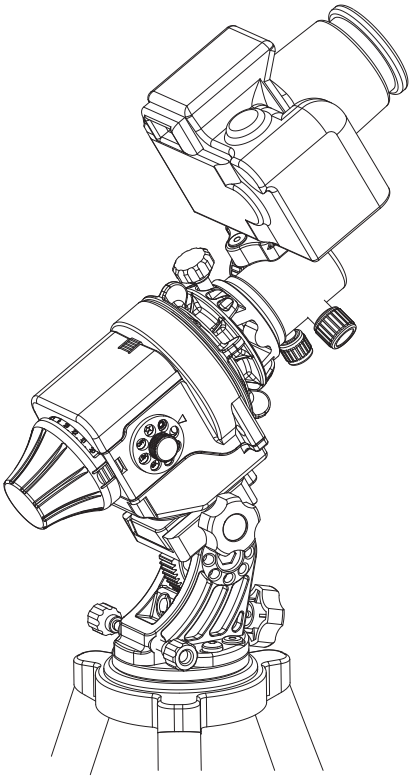
Kenko

SKYMEMO S

INSTRUCTION MANUAL



Kenko Tokina Co., Ltd.

Thank you for purchasing this product

Sky Memo S is user-friendly and provides various combinations to satisfy all your needs for astrophotography and time-lapse photography. It is a high precision, portable and stable celestial tracking platform for sidereal, solar and lunar tracking with automatic DSLR shutter release control. Moreover, it contains pre-programmed parameters assisting you to create interesting time-lapse videos with your DSLR.

For your Safety

To prevent damage to your Sky-Watcher product or injury to yourself or to others, read the following safety precautions entirely before using this equipment. Keep these safety instructions available to all users of the product.
To prevent possible injury, pay special attention to all warnings before using this product.

WARNING:

- **Do not look at the Sun through the Polar Scope.** Viewing the Sun or other strong light sources through the **Polar Scope** could cause permanent visual impairment
- **Do not use in the presence of flammable gas.** Do not use electronic equipment in the presence of flammable gas, as this could result in explosion or fire
- **Keep out of reach of children.** Failure to do so could result in injury. Moreover, note that small parts constitute a choking hazard. Consult a physician immediately when a child swallows any part of this equipment
- **Do not disassemble.** Touching the product's internal parts could result in injury. In the event of malfunction, remove the batteries and take the product to a Kenko Tokina authorized service center

Notice

- Kenko Tokina reserves the right to change the specification of the hardware and software described in this manual at any time and without prior notice.
- Kenko Tokina cannot be held liable for any damage resulting from inappropriate use of this product.
- While every effort has been made to ensure that the information in this manual is accurate and complete, we greatly appreciate if you find any errors, to report them to Kenko Tokina.

CONTENT

Features....4

How the Sky Memo S Works for Astrophotography....5

Introduction....6

The Sky Memo S Body. 6

The Optional Accessories....7

Preparation....9

Setup Tripod....9

Mount Sky Memo S....9

Mount The Imaging Equipment 11

For Astrophotography....11

For Time-Lapse Photography....13

Provide Power Source....14

Start Using Sky Memo S....15

Quick Function Reference....15

Mode Dial....16

3-position Slide Switch....16

Right/Left Buttons....17

Camera Shutter Interval Control....17

Osc Range....17

Auto-Guiding....18

USB Port....18

Motor Status Detection....19

LED Indication....19

Polar Alignment 20

Example 24

Firmware Upgrade....26

Advanced Version Firmware....27

Specification....28

Appendix....29

Features:

- High precision, portable and stable celestial tracking system
- Supports solar tracking, lunar tracking and star tracking
- Maximum payload up to 5 kg (11 lb)
- Supports star-scape photography
- Supports time-lapse photography
- User-friendly Mode Dial with pre-programmed control setting
- Supports multiple functions with easy assemblage
- Built-in **Polar Scope** with illuminator for precise polar alignment
- Automatic DSLR shutter release control
- Lifetime free firmware upgrade
- Supports single axis auto-guiding
- Built-in motor protection and status indication
- Uses AAx4 batteries
- Supports external USB power
- Low power consumption
- Compatible with 3/8” standard tripod thread and 1/4” quick release plate thread
- Other optional accessories available such as wedge and 1kg counterweight

How the Sky Memo S Works for Astrophotography

Due to the rotation of the Earth, stars are not stationary. They appear to circle around the celestial poles of the Earth (Fig1). Thus, being very faint and constantly moving across the sky, stars are impossible to be captured on photographs, unless the camera is able to track them steadily to allow long exposure. Sky Memo S provides the solution. With the high precision motor and built-in **Polar Scope**, Sky Memo S can be set to compensate exactly for the star movement by rotating the camera in the direction opposite to that of the Earth (Fig 2). The result is, the celestial objects appearing in the field of view of your camera do not move anymore and so, taking a picture with a long exposure time is possible while star trails(Fig 1) are eliminated. Fig. 3 illustrates how rich and sharp your night sky pictures can be with Sky Memo S. In addition, Sky Memo S is also capable of tracking at solar and lunar speeds.

Fig 1

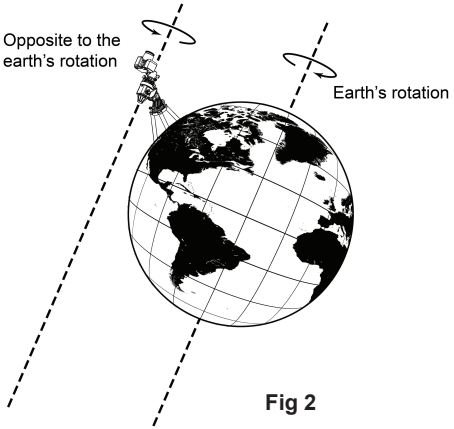
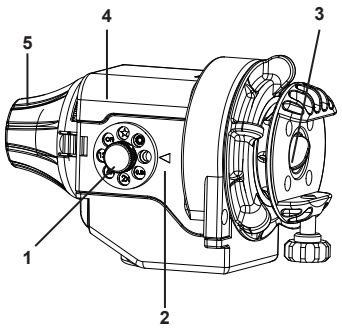


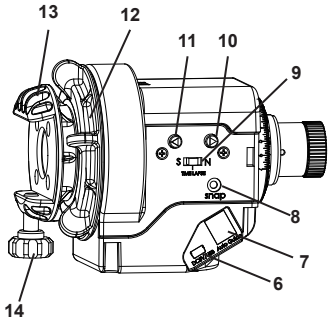
Fig 2

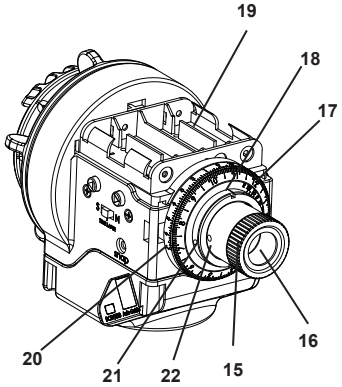
Fig 3

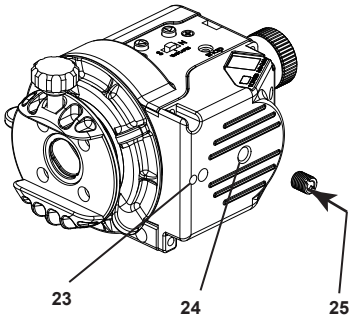
Introduction:

