

AZ40 Strain Wave Alt-Az Mount User Manual V1.0



20260210

Reading Tips

Reading Interpretation

Thank you for choosing AZ40 Strain Wave Alt-Az Mount.

The manual is based on the factory default specifications. Therefore, some specifications or appearance of your mount may be different. This manual is subject to change without prior notice.

The manual can still be used as a guide when there are differences in appearance or structure but no substantial differences in function or the use methods.

In order to ensure proper use of the mount, please read this user manual carefully before starting to use

Symbol Description

-  forbidden
-  Important points
-  Operation instruction

Reading Tips

Security precautions

-  Please install and use the mount in strict accordance with the steps and precautions reminded in this manual, operators shall be responsible for any damage to the equipment or personal injury caused by improper operation.
-  Ensure the mount's time, coordinates, and home position are properly set before use. Incorrect settings can cause GOTO errors or equipment collisions.
-  After installation, carefully check for any interference. Collisions can damage components, causing malfunctions or accuracy issues. Unplug immediately if interference or emergencies occur.
-  Please be careful when you carry, assemble or disassemble the mount and other heavy components and other equipments used on the mount . Or it may cause damage to the equipments or even personal injury.
-  Please ensure the entire setup is placed on a stable, flat surface and confirm the tripod has enough capacity and support area to prevent tipping, which could cause equipment damage or personal injury.
-  If there are children around when using, please pay attention to protecting their safety
-  The operating temperature of this mount ranges from -15°C to 40°C. Please use the mount reasonably under proper environmental conditions
-  Do not wipe the surface with corrosive liquid. Avoid water immersion and exposure to rain.
-  Unauthorized disassembly is strictly prohibited. Any self-disassembly will result in the warranty being voided.

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Product Overview

Specification

- 1.Head Weight: 6.5kg (excluding optional side brackets)
- 2.Payload: Top: ≤20kg (without counterweight)
≤30kg (with counterweight)
Side: ≤ 20kg per side
- 3. Altitude: 20 type strain wave gear
- 4. Azimuth: 20 type strain wave gear
- 5.Goto Speed: Max 6°/s
- 6.Power Port: 12v 3A DC 5.5 2.1
- 7.Mode: Alt-Az (Top & Side)
- 8.Support: SkySafari, Stellarium, ASCOM, INDI
- 9.Dovetail: VIXEN 75° & LOSMANDY 60°;
Arca (Optional)
- 10. Hand controller: Wired hand
- 11.Communication Interface: USB2.0、 Wi-Fi、 Bluetooth
- 12. Level bubble / Altitude power-off brake & limit protection

**Top Payload calculated with telescope CG 15 cm from dovetail.

Product Overview

Standard Packing

Standard Package Contents:



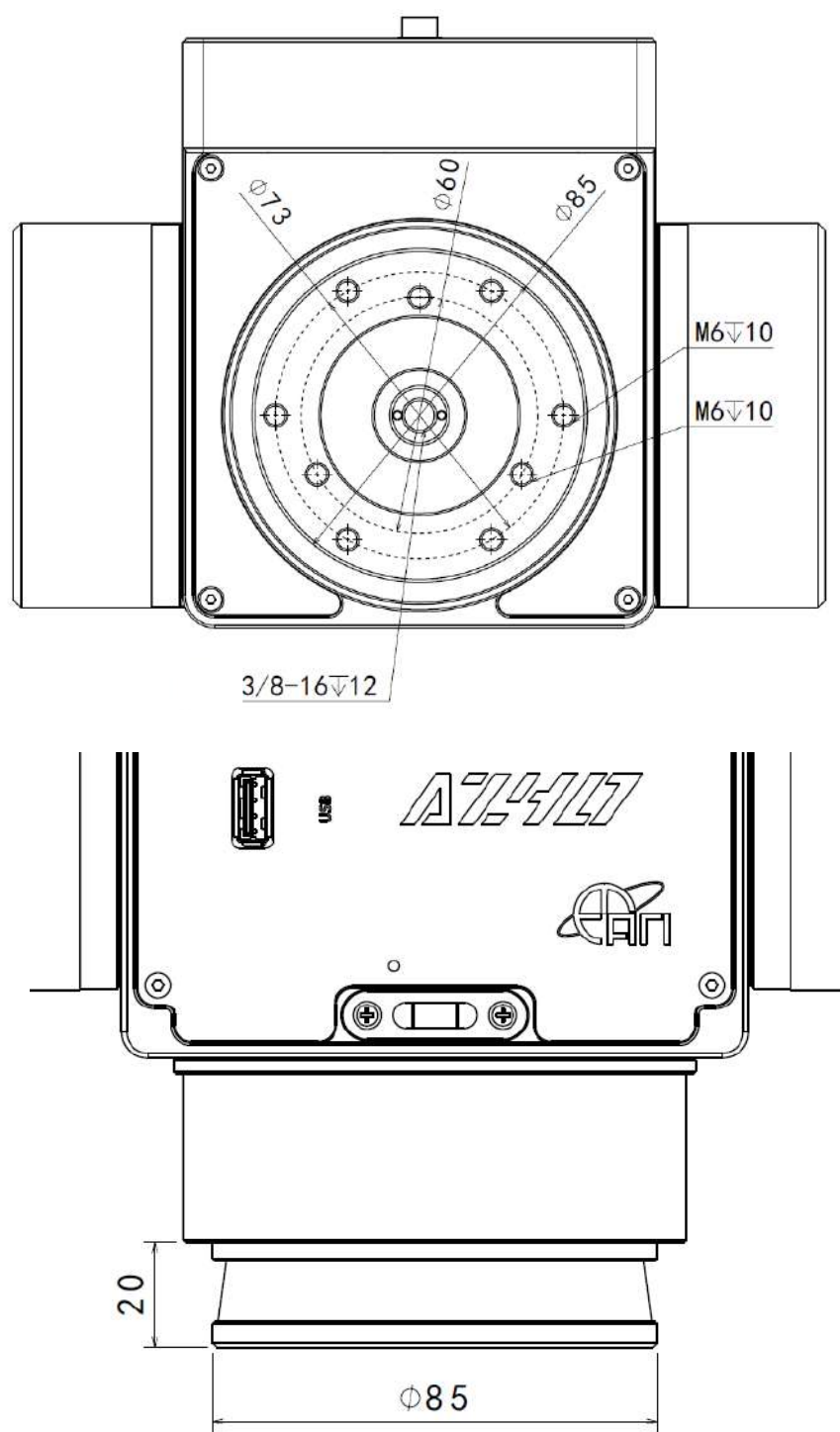
1	AZ40 Head	x1
2	Hand Controller	x1
3	Dovetail (VIXEN & LOSMANDY)	x1
4	0.5m USB2.0 Cable	x1

**Supplied in a custom foam-fitted carton. Carrying case not included.

Product Overview

Interface Size

AZ40 Base Mounting Dimensions



Product Overview

Optional Accessories: Dual Counterweight Bracket Kit

Counterweight
bracket x2



12x16mm
Sleeve x2



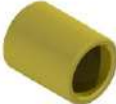
M12
Threaded
Rod x2



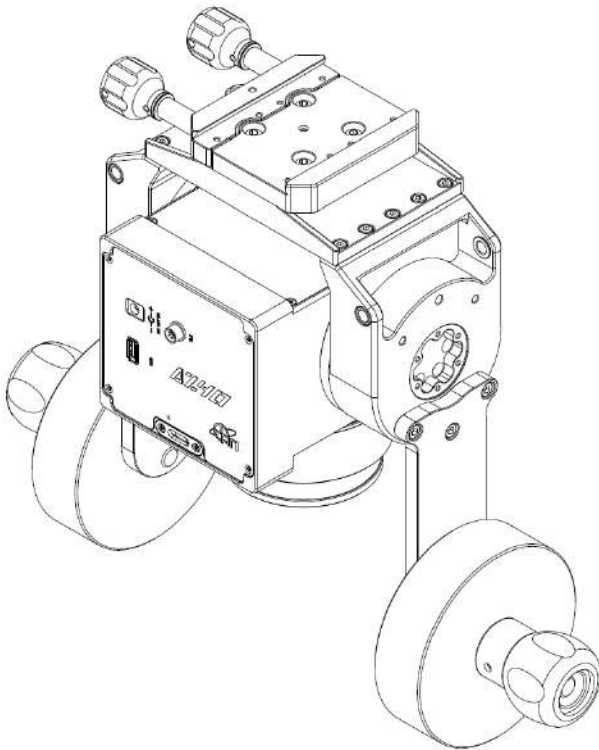
M5x16mm
x6



12x18mm
Sleeve x2



Locking
Knob x2



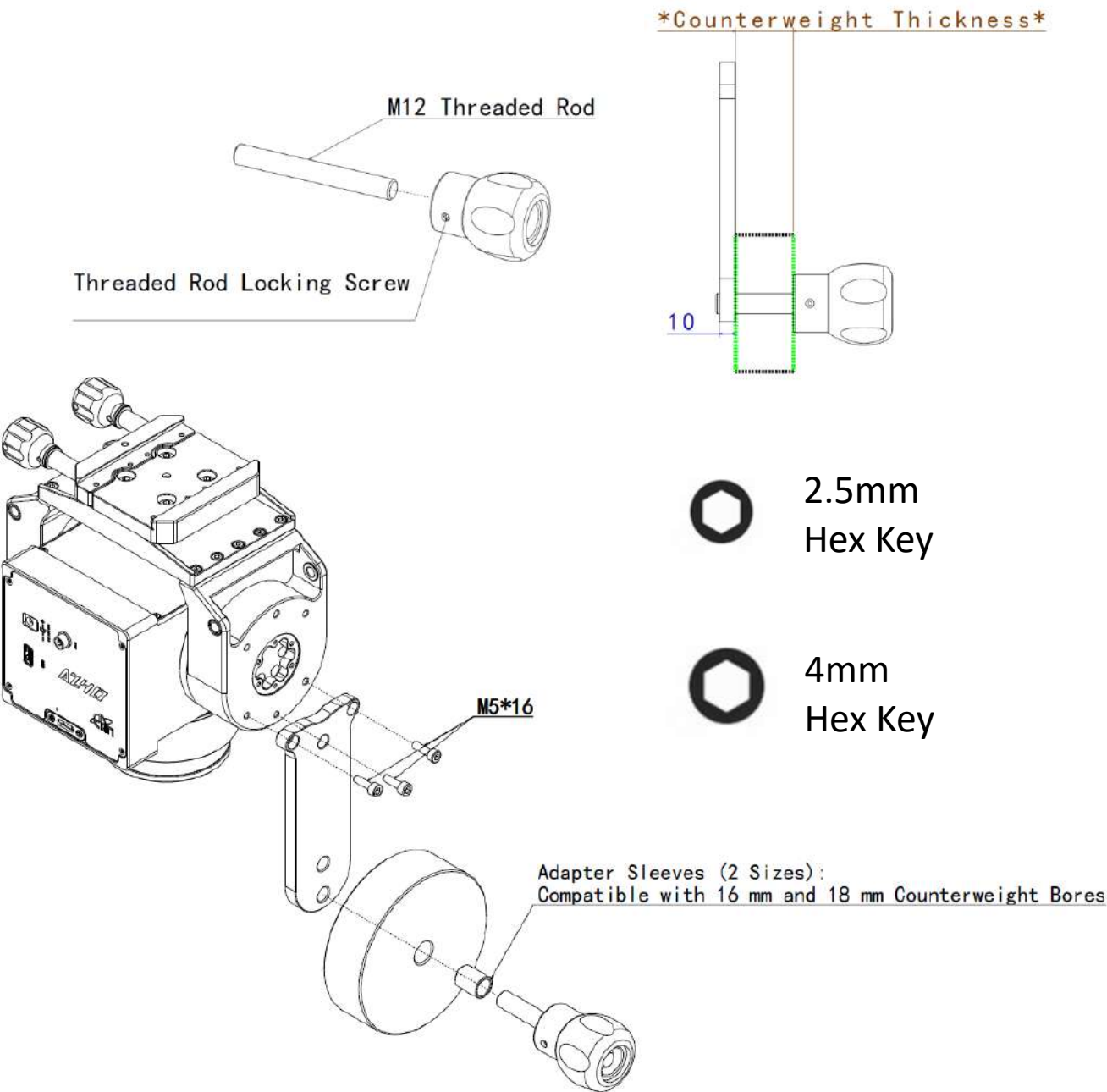
The counterweight brackets are designed for paired use.
Recommended counterweight: 3–5 kg.
Counterweights not included.

