

# ASI2600MC/MM DUO Manual



Thank you for purchasing ZWO ASI camera! Please make sure you've read this manual before you use the product.











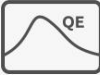
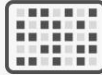
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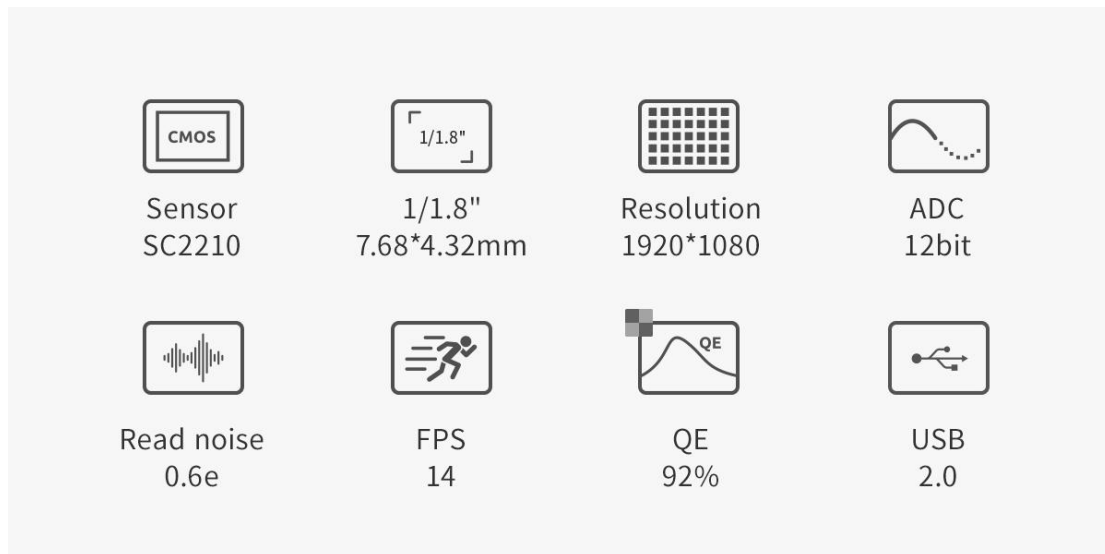
## 1 Product Introduction

ASI2600MC/MM Duo integrates a main sensor and a guide sensor into one camera.

 Sensor IMX571	 APS-C 23.5×15.7mm	 Resolution 6248×4176	 ADC 16bit
 Read noise 0.9e-4.2e	 Cooling Tempe 30-35°C	 DDR3 Buffer 512MB	 USB 3.0
 FPS 15(RAW8)	 Full well 50Ke	 QE Mono91% Color80%	 Pixel Size 3.76µm

**The main Sensor:** The main sensor is a Sony IMX571 CMOS equipped with STARVIS technology. It features an APS-C format, a native 16bit ADC and a dynamic range of up to 14stops. The 3.76µm small pixel accommodates a large full depth of 50Ke. The readout noise can be as low as 0.9e, and what can be more surprising is that it has absolutely no amp glow!

Note: The default full well capacity of ASI2600MC/MM Duo is 50Ke. But at the gain value of -25, the full well capacity will be expended to 73Ke.



**Guide sensor:** The guide sensor is a type 1/1.8 sensor SC2210 (7.68mm width by 4.32mm height). It has 4um x 4um pixels with an array of 1920x1080. As equipped with new technology, the guide sensor has a superb near-infrared sensitivity. Its full well capacity reaches 8780e, and the peak QE reaches 92% at 500nm. The readout noise is as low as 0.6e.

### Two in One Design

Thanks to the compact design, the ASI2600MC/MM Duo only needs one USB cable for control. It reduces potential cabling issues and improves setup convenience. You don't need a separate set of OAG and guide camera for your guide system anymore.



### Tilt Adjustment from Rear (Optional)

The 3 sets of the push and pull screws from the rear side make the camera tilt adjustment much easier without the trouble of removing the camera from the whole assembly.



**Performance Improvement**

Let's compare the specifications of ASI2600MC/MM Pro and ASI2600MC/MM Duo side by side.

	ASI2600MC/MM Duo	ASI2600MC/MM Pro
Sensor	SONY IMX571 SC2210	SONY IMX571
Max FPS	15 FPS (RAW8)	12.80 FPS (RAW8)
Full well	50Ke-Over 73Ke-at extended full well mode	50Ke
DDR3 buffer	512MB	512MB
Adapter	M54×0.75	M42×0.75
Guiding Mdule	Y	N

Note: The default full well capacity of ASI2600MC/MM Duo is 50Ke. But at the gain value of -25, it will be expended to 73Ke.

**STARVIS technology**

The main sensir of ASI2600MC/MM Duo is based on Sony STARVIS technology which reduces the amp glow. Sony's back-illuminated CMOS image sensor improves its sensitivity and noise reduction – these two are the key

factors in enhancing image quality.



Traditional CMOS sensors produce a weak infrared light source during exposure, which is quite often seen in the corners of uncalibrated images. It is the tell-tale sign of amp glow. As the main sensor of ASI2600MC/MM Duo uses zero-amp glow design, you won't have to worry about amp glow when taking images with high gains or long exposure times.



#### **Native 16bit ADC**

The main sensor of ASI2600MC/MM Duo has a native 16-bit ADC. It can really achieve a dynamic range output of 14stops with single frames, which will significantly improve the image sharpness and contrast, and also create smoother and more natural color transitions.

