

## Collimation with a Takahashi collimating scope

These instructions describe how you can adjust your Alluna Ritchey-Chrétien telescope to perfection in just a few steps and just a few minutes using a Takahashi collimating scope (optional). Collimation is best carried out in daylight.

All telescopes are adjusted to the best possible settings on the optical bench at the factory. If collimation is nonetheless required after shipping and assembly, it will doubtless be to a very small degree; please take great care when turning the adjustment screws.



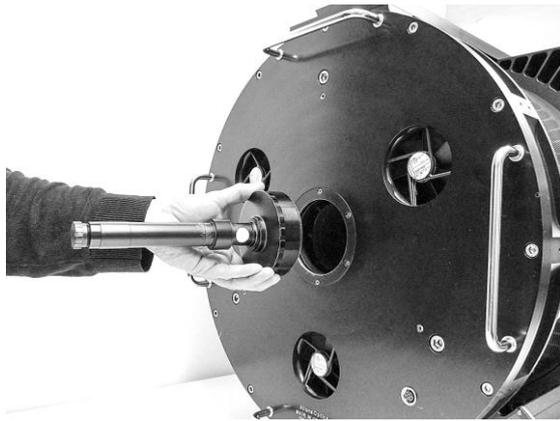
### Step 1

You will need a Takahashi-Collimating-Scope and an M100x1 adaptor to attach it securely to the telescope. The Takahashi collimating scope and the adaptor, which fits all our RC telescopes, are available from us as accessories.



### Step 2

Connect the Tak-Collimating-Scope to the M100x1 adaptor.



### Step 3

Now securely screw the adaptor with the Tak-Collimating-Scope into the Alluna RC-telescope.



### Step 4

The collimating scope is now securely attached to the telescope. The optical axis is exactly correct for subsequent use with CCD camera, eyepiece or other accessories! Nothing can wobble, everything is securely in place!

The aperture of the telescope should now be turned towards a light wall or some white paper. The telescope should not be angled horizontally for adjustment (and certainly not pointed downwards). Pointing diagonally upwards is sufficient.



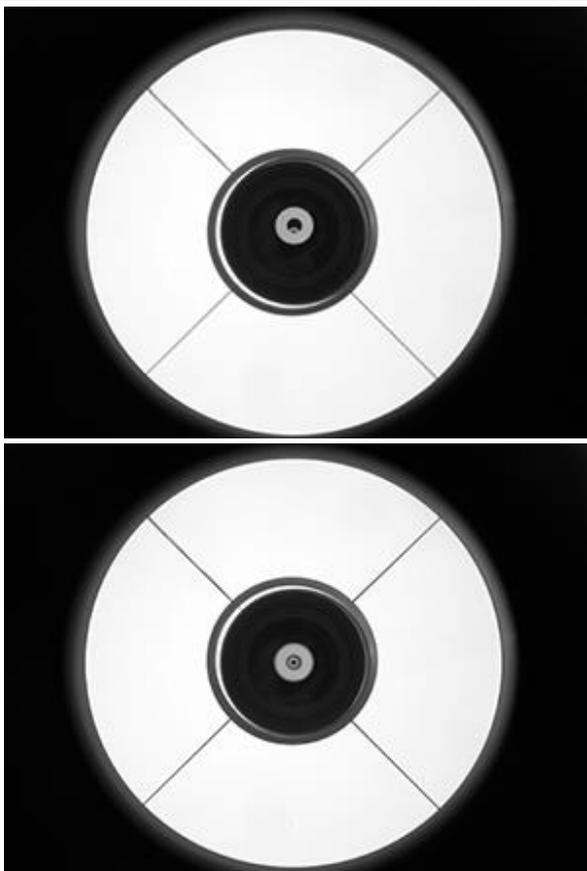
### Step 5

With a misaligned system, you will see the accompanying picture when you look through the collimating scope. We have made the misalignment particularly severe in this system for illustrative purposes. The aim is now to make all the visible rings concentric. The collimating scope can be adjusted backwards and forwards a short distance. This makes it possible to focus exactly on the individual rings and the centre markings of the secondary mirror.



#### Step 6 – Adjustment and lock screws

There are three adjustment screws and three lock screws for the primary and the secondary mirror respectively.



