

ASI183 Manual

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1. Instruction

Congratulations and thank you for buying one of our ASI Cameras! This manual will give you a brief introduction to your ASI camera. Please take the time to read it thoroughly and if you have any other questions, feel free to contact us. info@zwoptical.com

ASI183 Cameras are designed for astronomical photography. This is another great camera from ZWO not only suitable for DSO imaging but also planetary imaging. The excellent performance and multifunctional usage will impress you a lot!

For software installation instructions and other technical information please refer to “ASI USB3.0 Cameras software Manual”

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

2. Camera Models and Sensor Type

There are 4 types of ASI183 models:

Models	Mono or Color	Regulated TEC Cooling	Sensor
ASI183MM	Mono	No	Sony IMX183CLK-J
ASI183MC	Color	No	Sony IMX183CQJ-J
ASI183MM Pro	Mono	Yes	Sony IMX183CLK-J
ASI183MC Pro	Color	Yes	Sony IMX183CQJ-J

Which camera to choose:

Monochrome camera sensors are capable of higher detail and sensitivity than is possible with color sensors, but you need additional accessories such as filter wheel and filters. The post-processing is more complicated too, so a color camera is often recommended for the beginner of astrophotographer.

TEC cooling will help to reduce dark current noise for long exposures. For short exposures, such as under one second, the dark current noise is very low, however cooling is recommended for DSO imaging when long exposures are required.

3. What's in the box?

ASI183MM or ASI183MC



ASI183MM Pro or ASI183MC Pro



4. Camera technical specifications

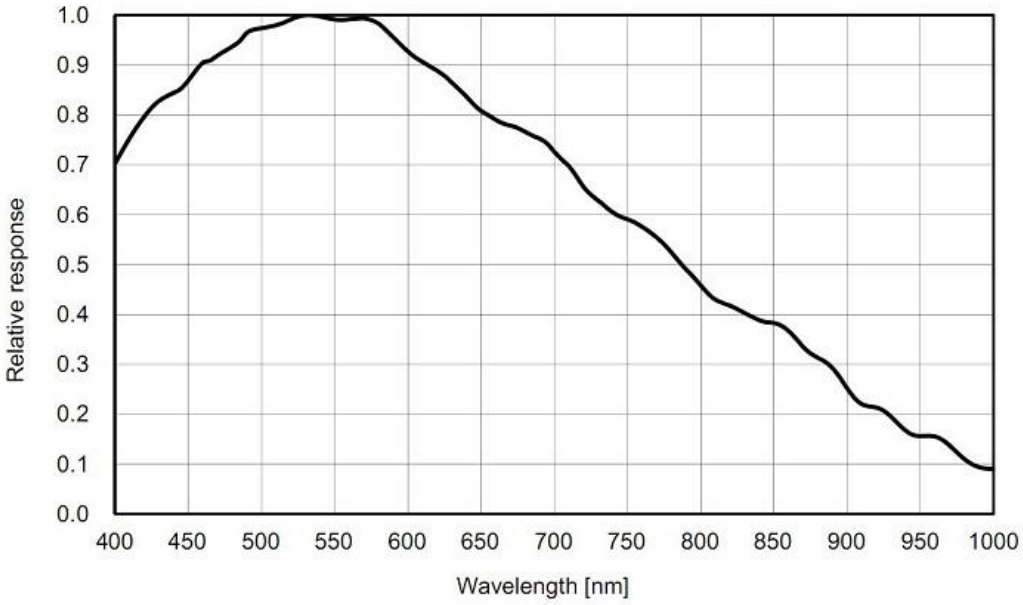
Sensor	1″ CMOS IMX183CLK-J/CQJ-J
Diagonal	15.9mm
Resolution	20.18Mega Pixels 5496*3672
Pixel Size	2.4μm
Image area	13.2mm*8.8mm
Max FPS at full resolution	19FPS
Shutter	Rolling shutter
Exposure Range	32μs-2000s
Read Noise	1.6e @30db gain
QE peak	84%
Full well	15ke
ADC	12 bit or 10 bit
DDR3 buffer	256MB(Cooled)
Interface	USB3.0/USB2.0
Adapters	2″ / 1.25″ / M42X0.75 Uncooled 2″ / M42X0.75 Cooled
Protect window	AR window
Dimensions	Uncooled 62mm/Cooled 78mm
Weight	Uncooled 140g/Cooled 410g
Back Focus Distance	6.5mm
Cooling:	Regulated Two Stage TEC
Delta T	40°C - 45°C (based on 30°C ambient temperature)
Cooling Power consumption	12V at 3A Max
Supported OS	Windows, Linux & Mac OSX
Working Temperature	-5°C—45°C
Storage Temperature	-20°C—60°
Working Relative Humidity	20%—80%
Storage Relative Humidity	20%—95%