#### **Frame Rate**

ASI2600MC/MM Duo's max FPS in RAW 8 high speed mode is 15FPS at full resolution, which is even quicker compared to ASI2600MC/MM Pro.

## 2 Notice for Use

Before you use the camera, please read the guide below.

All ASI DSO cameras need to be powered via DC12V@3A~5A power supply (D5.5x2.1mm, center positive). Or you can also use a 11V~14V lithium battery. Please note the power supply exceeding the range above will probably lead to irreversible damages to the camera.

Storage temperature	-10°C ~ 60°C
Storage humidity	20% ~ 95%
Operating temperature	-5°C ~ 50°C
Operating humidity	20% ~ 80%

Please do not use any corrosive solutions to clean the camera to avoid damaging the camera. Also don't expose the camera directly to the sun for long time to avoid surface discoloration.

## 3 Getting to Know Your Camera

### 3.1 Appearance



1. Heat sink
2. Focus knob for guide sensor
3. Sensor tilt adjustment plate: M54x0.75, 5mm thickness, removable.
4. Protective window: D60x2mm, UV/IR CUT (Color) ; D60x2mm, AR (Mono)
5. USB-B 2.0 port
6. USB-B 3.0 Hub
7. DC power port: D5.5x2.1mm, center positive. 12V 3A power supply is recommended.
8. Ultra-quiet magnetic cooling fan.



### 3.2 Specification

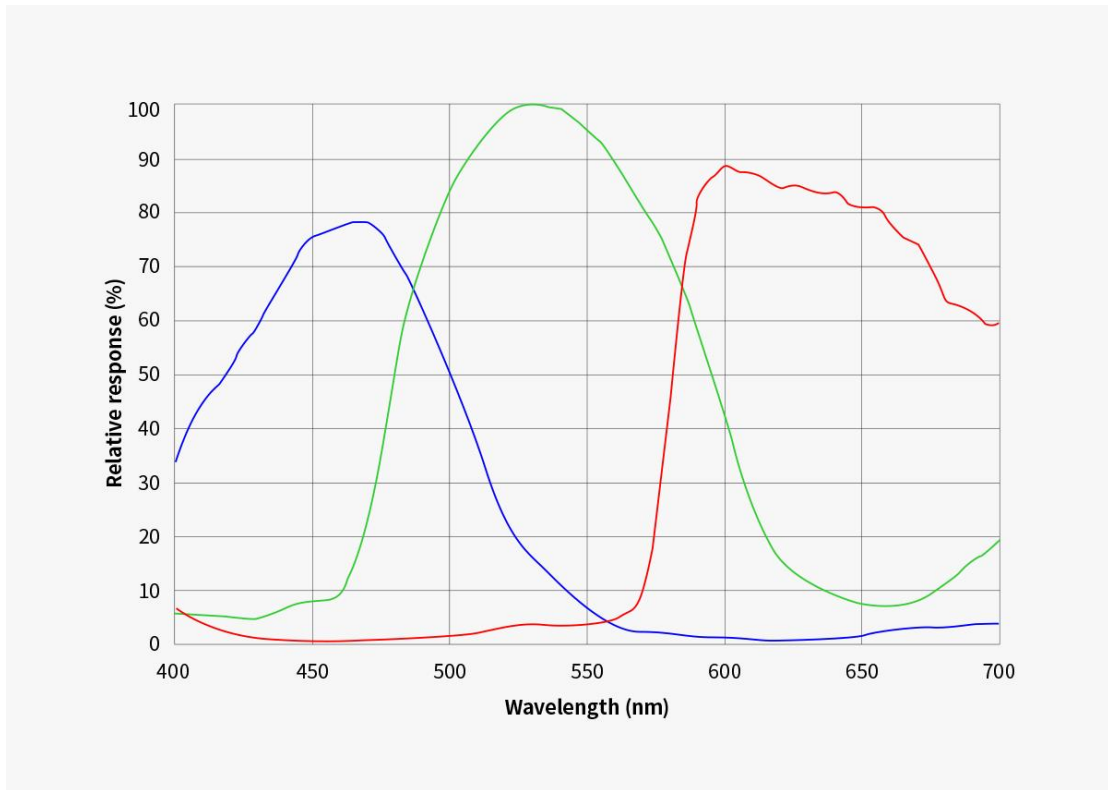
	Main Sensor	Guide Sensor
Sensor	SONY IMX571	SC2210_BW
Color & Mono	Color/Mono	Mono
Sensor format	APS-C	Type 1/1.8
Diagonal	28.3mm	8.81mm
Resolution	26MP 6248x4176	2.07MP 1920x1080
Pixel size	3.76 $\mu$ m	4 $\mu$ m
Sensor size	23.5mmx15.7mm	7.68mmx4.32mm
Max FPS at full resolution	15fps	16.9fps
Shutter	Rolling shutter	Rolling shutter
Exp range	32 $\mu$ s-2000s	32 $\mu$ s~10s
Readout noise	0.9-4.2e (1.3e@10db gain)	0.6-3.2e (1.97e@10.6db gain)
QE peak	80%(Color) ; 91%(Mono)	92% at 500nm
Full depth	73Ke*	8.78Ke
ADC	16bit	12bit
DDR3 buffer	512MB	\
USB port	USB-B 3.0	\
Adapter	M54x0.75	\
Protective window	UV/IR CUT (Color) ; AR (Mono)	
Camera diameter	90mm	
Camera weight	715g	
Back focus distance	17.5mm	
Cooling	Two-stage TEC cooling	\
Delta T	30°~35°@30°C ambient temperature	\
Cooling power load	12V, peak current 3A	\
Supported OS	Windows, Linux & Mac OSX	
Max power consumption	12V power: 27.48W	USB power: 0.46W

\*Note: The default full well capacity of ASI2600MC/MM Duo is 50Ke. But at the gain value of -25, it will be expended to 73Ke.

