| SIGRIST PROCESS-PHOTOMETER | Document number: 12112E |
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# INSTRUCTION MANUAL

# LabScat 2


## Laboratory Turbidimeter

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# Contents

# 1 General user information

## 1.1 Terms used in this document (glossary)

Please refer to our website for specialist terms: www.photometer.com/de/abc/index.html

## 1.2 Purpose of the Instruction Manual

This Instruction Manual provides the user with helpful information about the entire life cycle of the LabScat 2 and its peripheral devices. Before commissioning the instrument, you should be completely familiar with the Instruction Manual.

## 1.3 Target group of the documentation

The Instruction Manual is intended for all persons who are responsible for the operation and maintenance of the instrument.

## 1.4 Additional documentation

| DOC. NO. | TITLE | CONTENT |
|---|---|---|
| 12114E | Brief Instructions | The most important functions and the servicing schedule. |
| 12113E | Reference Manual | More sophisticated menu functions and worksteps for advanced users. |
| 12406E | Data sheet | Descriptions and technical data about the instrument. |
| 12115E | Service Manual | Repair and conversion instructions for service engineers. |
| 12733DEF | Declaration of conformity | Compliance with the underlying directives and standards. |

## 1.5 Copyright provisions



## 1.6 Document storage location

This document is part of the product. It should be stored in a safe place and always be close at hand for the user.

## 1.7 Order document

The most recent version of this document can be downloaded at www.photometer.com (first time registration required).
It can also be ordered from a SIGRIST representative in your country (→ Instruction Manual "Customer service information").

## 1.8 Proper use

The LabScat 2 and peripheral equipment is designed for measuring turbidity in liquids which are either in bottles or cuvettes.

## 1.9 User requirements

The instrument may be operated only by trained technical personnel who have read and understood the content of the Instruction Manual.

## 1.10 Declaration of conformity

Current technological principles were followed in designing and manufacturing the instrument. They comply with the applicable guidelines concerning safety and duty to take due care.

CE

EU: The measuring instrument meets all applicable requirements within the European Union (EU) for carrying the CE mark.

Please refer to the separate declaration of conformity for details.

## 1.11 Use restrictions

**EXPLOSION HAZARD!**

**Operation in an inappropriate environment.**

Use in explosive areas can cause explosions, which can lead to the death of persons in the vicinity.

- It is not permitted to operate the instrument in explosion hazardous areas or rooms.
- It is not permitted to use the instrument with explosive sample substances.

## 1.12 Dangers when not used properly

**DANGER!**

**Operation when not used properly.**

Improper use of the instrument can cause injuries to persons, process-related consequential damage and damage to the instrument and its peripherals.

In the following cases the manufacturer cannot guarantee the protection of persons and the instrument and therefore assumes no legal responsibility:

- The instrument is used in a way not included in the described area of application.
- The instrument is not properly mounted or set up.
- The instrument is not installed and operated in accordance with the Instruction Manual.
- The instrument has been operated with accessory parts which SIGRIST-PHOTOMETER AG has not expressly recommended.
- Improper changes to the instrument have been performed.
- The instrument has not been operated within the specifications, in particular concerning pressure and temperature.

## 1.13 Meaning of the safety symbols

All **danger symbols** used in this document are explained below:

**DANGER!**

**Danger due to electrical shock that may result in serious bodily injury or death.**

Non-observance of this danger warning may lead to electrical shocks and death.

**EXPLOSION HAZARD!**

**Danger due to explosion that may result in serious bodily injury or death.**

Non-observance of this notice may cause explosions resulting in serious property damage and death.

**WARNING!**

**Warning about bodily injury or hazards to health with long-term effects.**

Non-observance of this warning may lead to injuries with possible long-term effects.

**CAUTION!**

**Notice about possible material damage.**

Non-observance of this notice may cause material damage to the instrument and its peripherals.

## 1.14 Meaning of the pictograms

All **pictograms** used in this document are explained below:

Additional information about the current topic.

Practical procedures when working with the LabScat 2.

Manipulations on the touchscreen.

# 2 Instrument overview

## 2.1 LabScat 2 overview


*Figure 1: Instrument overview LabScat 2*

| | | | |
|---|---|---|---|
| ① | On/Off switch | ② | USB port with cover |
| ③ | Display (touchscreen) | ④ | Cover open |
| ⑤ | Water bath with bottle centering device | ⑥ | Cover closed |
| ⑦ | Desiccant container | ⑧ | Outlet (overflow / emptying) |
| ⑨ | Inlet | ⑩ | Regulator valve / emptying mechanism |

## 2.2 Identification of the LabScat 2

The instrument has the following rating plate :

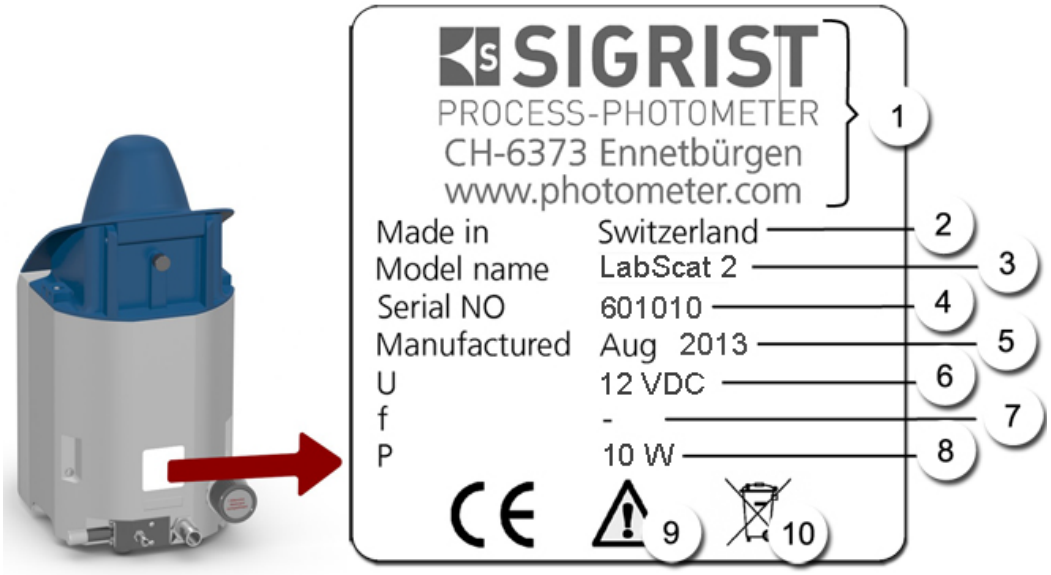



*Figure 2: LabScat 2 rating plate*

| | | | |
|---|---|---|---|
| ① | Manufacturer | ② | Country of origin |
| ③ | Product name | ④ | Serial number |
| ⑤ | Date of manufacture | ⑥ | Supply voltage |
| ⑦ | Frequency range | ⑧ | Power |
| ⑨ | Observe the Instruction Manual | ⑩ | Disposal information |

## 2.3 Scope of supply and accessory parts

The scope of supply can be found in the sales documents.

