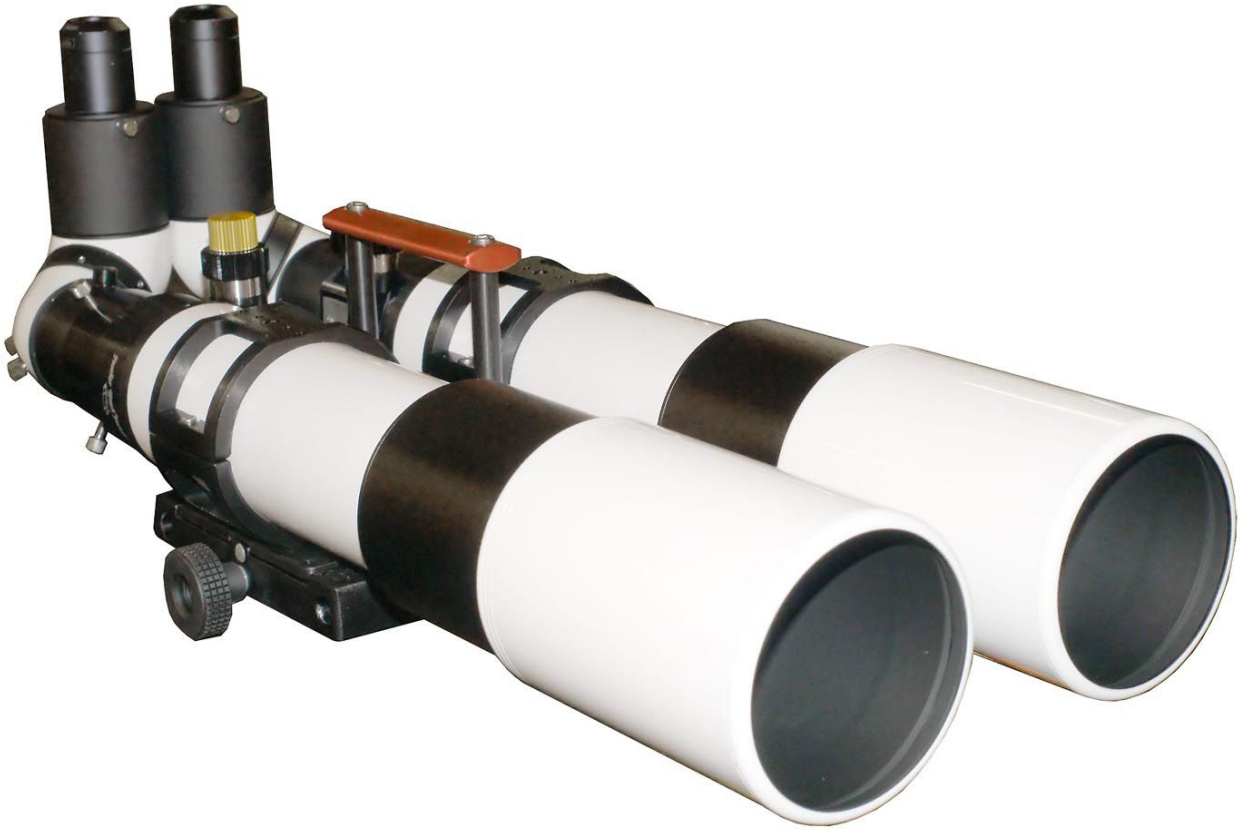
BORG
Double-telescope



Operating instructions
Binoplattform BB – 130/131 and Matsumoto EMS Image erecting systems

Version 3.1

This manual describes the setup and assembly of the BORG double telescopes with the AOK Binoplatform BB – 130/131 and the Matsumoto image erection systems. This enables you to achieve the optimal high performance of this telescope generation at any time. Normally, you receive the telescope system already assembled and do not have to assemble it yourself from the individual components. Nevertheless, the entire assembly is described here in case you need to disassemble the telescope, e.g. for other purposes. For example, if you want to disassemble the telescope temporarily for other purposes.

