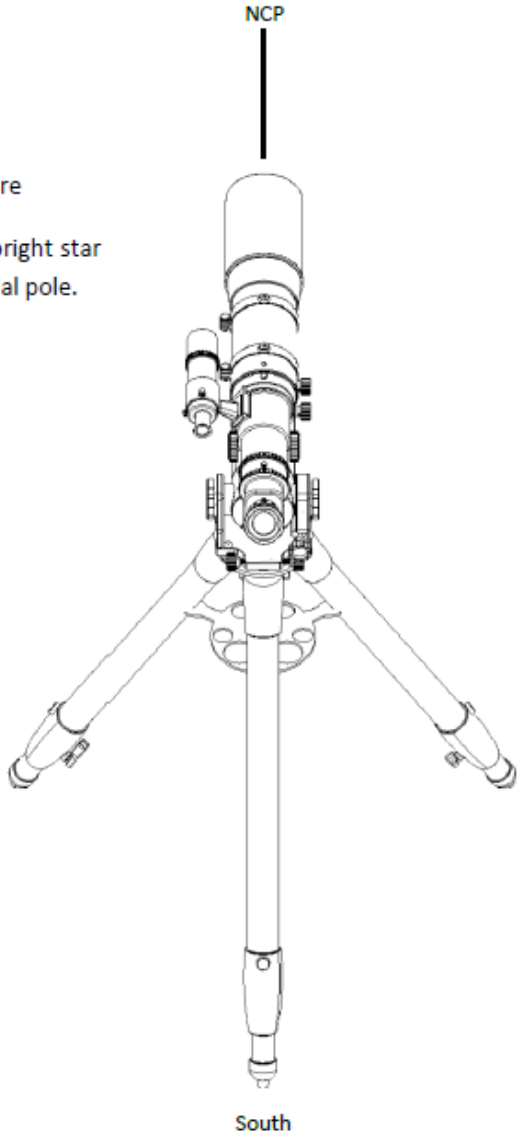
NYX-101 Mount

Three Point Polar Alignment routine HOWTO

We start with the NYX-101 in home position.

The north (or south) celestial pole is the point that the sky rotates around.



Example is for Northern Hemisphere

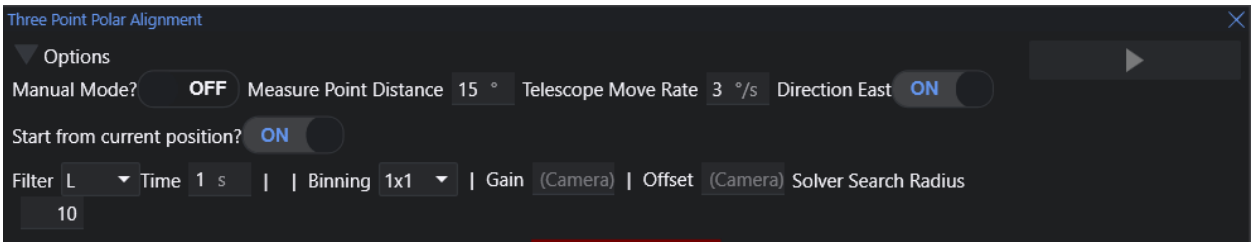
In the northern hemisphere, the bright star Polaris sits very close to the celestial pole.

We stand behind the mount and align the whole setup roughly with Polaris. We can use the electronic leveler to adjust mount's angle to match our latitude. To do that we have to loosen the altitude tensioners and fasten them again after completion.

TIP: *During polar alignment altitude tensioners and azimuth locking knobs have to be fastened but not so tight that we face difficulty to make fine adjustments.*

The first step is to launch N.I.N.A. and make sure everything is successfully connected. Bear in mind, we will use the "**Three Point Polar Alignment (TPPA)**" plugin so this must be installed as well. Plate solving must be setup to.