The Sky Memo S Body





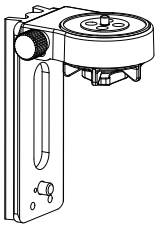




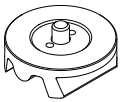
1：Mode Dial
2：Mode Index
3：Polar Scope Cap
4：Battery Case Cover
5：Polar Scope Cover
6：Mini USB Port
7：RJ-12 6-pins Auto-guider Interface
8：DSLR Shutter Control Port
9：3-Position Slide Switch
10：Right Button and LED Indication
11：Left Button and LED Indication
12：Clutch Knob
13：Mounting Platform
14：Locking Knob
15：Knurled Ring of Polar Scope
16：Polar Scope
17：Date Graduation Circle
18：Time Meridian Indicator
19：AAx4 Battery Case
20：Time Graduation Circle
21：Time Meridian Indicator Calibration Screw
22：Polar Scope Calibration Screw
23：Worm Gear Meshing Adjustment Screw
24：Socket for 3/8" Thread Screw
25：1/4” to 3/8” Convert Screw Adapter

The Optional Accessories: (The default included accessories may vary. Please refer to local dealers for details).

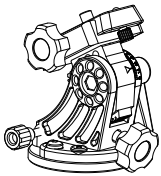
Polar Scope Illuminator - To provide lighting source for **Polar Scope**.



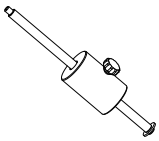
Fine-Tuning Mounting Assembly - To mount a telescope with ¼" thread screw on the **Sky Memo S**. Allows pointing and fine-tuning pointing in two directions.



3/8" Ball Head Adapter - To mount a standard camera ball-head with 3/8" thread screw on the **Sky Memo S.**

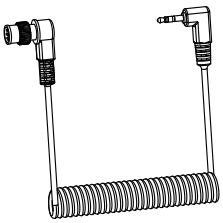


Equatorial Wedge - To adjust the latitude of the **Sky Memo S** for polar alignment. Offers higher accuracy and stability than a standard photo tripod head.



Counterweight - To balance the telescope or camera loading with 1kg counterweight.

1/4" to 3/8" Convert Screw Adapter - To convert the default socket for 3/8" thread screw to the socket for 1/4" thread screw in order to mount the **Sky Memo S** to a standard quick release plate of the tripod with 1/4" thread screw.

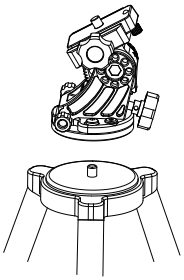


DSLR Shutter Control Cable - To connect the **DSLR Shutter Control Port** of **Sky Memo S** to your DSLR's external shutter control port. This allows **Sky Memo S** to directly control the DSLR's shutter release with pre-programmed shutter interval. You can order an optional cable for your camera from your local resellers. The Following list shows the cables that we offer as optional items.

Camera model	Camera interface
SE-ATC1	Canon remote control terminal(E3 type)
SE-ATC3	Canon remote control terminal(N3 type)
SE-ATN1	Nikon Ten-pin remote terminal
SE-ATN2	Nikon Remote cord connector

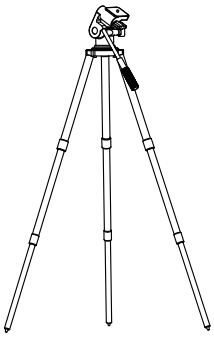
Preparation :

Setup Tripod:



Without Tilt-head: take a standard photo tripod or video tripod with a 3/8” connection screw. Spread the legs and secure the tripod legs at the desired height to provide a stable support for your **Sky Memo S**. Assemble **Equatorial Wedge** to the tripod as Fig 4.

Fig 4



With Tilt-head/Ball-head: Take a standard photo tripod or video tripod with Tilt-head or Ball-head. Spread the legs and secure the tripod legs at the desired height to provide a stable support for your **Sky Memo** S as Fig 5.

Fig 5

Mount Sky Memo S:

With Equatorial Wedge: Make sure the **1/4" to 3/8" Convert Screw Adapter** is not in the 3/8" threaded socket at the bottom side of the **Sky Memo S.** If it is, use a Slot Screwdriver to remove it. Mount the **Sky Memo S** on the (optional) Equatorial Wedge (Fig 6). Make sure the Stopper is facing forward. Then point the **Polar Scope** to the direction of the North Pole (For Northern Hemisphere observing) or South Pole (For Southern Hemisphere observing) (Fig 7). Lastly, complete the Polar Alignment process (Please see **Polar Alignment** session for reference).

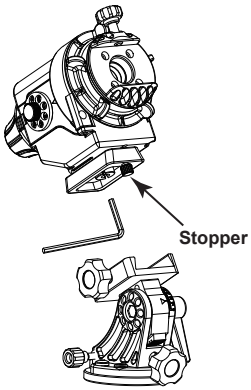


Fig 6

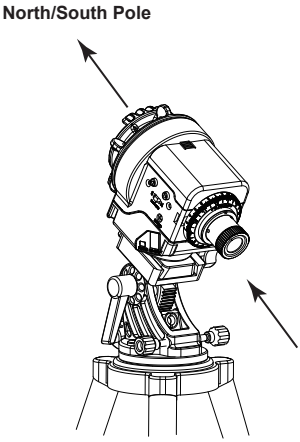


Fig 7

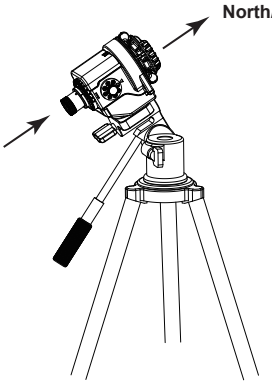


Fig8

With Tilt-head/ Ball-head: Make sure the **1/4" to 3/8" Convert Screw Adapter** is in the 3/8" threaded socket at the bottom of the **Sky Memo S.** If it is not, use an Slot Screwdriver to install it. Mount the **Sky Memo S** to the quick release plate on the tripod. Then point the **Polar Scope** to the direction of the North Pole (For Northern Hemisphere observing) or South Pole (For Southern Hemisphere observing) (Fig 8). Then complete the polar alignment process (Please see **Polar Alignment** session for reference).

Please DO NOT move the tripod or change the angle of Equatorial Wedge or tilt-head in order to keep the polar alignment. IF you did, please redo the polar alignment process.

Mount The Imaging Equipment:

Now you can mount your imaging equipment according to your need, including the **Shutter Control Cable,** as the following figures show. You can contact **Kenko Tokina** authorized dealers to acquire the optional accessories as needed. During mounting, please DO NOT move the tripod or change the angle of the **Equatorial Wedge** or tilt-head in order to keep the polar alignment.

