ASI6200 Manual

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Please download the latest version from our Official website.

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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, please feel free to contact us at info@zwoptical.com.

Welcome to join ZWO FB and User Forum below!

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

User Forum: https://bbs.astronomy-imaging-camera.com/

ASI6200 Camera is specifically designed for astronomical photography. It is not only suitable for DSO imaging but also for Planetary imaging You will be impressed by its superior performance and wide use!

Model	Mono/Color	（TEC）Cooling	DDR3 Buffer	Sensor
ASI6200MM Pro	**Mono**	Two Stage	256MB	SONY IMX455
ASI6200MC Pro	**Color**	Two Stage	256MB	SONY IMX455

How to choose cameras?
Normally, mono camera sensors are with higher sensitivity, better at high-demand shooting tasks. But extra accessories will be needed, such as filter wheel and filters, etc. Post processing of image is also complicated, thus we recommend the color cameras to fresh users.

For software installation instructions and other technical information, please refer to our official website http://zwoasi.com/

2. What's in the box?

ASI6200MM/MC Pro

3. Camera technical specifications

Sensor	SONY IMX455 CMOS
Diagonal	43.3mm
Resolution	62 Mega Pixels 9576*6388
Pixel Size	3.76μm
Image area	36mm*24mm
Max FPS at full resolution	2FPS
Shutter	Rolling shutter
Exposure Range	32μs-2000s
Read Noise	1.5-3.5e
QE peak	91%
Full well	51.4ke
ADC	16bit
DDR3 buffer	256MB
Interface	USB3.0/USB2.0
Adapters	M54*0.75
Protect window	AR window (mono) IR CUT (color)
Dimensions	90mm Diameter
Weight	0.7kg
Back Focus Distance	17.5mm
Cooling:	Regulated Two Stage TEC
Delta T	35°C below ambient
Cooling Power consumption	12V at 3A Max
Supported OS	Windows, Linux & Mac OSX