Proceed with the **TPPA** Routine:



Measure point distance: *The distance between measure points. If you choose a bigger value, be sure that you don't reach a meridian limit and that any part of your setup doesn't hit the tripod. The plugin uses three points, so if you choose 15° the total distance will be 30° (0° – 15° – 30°)*

Telescope Move Rate: *The rate at which the telescope should be moved between points. For heavy telescopes choose a smaller rate.*

Direction: *Defines if the direction for the second and third point should be done by moving the mount in east or west direction along the RA axis. If you choose OFF (WEST) and a large Measure Point Distance, bear in mind that the mount is tracking during the routine and you must have enough distance/time before it reaches West meridian limit.*

Start from current position: *We choose ON because we already have pointed our setup roughly to Polaris. If NCP view is obstructed you can choose any direction. Please bear the following in mind.*

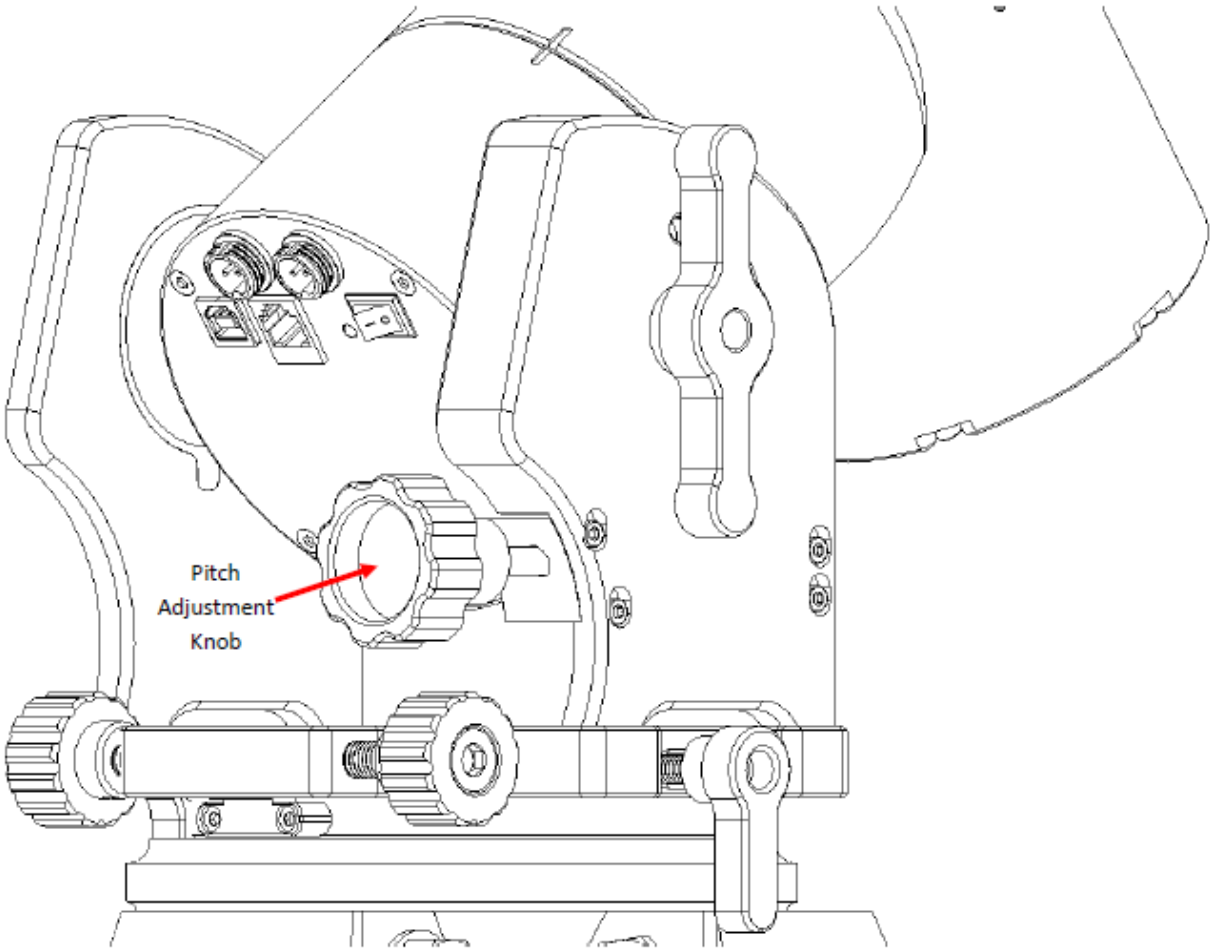
While the polar alignment in itself will work anywhere above your horizon, the further away you are from the celestial equator (which is at declination 0°) the less error prone the correction calculation will be, as things like tracking errors will be less pronounced then.

