NYX-101 Strain Wave Gear Mount

Product Manual

Version 1.6 - 2023-07-01



Version History

Version #	Implemented By	Revision Date	Reason
1.0	*Evans Souglakos*	*25/OCT/2022*	*Initial Document*
1.1	*Evans Souglakos*	*10/JAN/2023*	*Update drawings and correct minor errors, better explanations. Add information about the electronic leveler.*
1.2	*Evans Souglakos*	*17/JAN/2023*	*Additional drawings and explanations for the EQ6 tripod and adapter*
1.3	*Evans Souglakos*	*31/JAN/2023*	*Updates on tripod dimensions, updates on SkySafari connectivity, mount position explanation*
1.4	*Evans Souglakos*	*09/FEB/2023*	*Correction of ALTAZ setup drawing.*
1.5	*Evans Souglakos*	*10/MAR/2023*	*Torque recommendations, 3d-view, automatic meridian flip.*
1.6	*Evans Souglakos*	*01/JUL/2023*	*Covers NYX-101 V2 batch*

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PREFACE

INTRODUCTION

Thank you for purchasing the Pegasus Astro NYX-101 Mount.

Strain wave drive technology results in a smooth, backlash-free mount operation with extremely high torque, without the need for counterweights. A fully CNC machined aluminium 6061 and stainless-steel body, black and blue anodized, and a selection of branded internal parts, ensure that Nyx-101 will perform flawlessly for many years.

This hybrid combination of a stepper motor & belt system along with sophisticated electronics drives the Right Ascension axis down to 0.10 arcseconds of resolution. Mount has an electronic brake on the RA axis to prevent backsliding when power is off as well as safety limit stops during slew or tracking.

NYX-101 is compatible with ASCOM, INDI, and any software that supports the LX200 command set.

AIM

The purpose of this document is to support the user in the operation of the NYX-101. Please read carefully the manual before using the NYX-101 mount.

Any equipment damage or injury caused by improper mount operation is the end user's responsibility.

Pegasus Astro has developed this instruction manual to inform all users about the product, and the correct methods of interaction with the device and guarantee optimum safety conditions during its entire life cycle: transport, storage, installation, usage, and maintenance.

UPDATE OF THIS DOCUMENT

Pegasus Astro reserves the right to improve the product through modifications even though they may not be described in this edition of the manual. Furthermore, our company also reserves the right to change or update this manual based on future revisions.

WARRANTY

The product guarantees quality for three years from the date of purchase.

If defects are found in the product, please contact us to examine the issue and we will either repair it or replace the product/part with a new one.

Damage caused by consumer responsibility, normal wear and tear, and minor defects that do not interfere with use are not covered by warranty or replacement even within the warranty period.

Pegasus Astro will not be liable for any problems caused by the installation of parts purchased or manufactured separately by the customer.

For any issue, please contact via email: support@pegasusastro.com

PRODUCT OVERVIEW

KEY FEATURES

1. High-precision strain wave gears on both axes ensure high payload and a smooth, backlash-free operation without the need for counterweights for payloads up to 20 Kg
2. Lightweight CNC-machined aluminum alloy AL6061 used for aircraft makes the mount an excellent choice for your setup.
3. Can be used as a German Equatorial or as an Altazimuth mount.
4. Wi-Fi and USB2 connectivity in the mount can work simultaneously.
5. A power-off brake is installed on the RA Axis and provides an instant safe stop during a planned or unplanned power interruption.
6. DC 12 Volts Battery Operation with reverse polarity protection
7. Power and USB sockets are placed on the non-movable part of the mount.
8. Mount integrates a barometric sensor required to calculate atmospheric refraction corrections during sidereal tracking.
9. Universal saddle plate that accepts Vixen and Losmandy 3'' dovetails.
10. Integrated ST-4 Autoguiding Port.
11. QHY PoleMaster adapter in the front that allows you to place the PoleMaster and perform a quick and precise polar alignment.
12. ASCOM 6, INDI, LX200 protocol support. Sky-Safari works out of the box with the mount.
13. Safety limits on RA axis. Safety limit sensors on RA Axis prevent internal cable snags.
14. Firmware Upgradable via Wireless OTA. An easy firmware upgrade process allows you to stay up to date with bug fixes and the latest features of the mount.

TECHNICAL DATA

Product Name	NYX-101
Material	CNC machined 6061 aircraft aluminum alloy
Mount Type	German Equatorial or Alt-Azimuth
Transmission	Strain Wave Gear and Belt resulting reduction 500:1 (RA Axis) and 300:1 (DEC Axis), backlash-free
Motors	2 x Stepper Motors NEMA17; 0.9° per step
PE Cycle	432s, Cycle error < ± 20 arcsec
Latitude range	0° – 90° adjustable
Azimuth Adjustment	±5° adjustable using double screw knobs
Counterweight shaft thread	Tap size M12 (1.25mm thread)
Payload Capacity	20 Kg without counterweights, 30 Kg with counterweights
Body Weight	7.0 Kg
Safety / Power Off Brake	On Right Ascension Axis
Saddle	Vixen and Losmandy 3-inch dual saddle
RA Motor Resolution	0.10”
Max Slew Rate	5°/sec
Power Input	DC 12V – 14 VDC (unregulated) - GX12 Socket ~0.4A idle, ~0.7A during tracking, ~2.5Amps during slewing
Power Output	Up to 7Amps - GX12 Socket – pass through input voltage
Guide Port (EXT)	ST-4
Guide Speed	Adjustable (0.25x, 0.5x, 1x)
Mechanical Security Stop	Hard Limit Optical Encoder (90° past meridian on both sides)
Software Security Stop	± 30° past meridian (±120mins)
Zero (Home) Position	Magnetic Encoder
Communication	USB2 and Wi-Fi (2.4GHz)
Operating Temperature	-20° C to + 50°C
Warranty	3 years
Made in (designed, assembled and tested)	Greece. We carefully curate the entire manufacturing, testing and packing process.

PACKAGING

Mount comes inside a hard-shell carry case. All parts are specially packed inside this case. When you receive your new NYX-101 mount, pay attention to check that no part has been damaged during shipment.

MOUNT CARE AND HANDLING

- Handle the mount like a precision instrument.
- Excessive moisture for long periods can damage electronics and connectors.
- Do not touch the power cords with wet hands. There is a risk of electric shock.
- Never touch the internal electronic board as it produces high voltage and may get hot when in use.
- Do not disassemble or modify the product. The product may be damaged.
- Do not allow solvents or chemicals to come into contact with the device. Wipe the mount with a soft cloth.
- Mount electronics are not waterproof and they should be kept clean and dry.
- Store mount indoors in a dry room when not in use for a long time (preferably inside the carry-on case).
- Mount does not require re-greasing on both strain wave gears or any other internal mechanical part.
- Re-greasing the pitch elevation mechanism might be required after a long time of usage.
- The load capacity of the mount is 20 kg without counterweights (30 Kg with counterweights). Overloading the weight can cause damage to the mount.
- Telescope equipment is usually heavy, so be careful not to drop it when transporting or installing.
- Persistent rubbing with a cloth on logo marking areas may wear them.

HIGH TORQUE WARNING



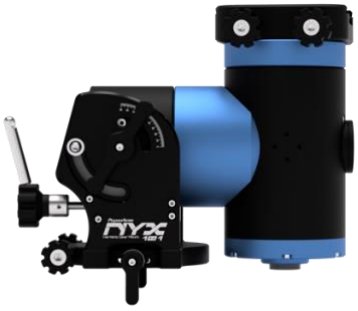
NYX-101 produces very high torque on both axes which can be dangerous if cables, your hand fingers or any other obstacle collide with the mount or stuck between moving parts!



In this unlike event, mount can easily crash or cut anything that is left unattended. Mount parts can also get damage due to the strong torque.

Take extra care of your gear, setup mount limits and most important, do not touch the mount when in slew.

INCLUDED ITEMS



NYX-101 Body



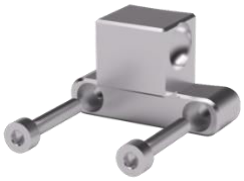
Power Supply 12V / 5A with GX12 jack



Hard Shell Case - Carry Bag



USB2 Type A to B Cable



Azimuth Dowel



Polemaster Ring Adapter



Altitude Lever

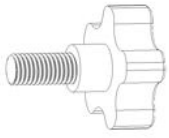
2 x Altitude (Pitch) Tensioners



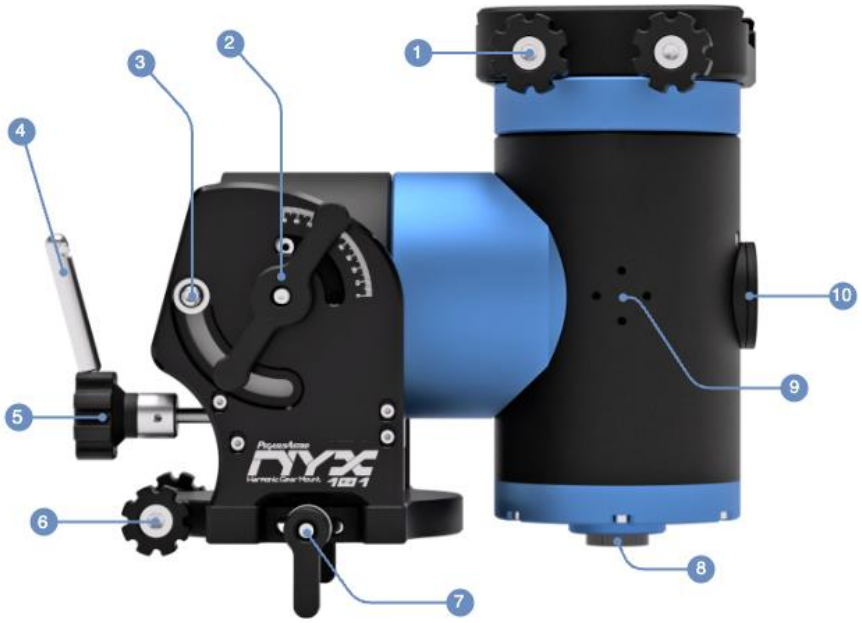
2 x Azimuth Locking Knobs



M12 Hand Knob

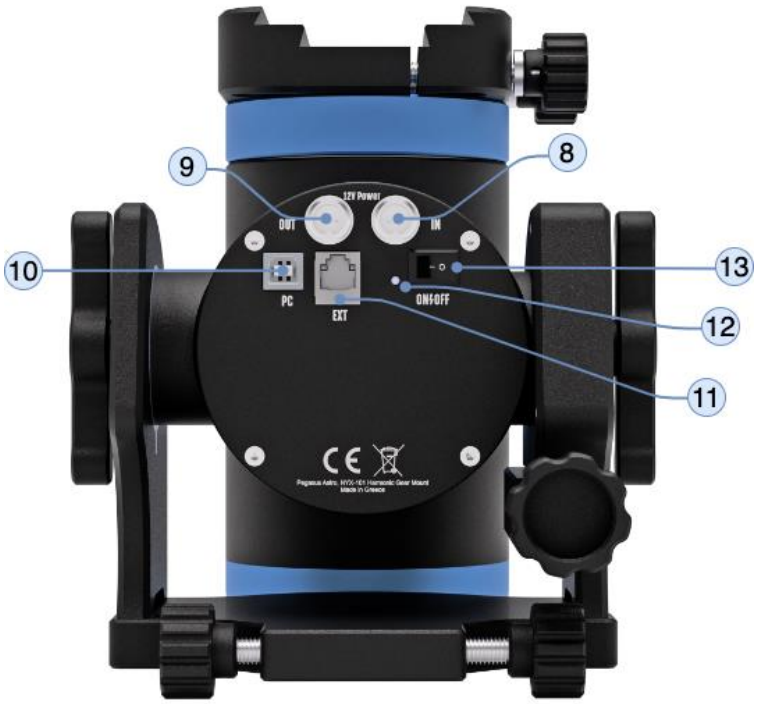


MOUNT KEY POINTS



[1]	**Dovetail Saddle and Clamp Knobs**: Saddle is compatible with Vixen and Losmandy 3-inch dovetails. Use the two knobs or insert an Allen hex tool (5mm hex key) to grip your telescope onto the saddle.
[2]	**Altitude Tensioner**: Loosen this knob to adjust the altitude knob of the mount and fasten again when after completion.
[3]	**Altitude Lock Screws:** After polar alignment, tighten these screws on both sides to fully lock the altitude (pitch).
[4]	**Altitude Lever:** Screw the lever into the knob for easier and more precise altitude (pitch) adjustments.
[5]	**Altitude Adjustment Knob:** Use this knob to adjust the altitude (pitch) from 0-90 degrees.
[6]	**Azimuth Adjustment Knobs:** Rotate these two knobs to adjust the azimuth base of the mount (± 5 degrees).
[7]	**Azimuth Locking Knobs:** Tighten to secure the mount on the azimuth base.
[8]	**Counterweight Shaft Screw:** Remove this cap and use this thread to place an M12 countershaft and install counterweights.
[9]	**Accessory Holes:** These M4 holes on each side allow you to securely attach accessories to the mount's body.
[10]	**Polarscope Adapter:** A QHY PoleMaster adapter is already installed onto the mount. Use this hole pattern along with the ring adapter (included) to easily attach / detach the PolarScope camera on the mount.

All electronics and connections are integrated into the non-moving part of the mount and are accessible from the back of it.



[8]	**12V Power Input:** The GX12 type socket ensures a secure, lockable connection. Use the included PSU (12V/5A) to power on the mount.
[9]	**12V Power Output:** The GX12 type socket ensures a secure, lockable connection. The input voltage is passed through this output. This output can deliver up to DC 12V/7Amps (for this purpose, a higher power PSU is required).
[10]	**USB Socket:** Connects the mount to your PC via a USB2 interface**.**
[11]	**ST4 Guiding Port:** Connect an ST4 camera for mount guiding in this port. This EXT port has a multipurpose role and can be used to plug a modern hand controller with a display (available soon).
[12]	**Red LED Indicator:** Light blinking pattern shows different mount states.
[13]	**Power Switch:** Turns on and off the mount.

Mount connections should be established before turning ON the mount, to avoid the risk of damaging the electronics. The USB port is an exception and can be plugged or unplugged when mount is in operation.

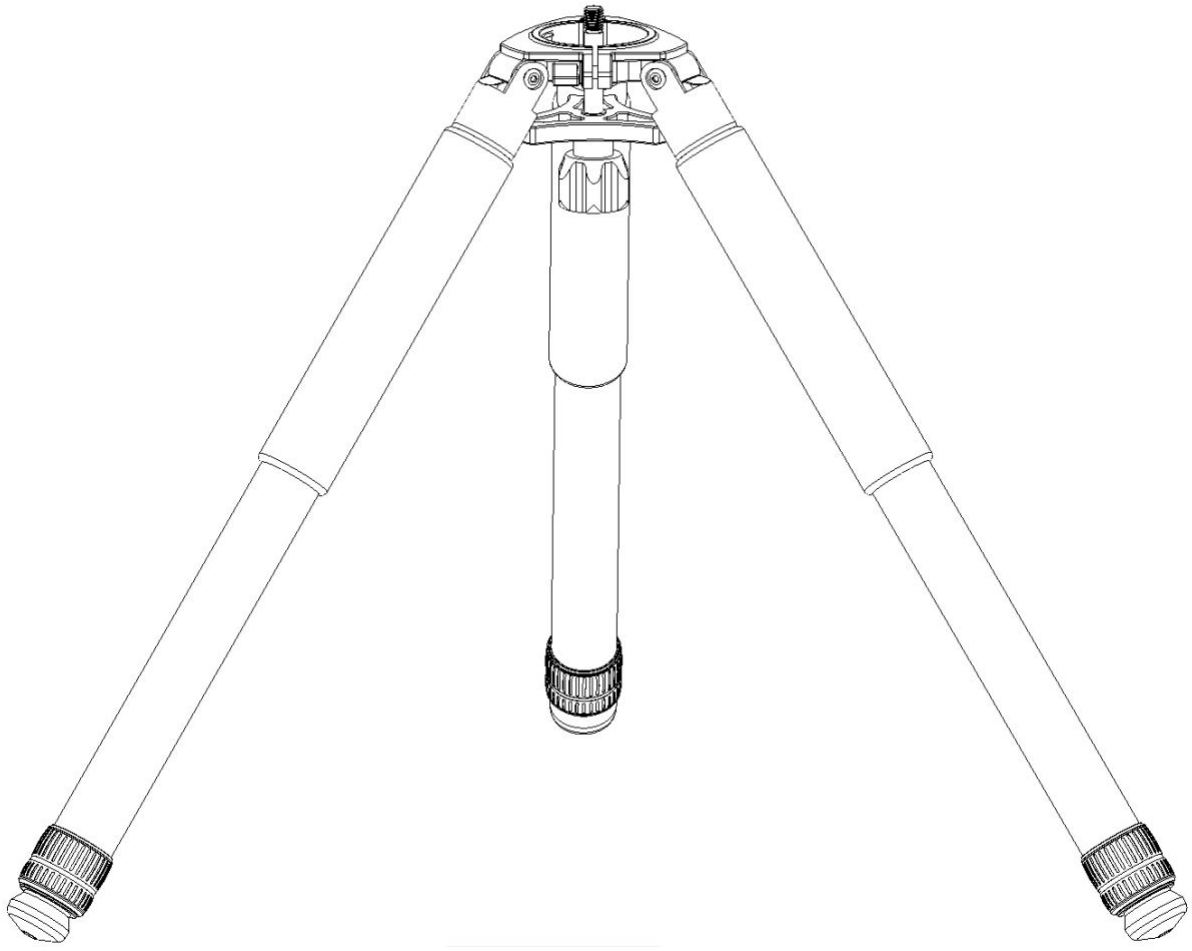
As the mount steps up the input voltage up to 42V DC it is important that you will not undervalue the risk of electric shocks.

Keep this mount back plate clear of dew and water.

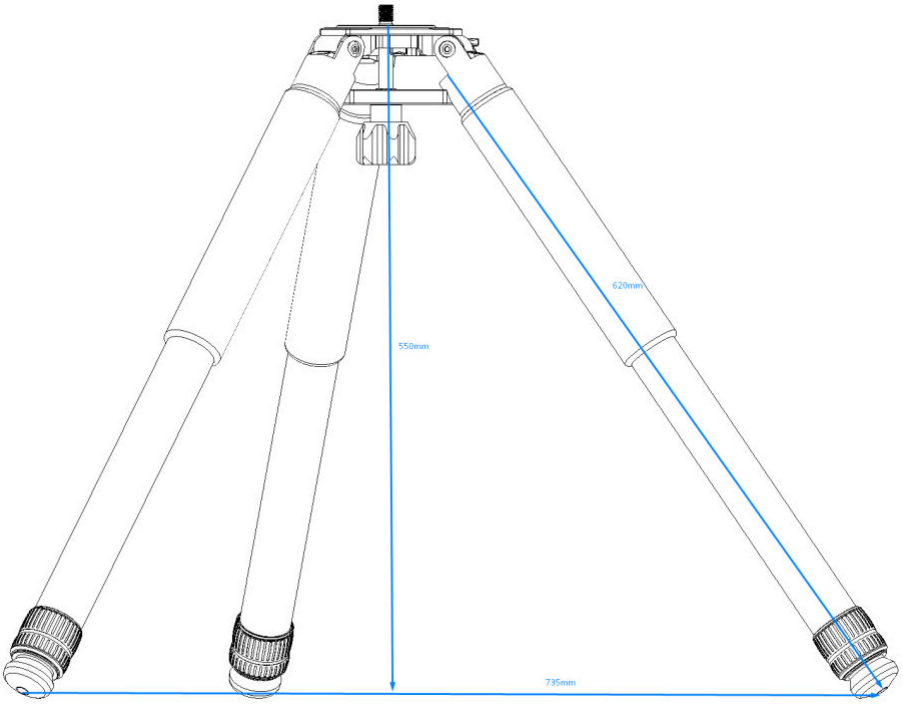
CARBON FIBER TRIPOD (PEG-TRPD101)

The tripod legs are rigid and lightweight, made from carbon fiber. We strongly suggest using this tripod with imaging equipment for up to 15 kg.

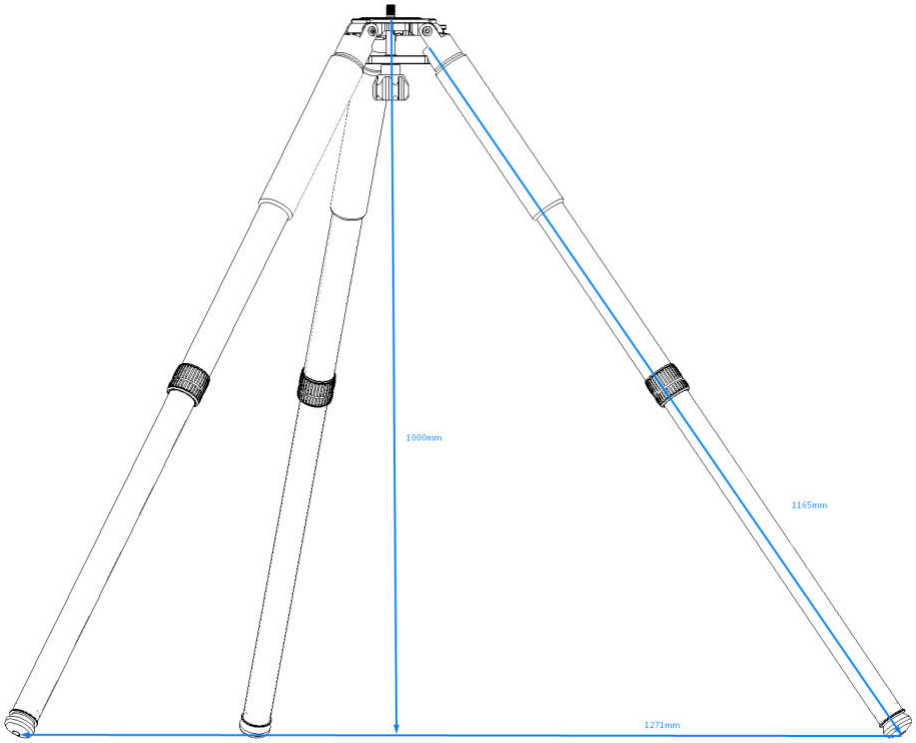
Specifications	**In the box**
▪ Length Retracted: 65 cm ▪ Max length: 120 cm ▪ Weight: 2000 gr ▪ Max Load Capacity: 50 Kg ▪ The angle of legs: Fixed 35°	▪ Carbon Tripod ▪ Mount Adapter ▪ Carry / Store bag ▪ 2 x Allen hex keys ▪ Triangular plate with M12 locking knob ▪ Metallic (3 pcs) nails to replace rubber foot pads



Tripod with retracted legs.

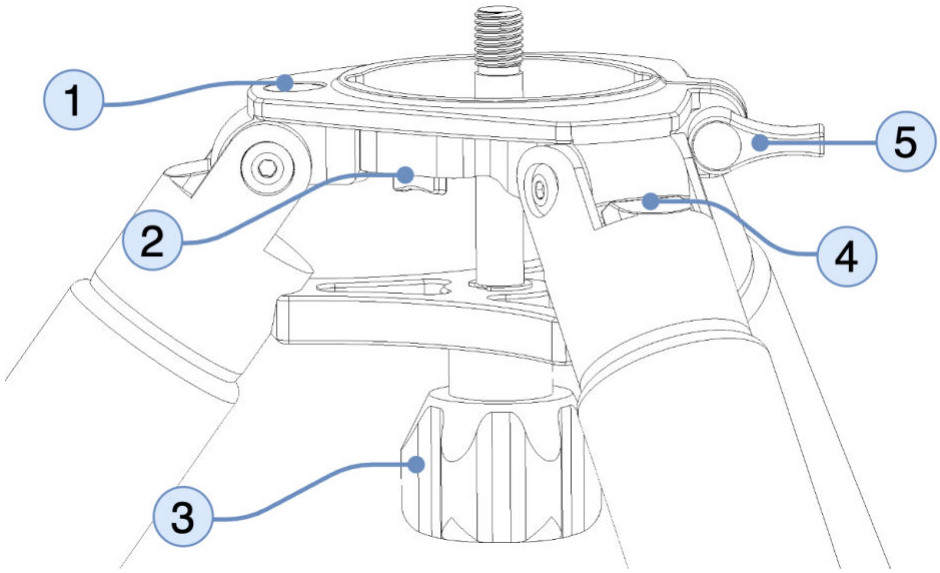


Tripod with legs fully extended.



SETTING UP THE CARBON FIBER TRIPOD

1. Expand the tripod legs on level ground.
2. Locate the locking clamps on the legs and turn counter-clockwise to unlock them.
3. Extend the tripod legs to the desired height.
4. Make sure the tripod top is level and then lock the clamps.
5. Extend the angle (fixed at 35°) on each leg to increase the angle diameter between the legs.



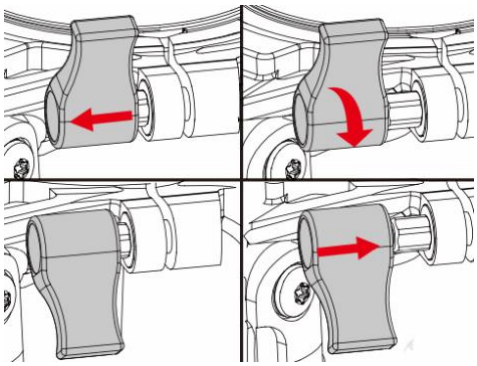
1	Level Bubble
2	Tray Safety Button. Press to release the adapter
3	Hand Knob
4	Extend Leg Angle. Legs form a fixed 35° angle.
5	Tray Fixed Knob

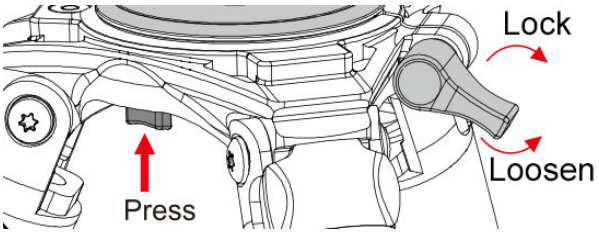
To insert an adapter:

1. Release the **Tray Fixed Knob** as shown in the figure below.
2. Place the adapter on top of the tripod.
3. Lock the **Tray Fixed Knob** to secure the adapter to the desired orientation.