### 3.3 Quantum Efficiency & Readout Noise

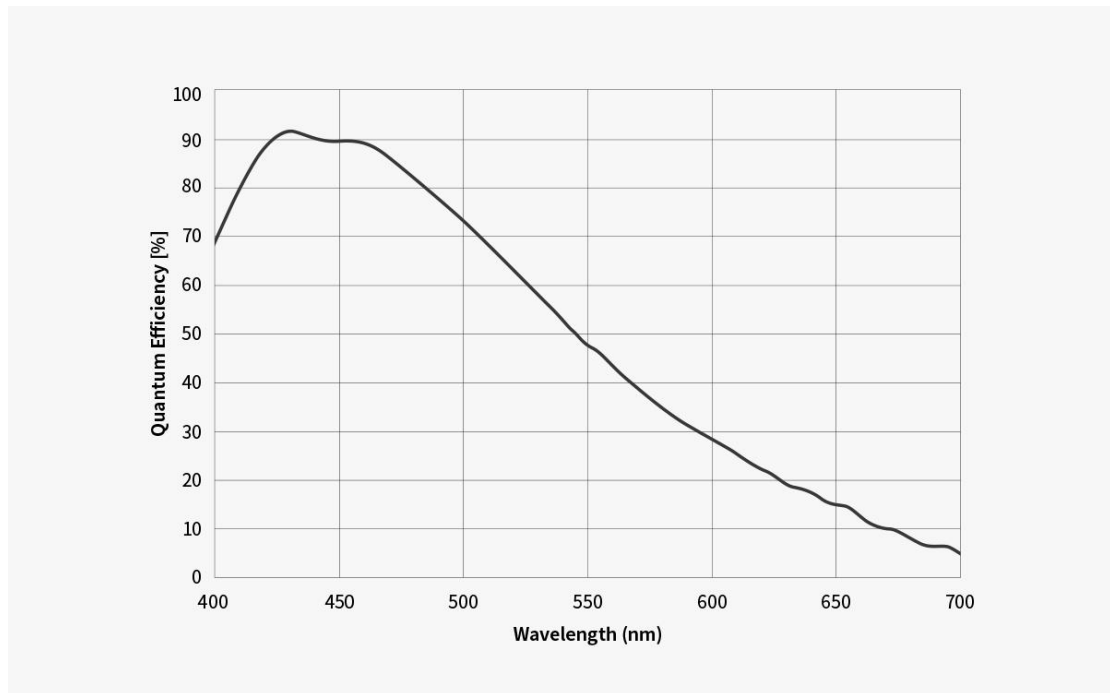
#### Quantum Efficiency

The main camera QE peak value of ASI2600MC Duo is measured by ZWO to be about 80%.

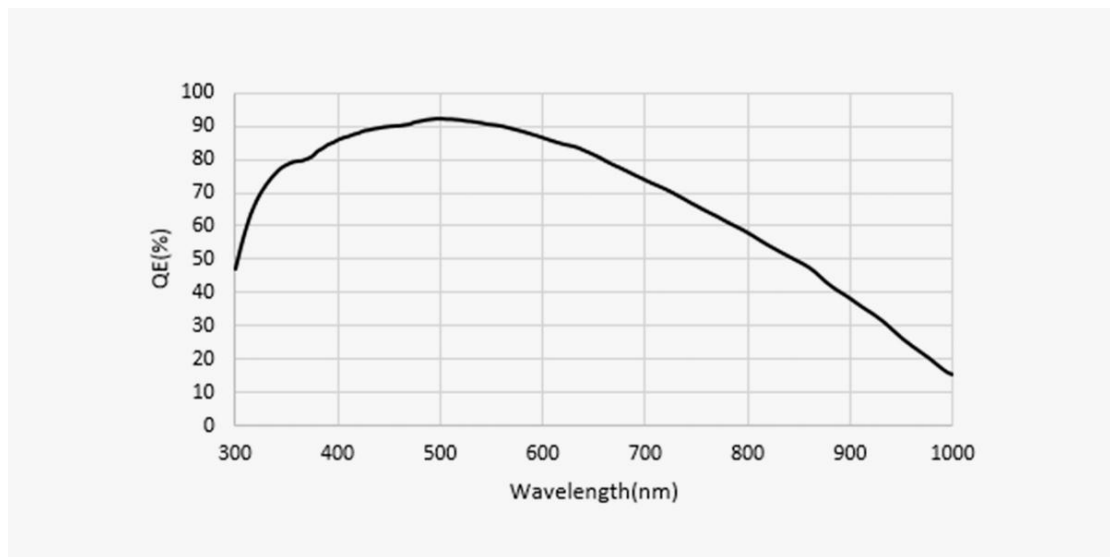


Main sensor (ASI2600MC Duo)

The main camera QE peak value of ASI2600MM Duo is measured by ZWO to be about 91%.



