UV Radiometers & Instrumentation

- **instruments for visualization and evaluation of data acquired by the sglux UV sensors**
- **graphic touch screen display (UVTOUCH and UV Control Pad)**
- **rugged version for harsh everyday use as reference radiometer or Windows based tablet computer,**
- **miniature data loggers, one or two channels, up to two year of permanent logging with one battery**

sglux
The UV Experts

BostonElectronics

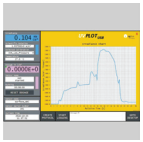
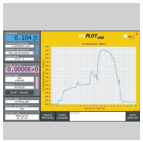
91 Boylston Street, Brookline, MA 02445
tel: (617)566-3821 fax: (617)731-0935
www.boselec.com boselec@boselec.com

UV Radiometers

Catalog

ABOUT SGLUX UV RADIOMETERS

UV sensors are used in industrial, research and development, and workplace safety applications. Frequently, the measurement signal generated by the sensor is sent directly to an instrument for display. For these applications, sglux produces top quality, high reliability UV radiometers with sensors tailored to the customer's requirements. These UV radiometers detect, measure, and store the UV sensor's signal and provide a wide range of operational features.

Product	Channels				Display	Dose Measurement	Data Storage (Logger)	Sensors and features
	1	2	3	4				
UVRRM	✓	✓			numeric			Any sglux UV sensor can be connected to the UVRRM. Sensor configured with a suitable plug.
UVPLOT 	✓				graphic	✓	✓	Any sglux UV sensor with USB connector. Can be connected to a local network.
UVMULTIPLOT 	✓	✓	✓	✓	graphic	✓	✓	Any sglux UV sensor with CAN connector. Can be connected to a local network.
UVTOUCH	✓	✓			graphic	✓	✓	Any sglux UV sensor with CAN connector.
UVMICROLOG	✓				none	✓	✓	One built-in sensor.
UVMINILOG	✓	✓			none	✓	✓	One or two built-in sensors.
SENSORMONITOR	✓	✓			alpha-numeric	✓	while connected to a computer	Any sglux UV sensor with voltage output and all photodiodes. Three fully programmable relay output terminals.

UV Radiometers

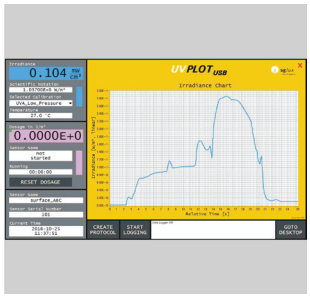
Catalog

BEGINNER - UVRRM

- UV reference radiometer
- Suitable for UV purifier sensor recalibration
- Any sglux UV sensor can be connected
- Low power consumption, long battery life

The **UVRRM** reference radiometer is an easy to use and rugged instrument. It can be connected to any sglux UV sensor type. It is used mainly for re-calibration of UV water purifier sensors. The **UVRRM** is ready to use immediately after powering on. Its low power consumption allows using it for years without changing the battery.

ALL-ROUNDER – UVPLOT



- UV radiometer based on a 8'' tablet computer
- Graphic display
- Datalogger and dosimeter
- Network-compatible, multi-channel

Do you need to display more than just the current radiation intensity? Do you need additional features such as a dosimeter function, datalogging, or seeing the intensity history to be plotted on the screen? The **UVPLOT** is a real all-round instrument for professionally displaying and processing radiation data. It can be connected to a local network via LAN or WiFi. A four-channel solution is available with the **UVMULTIPLOT**.

RUGGED PROFESSIONAL - UVTOUCH

- Two-channel UV radiometer
- Graphic display
- Datalogger and dosimeter
- Rugged metal housing

In harsh conditions of every day field or laboratory use the **UVTOUCH** is a reliable and true companion. Its robustness and versatility makes the **UVTOUCH** unique in the market. The **UVTOUCH** is a two-channel graphic intensity meter, dosimeter, and datalogger. The rugged metal housing even protects against hard impacts on hard floor.

UV Radiometers

Catalog

SIMPLE – UVMINILOG AND UVMICROLOG

- UV data logger for long-time monitoring
- with one or two UV sensors
- additional sensors e.g. temperature, pressure, relative humidity, illuminance (VIS) available
- Low power consumption, long battery life, waterproof

Do you need a simple, easy to use, and waterproof UV datalogger that stores the values and does nothing else? The tiny dataloggers, **UV MINILOG** and **UV MICROLOG**, perfectly match to this requirement. They are available with one or two UV sensors. The power consumption is very low and allows for two years of permanent logging without re-charging the battery.

PROGRAMMABLE - SENSORMONITOR

- Measurement and control module for monitoring and automation of irradiation processes
- Indication of radiation, dose, and status information
- Three programmable relays for automation of single and multi-level irradiation processes
- with two measurement inputs and USB/RS232 output

The **SENSORMONITOR** is a fully programmable measurement and control module with two sensor channels and three programmable relays. These relays switch on or off if a channel reaches or falls below a certain intensity value or if a certain dose is reached. It can be connected to a computer via USB/RS232. After programming, the **SENSORMONITOR** is a perfect control center for a small UV light source or to control sophisticated scientific experiments. The programming method is explained in a detailed manual. Alternatively, we are happy to do custom tailored programming.

UV Radiometers

Catalog

Boston Electronics

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LIST OF PUBLICATIONS

P. Sperfeld[1], B. Barton[1], S. Pape[1], A. Towara[1], J. Eggers[2], G. Hopfenmueller[3]
[1]Physikalisch-Technische Bundesanstalt Braunschweig und Berlin (PTB), Germany, [2]DVGW-Technologiezentrum Wasser, Karlsruhe, Germany, [3]sglux GmbH, Berlin, Germany
„Spectral irradiance measurement and actinic radiometer calibration for UV water disinfection“
Metrologia, Issue 51 (2014), *p. 282-288.*

P. Sperfeld[1], B. Barton[1], S. Pape[1], A. Towara[1], J. Eggers[2], G. Hopfenmueller[3]
[1]Physikalisch-Technische Bundesanstalt Braunschweig and Berlin (PTB), Germany, [2]DVGW-Technologiezentrum Wasser, Karlsruhe, Germany, [3]sglux GmbH, Berlin, Germany
„Spectral Irradiance Measurement and Actinic Radiometer Calibration for UV Water Disinfection
Proceedings of NEWRAD 2014, edited by S. Park, P. Kaerhae and E. Ikonen. (Aalto University, Espoo, Finland 2014) *p. 128.*

B. Barton[1], P. Sperfeld[1], A. Towara[1], G. Hopfenmueller[2]
[1]Physikalisch-Technische Bundesanstalt Braunschweig und Berlin (PTB), 4.1 Photometry and Applied Radiometry, Braunschweig, Germany, [2]sglux GmbH, Berlin, Germany
„Developing and setting up a calibration facility for UV sensors at high irradiance rates
EMEA Regional Conference, Karlsruhe, Germany (2013)

P. Sperfeld[1], B. Barton[1], S. Pape[1], G. Hopfenmueller[2]
[1]Physikalisch-Technische Bundesanstalt Braunschweig und Berlin (PTB), 4.1 Photometry and Applied Radiometry, Braunschweig, Germany, [2]sglux GmbH, Berlin, Germany
„Traceable spectral irradiance measurements at UV water disinfection facilities
EMEA Regional Conference, Karlsruhe, Germany (2013)

G. Hopfenmueller[1], T.Weiss[1], B. Barton[2], P. Sperfeld[2], S. Nowy[2], S. Pape[2], D. Friedrich[2], S. Winter[2], A. Towara[2], A. Hoepe[2], S. Teichert[2]
[1]sglux GmbH, Berlin, Germany, [2]Physikalisch-Technische Bundesanstalt Braunschweig und Berlin (PTB), 4.1 Photometry and Applied Radiometry, Braunschweig, Germany
„PTB traceable calibrated reference UV radiometer for measurements at high irradiance medium pressure mercury discharge lamps
EMEA Regional Conference, Karlsruhe, Germany (2013)

D. Prasai[1], W. John[1], L. Weixelbaum[1], O. Krueger[1] G. Wagner[2], P. Sperfeld[3], S. Nowy[3], D. Friedrich[3], S. Winter[3] and T. Weiss[4]
[1]Ferdinand-Braun-Institut, Leibniz-Institut fuer Hoechstfrequenztechnik, Berlin, Germany, [2]Leibniz-Institut fuer Kristallzuechtung, Berlin, Germany, [3]Physikalisch-Technische Bundesanstalt Braunschweig und Berlin (PTB), 4.1 Photometry and Applied Radiometry, Braunschweig, Germany, [4]sglux GmbH, Berlin, Germany
„Highly reliable silicon carbide photodiodes for visible-blind ultraviolet detector applications
J. Mater. Res., first view (2012)
Copyright © Materials Research Society 2012. Personal use of this material is permitted. However, permission to reprint/republish this material for advertising or promotional purposes or for creating new collective works for resale or redistribution to servers or lists, or to reuse any copyrighted component of this work in other works must be obtained from the Cambridge University Press.

S. Nowy[1], B. Barton[1], S. Pape[1], P. Sperfeld[1], D. Friedrich[1], S. Winter[1], G. Hopfenmueller[2], and T. Weiss[2]
[1]Physikalisch-Technische Bundesanstalt Braunschweig und Berlin (PTB), 4.1 Photometry and Applied Radiometry, Braunschweig, Germany, [2]sglux GmbH, Berlin, Germany
„Characterization of SiC photodiodes for high irradiance UV radiometers
Proceedings of NEWRAD2011, edited by S. Park and E. Ikonen. (Aalto University, Espoo, Finland, 2011) *p. 203.*

B. Barton[1], P. Sperfeld[1], S. Nowy[1], A. Towara[1], A. Hoepe[1], S. Teichert[1], G. Hopfenmueller[2], M. Baer[3], and T. Kreuzberger[3]
[1]Physikalisch-Technische Bundesanstalt Braunschweig und Berlin (PTB), 4.1 Photometry and Applied Radiometry, Braunschweig, Germany, [2]sglux GmbH, Berlin, Germany, [3]SGIL Silicaglas GmbH, Langewiesen, Germany
„Characterization of new optical diffusers used in high irradiance UV radiometers
Proceedings of NEWRAD2011, edited by S. Park and E. Ikonen. (Aalto University, Espoo, Finland, 2011) p. 278.1.

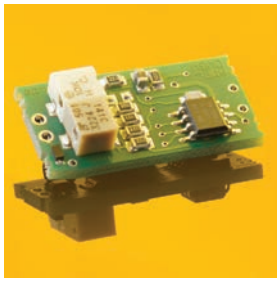
AMPCON series

Transmitter of photocurrent to 4 - 20 mA current loop

sglux The UV Experts

Boston Electronics

GENERAL FEATURES



Properties of the AMPCON

The AMPCON converts a photocurrent to an industry standard current loop signal. It exhibits a loop-powered (passive) 4 to 20 mA sensor to any PLC system.

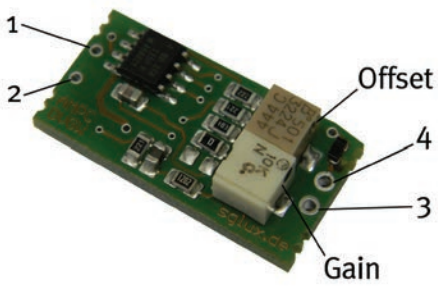
Three models with different measurement ranges are available. Gain and offset can be adjusted by potentiometers. The measurement range can also be customized by replacing passive components (see description on page 2).

SPECIFICATIONS

Parameter	Value	
Photocurrent measurement range	AMPCON_low	250 µA
	AMPCON_med	2.5 µA
	AMPCON_high	25 nA
Loop supply voltage	(10 to 24) V ± 10 % depending on loop resistance	
Total loop resistance	<= 700 Ω@ 24V, <= 100 Ω at 10V	
Gain adjustment range	± 35%	
Offset adjustment range	4 mA (±12.5%)	
Dimensions	13 x 26 x 8 mm (WxLxH)	
Operating temperature	-20 to +80 °C	
Storage temperature	-40 to +80 °C	
Standards	RoHS 2 2011/65/EU, DIN IEC 60381-1	

We strongly recommend to process this product on ESD protected workplaces.

CONNECTION



1 - Photodiode anode

2 - Photodiode cathode

3 - Signal output (connect to current input)

4 - V+ power supply

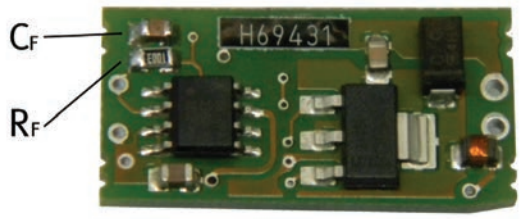
Gain - turn left to increase the gain

Offset - turn left to decrease the offset

AMPCON series

Transmitter of photocurrent to 4 - 20 mA current loop

CUSTOMIZATION OF MEASUREMENT RANGE



To modify the measurement range beyond the available adjustment range the feedback resistor R_f must be replaced. The adjustment range remains unaffected by this change. I_{max} is the designated maximum photocurrent to be measured.

$R_{f,new}$ (in MΩ) = 2160 / I_{max} (in nA)

The capacitor C_f defines the time constant τ of the measurement and may need modification too. By default τ is 10 ms for all models. The required value of C_f can be calculated from $R_{f,new}$ and the intended time constant:

C_f (in nF) = τ_{new} (in ms) / $R_{f,new}$ (in MΩ)

Recommended values:

10 kΩ <= $R_{f,new}$ <= 3 GΩ and 1 ms <= τ <= 200 ms, $C_{f,new}$ >= 33 pF,

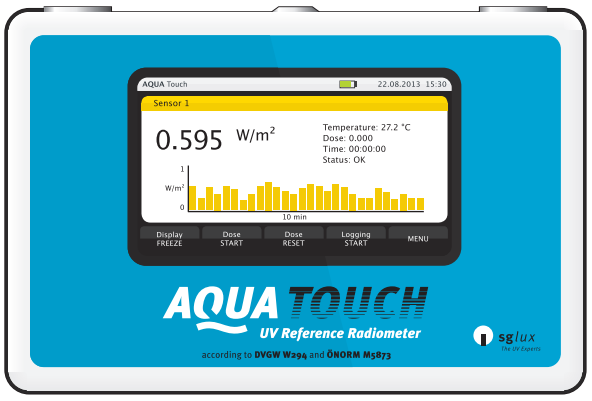
components package 0805 (2.0 x 1.25 mm)

Default component values:

Model	R_f	C_f
AMPCON_low	10 kΩ	1 µF
AMPCON_med	1 MΩ	10 nF
AMPCON_high	100 MΩ	100 pF

AQUA TOUCH Reference Radiometer according to DVGW W294–3 & ÖNORM M5873

Handheld for PTB traceable calibrated UV sensors according to DVGW W294–3 and ÖNORM M5873
for low and medium pressure lamps



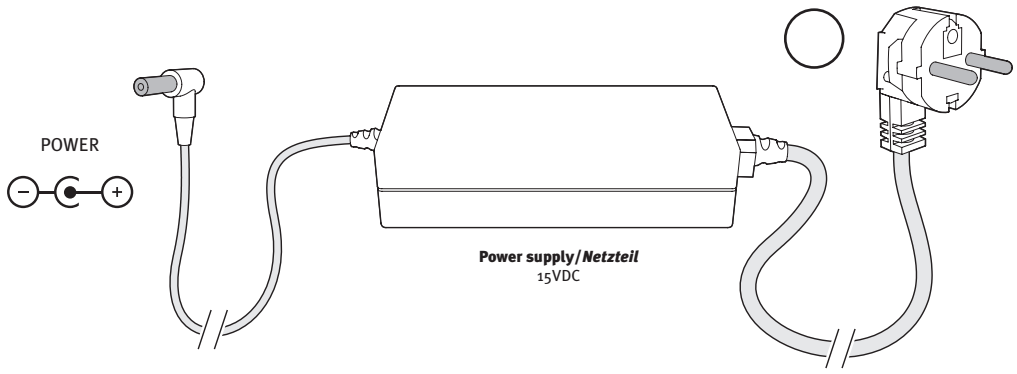
SiC Photodetector
guarantees radiation hardness

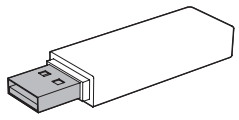
CAN bus signal processing
offers a large dynamic range

Intuitive touch screen control
makes working a pleasure

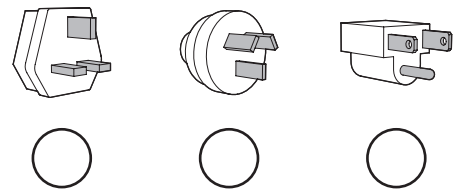
Handgerät für PTB-rückführbar kalibrierte UV-Sensoren gemäß DVGW W294–3 und ÖNORM M5873 für Nieder- und Mitteldruckstrahler

I. Components included in delivery – *Lieferumfang*

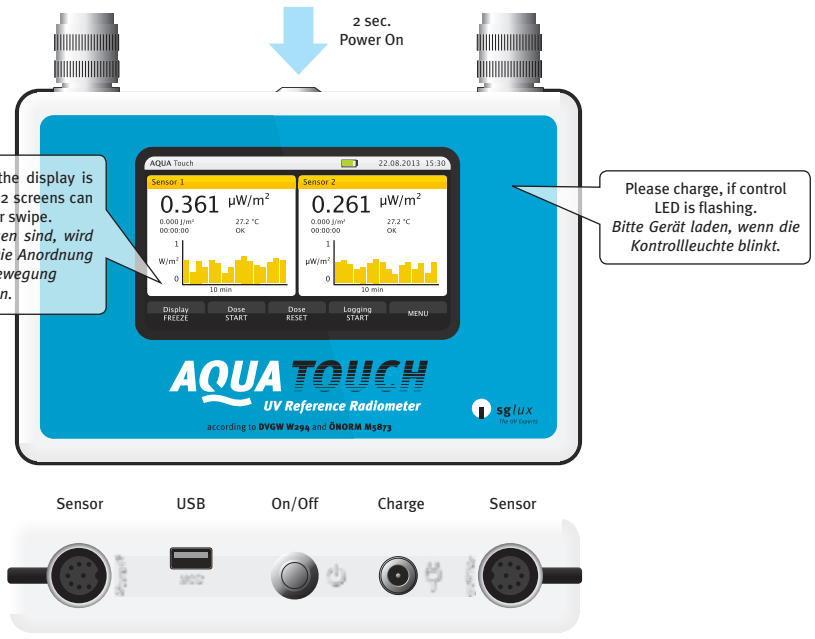




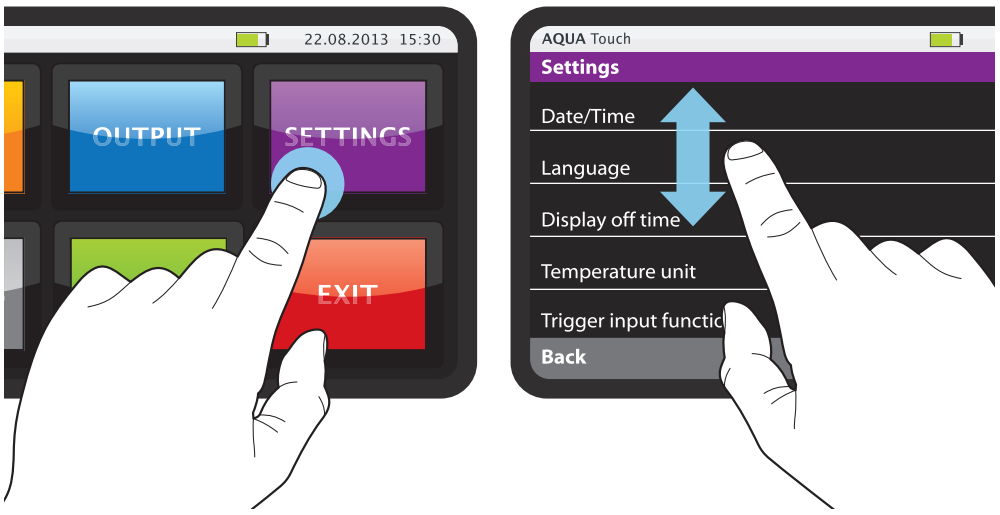
4GB USB flashdrive/*4GB USB-Stick*
For transfer of log files and installation of firmware updates
Zur Übertragung von Loggingdaten und Installation von Firmware-updates