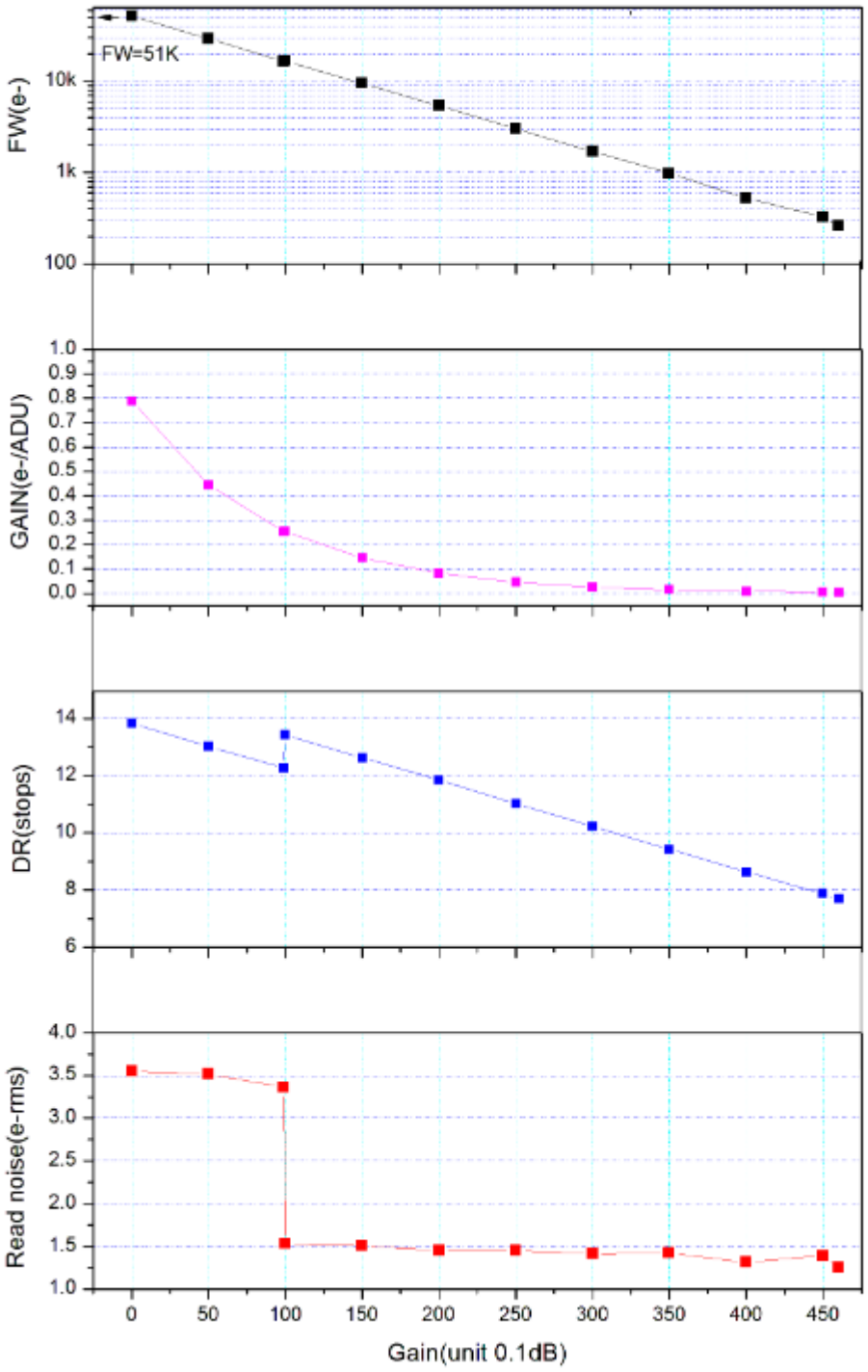
4. QE Graph & Read Noise

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 6200 Sensor, the peak value for QE is 91%.

Read noise includes pixel diode noise, circuit noise and ADC quantization error noise. The lower the better.
As you can see, the Read Noise of the ASI6200 camera is extremely low when compared with traditional CCD cameras. In addition, it is with Built-in HCG mode, which can effectively reduce read noise at high gain and keep the same wide dynamic range for this camera as at low gain. When the gain is 100, the HCG mode will be automatically turned on. Additionally, the read noise is as low as 1.5e while the dynamic range can still be close to 14bit.

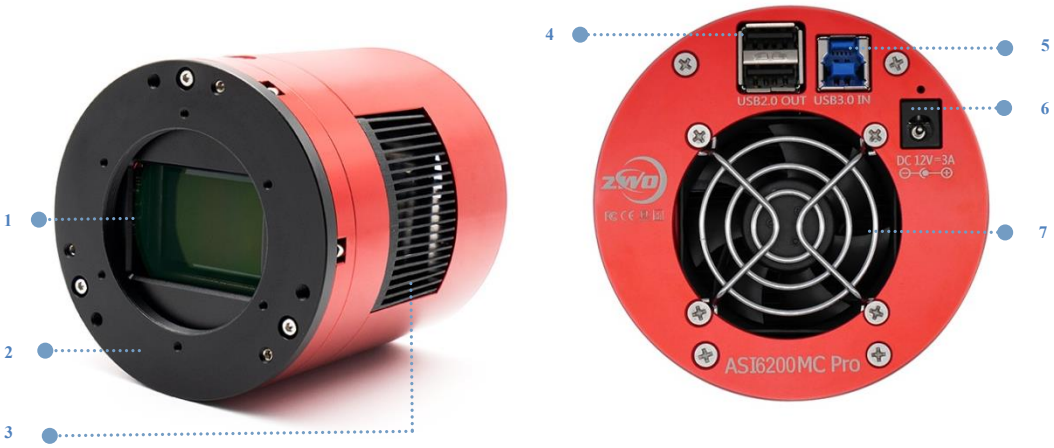
Depending on your target, you can set the gain lower for higher dynamic range (longer exposure) or set the gain higher for lower noise (such as short exposure or lucky imaging).