5. QE Graph & Read Noise

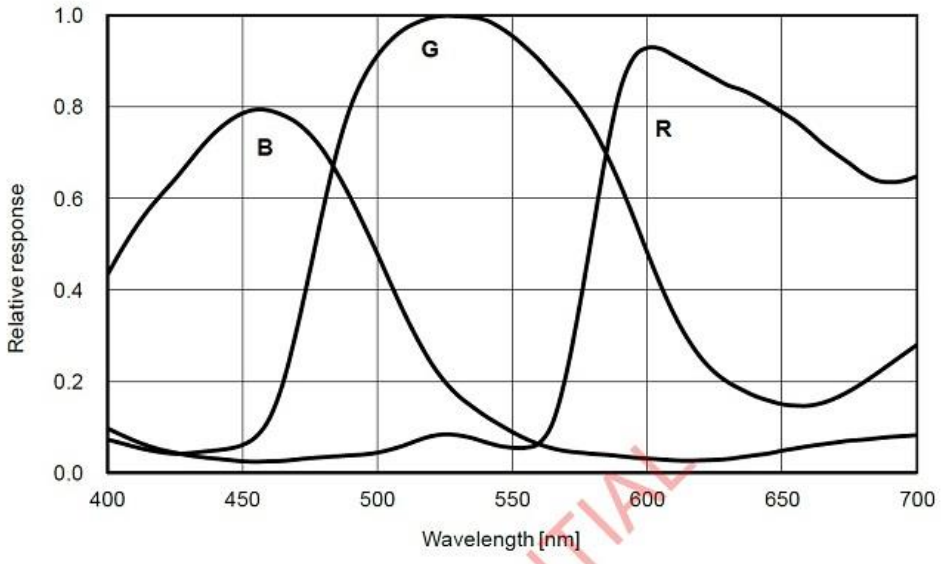
QE and Read noise are the most important parts to measure the performance of a camera. Higher QE and Lower read noise are needed to improve the SNR of an image.

