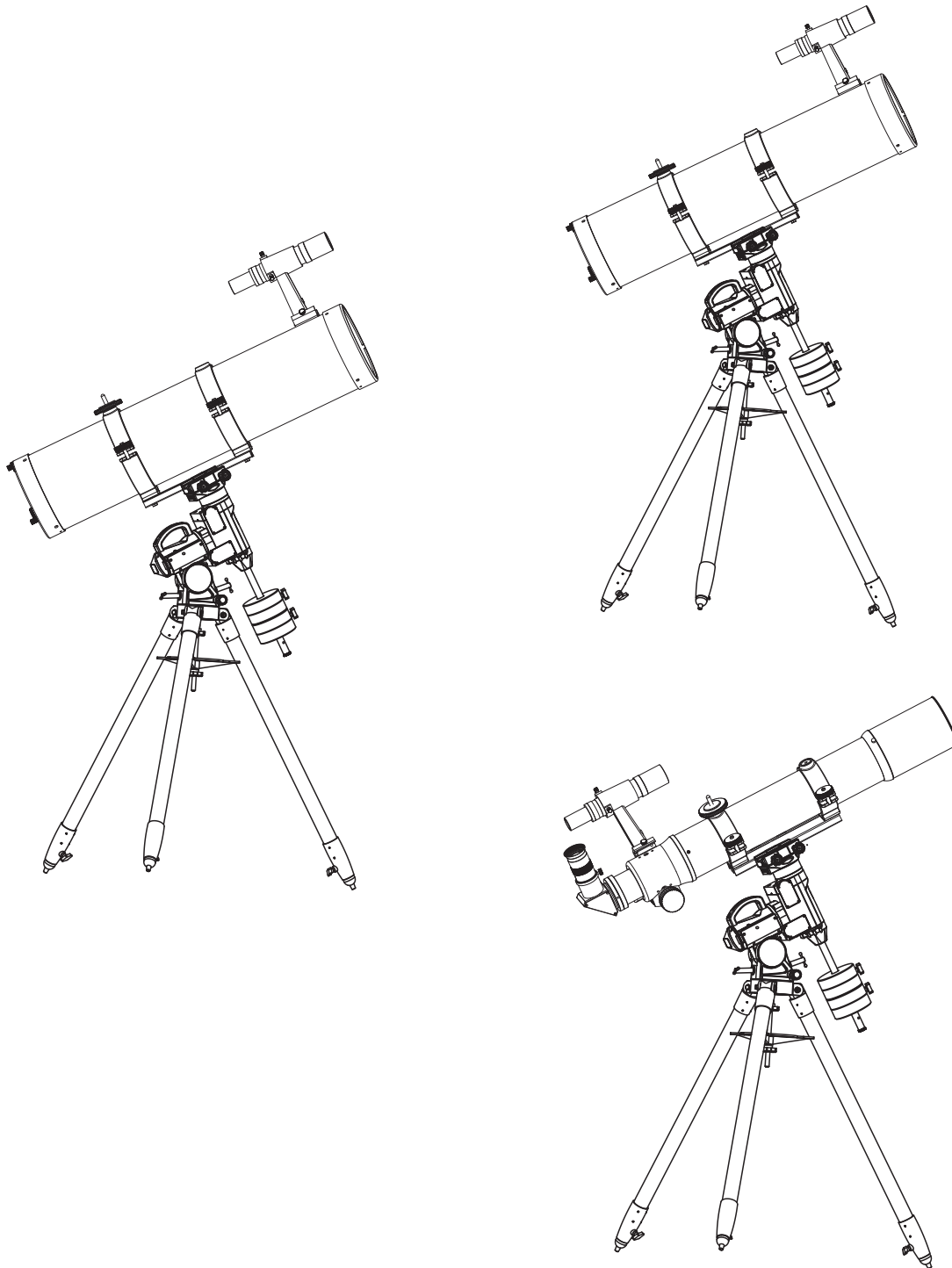


INSTRUCTION MANUAL

HEQ5-R PRO MOUNT



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PART I: Installation of the HEQ5-R Pro Mount

1.1 Installation of the Tripod (Fig.1)

1. Fully expand the tripod on level ground.
2. Locate the height adjustment clamps (10) on the legs. Unlock them, extend the legs to the desired height; make sure the tripod top is approximately level and then lock the clamps.

1.2 Installation of the Mount on the Tripod (Fig. 1 and Fig. 2)

1. Loosen the azimuth adjustment knobs (4) to obtain a gap between their ends to allow the tripod pin to fit in.
2. Put the mount on the tripod in such way the tripod pin sits in between the ends of the azimuth adjustment screws.
3. Turn the screw bar (5) in the center of the tripod clockwise to attach the mount
4. Install the accessory tray (7), and lock it in place with washer (8) and knurled knob(9).
Caution: the three arms of the accessory tray should be pushing tightly against the three tripod legs.
5. Put the tripod with the tripod leg marked "N" towards the north (supposing being in the northern hemisphere)
6. Check bubble level (11) and adjust the three feet to have the mount horizontal (see also 1.1.2).

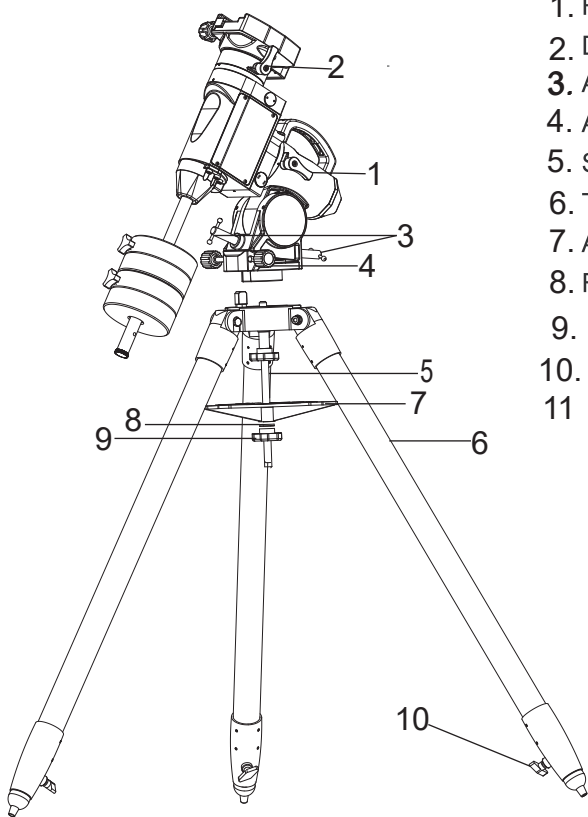


Fig. 1

1. RA Clutch wheel
2. Dec Clutch Lever
3. Altitude Adjustment Knob
4. Azimuth Adjustment Knob
5. Screw bar
6. Tripod Leg
7. Accessory Tray
8. Flat washer
9. Knurled Knob
10. Height Adjustment Clamp
11. Bubble Level

