CAA Manual



Version 0.2

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1. Introduction

Congratulations and thank you for purchasing our CAA! The Camera Angle Adjuster (CAA) is ZWO’s motorized rotator product. This manual introduces the ZWO CAA-M54. Please read it thoroughly. If you have any questions, feel free to contact us online.

2. Product Description

The CAA features ZWO's signature red exterior, an all-metal body, and a matte finish. It utilizes an optimized motor drive design, supports USB power and communication, and is compatible with the EAF HC hand controller.

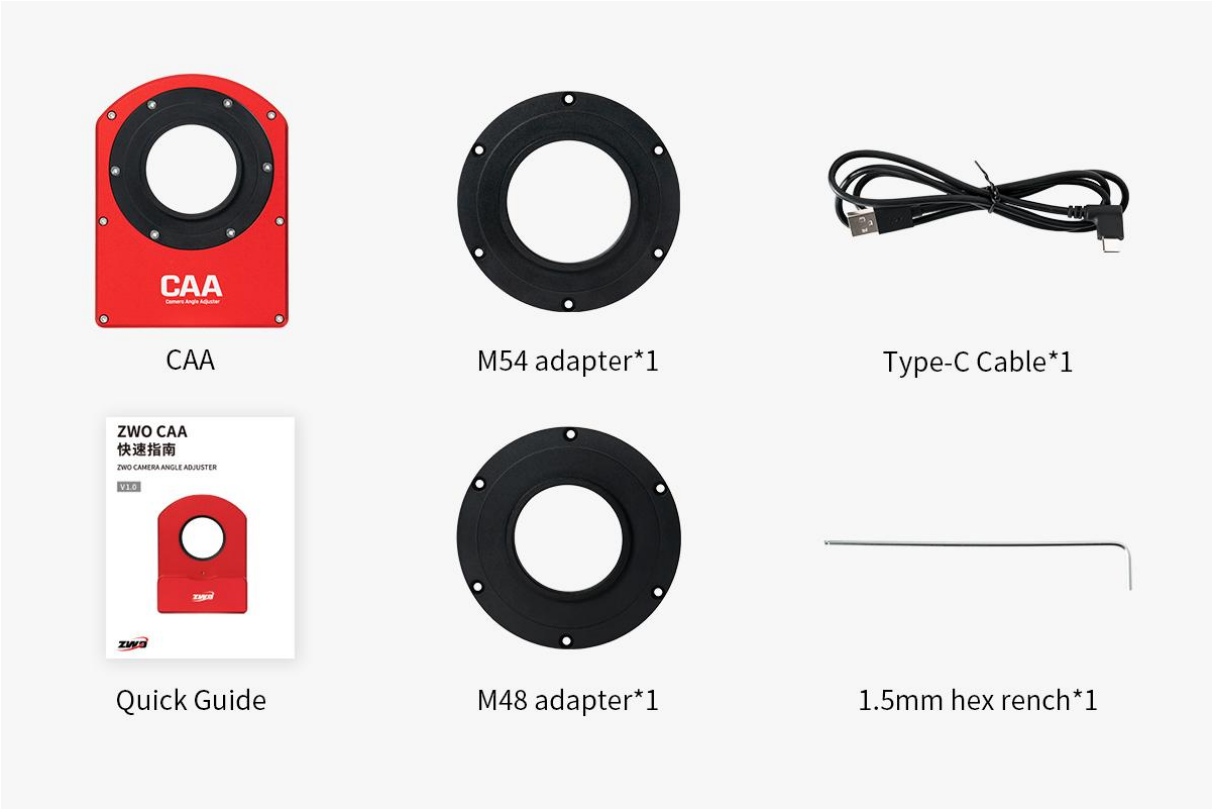




CAA Key Features

1. Highly integrated design.
2. ASCOM support and compatibility with various ASCOM third-party software.
3. Native support for ASIAIR and ASIStudio.
4. Manual and hand controller options for angle adjustments.
5. Smooth rotation with excellent concentricity.
6. Durable and stable.

2.1 Items Included



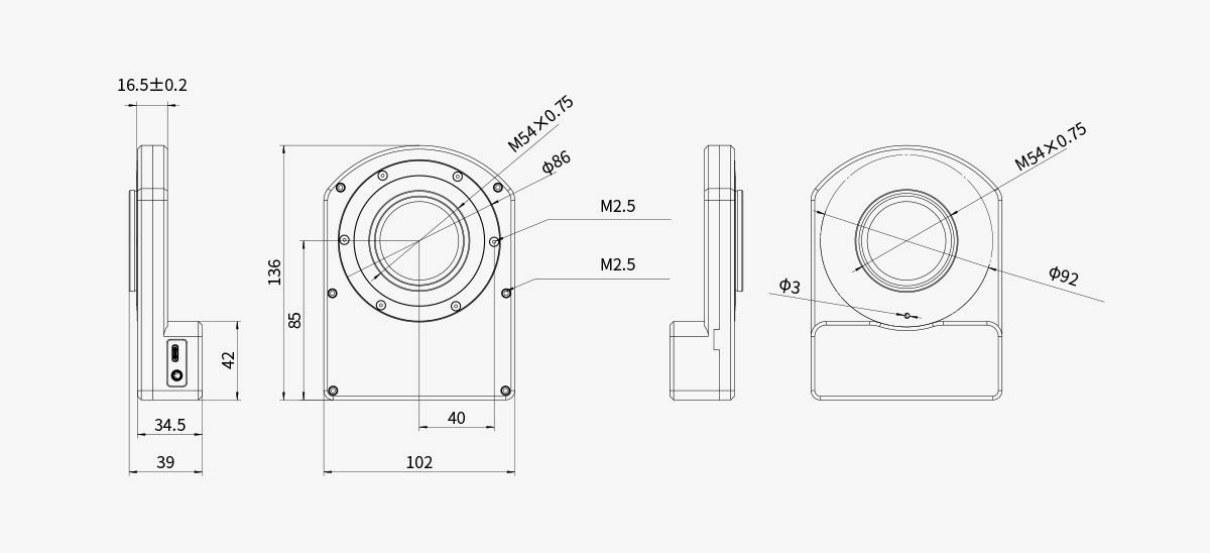
2.2 Specifications

Item	Specifications
Dimensions	136mm x 102mm x 35mm
Weight	465g
Rotation Speed	7.5°/s
Power Consumption	5V 300mA RMS
Clear Aperture	Φ48mm
Protection Level	IP42
Axial Runout	<0.5mm
Radial Runout	<0.5mm
Concentricity	<0.5mm
Parallelism	<0.5mm
Resolution	0.02°/step
Load Capacity	≤2.5N·m（5kg）

Positioning Accuracy	0.1 Degree
Back Focus Usage	16.5mm
Data Interface	USB type-C
ASCOM, ASIAIR, EAF Controller, SDK, and ASIStudio	Supported

3. Structural Dimensions Diagram

The detailed structural dimensions of the CAA are illustrated in the following diagram. Ensure accurate measurements are observed for installation and compatibility.

