube 101, except the threads where the Loctite goes. The grease will protect the bolt from corrosion.



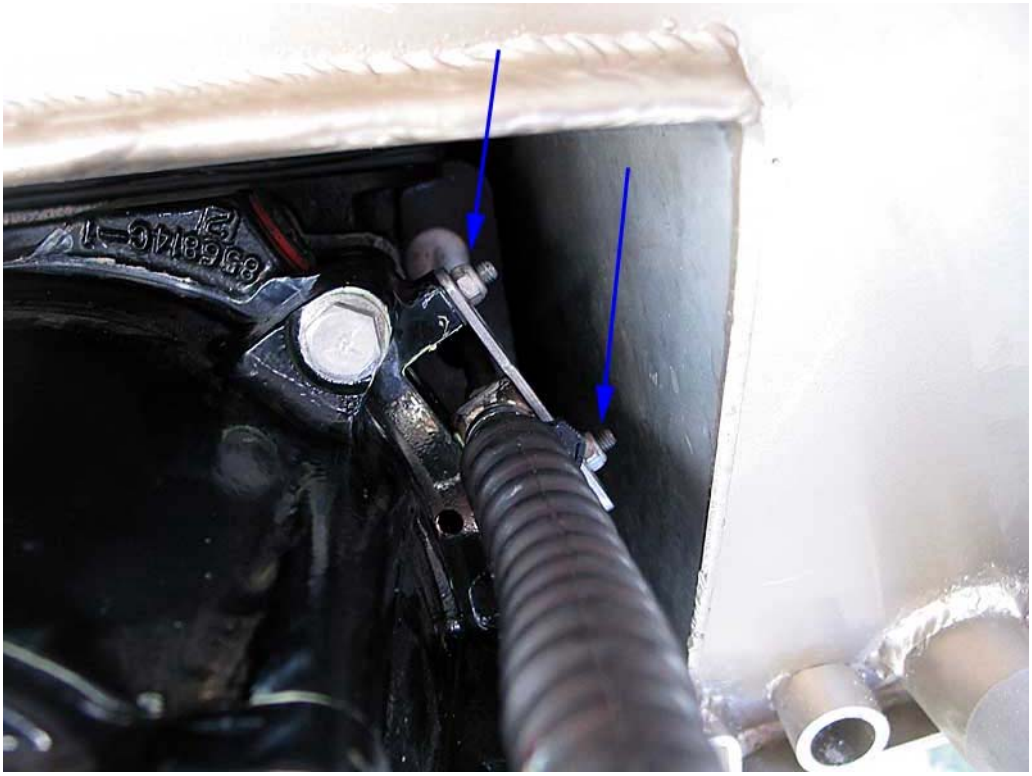
The bolts covered in Mercury Special Lube 101 and Loctite 271 applied to the thread. They can now be installed.

46. Install the 4 150 mm bolts and tighten to 35 ft lbs / 47 Nm. Be careful here. Use a torque wrench and tighten them in a criss cross pattern. Do NOT over tighten those bolts. They go in aluminum and stripping them would be a costly mistake.



Tighten Bolts to 35 ft lbs / 47 Nm.

