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# Table of Contents

ASI Mini Camera Manual                                                                                       1
1. Instruction                                                                                              3
2. Camera Models and Sensor Type                                                                           4
3. What's in the box?                                                                                       4
4. Camera technical specifications                                                                       5
5. QE Graph & Read Noise                                                                                  6
6. Getting to know your camera                                                                            10
   6.1 External View                                                                                         10
   6.4 Protect Window                                                                                        10
   6.5 Analog to Digital Converter (ADC)                                                                  10
   6.6 Binning                                                                                              11
7. How to use your camera                                                                                 11
8. Cleaning                                                                                                12
9. Mechanical drawing                                                                                      14
10. Servicing                                                                                               14
11. Warranty                                                                                                14
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 contact us. info@zwoptical.com

ASI Mini Cameras are designed for both Guiding and 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 our official website.
https://astronomy-imaging-camera.com/
2. Camera Models and Sensor Type

There are 2 types of ASI mini models:

<table>
<thead>
<tr>
<th>Model</th>
<th>Mono or Color</th>
<th>USB Speed</th>
<th>Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASI120MM Mini</td>
<td>Mono</td>
<td>USB2.0</td>
<td>AR0130</td>
</tr>
<tr>
<td>ASI290MM Mini</td>
<td>Mono</td>
<td>USB2.0</td>
<td>IMX290</td>
</tr>
<tr>
<td>ASI174MM Mini</td>
<td>Mono</td>
<td>USB2.0</td>
<td>IMX174</td>
</tr>
</tbody>
</table>

3. What's in the box?

ASI120MM mini / ASI290MM mini / ASI174MM mini

1.25” cover  camera body  quick guide  0.5m USB2.0 cable

2m USB2.0 cable  ST4 cable  M28.5-CS adapter  1.25” extender
## 4. Camera technical specifications

<table>
<thead>
<tr>
<th></th>
<th>ASI120MM Mini</th>
<th>ASI290MM Mini</th>
<th>ASI174MM Mini</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor</td>
<td>1/3” CMOS</td>
<td>1/2.8” CMOS</td>
<td>1/1.2” CMOS</td>
</tr>
<tr>
<td>Diagonal</td>
<td>6.09mm</td>
<td>6.5mm</td>
<td>13.2MM</td>
</tr>
<tr>
<td>Resolution</td>
<td>1.2 Mega Pixels 1280x960</td>
<td>2.1Mega Pixels 1936x1096</td>
<td>2.3Mega Pixels 1936x1216</td>
</tr>
<tr>
<td>Pixel Size</td>
<td>3.75μm</td>
<td>2.9μm</td>
<td>5.86μm</td>
</tr>
<tr>
<td>Image area</td>
<td>4.8mm*3.6mm</td>
<td>5.6mm*3.2mm</td>
<td>11.3mm*7.1mm</td>
</tr>
<tr>
<td>Max FPS at full resolution</td>
<td>35FPS</td>
<td>20.4FPS</td>
<td>18.4FPS</td>
</tr>
<tr>
<td>Shutter</td>
<td>Rolling shutter</td>
<td>Rolling shutter</td>
<td>Global shutter</td>
</tr>
<tr>
<td>Exposure Range</td>
<td>64μs-2000s</td>
<td>32μs-2000s</td>
<td>32μs-2000s</td>
</tr>
<tr>
<td>Read Noise</td>
<td>4.0-6.5e</td>
<td>1.0~3.2e</td>
<td>3.5-6.0e</td>
</tr>
<tr>
<td>QE peak</td>
<td>Almost 80%</td>
<td>80%</td>
<td>78%</td>
</tr>
<tr>
<td>Full well</td>
<td>13k e</td>
<td>14.6k e</td>
<td>32k e</td>
</tr>
<tr>
<td>ADC</td>
<td>12 bit</td>
<td>12 bit/10 bit</td>
<td>12 bit/10 bit</td>
</tr>
<tr>
<td>Interface</td>
<td>USB2.0</td>
<td>USB2.0</td>
<td>USB2.0</td>
</tr>
<tr>
<td>Protectors window</td>
<td>AR window</td>
<td>AR window</td>
<td>AR window</td>
</tr>
<tr>
<td>Dimensions</td>
<td>φ36mm*61mm</td>
<td>φ36mm*61mm</td>
<td>φ36mm*61mm</td>
</tr>
<tr>
<td>Weight</td>
<td>60g</td>
<td>60g</td>
<td>60g</td>
</tr>
<tr>
<td>Back Focus Distance</td>
<td>8.5mm</td>
<td>8.5mm</td>
<td>8.5mm</td>
</tr>
<tr>
<td>Supported OS</td>
<td>Windows, Linux &amp; Mac OSX</td>
<td>Windows, Linux &amp; Mac O60g SX</td>
<td>Windows, Linux &amp; Mac OSX</td>
</tr>
<tr>
<td>Working Temperature</td>
<td>-5° C—45°C</td>
<td>-5° C—45°C</td>
<td>-5° C—45°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-20° C—60°C</td>
<td>-20° C—60°C</td>
<td>-20° C—60°C</td>
</tr>
<tr>
<td>Working Relative Humidity</td>
<td>20%—80%</td>
<td>20%—80%</td>
<td>20%—80%</td>
</tr>
<tr>
<td>Storage Relative Humidity</td>
<td>20%—95%</td>
<td>20%—95%</td>
<td>20%—95%</td>
</tr>
</tbody>
</table>
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 120 sensor Relative QE Curve

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 mini 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).
Read noise, full well, gain and dynamic range for ASI290
6. Getting to know your camera

6.1 External View

ASI Mini Camera Manual

6.4 Protect Window

ASI Mini camera comes with the AR window, thickness is 1.1 mm.

6.5 Analog to Digital Converter (ADC)

ASI Mini camera records in 12bit ADC, 290 and 174 mini support 10bit ADC. This camera also supports ROI (region of interest) shooting, and this smaller ROI has faster fps.
6.6 Binning

ASI Mini camera supports software bin2 mode. 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:

1. CS adapter
2. C/CS Adapter
3. 1.25” extender
4. 1.25” filter(optional)
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/

Quickguide

- ZWO ASI Camera Quick Guide
- ZWO ASI Cooled Camera Quick Guide
- How to clean ASI camera and redry the desiccant
9. Mechanical drawing

10. 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.

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.