For the Mono 183 Sensor, the peak value for QE is around 84%

Relative QE



Color 183 sensor

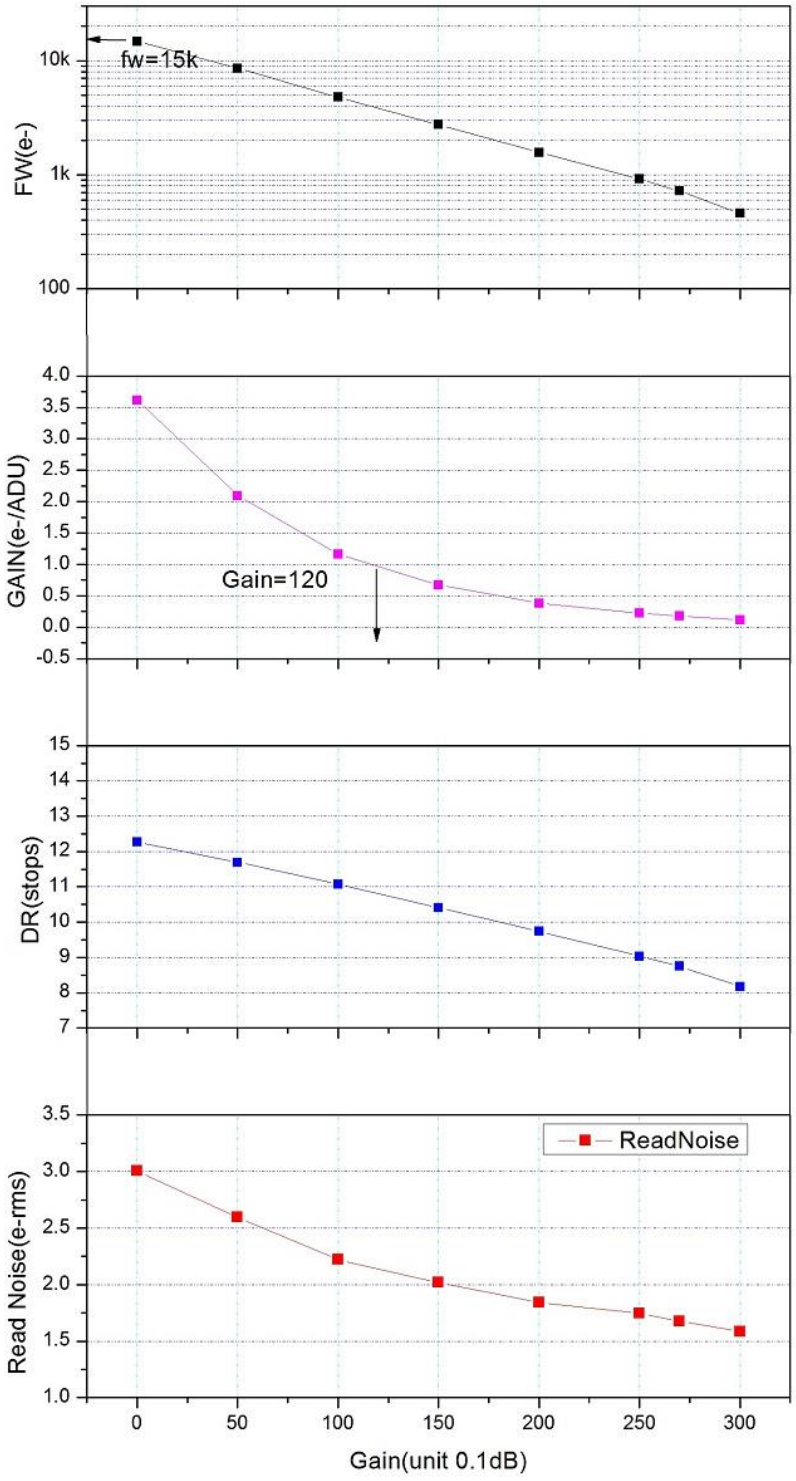


Read noise includes pixel diode noise, circuit noise and ADC quantization error noise, and the lower the better.

The Read Noise of the ASI183 cameras is extremely low when compared with traditional CCD cameras and it is even lower when the camera is used at a higher gain.

Depending on your target, you can set the gain lower for higher dynamic range (longer exposure) or set the gain higher for lower noise (such as short exposure or lucky imaging).

Read noise, full well, gain & dynamic range for ASI183



6. Getting to know your camera

6.1 External View



The first generation of cooled camera we used a ST4 port instead of USB2.0 hub

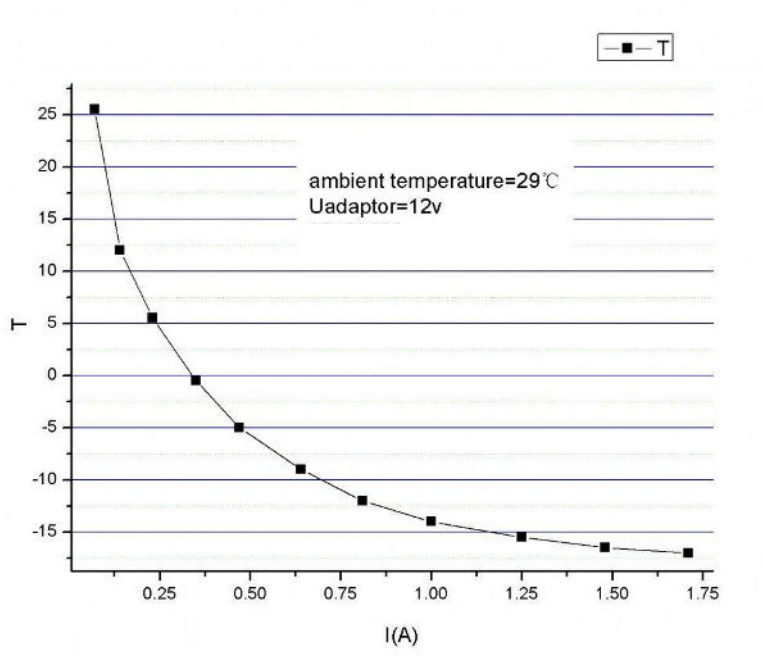
You can order the holder ring from us or our dealer to mount the cooled camera to tripod. There is 1/4″ screw under the holder



6.2 Power consumption

ASI cameras are designed to have very low power consumption which is around 300ma@5V. You only need the USB cable to power up the camera. However, you will need a separate power supply to activate the cooler. We recommend 12V at 3A or more AC-DC adapter for cooler power supply (2.1mm*5.5mm, center positive). You may also use a battery supply from 11 to 15V to power the cooler.

