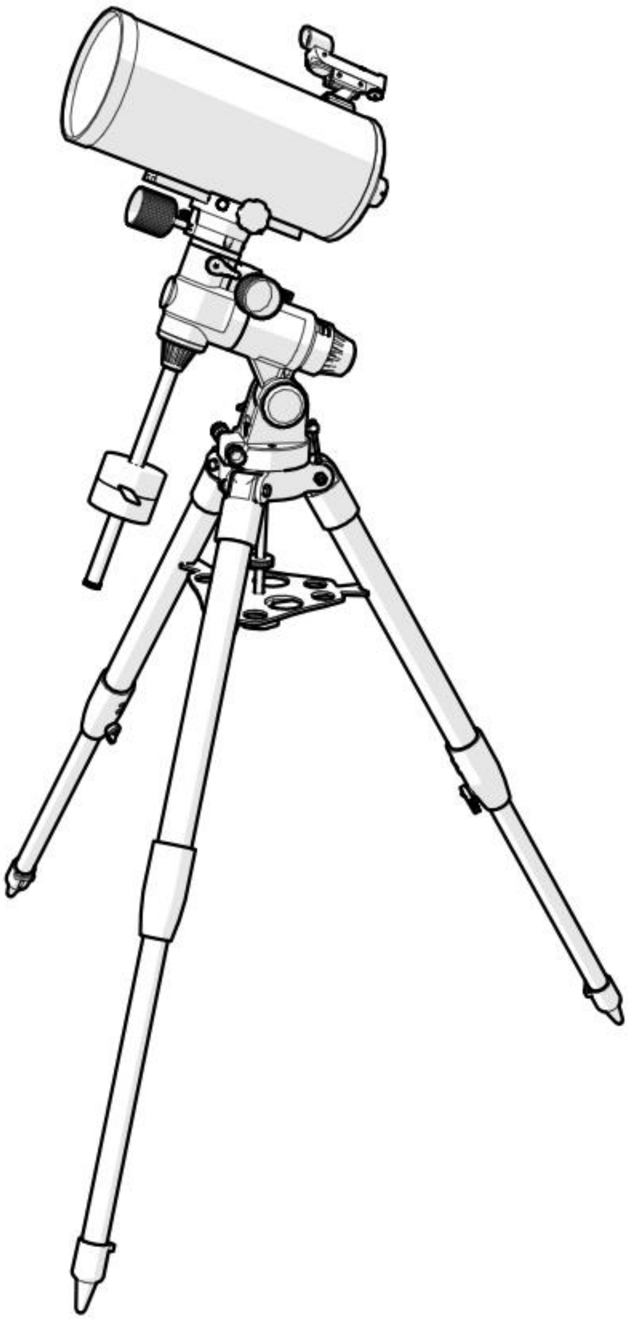
Instruction Manual



Omegon® EQ-500 X

English Version 8.2019 Rev. A, Art.-Nr. 62783

The Omegon® EQ-500 X

Congratulations to your new Omegon® EQ 500 X. This German equatorial telescope mount is designed to give you years of rewarding observations, thanks to durability and a high quality built. The mount can carry equipment weighing up to 10 kg. The Vixen-Style (GP) saddle makes it compatible with most small and medium sized telescope.

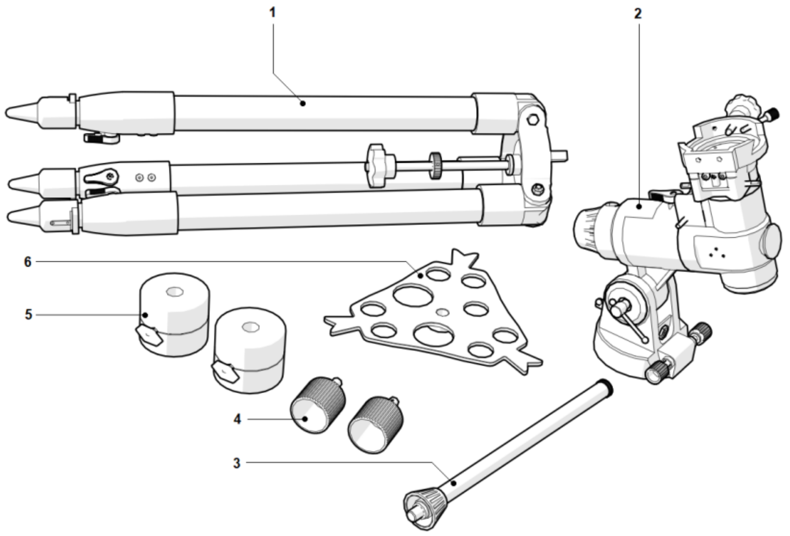
Compatible telescopes

- Newtonian telescopes up to 200mm (8”) aperture
- Refractor telescopes up to 130mm (5”) aperture
- Cassegrain telescopes up to 235mm (9.25”) aperture
- Maksutov telescopes up to 200mm (8”) aperture

Warning: Never point a telescope in the direction of the sun without a high-quality solar filter. Looking at the sun through a telescope causes instant damage to your eyes without warning. The focused sunlight is also likely to damage your telescope equipment. Never leave children using a telescope during daylight without adult supervision.

