DSO Camera ASI585MC Pro
Product Manual

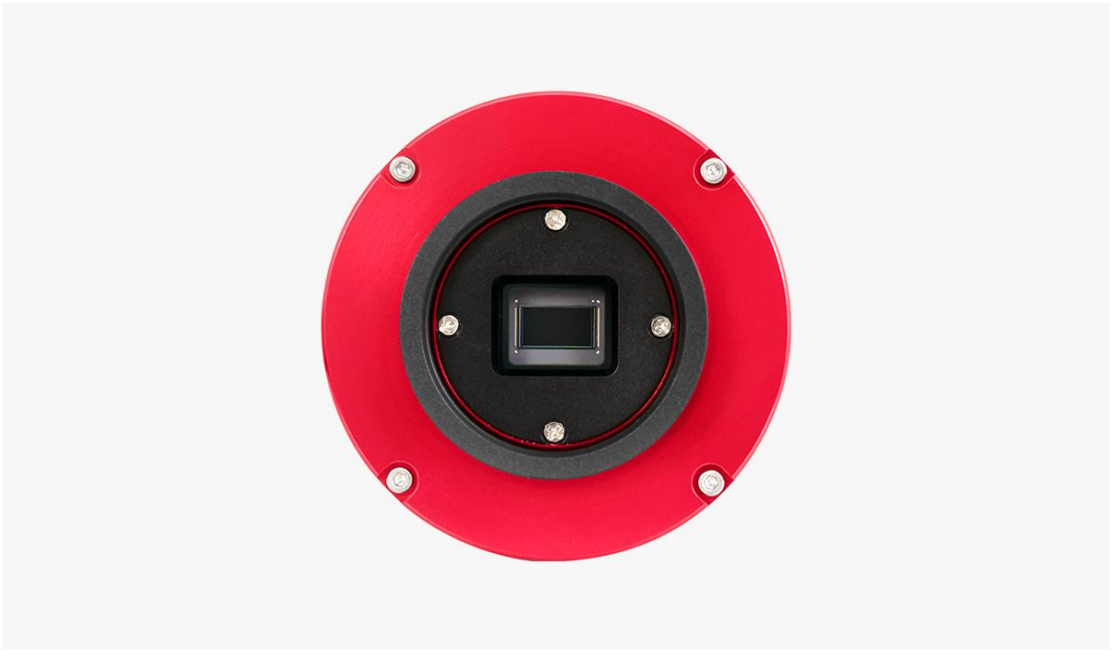
Thank you so much for purchasing ZWO ASI camera! Before using the product, please read this manual carefully.

Table of contents

1 Product Introduction

New DSO Camera with High Sensitivity

ASI585MC Pro is a new ZWO deep sky camera based on the 4k SONY CMOS sensor with a 1/1.2" format and 2.9μm pixels. It has a super high sensitivity and large resolution of 3840*2160 (8.29MP in total). It also features high transmission speeds - In high speed mode, the fast frame rate can reach 47fps at full resolution! Being an entry-level DSO camera, it offers great advantages of high cost-effectiveness.



DSO & Planetary Imaging

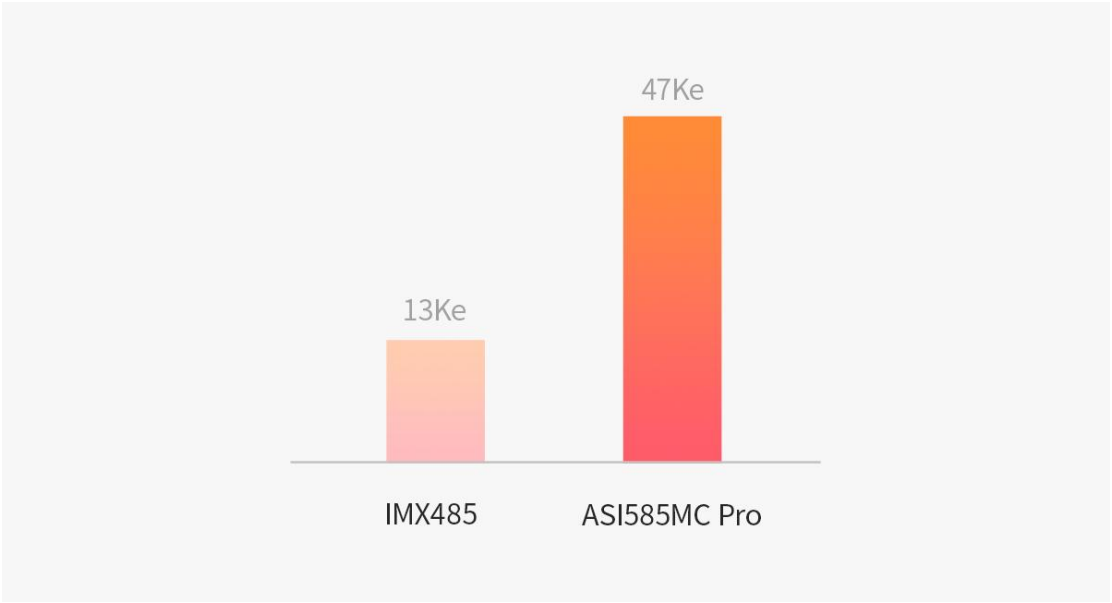
The STARVIS 2 technology brings ASI585MC Pro more advanced imaging performance compared to other cooled cameras. Its high frame rate makes it not only suitable for DSO photography but also solar/lunar/planetary photography.

