Opsytec Dr. Gröbel

Digital Radiometer RMD

Radiometer RMD

We care! Covid-19

UVGI Sensor

The radiometer RMD is currently available in a special version to prove the effectiveness of UVC surface disinfection based on the Sars-CoV-2 virus disinfection, known as Coronavirus or Covid-19, and other microorganisms.

Coronaviruses require about 6 J/m² at low humidity to disinfect the surface (D_{90}, source: “Ultraviolet Germicidal Irradiation Handbook”). The highest dose reported for viruses for a 6-log-step reduction is 235 mJ/cm² for 253,7 nm [1]. However, the doses for uv disinfection of corona viruses rely on the used lamp and wavelegth.

In addition to classical UV low pressure lamps more and more UV LEDs and 222 nm FAR UV excimer lamps are used. This far UVC wavelengths are said to not penetrate through the outer layer on the surface of human skin but still efficiently inactivate the viruses and microorganisms [2], [3].

We are happy to support all academic, industrial and medical customers with our measuring instruments. Therefore we offer the RMD with UV UVGI sensors at a special price. In addition, we offer an accredited ISO 17025 / DAKKS calibration.

RMD features a wide dynamic range and extremely low noise. For this purpose, the sensor already contains a multi-stage amplification, an extremely precise analog-to-digital converter and a temperature sensor. The memory contained in the sensor contains all sensor identifications and the calibration history.

Two UVGI sensors can be read out simultaneously. The measured data are clearly shown on the graphical display. For measurements of mercury low pressure lamps we recommend an UVC UVGI sensor. For measurements of the novel UVC LEDs we recommend an UVBB UVGI sensor to overcome the overlap of filter edge at 280 nm and emission at 275 nm. For measurements of far UVC KrCl* excimer lamps emitting at 222 nm we recommend a special UV sensitive sensor.

Compared to the RM-12, the RMD features a significantly higher resolution of 24 bit, an extended measuring range of up to 7 orders of magnitude and dose measurement. The device can be powered by a rechargeable battery or mains adapter and measures for up to 100 days at a time. The RMD is upgradeable to the RMD Pro.

Applications:

- Measurement of UVC and far UVC radiation
- Measurement of UVC LEDs & UVC light sources
- Dose measurement
- Proof of UVC surface disinfection

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certified according
DIN EN ISO 9001:2015

[1] Fluence (UV Dose) Required to Achieve Incremental Log Inactivation of Bacteria, Protozoa, Viruses and Algae by Adel Haji Malayeri at al.
[2] Germicidal Efficacy and Mammalian Skin Safety of 222-nm UV Light, Buonanno et al. Radiat Res. 2017 April ; 187(4): 483–491. doi:10.1667/RR0010CC.1.
[3] Far-UVC light: A new tool to control the spread of airborne-mediated microbial diseases, D. Welch et al. DOI:10.1038/s41598-018-21058-w et al.,

USE FOR UVC DECONTAMINATION RMD & RM-22

The RMD is the successor of the RM-22, which was successfully used in studies on disinfection. Information and important notes on UVC decontamination of a hospital room can be obtained here free of charge:

M. Lindblad, et al., Ultraviolet-C decontamination of a hospital room: Amount of UV light needed, Burns (2019), https://doi.org/10.1016/j.burns.2019.10.004

TECHNICAL DATA RMD

Sensor connectors	2, fully digital, UVGI
Display	graphical, 128 x 64 px
Display output	1 + 2 channels
	Irradiance + Dose
Dimensions	160 x 85 x 35 mm
Weight	250 g
Power supply	internal Li-Ion battery,
	230 V plug-in power supply
Recording time	> 2400 h
Operation temperature	0 to 40 °C
Storage temperature	-20 to 60 °C
Humidity	< 80% non-condensing