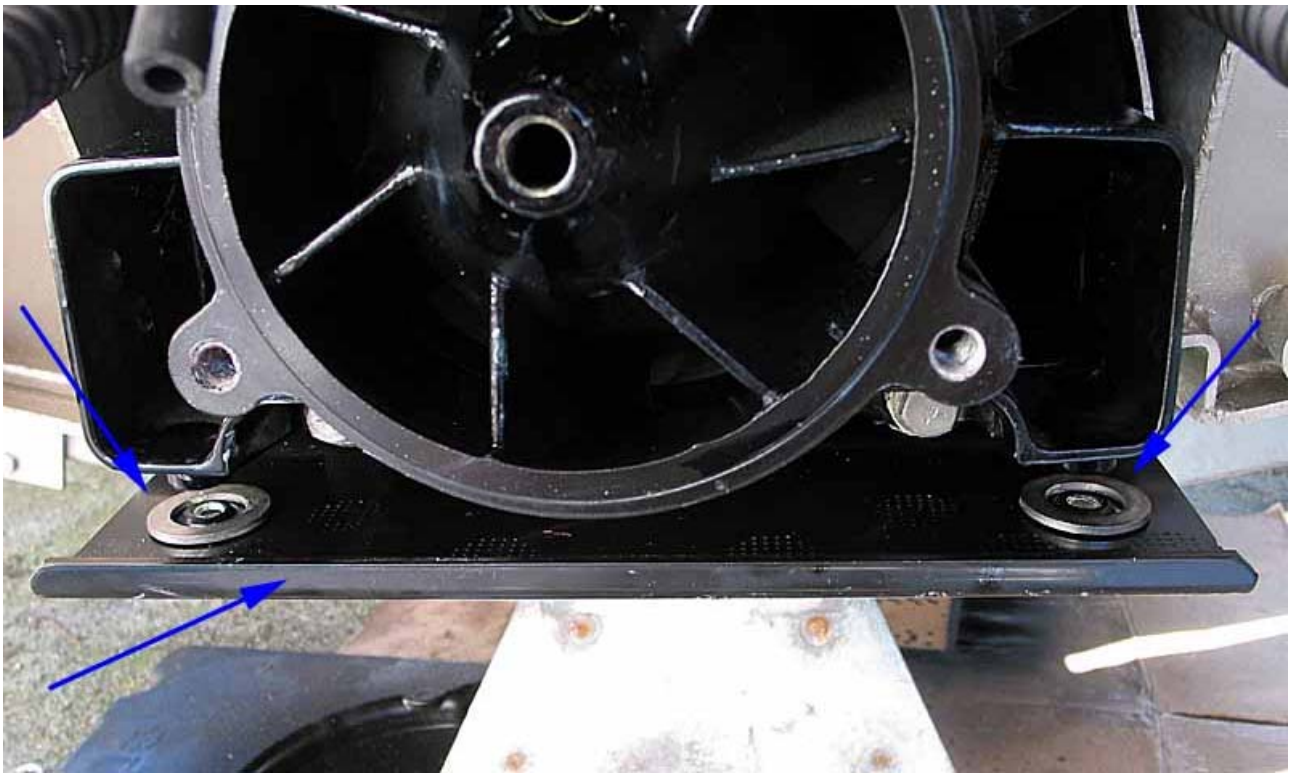
47. Install the Thrust adjuster to the wear ring. Be sure not to rotate it, as it would adjust the neutral thrust setting. Tighten the two M6 nuts. There is no torque specified.