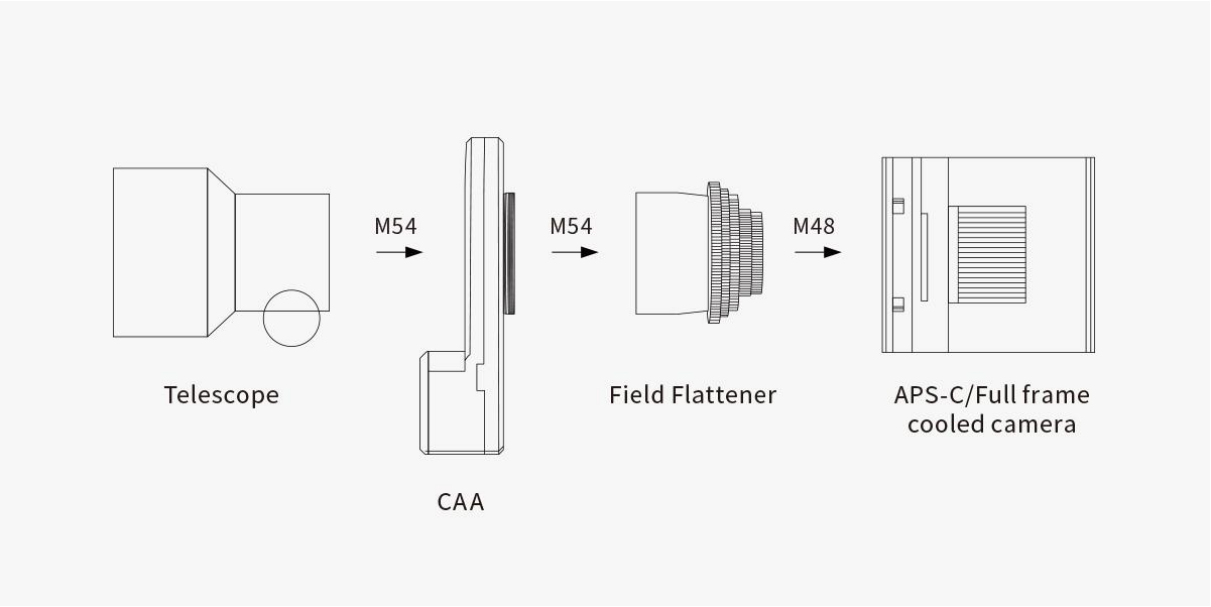


4. Installation Instructions

The CAA can be connected to telescopes with or without field flatteners：

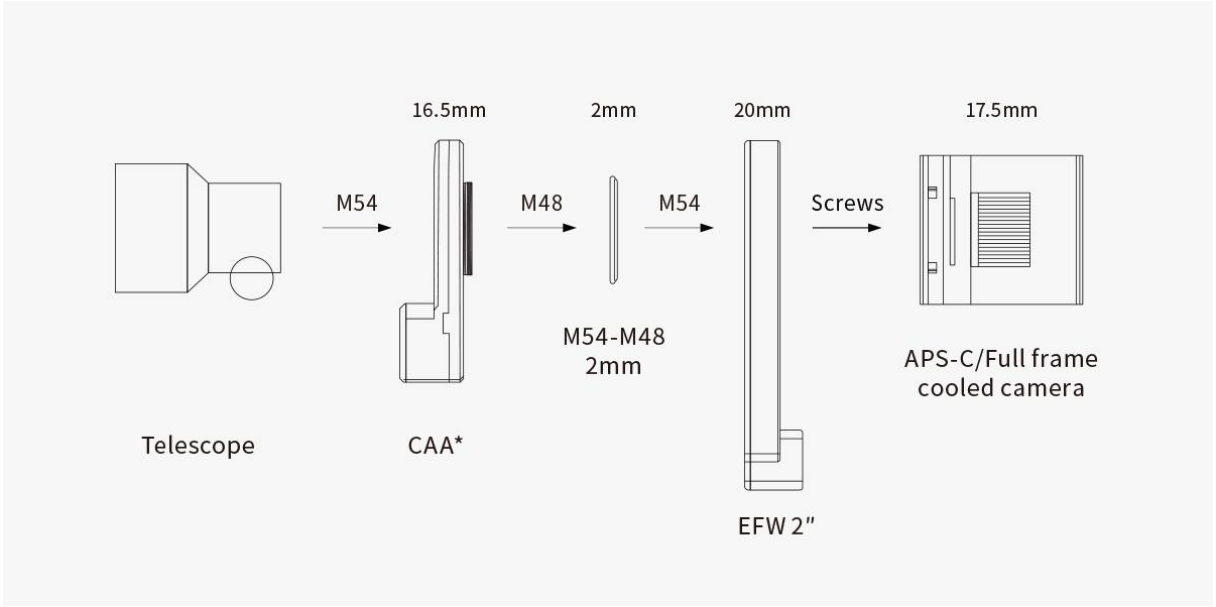
4.1 For Telescopes Requiring Field Flatteners

