Vixen

Instruction Manual for SXP2-WL Equatorial Mount

INTRODUCTION

Thank you for your pirchase of a Vixen SXP2-WL equatorial mount..

The SXP2-WL Mount is a motor-driven equatorial mount designed for conscious of taking astrophotography. You readily enjoy automatic navigation of the mount for GO-TO slewing and tracking with the provided Wireless Unit via a smartphone or a mobile tablet.

This manual is provided commonly with the SXP2-WL mount series and describes the functions and uses. You may occasionally find descriptions not relevant to your purchased model.

If you purchased the mount as a package together with an optical tube, read the instruction manual supplied with the optical tube in conjunction with this manual to make you use the product correctly and safely.

The contents described in this manual were the ones when the manual was written. Future updates for firmware of the Wireless Unit and app may include new functions not seen here. In this case, you can check a newly added description released on Vixen's website. Besides, it is advisable to check if the firmware version of your mount is the latest on our website.

The power supply for the mount is sold separately.

Be sure to read the instructions below before use.

Safety Precautions

The instruction manual will assist you in the safe and effective use of the product. Before using the mount, carefully read the safety precautions described below.

Legend	
⚠**Warning:**	If misused, it can cause severe injury or death.
⚠**Caution:**	Misuse can cause injury or damage to you or other property.

Legend	
⃠ **Important:**	You must complete all of the steps in this manual.
ⓘ **Important:**	You must entirely execute the instructions in this manual.

⚠Warning

- ⃠ Never look directly at the sun with your naked eyes or through your telescope and finderscope.
- ⃠ Do not leave the optical tube uncapped in the daytime. Sunlight passing through the telescope or finderscope may cause a fire.
- ⃠ Do not use the product in a water-splash environment. This could damage the product and could result in electrical shock.
- ⃠ Do not attempt to disassemble or alter any part of the equipment not expressly described in this manual. This could damage the product and result in electric shock or may lead to injury.
- ⓘ Keep small caps, plastic bags, or plastic packing materials away from the children. These may cause choking or suffocation.
- ⓘ Stop operating the product immediately and unplug the power cord if it emits smoke or a strange smell. It could result in fire or electrical shock.
- ⓘ Do not allow liquids or foreign objects to enter the product. Unplug the power cord or switch the power cord off. It could result in fire or electrical shock.
- ⓘ Do not damage, alter, or place a heavy item on the power cord. It could result in fire or electrical shock.
- ⓘ The product includes heavy-weight pieces such as the counterweight and the mount body. Be sure to handle these units carefully. Be careful not to drop the unit when lifting. It may cause damage or lead to injury.
- ⓘ Be sure to ventilate air while cleaning with a volatile cleaner or spray can cleaner to avoid poisoning.
- ⓘ Do not use the volatile cleaner or spray can cleaner neighborhood of the fire. It could lead to catching fire.

About Warranty

Please keep the invoice, receipt, etc., which you received when purchasing the products, in a safe place. Those will be effective as proof of purchase for warranty.

⚠Caution

- ⃠ Do not operate the product with wet hands. Plugging in and out the power cord and electrical connectors and treating the electronic parts with wet hands may damage the equipment or result in electrical shock.
- ⃠ Do not use the product while walking or moving on the way somewhere, as injuries may arise from stumbling, falling, or collisions with objects.
- ⃠ Do not bundle the power cord and electrical wires during the operation. It may result in a short circuit and damage to the surroundings.
- ⃠ Handle the power cord and electricity connectors properly. Do not pull the power cord by force when disconnecting. It may damage the cord and connectors, resulting in fire or electrical shock.

Handling and Storage

- Do not leave the product inside a car in bright sunshine or hot places. Keep any strong heat radiation sources away from the product.
- When cleaning, do not apply organic solvents such as paint thinners, or similar cleaners to the product. It may cause deterioration.
- Do not use the product in a wet environment. It may cause the product to malfunction or cause fire or electrical shock.
- Remove the batteries from the battery compartment if you do not use the product for a long time.
- For storage, keep the product in a dry place, where it is not exposed to direct rays of the sun. If the product gets dew condensation, dry it well in a ventilated place before storage.
- Avoid touching any lens surface directly with your hands. Blow off dust on lenses using a commercially available blower brush.
- Prevent the product from being exposed to rain, water droplets, heavy dew, mud, or sand. If the product becomes dirty with general smears, wipe it using a gentile cloth that was dampened and squeezed firmly.

Table of Contents

BEFORE USE

Checking the Package Contents

A package of the SXP2-WL contains the items below. Check if all the items are included. For other equipment used in conjunction with this product, you should read manuals for those items.

Contents

1) SXP2-WL Equatorial Mount	1
2) Counterweights – 3.7Kg	1
3) Wireless Unit	1
4) Allen Wrenches, one each of 5mm and 1.27mm	1
5) Cigarette-lighter Plug Cord	1
6) Instruction Manual (This booklet)	1

Note: Your Mount package may differ when you purchase it as a complete telescope package. A power supply unit is sold separately.

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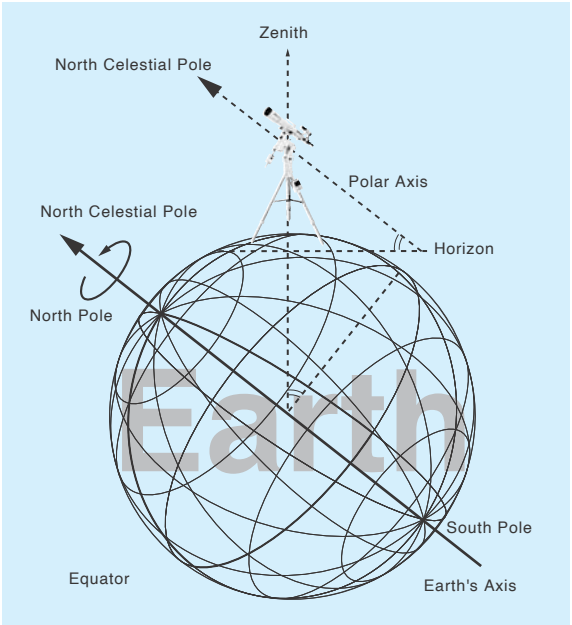
Basics of the Equatorial Mounts

What is an Equatorial Mount?

In the northern hemisphere, stars appear to turn around the polar star (the north celestial pole), making approximately one rotation per day. It is called diurnal motion and occurs because the earth turns on its axis once a day. The equatorial mount is a platform that is designed to rotate parallel to the earth's rotational axis.



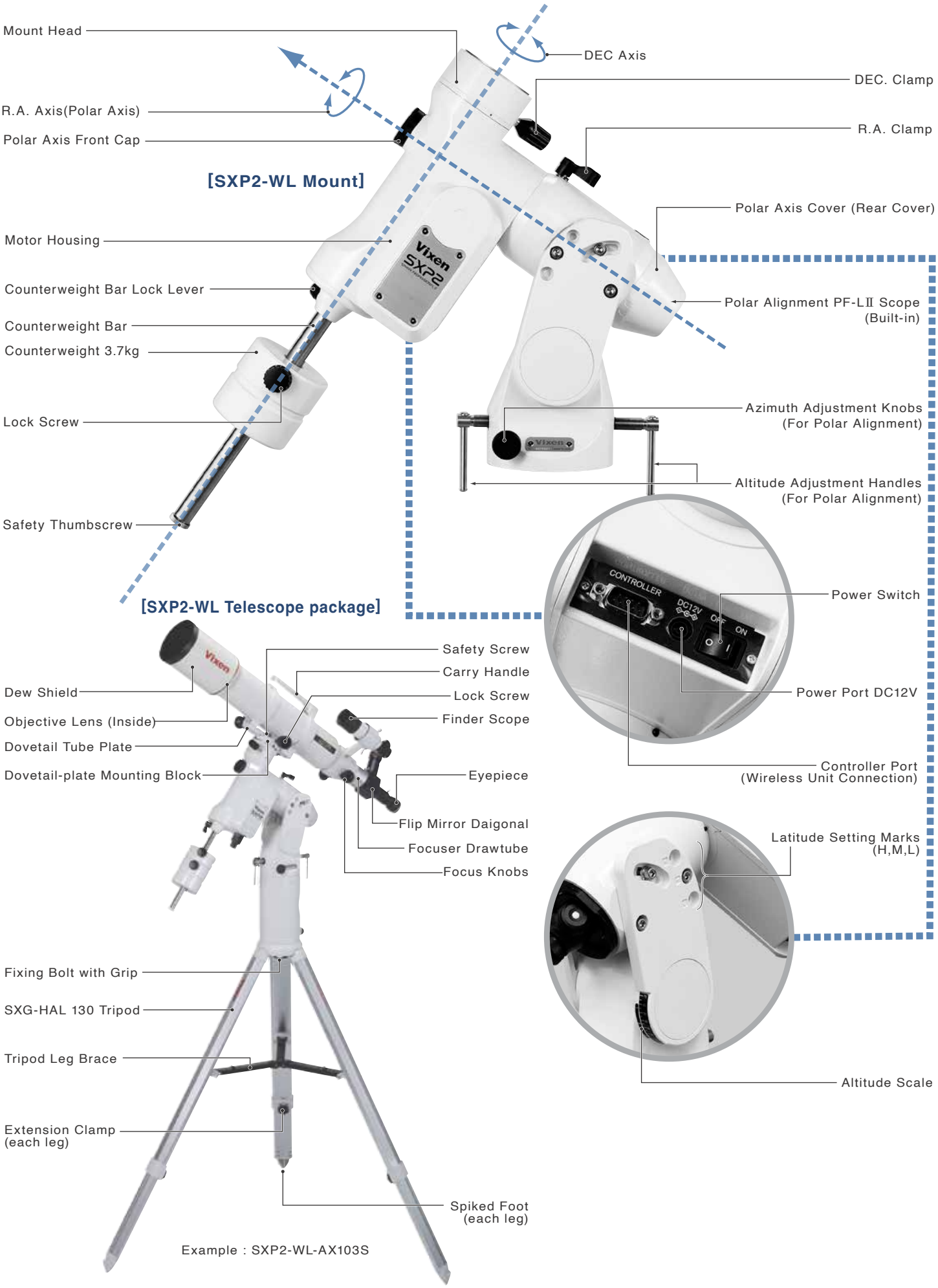
The Basic Movements of the Equatorial Mount

Every operation of the SXP2-WL equatorial mount is electrically controlled using a smartphone (or a tablet) and a dedicated application.
The mount will perform smooth and accurate movements when each component or unit attached to the mount is balanced correctly. An unbalanced mount may cause vibration and can result in tracking errors or failure of rotational mechanisms. Please check if the telescope is balanced correctly.

Note 1: Do not rotate the mount manually without loosening the R.A. and DEC clamp levers.
Note 2: Do not bump the mount strongly as it may damage the gears and bearings inside. It may result in malfunction.

The clamp levers on the mount allow you to rotate the RA and DEC bodies freely, and you can prepare the telescope quickly for the home position or store the mount in a compact case. You have to loosen the clamp levers to protect the inner gear train for storage and when you transport it. Be sure to tighten the clamp levers when you use the mount by the Wireless Unit.

Name of Each Part



Procedure for Operation

I. Installing the STAR BOOK Wireless App Install the STAR BOOK Wireless app on your smartphone. Refer to the instructions provided for the smartphone on how to install the app.	P7
II. Setting up the Telescope Set up the telescope according to the instruction manual provided for your telescope.	P8 to P17
III. Connecting the Wireless Unit Attach the wireless unit to the equatorial mount.	P18 to P19
IV. Wireless Connection between the Smartphone and the Wireless Unit Connect the wireless unit and the smartphone with a radio connection. To connect, refer to the instructions provided for the smartphone.	P20
V. Starting up the App Tap the icon of STAR BOOK Wireless on the screen to begin the app. Confirm the fundamental operation of the app.	P21 to P22
VI. GO-TO Slewing with the Wireless Unit Now you are ready to control your telescope via the smartphone with the STAR BOOK Wireless app. Enjoy your astronomical observation!	P23 to P28

PREPARATION

I. Installing the STAR BOOK Wireless App

You use a smartphone and a dedicated app ‘STAR BOOK Wireless’ to control Vixen equatorial mounts.

Applicable Mount: SX2, SXD2, SXD2-PFL, SXP, SXP-PFL, SXP2, AXJ (non-encoder equipped), AXD2, AXD

Downloading the App

Install the STAR BOOK Wireless app on your smartphone. Refer to the instructions provided for the smartphone on how to install the app.

STAR BOOK WIRELESS

The free download STAR BOOK Wireless app is available for iPhone and Android.
Visit our website at https://vixen.co.jp

Download on the App Store

GET IT ON Google Play

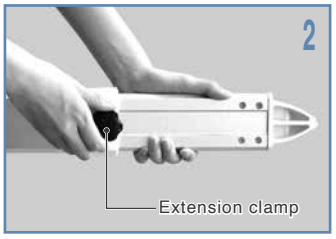
II. Setting up the Telescope

Read the instruction manual provided for your telescope in addition to this manual. You may occasionally find descriptions that would not be relevant to the product you purchased.

Setting up the Tripod

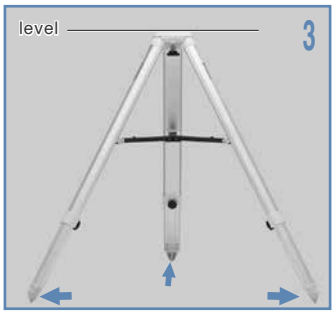
The tripod is sold separately unless you purchase a complete telescope package.

1 Place the tripod on level ground to keep the telescope stable during observation. Pull the tripod legs apart until the leg spreader is fully extended.



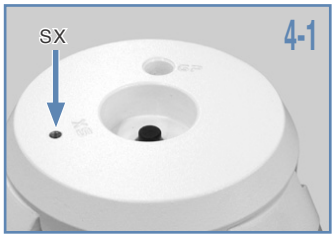
2 Loosen the extension clamp on the tripod leg so that the leg can be adjusted in length.

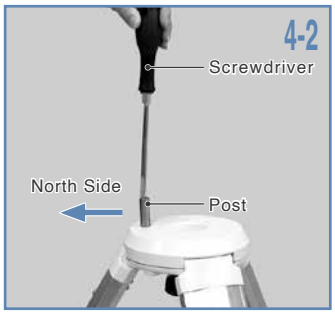
3 Tighten the extension clamp to hold the leg securely in place.



4 Attach the metal post to the tripod head. Thread the metal post into the hole as marked SX and tighten it with a screwdriver (Fig. 4-1).

Note: Be sure to screw down the metal post until the end of the thread firmly.
Position the tripod so that the metal post comes north.



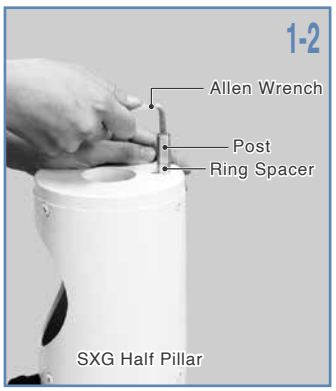


Attaching the SXG Half Pillar

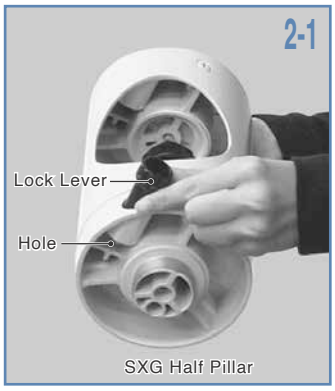
Proceed to the next if that is not supplied with your telescope package.

1 Put the ring spacer through the threaded part of the metal post. Attach the metal post on the head of the half pillar (Fig. 1-1).

Note: There are two threaded holes on the head of the half pillar. Thread the metal post into the outer threaded hole and tighten it with the supplied Allen wrench.

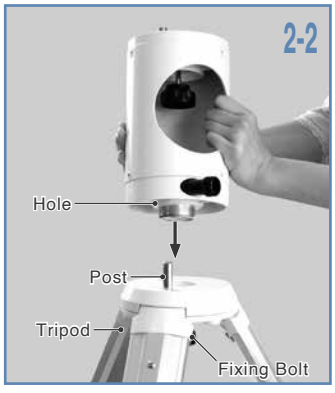


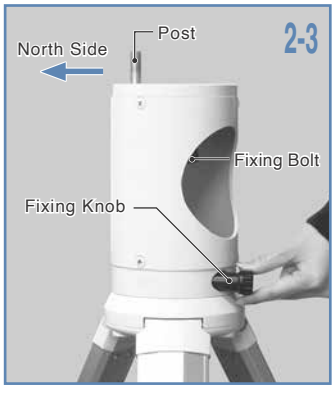
2 Loosen the fixing knob on the lower part of the half pillar in advance and attach the half pillar to the tripod head (Fig. 2-1). Place the half pillar over the tripod so that the metal post on the tripod head comes underneath the hollow for the fixing knob screw on the half pillar.



Attach the half pillar on the tripod head so that the center projection on the bottom of the half pillar fits the center hollow on the tripod head neatly (Fig. 2-2).

Tighten the fixing knob on the lower part of the half pillar and tighten the fixing bolt beneath the tripod head to fix the half pillar securely (Fig. 2-3).





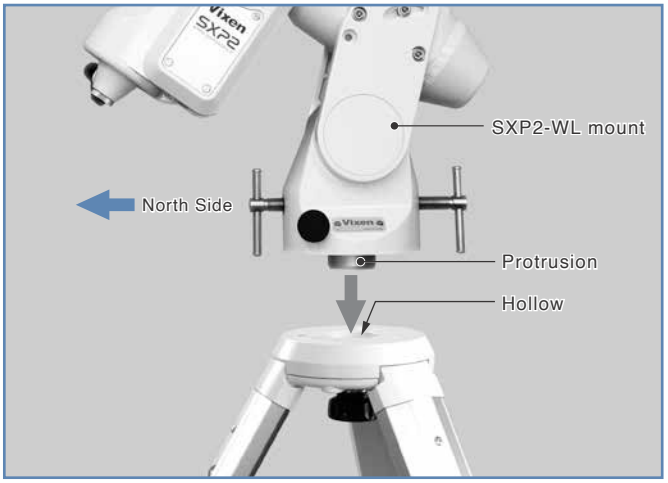
Setting up the Mount

⚠ Caution!: Be sure to handle the mount body carefully as it is heavy.

Setting up the Mount (without the SXG Half Pillar)

1 Place the tripod in the ground so that one of the three legs faces north in the northern hemisphere.

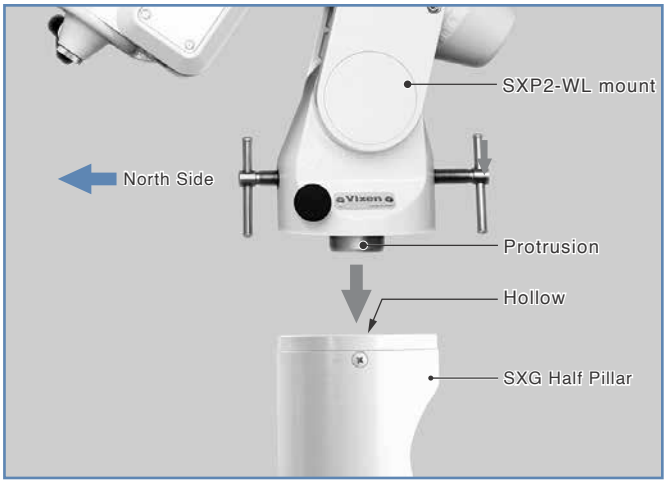
2 Attach the mount to the tripod head so that the center projection on the bottom of the mount fits the center hollow on the tripod head and the front of the mount faces north.



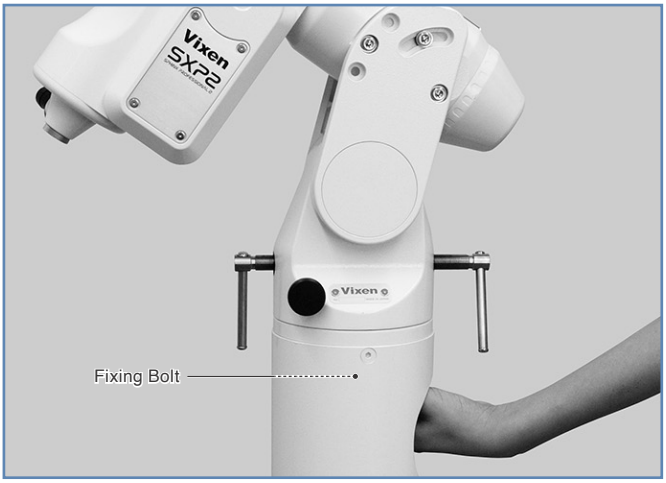
3 While holding the mount with one hand, tighten the fixing bolt underneath the tripod head to secure it in place. Make sure that the fixing bolt is tightened securely.

Setting up the Mount (using the SXG Half Pillar)

1 Attach the mount to the tripod head so that the center projection on the bottom of the mount fits the center hollow on the tripod head and the front of the mount faces north.



2 While holding the mount with one hand, tighten the fixing bolt underneath the head of the half pillar to secure it in place. Make sure that the fixing bolt is tightened securely.

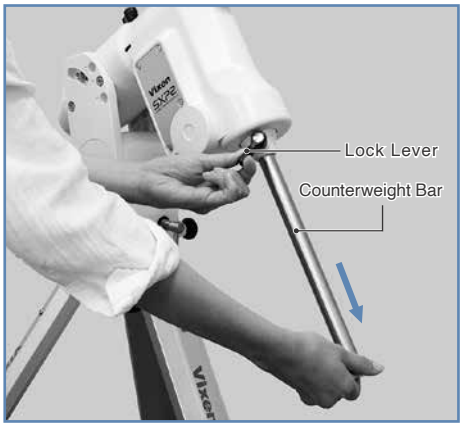


Attaching the Counterweight

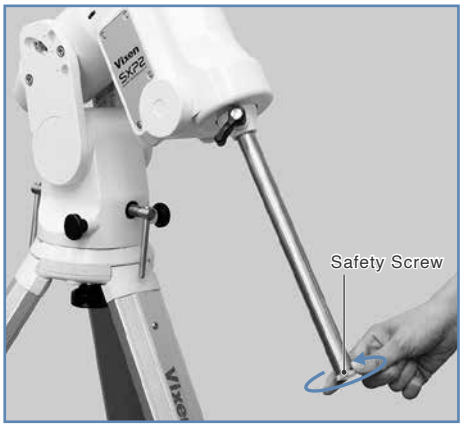
You may balance the mount with only the counterweight bar without a counterweight if you attach a lightweight optical tube.

⚠Caution!: Be sure to handle the counterweight carefully as it is heavy.

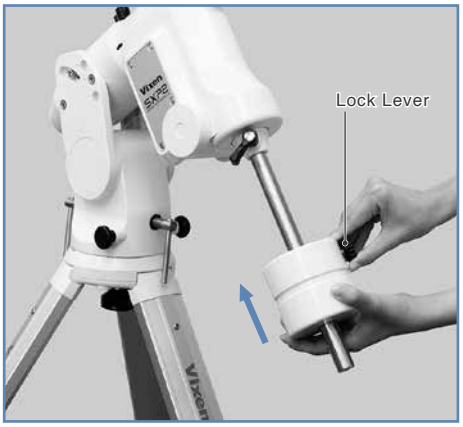
1 Loosen the counterweight bar lock lever to draw out the counterweight bar. Tighten the counterweight bar lock lever with the bar extended fully.



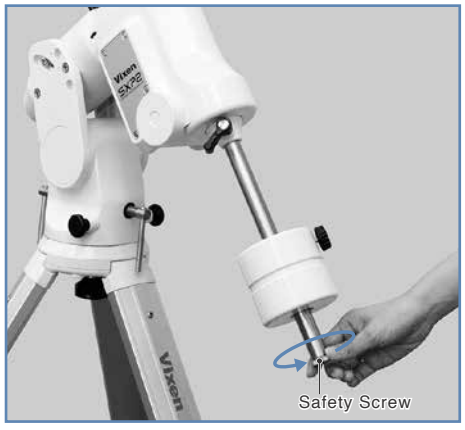
2 Remove the safety screw on the end of the bar. Loosen the lock screw on the side of a counterweight and put it through the bar.



3 Attach the counterweight to the bar so that the lock screw on the counterweight goes to the upper side of the bar as shown in the figure.



