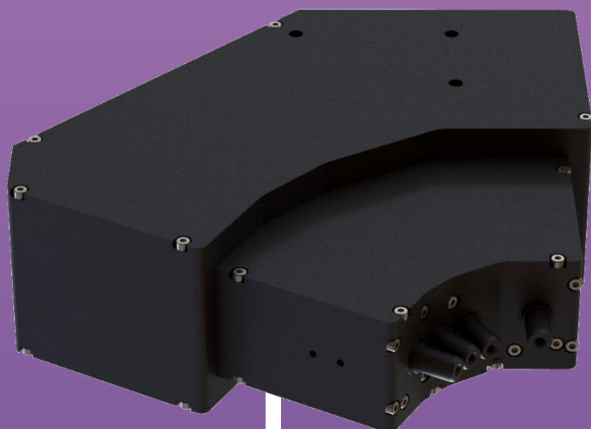




4 ANGLE HYPERION COLORIMETER

—
Specification

ADMESY

colorimeters | spectroradiometers | lightmeters

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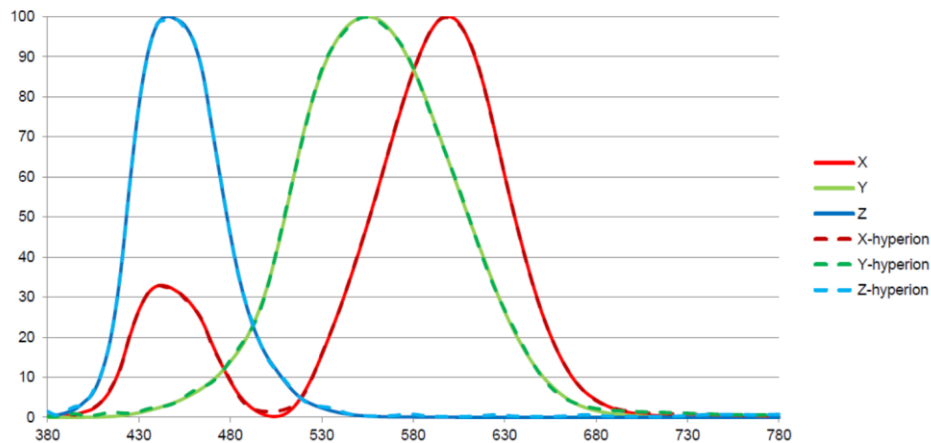
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4-ANGLE HYPERION

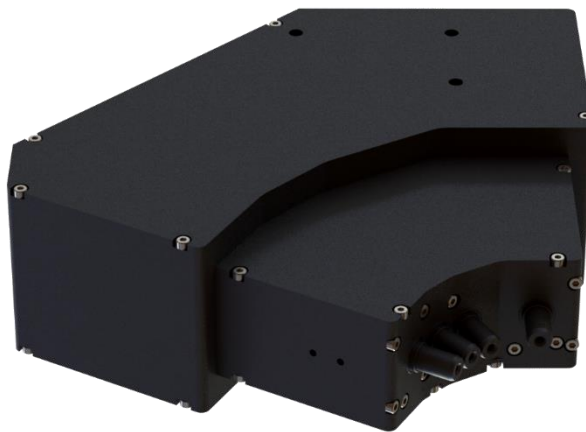
The 4 angle Hyperion colorimeter offers a unique combination of high speed and accurate color measurement capabilities packed in a robust package. It consists of 4 Hyperions in one package whereby every Hyperion engine is mounted under a different angle. The different angles are:

- 0 degrees
- 30 degrees
- 45 degrees
- 60 degrees

The improvement compared to the previous colorimeters is that the Hyperion engine has a significant improvement on filter characteristics and an incredible speed upgrade. It is actually 4x times faster than our previous models making accurate color measurements possible in 50 ms at 0.3cd/m².



The 4-angle Hyperion colorimeter is available with a 10mm spot size. A fiber version is also available with several optics, custom optics can be applied on request. Added to the filter characteristics the high sensitivity, ultra-low noise electronics and a huge dynamic range make it the ideal device for display measurements even at low levels.