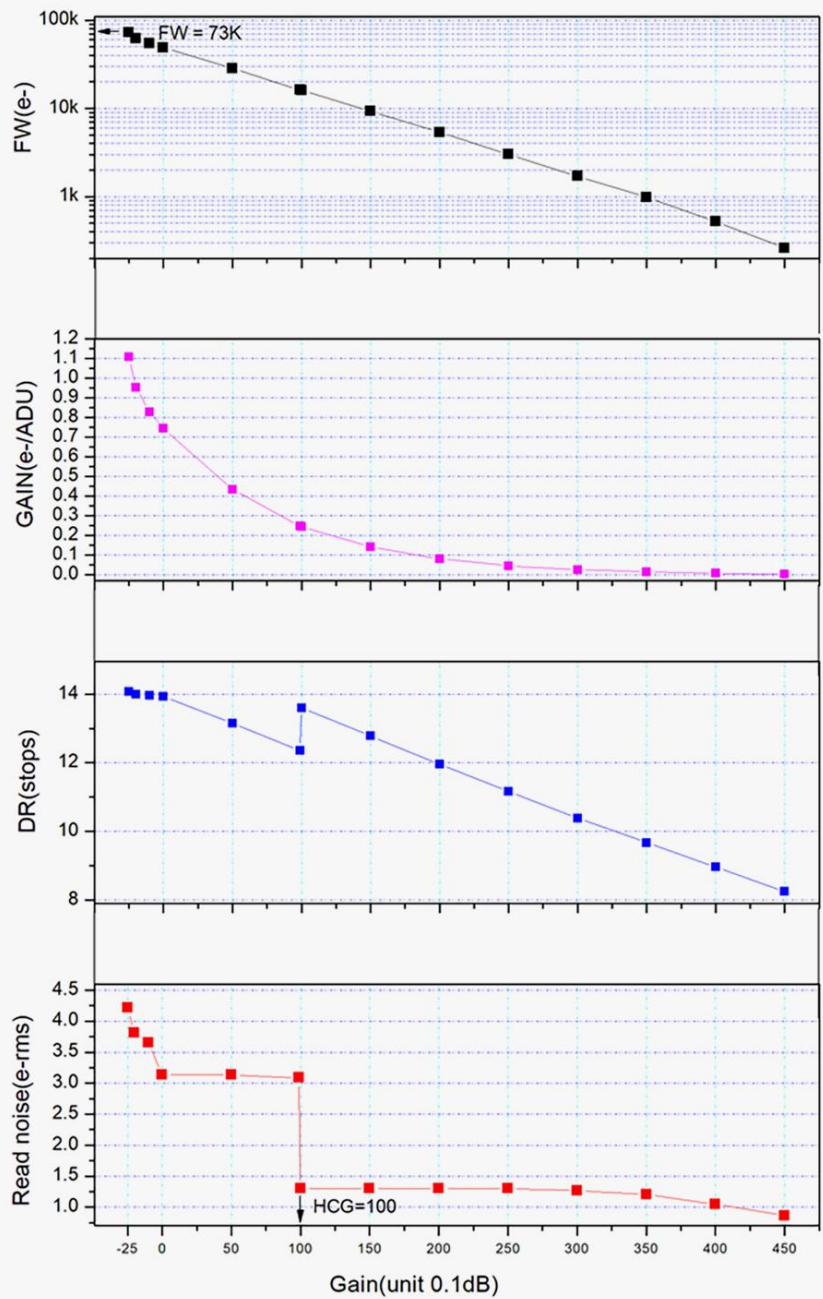
Main sensor (ASI2600MM Duo)



Guide sensor

### Readout Noise

**Extended full well mode:** The full well capacity of ASI2600MC/MM Duo will be extended to 73Ke when the gain value is set to -25. The image might not reach full saturation at the extreme case if the full well capacity exceeds 73Ke.



### 3.4 Analog to Digital Converter (ADC)

ASI2600MC/MM Duo has a built-in 16bit ADC. It supports partial sensor readout mode of custom ROI. Faster frame rate will be available at small ROI resolutions.

Below are the MAX frame rates of ASI2600MC/MM Duo at different USB ports and different ADC modes.

ASI2600MC/MM Duo Frame Rates						
	USB-B 3.0			USB-B 2.0		
	Normal mode: 16bit ADC		High speed mode: 12bit ADC	Normal mode: 16bit ADC		High speed mode: 12bit ADC
Resolution	RAW16	RAW8	RAW8	RAW16	RAW8	RAW8
6248x4176	6.1fps	6.1fps	15fps	0.85fps	1.64fps	1.70fps
4096x3072	8.2fps	8.2fps	30.2fps	1.79fps	2.75fps	3.44fps
4096x2160	11.6fps	11.6fps	42.8fps	1.96fps	4.89fps	4.89fps
3840x2160	11.6fps	11.6fps	42.8fps	2.61fps	5.2fps	5.2fps
1920x1080	22.8fps	22.8fps	83.7fps	10.4fps	20.9fps	20.9fps
1280x720	33.4fps	33.4fps	122.9fps	23.5fps	33.4fps	47fps
640x480	48.6fps	48.6fps	178.7fps	48.6fps	48.6fps	141.3fps
320x240	89.1fps	89.1fps	327.7fps	89.1fps	89.1fps	327.7fps

HardwareBin2 12Bit-ADC				
	USB-B 3.0		USB-B 2.0	
Resolution	RAW16	RAW8	RAW16	RAW8
3120x2088	6.1fps	6.1fps	0.83fps	1.71fps

