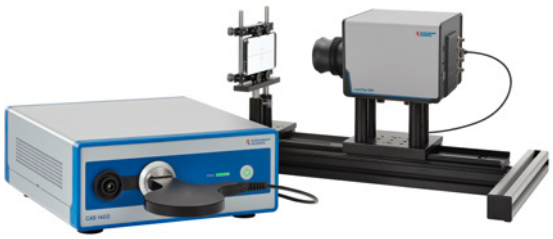
Instrument Systems
KONICA MINOLTA Group

LumiTop X20

Spectrally enhanced imaging colorimeter

Key features at a glance

- CMOS camera with 20 megapixels
- Proven concept of LumiTop – spectrally enhanced imaging colorimeter
- Enhanced dynamics from mcd/m² to Mcd/m²
- High flexibility in field of view by high-precision motorized lens
- Combination of 2D-RGB sensor with spectroradiometer and flicker sensor



\\ TECHNICAL SPECIFICATIONS

LumiTop X20		
Measurement quantities		
2D	Luminance, color	
Spot	Spectrum, luminance, color, flicker	
General specifications		
Operating system	Windows 10 (64 bit), Windows 11 (64 bit)	
Dimensions (l x w x h) [1]	360 mm x 280 mm x 190 mm	
Weight [2]	7.5 kg	
Power supply	24 V	
Operating temperature range	15 – 35 °C	
Camera specifications		
Effective resolution (h x v)	5496 x 3672 pixels (20 megapixels, CMOS)	
Pixel size	2.4 µm x 2.4 µm	
AD converter	12 bit	
Size sensor	15.9 mm diagonal	
Interface camera	1 Gigabit Ethernet	
Accuracy and precision	**Luminance**	**Color**
Accuracy of camera (rel. to CAS) [3]	±0.4 %	±0.0025
Instrumental precision camera [4]	±0.05 %	±0.00015
Camera uniformity (RNU) [5]	±0.35 %	±0.0013
Motorized focus specification		
Focus accuracy ΔSFR@0.1cyc/px [6]	0.1	
Focus precision ΔSFR@0.1cyc/px [7]	0.01	
Focus distance dependency of camera [8]	±1.3 %	±0.0015
Flicker specification		
Flicker range	1.5 cd/m² – 7,000 cd/m²	
Modulation frequency range	10 Hz – 1,500 Hz	

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Camera specifications		
Measurement range		
Min./max. luminance [9]	0.0005 cd/m² – 700,000 cd/m²	
Max. luminance @ 60 Hz frame rate [10]	4,000 cd/m²	
Limit of detection [11]	0.00005 cd/m²	
Measurement time (for 80 % signal level) [12]	**Hybrid mode**	**Camera only mode**
Measurement time @ 500 cd/m²	1.1 s	0.6 s
Measurement time @ 10 cd/m²	1.7 s	0.8 s

CAS specifications	**CAS 140D**	
Interface CAS	USB, Gigabit Ethernet	
Measurement range CAS [13]	L_{min} = 0.0002 cd/m²	
Accuracy and precision	**Luminance**	**Color**
Accuracy of CAS	±3.0 % [14]	±0.0015 [15]
Instrumental precision CAS [4]	±0.1 %	±0.0001
Focus distance dependency of CAS [16]	±0.5 %	±0.0003
Polarization sensitivity [17]	±2.0 %	±0.002

Spot size, field of spot size and field of view at selected working distances for 25 mm lens (f/1.4)							
Working distance [mm] [13]	**300**	**500**	**700**	**900**	**1100**	**1300**	**1500**
Spot size [mm]	8.3	16.1	24.0	31.8	39.6	47.5	55.3
Field of view [mm]	109 x 73	213 x 142	316 x 211	420 x 280	523 x 349	626 x 419	730 x 488
Field of view diagonal [in]	5.2	10.1	15.0	19.9	24.8	29.7	34.6

Spot size, field of spot size and field of view at selected working distances for 35 mm lens (f/1.4)							
Working distance [mm] [13]	**300**	**500**	**700**	**900**	**1100**	**1300**	**1500**
Spot size [mm]	6.1	11.8	17.5	23.2	29.0	34.7	40.4
Field of view [mm]	80 x 54	156 x 104	231 x 154	307 x 205	382 x 255	457 x 306	533 x 356
Field of view diagonal [in]	3.8	7.4	10.9	14.5	18.1	21.7	25.2

[1] Inclusive lens and fiber exit.
[2] Without CAS, with mode mixer.
[3] Typical value for maximum deviation over the FOV relative to the CAS spot
[4] 2σ of repeated measurements of one instrument (L ≈ 100 cd/m², autoexposure).
[5] RNU (response non-uniformity) is defined as 99.7 % percentile of the deviation of the mean image value.
[6] Mean value of repeated approaches to defocus position.
[7] 2σ of repeated approaches to defocus position.
[8] Max. deviation over complete measurement range.
[9] Lower measurement limit based on a signal to noise ratio of 10:1 for exposure time of 60 seconds. Upper measurement limit based on a signal level < 80 % for a white (non-modulated) LED light source using for minimum exposure time of 120 µs. Limit can be extended by additional external ND filter.
[10] Measurement with 16.666 ms exposure time synchronized to display frame rate.
[11] Limit of detection based on a signal to noise ratio of 1:1 for 60 s exposure time.
[12] Time between the beginning of two subsequent measurements using the SDK; determined with an exposure time of 5 ms (camera) and 10ms (CAS) for a white LED @ 500 cd/m² and 200 ms (camera) and 500 ms (CAS) for a white LED @ 10 cd/m². Depends mainly on PC processing capability.
[13] Lower measurement limit based on a signal to noise ratio of 10:1 for maximum exposure times 65 s for CAS 140D with 250 µm slit width.
[14] Immediately after calibration relative to calibration standard.
[15] Immediately after calibration.
[16] Maximum deviation over full calibrated focus distance range.
[17] Maximum deviation from average of repeated CAS measurements with a linear polarized light source and varying polarization angle.
[18] Distance between DUT and front plate of LumiTop.

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