There are also locations, that should be avoided due to geometrical constraints - pointing to azimuth exactly at 90° and 270° for the correction adjustments, as there the correction for altitude is impossible to calculate. - pointing directly to the zenith for the correction adjustments, as there the correction for azimuth is impossible to calculate.

In the last line we choose the settings that suits our camera. We prefer a small exposure time and high Gain so that the refresh rate of calculated Polar error is as fast as possible while the plugin is able to resolve enough stars for a successful plate solve.

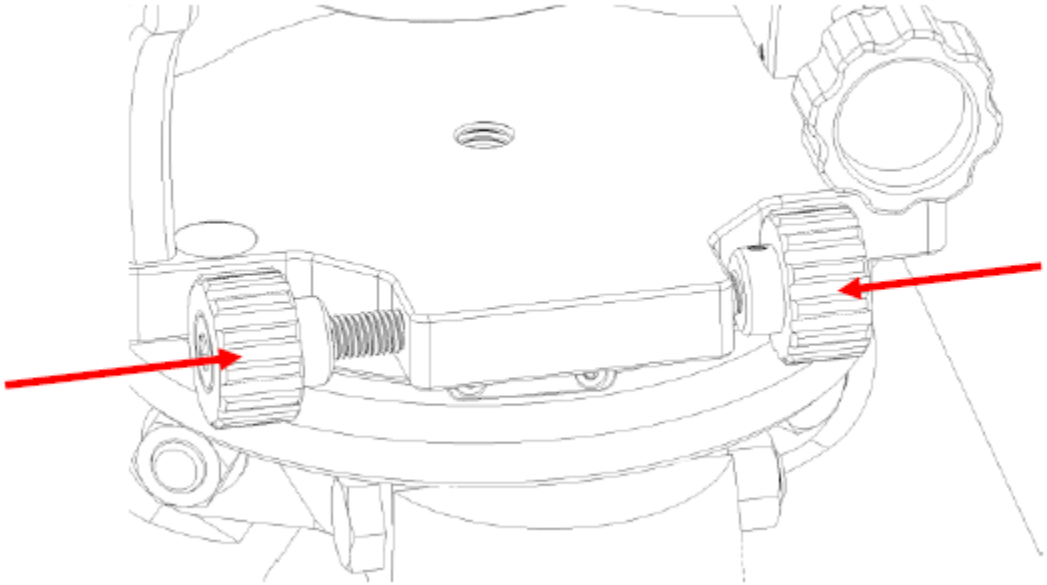
The above settings usually work very well. If you are very far of target you may need to increase the ***Solver Search Radius.*** In general, we prefer to keep it as low as possible to minimize the plate solving time. The routine starts, takes pictures and moves the mount until the final position. While the mount is on the final position, NINA will constantly image and plate solve, showing the polar alignment error.

Firstly, we adjust the altitude by rotating the **altitude adjustment knob.**



Important: *The altitude adjustment utilizes a worm gear mechanism so for more accurate results we finish the final adjustment with an **UP** move (counterclockwise) to clear any backlash. Even if we must go down we will go a little further and we will finish with an **UP (counterclockwise)** adjustment.*

We then proceed to adjust the **azimuth.**



We loosen both **Azimuth adjustment knobs.**

- If we have to make a **LEFT/WEST** correction, we tighten the **RIGHT azimuth knob.**
- If we have to make a **RIGHT/EAST** correction, we tighten the **LEFT azimuth knob.**

When we make the final adjustment, we tighten the **OPOSSITE** knob to lock our result.

