PROMETHEUS X 27 MM COLORIMETER

Specification -Preliminary

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PROMETHEUSX

The PrometheusX colorimeter is the newest version in the line of Admesy Colorimeters. Besides the performance of the colorimeter it also offers a high speed Y channel up to 640k samples per second. This combination is an unique combination of high speed and accurate colour measurement combined with the capability to analysis signal waveforms in detail due to the ultra high speed Y channel. This all is packed in a robust package with highly accurate, in-house made, filter characteristics.
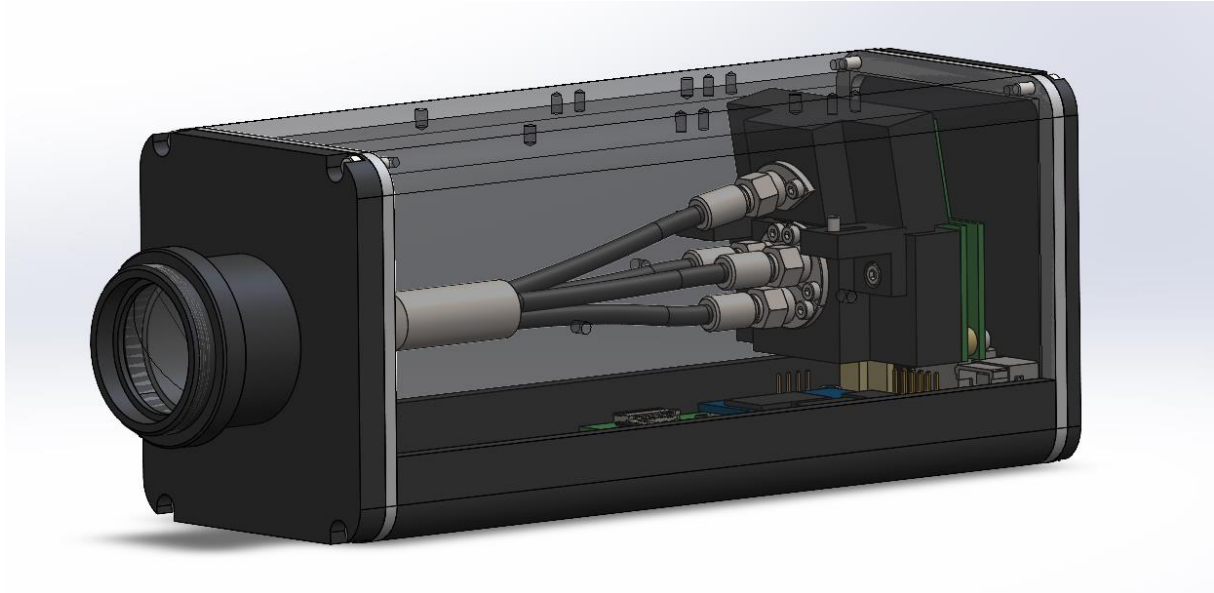
The PrometheusX colorimeter is available with 27mm collimating optics.

HIGHLIGHTS

- Staggering low luminance values, down to 0.0002 cd/m^2, can be achieved in only 1 second measurement time
- Huge dynamic range: 0.0002 to 10.000 cd/m^2
- Separate Y channel for detailed waveform analysis, speed up to 640k samples per second
- Highly accurate colour measurement according to human eye (CIE1931)
- Fast colour measurement even at low luminance level
- Flicker luminance (Y) function: 3125 or 2000 samples/second or 640k samples per second when using the separate Y channel
- Auto-range function
- Powerful MCU enables internal JEITA flicker calculation
- Mechanical shutter
- USBMTC standard compliant
- Windows, Linux and MAC OSX compatible
- Directly supported in virtually any language

STANDARDS

The Prometheus is compliant to the USBTMC standard and can be used in combination with external provided USBTMC compliant drivers. Currently it has been tested on Windows, Linux and Apple OSX using NI VISA (www.ni.com/visa) and using the open source drivers on Linux (i686, x86_64 and ARM).

