# Detect, Recognise and Track What is Invisible.

## With the LUMI Series.

Product marking
and product tracking

## LUMI-MOBILE / LUMI-LAB / LUMI-INLINE Series

Compact Hand-Held Units
Laboratory Measurement Systems
Inline Detectors


Sensor Instruments
Let's make sensors more individual

# LUMI-INLINE Series

## LUMI-INLINE-UV/VISIR-ANA

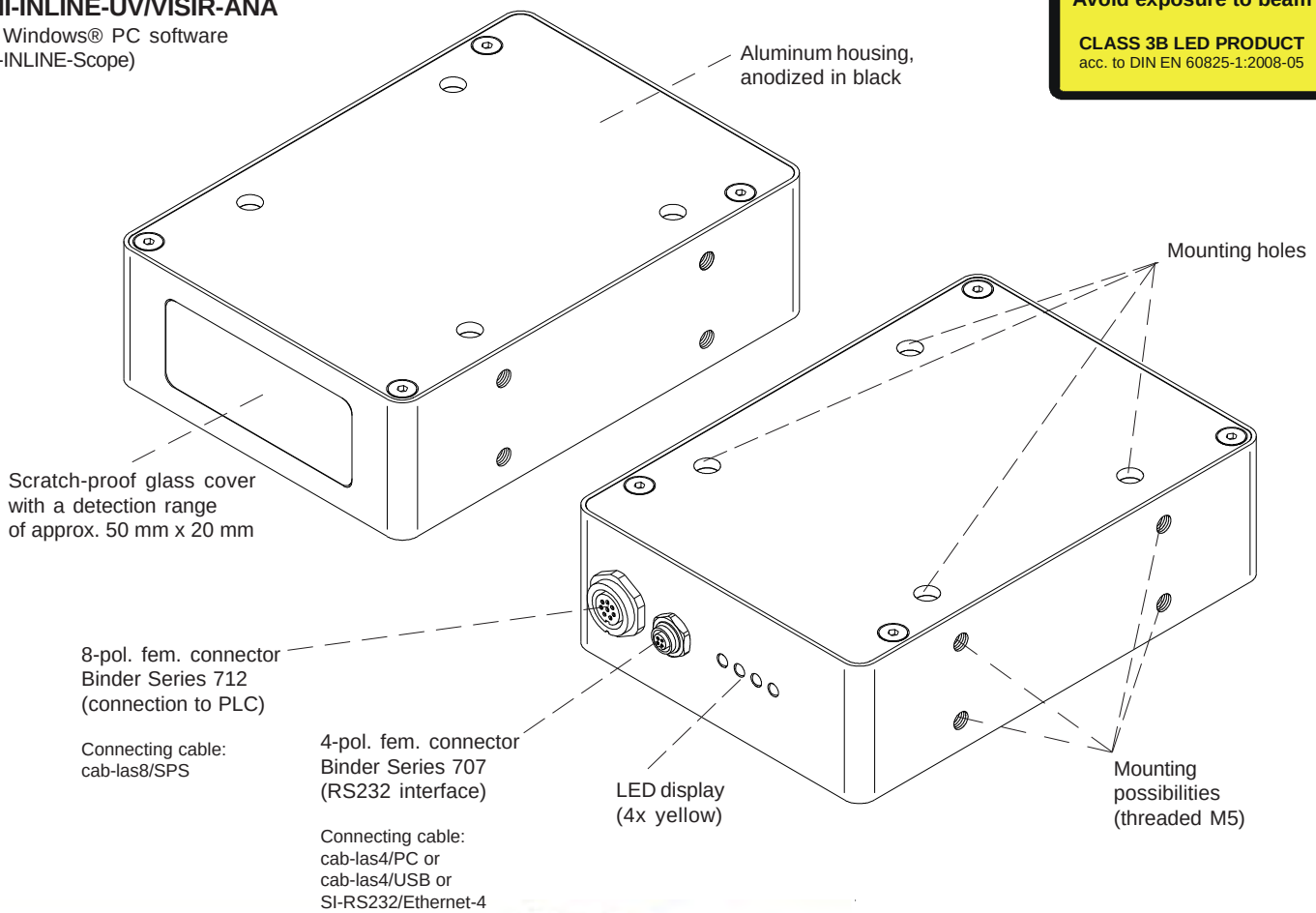
- Monitoring of the concentration of DOWN converters
- Monitoring of time constant $\tau$
- Monitoring software (under Windows®) for trend visualisation and tolerance exceedance of concentration and time constant
- 2 analog outputs (0V...+10V or 4mA...20mA) for the output of concentration and time constant
- 4 switching outputs (up to 15 states can be saved)
- LUMI-INLINE-Scope Windows® PC software for parameterising the measuring system
- Large detection range (typ. 50 mm x 20 mm)
- UV-LEDs, typ. 365 nm
- Scratch-proof glass cover
- RS232 interface
- Robust, industry-standard design

## Design

**Product name:**

**LUMI-INLINE-UV/VISIR-ANA**
(incl. Windows® PC software LUMI-INLINE-Scope)

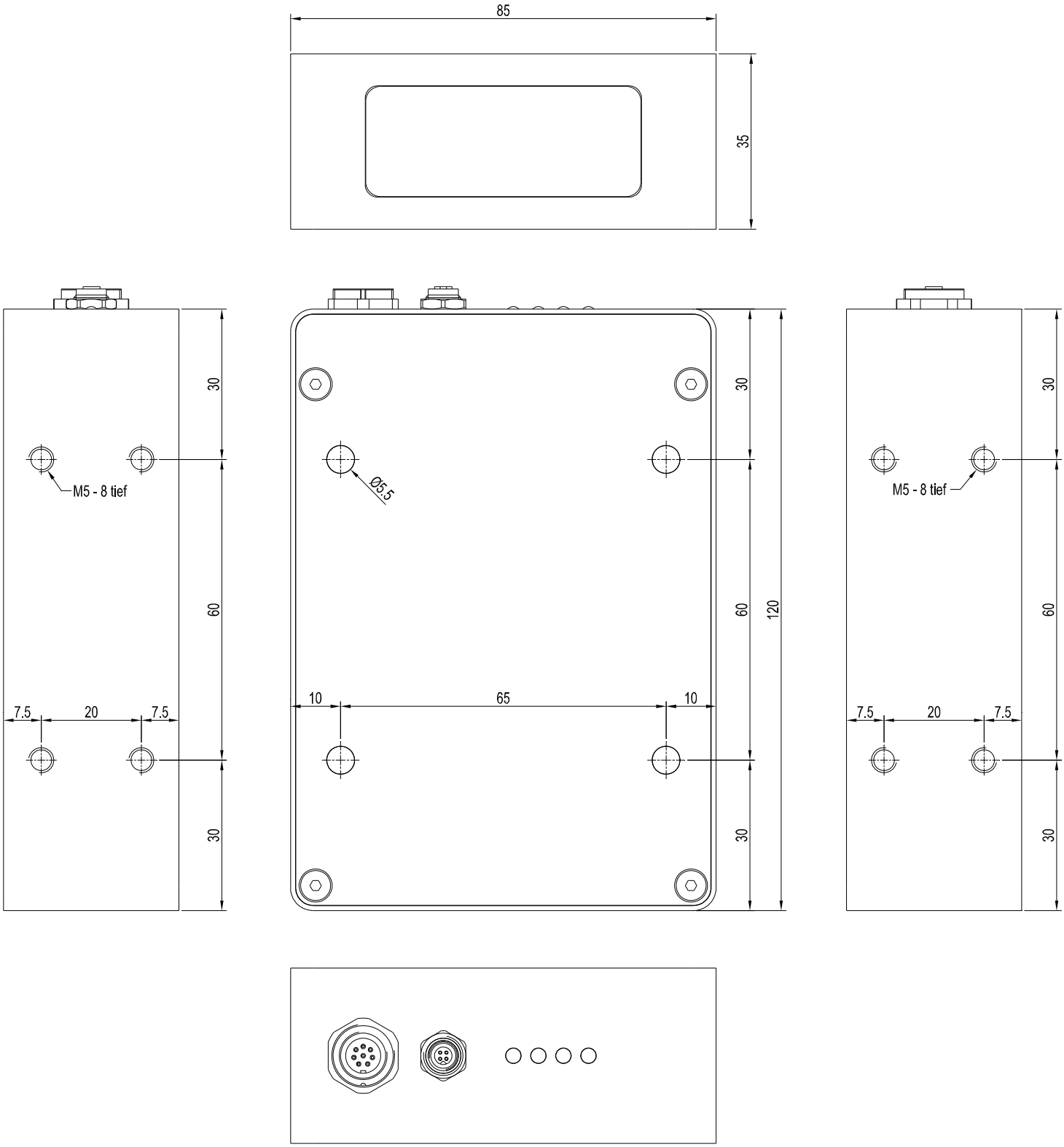
**LED RADIATION**
**Avoid exposure to beam**
**CLASS 3B LED PRODUCT**
acc. to DIN EN 60825-1:2008-05



## Technische Daten

| Model | LUMI-INLINE-UV/VISIR-ANA |
|---|---|
| Light source | UV-LEDs (typ. 365 nm), pulse operation |
| UV radiation | UV LED radiation, class 3B LED product, AVOID EXPOSURE TO BEAM |
| Reference distance | typ. 5 mm |
| Detection range (measuring window) | typ. 50 mm x 20 mm |
| Excitation wave length | typ. 365 nm |
| Voltage supply | +24VDC ± 10% |
| Pulse light peration | parameterizable under Windows®<br>(pulse length, pulse power, pulse/pause ratio, averaging, ...) |
| Enclosure rating | IP54 |
| Current consumption | typ. 200 mA (max. 500 mA) |
| Interface | RS232, parameterizable under Windows® |
| Digital output/input (2x) | Pin 3: OUT3/IN0 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)<br>Pin 4: OUT2/IN1 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)<br>short-circuit proof, 100 mA max. switching current, npn-, pnp-able (bright/dark switching, can be adjusted) |
| Digital output (2x) | Pin 5: OUT1 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)<br>Pin 6: OUT0 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)<br>short-circuit proof, 100 mA max. switching current, npn-, pnp-able (bright/dark switching, can be adjusted) |
| Analog output (2x) | Pin 7: ANA1 (analog 0V ... +10V or 4mA ... 20mA)<br>Pin 8: ANA0 (analog 0V ... +10V or 4mA ... 20mA)<br>analog voltage output 0V ... +10V or analog current output 4mA ... 20mA (parameterizable under Windows®) |
| Switching state indication | visualization by means of 4 yellow LED |
| Sensitivity, gain | parameterizable under Windows® |
| UV light power, pulse length | parameterizable under Windows® |
| Averaging | parameterizable under Windows® |
| Type of connector | connection to PLC: 8-pole circular connector type Binder 712<br>connection to PC (RS232): 4-pole circular connector type Binder 707 |
| Connecting cables | to PLC: cab-las8/SPS or cab-las8/SPS-w<br>to PC/RS232 interface: cab-las4/PC or cab-las4/PC-w<br>to PC/USB interface: cab-las4/USB or cab-las4/USB-w<br>to PC/Ethernet interface: SI-RS232/Ethernet-4 |
| Housing material | aluminum, anodized in black |
| Housing dimensions | LxWxH approx. 120 mm x 85 mm x 35 mm |
| Operating temp. range | 0°C ... +50°C |
| Storage temperature range | -20°C ... +75°C |
| EMC test acc. to | DIN EN 60947-5-2 CE |

## Dimensions



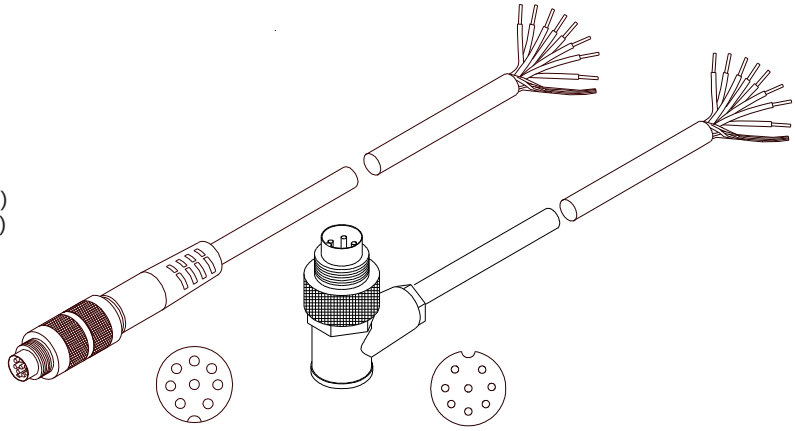

All dimensions in mm

# Connector Assignment

## Connection to PLC:
### 8-pol. fem. connector Binder Series 712

| Pin: | Color: | Assignment: |
|---|---|---|
| 1 | white | GND (0V) |
| 2 | brown | +24VDC (±10%) |
| 3 | green | OUT3/IN0 (Digital 0: 0 … 1V, Digital 1: +Ub - 10%) |
| 4 | yellow | OUT2/IN1 (Digital 0: 0 … 1V, Digital 1: +Ub - 10%) |
| 5 | grey | OUT1 (Digital 0: 0 … 1V, Digital 1: +Ub - 10%) |
| 6 | pink | OUT0 (Digital 0: 0 … 1V, Digital 1: +Ub - 10%) |
| 7 | blue | ANA1 (Analog: 0V ... +10V or 4mA ... 20mA) |
| 8 | red | ANA0 (Analog: 0V ... +10V or 4mA ... 20mA) |

Connecting cable:
cab-las8/SPS-(length) or
cab-las8/SPS-w-(length) (right-angle type)
(standard length 2m)



cab-las8/SPS-...
(max. length 25m,
outer jacket: PUR)

cab-las8/SPS-w-...
(max. length 25m,
outer jacket: PUR)

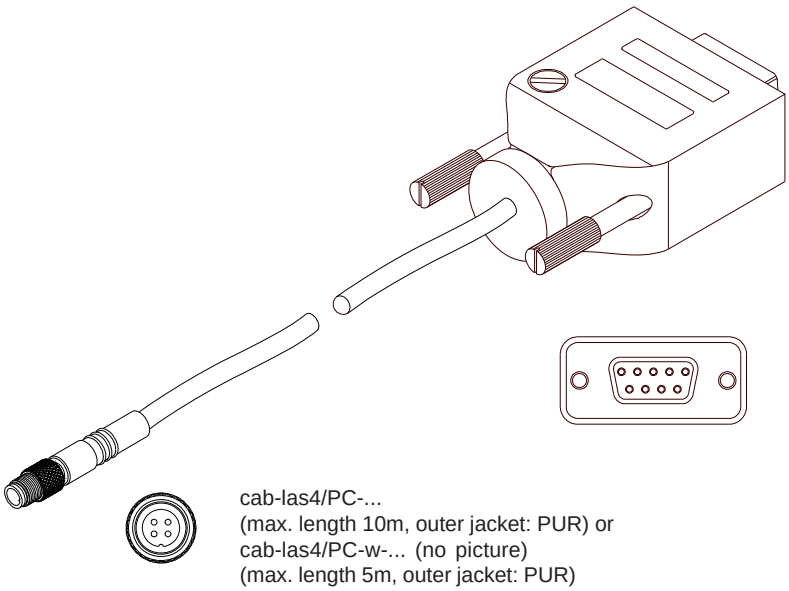
## Connection to PC:
### 4-pole fem. connector Binder Series 707

| Pin: | Assignment: |
|---|---|
| 1 | +24VDC (+Ub, OUT) |
| 2 | GND (0V) |
| 3 | RxD |
| 4 | TxD |

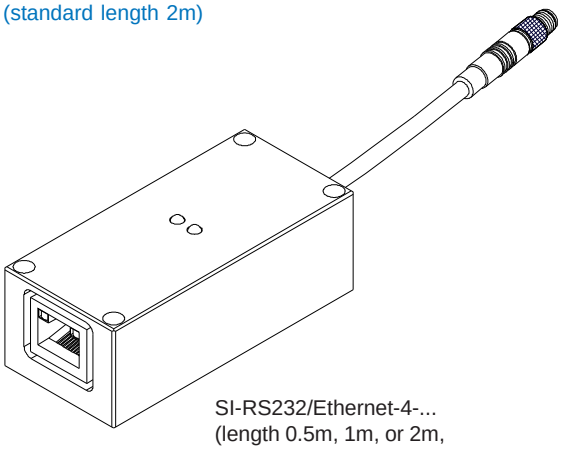
***Connection via RS232 interface at the PC:***
Connecting cable:
cab-las4/PC-(length)
cab-las4/PC-w-(length) (right-angle type)
(standard length 2m)

***alternative:***
***Connection via USB interface at the PC:***
Connecting cable (incl. driver software):
cab-las4/USB-(length)
cab-las4/USB-w-(length) (right-angle type)
(standard length 2m)

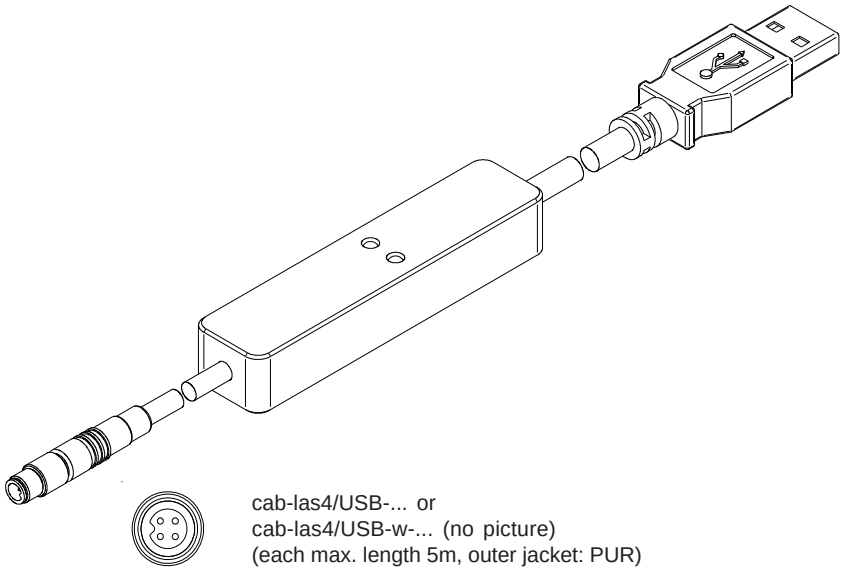
***alternative:***
***Connection to local network via Ethernet bus:***
Adapter (based on *Lantronix XPortModul*):
SI-RS232/Ethernet-4-(length)
(standard length 2m)



cab-las4/PC-...
(max. length 10m, outer jacket: PUR) or
cab-las4/PC-w-... (no picture)
(max. length 5m, outer jacket: PUR)



SI-RS232/Ethernet-4-...
(length 0.5m, 1m, or 2m,
outer jacket: PUR)



cab-las4/USB-... or
cab-las4/USB-w-... (no picture)
(each max. length 5m, outer jacket: PUR)

# LED Display

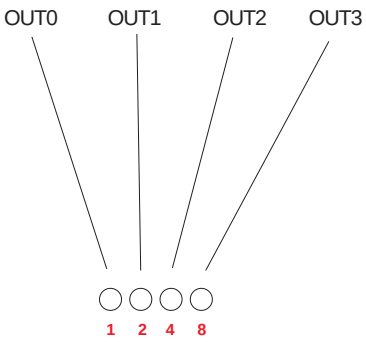
## LED display:

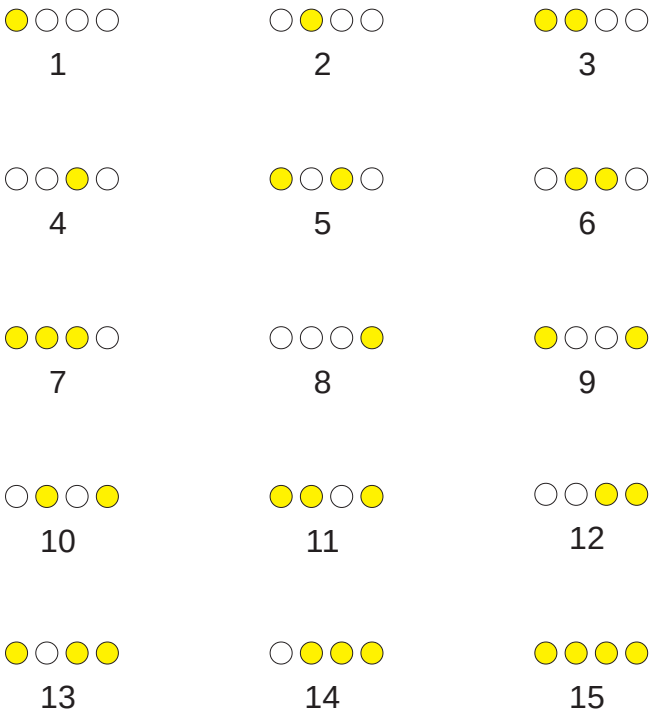
The LUMI-INLINE can save up to 15 states that are provided through the 4 digital switching outputs.

The state is visualised by 4 yellow LEDs at the housing of the LUMI-INLINE.

The state indicated by the LED display is provided as 4-bit binary information at digital outputs OUT0 to OUT3 of the 8-pole PLC connector socket.

**LUMI-INLINE-UV/VISIR-ANA**

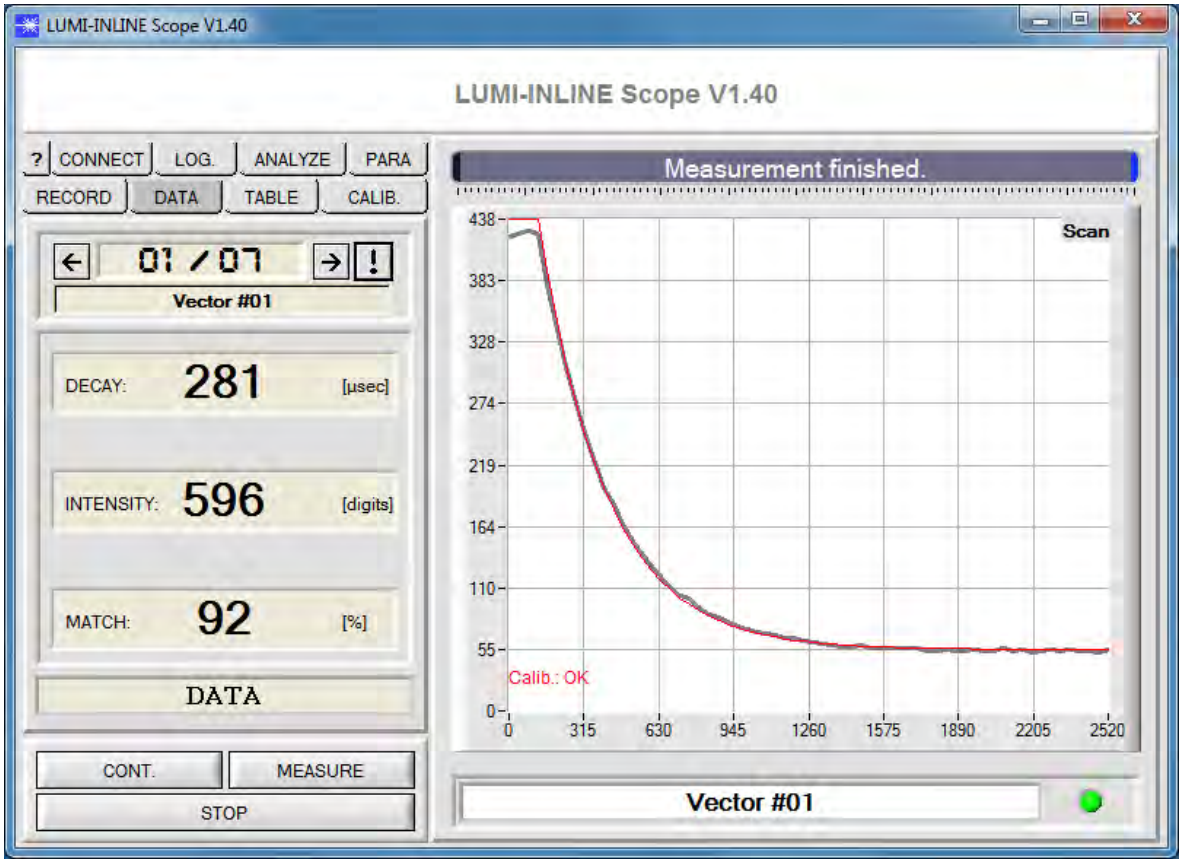



## Parameterization

### Parameterization under Windows® PC software:

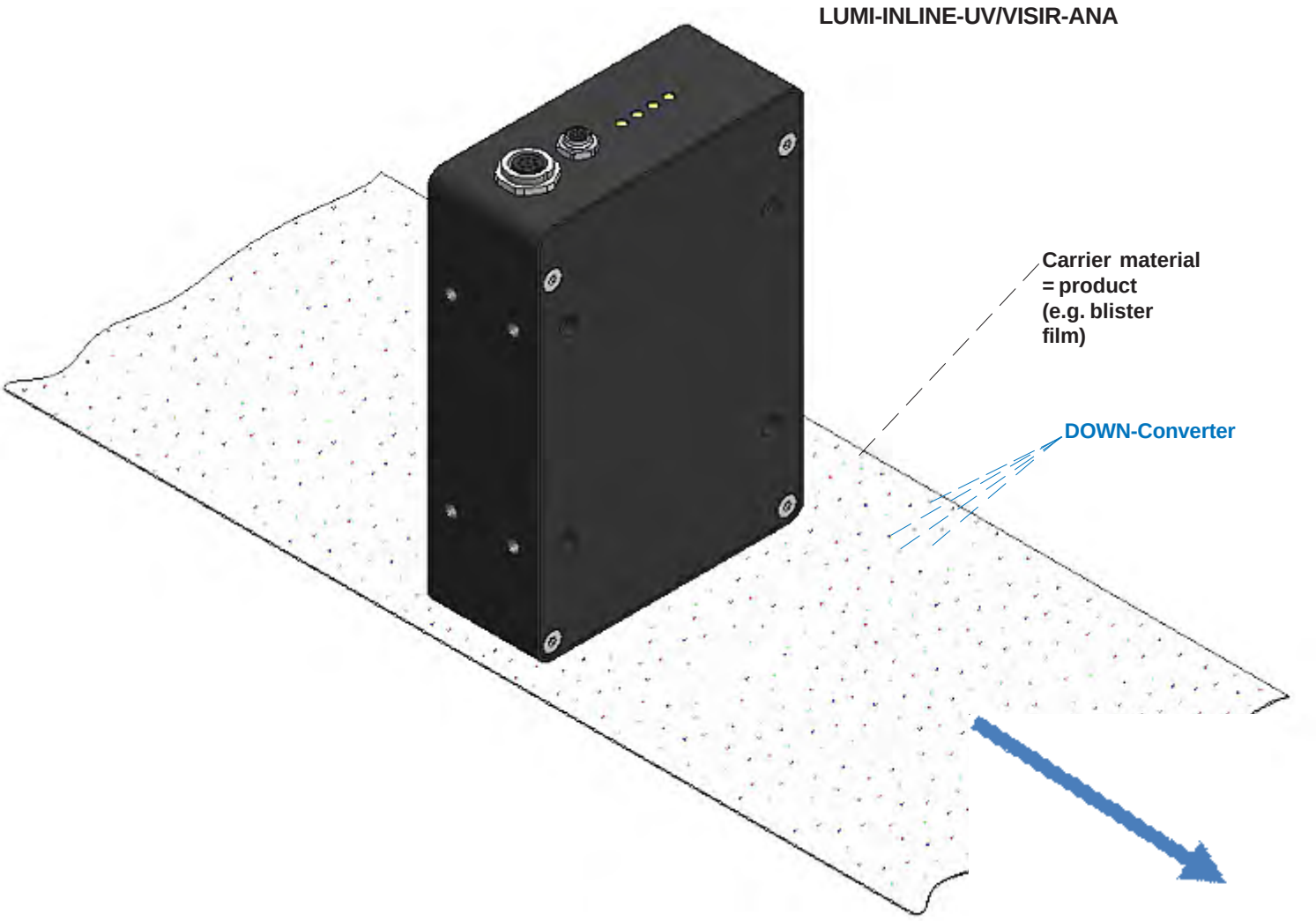
The LUMI-INLINE-Scope PC software can be used to process and analyse the measurement data. The signals and values of the measurement curves that are autarkically recorded by the sensor can be evaluated on the screen. A recorder function allows recording of measurements with the PC. Different views of the measurement data make it possible to focus on certain aspects of the measurement.

Apart from displaying measurement values, the download function for parameter files is the second main function of the PC software. These files contain the configuration data and the TEACH values for the products that should be identified.



## System Design

**Design of a LUMI-INLINE version with integrated optics:**



# LUMI-INLINE Series

## LUMI-INLINE-IR/IR-ANA

- Monitoring of the concentration of UP converters and DOWN converters
- Monitoring of time constant $\tau$
- Monitoring software (under Windows®) for trend visualisation and tolerance exceedance of concentration and time constant
- 2 analog outputs (0V...+10V or 4mA...20mA) for the output of concentration and time constant
- 4 switching outputs (up to 15 states can be saved)
- LUMI-INLINE-Scope Windows® PC software for parameterising the measuring system
- Large detection range (typ. 50 mm x 20 mm)
- IR-LEDs, typ. 940 nm
- Scratch-proof IR filter glass
- RS232 interface
- Robust, industry-standard design

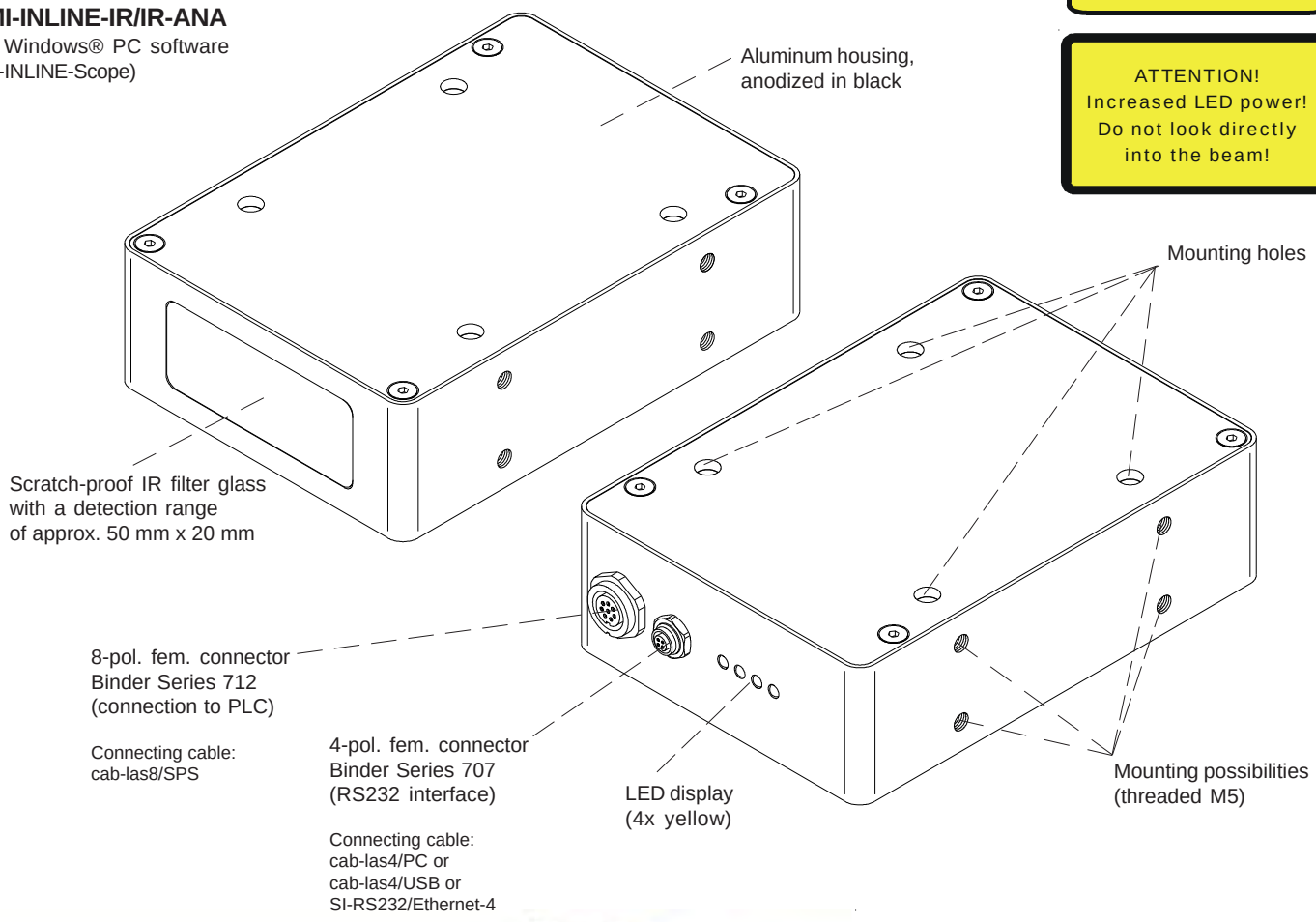
## Design

**Product name:**

**LUMI-INLINE-IR/IR-ANA**
(incl. Windows® PC software LUMI-INLINE-Scope)

CLASS 1 IR LED

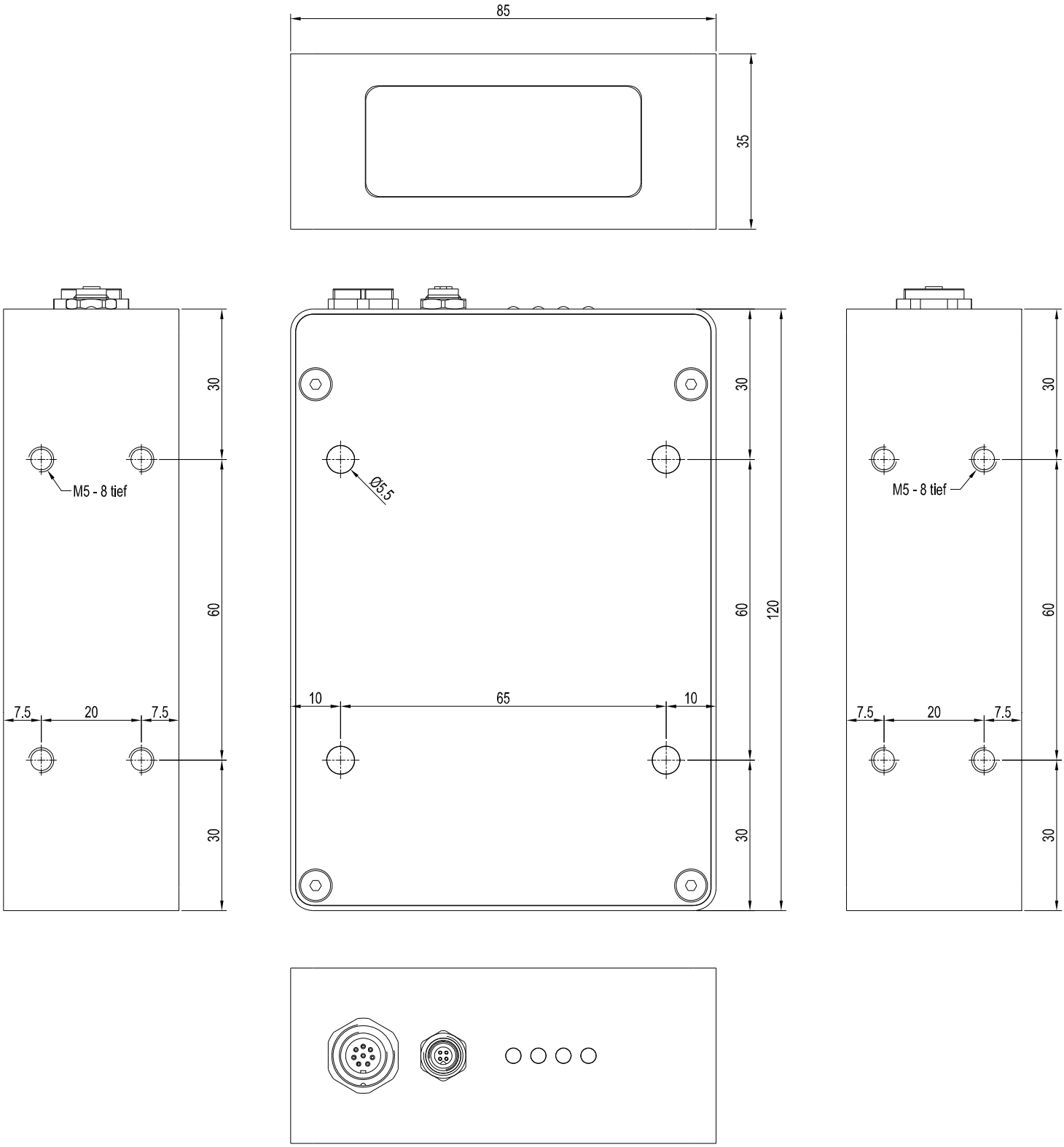
ATTENTION!
Increased LED power!
Do not look directly into the beam!



## Technical Data

| Model | LUMI-INLINE-IR/IR-ANA |
|---|---|
| Light source | IR-LEDs (typ. 940 nm), pulse operation |
| IR radiation | IR-LED, class 1 |
| Reference distance | typ. 5 mm |
| Detection range (measuring window) | typ. 50 mm x 20 mm |
| Excitation wave length | typ. 940 nm |
| Voltage supply | +24VDC ± 10% |
| Pulse light peration | parameterizable under Windows®<br>(pulse length, pulse power, pulse/pause ratio, averaging, ...) |
| Enclosure rating | IP54 |
| Current consumption | typ. 200 mA (max. 500 mA) |
| Interface | RS232, parameterizable under Windows® |
| Digital output/input (2x) | Pin 3: OUT3/IN0 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)<br>Pin 4: OUT2/IN1 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)<br>short-circuit proof, 100 mA max. switching current, npn-, pnp-able (bright/dark switching, can be adjusted) |
| Digital output (2x) | Pin 5: OUT1 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)<br>Pin 6: OUT0 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)<br>short-circuit proof, 100 mA max. switching current, npn-, pnp-able (bright/dark switching, can be adjusted) |
| Analog output (2x) | Pin 7: ANA1 (analog 0V ... +10V or 4mA ... 20mA)<br>Pin 8: ANA0 (analog 0V ... +10V or 4mA ... 20mA)<br>analog voltage output 0V ... +10V or analog current output 4mA ... 20mA (parameterizable under Windows®) |
| Switching state indication | visualization by means of 4 yellow LED |
| Sensitivity, gain | parameterizable under Windows® |
| IR light power, pulse length | parameterizable under Windows® |
| Averaging | parameterizable under Windows® |
| Type of connector | connection to PLC: 8-pole circular connector type Binder 712<br>connection to PC (RS232): 4-pole circular connector type Binder 707 |
| Connecting cables | to PLC: cab-las8/SPS or cab-las8/SPS-w<br>to PC/RS232 interface: cab-las4/PC or cab-las4/PC-w<br>to PC/USB interface: cab-las4/USB or cab-las4/USB-w<br>to PC/Ethernet interface: SI-RS232/Ethernet-4 |
| Housing material | aluminum, anodized in black |
| Housing dimensions | LxWxH approx. 120 mm x 85 mm x 35 mm |
| Operating temp. range | 0°C ... +50°C |
| Storage temperature range | -20°C ... +75°C |
| EMC test acc. to | DIN EN 60947-5-2 CE |

## Dimensions



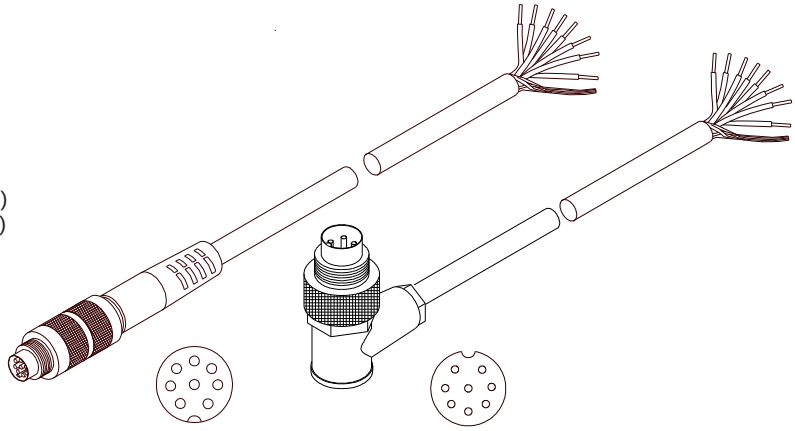

All dimensions in mm

# Connector Assignment

## Connection to PLC:
### 8-pol. fem. connector Binder Series 712

| Pin: | Color: | Assignment: |
|---|---|---|
| 1 | white | GND (0V) |
| 2 | brown | +24VDC (±10%) |
| 3 | green | OUT3/IN0 (Digital 0: 0 ... 1V, Digital 1: +Ub - 10%) |
| 4 | yellow | OUT2/IN1 (Digital 0: 0 ... 1V, Digital 1: +Ub - 10%) |
| 5 | grey | OUT1 (Digital 0: 0 ... 1V, Digital 1: +Ub - 10%) |
| 6 | pink | OUT0 (Digital 0: 0 ... 1V, Digital 1: +Ub - 10%) |
| 7 | blue | ANA1 (Analog: 0V ... +10V or 4mA ... 20mA) |
| 8 | red | ANA0 (Analog: 0V ... +10V or 4mA ... 20mA) |

Connecting cable:
cab-las8/SPS-(length) or
cab-las8/SPS-w-(length) (right-angle type)
(standard length 2m)



cab-las8/SPS-...
(max. length 25m,
outer jacket: PUR)

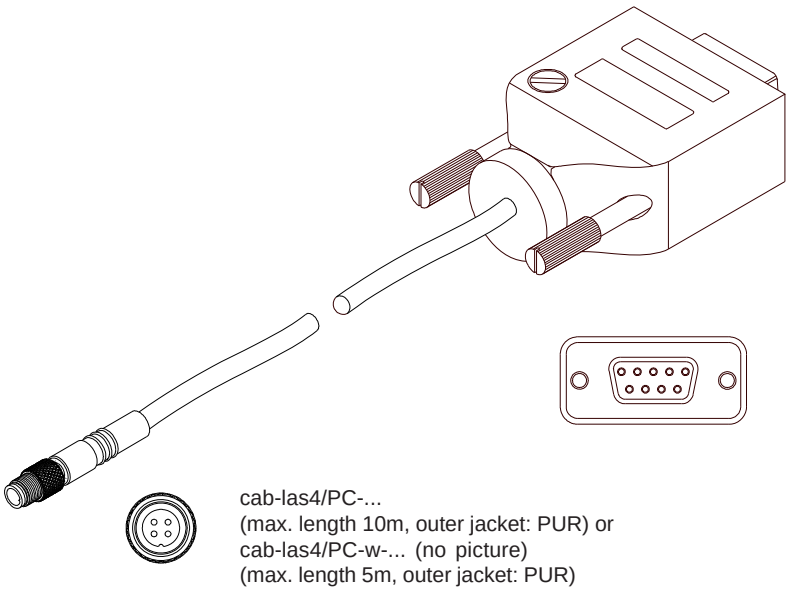
cab-las8/SPS-w-...
(max. length 25m,
outer jacket: PUR)

## Connection to PC:
### 4-pole fem. connector Binder Series 707

| Pin: | Assignment: |
|---|---|
| 1 | +24VDC (+Ub, OUT) |
| 2 | GND (0V) |
| 3 | RxD |
| 4 | TxD |

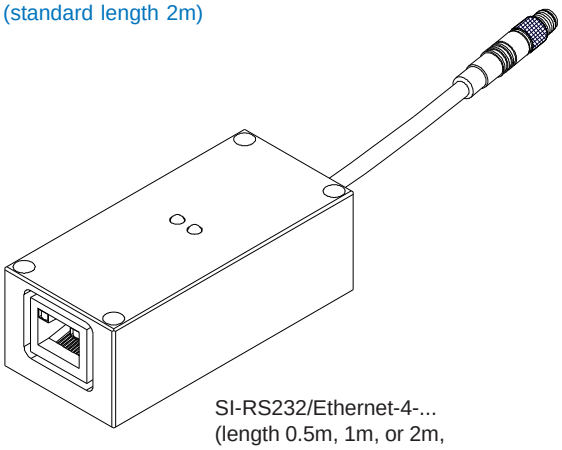
***Connection via RS232 interface at the PC:***
Connecting cable:
cab-las4/PC-(length)
cab-las4/PC-w-(length) (right-angle type)
(standard length 2m)

***alternative:***
***Connection via USB interface at the PC:***
Connecting cable (incl. driver software):
cab-las4/USB-(length)
cab-las4/USB-w-(length) (right-angle type)
(standard length 2m)

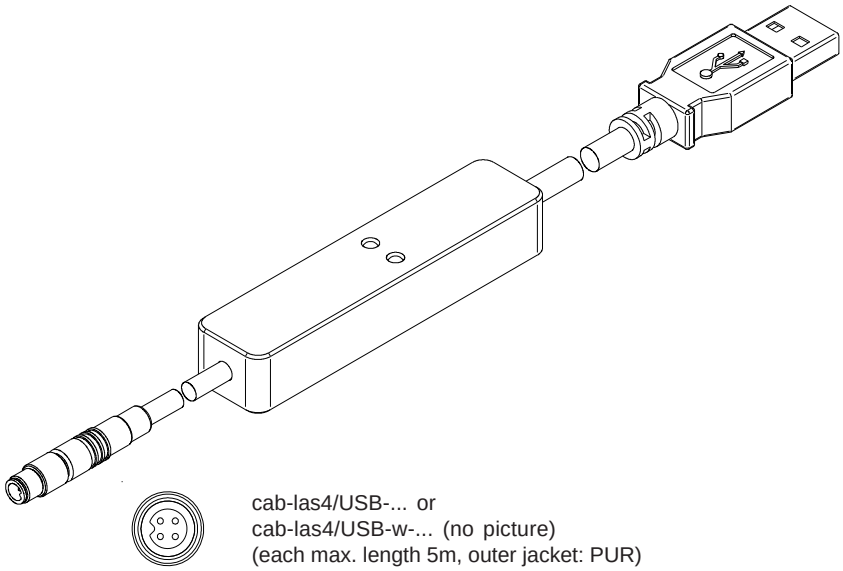


cab-las4/PC-...
(max. length 10m, outer jacket: PUR) or
cab-las4/PC-w-... (no picture)
(max. length 5m, outer jacket: PUR)

***alternative:***
***Connection to local network via Ethernet bus:***
Adapter (based on *Lantronix XPortModul*):
SI-RS232/Ethernet-4-(length)
(standard length 2m)



SI-RS232/Ethernet-4-...
(length 0.5m, 1m, or 2m,
outer jacket: PUR)



cab-las4/USB-... or
cab-las4/USB-w-... (no picture)
(each max. length 5m, outer jacket: PUR)

# LED Display

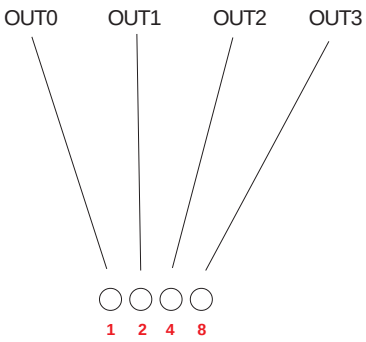
## LED display:

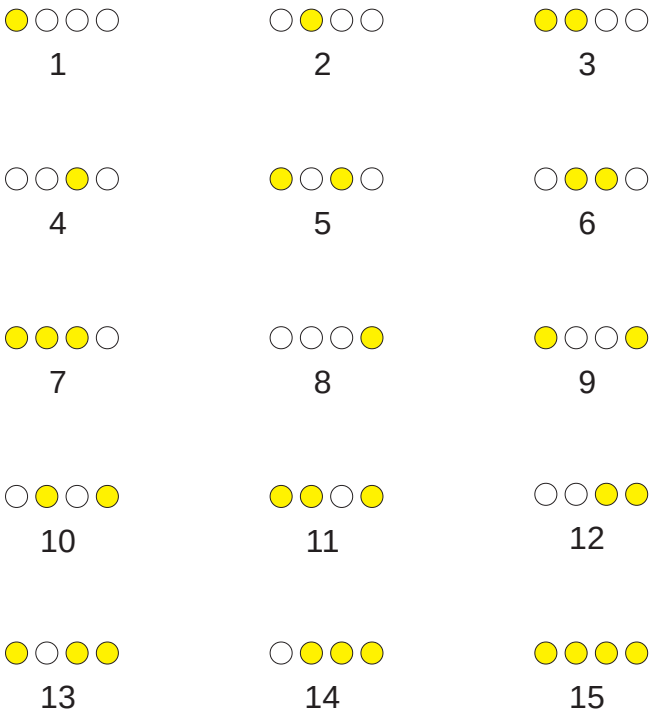
The LUMI-INLINE can save up to 15 states that are provided through the 4 digital switching outputs.