Overview Set-up / Adjustment

It is critical to follow the specific series of steps below for this primary reason: our visual system works to merge images horizontally, but not vertically. Keep this in mind and you will understand why these steps must be followed if you are to achieve the benefit of your bb-130/131 + EMS system.

Before you start assembling, please look at the individual steps. This will help you to better understand the overall assembly and thus complete the individual steps more quickly and safely.

BORG double telescopes consist of a holding platform (BB - 130/131), two identical telescopes and a deflection and erection system (EMS) for parallel observation with both eyes.

The platform has two adjustable supports connected by two stainless steel rods. On the left platform (seen from the back), one telescope is mounted which can be adjusted horizontally. The right platform holds the telescope with variable distance, which can also be adjusted vertically. Of course, the optical axes of the two telescopes can be easily and quickly adjusted to a certain extent on the deflection system, so that you can achieve a perfect image even at very high magnifications. Nevertheless, it is necessary to fundamentally align the two telescope tubes after the initial assembly.

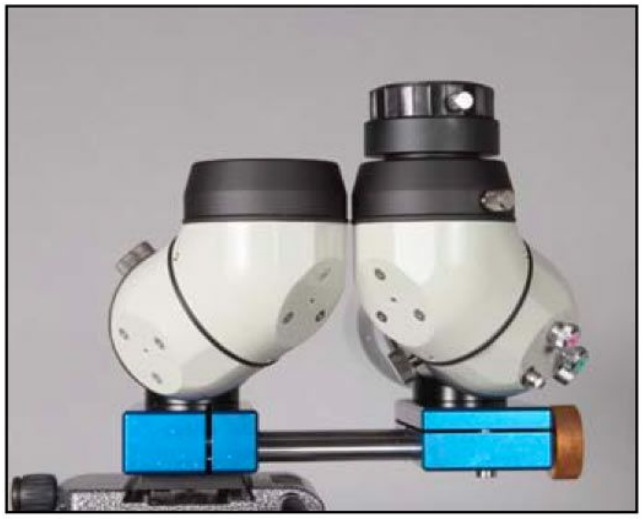
On the right hand side is a large hand screw with which the interpupillary distance can be finely adjusted without having to readjust the alignment of the two telescopes each time. If you mount the double telescope on an alt/azimuthal mount (e.g. an AYO), the corresponding L-bracket (available as an accessory) points to the left.

Notice:
The arrangement can also be reversed so that the screw for the eye relief adjustment is on the left side (of the mount).

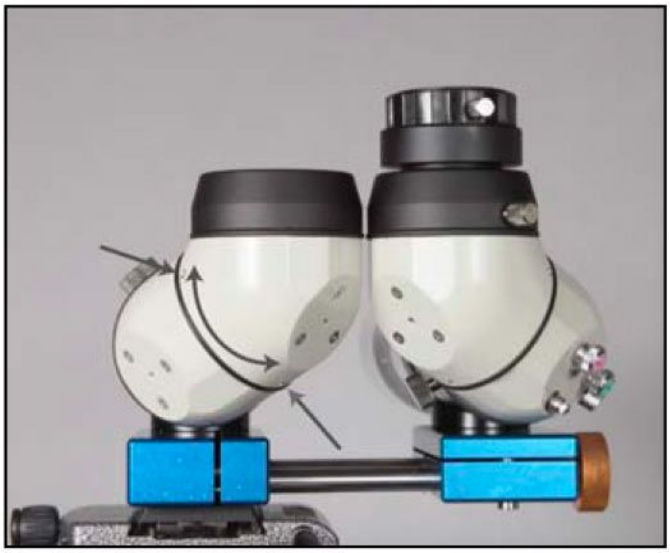
A precise fine adjustment to one's own eyes can then be made during observation at the adjustment screws of the deflection mirrors. This adjustment range is limited, however, which is why it is essential to align the two telescopes with each other. In any case, however, fine adjustment is necessary on the deflection mirror systems, not least because every observer has a slightly different eye position and you can only use the full power if the two optics are perfectly in tune with your own eyes. However, before you can adjust the telescope, you must complete the setup to the point where you can observe through the telescope with eyepieces.

