Opsytec Dr. Gröbel GmbH
Am Hardtwald 6-8
76275 Ettlingen

Tel.: 07243 / 94783 - 50
Fax: 07243 / 94783 - 65
info@opsytec.de

UVpad E

Manual

Version: 1.1.9

1 Content

2 Change history

Date	Version	Changed by	Comment
18.12.2018	1.1.5	Paravia	Editorial modifications, range
20.12.2018	1.1.6	Uhl	Editorial modifications, range tolerance
12.09.2019	1.1.7	Uhl	Editorial modifications, dark-mode
04.03.2021	1.1.8	Paravia	EU change
10.03.2022	1.1.9	Paravia	Technical data moved to data sheet

3 Symbols Overview

⚠️	Meaning: Failure to observe the mentioned instructions can result in an injury of the user.

🛑 STOP	Meaning: Failure to observe the mentioned instructions can result in a damage of the device.

☝️	Meaning: Instructions are to be observed for the regular operation.

*	Optional functions, not available for every UVpad E

4 Function Overview

The UVpad E combines the benefits of the spectral measuring technology with a handheld and easy to operate radiometer. Use the spectroradiometer UVpad E for an accurate measurement of the UV irradiance and for comparisons of different UV lamps and UV LEDs. 512 photodiodes measure the spectrum in the wavelength range of 200 – 440 nm. The categorization in UVA, UVB and UVC is taken according to international standards and traceable. The calibration to only one light source is omitted.

During the measurement, the spectrum is shown on the graphic display. The irradiances for UVA, UVB, UVC and VIS are available by the click of a button. In the background, the spectrum is already recorded. While measuring, the dose and the chronological irradiance sequence can additionally be documented. Spectra and measurement data can be exported and evaluated with the provided software.

The UVpad E offers these functions/features:

Spectral measurements:
- Real-time of the spectrum
- Real-time of irradiance

Radiometric measurements:
- Spectrum at max irradiance
- Irradiance (UVA, UVB, UVC, VIS)
- Profile of irradiance (UVA, UVB, UVC, VIS)
- Dose of irradiance (UVA, UVB, UVC, VIS)

Measurements related to cause and effects:
- Photo initiator spectrums (optional)
- Sensitivity functions of broadband radiometers (optional)

5 Technical Data

5.1 General technical data

Size (L x W x H)	160 x 100 x 20 mm³
Weight	~500 g
Power	battery powered, 3 x CR2032
Max. operational temperature	60°C
Display	graphical, 128 x 64 px
Optically active surface	Diameter: 10 mm
Optically active surface position	external sensor
internal memory	50 measurements with export option

5.2 Radiometric measurements

Spectral range	240 - 480 nm ±5 nm, standard, Optional: device specific
Spectral bandwidth	~ 2 nm
Irradiance measurement range	see technical datasheet + version
Irradiance dose measurement range	see technical datasheet + version
Irradiance profile	4 spectral ranges (UVA, UVB, UVC, VIS)
Measurement time	0 to 120 s, adjustable to ~ (rounded) 120 s (4 Hz) 48 s (10 Hz) 24 s (20 Hz) 10 s (50 Hz) 5 s (100 Hz)
Time resolution	10 ms to 250 ms, adjustable
Sampling rate	10 ms - 1000 ms, automatically set storage rate for export: see time resolution
Averaging	1 - 32
Gain	normal / LowGain for 10 to 30 ms
Cosine correction	yes
Calibration	yes, traceable to PTB / NIST
frequency of recalibration, recommended	12 months

5.3 spectral ranges

according	CIE
UV-C	240 - 280 nm
UV-B	280 - 315 nm
UV-A	315 - 400 nm
VIS	400 - 480 nm
based customer specification or CIE	optional

5.4 USB / hardware-software-requirements

USB connector	MiniUSB
PC requirements	min Intel CORE i3, 2 GB Ram, >40 Gb HDD
operating system	Windows 10

5.5 Effect related measurements

Photoinitiator / Sensitivity curve	optional

5.6 Dark mode*

radiometric	Automatic dark current correction using the PIXEL 1-4
dark+radiometric	Automatic dark current correction at start of measurement via function key using the PIXEL[1]-[32]. CAUTION: Avoid heating the meter as it will not be corrected.

6 Intended Use

The UVpad E determines the irradiance in the UV and VIS spectral range and indicates these on the integrated display. Typical Applications:

- Measurement of UV-LEDs and ultraviolet lamps
- UV dose measurements
- Universal irradiance measurement
- GMP and IQ/OQ documentation

7 Conventional Use

The UVpad E is solely intended for the determination and visualization of irradiances, which are generated in UV curing systems.

The UVpad E is battery operated and suitable for usage with lithium batteries, type CR2032. In case other batteries, than the supplied ones, are used, an operating range of up to 70 °C has to be observed. Spare batteries are to be obtained from your supplier.

Operation only allowed in dry environments. The assembly position is arbitrary.

When using the UVpad E, light and UV radiation can be reflected and distributed at the housing. Appropriate protection measures for the protection against radiation need to be applied, if necessary. Note: The UVpad E itself does not emit any hazardous radiation.

The housing, with the exception of the battery compartment, must not be opened by the user.

The optically active surface must not be touched.

optically active surface

Gloves need to be worn when cleaning the optically active surface.

The UVpad E is a highly sensitive optical measurement device. It must not be exposed to shocks.

Any other usage than the one described above leads to a damage of the product. Furthermore, this involves risks, such as short-circuits, fire and electric shocks. The entire device must not be modified and/or remodeled! The safety indications are to be observed without fail.

8 Important Information

Please read the **instruction manual** completely before start-up and operation. The latest version of the instruction manual applies.

Skin oil and contamination are absorbing in the UV spectral range. Finger prints / contamination on the optically active surface are to be avoided. If necessary, clean thoroughly with Isopropanol. Use gloves when cleaning.

The UVpad E is calibrated.

ATTENTION: Opening of the housing (except for the battery compartment) leads to a loss of calibration.

Only use **batteries**, which are suitable for up to 60 °C.

The UVpad E is a highly sensitive optical measurement device. It must not be exposed to shocks.

When using the UVpad E, light and UV radiation can be reflected and distributed at the housing. Appropriate protection measures for the **protection against radiation** need to be applied, if necessary.

The maximum housing temperature of the sensor can reach > 60 °C and there is the risk of skin burns on contact. Please allow for the UVpad E to cool down and use protective gloves to avoid **skin burns**.
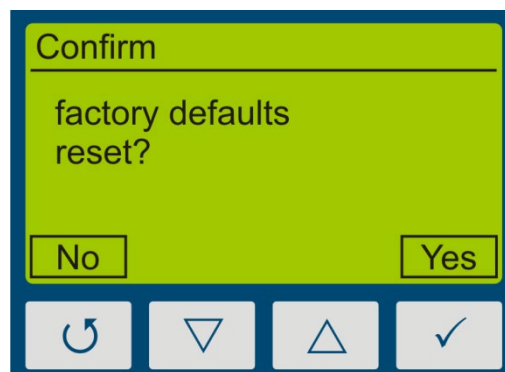
9 Operation

The UVpad E is operated via four keys. These are arranged on the front panel below the display. The keys and the functions are illustrated as follows:
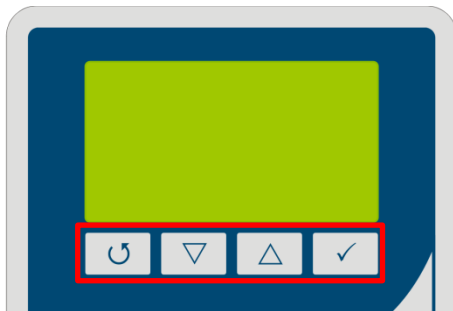
Key	Function
↺	Back / Cancel / Off
▽	Down
△	Up
✓	Confirm / Continue

The keys ↺ and ✓ are additionally available as softkeys. Softkey functions are directly displayed above the key. Example:
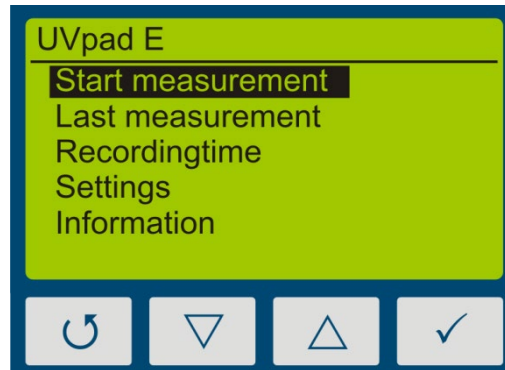

9.1 Switching the device on and off

The UVpad E is activated via any key. During the initialization (ca. 2s), the welcome screen is displayed:

After the initialization, the standby menu is displayed:

In the standby menu, the UVpad E is switched off via the key ↻.

