PRUUVE

UV dose measuring device
UV-MACS 2.1 / macsReader 2.1

(MACS = Mobile Activation Curve Setup)

Operating Instructions

Date of issue: 07.04.25 Version: 1.3.1

Language: EN

Before use, the operating instructions must be read carefully, understood fully and applied accordingly.

Checking the firmware version on the manufacturer's website before commissioning is recommended.

The operating instructions must be kept for future reference.

DE: Weitere Sprachen online.

EN: More languages online.

FR: Plus de langues en ligne.

ES: Más idiomas en línea.

IT: Altre lingue online.

https://pruuve.de/produkt/produktinformationen/

Manufacturer:

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01067 Dresden

+49 351 463 34905
kontakt@pruuve.de
www.pruuve.de/produkt/produktinformationen/

1 Product and manufacturer

1.1 Product

The following product is described in these operating instructions: «Maschine» Model 2.1. A structurally identical product is also sold under the name “macsReader” from distributor Dr. Hönle AG.

1.2 Product classification

The product has been classified by the manufacturer as electrical equipment in accordance with Low Voltage Directive 2014/35/EU.

1.3 Loss of manufacturer’s guarantee

The statutory warranty conditions apply to this product in accordance with the applicable national regulations.

Opening the equipment and/or making changes to the equipment as well as changes to the operating software will invalidate the manufacturer's warranty and is strictly prohibited.

1.4 Manufacturer

Name and address	PRUUVE GmbH Freiberger Strasse 1 01067 Dresden
Phone	+49 351 463 34905
E-mail	kontakt@pruuve.de
Internet	https://pruuve.de/
Product info	https://pruuve.de/produkt/produktinformationen/
LinkedIn	https://www.linkedin.com/company/pruuve
YouTube	https://www.youtube.com/@pruuve2024

2 About these operating instructions

The descriptions and recommended actions in these operating instructions must be read, understood and put into practice to ensure safe and proper use of the equipment.

Checking the firmware version on the manufacturer's website before commissioning is recommended.

https://pruuve.de/produkt/produktinformationen/

These operating instructions should be kept for future reference until the equipment has been disposed of.

2.1 Purpose

These operating instructions contain information on safe, failure-free and economical use of the equipment.

This information is intended for persons who carry out work in connection with the equipment.

The following table provides an overview of these persons and their tasks.

Person	Task
Instructed person	Use of equipment
Transport company	Transport of equipment
Disposer	Disposal of equipment

2.2 Availability

The operator will make these operating instructions or extracts of these instructions available to persons who carry out tasks in connection with the equipment.

The operator must keep the operating instructions or extracts from the instructions within reach in the immediate vicinity of the equipment.

If the equipment is handed over to another person, the operator must hand over the operating instructions as well.

2.3 Weitere Sprachen / Other languages / Autres langues / Otros idiomas / Altri lingue

Please visit the manufacturer's website regularly to download the latest language versions.

DE: Weitere Sprachen online.

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https://pruuve.de/produkt/produktinformationen/

3 Description of equipment

This section contains information to help you understand the equipment.

3.1 General product description

3.1.1 Product function as a whole

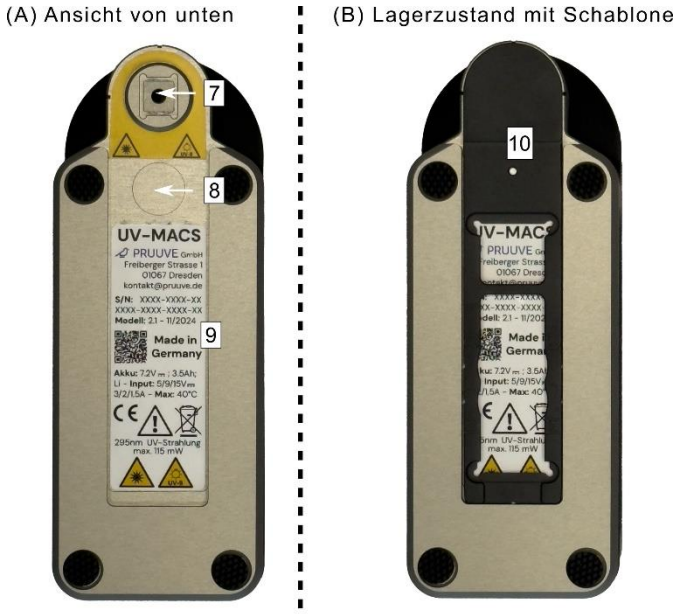
The “UV-MACS” measuring device in combination with the measuring strips (e.g. “Hg-500 UV strips”) is used for precise measurement of UV doses. The UV strips are affixed directly onto the object that will be irradiated, allowing for recording of the irradiation dose exactly on the workpiece surface. After irradiation, the UV-MACS is placed on the UV strip and activated. Within seconds, the measuring device displays the irradiation dose in mJ/cm². The measured value is assigned to a unique measurement ID and stored in the measured value memory along with the date and time. For the highest possible precision, calibrating the UV strips before irradiation with the UV-MACS is recommended. The data can then be transferred to a PC via USB-C for more precise evaluation and archiving and imported into Microsoft Excel, for instance.

Note: The function and operating principle of the equipment are described in more detail in the ‘Operation’ chapter.

3.1.2 Main components

The measuring device is composed of the following assemblies:

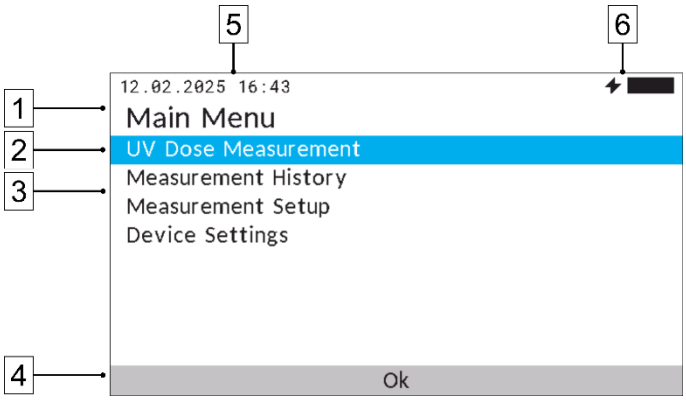
1. Optics tower: UV outlet through aperture on underside – see item 7.
2. Top side of optics tower: Possible heat development up to 45°C. Observe safety instructions.
3. Display: Display for control.
4. Control panel: Control pad with arrow keys and confirmation button.
5. Grip recesses
6. Stencil: Optional use for identical measuring conditions of the UV strips.



7. Aperture: UV outlet marked with coloured ring and warnings
8. Magnet for holding the stencil in place during transport and storage
9. Slot for stencil
10. Fixed stencil

3.1.3 Control and display

The display is laid out as follows: (Version: Firmware 69878)



1. Menu title: Displays the name of the menu currently open to orient users as to where they are within the menu structure.
2. Selection marker: Coloured highlighting of the currently selected menu option.
3. Menu options: Lists individual options that the user can select within the menu.
4. Navigation bar: An area at the bottom of the display that shows possible actions. The available options change depending on the menu content.
5. Date and time display
6. Display of charge level: Display in 20% increments and flash symbol during the charging process

3.1.4 Process of UV dose measurement

Note: A detailed description of the process can be found in the “Operation’ section of these operating instructions.

1. A new UV strip is attached to the workpiece surface.
2. Place the stencil (6) on the unirradiated UV strip.
3. Place the measuring device on the calibration position of the stencil using the grip recesses (5).
4. A *calibration* is carried out using the control panel (4) and display (3); UV radiation is emitted from the aperture (7) and hits the UV strip.
5. UV strip is exposed to a UV dose in the UV irradiation system.
6. Place the stencil (6) on the irradiated UV strip.
7. Place the measuring device on a measuring position of the stencil using the grip recesses (5).
8. A *measurement* is carried out using the control panel (4) and display (3); UV radiation is emitted from the aperture (7) and hits the UV strip.
9. The measured value is shown in the display (3).
10. The measuring device is switched off, the stencil (6) is placed in the slot (9) and held there by the integrated magnet (8).

