

FL 9BW

FL 9BW is a cooled CMOS camera designed for long exposure imaging. It not only incorporates high sensitivity and low noise advantages from latest sensor technologies, but also leverages Tucsen's many years experiences on cooling chamber design and advanced image processing. FL 9BW is able to capture clean and even images for up to 60 minutes exposure time.



Key Features

Benefits

Scientific Grade CMOS	92 % peak QE, 0.9 e ⁻ readout noise and no glow.
< 0.0005 e ⁻ /p/s Dark Current	Equivalent to the cooled CCD for long exposure imaging.
16000 : 1 Dynamic Range	More than 4 times that of the CCD, greatly expanding the signal detection range.
Pixel Correction Technology	High background quality ensures more accurate quantitative analysis. ^[1]
Flexible Binning Mode	Improving the sensitivity and dynamic range capability.
High Reliability Cooling Chamber	Cooled to -25 °C @ 22 °C, no condensation or other problems.
Compact Design	Conducive to instrument system integration.

Typical Applications

- Chemiluminescence
- Bioluminescence
- dPCR
- Fluorescence imaging

Noted Examples

[1] The FL 9BW has excellent background uniformity, as it has basically eliminated the bad factors such as amplifier glow and bad pixels.

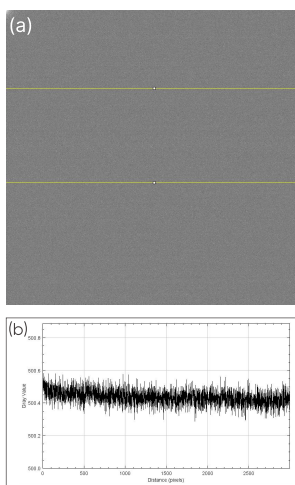
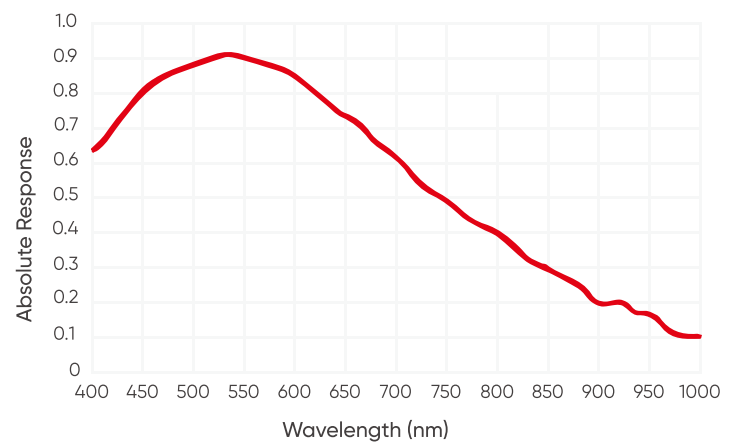
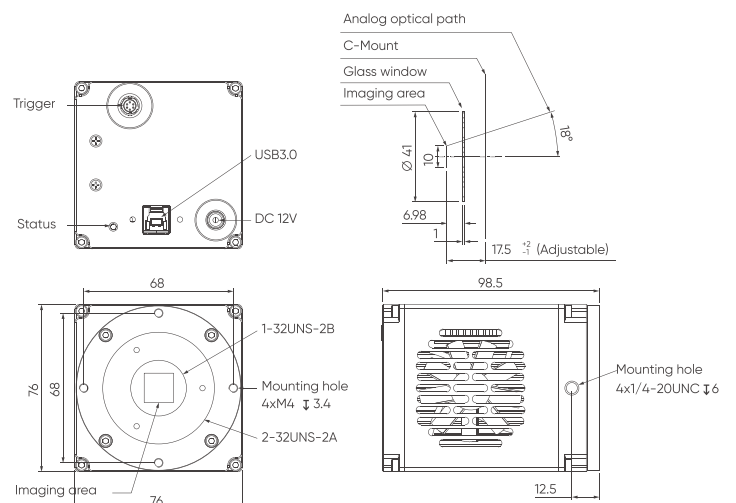


Figure (a) is the background image taken by FL 9BW with 600s exposure. Figure (b) is the grayscale intensity curve corresponding to the yellow region, showing excellent background uniformity.

Quantum Efficiency



Dimensions (Unit: mm)



Specifications

Long Exposure Cooled CMOS Camera

www.tucsen.com

Model	FL 9BW			
Sensor Type	BSI CMOS			
Sensor Model	SONY IMX533CLK-D			
Color / Mono	Mono			
Array Diagonal	15.96 mm (1")			
Effective Area	11.28 mm × 11.28 mm			
Pixel Size	3.76 μm × 3.76 μm			
Resolution	3000 × 3000, 9 MP			
Peak QE	92% @ 540 nm			
Dark Current	< 0.0005 e ⁻ /p/s			
Gain Mode	Gain 0 - HFWC	Gain 1 - Balance	Gain 2 - High Sensitivity 1	Gain 3 - High Sensitivity 2
Full Well Wapacity	Gain 0 : 47 ke ⁻ @ bin1; binning > 180 ke ⁻	Gain 1 : 16 ke ⁻ @ bin1; binning > 64 ke ⁻	Gain 2 : 8 ke ⁻ @ bin1; 14 bit binning > 32 ke ⁻	Gain 3 : 3ke ⁻ @ bin1 ; 14 bit binning > 12 ke ⁻
Readout Mode	Standard, Low-Noise			
Readout Noise (Standard)	3.2 e ⁻ @ Gain 0	1.2 e ⁻ @ Gain 1	1.0 e ⁻ @ Gain 2	0.95 e ⁻ @ Gain 3
Readout Noise (LowNoise)	2.5 e ⁻ @ Gain 0	1.0 e ⁻ @ Gain 1	0.9 e ⁻ @ Gain 2	0.85 e ⁻ @ Gain 3
Frame Rate	19 fps @ Standard Mode, 12 fps @ Low Noise Mode			
Shutter Mode	Rolling			
Exposure Time	15 μs ~ 60 min			
Image Correction	DDFC, DPC			
ROI	Support			
Binning	2, 3, 4, 6, 8, 12, 16, 24			
Cooling Method	Air			
Cooling Temperature	Cooled to -25 °C @ ambient temperature (22 °C)			
Trigger Mode	Hardware, Software			
Output Trigger Signals	Exposure Start, Global, Readout End, High Level, Low Level			
Trigger Interface	Hirose			
SDK	C, C++, C#			
Data Interface	USB 3.0			
Software	Mosaic, SamplePro, LabVIEW, MATLAB, Micro-Manager			
Optical Interface	C-Mount, Customizable			
Bit Depth	14 bit, 16 bit			
Power	12 V / 6 A			
Power Consumption	≤ 40 W			
Dimensions	76 mm x 76 mm x 98.5 mm			
Weight	835 g			
Operating System	Windows / Linux			
Operating Environment	Working: Temp. 0~45 °C, HUM 10~85% Storage: Temp. -10~60 °C, HUM 0~85%			