4.1.1 The CAA should be placed in front of the field flattener (M54 interface)：

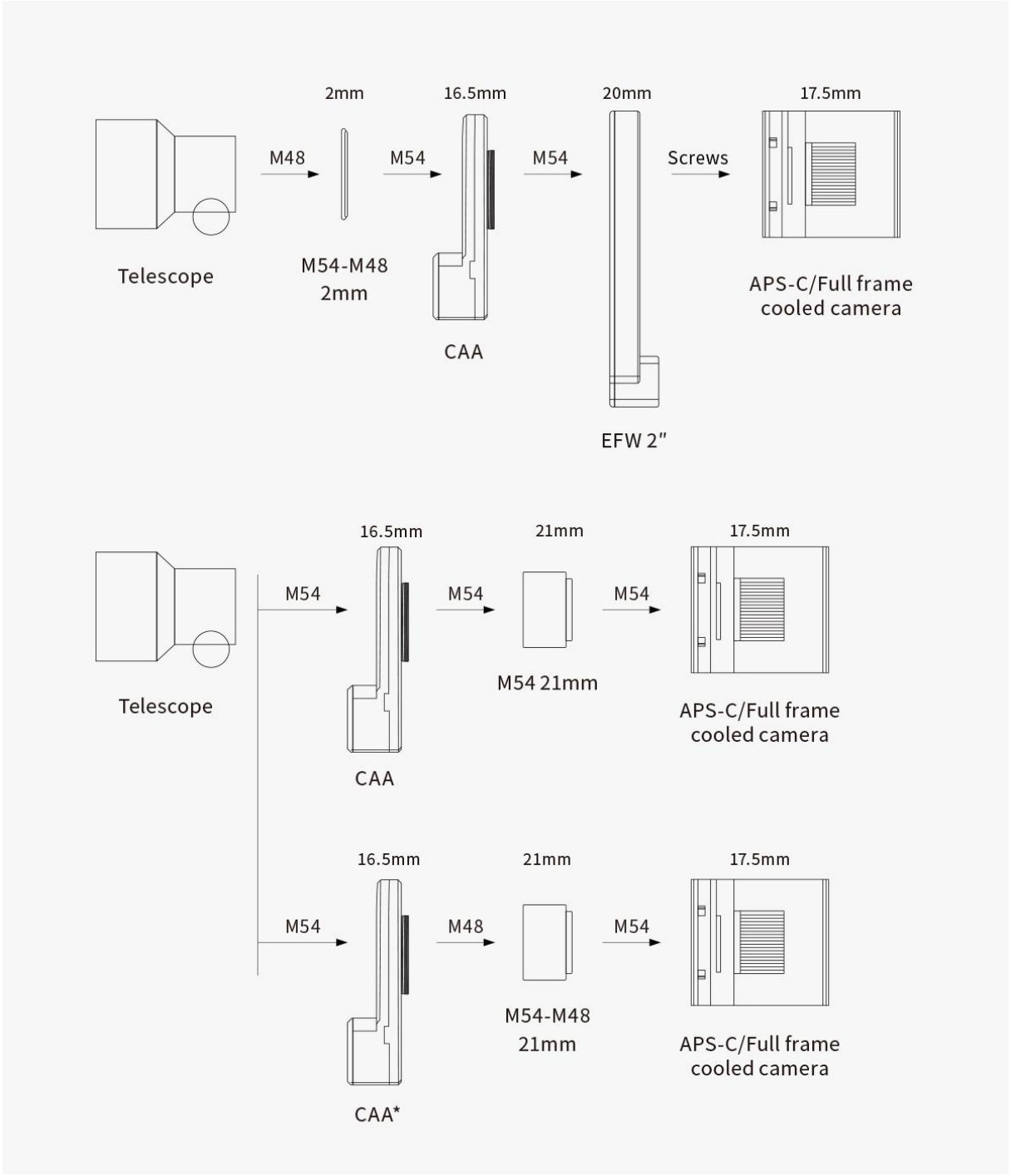


4.1.2 Alternatively, the CAA can be placed behind the field flattener：

Ensure proper spacing as the CAA occupies 16.5mm of back focus. Standard setups require additional back focus distance of 38.5mm, as illustrated in the manual.



The back focus configuration combined with other products is as follows:



Note: CAA marked with "*" requires replacing the M54 connector with an M48 connector (included)

4.2 For Telescopes Not Requiring Field Flatteners

For telescopes with built-in flattening capabilities, follow the back focus position parameters provided by the telescope manufacturer. Ensure correct sequencing and back focus allocation when installing the CAA.

5. How to Use the CAA

The CAA can be controlled via mobile apps or computer software.
Note: The ASIAIR v1 (the initial version with white casing) does not support CAA.

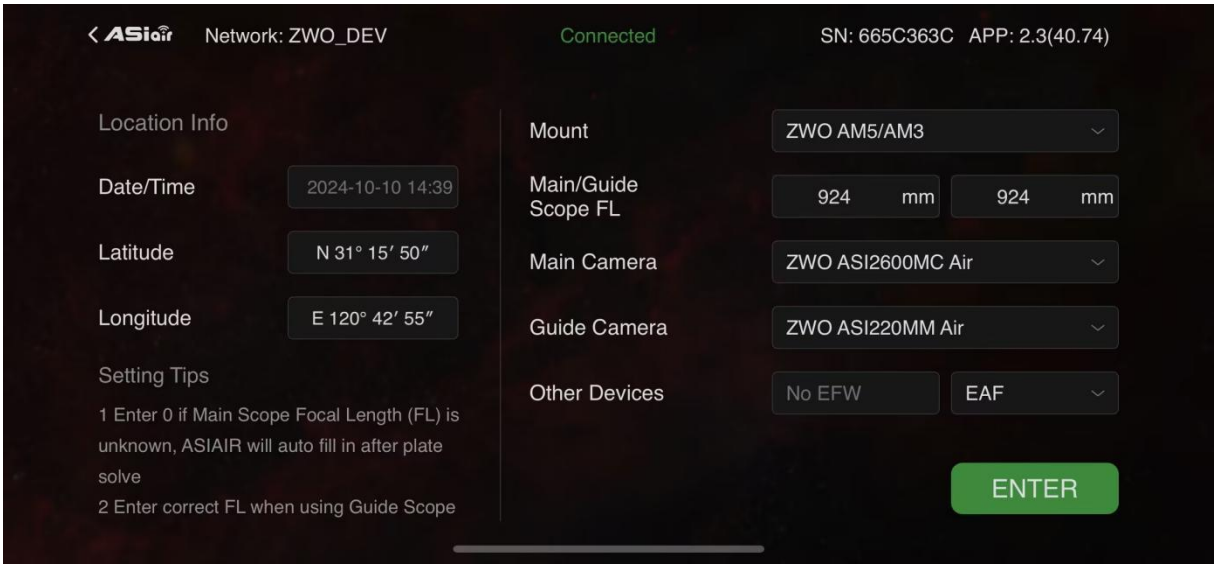
5.1 ASIAIR App (Recommended)

5.1.1 Install the ASIAIR App, connect the ASIAIR power supply and turn it on (please follow the steps in the ASIAIR Quick Guide).