After 2 minutes of not using the UVpad E, the device switches off automatically.
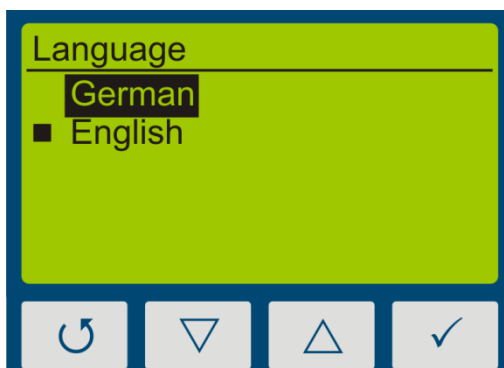
9.2 Standby Menu

Via the standby menu, all functions of the UVpad E are available for you. These are:

- Start measurement
- Show last measurement
- Scope measurement
- Settings
- Information

In the standby menu and in all other menus, select the active menu item via the keys ▽ and △. Confirm the active menu item with the key ✓. With ↻, you return to the previous menu without saving any changes.
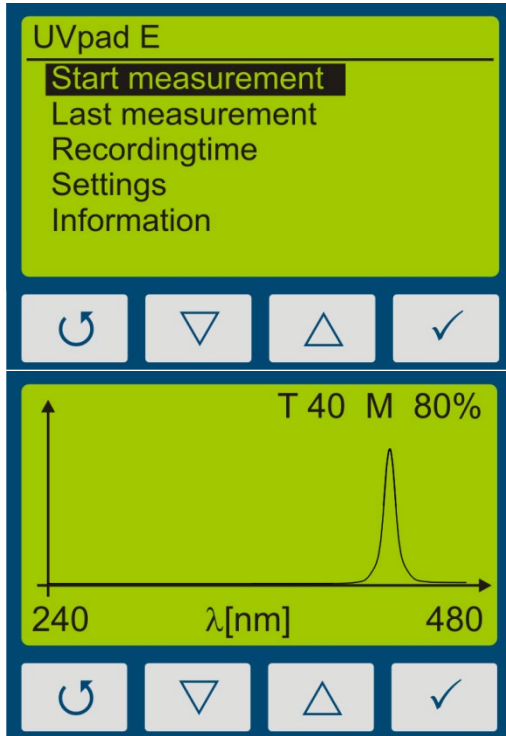
The selected menu item is highlighted in black and displayed inverted. If several settings are selectable, then the selected setting is marked with ■. Example:

In this example, the language "English" is set. "German" is selected, but not set.

With the key ↻-key, the setting is accepted and the language is being changed.

9.2.1 Start Measurement

From the standby menu, a measurement is started with the key ✓.

First, the spectrum is displayed.

Use '"Auto" mode to get the best integration time or, in fixed mode use ▽ and △ keys to adjust integration time.

Notes:
The optimal integration time, gain (L/H) and the saturation of the measurement range are displayed at the upper display edge. The integration time is displayed in ms. Example:

T 100: The integration time is 100 ms

Hint:
For optimum measurement results, the measuring range should be fully controlled. Very good measuring results are achieved when the measuring range is at least 50%.

The modulation is linear to the set integration time. Example:
55/5000
T10 M20%: Measuring range is 20% used => Bad
T40 M80%: Measuring range is 80% used => Very good
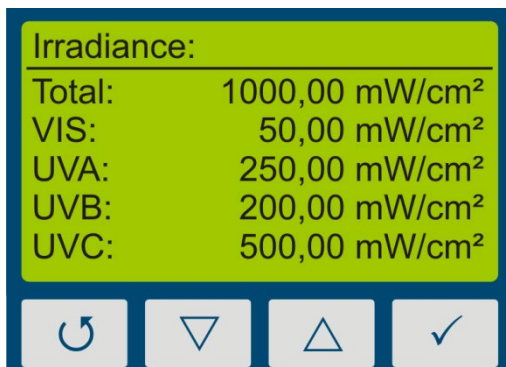
Switch between spectral and radiometric view by pressing ✓.

If storing measurements is selected via menu „recording time", the measurement is automatically recorded if the radiometric view is shown.
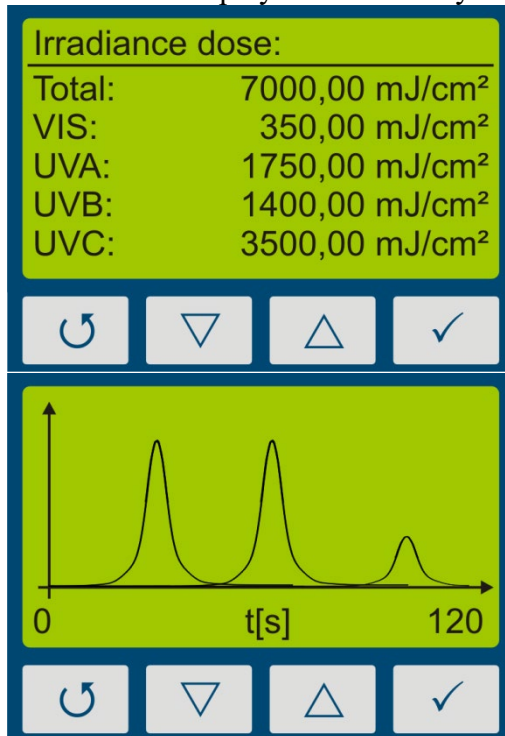
Stop the measurement by pressing the key ↻ for at least 0.5s.

The measurement results are displayed automatically. For a better overview, these are partitioned to four screens.

1. Irradiance (only when viewing saved measurements)
2. Dose of irradiance (UVA, UVB, UVC, VIS)
3. Spectrum at maximum irradiance (only when viewing saved measurements)
4. Irradiance profile over the duration of the measurement

These can be displayed with the keys ▽ or △.

First, the dose of irradiance is displayed.

Irradiance dose:	
Total:	7000,00 mJ/cm²
VIS:	350,00 mJ/cm²
UVA:	1750,00 mJ/cm²
UVB:	1400,00 mJ/cm²
UVC:	3500,00 mJ/cm²

With the key ▽, the irradiance profile for UVA, UVB, UVC, VIS and total are displayed.

With the key △, you are respectively being redirected to the previous menu. With the keys ↻ or ✓ you can return to the standby screen.
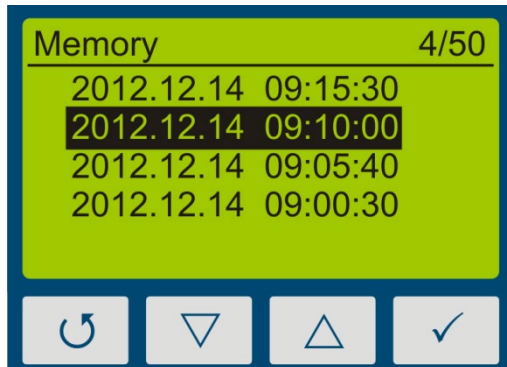
Note:
If the irradiance is too low for the measurement range, then the UVpad E displays no measured values. The irradiance and the dosage values are then displayed with "-".

9.2.2 Show last Measurement

In the standby menu select the item "Show last measurement" to display the last measurement.
Select the values from the list of measurements, which you want to display.
The navigation in the display screens is taken out, as described in chapter 9.2.1.

Select the measurement with the buttons ▽ and △. Confirm with ✓. Return with ↻.

If 50 measurements have already been saved, then a note comes up prior to a new measurement, stating that the memory is full and that the measurement can be taken out without saving it, or that alternatively, the oldest measurement result is being overwritten.

⇨ See Delete all Measurements
⇨ See Data Export

Delete all measurements:

The internal memory can be deleted directly on the UVpad E or via a PC. For this purpose, please select the prior menu item "Clear memory".
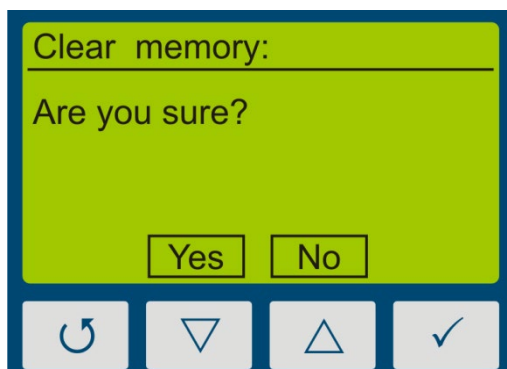
Confirm with Yes (▽). Return with ↻ or △.

