Planetary Camera ASI676MC

Product Manual



Thank you so much for purchasing ZWO ASI camera! Before using the product, please read this manual carefully.

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1 Product Introduction



All-sky Camera

Introducing the ASI676MC, the all-sky camera featuring a unique square 1/1.6-inch image sensor and a super high resolution of 12MP! It is perfectly suited for meteor recording and full sky surveillance.

The square format facilitates easier composition, making mosaic stitch simpler and more efficient, and the high resolution brings you clear details of the Sun and our Moon. With this camera, you may start your marvelous journey to explore the boundless night sky.

Why Square Format?

One of the biggest benefits of ASI676MC's square format is it makes the whole mosaic construction process much easier by eliminating the need to consider the difference between the long and wide sides of the format during mosaic stitching.

Not only that, the square format also makes the ASI676MC more compatible with various types of lenses such as fisheye lenses and wide-angle lenses. Thus, ASI676MC is more suitable for tasks such as meteor recording and full sky surveillance.

STARVIS 2

STARVIS is a sensor technology developed by Sony that surpasses the sensitivity of the human eye. STARVIS 2 is an advancement of STARVIS technology, supporting an even higher dynamic range.

With this technology, ASI676MC exhibits lower readout noise and dark current, along with significantly enhanced sensitivity in the near-infrared spectrum.

256MB DDR3

The camera is equipped with a USB 3.0 transmission interface and a built-in 256MB DDR3 cache to ensure stable and secure data transmission.



No Amp Glow

ASI676MC does not have any amp glow, no matter how long the exposure and how high the gain value you set.

Note: This technology is implemented directly at the hardware level, it does not require software control.

2 Notice for Use

Before using the camera, please read this manual carefully.

Note that the camera can only be used and stored under the following conditions. Usages out of the environment limits might lead to damage to the camera.

Storage temperature	-20°C ~ 60°C
Storage humidity	20% ~ 95%
Working temperature	-5℃ ~ 50℃
Working humidity	20% ~ 80%

Please do not use corrosive solutions to clean the camera to avoid corroding the oxide layer on the surface and damaging the camera. Meanwhile, please do not keep the camera exposed to the sun for a long time to avoid discoloration of the oxide layer on the camera surface.

3 Getting to Know Your Camera

3.1 External View



① USB 3.0/2.0 port

② ST4 guide port

③ IR protective window (D21x1.1mm)

④ 1/4” screw for fixing the camera to the tripod

3.2 Camera Specifications

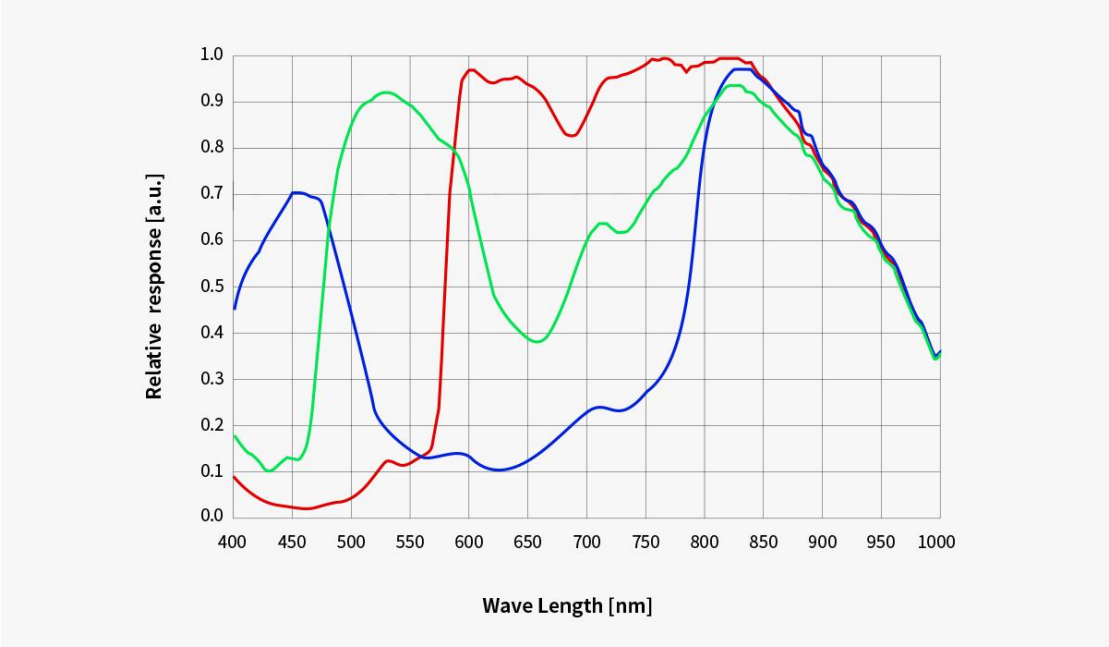
Sensor	Sony-IMX676
Sensor format	Type 1/1.6
Diagonal	10.04mm
Resolution	12.61MP 3552 x 3552
Pixel size	2μm
Sensor size	7.104mm x 7.104mm
Max FPS	31.2fps
Shutter	Rolling shutter
Exp range	32μs~2000s
Read noise	0.56-2.9e(1.8e@8.2db gain)
QE peak	83%
Full well capacity	10.55Ke
ADC	12bit
USB port	USB 3.0 /USB 2.0 Type-B
Adapter	1.25”/2”/M42 x 0.75
Protective window	ϕ21-1.1 IR
Camera diameter	62mm
Camera weight	126g
Back focus distance	12.5mm
Supported OS	WIN7/8/10 32&64、Linux、Mac