The state is visualised by 4 yellow LEDs at the housing of the LUMI-INLINE.

The state indicated by the LED display is provided as 4-bit binary information at digital outputs OUT0 to OUT3 of the 8-pole PLC connector socket.

**LUMI-INLINE-IR/IR-ANA**

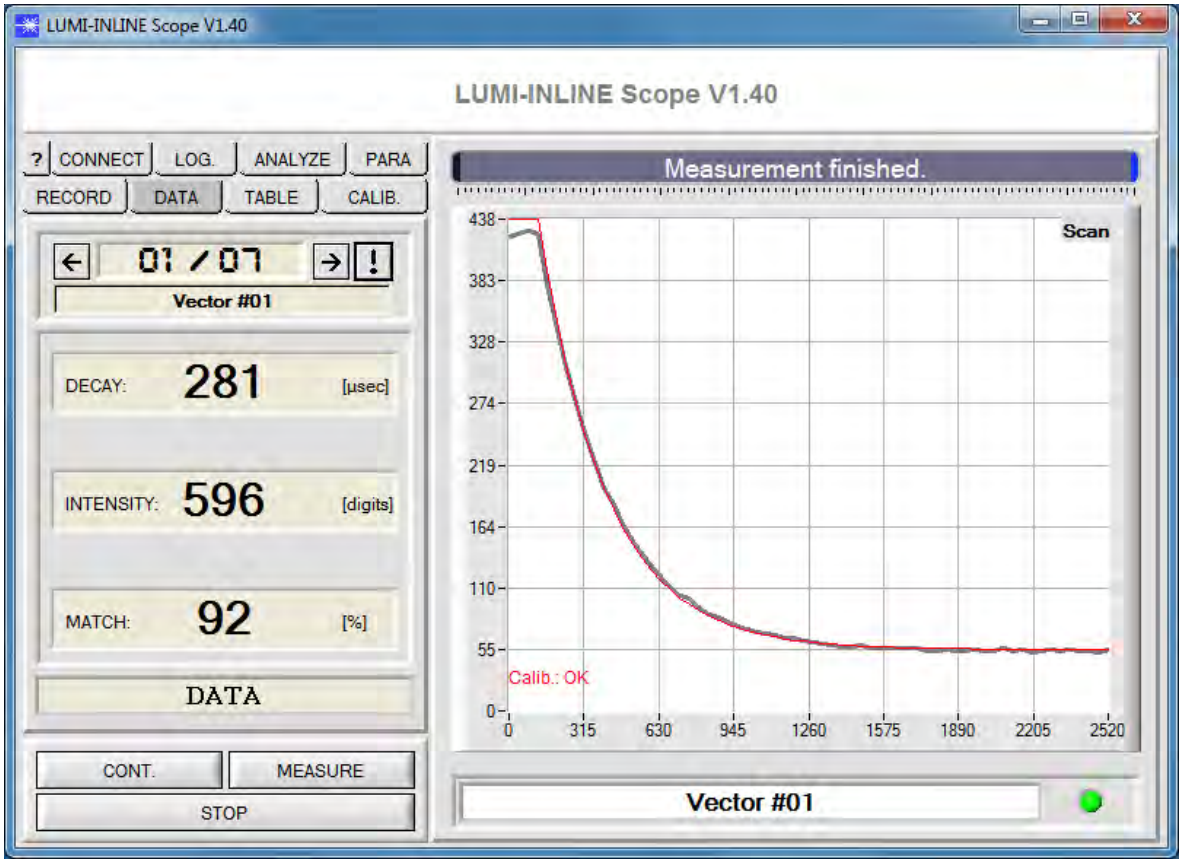



## Parameterization

### Parameterization under Windows® PC software:

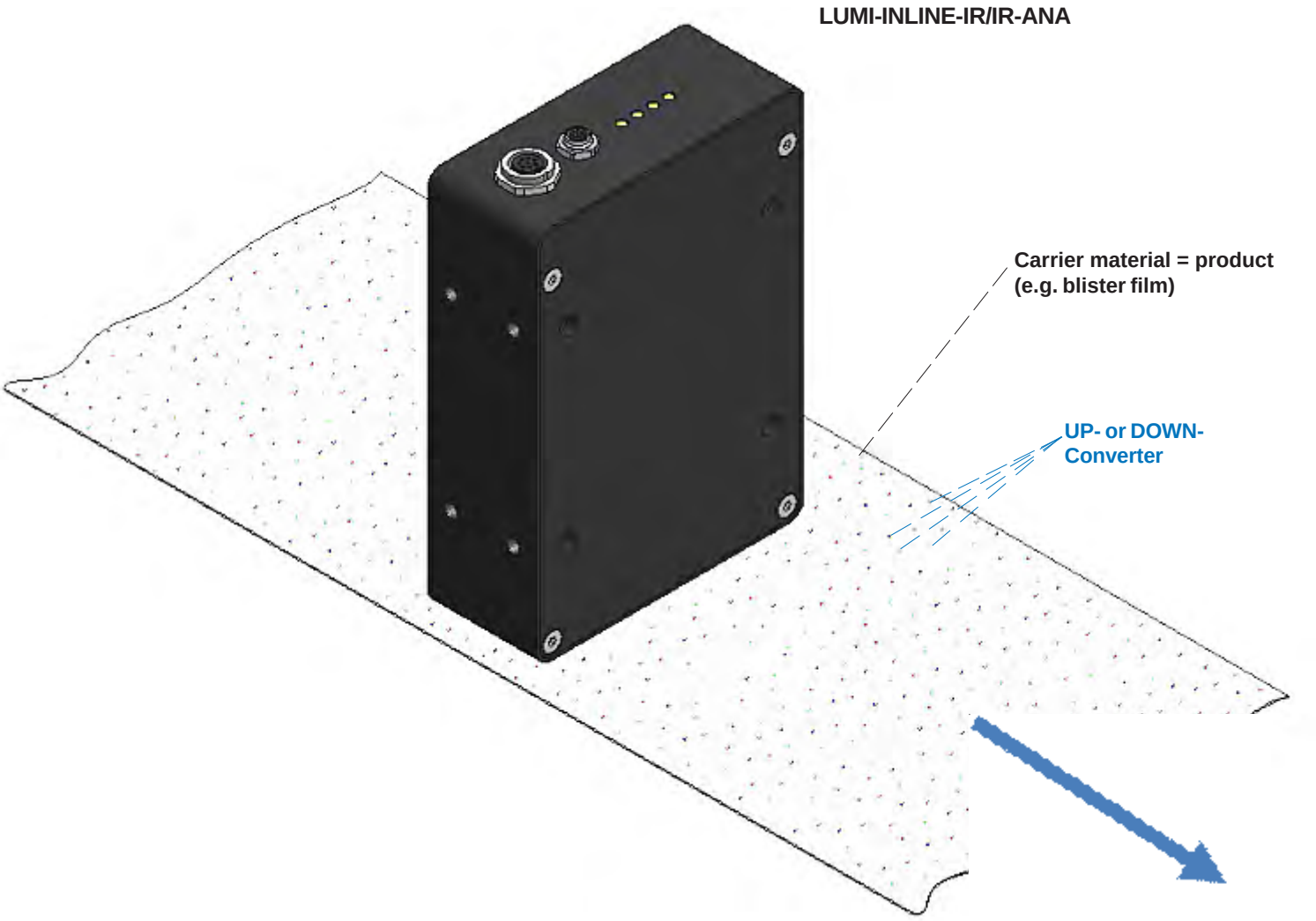
The LUMI-INLINE-Scope PC software can be used to process and analyse the measurement data. The signals and values of the measurement curves that are autarkically recorded by the sensor can be evaluated on the screen. A recorder function allows recording of measurements with the PC. Different views of the measurement data make it possible to focus on certain aspects of the measurement.

Apart from displaying measurement values, the download function for parameter files is the second main function of the PC software. These files contain the configuration data and the TEACH values for the products that should be identified.



## System Design

**Design of a LUMI-INLINE version with integrated optics:**



# LUMI-INLINE Series

## LUMI-INLINE-FIO-UV/VISIR-ANA

- Monitoring of the concentration of DOWN converters
- Monitoring of time constant $\tau$
- Monitoring software (under Windows®) for trend visualisation and tolerance exceedance of concentration and time constant
- 2 analog outputs (0V...+10V or 4mA...20mA) for the output of concentration and time constant
- 4 switching outputs (up to 15 states can be saved)
- LUMI-INLINE-Scope Windows® PC software for parameterising the measuring system
- Integrated light source: UV-LED typ. 365 nm
- Suitable for operation with an external light source (UV light source ELS-UV-2P)
- RS232 interface
- Robust, industry-standard design

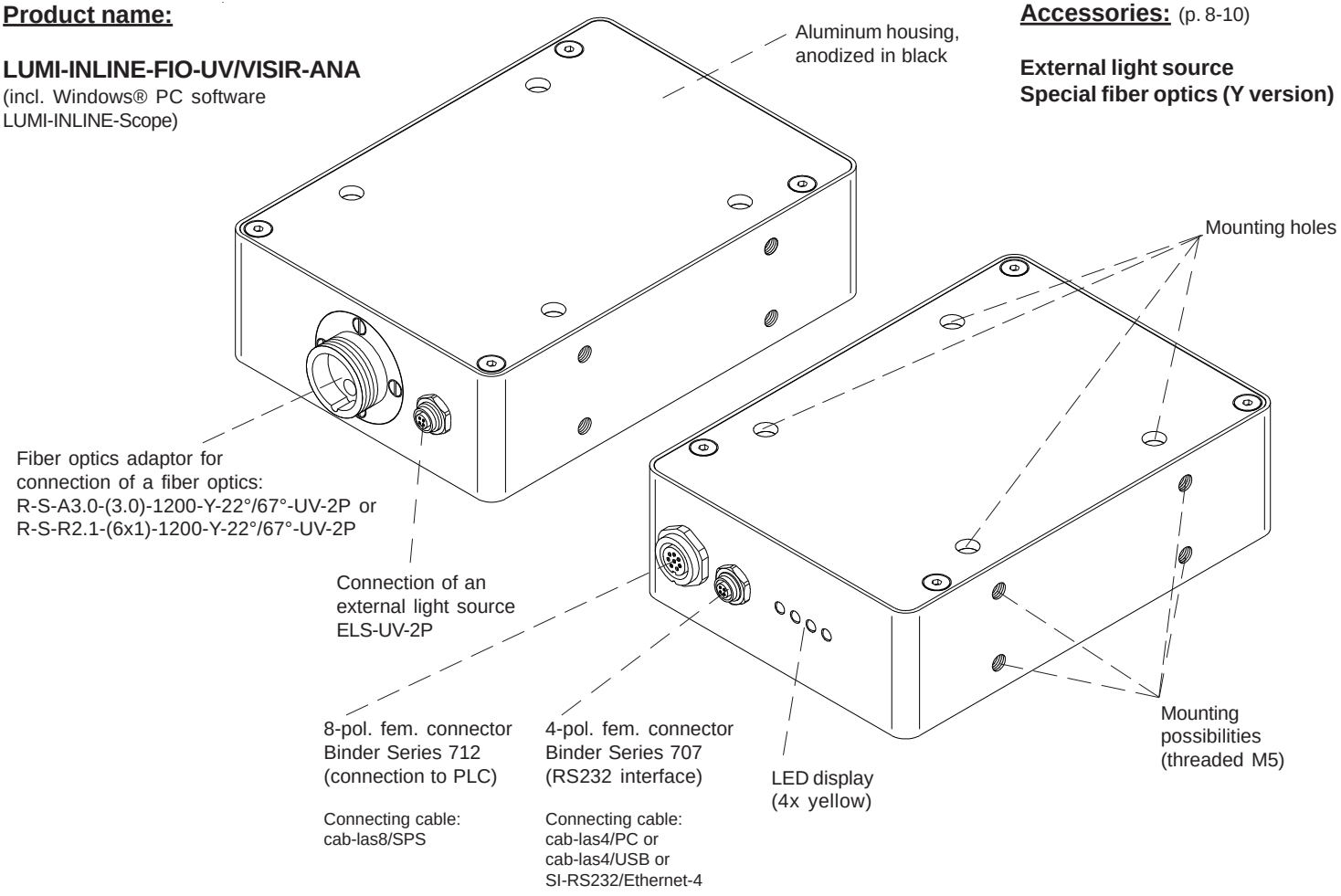
## Design

**Product name:**

**LUMI-INLINE-FIO-UV/VISIR-ANA**
(incl. Windows® PC software LUMI-INLINE-Scope)

**Accessories:** (p. 8-10)

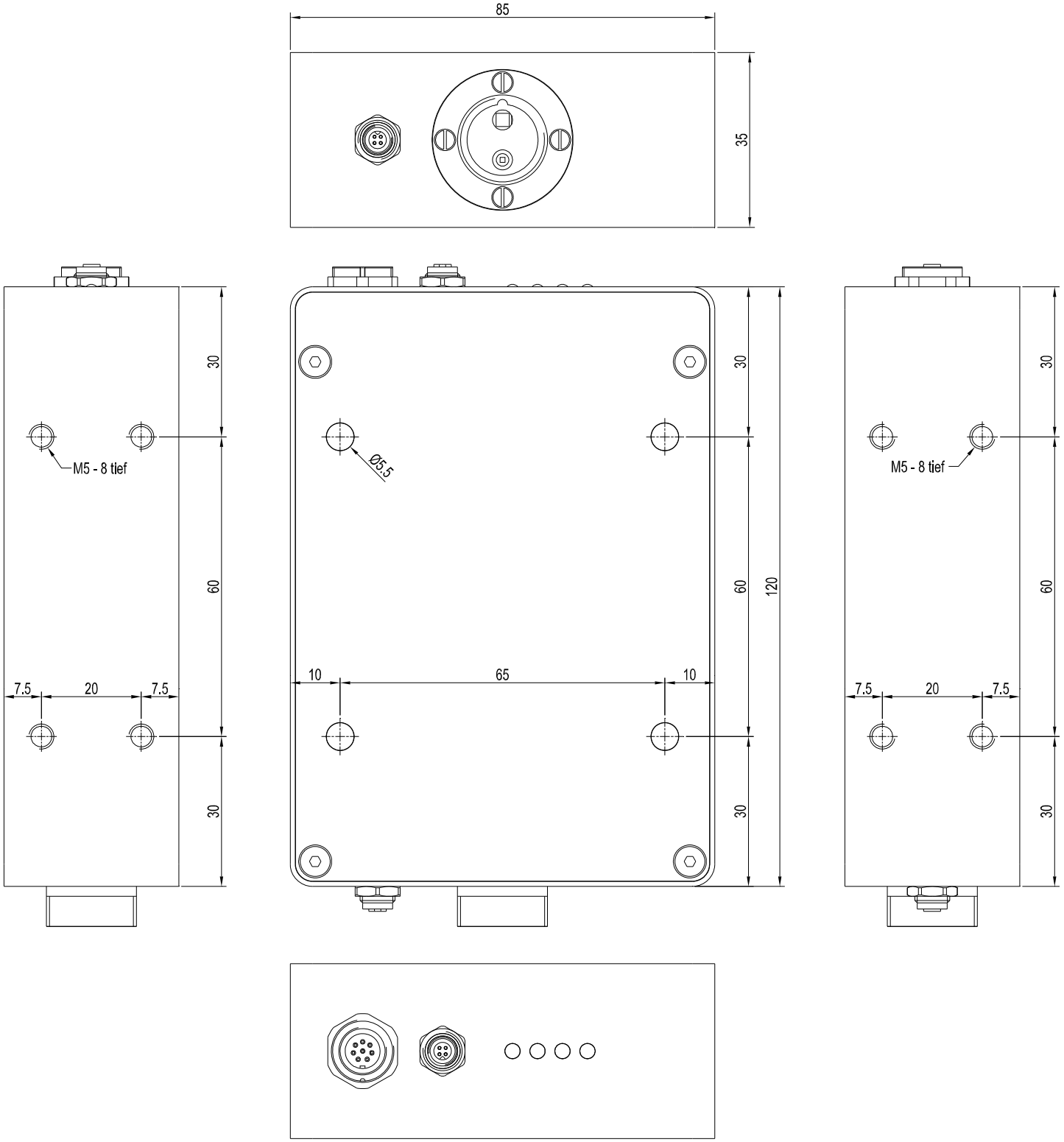
**External light source**
**Special fiber optics (Y version)**



## Technical Data

| Model | LUMI-INLINE-FIO-UV/VISIR-ANA |
|---|---|
| Light source (external) | External light source ELS-UV-2P with UV-LED (typ. 365 nm) |
| UV radiation | External light source ELS-UV-2P:<br>UV LED, CLASS 3B LED PRODUCT, AVOID EXPOSURE TO BEAM |
| Suitable fiber optics | R-S-A3.0-(3.0)-1200-Y-22°/67°-UV-2P<br>R-S-R2.1-(6x1)-1200-Y-22°/67°-UV-2P |
| Reference distance | typ. 3 mm |
| Detection range<br>(measuring window) | depends on the fiber optics that is used :<br>R-S-A3.0-(3.0)-1200-Y-22°/67°-UV-2P: typ. Ø 5 mm (at reference distance 3 mm)<br>R-S-R2.1-(6x1)-1200-Y-22°/67°-UV-2P: typ. 8 mm x 2 mm (at reference distance 3 mm) |
| Excitation wave length | typ. 365 nm |
| Voltage supply | +24VDC ± 10% |
| Pulse light peration | parameterizable under Windows®<br>(pulse length, pulse power, pulse/pause ratio, averaging, ...) |
| Enclosure rating | IP54 |
| Current consumption | typ. 200 mA (max. 500 mA) |
| Interface | RS232, parameterizable under Windows® |
| Digital output/input (2x) | Pin 3: OUT3/IN0 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)<br>Pin 4: OUT2/IN1 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)<br>short-circuit proof, 100 mA max. switching current, npn-, pnp-able (bright/dark switching, can be adjusted) |
| Digital output (2x) | Pin 5: OUT1 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)<br>Pin 6: OUT0 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)<br>short-circuit proof, 100 mA max. switching current, npn-, pnp-able (bright/dark switching, can be adjusted) |
| Analog output (2x) | Pin 7: ANA1 (analog 0V ... +10V or 4mA ... 20mA)<br>Pin 8: ANA0 (analog 0V ... +10V or 4mA ... 20mA)<br>analog voltage output 0V ... +10V or analog current output 4mA ... 20mA (parameterizable under Windows®) |
| Switching state indication | visualization by means of 4 yellow LED |
| Sensitivity, gain | parameterizable under Windows® |
| IR light power,<br>pulse length | parameterizable under Windows® |
| Averaging | parameterizable under Windows® |
| Type of connector | connection to PLC: 8-pole circular connector type Binder 712<br>connection to PC (RS232): 4-pole circular connector type Binder 707 |
| Connecting cables | to PLC: cab-las8/SPS or cab-las8/SPS-w<br>to PC/RS232 interface: cab-las4/PC or cab-las4/PC-w<br>to PC/USB interface: cab-las4/USB or cab-las4/USB-w<br>to PC/Ethernet interface: SI-RS232/Ethernet-4 |
| Housing material | aluminum, anodized in black |
| Housing dimensions | LxWxH approx. 120 mm x 85 mm x 35 mm |
| Dimensions of<br>external light source | LxØ approx. 90 mm x Ø 80 mm |
| Operating temp. range | 0°C ... +50°C |
| Storage temperature range | -20°C ... +75°C |
| EMC test acc. to | DIN EN 60947-5-2 CE |

## Dimensions



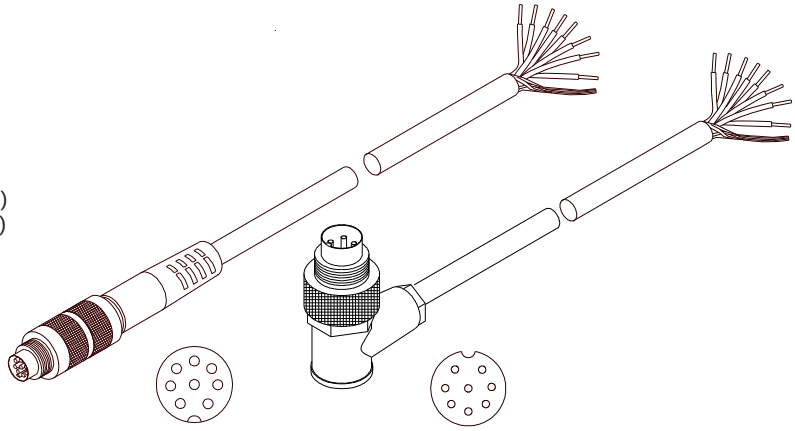

All dimensions in mm

## Connector Assignment

### Connection to PLC:
**8-pol. fem. connector Binder Series 712**

| Pin: | Color: | Assignment: |
|---|---|---|
| 1 | white | GND (0V) |
| 2 | brown | +24VDC (±10%) |
| 3 | green | OUT3/IN0 (Digital 0: 0 … 1V, Digital 1: +Ub - 10%) |
| 4 | yellow | OUT2/IN1 (Digital 0: 0 … 1V, Digital 1: +Ub - 10%) |
| 5 | grey | OUT1 (Digital 0: 0 … 1V, Digital 1: +Ub - 10%) |
| 6 | pink | OUT0 (Digital 0: 0 … 1V, Digital 1: +Ub - 10%) |
| 7 | blue | ANA1 (Analog: 0V ... +10V or 4mA ... 20mA) |
| 8 | red | ANA0 (Analog: 0V ... +10V or 4mA ... 20mA) |

Connecting cable:
cab-las8/SPS-(length) or
cab-las8/SPS-w-(length) (right-angle type)
(standard length 2m)



cab-las8/SPS-...
(max. length 25m,
outer jacket: PUR)

cab-las8/SPS-w-...
(max. length 25m,
outer jacket: PUR)

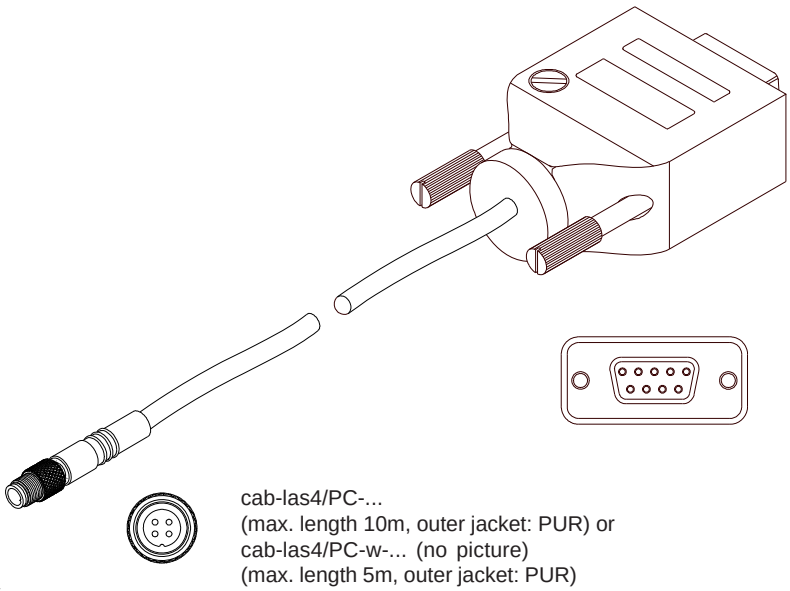
### Connection to PC:
**4-pole fem. connector Binder Series 707**

| Pin: | Assignment: |
|---|---|
| 1 | +24VDC (+Ub, OUT) |
| 2 | GND (0V) |
| 3 | RxD |
| 4 | TxD |

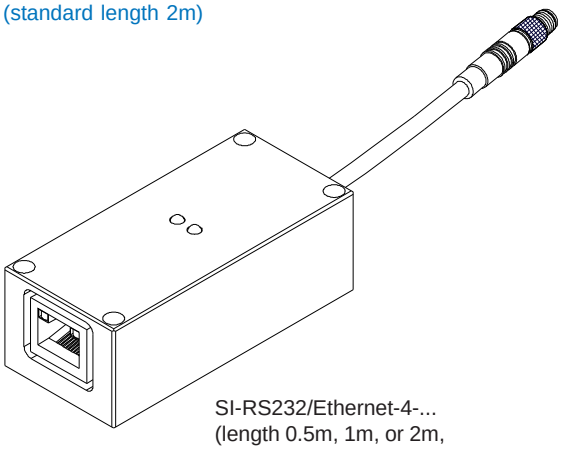
***Connection via RS232 interface at the PC:***
Connecting cable:
cab-las4/PC-(length)
cab-las4/PC-w-(length) (right-angle type)
(standard length 2m)

***alternative:***
***Connection via USB interface at the PC:***
Connecting cable (incl. driver software):
cab-las4/USB-(length)
cab-las4/USB-w-(length) (right-angle type)
(standard length 2m)

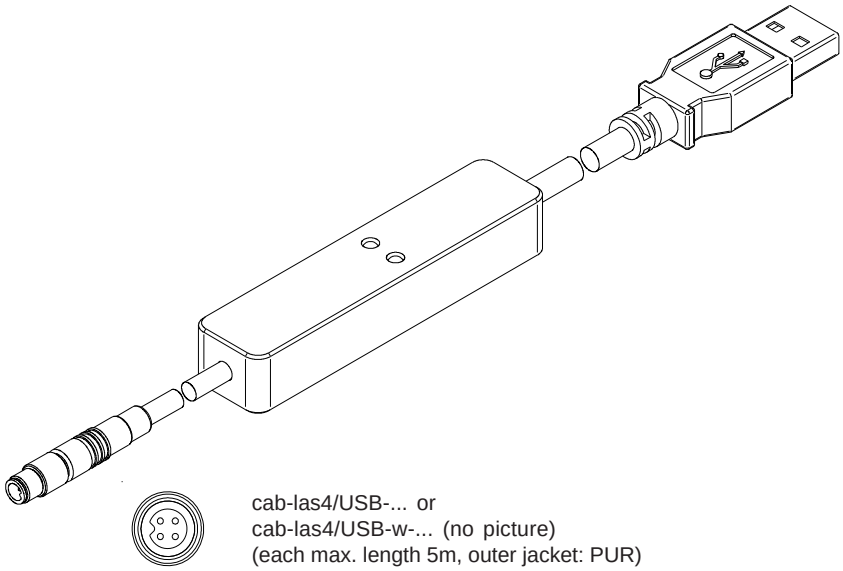
***alternative:***
***Connection to local network via Ethernet bus:***
Adapter (based on *Lantronix XPortModul*):
SI-RS232/Ethernet-4-(length)
(standard length 2m)



cab-las4/PC-...
(max. length 10m, outer jacket: PUR) or
cab-las4/PC-w-... (no picture)
(max. length 5m, outer jacket: PUR)



SI-RS232/Ethernet-4-...
(length 0.5m, 1m, or 2m,
outer jacket: PUR)



cab-las4/USB-... or
cab-las4/USB-w-... (no picture)
(each max. length 5m, outer jacket: PUR)

## LED Display

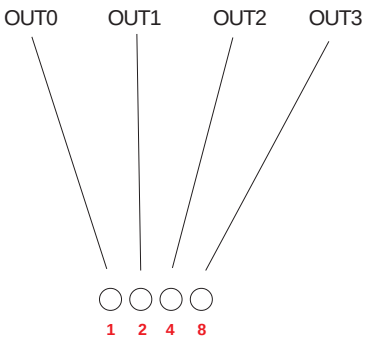
### LED display:

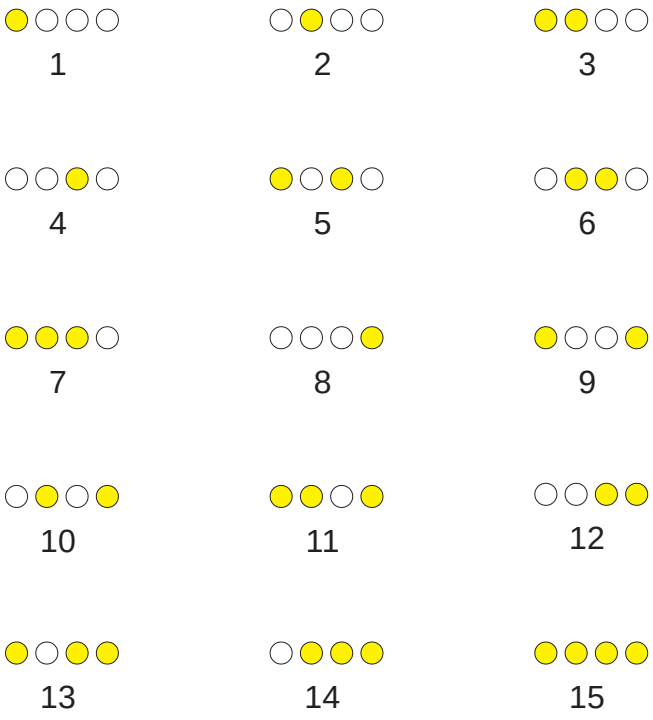
The LUMI-INLINE can save up to 15 states that are provided through the 4 digital switching outputs.

The state is visualised by 4 yellow LEDs at the housing of the LUMI-INLINE.

The state indicated by the LED display is provided as 4-bit binary information at digital outputs OUT0 to OUT3 of the 8-pole PLC connector socket.

**LUMI-INLINE-FIO-UV/VIS/IR-ANA**

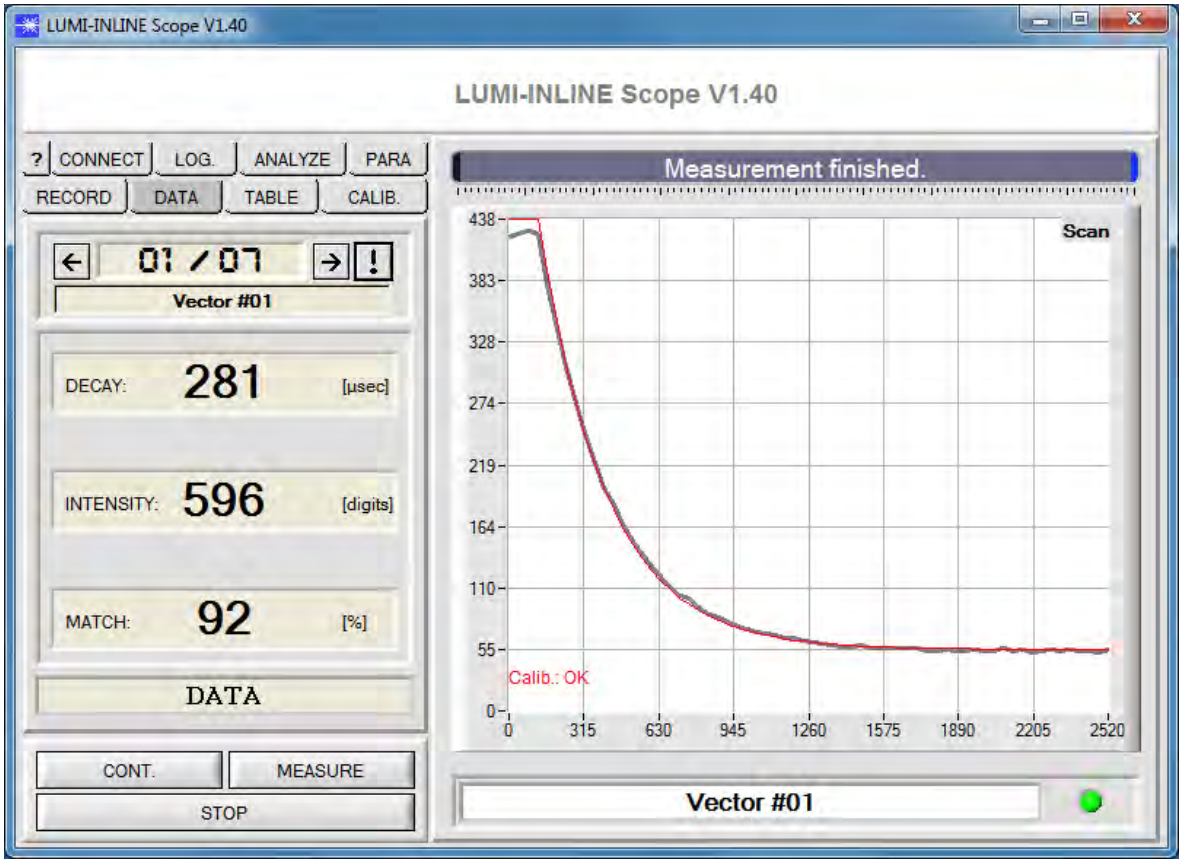



## Parameterization

### Parameterization under Windows® PC software:

The LUMI-INLINE-Scope PC software can be used to process and analyse the measurement data. The signals and values of the measurement curves that are autarkically recorded by the sensor can be evaluated on the screen. A recorder function allows recording of measurements with the PC. Different views of the measurement data make it possible to focus on certain aspects of the measurement.

Apart from displaying measurement values, the download function for parameter files is the second main function of the PC software. These files contain the configuration data and the TEACH values for the products that should be identified.

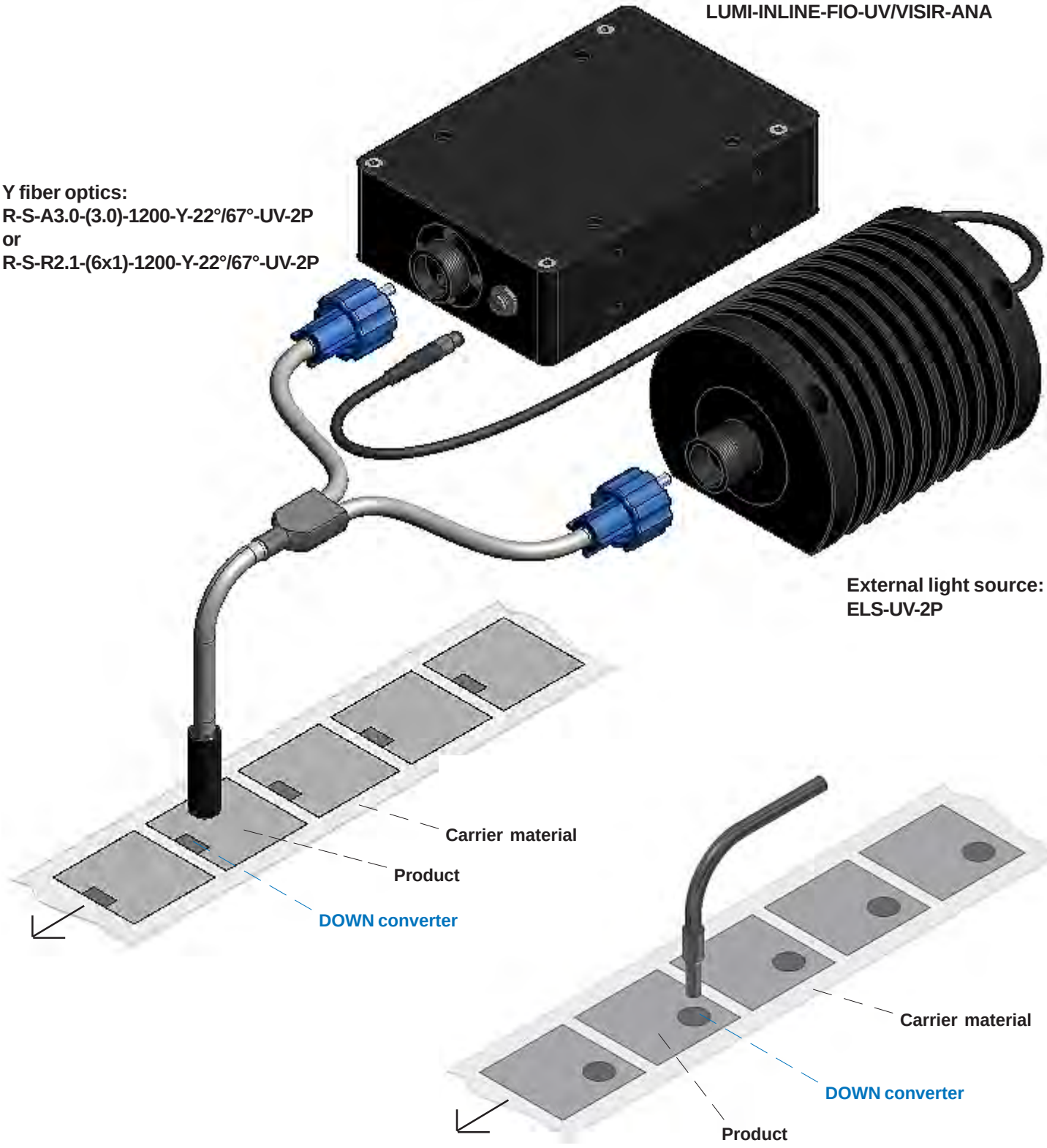


## System Design

**Design of a LUMI-INLINE version with fiber optics:**

**LUMI-INLINE-FIO-UV/VISIR-ANA**

**Y fiber optics:**
**R-S-A3.0-(3.0)-1200-Y-22°/67°-UV-2P**
**or**
**R-S-R2.1-(6x1)-1200-Y-22°/67°-UV-2P**



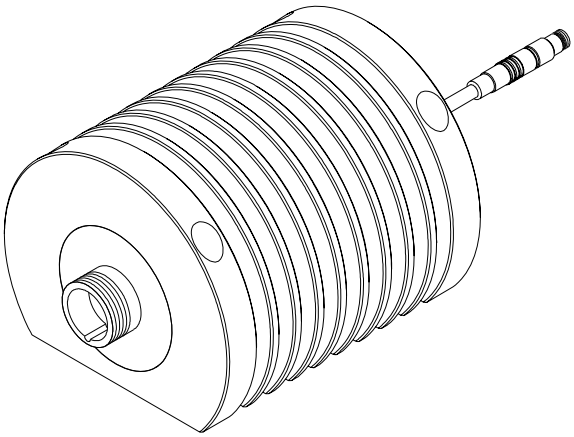
## UV Light Source

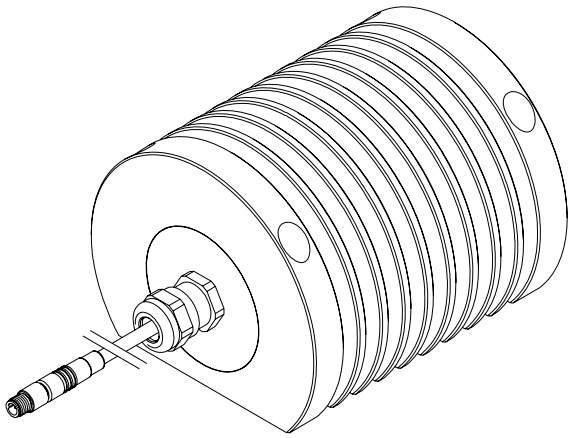
**External UV light source:**

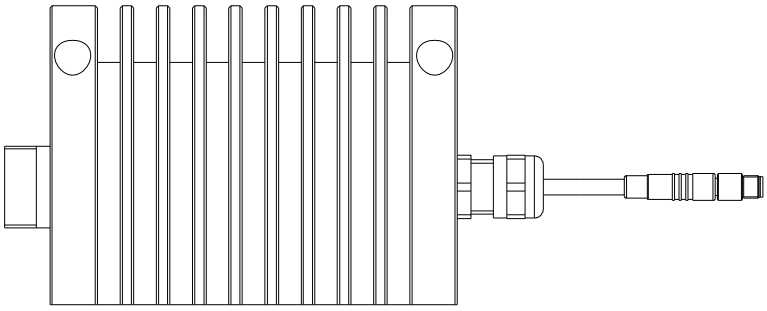
**ELS-UV-2P** (with UV-LED)
for use with **LUMI-INLINE-FIO-UV/VISIR-ANA** in connection with a special fiber optics (Y version)

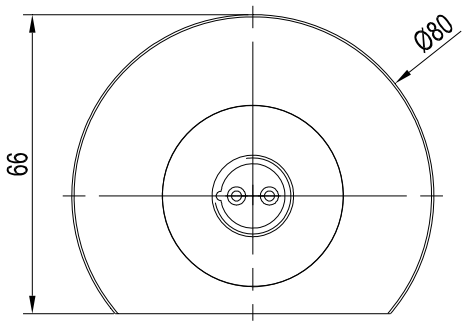
**LED RADIATION**
**Avoid exposure to beam**

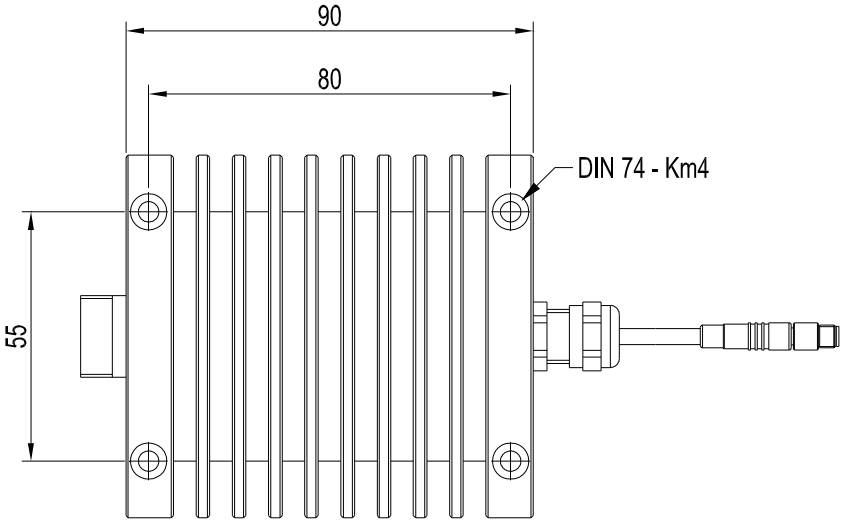
**CLASS 3B LED PRODUCT**
acc. to DIN EN 60825-1:2008-05









