Wireless Smart Camera ASI585MM Air User Manual V1.0



Thank you for purchasing the ZWO ASI585MM Air! Please read this manual carefully before using this product. The copyright and modification rights of this manual and other related materials belong to Suzhou ZWO Co., Ltd.

Contents

Foreword 1
Tips for Reading this Manual 2
1. Product Overview 5
2. Notice for Use 9
3. External View 11
3.1. External View 11
3.2. Specifications 13
3.3. Quantum Efficiency and Read Noise 16
3.4. Analog to Digital Converter (ADC) 18
3.5. Cooling System 18
3.6. Anti Dew 19
3.7. Power Consumption 19
3.8. Built-in Filter 20
3.9. DDR Buffer 21
3.10. Antenna 21
4. What's in the Box 22
5. Structural Dimension Diagram 23
6. Connection Methods 24
7. Warranty Service 25
8. After-sales Policy 27
9. Others 28
9.1. Firmware Update 28
9.2. Wi-Fi Reset 28
10. Contact Us 29

Foreword

Thank you for purchasing the ZWO ASI585MM Air! This camera is a highly integrated smart Wi-Fi device that integrates a deep-space sensor, a guiding sensor and a smart astrophotography controller. Independently developed by ZWO, this ASI585MM Air series opens a new chapter in astrophotography with its advanced product concept and highly integrated product design.

Before you embark on astrophotography with the camera, please take some time to read this manual. You may need a few hands-on exercises to familiarize yourself with the use of this camera. This manual provides detailed reference information for each step in use and detailed description of the relevant functions, so as to ensure your use of a simple and pleasant experience.

By means of text description and legend, this manual reminds the user of possible improper operation. Be sure to follow the instructions before actually using it. Any equipment damage and personal injury caused by improper operation shall be borne by the user himself.

Tips for Reading this Manual

Search for keywords

You can use the search function to search for keywords in this PDF document. For example, in Adobe Reader, Windows users can search for keywords using CTRL + F and MAC users can search for keywords using Command + F.

Click the table of contents to jump

You can see the content structure of this document through the table of contents, click on the title to jump to the corresponding page.

Print the document

You may also print this document if you prefer reading print instead of digital text.

Usage advice

ZWO provides the owners of ASI585MM Air with instructional videos and documentation. Since the manual is subject to change in the future, for up-to-date instructions on how to use this product, you may also refer to the Quick Guide of this product available at

Guides and Manuals - Discovery Astrophotography with ZWO ASTRO

Get the tutorial video

You can scan the QR code by mobile phone to obtain and watch the tutorial video of this product.

Download ZWO ASIAIR App

Scan the QR code for download addresses. iOS users can search "ASIAIR" in the App Store. Android users can search "ASIAIR" in Google Store or directly download the APK file on the ZWO website.

#Mobile devices refer to smart devices (such as phones and tablets) that support iOS or Android operating systems and have internet connectivity.

The ASIAIR APP requires Android 8.0 and above, or iOS 12 and above.







Minimum and recommended system configuration

For the best experience, we recommend you run the ASIAIR App on devices that exceed the recommended system requirements.

	Android	iOS	MacOS
Minimum requirement	Android 8 and above, RAM > 4GB	iOS 12 and above	Mac devices with Apple Silicon
Recommended configuration	Android 12 and above, RAM > 6GB	iOS 15 and above	Mac devices with Apple Silicon

Disclaimer

This product is not a toy. Do not allow children to touch this product or its parts or cables. Please be careful when operating in the presence of children.

For astrophotography enthusiasts who are just getting started, this product requires a period of learning and some basic knowledge of astronomy. Do read the entire manual and familiarize yourself with the functions of the product before operating it. Failure to operate the product properly may result in product damage and property damage.

For more service terms, please refer to the Service Agreement in the App. ZWO does not assume any losses caused by users not using the product in accordance with this manual.

Subject to laws and regulations, ZWO reserves the final right of interpretation of this document. ZWO reserves the right to update, revise or terminate this document without prior notice.

1. Product Overview

The ASI585MM Air case is made of high-quality aviation aluminum and machined by CNC. Its surface is anodized and sandblasted, providing excellent protection for the body while offering a smooth and comfortable feel. The size of the entire camera is similar to that of the ZWO deep space cameras. The interfaces are standardized, easy to install and easy to use.

The ASI585MM Air is highly integrated with a deep-space camera, a guiding camera and a smart astrophotography controller into one camera body. It also integrates eMMC storage with large storage space. It simplifies installation steps and avoids messy cable tangles, offering a stable and durable connection between multiple devices so that users can focus on and take pictures more efficiently.

The camera comes with an external enhanced dual-band antenna, supporting 2.4G and 5G frequency bands, and can be used stably and smoothly within 20 meters*.

*20 meters is the statistical average of multiple tests of the 2.4G frequency band in an open area. And 2.4G has a longer transmission distance than 5G and a slightly slower transmission speed.

