

Amateur Radio Station WCØM

(Formerly WCØEM, WFØGM)

Repairing a Yaesu G-1000DXA Rotor

(Part 1 of 2)

The following is my experience with a faulty Yaesu G-1000DXA Rotor, and how I repaired it.

Hopefully this account will help someone else repair their rotor if they encounter this same problem.

One day my azimuth indicator pointer went wacko on my rotor controller when it was busy turning my antenna.

What I mean is that the pointer went berserk, like it had a mind of its own! I noticed that the problem was its worst between 0 and 270 degrees while turning the antenna counter clockwise. The pointer would actually move clockwise, while the antenna was rotating counter clockwise! If I continued to advance the rotation CCW, the pointer would eventually move in the proper direction and "catch up" to where it should be on the dial. At first it did not always do this. But after a while, it was clear that the problem was not going to go away, because it became worse over time.

I am by no means an expert on these rotors, so if you do not have the same problem that I had, please don't ask me about it.

I had a real hard time finding much detail on the web about the problem described above. This page is the result of the lack of information out there concerning this repair. Hopefully it will help someone else fix their rotor having the **same problem**, and save them some grief.

After looking at the schematic, my best bet was that the potentiometer inside the rotator housing could be wearing. If there was an "open" somewhere along the path of the wiper, an incorrect voltage would be fed back to the controller. This is what turned out to be my problem. The following is my description of how I fixed it.

If you do not have the manuals, download them from the links below. I will refer to them during this discussion.

Download the User Manual [here](#)

Download the Service (Technical) Manual [here](#)

I recommend that you read through these instructions before taking things apart. Start by looking at the schematic on page 16 of the User Manual. At the top of the page is shown the rotator unit inside of a box drawn with a dashed line. Locate VR4; a 500 ohm potentiometer. This is the potentiometer that was giving me a problem. Note that the three leads of the pot are connected to pins 1, 2, and 3 of the 7-pin connector (item #7 in the Service Manual) on the rotor housing. You should measure full resistance across pins 1 and 3. When the rotor is fully CCW, resistance is maximum across pins 1 and 2, and minimum across pins 2 and 3. As the rotor is turned CW, the resistance across pins 1 and 2 will decrease, while the resistance across pins 2 and 3 will increase. Therefore the feedback voltage to the controller will increase/decrease.

Look for item #41 in the blowout drawing on the Rotator Section page of the Service Manual. This is the part that you will need to replace. Refer to the Service Manual for the item numbers indicated throughout these instructions.

I made this repair in January of 2012. Here is the contact information that was good at that time:

I called **Yaesu Tech Support (8am to 5pm PST) at 1-714-827-7600**. The part number listed in the manual for the 500 ohm pot was Q9000420. But when I asked for the part, they gave me a **substitute number: S8101678**.

I also ordered a new pilot lamp for the controller. In the manual this was part number Q1000068 but this also had a substitute number: S8101959.

Click on each picture for a high resolution view, or download all the photos in a zip file by clicking [HERE](#)

Download the full instructions in a single file in .pdf format [HERE](#)

Update July 2015! Before you begin:

Please download and read comments made by Scott, AC8DE.

Thanks to Scott for his contribution to this discussion.

Scott makes a very good point concerning hitting the hard stop of pot VR4.

That is something that you really should avoid!

Download his comments and instructions [HERE](#)



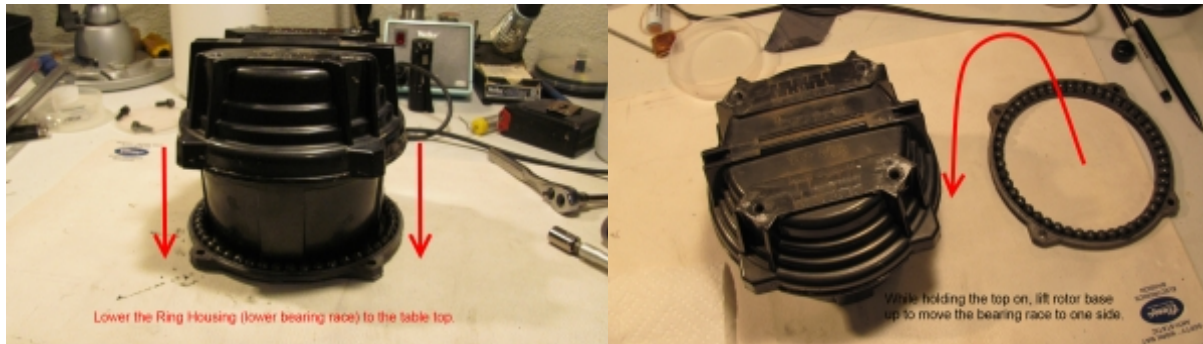
Step 1: Operate the rotor to its fully CCW position.