Presetting and assembly

Mount the two telescopic tubes on the two platform blocks as parallel as possible by eye. Make sure that the tubes are really screwed tight.



After you have screwed the two telescopic tubes onto the adjustment platform, you can attach the two Matsumoto deflecting mirror systems to the two tubes. Make sure that the two upper connection rings are as exactly parallel to the platform blocks as possible.



Also make sure that the two quick-adjustment screws on the right-hand deflection system are in a central position so that they can be turned equally in both directions.

Of course, at this stage you could simply twist one half of an EMS unit. However, by doing so, you are also twisting the image. The adjustment of the EMS must only be done at the end of the set-up when everything else is correct.

If the two deflection systems are not correctly aligned, this is shown by the fact that the two images are twisted in relation to each other. You can see this well if you look into both optics at the same time from above. How to correct this is described at the end.If the two deflection systems are not correctly aligned, this is shown by the fact that the two images are twisted in relation to each other. You can see this well if you look into both optics at the same time from above. How to correct this is described at the end.If the two deflection systems are not correctly aligned, this is shown by the fact that the two images are twisted in relation to each other. This is easy to see if you look into both optics at the same time from above. If this is the case, a description of how to correct this is given at the end of this manual.

Now you can mount the two 1.25 focusers on the EMS housings, unless they are already mounted before the EMS erecting systems (large models with 2" holder). In this case, there are corresponding eyepiece holders on the deflection housings.

Rough adjustment of the two telescope tubes

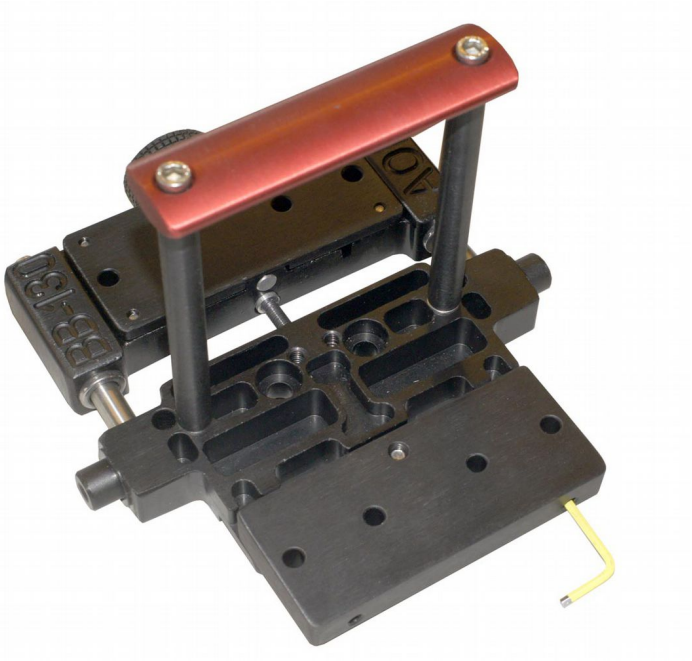
Insert two identical eyepieces into the two eyepiece holders and set the correct interpupillary distance for you. This is done with the hand screw on the right block.

