Planetary Camera ASI664MC

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



Higher image quality, Larger sensor size

ASI664MC is a remarkable new planetary CMOS camera. The 1/1.8” Sony IMX664 sensor features a small pixel size of 2.9μm pixel and a high resolution of 2704*1536(4.15MP). In high-speed mode, the frame rate reaches 95fps, while the readout noise remains at a low level, as low as 0.46e!

The larger sensor size and higher resolution compared with ASI662MC result in sharper images for a better astrophotography experience.

STARVIS 2 Technology

You might not be strange with Sony STARVIS 2 technology. It offers ASI664MC outstanding image quality and imaging performance.

ASI664MC VS ASI662MC

ASI664MC can be considered as an iteration of ASI662MC. With the great improvement in sensor size and resolution, it provides a larger FOV and also results in high-quality images containing more details.

Model	ASI662MC (Entry-level)	ASI664MC (Advanced)	ASI585MC (Flagship)
Color or mono	Color	Color	Color
Sensor format	1/2.8″	1/1.8″	1 / 1.2″
Diagonal	6.45mm	9.02mm	12.84mm
Resolution	2.07MP 1920x1080	4.15MP 2704x1536	8.29MP 3840x2160
Pixel size	2.9μm	2.9μm	2.9μm
Sensor size	5.568mmx3.132mm	7.841mmx4.454mm	11.136mmx6.264mm
Frame rate	107.6fps	95fps	46.9fps
Shutter	Rolling shutter	Rolling shutter	Rolling shutter
Read noise	0.8-6.9e (1.22e@19db gain)	0.46-5.8e (3.2e@19db gain)	0.8-12e (2.4e@15db gain)
QE Peak	91%	91%	91%
Full well capacity	38.2ke	36.5ke	47ke
ADC	12bit	12bit	12bit
Back focus distance	12.5mm	12.5mm	6.5mm/17.5mm

High Transmission Speed

This camera has a USB 3.0 interface, along with the built-in 256MB DDR3 cache, ensuring high-speed, smooth and stable data transmission.



Zero Amp Glow

ASI664MC adopts no-glow circuity to avoid the annoying amp glow being produced, and ensure the image quality no matter how long the exposure and how high the gain value is.

(Note: This feature 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 AR protective window (D21x1.1mm)
④ 1/4” screw for fixing the camera to the tripod

