

COMBIMASS®

Operating Manual

COMBIMASS® GA-m
Portable gas analyzer



IMPRINT

BINDER GmbH

Buchbrunnenweg 18

89081 Ulm, Germany

Tel.: +49 731 189 98-0

Fax +49 731 189 98-88

info@bindergroup.info

www.bindergroup.info

Translation of the original operating manual

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1 Identification

Model name: COMBIMASS® GA-m
Designation: Portable gas analyzer

1.1 Manufacturer and service address

BINDER GmbH
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89081 Ulm, Germany

Tel.: +49 731 189 98-0
Fax +49 731 189 98-88

info@bindergroup.info
www.bindergroup.info

1.2 Copyright

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2 Notes about this operating manual

2.1 Purpose of the document

The objective of this operating manual is to introduce you, the user, to the correct usage and safe operation of the device. To achieve this goal, it is essential that you study section “Safety” in detail and follow the instructions in this operating manual.

Should you have any questions to which you cannot find the answers in this operating manual, please contact BINDER.

2.2 Location of the operating manual

This operating manual can assist you only if it is available at all times. You should therefore keep it with the product at all times.

2.3 Liability and damage

Based on the information in this manual, the manufacturer accepts no liability for direct or consequential damage resulting from incorrect operation or maintenance.

The device must be operated only by persons who are familiar with the operating manual, the products and national work, safety and accident prevention laws, ordinances and regulations. We accept no liability for injury or material damage caused wholly or in part by untrained persons or through non-observation of work, safety and accident prevention regulations.

2.4 Abbreviations

AC	Alternating current
BGB	Bürgerliches Gesetzbuch (German Civil Code)
CE	Communauté Européenne (European Community)
DC	Direct current
DVGW	Deutscher Verein des Gas- und Wasserfaches (German Gas and Water Industry Association)
EU	European Union
ESD	Electrostatic sensitive device
EMC	Electromagnetic compatibility
ESD	Electrostatic sensitive device
Ex	Explosion protection
GND	Ground (earthing)
LED	Light-emitting diode

2.5 Illustrations

The illustrations herein can, for technical reasons, deviate slightly from the supplied device.

2.6 Highlighted text

To facilitate the readability and overview, some paragraphs and information are highlighted with symbols.

The symbols have the following meaning:





- ▶ Instruction to perform an action
- ✓ Result of action
- Bullet point
- ⇒ Further information about this topic

2.7 Warnings

The safety information warns the user of risks and informs about how these risks can be avoided.

Safety information is located at the beginning of each section and before instructions that could result in a dangerous situation. For further safety information, see section 4 "Safety".

Safety instructions that must be followed under all circumstances are highlighted as follows:

	<p>DANGER</p> <p>Warns about an extremely dangerous situation that will result in death or severe, irreversible injury if the danger warning is not observed.</p>
	<p>WARNING</p> <p>Warns about a dangerous situation that can result in death or severe, irreversible injury if the warning is not observed.</p>
	<p>CAUTION</p> <p>Warns about a dangerous situation that can result in minor, reversible injury if the caution is not observed.</p>
	<p>NOTE</p> <p>Warns about situations that can result in material damage if not observed.</p>

3 Product description

3.1 Intended use

The COMBIMASS® GA-m gas analyzer has been developed for gas analysis in mobile operation. The device is not suitable for use in a potentially explosive area (EX area).

The product must be used only for the following purposes:

- Qualitative process analysis of biogas, digester gas, landfill gas and synthesis gas

The product must not be used for the following purposes:

- Monitoring MAC (maximum allowable concentration) values
- Monitoring LEL (lower explosive limit) values
- Operating in Ex areas (areas in which explosive atmospheres occur)

Only persons authorized by the manufacturer must carry out changes, modifications and repairs. Unauthorized alterations, modifications or improper use exclude liability of the manufacturer for resulting damage.

3.2 Analyzed gases

Depending on the equipment, the gas analyzer is intended for the analysis of various gases. In the following table you will find the properties of the analyzed gases.

i NOTE: The actual gases measured can be seen on the start page of the user interface (see ⇒ 9.3 "Start page").

Designation	Properties
CH₄	Methane Flammable, color- and odorless gas
CO₂	Carbon dioxide Non-flammable, acidic, color- and odorless gas. Suffocating in high concentrations.
O₂	Oxygen Non-flammable, acidic, color- and odorless gas
H₂S	Hydrogen sulphide In low concentrations a colorless gas with an unpleasant odor. Flammable and highly toxic at high concentrations
H₂	Hydrogen Colorless, odorless and tasteless gas. Extremely flammable. Danger of explosion if hydrogen mixes with oxygen.
NH₃	Ammonia Strongly pungent-smelling, colourless, water soluble and toxic gas. Irritating to eyes. Has a suffocating effect.
CO	Carbon monoxide Colorless, odorless and tasteless gas. Toxic and flammable.

i NOTE: Information on measuring accuracies can be found at ⇒ 3.4 "Technical data".



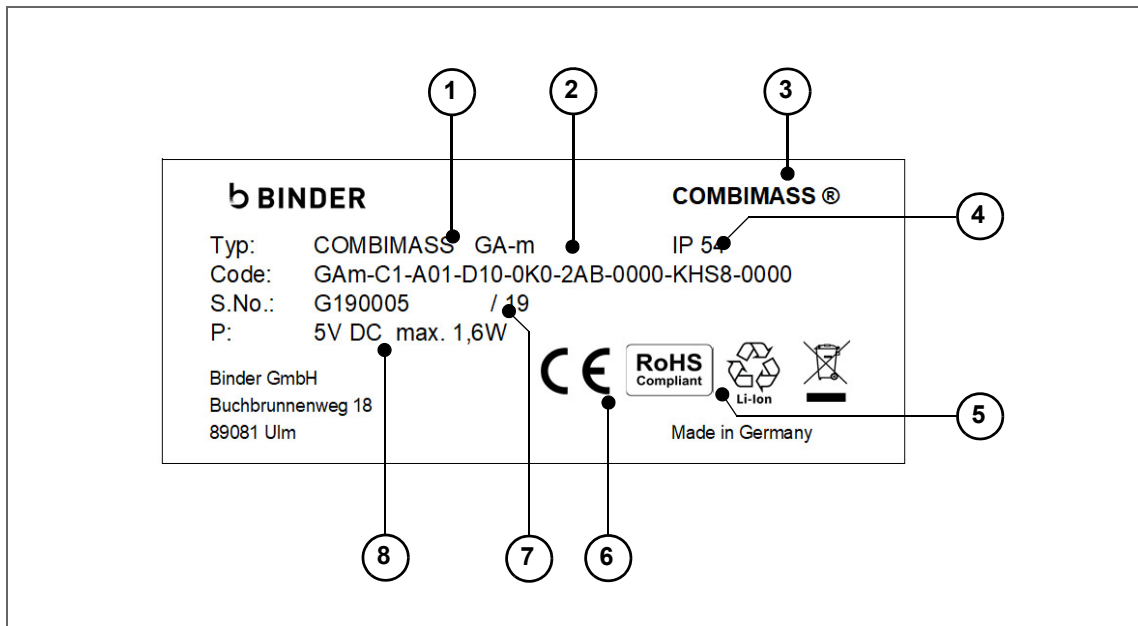
CAUTION

Observe safety regulations for handling gases!

The analyzer must be operated and maintained only by trained, selected persons.

- ▶ Thoroughly read the safety data sheets of the sampling gases.
- ▶ Observe all statutory health and safety regulations.

3.3 Nameplate



No.	Designation
1	Product name
2	Product code
3	Product group
4	IP protection class according to DIN EN 60529
5	Product labeling - Recycling and RoHS
6	CE marking
7	Serial number / Year of manufacture
8	Electrical characteristics

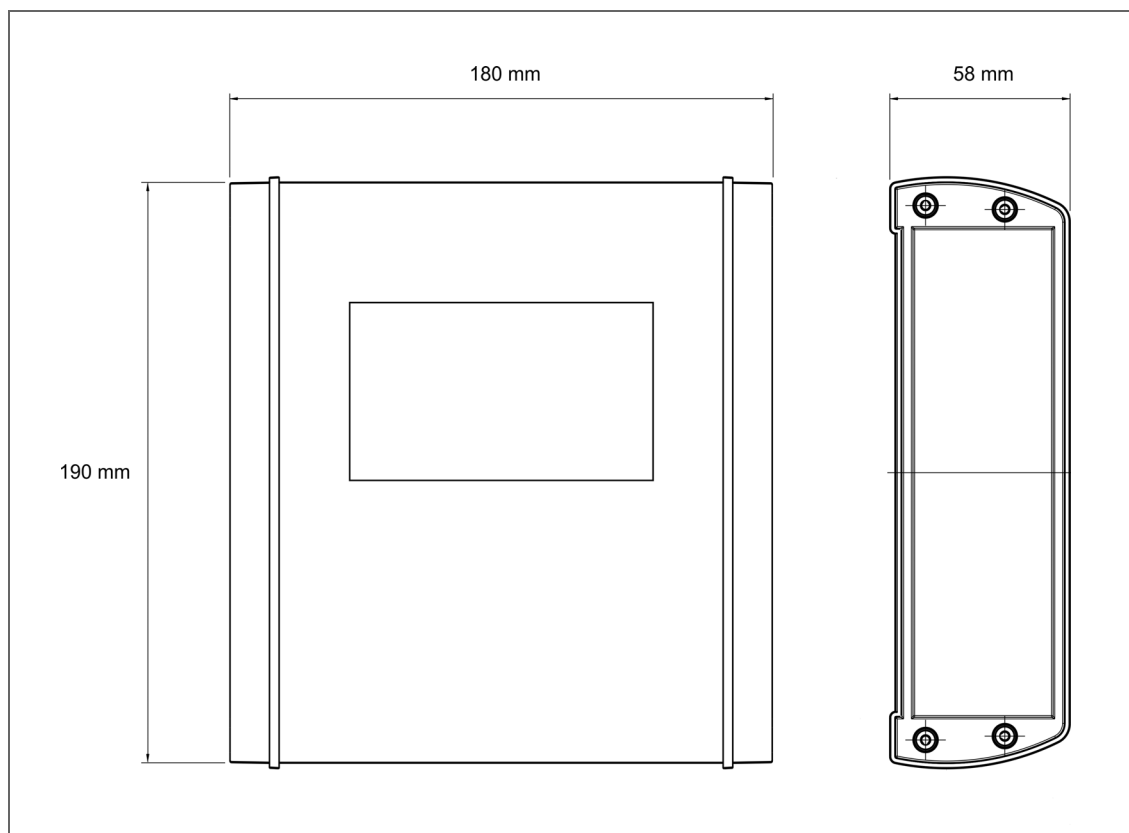


NOTE

The nameplate is not acetone-resistant

Do not use cleaning agents containing acetone. Do not use abrasive cleaning agents.

3.4 Technical data



Dimensions and weight

Height:	190 mm
Width:	180 mm
Depth:	58 mm
Weight:	1.7 kg

Ambient conditions

Protection class:	IP66
Ambient temperature:	-10 °C to 45 °C

Measuring gas

Temperature	5 °C to 40 °C
Rel. humidity	10–95 % (non-condensing)

Maximum pressure – medium	30 mbar rel.
Pressure range – environment	200–1250 mbar abs.
Gas flow (in measurement operation):	400 ml / min

Interfaces

Hose connections:	Outside dia. 6 mm / inside dia. 4 mm
Gas connections:	Gas inlet, gas outlet
Data exchange:	USB

Additional equipment

Inline adsorber	Manufacturer: Infiltec, type: DIA-MNI
Handle:	Optional
Carrying bag:	Optional
Transport case	Optional

Battery and power supply

Battery type:	Li-Ion rechargeable battery
Operating time	Approx. 8 hours
Charging time	Approx. 3–4 hours
Nominal voltage	3.6 V
Nominal capacity	6700 mAh

Operator control and display elements

Switches and buttons:	On/Off switch
Display:	4.3" Touch display (TFT)

Subject to technical modifications


3.5 Measuring ranges and measuring accuracies

Gas	Measuring range	Typical accuracy ¹	Typical T ₉₀ time / Typical measuring time
CH₄	0–100 % vol.	0–70 %: +/- 0.5 Vol.-%	50 s / 120 s
		70–100 %: +/- 1.5 0.5 Vol.-%	
CO₂	0–100 % vol.	0–60%: +/- 0.5 Vol.-%	40 s / 120 s
		60–100 %: +/- 1.5 Vol.-%	
O₂	0–30 % vol.	+/-1.0 Vol.-%	40 s / 120 s
H₂S	0–50 ppm	+/- 1.5 % FS	60 s / 120 s
	0–200 ppm	+/- 1.5 % FS	
	0–500 ppm	+/- 2.0 % FS	
	0–2,000 ppm	+/- 2.0 % FS	
	0–5,000 ppm	+/- 2.0 % FS	
	0–10,000 ppm	+/- 3.0 % FS	
H₂	0–1,000 ppm	+/- 2.5 % FS	30 s / 90 s
	0–4,000 ppm		
	0–10,000 ppm		
	0–40,000 ppm		
NH₃	0–100 ppm	+/- 10.0% FS	90 s / 180 s
	0–500 ppm		
	0–1,000 ppm		
CO	0–200 ppm	+/- 2.0 % FS	30 s / 90 s
	0–2,000 ppm		

¹ On delivery or after calibration; ² FS = Full Scale

4 Safety

This section provides information about the safe use of the product described here. All persons authorised to operate, maintain and repair the product must read section “Safety”.