The accessory parts are available online.

https://www.sigrist.com/de/Turbidity-Meters-Analyzers-Liquid/LabScat-2/Parts

## 2.4 LabScat 2 technical data

| DATA | VALUES |
|---|---|
| Measuring principle | Scattered light measurement 90°/25° |
| Measurement span | 0 .. 200 EBC (optional: 0 .. 500 EBC) |
| Color depth of the sample | Depending on bottle color and bottle diameter |
| Measuring time | 12 seconds |
| Wavelength | 650 nm according to MEBAK recommendation |
| Radiation class | LED device of Class 1 according to EN 60825-1 |
| Measuring angle | 90° and 25° |
| Resolution | < ± 1% of the measuring value or ± 1 mEBC |
| Reproducibility | 0 .. 2 EBC: ± 1% or ± 1 mEBC of the measuring value<br>2 .. 200 EBC: at 90° ±2%, at 25° ±3% of the measuring value |
| Repeatability | 0.001 EBC or ±0.1% full scale |
| Supply voltage | 12 VDC with separate power unit |
| Power consumption | 10 W |
| Interfaces | Ethernet, USB, Modbus TCP, optional Modbus RTU/Profibus DP |
| Reading | ¼ VGA with touchscreen<br>Resolution: 320 x 240 pixel, 3.5" diagonal |
| Water bath connections | Circulation approx. 0.5 l/min., max. Pressure 0.6 MPa (6 bar) |
| Warm-up time | Less than 5 min. |
| Bottle dimensions | Ø 50 to 88 mm, height up to 330 mm |
| Ambient temperature | 0 .. +40 °C |
| Ambient humidity | 0 .. 99% relative humidity |
| Weight | 5 kg |
| Dimension | L: 282.5 mm (343 mm when cover open)<br>H: 393 (480 mm when cover open)<br>W: 185.5 mm |

# 3 General safety points

## 3.1 Dangers when properly used

**DANGER!**

**Damaged instrument or cabling.**

Touching damaged cables may lead to electrical shocks or death.

- The instrument may be operated only when the cables are undamaged.
- The instrument may be operated only if it has been properly installed or repaired.

**DANGER!**

**Dangerous voltage inside the supplied mains device.**

Touching a wet or damaged mains device may lead to electrical shocks or death.

- Do not position the mains device in moist locations.
- Do not operate the mains device if housing is damaged.

**DANGER!**

**Damage to the instrument due to incorrect service voltage.**

If the instrument is connected to an incorrect service voltage, the instrument can be damaged.

- The instrument may be connected only to voltage sources as specified on the rating plate.

**DANGER!**

**Rotating bottle centering device.**

Reaching into the rotating bottle centering device may result in crushing of hands and fingers.

- Do not reach into the rotating bottle centering device.
- Start a measurement only when the water bath cover is closed.

**DANGER!**

**Missing Instruction Manual after the instrument changes hands.**

Operating the instrument without knowledge of the Instruction Manual may lead to injuries to persons and damage to the instrument.

- If the instrument changes hands, always include the Instruction Manual.
- If the Instruction Manual is lost, you can request a replacement.
  Registered users can download the current version at www.photometer.com.

**CAUTION!**

**Water escaping from leaking instrument or water connections.**

Escaping water can lead to flooding of the space and may cause material damage to the building and furnishings.

- Check the sealing of the inlet and outlet.
- Never leave the instrument unsupervised.

**CAUTION!**

**Penetration of moisture as well as condensation on the electrical components during operation.**

If moisture enters the instrument, the LabScat 2 can be damaged.

- The USB interface cover must always be attached during operation.
- If the instrument is operated with a water temperature which is lower than the ambient temperature, the instrument must remain switched on.

**CAUTION!**

**Penetration of moisture as well as condensation on the electrical components during servicing duty.**

If moisture enters the instrument, the LabScat 2 can be damaged.

- Work on the inside of the instrument may be performed only in a dry room and at room temperature. The instrument should be at operating or room temperature (avoid condensation on optical and electrical surfaces).

**CAUTION!**

**The use of aggressive chemicals when cleaning.**

Use of aggressive chemicals can cause damage to instrument components.

- Do not use aggressive chemicals or cleaning agents when cleaning.
- Should the instrument come in contact with aggressive chemicals, clean it thoroughly with a neutral cleaning agent.

**WARNING!**

**Unpleasant odors in the water bath**

Stagnant water or residual moisture in the water bath can lead to unpleasant odors.

- Empty and clean the water bath after every use.
- Do not close the cover on the water bath when not in operation.

## 3.2 Residual risk

**WARNING!**

**According to the risk assessment of the applied safety directive DIN EN 61010-1, there remains the risk of a faulty measuring value display. This risk can be reduced with the following measures:**

- Use an access code to prevent unauthorized persons from changing parameters.
- Perform the specified servicing duties.

## 3.3 Warning and danger symbols on the instrument

**WARNING!**

**There are no warning or danger symbols on the instrument.**

Users must ensure that they observe the safety measures as specified in the Instruction Manual at all times when working with the instrument and its peripheral equipment.

The following sections must be internalized:

- Section 1.11
- Section 1.12
- Section 1.13
- Section 3.1
- Section 3.2
- Observe safety pointers when performing the described procedures.
- Observe local safety pointers.

# 4 Assembly

## 4.1 Location selection

Note the following points for the operating location:

- The photometer is set up on a table or an even surface.
- Electrical supply and water supply must be ensured.
- The instrument should not be exposed to direct sunlight during measurement, as the measurement can be skewed by excessive external light.
- The water supply must be ensured as described in the technical data. The continual water circulation during operation ensures that the water bath is always filled, also for different water bottle sizes.
- Water outlet must be able to take place unhindered, as otherwise the water bath may overflow and flood the inside of the instrument.

## 4.2 Assembly and water bath connection

**CAUTION!**

**Loosely fastened hoses on the photometer.**

If the hoses become loose from the photometer, the space can flood and cause material damage to the building and furnishings.

- All hose junctions have to be secured with hose clamps. The connections should be checked about two weeks after installation to ensure they are sealed.

- Cleaning and other activities are easier if the instrument can be moved without removing the hoses. Therefore, ensure the hoses are sufficiently long.
- The regulator valve is designed for the maximum pressure of 0.6 MPa (6 bar). However, we recommend regulating the flow rate directly at the water valve during water withdrawal. Ensure that the feed hoses are specified for the maximum pressure.
- The water quality is monitored by the instrument. Monitoring is based on the measuring value of 90°, which is constantly measured, regardless of whether a measurement value acquisition was initiated. The lowest measuring value of the last 15 minutes is the water value.

  **Caution:** If a sample with high turbidity is in the LabScat 2 for longer than 15 minutes, a **WATER QUALITY** warning is triggered. The warning can be deleted by removing the sample from the measuring instrument.

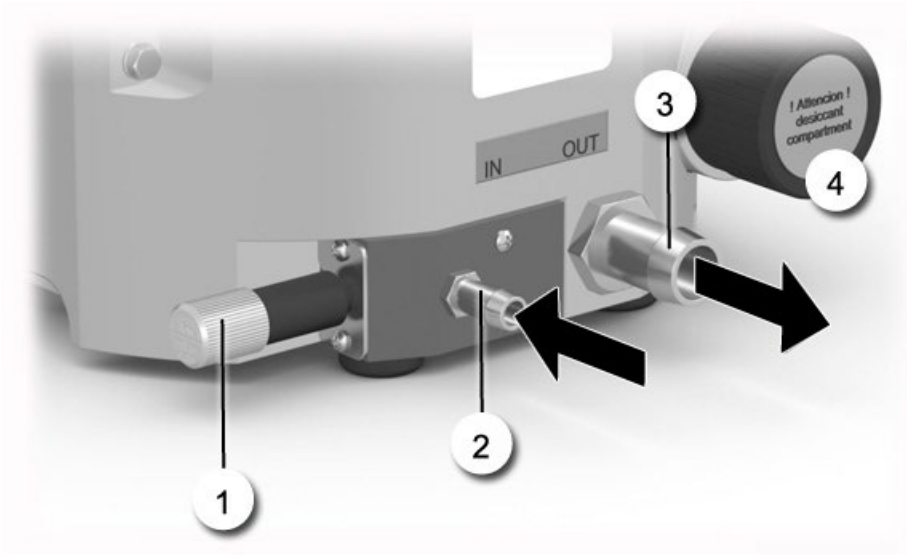
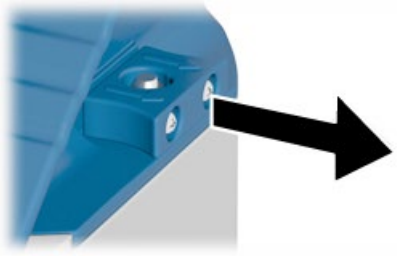
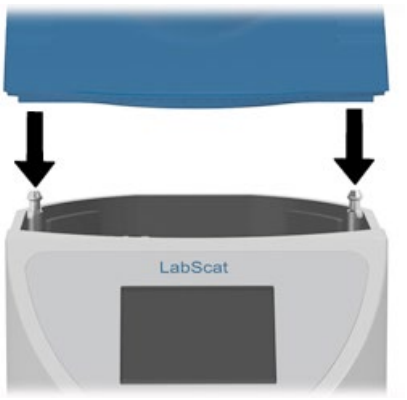