To release an adapter:

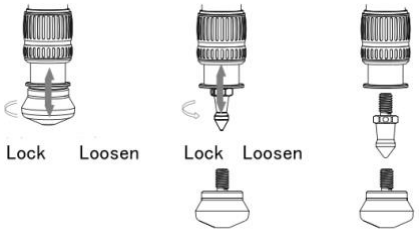
1. Unlock the **Tray Fixed Knob**.
2. Press the **Tray Safety Button.**
3. Slide out the adapter.





The tripod bag includes, in the zipper, three (3) foot nails that you can exchange with the stock foot pads.

As shown in the figure, the foot pad and foot nail can be exchanged according to the terrain and your shooting requirements.



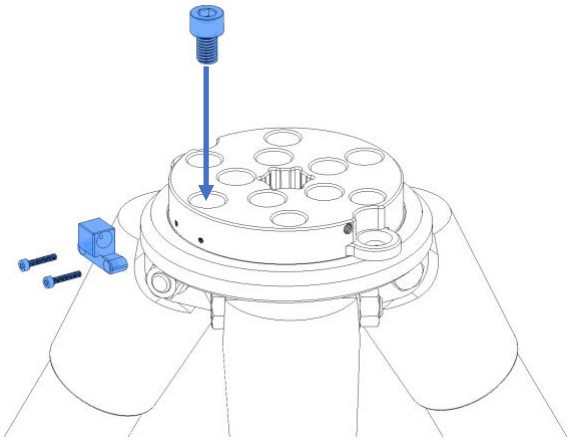


Use a wrench which is in the fitting bag through the torque hole to lock the foot nail easily)

BASE PLATE - TRIPOD ADAPTER

Before attaching the base plate adapter (PEG-ADAPT101-XXX) to any tripod, you must install the azimuth dowel required for the azimuth fine adjustment of the mount.

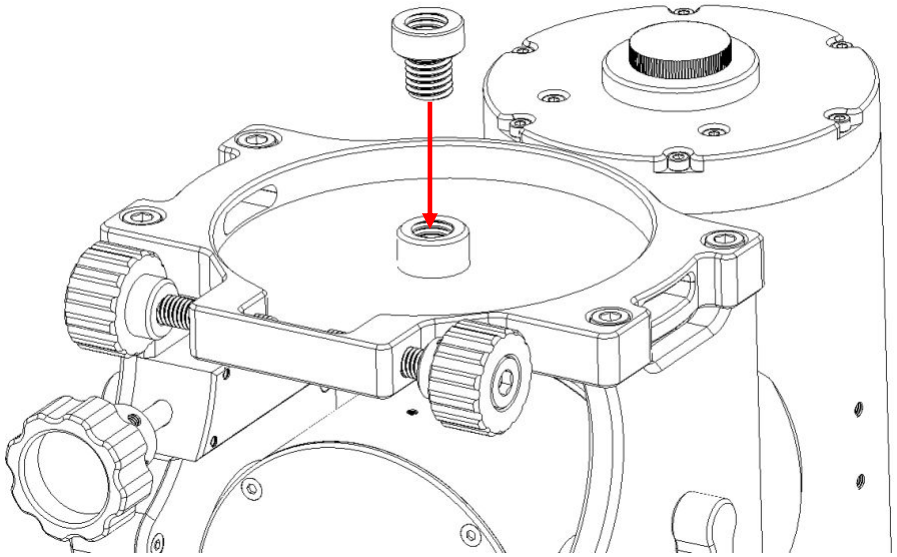
1. Locate the two small screw holes (M3) at the side of the tripod adapter.
2. Place the azimuth dowel (figure below) and secure it with the two supplied M3 Allen hex screws (use a 2.5mm Allen hex key).
3. **If you use the adapter onto an EQ6 mount you need to install the M10 screw below (included)**



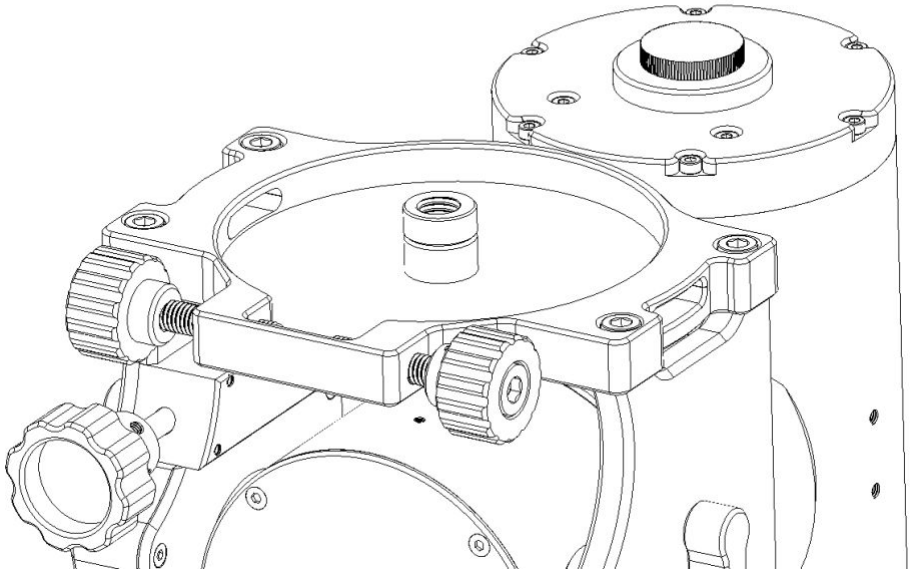
If you own an EQ6 compatible tripod, you must unscrew and store safely, the stock metal dowel.

- Use the M10 bolt (you will need an 8 mm Allen hex tool) to stack the EQ6 adapter with the aluminum tripod base. (Figure below)
- Use the EQ6 stock M12 shaft and pass it under and through the EQ6 adapter. Secure the mount head by tightening it into the M12 thread of the mount.

To attach the mount head directly to the EQ6 tripod you have to extend the M12 central thread of the mount base. Use the M12 male-to-female extension bolt (included with the PEG-ADAPT101-EQ6 adapter) and attach it to the M12 female thread as in the figure below. (No special tool is required).



This is how it should look (figure below)



HALF PIER

A pier extension (+18 cm / 7”) is an optional accessory that allows you to increase the pier height.

Pier extension can be easily constructed by purchasing the three (3) parts below:

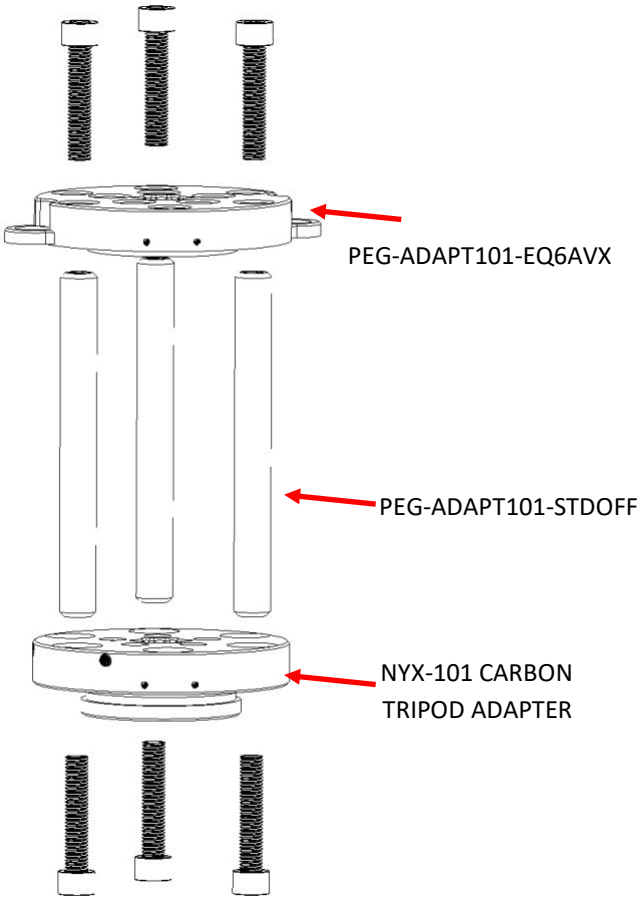
- EQ6 - Universal adapter (PEG-ADAPT101-EQ6/AVX).
- Aluminum Standoffs – 3 pcs (PEG-ADAPT101-STDOFF).
- Carbon Tripod Adapter (comes along with our Carbon Fiber Tripod - PEG-TRPD101).

Note 1: The PEG-ADAPT101-EQ6/AVX can be doubled to assemble the half-pier extension (this is an example for the EQ6 compatible tripod).

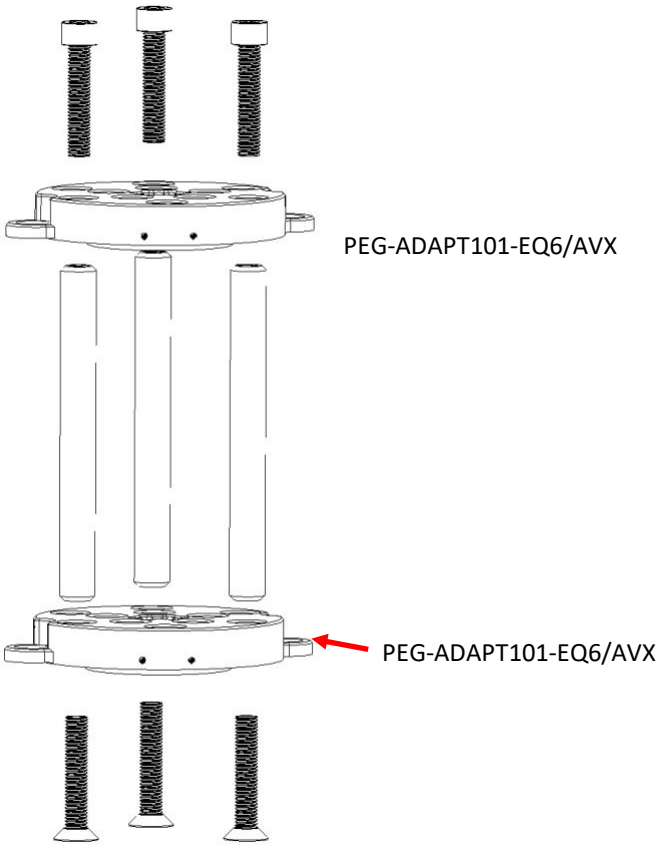
Note 2: Three (3) additional standoffs can be purchased to increase pier stability. Half Pier accepts up to 6 standoffs.

Note 3: The PEG-ADAPT101-STDOFF package includes 6 x M12 cheese-head and 6 x M12 countersunk screws.

NYX Tripod Half Pier Assembly



EQ6 / AVX Half Pier Assembly



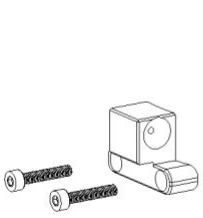
As you can see in these two figures, the adapter set can be interchanged so different bolts are required.

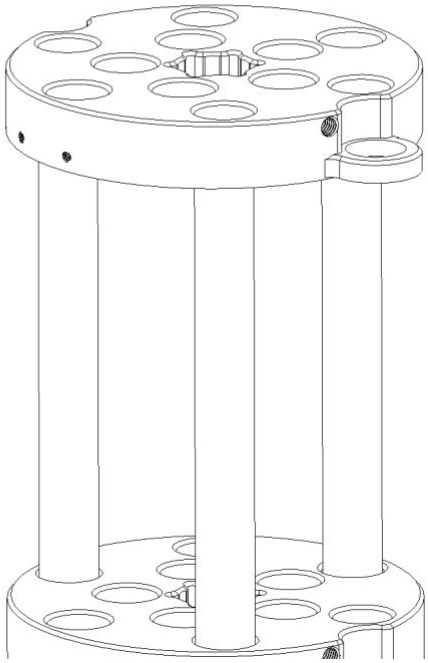
For example, you can use it on your observatory pier but you can also use it (as a grab-and-go solution) on the NYX-101 carbon fiber tripod.

To build the half pier you need the PEG-ADAPT101-STDOFF and the PEG-ADAPT101-EQ6/AVX (you already have the tripod adapter) so you can compile the half pier.

- If you want to install the half pier on your NYX-101 carbon tripod then you need to place the tripod adapter on the bottom and the EQ6/AVX adapter on top. In that scenario, you need 6 x cap cheese head bolts (left figure).
- If you want to install the half pier to your observatory, you need to arrange the tripod adapter on top and the EQ6 adapter on the bottom. In that scenario, you need 6 x countersunk bolts (right figure).
- If you do not have the NYX-101 Carbon tripod, double the PEG-ADAPT101-EQ6/AVX adapter and assemble the half-pier.

Please make sure to mount the metal dowl on the top adapter.

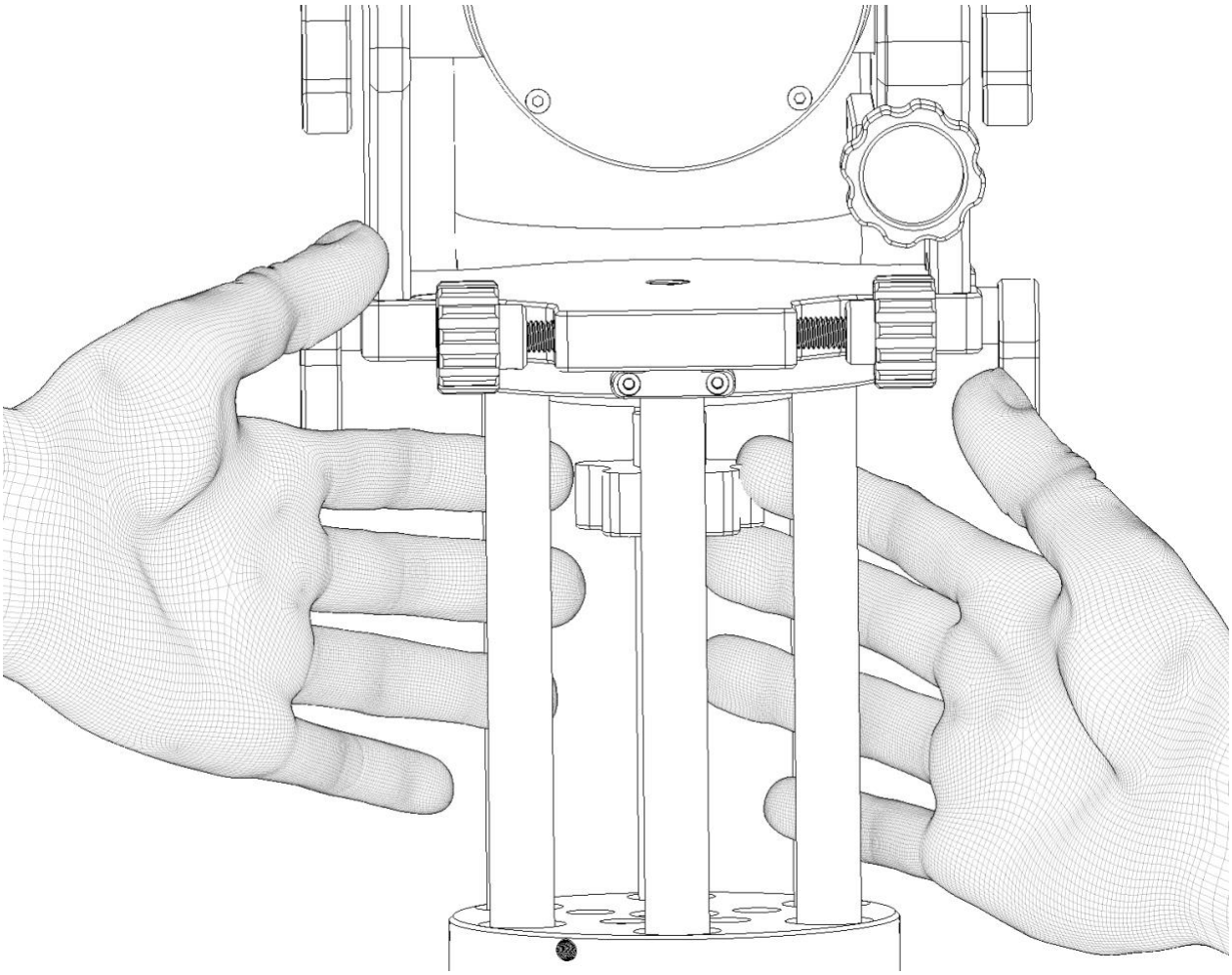




The figure below shows how to tighten the M12 short margarita knob that is included with the mount.

- Make sure that you have placed this margarita knob inside the standoffs, before the full assembly of the half pier.
- No extra force is required. Just tighten the knob ap.

The use of this margarita knob is to additionally secure the mount on the pier. The 2 x “azimuth locking knobs” and “azimuth bolts” already hold the mount in place.

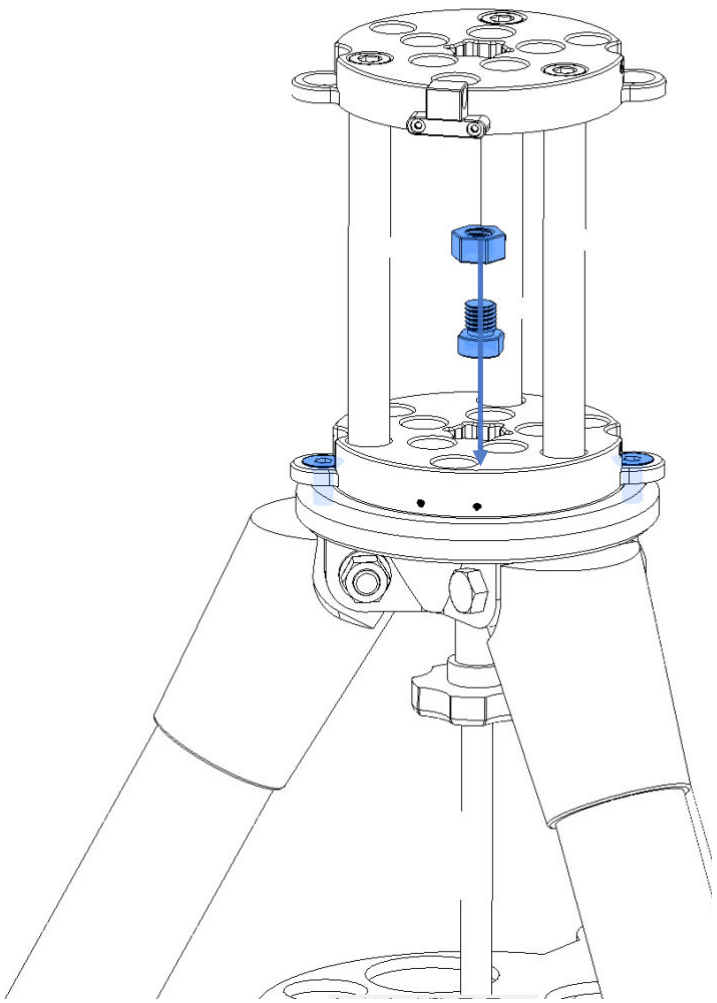


Use the M12 nut (included with the EQ6-AVX adapter) when you use the Half Pier. Drop the nut into the adapter center slot to securely grip the half-pier on the tripod.

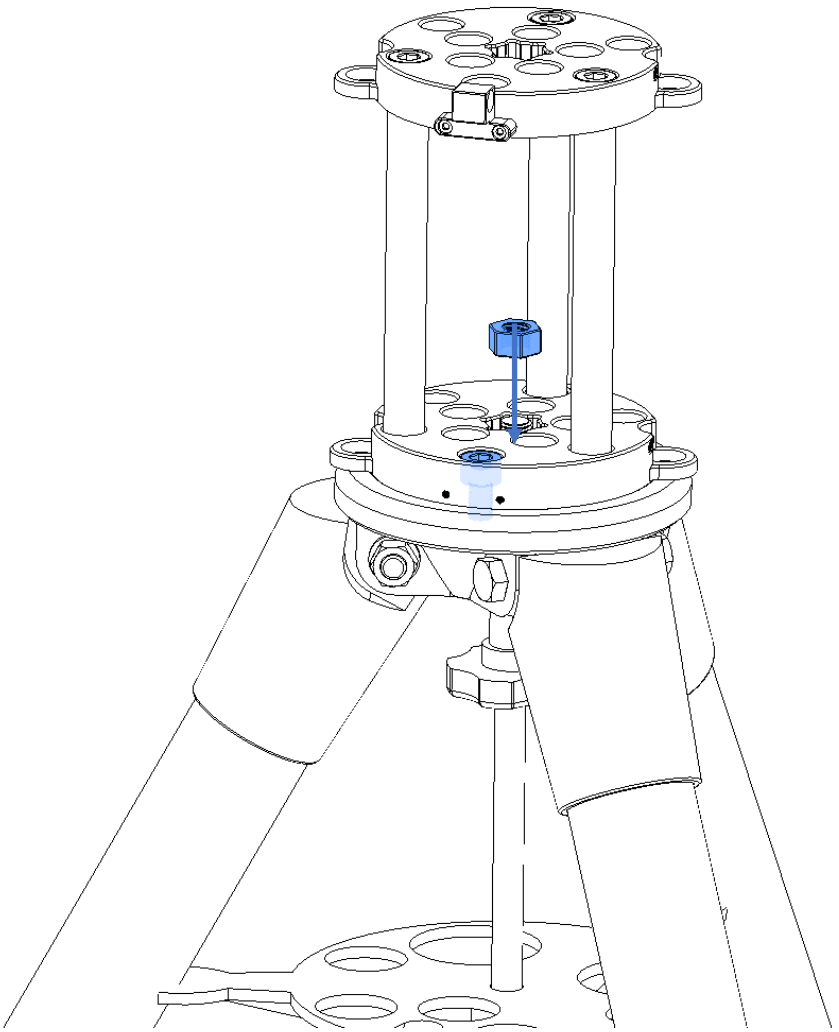
This nut is required for NYX-101 carbon tripod or 3rd party tripods **when you use the half-pier.**

Direct connection of mount to tripod does not require this M12 nut.

The below figure applies to an AVX tripod



The below figure applies to an EQ6 tripod



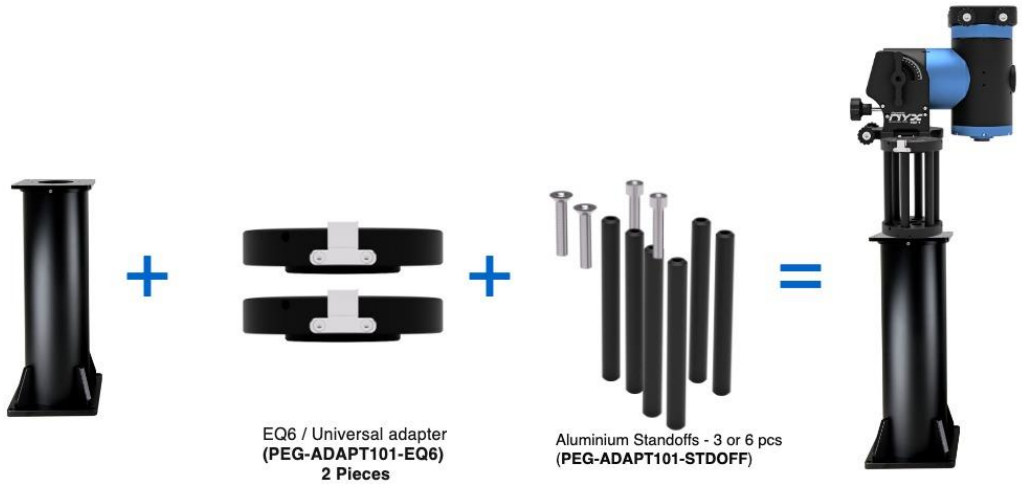


Pegasus Astro
Carbon Fiber Tripod
PEG-TRPD101

EQ6 / Universal adapter
(PEG-ADAPT101-EQ6)

Aluminium Standoffs - 3 or 6 pcs
(PEG-ADAPT101-STDOFF)

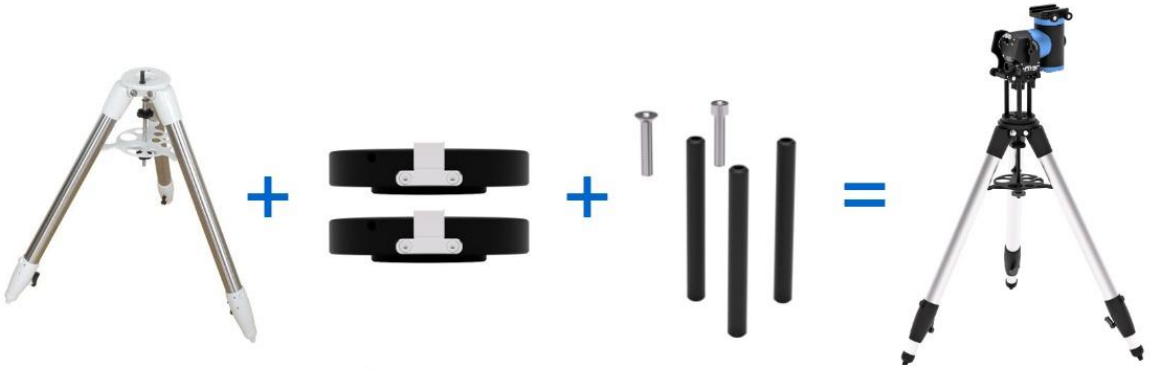
Scenario 1: I have the Carbon Fiber Tripod, so I only need a **Universal Adapter** and the **3 x standoffs** to assemble the pier extension.
My carbon tripod already **includes a carbon tripod adapter** which can be combined with the Universal adapter to assemble the pier extension



EQ6 / Universal adapter
(PEG-ADAPT101-EQ6)
2 Pieces

Aluminium Standoffs - 3 or 6 pcs
(PEG-ADAPT101-STDOFF)

Scenario 2: I own a custom / 3rd party observatory pier, so I need a **2 x Universal Adapters** + **Standoffs** to assemble the pier extension.
I can maximise stability by using two standoff packages (3x2 = 6 standoffs in total)



EQ6 / Universal adapter
(PEG-ADAPT101-EQ6)
2 Pieces

Aluminium Standoffs - 3 or 6 pcs
(PEG-ADAPT101-STDOFF)

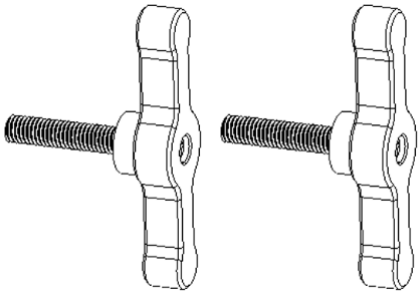
Scenario 3: I own a 3rd party aluminum tripod (in this example an EQ6 tripod) so I get **2 x Universal Adapters** and the **3 x Standoffs** to assemble the pier.
I can also maximise stability by using two standoff packages (3x2 = 6 standoffs in total)
*** If I own the carbon tripod I can use the existing Carbon tripod adapter as a replacement of the second EQ6 / Universal adapter**

INSTALLATION AND USAGE

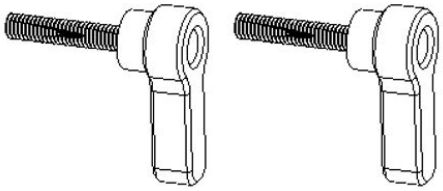
PUTTING ON THE MOUNT TO THE TRIPOD.

