ZWO EAF Manual

（EAF / EAF Pro）



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1 Preface

Congratulations and 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 aims to provide users with clear and easy-to-understand instructions through detailed explanations and illustrations while highlighting potential improper operations or hazards. To ensure safe and efficient use of the EAF, please read it thoroughly before use to fully understand its features and operating procedures.

2 Important Tips

This manual is designed to help users operate the EAF safely and efficiently. Before using the EAF, please carefully review the following guidelines and follow the instructions throughout the operation. Adhering to these recommendations will ensure the safe and stable performance of the device while extending its lifespan.

1.Safety Guidelines

Power Requirements:

Ensure the use of a power adapter that meets the specified requirements of the device. Avoid using incompatible power sources.

Ensure the device is completely powered off before plugging or unplugging the power supply.

Avoid pulling or twisting the power cord, and ensure the power cord remains intact.

Environmental Requirements:

Operate the device in a dry, dust-free, and well-ventilated environment. Avoid using it under extreme temperature conditions (recommended operating range: -10° C to 60° C).

Keep the device away from moisture and liquids to prevent short circuits or other electrical malfunctions.

Electrical Safety:

Do not disassemble the device while it is powered on to prevent electric shock or damage.

Regularly inspect electrical connections to ensure there are no loosen or corroded components.

2.Operational Guidelines

Preparation Before First Use:

Thoroughly read the user manual to understand the EAF's features and correct operating procedures.

Ensure the device is installed on a stable platform to prevent any risk of falling or vibration.

During Operation:

Avoid frequently turning the device on and off. Control the usage duration and allow the device enough time for proper cooling.

Operate gently during use, avoiding excessive force or rapid rotation of the focuser to prevent affecting the EAF's precision and lifespan.

Maintenance:

Regularly clean the device by wiping the outer shell and key components with a clean, soft cloth. Do not use organic solvents.

Perform regular calibration and checks as outlined in the manual to ensure long-term stable operation of the device.

3.Precautions for Specific Usage Scenarios

Outdoor Use:

If the device needs to be used outdoors, ensure its waterproof rating meets the requirements of the specific working environment, and use a protective waterproof cover.

In case of strong winds or rain, it is recommended to immediately move the device indoors.

Transport and Storage:

During transportation, use the original packaging materials to ensure that all components are securely fixed, preventing collisions and vibrations.

When the device is not in use for an extended period, clean it and store it in a dry, well-ventilated area, away from direct sunlight and high-temperature environments.

4. Prohibited Operations

No Unauthorized Disassembly:

Do not attempt to disassemble the device yourself if you are not a professional. If repairs are needed, please contact the authorized service team. Unauthorized disassembly may cause irreversible damage and void the warranty.

Avoid Overloading:

Do not operate the device under conditions that exceed its designed load capacity, such as overloading or prolonged use beyond recommended limits.

5. Emergency Handling

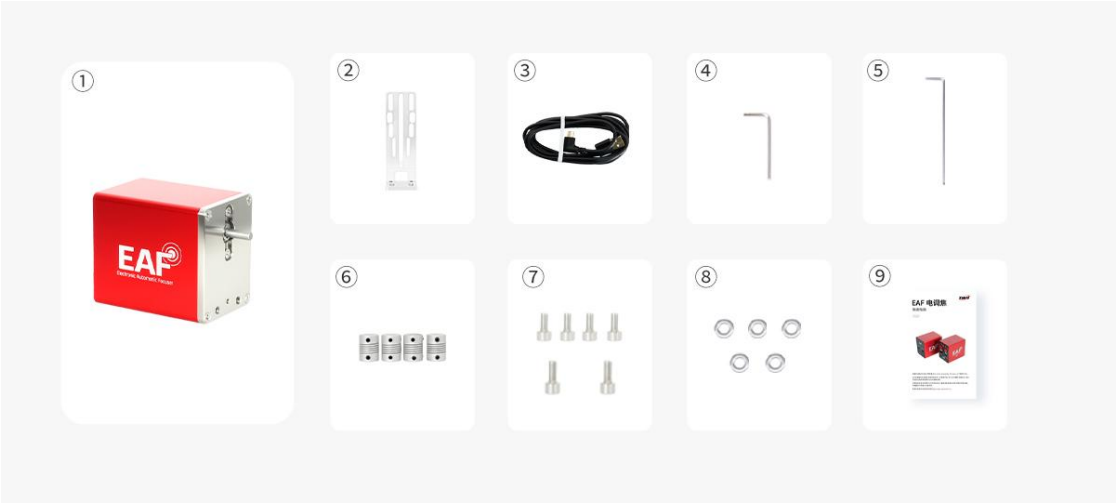
Abnormal Situation Handling:

If any unusual sounds, overheating, or smoke are detected during operation, immediately power off the device, stop using it, and contact our support team for inspection and repair.

6. Responsibilities and Warranty:

Follow the manufacturer's recommendations for regular maintenance and upkeep of the device. Keep the purchase receipt and maintenance records, as they are required for warranty service.

3 Packing List



1.EAF body x 1

2.Standard bracket x 1

3.2m USB2.0 cable (Type-C to Type-A) x 1

4.3mm Hex wrench x 1

5.2mm Hex wrench x 1

6.Flexible coupling 1 set (4-4mm x 1/4-5mm x 1/4-6mm x 1/4-7mm x 1)

7.Screw 1 set (M5 x 10 cylindrical head hex screws x 2 / M4 x 8 cylindrical head hex screws x 4)

8.Spacer x 5(Inner diameter: 5mm)

9.Quick Guide x 1

4 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 features ZWO's signature red exterior, an all-metal body, and a matte finish. The front logo incorporates an Airy Disk as an accent, highlighting its precise focusing capabilities. The design on the opposite side is inspired by the changes in the Airy Disk pattern during star focusing, making its purpose easily recognizable to users. 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. 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.

The EAF is an electric focuser driven by a high-precision stepper motor, capable of handling loads of over 5kg. It aims to achieve automatic and precise adjustment of the optical tube assembly (OTA)'s focal length, relieving users from the hassle of manual focusing and the challenges of low focus accuracy. This allows users to focus more on capturing celestial images. ZWO is committed to creating smarter and more cost-effective electric focuser devices, continuously improving the user experience and satisfaction.

Key highlights of the EAF:

1. Highly integrated design

2. Supports ASCOM and various ASCOM-compatible third-party software

3. Supports INDI

4. Supports native software like ASIAIR and ASIStudio

5. Precise focusing and automatic focus for deep-sky photography

6. Supports external hand controller and manual focusing

7. Supports external temperature sensor

8. Driver-free device, plug-and-play

9. Stable and durable

10.The high-end version EAF Pro supports Bluetooth communication and built-in battery power, with integrated focus ZWO ASIAIR APPs on the device

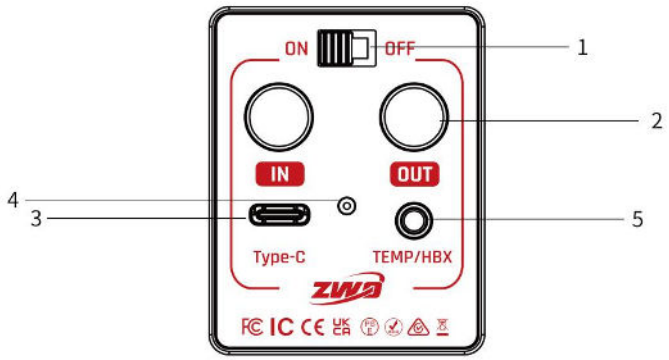
5 Specification Parameters

Product Model	EAF	EAF Pro
(W*H*Dmm)/Dimensions	41*52*70.3mm	41*52*73.4mm
Weight	215g	258g
Payload	5KG	5KG
Motor Specifications	Stepper motor, step angle 7.5°, reduction ratio 1:128	Stepper motor, step angle 7.5°, reduction ratio 1:128
Communication	Type-C	Type-C/Bluetooth
Power Supply	Type-C	Type-C/Built-in Battery
Built-in Battery	\	5V 2.5AH
Temperature Sensor/Hand Controller Interface	3.5mm Audio Jack	3.5mm Audio Jack
Hardware Focusing	Hand controller	Hand controller/focusing button
Software Focusing	ZWO ASIAIR APP, ZWO ASIStudio; ASCOM platform and various ASCOM-compatible third-party software	ZWO ASIAIR APP, ZWO ASIStudio; ASCOM platform and various ASCOM-compatible third-party software
Power Switch	\	2-position toggle switch
Status Indicator	\	Red and green dual-color LED *1
Operating Power Consumption	5V/500mA	4.2V/600mA
Battery Full Charge Time (Hours)	\	Standard USB Charging: 5 Hours 5V2A.max: 3 Hours
Operating Ttemperature	-20℃-40℃	-10℃-40℃
Operating Humidity	20%-60%，non-condensing	20%-60%，non-condensing
Storage Temperature	-20℃-60℃	-20℃-60℃ (recommended long-term storage temperature: 15°C ±10°C)
Storage Humidity	35%-75%，non-condensing	35%-75%，non-condensing
Charging Ambient Temperature	\	0℃-45℃

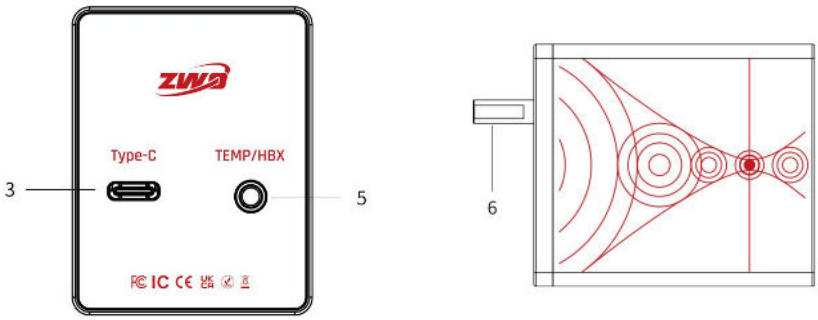
6 User Guide

6.1 Introduction to Appearance and Functions

EAF Pro:



EAF：



1.ON/OFF: Two-position toggle switch. 'ON' means the device is powered on and running on internal battery; 'OFF' means the device is powered off and can only be powered through an external Type-C port.

2.IN/OUT: Focus direction switch button. Pressing both 'IN' and 'OUT' for no more than1 second and releasing will cause a beep, indicating a successful reverse direction change. You can also switch the focus direction using the 'Reverse' button in ASIAIR APP, ASCOM, or ASIStudio.

3.Type-C: Type-C interface, supports powering the device or charging

the battery, and allows communication with ASIAIR and PC software for parameter settings and focus control.

4. Status Indicator, a red-green dual-color light used to indicate the device's status information;

Bluetooth Status:

Connecting: Red and green lights alternate flashing (the beep will sound continuously, once per second).

Connection Established: Flashing stops (the beep stops).

Note: Please complete the pairing within 60 seconds. If the time limit is exceeded, you will need to initiate the connection again.

Battery Status:

Low Battery (Needs Charging): Red light flashes continuously after power-on (Flash once every 3 seconds). Remains off in sleep mode.

Battery Normal: Green light stays on for 1 second after power-on, then turns off. Remains off in sleep mode.

Charging: Red light stays on.

Fully Charged: Green light stays on.

5.TEMP/HBX: 3.5mm audio port, which can connect to the dedicated external temperature sensor to collect temperature data and provide it to the shooting software for controlling auto-focus. It can also connect to a dedicated hand controller for manual focus and speed control.

6.Stepper Motor Shaft: Used to connect to a coupling to link with the telescope's focuser.

6.1.1 Precautions

1. Activate the Device：

Before using the EAF Pro for the first time, please make sure that you exit "Transport Mode."

This mode is designed to reduce battery drain during prolonged inactivity and will prevent the device from starting normally.

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° C ± 10° C.

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.

6.2 Pre-Use Preparations

6.2.1 Supported Telescopes

ZWO's EAF has designed three types of brackets to connect to various focusers.

The standard bracket supports the following models:

- SkyWatcher astrophotography reflectors
- SkyWatcher Black Diamond series
- SkyWatcher Dobsonian telescopes
- SkyWatcher Maksutov-Newtonian telescopes
- TS-Optics

- Astro-Tech
- Feather Touch
- SharpStar telescopes
- SkyRover telescopes
- Explore Scientific telescopes

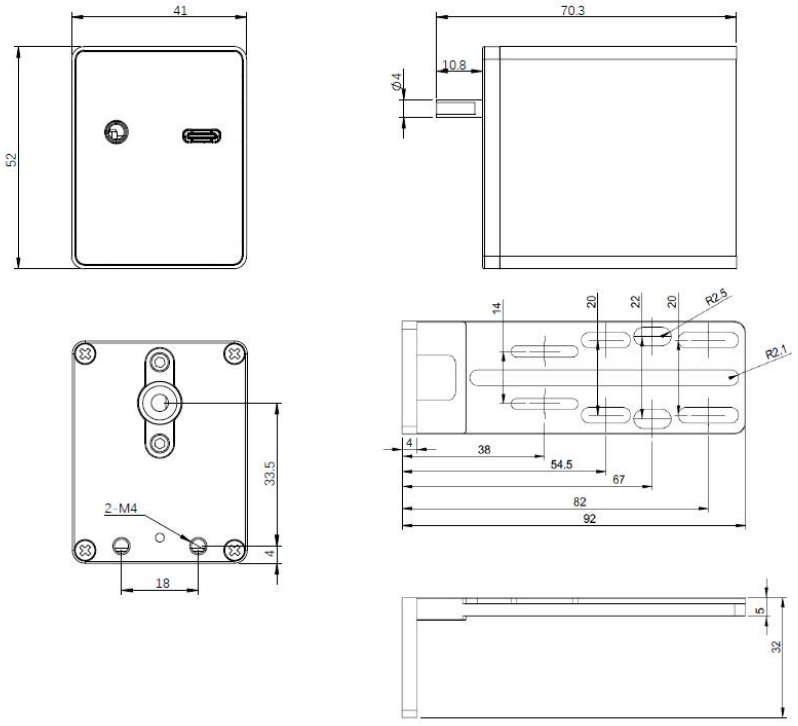
We recommend referring to this manual to confirm whether your telescope and focuser are compatible with the EAF.

https://www.yuque.com/zwopkb/hardware/eaf-support-list#G2tSm

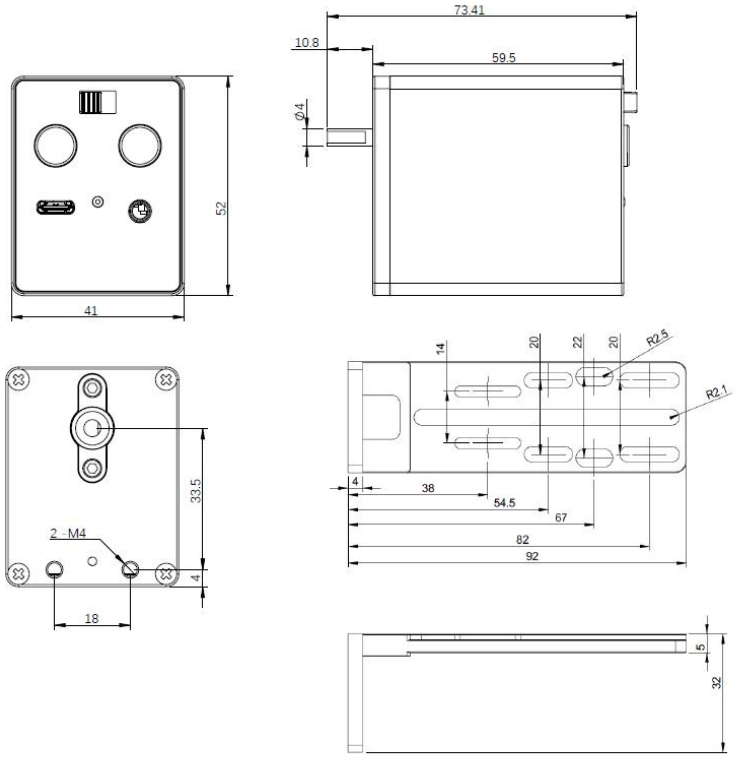
You can also refer to the mechanical drawings below to estimate compatibility. Over time, we will provide various brackets suitable for other telescopes. Please stay tuned to the ZWO website for updates.