HIGHLIGHTS

- Highly accurate color measurement according to human eye (CIE1931)
- 4 angles
- Fast color measurement even at low luminance level
- Flicker luminance (Y) function: 2000 samples/second
- Auto-range function
- Powerful MCU enables internal JEITA flicker calculation
- Mechanical shutter
- USBMTC standard compliant
- Windows, Linux and MAC OSX compatible
- Directly supported in Labview, Labwindows, Visual Studio via VISA library



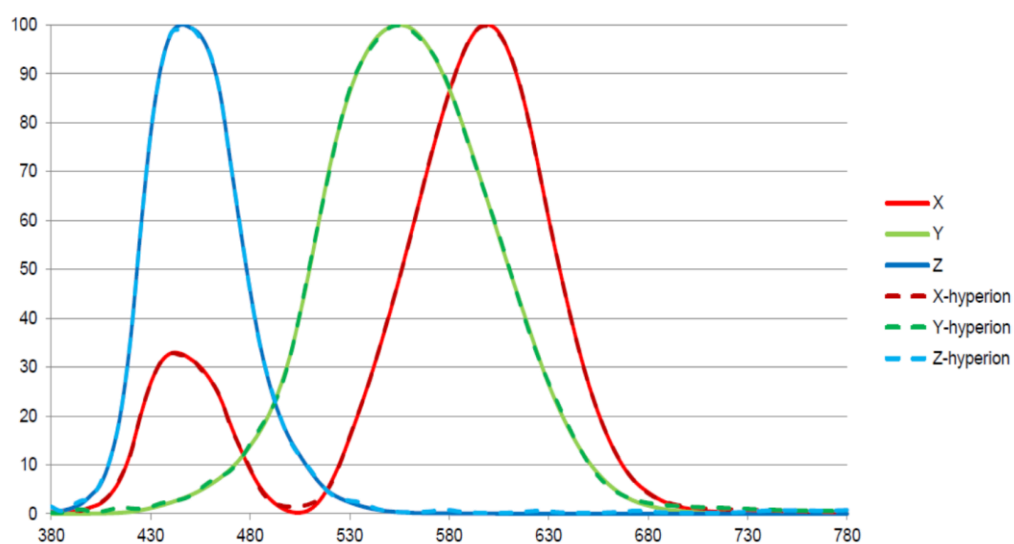
GENERAL SPECIFICATIONS

Interfaces	
USB 2.0	USBMTC compliant, SCPI command set, high speed device
RS 232	For PC and embedded purposes, using same command set as USB
Trigger in & out	5 V compliant

Power ratings				
	Min voltage	Typical voltage	Max voltage	Max current
USB power	4.75 V	5.00 V	5.25 V	500 mA
9 V power	8.75 V	9.00 V	9.25 V	500 mA

Measurement system	
Photo detector	4 times 3 silicon photo diode using XYZ interference filter
Spectral response	Approximates CIE 1931 color matching functions
Nr. of angles	4 angles – 0/30/45/60 degrees
Measurement parameters	XYZ, Yxy, Yuv, correlated color temperature (CCT), dominant wavelength DWL, Flicker, Response time
Size (HxWxD)	195x194x64 mm
Weight	1.5 kg
Mounting	Multiple mounting holes spread over two sides

TYPICAL SPECTRAL SENSITIVITY



SINGLE ANGLE MEASUREMENT SPECIFICATIONS

Measurement system	
Optical system	Acceptance angle 4.8° (± 2.4)
Measurement distance	32 mm distance front of 0 degree lens to display
Measurement spot size	0 degree 5mm round, 30 degree 5.8x5mm ellipse, 45 degree 7.1x5mm ellipse, 60 degree 10x5mm ellipse
Flicker measurement speed (sample mode)	Luminance 2000 samples / second, XYZ 2000 samples / second Correct detected frequency of at least 1 Hz
Color measurement speed	Color 22 ms or higher, depending on luminance level (including communication) 150 cd/m ² with DC level light at 16 ms. PWM requires longer integration (multiple frames)

Sample mode signal frequency response	
Parameter	F3dba
Gain 1	DC – 500 Hz
Gain 2	DC – 500 Hz
Gain 3	DC – 500 Hz