Step 2: Put a piece of masking tape on the Lower Housing (item #1 in the Service Manual) and mark the position of the rotor with the alignment marks on the Upper Housing (item #2 in the Service Manual).



Step 3: Flip the rotor over and using a 10mm wrench remove the 4 screws holding the bottom bearing race to the moving bell.



Step 4: Carefully flip the rotor back to top side up, while holding the bearing race together as if the screws had not been removed.

Then carefully lower the race along with the 49 ball bearings down to the table surface. Now without taking the top off, lift the base of the rotor up out of the center of the lower bearing race, and set the race to one side.



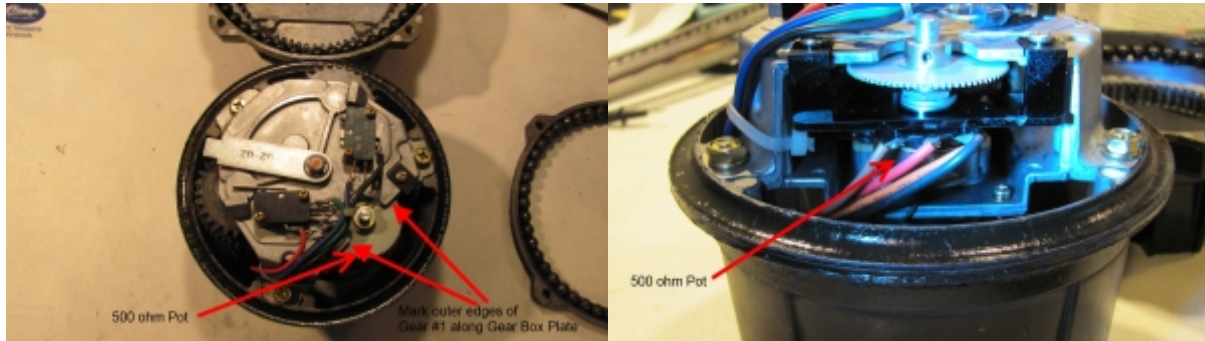
Step 5: Carefully lift the top of the rotor straight up to disengage the gears, then tip it over top down onto the table top.

Notice the nub in the aluminum Upper Housing that pushes the lever arm (item #31, Rotation Limiter) against the limit switch. When reassembling the rotor, you will need to do it in two steps because of the spring action of the limit switch.

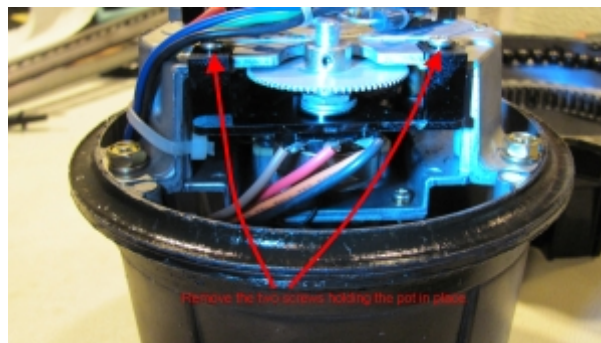
The way this works is, the rotor must turn 360 degrees for the nub to push against the other side of the lever when rotating the opposite direction. This in turn will cause it to push up against the other limit switch when it turns another 90 degrees. Thus you get 450 degrees of total rotation in one direction before a limit switch is activated.

Don't worry about this for now, I'll give you details on how to get it back together later.

Remove the 49 ball bearings from the rotor base and place them onto the race section of the over-turned Upper Housing for safe keeping while performing the next steps.



Step 6: Locate the 500 ohm position feedback potentiometer. It may be a good idea to mark the position of Gear #1 (item # 45) with a fine point marker to make it easier to see its position during reassembly. See the photo in this step, and in step 8.



Step 7: Remove the two screws on the plastic Pot Mounting Plate (item #39) that hold the pot in place on the Upper Gear Box Plate Assy. (item #33).



Step 8: Carefully slide the pot with Gears #1 and #2 (items #45 and #47) out from the Gear Box Plate, and pull the wires and the pot assembly out into the open. Note the registration marks I made on Gear #1. This may be helpful to you during reassembly.