For Astrophotography:

Sky Memo S +3/8" Ball Head Adapter + Ball head + Camera + Shutter Control Cable:

Note: Make sure the locking bolt of the **Mounting Platform** has locked on the indentation on the side of the **3/8" Ball Head Adapter** for better locking and support.

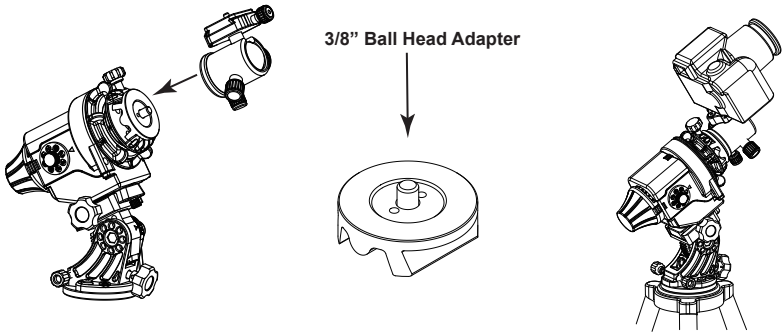
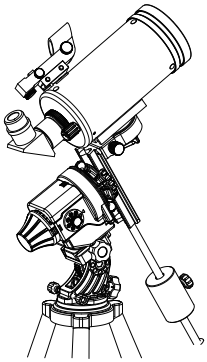


Fig 9



Sky Memo S + Fine-Tuning Mounting Assembly + 1kg Counterweight + Telescope:

Fig 10

Sky Memo S + Dovetail + Dual Ball Heads +Dual Cameras + Shutter Control Cable:

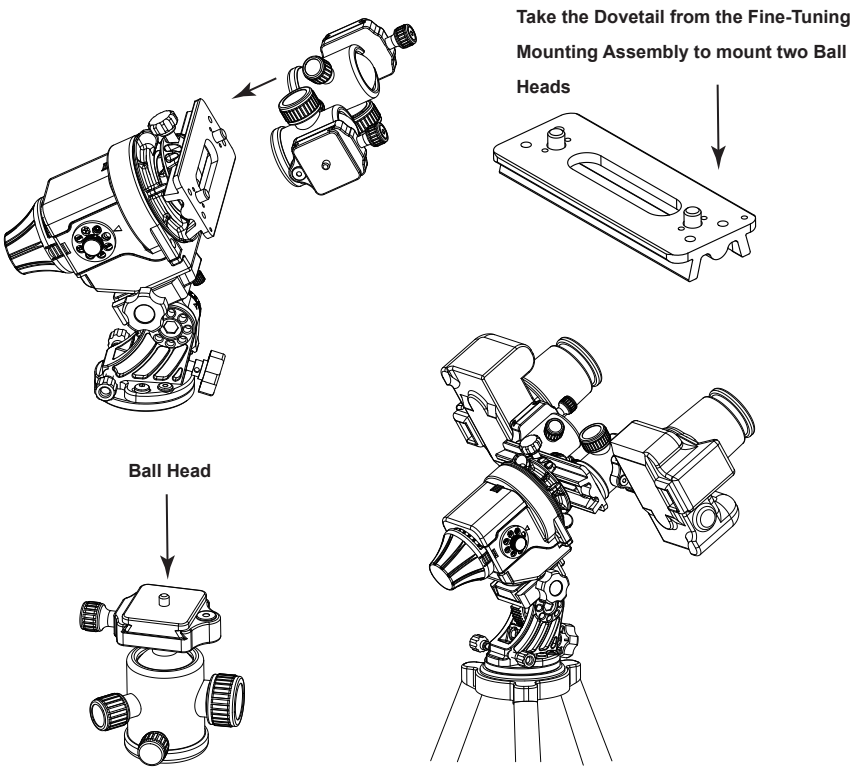
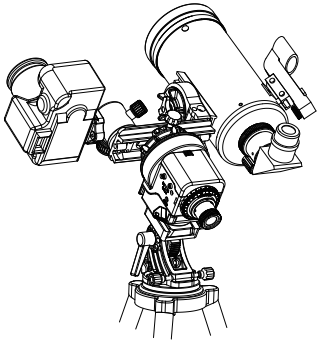


Fig 11



Sky Memo S + Fine-Tuning Mounting Assembly + Ball-Head + Camera+ Telescope (+ Auto-guider):

Fig 12

For Time-Lapse Photography:

(For reference only: you can assemble very different configurations to create more interesting time-lapse photography)

Horizontal Rotation Time-Lapse Photography:

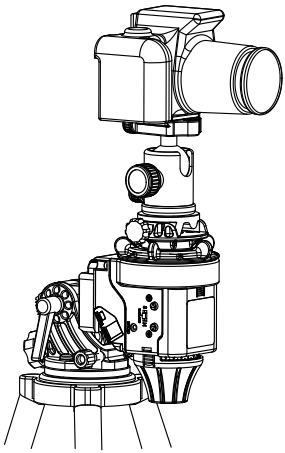


Fig 13

Vertical Rotation Time-Lapse Photography:

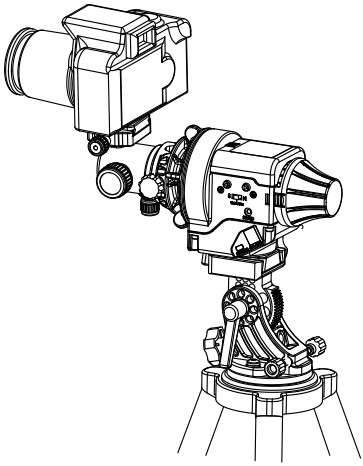


Fig 14

Provide Power Source:

Sky Memo S allows two power source options. One is inserting 4 AA type batteries; the other is providing DC 5V through USB port (type mini-B). (Fig 15)

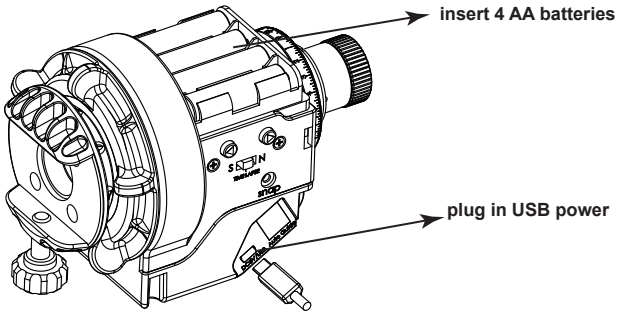
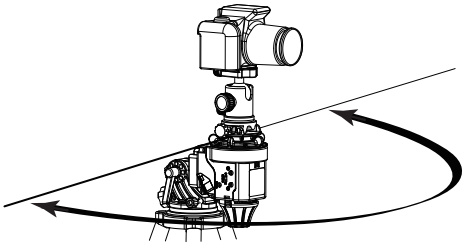


Fig 15

Start Using Sky Memo S

Quick Function Reference:



Mode Dial	Rotation Speed & Osc Range	Shutter Interval (sec)	
		Switch to TIMELAPSE	Switch to N or S
OFF	Turn off power		
★	Celestial tracking. 360°	50	100
☼	Solar tracking. 360°	7	14
☾	Lunar tracking. 360°	10	20
0.5X	48Hr/rev. 360°	15	30
2X	12Hr/rev. 60°	3	6
6X	4Hr/rev. 60°	2	4
12X	2Hr/rev. 60°	1	2

Table 1

Time- Lapse

Fig 16

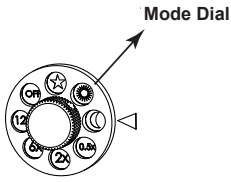


Fig 17

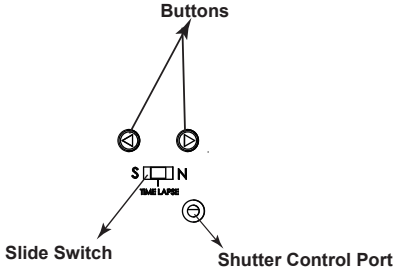


Fig 18

Mode Dial: For power control and selection of pre-programmed modes.