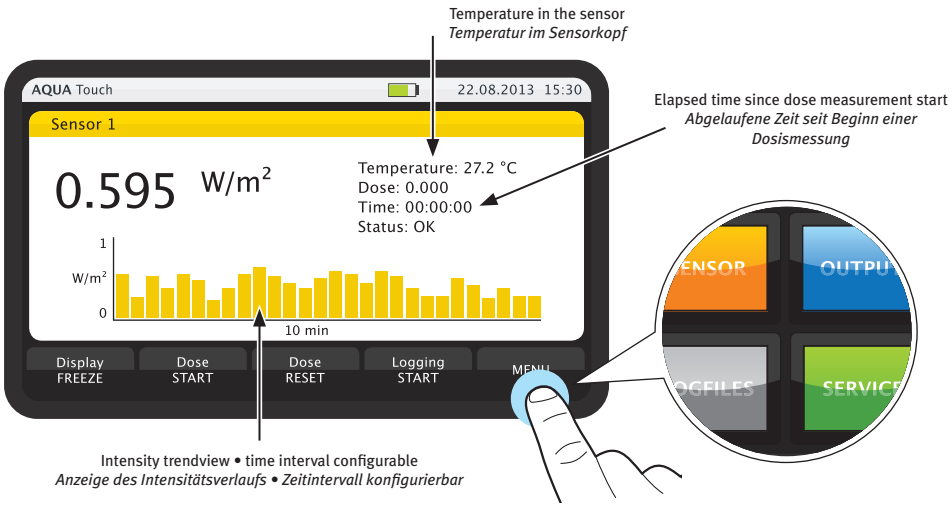
II. Getting started – *Inbetriebnahme*

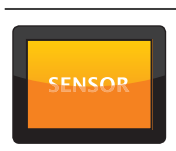


III. Handling – *Handhabung*



Main screen and menus – *Hauptbildschirm und Menus*





Setting of irradiation and area units, determination of sensor names

Einstellung von Einheiten der Bestrahlungsstärke und Bezugsfläche, Vergabe von Sensornamen

Configuration of switch outputs: Setting of thresholds, optional hysteresis and related measured output

Konfiguration der Schaltausgänge; Einstellung, auf welche Messgröße sich das Schaltsignal bezieht; Einstellung des Schwellwertes und einer möglichen Hysterese

Basic settings: date, time, language, temperature unit, logging interval, external control, configuration of the trend view length

Basiseinstellungen des Handgerätes: Datum, Uhrzeit, Sprache, Temperatureinheit, Logging-Intervall, externe Ansteuerung, Konfiguration der Verlaufsanzeige-Länge

Manufacturer information, upload of firmware updates

Hersteller-Informationen, Aufspielen von Firmwareupdates

Editing of logfiles, logfile transfer to USB flash drive

Editieren von Logging-Daten und Übertragung auf USB-Stick

Exit to main screen

Zurück zum Hauptbildschirm

Technical data, service information – *Technische Daten, Kontaktinformationen*

Dimensions (W x H x D)/*Größe (B x H x T)*	175 x 117 x 37 mm
Weight/*Gewicht*	900 g
Operation temperature/*Betriebstemperatur*	0–50°C
Storage temperature/*Lagertemperatur*	-20–50°C
Supply voltage/*Betriebsspannung*	15 V
Power supply input voltage (multiplug consigned) *Betriebsspannung des Netzteils*	100–240VAC
Power consumption (standard conditions, battery fully charged) *Leistungsaufnahme im Normalbetrieb (Akku voll geladen)*	5 W
Power consumption while charging *Leistungsaufnahme während des Ladevorgangs*	28 W
Pressure/*Luftdruck*	300–1080 hPa
Rel. Humidity (non-condensing)/*Rel. Feuchte (nicht-kondensierend)*	< 70%
Battery lifetime (min.)/*Akkubetriebsdauer (min.)*	10 h
Calibration values/*Kalibrierwerte*	Stored in sensor/*Gespeichert im Messkopf*
Dynamic range/*Dynamikbereich*	> 5 Decades/*> 5 Dekaden*
Power supply/*Stromversorgung*	Internal battery, power supply unit/ *Interner Akku, Netzteil*
Data storage/*Messwertspeicher*	> 11.000.000 Measurements/*Messungen*
Measurement range/*Messbereich*	s. Sensor
Display/*Display*	4,3“ TFT
Housing material/*Gehäusematerial*	Aluminium
Protection level/*Schutzklasse*	IP 62

Attention! While operating the AQUA TOUCH the following must be observed:
Do not expose the AQUA TOUCH to direct sunlight, intense heat radiation, or high electro-magnetic radiation. Please connect the AQUA TOUCH USB-port to a USB flashdrive only. Do not connect the USB port to a computer. Use the AQUA TOUCH with the provided power supply only. While charging the ambient temperature must not exceed 40°C (104°F).

Achtung! *Bei der Benutzung des AQUA TOUCH Handheld ist folgendes zu beachten:*
Gerät keiner direkten Sonneneinstrahlung, keiner intensiven Wärmebestrahlung und keiner starken ektromagnetischen Strahlung aussetzen. USB-Anschluss am AQUA TOUCH ausschließlich mit einem USB-Stick verbinden. Nicht an einen Computer anschließen. Gerät nur mit dem mitgelieferten Netzteil betreiben. Beim Ladevorgang darf die Umgebungstemperatur höchstens 40°C betragen.

Accessories/*Zubehör:* **UV Sensor**

Choose a PTB traceable calibrated UV sensor (40° or 160°) with desired dynamic range
Wählen Sie zu diesem Gerät einen PTB-rückführbar kalibrierten UV- Sensor (40° oder 160°) mit gewünschtem Dynamikbereich

CE RoHS IP 62

Boston Electronics
sglux The UV Experts

BOSTON ELECTRONICS | www.boselec.com | boselec@boselec.com | 617-566-3821

Description

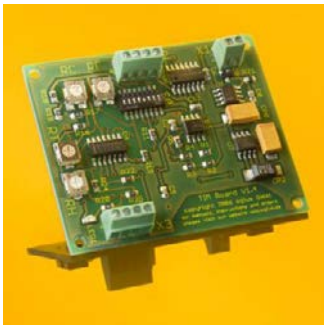


Fig. 1: Board overview

Most applications of photodiodes and especially those in the ultraviolet wavelength range require special amplifiers because of the small photocurrents. Although the uv-sensors of **sg***lux* provide large active areas you mostly may consider using an amplifier.

To support your application development we provide you this completely new photodiode amplifier board. Based on our successful **Multifunctional 2-Channel Amplifier Board** we included additional features: one analog channel with adjustable Schmitt-Trigger (ST) and a Current-to-Frequency converter (CFC) channel.

The CFC clearly simplifies the integration of our photodiodes into digital- and microprocessor based designs.

Features

- wide single supply voltage range 5.0 V … 18.0 V with surge and polarity protection
- low power consumption (< 50 mW @ 5 V)
- analog transimpedance amplifier channel with:
  - adjustable gain in the range 10^5 … 10^7 V/A with fine tuning option
  - Schmitt-Trigger stage with adjustable switching point and adjustable Hysteresis
  - LED for easy adjustment of the Schmitt-Trigger
- Current-to-Frequency converter with:
  - 2 measurement ranges giving high dynamic range
  - standard CMOS compatible digital output

Important Notice

Please consider any possible action to protect the sensitive devices on the board against electrostatic discharge (ESD). Not to do so voids warranty.

Getting Started

Power Supply

This board requires a single DC voltage supply from 5 V … 18 V to be connected as shown in figure 2. In general a simple filtered DC source is sufficient.
But for ultra low noise and high gain measurements we recommend using batteries or carefully selected power supply units.
The Board is protected against wrong polarity of the power supply. The surge protection device (AVX TransGuard VC080518) has a breakdown voltage of about 23 V and is capable of handling Pulses with 0.1 J / 10 µs.

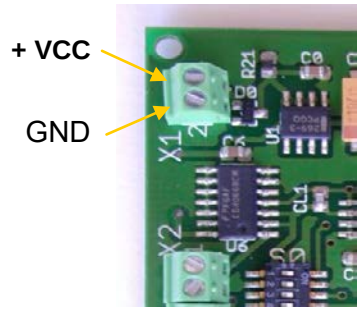


Fig. 2: Power supply connection

Current-to-Frequency Converter

The input and output connections for this Channel are shown in figure 3. The anode of the photodiode must be connected to the input terminal and the cathode to GND.

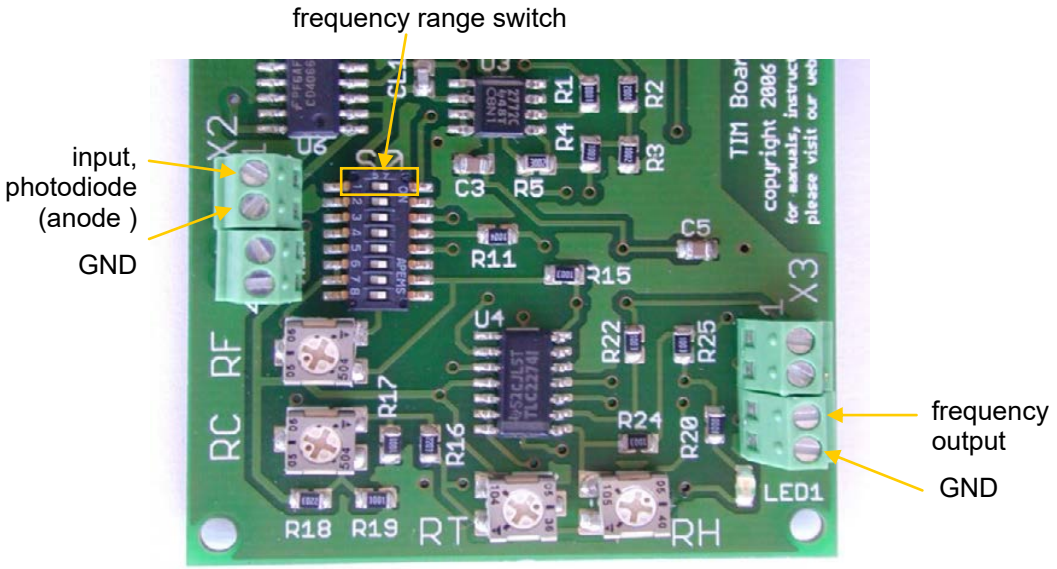


Fig. 3: Current-to-Frequency Converter input, output and switches

If there appears no pulse signal on the output the polarity of the photodiode may be wrong. Also check that your equipment is able of recognising pulses as short as 1 µs. Especially with older analog oscilloscopes and under artificial illumination it can be tricky to trigger these pulses because the output frequency may vary with the double of the mains frequency.

The measurement range can be selected by switch 1 as shown in the following table. One can calculate the output frequency by multiplying the photocurrent with the given conversion factor.

Switch 1	***Mode***	***Conversion factor***
1 = OFF	high frequency / low current	~ 3.3 □ 10^9 Hz / A
1 = ON	low frequency / high current	~ 3.0 □ 10^8 Hz / A

In both ranges the useful frequencies range from 0.1 Hz up to about 40 kHz giving a dynamic range of 112 dB. Above 40 kHz the linearity error increases steeply as shown in figure 4 due to the influence of the fixed output pulse duration on the total integration cycle lenght.

In programmable systems the linearity error can be corrected by using a matched lookup table. In this case frequencies up to 500 kHz can be used and thus the total dynamic range increases by two orders of magnitude.

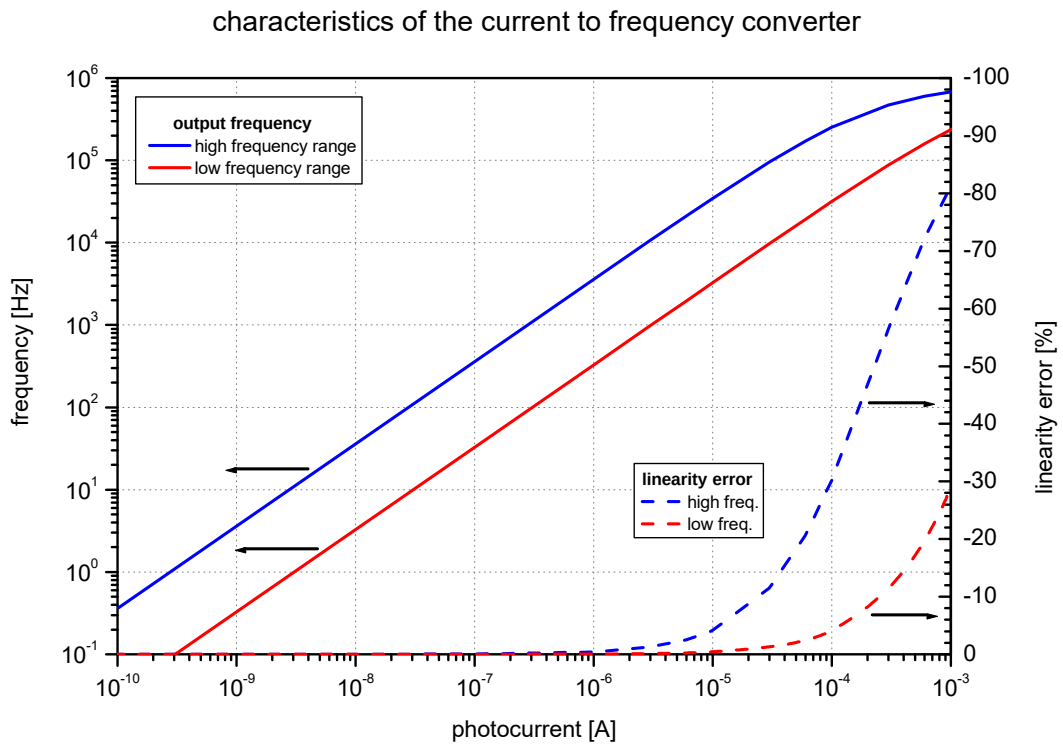


Fig. 4: CFC performance

Hint: If you require different conversion factors the load capacitors CL1 and CL2 have to be changed. CL1 is solely active with switch 1 opened. Closing switch 1 puts both capacitors in parallel and the active load capacitance equals their sum. We are happy to assist you with that or to deliver boards adapted to your application.

Analog Amplifier Channel

Amplifier stage

This channel is completely independent of the CFC and works fully bipolar. Please refer to figure 5 for the appropriate connections and controls.
If you connect the anode of the photodiode to the input pin the output voltage is negative and vice versa.

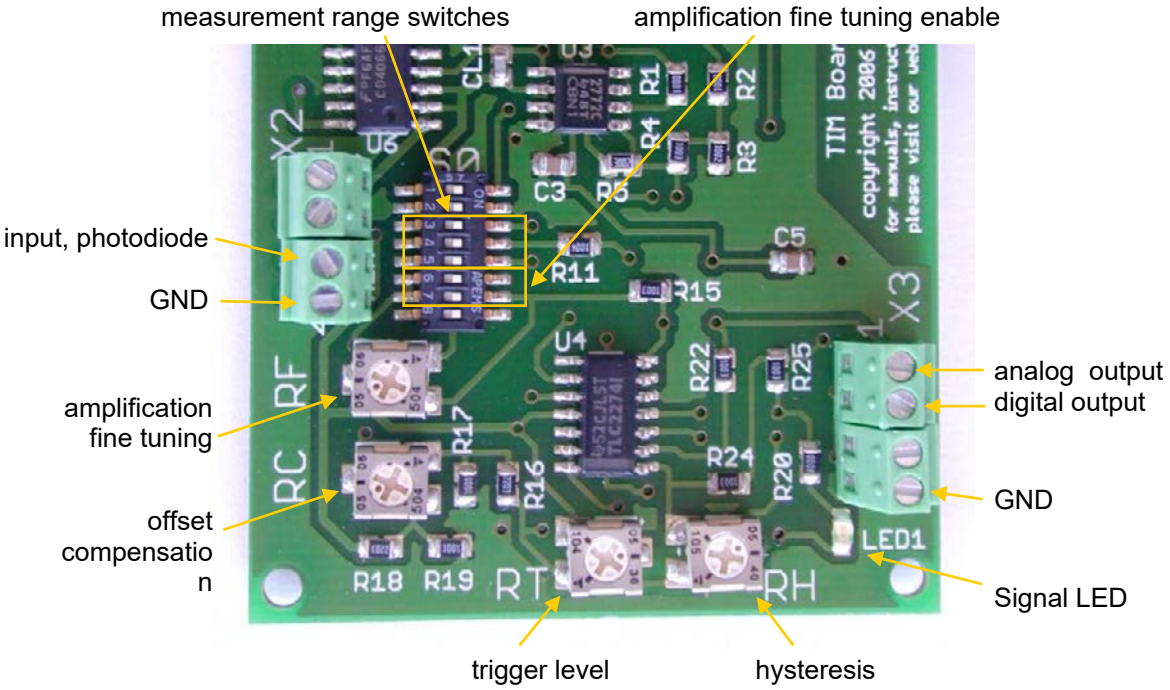


Fig. 5: Analog amplifier channel: input, output, potentiometers and switches

For basic operation close (ON) one of the switches 3, 4, 5 and both switches 6 and 7. The amplification can be selected as follows:

Switches 3,4,5	***Amplification***
3 = ON 4 = OFF 5 = OFF	10^7 V/A
3 = OFF 4 = ON 5 = OFF	10^6 V/A
3 = OFF 4 = OFF 5 = ON	10^5 V/A

To activate amplification fine tuning you must open both switches 6 and 7 (OFF). Now you can adjust the total amplification with potentiometer “RF” by a factor in the range 0.5 … 1.5.

Switches 6,7	***Amplification fine tunig***
6 = OFF 7 = OFF	enabled
6 = ON 7 = ON	disabled

Example: You choose 10^6 V/A and fine tuning. Now with “RF” you can trim the amplification in the range $5 \cdot 10^5$ V/A to $1.5 \cdot 10^6$ V/A.

The maximum analog output voltage is approx. ± 3.0 V and the output current must not exceed 1 mA. Please note that the amplifier is fast enough to resolve intensity modulation of the doubled mains frequency as normally found when using fluorescent lamps.

The input offset can be compensated by this procedure:

1. select amplification
2. connect the (darkened) photodiode
3. switch power on
4. adjust ‘RC’ potentiometer until the analog output voltage is as small as possible (typically below 10 mV)

Schmitt-Trigger

The analog output voltage is internally connected to the Schmitt-Trigger. The switching point can be adjusted by potentiometer “RT” within the range +3 V (left stop) … -3 V (right stop).

The Hysteresis is adjustable by potentiometer “RH” from 0.05 V (left stop) to approx. 1.5 V (center position). It doesn’t make sense to use the range from beyond the middle to the right stop because with such large hysteresis the function is unstable.

The logical state of the Schmitt-trigger output is displayed by the red LED. The LED is on if the output is logically HIGH (~ 3 V).

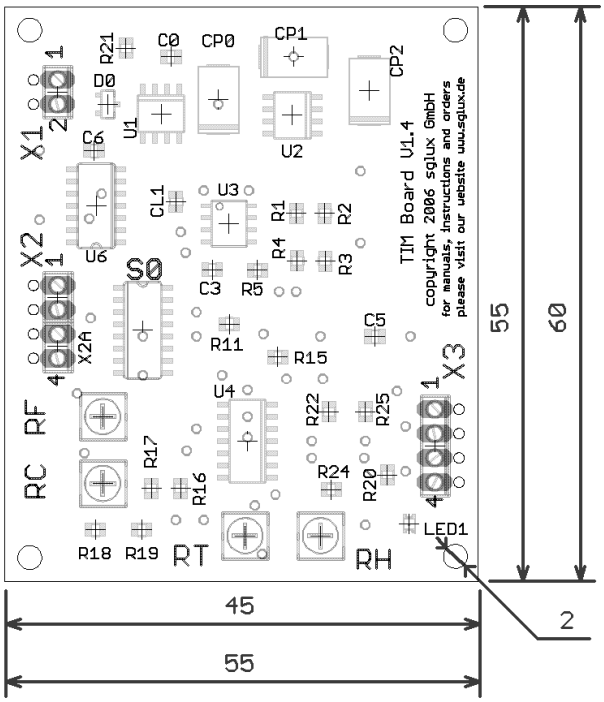
Special feature:

- if the analog output voltage is positive: the Schmitt-Trigger output goes HIGH if the analog output voltage exceeds the switching point.
- if the analog output voltage is negative: the Schmitt-Trigger output goes LOW if the analog output voltage exceeds the switching point.