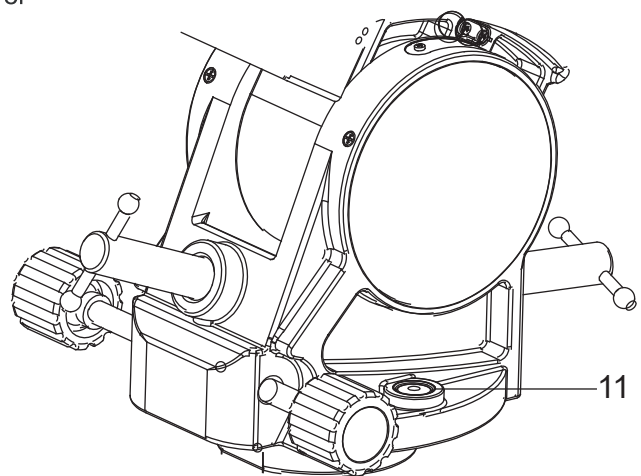


Fig. 2

1.3 Adjusting Latitude (Fig. 3 and Fig.4)

1. Turn latitude adjustment lever (3) until the arrow on the latitude scale of the mount matches the latitude of your observing site.
2. Attach the counterweight bar(12) on to the mount .
Slide the counterweight (13) on the counterweight bar and lock it with the locking screw (14). Put the counterweight bar security screw (15) in place.

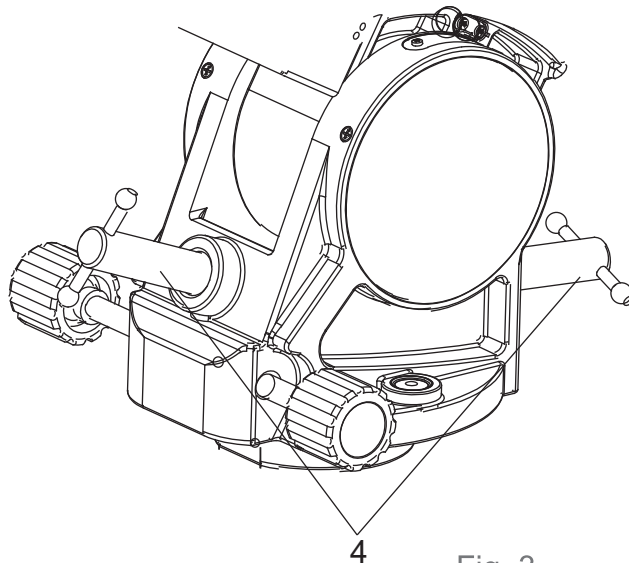


Fig. 3

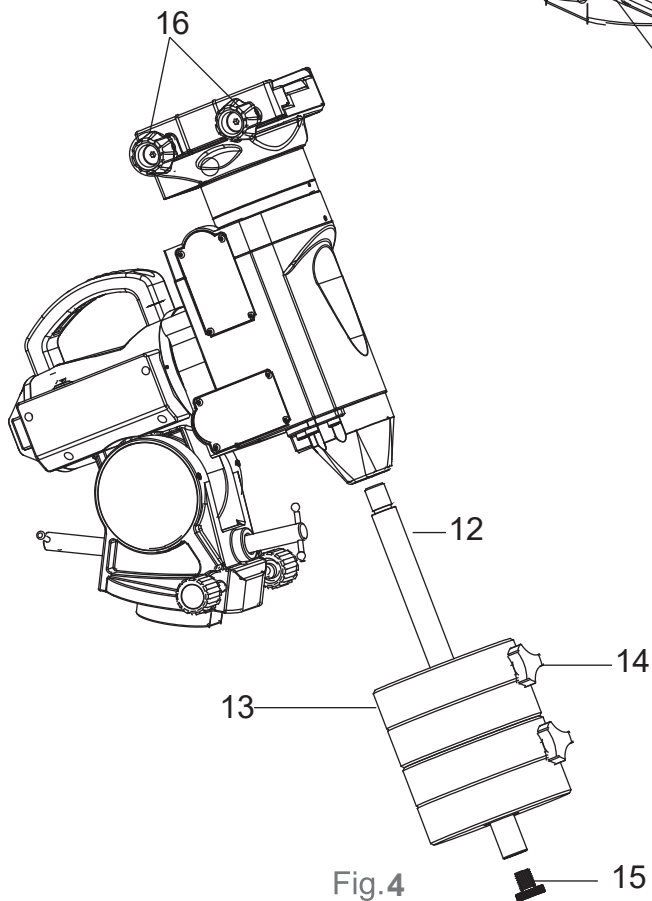


Fig.4

- 12 .Counterweight bar
- 13 .Counterweight
- 14 .Counterweight locking screw
- 15 .Counterweight bar security screw
- 16 .telescope locking screw

■ Part II: Configuration and Balancing of the HEQ5-R Pro Mount ■

2.1 Balancing the Telescope (Fig. 5)

1. Loosen DEC clutch lever (Fig.1, 2) and RA clutch wheel (Fig.1, 1) and put the mount in such position that the counterweight is in its lowest position. Make sure the DEC clutch lever (2) and RA clutch wheel (1) are tightened again and the telescope locking screw (Fig.4, 16) is loose. Put the telescope on the mount, lock it with the telescope locking screw (16). Check the DEC axis balance by loosening the DEC clutch lever (2) while holding the telescope. Make sure the telescope is balanced by mounting it accordingly in the telescope mounting clamp.
2. Loosen the RA clutch wheel (1) and put the counterweight bar in a horizontal position as shown in Fig.5. Check the balance of the mount, and shift the counterweight on the counterweight bar as needed.