4 Tighten the counterweight lock screw and replace the safety screw in place. Securely tighten the safety screw.



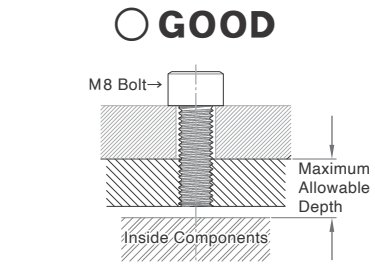
PREPARATION

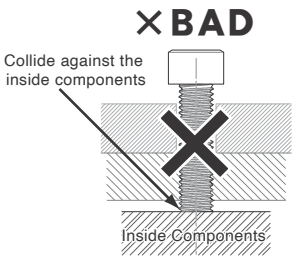
Attaching a Saddle Plate or a Dovetail-plate Mounting Block

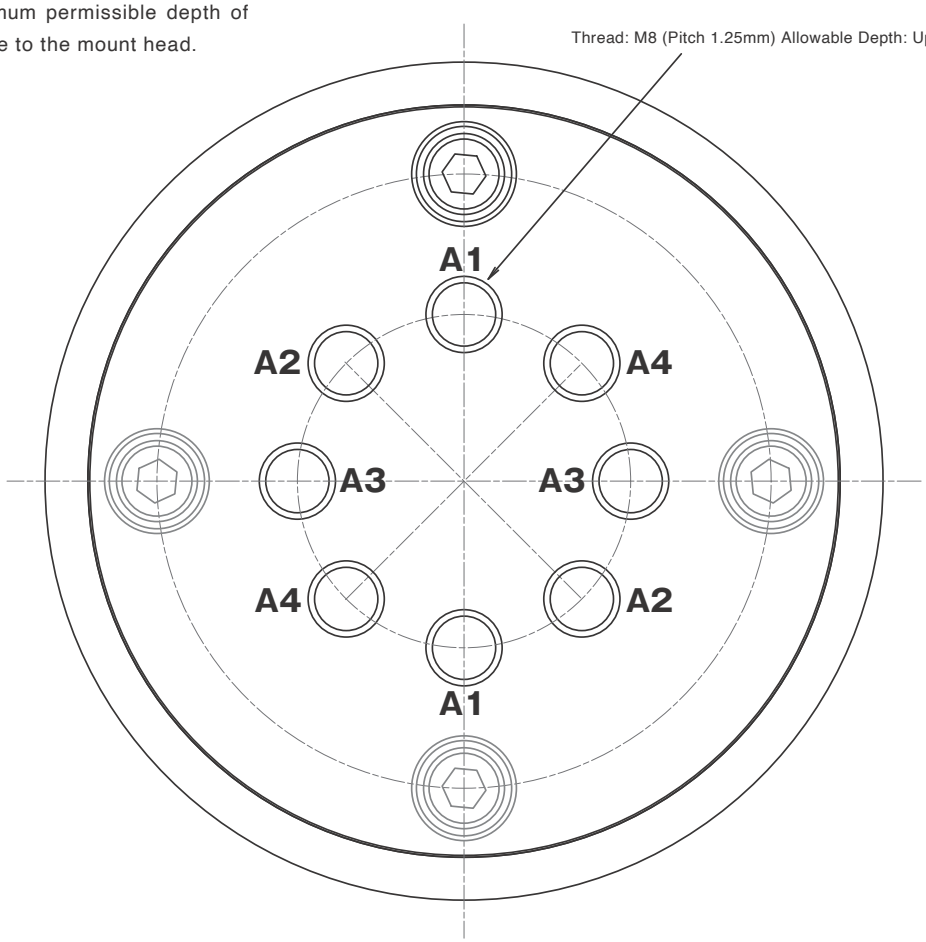
There are eight M8 pitch 1.25mm threaded screw holes on the mount head of the SXP2-WL, as shown in the figure. Choose the screw holes that are appropriate to your saddle plate holding the telescope tube.

⚠ Attention ! : Depth of Screw Holes

Do not use long bolts exceeding the maximum permissible depth of the threaded holes. It could result in damage to the mount head.





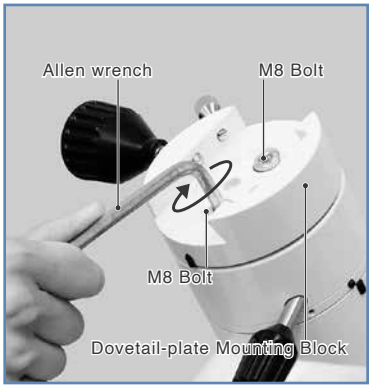


Using the Dovetail-plate Mounting Block (Optional)

This accessory may be supplied as a standard accessory if you purchase the telescope as a package.

1 Place the dovetail-plate mounting block on the mount head so that the screw holes match each other to the position A1 , A2, A3, or A4 on the drawing.

2 Attach the dovetail-plate mounting block securely with the two M8 bolts supplied with the SXP2-WL mount.



PREPARATION

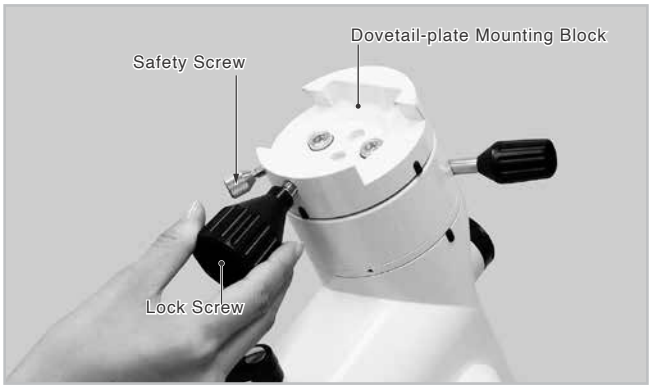
Attaching an Optical Tube

Attach an optical tube equipped with a Dovetail tube plate or Dovetail slide to the mount.
Example: AX103S, SD115S, or VC200L optical tube
Be careful not to drop the optical tube as it could damage the equipment or lead to injury.

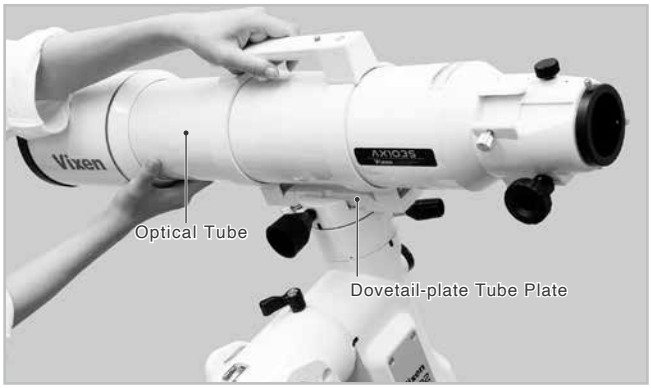
⚠ Caution!: Pay close attention to the security of the optical tube and do not loosen the lock knob too much.

The AX103 optical tube shown as an example.

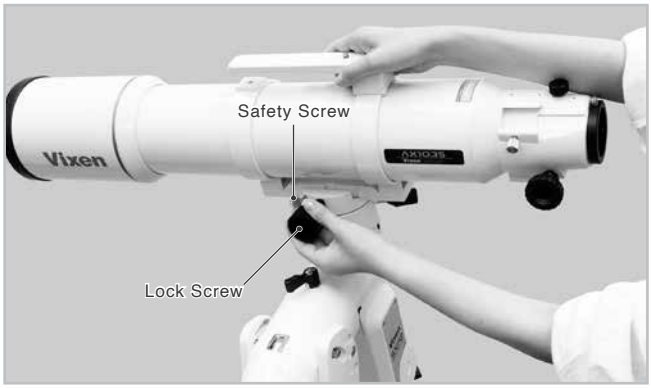
1 Loosen the tube plate lock screw and safety screw on the mount head fully so that space is available to insert the Dovetail tube plate-mounted optical tube.



2 Attach the Dovetail tube plate-mounted optical tube to the depressed platform of the mount head.



3 Tighten the tube plate lock knob securely while supporting the optical tube by hand. First, tighten the lock screw onto the dovetail tube plate centering notch until it is snug. Then, tighten the safety screw.



PREPARATION

Setting Up the 7x50mm Finder Scope

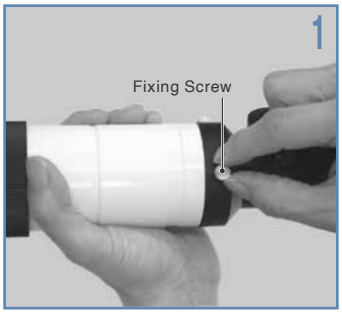
Attaching the 7x50mm Finder Scope II (Types of the finder scope may differ in your specific model.) You need to align the finder scope before using it.

⚠ Warning!:

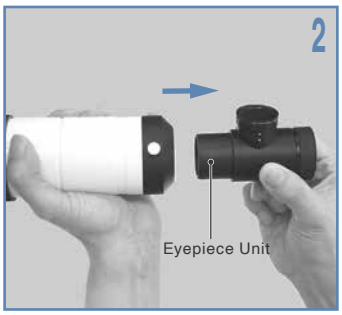
Follow the procedures when you attach the finder scope, flip mirror, and eyepiece, and take care not to over-loosen the screws as it may cause malfunction by falling.

Using it with the 50mm XY Finder Bracket

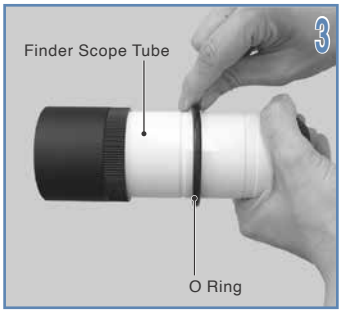
1 Loosen the fixing screw on the side of the finder scope tube holding the eyepiece unit to separate the eyepiece unit part.



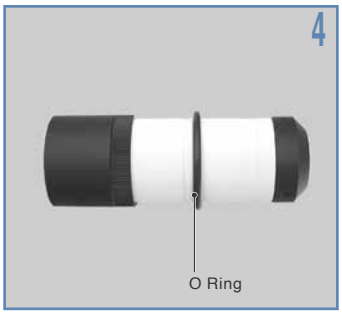
2 Take off the fixing screws and remove the eyepiece unit part from the finder scope tube.



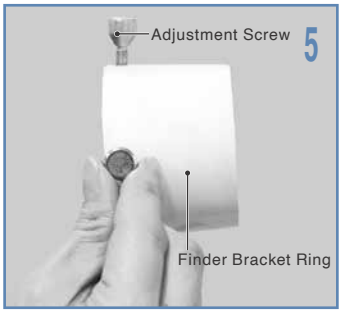
3 Put the finder scope tube through the O-ring. Take the O-ring to the middle of the finder scope tube



4 There are two grooves on the finder scope tube. Put the O-ring through on the finder scope tube until the O-ring positions a point at about 6mm in front of the groove of the objective side. Make sure that the O-ring remains stable in its position with your hand removed. If the O-ring is twisted, it may not stay in place and becomes unstable.

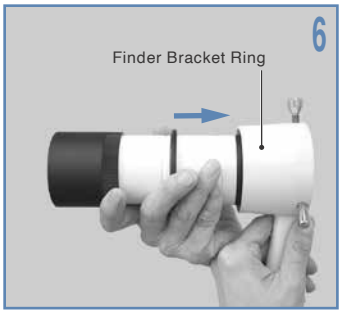


5 Back out the two adjustment screws on the finder bracket to allow passage of the finder scope.

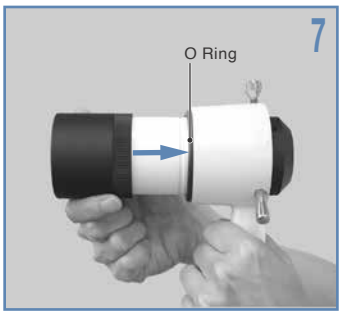


6 Put the finder scope through the finder bracket so that the eyepiece side of the finder scope slides into the finder bracket from its front side. (*1) Insert until the O-ring on the finder tube touches the finder bracket.

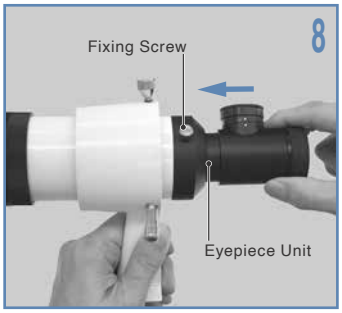
*1 In this process, the surface of the finder scope may rub against the inside of the finder bracket and be scratched, so be careful.



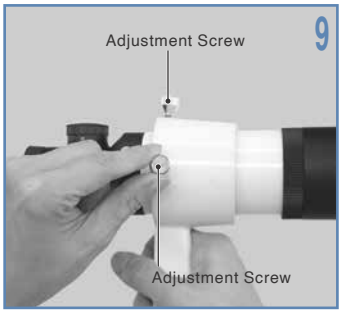
7 Push the O-ring in the finder bracket along with the finder scope so that the O-ring gets caught with it. When you push the O-ring in, you will feel the finder scope is pushed back by the repulsion of the rubber. When you push it forward by about 1cm, you will feel a click, and it will stop, so stop pushing in here. Check if the finder scope does not move by the repulsion of the rubber when you release the hand.



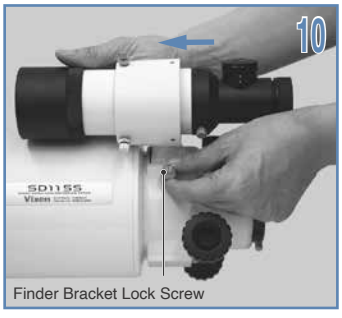
8 8 Put back the fixing screws and attach the eyepiece unit to the finder scope tube in place.



9 Tighten the two adjustment screws equally on the finder bracket so that the finder scope gets centered in the finder bracket.



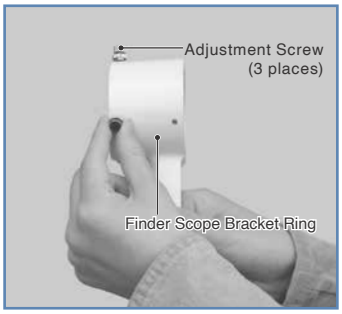
10 Loosen the lock screw on the finder bracket shoe and attach the finder bracket by sliding it from the drawtube side. Tighten the lock screw on the finder bracket shoe securely to finish.



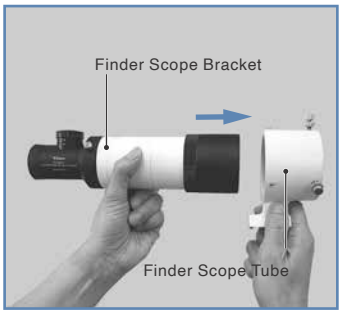
PREPARATION

Using it with the Low-profile 50mm Finder Bracket

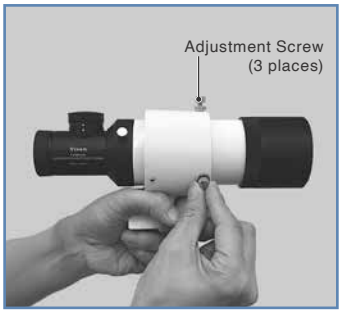
1 Loosen the three adjustment screws on the finder bracket ring as shown in the figure so that the tips of the screws are completely moved back to allow passage of the finder scope tube. Also, loosen the three grub screws with the supplied 2mm Allen wrench.



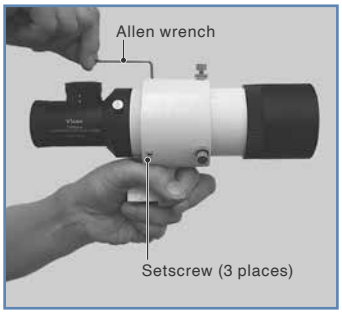
2 After determining the correct direction of the finder bracket, pass the finder scope tube through the bracket ring as shown in the figure.



3 Tighten the three adjustment screws equally to hold the finder scope in place. At this stage, there is no need to fix the finder scope securely.



4 Tighten the three grub screws on the bracket ring with the 2mm Allen wrench equally so that the finder scope stops rattling inside the bracket ring.



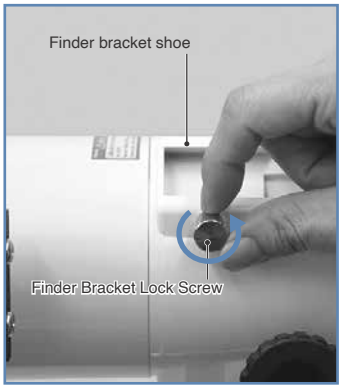
5 Mount the finder scope equipped with the finder bracket on your telescope.

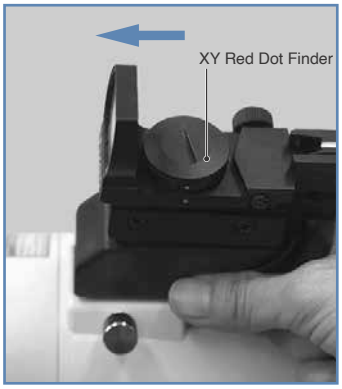
Attaching the XY Red Dot Finder

1 Loosen the lock screw on the finder bracket shoe of the telescope.

2 While paying attention to the orientation of the XY red dot finder, insert it into the dovetail groove on the finder bracket shoe, and tighten the lock screw.

Note: The dovetail attachment block of the XY red dot finder is made of plastic, so never tighten the lock screw with too much force.

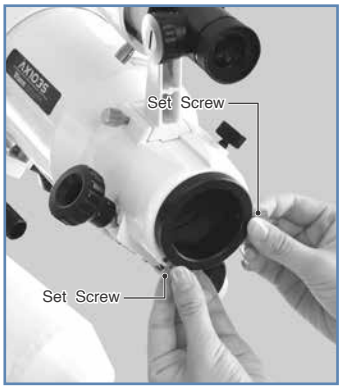


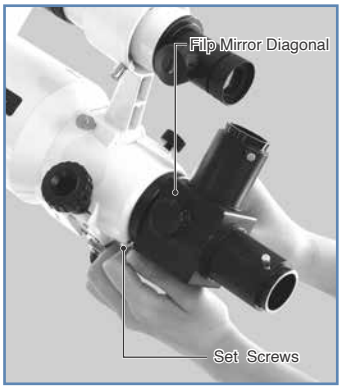


Attaching the Flip Mirror Diagonal

1 Loosen the two set screws on the 50.8mm ring that is attached to the tip of the drawtube, as shown in the fire. Insert the nosepiece part of the flip mirror diagonal into the 50.8mm ring to attach.

2 Tighten the two set screws on the 50.8mm ring securely.





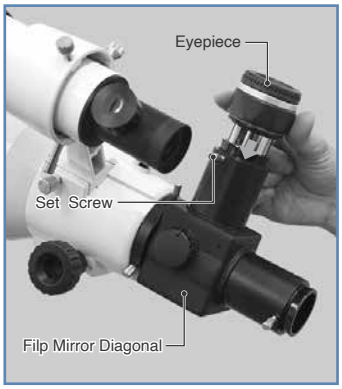
PREPARATION

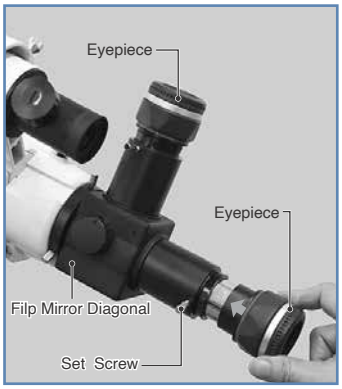
Attaching the Eyepiece

1 Loosen the set screw on the eyepiece adapter and attach a 31.7mm eyepiece by sliding the chrome portion of the eyepiece into the flip mirror diagonal, as shown in the figure.

2 Tighten the set screw to hold the eyepiece in place.

Note: Two eyepieces are attachable to the flip mirror diagonal, but you do not use them simultaneously.





Balancing the Telescope

Why does the equatorial mount need balancing?

The German-type equatorial mounts perform in two rotational axes, which cross each other at the right angle; one is called a right ascension axis, and the other is a declination axis. Each rotation uses gears, and it has the nature that the less load on the gear train, the more stability to the rotating axis. If the weight load is unbalanced, it will cause overloading of the gears, and it may stop operating normally.

Astronomical telescopes require a high level of precision in rotation, and it is significant to lessen the load on the gears as much as possible. For this reason, you need to adjust the equatorial mount so that the center of gravity is on each axis of rotation in right ascension and declination.

Note: You may not balance on the mount if you put an optical tube weighing less than 1.3kg. In that case, balance the mount using an optional large accessory plate DX or such addition.

⚠ Warning!:

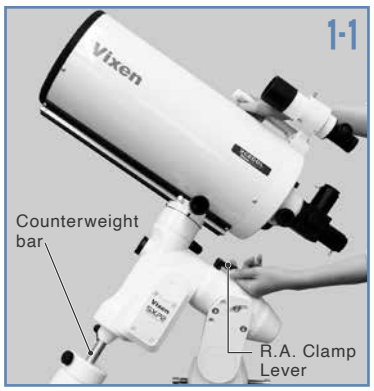
While you balance the optical tube with the counterweight, never loosen any of the knobs on the telescope tube or mount too much. The optical tube or its finder scope may hit the mount or tripod by sudden motion due to carelessness in handling or may fall on the ground.

Balancing the Telescope in Declination (DEC)

Optical Tube with Dovetail Slide Bar

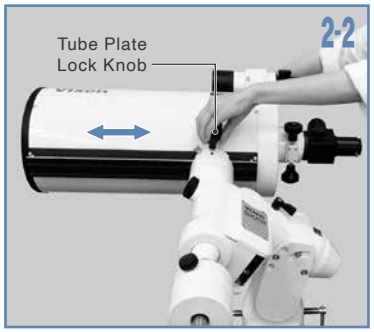
1 Loosen the R.A. clamp lever while holding the optical tube or counterweight bar (Fig.1-1) and turn the optical tube by hand until the DEC axis is horizontal. (Fig.1-2) Tighten the R.A. clamp lever to keep it in the horizontal position.

Support the optical tube or counterweight bar securely while loosening the clamp levers.



2 Next, loosen the DEC clamp lever while holding the optical tube by hand (Fig.2-1). Release the optical tube slowly to see if it remains stationary.

If the optical tube begins turning as you release it, you need to shift the optical tube until it is balanced.

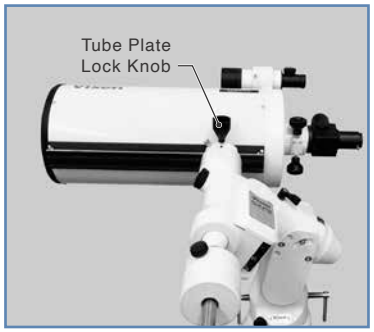


⚠ Caution

Do not loosen the tube plate lock knob too much in the balancing. It could cause the optical tube to fall and damage it.

3 Slightly loosen the tube plate lock knob and slide the optical tube either forward or backward until it remains stationary. Tighten the tube plate lock knob securely to hold the optical tube in place.

4 Tighten the DEC clamp lever to finish the adjustments.

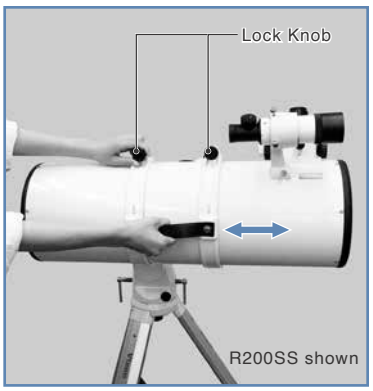


Optical Tube with Tube Rings

1 Loosen the R.A. clamp while holding the optical tube or counterweight bar (Fig.1-1) and turn the optical tube by hand until the DEC axis becomes horizontal (Fig.1-2)

2 Next, loosen the DEC clamp lever while holding the optical tube by hand (Fig.2-1). Release the optical tube slowly to see if it remains stationary.

If the optical tube begins turning as you release it, you need to shift the optical tube until it is balanced.



⚠ Caution

Do not loosen the tube ring lock knobs on the tube rings too much in the balancing. It could cause the optical tube to fall and damage it.

3 Loosen the tube ring lock knobs and slide the optical tube either forward or backward until it remains stationary. Tighten the tube ring lock knobs securely to hold the optical tube in place.

4 Tighten the DEC clamp lever to finish the adjustment.

Tips: An optional Universal dovetail plate or Accessory plate DX may be recommendable if it is hard to balance the telescope.

PREPARATION

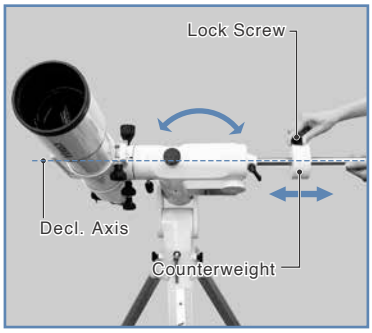
Balancing the Telescope in Right Ascension (R.A.)

1 Loosen the R.A. clamp lever while holding a counterweight bar by hand and turn the optical tube until the DEC axis is horizontal.

2 Release the counterweight bar slowly to see if the optical tube remains stationary. If the optical tube starts turning as you release the counterweight bar, you need to shift the counterweight on the bar until the Declination body is balanced.

You cannot balance the optical tube in the R.A. when you attach an optical tube weighing less than 1.3kg to the mount.

Loosen the lock screw on the counterweight and slide the counterweight slowly to the point at which the Declination body remains stationary.



3 Tighten the lock screw on the counterweight securely to hold in place.

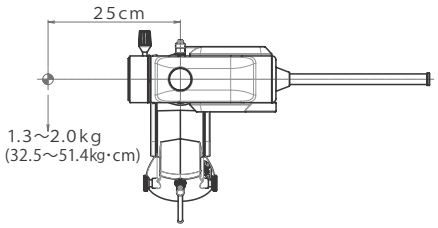
4 Tighten the R.A. clamp lever to finish the adjustments.

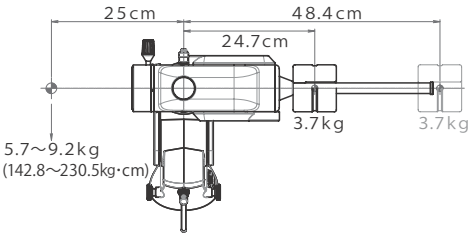
⚠ Caution

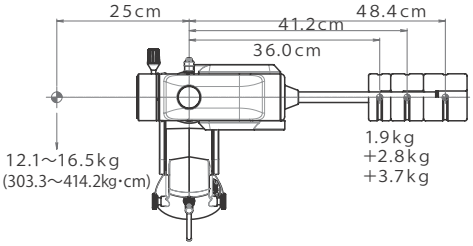
Do not slide the counterweight too much in the balancing. It could cause the optical tube to get damaged or lead to injury.