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	5V compliant

Power ratings				
	Min voltage	Typical voltage	Max voltage	Max current
USB power	4.75V	5.00V	5.25V	300mA
9V power	8.75V	9.00V	9.25V	300mA

Measurement system	
Photo detector	4 silicon photo diode using XYZ interference filters
Spectral response	Approximates CIE 1931 colour matching functions
Measurement parameters	XYZ, Yxy, Yuv, correlated colour temperature (CCT), dominant wavelength DWL, Flicker, Response time
Size (HxWxD)	90x70x2200 mm (without lens system)
Weight	~1000 gram
Mounting	12 M3 thread holes spread over four sides

TYPICAL SPECTRAL SENSITIVITY
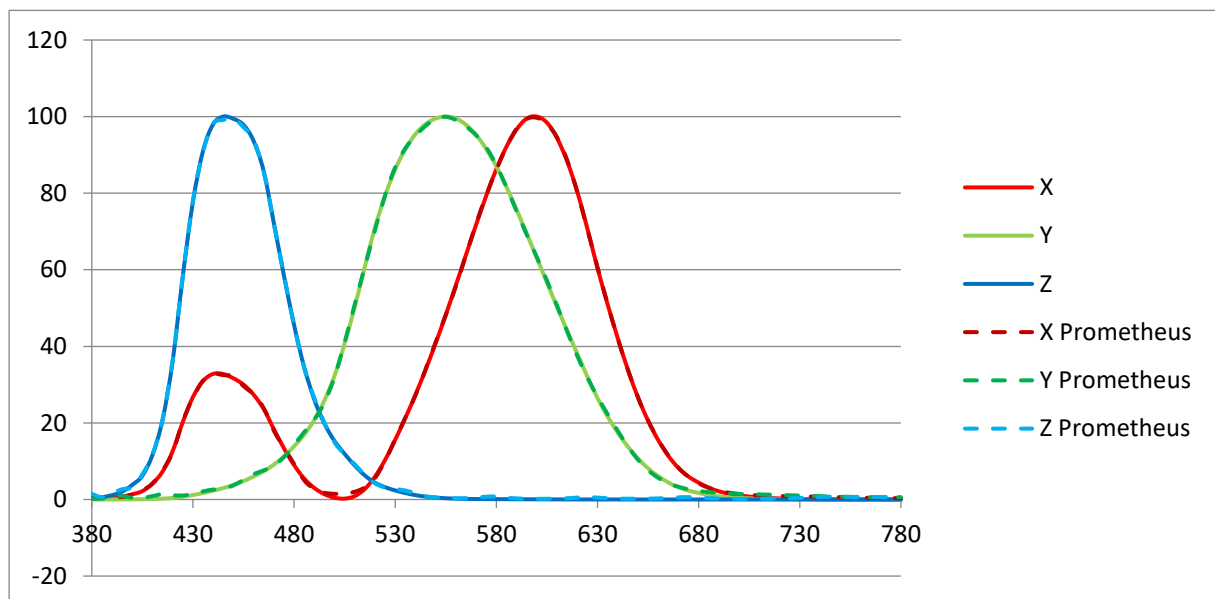
PROMETHEUSX 27MM MEASUREMENT SPECIFICATIONS

Measurement system	
Optical system	Acceptance angle 10º (± 5 º)
Measurement spot size	29.6 mm at 25 mm distance 33 mm at 50 mm distance
Flicker measurement speed (sample mode)	Luminance 640k, 2000 or 3125 samples / second, XYZ up to 3125 samples / second (can be configured by customer) Correct detected frequency of at least 1 Hz.
Colour measurement speed	Colour 22 ms or higher, depending on luminance level and frame frequency

Sample mode signal frequency response for XYZ sampling circuit	
Parameter	F_{3db}[a]
Gain 1	DC – 500 Hz
Gain 2	DC – 500 Hz
Gain 3	DC – 500 Hz

Sample mode signal frequency response for ultra high speed Y channel sampling circuit	
Gain 1	DC – 10 k Hz
Gain 2	DC – 15 k Hz
Gain 3	DC – 15k Hz
Gain 4	DC – 15 k Hz

Specifications ultra high speed Y channel	
Sampling frequency	Up to 640 000 samples per second (can be decreased by using the delay function → this will improve S/N)
Memory for saving sampling data	1 000 000 samples
Max measurement time	Up to 50 seconds
Dynamic range – luminance [cd/m²]	0.15 – 20 000 (delay 0) **Can measure lower, 0.15 is the indicated level where 1 sample has a S/N ratio of 1:10. When using more samples it is possible to go much lower.** **Levels of 10 to 100 times less can be detected when using more samples**

General	
Operating temperature	10-35°C ²
Shutter lifetime	> 1 000 000 h
Shutter speed	250 - 300 ms depending on temperature and lifetime