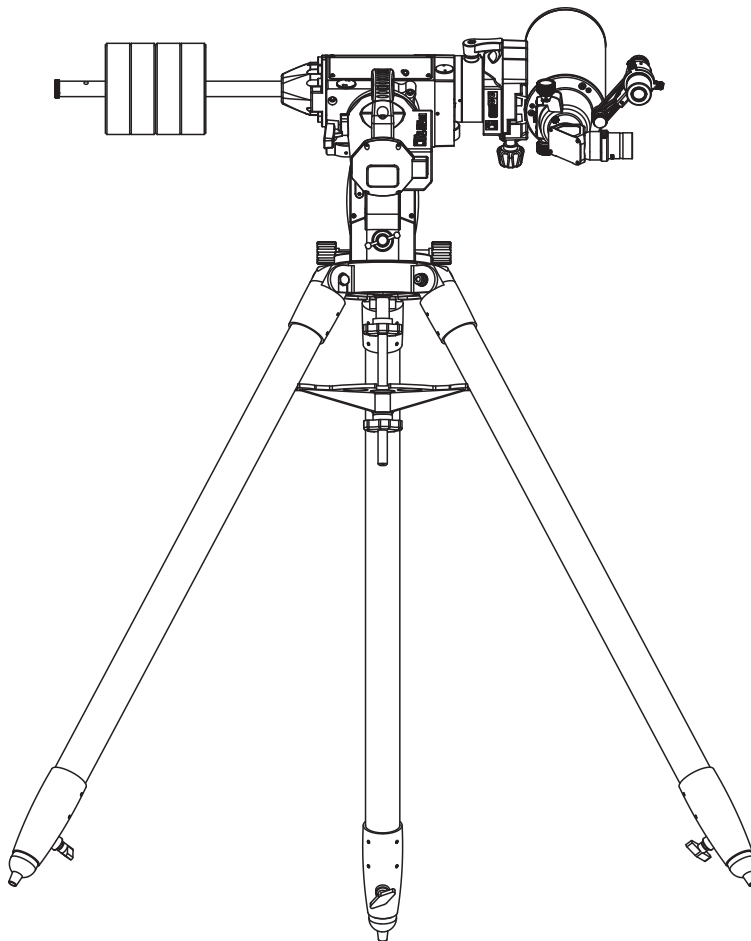


Fig.5

Part III: Connecting to the HEQ5-R Pro Mount

3.1 The HEQ5-R Pro Mount features :

1. Different methods to control the mount via built in WiFi or cable:

- Wi-Fi via smart device
- Wi-Fi via computer
- USB via computer (cable sold separately)
- SynScan hand controller (sold separately)

When controlling your mount via WiFi and your smart device, you need to download and install the SynScan Pro app which is available at no cost in the Google Play Store and Apple Store.

If connecting via a computer, the SynScan Pro app can be downloaded directly from our website:

<http://www.skywatcher.com/download/software/synscan-app/>

If connecting via the SynScan hand controller, you will need to purchase a hand controller from your preferred vendor.

2. Wi-Fi via Smart Device

Download the app and install it to your smart device.

Power ON the mount via the switch located on the HEQ5-R Pro Mount .

Locate the Wi-Fi settings on your smart device. You will need to connect to the Wi-Fi signal that the HEQ5-R Pro Mount is broadcasting.

The Wi-Fi name will have the following format: SynScan_****

Once selected, your smart device will be tethered to the mount.

Open the SynScan Pro app and select "Connect".

Your device will display the SynScan device within range. Tap the device and the app will connect.

3. Wi-Fi via Computer

Download the SynScan app and save it to a location where you can find it. Power ON the mount via the switch located on the HEQ5-R Pro Mount. Connect to the Wi-Fi network that the mount is broadcasting.

The Wi-Fi name will have the following format:

SynScan_****

Once selected, your smart device will be tethered to the mount. Open the SynScan Pro app and select "Connect".

Your device will display the SynScan device within range. Click the device and the app will connect.

4. USB via Computer

Download the SynScan app and save it to a location where you can find it.

Plug the mount in via USB (Fig. 6). Make sure that the device is turned OFF before plugging the USB connection in.

Power ON the mount via the switch located on the HEQ5-R Pro Mount. Open the SynScan Pro app and select "Connect".

Click the device and the app will connect.

5. Connecting via SynScan Hand Controller

Plug the RJ45 cable into the bottom of the hand controller port, and then connect to the mount (Fig. 6). Power ON the mount via the switch located on the HEQ5-R Pro Mount.

You will be prompted by the hand controller on the screen to initiate the mount. (Refer to SynScan hand controller manual for more information).

<http://www.skywatcher.com/download/manual/synscan-hand-control-and-synscan-app/>

NOTE: If you are using an existing Wi-Fi connection for the internet on a smart device, you will lose connection and your device will switch to cellular connection. You may also be required to set your device to remain connected regardless of connection to the internet. Please refer to your users manual on your specific device.

A detailed manual on the SynScan app can be downloaded from the Sky-Watcher support page:

<http://www.skywatcher.com/download/manual/>

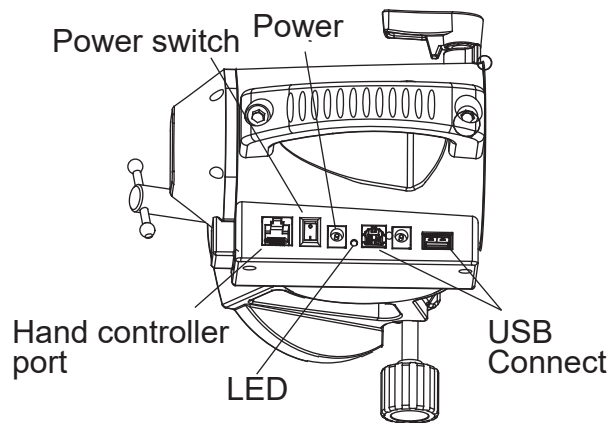


Fig. 6

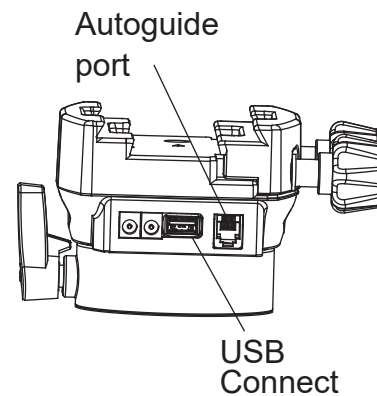


Fig. 7

6. External Power Supply Requirements

- Input Voltage: DC 9V (minimum) to DC 12.6V (maximum). Voltage not in this range might cause permanent damage to the motor controller or the hand controller.
- Input Plug: Barrel type with 2.0mm I.D and 5.5mm O.D. Must be central positive.
- Input Current: At least 1.5A.
- Do not use an unregulated AC-to-DC adapter. When choosing an AC adapter, a switching power supply with 12V output voltage and minimum 1.5A output current is recommended.
- If the power voltage is too high, the motor controller will stop the motors automatically.

