



PROMETHEUS VIEWFINDER SPECTRORADIOMETER

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Specification

ADMESY

colorimeters | spectroradiometers | lightmeters

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PROMETHEUS SERIES: VIEWFINDER SPECTROMETER

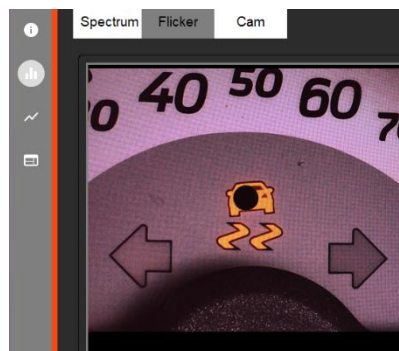
The Prometheus series spectroradiometer offers a unique combination of ease of use and accurate measurement capabilities packed in an extra robust package. The Prometheus viewfinder utilizes a high-end cooled CCD detector for low noise and high dynamic range and a fully automated optical Prichard mirror system to identify the exact spot where you are measuring.

An ideal device for measurements where ease of use, stability, performance, and price are of the essence. It's robust package makes it the perfect solution for hassle free integration in your product or process.



HIGHLIGHTS

- Viewfinder with Pritchard mirror design
- Camera enables to see the measurement spot on screen
- Automatic motorized focus, no need for manual focus
- Focus is factory calibrated, can be controlled by means of a simple software command
- Internal mechanical Shutter and OD filter wheel for very large dynamic range
- Low noise and low stray light
- Auto-range function
- Wavelength and radiance calibrated
- Extremely low polarization sensitivity
- Excellent linearity, internally compensated within $\pm 0.5\%$
- Dark current compensated, virtually zero over entire integration range
- USBTMC compliant, SCPI command set, high speed device
- USB 3, RS232, Ethernet connections and trigger in & out for ideal system integration
- Internal calculations for most common parameters, saving processing power in production environments
- Robust housing, optimized for mounting and protection in harsh production environments
- Contains photodiode with luminosity function for flicker
- Internal wavelength monitoring function, for health and self-correction of minor wavelength drifts – this all for ultimate accuracy
- SDK available for virtual any programming language



SPECTROMETER SPECIFICATIONS

Prometheus viewfinder	
Viewfinder optics	Standard lens and close up lens available (see optics specification for details)
Spectrometer spectral range	360 nm – 830 nm
Luminance range	0.0005-2 000 000 cd/m ²
Luminance accuracy	± 2 %
Color accuracy (x,y)	± 0.002
Non-linearity	< ± 0.5 %
Data output resolution	Can be set by software to virtually any resolution
Spectrometer Focal length	115 mm
Spectrometer NA optical bench	0.10
Spectral resolution FWHM	~ 2.8 nm
Order sorting filter	Linear variable filter
Wavelength accuracy	± 0.15 nm
Stray light	~ 0.05 % (measured @ 400 nm with 455 nm cut-off filter with A- light source)
Detector	High end Hamamatsu cooled detector (S7031)
Dark noise (RMS)	~ 3 to 5 counts (16 bit ADC)
S/N*	> 1300
Filter wheel	OD0, OD1, OD2 and shutter
Integration time	4.8 ms – 10 minutes (longer is possible)
Cooling temperature	-10 °C
Interfaces	USB 3, RS232, Ethernet, Trigger connections
Measurement parameters	Spectral output, radiometric data or colour data (Lumen, x,y, DWL, PWL, CRI, CCT, etc.), flicker, response time
Data processing time	15 ms
Size (LxWxH)	See mechanical dimensions
Weight	6.6 kg
Operating temperature	10 °C – 35 °C
Power input	Typical 15V DC (14.5-15.5V DC range)
Power consumption	30W

Note: *S/N is calculated at peak wavelength (almost full saturation) with 100 spectral measurements. Calculation method: average divided by standard deviation.

