

BORG

Binoscope

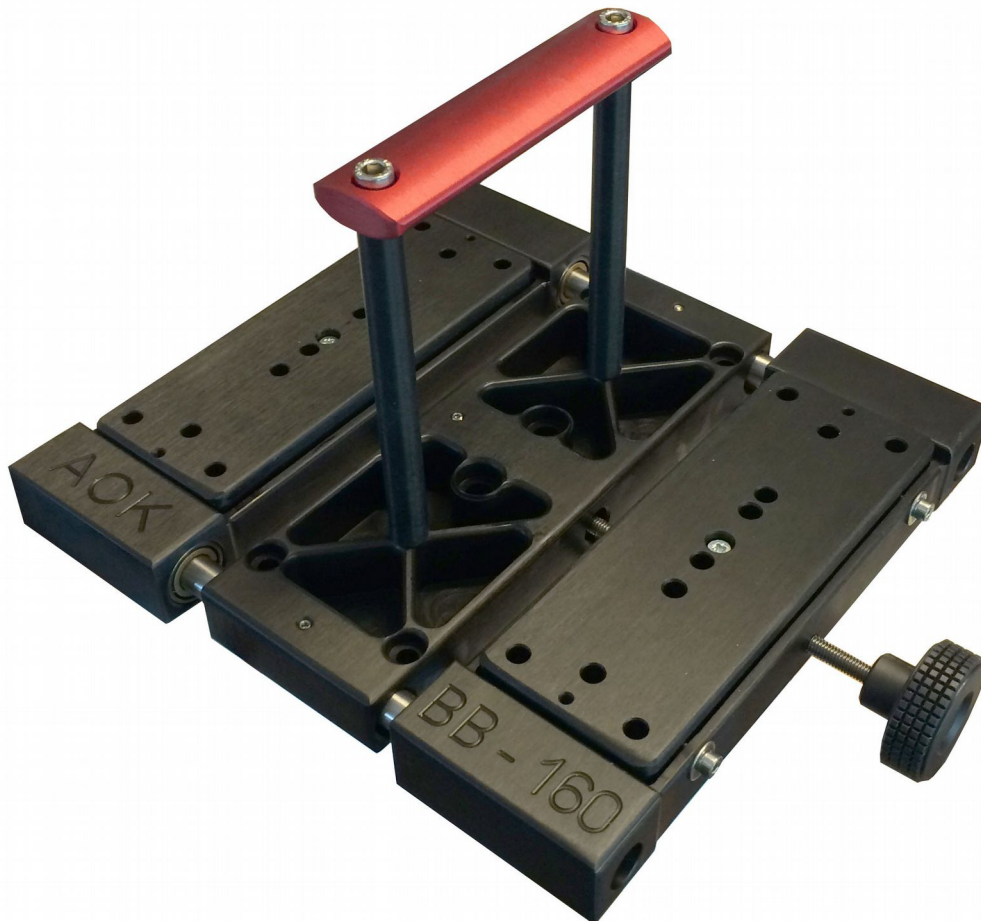


User manual

Binoplatfform BB – 160 and
Matsumoto EMS erecting system

Version 1.0

This manual describes the assembly of the BORG double telescopes with the AOK Binoplatfrom BB-160 and the Matsumoto imaging systems. This enables you to achieve the optimum high performance of this telescope generation at all times. Normally you receive the double telescope system already assembled and do not have to assemble it from the individual components themselves. Nevertheless, the entire construction is described here in case you want to use the telescope, for example. want to disassemble it temporarily for other uses or build it up yourself from individual components.



Overview Adjustment work / Adjustment

Before you start the assembly, please take a look at the individual steps. This helps you to better understand the overall structure and thus to complete the individual steps faster and safer.

BORG double telescopes consist of a holding platform (BB-160), two identical telescopes and a deflection and erection system (EMS) for parallel observation with both eyes.

On the side of the binoplatfrom there is a handwheel. This allows you to adjust the interpupillary distance. This works in such a way that the two tubes are changed parallel to each other without changing the center of gravity of the system.

The platform has two adjustable supports connected by two stainless steel rods. The platform is designed so that both telescopic tubes can be aligned both horizontally and vertically. At the same time, the central support structure always remains centric between the two telescopes. This means that the centre of gravity remains the same even when the distance between the two telescopes is adjusted. Of course, the optical axes of both telescopes can be adjusted quickly and easily to a certain extent on the deflection system, so that you achieve a perfect image even at very high magnifications. Nevertheless, it is necessary to align the two telescopic tubes after the first assembly.