Here is a test result of the cooler power consumption of our cooled camera. It only needs 0.5A to cool the camera to 30℃ below ambient.

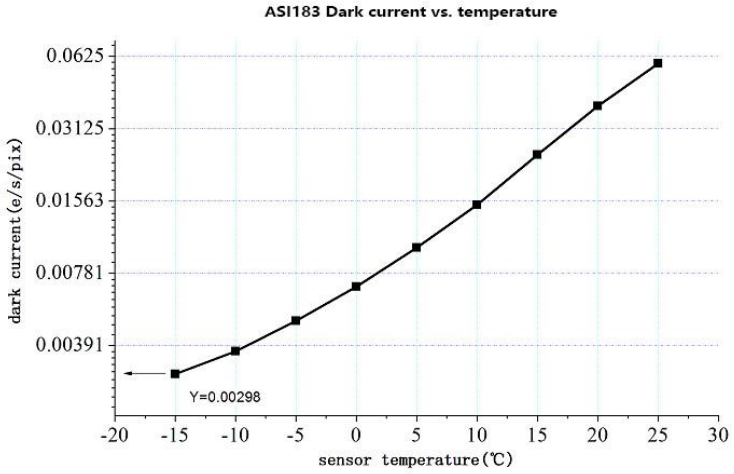


6.3 Cooling system

The cooled ASI183 cameras have a robust, regulated cooling system, which means that the camera sensor can be kept at the desired temperature throughout your imaging session. The super low readout noise, combined with efficient cooling and adjustable gain setting, allows you to do short or lucky DSO imaging unlike the traditional CCD cameras which need very long exposures for each frame. However, keep in mind that cooling won't help with very short exposures such as less than 100ms.

Based on the testing result at 30℃ ambient temperature, the Delta T of can be 40℃~45℃. Please note that the Delta T might get down when the cooling system is working for long time. Also, as the ambient temperature falls, the Delta T would also decrease.

Here is a dark current test result of 183 sensor at various temperatures.



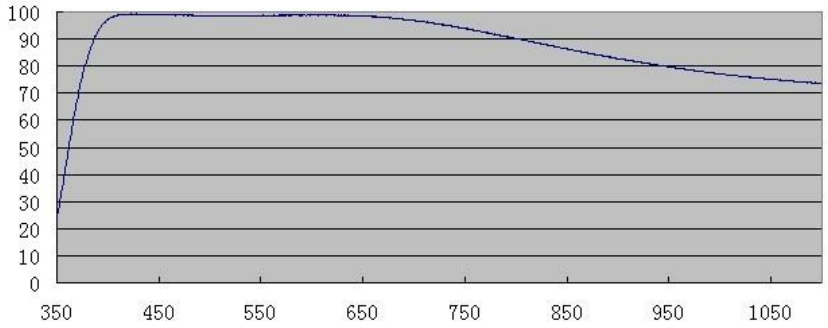
6.4 Back focus distance

When the attached 11mm T2 Extender is removed the optical distance from the sensor to the camera body is reduced to 6.5mm.

6.5 Protect Window

There is a protect window before the sensor of ASI183 camera.

It's an AR-AR coated BK7 glass, diameter is 32mm and 2mm thick.



6.6 Analog to Digital Converter (ADC)

The ASI183 camera records in 12bit ADC and 10bit ADC. You can image at a faster fps rate if you choose to use 10bit ADC (high speed mode). This camera also supports ROI (region of interest) shooting, and this smaller ROI has faster fps. You can uncheck “high speed” and choose 8bit output on software to enable 10bit ADC output, otherwise this camera will use 12bit ADC.

Here is the maximum speed of ASI183 running at 10bit ADC or 12bit ADC at 8bit mode.

Resolution	USB3.0	
	10Bit ADC	12Bit ADC
5496×3672	19fps	19fps
3840x2160	41fps	36fps
1920x1680	80fps	70fps
1280x720	117fps	103fps
640x480	170fps	150fps
320x240	308.fps	271fps

6.7 Binning

The ASI183 camera supports hardware bin2 and software bin2, bin3 and bin4 mode. Hardware binning is supported by sensor but is done in digital domain like software binning and use 10bit ADC. The only advantage of hardware binning is faster fps. We recommend customer to use software binning if you don’t care speed.