*Figure 3: Water bath connections*

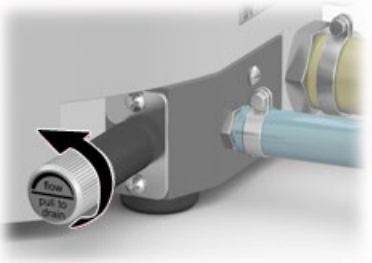
| | | | |
|---|---|---|---|
| ① | Regulator valve / emptying mechanism | ② | Inlet Ø 8 mm |
| ③ | Outlet Ø 16 mm | ④ | Desiccant container<br>Open the desiccant container only when changing the desiccant. |

| | WORKSTEP | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Set up the instrument on an even surface. | |
| 2. | **Remove the water bath cover:**<br>To do so, pull the two side locks outward at the same time and lift the water bath cover. |  |

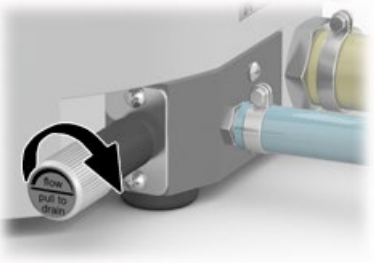
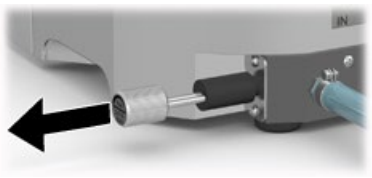
| | WORKSTEP | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 3. | **Insert bottle centering device:**<br>Insert the separately supplied bottle centering device into the instrument and fasten with the two knurled screws. |  |
| 4. | Position the water bath cover on the locking pins (arrow positions) and press down until the locks snap into place. |  |
| 5. | Fasten the drain hose on the drain tube (3) with a hose clamp. | |
| 6. | Fasten inlet hose on the inlet tube (2) with a hose clamp.<br>The supplied water filter must be inserted between the inlet and the water withdrawal. This protects the water bath and bottle centering device from dirt particles. |  |

## 4.3 Filling the water bath

- The regulator valve must be pressed in completely to fill the water bath.
- The water bath should not be without water circulation for a long period of time.
- The continual water circulation ensures that the water bath is always filled, also for different bottle sizes.
- The water bath must be cleaned periodically.

| | WORKSTEP | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Fully open the regulator valve counter clockwise and fill until the water overflows. |  |
| 2. | Set the regulator valve to approx. 0.5 l/min. | |

## 4.4 Emptying the water bath

| | WORKSTEP | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Stop the water supply by closing the regulator valve. |  |
| 2. | Pull out the regulator valve to the stop so that the water can flow out of the water bath. |  |

# 5 Electrical installation

## 5.1 Safety pointers for electrical connection

**DANGER!**

**Connecting the service voltage on the instrument.**

Improper connection of supply voltage to the instrument is extremely dangerous. The instrument may also be damaged. Local regulations for electrical connections must be observed at all times.

Further, the following basic principles must be observed:

- The supplied power supply must be protected from moisture.
- A back-up fuse with maximum tripping current of 16 A must be present and the cables must be able to withstand this load.
- If faults cannot be remedied, the unit must be put out of operation and protected against inadvertent operation.

## 5.2 Switch instrument on/off

The supplied power supply is designed with input voltages of 100-240 VAC and a frequency range of 47-63 Hz. There are three plug adapters in the scope of supply (EURO, UK, US).


*Figure 4: LabScat 2 On/Off switch*

| | | | |
|---|---|---|---|
| ① | On/Off switch (toggle switches)<br>⏻ Instrument is switched off<br>I Instrument is switched on | ② | USB port with cover<br>→ Reference Handbook |

# 6 Commissioning

The initial start-up of the web user interface via the Ethernet interface is described in the Reference Manual.

If malfunctions occur, consult the Section 10.

Proceed with the initial start-up in accordance with the following table:

| | WORKSTEP | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Replace the desiccant according to Section 9.4 by the supplied new desiccant. | |
| 2. | Check whether the water bath is connected correctly. If this is OK, fill the water bath. | Section 4.2 and Section 4.3 |
| 3. | 3.1: Establish supply voltage to photometer and then switch on the instrument. Welcome screen appears on the display.<br>The factory setting language is English. Accordingly, the displayed language during the initial start-up is English. Section 5 |  |
| | 3.2: Instrument carries out an internal functional check. |  |
| | 3.3: The instrument is ready for measurement. |  |
| 4. | Set language. | Section 8.1 |
| 5. | In the **Logger/Data** menu activate the **Name**. | Complete this step only if the data should be identified in more detail by means of a description text. |
| 6. | Select linearization. | Section 8.3 |
| 7. | Setting the date and time. | Section 8.4 |
| 8. | Enter access code. | Section 8.5 |

# 7 Operation

## 7.1 Operation basics

In this document we describe the practical examples only for the first steps of the menu configuration. All other setting options are described in the Reference Handbook. Operation using the web user interface is described in detail in the Reference Manual.

The instrument has a touchscreen. It is operated by touching with your finger. The navigation elements change color when touched.

**CAUTION!**

**Sensitive touchscreen.**

The touch screen can be damaged through improper handling. Damage can be avoided with the following measures:

- Touch the touchscreen only with your fingers and not with sharp objects.
- Use only slight pressure to perform manipulations on the touchscreen.
- Do not use chemicals or solvents to clean the touchscreen.

## 7.2 Control elements in normal operation


*Figure 5: Control elements in normal operation*

| | | | |
|---|---|---|---|
| ① | **Measure button**<br>Start the measurement.<br>Section 7.6 | ② | **Menu button**<br>Call up the menu structure.<br>Section 7.8 |
| ③ | **Lin button**<br>Switches between the standard linearization curve and the customer-specific linearization curves. Section 8.3 | ④ | **Info button**<br>Displays the information screen.<br>Section 7.3 |
| ⑤ | **Log Button**<br>Section 7.5 | | |

## 7.3 Info button

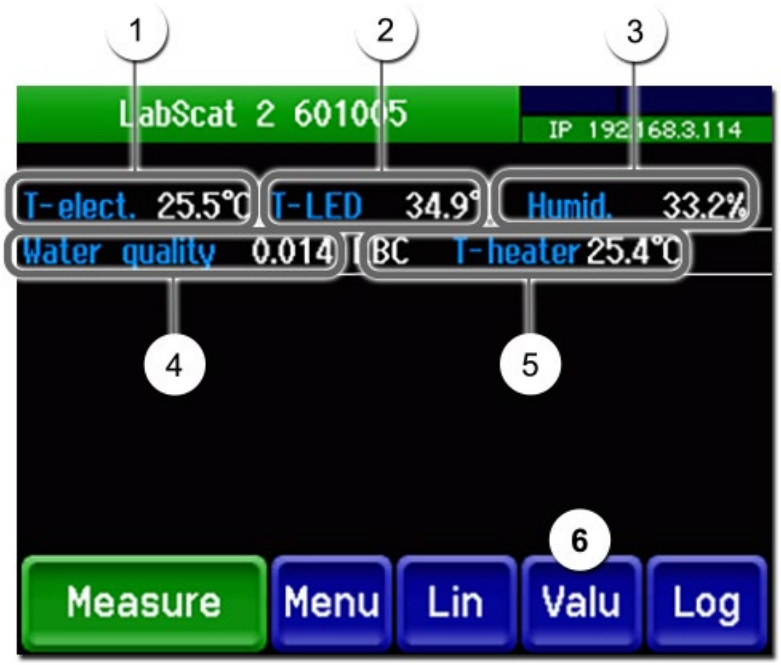



*Figure 6: Info display*

| | | | |
|---|---|---|---|
| ① | **T-elect.**<br>Measured temperature within the electronics in °C. | ② | **T-LED**<br>Current temperature of the light source (LED) in °C. |
| ③ | **Humidity**<br>Measured humidity in the dry chamber in %. | ④ | **Water quality**<br>Measured water quality in EBC. |
| ⑤ | **T-heater**<br>Current temperature of the optics holder in °C. | ⑥ | **Valu button**<br>Screen changes back to measuring value screen. |

