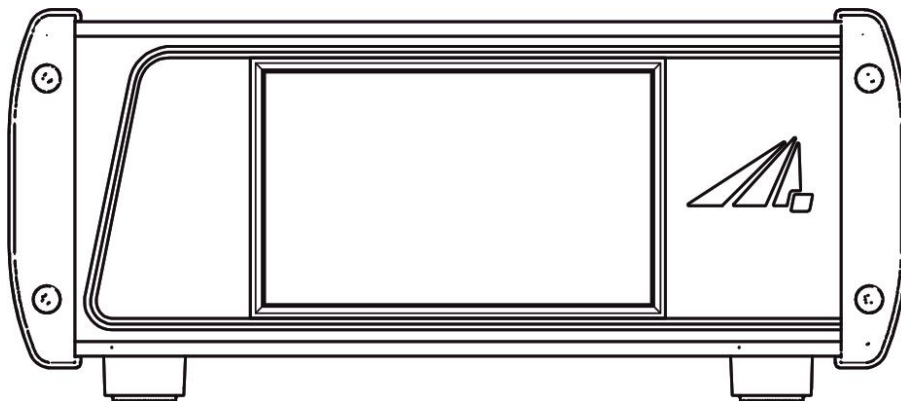


Radiometer RMD Touch 5

Manual



Version 1.0.0

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1 Table of contents

| | | |
|----------|---|-----------|
| 1 | Table of contents | 2 |
| 2 | Foreword..... | 4 |
| 3 | Guidelines and standards | 5 |
| 4 | Identification..... | 6 |
| 4.1 | Manufacturer, ordering spare parts and after-sales service..... | 6 |
| 4.2 | Change history | 6 |
| 4.3 | Copyright | 6 |
| 4.4 | Device identifier..... | 6 |
| 4.5 | Intended use | 7 |
| 4.6 | Foreseeable misuse | 7 |
| 4.7 | Legal information..... | 8 |
| 4.7.1 | Limitation of liability | 8 |
| 4.7.2 | Declaration of Conformity | 8 |
| 4.7.3 | Warranty condition en..... | 8 |
| 5 | General..... | 9 |
| 5.1 | Information about this manual..... | 10 |
| 5.2 | Information about the symbols..... | 11 |
| 5.2.1 | SAFETY INSTRUCTIONS | 11 |
| 5.2.2 | PROHIBITION SIGNS | 11 |
| 5.2.3 | WARNING SIGNS | 12 |
| 5.2.4 | ATTENTION..... | 12 |
| 5.2.5 | Optional function..... | 12 |
| 5.3 | Owner/operator information | 13 |
| 5.4 | Personnel requirements | 14 |
| 5.5 | Personal protective equipment | 14 |
| 5.5.1 | Protective gloves | 14 |
| 5.5.2 | Safety goggles..... | 14 |
| 6 | Safety instructions and residual risk..... | 16 |
| 6.1 | General | 16 |
| 6.2 | Safety instructions relating to normal operation..... | 17 |
| 6.3 | Maintenance and troubleshooting | 18 |
| 6.4 | Safety instructions relating to service and repair work | 18 |
| 7 | Description of the system and function overview | 20 |
| 7.1 | Practical hints..... | 21 |
| 7.2 | Transportation, storage, delivery..... | 22 |
| 7.3 | Commissioning..... | 23 |
| 8 | Operation | 24 |
| 8.1 | Switch on / Switch off | 24 |
| 8.2 | Introduction to the user interface..... | 25 |
| 8.3 | Measure with the RMD | 27 |
| 8.4 | Representations and representation changes | 27 |
| 8.4.1 | Dose measurement | 29 |

| | | |
|-----------|--|-----------|
| 8.4.2 | Minimum and maximum measurement..... | 29 |
| 8.4.3 | Set offset..... | 30 |
| 8.4.4 | Scope - Graphical measurement screen | 30 |
| 8.5 | Data recording..... | 31 |
| 8.5.1 | Measurement data recording on the USB stick..... | 31 |
| 8.5.2 | Screenshot to the USB stick | 33 |
| 8.5.3 | Data recording via USB | 34 |
| 8.6 | Settings..... | 35 |
| 8.6.1 | Change language | 35 |
| 8.6.2 | Time / Date..... | 36 |
| 8.6.3 | Display | 36 |
| 8.7 | Measurement | 37 |
| 8.7.1 | Record | 38 |
| 8.7.2 | Factory settings | 39 |
| 8.7.3 | Firmware update..... | 40 |
| 8.7.4 | Information | 40 |
| 8.8 | Additional lamp factors* | 41 |
| 8.9 | Multiple sensors: Erythema and NDT* | 41 |
| 8.9.1 | Erythema sensor | 42 |
| 8.9.2 | NDT | 42 |
| 9 | Software | 43 |
| 9.1 | Install software | 43 |
| 9.2 | Operation | 43 |
| 9.2.1 | Device control and information..... | 44 |
| 9.2.2 | Measurement | 45 |
| 9.3 | Measurement data | 46 |
| 10 | Technical data | 49 |
| 11 | Maintenance & Cleaning | 52 |
| 11.1 | Cleaning | 53 |
| 11.2 | Battery change | 54 |
| 11.3 | Exchange / delete USB stick..... | 54 |
| 11.4 | Firmware update | 55 |
| 11.5 | Calibration..... | 56 |
| 11.6 | Error / malfunction | 56 |
| 11.7 | Spare parts | 57 |
| 12 | Declaration of Conformity | 58 |
| 13 | NOTES..... | 59 |

2 Foreword

Dear Customer!

Thank you for choosing a product manufactured by us!

Please take your time to read this manual carefully. Please pay special attention to the safety instructions.

This is the condition for safe handling and safe operation of the system and its components.

If you have any questions that you do not find answered in this manual, please call us and we will be pleased to assist you. In addition, we always welcome any suggestions or proposals for improvement.

Our products undergo constant advanced development; therefore there may be minor differences between your system and the illustrations given in this Operating Manual.

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This is a translation of the original operating manual.

3 Guidelines and standards



The system is machinery under Annex II A of the Machinery Directive and is therefore delivered with a declaration of conformity and with a CE mark (in accordance with the Machinery Directive).

| Directives | |
|--------------------------------|--|
| EC Directives | 06/42/EC (Machinery) (partially observed) 2014/30/EC (EMC) 2014/35/EC (Low voltage) |
| Harmonized standards | |
| EN ISO 12100:2010 | Safety of Machinery – General Principles for Design Risk Assessment and Risk Reduction |
| EN 61000-6-2:2005 | Electromagnetic Compatibility (EMC) – Part 6-2: Immunity for Industrial Environments |
| EN 61000-6-4:2007 + A1:2011 | Electromagnetic Compatibility (EMC) – Part 6-4: Emission Standard for Industrial Environments |

4 Identification

4.1 Manufacturer, ordering spare parts and after-sales service

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4.2 Change history



We reserve the right to make changes in content. Opsytec Dr. Gröbel GmbH is not liable for any errors in this documentation. No liability shall be accepted for indirect damages arising from the delivery or use of this documentation, in as far as this is legally permissible.

| Version | Processor | Date | Change |
|---------|-----------|------------|---------|
| 1.0.0 | Paravia | 20.10.2021 | Release |
| | | | |
| | | | |

4.3 Copyright



Opsytec Dr. Gröbel GmbH shall retain the copyright for these operating manual. The operating manual is intended for the owner/operator and his personnel.

Copyright in accordance with DIN ISO 16016:

Reproduction and copying of this document, use and disclosure of its contents are prohibited unless expressly authorized.
 Non-compliance may result in a claim for damages. All rights reserved in case of registration of patent, utility patent, or design patent.
 Contraventions may be subject to prosecution.

4.4 Device identifier

Data for internal use:

| | |
|-----------------------------|-------------|
| Description of the machine: | RMD Touch 5 |
| Year of construction: | |
| Machine No. | |
| Project no. | |

4.5 Intended use

The RMD Touch determines, with the associated sensors, the irradiance and dose in the UV and VIS spectral range and displays them on the touch display. Operation is only permitted in a dry environment. If required, the sensors are available splash-proof according to IP65.

When using the sensors, light, IR and UV radiation can be reflected and scattered. If necessary, suitable protective measures must be used to protect against radiation.

The system is intended for industrial use in ordinary locations only as defined by the National Electric Code (NEC), NFPA 70. It is prohibited to use the equipment in hazardous areas or for general lighting.

It is prohibited to use the devices in explosive environments

- Installation, commissioning, operation, maintenance and service work may only be carried out by trained and qualified personnel who comply with all safety guidelines and standards.
- Responsibility: Damage resulting from unintentional or unauthorized tampering terminates any right to assert warranty or liability claims against the manufacturer.
- Warranty Disclaimer: The use of any non-original parts will void the warranty.
- Environmental protection: Defective parts containing substances harmful to the environment must be disposed of accordingly.
- Operation is only permitted in a dry environment. The installation is horizontal.
- Only suitable for indoor operation.
- Before opening, the system must be disconnected from the voltage and it must be checked that there is no voltage.
- Wear gloves for cleaning the sensors
- Do not clean the system when it is in operation.
- Any use other than that mentioned above will result in damage to the product. Furthermore, this is related to dangers such as short circuits, fire and electric shock. The entire device must not be changed and/or modified! The safety instructions must be observed at all times.

4.6 Foreseeable misuse

The following is considered foreseeable misuse:

- Operation of the device without safety devices and equipment.
- Activities of uninstructed personnel on the device.
- Non-compliance with the operating instructions of the owner/operator.
- Ignoring of the operating manual.
- Processing of materials other than those specified in the technical data.
- Any use outside the specified purpose.

4.7 Legal information

4.7.1 Limitation of liability

All information in this manual has been compiled taking into account the currently applicable standards and regulations, the technical standard and our many years of knowledge and experience.

The manufacturer is not liable for damages in the event that:

- This manual was ignored,
- the device has been used improperly,
- untrained personnel were used,
- untrained personnel have used the machine incorrectly,
- inadmissible modifications have been made,
- technical changes have been made
- Unapproved spare parts have been used.
- Failure to observe the instructions in the manual regarding safety, transport, storage, assembly, commissioning, operation and maintenance.
- Improperly performed repairs
- Foreign body impact or mechanical damage

We are not liable for common faults of the device caused by a power failure or a failure of the control system.

The actual scope of delivery may differ from the explanations and pictures in this manual in the case of special versions, when additional options are ordered, or due to the latest, technical changes.

The obligations agreed in the supply contract, as well as the manufacturer's terms of delivery and the legal regulations valid at the time of the conclusion of the contract shall apply.

4.7.2 Declaration of Conformity

The declaration of conformity can be found in the appendix or can be requested from the manufacturer.