Colorimeter specification			
Parameter	Range	Accuracy	Repeatability
Resolution	16 bit for X, Y and Z	>80 dB without averaging	
Luminance (Y)	0.02 cd/m ² - 20,000 cd/m ² integration time between 0.5ms – 1s	± 2% of measured value, measured at white image of LCD display, Luminance of app. 150 cd/m ² , x=0.300 y= 0.325	Y ± 0.3% at 0.4 cd/m ² ¹ Y ± 0.15% at 4 cd/m ² ¹ Y ± 0.1% at 20 cd/m ² ¹ Y ± 0.1% at 150 cd/m ² ¹
Chromaticity (x,y)		± 0.001 after calibration, measured at white image of LCD display, Luminance of app. 150 cd/m ² , x=0.300 y= 0.325	x,y ± 0.00075 for Y at 0.4 cd/m ² ¹ x,y ± 0.0003 for Y at 4 cd/m ² ¹ x,y ± 0.0003 for Y at 20 cd/m ² ¹ x,y ± 0.0002 for Y at 150 cd/m ² ¹
Measurement speed			4-10 samples / s for Y at 0.4 cd/m ² ¹ 10-20 samples / s for Y at 4 cd/m ² ¹ 40 samples / s for Y at 20 cd/m ² ¹ 40 samples / s for Y at 150 cd/m ² ¹
Flicker (contrast method)	5 cd/m ² or higher	± 1.2% flicker frequency 30Hz AC/DC 10% sine wave. Sine wave at 10 cd/m ²	± 0.2%
Flicker (JEITA method)	5 cd/m ² or higher	± 1.2dB flicker frequency 30Hz AC/DC 10% sine wave. Sine wave at 10 cd/m ²	± 0.2dB
Operating temperature	10-35°C ²		
Shutter lifetime	> 1000000		
Shutter speed	250-300 ms depending on temperature and lifetime		

1 All measurements are performed 20 times on a LED display with sufficient signal noise ratio, value is based on 2 sigma. Sample speed depends on the measured sample.

If the sample uses PWM, it will take longer. Use of lower rated values is strongly recommended to ensure repeatability.

2 Operating temperature reaches from 0 to 40 degrees. Dark level compensation is optimized for operating in temperatures between 10 and 35 degrees.

Other temperature ranges can be calibrated using the mechanical shutter if necessary.

SINGLE ANGLE MEASUREMENT DATA

Setting	#1	#2	#3
Max. integration time	100 ms	240 ms	1000 ms

Speed

Measurement	From [cd/m ²]	To [cd/m ²]	#1 times / sec	#2 times / sec	#3 times / sec
Lv, xy	0.4	—	8	3.7	0.6 – 0.9
	1.2	—	8	3.7	0.6 – 0.9
	4	—	10	10	10
	20	—	40	40	40
	60	—	40	40	40
	200	—	40	40	40
	400	3000	40	40	40

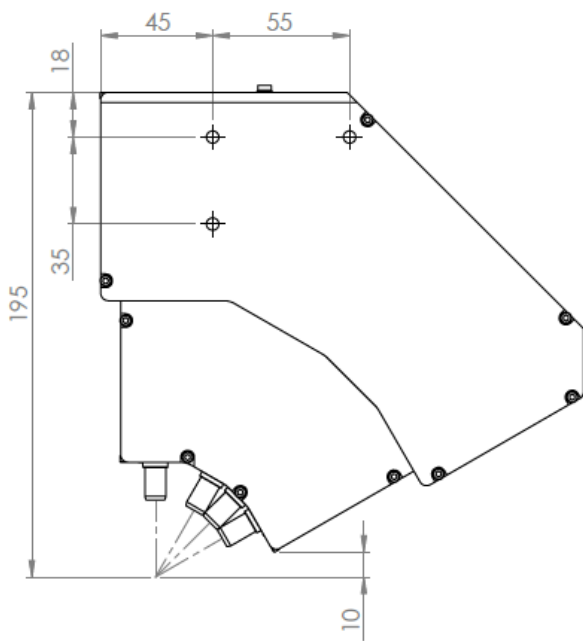
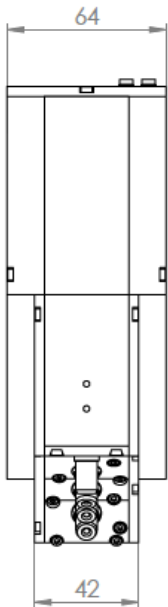
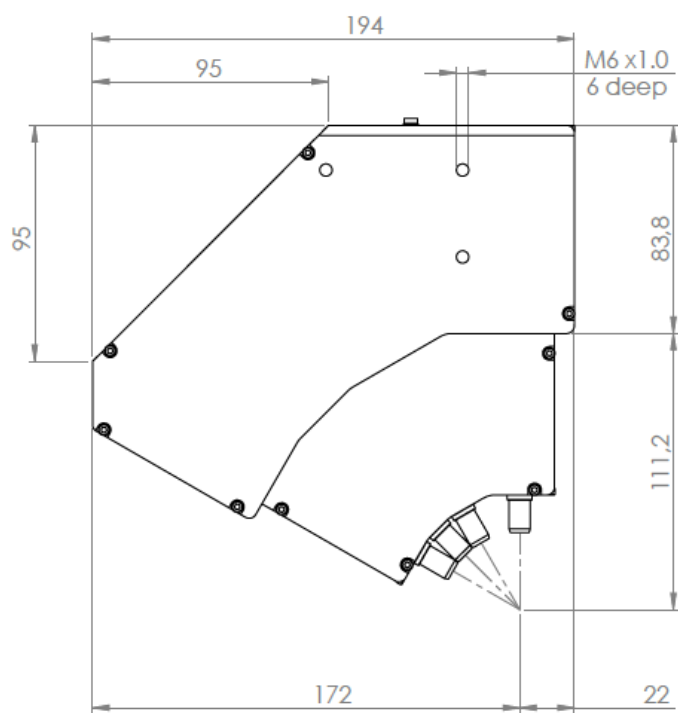
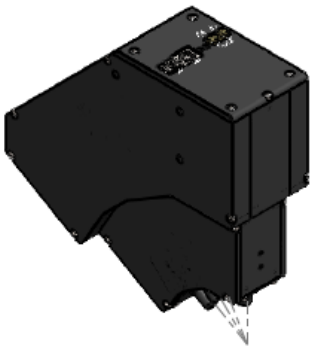
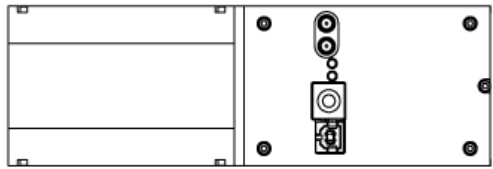
Chromaticity