This accessory needs to be purchased separately

Product Overview

Optional Accessories: Dual Counterweight Bracket Kit

Insert the M12 threaded rod into the knob, adjust the length to match the counterweight thickness, and tighten the locking screw to secure the rod.



 This accessory needs to be purchased separately

Product Overview

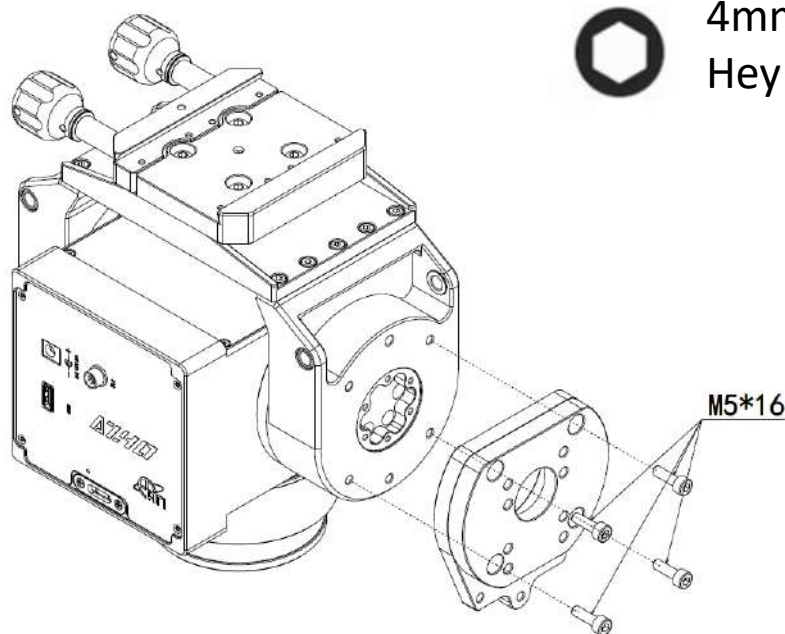
Optional Accessories: Fixed Bracket



fixed bracket x1



M5x16mm x6



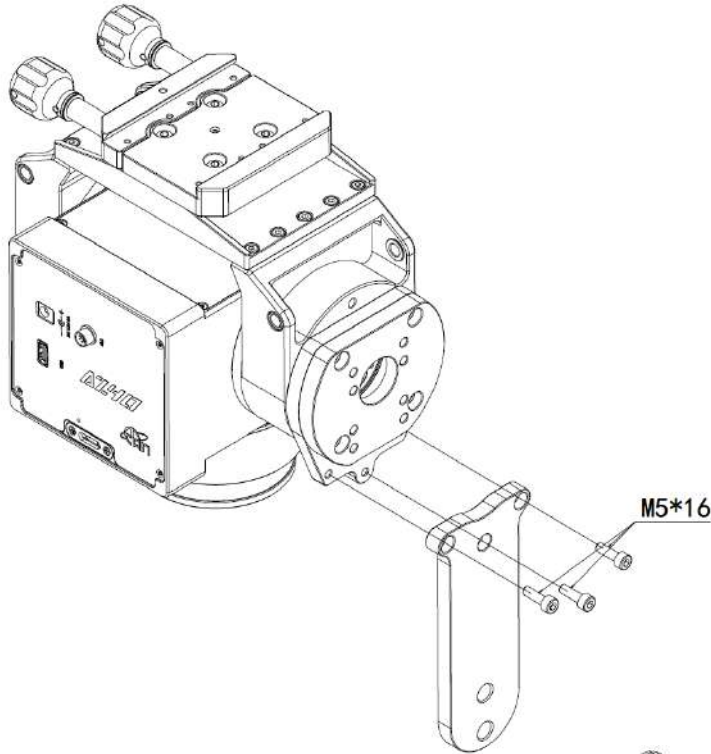
4mm
Hex Key



This accessory needs to be purchased separately

Product Overview

Optional Accessories: Fixed Bracket

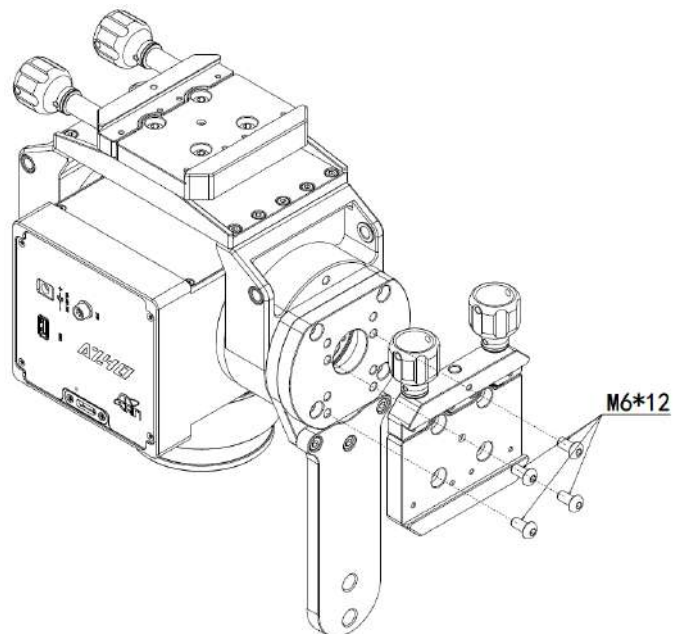


Install the counterweight bracket onto the fixed bracket



4mm
Hex Key

Install the dovetail saddle onto the fixed bracket



This accessory needs to be purchased separately

Product Overview

Optional Accessories: Adjustable Bracket



Adjustable Bracket
x1



Support Ring
x1



M5x16mm
x4



M3x12mm
x6



Positioning
Pin x4



M6 Thumb
Screw x1

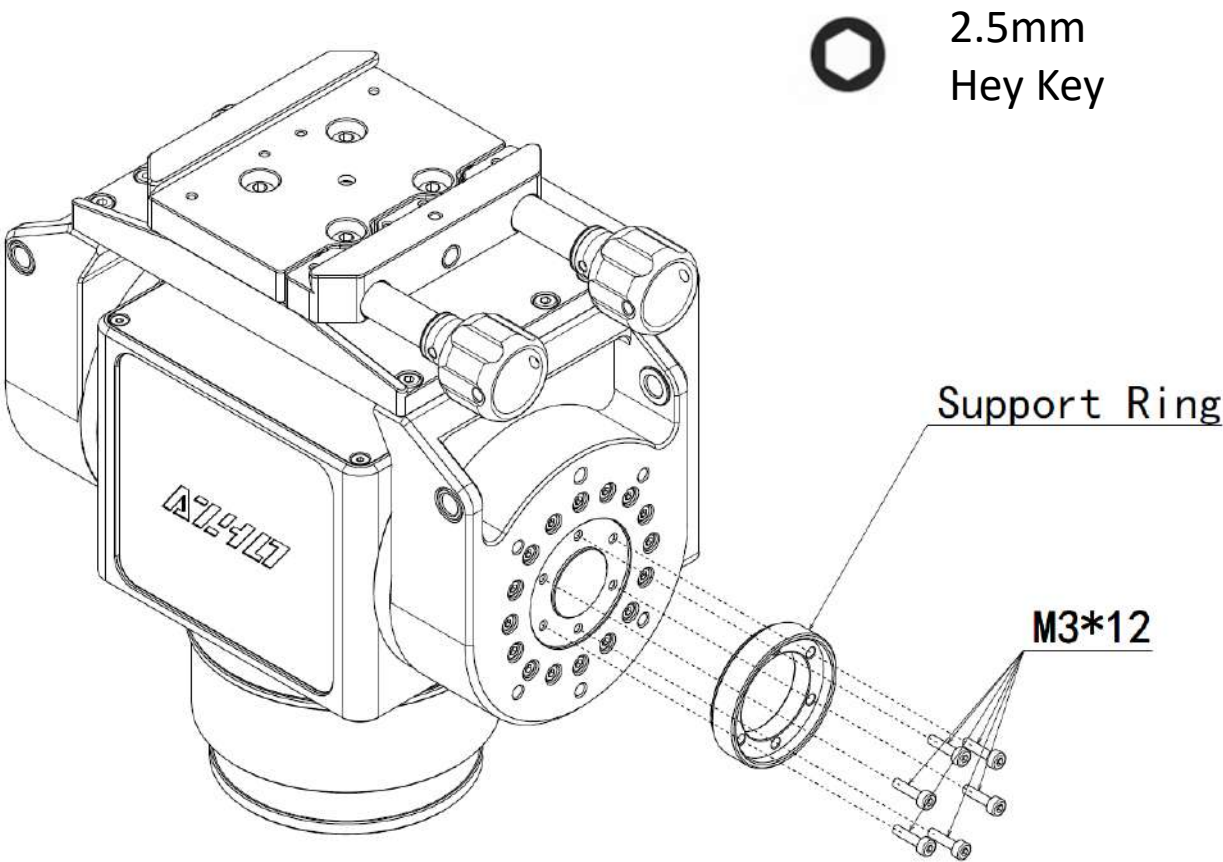


M8 Thumb
Screw x2

 This accessory needs to be purchased separately

Product Overview

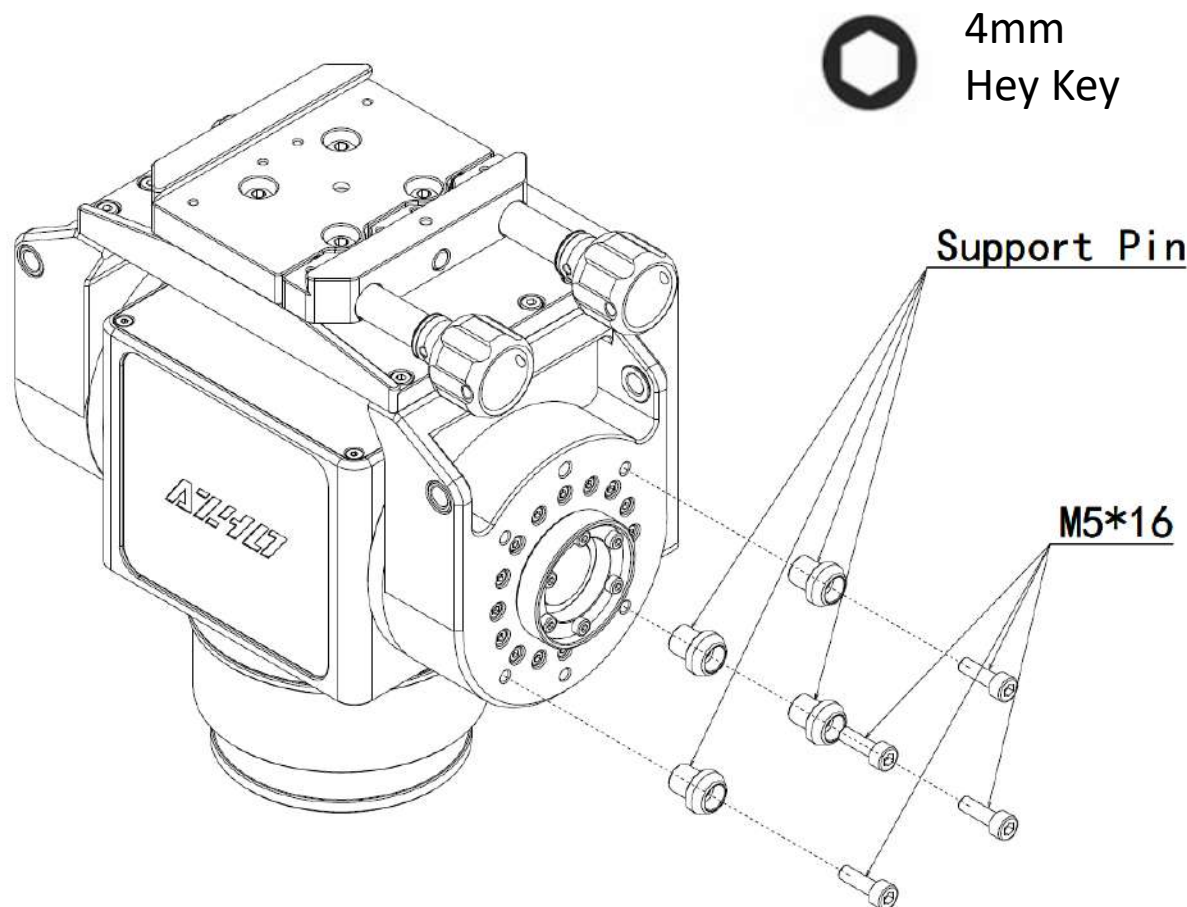
Optional Accessories: Adjustable Bracket