6.2.2 Structural Dimensions

EAF Structural Dimensions



EAF Pro Structural Dimensions



6.2.3 EAF Setup

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.

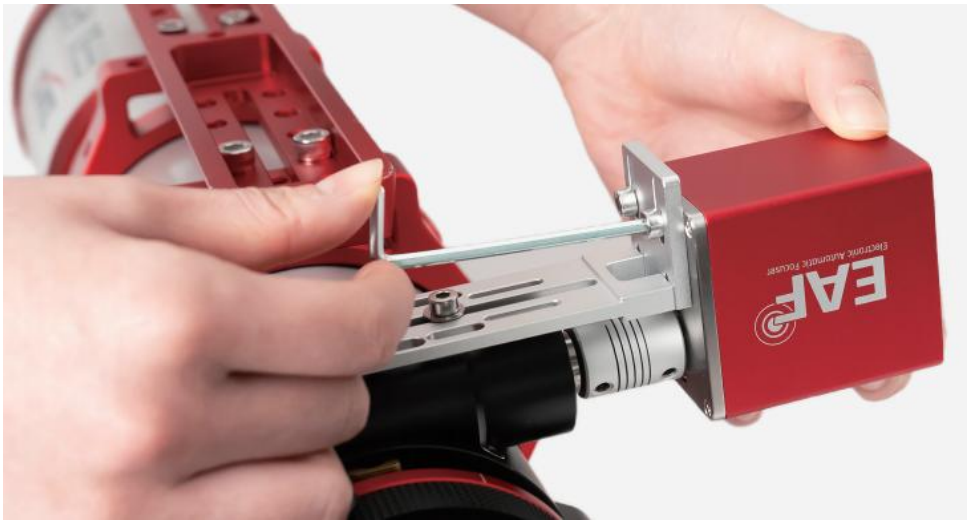


Attach the focuser body to the coupling, align the EAF motor shaft flat surface with the locking screw, and tighten the locking screw using the provided 2mm hex wrench.





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.



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 above, you only need to use wodethe 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.



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". If the device powers on normally (the indicator light will turn on), it means EAF Pro has successfully activated.

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

For the EAF Pro, in addition to wired connection via the Type-C port, wireless communication with a PC or ASIAIR can also be established via Bluetooth, powered by the built-in battery.

Bluetooth Connection Steps：

1. Turn on Bluetooth on the PC (No need to do this on the ASIAIR 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.

5.Now, you can proceed with wireless communication via Bluetooth.

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.

6.3 Start 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 ASIStudio. 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.

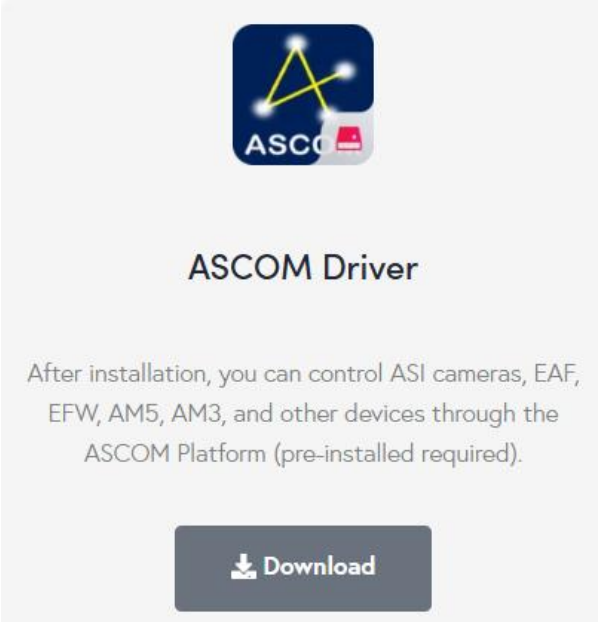
You can also purchase the ZWO-developed Hand Controller for focusing. Additionally, with EAF's integrated focusing buttons on its body, simple focusing operations can also do done for convenience.

The following sections will separately introduce the usage methods for different software.

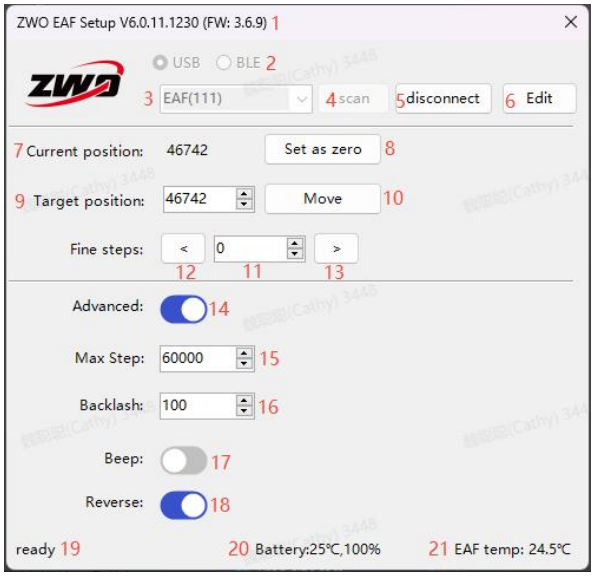
6.3.1 Using Third-Party Software on the ASCOM Platform

ASCOM Driver Installation

Download and install the ASCOM driver from the ZWO official website: https://www.zwoastro.com/software/



Introduction to the Functions of the ASCOM Driver



1. Display the driver version and firmware version information.

2. Select the communication method: USB or Bluetooth (BLE).

3. Display the scanned or connected device ID.

4. Scan for the target device ID.

5. Connect or disconnect the device.

6. Customize the device ID.

7. Display the current position of the focuser.

8. Set the current position as zero.

9. Enter the target position.

10. GOTO the target position.

11. Set the step size.

12. Default clockwise rotation.

13. Default counterclockwise rotation.

14. Display advanced settings options.

15. Set the maximum steps for the motor to limit the travel range for focuser protection.

16. Measure and accurately set the backlash steps to automatically eliminate backlash. If the backlash elimination has already been set in the imaging software, it is recommended to set this value to 0. For more details, please refer to the "EAF Parameter Settings" section in the EAF user manual.

17. Select to trigger the beeper for motor actions, stalling, or device insertion/removal status. (e.g., HC)

18. Select to reverse the motor rotation direction.

19. Indicate the current operating status of the device.

20. Display battery temperature and power information.

21. Display device temperature information.

The EAF Parameter Settings

Before using the software for focusing, it is necessary to configure the parameters of the 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.

Zero Position Setting:

For standard bracket installation, it is recommended to set the zero position at the fully retracted position of the focuser.

For curved focuser installation, it is recommended to set the zero position near the focal point of the focuser.

Upper Limit Setting:

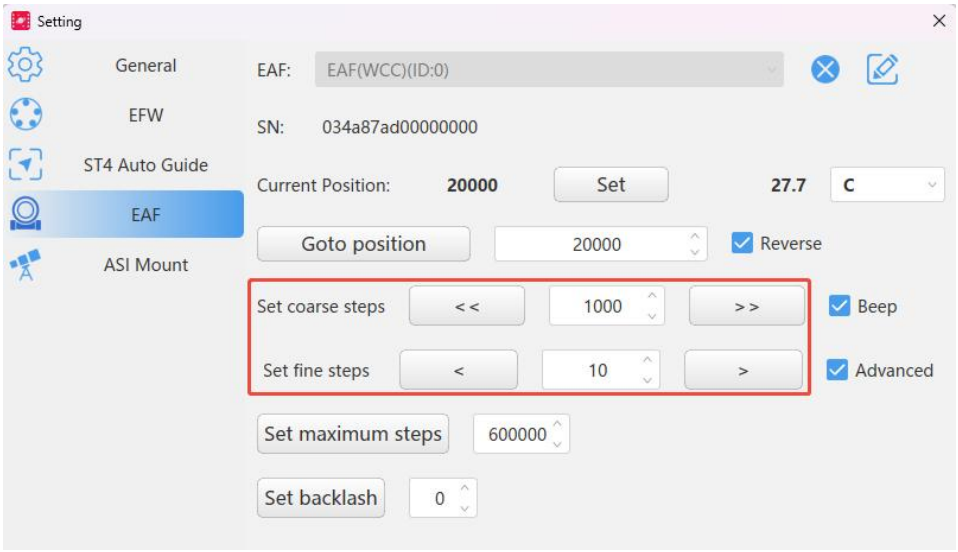
It is recommended to set the maximum step count at or below the travel limit of the focuser.

Backlash Setting:

After installing the EAF on the telescope's focuser, there will be some backlash. Therefore, it is necessary to measure the backlash value of your equipment and input it into the software to compensate for backlash during focusing operations.

Backlash Measurement:

Using ASICAP as an example, the following steps demonstrate how to accurately measure backlash: Install the EAF properly. Connect the Type-C interface to a PC and open the ASICAP imaging software. Enable EAF control. Set the coarse adjustment step size to 1000 steps and the fine adjustment step size to 10 steps.



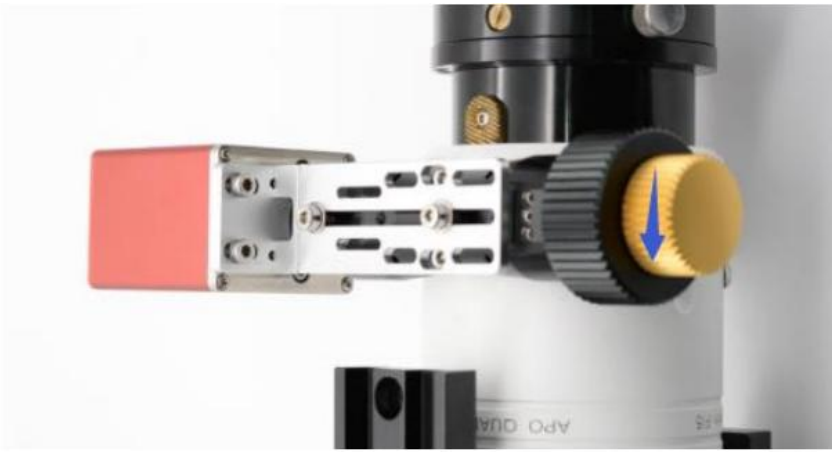
Move Outward: Click the coarse button to move the EAF out by 1000 steps.



Check Movement: Set the fine tuning steps to 10 steps, then click the inward fine adjustment button to move inward once. Observe whether the focusing handwheel on the opposite side rotates.

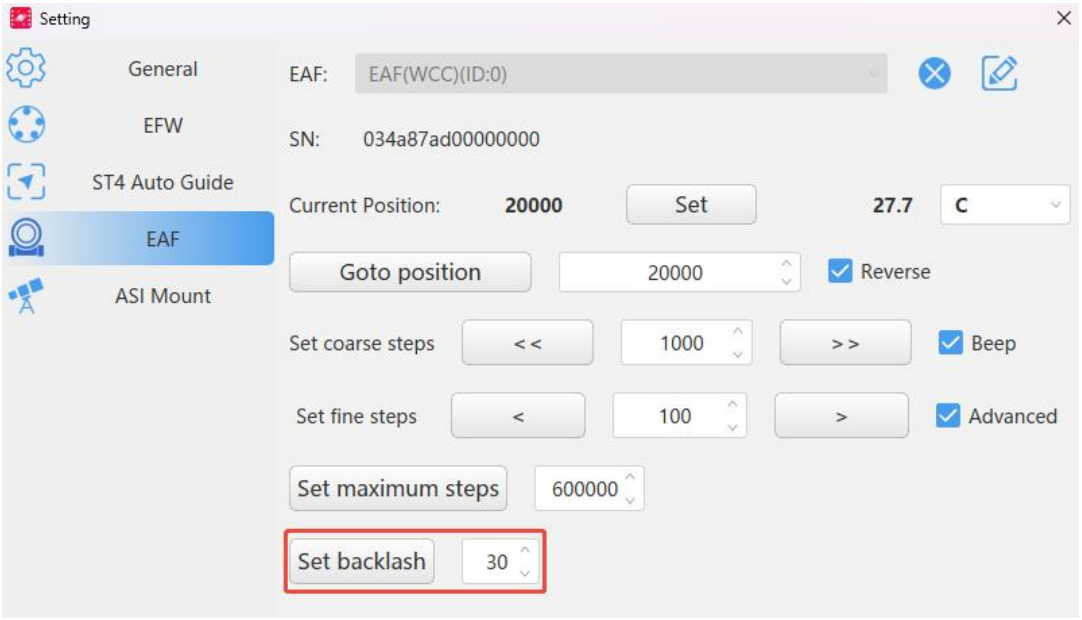


Measure Backlash: Continue clicking the inward fine adjustment button one step at a time while observing the focuser knob. When the focuser knob starts to rotate, it indicates the backlash has been taken up. The number of clicks before the focuser knob rotates multiplied by 10 is the backlash step count.



For example, if you click the inward button three times and the focuser knob starts rotating on the fourth click, then the backlash is 3 × 10 = 30 steps.

Set Backlash Compensation: Input the measured backlash step count into the backlash compensation setting.



For higher precision, you can set the fine step to 5 steps and repeat the above steps.