3.3 Quantum Efficiency & Read Noise

Quantum Efficiency

QE curve and read noise are very important parameters to measure the camera's performance. Higher QE and lower read noise are necessary to improve the image signal-to-noise ratio.

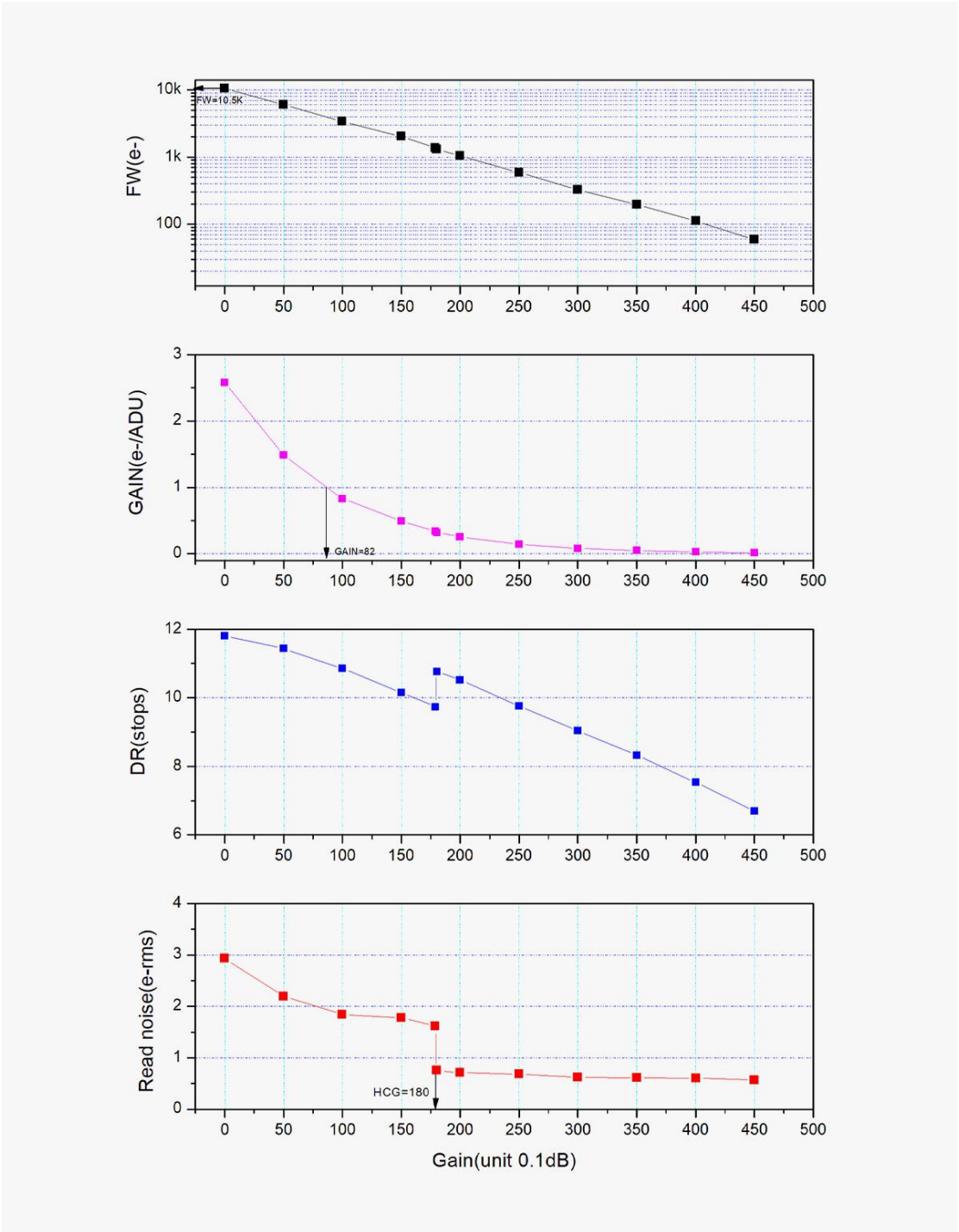
We have calculated that the peak quantum efficiency of the ASI676MC is about 83%.