STARVIS 2

STARVIS 2 was developed by SONY and evolved from STARVIS. It is the latest technology with a wider dynamic range and super-high sensitivity beyond the human eye. Benefiting from it, ASI585MC Pro's sensitivity and signal-to-noise ratio is greatly improved.

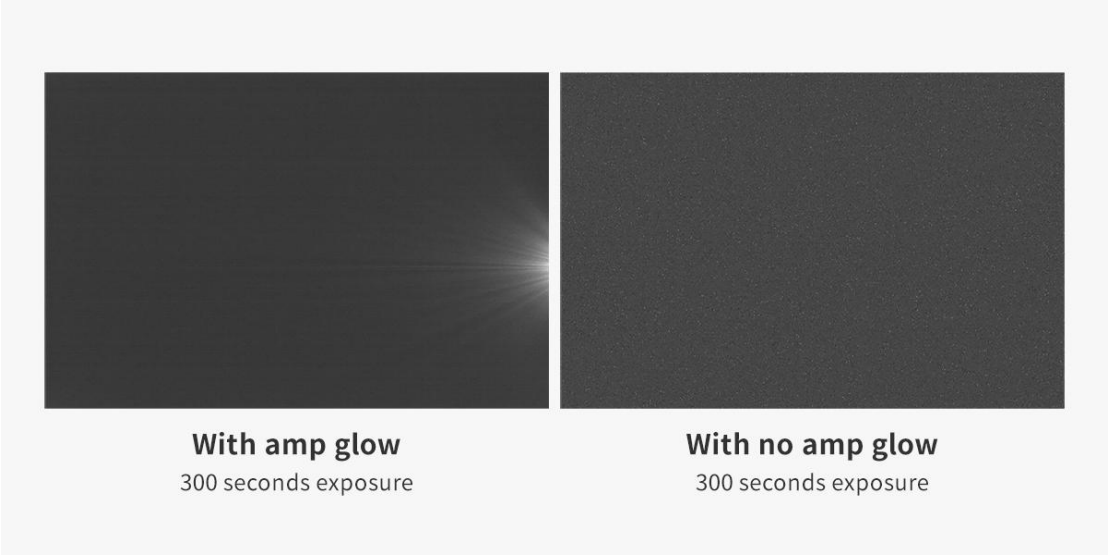
Large Full Well Capacity

The back-illuminated structure improves the camera's full well capacity. Even with unbinned 2.9μm pixels, ASI585MC Pro has a full well capacity of 47ke-, nearly 4 times of that of the last-generation sensor IMX485. A larger full well capacity gets the camera higher efficiency in collecting light, and can effectively restrain the highlight area from being overexposed, also can improve the signal-to-noise ratio.



No Amp Glow

ASI585MC Pro exhibits extremely clean dark frames with zero amp glow! No matter how long the exposure and how high the gain value is, you can easily get a clean and smooth astro images!



2 Notice for Use

Before using the camera, please read this manual carefully.

External power supplies are needed for all ASl cooled cameras. We recommend you use a 12V@3A~5A DC adapter (D5.5x2.1mm, center pole positive) or a lithium battery with 11-14V to power the camera. You can also use ASIAlR to power the cameras. Be aware that using power supply out of this voltage range will probably lead to irreparable damage to the camera.

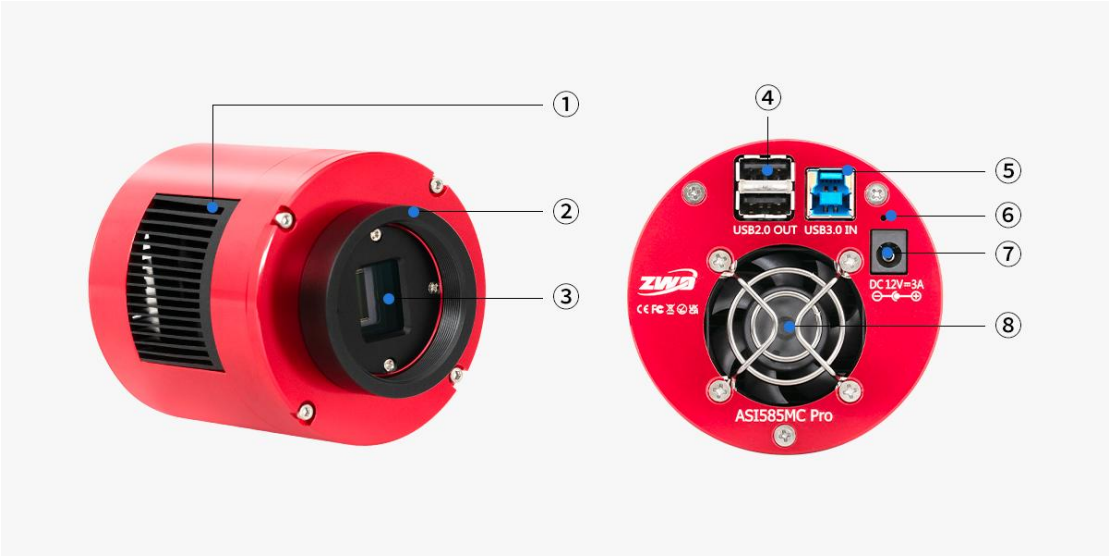
Note that the camera can only be used and stored under the following conditions. Usages out of the environment limits might lead to damage to the camera.