What’s included?

1- Stainless steel tripod
2- German equatorial mount head
3- Counterweight bar
4- Fine adjustment knobs (2)
5- Counterweights (2)
6- Tripod spreader plate



Introduction to equatorial mounts

The purpose of a telescope mount is not only to hold your telescope at a convenient height, but mainly to keep it balanced and steady during observation. At the same time, it allows you to easily point the telescope in any direction. The Omegon® EQ-500 X is an equatorial mount and hence offers even further convenience for observing the night sky. It is designed to compensate for the Earth’s rotation.

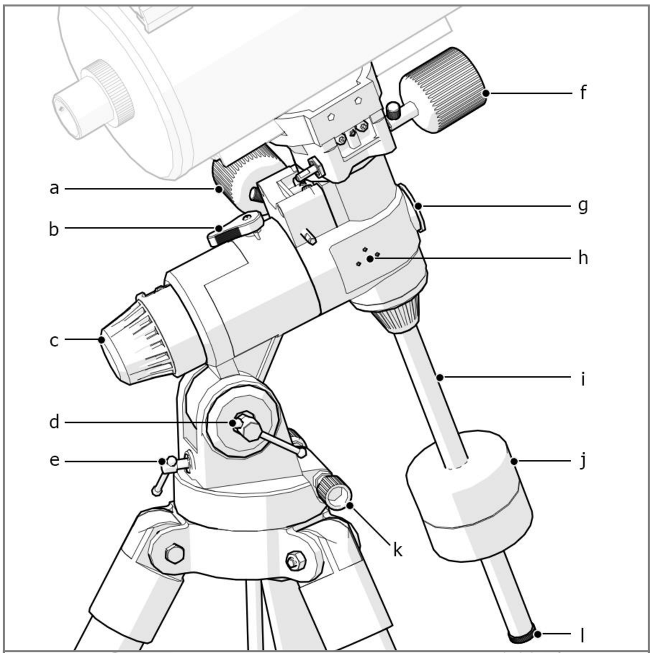
Because of the rotation of the Earth and with it the telescope and the observer, the whole sky shows an apparent movement and all stars seem to rotate around you once in 24 hours. While this movement is almost imperceivable to the naked eye, it is very noticeable with the high magnification of a telescope. The Objects you want to observe can move out of your field of view in just a short moment. Constant readjustment of the telescope’s direction is necessary. The Equatorial mount makes these readjustments very easy and allows for comfortable observation sessions. If aligned properly, a slow rotation of a single fine motion knob is enough to keep your observation targets from escaping your view.

The EQ 500 X has four axes:
Two axes, the altitude and azimuth adjustments, are only used to properly polar align the mount. After you finished the polar alignment, you shouldn’t touch these adjustments anymore.
The other two axes, RA-axis and DEC-axis (right ascension and declination), are used to move the telescope and point it in any desired direction. These axes each have one clamp. By opening the clamp, you can manually move the telescope along the corresponding axis. Once you close the clamp, the telescope’s orientation is fixed along this axis. You can now only move it with the corresponding slow-motion knob. The RA- and DEC-axis each have one slow motion knob. By turning them, you can control the telescopes direction very finely. The slow-motion knob of the RA-axis is used to compensate for the Earth’s rotation.

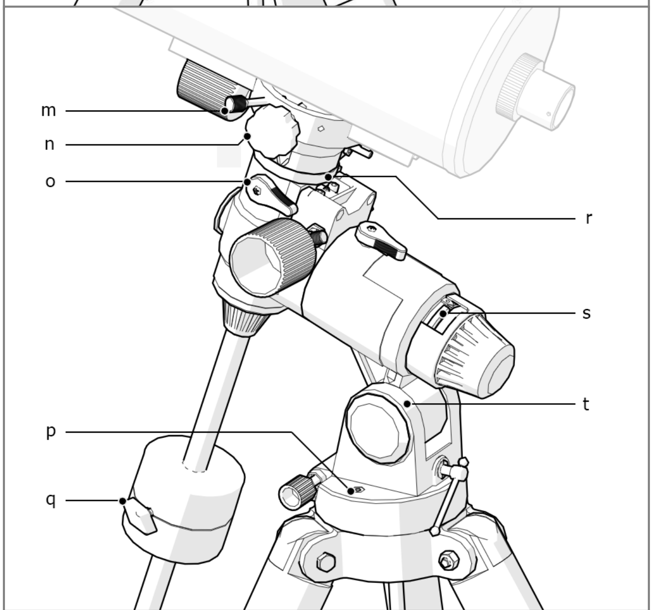
When aligned correctly, the mounts RA- and DEC-axis corresponds to the equatorial celestial coordinate system. Each star, nebula or galaxy in the sky has a fixed set of celestial coordinates, which can be looked up in celestial maps. This makes an equatorial mount like the Omegon® EQ-500 X ideal to use in combination with a star atlas.

What is what?