Read noise, full well, gain and dynamic range for ASI6200



5. Getting to know your camera

5.1 External View

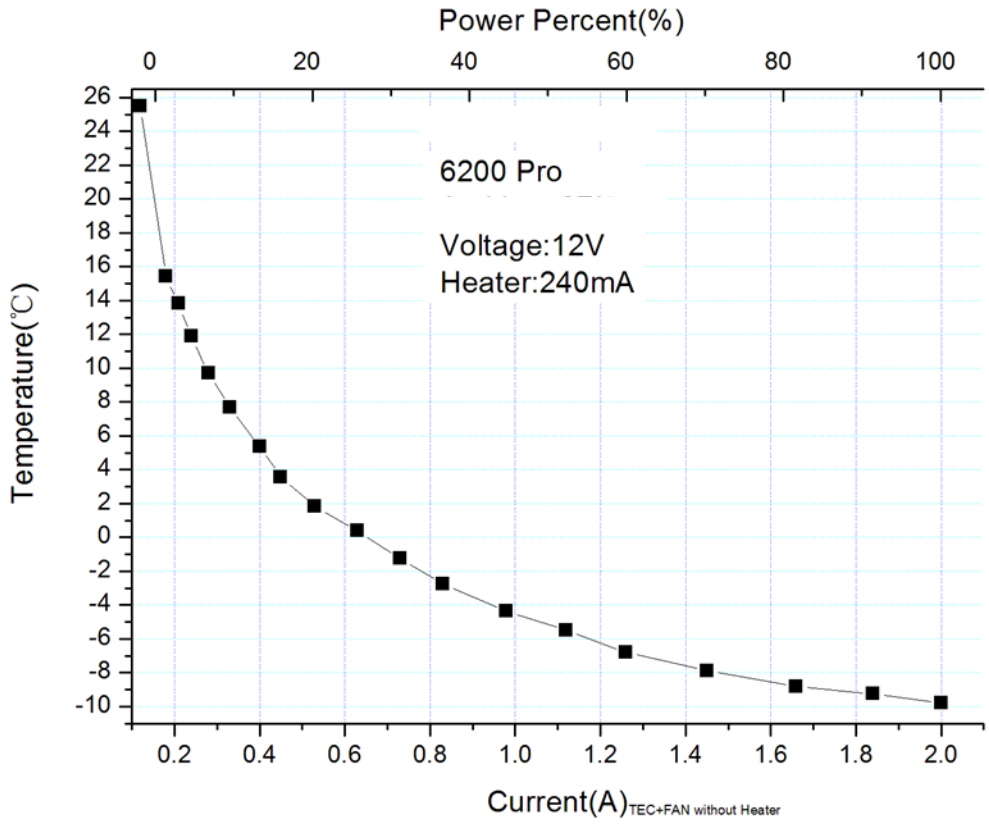


1. Protective Window, D60*2mm, AR window for mono camera, IR CUT for color camera
2. Tilt adjustment ring, M54 * 0.75 thread, can be removed
3. Radiator
4. USB2.0 Hub
5. USB3.0/USB2.0 Interface
6. Cooling power supply DC power port: size 5.5 * 2.1mm, positive inside and negative outside, 12V3A power is recommended.
7. Ultra-quiet magnetic levitation fan, will rotate only when the cooling is on.

The camera can be placed on a holder ring for Cooled cameras with a 1/4” thread under the ring.

5.2 Power Consumption

ASI6200 camera is with low power consumption, max at 5.75W. USB3.0 cable is recommended for power supply.
Recommended power supply for cooling: 12V @ 3A DC adapter (5.5×2.1mm, center pole positive).
Also suitable: lithium battery with 11-15V.
Here is the ASI6200 cooling efficiency graph.



5.3 DDR Buffer

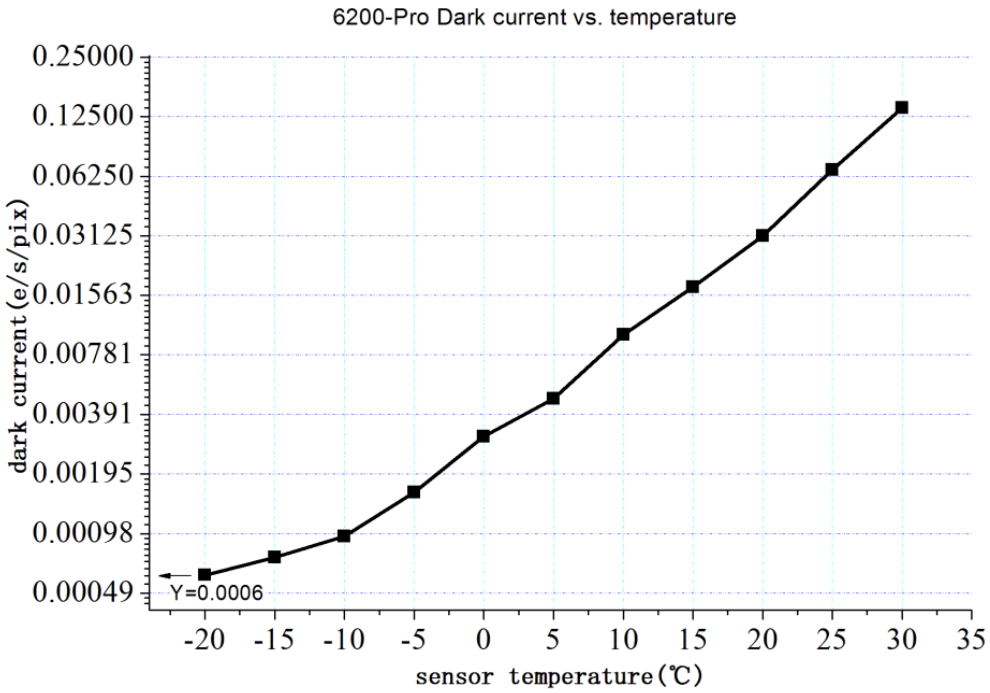
The ASI6200 Pro camera includes a 256MB DDR3 memory buffer to ensure the stability of data transmission. Additionally, the use of a memory buffer minimizes amp-glow, which is caused by the slow transfer speeds.

