

Ares-M Pro Camera Manual

V1.0

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Product Features

DSO cooled camera line is the most advanced product line in Player One history. We start the project from 2021, through a lot of modify and rebuild we made this final version. It brings our newest technology and design to everyone, we are very proud to introduce this camera line.



Technical parameters

Sensor	New SONY IMX533 1" CMOS (mono)
Diagonal	16mm
Total Pixels	9 Mega Pixels
Max Resolution	3008×3008
Pixel Size	3.76μm
Chip Size	11.31mm×11.31mm
Frame Rate	43FPS（10bit）
Shutter	Rolling shutter
Exposure Range	32μs-2000s
Readout Noise	4.46-1e
Full Well	73k e
QE Peak	≈91%
ADC	14 bit
Cooling System	High quality 2 stage TEC cooling Component
Cooler Power Consumption	12V – 3A Max
Delta T	35°C-40°C (below ambient)
Working Temperature and Humidity	Working Temperature: -10°C—60°C Working Relative Humidity: 0%—80%
Protective Window	D32*2MM High Quality AR Plus (Anti Reflection) Multi-Layer Coating
Data Port	USB3.0/USB2.0
Adapter	1.25″ / M42X0.75
Back Focal Length	17.5mm
Diameter	78mm
Weight	420g
Resolution and FPS	Under USB3.0 mode Resolution 10bit ADC 14bit ADC 3008×3008 43FPS 19.5FPS 2560×1440 95FPS 40FPS 1920×1080 125FPS 53FPS 1280×720 185FPS 79FPS 800×600 220FPS 93FPS 640×480 272FPS 115FPS More resolution options could be setup in capture software!

Product Description



Ares-M Pro (IMX533) camera is developed by Player One Astronomy, this camera is not only great for DSO imaging, and also can do solar and lunar imaging too. Ares-M Pro camera, which adopts **Sony IMX533 1" square format** monochrome sensor. The **3.76um pixel size** accommodates a well depth of **73Ke** with a total of 9**MP** (the resolution is 3008*3008)**,** and the diagonal is **16mm**.



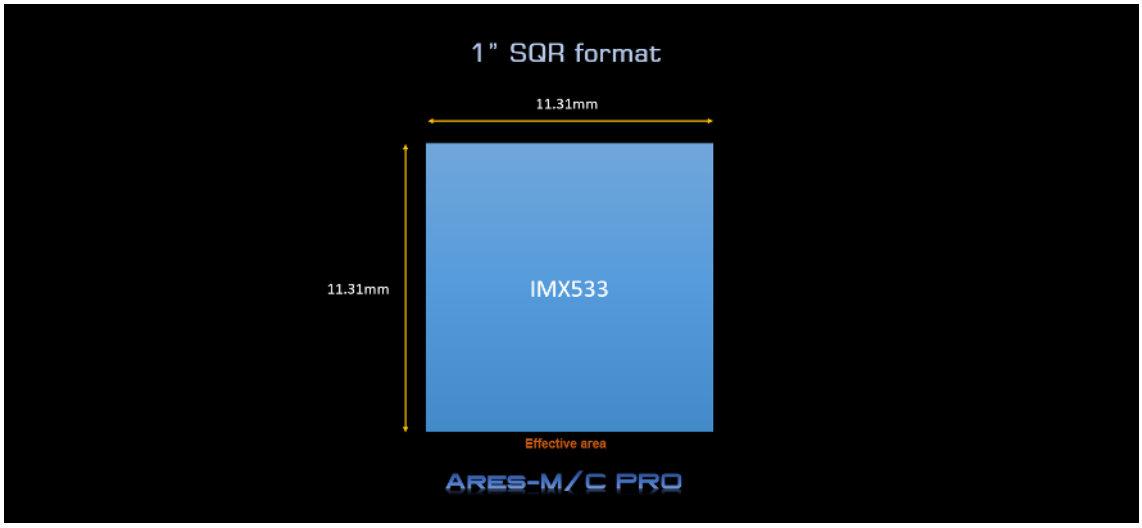
STARVIS Technology

Ares-M Pro (IMX533) camera based on **Sony STARVIS technology**, it is back-illuminated pixel technology used in CMOS image sensors.



Format

Ares-M Pro camera has 1″ format; this size is quite big for imaging.



Cutting-edge Design

The Ares cooled series is starting with a new design! This time with a round body, a classic red and black color scheme, and using carbon fiber to keep weight down and cutting-edge outlook. We also integrated the sensor tilter plate and anti-dew PCB board. This series of designs makes the camera not only light and cool, but also functional!



Front 3P and Rear 4P tilter plate

When shooting deep sky objects, the sensor tilt plate can be used to adjust the sensor tilt angle to make the stars at the corners more rounded. Ares camera provide both front and Rear tilter plate fulfill all usage scenarios.



Front 3P tilter plate is the default part on camera, we believe most users has experience with this before. it works well in a lot of basic scenarios.