3-Position Slide Switch: for selection of rotation direction and camera shutter interval.

Buttons: The Right / Left buttons are used for rotating in higher speed (about 12X celestial tracking speed).

LEDs : The LEDs built-in buttons provide the lighting source in the dark and indicate the device status such as low battery and motor error.

Snap : This is a 2.5mm 3-segment stereo jack for connecting to a camera's shutter control port to control camera shutter interval.

After finishing the preparation steps, you can start to enjoy the **Sky Memo S.** Its major functions are described as follows:

Main Function: Sky Memo S has a user-friendly **Mode Dial** and **3-Position Slide Switch** to allow users easy selection of the pre-programmed movement pattern. At the other side of the **Sky Memo S,** the two buttons give direct access to higher speed movement for quick positioning.

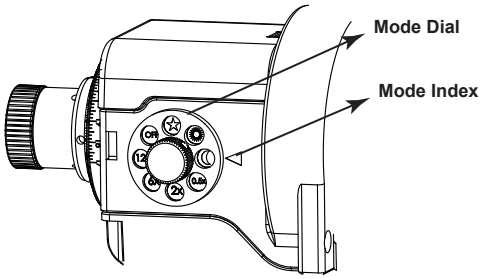


Fig 19

Mode Dial: Used to turn on/off power and select the desired modes shown in table 1. When the **Mode Index** is pointing at **OFF**, the mount has no power. If rotated to other modes besides the **OFF** mode, the power is turned on. The LED on the **Mode Dial** will light up to indicate the current mode, and the LED on the buttons will light up, too. Meanwhile, **Sky Memo S** will start tracking at the constant speed corresponding to the mode selected (Please refer to table 1).

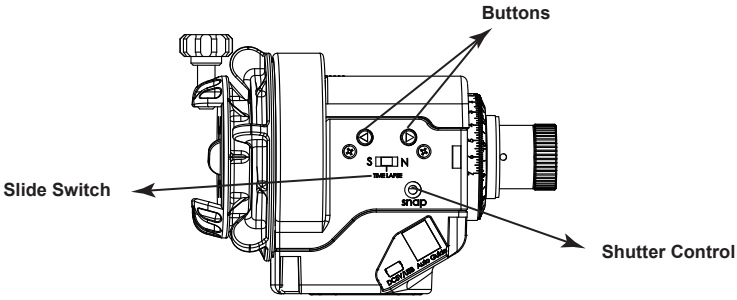


Fig 20

3-Position Slide Switch: Selects the rotation direction of the **Sky Memo S** and the camera shutter interval. When the switch is slid to **N** or **TIMELAPSE,** the **Sky Memo S** will rotate in the astronomical tracking direction in the Northern Hemisphere, which is counter-clockwise around the North Celestial Pole; when the switch is slid to **S,** the mount will rotate in the astronomical tracking direction in the Southern Hemisphere, which is clockwise around the South

Celestial Pole.

Right/Left Buttons: Used to rotate the **Sky Memo S** at the highest speed for easier positioning towards the desired object. When the Right Button is pushed, the **Sky Memo S** will rotate at 12-time sidereal rate and in the same direction as when sliding the switch to **N** or **TIMELAPSE**; when Left Button is pushed, the **Sky Memo S** will rotate at 12-time sidereal rate and in the same direction as when the switch is slid to **S**;

SNAP (DSLR Shutter Control Port): Sky Memo S provides a camera shutter control interface to control the shutter interval. The SNAP port is a 2.5 mm 3-segment stereo jack and the trigger signal connects to the tip and base segments. By using the proper **Shutter Control Cable**, the mount can control the camera's shutter release (please refer to **DSLR Shutter Control Cable in the Optional Accessories).** The Shutter interval period of every selected mode has been pre-programmed. Please refer to Table 1 for detail. For example, when the **Mode Dial** is set to **Mode** ★ and **Slide Switch** is set to **N,** the shutter interval period is 100 seconds, or 50 seconds if the **Slide Switch** is set to **TIMELAPSE** (See Table 1). whenever any change is applied to the buttons, mode dial, or switch, the timer is reset and the selected shutter interval period will restart from 0 sec.

Osc Range: To avoid the shutter release cable from twisting after a long period of use under the Astrophotography applications, **Sky Memo S** will reverse after reaching 360° rotation. That is, for **Mode** ★ ☼ ☾ and **0.5X,** Sky Memo S will oscillate within a 360° range. For the other modes, in order to provide more attractive scene while filming for time-lapse photography, under time-lapse applications such as Mode 2X, 6X and 12X, **Sky Memo S** will oscillate within 180°(See Table 1). Every button pushed or mode changed will reset the starting point of the range. For example, when the **Mode Dial** is set at **6X** and **Slide Switch** at **N**, the position where the particular mode is entered will be the left boundary of the oscillation. That is, it will rotate to the right first until it reaches 180°, then oscillates within this range (Fig 21 & 22). If any button is pushed, the position at which the button is released will become the new left boundary of the 180° range. If the switch is set at **S,** it will rotate to the left first until it reaches 180°, then reverse the direction for another 180°, and repeat the cycle (Fig 21 & 22).

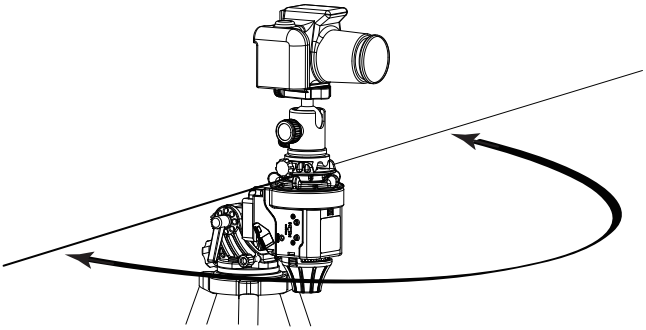


Fig 21

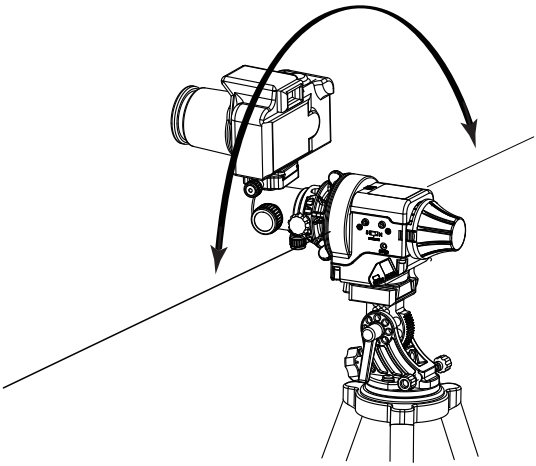


Fig 22

Auto-Guider: Sky Memo S also contains auto-guiding interface to accept single axis (RA axis) auto-guiding signal to provide more accurate celestial tracking for better quality of astrophotography. The RJ-12 6-pin outlet is for connecting an autoguider. It is compatible with any autoguider with a ST-4 type interface. This function only works in **Mode** ★ . For other modes, the auto-guiding signal has no effect.