5.4 Cooling System

The Cooling system of ASI6200 Pro camera can precisely control the sensor temperature. Unlike traditional CCD, the ASI6200 camera has ultra-low readout noise, efficient cooling, and adjustable

gain. There is no need to use ultra-long exposures to shoot targets, which significantly reduces the requirements for the photography system as well as the guide system. However, if you use short exposures (for example, less than 100ms), the effect of cooling on the image will be little. Cooling system can be set to a minimum temperature of -35 ℃ below ambient temperature.

Here's the dark current curve of ASI6200 sensor between -20 ℃ and 35 ℃



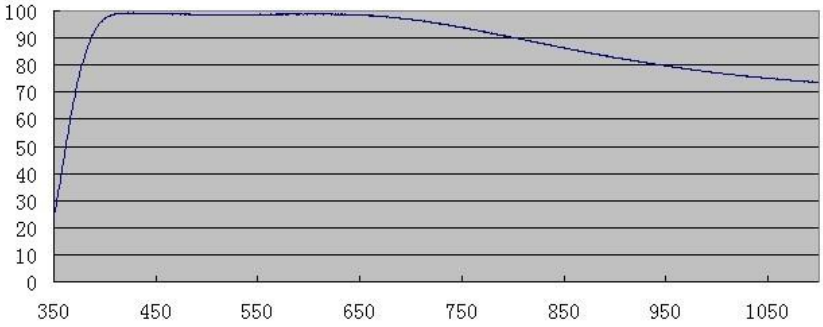
5.5 Back Focus Distance

The female flange to the sensor is 17.5mm. You can reach 55mm back focus distance with the 21mm and 16.5mm extender included in the camera package.

5.6 Protective Window

There is a protective window in front of the 6200camera sensor, with 60mm diameter and 2mm thickness.

ASI6200MM Pro uses an AR coated filter, while ASI6200MC Pro uses IR CUT filter.



5.7 Analog to Digital Converter (ADC)

The ASI6200 camera has a built-in 16-bit ADC. 12bit ADC mode for output will be used when we do hardware Bin, This camera also supports a custom ROI partial readout mode, with a faster frame rate at small ROI resolutions.

Please see below attached different frame rates under different resolutions on USB3.0 and USB2.0 of ASI6200 in 16bit mode.

Resolution	16Bit ADC	
	USB 2.0	USB 3.0
9576×6388	0.35fps	2.05fps
7680×4800	0.59fps	2.72fps
6400×4096	0.83fps	3.18fps
4096×2160	2.45fps	5.97fps
3840×2160	2.61fps	5.97fps
1920×1080	10.43fps	11.66fps
1280×720	17.10fps	17.10fps
640×480	24.81fps	24.81fps
320×240	45.21fps	45.21fps

5.8 Binning

The ASI6200 camera supports bin2, bin3, bin4 software Binning mode and hardware bin2, bin3, the best advantage of hardware binning is the faster frame rates. If you don't care about speed, we suggest you use software binning.

5.9 Tilt Adjustment

There are 3 sets of screws that can be used to tilt the sensor, make it same with the primary mirror of Newtonian, two screws per set for screw in /out.

You can refer to below:

1. Take a starred image with the camera, you will easily find out the tilt part in the image through the software, and then adjust one or more sets of flange adjustment screws on the camera corresponding to the image.