9.2.3 Setting integration time during measurements

If using fixed integration time, during a measurement you can set up the sensitivity of the UVpad E with the keys ▽ and △. Select ▽ for a lower sensitivity and △ for a higher sensitivity. The sensitivity is not saved.
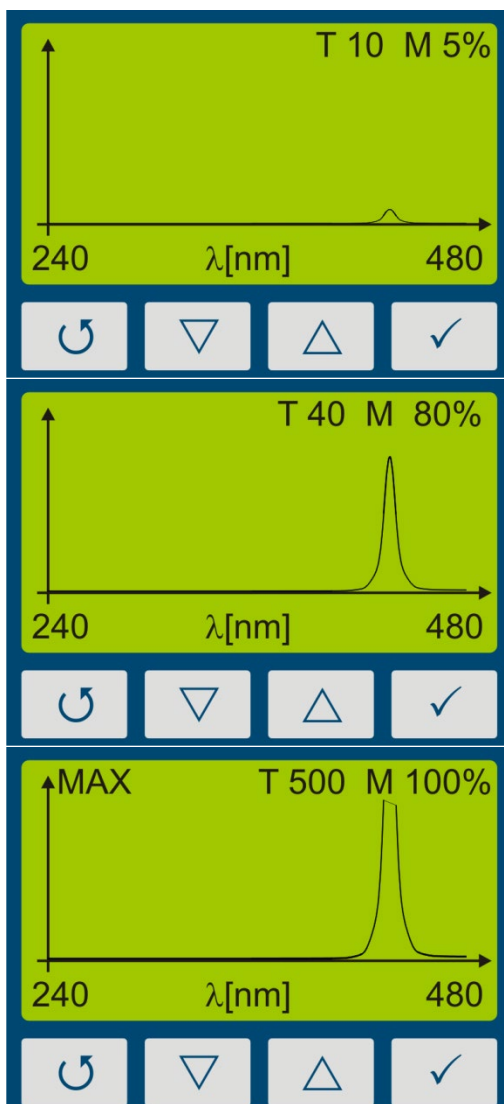
Select a higher sensitivity (△), if the spectrum is noisy or does not fill the display completely.

Select a lower sensitivity (▽), if single lines of the spectrum are cut on top. The measurement range is then exceeded and is shown in the display MAX.

Examples:

T 10 M 5% 240 λ[nm] 480	Sensitivity too low
T 40 M 80% 240 λ[nm] 480	Sensitivity correct
MAX T 500 M 100% 240 λ[nm] 480	Sensitivity too high

Risk of UV radiation.

Protect your skin and eyes during the work at and with UV radiation sources.

9.2.4 Recording time

If storing measurements is selected via settings (120 s to 5 s), the measurement is automatically recorded if the radiometric view is shown.


Set recording time via the buttons ∇ and $\triangle$. Confirm with ✓ or cancel the setting with ↺.

9.2.5 Settings

In the menu „Settings", you can set up the sensitivity, the effective function, the menu language and the date / time. Furthermore, you can reset the UVpad E to the factory settings.
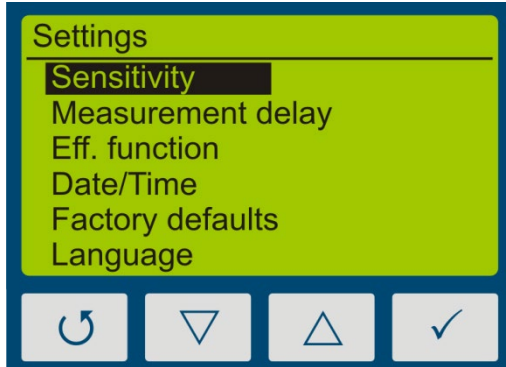
9.2.6 Information

Select the menu item "Information" from the standby menu, to display the serial number, the firmware version, as well as the date of calibration.
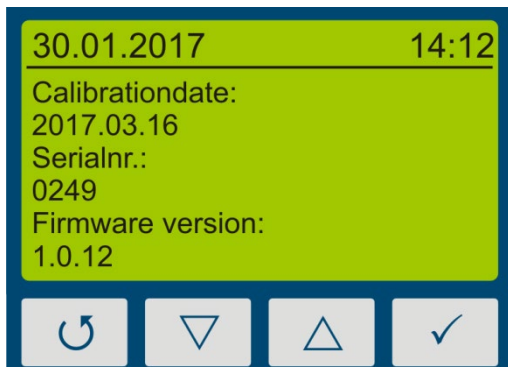
With any key, you are being redirected to the menu.

9.3 Settings

By selecting the menu item „Settings", you are being directed to the settings menu of the UVpad E.
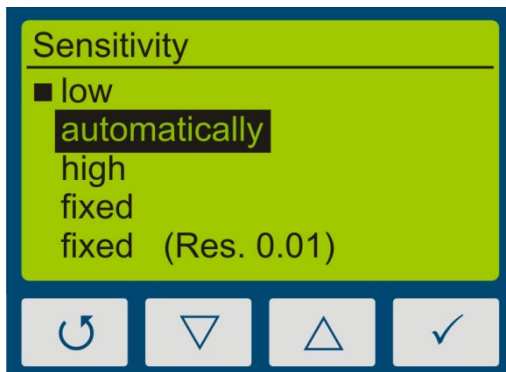
In this menu, the following functions are available:

- Settings of the sensitivity
- Selection of the effective function
- Language settings
- Settings of date and time
- Reset to factory settings

9.3.1 Sensitivity

The UVpad E adjusts the sensitivity automatically, in order to ensure the optimal signal-noise ratio. The sensitivity is hereby set via the sampling rate. With high irradiances, the sampling rate is increased in order to not exceed the measurement range. With low irradiances the sampling rate is decreased. As a result in belt conveyor systems erroneous measurements may be recorded. Please follow the instructions on the display and / or set a fixed integration time as sensitivity. Five pre-defined sensitivities are available.

In the setting „automatically", the UVpad E adjusts the sensitivity, once a minimum irradiance is existent. This setting is suitable for most applications.

In the setting „low", the sampling rate is always between 10 ms and 100ms. The UVpad E can measure UV-systems with a very high irradiance or significant irradiance modifications (e.g. with shutter operation or with very high tape speed).

The setting „high" is ideal for applications with a low irradiance.

In the settings „fixed" and „fixed (Res 0.01)", the integration time is predetermined. The UVpad E can be used optimally for known systems with shutters

	sampling rate
low	10 – 100 ms
automatic	10 – 330 ms
high	150 – 850 ms

Note:
In irradiation profile resolution is enhanced from 1 mW/cm² to 0.01 mW/ m² for the settings "high" and "Fixed (Res. 0.01). The measuring range then is 0 .. 650 mW/cm².
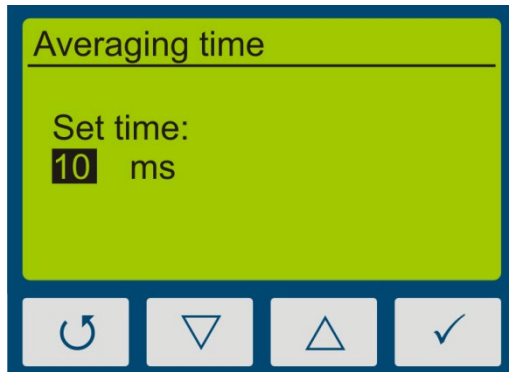
The menu item "Sample rate" is displayed, if you have selected a fixed sensitivity.

The integration time is set via the buttons ∇ and $\triangle$. Confirm with $\checkmark$ or cancel the setting with $\circlearrowleft$.

Pressing ∇ on 10 ms setting switches to low sensitivity.
This reduces sensitivity by factor of 5.

9.3.2 Averaging

The UVpad E can calculate the irradiance from the moving average. Hereby are signal-to-noise ratio, and thus measurement accuracy can be enhanced.
For integration times below 500 ms we recommend averaging over 16-32 measurements, while for integration times over 500 ms smaller settings may be useful.

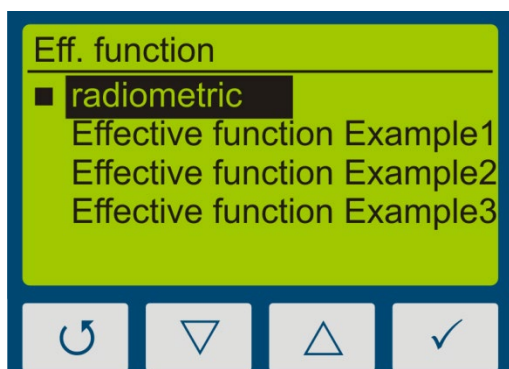### 9.3.3 Measurement mode / Effective functions *

In this menu, the effective function and manual dark measurement can be set.
Effective functions serve for the process-oriented measurement. This is often also called effect-related or actinic measurement.

In that case, effective functions can be for example:
- Absorption spectrums of photo initiators
- Spectral sensitivity function
- Filter function for instrument comparisons

In the Eff. function menu, the desired function / dark mode can be selected using the ∇-key or $\triangle$-key and confirmed with the $\checkmark$-key.

Select „radiometric", for traceable and internationally comparable measurements.

Select an effective function for a process-oriented measurement and a targeted system optimization. The international comparability is not given.

If measurements are taken out effect-related, then this is displayed in the irradiance and in the dosage display by the addition "(ef)" for "effective". Radiometric and effect-related measurements are illustrated subsequently.