4.7.3 Warranty condition en

The warranty conditions are subject to the Civil Code (BGB). The warranty period is 1 year, unless otherwise agreed in the purchase documents.

5 General

IMPORTANT SAFETY INSTRUCTIONS

WARNING - Always observe the following basic precautions when using electrical equipment:

- a) Read all instructions before using the device.
- b) This device may only be used by qualified and trained personnel. See training section in this manual.
- c) Know how to turn off the product. Familiarize yourself thoroughly with the the operating elements.
- d) Stay alert - watch what you are doing.
- e) Do not use the product when you are tired or under the influence of alcohol or drugs. alcohol or drugs.
- f) Keep danger zone away from all persons.
- g) Do not place the device on an unstable surface.
- h) Follow the maintenance instructions given in the operating manual.
- i) Keep these instructions in a safe place.

5.1 Information about this manual

This manual intends to make handling of this system and its components safe and efficient. The manual is part of the system and must be kept in its immediate vicinity where it is accessible for the personnel at any time.

This documentation contains the necessary information for the intended use of the described system. It is intended for technically qualified personnel who have been especially trained for operation, laboratory use, quality assurance, service and repair.

The personnel must have read this manual carefully and understood its content before commencing any work. The basic condition for safe working is observation of all stated safety information and operating instructions in this manual.

Knowledge and technically faultless implementation of the instructions, safety requirements, safety information and warnings are a condition for safety in operation, service and repair. Only qualified personnel has the required professional knowledge to apply the safety requirements, safety information and warnings stated in this operating manual in a general way correctly in a concrete situation.

In addition, the local accident prevention regulations and general safety regulations apply for the area of application of the system.

Illustrations in this manual serve the purpose of general understanding; they may differ from the actual version.

Apart from this manual the instructions for the installed components included in the appendix apply.

This operating manual cannot take any possible case of maintenance into account. If you need further information or if special problems occur that are not treated extensively enough in this manual please request the required information from the manufacturer.



For a simple description, the above mentioned components are collectively referred to as system.


5.2 Information about the symbols


5.2.1 SAFETY INSTRUCTIONS


In this manual, safety information is indicated by means of symbols. Safety information is preceded by signal words that indicate the scope of risk.

To avoid accidents and damage to persons or property, always follow the information and act prudently.

Throughout the text, you will find the following pictograms with the following meanings:

| | |
|---|---|
|  | ⚠ DANGER |
| | <p>Imminent danger Possible consequences: death or most serious injuries.</p> <ul style="list-style-type: none"> • Prevention |

| | |
|---|---|
|  | ⚠ WARNING |
| | <p>Dangerous Situation Possible consequences: death or most serious injuries.</p> <ul style="list-style-type: none"> • Prevention |

| | |
|---|--|
|  | ⚠ CAUTION |
| | <p>Possible Situation Possible consequences: slight or minor injuries. Sometimes also used for warning of material damage.</p> <ul style="list-style-type: none"> • Prevention |



Note

Information for use or useful important information

5.2.2 PROHIBITION SIGNS



General "Prohibited-sign"

5.2.3 WARNING SIGNS



Warning of optical radiation
(such as UV, IR, or visible radiation)



Warning of electricity!

5.2.4 ATTENTION



Wear eye protection!



Disconnect mains plug from electrical outlet!



Disconnect before carrying out maintenance or repair!



Use hand protection!



Refer to the instruction manual/booklet

5.2.5 Optional function

* Optional function, not available for every system.

5.3 Owner/operator information

The System is used in the commercial sector. The owner/operator of the system is therefore subject to the legal obligations concerning work safety.

In addition to the safety information in this manual, the generally applicable regulations valid for the application area of the system concerning safety, prevention of accidents and for protection of the environment must be noted and complied with.

The following applies in particular:

The owner/operator must acquire information about the valid occupational health and safety information and in a risk assessment determine additional hazards incurred due to the special operating conditions at the location of use of the system. He must implement these in the form of operating instructions for operation of the system and specifically for the individual work stations.

The owner/operator is obliged to check during the entire lifetime of the system whether the operating instructions that he generated comply with the current status of the regulations and update them if necessary.

The owner/operator must assign and define the responsibilities for installation, operation, rectification of faults, service and cleaning unambiguously.

The owner/operator must ensure that all personnel dealing with the system have read and understood this manual. Furthermore, he is obliged to provide personnel training in regular intervals and provide information about risks.

The owner/operator must provide the required personal protective equipment for his personnel. Furthermore, the owner/operator is responsible that the system is always in faultless technical condition. To ensure this, the service intervals specified in this manual and in the technical documents for the individual systems must be observed and all safety installations must be checked regularly for function and completeness.

The owner/operator must have all safety devices checked regularly for function and completeness.

The owner/operator must ensure that the operating personnel have knowledge about first aid measures and local rescue installations.

5.4 Personnel requirements

The System is used in the commercial sector. The owner/operator of the system is therefore subject to the legal obligations concerning work safety.

In addition to the safety information in this manual, the generally applicable regulations valid for the application area of the system concerning safety, prevention of accidents and for protection of the environment must be noted and complied with.

The following applies in particular:

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The owner/operator must have all safety devices checked regularly for function and completeness.

The owner/operator must ensure that the operating personnel have knowledge about first aid measures and local rescue installations.

5.5 Personal protective equipment

The purpose of personal protective equipment is to protect the personnel from risks that might affect his safety or health when working.

When executing various activities on and with the system, the personnel must wear personal protective equipment. This will be pointed out again in the individual chapters of this manual. Below, personal protective equipment is explained:

5.5.1 Protective gloves

Protective gloves are used to protect hands from visible and invisible radiation, friction, abrasion, stabs and deep injuries.



5.5.2 Safety goggles

Protective goggles are used to protect eyes from intense visible and invisible radiation.

Safety glasses and storage boxes can be ordered from Opsytec Dr. Gröbel GmbH, Am Hardtwald 6-8, 76275 Ettlingen or UVEX AREITSSSCHUTZ GMBH, Würzburger Str. 181 - 189, 90766 Fürth, Germany:

Protective eyewear part number: 9169065

Storage box part number: 9957502

| | |
|---|--|
|  |  CAUTION |
| | Use eye protection when working with the light source in the hazardous area. |



| | |
|---|--|
|  |  CAUTION |
| | Keep the safety goggles protected at the application site when not in use. |


6 Safety instructions and residual risk


6.1 General


The system is state-of-the-art and has been built in compliance with recognized safety regulations. Nonetheless, its use may constitute risks for life and limb of the operating and repair personnel (service personnel) or third parties or impairments to the machine. Operate the system only when its safety devices are in faultless condition. Disruptions that impair its safety must be rectified at once.

The following safety information must be strictly observed to prevent damage to the machine and personal injury!

| | |
|---|---|
|  |  WARNING |
| | <p>Risk of injury when personnel do not read the operation manual! Prior to commissioning and operation, read the operation manual completely. Read all safety information and instructions. Negligence concerning safety information and instructions may cause electric shock and/or severe injuries.</p> |

| | |
|---|---|
|  | CAUTION |
| | <p>Material damage due to kinking of the cables If you bend the cables too much, then cable breaks can occur. This can lead to impairment up to the lead to malfunction of the cables. Avoid bending or kinking the cables too much. Lay the cables together in a wide circle.</p> |

| | |
|---|--|
|  | CAUTION |
| | <p>Material damage due to improper handling If you wear the sensors on the cable, then material damage can occur over time. This can lead to malfunctions and even to the sensors becoming inoperable. Take the sensors in your hand for transport.</p> |

| CAUTION | |
|---|--|
|  | <p>Property damage due to high temperatures</p> <p>If the sensors are exposed to high temperatures, material damage may occur.</p> <p>This can lead to impairments or even the inoperability of the sensors.</p> <p>The sensors may be exposed to max. 60 °C.</p> <p>If necessary, do not irradiate the sensors for a long time to avoid overheating.</p> |

6.2 Safety instructions relating to normal operation

Never look directly into LEDs, lamps or UV lamps.

The RMD Touch itself does not emit any hazardous radiation.

UV radiation is harmful to humans, therefore observe the protective regulations when working. Furthermore, UV-C radiation in particular has a material-destroying effect. It is therefore advisable not to expose the sensors to too much radiation. Avoid overloading the sensors and use an aperture in good time.

If the thermal load caused by the emitters is too high, it may be useful to place a shielding hood over the sensors, which only exposes the receiver surface. This can significantly reduce the heating of the sensors.

Safety for persons working with UV radiation:

Wearing personal protective equipment (e.g. safety goggles and hand protection) is generally recommended when measuring LEDs, lamps or UV lamps. Wear personal protective equipment to protect the eyes and skin unless you can ensure complete shielding of UV radiation.


Safety glasses used must comply with the EN 170 standard and provide protection against direct and lateral irradiation.

Post warning signs at the work area and all access points.

Delimit the working area accordingly for manual workplaces or mobile use.

The risk assessment for a UV workplace is the responsibility of the customer. This requires measurements / assessments according to DIN EN 14255-1:2005-06 "Measurement and assessment of personal exposure to incoherent optical radiation - Part 1: Ultraviolet radiation emitted by artificial sources at the workplace".

DIN 14255-1 itself does not contain any limit values. These are given in Directive "2006/25/EC of the European Parliament and of the Council on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (artificial optical radiation)".

| | |
|---|---|
|  | CAUTION |
| | <p>Risk of Damage</p> <ul style="list-style-type: none"> • Skin fat and dirt are absorbent in the UV and visible spectral range. • Avoid fingerprints on the optically components, sensor surfaces, Lamps and reflectors. If necessary, the components must be cleaned carefully with Isopropyl. |

6.3 Maintenance and troubleshooting

The "Maintenance" chapter describes all the necessary work, the regular performance of which ensures reliable operation.

Apart from the measures described in these instructions, no unauthorized repairs or modifications may be carried out. Furthermore, no modifications, additions or conversions may be made without the manufacturer's approval.

If a malfunction occurs that cannot be remedied using the instructions, the manufacturer's customer service department must be contacted.

Also carry out regular maintenance, servicing and cleaning work to ensure a technically perfect condition and to increase the service life.


Immediately eliminate malfunctions that affect safety.

Immediately replace components and parts that are not in perfect condition.

Operation is not permitted if there is visible damage to the device.