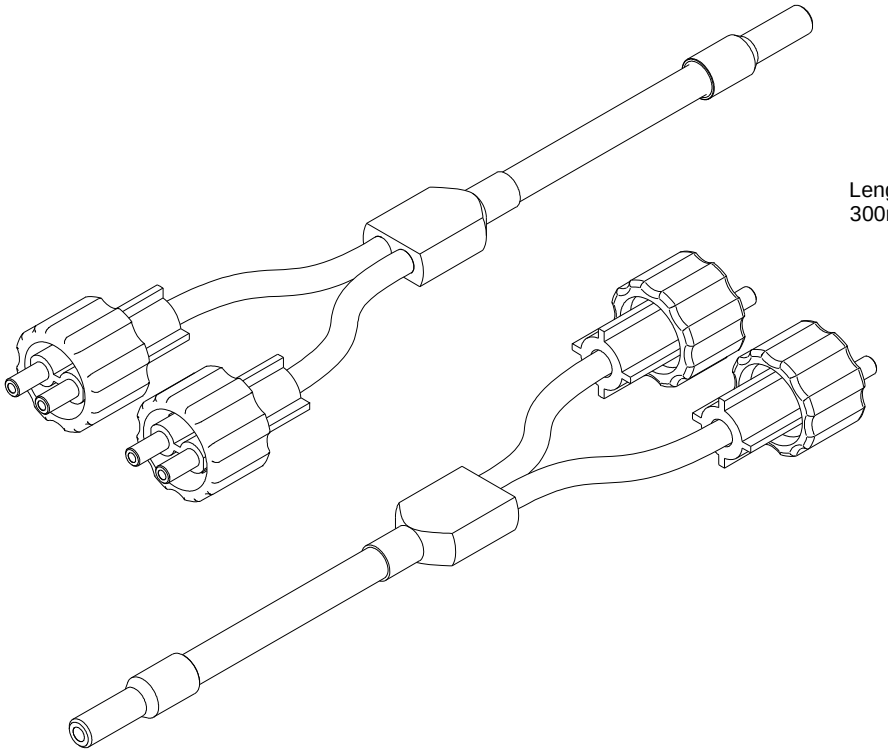



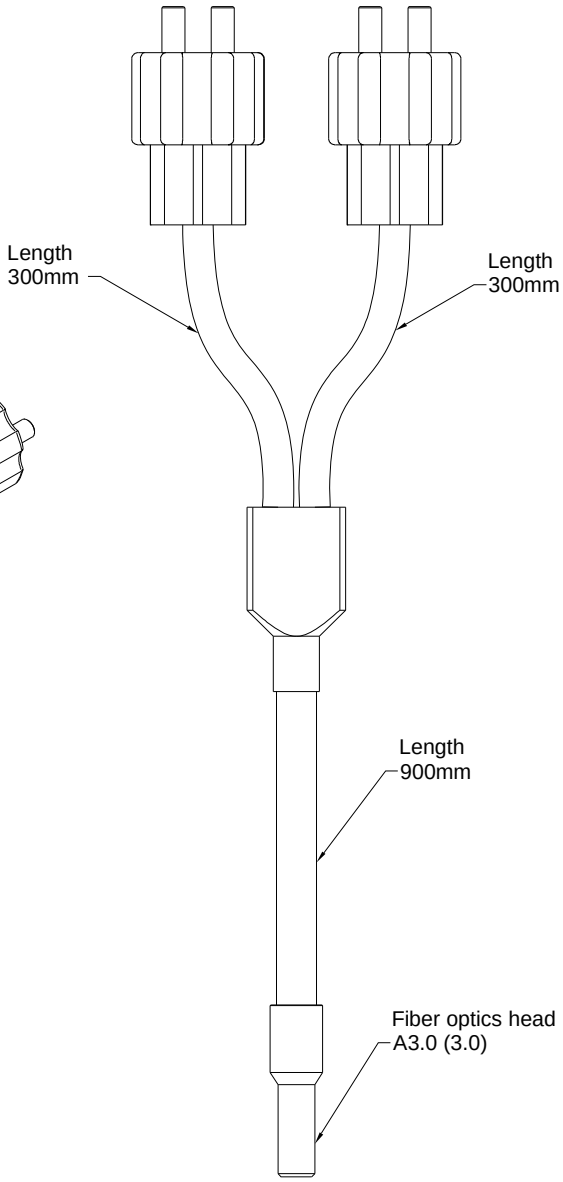

All dimensions in mm

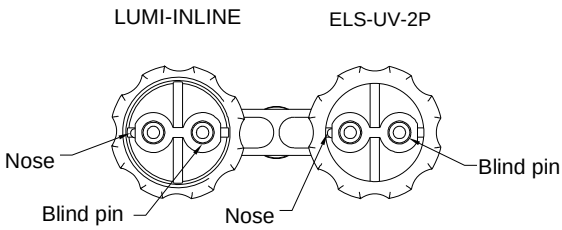
## Y Fiber Optics

**Y fiber optics:**

**R-S-A3.0-(3.0)-1200-Y-22°/67°-UV-2P**



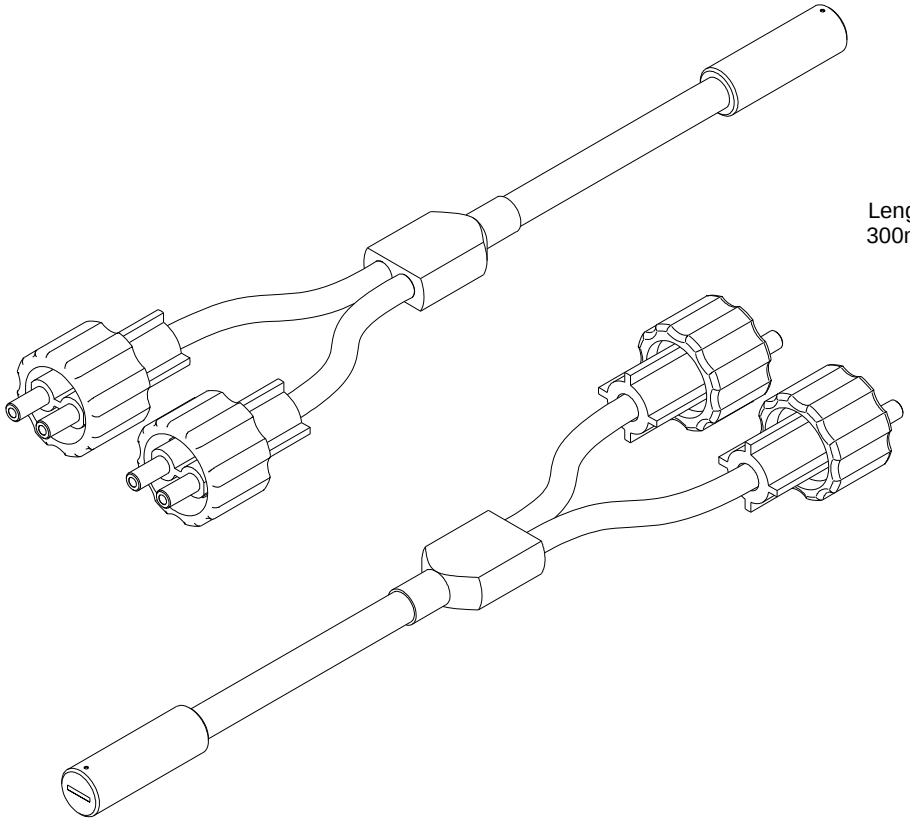


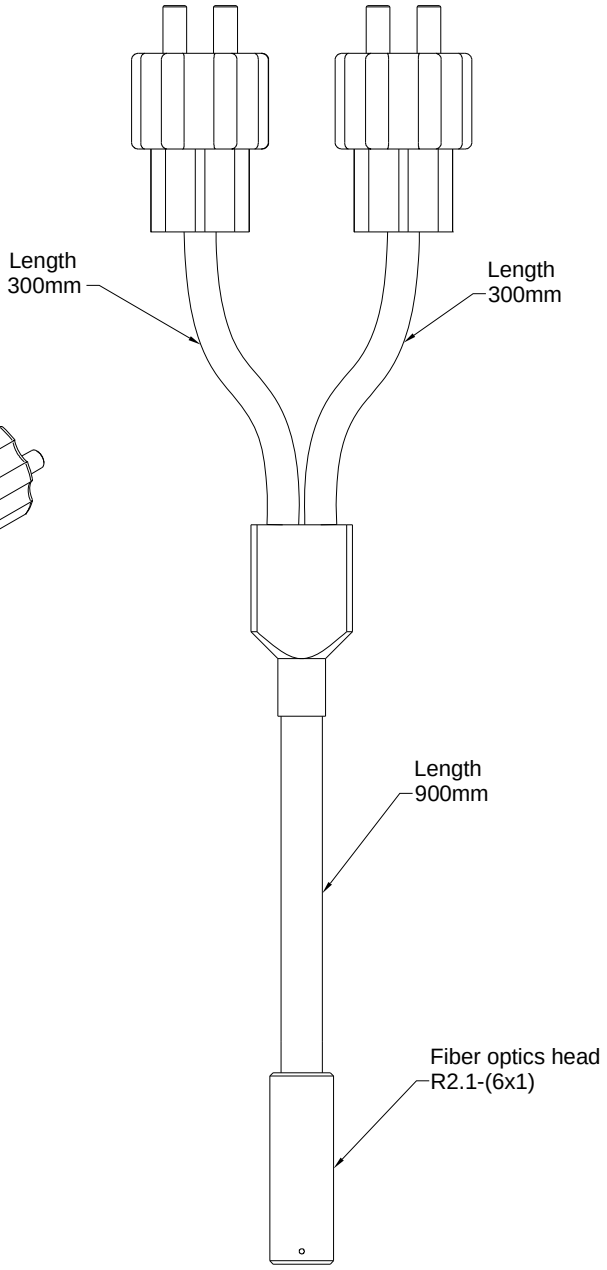



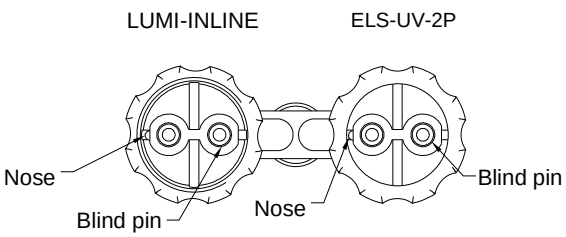
## Y Fiber Optics

**Y fiber optics:**

**R-S-R2.1-(6x1)-1200-Y-22°/67°-UV-2P**





# LUMI-INLINE Series

## LUMI-INLINE-FIO-IR/IR-ANA

- Monitoring of the concentration of UP converters and DOWN converters
- Monitoring of time constant $\tau$
- Monitoring software (under Windows®) for trend visualisation and tolerance exceedance of concentration and time constant
- 2 analog outputs (0V...+10V or 4mA...20mA) for the output of concentration and time constant
- 4 switching outputs (up to 15 states can be saved)
- LUMI-INLINE-Scope Windows® PC software for parameterising the measuring system
- Integrated light source: IR-LED typ. 940 nm
- Suitable for operation with an external light source (IR light source ELS-IR-2P or IR LASER light source ELS-IRL-2P)
- RS232 interface
- Robust, industry-standard design

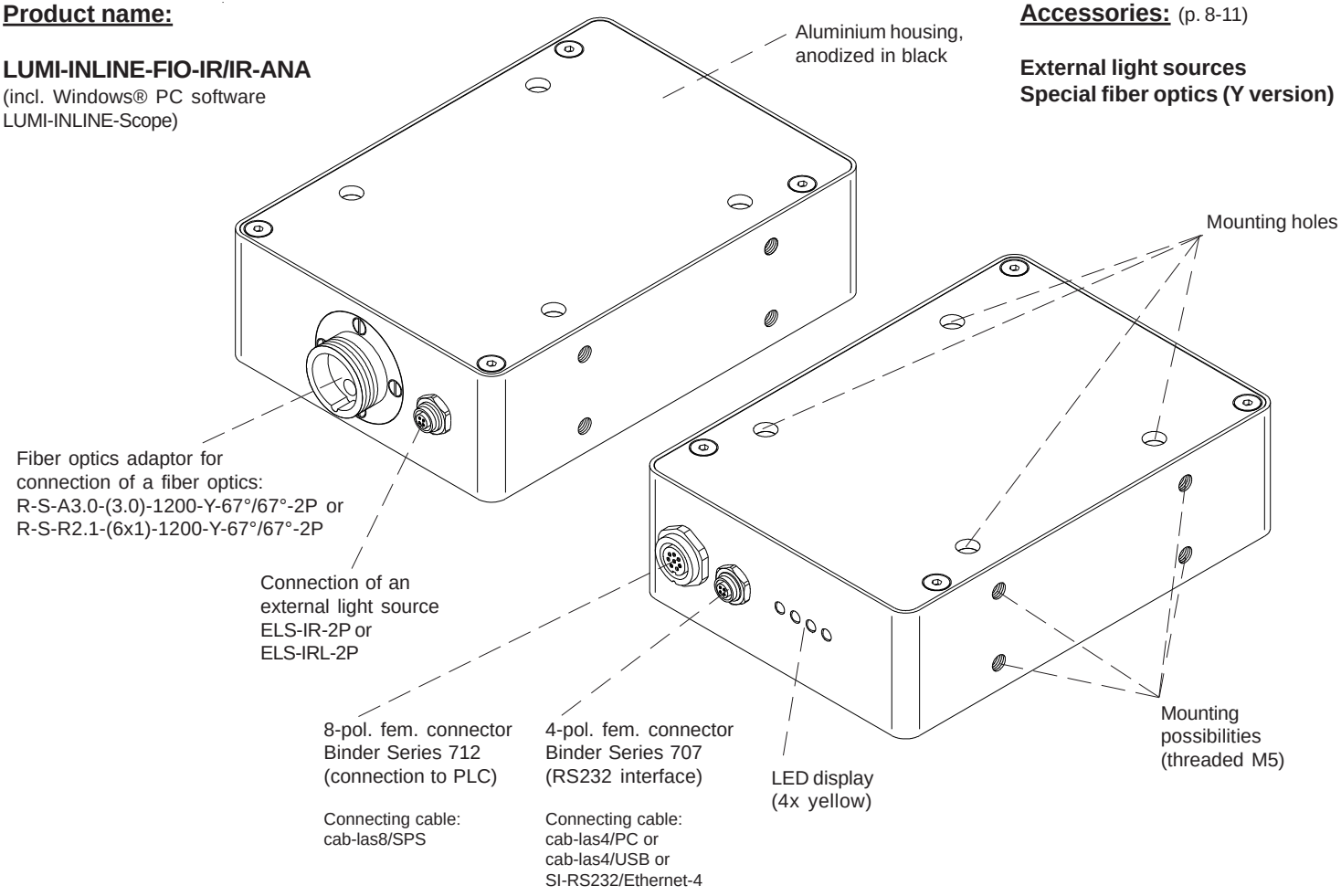
## Design

**Product name:**

**LUMI-INLINE-FIO-IR/IR-ANA**
(incl. Windows® PC software LUMI-INLINE-Scope)

**Accessories:** (p. 8-11)

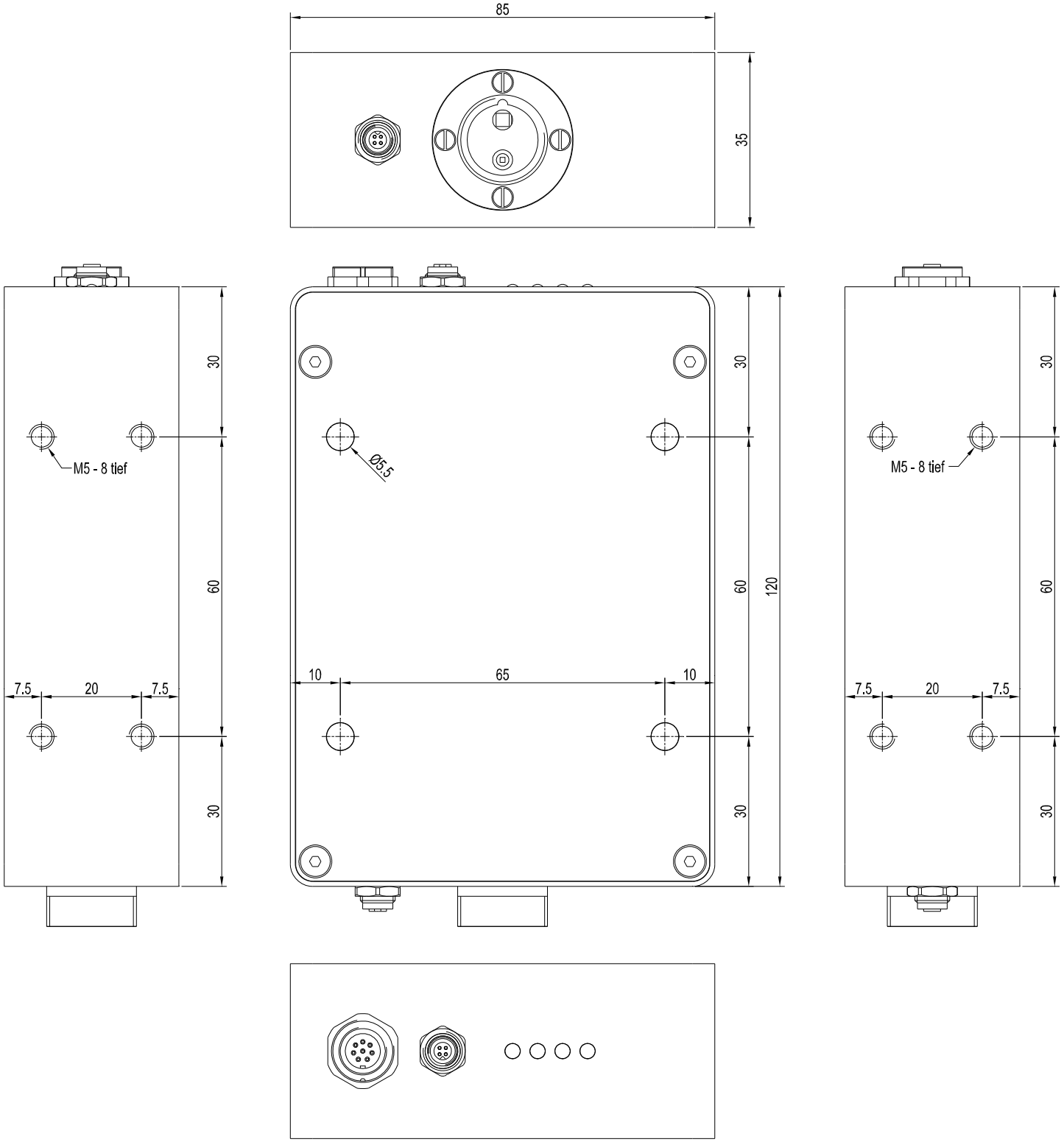
**External light sources**
**Special fiber optics (Y version)**



## Technical Data

| Model | LUMI-INLINE-FIO-IR/IR-ANA |
|---|---|
| Light source (external) | IR LED (typ. 940 nm) in case of external light source ELS-IR-2P<br>IR laser diode (typ. 980 nm) in case of external light source ELS-IRL-2P |
| IR radiation or<br>LASER radiation | depends on the light source that is used:<br>ELS-IR-2P: IR-LED, CLASS 1<br>ELS-IRL-2P: CLASS 3B LASER PRODUCT |
| Suitable fiber optics | R-S-A3.0-(3.0)-1200-Y-67°/67°-2P<br>R-S-R2.1-(6x1)-1200-Y-67°/67°-2P |
| Reference distance | typ. 3 mm |
| Detection range<br>(measuring window) | depends on the fiber optics that is used :<br>R-S-A3.0-(3.0)-1200-Y-67°/67°-2P: typ. Ø 5 mm (at reference distance 3 mm)<br>R-S-R2.1-(6x1)-1200-Y-67°/67°-2P: typ. 8 mm x 2 mm (at reference distance 3 mm) |
| Excitation wave length | typ. 940 nm (IR LED)<br>typ. 980 nm (IR laser diode) |
| Voltage supply | +24VDC ± 10% |
| Pulse light peration | parameterizable under Windows®<br>(pulse length, pulse power, pulse/pause ratio, averaging, ...) |
| Enclosure rating | IP54 |
| Current consumption | typ. 200 mA (max. 500 mA) |
| Interface | RS232, parameterizable under Windows® |
| Digital output/input (2x) | Pin 3: OUT3/IN0 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)<br>Pin 4: OUT2/IN1 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)<br>short-circuit proof, 100 mA max. switching current, npn-, pnp-able (bright/dark switching, can be adjusted) |
| Digital output (2x) | Pin 5: OUT1 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)<br>Pin 6: OUT0 (digital 0: 0 ... 1V, digital 1: +Ub - 10%)<br>short-circuit proof, 100 mA max. switching current, npn-, pnp-able (bright/dark switching, can be adjusted) |
| Analog output (2x) | Pin 7: ANA1 (analog 0V ... +10V or 4mA ... 20mA)<br>Pin 8: ANA0 (analog 0V ... +10V or 4mA ... 20mA)<br>analog voltage output 0V ... +10V or analog current output 4mA ... 20mA (parameterizable under Windows®) |
| Switching state indication | visualization by means of 4 yellow LED |
| Sensitivity, gain | parameterizable under Windows® |
| IR light power,<br>pulse length | parameterizable under Windows® |
| Averaging | parameterizable under Windows® |
| Type of connector | connection to PLC: 8-pole circular connector type Binder 712<br>connection to PC (RS232): 4-pole circular connector type Binder 707 |
| Connecting cables | to PLC: cab-las8/SPS or cab-las8/SPS-w<br>to PC/RS232 interface: cab-las4/PC or cab-las4/PC-w<br>to PC/USB interface: cab-las4/USB or cab-las4/USB-w<br>to PC/Ethernet interface: SI-RS232/Ethernet-4 |
| Housing material | aluminum, anodized in black |
| Housing dimensions | LxWxH approx. 120 mm x 85 mm x 35 mm |
| Dimensions of<br>external light source | LxØ approx. 90 mm x Ø 80 mm |
| Operating temp. range | 0°C ... +50°C |
| Storage temperature range | -20°C ... +75°C |
| EMC test acc. to | DIN EN 60947-5-2 CE |

## Dimensions



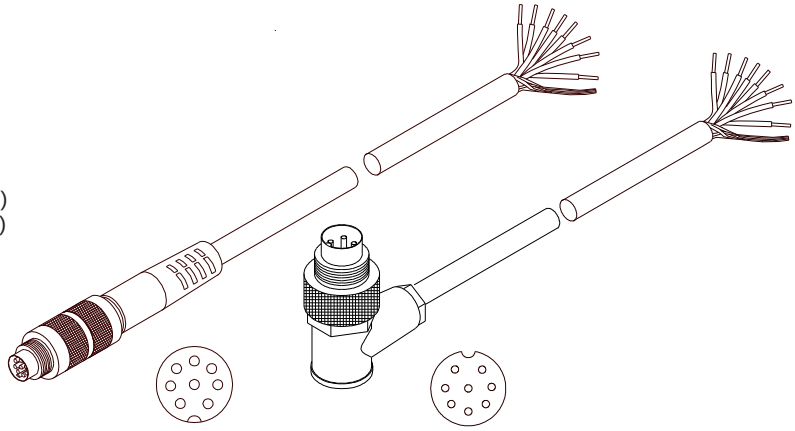

All dimensions in mm

## Connector Assignment

### Connection to PLC:
**8-pol. fem. connector Binder Series 712**

| Pin: | Color: | Assignment: |
|---|---|---|
| 1 | white | GND (0V) |
| 2 | brown | +24VDC (±10%) |
| 3 | green | OUT3/IN0 (Digital 0: 0 … 1V, Digital 1: +Ub - 10%) |
| 4 | yellow | OUT2/IN1 (Digital 0: 0 … 1V, Digital 1: +Ub - 10%) |
| 5 | grey | OUT1 (Digital 0: 0 … 1V, Digital 1: +Ub - 10%) |
| 6 | pink | OUT0 (Digital 0: 0 … 1V, Digital 1: +Ub - 10%) |
| 7 | blue | ANA1 (Analog: 0V ... +10V or 4mA ... 20mA) |
| 8 | red | ANA0 (Analog: 0V ... +10V or 4mA ... 20mA) |

Connecting cable:
cab-las8/SPS-(length) or
cab-las8/SPS-w-(length) (right-angle type)
(standard length 2m)



cab-las8/SPS-...
(max. length 25m,
outer jacket: PUR)

cab-las8/SPS-w-...
(max. length 25m,
outer jacket: PUR)

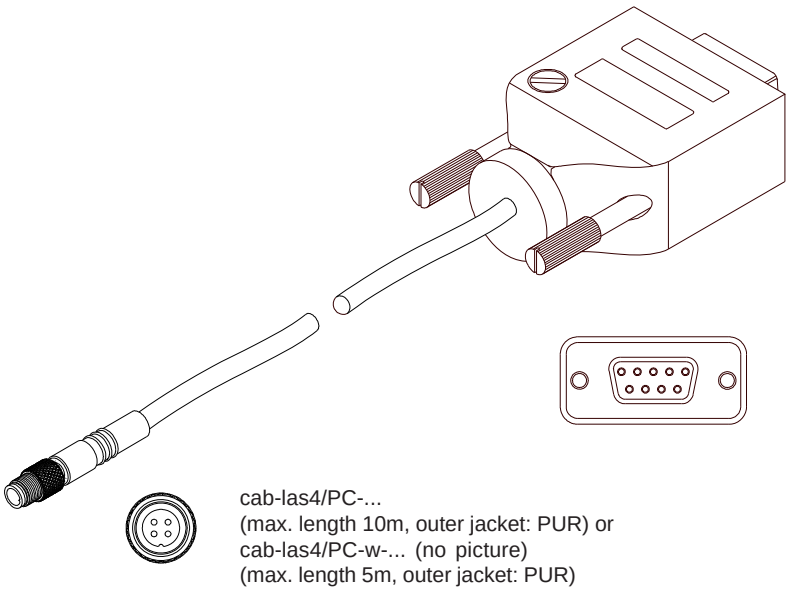
### Connection to PC:
**4-pole fem. connector Binder Series 707**

| Pin: | Assignment: |
|---|---|
| 1 | +24VDC (+Ub, OUT) |
| 2 | GND (0V) |
| 3 | RxD |
| 4 | TxD |

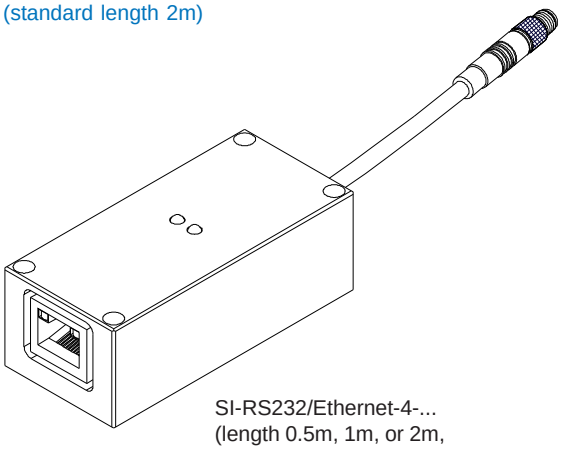
***Connection via RS232 interface at the PC:***
Connecting cable:
cab-las4/PC-(length)
cab-las4/PC-w-(length) (right-angle type)
(standard length 2m)

***alternative:***
***Connection via USB interface at the PC:***
Connecting cable (incl. driver software):
cab-las4/USB-(length)
cab-las4/USB-w-(length) (right-angle type)
(standard length 2m)

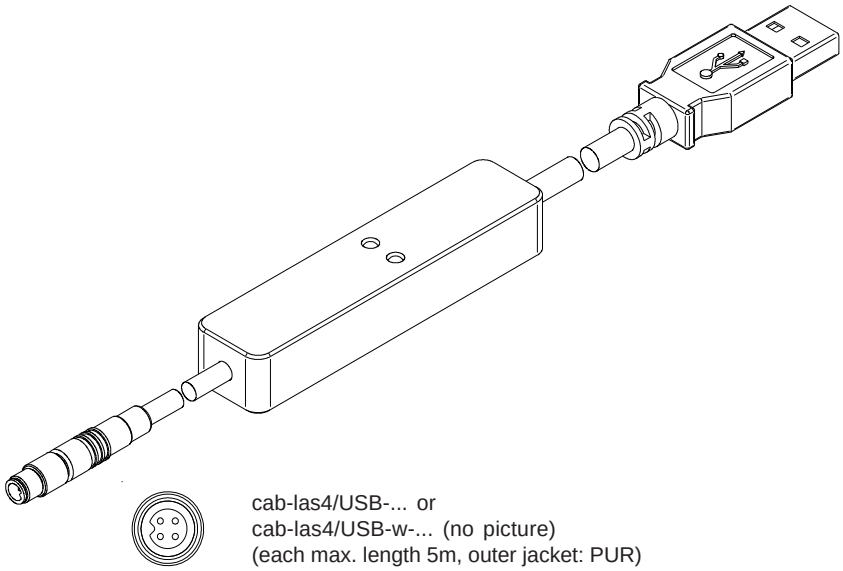
***alternative:***
***Connection to local network via Ethernet bus:***
Adapter (based on *Lantronix XPortModul*):
SI-RS232/Ethernet-4-(length)
(standard length 2m)



cab-las4/PC-...
(max. length 10m, outer jacket: PUR) or
cab-las4/PC-w-... (no picture)
(max. length 5m, outer jacket: PUR)



SI-RS232/Ethernet-4-...
(length 0.5m, 1m, or 2m,
outer jacket: PUR)



cab-las4/USB-... or
cab-las4/USB-w-... (no picture)
(each max. length 5m, outer jacket: PUR)

# LED Display

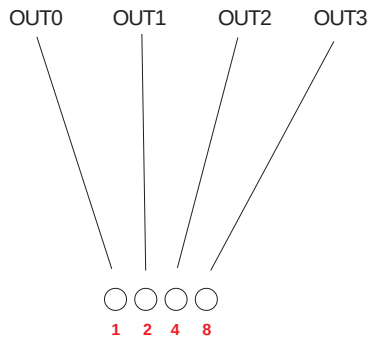
## LED display:

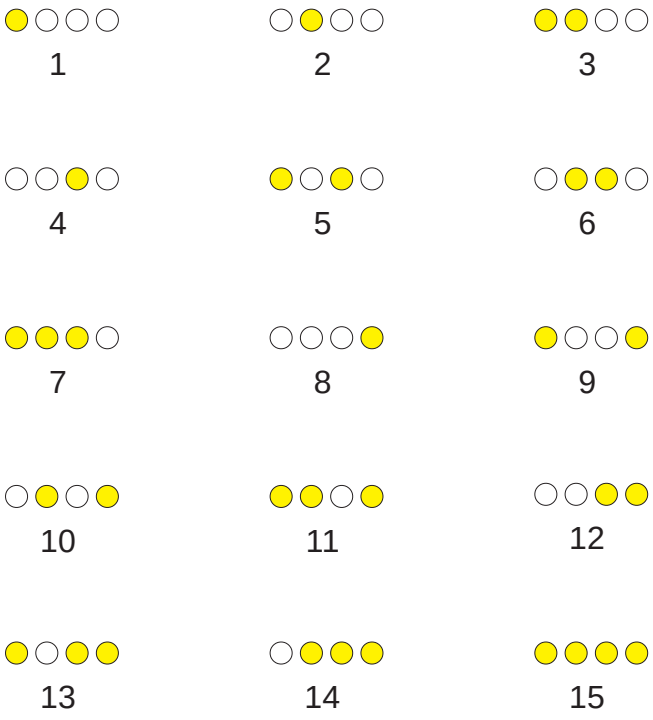
The LUMI-INLINE can save up to 15 states that are provided through the 4 digital switching outputs.

The state is visualised by 4 yellow LEDs at the housing of the LUMI-INLINE.

The state indicated by the LED display is provided as 4-bit binary information at digital outputs OUT0 to OUT3 of the 8-pole PLC connector socket.

**LUMI-INLINE-FIO-IR/IR-ANA**

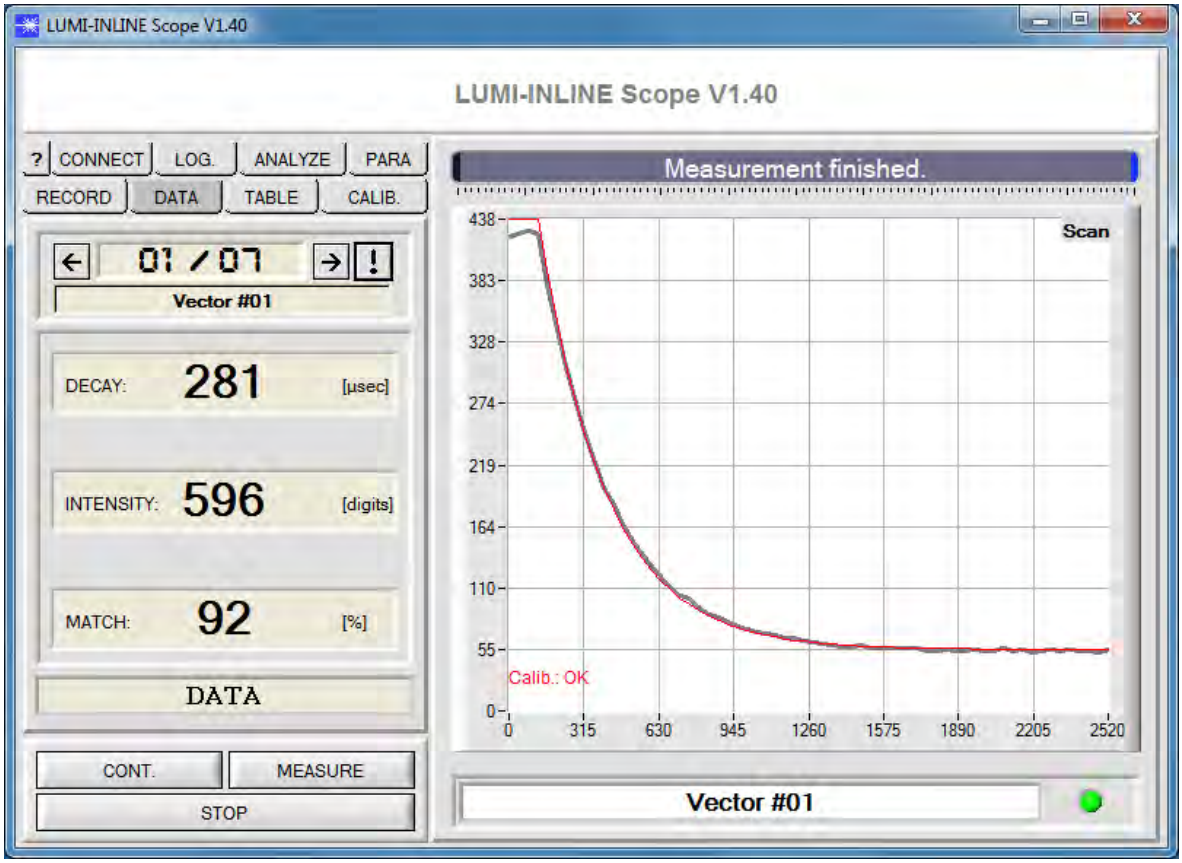



## Parameterization

### Parameterization under Windows® PC software:

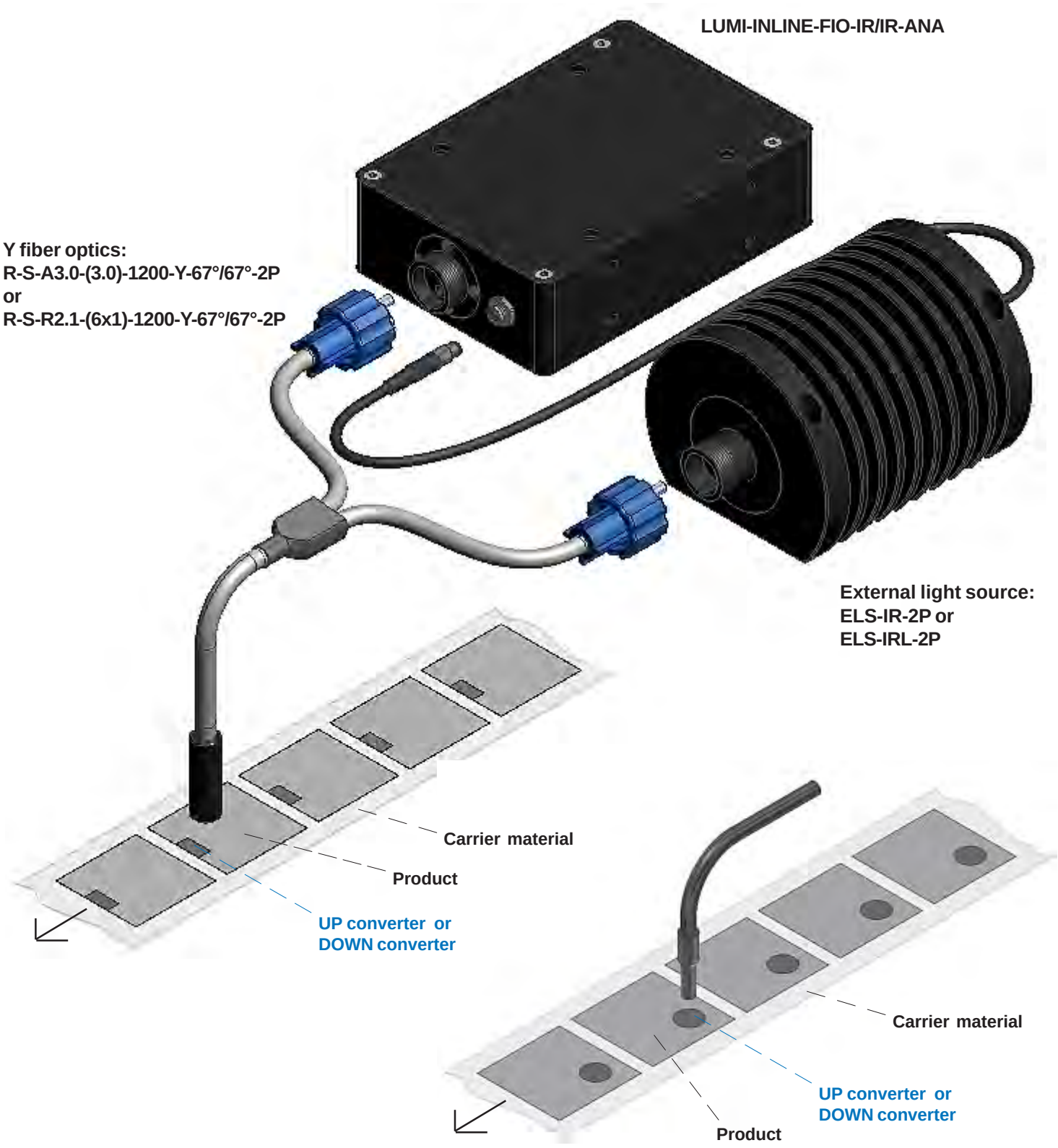
The LUMI-INLINE-Scope PC software can be used to process and analyse the measurement data. The signals and values of the measurement curves that are autarkically recorded by the sensor can be evaluated on the screen. A recorder function allows recording of measurements with the PC. Different views of the measurement data make it possible to focus on certain aspects of the measurement.

Apart from displaying measurement values, the download function for parameter files is the second main function of the PC software. These files contain the configuration data and the TEACH values for the products that should be identified.



## System Design

**Design of a LUMI-INLINE version with fiber optics:**



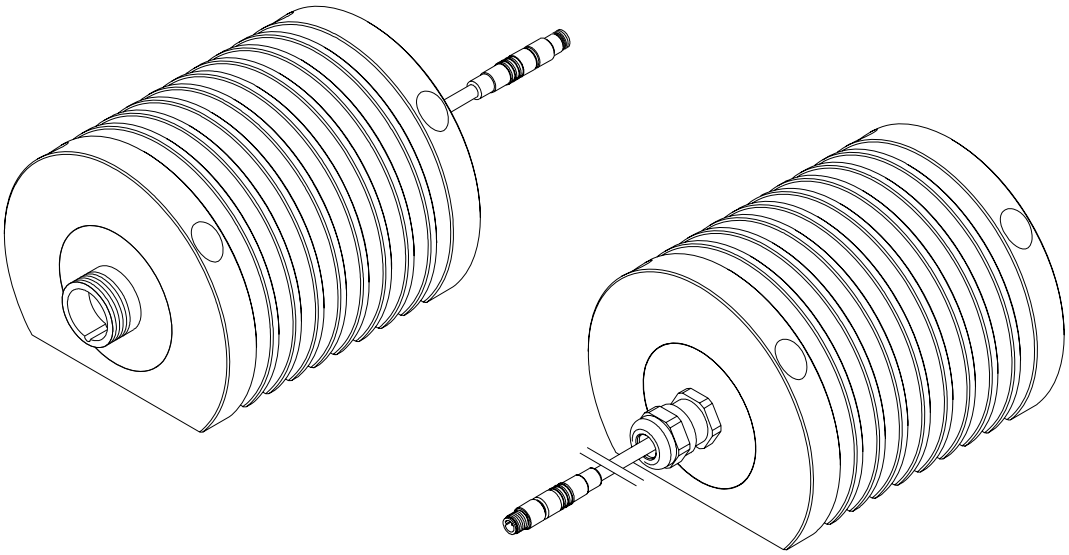
## IR Light Source

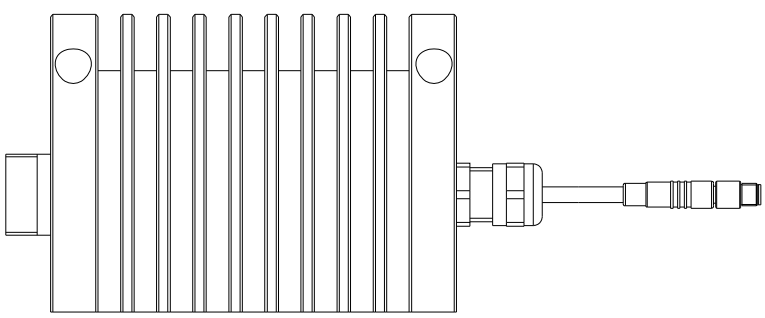
**External IR light source:**

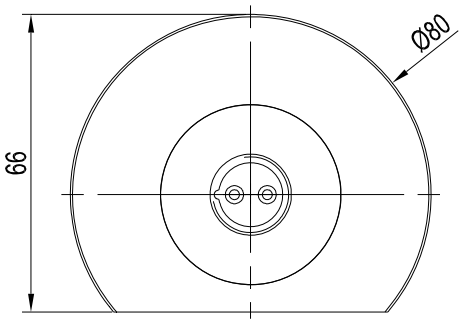
**ELS-IR-2P** (with IR-LED)
for use with **LUMI-INLINE-FIO-IR/IR-ANA** in connection with a special fiber optics (Y version)

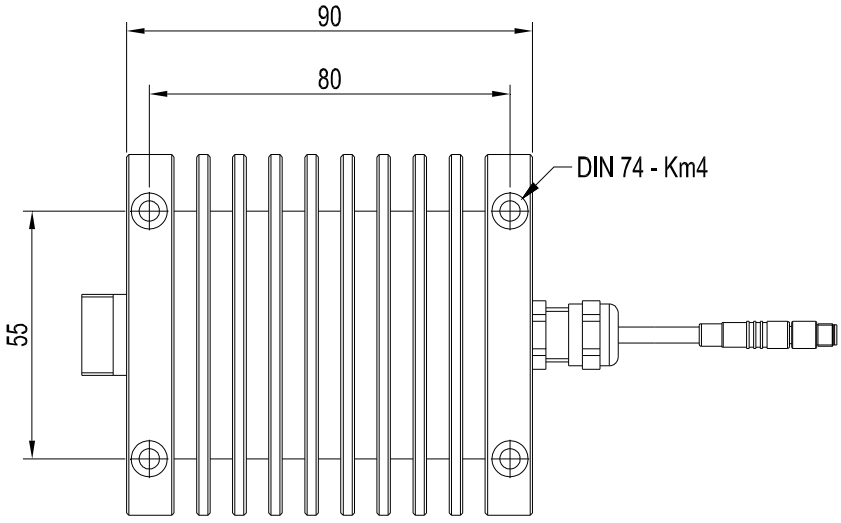
CLASS 1 IR LED

ATTENTION!
Increased LED power!
Do not look directly
into the beam!








All dimensions in mm

## IR Laser Light Source

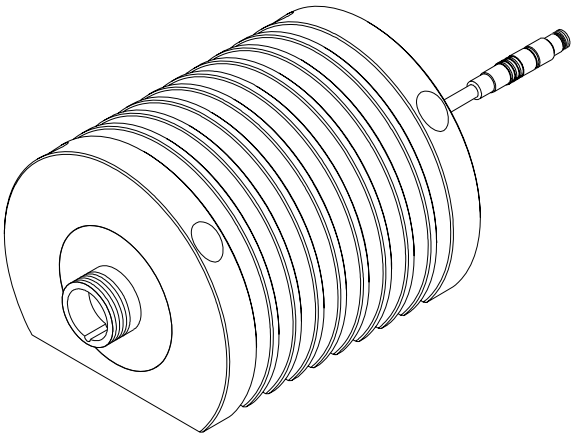
### External IR laser light source (3B):

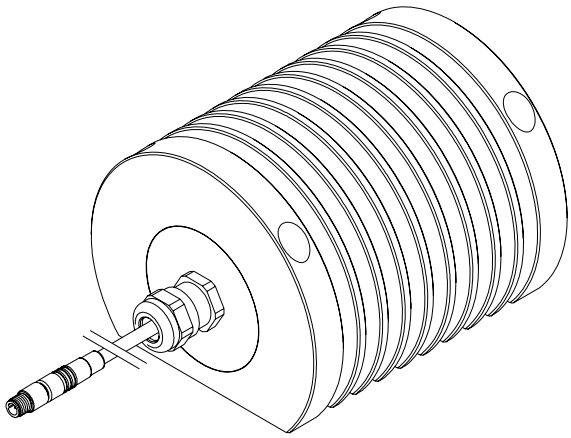
**ELS-IRL-2P** (external transmitter unit with IR laser diode, modulated typ. 500 kHz, class 3B laser product, wave length 980 nm) for use with LUMI-INLINE-FIO-IR/IR in connection with a special fiber optics (Y version)

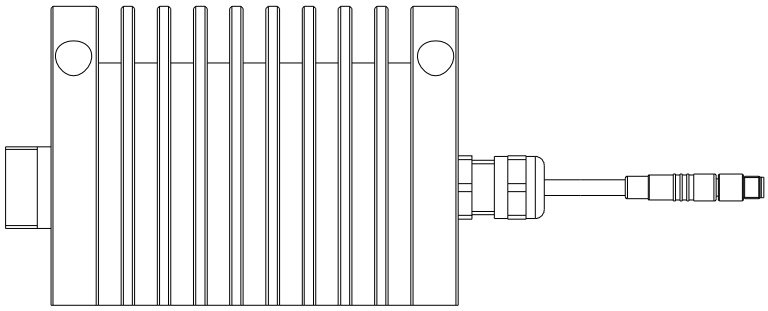
**Invisible laser radiation**
**Avoid exposure to beam**

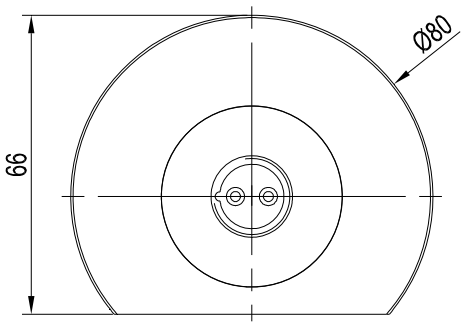
**CLASS 3B LASER PRODUCT**
acc. to DIN EN 60825-1:2001-11

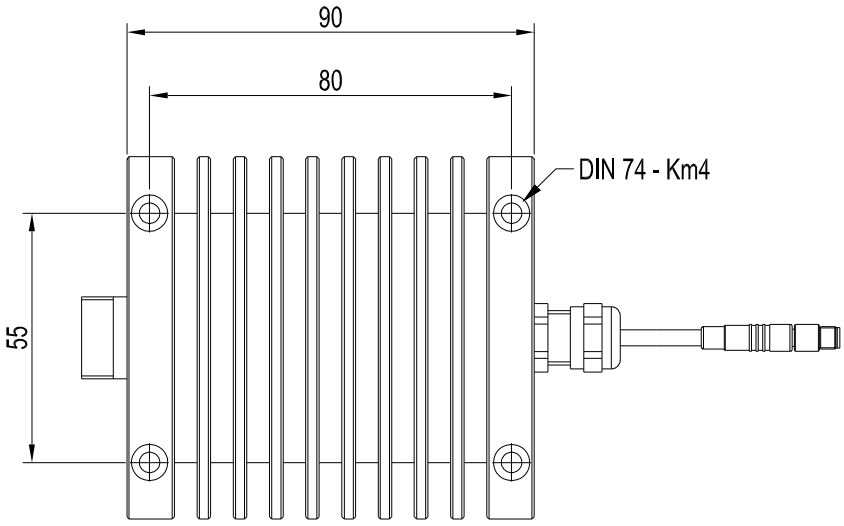
$P_0$ = 500 mW
$P_P$ = 1 W
t = 4 µs - 500 µs
F = 145 Hz
λ = 980 nm









