## ALMEMO® 470-1

**Wireless data logger ALMEMO® 470-1.**

**Wireless ALMEMO® sensor for temperature, atmospheric humidity, atmospheric pressure. For monitoring the room air condition or with extended operating temperature range from -40 to +85 °C.**

**Wireless ALMEMO® interface for ALMEMO® D7 sensor. For various measurable variables.**

**Wireless ALMEMO® sensor for carbon dioxide, air temperature, air pressure.**

## Wireless data logger, Wireless ALMEMO® sensor and wireless ALMEMO® interface

**ALMEMO® 470-1 wireless data logger**
The professional measuring instrument ALMEMO® 470-1 is a professional wireless data logger, which receives the measured values with timestamp from wireless sensors that are positioned remotely, saves the measured values and shows them on graphical display. The acquisition of the measured values occurs in a cycle that can be individually adjusted to each wireless sensor: for measurements, i.a. in climate chambers, for long term measurements with wireless sensors in sleep mode, i.a for monitoring the room air condition or environmental measurements. The data logger ALMEMO® 470-1 is intended to be mounted on a wall. The power is supplied via an external mains unit. An additional rechargeable battery in the device serves as a temporary buffer in case of power failure or during a brief mobile usage.

**Reliable radio transmission build upon a star-shaped and meshed net structure**
To provide wireless communication, the data logger ALMEMO® 470-1 operates in the 2.4 GHz frequency band. To increase the wireless range and the transmission reliability, the wireless sensors automatically configure themselves as a star-shaped and meshed net structure. Repeater functionality is integrated in each wireless sensor by default, so the sensor can forward data from adjacent wireless sensors to the data logger. This means that more distant sensors, which do not have a wireless connection to the data logger, can still be integrated into the wireless net. The transmission power of the network is configurable in the data logger to 1, 10, or 100mW such that local networks in the immediate neighborhood as well as long distance networks are possible.

**Wireless ALMEMO® sensor for temperature, atmospheric humidity, and atmospheric pressure.**
The wireless sensors operate with a plugged-on digital multi-sensor module for temperature, atmospheric humidity, and atmospheric pressure. The sensor module has a data medium on which all sensor specific data, such as serial number, adjustment data, and calibration data, is saved. The sensor module can therefore be replaced any time.

**For monitoring the room air condition or with extended operating temperature range from -40 to +85 °C.**
The standard version of the wireless sensor is used for monitoring the room air condition. The version with an extended operating temperature range from -40 to +85 °C and splash-water protection is used i.a. for measurements in conditioning and climate chambers or for outdoor tasks in the environmental measurement technology.

**Wireless ALMEMO® Sensor for indoor air quality: carbon dioxide, air temperature, air pressure.**
The wireless sensors operate with a built-in sensor module for carbon dioxide, air temperature and air pressure. This allows simultaneous assessment of air quality by measuring $CO_2$ concentration and occupancy quality (comfort) by measuring air temperature. If several wireless sensors are distributed in the room, a meaningful room profile can be created via the time-synchronous measurement; There is no need for complex wiring!

**Wireless ALMEMO® interface for ALMEMO® D6 and D7 sensors. For a vast variety of measurable variables.**
The digital wireless interface broadens the range of applications considerably. Almost all ALMEMO® D6 and D7 sensors for various measurable variables can be connected via the integrated ALMEMO® input socket to the wireless interface and their measured values can be transferred over the air to the wireless data logger. This way the amount of $CO_2$ in the atmosphere, surface temperatures on objects, or the illuminance at measuring locations can be recorded.

**Power supply of the wireless sensors and the wireless interfaces**
The wireless sensors and the interfaces are supplied by an integrated rechargeable battery. The rechargeable battery can be charged via the integrated micro USB port. A continuous power supply via mains unit is possible as well.

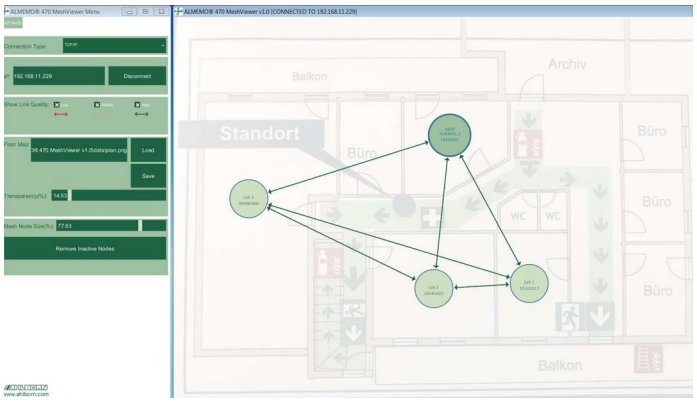
**Long runtimes in battery mode with activated sleep mode**
For long-term applications, the measured values are recorded in the wireless sensor or wireless interface with a large measuring cycle and transmitted to the data logger. For battery operation, significantly extended runtimes are achieved by using the sleep

mode. In this energy saving mode, the power supply and the plug/sensor supply are switched automatically. In sleep mode, the wireless sensor cannot operate as a repeater (only possible in continuous operation).