6.4 Safety instructions relating to service and repair work

| | |
|---|---|
|  | ⚠ WARNING |
| | <p>Risk of injury when touching live parts</p> <p>Before opening the device, disconnect all components from the supply voltage and check that no voltage is present.</p> |

| | |
|---|---|
|  | ⚠ CAUTION |
| | <p>Risk of Damage</p> <ul style="list-style-type: none"> • Skin fat and dirt are absorbent in the UV and visible spectral range. • Avoid fingerprints on the optically components, sensor surfaces, Lamps and reflectors. If necessary, the components must be cleaned carefully with Isopropyl. |

Service, repair and cleaning work may only be performed by authorized and specially trained personnel. The system must be de-energized and secured before major work (including cleaning) is performed).

Perform the prescribed adjustment, service and inspection work according to the schedule.

Only qualified electricians may carry out work on the electrical system.

Safety devices may only be removed during services and repairs if the system has previously been switched off and brought into a safe condition.

During service and maintenance work, important safety installations may no longer function. Work of this type therefore requires special care.

7 Description of the system and function overview

The RMD Touch radiometer is a development of Opsytec Dr. Gröbel GmbH. This easy-to-use radiometer incorporates more than 40 years of experience in all areas of irradiance and illuminance measurement. It is characterized by a wide dynamic range and extremely low noise. For this purpose, the sensor already contains a multi-stage amplification, an extremely precise analog-to-digital converter and a temperature sensor. The memory included in the sensor contains all sensor identifications and the calibration history.

This allows several sensors for UV radiation and light to be operated on the RMD Touch radiometer. A wide range of sensors is available for a wide variety of production and control processes. Sensors for the evaluation of erythema-weighted radiation and multi-channel sensors are also available. Two sensors can be read simultaneously. Different sensors cover the wavelength ranges from 200 nm to 780 nm. The RMD Touch automatically recognizes the change of sensors. Simultaneous measurements of different wavelength ranges are also possible.

The newly developed diffuser achieves very good cosine correction with excellent lateral uniformity. The radiation to be measured is distributed evenly over several channels, so that, for example, the simultaneous determination of UVA irradiances and illuminances is possible. The measurement data is clearly displayed on the touch display.

The measured values can be stored on the RMD Touch and output via USB.

With the associated software, the RMD can be controlled from the PC. The device records measurement data for up to 100 days at a time. The minimum as well as the maximum and the average irradiance, the dose and the measurement date / time are stored.

Applications:

- Measurement of UV LEDs & UV light sources
- NDT, material testing
- Monitoring of UV irradiation systems
- Measurement for workplace safety
- Measurement of H_{eff} and H_{UVA}
- Multichannel measurements
- Applications with high dynamics
- Data logging

The following components are supplied:

- RMD Touch
- Mains cable
- Sensor*/ Sensors*
- Suitcase*
- USB cable
- Software (download)
- Factory calibration certificate, optional ISO 17025 calibration certificate*.
- this documentation



For ease of description, the above components are collectively referred to as the system.

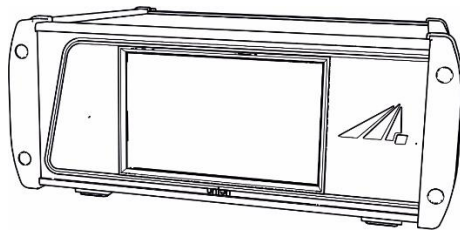


The RMD is available in several variants. If some of the functions described in this manual are not available in your RMD, please contact the manufacturer or distributor for an upgrade.

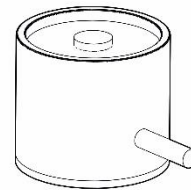
The following components are required by the customer:

- Personal protective equipment
- USB stick

The components at a glance:



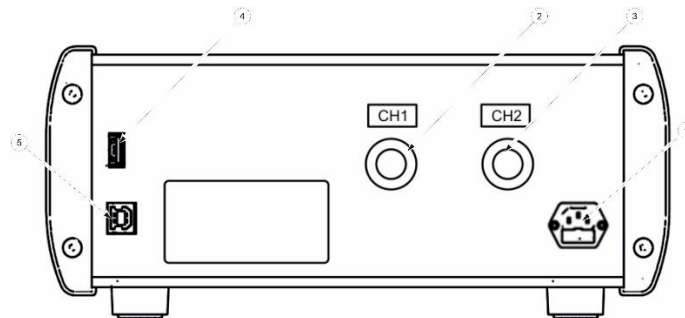
(1)



(2)

| Pos. | Designation | Pos. | Designation |
|------|-------------|------|-------------|
| 1 | RMD Touch | 2 | Sensor |

On the back of the housing, there is the connection for the supply voltage, a USB connection, the connection for a USB stick and the sensor connections.



(Image similar)

| Pos. | Designation | Pos. | Designation |
|------|------------------------|------|-------------------|
| 1 | Socket for mains cable | 2 | Sensor connection |
| 3 | Sensor connection | 4 | USB for USB stick |
| 5 | USB for PC | | |

7.1 Practical hints

The sensors are connected to the RMD Touch via a cable of about 2 m length. This ensures that even when measuring in inaccessible places, readings can be taken easily.

But keep in mind that radiation measurements are not as easy as measuring lengths with a scale. Although the measuring device provides you with a number, this number depends in many ways on your measuring arrangement. For example, the measured value decreases with the cosine of the tilt angle when the sensor is tilted off the axis of the radiator-sensor.

For reproducible measurement results, the environment around the lamp must have constant reflection ratios; the lamp voltage and lamp wattage must remain constant, as must the ambient temperature and the air flow conditions at the lamp. In addition, of course, the measurement position in relation to the lamp must be maintained and - very important - the spectral composition of the lamp must not have changed.

For each type of lamp - UV-A, UV-B or UV-C lamps - the appropriate sensor must be used. The determination of the UV-B and/or UV-C irradiance on UV-A lamps or correspondingly UV-A and/or UV-C irradiance on UV-B lamps naturally leads to incorrect measurements, as the sensors in the adjacent area are still partially sensitive and thus, for example, the very high UV-A content of a UV-A lamp in a UV-B measurement leads to an increase in the measured value.

7.2 Transportation, storage, delivery



Sensitive components

When transporting the system, therefore, make sure that it is not subjected to any load or hard impacts. Store the system according to the technical data - dry and dust-protected.



Check the scope of delivery

Check the delivered parts for completeness, damage or other conspicuous features. Document any damage found and report it immediately to the manufacturer or supplier.

No liability is assumed for obvious transport damage reported later.



Packaging material

Please dispose of the packaging material in an environmentally friendly manner.

7.3 Commissioning

Ensure appropriate workplace safety, especially from UV radiation

- Unpack all components and remove the packing materials.
- Position the sensor(s) at the desired location.
- Connect the sensor(s):
- Remove the sensor caps.
- Connect the sensor(s) to the connectors on the back of the RMD Touch. It does not matter which of the two inputs you plug the sensor into.
- The measurement data is saved on a USB stick. If necessary, connect a USB stick before starting the measurements.
- Connect the RMD Touch to the mains voltage.
- Switch on the RMD Touch with the power switch on the back.

Operate the device only in dry rooms (relative humidity max. 80 %, non-condensing) and in an environment with max. 60 °C). Do not operate the device in hazardous areas, not in dirty, dusty or oily environments.

Protect the device from chemical vapors and solvents, shocks and vibrations, splash water, condensation on its surface and corrosive media.

**Note**

We recommend that you allow the meter to warm up for at least 30 minutes before measuring.

8 Operation

8.1 Switch on / Switch off

Switch the system on and off using the switch on the back. After the device has started, the logo and the current firmware version first appear on the display.



After approx. 3 s, the irradiance measurement appears.



When the device is switched on for the first time, the date and time should be checked and set if necessary.

8.2 Introduction to the user interface

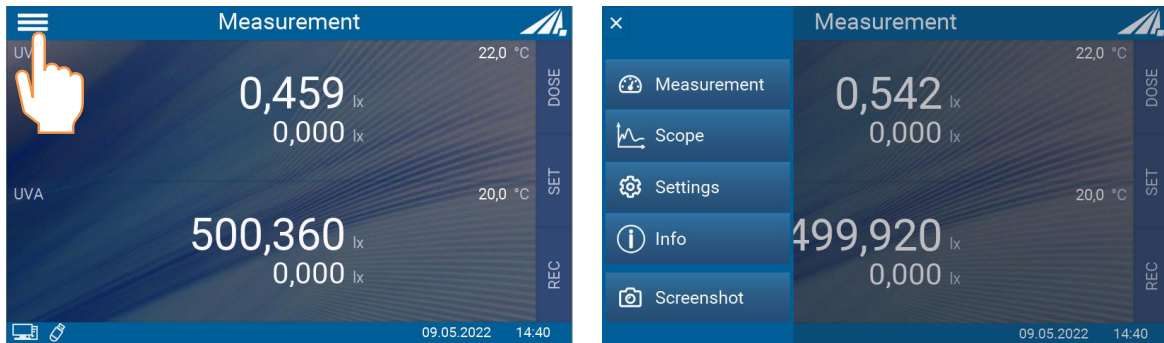
The RMD Touch has an intuitive user interface. All values relevant for the measurement are displayed in the center of the screen. The various menu Measurement screens are explained in the following chapter.







Here the symbols mean:

| Symbol | Function |
|--------|---|
| | Menu |
| | USB connection to a PC |
| | USB stick plugged |
| | Sensor temperature |
| | Sensor type |
| | Sensor channel |
| | Sensor error |
| | Display date & time |
| | Opens a numeric input window |
| | The lock icon appears when the GUI is locked to the condition. |
| | Measured value recording running / stopped |
| | The battery symbol indicates that the real-time battery of the device is exhausted. |
| | Cancel and return to the main menu |
| | Save a screenshot |

Clicking on the menu symbol at the upper left edge opens the **main menu**. The menu closes either by clicking the [x] symbol, by clicking outside the menu or automatically after 5 s.



In the main menu, you can switch between the numerical and graphical measurement screens, and also open the settings and information via the menu. In addition, the screenshot recording can be triggered here if a USB stick is connected.

-  Measurement
Opens the numerical measurement screens
-  Scope
Opens the graphical measurement screen
-  Settings
Measurement specific and device settings
-  Info
Sensor and devices information

The **function menu** provides controls relevant to the measurements. It is anchored to the right edge of the measurement screen and graph.



By clicking the individual tabs it is opened and closed again.

The icon at the top indicates whether the function menu closes by itself when not in use or whether it can only be closed by clicking the tab again.