USB Port: Sky Memo S contains a USB port (Type Mini-B) to support external USB power and support firmware upgrade. Please refer to **"Firmware Upgrade"** on page 26**.**

Motor Status Detection: If the motor stalls (rotation speed does not reach 10% of the targeted speed) over 5 seconds, in order to protect the motor and the mounted equipment, **Sky Memo S** will stop the motor and indicate "Motor Error" by flashing the LED on the buttons. Pushing buttons or switching mode will restart the motor and restart the detection. Moreover, if the motor speed error is over 5% (if it is not within the 95%~105% of the targeted speed), **Sky Memo S** will indicate "Motor Error" by flashing the LED on the buttons, but it will not apply any change to the motor control.

LED Indication: Sky Memo S has LEDs behind the buttons to indicating the current status. There are three different ways the LEDs will light up. If the LEDs don't light up, the **Sky Memo S** is not in working mode.

Normal Status: LED will light up continuously at low intensity.

LED will light up at low intensity to provide light source in the dark when the motor status is normal and the power level is normal.

Warning Status: LEDs will blink at a 0.5-second rate in two cases:

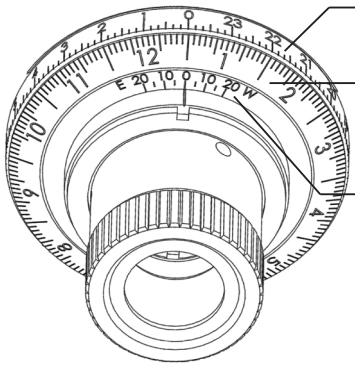
1. **Firmware upgrading:** When updating the firmware, LEDs on the **Sky Memo S** will blink as a warning not to turn off power.
2. **Battery low** (The battery voltage is lower than roughly 4.5V): **Sky Memo S** supports most of the AA batteries. When using rechargeable Nickel Metal Hydride (Ni-Mh) batteries, please replace the batteries when it indicates low battery in order to protect the batteries from over discharge. When using Alkaline batteries, the system will run normally for a while after indicating battery low.

Motor Error Status: LED will blink at a 3-times-per-second rate in two cases:

1. **Motor speed accuracy violation:** The motor speed error is over 5%. If this keeps happening, the user may need to check for overloading (Max load is 5kg) or low battery l
2. **Motor stall:** the motor stalls over 5 seconds. May be caused by external interference. Please check if the mount is blocked by an external force.

Polar Alignment:

Before starting with the polar alignment procedure, please review the following figure to get familiar with the scales and dials of the **Polar Scope**.



Time Graduation Circle
Representing 1 day (24 hours)
Each division is 10 minutes

Date Graduation Circle
Representing 1 year (12 month)
Each division is roughly 2 days

Standard Meridian Offset Scale
Used to offset longitudinal difference between observing site and the standard meridian of your time zone (STDM)

Fig 23

Use the built-in **Polar Scope** to complete the polar alignment. First, remove the **Polar Scope Cap** and insert the **Polar Scope Illuminator** (Fig 24). Rotate its **Power Dial** to turn on the power to illuminate the **Polar Scope** , then keep rotating the **Power Dial** until reaching optimal illumination (Calibrate the **Polar Scope** as needed. Please refer to " **Appendix Ⅰ:Calibrate The Polar Scope").**

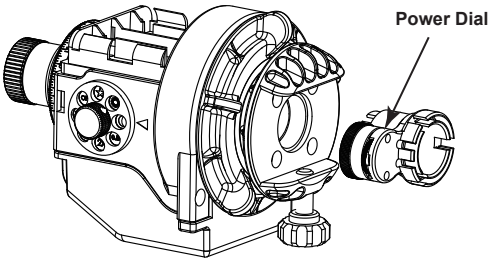


Fig 24

For Observing in The Northern Hemisphere: find Polaris (the brightest star near the North Celestial Pole) in the **Polar Scope** by adjusting the angle of the (optional) **Equatorial Wedge** or tilt-head on the tripod. Use third party Polaris Finder application or APP to find the corresponding

orientation of Polaris in the **Polar Scope** by simply entering the date, time, longitude and latitude of your observing location. Then move Polaris to that corresponding position in the Polar Scope by using the fine-tuning movements of the **Equatorial Wedge** or by moving the tilt-head on your tripod(Fig 24). If you cannot acquire the application to find the orientation of the Polaris, please refer to the " **The Orientation of Polaris in The Polar Scope** " in the following portion.

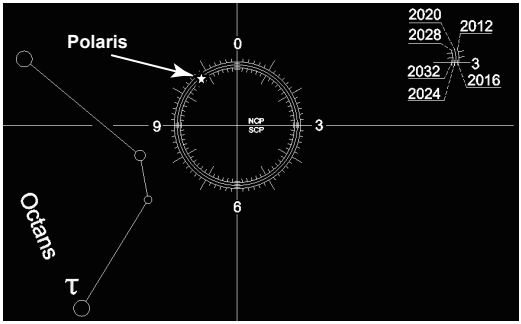


Fig 25

For Observing in The Southern Hemisphere: locate in the **Polar Scope** the 4 dim stars (Around Magnitude 5 to 6) which form the pattern “Octans” (see drawing in the **Polar Scope** as Fig 26). Align the orientation of the “Octans” drawing to the 4 stars. Then move the 4 stars to the 4 small circles of the “Octans” drawing by using the horizontal adjustment knob to fine-tune the **Equatorial Wedge** or by moving the tilt-head of your tripod.

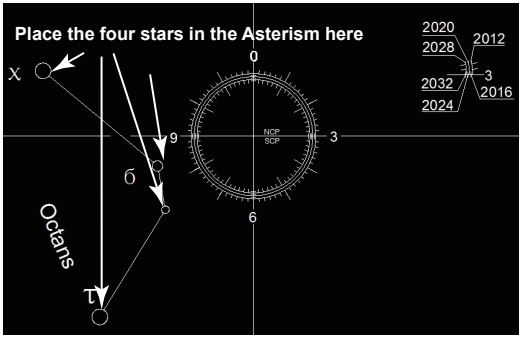


Fig 26

The Orientation of Polaris in The Polar Scope

As Polaris is not located exactly at the North Celestial Pole, we can see it orbiting the North Celestial Pole in a **Polar Scope**. The large circle seen in the center of the pattern in the Polar Scope is a representation of Polaris' orbit around the North Celestial Pole. When performing the polar alignment process, it is necessary to determine the orientation of Polaris on the circle. We can use the following 2 methods to get the orientation:

1. Locate both Polaris and Kochab in the sky near the North Celestial Pole. The relative position of Kochab to Polaris is an approximation of the orientation of Polaris in the **Polar Scope**. For example, if Kochab is at the 11 o'clock position of Polaris, then Polaris should also be placed at the 11 o'clock position on the reticle circle (See Fig 27).