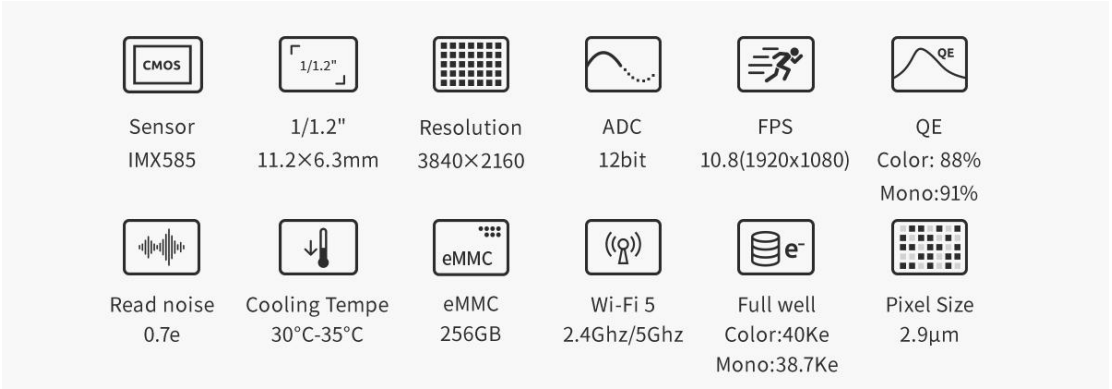
The camera supports the power supply and control of multiple hardware such as mount and EAF. Through the intelligent App, various imaging modes can be realized. A good software interactive experience can be achieved, and one-click image-processing can also be carried out so that users can get a high-quality image with ease.

Relying on ZWO's multiple patented technologies, the stability of the system and the accuracy of imaging are guaranteed, and the APP supports OTA upgrades. The professional and mature technical R&D team continuously enriches product functions and continuously improves user

experience.

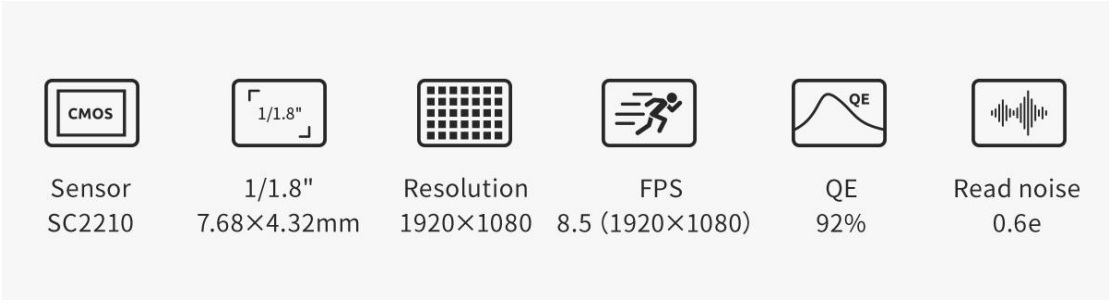
Main Sensor

Equipped with the Sony IMX585 CMOS sensor, this camera features a 1/1.2" image format, native 12-bit ADC, no amp glow, 12 stops of dynamic range, and read noise as low as 0.7e. The small pixel size of 2.9 μm supports a large full-well capacity of 38.7Ke.



Guide Sensor

The guide camera uses the Type 1/1.8” SC2210 sensor (7.68mm x 4.32mm) and is a black-and-white guide camera with infrared enhancement. The sensor has an effective resolution of 1920 × 1080 and a pixel size of 4 μm. It has a full well charge of 8.78ke, a readout noise as low as 0.6e, and a quantum efficiency of 92% (@500nm).

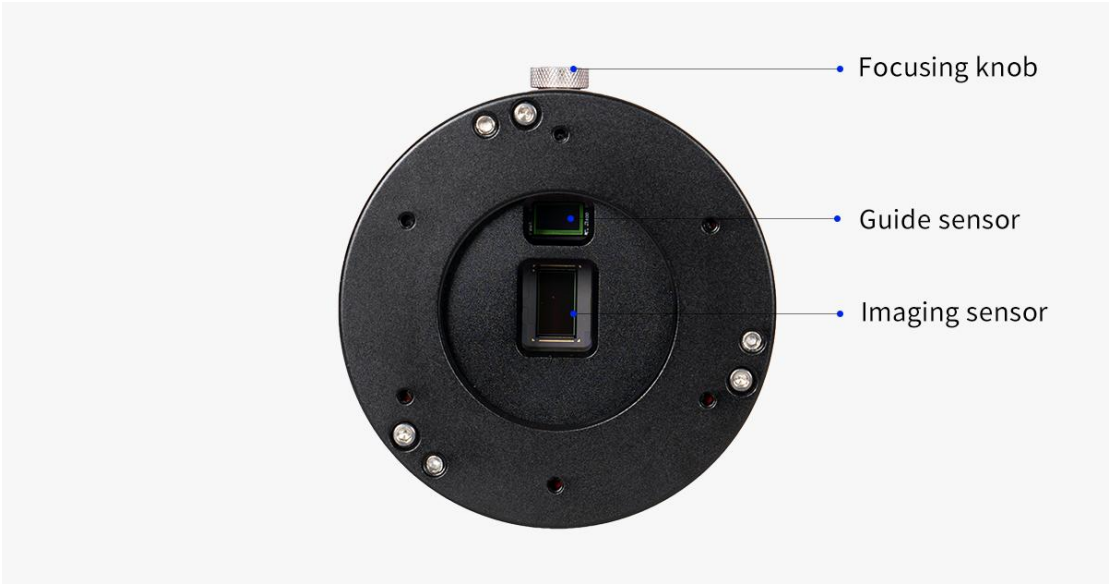


Three-in-one design

The ASI585MM Air breaks through technological barriers with its innovative integrated design, combining a guiding CMOS sensor, deep-sky

camera, and intelligent control. This eliminates the hassle of connecting and installing a separate guide camera, OAG, and ASIAIR controller. The product enables automatic guiding, automatic multi-target imaging, in-camera post-processing, and Wi-Fi wireless control and image transmission.