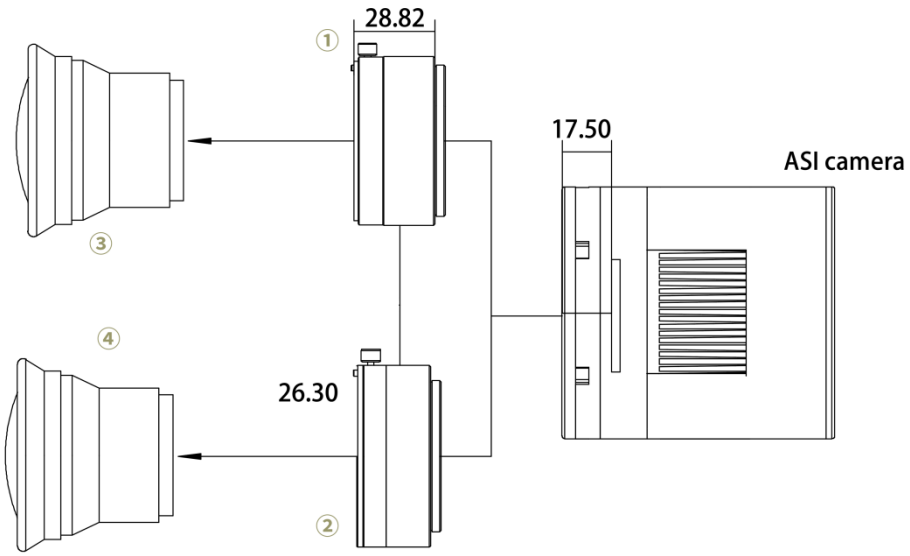
2. Take another image after the sensor tilt adjustment, compare the new image with the previous one in the software. If the tilt issue is reduced, that means the adjustment is correct. Otherwise, the adjustment is wrong.

3. Repeat step 2 until the stars in all corners are perfect.

6. How to use your camera

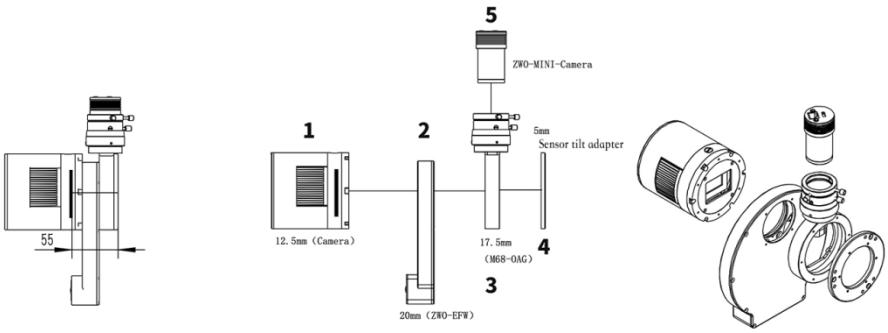
Using an adapter, the ASI6200 camera can be connected to a filter wheel/ telescope, or a camera lens. Most of the adapters are already included in the package, and the rest can be purchased directly from our official website below.
https://astronomy-imaging-camera.com/

Nikon /Canon lens Connection Diagram：



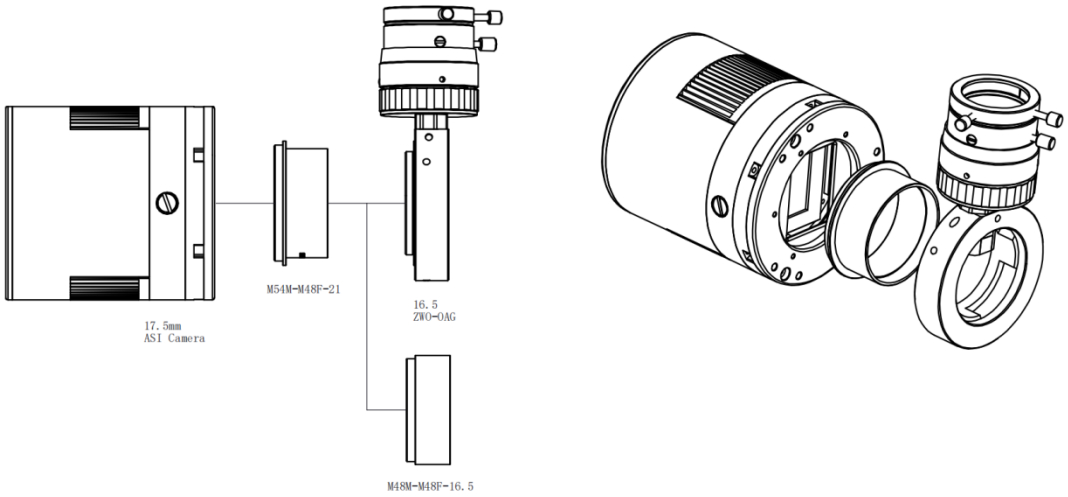
1. Nikon-M54 adapter
2. EOS-M54 adapter
3. Nikon lens
4. Canon lens