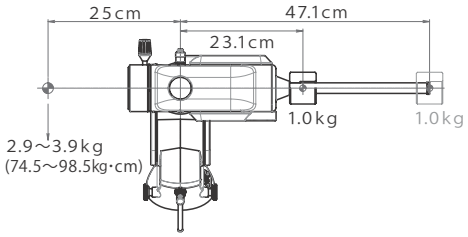
Tips on Proper Balancing

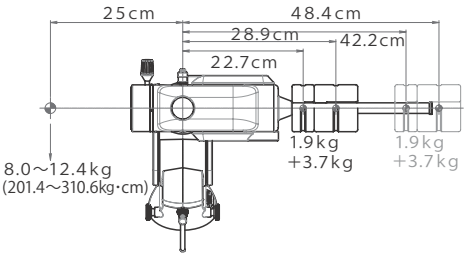
The balancing arrangements below rest on the premise that the center of gravity of a telescope tube is at a point of 25 cm away from the R.A. and DEC axis intersection.

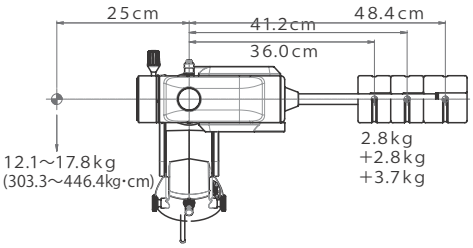


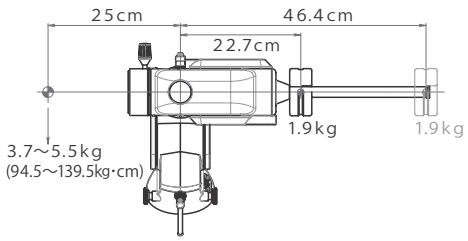


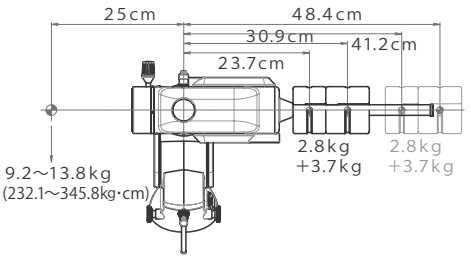


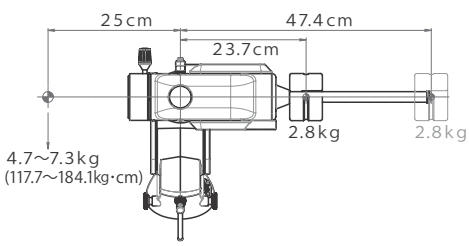


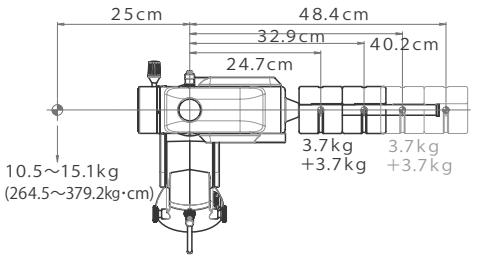












About Torque Load (kg・cm)

Vixen uses terns of Torque Load as guidance for an allowable loading weight. The capacity of the torque load can be calculated using the following formula.

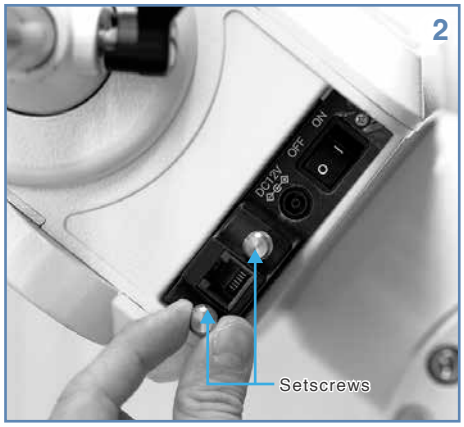
Torque Load (kg・cm) = Weight of an instrument loaded (Kg) x Distance from the RA and DEC axes crossing to the center of the gravity of an instrument loaded (cm).

III. Connecting the Wireless Unit

1 Attach the Wireless Unit to the controller cable port on the equatorial mount. Plug the Wireless into the connecting port the orientation of the connectors can be matched to each other. Plug it to the end securely.

Remenber to attach the Wireless Unit first before connecting the power cord. The Wireless Unit may break if you connect it while the equatorial mount is powered. It avoids a mishap when setting up in a dark environment where it may be hard to find the position of the power switch visibly.

2 Fix the Wireless Unit securely by tightening the screws accompanied.



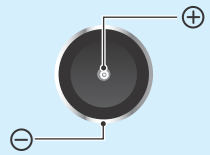
PREPARATION

Connecting the Power Cord

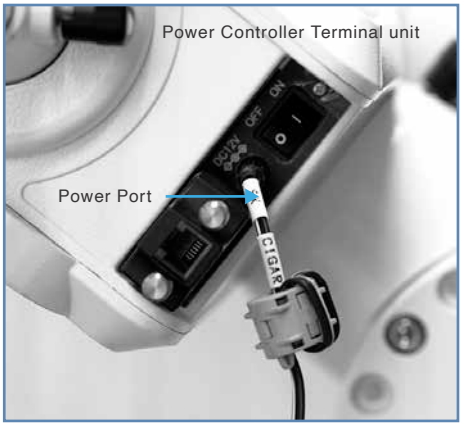
The power supply is sold separately. We recommend using an optional AC Adapter PD 12V 3A or Cigarette-lighter plug cord that is usable for commercially available portable batteries.

Confirm that the power switch is turned OFF before plugging the power cord into the power port on the equatorial mount.

Controller Cable Port



DC12V EIAJ RC5320A
Class4 center positive (+)

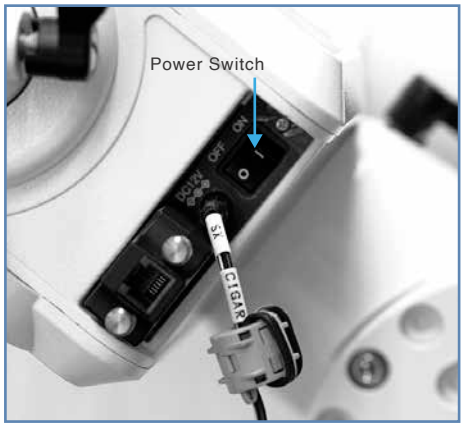


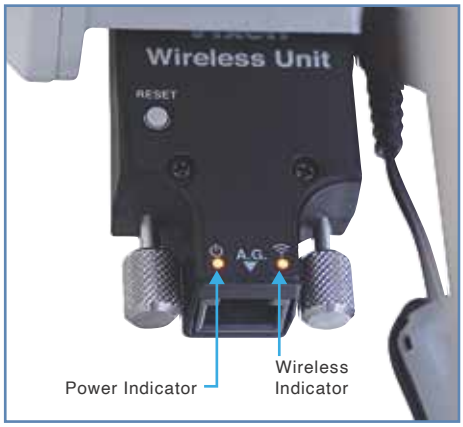
ⓘ About the handling of the power cord and power source.

- ⊘ **Avoid pulling or bending a part of the power cable adjacent to the connector. It may cause a wire to snap.**
- ⊘ **Do not use the power cord if it is bound.**
- ⊘ **If you use the equipped battery in a car as the power source, do not start the engine. It may cause a malfunction of the mount due to unwanted electrical noise.**
- ⓘ **When you unplug the power cable, always hold the connector part and pull it straight. Unplugging carelessly by grabbing the cable part may cause the wire to snap.**
- ⓘ **When you use a car battery, avoid letting the battery die.**

IV. Wireless Connection between the Smartphone and the Wireless Unit

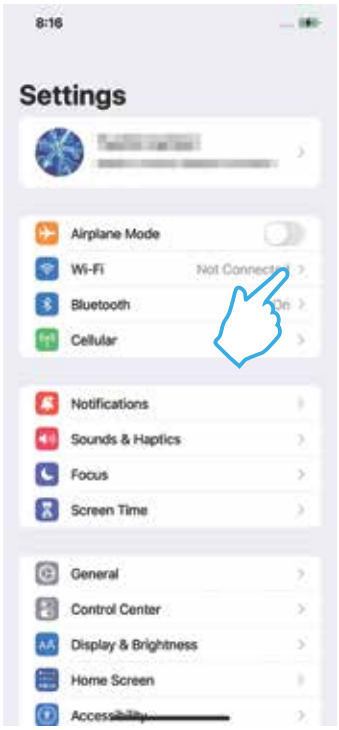
1 A smartphone that runs on iOS is used in this manual by way of example.
Power the equatorial mount. The power and wireless indicators ⏻ on the Wireless Unit turn red after a few seconds.

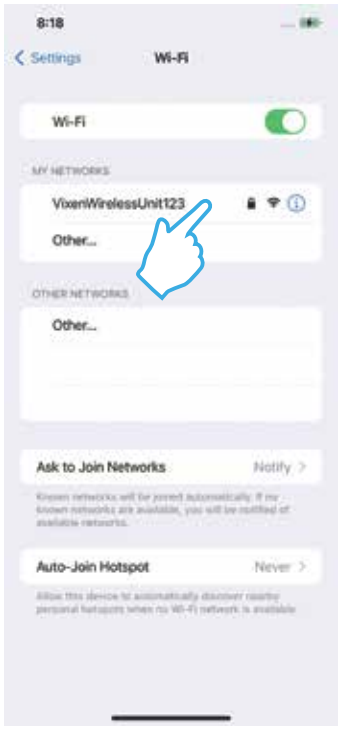




2 Open the screen of the wireless LAN connection on the smartphone and choose SSID.

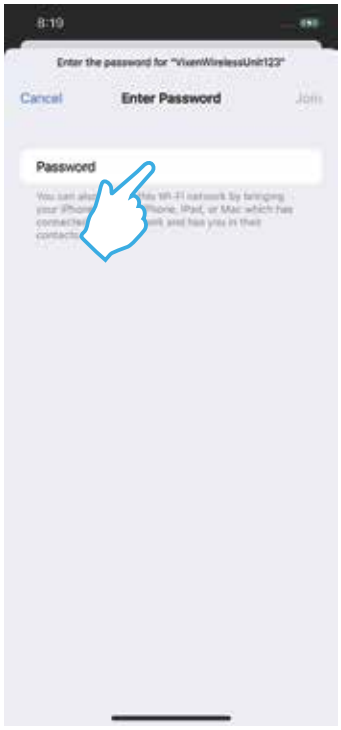
Tap the Vixen Wireless Unit XXXX (XXXX are arbitrary numbers) on the screen.

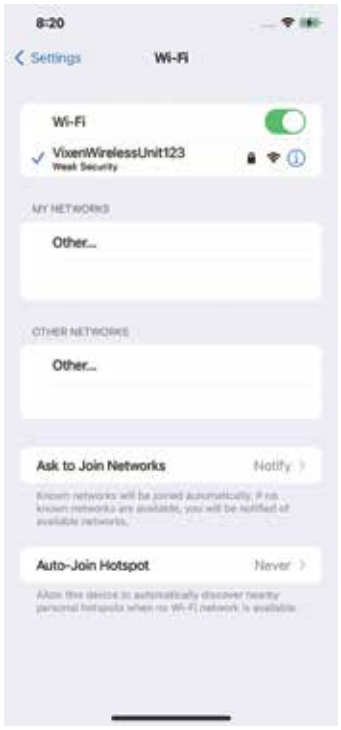




3 Tapping the SSID will proceed to the screen for entering a password.

Enter the initial password “1234567890” set at Vixen’s factory. (The name of the SSID and the password are changeable arbitrarily.)





4 When the connection is completed successfully, the wireless indicator on the Wireless Unit will light up blue. If the light stays red, the connection has failed. Start the procedure from (2) again.

USING THE WIRELESS UNIT

V. Starting up the App

Confirm the blue light of the wireless indicator, and tap the icon “STAR BOOK Wireless” on the smartphone. Now, you are ready to use the STAR BOOK Wireless.

Name of Each Part / Menus on the Screen

Wireless Unit Components Guide

Connector to Mount

The D-sub 9pin female connector connects the unit to the controller cable port on a mount.

Attachment Screws

Attach the unit to the controller cable port on the mount body with these two screws.

Reset Button

Pressing this button a little longer (over one second) will initialize the unit to the settings at Vixen’s Factory.

Wireless Indicator

It indicates the wireless connection status.

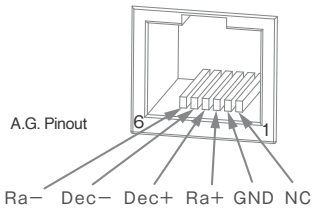
- Disconnected if it lights red. (No communication)
- Connected if it lights blue. (During communication)

Power Indicator

- If it lights red : Power is ON
- If it is off : Power is OFF

Autoguider (A.G.) Port

You can connect an external autoguider with the unit using an autoguider cable.



Menus and Displays on the Screen

You operate the telescope controller and commands by tapping and swiping the screen with a finger.

Note: The display and layout of the icons/menus shown are as of when Vixen produced this manual. It may change according to updates on the app. The contents may differ depending on the version you use.

Display Mode

SCOPE MODE

The telescope is linked to the star chart. The telescope follows in the same direction as you swipe the star chart.

CHART MODE

The star chart is independent of the telescope. The star chart is swiped with a finger for directional scrolling. Pinching in or out with two fingers will enlarge or reduce the star chart. You can choose any targets on the screen of the star chart using finger gestures.

Circles

Target Marker (Red)

The red circle marker points to the location of an object you have chosen as a target.

Target Circles (Green)

The double circles in green indicate the direction including the center of your telescope's field of view and its adjacent area.

Target Circles (White)

The double circles in white indicate the direction that includes the center of the star chart and its adjacent area.

Select Object

The moon, planets, deep-sky objects, and stars can be chosen by name or object number from the menus.

Setup Icon

Tapping this icon will call up the menus to determine or change various settings, such as the mode of the star chart displayed, the direction of scrolling/swiping the star chart, SSID/password, and so on.

Align

It shows the number of objects acquired for alignment.

Zoom Slider Bar

Magnifying the star chart allows you to make fine adjustments. The swipe motion of the star chart becomes slower as you zoom in on the star chart by sliding up the button on the slide bar.

★ Sign

Tapping this icon will call up well-known celestial objects indicated within the outer target circle in the center of the screen (and the center of the star chart). Tap an object you selected to point the telescope to it. The ★ sign will turn to ★<< during the GO-TO slewing.

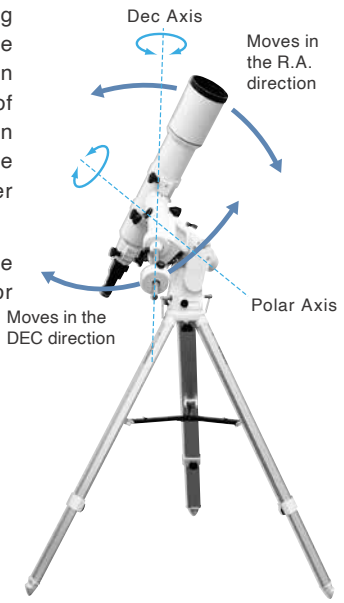
Target Object Information

The direction of your telescope and the location in coordinates are displayed. The telescope icon on the left indicates the status of the telescope movement (tracking, stopped, etc.).

Moving the Telescope

In the SCOPE MODE, swiping the star chart will move the telescope in the same direction according to the orientation of the star chart. You can zoom in and out of the star map on the screen using the zoom slider bar.

The motion direction by a swipe can be chosen from AltAZ or RADEC.



Setup Icon

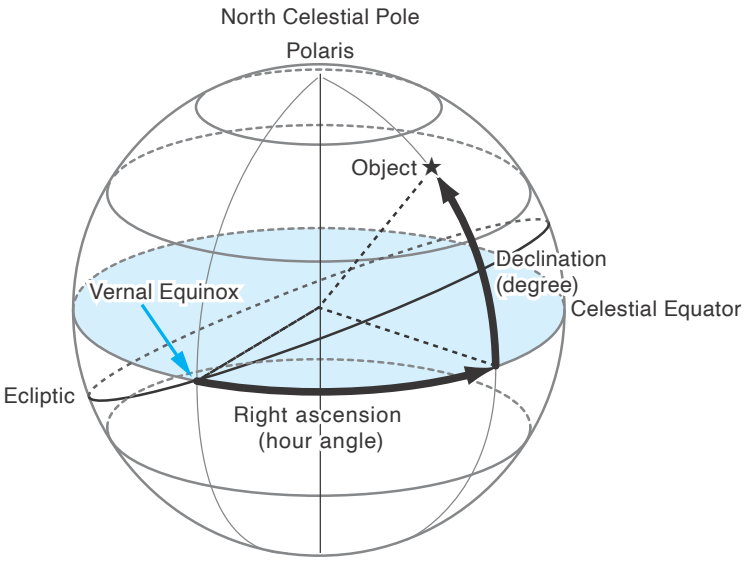
Zoom Slider

About Automatic GO-TO Navigation

The celestial GO-TO navigation system stores the coordinates of vast numbers of celestial objects in the database and allows you to find your desired celestial object of interest automatically. The moon and bright planets are readily found in the night sky as you can locate their positions with the naked eye. However, less bright planets, nebulae, and star clusters are dim and invisible mostly with the unaided eye. Even if you know where these dim and blurred objects are in the night sky, you often take time and effort to look for them. The automatic GO-TO slewing function will assist you in locating celestial objects easily and quickly.

Principle of GO-TO Slewing

It appears that the positions of stars relative to each other in the sky are all but fixed due to their extremely long distances from us on the Earth. Because of this, the star' s position on the celestial sphere can be measured on star maps using celestial coordinates. The right ascension of the celestial sphere corresponds to latitude, and the declination corresponds to altitude on the geographic maps. It is applied to locate celestial objects in the sky, like your car navigation system.



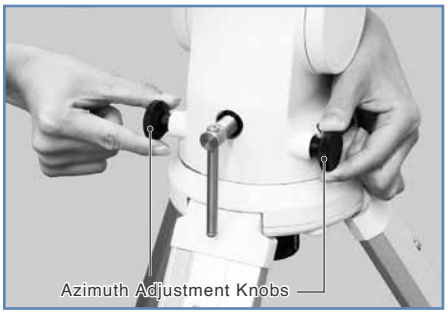
Guidance for GO-TO Operation

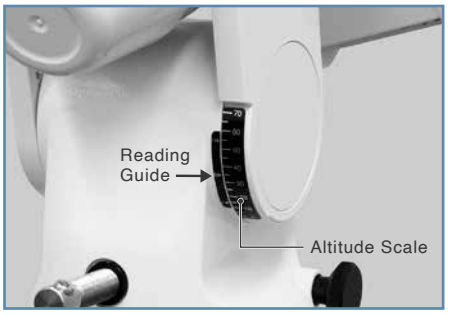
I. Locating the Mount	Point the mount toward the north celestial pole in the northern hemisphere (the south in the southern hemisphere) so that the R.A. axis on the mount is parallel with the axis of the celestial sphere in your observing location.	**P24**
II. Setting Home Position	Loosen the clamp levers on the R.A. and DEC axes and move the telescope to the home position by hand. Point the optical tube to the due west horizon in the northern hemisphere (the due east horizon in the southern hemisphere) to fix it in the home position.	**P24**
III. Alignment	Select bright stars from the list stored in the database to align their positions with the telescope. The more stars you have for alignment, the more centrally located the target objects will be in your telescope' s field of view.	**P25 to P27**
IV. GO-TO Slewing	Choose your target on the screen of the STAR BOOK Wireless app to start your observing sessions. Enjoy your observation!	**P27**

USING THE WIRELESS UNIT

I. Locating the Mount

After setting up the telescope, locate the mount so that its R.A. axis points toward the north celestial pole if you use the telescope in the northern hemisphere. Unless you intend to take lengthy astrophotography, you do not need to align the R.A. axis precisely to the celestial pole. A rough setting will work well for visual observation.





When turning the azimuth adjustment knobs to changing directions, loosening the screw on one side will allow you to tighten the screw on the other side.

When you use the telescope in the southern hemisphere, locate the mount so that the R.A. axis points toward the south celestial pole. And you set the mount's elevation to be the latitude of your observing site.

II. Setting Home Position

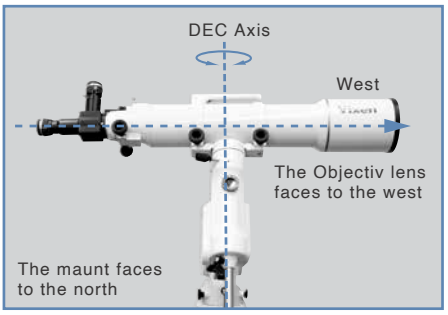
Loosen the R.A. and DEC clamp levers on the mount and position the telescope's optical tube by hand to point it to the west and level. You can slew the telescope utilizing the STAR BOOK Wireless app via a smartphone.

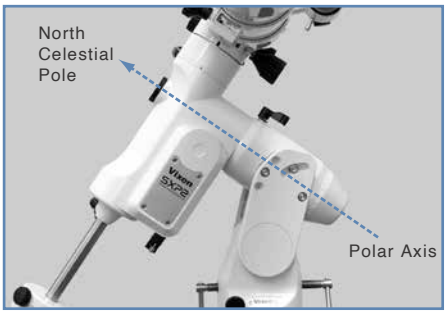
The STAR BOOK Wireless app is working to match the position at which the telescope points with the celestial coordinates memorized in the app based on information on the location, date, and time saved by the smartphone. It implies that you have finished the first alignment at this stage. Because of this, you can nealy point the telescope in the direction of a celestial object you desire to see next. (If the home position is accurate, the target object can be caught at least somewhere in the field of view of your finderscope.)

Refer to the drawings below on how the telescope is set at the home position.

When you fix the position of the optical tube tighten the R.A. and DEC clamp levers on the mount. After this, do not touch the clamp levers until you finish your observation.

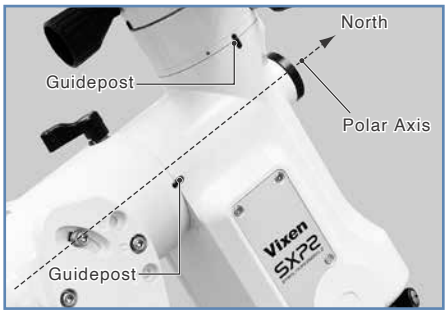
The home position is the first positioning of your telescope and is key to a successful GO-TO slewing. We recommend that you set the home position as accurately as possible.

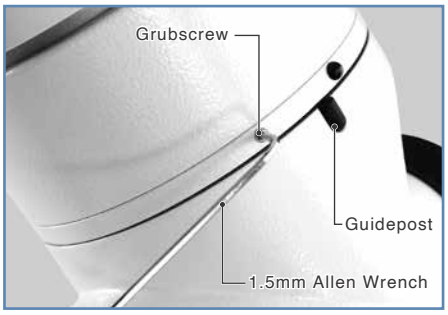




About home position guideposts

The SXP2-WL mount has guideposts on the R.A. and DEC, as shown in the figures. The guideposts are helpful when you position the telescope tube to be level toward the west in the northern hemisphere (toward the east in the southern hemisphere).





The position of the guidepost on the DEC can be shifted back and forth for readjustment depending on the telescope tube mounted. The DEC guidepost position can be changed by loosening it with the supplied Allen wrench to position it appropriately if necessary.

USING THE WIRELESS UNIT

III. Alignment

Alignment is a work to accord the information on the position acquired from the celestial coordinates with the location of actual stars you see in the sky on a one-on-one basis.

Generally, the first alignment obtained from the home position is less accurate, and the automatic GO-TO slewing may not work precisely.

The process for the acquisition of alignment is called “alignment” in this manual. The alignments are counted by numbers like as one point, two points, etc.

Starting the Alignment

1 Begin a STAR BOOK Wireless app with your smartphone. The message "Point the optical tube to the west so that it can be level" appears on the screen. Set the telescope in the home position. If you use the mount with the same settings you used during your last observing session, choose USE LAST MOUNT SETTING This option does not appear when you use the mount the first time and when you have moved the telescope. Tap NEXT to proceed.

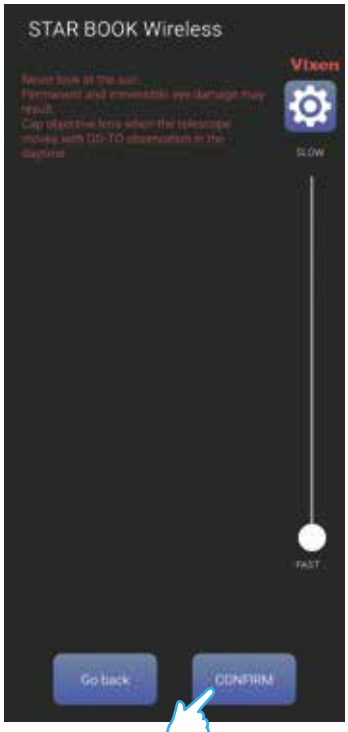
If you need to adjust the initial settings in detail, tap INITIAL SETTINGS to open the menu. You can always call up the initial setting menu by tapping icon while you display the star charts.

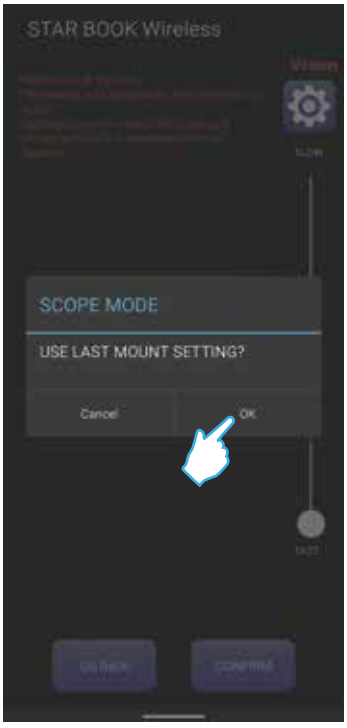
If you download the data for comets via the Internet, you are requested to start with the Initial Setting button.