6.3.1.1MaxIm DL Focusing

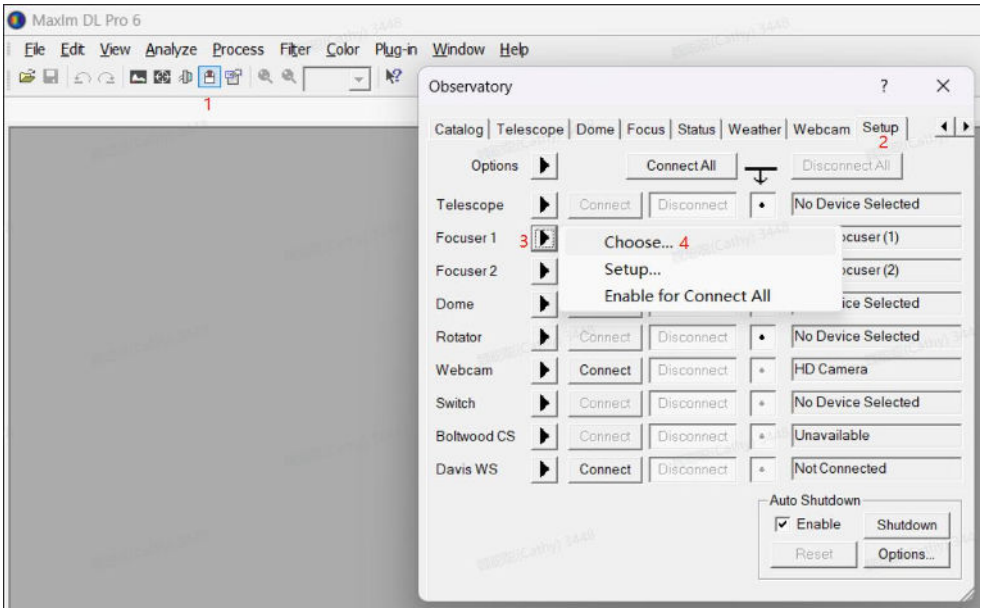
Parameter Settings

1. Open the "Observatory Control" panel.

2. Click "Setup."

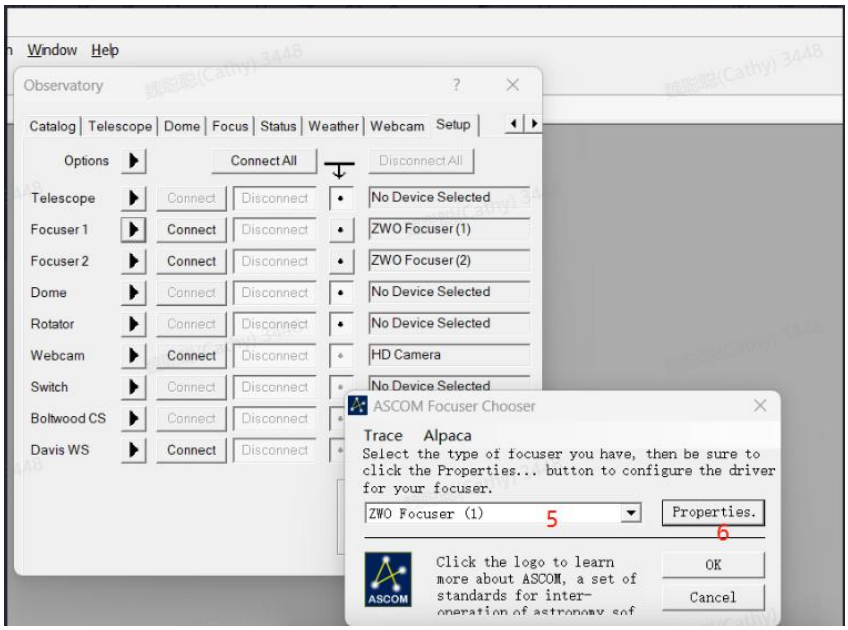
3. Click "Focuser 1" or "Focuser 2."

4. Select "Choose..."



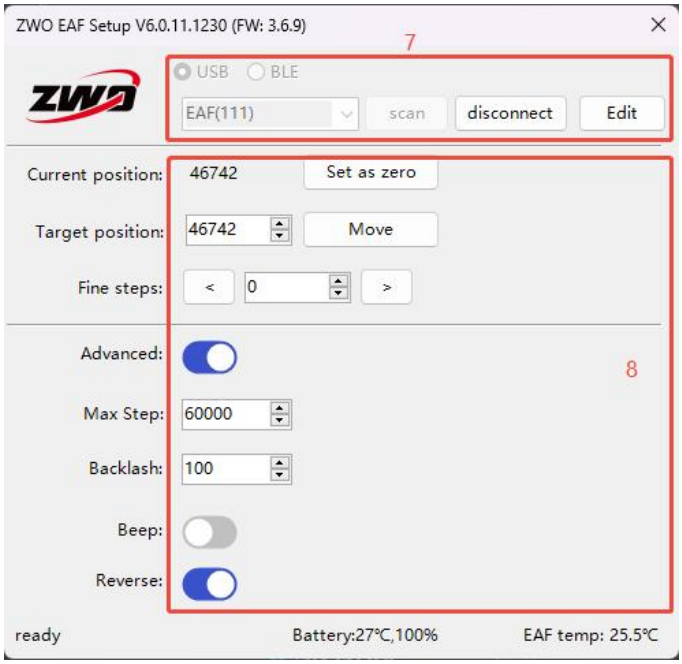
5. Select the "ZWO Focuser" .

6. Click "Properties" to enter the control page.



7. Select the USB or Bluetooth connection method, choose the device, and click "Connect" to establish the link. If using EAF Pro for Bluetooth communication, ensure the PC's Bluetooth is turned on, then check the 'BLE' connection option. The system will automatically scan for the device's Bluetooth ID (e.g., EAF Pro_xxxxxx) and connect to the device.

8. Refer to the "EAF Parameter Settings" chapter for instructions on setting the zero position, fine-tuning steps, and configuring the maximum steps and backlash in the "Advanced" settings.



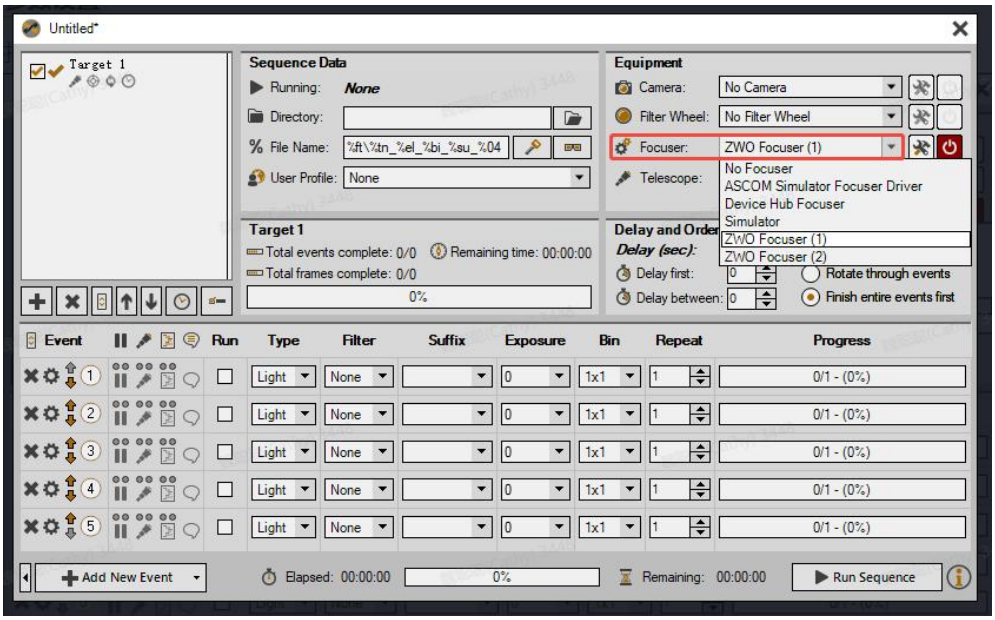
Manual Focusing

After setting the basic parameters, you can manually adjust the telescope's focus by pressing the focus button < >. Continuously observe the telescope's pinpoint stars or imaging conditions to assess the focusing status. During the coarse focusing stage, you can set a larger step size, such as 100 steps. When the telescope's imaging becomes gradually clearer, reduce the step size (e.g., to 10 steps) for fine adjustment, and continuously observe with the naked eye until focusing is completed.

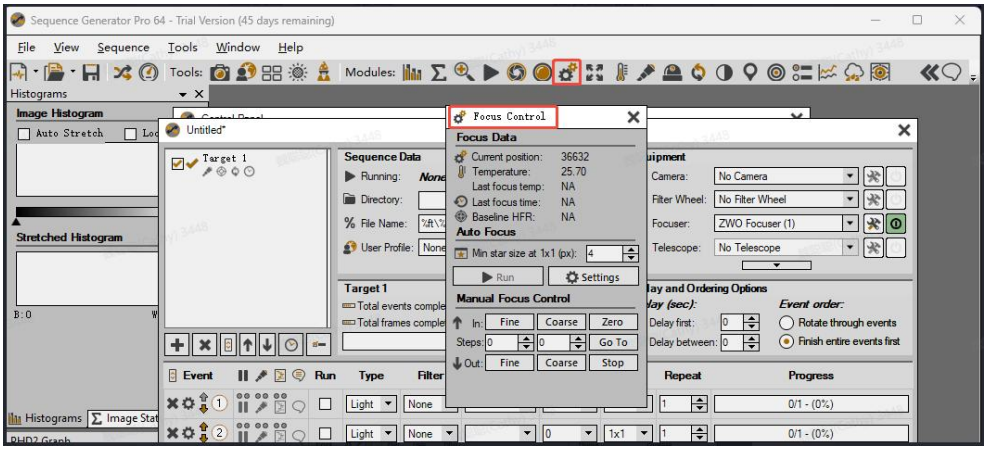
6.3.1.2 SGP Focusing

Parameter Settings

Open the software and navigate to the "Focuser" section. Select "ZWO Focuser" from the list.



Click the settings icon to enter the "Focus Control" panel.



Refer to the "EAF Parameter Settings" section to set the zero position, upper limit, and backlash. Additionally, set the step size according to your preference.

Manual Focusing Area in the "Focus Control" Panel:

"Fine": Fine adjustment, step size "Steps" can be set to 10.

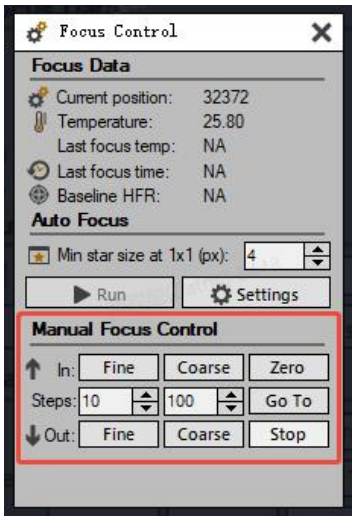
"Coarse": Coarse adjustment, step size "Steps" can be set to 100.

"Zero": Click to return the EAF back to the zero position.

"Go To": Moves the focuser to an absolute position.

"Stop": Stops the focusing.

"In" / "Out": Indicates different focusing directions.



Manual Focusing

After configuring the basic parameters as needed, trigger the “Go To”,“Fine”,or “Coarse” button to drive the EAF and manually adjust the telescope’ s focus. Continuously observe the pinpoint stars or imaging conditions to assess the focusing status.

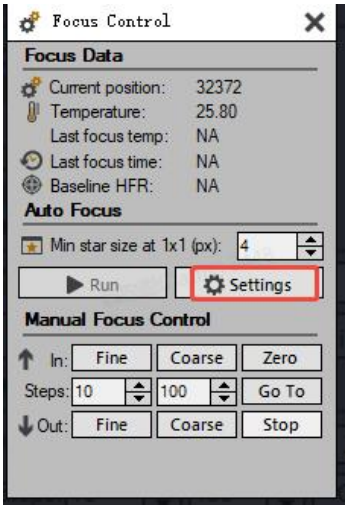
During the coarse focusing stage, you can set a larger step size, such as 100 steps. When the telescope's imaging becomes gradually clearer, reduce the step size (e.g., to 10 steps) for fine adjustment, and continuously observe with the naked eye until focusing is completed.

Autofocusing

The autofocusing and backlash compensation features in SGP are highly effective. When using SGP to compensate for backlash, set the

backlash value in the EAF ASCOM settings to 0 to prevent double compensation, which could slow down the focusing process.

1. Click Setting to enter the autofocus setup.

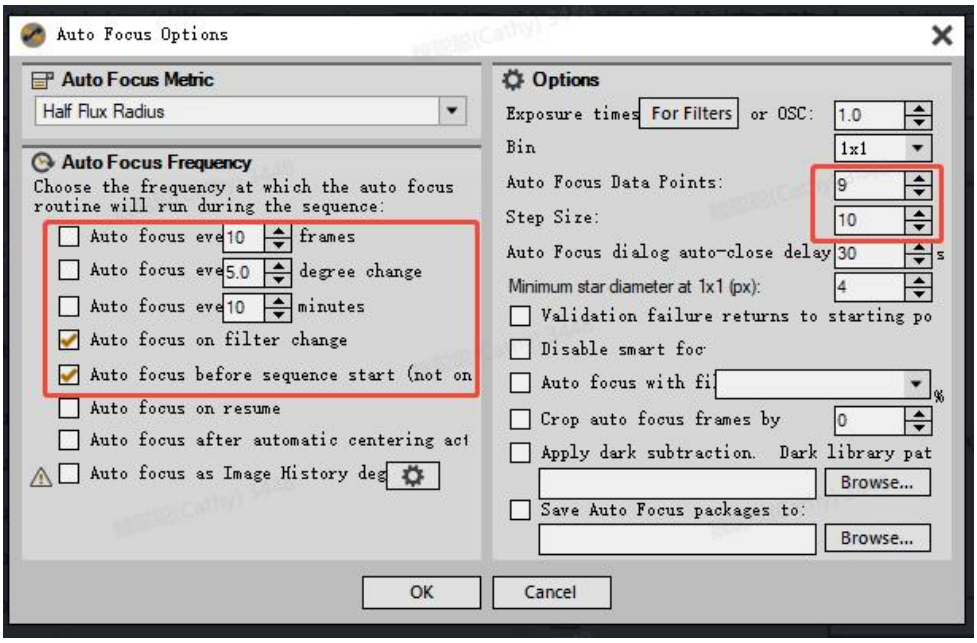


2. Configure Autofocus Parameters

Set autofpcus trigger conditions, such as after capturing a certain number of images, temperature changes, time intervals, filter changes, or before starting a planned imaging session.