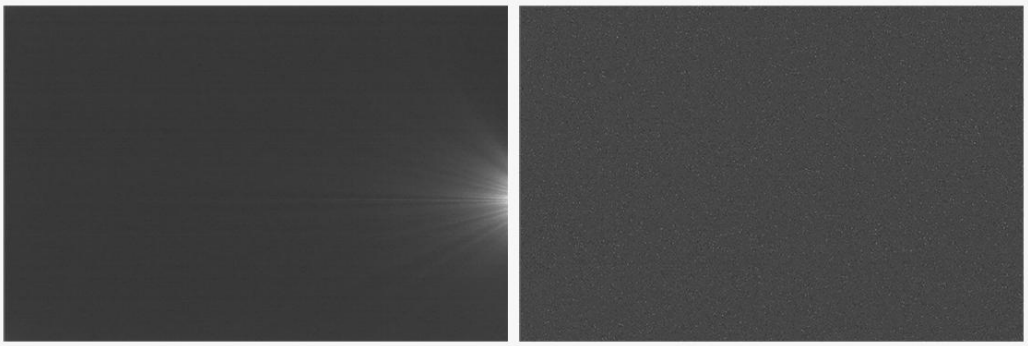
STARVIS 2 technology

STARVIS is Sony's image sensor technology, boasting light sensitivity exceeding that of the human eye. STARVIS2 is an evolution of STARVIS that supports a higher dynamic range. This technology significantly improves the sensitivity and signal-to-noise ratio of the ASI585MM Air

camera, resulting in superior image quality. Back-illuminated sensors reverse the placement of the metal wiring layer and the diodes, allowing light to reach the photodiodes unimpeded, resulting in higher absorption and improved image quality.

No amp-glow

Traditional CMOS sensors produce a weak infrared light source during operation quite often seen in the corner of uncalibrated images. It is the tell-tale sign of amp glow. As the ASI585MM Air uses zero-amp glow circuitry, you won't have to worry about amp glow even when using high gain or long exposure imaging.



Dark frame without any amp glow　　Dark frame with any amp glow

Native 12bit ADC

The ASI585MM Air is a CMOS astrophotography camera with a native 12-bit ADC, capable of delivering a dynamic range of 12 stops for single frame. This results in finer image texture and richer color gradients during non-linear stretching, enhancing the overall visual quality of astrophotographs.

2. Notice for Use

Before using the product, please carefully read the following guidelines:

1. Cameras with cooling functions require a DC12V@3A~10A power adapter (connector specification is D5.5x2.1mm, positive inside, negative outside). Additionally, 11V~14V lithium batteries can also power the camera. Using any power sources outside of this range may cause irreversible damage to the camera.

2. Only one power port can be used as the power input resource. It is prohibited from accessing multiple power inputs.

3. Ensure that the wireless smart camera operates in a well-ventilated environment.

4. Ensure that the connection cables between the wireless smart camera and other devices are not tangled, paying particular attention to the communication and power cables connected to the equatorial mount.

5. Use the camera only in favorable weather conditions (not during rain, snow, heavy fog, lightning, strong winds, or extreme weather). Using or storing the camera outside of the specified conditions may cause damage.

Operating Temperature	-20℃ ~ 50℃
Storage Temperature	-20℃ ~ 60℃
Operating Humidity	20% ~ 90%
Storage Humidity	30% ~ 70%

6. Before the image is completely exported to a USB drive or transferred from the camera to a computer, do not disconnect the USB drive or Type-C cable to avoid data loss or damage to the storage device. ZWO is not responsible for any data stored in the product and will not

provide compensation for such data.

7. During the activation of the wireless smart camera, do not put the ASIAIR App in the background or close it, and do not cut off the power supply to the camera.

8. Online authorization is only required for your first use of the camera. It needs an Internet connection so make sure the network at your place works well.

9. If the wireless smart camera operates for an extended period in extremely high temperatures, the device's temperature may rise to uncomfortable levels. Avoid touching the device immediately after cutting off the power.

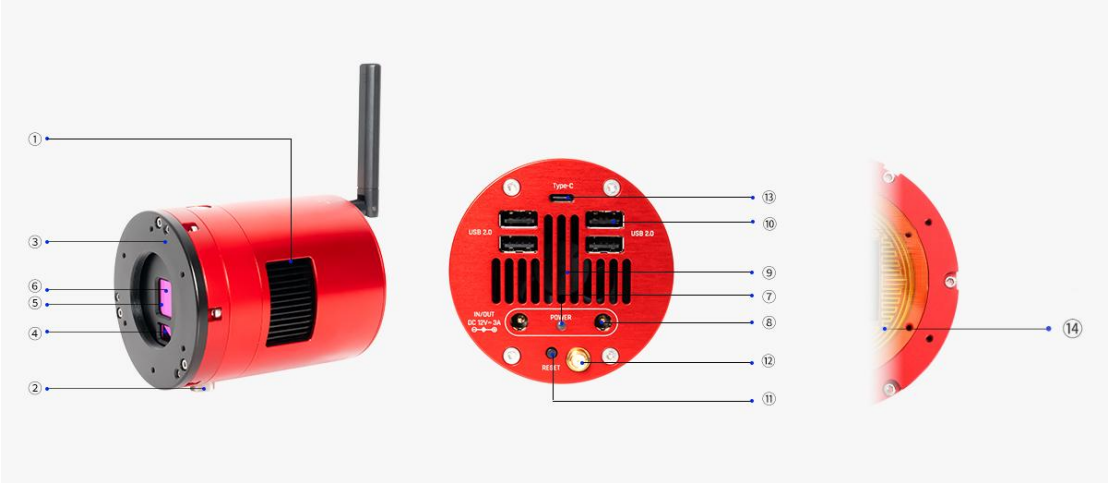
10. Do not use corrosive solutions to clean the camera to prevent damage.