Rear 4P tilter plate is an alternate part for camera, when use filter wheel/filter drawer and OAG with fixed angel, it is necessary. And it is also convenient for RASA users to adjust the sensor tilt angel.

The built-in high-density sponge shading pad can block the light from the side slits without any side leakage.

Carbon fiber and light weight

The Ares series uses a carbon fiber in camera housing and has been optimized for weight reduction in its structural design. The camera weighs only 420 grams, making it one of the lightest models on the market.



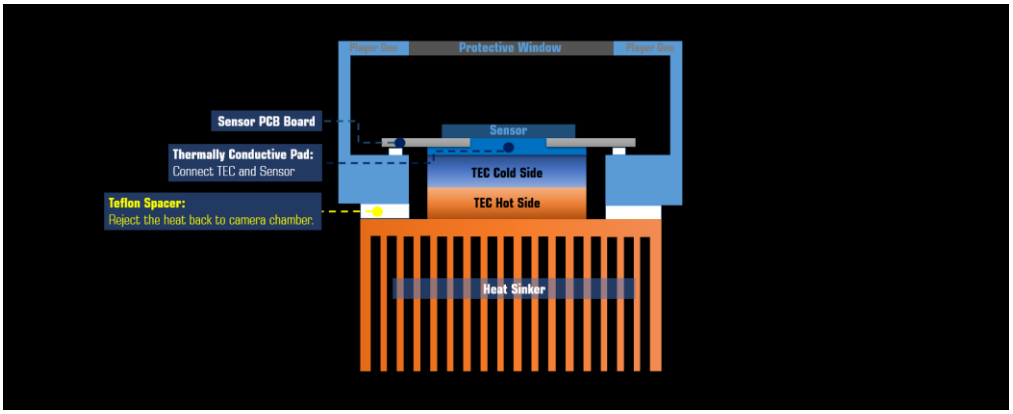
Deep Cooling

Player One cooled camera series use 2 Stage TEC Cooling unit, after improved the structure design to reject the heat back to camera chamber, Camera **Delta-T** can reach

35-40℃



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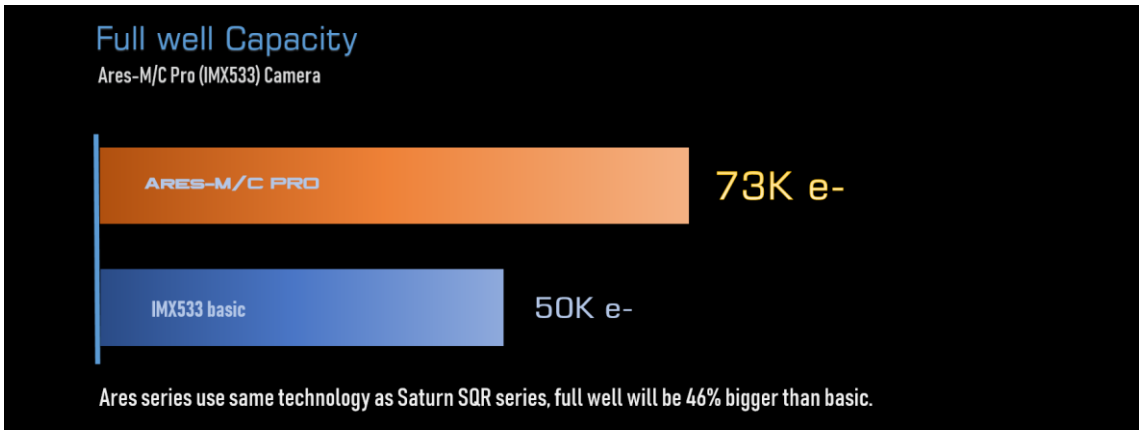
Anti-Dew heater

In the design of lightweight cooled cameras, Player One still pursuing the perfection, any necessary features must have, especially anti-dew system, is the problem that a lot of small cooled cameras ignored.



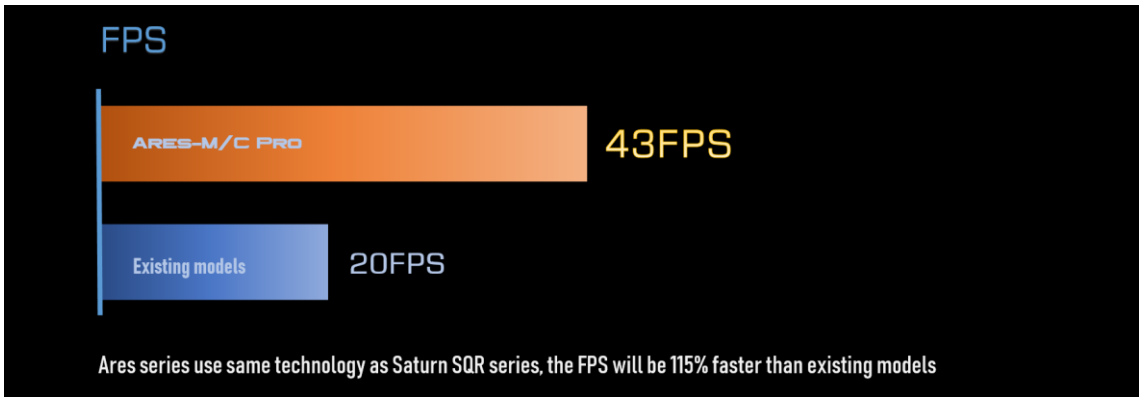
Full well

Ares-M Pro camera has 73Ke full well, it's almost 1.5 times than IMX533 Basic (50ke).