1. Carefully remove the mount from the hard-shell carry case.
   Please note, that the below mount head parts are not initially screwed on the mount head.
2. Locate them inside the case and have them ready for the next steps. Please make sure to use the plastic spacers on each of these screws. These spacers prevent any damage to the anodization of the mount body.

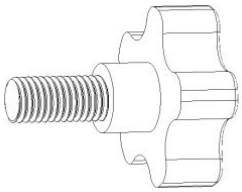
- **2 x Pitch Tensioners** (M8 screws)



- **2 x Azimuth Locking Knobs** (M6 screws)



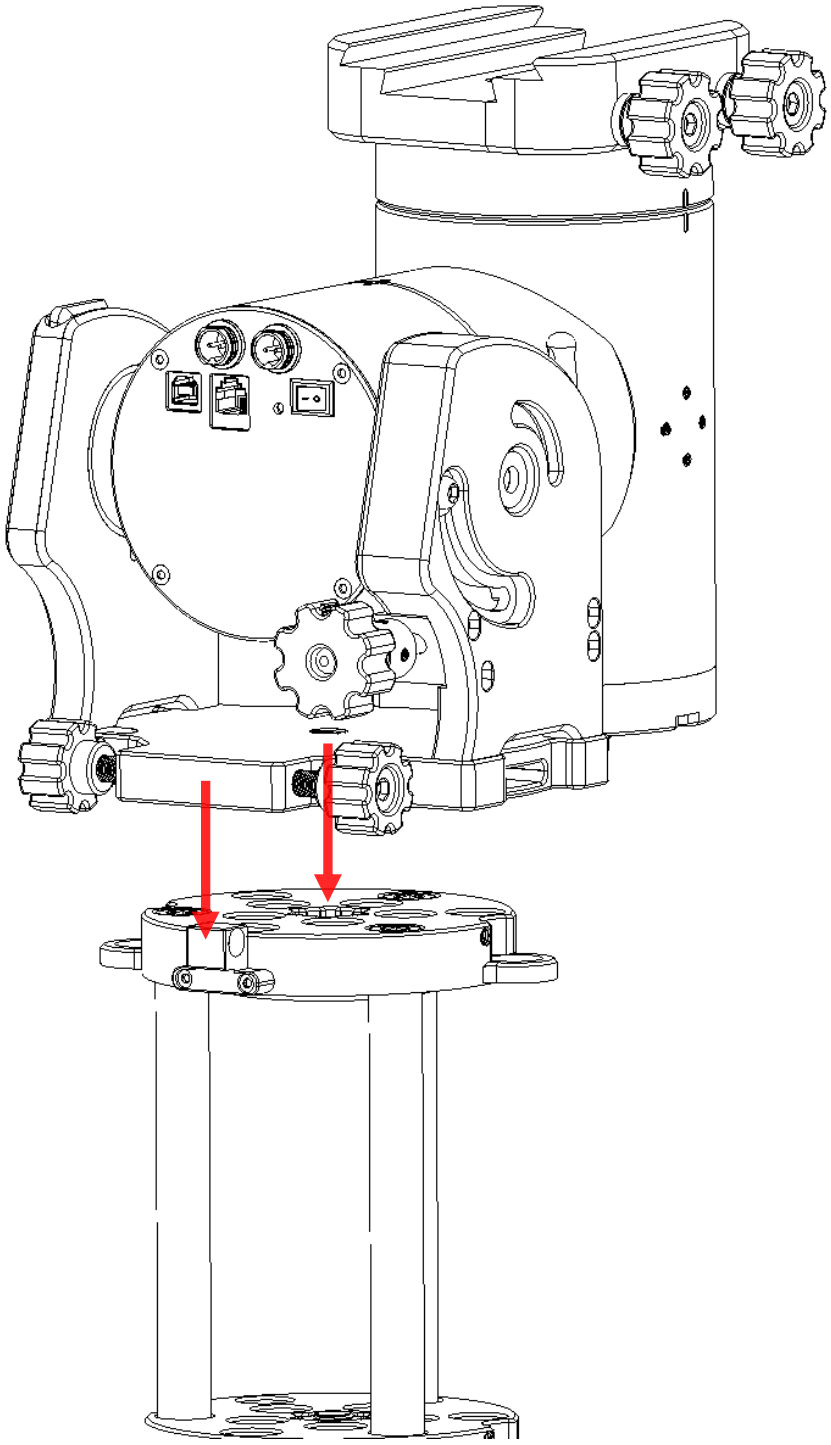
- **1 x Hand Knob** (M12 screw)



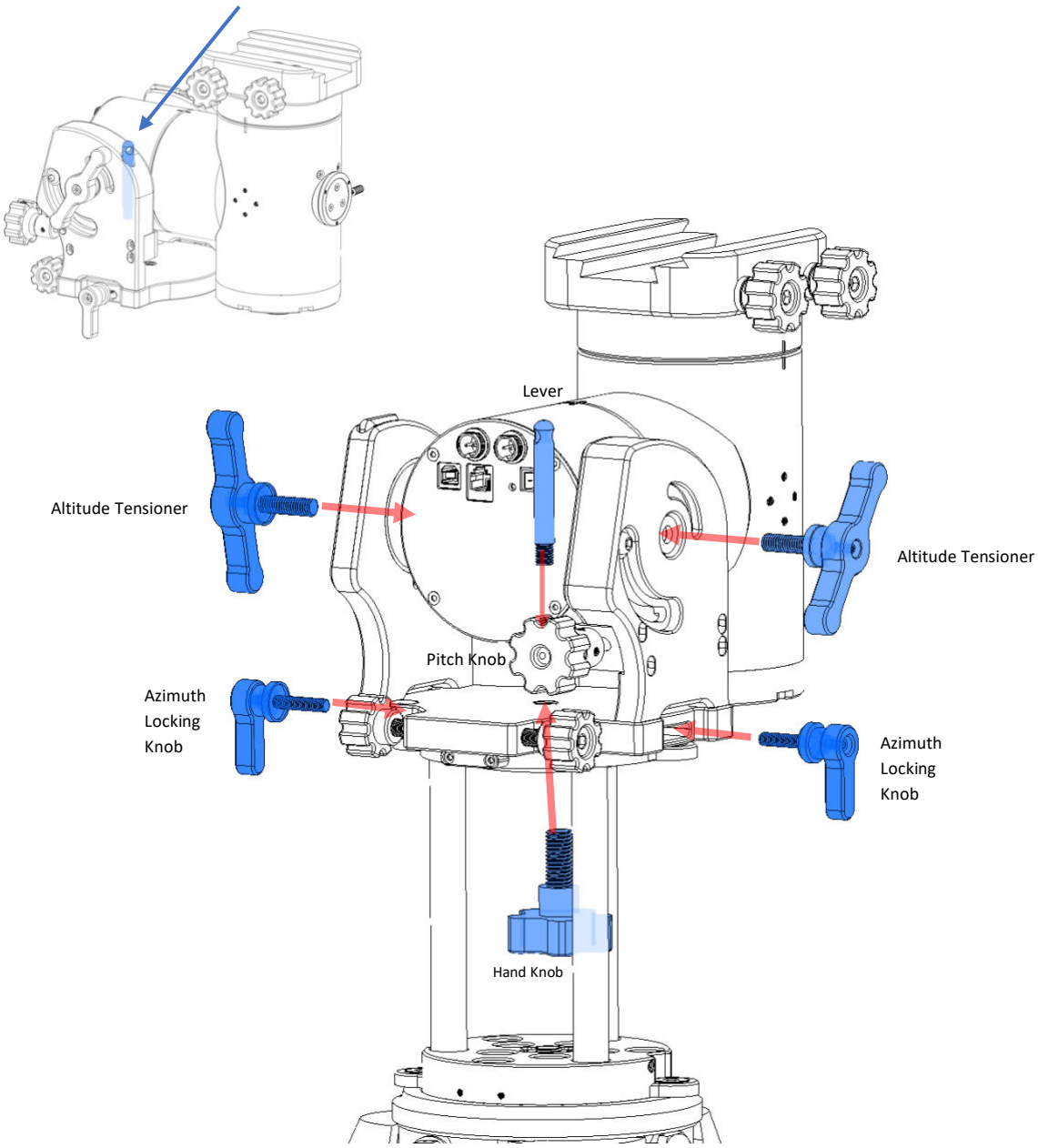
- **1 x Altitude Lever** (secured on the right side of the mount when mount is inside the case)



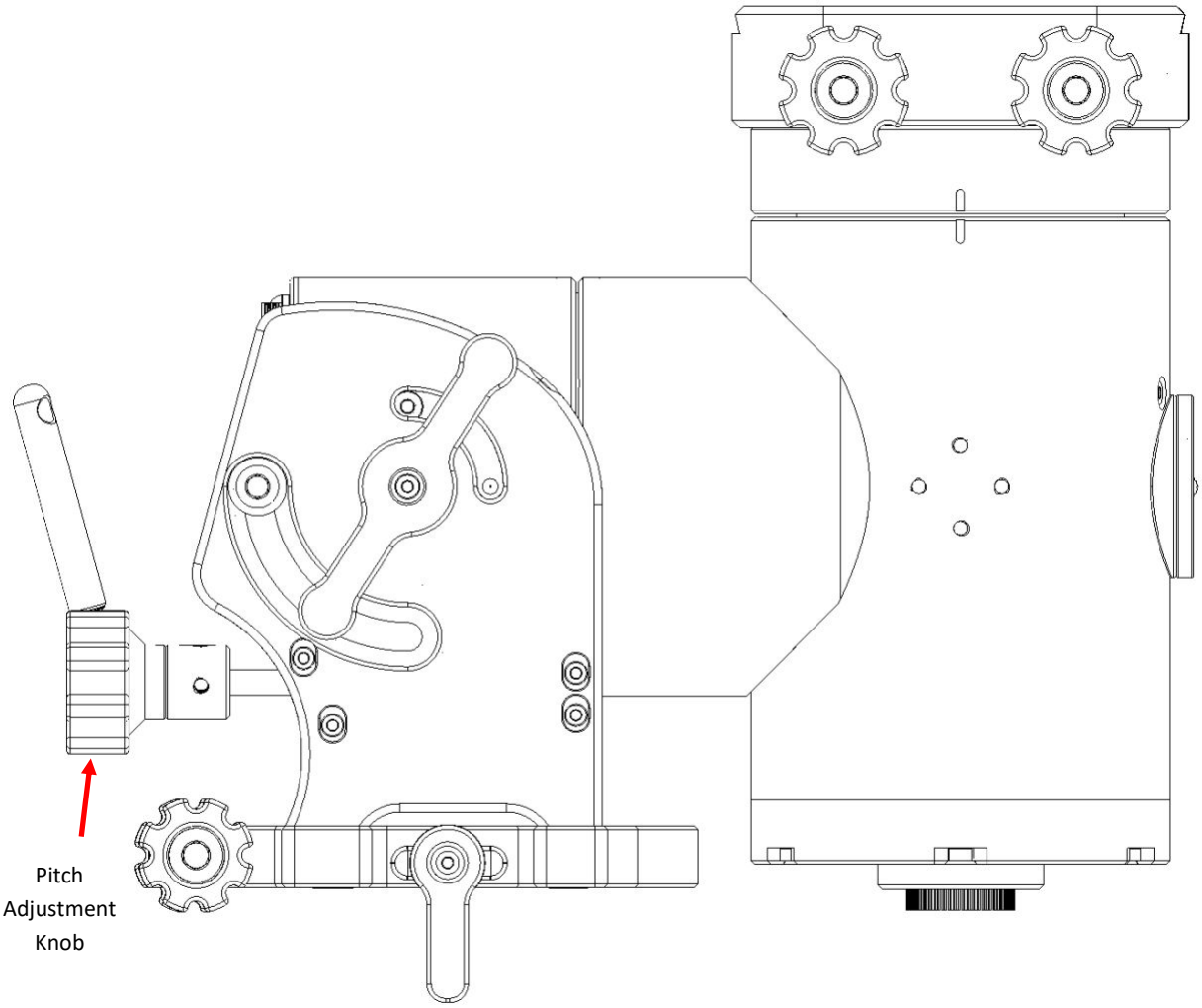
3. Ensure that the two azimuth adjustment knobs are loose so the azimuth dowel can be placed between the two azimuth adjustment knobs.
4. Gently lower the mount onto the tripod adapter as shown in the figure below.



5. Insert the 2 x **Azimuth Locking Knobs** on the left and right side (do not fully tighten them yet).
6. Insert and gently screw the 2 x **Altitude Tensioners** on the left and right side (do not fully tighten them yet).
7. Unscrew the **lever** that is fitted /stored on the left side of the mount and place it into the Altitude Knob.



8 Adjust the pitch of the mount by turning the **Pitch Adjustment Knob** anti-clockwise -> to increase pitch degrees or clockwise -> to decrease pitch degrees.



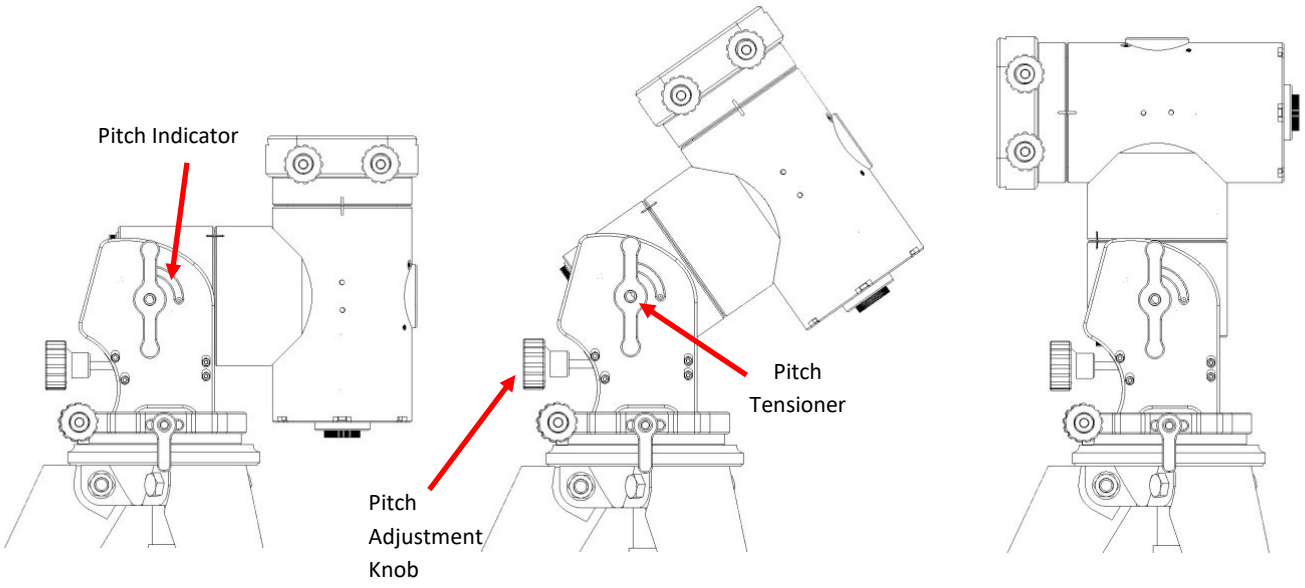
At this point, you can additionally tighten, the pitch and azimuth adjustment knobs.

Do not over tighten them as you will have to perform a polar alignment (if you are in equatorial mode) which requires fine adjustments of pitch and azimuth axis.

ALTITUDE ADJUSTMENT

The altitude (pitch) of the mount can be adjusted from 0 – 90 degrees.

- If you are in Equatorial mode, set the mount pitch level to the degrees of your observing site latitude. You can consult the pitch indication dot on the side of the mount.
- If you are in Alt-Azimuth mode, set the mount to a pitch or latitude of 90° (figure on the right)



Latitude 0° **Latitude 45°** **Latitude 90° - ALT-AZ**

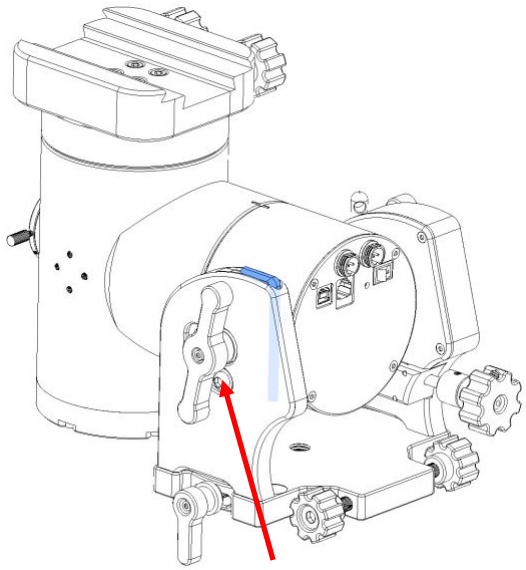
- The pitch of the mount can be adjusted by the pitch adjustment knob.
- Before you make any action, make sure that the **Pitch Tensioner** is not tightened.

ALTITUDE LOCK SET SCREWS

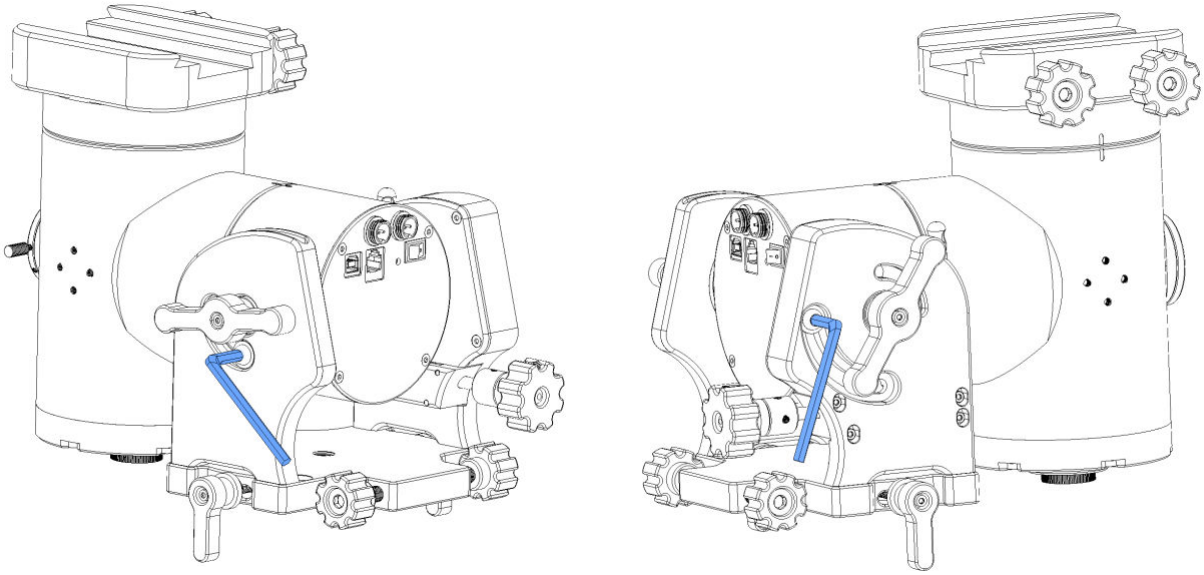
Extra altitude locking screws (M4) exists on both sides of the mount, allowing you to securely lock the altitude of the mount. **It is strongly advised to tighten these set screw when the mount is loaded with long or heavy telescope setups.**

When the mount is on a pier and the polar alignment is precisely done:

- Locate the Allen Key tool 4mm (fitted into the left side of the mount).
- Use the Allen key to lock both set screws, as shown in the figured below, to fully secure the altitude (pitch) of the mount.



Altitude Lock Screw (one on each side)

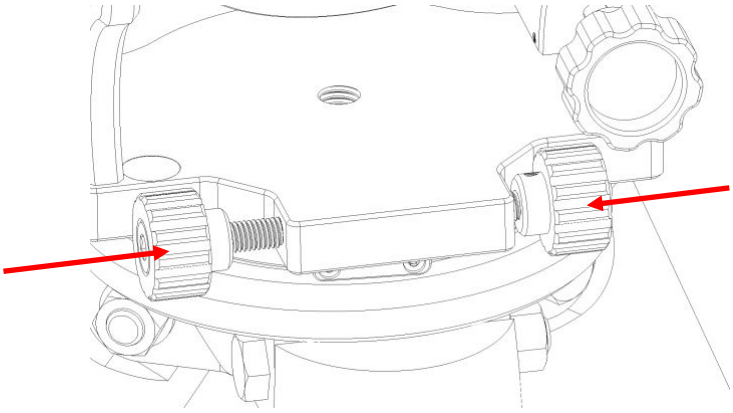


Tighten both screws to secure altitude

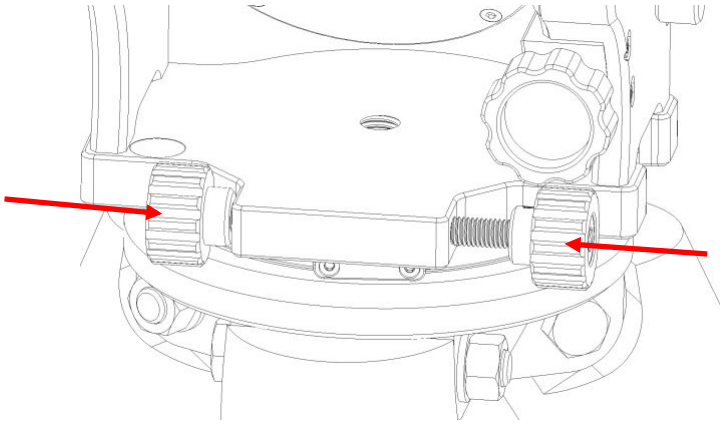
AZIMUTH ADJUSTMENT

1 Loosen the two azimuth locking knobs at the side of the mount.

2 Turn the azimuth fine adjustment knobs to fine-slide the mount left or right in the azimuth axis.



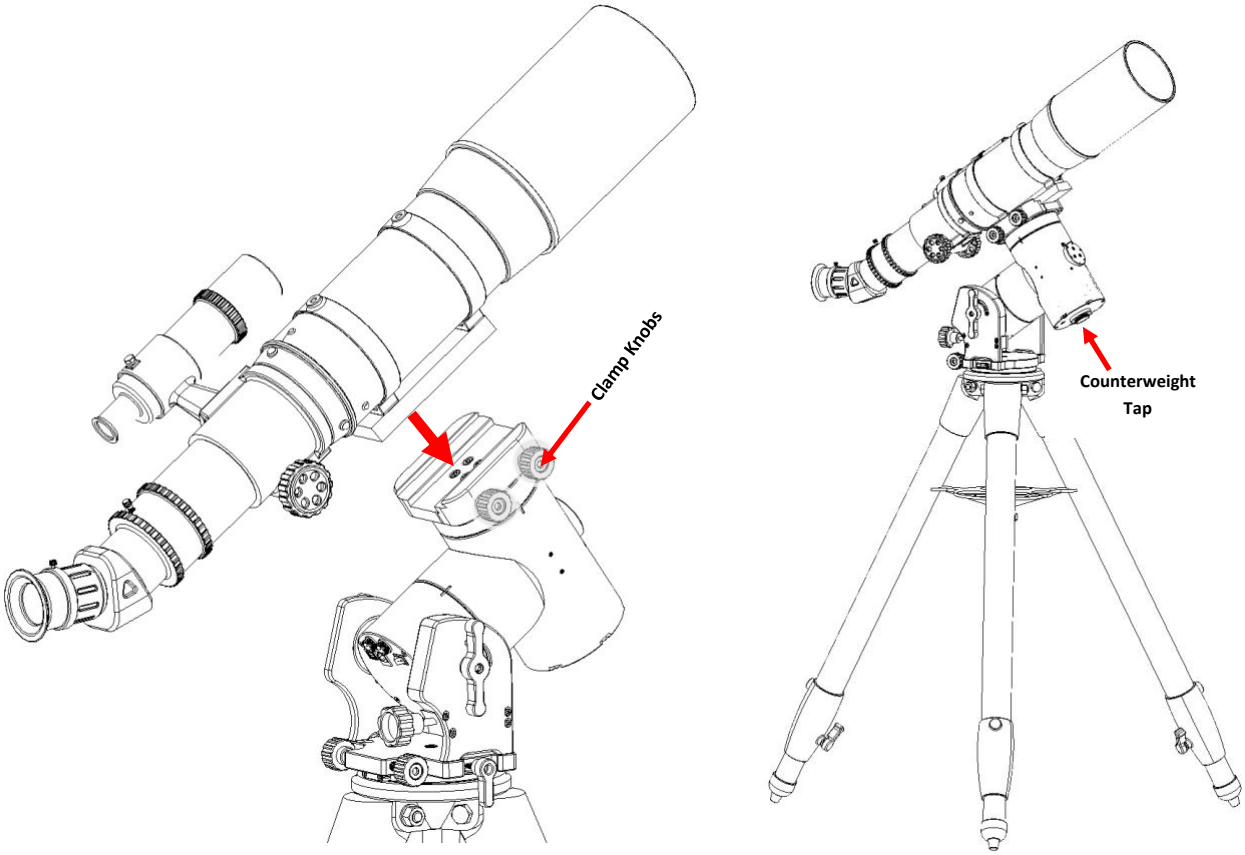
3 When you finish, tighten both Azimuth locking knobs to secure the mount's position.