If you tap NEXT or USE LAST MOUNT SETTING the solar warning notice will appear on the screen.

Tap CONFIRM and choose OK on the screen to proceed to the star chart with the SCOPE mode. The star chart where the circles at the center of the screen are directed due west is displayed.

Then, tap SELECT OBJECT on the screen to open the menu used for alignments.

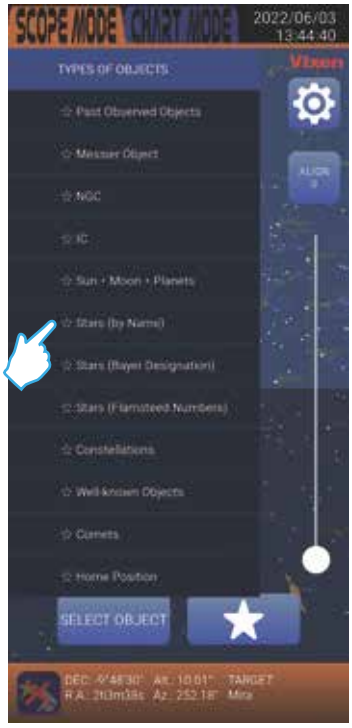




Note: If the Use Last Mount Setting command is chosen, the center circles on the star chart may show you in a different direction.

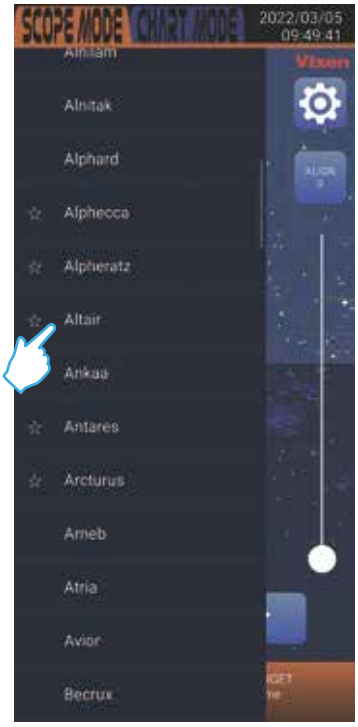
2 TYPES OF OBJECTS list appears on the screen, and choose an object you want to use for acquiring alignment.

Selecting a fixed star is recommendable as the accuracy of the alignment becomes better than other celestial objects. Fixed Star is chosen in the menu by way of example here.

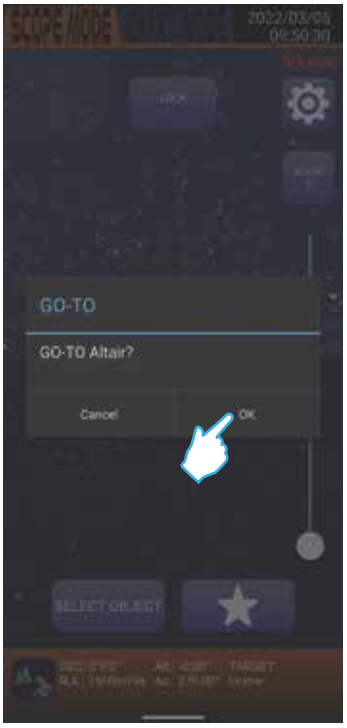


3 The names of the fixed stars appear on the menu. You choose Altair here as an example for the alignment and tap on it.

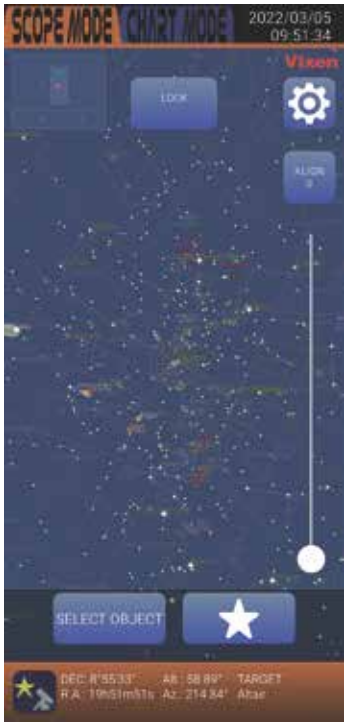
The fixed stars you use for alignments should be selected from stars you know the name of and recognize their locations in the night sky. Stars marked with ☆ are seen above the horizon and are available for alignments. You are unable to choose stars below the horizon.



4 The dialog box appears to ask if you are ready to slew the telescope to Altair. Then, tap GO-TO to start the automatic slewing. The telescope begins to move toward the target. Coordinates in R.A. and DEC of Altair are displayed at the bottom of the screen.



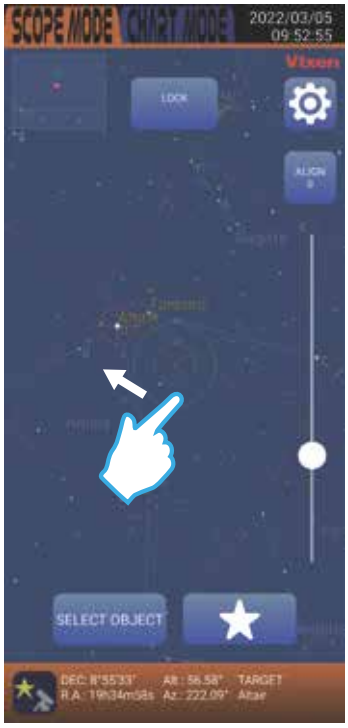
5 As soon as the GO-TO slewing finishes, the smartphone rings or vibrates to let you know. At this stage, you may not always succeed in putting the target (Altair) into the telescope's field of view, although the telescope points toward the target. You center the target in the field of view with the following procedures.



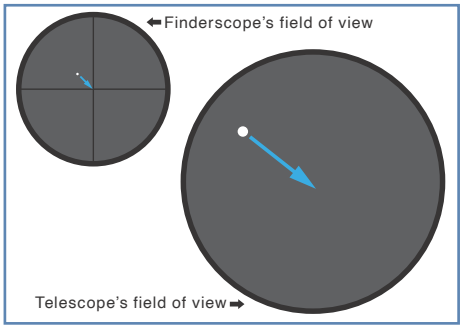
5-1 The motion of the telescope links with the motion of a swipe on the screen's star chart. While looking through the telescope, bring Altair into the center of the field of view. Magnifying the star chart with the zoom slider will reduce the motion of the telescope, and you can make fine adjustments in the direction.

Note: Altair will be away from the center circles on the smartphone's screen as you move the telescope to catch Altair in the field of view. It is caused by a discrepancy between the actual location of Altair you see and the position of the same star in the app's memorized database.

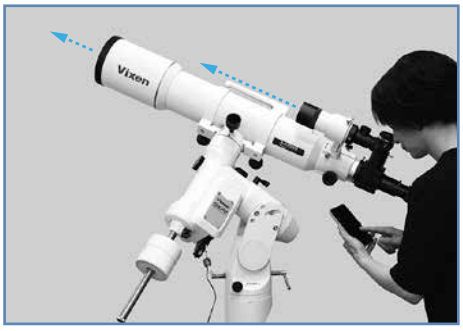
Once the alignment star is acquired, the discrepancy will cease.



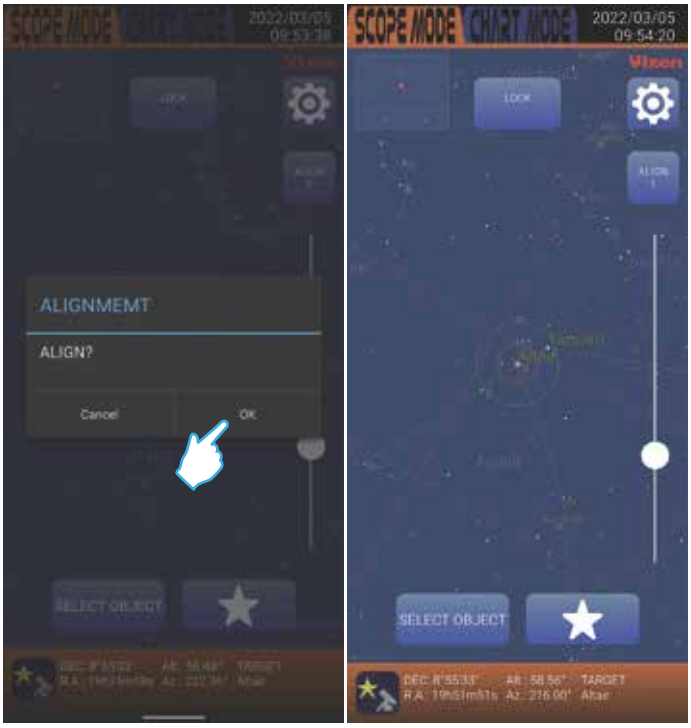
5-2 Center Altair in the field of view of the finderscope first and follow the same star with the telescope's field of view will make corrections of the direction easier.



After you bring Altair into the center of the finder scope's field of view, center the same star in the telescope's viewing field using an eyepiece with low magnification. Then, you change to an eyepiece with high magnification to center the target more accurately.



5-3 After you enter Altair into the center of the field of view, tap ALIGN X (X is an arbitrary number) on the screen. The dialog box appears and confirms the alignment with Altair. Choose OK by tapping it. The first alignment has been completed. The target Altair comes to the center in the center circles on the star chart. The star chart on the screen turns to the SCOPE mode.



6 It is necessary to choose several alignment stars to increase the pointing accuracy of your Go-To slewing. Repeat the procedures from (2) to (5) with different alignment stars. Aligning with stars of three or more will work practically.

IV. GO-TO Slewing

You can enjoy the GO-TO slewing using menus of celestial objects from TARGET OBJECTS after you make alignments with several stars. The target objects are tracked automatically and thus stay in the field of view. (It tracks only the diurnal motion of stars but also allows you to track planets and comets having their peculiar orbital elements.)

USING THE WIRELESS UNIT

Firmware Update

Updating the app should be executed by the instructions for updating on your smartphone. The update may be done automatically depending on the settings in your smartphone. For details, read the manuals for your smartphone.

Procedures for the firmware update.

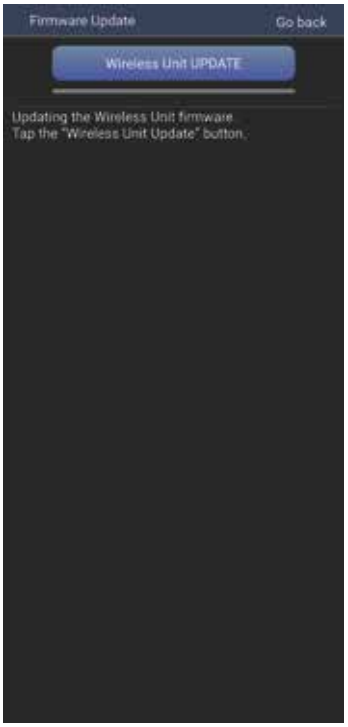
1 Please make sure that your smartphone is fully charged. Disconnecting during the update may cause failure.

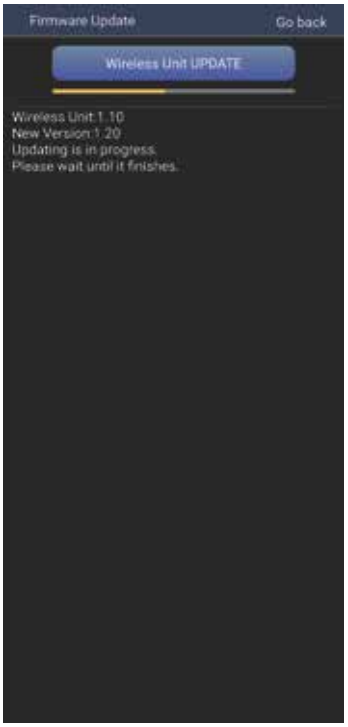
2 Confirm that the power indicator on the Wireless Unit is lit in blue just after you turn ON the power of the equatorial mount. Then start the STAR BOOK Wireless app.

If the app includes an updated firmware version, the dialog box prompting a firmware update will appear on the screen. Tap Wireless Unit UPDATE to advance to the next screen.

The firmware update appears on the screen. Then tap OK. The firmware update starts. (It may take about 5 minutes more or less to finish although it depends on connection environments.)

It is advisable to put the Wireless Unit adjacent to the smartphone during the update. Do not turn OFF the power of the mount Wireless Unit-connected.





Reset Button

You can initialize the Wireless Unit to return to the settings at Vixen's factory. Be aware that the wireless connection settings (SSID/password) are initialized, too. (The firmware has no initialization.)

Pressing the reset button for one second or longer will make the power and wireless indicators blink two times simultaneously. The Wireless Unit will be in the initial state and complete the reset.

If you used the Wireless Unit in the initial state without changing the password, the wireless connection might restart automatically as soon as you complete the reset.

APPLICATION

How to Use the Polar Alignment Scope

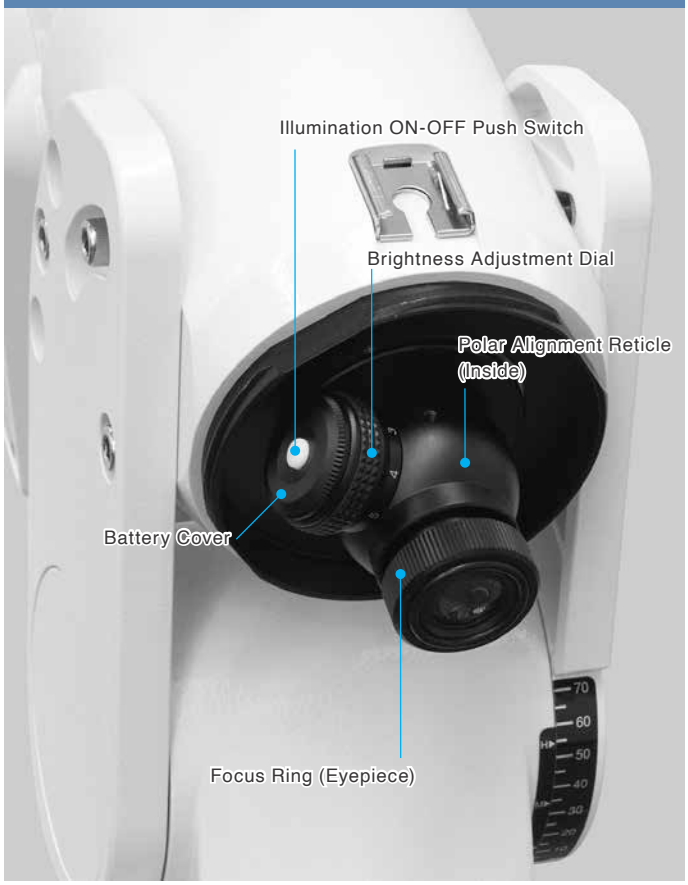
What is a Polar Alignment Scope?

The polar alignment scope is a small telescope equipped parallel to the R.A. axis of an equatorial mount so that it can precisely point to the north (or south) celestial pole. Accurate polar alignment is essential for successful long-exposure astrophotography of deep-sky objects with the equatorial mount. You check the longitude and latitude of your observing place in advance with a GPS or a map before the polar alignment. The polar alignment scope allows you to accurately align the mount to the celestial pole at three arc minutes or less.

Note:

- Inaccurate polar alignment could result in trailed stars and field rotation affectig the outcome of your imaging.
- It is not usable to tilt the mount over 70 degrees in both hemispheres.

Name of Each Part



Legend on the Polar Alignment Reticle

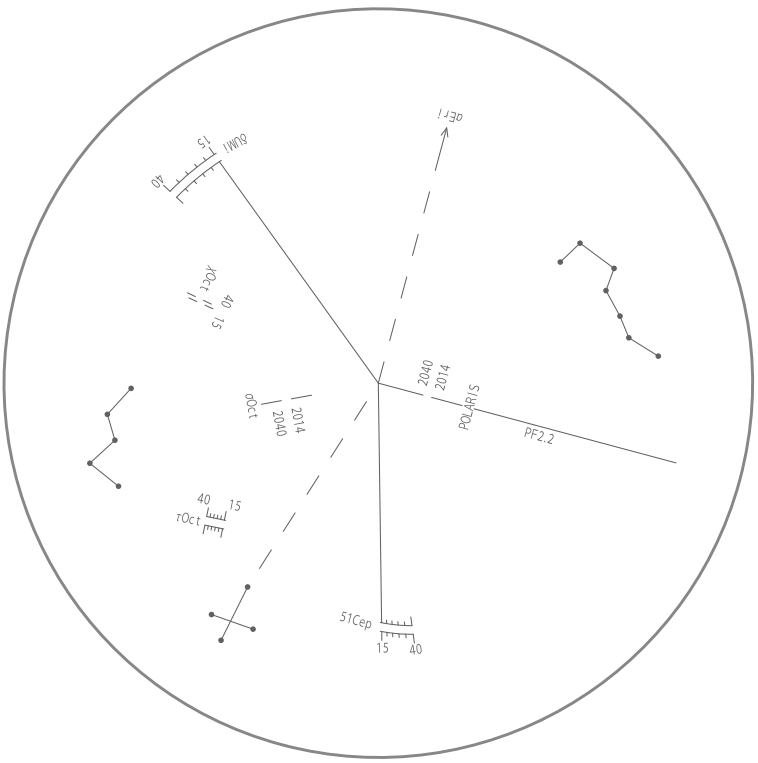
	Name	Constellation
In the Northern Hemisphere	POLARIS	Little Bear
	δUMi	Little Bear
	51Cep	Cepheus
	Useful guiding stars and constellations	
	“W” shape	Cassiopeia
	Big Dipper	Big Bear
In the Southern Hemisphere	σOct	Octans
	τOct	Octans
	χOct	Octans
	Useful guiding stars and constellations	
	Southern Cross	Crux
	αEri	Eridanus

Meaning of numbers

15 – the year 2015

40 – the year 2040

The position scales on the reticle are 5-year increments.

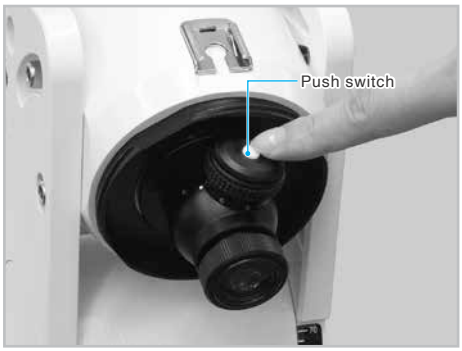


APPLICATION

Components Guide

Illumination Reticle ON and OFF

There is a push switch on the top of the brightness adjustment dial of the polar alignment scope. Depressing the push switch will illuminate the polar alignment reticle in red light. The red light goes dimmer gradually after a certain period of lighting (about one or two minutes) and turns off automatically.

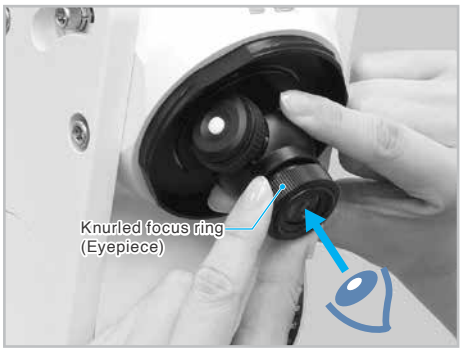


Adjusting the Brightness

The brightness of the illuminated reticle in red can be varied in eight steps by turning the brightness adjustment dial on the polar alignment scope.

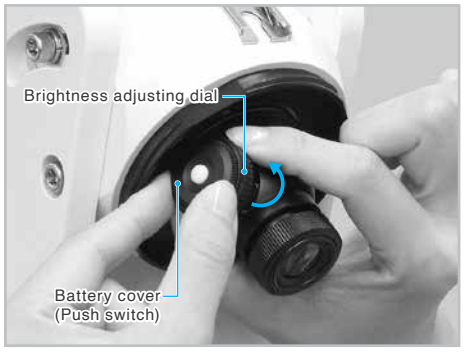
Focusing on the Polar Alignment Reticle

You focus on the polar alignment reticle by turning the eyepiece part of the polar alignment scope. While holding the polar alignment scope's body with one hand, turn the eyepiece part with the other.



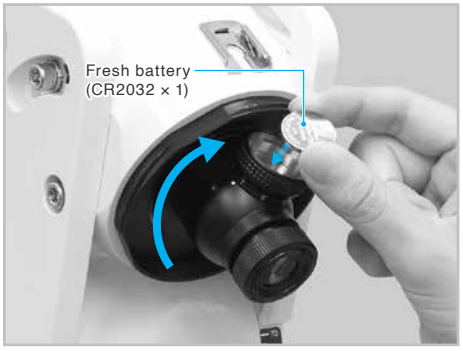
Replacing the Battery

1 While holding the brightness adjustment dial with one hand, remove the battery cover (the push switch) on the top part of the brightness adjustment dial by turning it counterclockwise with the other.

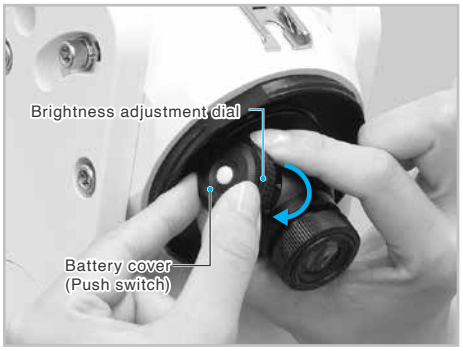


2 Tilt the battery compartment on the polar alignment scope downward so that the old battery can fall out from the battery compartment, as shown in the figure.

3 Turn the battery compartment upward and insert a fresh battery in the battery compartment. The bottom of the battery compartment is the plus-polarity.



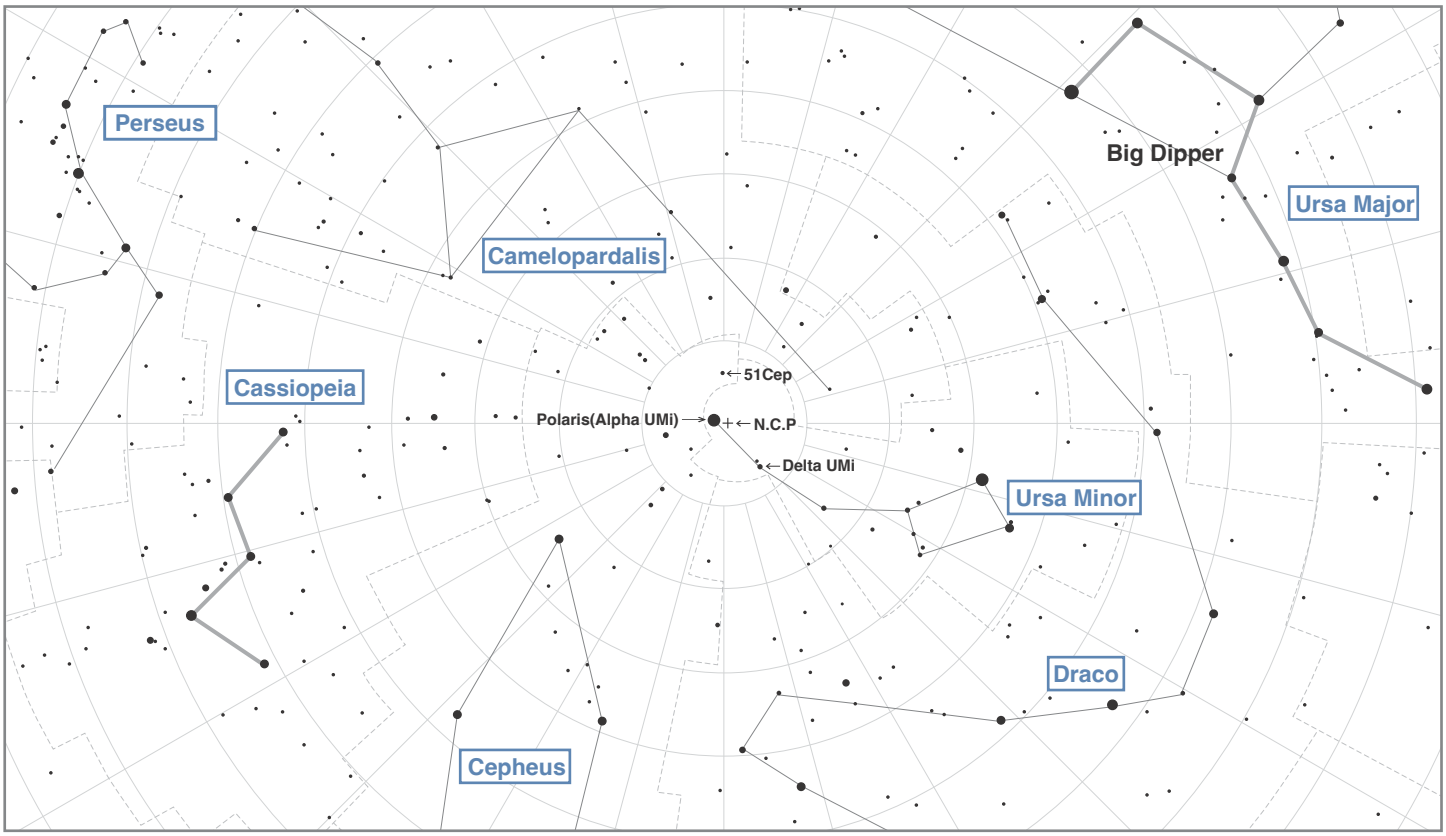
4 Replace the battery cover in place. Check if the illumination is lit by turning on the switch.