Step 9: Notice the 4 wires connected to the pot.

Pin #1 has the Brown wire soldered to it. This wire leads to pin #1 of the 7-pin connector on the Lower Housing.

Pin #2 (wiper) has a Red wire soldered to it. This wire leads to pin #2 of the 7-pin connector on the Lower Housing.

Pin #3 has two wires: The Orange wire and a Black wire. The Orange wire leads to pin #3 of the 7-pin connector on the Lower Housing. The Black wire leads to Ground. You can measure with an ohmmeter that the resistance between the Brown wire and the Red wiper wire should be about 500 ohms since the rotor was set to fully CCW before disassembly. Conversely, you should measure just a few ohms between the Orange/Black wires and the Red wiper wire.

If your wire colors are different, make sure that you make note of them. Desolder the wires from the leads on the pot.



Step 10: Next you must remove the pot from the assembly and mount the new one in its place.

Use a 1.5mm hex wrench to loosen the set screw on the collar (item #46) and slide the collar and the Gear #1 (item #45) off of the end of the shaft on the pot.

Remove Gear #2 (item #47).

Use a 12mm wrench to loosen and remove the nut that holds the pot to the Mounting Plate (item #39).

Amateur Radio Station WFØGM

Repairing a Yaesu G-1000DXA Rotor

(Part 2 of 2)

Here is where you should take a look at [comments](#) that Scott, AC8DE has made to avoid hitting the hard stop of the potentiometer.

He discusses electrically centering the pot to avoid hitting the hard stop at full rotation in either direction.

I did not have a problem with my rotor after I made my repair, but if I ever do this again, I will use Scott's method which I believe is better than the method that I used.

His comments are as follows:

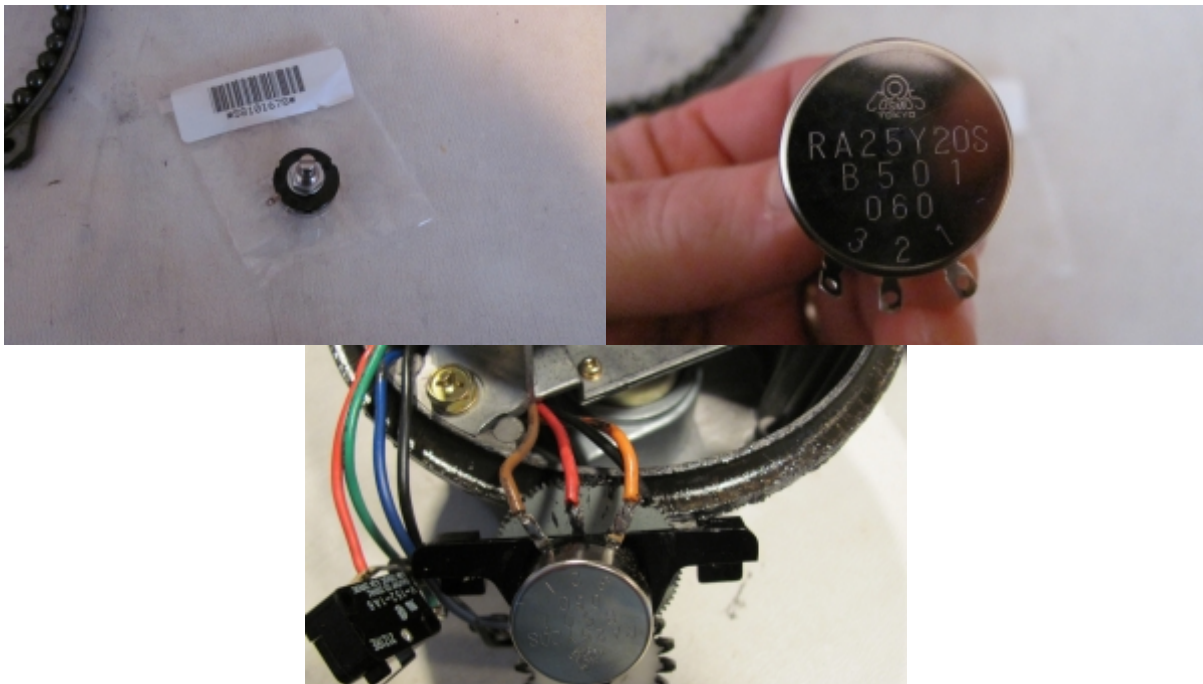
Read this section in its entirety TWICE and be sure you understand it before proceeding with the final assembly and indexing of the potentiometer.