Mono camera Connection Diagram：



1. ASI6200MM Pro camera
2. 2” Filter Wheel
3. M68 OAG
4. 5mm Tilt adjustment ring

Color camera Connection Diagram：

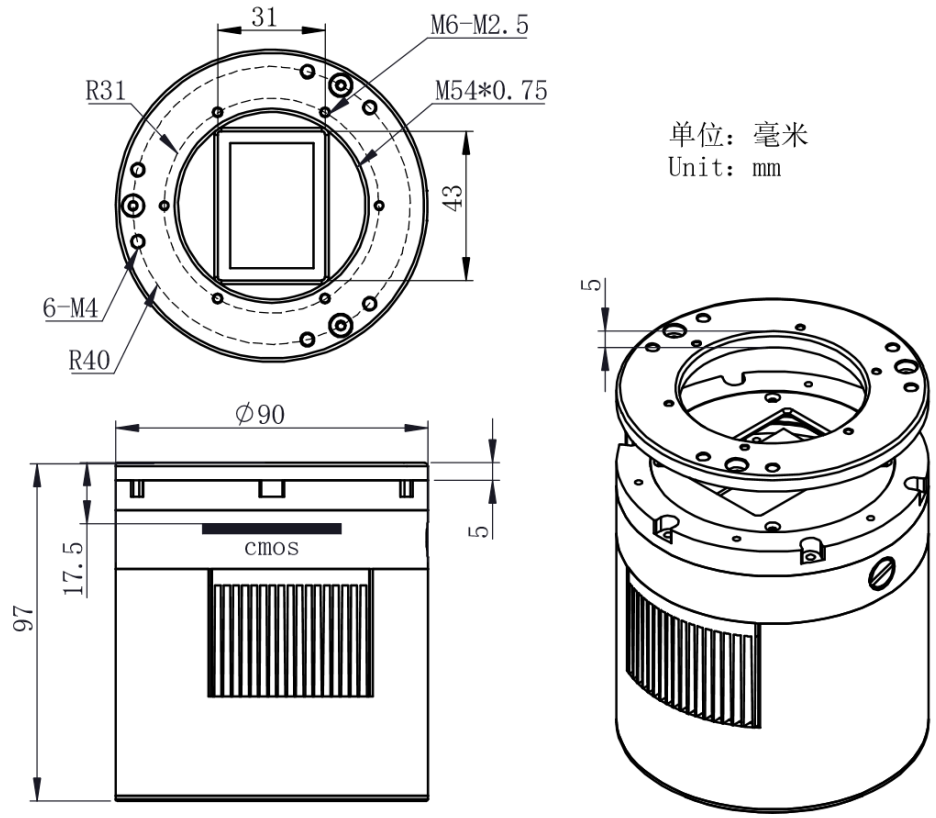


Planetary / Guide Cameras
External Device Connecting Drawing
1/4" screws
ST4 Guiding cable
USB 3.0/USB 2.0 Cable
Auto-guider port on Equatorial mount
Computer USB 3.0/USB 2.0 Port

Cooled Cameras
External Device Connecting Drawing
USB Hub For accessories
12V Power Adapter
USB2.0 Cable
ASI Pro/Cool Camera
USB3.0/USB2.0 Cable
Accessories
Computer USB3.0/USB2.0 Port

7. Mechanical drawing

ASI6200MM/MC Pro



8. Servicing

For software upgrades please refer to “Support-manual and software” on our official website.
https://astronomy-imaging-camera.com/
Repairs and servicing are available by emailing info@zwoptical.com
For customers who bought the camera from your local dealer, dealer is responsible for the customer service.

9.Warranty

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