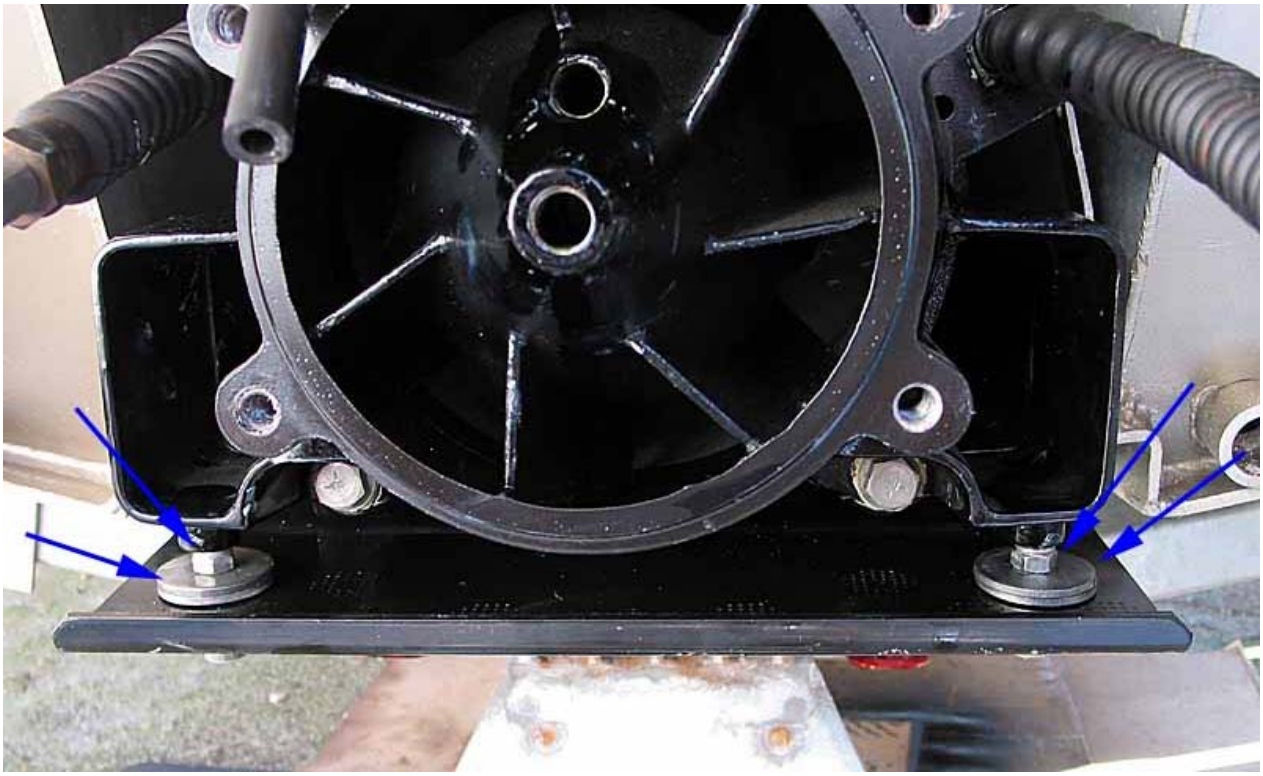
Installation of the Trim Plate

48. Clean the Trim Plate.

49. Install the Trim Plate in the gap between the Trim Ring and the Ride Plate. Install the Ring Washers as shown. They go first



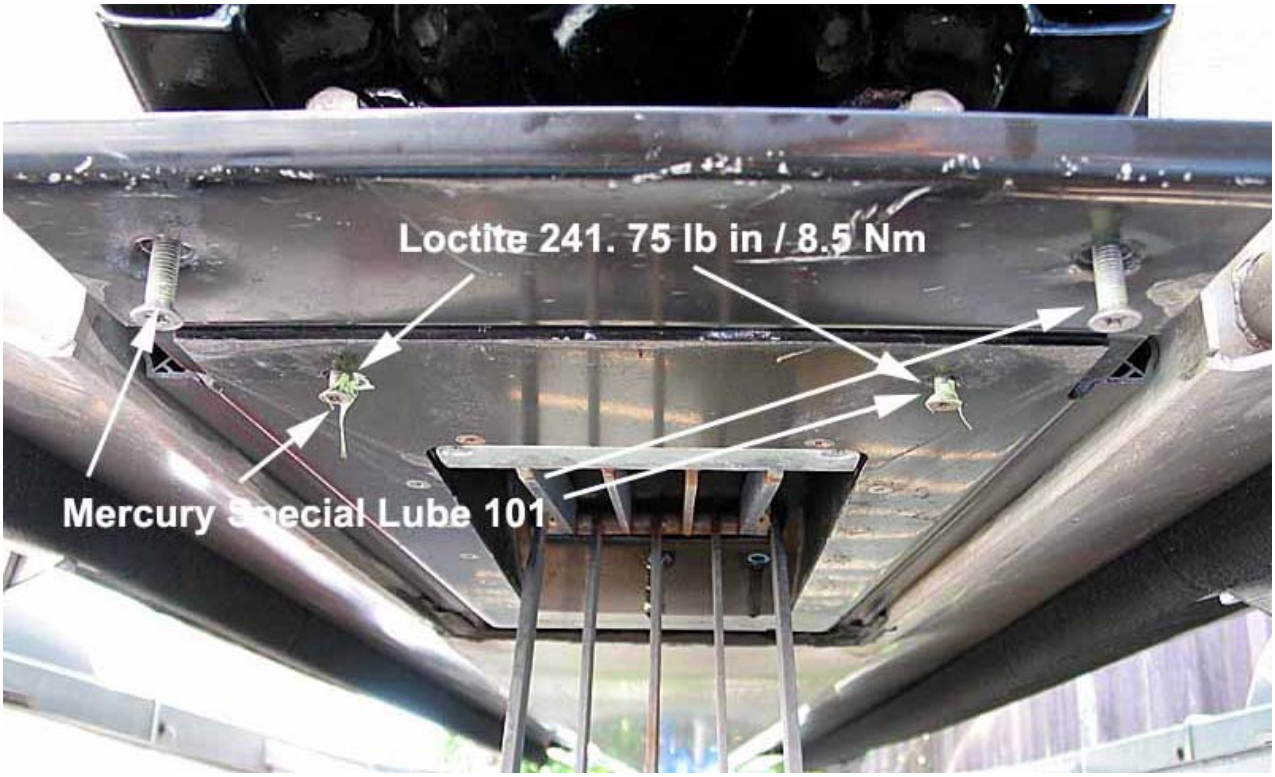
Trim Plate and the ring washer installed



The second washer, screw and nut installed

50. Install the two other washers on top of the ring washers. Place the nut on top and insert the screw from the bottom of the trim plate. Note that the screw spins freely in the wear ring and is held only by the nut. There is no torque specified for those screws.