APPLICATION

Polar Alignment in the Northern Hemisphere

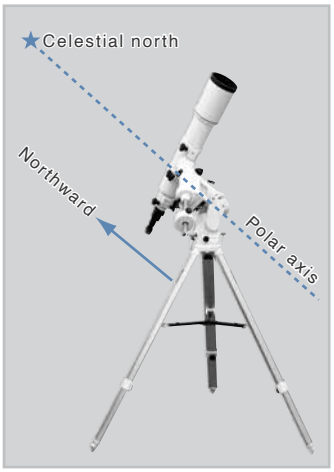
Align the equatorial mount to the north celestial pole (N.C.P.) in the northern hemisphere. The polar alignment scope utilizes 3 stars, i.e. Polaris, Delta Umi, and 51 Cap near the North Pole. Positions of the above stars are plotted on the polar alignment reticle. To locate the N.C.P., you match the three stars on the reticle with the three stars of the same seen in the polar alignment scope. The patterns of both the Big Dipper and Cassiopeia are engraved on the reticle also for use as a guidepost for the N.P.C.



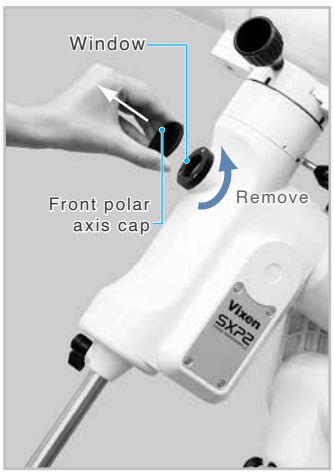
1 Check your observation site with a compass, a GPS, or a map in advance to confirm that Polaris and the Big Dipper or Cassiopeia can be seen from an observing location on the date of your observation.

The constellations the Big Dipper (part of Ursa Major) and Cassiopeia are near Polaris. You can find Polaris if you know the positions of these groups of stars. The Big Dipper and Cassiopeia are constellations seen in Spring and Autumn respectively.

2 Set up the telescope on flat and hard ground where you can see Polaris in the sky. A rough setting with a compass to point your telescope's equatorial mount to Polaris will work sufficiently in observing celestial objects visually.



3 Remove both the front polar axis cap on the declination body and the rear cap on the polar axis body. Extend the counterweight bar fully to secure the sight of the polar alignment scope.



4 Turn on the power switch of the mount and advance the initial settings until the telescope's home position screen appears on your smartphone.

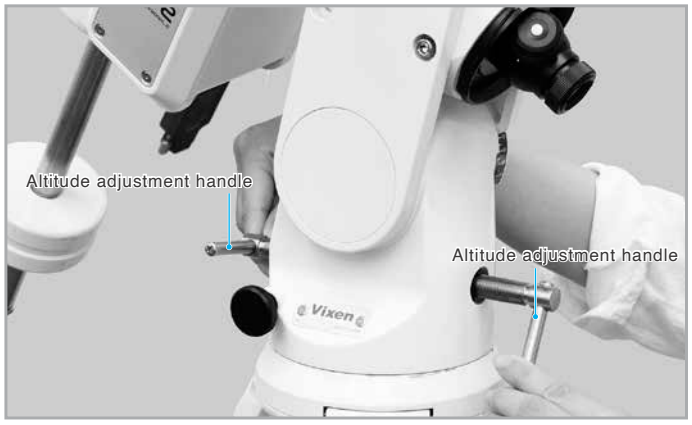
You can move the mount by swiping the screen on the smartphone with your fingers.

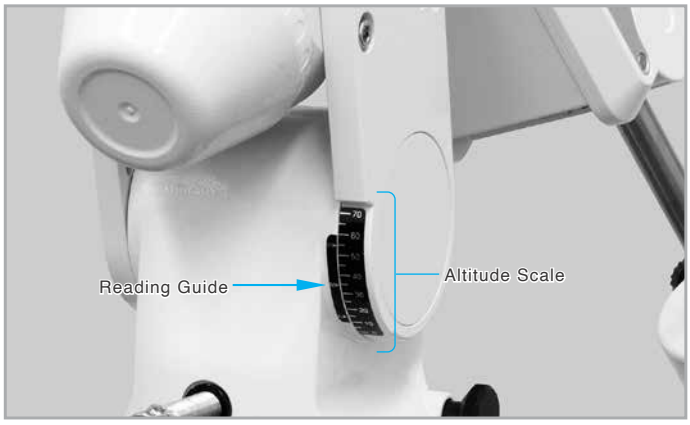
Vertical direction: DEC movement
Horizontal direction: R.A. movement

5 While looking into the opening on the declination body, which is in front of the objective lens side of the polar alignment scope, turn the declination body by swiping the smartphone's screen vertically until the objective lens of the polar alignment scope can be visible from the opening.

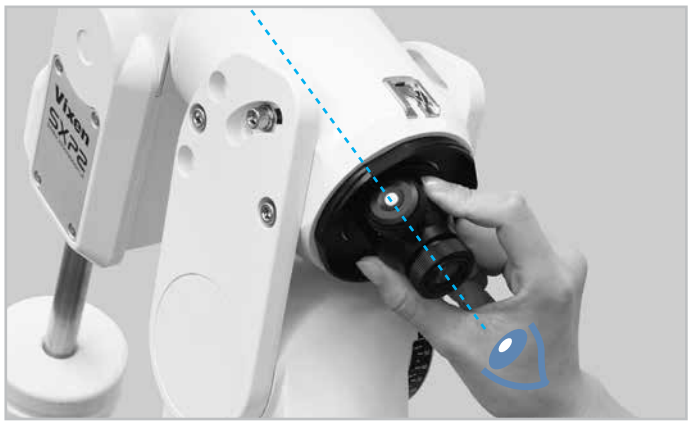
The declination body does not turn manually. Rotate it using the STAR BOOK Wireless app.

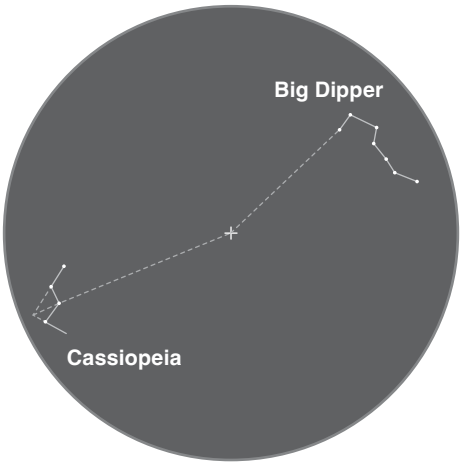
6 Turn the altitude adjustment handles so that the indicator of the altitude scale matches the latitude of your observation site. When you turn the altitude adjustment handles, unfastening one side of the handle will allow fastening the handle on the other side.



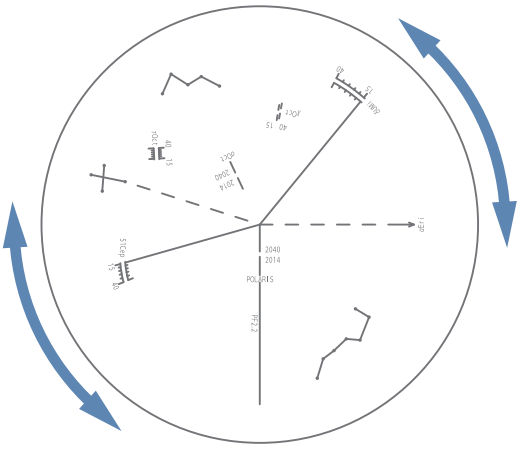


7 While looking through the eyepiece of the polar alignment scope, rotate the scope body so that the orientation of the engraved Big Dipper (or Cassiopeia) on the reticle matches the Big Dipper (or Cassiopeia) in the real sky.





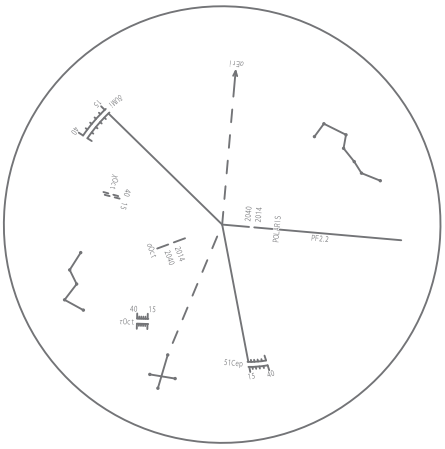
Field of view of the polar alignment scope



Turn the polar alignment scope to match the constellation patterns on the reticle with the constellations in the real sky in orientation.

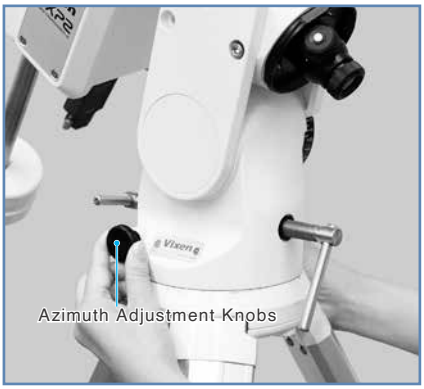
The actual stars of the Big Dipper (or Cassiopeia) are not visible in the field of view of the polar alignment scope.

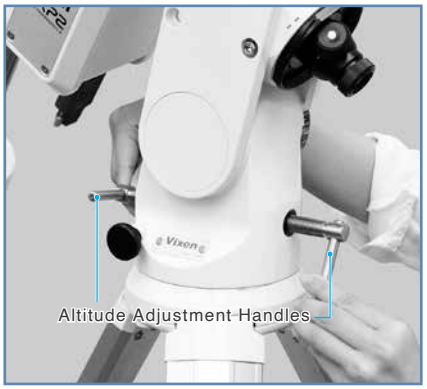
Actual field of view (in the northern sky)



Note :
The patterns of the Big Dipper and Cassiopeia on the reticle are positioned to correspond to the real sky. These are used as a guidepost to know the turning direction of the reticle on the polar alignment scope. The positions of the Big Dipper and Cassiopeia on the reticle have no relationship with the positions of Polaris, Delta UMi, and 51 Cep on the reticle. From this point, the following steps will bring Polaris, Delta UMi, and 51 Cep on the reticle closer to the actual stars.

8 While looking through the eyepiece of the polar alignment scope, adjust the direction of the mount with the altitude adjustment handles and azimuth adjustment knobs alternatively so that Polaris comes as close as possible to the designated position on the reticle.

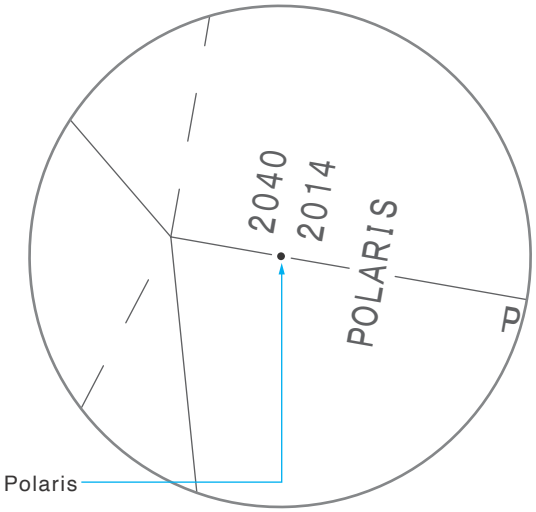




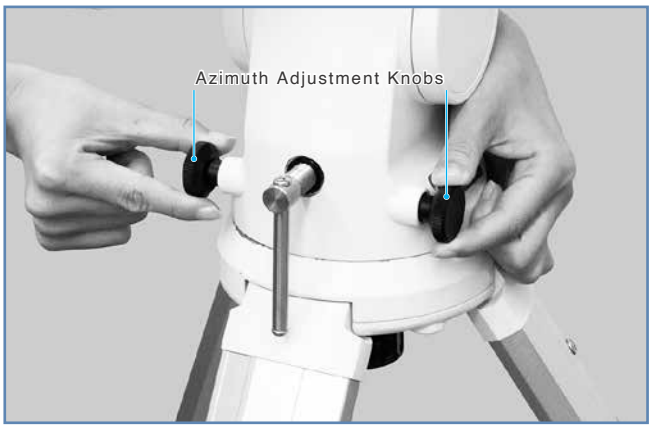
Introduce Polaris to the space between the two segments of the lines marked 2014 and 2040.

Polaris is relatively conspicuous in this area in the sky as it is a bright 2nd magnitude star adjacent to the north celestial pole.

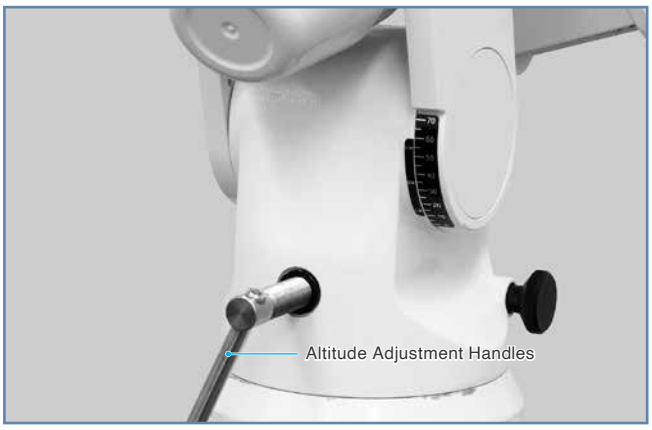
You match the orientation of the reticle and introduce Polaris into the gap between the two linear lines



9 When you turn the azimuth adjustment knobs, unfastening one side of the azimuth adjustment knob will allow fastening the knob on the other side to change the azimuth direction.



10 Turn the altitude adjustment handles so that Polaris can come as close to the designated position on the reticle.

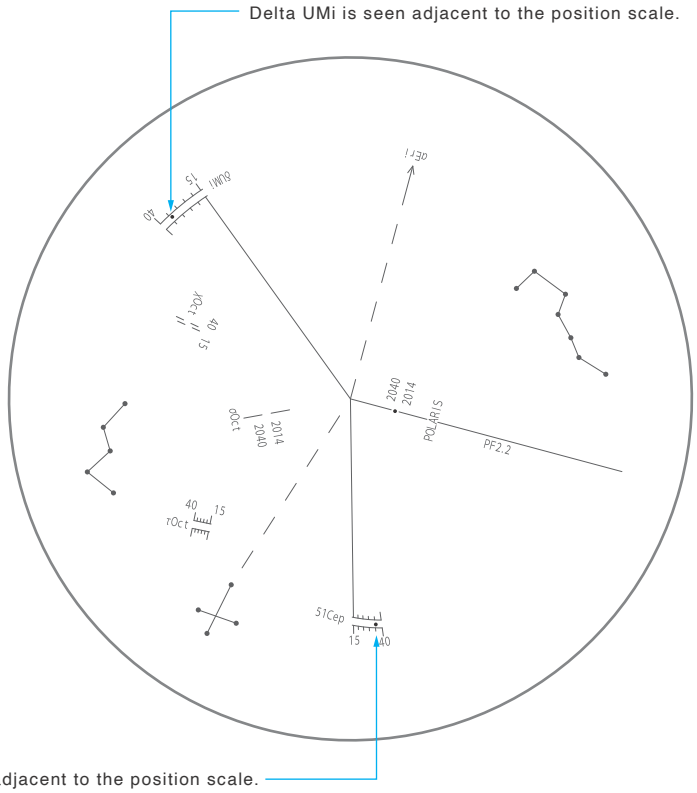


11 Because Polaris shifts to the designated position on the reticle, Delta UMi and 51 Cep come close to their respective designated positions on the scale. While looking through the eyepiece of the polar alignment scope, rotate the polar scope body so that Delta UMi and 51 Cap positions on the reticle come closest to actual UMi and 51 Cep.

The numbers 15 and 40 on the scales show the positions of UMi and 51 Cap in 2014 and 2040 respectively.

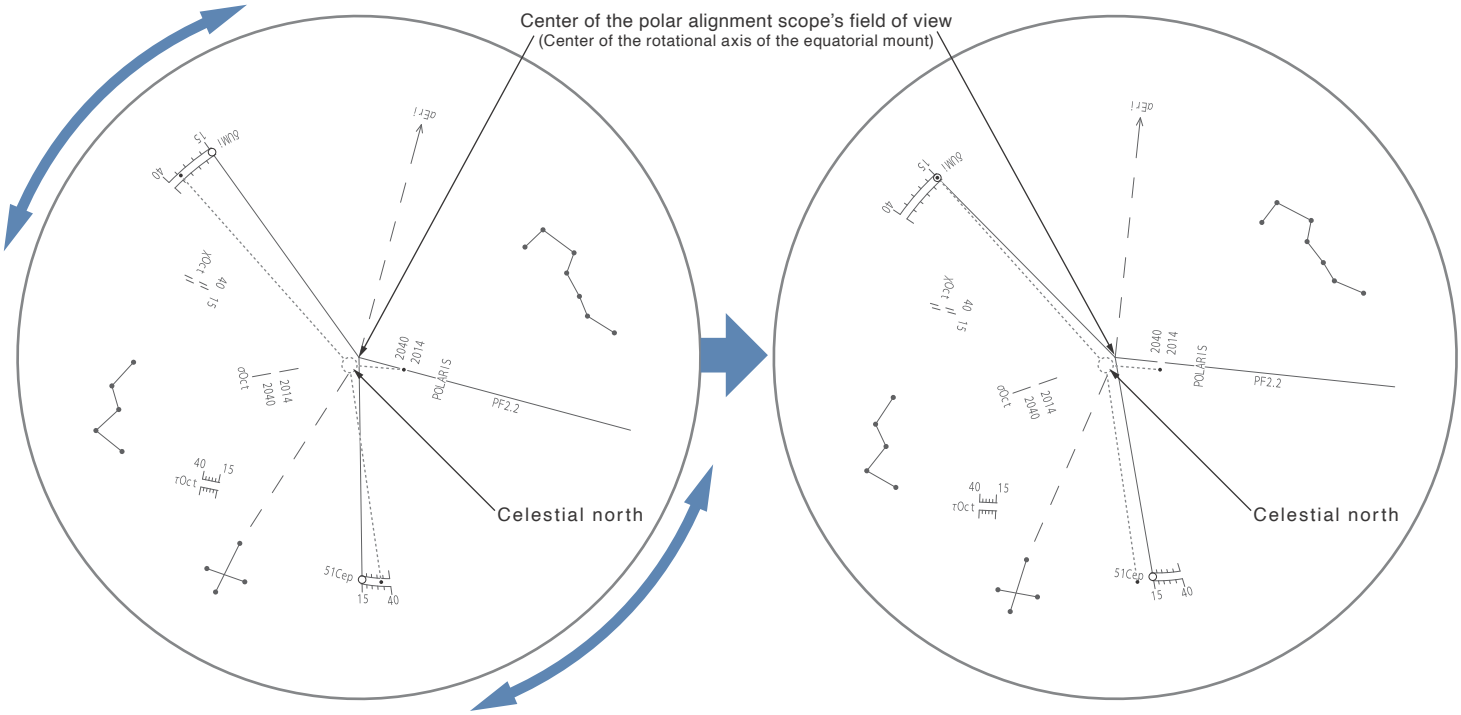
If Polaris comes to the correct position on the reticle, Delta UMi and 51 Cap can be seen near the designated position on the reticle.

Adjust the brightness of the reticle illumination to be dimmer if the reticle is too bright to see the approximately 5th magnitude Delta UMi and 51 Cep.



APPLICATION

Polaris is out of place from the designated position. This is part of the process.

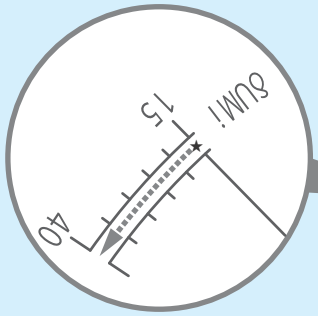


There is no mark in the sky to point to the North Celestial Pole. To locate the N.C.P., you use a conspicuous star like Polaris and two visible nearby stars in the same area in the sky. Your goal is to set Polaris of the year 2014 on the space between the two segments of the lines and place Delta UMi and 51 Cep on the year 2014 position of the position scales respectively. (In the case of the year 2014)

The illustrations above show that you turn the polar alignment scope body so that Delta UMi can come near the position of the year 2014 on the designated position scale.

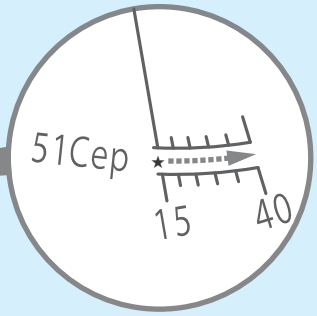
Consequently, Polaris got out of position from the space between the lines.

If the 5th magnitude 51 Cep is hard to see in the field of view of the polar alignment scope, it is all right to set only Delta UMi on the position scale of the reticle. You reduce the illumination for the reticle to the minimum if it is too bright to see the 5th-magnitude star.



The movement of Delta UMi from 2014 to 2040 by precession

The movement of Polaris from 2014 to 2040 by precession

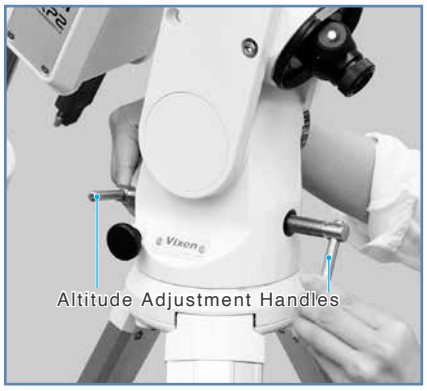


The movement of 51 Cep from 2014 to 2040 by precession

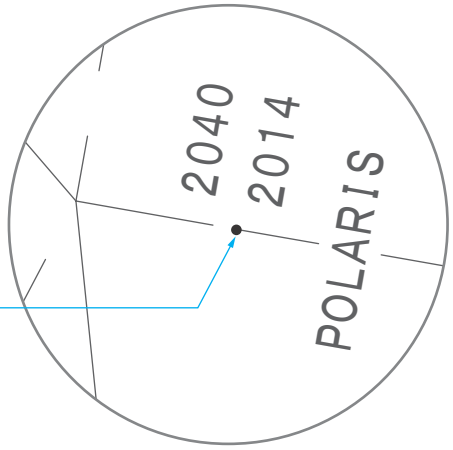
Precession of the equinoxes

The location of Polaris, Delta UMi, and 51 Cep on the position scales change year by year due to the precession of the Earth. You need to compensate for the location of the three stars on the position scales yearly.

12 While looking through the eyepiece of the polar alignment scope, turn the altitude adjustment handles and azimuth adjustment knobs so that Polaris and the other two stars come as close as possible to the designated positions on the scales.

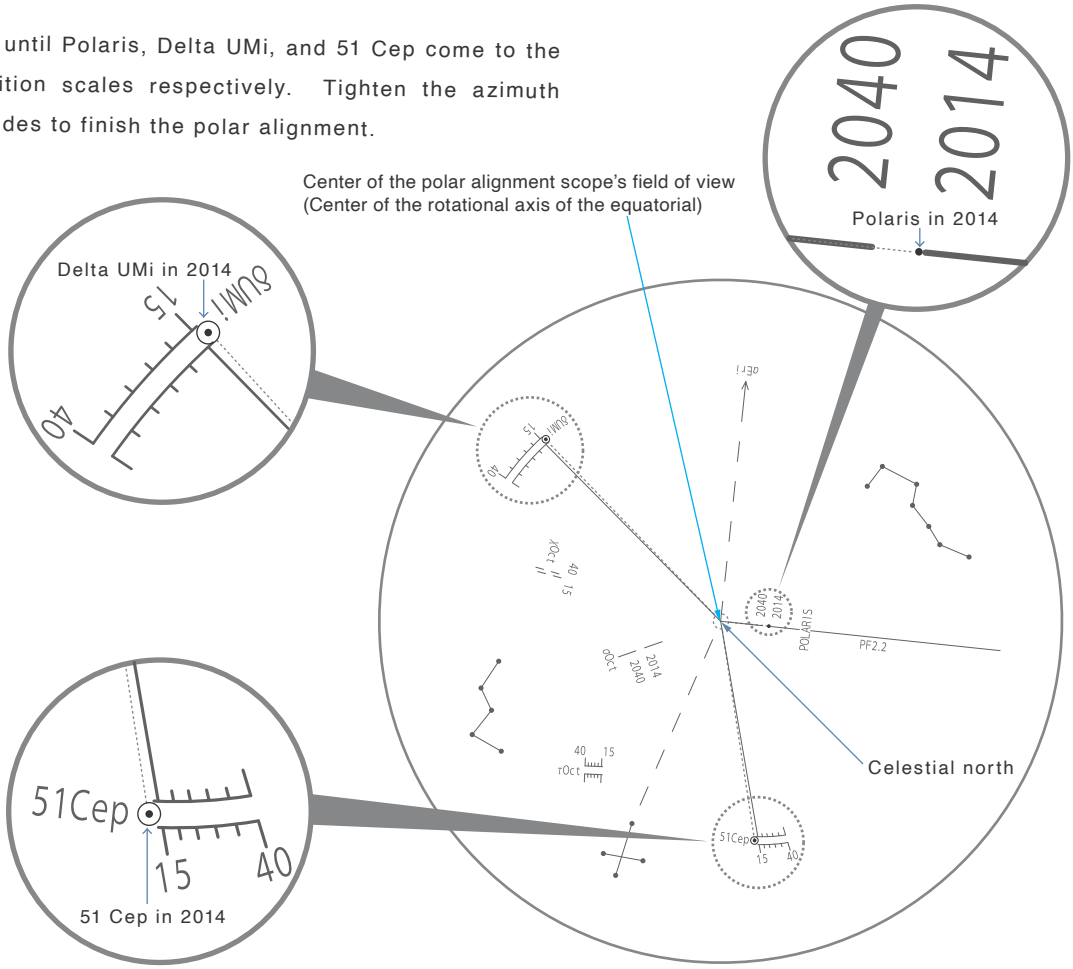


Tips :
You introduce Polaris into the designated position with the altitude adjustment handles first, and then the azimuth adjustment knobs.
You introduce Delta UMi and 51 Cap by rotating the polar alignment scope (for turning the reticle).