 This accessory needs to be purchased separately

Product Overview

Optional Accessories: Adjustable Bracket

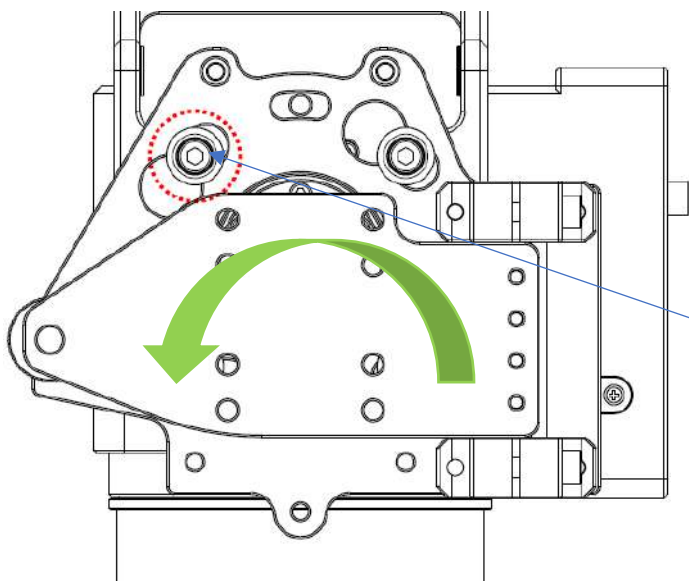
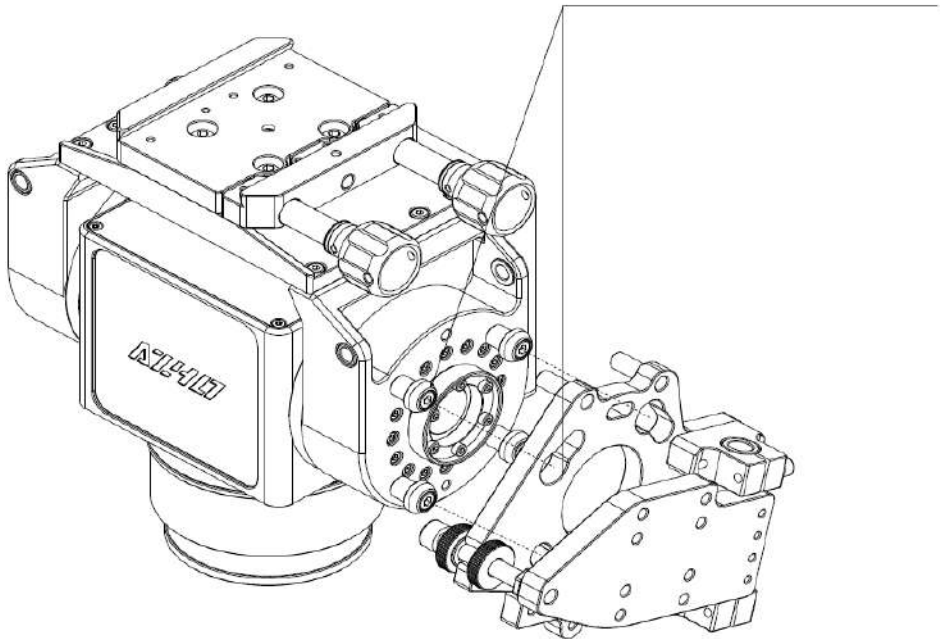


This accessory needs to be purchased separately

Product Overview

Optional Accessories: Adjustable Bracket

Align this hole with the locating pin and insert it into the adjustable bracket.



Rotate the bracket counterclockwise until the positioning pin engages with the slot.