8.3 Measure with the RMD

The measurement starts automatically as soon as the sensors are connected. For single-channel operation, the measurement screen is exemplified as follows:

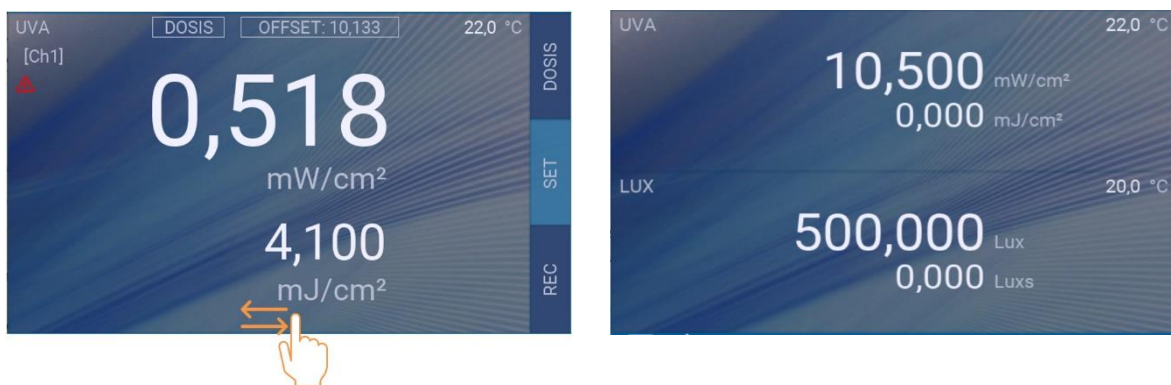


In the measurement screen is displayed:

- Irradiance/ Illuminance
- Dose
- Dose and offset display
- Sensor temperature
- Sensor error
- Channel number*

8.4 Representations and representation changes

The single-channel measurement screen is shown below. To change the measurement screens, you can swipe to the right and left.



If two sensors are connected there are five different numerical measurement screens, if only one sensor is connected three different ones are displayed.

The RMD Touch includes various measurement screens to cover the different measurement requirements. These are: Irradiance and dose measurement, Min/Max measurement and a graphic mode called Scope. The measurement screens at a glance:



(1) Irradiance and dose measurement



(2) Irradiance measurement



(3) Min/Max display



(4) Scope

In the measurement screen (1), the irradiance, for LUX sensors the illuminance, and dose of both sensors are displayed one below the other. This measurement screen always appears first when two sensors are connected. If only one sensor is connected, only the irradiance of the sensor is displayed.

In the measurement screen (2), the irradiance of one sensor each is displayed in large letters. The dose is only displayed if it is recorded or stopped. This measurement screen appears first if no sensor or one sensor is connected. If two sensors are connected, one screen appears for each sensor.

If two identical sensors are connected, the channel number appears here for differentiation.

The minimum and maximum measured values are added to the measurement screens (3). Here, the irradiance and the dose are displayed below. In addition, the minimum value and the maximum value are displayed. In the center, the current measured value is displayed graphically in relation to the minimum and maximum values.

In the graphical measurement screen (4), the measurement signals of the sensors are displayed over time.

8.4.1 Dose measurement

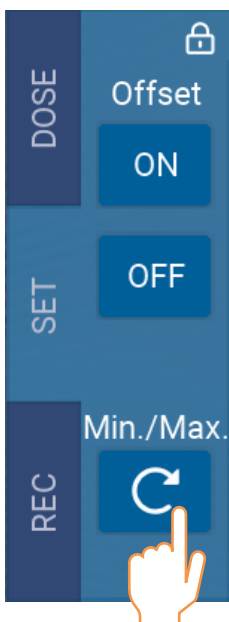
A dose measurement can be started, stopped and reset via the "**DOSIS**" function menu. In the dual display, the dose recording is started by both sensors, in the single view only that of the displayed sensor. Accordingly, the dose measurement can be stopped and reset from both sensors or from only one sensor.

In the single view, the dose is displayed only if it is running actively or is not zero.



- **START:**
Starts the dose measurement. The following appears at the top of the screen: DOSIS
- **STOP:**
The dose measurement is stopped.
The measured value remains on the screen until it is reset or a new dose measurement is started.
- **Reset dose measurement ↻ :**
A dose reset resets the current dose value.

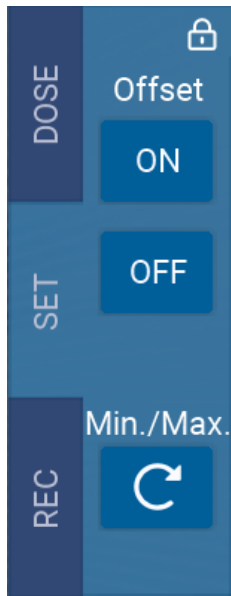
8.4.2 Minimum and maximum measurement



In the **function menu "SET"** the minimum and maximum value can be reset, in the dual display of both sensors, in the single view only of the displayed sensor.

The reset is only visible in the Min/Max measurement screen.

8.4.3 Set offset



An offset can be set in the **"SET" function menu**. The current measured value is subtracted from the measured value as an offset value. In the dual display an offset is taken from both sensors and in the single view only from the selected sensor.

- ON: Sets the offset or overwrites an existing offset
- OFF: Resets the existing offset

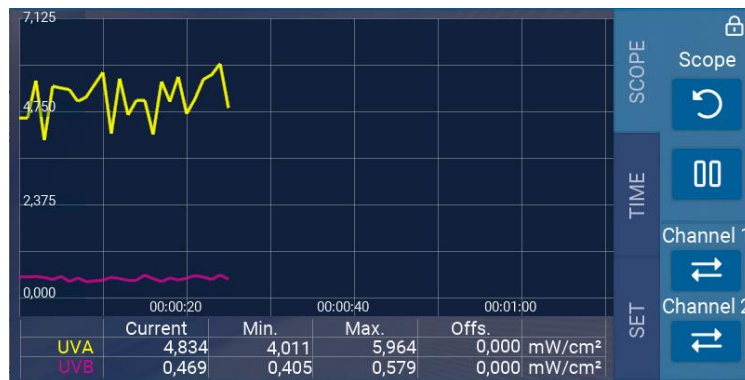
If the offset is active, the measured value is displayed above the measured values. Example:

OFFSET: 4,500

8.4.4 Scope - Graphical measurement screen

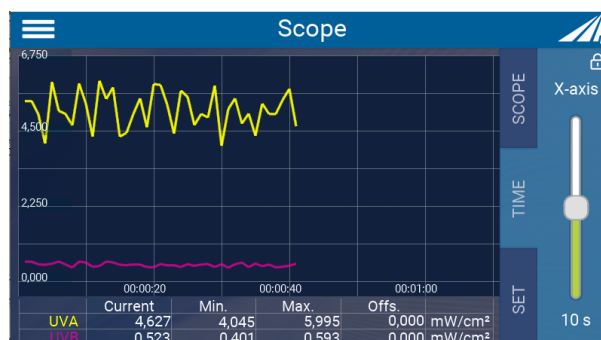
In the graphical measuring mode (Scope), the measuring signals of the sensors are displayed over time.

Like in the numerical displays, setting options for the graph are displayed in the function menu. Starting the dose or setting an offset are not possible here, but are accepted and continue to run in the background.



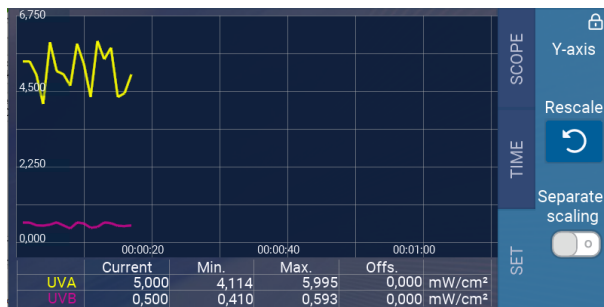
8.4.4.1 Adjust X and Y axis

In the TIME function menu, the resolution of the time axis (X axis) is set.

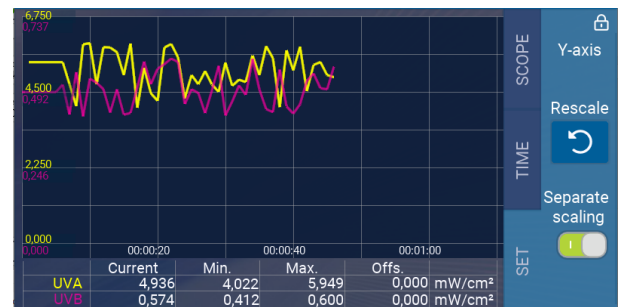


The slider determines the time scaling. It can be set from 3 s to 90 s.

The Y-axis is parameterized accordingly. Separate or common scaling can also be set for the Y-axis:



common scaling



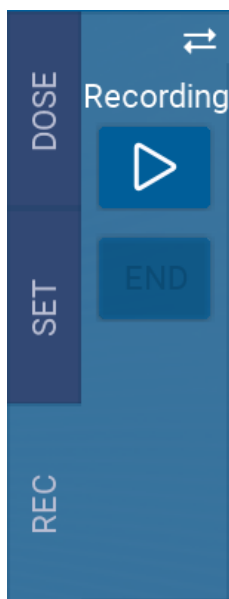
Separate scaling

8.5 Data recording

Measurement data can either be recorded to a USB stick or output via USB.

8.5.1 Measurement data recording on the USB stick

Data recording to a connected USB stick can be started and stopped in the measuring mode via the REC function menu tab. It can also be started automatically at the start of a dose measurement.



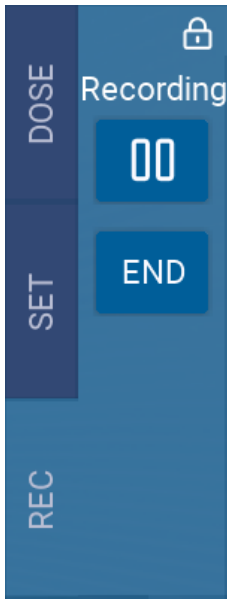
Clicking ▶ starts the recording.

At the beginning and end of the recording, the file path appears on the display. The file name is composed of the start time and the storage folder is composed of the date.



When recording is running, a green REC icon appears in the status bar:





If recording is running, it can be paused by clicking **00**. Clicking **▶** again will continue the recording. When recording is paused, a red REC symbol appears in the status bar:



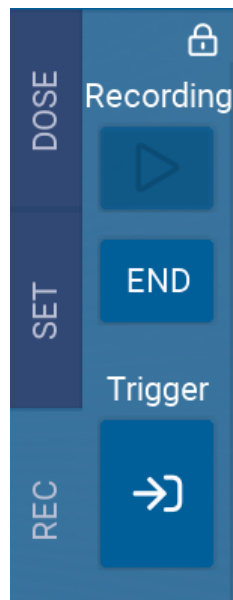
End the data recording by clicking END.

There are two modes for data recording. The mode can be selected in the settings menu can be changed.

Interval mode: Data is automatically recorded every x seconds (500 ms - 60 min), depending on the setting.

Manual mode: In manual mode measurement data is only recorded when the measurement is triggered.