3.1.5 Technical data (short version)

Note: The complete data can be found in the ‘Technical data’ chapter.

W / L / H (mm)	60 / 160 / 60
Weight without packaging (g)	480
Energy supply	Electrical: USB-C connection for power supply and data transfer

3.1.6 Service life of safety-relevant components

There are two types of safety-relevant components:

1. Temperature sensors that switch off the equipment at 45°C to protect it from overheating, premature ageing and fire.
2. Two independent protection circuits for the charging circuit and the lithium-ion battery.

Service life:

- Temperature sensors (monitoring system): The integrated circuits (ICs) in temperature sensors are designed for a service life of 10 to 15 years.
- Protection circuit: The protection circuit is specified for a Mean Time Between Failures (MTBF) of 10 years, which describes an average failure time span of 10 years between individual failures.

3.2 Operating modes, usage category, user groups and usage environment.

The following operating modes are available:

Operating mode	Description
Calibration mode (manual)	Calibration of 1–12 UV strips to define the reference value.
Measuring mode (manual)	Measurement of 1–12 UV strips to determine the UV dose.
Charging	In charging mode, the equipment is connected to an external energy source to charge the battery. Charging times vary depending on the cable and power supply used. The equipment can be charged with up to 15 V, whereby the voltage is handled via the standard USB Power Delivery (PD). For a full charge you need: Approx. 2–3 hours with USB-C / USB-C Approx. 8–9 hours with USB-C / USB-A 3.0 Approx. 12–13 hours with USB-C / USB-A 2.0
Automatic shutdown	The screen dims after 5 minutes of inactivity. The device switches off automatically after 30 minutes of inactivity. With open calibration, this time is extended to 180 minutes

The instructed person can choose between the calibration and measurement operating modes using the control pad in the menu navigation. See also the 'Operation' chapter.

Usage category

The product is intended exclusively for use in the following usage categories.

Use in other usage categories is not intended.

User groups

- Commercial or industrial users who have familiarised themselves with the operating instructions and safety instructions

Usage environment

- In rooms closed on all sides
- With sufficient glare-free illumination of the work area
- Without external persons (not in areas with public traffic or visitors)

Operating modes for use

- Manual mode

3.3 Display

The equipment has the following display: 3.0 inch TFT display 360px * 640px with approx. 245 dots per inch (DPI).

3.4 Interfaces

This section contains information on the equipment interfaces.

The following interfaces are available on the equipment:

- Product > Person: Control panel (control pad), display
- Product > Energy supply
  - Electrical energy supply: USB-C cable for power supply. Input 5V/3A, 9V/2A, 15V/1,5A.
- Product > IT
  - USB-C cable for data transfer

3.5 Malfunctions

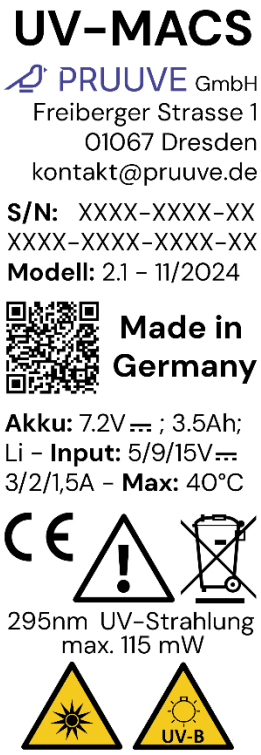
See chapter 8.1 ‘Malfunctions and corrective measures’.

3.6 Type plate

The type plate contains information about the equipment.

In the event that there is no longer a type plate present on the equipment, the type plate should be created with the following information and attached to the equipment.

The following illustration shows the type plate at item 9 as a sticker.



The S/N serial number can also be found in the software in the “About’ menu under Device Settings.

3.7 Scope of delivery

The scope of delivery of the equipment consists of the following items:

Item	Number
«Maschine» / macsReader equipment	1
Stencil for measurement and calibration	1
USB-A to USB-C cable	1
Protective case for storage	1
Phosphorescent test indicator	1
QR code to these operating instructions	1
Quick-Start Guide	1
Calibration certificate	1

3.8 Accessories: UV measuring strips

UV strips are required accessories. Please refer to the manufacturer's website for up-to-date information on available strips:

https://pruuve.de/produkt/produktinformationen/

4 Technical data

4.1 Utilisation load: Time limits

- Use: Maximum 1 hour between UV irradiation and measurement
- Maintenance interval: Every 12 months, maintenance and UV LED calibration must be carried out exclusively by the manufacturer.
- Charging cycles: Approx. 500 charging cycles until 80% of the original battery capacity is reached.

4.2 Dimensions, weight

W / L / H	60 mm / 160 mm / 60 mm
Weight without packaging	0.48 kg
Weight with packaging	Approx. 1 kg

4.3 Energy supply, power consumption

Electrical	Input: 5V/3A, 9V/2A, 15V/1.5A
Power consumption	Max. 22.5 W
Energy supply	SELV safety extra-low voltage and energy-limited circuit
Use at high altitudes	< 2000 m
Level of contamination	2

4.4 Ambient conditions: Operation, transport, storage

	Ambient temperature	Relative air humidity
Operation	+5 °C to +40 °C	Max. 85%, non-condensing
Transport	-20 °C to +60 °C	Max. 85%, non-condensing
Storage	-20 °C to +60 °C	Max. 85%, non-condensing

4.5 Radiation emission

EMC interference emission	Limit values upheld
Optical radiation	UV LED: 295 nm, max. 115 mW Aperture: Typically 300 mW/cm²
Risk group in accordance with DIN EN IEC 62471:2008	Risk group 3

5 Safety

This section contains information on how to protect people, property and the environment.

5.1 Warnings

These operating instructions contain warnings of residual dangers.

Classification of the warnings is based on the severity of the damage that can occur if the warnings are ignored and the recommended actions are not followed.

Please note that only supplied accessories or accessories explicitly approved by the manufacturer may be used with the product. Contact the manufacturer if in doubt.

If the equipment is not used as described in the instructions for use, the safety of the equipment may be impaired.

5.1.1 Signal words and signal colours

Warnings are presented with one of the following signal words and marked with a corresponding signal colour.

The following table provides an overview of signal words, what they mean and the assigned signal colours.

Signal word	Meaning	Signal colour
DANGER	Consequence of non-compliance: Death or extremely serious injuries.	Red
WARNING	Consequence of non-compliance: Death or extremely serious injuries possible.	Orange
CAUTION	Consequence of non-compliance: Serious or minor injuries possible.	Yellow
NOTE	Consequence of non-compliance: Property damage or environmental damage possible.	Blue

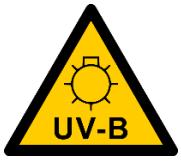
5.2 Symbol

The following symbols are used in these operating instructions and on the equipment.

5.2.1 Warning signs

A warning sign is a safety sign that warns of a risk or danger.

The following table provides an overview of the warning signs used and what they mean.

Symbol	Meaning	Symbol	Meaning
	General warning sign		Warning of optical radiation
	Warning of optical radiation in UV-B range		

5.2.2 Mandatory signs

A mandatory sign is a safety sign that stipulates a certain behaviour.

The following table provides an overview of the mandatory signs used and what they mean.

Symbol	Meaning
	Follow instructions

5.2.3 Regulatory markings

Regulatory markings are symbols on products that confirm their compliance with legal requirements, safety standards and environmentally-friendly disposal guidelines.

The following table provides an overview of the regulatory markings used and what they mean.