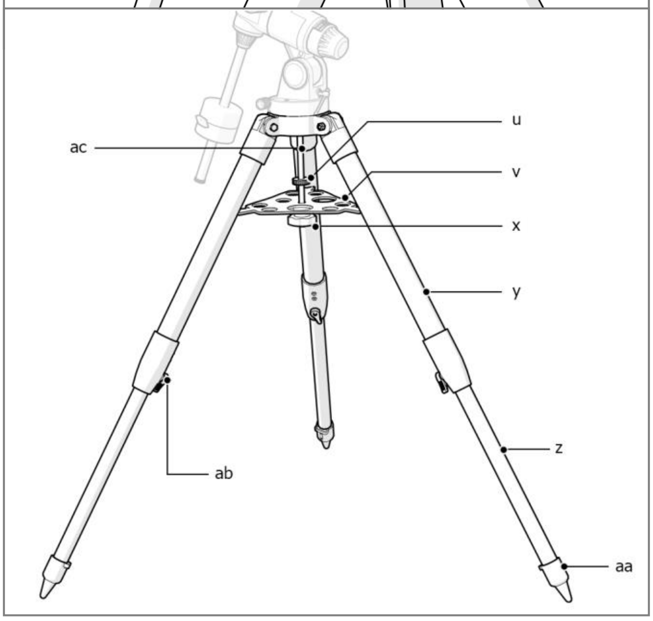
To properly follow this manual and successfully operate the telescope mount, it is helpful to know how all the different parts and features of the mount are called.



- a- Slow motion knob (RA-axis)
- b- RA-axis clamp
- c- Polar scope cover (back)
- d- Altitude clamp
- e- Altitude adjustment handle
- f- Slow motion knob (DEC-axis)
- g- Polar scope cover (front)
- h- ????
- i- Counterweight bar
- j- Counterweights
- k- Azimuth adjustment screws
- l- Counterweight bar end piece

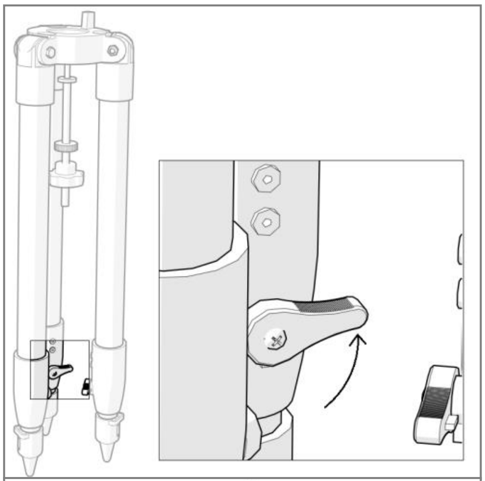


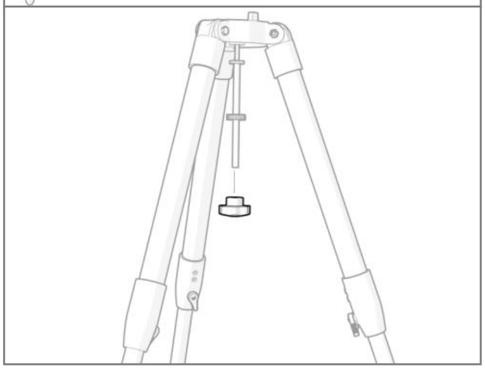
- m- Saddle security screw
- n- Telescope saddle knob
- o- DEC-axis clamp
- p- Circular bubble level
- q- Weight attachment screw
- r- DEC setting circle
- s- RA setting circle
- t- Latitude scale



- u- Central knob
- v- Spreader plate
- x- Spreader knob
- y- Tripod leg
- z- Tripod leg extension
- aa- Tripod foot
- ab- Clamps for tripod legs
- ac- Central rod

How to assemble the mount?





1. Preparing the tripod

1.1 Loosen the clamps for the tripod legs. Slide out the leg extensions and re-tighten the clamps.

1.2 Spread the three tripod legs to give it a wide and stable stance.

1.3 Remove the black spreader knob from the central rod.

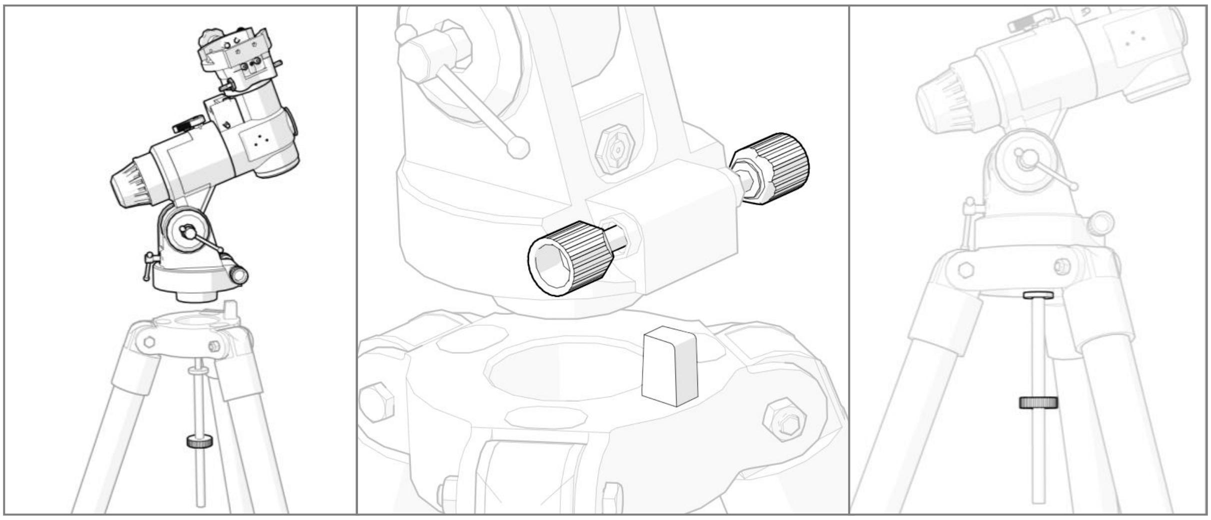
Tip: Extend the tripod legs by varying amounts for your desired tripod height or to offset uneven terrain.