Thus it is possible to realise either overshoot or undershoot detection with the same device by changing the polarity of the photodiode!

Physical Dimensions

All dimensions are shown in millimeters.



Absolute Maximum Ratings

Exceeding these limits may decrease lifetime or destroy the board or parts of it immediately.

Parameter	***Unit***	***Value***
Operation Temperature range *	°C	0 … +70
Storage Temperature range *	°C	-25 … +85
Supply voltage	V	+18.5
Output current (digital output)	mA	0.5
Output current (analog output)	mA	10

**in non condensing environment only*

Electrical Characteristics **(at 25°C unless otherwise noted, default jumper settings)**

General

Parameter	***Unit***	***min***	***Value typ***	***max***
Supply voltage	V	5	12	18
Power dissipation *(at 5 V supply voltage, depends on load and switching frequency)*	mW		50	

Analog channel

Parameter	***Unit***	***min***	***Value typ***	***max***
Fixed transimpedance gain *(gain setting by switches 3,4,5)* low medium high	V/A	0.98 □ 10^5 0.98 □ 10^6 0.90 □ 10^7	10^5 10^6 10^7	1.02 □ 10^5 1.02 □ 10^6 1.10 □ 10^7
Variable transimpedance gain factor range*		0.7 – 1.3	0.5 – 1.5	0.3 – 1.7
Input current	A			□ 30 □ 10^{-6}
Maximum output voltage *(in both polarities)*	V	□ 2.6	□ 2.9	□ 3.3
Output offset voltage *(with optimal compensation)*	mV		< □ 5	□ 10

** if fine tuning selected by closing switches 6 and 7 total gain derived by multiplying fixed gain with variable gain factor*

Digital channel

Parameter	***Unit***	***min***	***Value typ***	***max***
Output voltage LOW*	V	0	0.05	0.1
Output voltage HIGH*	V	2.8	3.1	3.3
Frequency output pulse length FWHM *(levels above)*	µs	1	1.2	2
Input current	A	~ 10^{-10}		~ 10^{-4}
Conversion rate low frequency mode high frequency mode	Hz / A	2.8 □ 10^8 3.1 □ 10^9	3.0 □ 10^8 3.3 □ 10^9	3.2 □ 10^8 3.5 □ 10^9
Conversion rate temperature dependance	1 / K		□ 3 □ 10^{-5}	

Linearity error, high frequency mode @ 10 kHz @ 40 kHz @ 100 kHz	%		 1 5.2 12	
Linearity error, low frequency mode @ 10 kHz @ 40 kHz @ 100 kHz	%		 1 5.5 13	

** for the frequency output as well as for the Schmitt-Trigger output*

DIGIBOX & Software

CAN-to-USB converter box and evaluation software

sglux
The UV Experts

Boston Electronics

GENERAL FEATURES

Properties of the DIGIBOX

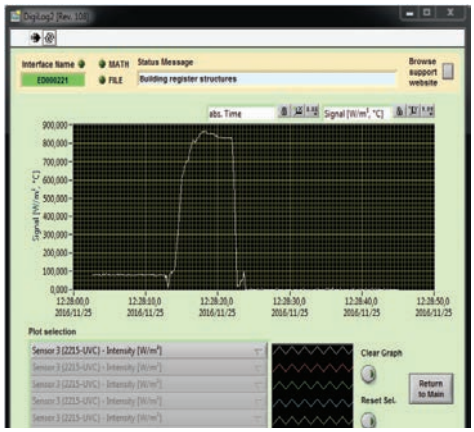
The DIGIBOX is a CAN-to-USB converter box converting the CAN output signal of the sglux digital UV sensors into a USB signal. Up to eight sensors can be connected to the box.

The free software "DigiLog2" shows actual values and trends. A logging function is included. The software can also be used for sensor calibration.

SPECIFICATIONS

Measurement	conversion of CAN signal from sglux digital UV sensors into a USB signal
Output	USB signal
Power supply	via USB terminal
Weight	300 g
Dimensions	115 mm x 65 mm x 35 mm
Sensor inputs in standard configuration	2
USB cable length	2 m

FEATURE OVERVIEW OF THE SOFTWARE DIGILOG



The LabView based free software "DigiLog2" is a tool for displaying and logging of irradiation and temperature data generated by the sglux digital UV sensors. The measurements and the data appearance can be customized. The output data is logged in a file.

The irradiation is displayed in the upper graphic window and the sensor temperature is shown below. In the left command column, the user can change various settings for the presentation and the logging. "DigiLog2" runs with all MS Windows systems since Windows XP.

LPL-01
UV Hand Lamp with timer function

General Features

Properties of the LPL-01

- UV radiation source with one or two low pressure lamps (UVA, UVB or UVC)
- High UV transparent UG11 window glass for high UVA and UVB radiation emission
- No emission of visible light (UVA, UVB-type)
- Rugged mechanical timer
- Applications: irradiation of biological and pharmaceutical samples, material inspection, fluorescence excitation, forensic and contamination analysis

The lamp is available with an individual traceable calibration. The consigned certificate provides information about the spectral output data and the correlation between irradiance and distance to the lamp. Please ask for this calibration service.

***Attention*: UV radiation can be harmful. Always protect eyes and skin.**

Specifications

Parameter	Symbol	Value	Unit
Supply voltage	V_{supply}	110/240	*VAC*
Electrical power	*P*	(2x) 8	*W*
Dimensions	*D*	375x68x75	mm^3
Weight	*m*	1600	*g*
Cable length		2	*m*
Irradiating area	*A*	195x40	mm^2
Peak wavelength of available lamps UVA; *used bulb: F8T5/BLB* UVB; *used bulb: G8T5E* UVC; *used bulb: G8T5*	λ	365; 315; 254	*nm*
Minimum timer setting	-	1	*min*
Maximum timer setting	-	60	*min*
Approx. UV intensity at 5cm distance (one lamp)	*I*	2	mW/cm^2

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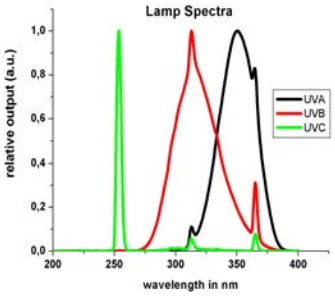
General Information

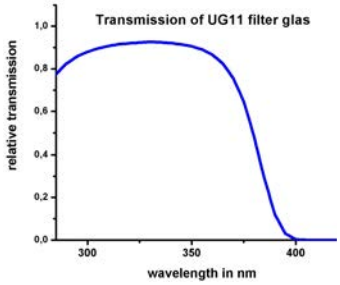


- UV Hand lamp can be configured with one or two low pressure lamps. Please define with your order.
- Spectral emission of the lamp can be selected between UVA, UVB and UVC.
- Different UV lamps in one housing are possible.
- Both lamps can be switched separately.
- Two identical lamps can be used to increase the maximum UV intensity.
- The lamp has a robust powder-coated housing.

Mechanical Timer

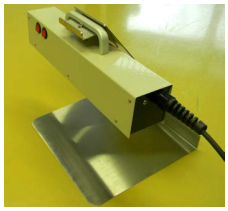
- This feature allows a comfortable work, where a defined irradiation time (or a related UV dose) is to be applied.
- The timer can be set for continuous operation (left position).
- The irradiation time can be set between 1 and 60 minutes.

Window Glass in UVA and UVB lamps



- Almost 100% UVA and UVB transmission allows high radiation output. The picture shows the relative transmission of the used UG11 window glass in %, depending on the wavelength.
- No visible light transmission optimizes fluorescence analysis. There, a material emits visible light when exposed to UV radiation. Visible light emission by the lamp would reduce the fluorescence effect.

Upgrade - Lamp Fixture for easy mounting of the LPL-01

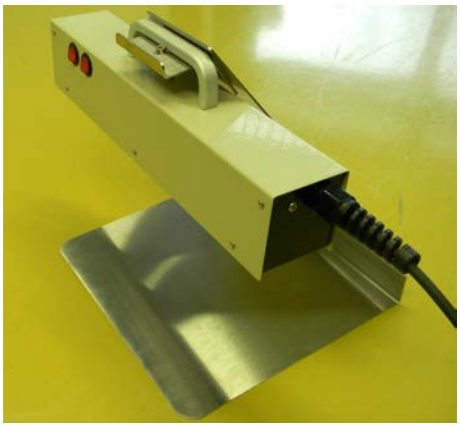


- The solid fixture enables easy lamp mounting.
- The fixture is height adjustable for varying the irradiation level (and irradiated area).
- A scale allows reproducible height positioning.
- Order number: LPL-01-Stand

LPL-01-fixture

Reproducible handlamp positioning for calibration and defined irradiance

General Features



Properties of the LPL-01-fixture

- Enables easy lamp mounting.
- Height adjustable for varying the irradiation level (and irradiated area).
- A scale allows reproducible height positioning for calibration purposes.
- Solidly manufactured from one piece of 2mm W1.4301 stainless steel plate.

Specifications

Parameter	Symbol	Value	Unit
Dimensions – base plate	*A*	277x300	mm^2
Height	*H*	320	*mm*
Weight	*m*	2700	*g*
Height adjustment range	H_a	120…300	*mm*

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Introduction

Photodiodes generate small photo-currents ranging from microamperes down to picoamperes, which cannot be measured with commonly available multimeters – amplifiers are required. Amplifiers such as the sglux dual channel MULTIBOARD converts very small currents into a voltage of 0… 4V. Thus such amplifiers convert the small current signal of photovoltaic elements (photodiodes) to signal voltages suitable for typical voltmeters, microcontrollers and PLC systems.

Basics

Photo-currents can be converted to voltages by transimpedance amplifiers (TIA). The MULTIBOARD utilizes this approach. The schematic is shown in Appendix C. For basic knowledge about this device please refer to application note (SBOA061) for device OPA128 from texas instruments. Other approaches employ current-to-frequency converters and integrators, such as the sglux “DIGIBOARD”.

Specifications

The MULTIBOARD contains two independent amplifier channels with adjustable gain. By using jumpers one can select the amplifier type (voltage or transimpedance amplifier) and configuration (two independent amplifiers or single two-stage amplifier) as well as the gain.

The board provides current gain in the range 10^5 V/A…10^7 V/A and voltage gain from 2… 1000 V/V in single-stage configuration. Additionally to the fixed gain factors are potentiometers for custom gain factors in the range 10^4 V/A…10^6 V/A. By two stages one may reach gains of 10^{10} V/A respectively 10^5 V/V if offsets are carefully adjusted. The maximum usable output voltage range is ±4 V and must be considered while calculating gain factors.

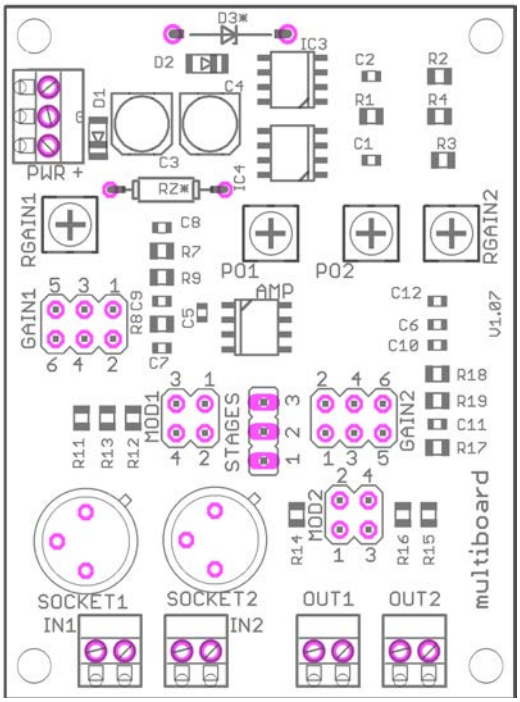
The circuit is ideally operated with a split power supply of ±7 V…±26 V. For lower performance measurements a single supply of 15 V…36 V may be used. **Note**: For using single supply mode see Appendix B. **Note**: Applying operating voltage with a wrong polarity can destroy the board. The photodiodes plug directly into sockets or are externally connected via screw terminals. The output voltages are available on screw terminals.

Specifications overview

Signal out	Ranges	Setting facilities	U_{supply}
0…4V	...400nA ...4µA ...40µA 40nA...4µA	• 3 ranges configurable with jumpers • continuously adjustable amplification with potentiometer • offset control with potentiometer	15…36V single supply or 2 x 7…26V dual supply

Starting

The index “x” in names relates to the channel number (“1” or “2”), for positions and pin numbers please refer to the picture on the right.



- Choose operation modes and configuration by setting jumpers MODx and STAGES; refer to Appendix A, tables 2 and 3.
- Set required gains with jumpers GAINx and/or potentiometers RGAINx; again refer to Appendix A, table 4.
- Connect voltmeter(s) to screw terminals OUTx. Right pin (#1) is the output, left pin (#2) equals to GND.
- Connect the power supply to screw terminal PWR. For dual power supply use top terminal (#3) for negative, middle (#2) for GND and bottom terminal (#1) for positive voltage. A single supply must be connected with positive pole to bottom pin (#1) and supply GND to top pin (#3), middle pin is left open.
  Note: In case of single supply there is a floating virtual ground on the middle terminal to which the inputs and outputs relate and which must not be connected to power supply GND.
- Adjust offsets for all channels. To do this shorten inputs for voltage amplifiers and leave inputs open for transimpedance stages (or insert photodiodes and darken them to compensate dark currents as well). Now adjust the output voltages to 1mV or less by potentiometers POx.
- Connect photodiode(s) to either terminal INx or SOCKETx. The right pins (#1) of screw terminals INx are the inputs, the left pins (#2) equal to GND (cathode). If using the sockets the upper pinhole is the input and must be plugged with one photodiode pin in any case. Other pinholes are grounded and may be used as required. Polarity of the photodiodes within sockets depends only on desired output voltage polarity.

Examples

Problem 1:

Compare photocurrents of two different photodiodes. This task at first requires two identical channels and an estimation of the photocurrent generated with this experiment. This current can be calculated by the formula:

$$I = A_{chip} \cdot S_{chip} \cdot E_{\lambda} \cdot 10.000$$

where I is the photocurrent in nA, A_{chip} is the chip active area of the photodiode you plan to use in mm^2. S_{chip} is the chip's spectral sensitivity in $AW^{-1}nm^{-1}$ and E_{λ} is the spectral irradiance of the UV light source in $mWcm^{-2}nm^{-1}$. Please get A_{chip} and S_{chip} from the photodiode's datasheet. E_{λ} needs some knowledge of the UV source you plan to use. Sun and purification lamps generate approx. 1…..10 $mWcm^{-2}nm^{-1}$. For a very detailed tutorial have an internet search for: "SiC UV Photodiode Selection Guide". Further to the example experiment, the estimated photocurrent may be approx. 1…2µA. As the output of the MULTIBOARD is 0…4V, you may expect to get 1…2V output voltage by defining the gain as 1V/µA = 10^6 V/A.

Solution:

- ✓ set jumper STAGES to position 1-2 (two channel mode), set MOD1 and MOD2 to position 1-2 (transimpedance amplifier)
- ✓ set GAIN1 and GAIN2 to position 2-4 (transimpedance gain 10^6 V/A)
- ✓ connect and turn on power supply
- ✓ insert photodiodes, darken them, compensate offsets (and dark currents) by adjusting PO1 and PO2
- ✓ illuminate photodiodes with visible and ultraviolet light, compare voltages on terminals OUT1 and OUT2

Problem 2:

Convert a photocurrent of 1nA to a voltage of 2.0 Volts. This requires a total gain of 2V/nA = $2\times\ 10^9$ V/A, which can be provided by two amplifier stages. The first stage converts the current to a voltage of 10mV with a gain 10^7 V/A, which is then boosted to 2.0 V by the second voltage amplifier stage with a gain of 200 V/V. This voltage can be displayed easily by a standard digital panel voltmeter.

Solution:

- ✓ set jumper STAGES to position 2-3 (two channel mode)
- ✓ set MOD1 to position 1-2 (transimpedance amplifier) and GAIN1 to position 1-3 giving 10^7 V/A in the first stage
- ✓ open MOD2 (voltage amplifier, pre-gain 2) and set GAIN2 to position 1-3 (giving overall voltage amplification of 200 in stage two)
- ✓ connect and turn on power supply

- ✓ insert photodiode into SOCKET1 and darken it; first compensate offset of first stage by adjusting PO1 until voltage on OUT1 is below 1 mV; then compensate offset of second stage by adjusting PO2 until voltage on OUT2 is below 1 mV
- ✓ illuminate photodiode and measure voltage on terminal OUT1

Appendix A

Table 1: pin, terminal and other assignments for split supply

	Pin 1	Pin 2	Pin 3	If a single supply is applied see Appendix B.
PWR	+7 V … +26 V	GND	-7 V … -26 V	
IN1	input terminal channel 1	GND		
SOCKET1	input socket channel 1	GND	GND	
OUT1	output terminal channel 1	GND		
PO1	offset compensation channel 1			
IN2	input terminal channel 2	GND		
SOCKET2	input socket channel 2	GND	GND	
OUT2	output terminal channel 2	GND		
PO2	offset compensation channel 2			

Table 2: channel configuration

STAGES	Function
1-2	two independent amplifier channels
2-3	single two-stage amplifier; note: channel two must be configured as voltage amplifier by setting MOD2 in any position but 1-2 and offsets must be carefully adjusted

Table 3: amplifier mode

MODx	Function
1-2	transimpedance amplifier
1-3	voltage amplifier pre-gain -10
3-4	voltage amplifier pre-gain -5
Open	voltage amplifier pre-gain -2

Table 4: gain factor setting

GAINx	transimpedance gain [V/A]	voltage gain (multiply by voltage pre-gain to get total voltage gain) [V/V]
1-3	10^7	100
2-4	10^6	10
3-5	10^5	1
4-6	adjustable by potentiometer RGAINx in range 10^4 … 10^6	0.1…10

Appendix B

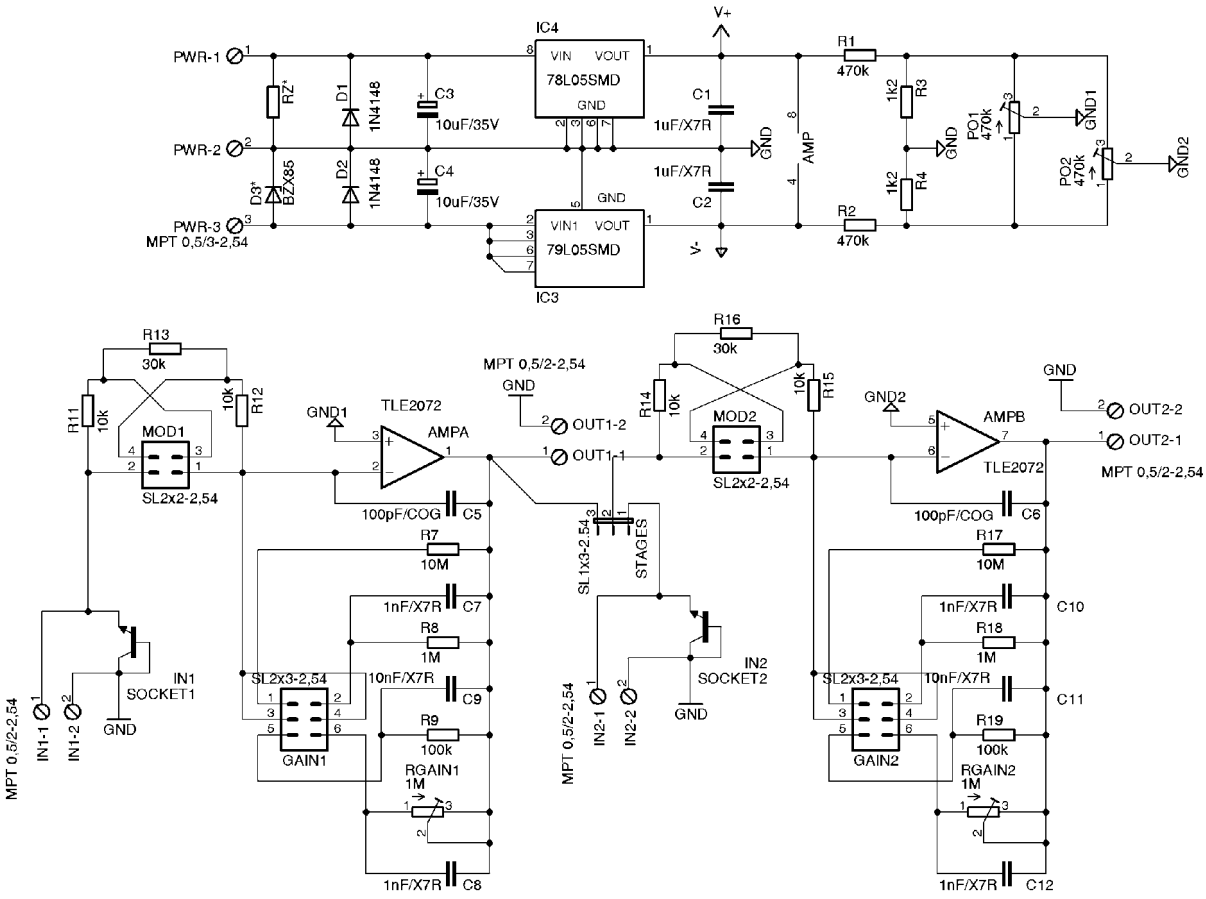
Table 1: pin, terminal and other assignments for single supply

	Pin 1	Pin 2	Pin 3	
PWR	+15 V … +36 V	open	Supply GND	The board GND is not referenced to the power supply GND
IN1	input terminal channel 1	GND		
SOCKET1	input socket channel 1	GND	GND	
OUT1	output terminal channel 1	GND		
PO1	offset compensation channel 1			
IN2	input terminal channel 2	GND		
SOCKET2	input socket channel 2	GND	GND	
OUT2	output terminal channel 2	GND		
PO2	offset compensation channel 2			

If a single supply is used add a zener diode (D3) with at least 7,5V zener voltage. The recommended zener voltage is half the single supply input voltage.

