Camera Adapter
SE R8

User Manual
rev. 2022-07-29

ASTRODEVICE

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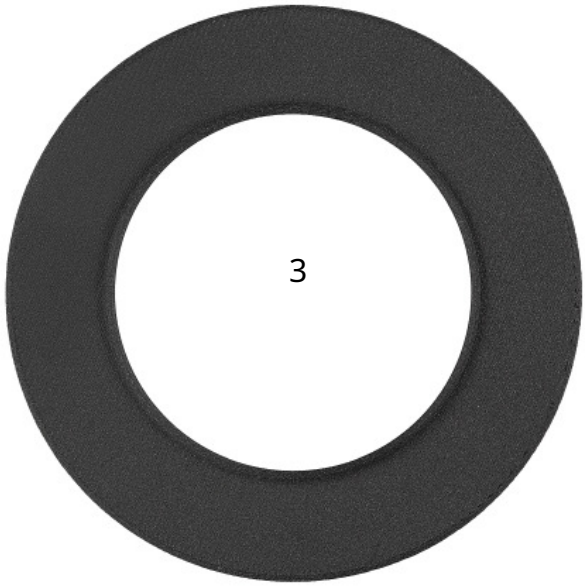

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Package contents:

1. Nut
2. Adapter body
3. Protective washer
4. Key to help pull the adapter off the camera

Nut and body are separate elements. They fit together to form a set.

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 SE R8 adapter is used to connect a Sony camera equipped with the E mount to the Celstron RASA 8 telescope. Adapter provides a total backfocus of 28.70 mm* and allows to screw in a standard 2” filter.

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.

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.

* ±0.1 mm due to 3D printing tolerances.

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. Three structural bolts are incorporated into the unit; they are located every 120 degrees around the circumference of the so. One of the sockets in which such a screw is placed is shown in fig. 1. These bolts secure the structure against disconnection and MUST NOT be removed under any circumstances. Removal may lead to irreparable damage to the device and/or uncontrolled disconnection of the camera and its possible fall and destruction. Never unscrew these screws.

fig. 1

Much of the adapter has a subtle geometry: there are both fine threads and narrow tabs to hold the camera, which are analogous to those used to mount the lens to the body. Remember that you are dealing with 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.

The device was screwed to the telescope and 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. 2, yellow arrows).

The large nut integrated in 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****.*