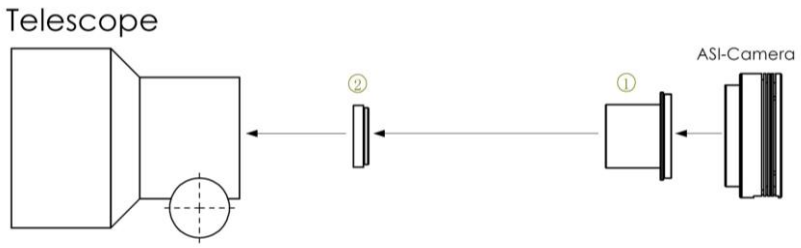
6.8 DDR Buffer

The ASI183 Pro camera includes a 256MB DDR3 memory buffer to help improve data transfer reliability. Additionally, the use of a memory buffer minimizes amp-glow, which is caused by the slow transfer speeds when the camera is used with a USB 2.0 port. DDR memory buffer is the main difference between ASI “Cool” and “Pro” cameras.

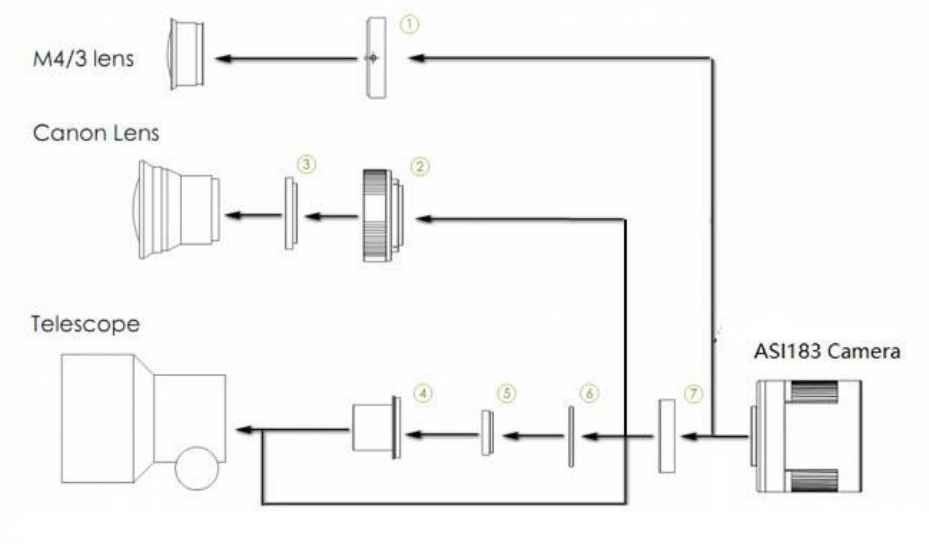
7. How to use your camera

There are many adapters available for this camera for connecting to your scope or lens. Some are included with the camera and others you can order from our site:

Color camera connecting drawing:



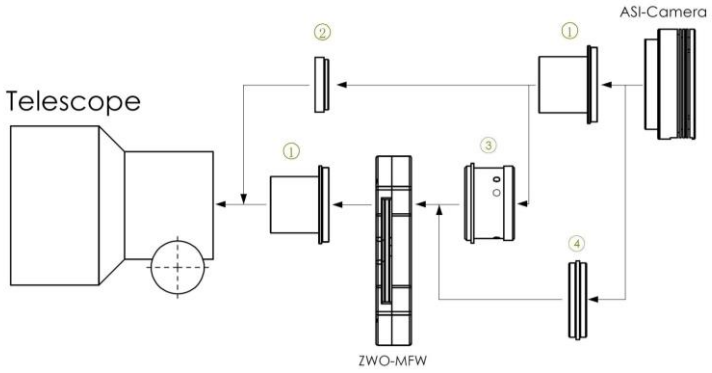
1. 1.25” T-Mount
2. 1.25”filter(optional)