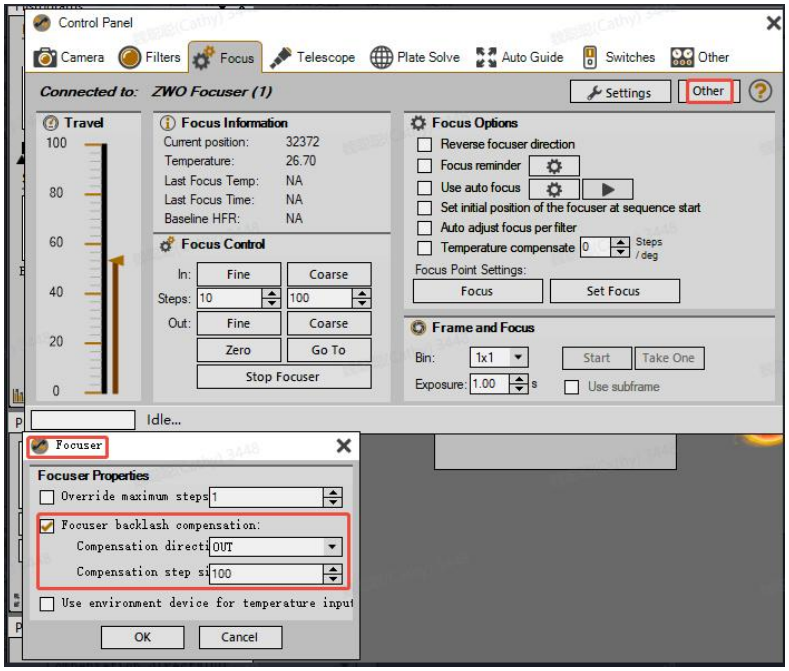
It is recommended to use 9 data points for reference during autofocus.

The autofocus step size is recommended to be between 5 and 20 steps. Adjust this based on the autofocus curve. If the step size is too small, the curve changes too slowly. If the step size is too large, the curve becomes too steep. Both scenarios make it difficult to determine the optimal focus point.



3. Configure Software Backlash Compensation

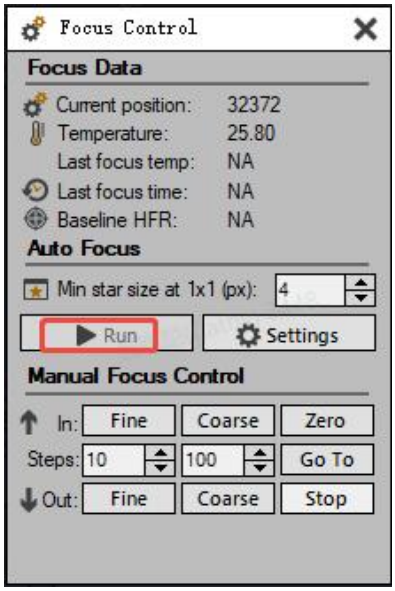
The compensation direction is typically set to OUT, meaning the compensation is applied when the focuser moves outward. The compensation step size should be slightly larger than the inherent backlash of the motor, with a recommended setting of 100 steps.



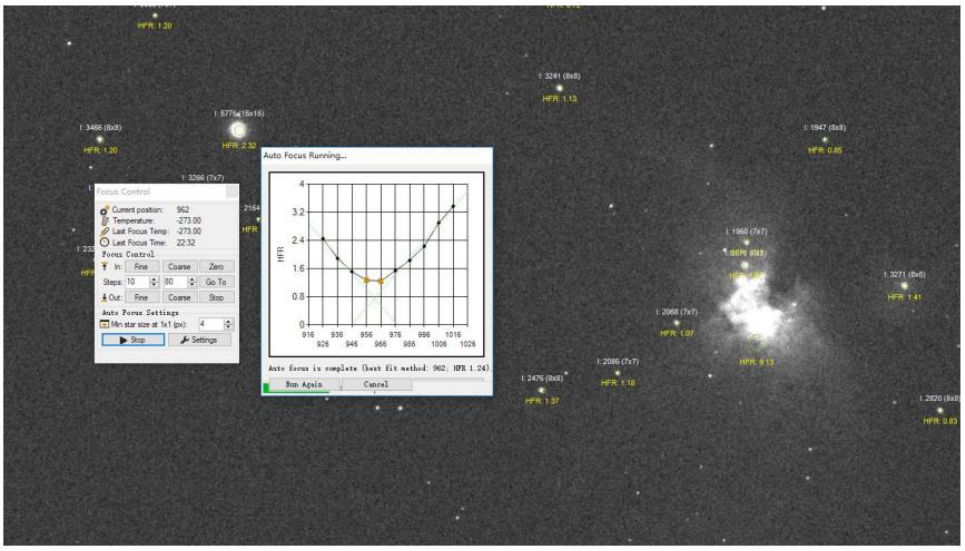
4.Start Autofocusing

Point the telescope at the sky. For the first use, perform a rough manual focus to ensure enough stars are visible.

Then, click the ‘Run’ button to initiate the autofocus process.

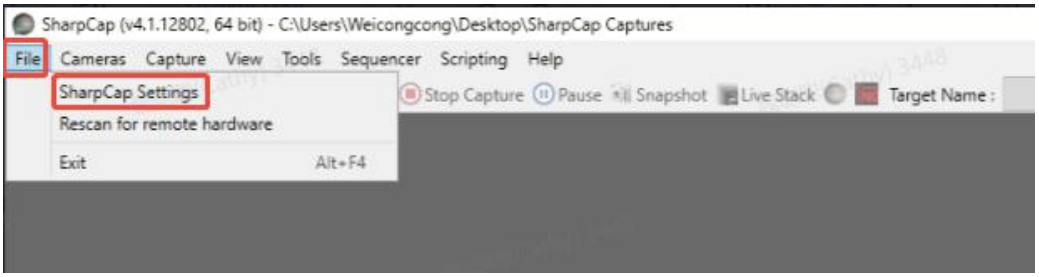


SGP will automatically capture images and adjust the focus while plotting a V-curve. Once the focusing curve is completed, SGP will drive the EAF to the calculated optimal focus position. Autofocus is then complete.

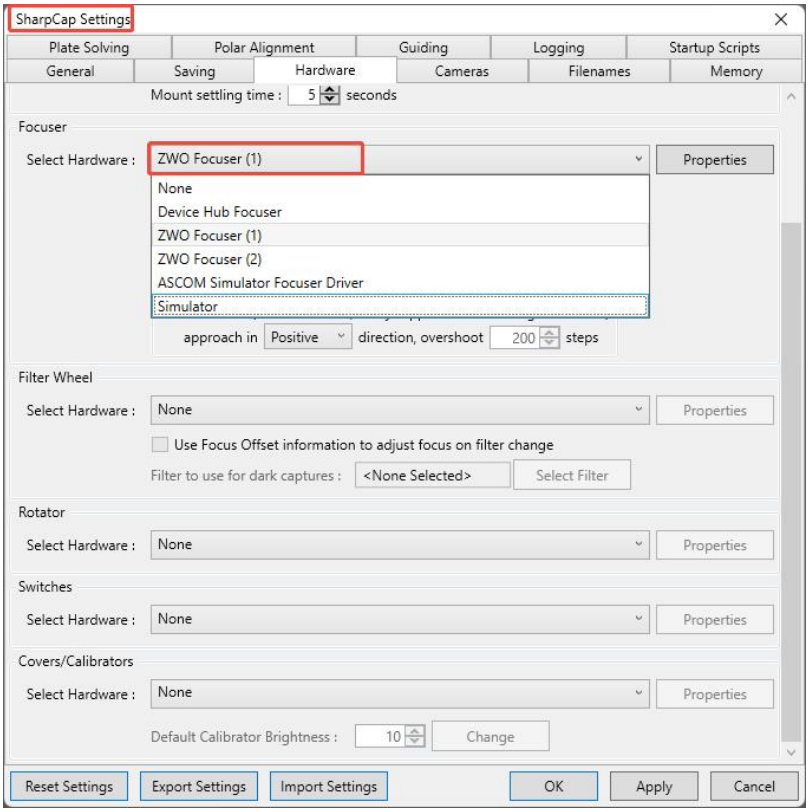


6.3.1.3 SharpCap Focusing

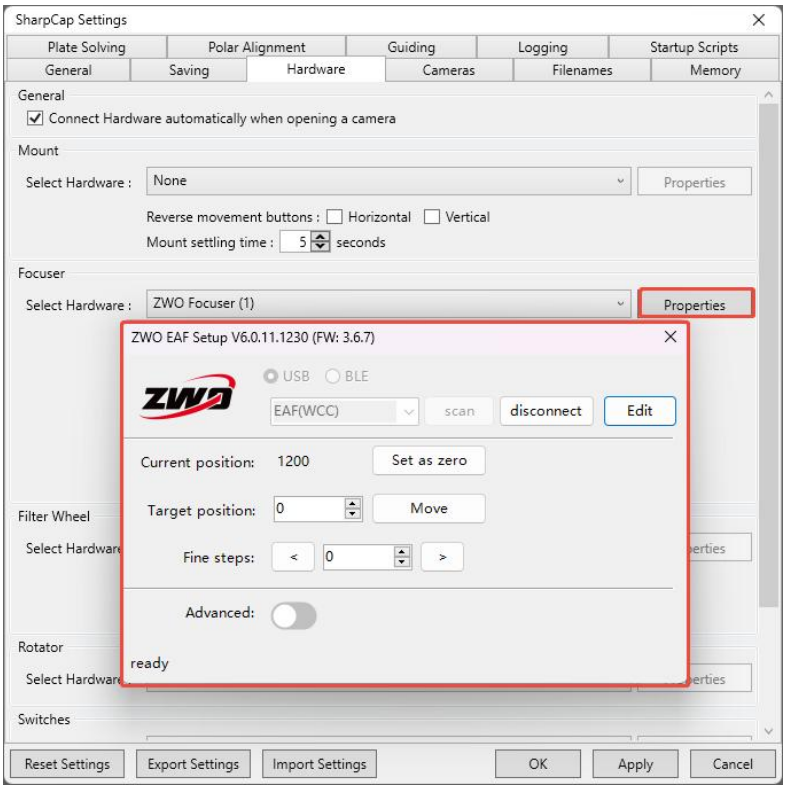
Open the software and navigate to the “File” menu. Select “SharpCap Settings”.



In the “SharpCap Settings” page, select the “ZWO Focuser” driver.

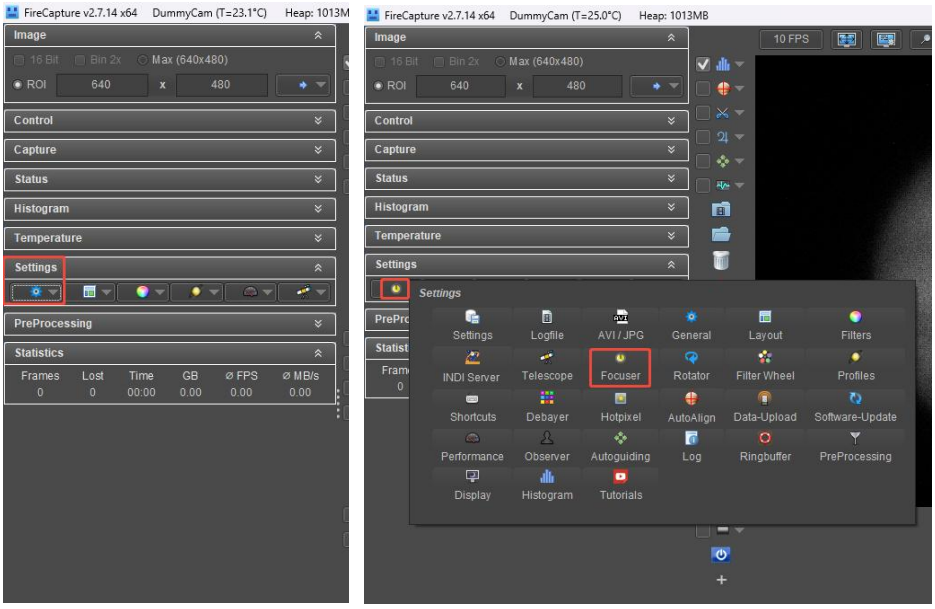


Click the “Properties” button to open the “EAF Setup” window automatically. Here, you can configure basic parameters and perform manual focusing operations.