Set Polaris to the position corresponding to the year of your observation.

13 Repeat procedures 11 and 12 until Polaris, Delta UMi, and 51 Cep come to the proper positions on the position scales respectively. Tighten the azimuth adjustment knobs from both sides to finish the polar alignment.

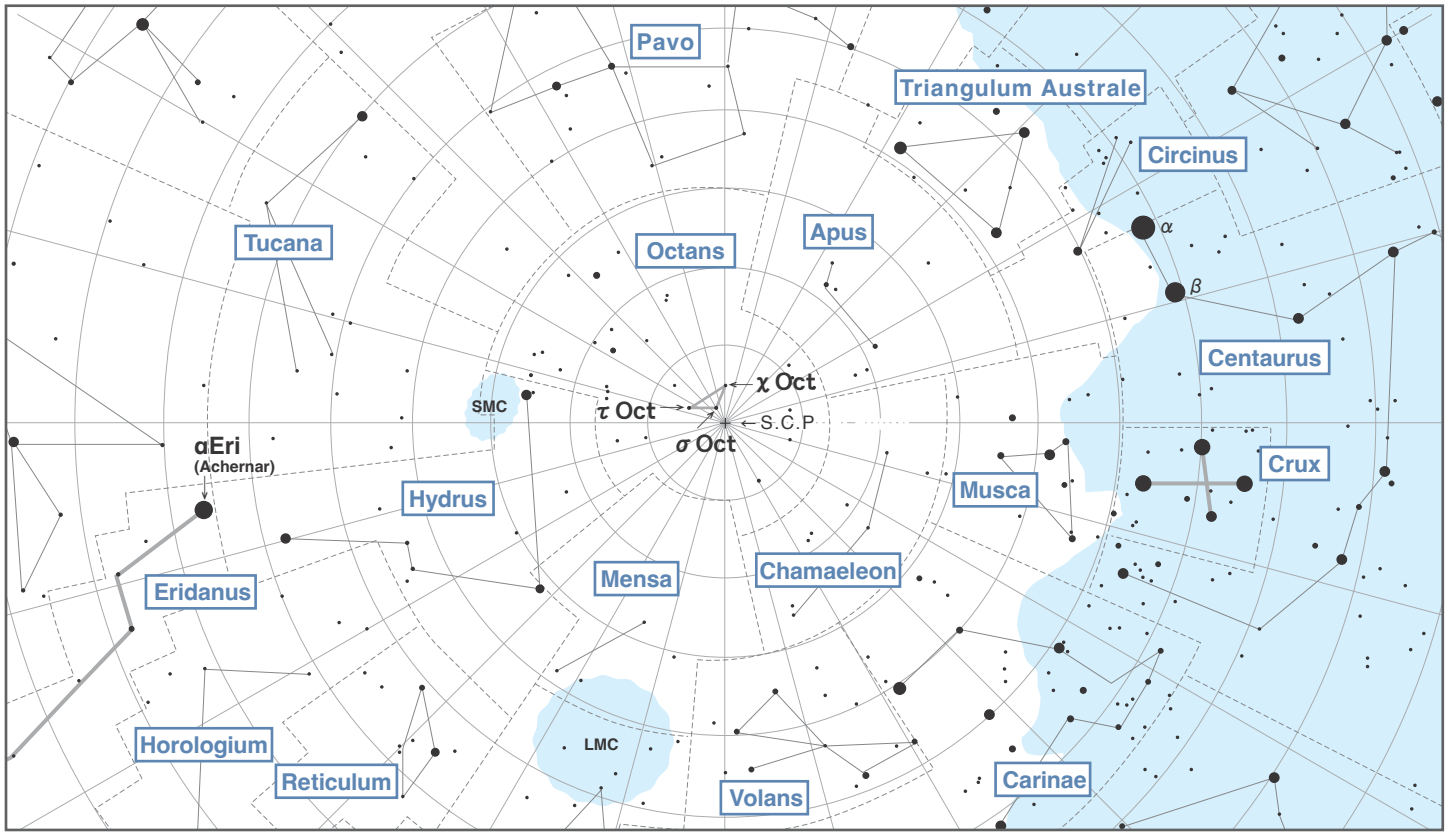


As an illustration here, Polaris is set to the edge of the line on the side of 2014. Delta UMi and 51 Cep are set between the two curved lines of the position scales and put near the protruded line on the scale. (In the case of the year 2014) Perfect!

APPLICATION

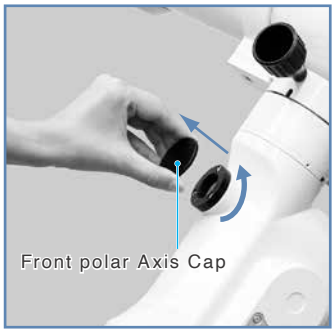
Polar Alignment in the Southern Hemisphere

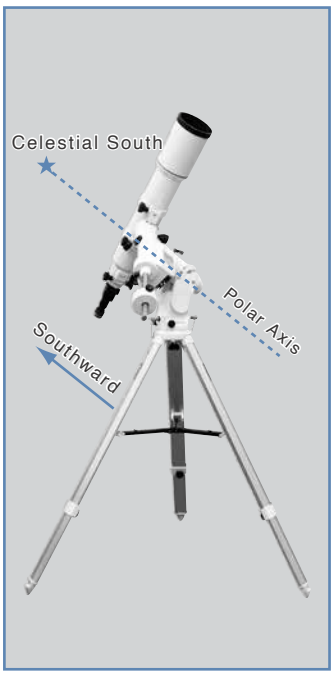
In the southern hemisphere, you align the equatorial mount to the south celestial pole (S.C.P.). The position scales for three stars near the S.C.P. are engraved on the reticle for the polar alignment. These stars are Sigma, Tau, and Chi in the constellation Octans. To locate the S.C.P., you merely match the scale positions on the reticle with the designated three stars you find in the field of view of the polar alignment scope. The patterns of Crux (the Southern Cross) and Alpha Eridani (Achernar) are indicated on the reticle to serve as a guidepost for the S.P.C.



1 Check your observing site with a compass, a GPS, or a map in advance to confirm that Octans, the Southern Cross, and Alpha Eridani can be seen from your observing location on the date of your observation.

2 Set up a telescope on flat hard ground where you can see Octans in the sky. Remove both the front polar axis cap on the declination body and the rear cap on the polar axis body.



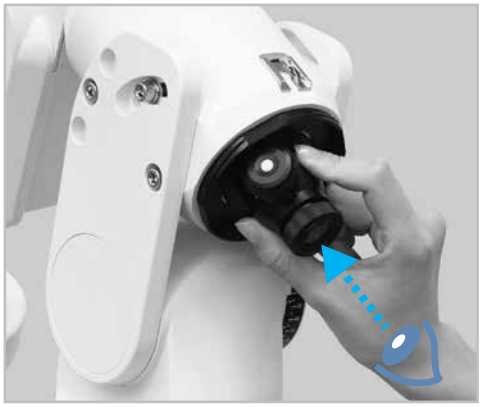


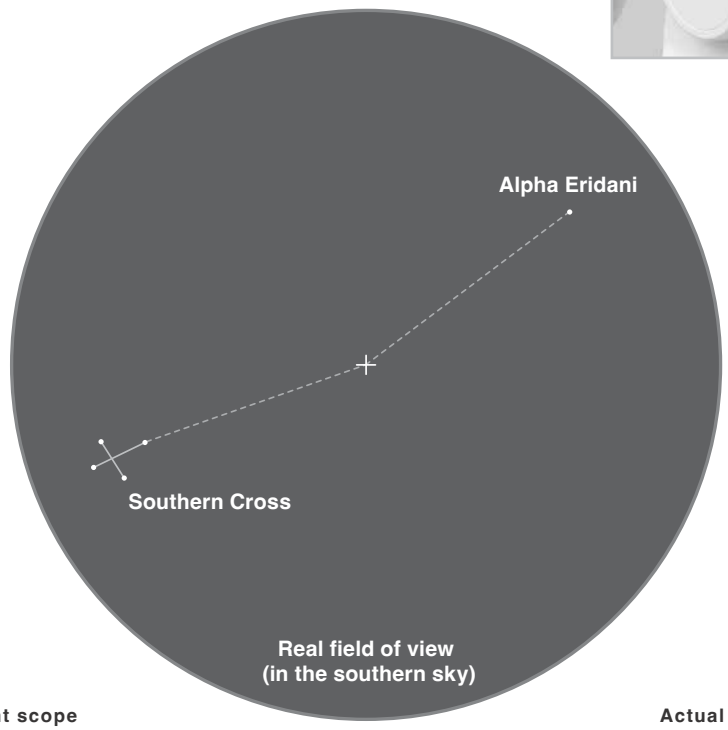
3 Turn on the power switch of the mount and advance the initial settings until the telescope's home position screen appears on the smartphone. You position the telescope tube to be level toward the east in the southern hemisphere.

APPLICATION

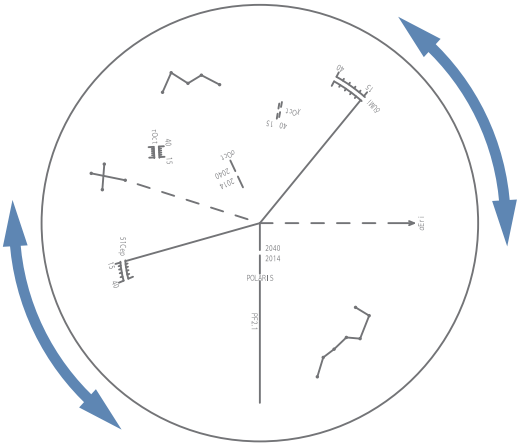
Tips:
Unlike Polaris, a bright 2nd magnitude star adjacent to the N.C.P., the constellation Octans is made up of dark stars about 5th magnitude on average. The nearest star to the S.C.P. is Sigma Octantis, one of four stars forming a trapezoid in Octans, visible at 5.5th magnitude. Practice may be required to locate the inconspicuous Sigma, Tau, and Chi from Octans.

4 While looking through the polar alignment scope, you turn the scope body to match the Southern Cross on the reticle with the orientation of Crux in the actual sky. Or you turn the scope body to match the direction of Alpha Eridani indicated on the reticle with Alpha Eridani in the actual sky.





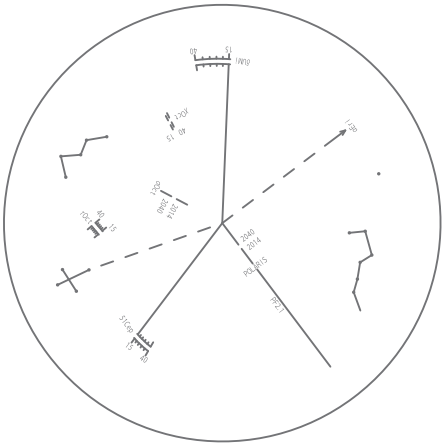
Field of view of the polar alignment scope



Turn the polar alignment scope to match the constellation patterns on the reticle with the constellations in the actual sky in orientation.

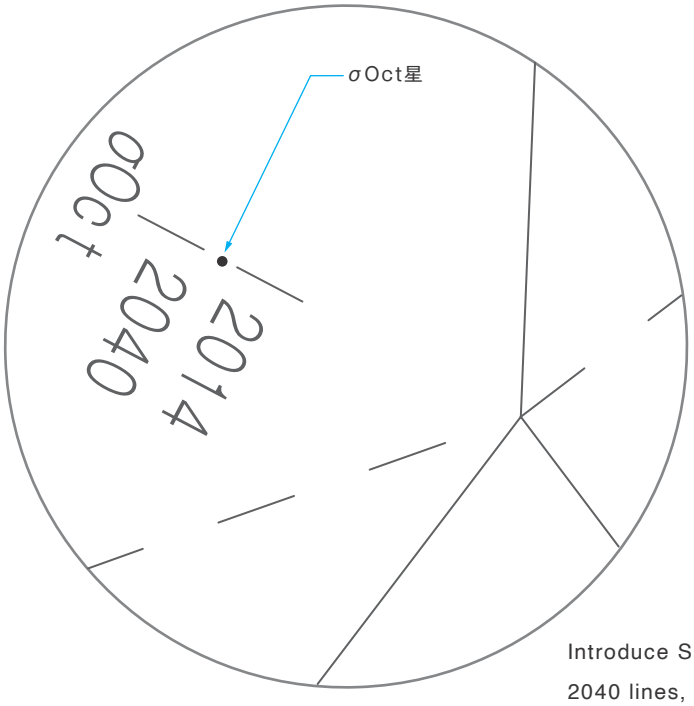
The actual stars of Crux (or Alpha Eridani) are not visible in the field of view of the polar alignment scope.

Actual field of view (in the southern sky)



Note :
The patterns of Crux and Alpha Eridani on the reticle are positioned to correspond to the actual sky. These are used as a guidepost to know the turning direction of the reticle on the polar alignment scope. The positions of Crux and Alpha Eridani on the reticle have no relationship with the positions of Octans stars on the reticle.

5 While looking through the eyepiece of the polar alignment scope, adjust the direction of the mount with the altitude adjustment handles and azimuth adjustment knobs alternatively so that Sigma Octantis comes as close as possible to the designated position on the reticle.

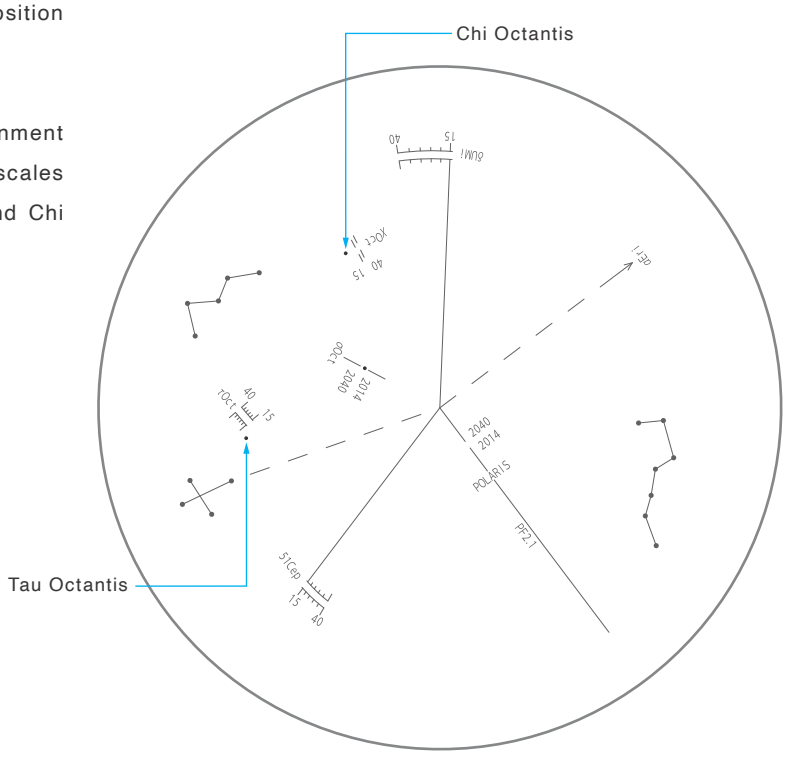


Introduce Sigma Octantis into the space between the two segments of 2014 and 2040 lines, as shown in the figure.

Turn the scope body so that the space between the two segments on the reticle comes as close as possible to Sigma Octantis.

6 As Sigma Octantis shifts toward the designated position on the reticle, both Tau and Chi Octantis come close to their position scales respectively.

While looking through the eyepiece of the polar alignment scope, turn the scope body so that each of the position scales for Tau and Chi Octantis come closest to actual Tau and Chi Octantis in the scope's field of view.



APPLICATION

Precise Polar Alignment (Drift Alignment – for advanced users)

If you precisely align the mount with the provided polar alignment scope, the mount will keep tracking the celestial objects in a field of view of your telescope's eyepiece.
It enables you to take 5 to 10 minutes of exposure with a telephoto lens of 200mm focal length or less in taking astrophotography.

However, if you take an exposure longer than 10 minutes or use a telephoto lens of a focal length longer than 200mm, you require more precise polar alignment. The following method of polar alignment is called 'Drift Alignment'. You perform the polar alignment by watching the movements of a bright star in the field of view of an eyepiece.

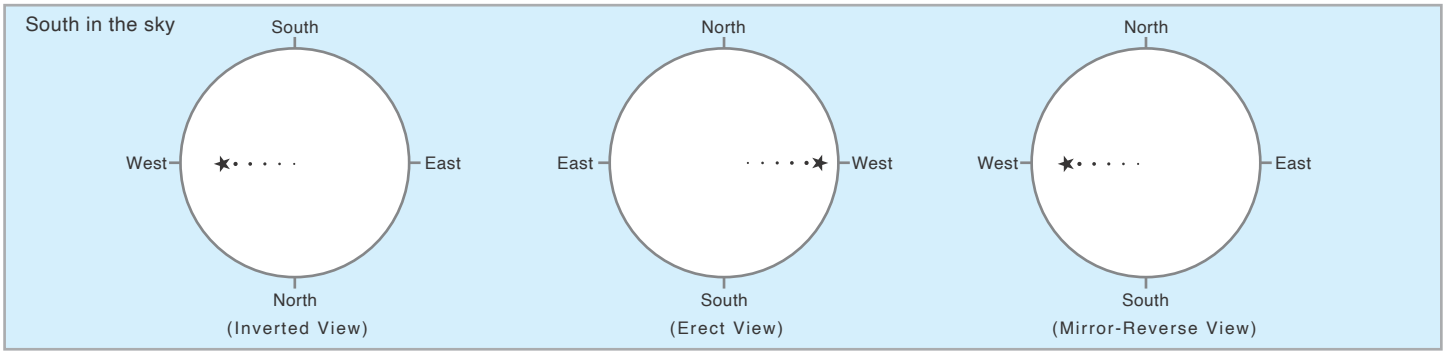
Perform drift alignment before you proceed to star alignment using the STAR BOOK Wireless Unit. Information acquired by the star alignment corrects a deviation from the polar axis on the mount automatically. If this is done first, it will spoil the drift alignment as the deviation disappears.

Drift Alignment in the Northern Hemisphere

1 First, align the mount to the north celestial pole using the polar alignment scope. It will save time during the process of drift alignment.

2 Align the mount to match the direction of azimuth with your observing site. Prepare an eyepiece with an illuminating cross hairs reticle. Choose a bright star just north of the celestial equator near the meridian (due south), and put it in a field of view of the eyepiece. Turn off the power switch of the mount momentarily while looking through the eyepiece to see which direction the star moves. Confirm the west and rotate the eyepiece so that one of the crosshairs can be parallel to the east-west direction in the field of view.

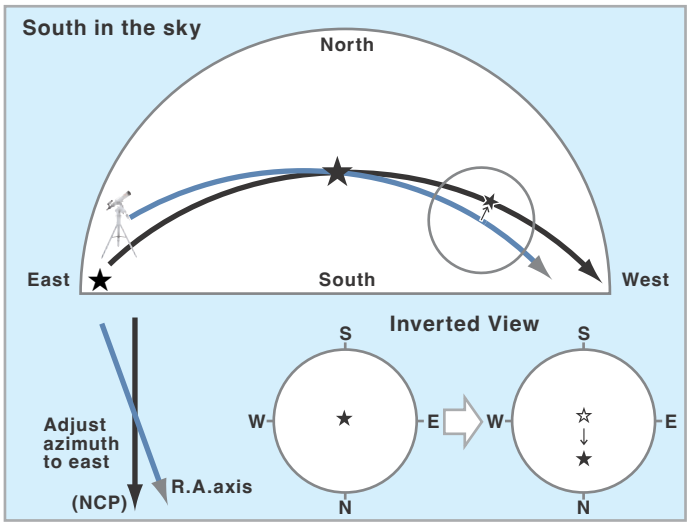
The figure shows the directions of north, south, east, and west in the eyepiece according to the types of telescopes with or without a star diagonal.

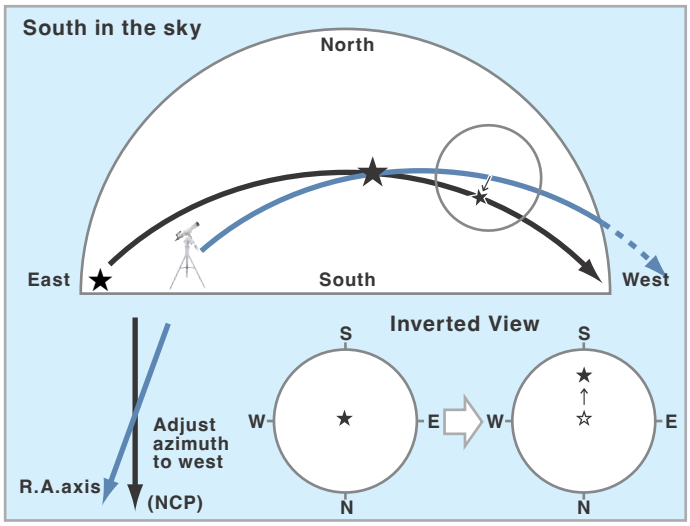


The following descriptions are based on a refracting telescope without a star diagonal. Drive the mount at a sidereal rate and look through the eyepiece to monitor the drift motion of the star in the north-south direction.

If the star drifts north (i.e., it seemingly moves down due to the inverted view), move the mount to the east with the azimuth knobs.
If the star drifts south (i.e., it seemingly moves up due to the inverted view), move the mount to the east with the azimuth knobs.

You may find that the star in the field of view moves slightly in the east-west direction, but disregard it at this stage and continue the adjustments.

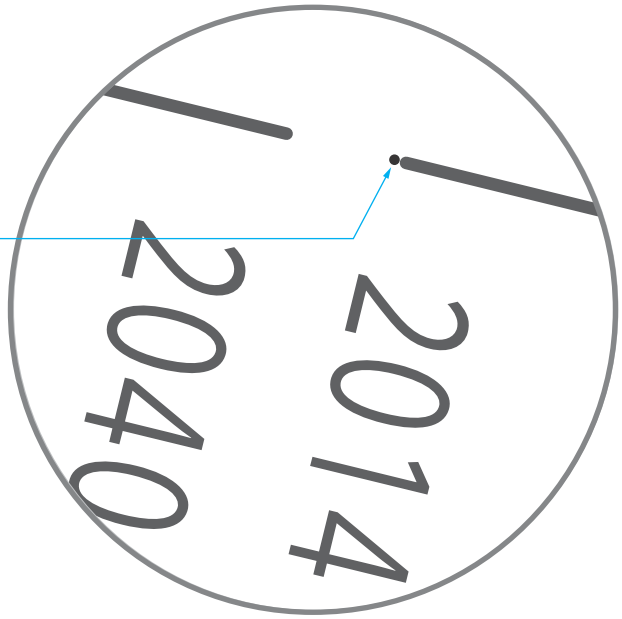




Continue the adjustments until the star stops drifting in the north (star drifts down) or south (star drifts up) direction. You finish the drift alignment in the azimuth direction.

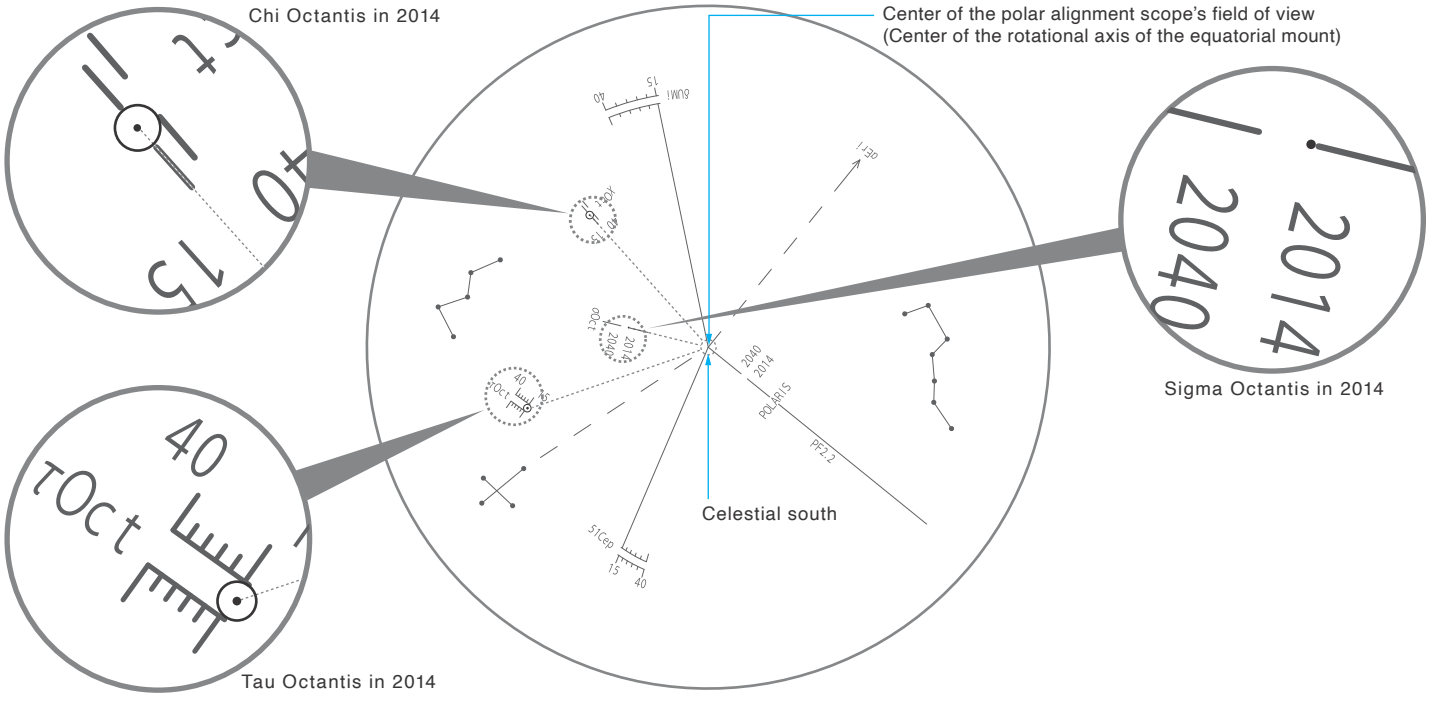
7 While looking through the eyepiece of the polar alignment scope, turn the altitude adjustment handles and azimuth adjustment knobs so that Sigma Octantis and the other two stars come as close as possible to the designated positions on the scales.