Symbol	Meaning	Symbol	Meaning
CE	Confirms EU conformity and product safety		Requires separate disposal for environmental protection
⎓	Indicates direct current (DC) for operation of the equipment		

5.3 Intended use

The equipment is intended exclusively for the following use:

Purpose of the product

The equipment is used for measurement of UV doses from UV dose products (UV strips, UV films, UV adhesive spots) from PRUUVE GmbH or the macsStrips from Dr. Hönle AG.

Please refer to the chapters on safety and protective measures for more detailed information. The following only contains important general information on intended use.

- The operating instructions must be read carefully before initial commissioning.
- The user is aware of all hazards and the relevant safety measures in connection with the equipment.
- Potential danger zones on the equipment (e.g. UV radiation) are clearly marked and known to the user.
- Protect yourself and third parties from harmful UV radiation. Do not use the equipment on your body. Do not expose eyes or skin to radiation.
- The equipment must not be used if there is visible damage to the housing, the sensors or the electronics.
- If the equipment malfunctions, operation must be stopped immediately. The equipment may only be put back into operation after it has been inspected by the manufacturer.
- All repair and maintenance work may only be carried out by the manufacturer.
- The equipment must be disposed of through the manufacturer.

Operating modes

- The equipment may only be used with UV dose products (UV strips, UV films, UV adhesive spots) from PRUUVE GmbH or the macsStrips from Dr. Hönle AG .
- The equipment may only be used on a firm and stable surface.
- The aperture must always face downwards and be securely supported.
- The equipment must not be moved or lifted throughout the entire calibration and measurement process.
- The equipment may only be operated with the supplied software. Software updates are provided exclusively by the manufacturer.

Any other use is not intended use.

Area of application

The product is intended exclusively for use in the following areas of application:

- Industrial areas
- Business/Commercial area, small businesses

Use in other areas of application is not intended.

5.4 Misuse

Use of the equipment for the following purposes is not permitted:

Reasonably foreseeable misuse

In the following, foreseeable misuse is described in bold with the respective instructions on how to deal with the specific case.

- Equipment falls to the ground during measurement: Make sure that the equipment is standing on a stable surface during measurement to prevent damage and incorrect results.
- Equipment tips during measurement: Make sure that the equipment is placed on a level and stable surface to prevent it from tipping over.
- Equipment is not positioned correctly on the UV strip: Hold the equipment so that the aperture is in direct contact with the measuring strip. Hold the stencil firmly with one hand and make small circular movements with the other hand so that the optics tower can click into place.
- Checking UV LED status during measurement: Avoid moving the equipment during measurement to prevent malfunctions and inaccurate measurement results.
- Operating instructions are not read: Please read the operating instructions carefully to ensure safe and effective use of the equipment.
- The operator has not explicitly trained the user and documented this: As the user, have your employer train you in proper use and document this training in writing.
- Use of equipment if there is visible damage: Do not use the equipment if there is visible damage to the housing, sensors or electronics. Contact the manufacturer for clarification.
- Attempt to modify or improperly repair the equipment: Modifications or unauthorised repairs to the equipment are prohibited and can lead to safety risks.
- Use of unsuitable cleaning agents or disinfectants: Only use the cleaning agents and disinfectants recommended in the instructions to avoid damage to the equipment.
- Improper disposal of the equipment: Only dispose of the equipment through the manufacturer.

5.5 Tasks and qualification of staff

Knowledge of all basic safety regulations is a requirement for the safe handling and fault-free operation of the equipment.

Before starting work, persons assigned to work on the equipment must undertake to:

- Observe the regulations on occupational safety and accident prevention.
- Read the safety chapter and the warnings in these operating instructions and observe them at all times during operation.

The operator is responsible for compliance with the relevant regulations and standards at the operating site.

Person	Task	Required qualification
Instructed person	Determination of UV doses. In particular, calibration measurements of unexposed UV strips and recording of the measured values of the exposed UV strips.	Reading, understanding and applying the operating instructions, if applicable additional training & instruction by experienced instructed persons

5.6 Safety devices

Hazardous areas of the equipment are safeguarded with safety devices to protect people.

5.6.1 Fixed guards

No.	Description
1	The **housing** of the equipment is used as a separating safety device and protects the user from direct contact with the built-in battery. It prevents accidental contact and ensures that potential hazards, such as injuries caused by leaking substances, are prevented.

5.6.2 Safety devices

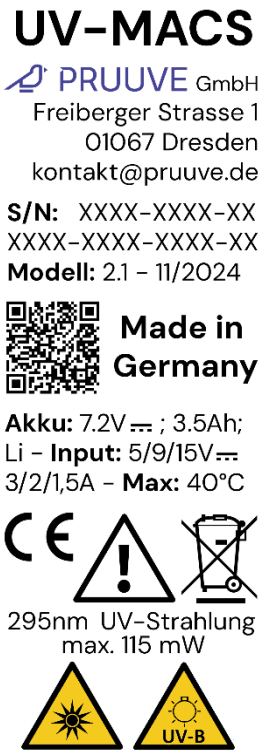
No.	Description
1	The fire risk protection system consists of **two independent protection circuits**: One in the charging circuit and one in the lithium-ion battery. Both are active during the charging process and ensure protection against overcharging and overheating even if one circuit fails. The battery circuit protects against external short circuits, high discharge currents and high temperatures during normal operation. An additional fuse inside the battery and a housing temperature monitor that switches off at 45 °C provide further protection. Temperature monitoring is independent and redundant to the battery electronics to ensure safe shutdown even if one of the existing safety circuits fails.

No.	Description
2	Safety-certified battery: Use of integrated protective mechanisms such as overcurrent, overtemperature and short-circuit protection, which reduce the risk of thermal events.
3	Software detection I – eye protection. This measure is based on 2 functions that are linked by an AND condition: The UV LED only switches on if 1) the internal photodiode directed at the aperture detects darkness AND 2) the microcontroller acceleration sensor detects that the equipment is pointing downwards.
4	Software detection II – skin protection. The UV LED switches off as soon as the acceleration sensor of the microcontroller detects an acceleration or rotation, which can be measured, for example, by lifting or tilting the equipment.
5	Software – switch-off at high temperatures from 45°C. The equipment switches off automatically as soon as a temperature of 45 °C is reached or exceeded. Four temperature sensors are installed for this purpose. All four sensors are checked for 45°C. The device is switched off as soon as just one of the four sensors reaches or exceeds the limit value.

5.7 Symbols and information on the equipment

This section contains information on symbols, what they mean and their position on the equipment.

The type plate is shown below and attached in the slot for the stencil. See also point (9) in the product description.



The meaning of the symbols is described in chapter 5.2 ‘Symbols’.

5.8 Notes on occupational safety

The operator of the equipment is responsible for executing the occupational health and safety obligations. The operator must execute the occupational health and safety obligations of the country in which the equipment is used.

The operator fulfils the occupational health and safety obligations towards the persons who do work on or in connection with the equipment.

The occupational health and safety obligations include the following points:

- Provision of these operating instructions
- Provision of the applicable documents
- Instruction of persons regarding the intended use and prevention of misuse
- Instruction of persons regarding safety devices and supplementary safety devices
- Instruction of persons regarding residual risks
- Written documentation of user instruction

This list does not claim to be exhaustive.

6 Commissioning

This section contains information on commissioning the equipment.

Commissioning of the equipment serves to inspect its functions and properties and to detect and rectify faults.

Before commissioning the equipment, please familiarise yourself with the complete operating instructions to ensure safe and correct handling of the equipment. Also discuss all safety-relevant points with the responsible safety officer and, if required, provide suitable personal protective equipment such as safety goggles.

Carefully inspect the equipment upon receipt for any external damage that may have occurred during transport. Damage, such as cracks or loose parts, should be reported to the manufacturer before commissioning and may only be repaired by the manufacturer.