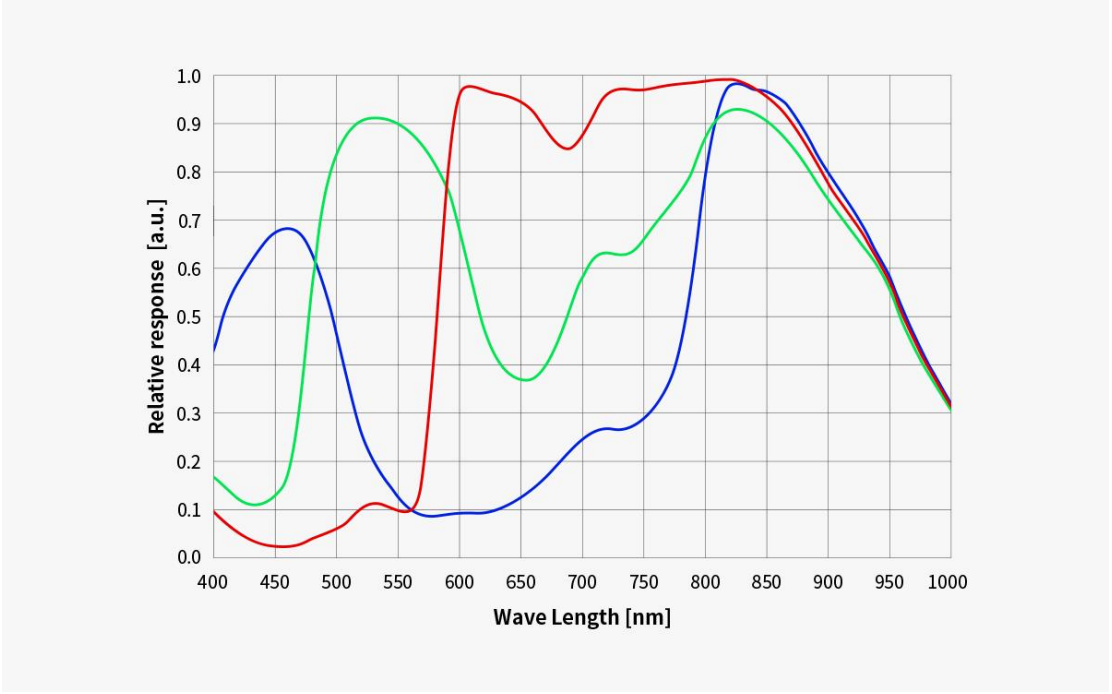
3.2 Camera Specifications

Sensor	Sony-IMX664AAQR1-C
Sensor format	Type 1/1.8
Diagonal	9.02mm
Resolution	4.15MP 2704x1536
Pixel size	2.9μm
Sensor size	7.841mm x 4.454
Fast frame rate	95fps
Shutter	Rolling Shutter
Exposure range	32μs~2000s
Read noise	0.46-5.8e (3.2e@19db gain)
QE peak	91%
Full well capacity	36.5Ke
ADC	12bit
USB interface	USB 3.0 /USB 2.0 Type-B
Adapter	M42x0.75
Protect window	ϕ21-1.1 AR
Dimension	62mm
Weight	126g
Back focus distance	12.5mm
Supported OS	WIN7/8/10 32&64, Linux, Mac

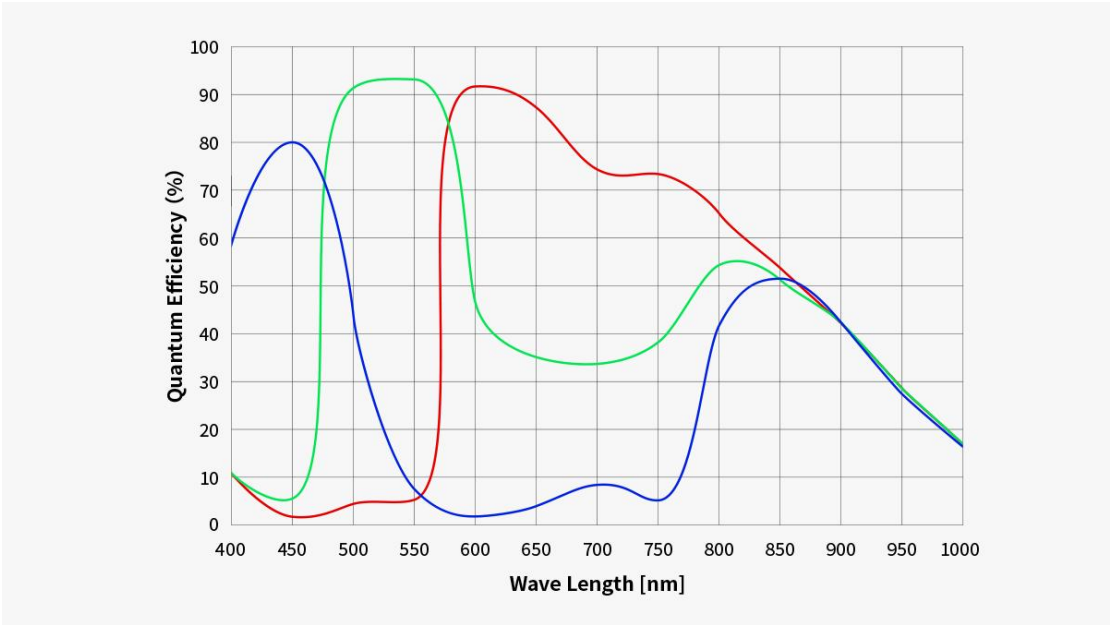
3.3 Quantum Efficiency & Read Noise

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.