On the right 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 every time. If the double telescope is mounted on an alto/azimuthal mount (e.g. an AYO), the corresponding L-holder available as accessory points to the left.

Hint:

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

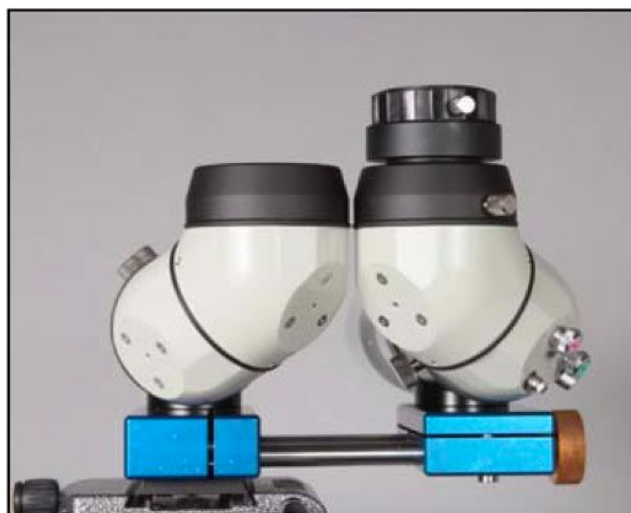
A precise fine adjustment to one's own eyes can then be made during the observation with the adjustment screws of the deflecting mirrors. However, this adjustment range is limited, which is why it is essential to align the two telescopes with each other beforehand. In any case, however, fine adjustment of the deflecting mirror systems is necessary, not least because each observer has a slightly different eye position and many eyepieces also have a slightly different optical axis. This usually does not disturb, but with a double telescope this leads to a loss of power. But you can use the full power if the two optics are perfectly tuned to your own eyes. Before you can adjust the telescope, however, you must complete the assembly so that you can observe with your eyes through both eyepieces.

Presetting and assembly



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

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 parallel to the platform blocks as possible.



If necessary, turn one or both elements as shown until the upper connection rings are parallel. Make sure that the 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 you can rotate the whole element in the eyepiece holder of the telescope in this state. This is easier at the moment than twisting the two halves of the EMS. The exact adjustment of the EMS only has to be done at the end of the setup if everything else is correct.

If the two deflection systems are not correctly aligned, this can be seen in the fact that the two images are twisted towards each other. You can see this well when you look into both optics from above at the same time. How to correct this is described at the end.

Now you can mount the two eyepiece extensions on the deflection housings, unless they are already mounted in front of the deflection systems (large models with 2" holder). In this case, eyepiece holders are located on the deflection housings.



Coarse adjustment of the two telescopic 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.

