INSTRUCTIONS MANUAL

VASCO

Motor Focus Bracket for MAK 127

Sky-Watcher, Orion or Celestron

For SW Electronic Focuser and ZWO EAF

TS – Optics, Sky-Watcher, Orion and others

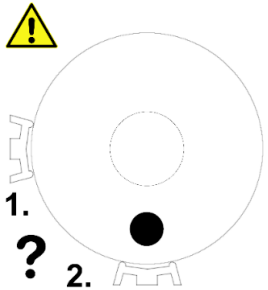
(Not Included)

Introduction

This instructions manual pretends to help you through the capabilities of the current bracket version V6.1, its applications and assembly. The coupling of a focus motor largely improves focusing precision, helping you to take advantage of your telescope capabilities and therefore, capture the sharpest details on the Solar System bodies and Deep Sky Objects. No modification is needed to your telescope.

Telescope versions

The MAK127 comes in several variants, their features are, sometimes, hardly recognised by beginners on the type. They are arranged in two main groups, recognized by the position of the dovetail bar as bellow:



The dovetail position nº1, shows a tube to use in an equatorial mount. The nº2 refers to the dovetail position found in ALT-AZ mounts. This will have impact when choosing the bracket, as we will see later.

Another important characteristic is the visual back thread. Most MAK 127 telescopes have the “MAK thread” or 45mm in diameter, with a standard 1,25” eyepiece. In the USA, the Sky-Watcher brand sometimes comes with a SCT visual back thread for 2” eyepieces. It is important to understand these features before you start choosing your setup.

Motor focuser options

DC Motor

This bracket was designed for a very common motor focuser used with refractors. It has lots of torque due to the 12V geared DC motor.

Several brands commercialize this kind of motor and control pad, commonly known as Sky-Watcher Electronic Focuser. Alternatively, this motor can be controlled by a computer with ASCOM drivers via an USB interface with several brands available. The focuser knob is drive by a belt and pulleys arrangement.

ZWO EAF Electronic Automatic Focuser

A special adapter enables the use of the ZWO EAF with direct drive mode in conjunction with the same bracket. This will take room near the visual back, limiting camera diameter and mirror rotation. Anyway, these can be negotiated by using and extension tube or a mirror. The limiting diameter visual back accessories is 70mm, a planetary camera is 62mm in diameter. As an alternative, the motor can be mounted on the side with a belt and pulley arrangement.

Stepper Motor NEMA11

As the ZWO EAF, the stepper motor can be mounted with direct drive or belt and pulley. The casing has an 8 pin RJ45 socket and you will need an USB interface for ASCOM drivers. You may ask for this special version.

The Bracket

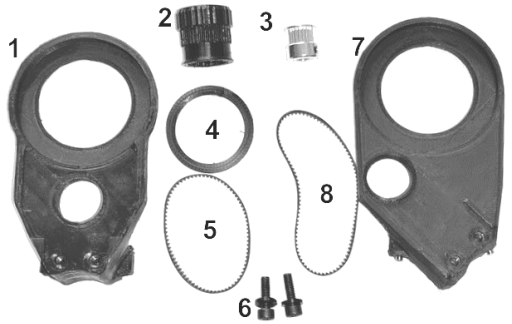
It is 3D printed in black PETG, a very versatile plastic with good flexibility and excellent mechanical, chemical and thermal properties. As it is plastic, it won’t scratch your tube nor put much weight on it.

The bracket body has a hole for the visual back, with diameters of 46mm or 51mm (SCT), the knob hole, the two inserted Inox M5 threads and the tube locker that has two M4 Allen set screws. These will adjust the bracket against the tube avoiding bending, although the bracket has enough stiffness to work without it. In the inner bracket face, there is a pin that goes inside the collimation screw recess. There are two bracket shapes available, one for equatorial dovetail position, another for ALT-AZ dovetail position.

Parts list for standard equatorial bracket (knob at 90º with the dovetail):

- Motor focuser bracket (1)
- Printed GT2 pulley 25mm diameter (2)
- GT2 Pulley 20 teeth 6,35mm bore (3)
- Washer for MAK 45mm thread (4)
- GT2 Belt 160mm (5)
- 2xM5x16mm Allen screws with washers (6)

In the ALT-AZ version, the bracket (7) has a different shape and the GT2 belt has a length of 200mm (8).