	<p>WARNING</p> <p>Incorrect use is prohibited!</p> <p>The product must be used only for the purposes described in section “Intended use”.</p>
---	---

4.1 Operator and user qualification





All persons who are entrusted with the installation, commissioning, operation, maintenance and repair of the device must:

- be suitably qualified,
- closely follow the operating manual and
- observe the applicable health and safety rules.

The appliances must be installed and commissioned only by trained, authorised specialists. Work on electrical components must be carried out by a qualified electrician according to the locally applicable regulations.

The operator must make the operating manual available to the user. Persons entrusted with the assembly and operators must have read and understood the operating manual and these safety instructions prior to their activity.

4.2 List of safety symbols used


	<p>Pressurised line This symbol warns about danger through pressure.</p>
	<p>Risk of explosion This symbol warns about a risk of explosion.</p>
	<p>ESD – damage through electrostatic discharge This symbol warns about danger through electrostatic discharge.</p>
	<p>Dangerous voltage This symbol warns about an electrocution hazard.</p>

4.3 Electrostatic sensitive devices (ESD)

Many electronic devices are inherently sensitive to overvoltages and hence also to electrostatic discharges.

The customary international designation for such devices is ESD (electrostatic sensitive device).

Applied to cabinets, racks or packaging, the symbol in the following note indicates the use of electrostatic sensitive devices and therefore to the touch sensitivity of the respective assemblies.

	Damage through electrostatic discharge
	Electronic assemblies can be damaged by electrostatic discharge.
	<ul style="list-style-type: none">▶ Carry out repairs, modifications and inspections in an ESD workplace.▶ If such a workplace is not available, wear an antistatic armband or touch a suitable conductive object.

4.4 Safety and warning instructions

All components in the device have been tested for leaks. There is no conceivable situation in which incorrect operation would cause a potentially explosive gas mixture inside the instrument.



CAUTION

Flammable gases / Risk of poisoning through escaping gases

Gases that are analyzed with the device can be flammable or toxic. The device must be commissioned, operated and maintained only by trained, selected persons.

- ▶ Thoroughly read the safety data sheets of the sampling gases.
- ▶ Observe all statutory health and safety regulations.
- ▶ If you smell gas, immediately take the system out of operation.
- ▶ Regularly check gas connections for leakage.

⇒ For further information, see Section "Maintenance"



CAUTION

Use in Ex areas prohibited!

The analyzer must not under any circumstances be used in areas in which explosive atmospheres may form.



WARNING

Important notes about commissioning and use

Installation and commissioning work, in particular the connection of gas lines, must be carried out only by trained specialists.

- ▶ Never connect the gas connections to a gas supply with more than +30 mbar above atmospheric pressure. Always use a suitable pressure controller.
- ▶ After commissioning, check all gas-carrying parts for leaks.
- ▶ Use only original BINDER spare parts and accessories.

⇒ For further information, see Section 8.6 "Commissioning"

**WARNING****Observe ambient conditions**

Use of the analyzer in the following environments is prohibited:

- Corrosive environments
- In unventilated ducts
- At temperatures outside a range of -10 °C to +45 °C

⇒ For further information, see Section 8.6 "Commissioning"

**WARNING****Purge the device with clean air after each measurement**

After a measurement, there may be gas residues in the analyzer. A reactive mixture may form in the device due to the gas residues. Toxic residual gases may reduce the service life of the measuring cells and impair measuring accuracy.

- ▶ Purge the device with air after each measurement and before switching it off

⇒ For further information, see Section 7.3 "Purging the analyzer with air"

**WARNING****Remove condensation from gas hoses!**

If the gas to be analyzed is too wet, condensation may collect in the gas hoses. Condensation may contain aggressive and toxic gas residues (e.g., H₂S or NH₃). The liquid may cause damage to health, the environment or the device.

- ▶ Drain and dispose of visible condensation immediately. If necessary, wear suitable safety gloves and goggles.
 - ▶ Observe all statutory health and safety regulations during disposal
 - ▶ The device may only be used if an unspent adsorber is present in the gas sampling hose.
- ⇒ For further information, see Section 8.6.1 "Information on using the gas hoses"
- ⇒ For further information, see Section 10.2 "Replacing the inline adsorber"

**WARNING****Do not open the analyzer!**

The analyzer contains no parts that can be replaced by users themselves. Opening the device voids the warranty.

**WARNING****Do not use damaged appliances**

Do not use the device if it is damaged or compromised in any way (e.g. loose hose connections, porous or damaged hoses, or missing screws).

**CAUTION****Regularly inspect the gas analyzer!**

To maintain reliable operation, the device must be regularly checked and serviced. Use only original spare and wear parts.

⇒ For further information, see Section “Maintenance”


Observe all fault messages. Maintenance work must be carried out only by Binder or by Binder-trained specialists. Otherwise the availability and accuracy of the readings cannot be guaranteed.

4.5 Warning signs on the device

Safe use is possible only when all information required for safe operation is observed. This information includes, in particular, all safety and warning instructions.

- ▶ Replace any missing or damaged signs.
- ▶ Keep warning signs clean and clearly legible.

4.5.1 Warning signs on live components

	<p>DANGER</p> <p>Dangerous voltage! Parts marked with the lightning symbol are live.</p> <ul style="list-style-type: none">▶ Before carrying out servicing, isolate the system from mains power!▶ NAFTA region: Risk Of Electric Shock Or Burn.
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5 Design and function

5.1 Components of the analyzer system

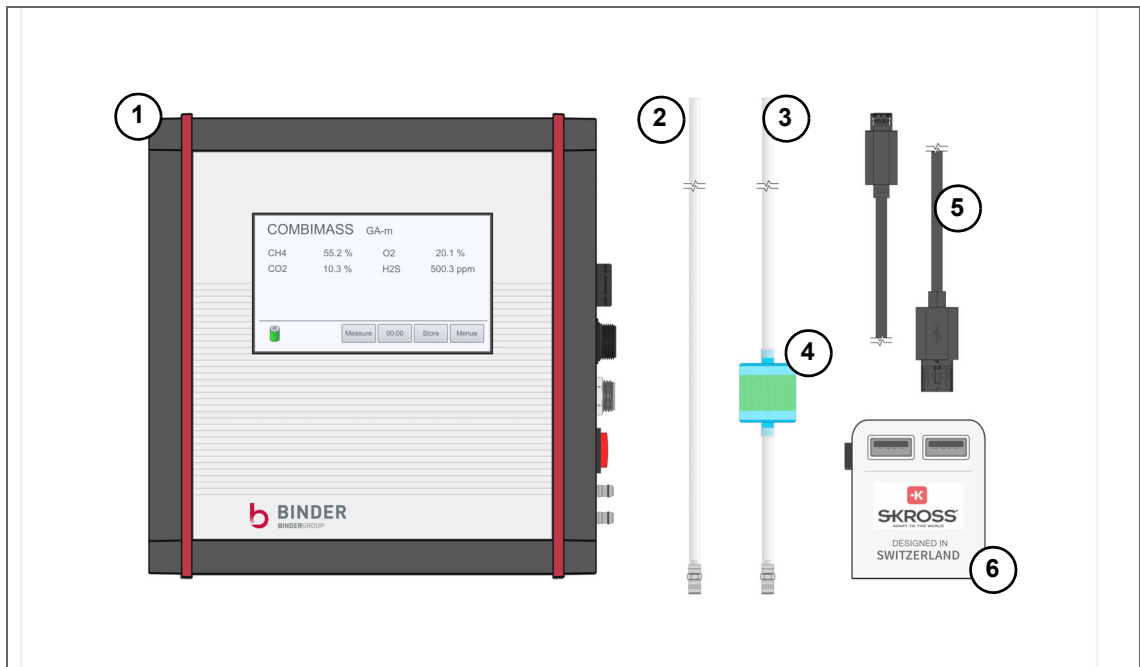


Fig. 5 - 1 Overview of the analyzer system components

No.	Designation	Explanation
1	Gas analyzer	The analyzer housing contains the components for gas analysis and the electronics for monitoring the gas modules, pumps, and valves. Further information at ⇒ "5.1.1 "The COMBIMASS gas analyzer"
2	Hose Outlet (Gas out)	This hose discharges the exhaust gas from the analyzer. Further information at ⇒ "7.1 "Connecting gas hoses".
3	Hose Inlet (Gas in)	This hose draws the sampling gas into the analyzer. Further information at ⇒ "7.1 "Connecting gas hoses".
4	Inline adsorber	Cleans the sampling gas. Separates solid or liquid particles from the sampling gas. Subject to wear. Further information: ⇒ "7.1 "Connecting gas hoses" ⇒ "10.2 "Replacing the inline adsorber".

No.	Designation	Explanation
5	USB charging cable / cable for data exchange	Used to charge the analyzer battery and to transfer saved measured data to a PC. ⇒ "7.5 "Charging the battery". ⇒ "7.6 "Saving and evaluating measured data (data logger)".
6	USB charger	Used to charge the analyzer battery. Further information at ⇒ "7.5 "Charging the battery".

5.1.1 The COMBIMASS gas analyzer

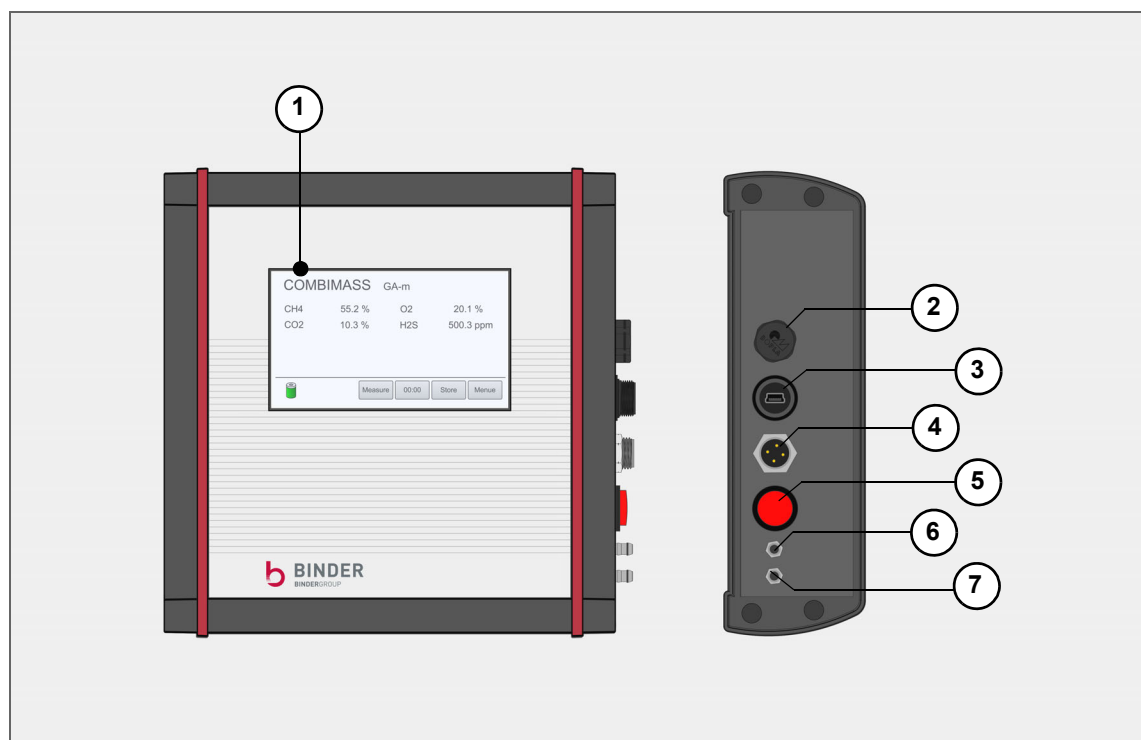


Fig. 5 - 2 Overview of the gas analyzer

No.	Designation	Explanation
1	Display / touch screen	Shows the user interface and allows changes to the analyzer's configuration. Further information ⇒ 9 "Menu settings".
2	Pressure equalizing element*	Prevents moisture from being sucked into the housing in the event of pressure fluctuations due to temperature differences.