Set Sigma Octantis to the position corresponding to the year of your observation.



Tips:
Introduce Sigma Octantis into the designated position with the altitude adjustment handles first, and then the azimuth adjustment knobs.
Introduce Tau and Chi Octantis by rotating the polar alignment scope (for turning the reticle).

8 Repeat procedures 6 and 7 until Sigma, Tau, and Chi Octantis come to the proper positions on the position scales respectively. Tighten the azimuth adjustment knobs from both sides to finish the polar alignment.

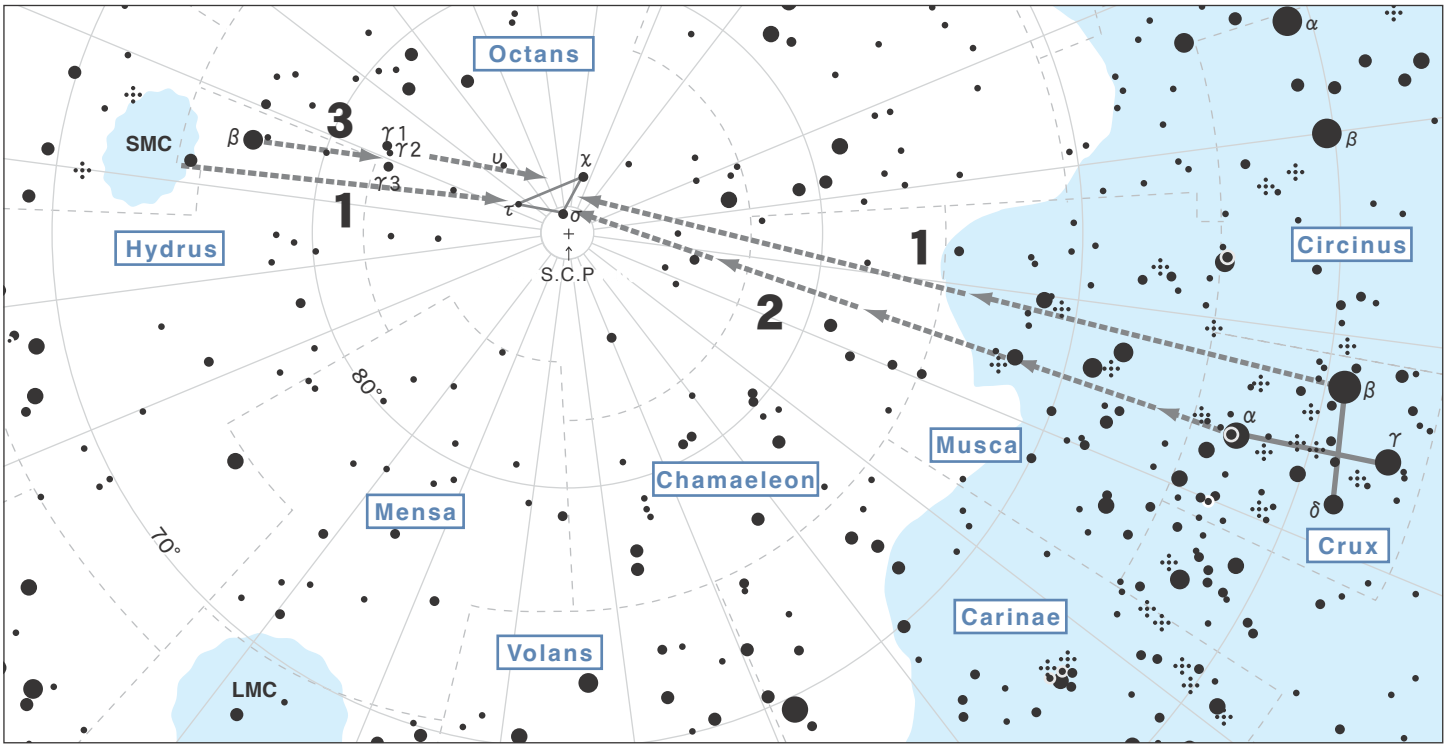


As an illustration here, Sigma Octantis is set to the edge of the line on the side of 2014. Both Tau and Chi Octantis are between the two curved lines of the position scales and are put near the protruded line on the scale. (In the case of the year 2014) Perfect!

APPLICATION

Tips on Finding the Constellation Octans

There are methods that you locate inconspicuous Octans using the surrounding stars and constellations.



Note: The orientation of Octans changes depending on the seasons of the year.

1 Directing to Octans using Small Magellanic Cloud and Crux (the Southern Cross)

Draw an imaginary line between the center of SMC and Beta Crux, and divide it at a ratio of one to two. You will find the four stars of Octans at the divide point.

2 Directing to Octans using the arrangement of stars of Crux (the Southern Cross)

Draw an imaginary line extended toward SMC with a different imaginary line drawn between Alpha and Gamma Crux. The imaginary line from Crux reaches the Octantis three stars when extended by 4.5 times.

3 Directing to Octans using SMC, Beta Hydrus, and Gamma Octantis

f you cast your eyes from SMC toward Crux by little, you will find Beta Hydrus. Going southward toward Crux from Beta Hydra will make you find Gamma Octantis, which consists of a row of three stars. Continue on your eyes by the same distance toward Crux, and you will find the four stars of Octans.

About PF-L Assist App

The PF-L Assist app helps align a Vixen equatorial mount to the north celestial pole or south celestial pole by simulating the field of view of the polar alignment scope. The app displays the current night sky which can be seen in your location, and it will guide you to match the orientation of the constellations on the reticle in the polar alignment scope with the constellations in the real sky when you set up the equatorial mount.

You can readily locate stars designated for polar alignment even if the constellation is hidden by trees or buildings, when the night sky is affected by city lights, or when you set up the equatorial mount at dusk.

PF-L Assist

The free download PF-L Assist app is available for iPhone, Android, and Kindle Fire.
Visit our website at: https://www.vixen.co.jp

Download on the App Store

ANDROID APP ON Google play

APPLICATION

Precise Polar Alignment (Drift Alignment – for advanced users)

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However, if you take an exposure longer than 10 minutes or use a telephoto lens of a focal length longer than 200mm, you require more precise polar alignment. The following method of polar alignment is called 'Drift Alignment'. You perform the polar alignment by watching the movements of a bright star in the field of view of an eyepiece.

Perform drift alignment before you proceed to star alignment using the STAR BOOK Wireless Unit. Information acquired by the star alignment corrects a deviation from the polar axis on the mount automatically. If this is done first, it will spoil the drift alignment as the deviation disappears.

Drift Alignment in the Northern Hemisphere

1 First, align the mount to the north celestial pole using the polar alignment scope. It will save time during the process of drift alignment.

2 Align the mount to match the direction of azimuth with your observing site. Prepare an eyepiece with an illuminating cross hairs reticle. Choose a bright star just north of the celestial equator near the meridian (due south), and put it in a field of view of the eyepiece. Turn off the power switch of the mount momentarily while looking through the eyepiece to see which direction the star moves. Confirm the west and rotate the eyepiece so that one of the crosshairs can be parallel to the east-west direction in the field of view.

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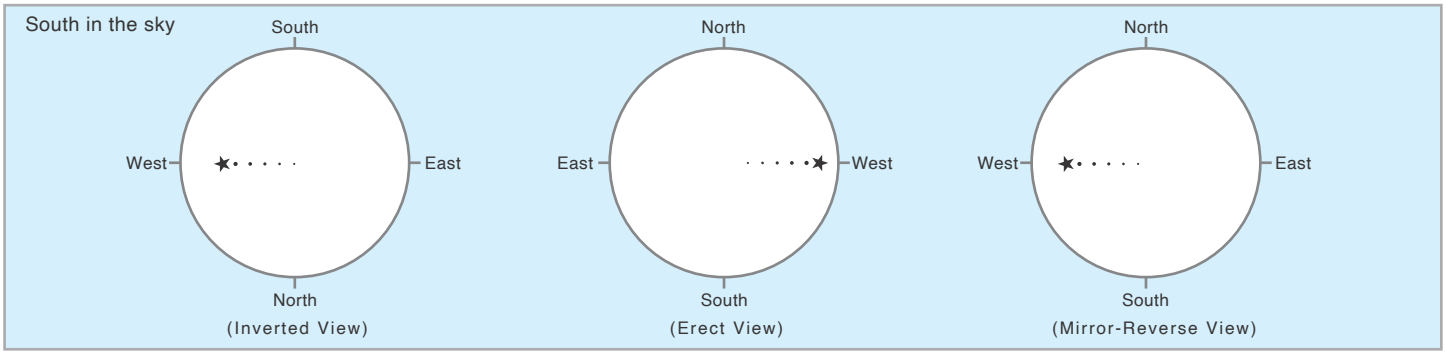

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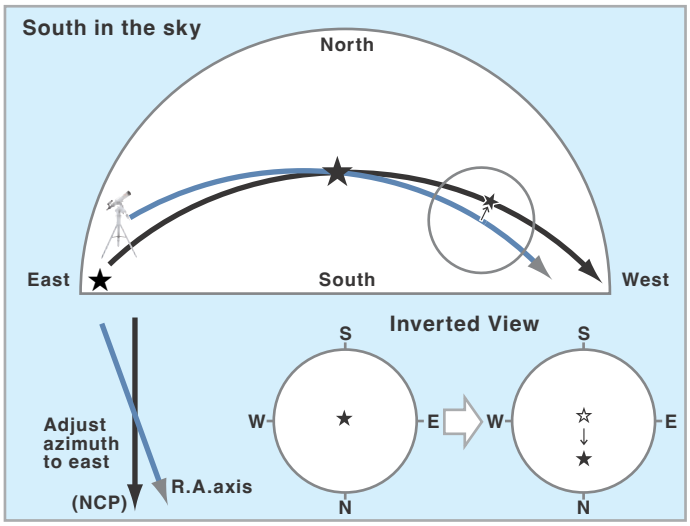
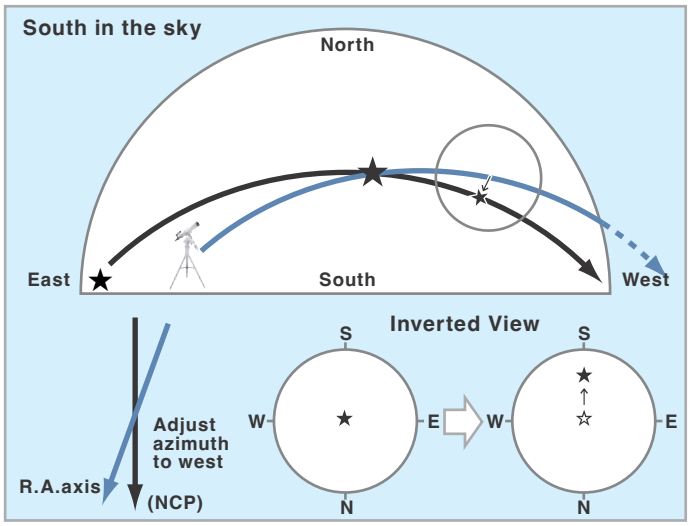
If the star drifts south (i.e., it seemingly moves up due to the inverted view), move the mount to the east with the azimuth knobs.

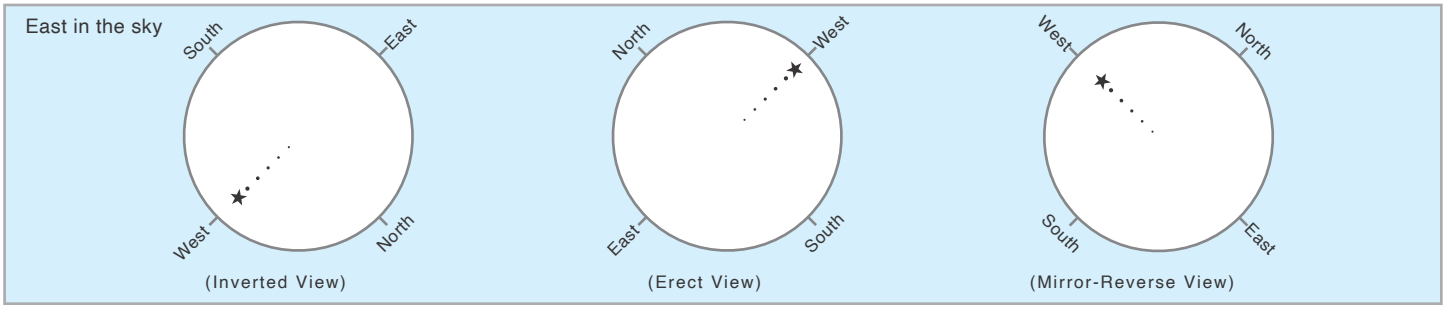
You may find that the star in the field of view moves slightly in the east-west direction, but disregard it at this stage and continue the adjustments.





Continue the adjustments until the star stops drifting in the north (star drifts down) or south (star drifts up) direction. You finish the drift alignment in the azimuth direction.

3 Align the mount to match the height of the altitude with your observing site. Choose a bright star in the eastern or western sky and near the celestial equator, and put it in a field of view of the eyepiece. Here, an eastern star in the sky is chosen.

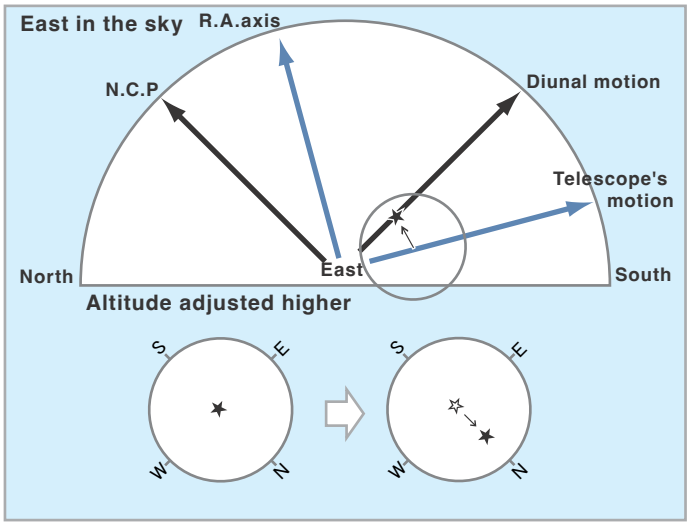


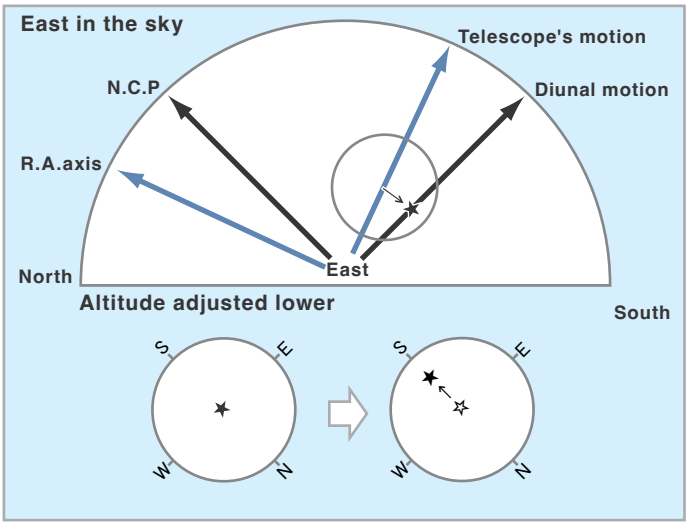
Confirm the west-east direction in the field of view and rotate the eyepiece so that one of the crosshairs is parallel to the east-west direction in the eyepiece.

Track the star in the eastern sky with the mount to observe it.
Drive the mount and look through the eyepiece to monitor the drift motion of the star in the north-south direction.

If the star drifts north (i.e., it seemingly moves lower right due to the inverted view), move the mount to low with the altitude handles.

f the star drifts south (i.e., it seemingly moves upper left due to the inverted view), move the mount to high with the altitude handles.





Continue the adjustments until the star stops drifting in the north (star drifts lower right) or south (star drifts upper left) direction. You finish the drift alignment in the altitude direction.

APPLICATION

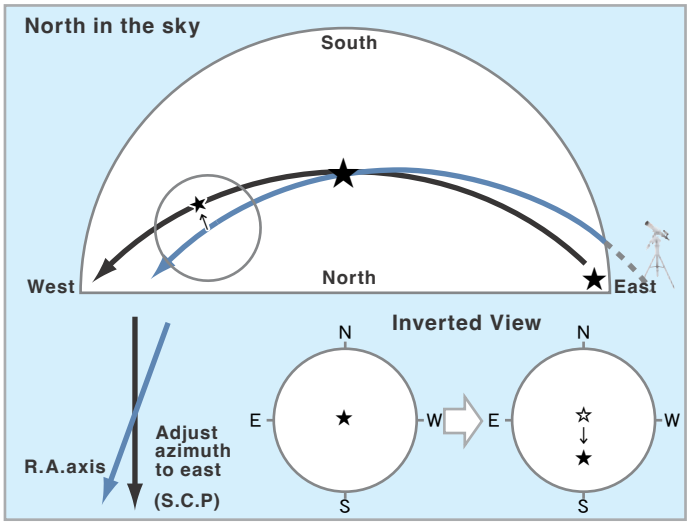
Drift Alignment in the Southern Hemisphere

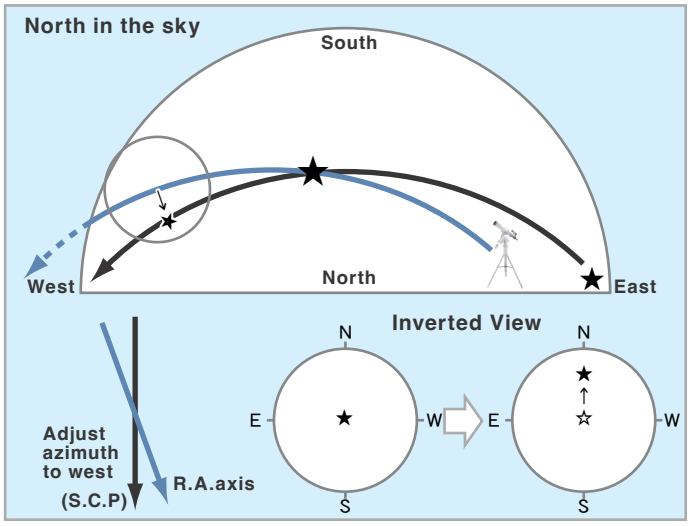
1 Align the mount to match the direction of azimuth with your observing site. Prepare an eyepiece with an illuminating cross-hairs reticle. Choose a bright star just south of the celestial equator near the meridian (due north), and put it in a field of view of the eyepiece.

Turn off the power switch of the mount momentarily while looking through the eyepiece to see which direction the star moves. Confirm the west and rotate the eyepiece so that one of the crosshairs can be parallel to the east-west direction in the field of view. The following descriptions are based on a refracting telescope without a star diagonal.

If the star drifts south (i.e., it seemingly moves down due to the inverted view), move the mount to the east with the azimuth knobs.

If the star drifts north (i.e., it seemingly moves up due to the inverted view), move the mount to the east with the azimuth knobs.





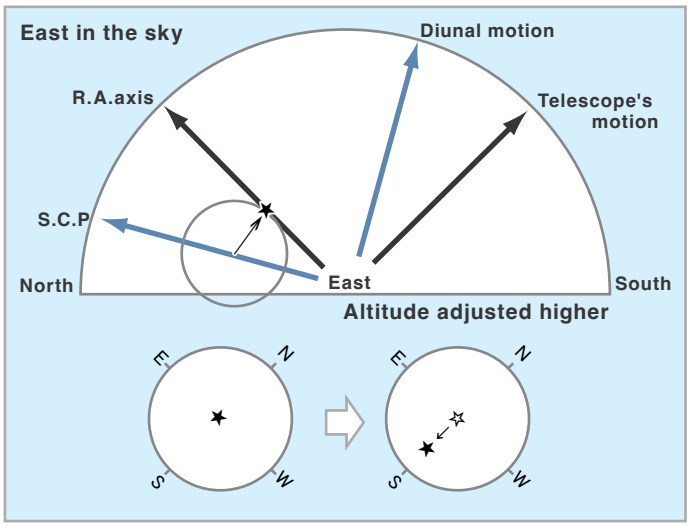
Continue the adjustments until the star stops drifting in the north (star drifts down) or south (star drifts up) direction. You finish the drift alignment in the azimuth direction.

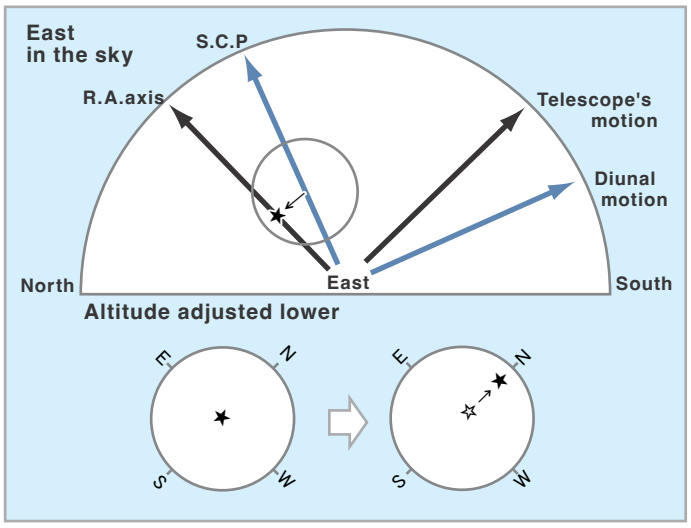
2 Align the mount to match the height of the altitude with your observing site. Choose a bright star in the eastern or western sky and near the celestial equator, and put it in a field of view of the eyepiece. Here, an eastern star in the sky is chosen.

Confirm the west-east direction in the field of view and rotate the eyepiece so that one of the crosshairs is parallel to the east-west direction in the eyepiece.

If the star drifts south (i.e., it seemingly moves lower left due to the inverted view), move the mount to low with the altitude handle.

If the star drifts north (i.e., it seemingly moves upper right due to the inverted view), move the mount to high with the altitude handle.





Continue the adjustments until the star stops drifting in the south (star drifts lower left) or north (star drifts upper right) direction. You finish the drift alignment in the altitude direction.

APPLICATION

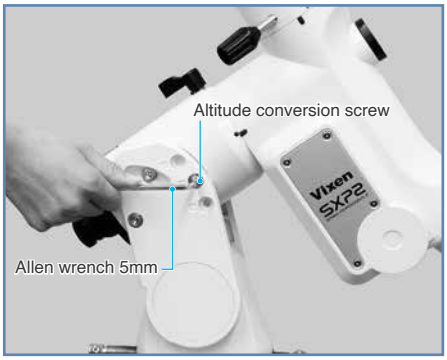
Changing the Altitude Setting to Low or High

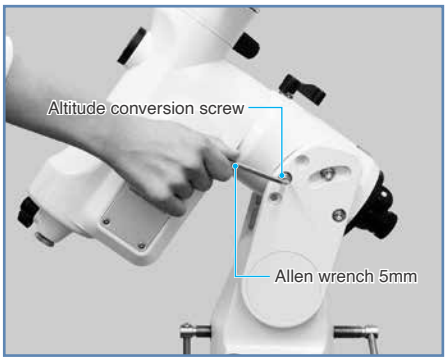
The SXP2-WL mount is set for use in the middle latitude zone (35 degrees plus/minus 15 degrees in latitude) at Vixen's factory. If your observing site is lower or higher than the range of the middle latitude zone, you need to change the current altitude setting to match the latitude of your observing place.
The range of altitude adjustments is divided into three positions (low, middle, and high) between 0 degrees and 70 degrees in latitude.

High Latitude:	**40 degrees up to 70 degrees**
Middle Latitude:	**20 degrees up to 50 degrees (Initial setting at Vixen's factory)**
Low latitude:	**0 degrees up to 30 degrees**

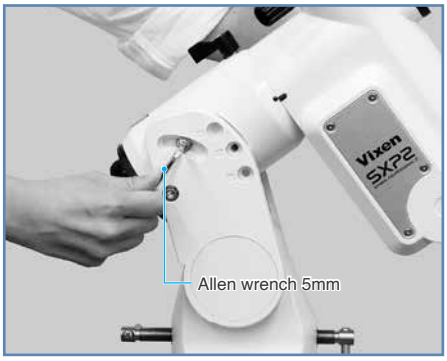
1 Remove the optical tube, counterweight(s), and wireless unit from the mount.

2 With the 5mm Allen wrench, remove altitude conversion screws on both sides of the fork arms with which the R.A. mount body is mounted. The altitude conversion screws are set to the middle position marked M at Vixen's factory. Two washers come off along with the altitude conversion screws. Take care not to lose these washers.