11. Avoid exposing the camera to direct sunlight for prolonged periods to prevent surface discoloration.

12. Do not use the device for long periods under under-voltage conditions.

3. External View

3. 1. External View



No.	Name	Specification	Quantity	Note
1	Heat sink		1	
2	Focusing knob		1	For focusing the guiding sensor
3	Sensor tilt plate	M42x0.75 threads, 5mm thickness	1	Removable
4	Guiding sensor	SC2210_BW	1	
5	Main Sensor	SONY IMX585	1	
6	Protective window	D48x2mm	1	UV/IR CUT coating for OSC camera, AR coating for mono camera
7	Power status indicator		1	The red light is always on when the power supply is normal. The red light is off when the power supply is abnormal. Turning on/off the indicator is supported

				on the App
8	DC IN/OUT	Power input/output port, D5.5x2.1mm, DC12V@3A~10A (positive inside, negative outside). 11V~14V lithium batterie is also supported	3	Only one DC port can be used as power input
9	Ultra-quiet magnetic levitation fan		1	
10	USB 2.0 port	Can be used to connect EAF and EFW	4	
11	RESET button		1	When Wi-Fi is abnormal, you can reset Wi-Fi. To do this, press and hold the RESET button for 5 seconds, and release it after the voice broadcast says "WiFi reset successful, waiting for connection". The hotspot, password, and Network bridge data will be reset successfully.
12	Wi-Fi antenna port		1	For installing the Wi-Fi antenna
13	Type-C port		1	Can be used to transfer image data to PC
14	Dew-heater (inbuilt)		1	Avoid dew issues

3. 2. Specifications

Product Name	Wireless Smart Camera
Model	ASI585MM Air
Dimensions	Camera body: Ø78mm, 108mm height Antenna: 94mm long
Weight	620g
Operating Temperature	-20℃~50℃
Storage Temperature	-20℃~60℃
Operating Humidity	20% ~ 90%
Storage Humidity	30% ~ 70%
RAM	2GB DDR4
Storage Space	eMMC 256GB
Wireless Network	802.11 b/g/n/ac (2.4Gh/5 Ghz)
DC Power	12V@3A-10A input. All three DC ports can be used both as input and output. You can use any one among them as power input.
HUB	USB 2.0 - HUB x4
OS	Windows/Linux(Aplaca)
Adapter Ring	M42x0.75
Back Focus	12.5mm or 17.5mm
Power Mode	DC12V-3A
Max Power Dissipation	24.6W

Main sensor and guide sensor parameters：

	Main Camera	Guide Camera
Characteristic		
Sensor	SONY IMX585	SC2210_BW

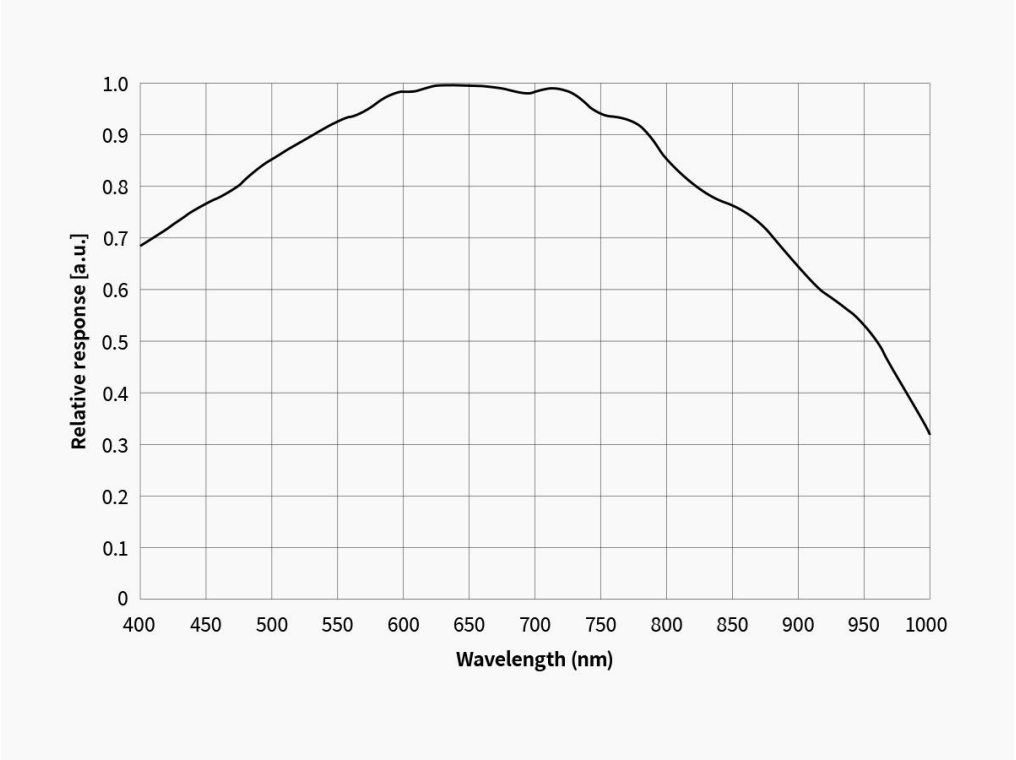
Color	Mono	Mono
Sensor Size	1/1.2"	1/1.8"
Pixel Size	2.9μm	4μm
Shutter	Rolling shutter	Rolling shutter
Image Resolution	3840 x 2160	2.07MP 1920x1080
Spectrum Range	200nm-1000nm	300nm-1000nm
Read Noise	0.7-6.4 e	0.6-3.2 e
Peak Quantum Efficiency	91%	500nm 92%
Full Well Capacity	38.7Ke	8.78Ke
Diagonal	12.84mm	8.81mm
Max Frame Rate	10.8fps(1920x1080)	8.5fps
SNR	12.56stops	11.4stops
Dynamic Range	12bit	11.43bit
Data/Control		
ADC	12bit	12bit
BinADC	10bit	\
HSpeedADC	\	\
Acquisition Mode	Continuous operation, software triggered	Continuous operation, software triggered
Analog Gain	0dB - 450dB	0dB-350dB
Digital Gain	450dB-600dB	351dB-600dB
UnityGain	195	68
HCGGain	200	106
Exposure Time	32μs-2000s	32μs~10s
Exposure Control	Auto/Manual	Auto/Manual
Data Format	RAW8、RAW16、RGB24	RAW8、RAW16、Mono8、Mono16