No.	Designation	Explanation
3	Micro USB port*	Used to charge the analyzer battery and to transfer saved measured data to a PC. ⇒ "7.5 "Charging the battery". ⇒ "7.6 "Saving and evaluating measured data (data logger)".
4	Modbus port* (optional)	For data transfer via Modbus (optionally available)
5	On/Off	Press and hold the pushbutton for 1 second to switch the device on or off.
6	Sampling gas inlet (Gas in)	Connector for drawing the sampling gas into the analyzer. Further information at ⇒ "7.1 "Connecting gas hoses".
7	Exhaust gas / air (Gas out)	Connector for discharging the exhaust gas from the analyzer. Further information at ⇒ "7.1 "Connecting gas hoses".

* **i** NOTE: The protection class specified in Section ⇒ 3.4 "Technical data" can only be assured if the corresponding component is undamaged and the respective lock (if available) is fitted.

5.2 Functional description

5.2.1 Function sequence – gas analysis

After launching the measuring process, the measurement starts automatically. The following steps take place during the measurement:

- Gas sampling:** The gas flow to be measured is sampled from the process gas pipe at the measuring point.
- Drawing in sampling gas:** A pump draws the sampling gas into the analyzer.
- Filtering gas:** A inline adsorber separates solid or liquid particles from the sampling gas.
- Gas analysis:** The analysis modules in the device transmit the gas concentrations to the controller.
- Purge:** The gas modules are purged with air, which is drawn through the sampling gas hose.

6 Operator control elements

6.1 Touch-screen display

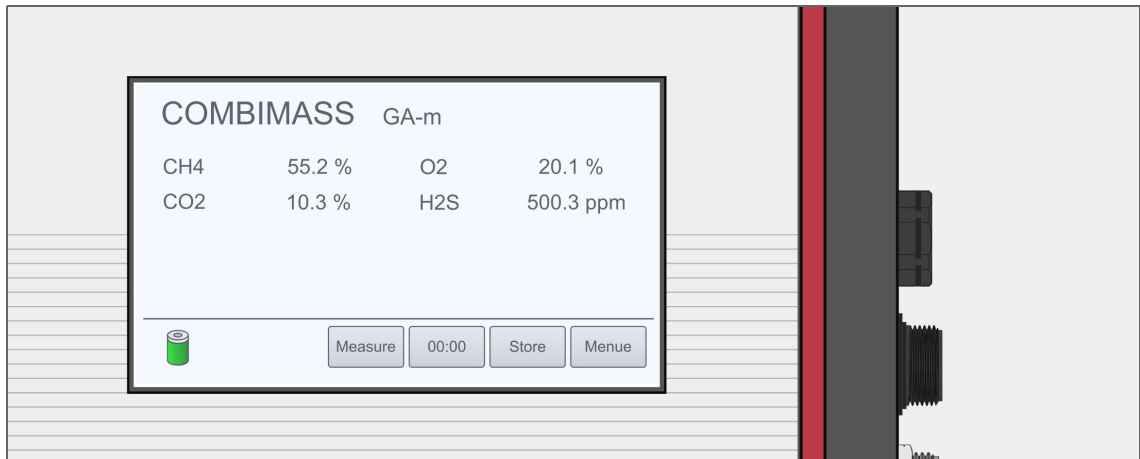


Fig. 6 - 1 Touch-screen display

The device is equipped with a touch screen. This is operated by touching the screen with your finger. Further information ⇒ 9.1 "Navigating in the menu".



NOTE

Protect display from soiling and damage

Mechanical damage of the touch screen is not included in the warranty.

- ▶ Do not use a pen or any similar hard objects for operation.
- ▶ Make sure that the touch screen does not come into contact with any acids or solvents.

6.2 On/Off pushbutton

The On/Off pushbutton is located on the side of the housing. Press and hold the pushbutton for 1 second to switch on the device.

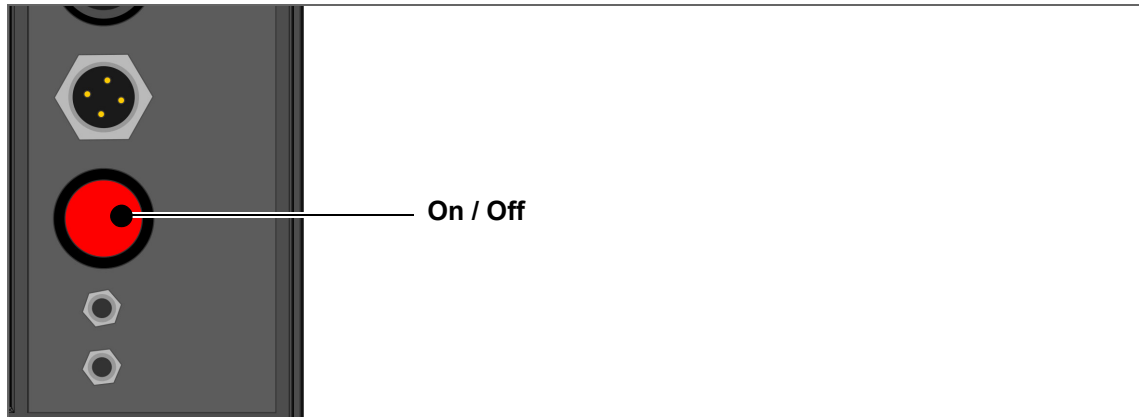



Fig. 6 - 2 On/Off pushbutton

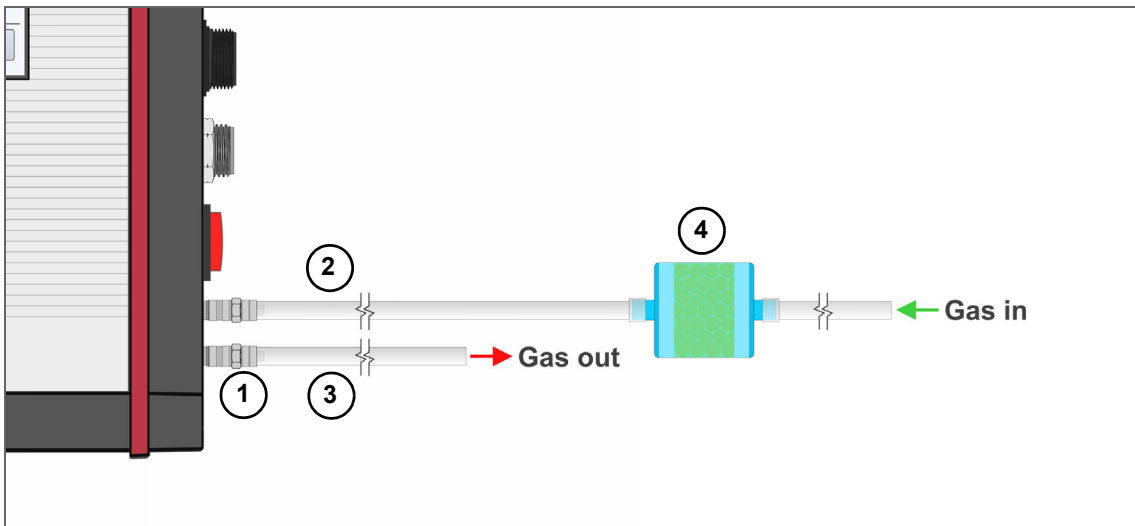
Pushbutton (red)	Function
To switch on	Press and hold the pushbutton for at least 1 second
To switch off	Press and hold the pushbutton for at least 1 second

7 Quick guide

7.1 Connecting gas hoses

	<p>WARNING</p> <p>Connection only with pressure reducer and Inline Adsorber!</p> <p>Excessive gas pressure may cause irreparable damage to the device.</p> <ul style="list-style-type: none"> ▶ Always use a pressure reducer with 30-mbar outlet pressure that is suitable for the gas ▶ Always use an inline adsorber. For more information, see ⇒ "10.2 "Replacing the inline adsorber".
---	---

Connect the supplied gas hoses as shown in the figure. Make sure that the device is switched off before connecting the gas hoses.



No.	Designation	Explanation
1	Quick coupling	Ensures that the hoses are securely and tightly seated on the connections to the analyzer. Make sure that you hear a click when the connection engages.
2	Hose Inlet (Gas in)	This hose draws the sampling gas into the analyzer.
3	Hose Outlet (Gas out)	This hose discharges the exhaust gas from the analyzer. Please note the safety instruction on the next page.

No.	Designation	Explanation
4	Inline adsorber	Cleans the sampling gas. Separates solid or liquid particles from the sampling gas. Subject to wear (further information at ⇒ "10 "Maintenance and servicing").

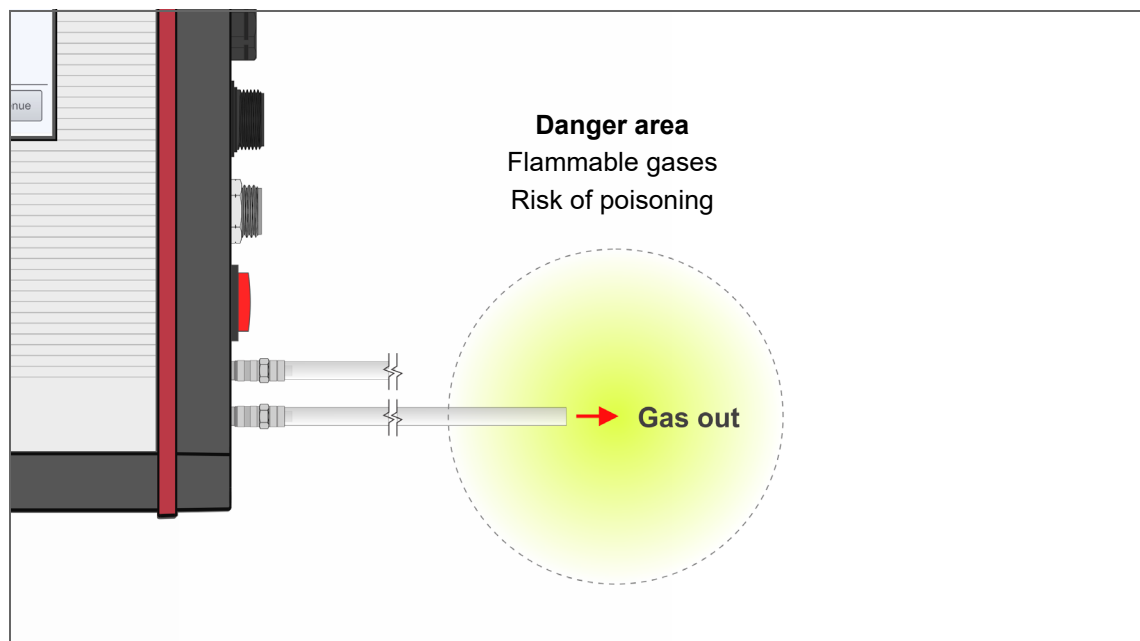


CAUTION

Flammable gases / Risk of poisoning through escaping gases

Gases exiting the exhaust hose may be flammable or toxic. Ensure that there are no persons near the exhaust hose when measuring flammable or toxic gases or gas mixtures.

