ASI290 Manual

Revision 1.3

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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 read it thoroughly. If you have any other questions, please feel free to submit it on the ZWO support site: https://support.astronomy-imaging-camera.com/

ASI290 Cameras are designed for astronomical photography.
Its excellent performance and multifunctional usage will impress you a lot!

For software installation instructions and other technical information please refer to “Support” on the ZWO site:
https://astronomy-imaging-camera.com/software-drivers

2. Camera Models and Sensor Type

There are 4 types of ASI290 models:

Model	Mono or Color	Regulated TEC Cooling	Sensor
ASI290MM	Mono	No	IMX290LQR
ASI290MC (Discontinued)	Color	No	IMX291LQR
ASI290MM-COOL (Discontinued)	Mono	Yes	IMX290LQR
ASI290MC-COOL (Discontinued)	Color	Yes	IMX291LQR

3. What's in the box?

ASI290MM

Camera body

1.25'' Cover

1.25''Nosepiece

ST4 Cable

Quick guide

USB3.0 Cable
(2m)

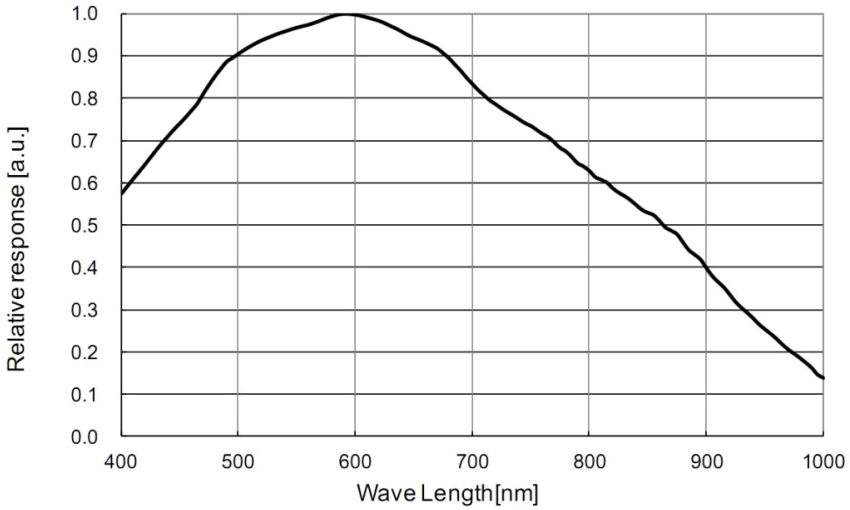
4. Camera technical specifications

Sensor	1 / 2.8″ CMOS
Diagonal	6.5mm
Resolution	2.1Mega Pixels 1936×1096
Pixel Size	2.9μm
Image area	5.6mm*3.2mm
Max FPS at full resolution	170FPS
Shutter	Rolling shutter
Exposure Range	32μs-2000s
Read Noise	1.0~3.2e
QE peak	TBD
Full well	14.6k e
ADC	12 bit
Interface	USB3.0/USB2.0
Adapters	2″ / 1.25″ / M42X0.75
Protect window	AR window
Dimensions	62mm
Weight	120g
Back Focus Distance	12.5mm
Supported OS	Windows, Linux & Mac OSX
Working Temperature	-5°C—45°C
Storage Temperature	-20°C—60°C
Working Relative Humidity	20%—80%
Storage Relative Humidity	20%—95%

5. QE Graph & Read Noise

QE and Read Noise are the most important parameters to measure the performance of a camera. Higher QE and lower Read Noise are needed to improve the SNR of an image.