Frame rate

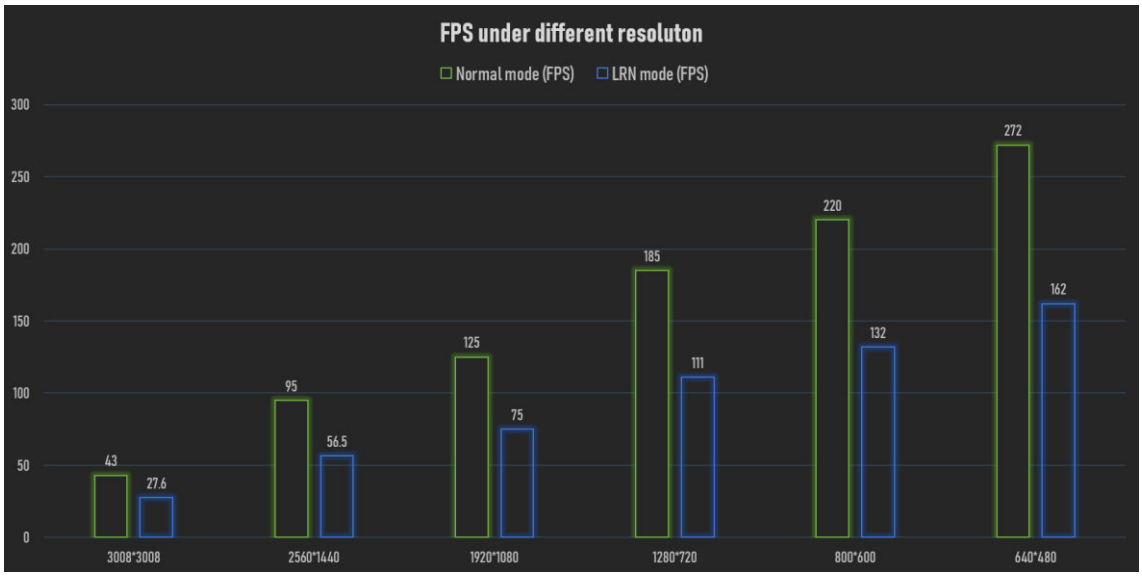
Ares-M Pro camera can run 43FPS under RAW8 mode, that's much faster than existing models on market.



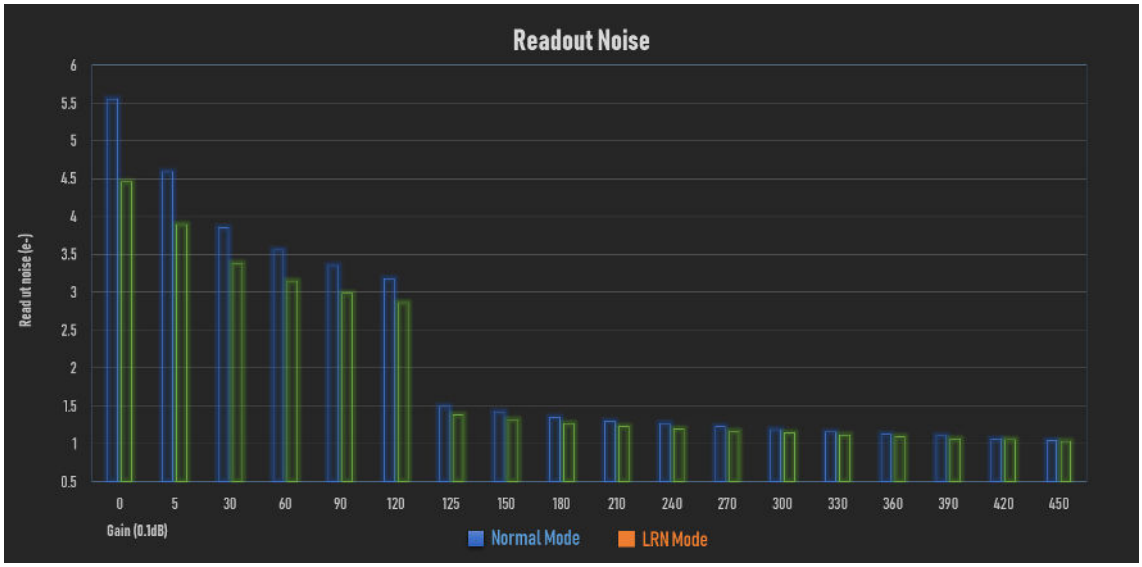
Dual Sampling Mode

Ares series has dual sampling mode. Normal mode and LRN mode, they has different advantages in imaging.