During initial commissioning, make sure that the desired language is selected in the settings menu. Then check whether a firmware update is available and, if needed, carry this out as described below in order to install the current software version and all safety-relevant updates on the equipment.

Finally, carry out a visual inspection of the equipment to ensure that there is no visible damage. If visible damage is found, the equipment must not be used. Please contact the manufacturer for further instructions.

6.1 Performing a firmware update

Before initial commissioning, and at least every three months after that time, check whether a firmware update is available. To do this, go to the manufacturer's website. Before downloading the software, compare the version number on your equipment (Device Settings > About > FW) with the firmware version available on the website. If the version number on the website is higher, follow the instructions for updating the firmware found there.

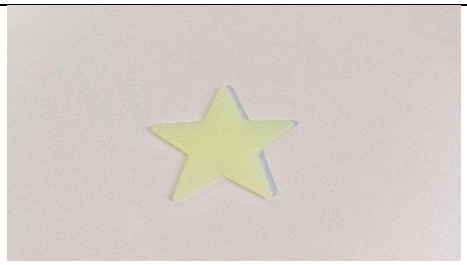
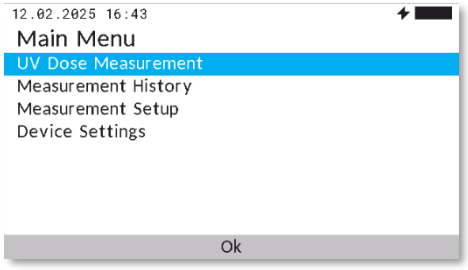
6.2 Checking safety devices and function

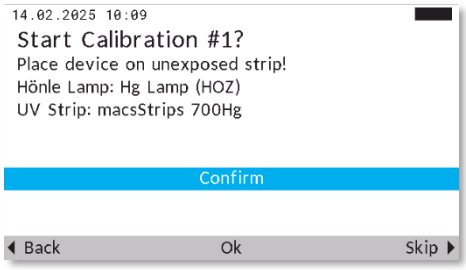
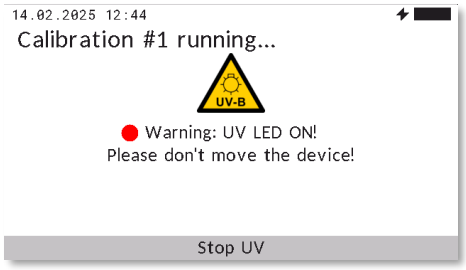
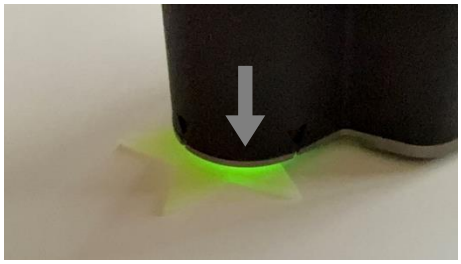
The safety devices are only checked by the manufacturer.

6.3 Functional test of UV LED

Note: Detailed operation can be found in the 'Switching on/off and navigation' section.

Follow the instructions below to check the general function of the UV LED integrated in the equipment. You will need the supplied phosphorescent test indicator. The goal is to irradiate the test indicator with UV light and check the light produced as verification of successful operation.

#	Image / Screenshot	Handling	Result
U1		Place the test indicator provided by the manufacturer on a horizontal and stable surface.	The test indicator is ready.
U2		Remove the stencil from the equipment and set it aside.	The aperture is exposed.
U3		Position the equipment so that the aperture lies directly on the test indicator.	Equipment is ready with the aperture on the test indicator.
U4		Switch on the equipment.	The equipment starts and you will briefly see the Hönle logo as well as then the main menu.
U5		Select the 'UV Dose Measurement' function and navigate using the keypad.	

#	Image / Screenshot	Handling	Result
U6		Start calibration measurement as described in section 7.5.	UV LED switches on.
U7	 	During calibration, check whether a clear glow is visible on the test indicator. Note: You can stop the emission of UV radiation at any time by pressing 'Stop UV'.	Calibration is running and the test indicator lights up. The function of the UV LED has been successfully checked.

If the test indicator does not light up during calibration, the UV LED may be defective. First repeat the test. If the test is still unsuccessful, contact the manufacturer for further information.

6.4 Equipment charging

The equipment is pre-charged when delivered and is ready for immediate use. However, please check the charge level of the battery before using it for the first time. If it is below 40%, charge the equipment beforehand.

Only charge the device using the supplied USB cable to ensure optimum function and safety. Only use suitable USB connections that comply with the technical requirements of the equipment.

Make sure that the charging port is free of dirt and moisture before connecting the charging cable. Charging should only be carried out in a dry environment to prevent damage or short circuits. Only use chargers that comply with local safety standards and are not damaged.

Only charge the equipment at room temperature and avoid charging at extreme temperatures (below 0 °C or above 45 °C) since this could impair battery performance or damage the battery. Disconnect the equipment from the charger once it is fully charged to extend the service life of the battery.

Important note: Only use the USB cable supplied by the manufacturer.

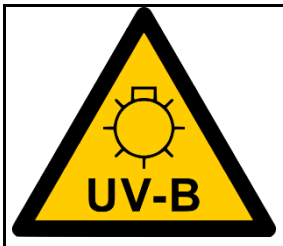
7 Operation

This section contains information on safe use of the equipment. The equipment may only be used by instructed persons who have read the operating instructions and are aware of all potential hazards.

7.1 Residual risks and warnings

7.1.1 UV radiation

There is a residual risk of UV exposure if the user improperly removes the equipment from a firm and stable surface after starting the measurement. As a result, uncontrolled UV radiation can escape and reach eyes or skin.



⚠WARNING

Direct exposure to ultraviolet (UV) radiation can cause serious damage to health.

Skin damage: Exposure to UV rays can cause sunburn, skin ageing and increased risk of skin cancer.

Eye damage: UV radiation can damage the eyes and increase the risk of cataracts and other eye diseases. Do not look directly into UV light sources.

Technical equipment: Make sure that the equipment is used correctly and that the operating instructions are followed.

Note – Source of UV radiation: The source of the UV radiation, also called the aperture, is marked by a coloured ring. See also the 'Main components' section.

Note – stopping UV emission: As soon as it has been activated, UV emission can be deactivated at any time by pressing the central button.

Note – safety goggles: To prevent damage to the eyes, UV safety goggles can be worn in addition to the built-in protective measures. If you also want to wear safety goggles, they must be designed for a wavelength of 295 nm and feature a degree of protection of 2-1.2 in accordance with standards EN 166 and EN 170. That means the maximum spectral transmission is 0.0003% at 210 nm – 313 nm.

7.1.2 Temperature

The residual risk is that, despite automatic switch-off at 45 °C, unforeseen factors such as sensor errors, electrical faults or insufficient cooling can lead to overheating, which may result in burns or hazards such as fire.

⚠WARNING

Risk due to overheating! In the event of unforeseen malfunctions, the temperature may rise above 45 °C. Risk of burns or fire. Do not touch equipment if it is overheating and keep it away from flammable materials.

7.1.3 Biological and chemical effects

The residual risk is that, despite the protective housing and case, mechanical effects, extreme temperatures or improper handling can lead to damage to the battery, which can in turn cause hazardous substances to leak out and result in potential health risks or environmental damage.

⚠WARNING

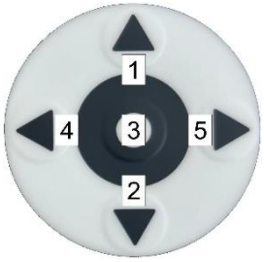
If the lithium-ion battery is damaged, there is a risk of biological and chemical effects. Escaping hazardous substances can result in health risks. Please avoid direct contact and act in accordance with safety instructions.