Irradiance:
Total:	1000,00 mW/cm²
VIS:	50,00 mW/cm²
UVA:	250,00 mW/cm²
UVB:	200,00 mW/cm²
UVC:	500,00 mW/cm²

Example: radiometric

Irradiance (ef)
Total:	150 mW/cm²
VIS:	50 mW/cm²
UVA:	100 mW/cm²
UVB:	0 mW/cm²
UVC:	0 mW/cm²

Example: with effective function

The function "Effective Function" is only available, if your UVpad E has been programmed with a customized effective function at factory.

9.3.4 Manual dark measurement

For manual dark measurement, select the "dark+radiometric" menu item under Settings, Measurement mode. If your UVpad E is equipped with several active functions, manual dark measurement may be available for further active functions.

Hint:

Manual dark measurement is only active in the "Fixed sensitivity" mode. Therefore, set a fixed integration time.

If the dark measurement for the integration time has not yet been carried out, the UVpad E does not display any measured values. The irradiance and dose values are then displayed with "-".

Manual dark measurement is important if the irradiance at the short-wave end of the measuring range (e.g. 240 nm) is not "zero", otherwise the measured values are too low.
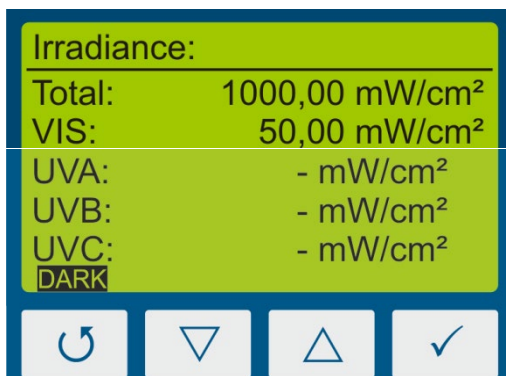
For measurement with manual dark measurement, start the measurement and set the integration time with the key ▽ or △.

```
                    T 40  M 80%



 240        λ[nm]          480
```
[↺] [▽] [△] [✓]
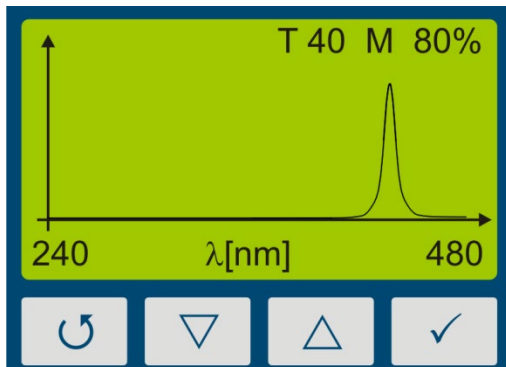
1. Set the integration time with the ▽ or △ button.
2. Start irradiance display with key ✓ or start dark measurement with key ↺.

```
DARK: TH 100 ms        D150

  dark measurement.
  Cover sensor.
  OK => measurement
  ESC = Back to menue
```
[↺] [▽] [△] [✓]
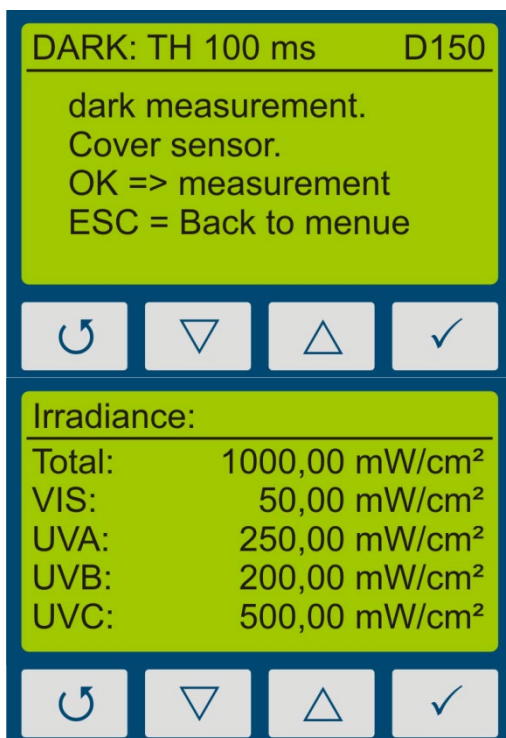
1. Cover the sensor, wait 1-2 seconds or 3-4 measurements and press ✓ to switch to the irradiance display.

```
Irradiance:
Total:      1000,00 mW/cm²
VIS:          50,00 mW/cm²
UVA:         250,00 mW/cm²
UVB:         200,00 mW/cm²
UVC:         500,00 mW/cm²
```
[↺] [▽] [△] [✓]

2. The irradiance is displayed.

3. Press the ↺ button for at least two seconds to save the measurement. After that, the irradiation values are displayed.

```
Irradiance:
Total:      1000,00 mW/cm²
VIS:          50,00 mW/cm²
UVA:             - mW/cm²
UVB:             - mW/cm²
UVC:             - mW/cm²
DARK
```
[↺] [▽] [△] [✓]

Hint:

The irradiance is not displayed if the dark measurement has not yet been taken or the integration time has been changed.
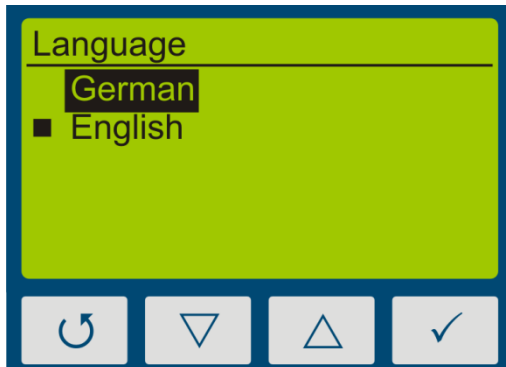
The message DARK is displayed.

Hints:
The optimum integration time, the gain (L/H) and the modulation of the measuring range are displayed at the top of the display. The integration time is displayed in ms. Example: T 100: The integration time is 100 ms
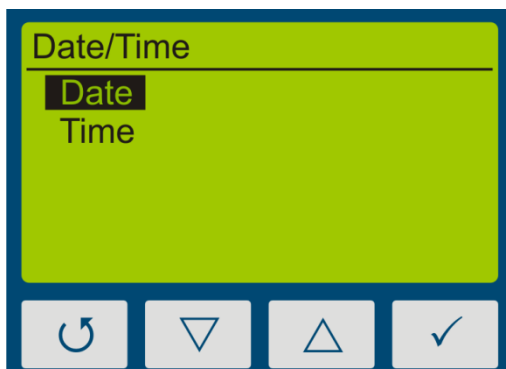
9.3.5 Language

The UVpad E comes with a menu in the German and English language.

Select the desired language with the keys ▽ and △ and confirm with ✓.

9.3.6 Date / Time

The UVpad E has a real-time clock to check the validity of the calibration.
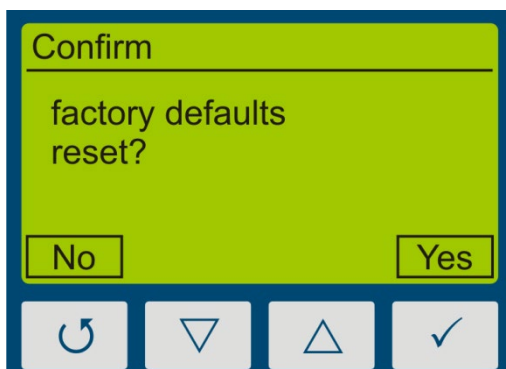You can set up the real-time clock in the menu „Date / Time".

First set the day with the keys ▽ and △. Select ✓ for the month, the year, the hours and minutes.
Confirm your settings with ✓.
With ↻ you can cancel the settings at any time.

9.3.7 Factory Settings

Reset the UVpad E to the factory settings and confirm.

Confirm the restoration of the factory settings with ✓.

With ↻ you can cancel the restoration of the factory settings.

10 Data Export / PC-Software

10.1 Installation

For the installation, please proceed as follows:

1.) If necessary, disconnect the connection of the UVpad E with the PC.

2.) Start the installation with "setup.exe" in the master data of the Software CD. Follow the instructions of the installation program.

The driver installation is executed as an independent application TUSB3410.

For the software UVpad E Viewer, the Microsoft .NET Framework Version 4.0 or higher is required. This is found on the installation CD or free of charge at: www.microsoft.de.

3.) After completing the installation, connect the UVpad E with the PC. The UVpad E is integrated as a virtual, serial interface. The driver installation is taken out automatically under Windows 7.

10.2 Connecting with the PC

Connect the UVpad E with the PC and switch it on. The screen displays the message "USB connected".

Once the UVpad E is connected with the PC, it does not react to any keystroke. Disconnect the connection with the PC and the UVpad E continues working autonomously.