During this recording, the red REC icon appears in the status bar **REC**



Manual triggering is possible via the trigger key in the function menu.

When a recording is made, the green REC symbol appears briefly in the status bar **▶ REC**

The measurement data files are saved as CSV files. CSV stands for comma-separated-values. A CSV file stores tabular data (numbers and text) in plain text. CSV is a simple file format that is supported by many programs and can be opened with a spreadsheet such as Microsoft Excel or OpenOffice.org Calc.

In the following, the content of the lines is explained using a file excerpt:

```

RMD data file
www.opsytec.de

[RMD Info]
RMD Touch 5
Firmware      1.0.0518
Series N.     00101
Type          814405
Manu.Date     11.01.2021

[Measurement information]
Measurement modeTiming
time interval      60 s
Averaging          0.25s
File name         210413\130217.csv
Decimal separator  , [comma]

[CH1 Info]
Sensor typelfach  , LUX, RM-Digital
Sensor
Type             814461
Serial number    00135
Calibration date10 .05.2019
Unit            klx
Wavelength range380 - 780 nm
Measuring range0-2000 klx

[CH2 Info]
Sensor typelx , UV-C, RM-Digital Sensor
Type          814410
Serial number  00115
Calibration date10 .05.2019
Unit          W/cm2
Wavelength range200 - 280 nm
Measuring range0-2000 mW/cm2

***File      open***01.01. 201909:42:28
*****Measurements *****
      Date [DD.MM.YYYY]      Time [HH:MM:SS]      CH1: LUX [klx] CH2: UVC [W/cm2]      Can
CH1: LUX [klxs]      Can CH2:      UVC [J/cm2]      Temp. CH1 [°C] Temp. CH2 [°C]
      01.01. 201909:42:      280,      33900, 339022, 422,6
      01.01. 201909:43:      280,      3400, 679022, 522,6
      01.01. 201909:44:      280,      3401, 019022, 522,6
      01.01. 201909:45:      280,      33901, 358022, 422,6
      01.01. 201909:46:      280,      33901, 697022, 522,6
      01.01. 201909:47:      280,      33902, 036022, 522,6
      01.01. 201909:48:      280,      33902, 375022, 522,6

***File closed***      01.01.201909 :49:27

```

Information about the device used

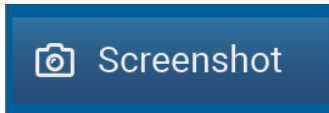
The settings used during data recording.

Information about the sensors used.

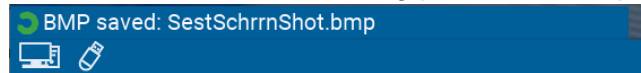
8.5.2 Screenshot to the USB stick

If a USB stick is connected, a screenshot of the screen, in BMP format, can be saved to the USB stick at any time.

The capture is triggered in the main menu by clicking "Screenshot".



Before the snapshot is created, the menu closes and the screen locks. When the saving process is completed, the



8.5.3 Data recording via USB

Data recording via USB can be started via a COM interface. The measured values; ges. offset; dose; min.; max. and the temperature (each for both sensors) are output, a semicolon serves as separator.

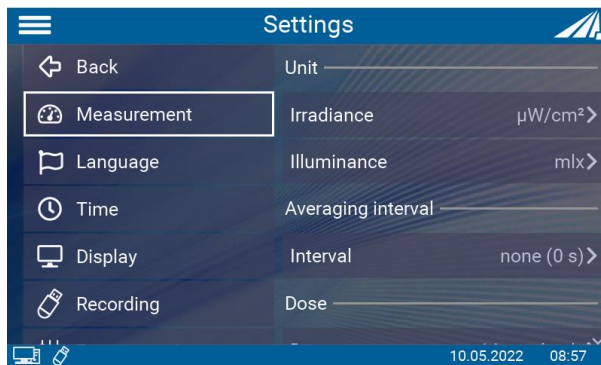
The recording is stopped by a COM command or by pulling the USB cable.

```
Datarecording[TAB]Start[CRLF]
Sensor1;Measured value [klx];ges.Offset;Dose[klxs];Min.;Max.;Temp. [deg C];Sensor2;Measured
value [W/cm2];ges.Offset;Dose[J/cm2];Min.;Max.;Temp. [deg C]
LUX;0.176;0.000;0.000;0.160;0.176;22.3;UVC;0.000;0.000;0.000;0.000;0.000;22.4;
LUX;0.176;0.000;0.000;0.160;0.176;22.3;UVC;0.000;0.000;0.000;0.000;0.000;22.4;
LUX;0.176;0.000;0.000;0.160;0.176;22.3;UVC;0.000;0.000;0.000;0.000;0.000;22.4;
LUX;0.176;0.000;0.000;0.160;0.176;22.3;UVC;0.000;0.000;0.000;0.000;0.000;22.5;
LUX;0.176;0.000;0.000;0.160;0.176;22.3;UVC;0.000;0.000;0.000;0.000;0.000;22.5;
LUX;0.176;0.000;0.000;0.160;0.176;22.3;UVC;0.000;0.000;0.000;0.000;0.000;22.5;
LUX;0.176;0.000;0.000;0.160;0.176;22.3;UVC;0.000;0.000;0.000;0.000;0.000;22.5;
Datarecording[TAB]Stop[CRLF]
```

See here: Chapter 9

8.6 Settings

The Settings menu item contains general settings for the measurement and general settings for the RMD Touch.



The settings can be reached via the main menu.

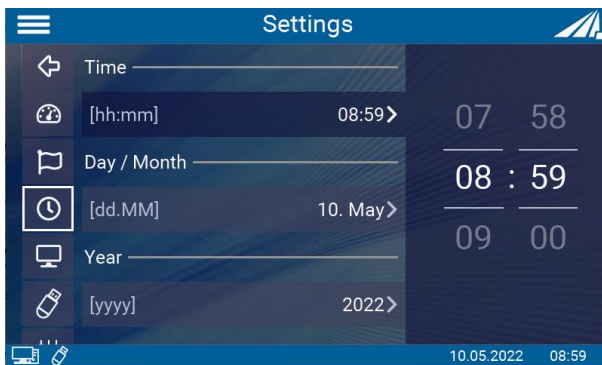
8.6.1 Change language

This menu item allows switching the system language between German and English and switching the decimal separator used between comma and dot. Analogous to the decimal separator, the thousands separator also changes.



8.6.2 Time / Date

The RMD Touch has a real-time clock. You can set the real-time clock in the "Date / time" menu.



The real-time clock is set automatically by connecting the device to the PC software or can be set in the Time menu. Setting the time may be necessary e.g. after a firmware update or after resetting to factory settings.



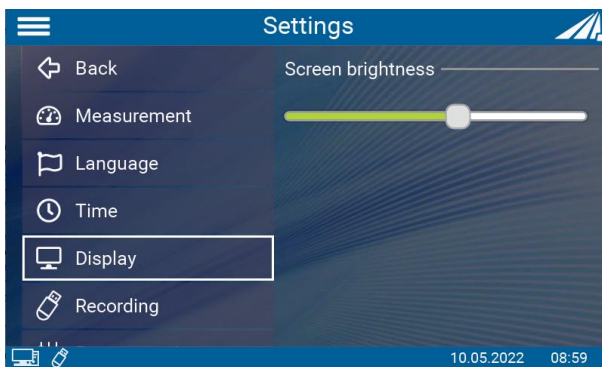
Note

The real-time clock is supported by an internal battery for a short time. Leave the power cord plugged in to conserve the battery.

Check the settings after a leap day / leap second or after changing the summer/winter time.

8.6.3 Display

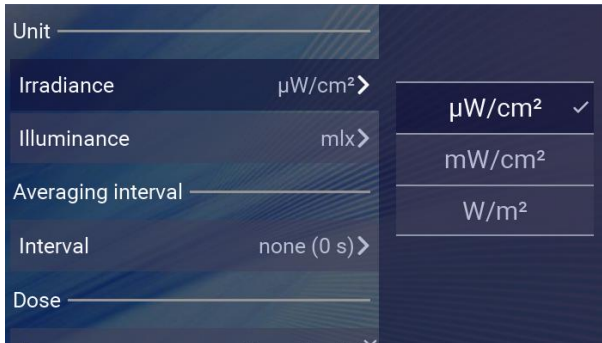
In the Display setting, the display brightness can be changed.



8.7 Measurement

The following measurement-specific settings can be made in this menu item:

Unit:



Irradiance

- mW/cm^2
- W/m^2
- $\mu\text{W}/\text{cm}^2$

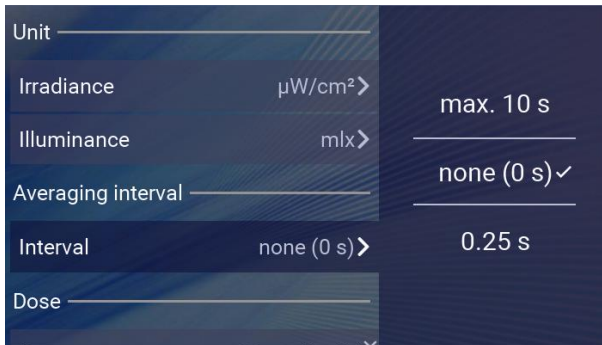


Illuminance:

- mLux
- Lux
- kLux
- MLux

Averaging interval:

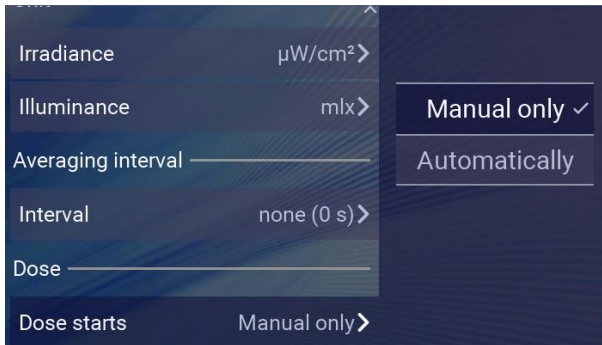
The averaging interval is the time period over which the average is taken:



- none (0 s) "no averaging".
- very short (0.25 s)
- short (0.5 s)
- medium (1 s)
- long (2 s)
- maximum (10 s)

Dose:

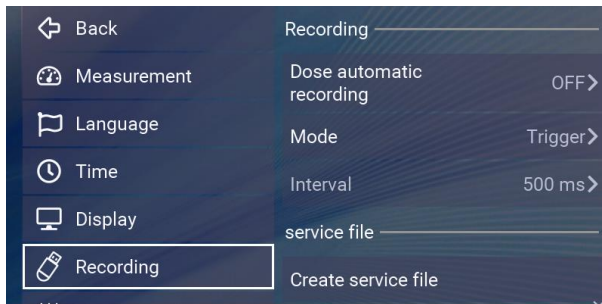
Here you can set whether the dose measurement is started automatically when the device is switched on and a sensor is plugged in or whether it can only be started via the function menu.