When you have completed the rotator rebuild, but have not placed the main cap back on the rotator body, rotate the pot to electrical center by using a 12V gel cell battery (or other 12VDC source) across pins 4 & 5, stopping from time to time being careful to measure the resistance across pins 1 & 2 and 2 & 3 as you go until the readings are approximately equal (approx 250 ohm); i.e - center of potentiometer rotation. Do not over accidentally rotate the pot past its physical end stop, as this will destroy it! Go slowly and do not rush at this point! Invert the upper housing on your work surface, grease the bearing race and place 49 ball bearings in the race. Insert the rebuilt rotator lower body into the upper body so that the index mark on the upper body is as close to 180 degrees away from the electrical connector and index mark on the lower body as you can get it. Flip the rotator over so it is sitting on the bottom of the lower housing. Leave the lower bearing ring housing off at this point. Using your 12V battery, apply power across pins 4 & 5 and rotate in either direction until the index marks on the cap and body are exactly aligned. Take a reading of the resistance across pins 1 & 2 and 3 & 2 and record. Rotate in the opposite direction until the index marks are again aligned and re-record your readings. The readings should be within +/- 15 ohm of each other on pins 1 & 2 and 3 & 2, but reversed in each direction of rotation. The resistance measurements should typically be around 435 ohm and 65 ohm, +/- 15 ohm on pins 1 & 2 and 3 & 2, assuming a perfect 500 ohm total reading on the pot (pins 1 & 3), but will vary from this as the pots are never perfectly 500 ohm. If the readings in both rotation directions show more than a +/- 15 ohm difference when the index marks are aligned, turn the rotator over, make sure you have tilted the rotator so the switch arm falls against the stop switch to get it out of the way, then carefully lift the bottom housing slightly up from the top cap just until the gears are disengaged and then index the body one tooth in one direction or the other to and reengage the race and gears. BE CAREFUL so as to not dislodge any ball bearings in the process. You will need to repeat this procedure until you are happy with the potentiometer readings. NOTE - It is not likely that you will need to re-index the top housing gears IF you have taken care with electrically centering the pot and making sure you index the top housing correctly 180 from the index mark on the lower housing when you

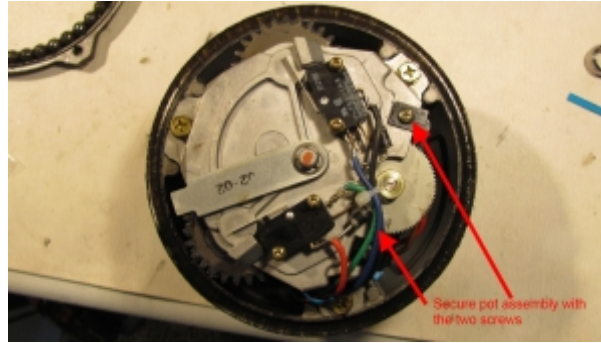
assemble, as 13.5 degrees of pot rotation is quite a bit of room for error. Flip the rotator back over and realign the index marks on both housings using the battery and check resistance again. Once the resistance is approximately equal in both directions as indicated above, continue rotation to a mechanical stop and you should end up with about 475 ohms and 25 ohms +/- 15 ohms of resistance when you reach the hard stop across the same pins. I suggest making multiple stops as you approach a hard stop checking resistance several times just to make sure you don't over rotate the potentiometer. This indicates that there is about 13.5 degrees of rotation left on the pot if you happen to hit those resistance values spot on. It is not critical that you are perfectly equal in your resistance readings at both hard stops. As long as you are not at zero ohm at either hard stop, you have done it correctly. Once this is complete, flip the rotator upside down again, grease the bottom bearing race in the assembled unit, insert 49 ball bearings, attached your lower retainer ring race making sure its index mark is aligned with the lower housing's index mark and tighten the 4 screws. I suggest using blue thread lock on the 4 screws, even though Yaesu does not use it, but this is your call. I suggest rotating the unit again with the battery to each hard stop to make sure it sounds right and to recheck the potentiometer readings.