FLICKER SPECIFICATIONS

Measurement system	
Luminance range	1 – 600 000 cd/m ²
Flicker measurement speed (sample mode)	186 567 samples/second. Memory for 1 000 000 samples
Flicker contrast method	± 1 % Flicker frequency: 30 Hz AC/DC 10 % sine wave at 10 cd/m ²
Flicker Jeita method	± 1dB Flicker frequency: 30 Hz AC/DC 10 % sine wave at 10 cd/m ²

Sample mode signal frequency response	
Parameter	F _{3db}
Gain 1	DC – 10 kHz
Gain 2-3-4	DC – 15 kHz

CAMERA SPECIFICATIONS

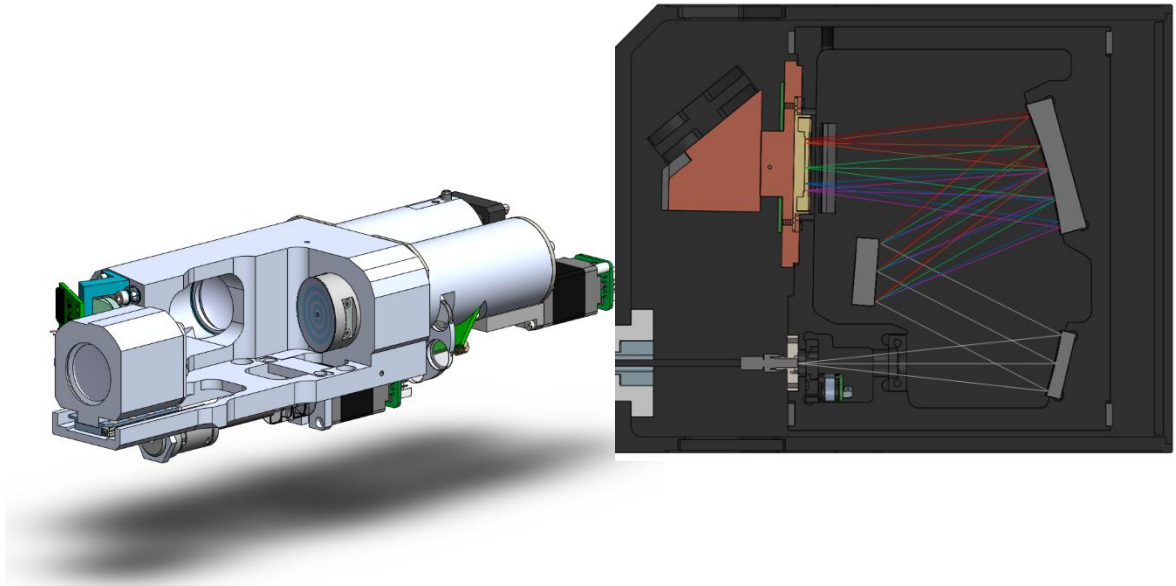
Prometheus viewfinder	
F#	4.8
Sensor	5.1 MP CMOS-sensor (IMX264 RGB)
Integration time	1000 μ s – 10 s

OPTICS SPECIFICATIONS

Standard lens: f = 68mm, spectrometer measuring angle +/-1.2 degree, working distance range is from 0.25m to 305m				
Working distance [m]	0.250	0.350	0.800	305
Spectrometer spot diameter	4.6 mm	6.9 mm	16.7 mm	67.1 m
Camera field of view	58.2 mm x 47.0 mm	87.7 mm x 70.9 mm	213.1 mm x 172.2 mm	859.1 m x 694.3 m

Close up lens: f = 48.6mm, spectrometer measuring angle 0.75 degree, working distance range is from 56.9mm to 70.7mm				
Working distance [mm]	56.9	60.7	64.6	70.7
Spectrometer spot diameter	1.03 mm	1.15 mm	1.27 mm	1.45 mm
Camera field of view	12.54 mm x 10.21 mm	13.99 mm x 11.41 mm	15.55 mm x 12.70 mm	17.76 mm x 14.54 mm