Download on the App Store

GET IT ON Google Play

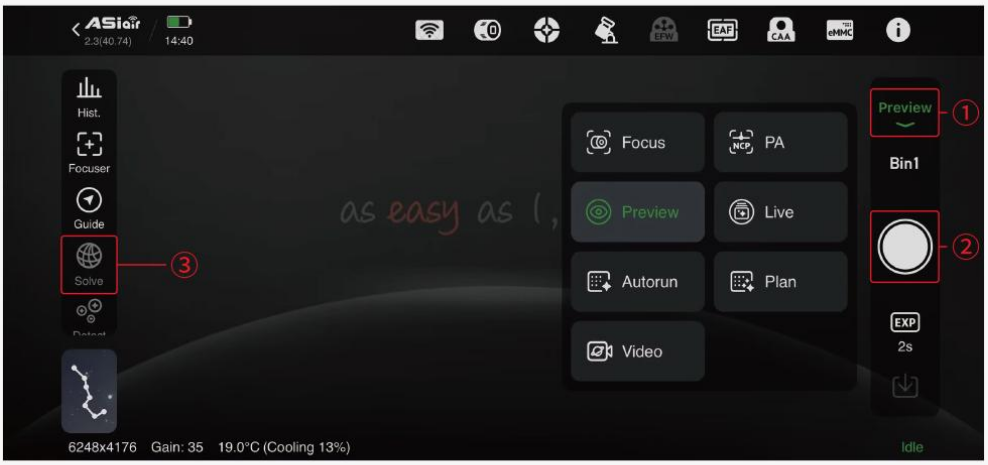
Keep your mobile device connected to ASIAIR's Wi-Fi. Open the ASIAIR App, enter the device, confirm that it is correctly connected to the ASIAIR controller, and click to enter.



5.1.2 App settings

Before you start using the mobile app to control CAA, please complete the following steps to ensure the best experience：

(1) **Plate solving and synchronization:** It is recommended to plate solve and synchronize in preview mode before using CAA. [Preview mode ① --- click to shoot ② --- click to plate solve after taking the picture ③]

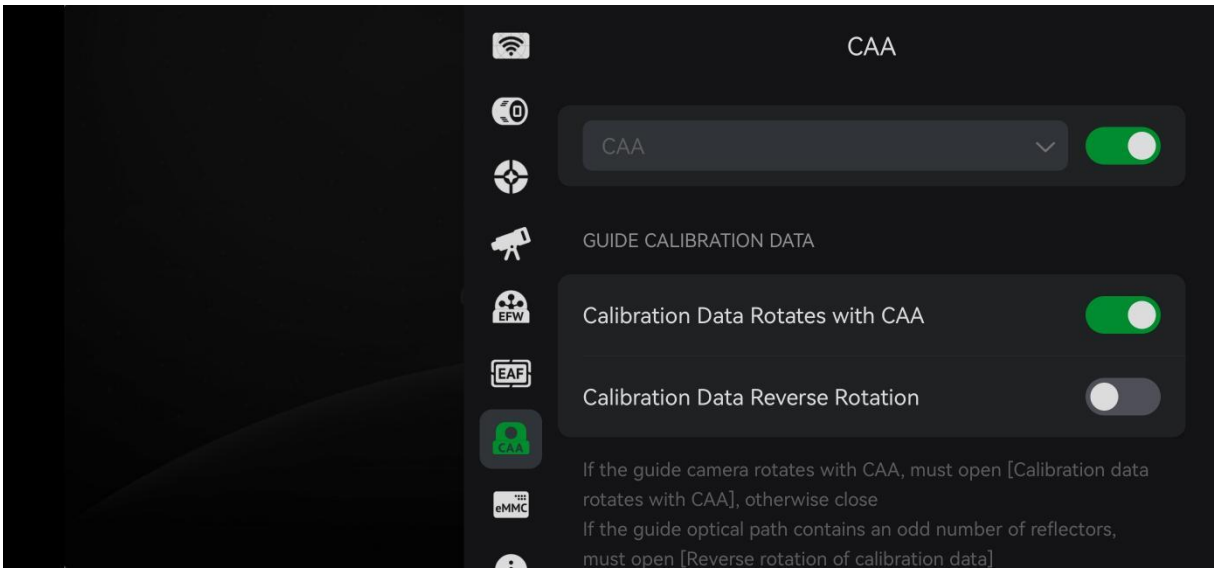


(2) **Guide star settings:** After CAA is connected, the user needs to determine the type of guide star equipment and whether it is necessary to turn on "calibration data rotation with CAA" and "calibration data reverse rotation".

[CAA setting page---Calibration data rotates with CAA/reverse rotation of calibration data]

Note: If the guide star image will rotate with the CAA at the same time, [Calibration data rotates with the CAA] must be turned on, otherwise it should be turned off;

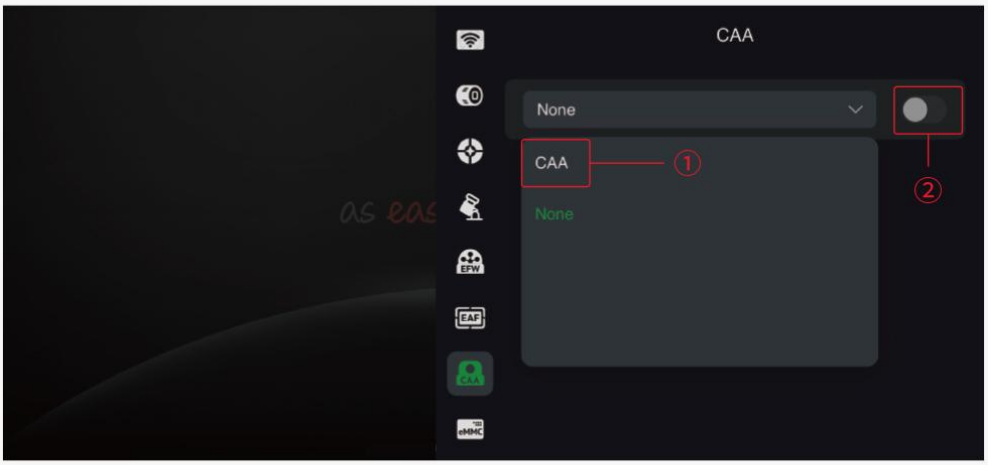
If the guiding optical path contains an odd number of mirrors (for example, using a combination of OAG and guide camera), [Calibration Data Reverse Rotation] must be turned on, otherwise it must be turned off.



5.1.3 ASIAIR App provides three methods to control CAA：

（1）CAA rotation control

[Select "CAA" in the "CAA Settings Page" ① --- Click "Open" ② --- Set the angle through the "Compass/Input Box" ③ --- Click the Rotate Button ④.]