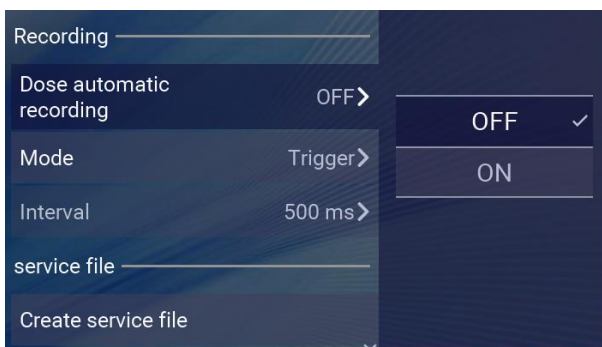
- **Manual only:**
The dose is started and stopped via the function menu.
- **Automatic:**
The dose runs continuously and can be reset. The automatic recording of measured values, is not possible with the "Automatic" setting.

8.7.1 Record

The Recording menu item contains the settings for how measurement data is to be recorded. It can be set in which interval the data are recorded and whether the recording should be started automatically.

**Record dose automatically:**

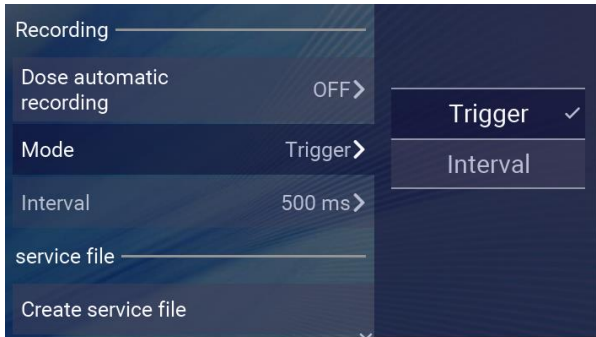
This setting specifies whether the data recording to the USB stick (if available) is automatically started when starting the dose measurement via the function menu.



- **OFF:**
Data recording is started and stopped via the function menu.
- **ON:**
If a dose measurement is started in the function menu, a recording also starts automatically. The recording must be ended via the function menu.

Mode:

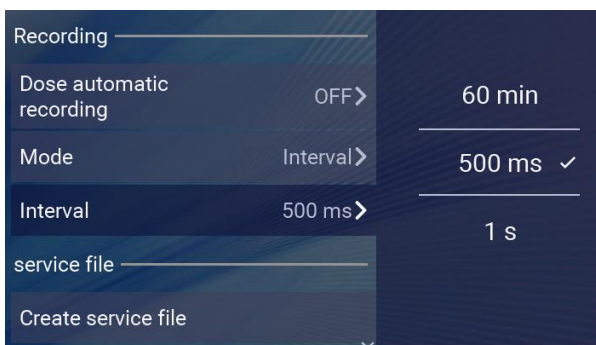
During a file recording, the saving of a measured value can either be triggered by display (a value is recorded every x seconds) or manually.



- **Trigger:**
The measured values are only recorded if this was triggered manually (via menu). One measured value is always recorded.
- **Interval:**
The measured values are saved every x seconds.

Interval:

Determines how often measurement data should be recorded. This setting is disabled if the recording mode is "Trigger".



Possible intervals are:

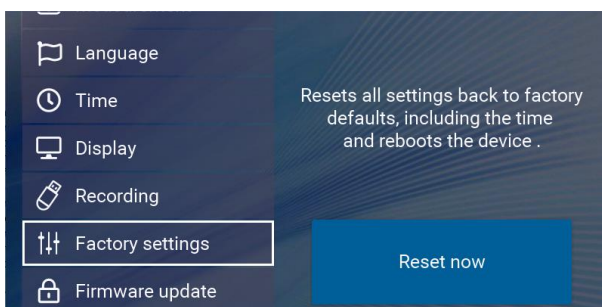
- 500 ms
- 1 s
- 10s
- 1 min
- 10 min
- 60 min

Create service file:

A service file can be created here to support troubleshooting by the manufacturer.

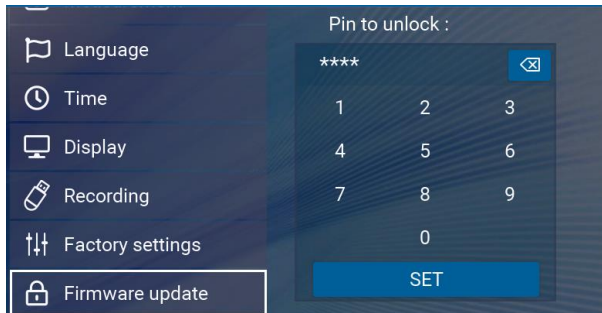
8.7.2 Factory settings

By confirming, the device is reset to its original settings and restarted. The time must then be set again. The switch responds to a long click.



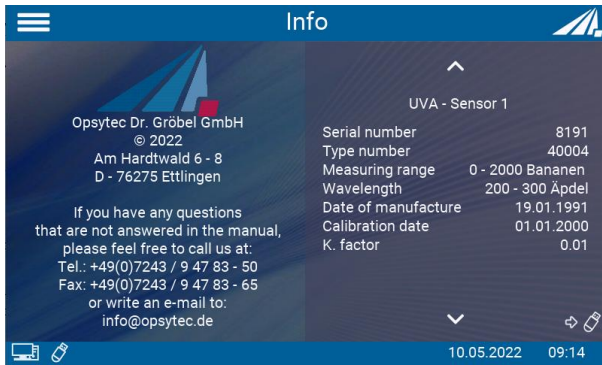
8.7.3 Firmware update

The firmware of the device can be updated with a Windows PC.
Please contact the manufacturer for this.



8.7.4 Information

Sensor-specific and device-specific information can be called up under the Information menu item. Only connected sensors are visible in the menu.



Display of sensor information. If no sensor is connected, this menu item is not displayed.



Display of information about the RMD.

8.8 Additional lamp factors*

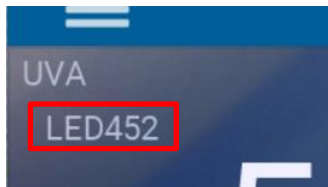
If a sensor with additional lamp factors is connected, the (FAKTOR) tab appears in the function menu:



To select a factor to , click on FAKTOR and select the desired lamp.

It is possible to store up to 10 lamp factors in one sensor. Click on the desired factor to switch between them.

(* Lamp name exemplary)



The currently set name of the factor appears in addition to or instead of the sensor name.

(This function is only available with a corresponding sensor with lamp factors).

8.9 Multiple sensors: Erythema and NDT*.

The multiple sensors differ from the simple sensors in the measurement screen.

This function is only available with the corresponding sensors:

- NDT (365 nm + LUX) 315 - 400 nm, 380 -780 nm
- Erythema + UVA 200 - 400 nm, Ery(λ)
- Special sensors

8.9.1 Erythema sensor

In addition to the measured irradiances of the two channels, the erythema sensors have the sum of these also displayed on the measuring screen. The dose value is only displayed if the dose is recorded.



Similarly, the min., max. values and the current measured value are displayed one below the other. The dose is not displayed here.



8.9.2 NDT

The NDT sensors do not sum due to the different units, therefore only the two channels are shown on the screen. The dose value is only displayed when the dose is recorded.



Similarly, min. and max. values and the current measured value are displayed one below the other. The dose is not displayed here.



9 Software

The software is used to read and control the RMD Touch with the PC. The software enables:

- Display and export measured values
- To turn the data logging on and off
- Change the settings

9.1 Install software

For the installation, proceed as follows:

1. Uninstall any old versions of the software first.
2. If necessary, disconnect the RMD Touch from the PC.
3. Start the installation with "Setup.exe" in the root directory of the USB stick. Follow the instructions of the installation program.
4. After the installation is complete, connect the RMD Touch to the PC. The driver installation is automatic under Windows 10 and Windows 11.
5. Connect the RMD Touch to the PC and start the software.



Note

The driver installation is done as a virtual COM port. If the ZPM is not correctly integrated, switch it off with the USB connection plugged in and switch it on again after at least three seconds.

9.2 Operation

The operation of the software is divided into tabs with:

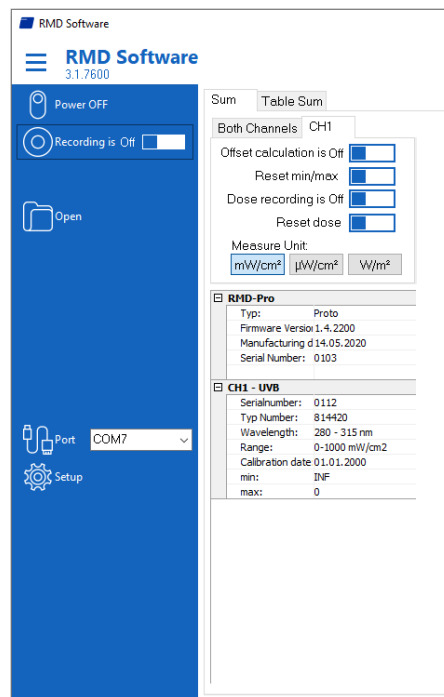
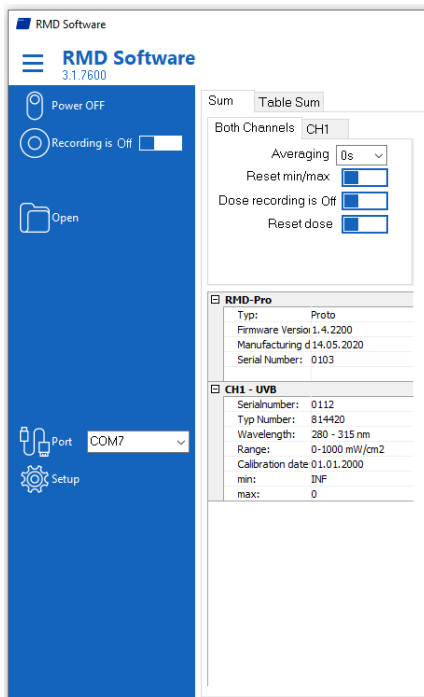
- Control of the measuring device / measurements on the PC
- Information about the RMD Touch and the sensors
- Setting of the measured value output
- Output of the measurements as a table
- Output of the measurements the graph

Via software, measurements can be started and stopped, and the settings for the measurements can be made.