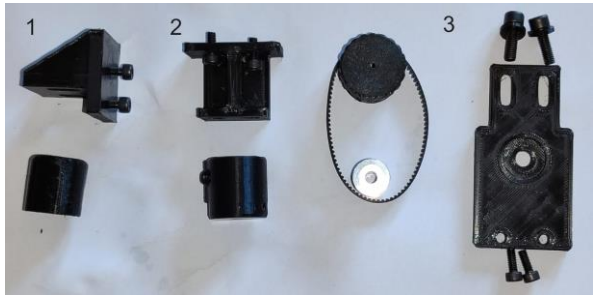


Options for ZWO EAF with direct drive:

1- An adapter permits the connection of the equatorial bracket with the L-shape ZWO bracket, so the motor can be mounted on top of the focus knob. A coupler is provided to connect the 5mm shaft to the focuser rubber knob. It is only available for the equatorial bracket (1) being also suitable for ALT-AZ setups. Follow the proper assembly instructions.

2- A special mount bracket permits a direct and shortened assembly of the EAF motor, without the knob rubber cap nor the original L-Bracket.

3- A motor plate permits to use the EAF as the DC motor through a combination of pulleys and belt. This is only viable with the Equatorial telescope version, since the motor will be on the tube side and would collide with the ALT-AZ dovetail and mount's saddle plate.



Assembly for SW Motor

1. Remove the coupler that comes with the motor focuser and replace it with the GT2 pulley. Lock in place with the set screws;
2. Using the focuser knob, adjust the telescope main mirror to a near focus position for your chosen optical assembly;
3. With the telescope in the horizontal position, unscrew the eyepiece visual back and place the bracket over, checking if the visual back's thread hole is not too tight. If so, you may sand the hole from inside a little bit, so you can remove it easily;
4. The pin in the back of the bracket should go inside the collimation screw's recess;
5. With the 44mm plastic washer inside the visual back female thread, screw it over the male thread. (it won't be used with the SCT thread or SCT visual back with a thread adapter);
6. With a 2mm Allen key, adjust the set screws until the protection strips touch the tube, verifying if the pin is corrected place. Avoid excessive screw torque. The bracket should not bend nor rotate;
7. Check if the focuser knob is free and do not make any friction with the bracket;
8. Insert the 25mm pulley over the focuser rubber cap;
9. Place the motor focuser over the bracket and insert the M5 screws with the washers, without tightening;
10. Adjust the alignment between the two pulleys and place the 160mm or 200mm GT2 belt;
11. Adjust belt tension at will and tighten the main screws. When pressing the belt between fingers it should bend 3 to 4mm without effort and this should not bend the bracket;
12. Power up your focuser and check if all is working properly without friction;
13. WARNING. Be aware of the focuser end stops of your telescope to avoid damage. For that, use a near focus position to start (see 2);
14. When changing focus distance, e.g. introducing a Barlow lens, just pull the 25mm pulley until the toothless track be aligned with the belt, so it can manually rotate and the belt can slide over the track. Alternatively, take note on your control pad witch button made the focal distance shorter or larger, since the focus travel is too slow to notice changes in the blur image when far away from focus. Another way, use an appropriate pen to write de direction of focusing in the telescope back end near the know or even glue a plus and minus sign. (notice the back of rubber knob cap).

Assembly for ZWO EAF focuser with direct drive

1. Follow the previous assembly instruction from point 2 to 6;
2. Install the square bracket over the main bracket with the M5 screws allowing some movement;
3. Attach the EAF casing to the L-bracket;
4. Unscrew the cap's set screw with a 2mm Allen key and insert it in the EAF D-shaped axle;
5. Adjust the set screw gently close to the motor casing but leaving a clearance gap, enough to avoid friction;
6. With the knob cap over the telescope rubber knob, insert the two M4 screws so the L-shaped metallic bracket is aligned, adjusting the position of the square bracket;
7. Adjust the position of the casing over the L-bracket and thigh to screws;
8. With the L-bracket and motor casing removed, tight the square bracket's M5 screws;
9. Finally screw the L-bracket and motor casing over the square bracket inserting the cap over the knob, making final alignment adjustments with the screws between the L-bracket and motor casing. Avoid axle misalignment, since it will stress the internal gears;
10. Warning: do not manually try to rotate the cap and motor axle since you may damage the EAF inner gears.

Caution!

-Avoid direct sunlight exposure over the bracket or inside a hot car. It is black and can heat up a lot and bend;

-If sanding is needed, to trim or to paint, use a face mask and safety glasses to avoid the plastic dust. Use a vacuum cleaner to clean your work space and the bracket. Clean it very well before putting it in the telescope, since dust might get in your scope's tube and mirror;

-Do not tight the screws too much or apply excessive torque since you may damage the bracket;

-You may grind, sand and paint the bracket with a car like spray paint;

-Do not drill or screw other parts to the bracket since it is hollow with "honey comb" like internal structure.

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