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Instruction Manual

ALMEMO® 470
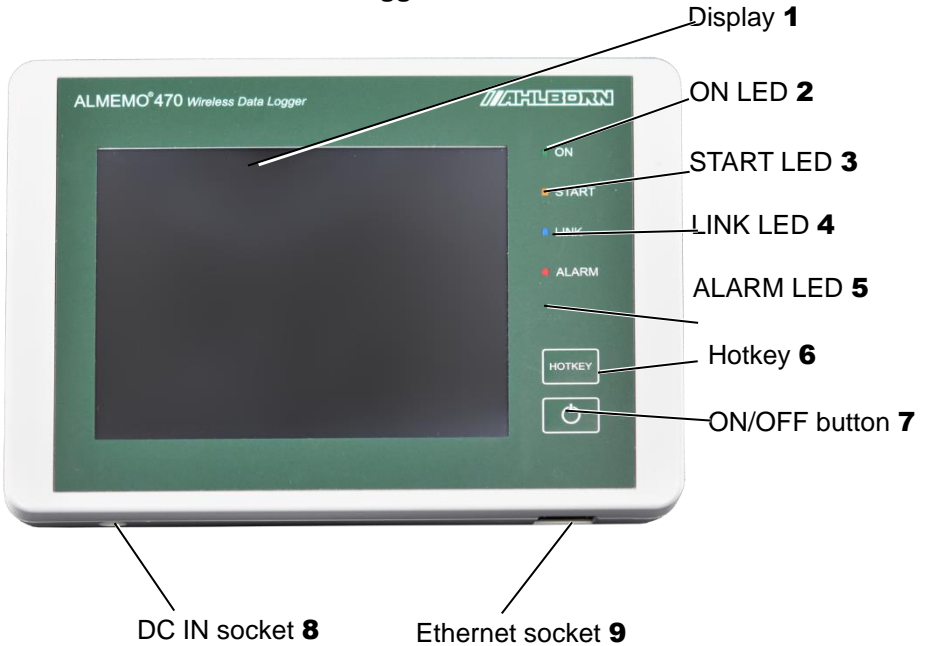
Wireless Data Logger

Including wireless ALMEMO® Sensor and wireless ALMEMO® Interface
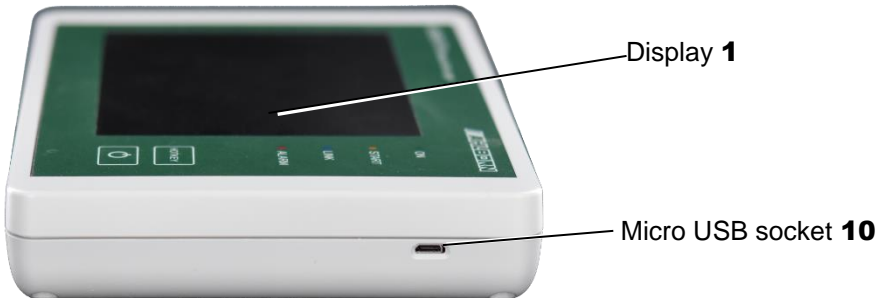
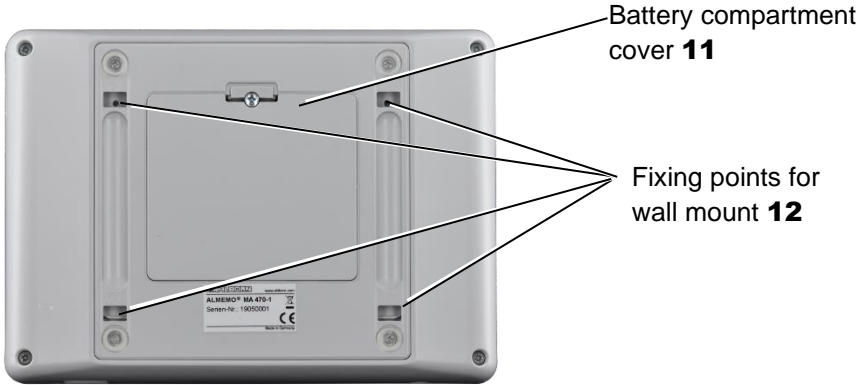V7 Technology
English
V2.2
26.01.2022

1 Global Overview

ALMEMO® 470 Wireless Data Logger

Display **1**
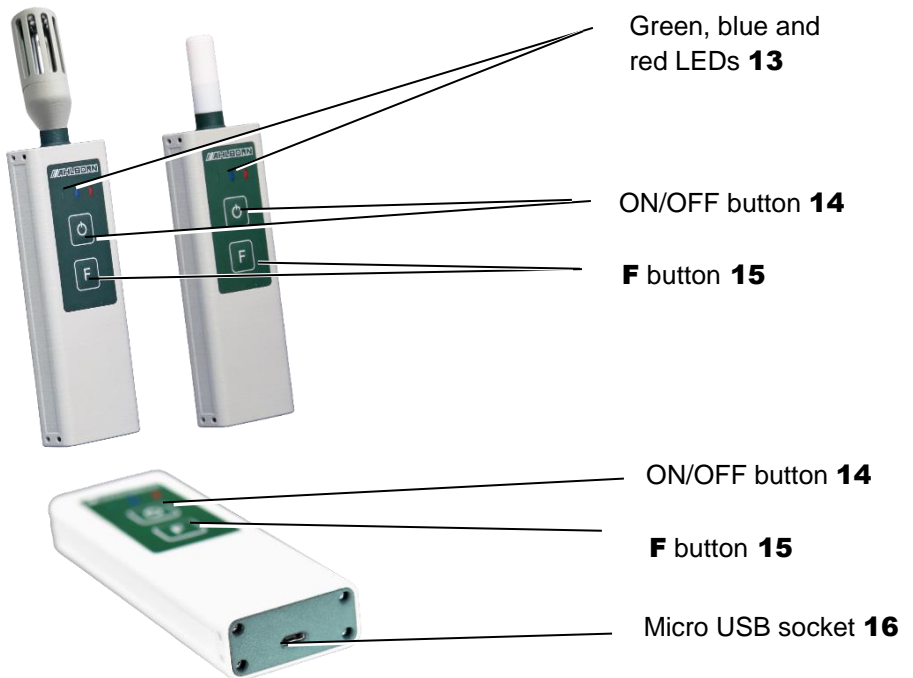
ON LED **2**

START LED **3**

LINK LED **4**

ALARM LED **5**

Hotkey **6**

ON/OFF button **7**

DC IN socket **8**   Ethernet socket **9**

Side view of the ALMEMO® 470 wireless data logger

Display **1**

Micro USB socket **10**

Rear view of the ALMEMO® 470 Wireless Data Logger

Battery compartment
cover **11**

Fixing points for
wall mount **12**

Wireless ALMEMO® Sensor

Green, blue and
red LEDs **13**

ON/OFF button **14**

F button **15**

ON/OFF button **14**

F button **15**

Micro USB socket **16**

Wireless ALMEMO® Interface

Micro USB socket **16**

ALMEMO® input
socket **17**

Green LED

Blue LED

Red LED

ON/OFF button **14**

F button **15**
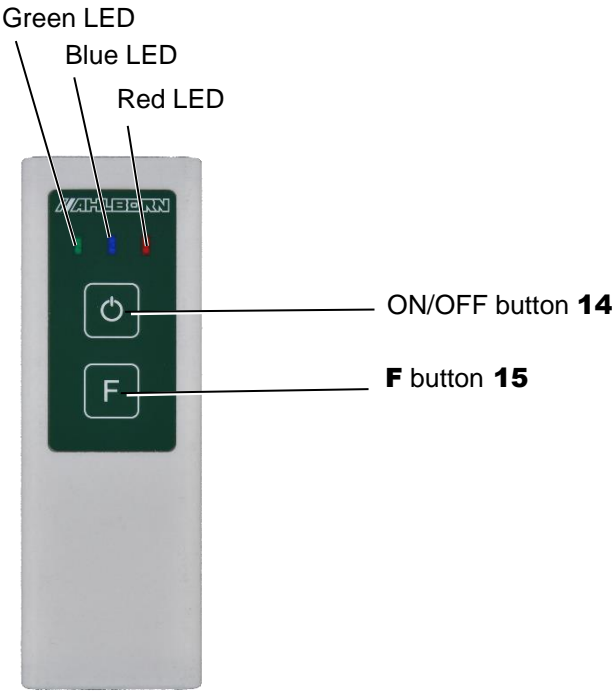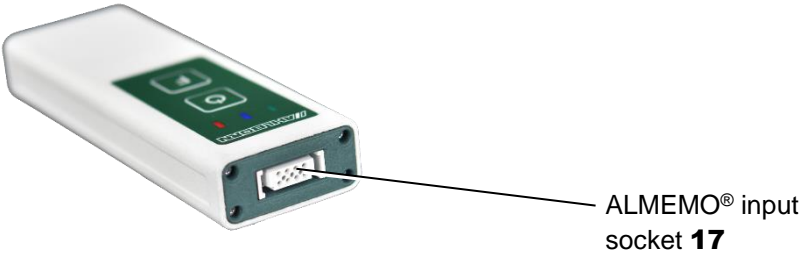
2 Table of Contents

3 Explanation of Symbols

  Safety note

! Requirement

→ Request

☞ Notice

➢ Result

3 Reference referring to the legend Global Overview of the data logger, wireless ALMEMO® sensor and wireless ALMEMO® interface (page 2-4)

back Text displayed within a software

4 Safety Notes ⚠️

→ Please read the Instruction Manual carefully and follow the safety and warning notes.

→ Only operate the measuring instrument in accordance with the intended use.

→ Do not operate the device outside of the indicated environmental conditions. Only operate the device within the technical specifications (see chapter 14 Technical Data).

→ Only open the device for maintenance and care purposes, see chapter 10 Maintenance and Care.

→ Make sure that the static electricity has been discharged before you touch the sensor cable.

→ Do not install sensor cables close to electric power lines.

→ Do not operate the device near fuels or chemicals, not on blasting areas or petrol stations.

→ Only use the supplied mains adapter. Do not open or manipulate the mains adapter.

→ Do not use the device when damaged due to electrostatic discharge, radiation or lightning.

→ Make sure that the batteries are not mechanically damaged, short circuited, or thrown into a fire.

→ If you have a pacemaker or an implanted defibrillator, do not use a magnetic wall mount. Magnets can affect the functionality of pacemakers and implanted defibrillators.

4.1 How to avoid Measuring Errors and Product Damages

→ Please wait for the device to adapt to the ambient temperature before starting to operate it.

☞ Bringing the device from a cold environment into the operating room may cause condensation on the electronics assembly. Regarding thermocouple measurements, severe temperature changes may cause larger measuring errors.

→   When connecting a mains adapter please consider the mains voltage.

→   Pay attention to the maximum load capacity of the sensor power supply.

→   Do not make any changes to the ALMEMO® measuring instrument and to the ALMEMO® wireless sensors.

→   Do not connect unsuitable peripheral devices to the measuring instrument.

→   Avoid heat, large temperature fluctuations, and increased electromagnetic radiation during operation (see chapter 14 Technical Data).

4.2 Intended Use

The ALMEMO® 470 wireless data logger is a measuring instrument and is intended only for measuring various measuring variables. The data logger supports the radio connection to a variety of ALMEMO® wireless sensors and the connection to a computer to use the configuration and the measurement data evaluation software.

A detailed overview on possible measuring tasks is given in the ALMEMO® Manual. To avoid measuring errors and damages to the device, it is recommended to read the relevant chapter for each measuring task and to pay attention to the notes given.

Please pay attention to all information and safety notes listed in this Instruction Manual. Only use the measuring instrument within the technical specifications (see chapter 14 Technical Data). Any other use is considered inappropriate and may result in damage to property or personal injury. Any such usage will result in the loss of the warranty rights.

☞   In case of doubt, please contact our technical support (Phone: +49 (0)8024/3007-38, email: help@ahlborn.com).

5 Product

5.1 Scope of Delivery

→ When unpacking, please pay attention to damages to the measuring
instrument as well as to the completeness of the delivery.

☞ The precise compilation of your delivery depends on your purchase
order.

ALMEMO® 470 wireless data logger	
Mains adapter for the data logger	
USB data cable	
Ethernet data cable	
Wall mount for the data logger	
Wireless ALMEMO® sensor	

Wireless ALMEMO® interface	
Mains adapter for the wireless ALMEMO® sensor or for the wireless ALMEMO® interface	
Wall mount for wireless ALMEMO® sensor or for the wireless ALMEMO® interface	
Present copy of the Instruction Manual	

→   In the event of a damage caused during transportation, please keep
    the packaging material and contact the supplier immediately.

5.2 Description

☞   The general overview of the wireless data logger can be found on
    pages 2 and 3.

☞   The technical data of the wireless data logger can be found in
    chapter 14.1 Technical data of the data logger

☞   The general overview of the wireless ALMEMO® sensors and the
    wireless ALMEMO® interface can be found on pages 3 and 4.

☞   The technical data of the wireless ALMEMO® sensors and the
    wireless ALMEMO® interface can be found in chapter 14.2 Technical
    Data of the Wireless Sensor.

Status LEDs data logger

🟩	ON	Flashing	Connected to power supply, battery is being charged
		Constant light, Display on	Switched on and / or battery fully charged
		Constant light, Display off	Power saving mode
🟨	START	Flashing	Measurement has been started
🟦	LINK	Flashing	Data received from the ALMEMO® wireless sensor, LED continues flashing according to the data volume received
🟥	ALARM	Constant light	Alarm was activated due to sensor break or limit value overshoot

Description ALMEMO® wireless sensor (wireless ALMEMO® sensor and wireless ALMEMO® interface)

☞ The general overview of the wireless ALMEMO® sensors can be found on page 3 and the general overview of the wireless ALMEMO® interfaces can be found on page 4.

All sensors that can be connected to the ALMEMO® 470 wireless data logger and can transfer measurement data are considered as ALMEMO® wireless sensors.

Here we need to differentiate between wireless ALMEMO® sensors and wireless ALMEMO® interfaces with ALMEMO® sensors. Wireless ALMEMO® sensors have a permanently installed sensor, e.g. the ALMEMO® Sensor FH 1746-Cx for the measurable variables humidity, temperature, and atmospheric pressure. Wireless ALMEMO® interfaces have an ALMEMO® input socket, into which an ALMEMO® sensor featuring either an ALMEMO® D7 or D6 plug can be inserted. This means that via the wireless ALMEMO® interface a vast variety of measurable variables can be transferred to the ALMEMO® 470 wireless data logger.

☞ The technical data of the wireless sensor can be found in chapter 14.2 Technical data of the wireless sensor.

Radio connection

The wireless data logger receives the measured data, measured and buffer-saved by the ALMEMO® wireless sensors, via a radio connection. In case a direct connection to the wireless data logger is not possible, every ALMEMO® wireless sensor can act as a repeater by receiving measured data from other ALMEMO® wireless sensors and forwarding the data to the wireless data logger. The repeater function is disabled for wireless sensors that are in sleep mode.

Radio channels

A maximum of ten ALMEMO® wireless sensors (wireless ALMEMO® sensors and/or wireless ALMEMO® interfaces) can be connected to the ALMEMO® 470 wireless data logger. Every ALMEMO® wireless sensor uses the same radio channel that has been set on the wireless data logger. You can choose from a range of 16 different radio channels in the 2.4 GHz frequency range. Several wireless data loggers that are operated in parallel should be set to different radio channels to connect to the ALMEMO® wireless sensor.