USB connected...
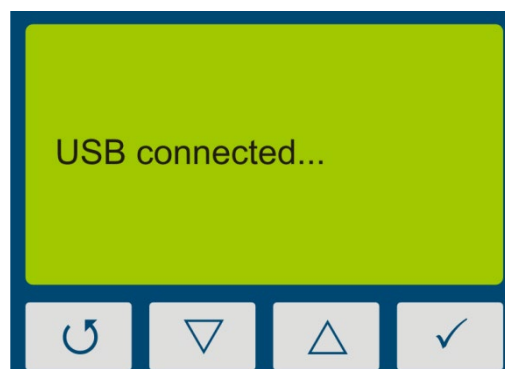
10.3 Viewer Software

The UVpad E software is divided into two areas. The area *measurement overview* displays the executed measurements with date / time, irradiation and dosage, as well as the integration time, the saturation und the measurement duration.

Individual measurements can be compared in the display area based on spectra, irradiance profile or by means of measurement data.
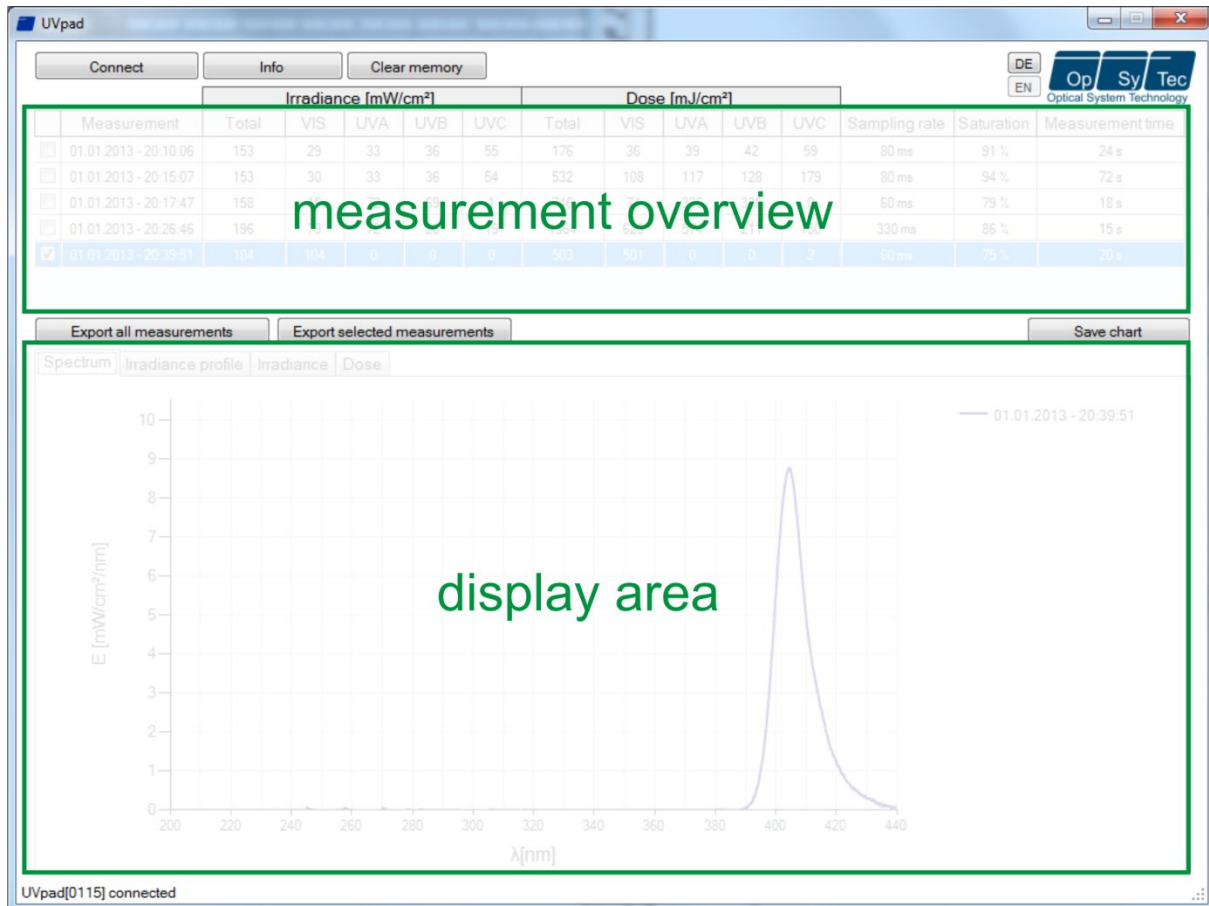
The buttons EN and DE let you change the language (German / English).

When starting the software, the measurements are automatically imported, when an UVpad E is being detected. Importing can take a few seconds. During this time, a progress bar displays the import:
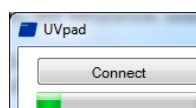

If the UVpad E is not connected or not ready yet, then an error message pops up. Restart the import after a few seconds via the button „Connect".

In the spectrum view and the irradiance profile graph, you can zoom with the right mouse button. Use left mouse button to zoom out again. Example:
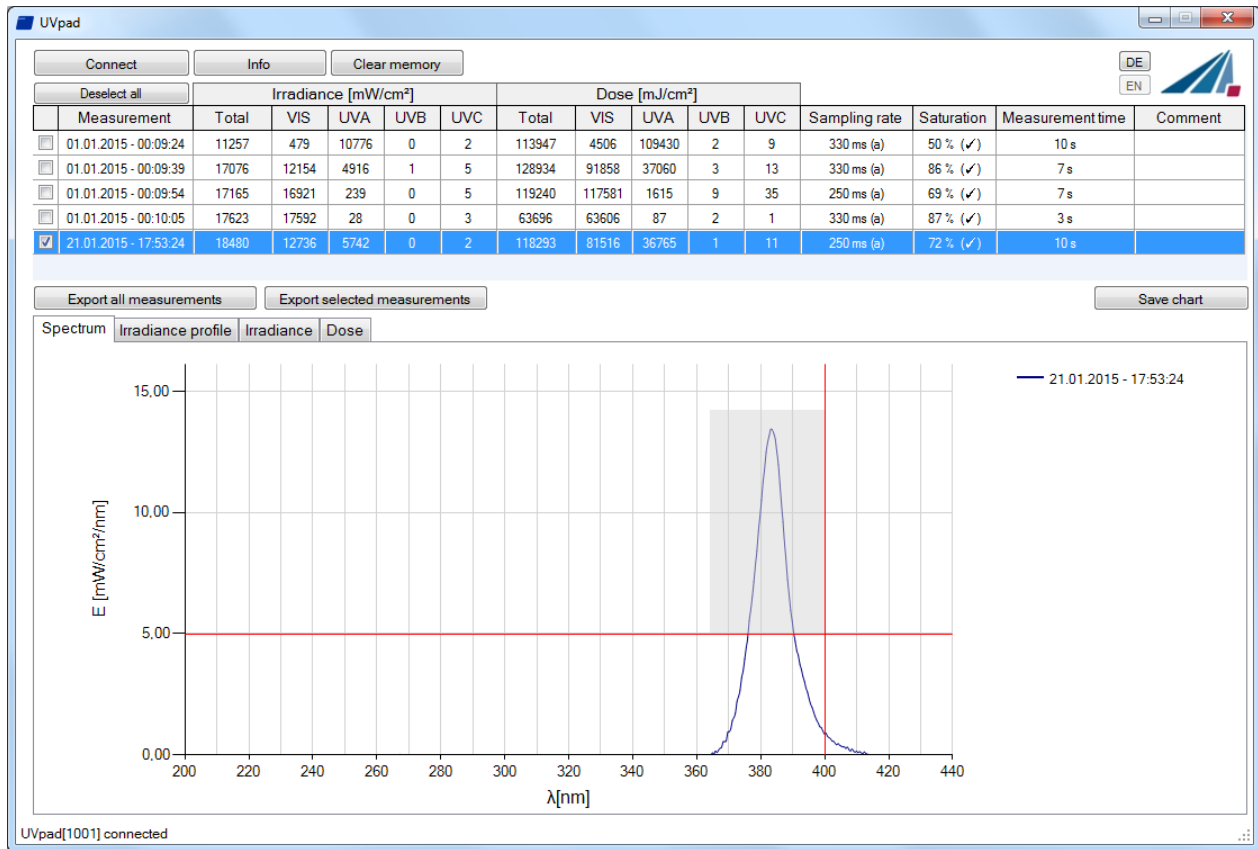
The max. irradiance and dose will then be calculated in active view (irradiance profile).
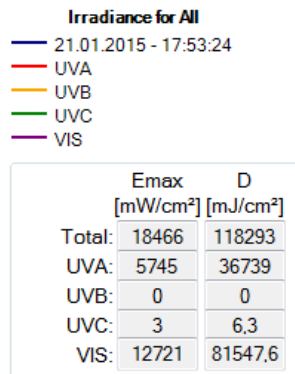

Working with different measurements:
You can select and compare different measurements. You can also add a comment in the table before exporting data.

Note: The UVpad E Viewer displays measurement settings and results as sensitivity, saturation and errors. Use mouse over function in table view this.