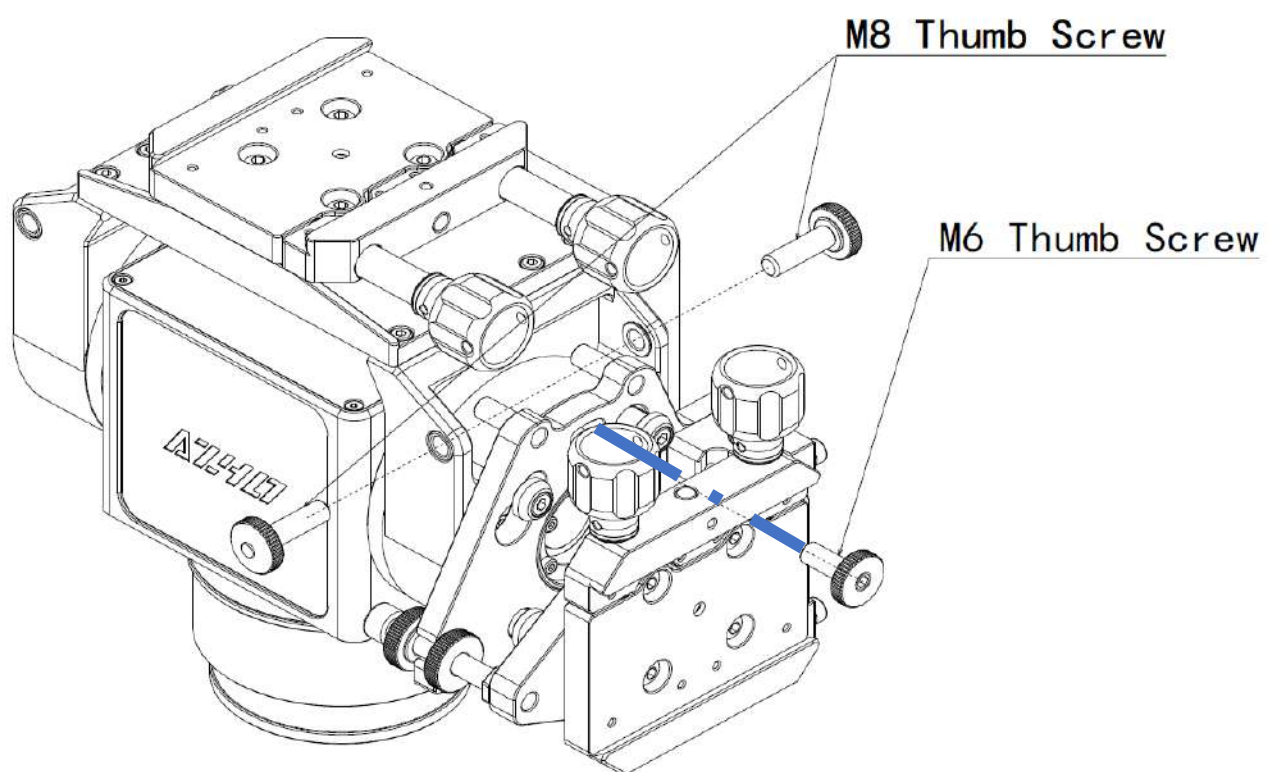


This accessory needs to be purchased separately

Product Overview

Optional Accessories: Adjustable Bracket

Install the thumb screw



This accessory needs to be purchased separately

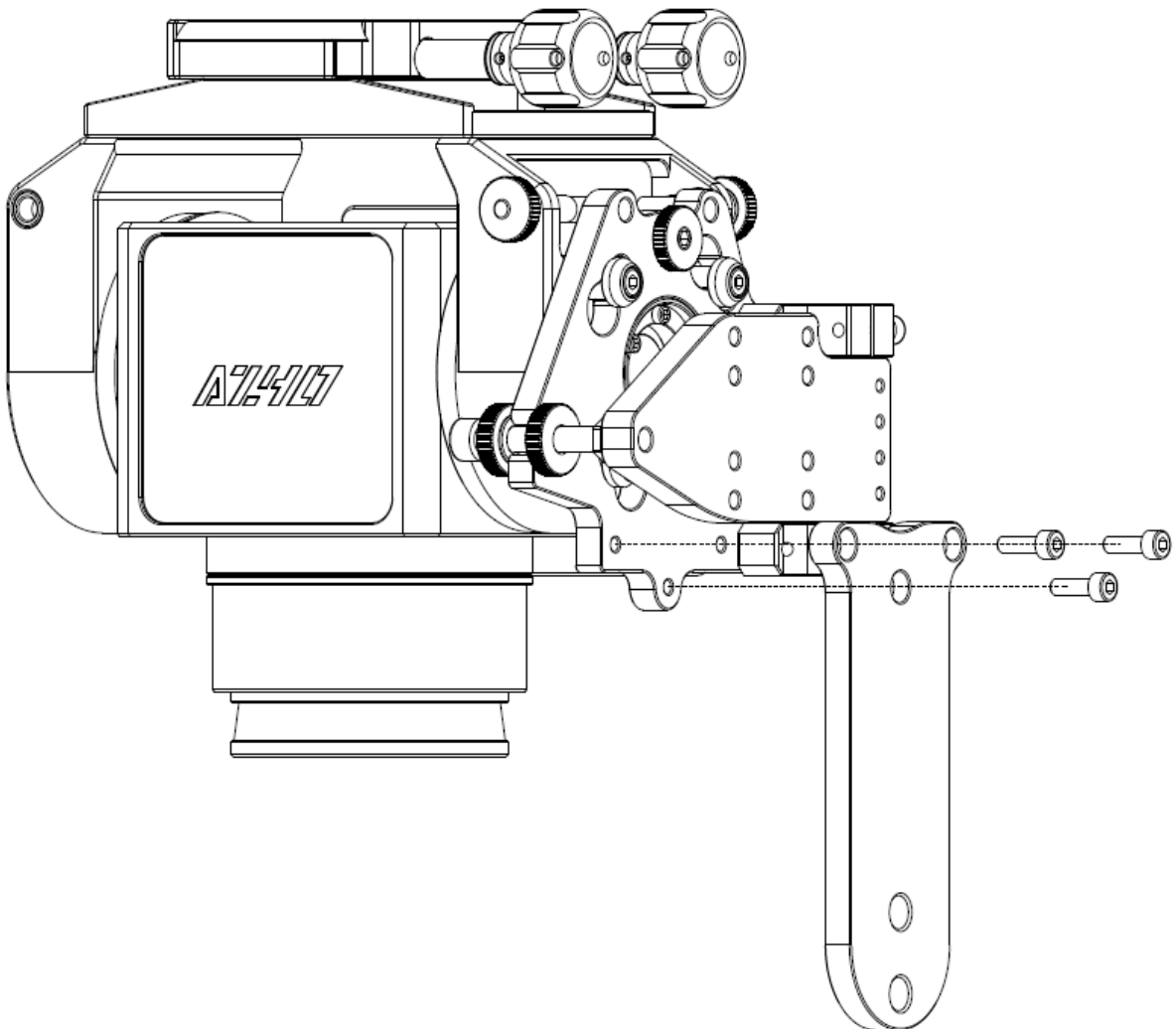
Product Overview

Optional Accessories: Adjustable Bracket

Install the
counterweight
bracket onto the
adjustable bracket



4mm
Hex Key

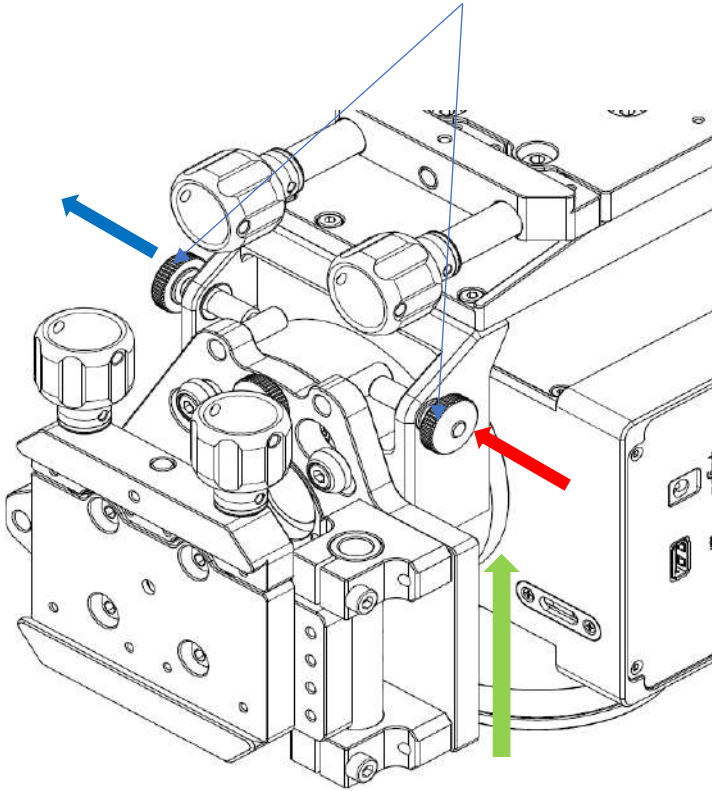


This accessory needs to be purchased separately

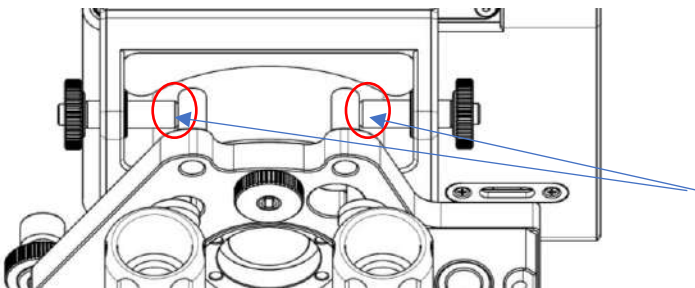
Installation & Adjustment

Coaxial Adjustment of the Adjustable Bracket

The two knobs here are used to adjust the altitude angle. When tightening the thumb screw indicated by the red arrow while loosening the one indicated by the blue arrow, the telescope will move upward in the direction of the green arrow. Reversing the operation will move the telescope downward.



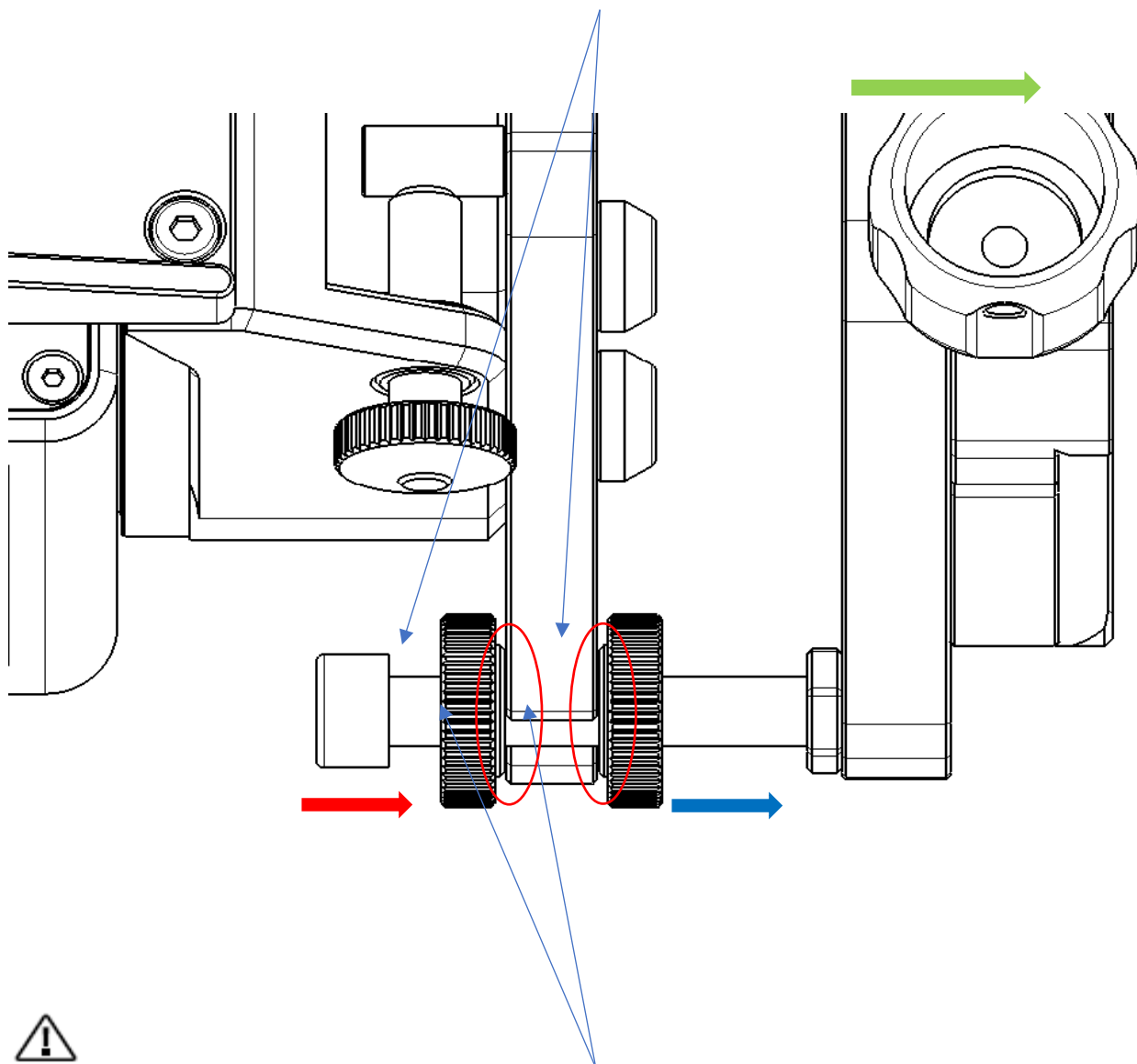
Note: Once the telescope is correctly aligned, retighten the loosened thumb screw and ensure the end faces of both thumb screws are firmly in contact with the support column.



Installation & Adjustment

Coaxial Adjustment of the Adjustable Bracket

The two knobs here are used to adjust the horizontal direction. When loosening the thumb screw indicated by the blue arrow while tightening the one indicated by the red arrow, the telescope will move to the right in the direction of the green arrow. Reversing the operation will move the telescope to the left.



Note: Once the telescope is correctly aligned, retighten the loosened thumb screw and ensure the end faces of both thumb screws are firmly in contact with the support column.

Accessory Installation

Installation of dovetail

Dovetail

AZ40 comes with standard LOSMANDY 60° and Vixen 75° dovetail compatibility. Arca specifications can be achieved by installing the Arca strips (optional)

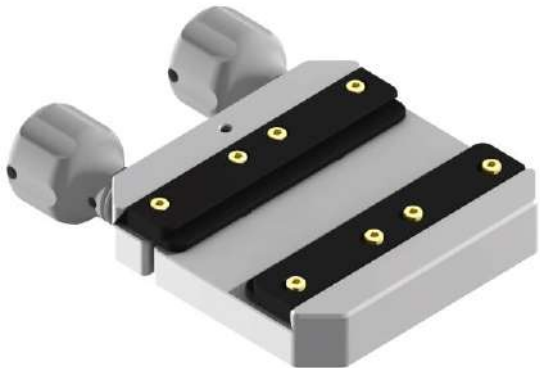
LOSMANDY



VIXEN



ARCA(optional)



Installation

Top Mounting

Mounting the Telescope



Install the telescope into the upper dovetail, ensuring the orientation matches the diagram below.



SkySafari Quick Start Guide

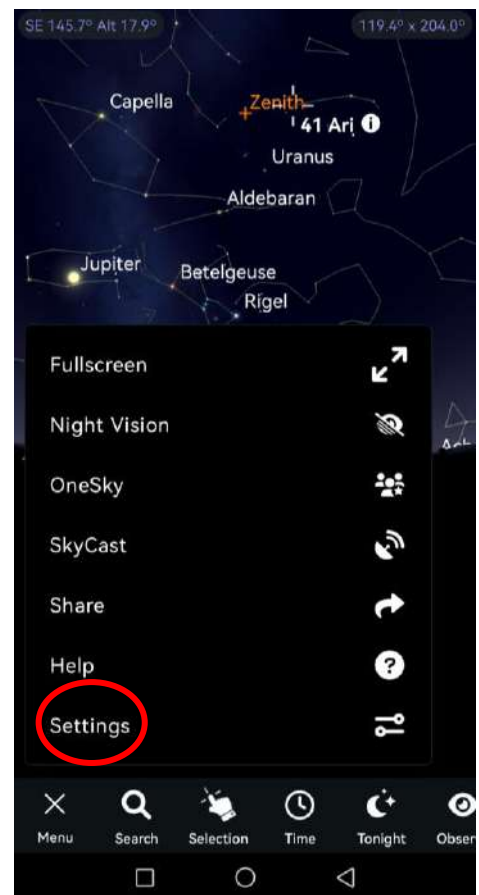
SkySafari Guide

💡 Using SkySafari to Set Up and Control the Mount

Connecting via WiFi:

Connect to the WiFi hotspot “OnStep” ; Password: password

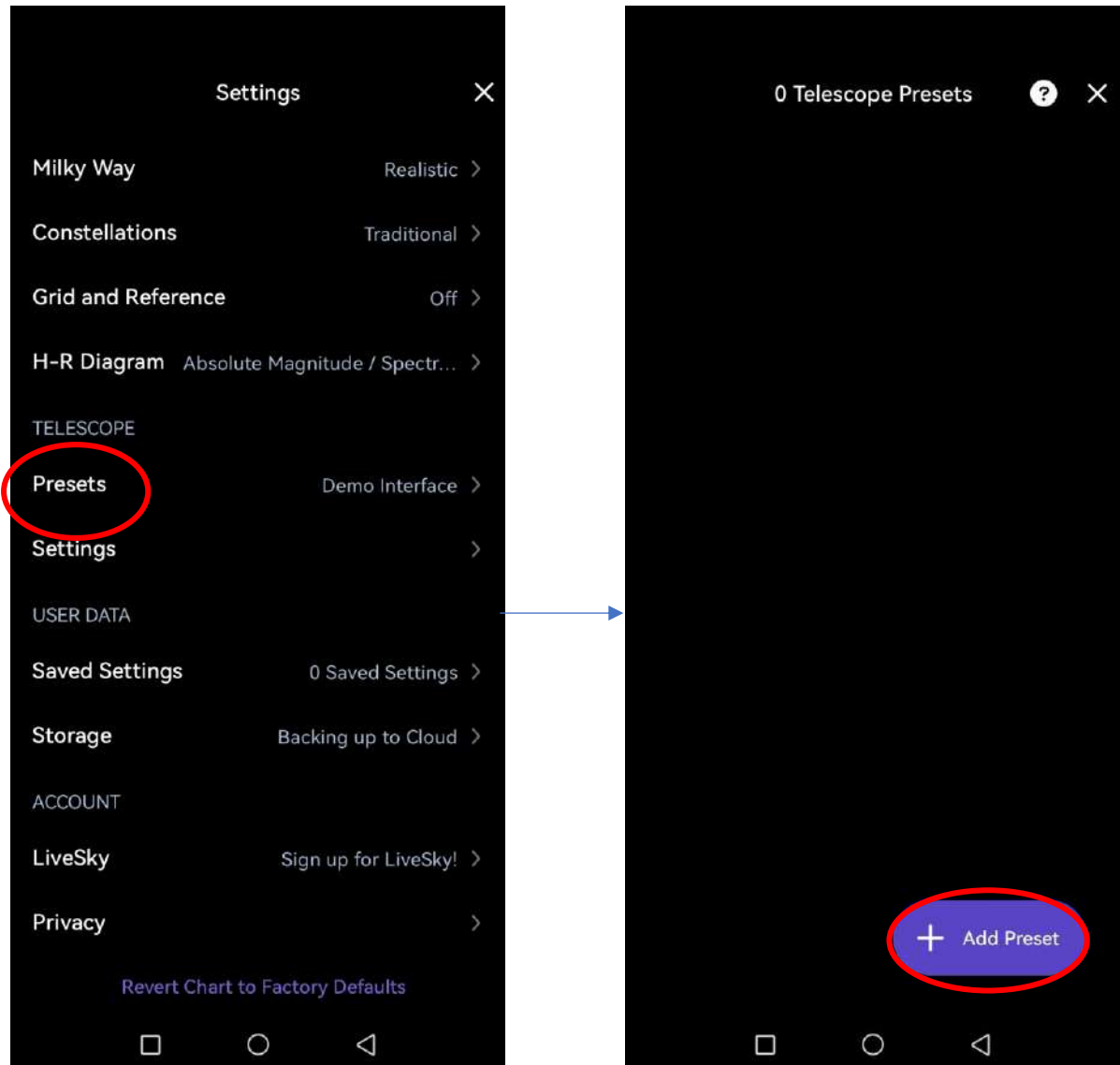
Open SkySafari (SkySafari 7 is used here as an example).