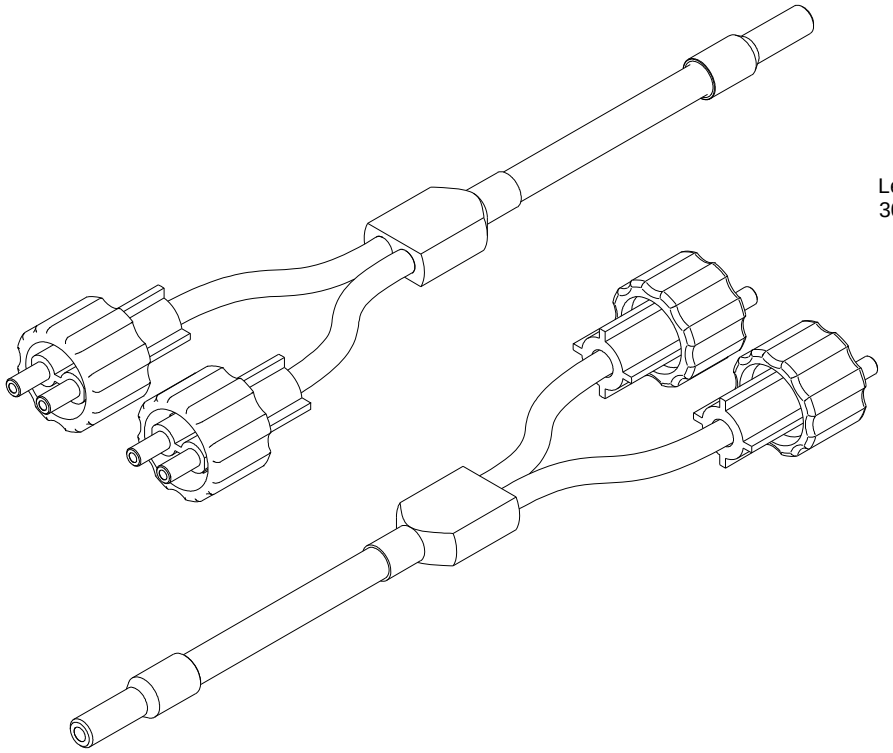



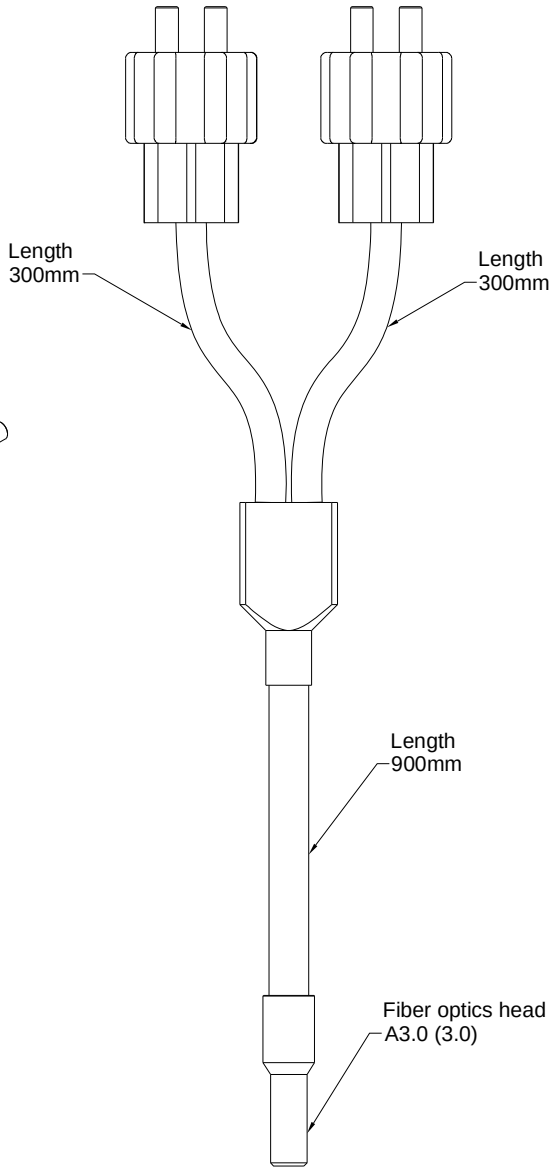

All dimensions in mm

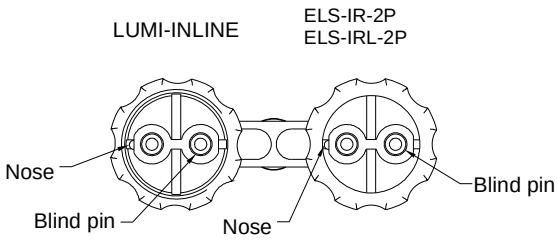
# Y Fiber Optics

## Y fiber optics:

**R-S-A3.0-(3.0)-1200-Y-67°/67°-2P**



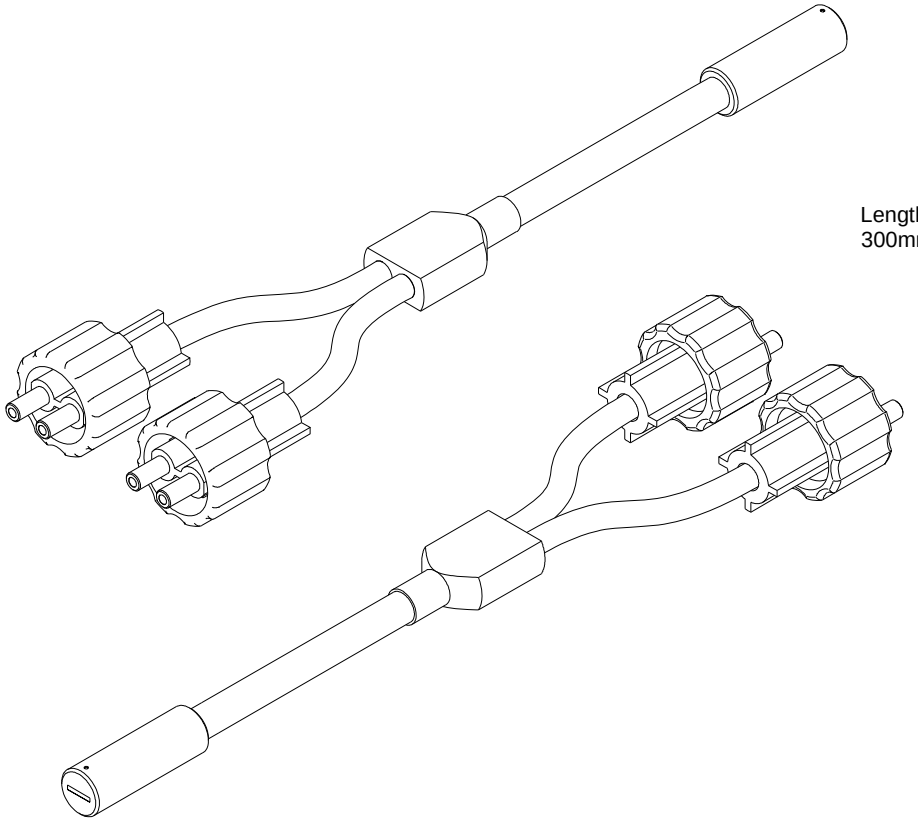


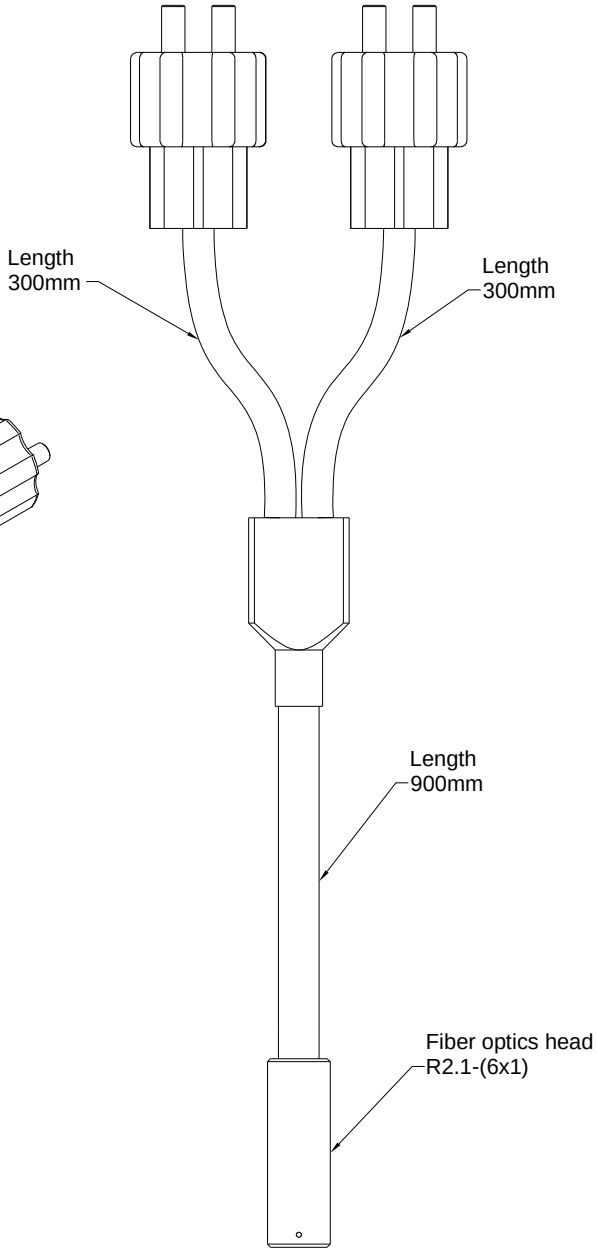



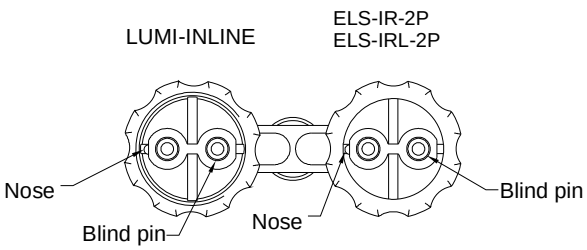
## Y Fiber Optics

**Y fiber optics:**

**R-S-R2.1-(6x1)-1200-Y-67°/67°-2P**





# LUMI-MOBILE Series

## LUMI-MOBILE-QC-IR/IR

**Hand-held device for battery operation**


- Measurement of the relaxation behaviour of luminescent products such as "UP-Converting Phosphors" or "DOWN-Converters"
- Uses IR-LEDs (laser class 1)
- Automatic constant light / outside light compensation
- Wide detection range
- Wide dynamic range (70 dB) available
- Battery operation with 9V block battery (independent of mains and PC)
- Alphanumeric display of the identified luminescent product
- USB port for connection to PC: Windows® program for further analysis
- Acoustical and optical information upon product detection
- **19 products can be saved**

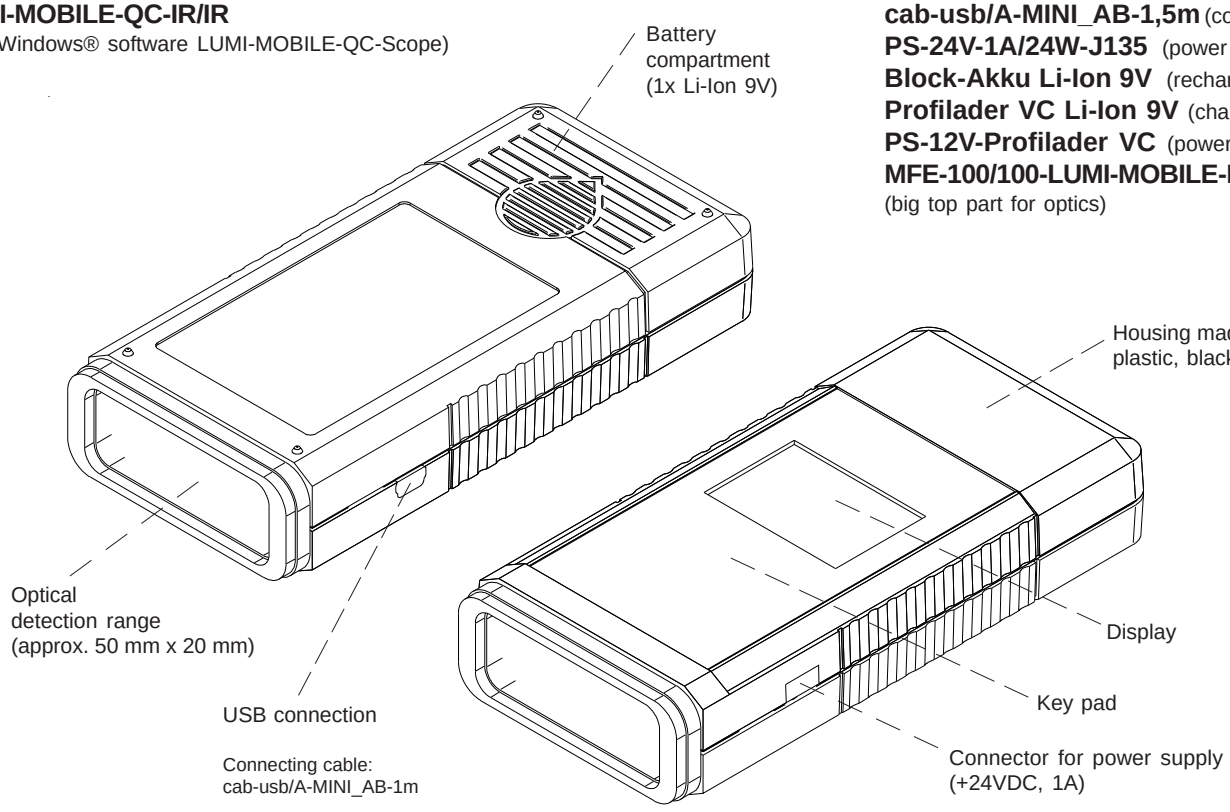
## Design

**Product name:**

**LUMI-MOBILE-QC-IR/IR**
(incl. Windows® software LUMI-MOBILE-QC-Scope)

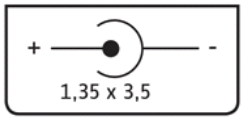
**Accessories:** (cf. p. 9)

**cab-usb/A-MINI_AB-1,5m** (connecting cable)
**PS-24V-1A/24W-J135** (power supply)
**Block-Akku Li-Ion 9V** (rechargeable battery)
**Profilader VC Li-Ion 9V** (charger)
**PS-12V-Profilader VC** (power supply charger)
**MFE-100/100-LUMI-MOBILE-IR-NV**
(big top part for optics)



## Technical Data

| Model | LUMI-MOBILE-QC-IR/IR |
|---|---|
| Light source | IR-LEDs, λ typ. 940 nm |
| Reference distance | contacting, with optical fiber sensor head |
| Detection range | typ. 50 mm x 20 mm |
| Optical filter | daylight block filter |
| Voltage supply | operation with a battery or with power supply unit (+24VDC, 1A) |
| AC operation | pulsed |
| Enclosure rating | IP54 |
| Current consumption | typ. 200 mA |
| Interface | USB, parameterizable under Windows® |
| EMC test acc. to | DIN EN 60947-5-2 CE |
| Operating temp. range | 0°C ... +55°C |
| Storage temperature range | -20°C ... +85°C |
| Housing material | plastic, black |
| Housing dimensions | L x W x H approx. 126 mm x 60 mm x 26 mm |
| Product memory depth | up to 19 products |

| Model | Power Supply PS-24V-1A/24W-J135 |
|---|---|
| Secundary voltage | +24VDC regulated, 1A output current |
| Power supply capacity | 24W |
| Dimensions DC connector | L x W x H approx. 1.35 mm x 3.5 mm x 9 mm   |
| Note | When a power supply unit is connected it has preference over the battery. In this case the battery will not be used. If the power supply plug is inserted at the sensor, but the power supply unit is not connected to the mains supply, the sensor will not operate (the sensor electronic components get no power from the battery or from the power supply unit). |

## Features

The **LUMI-MOBILE-QC-IR/IR** sensor belongs to the **LUMI sensor family** for the optical detection and identification of so-called UP-Converting Phosphors (UCP) or DOWN-Converting Phosphors (DCP).

UCPs are rare earth particles of micrometer down to nanometre size that have the special property of using internal physical processes to convert low-energy photons (e.g. infrared light) into high-energy photons (visible light). Phosphorescence, i.e. the temporary storing and later releasing of excitation energy, is a second property of UCPs. When an UCP is exposed to pulsed excitation, the excitation state relaxes exponentially after the end of excitation under the emission of light. This time curve of the intensity is characteristic for the respective UCP. DCPs in part are the same materials, but in this case higher-energy photons are converted into lower-energy photons, which also happens with a time delay.

The **LUMI-MOBILE-QC-IR/IR** identifies UCPs and DCPs by way of the parameters of the exponential relaxation curve.
The UCP or DCP is excited by an impulse, and the relaxation behaviour is scanned/digitised over time. The recorded data are approximated by way of modelling. The model parameters "TAU" (time constant) and "INTENSITY" (start intensity) of the exponential curve are used to identify the respective sample.

The **LUMI-MOBILE-QC-IR/IR** is battery-powered and with its internal microprocessor operates independent of mains and PC. As an option a supplied PC software can be used for further analysis. **LUMI-MOBILE-FIO-QC-IR/IR** sensors are operated by way of the membrane keypad at the housing front. Parameterization is not possible.

The setting of the **LUMI-MOBILE-QC-IR/IR** sensor is first defined with the **LUMI-MOBILE-LAB-IR/IR** system and is then saved in the sensor's non-volatile memory.

The sensors features an automatic outside light compensation function. To be able to respond more flexibly to different measurement situations, the outside light that occurs in a measurement in addition to the signal of the sample to be measured, is compensated by an automatic control function. The time that is necessary for outside light compensation depends on the parameterisation, on the ambient light, and on the start situation, and typically lies between 0 and 5 seconds. Measurements can only be performed when outside light compensation is finished.

## Measurement

**Performing a measurement:**

Connect the power supply unit or the battery, and turn the sensor on.

Place the sensor on the object. Make sure that the attached aperture encloses the object or is flush with the object to prevent any influence of extraneous light that might reach the sensor optics from the outside. If possible, switch off any dynamic infrared sources (neon lamps, halogen spotlights, and bulbs in the direct vicinity). When using a fiber optic sensor type (FIO) best-possible shielding against extraneous light also must be ensured.

Wait until the sensor has completed its extraneous light offset and has fully charged the emitter pulse unit. When the sensor is ready it displays „OK“. Press the „ENTER“ key and wait until the scan process is finished. Make absolutely sure that the sensor is not tilted or moved during the measurement.

Acoustic signals:
The results of a measurement (positive/negative) also are indicated by way of acoustic buzzer signals:
POSITIVE: Two short high buzzer signals, NEGATIVE: One long low buzzer signal.

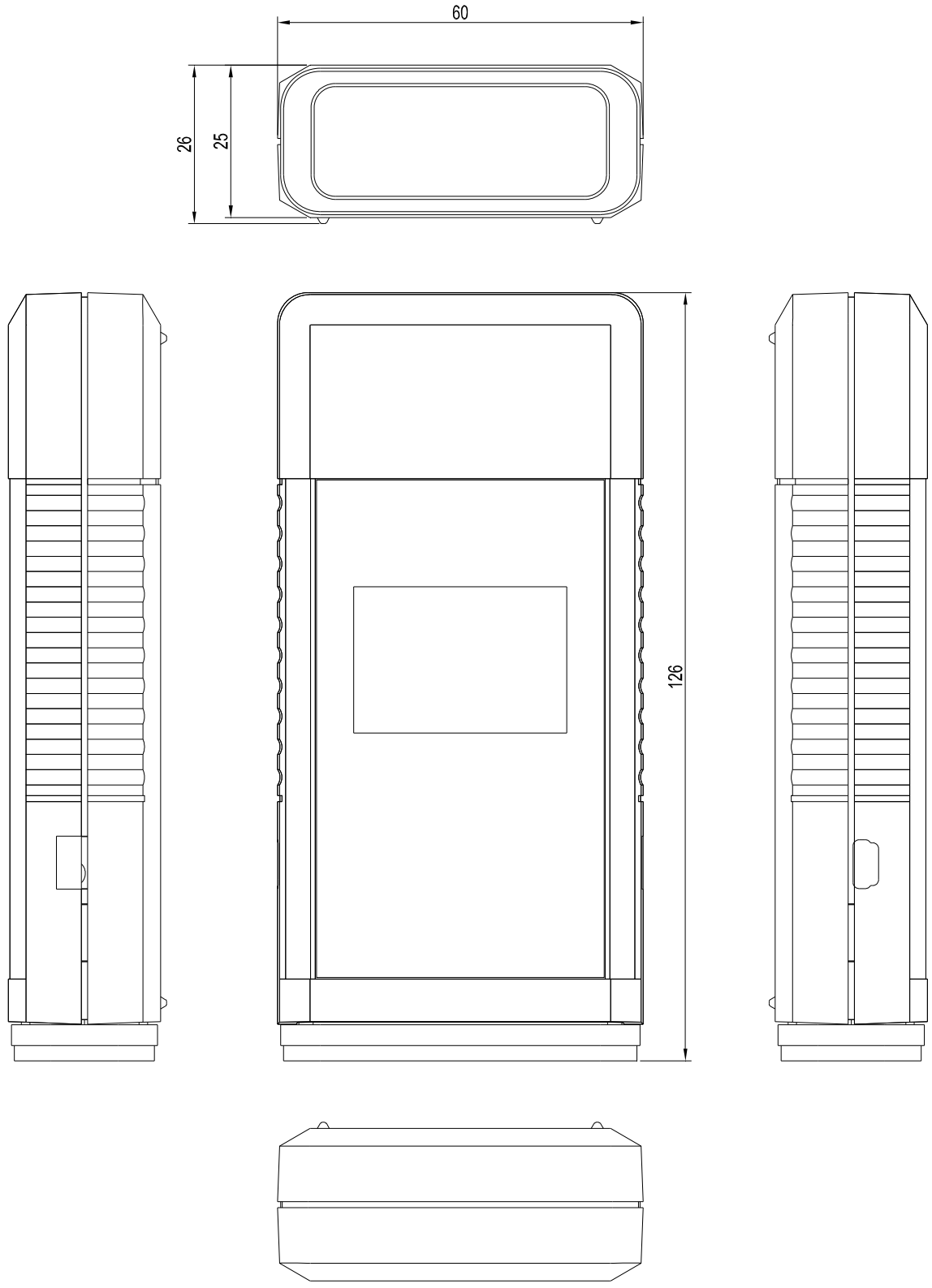
Optical informationen:
Via display: POSITIVE: product is displayed, NEGATIVE: failure information.

## Product Change

**Product change with LUMI-MOBILE-QC-IR/IR:**

The Windows® PC software LUMI-MOBILE-QC-Scope can be used to read a new file (a file maximally contains 19 products). The product dataset existing in the product memory of the sensor will be overwritten, and up to 19 new products will then be available in the product memory.

## Dimensions




All dimensions in mm

## Key Function

### Functions of the key pad:

The keys have a tactile switching point
that can be recognised by a soft "click".



Turns the sensor on / off.
To turn the sensor on (battery or power supply unit connected), press and hold the key until the boot screen is displayed.To turn the sensor off, press and hold the key until shutdown is finished.


Starts a measurement.
Press the key briefly and release it again. Make sure that during a measurement the sensor remains on the measurement object. A measurement only can be started when the sensor is in „IDLE“ state (which is shown on the display). In all other states pressing the ENTER key will have no effect.

Selects one of (up to) 19 products out of the product memory.
Changes the parameter set / the product to be identified from the current one to the next higher one.
When the last active parameter set is reached, the sensor changes back to the first one.

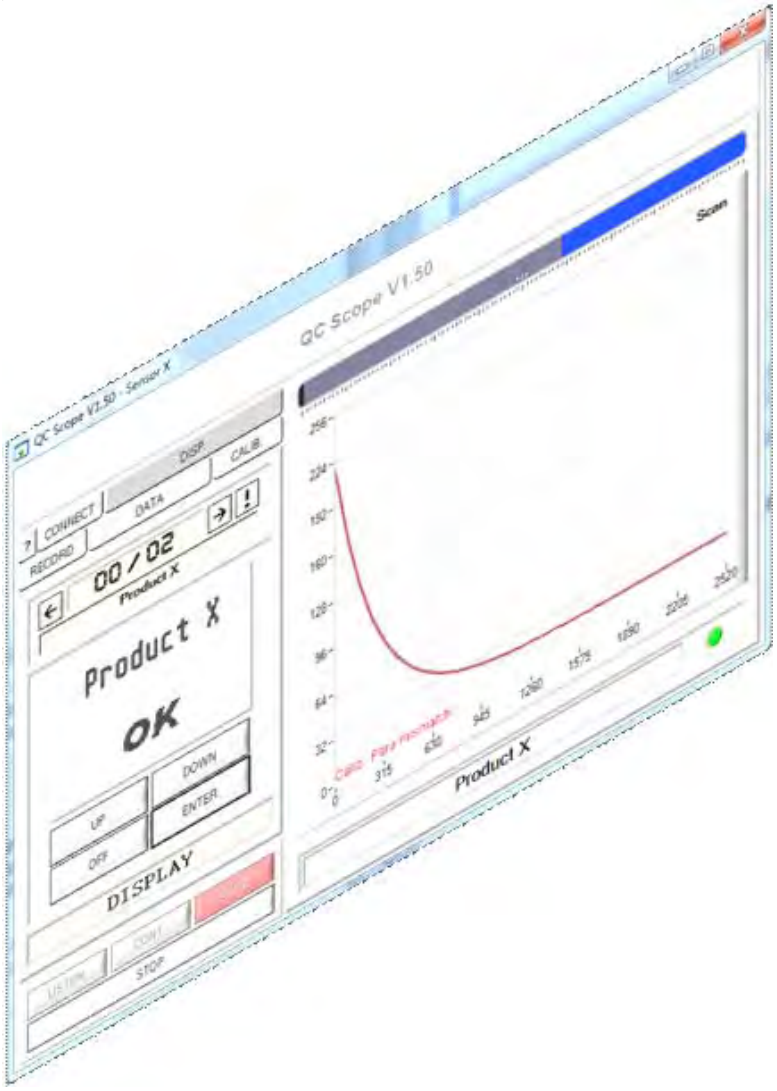
Selects one of (up to) 19 products out of the product memory.
Changes the parameter set / the product to be identified from the current one to the next lower one.
When the first active parameter set is reached, the sensor changes back to the last one.

The sensor can be operated with a battery (typ Li-Ion 9V) or as an alternative with a power supply unit (+24V regulated DC voltage, 1A output current).

Info: When a power supply unit is connected it has preference over the battery. In this case the battery will not be used.
If the power supply plug is inserted at the sensor, but the power supply unit is not connected to the mains supply, the sensor will not operate (the sensor electronic components get no power from the battery or from the power supply unit).

## Display

**Graphic display and PC screen display:**


The high-contrast graphic display of the sensor shows the measurement results alphanumerically or numerically, depending on sensor type and settings. In combination with an acoustic signal the measurement result thus is clearly communicated.

The PC software can be used to process and analyse the measurement data. The signals and values of the measurement curves that are autarkically recorded by the sensor can be evaluated on the screen. A recorder function allows recording of measurements with the PC. Different views of the measurement data make it possible to focus on certain aspects of the measurement.

Apart from displaying measurement values, the download function for parameter files is the second main function of the PC software. These files contain the configuration data and the TEACH values for the products that should be identified.

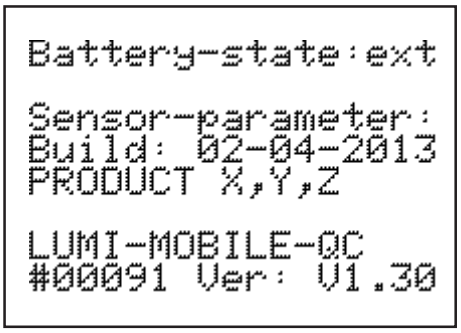
**ATTENTION: The generation of parameter files is a special feature of the LUMI-MOBILE-LAB sensor. Sensors of all expansion levels only can be configured by means of parameter files.**

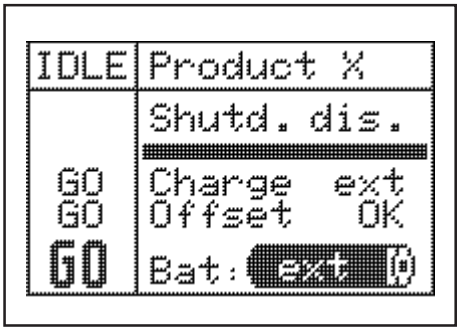
## Display

**Functions of the display:**

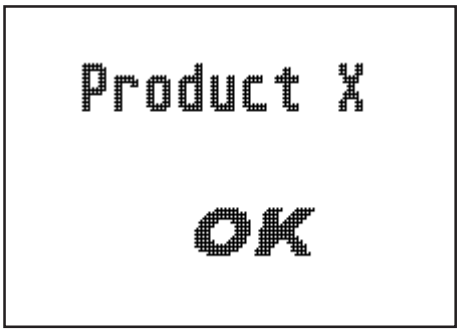
- Display of product designation
- Display of identification (OK, nOK)
- Listing of cause in case of negative identification
- Numeric display of measurement values (not with all versions)
- Display of battery charge state
- Status of automatic outside light compensation

**IDLE**




**Product detected**




**Product not detected**



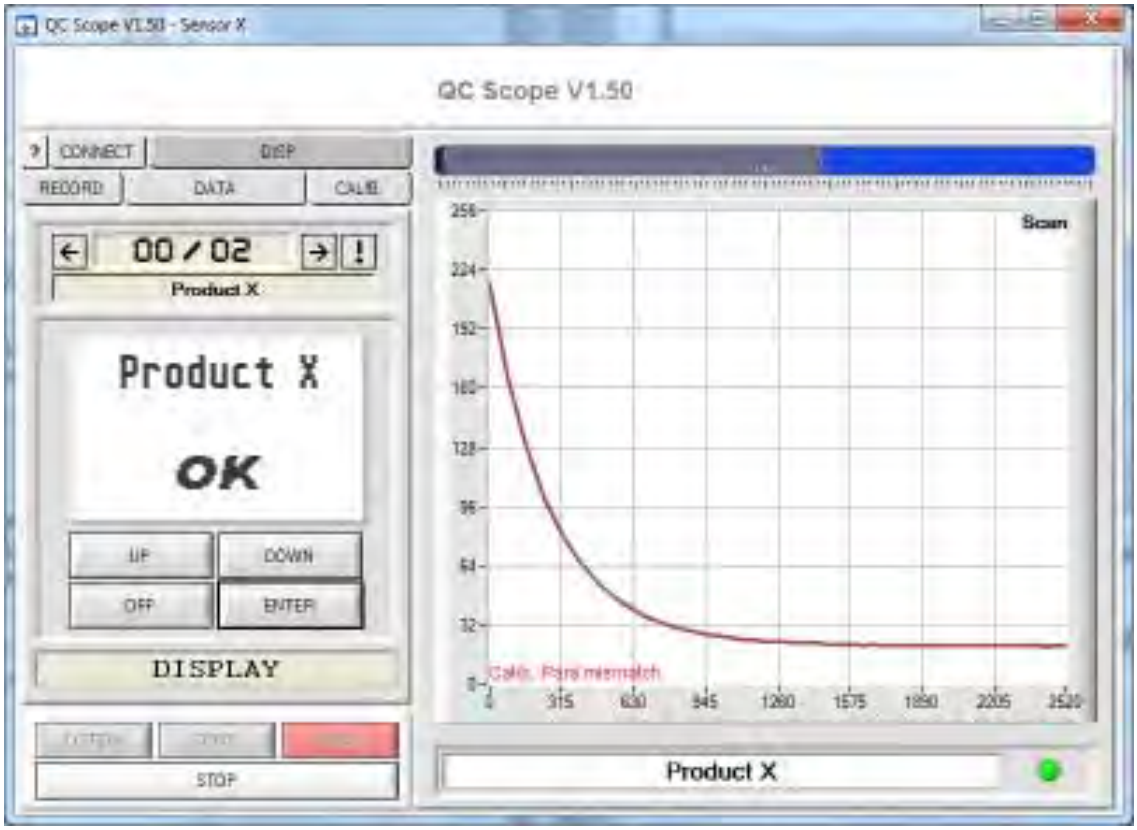
## Windows® Software

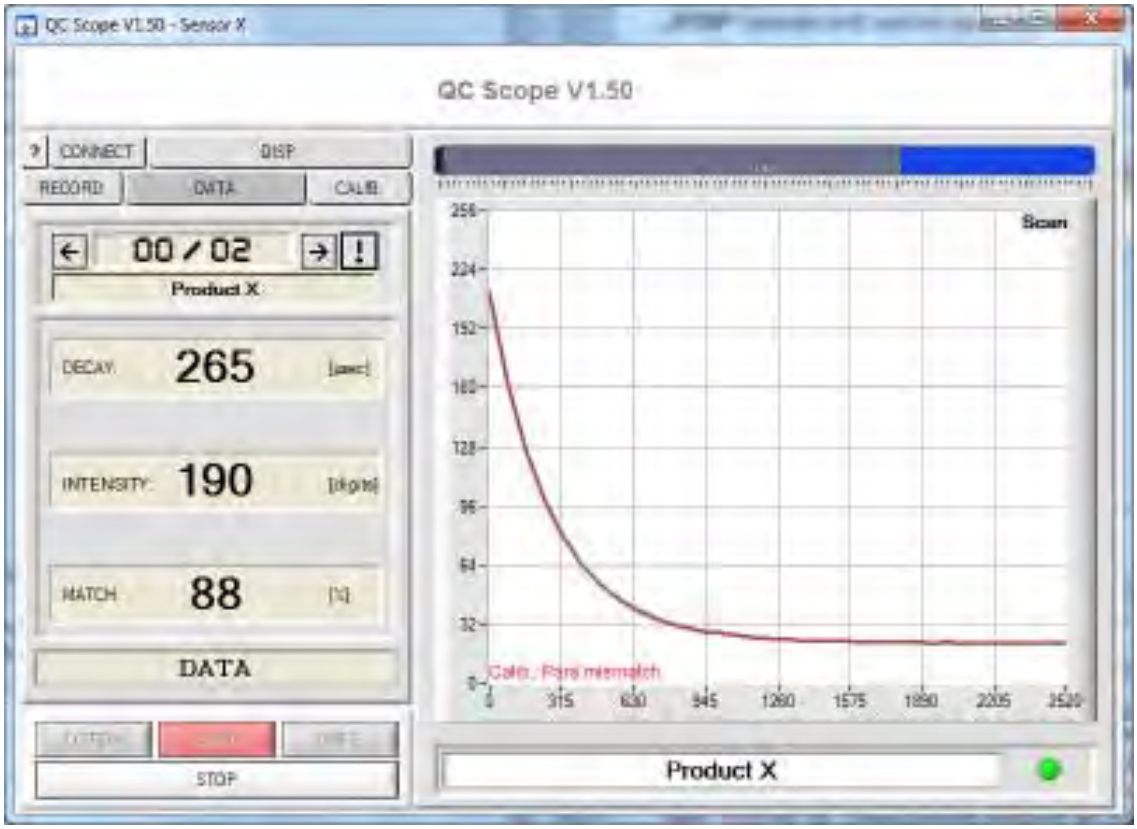
**Functions of the Windows® PC software:**

- Communication with the sensor through USB
- Download of configuration files to the sensor
- Calibration of the sensor
- Generation of configuration files **(only LAB expansion level)**
- Display of measurement values
- Representation of the display
- Display of signal curves
- Recording/ saving of measurement data on the PC
- Analysis of signal curves **(only LAB expansion level)**

## Windows® Software

**Windows® PC software user interface:**



## Accessories

### Connecting cables:
(please order separately)

**cab-usb/A-MINI_AB-1,5m**
USB connecting cables

**PS-24V-1A/24W-J135**
Power supply, without charging function

### Top part for optics (spacer):
(please order separately)

**MFE-100/100-LUMI-MOBILE-IR-NV**
Big top part for optics (spacer)

### Battery and charger:
(please order separately)

**Block-Akku Li-Ion 9V**
Rechargeable battery Li-Ion 9V

**Profilader VC Li-Ion 9V**
Charger for 2 pcs. „Block-Akku Li-Ion 9V“ (battery)

**PS-12V-Profilader VC**
Power supply for charger „Profilader VC Li-Ion 9V“

## LUMI-MOBILE Cases

**LUMI-MOBILE-QC-IR/IR-CASE-3**
Sensor case model 3 (with MFE-100/100-LUMI-MOBILE-IR-NV))

Case composed of:
1x **LUMI-MOBILE-QC-IR/IR**
incl. **software LUMI-MOBILE-QC-Scope**
(hand-held device with display, for battery operation)
1x **MFE-100/100-LUMI-MOBILE-IR-NV** (big top parts for optics)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1A/24W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

**LUMI-MOBILE-QC-IR/IR-CASE-4**
Sensor case model 4 (without MFE-100/100-LUMI-MOBILE-IR-NV))

Case composed of:
1x **LUMI-MOBILE-QC-IR/IR**
incl. **software LUMI-MOBILE-QC-Scope**
(hand-held device with display, for battery operation)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1A/24W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

# LUMI-MOBILE Series

## LUMI-MOBILE-PT-IR/IR

**Hand-held device for battery operation**


- Measurement of the relaxation behaviour of luminescent products such as "UP-Converting Phosphors" or "DOWN-Converters"
- Uses IR-LEDs (laser class 1)
- Automatic constant light / outside light compensation
- Wide detection range
- Wide dynamic range (70 dB) available
- Battery operation with 9V block battery (independent of mains and PC)
- Alphanumeric display of the identified luminescent product
- USB port for connection to PC: Windows® program for further analysis
- Acoustical and optical information upon product detection
- **1 product can be saved**

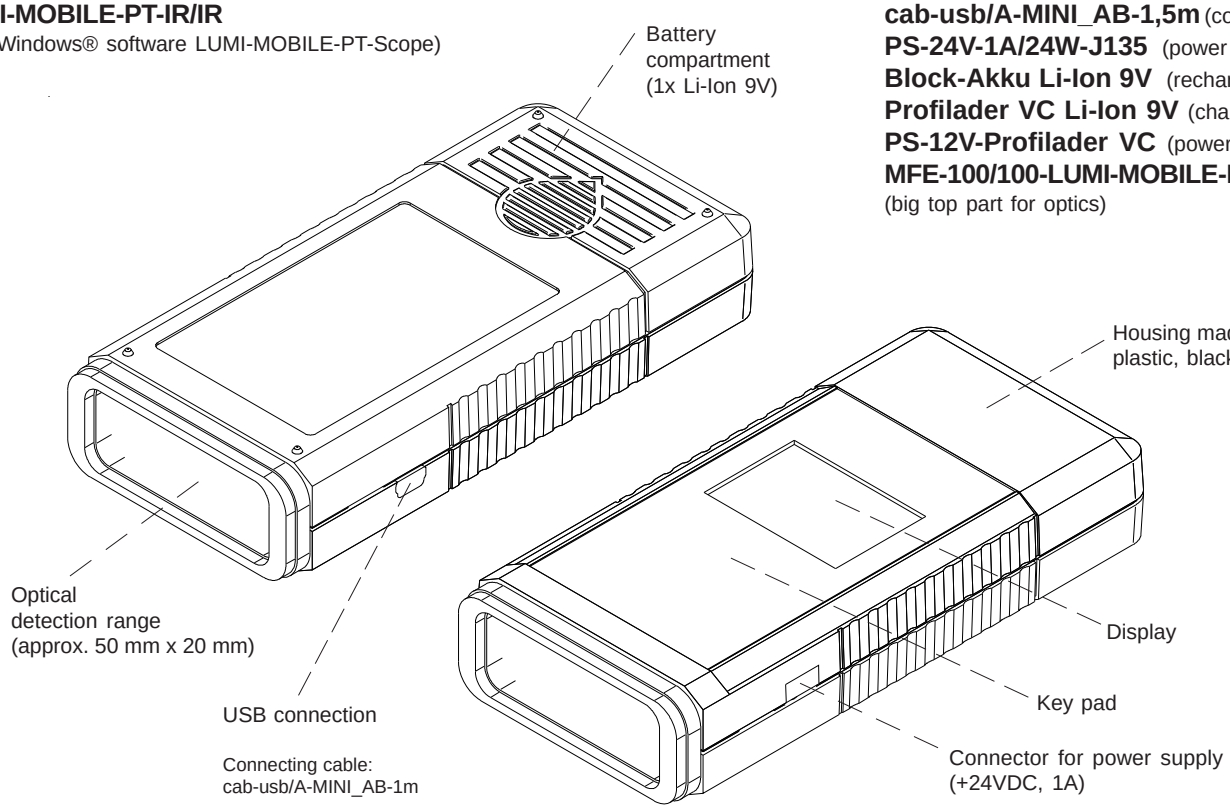
## Design

**Product name:**

**LUMI-MOBILE-PT-IR/IR**
(incl. Windows® software LUMI-MOBILE-PT-Scope)

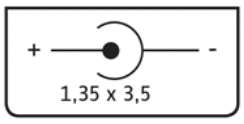
**Accessories:** (cf. p. 9)

**cab-usb/A-MINI_AB-1,5m** (connecting cable)
**PS-24V-1A/24W-J135** (power supply)
**Block-Akku Li-Ion 9V** (rechargeable battery)
**Profilader VC Li-Ion 9V** (charger)
**PS-12V-Profilader VC** (power supply charger)
**MFE-100/100-LUMI-MOBILE-IR-NV**
(big top part for optics)



## Technical Data

| Model | LUMI-MOBILE-PT-IR/IR |
|---|---|
| Light source | IR-LEDs, λ typ. 940 nm |
| Reference distance | contacting, with optical fiber sensor head |
| Detection range | typ. 50 mm x 20 mm |
| Optical filter | daylight block filter |
| Voltage supply | operation with a battery or with power supply unit (+24VDC, regulated, 1A) |
| AC operation | pulsed |
| Enclosure rating | IP54 |
| Current consumption | typ. 200 mA |
| Interface | USB, parameterizable under Windows® |
| EMC test acc. to | DIN EN 60947-5-2 CE |
| Operating temp. range | 0°C ... +55°C |
| Storage temperature range | -20°C ... +85°C |
| Housing material | plastic, black |
| Housing dimensions | L x W x H approx. 126 mm x 60 mm x 26 mm |
| Product memory depth | 1 product |

| Model | Power Supply PS-24V-1A/24W-J135 |
|---|---|
| Secundary voltage | +24VDC regulated, 1A output current |
| Power supply capacity | 24W |
| Dimensions DC connector | L x W x H approx. 1.35 mm x 3.5 mm x 9 mm   |
| Note | When a power supply unit is connected it has preference over the battery. In this case the battery will not be used. If the power supply plug is inserted at the sensor, but the power supply unit is not connected to the mains supply, the sensor will not operate (the sensor electronic components get no power from the battery or from the power supply unit). |

## Features

The **LUMI-MOBILE-PT-IR/IR** sensor belongs to the **LUMI sensor family** for the optical detection and identification of so-called UP-Converting Phosphors (UCP) or DOWN-Converting Phosphors (DCP).

UCPs are rare earth particles of micrometer down to nanometre size that have the special property of using internal physical processes to convert low-energy photons (e.g. infrared light) into high-energy photons (visible light). Phosphorescence, i.e. the temporary storing and later releasing of excitation energy, is a second property of UCPs. When an UCP is exposed to pulsed excitation, the excitation state relaxes exponentially after the end of excitation under the emission of light. This time curve of the intensity is characteristic for the respective UCP. DCPs in part are the same materials, but in this case higher-energy photons are converted into lower-energy photons, which also happens with a time delay.

The **LUMI-MOBILE-PT-IR/IR** identifies UCPs and DCPs by way of the parameters of the exponential relaxation curve.
The UCP or DCP is excited by an impulse, and the relaxation behaviour is scanned/digitised over time. The recorded data are approximated by way of modelling. The model parameters "TAU" (time constant) and "INTENSITY" (start intensity) of the exponential curve are used to identify the respective sample.

The **LUMI-MOBILE-PT-IR/IR** is battery-powered and with its internal microprocessor operates independent of mains and PC. As an option a supplied PC software can be used for further analysis. **LUMI-MOBILE-PT-IR/IR** sensors are operated by way of the membrane keypad at the housing front. Parameterization is not possible.

The setting of the **LUMI-MOBILE-PT-IR/IR** sensor is first defined with the **LUMI-MOBILE-LAB-IR/IR** system and is then saved in the sensor's non-volatile memory.

The sensors features an automatic outside light compensation function. To be able to respond more flexibly to different measurement situations, the outside light that occurs in a measurement in addition to the signal of the sample to be measured, is compensated by an automatic control function. The time that is necessary for outside light compensation depends on the parameterisation, on the ambient light, and on the start situation, and typically lies between 0 and 5 seconds. Measurements can only be performed when outside light compensation is finished.

## Measurement

**Performing a measurement:**

Connect the power supply unit or the battery, and turn the sensor on.

Place the sensor on the object. Make sure that the attached aperture encloses the object or is flush with the object to prevent any influence of extraneous light that might reach the sensor optics from the outside. If possible, switch off any dynamic infrared sources (neon lamps, halogen spotlights, and bulbs in the direct vicinity). When using a fiber optic sensor type (FIO) best-possible shielding against extraneous light also must be ensured.

Wait until the sensor has completed its extraneous light offset and has fully charged the emitter pulse unit. When the sensor is ready it displays „OK“. Press the „ENTER“ key and wait until the scan process is finished. Make absolutely sure that the sensor is not tilted or moved during the measurement.

Acoustic signals:
The results of a measurement (positive/negative) also are indicated by way of acoustic buzzer signals:
POSITIVE: Two short high buzzer signals, NEGATIVE: One long low buzzer signal.

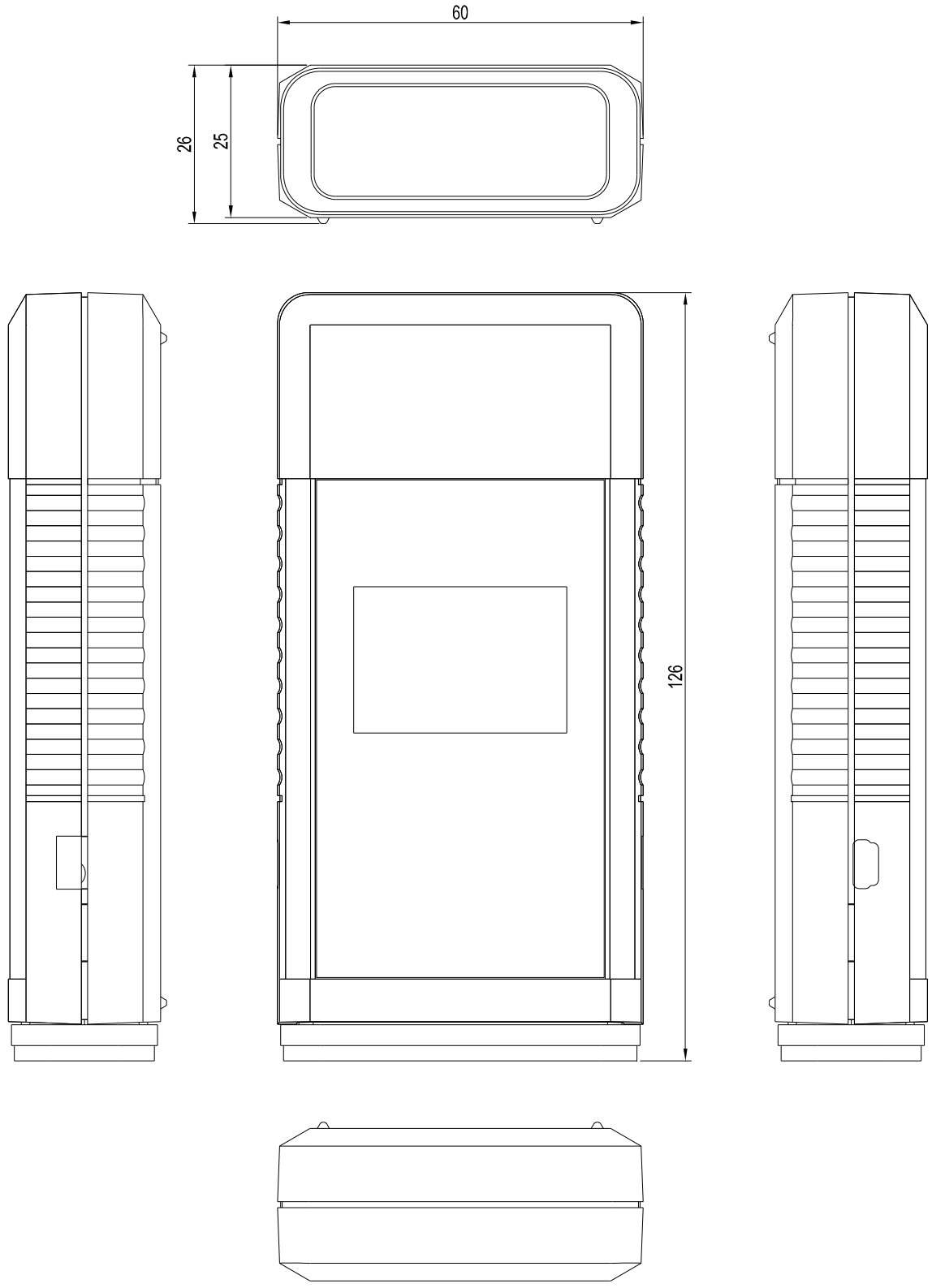
Optical informationen:
Via display: POSITIVE: product is displayed, NEGATIVE: failure information.

## Product Change

**Product change with LUMI-MOBILE-PT-IR/IR:**

The Windows® PC software LUMI-MOBILE-PT-Scope can be used to read one new file (one new product).
The product dataset existing in the product memory of the sensor will be overwritten, and the new product will then be available in the product memory.

## Dimensions




All dimensions in mm

# Key Function

## Functions of the key pad:

The keys have a tactile switching point that can be recognised by a soft "click".



Turns the sensor on / off.
To turn the sensor on (battery or power supply unit connected), press and hold the key until the boot screen is displayed.To turn the sensor off, press and hold the key until shutdown is finished.


Starts a measurement.
Press the key briefly and release it again. Make sure that during a measurement the sensor remains on the measurement object. A measurement only can be started when the sensor is in „IDLE“ state (which is shown on the display). In all other states pressing the ENTER key will have no effect.