9.2.1 Device control and information

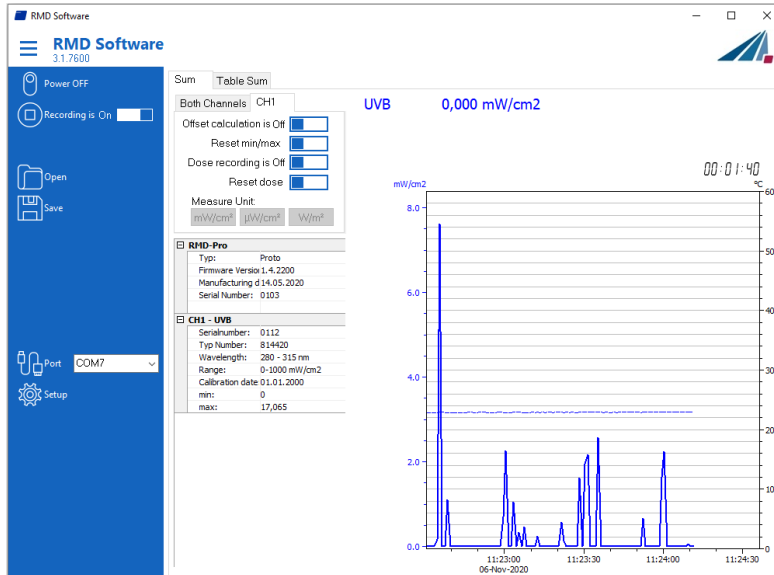
The following figure shows in the upper part the "Settings" for controlling the RMD Touch radiometer according to the previously described device settings.

Below that, "Information" with data on the sensors and the RMD Touch radiometer is displayed



9.2.2 Measurement

The following figure shows the "Measurement" tab with the current measurement value as a graph. The settings for the graph can be found under "Setup".



The following figure shows setting options for the graph



The following figure shows the "Table" tab with the last measured values.

The screenshot shows the RMD Software interface with the 'Table' tab selected. The table displays measurement data for various parameters over time. The data is as follows:

| Date | Time | UVB | nC | Dose UVB | Dose nC | Temp. UVB | Temp. nC |
|------------|----------|-------|----|----------|---------|-----------|----------|
| 06.11.2020 | 11:31:11 | 0.000 | | | | 23 | |
| 06.11.2020 | 11:31:12 | 0.010 | | | | 23 | |
| 06.11.2020 | 11:31:13 | 0.000 | | | | 22.9 | |
| 06.11.2020 | 11:31:14 | 0.000 | | | | 22.9 | |
| 06.11.2020 | 11:31:15 | 0.000 | | | | 22.9 | |
| 06.11.2020 | 11:31:16 | 0.000 | | | | 23 | |
| 06.11.2020 | 11:31:17 | 2.527 | | | | 23 | |
| 06.11.2020 | 11:31:18 | 0.000 | | | | 22.9 | |
| 06.11.2020 | 11:31:19 | 0.000 | | | | 23 | |
| 06.11.2020 | 11:31:20 | 0.000 | | | | 22.9 | |
| 06.11.2020 | 11:31:21 | 0.000 | | | | 22.9 | |
| 06.11.2020 | 11:31:22 | 0.000 | | | | 22.9 | |
| 06.11.2020 | 11:31:23 | 0.000 | | | | 22.9 | |
| 06.11.2020 | 11:31:24 | 0.000 | | | | 22.9 | |
| 06.11.2020 | 11:31:25 | 0.000 | | | | 23 | |
| 06.11.2020 | 11:31:26 | 0.000 | | | | 23 | |
| 06.11.2020 | 11:31:27 | 0.000 | | | | 23 | |
| 06.11.2020 | 11:31:28 | 0.000 | | | | 22.9 | |
| 06.11.2020 | 11:31:29 | 0.000 | | | | 23 | |
| 06.11.2020 | 11:31:30 | 0.000 | | | | 23 | |
| 06.11.2020 | 11:31:31 | 0.000 | | | | 23 | |
| 06.11.2020 | 11:31:32 | 0.000 | | | | 22.9 | |
| 06.11.2020 | 11:31:33 | 0.000 | | | | 23 | |
| 06.11.2020 | 11:31:34 | 0.000 | | | | 23 | |
| 06.11.2020 | 11:31:35 | 0.000 | | | | 22.9 | |
| 06.11.2020 | 11:31:36 | 3.057 | | | | 23 | |
| 06.11.2020 | 11:31:37 | 0.486 | | | | 23 | |
| 06.11.2020 | 11:31:38 | 0.000 | | | | 22.9 | |
| 06.11.2020 | 11:31:39 | 0.000 | | | | 22.9 | |

9.3 Measurement data

Measurements are stored on an external USB stick.

The data files are saved as CSV files. CSV stands for comma-separated-values. A CSV file stores tabular data (numbers and text) in plain text. This makes a CSV file easy to read (e.g. in a text editor).

CSV is a simple file format that is supported by many programs. The file format was chosen because it can easily be opened with a spreadsheet like Microsoft Excel or OpenOffice.org Calc.

In the software, measurements can be exported using the Save / Save As function or as CSV data. For easy import, the format can be adjusted in the "Settings" menu.

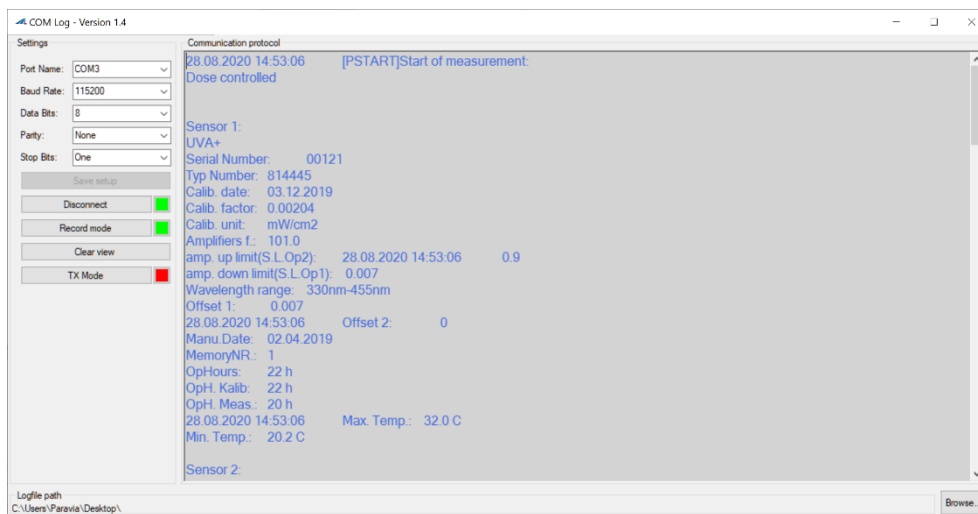
Data export via USB

The RPM Touch automatically transfers all data via USB. Output is the content of the files when they are written. The communication takes place as ASCII communication.

Definitions:

- Baud rate: 115200 baud
- Parity: None
- Data bits: 8
- Stop bit: 1

The following software gives an example of the data collection functions:



All commands and responses use TAB (\x09) as separator and are terminated by CRLF (Carriage Return \x0d and Line Feed \x0a). Commands that are not recognized are answered with "NACK: no such command". The RMD does not echo the commands.

To control data recording via USB the following commands are used:

- Datarecording{TAB}Start{CRLF} → Starts sending the measurement data every 1 s
- Datarecording{TAB}Stop{CRLF} → Stops sending the measurement data.

The following commands can be used while recording is running. However, they are only applied to the selected channel or sensor:

- Datarecording{TAB}Dose{TAB}Start{CRLF} → Starts the dose measurement
- Datarecording{TAB}Dose{TAB}Stop{CRLF} → Stops the dose measurement
- Datarecording{TAB}Dose{TAB}Reset{CRLF} → Resets the dose measurement
- Datarecording{TAB}Minmax{CRLF} → Resets the min and max values
- Set{TAB}Offset{CRLF} → Sets the current measured value as offset
- Set{TAB}Offset0{CRLF} → Resets the offset

The channel can be changed with the following commands:

- Set{TAB}Sensor1{CRLF} → Switches to channel 1
- Set{TAB}Sensor2{CRLF} → Switches to channel 2
- Set {TAB}Both{CRLF} → Activates all connected channels

The following commands, for measurement adjustments and information, should not be sent during a measurement.

- Set{TAB}Averaging{TAB}Xs{CRLF} → Sets the averaging for all channels. Possible averages (X) are 0s, 0.25s, 0.5s 1s or 2s.

| | |
|------------------------|---|
| Info{TAB}Device{CRLF} | → General information about the RMD such as the firmware, serial number, type number and date of manufacture. |
| Info{TAB}Sensor1{CRLF} | → Gives information about the sensor connected to channel 1: Sensor type, type number, serial number, calibration date, calibration unit, calibrated wavelength and the measuring range. |
| Info{TAB}Sensor2{CRLF} | → Analog to channel 1 |
| OFF{CRLF} | → Turns off the RMD |
| ON{CRLF} | → Turns on the RMD |



The command set can be read out with the command `Help[CRLF]`.