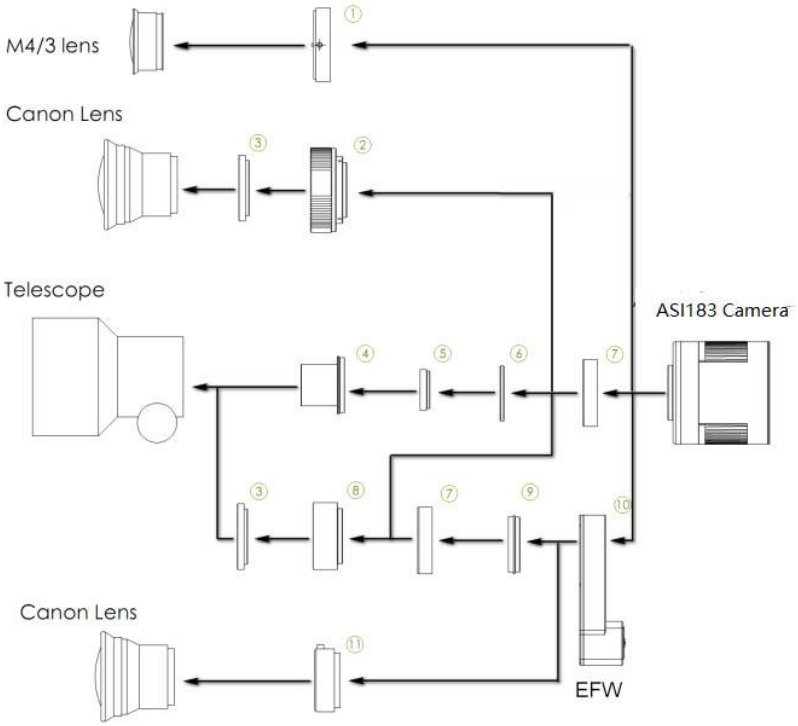
1. M43-T2 adapter
2. EOS-T2 adapter
3. 2”Filter (optional)
4. 1.25” T-Mount
5. 1.25” Filter (optional)

6. M42-1.25” Filter (optional)
7. T2 extender 11mm

Mono camera connecting drawing:



1. 1.25” T-Mount
2. 1.25” filter(optional)
3. M42-1.25” adapter
4. M42-M42（Male screw thread）



1. M43-T2 adapter
2. EOS-T2 adapter
3. 2”Filter (optional)
4. 1.25” T-Mount
5. 1.25” Filter (optional)
6. M42-1.25” Filter (optional)

7. T2 extender 11mm
8. M42-M48 extender 16.5mm
9. T2-T2 adapter
10. EFW mini
11. EOS adapter for EFW

Here are the steps to show you how to connect mono 183 and our EFW mini to your scopes. Benefiting from the short back focus design, 1.25” filter is big enough for ASI183 camera.

<table>
<tr>
<td>

EFW Mini & ASI183MM cooled camera</td>
<td>
Unscrew the six screws.</td>
</tr>
<tr>
<td>
Take the back cover off.</td>
<td>
Screw on all the filters.</td>
</tr>
</table>



Tighten back the screws.



Screw off the T2-1.25” holder on the EFW, screw off the T2 ring on the 183 camera.



Attached the camera to the EFW as shown.



Take out the 1.25” T-Mount form the T2-1.25” holder.



Install the T-mount to the back of the EFW.



Attach it to your telescope.



Here is the sideways view.



T2 extender can be used for attaching the telescope with 2” interface.

Here is an example of the whole setup including an OAG and guider camera.