**Visualize measuring data on the data logger**
To visualize measuring data, the display of the data logger features a list of the measuring channels as well as a single measurement value display. In addition, the user can configure his own individual display as a customer specific user menu on the data logger by only adding his own selection of measuring channels.

**Evaluation and storage of the measured data**.
Via an external PC measured data is recorded and visualized by the WinControl software. The data logger ALMEMO® 470-1 and the PC are either connected via USB interface or via Ethernet interface. An industrial SD card integrated in the data logger ensures a safe storage of the measured data. Additionally, the actual measured data is cached in every wireless sensor to make sure that the complete measured data is available also in case of a short-time failure of either the wireless connection or the data logger.

**Configuration of the wireless system**
The sensors in the wireless network are configured and managed on the data logger ALMEMO® 470-1 via the clear touch display. Various functions are available, i.a. to couple and de-couple the wireless sensors with the data logger or to configure the cycles and limit values of the wireless sensors. In addition, it is possible to add a comment to every wireless sensor to be able




ALMEMO® 470 Mesh-Viewer

to assign a particular measurement point to the sensors. The program ALMEMO® 470 Mesh-Viewer makes it possible to display the signal strength of every single sensor node / wireless sensor as well as the entire network topology on the PC. This, in combination with the configurable signal strength in the data logger, enables a fast and optimal installation of the wireless network.

**Accessories for installing the components for different applications**
Thanks to an integrated holder, the data logger ALMEMO® 470-1 can be mounted to the wall. Regarding the wireless sensors, different accessories for mounting the sensors are available: wall mount, suction cup fastening, magnetic mount, or rope to hang the sensors.

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## Wireless data logger ALMEMO® 470-1

**Wireless data logger for 10 wireless sensors. Interface to the PC for WinControl software for measured data scanning and measured value processing.**

## Technical data

| | |
|---|---|
| **Measuring inputs:** | 10 wireless sensors of type<br>- wireless ALMEMO® sensor<br>for atmospheric humidity, temperature and atmospheric pressure FH 1746-1Cx<br>- wireless ALMEMO® interface<br>for ALMEMO® D6 and D7sensor<br>ZA 1770-1IF |
| Channels: | up to 40 measuring channels |
| **Interfaces:** | USB, Ethernet<br>for connection to the PC and measured value scanning via WinControl |
| **Standard equipment:** | |
| Display: | graphics display 5,7“,<br>TFT-LCD VGA 640x480,<br>illumination while LED, dimmable |
| Keypad: | capacitive touch screen and<br>2 additional keys on front foil |
| Memory: | up to 2 million measured values,<br>industrial flash memory as micro SD card. |
| Date and time-of-day: | Real-time clock (4.7 ppm)<br>buffered with lithium battery |
| **Power supply:** | |
| Rechargeable battery: | 5 rechargeable NiMH batteries AA (1900 mAh),<br>Failure buffer for up to 6 hours in power saving mode |
| mains adapter: | ZB 1112-NA12 100 to 240 VAC<br>to 12 VDC, 1.5 A, galvanically isolated,<br>via an hollow connector |
| **Housing:** | |
| Protection class: | IP50 |
| Dimensions: | 190 x 135 x 40 mm (WxHxD)<br>(without wall mount) |
| Weight: | ca. 0.8 kg (including rechargeable batteries) |

Ambient conditions see from page 01.04

## Accessories

**Order no.**

Base (snap-on) for ALMEMO® 470, desk form, for wall mounting or as table desk. ZB9470S

Base

WinControl software for measured value scanning
with protocol and functionality for ALMEMO 470 from program version Standard WC2 (or higher WC3/WC4) SW5600WC2
For further explanations and descriptions, see chapter Software

## Standard delivery

**Order no.**

Wireless data logger ALMEMO® 470-1 with Ethernet interface and USB interface, SD memory, rechargeable battery. Including mains unit ZB1112NA12 and wall mount, incl. ALMEMO® 470 Mesh-Viewer **MA4701**

## Wireless ALMEMO® sensor for atmospheric humidity, temperature, atmospheric pressure

FH 1746-1C2VR2 FH 1746-1C2VR1 FH 1746-1C4 / HT

Replacement multi-sensor module FH0D 46-C

Replacement sensor module FH0D 46-C2

- For room climate monitoring in production and storage.
- For measurements in climatic and conditioning chambers.
- For environmental measurements.
- Version with extended temperature range
- and splash water protection
- Sleep mode for long operating time with rechargeable battery