Attention: The azimuth adjustment screws on the underside of the mount head must be extended before attaching the mount head! Extend them far enough to give enough space for the protruding knob on the top of the tripod.

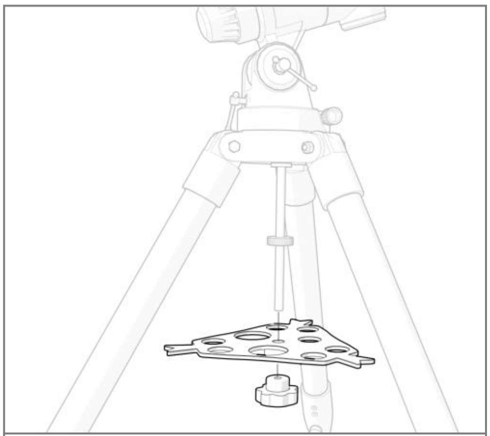
2. Attaching the mount head

2.1 Place the mount head onto the tripod.

2.2 Use the central rod between the three tripod legs to screw the mount head tightly onto the tripod. Make sure the washer at the top of the central rod is flush with the tripod.



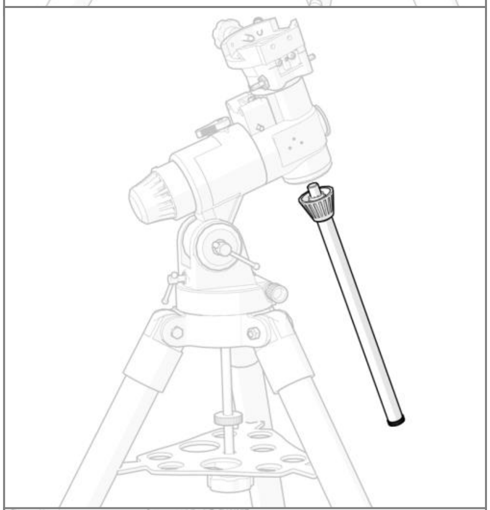
3. Attaching miscellaneous parts



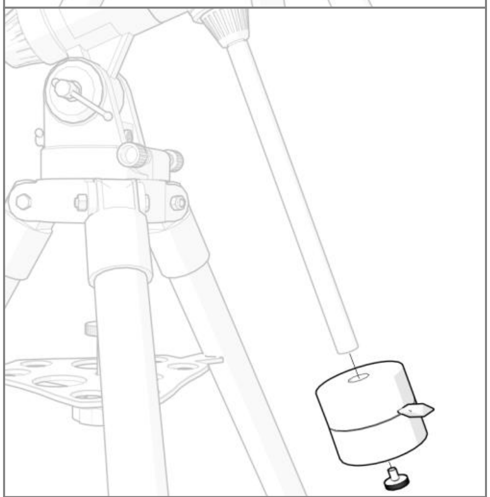
3.1 Insert the spreader plate onto the central rod. Slide it up as far as possible while positioning it tightly between the three legs.

3.2 Screw the black knob onto the central rod to tighten and hold the spreader plate into position.

3.3 Screw the counterweight bar into the threaded hole opposite of the telescope saddle.



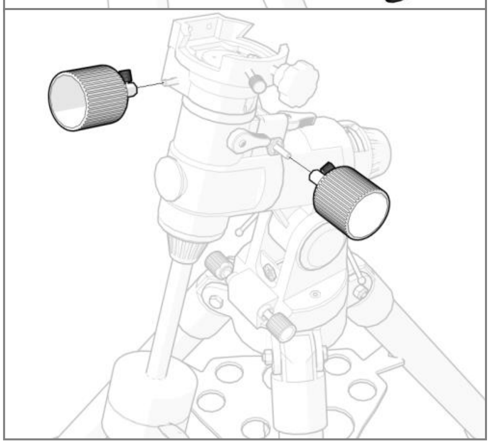
> **Tip:** The mount head might be in a different position than shown in these images. By opening the clamp for the RA-axis, you can rotate the mount head until the counterweight bar points to the ground.
>
> By loosening the altitude clamp and rotating the altitude adjustment handle, you can slowly change the angle of the mount head to prevent the counterweight bar touching the tripod legs.
>
> Don’t forget to tighten all clamps again!