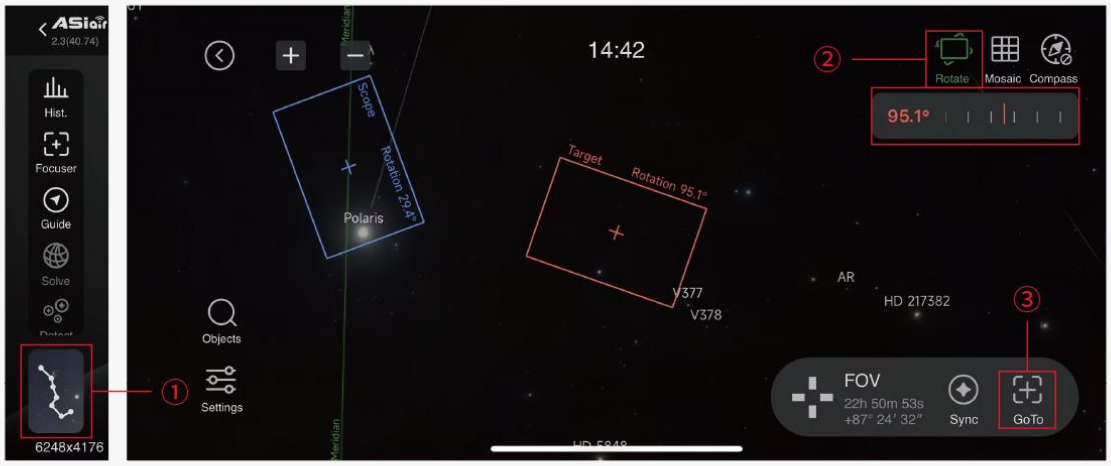


Note: The red triangle in the compass is the current angle of the camera sensor, the white sliding button is the target position, and the rotation angle can be entered in the right input box.

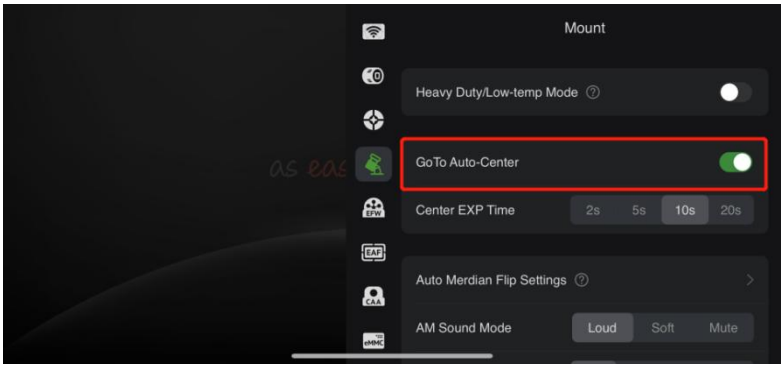
（2）GoTo target through a specific angle in the star chart

[Enter the star map ①---Click "Rotate" in the upper right corner ②Set the angle of the "Target

box"---GoTo ③]



Note: Method 2 requires turning on "GoTo target automatic centering" in the equatorial mount settings page (it is turned on by default).

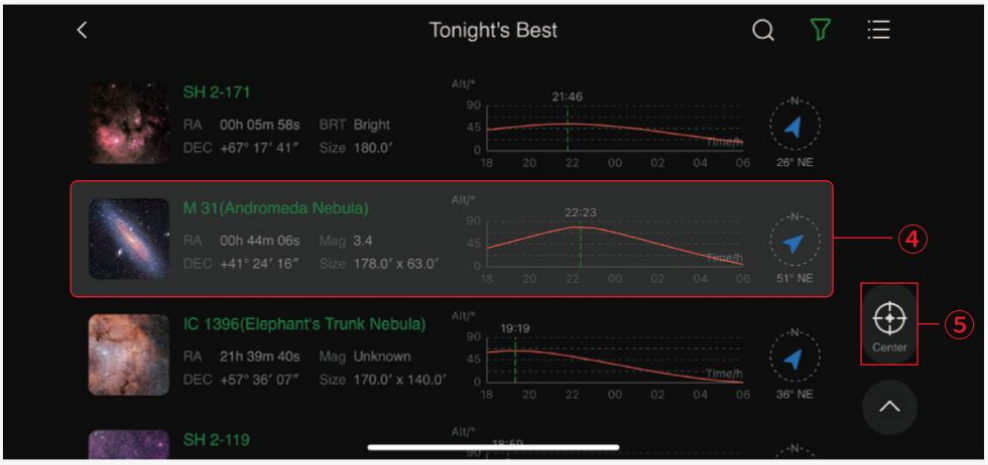


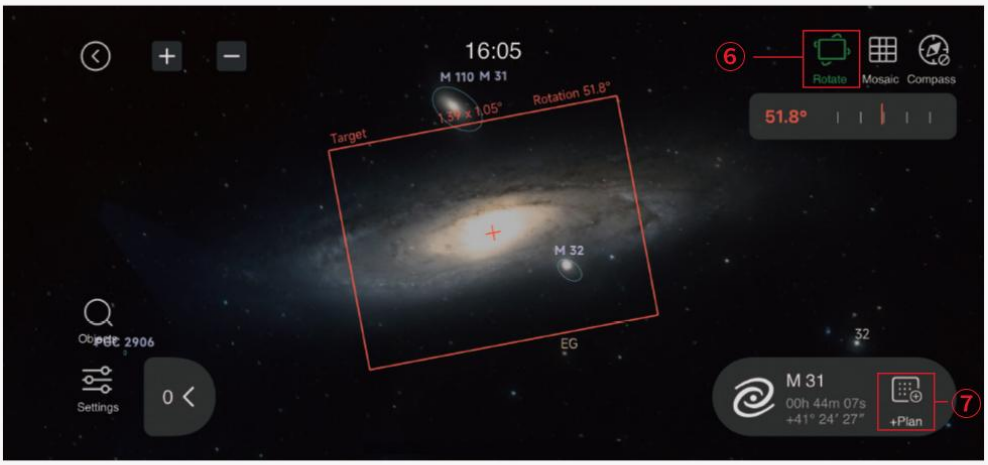
（3）In multi-target mode, set the target shooting angle

[Switch multi-target mode ① ---Enter the star map ② ---Select the target (drag the star map background/enter the celestial body library ③)---Select the celestial body ④ and center it ⑤]---[Rotate] Set the target angle ⑥ ---Add target in the lower right corner ⑦]


ASIair
2.3(11.42)
16:03
Hist.
Guide
Detect
Annotate
RA 0.00″
DEC 0.00″
Tot 0.00″
Stopped
as easy as 1, 2, 3
Plan
①
Max
Avg
Min
Std
②
32768
65535
Auto
Zoom
4656x3520 Gain: 139 -0.5°C (Cooling 56%)
Idle