10.4 Export of measurements

Measurements can be exported individually, in a group or completely. For this purpose, mark up to 10 measurements.
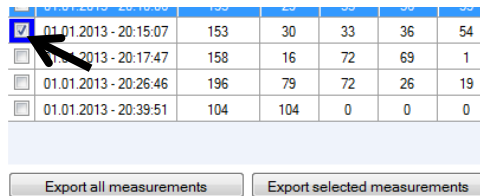
Button „Deselect all" deselect marked measurements.

Select "Export selected measurements" or "Export all measurements" for the data export. The measurements are exported as a text file, separated by a comma, and can thus be imported to a table calculation program, such as Microsoft EXCEL.

The exported file contains all information to the measurement, the spectrum and the irradiation profile.

Marked measurements appear in the display area, as illustrated by the following LED spectrum:
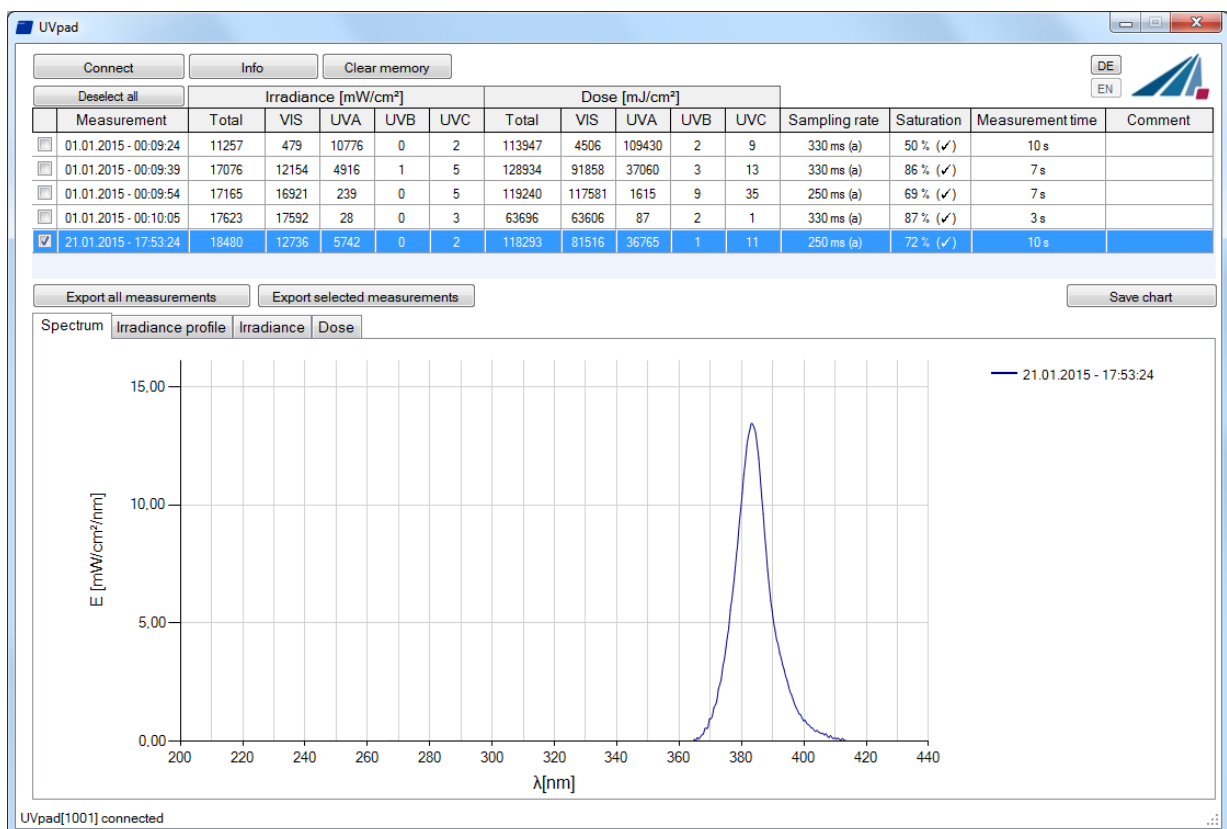
10.5 Displaying and comparing Measurements

Select the desired display via the tab:

| Spectrum | Irradiance profile | Irradiance | Dose |

Below is an example with two irradiance measurements.

Up to 10 measurements are selectable at the same time and are labeled in the display area with date / time.
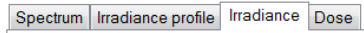
Each display can be saved via the button "save chart" as an image file (*.jpg, *.bmp, *.tiff, *.wmf).
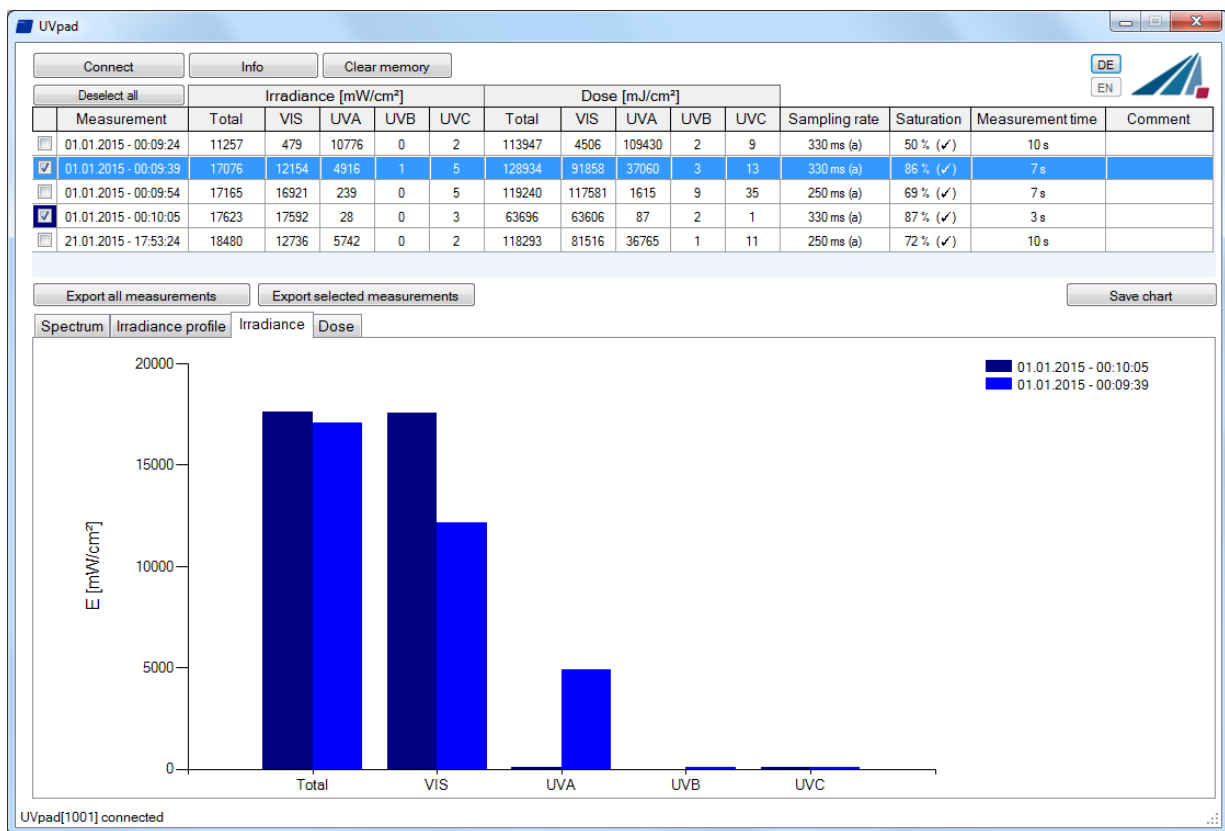
10.6 Displaying the Irradiance profile

The irradiance profiles are separately available for all four spectral ranges. For this purpose, mark the desired measurements and select the desired spectral range on the tab "Irradiance profile".

The following example illustrates an irradiance profile for all spectral ranges.

> The data logging takes place adjustable between 10 and 250 ms. With shorter integration times, the maximum irradiance is being saved.
> The calculation of the dosage is taken out independently in real time.