51. Install the two Torx 30 screws that bolt the Trim Plate to the Ride Plate. Apply Loctite 242 to these screws. I also place a dap of Mercury Special Lube 101 under the head of the screw to prevent them from corroding.



Apply Loctite 241, Tighten to 75 lb in / 8.5 Nm. Apply a dab of Mercury Special Lube 101 under the head of the Torx 30 bolt.

Filling the Stator with Oil

Use Mercury's High Performance gear Oil for the drive. The use of lesser quality oil may be possible but for the amount of money saved for the small qty it needs, this is hardly worth the trouble.

Take in mind however that Mercury's Premium and High Performance gear oil does not mix well. If you ran either and switch to the other you need to make sure you flush all the old oil out. The same applies to the drive gear oil.

52. Install the center plug into the stator housing. Use Loctite PST or equivalent like Permatex pipe sealant. Do not use Teflon tape for this plug.

The plug prepared with sealant.

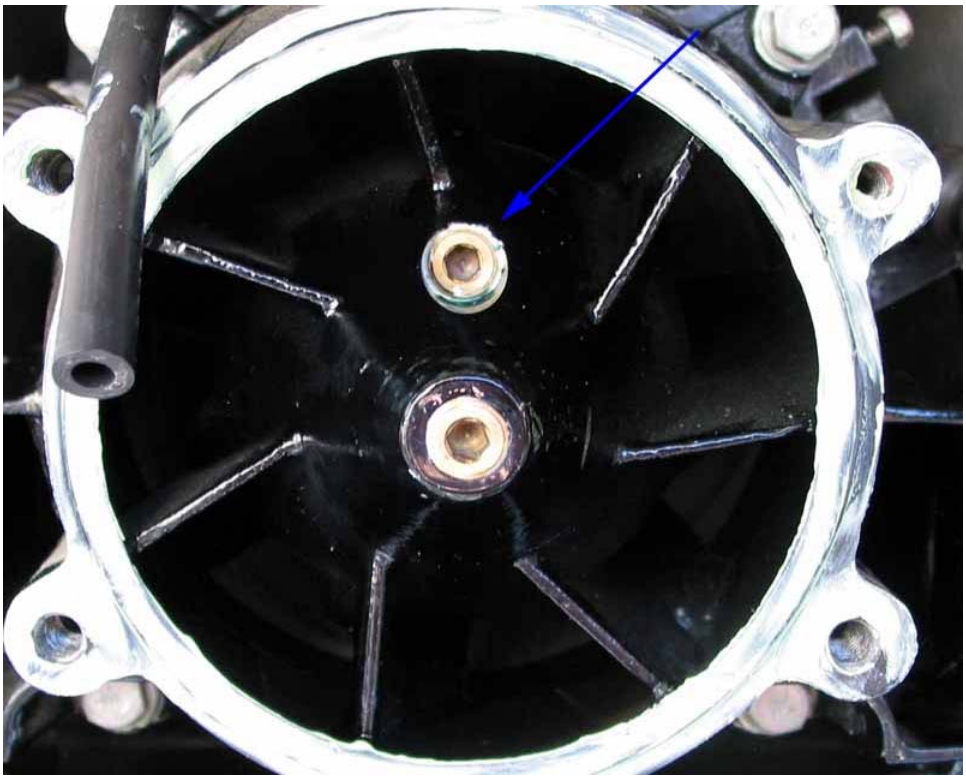
The plug installed in the CENTER hole of the stator.

53. Note the amount of oil you have in your oil bottle.

The stator requires 19 oz / 550 ml of oil. Put a shop towel into the stator vanes to capture any oil spills. Use one of the outboard motor hand oil pumps and start pumping until oil into the top vent until it runs out of the vent.

Verify on the bottle that you used the required amount of oil.