1. Normal mode has faster FPS, it is more suitable for planetary imaging.



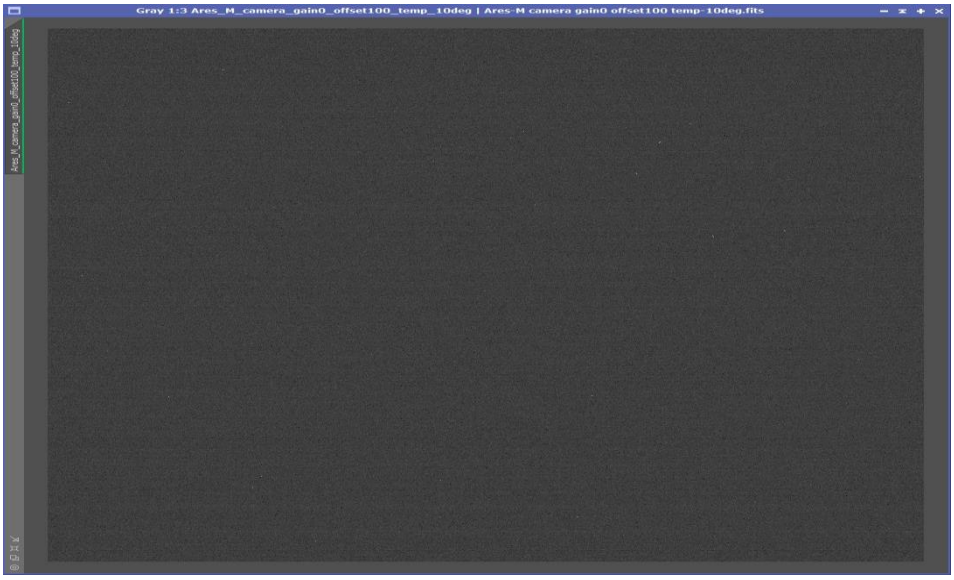
2. LRN (low readout noise) **mode** has lower readout noise and higher dynamic range. it is more suitable for DSO imaging.



Non-Amp-Glow

Dark frame of Ares-M PRO (IMX533) camera is totally “dark”, it is also “Non-Amp-Glow” camera too!

300s@gain=0, offset=10, -10 degree, Dark frame of Ares-M PRO camera: DOWNLOAD



Preview of Dark frame: Exposure=300s, gain=0, offset=10, temp=-10℃ STF auto-Stretch in Pixinsight 1.86

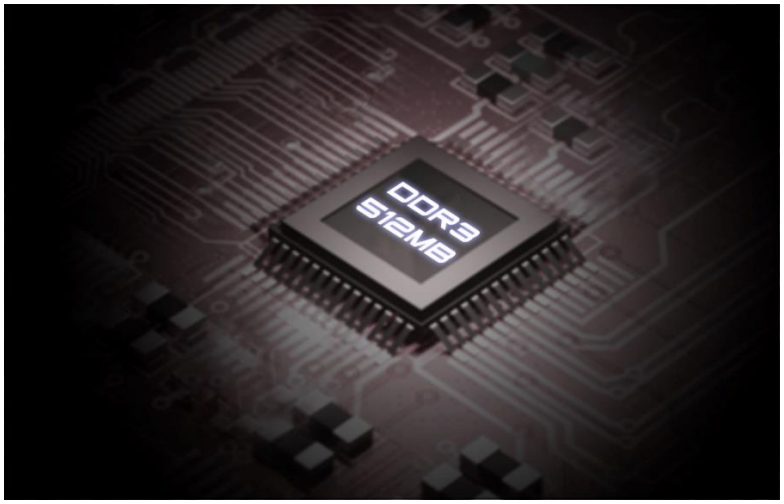
Non-Amp-Glow can give us very clean background, much easier to get high quality images.

Ares-M PRO camera also very good for solar, lunar and planetary imaging. Its 1″ square sensor can easily capture full disk of the Sun and Moon with short focal refractors. And it also could make mosaic work more efficient.