7.1.4 Required personal protective equipment

The following personal protective equipment can also be used when using the equipment:

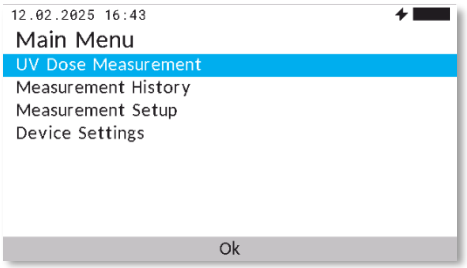
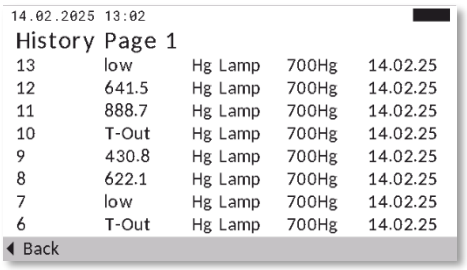
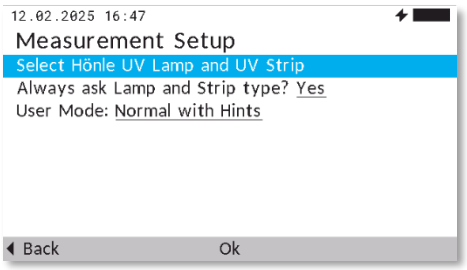
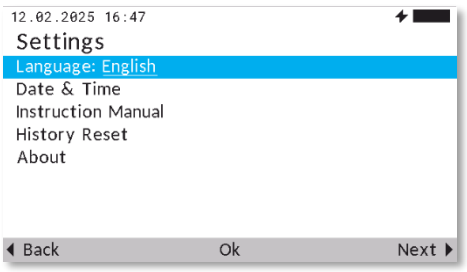
- UV safety goggles (295 nm), protection class 2-1.2: max. transmission 0.0003% at 210 nm – 313 nm

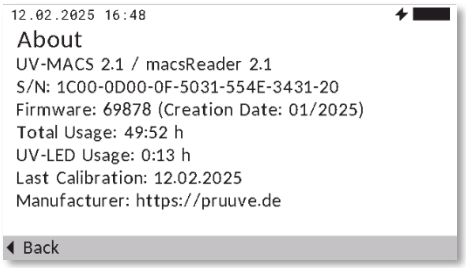
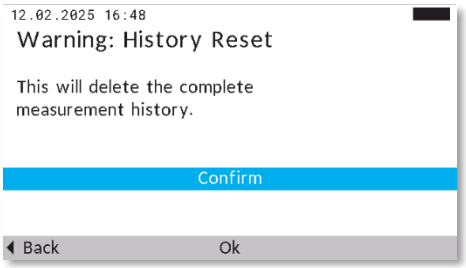
7.2 Switching on/off and navigation

Switching on	Briefly press the central button on the control pad.	
Switching off	Press and hold the central button for approx. 4 seconds.	
Navigation	1. Move up in the menu list 2. Move down in the menu list 3. Confirm action 4. Back or repeat, depending on current menu 5. Skip or execute special functions, depending on the current menu. Note: For buttons 3, 4 and 5, the possible actions are displayed at the bottom edge of the screen.	

7.3 Overview of the basic functions and general settings

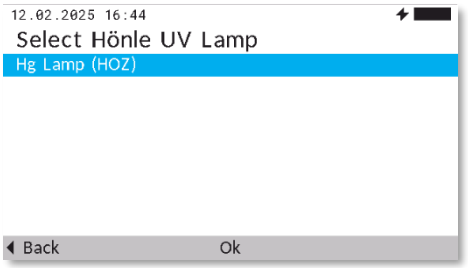
Note: The screen dims after 5 minutes of inactivity. The device switches off automatically after 30 minutes of inactivity. With open calibration, this time is extended to 180 minutes.

#	Screenshot	Explanation
G1		In the main menu, you can choose between the basic measurement functions, the history, the measurement settings and the device settings. UV measurement is explained in detail in section 7.5.
G2		You can view your measurement history under 'Measurement History'.
G3		Under 'Measurement Setup' you can 1) Select lamp and strip 2) Set whether or not the lamp and strip should be queried before each measurement. 3) Switch the 'User Mode' between 'Normal with Hints' and 'Expert'. In Expert mode, operating notes such as the request for UV irradiation and stencil use are no longer displayed.
G4		Under 'Device Settings' you can find general settings and change the language, date and time, display a QR code with a link to the operating instructions, view device details and reset the measurement history.
G5		Under 'Date & Time' you can change the date and time. Use the up and down arrow keys to edit the underlined numbers. Use the left and right arrow keys to navigate to the next number. Confirm your entry at the end with the 'OK' button.

#	Screenshot	Explanation
G6		You will find details about the equipment under 'About'. These are helpful for the manufacturer for possible troubleshooting.
G7		You can reset the measurement history under 'History Reset'.

7.4 Selection of UV lamp and UV strip

When starting the equipment, you will be prompted to select your UV irradiation device for your (printing) machine (referred to as 'UV lamp' in the following) and the UV strips used. The start-up prompt can be deactivated in the settings. You can also change your selection later in the 'Measurement Setup' menu item.

#	Image / Screenshot	Handling	Result
A1		Under 'Select UV Strip', you can select the UV strip that will be used for the measurement.	Correct calibration values for UV strip stored in the equipment.
A2		Under 'Select Hönle UV Lamp', select the UV lamp that is installed in your system.	Correct calibration values for UV lamp stored in the equipment.

The selection influences the measurable UV dose range and the correct UV dose value. That is why it is crucial that you check your selection, which is also displayed before each calibration and measurement. If you are unsure, select the UV lamp that comes closest to yours.

If your UV lamp or UV strip are not available in the selection, check whether a firmware update is available. See the 'Commissioning' chapter. If this does not solve the problem, check the manufacturer's website to see if there are products suitable for your requirements or contact the manufacturer if necessary.

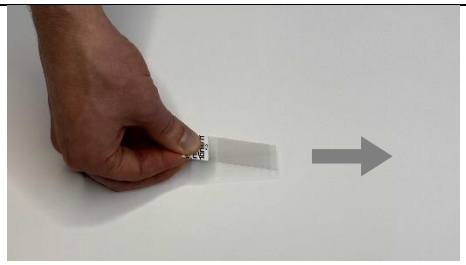
7.5 Determination of UV dose: Calibration and measurement

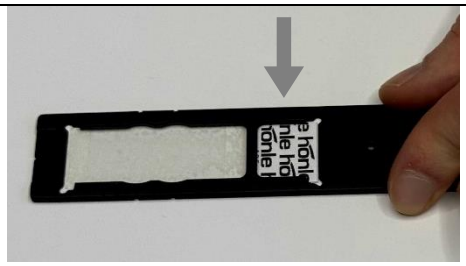
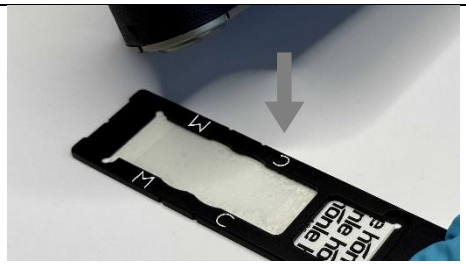
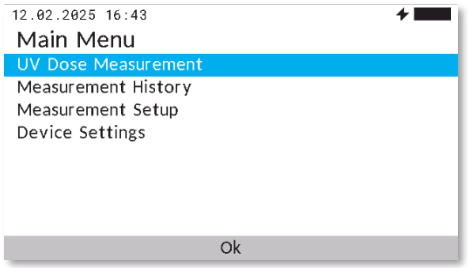
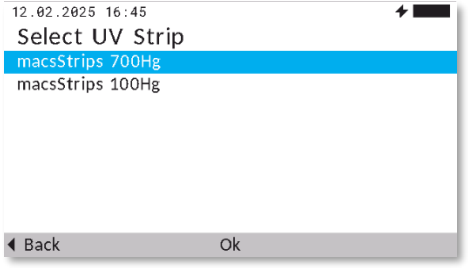
For the best possible precision, calibration is recommended before each measurement. However, you can also carry out measurements without calibration for quick test measurements. To do this, skip the calibration in the menu by pressing the 'Skip' button. Preset calibration values are then used for your measurement.