TELESCOPE PLACEMENT

1. Loosen the two clamp knobs at the side of the Universal Saddle.
2. Align the telescope with the saddle and gently place the dovetail onto the saddle. The saddle can accept a Vixen Style or a Losmandy 3-inch dovetail.
3. Tighten both Clamp Knobs to secure the telescope. You can use the two Allen hex keys (6mm tool) on the clamps to apply more strength.
4. Keep supporting the telescope until you are sure that it has been firmly attached to the saddle. If the telescope setup is heavy, it is advised to get additional help from another person.

Before placing the telescope in equatorial mode, please ensure that the Universal Saddle is upwards - counterweight tap points down.



5. The telescope has now been placed and secured onto the mount.

You can still use the pitch and azimuth knobs but we strongly suggest to avoid large movements on the pitch knob when the telescope assembly is heavy (above 15 Kg) as it stresses the pitch adjustment mechanism.

BALANCING OF TELESCOPE

Both mount axes use a powerful strain wave and a synchronous belt gearbox that guarantees extremely high torque. These mechanics eliminate the need for a balanced axis so no counterweights are required.

However, when the motors are not energized, telescope weight can gradually start rotating the motor shaft, leading to a speed-up slewing of axes towards the ground. This cannot happen to the right ascension axis as there is a power-off brake installed that locks the motor shaft. The electric brake has been designed to support payloads of up to 20 kg.

The declination axis does not have a power-off brake installed so the telescope should be mounted close to the balance point of the dec axis.

Balance of the declination axis is required **only after power-off**. Balance does not affect the tracking or slewing of the mount during operation as the motor is always energized and keeps the declination axis in place.

How to balance the telescope on the declination axis:

1. From the mount's initial position rotate the declination axis only to 90 degrees (figure below).
2. Loosen saddle knobs (or tube rings) and carefully slide the telescope left or right.
3. With the telescope tube horizontal, slide the dovetail onto the saddle (or the telescope tube inside the rings) to the direction where is the least heavy part side.
4. Slowly release the telescope and examine the mount for any rotational movement on the declination axis.
5. If there is movement, adjust the telescope position to the opposite direction.
6. The final position of the telescope should remain stationary without support.



DO NOT TRY TO MOVE THE AXIS LEFT OR RIGHT. A **VERY ROUGH BALANCE** IS ONLY REQUIRED. IF YOUR TELESCOPE REMAINS STATIONARY WITHOUT SUPPORT THEN YOU ARE GOOD TO GO

PAYLOAD CAPACITY AND COUNTERWEIGHTS

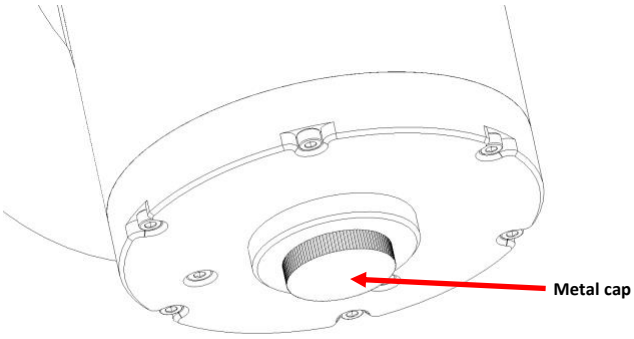
Mount support payloads up to 20 kg without counterweights. With the addition of counterweights, the payload can be increased up to 30 kg.

Please pay close attention to the following:

- Large telescope dimensions in combination with a weight close to payload limits might affect mount tracking performance. The heavier and longer the telescope tube (off-center), the more the mechanical stress on the motors and strain wave gearbox. Large tubes such as Newtonian OTAs might require an extra 5 kg counterweight to ensure the stability and smooth operation of the mount.
- A heavy telescope setup can easily tip off the tripod, especially if a 3rd party tripod is lightweight, with a small leg radius and there are no counterweights installed. Please pay extra attention to this as there is a danger of crashing the telescope setup onto the ground and heavily damaging your precious equipment.

COMPATIBLE COUNTER WEIGHTS AND SHAFT

NYX-101 supports an M12 shaft. As we care about in mount's portability, we designed an M12 screw hole that accepts shafts and counterweights from other manufacturers and can be easily found across every region in the world.



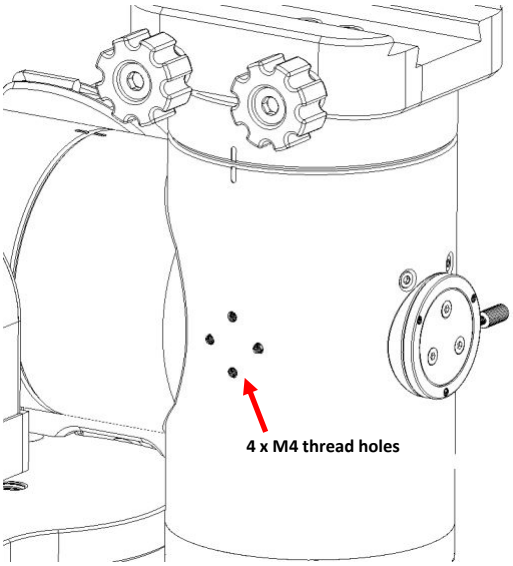
To install a shaft and counterweights:

1. Unscrew the metal cap.
2. You will see the M12 screw that allows the connection of a counterweight shaft.
3. Install the counterweight shaft and tighten it clockwise.
4. Place the counterweight(s). As you cannot manually balance the mount due to the strain wave gear axis lock, place these weights at the end of the shaft.

Do not remove any other screws as they secure the counterweight shaft with the mount's head.

INSTALLATION OF ACCESSORIES

Mount's head has 4 x M4 screws on each side. This allows you to attach small accessories or a finder shoe to it.

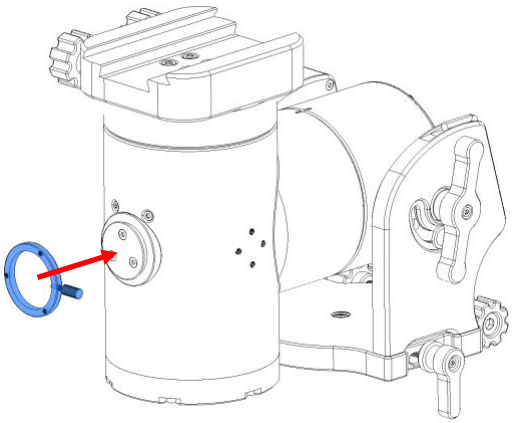


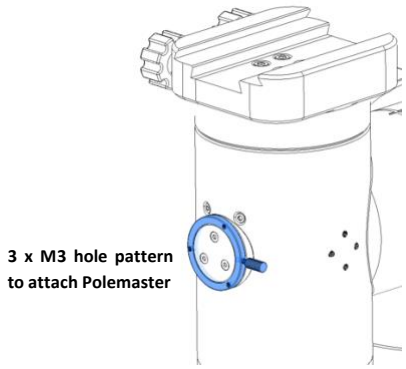
QHY'S POLEMASTER INSTALLATION

The QHY's PoleMaster is an easy, convenient and fast way to achieve excellent polar alignment. PoleMaster uses a high-sensitivity camera to capture an image of the northern sky to calculate where the true north is. It displays this information on a screen so you can quickly adjust the mount.

This small camera device has been recognized by astronomy enthusiasts around the world and has become a must-have for anyone using an equatorial mount for visual use or imaging.

On the front of the head, you can locate the PoleMaster ring adapter that has 3 x M3 screws where you can attach a QHY PoleMaster. The adapter has a locking knob so you can attach and detach the PoleMaster camera on demand. Place the camera with its USB cable extended on the left as you look at the figure below and secure it with PoleMaster's screws.





MOUNT MODES

USE OF EQUATORIAL MODE

Our planet has a spin axis, tilted at 23.5°, relative to dead vertical to its orbit plane. As Earth rotates around this axis, the stars appear to move against the background sky throughout the night, rising in the east and setting in the west.

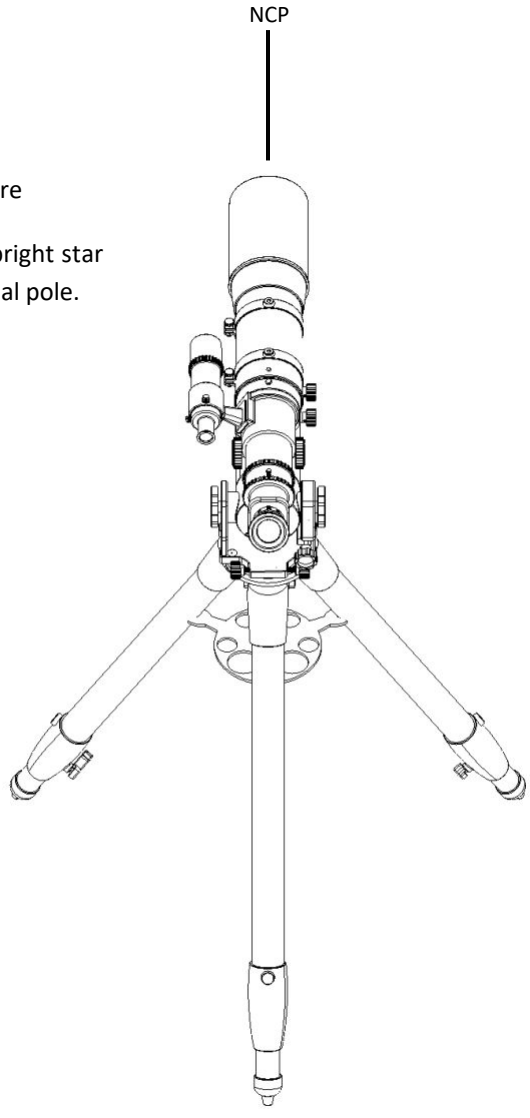
To follow this movement, the telescope has to be moved slowly in the opposite direction to Earth's rotation: in other words, following the stars.

To do that you need to adjust the mount's pitch set to be the same as your local latitude so that the polar axis is lined up and points at the north celestial pole (NCP) - (or south SCP for the Southern hemisphere).

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.



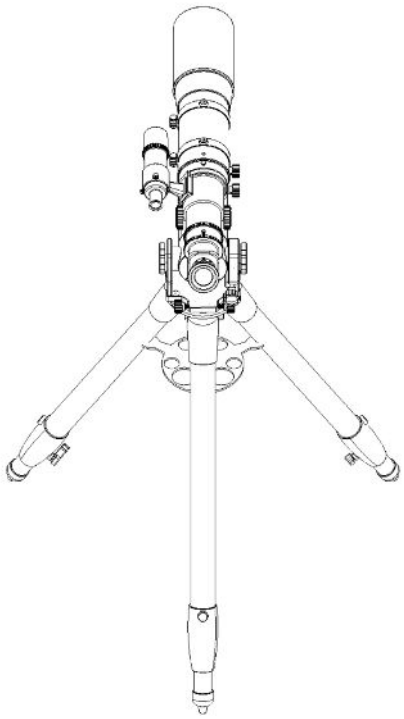
You don't need to be overly accurate in your polar alignment for visual observations.

- For observing in Northern Hemisphere, you need to find Polaris, the brightest star near the North Celestial Pole) in the QHY PoleMaster (not included) or polar align software (e.g. Sharpcap, N.I.N.A., etc). Then use the pitch adjustment knob and the two azimuth adjustment knobs to move the Polaris to the proper position.
- For observing in Southern Hemisphere, locate the 4 dim stars which form the "Octans" pattern.

For imaging purposes, you must be very accurate so different types of precise polar alignment methods can be used.

Once the mount has been lined up on the celestial pole, your scope will track the stars with ease.

1. Level the tripod with as much accuracy as you can. You can consult the electronic leveler (pitch and roll readouts) from our software or the classic bubble leveler of the mount.
2. Point the mount to the north (or south) celestial pole. The polar-scope adapter of the NYX-101 should look at the north (or south) celestial pole.
3. Adjust the mount's pitch (altitude) setting so that it's the same as your local latitude.
4. To make azimuth adjustments, unscrew the two azimuth knobs to move the mount head and scope left or right, slightly parallel to the horizon.
5. The telescope's initial (home) position, in the equatorial mode, should be as in the image below.
6. If the zero position is not as described, the first start alignment position will have a high GoTo offset. After the first star sync, there is no actual difference.



Initial (Home) Position

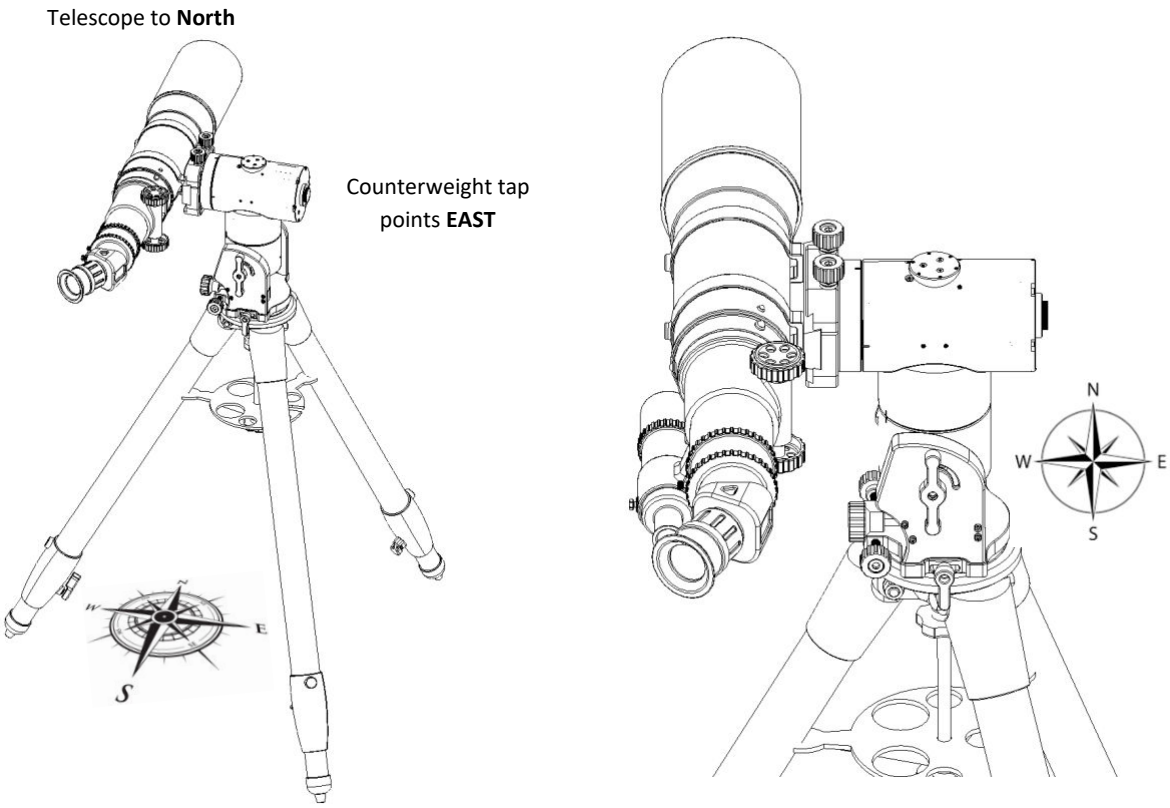
USE OF ALT-AZIMUTH MODE

The Alt-Azimuth mount setup is a simple two-axis mount for supporting and rotating the telescope about two perpendicular axes: one vertical and the other horizontal. Rotation about the vertical axis varies the azimuth (compass bearing) of the pointing direction of the instrument.

Alt-azimuth mounts track in iterative up/down - left/right movements. With these two motions, you can point a telescope to any object in the sky. Its biggest advantage is the simplicity of its mechanical design.

The primary disadvantage is its inability to follow astronomical objects in the night sky as the Earth spins on its axis. For the visual observer, an Alt-Az setup seems more convenient as it prevents any awkward position of the telescope eyepiece during the observation of different celestial targets.

To use the NYX-101 in ALT-AZ mode you need to:



THIS IS AN EXAMPLE FOR NORTH HEMISPHERE. FOR SOUTH, KEEP THE SAME FIGURE BUT POINT THE TELESCOPE TO SOUTH.

1. Level the tripod. You can use the electronic leveler or the classic bubble leveler of the mount.
2. Adjust the mount's altitude (pitch angle) up to 90 degrees.
3. **Rotate the declination axis to 90 degrees** so that the telescope points to the horizon.
4. Practically **THE TELESCOPE SHOULD POINT NORTH** as shown in the figure.
5. Counterweight tap **SHOULD POINT EAST**
6. Ensure to click **Reset Home Position** when you start ALTAZ (this is only required on the first session or when you switch from EQ to ALTAZ mode)

As the mount has internal cables between non movable part and RA/DEC axis, a hardware limit encoder is installed and prevents any twist and cut of the motor cables.

Mount 's ALT-AZ orientation should be done the way that was described to prevent a limit sensor trigger that might disallow you to move to a target visible in your night sky.

LIMITS

To protect the mount and telescope from possible collisions, NYX-101 provides limit functions.

Mount operations that are subject to limits are:

1. Tracking
2. GoTos
3. Manual slews are initiated by the direction pad, towards the limit direction.
4. Zero position
5. Park

When a limit condition is detected, the following actions are performed:

- Both motor axes (Ra and DEC) are immediately stopped.
- Tracking is stopped.

To remove the mount from the "limited" state use the direction pad to slew the scope away from the limit point.

NYX-101 incorporates three (3) software and one (1) hardware limits. The software limits are configurable by the software. Hardware limits are not configurable and have to do with hardware limit sensors for your mount and telescope equipment protection.

Software limits:

- Horizon Limit
  - ❖ Is configurable from -30° to +30° (By default a horizon is applied to an altitude of -10°)
- Overhead Limit
  - ❖ Is configurable from +60° to +90° (Default +90°)
- Meridian Limit.
  - ❖ The meridian limit (E or W) can be set from -120 to 120 minutes (pre or past meridian).

Note that:

- RA axis supports an "Hour Angle" or Azimuth range of ±180 degrees.
- Dec axis supports an allowed Declination or Altitude range of ±90 degrees.

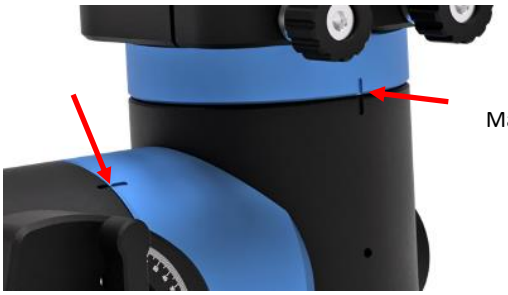
Hardware limits:

- Optical Sense Limit on ±360 degrees on the Right Ascension axis disallowing internal cable snag or damage.

MOUNT POSITION

NYX-101 mount has an internal non-volatile memory (FRAM type) that can hold data even after it is powered off. With more than 10 billion read/write cycles, the lifetime of this memory is essentially unlimited. This gives the advantage of continuously storing in memory the position of the motor (for both axes). If you switch off the mount, the last mount position is automatically retrieved on the boot sequence. *(Note that this feature is available on firmware v1.3 and above)*

To zero the mount position (set the home position) you have to manually slew both axes, using the keypad, to match the indicators.



Match Indicator lines

Then click "**Reset Home**". The setting will be stored in memory as a zero point.

When you switch between ALT/AZ and Equatorial mode you must reset the zero position of the mount.

INDICATOR LAMP

A red indicator lamp (LED) is located at the back of the mount. The table below shows the different conditions of this lamp.

Condition	**Status**
During mount start-up – firmware load	LED turns ON. Indicates that firmware is loaded.
During mount slewing	LED remains ON.
During mount tracking (any tracking mode)	Blinking fast every 0.25 seconds.
Abnormal state.	LED is Off.

MOUNT CONNECTIONS

POWER INPUT

A circular GX12-2 male connector (labeled IN) is placed at the non-moving part of the mount to ensure a secure lock and disallows any cable drag during tracking or slewing of the mount.

Power input requires 11 (minimum) - 14.0V (maximum) DC and at least 3 Amps of current. The socket, internal wires and electronics can pass up to 10 Amps of total current. Voltage not in this range might cause permanent damage to the motor board.

NYX-101 mount consumes 0.4A on idle operation, ~0.7A during tracking and ~2.5Amps during slewing (peaks up to 3Amps).

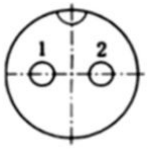
The package of the mount comes with a stock PSU which outputs 12.5V / 5Amps. The output socket of the PSU is a GX12-2 pin female connector.



Do not use an un-regulated AC-to-DC adapter. Use the stock PSU (12V/5A) that comes along with the NYX-101. If there are higher power requirements we strongly suggest to get or our certified Pegasus Astro 12V/10A PSU. (PEG-PSU-25)

<u>Do not use step-up controllers</u> to increase the input voltage as this has zero effect to mount operation, torque, tracking and stability of the mount. Mount has its own internal step-up regulator and drives the motor at higher voltage levels than the actual voltage input.

Power input has reverse polarity protection in case you accidentally reverse the wires or poles. In such a case the mount will not turn on.

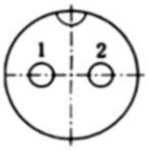


1	GND
2	VCC (11-14V)

POWER OUTPUT

A circular GX12-2 male connector is at the left (labeled OUT) of the power input connector. This port can pass up to 7 Amps of total current and provides the same voltage level that receives from the input. In short, **it is a pass-through port.** (Mount requires 3A and another 7A is available for your equipment – when you use a 10A PSU).

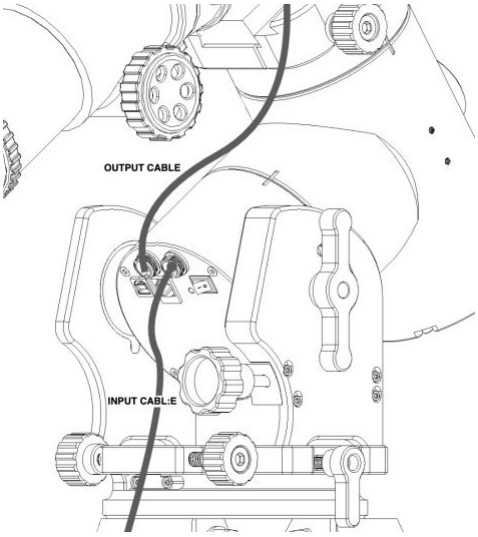
Reverse polarity protection is applied in the mount electronics only and not in the pass-through power output.



1	GND
2	VCC (same as input)

You can use this power output socket to provide power to your imaging equipment. E.g., if you own a Pegasus Astro Powerbox you can power it from this power output (figure below). The cable you need to provide power to the mount from our Powerbox products is the ***PEG-CABL-GX12***.

Please note that you will need a higher current PSU to provide power to the NYX and all of your equipment (at least a 12V/10A PSU).



Below you can see some optional cables we offer for your “power distribution” needs.

Cigarette Lighter Adapter to GX12 (1.8m)
CIGLIGHT-ADAPTERGX12



Use this cable to provide power to NYX-101 by using a battery pack

Adapter 2.5 x 5.5mm female to GX12 female (30cm) **PEG-ADAPT-25GX12**



If you own a PEG-PSU-25 you can convert the 2.5mm socket to GX12 and provide power to NYX-101

Power cable 2.1mm Male to GX12 female
PEG-CABL-GX12



If you own a PegasusAstro Powerbox use this cable to provide power to NYX-101 mount

USB2 PROTOCOL

Plug the stock USB2 type A to B cable into the USB socket of the mount and your computer. Mount is automatically discovered from the Unity platform or our ASCOM driver.