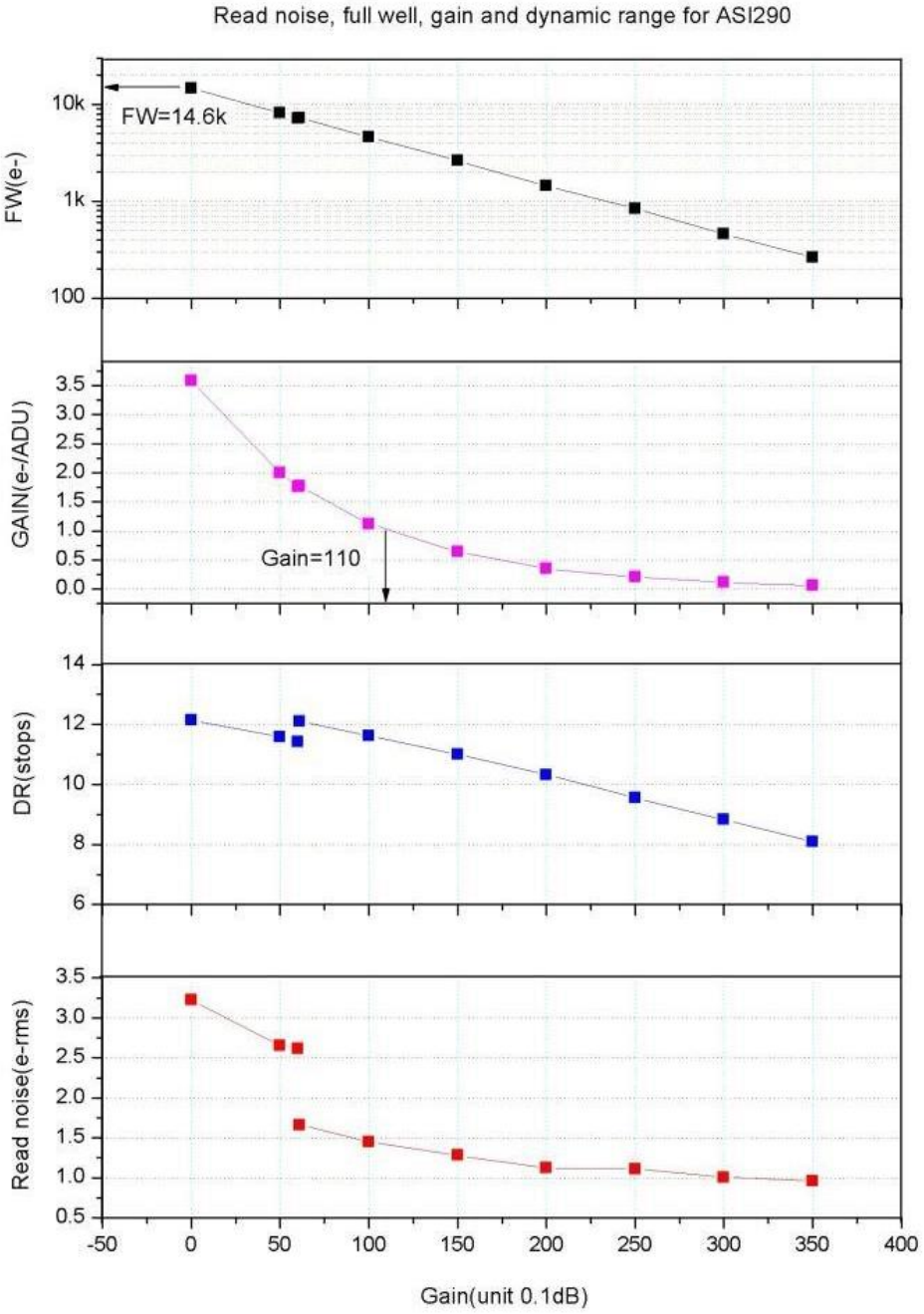
Mono 290 sensor Relative QE Curve



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

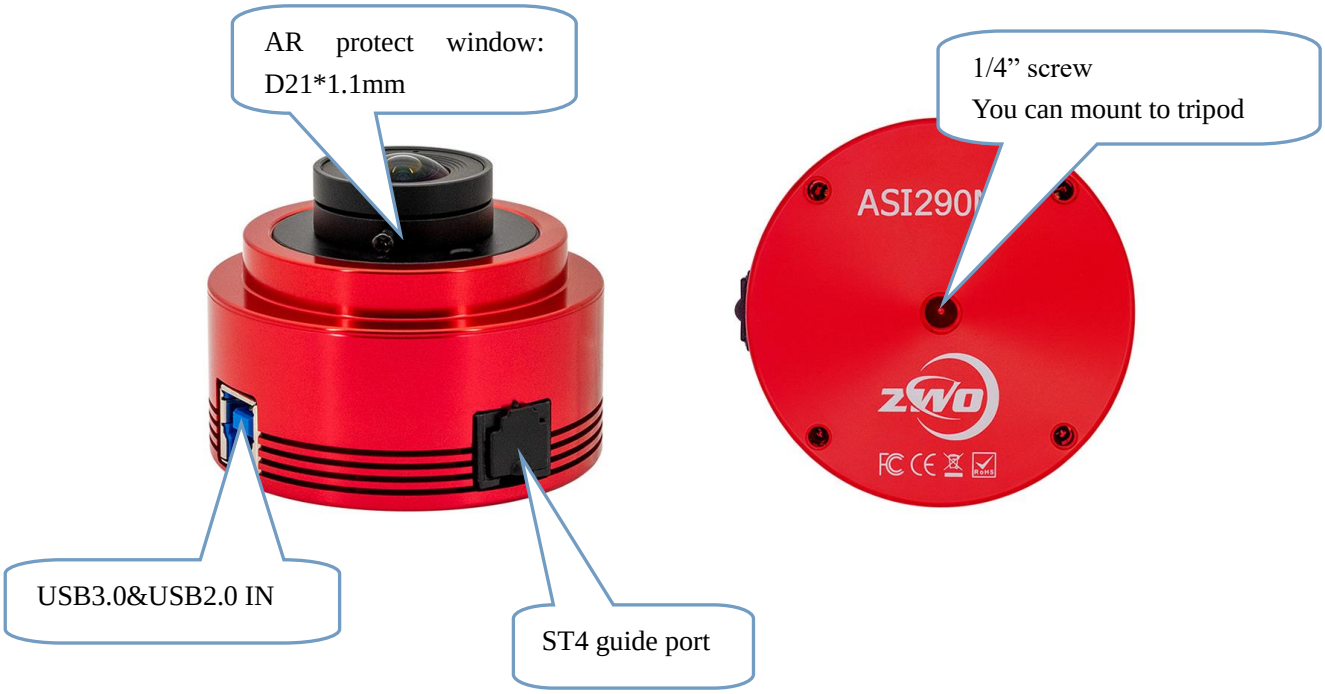
The Read Noise of the ASI290 cameras is extremely lower when compared with traditional CCD cameras. It is even lower when the camera is set at a higher Gain.

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).



6. Getting to know your camera

6.1 External View

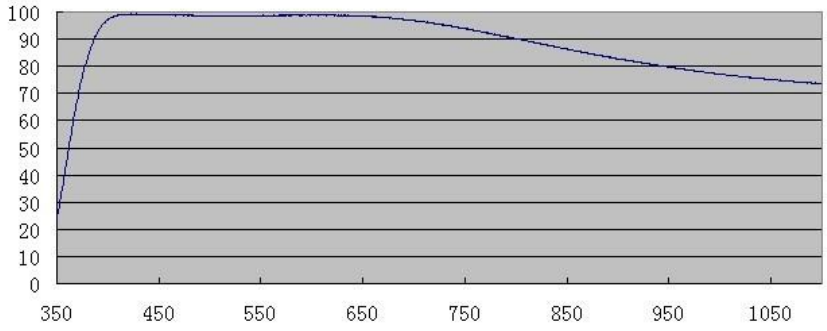


6.2 Power consumption:

ASI cameras are designed to have very low power consumption which is around 160ma@5V. You only need the USB cable to power up the camera.

6.3 Protect Window

There is a protect window before the sensor of ASI290 camera: D21 AR window, 1.1 mm thickness.



6.4 Analog to Digital Converter (ADC)

The ASI290 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.
Here is the maximum speed of ASI290 running at 10bit ADC and 12bit ADC.

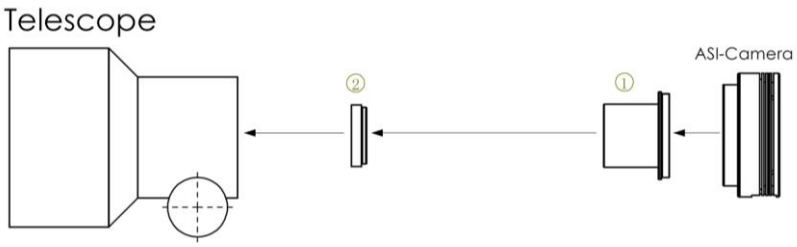
Resolution	USB3.0	
	12Bit ADC	10Bit ADC
1936×1096	82.2 FPS	170 FPS
1280×960	93.6 FPS	193.9 FPS
640×480	184 FPS	381.2 FPS
320×240	355.9 FPS	737.5 FPS
2X2Bin 968×548	82.2 FPS	170 FPS