SkySafari Quick Start Guide

SkySafari Guide

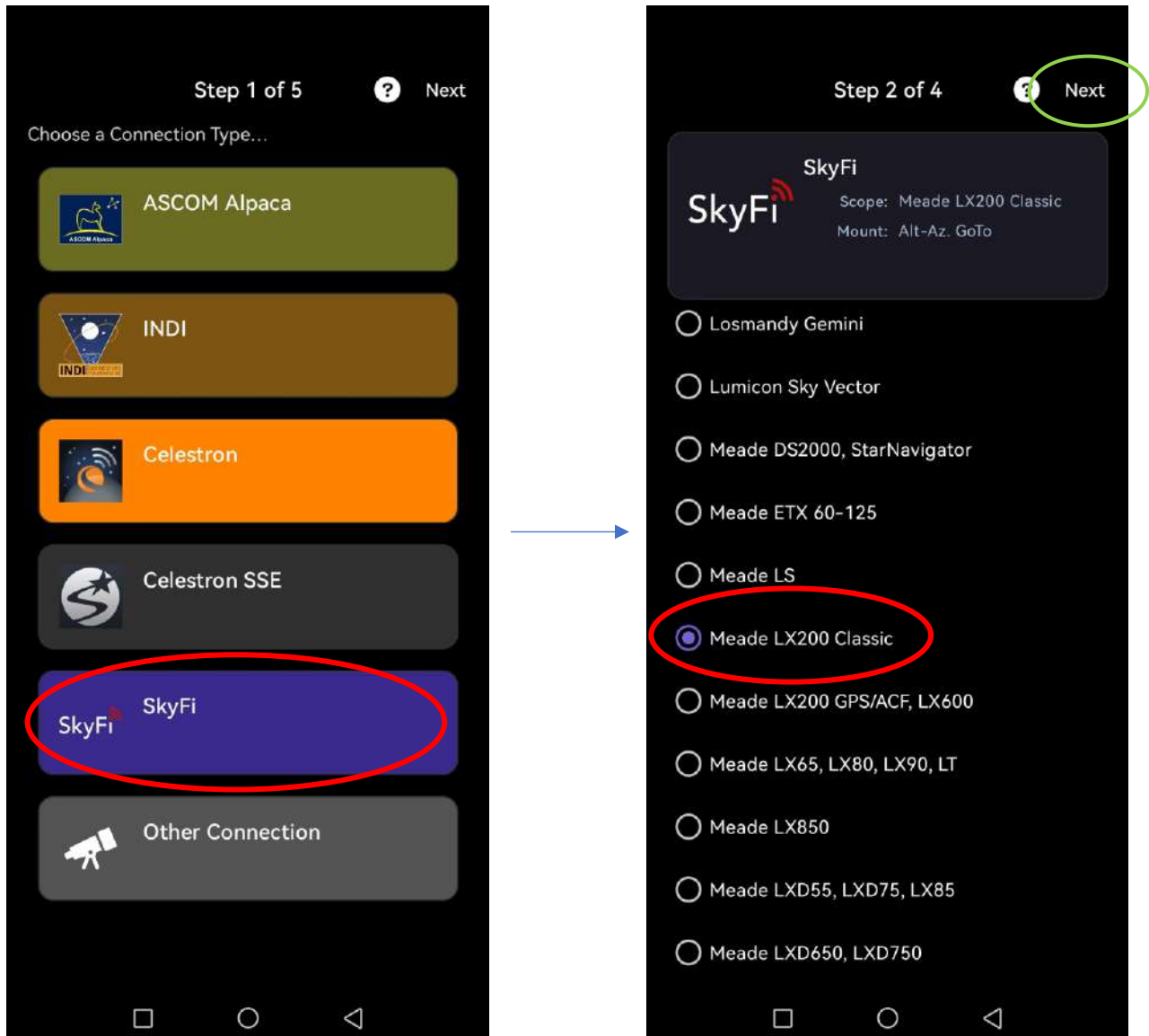
Using SkySafari to Set Up and Control the Mount



SkySafari Quick Start Guide

SkySafari Guide

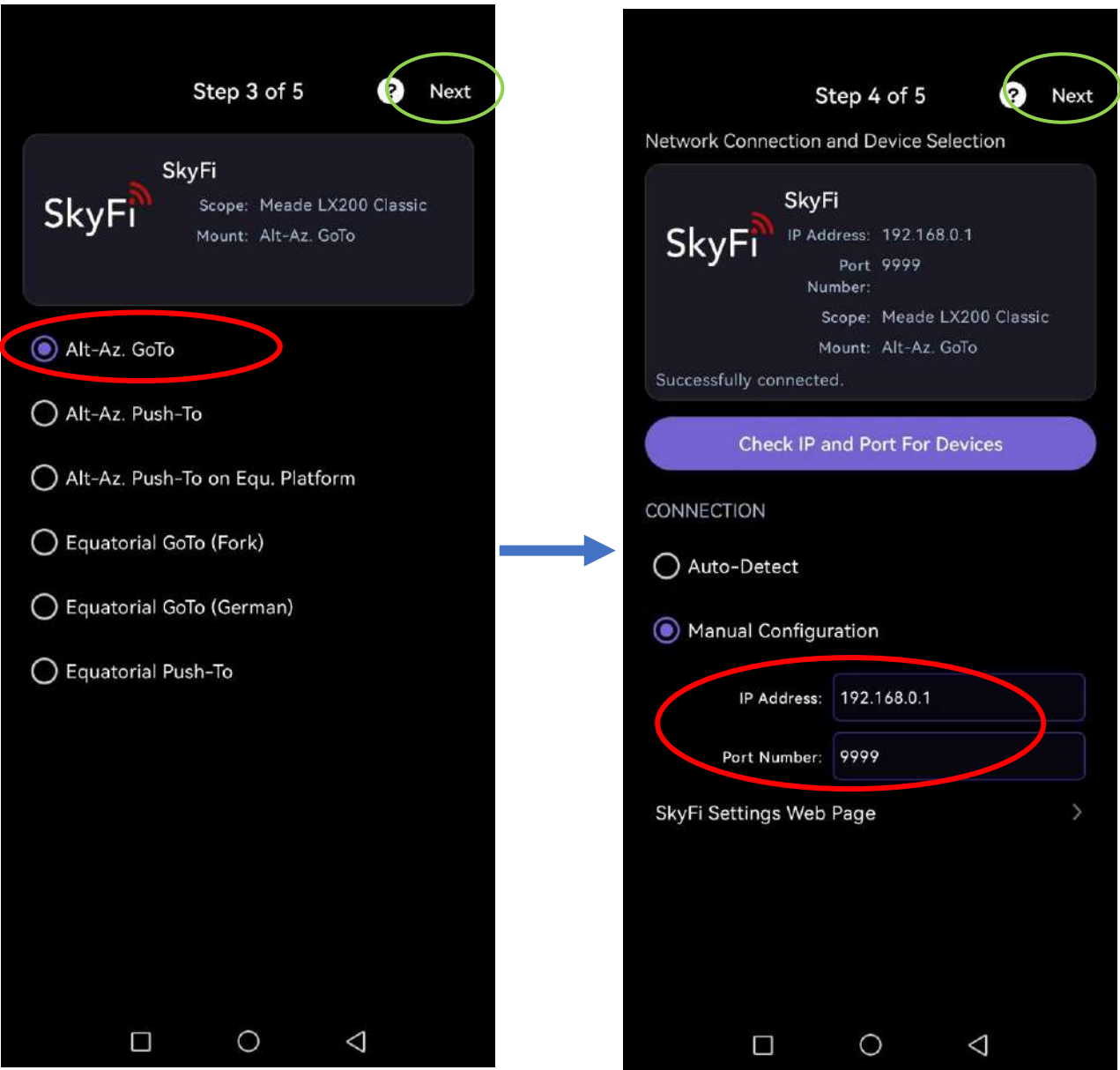
Using SkySafari to Set Up and Control the Mount



SkySafari Quick Start Guide

SkySafari Guide

Using SkySafari to Set Up and Control the Mount

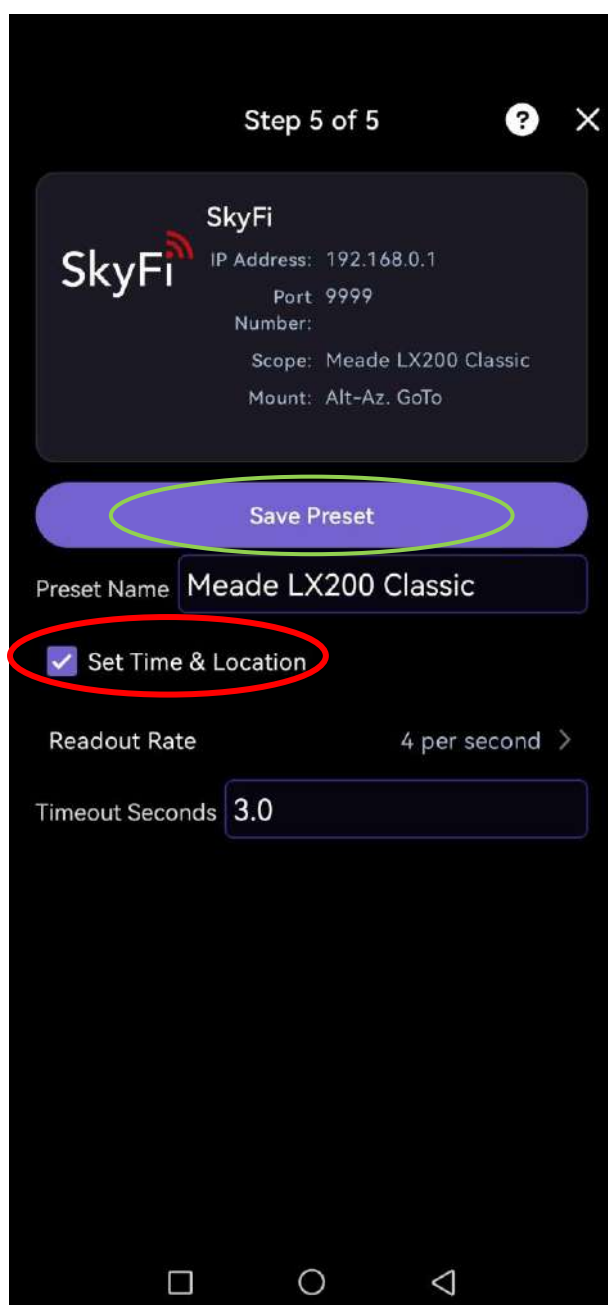


Enter the correct parameters as shown in the figure above.