512MB DDR3 Cache

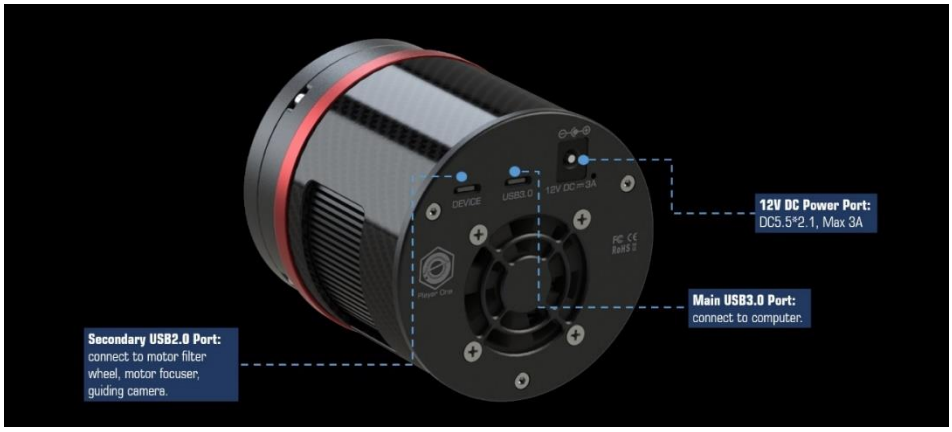
As an improvement, DDR3 cache in cooled cameras are increased to 512MB. It helps stabilize and secure data transmission, it effectively avoids frame dropping and greatly reduces readout noise.

With the DDR3 cache, the camera does not have high demands on computing needs any longer, it will still have excellent performance even if it is connected to a USB 2.0 port.



Type-C Data port and Power port

Back piece of cooled camera has 2 Type-C data port and 12V DC 5.5×2.1mm power port.



Main data port support USB3.0 protocol, the camera can run 43fps under RAW8 mode. Type-C port is easier to plug in when assemble the imaging equipment in night.

When recording images, since the actual writing speed will be affected by the writing speed of the hard disk itself, when the hard disk writing speed is slow, the recording may not reach the theoretical speed. It is recommended that you use a high-quality solid state drive to record data to give full play to the performance of the camera.

The camera has 12V DC5.5*2.1mm port to provide enough power to TEC cooling system. If you don't need to power up cooling, only need to connect the main Type-C port, the camera will work as a uncooled camera.

Standard Cable Usage



Cooling System and Anti-Dew Heater

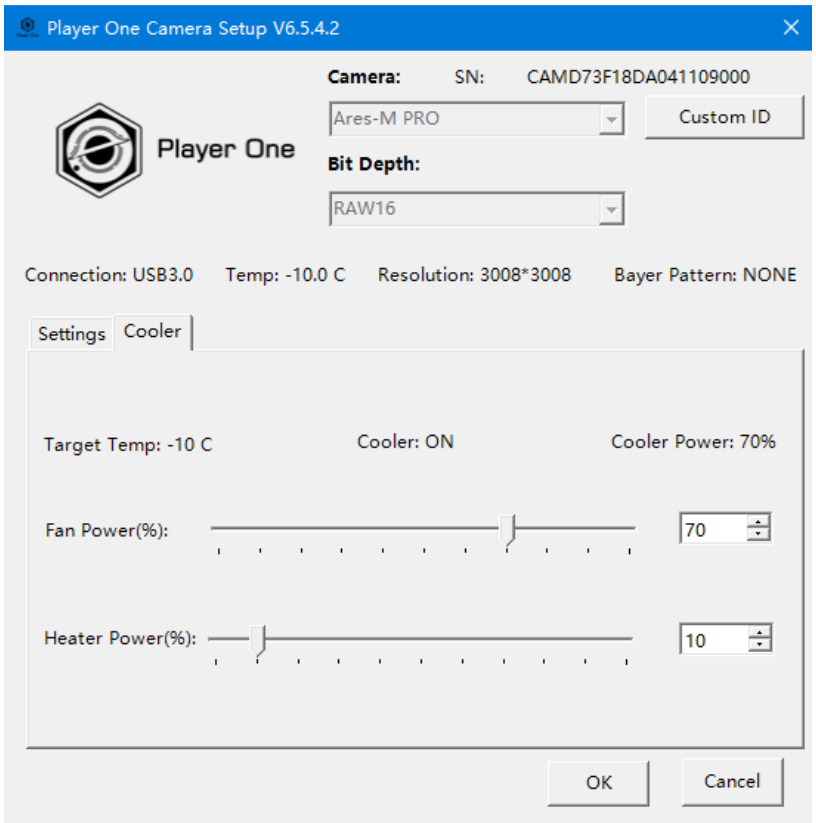
In ASCOM window, we provide 3 adjustable parameters: Target temperature, Fan Speed and Anti-Dew power.

Standard Delta-T: 35℃-40℃, when **ambient temp 30℃, fan speed 100%, dew heater 1%**.

Recommend Delta-T settings: 30℃-35℃ **below ambient, fan speed 50-70%, dew heater 10%, power consumption 40- 60%.**

The rotation speed of cooling fan is also adjustable; the **default value is 50%** speed.

Dew problem is the biggest enemy in astro imaging, the camera integrated anti-dew heater in front of the camera. The heat power is adjustable.