Storage temperature	-20℃ ~ 60℃
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. Heat sink
2. M42 11mm ring: Can be screwed off if needed.
3. AR protective window (D32*2mm)
4. USB 2.0 Hub
5. USB 3.0/USB 2.0 data transmission port
6. LED indicator
7. DC power port: D5.5x2.1mm, center pole positive. 12V@3A power supply is recommended to use.
8. Ultra-quiet magnetic levitation fan: Only runs when cooling is turned on.

The camera can be supported by the ZWO holder ring. There is a 1/4” screw interface at the base of the ring.

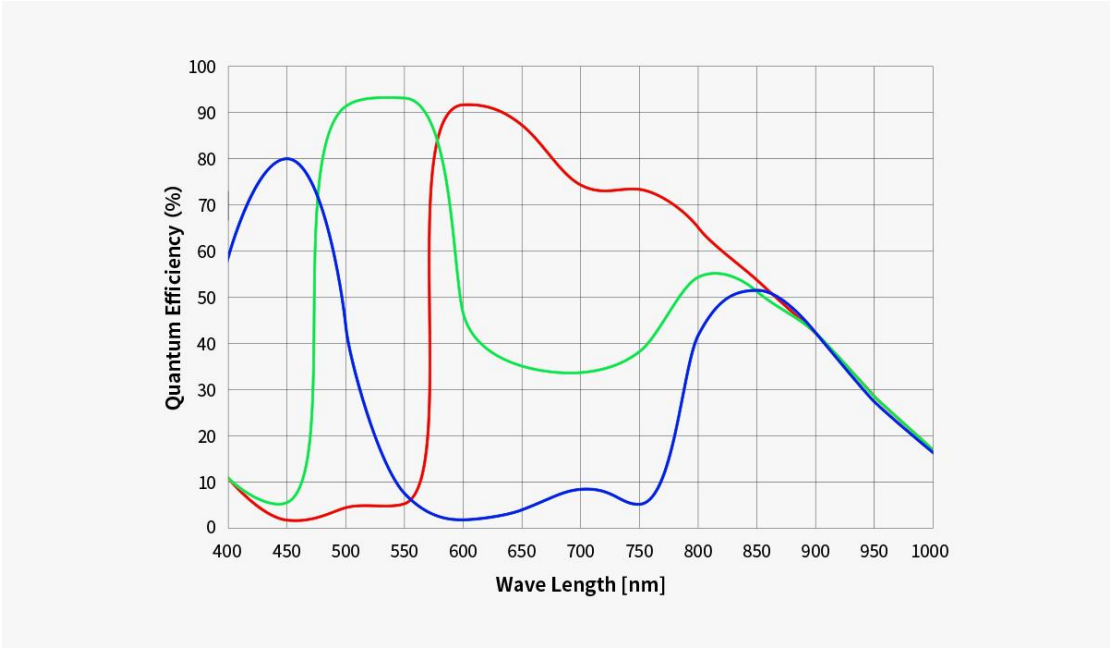
3.2 Camera Specifications

Sensor	Sony-IMX585
Sensor format	Type 1/1.2
Diagonal	12.84mm
Resolution	8.29MP (3840 x 2160)
Pixel size	2.9μm
Sensor size	11.136mm x 6.264mm
Max frame rate	47fps
Shutter	Rolling shutter
Exp range	32μs~2000s
Read noise	0.9-12e (2.4e@15db gain)
QE peak	91%
Full well capacity	47ke
ADC	12bit
DDR3 buffer	512MB
USB port	USB 3.0 Type-B
Connection adapter	M42 x 0.75 adapter
Protective window	D32-2 AR
Camera diagonal	φ78 x 73.5
Net weight	0.47kg
Back focus distance	17.5mm (11mm ring included) / 6.5mm
Cooling	2-stage TEC cooling
Delta-T	30°~35°@ environmental temperature 30°C
Power consumption (Cooling on)	12V, Max current 3A
Supported OS	Windows, Linux & Mac OSX