HardwareBin3 12Bit-ADC				
	USB-B 3.0		USB-B 2.0	
Resolution	RAW16	RAW8	RAW16	RAW8
2080x1392	6.1fps	6.1fps	0.83fps	1.72fps

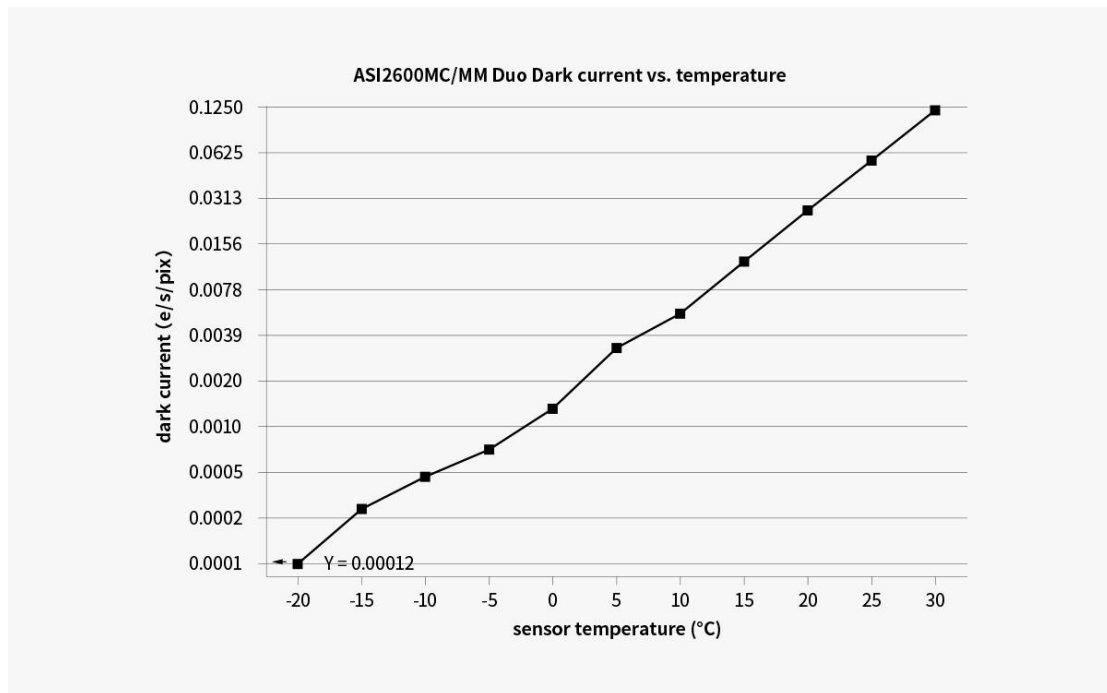
ASI220MM Mini Frame Rates		
	USB-B 2.0	
	Normal mode: 12bit ADC	
Resolution	RAW16	RAW8
1920x1080	8.5fps	16.9fps
1280x720	12.7fps	25.2fps
640x480	18.5fps	37fps
320x240	34.8fps	69.6fps

### 3.5 Cooling System

#### Two-stage TEC Cooling

The Cooling system of ASI2600MC/MM Duo camera can precisely control the sensor temperature. It can cool the CMOS sensor temperature to 30°~35° below ambient (Test result is achieved at 30°C environmental temperature), which can greatly reduce dark current. Even the camera is used for long-time exposure imaging sessions, it still gets low noise.

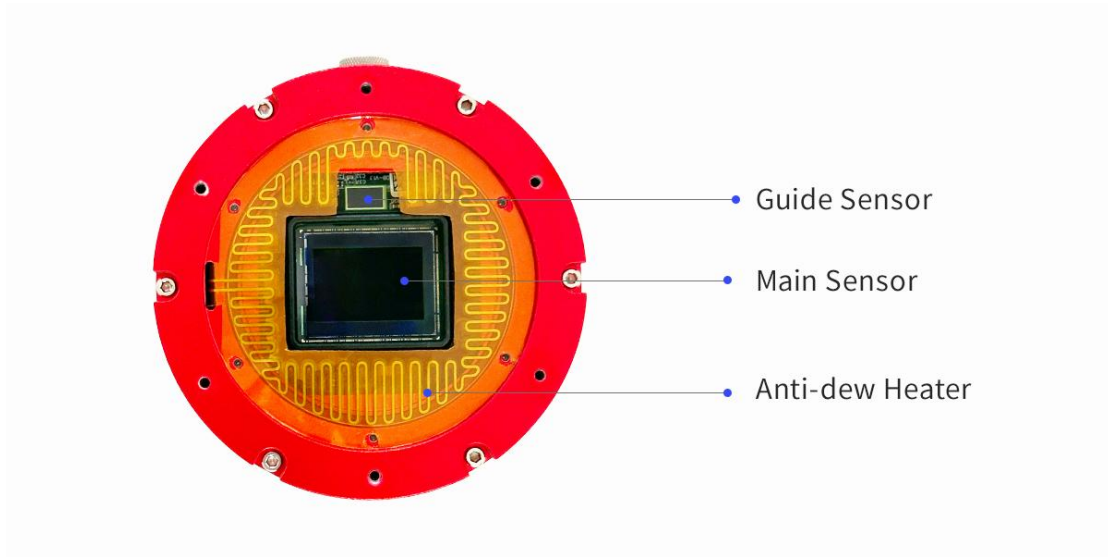
Note: The lower the environmental temperature is, the smaller the temperature difference value the camera will get.



