Instruction Manual

Omegon® Deluxe Collimating Eyepiece

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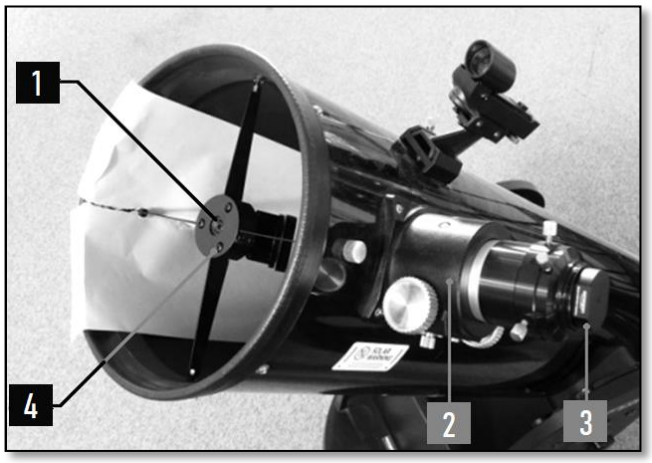
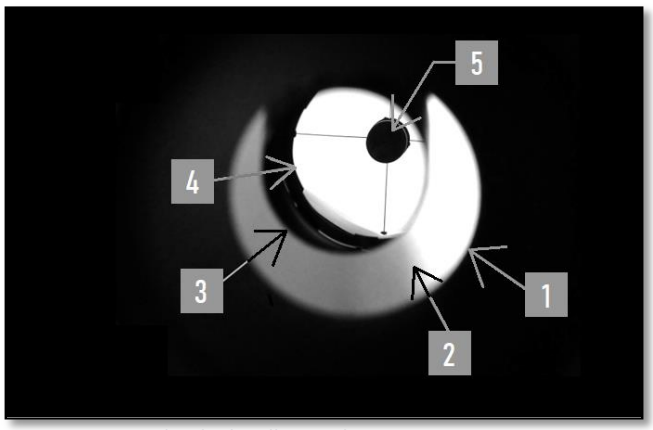
The Omegon® Deluxe Collimating Eyepiece

Congratulations on the purchase of your Omegon Deluxe Collimating Eyepiece! With the help of this eyepiece, it is possible to perfectly collimate your Newtonian telescope. It is also useful for collimating a refractor. SC telescopes and other Cassegrains with a hole in the primary mirror cannot be collimated using it – these instruments should be collimated at night, by using a star's defocused image.

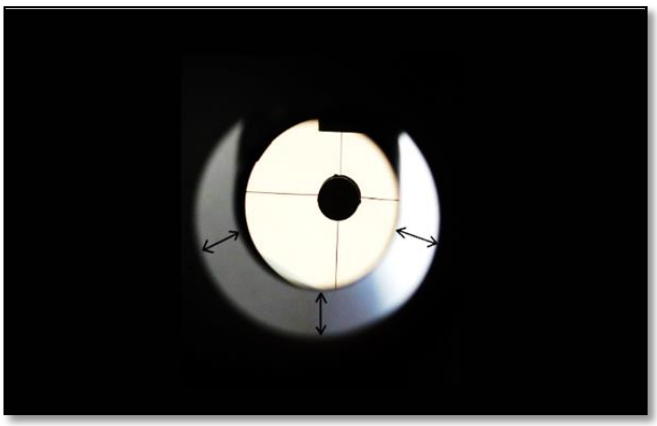
The Omegon Deluxe Collimating Eyepiece is useful for collimating both mirrors – primary and secondary – but not for collimating the focuser. If you use your Newtonian for visual observing only, it is not necessary to collimate the focuser. Its collimation will always be sufficiently good straight from the factory. Only if you want to do high level deep sky photography, it is possible you may have to collimate the focuser using a special tool. Always start collimation with the secondary mirror, and finish with the primary.



Picture 1. Secondary with focuser.



Picture 2. Completely decollimated Newtonian.



Picture 3. Secondary mirror in correct position.

1. Secondary mirror.

1.1. Preparation. Before starting on the secondary, put a sheet of white paper into the telescope OTA. This will make secondary collimation easier, as you will be able to see the outer edge of the secondary better against the white paper than against the black inner OTA wall (Picture 1). In the centre of the front of the secondary holder, you can see a large Phillips screw; this screw fixes the secondary holder in place. The three screws around the central screw are the collimating screws which press onto the secondary holder. These can be Phillips or hex-head screws, but the principle is always the same. Now slide the Collimating Eyepiece completely into the 1.25" opening of the focuser.