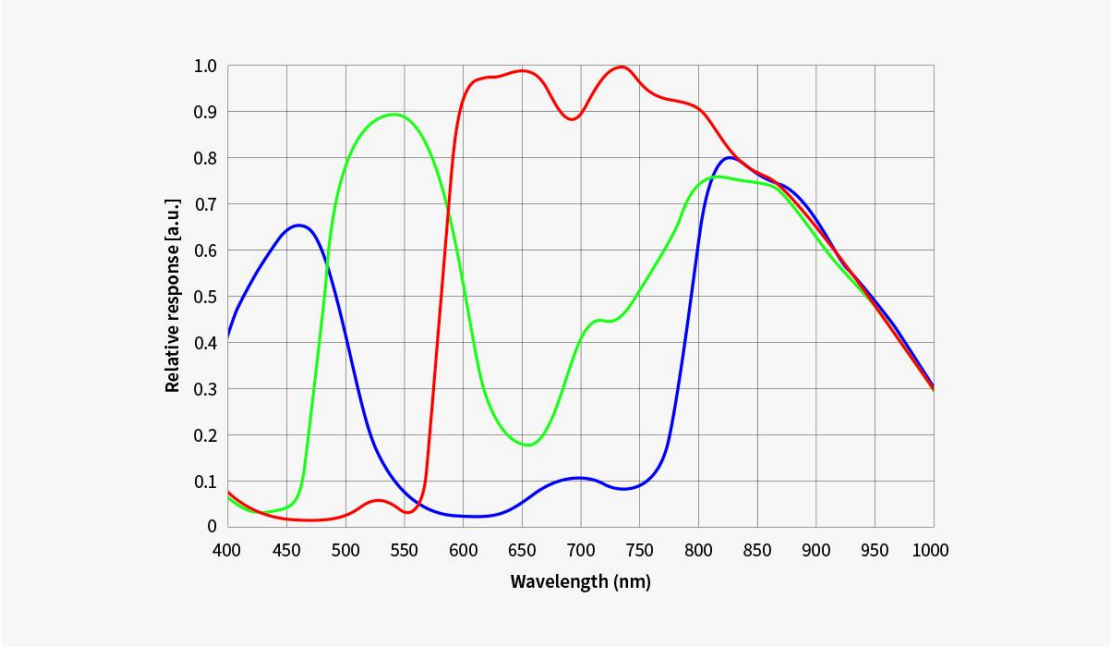
3.3 Quantum Efficiency & Read Noise

Quantum Efficiency

According to our test results, the QE peak value of ASI585MC Pro is 91%.



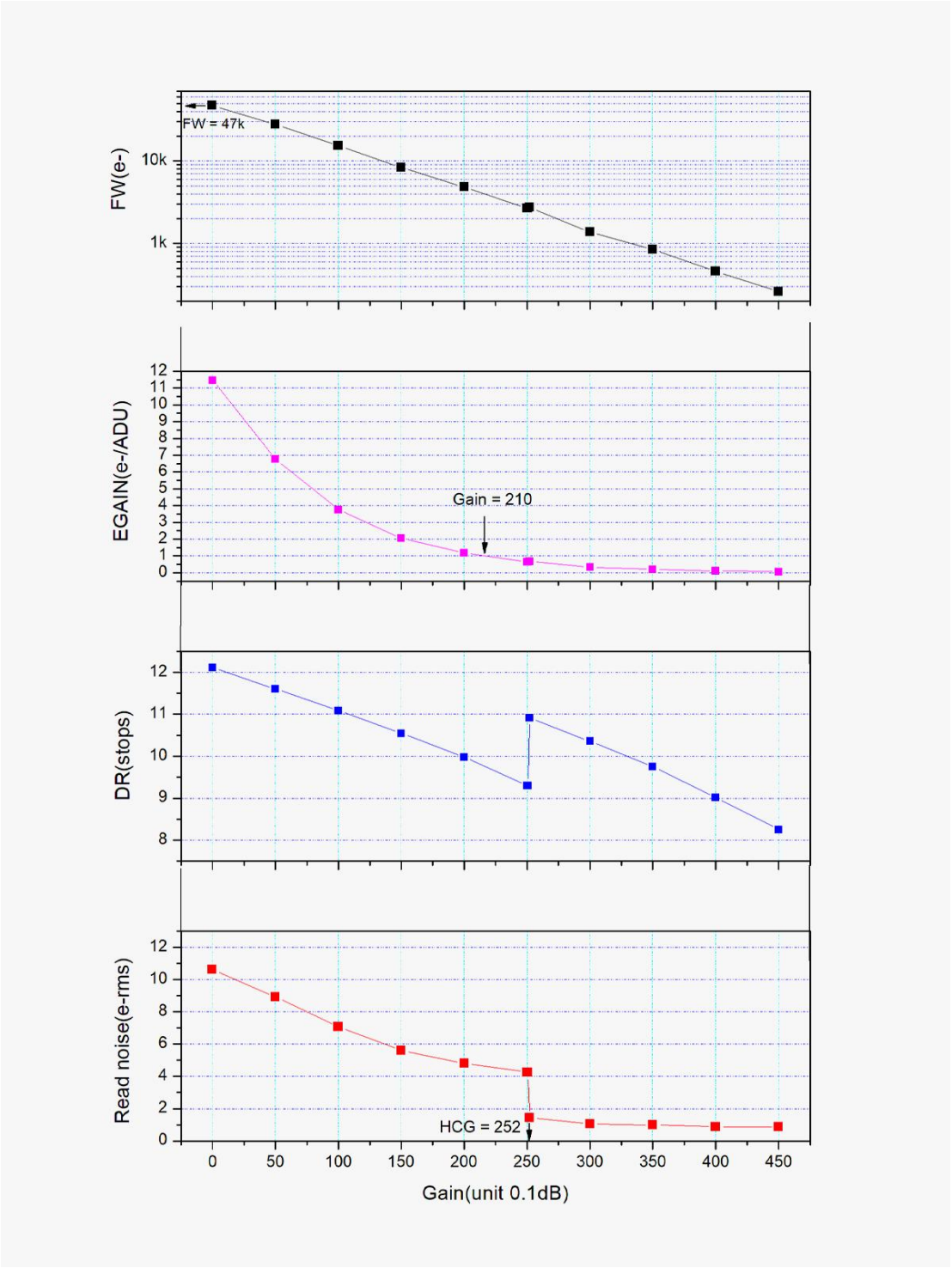
Quantum Efficiency



Relative Response

Read Noise

The camera 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 11 stops; the read noise can be lower than 0.9e.



