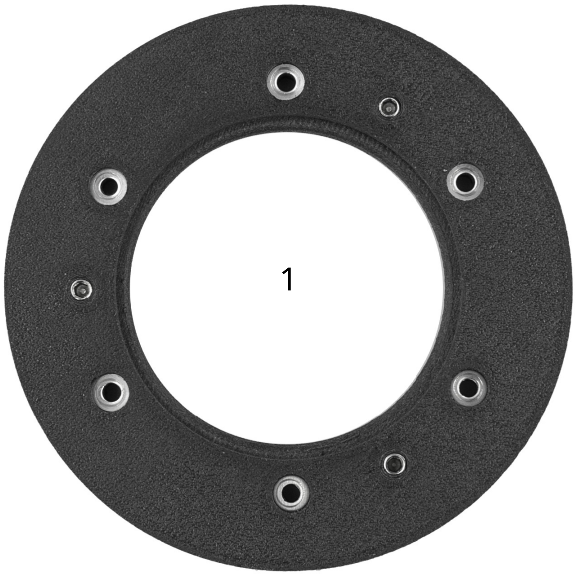
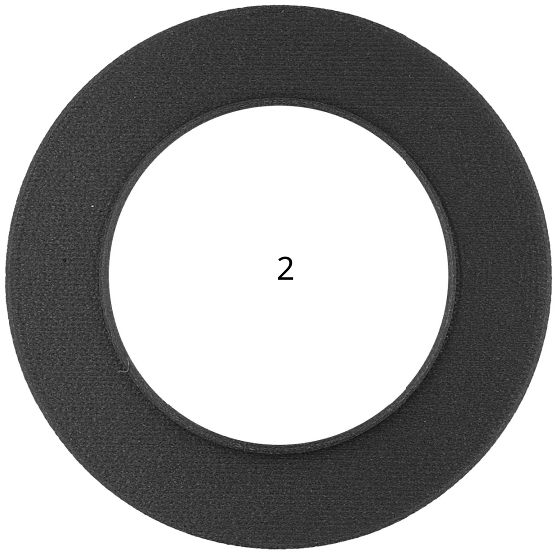
Filter Adapter
RSF R8

User Manual
rev. 2022-11-07

ASTRODEVICE





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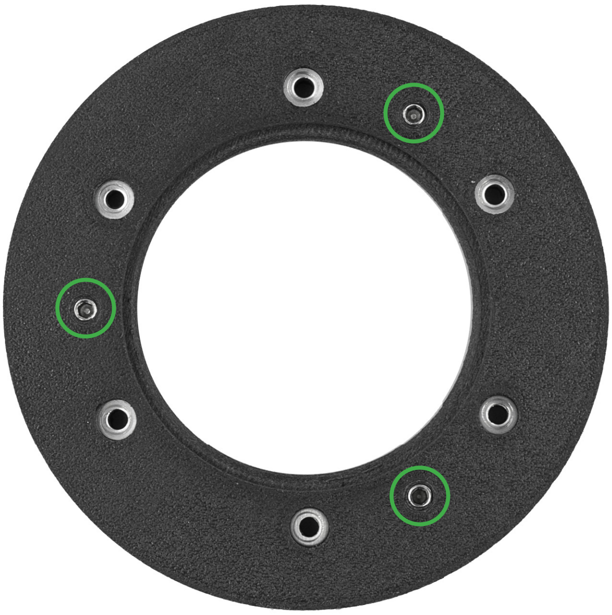
Package contents:

1. Adapter body
2. Protective washer
3. Mouting screws (6 pcs)



The body adapter is equipped with three screws for leveling any sensor tilt (marked with green circles above). They can be adjusted with a standard 2 mm hex wrench.

By default, all tilt adjustment screws are screwed inside the adapter. When proceeding with the initial installation, make sure that these screws are just so, so they DO NOT protrude above the front surface. First assume that your camera has no tilt, so the use of screws is not necessary and they must be completely screwed inside the adapter. If you find that tilt adjustment is needed, the relevant instructions are in the final section of this manual.