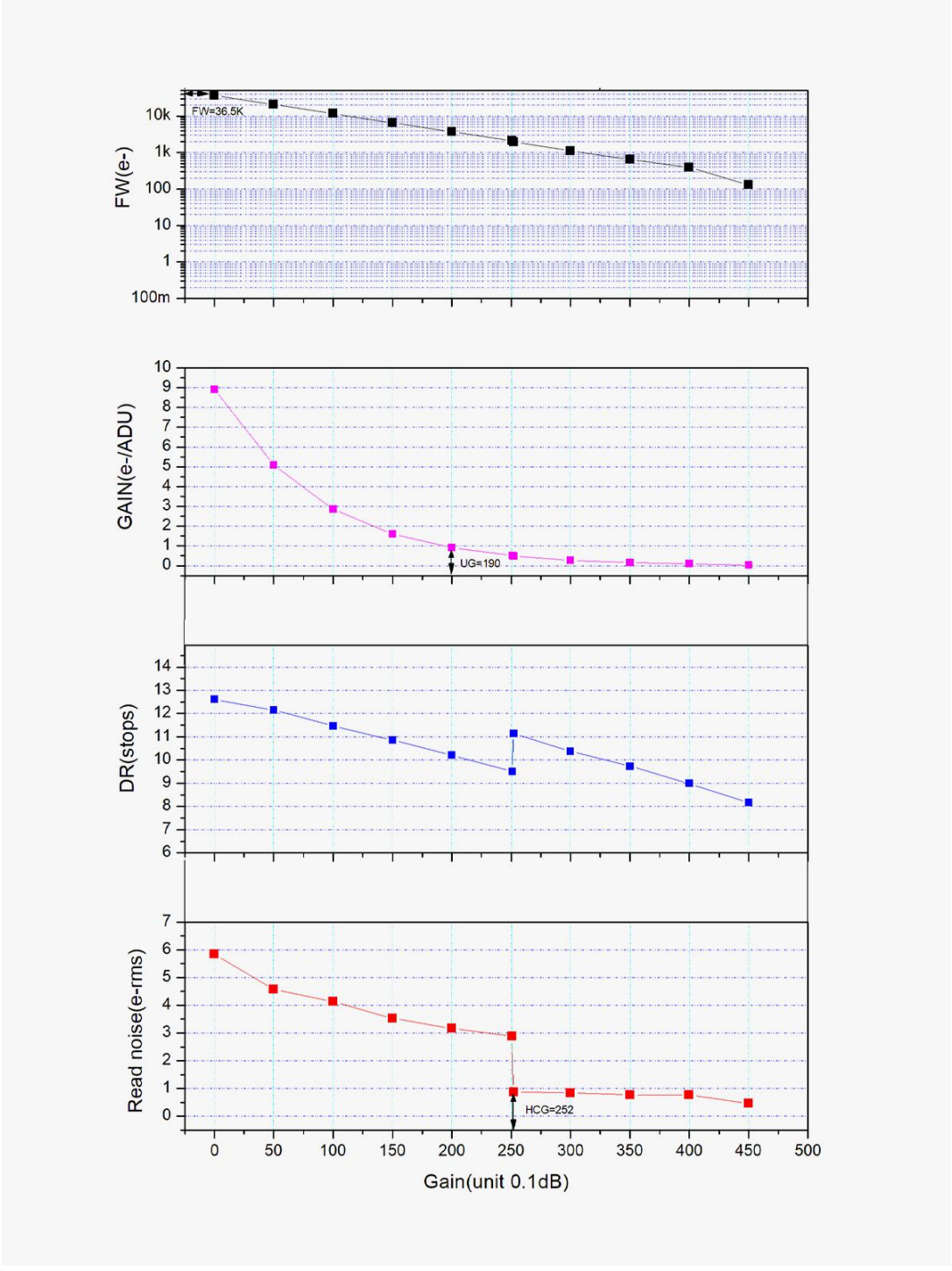
Relative Response



Quantum Efficiency

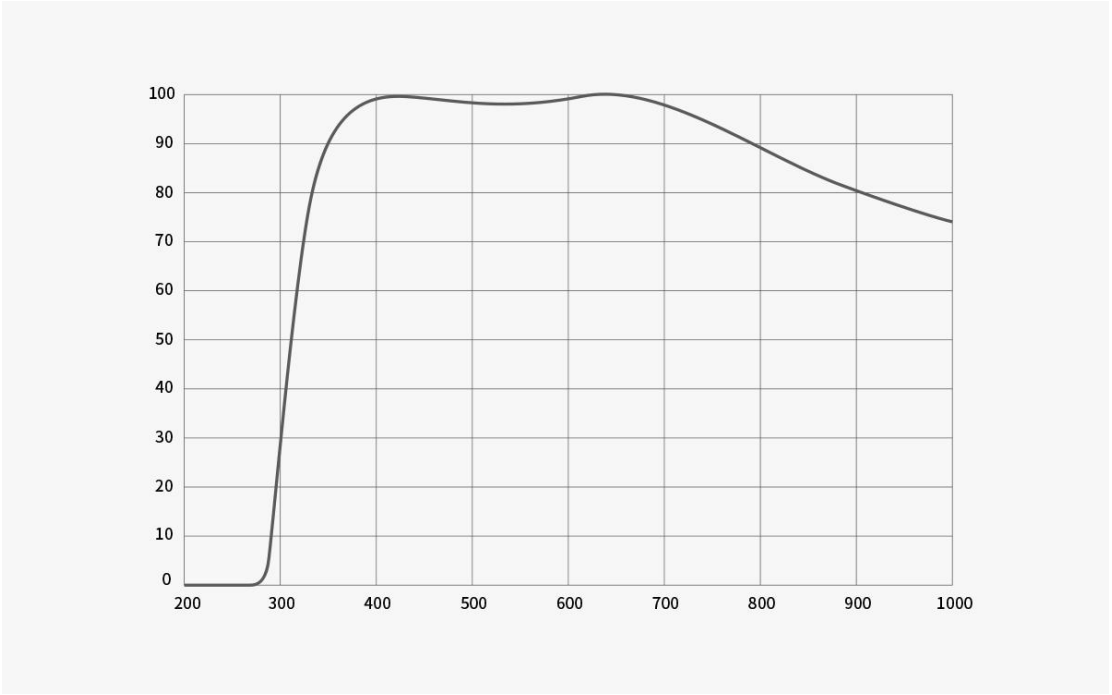
Read Noise

Read noise contains pixel noise, circuit noise and ADC noise. The lower the read noise is, the better. You may see from the chart below that ASI664MC has very low read noise. It has a built-in HCG mode, which can effectively reduce read noise at high gain and keep the dynamic range at the same level as it does at low gain. At gain 252 and above, the HCG mode is automatically turned on; the dynamic range is close to 11bit; the read noise can be lower than 1.0e.



3.4 Protective Window

ASI664MC has an AR-coated protective window in front of the sensor. Its thickness is 1.1mm and diagonal is 21mm. It can protect the sensor from dust or dew.



3.5 Analog to Digital Converter (ADC)

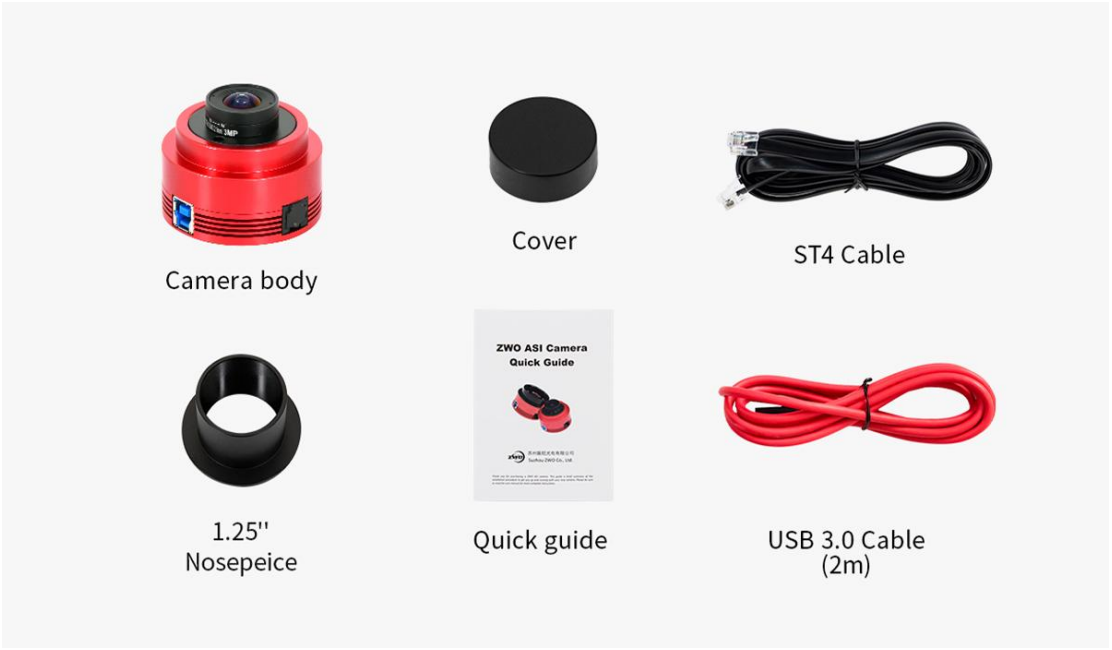
ASI664MC records in 12bit ADC and 10bit ADC. You can image at a faster frame rate if you use 10bit ADC (high speed mode). You may also set an ROI if you want even faster frame rates.

Resolution	USB3.0			USB2.0		
	Normal mode: 12BIT ADC		High-speed mode: 10BIT ADC	Normal mode: 12BIT ADC		High-speed mode: 10BIT ADC
	RAW16	RAW8	RAW8	RAW16	RAW8	RAW8
2704 x 1536	47.4fps	65.3fps	94.8fps	5.2fps	10.4fps	10.4fps
1920 x 1080	91.4fps	91.4fps	142.6fps	10.4fps	20.9fps	20.9fps
1280 x 720	133.6fps	133.6fps	208.5fps	23.5fps	47.0fps	47.0fps
640 x 480	192.9fps	192.9fps	301.2fps	70.5fps	141.2fps	141.2fps
320 x 240	347.3fps	347.3fps	542.1fps	283.3fps	347.3fps	542.1fps

3.6 Power consumption

All ASI cameras have low power consumption. ASI664 is no exception. When it is powered with a USB cable, the max power consumption is only 1.36W.