White Balance	Auto/manual	Auto/manual
Output Format	Raw	Raw
Software Bin	Bin2 Bin3 Bin4	Bin1 Bin2
Function		
Delta-T	30℃-35℃ (tested at the environment temperature of 30℃)	\
Power Of Heating Tube	2.4W	\

3. 3. Quantum Efficiency and Read Noise

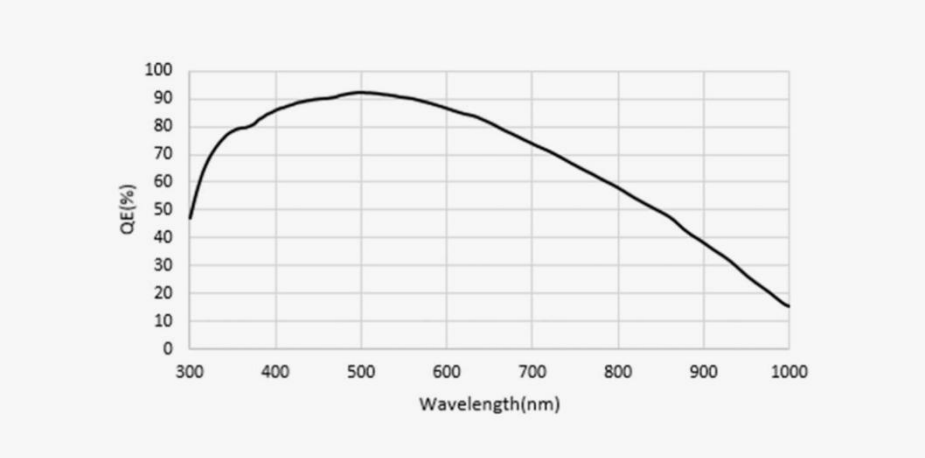
Quantum efficiency(QE) - Main sensor

The QE peak value of ASI585MM Air's main sensor is estimated to be 91%.