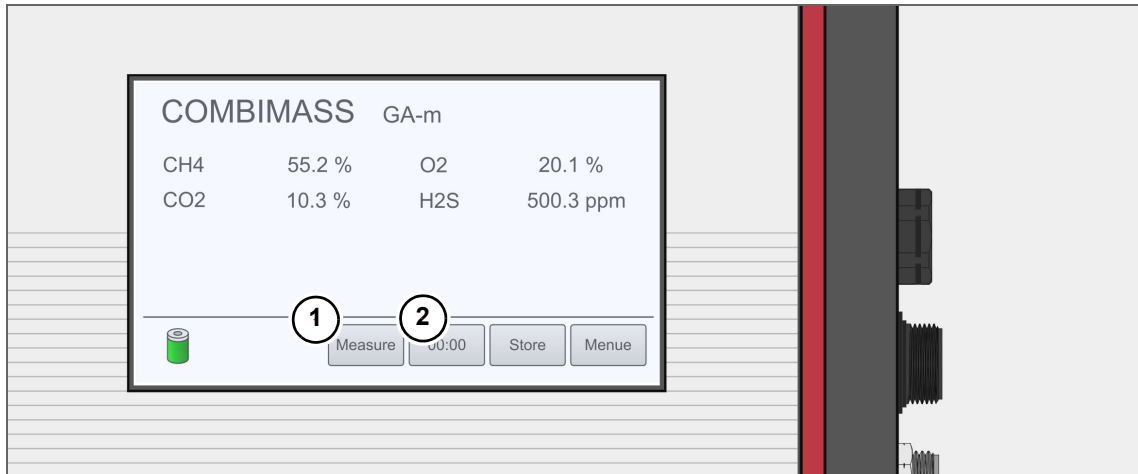
- ▶ Thoroughly read the safety data sheets of the sampling gases.
- ▶ Observe all statutory health and safety regulations.
- ▶ If you smell gas, immediately take the system out of operation.
- ▶ Regularly check gas connections for leakage.
- ▶ Route the exhaust hose to a frost-free, well-ventilated place outdoors.



i NOTE: On the start page of the user interface (see ⇒ 9.3 "Start page") you can check which gases are measured with your device.

7.2 Switching on the device and starting the measurement

Press and hold the red On/Off button (see ⇒ 5.1.1 "The COMBIMASS gas analyzer") for at least 1 second to switch on the device. The start page of the user interface appears on the display.



No.	Button/indication	Function
1	Measure / Stop	Starts or stops the measurement.
2	Measuring time	Displays the present duration of the current measurement process.

Proceed as described below to perform a measurement:

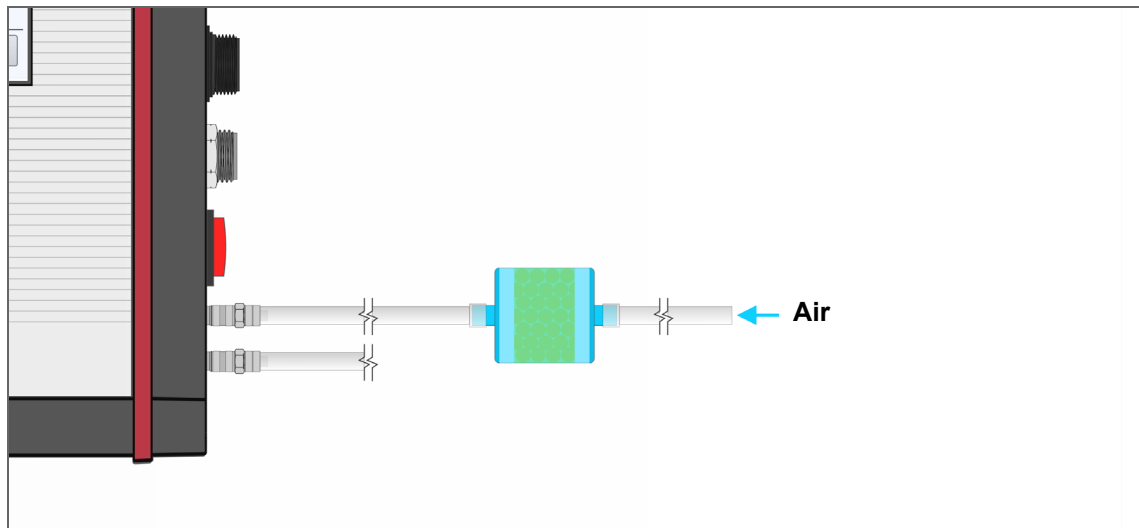
1. Make sure that all gas hoses are connected (see ⇒ 7.1 "Connecting gas hoses").
2. Switch on the device at the main switch (press and hold for 1 second).
3. Touch the [Measure] button to start the measurement.
4. Measure until the values on the display remain stable. Touch [Stop] to stop the measurement.
5. To ensure the highest possible measurement accuracy and lifetime of the measuring cells, purge the device with air after each measurement (see ⇒ 7.3 "Purging the analyzer with air").

i NOTE: Readings and measured gases in these instruction are examples only. Depending on the device equipment, the number and type of gases may vary. ⇒ 3.2 "Analyzed gases" provides an overview of which gases can be analyzed with your device.

7.3 Purging the analyzer with air

After a measurement, there may be gas residues in the analyzer. These gas residues must be purged with fresh ambient air from the device after each measurement to ensure the highest possible measurement accuracy and lifetime of the measuring cells.

Proceed as described below to purge the device:



1. Disconnect the gas sampling hose from the gas sampling point.
 2. Make sure that the end of the gas sampling hose is in an area where clean air can be drawn in.
 3. Touch [Measure] to start the pump in the device and draw in fresh air.
 4. **Continue purging for the time specified in ⇒ 7.3.1 "Table - Purging times".**
 5. If necessary, re-connect the gas sampling hose to the gas sampling point.
- ✓ The analyser has been purged with air and can be used for the next measurement.

7.3.1 Table - Purging times

Use the times in the table for purging the gas measuring cells.

Gas	Purging time
CH ₄	Measuring time x 1,5
CO ₂	Measuring time x 1,5 - 2
O ₂	-
H ₂ S - 0-50 ppm	10 min.
H ₂ S - 0-500 ppm	15 min.
H ₂ S - 0-2000 ppm	25 min.
H ₂ S - 0-10.000 ppm	30 min.
H ₂	Measuring time x 1,5
NH ₃	Measuring time x 1,5 - 2
CO	Measuring time x 1,5 - 2

7.4 Stopping the measurement and switching off the device

Proceed as follows to stop and switch off the device:

1. When a measurement is in progress, touch [Stop].
2. Purge the device as described in ⇒ 7.3 "Purging the analyzer with air".
3. Switch off the device at the red main switch
(press and hold the pushbutton for at least 1 second).

If you do not wish to use the device for a prolonged period of time, please observe the storage instructions (see ⇒ 8.4 "Storage").

7.5 Charging the battery

The battery charge level is shown at the bottom left of the display. When the battery is fully charged, the battery icon is highlighted in green. When the battery needs charging, the battery icon is highlighted in red.

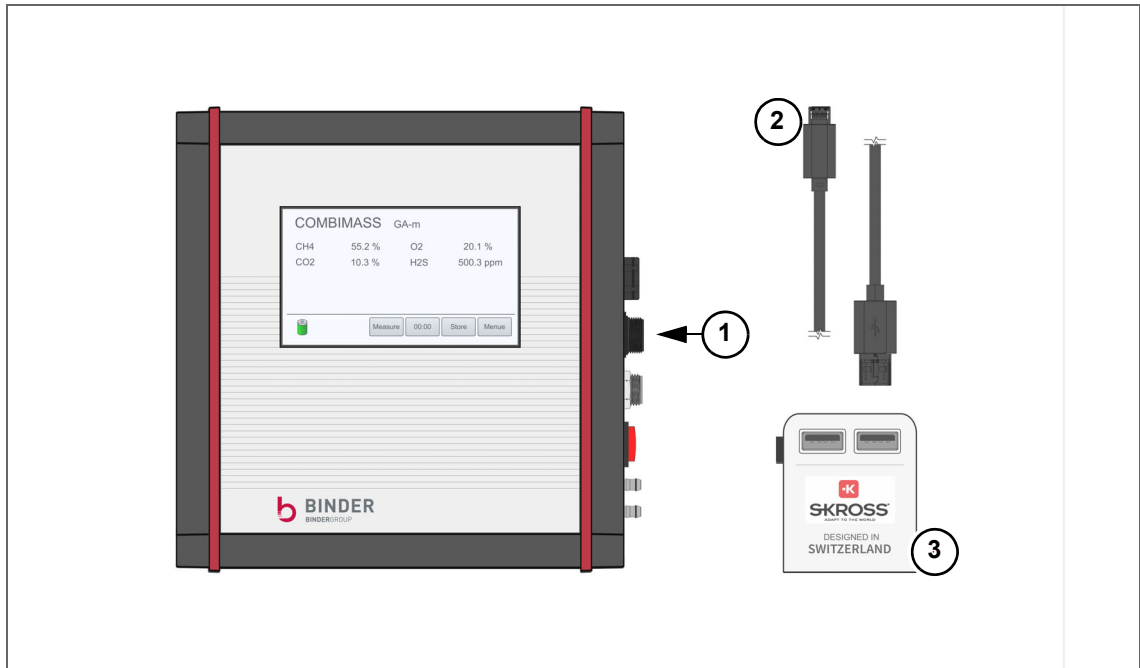


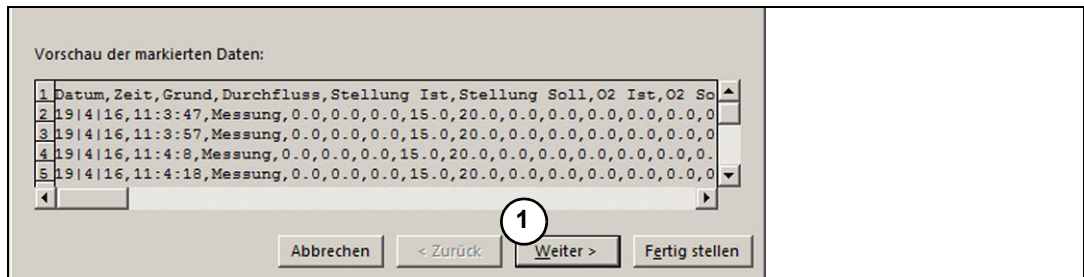
Fig. 7 - 1 Charger and charging cable

No.	Designation	Explanation
1	Micro USB port	Plug in the charging cable here.
2	USB charging cable	Connect the charging cable with the USB charger
3	USB charger	Plug the charger into a grounded power outlet. Alternatively, you can charge the device from a laptop or PC. Further information at ⇒ 13 "Appendix – USB Charger".

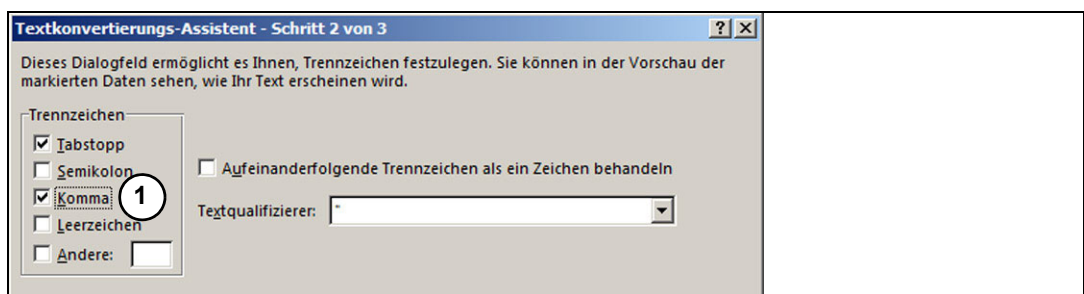
A complete charge is sufficient for approx. 8 hours of operation. The charging time for a full charge is approx. 4 hours. Further information on the technical data of the battery can be found at ⇒ 3.4 "Technical data".

6. Settings in the text conversion wizard

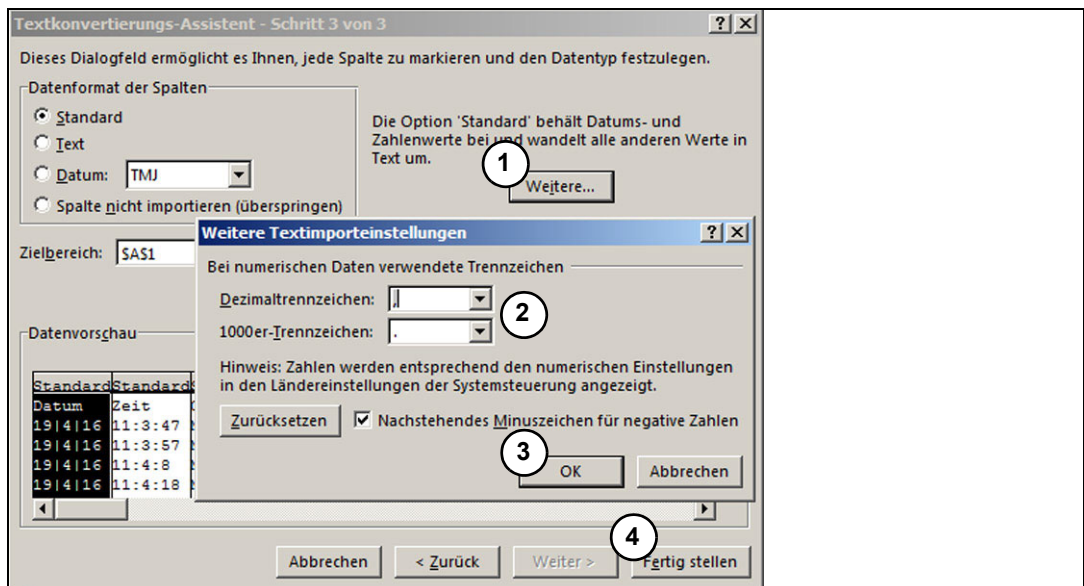
Step 1: On the first page, you do not need to make any settings. Click [Next] (1).



