



# EAF 电调焦

## 快速指南

V1.0



感谢您选购ZWO电动调焦器 (Electronic Automatic Focuser, 以下简称EAF)。

EAF是由振旺光电自主研发并制造的一款智能产品，专为天文摄影领域设计，旨在实现望远镜镜筒焦距的自动和精确调整。

本快指旨在通过简单的文字说明与图示，确保您能够安全且高效地使用本设备，并提醒您了解相关注意事项。

更多信息请访问我们的官网<http://www.zwoastro.cn>

# 产品简介

为了满足不同用户的需求，ZWO推出了两个版本的EAF产品：标准版EAF和高配版EAF Pro。

EAF是对老版EAF的升级，其接口从Type-B升级为更为通用的Type-C接口；



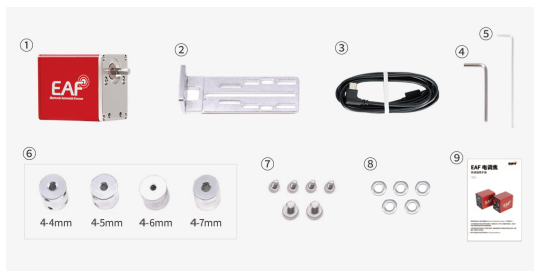
EAF Pro则配备了蓝牙芯片，支持与天文盒子或PC的无线通讯，且内嵌锂电池，不再依赖外部供电，真正实现了无线操作。



附件中提供了多种安装支架，可灵活安装在市场上大多数望远镜调焦座上，以适应不同的使用需求。

|                  | EAF           | EAF Pro            |
|------------------|---------------|--------------------|
| 尺寸               | 41*52*70.3mm  | 41*52*73.4mm       |
| 负载               | 5kg           | 5kg                |
| 驱动方式             | 步进电机，减速比128   | 步进电机，减速比128        |
| 通信方式             | Type-C (5V1A) | Type-C (5V1A) / 蓝牙 |
| 电池               | ×             | ✓                  |
| 温度传感器<br>手控盒HC接口 | ✓             | ✓                  |
| 电源开关             | ×             | ✓                  |
| 状态指示灯            | ×             | ✓                  |
| 调焦按钮             | ×             | ✓                  |

# 包装清单- 标配版



- ①. EAF本体 x1
- ②. 标准连接板 x1
- ③. 2米USB2.0 (Type-C to Type-A)线 x1
- ④. 3mm六角扳手\*1个
- ⑤. 2mm六角扳手\*1个
- ⑥. 联轴器x1套(4-4mm\*1个/4-5mm\*1个/4-6mm\*1个/4-7mm\*1个)
- ⑦. 螺丝\*1套(M5\*10圆柱头内六角 2个/M4\*8圆柱头内六角 4个)
- ⑧. 垫片x5(内孔5mm)
- ⑨. 快速指南 x1