54. Install the vent plug. Use Loctite PST or equivalent like Permatex pipe sealant. Do not use Teflon tape for this plug.



55. Wipe any oil off the plugs and observe for oil seeping through. Remove the plug and reseal if you see any oil working its way through as that would mean water can work its way in.

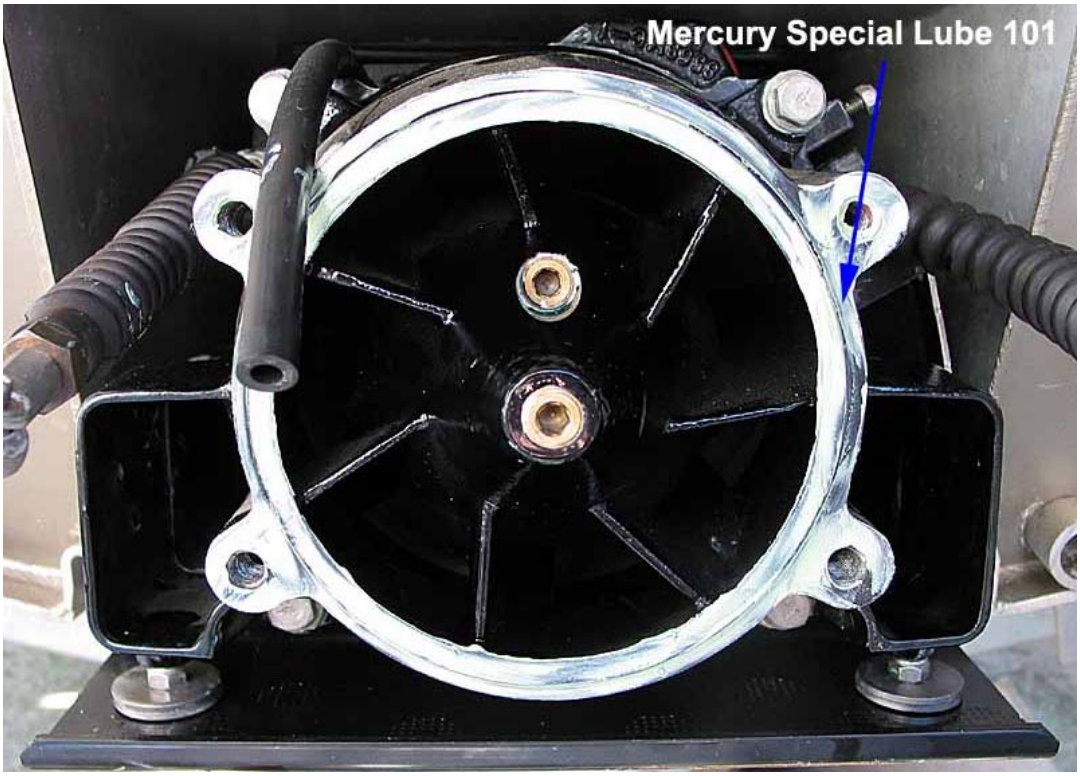
56. Clean up any oil spills, as any oil spills left on the drive will end up in the water.

Installing the Nozzle with Reverse Gate

57. Inspect all three sacrificial anodes of the drive for wear. Replace if close to 50% of the anodes are gone. Clean the anodes.

58. Clean all mating surfaces between stator and nozzle. Make sure there is no sand or debris in there that could cause misalignment of those components.