SkySafari Quick Start Guide

SkySafari Guide

Using SkySafari to Set Up and Control the Mount

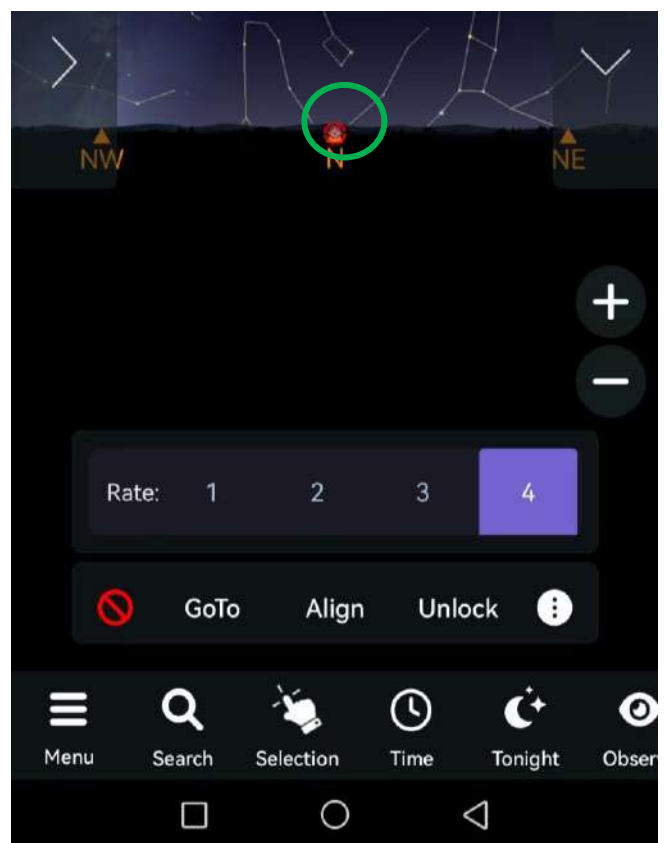


For first-time use or when changing observing locations, check the “Set Time & Location” option. After connecting to the mount, SkySafari will upload the time and location information from your mobile device to the mount.

SkySafari Quick Start Guide

SkySafari Guide

Tap “Connect” to establish a connection. SkySafari will then display the mount’s current pointing position on the star chart.

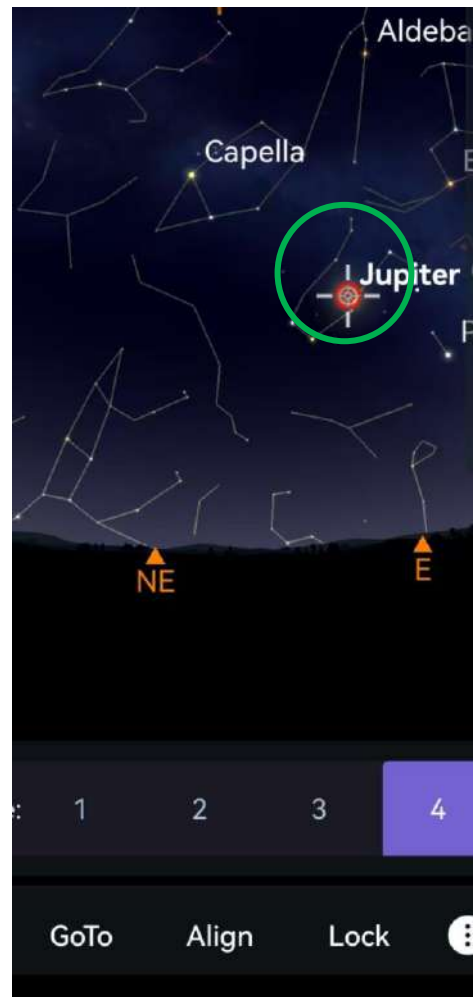


SkySafari Quick Start Guide

SkySafari Guide

Quick 1-Star Alignment :

Using the hand controller, point the telescope at a clearly visible target, such as Jupiter. At this stage, the mount's indicated position in SkySafari may show some offset from Jupiter on the star chart (as shown in the lower-left figure). Select Jupiter and tap "Align" to complete the alignment. After alignment, the mount's pointing position will coincide with Jupiter on the chart, completing the quick calibration. This method is sufficient for visual observation in most cases.



OnStep Quick Start Guide

OnStep Guide

Android users can set and control the mount through OnStep APP or webpage



IOS system cannot use APP, webpage is workable



Connect to the web via WiFi:

Search for WIFI hotspot OnStep connection through PC or mobile phone, password: password

Enter "192.168.0.1:9999" or "192.168.0.1" into the browser

OnStep WiFi Server 2.1i (OnStep 4.24a)

Status Control Library PEC Settings Config WiFi

Site:
7/30/22 04:44:59 UT (web browser)
1/01/00 00:04:27 UT (06:44:19 LST)
Long. = +000°00, Lat. = +00°00

Coordinates:
Current: $\alpha=18:44:24$, $\delta=+89^{\circ}26:29$
Target : $\alpha=00:00:00$, $\delta=+00^{\circ}00:00$
Pier Side=**None** (meridian flips **On**)

Polar Alignment:
◀ 0" ▲ 0" (Mount relative to NCP)

Operations:
Parking: **Not Parked (At Home)**
Tracking: **Off**
Tracking Rate: 0.000Hz
Maximum slew speed: 1.5°/s

State:
Last General (Background) Error: **None**
Workload: **5%**
Wireless signal strength: **31dBm (100%)**

OnStep Quick Start Guide

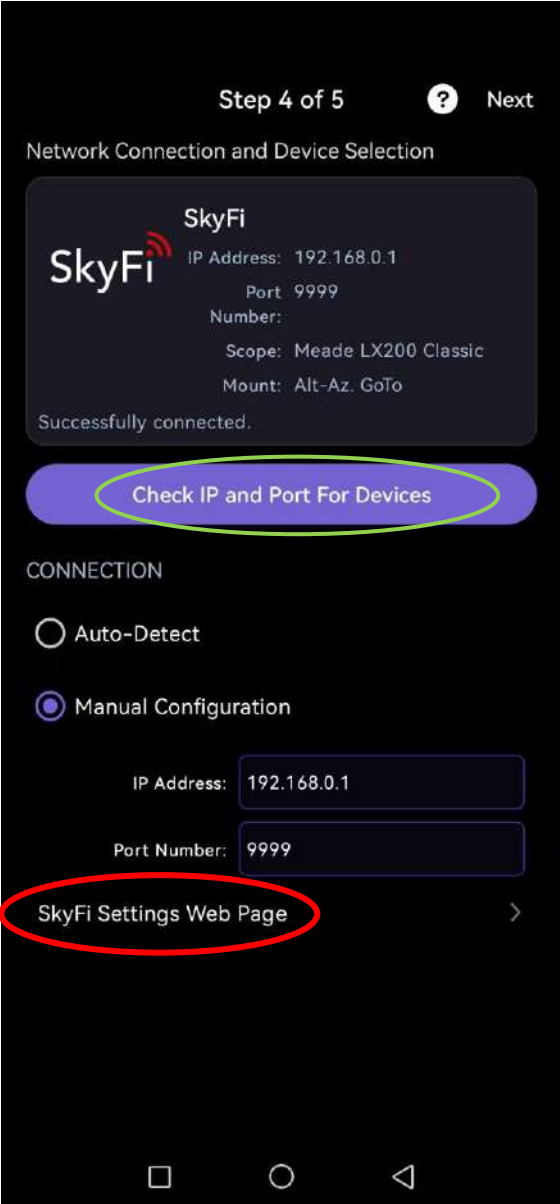
OnStep Guide

Enter “192.168.0.1” in a web browser to access this interface.
The same interface can also be accessed through SkySafari.



In the SkySafari screen shown on the right, tap the red-circled area to access the control interface shown above.

Tap the green-circled area to check the connection status.



OnStep Quick Start Guide

OnStep Guide



Changing the OnStep WiFi Hotspot Name (optional)

If multiple OnStep devices are used nearby, changing the WiFi hotspot name helps avoid connection conflicts.

Recommended: change hotspot name only. Keep password.

OnStep WiFi Server 2.1v (OnStep 4.24s)

Status Control Library PEC Settings Config **WiFi**

Performance and compatibility:
Command channel serial read time-out: 60 ms
Web channel serial read time-out: 60 ms
Upload

Station mode (connect to an Access-Point):
SSID: [redacted] Password: [redacted] (8 char min.)
MAC: [redacted]
IP Address: 192 . 168 . 0 . 1
Gateway: 192 . 168 . 0 . 1
Subnet: 255 . 255 . 255 . 0
Enable DHCP: ☒ (Note: above addresses are ignored if DHCP is enabled)
Enable Station Mode: ☐
Upload

Access-Point mode:
SSID: **ONSTEP** Password: [redacted] 8 char min. Channel: 7
MAC: [redacted]
IP Address: 192 . 168 . 0 . 1
Gateway: 192 . 168 . 0 . 1
Subnet: 255 . 255 . 255 . 0
Enable Access-Point Mode: ☒ (Note: auto-enabled if Station Mode fails to connect)
Upload

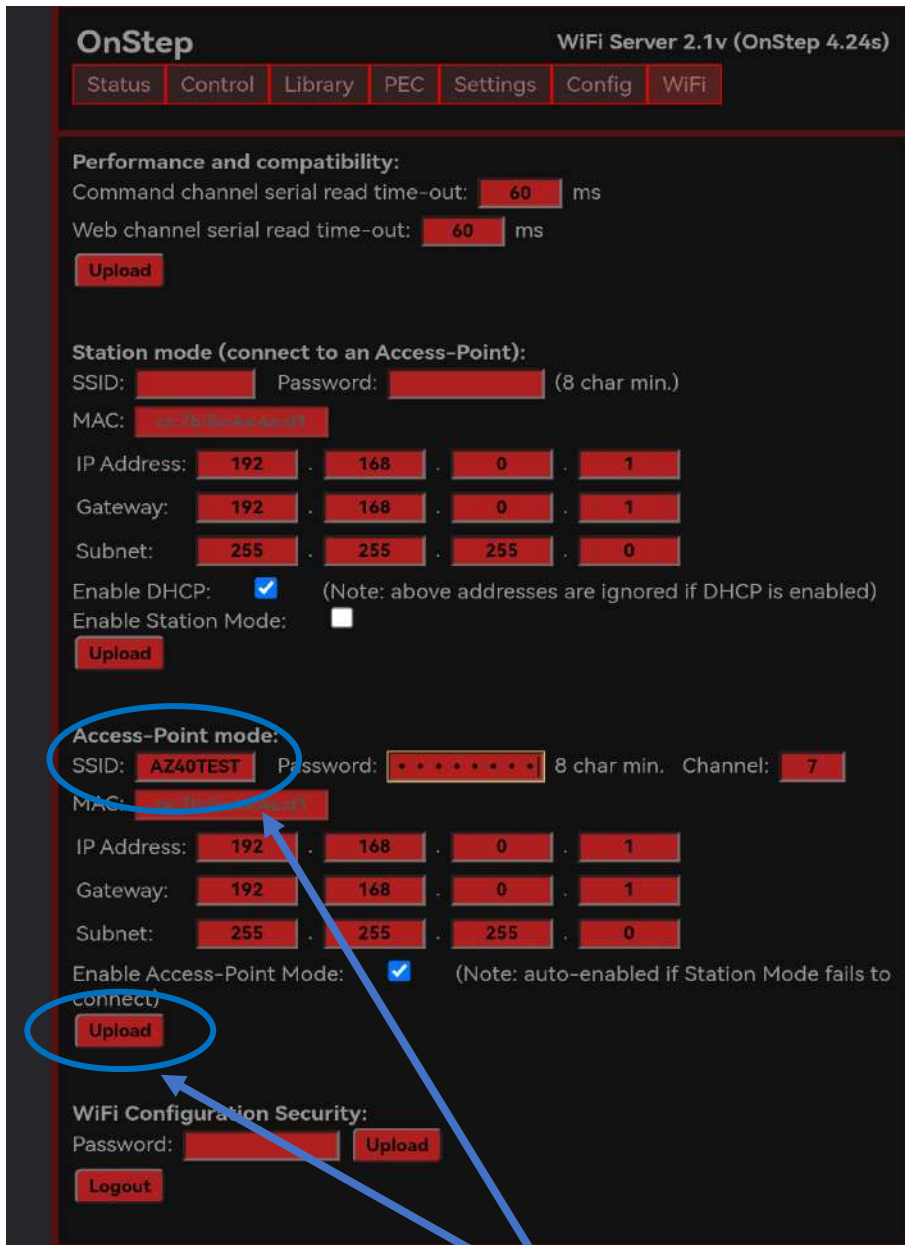
WiFi Configuration Security:
Password: [redacted] **Upload**
Logout

Open the WiFi settings page
Password: password

OnStep Quick Start Guide

OnStep Guide

💡 Changing the OnStep WiFi Hotspot Name (optional)



OnStep WiFi Server 2.1v (OnStep 4.24s)

Status Control Library PEC Settings Config **WiFi**

Performance and compatibility:
Command channel serial read time-out: 60 ms
Web channel serial read time-out: 60 ms
Upload

Station mode (connect to an Access-Point):
SSID: Password: (8 char min.)
MAC:
IP Address: 192 168 0 1
Gateway: 192 168 0 1
Subnet: 255 255 255 0
Enable DHCP: ☒ (Note: above addresses are ignored if DHCP is enabled)
Enable Station Mode: ☐
Upload

Access-Point mode:
SSID: **AZ40TEST** Password: 8 char min. Channel: 7
MAC:
IP Address: 192 168 0 1
Gateway: 192 168 0 1
Subnet: 255 255 255 0
Enable Access-Point Mode: ☒ (Note: auto-enabled if Station Mode fails to connect)
Upload

WiFi Configuration Security:
Password: **Upload**
Logout

After changing the WiFi hotspot name, click Upload
(Avoid changing the password, as a forgotten password is difficult to recover once lost.)