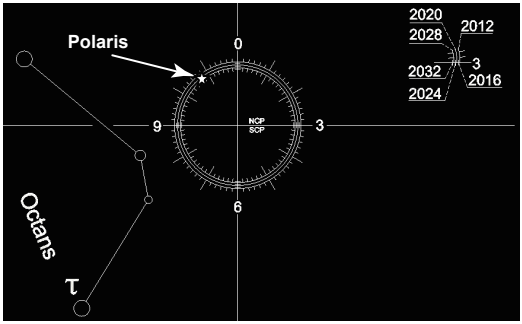


Fig 27

2. Use the built-in **Date Graduation Circle, Time Graduation Circle** and **Time Meridian Indicator** to find the orientation of Polaris in the **Polar Scope** following the steps described below:

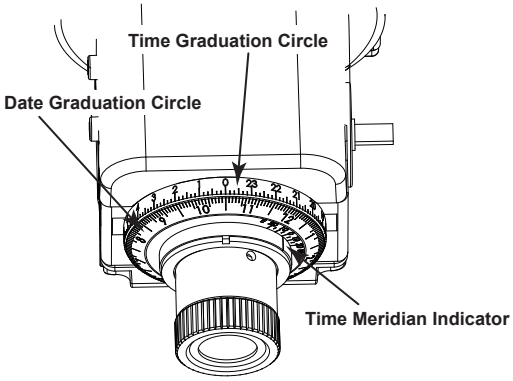


Fig 28

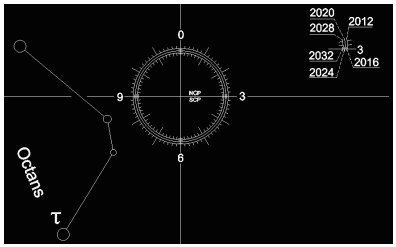


Fig 29

1. First, rotate the Wedge and adjust the latitude to bring Polaris within the field of view of the **Polar Scope**.

2. Then rotate the **Date Graduation Circle** to align Oct 31 to the 0 of the **Time Graduation Circle** and turn the **Eyepiece/Mounting Platform** to align the **Time Meridian Indicator** to the 0 of the **Time Meridian Circle** (Fig 28). This is the date and time when the orientation of Polaris is directly below the north pole (6 o'clock).

3. At this point, the "6" in the reticle should point straight down (as shown in Fig. 29). If not so, please refer to " **Appendix I: Calibrate the Polar Scope**"

4. Adjust the **Date Graduation Circle**. Find out the difference in degree between your observing site longitude and the central meridian of your time zone and determine if you are on the east or the west side of the central meridian. Now, adjust the Date Graduation Circle accordingly.

Example: If you are located in Prince Rupert, Canada, your longitude is 130.32°W. The standard meridian (STDM) for this time zone is 120°W. This means Prince Rupert is about 10° westward in relation to the STDM. Turn the Date Graduation Circle to W10 to compensate for this (Fig 30).

5. Match the **Date Graduation Circle** with your observing time by turning the eyepiece/ Mounting Platform. Please **DO NOT** rotate **Date Graduation Circle** directly at this step. For example, if your observing date is March 4 and observing time is 8:00PM (Standard Time, that is Daylight Time -1 if applied), then hold and turn the mounting platform until the 2nd scale mark of March is aligned with the “20” on the **Time Graduation Circle**, which represents 8:00pm(Fig 31).

6. Put Polaris at the 6 o'clock position in the FOV of the **Polar cope** to finish the polar alignment.

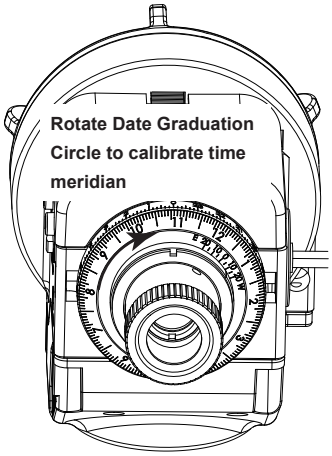


Fig 30

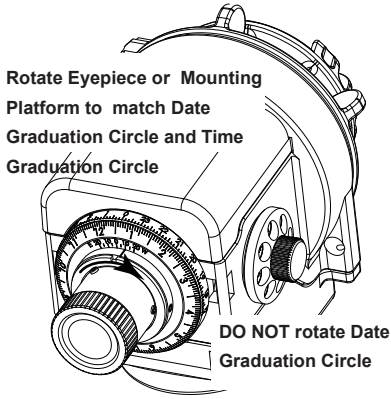


Fig 31

Example for Astrophotography for Celestial Tracking:

1. Assemble the tripod and **Sky Memo S** according to your need. Then finish the polar alignment.

2. Mount the camera or telescope. Install the cables (**Shutter Control Cable** and auto-guiding) if needed.

3. Slide the **3-Position Slide Switch** to **N** if you are in Northern Hemisphere (Fig 32).

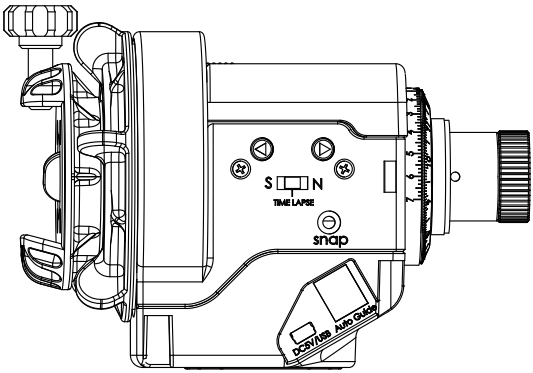


Fig 32

4. Rotate the **Mode Dial** to **Mode** ★ . The LED on the **Mode Dial** will light up Mode ★ . The LED in the buttons will light up, too. The **Sky Memo S** will start tracking the celestial objects at sidereal rate (86164 seconds per revolution, about 23.9 hours per revolution). At the same time, it will assume control of the camera by activating the camera's shutter release function with an interval period of 100 seconds (as if you are pushing on the shutter release button of the camera for 99.5 seconds and not pushing for 0.5 second and pushing again for 99.5 seconds).

5. You can push the left and right buttons to move the **Sky Memo S** at the highest speed (12 times sidereal rate) to approach the targeted object in RA direction. When you reach the targeted object, release the button. The **Sky Memo S** will continue celestial tracking and restart the shutter interval period of 100 seconds.