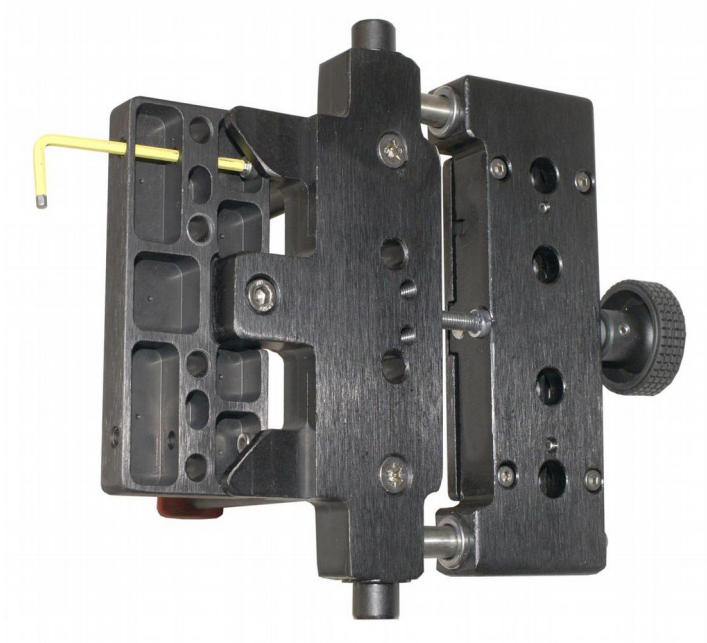
Look with both eyes through the two eyepieces and pay attention at the present moment only to a pleasant, overlapping image. The two telescopes will probably not be looking in the same direction. It is best not to focus at all before adjusting the telescope, but only to ensure a comfortable viewing experience.

After you have set the interpupillary distance to some extent, you can start adjusting. You have two planes of movement at your disposal, one telescope is adjusted in the horizontal plane, the other in the vertical plane. For a first adjustment, it is best to observe an object in daylight. Bring both images into focus. Also, be sure to set the two adjustment screws on the right EMS to a middle position!

Point the double telescope at a prominent object as far away as possible, e.g. a church tower or something similar. Use rather long focal length eyepieces and focus the two images. Now start with the rough alignment of the two telescopes. To do this, first align the VERTICAL alignment of the left telescope with the right telescope so that it is slightly DOWN! This means that you point the double telescope at the object. Now you have to align the left telescope with the help of the adjustment screws in the vertical axis slightly next to the object so that the image is slightly higher or lower. Then adjust the left telescope horizontally to each other. But this only works if the two images are offset in height. If not, the brain would take over this work and this must be prevented at all costs. Only when the two images match in the horizontal line may they be adjusted to coincide in height. Only in this way can you achieve the "wow" effect that allows this enormous increase in performance. You can see exactly how this is done on the following pages.

Adjusting the horizontal axis (left telescope)





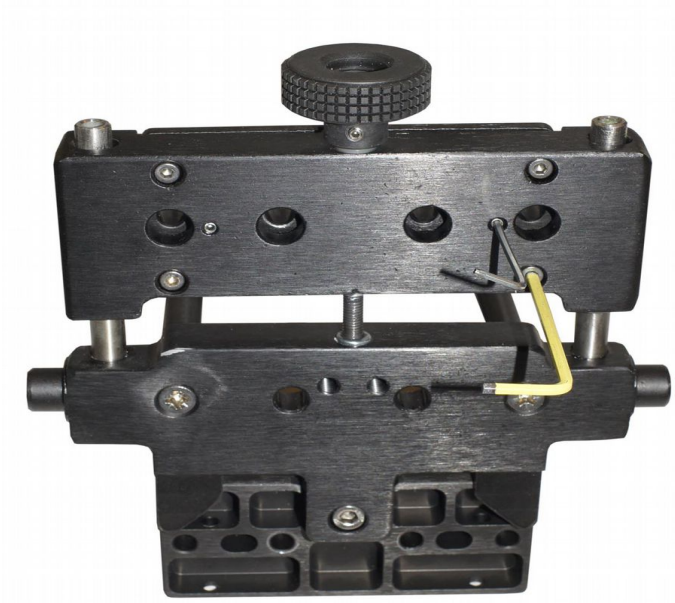
There are two M4 screws for this adjustment. Use a suitable Allen key as shown.