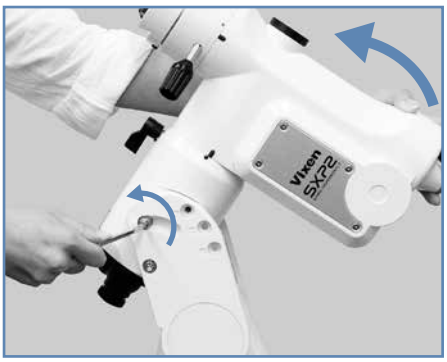


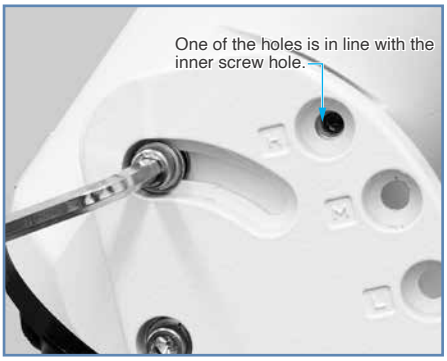


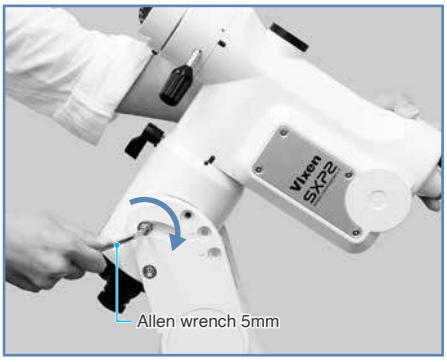
3 Unfasten each of the altitude conversion screws little by little. Be sure to loosen the screws slowly and carefully while holding the mount body securely with the other hand as the mount is a heavy item. heavy item.



4 Confirm that the screw hole on the R.A. mount body matches with the hole of the low(L) or high(H) latitude position on the fork arms by ascending or descending the mount body. Fasten the screws on the slits of the fork arms to fix the mount body securely.







5 Put back the altitude conversion screws and washers in place. Tighten the screws with the Allen wrench securely and the setting is completed.

Caution:

Never tilt the mount body quickly as it may cause damage or lead to injury. It is not possible to set the latitude over 70 degrees.

APPLICATION

Autoguider

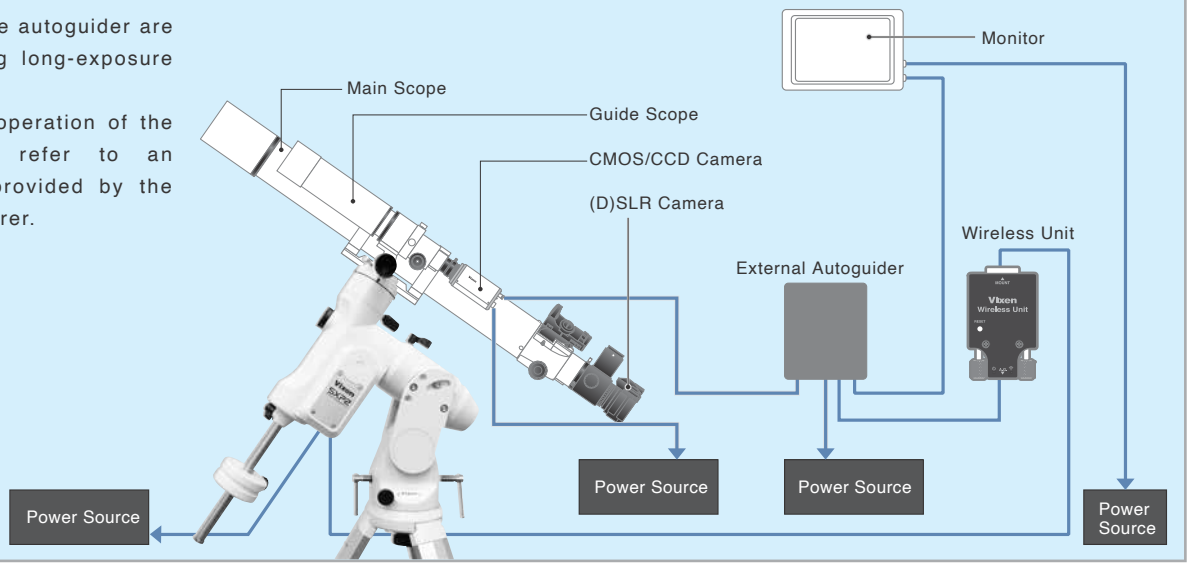
The wireless unit has an autoguider port to connect a commercially available autoguider.

Tips : The autoguider pinout is compatible with the ST series autoguiders from SBIG.

Auto Guiding Configuration

Auto guiding allows you to accurately follow a star with an equatorial mount automatically. The autoguider compensates for erratic motions of the star captured with a CMOS/CCD camera attached to a guide scope so that you can achieve accurate tracking of the equatorial mount.

The advantages of the autoguider are most apparent during long-exposure astrophotography.
For installation and operation of the autoguider, please refer to an instruction manual provided by the autoguider manufacturer.



SPECIFICATIONS

SXP2-WL Equatorial Mount

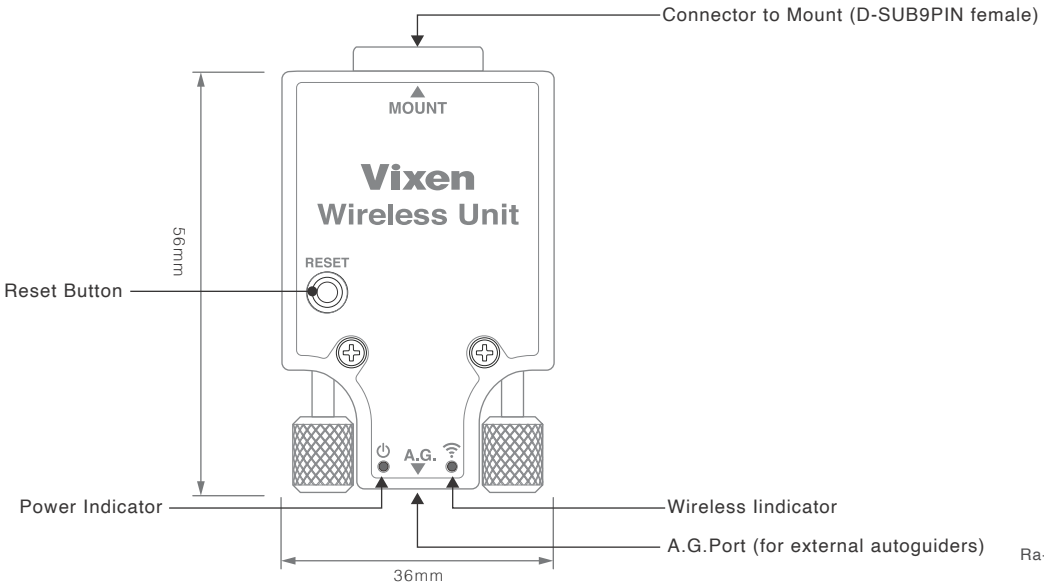
R.A. Slow Motion Wheel	Gear with 180-tooth full circle micro-movement, 73.2mm dia., Brass made
DEC Slow Motion Wheel	Gear with 180-tooth full circle micro-movement, 73.2mm dia., Brass made
Worm Gear Shaft	9mm dia., Brass made
R.A. Axis Shaft	40mm dia., Carbon steel
DEC Axis Shaft	40mm dia., Carbon steel
Number of Bearings	16
Counterweight Bar	20mm dia., Retractable
Polar Alignment Scope	Bult-in 5x20mm scope, Field of view 10 degrees, 3-star alignment system, Self-light-off reticle illuminator, brightness adjustable in 8 steps, 3 arc minutes setting accuracy, 1 x CR2032 battery
Azimuth Adjustment	About +/- 5 degrees in fine adjustments, 1.7 degrees per knob rotation
Altitude Adjustment	About 0.7 degrees per rotation, Adjustable altitude range: 0 degree to 70 degrees, with 5-degree increments scale
Motor Drive	Stepping (Pulse) motors with 250PPS micro-step control
Automatic Slewing and Tracking	Wireless Unit and Smartphone with a dedicated app, Maximum tracking speed at 1000x sidereal rate
Maximum Loading Weight	17.0 kg (at a distance of 25cm from the R.A. and DEC crossing point.)
Controller Cable Port	D-SUB 9PIN male
Power Cable Port	DC12V EIAJ RC5320A Class 4, Center-plus polarity
Electricity Consumption	DC 12V, 0.45A to 2.5A (Mount plus Wireless unit) at the maximum loading weitht of 17kg
Dimensions	386mm x 419mm x 128mm
Weight	About 13.3kg (without Counterweight)
Optionally Available Accessories	Dovetail-plate Mounting Block, SXG-HAL130 Aluminum Tripod, SXG Half Pillar, SXG-P85DX Pillar, ASG-CB90 Tripod, AC 12V-3A Adapter

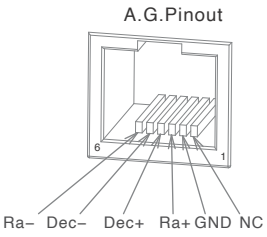
Wireless Unit

Type	Wireless connection equatorial mount control unit
Applicable mount	SX2, SXD2-PFL, SXP, SXP-PFL, SXP2, AXJ (Not available for a mount with AXJ encoders), AXD, AXD2
Equipped CPU	32bit CISC Processor 120MHz
Controller Cable Port	D-SUB 9PIN female
Autoguider Port	6-pole 6-wired modular jack (for external autoguider)
Wi-Fi Function	With dedicated application software and use a smartphone as a user interface.
Operating environment of the app	Applicable OS : Android ver.6 or higher, iOS ver.9.0 or higher※ · Wireless LAN Standards : IEEE 802.11b/g/n · Data Encryption methods: WPA2-PSK ※Even if your Wi-Fi environment meets the above conditions, it may not work correctly. Be sure to check the operation of the app before use.
Power Source	Supplied from a mount.
Operating Voltage / Current consumption	DC12V 0.1A (Max.)
Operating Temperature	0~40°C
Specification Remarks	Updating via Wi-Fi is available. / Cannot be used together with AXJ encoders.
Dimensions and Weight	56×36×19.5mm · 60g

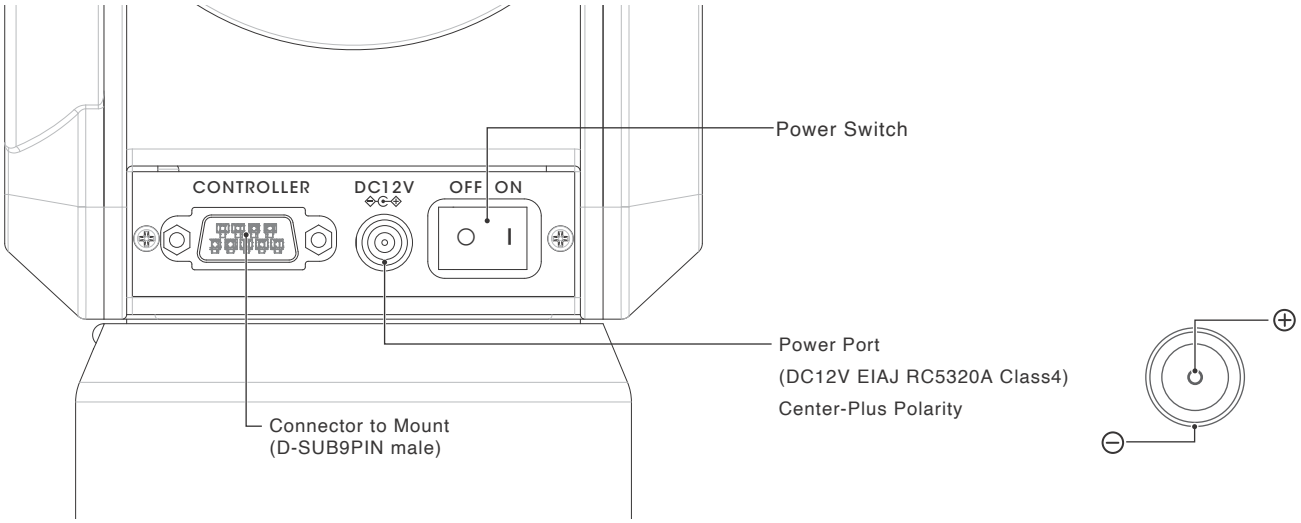
SPECIFICATIONS

Wireless Unit Components Guide



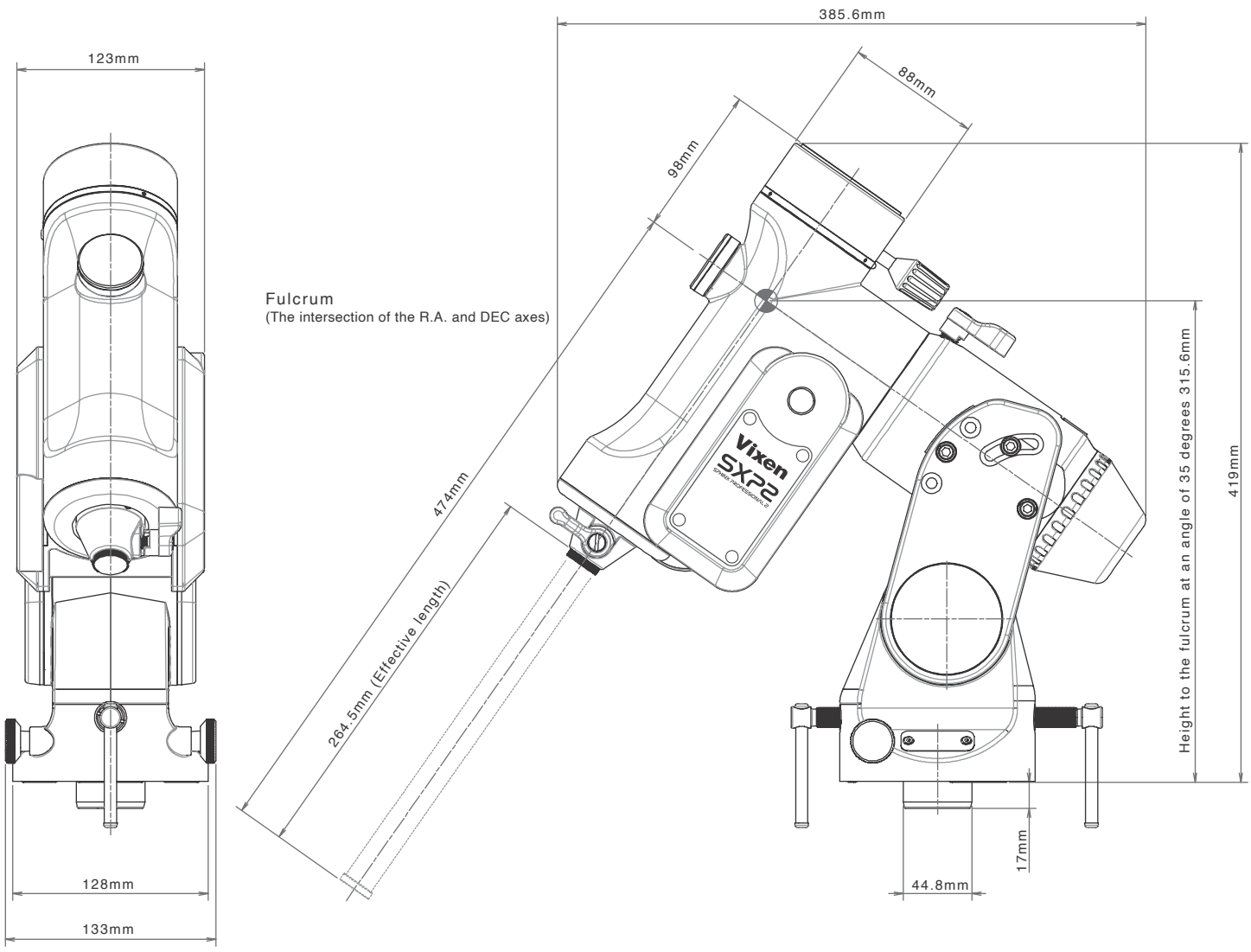


Connectors on the SXP2 WL Mount

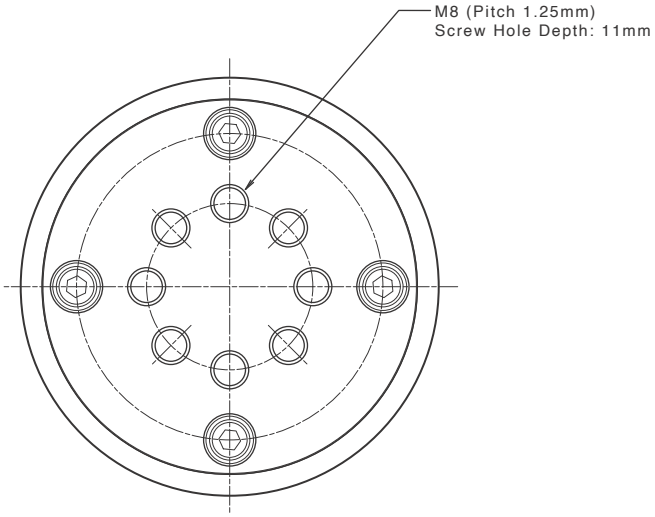


SPECIFICATIONS

Dimensions of the SXP2 Mount

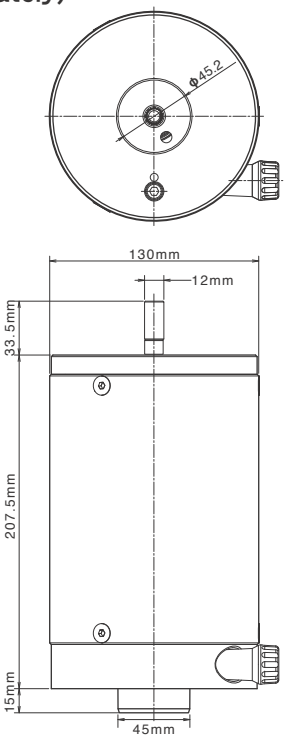


Screw Holes on the Mount Head



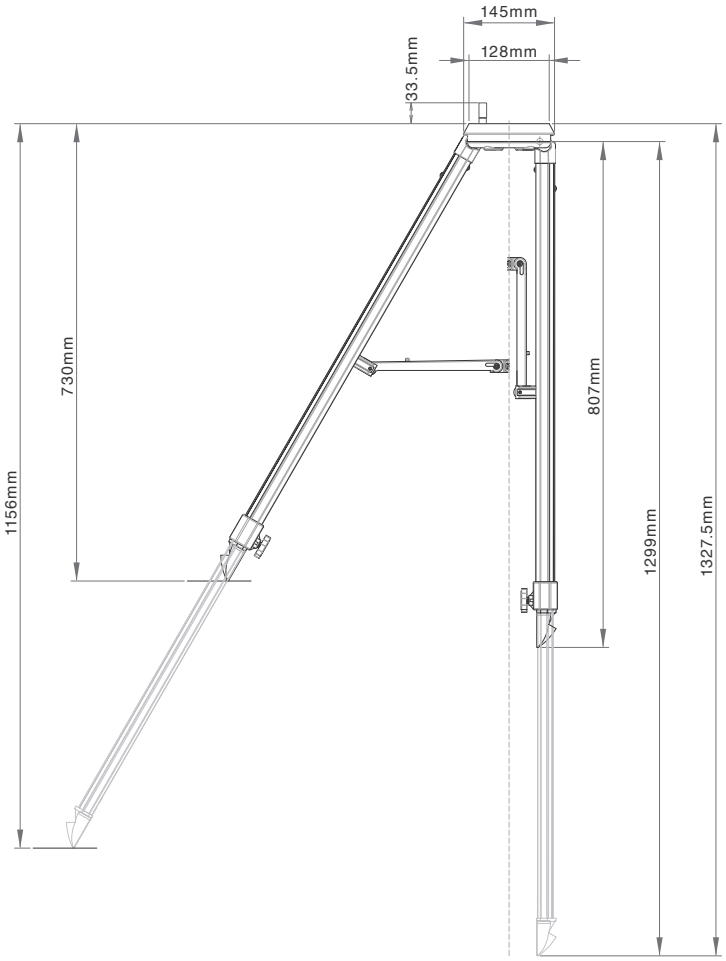
Dimensions of the SXG Half Pillar

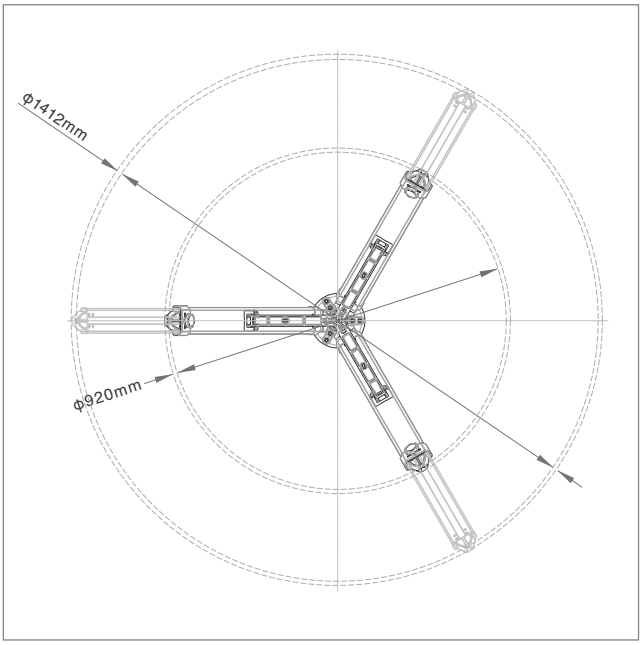
(Sold separately)



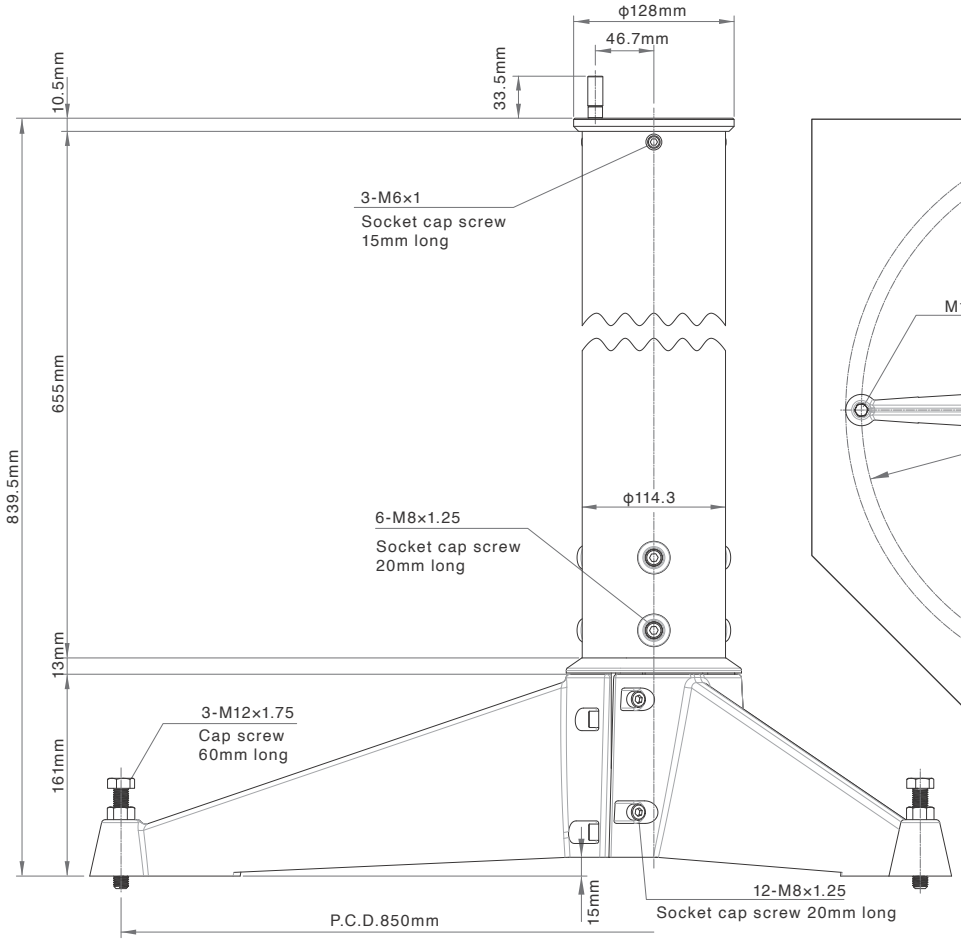
SPECIFICATIONS

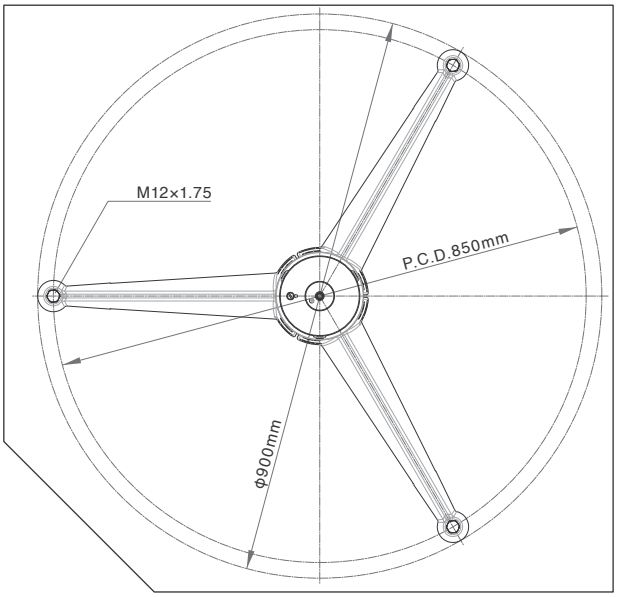
Dimensions of the SXG-HAL130 Tripod





Dimensions of the SXG-P85DX Pillar





★Actual dimensions may differ slightly on your product.

★The specifications are subject to change without notice.

Vixen

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