Planetary/Guide Cameras
External Device Connecting Drawing

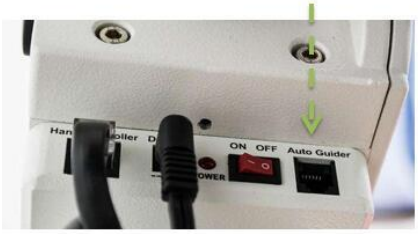


1/4" Screw



ST4 Cable

USB3.0/USB2.0 Cable





Auto Guider Port of Mount

Computer USB3.0/USB2.0 Port

Cooled Cameras
External Device Connecting Drawing



USB Hub For accessaries

12V Power Adapter



USB2.0 Cable

USB3.0/USB2.0 Cable



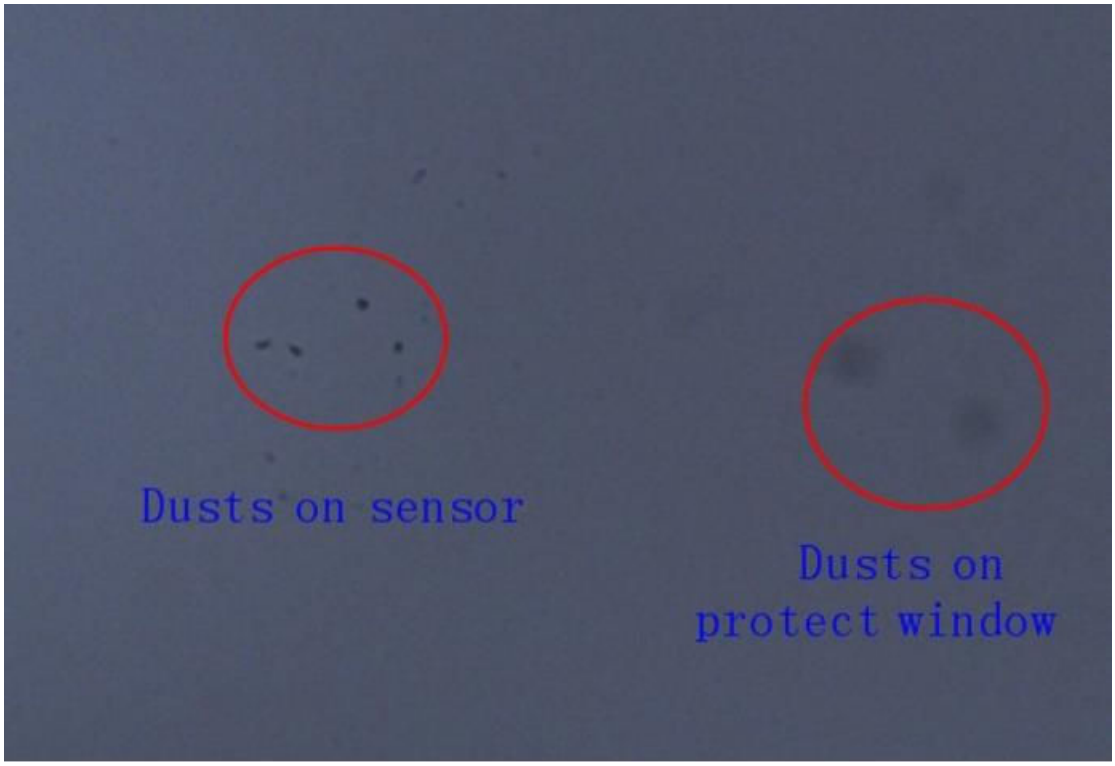


Accessaries

Computer USB3.0/USB2.0 Port

8. Cleaning

The camera comes with an AR protect window, which can protect the sensor from dust and humidity. Should you need to clean the sensor, it's better to do so during the daytime. To see the dust, you just need to setup your telescope and point it to a bright place. A Barlow is required to see these dusts clear. Then attach the camera and adjust the exposure to make sure not over exposed. You can see an image like below if it's dirty.



The big dim spot on the image (at right) are the shadows of dust on the protect window.

The very small but very dark spot in the image (at left) are the shadows of the dusts on the sensor.

The suggested way to clean them is try to blow them away with a manual air pump. To clean the dust on the sensor you will need to open the camera chamber.

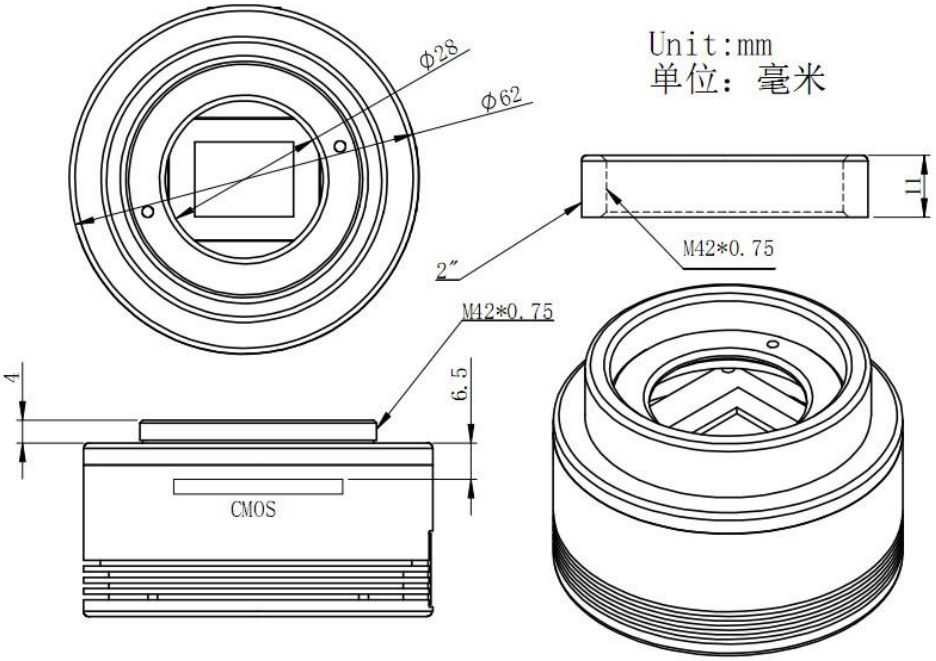
We have a very detailed instruction on our website:
https://astronomy-imaging-camera.com/manuals/