59. Apply Mercury Special Lube 101 to the mating surfaces.



60. Clean the 2 x M10 x 35 mm bolts and the 2 x M10 x 45 mm bolts.

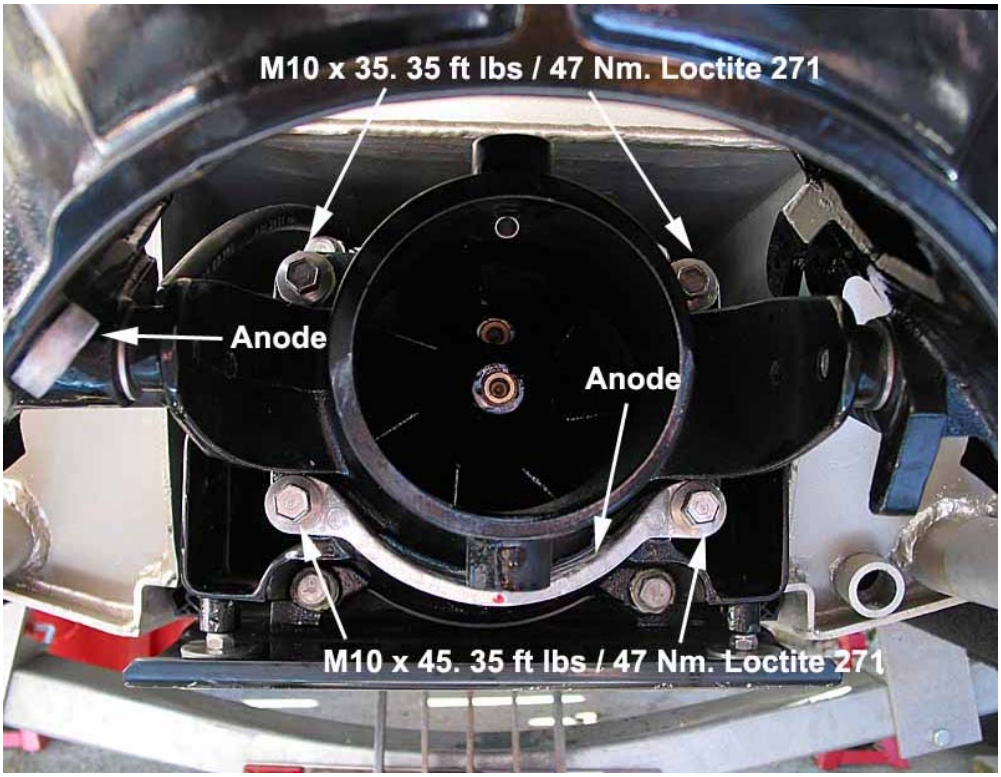
61. I apply Mercury 101 to the bolt up to the thread where the Loctite goes. This has proven to help with corrosion in saltwater.

62. Apply Loctite 271 to the threaded ends of the 4 bolts.

The bolts cleaned. Loctite 271 and Mercury Special Lube 101 applied.

63. Install the 4 bolts. The longer ones go on the bottom and hold the sacrificial anode in place. The short ones go on the top.

64. Tighten the bolts with a 13 mm socket and torque in a criss cross pattern to 35 ft lbs / 47 Nm. Be careful not to strip anything as you are working in aluminum.

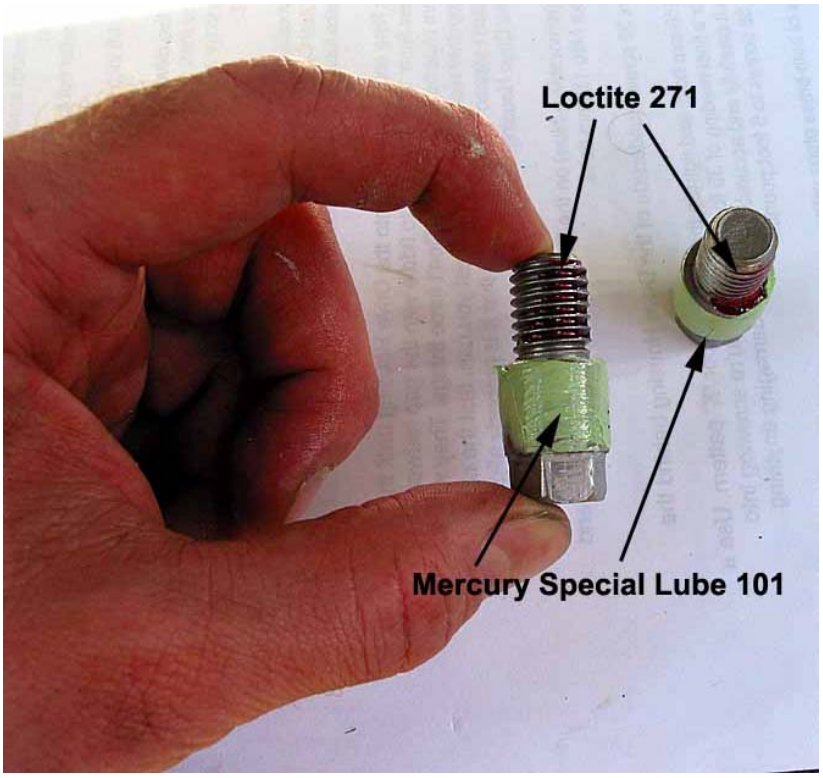


Installation of the Rudder

65. Clean the 2 Pivot bolts

66. I apply Mercury Special Lube 101 to the bolts up to the thread where the Loctite goes. This has proven to help with corrosion in saltwater.