Measuring channels

Every ALMEMO® wireless sensor provides several measuring channels. Wireless ALMEMO® sensors have four measuring channels. Wireless ALMEMO® interfaces feature the number of measuring channels that the connected ALMEMO® sensor provides. Wireless ALMEMO® interfaces can have a maximum of ten measuring channels.

Only the measurement data of the measuring channels that have been selected in the data logger will be transferred to the wireless data logger. The wireless data logger can receive a maximum of 40 measuring channels.

Every measuring channel has a unique channel number.

M 1. 2. 4
— Measuring channel
— ALMEMO® wireless sensor
— Wireless data logger
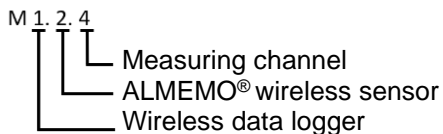
5.3 Wireless Sensor Overview
key assignment and LED states
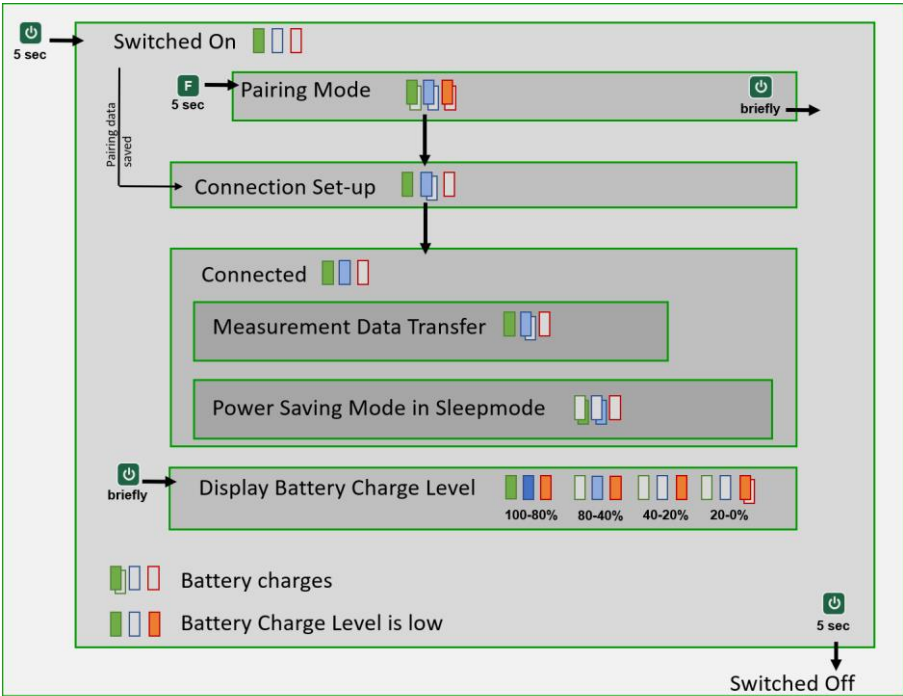
Legend

6 Initial Operation

How to switch the data logger on

1. Insert the DC plug of the included mains adapter for the data logger into the DC IN socket **8** of the data logger and the mains plug into a power socket.

➢ The ON LED **2** of the data logger is flashing as long as the battery is being charged.

2. Press the ON/OFF button **7** of the data logger.

➢ All LEDs of the data logger light up.

➢ The display **1** of the data logger will show the home screen.

➢ The display **1** of the data logger will show the home screen and the ON LED **2** of the data logger is flashing as long as the battery is being charged.

➢ The ON LED **2** of the data logger lights up as soon as the battery is fully charged.

How to switch on the wireless sensor

3. Insert the Micro USB plug of the included mains adapter for the ALMEMO® wireless sensor into the Micro USB socket **16** of the ALMEMO® wireless sensor. Insert the mains plug into a power socket.

➢ The green LED of the ALMEMO® wireless sensor is flashing as long as the wireless sensor is being charged.

4. If you want to use a wireless ALMEMO® interface as an ALMEMO® wireless sensor, insert the ALMEMO® D7 or D6 plug of the desired ALMEMO® sensor into the ALMEMO® input socket **17** of the wireless ALMEMO® interface.

5. Press and hold the ON/OFF button **14** of the ALMEMO® wireless sensor.

> ➢ All LEDs of the ALMEMO® wireless sensor will light up; the ALMEMO® wireless sensor is being switched on.

> ➢ The green LED of the ALMEMO® wireless sensor lights up and only flashes briefly as long as the battery is being charged. The ALMEMO® wireless sensor is switched on.

☞ In case pairing data is saved on the wireless sensor and the sensor tries to establish a connection to the data logger using the saved pairing data, the blue LED of the ALMEMO® wireless sensor is flashing.

☞ When the ALMEMO® wireless sensor is connected to the data logger, the blue LED of the ALMEMO® wireless sensor lights up. When data is transferred to the data logger, the blue LED flashes.

Check which wireless sensors are connected to the data logger

6. In the home screen of the data logger, tap on Sensor overview 🔌.

> ➢ All connected sensors will be displayed in the sensor overview. The serial number, which can be found in the right-hand column, can be used to distinguish the wireless sensors.

The serial number can be found on the rear side of the wireless sensor.

How to connect the wireless sensor with a data logger

☞ If the blue LED does not flash and only the green LED flashes respectively lights up, no pairing data is saved on the wireless sensor. To connect the wireless sensor to the data logger, please follow the steps indicated in chapter 7.1.7 How to connect the wireless sensor to the data logger.

☞ If initially the blue LED flashes and afterwards the red LED flashes approximately 7 times, pairing data is saved on the wireless sensor but the wireless sensor was not able to establish a connection to the data logger. The wireless sensor continues to try to connect to the data logger while the blue and the green LEDs are slowly flashing

simultaneously.

If no connection could be established after a while, it might be because no pairing data for this sensor is saved on the data logger. Please check if the sensor is listed in the table in the menu Settings>Wireless network>Sensor pairing.

If the sensor is not listed in this table, delete the pairing data saved on the wireless sensor (7.1.8 How to terminate the Connection between Wireless Sensor and Data Logger, section Delete pairing data in wireless sensor without connection). Afterwards, pair the wireless sensor with the data logger (see chapter 7.1.7 How to connect the Wireless Sensor with a Data Logger, section Pair wireless sensor with the data logger).

☞ To check the connection quality, use the ALMEMO® 470 MeshViewer software (see Instruction Manual ALMEMO® 470 MeshViewer).

☞ If no connection can be established between the wireless sensor and the data logger, it might be because the radio channel is overloaded. Change the radio channel of the wireless network of the data logger (see chapter 8.1.2 How to set a Radio Channel) and make sure to select a free channel.

How to start a measurement

7. On the data logger, tap on the tab Display ▪▪▪, to open the menu display.

➢ The measuring channels of the connected wireless sensors will be displayed in the Channel list ▤ with measured value, maximum value, and minimum value.

8. Tap on the button Start.

➢ The measurement starts.

➢ The START LED **3** flashes.

7 Usage

7.1 How to prepare the Measurements

7.1.1 How to connect the Power Supply

Connect the power supply to the data logger

⚠️ Only use the included mains adapter. Only for this mains adapter, we can guarantee a continuously stable power supply.

→ Insert the DC plug of the included mains adapter for the data logger into the DC IN socket **8** of the data logger. Insert the mains plug into a power socket.

➢ The ON LED **2** of the data logger flashes as long as the battery is charged.

➢ If the data logger is switched on, a battery symbol will be displayed in the upper right corner of the screen. As long as the battery is charged, the battery symbol will switch between full and half full.

☞ In the wireless data logger batteries are included that will provide a continuous sufficient power supply in case of main power fluctuations. If the batteries are fully charged, the power supply of the wireless data logger is also guaranteed during a short mobile usage.

Connect the power supply to the wireless sensor

⚠️ Only use the mains adapter with the order number ZB1505NA1. Only for this mains adapter, we can guarantee a continuously stable power supply.

→ Insert the Micro USB plug of the included mains adapter for the ALMEMO® wireless sensor into the Micro USB socket **16** of the ALMEMO® wireless sensor. Insert the mains plug into a power socket.

➢ The green LED of the ALMEMO® wireless sensor flashes as long as the wireless sensor is charged. In case the wireless sensor is being charged while it is switched on, the green LED lights up and flashes only briefly.

☞ To save power and increase the battery life of the wireless sensor, you can use the sleep mode of the wireless sensor for output cycles longer than 30 seconds (see chapter 8.2.6 How to enable /disable sleep mode).

7.1.2 How to check the Battery Charge Level

Check the battery charge level of the data logger

! The data logger must be switched on.

→ Take note of the battery symbol in the upper right corner of the display.

Symbol	Symbol description	Message regarding battery charge level
	The battery symbol is completely filled.	At least 80 %
	The battery symbol is halfway filled.	At least 40%
	One third of the battery symbol flashes red.	Insufficient battery charge level. The data logger will switch off soon.

☞ In case the battery charge level of the data logger is very low, a quadruple acoustic signal will sound (as long as the signal transmitter is switched on).

Check the battery charge level of the wireless sensor

- ! The wireless sensor must be switched on.
- → Shortly press the ON/OFF button **14** of the ALMEMO® wireless sensor.
- ➢ The LEDs will display the battery charge level of the wireless sensor for 8 seconds.

LED states	LED description	Message regarding the battery charge level
	All LEDs light up	At least 80 %
	Only the blue and the red LED light up	At least 40%
	Only the red LED lights up.	At least 20%
	The red LED is flashing.	Less than 20%

- ➢ The wireless sensor will return to the previous state and the LEDs will light as they did before displaying the battery charge level.
- ☞ To save power and increase battery life of the wireless sensor, you can use the sleep mode of the wireless sensor for output cycles longer than 30 seconds (see chapter 8.2.6 How to enable / disable sleep mode).

7.1.3 How to switch the Data Logger on/off

Switch the data logger on

- → Press and hold the ON/OFF key **7**.
- ➢ All LEDs of the data logger will light up.
- ➢ The display **1** of the data logger will show the home screen.
- ➢ The display **1** of the data logger will show the home screen and the ON LED **2** of the data logger flashes as long as the battery is charged.

➤ The ON LED **2** of the data logger lights up as soon as the battery is fully charged.

Switch the data logger off

→ Press the ON/OFF button **7**.

➤ The display of the data logger and the status LEDs will go out.

➤ The data logger is switched off.

7.1.4 How to use the Power Saving Mode of the data logger

☞ During power saving mode, the data logger switches the display off after a set period of time or dims the display brightness to a pre-set brightness level. All functions of the data logger, such as saving the measurement data, will continue to work.

☞ The power saving mode will only start when the data logger is not connected with the mains adapter. Thanks to the power saving mode, the battery runtime will be extended.

1. In the home screen, tap on Settings ⚒.

2. Tap on Device settings.

3. Tap on Display settings.

4. Tap on the field next to Energy-saving mode after …

5. Tap on the desired number of minutes.

➤ The power saving mode will start when you did not touch the display of the data logger for the set period of time.

6. In the line Display brightness in energy-saving mode tap on one of the selection fields that feature the brightness gradations. To switch the display off during power saving mode, select the lowest display brightness level so that no selection field is marked green.

➤ The display brightness will be dimmed to the set brightness level during power saving mode.

☞ If the display is switched off during power saving mode, you will notice that the power saving mode is on when the ON LED **2** is lit even though the display is switched off.

➢ You can end the power saving mode by tapping on the display.

7.1.5 How to connect /disconnect an ALMEMO® Sensor to the Wireless ALMEMO® Interface

Connect a sensor

☞ The wireless ALMEMO® interface is a ALMEMO® wireless sensor with a ALMEMO® input socket, to which an ALMEMO® sensor can be connected with a ALMEMO® D7 or D6 plug.

☞ The maximum sensor power supply of the wireless ALMEMO® interface is 6V at 30 mA. For sensors that require higher voltage / electricity, an external power supply has to be provided.

! The wireless ALMEMO® interface needs to be switched off.

→ Insert the ALMEMO® D7 or D6 plug of the desired sensor into the ALMEMO® input socket **17** of the wireless ALMEMO® interface.

☞ All standard ALMEMO® sensors with ALMEMO® plugs are generally programmed with measuring range and dimension and can therefore be connected to every wireless ALMEMO® interface and to every ALMEMO® measuring device.

Disconnect a sensor

! The wireless ALMEMO® interface needs to be switched off.

→ Press the two locking levers of the ALMEMO® plug and remove it from the ALMEMO® input socket **17**.

7.1.6 How to switch the Wireless Sensor on/off

Switch the wireless sensor on

→ Press and hold the ON/OFF button **14** of the ALMEMO® wireless sensor.

➢ All LEDs of the ALMEMO® wireless sensor will light up; the ALMEMO® wireless sensor will be switched on.

➢ The green LED of the ALMEMO® wireless sensor will light up and only flashes briefly as long as the batteries are charged. The ALMEMO® wireless sensor is switched on.

➢ In case pairing data is saved on the wireless sensor and the sensor tries to connect to the data logger, the blue LED flashes slowly.

Switch the wireless sensor off

→ Press and hold the ON/OFF button **14** of the ALMEMO® wireless sensor.

➢ All LEDs of the ALMEMO® wireless sensor are lit – then the red LED goes out followed by the blue LED and at the end by the green LED.

➢ The wireless sensor has been switched off.

☞ To save power and increase the battery life of the wireless sensor, you can use the sleep mode of the wireless sensor for output cycles longer than 30 seconds see chapter 8.2.6 How to enable / disable sleep mode).

7.1.7 How to connect the Wireless Sensor with the Data Logger

Pair the wireless sensor with the data logger

☞ The data logger sets up a wireless network for all wireless sensors. The SSID of the wireless sensor can be selected (8.1.2 How to set a Wireless Network SSID).

☞ For the wireless network, the data logger uses the 2.4 GHz frequency range. If you experience connection problems, set the radio channel of the data logger to a free radio channel (8.1.1 How to set a Radio Channel).

! In case a wireless ALMEMO® interface is used as an ALMEMO® wireless sensor, the ALMEMO® D7 or D6 plug of the desired ALMEMO® sensor must be plugged into the ALMEMO® input socket **17** of the wireless ALMEMO® Interface.

! The wireless sensor needs to be switched on. The green LED is lit (and flashes briefly in case the wireless sensor is being charged).

! The wireless sensor must not be paired with a data logger and therefore does not contain any pairing data. The blue LED does

neither light up nor flash.

☞ In case the green and the blue LED flash simultaneously after the wireless sensor has been switched on, the wireless sensor was already paired with a data logger and pairing data is saved on the wireless sensor. If the wireless sensor was delivered together with a data logger, usually the two of them have already been paired.
If you want to connect the wireless sensor with the same data logger featuring the same settings you had previously, please follow the instruction in section Reconnect sensor and data logger.
If you want to connect the wireless sensor with another data logger or with other wireless settings, please follow the instructions in chapter 7.1.8 How to terminate the Connection between Wireless Sensor and Data Logger, section Delete pairing data from a wireless sensor without connection) and afterwards the steps indicated in the present section Pair the wireless sensor with the data logger.

! The data logger needs to be switched on.