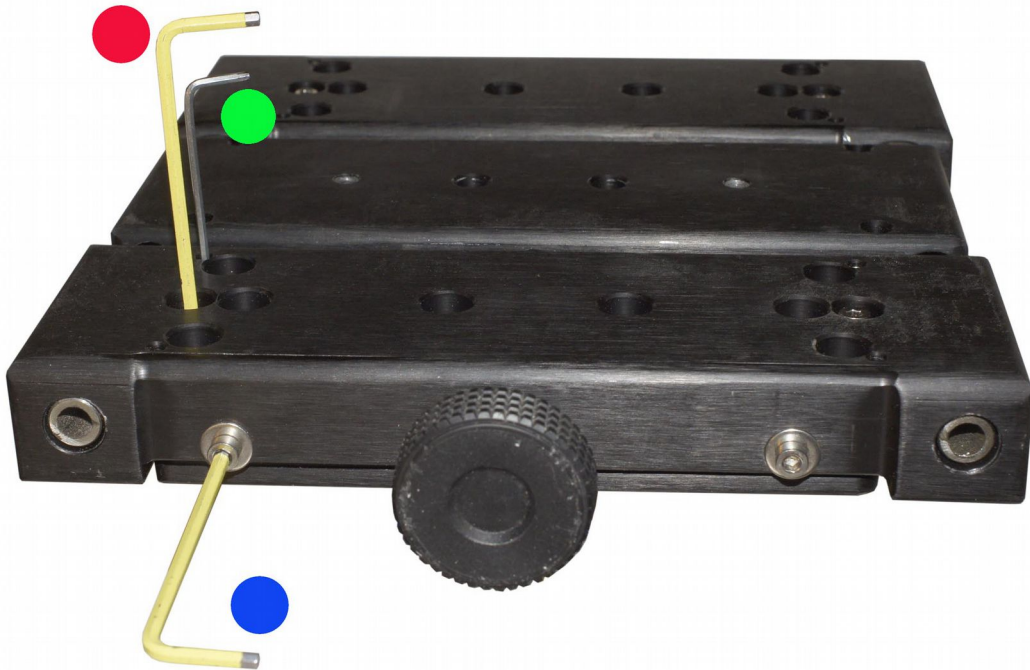


Look through the two eyepieces with both eyes and at this moment only pay attention to a pleasant, overlapping image. The two telescopes will probably not look in the same direction. Before making adjustments, it is best not to focus at all, but only to ensure comfortable vision.

After you have set the interpupillary distance, you can start adjusting. You have two movement planes at your disposal, whereby both telescopes can be adjusted in the horizontal as well as the vertical plane. For an initial setting, it is best to observe an object in daylight. Focus on both images. In addition, make sure that the two adjusting screws on the right EMS are in the middle position!

Point the double telescope at a striking object as far away as possible, such as 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 horizontal alignment of one telescope with the other. This means that you point the double telescope with the one tube at the object. Now you must point the other telescope at the same object using the adjusting screws in the horizontal axis.

Adjusting the horizontal axis



For this adjustment, two symmetrically located M4 screws are provided on each telescopic platform. Use a suitable Allen key as shown (blue markings).

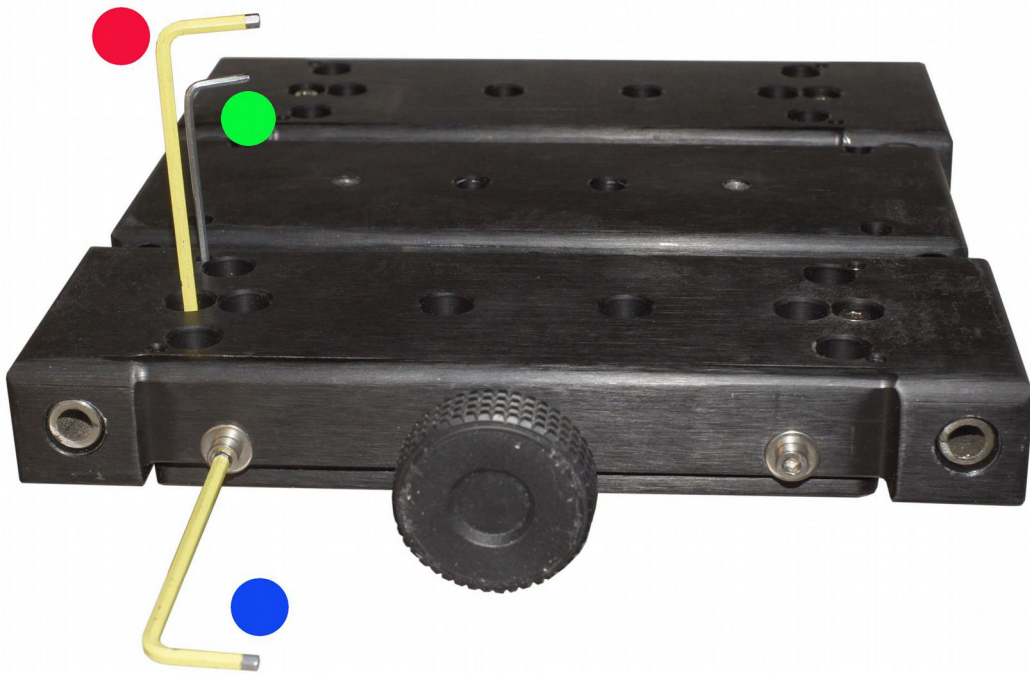
Of course, you must first loosen the two screws with the blue marking. Also loosen the two screws with the red marking a little. The stud screws with the smaller Allen key (marked green) cannot be loosened.

Now you can carefully tighten the two symmetrically arranged screws with the Allen key marked in blue. You will be able to watch through the telescope how the telescope axis moves. Of course you can adjust both telescopes at the same time - the adjustment range of the individual adjustment plate is limited.