Without function on case of LUMI-MOBILE-FIO-PT

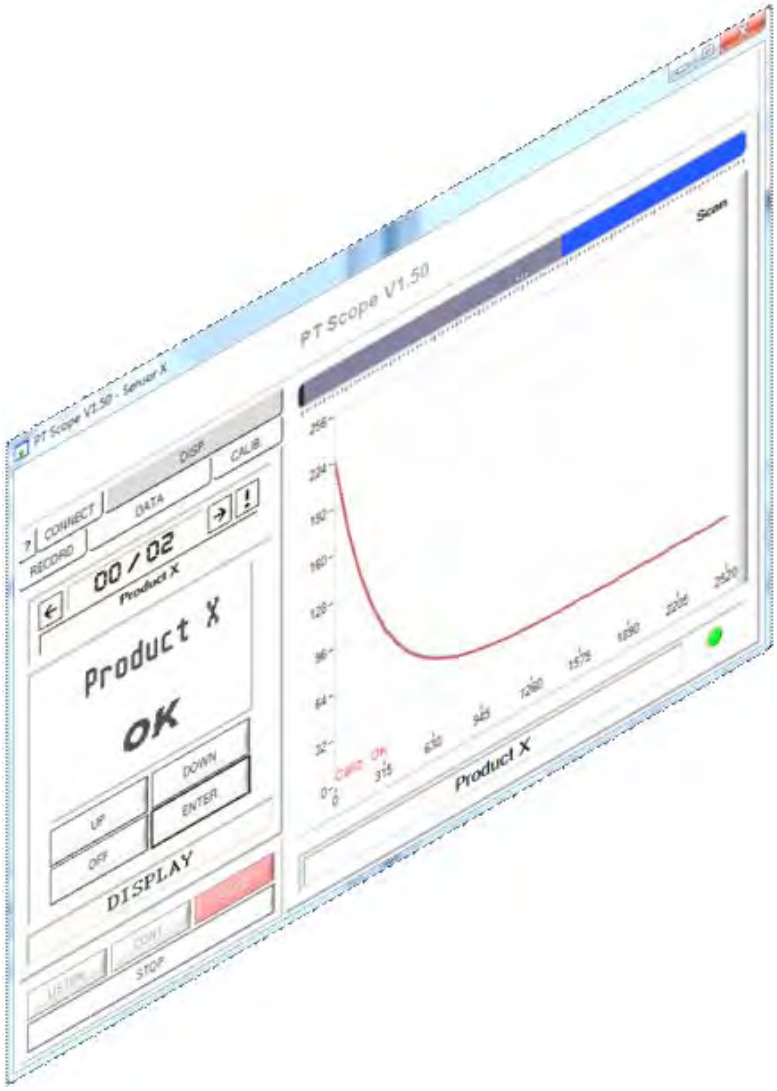
Without function on case of LUMI-MOBILE-FIO-PT

The sensor can be operated with a battery (typ Li-Ion 9V) or as an alternative with a power supply unit (+24V regulated DC voltage, 1A output current).

Info: When a power supply unit is connected it has preference over the battery. In this case the battery will not be used.
If the power supply plug is inserted at the sensor, but the power supply unit is not connected to the mains supply, the sensor will not operate (the sensor electronic components get no power from the battery or from the power supply unit).

## Display

**Graphic display and PC screen display:**


The high-contrast graphic display of the sensor shows the measurement results alphanumerically or numerically, depending on sensor type and settings. In combination with an acoustic signal the measurement result thus is clearly communicated.

The PC software can be used to process and analyse the measurement data. The signals and values of the measurement curves that are autarkically recorded by the sensor can be evaluated on the screen. A recorder function allows recording of measurements with the PC. Different views of the measurement data make it possible to focus on certain aspects of the measurement.

Apart from displaying measurement values, the download function for parameter files is the second main function of the PC software. These files contain the configuration data and the TEACH values for the products that should be identified.

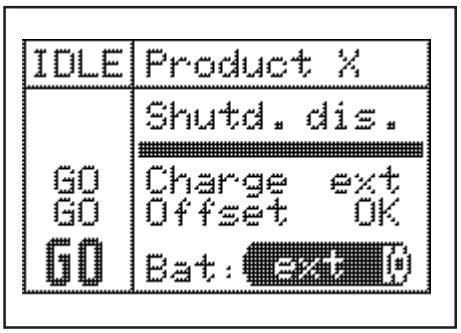
**ATTENTION: The generation of parameter files is a special feature of the LUMI-MOBILE-LAB sensor. Sensors of all expansion levels only can be configured by means of parameter files.**

## Display

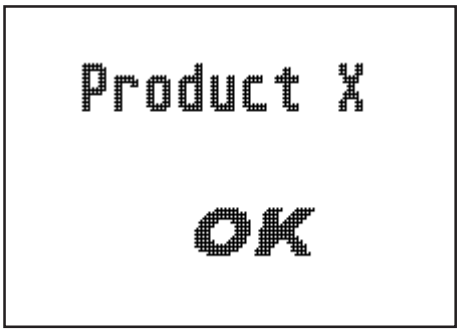
**Functions of the display:**

- Display of product designation
- Display of identification (OK, nOK)
- Listing of cause in case of negative identification
- Numeric display of measurement values (not with all versions)
- Display of battery charge state
- Status of automatic outside light compensation

**IDLE**


**Product detected**




**Product not detected**



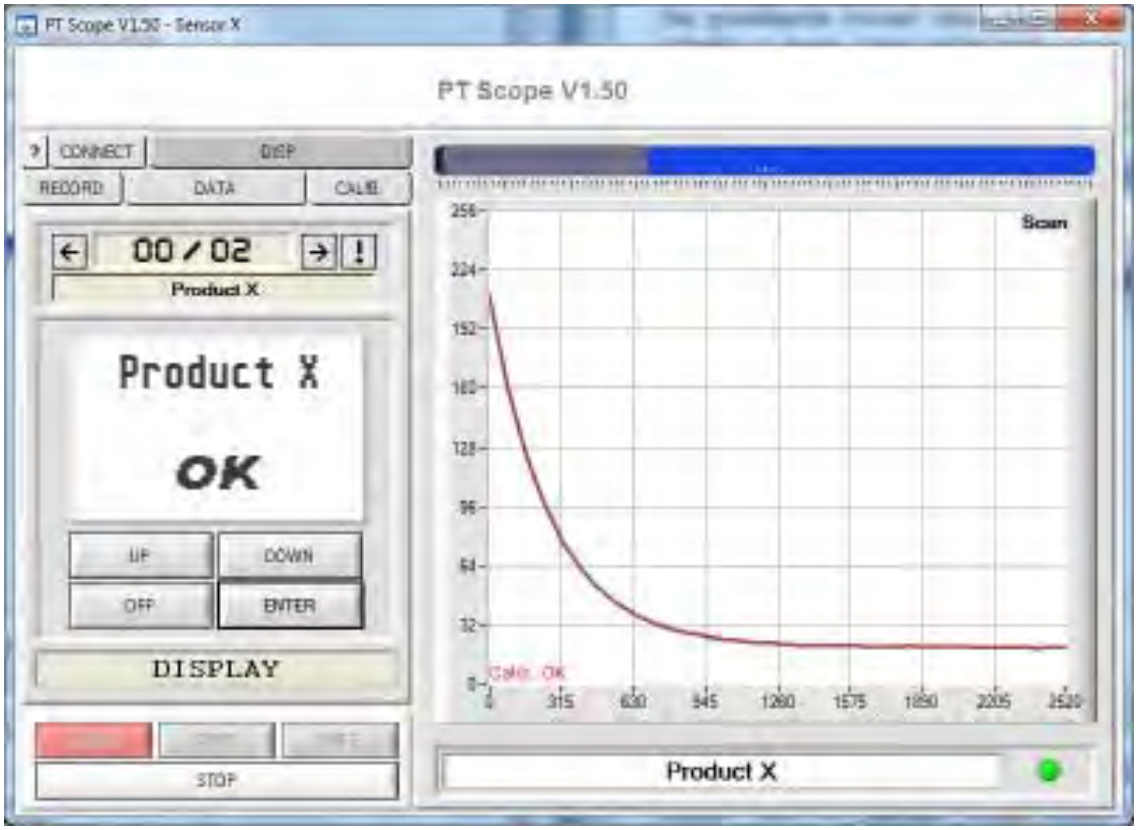
## Windows® Software

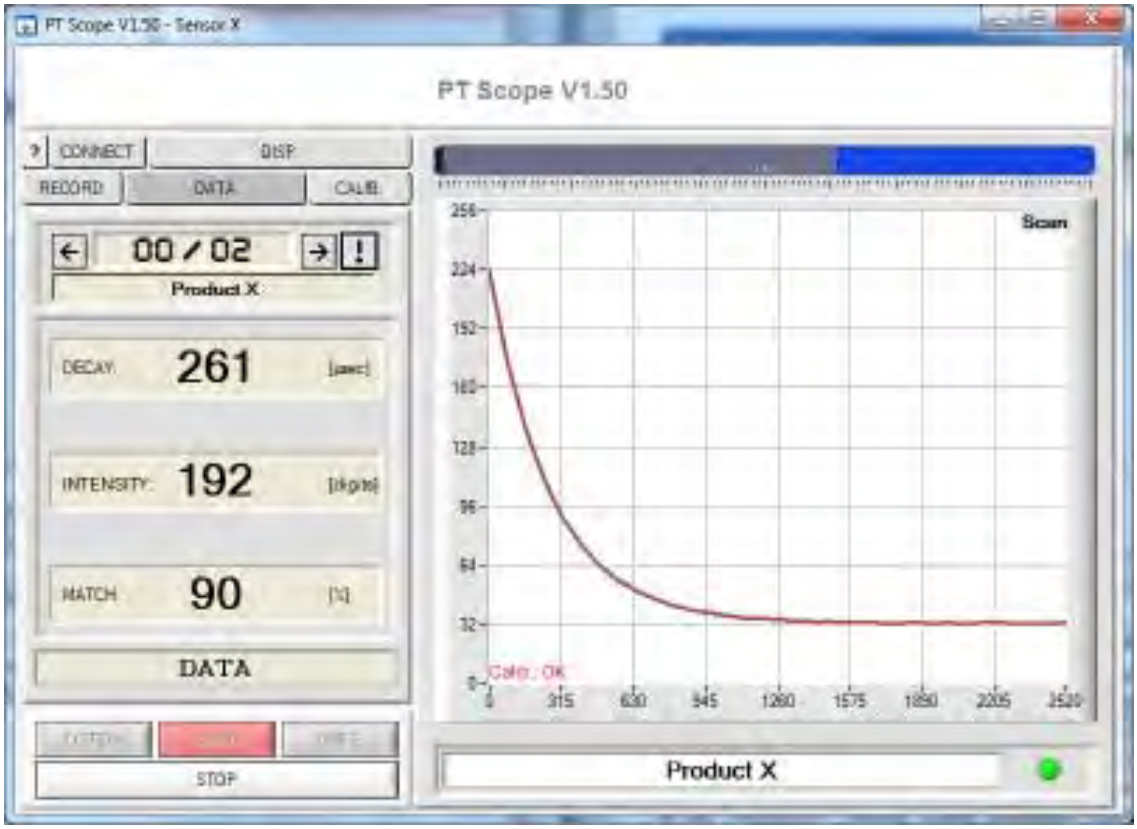
**Functions of the Windows® PC software:**

- Communication with the sensor through USB
- Download of configuration files to the sensor
- Calibration of the sensor
- Generation of configuration files **(only LAB expansion level)**
- Display of measurement values
- Representation of the display
- Display of signal curves
- Recording/ saving of measurement data on the PC
- Analysis of signal curves **(only LAB expansion level)**

## Windows® Software

**Windows® PC software user interface:**



## Accessories

### Connecting cables:
(please order separately)

**cab-usb/A-MINI_AB-1,5m**
USB connecting cables

**PS-24V-1A/24W-J135**
Power supply, without charging function

### Top part for optics (spacer):
(please order separately)

**MFE-100/100-LUMI-MOBILE-IR-NV**
Big top part for optics (spacer)

### Battery and charger:
(please order separately)

**Block-Akku Li-Ion 9V**
Rechargeable battery Li-Ion 9V

**Profilader VC Li-Ion 9V**
Charger for 2 pcs. „Block-Akku Li-Ion 9V“ (battery)

**PS-12V-Profilader VC**
Power supply for charger „Profilader VC Li-Ion 9V“

## LUMI-MOBILE Cases

**LUMI-MOBILE-PT-IR/IR-CASE-3**
Sensor case model 3 (with MFE-100/100-LUMI-MOBILE-IR-NV)

Case composed of:
1x **LUMI-MOBILE-PT-IR/IR**
incl. **software LUMI-MOBILE-PT-Scope**
(hand-held device with display, for battery operation)
1x **MFE-100/100-LUMI-MOBILE-IR-NV** (big top parts for optics)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1A/24W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

**LUMI-MOBILE-PT-IR/IR-CASE-4**
Sensor case model 4 (without MFE-100/100-LUMI-MOBILE-IR-NV)

Case composed of:
1x **LUMI-MOBILE-PT-IR/IR**
incl. **software LUMI-MOBILE-PT-Scope**
(hand-held device with display, for battery operation)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1A/24W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

# LUMI-MOBILE Series

## LUMI-MOBILE-LAB-IR/IR

**Hand-held device for battery operation**


- Measurement of the relaxation behaviour of luminescent products such as "UP-Converting Phosphors" or "DOWN-Converters"
- Uses IR-LEDs (laser class 1)
- Automatic constant light / outside light compensation
- Wide detection range
- Wide dynamic range (70 dB) available
- Battery operation with 9V block battery (independent of mains and PC)
- Optional: Numeric display of time constant TAU and of the concentration of luminescent products in the carrier material
- Optional: Numeric display of measurement quality
- Optional: Alphanumeric display of the identified luminescent pro
- USB port for connection to PC: Windows® program for further analysis
- Acoustical and optical information upon product detection
- **31 products can be saved**
- **Parameterisation of product files intended for -PT and -QC in the product memory**
- **Comprehensive analysis software (LUMI-MOBILE-LAB-Scope) under Windows®**

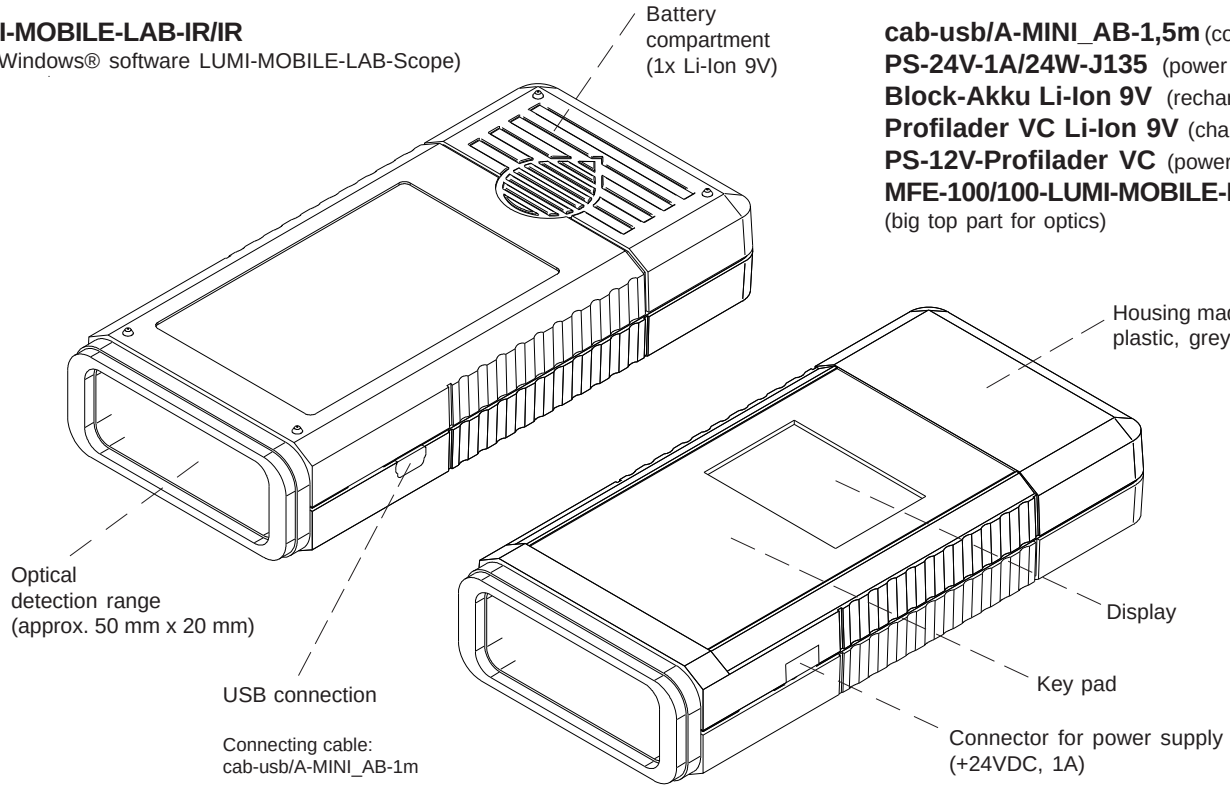
## Design

**Product name:**

**LUMI-MOBILE-LAB-IR/IR**
(incl. Windows® software LUMI-MOBILE-LAB-Scope)

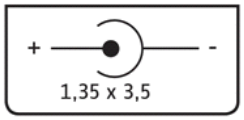
**Accessories:** (cf. p. 10)

**cab-usb/A-MINI_AB-1,5m** (connecting cable)
**PS-24V-1A/24W-J135** (power supply)
**Block-Akku Li-Ion 9V** (rechargeable battery)
**Profilader VC Li-Ion 9V** (charger)
**PS-12V-Profilader VC** (power supply charger)
**MFE-100/100-LUMI-MOBILE-IR-NV**
(big top part for optics)



## Technical Data

| Model | LUMI-MOBILE-LAB-IR/IR |
|---|---|
| Light source | IR-LEDs, λ typ. 940 nm |
| Reference distance | contacting |
| Detection range | typ. 50 mm x 20 mm |
| Optical filter | daylight block filter |
| Voltage supply | operation with a battery or with power supply unit (+24VDC, 1A) |
| AC operation | pulsed |
| Enclosure rating | IP54 |
| Current consumption | typ. 200 mA |
| Interface | USB, parameterizable under Windows® |
| EMC test acc. to | DIN EN 60947-5-2 CE |
| Operating temp. range | 0°C ... +55°C |
| Storage temperature range | -20°C ... +85°C |
| Housing material | plastic, grey |
| Housing dimensions | L x W x H approx. 126 mm x 60 mm x 26 mm |
| Product memory depth | up to 31 products, parameterizable under Windows® |
| Sensitivity (gain) | parameterizable under Windows® |
| IR light power | adjustable under Windows® |
| Averaging | up to 64 values, adjustable under Windows® |
| Pulse length,<br>scan frequency,<br>pulse frequency | parameterizable under Windows® |
| Measuring start/end | parameterizable under Windows® |

| Model | Power Supply PS-24V-1A/24W-J135 |
|---|---|
| Secundary voltage | +24VDC regulated, 1A output current |
| Power supply capacity | 24W |
| Dimensions DC connector | L x W x H approx. 1.35 mm x 3.5 mm x 9 mm   |
| Note | When a power supply unit is connected it has preference over the battery. In this case the battery will not be used. If the power supply plug is inserted at the sensor, but the power supply unit is not connected to the mains supply, the sensor will not operate (the sensor electronic components get no power from the battery or from the power supply unit). |

## Features

The **LUMI-MOBILE-LAB-IR/IR** sensor belongs to the **LUMI sensor family** for the optical detection and identification of so-called UP-Converting Phosphors (UCP) or DOWN-Converting Phosphors (DCP).

UCPs are rare earth particles of micrometer down to nanometre size that have the special property of using internal physical processes to convert low-energy photons (e.g. infrared light) into high-energy photons (visible light). Phosphorescence, i.e. the temporary storing and later releasing of excitation energy, is a second property of UCPs. When an UCP is exposed to pulsed excitation, the excitation state relaxes exponentially after the end of excitation under the emission of light. This time curve of the intensity is characteristic for the respective UCP. DCPs in part are the same materials, but in this case higher-energy photons are converted into lower-energy photons, which also happens with a time delay.

The **LUMI-MOBILE-LAB-IR/IR** identifies UCPs and DCPs by way of the parameters of the exponential relaxation curve.
The UCP or DCP is excited by an impulse, and the relaxation behaviour is scanned/digitised over time. The recorded data are approximated by way of modelling. The model parameters "TAU" (time constant) and "INTENSITY" (start intensity) of the exponential curve are used to identify the respective sample.

The **LUMI-MOBILE-LAB-IR/IR** is battery-powered and with its internal microprocessor operates independent of mains and PC. As an option a supplied PC software can be used for further analysis. **LUMI-MOBILE-LAB-IR/IR** sensors are operated by way of the membrane keypad at the housing front.

The settings of the sensors (**LUMI-MOBILE-PT-IR/IR** or **LUMI-MOBILE-QC-IR/IR**) are first defined with the **LUMI-MOBILE-LAB-IR/IR** system and are then saved in the sensor's non-volatile memory. For test purposes individual parameters can be temporarily changed in the volatile memory.

The sensors features an automatic outside light compensation function. To be able to respond more flexibly to different measurement situations, the outside light that occurs in a measurement in addition to the signal of the sample to be measured, is compensated by an automatic control function. The time that is necessary for outside light compensation depends on the parameterisation, on the ambient light, and on the start situation, and typically lies between 0 and 5 seconds. Measurements can only be performed when outside light compensation is finished.

## Measurement

**Performing a measurement:**

Connect the power supply unit or the battery, and turn the sensor on.

Place the sensor on the object. Make sure that the attached aperture encloses the object or is flush with the object to prevent any influence of extraneous light that might reach the sensor optics from the outside. If possible, switch off any dynamic infrared sources (neon lamps, halogen spotlights, and bulbs in the direct vicinity). When using a fiber optic sensor type (FIO) best-possible shielding against extraneous light also must be ensured.

Wait until the sensor has completed its extraneous light offset and has fully charged the emitter pulse unit. When the sensor is ready it displays „OK“. Press the „ENTER“ key and wait until the scan process is finished. Make absolutely sure that the sensor is not tilted or moved during the measurement.

Acoustic signals:
The results of a measurement (positive/negative) also are indicated by way of acoustic buzzer signals:
POSITIVE: Two short high buzzer signals, NEGATIVE: One long low buzzer signal.

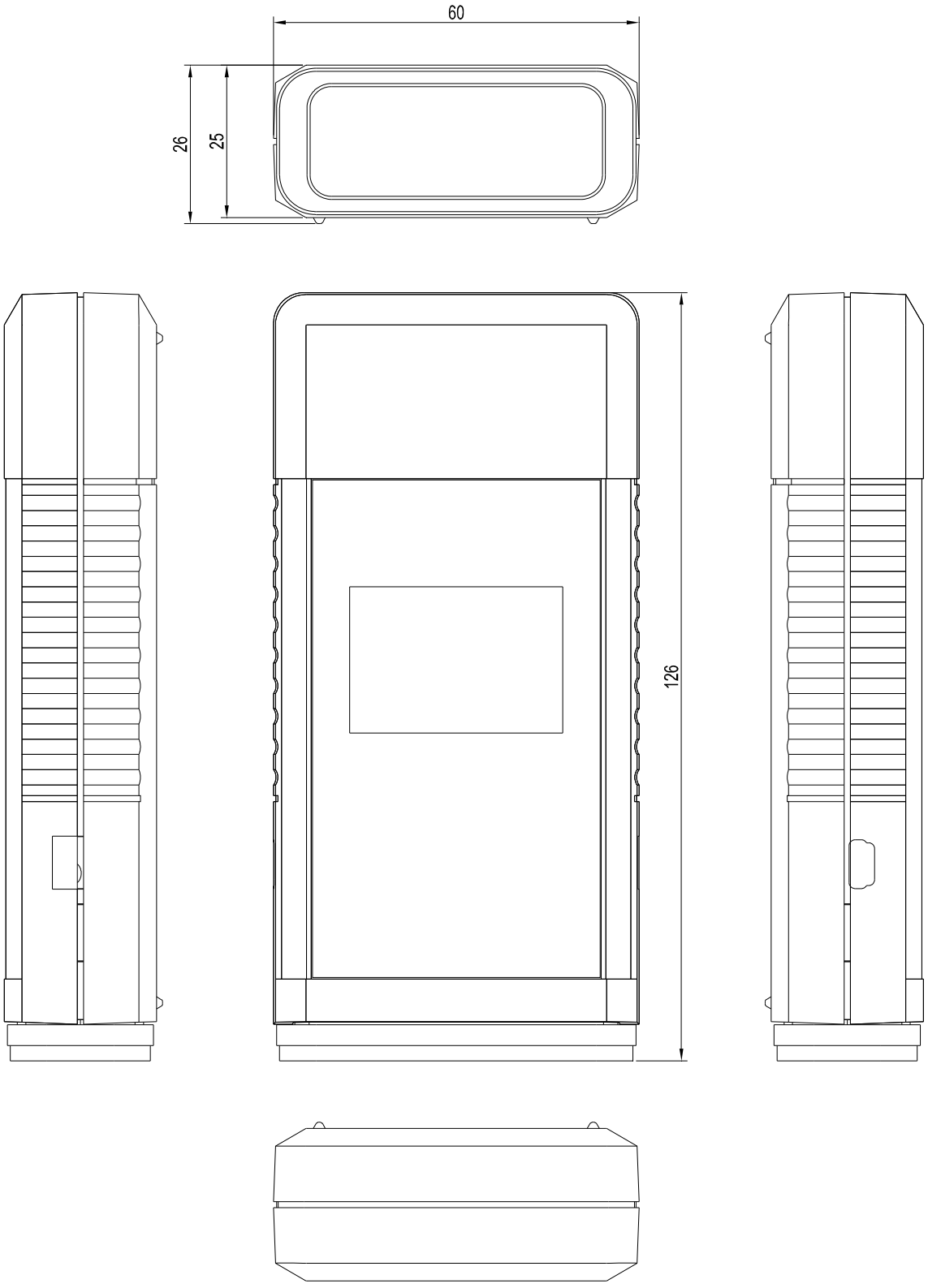
Optical informationen:
Via display: POSITIVE: product is displayed, NEGATIVE: failure information.

## Product Change

**Product change with LUMI-MOBILE-LAB-IR/IR:**

The Windows® PC software LUMI-MOBILE-LAB-Scope can be used to read a new file (a file maximally contains 31 products). The product dataset existing in the product memory of the sensor will be overwritten, and up to 31 new products will then be available in the product memory.

## Dimensions




All dimensions in mm

Sensor Instruments GmbH • D-94169 Thurmansbang • Schlinding 11
Tel. +49 (0)8544 9719-0 • Fax +49 (0)8544 9719-13
info@sensorinstruments.de • www.sensorinstruments.de

## Key Function

### Functions of the key pad:

The keys have a tactile switching point that can be recognised by a soft "click".



Turns the sensor on / off.
To turn the sensor on (battery or power supply unit connected), press and hold the key until the boot screen is displayed.To turn the sensor off, press and hold the key until shutdown is finished.


Starts a measurement.
Press the key briefly and release it again. Make sure that during a measurement the sensor remains on the measurement object. A measurement only can be started when the sensor is in „IDLE“ state (which is shown on the display). In all other states pressing the ENTER key will have no effect.

Selects one of (up to) 31 products out of the product memory.
Changes the parameter set / the product to be identified from the current one to the next higher one.
When the last active parameter set is reached, the sensor changes back to the first one.

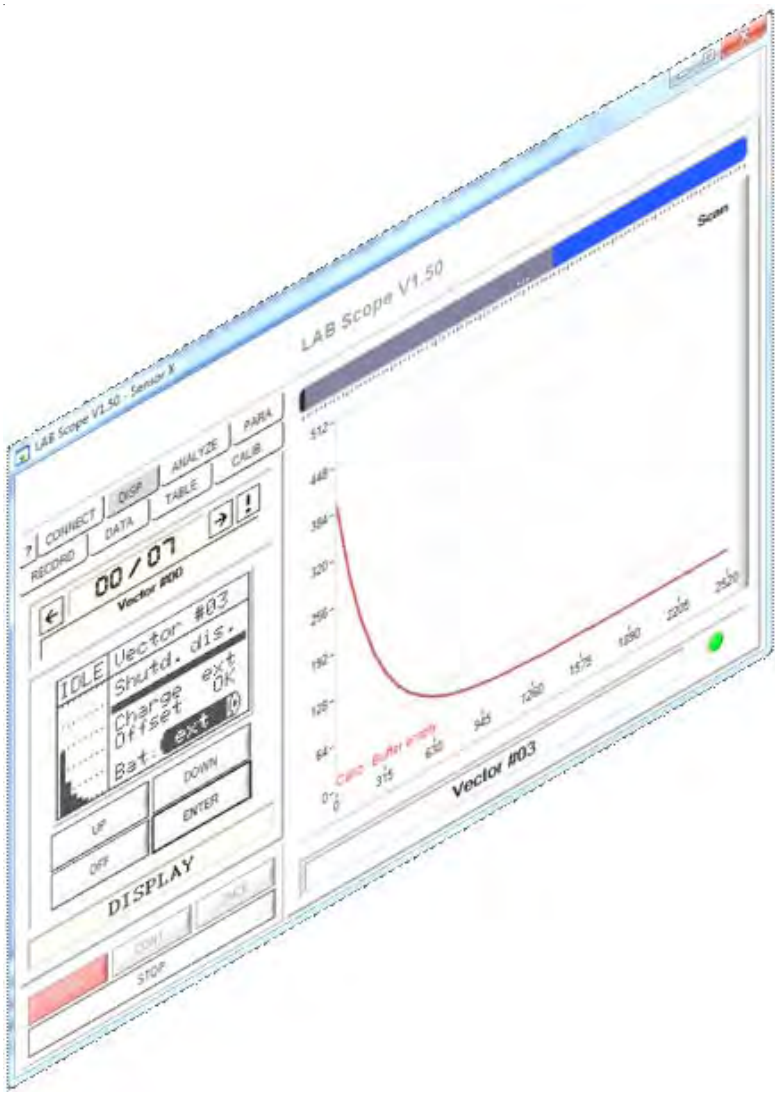
Selects one of (up to) 31 products out of the product memory.
Changes the parameter set / the product to be identified from the current one to the next lower one.
When the first active parameter set is reached, the sensor changes back to the last one.

The sensor can be operated with a battery (typ Li-Ion 9V) or as an alternative with a power supply unit (+24V regulated DC voltage, 1A output current).

Info: When a power supply unit is connected it has preference over the battery. In this case the battery will not be used.
If the power supply plug is inserted at the sensor, but the power supply unit is not connected to the mains supply, the sensor will not operate (the sensor electronic components get no power from the battery or from the power supply unit).

## Display

**Graphic display and PC screen display:**


The high-contrast graphic display of the sensor shows the measurement results alphanumerically or numerically, depending on sensor type and settings. In combination with an acoustic signal the measurement result thus is clearly communicated.

The PC software can be used to process and analyse the measurement data. The signals and values of the measurement curves that are autarkically recorded by the sensor can be evaluated on the screen. A recorder function allows recording of measurements with the PC. Different views of the measurement data make it possible to focus on certain aspects of the measurement.

Apart from displaying measurement values, the download function for parameter files is the second main function of the PC software. These files contain the configuration data and the TEACH values for the products that should be identified.

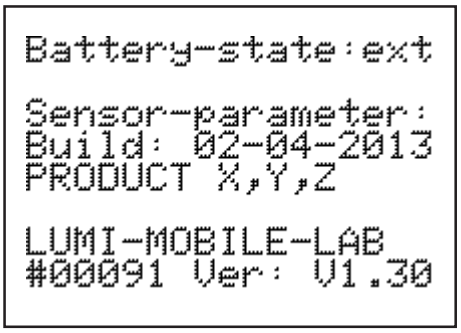
**ATTENTION: The generation of parameter files is a special feature of the LUMI-MOBILE-LAB sensor. Sensors of all expansion levels only can be configured by means of parameter files.**

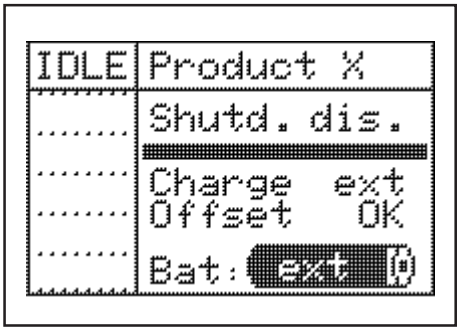
## Display

**Functions of the display:**

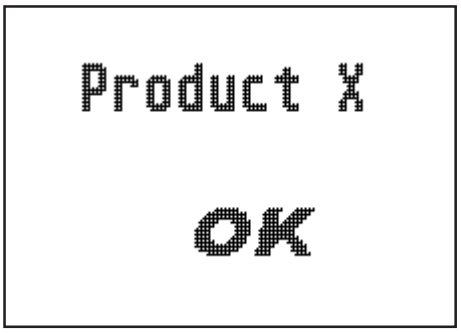
- Display of product designation
- Display of identification (OK, nOK)
- Listing of cause in case of negative identification
- Numeric display of measurement values (not with all versions)
- Display of battery charge state
- Status of automatic outside light compensation

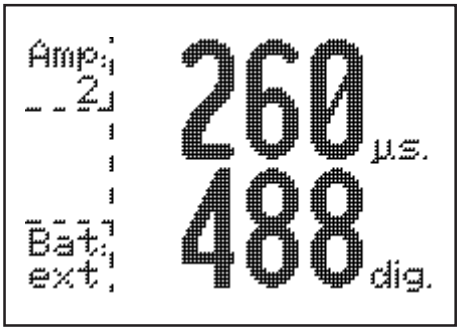
**IDLE**




**Product detected**




**Product not detected**



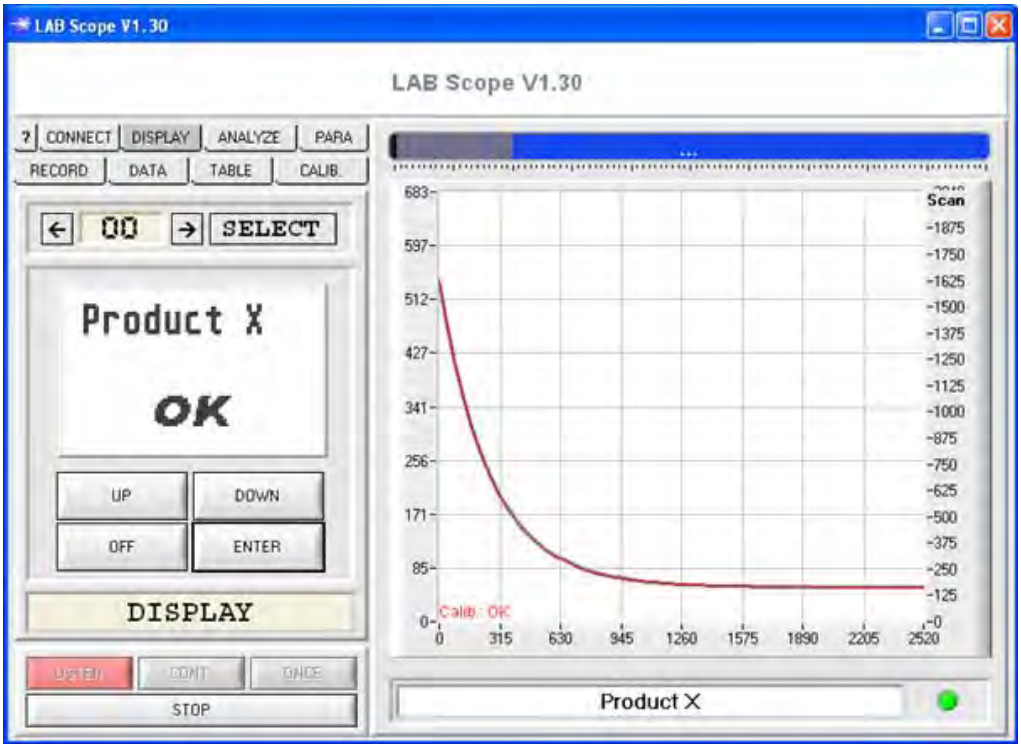
## Windows® Software

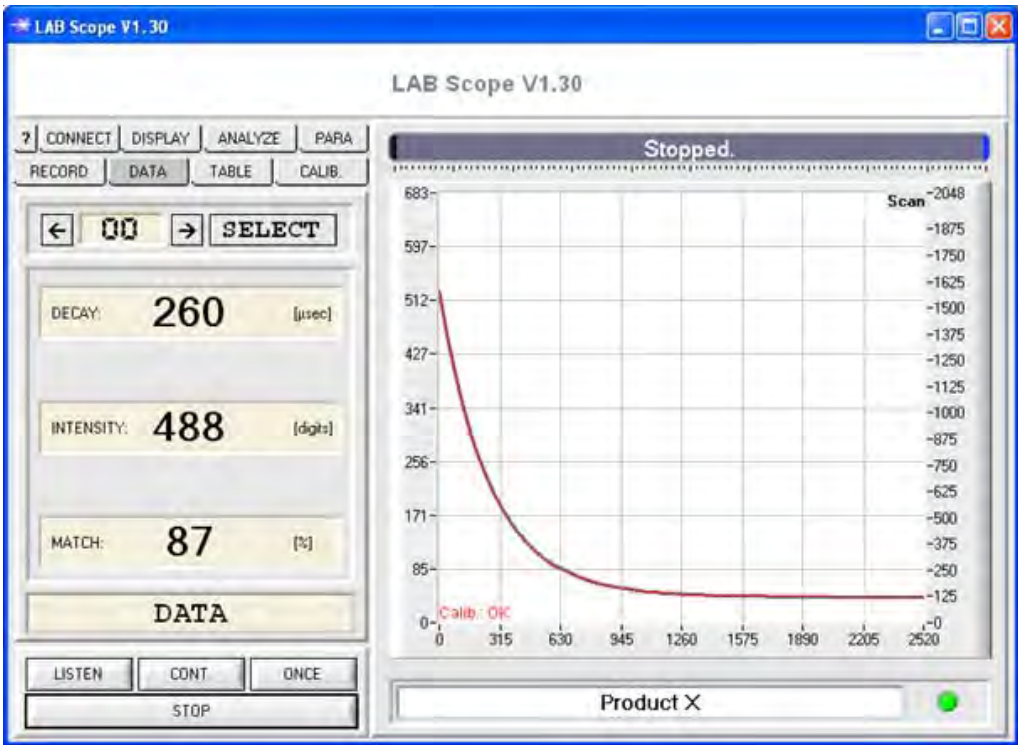
**Functions of the Windows® PC software:**

- Communication with the sensor through USB
- Download of configuration files to the sensor
- Calibration of the sensor
- Generation of configuration files **(only LAB expansion level)**
- Display of measurement values
- Representation of the display
- Display of signal curves
- Recording/ saving of measurement data on the PC
- Analysis of signal curves **(only LAB expansion level)**

## Windows® Software

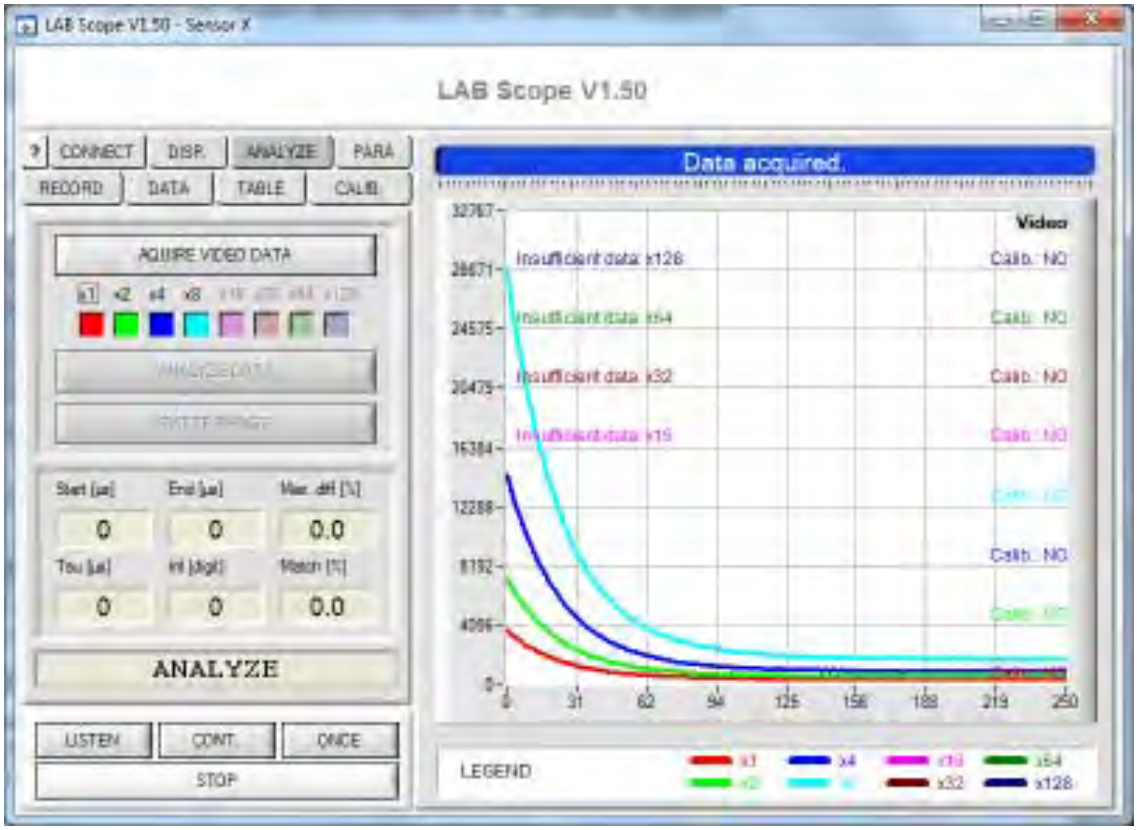
**Windows® PC software user interface:**

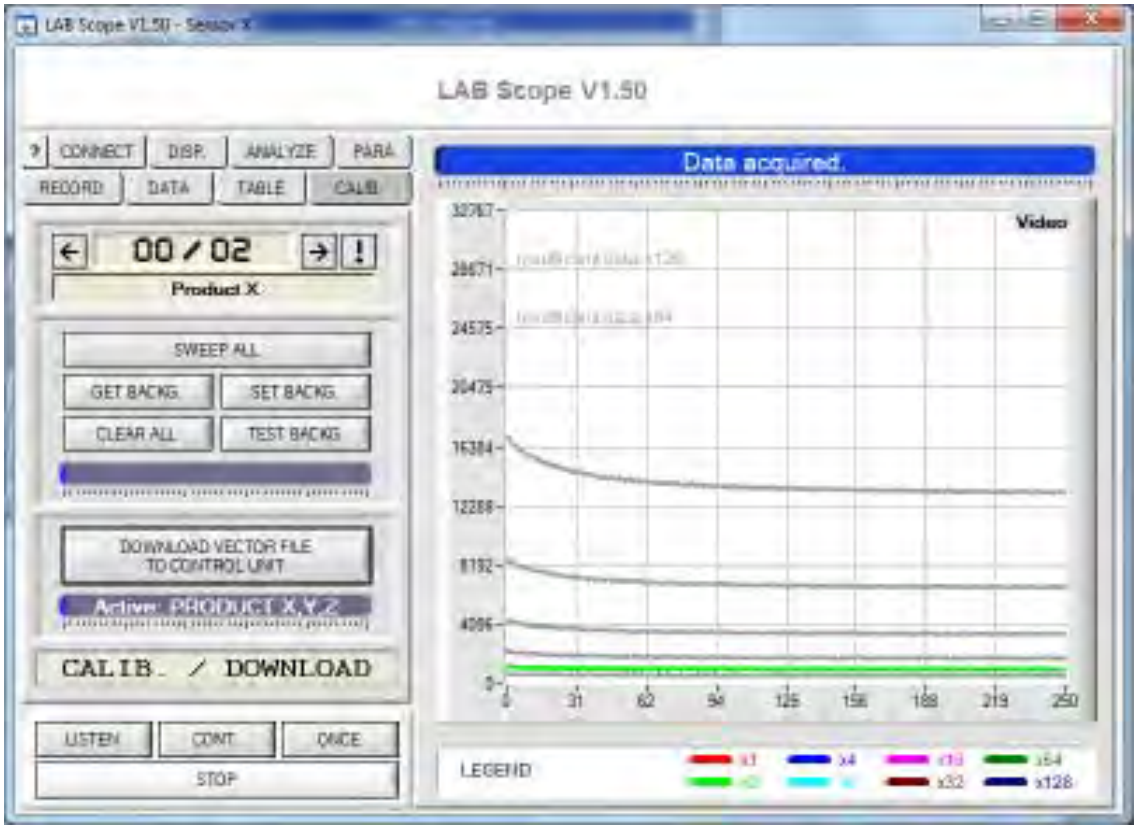


## Windows® Software

**Windows® PC software user interface:**



## Accessories

### Connecting cables:
(please order separately)

**cab-usb/A-MINI_AB-1,5m**
USB connecting cables

**PS-24V-1A/24W-J135**
Power supply, without charging function

### Top part for optics (spacer):
(please order separately)

**MFE-100/100-LUMI-MOBILE-IR-NV**
Big top part for optics (spacer)

### Battery and charger:
(please order separately)

**Block-Akku Li-Ion 9V**
Rechargeable battery Li-Ion 9V

**Profilader VC Li-Ion 9V**
Charger for 2 pcs. „Block-Akku Li-Ion 9V“ (battery)

**PS-12V-Profilader VC**
Power supply for charger „Profilader VC Li-Ion 9V“

## LUMI-MOBILE Cases

**LUMI-MOBILE-LAB-IR/IR-CASE-3**
Sensor case model 3 (with MFE-100/100-LUMI-MOBILE-IR-NV)

Case composed of:
1x **LUMI-MOBILE-LAB-IR/IR**
incl. **software LUMI-MOBILE-LAB-Scope**
(hand-held device with display, for battery operation)
1x **MFE-100/100-LUMI-MOBILE-IR-NV** (big top parts for optics)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1A/24W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

**LUMI-MOBILE-LAB-IR/IR-CASE-4**
Sensor case model 4 (without MFE-100/100-LUMI-MOBILE-IR-NV))

Case composed of:
1x **LUMI-MOBILE-LAB-IR/IR**
incl. **software LUMI-MOBILE-LAB-Scope**
(hand-held device with display, for battery operation)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1A/24W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

# LUMI-MOBILE Series

## LUMI-MOBILE-JR-IR/IR

**Hand-held device for battery operation (with LED display)**


- Measurement of the relaxation behaviour of luminescent products such as "UP-Converting Phosphors" or "DOWN-Converters"
- Uses IR-LEDs (laser class 1)
- Automatic constant light / outside light compensation
- Wide detection range
- Wide dynamic range (70 dB) available
- Battery operation with 9V block battery (independent of mains and PC)
- Alphanumeric display of the identified luminescent product
- USB port for connection to PC: Windows® program for further analysis
- Acoustical and optical information upon product detection
- **1 product can be saved**

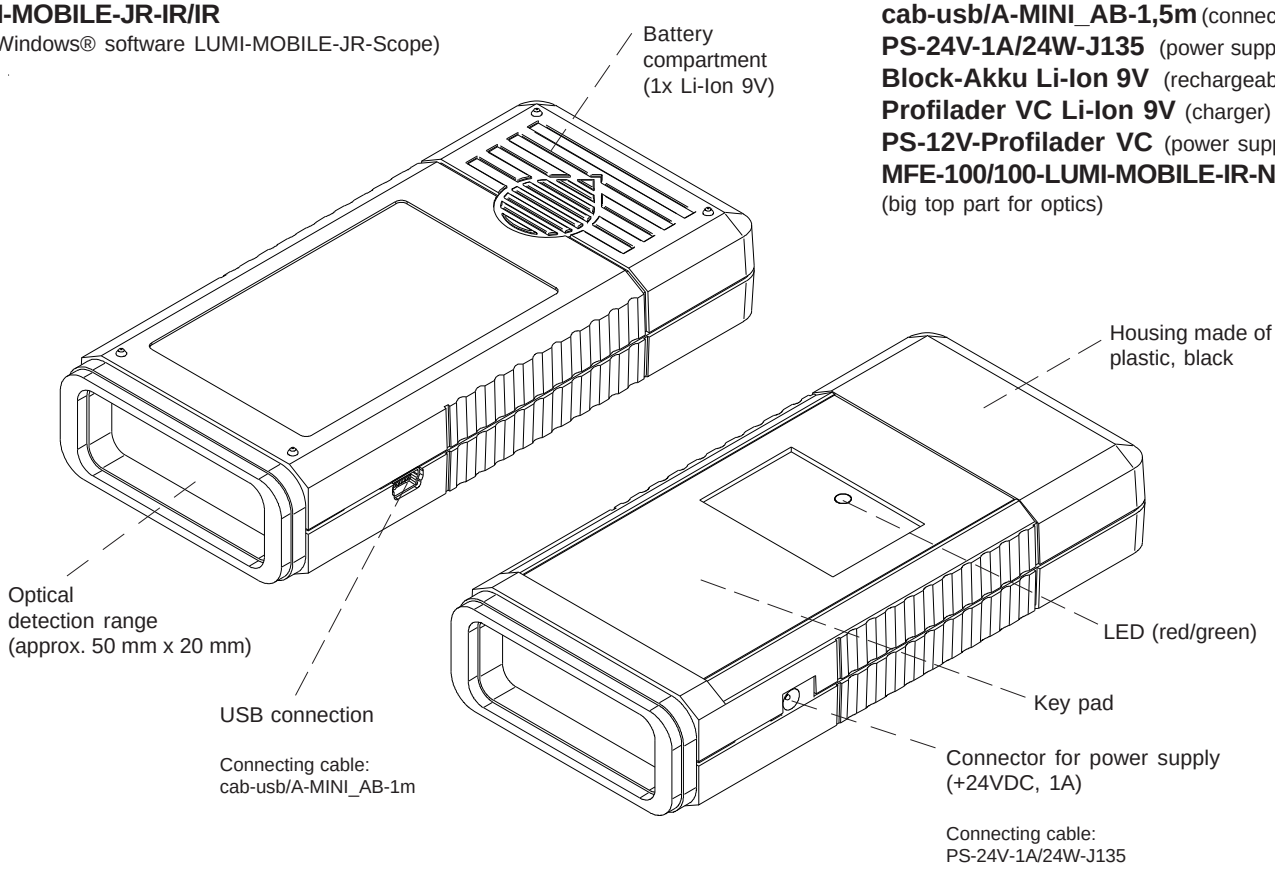
## Design

**Product name:**

**LUMI-MOBILE-JR-IR/IR**
(incl. Windows® software LUMI-MOBILE-JR-Scope)

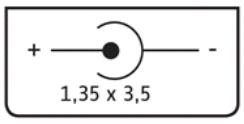
**Accessories:**

**cab-usb/A-MINI_AB-1,5m** (connecting cable)
**PS-24V-1A/24W-J135** (power supply)
**Block-Akku Li-Ion 9V** (rechargeable battery)
**Profilader VC Li-Ion 9V** (charger)
**PS-12V-Profilader VC** (power supply charger)
**MFE-100/100-LUMI-MOBILE-IR-NV**
(big top part for optics)



## Technical Data

| Model | LUMI-MOBILE-JR-IR/IR |
|---|---|
| Light source | IR-LEDs, λ typ. 940 nm |
| Reference distance | contacting, with optical fiber sensor head |
| Detection range | typ. 50 mm x 20 mm |
| Optical filter | daylight block filter |
| Voltage supply | operation with a battery or with power supply unit (+24VDC, regulated, 1A) |
| AC operation | pulsed |
| Enclosure rating | IP54 |
| Current consumption | typ. 200 mA |
| Interface | USB, parameterizable under Windows® |
| EMC test acc. to | DIN EN 60947-5-2 CE |
| Operating temp. range | 0°C ... +55°C |
| Storage temperature range | -20°C ... +85°C |
| Housing material | plastic, black |
| Housing dimensions | L x W x H approx. 126 mm x 60 mm x 26 mm |
| Product memory depth | 1 product |

| Model | Power Supply PS-24V-1A/24W-J135 |
|---|---|
| Secundary voltage | +24VDC regulated, 1A output current |
| Power supply capacity | 24W |
| Dimensions DC connector | L x W x H approx. 1.35 mm x 3.5 mm x 9 mm   |
| Note | When a power supply unit is connected it has preference over the battery. In this case the battery will not be used. If the power supply plug is inserted at the sensor, but the power supply unit is not connected to the mains supply, the sensor will not operate (the sensor electronic components get no power from the battery or from the power supply unit). |

## Features

The **LUMI-MOBILE-JR-IR/IR** sensor belongs to the **LUMI sensor family** for the optical detection and identification of so-called UP-Converting Phosphors (UCP) or DOWN-Converting Phosphors (DCP).