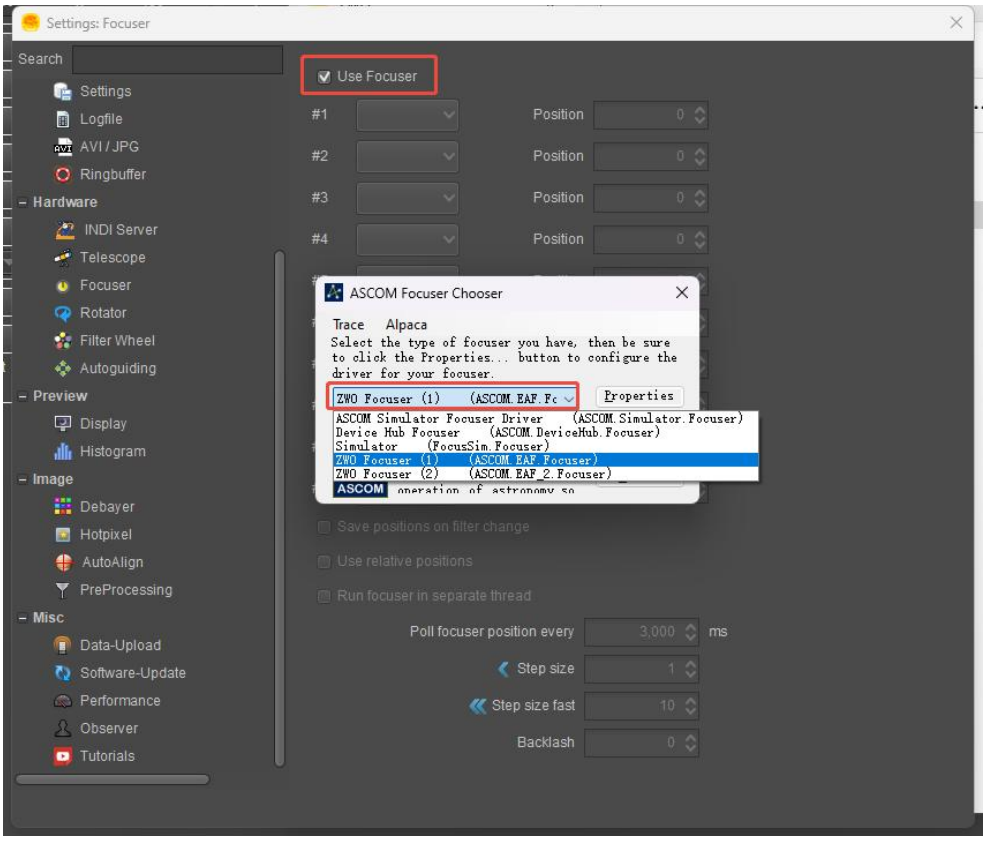


6.3.1.4 FireCapture Focusing

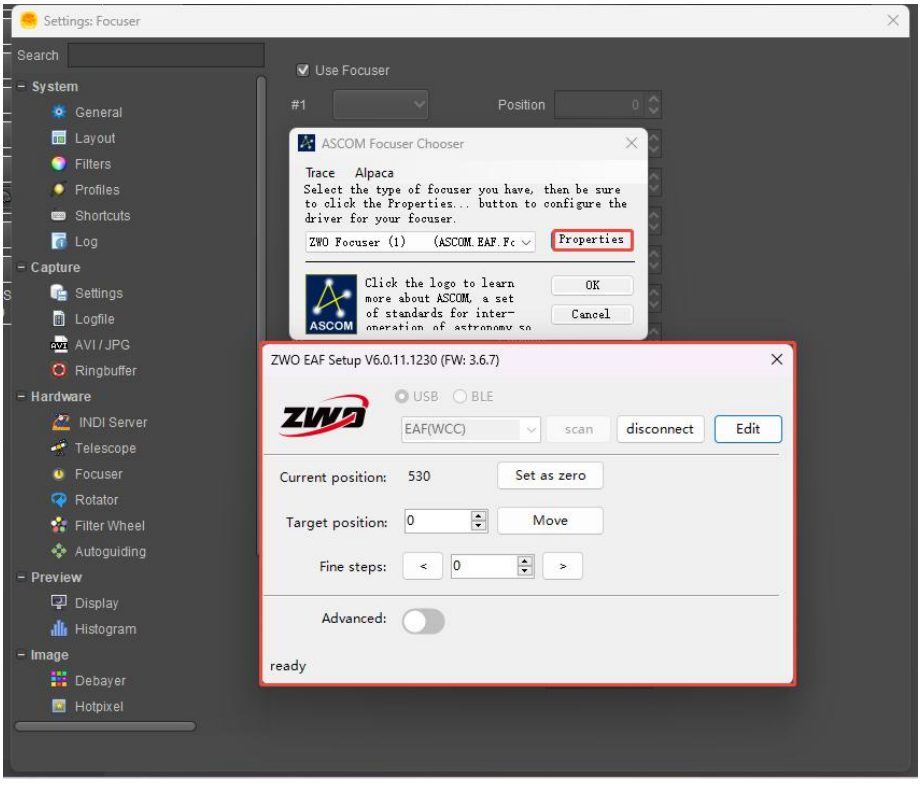
Open the software, in the “Settings” panel, click the “Focuser” icon.



Enter the “Focuser” settings page, check “Use Focuser”, in the ASCOM panel, select the “ZWO Focuser” driver.

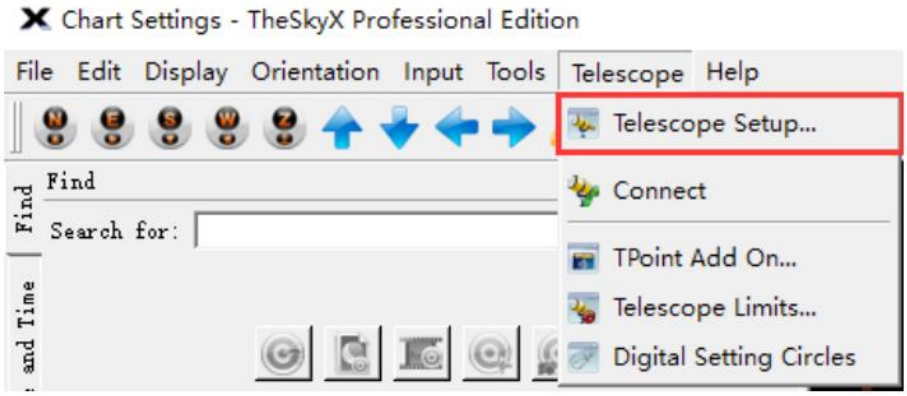


Click “Properties” to open the “ZWO EAF Setup” page, where you can configure the EAF parameters and perform manual focusing operations.

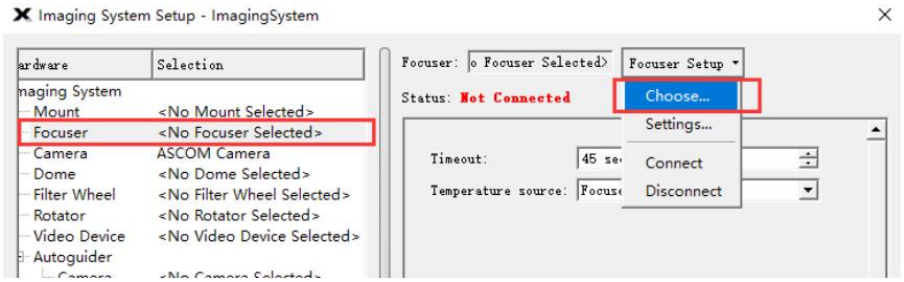


6.3.1.5 The SkyX Focusing

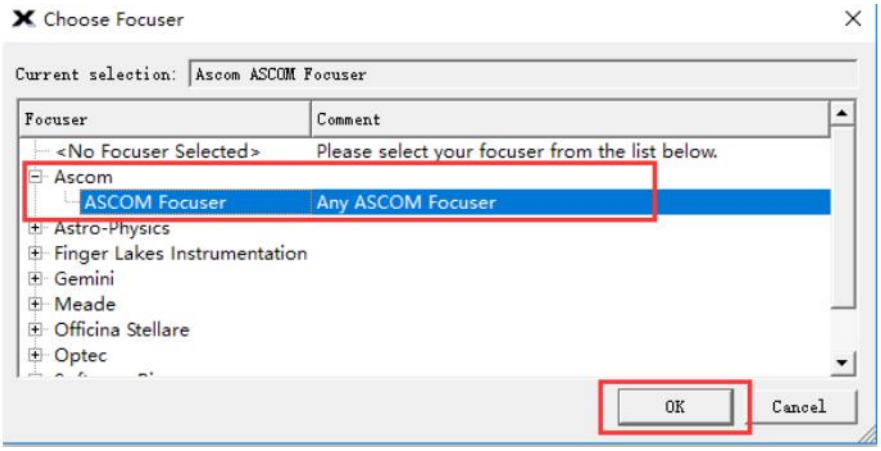
Open “The Sky” software, in the menu bar, click “Telescope” and select “Telescope Setup”.



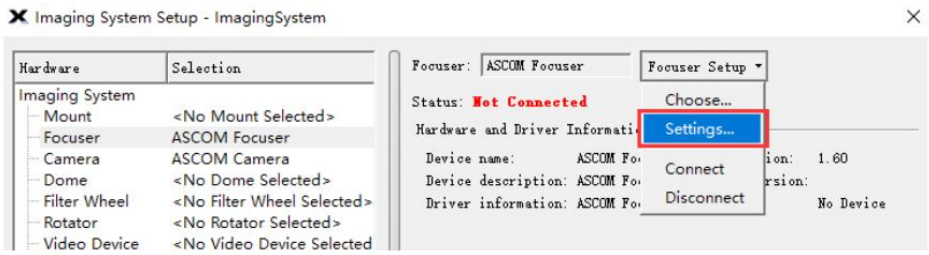
In the “Focuser Setup” window, select “Choose”.



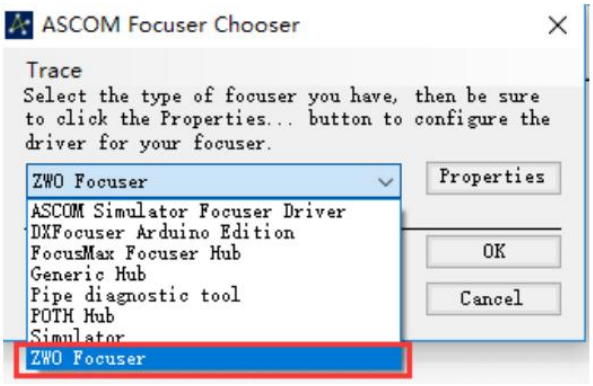
Select “ASCOM Focuser”.



In the “Focuser Setup” window, select “Settings”.

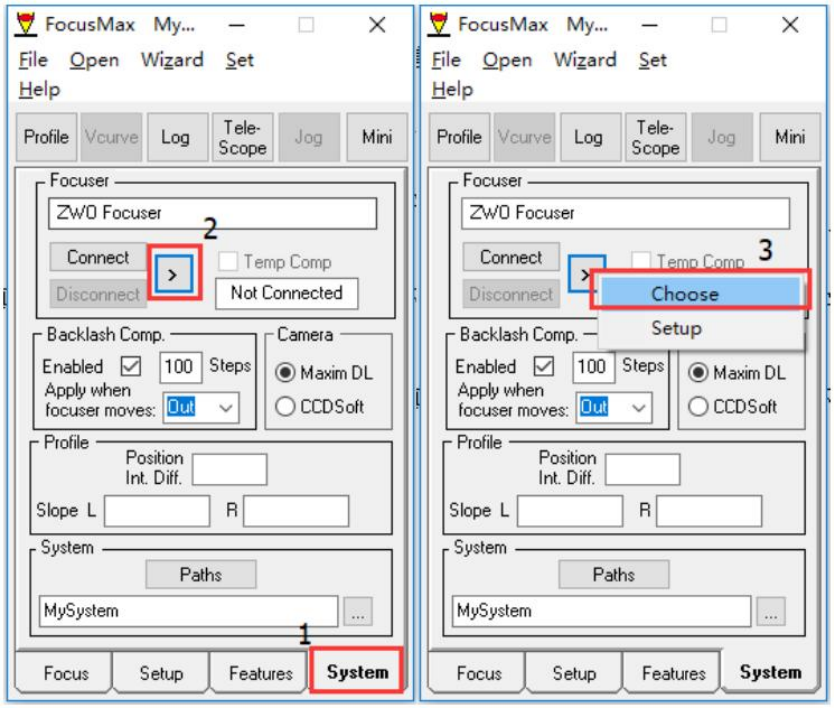


Select “ZWO Focuser” to begin the focusing.

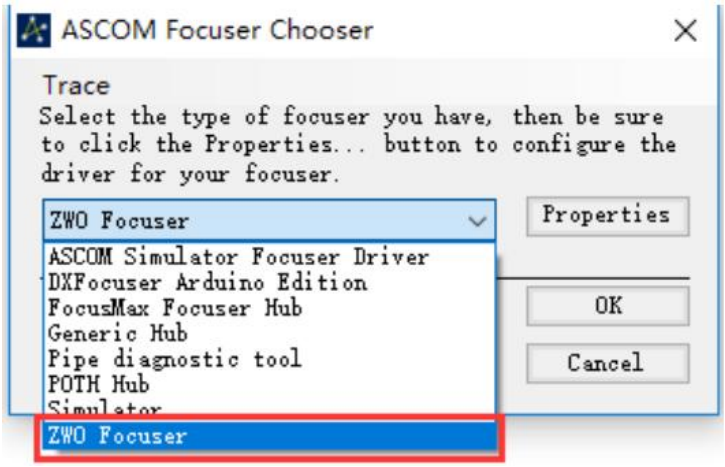


6.3.1.6 FocusMax Autofocusing

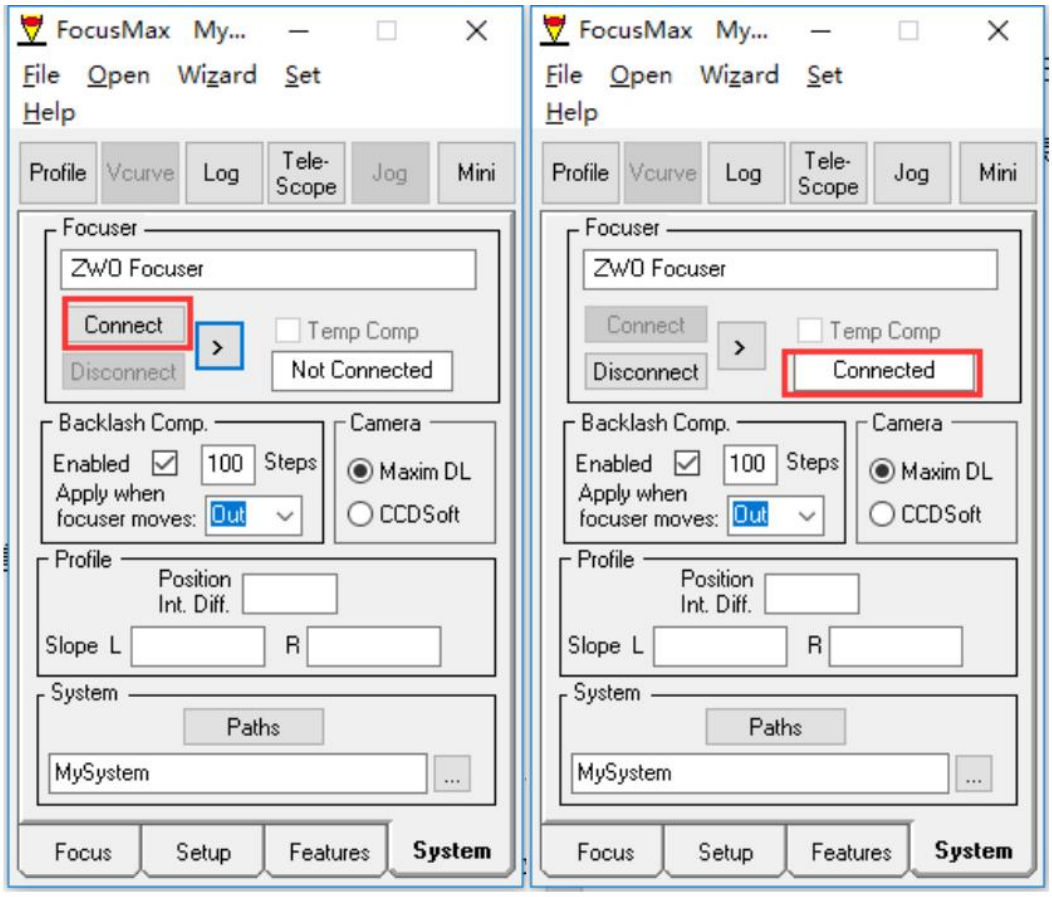
Set up the camera. Open the software, click System to enter the settings interface. Click the button 2 as shown below, click Choose to enter the EAF settings menu.