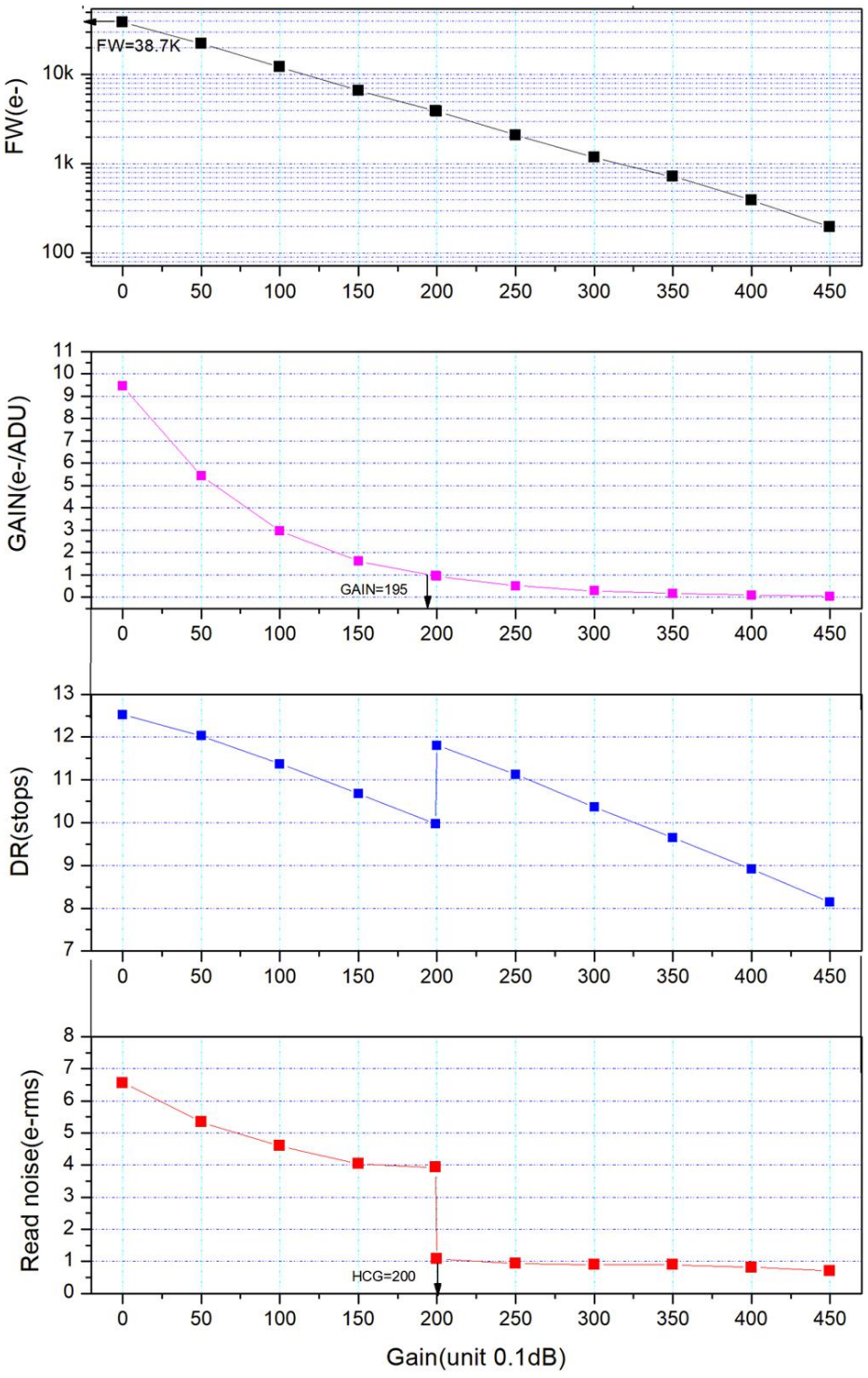


Quantum efficiency(QE) - Guide sensor

The QE peak value of ASI585MM Air's guide sensor is estimated to be about 92%.



Read noise


FW=38.7K
FW(e-)
10k
1k
100
GAIN(e-/ADU)
GAIN=195
DR(stops)
Read noise(e-rms)
HCG=200
Gain(unit 0.1dB)

3. 4. Analog to Digital Converter (ADC)

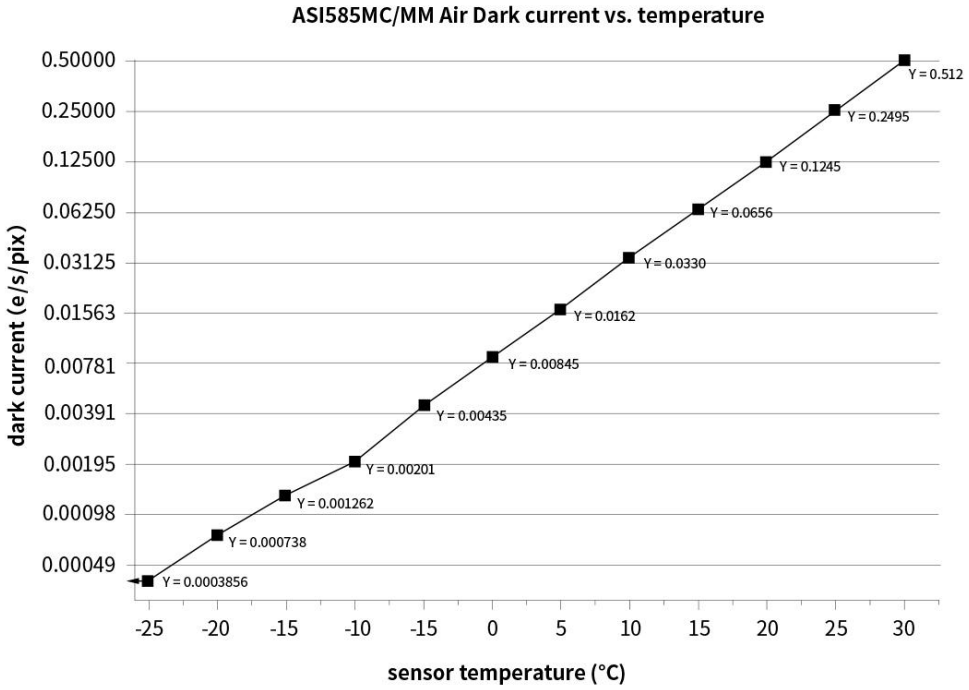
The ASI585MM Air camera has a built-in native 12-bit ADC. The image below shows the fastest frame rate at typical resolution.

IMX585 Frame rate		SC2210 Frame rate	
Resolution	RAW8	Resolution	RAW8
1920 × 1080	10.8 fps	1920 × 1080	8.5 fps
1280 × 960	17.2 fps	1280 × 960	8.5 fps
1280 × 720	22.2 fps	1280 × 720	8.5 fps
640 × 480	30 fps	640 × 480	8.5 fps
480 × 360	30 fps	480 × 360	8.5 fps
320 × 240	30 fps		

3. 5. Cooling System

The two-stage TEC cooler can lower the CMOS sensor temperature by 30℃ to 35℃ relative to the ambient temperature (based on tests conducted in a 30℃ environment), significantly reducing dark current generation. Even during long exposures of several hundred seconds, noise remains minimal.

Note: The lower the ambient temperature, the smaller the temperature difference achieved by cooling.