1. In the home screen, tap on Settings ⚒.

2. Tap on Wireless network.

3. Tap on Sensor pairing.

4. Tap on the field next to Pairing key.

5. Enter the serial number of the ALMEMO® wireless sensor. You will find the serial number on the nameplate on the rear side of the ALMEMO® wireless sensor.

6. Tap on OK.

➢ The serial number of the ALMEMO® wireless sensor will be saved to the data logger.

➢ The serial number of the ALMEMO® wireless sensor will be displayed next to the field Pairing key.

7. Press and hold the **F** button **15** of the ALMEMO® wireless sensor.

➢ All LEDs of the ALMEMO® wireless sensor are flashing simultaneously. The wireless sensor previously had no pairing data

stored and queries the pairing data from the data logger. This may take some time.

☞ In case only the red LED flashes approximately 7 times instead of all LEDs flashing simultaneously, pairing data is already stored on the wireless sensor. In this case delete the stored pairing data (see chapter 7.1.8 How to terminate the Connection between Wireless Sensor and Data Logger, section Delete pairing data from a wireless sensor without connection) and then repeat step 7 of the present section.

➢ The green and the blue LED of the ALMEMO® wireless sensor slowly flash simultaneously. The ALMEMO® wireless sensor establishes a connection to the data logger. This may take some time.

➢ The green LED of the ALMEMO® wireless sensor is lit (respectively flashes briefly in case the batteries are being charged). The blue LED of the ALMEMO® wireless sensor as well as the LINK LED **4** of the data logger are flashing. Initialization data is being transferred from the ALMEMO® wireless sensor to the data logger.

➢ The measuring channels will gradually be listed in the menu Channel List, in the menu Measured Value Display, and in the menu Sensor > Measuring Channels. All measuring channels will be displayed featuring the INIT symbol as long as initialization data is being transferred.

➢ The blue LED of the ALMEMO® wireless sensor is lit. The ALMEMO® wireless sensor is connected to the data logger. The blue LED flashes if data is being transferred to the data logger.

➢ The LINK LED **4** flashes if data is being transferred from the wireless sensor to the data logger.

➢ The ALMEMO® wireless sensor will be displayed in the table in the menu Settings>Wireless network>Sensor pairing.

→ To check the connection quality and the signal strength in the menu Sensor overview 📡, tap on the arrow at the end of the line of the wireless sensor whose connection you want to check.

➢ The signal strength will be displayed in dBm in the line Signal strength.

> ➢ In the line Connection quality , the connection quality will be
> indicated by three fields.

Description	Message regarding connection quality
All fields green	Very good connection
Two fields green	Good connection
One field green	Poor connection
All fields grey	No connection

☞ In case you want to connect several wireless sensors to a data
logger, repeat steps 4 to 7 for every single wireless sensor. If you
want to put several data loggers simultaneously into operation,
please follow the instruction in chapter 9 Connection set-up with
several data loggers.

☞ The connection between the data logger and the ALMEMO® wireless
sensor or several ALMEMO® wireless sensors can be checked in the
ALMEMO® 470 MeshViewer software (see Instruction Manual
ALMEMO® 470 MeshViewer).

☞ If no connection can be established between the wireless sensor and
the data logger, it might be because the radio channel is overloaded.
Change the radio channel of the wireless network of the data logger
(see chapter 8.1.2 How to set a Radio Channel) and make sure to
select a free channel.

☞ If the connection between data logger and wireless sensor was
interrupted, the symbol RADIOFAIL will be displayed in the data logger
in the table in the menu Sensor pairing. The symbol RADIOFAIL will
also be displayed in the menus Channel list, User menu, and
Measured value display as well as in the menu Sensor overview.

Reconnect sensor and data logger

☞ The wireless sensor and the data logger save the pairing data during
the pairing process. After being switched off and then on again, both
devices connect automatically.

1. Switch the data logger on by pressing the ON/OFF button **7**.

➢ All LEDs of the data logger light up.

➢ The display **1** of the data logger will show the home screen.

➢ The display **1** of the data logger will show the home screen and the ON LED **2** of the data logger flashes as long as the data logger is being charged.

➢ The ON LED **2** of the data logger is lit as soon as the batteries are fully charged.

 2. Switch the wireless sensor on by pressing and holding the ON/OFF button **14** of the wireless sensor.

➢ All LEDs of the ALMEMO® wireless sensor are lit; the ALMEMO® wireless sensor is being switched on.

➢ The green LED of the ALMEMO® wireless sensor is lit and flashes only briefly as long as the batteries are being charged. The ALMEMO® wireless sensor has been switched on.

➢ The blue LED is flashing. The wireless sensor is trying to establish a connection to the data logger by using the saved pairing data.

☞ In case the red LED flashes approximately 7 times, the wireless sensor could not establish a connection with the data logger. The wireless sensor continues to try to establish a connection with the data logger while the blue and the green LED are slowly flashing simultaneously.

 If no connection could be established after a while, it might be because no pairing data for this sensor is saved on the data logger. Please check if the sensor is listed in the table in the menu Settings>Wireless network>Sensor pairing.

 If the sensor is not listed in this table, delete the pairing data saved on the wireless sensor (7.1.8 How to terminate the Connection between Wireless Sensor and Data Logger, section Delete pairing data in wireless sensor without connection). Afterwards pair the wireless sensor with the data logger (see chapter 7.1.7 How to connect the Wireless Sensor with a Data Logger, section Pair wireless sensor with the data logger).

➢ The measuring channels will gradually be listed in the menu Channel List, in the menu Measured Value Display, and in the menu Sensor > Measuring Channels. All measuring channels will be displayed

featuring the INIT symbol as long as initialization data is being transferred.

➢ The blue LED of the ALMEMO® wireless sensor is lit. The ALMEMO® wireless sensor is connected to the data logger. The blue LED flashes if data is being transferred to the data logger.

→ To check the connection quality and the signal strength in the menu Sensor overview 🖋, tap on the arrow at the end of the line of the wireless sensor whose connection you want to check.

➢ The signal strength will be displayed in dBm in the line Signal strength.

➢ In the line Connection quality, the connection quality will be indicated by three fields.

Description	Message regarding connection quality
All fields green	Very good connection
Two fields green	Good connection
One field green	Poor connection
All fields grey	No connection

☞ The connection between the data logger and the ALMEMO® wireless sensor or several ALMEMO® wireless sensors can be checked in the ALMEMO® 470 MeshViewer software (see Instruction Manual ALMEMO® 470 MeshViewer).

7.1.8 How to terminate the Connection between Wireless Sensor and Data Logger

☞ The data logger and the wireless sensor are connected when both devices are switched on and paired, the blue LED of the wireless sensor is lit and the wireless sensor is listed on the data logger in the table in the menu Settings>Wireless network>Sensor pairing.

☞ The wireless sensor and the data logger save the pairing data during the pairing process. After being switched off and then on again, both devices connect automatically. During the unpairing process it is therefore mandatory to delete the pairing data from the data logger as well as from the wireless sensor.

Unpair wireless sensor while being connected

! There needs to be a connection between the data logger and the wireless sensor. The blue LED of the wireless sensor is lit respectively flashes in case measurement data is being transferred. The wireless sensor is listed in the table in the menu Sensor pairing.

1. In the home screen, tap on Settings ✖.

2. Tap on Wireless network.

3. Tap on Sensor pairing.

4. Tap on the field next to Unpair sensors.

5. Select the sensor you want to unpair.

➢ The sensor is being unpaired. The sensor will no longer be listed in the table. The blue LED of the wireless sensor is no longer lit. The pairing data will be deleted from the data logger as well as from the wireless sensor.

☞ If you want to unpair all connected sensors simultaneously, in step 4 tap on the button Unpair all sensors.

☞ If no connection is established to one or to several sensors that shall be unpaired, a dialog box will open on the data logger. Tap on Yes, to delete the pairing data of the one or the several wireless sensors anyway. Afterwards delete the pairing data from the wireless sensor (see the following section).

Delete pairing data from wireless sensor without connection

☞ During the unpairing process, pairing data needs to be deleted from the data logger as well as from the wireless sensor. Therefore unpair the wireless sensor – if possible – while being connected (see section Unpair wireless sensor while being connected).

☞ In case the data logger and the wireless sensor cannot be
connected, and you still want to delete the pairing data from the
wireless sensor, follow the following steps:

! The wireless sensor needs to be switched on. The green LED is lit.

→ Simultaneously press and hold the ON/OFF button **14** and the **F**

button **15** of the wireless sensor for 3 seconds.

➢ All LEDs go out.

➢ The blue and the red LED flash several times simultaneously. The
pairing data will be deleted from the wireless sensor.

➢ The green LED is lit. The wireless sensor is switched on and has no
pairing data stored.

→ Delete the pairing data of this sensor from the data logger as well (see
section Delete pairing data from data logger without connection).

Delete Pairing Data from Data Logger without Connection

☞ During the unpairing process, pairing data needs to be deleted from
the data logger as well as from the wireless sensor. Therefore unpair
the wireless sensor – if possible – while being connected (see
section Unpair wireless sensor while being connected).

In case the data logger and the wireless sensor cannot be
connected, and you want to delete the pairing data from the data
logger, follow the following steps:

1. In the home screen, tap on Settings ✖.

2. Tap on Radio settings.

3. Tap on Sensor pairing.

4. Tap on the field next to Unpair sensors.

5. Select the sensor you want to unpair.

➢ A dialog box will open in the data logger.

6. Tap on Yes to delete the pairing data of the one or the several wireless
sensors from the data logger anyway.

➢ The pairing data of the sensor will be deleted from the data logger.
The sensor will no longer be listed in the table.

☞ If you want to unpair all connected wireless sensors simultaneously, in step 4 tap on the button Unpair all sensors.

→ Delete the pairing data from the wireless sensor as well (see section Delete pairing data from wireless sensor without connection).

7.2 How to display Measured Values

! The data logger needs to be switched on.

! In case a wireless ALMEMO® interface is used as an ALMEMO® wireless sensor, the ALMEMO® D7 or D6 plug of the desired ALMEMO® sensor must be plugged into the ALMEMO® input socket of the wireless ALMEMO® Interface.

! The wireless sensor needs to be switched on.

! The wireless sensors needs to be connected to the data logger.

7.2.1 How to display Measured Values in a Channel List

1. In the home screen, tap on Display **ıl.**.

2. Tap on the tab channel list **≡≡**.

➢ The measuring channels of the connected wireless sensors will be displayed featuring measured value, maximum value, and minimum value.

Select the displayed type of measured value

☞ For every column of the table you can choose which kind of measured values shall be displayed in the table. You can choose measured value, maximum value, minimum value, and average value of the respective measuring channel.

☞ The measured value always displays the current measured value. The function values maximum value, minimum value, and average value relate to all measured values since the function values were last cleared. E.g. for the minimum value, all measured values measured since the record was cleared for the last time are being considered and the lowest value will be displayed.

1. Tap on the cell in the header of the column, whose display you want to change.
2. Tap on the desired type of measured value.
➢ The selected type of measured value will be displayed in the header. The relevant measurement data will be displayed in the column.

7.2.2 How to display Measured Values in the User Menu

☞ The user menu is an individual presentation of measured values. You can select the number of measured values displayed as well as the measuring channels displayed.

1. In the home screen, tap on Display ▐▐.
2. Tap on the tab user menu ▤.
3. Tap on Manage user menus.
4. Tap on the field next to User menu name.
5. Enter the desired name for the new user menu.
6. Tap on OK.
7. Tap on the field next to User menu template.
8. Select the display of the measured values.
9. In the line Add user menu tap on the button Add.
10. Tap on the line of the user menu that you have just created.
➢ The user menu will open and will feature the previously selected kind of display of the measured values.
11. Tap on Mx in the line, in which you want to add a measuring point.
12. Tap on the measuring point whose measuring value you want to display in that line.
13. Repeat steps 11 and 12 for all cells, in which measuring values shall be displayed.
➢ The chosen measuring values will be displayed in the selected cell.
☞ If the data logger was switched off and then on again, the user menu will at first be displayed blank. As soon as the wireless sensor is

connected, the measuring points and the measured values will be displayed.

Hide measured values in the user menu

1. Tap on the measuring point name Mx.x.x in the cell, whose measured values you want to hide.
2. Tap on Hide.
➢ The cell will be displayed empty.

☞ Hidden cells can only be shown again by resetting the user menu.

Reset or delete user menu

1. Tap on the tab User menu 📇.
2. Tap on Manage user menus.
3. Tap on the field next to Reset user menu respectively Delete user menu.
4. Select the user menu you want to reset respectively delete.

7.2.3 How to display Measured Values in the Measured Value Display

1. Display the measured value in the channel list or in the user menu.
2. Tap on the desired measured value that shall be displayed in the measured value display with maximum and minimum value.
➢ The measured value display will open.
→ To exit the measured value display, either tap on the tab Display 📊 or on Back.

7.2.4 How to delete the Function Values maximum value, minimum value, and average value

☞ If you delete a function value of a measuring channel, the function value will be calculated by using the measured values obtained from then on.

1. Select the type of measured value of a table cell displayed in the menu channel list as described in 7.2.1 How to display measured values in a channel list.

➢ The measuring channels of the connected wireless sensors will be displayed with the desired measurement data.

2. Tap on the table cell, whose function value you want to delete.

3. Tap on Delete minimum value orDelete maximum value or Delete average value.

☞ You can delete all function values of all measuring channels simultaneously by tapping on Delete all maximum / minimum / average values in step 3.

➢ The desired function values will be deleted and will then be calculated by using the measurement data obtained from then on.

Or

1. In the home screen, tap on Settings ⚒.

2. Tap on Device settings.

3. Tap on Function values.

4. Tap on the field next to Delete maximum value, delete minimum value or Delete average value.

5. Tap on the measuring channel, whose function values you want to delete.

☞ You can delete all function values of all measuring channels simultaneously by tapping on the button Delete in the line Delete all maximum / minimum / average values in step 4.

➢ The desired function values will be deleted and will then be calculated by using the measurement data obtained from then on.

7.3 How to perform Measuring Operations

☞ During a measuring operation, the received measurement data will be saved to the data logger according to the selected measuring cycle and output cycle (8.2.4 How to set the Measuring Cycle and chapter 8.2.5 How to set the Output Cycle).

☞ Before starting the measuring operation, please make sure that the time and date are correctly set (see chapter 8.1.7 How to set Time, Date and Time Zone) and that the data storage mode is set according to your needs (see chapter 8.1.8 How to set the Data Storage Mode). If required, you can name the upcoming measuring operation to easily recognize the storage file later on (see chapter 7.4.2 How to name Upcoming Measuring Operations).

7.3.1 How to start / stop a measuring operation

Start a measuring operation

! The data logger needs to be switched on.

! In case a wireless ALMEMO® interface is used as an ALMEMO® wireless sensor, the ALMEMO® D7 or D6 plug of the desired ALMEMO® sensor must be plugged into the ALMEMO® input socket of the wireless ALMEMO® Interface.

! The wireless sensors need to be switched on.

! The wireless sensors need to be connected to the data logger.

☞ Make sure that the operating mode Measure is set (see chapter 8.1.6 How to set the Operating Mode). In this operating mode, only measurement data will be transferred (no network configuration). This enables a fast measurement data transmission.