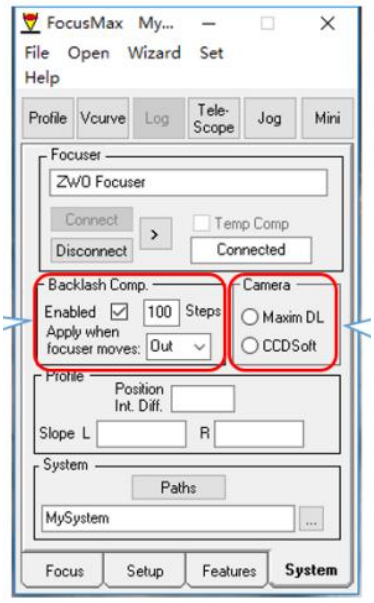
Select the ZWO Focuser in the dialog and click OK.



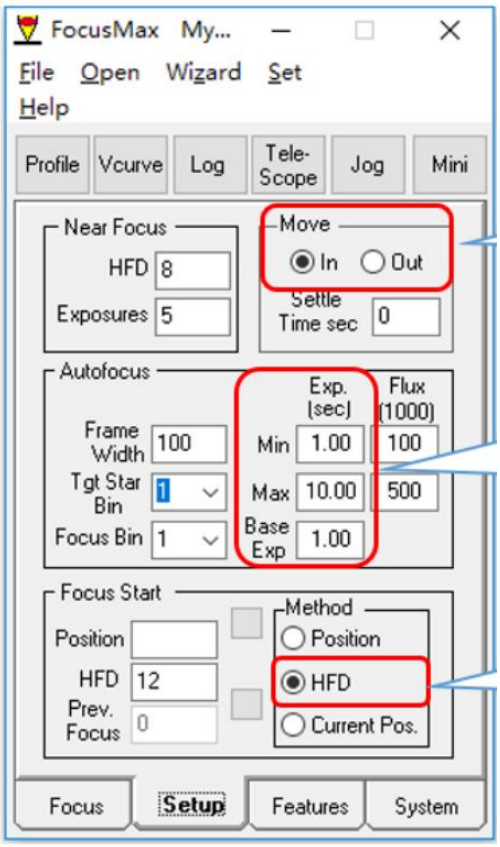
Connect the EAF. Click the Connect button and wait for the connection to be made.



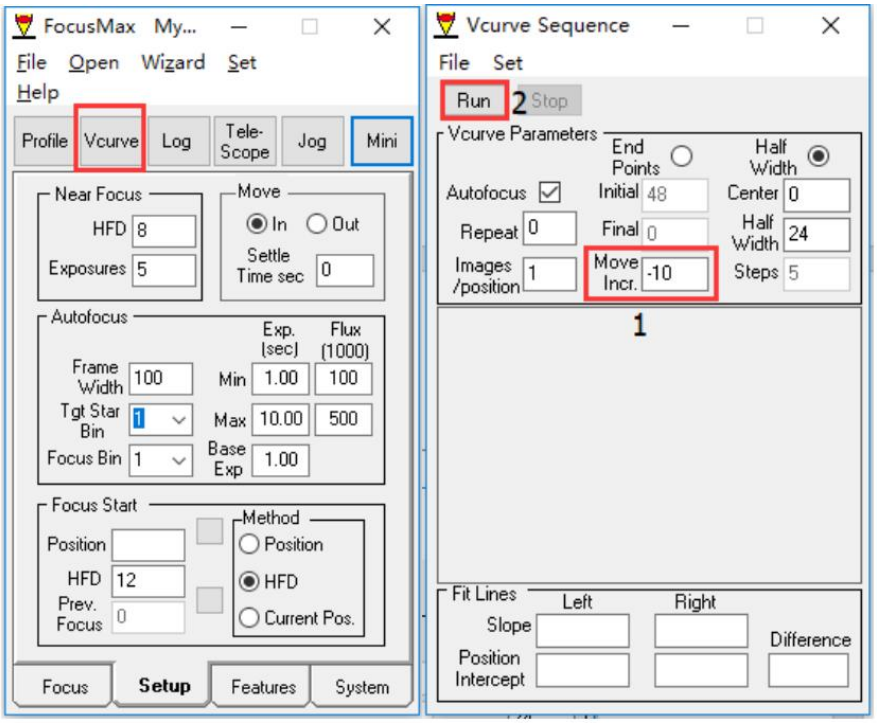
Set the Backlash Compensation and Camera Control.



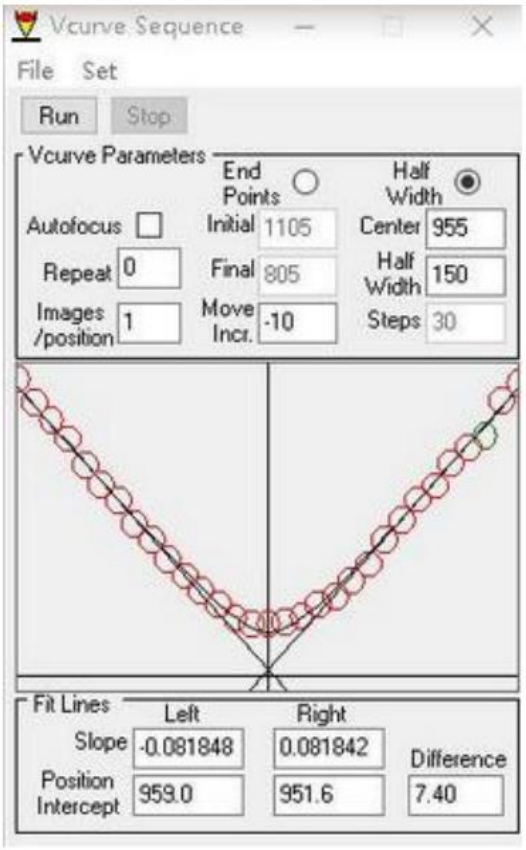
Set the Exposure and Focus Mode.



Open the Vcurve dialog box and set the number of steps per move (generally set to -10). Run the autofocus routine.



After the V curve is drawn the focuser will be driven to the optimal focus position.

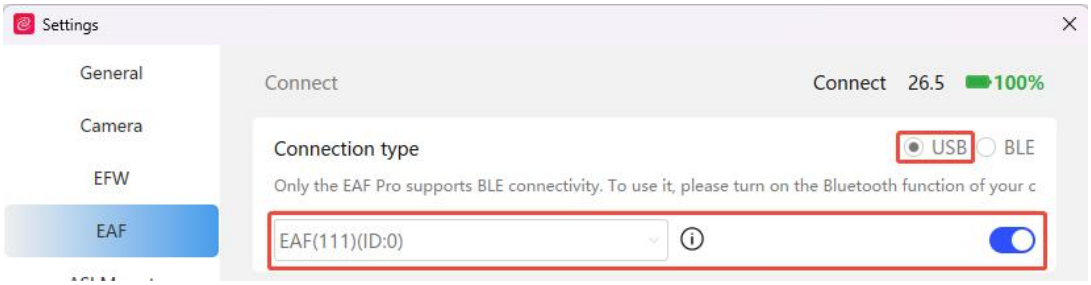


6.3.2 ASIStudio Focusing

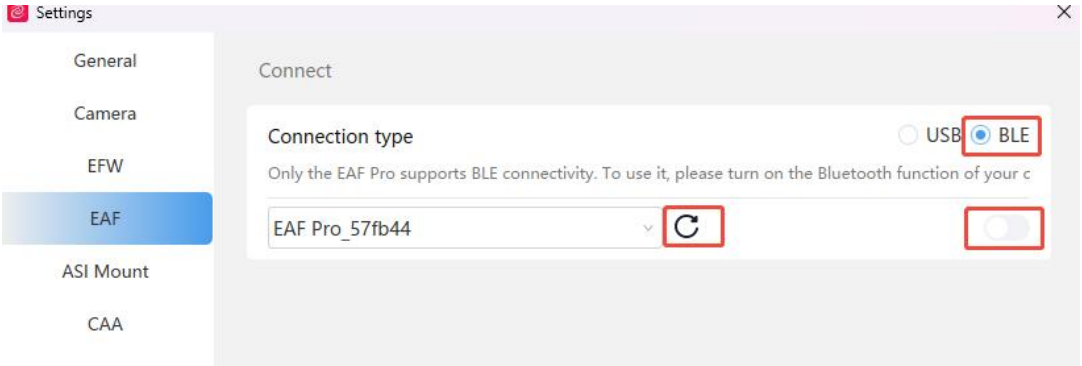
Open the “ASIImg” software from ASIStudio, then click the EAF icon in ASIImg to enter the EAF operation interface.

ASIStudio supports two communication methods: USB 2.0 and Bluetooth.

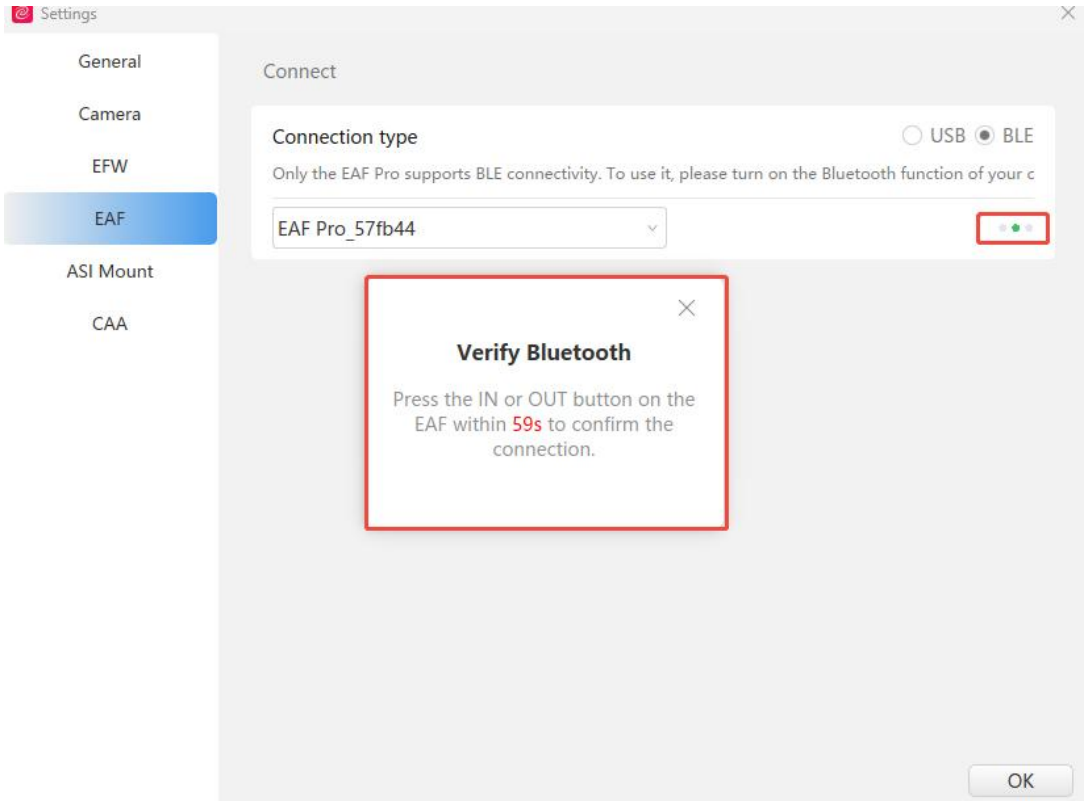
USB 2.0 Communication: In the “ASIStudio” page, select the “USB” communication method, choose the EAF model you wish to connect to from the device list, and then toggle the connection switch.



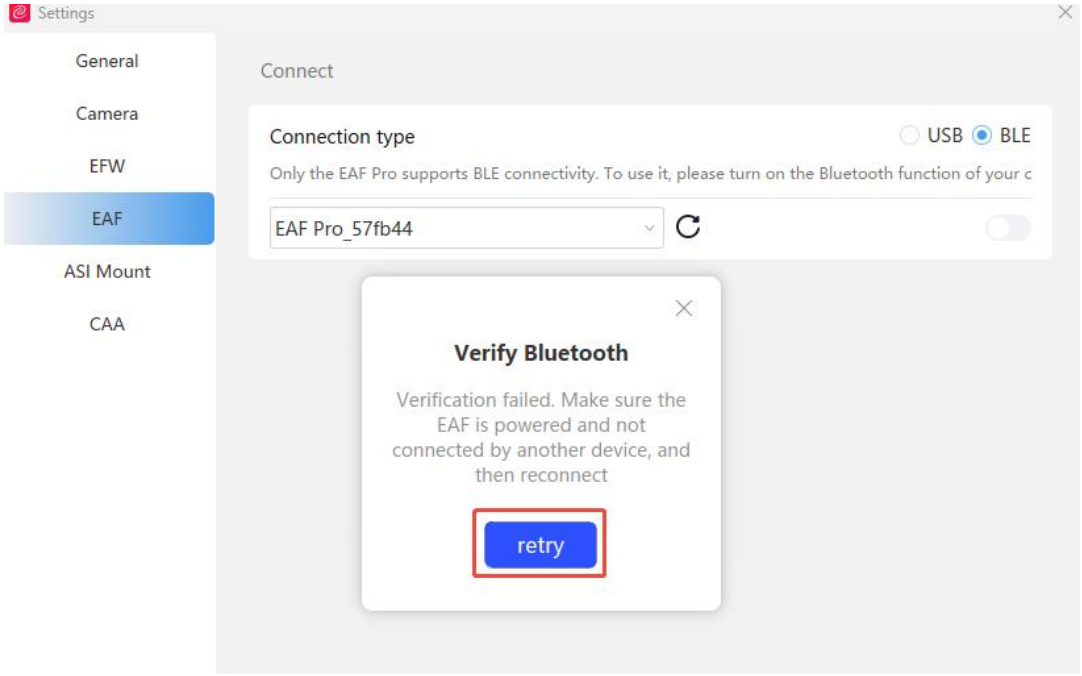
Bluetooth Communication: EAF Pro also supports wireless Bluetooth communication (not supported by EAF). First, enable Bluetooth on the PC, then select “BLE” communication method on the “ASIStudio”, scan for the Bluetooth device ID, and toggle the connection switch.



Follow the instructions that pop up on the screen and press the IN or OUT button on the EAF Pro within 60 seconds to pair via Bluetooth. (Once the pairing is successful, the beeping sound from the device will stop.) If Bluetooth was previously connected, re-pairing is not required.