First read the entire manual and make sure that everything is clear to you.
Only then start working with adapter.
If you have any questions, please contact Astrodevice.

Introduction

The RSF R8 adapter is used to connect ZWO ASI cooled cameras equipped with tilt plate to the Celstron RASA 8 telescope. Adapter provides a total backfocus of 28.70 mm* and allows to screw in a standard 2” filter.

The tilt plate in the camera must be 5 mm thick and have 6 centrally spaced mounting holes, allowing screws with a diameter of 2.5 mm. The holes must be located 31 mm from the geometric center.

Cameras that meet this requirement are:

- ZWO ASI 2400 MC Pro,
- ZWO ASI 2600 MM/MC Pro,
- ZWO ASI 6200 MM/MC Pro.

Usage

The device is designed to work in conditions of 0-40 degrees Celsius (32°F - 104°F).

High temperatures

Although PET-G plastic is relatively robust, too high a temperature can lead to deformations. If you don’t even notice them, the micro structural changes can cause the device to become uncalibrated. Therefore, do not store or use the adapter at high temperatures. Adopt the rule of thumb that if it’s too hot for you, so is for the adapter.

* ±0.1 mm due to 3D printing tolerances.

Low temperatures

Our accessories have been successfully tested in temperatures as low as -20 degrees Celsius (-4°F). Although the use of the device in freezing temperatures is technically possible, there is a risk associated with the phenomenon of ice condensation. If water freezes in the crevices of the structure, ice can damage the accessory and lead to its destruction. Therefore, if you intend to use the adapter in freezing weather at your own risk, make sure that the environment is dry.

Under all conditions, work with the device should be personally supervised. Before use, make sure that the accessories and their threads are not damaged and that they are securely mounted. Never use a defective device.

Technology

The adapter was made with 3D printing technology using carbon fiber reinforced PET-G plastic. Refinement with this material significantly strengthens the construction and on the outside it manifests itself with a characteristic, slightly rough texture.

When choosing the material from which the adapter is made, we made sure that it would meet the highest standards. Regardless, however, it should be borne in mind that - although extremely durable - it is plastic. Handle the device gently, do not do anything by force, be careful not to damage the thread by screwing the filter in crookedly or screwing the adapter onto the telescope crookedly. Metal is harder than plastic and if something goes wrong - it will destroy it. So be careful and take your time.

For testing three different filters were mounted in the unit. Filters were made by three different manufacturers using three different models of filter enclosures.

The fine threads made with 3D printing technology require a lot of delicacy and caution when screwing in the filter, so never tighten anything by force. If you can't screw the filter in, turn it back and try again until the thread catch the filter and allows gentle advancement. Once you have screwed the filter in, never force it all the way in. Be gentle.

Setting up a telescope

1. **Remove the glass window from the front of the telescope.**

   See fig. 2.

The glass window affects the effective optical path length and it must not be used together with other filters.

2. **Make sure all screws visible in the front metal plane of the telescope stays back, that they do not protrude forward the surface.**

   See (fig. 1, yellow arrows).

*The adapter fits tightly into the metal plane of the front of the telescope and, when tightened, must not press against any protruding part: screw, glass window or anything else. That's why **glass window MUST BE UNSCREWED**. If anything were to stick out of the front plane, after the drawer is screwed on, the sensor backfocus would be incorrect, the image would be distorted and the **pressure caused by the tightening the nut could destroy the telescope**.*