PROMETHEUS VIEWFINDER AT A GLANCE



The Prometheus viewfinder is made out of two main major parts:

- Spectrometer bench
- Viewfinder system

Spectrometer bench

The spectrometer bench inside the Prometheus viewfinder consists of a Czerny-Turner configuration. The optical bench consists of a slit, a mirror, a grating, a second mirror, a collector lens, a linear variable filter (OSF) and a cooled detector. This is based on the Neo spectrometer bench.

Viewfinder system

The Pritchard based viewfinder system is a complex optical system which consists of three parts

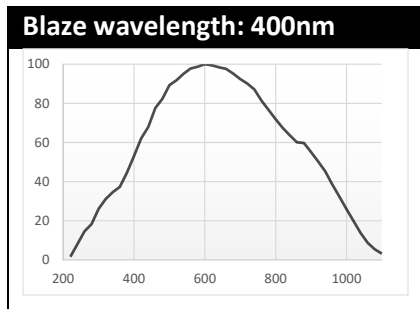
- A lens which focusses the light onto the Pritchard mirror, the lens can be moved to change the focus distance to the display (or other DUT).
- Pritchard mirror (mirror with a hole), the mirror reflects the light into a relay system which focuses the light onto a CMOS image sensor.
- The light going into the hole is relayed to the spectrometer by also an optical system, this part also contains a filter wheel for extended dynamic range.
- Additionally the Viewfinder system also has a photodiode incorporated for flicker measurements.

Special features

- Motorized focus, no need to focus any more with hand. Focus can be adjusted by simple commands through the interface
- Camera instead of eyepiece, enables full automation
- Internal spectrometer wavelength check and compensation. This increases the accuracy.

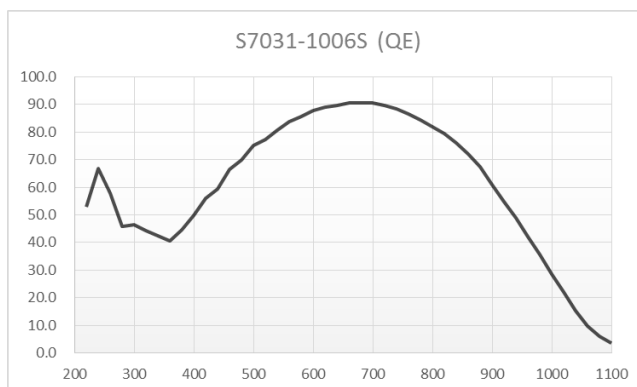
Spectrometer system response

The system response is mainly determined by the grating and the detector response. In the system response we have included the detector, grating and the mirrors. This data is based on simulation data and is only meant as an indication.



The Prometheus viewfinder uses a cooled CCD detector from Hamamatsu

Quantum efficiency of the detector is illustrated in the following graph.