1. In the home screen, tap on Display 📊.
2. Open the menu measuring point list, user menu, or measured value display.
3. Tap on the button Start.

➢ The measuring operation will be started.

➢ The START LED **3** is flashing.

➢ Measurement data received from the wireless sensor will be saved to the data logger with a timestamp.

➢ In the upper line of the display **1** the arrows of the icon 🔲 will start flashing.

☞   🔲   In case the data storage mode ring memory is enabled, the arrows flash in orange.

    🔲   In case the data storage mode linear memory is enabled, the arrows flash in blue.

☞ As long as a measuring operation is running, some settings and operations cannot be performed on the data logger. For example, no sensors can be paired or unpaired.

☞ You will also find the button Start in the menu sensor overview 🔌.

Stop a measuring operation

1. In the home screen, tap on Display 📊.

2. Open the menu measuring point list, user menu, or measured value display.

3. Tap on the button Stop.

➢ The START LED **3** goes out.

➢ In the upper line of the display **1** the arrows of the icon 🔲 do no longer flash.

☞ You will also find the button Stop in the menu sensor overview 🔌.

7.3.2 How to recognize and manage Alarm Signals

☞ If an alarm is triggered in the data logger, a dialog field will open to inform you about the alarm. The alarm will be listed in the alarm list featuring the following information: Alarm occurrence time, time of alarm end, and the corresponding measuring channel. In addition, an acoustic signal will sound (provided that the signal transmitter has been switched on) and the ALARM LED **5** will light up.

☞ If an alarm is triggered in the data logger, a dialog field will open to inform you about the alarm. The alarm will be listed in the alarm list

featuring the following information: Alarm occurrence time, time of alarm end, and the corresponding measuring channel. In addition, an acoustic signal will sound (provided that the signal transmitter has been switched on) and the ALARM LED **5** will light up.

Recognize an alarm

☞ If an alarm is triggered in the data logger, a dialog field informs you about the new entry of an alarm in the alarm list. The alarm dialog can be switched off (see chapter 8.1.16 How to switch the Alarm Dialog on and off).

→ Tap on OK to close the dialog field.

☞ If an alarm is triggered in the data logger, an acoustic signal will sound (provided that the signal transmitter is switched on) and the ALARM LED **5** will light up. The ALARM LED **5** will light until the alarm state is cancelled.

☞ The alarm will be listed in the alarm list featuring the following information: Alarm occurrence time, time of alarm end, and the corresponding measuring channel.

1. In the home screen, tap on Display 📊 to open the alarm list.
2. Go to the tab alarm list 🔔.

➢ The alarm list will display all alarms saved so far with the affected measuring channels and the type of alarm in the column alarm, the alarm occurrence time in the column alarm occurrence, and the time of the alarm end in the column alarm end.

Display in column Alarm	Message type of alarm
LIMIT-LOW	Lower limit value undershoot
LIMIT-HIGH	Upper limit value overshoot
RADIOFAIL	Interruption of radio connection
U-SENSOR	Sensor supply voltage dropping below a sufficient value
BREAK	Sensor break

UNDERRANGE	Lower range limit underrun
OVERRANGE	Upper range limit overrun

Manage alarms in the alarm list

1. In the home screen, tap on Display 📊 to open the alarm list.

2. Go to the tab alarm list 🔔.

3. Enable the checkbox next to the alarm you want to delete.

☞ The most recent alarm is on the top of the list. In case the alarm you are looking for is not displayed, use the arrow keys ‹ › to scroll until you find the alarm you searched for.

4. Tap on the button ⊠ at the end of the header of the table.

5. Tap on Delete selection.

☞ If you want to delete all alarms in the alarm list, in step 5 tap on Delete all. For this scenario, no alarm must be selected (i.e no checkbox must be enabled).

➢ The alarm will be deleted from the alarm list. However, the alarm remains active in the data logger. The ALARM LED **5** will light until the alarm condition is cancelled.

7.3.3 How to detect a Radio Connection Loss

In case the radio connection was interrupted, the red and the blue LED of the wireless sensor flash alternately.

On the data logger in the line of the wireless sensor, the symbol RADIOFAIL will be displayed in the menus channel list, user menu, and measured value display as well as in the menu sensor overview 🖊 and in the menu Settings>Wireless network>Sensor pairing. Additionally, an acoustic signal will sound (provided that the signal transmitter is switched on) and the ALARM LED **5** will light up.

7.3.4 How to detect a Sensor Break

In case of a sensor breakage, the field of the missing measured value will show the BREAK symbol in the menus channel list, user menu, and

measured value display as well as in the menu Sensor overview>Sensor SX.X> Measuring channels.

Additionally, an acoustic signal will sound and the ALARM LED **5** will light up.

Measured values will be displayed without the BREAK symbol as soon as the sensor break no longer exists and the set output cycle has run out, which means that a new measured value has been sent to the data logger.

7.3.5 How to query the Memory Status

☞ The available memory for measured values is 100 MB (up to 2 million measured values can be stored).

☞ In the upper line of the display **1** right behind M: the memory space used will be indicated in percent.

☞ You can set the storage capacity (see chapter 8.1.9 How to set the Storage Capacity).

→ In the home screen, tap on memory 🔲.

➢ In the line Memory status, the memory space used will be indicated in percent.

➢ The amount of total and free memory space will be displayed.

☞ As soon as a measurement has been started, the arrows of the icon 🔲 in the upper line of the display **1** will start flashing.

➢ While a measurement is running, the name and start time of the current measurement as well as the estimated remaining duration will be displayed. The estimated remaining duration depends on the amount of free memory, on the number of active measuring channels, and on the measuring cycles set in the wireless sensors.

7.4 How to manage Measurements

7.4.1 How to export measurements from the data logger to a PC

! The data logger must either be connected to the PC via a USB connection or via an Ethernet network (see chapter 7.5 How to connect the Data Logger to a PC).

→ Connect the data logger with the ALMEMO® Control software (see chapter 7.5.4 How to use ALMEMO® Control).

1. Click on Search attached devices.

Or

1. In the menu Device list click on Refresh list.

2. In the menu Device list on the tab Edit, click on Data memory...

3. In the line Measured value memory device, enable the radio button.

4. Click on the button Refresh list.

➢ The table will display the measurements stored in the measured value memory of the data logger including the measurement name, start time, end time, and size in Mb.

5. In the table click on the line, in which the measurement you want to export is displayed.

☞ You can select several measurements at once to save them as individual files in the same file folder on your PC. To do so, click on the relevant lines while holding down the Ctrl key so that the desired measurements are selected.

6. If you only want to export measurement data of a designated time interval, tick the checkbox Select time segment, and enter a start time as well as an end time in the fields Start date, Start time, End date, End time.

☞ If you want to choose a time interval that applies to several measurements, all relevant measurements must be selected. For each measurement, a file will be stored that contains only the section

of the measurement that was measured during the selected time interval.

7. If you would rather save the Coordinated Universal Time (UTC) as the timestamp for your export file than the time set in your data logger, tick the checkbox Using Coordinated Universal Time (UTC) in the section Select Export Settings.

8. If the measurement shall be splitted and saved in several export files (in case the measurement is larger than 128 MB) go to the section Select export settings and tick the checkbox Split large .csv files.

9. If the timestamp in your export file shall be rounded to 1 second, go to the section Select export settings and enable the checkbox Suppress milliseconds.

10. In the line Export to click on the button Search.

11. Select the file folder, to which you want to export and save the selected measurement(s).

12. Click on OK.

13. Click on the button Export measurements.

➢ The measurement(s) will be exported. This process can take some time.

➢ In the data logger in the menu Memory, the output status will be indicated in percent in the line Output status.

➢ The measurement(s) will be saved as .csv file, as .txt file, and as .sqlite file in the selected folder.

7.4.2 How to name upcoming Measurements

! No measurement may be started.

1. In the home screen, tap on Memory 🖫.

2. Tap on the field next to Name of measurement.

3. Enter the desired name for the next measurement.

4. Tap on OK.

> ➢ If you start a measurement, the measurement will be given the desired name and will be listed with this name in the table in the menu Manage measurements.
> ➢ If you stop a measurement and start a new one without selecting a new name for the next measurement, an ascending serial number will be added to the measurement name.

7.4.3 How to delete a Measurement

! No measurement may be started.

1. In the home screen tap on Memory 💾.
2. Tap on Manage measurements.
3. Tick the checkbox of the measurement you want to delete.

☞ The last stopped measurement will be the first one listed in the table. If the desired measurement is not displayed in the table, you can scroll back and forth by using the arrow keys ‹ › until you have found the desired measurement.

4. Tap one the ✖ button at the end of the header of the table.
5. Tap on Delete selection.

☞ If you want to delete all measurements saved on the data logger, in step 5 tap on Delete all. For this scenario, no measurement must be selected (i.e no checkbox must be enabled).

> ➢ The measurement will be deleted from the memory of the data logger.

7.5 How to connect a Data Logger to a PC

☞ The ALMEMO® 470 wireless data logger can be connected to a PC either via USB or via an Ethernet network.

In case both connections are established at the same time, data will only be send and received via the Ethernet interface.

7.5.1 How to establish a USB Connection

! The data logger must not be connected via an Ethernet network with a PC. Disconnect the data logger from the Ethernet network if you want to use the connection via USB.

⚠ Before inserting the USB cable, run the installation program.

☞ This installation instruction applies to all Windows versions from Windows XP upwards.

How to install the USB driver before connecting the USB data cable

1. Follow the Link below
   https://www.ahlborn.com/en_UK/service/downloads/drivers

2. In the field Drivers USB data cable ZA 1919 click on DOWNLOAD.

3. Click on Driver for Windows or Driver for Linux.

➢ The file is being downloaded.

4. Unzip the downloaded folder.

5. Open the folder and click on CP210xVCPInstaller_x64.exe or
   CP210xVCPInstaller_x86.exe.

6. Confirm that you want to install the driver.

7. Accept the licence agreement.

8. Click on Finish.

9. Insert the micro USB plug of the USB data cable into the
   micro USB socket **10**.

10. Insert the USB-A plug of the USB data cable into a free USB socket on the PC.

➢ Via the USB connection, you can export the stored measurements to the PC. To do so you can either use the ALMEMO® Control software or the AMR WinControl software. In addition, you can use the ALMEMO® 470 MeshViewer software via the USB connection.

Installation after accidentally connecting the USB data cable

1. Follow the Link below
   https://www.ahlborn.com/en_UK/service/downloads/drivers

2. In the field Drivers USB data cable ZA 1919 click on DOWNLOAD.

3. Click on Driver for Windows or Driver for Linux.

➢ The file is being downloaded.

4. Unzip the downloaded folder.

5. On the PC keyboard simultaneously press the Windows key and the R key.

➢ The dialog box Run will open.

6. Enter devmgmt.msc and press Enter.

➢ The dialog box Device manager will open.

7. In the section Other devices double-click on the device entitled Silicon Labs.

8. Click on Update driver.

9. Click on Browse my computer for driver software respectively confirm that you will search the driver software by yourself. Click on Browse.

10. Click on the downloaded, unzipped folder with the driver.

11. Click on OK.

12. Click on Next.

➢ The driver will be installed.

13. Insert the Micro USB plug of the USB data cable into the micro USB socket **10**.

14. Insert the USB-A plug of the USB data cable into a free USB socket on the PC.

➢ Via the USB connection, you can export the stored measurements to the PC. To do so you can either use the ALMEMO® Control software or the AMR WinControl software. In addition, you can use the ALMEMO® 470 MeshViewer software via the USB connection.

Identify the COM port number

1. On the PC keyboard simultaneously press the Windows key and the R key.

> The dialog box Run will open.

2. Enter devmgmt.msc and press Enter.

> The dialog box Device Manager will open.

3. Click on the arrow Connections (COM & LPT).

4. Note down the number of the COM port behind Silicon Labs.

7.5.2 How to establish an Ethernet connection

☞ The direct connection via an Ethernet data cable between the data
logger and a PC requires a static IP address in the PC and -- from
the same network address space -- a static IP address in the data
logger. For the wireless ALMEMO® data logger the IP address is
preset as a dynamic IP address.

1. In the PC, set a
static IP address.
In doing so, make
sure to set the IP
address for the
Ethernet port that
you want to use
for the connection
to the data logger.
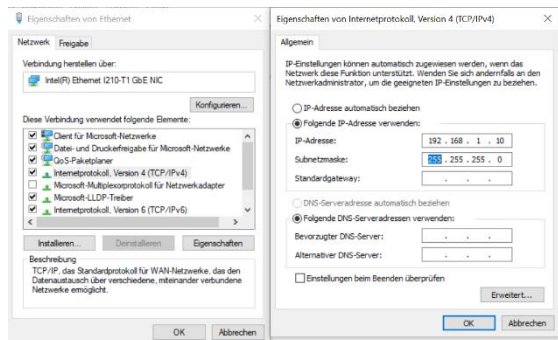
2. In the data logger set an IP address that is located in the same
network address space as the IP address of the PC (see chapter
8.1.11 How to set a static or a dynamic IP address).

3. Connect one plug of the Ethernet data cable to the Ethernet socket **9**
of the data logger and the other plug of the Ethernet data cable to the
Ethernet socket of the PC.

> Via the Ethernet connection you can export measured values to the
PC, use the AMR WinControl software, and use the ALMEMO® 470
MeshViewer software.

7.5.3 How to establish a Connection via an Ethernet Network

☞ The IP address of the wireless ALMEMO® data logger is preset as a dynamic IP address. When connecting to an Ethernet network, the data logger receives an IP address from the DHCP server.

☞ In some Ethernet networks, static IP addresses are required. If required, ask your IT department to provide you with a static IP address for the wireless ALMEMO® data logger that is adapted to your network and set this address in your data logger (see chapter 8.1.11 How to set a Static or Dynamic IP Address).

! The data logger needs to be switched off.

1. Connect an Ethernet data cable with the Ethernet socket **9** of the data logger and with the Ethernet socket of a router connected to the Ethernet network, to which the PC is connected.

2. Switch the data logger on.

➢ In the menu Settings >Device Settings>Communication, the current IP address will be displayed.

➢ Via the connection via the Ethernet network, you can export measured values to the PC, use the AMR WinControl software, and use the ALMEMO® 470 MeshViewer software.

Switch the Ethernet network while the data logger is switched on

☞ In some cases it might be necessary to switch the Ethernet network while the data logger is switched on, e.g. when a measurement is running. In case the IP address of the data logger is set to dynamic, the network connection must be restarted.

1. Connect the Ethernet data cable with the Ethernet socket **9** of the data logger and with the Ethernet socket of the router connected to the desired Ethernet network.

2. In the home screen, tap on Settings ✖.

3. Tap on Device settings.

4. Tap on Communication.

5. In the line Reboot of the network connection tap on Start.

➢ The network connection will be restarted and the new IP address of the data logger will be displayed in the line IP address.

7.5.4 How to use AMR WinControl

☞ Use software version 8.2.8.0 or higher to be able to connect to the ALMEMO® 470 wireless data logger.

! The software AMR WinControl must support the protocol ALMEMO 470.

! The data logger must be connected to the PC via a USB connection, via an Ethernet connection, or via an Ethernet network.

! The data logger must not be connected to the ALMEMO® Control software or to the ALMEMO® 470 MeshViewer software.