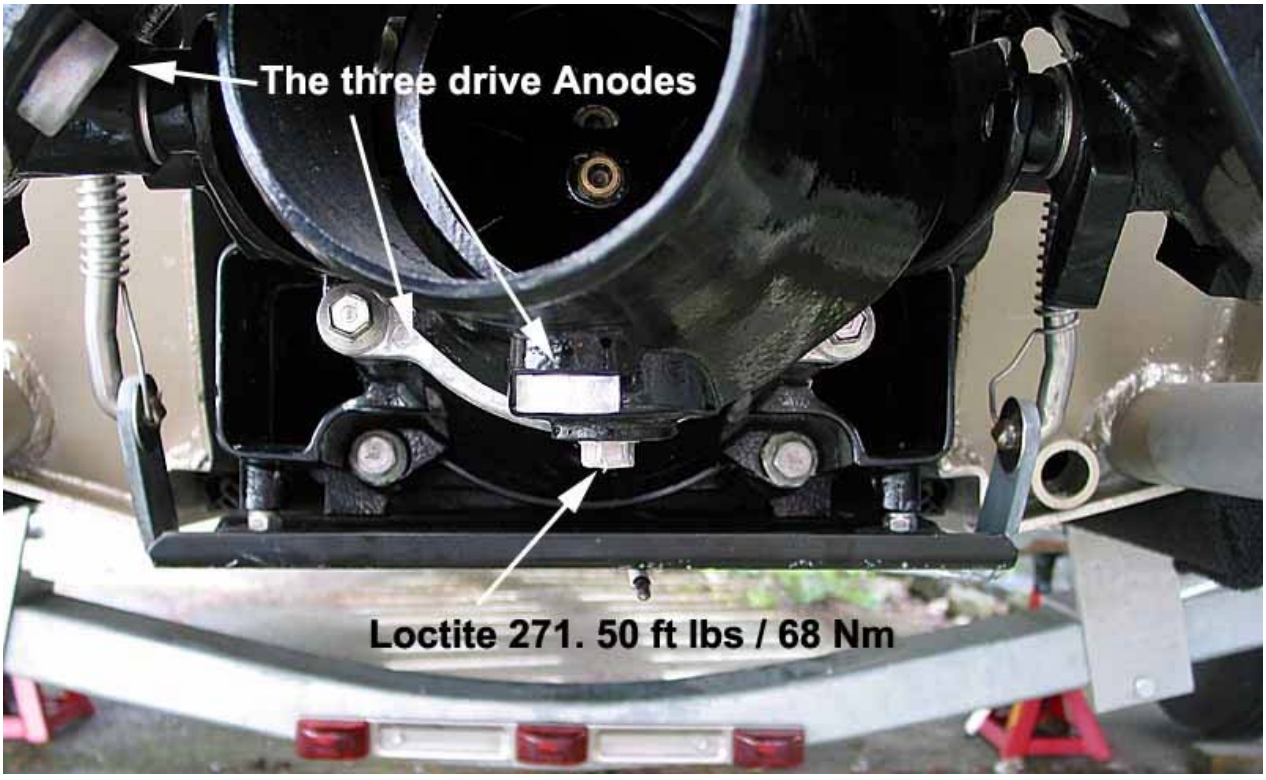
67. Apply Loctite 271 to the threaded ends of the 2 bolts.



68. Install the Rudder using the 2 pivots bolts. Use a 13mm socket and torque the bolts to 50 ft lbs / 68 Nm.

69. Connect the bilge vacuum hose to the fitting on the nozzle.


Loctite 207. 50 ft lbs / 68 Nm
Bilge Vacuum


The three drive Anodes
Loctite 271. 50 ft lbs / 68 Nm

Installation of the Steering and Thrust Cables

70. Install the steering cable to the rudder. Make sure to install the washers in the correct order. The washer goes between the knuckle and the steering arm. Use Mercury Special Lube 101 in the knuckle to your discretion.