UCPs are rare earth particles of micrometer down to nanometre size that have the special property of using internal physical processes to convert low-energy photons (e.g. infrared light) into high-energy photons (visible light). Phosphorescence, i.e. the temporary storing and later releasing of excitation energy, is a second property of UCPs. When an UCP is exposed to pulsed excitation, the excitation state relaxes exponentially after the end of excitation under the emission of light. This time curve of the intensity is characteristic for the respective UCP. DCPs in part are the same materials, but in this case higher-energy photons are converted into lower-energy photons, which also happens with a time delay.

The **LUMI-MOBILE-JR-IR/IR** identifies UCPs and DCPs by way of the parameters of the exponential relaxation curve.
The UCP or DCP is excited by an impulse, and the relaxation behaviour is scanned/digitised over time. The recorded data are approximated by way of modelling. The model parameters "TAU" (time constant) and "INTENSITY" (start intensity) of the exponential curve are used to identify the respective sample.

The **LUMI-MOBILE-JR-IR/IR** is battery-powered and with its internal microprocessor operates independent of mains and PC.
As an option a supplied PC software can be used for further analysis. **LUMI-MOBILE-JR-IR/IR** sensors are operated by way of the membrane keypad at the housing front. Parameterization is not possible.

The setting of the **LUMI-MOBILE-JR-IR/IR** sensor is first defined with the **LUMI-MOBILE-LAB-IR/IR** system and is then saved in the sensor's non-volatile memory.

The sensors features an automatic outside light compensation function. To be able to respond more flexibly to different measurement situations, the outside light that occurs in a measurement in addition to the signal of the sample to be measured, is compensated by an automatic control function. The time that is necessary for outside light compensation depends on the parameterisation, on the ambient light, and on the start situation, and typically lies between 0 and 5 seconds. Measurements can only be performed when outside light compensation is finished.

## Measurement

**Performing a measurement:**

Connect the power supply unit or the battery, and turn the sensor on. During the boot process, the LED lights green.

Place the sensor on the object. Make sure that the attached aperture encloses the object or is flush with the object to prevent any influence of extraneous light that might reach the sensor optics from the outside. If possible, switch off any dynamic infrared sources (neon lamps, halogen spotlights, and bulbs in the direct vicinity). When using a fiber optic sensor type (FIO) best-possible shielding against extraneous light also must be ensured.

Wait until the sensor has completed its extraneous light offset and has fully charged the emitter pulse unit. During the extraneous light offset, the LED blinks red. Once ready, the LED switches off. Press the „ENTER“ key and wait until the scan process is finished. Make absolutely sure that the sensor is not tilted or moved during the measurement.

Acoustic signals:
The results of a measurement (positive/negative) also are indicated by way of acoustic buzzer signals:
POSITIVE: Two short high buzzer signals, NEGATIVE: On long low buzzer signal.

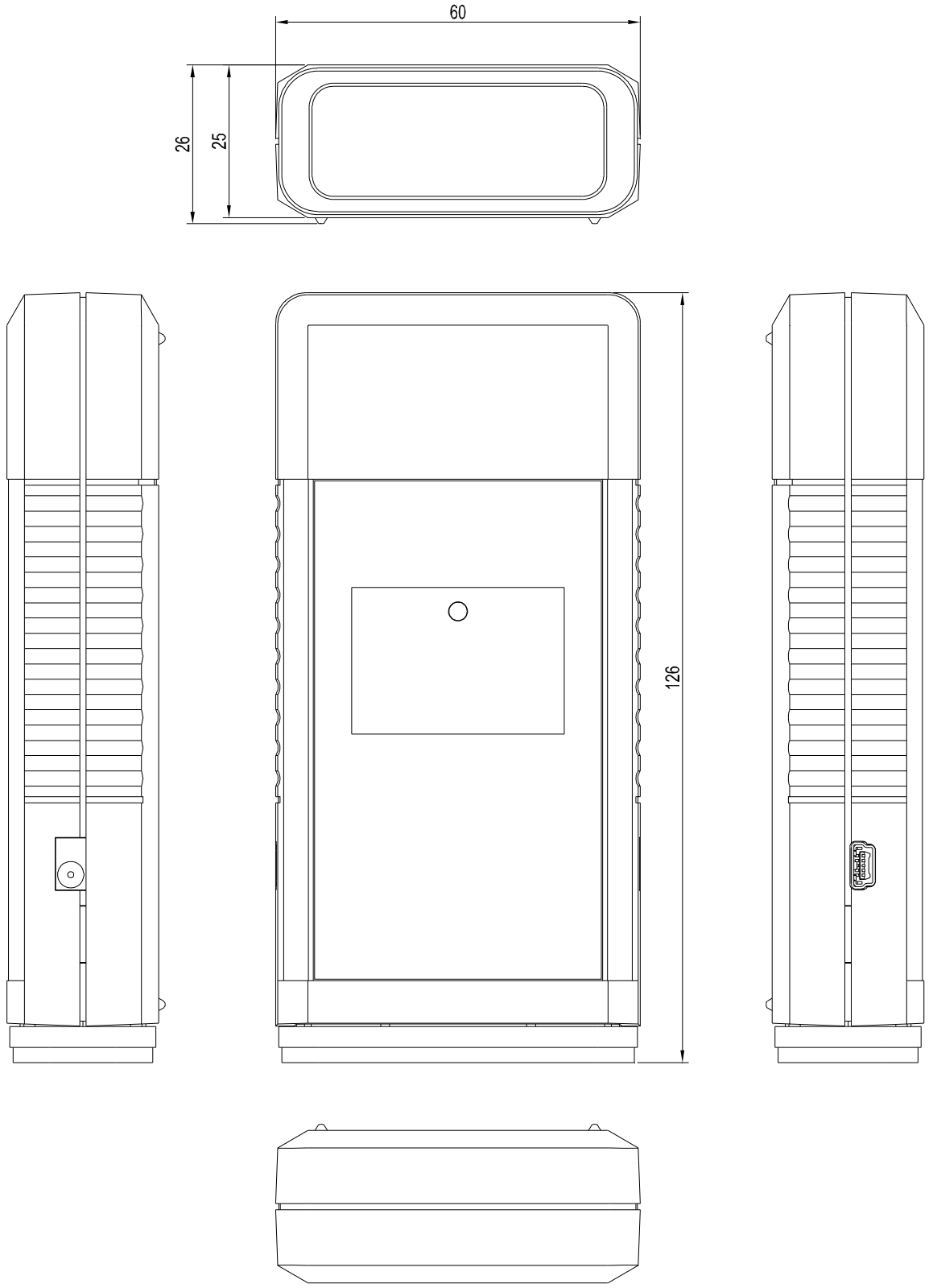
Optical informationen:
Via LED: POSITIVE: LED green, NEGATIVE: LED red.

## Product Change

**Product change with LUMI-MOBILE-JR-IR/IR:**

The Windows® PC software LUMI-MOBILE-JR-Scope can be used to read one new file (one new product).
The product dataset existing in the product memory of the sensor will be overwritten, and the new product will then be available in the product memory.

## Dimensions




All dimensions in mm

## Key Function

### Functions of the key pad:

The keys have a tactile switching point
that can be recognised by a soft "click".



Turns the sensor on / off.
To turn the sensor on (battery or power supply unit connected), press and hold the key until the LED lights green.To turn the sensor off, press and hold the key until shutdown is finished. During the shutdown the LED blinks red. As soon as the LED switches off the shutdown is finished.


Starts a measurement.
Press the key briefly and release it again. Make sure that during a measurement the sensor remains on the measurement object. A measurement only can be started when the sensor is in „IDLE“ state (which is shown on the display). In all other states pressing the ENTER key will have no effect.

Without function on case of LUMI-MOBILE-JR

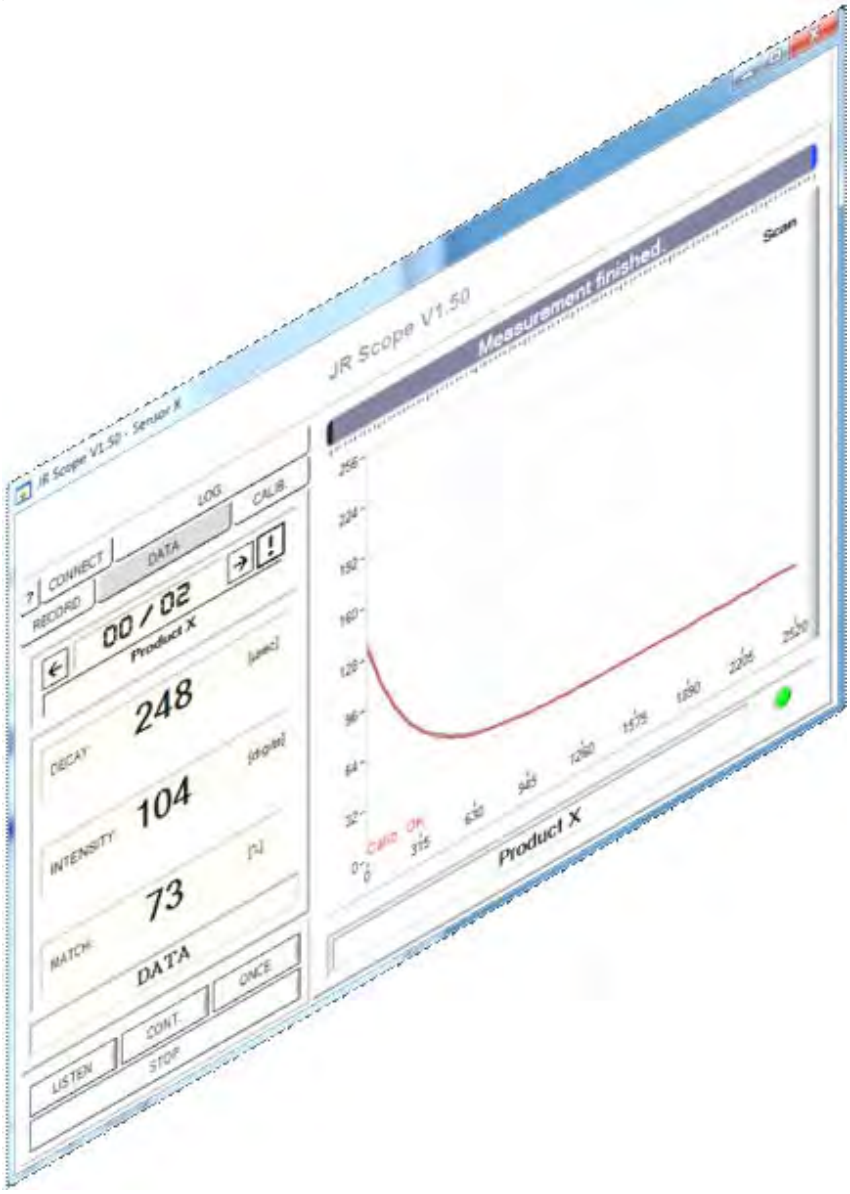
Without function on case of LUMI-MOBILE-JR

The sensor can be operated with a battery (typ Li-Ion 9V) or as an alternative with a power supply unit (+24V regulated DC voltage, 1A output current).

Info: When a power supply unit is connected it has preference over the battery. In this case the battery will not be used.
If the power supply plug is inserted at the sensor, but the power supply unit is not connected to the mains supply, the sensor will not operate (the sensor electronic components get no power from the battery or from the power supply unit).

## Display

**LED display (red/green LED) and PC screen display:**


The PC software can be used to process and analyse the measurement data. The signals and values of the measurement curves that are autarkically recorded by the sensor can be evaluated on the screen. A recorder function allows recording of measurements with the PC. Different views of the measurement data make it possible to focus on certain aspects of the measurement.

Apart from displaying measurement values, the download function for parameter files is the second main function of the PC software. These files contain the configuration data and the TEACH values for the products that should be identified.

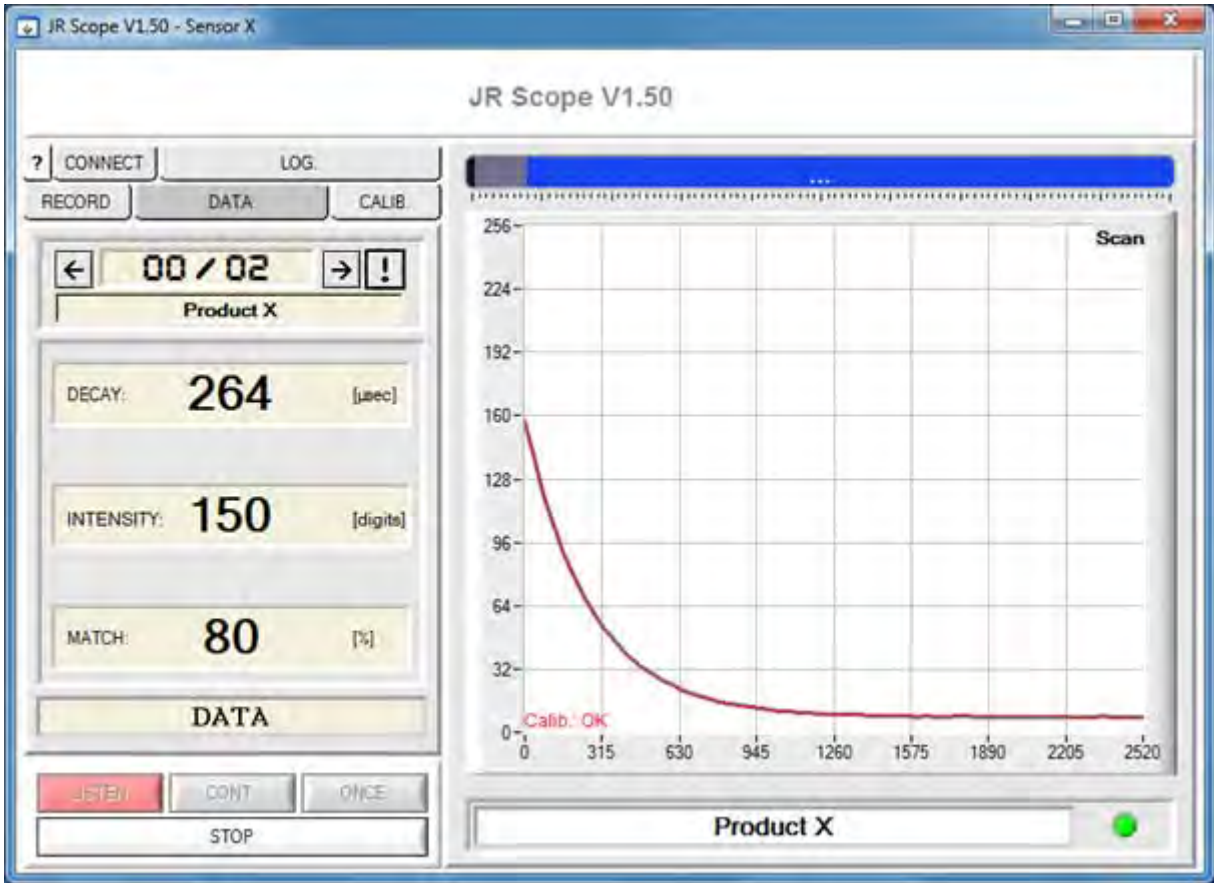
**ATTENTION: The generation of parameter files is a special feature of the LUMI-MOBILE-LAB sensor. Sensors of all expansion levels only can be configured by means of parameter files.**

## Windows® Software

### Functions of the Windows® PC software:

- Communication with the sensor through USB
- Download of configuration files to the sensor
- Calibration of the sensor
- Generation of configuration files **(only LAB expansion level)**
- Display of measurement values
- Display of signal curves
- Recording/ saving of measurement data on the PC
- Analysis of signal curves **(only LAB expansion level)**

### Windows® PC software user interface:



## Accessories

### Connecting cables:
(please order separately)

**cab-usb/A-MINI_AB-1,5m**
USB connecting cables

**PS-24V-1A/24W-J135**
Power supply, without charging function

### Top part for optics (spacer):
(please order separately)

**MFE-100/100-LUMI-MOBILE-IR-NV**
Big top part for optics (spacer)

### Battery and charger:
(please order separately)

**Block-Akku Li-Ion 9V**
Rechargeable battery Li-Ion 9V

**Profilader VC Li-Ion 9V**
Charger for 2 pcs. „Block-Akku Li-Ion 9V“ (battery)

**PS-12V-Profilader VC**
Power supply for charger „Profilader VC Li-Ion 9V“

## LUMI-MOBILE Cases

**LUMI-MOBILE-JR-IR/IR-CASE-3**
Sensor case model 3 (with MFE-100/100-LUMI-MOBILE-IR-NV)

Case composed of:
1x **LUMI-MOBILE-JR-IR/IR**
incl. **software LUMI-MOBILE-JR-Scope**
(hand-held device with display, for battery operation)
1x **MFE-100/100-LUMI-MOBILE-IR-NV** (big top parts for optics)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1,25A/30W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

**LUMI-MOBILE-JR-IR/IR-CASE-4**
Sensor case model 4 (without MFE-100/100-LUMI-MOBILE-IR-NV)

Case composed of:
1x **LUMI-MOBILE-JR-IR/IR**
incl. **software LUMI-MOBILE-JR-Scope**
(hand-held device with display, for battery operation)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1,25A/30W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

# LUMI-MOBILE Series

## LUMI-MOBILE-FIO-QC-IR/IR

**Hand-held device for battery operation (fiber optics version)**


- Measurement of the relaxation behaviour of luminescent products such as "UP-Converting Phosphors" or "DOWN-Converters"
- Uses IR-LEDs (laser class 1)
- Automatic constant light / outside light compensation
- Wide detection range
- Wide dynamic range (70 dB) available
- Battery operation with 9V block battery (independent of mains and PC)
- Alphanumeric display of the identified luminescent product
- USB port for connection to PC: Windows® program for further analysis
- Acoustical and optical information upon product detection
- **19 products can be saved**

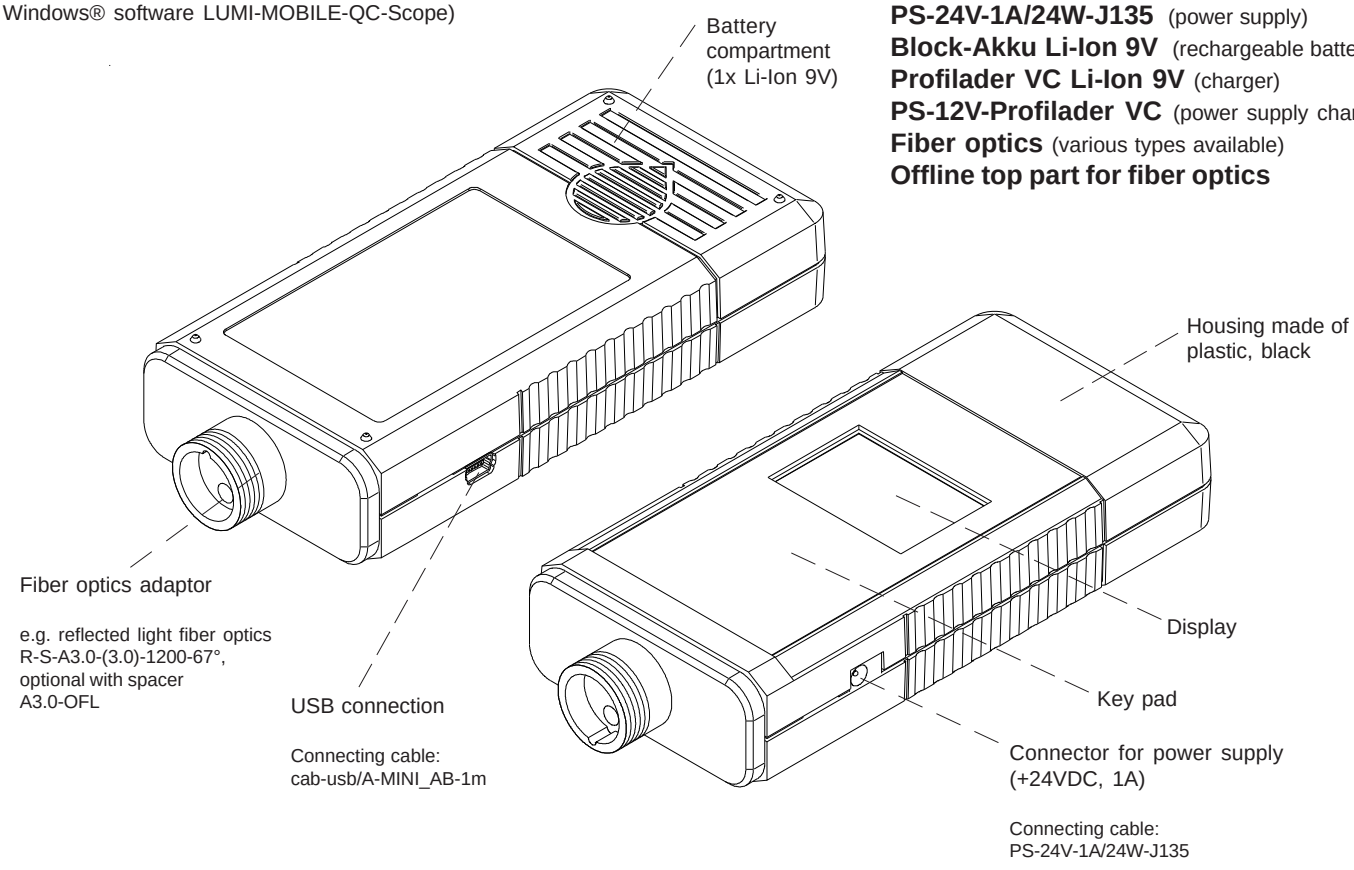
## Design

**Product name:**

**LUMI-MOBILE-FIO-QC-IR/IR**
(incl. Windows® software LUMI-MOBILE-QC-Scope)

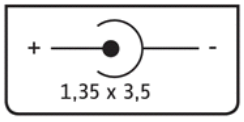
**Accessories:** (cf. p. 9)

**cab-usb/A-MINI_AB-1,5m** (connecting cable)
**PS-24V-1A/24W-J135** (power supply)
**Block-Akku Li-Ion 9V** (rechargeable battery)
**Profilader VC Li-Ion 9V** (charger)
**PS-12V-Profilader VC** (power supply charger)
**Fiber optics** (various types available)
**Offline top part for fiber optics**



## Technical Data

| Model | LUMI-MOBILE-FIO-QC-IR/IR | |
|---|---|---|
| Light source | IR-LEDs, λ typ. 940 nm | |
| Reference distance | contacting, with optical fiber sensor head | |
| Detection range | depends on the fiber optics used | |
| Suitable fiber optics | total length 600 mm:<br>R-S-A3.0-(3.0)-600-67° (fiber bundle Ø 3 mm)<br>R-S-R1.1-(3x0.5)-600-67° (fiber gap 3 mm x 0.5 mm)<br>R-S-R2.1-(6x1)-600-67° (fiber gap 6 mm x 1 mm) | total length 1200 mm:<br>R-S-A3.0-(3.0)-1200-67° (fiber bundle Ø 3 mm)<br>R-S-R1.1-(3x0.5)-1200-67° (fiber gap 3mm x 0.5 mm)<br>R-S-R2.1-(6x1)-1200-67° (fiber gap 6 mm x 1 mm) |
| Optical filter | daylight block filter | |
| Voltage supply | operation with a battery or with power supply unit (+24VDC, 1A) | |
| AC operation | pulsed | |
| Enclosure rating | IP54 | |
| Current consumption | typ. 200 mA | |
| Interface | USB, parameterizable under Windows® | |
| EMC test acc. to | DIN EN 60947-5-2 CE | |
| Operating temp. range | 0°C ... +55°C | |
| Storage temperature range | -20°C ... +85°C | |
| Housing material | plastic, black | |
| Housing dimensions | L x W x H approx. 136.1 mm x 60 mm x 26 mm | |
| Product memory depth | up to 19 products | |

| Model | Power Supply PS-24V-1A/24W-J135 |
|---|---|
| Secundary voltage | +24VDC regulated, 1A output current |
| Power supply capacity | 24W |
| Dimensions DC connector | L x W x H approx. 1.35 mm x 3.5 mm x 9 mm   |
| Note | When a power supply unit is connected it has preference over the battery. In this case the battery will not be used. If the power supply plug is inserted at the sensor, but the power supply unit is not connected to the mains supply, the sensor will not operate (the sensor electronic components get no power from the battery or from the power supply unit). |

## Features

The **LUMI-MOBILE-FIO-QC-IR/IR** sensor belongs to the **LUMI sensor family** for the optical detection and identification of so-called UP-Converting Phosphors (UCP) or DOWN-Converting Phosphors (DCP).

UCPs are rare earth particles of micrometer down to nanometre size that have the special property of using internal physical processes to convert low-energy photons (e.g. infrared light) into high-energy photons (visible light). Phosphorescence, i.e. the temporary storing and later releasing of excitation energy, is a second property of UCPs. When an UCP is exposed to pulsed excitation, the excitation state relaxes exponentially after the end of excitation under the emission of light. This time curve of the intensity is characteristic for the respective UCP. DCPs in part are the same materials, but in this case higher-energy photons are converted into lower-energy photons, which also happens with a time delay.

The **LUMI-MOBILE-FIO-QC-IR/IR** identifies UCPs and DCPs by way of the parameters of the exponential relaxation curve.
The UCP or DCP is excited by an impulse, and the relaxation behaviour is scanned/digitised over time. The recorded data are approximated by way of modelling. The model parameters "TAU" (time constant) and "INTENSITY" (start intensity) of the exponential curve are used to identify the respective sample.

The **LUMI-MOBILE-FIO-QC-IR/IR** is battery-powered and with its internal microprocessor operates independent of mains and PC. As an option a supplied PC software can be used for further analysis. **LUMI-MOBILE-FIO-QC-IR/IR** sensors are operated by way of the membrane keypad at the housing front. Parameterization is not possible.

The setting of the **LUMI-MOBILE-FIO-QC-IR/IR** sensor is first defined with the **LUMI-MOBILE-FIO-LAB-IR/IR** system and is then saved in the sensor's non-volatile memory.

The sensors features an automatic outside light compensation function. To be able to respond more flexibly to different measurement situations, the outside light that occurs in a measurement in addition to the signal of the sample to be measured, is compensated by an automatic control function. The time that is necessary for outside light compensation depends on the parameterisation, on the ambient light, and on the start situation, and typically lies between 0 and 5 seconds. Measurements can only be performed when outside light compensation is finished.

## Measurement

**Performing a measurement:**

Connect the power supply unit or the battery, and turn the sensor on.

Place the sensor on the object. Make sure that the attached aperture encloses the object or is flush with the object to prevent any influence of extraneous light that might reach the sensor optics from the outside. If possible, switch off any dynamic infrared sources (neon lamps, halogen spotlights, and bulbs in the direct vicinity). When using a fiber optic sensor type (FIO) best-possible shielding against extraneous light also must be ensured.

Wait until the sensor has completed its extraneous light offset and has fully charged the emitter pulse unit. When the sensor is ready it displays „OK“. Press the „ENTER“ key and wait until the scan process is finished. Make absolutely sure that the sensor is not tilted or moved during the measurement.

Acoustic signals:
The results of a measurement (positive/negative) also are indicated by way of acoustic buzzer signals:
POSITIVE: Two short high buzzer signals, NEGATIVE: One long low buzzer signal.

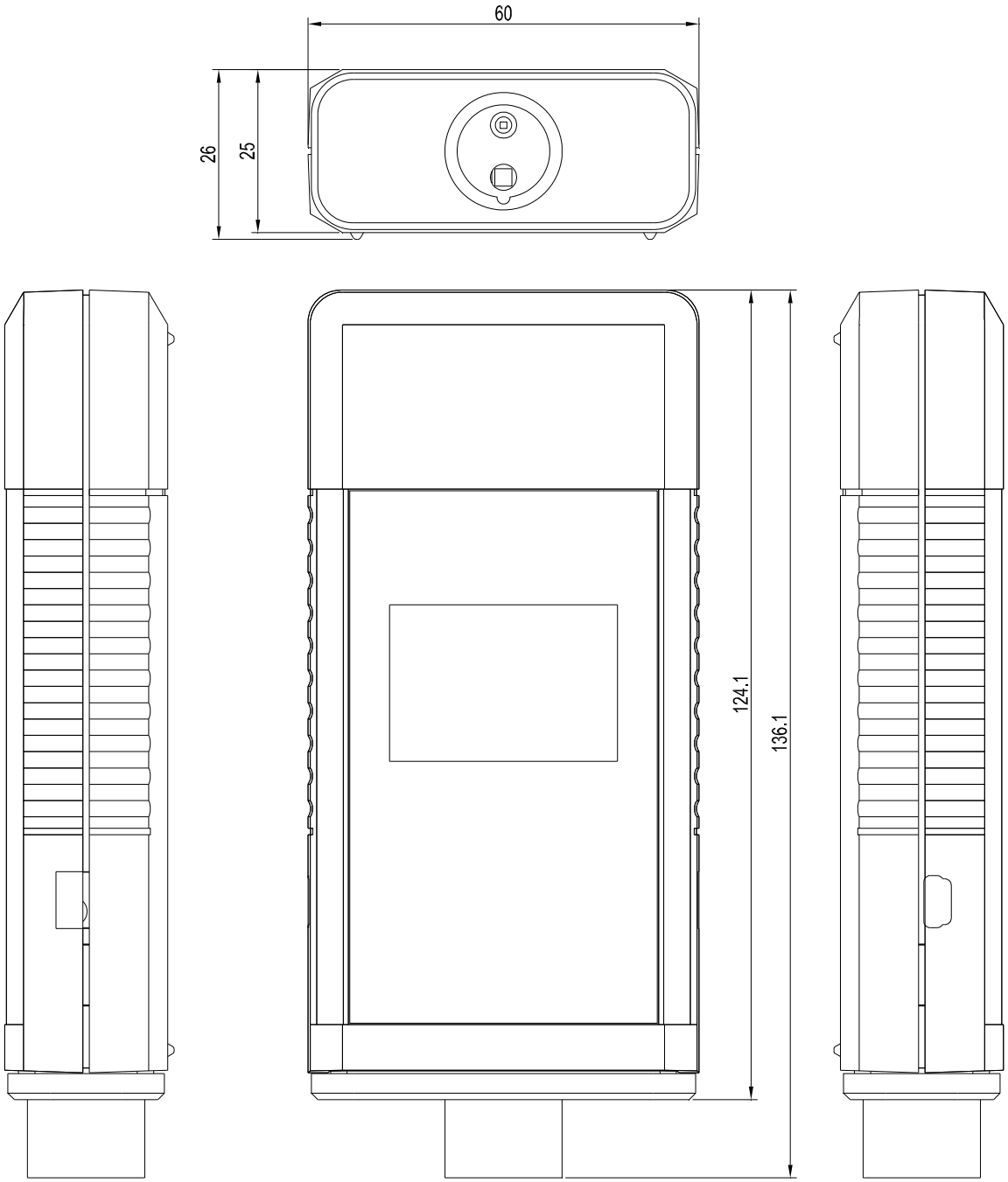
Optical informationen:
Via display: POSITIVE: product is displayed, NEGATIVE: failure information.

## Product Change

**Product change with LUMI-MOBILE-FIO-QC-IR/IR:**

The Windows® PC software LUMI-MOBILE-QC-Scope can be used to read a new file (a file maximally contains 19 products). The product dataset existing in the product memory of the sensor will be overwritten, and up to 19 new products will then be available in the product memory.

## Dimensions




All dimensions in mm

## Key Function

### Functions of the key pad:

The keys have a tactile switching point
that can be recognised by a soft "click".



Turns the sensor on / off.
To turn the sensor on (battery or power supply unit connected), press and hold the key until the boot screen is displayed.To turn the sensor off, press and hold the key until shutdown is finished.


Starts a measurement.
Press the key briefly and release it again. Make sure that during a measurement the sensor remains on the measurement object. A measurement only can be started when the sensor is in „IDLE“ state (which is shown on the display). In all other states pressing the ENTER key will have no effect.

Selects one of (up to) 19 products out of the product memory.
Changes the parameter set / the product to be identified from the current one to the next higher one.
When the last active parameter set is reached, the sensor changes back to the first one.

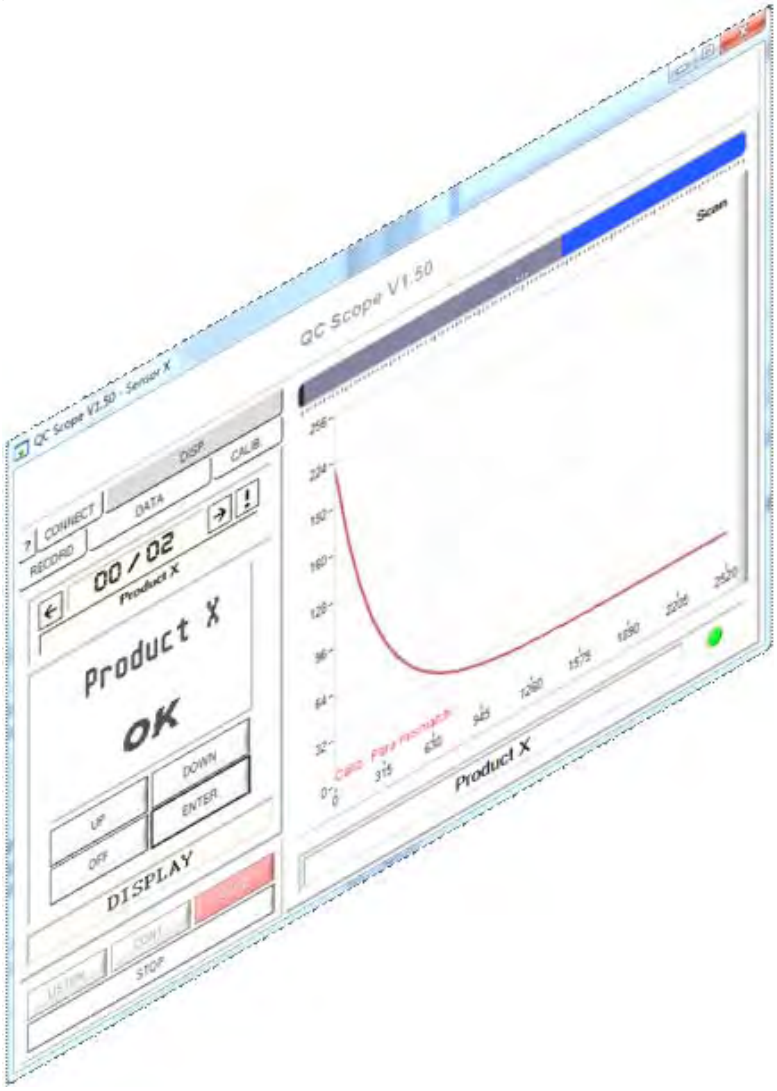
Selects one of (up to) 19 products out of the product memory.
Changes the parameter set / the product to be identified from the current one to the next lower one.
When the first active parameter set is reached, the sensor changes back to the last one.

The sensor can be operated with a battery (typ Li-Ion 9V) or as an alternative with a power supply unit (+24V regulated DC voltage, 1A output current).

Info: When a power supply unit is connected it has preference over the battery. In this case the battery will not be used.
If the power supply plug is inserted at the sensor, but the power supply unit is not connected to the mains supply, the sensor will not operate (the sensor electronic components get no power from the battery or from the power supply unit).

## Display

**Graphic display and PC screen display:**


The high-contrast graphic display of the sensor shows the measurement results alphanumerically or numerically, depending on sensor type and settings. In combination with an acoustic signal the measurement result thus is clearly communicated.

The PC software can be used to process and analyse the measurement data. The signals and values of the measurement curves that are autarkically recorded by the sensor can be evaluated on the screen. A recorder function allows recording of measurements with the PC. Different views of the measurement data make it possible to focus on certain aspects of the measurement.

Apart from displaying measurement values, the download function for parameter files is the second main function of the PC software. These files contain the configuration data and the TEACH values for the products that should be identified.

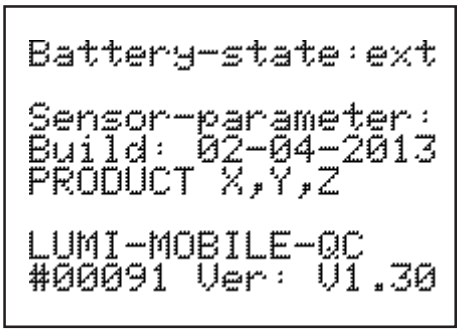
**ATTENTION: The generation of parameter files is a special feature of the LUMI-MOBILE-LAB sensor. Sensors of all expansion levels only can be configured by means of parameter files.**

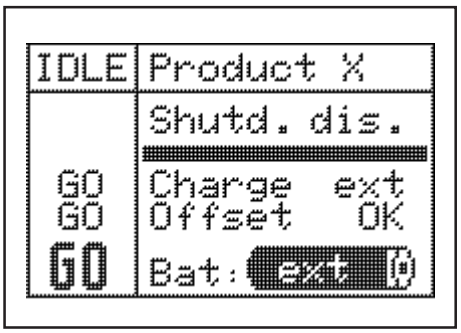
## Display

**Functions of the display:**

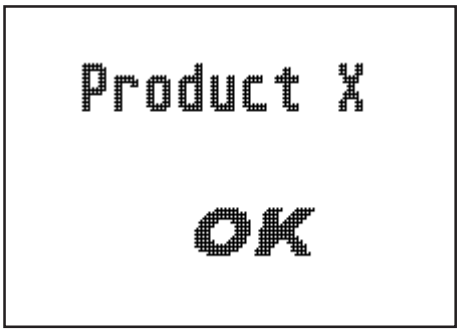
- Display of product designation
- Display of identification (OK, nOK)
- Listing of cause in case of negative identification
- Numeric display of measurement values (not with all versions)
- Display of battery charge state
- Status of automatic outside light compensation

**IDLE**




**Product detected**




**Product not detected**



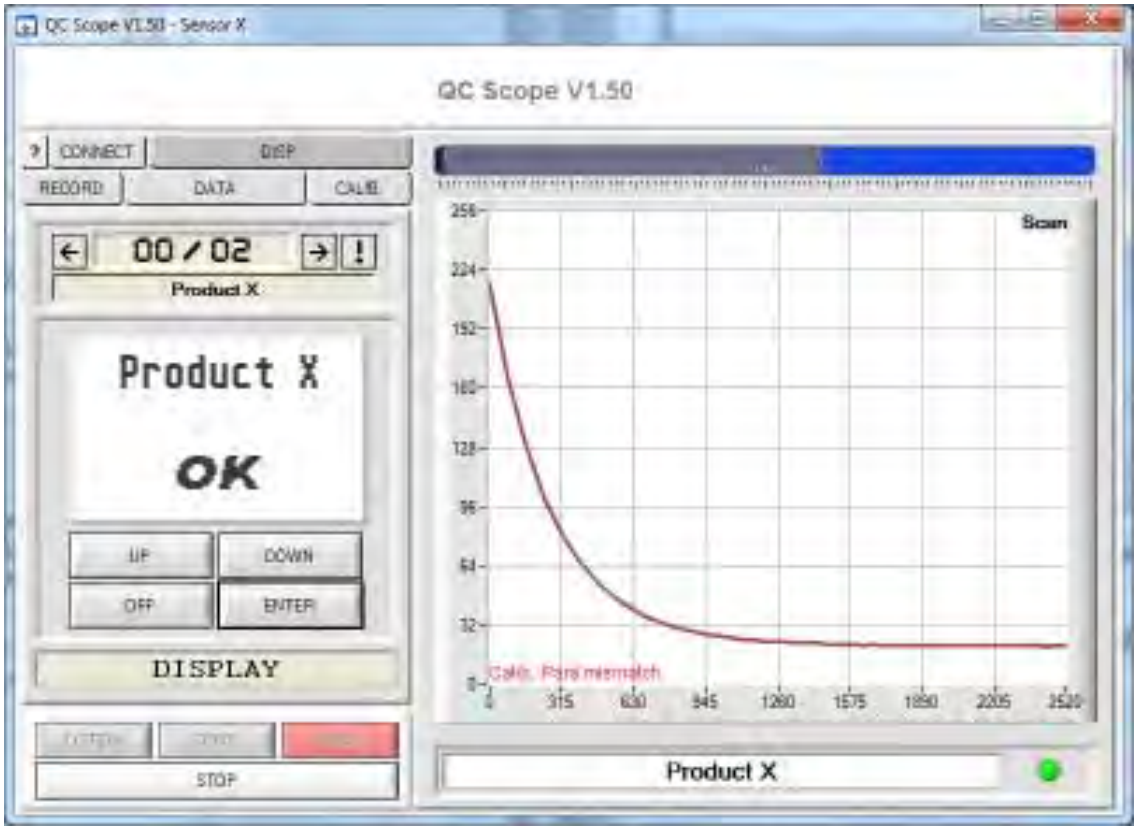
## Windows® Software

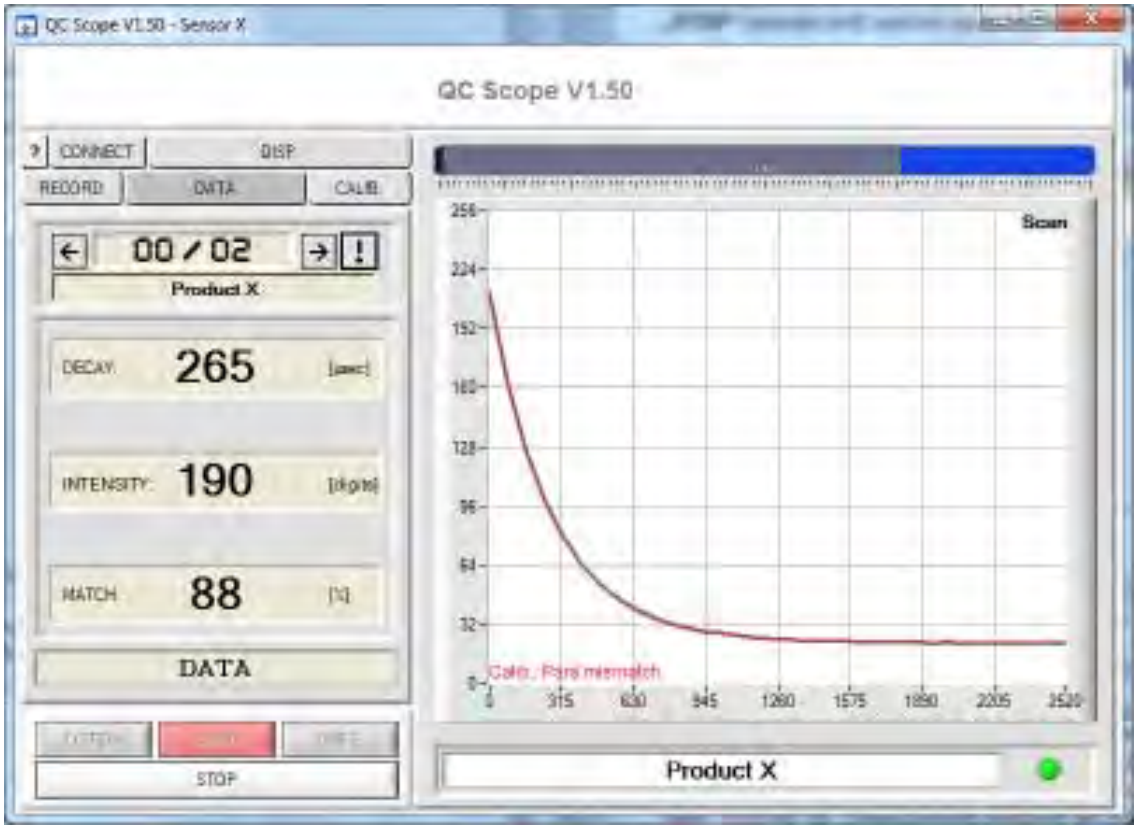
**Functions of the Windows® PC software:**

- Communication with the sensor through USB
- Download of configuration files to the sensor
- Calibration of the sensor
- Generation of configuration files **(only LAB expansion level)**
- Display of measurement values
- Representation of the display
- Display of signal curves
- Recording/ saving of measurement data on the PC
- Analysis of signal curves **(only LAB expansion level)**