## 供选购的附件



手控盒



温度探头

# 使用指南

## 准备工作

### 安装电调焦

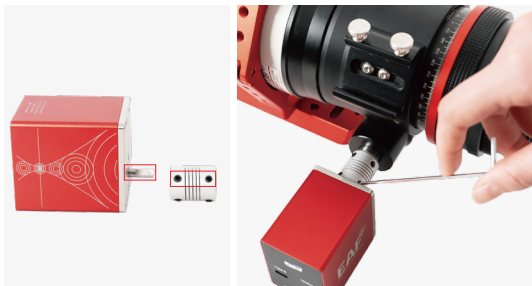
使用合适尺寸的扳手拆下望远镜调焦座的粗调旋钮；



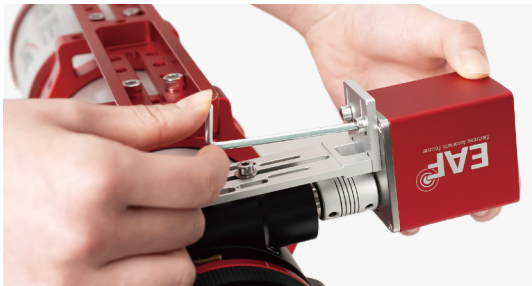
将联轴器安装在望远镜调焦座轴上并用2mm六角扳手拧紧锁紧螺钉；



将调焦器主体固定到联轴器上，且将EAF电机轴平面对准锁紧螺钉并使用提供的2mm六角扳手拧紧锁紧螺钉；



用提供的M4螺钉将电调焦主体固定到连接板上，并将连接板固定到调焦座组件中的相应安装孔上，注意连接板与电调焦安装面贴合无间隙且与调焦座表面相对平行；



检查并确保电调焦所有连接装置牢固。  
这样就完成了电调焦的硬件安装。



对于像下图这样的曲面调焦座，您只需要使用原来的锁紧螺丝和3个垫片来固定电调焦。在电调焦连接板的底部有凹槽，单个螺丝就能提供足够的稳定性。



## 注意

1. 选择合适的联轴器规格：包装中附有四种规格的联轴器。请根据调焦座出轴的实际尺寸，选择最适合的规格进行安装。
2. 正确安装联轴器：由于电调焦电机出轴的形状不规则（有一侧为平面，另一侧为圆面），请确保联轴器上的同一面的两颗螺丝对准电机轴的平面，以确保连接的稳固，从而避免出现打滑的情况。
3. 安装后的检查步骤：安装联轴器后，务必进行仔细检查以确保其牢固性。建议通过手动转动电机几圈，确认没有打滑现象。这将有助于在实际拍摄过程中避免调焦异常的问题。

## 供电与通讯



拿到EAF Pro(非电池版本不需要)后，请将电调焦Type-C 接口连接到电脑或ASIAIR 的USB 端口、充电宝或充电器进行激活，然后将开关拨至“ON”位置，即可以正常开机(此时指示灯会亮起)。



将电调焦的Type-C接口连接到PC或ASIAIR的USB接口，可以实现供电与通讯。

对于EAF Pro，除了通过Type-C接口有线连接外，还可以通过蓝牙与PC或ASIAIR进行无线通讯，使用内置电池供电，不使用时，建议把开关拨到OFF。

## 蓝牙连接步骤

1. 在PC上打开蓝牙功能(ASIAIR APP不需要)，并在软件里扫描电调焦的蓝牙名称，如 ‘EAF Pro\_XXXXXX’，然后点击连接。
2. 此时，EAF Pro的状态指示灯将红绿交替闪烁，并伴随连续的蜂鸣声。
3. 手动按一下设备上的in或out按键进行配对确认。
4. 当蓝牙连接成功后，闪烁和蜂鸣声将停止。

## 蓝牙重置

当蓝牙连接不上或不稳定时，同时按下IN和OUT，保持5秒以上，蜂鸣器滴一声后蓝牙重置成功，此时蓝牙名称会恢复默认值。

你还可以通过3.5mm音频口外接温度传感器或手动控制器，根据实际需要进行选择。

## 调焦

电调焦支持移动端和PC端软件控制，能够实现参数设置及行星摄影或深空摄影的对焦操作。

例如，ZWO自研的移动端APP ASIAIR和PC端软件ASISudio。

此外，还支持ASCOM平台的第三方拍摄软件如行星拍摄软件Sharpcap、FireCapture等，深空拍摄软件Maxim DL, The SkyX, SGP, Nebulosity等等。

你还可以购买 ZWO 自研的手控盒HC进行调焦。当然，EAF Pro自带的调焦按钮也能实现对焦功能。

# 注意事项

## 1. 激活设备

在首次使用 EAF Pro 前, 请先激活设备。

拿到设备后, 请将电调焦 Type-C 接口连接到电脑的USB端口、ASIAIR 的USB 端口、充电宝或充电器进行激活, 然后将开关拨至“ON”位置, 如果可以正常开机(此时指示灯会亮起)则表示已激活。

建议在使用前先将设备充满电, 以确保长时间稳定工作。

## 2. 载重限制

EAF 的额定载重为 5kg。请避免长时间超负荷使用, 以免导致调焦器堵转或损坏。

## 3. 电调焦初始设置

EAF 的步进电机具有一定扭矩。第一次操作时, 请先设置零位和最大步数, 防止电动调焦器受到损坏。

## 4. 节省电量

EAF Pro 不使用时, 请将开关拨至“OFF”节约电池电量。

为防止电池过度放电, 请在长时间存放前充满电, 并尽量避免超过三个月的长时间存放。

建议存储温度为  $15^{\circ}\text{C} \pm 10$ 。

## 5. 异常警示

当设备状态异常（如堵转）时，蜂鸣器会发出“滴滴”警示声。

请及时调整设备使用环境，使其恢复正常工作状态。

## 6. 电池使用温度

充电温度范围为 0°C-45°C，放电温度范围为 -10°C-40°C。

在这些温度范围外使用可能导致无法正常充放电，甚至严重减短电池寿命。

请尽量避免在极端环境下使用设备。

## 7. 使用前参数设置

请在使用前设置好回差，零位，最大步数限制以保证最佳使用体验。

若中途打开了EAF的“反向”功能请务必重新设置零位，否则会影响正常使用功能。

## 参考文档

如果需要更详细的用户手册信息，请访问官网

<http://www.zwoastro.cn/support/manual>

## 软件和驱动

电调焦是免驱设备，电脑不需要额外安装专门的驱动就支持操作电调焦。

如果需要安装ASCOM驱动或者EAF固件升级工具，请访问官网

<http://www.zwoastro.cn/downloads>进行下载



扫码关注公众号



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Twitter: <https://twitter.com/zwoastro>

Web: <https://www.zwoastro.com>

# Reference Document

For more detailed user manual information, please visit the official website: <https://www.zwoastro.com/guides-and-manuals/>

## Software and Drivers

The EAF is a driver-free device, thus the computer does not require additional specialized drivers to operate it.