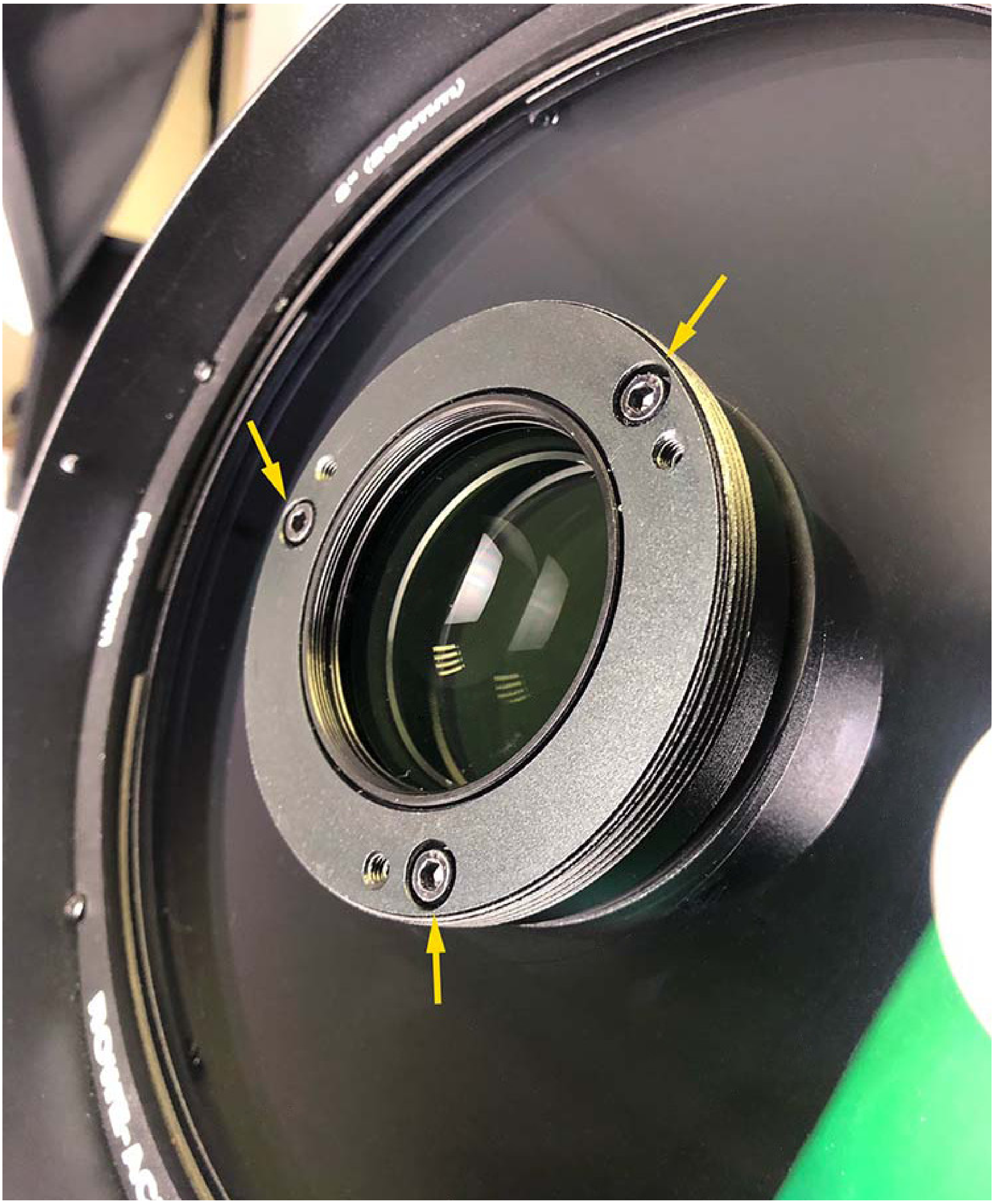


fig. 1

Installing the adapter

1. Put the camera on the table so that it is facing up with the sensor (fig. 2).

fig. 2

2. Place the original M87 metal nut supplied with the telescope on top of the camera (fig. 3).

fig. 3

3. Place the adapter on top and screw it to the black tilt plate using the 6 M2.5 screws provided (fig. 4). Make sure there is a metal washer in the adapter, in the socket of each screw.

fig. 4

4. Screw the 2” filter into the front of the adapter.

fig. 5

Done!

Tilt Adjustment

The adapter is equipped with three screws for adjusting the tilt of the sensor.