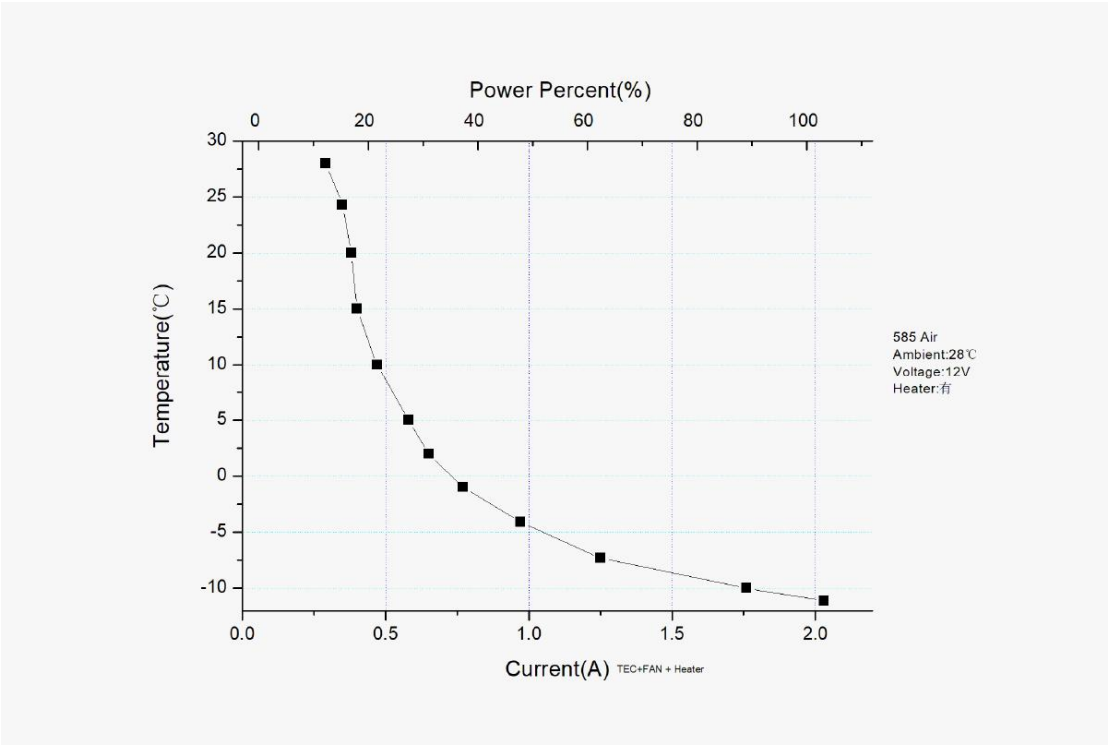
3. 6. Anti Dew

The camera features a built-in heater strip, which warms the protective glass window to prevent fogging issues. The heater operates at 2.4W power consumption, and users can enable or disable it through compatible software.

3. 7. Power Consumption

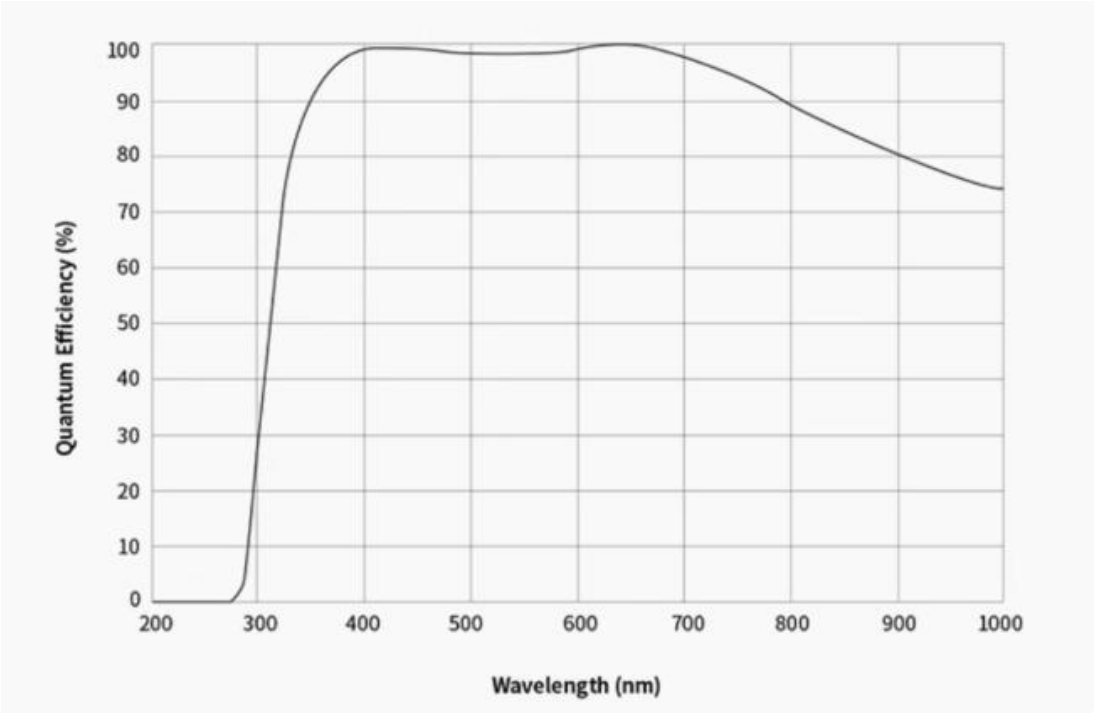
All ASI cameras have low power consumption. ASI585MM Air is no exception. Cameras with cooling functions require a DC12V@3A~10A power adapter (connector specification is D5.5x2.1mm, positive inside, negative outside). Additionally, 11V~14V lithium batteries can also power the camera. Using any power sources outside of this range may cause irreversible damage to the camera.

Below is the power consumption of ASI585MC Air:



3. 8. Built-in Filter

The ASI585MM Air camera is equipped with an AR anti-reflection filter in front of the sensor, serving as a protective window. This filter protects the sensor from external damage while reducing reflections on the optical surface and increasing light transmission, thereby improving image quality.



3. 9. DDR Buffer

ASI585MM Air is integrated with a 2GB DDR4 buffer that ensures the stability and security of data transmission, and effectively avoids the frame droping issue during long exposure.