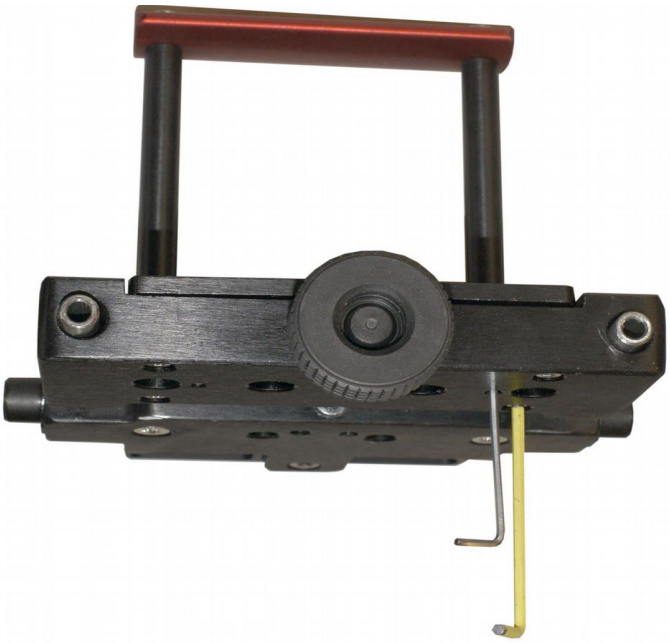
Of course, you must first loosen the two screws a little. Only then can you finely adjust the telescope in the axis by tightening one screw. Always make sure that you have loosened the other screw enough. Note that the platform is rotated via a stable axis. This axis is fixed with the large Allen screw in the middle. You may have to loosen this screw a little and tighten it again at the end.

If this axle is well adjusted, you can tighten the other screw again so that both screws are tight and the platform lies stiffly against the middle part. Check whether you can adjust the axis a little equally on both sides with the fine adjustment screw on the EMS. If necessary, align the tube a little better. Be sure to return the fine adjustment screws on the EMS to a c e n t r a l p o s i t i o n !

In order to be able to adjust this axis well, the image in the other (right) telescope must be slightly offset in the height axis! If this is not the case, the brain would automatically merge the two images after a certain amount of misalignment. If this happens, however, a considerable part of the capacity of the visual lobe (the part of the brain responsible for seeing) is used or blocked. The image must therefore be offset in height so that this does not happen. Only when you have brought the image together in the horizontal axis may you also bring the image together in the vertical axis! This is the only way to create the "WOW" effect that makes the image in a double telescope so vivid and enables the enormous increase in performance.

Adjusting the altitude axis (right telescope)





You now have a set of tension and compression bolts on the bottom of the right telescopic platform. This platform also has an axle in the middle.

You can easily adjust the height axis of the right telescope to the left telescope using only the two inner studs (each functioning as a pressure screw) and finally fix the platform with the outer, somewhat larger screws. These four screws are used as traction screws.

Check again with the help of the fine adjustment screws on the EMS whether you have about the same amount of adjustment travel on both sides.

Important note for practice:

When adjusting the telescope to your eyes, always start by adjusting the elevation axis so that the images are not in the same plane. Then you can adjust the horizontal axis so that the two images are exactly on top of each other. Then adjust the height axis again so that the images are exactly together.

