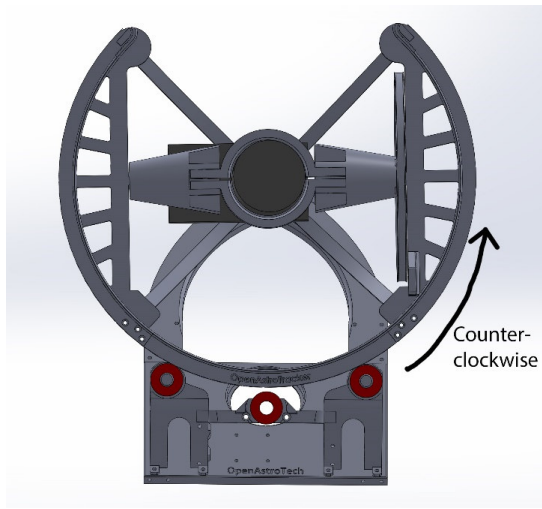The fact that the OpenAstroTracker is printed sadly requires a calibration by everyone. Slight deviations in diameters from printing can have a big impact on performance.

How to calibrate the GoTo:

Counter-clockwise

After you have assembled the whole build you can start calibrating the RA and DEC movement. Luckily this can be done inside. Do this with the camera attached.

Start up the Arduino and navigate to the RAs menu. **Don't enter anything in the HA menu, leave it at 0h00m**. Increase the RA by 1h and press the SELECT button. The big wheel should now turn counterclockwise in the north or clockwise if youre in the southern hemisphere. For reference I will always refer as if youre looking at the mount from the front, where the front is the wide part of the mount.

If for some reason the mount turns in the wrong direction, simply flip the wiring for RA around.

Now disconnect the power for the steppers and turn the mount with your hands until its positioned like this:


Connect the power again and let the mount move 1h RA. After it stopped, measure the distance it has moved with a ruler or preferably a digital caliper. It should be exactly 47mm.
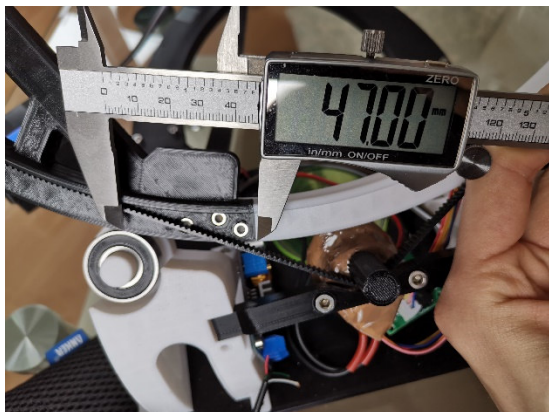
If it moved any other distance, go to the Arduino code and find the entry "int RAsteps = xxx" on the first tab. De- or increase this value, hit upload and repeat the whole procedure. Do this until the RA wheel always moves 47mm in both directions.

The procedure for DEC is very similar.
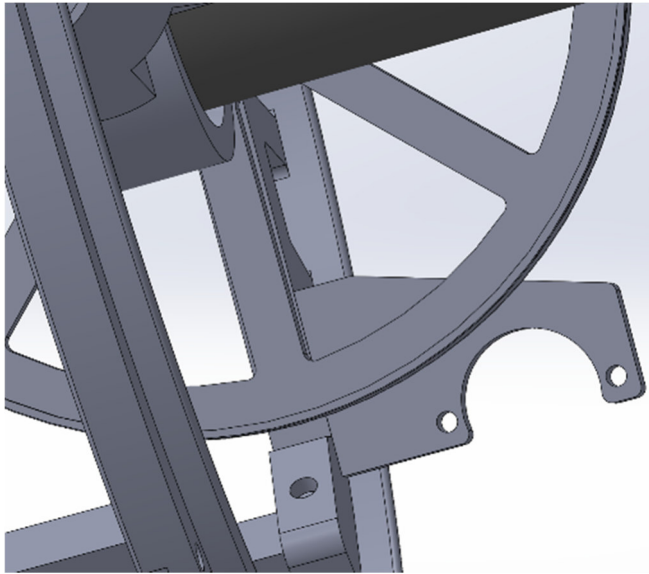
With the power off, turn the DEC stepper until one of the struts of the DEC wheel lines up with the other wheel. You can feel this very well with your fingers.

Connect the power again and navigate to the DEC menu. It should show 90° by default. Decrease it to 45° (-45° in the south south) and press select. The camera should now be moved **UP**. If for some reason it gets moved down, flip the wiring for the DEC stepper.
After the move is finished, the DEC wheel should have rotated 45°, you can see that very well because the next strut should be aligned again.

As of writing this guide, there is no value to calibrate the DEC movement, because I haven't heard from anyones DEC wheel moving wrong. I will however add a calibration value "DECsteps" in the next updates that allows the calibration in the same way that RAsteps does.

How to calibrate the tracking speed:

The previous calibration only affects the movement for GoTo, not the tracking itself. Sadly, the tracking calibration has to be done with real exposures and can take quite some time to get right. So be prepared to sit out in the cold for some hours.

Set up the mount and polar align it well. Take exposures with increasing time. So 10s, 20s, 30s, 1 minute, until you get obvious and long star trails.

What you want:

Straight, solid trails.

This means a tracking error that we want to calibrate.

Dotted, curved etc. trails. This means some other error, like a cable snagging, bump in the RA wheel, passing truck etc. See the troubleshooting for these errors.

To rule out random errors like the mentioned ones, always take at least 3 exposures. Only adjust the tracking speed if the error stays consistent in all exposures, with the startrails being the same length and shape. You will otherwise try to fix another error that's not correlated to tracking speed.

Repeat until you get consistent exposures.

A tip: Aim for a much higher exposure time than you would actually use. So if you want to use 1 minute exposures, use 3 minute exposures to calibrate. Even if you cant get the 3 minute exposures perfect, the 1 minute ones will still be good.

To adjust the tracking speed, navigate to the "CAL" menu on the Arduino. It should be 1.0000 by default. De- or increase the value, see if the trails get better or worse, repeat. By pressing select in this menu, the value you entered will be saved even when the Arduino is powered off. Please note that you should never store values greater than +/- 0.0255. This might not seem much but it's a significant speed change. If for some reason you need a higher value, you will have to change the value in the code directly, first tab "float speed = 1.000".