(End of AC8DE's comments)

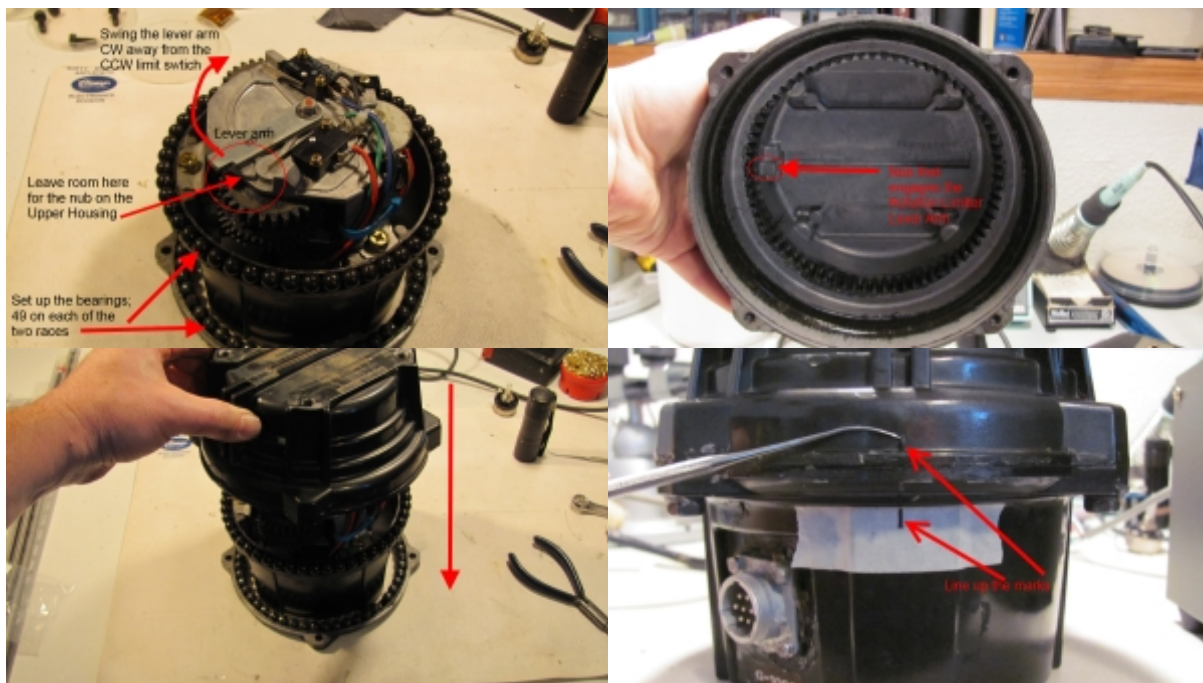
The method that I used in the original discussion continues below:



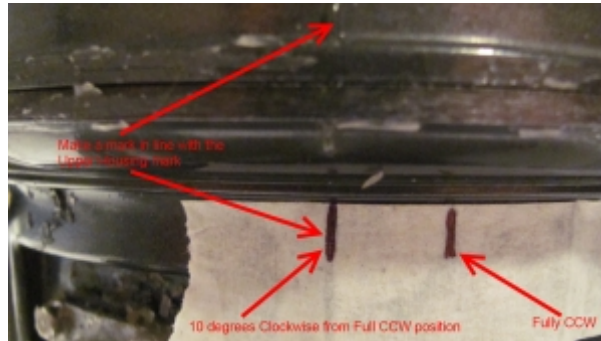
Step 11: Obtain the replacement pot. Make sure that you turn the wiper shaft fully clockwise so that it is in the same position as the one that you have removed. Solder the wires to the pot and assemble the new pot with the gears in reverse order.



Step 12: Slide the pot assembly back onto the Upper Gear Box Plate (item #33). Carefully guide the teeth of Gear #2 (item #47) into the mating gear inside the gear box. Don't mesh the gears too much, allow a small amount of play between gears. Your registration marks on Gear #1 (item #46) should line up very closely with the edges of the Upper Gear Box Plate. Install the two screws and snugly secure the pot assembly to the Upper Gear Box Plate, but do not over tighten!



Step 13: Now it is time to put the Upper Housing (item #2) back on. Put the 49 ball bearings (item #5) back onto the upper race. The grease should hold them in place. If you desire to put new grease on, this would be the time to clean it up and do it. Move the Rotation Limiter lever arm (item #35) clockwise a couple of inches. This must be far enough so that the nub on the Upper Housing will clear it and falls between the lever arm and the CCW Limit Switch (item #37) when properly seated. Line up the calibration mark on the Upper Housing with the mark you put on the masking tape while lowering the Upper Housing onto the Lower Housing (item #1).



Step 14: Connect the controller to the rotor housing. Turn on the controller and set the rotation speed to minimum.