### 3.6 Anti-Dew Heater

#### Heater on the Glass

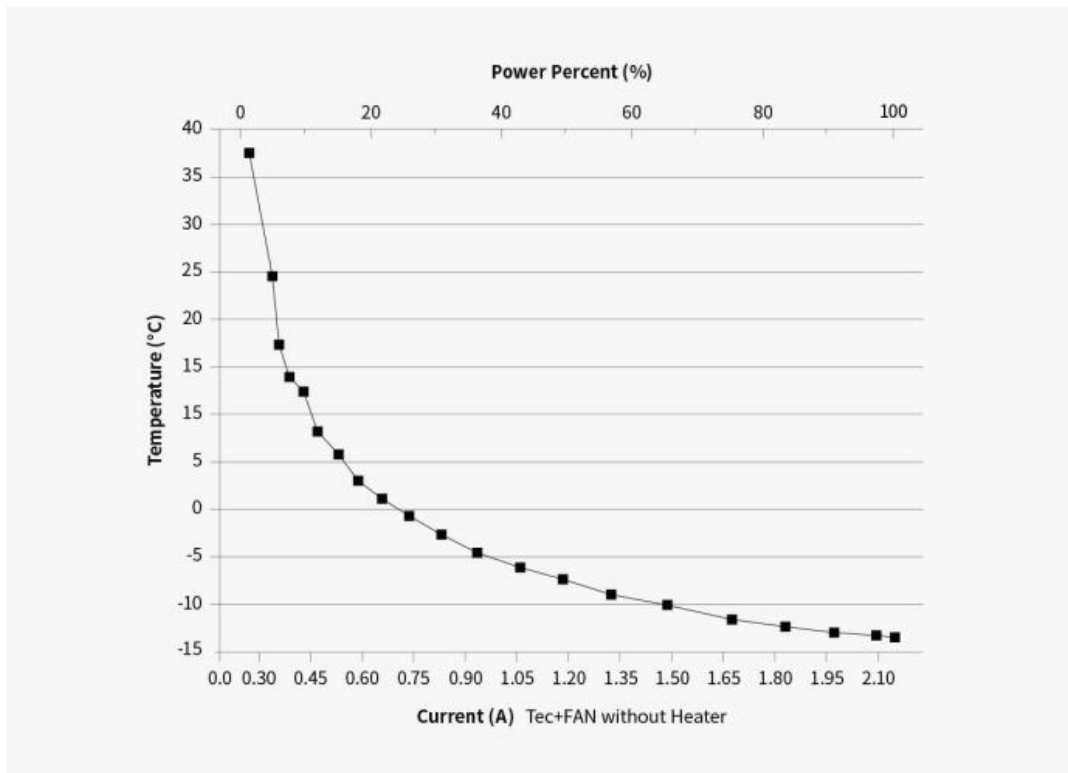
There is a polyimide heater completely fitting the protective window in the ASI2600MC/MM Duo camera. It can help avoid potential dew or icing issues. The power consumption of the heater is about 2.88W. You can turn it off in the imaging software to save power.



### 3.7 Power Consumption

ASI2600MC/MM Duo can be powered with a DC 12V@ 3A-5A adapter (D5.5x2.1mm, center pole positive), or a 11-14V lithium battery.

The cooling efficiency chart is as following figure shows:



Note: When the anti-dew heater is on, and the cooling temperature is at 22°C, the current of the heater is 240mA.

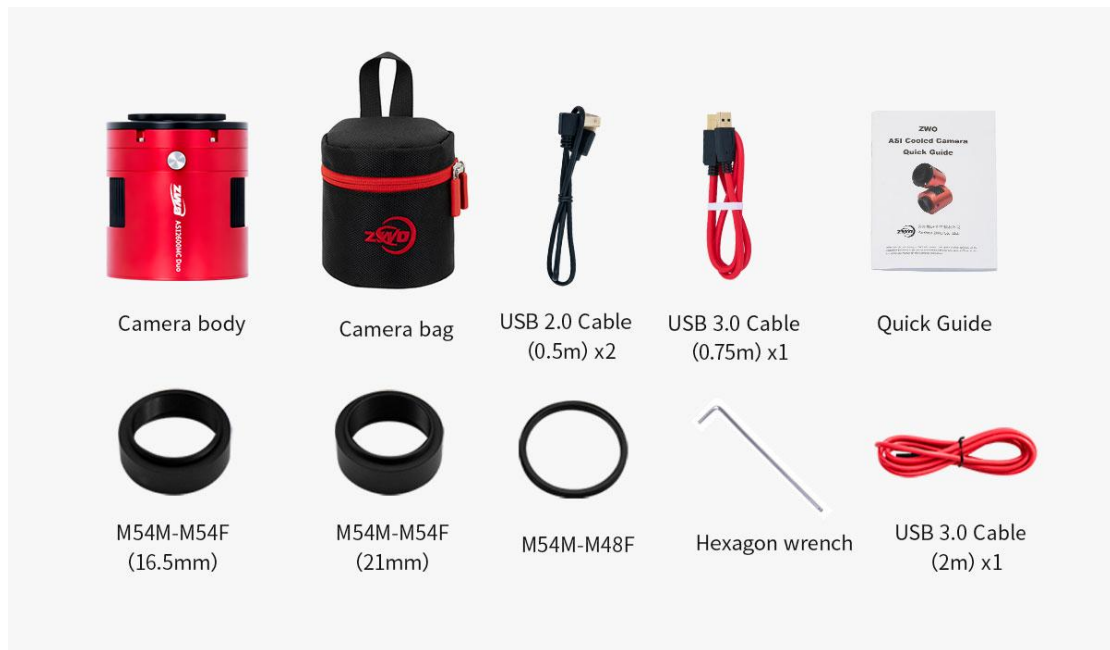
### 3.8 High-speed Buffer

With the match of USB 3.0 and 512MB DDR3 buffer, ASI2600MC/MM Duo provides stable and secure data transmission that can effectively avoid frame-dropping issues during long exposures.