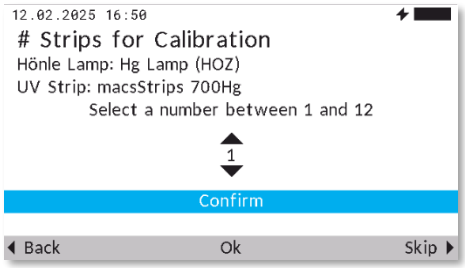
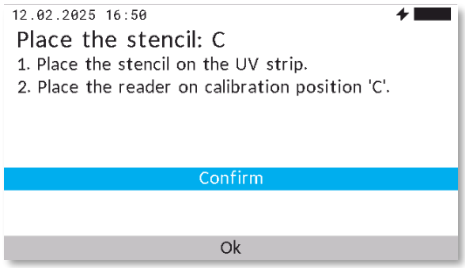
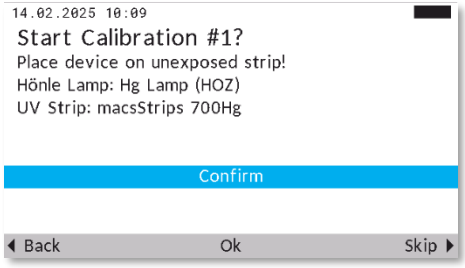
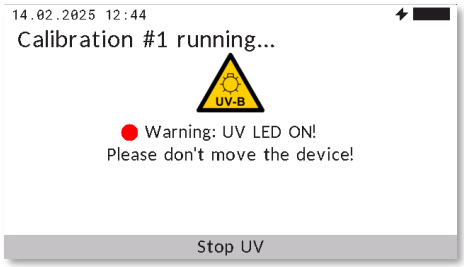
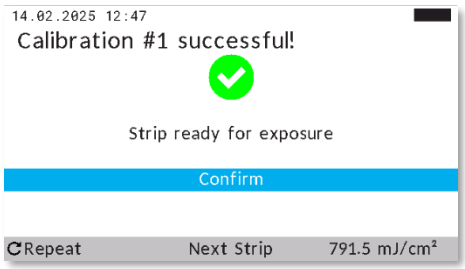
Note – stopping UV emission: As soon as it has been activated, UV emission can be deactivated at any time by pressing the central button.

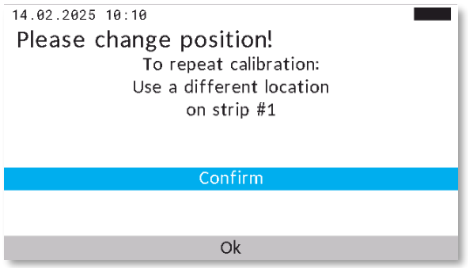
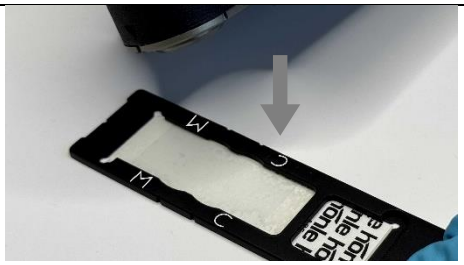
Note – warm-up time: Ideally let the UV lamp in your system run in standby mode for approx. 10 minutes before starting measurement. This allows the lamp to warm up and ensures more reliable measurement results.

7.5.1 UV strip calibration

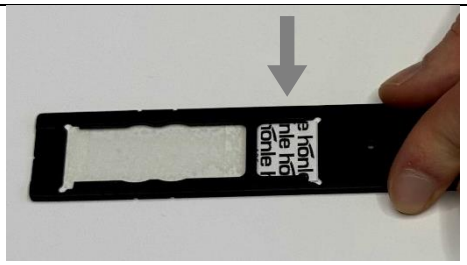
#	Image / Screenshot	Handling	Result
K1	---	Make sure that the workpiece surface at the measuring point is level and stable.	Workpiece prepared for calibration.
K2		Remove a UV strip from the 5-piece booklet.	You are holding a UV strip in your hand.
K3		Apply 1 to 12 UV strips to the workpiece. Note: Make sure that the long adhesive side is aligned in the direction of movement of your irradiation device. Note: The UV strip is calibrated in the following BEFORE UV irradiation.	1 to 12 UV strips are affixed to the workpiece.
K4		Remove the stencil from under the equipment.	Stencil removed, aperture for measurement is exposed.

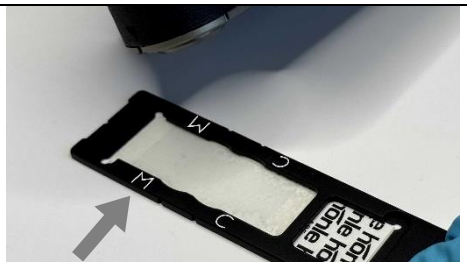
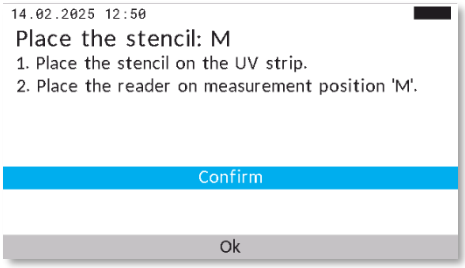
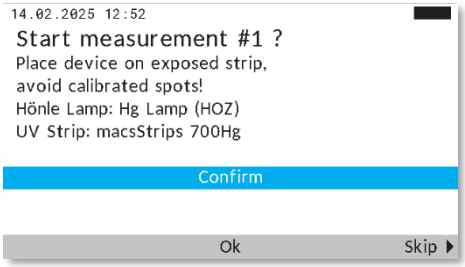
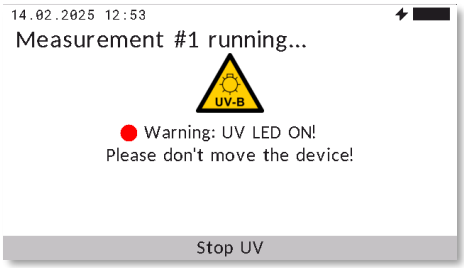
#	Image / Screenshot	Handling	Result
K5		Place the stencil on the UV strip. Make sure that the strip sits in the recess provided and that the printed handle is in the square window of the stencil.	The stencil is lying on the strip and enables reproducible calibrations.
K6		Place the equipment on the stencil at the 'C' mark.	The equipment is correctly positioned and ready for calibration to start, which is triggered in the software.
K7		Switch on the equipment by briefly pressing the central button.	The equipment starts, and you will briefly see the Hönle logo as well as then the main menu.
K8		Select 'UV dose measurement'. Use the arrow buttons to navigate and the central button to confirm.	This takes you to the next menu, which queries the UV lamp and UV strip. Note: The query can be switched off in the settings.
K9	 	Select the correct UV lamp and UV strip for your setup.	Present UV lamp & UV strip selected.