3. 10. Antenna

The Wi-Fi antenna of the smart camera is disassembled in the package. Before you use the camera, you need to install the antenna manually by simply fixing it to the antenna port.





4. What's in the Box



Camera body
Camera bag



DC 1.5m male-female extension cable



DC 1m cable



USB2.0 cable x2



T2 extender(21mm)



T2-M48 extender



M42-M48 tilter



1m hook&loop



Quick guide



2mm M2.5 hex wrench

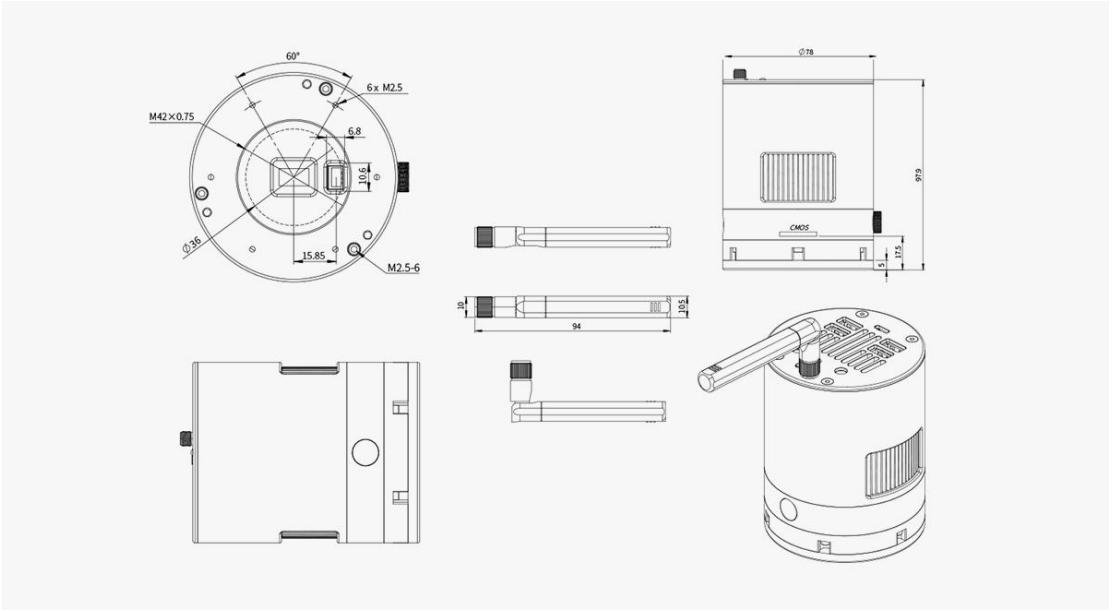


External antenna



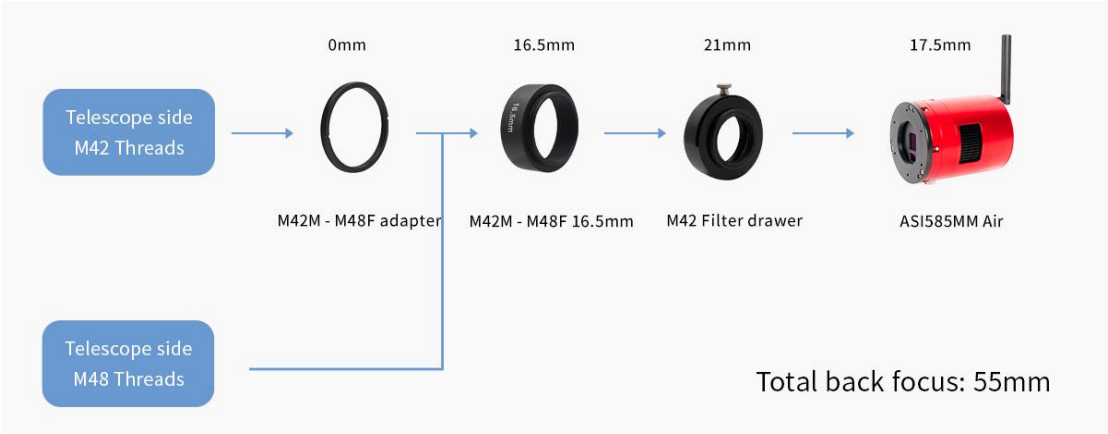
Packing list

5. Structural Dimension Diagram



6. Connection Methods





7. Warranty Service

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 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. 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-sales Policy

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.

9. Others

9.1. Firmware Update

The ASI585MM Air regularly receives updates that introduce new features and optimize performance. The software updates are divided into firmware and App updates. The firmware update is distributed with the new versions of the ASIAIR App. When you download a new version of the ASIAIR App and connect to the ASI585MM Air, the App will prompt you to update the firmware. Confirm the update and wait a few minutes for it to complete.

If the firmware upgrade fails, exit the ASIAIR App. Unplug the power cable from the ASI585MM Air, then plug it back in to restart the device. Try the update process again.

9.2. Wi-Fi Reset

If you are unable to find the Wi-Fi signal from the ASI585MM Air, you can reset the Wi-Fi settings. Ensure the camera is powered on. Press and hold the RESET button for 5 seconds. Release the button when you hear the voice prompt saying "Device is reset, ready to connect." The hotspot, password, and bridging data will be reset successfully.

10. Contact Us



ZWO website: Home - Discovery Astrophotography with ZWO ASTRO

Facebook: https://www.facebook.com/zwoastro

Instagram: https://www.instagram.com/zwoastro/

Email address: support@zwoptical.com

Submit a ticket on ZWO support page: ZWO ASI | Support