Any driver that is required to discover the NYX-101 via USB is in the Unity Platform package and automatically configured during Unity installation.

Read more in the "How to initially connect the mount" section of this manual.

WI-FI NETWORK

NYX-101 mount can be operated by its Wi-Fi transceiver:

- **Wi-Fi Hotspot**: NYX-101 creates, during startup, a Wireless Access Point that allows a mobile client to connect directly to the mount.
- **Wi-Fi Client**: Mount can be configured (via Unity Platform). to connect during startup, as a client, to a 2.4GHz Wi-Fi network (such as your home's wireless network).



Only 2.4 GHz wireless networks are supported. Mount cannot discover and connect to 5 GHz networks.

CHANNEL ROUTING

Unity platform driver prefers the (wired) USB2 connectivity and communicates with the mount via the USB cable. If the mount is connected to the same Wi-Fi network as your PC, Unity software automatically discovers the mount through the Wi-Fi network and keeps the Wi-Fi channel **as a backup communication route**.

In case you unplug the USB cable, all traffic is automatically re-routed to the Wi-Fi channel, without communication disruption. (So, Wi-Fi instantly becomes the active channel).

- If the USB cable is re-plugged, the driver automatically switches the traffic through the USB channel.
- If the USB cable is not available, the software communicates with the mount through Wi-Fi only.

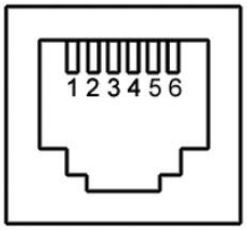
The ASCOM driver supports multi-clients and exchange information with the Unity Server that runs in the background. The USB vs Wi-Fi channel preference, selection and seamless operation is also applied in the ASCOM driver.

EXTERNAL PORT (ST-4)

Ext port has a multi-functional role. Currently, and by default, is an ST-4 auto guider input where you can connect a guiding camera.

A modern hand controller with a display (under development phase) will be available to be connected to this socket.

The pinout of the 6C6P socket (image below) is for the ST-4 connectivity and moves the mount in one of the four directions by grounding the direction pin. The pulse time of the correction is proportional to the duration of each contact.



1. VCC (3.3V)
2. GND
3. RA+
4. DEC+
5. RA-
6. DEC-

DO NOT plug a 3rd party hand controller or anything different than an ST-4 guiding camera into the EXT port. Only ST4 cameras and certified Pegasus Astro products are compatible with the EXT port. **Otherwise, there is a high risk of severe damage to the electronic board of the NYX-101 mount.**

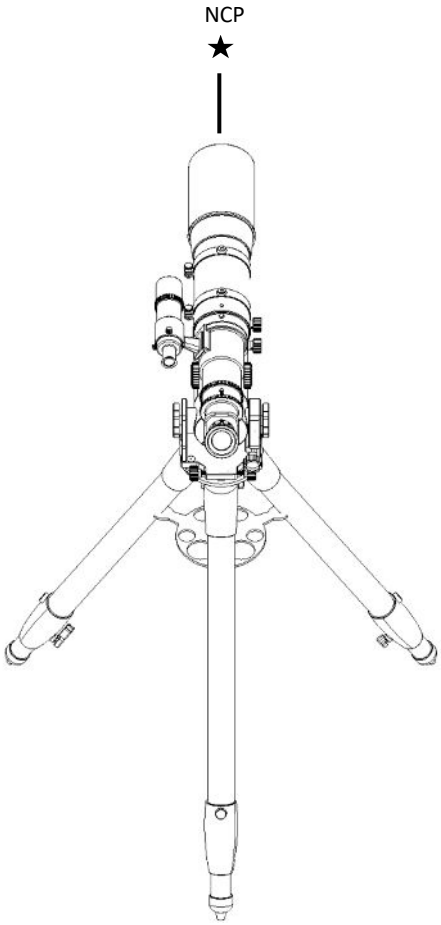
FIRST TIME OPERATION

The default factory mount mode is the **Equatorial (German Equatorial Mode)**.

If you intend to use the mount in Equatorial mode for visual observations, you have to orient the mount tripod and telescope to the NCP (Polaris) or SCP (Octants) if you are located in the Southern hemisphere.

For imaging purposes and especially for deep sky astrophotography, you will have to perform a **precise polar alignment**. For more details, please check the **Polar Alignment** Section of this manual.

After completing the mount's polar alignment process, please ensure that the telescope points roughly to the NCP or SCP. Telescope's initial position should be as in the image shown below.

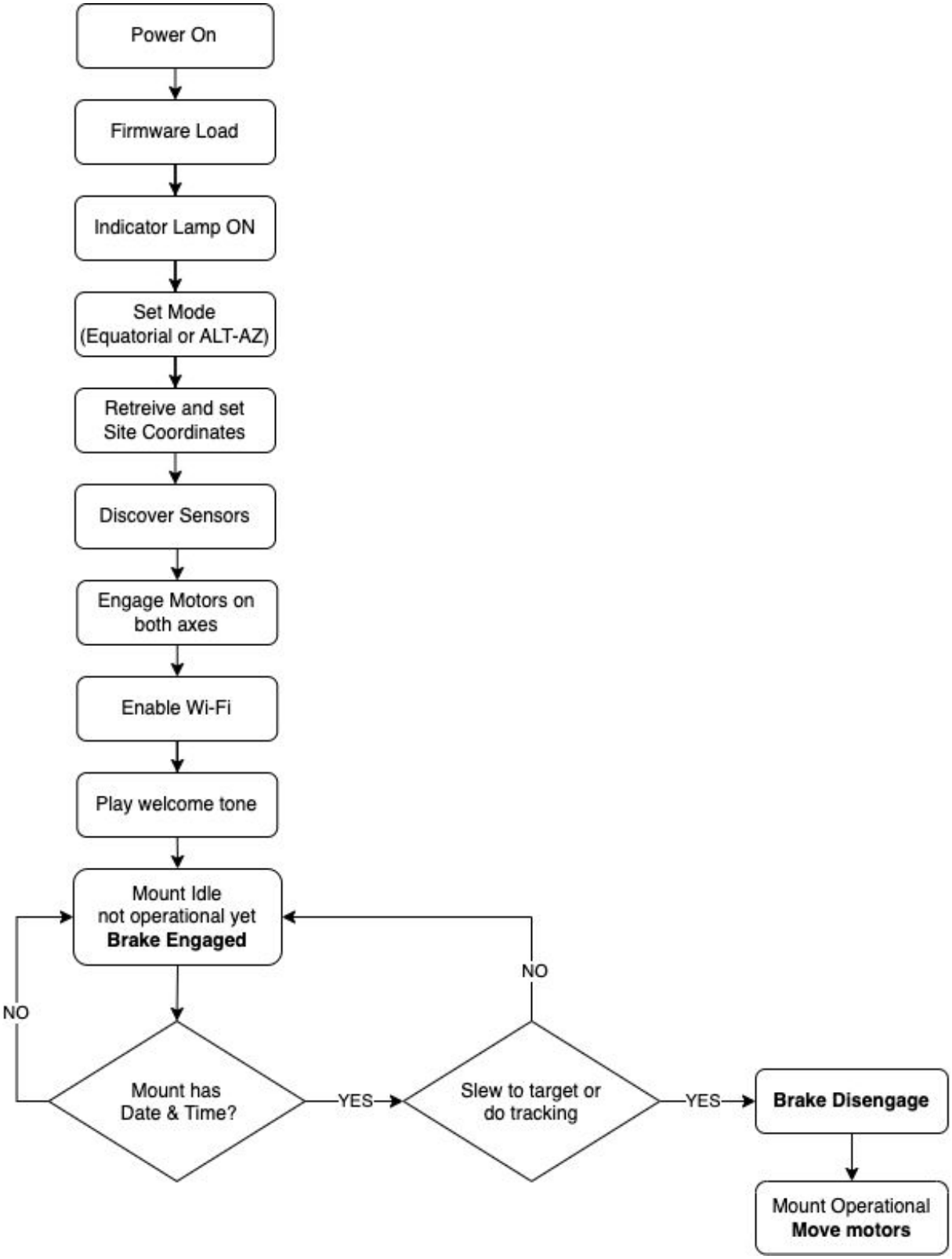


Plug the USB cable into the mount and your computer. Then, turn the mount's power switch ON.

Mount will initiate the boot sequence, the indication LED with turn on, and after 10 seconds you should hear a four notes welcome melody confirming that the mount's firmware was loaded successfully. This is the time that the mount is in a fully operational state.

South

BOOT SEQUENCE



HOW TO INITIALLY CONNECT TO THE MOUNT

The mount needs your location coordinates and altitude to perform all astronomic calculations.

The current date and time are automatically pushed from the software but site coordinates should be *entered by the user, as the mount does not have a GPS installed.

- Mobile IOS / Android application automatically pushes your current location to mount, taken from the GPS of your mobile phone.

There are two ways to initially connect to the NYX-101 mount.

This can be achieved via:

- USB cable and using the **Unity Platform** (only by Windows OS).
- **Mobile** (Android or IOS) application by connecting to the NYX-101 Wi-Fi Access Point (hotspot).

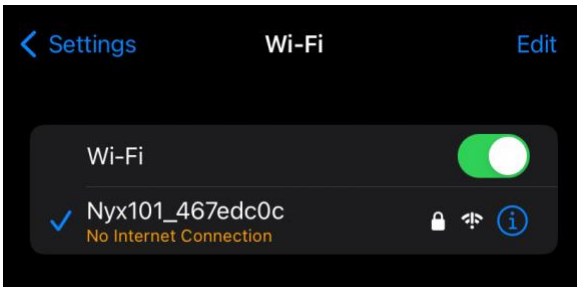
Wi-Fi Access Point and Mobile application

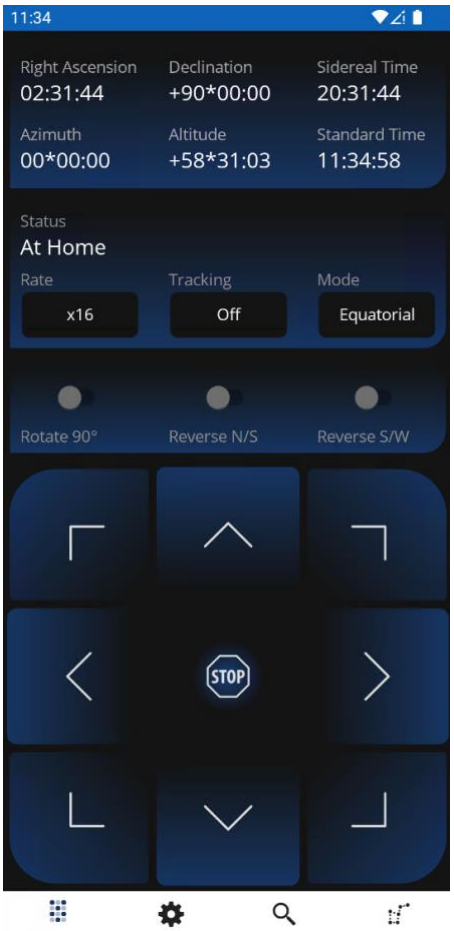
By default, NYX-101 mount launches a Wi-Fi hotspot access point which is accessible through the mobile application. You will have to connect to the network below and open the mobile application.

The default access point credentials are:

Name (SSID)	Password
Nyx101_xxxxxxxx	12345678

An example of what you should see in your mobile Wi-Fi discovery is the screenshot below:





- Download the "**PegasusAstro Unity**" application from Apple App Store or Android Play Store.
- Connect with your mobile device to the Nyx101_xxxxxxxx Wi-Fi Access point of the mount.
- Run the application. NYX-101 mount will be automatically discovered.
- If your current location differs from the mount's, a message will appear asking you to push the current location to the mount.
- Finally, the screen at the left will be visible.
- From this point, you can operate all the basic functions of the mount.

You must enable tracking in order to disengage brake and turn the mount fully operational.

From firmware 1.19 and above, brake is automatically disengaged when you click any move arrow or send a slew command.

During boot process the electric brake in the Right Ascension axis is engaged and is released only when the NYX-101 mount is fully operational (right ascension motor is locked and ready to accept slew commands).

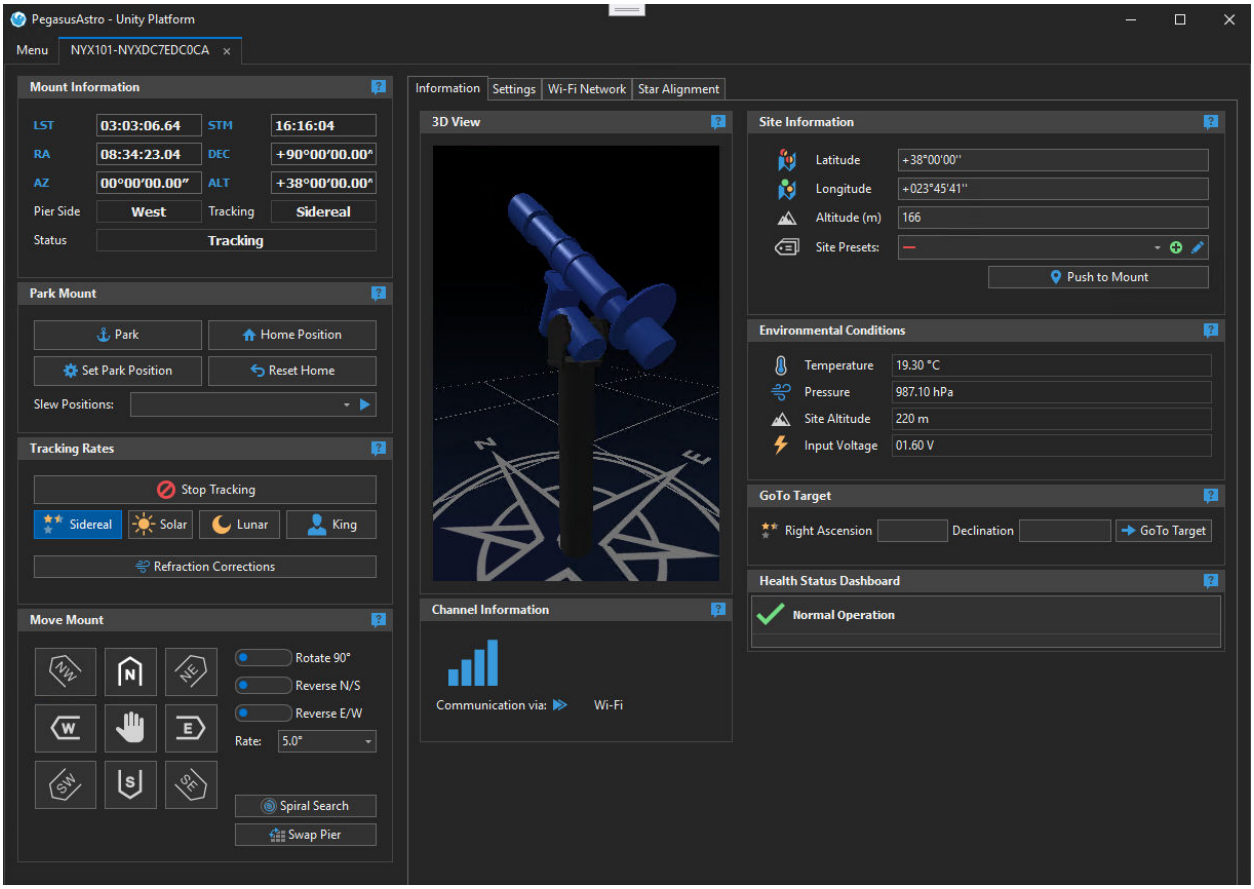
USB Cable and Unity Platform

If you use a Windows PC, the alternative approach and most preferable is to connect and configure the mount through Unity Platform (Windows-based software) and a USB cable.

- Plug the USB cable into the mount and your computer.
- Make sure that the NYX-101 mount switch is ON. (LED indicator should turn ON)
- Download and install Unity Platform from: https://pegasusastro.com/download/
- Open the Unity application and after a while, you should see the screen below.



- Click the discovered NYX-101 mount to enter the control panel. Please note that the **NYX[xxxxxxxx]** is the unique identification code of your NYX-101 mount.
- The NYX-101 control panel will load and the following screen will be visible.

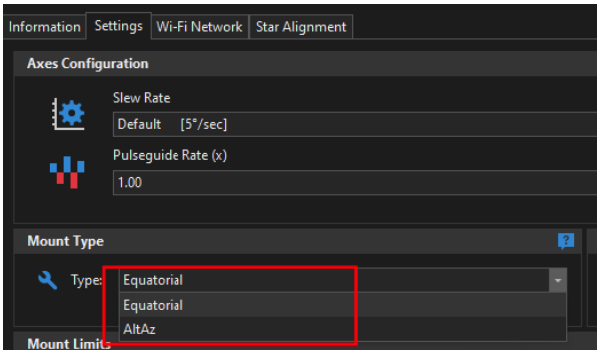


SET MOUNT MODE

Click **Settings Tab -> Mount Type**

The factory default mode is Equatorial. In the drop-down menu, you have the option to select **Equatorial** or **Alt-Az** mode. A change in the mode requires a mount reboot (which will be initiated automatically after answering 'YES' to the confirmation dialog) to apply the mode.

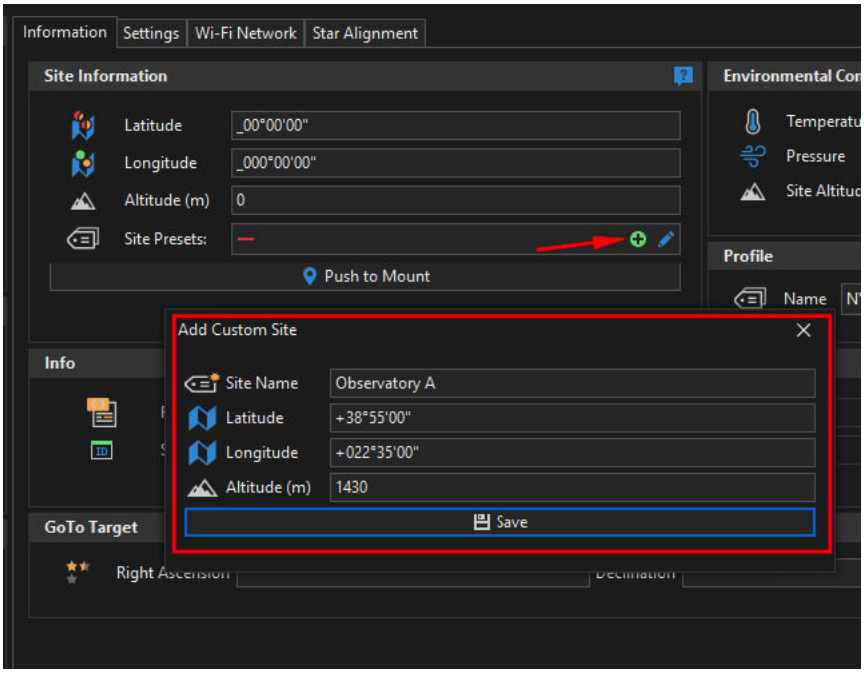
The mode is stored in the mount's internal memory and retrieved during boot.

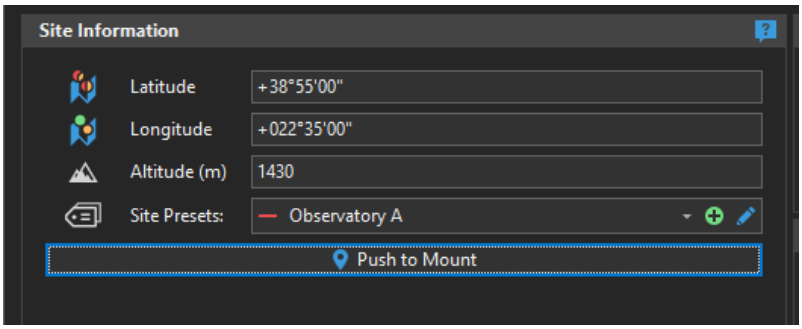


SET SITE LOCATION

Locate **Information -> Site Information** and click the green (+) arrow. This allows you to add a new site by entering its coordinates and then pushing them into the mount.

- Enter your site coordinates (latitude, longitude) and your approximate altitude and press **Save.** Note that you can use the altitude reading reported by the barometric sensor.





Click the **Push to Mount** button to push your observing site coordinates into the NYX-101 mount.

Positive latitude is above the equator (N), and negative latitude is below the equator (S).

Positive longitude is east (E) of the prime meridian, while negative longitude is west (W) of the prime meridian (a north-south line that runs through Greenwich in the U.K).

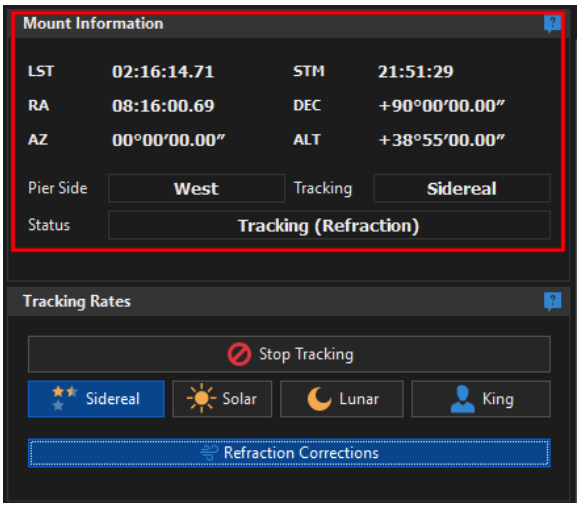
Always include a + or - sign before latitude and longitude degrees.

You can store multiple sites pre-sets in Unity and when required, push the selected site coordinates into the mount.

For each new site entry, click the icon to enter a new site. You can edit or delete each site pre-set.

MOUNT INFORMATION

The panel below displays all transmitted mount information and continuously updates them.



LST refers to the Local Sidereal Time, which is the right ascension (RA) that is on the meridian at your observing location. Objects with an RA equal to the LST are transiting, appearing at their highest point in the sky for the day.

RA (Right Ascension) and **DEC** (Declination) are the coordinates on the sky that correspond to the longitude and latitude on Earth. RA measures east and west on the celestial sphere and is like longitude on the Earth. Right Ascension is measured in hours, minutes, and seconds. Declination is measured in degrees, arcminutes, and

arcseconds. There are 60 arc mins in a degree and 60 arcsec in an arcmin. Declination tells you how high overhead your object eventually will rise.

STM: refers to Standard time which is the local time for a site when daylight saving time is not in use. Note that the mount does not use daylight savings for its celestial calculations.

AZ: Azimuth is the angular distance of an object from the local North, measured along the horizon.

ALT: refers to Altitude which is the angular distance of an object above the local horizon. It ranges from 0 degrees at the horizon to 90 degrees at the zenith, the spot directly overhead.

Pier Side shows where your telescope points: West or East.

Tracking shows the current rate at that your mount tracks the sky.

Status prints your mount's condition messages. It reports if the NYX-101 mount:

- Is Tracking
- Is Slewing
- Is Parked
- is Parking
- is At Home
- Reached a mount limit: parking, horizon, overhead, meridian, hardware limit sensor.
- Encounter a motor drive error.

VIRTUAL KEYPAD

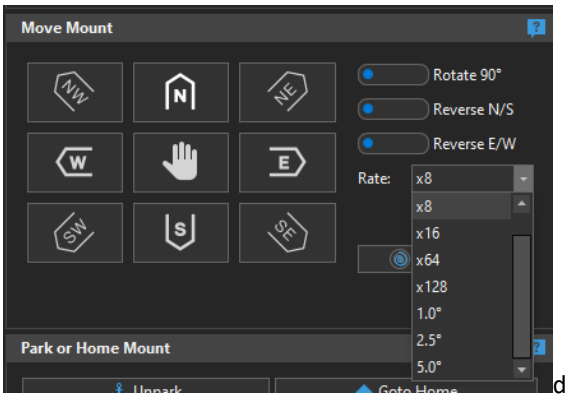
You can move your telescope in any direction and with different speeds/moving rates. To achieve that:

- Click the **Rates** drop-down menu to choose a move rate.
- Press and hold each **direction button (N, S, W, E, NW, NE, SW, SE)** to move the telescope with the selected move rate.
- Release the mouse button to stop the slew in this direction.
- The center button  is an **emergency stop** button for any kind of slew or telescope movement. Just press this button to stop any movement.
- You can also rotate or reverse the buttons, by using the **three sliders**, to match these buttons with your FOV movement orientation.



About key direction movement:
Keypad moves mount to cardinal directions (N, S, E, W) and not to just a direction like left, right, up or down.

An impression that manual slew direction is wrong can happen when the mount points close to NCP, as the scope moves rightwards, towards actual North. If you keep going past North and then press the South button it moves in the same direction as before because now that's where South is from its last stationary position. Alternatively, if you pressed North a second time instead, the mount reverses direction compared to the first time you pressed North button because that's where actual North is now.



d

Mount supports custom rates for each axis (in degrees per second). Currently, the rates in the software are fixed to the most useful rates (there are eight available rates: x2, x8, x16, x64, x128, 1.0°, 2.5°, 5.0°) to e.g. **Centre, Guide, Move or Fast Slew** the mount to a target.

3D VIEW



The 3D View displays how the mount is oriented based on the current RA and DEC coordinates.

The model is updated frequently (every 0.5 seconds). A compass is also displayed to point out how the mount is placed inside the 3d environment.