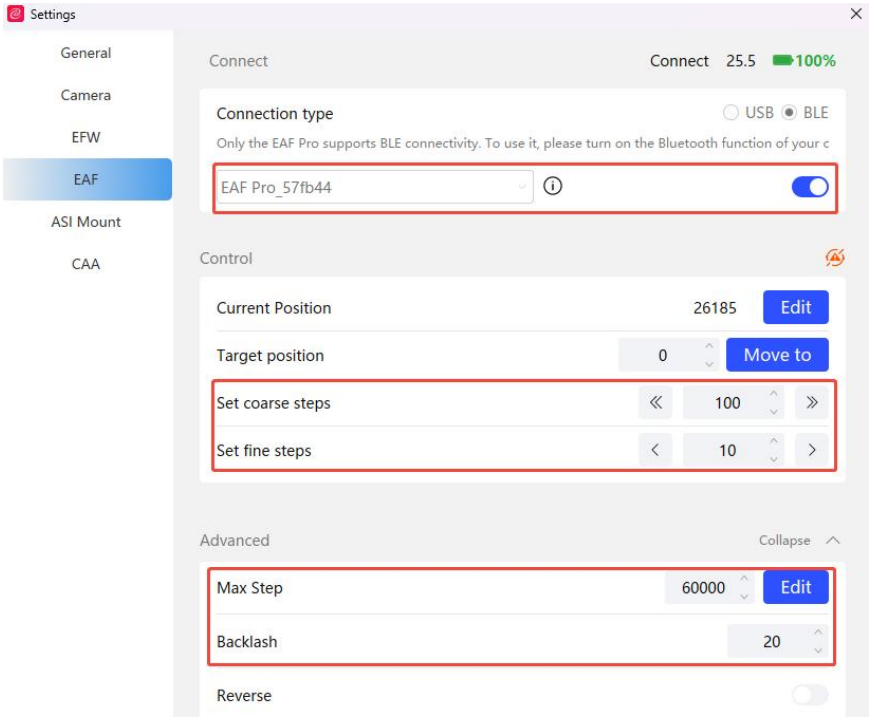


If the Bluetooth pairing is not completed within 60 seconds, click “retry” to initiate the pairing request again.



The following page indicates that the Bluetooth connection is successful. Once the coarse step size, fine step size, maximum steps,

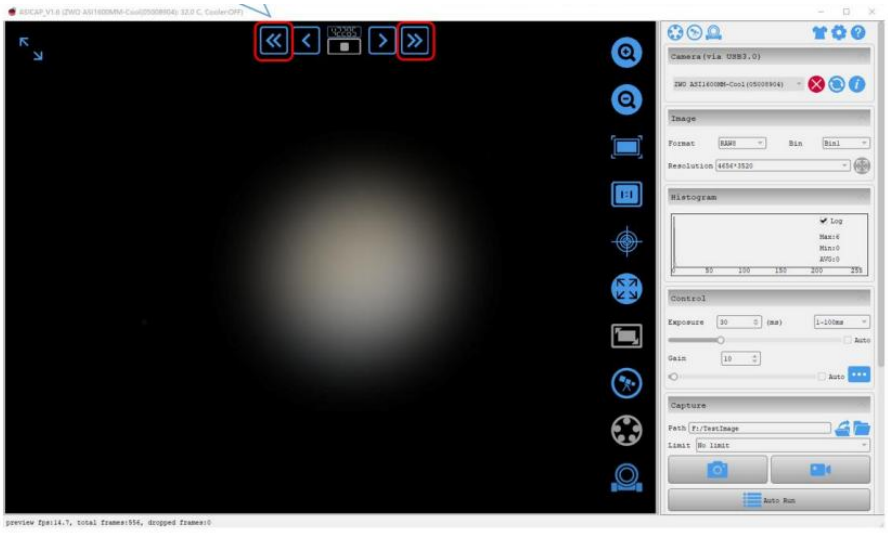
backlash, and other parameters are set, you can proceed with the focusing operation.



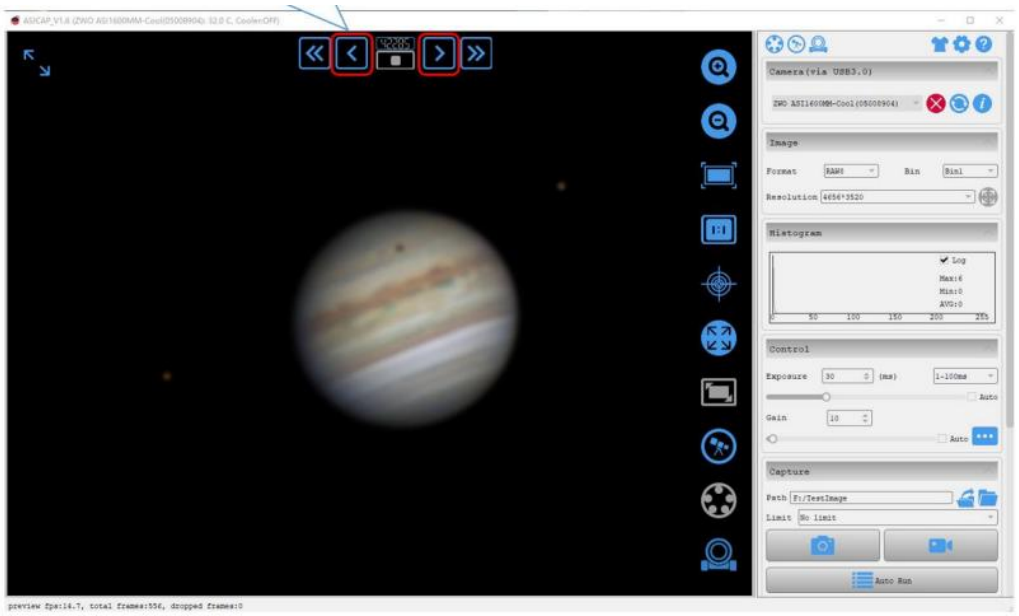
Manual Focusing

Taking ASICap as an example.

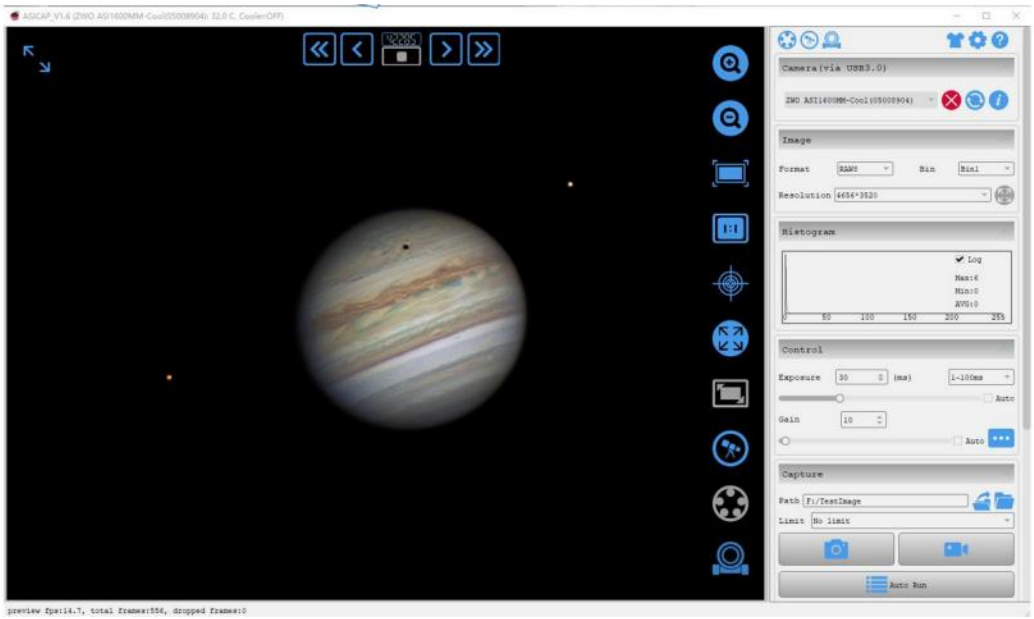
Perform a coarse adjustment first to quickly bring the image into focus.



Proceed with fine-tuning to achieve precise focus.

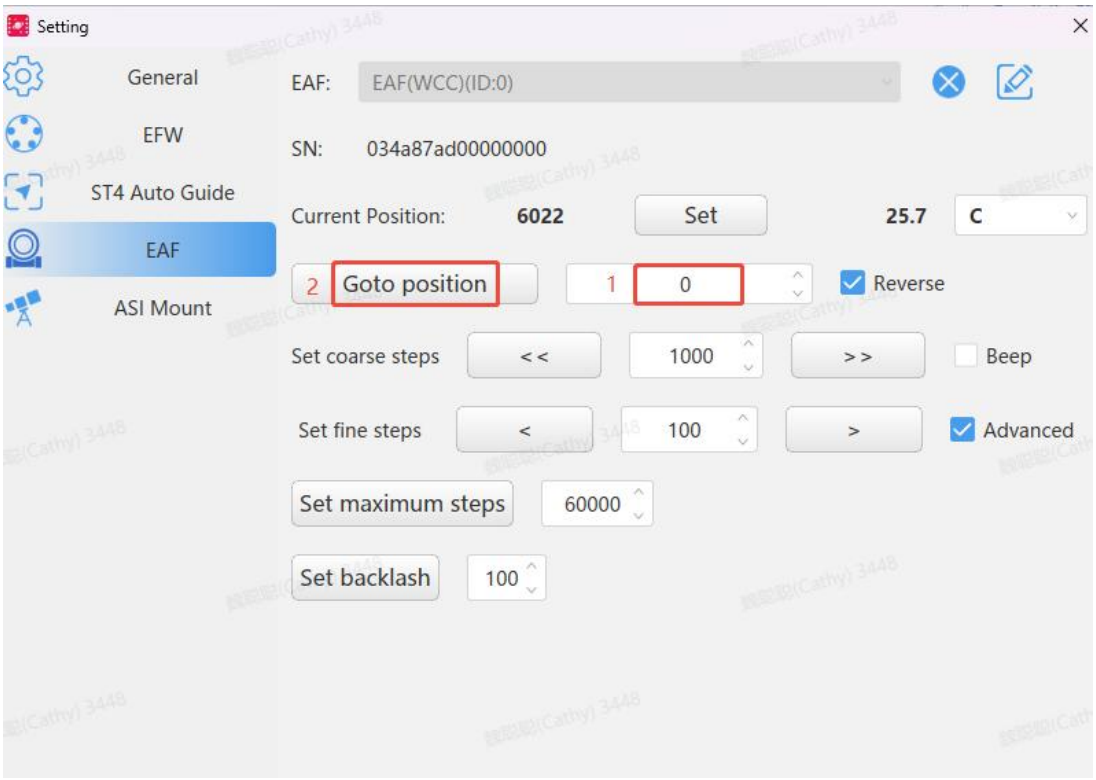


When the image shows clear, well-defined details, it indicates that the focus is successful.



After the capture is complete, return the focuser to its zero position.

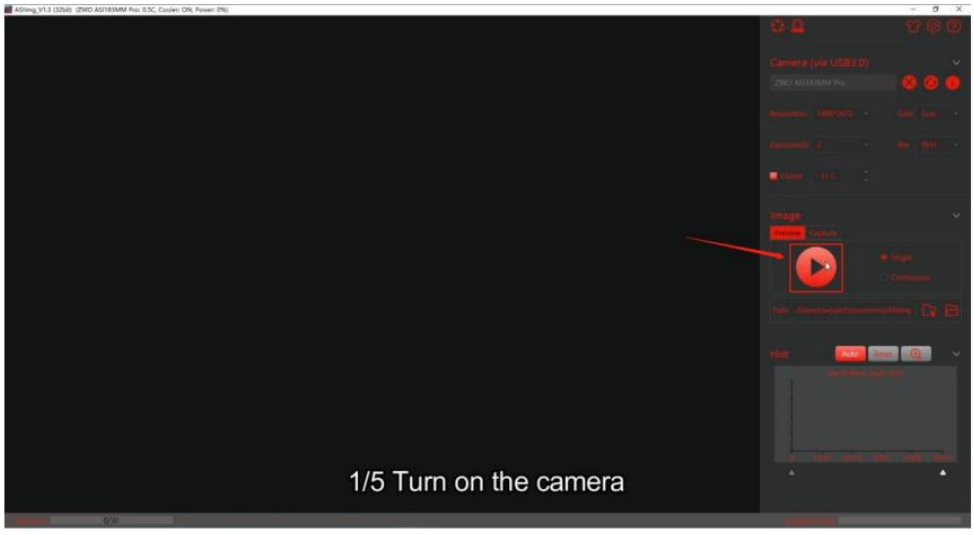
Enter the value 0 in the Marker 1, then click “Goto Position” at Marker 2. The EAF will return to the preset zero position and be ready for storage.



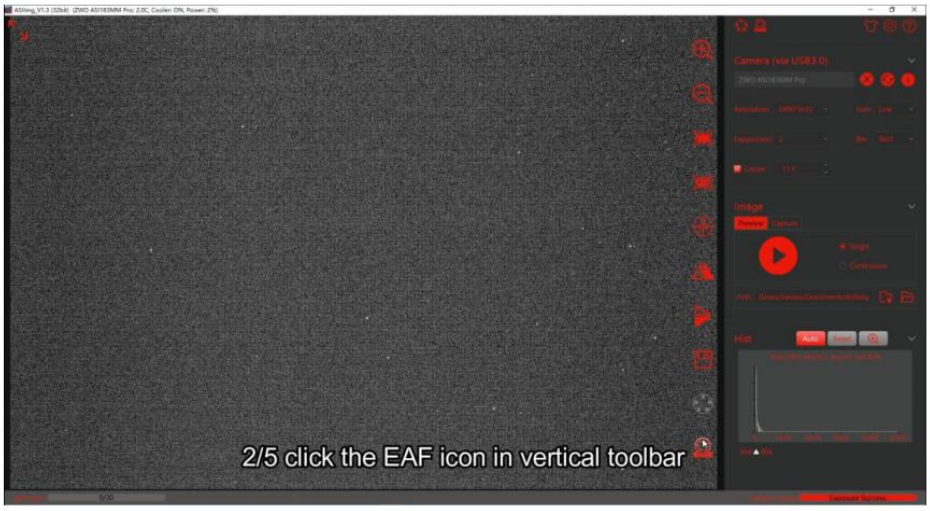
Autofocusing

Taking ASIImg as an example.