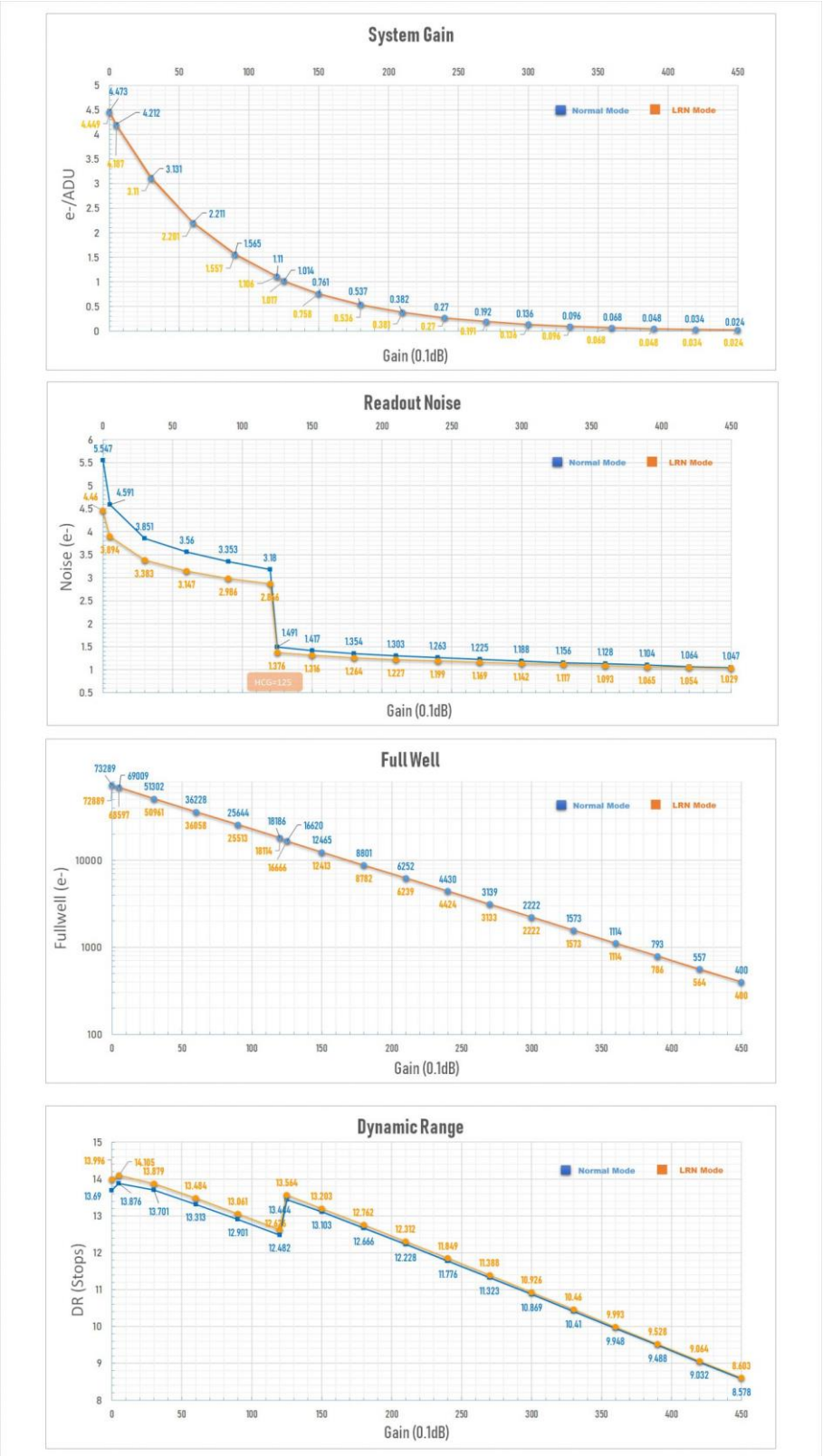


Overvoltage and overcurrent protection mechanism

Player One cameras produced by the number one player ensures the safety of your camera and other equipment through overvoltage and overcurrent protection mechanisms.

Performance

HCG open at gain=125.



Readout Noise

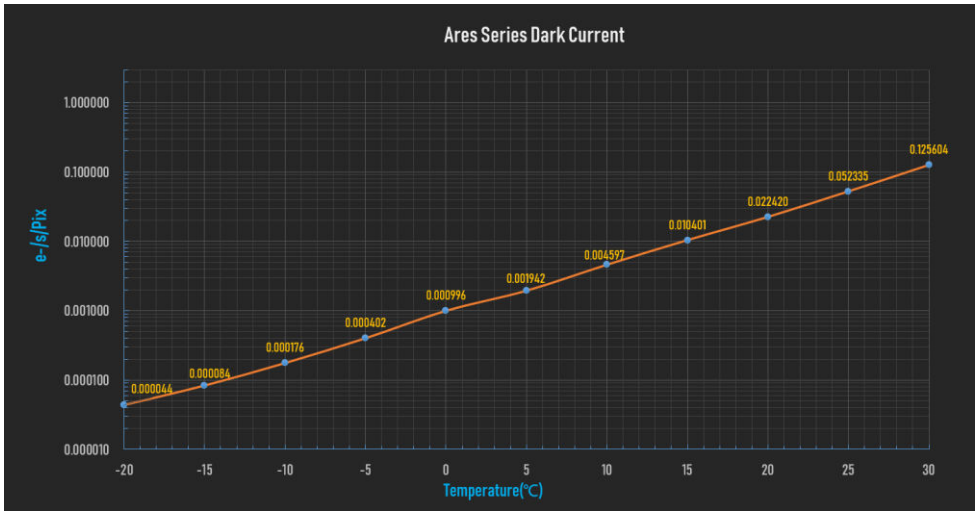
Regarding readout noise, we solemnly promise that all values are obtained from actual tests. And for users, you could use Sharpcap 4 for testing. SC4 has a function called **Sensor Analysis**, provide a very simple way to test readout noise.