## Windows® Software

**Windows® PC software user interface:**



## Accessories

### Connecting cables:
(please order separately)

**cab-usb/A-MINI_AB-1,5m**
USB connecting cables

**PS-24V-1A/24W-J135**
Power supply, without charging function

### Battery and charger:
(please order separately)

**Block-Akku Li-Ion 9V**
Rechargeable battery Li-Ion 9V

**Profilader VC Li-Ion 9V**
Charger for 2 pcs. „Block-Akku Li-Ion 9V“ (battery)

**PS-12V-Profilader VC**
Power supply for charger „Profilader VC Li-Ion 9V“

### Reflected light fiber optics
(please order separately)

**R-S-A3.0-(3.0)-600-67°** (length 600 mm)
**R-S-A3.0-(3.0)-1200-67°** (length 1200 mm)

**R-S-R1.1-(3x0.5)-600-67°** (length 600 mm)
**R-S-R1.1-(3x0.5)-1200-67°** (length 1200 mm)

**R-S-R2.1-(6x1)-600-67°** (length 600 mm)
**R-S-R2.1-(6x1)-1200-67°** (length 1200 mm)

### Offline top part (spacer) for reflected light fiber optics
(please order separately)
**A3.0-OFL-SHIFT** (offline top part for fiber optics with sensor head type A3.0)

## LUMI-MOBILE Case

**LUMI-MOBILE-FIO-QC-IR/IR-CASE-1b**
Sensor case model 1b (fiber optics length 600 mm)

Case composed of:
1x **LUMI-MOBILE-FIO-QC-IR/IR**
incl. **software LUMI-MOBILE-QC-Scope**
(hand-held device with display, for battery operation)
1x **R-S-A3.0-(3.0)-600-67°** (reflected light fiber optics, type A3.0)
1x **A3.0-OFL-SHIFT** (spacer for fiber optics type A3.0)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1A/24W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

**LUMI-MOBILE-FIO-QC-IR/IR-CASE-1c**
Sensor case model 1c (fiber optics length 1200 mm)

Case composed of:
1x **LUMI-MOBILE-FIO-QC-IR/IR**
incl. **software LUMI-MOBILE-QC-Scope**
(hand-held device with display, for battery operation)
1x **R-S-A3.0-(3.0)-1200-67°** (reflected light fiber optics, type A3.0)
1x **A3.0-OFL-SHIFT** (spacer for fiber optics type A3.0)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1A/24W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

# LUMI-MOBILE Series

## LUMI-MOBILE-FIO-PT-IR/IR

**Hand-held device for battery operation (fiber optics version)**


- Measurement of the relaxation behaviour of luminescent products such as "UP-Converting Phosphors" or "DOWN-Converters"
- Uses IR-LEDs (laser class 1)
- Automatic constant light / outside light compensation
- Wide detection range
- Wide dynamic range (70 dB) available
- Battery operation with 9V block battery (independent of mains and PC)
- Alphanumeric display of the identified luminescent product
- USB port for connection to PC: Windows® program for further analysis
- Acoustical and optical information upon product detection
- **1 product can be saved**

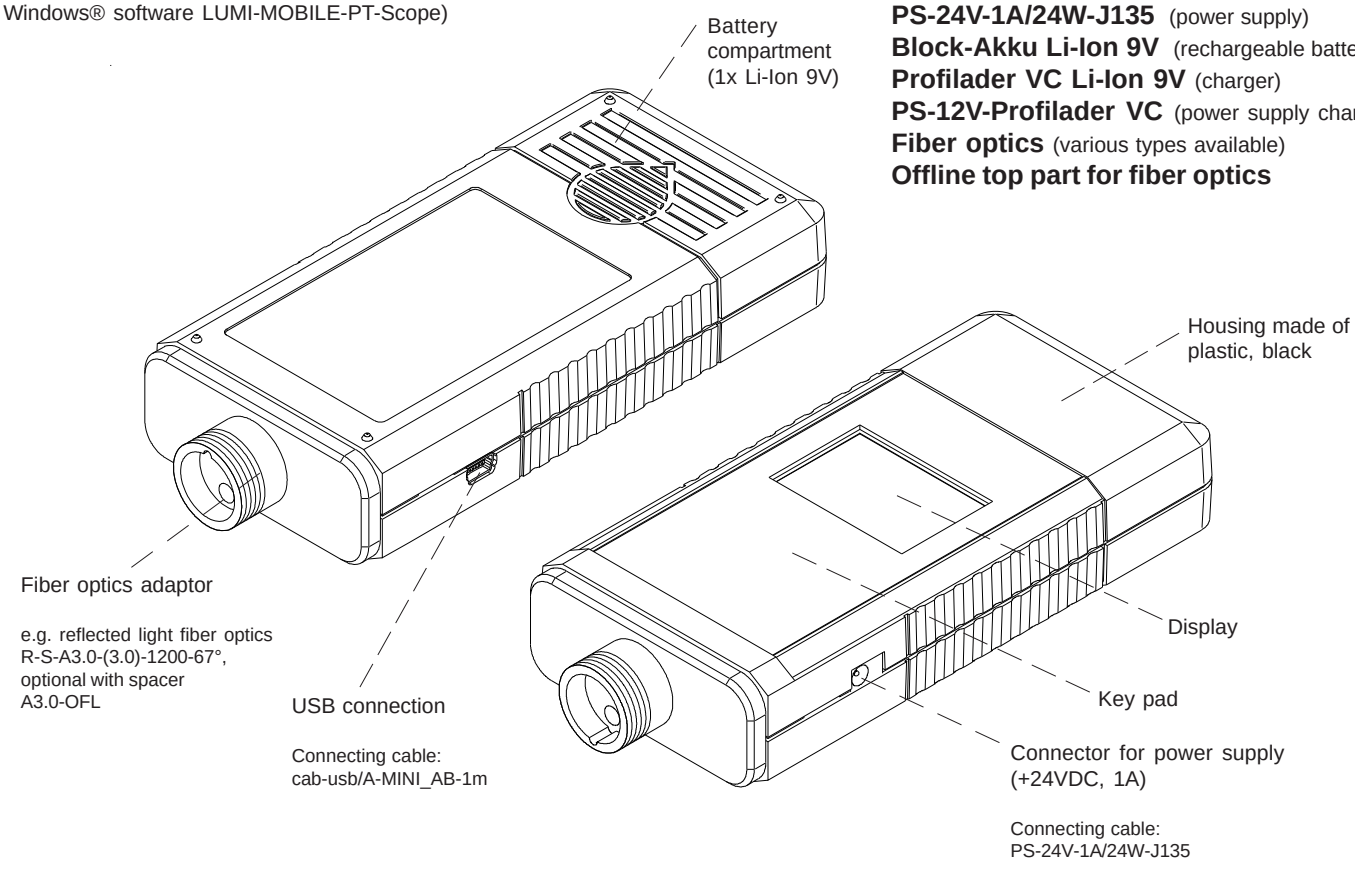
## Design

**Product name:**

**LUMI-MOBILE-FIO-PT-IR/IR**
(incl. Windows® software LUMI-MOBILE-PT-Scope)

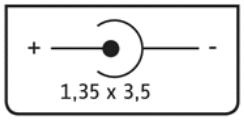
**Accessories:** (cf. p. 9)

**cab-usb/A-MINI_AB-1,5m** (connecting cable)
**PS-24V-1A/24W-J135** (power supply)
**Block-Akku Li-Ion 9V** (rechargeable battery)
**Profilader VC Li-Ion 9V** (charger)
**PS-12V-Profilader VC** (power supply charger)
**Fiber optics** (various types available)
**Offline top part for fiber optics**



## Technical Data

| Model | LUMI-MOBILE-FIO-PT-IR/IR | |
|---|---|---|
| Light source | IR-LEDs, λ typ. 940 nm | |
| Reference distance | contacting, with optical fiber sensor head | |
| Detection range | depends on the fiber optics used | |
| Suitable fiber optics | total length 600 mm:<br>R-S-A3.0-(3.0)-600-67° (fiber bundle Ø 3 mm)<br>R-S-R1.1-(3x0.5)-600-67° (fiber gap 3 mm x 0.5 mm)<br>R-S-R2.1-(6x1)-600-67° (fiber gap 6 mm x 1 mm) | total length 1200 mm:<br>R-S-A3.0-(3.0)-1200-67° (fiber bundle Ø 3 mm)<br>R-S-R1.1-(3x0.5)-1200-67° (fiber gap 3mm x 0.5 mm)<br>R-S-R2.1-(6x1)-1200-67° (fiber gap 6 mm x 1 mm) |
| Optical filter | daylight block filter | |
| Voltage supply | operation with a battery or with power supply unit (+24VDC, regulated, 1A) | |
| AC operation | pulsed | |
| Enclosure rating | IP54 | |
| Current consumption | typ. 200 mA | |
| Interface | USB, parameterizable under Windows® | |
| EMC test acc. to | DIN EN 60947-5-2 CE | |
| Operating temp. range | 0°C ... +55°C | |
| Storage temperature range | -20°C ... +85°C | |
| Housing material | plastic, black | |
| Housing dimensions | L x W x H approx. 136.1 mm x 60 mm x 26 mm | |
| Product memory depth | 1 product | |

| Model | Power Supply PS-24V-1A/24W-J135 |
|---|---|
| Secundary voltage | +24VDC regulated, 1A output current |
| Power supply capacity | 24W |
| Dimensions DC connector | L x W x H approx. 1.35 mm x 3.5 mm x 9 mm   |
| Note | When a power supply unit is connected it has preference over the battery. In this case the battery will not be used. If the power supply plug is inserted at the sensor, but the power supply unit is not connected to the mains supply, the sensor will not operate (the sensor electronic components get no power from the battery or from the power supply unit). |

## Features

The **LUMI-MOBILE-FIO-PT-IR/IR** sensor belongs to the **LUMI sensor family** for the optical detection and identification of so-called UP-Converting Phosphors (UCP) or DOWN-Converting Phosphors (DCP).

UCPs are rare earth particles of micrometer down to nanometre size that have the special property of using internal physical processes to convert low-energy photons (e.g. infrared light) into high-energy photons (visible light). Phosphorescence, i.e. the temporary storing and later releasing of excitation energy, is a second property of UCPs. When an UCP is exposed to pulsed excitation, the excitation state relaxes exponentially after the end of excitation under the emission of light. This time curve of the intensity is characteristic for the respective UCP. DCPs in part are the same materials, but in this case higher-energy photons are converted into lower-energy photons, which also happens with a time delay.

The **LUMI-MOBILE-FIO-PT-IR/IR** identifies UCPs and DCPs by way of the parameters of the exponential relaxation curve.
The UCP or DCP is excited by an impulse, and the relaxation behaviour is scanned/digitised over time. The recorded data are approximated by way of modelling. The model parameters "TAU" (time constant) and "INTENSITY" (start intensity) of the exponential curve are used to identify the respective sample.

The **LUMI-MOBILE-FIO-PT-IR/IR** is battery-powered and with its internal microprocessor operates independent of mains and PC. As an option a supplied PC software can be used for further analysis. **LUMI-MOBILE-FIO-PT-IR/IR** sensors are operated by way of the membrane keypad at the housing front. Parameterization is not possible.

The setting of the **LUMI-MOBILE-FIO-PT-IR/IR** sensor is first defined with the **LUMI-MOBILE-FIO-LAB-IR/IR** system and is then saved in the sensor's non-volatile memory.

The sensors features an automatic outside light compensation function. To be able to respond more flexibly to different measurement situations, the outside light that occurs in a measurement in addition to the signal of the sample to be measured, is compensated by an automatic control function. The time that is necessary for outside light compensation depends on the parameterisation, on the ambient light, and on the start situation, and typically lies between 0 and 5 seconds. Measurements can only be performed when outside light compensation is finished.

## Measurement

**Performing a measurement:**

Connect the power supply unit or the battery, and turn the sensor on.

Place the sensor on the object. Make sure that the attached aperture encloses the object or is flush with the object to prevent any influence of extraneous light that might reach the sensor optics from the outside. If possible, switch off any dynamic infrared sources (neon lamps, halogen spotlights, and bulbs in the direct vicinity). When using a fiber optic sensor type (FIO) best-possible shielding against extraneous light also must be ensured.

Wait until the sensor has completed its extraneous light offset and has fully charged the emitter pulse unit. When the sensor is ready it displays „OK“. Press the „ENTER“ key and wait until the scan process is finished. Make absolutely sure that the sensor is not tilted or moved during the measurement.

Acoustic signals:
The results of a measurement (positive/negative) also are indicated by way of acoustic buzzer signals:
POSITIVE: Two short high buzzer signals, NEGATIVE: One long low buzzer signal.

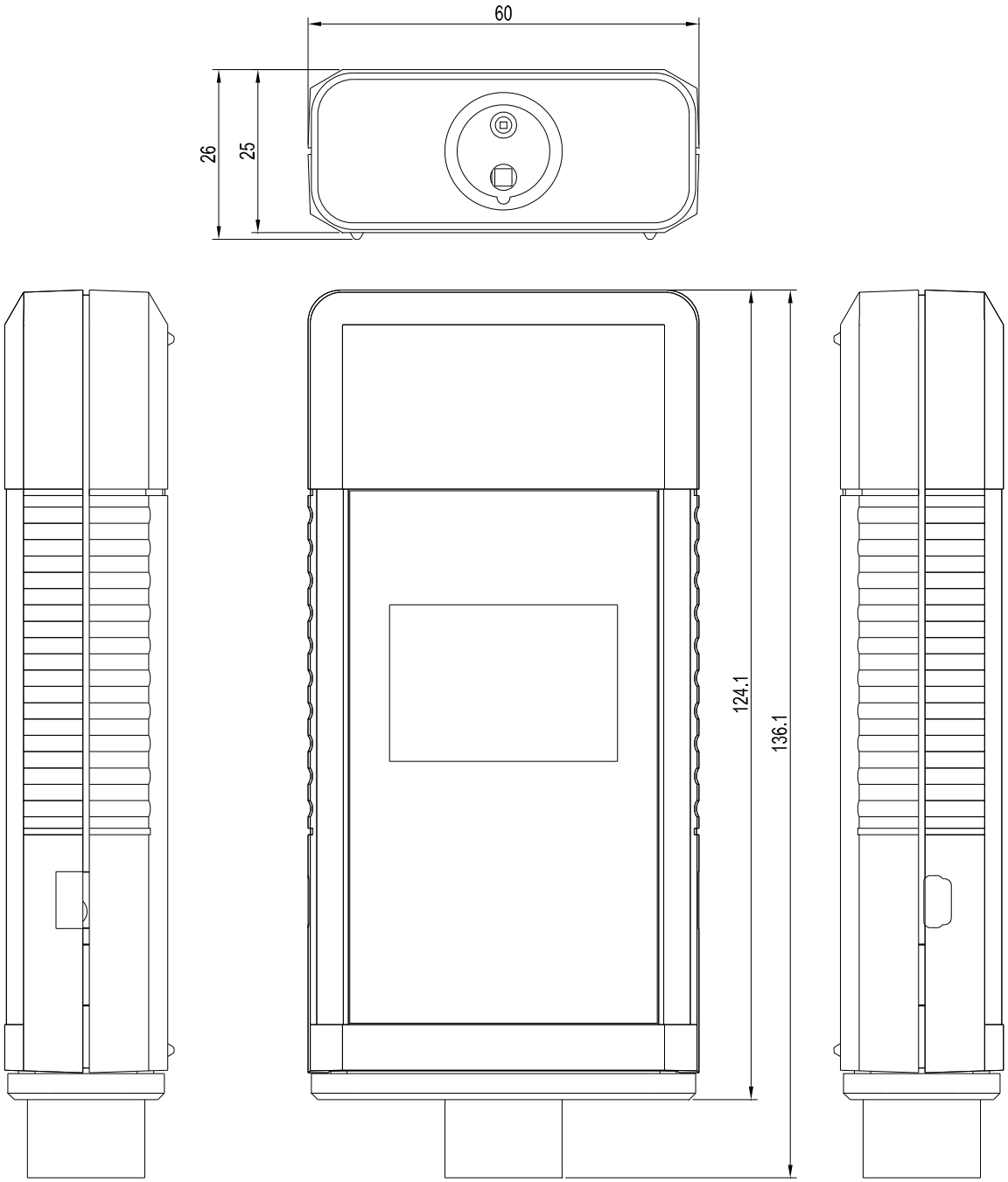
Optical informationen:
Via display: POSITIVE: product is displayed, NEGATIVE: failure information.

## Product Change

**Product change with LUMI-MOBILE-FIO-PT-IR/IR:**

The Windows® PC software LUMI-MOBILE-PT-Scope can be used to read one new file (one new product).
The product dataset existing in the product memory of the sensor will be overwritten, and the new product will then be available in the product memory.

## Dimensions




All dimensions in mm

## Key Function

### Functions of the key pad:

The keys have a tactile switching point that can be recognised by a soft "click".



Turns the sensor on / off.
To turn the sensor on (battery or power supply unit connected), press and hold the key until the boot screen is displayed.To turn the sensor off, press and hold the key until shutdown is finished.


Starts a measurement.
Press the key briefly and release it again. Make sure that during a measurement the sensor remains on the measurement object. A measurement only can be started when the sensor is in „IDLE“ state (which is shown on the display). In all other states pressing the ENTER key will have no effect.

Without function on case of LUMI-MOBILE-FIO-PT

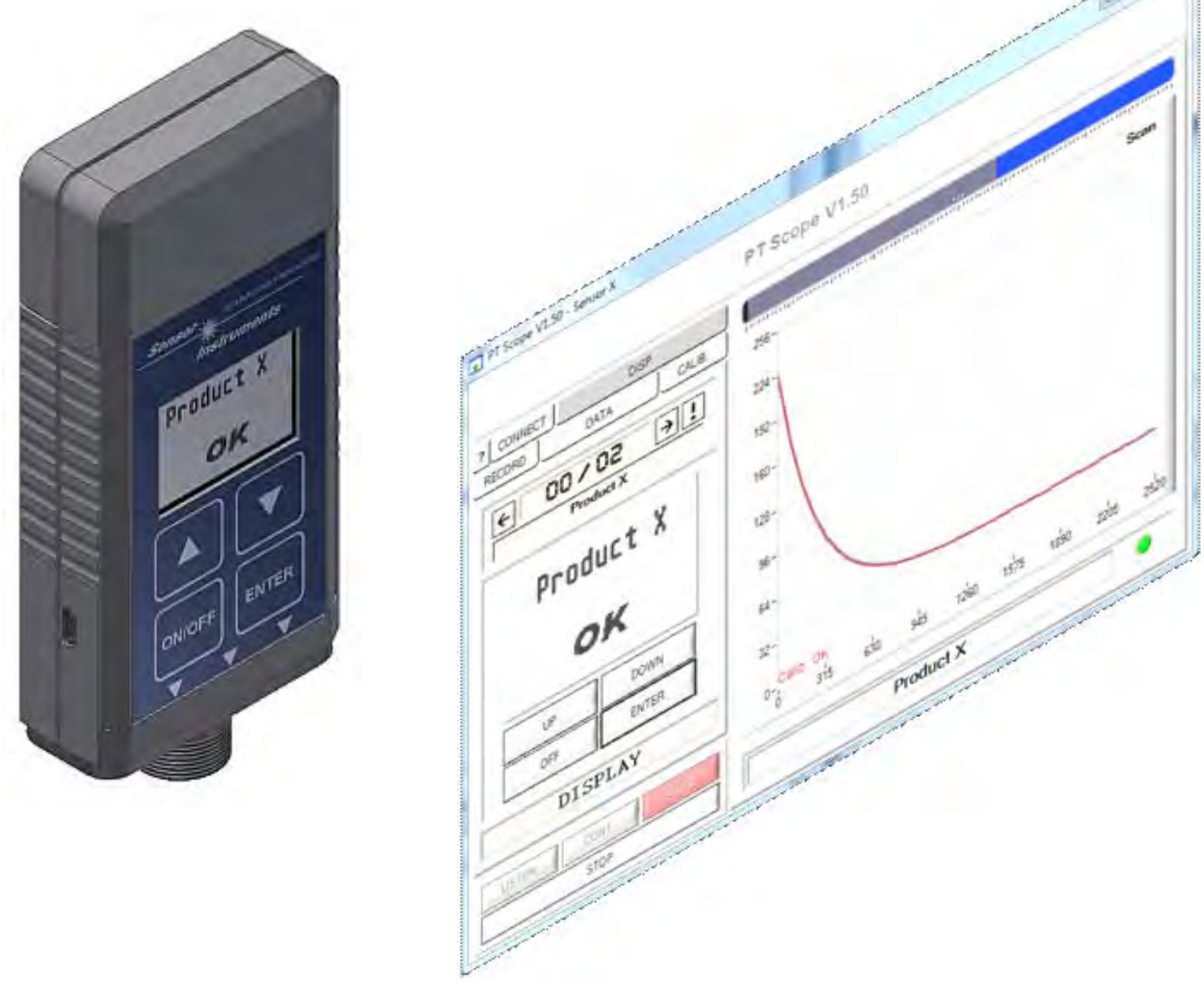
Without function on case of LUMI-MOBILE-FIO-PT

The sensor can be operated with a battery (typ Li-Ion 9V) or as an alternative with a power supply unit (+24V regulated DC voltage, 1A output current).

Info: When a power supply unit is connected it has preference over the battery. In this case the battery will not be used.
If the power supply plug is inserted at the sensor, but the power supply unit is not connected to the mains supply, the sensor will not operate (the sensor electronic components get no power from the battery or from the power supply unit).

## Display

**Graphic display and PC screen display:**




The high-contrast graphic display of the sensor shows the measurement results alphanumerically or numerically, depending on sensor type and settings. In combination with an acoustic signal the measurement result thus is clearly communicated.

The PC software can be used to process and analyse the measurement data. The signals and values of the measurement curves that are autarkically recorded by the sensor can be evaluated on the screen. A recorder function allows recording of measurements with the PC. Different views of the measurement data make it possible to focus on certain aspects of the measurement.

Apart from displaying measurement values, the download function for parameter files is the second main function of the PC software. These files contain the configuration data and the TEACH values for the products that should be identified.

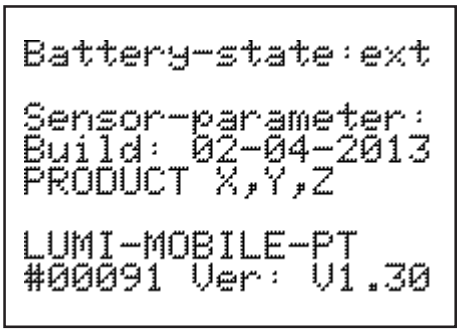
**ATTENTION: The generation of parameter files is a special feature of the LUMI-MOBILE-LAB sensor. Sensors of all expansion levels only can be configured by means of parameter files.**

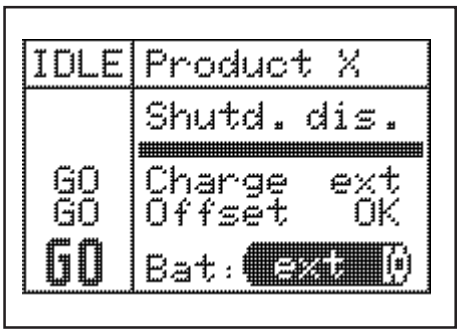
## Display

**Functions of the display:**

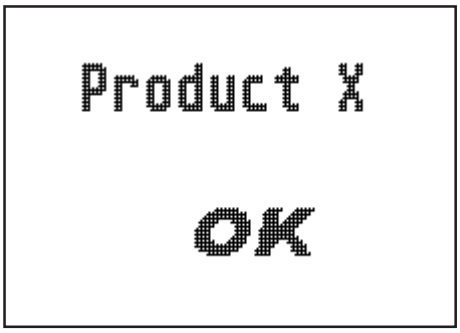
- Display of product designation
- Display of identification (OK, nOK)
- Listing of cause in case of negative identification
- Numeric display of measurement values (not with all versions)
- Display of battery charge state
- Status of automatic outside light compensation

**IDLE**




**Product detected**




**Product not detected**



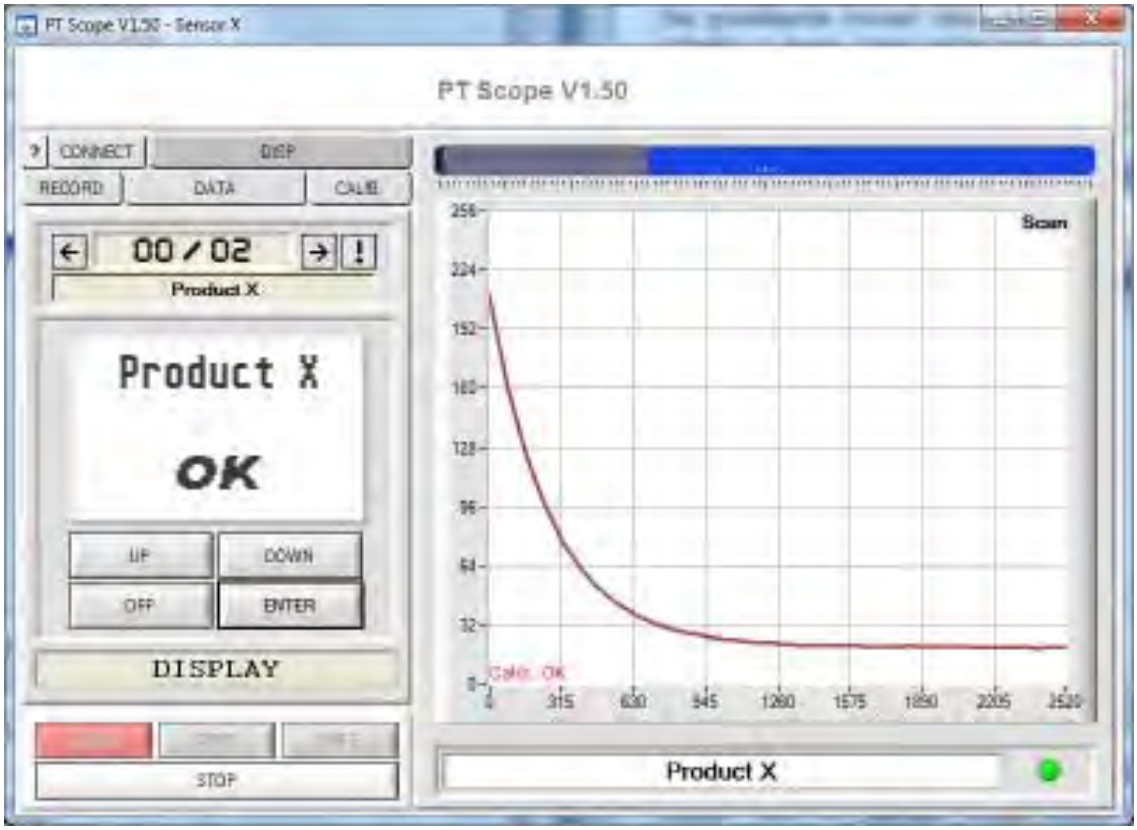
## Windows® Software

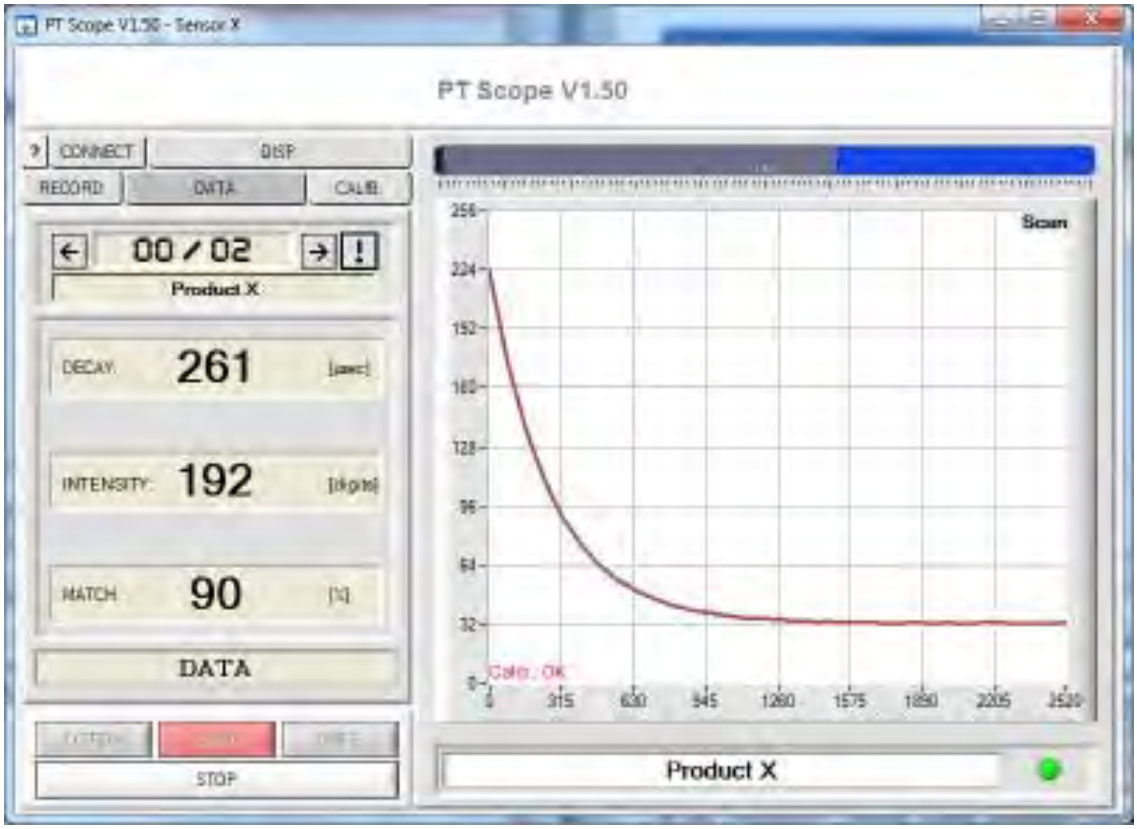
**Functions of the Windows® PC software:**

- Communication with the sensor through USB
- Download of configuration files to the sensor
- Calibration of the sensor
- Generation of configuration files **(only LAB expansion level)**
- Display of measurement values
- Representation of the display
- Display of signal curves
- Recording/ saving of measurement data on the PC
- Analysis of signal curves **(only LAB expansion level)**

## Windows® Software

**Windows® PC software user interface:**



## Accessories

### Connecting cables:
(please order separately)

**cab-usb/A-MINI_AB-1,5m**
USB connecting cables

**PS-24V-1A/24W-J135**
Power supply, without charging function

### Battery and charger:
(please order separately)

**Block-Akku Li-Ion 9V**
Rechargeable battery Li-Ion 9V

**Profilader VC Li-Ion 9V**
Charger for 2 pcs. „Block-Akku Li-Ion 9V“ (battery)

**PS-12V-Profilader VC**
Power supply for charger „Profilader VC Li-Ion 9V“

### Reflected light fiber optics
(please order separately)

**R-S-A3.0-(3.0)-600-67°** (length 600 mm)
**R-S-A3.0-(3.0)-1200-67°** (length 1200 mm)

**R-S-R1.1-(3x0.5)-600-67°** (length 600 mm)
**R-S-R1.1-(3x0.5)-1200-67°** (length 1200 mm)

**R-S-R2.1-(6x1)-600-67°** (length 600 mm)
**R-S-R2.1-(6x1)-1200-67°** (length 1200 mm)

### Offline top part (spacer) for reflected light fiber optics
(please order separately)
**A3.0-OFL-SHIFT** (offline top part for fiber optics with sensor head type A3.0)
**A3.0-OFL-D14/6** (offline top part for fiber optics with sensor head type A3.0)

## LUMI-MOBILE Case

### LUMI-MOBILE-FIO-PT-IR/IR-CASE-1b
Sensor case model 1b (fiber optics length 600 mm)
incl. spacer A3.0-OFL-SHIFT

Case composed of:
1x **LUMI-MOBILE-FIO-PT-IR/IR**
incl. **software LUMI-MOBILE-PT-Scope**
(hand-held device with display, for battery operation)
1x **R-S-A3.0-(3.0)-600-67°** (reflected light fiber optics, type A3.0)
1x **A3.0-OFL-SHIFT** (spacer for fiber optics type A3.0)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1A/24W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

### LUMI-MOBILE-FIO-PT-IR/IR-CASE-1c
Sensor case model 1c (fiber optics length 1200 mm)
incl. spacer A3.0-OFL-SHIFT

Case composed of:
1x **LUMI-MOBILE-FIO-PT-IR/IR**
incl. **software LUMI-MOBILE-PT-Scope**
(hand-held device with display, for battery operation)
1x **R-S-A3.0-(3.0)-1200-67°** (reflected light fiber optics, type A3.0)
1x **A3.0-OFL-SHIFT** (spacer for fiber optics type A3.0)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1A/24W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

### LUMI-MOBILE-FIO-PT-IR/IR-CASE-1d
Sensor case model 1d (fiber optics length 1200 mm)
incl. spacer A3.0-OFL-D14/6

Case composed of:
1x **LUMI-MOBILE-FIO-PT-IR/IR**
incl. **software LUMI-MOBILE-PT-Scope**
(hand-held device with display, for battery operation)
1x **R-S-A3.0-(3.0)-1200-67°** (reflected light fiber optics, type A3.0)
1x **A3.0-OFL-D14/6** (spacer for fiber optics type A3.0)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1A/24W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

# LUMI-MOBILE Series

## LUMI-MOBILE-FIO-LAB-IR/IR

**Hand-held device for battery operation (fiber optics version)**


- Measurement of the relaxation behaviour of luminescent products such as "UP-Converting Phosphors" or "DOWN-Converters"
- Uses IR-LEDs (laser class 1)
- Automatic constant light / outside light compensation
- Wide detection range
- Wide dynamic range (70 dB) available
- Battery operation with 9V block battery (independent of mains and PC)
- Optional: Numeric display of time constant TAU and of the concentration of luminescent products in the carrier material
- Optional: Numeric display of measurement quality
- Optional: Alphanumeric display of the identified luminescent pro
- USB port for connection to PC: Windows® program for further analysis
- Acoustical and optical information upon product detection
- **31 products can be saved**
- **Parameterisation of product files intended for -PT and -QC in the product memory**
- **Comprehensive analysis software (LUMI-MOBILE-LAB-Scope) under Windows®**

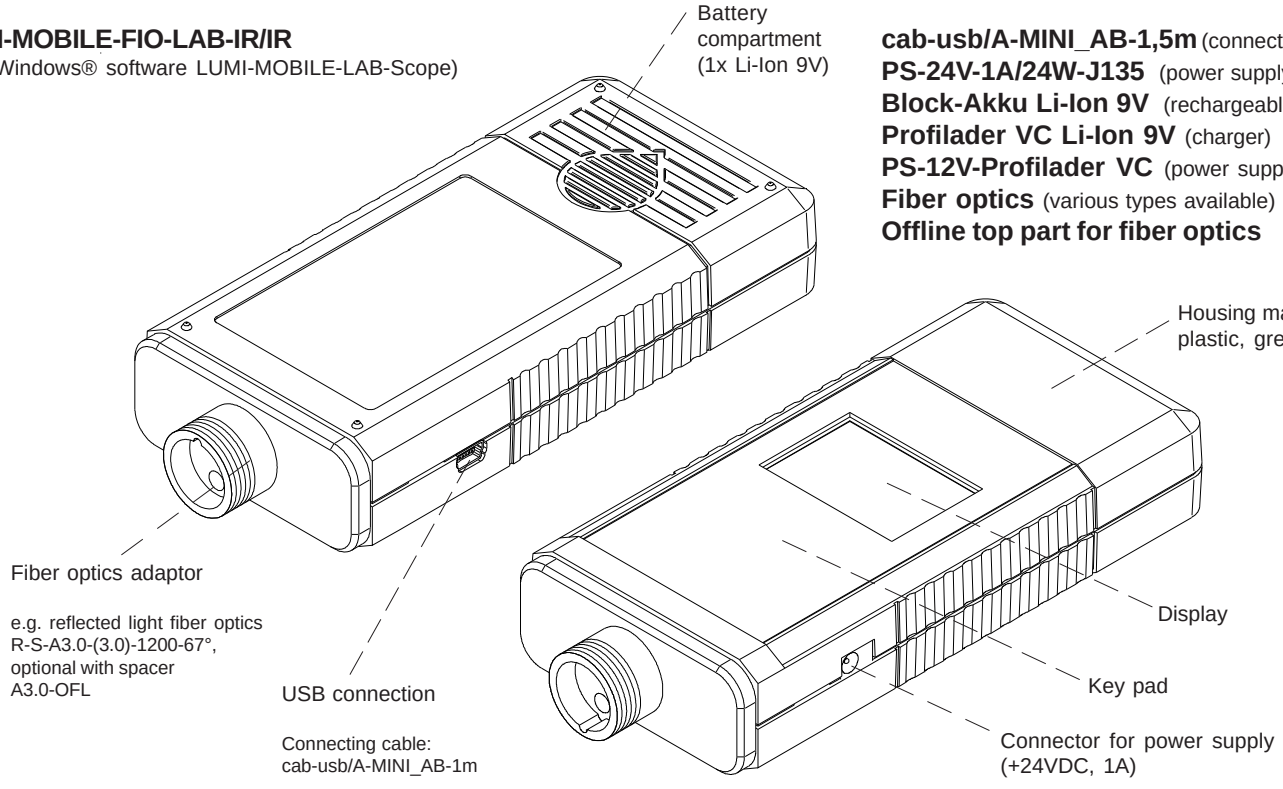
## Design

**Product name:**

**LUMI-MOBILE-FIO-LAB-IR/IR**
(incl. Windows® software LUMI-MOBILE-LAB-Scope)

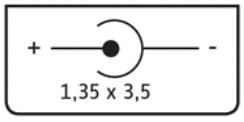
**Accessories:** (cf. p. 10)

**cab-usb/A-MINI_AB-1,5m** (connecting cable)
**PS-24V-1A/24W-J135** (power supply)
**Block-Akku Li-Ion 9V** (rechargeable battery)
**Profilader VC Li-Ion 9V** (charger)
**PS-12V-Profilader VC** (power supply charger)
**Fiber optics** (various types available)
**Offline top part for fiber optics**



## Technical Data

| Model | LUMI-MOBILE-FIO-LAB-IR/IR | |
|---|---|---|
| Light source | IR-LEDs, λ typ. 940 nm | |
| Reference distance | contacting, with optical fiber sensor head | |
| Detection range | depends on the fiber optics used | |
| Suitable fiber optics | total length 600 mm:<br>R-S-A3.0-(3.0)-600-67° (fiber bundle Ø 3 mm)<br>R-S-R1.1-(3x0.5)-600-67° (fiber gap 3 mm x 0.5 mm)<br>R-S-R2.1-(6x1)-600-67° (fiber gap 6 mm x 1 mm) | total length 1200 mm:<br>R-S-A3.0-(3.0)-1200-67° (fiber bundle Ø 3 mm)<br>R-S-R1.1-(3x0.5)-1200-67° (fiber gap 3mm x 0.5 mm)<br>R-S-R2.1-(6x1)-1200-67° (fiber gap 6 mm x 1 mm) |
| Optical filter | daylight block filter | |
| Voltage supply | operation with a battery or with power supply unit (+24VDC, 1A) | |
| AC operation | pulsed | |
| Enclosure rating | IP54 | |
| Current consumption | typ. 200 mA | |
| Interface | USB, parameterizable under Windows® | |
| EMC test acc. to | DIN EN 60947-5-2 CE | |
| Operating temp. range | 0°C ... +55°C | |
| Storage temperature range | -20°C ... +85°C | |
| Housing material | plastic, grey | |
| Housing dimensions | L x W x H approx. 136.1 mm x 60 mm x 26 mm | |
| Product memory depth | up to 31 products, parameterizable under Windows® | |
| Sensitivity (gain) | parameterizable under Windows® | |
| IR light power | adjustable under Windows® | |
| Averaging | up to 64 values, adjustable under Windows® | |
| Pulse length,<br>scan frequency,<br>pulse frequency | parameterizable under Windows® | |
| Measuring start/end | parameterizable under Windows® | |

| Model | Power Supply PS-24V-1A/24W-J135 |
|---|---|
| Secundary voltage | +24VDC regulated, 1A output current |
| Power supply capacity | 24W |
| Dimensions DC connector | L x W x H approx. 1.35 mm x 3.5 mm x 9 mm   |
| Note | When a power supply unit is connected it has preference over the battery. In this case the battery will not be used. If the power supply plug is inserted at the sensor, but the power supply unit is not connected to the mains supply, the sensor will not operate (the sensor electronic components get no power from the battery or from the power supply unit). |

## Features

The **LUMI-MOBILE-FIO-LAB-IR/IR** sensor belongs to the **LUMI sensor family** for the optical detection and identification of so-called UP-Converting Phosphors (UCP) or DOWN-Converting Phosphors (DCP).

UCPs are rare earth particles of micrometer down to nanometre size that have the special property of using internal physical processes to convert low-energy photons (e.g. infrared light) into high-energy photons (visible light). Phosphorescence, i.e. the temporary storing and later releasing of excitation energy, is a second property of UCPs. When an UCP is exposed to pulsed excitation, the excitation state relaxes exponentially after the end of excitation under the emission of light. This time curve of the intensity is characteristic for the respective UCP. DCPs in part are the same materials, but in this case higher-energy photons are converted into lower-energy photons, which also happens with a time delay.

The **LUMI-MOBILE-FIO-LAB-IR/IR** identifies UCPs and DCPs by way of the parameters of the exponential relaxation curve. The UCP or DCP is excited by an impulse, and the relaxation behaviour is scanned/digitised over time. The recorded data are approximated by way of modelling. The model parameters "TAU" (time constant) and "INTENSITY" (start intensity) of the exponential curve are used to identify the respective sample.

The **LUMI-MOBILE-FIO-LAB-IR/IR** is battery-powered and with its internal microprocessor operates independent of mains and PC. As an option a supplied PC software can be used for further analysis. **LUMI-MOBILE-FIO-LAB-IR/IR** sensors are operated by way of the membrane keypad at the housing front.

The settings of the sensor (**LUMI-MOBILE-FIO-PT-IR/IR** or **LUMI-MOBILE-FIO-QC-IR/IR**) are first defined with the **LUMI-MOBILE-FIO-LAB-IR/IR** system and are then saved in the sensor's non-volatile memory. For test purposes individual parameters can be temporarily changed in the volatile memory.

The sensors features an automatic outside light compensation function. To be able to respond more flexibly to different measurement situations, the outside light that occurs in a measurement in addition to the signal of the sample to be measured, is compensated by an automatic control function. The time that is necessary for outside light compensation depends on the parameterisation, on the ambient light, and on the start situation, and typically lies between 0 and 5 seconds. Measurements can only be performed when outside light compensation is finished.

## Measurement

**Performing a measurement:**

Connect the power supply unit or the battery, and turn the sensor on.

Place the sensor on the object. Make sure that the attached aperture encloses the object or is flush with the object to prevent any influence of extraneous light that might reach the sensor optics from the outside. If possible, switch off any dynamic infrared sources (neon lamps, halogen spotlights, and bulbs in the direct vicinity). When using a fiber optic sensor type (FIO) best-possible shielding against extraneous light also must be ensured.

Wait until the sensor has completed its extraneous light offset and has fully charged the emitter pulse unit. When the sensor is ready it displays „OK“. Press the „ENTER“ key and wait until the scan process is finished. Make absolutely sure that the sensor is not tilted or moved during the measurement.

Acoustic signals:
The results of a measurement (positive/negative) also are indicated by way of acoustic buzzer signals:
POSITIVE: Two short high buzzer signals, NEGATIVE: One long low buzzer signal.

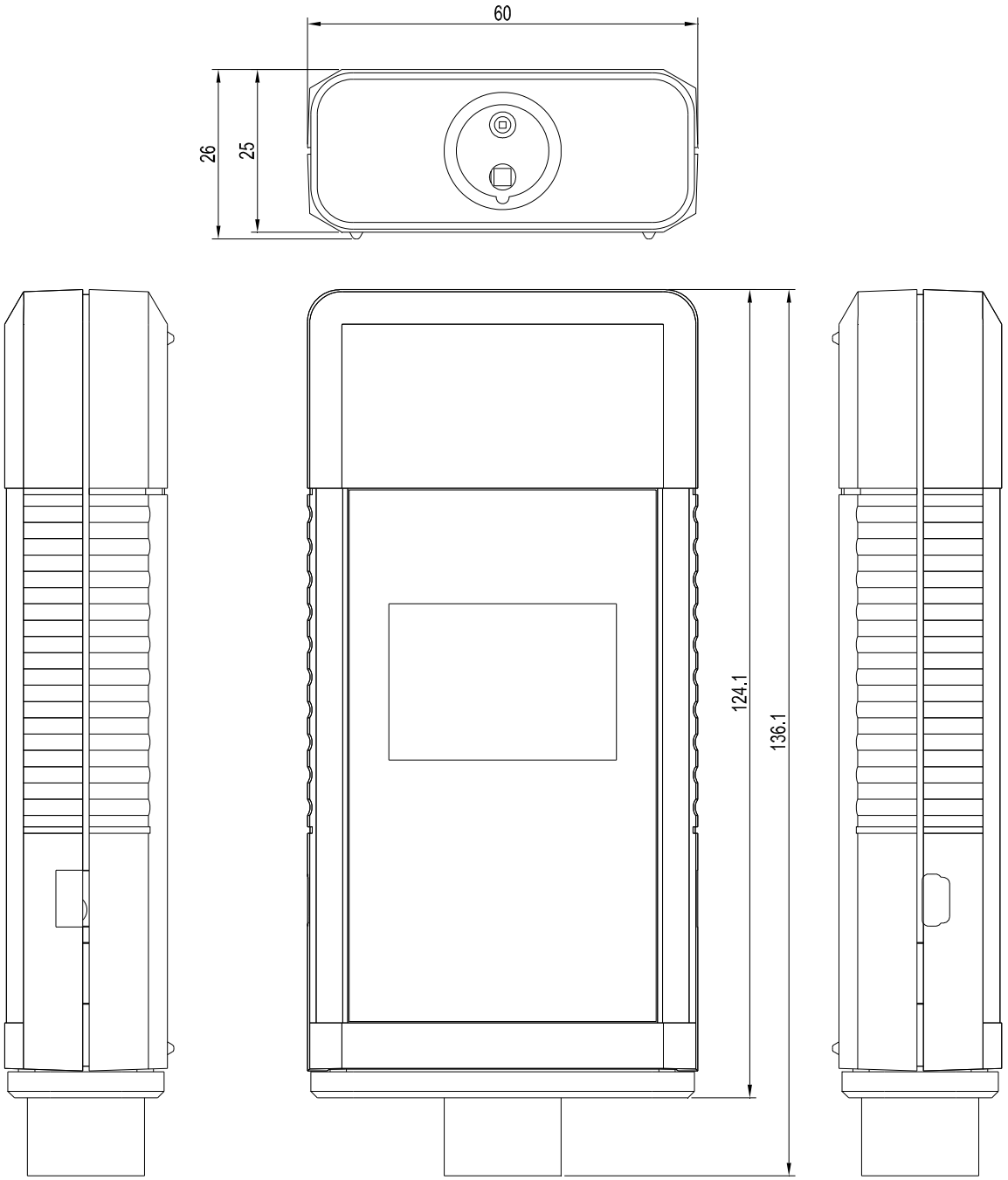
Optical informationen:
Via display: POSITIVE: product is displayed, NEGATIVE: failure information.

## Product Change

**Product change with LUMI-MOBILE-FIO-LAB-IR/IR:**

The Windows® PC software LUMI-MOBILE-LAB-Scope can be used to read a new file (a file maximally contains 31 products). The product dataset existing in the product memory of the sensor will be overwritten, and up to 31 new products will then be available in the product memory.

## Dimensions




All dimensions in mm

## Key Function

### Functions of the key pad:

The keys have a tactile switching point
that can be recognised by a soft "click".



Turns the sensor on / off.
To turn the sensor on (battery or power supply unit connected), press and hold the key until the boot screen is displayed.To turn the sensor off, press and hold the key until shutdown is finished.