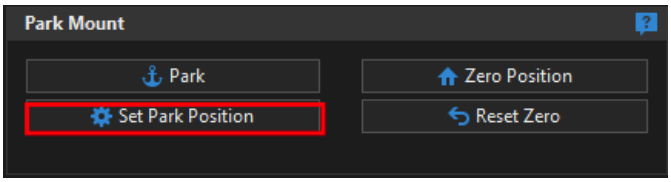
PARK AND UNPARK

The park position allows you to simply turn off the power switch and the mount will keep stored in its memory the information regarding the last position. After unparking, you can continue your observing session with aligned information retrieved from memory and re-used by the mount.

It is strongly advised to **Set a Parking Position** that will allow you to park the mount to the exact position on request.

Click **Park** to store your current position as your new parking position. Please note that the mount should have valid observatory site coordinates to properly set a new park position.

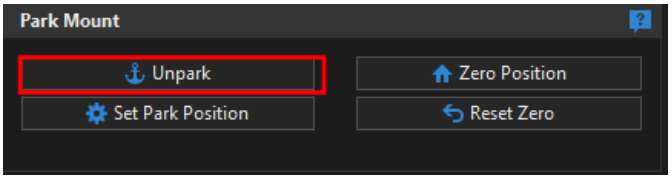
On Park command both axis motors are disengaged to save power and right ascension electronic brake is instantly engaged to prevent any telescope slippage.



After that, you can click **Park** when you finish your observations or **Unpark** when you start a new observing session.

When mount is **at Park** you cannot perform a Go-To or a Slew movement. Keypad buttons do not work.

Click **Unpark** button to start operating the mount.



HOME POSITION

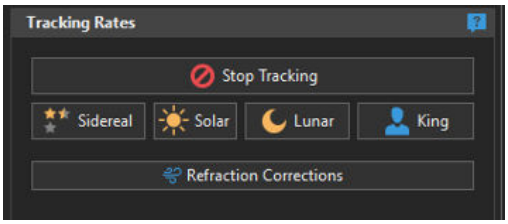
The home (or zero) position is typically a position in which the mount and telescope are in line with the meridian and pointed straight north (or south in the Southern hemisphere). The telescope will be oriented directly above the polar axis (concentric to the polar axis). The zero position of the mount should be always the initial telescope position that points to the NCP (Polaris) or SCP (Octants).

In short, this should be the position the mount always starts up when you do not unpark from a saved park position.

You can reset the zero initial position by clicking the **Reset Zero** button. This assumes that your telescope points to the NCP and it will initialize the mount RA and DEC coordinates from this position.

TRACKING RATES

NYX-101 mount is capable of the following tracking rates:



Sidereal: is the apparent rate of motion of stars across the sky, which is slightly faster than the rate of motion of the sun.

Solar: as the name implies, the telescope tracks the sun which also moves across the sky at a different rate than the stars or the moon.

Lunar tracking follows the moon, which moves across the sky at a different rate than the rest of the stars.

King developed the algorithm known as the King Tracking Rate, which corrects the tracking rate of a telescope to account for atmospheric refraction.

Click a button to apply the desired tracking rate to the mount. The button will change color confirming that the selected rate is now active.

Two more buttons have the functionalities below:

Stop Tracking: Stops any applied tracking rate and sets the mount to idle.

Refraction Corrections: Tracking can optionally compensate for refraction by consulting your site's current barometric pressure and temperature sensor readings. Click the **Refraction Corrections** button to apply refraction corrections to the tracking model (this setting is applied only to Sidereal tracking).

Custom Rates: *Mount **supports custom rates on both axes** for satellite tracking, comets, minor objects, etc. This is implemented by the ASCOM driver and works with software that supports custom rates. E.g. SkyTrack*

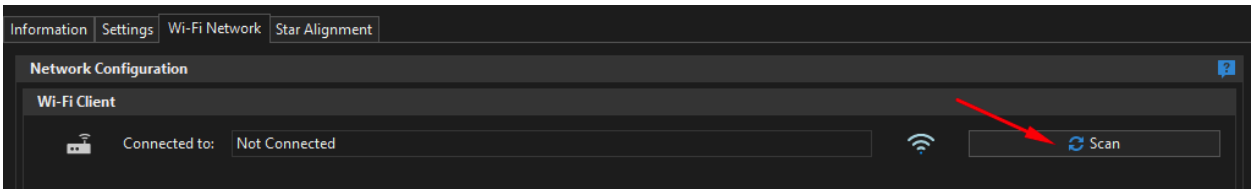
Wi-Fi Client Configuration

Apart from the Wi-Fi hotspot that is initiated during boot, you can connect the NYX-101 mount to a 2.4GHz * Wi-Fi network. Wi-Fi Access Point and Wi-Fi Client can work simultaneously.

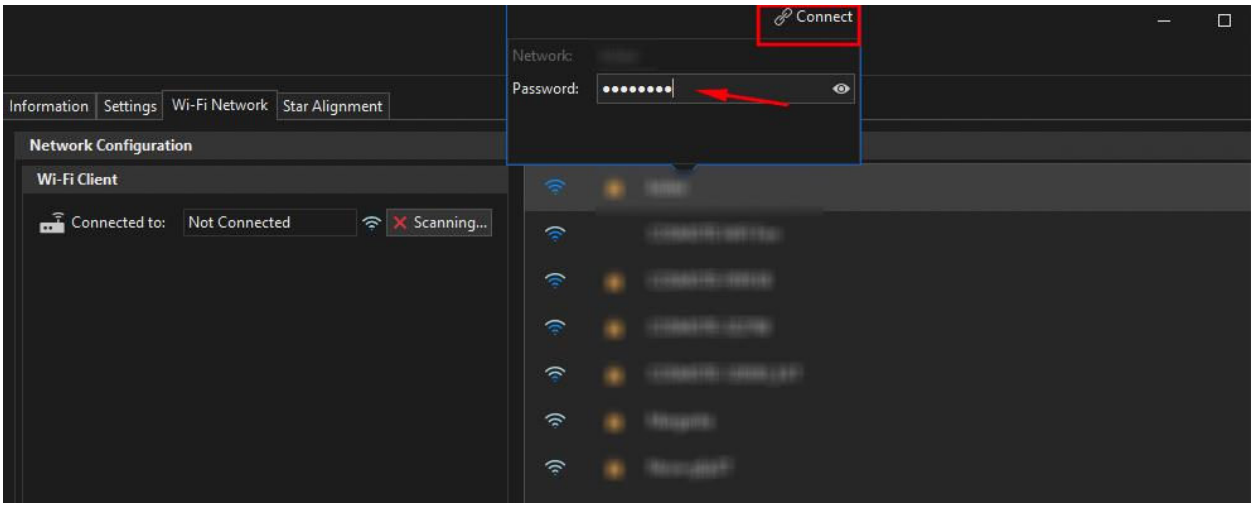
* Please note that 5.0 GHz networks are not supported.

To do that:

- Locate **Wi-Fi Network -> Wi-Fi Client**
- Click the **Scan** button to discover the wireless networks in your area. This discovery can take 5-10 seconds.



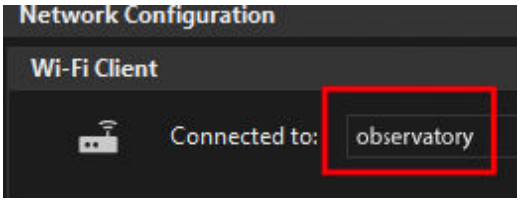
- Select your preferred network SSID from the list on the right and enter the network WPA/WPA2 password. Notice that in this list, you can also view the signal level quality of each discovered network.
  * If the SSID network is open (does not require a password) then just click **Connect**.
- Click **Connect** button to connect to the wireless network.



This Wi-Fi client setting is automatically stored in the mount's internal memory and retrieved during boot.

NYX-101 mount will keep trying to re-connect to the configured wireless network, even if the network is lost due to bad reception.

If the password is valid and the network is reachable (with a good signal), the NYX-101 mount will connect to the wireless network and report: **Connected to: SSID_NAME** (as shown in the screenshot example below)



WI-FI HOTSPOT CONFIGURATION

Wi-Fi Hotspot SSID name and password can be modified by the user. The name of the access point has always a prefix of "**Nyx101_**" and allows up to 20 characters after that. Password can be up to 30 characters.

Type a new network SSID name and password and click **Set Hotspot.** Please note that the mount's wireless subsystem will reload to apply the access point configuration change.



- You can enable or disable the hotspot by sliding the button ON/OFF.
- You can change the hotspot channel if your area is fully crowded with Wi-Fi networks. **Channels 1, 6, and 11 [default] are the best channels for 2.4 GHz Wi-Fi.** These are the only channels in the 2.4 GHz frequency band that don't overlap with each other. You'll only want to consider using a different channel if each of these channels is overcrowded in your coverage area.
- Wi-Fi hotspot has been configured from the factory with a channel width of 20 MHz which improves reliability. 40 MHz Wireless-N is rarely optimal, as it will interfere with nearly the entire spectrum of Wireless-N channels.

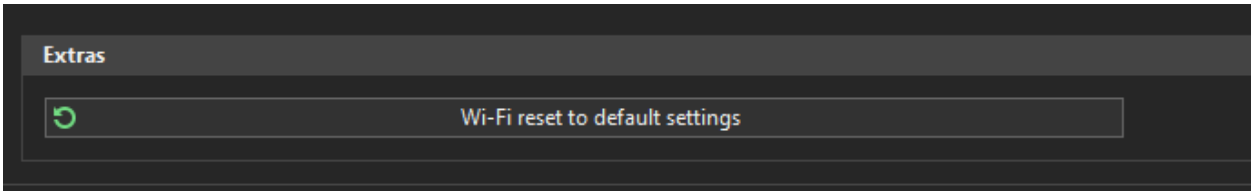
CONSIDERATIONS ABOUT WI-FI CHANNELS TO IMPROVE NETWORK CONNECTION

- Wi-Fi is a line-of-sight radio technology, which means that it operates not by surrounding your device with a wireless signal, but by connecting directly to it, through whatever walls, subflooring, or other electronic devices are in its way. Each solid object between the antenna of your wireless access point (router/modem) and your computer will diminish the signal. Repositioning things by inches can make a world of difference.
- Sources of interference are not always obvious. Many times, you may be receiving interference from hidden wireless networks or even some electronics. Interference from electronics is more prevalent with the 2.4 GHz radio spectrum. If you are using a low channel width on a free channel and are still seeing wireless disconnects (even while near your wireless access point), then the issue could be something else occupying that spectrum. Try experimenting with other channels.
- In a crowded wireless landscape, wireless performance will often degrade and improve on its own, as other people use their Wi-Fi networks. Experimenting with channel settings can help here as well, since some of your competition may rarely use their Wi-Fi, while others are continually transferring data from many devices. If you live in an apartment complex, for example, and your neighbor has their router against a

shared wall, sharing a wireless channel will not become a noticeable problem until they get home, connect with their smartphones, and start streaming to their television. However, at that point, your Wi-Fi may become completely unusable until you change the wireless channel.

RESET TO DEFAULT THE WI-FI CONFIGURATION

Click the below button to reset to default all Wi-Fi client and hotspot settings.



CHANNEL INFORMATION

This section displays the **available and active channels** that Unity has discovered and utilized.

Unity Platform discovers and talks to the NYX-101 mount by using two different channels, simultaneously:

- USB (via USB cable)
- Wi-Fi (via the mount's Wi-Fi Client connected to your network access point)

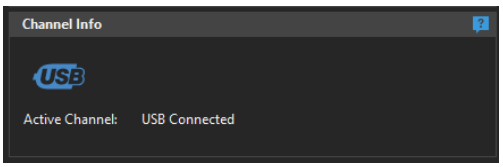
Each time Unity discovers any of these channels, it displays an icon indicating the channel type, as shown in the table below:

USB Connectivity	Wi-Fi Connectivity
	

USB-ONLY CHANNEL USAGE

Communication with the mount happens only through a wired USB2 cable. The below image shows the condition where the mount is **plugged only by a USB cable** so USB communication is active.

Notice that Channel Info displays only a USB icon.



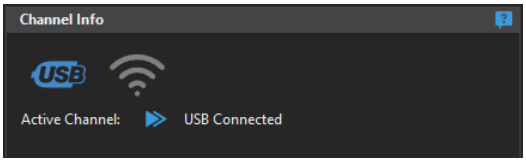
USB AND WI-FI CHANNEL USAGE

Communication with the mount happens with the USB cable and Wi-Fi client. Notice that *Channel info displays two icons: a USB and a Wi-Fi.*

When mount is plugged with a USB cable and the Wi-Fi client is connected, the **preferred channel** is always the **wired USB** cable. Wi-Fi acts as a fallback channel.

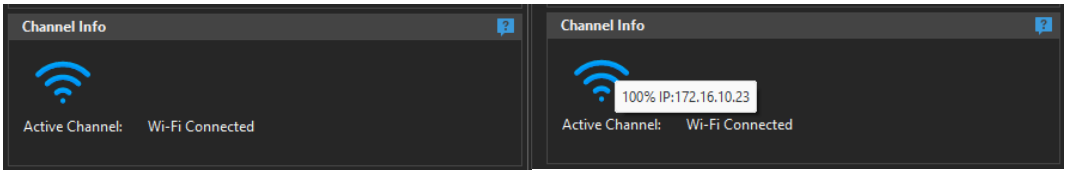
In case the USB cable is disconnected, for any reason, Unity will instantly switch to the 'on-hold' Wi-Fi channel, **without service disruption**.

Wi-Fi channel configuration does not require an IP address setup. The mount automatically receives a network address from your local network (via DHCP) and continuously broadcasts its presence inside the network, so Unity Platform can discover it.



WI-FI-ONLY CHANNEL USAGE

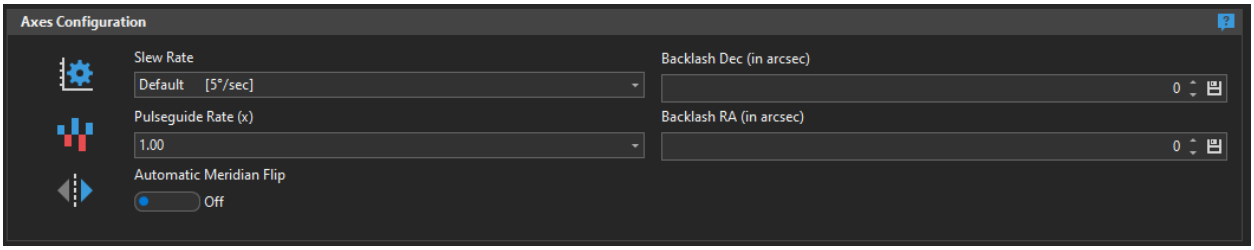
The screenshot below displays a Wi-Fi-only discovered channel. *Notice that Channel Info displays only a Wi-Fi icon.*



If you leave your mouse on the Wi-Fi icon you can see the signal strength percentage and the IP address that was assigned by your network to the NYX-101 mount.

AXES CONFIGURATION

SLEW RATES

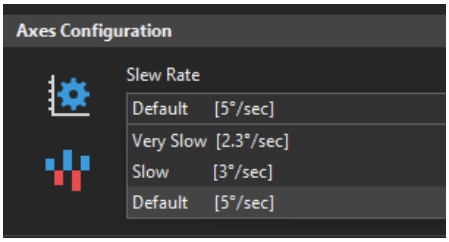


The slew rate is the maximum speed in degrees that both mount axes will accelerate and reach when slewing to a target. NYX-101 accepts three different slew rates through the Unity Platform.

The selected slew rate is stored in the mount's internal memory and retrieved on boot.

Any motor axis movement cannot exceed the applied slew rate. This is also applicable to the keypad buttons.

Available **slew rates** (three pre-sets) are shown below:



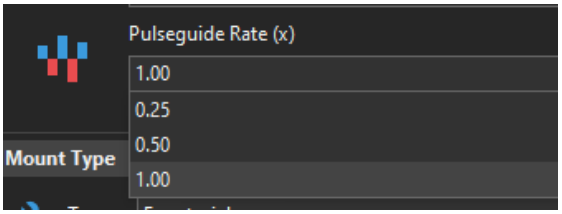
By factory default, the applied slew rate is 5.0 degrees per second to both mount axes: right ascension and declination.

When there is a heavy payload on the mount (imaging or visual telescope set up close to the mount's weight payload limits), it is recommended to lower the slew rate so motors can output a higher torque.

It is not a very wise choice to move a heavy payload on a counterweights-less mount, meaning that the tripod can tip over by the momentum of the fast-slewing speed.

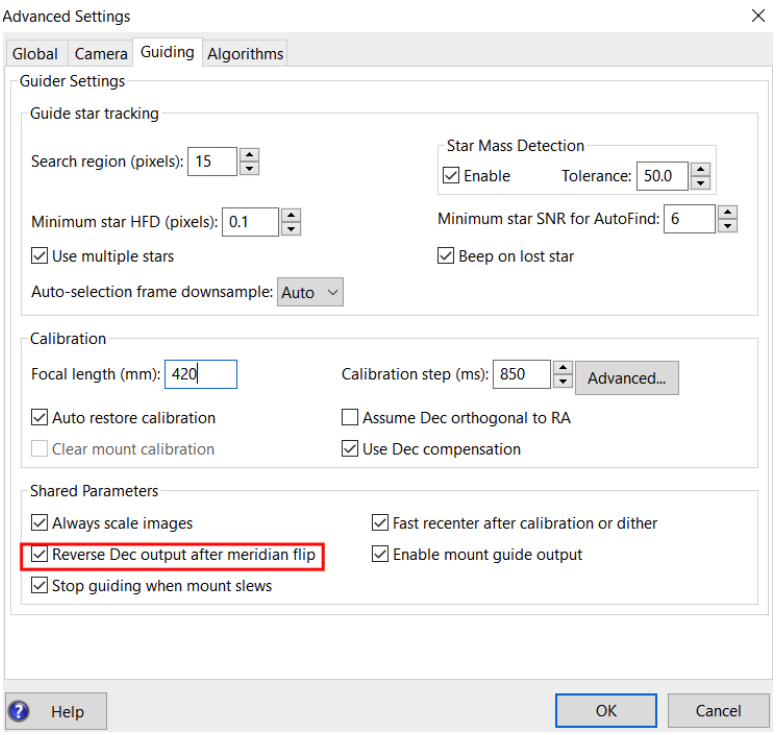
PULSE GUIDE RATES

ASCOM pulse-guide or hardware ST4 port pulse-guide can be configured from this menu. Select x0.25, x0.50 or x1.00 rate. We recommend the factory default x0.50 pulse-guide rate setting for ASCOM pulse guiding (such as with PHD2).



The selected pulse-guide rate is stored in the mount's internal memory and retrieved on boot.

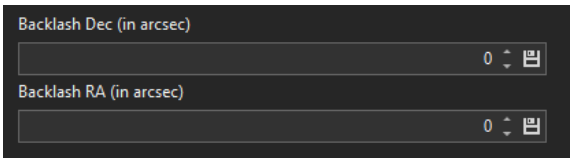
If you use PHD2 for autoguiding make sure to click the "**Reverse DEC output after meridian flip**" in the advanced settings of PHD2.



BACKLASH COMPENSATION

This option is not usually required as the strain-wave (harmonic) technology has zero backlash. Technically, a backlash of some arcsecond might exist due to all mechanical parts so we implemented this option in case it is needed for a super-fine tuning of the mount's motor, belt, and strain wave transmission system.

However, under normal conditions, the backlash setup is **not required** so you can ignore it**.** You might cause more problems than fixing something here. Keep both values to zero (0).



Backlash compensation values are stored in the mount's internal memory and retrieved on boot.

AUTOMATIC MERIDIAN FLIP

This option initiates an automatic meridian flip when your mount reaches the meridian configured limit. E.g., as your mount tracks the sky, when it reaches the meridian limit, it will automatically slew to the opposite side of the pier.



Automatic Meridian does not work when a **negative meridian time limit** has been configured to NYX-101. (e.g., -10 minutes)

Automated meridian flip setting is stored in the mount's internal memory and retrieved on boot.

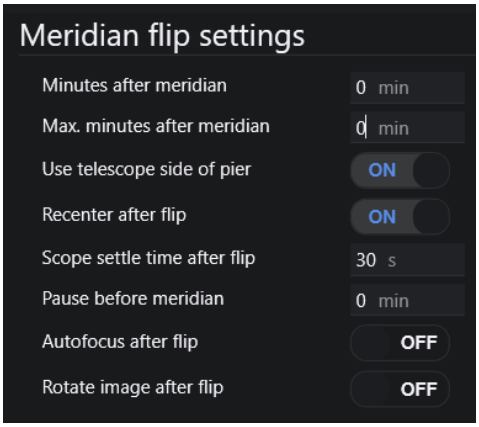
Pay extra attention that an automatic meridian flip will not cause a collision of your telescope to any stationary object or cause a cable snag as your telescope change pier side.

Automatic meridian flip does not communicate with your imaging software. By the time your mount reaches the meridian limit, it will start slewing both axes to the opposite way in order to perform the meridian flip. This could be an issue if you have set your imaging sequence and your camera exposes photos.

For a more sophisticated and controllable method of the meridian flip, it is strongly advised to disable the "**Automatic Meridian Flip** "function in Unity Platform and use your imaging software (E.g. N.I.N.A.) to control the meridian flip.

N.I.N.A or any other modern imaging software can calculate the meridian limit time and automatically perform the flip. Please note that the Meridian limit **at the NYX-101** settings should be set, for example, to +5-10 minutes. This allows any software to perform the flip without any hard meridian limit hit.

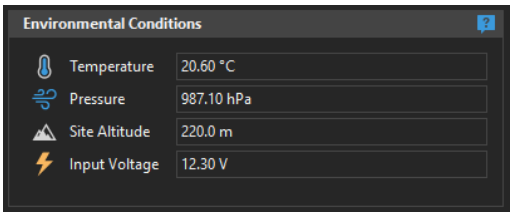
NINA Meridian flip settings (NINA > options > imaging) can be seen below:



ENVIRONMENTAL CONDITIONS

NYX-101 mount integrates a set of sensors that report:

- Ambient Temperature (in °C or °F).
- Barometric Pressure (absolute pressure in hPa).
- Site Altitude (in meters or feet).
- Input Voltage (in Volts).



Temperature and Pressure readouts are used to calculate refraction corrections - compensation in sidereal tracking. These readouts can be seen in the Environmental Conditions" section of the Unity Platform.

Input voltage displays the voltage that arrives at the mount electronic board and warns if levels are not optimal.

*Units, imperial or metric are switchable from Unity Platform (Configuration -> Localization -> Units)

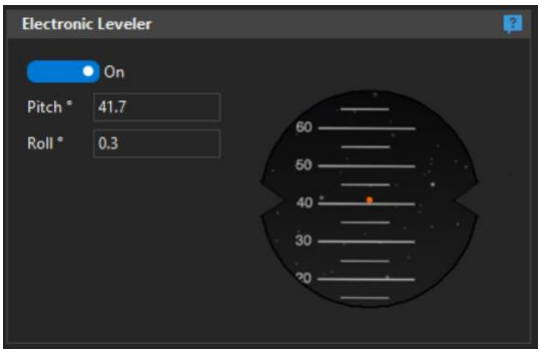
ELECTRONIC LEVELLER

NYX-101 mount incorporates an electronic leveler that can show the pitch (altitude) and roll angle in degrees.

In Equatorial mode, the leveler can be consulted to set the altitude (pitch) of your mount and quickly find NCP or SCP. The altitude/pitch of your mount should be at the same degrees as your site latitude.

Click Slider to On, to enable the leveler. Consult pitch and roll readouts, or the graphical altitude representation.

When finished it is advised to turn the leveler to OFF to reduce mount processing power.



In Altazimuth mode, the leveler displays the tripod placement on the 2-axis and allows you to precisely level it. To achieve that, try to zero or bring as close to zero as possible for both readouts (pitch and roll).

MOUNT LIMITS

Here you can set the following limits for the mount:

- Elevation Limits
  - Horizon Limit is the minimum elevation in degrees of the mount relative to the horizon.
  - Overhead Limit is the highest elevation in degrees above the horizon that the telescope will slew.
- Meridian Limits
  - Pre-meridian or past meridian in minutes.

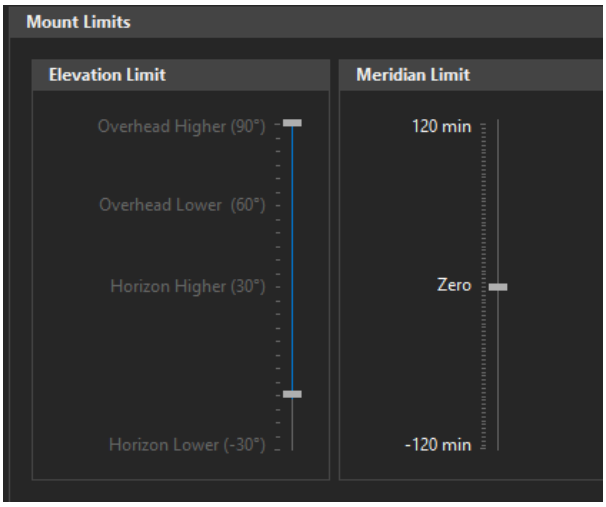
The Elevation Limit slider can be set in two positions.

- The lower that corresponds to the lower horizon limit that the mount can slew. You can set a low slider position from 0° to -30°.
- The higher that shows the overhead (maximum altitude) that the mount can slew. You can set a high slider position from 60° to 90°.

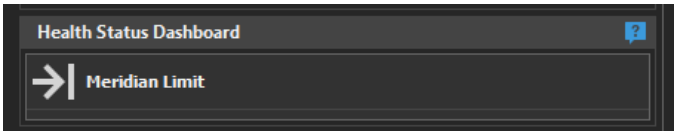
The Meridian Limit access positions from -120 to 120 minutes, pre or past meridian. Move the slider up or down to set the meridian limit.

Note that manual slews, GoTos and tracking operations are affected by the meridian limit and when reaching there, the mount will stop any motor movement.