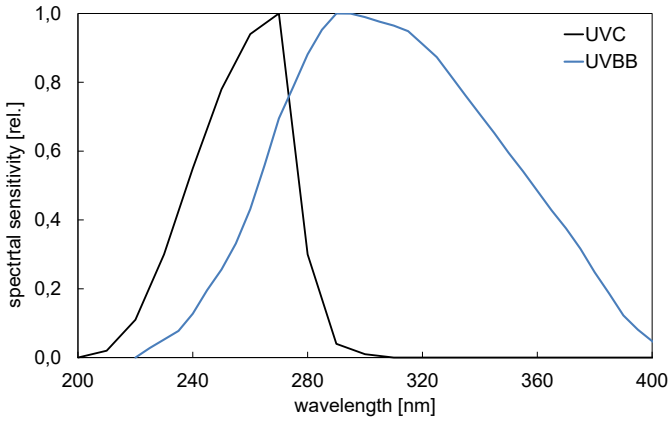
TECHNICAL DATA SENSORS

Spectral range	200 - 280 nm (UVC)
	230 - 400 nm (UVBB)
	210 - 380 nm (for KrCl*)
Measurement range	10 mW/cm² or 100 mW/cm²
Resolution	0,001 µW/cm²
Recommended for job /	high sensitive version
safety at work	0 - 10 mW/cm²
Dose range	0 - 100 MJ/cm²
Calibration	UVC-LP 253,7 nm
	UVC medium pressure (alter.)
	UV-LED 275 nm (UVBB)
Dynamic range	up to 10^7
AD conversion	24 bit
Temperature sensor	integrated
Dimensions	Ø 40 mm, h 35 mm
Optical area	Ø 6 mm
Weight	160 g
Connecting cable	1,8 m
Operation temperature	0 to 40 °C
Storage temperature	-20 to 60 °C
Humidity	< 80% non-condensing

TYPICAL TECHNICAL DATA

Calibration uncertainty	7,0% (k=2)
Linearity error	< 1%
Ageing / year	< 3%

The spectral sensitivity indicates the sensor sensitivity vs. wavelength. The UVC UVGI sensor is calibrated to 253.7 nm. The UVBB UVGI sensor is calibrated to 275nm LEDs to overcome filter edge effects. 222 nm far UVC sources can be calibrated in the Opsytec lab.



Spectral sensitifity UVC UVGI and UVBB UVGIsensor

PART NUMBERS

RMD Set 222nm UVGI	814400E (222 nm KrCl*)
RMD Set UVC UVGI	814400C (253.7 nm UVC-LP)
RMD Set UVBB UVGI	814400B (275 nm LED)
ISO 17025 Calibration	17025C
Upgrade to RMD pro	814403

SCOPE OF DELIVERY

RMD Radiometer, sensor, power supply, power cable, case and manual

The set can be upgraded for RMD Pro functions.

We calibrate traceable to PTB and deliver with factory calibration certificates, optionally with ISO 17025 calibration certificates.

RMD VS. RMD PRO

The RMD can be subsequently upgraded with the Pro functions. For this purpose, please order upgrade kit article number 814403.

You can perform the upgrade yourself. It is not necessary to send in the device. We would be pleased to perform the upgrade during the annual recalibration.

FUNCTIONS IN DETAIL

	RMD	RMD Pro
Irradiance measurement	✓	✓
Dose measurement	✓	✓
2 digital sensors can be connected	✓	✓
Integrated temperature sensor	✓	✓
Languages: German / English	✓	✓
Internal memory	-	8 GB
Recording measurements	-	✓
Real time clock	-	✓
USB connection	-	✓
Remote control from PC	-	✓
PC software	-	✓
Measurement data evaluation MIN/MAX	-	✓
Easy firmware upgrades	✓	✓

ONE MEASURING INSTRUMENT - MANY POSSIBILITIES

Our radiometric sensors are long-term stable, robust and suitable for many applications. For some applications we recommend our other sensor series, e.g. when the maximum overall height is limited or for high temperatures. These sensors can be connected to the RMD & RMD Pro:

Radiometric sensors - universal use

XT sensors - for high irradiances and temperatures

FLT - perfect for the PLC connection and monitoring

UV probes - for bad accessible areas

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