We wrote a tutorial on our website: https://player-one-astronomy.com/service/manuals/

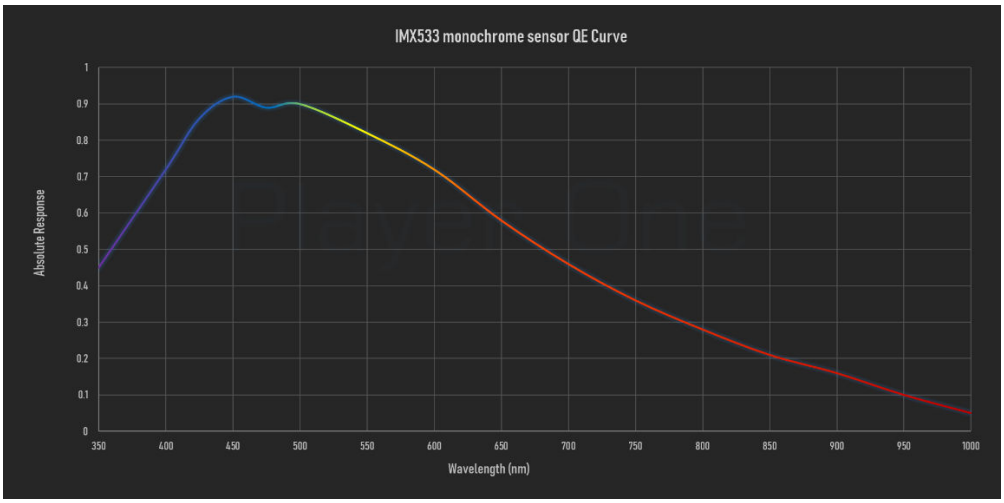
If you are interested in readout noise testing, you may try it yourself, which is very simple.

Dark current

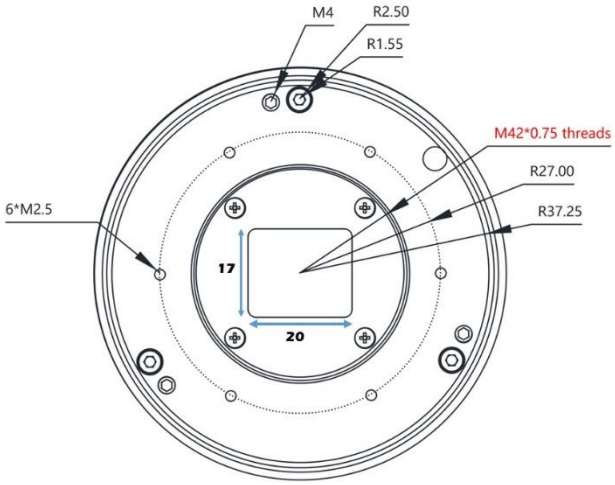
The dark current is only 0.000044 e/s/pix at -20℃, and 0.000996e/s/pix at 0℃. In entire curve, dark current is almost like a straight a line, which can prove that Ares camera has very good quality and stable performance.

