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Amateur Radio Station 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 had a real hard time finding much detail on the web about this problem. This page is the result of the lack of information out there concerning this repair. Hopefully it will help someone else fix their rotor, 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 turned out to be my problem. The following is my description of how I fixed it.

Download the User Manual here

Download the Service (Technical) Manual here

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 first 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. 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.

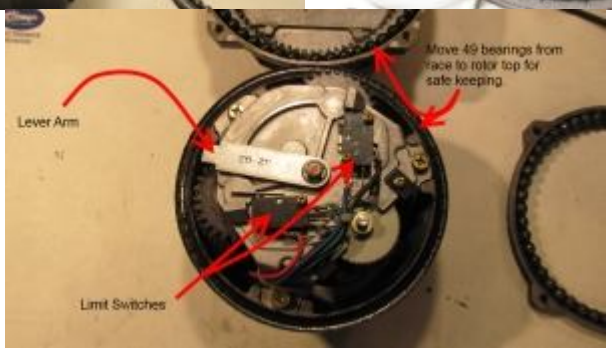
Click on each picture for a high resolution view, or download all the photos in a zip file by clicking HERE
Download these instruction in .pdf format HERE

Step 1: Operate the rotor to it's 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.

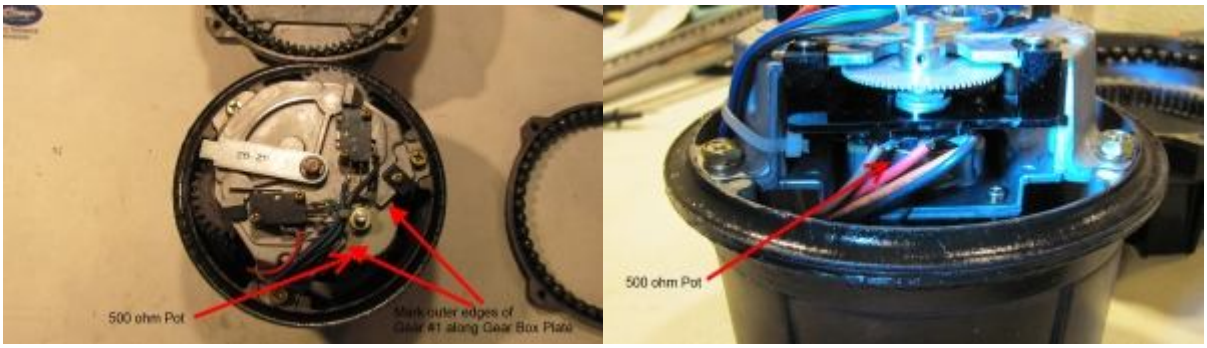


Step 5: Carefully lift the top of the rotor straight up to disengage the gears, then tip it over top down onto the table top.

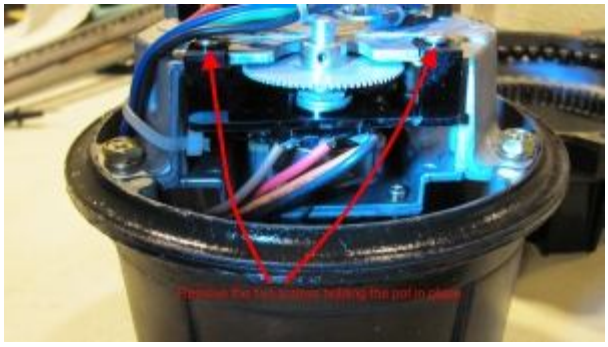
Notice the nub in the aluminum Upper Housing that pushes the lever arm (item #31, Rotation Limiter) against the limit switch. When reassembling the rotor, you will need to do it in two steps because of the spring action of the limit switch.

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.

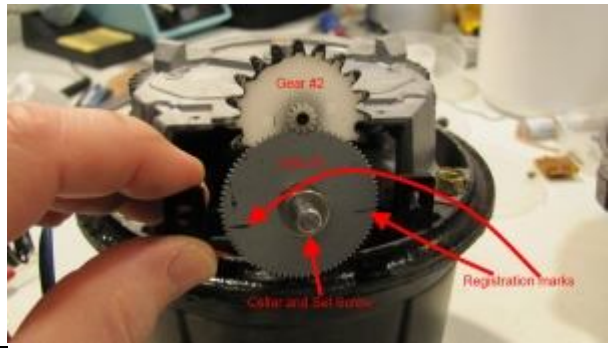
Remove the 49 ball bearings from the rotor base and place them onto the race section of the over-turned Upper Housing for safe keeping while performing the next steps.



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).