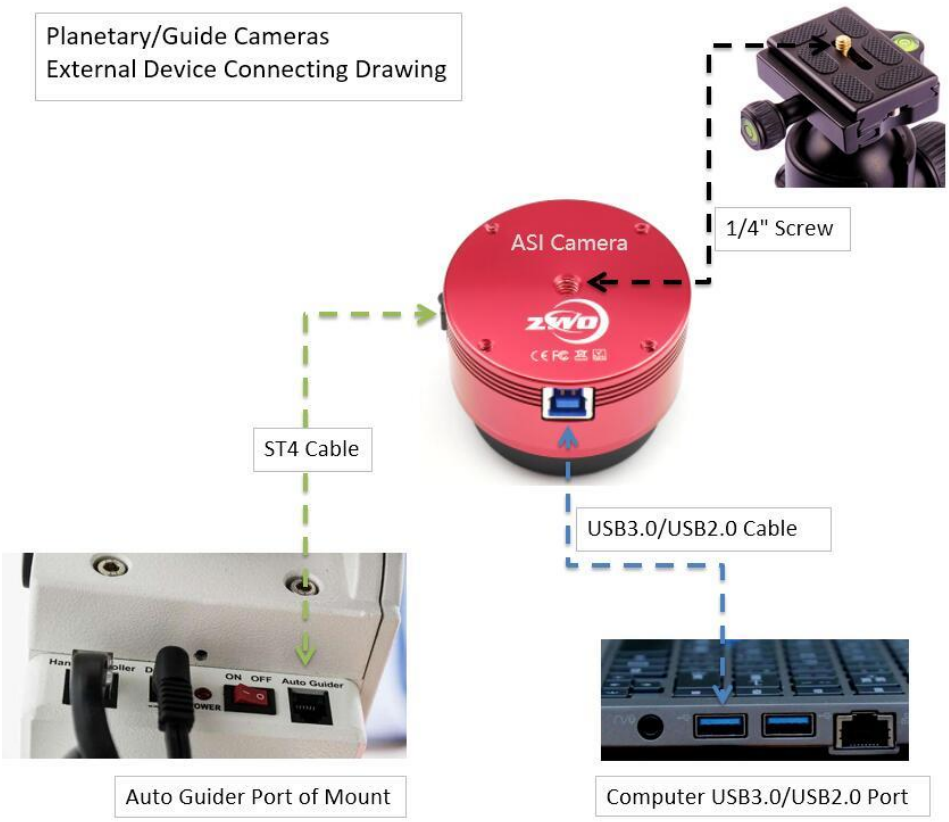
6.6 Binning

The ASI290 camera supports software bin2 mode. You should use 10bit ADC. We recommend customer to use software binning if you don’t care speed.