Appendix C

Schematic:



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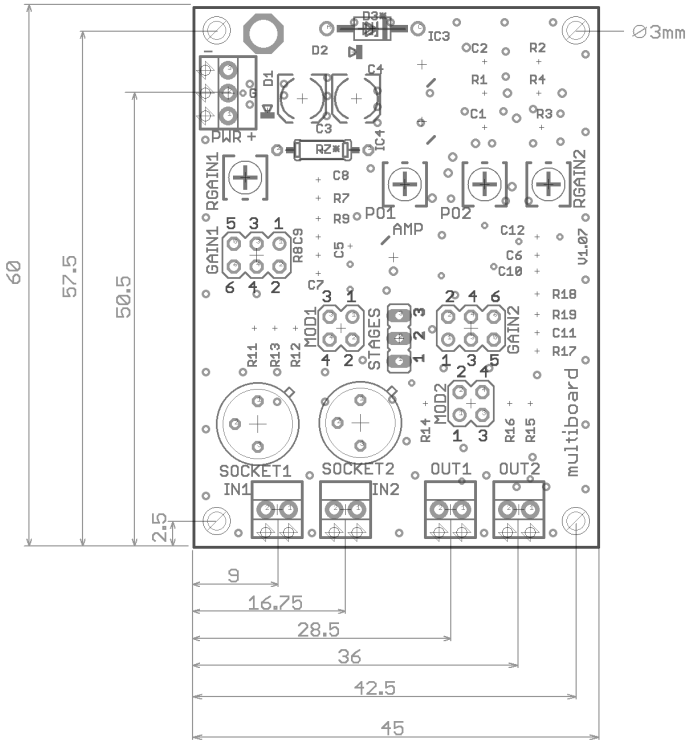
Appendix D

Dimensions:



Photodiode Amplifier Connect

Photocurrent amplifier with relay output

GENERAL FEATURES

Properties of the Photodiode Amplifier Connect

The Photodiode Amplifier Connect is a photocurrent amplifier with integrated relay output. The instrument is used for amplification of very low currents like they are generated by a photodiode. These currents are converted into a voltage between -5 V and 5 V. The amplifier has a potential free relay output with configurable threshold for switching of alarms, lamps or shutters. Three gains are chosable for conversion and measurement of photocurrents between 100 pA and 40 micro A.

The threshold and hysteresis settings can be done stepless via two control dials. The relay activation is additionally shown by a LED on the panel. The input signal is integrated via a BNC plug, the output voltage and the relay signal is read out via banana plugs.

The amplifier is primarily used in measurement laboratories and in experimental setups. All sglux photodiodes are available with BNC output and can be used with the amplifier. The devices comes with an 18 VDC external power supply.

FEATURE OVERVIEW

Measurement properties	One measurement signal, gain factors 10^5, 10^6 and 10^7 V/A; photocurrent input via BNC plugs
Output	Voltage -5 V ... 5 V and potential free relay output, both via banana plugs
Housing	Powder-coated aluminium housing with good EMC conditions, rubber feet
Accessories	Power supply
Optional accessories	Photodiodes from the sglux offer, integrated into a housing with BNC output

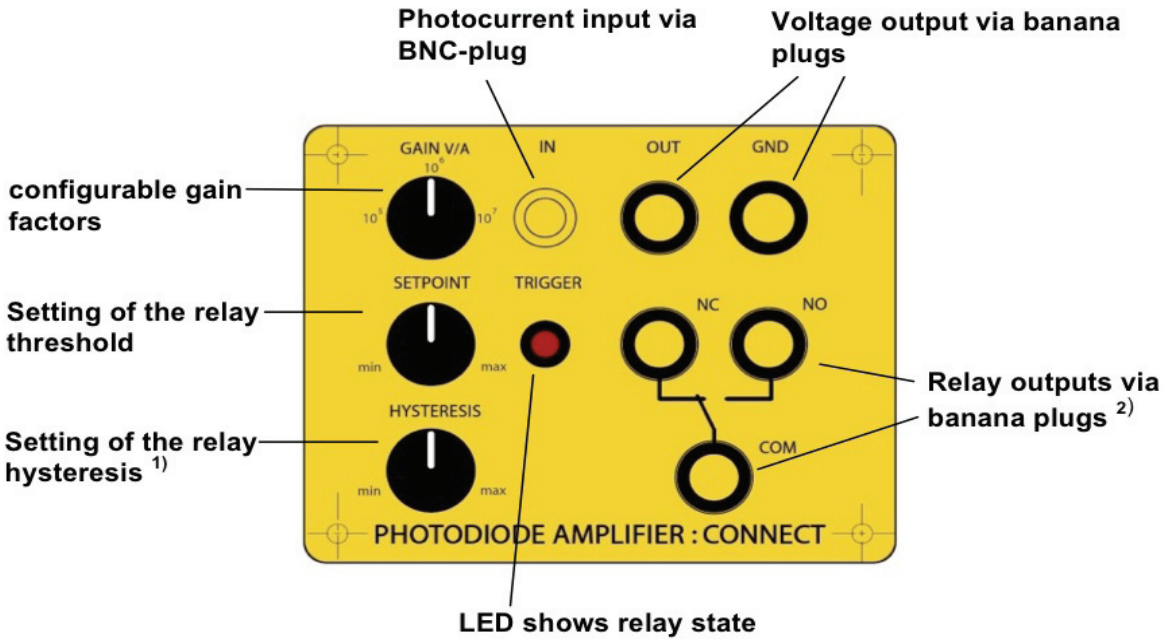
SPECIFICATIONS

Parameter	Value
Degree of protection	IP54
Operating temperature	-40 ... +80 °C
Storage temperature	-40 ... +85 °C
Power supply	5 ... 18 VDC
Power consumption (24V)	10 mA
Weight	0.54 kg

Photodiode Amplifier Connect

Photocurrent amplifier with relay output

OPERATION



1) The activation of the threshold hysteresis is necessary, if the measurement value is fluctuating around the threshold value and small variations should not activate the relay.

2) This is a potential free relay output. If connections NC (normally closed) and COM are used, the switching circuit is closed and will be opened by the relay activation. If connections NO (normally open) and COM are used, the switching circuit is open and will be closed by the relay activation.

Photodiode Amplifier Dual

Two channel photocurrent amplifier

GENERAL FEATURES

Properties of the Photodiode Amplifier Dual

The Photodiode Amplifier Dual is a two channel photocurrent amplifier. The instrument is used for amplification of low currents like they are generated by a photodiode. The output signal is a voltage between -5 V and 5 V. Both channels have 5 gain settings for amplification and measurement of photocurrents between 10 pA and 400 microA.

The amplifier combines approved metrology with a simple and comfortable manageability and robustness. The input signal is integrated via a BNC plug, the output voltage and the relay signal is read out via banana plugs.
The amplifier is primarily used in measurement laboratories and in experimental setups. All sglux photodiodes are available with BNC output and can be used with the amplifier. The devices comes with an 18 VDC external power supply.

FEATURE OVERVIEW

Measurement properties	Two measurement channels, gain factors 10^4, 10^5, 10^6, 10^7 and 10^8 V/A (other gain values on request); photocurrent input via BNC plugs
Output	Output signal -5 V ... 5 V via banana plugs
Housing	Powder-coated aluminium housing with good EMC conditions, rubber feet
Accessories	Power supply
Optional accessories	Photodiodes from the sglux offer, integrated into a housing with BNC output

SPECIFICATIONS

Parameter	Value
Degree of protection	IP54
Operating temperature	-40 ... +80 °C
Storage temperature	-40 ... +85 °C
Power supply	18 ... 24 VDC
Power consumption (24V)	10 mA
Weight	0.54 kg

RADIKON

Versatile radiation controller for industry and science

sglux
The UV Experts

Boston Electronics

GENERAL FEATURES

Properties of the RADIKON

The RADIKON is used to control the value generated by a detector (e.g. radiation sensor or a pressure sensor). If the detector value falls below a certain setpoint value a relay is activated where a valve, an alarm buzzer or other modules can be connected.
The highlight of the RADIKON is its high versatility making the module very interesting to industrial developers who need to match the controller with different imput signals.

The RADIKON can read the generic current of a photodiode (5nA < ISensor < 5µA) as well as 0...x Volt and 0(4)...20mA probe signals. The value x is user definable. The RADIKON outputs a voltage of 0...10V which can be used to attach a separate display or to connect the RADIKON with a PID controller. A multi-colour LED changes its colour with the radiation intensity level. All these features as well as easy set up and configuration make the RADIKON a perfect tool for developers or manufacturers of small series. For medium series controller modules with customized properties are offered.

SPECIFICATIONS

Input Values **Parameter**	**Value**
Generic sensor signal, e.g. photodiode current	0 to x nA x can be configured (with jumpers) to 50 nA, 150 nA, 500 nA, 1.5 µA and 5 µA, other values are possible by soldering an own feedback resistor
Voltage input	0 to x Volt x can be configured (with jumpers) to 50 mV, 142 mV, 450 mV, 1160 mV, 2500 mV and 10 V, other values are possible by soldering an own feedback resistor
Current input (current loop)	y to 20 mA y can be configured (with jumpers) to 0 mA or 4 mA
Adjustable setpoints	relay setpoint, multi colour LED
Other Properties	
Inputs	DC-isolated, EMC and EDS conform
Power supply	12 to 24 VDC

RADIKON

Versatile radiation controller for industry and science

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HOW TO SET UP

Using the potentiometers „SET POINT HIGH“ and „SET POINT LOW“ the setpoints for the value “good” = LED is green to value “critical” = LED is blue (SET POINT HIGH) and for the value “critical” to “too low” = LED is red (SET POINT LOW) can be adjusted. Please start with adjusting SET POINT LOW by creating an input value which equals to a signal which is quite between “critical” and “too low”. Turning right of the potentiometer shifts the setpoint towards lower signal level and turning left shifts it towards higher signal level. After turning the potentiometer the module needs 5 seconds to store the value. Now your RADIKON is ready to use. Additionally you may also adjust a setpoint for the value “good” to “critical”. This feature is particularily interesting if the decline of the signal intensity (e.g. the aging of a lamp) needs be be monitored before the signal is too low. To set the value the source, e.g. the lamp, needs to be adjusted at that point. Now, analogue to the above procedure the setpoint can be configured while turning the SET POINT HIGH potentiometer. The colour of the LED changes from green=good to blue=critical.

HOW TO USE

After powering on the RADIKON a 100ms selftest starts. Then the LED “POWER” is on and a 180 s warm up delay starts. During the warm up delay the LED “STATE” is on and the LED “RADIATION” is green. That means that during the first 180s each imput value is interpreted as “good”. This feature is important to avoid false alarms during warm up of the lamps to measure. If you need another warm up delay please inform is with your order. After the warm up delay the RADIKON is ready. If the imput value is OK the LED is green, is it critical the LED is blue and is it too low the LED is red and the relay changes its position. If zero imput is present (e.g. sensor failure) the LED blinks red. In case of overrange the LED blinks green.

POWER SUPPLY

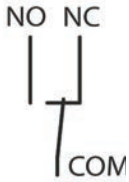
A power supply of 12-24VDC is required. Positive pole goes to terminal + and supply ground to terminal -.

OUTPUT CONNECTIONS

The response the RADIKON calculates based on the input value can be read using two different methods.

Relay Output

The free floating relay output is connected with the terminals "NO" and "COM" if the relay should be "normally open". If "normally closed" is needed please connect with "NC" and "COM".



0 - 10 V - output

This output is to be connected with the terminals "AO"and "-". You can use this output to connect a display or to use the 0-10V output as actual value input of a PID regulator.

RADIKON

Versatile radiation controller for industry and science

INPUT CONNECTIONS

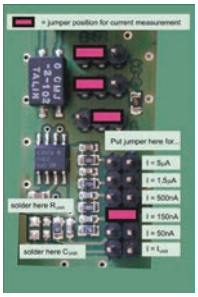
The RADIKON is able to read all common sensor outputs. Below the wiring for the different sensor outputs is explained:

Wiring of a Photodiode or another small current source

- Anode (+) to terminal PD+
- Cathode (-) to terminal PD-
- Shielding to terminal –
- please consider that cable length must be as short as possible

Configuration of the photodiode input

If you like to use the generic photodiode input at first you need to know about the typical current coming from your photodiode. The RADIKON works with currents from 50nA and 5µA. By default the unit is set to a typical current of 150nA. If your sensor gives another current please open the RADIKON's housing and remove the PCB. The picture at the right side shows the different jumper positions. If your current is below 50nA or above 5µA please set the jumper to „VAR" and solder a special 0804 SMD resistor calculated by the formula R_{VAR} = 5000/I, where R_{VAR} is given in MOhm, and I, the input current you need is given in nA. The value C_{VAR} calculates by C_{VAR}=0.1s/ R_{VAR}



Jumper positions for photodiode input

Wiring sensor voltage 0-10V:

- Anode (+) to terminal AI
- Cathode (-) to terminal –
- Bridge from + to F2

Configuration of the voltage input 0-10V:

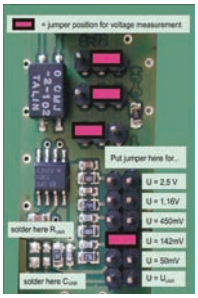
No configuration is needed. No jumpers must be moved.

Wiring sensor voltage 0-x V

- Anode (+) to terminal PD+
- Cathode (-) to terminal PD-

Configuration of the voltage input 0-xV:

The maximum value x ist the maximum voltage your sensor outputs. If this max. voltage is not 10V you need to configure another max. voltage with the jumpers as shown at the right side picture. You can select max. values x = 50mV, 142mV, 450mV, 1160mV or 2500mV. If your max. voltage is below 50mV or above 2.5V please set the jumper to „VAR" and solder a special 0804 SMD resistor calculated by the formula R_{VAR}= 5000/U, where R_{VAR} is given in MOhm, and U, the input voltage you need is given in mV. The value C_{VAR} calculates by C_{VAR}=0.1s/ R_{VAR}



Jumper positions for sensor voltage 0-x V input

Wiring sensor current 0-20mA:

- Anode (+) to terminal +
- Cathode (-) to terminal AI
- 500Ohm- Resistor from AI to – (included in the delivery)
- Bridge from + to F2

Configuration of the sensor current input 0-20mA:

No configuration is needed. No jumpers must be moved.

Wiring sensor current 4-20mA:

- Anode (+) to terminal +
- Cathode (-) to terminal AI
- 500 Ohm- Resistor from AI to –
- Bridge from + to F1

Configuration of the sensor current input 4-20mA:

No configuration is needed. No jumpers must be moved.

SENSOR MONITOR 5.0

Radiation monitor and controller

sglux
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GENERAL FEATURES

Properties of the Sensor Monitor 5.0 series

The Sensor Monitor 5.0 series are measurement and control modules for monitoring and automation of irradiation processes. They display radiation, dose and status information which is simultaneously provided via USB / RS232.

Three programmable relays allow an automated control of single- and multi-level irradiation processes.

The Sensor Monitor 5.0 is used as a radiation monitor or control module in disinfection, drying, hardening, biotechnology and in scientific research.

It is available with a NIST or PTB traceable calibration.

SPECIFICATIONS

Fixed Specifications **Parameter**	**Value**
Panel dimensions (L x W x H) (DIN 43700 - Uninorm)	144 mm x 86 mm x 72 mm
Weight	140 g
Cut-out at control cabinet (L x W)	137 mm x 67 mm
Degree of protection	IP40
Operating temperature	0 ... +70°C
Storage temperature	-25 ... +85°C
Power supply	12 ... 24 V_{DC}
Power consumption at 24 V_{DC}	0.4 W

Configurable Specifications **Parameter**	**Value**
Number of probe inputs	1 or 2
Data output	none or USB / RS232
Number of relay outputs	3

MODEL OVERVIEW

Sensor Monitor 5.0 Classic	One channel, no data output
Sensor Monitor 5.0 Connect	One channel, USB / RS232 data output
Sensor Monitor 5.0 Double	Two channels, no data output
Sensor Monitor 5.0 Double Connect	Two channels, USB / RS232 data output

SENSOR MONITOR 5.0

Radiation monitor and controller

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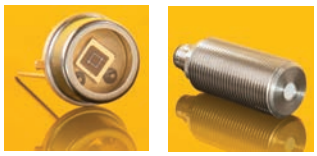
CONNECTIONS AND OUTPUTS

Sensor input



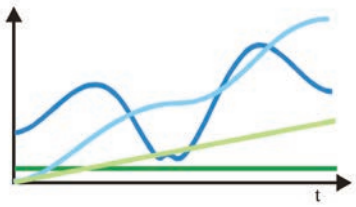
The input terminal can be connected to amplified probes with voltage output or photodiodes.

Visualization of values and state

Each row of the user configurable illuminated display shows the following information:

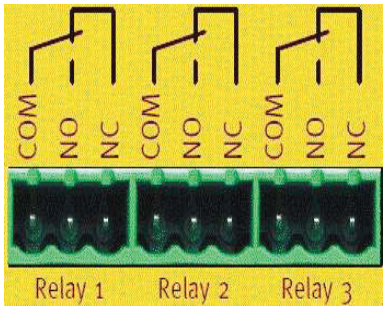
- Radiation or dose (in selectable units) and relay state
- Error messages like overrange

Data output



If the option *Connect* is selected the measurement data can be read out via USB or RS232 to a PC or PLC. The transfer is done with a CSV file which can be analyzed with a typical software like Origin or Excel.