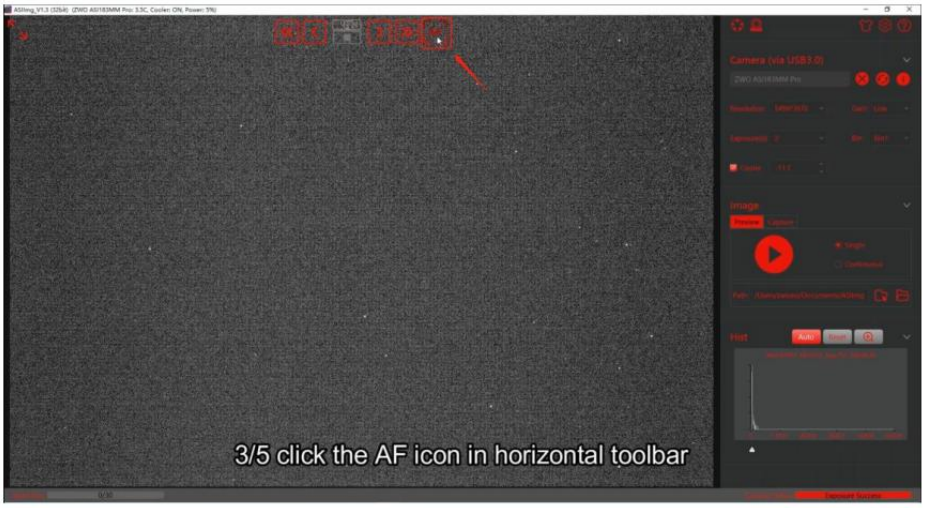
Open the camera.



Open the EAF Quick Control Bar.



Open the Autofocus Panel.



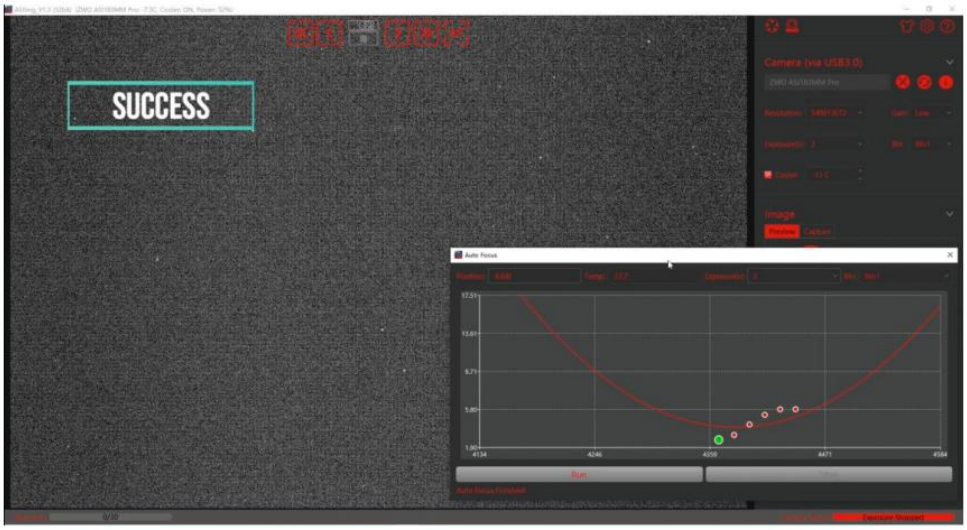
Set the appropriate exposure and binning mode.



Click “Run” to begin the automatic focusing process.



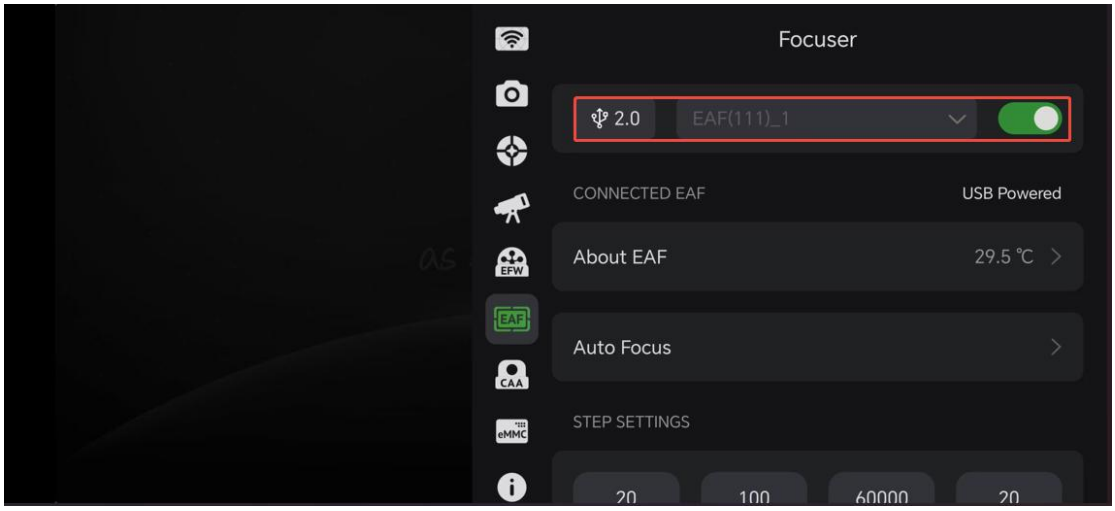
The image after successful focusing:



6.3.3 ASIAIR Focusing

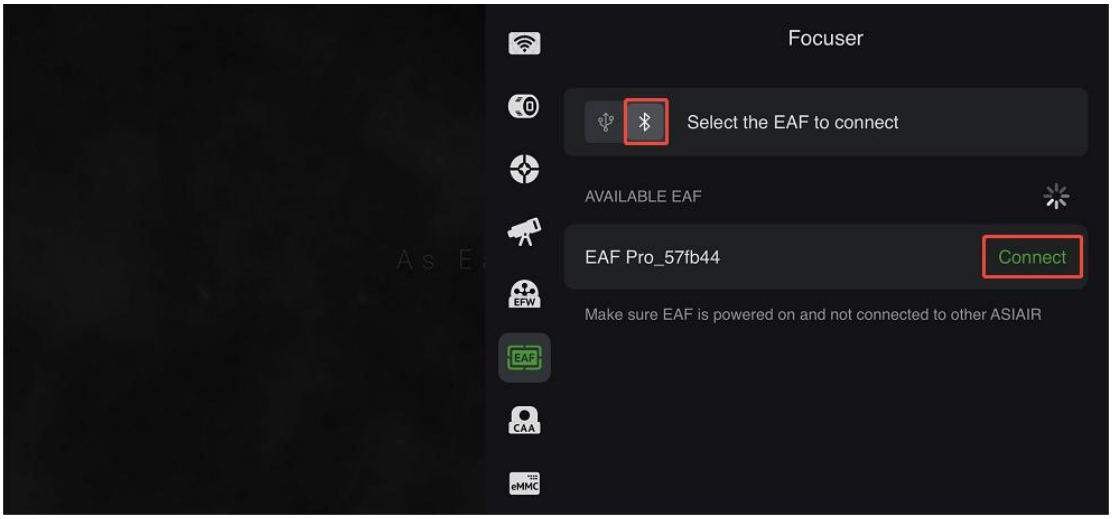
In the ASIAIR app, select the “EAF” option to enter the focuser control page. The App supports both USB 2.0 and Bluetooth communication.

USB 2.0 Communication: Select the USB communication method, choose the EAF model, and turn on the switch.



Bluetooth Communication: EAF Pro supports not only USB 2.0 communication but also Bluetooth communication.

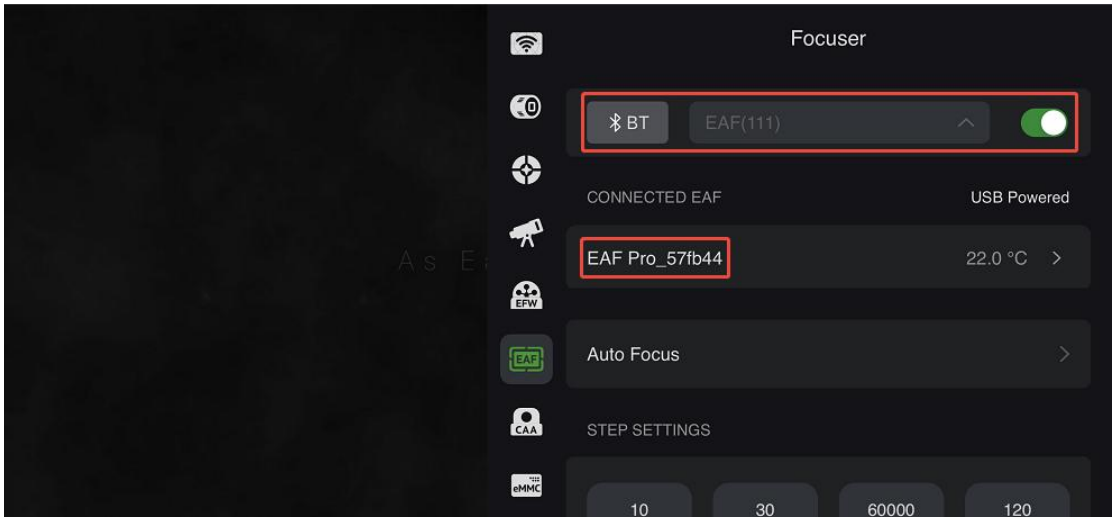
When selecting Bluetooth communication, the App will automatically scan for the device's Bluetooth ID, click “Connect” to pair and start using it.



According to the information displayed on the screen, click the IN or OUT button on the EAF Pro body within 60 seconds to pair via Bluetooth (the beeping sound from the device will stop). If Bluetooth has been paired previously, it's no need to repeat the pairing process.



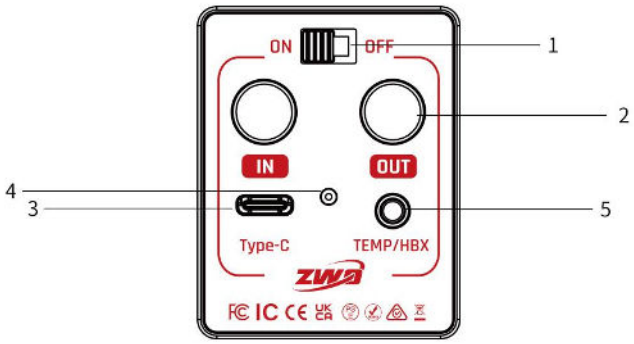
The following page indicates that the Bluetooth connection is successful, and you can now proceed with parameter settings and focusing operations.



ASIAIR currently supports both manual and automatic focusing. For detailed instructions, please refer to the link: https://www.yuque.com/zwopkb/asiair/focus

6.3.4 Body Button Focusing

The EAF Pro comes with built-in focus buttons, allowing for manual focusing.



1.Ensure the device has stable power supply and normal communication.

2.Using ZWO's self-developed PC software ASIStudio or third-party software on the ASCOM platform, open the camera's exposure view to observe the current image clarity and perform the focusing operation.

3.Refer to the 'EAF Parameter Settings' section to configure the basic parameters.

4.Click the IN or OUT focus buttons, and you will see the clarity of the camera's image change until the focus is complete.

Note: When storing the equipment after shooting, the EAF Pro can be switched to the 'ON' position. In this case, the device is powered by its built-in battery, allowing the telescope focuser to be retracted without the need for wired power supply.

6.3.5 Hand Controller Focusing

Similar to the body button focusing method, you can adjust the telescope’s focus using the ZWO self-developed hand controller (sold separately).

7 After-Sales Service

For software upgrades, please visit our official website and download the update directly: "Homepage —— Software".

https://www/zwoastro.com/

For repairs and other Services, please contact us:

Chinese Users: Follow the ZWO Official WeChat account and send messages to our customer service team.

Overseas Users: Visit the https://support.zwoastro.com/ page and submit a service ticket.

Email: info@zwoptical.com

Phone: 0512-65923102

1.For products returned or replaced under warranty, customers are responsible for the shipping costs to return the product. When returning the product, you must include a note detailing the actual cause of the issue and provide relevant proof, such as photos or videos. If ZWO confirms in writing that a replacement is necessary, the user must return the product with all accessories, manuals, and packaging to the address specified by ZWO. By returning the product, you agree to pay for any non-warranty repair fees incurred during the process. The repaired or replaced product will be sent back after payment.

2.For products requiring return for after-sales service, ZWO will provide an RMA (Return Merchandise Authorization) Code for reference. ZWO will not accept any returns without prior written confirmation and a valid RMA code.

3.If your product was purchased through a ZWO authorized dealer, please contact the dealer directly for after-sales support.

8 Warranty Policy

1.ZWO offers a 2-year free warranty for products purchased directly from the company, starting from the date of receipt. (1-year warranty for the battery).

2.If the user encounters a Dead-on-Arrival (DOA) issue and contacts ZWO within the specified time frame, providing proof of purchase and related documentation, ZWO will arrange for a pickup service, and depending on the situation, offer the following services: replacement (or partial replacement), repair, or refund (or partial refund).

1）Product Quality Issues: If a quality issue is identified within 30 days of receipt and confirmed by ZWO's Customer Service Center, ZWO will provide free replacement.

2）Shipping Issues: If the product packaging shows clear signs of water damage, severe compression, or deformation upon receipt, and the user provides packaging photos and proof of receipt within 3 days, ZWO will verify and offer refund or replacement for items shipped directly by ZWO or its authorized distributor. If the shipment is handled directly by the dealer, the dealer will be responsible for after-sales support.

3.The following circumstances are not covered under the warranty, but ZWO can offer repair services:

1）The product is out of warranty.

2）The product has liquid ingress, moisture damage, or corrosion.

3）Damage caused by external forces, such as scratches, deformed casing, or broken Type-C ports.

4）Unauthorized disassembly, third-party repairs, modification, firmware flashing, or installation of incorrect firmware.

5）Alteration of the system or removal/modification of warranty seals.

6）Improper installation or use contrary to the product manual.

7）Damage due to force majeure events such as floods, fires, earthquakes, lightning, or severe impact.

8）User errors during operation or usage that result in damage.

9）Lack of valid proof of purchase or warranty certificate.

10）The product is a second-hand item.

Accessories or other components with quality issues are not grounds for returning or replacing the main device. Users can request replacement of the affected accessory separately.

Note: Any modifications to this manual will not be notified separately.

FCC Requirement

Any changes or modifications not expressly approved by the party responsible for compliance could void the user’ s authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

– Consult the dealer or an experienced radio/TV technician for help.

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment. This device should be installed and operated with minimum distance 20cm between the radiator & your body.

IC Requirement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada’s licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference.

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux

CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1) L'appareil ne doit pas produire de brouillage;

2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet émetteur ne doit pas être colocalisé ou fonctionner en conjonction avec une autre antenne ou un autre émetteur.

The device meets the exemption from the routine evaluation limits in section 2.5 of RSS-102 and compliance with RSS-102 RF exposure, users can obtain Canadian information on RF exposure and compliance.

Le dispositif rencontre l'exemption des limites courantes d'évaluation dans la section 2.5 de RSS 102 etla conformité à l'exposition de RSS-102 rf, utilisateurs peut obtenir l'information canadienne surl'exposition et la conformité de rf.

This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Cet émetteur ne doit pas être Co-placé ou ne fonctionnant en même temps qu'aucune autre antenne ouémetteur. Cet équipement devrait être installé et actionné avec une distance minimum de 20 centimètres entre le radiateur et votre corps.