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

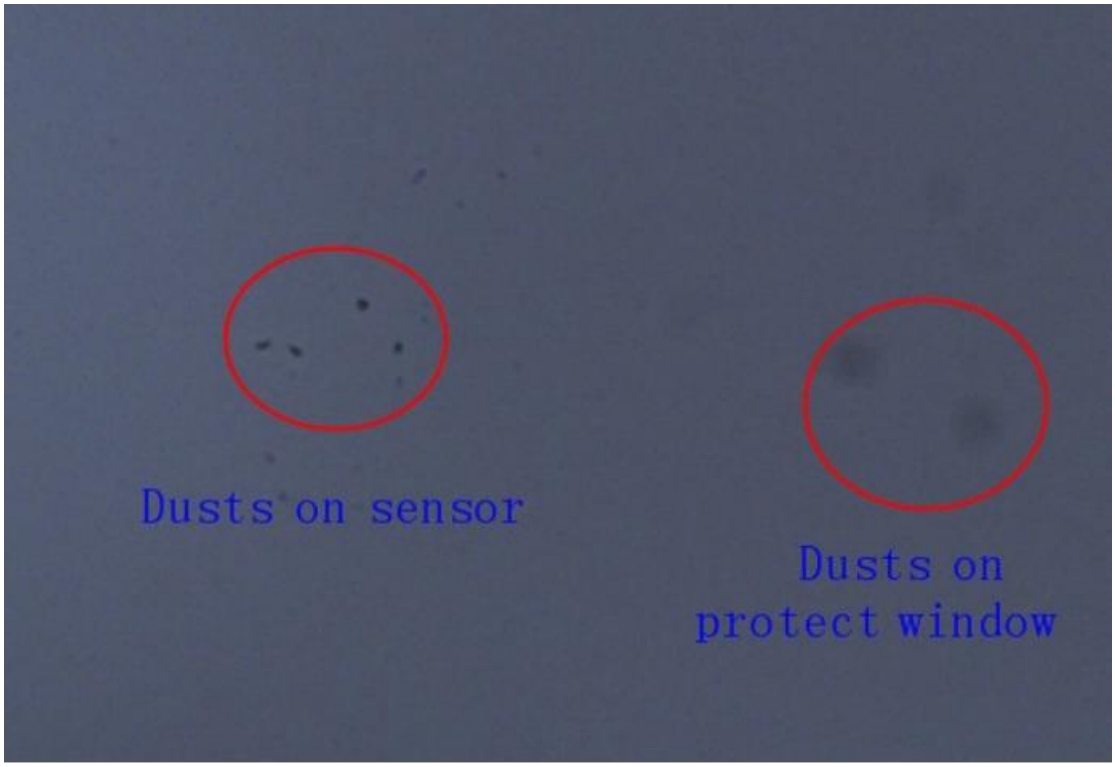





Cooled Cameras
External Device Connecting Drawing
USB Hub For accessaries
12V Power Adapter
USB2.0 OUT
USB3.0 IN
DC 12V⎓3A
ASI Pro/Cool Camera
USB2.0 Cable
USB3.0/USB2.0 Cable
EFW mini
Accessaries
Computer USB3.0/USB2.0 Port

8. Clean the camera and redry desiccant

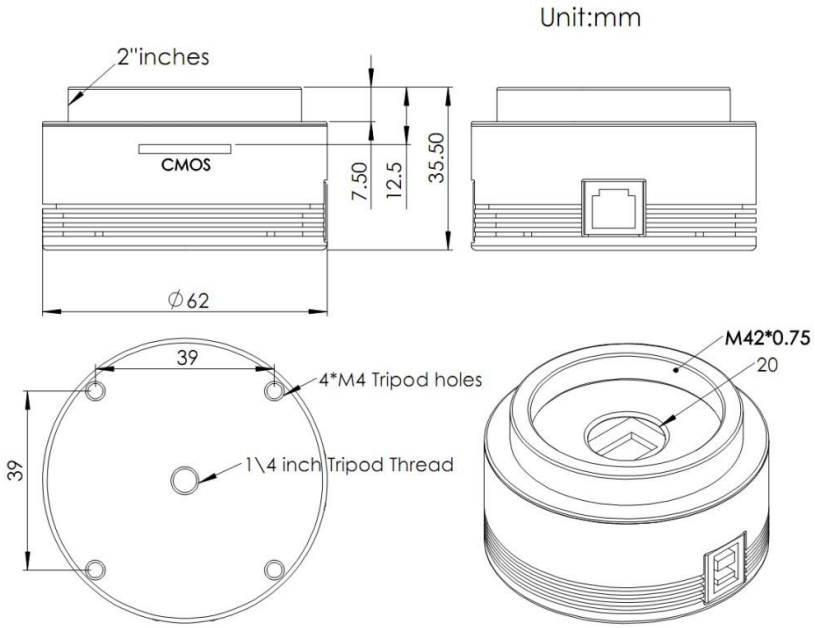
The camera comes with an AR protect window, which can protect the sensor from dust and humidity. Should you need to clean the sensor, it's better to do so during the daytime. To see the dust, you just need to setup your telescope and point it to a bright place. A Barlow is required to see these dusts 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/How_to_clean_ASI_camera_and_redry_the_desiccant.pdf

9. Mechanical drawing

ASI290MM



10. Servicing

For software upgrades please refer to “Support-manual and software” on our official website.
https://astronomy-imaging-camera.com/
Repairs and consultation: https://support.astronomy-imaging-camera.com/

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

11. 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.