3.4 Analog to Digital Converter (ADC)

ASI585MC Pro records in 12bit ADC and 10bit ADC. You can image at a faster frame rate if you use 10bit ADC (high speed mode). Or you may also set an ROI if you want even faster frame rates.

Below are the maximum speeds of ASI585MC Pro running at different USB transmission modes.

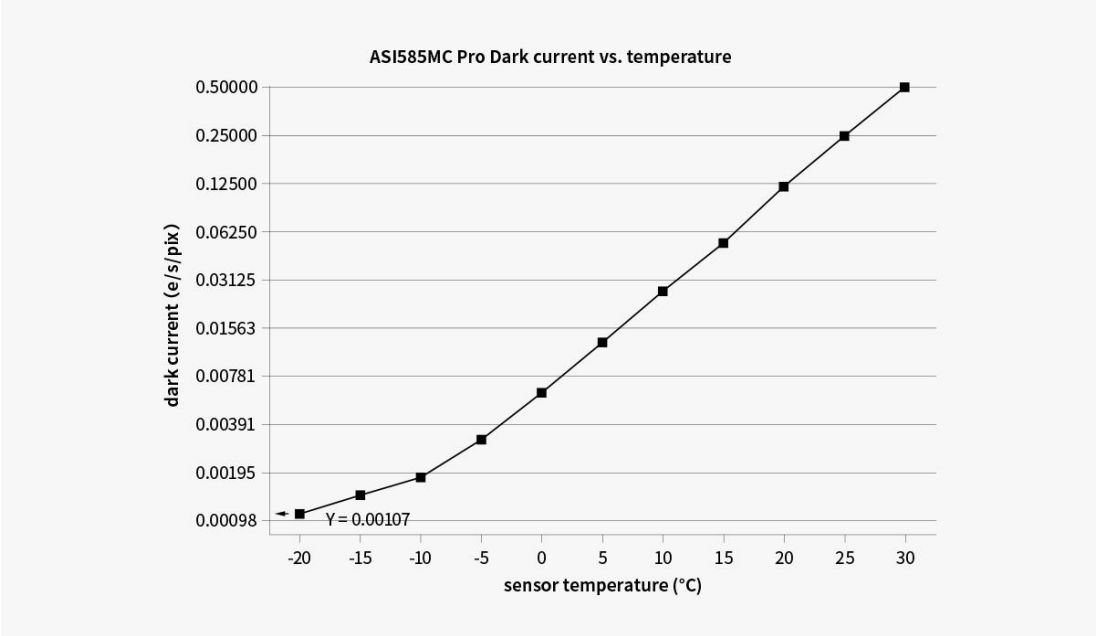
Resolution	USB 3.0			USB 2.0		
	Normal Mode: 12BIT ADC		High-speed Mode: 10BIT ADC	Normal Mode: 12BIT ADC		High-speed Mode: 10BIT ADC
	RAW16	RAW8	RAW8	RAW16	RAW8	RAW8
3840*2160	23.7fps	46.9fps	46.9fps	2.61fps	5.2fps	5.2fps
1920*1080	91.4fps	91.4fps	91.4fps	10.4fps	20.8fps	20.8fps
1280*720	133.5fps	133.5fps	133.5fps	23.5fps	47fps	47fps
640*480	192.9fps	192.9fps	192.9fps	70.5fps	141.3fps	141.3fps
320*240	347.3fps	347.3fps	347.3fps	283.1fps	347.3fps	347.3fps

3.5 Two-stage TEC Cooling

Thanks to the two-stage TEC cooling, ASI585MC Pro can lower the CMOS sensor temperature to more than 35 degrees Celsius below ambient temperature, which can greatly reduce dark current generation and sensor noise even during extended exposure times.