OnStep Quick Start Guide

OnStep Guide

Changing the OnStep WiFi Hotspot Name (optional)



Restart the mount, then
reconnect to the WiFi hotspot

OnStep Quick Start Guide

OnStep Guide

💡 For first-time use or when observing from a new location, set the latitude/longitude coordinates and local time.

OnStep

WiFi Server 2.1i (OnStep 4.24a)

Status

Control

Library

PEC

Settings

Config

WiFi

Basic:

Site Latitude, Longitude, UTC Offset

-121

°

13

'

Longitude, in deg. and min. +/- 180, W is +

31

°

03

'

Latitude, in deg. and min. +/- 90, N is +

-08

h

00

m

UTC Offset, in hours and min. -14 to +12

Opposite of a time-zone value, this is for Standard Time (not Daylight Time.)

Upload

Horizon and Overhead Limits

Axis1: RA/Azm

Axis2: Dec/Alt

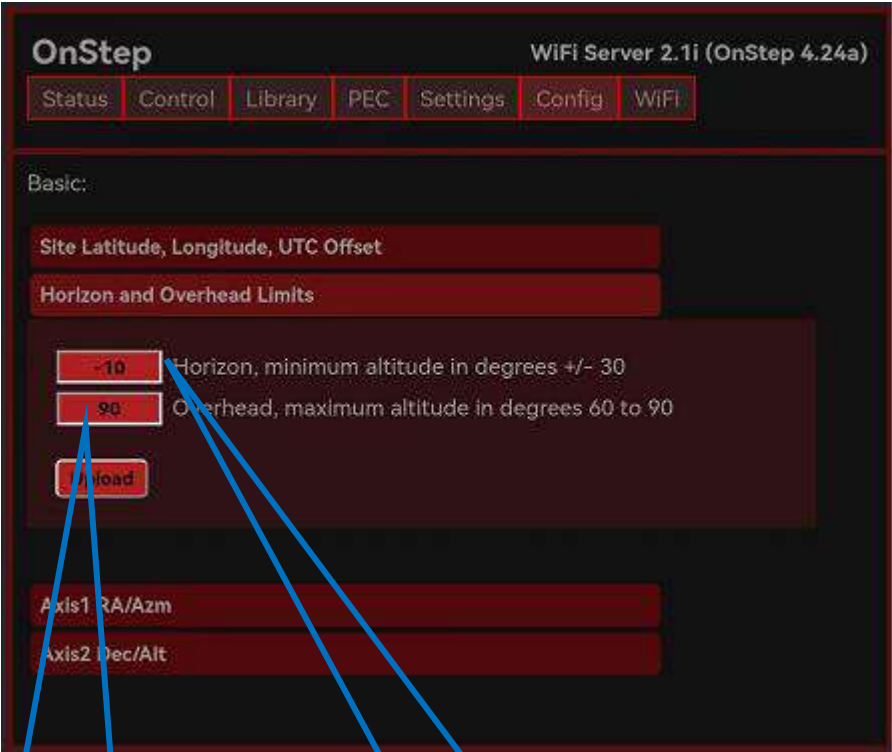
Set UTC

After synchronization from SkySafari, the current coordinates will be displayed here.

OnStep Quick Start Guide

OnStep Guide

Limit Position Settings



Upper Altitude Limit

Lower Altitude Limit



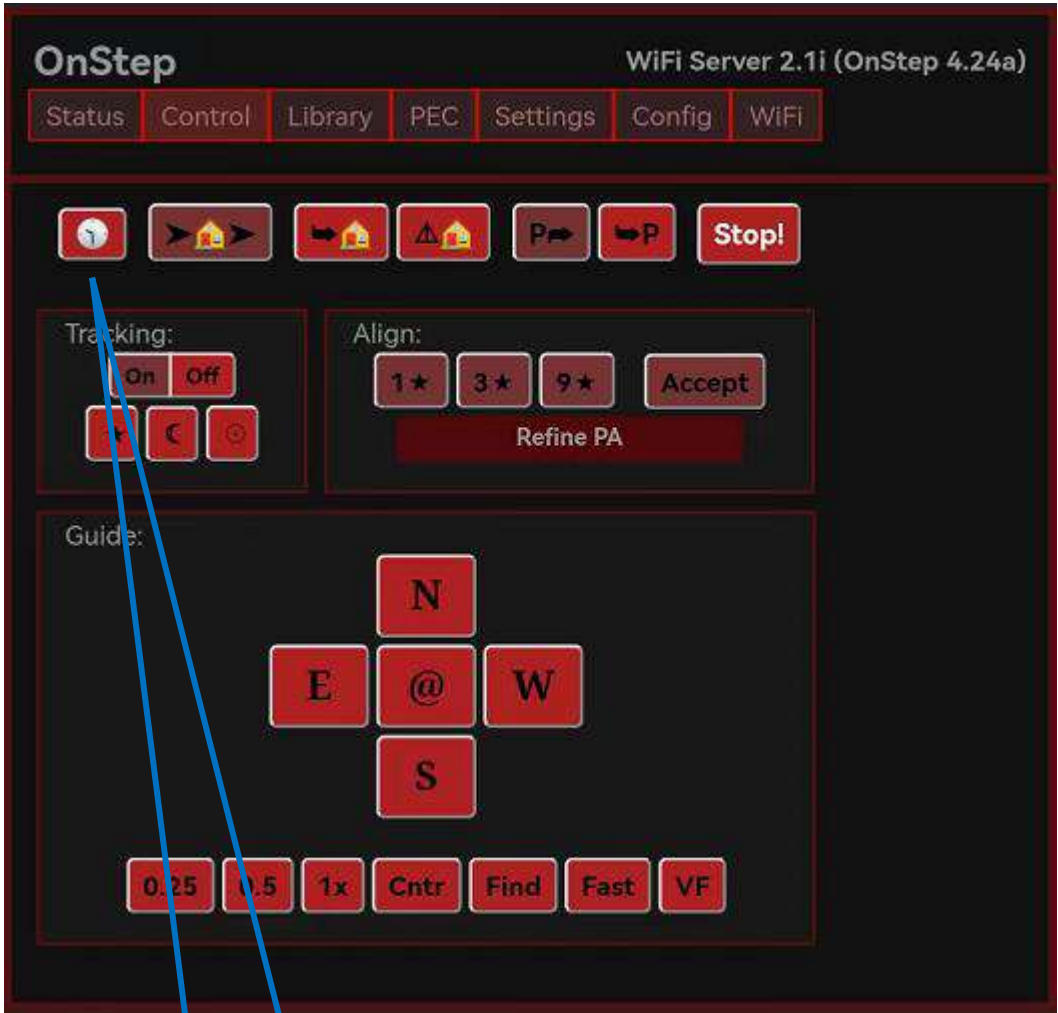
Note: If the mount is manually rotated beyond the set limits, it will automatically stop. If a GoTo target exceeds the configured limits, the mount will not execute the GoTo command.

The limit positions are related to the configured time, geographic coordinates, and home position.

OnStep Quick Start Guide

OnStep Guide

Set Time



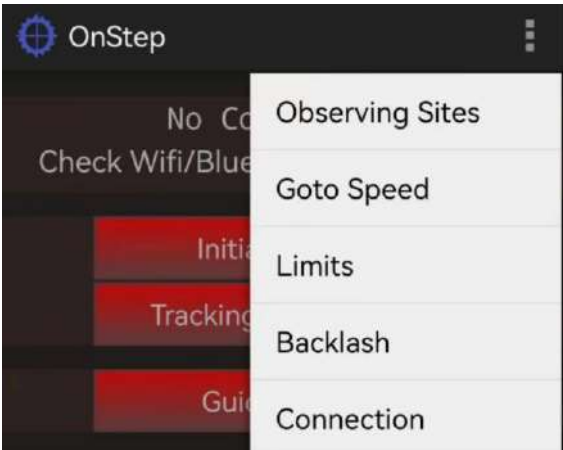
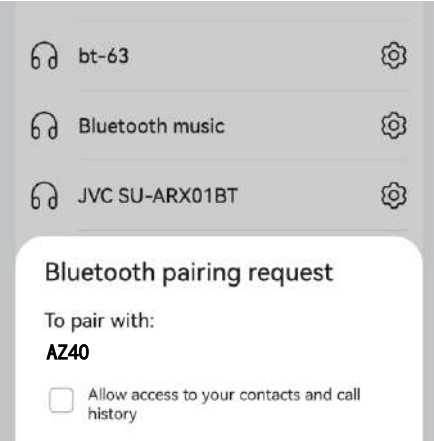
Set Time

OnStep Quick Start Guide

OnStep Guide

 **Connect to the Android app via Bluetooth.**
(app only supports Android system, Apple system needs to be set through the webpage)