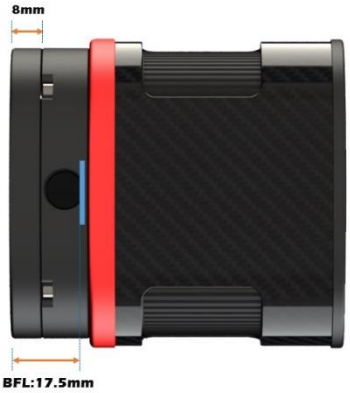


Absolute QE Curve



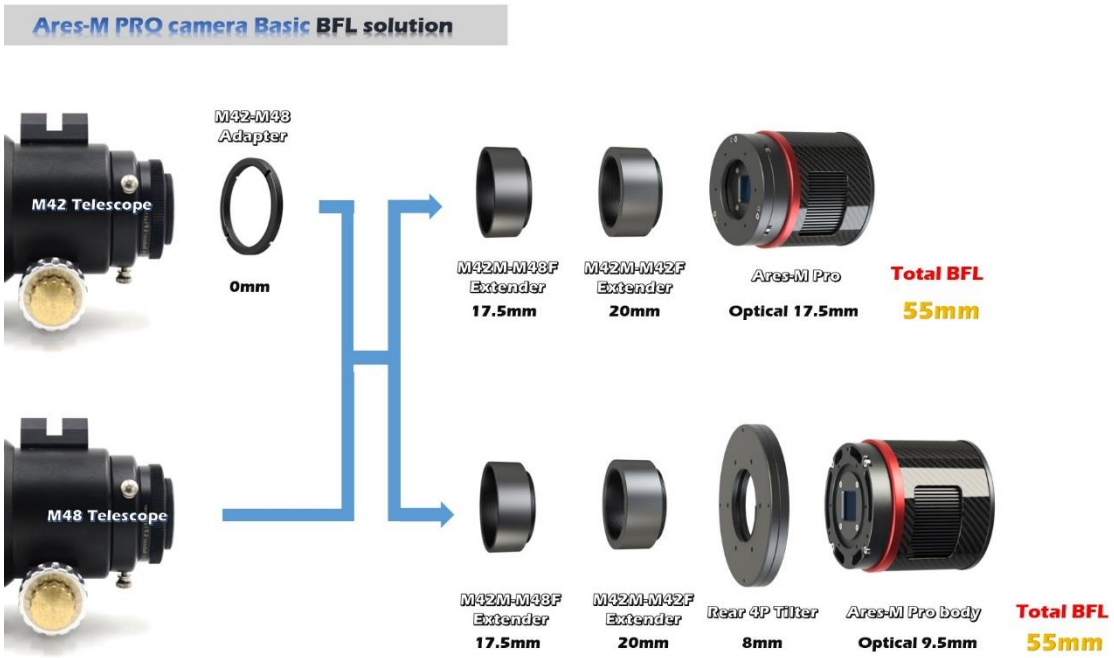
Mechanical Drawing





BFL Solutions

Following is some recommend 55mm BFL solution for this camera. If don't consider about BFL, the connection way is various.







Notice: Some BFL solution is 56mm (Compensate light path differences which caused by filters)

Package List



Warranty & Shipping Policy

Payment method

We provide *PayPal* and *PayPal checkout* on our website.

Shipping and Delivery

Shipping Fee:

- Amount >= 299USD: free express shipping
- Amount < 299USD: 29.9USD for express shipping

Shipping Services:

- We usually use DHL, UPS, FedEx, TNT for shipping.
- Make sure your email is correct, we maybe will contact with you through emails in case of emergency.

If customer wants to designate a shipping company or has special requirement, please send an email to *support@player-one-astronomy.com* and tell us your detailed requirement.

Shipping time:

- Usually 7-14 days.
- Tracking number will be updated in 3 days after paid.

For orders from areas where transportation is not easy, such as islands, town in mountainous regions, delivery time will be slightly longer.

Please send an email to *support@player-one-astronomy.com* immediately, if the following occurs:

- Shipping delayed or has some abnormal information.
- The packing is badly damaged on arrival, take pictures and do not sign.

Tax

- The price on our website without tax.
- Please note that buyers are liable to charge tax involved, such as Import tax, VAT, customs handling fee, etc.
- Those fees possibly will be collected at the time of delivery by courier.

For best experiences, we recommend customers to purchase our products form local dealers.

After-sales Service

Warranty Policy

2-year free warranty (time start from delivered) for Player One products. If the product has any issue, please send the image or video and description to support@player-one-astronomy.com for further check to confirm.

- Purchase from Player One official online store, we will provide warranty service directly.
- Purchase form dealer, we will provide warranty service through dealer.

Repair in warranty, customer only pay the shipping fee of shipping back the product to us or dealer, and no other extra fees.

Replacement Policy

You can request our Replacement Service:

√ Within 30 calendar days of receiving the product if the product does not match the original description of the product in one or more significant respects.

√ Within 30 calendar days of receiving the product if the product suffers performance failure.

Please contact our After-Sales team by email to *support@player-one-astronomy.com* within 30 calendar days of receiving the products. Player One shall be responsible for the two-way replacement freight for any products sent in for replacement due to performance faults.

Warranty and Replacement Policy Exceptions:

× Warranty service time or replacement service time expired.

× Legal proof-of-purchase, receipts, or invoices are not provided, or are reasonably believed to have been forged or tampered with.

× A product sent to Player One for replacement does not include all original accessories, attachments and packaging, or contains items damaged by user error.

× A product is found to have no defects after all appropriate tests are conducted by Player One.

× Any fault or damage of the product is caused by unauthorized use or modification of the product, including exposure to moisture, entry of foreign bodies (water, oil, sand, etc.) or improper installation or operation.

× Product labels or serial numbers show signs of tampering or alteration.

× Damage is caused by uncontrollable external factors, including falling down, fires, floods, or lightning strikes, etc.

× Proof of damage during transit issued by the carrier cannot be provided.

× Other circumstances stated in this policy.

In those situations, repair the product might have extra cost, we will estimate cost and email customer to know the information before send product back.