1. Open the software AMR WinControl.

2. Click on Settings.

3. Click on Add connection.

4. Click on the field next to Protocol.

5. Click on ALMEMO A470 protocol.

Connection via USB

6. In the line connection click on COM Port.

7. In the line COM-Port click on the corresponding COM-Port.

☞ To identify the COM port number, see chapter 7.5.1 How to establish a USB Connection, section Identify the COM port number.

8. In the field next to Baud Rate select the baud rate set in the data logger. You can find the set baud rate in the data logger menu Settings>Device settings>Communication.

9. Click on OK.

Connecting via Ethernet network

6. In the line Connection, click one Network.

7. Check the IP address of the data logger in the data logger menu Settings>Device settings>Communication.

8. Enter the IP address in the field next to IP address or computer name.

9. Select 10001 as TCP port.

10. Click on OK.

➢ If connected to the AMR WinControl software, Active will be displayed in the data logger menu Settings>Device settings>Communication in the line PC software connection.

7.5.5 How to use ALMEMO® Control

☞ The connection to the ALMEMO® 470 wireless data logger is supported starting with program version 6.3 .

! The data logger must be connected to the PC either via USB connection, via an Ethernet connection, or via an Ethernet network.

! The data logger must not be connected to the AMR WinControl software or to the ALMEMO® 470 MeshViewer software.

1. Install the ALMEMO® Control software.

2. Open the ALMEMO® Control software.

Connection via USB

3. Click on Interface.

4. Click on the tab ALMEMO cable (serial interface).

5. Click on the field underneath Interface.

6. Click on the relevant COM port number.

☞ To identify the COM port number, see chapter 7.5.1 How to establish a USB Connection, section Identify the COM port number.

7. Click on the field underneath Baud rate.

8. Enter the baud rate set in the data logger. You can find the set baud rate in the data logger menu Settings>Device settings>Communication.

9. Click on the field next to Protocol.

10. Click on ALMEMO 470.

11. Click on OK.

Connection via Ethernet network

3. Click on Interface.

4. Click on the tab IP network.

5. Look for the IP address of the data logger in the data logger menu Settings>Device settings>Communication.

6. Enter the IP address in the field next to IP address or host.

7. Click on the field next to Port.

8. Enter 10001.

9. Click on the field next to Protocol.

10. Click on ALMEMO 470.

11. Click on OK.

➢ If connected to the ALMEMO® Control software, Active will be displayed in the data logger menu Settings>Device settings>Communication in the line PC software connection.

7.6 How to use the Mounting Support for the Data Logger

7.6.1 How to hang the data logger on the wall mount
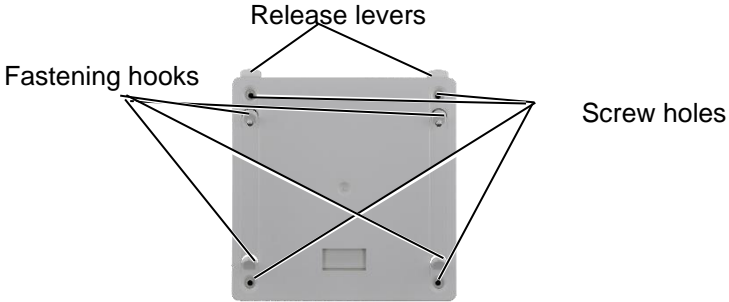
1. Use screws to attach the wall mount for the ALMEMO® 470 wireless data logger to the desired position on the wall.
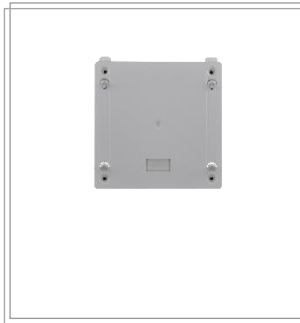
2. Hang the ALMEMO® 470 wireless data logger on the wall mount by snapping the fixing points **12** on the rear side of the data logger on the fastening hooks of the wall mount.

7.6.2 How to remove the Data Logger from the Wall Mount

→   Press both release levers of the wall mount and pull the data logger up to remove it from the wall mount.

Release levers
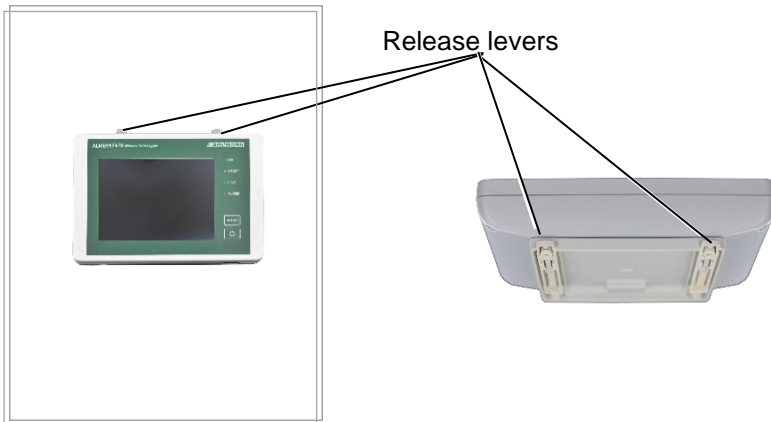
7.6.3 How to use the Pedestal as a Table Top Console

→   Plug the ALMEMO® 470 wireless data logger to the console by letting the fixing points **12** on the rear side of the data logger snap into the fastening hooks of the table top console.

→   Press both release levers of the console to remove the ALMEMO® 470 wireless data logger from the table top console.

Release levers

7.6.4 How to use the Pedestal as a Wall Mount

1. Loosen the screws of the pedestal using a screwdriver.
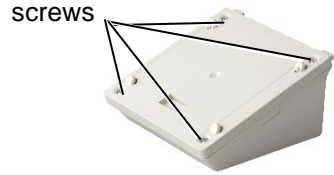
screws

2. Open the pedestal.

screw holes

3. Use screws to attach the housing of the pedestall (the bottom part of the pedestal) to the desired position on the wall.
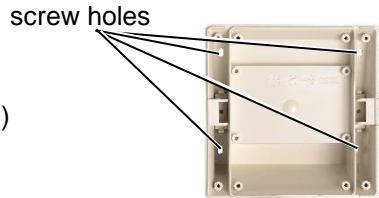
4. Close the pedestal and use screws to attach the adapter plate (the upper part of the pedestal) to the pedestal housing that was attached to the wall.

5. Attach the ALMEMO® 470 wireless data logger to the wall mount by letting the fixing points **12** on the rear side of the data logger snap into the fastening hooks of the pedestal.

Release levers

→ Press both release levers of the pedestal and pull the ALMEMO® 470 wireless data logger up to remove it from the pedestal.

7.7 How to use the Wall Mount for the ALMEMO® Wireless Sensor

7.7.1 How to install the Magnetic Mount

⚠ If you have a pacemaker or an implanted defibrillator, do not use a magnetic wall mount. Magnets can affect the functionality of pacemakers and implanted defibrillators.

1. Place the magnetic mount on the mounting surface on the rear side of the ALMEMO® wireless sensor.

⚠ Only use the provided fixing screws. If the fixing screw get lost, please contact the customer service.

2. Fasten the magnetic mount by using the provided fixing screw.

➢ Thanks to the magnetic mount, the ALMEMO® wireless sensor can be attached to ferromagnetic surfaces such as metal walls.

7.7.2 How to use the Mounting Plate

1. Use screws to fasten the mounting plate to the desired position on the wall.
2. Slide the ALMEMO® wireless sensor above the mounting plate until it noticeably snaps in.

➢ The ALMEMO® wireless sensor can be taken out of the mount and can easily be snapped in again.

7.7.3 How to use the Suction Cup Fastening

1. Firmly press the suction cups of the suction cup fastening on a smooth surface, such as a glass pane. Make sure that the smooth surface is free of dirt and grease.
2. Slide the ALMEMO® wireless sensor above the suction cup fastening until it noticeably snaps in.

➢ The ALMEMO® wireless sensor can be taken out of the mount and can easily be snapped in again.

8 Settings

8.1 How to set the Data Logger

8.1.1 How to set the Display Language

1. In the home screen click on the ⊕ button to change the language that is used throughout all menus of the data logger.
2. Tap on the desired language.
➢ All menus of the data logger will be displayed in the desired language.

Or

1. In the home screen tap on Settings ✖.
2. Tap on Device settings.
3. Tap on Display settings.
4. Tap one the field next to Language.
5. Tap on the line that displays the desired language.
➢ All menus of the data logger will be displayed in the desired language.

8.1.2 How to set a Radio Channel

☞ For the wireless network, the data logger uses the 2.4 GHz frequency range. Before finally selecting a radio channel, check the capacity of the chosen radio channel (see chapter 8.1.3 How to check the Radio Channel Utilization).

☞ The 2.4 GHz frequency range is also used by a couple of other radio applications, especially by WiFi networks. If necessary, change the settings of your WiFi network to keep the radio channels free for the ALMEMO® 470 wireless data logger.

☞ The selectable radio channels are assigned to particular radio frequencies as indicated in the table below:

Radio channel	1	2	3	4	5	6	7	8
MHz	2405	2410	2415	2420	2425	2430	2435	2440
Radio channel	9	10	11	12	13	14	15	16
MHz	2445	2450	2455	2460	2465	2470	2475	2480

☞ Every radio channel overlaps with at least one WiFi channel as schematically illustrated in the image below.
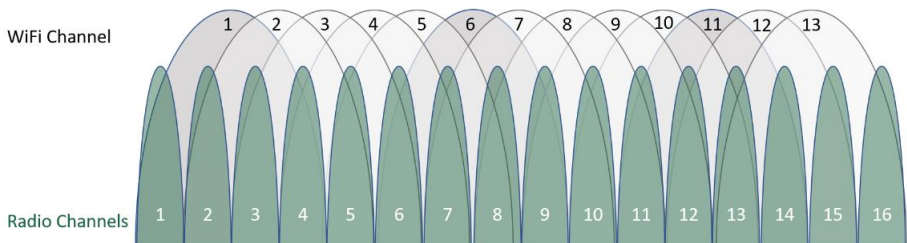
☞   To detect free radio frequencies you can use computer programs, tablet apps, or smart phone apps suitable for this purpose.

☞ All wireless sensors connected to a data logger, use the radio channel specified by the data logger.

! The radio channel can only be set if no wireless sensor is paired (see chapter 7.1.8 How to terminate the Connection between Wireless Sensor and Data Logger).

1. In the home screen, tap on Settings ✕.

2. Tap on Wireless network.

3. Tap on the field next to Radio channel.

4. Tap on the desired radio channel.

➢ The desired radio channel will be displayed in the field next to radio channel and will be used for the wireless network of the data logger.

Or

4. Tap on AUTO.

➢ The data logger will check the capacity of all available radio channels and will select a radio channel with low capacity utilization.

☞ The radio channel will not be changed until you select another radio channel or you tap on AUTO again. The capacity utilization of the radio channel by other radio applications may change meanwhile.

8.1.3 How to check the Radio Channel Utilization

☞ When the utilization of the radio channels is checked, the current utilization will be displayed in percent (%) and decibels milliwatt (dBm).

The checking procedure is supposed to help finding a suitable radio channel. However, due to various impacts, the utilization of the radio channels can change significantly.

1. In the home screen, tap on Settings ✖.

2. Tap on Wireless network.

3. Tap on Radio channel utilization.

➢ The selected radio channel will be displayed in the line Select radio channel.

➢ Next to Check radio channel utilization tap on START.

➢ The progress of the checking procedure will be indicated in percent in the line Check radio channel utilization.

➢ The measured utilization will be recorded in the table.

→ By using the arrows ‹ › scroll until you see the line featuring the desired radio channel.

☞ A high percent value indicates a high level of utilization for that radio channel and implies that – if possible – another radio channel should be selected.

☞ In case no wireless sensor is connected to the data logger, you can set a radio channel by tapping on the field next to Select radio channel (see chapter 8.1.2 How to set a Radio Channel).

8.1.4 How to set a Wireless Network SSID

! No wireless sensor must be connected to the data logger.

☞ If you want to operate several data loggers in parallel, make sure to set a different wireless network SSID for each data logger.

1. In the home screen, tap on Settings ✖.

2. Tap on Wireless network.

3. Tap on the field next to Wireless network SSID.

4. Tap on the desired wireless network SSID.

➢ The wireless network created by the data logger will obtain the desired SSID.

8.1.5 How to set the Transmission Power

! No measurement may be started.

1. In the home screen, tap on Settings ✖.

2. Tap on Wireless network.

3. Tap on the field next to Radio transmit power.

4. Tap on the desired radio transmit power.

Selection	Transmission power in dBm	Transmission power in mW
Low	0 dBm	1 mW
Medium	10 dBm	10 mW
Maximum	17 dBm	100mW

➢ The data logger will transmit data at the selected transmission power.

8.1.6 How to set the Operating Mode

☞ There are three different operating modes available for the data logger. The selected operating mode determines what kind of data is being transferred between the data logger and the wireless sensor.

☞ Operating mode Measure

This operating mode is recommended if many wireless sensors

featuring short measuring cycles are connected to the data logger. In this mode, measuring data of the wireless sensors is sent to the data logger and configuration packets are sent from the data logger to the wireless sensors.

Important: No network information of the wireless sensors is sent. This means that in this operating mode, the ALMEMO® 470 MeshViewer software cannot be used for network monitoring purposes.

☞ Operating mode …with network monitoring

In this operating mode, measuring and configuration data as well as network information (e.g. signal strength, neighboring nodes) will be sent from every sensor. Network monitoring with the ALMEMO® 470 MeshViewer software is only possible in this operating mode. Since the bandwidth will be increasingly occupied during this operating mode, the transfer of the measuring data might be delayed. On that account, only enable this operating mode if you want to monitor the network.

☞ Operating mode Configuration

In this operating mode, only configuration data will be transferred between the data logger and the wireless sensor. Sensor settings can most quickly be made in this operating mode. In the operating mode Configuration, no measurements can be started and the use of the ALMEMO® 470 MeshViewer software for network monitoring purposes is not possible.

! No measurement may be started.

1. In the home screen, tap on Settings ✕.

2. Tap on Wireless network.

3. Tap on the field in the line Operating mode.

4. Tap on the desired operating mode.

➢ The operating mode is set in the data logger. All wireless sensors connected to the data logger will send and receive the data that comply with the set operating mode (as described in the Notice above).

☞ In the operating mode Configuration, it is not possible to start a measurement and in the sensor overview, the STOP symbol will be

displayed with every sensor. In the measured value display, the last measured values received before the operating mode Configuration was set will be displayed with the STOP symbol on every measuring channel.

☞ In the operating mode Configuration the data logger is not able to detect when an ALMEMO® plug is being unplugged from the wireless ALMEMO® interface and another ALMEMO® plug is being connected.

Especially in the operating mode Configuration only change the ALMEMO® sensor on the wireless ALMEMO® interface when the wireless ALMEMO® interface is switched off.

8.1.7 How to set Time, Date and Time Zone

Set Time and Date

!   No measurement may be started.

1. In the home screen, tap on Settings ⚒.

2. Tap on Device settings.

3. Tap on Date/Time.

4. Tap on the fields next to Time-of-day and enter the current time in the format Hour : Minute : Second.

5. Tap on the fields next to Date and enter the current date in the format Day . Month . Year.

Enable automatic time adjustment

☞ In case automatic time adjustment is enabled and the button next to automatic time adjustment is set to ON, based on the set date, the data logger will calculate whether it is summer time or winter time. On the next time adjustment date (last Sunday in March and last Sunday in October), the data logger adjusts its time-of-day automatically.