PartIV: Guiding with the HEQ5-R Pro Mount

5.1 Autoguiding with an external camera is a method to improve the tracking movement of the mount when taking pictures with long exposure times where high tracking precision is needed. The communication with the HEQ5-R Pro mount for operation with autoguiding can be done via the autoguider port (ST4 type) or via the USB port.

A guide scope and guide camera are required in order to do autoguiding (sold separately by your local telescope dealer).

Before we begin, make sure that you have the appropriate guiding software installed on your device.

Follow these steps in order to set up autoguiding for the mount.

Step 1: Start by installing the latest version of ASCOM.

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

Download the SynScan Pro app for Windows and the ASCOM drivers for the HEQ5-R Pro Mount.

All software can be found at the following website:

<http://www.skywatcher.com/download/software/>

Next, install the ASCOM drivers (PC).

ASCOM Driver for SynScan Pro app Version.

ASCOM Driver for SynScan hand controller.

(Version numbers will change as and when new updates become available).

<http://www.skywatcher.com/download/software/ascom-driver/>

Install the SynScan Pro app (PC).

<http://www.skywatcher.com/download/software/synscan-app/>

Step 2: Connect your guide camera to your PC (refer to user manuals for connection on specific camera).

Connect the mount via USB to your PC using a USB 2.0 cable.

If you have an ST-4 port on the camera, connect the ST-4 cable to the camera and mount. ST-4 uses a 6P6C RJ12 data cable (sold separately). Connect the power to the mount and turn the HEQ5-R Pro Mount on.

Step 3: Launch the SynScan Pro app.

Click on SETTINGS and then CONNECT SETTINGS.

Select SERIAL and choose the appropriate port (COM).

Click BACK and then CONNECT.

SynScan Pro will now be connected to your mount and is ready for use.

To find out which COM port the HEQ5-R Pro Mount is using, open up DEVICE MANAGER in Windows found in the CONTROL PANEL. Look for Prolific USB-to-Serial Comm Port (Fig. 6). If you have a yellow circular exclamation mark shows up next to the serial port, download and install the Prolific USB-to-Serial Device Driver.

Step 4: Open your guiding software and follow the instructions from your program on connecting to the mount. When selecting the mount type, make sure “SynScan App Driver” is selected. This will allow ASCOM direct communication to the SynScan Pro app.

For more information on the SynScan Pro app and ASCOM connection, refer to the SynScan Pro manual for more information:

<http://www.skywatcher.com/download/manual/synscan-hand-control-and-synscan-app/>

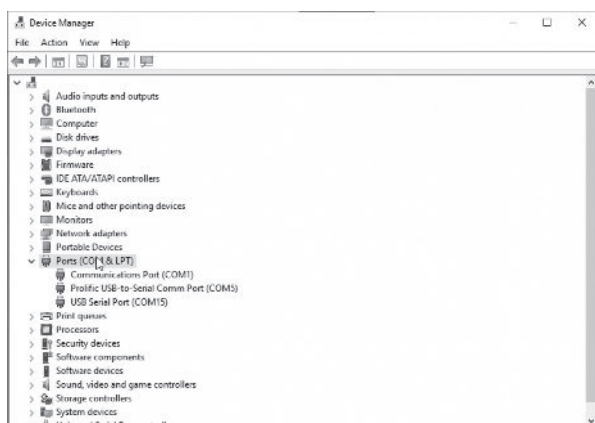


Fig.8

Part V: Installation and Use of the Telescope

Before you begin

This instruction manual is applicable to 3 models. Take a moment to find the model of your telescope. Follow the instructions for your specific model in the manual. Read the entire instructions carefully before beginning. Your telescope should be assembled for the first time in bright light conditions, inside, or at daytime, in an open area to keep an overview of all parts when unpacking and mounting.

REFRACTOR

- A. Dust Cap/Mask (Remove before viewing)
- B. Sun Shade/Dew Cap
- C. Telescope main Tube
- D. Tube Ring
- E. Piggyback Bracket
- F. Finderscope
- G. Finderscope Bracket
- H. Finderscope Alignment Screws
- I. Eyepiece
- J. Diagonal
- K. Focus Tube
- L. Focus Knob
- M. Locking screw
- N. Mounting Plate