Relay functions



Three potential-free relays can be used for process control.

- Activation when excessing or failing below a threshold intensity or reaching an irradiation dose (lamp switch and/or alarm).
- Logic combination, control of transport processes, switch conditions depending on dose, intensity and relative lamp output.

SENSOR MONITOR 5.0

Radiation monitor and controller

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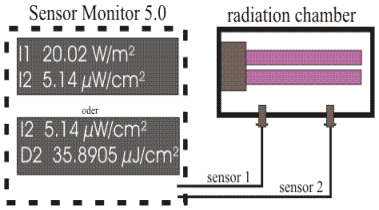
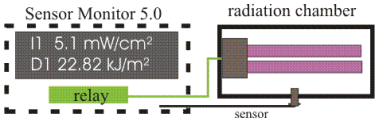
BASIC FUNCTIONS

Radiation measurement



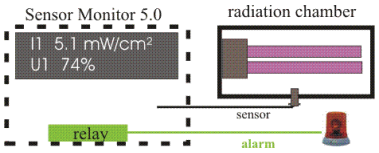
Parallel measurements of two lamp outputs or radiation parts of one lamp can be realized (e.g. UVA and UVB). In the first display example the intensity I1 at sensor 1 and the intensity I2 at sensor 2 is displayed. The second picture shows intensity and dose (time integration of the intensity). If the data port is activated the complete relevant information (intensities, doses, error messages and state of relays and dose measurements) is transferred to a PC.

Measurement and lamp control



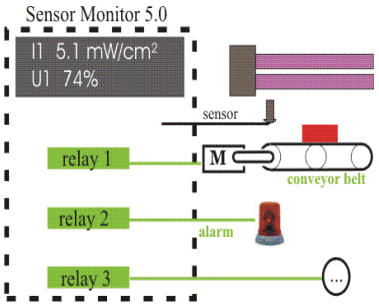
At excessing or failing below a configurable intensity threshold or reaching an irradiation dose the lamp can be switched off or changed over to another lamp.

Measurement and alarm



In the example an alarm is given if the percentaged lamp power falls below a configurable threshold. Further two relays can be used for other functions (switching of pumps, shutters, etc.).

Transport control of irradiated goods



Measurement of the dose at irradiated goods and activation of the belt transport. The hold times of the relays are variable therefore the transport distance can be adjusted with the hold time. In the example a second relay is giving an alarm if the intensity falls below the threshold. The third relay can be used for information from a second sensor or for a logic combination with one of the other relays (e.g. transport if dose threshold is exceeded and intensity is higher than a minimum value at the same time).

SENSOR MONITOR 5.0

Radiation monitor and controller

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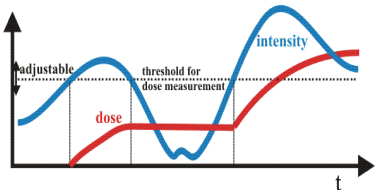
ADVANCED USE IN PROCESS AUTOMATION

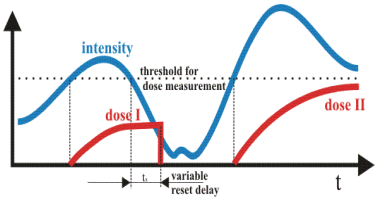
Automated dose measurement

The measurement of irradiation doses can be done manually or subjected to automation conditions.

In the first example the dose measurement is started at exceeding a critical intensity. If the intensity falls below the threshold the integration is interrupted and the dose stays constant. While exceeding the threshold again, the integration is continued.



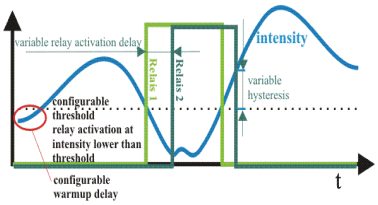
In the second example the dose measurement is finish with falling under the intensity threshold. The reset delay keeps the value on the display. At exceeding of the threshold a new dose is generated. The generation of single doses is used if the dose stop condition is activating a pump or a transport of a good (see below). For each irradiated good or segment a dose is calculated.



Relay configuration

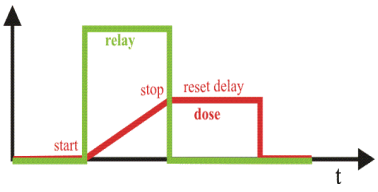
Three relays can be configured for controlling different functions activated by various configurable process conditions. In the simplest use the relays activate at falling under or exceeding a critical threshold of a selectable measure.

A warmup delay can be implemented to avoid false reports at the start-up process. Additionally it may be reasonable to ignore a short malfunction and only to consider a longer malfunction by using a relay activation delay. Hysteresis parameters can be set for values that are alternating around the threshold.



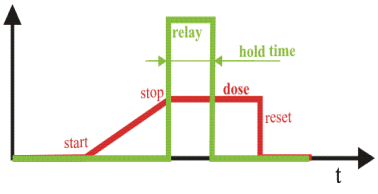
Dose measurement indication

Each relay can be associated with dose functions. Running dose measurements can be indicated by an activated relay. There is no difference if the dose measurement is operated manually or under automated conditions.



Dose limit indication

At the dose limit indication the relay is activated if the dose measurement is finished. With the hold time the time of the relay activation is set.



10W Single Output Industrial Power Supply

for sglux UV sensor probes

sglux The UV Experts

Boston Electronics

GENERAL FEATURES

Properties of the power supply

- Universal wide range AC/DC input
- Protections: short circuit / over load / over voltage
- Cooling by free air convection
- Direct assembly on DIN Rail TS-35/7.5 or 15, 22.5 mm width
- Built in DC OK active sginal, power-on LED
- No load power consumption < 0.75 W
- 100% full load burn-in test

TECHNICAL SPECIFICATIONS

Parameter	Value
Voltage Range	85 ... 264 V_{AC}, 120 ... 370 V_{DC}
Frequency Range	47 ... 63 Hz
Typical AC Current	0.33 A/115V_{AC} 0.21A/230V_{AC}
Operating Temperature	–20 ... +70°C
Working Humidity	20 ... 90% RH (non-condensing)
Dimensions	22.5 mm x 90 mm x 100 mm (WxHxD)

MODEL		MDR-10-12	MDR-10-24
OUTPUT	DC Voltage	12 V	24 V
	Rated Current	0.84 A	0.42 A
	Rated Power	10W	10 W
	Ripple & Noise (max.)	120 mV_{p-p}	150 mV_{p-p}
	Voltage Tolerance	± 3.0 %	± 2.0 %
	Line / Load Regulation	± 1.0 % / ± 3.0 %	± 1.0 % / ± 2.0 %
EMC & Others	EMC Emission	Compliance to EN55011, 55022 (CISPR22), EN61204-3 Class B, EN61000-3-2,-3	
	EMC Immunity	Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55024, EN61000-6-1, EN61204-3, light industry level, criteria A	
	MTBF	584K hrs min. MIL-HDBK-217F (25°C)	

For further information please see manufacturers datasheet Meanwell MDR-10 series.

UV Control Pad

Windows based Radiometer/Datalogger software for use with the sglux digital UV sensors

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GENERAL FEATURES

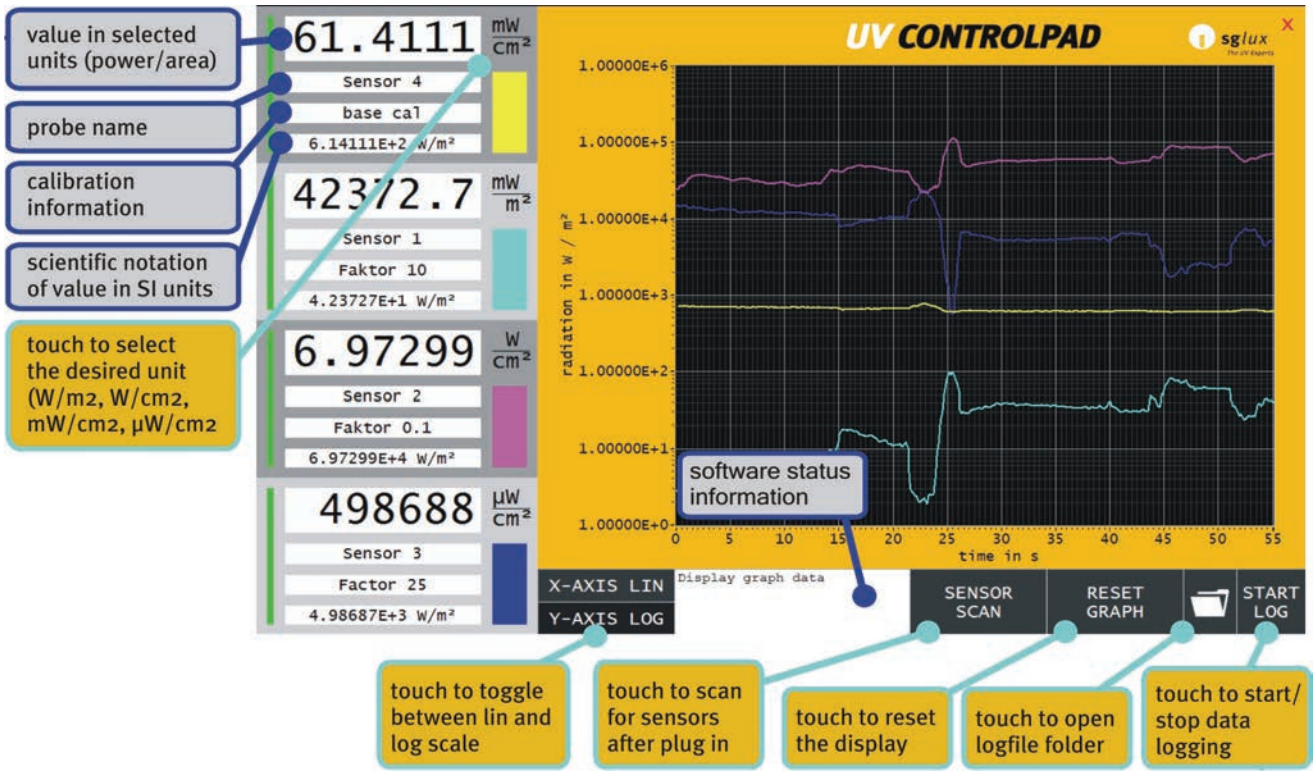
Properties of the UV Control Pad

The UV Control Pad is a Windows based Radiometer/Datalogger free software for use with the sglux digital sensors. This software displays and logs the data acquired of up to four digital UV sensors. The tool can be used with many Windows tablet computers, notebooks or PCs. A ready to use 10'' tablet computer with pre-installed software and a stand (based on a TREKSTOR wintron 10.1) is available.

GETTING STARTED

Connect the sensors to the DIGIBOX and connect the DIGIBOX via USB to the computer. Then push the power button for 3 seconds and let the computer boot and start the software.

HOW TO USE THE UV CONTROL PAD



UV Control Pad

Windows based Radiometer/Datalogger software for use with the sglux digital UV sensors

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HOW TO ACCESS THE LOGGING DATA

When the logging function is activated a green light on the log button is flashing and the UV Control Pad writes the logging information on the memory card (Drive D:/). After finishing of the logging session (touch the STOP LOG button) accessing to the logfiles is e.g. possible by touching the folder icon (bottom right of the display). The logfile is a CSV-file. The logfile's content can be displayed by double click at the file name. The data export to another computer can be done using a USB memory stick (remove the DIGIBOX plug before). After inserting the stick an Explorer window opens and the logfile can dragged to the memory stick. Alternatively a WIFI connection (via shared folder) allows a wireless data transfer to another computer. Please note that the UV Control Pad is a software for life viewing and logging only. Sensor configuration requires the software "DigiLog" distributed with a digital UV sensor.

STRUCTURE OF THE LOG FILE

	A	B	C	D	E
1	[HEADER]				
2	Computername	Program_ID	Username	Interface_name	Log_start
3	WINTAB002	UV Control Pad [Rev. 0]	Steve	ED000221	2015-12-02T16:23:45
4					
5					
6					
7	[NODE_ID_001]				
8	Nodename	Nodealias	GUID	UID	FW
9	UVC-DVGW-01	WOTANone	F3423232	3163	02.00.02
12					
13	Current Offset	Current Factor	Current Avg.	Temp. Offset	Temp. Factor
14	1,28E+09	1,443E+01	0	1,70E+10	4,010000E+07
15					
16					
17					
18	Calset Max	Calset Active	Calset Name	Calset Value	
19	1	1	basecalib	1	
20					
21					
22	[DATA]				
23	Sys_date_and_time	Raw_time	Id	Type	Si_value
24	2015-12-02T16:23:45,18	81260	1	55	2,434200E-01
25	2015-12-02T16:23:45,33	81338	1	55	2,435300E-01
26	2015-12-02T16:23:45,48	81416	1	55	2,435300E-01
27	2015-12-02T16:23:45,48	81602	1	55	2,435500E-01
28	2015-12-02T16:23:45,53	81682	1	55	2,435600E-01
29	2015-12-02T16:23:45,64	81760	1	55	2,435800E-01
30	2015-12-02T16:23:45,80	81852	1	55	2,436100E-01
31	2015-12-02T16:23:45,94	82063	1	55	2,436000E-01
32	2015-12-02T16:23:46,02	82142	1	55	2,435800E-01
33	2015-12-02T16:23:46,25	82239	1	55	2,435900E-01
34	2015-12-02T16:23:46,33	82318	1	55	2,435700E-01
35	2015-12-02T16:23:46,40	82396	1	55	2,435800E-01
36	2015-12-02T16:23:46,56	82625	1	55	2,435900E-01
37	2015-12-02T16:23:46,64	82704	1	55	2,436000E-01
38	2015-12-02T16:23:46,87	83016	1	55	2,435500E-01
39	2015-12-02T16:23:46,87	83018	1	6	2,530000E+01
40	2015-12-02T16:23:46,95	83098	1	55	2,434900E-01

UV Microlog

UV datalogger for science and production monitoring

sglux
The UV Experts
Boston Electronics

GENERAL FEATURES

Properties of the UV Microlog

The UV Microlog is a datalogger to log ultraviolet and/or visible light information obtained by one sensor. Additionally, the instrument can be equipped with internal sensors to measure pressure, acceleration, humidity and temperature.
The UV Microlog stores 2,000,000 parameters. The rechargeable battery allows up to 3 months of permanent measurement without battery charging.

Sensor selection

The applications of a UV and/or VIS datalogger are quite varied and therefore the required sensitivity, environmental endurance, spectral response and field of view must be tailored for individual conditions of use. We configure each UV Microlog according to the application's specific requirement such as logging of very low UV radiation in a museum, logging of sun radiation (UVA, Erythema, visible) or logging of radiation intensity and dose during a curing process. Our calibration laboratory is happy to do a traceable calibration of the UV Microlog.

SPECIFICATIONS

Fixed Specifications **Parameter**	**Value**
Dimensions (L x W x H)	59 mm x 22(33) mm x 16 mm
Weight	40 g
Operating Temperature	-15 ... +65°C
Storage Temperature	-20 ... +70°C
Capacity Lithium-polymer Battery	170 mAh
Data Storage	2 000 000 parameters
Number of UV/VIS detectors	1
Interface	USB
Min. Storage Rate UV/VIS Intensity	2 per day
Max. Storage Rate UV/VIS Intensity	50 per second

UV Microlog

UV datalogger for science and production monitoring

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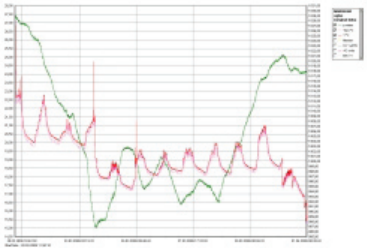
OPTIONAL INTERNAL SENSORS

The UV Microlog can be equipped with further internal sensors (in addition to one or two external sensors):

* External Temperature
* Relative Humidity
* Pressure
* Acceleration (3-Axis)

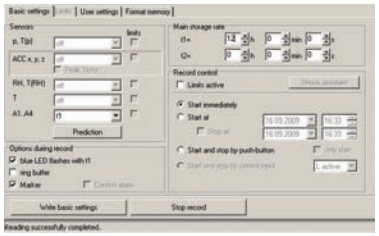
Measure	**Working Range**	**Accuracy**
Internal Temperature	-10°C ... +58°C	+/-0.1°C (+5°C ... +45°C) +/-0.2°C (-10°C ... +58°C)
Relative Humidity	0 ... 100% rel. hum. (-20°C ... +65°C)	+/-2% rel. hum. (10...85% rel. hum., 0°C ...+40°C) +/-4% rel. hum. (85...95% rel. hum., 0°C ... +40°C)
Pressure	0 ... 2500 mbar abs.	+/-2.5 mbar (750 ... 1100 mbar absolute)
Acceleration (3-Axis)	+/-10 G / +/-2 G sel.	+/-0.15 g (25°C)

SOFTWARE (*for download at www.download.sglux.de/dataloggers/)*



Using the software *Setup* the user customizes the properties of the UV Microlog. With the software *Reader* the USB data transfer ist started. The *Viewer* is used for graphical displaying. The data can be exported as a csv file for analyzing in standard software like Excel or Origin. The software *Online* is displaying online measurements.

LOGGING FEATURES



- Record limits can be set for all used sensors.
- Measurements can be started via a connected computer (date and time for the start can be chosen).
- Prediction feature calculates memory and battery capacity for the chosen measurement rates.
- For monitoring of sensitive transport goods a shock measurement can be activated (if acceleration sensor is equipped). Therefore a threshold can be chosen. Every acceleration above this threshold is recorded. The mixing gravitational acceleration is not taken into account.

UV Minilog

UV datalogger for science and production monitoring

sglux
The UV Experts

Boston Electronics

GENERAL FEATURES

Properties of the UV Minilog

The UV Minilog is a datalogger to log ultraviolet and/or visible light information obtained by one or two sensors. Additionally, the instrument can be equipped with internal sensors to measure pressure, acceleration, humidity and temperature. The UV Minilog stores 2,000,000 parameters. The rechargeable battery allows up to 18 months of permanent measurement without battery charging.

Sensor selection

The applications of a UV and/or VIS datalogger are quite varied and therefore the required sensitivity, environmental endurance, spectral response and field of view must be tailored for individual conditions of use. We configure each UV Minilog according to the application's specific requirement such as logging of very low UV radiation in a museum, logging of sun radiation (UVA, Erythema, visible) or logging of radiation intensity and dose during a curing process. Our calibration laboratory is happy to do a traceable calibration of the UV Minilog.

SPECIFICATIONS

Fixed Specifications **Parameter**	**Value**
Dimensions (L x W x H)	53 mm x (28.5) 43.5 mm x 29.5 mm
Weight	60 g
Operating Temperature	-15 ... +65°C
Storage Temperature	-20 ... +70°C
Capacity Lithium-polymer Battery	900 mAh
Data Storage	2 000 000 parameters
Number of UV/VIS detectors	1 or 2
Interface	USB
Min. Storage Rate UV/VIS Intensity	2 per day
Max. Storage Rate UV/VIS Intensity	50 per second

UV Minilog

UV datalogger for science and production monitoring

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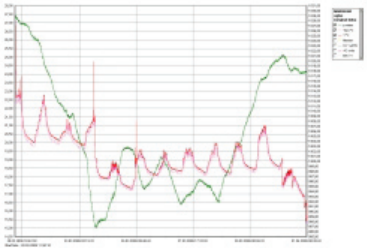
OPTIONAL INTERNAL SENSORS

The UV Minilog can be equipped with further internal sensors (in addition to one or two external sensors):

* External Temperature
* Relative Humidity
* Pressure
* Acceleration (3-Axis)

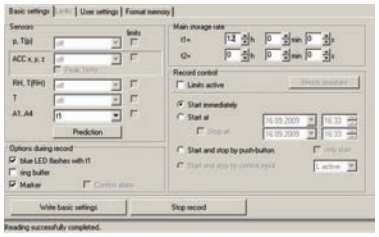
Measure	**Working Range**	**Accuracy**
Internal Temperature	-10°C ... +58°C	+/-0.1°C (+5°C ... +45°C) +/-0.2°C (-10°C ... +58°C)
Relative Humidity	0 ... 100% rel. hum. (-20°C ... +65°C)	+/-2% rel. hum. (10...85% rel. hum., 0°C ...+40°C) +/-4% rel. hum. (85...95% rel. hum., 0°C ... +40°C)
Pressure	0 ... 2500 mbar abs.	+/-2.5 mbar (750 ... 1100 mbar absolute)
Acceleration (3-Axis)	+/-10 G / +/-2 G sel.	+/-0.15 g (25°C)

SOFTWARE (*for download at www.download.sglux.de/dataloggers/)*



Using the software *Setup* the user customizes the properties of the UV Minilog. With the software *Reader* the USB data transfer ist started. The *Viewer* is used for graphical displaying. The data can be exported as a csv file for analyzing in standard software like Excel or Origin. The software *Online* is displaying online measurements.