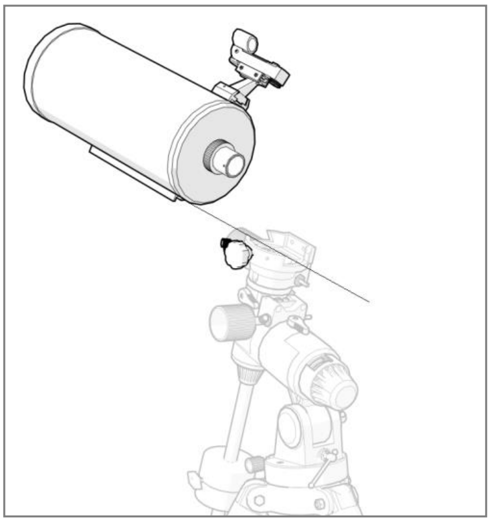
3.4 Unscrew the flat end piece of the counterweight bar and slide the counterweights onto the bar. Each counterweight has an attachment clamp. Loosen it to freely move the counterweight along the bar and tighten it to hold it in place.

3.5 With the counterweights clamped onto the bar, screw the end piece back onto the counterweight bar. This prevents the weight from accidentally sliding off.

> **Hint:** Depending on your telescope, you might need a second or third counterweight. A second counterweight is included with this mount.
>
> You can use any counterweight with an inner diameter of 20 mm.



3.6 Attach the two slow motion knobs to the metal shafts on the DEC- and RA-axis. Each knob can be tightened onto the shaft by a small perpendicular screw.



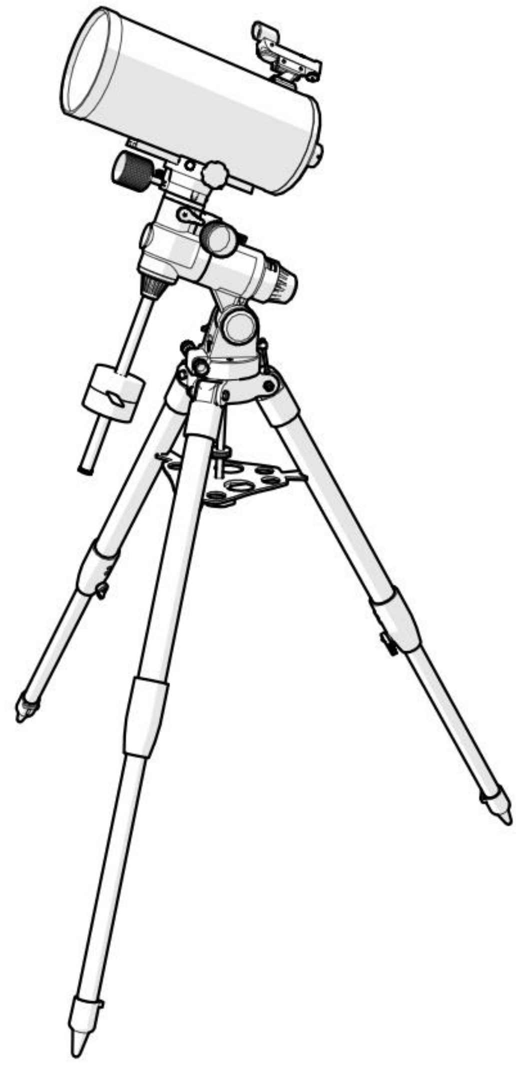
4 Installing your telescope

4.1 Unscrew the telescope saddle knob and the saddle security screw. They need to be extended far enough to not obstruct the telescope's dovetail bar in the next step.

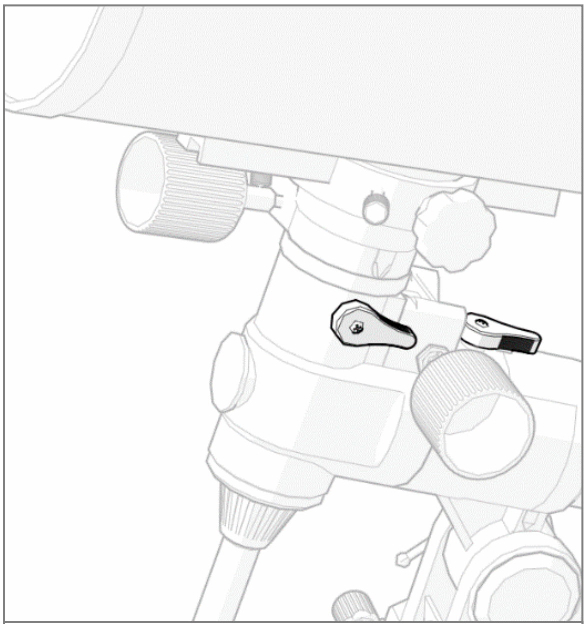
4.2 Slide the telescope's dovetail bar into the saddle.