- ① Matching Bluetooth
- ② Select Connection in the APP



- ③ Choose Bluetooth
- ④ Complete connection



 **The first connection may be very slow. Please allow some time for the process to complete.**

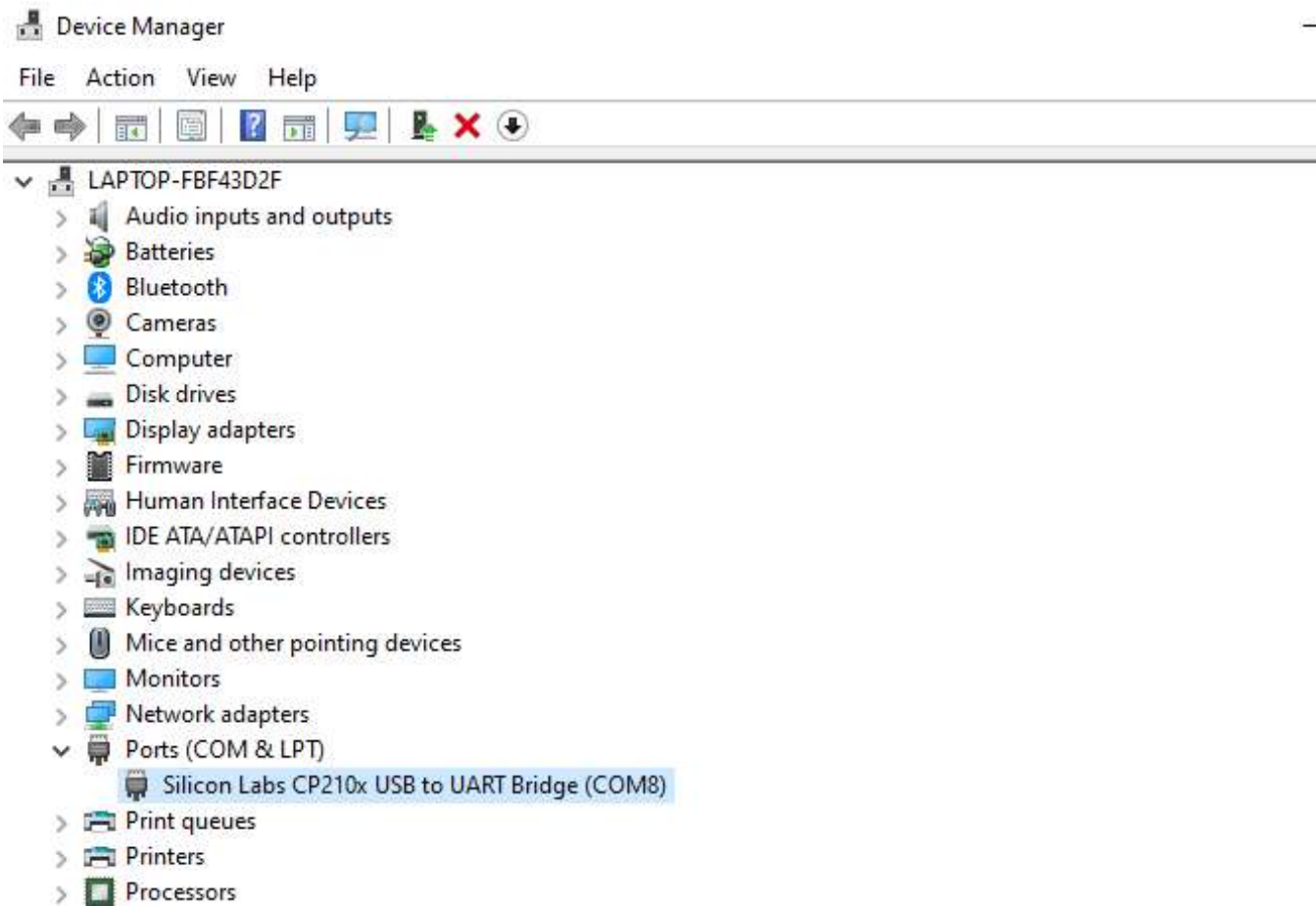
OnStep Quick Start Guide

OnStep Guide

OnStep and PC connection

Step ① Installing the mount serial port driver cp2102

💡 **Confirm that the mount serial port connection is normal in Windows Device Manager**



Step ② Install ASCOM platform

<https://www.ascom-standards.org/>



Step ③ Install OnStep ASCOM driver

<http://stellarjourney.com/main/onstep-ascom-driver-software/>

OnStep Quick Start Guide

OnStep Guide

OnStep and PC connection

Select the correct serial port (check the correct port number in Device Manager) and connect the mount

OnStep Telescope Setup



3.7 

Port: COM5 IP Address: 192.168.0.1:9999

Retry Timeout (3000ms): 

Currently connected to: OnStep 4.25a ☒ Enable Serial Port DTR Control ☐ Use Error Correction Protocol

Site Information

Latitude (N is +): +31°02:59

Longitude (W is +): -121°13:00

Elevation (m): 0

UTC Offset (opposite of a): -8

Date/Time

Date: 12/17/21

Standard Time: 09:37:30

Time (UTC): 01:37:30

Time (LST): 15:26:01

Set Date/Time on Connect: ☐

Optics

Aperture (m): 0

Aperture Area (m²): 0

Focal Length (m): 0

NOTE: OnStep never uses Daylight Savings Time internally, so all time related values are based on Standard Time.

Backlash

RA/Azm: 0 (arc-sec)

Dec/Alt: 0 (arc-sec)

Limits

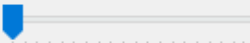
Horizon: -10 (deg)

Overhead: 90 (deg)

Meridian E: 8 (deg)

Meridian W: 8 (deg)

Max. Goto Rate

 31.25 us

(6 deg/sec)

☐ Trace on

OnStep Quick Start Guide

OnStep Guide

AZ40 Hand Controller

Button Function



For safety, the hand controller defaults to a low speed (20X) upon startup. Press 'F' to increase the speed.

OnStep Quick Start Guide

OnStep Guide

AZ40 Hand Controller

Button Function



1. Short Press = switching display information
2. Long Press = entering Main Menu
3. Double Click = Feature Menu

OnStep Quick Start Guide

OnStep Guide

AZ40 Hand Controller

Button Function

1. North when tracking
2. Scroll Up while in Menu's

1. South when tracking
2. Scroll Up while in Menu's



N and S Button Note

Near the celestial pole, the N and S buttons may behave unexpectedly. This is normal. The system always tries to move North when you press the N button. If it can't, it will move South until you release the button.

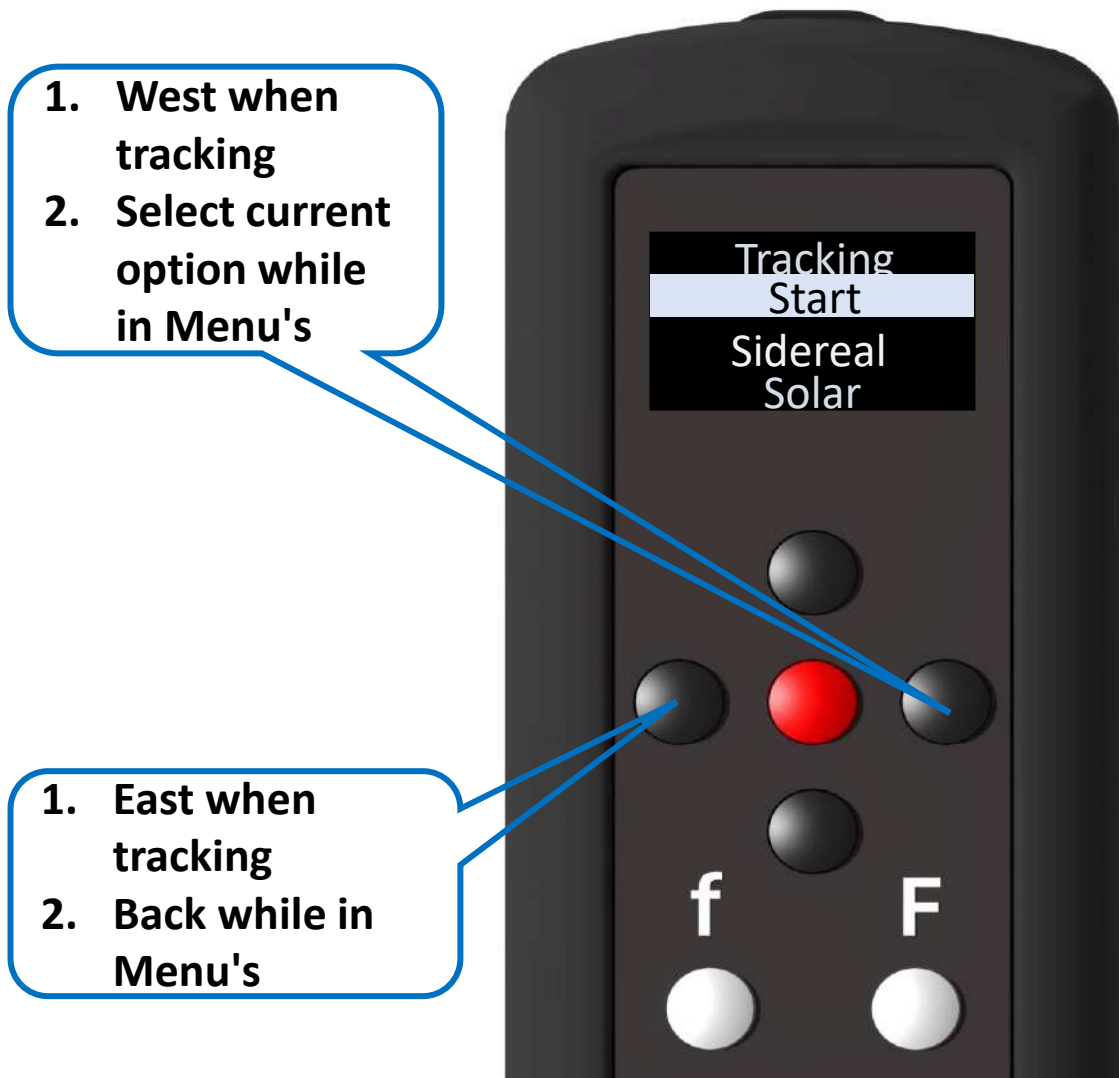
Tip: This behavior is expected near the pole and will make more sense with practice. In the Southern Hemisphere, this will be reversed.

OnStep Quick Start Guide

OnStep Guide

AZ40 Hand Controller

Button Function



Refer to the OnStep website for detailed menus and usage instructions. <https://onstep.groups.io/g/main/wiki/28605>

OnStep Quick Start Guide

OnStep Guide

Common status icons for the Hand Controller



Alignment Star #1



Alignment Star #2 (#3 thru #8 not shown)



Alignment Star #9 (last possible)



Telescope is at home position. Tracking is OFF



Unknown error. Tracking has stopped



Telescope position exceeds user defined Meridian limit. Tracking has stopped



Telescope position exceeds user defined RA limits "Under Pole". Tracking has stopped



Telescope position exceeds user defined Azimuth limits. Tracking has stopped



Telescope position exceeds user defined Declination limit. Tracking has stopped



Telescope limit sensed. Tracking has stopped



Telescope position exceeds user defined Horizon or Overhead limit. Tracking has stopped



Motor fault. Tracking has stopped



East side of pier. Declination is between 90 and -90



West side of pier. Declination is between 180 and 90 or -90 and -180



PEC, paused

OnStep Quick Start Guide

OnStep Guide

Common status icons for the Hand Controller

-  PEC, recording
-  PEC, playing
-  Telescope is slewing
-  Lunar Tracking rate is selected
-  Solar Tracking rate is selected
-  King Tracking rate is selected
-  Sidereal Tracking rate is selected
-  Sidereal Tracking, refraction compensated (RA-axis only)
-  Sidereal Tracking, refraction compensated (Dual-axis)
-  Sidereal Tracking, refraction and pointing model compensated (Full)
-  Sidereal Tracking, refraction and pointing model compensated (Full, Dual-axis)
-  Tracking is OFF
-  Telescope is guiding
-  Park failure
-  Telescope is slewing to park position
-  Telescope is parked

Warranty Statement

Warranty

Thank you for purchasing AZ40 Strain Wave Alt-Az Mount. To ensure you have the best experience with our product, we provide a two-year warranty service for AZ40. Below are the specific warranty terms and conditions:

Warranty Period

This product is covered by a two-year warranty starting from the date of purchase.

Warranty Coverage

During the warranty period, if the product exhibits any material or workmanship defects under normal use, we will provide free repair or replacement services. This includes, but is not limited to:

- Motor failure
- Control board failure
- Mechanical structure damage

Warranty Exclusions

The warranty does not cover the following situations:

- 1. Human-induced damage:** Including but not limited to damage caused by dropping, impact, submersion, excessive use, etc.
- 2. Unauthorized repair or modification:** If the product has been repaired or modified by an unauthorized service provider, the warranty will be void.
- 3. Accidents or natural disasters:** Including but not limited to fire, earthquake, flood, lightning, etc.

Warranty Statement

Warranty

4. Normal wear and tear: Such as normal wear and tear, scratches on the exterior, etc.

Warranty Service Procedure

1.Contact Customer Service: If your product requires repair, please first contact the after-sales service of the purchase channel or directly contact our customer service center. Provide a detailed description of the fault.

2.Fault Diagnosis: We will conduct a preliminary diagnosis of the reported fault via email. If further inspection is needed, we will guide you to send the product to the designated repair center.

3.Repair or Replacement: Once the product is confirmed to be within the warranty conditions, we will provide free repair services. If the product cannot be repaired, we will replace it with the same model or an equivalent product of the same value.

4.Return Shipping: The repaired or replaced product will be shipped back to you via courier.

Important Notes

- Before sending the product, please ensure it is properly packaged to avoid further damage during transit.
- When shipping, include a description of the fault.

If you have any questions or need further assistance, please feel free to contact our customer service team. We are dedicated to serving you.

Customer Service Email: support@easeastro.com

Thank you for your understanding and support.