Example for Time-Lapse Photography in Mode 12X:

1. Assemble the tripod and **Sky Memo S** according to your need.

2. Assemble the camera and connect the camera and **Sky Memo S** with the **Shutter Control Cable.**

3. Slide the **Slide Switch** to position **N.** Rotate the **Mode Dial** to **Mode 12X.**

4. **Sky Memo S** will rotate firstly to the right with a speed of 2 hour per revolution until reaching 180° , then oscillate within this range. (Fig 33). At the same time, it will assume control of the camera by activating the camera's shutter release function with an interval period of 2 seconds (as if you are pushing on the shutter release button of the camera for 1.5 seconds, and not pushing for 0.5 seconds and pushing again for 1.5 seconds).

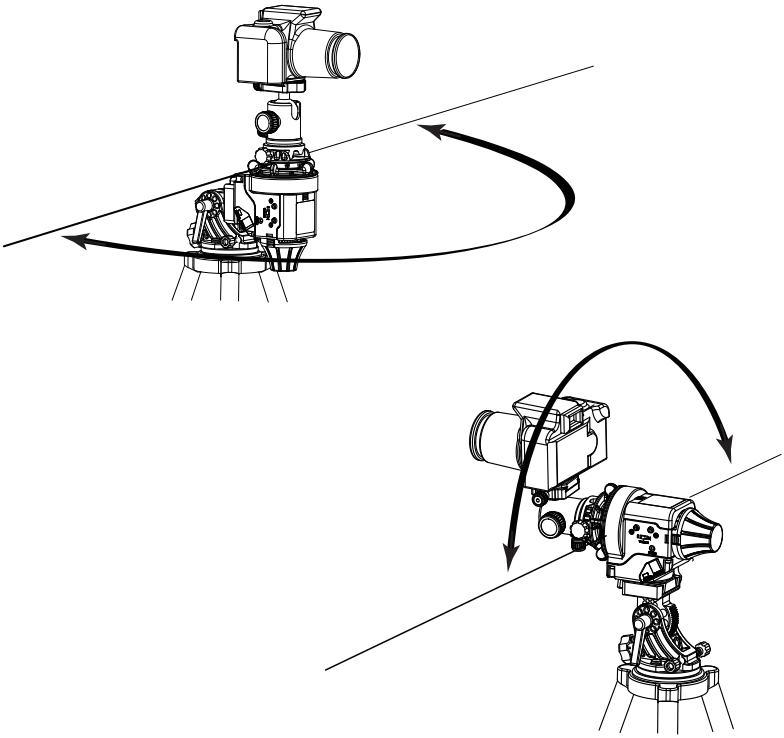


Fig 33

Appendix I

Calibrate The Polar Scope

Before using the **Polar Scope** for polar alignment, the **Polar Scope** itself must be calibrated to ensure the pattern in the **Polar Scope** is aligned to the mount's R.A. axis. The following steps will outline how to calibrate the **Polar Scope. Calibrating during daytime is strongly recommended :**

1. Choose a fixed object (the Polaris at night, or a faraway object in daytime); orient **Sky Memo S** to put the crosshair of the **Polar Scope** exactly on the chosen object.
2. Rotate the mount in R.A. axis for half a turn.
3. If the object remains exactly behind the crosshair in the **Polar Scope** after the rotation, then it means the **Polar Scope** is aligned to the R.A. axis and no calibration is needed.
4. If, during rotation, you see the object wandering off, calibration is needed. You should rotate the **Sky Memo S** to find the point where the object is at the longest distance from the crosshair center, and then you should move the crosshair halfway towards the object (Fig 35), using the 3 tiny adjustment screws on the side of the **Polar Scope** (Fig 34). A 1.5mm Allen wrench is needed.

IMPORTANT WARNING: Adjusting with the very small Allen screws is delicate. Read the note below.

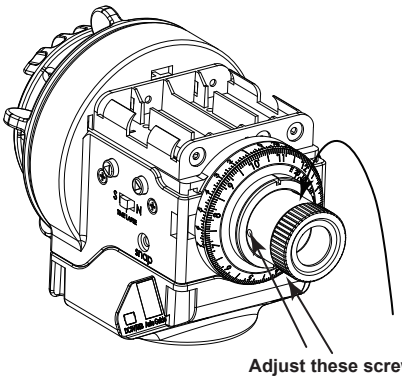


Fig 34

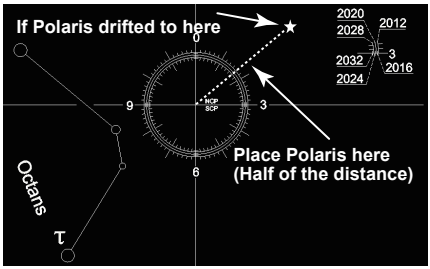
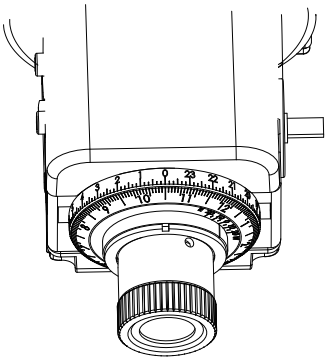


Fig 35

5. Repeat steps 1 to 4 a few times until the object remains at the center of the reticle when rotating the mount in R.A. axis.

6. Turn the **Date Graduation Circle** to align Oct 31 to the 0 of the **Time Graduation Circle.** Then hold the **Date Graduation Circle** and turn the eyepiece/Mounting Platform to align the **Time Meridian Indicator** to the 0 of the **Time Meridian Circle** (Fig 36). Then, when looking through the eyepiece, you should see the pattern aligned as shown in Fig 37. If the pattern is oriented differently, then scales need readjustment. To readjust, turn the **Date Graduation Circle** to align Oct 31 to the 0 of the **Time Graduation Circle.** Then hold it and turn the eyepiece/mounting platform to orient the pattern in the position shown in Fig 36. Loosen the **Time Meridian Indicator Calibration Screw** and move the meridian indicator to align it to the 0 of the **Time Meridian Circle** without turning the **Date Graduation Circle** and **Eyepiece/Mounting Platform**. Tighten the Time Meridian Indicator calibration screw. See through the eyepiece. Now the pattern should still be in the right position.



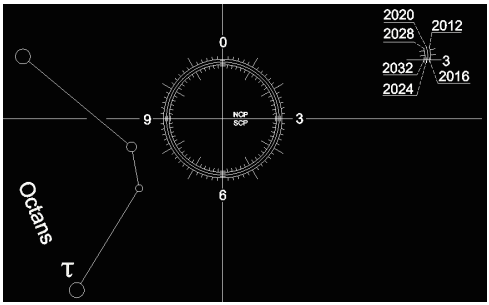


Fig 37

Note:

• When adjusting the Allen screws, loosen one screw only ¼ of a turn, and then tighten the other two gently.

• Do not over tighten the Allen screws; it might damage the pattern plate in the **Polar Scope**.

• Do not loosen one screw completely or loosen more than one screw at a time; otherwise, the pattern plate in the **Polar Scope** will be disengaged and further adjustment is impossible.

• If the pattern plate does disengage, remove the **Polar Scope**'s eyepiece by turning the **Knurled Ring** counterclockwise and then engage the pattern plate again.

• It is recommended to do this calibration at daytime, aiming at a point object (such as a distant rooftop) because the delicate operation with the tiny Allen screws is even more delicate in the dark.