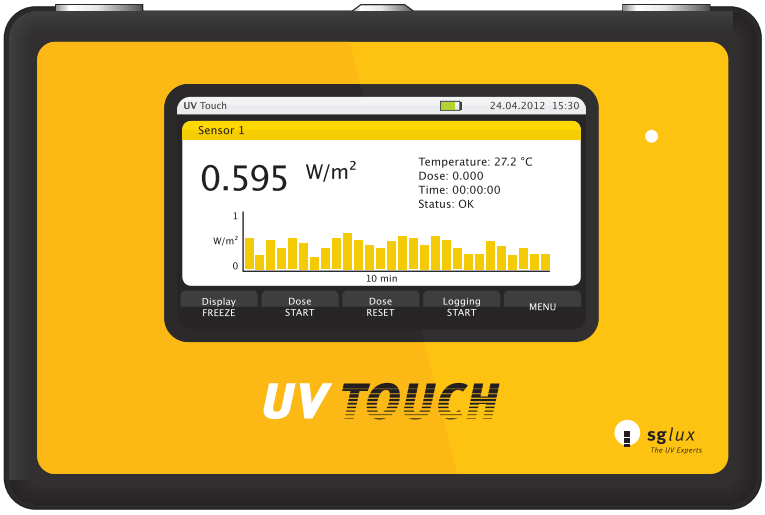
LOGGING FEATURES



- Record limits can be set for all used sensors. If a signal is exceeding a limit the red LED is flashing (on request).
- Measurements can be started via a connected computer (date and time for the start can be chosen) or manually by a push-button (on request).
- The push-button can be used as a marker to mark special events in the recording.
- Prediction feature calculates memory and battery capacity for the chosen measurement rates.
- For monitoring of sensitive transport goods a shock measurement can be activated (if acceleration sensor is equipped). Therefore a threshold can be chosen. Every acceleration above this threshold is recorded. The mixing gravitational acceleration is not taken into account.

UV TOUCH High Precision Touch Control UV Radiometer, Dosimeter & Datalogger

Hold the world of UV radiation in your hand. Radiation hard SiC detectors guarantee reliable values for years.
Modern CAN based signal conversion offers a large dynamic range.
The intuitive full touch screen control makes working a pure pleasure.



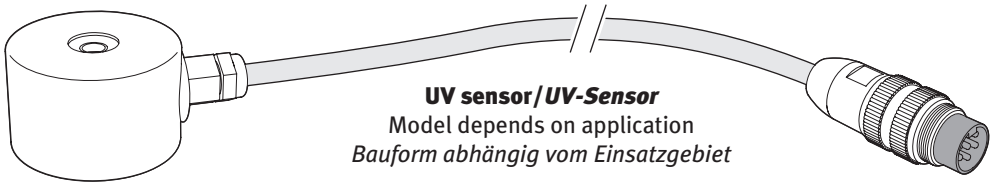
SiC Photodetector
guarantees radiation hardness

CAN bus signal processing
offers a large dynamic range

Intuitive touch screen control
makes working a pleasure

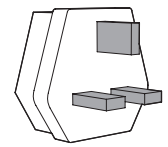
*Halten Sie die Welt der UV-Strahlung in Ihrer Hand. Strahlungsharte SiC-Detektoren garantieren zuverlässige Werte im Mess-Alltag. Hochmoderne CAN-basierte Übertragungstechnologie sichert einen großen Dynamikbereich. Eine intuitive Touch-Screen-Bedienung macht die Arbeit mit dem **UVTOUCH** zum Vergnügen.*

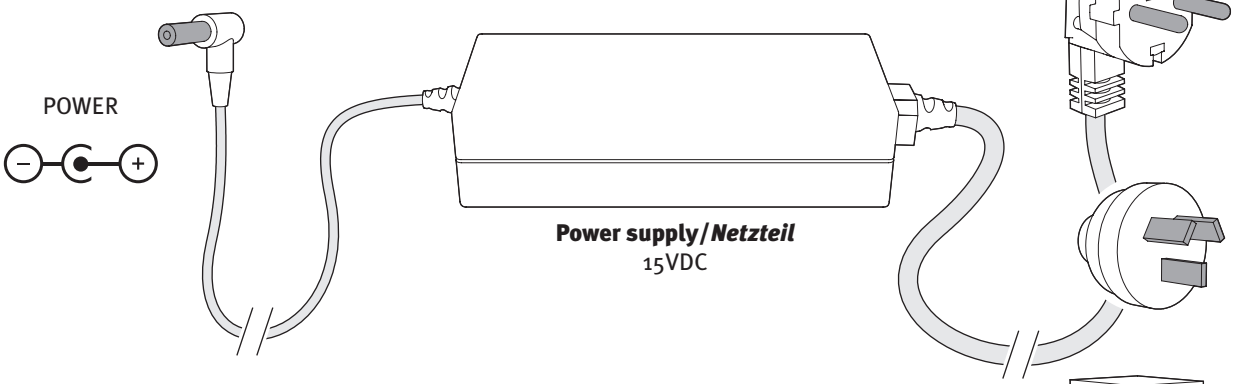
I. Components – *Komponenten*



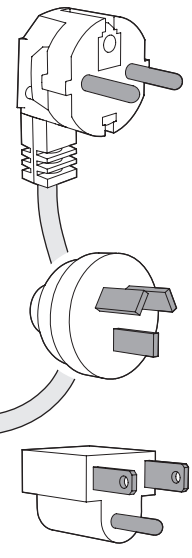
UV sensor/*UV-Sensor*
Model depends on application
Bauform abhängig vom Einsatzgebiet

(Sensor not included. Please order a customized digital probe and calibration separately.)
(Sensor nicht enthalten. Bitte bestellen Sie den passenden Sensor separat.)

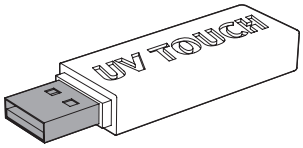




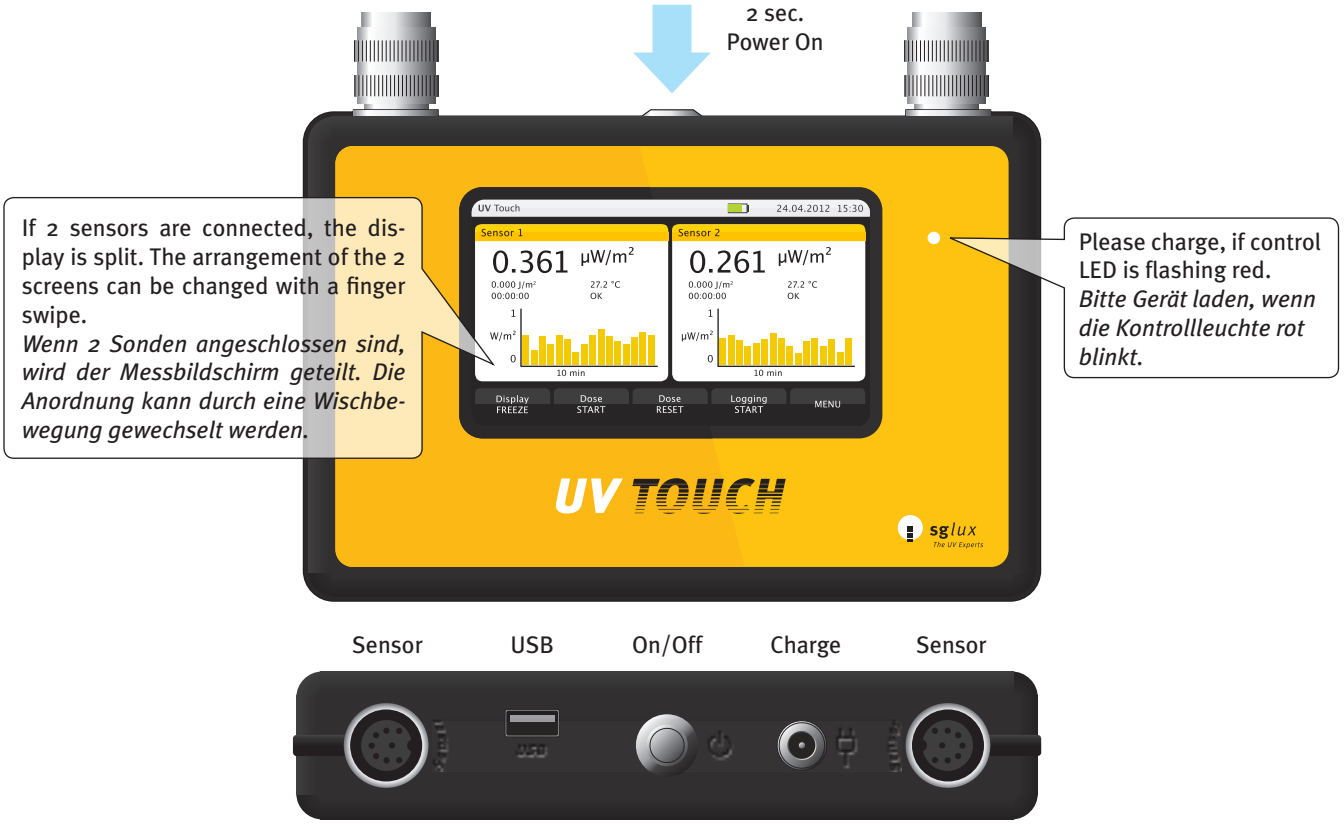
Power supply/*Netzteil*
15VDC



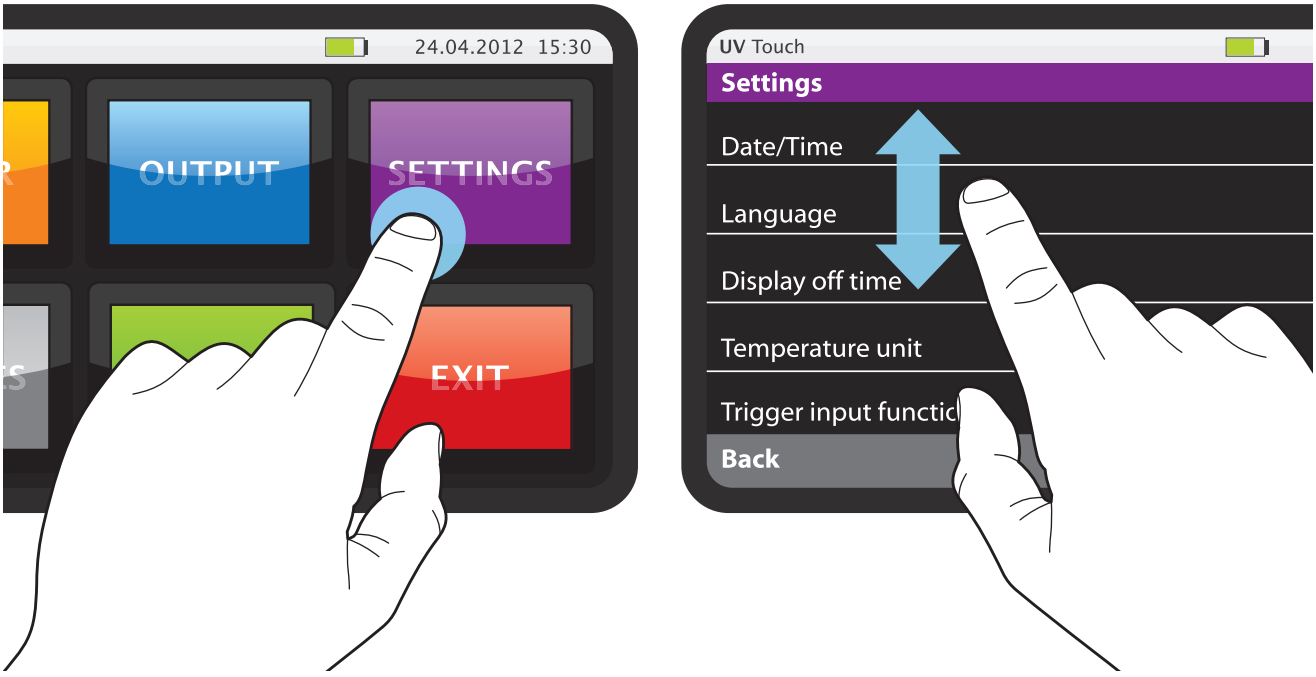
4GB USB flashdrive/*4GB USB-Stick*
For transfer of log files and installation of firmware updates
Zur Übertragung von Loggingdaten und Installation von Firmware-updates



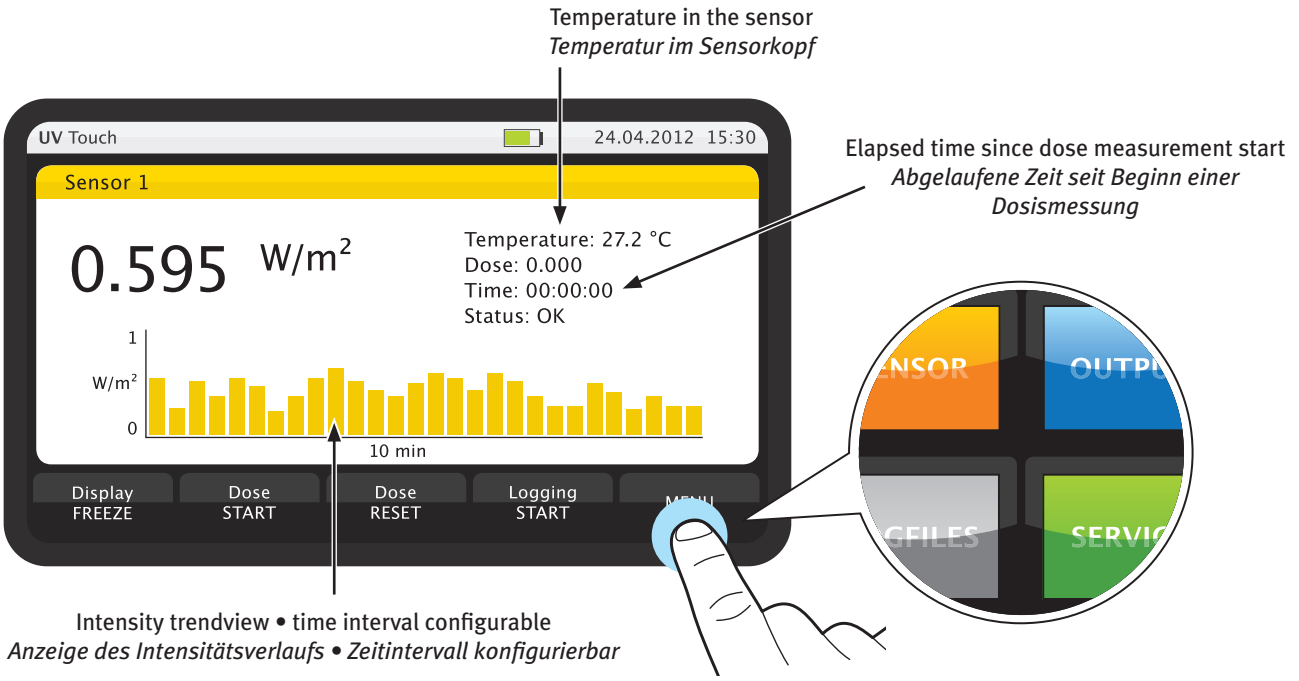
II. Getting started – *Inbetriebnahme*



III. Handling – *Handhabung*



Main screen and menus – *Hauptbildschirm und Menus*



Setting of irradiation and area units, determination of sensor names

Einstellung von Einheiten der Bestrahlungsstärke und Bezugsfläche, Vergabe von Sensornamen

Configuration of switch outputs: Setting of thresholds, optional hysteresis and related measured output

Konfiguration der Schaltausgänge; Einstellung, auf welche Messgröße sich das Schaltsignal bezieht; Einstellung des Schwellwertes und einer möglichen Hysterese

Basic settings: date, time, language, temperature unit, logging interval, external control, configuration of the trend view length

Basiseinstellungen des Handgerätes: Datum, Uhrzeit, Sprache, Temperatureinheit, Logging-Intervall, externe Ansteuerung, Konfiguration der Verlaufsanzeige-Länge

Manufacturer information, upload of firmware updates

Hersteller-Informationen, Aufspielen von Firmwareupdates

Editing of logfiles, logfile transfer to USB flash drive

Editieren von Logging-Daten und Übertragung auf USB-Stick

Exit to main screen

Zurück zum Hauptbildschirm

Technical data, service information – *Technische Daten, Kontaktinformationen*

Dimensions (W x H x D)/*Größe (B x H x T)*	175 x 117 x 37 mm
Weight/*Gewicht*	900 g
Operation temperature/*Betriebstemperatur*	0–50°C
Storage temperature/*Lagertemperatur*	-20–50°C
Supply voltage/*Betriebsspannung*	15 V
Power supply input voltage (multiplug consigned) *Betriebsspannung des Netzteils*	100–240VAC
Power consumption (standard conditions, battery fully charged) *Leistungsaufnahme im Normalbetrieb (Akku voll geladen)*	5 W
Power consumption while charging *Leistungsaufnahme während des Ladevorgangs*	28 W
Pressure/*Luftdruck*	300–1080 hPa
Rel. Humidity (non-condensing)/*Rel. Feuchte (nicht-kondensierend)*	< 70%
Battery lifetime (min.)/*Akkubetriebsdauer (min.)*	10 h
Calibration values/*Kalibrierwerte*	Stored in sensor/*Gespeichert im Messkopf*
Dynamic range/*Dynamikbereich*	> 5 Decades/> *5 Dekaden*
Power supply/*Stromversorgung*	Internal battery, power supply unit/ *Interner Akku, Netzteil*
Data storage/*Messwertspeicher*	> 11.000.000 Measurements/*Messungen*
Measurement range/*Messbereich*	s. Sensor
Display/*Display*	4,3“ TFT
Housing material/*Gehäusematerial*	Aluminium
Protection level/*Schutzklasse*	IP 62

Attention! While operating the UVTOUCH the following must be observed:
Do not expose the UVTOUCH to direct sunlight, intense heat radiation, or high electro-magnetic radiation. Please connect the UVTOUCH USB-port to a USB flashdrive only. Do not connect the USB port to a computer. Use the UVTOUCH with the provided power supply only.
While charging the ambient temperature must not exceed 40°C (104°F).

Achtung! *Bei der Benutzung des UVTOUCH Handheld ist folgendes zu beachten:*
Gerät keiner direkten Sonneneinstrahlung, keiner intensiven Wärmebestrahlung und keiner starken ektromagnetischen Strahlung aussetzen. USB-Anschluss am UVTOUCH ausschließlich mit einem USB-Stick verbinden. Nicht an einen Computer anschließen. Gerät nur mit dem mitgelieferten Netzteil betreiben. Beim Ladevorgang darf die Umgebungstemperatur höchstens 40°C betragen.

Accessories/*Zubehör:* **IO-Box**

Logic input for external UVTOUCH control/*Logik-Eingang zur externen Steuerung des UVTOUCH*
Relais output for switching external devices/*Relais-Ausgänge zur Schaltung externer Geräte*

CE RoHS IP 62

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VOLTCON series

Transmitter of photocurrent to 0 - 5 V signal

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GENERAL FEATURES

Properties of the VOLTCON

The VOLTCON converts a photocurrent into an output voltage between 0 and 5 V and can be connected to any PLC system.