## Technical data

| | |
|---|---|
| **Measuring input:** | for 1 multi-sensor element for humidity, temperature and atmospheric pressure FH0D 46-Cx |
| Channels: | 4 measuring channels |
| Measuring ranges: | Temperature: see operating temperature<br>Humidity: 5 ... 98 % r.H.<br>Air pressure: 700 ... 1100 mbar |
| Accuracy: | see sensor specification FH0D 46-Cx |
| Galvanic Isolation: | yes (wireless) |
| Measuring cycle *: | 10 s to 24 h |
| Output cycle*: | 10 s to 24 h |
| **Interfaces:** | Radio, repeater function integrated**<br>USB for supply and update |
| **Standard equipment:** | |
| Display: | 3 LEDs |
| Keypad: | foil keypad |
| Memory: | ring memory for 128 measured values |
| Date and time-of-day: | clock synchronization<br>via data logger ALMEMO® 470-1 |
| **Power supply:** | |
| Rechargeable battery: | 2 rechargeable NiMH batteries AA (1900 mAh) |
| Operating time with rechargeable battery: | depending on measuring cycle, output cycle, sleep mode |
| mains adapter: | ZB 1505-NA1 100 to 240 VAC to 5 VDC, 2 A, galvanically isolated, via micro USB |
| **Operating temperature:** | -5 to +50 °C (standard version)<br>-40 to +85 °C (version with extended temperature range) |
| **Storage temperature:** | -20 to +60 °C (standard version).<br>-40 to +85 °C (version with extended temperature range) |
| **Housing:** | |
| Protection class: | (with sensor) |
| FH 1746-1C4 | IP54 |
| FH 1746-1C2VR1 | IP20 |
| Dimensions: | (without mount) |
| FH 1746-1C4 | 43 x 135+30* x 21 mm (WxHxD). (*filter cap) |
| FH 1746-1C2VR1 | 43 x 135+50* x 21+50* mm (WxHxD). (*sensor tube) |
| FH 1746-1C2VR2 | 43 x 135+40* x 21+100* mm (WxHxD). (*sensor tube) |
| **Weight:** | approx. 0.1 kg (including rechargeable batteries) |

* depending on the number of data logged with the data logger ALMEMO® 470-1 connected wireless sensors
** Repeater operation not in sleep mode

**Standard delivery** (Power supply unit see under accessories) **Order no.**

Wireless ALMEMO® sensor (radio, repeater function integrated) with multi-sensor module for humidity, temperature and atmospheric pressure. Ring memory, integrated rechargeable battery.

| | |
|---|---|
| Straight sensor version, with protective cap PTFE. Standard version. | **FH17461C4** |
| Straight sensor version, with extended operating temperature range. | **FH17461C4HT** |
| Digital replacement multi-sensor module for humidity, temperature and atmospheric pressure (adjusted, pluggable) for FH 1746-1C4 | **FH0D46C** |
| Angled sensor version, with short angled sensor tube, slotted sensor cover. | **FH17461C2VR1** |
| Angled sensor version, with long angled sensor tube, slotted sensor cover. | **FH17461C2VR2** |
| Digital replacement multi-sensor module for humidity, temperature and atmospheric pressure (adjusted, pluggable) enclosed in slotted sensor cover for FH 1746-1C2x | **FH0D46C2** |

DAkkS or works calibration KH9xxx, humidity, temperature and KD92xx, atmospheric pressure, for digital sensors (see chapter „Calibration certificates“). DAkkS calibration meets all the requirements regarding test resources laid down in DIN EN ISO/IEC 17025

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new

ALMEMO® V7

## Wireless ALMEMO® interface ZA 1770-1IF

- For ALMEMO® D6 and D7 sensors incl. sensor supply.
- Sleep mode for long operating time with rechargeable battery.

## Technical data

| | |
|---|---|
| **Measuring input:** | 1 ALMEMO® socket for ALMEMO® D6 or D7 sensors |
| Channels: | up to 10 measuring channels |
| Accuracy: | see specifications of the ALMEMO® D7 sensor |
| Galvanic isolation: | yes (wireless) |
| Sensor supply: | 6 V, 30 mA (operated with rechargeable battery or with mains adapter) |
| Measuring cycle*: | 10 s to 24 h |
| Output cycle*: | 10 s to 24 h |
| **Interfaces:** | Radio, repeater function integrated** USB for supply and update |
| Standard equipment: | |
| Display: | 3 LEDs |
| Keypad: | foil keypad |
| Memory: | ring memory for 128 measured values |
| Date and time-of-day: | clock synchronization via data logger ALMEMO® 470-1 |

| | |
|---|---|
| **Power supply:** | |
| Rechargeable battery: | 2 rechargeable NiMH batteries AA (1900 mAh) |
| Operating time with rechargeable battery: | depends on current consumption of the ALMEMO® D7 sensor and the measuring cycle, output cycle, sleep mode |
| Mains adapter: | ZB 1505-NA1 100 to 240 VAC to 5 VDC, 2 A, galvanically isolated, via micro USB |
| **Operating temperature:** | -5 to +50 °C |
| **Storage temperature:** | -20 to +60 °C |
| **Housing:** | |
| Protection class: | IP50 |
| Dimension: | 43 x 135 x 21 mm (WxHxD) (without mount) |
| Weight: | ca. 0.1 kg (including rechargeable batteries) |