Relative response (ASI676MC)

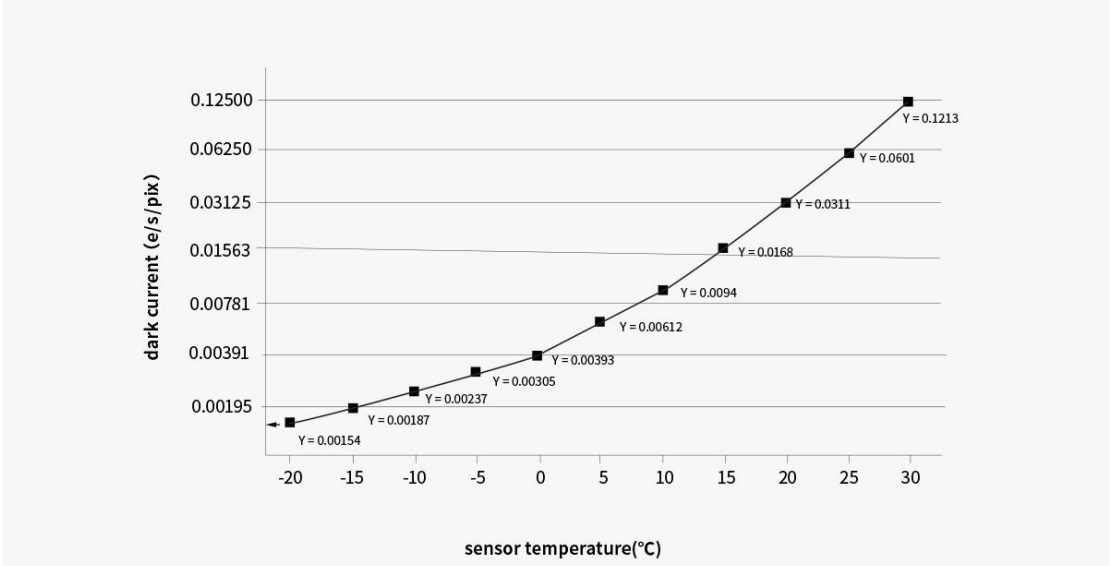
Read Noise

The camera has a built-in HCG mode, which can effectively reduce readout noise at high gain. This allows the camera to maintain the same high dynamic range as it does at low gain. When the gain is 180, the HCG mode is automatically turned on. The readout noise is as low as 0.56e, and the dynamic range can still reach a level close to 11stops.