4.3 Tighten the saddle knob against the dovetail bar, to securely fix the fix the telescope in place on the mount head.

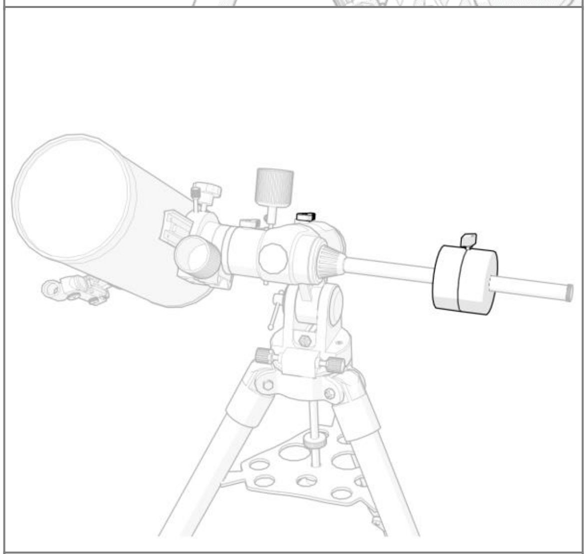
Congratulations! The telescope and mount are now assembled completely. Everything looks finished and you might be tempted to just dive into observation and use it without further preparations. However, it is strongly recommended to follow the rest of this manual to balance the mount correctly and align it with the Earth's axis of rotation.



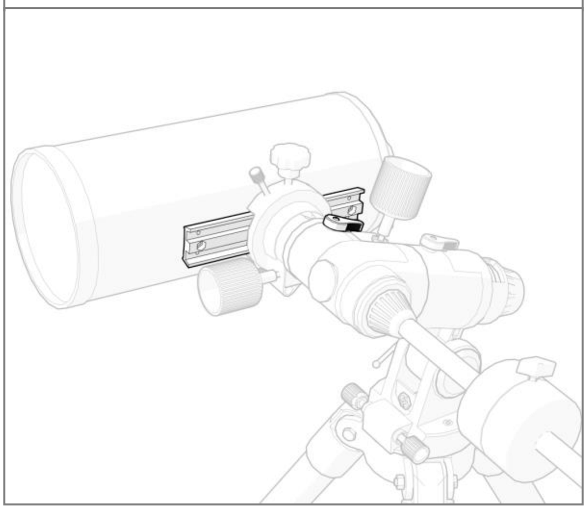
Balancing the equatorial mount



1. The telescope must be balanced along the RA-axis and the DEC-axis. Get familiar with the clamps for both axes. The clamp for the RA-axis is further back on the mount, while the clamp for the DEC-axis is at the front, closer to the telescope saddle.



2. It is recommended to start the balancing process with the RA-axis. Make sure that the clamp for the DEC-axis is tightened and the telescope can't move around this axis. Loosen the Clamp for the RA-axis and rotate the telescope until the counterweight bar is horizontal. Hold onto the telescope. If the RA-axis is unbalanced, it will not be able to stay in this horizontal position without you holding it there. Unscrew the clamp for the counterweight and carefully move it along the horizontal counterweight bar until the telescope is balanced and can stay horizontal without your support. The RA-axis is now balanced. Make sure to re-tighten the counterweight in this position.
If a balance along this axis is not possible, you might need an additional counterweight.

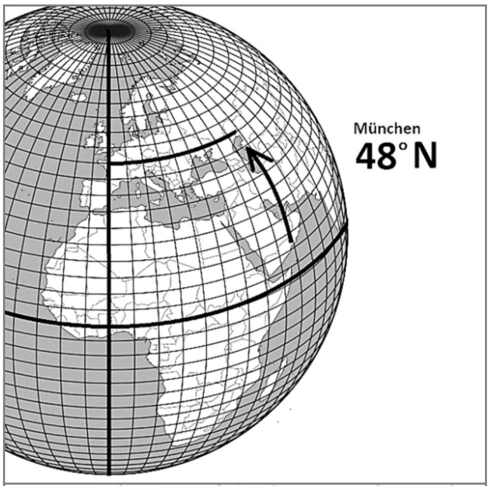


3. Close the clamps of the RA-axis with the counterweight bar in horizontal position. Loosen the clamp for the DEC-axis. Rotate the telescope towards the horizon and hold onto it. If the DEC-axis is unbalanced, it will not be able to stay in this horizontal position without your support.
Carefully loosen the saddle knob that clamps against the telescope's dovetail bar. Make sure to not let the telescope drop out of the saddle and hold onto it. Slide the Telescope along the dovetail bar left or right and carefully test the balance. Tighten the saddle knob again. The telescope should now be able to stay horizontal without you holding onto it. Loosen the telescope saddle knob and readjust the position of the dovetail bar if necessary.
After the telescope is balanced along the DEC-axis, make sure to re-tighten the saddle knob again. Tighten the saddle security screw for additional stability.

4. If both the RA-axis and the DEC-axis are balance, you should be able to open the clamps of both axes. The telescope should then be freely movable to any position and it should stay balanced in any position. If this isn't the case, repeat the balancing process from the beginning.

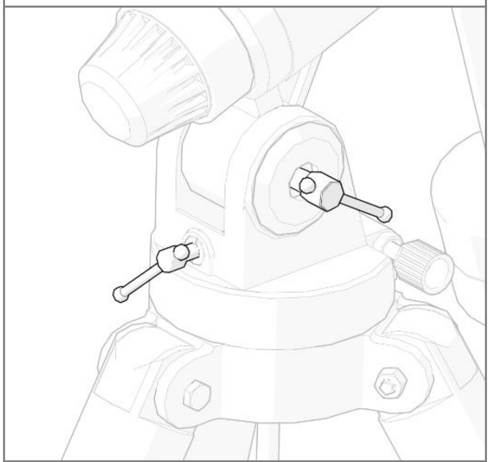
Polar alignment

The polar alignment ensures, that the RA-axis of the telescope is parallel to the Earth’s axis of rotation. This makes tracking of objects in the night sky much more comfortable and allows the use of setting circles to centre on dark and hard to find objects. For visual observation, an approximate polar alignment is often enough.