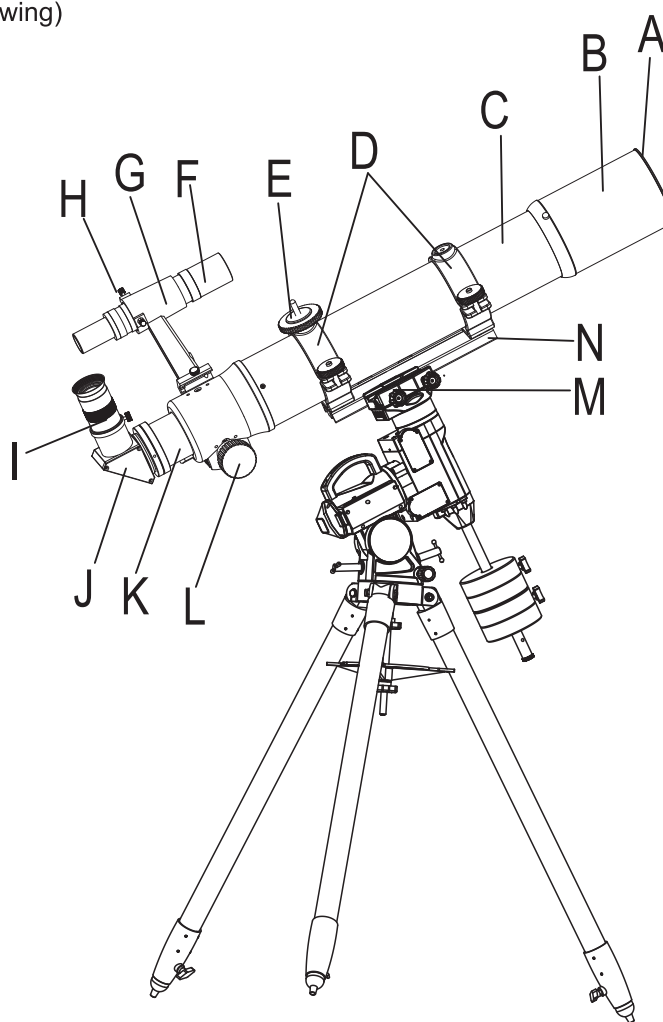


Fig.9

REFLECTOR

- A. Finderscope BracketLocking Screw
- B. Finderscope
- C. Finderscope Bracket
- D. Finderscope Alignment Screws
- E. Tube Ring
- F. Piggyback Bracket
- G. Telescope Main Tube
- H. Main mirror
- I. Locking Screw

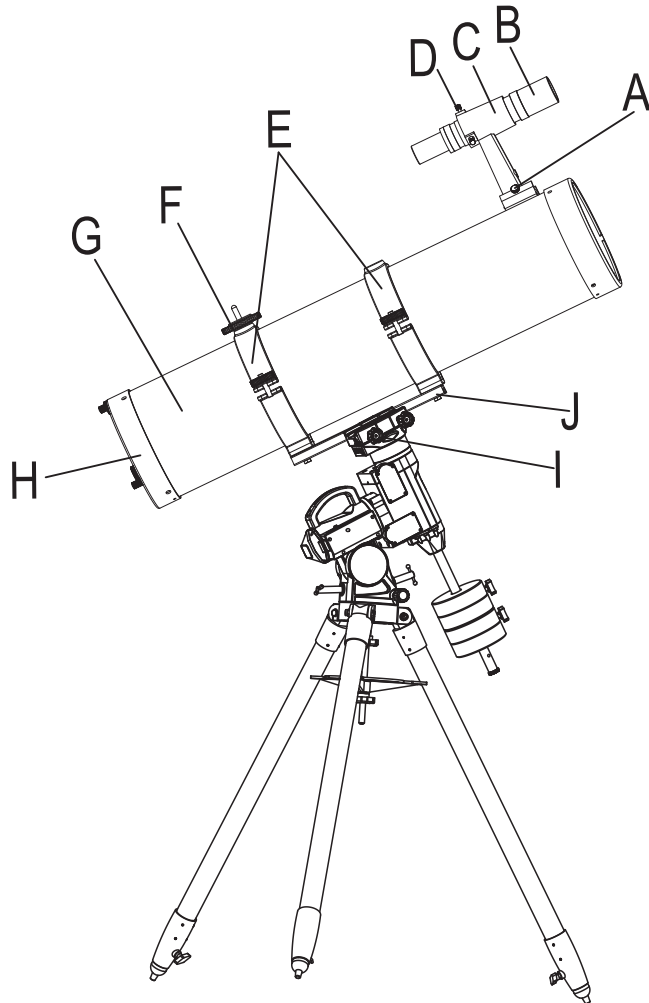


Fig.10

MAKSUTOV

- A. Dust Cap/Mask(not shown, remove before viewing)
- B. Telescope Main Tube
- C. Finderscope
- D. Finderscope Bracket
- E. Finderscope Alignment Screws
- F. Finderscope Bracket Locking Screw
- G. Eyepiece
- H. Diagonal
- I. Focus knob
- J. Locking screw
- K. Mounting Plate

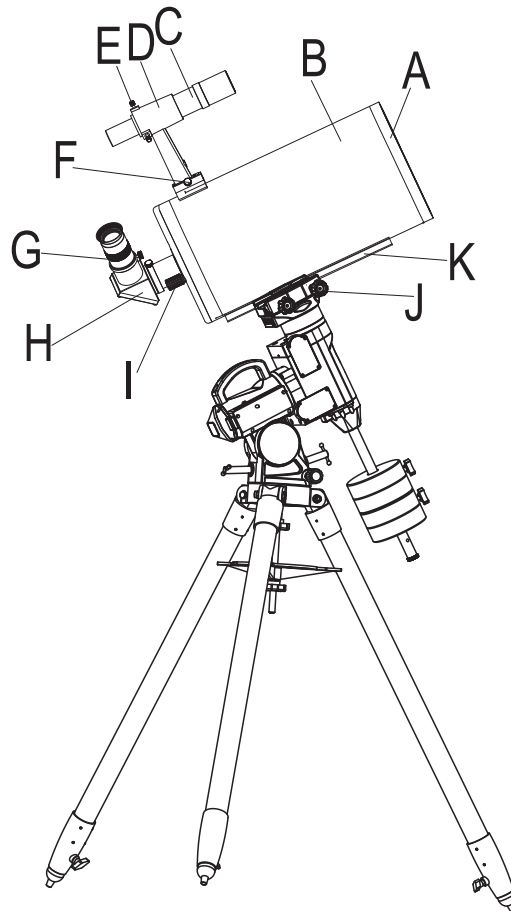


Fig.11

5.1 Finderscope / red dot finder assembly

1. Attaching the Finderscope Bracket (Fig.12)

- Locate the finderscope optical assembly.
- Slide the finderscope bracket into the rectangular slot and tighten the screw to hold the bracket in place.

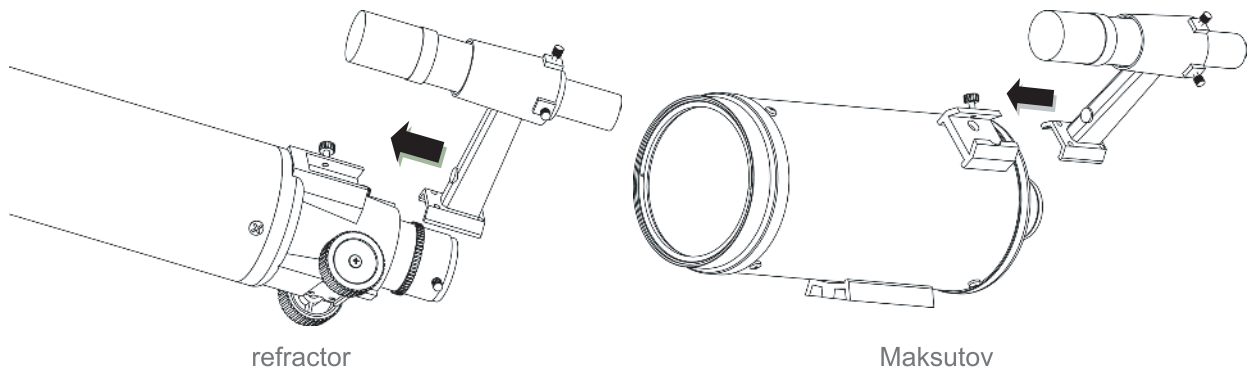


Fig.12

2. Attaching the Red Dot Finder (Fig.13)

- Slide the red dot finder bracket into the rectangular slot and tighten the screw to hold the red dot finder in place.