Step 2: Select the comma as separator character (1) and click [Next].



Step 3: Select [More...] (1). Submenu *More text import settings* appears. As decimal separator, select the full-stop and as thousands delimiter (2) the comma. Then click [OK] (3) and [Finish] (4).



✓ The edited table is being created and can be evaluated (⇒ see 7.6.2 "Evaluating measured data").

7.6.2 Evaluating measured data

A maximum of 600 records can be saved. The following information is stored in the .csv file:

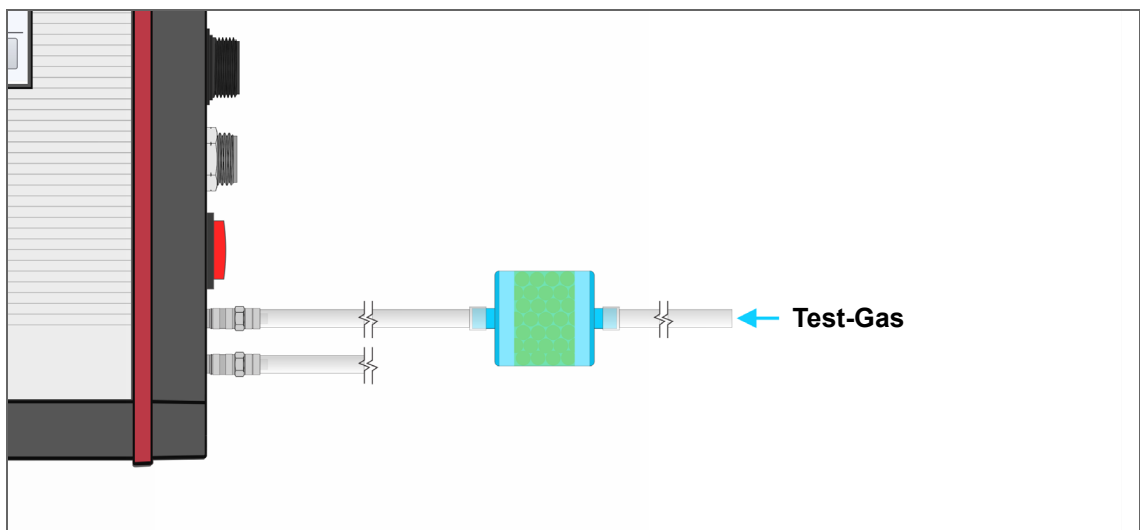
- Sequential No. of the measurement
- Date and time
- Measurement location
- Readings

7.7 Calibrating the device

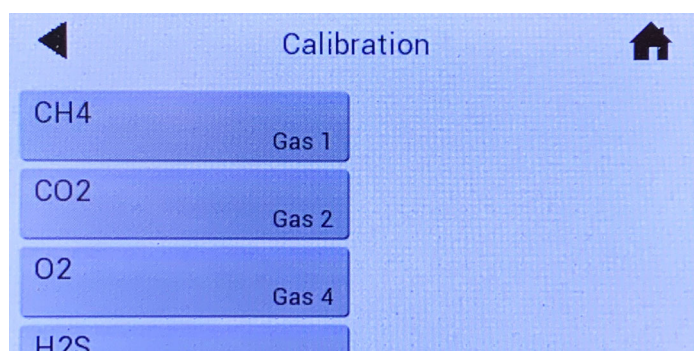
The device can be calibrated with test gas. Test gas is a gas mixture with a defined composition. It is used for the following purposes:

- To compare the current readings of the gas modules with the known composition of the test gas.
- To compensate the wear of the measuring cells and the associated drift of the readings.

Proceed as described below to calibrate the instrument:

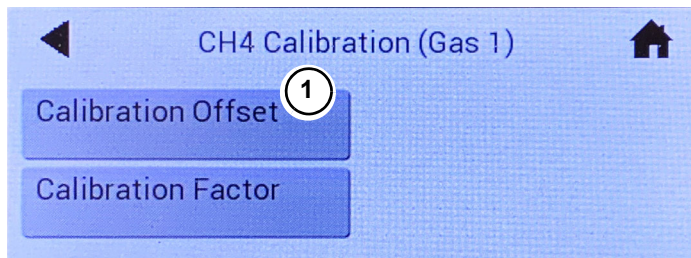


1. Purge the analyzer with air before starting calibration (see ⇒ 7.3 "Purging the analyzer with air").
2. Connect a suitable test gas cylinder. Details on the concentration of the test gas can be found on the label of the test gas bottle or in the test certificate.
⚠ CAUTION! Always use a pressure reducer with 30 mbar output pressure suitable for the gas. Observe the instructions in chapter ⇒ 7.1 "Connecting gas hoses".
3. Open menu ⇒ 9.4.5 "Service".
4. Select the gas measuring cell you want to calibrate.

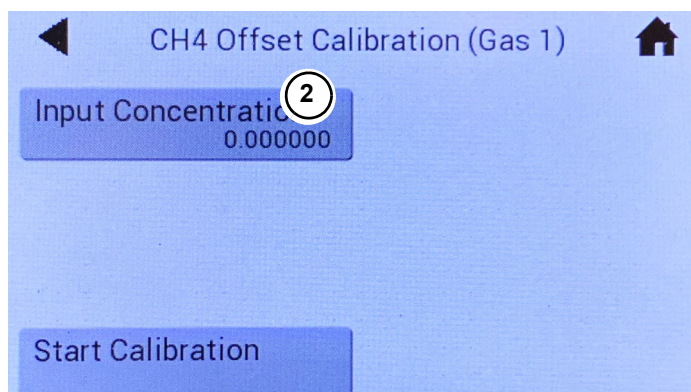


► Continue on the next page.

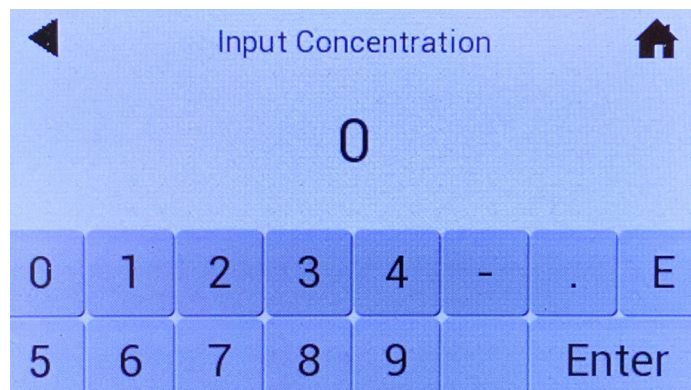
5. Press „Calibration Offset“ (1).



6. The "Calibration Offset" is used to compensate the wear of the measuring cell. Over time, the measured value displayed on the start screen decreases. For example, if you enter 0.2 as the offset, 0.2 % will be added to the actual reading.



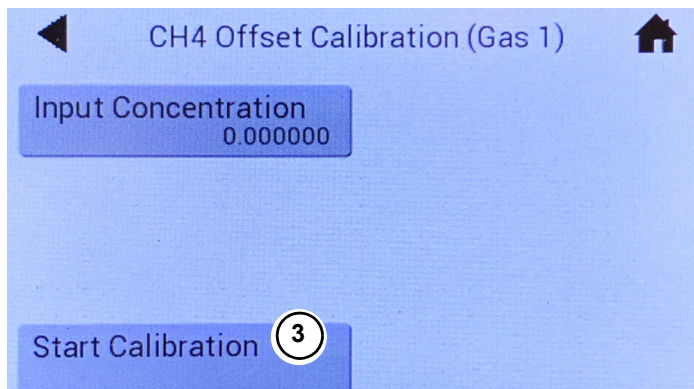
Press [Input Concentration] (2) to enter an offset.



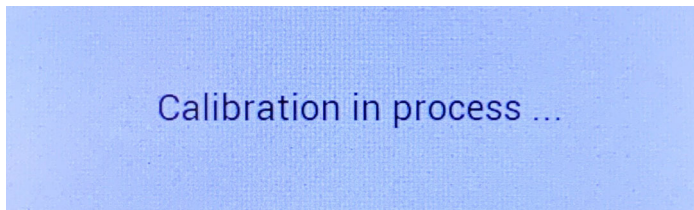
Finally, press [Enter] to accept the offset.

► Continue on the next page.

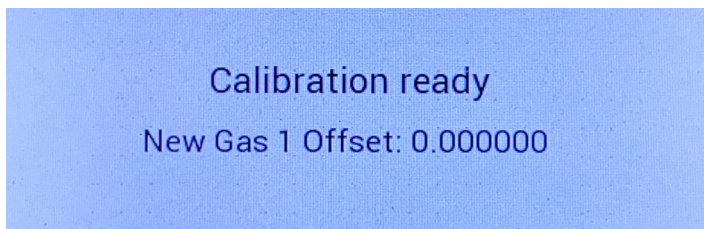
7. The offset just entered is now shown on the [Input Concentration] button. Press [Start Calibration] **(3)** to start the calibration process.



The calibration process starts and the noise of the pump can be heard. The following message is displayed for the duration of the calibration:



If the calibration process has been successfully completed, the following message appears on the display:




✓ The device has been successfully calibrated and can be used for the next measurement.

Press the [△ Home] button to return to the home page. Press [◀] to return to the previous page.

8 Transport and commissioning

8.1 Transport

	<p>NOTE</p> <p>Transport the device only in the original bag or in the original case</p> <p>Each analyzer is supplied in a transport case or bag that protects the high-precision electronics from damage.</p> <p>► Before shipping, storage or transport – pack the device and accessories in the protective case or bag</p>
---	---

8.1.1 Instructions for transporting lithium-ion batteries

Special safety regulations apply to the transport of lithium batteries due to the high risk of fire in the event of a short circuit or the influence of water.

The dangerous goods regulations distinguish between "small" and "large" lithium batteries. The batteries in this gas analyzer are considered small.

Packages with small batteries are usually shipped with a clearly visible label indicating their contents.



Fig. 8 - 1 Example - Labelling for the transport of lithium-ion batteries

Without marking, packages can be sent which contain a maximum of 2 small lithium batteries used in devices, provided that the shipment does not consist of more than 2 such packages.

The labelling must contain the following information:

- Indication of the presence of lithium-ion batteries incl. UN number (UN 3481)
- Indication that there is a risk of ignition if damaged
- A telephone number where additional information can be obtained

8.1.2 Transport of lithium-ion batteries in airplanes

There are detailed regulations for lithium batteries in passenger baggage. Normally, our gas analysers can be transported in hand luggage as well as in checked baggage, as the batteries are integrated in the device.

In case of any doubts, please ask at check-in or inform yourself on the airline's website. Information on the technical data of the batteries can be found in the chapter "Technical data".

8.2 Inspecting received goods



WARNING

Do not use damaged appliances

Do not use the device if it is damaged or compromised in any way (e.g. loose hose connections, porous or damaged hoses, or missing screws).

Our products are carefully picked and inspected for completeness prior to shipment. We nevertheless ask you to check the delivered goods for completeness before installation.

- ▶ Carefully unpack the delivered products.
- ▶ Check whether the supplied articles are complete and match the delivery note.
- ▶ Inspect the product for damage before starting to use it.

Should you identify any damage or if not all articles are present, please contact our customer service (see next item 8.3 "Complaints").

8.3 Complaints

Please return any damaged or incorrectly supplied systems to the following address:

BINDER GmbH

Buchbrunnenweg 18

89081 Ulm, Germany

Tel.: +49 731 189 98-0

Fax +49 731 189 98-88



NOTE

Returns only with decontamination certificate

If the device has been in operation, we can only accept your return with a completed decontamination certificate.

► Copying or printing

⇒ 12 "*Appendix – Decontamination certificate*"

On the Internet:

⇒ www.bindergroup.info/binder/en/service/service.php

► Complete and enclose with the return delivery

If the device has not been in operation (wrong delivery or defective upon delivery), include a note stating, e.g., "*System defective, equipment was not in operation*", or "*Wrong delivery, equipment was not in operation*". In this case, a decontamination certificate is not necessary.