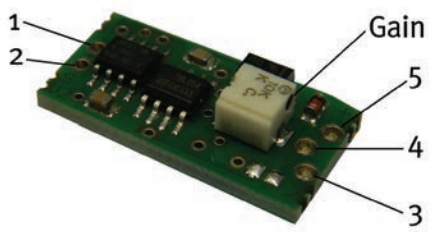
Three models with different measurement ranges are available. The amplification factor (gain) can be adjusted by a potentiometer. The measurement range can also be customized by replacing passive components (see description on page 2).

SPECIFICATIONS

Parameter	Value
Photocurrent measurement range	VOLTCON_low 500 µA
	VOLTCON_med 5 µA
	VOLTCON_high 50 nA
Supply voltage	7* ... 24 V (*usable down to 5V, but this is not recommended)
Gain adjustment range	± 35%
Dark output voltage	< 1 mV
Dimensions	13 x 26 x 8 mm (WxLxH)
Operating temperature	-20 ... +80 °C
Storage temperature	-40 ... +80 °C
Standards	RoHS 2 2011/65/EU, DIN IEC 60381-2

We strongly recommend to process this product on ESD protected workplaces.

CONNECTION



1 - Photodiode anode

2 - Photodiode cathode

3 - Signal output (connect to current input)

4 - GND power supply

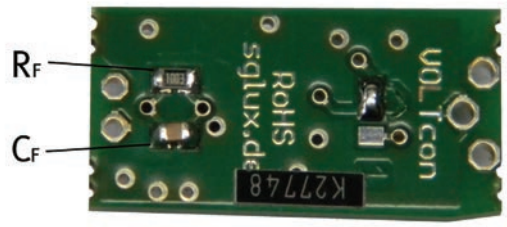
5 - V+ power supply

Gain - turn left to increase the gain

VOLTCON series

Transmitter of photocurrent to 0 - 5 V signal

CUSTOMIZATION OF MEASUREMENT RANGE



To modify the measurement range beyond the available adjustment range the feedback resistor R_f must be replaced. The adjustment range remains unaffected by this change. I_{max} is the designated maximum photocurrent to be measured.

$R_{f,new}$ (in MΩ) = 5 / I_{max} (in µA)

The capacitor C_f defines the time constant τ of the measurement and may need modification too. By default τ is 10 ms for all models. The required value of C_f can be calculated from $R_{f,new}$ and the intended time constant:

C_f (in nF) = τ_{new} (in ms) / $R_{f,new}$ (in MΩ)

Recommended values:

10 kΩ <= $R_{f,new}$ <= 3 GΩ and 1 ms <= τ <= 200 ms, $C_{f,new}$ >= 33 pF,

components package size 0805 (2.0 x 1.25 mm)

Default component values:

Model	**R_f**	**C_f**
VOLTCON_low	10 kΩ	1 µF
VOLTCON_med	1 MΩ	10 nF
VOLTCON_high	100 MΩ	100 pF

Reference Radiometer

RRM according to DVGW and ÖNORM

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GENERAL FEATURES

Properties of the Reference Radiometer

The Reference Radiometer RRM is designed to check and recalibrate duty sensors for water sterilisation systems according DVGW and ÖNORM. This mobile radiometer consists of a handheld unit with sensor type selection switch and two sensor heads. The sensors are built according to DVGW W294-3 and ÖNORM M5873. They are identical in construction with the duty sensors. The radiometer is calibrated to microbicidal weighted irradiance at λ = 254 nm against a PTB traceable standard. Medium pressure calibration can be done on request.

HAND-HELD DISPLAY DEVICE

- 20 / 200 / 2,000 / 20,000 W/m² ranges, selectable with rotary switch
- Display with 3 ½ digits
- Hold function: to be activated with main switch at left side of case (off - on - hold)
- Battery powered: 9V type 6F22 or similar, displays „Batt“ when battery runs down, battery has to be changed

Reference Radiometer

RRM according to DVGW and ÖNORM

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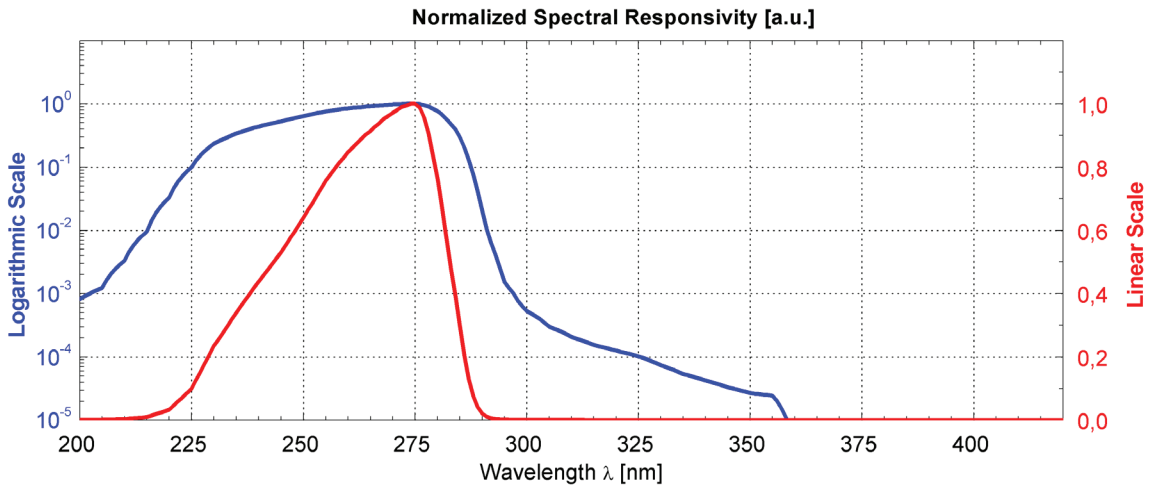
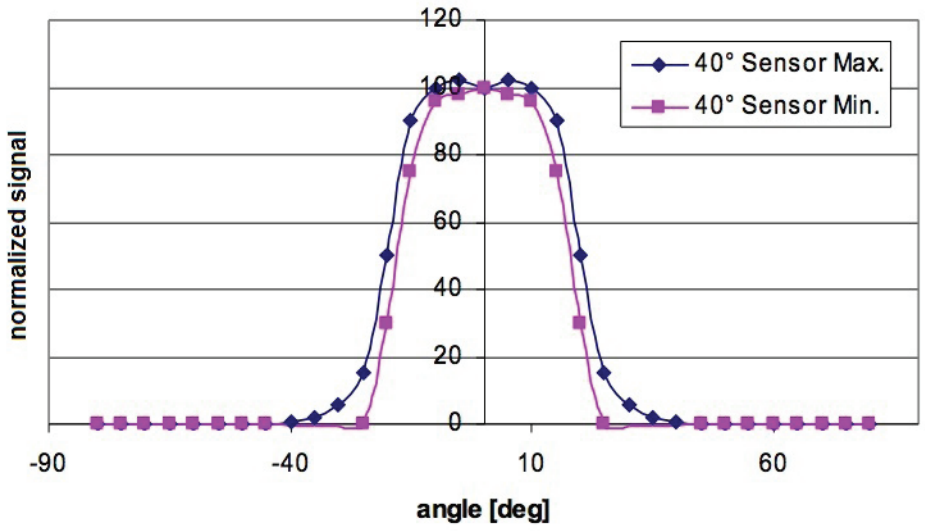
PLUG-IN SENSOR UNIT - according to DVGW W294-3

- Sensor with coaxial cable plugs into hand-held display device
- Range of sensed wavelength: 220 ... 290 nm, spectral sensitivity according to DVGW W294-3
- Wavelength of calibration: 254 nm
- Field of view: 40°
- Sensor: SiC-photodiode with filter





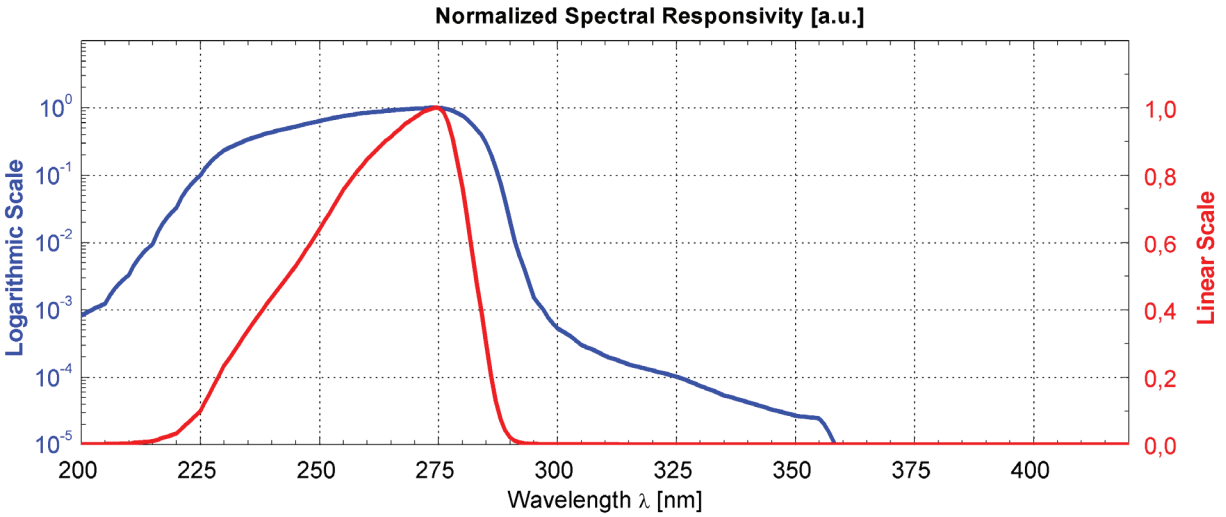
DVGW Sensor: sensor field of view

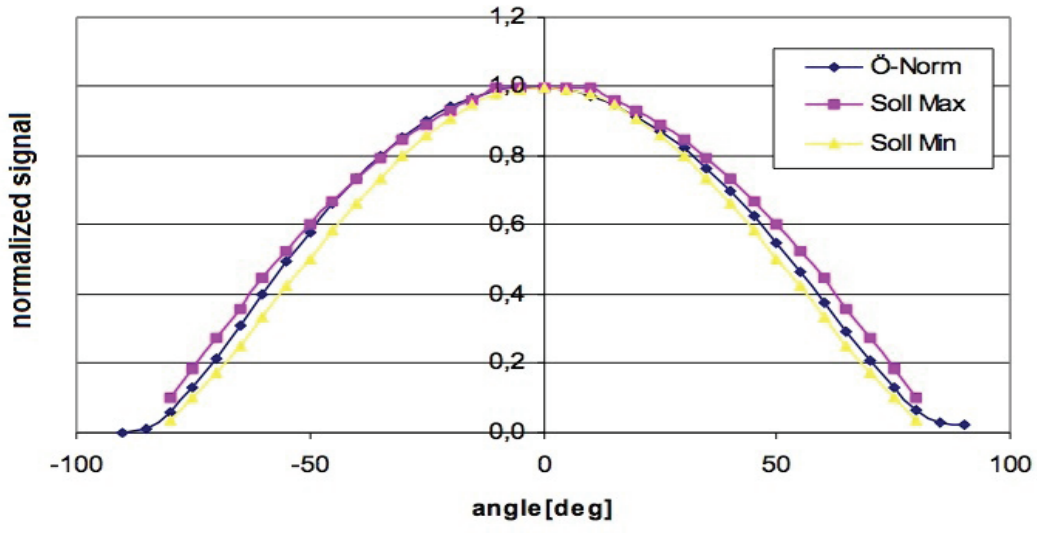
Reference Radiometer

RRM according to DVGW and ÖNORM

PLUG-IN SENSOR UNIT - according to ÖNORM 5873

- SiC-based sensor with coaxial cable plugs for hand-held display device
- Wavelength range: 220 ... 290 nm, spectral sensitivity according to ÖNORM 5873 / DVGW W294-3
- Wavelength of calibration: 254 nm
- Field of view: 160°





ÖNORM Sensor: sensor field of view

Reference Radiometer

RRM according to DVGW and ÖNORM

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CALIBRATION

- Radiation source: Hg-low-pressure, quasi-parallel radiation (using sufficient distance and screen)
- Calibration of sensor at 2 W/m² microbicidal weighted irradiation
- Calibration by substitution with PTB calibrated reference sensor
- Relative expanded uncertainty of measurement (k=2): 6%
- Re-calibration is recommended after 1 year.

OPERATING INSTRUCTIONS

Plug one of the sensor units into the hand held display device (coaxial connector) and select the corresponding sensor type with the left rotary switch (DVGW or ÖNORM). Please select the measurement range according to the expected measurement values using the rotary switch.
Note: In case of saturation, please select a higher measurement range (although the device will not be damaged if saturated).

Switch the device on (sliding switch, left side of case, middle position). The display shows the measurement value in the selected range. Please note that there can be a significant settling time until stable values are shown (up to 3 sec. in the 20 W/m² range). In this most sensitive range an offset error of ±2 digits is tolerable.

Using the sliding switch position “Hold” the current measurement value displayed will be shown until the sliding switch is put back into middle position.

Please switch the device off after use. **There is no timed automatic power down**.
In case of low battery voltage (below 2/3 U_{max}) the sign “Batt” appears in the display. Please change battery to avoid measurement errors. The device will power down automatically if the battery runs down further on. The lifetime of a new battery (alkali) is approximately 100 hours.

Please keep the sensor measurement window clean. If necessary clean it with a soft fabric.

UV Safester UVC

Instrument to detect harmful UVC radiation according to Directive 2006/25/EC

GENERAL FEATURES

Properties of the UV Safester UVC

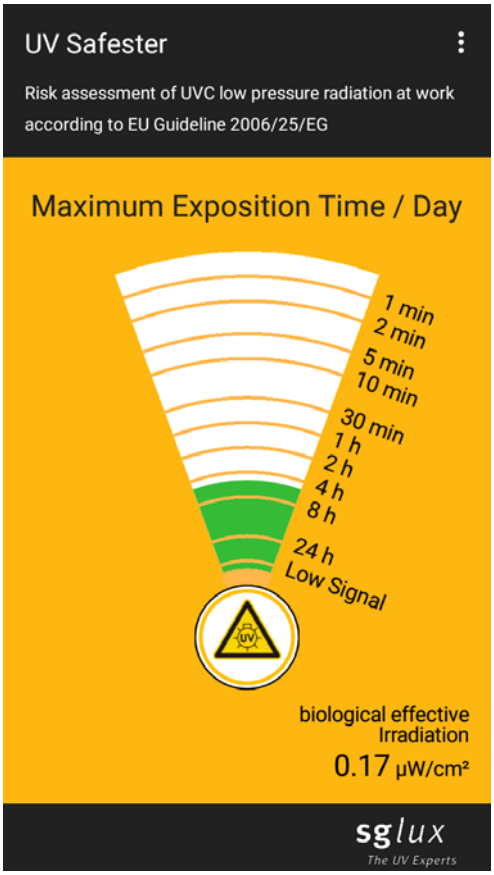
The UV Safester UVC is an instrument to detect harmful UVC radiation on working places according to the "Directive 2006/25/EC of the European Parliament and of the Council of 5 April 2006 on the minimum health and safety requirements regarding the exposure of workers to risks arising from UVC radiation."

The instrument measures and displays the maximum time a person can be exposed to a given UVC irradiation anticipating that this irradiation will not change over time. It consists of a calibrated UV sensor with calibration certificate, an Android smartphone, a battery charger and a case.

The instrument must not be used to detect other UV radiation sources than UVC low pressure tubes.

GETTING STARTED

Protect eyes and skin and switch on the UVC low pressure source. Please note that the UV Safester sensor also reacts to strong sunlight. Accordingly we recommend to avoid sunlight e.g. by closing a curtain, or doing the measurement when no sunlight is present (clouds, morning or evening time).



USING THE UV SAFESTER UVC

Connect the sensor to the smartphone's USB terminal and power on the smartphone. The app will start automatically. Point the sensor to a place where UVC radiation is suspected, move it and turn it, observe the display and enter the shortest exposition time displayed into your Risk Assessment Protocol.
In addition to the max. exposition time, the currently measured biologically effective irradiation according to TROS IOS / ICNIRP is displayed.

UV Safester UVC

Instrument to detect harmful UVC radiation according to Directive 2006/25/EC

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SCIENTIFIC BACKGROUND

Occurrence of harmful UV radiation

Harmful UV radiation is generated by UV light sources used in industrial processes such as curing or welding machines or end user devices such as UV sterilizers for air and water or ozone generators. In case of improper shielding some of these devices emit a radiation such strong that just a few seconds will irreversibly damage the human eye. During normal use these devices usually protect the operator from this radiation. However, defective or unsuited devices and devices in maintenance mode emit harmful UV radiation.

Functional Principle of the UV Safester UVC

The Directive 2006/25/EC defines a maximum daily dose of harmful artificial UV radiation with H_{eff} = 30 J/m². H_{eff} is defined by the following formula:

$$H_{eff} = \int_0^t \int_{\lambda = 180\ nm}^{\lambda = 400\ nm} E_\lambda(\lambda, t) \cdot S(\lambda) \cdot d\lambda \cdot dt$$

where:

t	time of exposure
λ	wavelength of UV irradiation between 180 nm an 400 nm
E_λ	spectral irradiance of the source
S_λ	spectral weighting taking into account the wavelength dependence of the health effects of UV radiation on eye and skin, (according to Table 1.2 of the Directive)

The UV Safester UVC works with a Silicon Carbide (SiC) UV photodiode combined with a filter to suppress the influence of the sun's UV radiation. The spectral responsivity of this photodiode is close to the wavelength dependence of the health effects of UV radiation, but it is not identical. Thus, the UV Safester UVC must not be used to measure other sources than low pressure UVC lamps.

The calibration of the sensor is done using a traceable UVC reference source. Please find further information in the Calibration Certificate that comes with the instrument.

Directive 2006/25/EC - artificial optical radiation

This Directive aims to improve the health and safety of workers by laying down limit values for exposures of workers to artificial optical radiation to eyes and skin. Exposure to natural optical radiation (sunlight) and its possible health consequences are not covered by the Directive. The Directive gives legal definitions on optical radiation, on wavelength ranges (visible, ultraviolet, infrared), on kinds of artificial optical radiation (laser radiation and non-coherent radiation), on exposure limit values whose compliance ensures the physical health of workers who are exposed to artificial optical radiation at work, and on parameters for measurement such as irradiation, radiance and radiant exposure. The employer is obliged to assess and to measure (and/or to calculate) the levels of exposure to artificial optical radiation to which workers are likely to be exposed.