## 7.4 Displays in normal operation

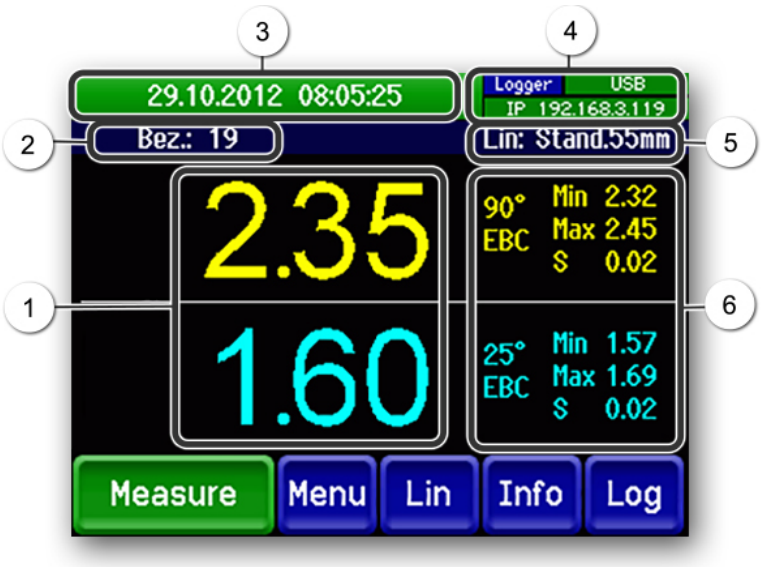



*Figure 7: Displays in normal operation*

| | | | |
|---|---|---|---|
| ① | **Measuring value 90°/25°**<br>For values which are greater than the maximum measuring range, no measuring value is displayed; instead ******** is displayed. | ② | **Name of the measurement result**<br>There are two possibilities:<br>▪ If Logger**/Data/Name** activated: **Name** is shown.<br>▪ If **Logger/Data/Name** not activated: Measurement counter is displayed. |
| ③ | **Status line**<br>In normal operation the status line is green and shows the date and time.<br>If malfunctions occur, warning and error messages will be displayed and the status line changes color. | ④ | **Interface information**<br>Top left: Logger status<br>Top right: USB status<br>Below: Ethernet IP status<br>The following messages are possible:<br>▪ IP not connected (cable not connected)<br>▪ IP DHCP running…<br>▪ IP 169.254.1.1 (example address)<br>Color coding: **Black:** Not active, not present/**Blue:** Activated in quiescent mode/**Green:** Active/**Red:** Fault |
| ⑤ | **Linearization function**<br>▪ **Lin: Stand.55 mm (white)**<br>The standard linearization is set.<br>▪ **Lin: Special (Red)**<br>One of the four customer-specific linearization curves is set. The curves are defined in the Meas. menu. **Canals/canal n/linear.n**. | ⑥ | **Channel name with unit**<br>During bottle rotation the following measurements are performed:<br>▪ **Min:** indicates the smallest measured value.<br>▪ **Max:** indicates the largest measured value.<br>▪ **S:** indicates the standard deviation. |

## 7.5 Functions of the log screen (Log button)

- The file can also be viewed via the web interface as a text file.
- The log file is deleted after it has been transferred to a USB stick.
- When exiting the log screen, the file is shortened to a maximum of 1000 entries.

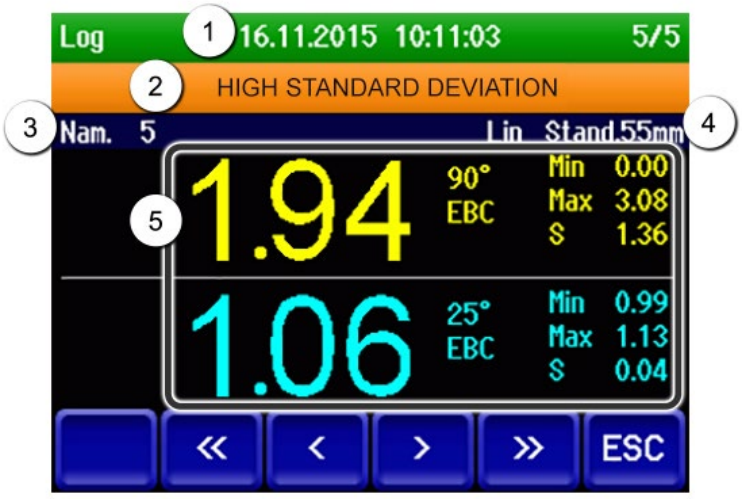


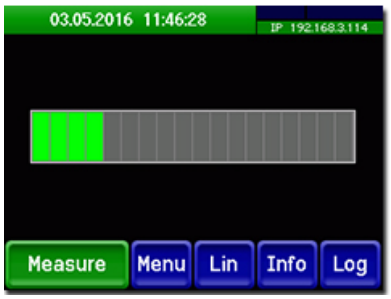

*Figure 8: Functions of the Log display*

| | | | |
|---|---|---|---|
| ① | Date, time and storage location | ② | Fault messages and warning messages |
| ③ | Description of the measurement | ④ | Lin curve used |
| ⑤ | Measuring values 90°/25° with minimum value, maximum value and standard deviation. | | |

**</>:** Forward/back one storage location
**<</>>:** Forward/back 20 storage locations
**ESC:** Exit logger

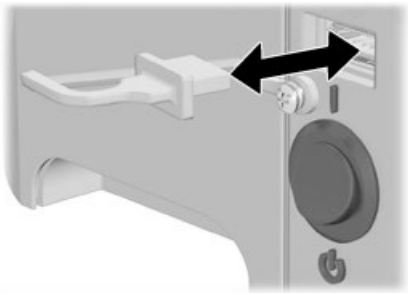
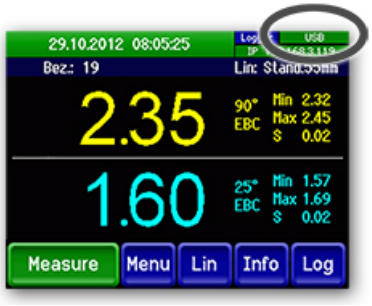
## 7.6 Perform measurement

| | WORKSTEP | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Fill the water bath in accordance with Section 4.3. | Depending on the water quality, air bubbles may appear in the water bath. Stirring can improve the situation. |
| 2. | Put the sample in the water bath and close the water bath cover. | |

| | WORKSTEP | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 3. | Check whether the desired linearization is active.<br>You can switch between the standard and customer-specific linearization with the **Lin** button. | |
| 4. | Press the **Measure** button. | |
| 5. | Confirm entry with **OK**. Measurement starts. | During measurement, a progress display is shown. Operation is blocked while measurement is running.<br>  |
| 6. | If the **Name** was activated in the **Logger/Data** menu, enter the sample name in the input mask.<br>The entry can be made via the touchscreen or via a connected USB keyboard or barcode reader. |  |
| 7. | After a successful measurement, the measured values are shown on the display.<br>On the right, the minimum value, the maximum value and the standard deviation are displayed.<br>Large measuring value fluctuations point to an inhomogeneous sample. |  |
| | **Incorrect measurement**<br>If the measurement did not run correctly, an error message is output in the status line. |  |

## 7.7 Copy measurement data to USB stick

Only the data that was added since the last time data was transferred will be copied.