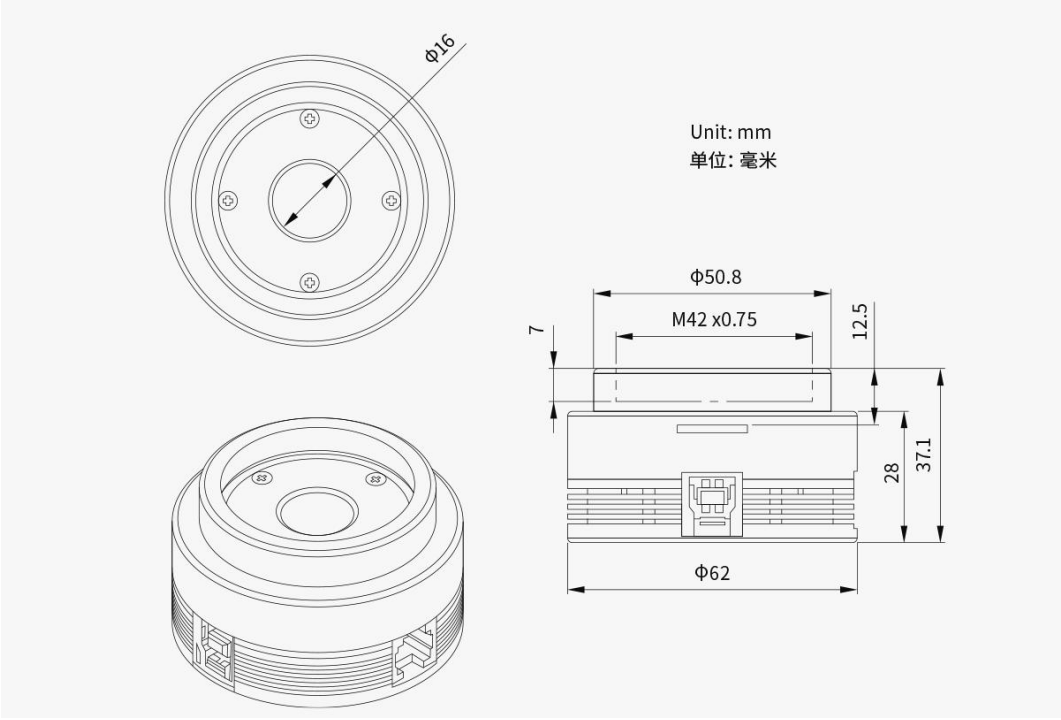
4 What's in the Box?



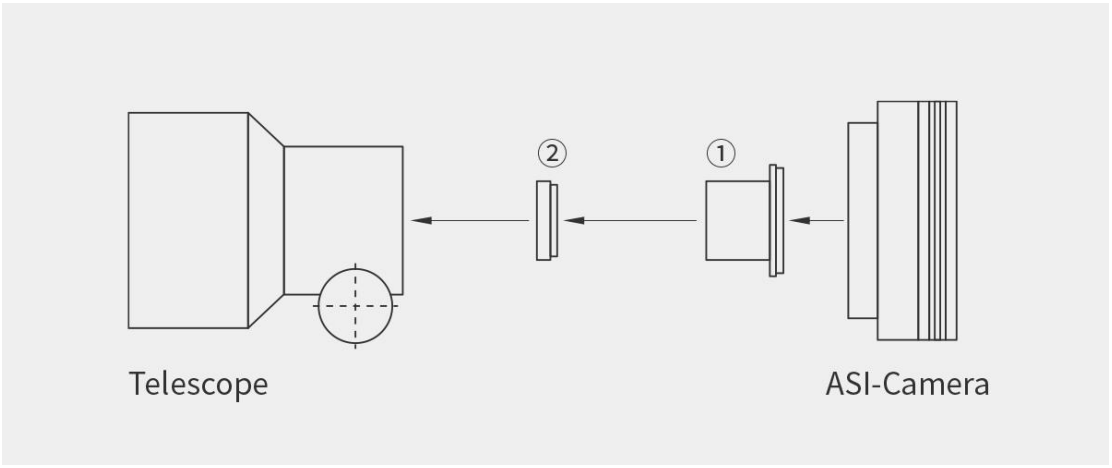
Equipped with a 2m USB cable that can be used to connect the computer and the camera for guiding.

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.