MEASUREMENT DATA

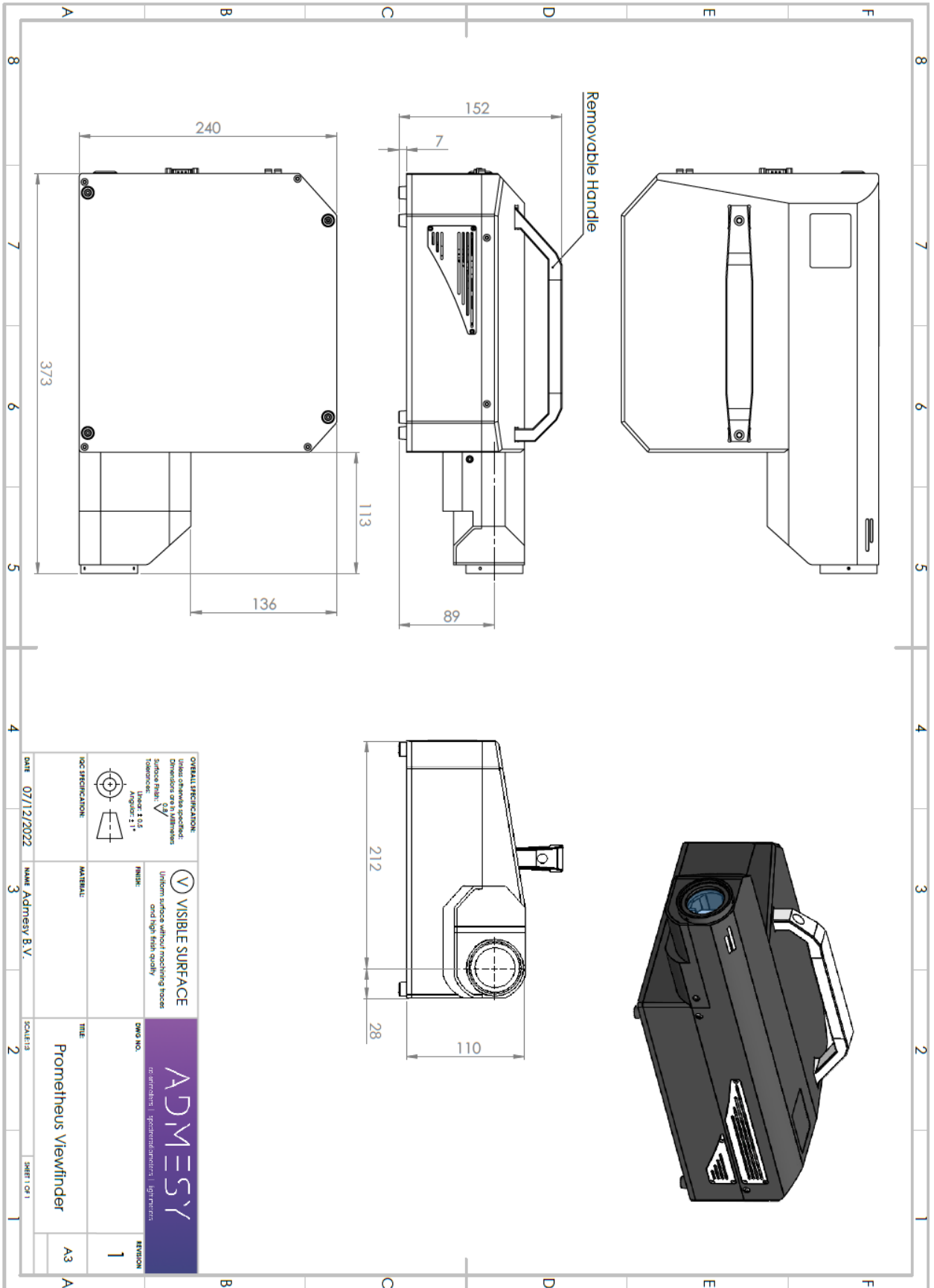
Measurement parameters	
Used target display	LCD display with LED backlight
Average	1
Auto-range function	Off
Temperature	24 °C

Repeatability ^{1 2}			
Luminance level cd/m ²	Luminance 2 σ	Colour 2 σ	Measurement time ms
250	< 0.05 %	± 0.0003	16
10	< 0.05 %	± 0.0003	75
1	< 0.05 %	± 0.0003	500
0.25	< 0.6 %	± 0.001	1000
0.0009	< 1 %	± 0.0015	30 000

1 Speed and repeatability are directly related to each other; a lower repeatability can increase speed and vice versa.

2 Measurements are real life taken measurement and can vary from device to device.

PROMETHEUS VIEWFINDER DIMENSIONS



ADMESY

colorimeters | spectroradiometers | lightmeters

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