UV Safester UVC

Instrument to detect harmful UVC radiation according to Directive 2006/25/EC

Further Information

The following links guide to a “Non-binding guide to good practice for implementing Directive 2006/25/EC” issued by the European Commission. We recommend to study this document carefully before using the UV Safester UVC.

ec.europa.eu/social/BlobServlet?docId=6790&langId=en (English language)
ec.europa.eu/social/BlobServlet?docId=6790&langId=fr (French language)
ec.europa.eu/social/BlobServlet?docId=6790&langId=es (Spanish language)

UV-Beam-Adjuster

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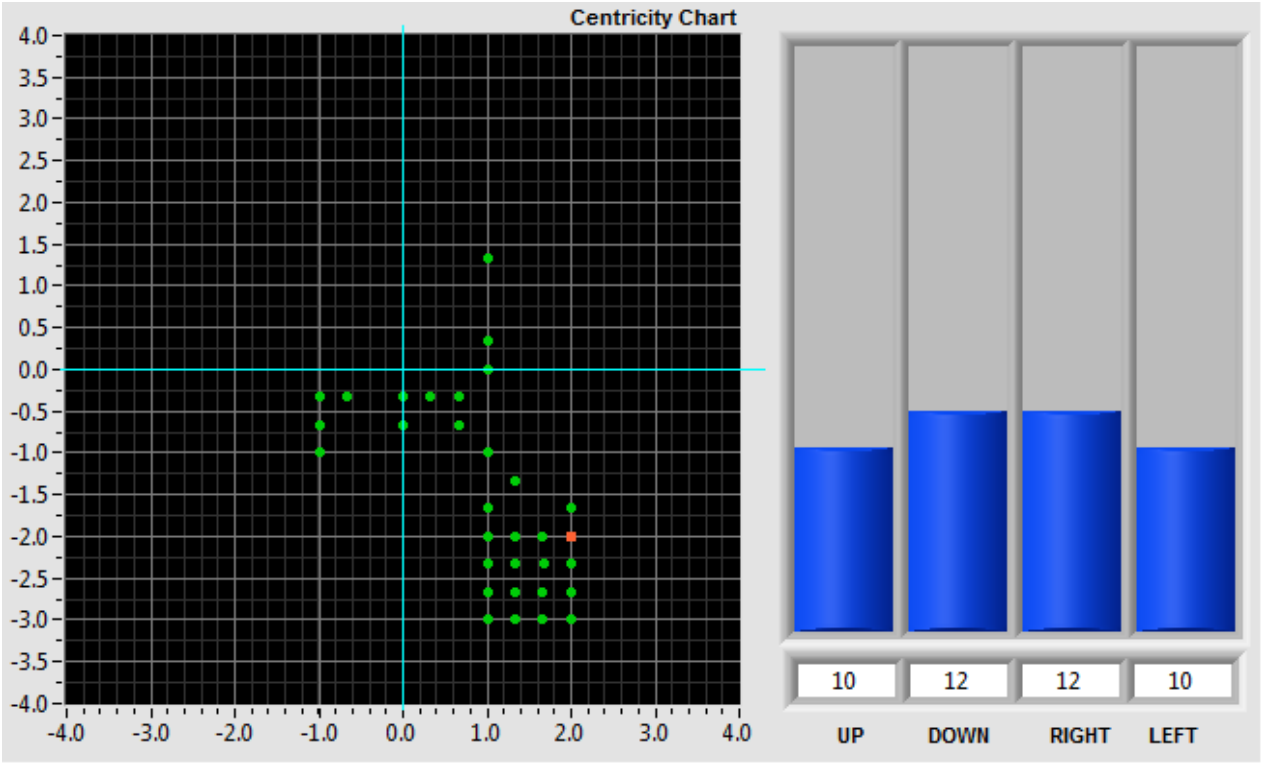
DESCRIPTION

The UV-Beam-Adjuster is designed to support the position adjustment of a UV beam such a LASER or a LED beam with a diameter from 50 µm up to 2 mm. It bases on a monolithic four quadrant Silicon Carbide photodiode chip. The unit comes with a housing with included electronics and a stand compatible to optical benches (14 mm diamter rod and M6 thread).

Data analysis is done with the sglux CONTROL PAD or alternatively using own hardware with consigned software. The below picture shows the most important part of the program screen. On the left side the software displays the actual position of the beam (red dot) and previous positions (green dots). The blue columns at the right side give the the total intensity on each specific segment of the detector.



UV-Beam -Adjuster

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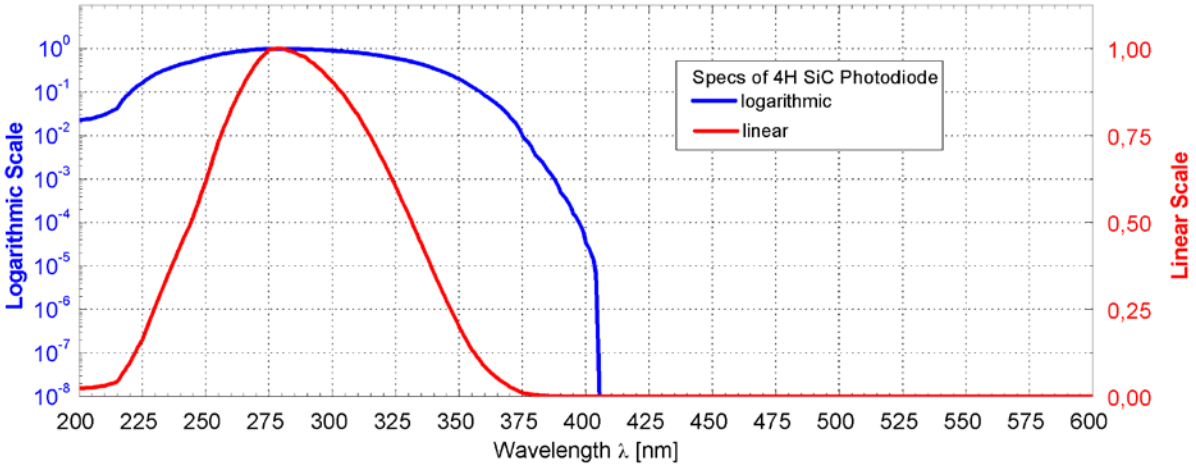
SPECIFICATIONS

Parameter	Value	Unit
Detector	SIC-4-quadrant photodiode	–
Total detector diameter	2.72	mm
Segenmt active area	1.4	mm^2
Separating strip	32	µm
Spectral range	221 ... 358	nm
Wavelength of max. spectral response	280	nm
Visible blindness	$> 10^{10}$	–
Beam diameter	0.05 ... 2	mm
Beam power	max. 4	mW/cm^2
Connection	USB 2.0	–
Current consumption, typical	100	mA
Dimensions	80x80x25	mm
Weight	250	g
Operating temperature, non-condensing	0 ... +65	°C
Operating system support	Microsoft Windows, XP, Vista, 7, 8, 8.1 in 32/64 Bit	–

NORMALIZED SPECTRAL RESPONSIVITY OF THE SENSOR



UV-Beam-Adjuster

MOUNTING AND CONNECTIONS

Mounting

The UV-Beam-Adjuster is equipped with M6 stud bold on the bottom face of the housing. In original condition we provide a 120 mm rod of 14 mm diameter which is compatible with most optical benches. This rod can be removed if other mounting is necessary.

Connection

The device contains an USB 2.0 Type B connector and a mating cable from USB-B to standard USB-A socket is provided on delivery.

SOFTWARE INSTALLATION

The provided software is compatible with Windows XP, Vista, 7, 8 both 32 and 64 Bit. Before connecting the device the first time to a computer, it is recommended to install the provided software. It can also be downloaded from our website at this address:

http://www.download.sglux.de/radiometers/beam-adjuster/

Please download the file named

uv-beam-adjuster_setup+rt*.exe

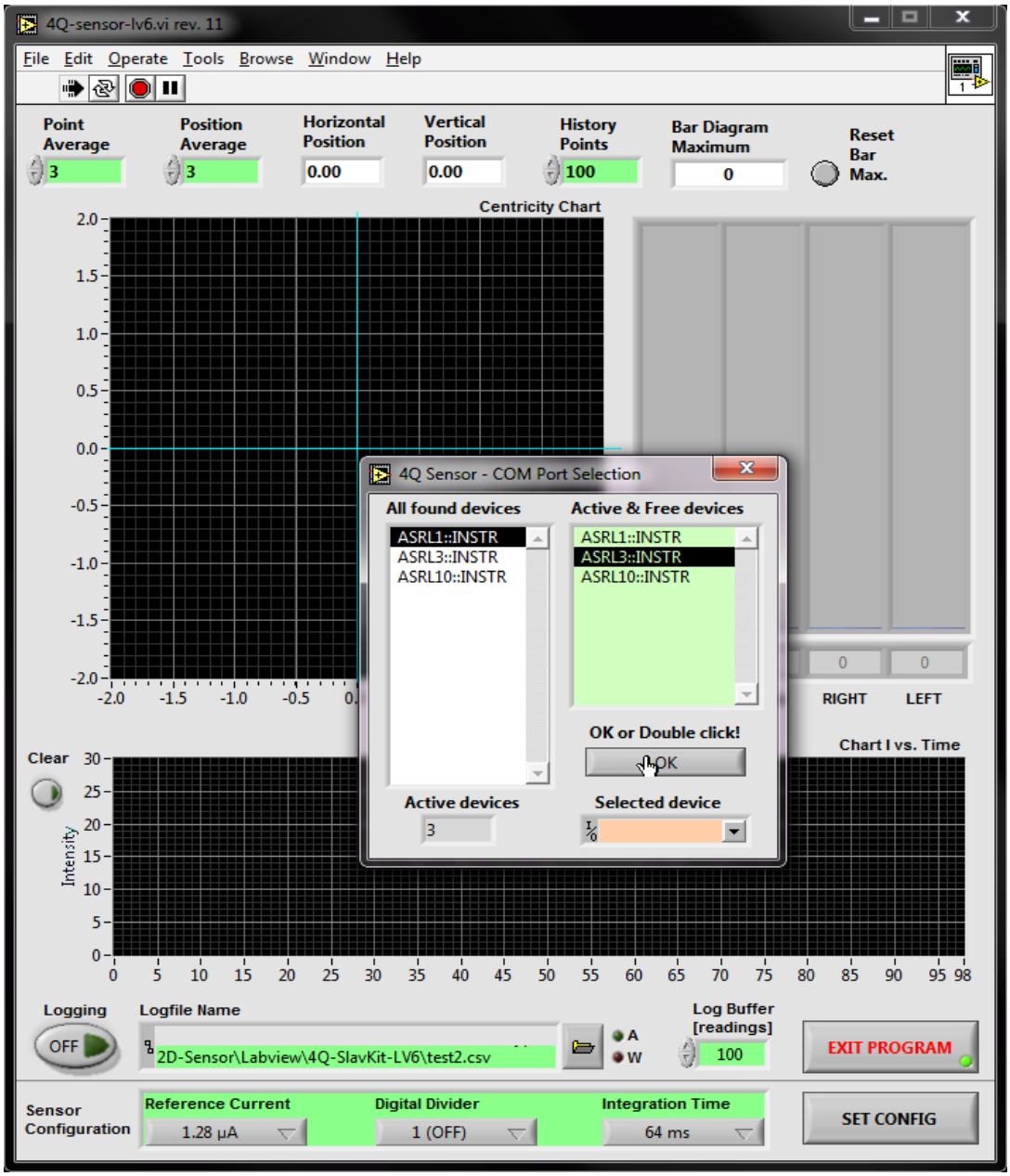
where * denotes the version number of the setup. It is recommended to download the highest number available. After download please make sure you have administrative rights. Execute the setup and use default options.
It is recommended to uninstall all previous versions of this program (but not the runtime and drivers!) before installing a newer revision.
Note: If the software is installed on a computer for the first time, it is required to execute the following steps at least once:
· Install the Labview runtime by selecting “Labview Runtime Installation” from the start menu folder “sglux\UV-Beam-Adjuster”
· Install the correct driver package matching the Bit-width of your operating system by selecting either “USB Driver 32-Bit setup” or “USB Driver 64-Bit setup” from the start menu folder “sglux\UV-Beam-Adjuster”

UV-Beam-Adjuster

OPERATION

Start up

Before starting the software please take a look into your systems device manager which serial port the UV-Beam-Adjuster is connected to.
Please select the proper serial port number the UV-Beam-Adjuster is connected to (here COM3 is denoted as ASLR3), see figure below. If you have chosen the wrong port just finish the program and start again.



UV-Beam-Adjuster

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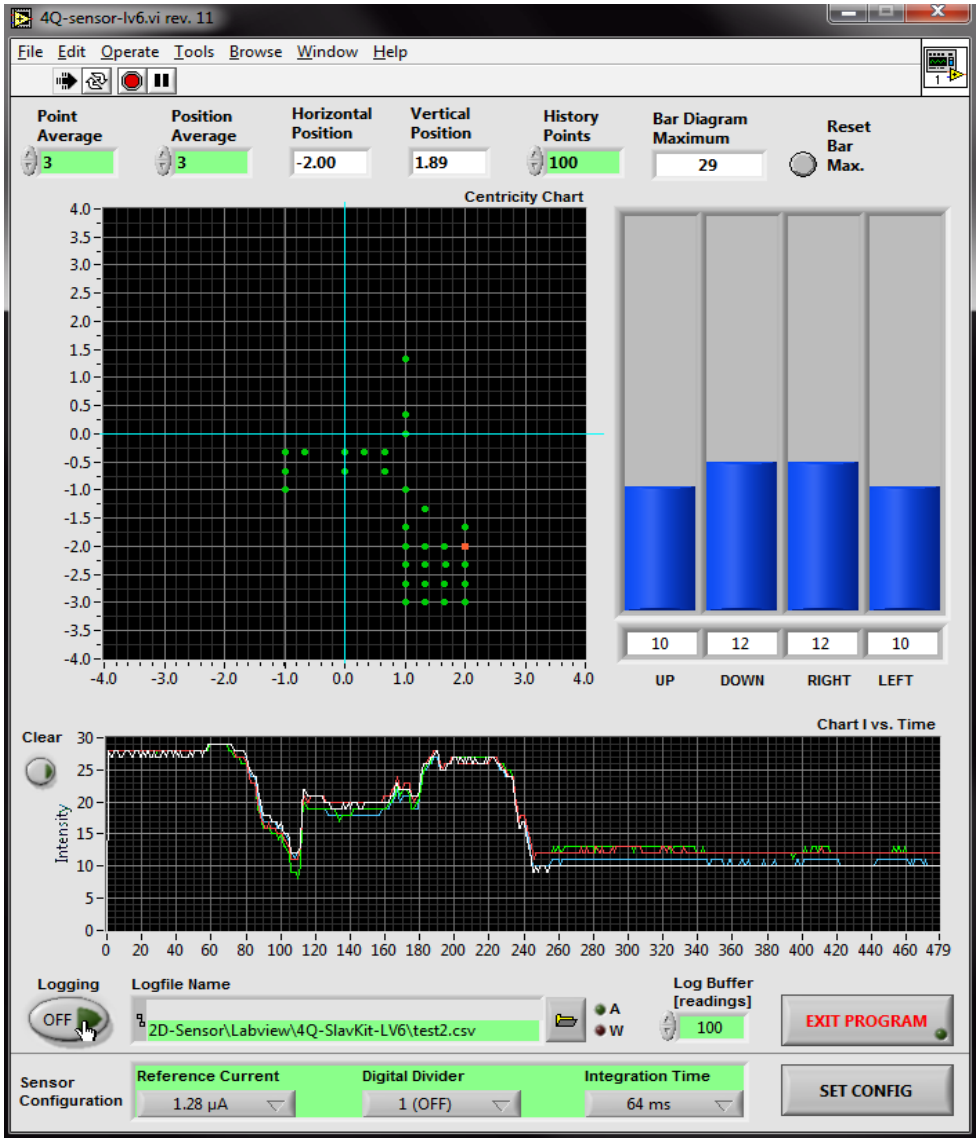
Boston Electronics

Main Screen

Now you will see the main screen of the application with different visualizations of the measurement values (see figure below). All parameters with green background can be changed by the user where other values are only indicators.



In the top area are some display configuration options. Point average and position average give the number of samples that are averaged before computing the actual position of the point in the chart (red dot in top left chart) and the horizontal / vertical position fields respectively.
History points gives the number of previous positions shown in the top left chart (green dots).

UV-Beam-Adjuster

Top right the data is represented as bar diagram showing the total intensity on each segment of the detector - and the current value as number is given below each bar. The Up/Down/Left/Right denote the segment viewed along the beam straight onto the detector with mounting rod on bottom side.
Furthermore there is a logging chart showing the last 1000 intensity values of the segments.

The intensity distribution is centred on the sensor if one of these conditions match:

- horizontal and vertical position is zero
- the red dot in the top left diagram remains within +- 1 area around origin for continous time
- the top right bar display has all bars the same height (e.g. the numbers below the bars are all the same)
- the logging chart shows all four lines with the same value

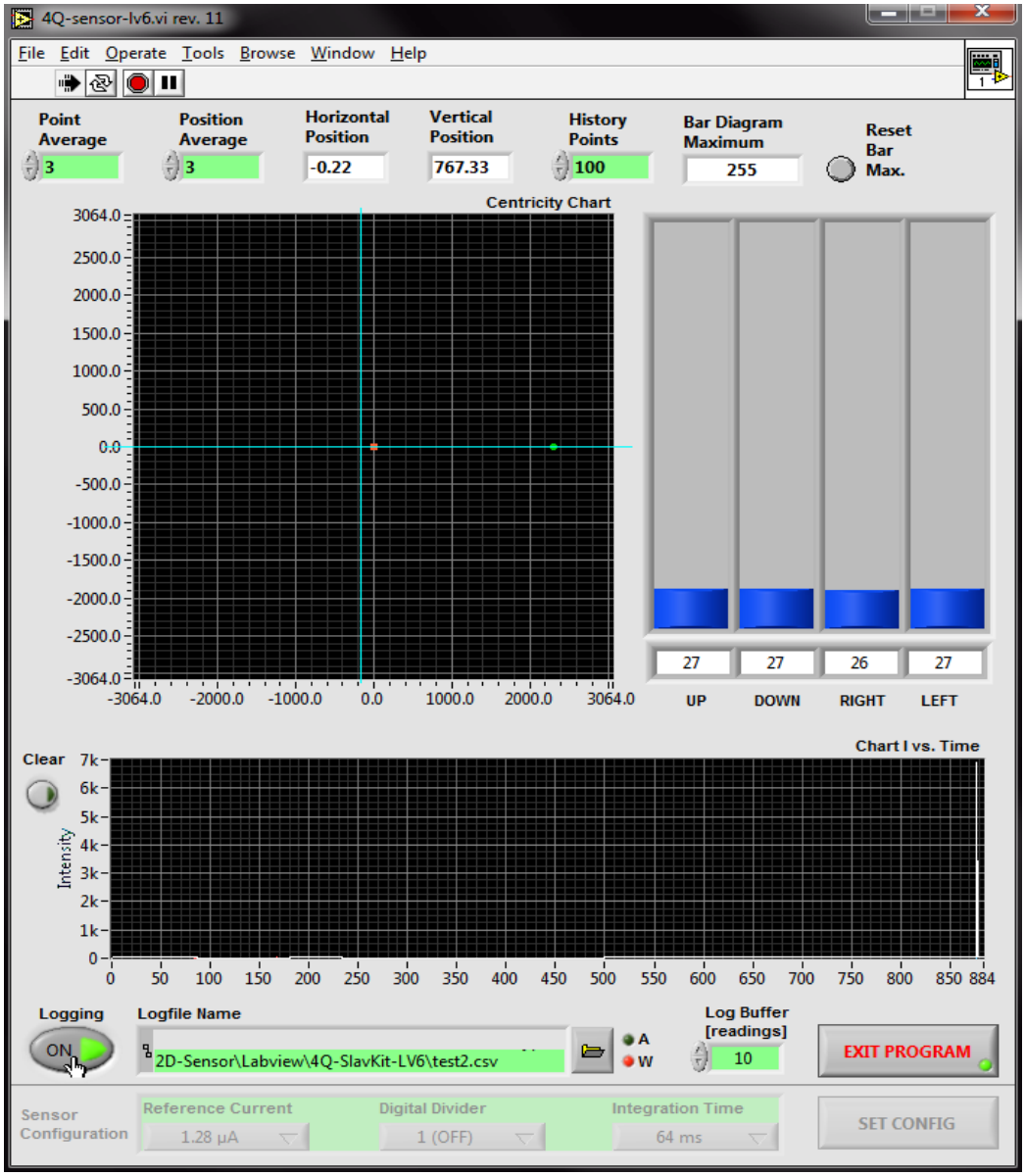
Please note the position can only be correctly determined if the beam has a smaller diameter than the detector.

It is strongly recommended to exit the program via “EXIT PROGRAM” button if data logging is enabled - as this ensures graceful end of data acquisition and final writing of all data in the internal file buffers.
If data logging is not used it is fine to just exit the program by closing the window.

UV-Beam-Adjuster

Data Logging

To enable data logging you first need to define the path and file for data storage by clicking the directory symbol and by giving a file name.



After defining the log file name you can enable the logging by pushing the Logging button. Data logging continues until you disable it or exit the program. For protection of flash media the “Log buffer” was implemented which buffers an adjustable amount of samples before writing them to the media. The write action is indicated by the small red dot indicator.
Please always disable logging or at least use the exit program button for graceful program end.