6. Tap on the slider next to Automatic time adjustment to enable or disable the automatic time adjustment.

Set a time zone

☞   Measured data will be stored in the wireless sensor with a timestamp. To be sure that the timestamp does not show the time set in the data logger but rather the Coordinated Universal Time (UTC) the time zone in which the data logger and the wireless sensor are located must be set on the data logger.

7. Tap on the field next to Time zone.

8. Enter the desired time zone. In doing so, enter the number of hours that are added to the Coordinated Universal Time (UTC) (positive, e.g. for Europe/Berlin 2 during summer time, 1 during winter time) or deducted from the Coordinated Universal Time (UTC) (negative, e.g. for America/New York -4 during summer time, -5 during winter time).

8.1.8 How to set the Data Storage Mode

In the data storage mode "ring memory", the oldest data of a running measurement will be overwritten when the memory is full.

In the data storage mode "linear memory", the measuring operation will stop automatically when the memory is full.

When a measurement has been started, the arrows of the 🔲 icon are flashing in the upper line of the display **1**.

In case the data storage mode "ring memory" is enabled, the arrows flash in orange

In case the data storage mode "linear memory" is enabled, the arrows flash in blue.

!   No measurement may be started.

1. In the home screen, tap on Memory 🔲.

2. In the line Ring memory tick the checkbox if you want to choose the ring memory; leave the checkbox unticked if you want to choose the linear memory.

8.1.9 How to set the Storage Capacity

!   No measurement may be started.

1. In the home screen tap on Memory 🔲.

2. Tap into the field next to Memory total.

3. Tap on the desired storage capacity.

➢   In the data storage mode ring memory, the oldest data of a running measurement will be overwritten when the memory is full.

➢   In the data storage mode linear memory the measuring operation will stop automatically when the memory is full.

☞   Already stored measurements will not be deleted when the storage capacity is set even if they occupy more space. The existing measurements will, however, be taken into account when the free storage space is being calculated.

Make sure to choose a storage capacity that offers enough storage capacity for already stored and new measurements – especially if you do not want to delete already stored measurements.

8.1.10 How to set the Hotkey Assignment

☞   The hotkey **6** serves to rapidly select a menu you selected. By default, the hotkey is set to the home screen.

1. By tapping on the relevant menus, enter the menu you want to reach when pressing the hotkey **6**.

2. Press and hold the hotkey **6**.

➢   An acoustic signal will sound (provided that the signal transmitter has been switched on). The new hotkey assignment has been saved.

➢   When you are in another menu and briefly press the hotkey **6**, you will enter the desired menu.

8.1.11 How to set a static or a dynamic IP address

! There shall be no connection via Ethernet between the data logger and another device.

Set the static IP address

1. In the home screen, tap on Settings ⚒.
2. Tap on Device settings.
3. Tap on Communication.
4. Tap on the field next to Dynamic IP address (DHCP).
5. Tap on OFF.
➢ The data logger receives the static IP address that is displayed next to the field IP address.
6. Tap on the field next to IP address.
7. Enter the desired IP address.
8. Tap on the field next to Subnet mask.
9. Enter the desired Subnet mask.
➢ The data logger receives the desired static IP address together with the desired subnet mask.
➢ The current IP address will be displayed in the field next to IP address. The MAC address will be displayed in the field next to MAC address.

Set the dynamic IP address

1. In the home screen, tap on Settings ⚒.
2. Tap on Device settings.
3. Tap on Communication.
4. Tap on the field next to Dynamic IP address (DHCP).
5. Tap on ON.

➢ The data logger receives a dynamic IP address that will be assigned by the respective DHCP server in the Ethernet network. This process may take some time.

➢ The current IP address will be displayed in the field next to IP address. The MAC address will be displayed in the field next to MAC address.

8.1.12 How to set the Baud Rate for the USB Connection

☞ As long as a USB connection is active, do not change the baud rate. Otherwise the USB connection will be interrupted and data could be lost.

1. In the home screen, tap on Settings ✖.

2. Tap on Device settings.

3. Tap on Communication.

4. Tap on the field next to Baud rate.

5. Tap on the desired baud rate.

➢ The data logger will transfer data via USB connections at the desired baud rate.

☞ Make sure to select the appropriate baud rate for programs such as AMR WinControl and ALMEMO® Control.

8.1.13 How to change the Device Designation

! No measurement may be started.

1. In the home screen, tap on Settings ✖.

2. Tap on Device settings.

3. Tap one the field next to Device designation.

4. Enter the desired device designation.

5. Tap on OK.

➢ The data logger will receive the desired device designation.

8.1.14 How to find the Software Version of the Data Logger

Display software version

→ You will find the display software version in the right lower corner on the home screen.

Wireless network software version

1. In the home screen, tap on Settings ✖.

2. Tap on Wireless network.

3. You will find the wireless network software version in the line Software version.

8.1.15 How to switch the Signal Transmitter on and off

1. In the home screen, tap on Settings ✖.

2. Tap on Device settings.

3. Tap on the button next to Signal transmitter.

➢ If the signal transmitter is switched on, an acoustic signal will sound when you tap on the screen and in case of alarm conditions such as limit value overshot, limit value undershot, and wireless network interruption. The button next to Signal transmitter will then light green and contains the word ON.

➢ If the signal transmitter is switched off, no acoustic signal will sound. The button next to Signal transmitter is then grey and contains the word OFF.

8.1.16 How to switch the Alarm Dialog on and off

1. In the home screen, tap on Settings ✖.

2. Tap on Device settings.

3. Tap on Display settings

4. Tap on the button next to Alarm dialog.

➢ If the alarm dialog is switched on, the button next to Alarm dialog will light green and feature the word ON. In this case, if an alarm is

triggered in the data logger, a dialog field will open informing you that a new alarm has been added to the alarm list.

➢ If the alarm dialog is switched off, the button next to Alarm dialog is grey and features the word OFF.

8.1.17 How to set the Display Brightness

1. In the home screen, tap on Settings 🔧.

2. Tap on Device settings.

3. Tap on Display settings.

4. In the line Display brightness tap on one of the selection boxes that present the brightness levels.

➢ The display **1** will now feature the desired brightness.

☞ It is possible to enable the power saving mode such that the brightness of the display **1** will be reduced after a set period of time (see chapter 7.1.4 How to use the Power Saving Mode).

8.2 How to set the Wireless Sensor

☞ On the ALMEMO® 470 wireless data logger, the following features can be set: designation of the wireless sensor, radio transmit power, the measuring cycle, the output cycle and the enabled measuring channels. Further settings in the ALMEMO® D7 or D6 plug can only be made in the ALMEMO® Control software via a suitable ALMEMO® measuring device or via an ALMEMO® USB data cable ZA 1919 AKUV.

☞ Settings in the wireless sensor can be made in every operating mode. In the operating mode Configuration, the data transfer of the settings is faster (see chapter 8.1.6 How to set the Operating Mode). This is recommended for the duration of configuration in case of several connected sensors with short measuring cycles.

☞ Only change the ALMEMO® sensor on the wireless ALMEMO® interface when the wireless ALMEMO® interface is switched off.

☞ To change the setting of a wireless sensor that is in sleep mode, you should temporarily interrupt the energy saving mode (see chapter 8.2.7 How to enable / disable Sleep Mode).

8.2.1 How to display the Wireless Sensors

→ In the home screen tap on sensor overview ✎.

➢ All connected sensors will be displayed.

8.2.2 How to set the Wireless Sensor Designation

! The wireless sensor needs to be connected to the data logger.

1. In the home screen, tap on Sensor overview ✎.

2. In the column Designation, tap on the cell of the wireless sensor you want to name.

Or

2. Tap on the arrow at the end of the line of the wireless sensor, whose designation you want to change and tap on the field next to Designation.

3. Enter the desired designation.

4. Tap on OK.

➢ The wireless sensor will receive the desired designation.

➢ In the menu Sensor overview ✎, the wireless sensor will now be displayed with the new designation.

8.2.3 How to set the Transmission Power

! The wireless sensor needs to be connected to the data logger.

! No measurement may be started.

1. In the home screen, tap on sensor overview ✎.

2. Tap on the arrow in the end of the line of the wireless sensor, whose transmission power you want to change.

3. Tap on the field next to Radio transmit power.

4. Tap on the desired radio transmit power.

Selection	Transmission power in dBm	Transmission power in mW
Low	0 dBm	1 mW
Medium	10 dBm	10 mW
Maximum	17 dBm	100mW

➢ The wireless sensor will send at the selected transmission power.

8.2.4 How to set the Measuring Cycle

☞ During the measuring cycle, the measurement data will be stored with a timestamp in the wireless sensor. The data will be sent to the data logger according to the output cycle. The fastest measuring cycle that can be set is 10 seconds.

☞ The measuring cycle can be configured to be shorter than the output cycle. In that case several measurement data per measuring channel will be sent to the data logger in one output cycle. The measuring cycle must be at least one tenth of the output cycle.

☞ Especially for measurements with fast measuring cycles make sure that the operating mode Measure is set (see chapter 8.1.6 How to set the Operating Mode).

! The wireless sensor needs to be connected to the data logger.

! No measurement may be started.

1. In the home screen, tap on Sensor overview 🗡.

2. Tap on the arrow at the end of the line of the wireless sensor, whose measuring cycle you want to change.

3. Tap on the field next to Measuring cycle.

4. Enter the desired measuring cycle.

➢ The measurement data will be stored in the wireless sensor according to the desired measuring cycle. The data will be sent to the data logger according to the output cycle.

8.2.5 How to set the Output Cycle

☞ During the measuring cycle, the measurement data will be stored with a timestamp in the wireless sensor. The data will be sent to the data logger according to the output cycle. A maximum of 128 measured values can be stored in the wireless sensor, so that in the output cycle these values will be sent together to the data logger. The number of measurement cycles, in which the measured values can be temporarily stored can be calculated by dividing the 128 measured values through the number of active measuring channels

The fastest measuring cycle that can be set is 10 seconds.

☞ The output cycle can take a maximum of ten times the value of the set measuring cycle. In case the set output cycle is shorter than the set measuring cycle, the measuring data will be sent to the data logger according to the measuring cycle.

☞ Especially for measurements with fast measuring cycles make sure that the operating mode Measure is set (see chapter 8.1.6 How to set the Operating Mode).

! No measurement may be started.

1. In the home screen, tap on Sensor overview 🖊.

2. Tap on the arrow at the end of the line of the wireless sensor, whose output cycle you want to change.

3. Tap on the field next to Output cycle.

4. Enter the desired output cycle.

➢ The measurement data will be sent to the data logger according to the output cycle of the wireless sensor.

8.2.6 How to enable / disable sleep mode

☞ During long output cycles, every time when no measurement data is being transmitted to the data logger, the energy saving mode will take effect for the wireless sensor in sleep mode.

During that time, the wireless sensor consumes very little current so that the battery life will be extended.

☞ ALMEMO® Sensors that are supplied via the sensor supply of the

ALMEMO® wireless interface will possibly consume permanently a lot of current. To extend battery life, the sensor supply will be automated during sleep mode. For sensors that require some time for the transient oscillation before a measured value can be queried, a settling time can be set.

In ALMEMO® plugs that have already been programmed upon delivery, the settling time is already saved as sleep delay time. still it has to be set in the ALMEMO® wireless interface (see below).

☞ During sleep mode the wireless sensor cannot function as a repeater. This means that the sensor cannot receive measured data from other ALMEMO® wireless sensors and forward them to the wireless data logger in case no direct connection between the other sensor and the data logger is possible.

☞ The sleep mode is available for wireless sensors with software version V1.04 and higher and for data loggers with software version V1.03 and higher. For software updates please contact the technical support (phone +49 8024 3007-38, email help@ahlborn.com).

☞ In case you want to make settings regarding designation of the sensor, transmission power, measuring cycle, output cycle, or active measuring channels, the energy saving mode should be interrupted (see section How to get the wireless sensor temporarily out of the energy saving mode).

Enable sleep mode

! The wireless sensor must be connected to the data logger.

! No measurement may be started.

! The output cycle should be set to at least 30 seconds (see chapter 8.2.5 How to set the Output Cycle), to make sure that the time in which the sensor is in energy saving mode is sufficient to extend the battery life.

1. In the home screen, tap on sensor overview 📡.

2. Tap on the arrow at the end of the line of the wireless sensor, of which you want to enable the sleep mode.

3. Tap on Power setting.

4. Tap on the field next to Radio network registration.

5. Tap on Power saving.

☞ The sleep mode will not be activated until the wireless sensor is being paired again.

☞ To extend the battery life, for wireless ALMEMO® interfaces the sensor supply is being automated during sleep mode.

6. In case you want to run a wireless ALMEMO® interface with an ALMEMO® sensor that shall permanently be powered via sensor supply in sleep mode:

   Tap on the button next to Sensor supply permanently, until the button lights green and features the word ON. The ALMEMO® sensor will then be permanently powered via sensor supply.

7. In case you use the recommended automated sensor supply (sensor supply permanently OFF) and you want to use a wireless ALMEMO® interface with an ALMEMO® sensor that requires a settling time before querying a measured value:

   Tap on the field next to Settling time, enter the desired settling time in seconds, and tap on OK.

➢ Before querying a measured value, the sensor will be powered via sensor supply for as long as its settling time may be.

8. Keep tapping on the button Back, until the data logger displays the home screen.

9. In the home screen, tap on Settings ⚒.

10. Tap on Wireless network.

11. Tap on Sensor pairing.

12. In the line Unpair sensors tap on the field Select sensor.

13. Tap on the sensor you want to unpair to enable the sleep mode.

➢ The sensor will be unpaired. It will no longer be listed in the table. The blue LED of the wireless sensor is no longer on. The pairing data has been deleted in the data logger as well as in the wireless sensor.

→ To pair the sensor once again with the data logger, follow the steps 4 to 7 in the chapter 7.1.7 How to connect the Wireless Sensor with the Data Logger.

➢ All LEDs of the ALMEMO® wireless sensor are flashing simultaneously. The wireless sensor queries the pairing data from the data logger. This may take some time.

➢ The green and the blue LED of the ALMEMO® wireless sensor are slowly flashing simultaneously. The ALMEMO® wireless sensor establishes a connection to the data logger. This may take some time.

➢ The green LED of the ALMEMO® wireless sensor lights up (respectively is flashing briefly when the batteries are being charged). The blue LED of the ALMEMO® wireless sensor is flashing and the LINK LED **4** of the data logger is flashing. Initialization data is being transmitted from the ALMEMO® wireless sensor to the data logger.

➢ The ALMEMO® wireless sensor will now be listed in the table in the menu Settings>Wireless network>Sensor pairing.

→ In the data logger set the operating mode "Measure" or "... with network monitoring" in case the operating mode "Configuration" is set.

➢ The LEDs of the wireless sensor are no longer lit. The blue LED is flashing once every 10 seconds. The green LED is flashing simultaneously with the blue one in case the batteries of the wireless sensor are being charged.

➢ In the menu Sensor>Power settings the word Power saving is being displayed in the field next to Radio network registration.

➢ The green and the blue LED are flashing once every minute while the wireless sensor is querying data (intended for this very sensor) from the data logger.