Appendix I I

Fine-Tuning Mounting Assembly:

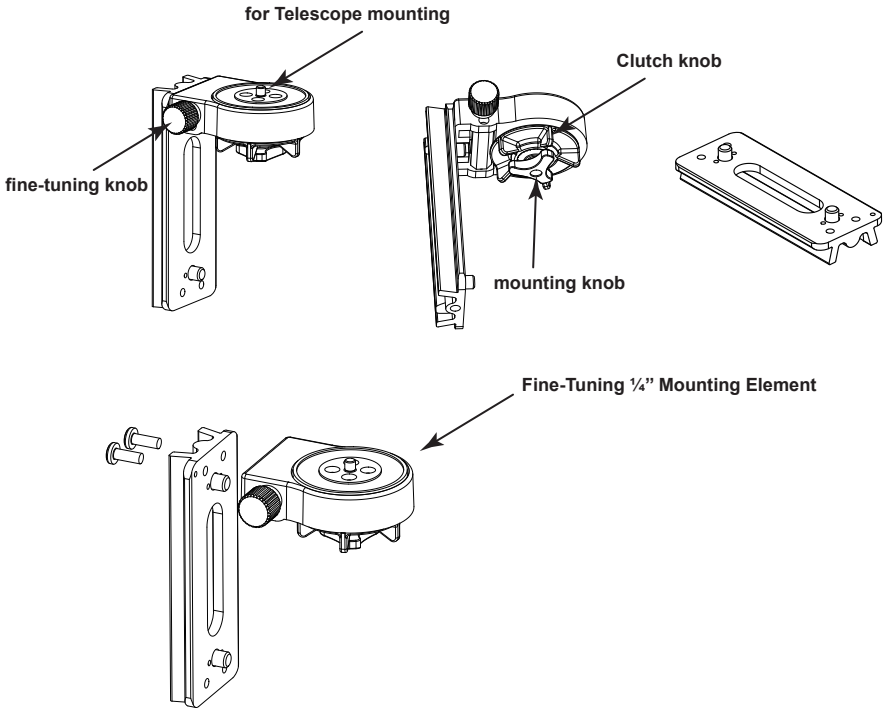


Fig 38

Fig 36

The Fine-Tuning Mounting Assembly connects a telescope to Sky Memo S and allows rotation in the other direction (at 90°, DEC direction). You can adjust the tightness of the rotation with the clutch knob. You also can fine-tune the camera or telescope orientation slightly in DEC direction by using the fine-tuning knob. You can also remove the Fine-Tuning ¼'' Mounting Element from the dovetail and then mount two ball heads on the dovetail to carry two cameras or one camera and another instrument. You can also use the Fine-Tuning ¼'' Mounting Element at one side and use ball head at the other side. You can implement various combinations to fit your needs.

Equatorial Wedge:

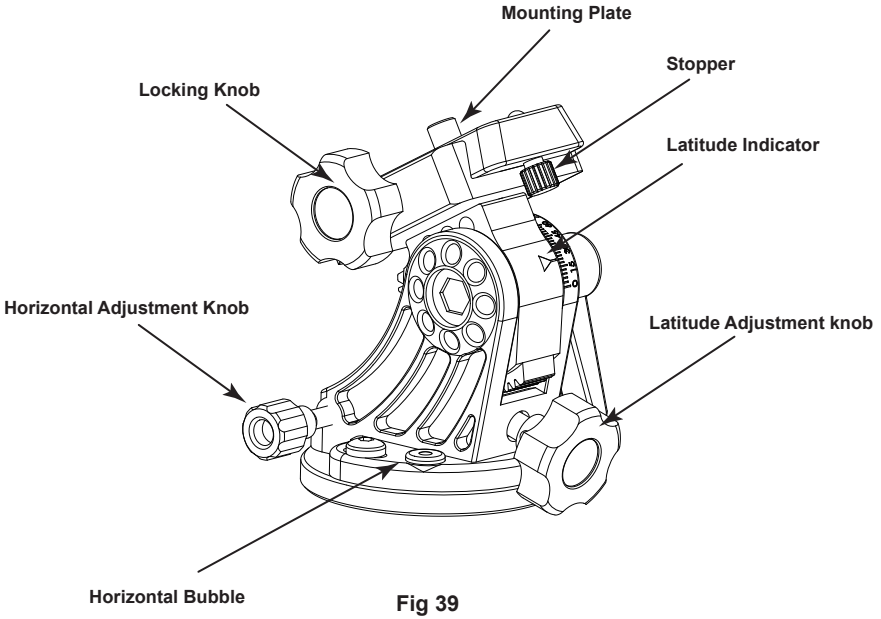


Fig 39

The **Equatorial Wedge** is a device to adjust the latitude for polar alignment. Rotate the Latitude Adjustment Knob can adjust the latitude of the **Sky Memo S** indicated by the Latitude Indicator. The range is from 0° to 90°. The Horizontal Adjustment Knob can adjust the Wedge to rotate to right or left horizontally. The Horizontal bubble is for checking if the base plate of the wedge is horizontal. The accuracy is 1°. When you install the **Mounting Plate** on the **Sky Memo S** , Make sure the **Stopper** is facing forward as Fig 39 shows to avoid equipment slippage, before you fasten the Locking Knob.

Specification

Sky Memo S	
Type	Ultra compact equatorial tracking platform
Tracking mode	Astrophotography: Celestial Tracking rate, 1/2 celestial tracking rate, solar tracking rate, lunar tracking rate(mean lunar time). For both of northern and southern hemispheres. Time-lapse photography: 12 hr/rev, 4 hr/rev and 2 hr/rev
Max payload	5 kg (11 lb)
Wheel Gear	86mm dia. 144 teeth aluminum alloy
Worm Gear	13mm dia. High tension brass
Motor drive	DC Servo
Built-in accessory	Polar scope
Polar scope	About 7° field of view
Working voltage	4 x AA battery: DC 3.6V~ 6.5V External power supply: DC 5V
Duration of operation	Up to 72 hours continuous tracking with high quality alkaline AA battery at 20 °C(Battery life may vary with loading and battery quality).
Operation temperature	0 ° ~ 40 °C
Dimensions	173.5mm x 113.3mm x 96 mm
Weight	1 kg
Base connect	3/8" threaded socket (or 1/4" with conversion adapter supplied)

CAUTION!

NEVER USE YOUR TELESCOPE TO LOOK DIRECTLY AT THE SUN. PERMANENT EYE DAMAGE WILL RESULT. USE A PROPER SOLAR FILTER FIRMLY MOUNTED ON THE FRONT OF THE TELESCOPE FOR VIEWING THE SUN. WHEN OBSERVING THE SUN, PLACE A DUST CAP OVER YOUR FINDERSCOPE OR REMOVE IT TO PROTECT YOU FROM ACCIDENTAL EXPOSURE. NEVER USE AN EYEPIECE-TYPE SOLAR FILTER AND NEVER USE YOUR TELESCOPE TO PROJECT SUNLIGHT ONTO ANOTHER SURFACE, THE INTERNAL HEAT BUILD-UP WILL DAMAGE THE TELESCOPE OPTICAL ELEMENTS.