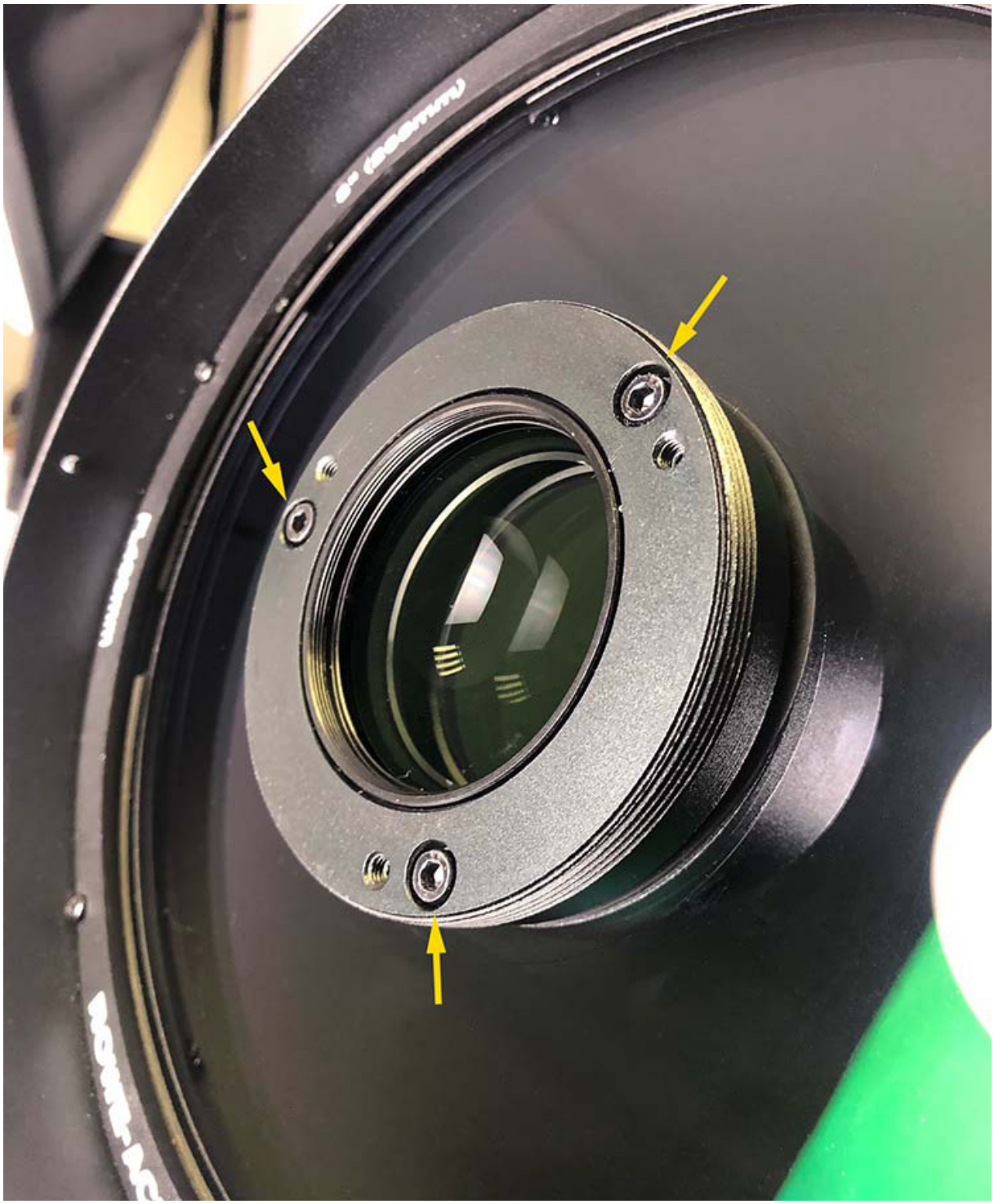

fig. 2

Installing the adapter

The mechanism for mounting the adapter on the camera is the same as for a standard lens. The important difference is the lack of auxiliary markings on the adapter. Lenses generally have a colored mark on them, which must be aligned with the red mark on the body at the beginning of the installation. The adapter is equipped with a freely rotating nut, so it is impossible to put any mark on it, which would always stay in the same place. Therefore, when installing the adapter, you have to do without additional colored designations. To make this process as easy as possible, a simple installation diagram is shown below.

Introduction

First please look at fig. 3. The illustration shows the idea of mutual fit of elements - the state we want to achieve after mounting the adapter. Two elements are important here: the pin on the camera and the slot in the adapter; both are marked in green. Once mounted, they should go one into the other. It only takes two simple steps to accomplish this.

fig. 3

1. **Step 1**

   See fig. 4.

   Rotate the adapter 45 degrees so that the slot now marked in yellow is in the location of the camera marked with the yellow arrow. In this position, slide the adapter into the camera as if you were just mounting a lens.

fig. 4

2. **Step 2**

   See fig. 5.

   Turn the inserted adapter back 45 degrees until the tab on the camera body clicks into the slot in the adapter.

fig. 5

Done!

Now you can screw the filter and camera adapter onto the telescope.

Removing the adapter

The adapter is mounted on the camera using almost all available space. Therefore, its efficient removal requires some cleverness. The lens release button is located under the adapter, and some thin flat object may be helpful in pressing it. After pressing the button, the adapter should be turned in a counterclockwise direction. To do this easily, help yourself by using the included key. To use it, insert its tabs into the two holes visible on the front of the adapter.

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

When you mount a camera with an adapter on a telescope, be careful. There is little space here and everything is tightly fitted to meet the requirements of short backfocus. The large nut should screw on freely, without noticeable resistance. Once again, make sure to screw it in carefully so as not to cut the thread by screwing it in crookedly. Always install the adapter when it is light around and you have convenient access and good visibility. Hold the camera with one hand and screw the cap with the other.

Tighten the nut with feeling. The adapter should not be pressed too tightly to the telescope, but to the first resistance - so that there is no slack at all. Remember that the amount of pressure you apply will affect the image geometry, as the RASA telescope is sensitive to even the slightest deviation in backfocus.

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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