➢ In case the wireless sensor is transmitting data to the data logger during the output cycle, the green LED is on and the blue LED are flashing.

How to get the wireless sensor temporarily out of the energy saving mode

☞ The wireless sensor is in energy saving mode when the LEDs of the wireless sensors are no longer lit and the blue LED flashes once

every 10 seconds. The green LED is flashing simultaneously with the blue one when the batteries of the wireless sensor are being charged.

→   Press and hold the ON/OFF key **14** of the wireless sensor for quite some time.

➢   The wireless sensor leaves the energy saving mode. The green LED lights up, respectively flashes in case the batteries are being charged. The blue LED lights up, respectively flashes in case data is being transmitted to the data logger.

➢   The sleep mode of the wireless sensor is still enabled (in the menu Sensor>Power settings the word Power saving is being displayed in the field next to Radio network registration). The sensor can once again be put into the energy saving mode (see below).

Or

1. In the home screen tap on Settings ⚒.

2. Tap on Wireless network.

3. Tap on the field in the line Operating mode.

4. Tap on Configuration.

➢   Within the next two minutes, all sensors connected will change into the operating mode "Configuration" and hence will leave the energy saving mode.

➢   The green LED of the wireless sensor lights up, respectively is flashing when the batteries are being charged. The blue LED of the wireless sensor lights up, respectively flashes when data is transmitted to the data logger.

➢   The sleep mode of the wireless sensor is still enabled (in the menu Sensor>Power settings the text Power saving is being displayed in the field next to Radio network registration). The sensor can once again be put into energy saving mode (see below).

Put the wireless sensor back into energy saving mode

☞   The wireless sensor is in sleep mode when in the menu Sensor>Power settings the text Power saving is being displayed in

the field next to Radio network registration. However, the sensor is not in energy saving mode when the green LED is lit respectively is flashing when the batteries are being charged. The blue LED of the wireless sensor is lit, respectively is flashing when data is being transferred to the data logger.

! The operating mode "Measure" or "... with network monitoring" must be set in the data logger.

☞ Wireless sensors for which the energy saving mode was interrupted because the operating mode "Configuration" was set, will automatically re-enter the energy saving mode as soon as one of the operating modes "Measure" or "...with network monitoring" is set.

☞ For wireless sensors whose energy saving mode was interrupted by pressing the ON/OFF key:

→ Shortly press the ON/OFF key **14** of the wireless sensor.

➢ The LEDs will show the battery charge level of the wireless sensor for 8 seconds (see chapter 7.1.2 How to check the Battery Charge Level).

➢ The LEDs of the wireless sensor are no longer lit (provided that the wireless sensor does not transfer data to the data logger). The blue LED is flashing once every 10 seconds. The green LED is flashing simultaneously with the blue LED in case the battery of the wireless sensor is being charged.

Or

→ Shortly press the **F** key **15** of the wireless sensor.

➢ The LEDs of the wireless sensor are no longer lit (provided that the wireless sensor does not transfer data to the data logger). The blue LED is flashing once every 10 seconds. The green LED is flashing simultaneously with the blue LED in case the battery of the wireless sensor is being charged. The green and the blue LED are flashing once every minute while the wireless sensor is querying data (intended for this very sensor) from the data logger.

Disable sleep mode

☞ The wireless sensor is in sleep mode when in the menu Sensor>Power settings the text Power saving is being displayed in the field next to Radio network registration

1. In the home screen tap on Sensor overview ⌇.

2. Tap on the arrow at the end of the line of the wireless sensor, of which you want to disable the sleep mode.

3. Tap on Power settings.

4. Tap on the field next to Radio network registration.

5. Tap on With radio forwarding .

☞ The sleep mode will only be disabled after the wireless sensor has been re-paired (see chapter 7.1.8 How to terminate the Connection between Wireless Sensor and Data Logger and also see 7.1.7 How to connect the Wireless Sensor with the Data Logger).

➢ The sleep mode of the wireless sensor is disabled. In the menu Sensor>Power settings the text With radio forwarding is being displayed in the field next to Radio network registration. The green LED of the wireless sensor is lit, respectively is flashing in case the battery is being charged. The blue LED of the wireless sensor is lit, respectively is flashing in case data is being transferred to the data logger.

Or

→ Unpair the wireless sensor and delete the pairing data in the wireless sensor (see chapter 7.1.8 How to terminate the Connection between Wireless Sensor and Data Logger and also see 7.1.7 How to connect the Wireless Sensor with the Data Logger).

➢ The sleep mode of the wireless sensor is disabled. In the menu Sensor>Power settings the text With radio forwarding is being displayed in the field next to Radio network registration. The green LED of the wireless sensor is lit, respectively is flashing in case the battery is being charged. The blue LED of the wireless sensor is lit, respectively is flashing in case data is being transferred to the data logger.

8.2.7 How to automate Sensor Supply and Settling Time

☞ ALMEMO® Sensors that are powered via the sensor supply of the ALMEMO® wireless interface will possibly consume permanently a lot of current. To save energy and to extend the battery life, the sensor supply can be switched off whenever no measured values are queried from the ALMEMO® sensor.

☞ For sensors that require some time for the transient oscillation before a measured value can be queried, a settling time can be set.

☞ To extend the battery life during sleep mode, the sensor supply will be automated by default as soon as the sleep mode is enabled for a wireless ALMEMO® interface. If required, the sensor supply can be permanently provided despite enabled sleep mode.

1. In the home screen, tap on Sensor overview ⚡.
2. Tap on the arrow at the end of the line of the wireless sensor, of which you want to automate the power supply.
3. Tap on Power settings.
4. Tap on the button next to Sensor supply permanently, so that the button is grey and contains the word OFF.
➢ The sensor of the ALMEMO® sensor will only be supplied via the sensor supply when a measured value is queried.
5. Tap on the field next to Settling time.
6. Enter the desired settling time.
7. Tap on OK.
➢ During an automated query the sensor of the ALMEMO® probe will now be supplied for the set settling time before the query and during the measured value query by the sensor supply.

8.2.8 How to find the Software Version of the Wireless Sensor

! The wireless sensor needs to be connected to the data logger.
1. In the home screen, tab on Sensor overview ⚡.

2. Tap on the arrow at the end of the line of the wireless sensor, whose software version you want to know.

➢ The software version of the wireless sensor will be displayed in the line Software version.

8.3 How to set a Measuring Channel

☞ In the ALMEMO® 470 wireless data logger channel designation and limit values can be set. Further measuring channel settings in the ALMEMO® D7 or D6 plug can only be set in the ALMEMO® Control software via a suitable ALMEMO® measuring device or via a ALMEMO® USB data cable ZA 1919 AKUV.

☞ Only change the ALMEMO® sensor on the wireless ALMEMO® interface when the wireless ALMEMO® interface has been switched off.

8.3.1 How to enable and disable a Measuring Channel

☞ One ALMEMO® 470 wireless data logger can process a maximum of 40 measuring channels, and a maximum of ten ALMEMO® wireless sensors can be connected to the data logger. Since wireless ALMEMO® interfaces can have up to ten measuring channels, it may be helpful to disable measuring channels of a wireless sensor that are not needed to be able to process enough measuring channels on the ALMEMO® 470 wireless data logger.

Disable a measuring channel

! In case a wireless ALMEMO® interface is used as an ALMEMO® wireless sensor, the ALMEMO® D7 or D6 plug of the desired ALMEMO® sensor must be plugged into the ALMEMO® input socket **17** of the wireless ALMEMO® Interface.

! The wireless sensor needs to be connected to the data logger.

! No measurement may be started.

1. In the home screen, tap on sensor overview 🔌.

2. Tap on the arrow at the end of the line of the wireless sensor, whose measuring channel you want to disable.

3. Tap on Measuring channels.

4. Untick the checkbox in the line of the measuring channel you want to disable.

➢ The measuring channel is disabled and the measurement data of this measuring channel will not be stored in the wireless sensor and not be transferred to the data logger. The measuring channel will not be listed in the menu Display.

Enable a measuring channel

☞ Only measuring channels that have been preset but are currently disabled can be enabled. In the wireless ALMEMO® sensor, measuring channels are preset by default, in the wireless ALMEMO® interface precisely those measuring channels can be enabled that are stored to the ALMEMO® D7 or D6 plug connected to the wireless ALMEMO® interface.

☞ Further measuring channels in the ALMEMO® D7 or D6 plug can be enabled in the ALMEMO® Control software via a suitable ALMEMO® measuring device or via a ALMEMO® USB data cable ZA 1919 AKUV.

! The wireless sensor needs to be connected to the data logger.

! No measurement may be started.

1. In the home screen, tap on Sensor overview ✎.

2. Tap on the arrow at the end of the line of the wireless sensor, whose measuring channel you want to enable.

3. Tap on Measuring channels.

4. Tick the checkbox in the line of the measuring channel you want to enable.

➢ The measuring channel is now enabled and the measurement data of this measuring channel will be stored to the wireless sensor and then be transferred to the data logger. The measuring channel is listed on the menu Display.

8.3.2 How to set the Channel Designation

! The wireless sensor needs to be connected to the data logger.

1. In the home screen, tap on Sensor overview 🔌.

2. Tap on the arrow at the end of the line of the wireless sensor whose measuring channel you want to name.

3. Tap on Measuring channels.

4. In the column Channel designation, tap on the cell of the measuring channel you want to name.

Or

4. Tap on the arrow at the end of the line of the wireless sensor whose measuring channel you want to name and tap on the field next to Designation.

5. Enter the desired channel designation.

6. Tap on OK.

➢ The measuring channel will receive the desired designation and will be displayed with this designation in the menu Measuring channels and in the measured value display.

➢ In case you have set the channel designation of a measuring channel in a ALMEMO® D7 or D6 plug of a wireless ALMEMO® interface, the channel designation will be saved to the ALMEMO® plug .

8.3.3 How to set Limit Values

! The wireless sensor needs to be connected to the data logger.

! No measurement may be started.

1. In the home screen, tap on Sensor overview 🔌.

2. Tap on the arrow at the end of the line of the wireless sensors whose limit values you want to set.

3. Tap on Measuring channels.

4. Tap on the arrow at the end of the line of the measuring channel whose limit values you want to set.

5. Tap on Limit values.

6. Tap on the field next to Limit value, maximum.

7. Enter the desired upper limit value.

8. Tap on the field next to Limit value, minimum.

9. Enter the desired lower limit value.

➢ The desired limit values are set. In case the limit value is overshot respectively undershot, the measured value will be displayed in red (limit value overshoot) respectively in blue (limit value undershoot) and an acoustic signal will sound in the data logger (provided that the signal transmitter has been switched on). Additionally, the ALARM LED **5** of the data logger will light up.

➢ If you set the limit values of a measuring channel in a ALMEMO® D7 or D6 plug of a wireless ALMEMO® interface, the limit values will be saved to the ALMEMO® plug.

9 How to set-up a Connection for Several Data Loggers

☞ You can operate several ALMEMO® 470 wireless data loggers in parallel. Which wireless sensor will connect to which ALMEMO® 470 wireless data logger is determined via the pairing of the wireless sensor and the data logger.

A maximum of five ALMEMO® 470 wireless data loggers can be operated in parallel. Each data logger must receive a unique wireless network SSID.

To avoid interruptions of the data transfer, different radio channels should be set on the data loggers.

⚠️ Use the provided mains adapter. We can only guarantee a continuously stable power supply if the provided mains adapter is used.

! No wireless sensors may be paired with the data logger (see chapter 7.1.8 How to terminate the Connection between Wireless Sensor and Data Logger).

1. Connect the data logger to the power supply (see chapter 7.1.1 How to connect to the Power Supply).

2. Switch one of the data loggers on (see chapter 7.1.3 How to switch the Data Logger on/off).

3. In the home screen, tap on Settings ✖.

4. Tap on Wireless network.

5. Tap on the field next to Wireless network SSID.

6. Tap on the desired wireless network SSID.

➢ The wireless network created by the data logger receives the SSID.

7. Tap on the field next to Radio channel.

8. Tap on the desired radio channel. In this case, do not select the channel AUTO.

9. The desired radio channel will be displayed in the field next to radio channel and will be used for the wireless network of the data logger.

10. Repeat steps 2. to 9. for every data logger you want to operate in parallel. Make sure that you set a different wireless network SSID for every data logger. Additionally, make sure that you set different radio channels.

11. Connect the wireless sensors with the power supply (see chapter 7.1.1 How to connect to the Power Supply).

12. Switch the wireless sensors on (see chapter 7.1.6 How to switch the Wireless Sensor on/off).

13. Pair the wireless sensors with the data loggers (see chapter 7.1.7 How to connect the Wireless Sensor with the Data Logger). Make sure that the pairing key of the wireless sensor is entered in the right data logger you want to connect the wireless sensor to.

→ To check the connection quality and the signal strength, go to the menu Sensor overview 🗲 and tap on the arrow at the end of the line of the wireless sensor whose connection you want to check.

➢ The signal strength will be displayed in the line Signal strength in dBm.

➢ In the line Connection quality, the connection quality will be indicated by three fields:

Description	Message regarding the connection quality
All fields are green	Very good connection
Two fields are green	Good connection
One field is green	Bad connection
All fields are grey	No connection

☞ The connection between a data logger and the connected ALMEMO® wireless sensors can be checked in the ALMEMO® 470 MeshViewer software (see Instruction Manual ALMEMO® 470 MeshViewer).

10   Maintenance and Care

How to clean the Housing of the data logger

! The data logger needs to be switched off.

! The data logger needs to be disconnected from the power supply.

→ If soiled, clean the housing with a damp cloth.

⚠ Do not use aggressive detergents or solvents for cleaning.

How to maintain the battery pack

→ Please charge your batteries on a regular basis and permanently provide a sufficient charging level.

☞ Deep discharges will severely limit the operating life of the battery.

How to replace the batteries of the data logger

! The data logger must be switched off.

! The data logger must be disconnected from the power supply.

1. Loosen the screw of the battery compartment cover **11** by using a screwdriver.

2. Open the battery compartment by pulling on the tab of the lid.

3. Remove the batteries.

⚠ Only use batteries with the order number ZB2000A1NM.

⚠ Do not use non-rechargeable batteries. Only rechargeable batteries may be used.

⚠ Always insert exactly five batteries.

4. Use new batteries. Pay attention to the imprinted labeling indicating the pole direction of the rechargeable batteries in the battery compartment.

5. Close the battery compartment with its cover and secure it with the screw.

How to clean the Housing of the Wireless ALMEMO® Sensor

→   If soiled, clean the housing with a damp cloth.

→   Make sure that you clean the protecting cap with a dry cloth only, because the sensitive sensor element is below the protecting cap.

⚠   Do not use aggressive detergents or solvents for cleaning the housing and do neither use aggressive detergents or solvents nor water for cleaning the protecting cap.

How to clean, calibrate or replace the Sensor Element of the Wireless ALMEMO® Sensor

⚠   Never remove the protecting cap of the wireless ALMEMO® Sensor. The sensitive sensor element is below the protection cap.

→   For calibration or replacement of the sensor send your wireless ALMEMO® sensors to the Ahlborn Company.

How to replace batteries of the wireless sensor

⚠   To avoid product damages, do not open the wireless ALMEMO® sensor or the wireless ALMEMO® interfaces.