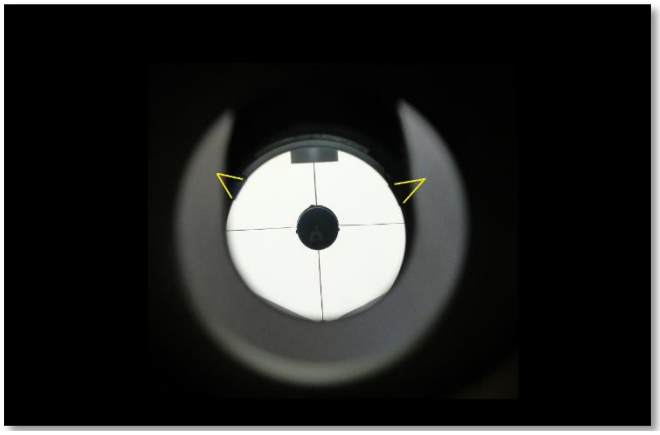
1. Adjustment screw **2.** Focuser
3. Collimating eyepiece **4.** Adjustment screw

If everything is completely decollimated, you will see something like this. The elements may be shifted relative to each other differently from here – this picture is only an example. The elements are:

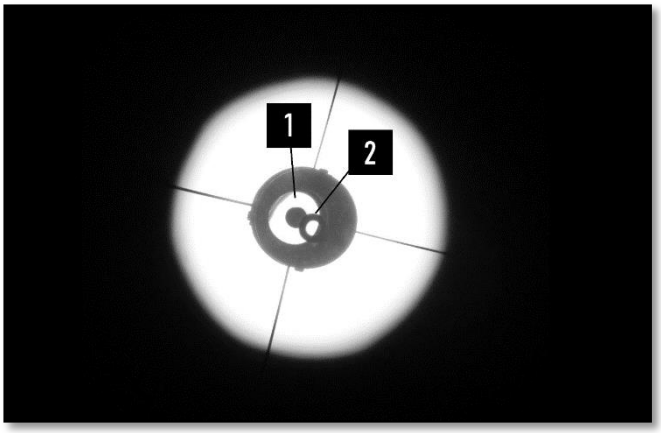
1. Lower edge of the Collimating Eyepiece;
2. Inner OTA wall opposite the focuser – in this picture white because of the sheet of paper;
3. Outer edge of the secondary or the secondary holder;
4. Reflected in the secondary: outer edge of the primary mirror. Here, the view is against the sheet of paper, so the reflection of the main mirror appears white
5. Reflected in the primary: shadow of secondary and spider.

1.2. Positioning of secondary mirror. First, loosen the three collimation screws on the secondary holder. After this, once the holder is loose, you can do three different things: rotating the holder around the telescope axis, screwing the central screw in or out to shift the longitudinal position of the secondary and tilting the lateral position of the holder. First, try to move the secondary into a position directly under the focuser. This means that the secondary appears concentric in the lower rim of the Collimating Eyepiece. You can check this using the white, U-shaped area, which should appear concentric. This situation is indicated with the three arrows in Picture 3.

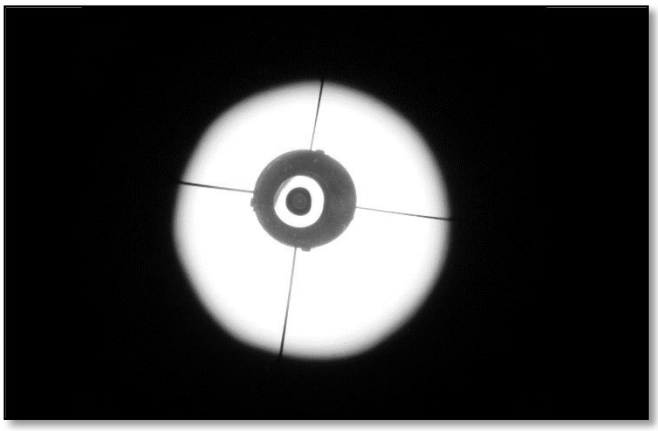
To achieve this view, you will have to experiment with the four screws, but once you have done this a few times, you will become familiar with the process.



Picture 4. Secondary correctly collimated.



Picture 5. Primary decollimated.



Picture 6. Primary collimated.