If this axle is well adjusted, you can only slightly counter-tighten the other screw for the time being so that the platform remains rigid in the axle. Check whether you can use the fine adjustment screw on the EMS to adjust the axle slightly equally on both sides. If necessary, align the tube a little better. Make sure that the fine adjustment screws on the EMS are in the middle position again!

If this axis is well adjusted, you can now adjust the height axis of both telescopes.

Setting the height axis



They have a set of tension and compression screws at the bottom of each telescopic platform. The two traction screws are arranged in the central axis (red marking) and the four pressure screws are arranged on the outside (green marking). Make sure that the two adjusting screws for horizontal adjustment are only slightly tightened.

You can easily adjust the height axis of the two telescopes with the two inner screws (red markings) and finally fix the platform with the outer studs (green markings). These total of four screws are used as pressure screws.

Use the fine adjustment screws on the EMS to check whether you have approximately the same adjustment travel on both sides.

If the axes are well adjusted, do not forget to retighten the screws for horizontal adjustment.

Important information for the practice:

If you adjust the telescope to your eyes, always adjust the height 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 of the axis so that the images come together exactly.

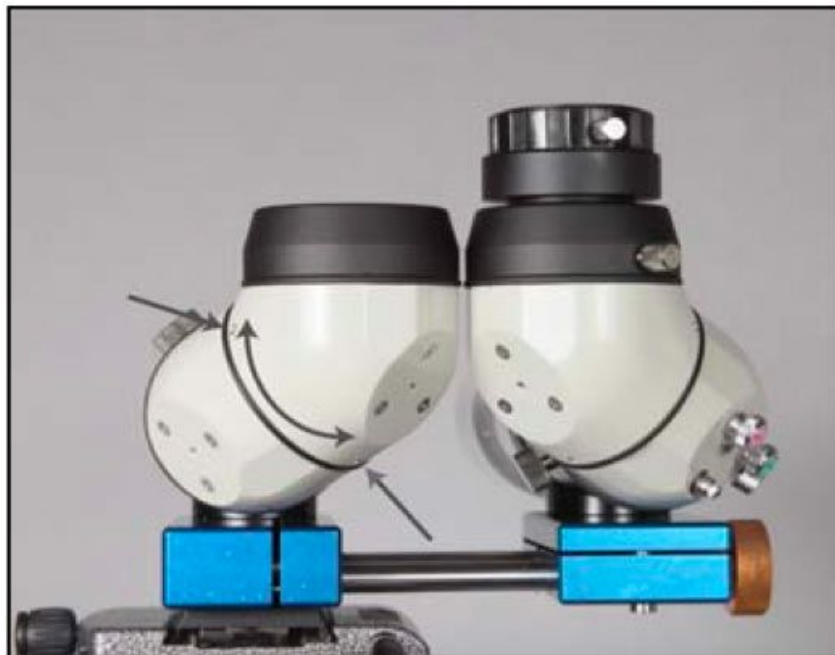
If you do not adjust the telescope that way, the brain will quickly put the two images together in the horizontal axis without exactly aligning them with your eyes. As a result, however, the brain "consumes" a lot of power which is then missing in the fine recognition in the night sky.

Hint:

Then check the setting with all other eyepieces. You may need to repeat these two steps to make the two images exactly congruent. Make sure that the two tension and compression screws are fully tightened after successful adjustment.

Place the double telescope on a star field and observe the image field. The interpupillary distance must be set in such a way that an image is created. With the aid of the two fine adjustment screws, you can now adjust the image 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 looking through such a telescope for the first time. As a final adjustment, however, you now concentrate on the image field rotation of the two images.

It is best to look for a star field with several bright stars. A star in the center of the image must be exactly congruent. Now pay attention to the stars at the edge of the image: These must of course also be congruent. However, if you notice a rotation of the image, the two deflection systems are not exactly aligned. This means that the two angles of the elements are not exactly symmetrical to each other. Correct this by slightly loosening and twisting one element at the connection of the two halves until the images are rotationally symmetrical. However, twist the two halves in small angular amounts. You may have to turn the whole element a little in the extension again 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 it is congruent - is not centered equally in the two eyepieces. This is an effect of the interaction of one's own eyes and the wide viewing angles. If you use high-resolution eyepieces with a rather narrow field of view, the image will still match.

If you have any questions, please do not hesitate to contact us. Enjoy the two-eyed observation!