



WESTBORO
PHOTONICS

SMART SERIES IMAGING
PHOTOMETERS

USB3 CMOS

P230U, P501U, P890U, P1230U

USB3 CMOS

KEY FEATURES

- Fastest Measurements
- Up to 12 Megapixels Resolution
- Small Size, Low Power
- Exceptional Sensitivity
- Wider Dynamic Range



APPLICATIONS

- Display Testing
- Beam Pattern of Lamps and Luminaires
- Roadway Lighting
- Automotive and Avionics Lighting
- Architectural Scenes
- Theatrical and Commercial Lighting
- Human Factors Engineering

The new CMOS Smart Series imaging photometers set the benchmark for measurement performance and value.

HIGH RESOLUTION

With several lens choices and resolutions of 2.3, 5.0, 8.9 or 12.3 megapixels, these photometers have your application covered.

measurement can reliably report a wider dynamic range of luminance values (>70dB). Up to 1,000,000:1 dynamic range can be acquired using HDR imaging methods.

MATCHED LENSES

Each photometer has a lens series that is matched to the sensor resolution and size, providing optimally crisp and clear images. Standard lenses offer fields of view from 10° to as much as 82°. Microscope lenses are also available.

COMPACT

Weighing just 300 g (with a typical lens) the photometer is easier and less costly to mount. Its small footprint allows for installation into tight spaces and the locking USB3 cables ensure reliable connectivity.

SUPERIOR SENSORS

Using Sony's latest Pregius® CMOS sensors, the photometric measurements are faster, more precise and more sensitive than previously possible. The specifications for dynamic range, quantum efficiency, full well capacity, sensitivity and noise are all improved. The Pregius sensors also have markedly lower noise as compared to the latest CCD sensors.

CAPABLE SOFTWARE

Photometrica® software and optional software packages provide extensive options for measurement and analysis. The optional Photometrica Software Development Kit (SDK) allows for the creation of fully customized solutions using built-in scripting or external control.

HIGH DYNAMIC RANGE

As a result of the improved noise performance and large full well capacity, a single exposure

LOW POWER (<4.5W)

The photometers can be powered over the USB3 cable or via the photometer's GPIO connector. Most importantly, the low power consumption results in cooler operation and less noise.

SMART SERIES USB3 CMOS

SPECIFICATIONS		P230U	P501U	P890U	P1230U
Sensor Model, Diagonal Size, Pixel Pitch		IMX174, 1/1.2", 5.86 μ m	IMX250, 2/3", 3.45 μ m	IMX255, 1", 3.45 μ m	IMX253, 1.1", 3.45 μ m
Sensor Type		Sony Pregius, 12-bit, global shutter CMOS			
Sensor Megapixels	2.3	5.0	8.9	12.3	
Pixel Array	1920 x 1200	2448 x 2048	4096 x 2160	4096 x 3000	
Full Well (e-)	32,500		10,200		
System Dynamic Range (single exposure, per pixel)	73 dB		71 dB		
High Dynamic Range (multi-exposure)			> 1,000,000:1		
Temporal Dark Noise (e-)	6.83	2.37	2.43	2.43	
Luminance Minimum (cd/m ²)*, Limit of Detection			0.001		
Luminance Minimum (cd/m ²)*, SNR = 60			0.002		
Luminance Minimum (cd/m ²)*, SNR = 100			0.003		
Luminance Maximum (cd/m ²)**	250,000		3,500,000		
System Accuracy***			Luminance (Y) \pm 4 %		
Short-Term Repeatability****			Luminance (Y) \pm 0.02 %		
Standard Lenses	5 mm lens		82.0° x 68.6°; 197 mm x 164 mm; 16 cm to ∞		
	8 mm lens	70.1° x 43.8°; 172 mm x 107 mm; 19 cm to ∞	54.0° x 45.2°; 133 mm x 111 mm; 16 cm to ∞		
	12 mm lens	48.8° x 30.5°; 290 mm x 181 mm; 35 cm to ∞	39.1° x 32.7°; 80.7 mm x 67.5 mm; 15 cm to ∞	55.9° x 43.1°; 125.0 mm x 29.5 mm; 18 cm to ∞	55.9° x 40.9°; 125.0 mm x 91.6 mm; 18 cm to ∞
	16 mm lens	38.9° x 24.3°; 221 mm x 138 mm; 35 cm to ∞	30.0° x 25.1°; 61.1 mm x 51.1 mm; 15 cm to ∞	44.0° x 23.2°; 93.5 mm x 49.3 mm; 18 cm to ∞	44.0° x 32.2°; 93.5 mm x 68.5 mm; 18 cm to ∞
	25 mm lens	25.8° x 16.1°; 141 mm x 88.3 mm; 35 cm to ∞	20.0° x 16.7°; 36.7 mm x 30.7 mm; 15 cm to ∞	28.9° x 15.2°; 86.0 mm x 45.4 mm; 24 cm to ∞	28.9° x 21.2°; 86.0 mm x 63.0 mm; 24 cm to ∞
	35 mm lens	18.4° x 11.5°; 96.8 mm x 60.5 mm; 35 cm to ∞	14.3° x 12.0°; 23.4 mm x 19.6 mm; 18 cm to ∞	20.8° x 11°; 70.0 mm x 36.9 mm; 28 cm to ∞	20.8° x 15.2°; 70.0 mm x 51.3 mm; 28 cm to ∞
	50 mm lens	12.8° x 8.0°; 107 mm x 66.9 mm; 35 cm to ∞	10.1° x 8.4°; 19.1 mm x 16.0 mm; 18 cm to ∞	14.6° x 7.7°; 70.0 mm x 36.9 mm; 38 cm to ∞	14.6° x 10.7°; 70.0 mm x 51.3 mm; 38 cm to ∞
Calibrated Iris Positions	Four: f/1.4, f/2.8, f/4, f/8		Two: typically f/2, f/16		
Minimum Measurement Time at 100 cd/m ² (sec)	0.3	0.4	0.5	0.6	
Spatial Measurement Capabilities	Luminance, Illuminance, Luminous Intensity, Uniformity, Contrast, Gamma, User Defined				
Units	cd/m ² , fL, lux, fc, cd				
Communication Interface	USB3				
Power	5 V over USB or 12 V over GPIO Connector (recommended), 4.5 W max				
Dimensions Excluding Lens (H x W x D)	44 mm x 29 mm x 58 mm				
Weight	110 g for photometer; 200 to 350 g with a typical lens attached				
Operating Temperature	0 to 50°C, to specifications: 18 to 24°C				
Operating Humidity	10% to 90% (no condensation)				
Compliance	CE, FCC, KCC, RoHS. The ECCN for this product is: EAR099.				

* Using 7x7 pixel area

** Using smallest iris and no density filters

*** Based on measurements of illuminant A, 20 x 20 pixel area

**** Using 90 x 90 pixel area

SYSTEM RECOMMENDATIONS

- 3.0 GHz and 8 cores
- 16 - 32 GB RAM
- Windows 7 or 10, 64 bit
- Dual-monitor video output
- USB 3.1 port. (USB 3.1 PCIe card included with system)

All photometers include Photometria software, PCI express card with two USB 3.1 ports and a 3 meter USB 3.0 Type-A to Micro-B cable with locking screws. Lenses are selected separately.