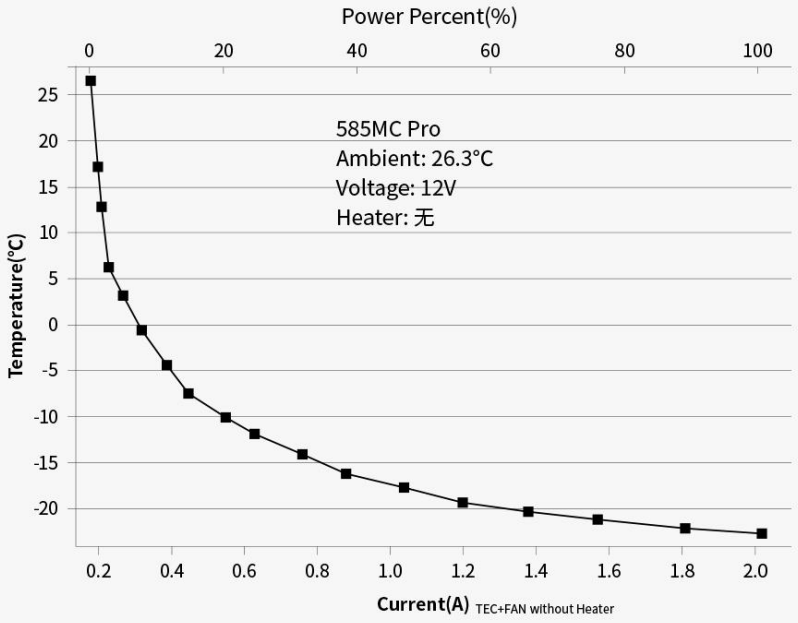
*The Delta T 35℃ is tested at 30℃ ambient temperature. It might get down when the cooling system is working for a long time. Also, as the ambient temperature falls, the Delta T would decrease.

Below is the dark current curve of ASI585MC Pro at the temperature from -20℃ to 30℃.



3.6 Power Consumption

All ASI cameras have low power consumption. ASI585MC Pro is no exception. When it's at cooling status, the max power consumption is only 2.865W.



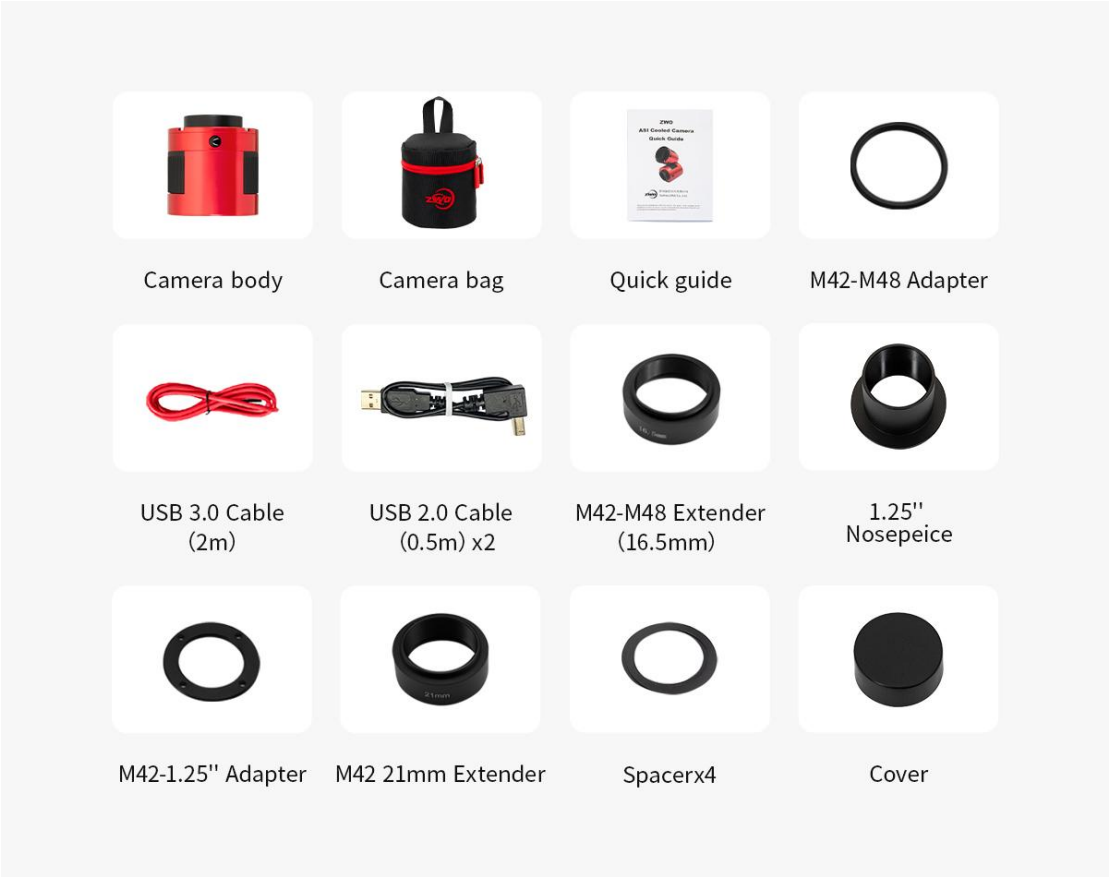
3.7 High Transmission Speed

512M DDR3 buffer: Can ensure a stable date transmission in the long exposure condition, minimizing frame drops and also reducing the requirements for the computer hardware.

USB 3.0 Port: Provides 5Gb bandwidth to allow ASI585MC Pro to run at 47fps at 8.29MP full resolution (10bit, high speed mode).

USB 2.0 HUB: Can be used to connect various kinds of USB devices such as EFW, guide camera and EAF.