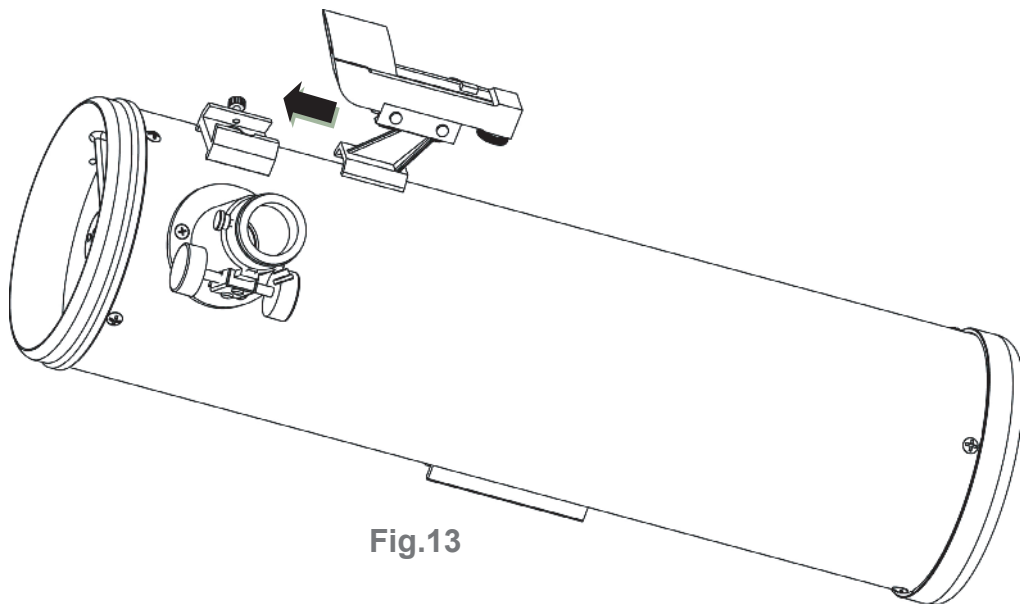


Fig.13

5.2 Eyepiece Assembly

1. Inserting eyepiece for refractor and Maksutov (Fig.14)

- Loosen the thumbscrew on the end of the focus tube.
- Insert the diagonal into the focus tube and re-tighten the thumbscrew to hold the diagonal in place.
- Loosen the thumbscrews on the diagonal.
- Insert the desired eyepiece into diagonal and secure it by re-tightening the thumbscrews.

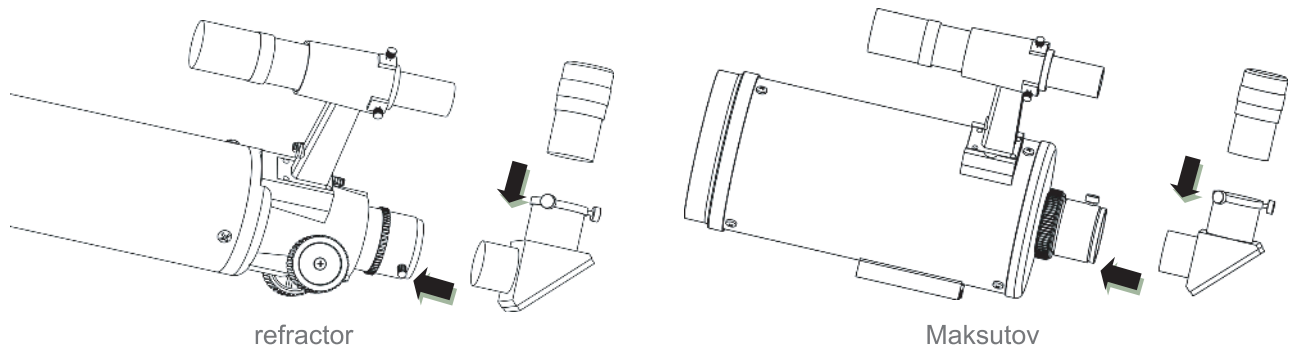


Fig. 14

2. Inserting Eyepiece for Reflector (Fig.15)

- Unscrew the thumbscrews on the end of the focus tube to remove the black plastic end-cap.
- Insert the desired eyepiece then re-tighten thumbscrews to hold the eyepiece in place.