Specifications XYZ colorimeter			Auto-range condition 1		Auto-range condition 2	
	Performance guarantee range		~0.0002 to ~3 000 Cd/m2 (~20.000 possible in UHL mode*2)			
Luminance			Spec	Max int time [μs]	Spec	Max int time [μs]
	Accuracy (white)	~ 0.0002 cd/m²	+/-9%	1 000 000	—	
		~ 0.001 cd/m²	+/-3%	1 000 000		
		~ 0.01 cd/m²	+/-1.5%	1 000 000		
		~ 0.1 cd/m²	+/-1.5%	100 000		
		~ 1 cd/m²	+/-1.5%	33 333		
		~ 10 cd/m²				
		~ 100 cd/m²				
	Repeatability auto-range on (2σ) *1	~ 0.0002 cd/m²	3%	1 000 000	3%	1 000 000
		~ 0.001 cd/m²	0.8%	1 000 000	0.8%	1 000 000
		~ 0.01 cd/m²	0.2%	1 000 000	0.33%	250 000
		~ 0.1 cd/m²	0.1%	100 000	0.25%	50 000
		~ 1 cd/m²	0.1%	33 333	0.2%	33 333
		~ 10 cd/m²				
		~ 100 cd/m²				
Chromaticity	Performance guarantee range		~0.001 to ~3 000 Cd/m2 (~20.000 possible in UHL mode*2)			
	Accuracy (white)	~ 0.001 cd/m²	+/- 0.005	1 000 000	—	
		~ 0.003 cd/m²	+/- 0.003	1 000 000		
		~ 0.01 cd/m²	+/- 0.002	1 000 000		
		~ 0.1 cd/m²	+/- 0.002	100 000		
		~ 1 cd/m²	+/- 0.002	33 333		
		~ 10 cd/m²				
		~ 100 cd/m²				
	Repeatability auto-range on (2σ) *1	~ 0.001 cd/m²	0.002	1 000 000	0.002	1 000 000
		~ 0.003 cd/m²	0.0007	1 000 000	0.0025	250 000
		~ 0.01 cd/m²	0.0003	1 000 000	0.001	250 000
		~ 0.1 cd/m²	0.0003	100 000	0.0005	50 000
		~ 1 cd/m²	0.0002	33 333	0.0002	33 333
		~ 10 cd/m²	0.0002	33 333	0.0002	33 333
		~ 100 cd/m²				
Flicker Wave-form	Sampling frequency		2000 or 3125 (depending on function you use)			
	Memory for saving sampling data		100000 samples			
	Max measurement time		Up to 50 seconds			
	Dynamic range - luminance		0.25 – 2800			
	Dynamic range - frequency		0.5 - 500			
Synchronization mode			ARFREQ			
Object under measurement （frequency）			0.5 - 500			