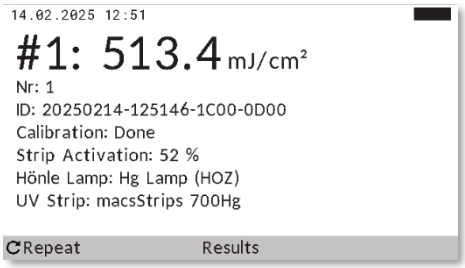
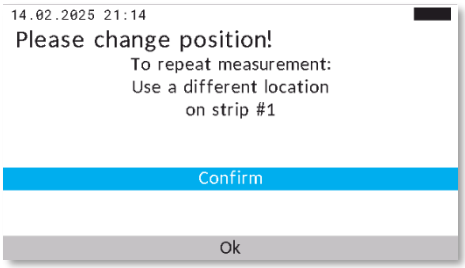
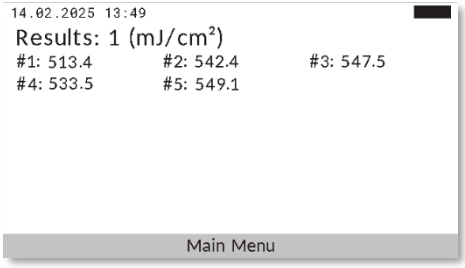
#	Image / Screenshot	Handling	Result
K10		Use the up and down arrow buttons to select the number of strips used (1 to 12). Then confirm your selection with the central button. **Note**: One calibration is required per strip.	You will be taken to the next menu to continue with calibration.
K11		Confirm that you have placed the equipment on the stencil at the 'C' mark.	You will be taken to the next menu to start calibration.
K12		Check again if the selection of the UV lamp and UV strips on the screen is correct. Then confirm the start of calibration.	Calibration starts and the UV LED is switched on.
K13		Wait for calibration to finish. This can take up to 10 seconds. WARNING! UV radiation is emitted from the aperture in the process. Note: You can stop the emission of UV radiation at any time by pressing 'Stop UV'.	---
K14		After successful calibration, you can calibrate additional strips with 'Next Strip'. **Note**: Make a note of the order of the calibrations because the same order is required for measurement. **Note**: If calibrations are incorrect, you can repeat calibration at **a new position on the strip** using 'Repeat'. Remove the stencil if necessary when doing so.	Present strip is calibrated.

#	Image / Screenshot	Handling	Result
			
K15		Repeat calibrations for additional UV strips by placing the equipment on the stencil at the 'C' mark for additional strips.	All strips are calibrated and prepared for exposure with your UV lamp.
K16	---	Do not switch off the equipment! Otherwise all calibrations will be lost. **Note**: If calibration is open without subsequent measurement, automatic switch-off is extended from 30 to 180 minutes in the event of inactivity.	The equipment stores calibration values until measurement is performed.

7.5.2 UV dose measurement

#	Image / Screenshot	Handling	Result
M1	---	Expose the UV strips with the UV lamp that you have selected.	Strips exposed.
M2	---	Make sure that the workpiece surface at the measuring point is level and stable when doing so.	Workpiece prepared for calibration.
M3		Place the stencil on the UV strip. Make sure that the strip sits in the recess provided and that the printed handle is in the square window of the stencil.	The stencil lies on the strip and enables reproducible measurements.

#	Image / Screenshot	Handling	Result
M4		Place the equipment on the stencil at the 'M' mark. Make absolutely sure that it is ***not*** the previously selected calibration position. Note: Now measure the UV strips in the same order as the calibrations.	The equipment is correctly positioned and ready for measurement to start, which is triggered in the software.
M5		Confirm that your UV strips have been exposed.	The equipment has reminded you of the required UV irradiation.
M6		Confirm that you have placed the equipment on the stencil at the 'M' mark.	You will be taken to the next menu to start measurement.
M7		Then confirm the start of calibration.	Measurement starts and the UV LED is switched on.
M8		Wait for the measurement to finish. This can take up to 10 seconds. WARNING! UV radiation is emitted from the aperture in the process. Note: You can stop the emission of UV radiation at any time by pressing 'Stop UV'.	---

#	Image / Screenshot	Handling	Result
M9		Once the measurement is complete, the UV dose value is displayed along with additional information. Use 'Next Strip' to repeat the measurement for all other UV strips or use 'Repeat' to repeat the measurement on the same strip at **a new position**. Remove the stencil if necessary. Once all strips have been measured, click 'Results' to see the overview of all results.	Repeated measurement or measurement overview.
M10		Optional: Use 'Repeat' to repeat the measurement on the same strip at **a new position**. Remove the stencil if necessary.	Determine a new measured value for the same strip. The previous measured value for the strip is overwritten.
M11		Here you will find an overview of all measurement results. Then confirm return to the main menu.	Return to the main menu.

7.6 Data transfer to the PC

To transfer data to the PC, connect the device to a PC using a USB cable. Then download the relevant executable file from the manufacturer's website and run it. Follow the instructions on the screen to complete data transfer.

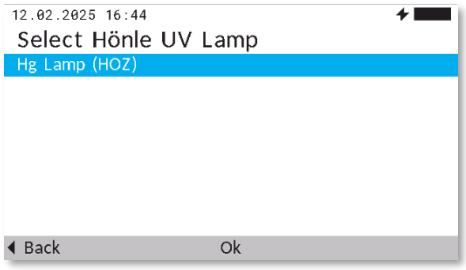
8 Maintenance

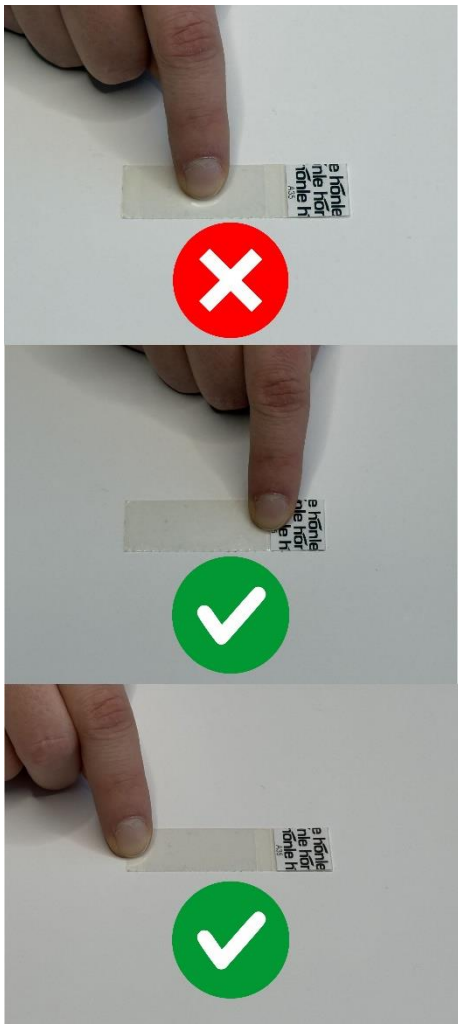
This section contains information on malfunctions or troubleshooting and their corrective measures as well as cleaning and maintenance.

8.1 Malfunctions and corrective measures

The following table lists possible malfunctions and their corrective measures. If malfunctions occur that are not listed, please contact the manufacturer immediately.