| | WORKSTEP | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Ensure the instrument is in normal operation. | |
| 2. | Remove splash guard from the USB port. |  |
| 3. | Insert USB memory stick into the port. |  |
| 4. | After the USB memory stick is inserted, the saved measuring values are automatically copied to the USB memory stick.<br>**Status of the USB display:**<br>▪ During copying, the USB display is green.<br>▪ After saving is completed, the USB display changes to blue.<br>▪ The USB display changes to red if no measuring values are saved or if an error occurs during the data transfer. |  |
| 5. | Remove USB memory stick and insert splash guard in the USB port. | |

| | WORKSTEP | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 6. | The data is saved on the USB memory stick in the folder **SIGRIST_LOG**.<br>The file name is composed of the save date and time.<br>The data is saved as text files and can be opened with any editor (e.g. Windows editor or Excel). The data can be copied and used for your own purposes.<br>**Data that has been transmitted to the USB stick are no longer available in the LabScat.** | |

## 7.8 Switching to service mode

| | MANIPULATION | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Press the **Menu** button. | |
| 2. | Set the access code and confirm with **OK**. | Factory setting is **0**. |
| 3. | The main menus appear. Now the instrument is in service mode. | |

### 7.8.1 Input elements in service mode

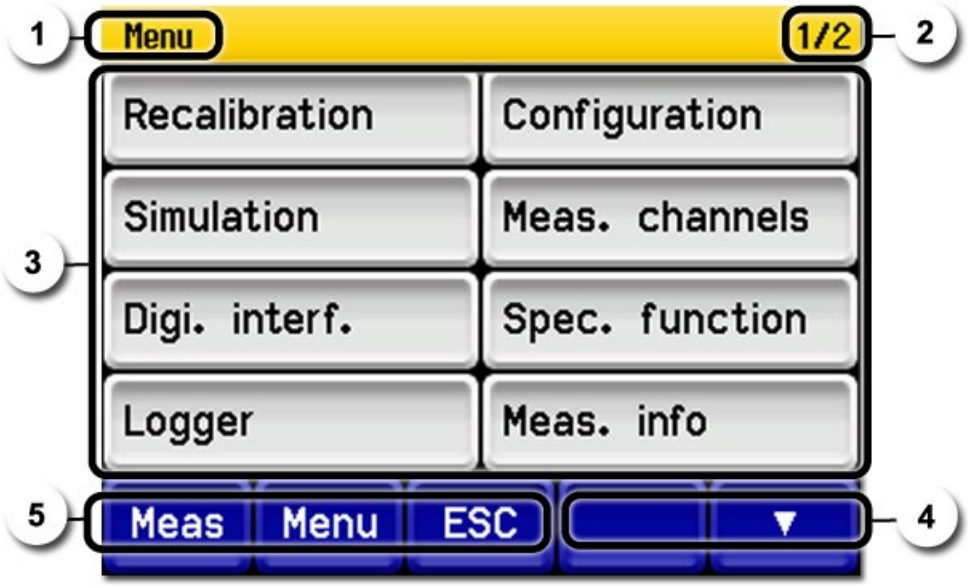



*Figure 9: Input elements in service mode*

| | | | |
|---|---|---|---|
| ① | **Path specification** | ② | **Page number / total number of pages** |
| ③ | **Main menus**<br>Instrument-specific menus of the photometer. | ④ | **Next page** |
| ⑤ | **Meas button:**<br>The instrument changes to measuring operation.<br>**Menu button:**<br>The display goes back to mean menus and remains in service mode.<br>**ESC button:**<br>The display goes back one level in the menu hierarchy until the measuring mode finally is reached. | | |

## 7.8.2 Numerical entry

The following screen is for entering numbers and data:

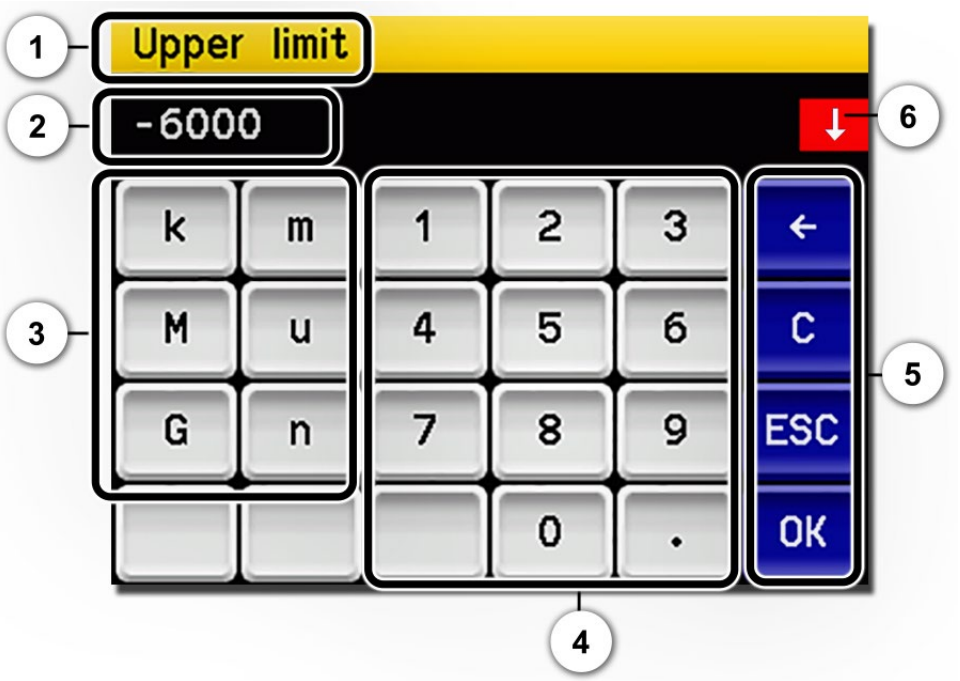



*Figure 10: Numerical entry*

| | | | |
|---|---|---|---|
| ① | Parameter name | ② | Entered values |
| ③ | **Prefix:** For entering very large or very small values. This can be done as follows:<br>1. Enter value<br>2. Select SI prefix<br>**Function:**<br>n = $10^{-9}$, u = $10^{-6}$, m = $10^{-3}$,<br>k = $10^{3}$, M = $10^{6}$, G = $10^{9}$ | ④ | Numerical entry |
| ⑤ | **←:** Deletes one digit of the displayed value.<br>**C:** Clears the displayed value.<br>**ESC:** Touching the **ESC** field causes the display to go back one level in the menu hierarchy. The entered value is not saved.<br>**OK:** Confirm entered value. | ⑥ | If the value entry is too high or too low, a white arrow appears in a red field top right.<br>**Arrow points upward:** Entry too high<br>**Arrow points downward:** Entry too low |

## 7.8.3 Single selection of functions

The single selection is identifiable by the **ESC** button below right.

The currently selected function is green. Use the Up/Down arrows to navigate the options in long lists. Use the **ESC** button to cancel the entry.
Pressing a selection item saves the configuration and completes the entry.


*Figure 11: Example of single selection*

## 7.8.4 Multiple selection of functions

The multiple selection is identifiable by the **OK** button bottom right:

The currently selected values are green. Use the Up/Down arrows to navigate the options in long lists. Pressing a selection item changes the active status of the corresponding item. Press the **OK** button to save the configuration and complete the entry.