1 Measured with internal Admesy reference display.

*2.For UHL mode *Ultra High Luminance) care should be taken with signals which have a frequency behavior*
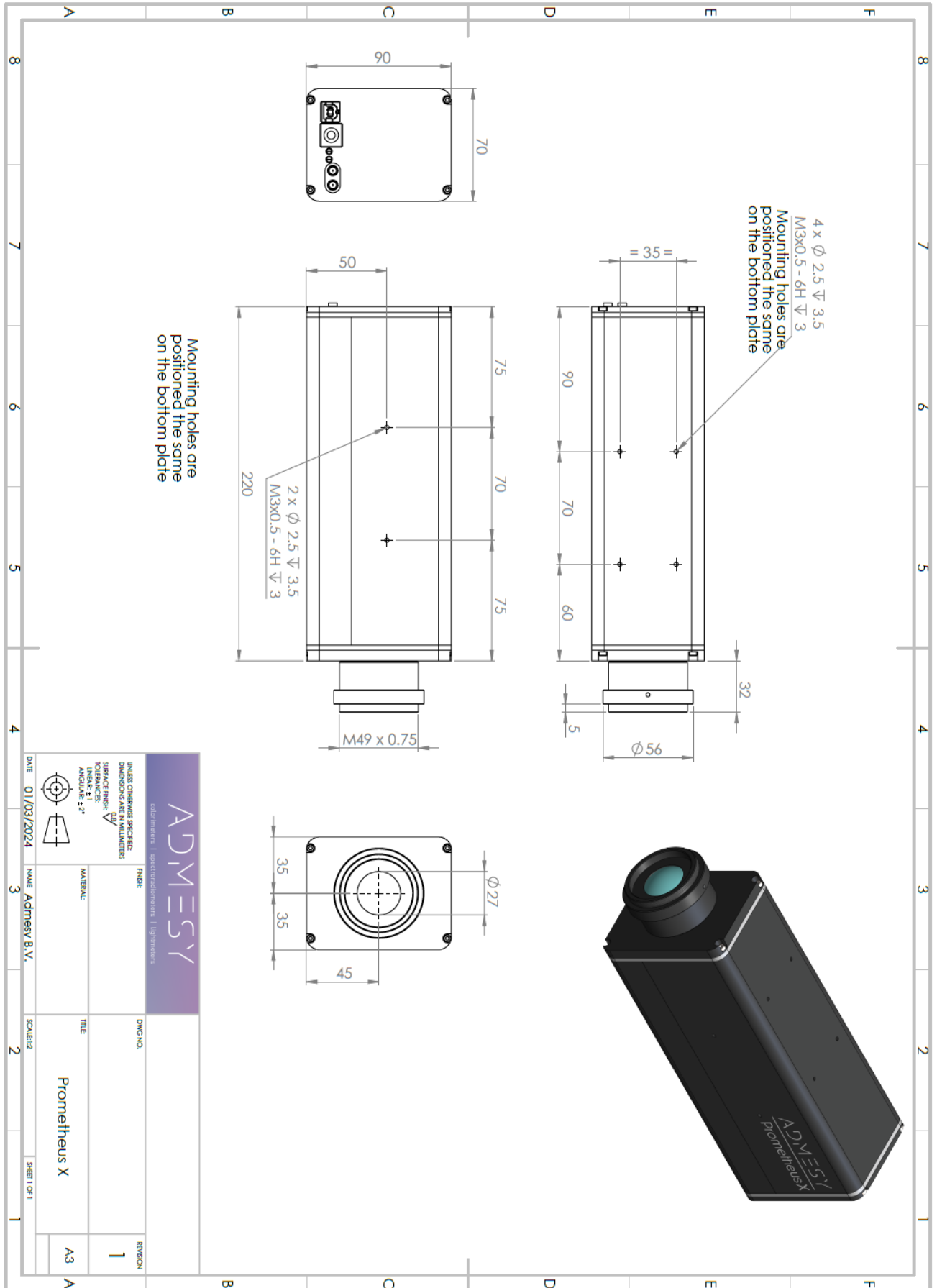
ULTRA LOW LUMINANCE PERFORMANCE

Below repeatability data is measured under very stable conditions.

	Measured on LCD display with backlight set to minimal				
	AVG_Y	2*STDEV_Y(%)	2*STDEV_x	2*STDEV_y	Tact time[ms]
No ND Filter	0.01040	0.231%	0.00035	0.00030	721.6
	0.00105	0.654%	0.00184	0.00132	1054.5
	0.00068	0.721%	0.00244	0.00218	1053.9
4X ND Filter	0.00053	1.222%	0.00362	0.00360	1054.2
	0.00041	1.679%	0.00592	0.00606	1054.4
	0.00032	1.678%	0.00691	0.00656	1055.0
	0.00022	2.323%	0.00915	0.00881	1055.3
	0.00019	2.635%	0.00991	0.00862	1053.5

With care and attention even 0.0001 cd/m2 luminance can be achieved with good to reasonable result.

PROMETHEUSX 27 MM DIMENSIONS

90

70

50

220

75

70

75

Mounting holes are
positioned the same
on the bottom plate

2 x Ø 2.5 ∇ 3.5
M3x0.5 - 6H ∇ 3

M49 x 0.75

= 35 =

4 x Ø 2.5 ∇ 3.5
M3x0.5 - 6H ∇ 3
Mounting holes are
positioned the same
on the bottom plate

90

70

60

32

5

Ø 56

35

35

Ø 27

45

DATE 01/03/2024

NAME Admesy B.V.

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES:
LINEAR: ± 1
ANGULAR: ± 2°

SURFACE FINISH:

FINISH:

MATERIAL:

ADMESY
colorimeters | spectroradiometers | lightmeters

DWG NO.

TITLE:

SCALE:1:2

Prometheus X

SHEET 1 OF 1

REVISION 1

A3

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