*If after the azimuth final adjustment, we see and alteration in altitude we can go back to first step to adjust it but always keeping in mind to finish with an **UP move**.*

We stop the TPPA routine and return the mount to the HOME position.

We have to repeat TPPA two more times if we are looking for a nearly perfect polar alignment.

That is something that has to do with the way TTPA routine functions.

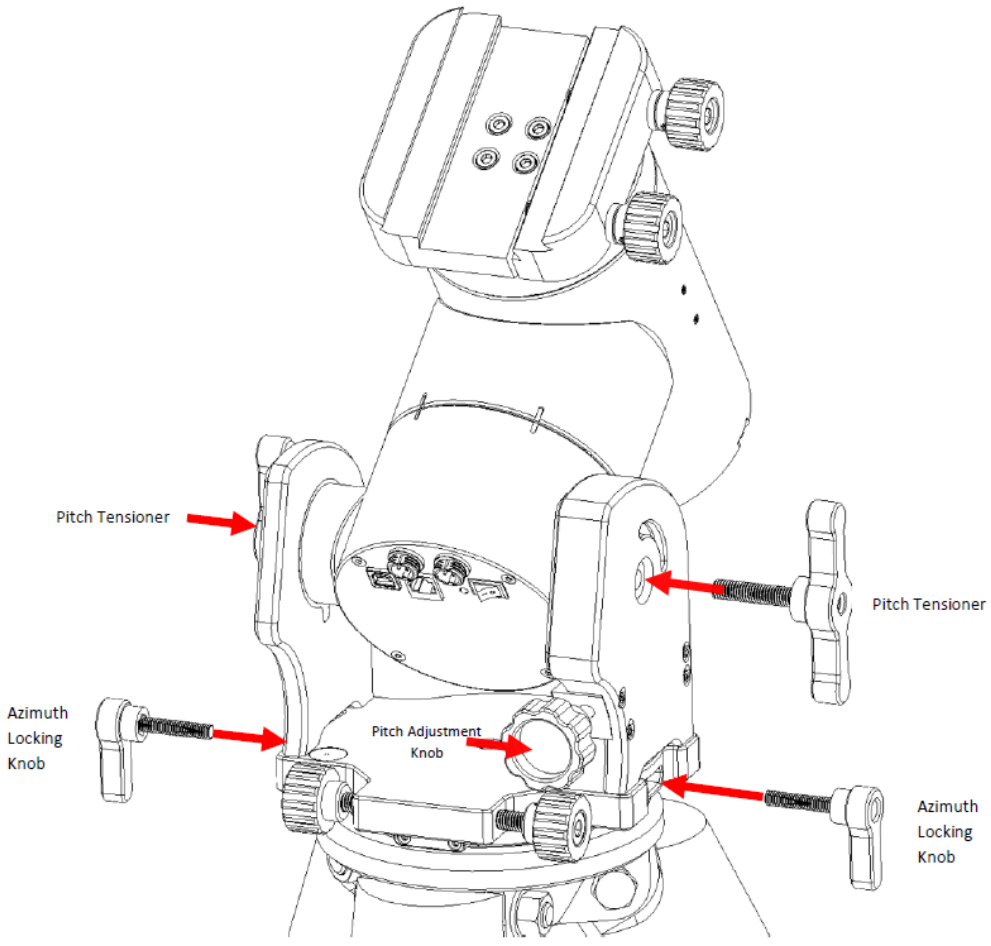
The routine relies on the mount to be tracking and any change of the frame will be added to the error corrections.

When the mount is not aligned or just ran through some periodic error it will not track perfectly and therefore some error margin will be introduced.