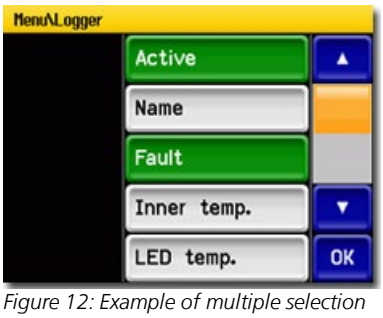


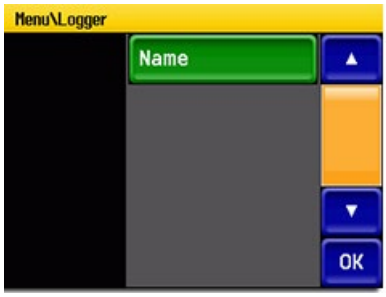

*Figure 12: Example of multiple selection*

# 8 Settings

## 8.1 Setting the operating language

| | MANIPULATION | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Press the **Menu** button. | |
| 2. | Set the access code and confirm with **OK**. | Factory setting is **0**. |
| 3. | Press the **Configuration** button to access language selection. | If the desired menu does not appear, press the arrow bottom right. |
| 4. | Press language field (circle). The list of all languages appears (factory setting is English). |  |
| 5. | Apply the desired language by pressing the corresponding field, or press the **ESC** button to cancel. |  |
| 6. | Press the **Meas** button. | |

## 8.2 Activate name in the Logger menu

| | MANIPULATION | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Press the **Menu** button. | |
| 2. | Set the access code and confirm with **OK**. | Factory setting is **0**. |
| 3. | Press the **Logger** button. | |
| 4. | For **Data** press the **Define** button. |  |
| 5. | Press the **Name** button, ensuring it appears green. |  |
| 6. | Press the **OK** button to confirm. | |
| 7. | Press the **Meas** button. | |

# 8.3 Linearization selection

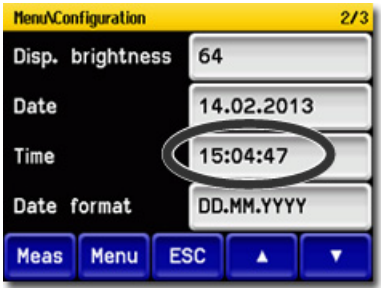
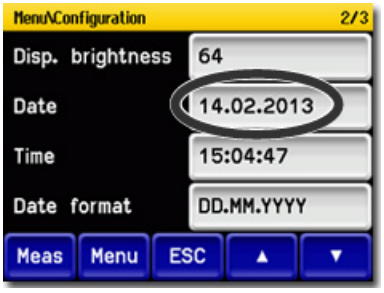
| | MANIPULATION | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Press the **Lin** button.<br>A selection of the available linearization curves is displayed. |  |
| 2. | Press the button of the desired linearization curve. | |
| 3. | The Instrument will automatically return to the normal measuring mode and displays the new linearization curve. | |

More detailed information about linearization can be found in the Reference Manual.

The measured turbidity value is dependent on the bottle diameter. The influence of the bottle diameter is particularly noticeable at turbidity over 2 EBC. We recommend using the linearization curve only for turbidities over 2 EBC. For turbidities under 2 EBC, use the standard linearization.

The standard linearization is designed for measuring cells with an inner diameter of 55 mm. Four additional curves are stored for the diameters of 25 mm, 60 mm, 65 mm and 80 mm. They represent an approximation for different bottle types with the corresponding diameters.
To increase accuracy or to adjust other diameters, these four linearization curves can be adjusted to any requirements.

## 8.4 Setting the date and time

| | MANIPULATION | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Press the **Menu** button. | |
| 2. | Set the access code and confirm with **OK**. | Factory setting is **0**. |
| 3. | Press the **Configuration** button. | If the desired menu does not appear, press the arrow bottom right. |
| 4. | To enter the time, press the currently displayed time at the **Time** menu item and enter the new time with the number pad.<br>Confirm entry with **OK**. | The time must be entered in the format **hh:mm**.<br>  |
| 5. | To enter the date, press the currently displayed date at the **Date** menu item and enter the new date with the number pad.<br>Confirm entry with **OK**. | The date must be entered in the format selected under the **Date format** menu item.<br>  |
| 6. | Press the **Meas** button. | Instrument again in normal operation. |

## 8.5 Setting or changing the access code

You can protect the settings of the instrument against unauthorized manipulations by defining your own access code.

| | MANIPULATION | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Press the **Menu** button. | |
| 2. | Set the access code and confirm with **OK**. | Factory setting is **0**. |
| 3. | Press the **Configuration** button. | If the desired menu does not appear, press the arrow bottom right. |
| 4. | Press the button to the right of the **Access code** description text. | |
| 5. | Enter the access code and confirm with **OK**. | |
| 6. | Press the **Meas** button. | Instrument again in normal operation. |

A forgotten access code can be cleared only by a SIGRIST service engineer.

Enter your personal access code here:

| | | | | | |
|---|---|---|---|---|---|
| | | | | | |

## 8.6 Backup configured data

These measures can be of use to the service engineers for service purposes.

| | MANIPULATION | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Press the **Menu** button. | |
| 2. | Set the access code and confirm with **OK**. | Factory setting is **0**. |
| 3. | Press the **System info.** button. | If the desired menu does not appear, press the arrow bottom right. |
| 4. | In the **User -> SD** and **Expert -> SD** submenus press the **Copy** function. | The user and expert data are copied to the microSD card. After a successfully completed procedure, acknowledge with the **OK** button. |
| 5. | Press the **Meas** button. | Instrument again in measuring operation. |

## 8.7 View measurement counter

| | MANIPULATION | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Press the **Menu** button. | |
| 2. | Set the access code and confirm with **OK**. | Factory setting is **0**. |
| 3. | Press the **System info** button. | If the desired menu does not appear, press the arrow bottom right. |
| 4. | Press the down arrow key. | |
| 5. | Read the measurement counter. | |
| 6. | Press the **Meas** button. | Instrument again in normal operation. |

## 8.8 Working with a USB keyboard or barcode reader

The keyboard or barcode reader can be used for all text entry fields (names, units, figures).

Connection to the LabScat 2 can be made as follows:

| | MANIPULATION | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Connect the keyboard/barcode reader to the USB interface. | |
| 2. | The connection to the device is confirmed when **USB** is shown in the information field at the top right.<br>The measurement can be started with the F1 key. | |

# 9 Servicing

## 9.1 Servicing schedule

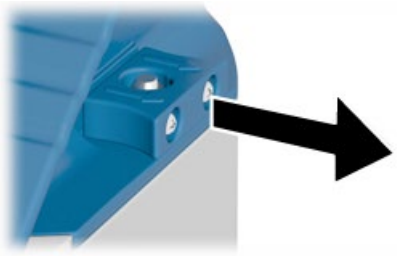
| WHEN | WHO | WHAT | PURPOSE |
|---|---|---|---|
| As needed | Operator | Cleaning the water bath.<br>Section 9.2 | Obligatory measure for maintaining measuring precision. Interval dependent on water quality and handling. |
| Every three months or as needed | Operator | Adjustment with checking unit.<br>Section 9.3 | Measure for maintaining measuring precision. |
| For warning **humidity**<br>Section 7.3 | Operator | Changing the desiccant.<br>Section 9.4 | Obligatory measure for maintenance of the instrument. |

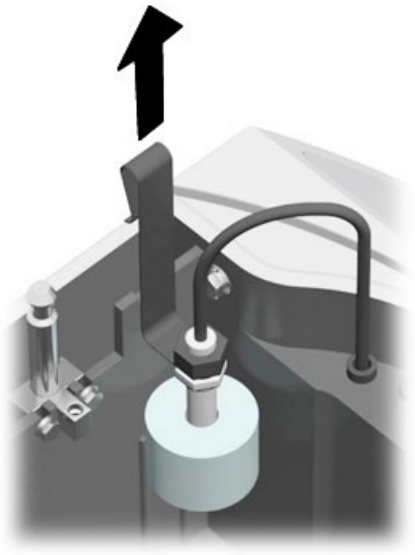
*Table 1: Servicing schedule*

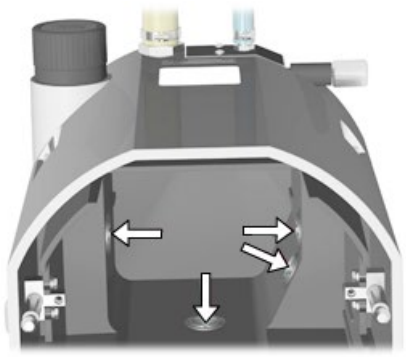
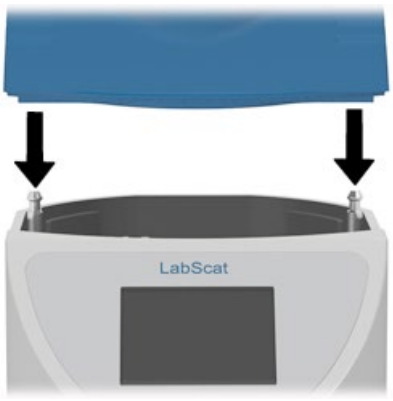
## 9.2 Cleaning the water bath

Soiling of the water bath is generally compensated by the LabScat 2. After a certain operating duration, however, depending on the operating conditions and the water quality, soiling can become so extreme that it can no longer be compensated.