8.4 Storage

To keep an unused device operational for a longer period, observe the following points:

- The storage location must be cool and dry.
- Temperature at storage location **NOT** below - 20°. Too low temperatures can damage electronic components.
- Check the battery charge level every 6 months. If necessary, recharge the battery to 55 to 75 percent to prevent deep discharges. For more information, see ⇒ 7.5 "Charging the battery".
- Before storage – pack the device and accessories in the protective case



NOTE

Damage through improper storage

For damage caused by improper storage, the manufacturer does not accept liability or warranty.

8.5 Ambient conditions

The location where the device is to be used must meet the following criteria:

- Ambient temperature: -10 °C to 45 °C
- Outside Ex zones
- Outside corrosive environments

8.6 Commissioning




WARNING


Risk of injury – commissioning only by qualified personnel

Persons entrusted with commissioning or maintenance tasks must carefully observe the safety instructions in the operating manual and follow the applicable occupational safety rules.

Work on electrical components must be carried out by a qualified electrician according to the locally applicable regulations.

8.6.1 Information on using the gas hoses

	<p>NOTE</p> <p>Recommended plastic hoses</p> <p>We recommend the use of biogas-resistant hoses from Saint Gobain with the following specification:</p> <p>Model: Tygon E-3603 Outer diameter: 6 mm Inner diameter: 4 mm</p> <p>All connectors supplied by us fit to this hose.</p>
---	--

	<p>WARNING</p> <p>Remove condensation from gas hoses!</p> <p>If the gas to be analyzed is too wet, condensation may collect in the gas hoses. Condensation may contain aggressive and toxic gas residues (e.g., H₂S or NH₃). The liquid may cause damage to health, the environment or the device.</p> <ul style="list-style-type: none">▶ Drain and dispose of visible condensation immediately. If necessary, wear suitable safety gloves and goggles.▶ Observe all statutory health and safety regulations during disposal▶ The device may only be used if an unspent adsorber is present in the gas sampling hose. <p>⇒ For further information, see Section 10.2 "Replacing the inline adsorber"</p>
--	---

Make sure that plastic pipes are not kinked. Any condensate that forms must not collect in a sagging bend and form a water pocket, as this would inhibit or prevent gas flow.

8.7 Disposal

The device must not be disposed of with household waste. This device is labelled according to the European Directive 2012/19/EU (WEEE Directive) on Waste Electrical and Electronic Equipment.

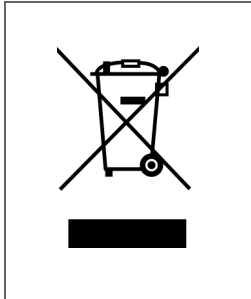



Fig. 8 - 2 Labelling according to directive 2012/19/EU (WEEE directive)

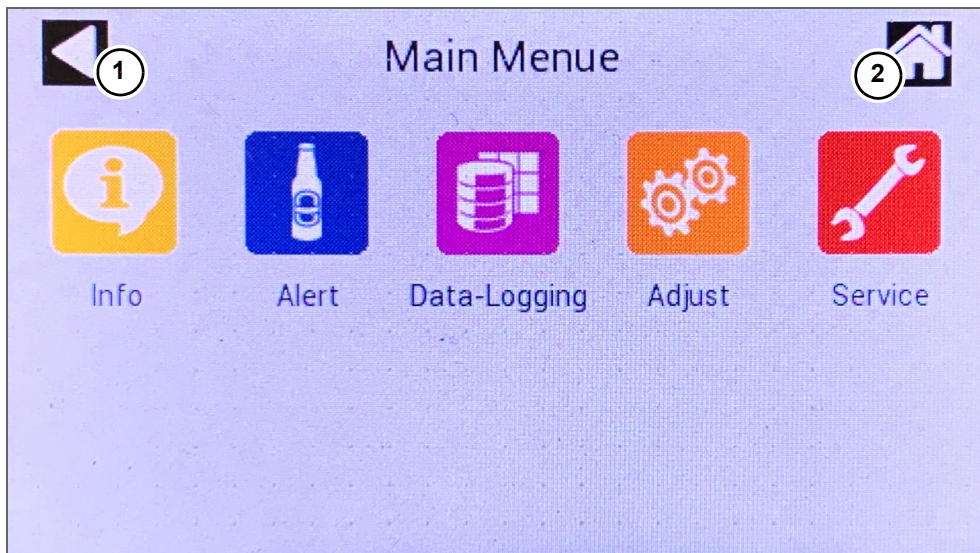
The directive provides the framework for an EU-wide take-back and recycling of waste equipment. To return your old equipment, please use the return and collection systems available to you.

You can return the device to your dealer or Binder GmbH after use.

9 Menu settings

	<p>NOTE</p> <p>Menu may differ</p> <p>Depending on the software version, the order of the menus or selectable parameters may differ from the description in this manual.</p>
---	--

9.1 Navigating in the menu



To operate a function, touch it on the touch screen.

No.	Button/indication	Function
1	◀	Scrolling to the previous page within a menu.
1	▶	Scrolling to the next page within a menu.
2	🏠	Back to the start page (see ⇒ 9.3 "Start page")

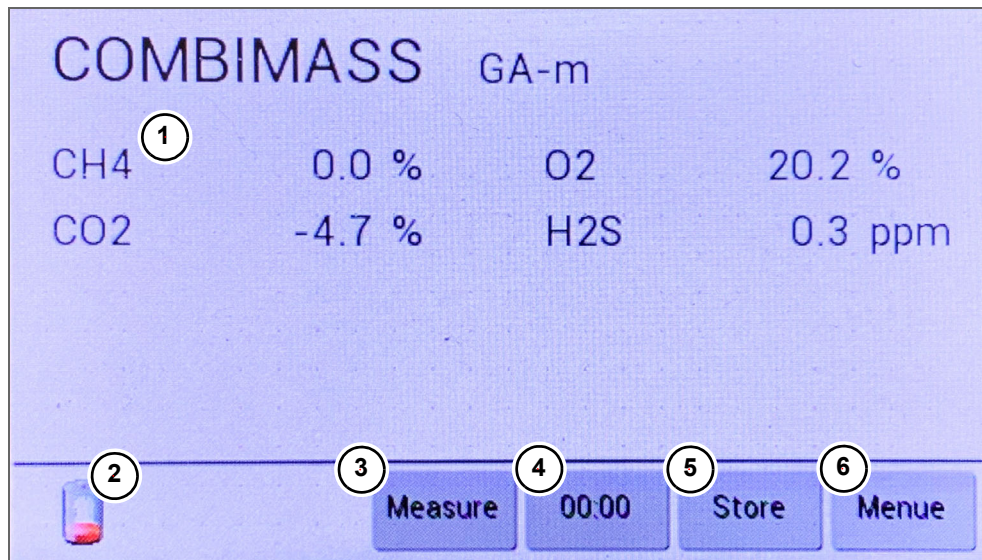
In the following text, fields on the touch screen are indicated with square brackets: [Button].

9.2 Menu structure

- ⇒ Start page - see page 59
- ⇒ Store - see page 60
- ⇒ Menu - see page 60
 - ⇒ Info - see page 60
 - ⇒ Alert - see page 62
 - ⇒ Data Logging - see page 63
 - ⇒ Adjust - see page 64
 - ⇒ Language - see page 64
 - ⇒ Date / Time - see page 65
 - ⇒ Service - see page 66

9.3 Start page

After switching on (see ⇒ 7.2 "Switching on the device and starting the measurement"), the main window of the user interface appears on the display. The main window shows the current readings.



The lower screen section contains the control buttons and information about the operating state of the analyzer station.

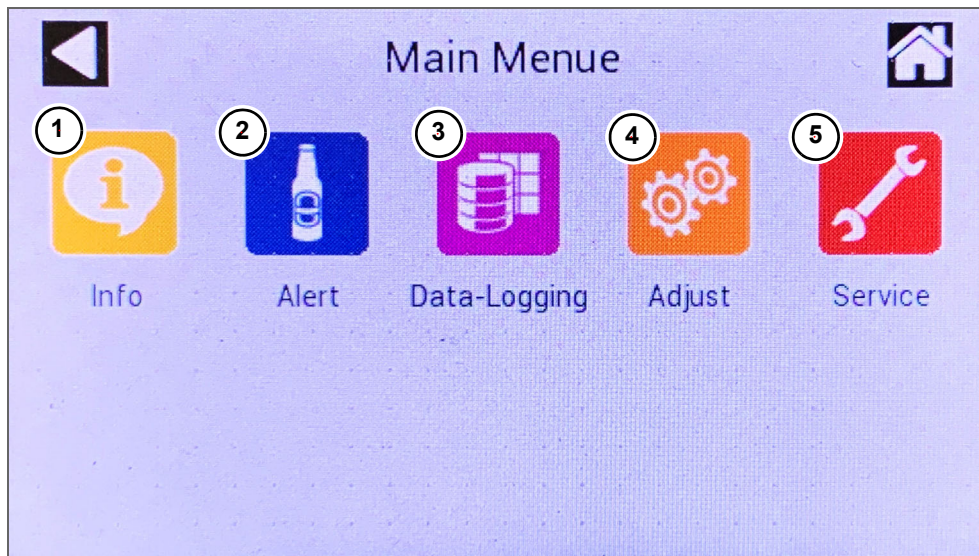
No.	Button/ indication	Function
1	Measuring points/readings	Actually measured gas concentrations. i NOTE: Readings and measured gases are examples only. Depending on the customer's specifications, the number and type of gases can vary. ⇒ 3.2 "Analyzed gases" provides an overview of which gases can be analyzed with your device.
2	Battery charge level	Indicates the charge level of the battery. Further information at ⇒ 7.5 "Charging the battery".
3	Measure / Stop	Starts the measuring process / stops the measuring process (see ⇒ 7.2 "Switching on the device and starting the measurement").
4	Measuring time	Displays the running time of the current measurement. Further information at ⇒ 7.2 "Switching on the device and starting the measurement".
5	Store	Opens the menu for saving the measured data (see ⇒ 9.3.1 "Store").
6	Menu	Opens the main menu (see ⇒ 9.4 "Menu").

9.3.1 Store

Touch the [Store] button on the start page to open the menu ⇒ 9.4.3 "Data Logging". In this menu, you can define how the measured data are stored on the device.

9.4 Menu

Touch the [Menu] button on the start page (see 9.3 "Start page") to return to the main menu of the user interface.



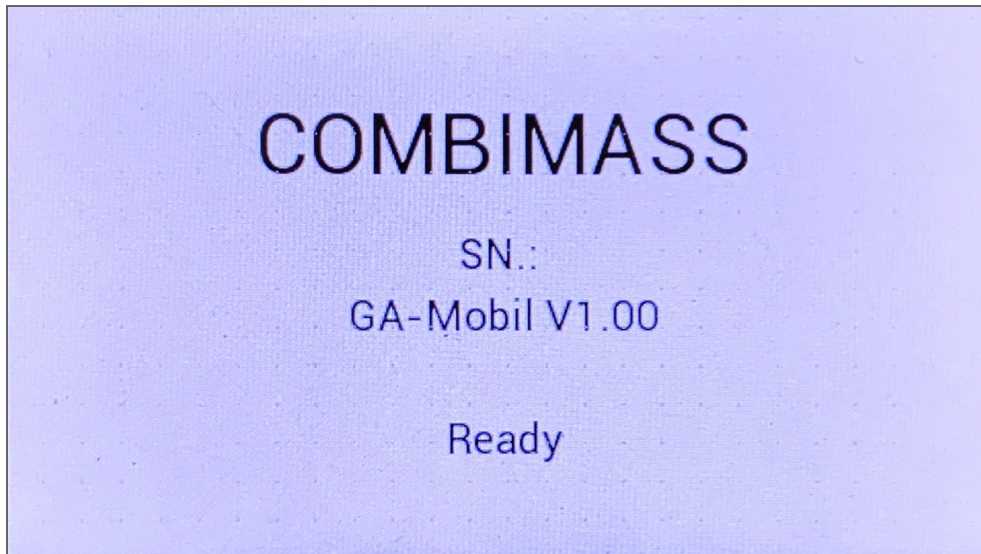
From the main menu, you can access the submenus of the user interface.

No.	Button/indication	Function
1	Info	Opens the Info page ⇒ 9.4.1 "Info".
2	Alert	Opens the Alert menu ⇒ 9.4.2 "Alert".
3	Data Logging	Opens the Data Logging menu ⇒ 9.4.3 "Data Logging".
4	Adjust	Opens the Adjust menu ⇒ 9.4.3 "Data Logging".
5	Service	Opens the Service menu ⇒ 9.4.3 "Data Logging".