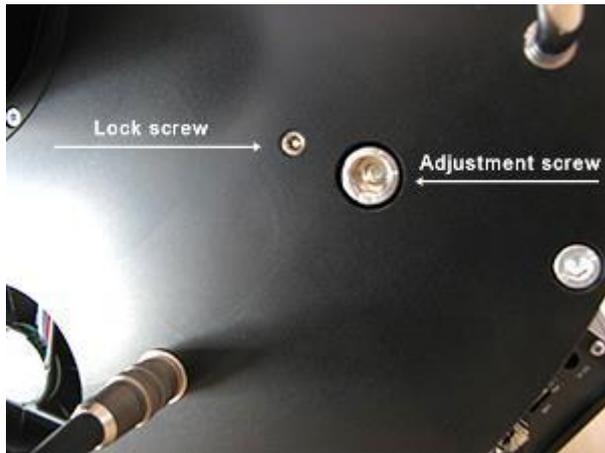
#### Step 7 – Adjusting the secondary mirror

**The secondary mirror is always adjusted first.**

To do this, loosen the three lock screws on the secondary mirror holder.

As you turn the adjustment screws on the secondary mirror holder, the smallest inner white dot will move; this is the small (approx. 1mm) marking located on the secondary mirror. This must be accurately centred on the exact centre-point of the second inner white ring.

When the inner white point is centred on the inner white ring, the secondary mirror is perfectly adjusted. Do not forget to tighten the lock screws on the secondary mirror holder equally, using light pressure.



### Step 8 – Adjusting the primary mirror

**The primary mirror is adjusted second.**

If adjustment of the primary mirror is required, after adjusting the secondary mirror first loosen the lock screws on the back plate. The adjustment screws can now be moved to set the mirror. Take great care here too: a turn of just a millimetre will have visible results.

The wider black circle must now be centred on the slightly narrower, black outer ring.



Please compare the accompanying image with the image from step 7. If you can see a very thin, equally proportioned white ring between the two circles, the primary mirror and thus the entire RC system is correctly adjusted.

The arms of the spider assembly must be straight at all times. The image to the left shows an almost perfectly adjusted Alluna RC. If you look very closely, the primary mirror must still be adjusted a tiny fraction to the right. Please do not forget to tighten the lock screws of the primary mirror using equal pressure, always checking the adjustment. Tighten the screws but please do not “over tighten”.

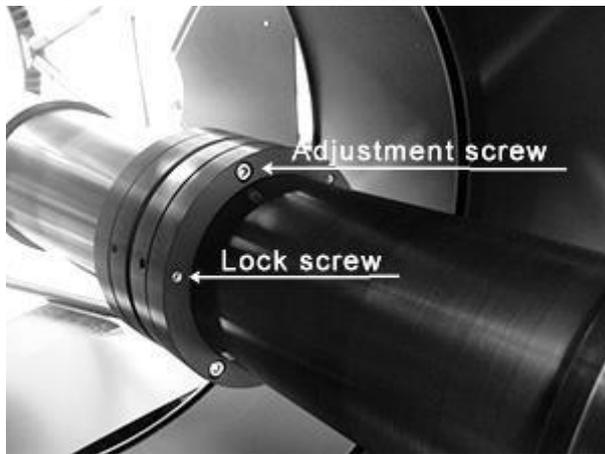


### Step 9

Once adjusted in daylight, the RC should already be very well adjusted. Fine adjustment of the primary mirror can subsequently be carried out with the aid of a defocused star near the zenith. A securely connected CCD camera will help to monitor adjustment on the screen here, although it can also be monitored visually using an eyepiece.

The secondary mirror shadow and outer circumference of the star should be concentric, at which point the adjustment of the primary mirror will be correct. The star should show no astigmatism at the centre of the field of view, at which point the adjustment of the secondary mirror will also be correct.

Here, the star should be located in the exact centre of the field of view, as astigmatism resulting from the telescope's construction would falsify the results away from the centre.



Step 10 – Adjusting the primary mirror baffle tube

**Please carry out this step only when you are quite sure that the telescope is correctly adjusted.**

If the adjustment for the star is perfect, but the rings are afterwards no longer concentric with the Takashi collimating scope, the baffle tube alignment can be readjusted a little.

To this end, there are three adjustment screws and three lock screws on the baffle tube flange.

Adjustment of the baffle tube should be required only very infrequently, if at all.

**Note: under no circumstances should the Dust Cover flaps rub against the baffle tube after the baffle tube has been adjusted.**

Alluna telescopes are extremely stable when adjusted; once a perfect adjustment has been achieved, no further collimation should be required for a lengthy period of time. Please note that these instructions are applicable only to Alluna RC-telescopes.