* depending on the number of data logged with the data logger ALMEMO® 470-1 connected wireless sensors
** Repeater operation not in sleep mode

## Standard delivery (Power supply unit see under accessories)

**Order no.**

Wireless ALMEMO® Interface (radio, repeater function integrated) with 1 ALMEMO® input socket for 1 ALMEMO® D6 or D7 sensor. Ring memory, integrated rechargeable battery. **ZA17701IF**

## Accessories for wireless ALMEMO® sensor and wireless ALMEMO® interface

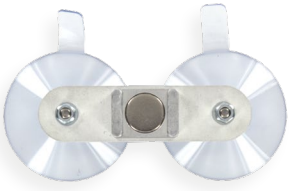
**Order no.**

For battery charge respectively permanent supply:
Switch-mode power supply / connector version, 100 to 240 V AC / 5 V DC including cable with micro USB plug **ZB1505NA1**

Wall mount: mounting plate (including magnet). Dimension: 35 x 50 mm (WxH). **ZB9700WH**
Suction cup fastening: 2 suction cups with mount (including magnet). Dimension: approx. 50 x 110 mm (WxH). **ZB9700SH**
Magnet mount: round magnet (including fastening screw). Dimension: Ø 31 mm. **ZB9700MH**

Magnet mount

Mounting plate



Suction cup fastening

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new



# Wireless ALMEMO® Sensor for Carbon Dioxide, Temperature and Air Pressure FY 1700-1CO2M0B05

- To assess the air quality via the measurement of the $CO_2$ concentration.
- At the same time to assess the quality of stay (comfort) via the measurement of air temperature.
- Sleep mode for long operating time with rechargeable battery.

## Technical data

| | |
|---|---|
| **Measuring input:** | built-in multi-sensor element for carbon dioxide, temperature and air pressure |
| Galvanic Isolation: | yes (wireless) |
| Channels: | up to 4 measuring channels |
| measuring ranges: | $CO_2$: up to 5000 ppm<br>temperature: -5 to +50 °C<br>Air pressure: 700 to 1100 mbar |
| Accuracy: | $CO_2$: ±(50 ppm + 3 % of mesured value)<br>temperature: typical ± 0.5 °C (at 25 °C)<br>air pressure: typical ± 2 mbar |
| Nominal conditions: | 25 °C , 1013 mbar |
| Ansprechzeit t63: | 140 s |
| Response time t63: | 140 s |
| Switch-on time: | 15 s |
| Refresh rate: | 15 s for all 3 channels |
| Measuring cycle*: | 10 s to 24 h |
| Output cycle*: | 10 s to 24 h |
| **Interfaces:** | Radio, repeater function integrated**<br>USB for supply and update |
| **Standard equipment:** | |
| Display: | 3 LEDs |
| Keypad: | foil keypad |
| Memory: | ring memory for 128 measured values |
| Date and time-of-day: | clock synchronization<br>via data logger ALMEMO® 470-1 |
| **Power supply:** | |
| Rechargeable battery: | 2 rechargeable NiMH batteries AA (1900 mAh) |
| Operating time with rechargeable battery: | depending on measuring cycle, output cycle, sleep mode |
| mains adapter: | ZB 1505-NA1 100 to 240 VAC<br>to 5 VDC, 2 A, galvanically isolated,<br>via micro USB |
| **Operating temperature:** | -5 to +50 °C<br>0 to 95 % r.H. (non condensing)<br>700 to 1100 mbar |
| **Storage temperature:** | -20 to +60 °C |
| **Housing:** | |
| Protection class: | IP20 |
| Dimensions: | 43 x 186* x 22 mm (WxHxD)<br>(without mount)<br>(*incl. protective cap) |
| **Weight:** | approx. 0.1 kg<br>(including rechargeable batteries) |

* depending on the number of data logged with the data logger ALMEMO® 470-1 connected wireless sensors
** Repeater operation not in sleep mode

**Standard delivery** (Power supply unit see under accessories) **Order no.**

Wireless ALMEMO® sensor (repeater function integrated) with built-in multi-sensor element for carbon dioxide, temperature and air pressure, ring memory, built-in rechargeable battery **FY17001CO2M0B05**

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