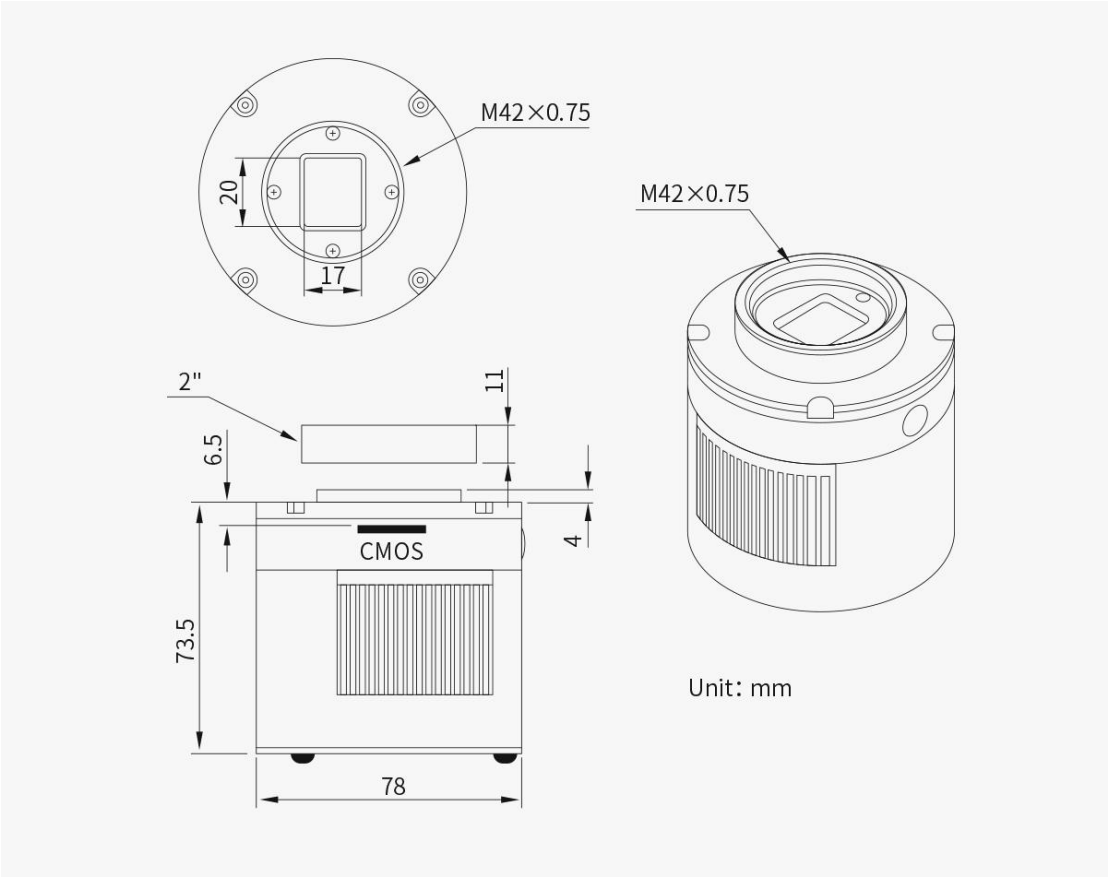
4 What's in the Box?



The 2m USB 3.0 cable and two 0.5m USB 2.0 cables can meet multiple requirements in different usage scenarios. For example, the 2m long cable can be used for guiding with a PC. The 0.5m short cables can be used to connect ASIAIR to the guide camera or EAF.

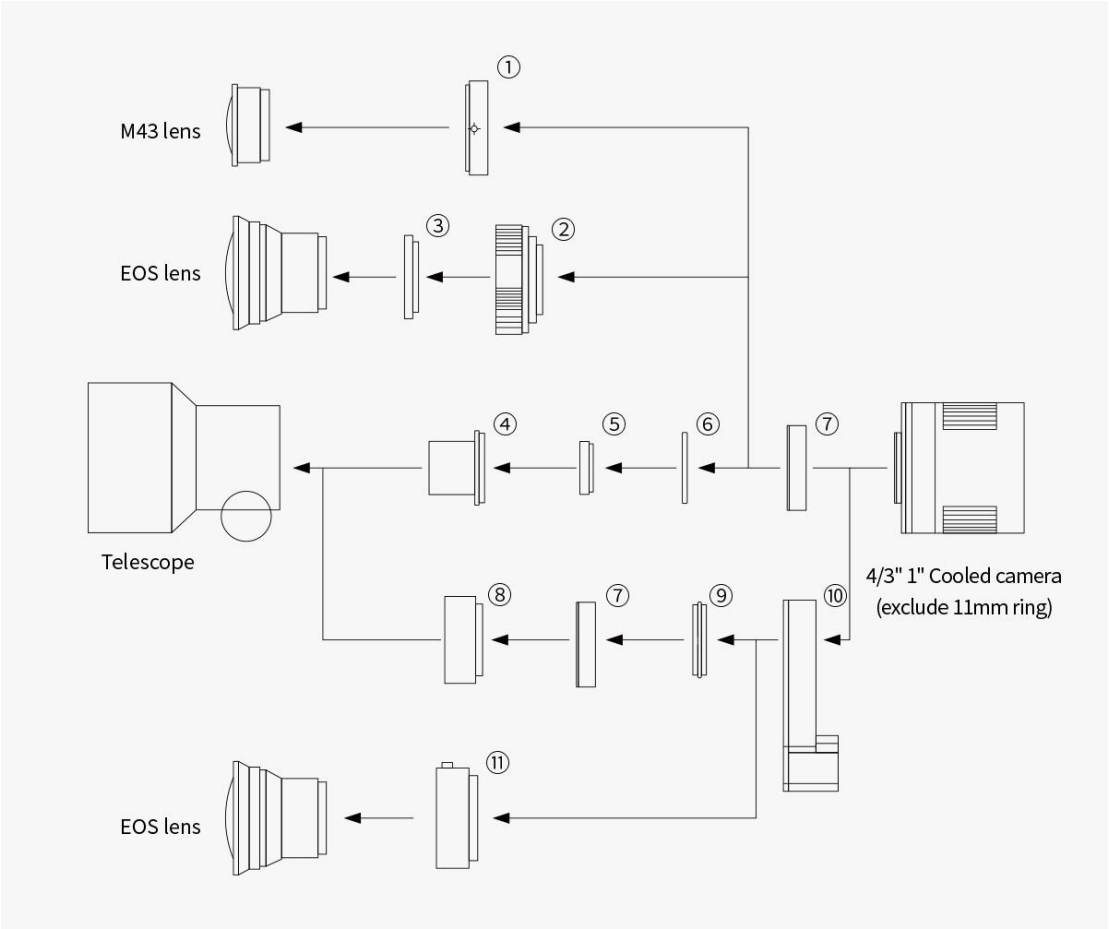
Spacers x4: 0.1mm *1; 0.2mm *2; 0.5mm *1