The screen can be adjusted via the zoom function. For this purpose, change the X and the Y intercept and confirm with „Zoom Fit". The maximum irradiance Emax and the dosage D in the display area are displayed on the right.
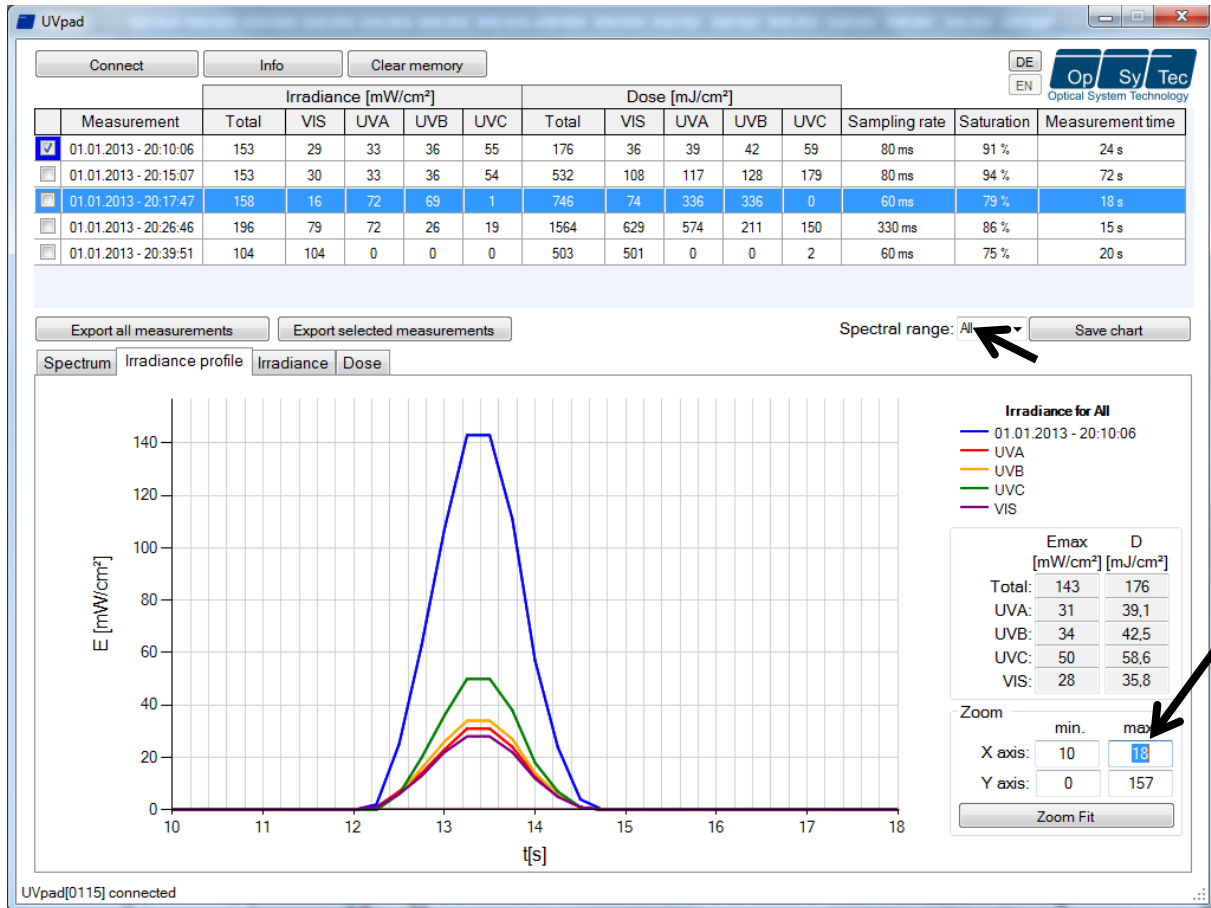
10.7 Deleting Measurements

You can delete the entire memory of the UVpad E via the button "Delete all measurements". Confirm the confirmation prompt with OK. Individual measurements cannot be deleted.

Tip: Via the button „Info ", the serial number and the assignment of memory space of the UVpad E are displayed.
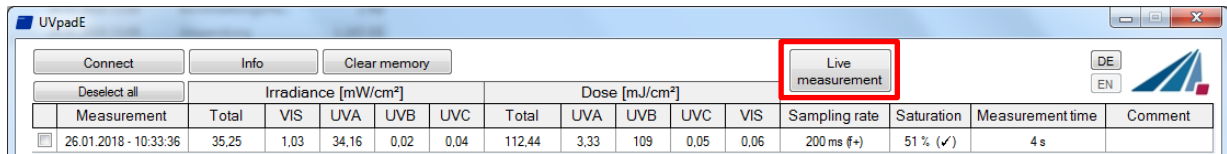
11 Remote control / Live measurement

In addition to the export functions, the UVpad E software also has a remote control called "Live measurement". The button with the same name takes you to a separate user interface for remote control of the UVPad E.

The remote control is available for firmware version 1.2.4 and higher. Ask for an update if necessary!

The user interface is divided into sections. All measurements received by the UVpad E are displayed in the display area. The parameters that must be adjusted for a measurement can be found in the parameter area. Once a measurement has been completed, the user has the option of exporting a "Single measurement" or "All measurements" in the export area. In contrast to the single measurement, when exporting all measurements not only the averaged spectrum is written to a *. csv file. All single dark current or spectra measurements are also written to the file.
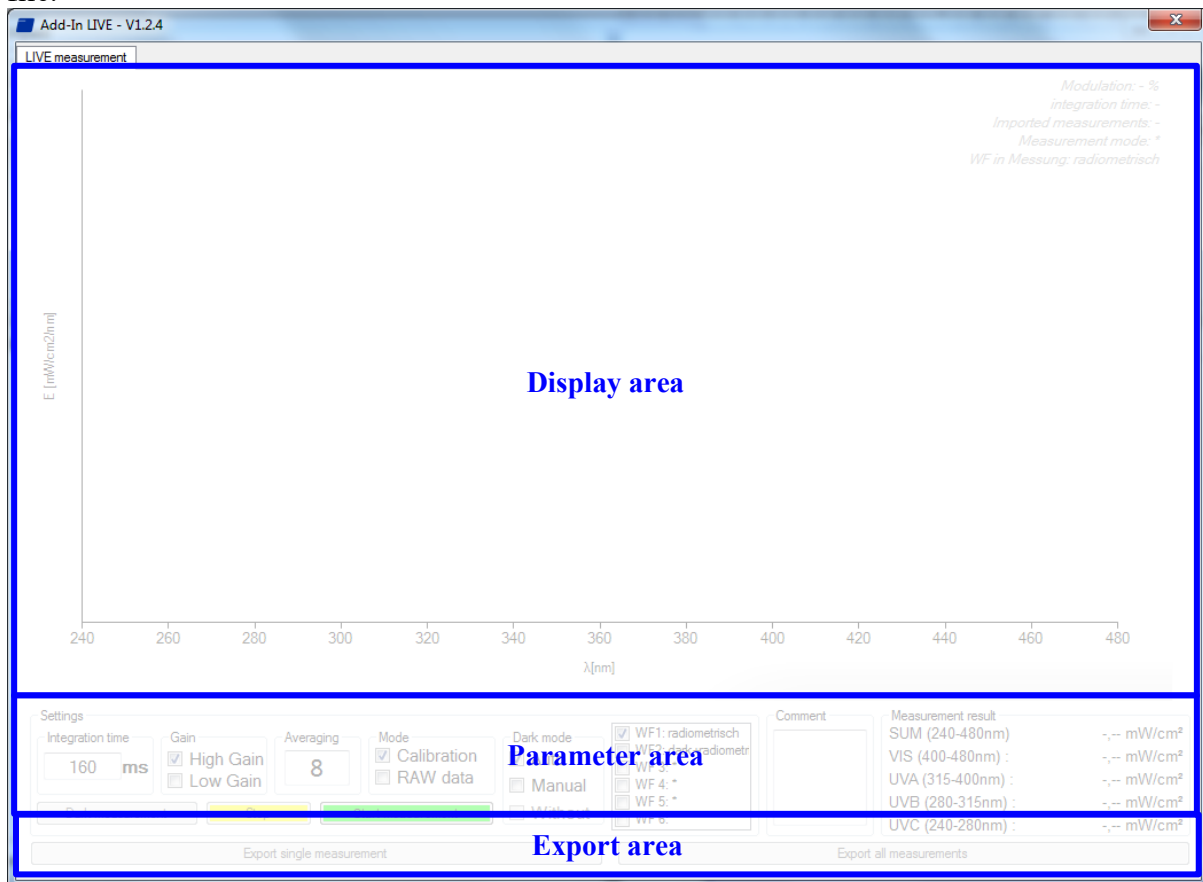
Before starting a measurement, integration time, dark current or another effective function can be set in the parameter area. Basically, two different operating modes are available for one measurement.

In the calibrated mode, radiometric weighted measured values are displayed.
In the "RAW data" mode, only unweighted count values can be recorded and exported. In contrast to the calibrated mode, there is no automatic dark current correction and calibration.

Three methods are available for the dark current measurement, depending on the selected mode. In the "Auto" mode a dark current measurement is done directly in the device. In "Auto" mode, dark current correction is carried out as usual in the UVpad E device.

> **"Calibration + Auto" mode corresponds to the measurement result of the UVpad E.**
> (All other modes are suitable for special applications and are calculated in the PC.)

In "Manual" mode, an entire dark current spectrum is recorded which is later calculated with the spectrum. If no dark current correction is to be carried out, select the mode "Without".

After starting a dark measurement or spectrum, the selected number of averages is imported from the device. The progress of a measurement series is displayed by a progress bar.