You can find detailed information about this adjustment system at
https://astrodevice.com/front-tilting-mechanism

If you find that the shape of the stars in your pictures is not uniform, the reason may be, among other things, that the sensor plane is not perfectly parallel to the front plane of the telescope. If this is the case, you can try to make a corresponding adjustment, compensating for the deviation by tuning one or two adjustment screws.

The screws extend forward in such a way that the adapter, together with the mounted camera, deviates from the plane of the telescope mount. By touching the mounting plane, the screws provide the proper distance. The problem, however, is that metal screws touching the blackened metal part of the telescope can scratch it. Although the telescope's mounting plane is made of hard steel, it has been coated with a black coating that will rub off if pressure is applied or metal screws are moved over it. To prevent this, the adapter comes with a 0.6mm thick protective washer. It lengthens the backfocus, but this lengthening should perhaps not significantly affect the end result. In any case, the intention is that the optical distortion caused by the longer backfocus will be much less than the problem caused by the tilt.

Never use tilt adjustment without using a protective washer! Never let the tilt adjustment screws directly press on the front plane of the telescope. If you want to adjust the tilt - always use a washer.

You can make adjustments by trial and error, but if you have an electric focuser, with the help of the following instructions you will be able to greatly reduce the guesswork and measure exactly what problem you are dealing with, which side of the sensor and by how much, more or less, you need to adjust screws.

If you suspect that your sensor is tilted, proceed as follows:

1. Start from the default initial state, so make sure that all tilt adjustment screws are screwed inside the adapter and do not protrude above its surface.

2. Screw the adapter onto the telescope with the camera attached.

3. Focus in the center of the frame and note the position of the focuser. Let's call it position A.

4. Unscrew the adapter from the telescope.

5. Put the protective washer on the telescope: the protruding edge of the washer should be inserted into the hole where the lens is located, and from which you unscrewed the glass window earlier. Once in place, the washer will itself be held on the telescope and will face flat outward (see fig. 6).

fig. 6

6. Screw the adapter on the telescope with the camera attached.

7. Now your sensor is offset from the telescope by an additional 0.6 mm, which is the thickness of the washer.

8. Refocus in the center of the frame and note the position of the focuser. Let’s call it position B. Divide the difference in steps (B-A) by 0.6, which is the thickness of the shim. This will give you the number of focuser steps per 1 mm of backfocus shift. Depending on the software settings of your focuser’s indication, you may get a positive or negative number. Determine whether by moving the sensor back (as you did by mounting the shim) you increased or decreased the number of focuser steps.

9. Sharpen the image in each corner of the frame one by one. Note the position of the focuser each time. Having the four outermost points of the frame with their positions noted, you can determine how much each point must be moved forward or backward in relation to the others. By making this calculation you should determine that:

- one corner of the sensor is farthest back

or

- one edge of the sensor is farthest back which is the equivalent of having the offset of two adjacent corners the same.

10. Once you have determined which part of the sensor is farthest back, you will want to make compensation on the opposite side. You will need to turn the tilt adjustment screws in such a way that the part of the sensor closer to the telescope moves back the same distance as the farther part. Theoretically, you could already calculate the appropriate offset value having the previous measurements at your disposal, but it is worthwhile for you to determine it directly again in the way described in the next three steps.

11. Focus the frame at the point farthest away from the sensor and note the position of the focuser. Let’s call it position C.

12. Focus the frame at the point closest to the sensor and note the position of the focuser. Let's call it position D.
13. Convert the difference (D-C) into millimeters using the conversion factor you got in step 8.

14. This is how much you need to move the part of the sensor closest to the telescope away. Now remove the adapter from the telescope (leave the washer!) and adjust the appropriate screws. Put the adapter with the camera on the telescope and take focus measurements.

Final remarks

Before attaching the adapter to the camera, inspect it for cracks or other defects.

After attaching the adapter to the camera, but even before mounting the camera on the telescope, make sure the adapter and camera are firmly secured and there is no play.

After attaching the camera with the adapter to the telescope, make sure that the whole thing is completely rigid and properly connected.

If in any doubt, remove the adapter and inspect it.

Never use a damaged accessory.

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