14:42
Rotate
Mosaic
Compass
Scope
Rotation 29.4°
Polaris
Target
Rotation 29.4°
V377
V378
AR
HD 217382
Objects
③
Settings
FOV
22h 50m 53s
+87° 24′ 32″
Sync
GoTo
HD 5848


Tonight's Best
SH 2-171
RA 00h 05m 58s BRT Bright
DEC +67° 17′ 41″ Size 180.0′
21:46
26° NE
M 31(Andromeda Nebula)
RA 00h 44m 06s Mag 3.4
DEC +41° 24′ 16″ Size 178.0′ x 63.0′
22:23
51° NE
④
IC 1396(Elephant's Trunk Nebula)
RA 21h 39m 40s Mag Unknown
DEC +57° 36′ 07″ Size 170.0′ x 140.0′
19:19
36° NE
Center
⑤
SH 2-119



5.2 Handle control method (handle needs to be purchased separately)

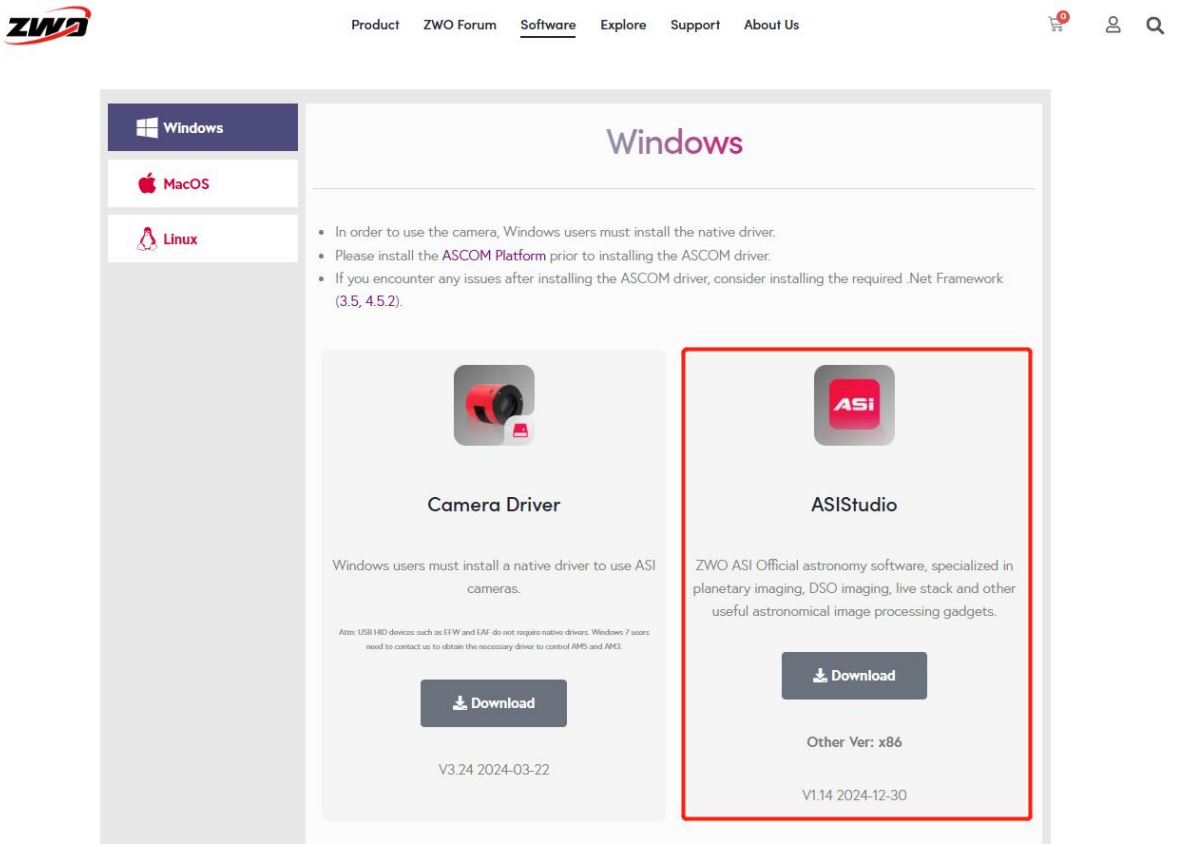
Handle control: If you need to use handle control, you can choose the ZWO EAF handle. Connect the handle to the HC interface of CAA to manually control its rotation angle.

Note: CAA firmware comes with a 360° limit setting. If the handle does not rotate on one side, please try to rotate in the opposite direction.

5.3 Computer-side, ASIStudio control method (taking Windows as an example)

5.3.1 Install ASIStudio

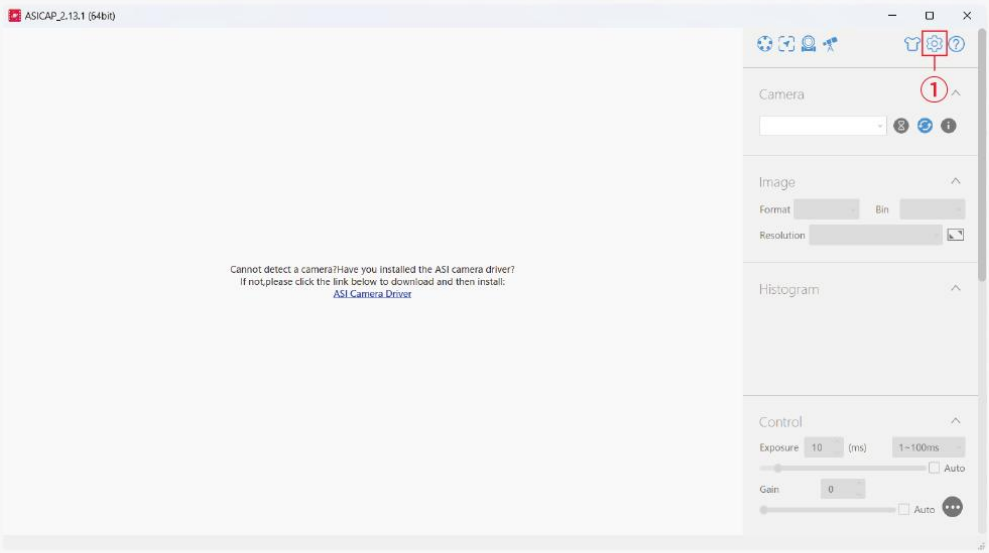
Open the ZWO official website https://www.zwoastro.cn/downloads, download the installation package of the official shooting software "ASIStudio" and complete the installation.