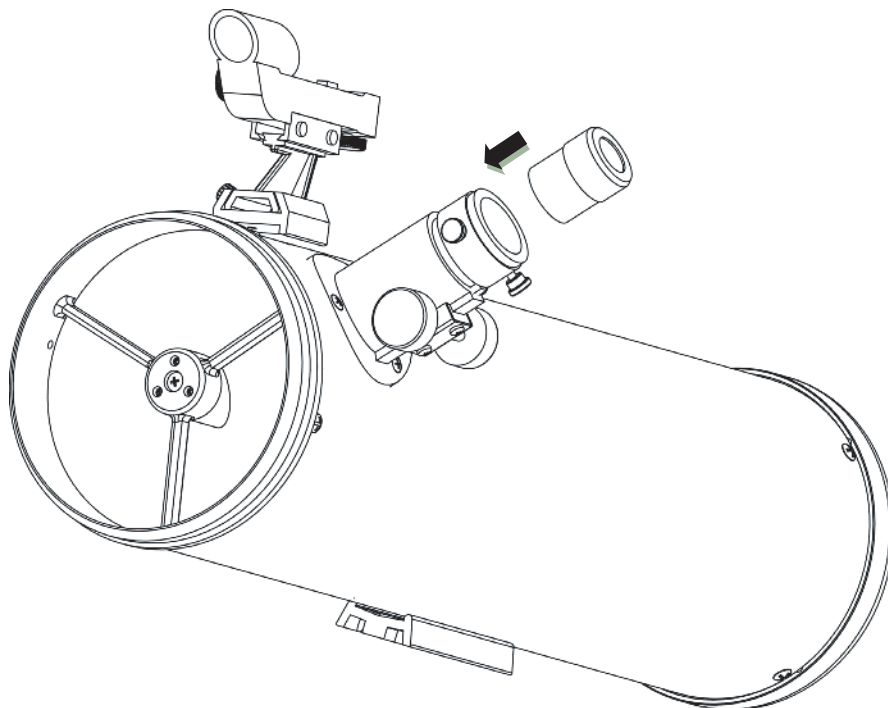


Fig. 15

PART VI : Operating Your Telescope

6.1 Aligning and using the finderscope / red dot finder

1. These fixed magnification scopes mounted on the optical tube are very useful accessories. When they are correctly aligned with the telescope, objects can be quickly located and brought to the center of the field. Alignment is best done outdoors in day light when it's easier to locate objects. If it is necessary to refocus your finderscope, sight on an object that is at least 500 meters (or yards) away. For the 6x30 finderscope: loosen the locking ring by unscrewing it back towards the bracket. The front lens holder can now be turned in and out to focus. When focus is reached, lock it in position with the locking ring (Fig.16).

- Choose a distant object that is at least 500 meters(yards) away and point the main telescope at the object. Point the telescope exactly to have the object well centered in the eyepiece of the telescope.
- Check in the finderscope if the same object is also well centered on the crosshairs.
- For the 6x30 finderscope with spring loading, adjust only the two small screws (Fig.17)

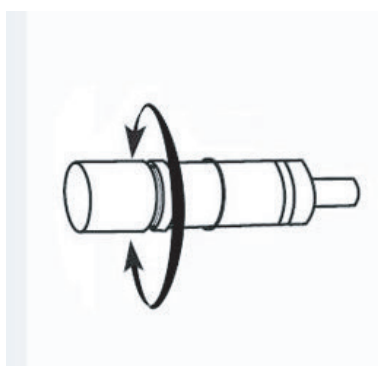


Fig. 16

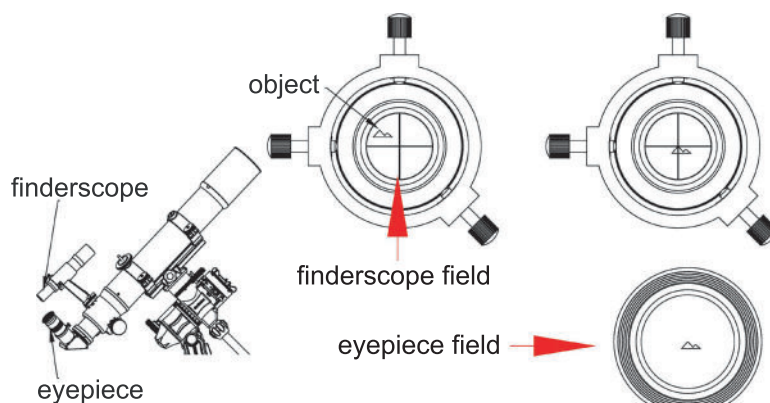


Fig.17

6.2 Focusing the telescope

Slowly turn the focus knob one way or the other, until the image in the eyepiece is sharp (Fig.20). Check if the accessories and adapters you use are corresponding to the instructions of the manual if a sharp image cannot be reached. Another cause may be that the object you are aiming at with your telescope is too close.

Refocusing is almost always necessary when you switch eyepieces.