Touch the [△ Home] button to return to the start page. Touch the [◀] button to return to the previous page.

9.4.1 Info

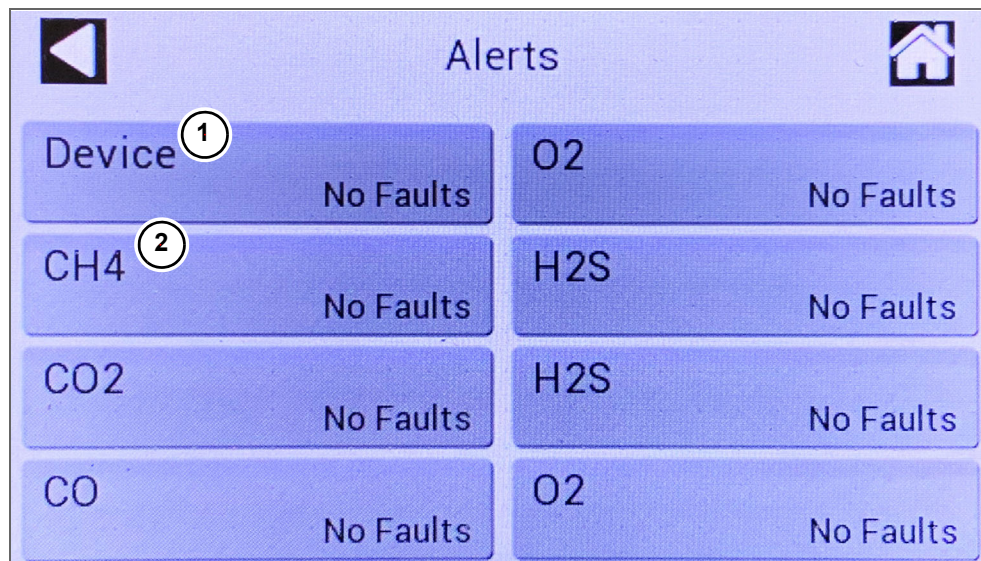
Touch the [Info] button to open the Info page.



The Info screen contains information about the current software version and the serial number of the device.

9.4.2 Alert

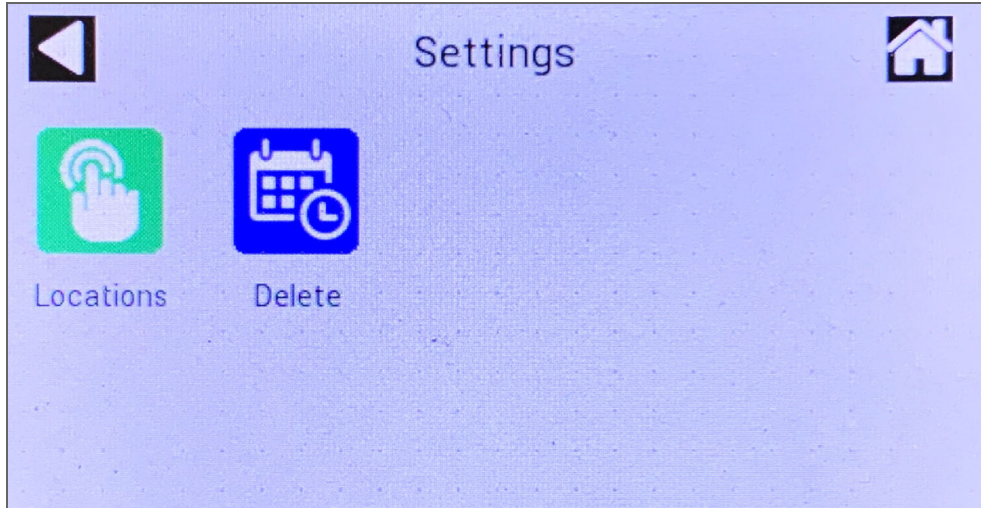
The Alert screen lists all current fault states of the device.



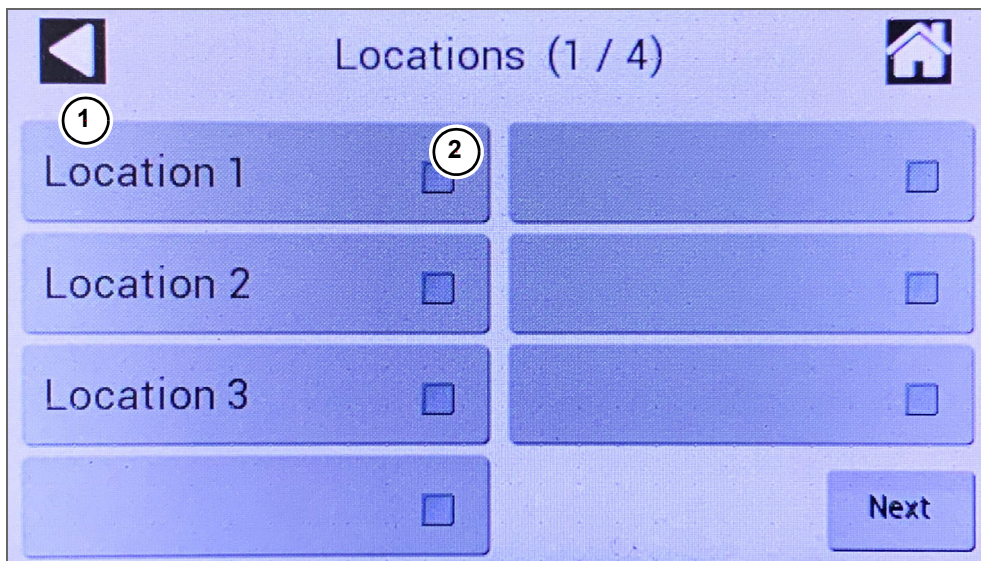
No.	Button/ indication	Function
1	Device	Indicates whether a general alarm (common alarm) is pending. No alarm = „No Faults“
2	Gases (CH4, CO2, ...)	Indicates whether an alarm is pending for the corresponding gas cell.

9.4.3 Data Logging

The measured data are stored on the device in relation to the measurement location. Optionally the re-corded data can be evaluated on the PC.



Touch [Delete] to delete all stored measured data. Touch [Locations] to open the Settings menu for saving the measured data.

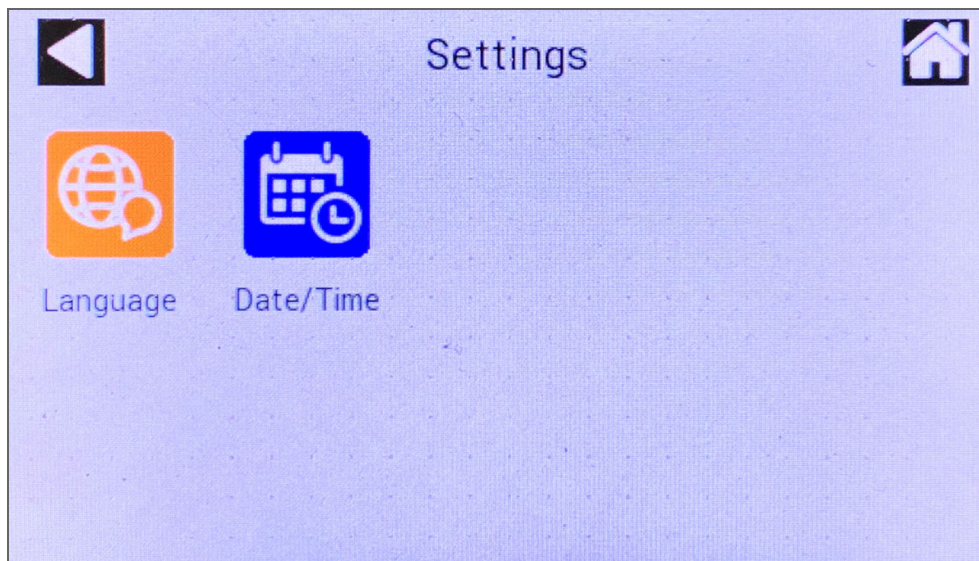


Touch a button **(1)** to assign a name for the measurement location. Touch the checkbox **(2)** next to the location name to activate data storage. When storage is active, a green tick appears.

Up to 25 measurement locations can be defined for data storage. The measured data are written to a .csv file. A maximum of 600 records can be saved. You can find more information on evaluating the measured data at ⇒ 7.6 "Saving and evaluating measured data (data logger)".

9.4.4 Adjust

In this menu, you can set the system language and system time for the device.



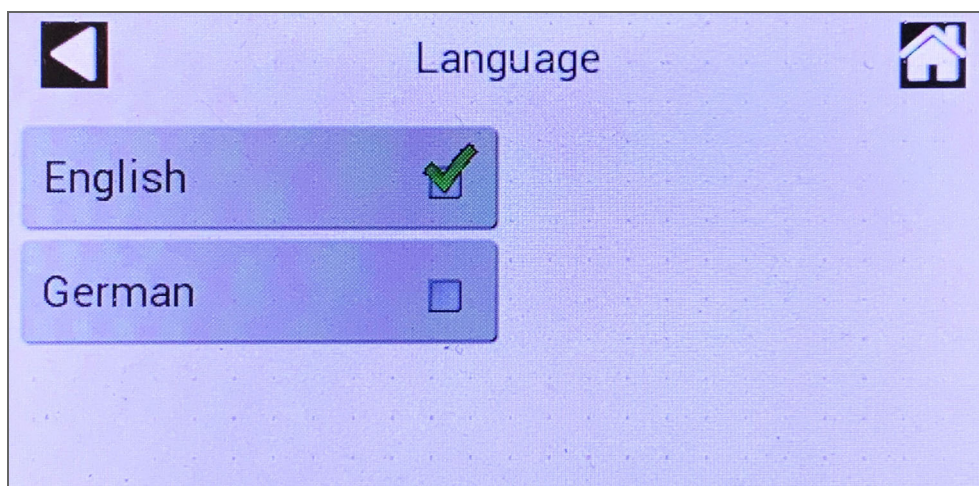
Touch [Language] or [Date] to open the corresponding submenu.

⇒ 9.4.4.1 "Language"

⇒ 9.4.4.2 "Date / Time"

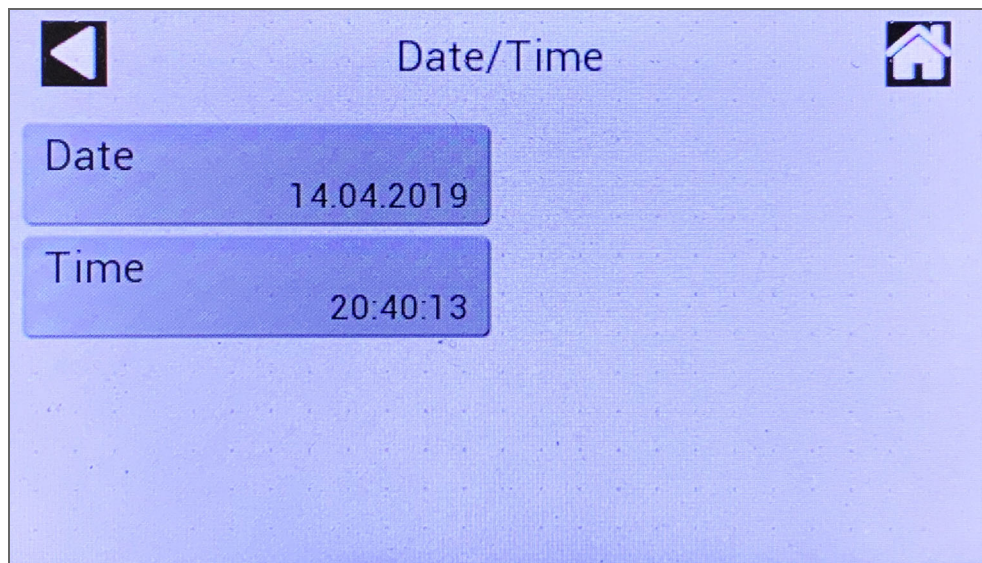
Touch the [△ Home] button to return to the start page.

9.4.4.1 Language



Select the system language for the user interface here. A green tick mark is displayed next to the selected language. Touch the [△ Home] button to return to the start page.