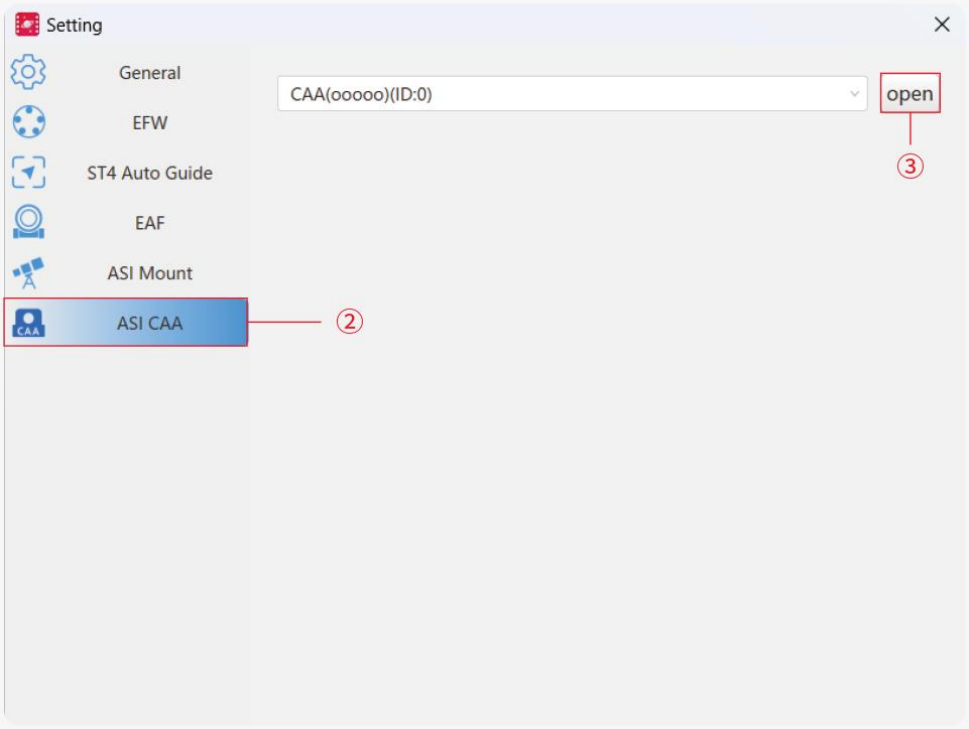


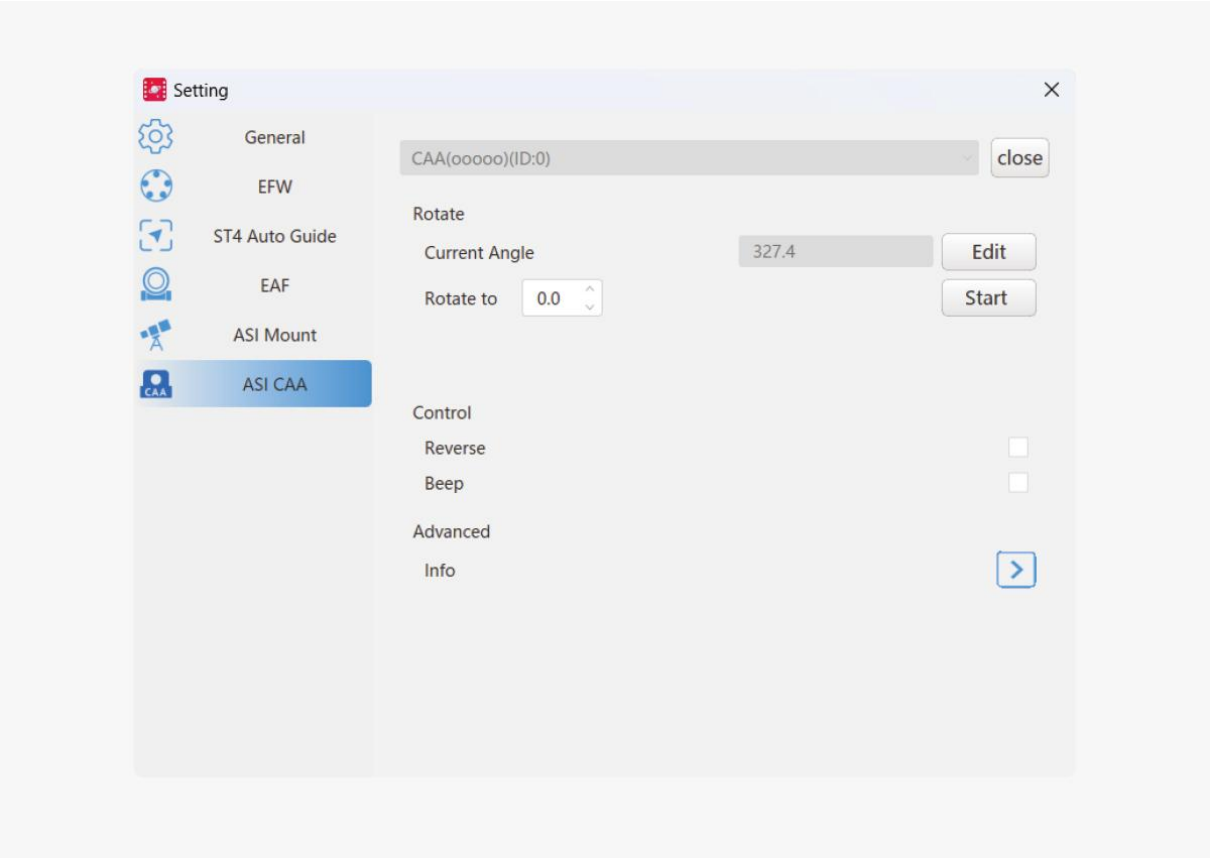
5.3.2 Connect with CAA

Connect the CAA data cable to the computer. After completing the cable connection, open ASIStudio.

[ASICap/ASIImg]---[Settings]---[ASI CAA]---[Open].