Limit settings take immediate effect, are stored in the mount's internal memory and are retrieved on boot.



When you hit a limit, the Unity Platform health status dashboard will display the limit type (image below).



STAR ALIGNMENT

To ensure the pointing accuracy of the telescope is correct, a star alignment routine should be done after setting up the mount. Equatorial mounts usually require a 2 or 3-star alignment routine to effectively "train" the mount after a successful polar alignment.

A star alignment routine essentially tells the telescope mount where objects are in the night sky in relation to each other, using real-time user input. This process involves centering a bright, named star in the eyepiece and confirming this position on the mount.

Nowadays, most used by amateur and professional astronomers and astrophotographers do not perform the classic 3-star alignment process with their equatorial mount. The popular alternative approach *to a star alignment routine* is to **Plate and Solve** your imaging frame and use the mount's **Sync** function.

This method involves taking a picture of the night sky and identifying the star pattern from an existing database. The plate-solving software then communicates to the telescope mount where it is currently pointed and maps out the rest of the sky.

Plate solving has several advantages over a manual star alignment routine, such as the ability to match an existing object framing from a previous imaging session or meridian flip. t is also useful when creating large mosaics that involve careful planning of several overlapping images.

Visual observers (in GEM mode) prefer the old classic n-star alignment approach. Nevertheless, A 3-star alignment can reduce cone error, as the mount has the adequate amount of information needed to determine a precise position

Tracking of the mount has nothing to do with the star alignment pointing model.

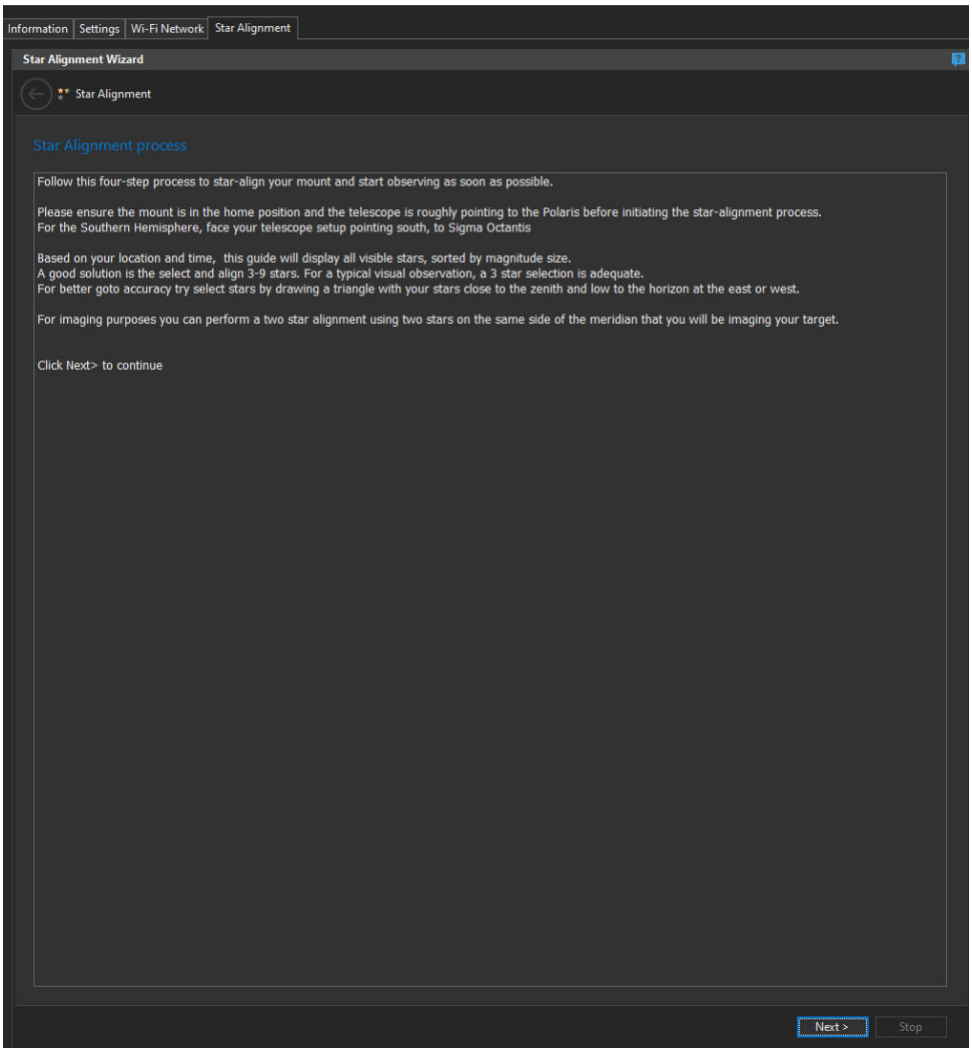
Cone Error refers to a condition with a German Equatorial mount (GEM) where the telescope is not truly at a right-angles to the Declination Axis (Dec.), i.e., is not parallel to the Right Ascension Axis (RA). For visual observation, Cone Error Correction (CEC) is not necessary, but for astrophotography and setup of GoTo mounts, cone error correction may be advisable.

In Alt-Az mode the preferred star alignment process is the 2 or 3-star alignment.

To perform a 1–9-star alignment to the NYX-101, in any mode (German Equatorial or ALT-AZ), follow the guide below: (*Unity Mobile accepts 1,2,3 or 5 stars)

Locate **Star Alignment -> Star Alignment Wizard** and click the **Next** button

Before any star alignment the mount should be homed at the **zero position** and the telescope should roughly points to the NCP or SCP.



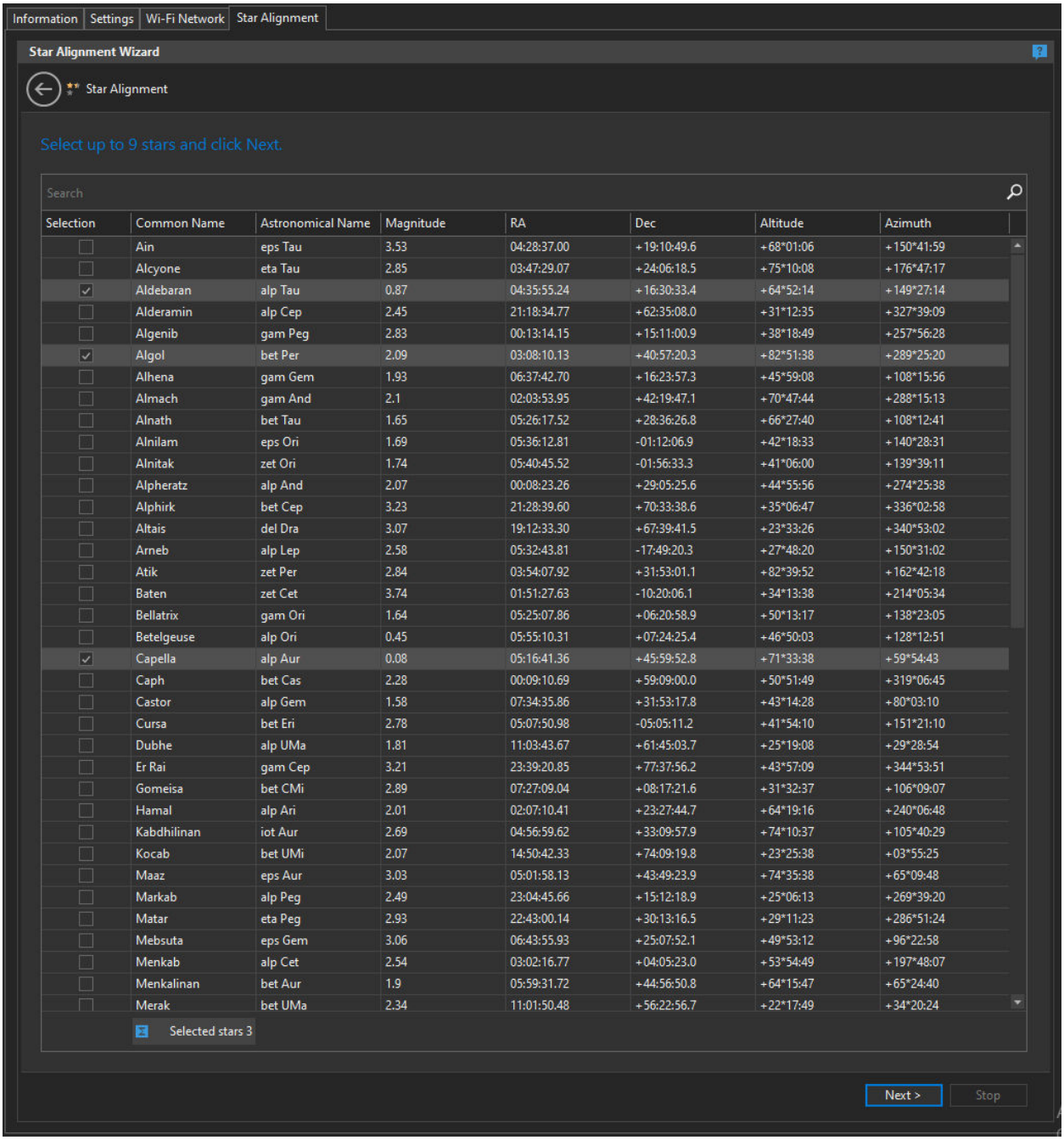
Based on your site location, date, and time, the guide will display, in a list, the brightest and most visible stars of your sky, sorted by brighter magnitude size. The list is continuously updated with the current altitude and azimuth coordinates of these stars.

For good results, choose bright alignment stars that are near the meridian and preferably close to the celestial equator. Try to avoid stars that are close to the west / east horizon or directly overhead. Also, stars too near the celestial pole are less accurate than those further away.

If there is a cone error in the mount setup or if you are not sure about it, it is recommended to choose two alignment stars that are on the same side of the meridian. The absolute values of the two alignment stars' declination should be between 10 - 30 degrees.

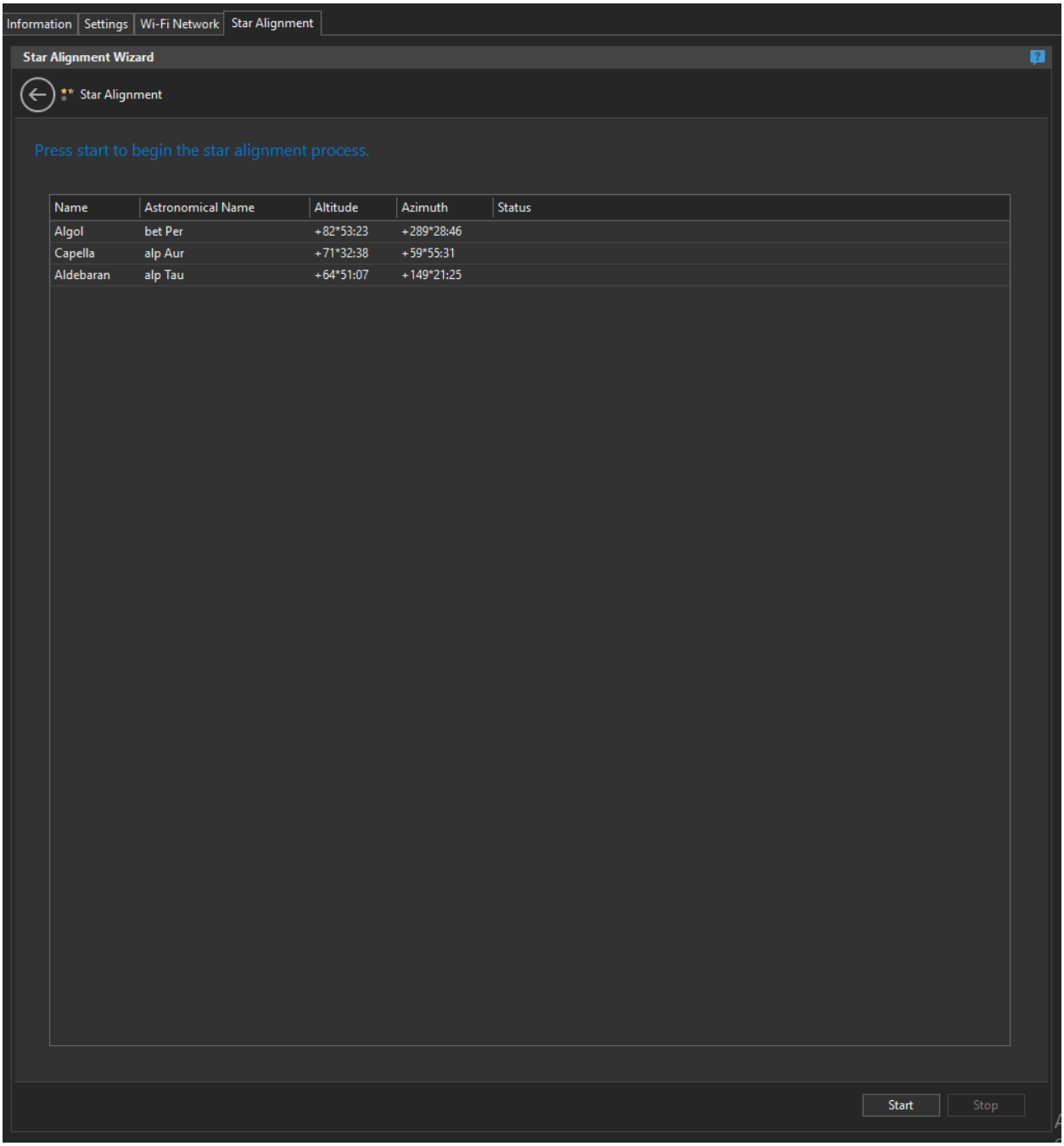
You can select up to (9) nine stars. Usually, a 3-star selection is adequate for a satisfactory star alignment result.

A good polar alignment requires 2 stars or even 1 star.

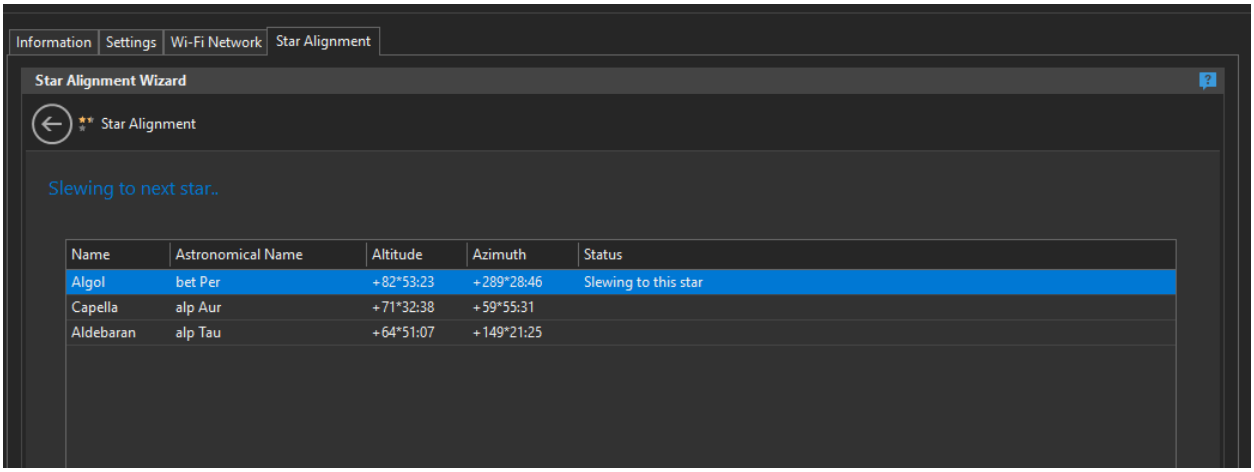


Click **Next** button

The Star Alignment guide will list all selected stars and be ready to slew (GoTo) the mount to each target. Click **Start.**

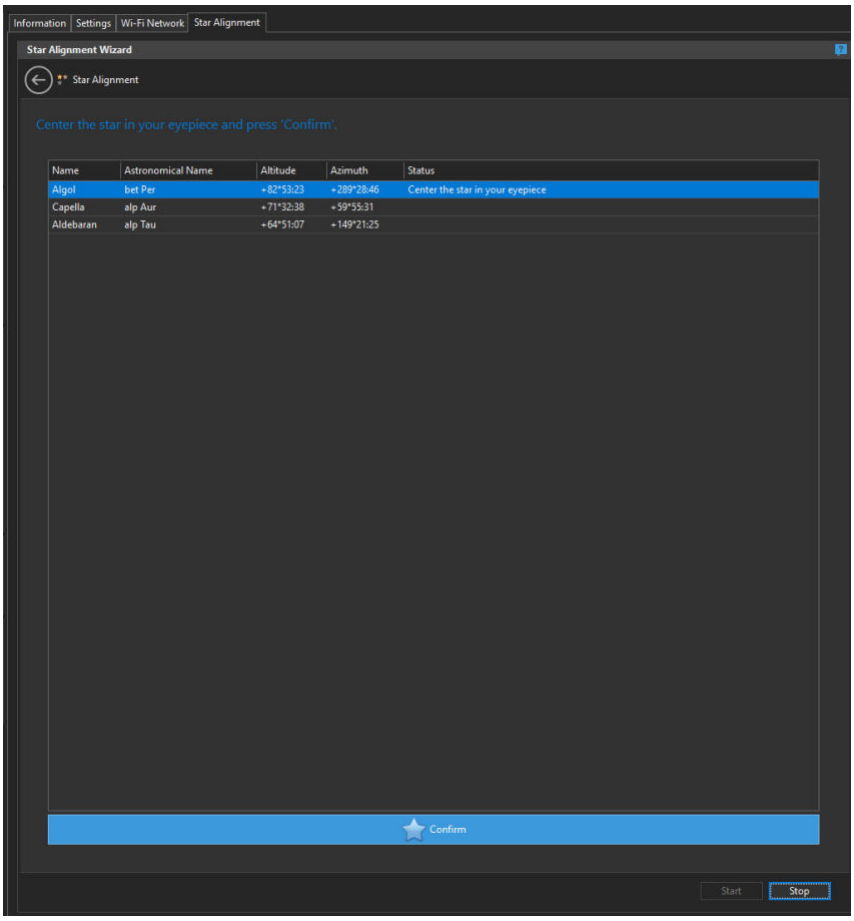


Mount will start slewing to the first-star entry of the list.

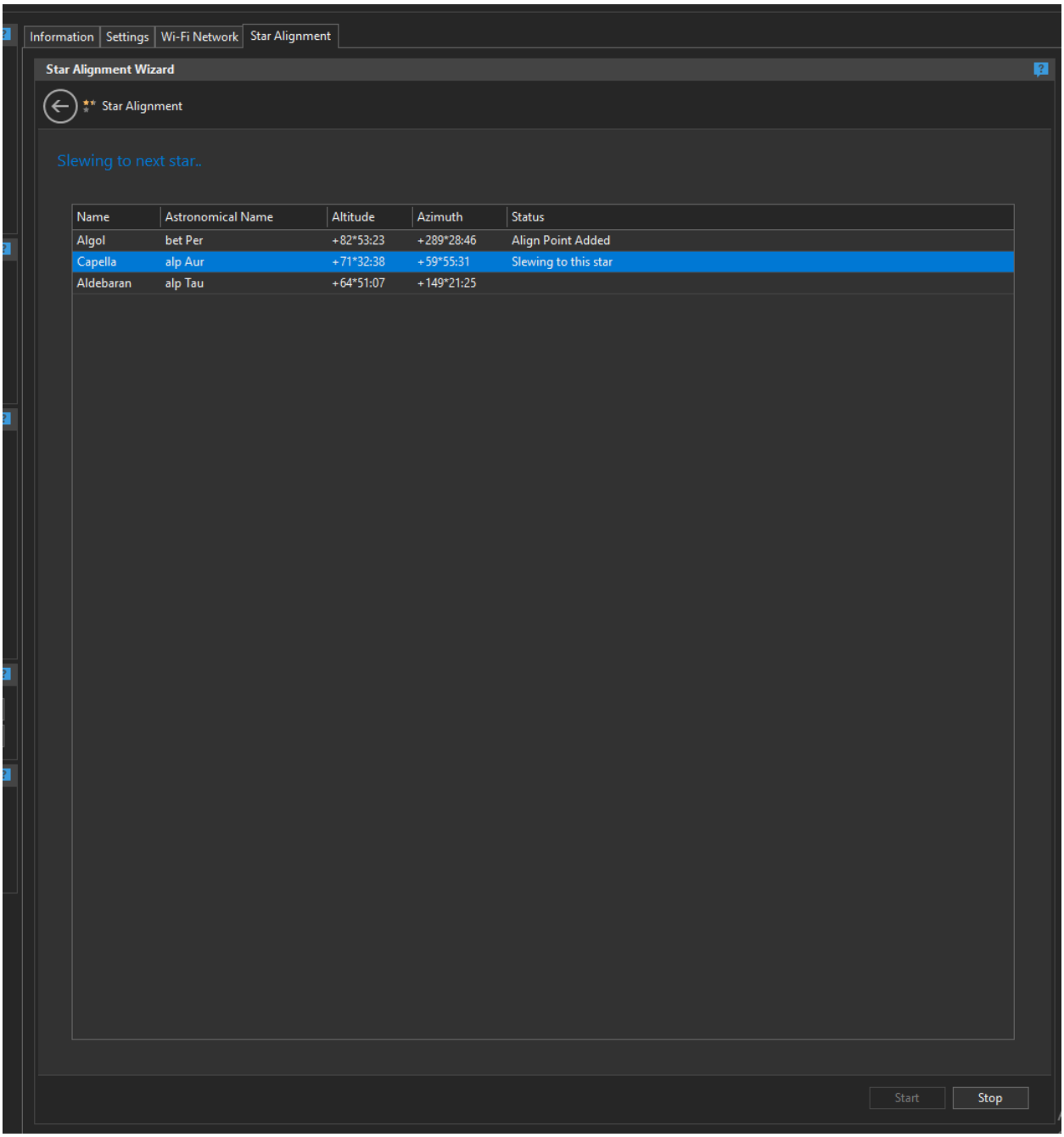


After reaching the star you will see a message to “Center the star in your eyepiece or FOV”.

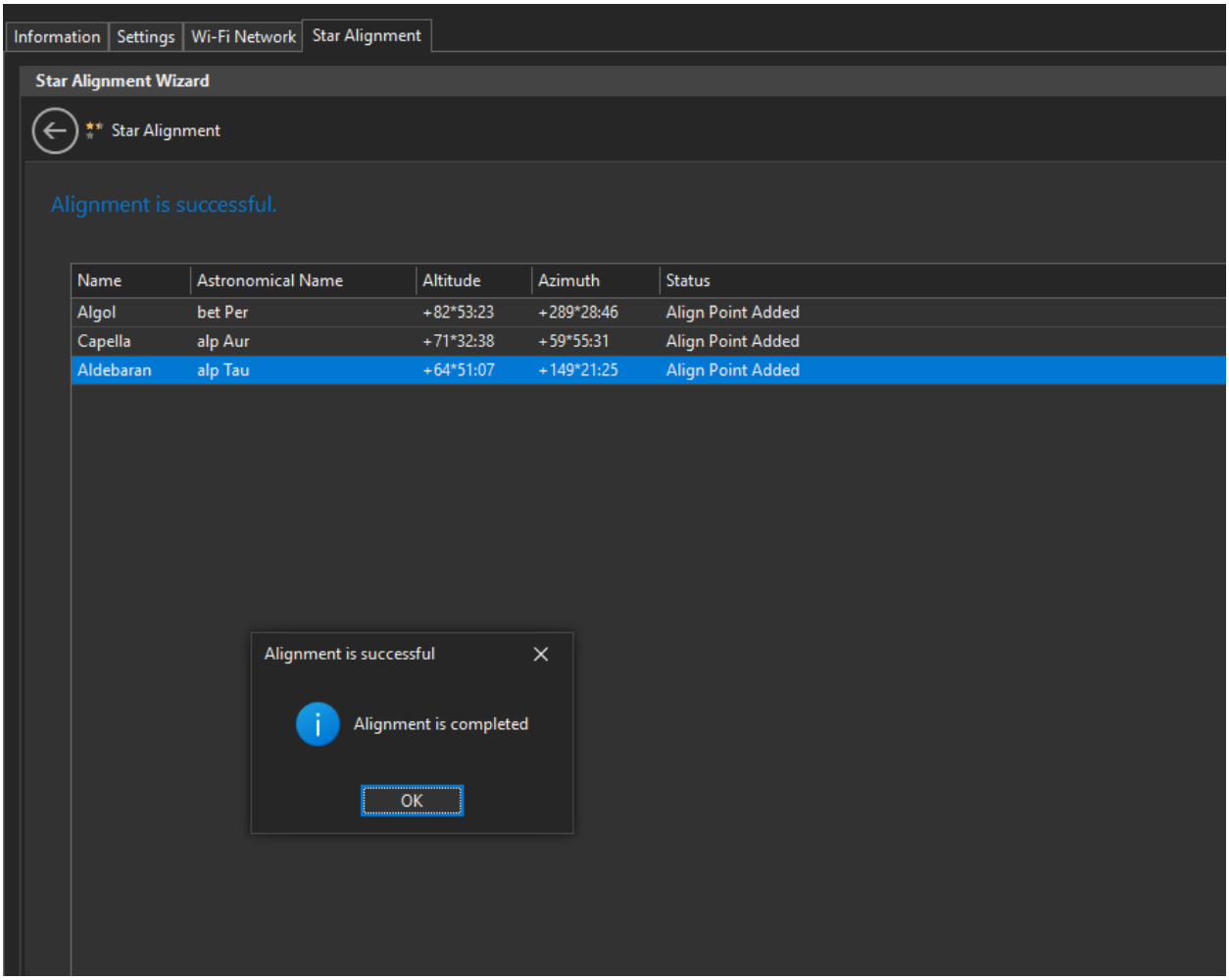
Make the required adjustments with the arrows/keypad to center the star in your eyepiece or FOV as well as you can. Click **Confirm** when done.