The following procedure describes water bath cleaning:

| | WORKSTEP | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Switch off the instrument in accordance with Section 5.2. | |
| 2. | Empty the water bath in accordance with Section 4.4. | |
| 3. | **Remove the water bath cover:**<br>Pull the two side locks outward at the same time and lift the water bath cover. |  |

| | WORKSTEP | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 4. | **Remove the centering mechanism:**<br>Loosen the two knurled screws (circles) and lift the entire unit out of the water bath. |  |
| 5. | Clean the centering mechanism under running water with a brush and rinse.<br>This centering mechanism is dishwasher-proof, but the temperature must not exceed 80 °C. |  |
| 6. | **Remove the floater:**<br>Pull the floater upward and hang it over the rim of the water bath to the outside. |  |

| | WORKSTEP | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 7. | Remove lime deposits from the inside of the water bath with a commercially available de-calcifier.<br>Rinse the water bath with clear water. | |
| 8. | Clean the window on the inside of the water bath (arrow positions) with a clean, soft cloth (e.g. a cotton cloth). |  |
| 9. | Insert the floater into the guide bar (circle position) and ensure that it can move freely. |  |
| 10. | Mount and fasten the centering mechanism. | |
| 11. | Position the water bath cover on the locking pins and press down until the locks snap into place. |  |

## 9.3 Adjustment with checking unit

The following procedure describes adjustment with the control unit:

| | WORKSTEP | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Clean water bath. | Section 9.2 |
| 2. | Ensure that the water supply to the water bath corresponds to the specifications. | Section 2.4 |
| 3. | Fill water bath. | Section 4.3 |
| 4. | Inspect the checking unit of the instrument and ensure that it is clean and undamaged. | |
| 5. | Check whether the units specified on the checking unit match the nominal values in the instrument. This can be done as follows:<br>**a:** Press the **Menu** button.<br>**b:** Enter access code.<br>**c:** Press the **Recalibr.** button and then **C1 90°** and check whether the saved nominal value of 90° matches the specification on the checking unit.<br>**d:** Press the **ESC** button.<br>**e:** Press the **C2 25°** button and check whether the saved 25° nominal value matches the specification on the checking unit.<br>**f:** Press the **ESC** button. |  |
| 6. | Put the checking unit into the water bath and close the cover. |  |
| 7. | **Prepare adjustment.**<br>Press the **C1 90°** button. | |

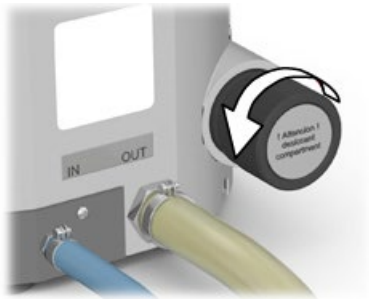
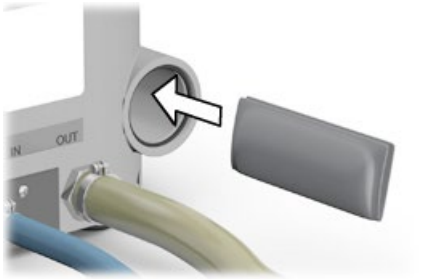
| | WORKSTEP | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 8. | **Perform adjustment.**<br>Press the **initiate** button and wait.<br>If the adjustment was successful, confirm with **Adjustment OK**. This completes the adjustment.<br><br>If the adjustment was **not** successful, it is indicated with **Adjustment fault**. In this case, check the points in the following list one after the other:<br>▪ Cleanliness of the checking unit.<br>▪ Correct checking unit used.<br>▪ Nominal values correspond to the values of the checking unit.<br>If the check was not successfully completed, contact your country representative. | With the initiation of the 90° adjustment, the 25° adjustment is also always initiated. |
| 9. | Remove the checking unit. | |
| 10. | The instrument can now be operated again. | |

A new recalibration factor is determined during recalibration. The deviation from the original state is displayed under **Curr. corr.**.

The text file recali.**txt is also** created that can be viewed using a text editor. This is copied to the USB stick in the SIGRIST_LOG folder.

# 9.4 Replace desiccant

The following procedure describes changing the desiccant:

| | WORKSTEP | ADDITIONAL INFO / IMAGES |
|---|---|---|
| 1. | Unscrew the cover of the desiccant container. |  |
| 2. | Pull out the desiccant.<br>If the desiccant gets caught, tip the instrument backwards a little and then pull out the desiccant. | |
| 3. | Fold the new desiccant lengthwise and insert in the desiccant container. |  |
| 4. | Screw the cover onto the desiccant container until it does not go any further.<br>It may take several hours after a desiccant change until the humidity value has stabilized. |  |

# 10 Troubleshooting

## 10.1 Pinpointing malfunctions

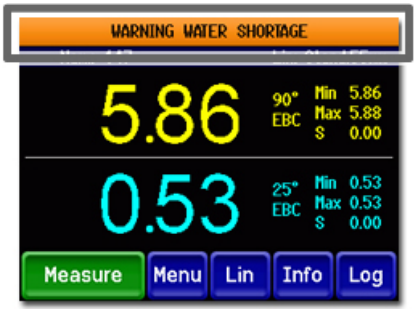
| DETECTABLE MALFUNCTION | ACTION |
|---|---|
| No reading | ▪ Check whether the mains device is plugged in.<br>▪ Check whether the supply voltage is present.<br>▪ Check whether the instrument is switched on. |
| Error message in the display | ▪ Analyze the error message in accordance with Section 10. |
| The reading is wrong | ▪ Ensure that the sample to be measured corresponds to the operating conditions. Section 2.4<br>▪ Perform adjustment. Section 9.3<br>▪ Check whether the photometer is correctly mounted. Section 4<br>▪ Ensure that the servicing duties have been performed according to the servicing schedule. Section 9 |

*Table 2: Pinpointing malfunctions*

If the listed measures do not result in the desired results, please consult with customer service. Section 11

## 10.2 Warning messages and effect on operation

Warnings indicate an unusual state.

| WARNINGS | |
|---|---|
| If a warning occurs during operation, it has the following effects:<br>▪ The instrument continues to operate; however, the measuring results must be carefully evaluated. The cause of the warning message should be remedied at the next possible opportunity.<br>▪ When the cause of the warning has been remedied, it is automatically deleted.<br>▪ When the **Warning** message occurs, the color of the status display changes to **orange** and the warning text describes what the warning is about. |  <br>Example: **WARNING WATER SHORTAGE.** |

The following warning messages can be displayed:

| WARNING | DESCRIPTION | POSSIBLE CAUSES |
|---|---|---|
| HIGH STANDARD DEVIATION | The standard deviation is greater than 50 EBC and greater than 15% of the mean value. | ▪ Sample is unstable. This can stem from particles or gas emissions. |
| ADJUSTFAULT | The adjustment of the instrument could not be performed. | ▪ The instrument is soiled. Section 9.2.<br>▪ The set point for the adjustment does not match the value of the sample. |
| WATER SHORTAGE | A float switch is in the water bath. It reports when the water level in the water bath is too low. | ▪ Regulator valve is closed or water connection is not correct.<br>▪ Can be briefly displayed if a large bottle has been removed from the water bath.<br>▪ Float switch is stuck. Section 9.2.<br>▪ Defect in the electronic system. → Service technician |
| WATER QUALITY | The water quality is insufficient. | ▪ The water quality in the water bath is insufficient.<br>▪ A sample with a high turbidity value has been in the water bath for a long time. |
| MOTOR | The speed of the motor for the bottle centering device is too low | ▪ Blocking of the bottle centering device. Section 9.2<br>▪ Defective drive motor.<br>▪ Defective drive belt. |
| HUMIDITY | The relative humidity in the instrument has risen above the set limit | ▪ The desiccant is saturated.<br>▪ Gaskets on the electronic component defective.<br>▪ Instrument was open too long. |
| OVER TEMP | The temperature in the instrument has exceeded 65 °C. | ▪ The medium or ambient temperature is too high and defective or no cooling. |