ASICAP_2.13.1 (64bit)
Camera
①
Image
Format
Bin
Resolution
Histogram
Control
Exposure
10
(ms)
1~100ms
Auto
Gain
0
Auto
Cannot detect a camera?Have you installed the ASI camera driver?
If not,please click the link below to download and then install:
ASI Camera Driver


Setting
General
EFW
ST4 Auto Guide
EAF
ASI Mount
ASI CAA
②
CAA(ooooo)(ID:0)
open
③



5.4 Other computer-side methods: support third-party software for shooting

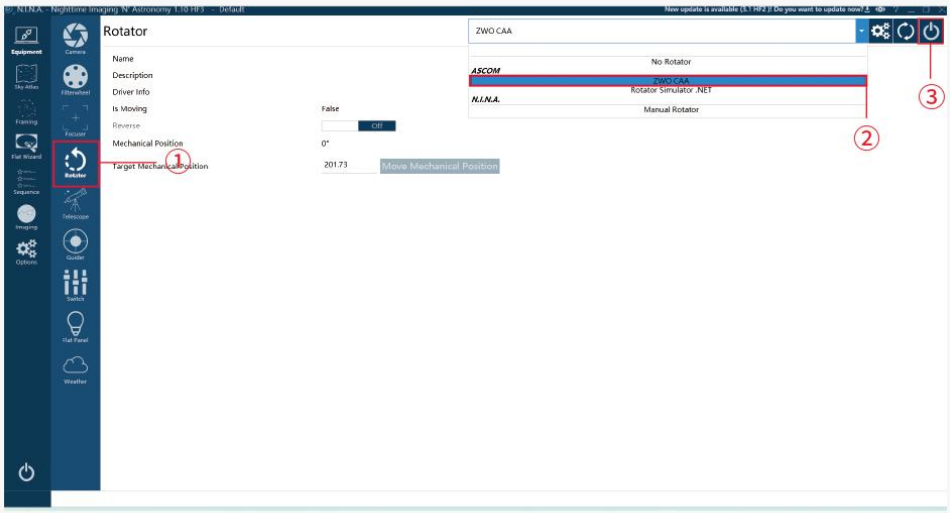
5.4.1 Install third-party software

Open the ZWO official website https://www.zwoastro.cn/downloads, download and install the ASCOM driver, and then you can open third-party software to use ZWO CAA, such as MaxIm DL, NINA and other software. The following uses NINA as an example to briefly explain the use of ZWO CAA.

It is recommended to install the ASCOM platform v6.6 and above to maintain your smooth experience.

5.4.2 Connect with CAA

Connect the CAA data cable to the computer. After completing the cable connection, open the NINA software and select Rotator ①---ZWO CAA ②---Connect ③.


Rotator
ZWO CAA
Name
Description
Driver Info
Is Moving
False
Reverse
Off
Mechanical Position
0°
Target Mechanical Position
201.73
Move Mechanical Position
No Rotator
ASCOM
ZWO CAA
Rotator Simulator .NET
N.I.N.A.
Manual Rotator
1
2
3

6. Things to note

（1）When installing the CAA, please pay attention to whether there is interference between the CAA and other components such as the telescope and camera to avoid damage to the equipment.

（2）The ASIAIR v1 (the initial version with white casing) does not support CAA.

（3）When disassembling the camera, if the camera termination ring cannot be unscrewed, you can take the following steps：

① First rotate the camera termination ring so that the hole shown in the picture are exposed;



② Then use the standard hexagonal wrench and insert it into the exposed hole;



③ Finally, continue to rotate the adapter to successfully remove the camera adapter.



7. Warranty service

1. ZWO provides a 2-year free warranty service for products purchased by users from our company. The warranty period is calculated from the day after the user receives the product; for ASIAIR PLUS products, the warranty period is calculated from the day the user's device is activated.

2. If the user encounters the following damage on arrival (DOA) situation and contacts ZWO within the corresponding period and issues a product purchase invoice and relevant certificates, ZWO will provide door-to-door pickup service and provide after-sales exchange (or replacement) of the following products as appropriate. Partial replacement), repair or return (or partial return) service:
1) Product quality problems: If the user discovers quality problems with the product within 180 days from the date of receipt of the product and contacts ZWO, after inspection by the ZWO customer service center, if it is confirmed that the product itself has quality problems or defects, ZWO will provide free exchange service;
2) Product transportation issues: After receiving the product, the user finds that the outer packaging of the product has obvious signs of water soaking or severe backlog and deformation, and provides relevant product outer packaging pictures and receipts to ZWO within 3 days from the date of receipt of the product. Proven by ZWO After verification by the customer service center, it is confirmed that the product is shipped directly to the user or agent by ZWO, then ZWO will provide relevant return and exchange services; if the product is directly sold or shipped to the user by ZWO agent, ZWO agent The merchant will be responsible for providing relevant return and exchange services;
3) Quality problems with product accessories or other parts are not a condition for returning the item. Users can separately request replacement of new accessories.

3. If the following conditions occur on the product, it is not within the scope of warranty service. ZWO can provide users with paid maintenance services:
1) The product exceeds the warranty period.
2) The product is exposed to liquid and gets corroded by moisture.
3) The product is damaged by external force (such as the camera protective window glass shattering, the product shell deforming, the USB port breaking, etc.).
4) Disassembly, third-party repair, modification and refurbishing, and flashing (downloading wrong firmware) without ZWO’s express written authorization.
5) The product system has been changed or the warranty label has been lost or changed.
6) Product quality problems caused by failure to install according to product usage requirements or instructions.

7) Physical damage and failure of the product caused by irresistible external forces (such as floods, fires, earthquakes, lightning strikes and other strong vibrations or extrusions).
8) Damage caused by improper user operation during shooting or use, such as not protecting the equipment, shooting directly in the sun, etc.
9) There is no valid product purchase invoice and warranty certificate.
10) The products purchased by the customer are second-hand products.

8. After-sales policy

If you need to upgrade the software, please go directly to the following official website to download the update, "Official website home page - Help Center - Documents and Manuals".
Home - Discovery Astrophotography with ZWO ASTRO
For repairs and other services, please contact us:
Domestic users can follow the ZWO WeChat public account and click to contact customer service.
Overseas users can visit https://support.zwoastro.com/ to submit a work order.
Email address: info@zwoptical.com
Tel: 0512-65923102

1. For products that are returned for repair or replacement within the warranty period, the user will bear the cost of sending them back. When returning products, users should note the true cause of product damage and provide corresponding valid proof, such as pictures or videos.
For products that need to be replaced as confirmed by ZWO in writing, users should send the fully packaged product, together with all accessories, instructions, etc., back to the designated address of ZWO.
By returning the product, the user agrees to pay the maintenance fees that may be incurred during product maintenance that are not within the scope of the warranty service. ZWO will send back the product after charging.
2. For products that need to be sent back for after-sales service, ZWO will provide the corresponding RMA code for reference. ZWO does not accept any products sent back without written confirmation from ZWO and without an RMA number.
3. If the user purchased the ZWO product from a ZWO agent, he or she can directly contact the ZWO agent to obtain relevant after-sales service.