Hold the Upper Housing in place by putting downward pressure on it with one hand, and rotate the Upper Housing about 10 degrees clockwise using the seesaw switch with the other hand.

Turn off the controller. Disconnect the cables.

Make a new mark on the masking tape where the calibration mark is pointing.

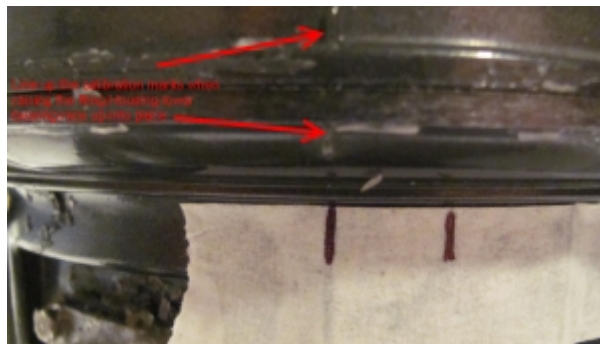


Step 15: Now remove the Upper Housing from the Lower Housing by lifting the Upper Housing straight up as show in Step 5. Move the Rotation Limiter lever arm (item #35) all the way up against the CCW limit switch (item #37). Put the Upper Housing back onto the Lower Housing and make sure the mark on the Upper Housing lines up with the 10 degree mark you made on the masking tape in the previous step. The nub on the Upper Housing must end up on the left side of the Rotation Limiter lever arm when the Upper Housing is put back onto the Lower Housing.

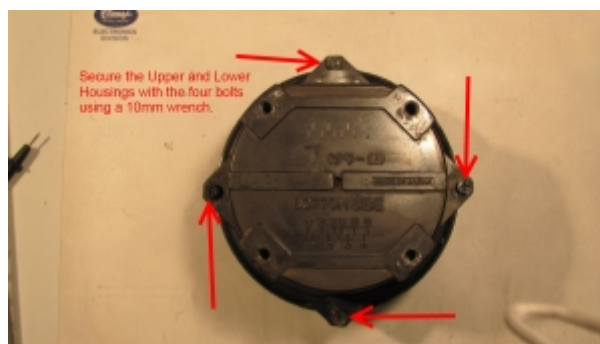
Step 16: Now connect the controller to the rotor and test it before bolting things back together. Set the speed control to the slowest position so that the rotor moves at its slowest speed. While holding the Upper Housing down with one hand, and your other hand pressing the seesaw switch on the controller, turn the rotor back to the fully

CCW position and make sure it stops turning when it reaches the mark you have made on the masking tape at the fully CCW position. This will tell you that you have the Rotation Limiter (item #35) lever arm, pressing the CCW limit switch (item #37) properly. Listen to the gears as it rotates. Stop if something doesn't sound right!

Now turn the rotor all the way to the fully CW position. The nub on the Upper Housing should swing around and push the Rotation Limiter lever arm all the way up against the CW limit switch, and the rotor should stop. Again, listen to the gears as it rotates. Stop if something doesn't sound right! If all looks good, turn the rotor back to the fully CCW position again, then back CW 10 degrees to your 10 degree mark.



Step 17: Disconnect the controller cable from the rotor. Make sure all 49 of the remaining ball bearings are placed onto the Ring Housing (item #55) lower race. The grease should hold them in place. Raise the Ring Housing lower bearing race up in place with the calibration mark on the lower race lined up with the calibration mark on the Upper Housing.



Step 18: Now keeping the Ring Housing raised up against the Upper Housing, squeeze the two together while flipping the rotor over onto its top. Install the four 10mm bolts (item #4) through the Ring Housing into the threaded holes in the Upper Housing. Secure the bolts evenly and firmly into place, but do not over tighten!

Step 19: The last thing to do is to connect up the controller to the rotor and do a final check and calibration. Make sure the speed control is at the slowest position. Turn the rotor back to the fully CW position. The nub on the Upper Housing should swing around and push the Rotation Limiter lever arm all the way up against the CW limit switch, and the rotor should stop. Now turn the rotor all the way to the fully CCW position. Make sure it stops turning when it reaches the mark you have made on the masking tape at the fully CCW position.

Now follow the calibration procedure detailed in the User Manual on page 8, "Indoor Performance Check and Alignment".

Your rotor should now be as good as new and back in business!

[WCØM Home](http://wc0m.fpage.com/index.htm)

<http://wc0m.fpage.com/index.htm>