Quick Guide

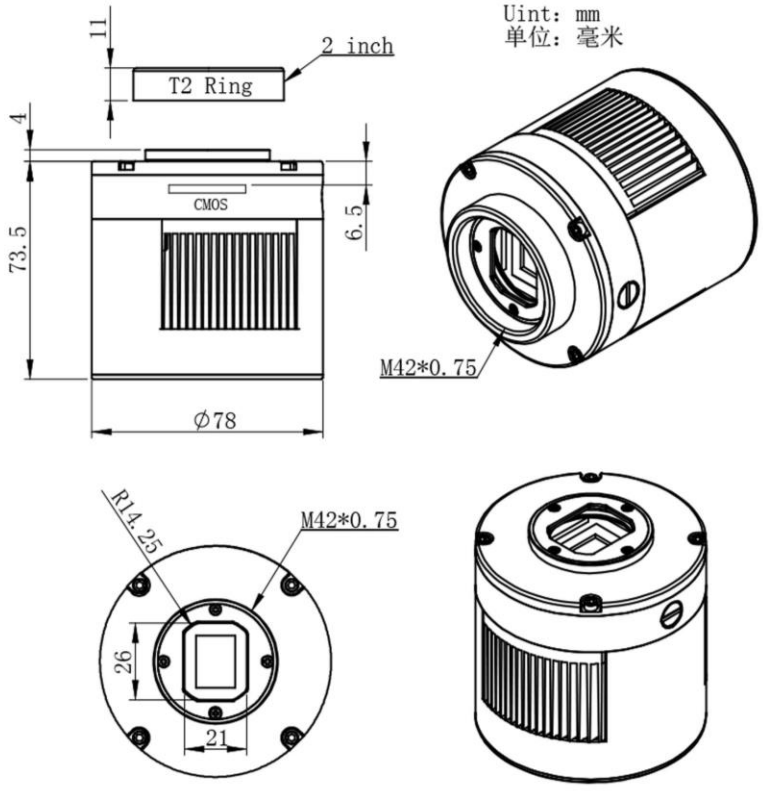
Quick Guide				
ASIAIR	v1.3	2018-08	Read Online	Download
ASI Uncooled Camera	v1.0	2017-05	Read Online	Download
ASI Cooled Camera	v1.0	2017-08	Read Online	Download
EAF	v2.7	2021-07	Read Online	Download
EFW	v2.1	2020-12	Read Online	Download
ADC	v1.0	2017-11	Read Online	Download
How to clean ASI camera and re-dry the desiccants	v1.2	2020-12	Read Online	Download
How to clean the prism of ZWO ADC	v1.0	2018-08	Read Online	Download
ZWO Camera Firmware Upgrade reference manual	v1.1	2021-04	Read Online	Download
ZWO WiFi Extender	v1.0	2021-03	Read Online	Download

9. Mechanical drawing

ASI183MM/ASI183MC



ASI183MM Pro /ASI183MC Pro



10. Servicing

Repairs, servicing and upgrades are available by emailing info@zwoptical.com

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

11. Warranty

We provide 2-year warranty for our products, we will offer repair service for free or replace for free if the camera doesn't work within warranty period.

After the warranty period, we will continue to provide repair support and service on a charged basis.

This warranty does not apply to damage that occurred as a result of abuse or misuse, or caused by a fall or any other transportation failures after purchase.

Customer must pay for shipping when shipping the camera back for repair or replacement.