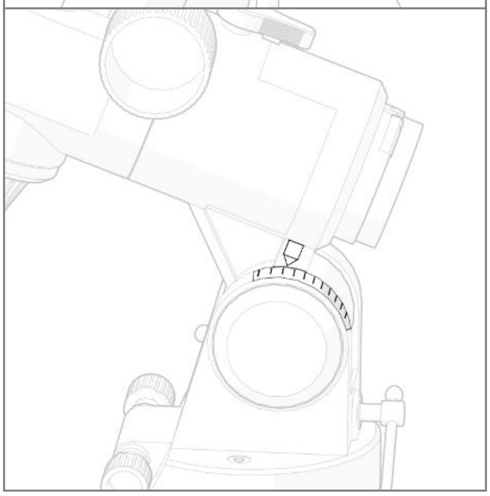


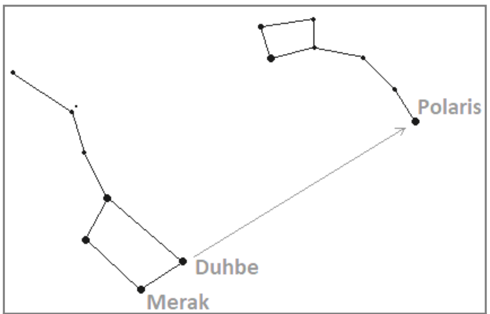
1 Approximate polar alignment

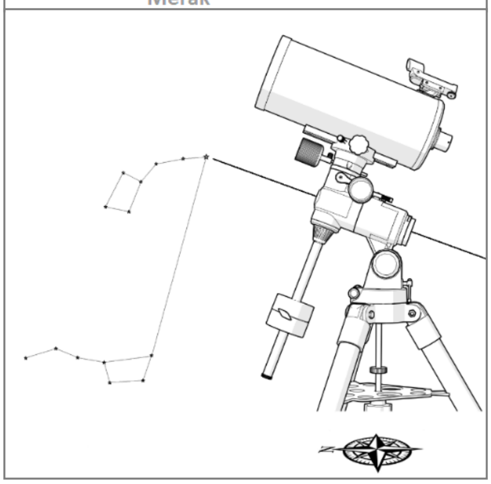
1.1 A quick and approximate polar alignment is possible without a polar scope. You need to know your local latitude. The latitude is one of the geographic coordinates to describe a position on the globe. It runs from 0° at the Equator to 90° at the North Pole (and -90° at the South Pole). You can check the latitude of your location with most GPS devices or maps. You can also simply search online for the latitude of the nearest city. For this approximate polar alignment, it is enough to know the latitude to an accuracy of 1°.



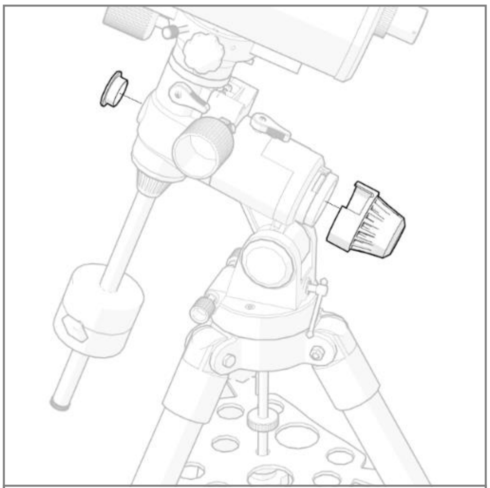
1.2 Open the altitude adjustment clamp on the side of the mount head. You only need to loosen it by a small amount. Then rotate the altitude adjustment handle and note how the arrow at the latitude scale moves accordingly. Adjust the altitude until the arrow points at your local latitude. Re-tighten the altitude adjustment clamp.





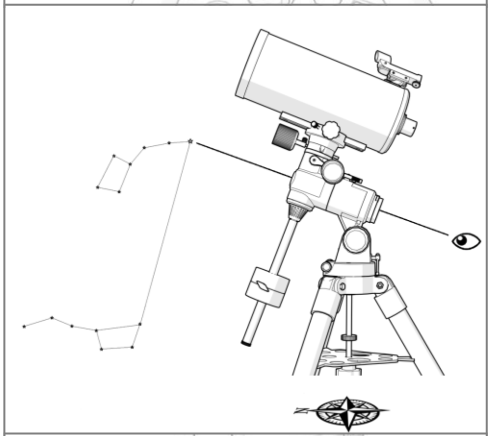


1.3. The telescope mount must be pointed towards the celestial pole (north for the northern hemisphere). For an approximate polar alignment, you can use a compass or the night sky to orient yourself. The north star Polaris is usually visible with the naked eye, even under light polluted skies. Ursa Major and Ursa Minor (Big and Little Dipper) are one of the most recognizable constellations in the sky. Polaris is the last star of the handle of the Little Dipper. The RA-axis of the telescope mount must be pointed in the direction of Polaris. Pick up the telescope mount from the ground and position it towards north.