If you need to install the ASCOM driver or the EAF firmware upgrade tool, please visit the official website for download:

<https://www.zwoastro.com/software/>



## 5. Abnormal Alarm

When the device is in an abnormal state (e.g., stalling), the buzzer will emit a "beep-beep" warning sound.

Please promptly adjust the device's operating environment to restore normal working conditions.

## 6. Battery Operating Temperature

The charging temperature range is 0°C to 45°C, and the discharging temperature range is -10°C to 40°C.

Using the device outside these temperature ranges may result in failure to charge or discharge properly, and may significantly shorten the battery lifespan.

Please avoid using the device in extreme environments.

## 7. Pre-Usage Parameter Setup

Please set the backlash, zero position, and maximum steps limit before use to ensure the best performance.

If the "Reverse" function of the EAF is activated during operation, make sure to reset the zero position to avoid affecting the proper functioning of the device.

# Precautions

## 1. Activate the Device

Before using the EAF Pro for the first time, please activate the device.

After receiving the device, connect the EAF Type-C interface to the USB port of your computer, or ASIAIR, power bank, or charger to activate it. Then, switch the power to the "ON". If the device powers on normally (the indicator light will turn on), the device is successfully activated.

It is recommended to fully charge the device before use to ensure stable operation for an extended periods.

## 2. Payload

The rated payload of the EAF is 5kg. Please avoid prolonged overloading to prevent the focuser from stalling or being damaged.

## 3. Initial Setup of EAF

The stepper motor of the EAF has a certain torque. During the first operation, please set the zero position and maximum steps to prevent damage to the focuser.

## 4. Power Saving

When the EAF Pro is not in use, please turn the switch to "OFF" to conserve battery power.

To prevent excessive battery discharge, charge it fully before long-term storage, and avoid storage periods exceeding three months.

The recommended storage temperature is  $15^{\circ}\text{C} \pm 10^{\circ}\text{C}$ .

## Focusing

The EAF can be controlled via both mobile and PC software to achieve great focusing result in both planetary and deep-sky photography projects.

For example, ZWO's self-developed mobile App ASIAIR and PC software ASISStudio.

In addition, it also supports third-party imaging software on the ASCOM platform, such as planetary imaging software like Sharpcap, FireCapture, as well as deep-sky imaging software like Maxim DL, The SkyX, SGP, Nebulosity, among others.

You can also purchase the ZWO-developed Hand Controller (HC) for focusing. Additionally, with EAF's integrated focusing buttons on its body, simple focusing operations can also do done for convenience.

Power and communication can be established by connecting the EAF Type-C port to the USB port of a PC or ASI AIR.

For the EAF Pro, in addition to wired connection via the Type-C port, wireless communication with a PC or ASI AIR can also be established via Bluetooth, powered by the built-in battery, and when not in use, it is recommended to switch it to OFF.

## **Bluetooth Connection Steps**

1. Turn on Bluetooth on the PC (No need to do this on the ASI AIR APP), and scan for the Bluetooth name of the EAF in the software, such as 'EAF Pro\_XXXXXX', then click to connect.
2. At this point, the status indicator on the EAF Pro will blink alternately between red and green, accompanied by a continuous beeping sound.
3. Press the 'IN' or 'OUT' on the device manually to confirm the pairing.
4. Once the Bluetooth connection is successful, the flashing and beeping will stop.

## **Bluetooth Reset**

When the Bluetooth connection is unstable or fails to connect, press and hold the 'IN' and 'OUT' simultaneously for more than 5 seconds. After a short beep, the Bluetooth reset is successful, and the Bluetooth name will revert to its default value.

Depending on your needs, you can connect an external Temperature Sensor or Hand Controller via the 3.5mm audio jack.

# Attention

1. Select the appropriate coupling. The package includes four different specifications of couplings. Please choose the most suitable one based on the actual size of the focuser shaft for installation.
2. Correctly install the coupling: Since the shape of the EAF motor shaft is irregular (one side is flat, and the other side is round), please make sure that the two screws on the same side of the coupling are aligned with the flat surface of the motor shaft to ensure a secure connection and prevent slippage.
3. Post-installation inspection: After installing the coupling, make sure to conduct a thorough check to ensure its tightness. It is recommended to manually rotate the motor a few times to confirm that there is no slippage. This will help avoid focusing issues during actual imaging sessions.