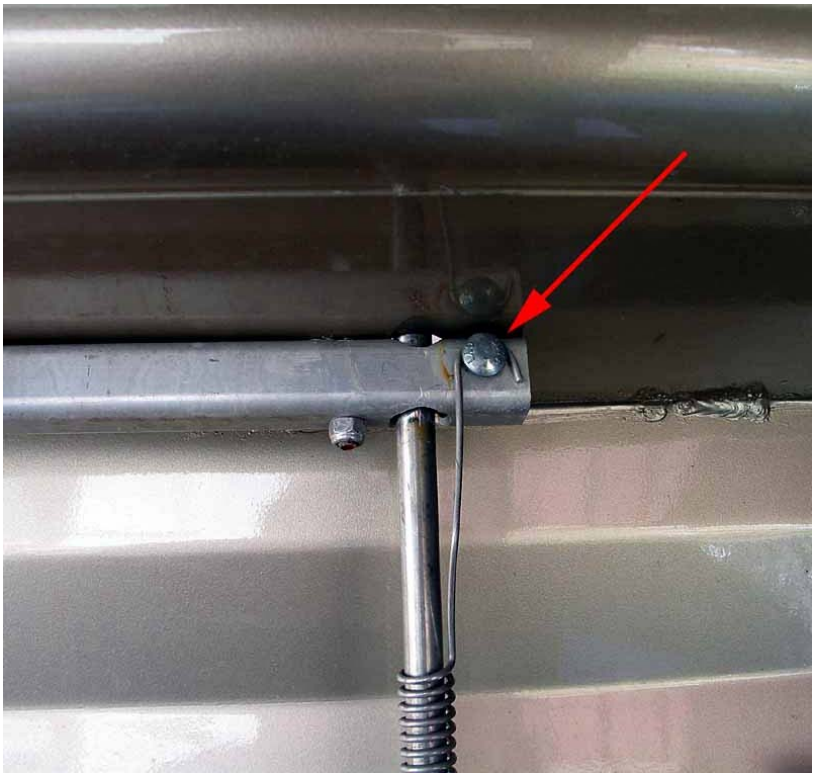
71. Install the reverse gate cable. Use a new stainless steel cotter pin. Take care not to scratch the paint when installing the cotter pin, as this would promote electrolysis.

Installation of the Easy Clean Grate

Reinstall the Reverse Gate in the reverse order, as it was de installed.

72. Hook the springs over the bolts under the swim platform. Watch out. This is where usually lots of skin goes missing from uncareful hands … wrestle the springs onto the bolts.

73. Tighten the bolts that hold the springs.



74. Reinstall the Easy Clean Handle

Filling the Drive Oil

Now comes the easy part ... changing the oil of the drive. This is as simple as changing the oil on an outboard.

1. Put an oil drain pan under the boat.

2. Remove the drain plug using a large flat head screwdriver. The drain plug is the plug in the center. There is a blue rubber gasket under the plug. Make sure this does not end up in your oil drain pan.

3. Remove the vent plug. This is the plug off center. It has the same blue rubber gasket. Make sure you do not lose the gasket. Let the oil drain

4. Examine the oil for metal chips, water, foam and milky appearance. Any of those indicates leaks and water intrusion or drive damage.

5. Let all the oil drain out. This is best done BEFORE working on the stator oil to give the oil time to drain.

6. The drive requires about 27 oz / 825 ml to refill. Use Mercury's High Performance Gear Oil.

7. Note the mount of oil in your oil bottle and pump the oil in with an outboard oil pump until it comes out of the vent hole.

8. Verify that you pumped 27 oz / 825 ml in the drive! If the boat isn't level you may not get enough oil in there.

9. Install the vent plug. Be sure to install the blue rubber gasket with it.

10. Remove the oil pump and install the drain plug. Be sure to install the blue rubber gasket with it.

11. Tighten both plugs and clean off any oil spills of the drive as all oil left will end up in the water.

Final Checks

Perform the following checks before finishing. Do not omit these checks as incorrect installation can cause a loss of power or steering and cause serious injury or death!

1. Is the Reverse Gate Cable bolted correctly to the Wear Ring?

2. Is the Reverse Gate Cable bolted correctly to the Reverse Gate?

3. Is the Steering Cable bolted to the Rudder?

4. Are both, drain and vent plug, tightened in the Stator?

5. Are both, drain and vent plug with rubber gaskets, tightened in the Drive Housing?

Done!