> **Tip:**
>
> For best measurement results, the measuring range should be almost completely controlled. Good measurement results are achieved if the measuring range is used by at least 50%. The modulation is linear to the set integration time. Example:
>
> Integration time 10 ms; modulation 20%: Measuring range is used up to 20% → Bad
>
> Integration time 40 ms; modulation 80%: Measuring range is used to 80% → Very good

After the measurement has been completed, there are two options in the export area (single measurement / all measurements) for saving the measurement results in a file.

When exporting all measurements, in addition to the averaged measurement result, all individual measurements as well as the measurement results for irradiance are exported to a *. csv file. The export of a "single measurement" only provides the averaged measurement result. All measurement settings are also saved in the export file.

Note:

The subsequent modification of a parameter blocks both export options!

Tip:

To switch between German and English use the key combination:

Ctrl + Shift + d ~ german

Ctrl + Shift + e ~ english

12 Notes for optimal measurement results

The UVpad E achieves optimal measurement results, if the measurement range is well adjusted to the irradiance and thus to the UV system. This is generally taken out automatically.
The following notes are there to support you with the setting of the UVpad E, so that optimal measurement results can be achieved.

12.1 The UVpad E displays „MAX"

The UVpad E saves the maximum irradiance during the measurement. Due to the individual lines in the spectrum, the measurement signal can partly exceed the measurement range. In this case, the UVpad E displays the message "MAX".
Select low sensitivity or a fixed integration time. Reduce the lamp power, if this is insufficient.

> If the measuring range is over modulated in setting "fixed sensitivity" a hint will be shown after a measurement. Note that measurement data will not be stored.

12.2 The UVpad E displays too little irradiance values

Check if the sensitivity has been set correctly. Optimal measurement results are achieved, if the measurement range is used to at least 50%. After a measurement, the value M should be higher than 50%.

> Select a low or automatic sensitivity or set a short integration time.

> When "automatic sensitivity" is set, the spectrum and irradiance will be stored as the optimal measuring range is automatically found.
> In the case of band systems, it may happen that a maximum is recorded prior to the lamp position and that UVpad E is over modulated below the lamp.
> In this case the shown irradiance may be too low. However, the dose is correctly. In this case a fixed integration time may be helpful.

12.3 The UVpad E displays too high or too low UVC Values

The UVpad E measures the entire UV spectrum range and divides it standardized into UV spectrum ranges (UVA, UVB, UVC).
For comparison:
Broadband radiometers possibly only measure a part of this range, if these do not operate with standardized spectral ranges. Thus, high deviations can arise especially in the UVC.
Furthermore, the UV lamps generally emit visible light and IR radiation apart from the UV radiation. Both can generate scattered light in the UVpad E, which is then detected. It is also possible that the UVpad E heats up during the measurement and thus the reading noise in-

creases. Therefore, the UVpad E has an automatic correction function. However, low UVC values can possibly not be avoided, even if the UV lamp does not emit UVC.

12.4 The UVpad E displays " - "

Just like each measurement device, the UVpad E has a fixed measurement range. If this range is fallen below, then the UV radiation cannot be captured correctly. In that case, the UVpad E displays " – ".

Select a higher, lower or automatic sensitivity or set a long integration time.

12.5 The measured value is not reproducible

Measurements are only stored and displayed in UVpad E when the saturation is between 10% and 100%. This can cause to saturation direct under the light source, however correct measurement may be recorded before or after that. Especially UV LEDs can lead to a correct measurement switching the LED on within one measurement, while all other are saturated.

Select a fixed integration time.

Note: Reduce the integration time to 10ms and not saturation. Then set the highest possible integration time

13 Cleaning, Maintenance & Troubleshooting

13.1 Calibration

The calibration of the UVpad Es is checked during the initialization. If the UVpad E is not calibrated properly anymore, then this is indicated by a note after the initialization process. Measurements are also possible at any time with an expired calibration.
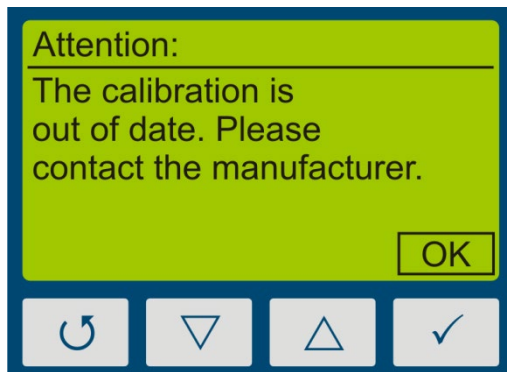
Confirm with the key ✓.

The UVpad E can only be maintained and calibrated by the manufacturer. For this purpose, please consult your supplier.

	UV spectroradiometer are in principle subject to a high high-energy load by UV radiation. This can affect the calibration and lead to an early due date for a re-calibration. This can depend on the individual use, the environment and the radiation sources.

13.2 Cleaning

Skin oil and contamination are absorbing in the UV spectral range and thus affect the measurement result. Finger prints or contamination on the optically active entrance opening are therefore generally to be avoided.
Should a cleaning become necessary, please use a lintless cloth and Isopropanol. Clean the optically active surface with circular movements. Avoid a strong force. If necessary, leave the UVpad E to dry completely after cleaning it.
Please note:

STOP	For cleaning the optically active surface, please wear gloves.

STOP	Do not use Acetone or other chemical cleaning agents to clean the UVpad E.

> **STOP** The housing, with the exception of the battery compartment, is not to be opened by the user.

13.3 Battery Change

> When the batteries are emty a measurement cannot be started and the UVpad E reinitializes. The message "empty battery" is displayed.
>
> Change the batteries.
> The measured data will be stored. Date and time should be adjusted.

The UVpad E is operated with lithium batteries. For a battery change, switch the UVpad E off and turn it with the rear panel facing towards you. Loosen the three marked screws with a screwdriver (Torx T6) and remove the cover.
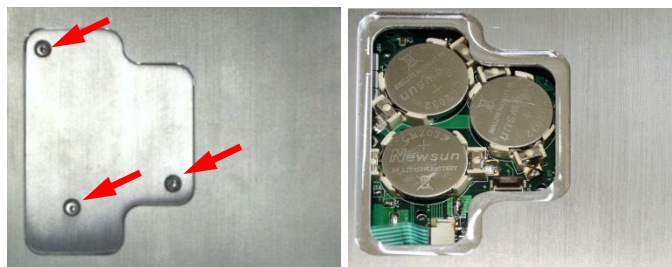
Remove the old lithium batteries carefully and replace them by new ones. Close the cover again and tighten the screws carefully.

Please note:

> ⚠ Only use **batteries**, which are suitable for up to 70 °C. Appropriate batteries can be obtained from your supplier.

> **STOP** The housing, except for the battery compartment, must not be opened by the user.

> **STOP** **The UVpad E is calibrated.**
>
> ATTENTION: Opening of the housing (except for the battery compartment) leads to a loss of calibration.

13.4 Troubleshooting

The subsequent notes and error messages address the user. The information should help to ensure the release and the appropriate operation of the reference spectrometer. For this reason, possible causes and remedies are listed below:

Error / Error Message	Cause	Remedy
The UVpad E cannot be switched on	The batteries are empty	Change batteries.
	Interruption	Restart the device. For this purpose, remove all batteries and replace them after 5 minutes. The UVpad E is in delivery status.
The measured value is not reproducible	Automatic, low or high sensitivity selected	Use fixed sensitivity
The UVpad E displays too high / too low results	Effect-related measurement	Check the settings for effect-related measurements.
	The optically active surface is contaminated	Clean the optically active surface.
	The calibration is invalid	Have the UVpad E re-calibrated.
	wrong settings	check integration time
The UVpad E displays a saturation "MAX"	Measurement range exceeded	Use the sensitivity setting „low".
The UVpad E displays a strong noise	Sensitivity too low	Increase the sensitivity to „high".
The calibration is expired	Calibration interval expired	Have the UVpad E re-calibrated.
The UVpad E is not detected by the PC	The UVpad E is switched off	Switch the UVpad E on and wait a few seconds for the initialization.
	Check USB cable	Use delivered cable.

14 Declaration of Conformity

CE

Manufacturer :	Company name: Opsytec Dr. Gröbel GmbH Street: Am Hardtwald 6-8 City: 76275 Ettlingen Country: Deutschland
Person authorized to compile the technical documentation	Company name: Opsytec Dr. Gröbel GmbH Street: Am Hardtwald 6-8 City: 76275 Ettlingen Country: Deutschland
Product:	Spectral radiometer
Type designation:	UVpad E
Type number:	670027 xxxx 670027HP xxxx 670027HS xxxx

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

2014/30/EU
Directive of the European Parliament and of the Council relating to electromagnetic compatibility (EMC Directive, recast)".

2011/65/EU
"Directive of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)".

Ettlingen, 04.03.2021

gez. Dr. Mark Paravia

This document was created electronically and is valid without signature.

15 Notes