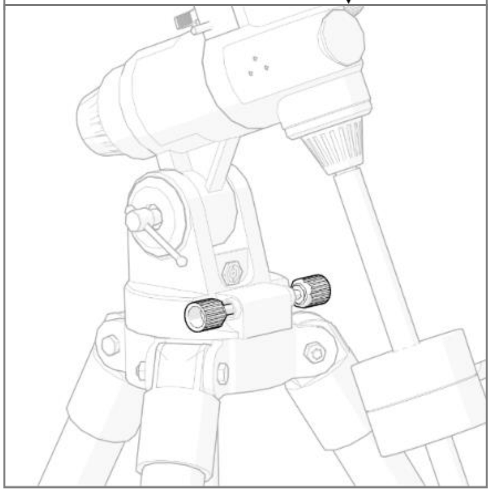


1.4 Remove the front and back polar scope covers. For an exact polar alignment, an optical polar scope can be installed here. For the approximate polar alignment, the naked view through the polar tube is enough.

1.5 The approximate polar alignment is finished, when Polaris is visible in the centre of your field of view while looking through the empty polar tube. To move and centre Polaris there, it is necessary to finely adjust the mounts altitude and azimuth axis.



1.6 To adjust the altitude axis, open the altitude adjustment clamp on the side of the mount head (like in step 1.2 above.) Rotate the altitude adjustment handle. Instead of looking at the latitude scale, focus on the night sky. Polaris will move up or down while rotating the handle.



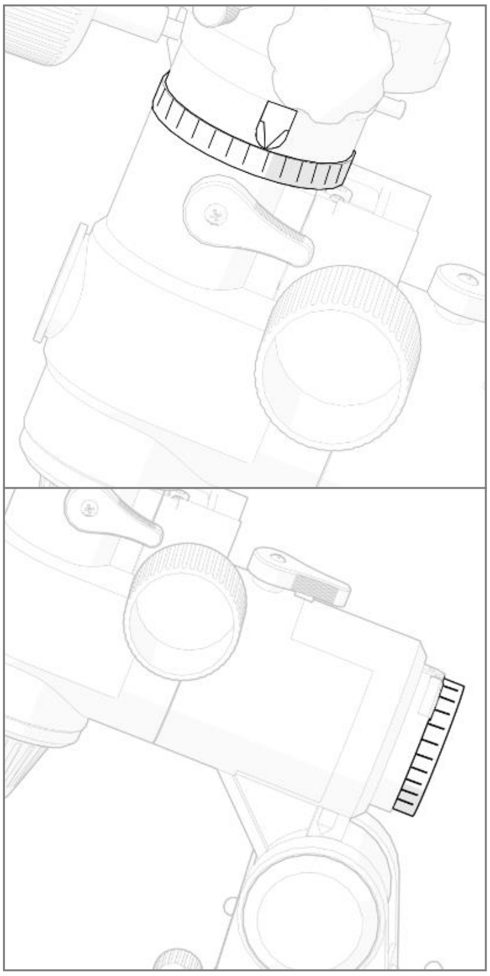
1.7 To move Polaris left and right in your field of view, you need to adjust the azimuth axis of the mount. Use the two azimuth adjustment screws for that. Screw them both in (without force) until you feel a resistance. The screws now clamp around a knob on top of the tripod. Now you must always operate both adjustment screws simultaneously: When screwing one adjustment further in, you must screw the other adjustment further out. This moves Polaris left or right in your field of view.

1.8 After centring Polaris, re-tighten the altitude adjustment clamp.

Congratulations! Your mount is now balanced and aligned.

Tip: A much more precise polar alignment is possible with optional accessories, for example an optical polar scope. However, for most visual applications this precision isn't needed.

How to use Setting Circles?



Setting circles are a very useful tool for operating equatorial mounts, especially for finding faint objects without a GoTo function. They are best used in combination with a physical or digital star atlas, because you need to know the RA and DEC coordinates of stars and nebulas.

There are setting circles on both the RA and DEC axis, marked with celestial coordinates. Both setting circles are manually movable. At each circle, you can find an arrow pointing to a specific coordinate.

1. To find a faint object, first consult your star atlas and learn about the region of the sky around the object. You need to find a star in the vicinity of the object, that you can recognize with your naked eye in the night sky. This will be your reference star.

2. Point the telescope at the reference star and centre it in a low power eyepiece. Check the RA and DEC coordinate of this star in your atlas.

3. Rotate both setting circles so that the corresponding arrows mark exactly the coordinates of the star. The circles are now set to your reference star.

4. Check the RA and DEC coordinates of the faint object you are interested in observing. Rotating the telescope around both axes will also change what coordinates the arrows are pointing at.
Move the Telescope until the settings circles show the exact RA and DEC coordinates of your target object

5. The object should now be visible in the field of view of your telescope (using a low powered eyepiece).

Tip: This method is more precise the closer the reference star is to your target object.