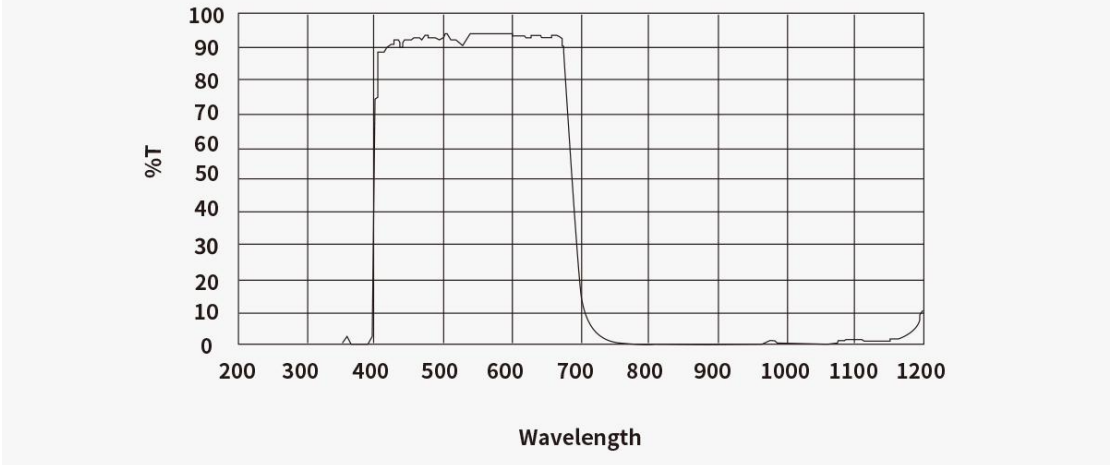
3.4 Dark Current Noise

The ASI676MC's lower dark current noise means that the image signal-to-noise ratio is also higher, especially when photographing dark objects, it produces images with better sharpness.



3.5 Protective Window

ASI676MC is equipped with an IR-cut coated window in front of the sensor, with a diameter of 21mm and a thickness of 1.1mm. It effectively reduces infrared interference and improves image quality.



3.6 Analog to Digital Converter (ADC)

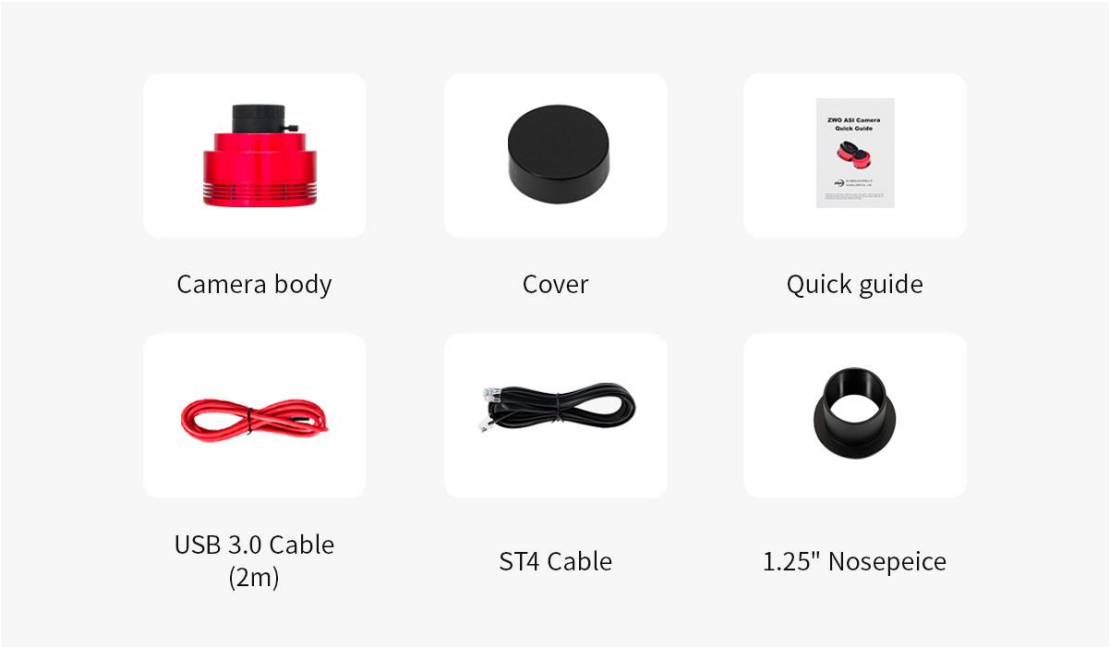
ASI676MC records in 12bit ADC and 10bit ADC. You may also set an ROI if you want even faster frame rates.

Resolution	USB3.0		USB2.0	
	Normal mode:12BIT ADC		Normal mode:12BIT ADC	
	RAW16	RAW8	RAW16	RAW8
3552x3552	15.6fps	31.2fps	1.7fps	3.4fps
1920x1080	95fps	99.7fps	10.4fps	20.9fps
1280x720	145.7fps	145.7fps	23.5fps	47fps
640x480	210.4fps	210.4fps	70.5fps	141.2fps
320x240	379fps	379fps	283fps	347fps

3.7 Power consumption

All ASI cameras have low power consumption. ASI678MM/MC is no exception. When it is powered with a USB cable, the max power consumption is only 1.36W.