*Table 3: Possible warning messages*

## 10.3 Error messages and effect on operation

| FAULT | |
|---|---|
| If an error occurs during operation, it has the following effects:<br>▪ The measurement is canceled.<br>▪ The measuring values go to 0.<br>▪ When the **Fault** message appears, the color of the status display changes to **red** and the text describes the fault in question.<br>If the cause of the fault has been remedied, it is automatically deleted. |  <br>Example: **TOO MUCH EXTERNAL LIGHT** |

The following error messages can be displayed:

| ERROR MESSAGE | DESCRIPTION | POSSIBLE CAUSES |
|---|---|---|
| V ANALOG | One of the internal analogue voltages is outside the permitted range. | ▪ Defect in the electronic system. → Service technician |
| MEASUR.FAULT | Measurement value acquisition is faulty. | ▪ Sample very unstable.<br>▪ Large air bubbles in the water bath.<br>▪ External light influence too strong. Water bath cover is open.<br>▪ Defect in the electronic system. → Service technician |
| LED1 FAILURE | The detector for the LED monitoring is not receiving any light. | ▪ Defective light source. → Service technician |
| TOO MUCH EXTERNAL LIGHT | The detectors receive too much light. | ▪ Water bath cover open. |
| ABSORPTION TOO HIGH | The sample absorbs the light too strongly. A measurement is not possible. | ▪ The sample and/or the bottle is too dark. |
| HUMIDITY | The relative humidity in the instrument has risen above 50%. | ▪ The desiccant is saturated.<br>▪ The seals on the electronic component are defective.<br>▪ The instrument was open for too long. |

*Table 4: Possible error messages*

## 10.4 Prioritized error messages and effect

When there is a prioritized fault, the cause of the malfunction is serious.

| **PRIO (PRIORITIZED FAULT)** | |
|---|---|
| If a prioritized fault occurs during operation, it has the following effects:<br>▪ The measuring values go to 0.<br>▪ Prioritized faults can be cleared only by a service engineer.<br>▪ When the **Prio** message occurs, the color of the status display changes to **red** and the error text describes which prioritized fault it is. |  <br>Example: **PRIO DEFAULT VALUES** |

The following prio error messages can be displayed:

| PRIO MESSAGE | DESCRIPTION | POSSIBLE CAUSES |
|---|---|---|
| DEFAULT VALUES | The default values were loaded. | ▪ If no parameters were initialized or if all parameters were lost, the default values are loaded. |
| CRC EXPERTS | A fault was determined when the expert data was checked. | ▪ Electromagnetic malfunctions.<br>▪ Defect in the electronic system. |
| CRC USER | A fault was determined when the user data was checked. | ▪ Electromagnetic malfunctions.<br>▪ Defect in the electronic system. |
| CRC DISPLAY | A fault was determined when the display data was checked. | ▪ Electromagnetic malfunctions.<br>▪ Defect in the electronic system. |
| EXT RAM | A fault was determined when the RAM in the graphic controller was checked. | ▪ Defect in the electronic system. |

*Table 5: Possible prio error messages*

# 11 Customer service information

Should you have any questions, please contact the responsible service center in your country or region. If this is not known, SIGRIST-PHOTOMETER AG customer service in Switzerland would be glad to provide you with a contact address.

A current list of all SIGRIST country representatives is available in the Internet at www.photometer.com.

Please have the following information ready when you contact a SIGRIST service point or customer service:

- The serial number of the LabScat 2.
- A description of the instrument behavior and the work steps involved when the problem occurred.
- A description of what you did when trying to solve the problem yourself.
- The documentation of the third-party products you use in conjunction with the photometer or peripheral devices.

# 12 Decommissioning/storage

**DANGER!**

**Pulling out or inserting plug of the power unit.**

Pulling out or plugging in the power unit can be extremely dangerous. The instrument may also be damaged. Local regulations must be observed at all times.

The aim of decommissioning is to prepare the instrument properly for storage.

| | PROCEDURE | ADDITIONAL INFO |
|---|---|---|
| 1. | Interrupt service voltage to the photometer and pull out the power unit plug. | |
| 2. | Empty water bath. | Section 4.4 |
| 3. | Remove water inlet and outlet. | Section 4.2 |
| 4. | Thoroughly clean and dry the instrument. | Section 9.2 |
| 5. | Close water bath cover. | |
| 6. | Make sure that the USB cover is mounted. | |

**Storage:**
There are no special requirements for storing the instruments. However, please note the following information:

- The instrument contains electronic components. Storage for such components must fulfill the usual conditions. It is important to ensure that the storage temperature is between -20 and +50°C.
- All components that come into contact with the sample during operation have to be dry and clean for a long time before being put into storage.
- The instrument and accessory parts must be protected from weather factors, condensing humidity, and aggressive gases.

# 13 Packaging/Transport/Returning

**DANGER!**

**Injuries to persons caused by dangerous samples in the returned instrument.**

Instruments that have come into contact with dangerous samples may not be sent to be repaired without information regarding the concerned sample.

Detailed information about the samples must be received by SIGRIST-PHOTOMETER so that relevant precautionary measures can be taken when unpacking.

**ACHTUNG!**

**Damages to the water bath can occur during transportation by air.**

Due to the low outer pressure during air transportation, the glued points on the water bath may be subjected to excess load and thus damaged.

- It is thus absolutely essential to unscrew the cover of the desiccant container slightly when transporting by air.

The original packaging of the photometer and its peripheral devices should be used for packaging when possible. If the original packaging is no longer available, note the following information:

- Before packaging, close the openings of the photometer with adhesive tape or plugs so that no packaging materials can enter the instrument.
- The photometer contains optical and electronic components. Make sure that the packaging protects the instrument from being damaged by impact during transport.
- All peripheral devices and accessory parts must be packaged separately and marked with serial numbers (Section 2.2). This prevents confusion and mix-ups later while also making it easier to identify parts.
- When sending for repairs, ensure that the complete instrument including the **checking unit** is sent.
- Fill in the repair note and attach to the inside of the packaging.

When packaged in the way described above, the instruments can be transported by the usual shipping methods and in all positions.

# 14 Disposal

Disposal of the photometer and its peripheral devices is to be carried out in compliance with regional statutory regulations.

The photometer has no environmentally damaging sources of radiation. The materials listed below should be disposed of or recycled as described in the following table:

| CATEGORY | MATERIALS | DISPOSAL POSSIBILITIES |
|---|---|---|
| Packaging | Cardboard, wood, paper | Reuse as packaging material, local disposal points, incineration plants |
| | Protective foils, polystyrene shells | Reuse as packaging material, recycling |
| Electronics | Printed circuit boards, electro-mechanical components | To be disposed of as electronic waste |
| Water bath | ABS plastic | Local disposal center |
| Optics | Glass, aluminum | Recycling via centers for recycling glass and waste metal |
| Battery | Lithium | Recycling via locally organized collection point |
| Housing | ABS plastic, styrene, butadiene painted | Local disposal center |

*Table 6: Materials and their disposal*

# 15 Spare parts list

The parts mentioned in this documentation and their article numbers are listed in the following table:

| ART. NO. | ARTICLE NAME | REMARKS |
|---|---|---|
| 119202 | Desiccant bag, 60g | |
| 119357 | Cover with collar for LabScat 2 | |
| 119364 | Centering mechanism for LabScat 2 | |

# 16 Appendix

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