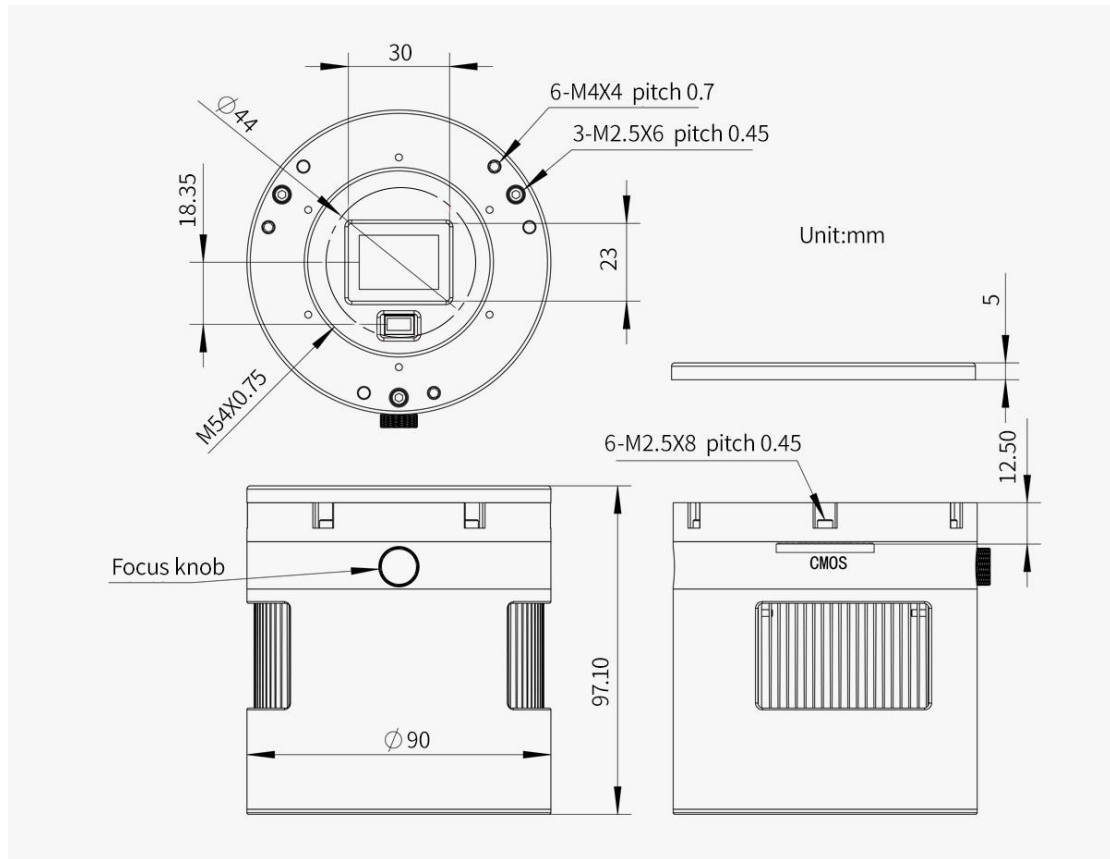




## 4 What's in the Box

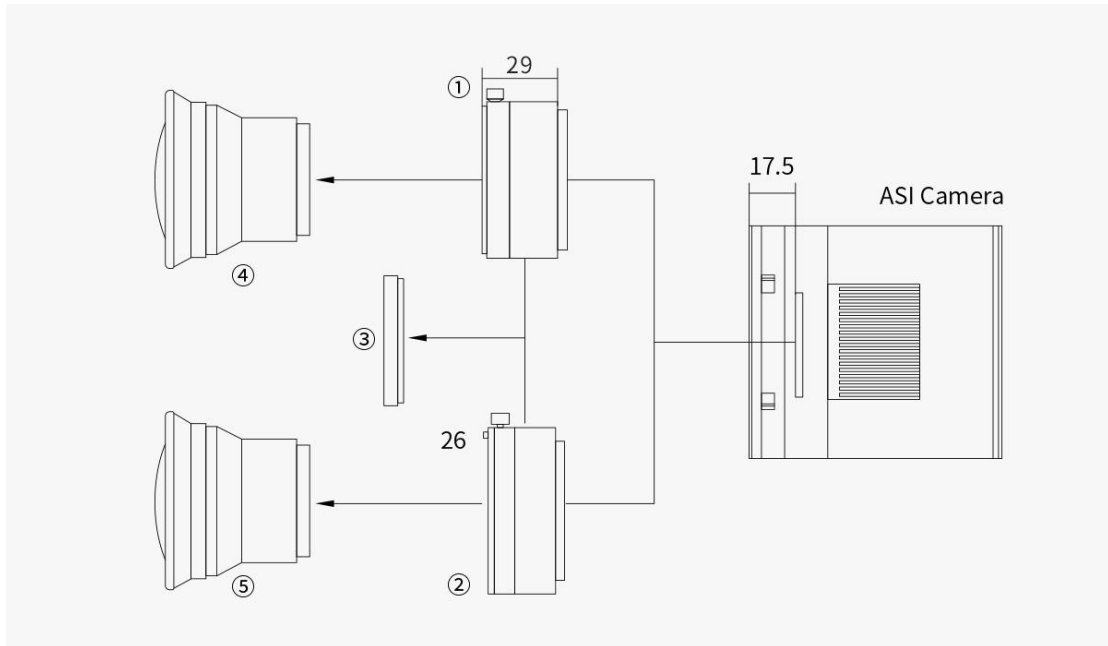


## 5 Mechanical Drawing



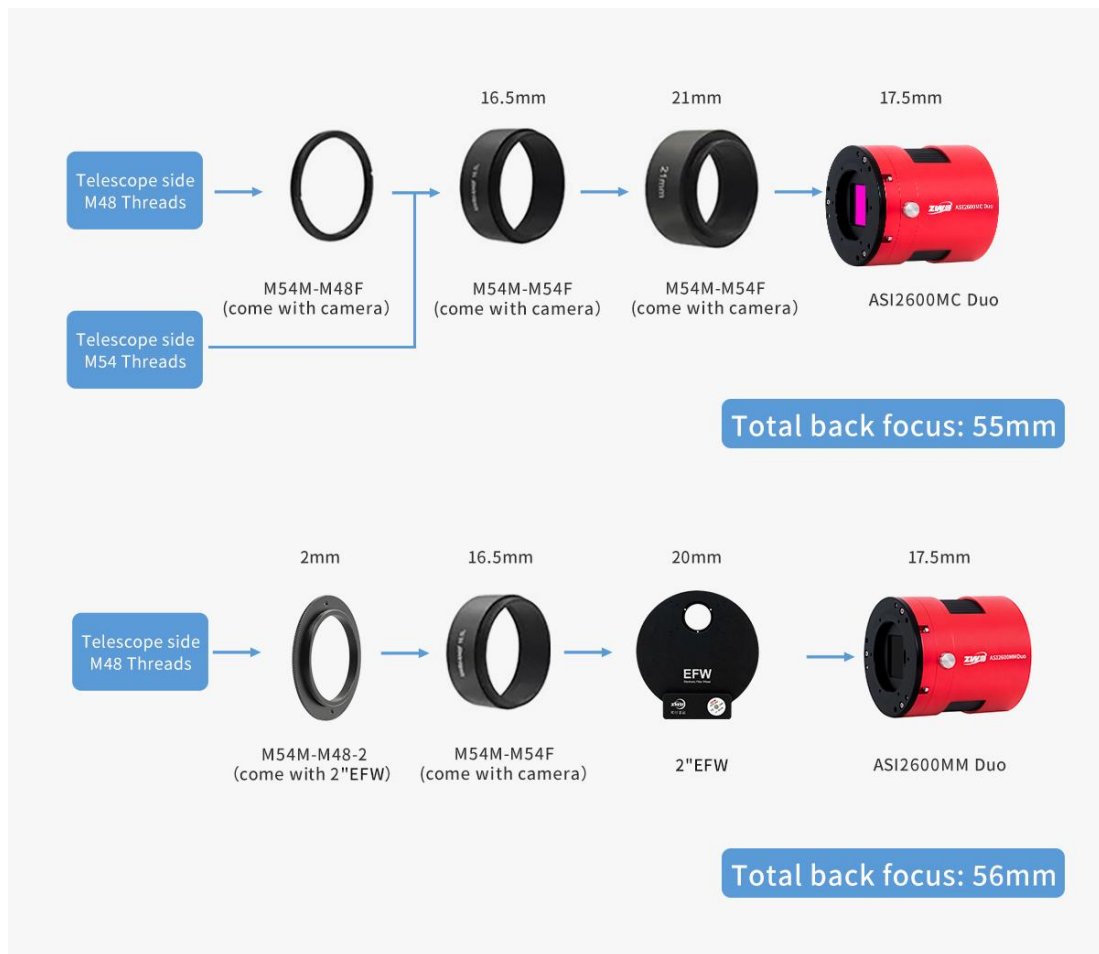
## 6 Connection Methods

### 6.1 Connect Nikon/Canon Lenses



- ① Nikon-T2 Adapter ② EOS-T2 Adapter ③ 2" Filter ④ Nikon Lenses ⑤ Canon Lenses

## 6.2 Solutions for 55mm back focus length



## 7 Warranty Policy

1. ZWO provides Users with a warranty period of 2 years for ZWO branded products. The warranty starts from the second day when the customer gets the product.

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 30 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. 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; or

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

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.); or

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

- 5) The product system is modified, or the maintenance notice is lost or changed; or
- 6) Product quality problem caused by installation not following the requirements or instructions for the Products; or
- 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); or
- 8) Damage caused by the improper Customer operation during the period of shooting or use, such as using without the equipment protection or direct shooting of the sun; or
- 9) No valid purchase invoice or warranty certificate; or
- 10) The Products are second-hand products.

## 8 After-sale Service

For software upgrades, please refer to “Support - Software” on our official website.

<https://astronomy-imaging-camera.com/>

Repairs and servicing are available by emailing [info@zwoptical.com](mailto:info@zwoptical.com)

For customers who bought the camera from your local dealer, dealer is responsible for the customer service.

Phone number: 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.