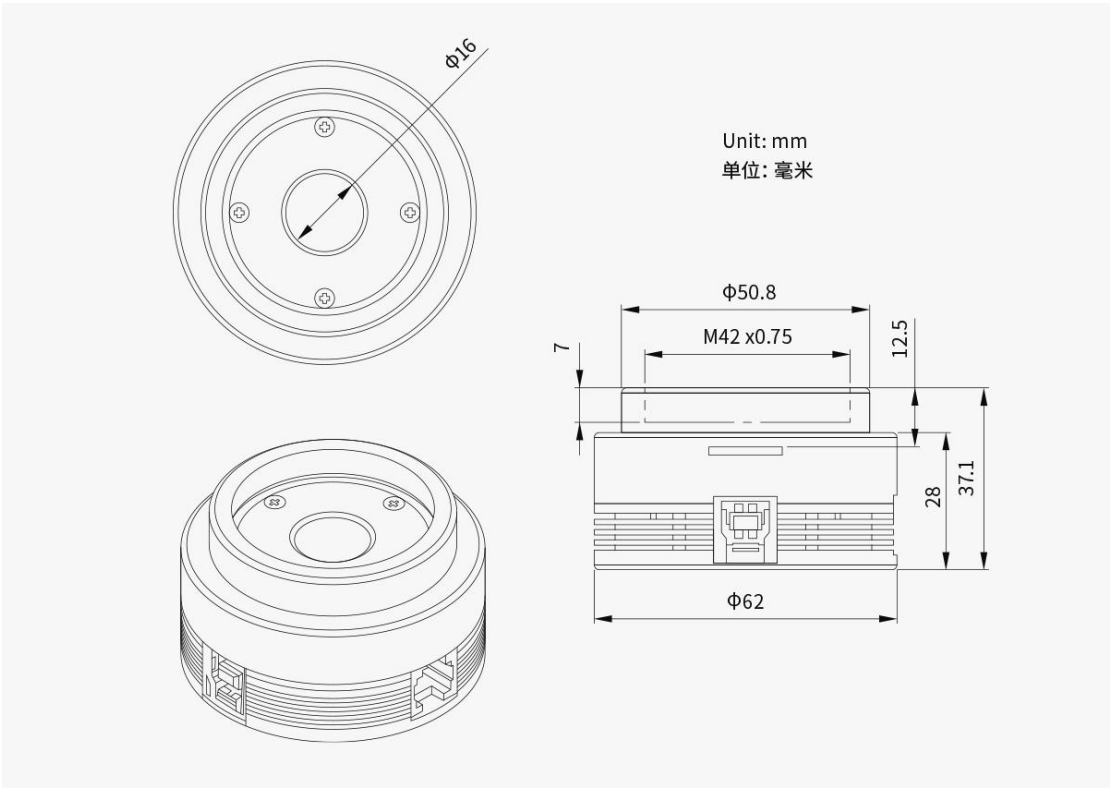
4 What’s in the Box?



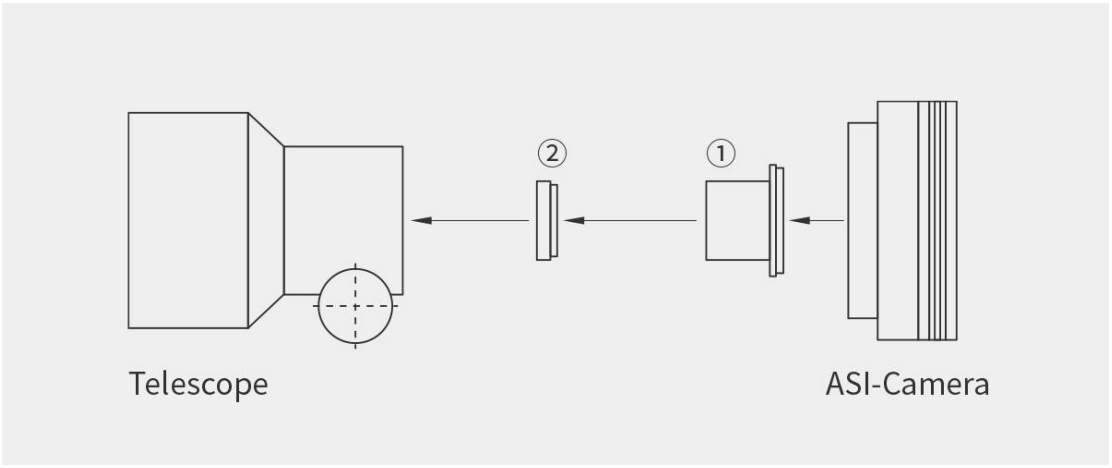
Equipped with a 2m USB cable that can be used to connect the computer and the camera for guiding.