8.1.1 General malfunctions

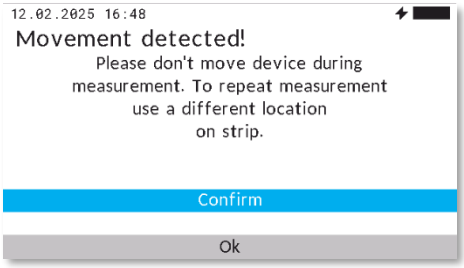
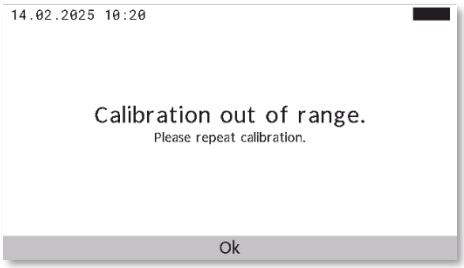
#	Malfunctions	Cause	Solution
F1	Screen stays black	Equipment is switched off	Switch on equipment
F2	Equipment does not switch on	Battery is empty	Charge battery in accordance with instructions
F3	Equipment does not charge	Charging cable is not correctly inserted	Check whether the charging cable is correctly inserted 
		Charging cable is defective	Request spare part from manufacturer
F4	Measured values are unrealistic or incorrect	Incorrect strip or lamp selected	Choose the right strip and matching lamp  

Measured values are unrealistic or incorrect	Aperture is contaminated	Clean aperture as described in the “Cleaning” chapter 
	Strip is heavily soiled when affixing it	Do not touch the strip in the centre and apply with clean hands or suitable tools 

F5	Equipment is not detected during data transfer	Charging cable is not correctly inserted	Check whether the charging cable is correctly inserted 
		Charging cable is defective	Order a new charging cable as a spare part from the manufacturer
F6	Equipment shows incorrect time or date	The time or date is set incorrectly	Set the time and date correctly in accordance with the instructions 
F7	The measurement function may be disrupted (incorrect results) and the display may show incorrect values or fail.	Interference radiation (EMC)	After interference radiation has ended, the equipment must work correctly again. A reset may be required here.

8.1.2 Software error messages and corrective measures

The following table lists possible error messages on the display as well as their cause and solution.

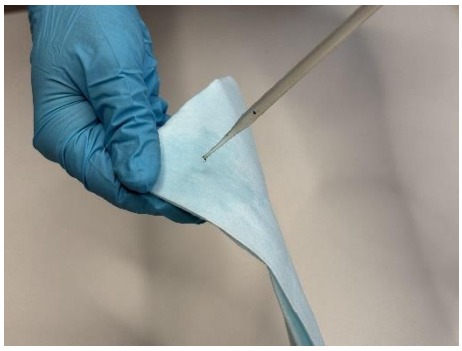
#	Software error message	Cause	Solution
F8		Equipment detects movement during measurement and stops the measurement process for safety reasons.	Only use the equipment on a level and stable surface and avoid movements during measurement.
F9		Measurement/Calibration does not start because the equipment detects light.	Place the equipment with the aperture directly on the UV strip.
F10		Calibration value is outside of expected range. Possible causes: 1. Measured with stencil in transport position. 2. UV strip not hit. 3. Incorrect UV strip selected.	1. Remove the stencil. 2. Check whether the strip is correctly positioned. 3. Select the correct strip. If you have any problems, please contact the manufacturer.
F11		The UV irradiation is too low for the UV strips used.	Reduce the path speed or increase the lamp power. You can use another UV strip as an alternative.
F12		The UV irradiation is too high for the UV strips used.	Increase the path speed or reduce the lamp power. You can use another UV strip as an alternative.

8.2 Cleaning

This section contains information on safe cleaning of the equipment.

It is important that the glass plate at the aperture is clean for proper operation. The following procedure must be used to clean the aperture:

Before cleaning, be sure to switch off the equipment and remove the charging cable. Only clean the equipment with a microfibre cloth and only apply light pressure.



If necessary, you can lightly moisten the microfibre cloth with water or, if it is very soiled, with isopropyl alcohol. Avoid using other cleaning products to prevent damage to the surface. After cleaning, wait until the cleaning product has completely evaporated before putting the equipment back into operation.

When cleaning with isopropyl alcohol, wearing suitable protective gloves is recommended to prevent skin irritation.

8.3 Spare parts

The following list contains the available spare parts for the equipment:

- Stencil for measurement and calibration
- USB-A to USB-C cable
- Protective case for storage

9 Storage and transport

This section contains information on safe storage and transport of the equipment. See the separate product data sheets for information about storage and transport of the UV strips.

To prevent damage, store and transport the measuring device only in the closed hard-shell case provided by the manufacturer and in the slot provided. Protect the aperture by fixing the stencil in the slot provided on the base using a magnet. Please note the permissible ambient conditions for transport and storage and inform the carrier about them.

Warning of residual risks

Observe chapter 7.1 ‘Residual risks and warnings’.

Note on validity of UV LED calibration

We recommend factory UV LED calibration by the manufacturer at least every 12 months. This does *not* mean the UV strip calibration that you can carry out independently before a measurement.

9.1 Ambient conditions

The equipment can be stored and transported under the following ambient conditions:

Ambient temperature	-20 °C to +60 °C
Relative air humidity	Max. 85%, non-condensing

9.2 Technical data

Weight without packaging	0.48 kg
Weight with packaging	Approx. 1 kg
Dimensions L / W / H (without packaging)	60 mm / 160 mm / 60 mm
Dimensions L / W / H (external dimensions of case)	238 mm / 198 mm / 94 mm
Dimensions L / W / H (external dimensions of box)	270 mm / 208 mm / 100 mm

9.3 Requirements

The following requirements must be met for storage or transport:

- The equipment has been switched off.
- The stencil is fixed to the underside of the equipment.
- The storage room/transport environment is closed on all sides, and is clean, dry and free from chemical influences.

10 Disposal

This section contains information about proper and professional disposal of the equipment.

Disposal is the collection, reshaping, selection, preparation, regeneration, destruction, recycling and sale of the materials to be disposed of that are built into the equipment.

The equipment must be disposed of exclusively through the manufacturer, PRUUVE GmbH. If the equipment shows visible external damage or you suspect damage to the battery, contact the manufacturer. Wait for instructions on how to proceed. In this case, under no circumstances should you send in the equipment without prior instruction.

Warning of residual risks

Observe chapter 7.1 ‘Residual risks and warnings’.

10.1 Tasks and qualification of staff

Persons who dispose of the equipment must meet the following requirements:

Person	Task	Required qualification
Disposer	Disposal of equipment	Person with appropriate training, education and experience enabling them to carry out waste management activities within the framework of applicable legislation.

10.2 Personal protective equipment required in case of battery leakage

In the event of damage or possible leakage of lithium-ion batteries, the following personal protective equipment (PPE) is recommended:

- Protective gloves: Chemical-resistant gloves, ideally made of nitrile or a similar chemical-resistant material, to prevent skin contact with electrolytes or other hazardous substances.
- Safety goggles: Chemical-resistant safety goggles or face shield to protect eyes from splashes or fumes.
- Respiratory mask: If fumes or hazardous gases are possible, an appropriate respiratory mask should be worn.
- Long, protective clothing: Long-sleeved clothing and long pants made of durable material to protect the skin. Chemical-resistant, preferably cotton, no synthetic fibres.
- Safety boots: Closed, non-slip safety boots for protecting the feet from heavy objects or dangerous substances.

10.3 Legal regulations

Disposal of the equipment is carried out in accordance with the legal regulations of the country in which the equipment is disposed of.

Compliance with these legal regulations is generally the responsibility of the operator of the equipment or the person responsible for disposal.

11 EU Declaration of Conformity

We

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Place	Dresden
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declare that this EU Declaration of Conformity has been issued under our sole responsibility for the following product:

Designation	UV-MACS (Distributed by PRUUVE GmbH) or structurally identical equipment macsReader (distributed by Dr. Hönle AG)
Product, type, model, batch or serial number	Model 2.1
The product described above complies with the relevant Union harmonisation legislation	• DIRECTIVE 2014/35/EU, Official Journal L 96 from 29/3/2014, p. 357–374 • DIRECTIVE 2006/25/EC Protection against hazards caused by physical agents (artificial optical radiation)
Applied harmonised standards or common specifications	• EN 61010-1:2010 • EN 61010-1:2010/A1:2019 • EN 61010-1:2010/A1:2019/AC:2019-04 • IEC 62133-2:2017 (battery) • ISO 13732-1:2008 (maximum temperature) • IEC 62471:2008 (radiation limit value)
Signed for and on behalf of	PRUUVE GmbH
Place	Dresden
Date	07/04/2025
First name and surname, function Signature:	Dr. Philipp Wellmann, Managing Director

PRUUVE

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