Starts a measurement.
Press the key briefly and release it again. Make sure that during a measurement the sensor remains on the measurement object. A measurement only can be started when the sensor is in „IDLE“ state (which is shown on the display). In all other states pressing the ENTER key will have no effect.

Selects one of (up to) 31 products out of the product memory.
Changes the parameter set / the product to be identified from the current one to the next higher one.
When the last active parameter set is reached, the sensor changes back to the first one.

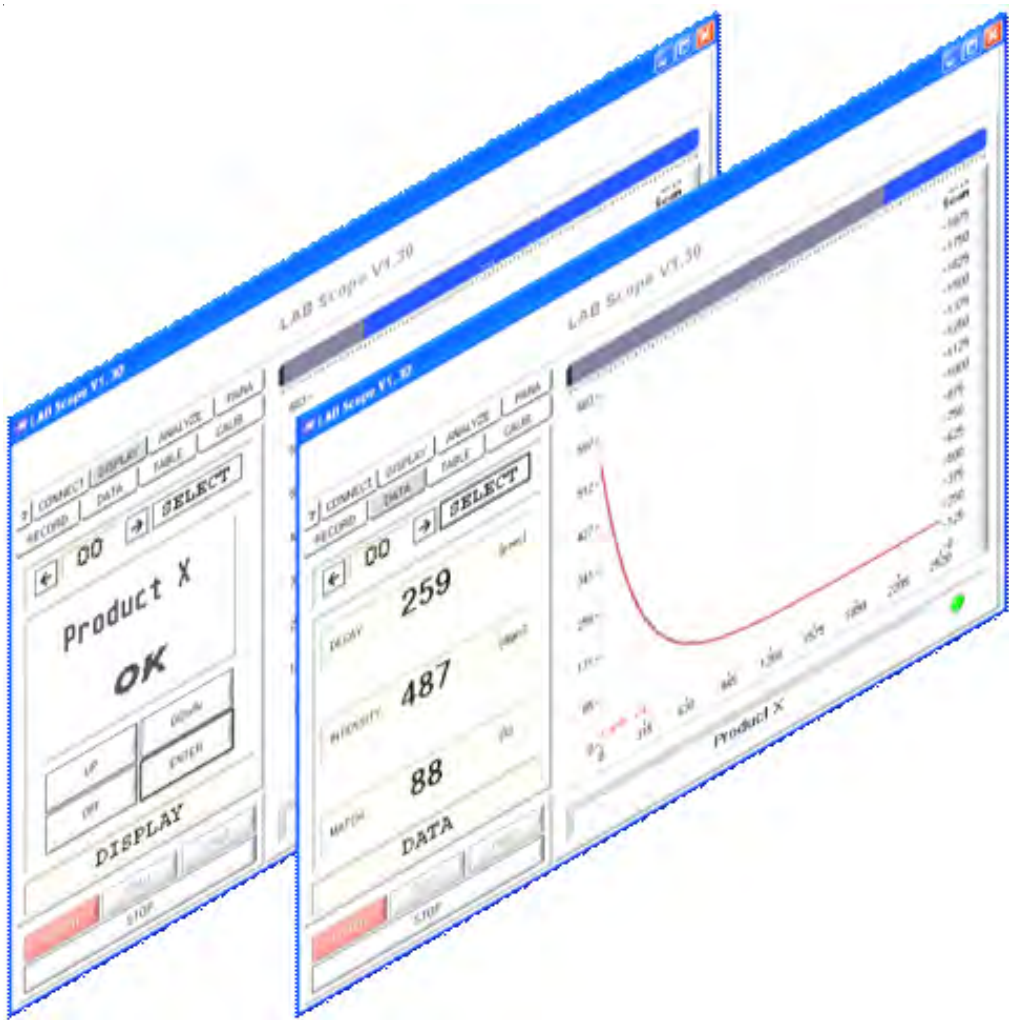
Selects one of (up to) 31 products out of the product memory.
Changes the parameter set / the product to be identified from the current one to the next lower one.
When the first active parameter set is reached, the sensor changes back to the last one.

The sensor can be operated with a battery (typ Li-Ion 9V) or as an alternative with a power supply unit (+24V regulated DC voltage, 1A output current).

Info: When a power supply unit is connected it has preference over the battery. In this case the battery will not be used.
If the power supply plug is inserted at the sensor, but the power supply unit is not connected to the mains supply, the sensor will not operate (the sensor electronic components get no power from the battery or from the power supply unit).

## Display

### Graphic display and PC screen display


The high-contrast graphic display of the sensor shows the measurement results alphanumerically or numerically, depending on sensor type and settings. In combination with an acoustic signal the measurement result thus is clearly communicated.

The PC software can be used to process and analyse the measurement data. The signals and values of the measurement curves that are autarkically recorded by the sensor can be evaluated on the screen. A recorder function allows recording of measurements with the PC. Different views of the measurement data make it possible to focus on certain aspects of the measurement.

Apart from displaying measurement values, the download function for parameter files is the second main function of the PC software. These files contain the configuration data and the TEACH values for the products that should be identified.

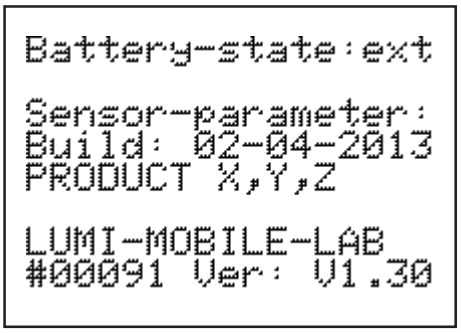
**ATTENTION: The generation of parameter files is a special feature of the LUMI-MOBILE-LAB sensor. Sensors of all expansion levels only can be configured by means of parameter files.**

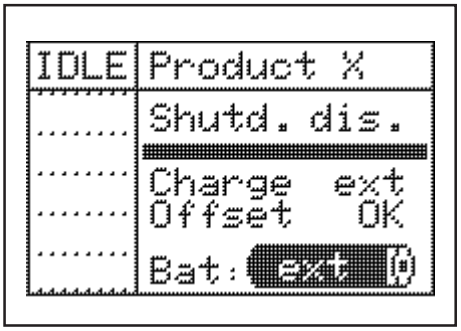
## Display

**Functions of the display:**

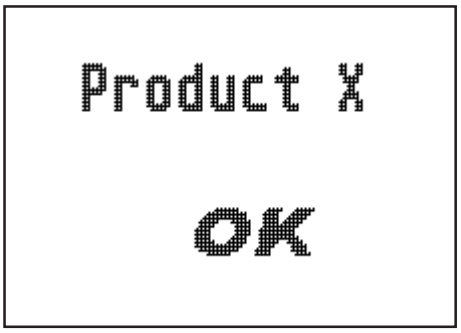
- Display of product designation
- Display of identification (OK, nOK)
- Listing of cause in case of negative identification
- Numeric display of measurement values (not with all versions)
- Display of battery charge state
- Status of automatic outside light compensation

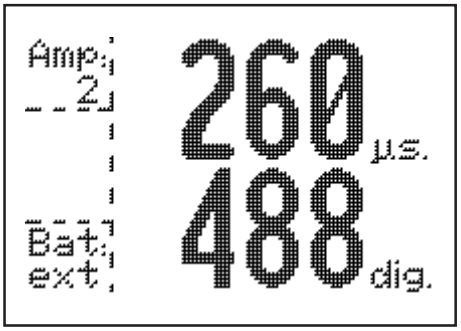
**IDLE**




**Product detected**




**Product not detected**



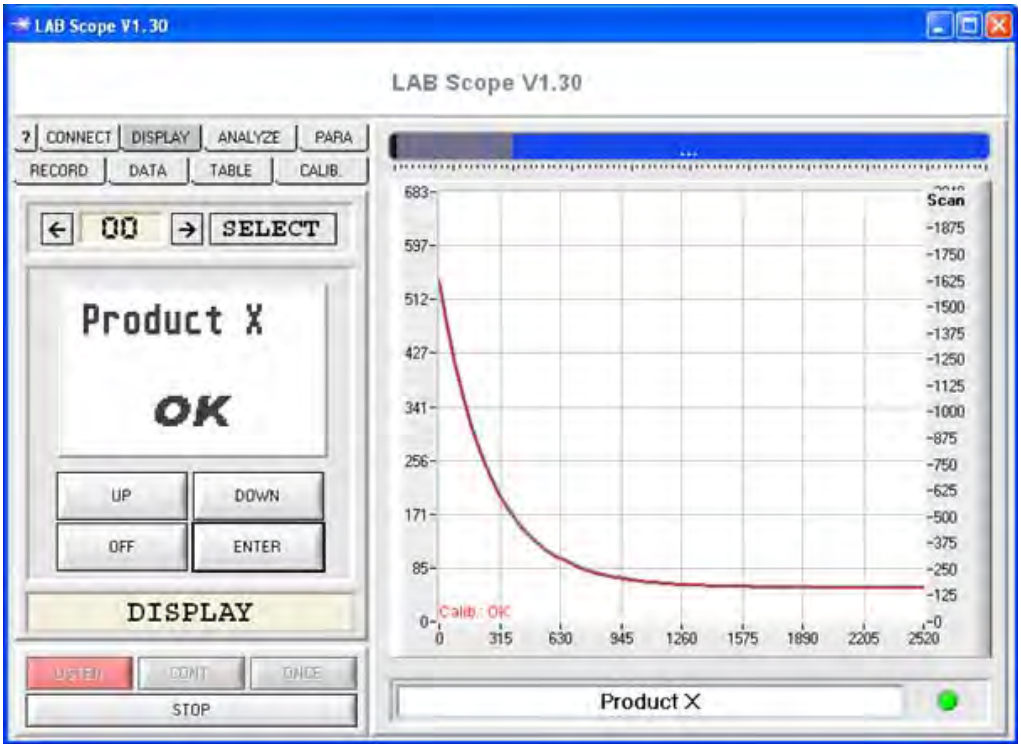
## Windows® Software

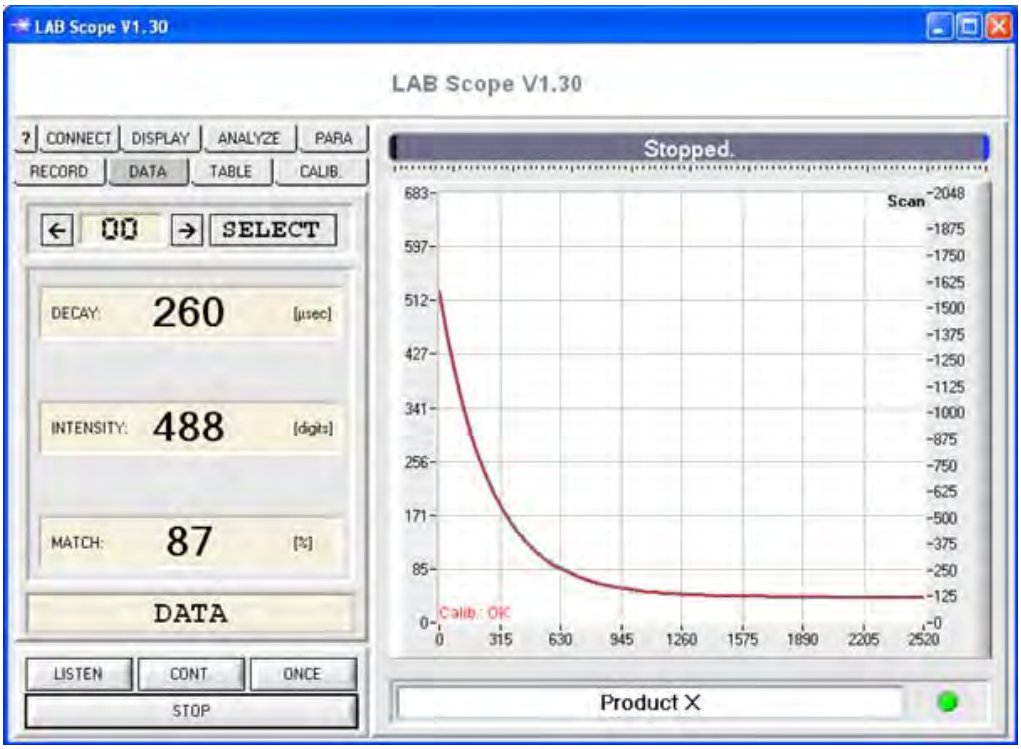
**Functions of the Windows® PC software:**

- Communication with the sensor through USB
- Download of configuration files to the sensor
- Calibration of the sensor
- Generation of configuration files **(only LAB expansion level)**
- Display of measurement values
- Representation of the display
- Display of signal curves
- Recording/ saving of measurement data on the PC
- Analysis of signal curves **(only LAB expansion level)**

## Windows® Software

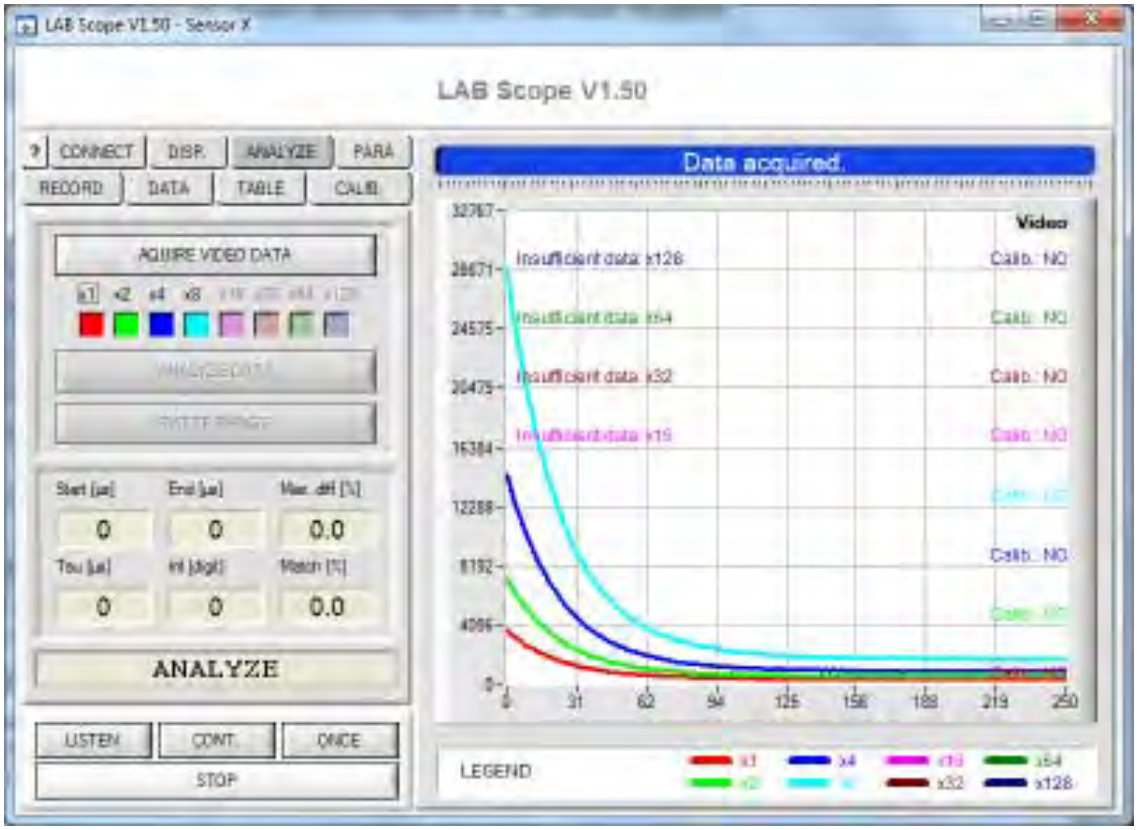
**Windows® PC software user interface:**

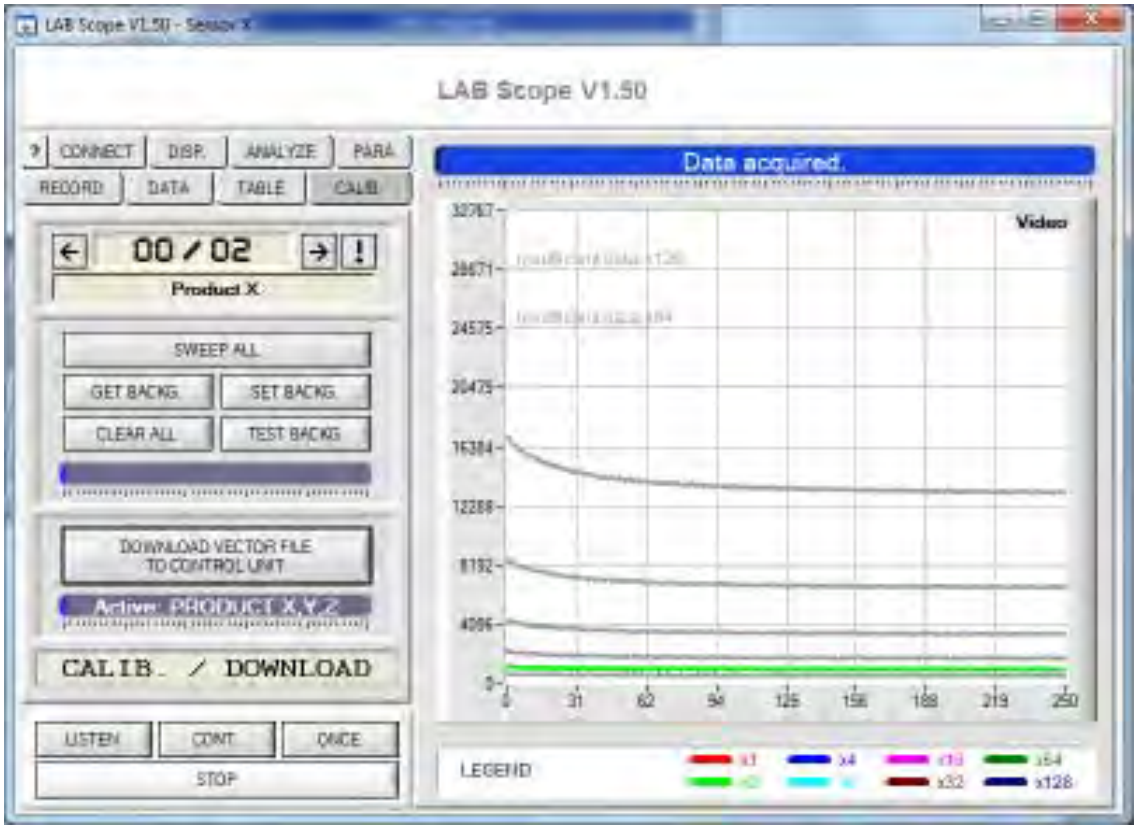


## Windows® Software

**Windows® PC software user interface:**



## Accessories

### Connecting cables:
(please order separately)

**cab-usb/A-MINI_AB-1,5m**
USB connecting cables

**PS-24V-1A/24W-J135**
Power supply, without charging function

### Battery and charger:
(please order separately)

**Block-Akku Li-Ion 9V**
Rechargeable battery Li-Ion 9V

**Profilader VC Li-Ion 9V**
Charger for 2 pcs. „Block-Akku Li-Ion 9V“ (battery)

**PS-12V-Profilader VC**
Power supply for charger „Profilader VC Li-Ion 9V“

### Reflected light fiber optics
(please order separately)

**R-S-A3.0-(3.0)-600-67°** (length 600 mm)
**R-S-A3.0-(3.0)-1200-67°** (length 1200 mm)

**R-S-R1.1-(3x0.5)-600-67°** (length 600 mm)
**R-S-R1.1-(3x0.5)-1200-67°** (length 1200 mm)

**R-S-R2.1-(6x1)-600-67°** (length 600 mm)
**R-S-R2.1-(6x1)-1200-67°** (length 1200 mm)

### Offline top part (spacer) for reflected light fiber optics
(please order separately)
**A3.0-OFL-SHIFT** (offline top part for fiber optics with sensor head type A3.0)

## LUMI-MOBILE Cases

### LUMI-MOBILE-FIO-LAB-IR/IR-CASE-1b
Sensor case model 1b (fiber optics length 600 mm)

Case composed of:
1x **LUMI-MOBILE-FIO-LAB-IR/IR**
incl. **software LUMI-MOBILE-LAB-Scope**
(hand-held device with display, for battery operation)
1x **R-S-A3.0-(3.0)-600-67°** (reflected light fiber optics, type A3.0)
1x **A3.0-OFL-SHIFT** (spacer for fiber optics type A3.0)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1A/24W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

### LUMI-MOBILE-FIO-LAB-IR/IR-CASE-1c
Sensor case model 1c (fiber optics length 1200 mm)

Case composed of:
1x **LUMI-MOBILE-FIO-LAB-IR/IR**
incl. **software LUMI-MOBILE-LAB-Scope**
(hand-held device with display, for battery operation)
1x **R-S-A3.0-(3.0)-1200-67°** (reflected light fiber optics, type A3.0)
1x **A3.0-OFL-SHIFT** (spacer for fiber optics type A3.0)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1A/24W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

# LUMI-MOBILE Series

## LUMI-MOBILE-FIO-JR-IR/IR

**Hand-held device for battery operation**
**(fiber optics version, with LED display)**


- Measurement of the relaxation behaviour of luminescent products such as "UP-Converting Phosphors" or "DOWN-Converters"
- Uses IR-LEDs (laser class 1)
- Automatic constant light / outside light compensation
- Wide detection range
- Wide dynamic range (70 dB) available
- Battery operation with 9V block battery (independent of mains and PC)
- Alphanumeric display of the identified luminescent product
- USB port for connection to PC:
  Windows® program for further analysis
- Acoustical and optical information upon product detection
- **1 product can be saved**

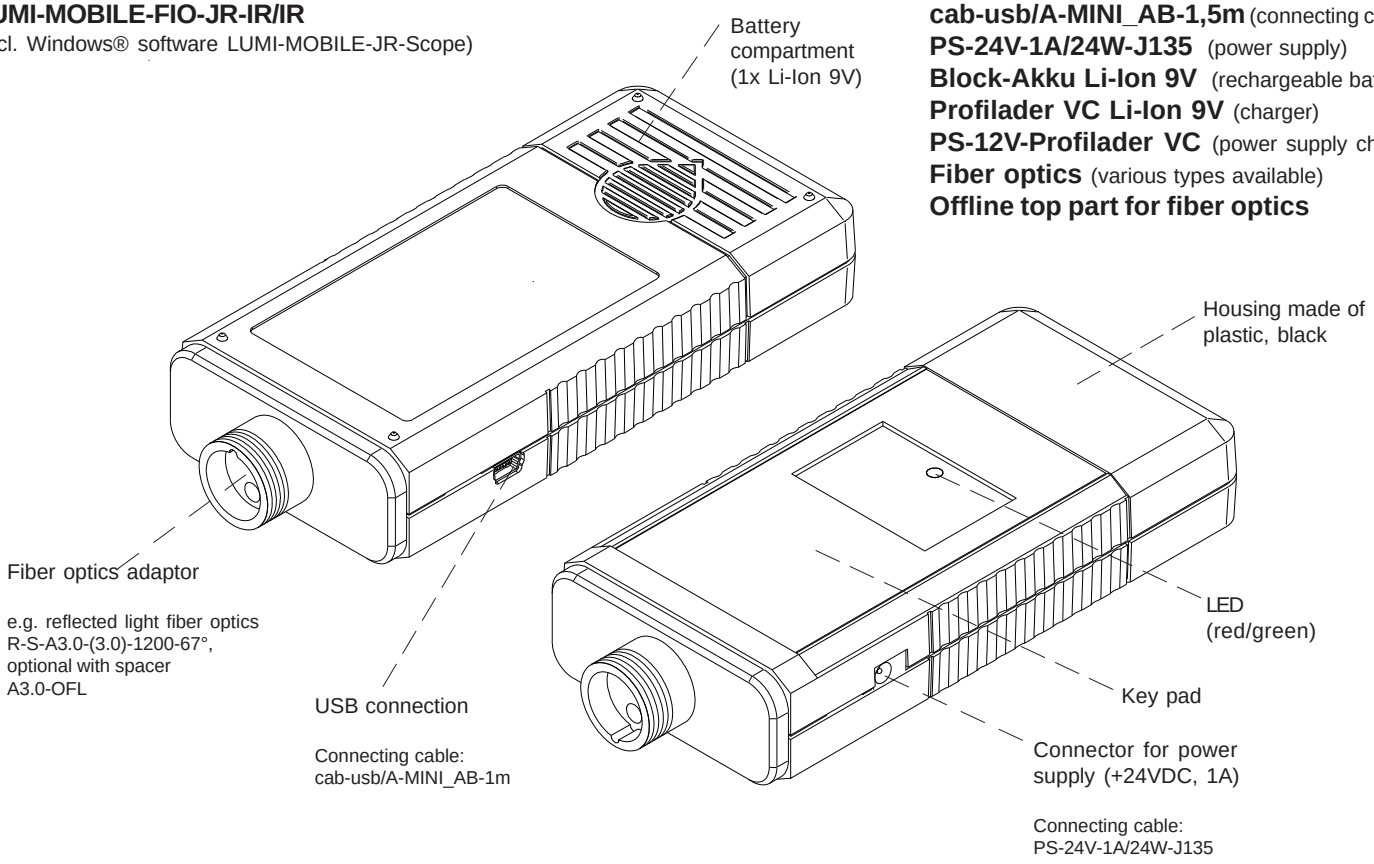
## Design

**Product name:**

**LUMI-MOBILE-FIO-JR-IR/IR**
(incl. Windows® software LUMI-MOBILE-JR-Scope)

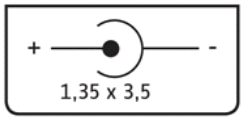
**Accessories:** (cf. p.9)

**cab-usb/A-MINI_AB-1,5m** (connecting cable)
**PS-24V-1A/24W-J135** (power supply)
**Block-Akku Li-Ion 9V** (rechargeable battery)
**Profilader VC Li-Ion 9V** (charger)
**PS-12V-Profilader VC** (power supply charger)
**Fiber optics** (various types available)
**Offline top part for fiber optics**



## Technical Data

| Model | LUMI-MOBILE-FIO-JR-IR/IR | |
|---|---|---|
| Light source | IR-LEDs, λ typ. 940 nm | |
| Reference distance | contacting, with optical fiber sensor head | |
| Detection range | depends on the fiber optics used | |
| Suitable fiber optics | total length 600 mm:<br>R-S-A3.0-(3.0)-600-67° (fiber bundle Ø 3 mm)<br>R-S-R1.1-(3x0.5)-600-67° (fiber gap 3 mm x 0.5 mm)<br>R-S-R2.1-(6x1)-600-67° (fiber gap 6 mm x 1 mm) | total length 1200 mm:<br>R-S-A3.0-(3.0)-1200-67° (fiber bundle Ø 3 mm)<br>R-S-R1.1-(3x0.5)-1200-67° (fiber gap 3mm x 0.5 mm)<br>R-S-R2.1-(6x1)-1200-67° (fiber gap 6 mm x 1 mm) |
| Optical filter | daylight block filter | |
| Voltage supply | operation with a battery or with power supply unit (+24VDC, regulated, 1A) | |
| AC operation | pulsed | |
| Enclosure rating | IP54 | |
| Current consumption | typ. 200 mA | |
| Interface | USB, parameterizable under Windows® | |
| EMC test acc. to | DIN EN 60947-5-2 CE | |
| Operating temp. range | 0°C ... +55°C | |
| Storage temperature range | -20°C ... +85°C | |
| Housing material | plastic, black | |
| Housing dimensions | L x W x H approx. 136.1 mm x 60 mm x 26 mm | |
| Product memory depth | 1 product | |

| Model | Power Supply PS-24V-1A/24W-J135 |
|---|---|
| Secundary voltage | +24VDC regulated, 1A output current |
| Power supply capacity | 24W |
| Dimensions DC connector | L x W x H approx. 1.35 mm x 3.5 mm x 9 mm   |
| Note | When a power supply unit is connected it has preference over the battery. In this case the battery will not be used. If the power supply plug is inserted at the sensor, but the power supply unit is not connected to the mains supply, the sensor will not operate (the sensor electronic components get no power from the battery or from the power supply unit). |

## Features

The **LUMI-MOBILE-FIO-JR-IR/IR** sensor belongs to the **LUMI sensor family** for the optical detection and identification of so-called UP-Converting Phosphors (UCP) or DOWN-Converting Phosphors (DCP).

UCPs are rare earth particles of micrometer down to nanometre size that have the special property of using internal physical processes to convert low-energy photons (e.g. infrared light) into high-energy photons (visible light). Phosphorescence, i.e. the temporary storing and later releasing of excitation energy, is a second property of UCPs. When an UCP is exposed to pulsed excitation, the excitation state relaxes exponentially after the end of excitation under the emission of light. This time curve of the intensity is characteristic for the respective UCP. DCPs in part are the same materials, but in this case higher-energy photons are converted into lower-energy photons, which also happens with a time delay.

The **LUMI-MOBILE-FIO-JR-IR/IR** identifies UCPs and DCPs by way of the parameters of the exponential relaxation curve.
The UCP or DCP is excited by an impulse, and the relaxation behaviour is scanned/digitised over time. The recorded data are approximated by way of modelling. The model parameters "TAU" (time constant) and "INTENSITY" (start intensity) of the exponential curve are used to identify the respective sample.

The **LUMI-MOBILE-FIO-JR-IR/IR** is battery-powered and with its internal microprocessor operates independent of mains and PC. As an option a supplied PC software can be used for further analysis. **LUMI-MOBILE-FIO-JR-IR/IR** sensors are operated by way of the membrane keypad at the housing front. Parameterization is not possible.

The setting of the **LUMI-MOBILE-FIO-JR-IR/IR** sensor is first defined with the **LUMI-MOBILE-FIO-LAB-IR/IR** system and is then saved in the sensor's non-volatile memory.

The sensors features an automatic outside light compensation function. To be able to respond more flexibly to different measurement situations, the outside light that occurs in a measurement in addition to the signal of the sample to be measured, is compensated by an automatic control function. The time that is necessary for outside light compensation depends on the parameterisation, on the ambient light, and on the start situation, and typically lies between 0 and 5 seconds. Measurements can only be performed when outside light compensation is finished.

## Measurement

**Performing a measurement:**

Connect the power supply unit or the battery, and turn the sensor on. During the boot process, the LED lights green.

Place the sensor on the object. Make sure that the attached aperture encloses the object or is flush with the object to prevent any influence of extraneous light that might reach the sensor optics from the outside. If possible, switch off any dynamic infrared sources (neon lamps, halogen spotlights, and bulbs in the direct vicinity). When using a fiber optic sensor type (FIO) best-possible shielding against extraneous light also must be ensured.

Wait until the sensor has completed its extraneous light offset and has fully charged the emitter pulse unit. During the extraneous light offset, the LED blinks red. Once ready, the LED switches off. Press the „ENTER“ key and wait until the scan process is finished. Make absolutely sure that the sensor is not tilted or moved during the measurement.

Acoustic signals:
The results of a measurement (positive/negative) also are indicated by way of acoustic buzzer signals:
POSITIVE: Two short high buzzer signals, NEGATIVE: One long low buzzer signal.

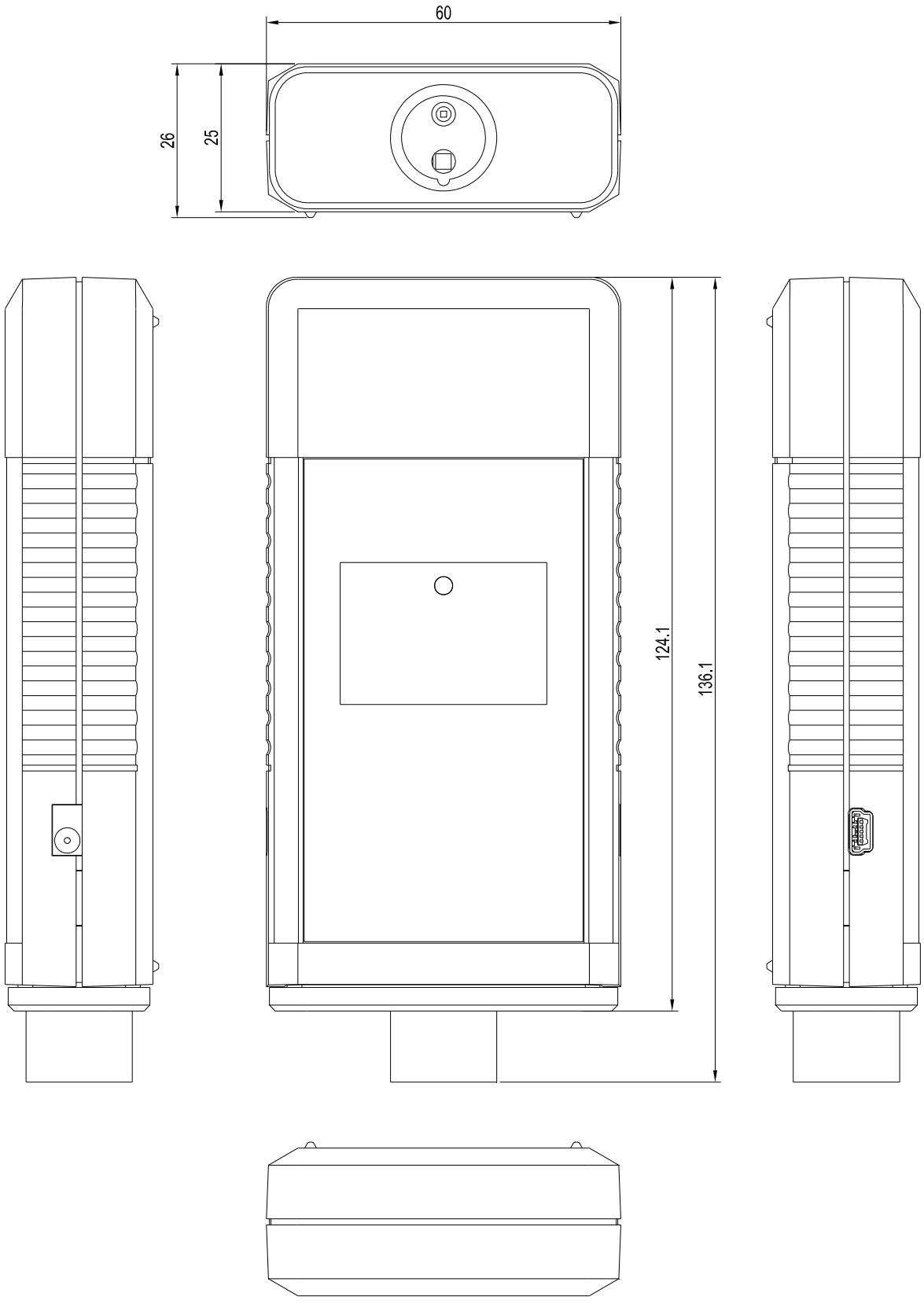
Optical informationen:
Via LED: POSITIVE: LED green, NEGATIVE: LED red.

## Product Change

**Product change with LUMI-MOBILE-FIO-JR-IR/IR:**

The Windows® PC software LUMI-MOBILE-JR-Scope can be used to read one new file (one new product).
The product dataset existing in the product memory of the sensor will be overwritten, and the new product will then be available in the product memory.

## Dimensions




All dimensions in mm

*Sensor Instruments GmbH • D-94169 Thurmansbang • Schlinding 11*
*Tel. +49 (0)8544 9719-0 • Fax +49 (0)8544 9719-13*
*info@sensorinstruments.de • www.sensorinstruments.de*

## Key Function

### Functions of the key pad:

The keys have a tactile switching point
that can be recognised by a soft "click".



Turns the sensor on / off.
To turn the sensor on (battery or power supply unit connected), press and hold the key until the LED lights green.To turn the sensor off, press and hold the key until shutdown is finished. During the shutdown the LED blinks red. As soon as the LED switches off the shutdown is finished.


Starts a measurement.
Press the key briefly and release it again. Make sure that during a measurement the sensor remains on the measurement object. A measurement only can be started when the sensor is in „IDLE“ state (which is shown on the display). In all other states pressing the ENTER key will have no effect.

Without function on case of LUMI-MOBILE-FIO-JR

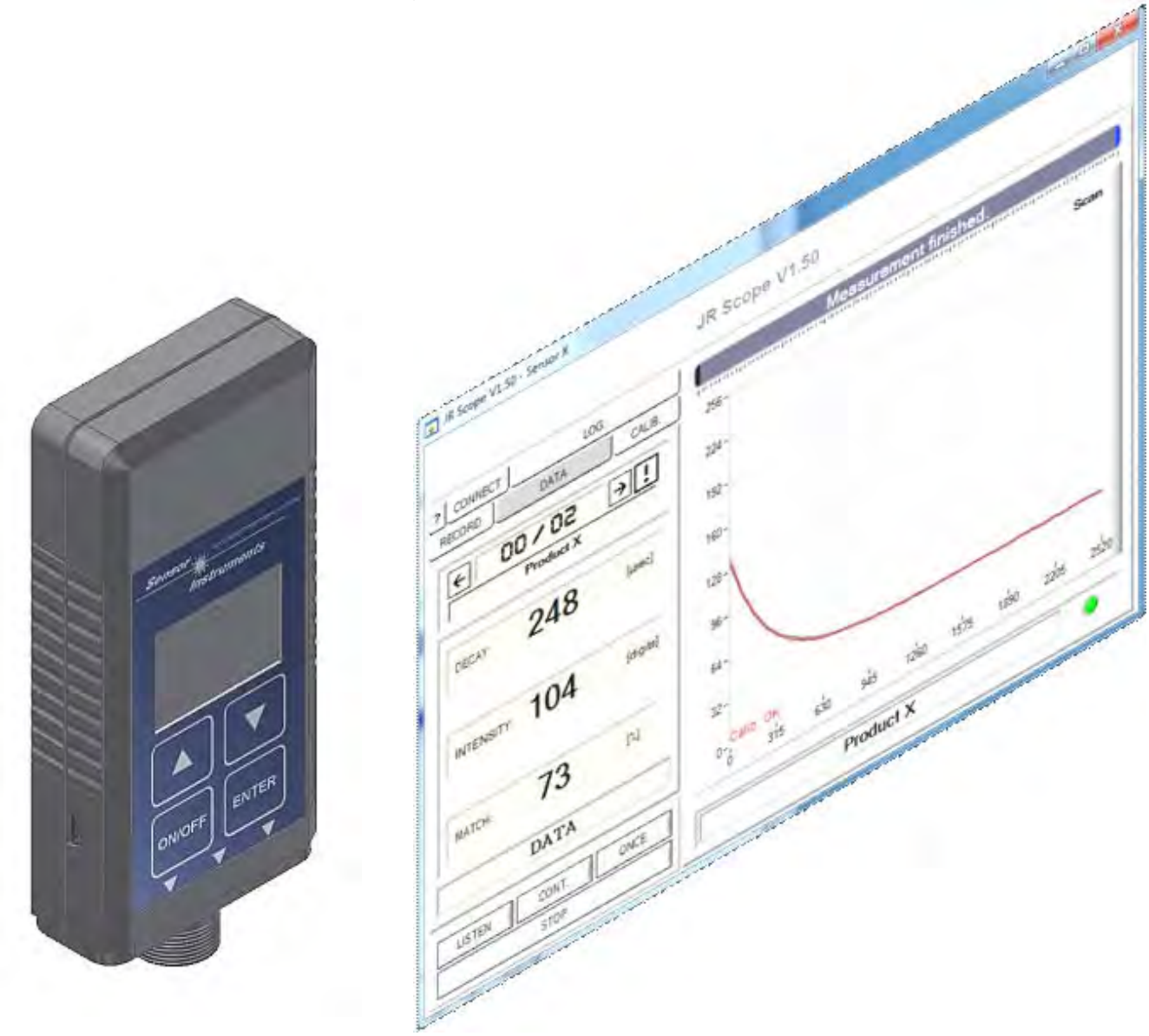
Without function on case of LUMI-MOBILE-FIO-JR

The sensor can be operated with a battery (typ Li-Ion 9V) or as an alternative with a power supply unit (+24V regulated DC voltage, 1A output current).

Info: When a power supply unit is connected it has preference over the battery. In this case the battery will not be used.
If the power supply plug is inserted at the sensor, but the power supply unit is not connected to the mains supply, the sensor will not operate (the sensor electronic components get no power from the battery or from the power supply unit).

## Display

**Graphic display and PC screen display:**




The PC software can be used to process and analyse the measurement data. The signals and values of the measurement curves that are autarkically recorded by the sensor can be evaluated on the screen. A recorder function allows recording of measurements with the PC. Different views of the measurement data make it possible to focus on certain aspects of the measurement.

Apart from displaying measurement values, the download function for parameter files is the second main function of the PC software. These files contain the configuration data and the TEACH values for the products that should be identified.

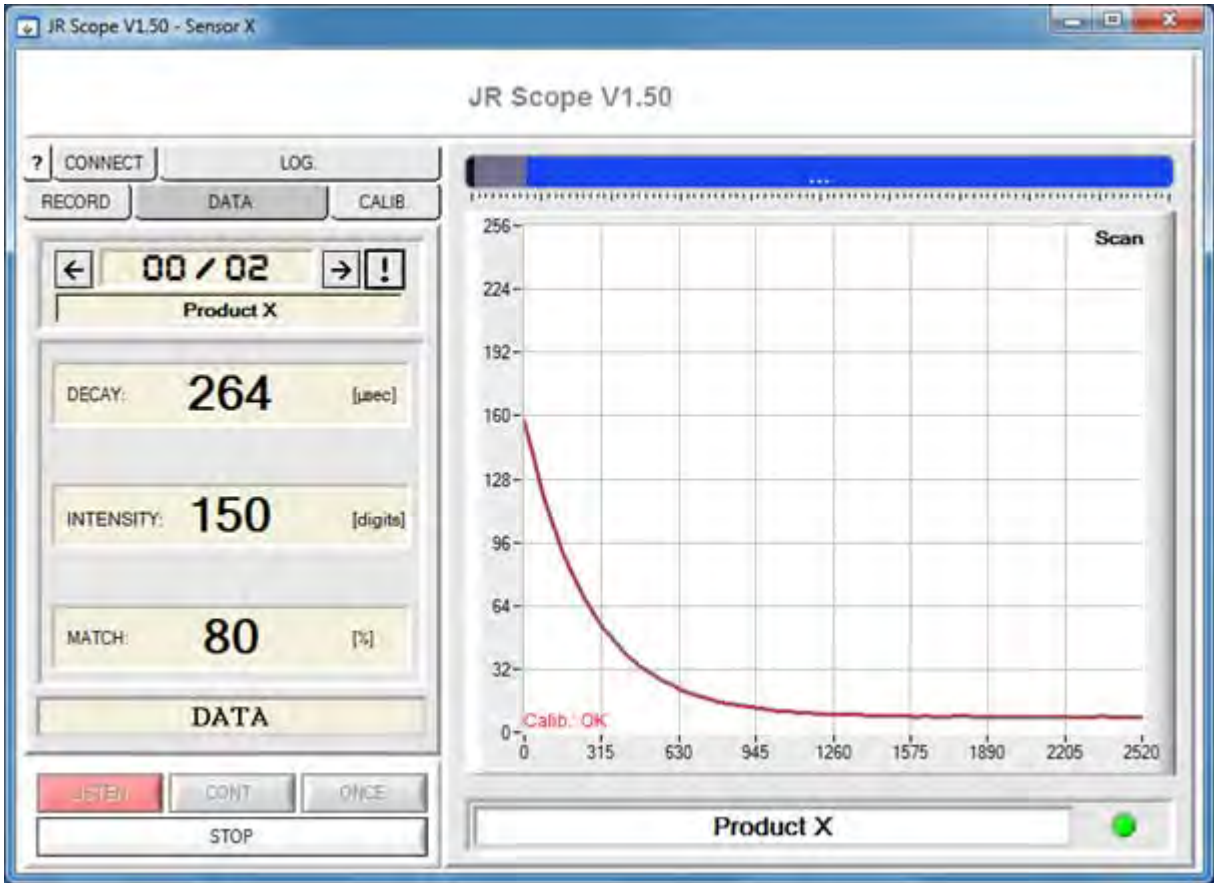
**ATTENTION: The generation of parameter files is a special feature of the LUMI-MOBILE-LAB sensor. Sensors of all expansion levels only can be configured by means of parameter files.**

## Windows® Software

**Functions of the Windows® PC software:**

- Communication with the sensor through USB
- Download of configuration files to the sensor
- Calibration of the sensor
- Generation of configuration files **(only LAB expansion level)**
- Display of measurement values
- Display of signal curves
- Recording/ saving of measurement data on the PC
- Analysis of signal curves **(only LAB expansion level)**

**Windows® PC software user interface:**



## Accessories

### Connecting cables:
(please order separately)

**cab-usb/A-MINI_AB-1,5m**
USB connecting cables

**PS-24V-1A/24W-J135**
Power supply, without charging function

### Battery and charger:
(please order separately)

**Block-Akku Li-Ion 9V**
Rechargeable battery Li-Ion 9V

**Profilader VC Li-Ion 9V**
Charger for 2 pcs. „Block-Akku Li-Ion 9V“ (battery)

**PS-12V-Profilader VC**
Power supply for charger „Profilader VC Li-Ion 9V“

### Reflected light fiber optics
(please order separately)

**R-S-A3.0-(3.0)-600-67°** (length 600 mm)
**R-S-A3.0-(3.0)-1200-67°** (length 1200 mm)

**R-S-R1.1-(3x0.5)-600-67°** (length 600 mm)
**R-S-R1.1-(3x0.5)-1200-67°** (length 1200 mm)

**R-S-R2.1-(6x1)-600-67°** (length 600 mm)
**R-S-R2.1-(6x1)-1200-67°** (length 1200 mm)

### Offline top part (spacer) for reflected light fiber optics
(please order separately)
**A3.0-OFL-SHIFT** (offline top part for fiber optics with sensor head type A3.0)
**A3.0-OFL-D14/6** (offline top part for fiber optics with sensor head type A3.0)

## LUMI-MOBILE Case

### LUMI-MOBILE-FIO-JR-IR/IR-CASE-1b
Sensor case model 1b (fiber optics length 600 mm)
incl. spacer A3.0-OFL-SHIFT

Case composed of:
1x **LUMI-MOBILE-FIO-JR-IR/IR**
incl. **software LUMI-MOBILE-JR-Scope**
(hand-held device with display, for battery operation)
1x **R-S-A3.0-(3.0)-600-67°** (reflected light fiber optics, type A3.0)
1x **A3.0-OFL-SHIFT** (spacer for fiber optics type A3.0)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1A/24W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

### LUMI-MOBILE-FIO-JR-IR/IR-CASE-1c
Sensor case model 1c (fiber optics length 1200 mm)
incl. spacer A3.0-OFL-SHIFT

Case composed of:
1x **LUMI-MOBILE-FIO-JR-IR/IR**
incl. **software LUMI-MOBILE-JR-Scope**
(hand-held device with display, for battery operation)
1x **R-S-A3.0-(3.0)-1200-67°** (reflected light fiber optics, type A3.0)
1x **A3.0-OFL-SHIFT** (spacer for fiber optics type A3.0)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1A/24W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam

### LUMI-MOBILE-FIO-JR-IR/IR-CASE-1d
Sensor case model 1d (fiber optics length 1200 mm)
incl. spacer A3.0-OFL-D14/6

Case composed of:
1x **LUMI-MOBILE-FIO-JR-IR/IR**
incl. **software LUMI-MOBILE-JR-Scope**
(hand-held device with display, for battery operation)
1x **R-S-A3.0-(3.0)-1200-67°** (reflected light fiber optics, type A3.0)
1x **A3.0-OFL-D14/6** (spacer for fiber optics type A3.0)
2x **Block-Akku Li-Ion 9V** (rechargeable Li-Ion battery)
1x **Profilader VC Li-Ion 9V** (charger for 2x Block-Akku Li-Ion 9V)
1x **PS-12V-Profilader VC** (power suppy for Profilader VC Li-Ion 9V)
1x **PS-24V-1A/24W-J135** (power supply without charging function)
1x **cab-usb/A-MINI_AB-1,5m** (USB connecting cable)
1x **Case (S)** Hard case, incl. grid foam