Note: Please take off the self-contained lens on the top of the camera before you use the camera for astrophotography.

5 Structural Dimension Diagram



6 Connection Methods



① 1.25” T-mount

② 1.25” filter (optional)



7 Warranty

1. ZWO will provide a 2-year free warranty service (Warranty Period) for ZWO products purchased by Users from ZWO ("Products") in accordance with this Policy, commencing on the day following receipt of the Products by Users. For ASIAIR Plus users, commencing on the day of device activation.

2. If a User encounters the following Dead on Arrival (DOA) and contacts ZWO within the corresponding time limit to issue the Product purchase invoice and relevant evidence, ZWO will provide door-to-door pick-up service and, as appropriate, after-sale replacement (or partial replacement), repair or return (or partial return) service for the following Products:

1) Product quality problem

Provided that a User detects a quality problem and contacts ZWO within 180 days after receipt of the Products, and ZWO support team confirms that the Products indeed have a quality problem or defect after their inspection, ZWO will provide free replacement service towards such Products;

2) Product transportation problem

Provided that a User finds obvious signs of bubbling, serious overstocking, or deformation on the outer package of the Products upon receipt of the Products, and provides ZWO with pictures of the outer package and proof of receipt within 3 days after receipt of such Products, ZWO support team will verify the actual shipper and determine the responsible party for such transportation problem. In the event that ZWO is the actual shipper, ZWO will be responsible for providing the relevant return or replacement service, however, if the Products are directly sold or transported to the User by an agent of ZWO, the agent will be responsible for providing the relevant return or replacement service;

3) Any quality problem with the accessories or other parts of the Products is not a condition for the return or change of the Products, and the User may solely request to replace the accessories with new ones, which shall be handled after verification by ZWO support team.

3. If the Products are under the following circumstances, they are not within the scope of warranty service. ZWO may provide maintenance services to the Users:

1) The Warranty Period of the Products has expired;

2) The Products are injected into liquid or affected by moisture or corrosion;

3) The Products are damaged by an external force (such as the broken of the camera protection window glass, the deformation of the product shell, the broken of the USB port, etc.);

4) Disassembling, repairing by a third party, refurbishment of the Products (such as downloading erroneous firmware) without the written authorization of ZWO;

5) The product system is modified, or the maintenance notice is lost or changed;

6) Product quality problem caused by installation not following the requirements or instructions for the Products;

7) Physical damage or failure of the Products caused by the force majeure (such as strong vibration or extrusion such as flood, fire, earthquake, or thunder stroke);

8) Damage caused by the improper User operation during the period of shooting or use, such as using without the equipment protection or direct shooting of the sun;

9) No valid purchase invoice or warranty certificate;

10) The Products are second-hand products.

8 Servicing

For software upgrades, please refer to “Guide & Manuals” on our official website.
https://www.zwoastro.com/guides-and-manuals/
For repairs and consultation, you can visit here:
https://support.astronomy-imaging-camera.com/
Email: info@zwoptical.com.
Phone: 0512-65923102

1. For the normal repair or replacement of the Products during the Warranty Period, the User will bear the return cost. When returning the Products, Users shall specify the actual reasons for the damage to the Products, and shall provide the corresponding valid certificates, such as pictures or videos, etc.

For the Products that need to be replaced after being confirmed by ZWO in writing, the User shall return the Products with the complete package, together with all accessories, manuals, etc., to the address designated by ZWO.

By sending back the product to ZWO, the User agrees to pay out-of-warranty fees that may arise during the repair process of the product. ZWO will send back the product after charging.

2. For the Products that need to be returned for after-sales service, ZWO will provide the corresponding RMA code for reference. ZWO will not accept any products having no RMA code that have been returned privately without ZWO written confirmation.

3. If a User purchases the ZWO Products from a ZWO agent, the User may contact the ZWO agent directly for the relevant after-sales service.