→   For battery replacement send your wireless ALMEMO® sensors and wireless ALMEMO® interfaces to the Ahlborn Company.

11 Questions and Answers

11.1 General Questions

Question	Possible causes	Possible solution
The wireless sensor does not connect to the data logger	Overloaded radio channel	Select another radio channel for the wireless network of the data logger (see chapter 8.1.2 How to set a Radio Channel)
	Wireless sensor is outside the range of the wireless network	Operate the wireless sensor closer to the data logger, mind radio barriers such as walls and metal cabinets.
	Wireless sensor has saved the wrong pairing data.	Simultaneously press the ON/OFF button and the F button for 3 seconds. The red and the blue LED are flashing simultaneously and the pairing data will be deleted.

Pair the wireless sensor with the data logger (see chapter 7.1.7 How to connect the Wireless Sensor with the Data Logger). |
| After having been switched off and then on again, the wireless sensor does not automatically connect to the data logger. | The pairing data has been deleted from the wireless sensor or from the data logger. | Once again switch the wireless sensor and the data logger off and then on again.

In case the connection is still not automatically established:

Simultaneously press the ON/OFF button and the F button for 3 seconds. The red and the blue LED are flashing simultaneously and the pairing data will be deleted.

Pair the wireless sensor with the data logger (see chapter 7.1.7 How to connect the Wireless Sensor with the Data Logger). |
| | Wireless sensor is outside the range of the wireless network | Operate the wireless sensor closer to the data logger, mind radio barriers such as walls and metal cabinets. |

	Overloaded radio channel	Select another radio channel for the wireless network of the data logger (see chapter 8.1.2 How to set a Radio Channel)
The wireless sensor connects with the wrong data logger.	Serial number of the wireless sensor has been entered in several data loggers.	Delete the pairing data from the data logger, to which you do not want to connect the wireless sensor (see chapter 7.1.8 How to terminate the Connection between Wireless Sensor and Data Logger) and on the same data logger delete the serial number of the wireless sensor from the field pairing key in the menu Settings>Wireless network>Sensor pairing.
The data transfer between data logger and wireless sensor is delayed.	Overloaded radio channel	Select another radio channel for the wireless network of the data logger (see chapter 8.1.2 How to set a Radio Channel)
	Two data loggers with the same wireless network SSID	Select different wireless network SSID for each data logger (see chapter 8.1.4 How to set a Wireless Network SSID).
	Operating mode …with network monitoring is set.	Set the operating mode Measure (see chapter 8.1.6 How to set the Operating Mode).
The wireless sensor cannot be switched on.	The batteries of the wireless sensor are empty.	Connect the power supply (see chapter 7.1.1 How to connect the Power Supply) and wait some time before trying to switch on the sensor again.
After the connection has been established the LEDs of the wireless sensor go out.	The sleep mode of the wireless sensor is enabled.	If required, disable the sleep mode of the wireless sensor (see chapter 8.2.6 How to enable / disable sleep mode).
The measuring channels of a wireless sensor are not being displayed.	No measuring channels are enabled.	Enable one or several measuring channels (see chapter 8.3.1 How to enable and disable a Measuring Channel).

	No ALMEMO® sensor has been connected to the wireless ALMEMO® interface.	Connect the ALMEMO® D6 or D7 plug of an ALMEMO® sensor to the wireless ALMEMO® interface (see chapter 7.1.5 7.1.5 How to connect /disconnect an ALMEMO® Sensor to the Wireless ALMEMO® Interface).
Measurements cannot be started.	Operating mode Configuration is set.	Set the operating mode Measure (see chapter 8.1.6 How to set the Operating Mode).
	No wireless sensors are connected.	Connect one or several wireless sensors with the data logger (see chapter 7.1.7 How to connect the Wireless Sensor with the Data Logger).
	No measuring channels are active.	Activate one or several measuring channels (see chapter 8.3.1 How to enable and disable a measuring channel).
Measured values are being displayed with the INIT symbol.	The wireless sensor was switched off and then on again. The wireless sensor is reconnecting.	Please wait until the wireless sensor has initialized the measuring points.
	Data logger was switched off and the on again. The wireless sensor is reconnecting.	Please wait until the wireless sensor has initialized the measuring points.
	The ALMEMO® plug was disconnected from the wireless ALMEMO® interface and then the plug (or another plug) was connected again.	Switch the wireless ALMEMO® interface off and then on again. Only change the ALMEMO® sensor on the wireless ALMEMO® interface when the wireless ALMEMO® interface is switched off.
Delayed transmission of configuration data for sensor setting.	Overloaded radio connection	During the time, when you want to change sensor settings, temporarily use the Configuration operating mode (see chapter 8.1.6 How to set the Operating Mode).

No USB connection to the PC can be established.	Simultaneous connection via Ethernet	Disconnect the Ethernet connection to use the connection via USB.
A connection to the ALMEMO® 470 MeshViewer software cannot be established.	Either operating mode Measure or operating mode Configuration is set.	During the time, when you want to connect the data logger to the ALMEMO® 470 MeshViewer software, temporarily set the operating mode ...with network monitoring (see chapter 8.1.6 How to set the operating mode).
The IP address does not change after switching the Ethernet network.	Ethernet network was changed while the data logger was switched on	Restart the network connection (see chapter 7.5.3 How to establish a Connection via an Ethernet network, section Switch the Ethernet network while the data logger is switched on).
Measured values do not change and are displayed with the symbol `STOP`.	The operating mode Configuration is set.	Set the operating mode to Measure (see chapter 8.1.6 How to set the Operating Mode).
Measured values are being displayed with the `TSYN` symbol.	The wireless sensor has reset its time setting. The timestamps might overlap.	If required, check the timestamps of the affected measured values in the export file after exporting the measurement.
Quadruple acoustic sounds are emitted from the data logger.	The battery charge level is very low.	Charge the batteries of the data logger (see chapter 7.1.1 How to connect the Power Supply).
Data logger does not respond to touch and key commands.	Error status in the device software	Switch the device off and then on again to reboot the device. If the device still does not respond, remove the batteries and insert them again (see chapter 10 Maintenance and Care, section How to replace the batteries of the data logger).

→   In case we could not answer your question, please contact the technical support (Phone: +49 (0)8024/3007-38, email: help@ahlborn.com).

11.2 How to reset the Data Logger Settings

⚠️ If you follow the following steps, all settings made so far will be deleted.

⚠️ After the reset, the saved measurements will no longer contain start and stop times (i.e. no timestamps will be available).

⚠️ With the reset taking effect, the time and date in the data logger will be set to 00:00 (time) and 00.00.2000 (date).

☞ Before resetting the data logger, export the saved measurements to keep the start and stop times.

☞ The pairing data of the connected wireless sensors will not be deleted.

! The data logger must be switched off.

1. Press and hold the Hotkey **6**, while pressing the ON/OFF key **7**. Press and hold those keys until the home screen will be displayed.

➢ All settings made so far will be deleted.

➢ The data logger is switched on.

2. Set the time and date of the data logger before starting a new measurement (see chapter 8.1.7 How to set Time, Date and Time Zone).

11.3 How to interpret the LED Status of the Wireless Sensor

The wireless sensor communicates its current condition using the three LEDs green, blue, and red.

LED Status	LED description	Message
	The green LED is lit.	The wireless sensor is switched on. The sensor is not connected to the data logger and no pairing data is stored.
	The green LED is flashing.	The batteries of the wireless sensor are being charged.
	The green LED is lit and flashes only briefly	The wireless sensor is switched on and its batteries are being charged.
	All LEDs are lit.	The wireless sensor is just being switched on.
	All LEDs are flashing simultaneously.	The wireless sensor is in the pairing mode. It had no pairing data stored and now queries pairing data from the data logger.
	The green and the blue LED are slowly flashing simultaneously.	The wireless sensor is establishing a connection to the data logger.
	The blue LED is flashing rapidly.	The wireless sensor is transferring initialization data to the data logger.
	The red LED is flashing for approximately 7 times.	Error status. Either the wireless sensor shall be paired but already has pairing data stored or the wireless sensor was not able to send its initialization data to the data logger.

	The blue LED is lit.	The wireless sensor is connected to the data logger.
	The blue LED flashes rarely.	The wireless sensor is transferring data (e.g. measuring data) to the data logger.
	The red LED is lit.	The battery charge level of the wireless sensor is low.
	All LED light up, the red LED goes out, then the blue LED goes out, and last the green LED goes out.	The wireless sensor is being switched off.
	The blue and the red LED are flashing simultaneously.	The pairing data is being deleted from the wireless sensor.
	The LEDs go out. The blue LED is flashing once every 10 seconds. Alternatively, the blue and the green LED are both flashing once every 10 seconds.	The wireless sensor is in sleep mode. Alternatively, the wireless sensor is in sleep mode and the battery of the wireless sensor is being charged.

After briefly pressing the ON/OFF button **14** of the wireless sensor, the wireless sensor will display the battery charge level.

LED Status	LED Description	Message regarding the battery charge level
	All LEDs are lit.	At least 80 %
	Only the blue and the red LED are lit.	At least 40%
	Only the red LED is lit.	At least 20%
	The red LED is flashing.	Less than 20%

12 Warranty

Before leaving the factory, every device has passed several quality tests. For proper functioning, a 2-year warranty is granted beginning with the day of delivery. Before returning the device, please pay attention to the information provided in chapter 11 Questions and Answers. In case of a defect, please use – if possible – the original packing material and attach a precise description of the defect as well as of the corresponding boundary conditions.

The following cases are excluded from warranty:

- Unauthorized interventions and changes within the device performed by the customer
- Operation outside the indicated environmental conditions applicable for this product
- Use of improper power supply and peripheral devices
- Improper use of the device
- Damage due to electrostatic discharge or lighting
- Disregard of the Instruction Manual

We reserve the right to make changes in product features in favor of technical progress or due to new construction elements.

13 Disposal

The symbol of a crossed-out waste bin implies that the product must be disposed of separately in the European Union.
This applies to the product itself as well as to all accessory components labeled with this symbol. The products must not be discarded via the unsorted municipal waste.

→ Dispose of defect rechargeable batteries / empty batteries in accordance with the legal requirements.

→ When no longer in use, the product must be disposed of at the collecting point specified for electrical and electronic equipment. In doing so, please observe the local disposal regulations.

→ Dispose of the packing material in accordance with local regulations.

14 Technical Data

14.1 Technical Data ALMEMO® 470 Wireless Data Logger

Measuring inputs	10 wireless sensors of the type - Wireless ALMEMO® sensor - Wireless ALMEMO® interface
Measuring channels	In total, up to 40 measuring channels
Interfaces	USB, Ethernet for connection to the PC and measured value query via WinControl
Equipment:	
Display	Graphic display 5,7", TFT-LCD VGA 640x480, illumination white LED, dimmable
Keyboard	Capacitive touch screen and 2 additional keys on front foil
Memory	Industrial flash memory as micro SD (up to 2 million measured values)
Date and time-of-day	Real-time clock (4.7 ppm) buffered with lithium battery
Power supply:	
Rechargeable batteries	5 NiMH batteries AA (1900 mAh), running time up to 2 hours respectively up to 6 hours in power saving mode.
Mains adapter	ZB 1112-NA 10 100 to 240 VAC to 12 VDC, 2 A, galvanically isolated, via barrel connector
Operating temperature	-5 to +50 °C
Storage temperature	-20 to +60 °C
Housing:	
Protection class	IP50
Dimensions	190 x 135 x 40 mm (WxHxD) (without wall mount)
Weight	approx. 0.8 kg (including batteries)

Subject to technical modifications without prior notice!

14.2 Technical Data of the Wireless ALMEMO® Sensor

Measuring input	For 1 multi-sensor element for humidity, temperature, and atmospheric pressure FH0D-Cx Or for 1 Multi Sensor elementfor CO2, temperature and air pressure
Measuring channels	Up to 4 measuring channels
Accuracy	FH 1746-1Cx: see sensor specification FH0D 46-Cx FY 1700-1CO2M0B05: See data sheet
Galvanic isolation	Yes (radio)
Measuring cycle	10s to 24h
Interfaces	USB for supply and update
Equipment	
Display	3 LEDs
Keyboard	Membrane keyboard
Memory	Ring memory (128 measured values)
Date and time-of-day	Synchronization of the time via the ALMEMO® 470 wireless data logger
Power supply	
Batteries	2 NiMH rechargeable batteries AA 1900 mAh (standard version) 1100 mAh (version with extended temperature range)
Operating time with batteries	Depends on the measuring cycle
Mains adapter	ZB 1505-NA1 100 to 240 VAC to 5 VDC, 2A, galvanically isolated, via micro USB

Operating and Storage temperature	Operating temperature	Storage temperature
FH 1746-1C4	-5 to +50 °C	-20 … +60 °C
FH 1746-1C2VR1 /2	-5 to +50 °C	-20 … +60 °C
FH17461C4HT	-40 to +85°C	-40 … +85 °C
FY 1700-1CO2M0B05	-5 to +50 °C	-20 … +60 °C

Housing		
Protection class	FH 1746-1C4	IP 54
	FH 1746-1C2VR1 /2	IP20
	FY 1700-1CO2M0B05	IP20
Dimensions	Without mounting support	
FH 1746-1C4	43 x 135+30* x 21mm (WxHxD) (*filter cap)	
FH 1746-1C2VR1	43 x 135+50* x 21 + 50* mm (WxHxD) (*sensor tube)	
FH 1746-1C2VR2	43 x 135+30* x 21 + 100* mm(WxHxD) (*sensor tube)	
FY 1700-1CO2M0B05	43 x 135+50* x 22 mm (WxHxD) (*protecting cap)	
Weight	approx. 0.1 kg (including batteries)	

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14.3 Technical Data Wireless ALMEMO® Interface

Measuring input	1 ALMEMO® socket for ALMEMO® D7 sensor
Measuring channel	Up to 10 measuring channels
Accuracy	See specifications of the ALMEMO® D7 sensor
Galvanic isolation	Yes (radio)
Sensor supply	6 V, 30 mA (operation with batteries or with mains adapter)
Measuring cycle	10s to 24h
Interfaces	USB for supply and update
Equipment	
Display	3 LEDs
Keyboard	Membrane keyboard
Memory	Ring memory (128 measured values)
Date and time-of-day	Synchronization of the time via the ALMEMO® 470 wireless data logger
Power supply	
Batteries	2 NiMH-rechargeable batteries AA (1900 mAh)
Operating time with batteries	Depends on the current consumption of the ALMEMO® D7 sensor and on the measuring cycle
Mains adapter	ZB 1505-NA1 100 to 240 VAC to 5 VDC, 1A, galvanically isolated, via micro USB
Operating temperature	-5 to +50 °C (standard version)
Storage temperature	-20 to +60 °C (standard version)
Housing	
Protection class	IP50
Dimensions	B43 x H135+30 x T21mm (WxHxD) (without mounting support)
Weight	approx. 0.1 kg (including batteries)

Subject to technical modifications without prior notice!

15 Subject Index

Besides greatest diligence, the possibility of incorrect information
cannot be excluded! Subject to technical modifications
without prior notice!

You will find the present and further Instruction Manuals, as well as the

ALMEMO® Manual on **www.ahlborn.com**

under the tab SERVICE on DOWNLOADS.

PLEASE KEEP THIS INSTRUCTION MANUAL FOR
FURTHER REFERENCE