10 Technical data



The pin assignment for special versions may vary and can be found in the "Technical Drawing" appendix.

| General data | |
|------------------------------|---|
| Ambient temperature | +18 to 35 °C |
| Storage temperature, approx. | +0 to +60 °C |
| Air humidity | 10% to 80% rel. humidity |
| Pressure range | 900 to 1050 hPa |
| Structure type | Desktop device |
| Body position | horizontal |
| Dimensions | 250 x 185 x 100 mm ³ |
| Weight | 2,6 kg |
| Maximum housing temperature | <60 °C |
| Cooling | Air cooling |
| Display | Capacitive touch display |
| Noise emission | L _{pa} < 70 dB at the workplace in normal operation according to DIN 45635 T. 19 |

| Connections | |
|-----------------------------|------------------------------------|
| Mains voltage and frequency | 100-120VAC / 200-240VAC / 50/60 Hz |
| Input current mains side | approx. 0.2 A max |
| Fuse | See nameplate |
| Data interface | USB type B |
| Connection sensor | 2 pieces, full-digital |
| USB stick | USB type A, max 16 GB, FAT32 |

| Measurement | |
|---------------------|---|
| Display output | 1 + 2 channels Irradiance + dose Min/max irradiance |
| Internal memory | 8 GB |
| Data recording rate | adjustable: 1 s - 15 min |
| Recording duration | > 2400 h |

| USB connection / hardware- software requirements*. | |
|---|---|
| PC requirements | min Intel CORE i3, 2 GB Ram, >40 Gb HDD |
| Operating system | Windows 7 or 10 with .NET Framework > 4.0 |

| PIN | |
|------------|----------------------|
| PIN | Ask the manufacturer |

| Firmware versions | |
|--------------------------|-------|
| Firmware version | 1.0.1 |

| Mounting position, minimum distances | |
|---|------|
| Minimum distances, top | 4 cm |
| Minimum distances, lateral | 4 cm |

| TECHNICAL DATA SENSORS | |
|-------------------------------|----------------------------|
| Measuring range | 0 - 10 W/cm ² |
| Resolution | 0.001 mW/cm ² |
| Dose measuring range | 0 - 100 MJ/cm ² |
| Illuminance measurement | 0 - 500.000 lx |
| Dynamic range | up to 107 |
| AD conversion | 24 bit |
| Temperature sensor | integrated |
| Dimensions | Ø 40 mm, h 35 mm |
| Optical surface | Ø 6 mm |
| Weight | 160 g |
| Connection cable | 2 m |
| Operating temperature | 0 to 40 °C |
| Storage temperature | -20 to 60 °C |
| Humidity | <80%, non-condensing |



The technical data for special versions may differ and can be found in the appendices to the special versions.

| Spectral ranges of the sensors | |
|---------------------------------------|------------------------------|
| UVC | 200 - 280 nm |
| UVB | 280 - 315 nm |
| UVA | 315 - 400 nm |
| UVA+ | 330 - 455 nm |
| UVBB (Broadband) | 230 - 400 nm |
| VISB | 400 - 480 nm |
| VISBG | 400 - 570 nm |
| LUX | 380 - 780 nm, $V(\lambda)$ |
| NDT (365 nm + LUX) | 315 - 400 nm, 380 - 780 nm |
| Erythema + UVA | 200 - 400 nm, $Ery(\lambda)$ |

11 Maintenance & Cleaning



This chapter is intended for qualified users with maintenance tasks.


The system is largely maintenance-free. Clean the optical components only when necessary.


The RMD Touch is a system that requires only occasional cleaning as needed and calibration as maintenance.

For cleaning, we recommend that you only do this when necessary and not on a regular basis, as the sensor surface is (scratch)sensitive.

The following table gives some maintenance steps as a recommendation:

| No. | Maintenance item | Procedure | Recommended frequency |
|-----|-------------------------|---|-----------------------|
| 1 | Sensor testing | Check sensors, must be free of contamination, otherwise clean / recalibrate. | Monthly |
| 2 | Cleaning the components | Visual inspection The surfaces must be clean. Cleaning only as required. | Monthly |
| 3 | | If cleaning is required, use compressed air or isopropanol (UV IR grade) and a very soft paper towel. | If needed |
| 4 | Calibration | Check calibration by comparison measurement or calibration date. | If needed |
| 5 | | If recalibration is required, send to the manufacturer | Annual |
| 6 | Testing the cables | Check all wiring connections for possible damage or loose contacts. Replace if necessary. | All 6 Weeks |

| | |
|---|--|
|  | ⚠ CAUTION |
| | <p>The surfaces of the sensors can be affected by UV radiation. heat up. This may cause burns on contact.</p> <p>Therefore, note:</p> <ul style="list-style-type: none"> - Wear protective gloves if necessary - Observe cooling phase if necessary |

| | |
|---|--|
|  | CAUTION |
| | <p>Risk of damage</p> <ul style="list-style-type: none"> • Skin grease and dirt are absorbent in the UV and visible spectral range. • Avoid fingerprints on the optically active sensor surface. If necessary, clean the components carefully with isopropanol. |





11.1 Cleaning

Skin grease and dirt are partly absorbent and impair the measurement result. Therefore, contamination of the sensor must be avoided.

Only carry out cleaning work on the sensor as required. This will give you the best possible stability. Clean only with isopropanol (UV-IR-GRADE), with oil-free compressed air or with clean, lint-free cloths.

To do this, use an optical cleaning cloth and wipe the surfaces carefully. For stubborn dirt, moisten the cloth with isopropanol. Clean the surfaces using circular movements. Avoid strong pressure. If necessary, allow the surfaces to dry completely after cleaning.

- For cleaning:
 - Use isopropanol only
 - Switch off the system.
 - Wear clean, lint-free gloves.
 - Clean the components carefully.
 - Apply the detergent only to the cloth, moisten only.
 - The cleaning agent could get inside and cause property damage.
 - Wipe the surfaces with little pressure, in a circular motion.
 - Then remove all residues of the cleaning agent.
 - Switch the system back on.
 - Set the desired operating mode again.

| | |
|---|--|
|  | <p style="text-align: center;">⚠ WARNING</p> <p>NOTES Gloves must be worn for cleaning the optically active surface.</p> |
|  | <p style="text-align: center;">⚠ WARNING</p> <p>NOTES Do not use acetone or other chemical cleaners to clean the measuring device.</p> |
|  | <p style="text-align: center;">⚠ WARNING</p> <p>NOTES The meter cannot be opened by the user.</p> |
|  | <p style="text-align: center;">⚠ CAUTION</p> <p>Possible damage to the system Do not use compressed air or cleaning agents.</p> |

11.2 Battery change

The meter is shipped with an internal battery for the real-time clock. Contact the manufacturer for battery replacement.



Note

If the batteries are empty, the real-time clock may deviate.

Without external supply and without batteries or with empty batteries, the real-time clock is reset. After switching on, the user is prompted to set the real-time clock.

The measurement data is retained.

11.3 Exchange / delete USB stick

The measurement data is stored on a USB stick, but can only be read out and deleted on the PC.



Note

Delete the measurement data after 50,000 measurements.

Sufficient data backup is recommended.

11.4 Firmware update

It is possible to update the firmware of the RMD Touch via USB. For this, the RMD Touch must be connected via USB to a suitable PC on which the update program is running.

In addition, the RMD must be put into update mode via menu, the update mode is secured by the password.

Contact the manufacturer for this and for a new firmware.

1. Enter the password. By confirming the password with OK, the device enters the update mode. This can only be interrupted by a reset!

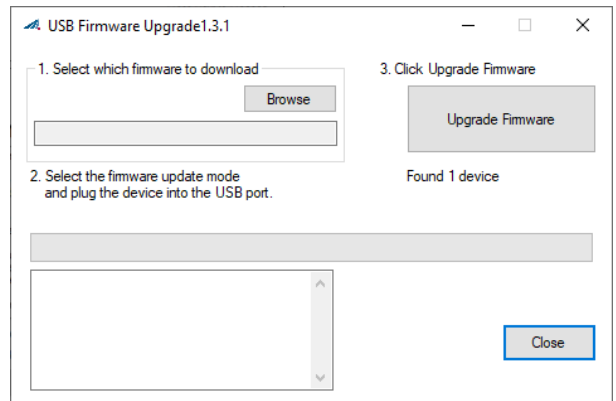
2. Open software on PC and click Next>.



3. Accept license and continue

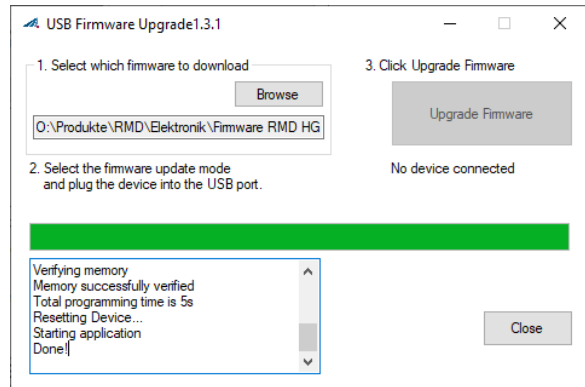
4. Browse to select the new firmware, as a TEXT file.

If the device is in update mode and has been found, the update can be started with Upgrade Firmware.



During the update the USB connection must not be disconnected and the PC must be switched off!

5. The loading bar shows the progress of the update. The RMD can only be removed and the software closed when "Done" is displayed in the info window. After a successful firmware update, the RMD Touch restarts. The date and time must be entered again.



11.5 Calibration

The user is always responsible for determining and adhering to recalibration intervals. We recommend checking all calibration items at intervals of 12 months (manufacturer's recommendation). Note: In case of heavy use, this period may be too long. If damage or contamination is suspected, we strongly recommend an immediate check.

11.6 Error / malfunction

The following notes and error messages are intended for the user. The explanations are intended to help ensure proper operation. Possible reasons and remedies are given.

| Function / Display | Meaning | Measures |
|---|-----------------------------------|--|
| The irradiance is too low | Sensor ages Sensor dirty | Have sensor recalibrated Clean sensor (e.g. with ISOPROPANOL) |
| Sensor is not displayed | Sensor not detected | Reconnect sensor Restart RMD Touch |
| USB stick Icon is no longer displayed, communication with PC not possible | USB stick is no longer recognized | Reconnect USB stick Reset device. |

Errors are displayed on the screen. Follow the screen instructions on the example:



Before the measurement cycle, it is checked whether there is enough memory on the USB stick.

-> Continue without saving with OK

-> Cancel takes you back to the start screen.



Before the measuring cycle, it is checked whether a USB stick is available.

-> Continue without saving with OK

-> Cancel takes you back to the start screen.

11.7 Spare parts



Contact for replacement orders:

Opsytec Dr. Gröbel GmbH

Am Hardtwald 6-8

76275 Ettlingen

Germany

Phone +49 - 7243 - 94 783 - 50

Fax +49 - 7243 - 94 783 - 65

Visit us on the Internet: www.opsytec.de

12 Declaration of Conformity



| | |
|---|---|
| Manufacturer: | Company name: Opsytec Dr. Gröbel GmbH Street: Am Hardtwald 6-8 Place: 76275 Ettlingen Country: Germany |
| Authorized person for the compilation of technical documentation: | Company name: Opsytec Dr. Gröbel GmbH Street: Am Hardtwald 6-8 Place: 76275 Ettlingen Country: Germany |
| Product: | Radiometer RMD Touch with sensors |
| Type designation: | RMD Touch |
| Type number: | 760 003 XXXX 8144XX XXXX |

The manufacturer hereby declares that we have developed, designed and produced the above-mentioned product(s) under our sole responsibility and that the product complies with the following standard(s) or guideline(s) in this declaration:

2014/35/EU

"Directive of the European Parliament and of the Council on the harmonization of the laws of the Member States relating to the provision of electrical Equipment for use within certain voltage limits on the market (Low Voltage Directive)".

2014/30/EU

"Directive of the European Parliament and of the Council on Electromagnetic Compatibility (EMC Directive, recast)".

The compliance of the designated product with the provisions of the Directive is demonstrated by full compliance with the following standards:

Ettlingen, 20.10.2021

gez. Dr. Mark Paravia

This document is valid without signature if the person responsible for the release is named in clear writing.