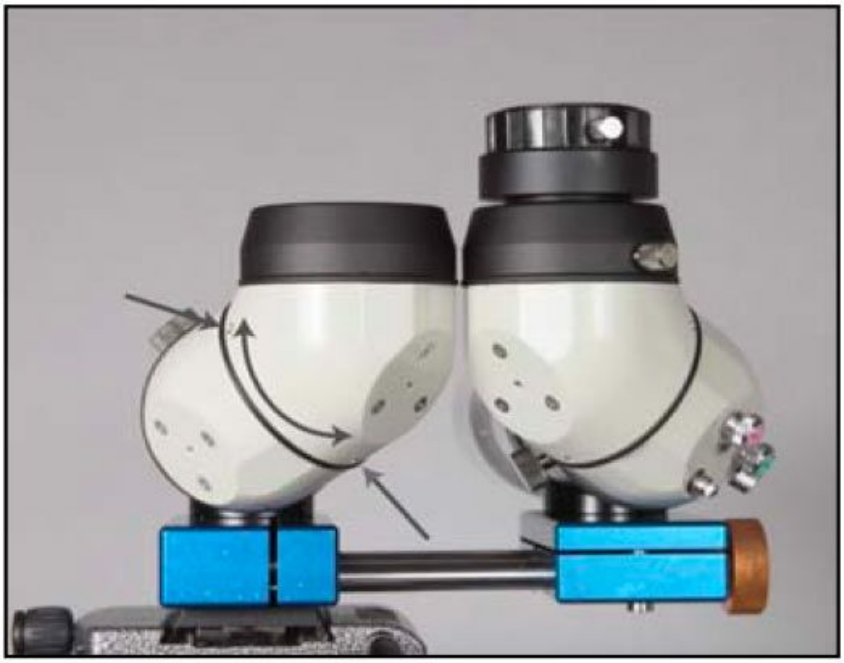
If you do not adjust the telescope in this way, the brain will quickly put the two images together in the horizontal axis without matching your eyes exactly. However, this "consumes" a lot of brain power which is then missing in the fine recognition of the night sky.

Note:
The arrangement of the bino platform can also be reversed, so that the arrangement is more suitable for left-handers. In this case, the adjustment screws are also on the other side.

Note:
Then check the adjustment with all other eyepieces as well. You may have to repeat these two steps to get the two images to coincide or, in the worst case, you may have to adjust one setting between the extreme positions so that all eyepieces can be optimally adjusted with the fine adjustment screws on one EMS. Also make sure that an eyepiece does not shift the image just by turning it in the socket. Make sure that the respective tension and pressure screws are tight after successful adjustment.

As a final adjustment, however, you now concentrate on the image field rotation of the two images.

It is best to look for an image with a long edge, e.g. a house roof. Now check whether this edge remains congruent in both pictures. It is often the case that the edges of the two pictures are slightly twisted in relation to each other. This can be corrected, for example, by tilting one or both EMSs slightly against each other. If it is only a little, it is usually the best choice. Rotate one or both EMS a little in the focuser until the edges are in the same axis. If the torsion is too great, you have to turn the two partial housings of one or both EMS against each other. To do this, loosen the small studs on the connecting line so that you can turn the two halves against each other. However, only a small twist will be necessary to achieve the desired correction. So only twist the two halves in small angular amounts at a time. You may then have to turn the whole element again a little in the extension so that the two eyepieces are parallel again.



When observing with rather long focal length wide angle eyepieces, you will notice that the image - if congruent - is not equally centred in the two eyepieces. This is an effect of the interaction of your own eyes and the large viewing angles. If you use high magnification eyepieces with a rather narrow field of view, the image will tend to match.

One effect of this is that with super wide-angle eyepieces, which all work with a strong field of view distortion, there are increasingly coverage errors in the peripheral areas which cannot always be completely corrected. For this reason, among others, you should not use eyepieces with more than approx. 70 degrees.

If you have any unanswered questions, please do not hesitate to contact us. Have fun with binocular observing!

Place the double telescope on a star field and observe the field of view. Adjust the interpupillary distance so that virtually one image is formed. With the help of the two fine adjustment screws, you can now adjust the image to be exactly congruent at any time and with all eyepiece pairs or magnifications. This is done within seconds and can also be done successfully by laymen who are looking through such a telescope for the first time. This adjustment allows the brain lobe to direct practically all of its power to the visibility of the finest differences in contrast. This results in this enormous performance gain of an optimally adjusted double telescope. Only if you do this can you really exploit or experience the performance. A quality of observation that cannot be achieved with any other system.