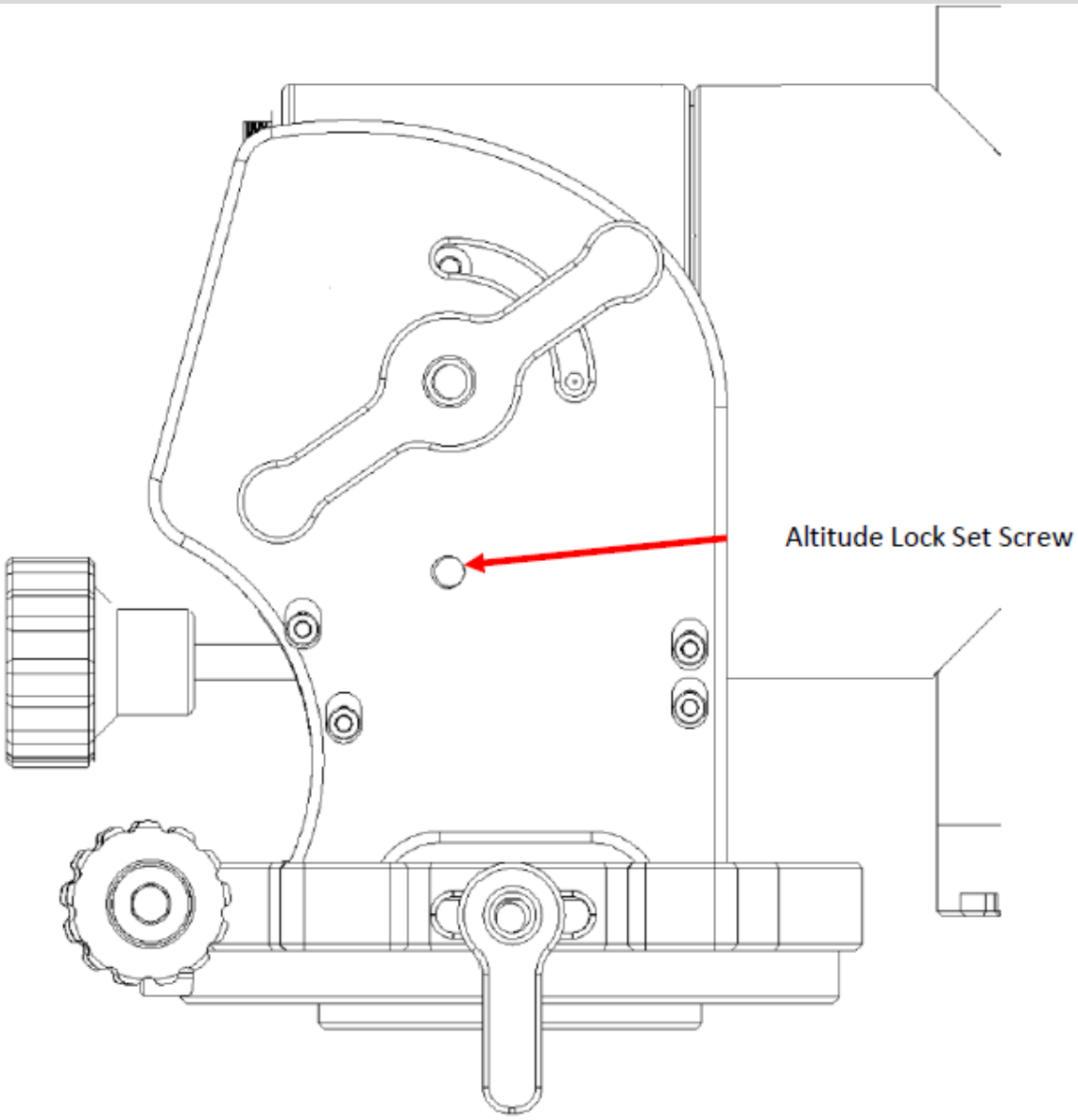
As already stated above, don't worry about a few arcseconds of error. If it takes a long time for you to dial in the alignment you can also restart the alignment routine to recalculate the initial error and fine tune the alignment further.

With every iteration we come closer to a perfect polar alignment. It isn't uncommon to experience a big error between the first and second iteration. Usually, the third time we do very little to no adjustment.

When we finish, we have to tighten the **Altitude tensioners** and **Azimuth locking knobs.**



IMPORTANT: With long or heavy telescope assemblies it is advised to also tighten the M6 **Altitude Lock set screw**.



We are ready to go!