5 Structural Dimension Diagram



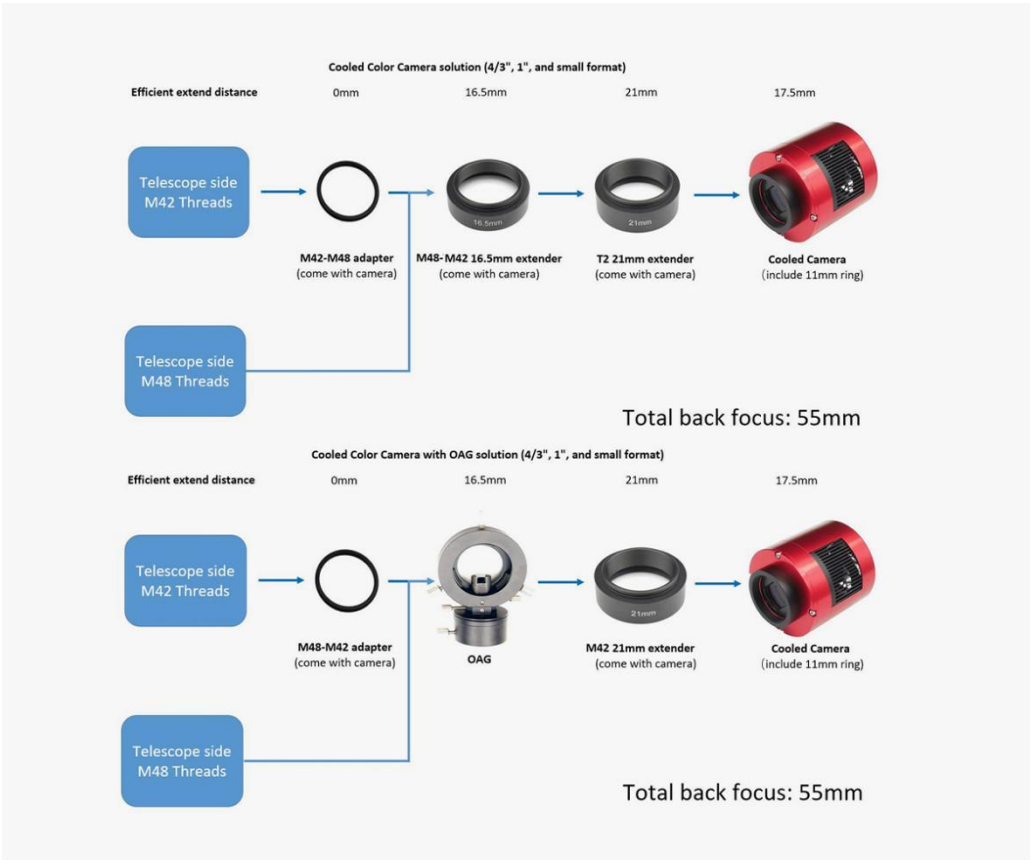
6 Connection Methods

6.1 Connecting to Nikon/Canon Lens



1. M43-T2 adapter (optional)
2. EOS-T2 adapter (optional)
3. 2” filter (optional)
4. 1.25” T-mount
5. 1.25” filter (optional)
6. M42-1.25” adapter
7. 11mm T2 extender
8. 16.5mm M42-M48 extender
9. T2-T2 adapter
10. EFW mini
11. EOS lens adapter for EFW

6.2 Solutions for 55mm best back focus distance



6.3 Connecting to external devices

7 Warranty

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 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.