

LumiTop 4000

14 mm lens

Spectrally enhanced imaging colorimeter

Key features at a glance

- ▲ 2D measurements with unprecedented accuracy due to high-end reference spectroradiometer CAS 140D
- ▲ 3-in-1 measurement device (spectroradiometer, RGB camera and flicker diode)
- ▲ Easy integration in production lines
- ▲ One shot characterization of large displays



\\ TECHNICAL SPECIFICATIONS

LumiTop 4000		
Measurement quantities		
2D	Luminance, color	
Spot	Spectrum, luminance, color, flicker	
General specifications		
Operating system	Windows 11 (64 bit)	
Dimensions (l x w x h) ¹⁾	283 mm x 190 mm x 128 mm	
Weight ²⁾	4.1 kg	
Power supply	24 V	
Operating temperature range	15 – 35 °C	
Camera specifications		
Effective resolution (h x v)	4096 x 3000 pixels (12 megapixels, CMOS)	
Pixel size	3.45 µm x 3.45 µm	
Dynamic range	70 dB	
AD converter	12 bit	
Size sensor	1.1" (17.52 mm diagonal)	
Interface camera	Gigabit Ethernet, M12 12-Pin Female	
Measurement range 2D ^{3) 4)}	L = 0.02 cd/m² – 270,000 cd/m²	
Accuracy and precision	Luminance	Color
Accuracy of camera (rel. to CAS) ⁵⁾	±0.4 %	±0.002
Instrumental precision camera ⁶⁾	±0.03 %	±0.0001
Camera uniformity (RNU) ⁷⁾	±0.35 %	±0.0013
Measurement time ⁸⁾		
Measurement time hybrid mode	0.7 s	
Measurement time camera only	0.7 s	

 TECHNICAL SPECIFICATIONS

CAS specifications	CAS 140D					
Interface CAS	USB, PCIe, Gigabit Ethernet					
Measurement range CAS ^{3) 9)}	L = 0.005 cd/m ² – 6.8 x 10 ⁷ cd/m ²					
Accuracy and precision	Luminance	Color				
Accuracy of CAS	±3.0 % ¹⁰⁾	±0.0015 ¹¹⁾				
Instrumental precision CAS ⁶⁾	±0.1 %	±0.0001				
Polarization sensitivity ¹²⁾	±2.0 %	±0.002				
Flicker specifications						
Flicker range	5 cd/m ² – ca. 600 cd/m ²					
Flicker accuracy ¹³⁾	±1 dB					
Flicker instrumental precision ^{13) 14)}	±0.02 dB					
Spot size and field of view at selected working distances for 14 mm lens (f/4.0)						
Working distance ¹⁵⁾ [mm]	200	300	500	700	800	1000
Spot size [mm]	10.0	17.2	31.8	46.3	53.6	68.1
Field of view [mm]	140 x 103	243 x 178	448 x 328	654 x 479	756 x 554	962 x 704
Field of view diagonal [in]	6.9	11.9	21.9	31.9	36.9	47.0

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¹⁾ Inclusive lens and fiber exit.

²⁾ Without CAS, with mode mixer.

³⁾ External neutral density filters on the lens (OD 0.3/0.6/0.9) are available for increasing the upper measurement limit or measuring modulated light sources.

⁴⁾ Lower measurement limit based on a signal to noise ratio of 10:1 for maximum exposure time (10 seconds). Upper measurement limit based on a signal level < 80 % for a white (non-modulated) LED light source using for minimum exposure time of 27 μs .

⁵⁾ Typical value for maximum deviation over the FOV relative to the CAS spot; calculated for an image with 21 pixels cropped at each edge and 13 by 13 pixels binning (34 averages) immediately after calibration with reference used for flat-field correction.

⁶⁾ 2σ of repeated measurements of one instrument ($L \approx 100 \text{ cd/m}^2$, autoexposure).

⁷⁾ RNU (response non-uniformity) is defined as 99.7 % percentile of the deviation of the mean image value; calculated for an image with 21 pixels cropped at each edge and 13 by 13 pixels binning (34 averages) immediately after calibration with reference used for flat-field correction.

⁸⁾ Time between beginning of two subsequent measurements using the SDK; determined with a camera exposure time of 20 ms and CAS exposure time of 200 ms for a white LED ($L \approx 500 \text{ cd/m}^2$). Depends mainly on PC processing capability.

⁹⁾ Lower measurement limit based on a signal to noise ratio of 10:1 for maximum exposure times 65 s for CAS 140D. Upper measurement limit based on a signal level < 80 % for a white (non-modulated) LED light source using a CAS internal optical density filter OD4 and minimum exposure time (4 ms CAS 140D). Values valid for CAS 140D with 250 μm slit width.

¹⁰⁾ Immediately after calibration relative to calibration standard.

¹¹⁾ Immediately after calibration.

¹²⁾ Maximum deviation from average of repeated CAS measurements with a linear polarized light source and varying polarization angle.

¹³⁾ $L \approx 150 \text{ cd/m}^2$, 30Hz, 10 % sine wave.

¹⁴⁾ 2σ of repeated measurements of one instrument.

¹⁵⁾ Distance between DUT and front plate of LumiTop