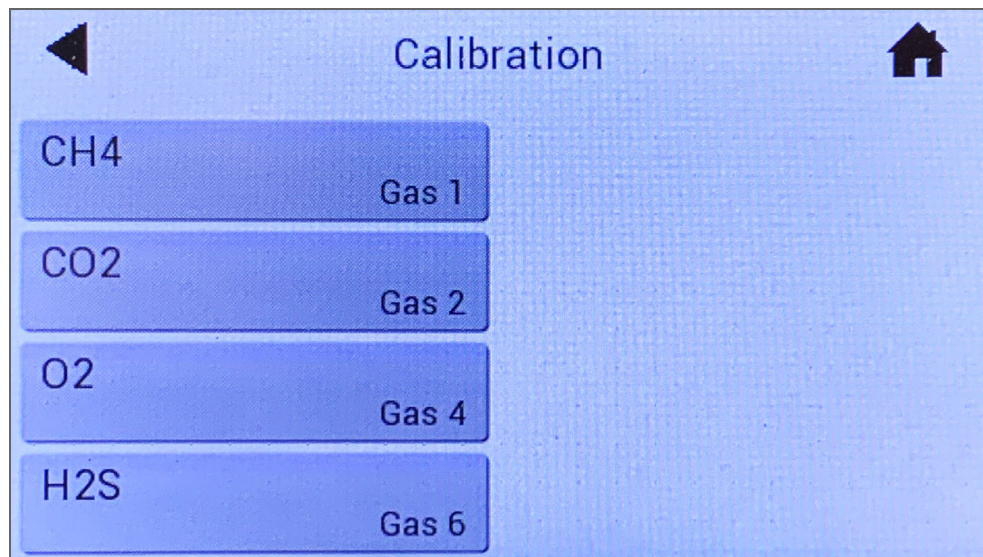
9.4.4.2 Date / Time



Enter the system time for the device. Enter the time and date. Touch the [△ Home] button to return to the start page.

9.4.5 Service

This menu is used to calibrate the device with test gas.



Proceed as described in ⇒ 7.7 "Calibrating the device" to calibrate the device.

i NOTE: Readings and measured gases are examples only. Depending on the customer's specifications, the number and type of gases can vary. ⇒ 3.2 "Analyzed gases" provides an overview of which gases can be analyzed with your device.

Press the [△ Home] button to return to the home page. Press [◀] to return to the previous page.

10 Maintenance and servicing

The functioning of the individual components depends to a large extent on the quality of cleaning and maintenance.



WARNING

Maintenance only by qualified personnel

Persons entrusted with maintenance tasks must carefully observe the safety instructions in the operating manual and follow the applicable occupational safety rules.



WARNING

Before maintenance – interrupt the power supply!

For all maintenance work, the power supply must be disconnected and the device must be switched off.

⇒ For further information, see Section 7.4 "Stopping the measurement and switching off the device"

10.1 Checking the battery charge level

Check the battery charge level **every 6 months**. If necessary, recharge the battery to 55 to 75 percent to prevent deep discharges. For more information, see ⇒ 7.5 "Charging the battery".

10.2 Replacing the inline adsorber

When the adsorber is spent, the color of the gel balls inside changes from orange to clear. Replace the adsorber as soon as it is spent.



WARNING

Only use device with Inline Adsorber!

Use without an adsorber may cause damage to the device.

If no Inline Adsorber is used, the integrated filter may clog. The internal filter can only be replaced by the customer service of Binder GmbH.

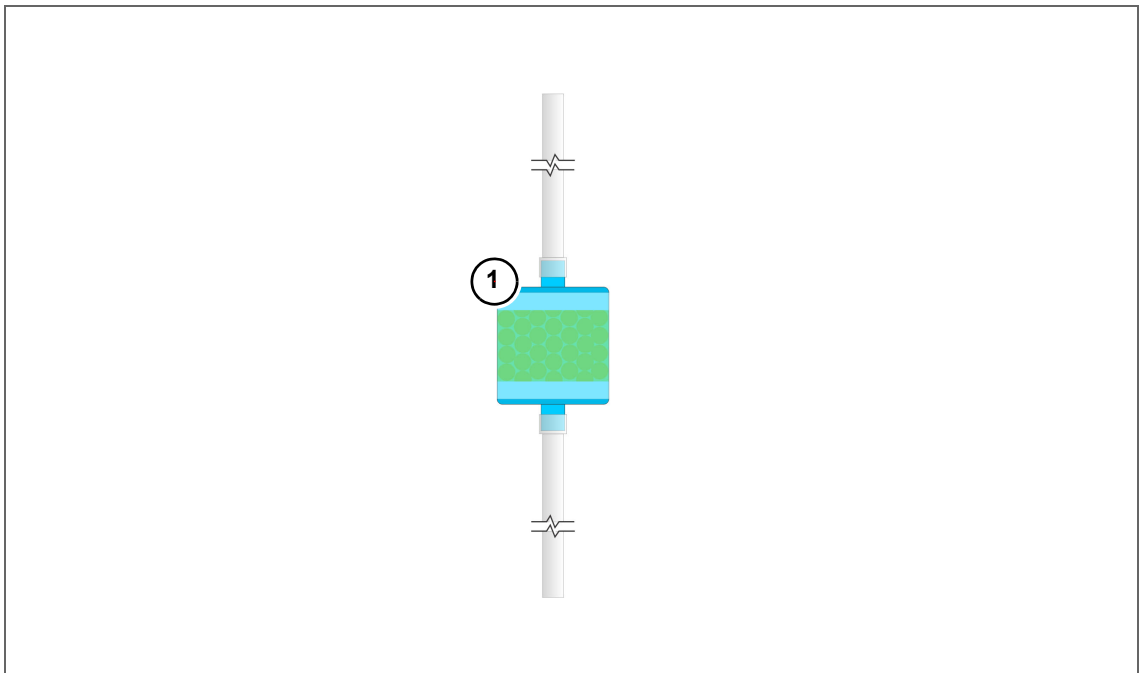


Proceed as follows to replace the adsorber.

1. Purge the device with air (see ⇒ 7.3 "Purging the analyzer with air").
 2. Switch off the device (see ⇒ 7.4 "Stopping the measurement and switching off the device").
 3. The adsorber is located in the gas sampling hose (see ⇒ 7.1 "Connecting gas hoses"). Disconnect the two hose ends from the adsorber and insert a new adsorber.
- ✓ The inline adsorber has been replaced and can be used for the next measurement.

i NOTE: The part number for ordering a new adsorber can be found in the spare and wear parts list ⇒ 11 "Spare and wear parts".

11 Spare and wear parts



No.	Art. No.:	Quantity	Designation	Recommended Replacement Cycle
1	0300858	1	Inline adsorber - Infiltec, type: DIA-MNI	Depending on discoloration*

*When the adsorber is spent, the color of the gel balls inside changes from orange to clear. Replace the adsorber immediately (see ⇒ 10.2 "Replacing the inline adsorber").

12 Appendix – Decontamination certificate



Declaration on the Contamination of the Following Products:

Product information		Reason for sending in
Type:		
Article number:		
Type:		
Article number:		
Type:		
Article number:		

I hereby confirm that the article(s) listed above has/have not been contaminated by a dangerous or toxic substance or material as defined by national or regional legislation.

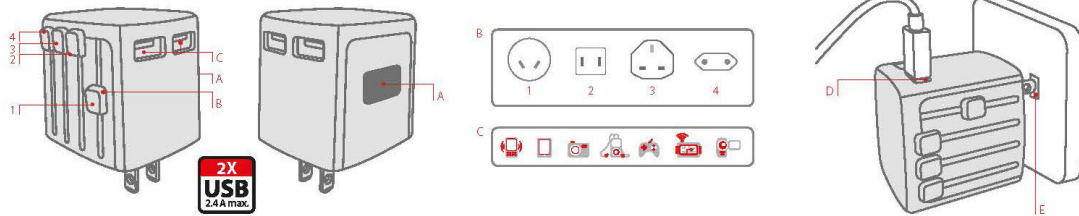
I hereby confirm that the article(s) has/have been cleaned completely and thoroughly. If the article(s) has/have been exposed to dangerous or toxic materials/substances, I hereby confirm that the undersigned guarantees complete and thorough neutralisation of these substances and of any contamination (of the article(s) sent in). I also understand that this certificate does not affect our obligation to hand over a decontaminated product to BINDER GmbH for repairs.
Failure to comply with this rule can lead to claims for compensation.

Customer/Dept./Institute:	
Street:	
Postcode, town:	
Contact:	
Telephone:	
Order number of customer:	

Name of authorised person (in block letters) _____

_____ Date _____ Signature of authorised person _____ Company stamp _____

13 Appendix – USB Charger



ENGLISH

PRODUCT OVERVIEW & FUNCTIONS

World USB Charger
Charge your USB-devices in over 220 countries around the world.

- A Release button
B Country sliders/country-specific plugs
1 USA, Japan
2 Australia, China
3 UK
4 Euro

C Dual USB output
The World USB Charger is suitable for devices that are charged using a USB port (C), for example smartphones, tablet PCs, digital cameras, MP3 players, game consoles, GPS devices, video cameras, etc.

Input current: 100V – 250V, Protection class II.
Output: 5 V / 2400 mA, 2 x USB, shared

INSTRUCTIONS

Before use, press the release button (A) and push the required slider forwards until it clicks into place.

Connect the USB device to the charger (F). Connect the charger to the mains (G). After use, press the release button (A) and push the slider back into the starting position.

ACCESSORIES

The matching SKROSS® charge & sync cables with Lightning connector or Micro-USB port are available in stores and online.

SAFETY PRECAUTIONS

- Keep the USB charger out of the reach of children.
- The USB charger is only intended for short-term use and should be disconnected from the mains after use.
- Never use the USB charger if the casing is damaged.
- Never expose the USB charger to liquids or moisture.
- Improper use of the USB Charger will invalidate the manufacturer's warranty. No liability is accepted for damages.
- Keep these instructions.

CUSTOMER SERVICE

If you have any problems using the World USB Charger of SKROSS®, please contact us on support@skross.com.

WARRANTY TERMS

Two-year warranty. The full warranty terms can be found at www.skross.com.

All products and software mentioned in this document are registered brands belonging to the relevant brand owner. Subject to errors.

© 2018 WorldConnect AG. All rights reserved. SKROSS® is a registered trademark of WorldConnect AG. All trademarks and registered trademarks are the property of their respective owners. Subject to changes in technical specifications.

DEUTSCH

PRODUKTÜBERSICHT & FUNKTIONEN

World USB Charger
Laden Sie Ihre USB-Geräte in über 220 Ländern dieser Welt.

- A Entriegelungsknopf
B Länderschieber/Länderspezifische Stecker
1 USA, Japan
2 Australien, China
3 UK
4 Euro

C Dualer USB-Ausgang

Der World USB Charger ist geeignet für Geräte die über einen USB-Anschluss geladen werden (C): z.B. Smartphone, TabletPC, Digitalkamera, MP3-Player, Spielkonsole, GPS, Camcorder etc.

Eingangsspannung: 100V – 250V.
Schutzklasse II.
Ausgang: 5 V / 2400 mA, 2 x USB, shared.

ANWENDUNG

Vor dem Gebrauch, Entriegelungsknopf (A) drücken und den gewünschten Schieber bis zum Einrasten (Klick) nach vorne schieben.

USB-Gerät mit dem Ladegerät verbinden (D). Ladegerät mit dem Stromnetz verbinden (E). Nach dem Einsatz Entriegelungsknopf (A) drücken und Schieber vollständig in die Ausgangsposition bringen.

ZUBEHÖR

Passende SKROSS® Charge & Sync Kabel mit Lightning Connector oder Micro-USB Anschluss sind im Handel oder online erhältlich.

VORSICHTSMASSNAHMEN

- Ladegerät von Kindern fernhalten.
- Ladegerät ist für den temporären Einsatz vorgesehen und nach Gebrauch vom Stromnetz zu trennen.
- Ladegerät darf nicht mit beschädigtem Gehäuse verwendet werden.
- Ladegerät darf nicht Flüssigkeiten oder Feuchtigkeit ausgesetzt werden.
- Bei unsachgemäßer Verwendung des Ladegeräts

erlischt automatisch die Herstellergarantie. Für Schäden wird keinerlei Haftung übernommen.
- Diese Anleitung ist aufzubewahren.

KUNDENDIENST

Sollten Sie Probleme im Umgang mit dem World USB Charger haben, setzen Sie sich bitte mit uns unter support@skross.com in Verbindung.

GARANTIEBESTIMMUNGEN

2 Jahre Garantie. Sie finden die vollständigen Garantiebedingungen unter www.skross.com.

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BINDER GmbH

Buchbrunnenweg 18

89081 Ulm, Germany

Tel.: +49 731 189 98-0

Fax +49 731 189 98-88

info@bindergroup.info

www.bindergroup.info

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