## Power / Data



After receiving the device, connect the EAF Type-C port to the USB port of your computer or ASIAIR, power bank, or other charger to activate it, then, switch the power to the "ON". That means the device can power on normally (the indicator light will turn on).

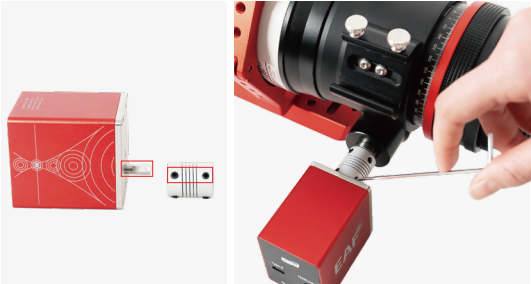
Check and ensure that all the connections of the EAF are secure. This completes the hardware installation of the EAF.



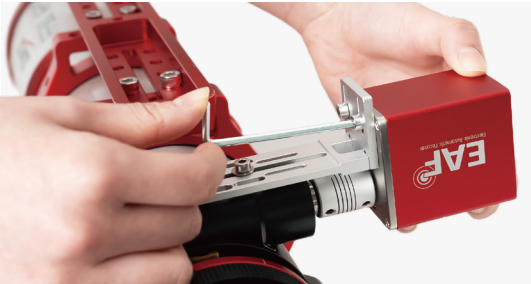
For curved focusers like the one in the image below, you only need to use the original locking screws and 3 washers to secure the EAF. There is a groove at the bottom of the EAF bracket, and a single screw provides sufficient stability.



Attach the focuser body to the coupling, align the EAF motor shaft flat surface with the locking screw, and tighten the locking screw using the provided 2mm hex wrench.



Secure the EAF body to the bracket and the bracket to the matching mounting holes in the focuser assembly using the supplied M4 screws. Ensure that the bracket is flush with the EAF mounting surface without any gaps, and that it is parallel to the focuser body surface.



# User Manual

## Preparation

### Install the EAF

Remove the coarse adjustment knob of the telescope focuser using a suitable sized wrench.



Install the coupling on the telescope focuser shaft and tighten the locking screw with the 2mm hex wrench.





# In the Box - Standard Version



- ①. EAF body \*1
- ②. Standard bracket\*1
- ③. 2m USB2.0 cable(Type-C to Type-A)\*1
- ④. 3mm Hex wrench\*1
- ⑤. 2mm Hex wrench\*1
- ⑥. Flexible coupling 1 set  
(4-4mm\*1/4-5mm\*1/4-6mm\*1/4-7mm\*1)
- ⑦. Screw 1 set (M5\*10 cylindrical head  
hex screws\*2 / M4\*8 cylindrical head hex  
screws\*4)
- ⑧. Spacer\*5(Inner diameter: 5mm)
- ⑨. Quick Guide\*1

## Optional Accessories



Hand Controller



Temperature Sensor

The accessories include a variety of mounting brackets, which can be flexibly installed on most telescope focusers available on the market to accommodate different user needs.

|   | EAF                                    | EAF Pro                                |
|---|--|--|
| Dimensions                                      | 41*52*70.3mm                           | 41*52*73.4mm                           |
| Payload   | 5kg                                    | 5kg                                    |
| Drive Mechanism                                 | Stepper motor<br>Reduction ratio 1:128 | Stepper motor<br>Reduction ratio 1:128 |
| Communication Method                            | Type-C (5V1A)                          | Type-C (5V1A) /Bluetooth               |
| Battery   | ✕                                      | ✓                                      |
| Temperature Sensor<br>Hand Controller Interface | ✓                                      | ✓                                      |
| Power Switch                                    | ✕                                      | ✓                                      |
| Status Indicator Light                          | ✕                                      | ✓                                      |
| Focus Button                                    | ✕                                      | ✓                                      |

# Product Introduction

To meet the diverse needs of users, ZWO has launched two versions of the EAF: the standard EAF and the high-end EAF Pro.

The EAF is an upgrade from the previous version, with its interface upgraded from Type-B to the more universal Type-C.



The EAF Pro is equipped with a Bluetooth chip, enabling wireless communication with ASIAIR or PCs, it also features a built-in lithium battery, no longer relying on external power supply, and truly enabling wireless operation.



# EAF

## Quick Guide

V1.0



Thank you for purchasing the ZWO Electronic Automatic Focuser(EAF).

The EAF is an intelligent product independently developed and manufactured by ZWO, specifically designed for astronomical photography. It aims to achieve automatic and precise adjustment of the optical tube assembly (OTA)'s focal length.

This manual can guide you to use the EAF safely and efficiently through simple instructions and illustrations. It also highlights important precautions.

For more information, please visit our official website:  
<https://www.zwoastro.com>