Measurement Range	From [cd/m ²]	To [cd/m ²]	#1 xy	#2 xy	#3 xy
Accuracy (for white)	0.4	—	± 0.005	± 0.005	± 0.003
	1.2	—	± 0.0025	± 0.0025	± 0.002
	4	—	± 0.002	± 0.0015	± 0.0015
	20	—	± 0.0015	± 0.0015	± 0.0015
	60	—	± 0.0015	± 0.0015	± 0.0015
	200	—	± 0.0015	± 0.0015	± 0.0015
	400	20000	± 0.0015	± 0.0015	± 0.0015
Repeatability (2 sigma)	0.4	—	0.004	0.0025	0.00075
	1.2	—	0.0020	0.0009	0.00022
	4	—	0.00041	0.00043	0.00033
	20	—	0.00056	0.00040	0.00066
	60	—	0.00032	0.00028	0.00033
	200	—	0.00017	0.00012	0.00022
	400	20000	0.00014	0.00012	0.0001

Luminance

Measurement Range	From [cd/m ²]	To [cd/m ²]	#1 Level [%]	#1 [cd/m ²]	#2 Level [%]	#2 [cd/m ²]	#3 Level [%]	#3 [cd/m ²]
Accuracy (for white)	0.04	—	± 5%	—	± 5%	—	± 5%	—
	0.4	—	± 5%	—	± 5%	—	± 5%	—
	1.2	—	± 4%	—	± 4%	—	± 4%	—
	4	—	± 3%	—	± 3%	—	± 3%	—
	20	—	± 3%	—	± 3%	—	± 3%	—
	60	—	± 2%	—	± 2%	—	± 2%	—
	200	—	± 2%	—	± 2%	—	± 2%	—
Repeatability (2 sigma)	400	20000	± 2%	—	± 2%	—	± 2%	—
	0.04	—	± 3%	± 0.0003	± 2%	± 0.0002	± 0.6%	± 0.0001
	0.4	—	± 0.9%	± 0.0009	± 0.5%	± 0.0005	± 0.4%	± 0.0004
	1.2	—	± 0.9%	± 0.0027	± 0.5%	± 0.0015	± 0.2%	± 0.0006
	4	—	± 0.6%	± 0.006	± 0.4%	± 0.004	± 0.15%	± 0.0015
	20	—	± 0.3%	± 0.015	± 0.3%	± 0.015	± 0.13%	± 0.0065
	60	—	± 0.3%	± 0.045	± 0.3%	± 0.045	± 0.11%	± 0.062
	200	—	± 0.2%	± 0.10	± 0.12%	± 0.06	± 0.06%	± 0.030
	400	20000	± 0.3%	± 0.30	± 0.08%	± 0.08	± 0.06%	± 0.06

4 – ANGLE HYPERION DIMENSIONS



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colorimeters | spectroradiometers | lightmeters

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