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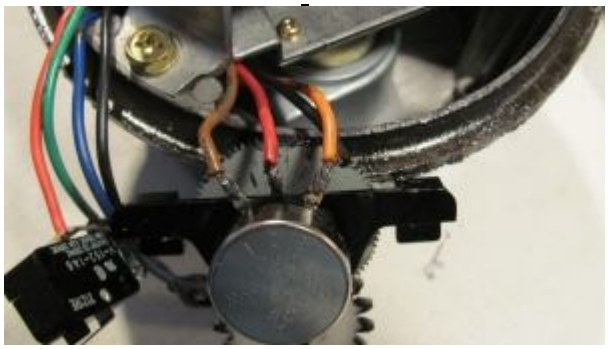
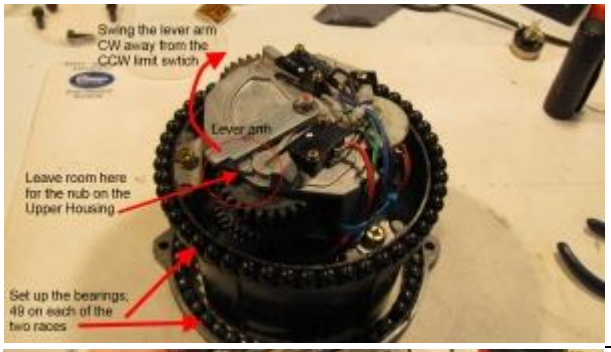
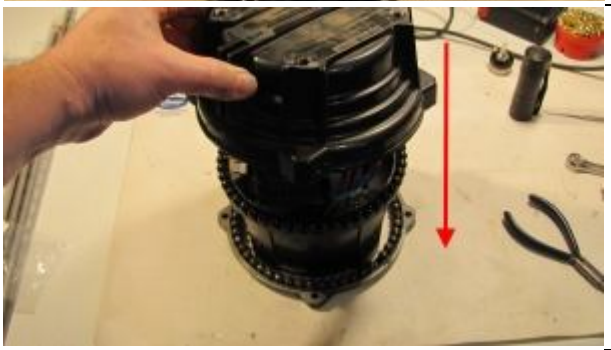


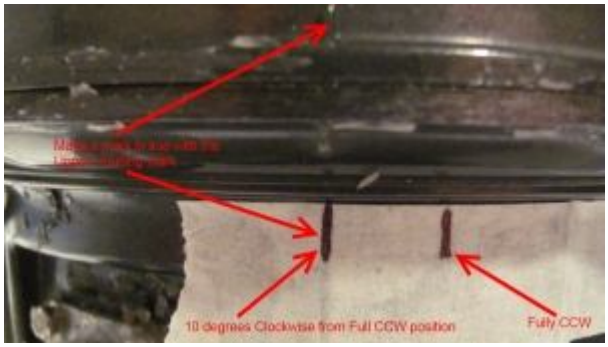
Step 11: Obtain the replacement pot. Make sure that you turn the wiper shaft fully clockwise so that it is in the same position as the one that you have removed. Solder the wires to the pot and assemble the new pot with the gears in reverse order.

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!

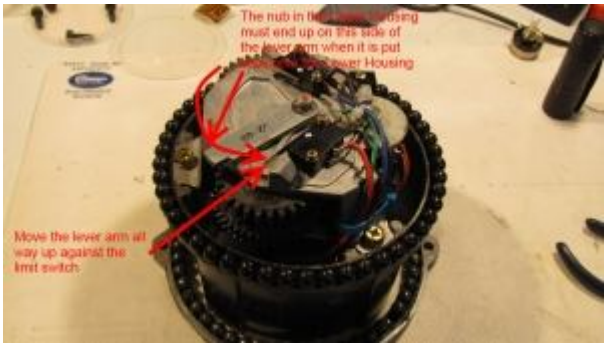



Step 13: Now it is time to put the Upper Housing (item #2) back on. Put the 49 ball bearings (item #5) back onto the upper race. The grease should hold them in place. If you desire to put new grease on, this would be the time to clean it up and do it.
Move the Rotation Limiter lever arm (item #35) clockwise 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).

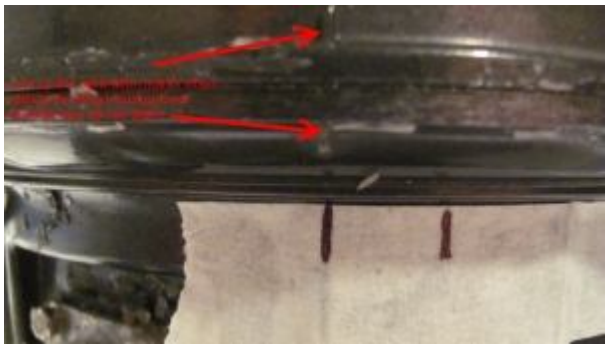


Step 14: Connect the controller to the rotor housing. Turn on the controller and set the rotation speed to minimum.
Hold the Upper Housing in place by putting downward pressure on it with one hand, and rotate the Upper Housing about 10 degrees clockwise using the seesaw switch with the other hand.
Turn 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 it's 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 it's 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!

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