The Star Alignment Wizard will slew mount to the next star and the same procedure will be repeated until you have centered all listed stars.



When finished, a message that **Alignment is completed** will pop up. Click **OK** and **Exit** the guide.



Congratulations, now, you have star-aligned your mount. Remember to park the mount when you finish your observations so your alignment model will be stored in the mount's internal memory.

If you move the tripod or do any polar alignment corrections then you will have to re-initiate the star alignment process.

POLAR ALIGNMENT

A precise polar alignment can provide you with many benefits when it comes to astrophotography, including better auto-guiding accuracy. This means that you'll be able to capture longer exposures without the worry of tracking errors.

Modern imaging software like SharpCap or N.I.N.A. can help you align the RA axis of your telescope mount with the NCP by comparing images. This works by taking an image plate solving then rotating along the RA taking another and plate solving then rotating some more and taking a third and plate solving. After three images it knows your error and goes into a plate-solving loop and gives you azimuth and altitude adjustments

Process of polar alignment

- Level the tripod: Make sure that the tripod of your telescope mount is as level as possible. An uneven tripod will result in an inaccurate position of your mount in relation to the altitude scale. the tripod needs to be pointing North before leveling. Otherwise, you'll have to rotate the tripod and possibly re-level.
- Knowing your latitude, adjust the position of the telescope mount to align with the North celestial pole. The NYX-101 mount has a latitude scale with an indicator of what latitude your mount is currently in line with. You can also consult the NYX-101 electronic leveler to verify and adjust the altitude (pitch) of the mount.
- Adjust the azimuth. Use the azimuth adjustment knobs for moving the mount left to right. You have to loosen one, tighten the other. Turn the knobs a few times while looking through your live image of the electronic polar scope. Polaris should have moved to either the left or the right. Continue this balancing act until the Polaris appears in the approximate horizontal plane that was displayed in the PolarScope.

A couple of useful links for more information:

https://astrobackyard.com/polar-alignment-in-sharpcap/

https://astrobackyard.com/polar-alignment/

https://www.youtube.com/watch?v=JI1tzoBhkH8



A polar alignment within one arc minute of the pole is usually considered to be excellent and good enough for long-exposure imaging.

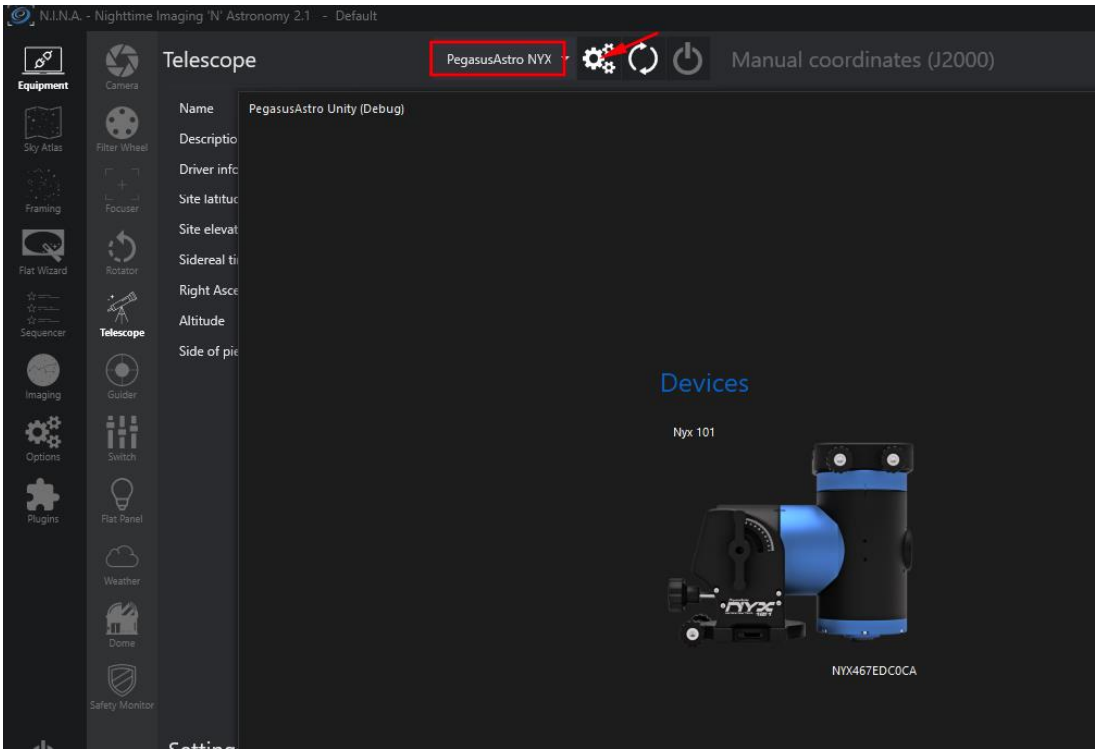
If you are experiencing tracking issues or severe star-trailing in your images, it may be useful to re-check your Polar alignment.

ASCOM SOFTWARE

Our ASCOM 6 driver supports multiple clients and pulse-guiding commands. The ASCOM driver is installed automatically during Unity Platform installation. If you encounter any issues, please make sure you always have the latest ASCOM release installed -> https://ascom-standards.org/

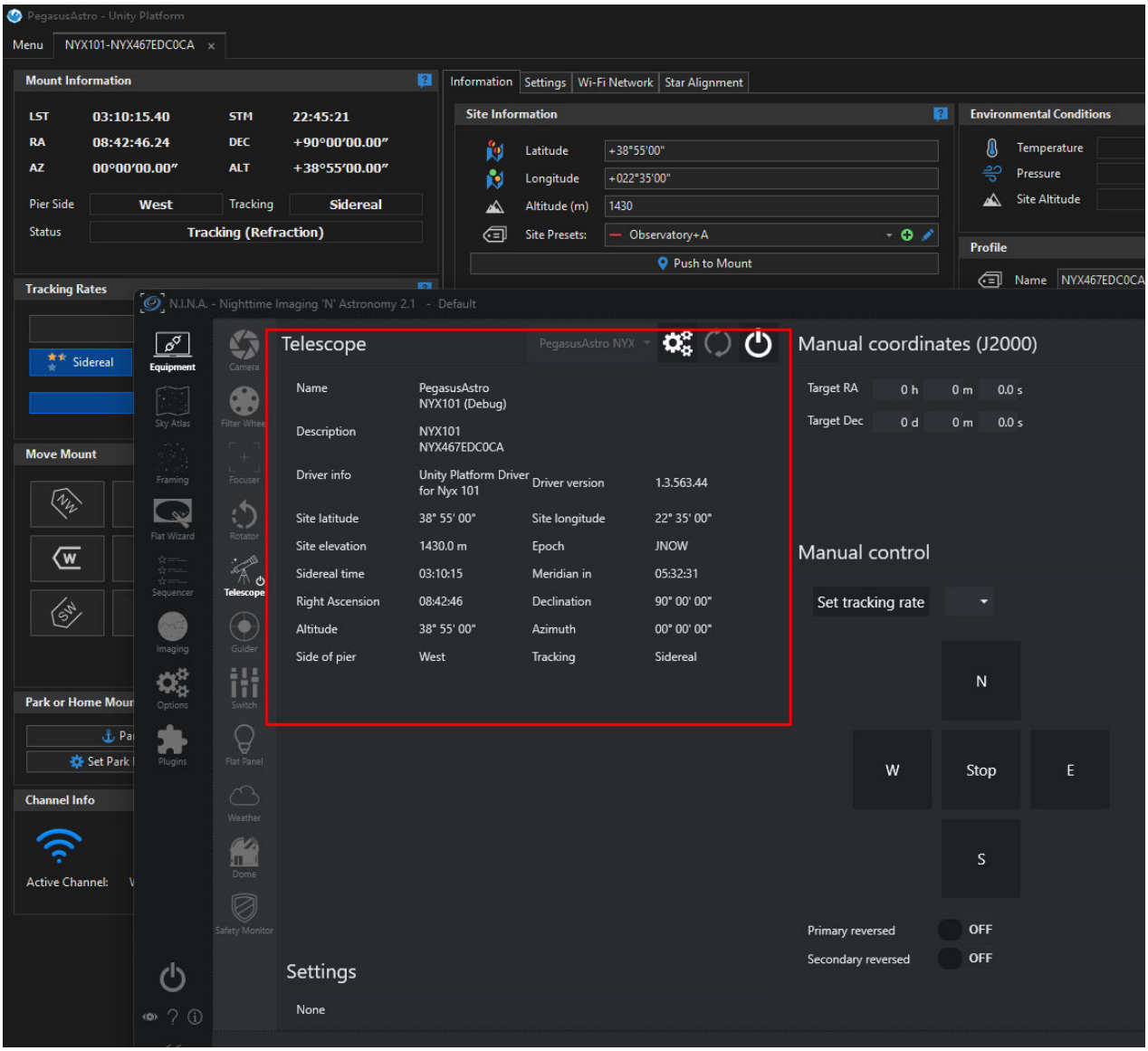
Use any ASCOM-compatible software to control the mount. We use the “Nighttime Imaging 'N' Astronomy” software in this example.

Click ASCOM Telescope settings and select the discovered NYX-101 mount.



Connect to the ASCOM driver.

All mount information and standard operations such as keypad control, target slewing / GoTo, target sync and all supported ASCOM methods are available through the driver.


PegasusAstro - Unity Platform
Menu
NYX101-NYX467EDC0CA
Mount Information
LST 03:10:15.40
STM 22:45:21
RA 08:42:46.24
DEC +90°00'00.00"
AZ 00°00'00.00"
ALT +38°55'00.00"
Pier Side West
Tracking Sidereal
Status Tracking (Refraction)
Information
Settings
Wi-Fi Network
Star Alignment
Site Information
Latitude +38°55'00"
Longitude +022°35'00"
Altitude (m) 1430
Site Presets: Observatory+A
Push to Mount
Environmental Conditions
Temperature
Pressure
Site Altitude
Profile
Name NYX467EDC0CA
Tracking Rates
Sidereal
Move Mount
Park or Home Mour
Channel Info
Active Channel:
N.I.N.A. - Nighttime Imaging 'N' Astronomy 2.1 - Default
Equipment
Camera
Sky Atlas
Filter Whee
Framing
Focuser
Flat Wizard
Rotator
Sequencer
Telescope
Imaging
Guider
Options
Switch
Plugins
Flat Panel
Weather
Dome
Safety Monitor
Telescope
PegasusAstro NYX
Name PegasusAstro NYX101 (Debug)
Description NYX101 NYX467EDC0CA
Driver info Unity Platform Driver for Nyx 101
Driver version 1.3.563.44
Site latitude 38° 55' 00"
Site longitude 22° 35' 00"
Site elevation 1430.0 m
Epoch JNOW
Sidereal time 03:10:15
Meridian in 05:32:31
Right Ascension 08:42:46
Declination 90° 00' 00"
Altitude 38° 55' 00"
Azimuth 00° 00' 00"
Side of pier West
Tracking Sidereal
Manual coordinates (J2000)
Target RA 0 h 0 m 0.0 s
Target Dec 0 d 0 m 0.0 s
Manual control
Set tracking rate
N
W
Stop
E
S
Primary reversed OFF
Secondary reversed OFF
Settings
None

LX200 SOFTWARE

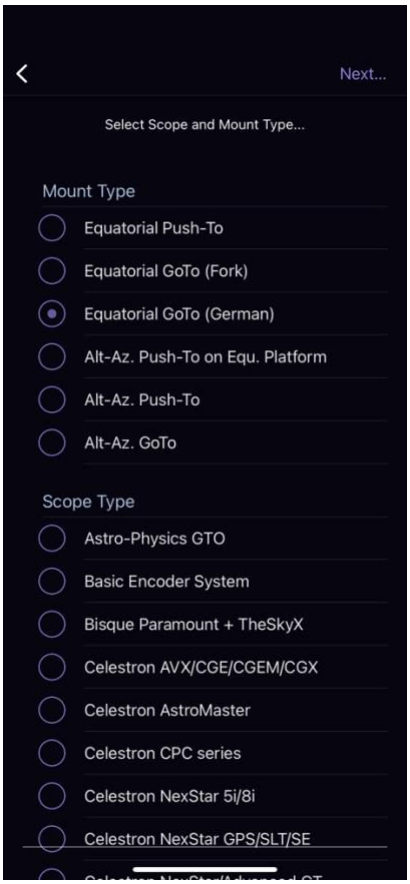
NYX-101 mount can communicate with any software that supports the basic LX200 command set.

Make sure that you have first connected the NYX-101 with Unity mobile software in order to push coordinates and current datetime to mount. Moreover, mount should be operational (not brake locked) which means that it should be in any tracking mode.

In the below example, we use the *Sky Safari Plus 7*. *(You need the Plus or Pro version to have the telescope connect functionality).* To do that:

- Open Sky Safari Plus 7
- Go to **Settings -> Telescope -> Presets**
- Select **Add Preset -> Other**

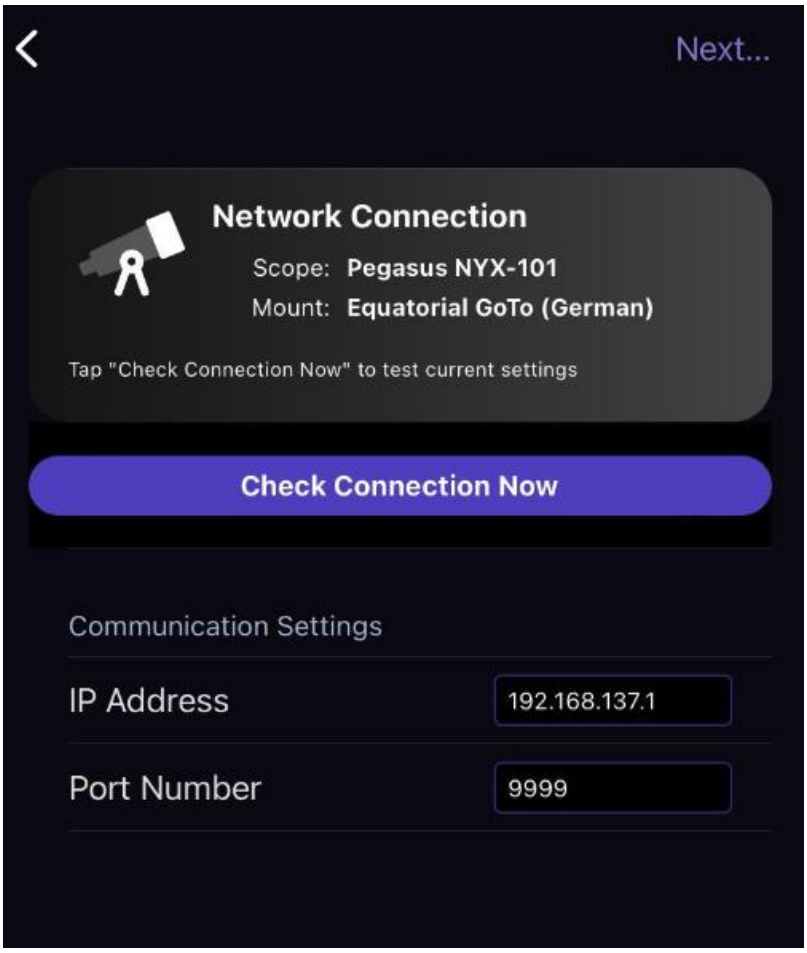
You have to select the **Equatorial Goto (German)** or **Alt-Az. GoTo**



From the **Scope Type** list, choose **Pegasus NYX-101.** Any Meade driver should work as it uses the same basic LX200 commands as NYX-101 does.

Press Next…

On the screen below you need to type the:



- wireless IP Address that your mount has acquired, or
- fixed IP: **192.168.137.1** that the NYX-101 Wi-Fi hotspot always uses.

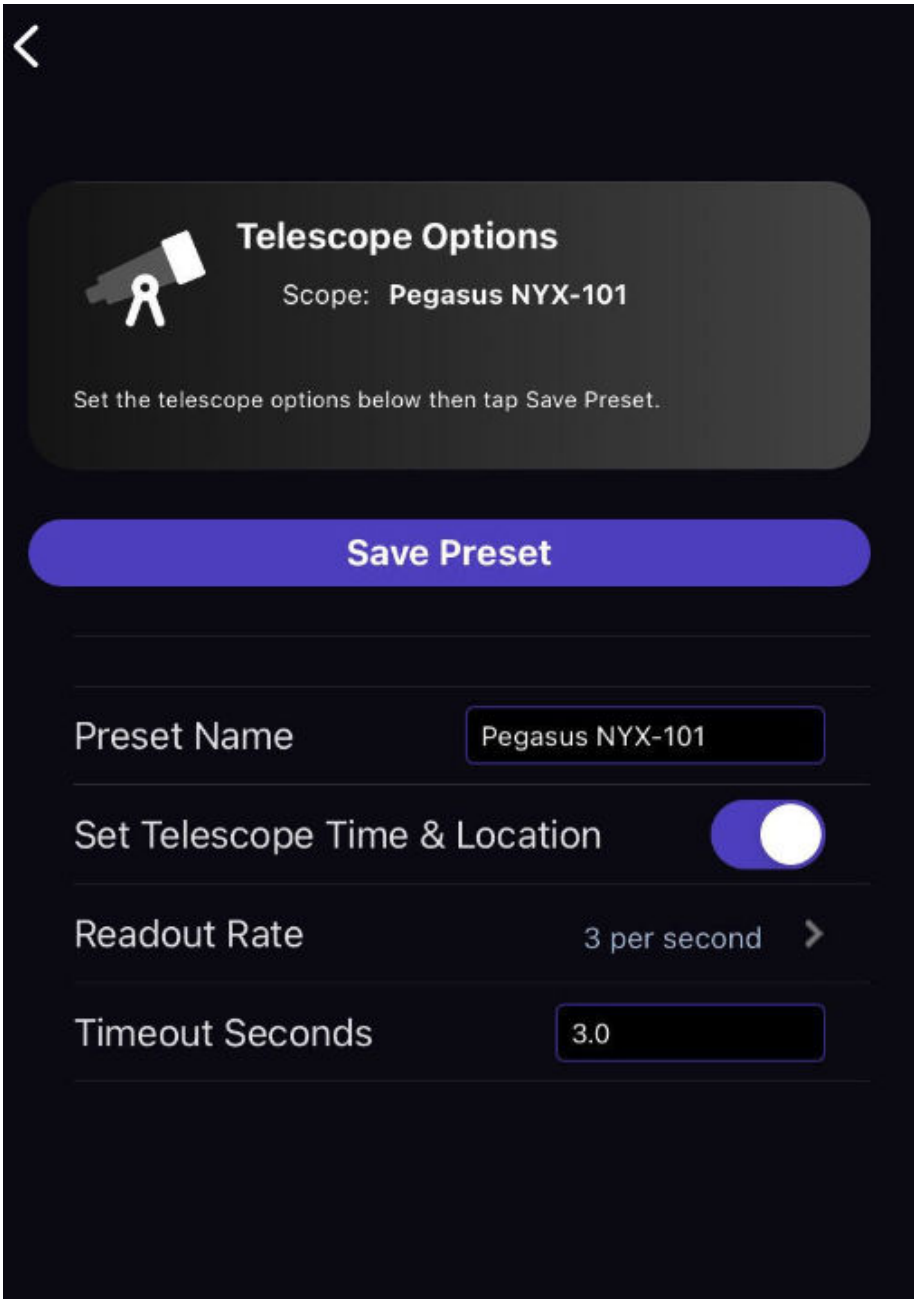
  To use the fixed IP, please ensure that your mobile device is connected to the NYX_xxxxxxx wireless network.

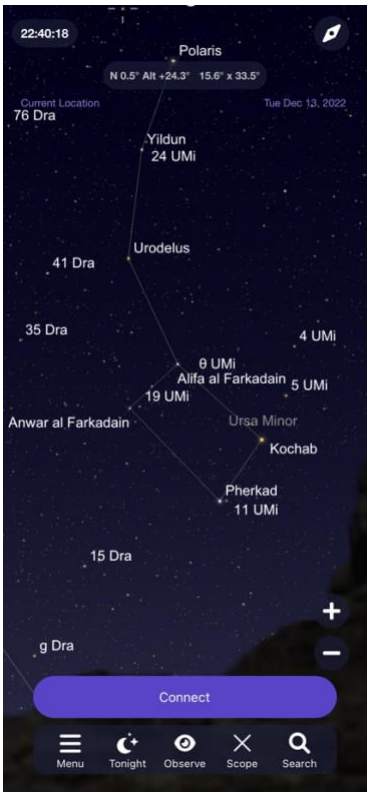
- Keep the Port Number as is (9999).

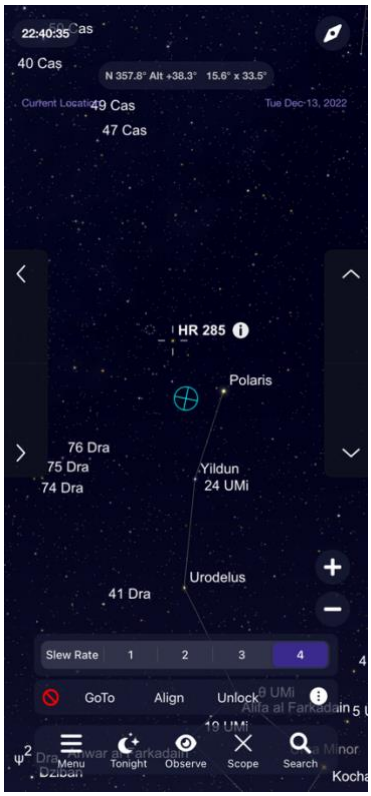
- To verify that your communication with NYX-101 is successful, press "**Check Connection Now**".
- On success, you will see the message "Connection verified"

Press **Next..**

- Enter a Preset Name (You can keep the Pegasus NYX-101)
- **Tick** the "Set Telescope Time & Location". **This is important as the mount needs time and location to calculate limits and unlock its brake.**
- Press **Save Preset.**
- Exit Settings.





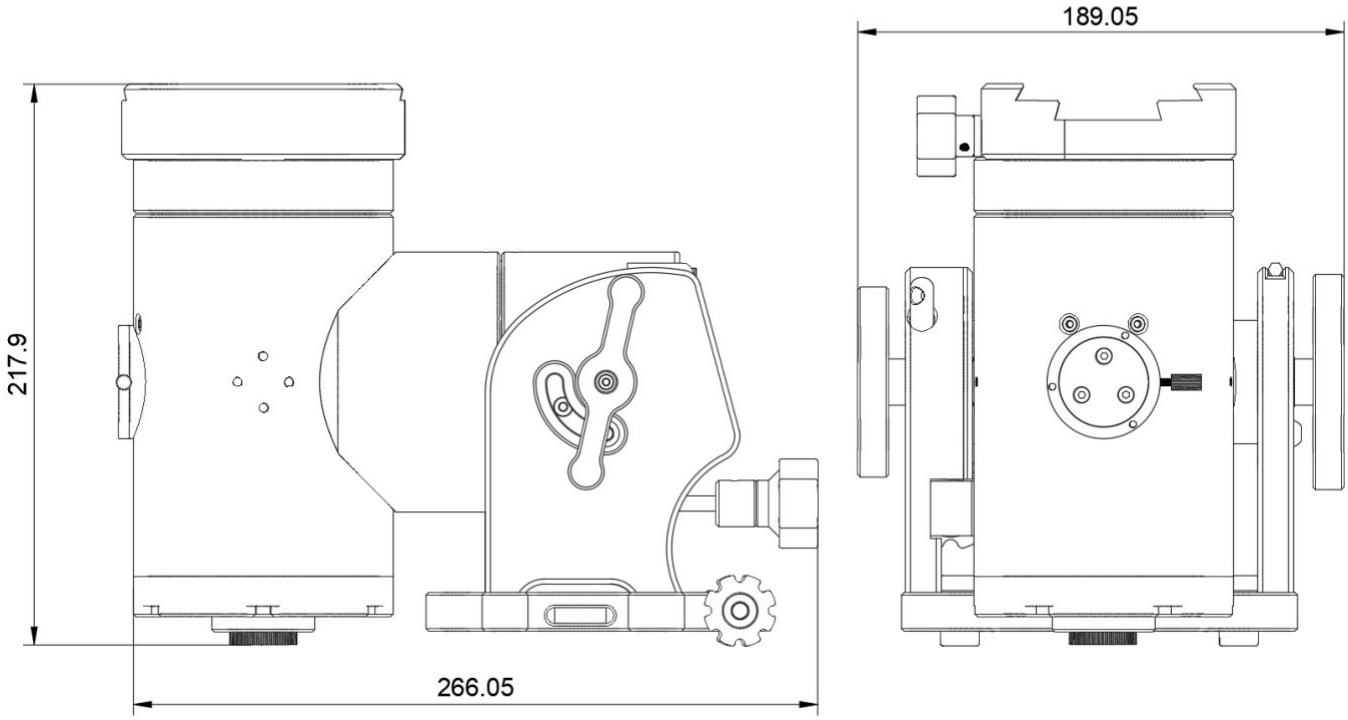


As you are at the main sky view, select the **Scope** icon and Press **Connect** button.

The application will communicate with NYX-101 and available controls will be visible.

From there, you can select Slew Rates, Move with arrow keys, GoTo, or Sync to targets.

MECHANICAL DRAWING



ADAPTER EQ6/AZ DRAWING