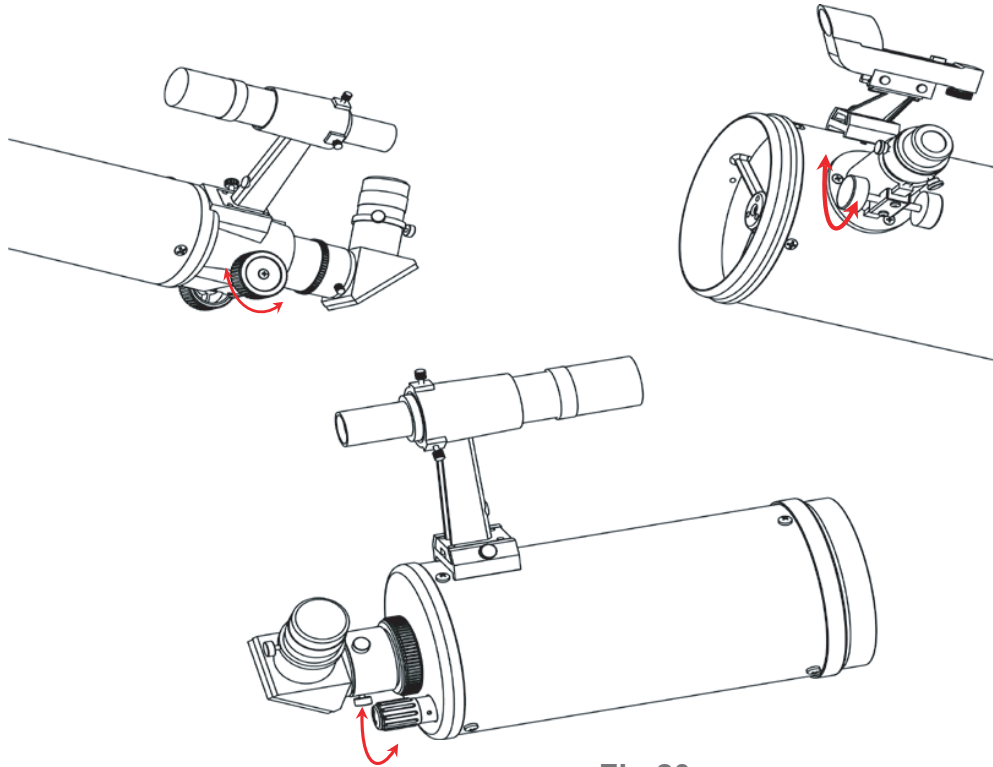


Fig.20

6.3 Choosing the appropriate eyepiece

- The magnification produced by a telescope is determined by the focal length of the eye-piece that is used with it. To determine a magnification for your telescope, divide its focal length by the focal length of the eyepieces you are going to use. For example, a 10mm focal length eyepiece will give 80X magnification with an 800mm focal length telescope.
- When you are looking at astronomical objects, you are looking through a column of air that reaches to the edge of space which seldom stays still. Similarly, when viewing over land you are often looking through heat waves radiating from the ground, house, build-ings, etc. Your telescope may be able to give very high magnification but you end up magnifying all the turbulence between the telescope and the object. A good way to choose the right eyepiece for observation of bright objects (moon, planets etc.) is to start with a low power eyepiece, and increase the magnification step by step until you get the impression that increasing magnification does not provide more details in the image. A rule of thumb is that the maximum magnification is (with exceptionally good weather conditions) 2x the diameter in mm of the telescope.
- To look for faint objects (nebula etc.), a very low power eyepiece is recommended because magnifying more also means a darker image, and inversely, a lower magnification produces a brighter image. A lower magnification also shows a wider view of the sky, which also helps finding objects. The minimal useful magnification (= maximum brightness) of a telescope is 0.14x the diameter in mm of the telescope. Conclusion: every search in the sky starts by looking in the finderscope, then look in your telescope equipped with a low power eyepiece having a bright and wide view on the sky. After having found and centered the object in the low power eyepiece, magnification can be increased step by step by switching to more powerful eyepieces if weather conditions (air turbulence) and the brightness of the object allows it.

PART VII : Observing the sky

7.1 Sky Conditions

- Sky conditions are usually defined by two atmospheric characteristics, seeing, or the steadiness of the air, and transparency, light scattering due to the amount of water vapor and particulate material in the air.
- When you observe the Moon and the planets, and they appear as though water is running over them, you probably have bad “seeing” because you are observing through turbulent air. In conditions of good “seeing”, the stars appear steady, without twinkling, when you look at them with unassisted eyes (without a telescope).
- Ideal “transparency” is when the sky is inky black and the air is unpolluted.

7.2 Selecting an Observation Site

- Travel to the best site that is reasonably accessible. It should be away from city lights, and upwind from any source of air pollution. A
- Always choose as high an elevation as possible; this will get you above some of the lights and pollution and will ensure that you aren't in any ground fog. Sometimes low fog banks help to block light pollution if you get above them.
- Try to have a dark, unobstructed view of the horizon, especially the southern horizon if you are in the Northern Hemisphere and vice versa. However, remember that the darkest sky is usually at the “Zenith”, directly above your head. It is the shortest path through the atmosphere.
- Do not try to observe any object when the light path passes near any protrusion on the ground. Even extremely light winds can cause major air turbulence as they flow over the top of a building or wall.
- Observing through a window is not recommended because the window glass will distort images considerably. And an open window can be even worse, because warmer indoor air will escape out the window, causing turbulence which also affects images.
- Astronomy is an outdoor activity. The best conditions will have still air, and obviously, a clear view of the sky. It is not necessary that the sky be cloud-free. Often, broken cloud conditions provide excellent seeing.

7.3 Choosing the Best Time to Observe

- Do not view immediately after sunset. After the sun goes down, the Earth is still cooling, causing air turbulence. As the night goes on, not only will seeing improve, but air pollution and ground lights will often diminish. Some of the best observing time is often in the early morning hours.
- Objects are best observed as they cross the meridian, which is an imaginary line that runs through the Zenith, due North-South. This is the point at which objects reach their highest points in the sky. Observing at this time reduces bad atmospheric effects.
- When observing near the horizon, you look through lots of atmosphere, complete with turbulence, dust particles and increased light pollution.

7.4 Cooling the Telescope

- Telescopes require at least 10 to 30 minutes to cool down to outside air temperature. This may take longer if there is a big difference between the temperature of the telescope and the outside air. This minimizes heatwave distortion inside telescope tube (tube currents). Allow a longer cooling time for larger optics.

7.5 Adapting Your Eyes

- Do not expose your eyes to anything except red light for 30 minutes prior to observing. This allows your pupils to expand to their maximum diameter and build up the levels of optical pigments, which are rapidly lost if exposed to bright light.
- Observe with both eyes open. This avoids fatigue at the eyepiece. If you find this too distracting, cover the non-used eye with your hand or an eye patch. Use averted vision on faint objects: The center of your eye is the least sensitive to low light levels. When viewing a faint object, don't look directly at it. Instead, look slightly to the side, and the object will appear brighter.

PART VI: Proper Care For Your Telescope

8.1 Cleaning Your Telescope

- Replace the dust cap over end of telescope when not in use. This prevents dust from settling on mirror or lens surface.
- Do not clean the telescope mirror or lens surface unless you are familiar with lens surfaces. A little dust on these surfaces will not noticeably affect the image quality. Contact your dealer for advice if these surfaces are more dirty than just some dust. Eyepieces will get dirty more quickly due to contact with eyelash etc. Their optical surface is less sensitive, and can be cleaned regularly with soft cloth and cleaning fluid suited for optical surfaces.

HEQ5-R Pro Mount Specification

Tracking mode	Astrophotography: EQ mode
Max. payload	15kg
Worm	Copper - Diameter 15.5mm
RA Worm wheel	Aluminum alloy - Diameter 74mm
Motor drive	1.8 ° Hybrid Stepper Motor
Latitude Adjustment Range	5° to 72°
GOTO Controller	SynScan hand control, SynScan Pro App
Working voltage	DC 9V ~ 12.6V ,External power supply: DC 12V
Operational temperature	-10°C ~ 50°C
Weight	12kg
Dovetail type	Standard Vixen dovetail mount (V Style)

WARRANTY & CUSTOMER SUPPORT

Warranty information differs from region to region. Contact your local dealer for the warranty in your region. Warranty shall be void and of no force of effect in the event a covered product has been modified in design or function, or subjected to abuse, misuse, mishandling or unauthorized repair. Further, product malfunction or deterioration due to normal wear is not covered by this warranty. Sky-Watcher is not responsible for any user modifications to any products.

Sky-Watcher reserves the right to modify or discontinue, without prior notice to you, any model or style telescope. For technical and customer support, you will need to contact your regional support team. Please refer to the Sky-Watcher website and check under

“Global Distributer” for your specific region.

<http://www.skywatcher.com/where-to-buy/>

HEQ5-R Pro Mount



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.