1.3. Secondary orientation. In the last step, you have to adjust the secondary in such a way that you can see the complete primary mirror in the secondary. This has been achieved when you can see the (three) primary clamps. Two of them are indicated in Picture 4. Here, the third clamp is still a little bit outside the secondary, but the secondary is almost perfectly collimated.

The two narrow grey areas near the lower rim of the secondary are the shadows thrown by the sheet of paper still in the OTA. On the upper part of the secondary, you can see a part of the focuser tube protruding into the telescope OTA. The shadow of the secondary is not in the centre of the primary yet. This will be done in the next step: collimating the primary.

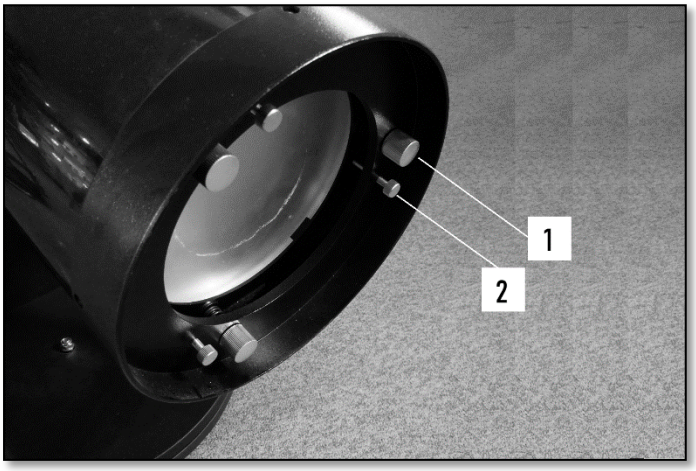
At this stage, it is not necessary to have all the elements 100% concentric to each other. All the previous steps were only in order to illuminate the field of view more or less concentrically. Even if the secondary is not in perfect collimation, this will have no influence on image quality. The primary, however, should be collimated as well as possible.

2. Primary mirror.

After secondary collimation, slide the Collimating Eyepiece out of the focuser until the opening on its side is completely free and is directed towards a bright surface, e.g. a window. You will now see a bright ring in the shadow from the secondary (1). Superimposed on the bright ring, but not concentric to it, is a dark ring (2). This is the shadow of the central marking in the centre of the primary (see Picture 5). Most Newtonian telescopes come with this marking already there. In this picture, the primary is fairly badly decollimated.

Last step: Primary collimation. The bright ring (opening of the Collimating Eyepiece) and the dark ring (centre marking on the primary) must be concentric (as shown in Picture 6). Use the collimation screws at the rear of the primary mirror cell. Here again, you will become more experienced after some practice.

Collimation completed! Do not forget to remove the sheet of paper!



Picture 7. Primary mirror cell.

Most Newtonians have three sets of two collimation screws on the primary mirror cell, one adjustment screw and one locking screw each.

1. Adjustment screw	**2.** Locking screw

3. Remarks. You do not need to worry about adjusting the collimation screws of your telescope! You cannot damage anything. The worst case is that you will end with a decollimated telescope and have to start all over again.

If possible, do the collimation in bright daylight. The last step (primary collimation) can also be done at night (using a torch to shine into the opening of the Collimating Eyepiece), but this is less straightforward than collimating during the day and needs more practice.

Try to have two people available for carrying out primary collimation. One to adjust the collimation screws and the other to look into the Collimating Eyepiece and say ”better“ or” worse“. With practice, you will be able to collimate the primary in just one minute.

If you are familiar with collimation, you may wish to try this experiment: roughly decollimate your scope-like in Picture 5 and observe a star. You will notice a comet-shaped star-image instead of a pinpoint. This is ‘coma’, the main off-axis aberration with Newtonian telescopes. Any time you see such an asymmetric star image in you telescope, you will know that it is time to collimate it!

4. Refractors. If you own a refractor with collimation screws on the lens cell, you can also use your Collimating Eyepiece here. Leave the front cover on the lens and slide the Collimating Eyepiece into the 1.25“ focuser. If you shine a powerful torch into the opening, you will see ring shaped reflections from the lens surfaces, but these reflections are rather difficult to see. If the reflections are not concentric, you can use the collimation screws to centre them.

Be aware that the reflections react very sensitively to adjustments with the collimations screws. It is a good idea to try to collimate your refractor only when notice distorted star images when observing the night sky!

We wish you clear skies with your freshly collimated telescope!

5. Characteristics.
Weight: 75 g;
Dimension: Diameter 28 mm; Height 84 mm;
Material: Anodized aluminium;
Recommended for: Newtonians and Refractors.