# BELIMO®

## Room Sensor CO₂ / Humidity / Temperature

For measuring the temperature, humidity and CO2 in the room. The room units can be seamlessly connected to existing third-party controllers. With MP-Bus communication and integrated 0...10V output. Output signal is selectable via NFC.

5 YEAR WARRANTY

MP BUS®

NFC

## Type Overview

| Type | Communication | Output signal active CO₂ | Output signal active humidity | Output signal active temperature |
|---|---|---|---|---|
| 22RTM-19-1 | MP-Bus | 0...5 V, 0...10 V, 2...10 V | 0...5 V, 0...10 V, 2...10 V | 0...5 V, 0...10 V, 2...10 V |

## Technical Data

| | | |
|---|---|---|
| **Electrical data** | Nominal voltage | AC/DC 24 V |
| | Nominal voltage range | AC 19.2...28.8 V / DC 19.2...28.8 V |
| | Power consumption AC | 1 VA |
| | Power consumption DC | 0.5 W |
| | Electrical connection | Spring loaded terminal block 0.25...1.5 mm² |
| | Cable entry | Wire openings at the backside (for In-wall wiring) and top-/bottom side (for On-wall wiring) |
| **Functional data** | Sensor Technology | CO₂: NDIR (non dispersive infrared) dual channel |
| | Communicative control | MP-Bus |
| | Output signal active note | Output 0...5 V, 0...10 V (factory setting), 2...10 V selectable via NFC<br>Voltage output: min. 10 kΩ load |
| | Application | Air |
| **Measuring data** | Measuring values | CO₂<br>Relative humidity<br>Dew point<br>Temperature |
| | Measuring range CO₂ | 0...2000 ppm |
| | Measuring range humidity | 0...100% r.H. |
| | Measuring range temperature | 0...50°C [30...120°F] |
| | Accuracy CO₂ | ±(50 ppm + 2% of measuring value) |
| | Accuracy humidity | Typical ±3% between 20...80% r.H. @ 25°C |
| | Accuracy temperature active | ±0.5°C @ 25°C [±0.9°F @ 77°F] |
| | Long-term stability | ±20 ppm p.a.<br>±0.25% r.H. p.a. @ 25°C @ 50% r.H. |
| | Time constant τ (63%) in the room | Typical 960 s |
| | Wall coupling factor | 52 % |
| **Materials** | Housing | White, RAL 9003 |
| **Safety data** | Ambient humidity | Max. 95% r.H., non-condensing |

| | |
|---|---|
| Ambient temperature | 0...50°C [30...120°F] |
| Storage temperature | -20...60°C [-5...140°F] |
| Protection class IEC/EN | III Protective extra-low voltage (PELV) |
| EU Conformity | CE Marking |
| Certification IEC/EN | IEC/EN 60730-1 and IEC/EN 60730-2-9 |
| Degree of protection IEC/EN | IP30 |
| Quality Standard | ISO 9001 |

## Safety notes

⚠ This device has been designed for use in stationary heating, ventilation and air-conditioning systems and must not be used outside the specified field of application. Unauthorised modifications are prohibited. The product must not be used in relation with any equipment that in case of a failure may threaten humans, animals or assets.

Ensure all power is disconnected before installing. Do not connect to live/operating equipment.

Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.

The device contains electrical and electronic components and must not be disposed of as household refuse. All locally valid regulations and requirements must be observed.

## Remarks

**General remarks concerning sensors**

The measuring result is influenced by the thermal characteristics of the wall. A solid concrete wall responds to thermal fluctuations within a room slower than a light-weight structure wall. Room temperature sensors installed in flush-mounted boxes have a longer response time to thermal variations. For example, in extreme cases they will detect the radiant heat of the wall even if the air temperature in the room is lower. The quicker the dynamics of the wall (temperature acceptance of the wall) or the longer the selected inquiry interval of the temperature sensor is, the smaller the deviations are.

**Build-up of Self-Heating by Electrical Dissipative Power**

Temperature sensors with electronic components always have a dissipative power which affects the temperature measurement of the ambient air. The dissipation in active temperature sensors shows a linear increase with rising operating voltage. The dissipative power should be taken into account when measuring temperature. In case of a fixed operating voltage (±0.2 V) this is normally done by adding or reducing a constant offset value. As Belimo transducers work with a variable operating voltage, only one operating voltage can be taken into consideration, for reasons of production engineering. Transducers 0...10 V / 4...20 mA have a standard setting at an operating voltage of DC 24 V. That means, that at this voltage, the expected measuring error of the output signal will be the least. For other operating voltages, the offset error will be increased by a changing power loss of the sensor electronics.

If a readjustment directly at the active sensor should be necessary during later operation, this can be done with the following adjustment methods.

- For sensors with NFC or dongle by the corresponding Belimo app

- For sensors with a trimming potentiometer on the sensor board

- For bus sensors via bus interface with a corresponding software variable

**Application notice for humidity sensors**

Refrain from touching the sensitive humidity sensor element. Touching the sensitive surface will void warranty.

When exposed to harsh environmental conditions such as high ambient temperature and/or high levels of humidity, or presence of aggressive gases (i.e. chlorine, ozone, ammonia), the sensor element may be affected and readings may be outside the specified accuracy. Replacement of deteriorated humidity sensors due to harsh environmental conditions is not covered by the general warranty.

The sensor shows best performance when operated within recommended normal temperature range of 5...60°C and humidity range of 20...80% r.H. Long-term exposure to conditions outside normal range, especially at high humidity, may temporarily offset the humidity signal (e.g. +3% r.H. after 60h kept at >80% r.H.). After returning into the normal temperature and humidity range the sensor will slowly come back to calibration state by itself.

**Information Self-Calibration Feature $CO_2$**

All $CO_2$ sensors are subject to drift caused by the aging process of the components, resulting in regular re-calibration or replacement of units. However, the dual channel technology integrates automatic self-calibration technology vs. common used ABC-Logic sensors. Dual channel self-calibration technology is

ideally suited for applications operating 24/7 hours such as those in hosiptals or other commerical applications. Manual calibration is not required.

**Digital input**  Auxiliary Digital Input can be used with third-party sensors and switches (window alarm, occupancy detector, etc.). The input values are monitored and transmitted only through the MP-Bus communication protocol.

## Scope of delivery

Screws

## Accessories

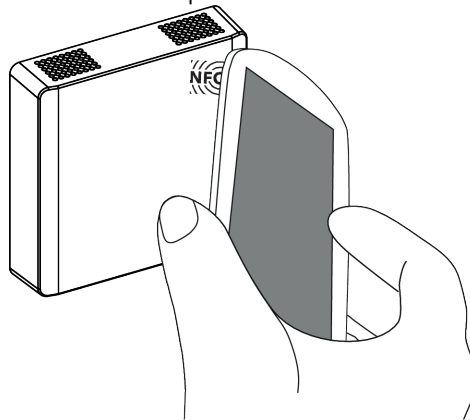| Service tools | Description | Type |
|---|---|---|
| | Belimo Assistant App, Smartphone app for easy commissioning, parametrising and maintenance | Belimo Assistant App |
| | Converter Bluetooth / NFC | ZIP-BT-NFC |

## Service

**NFC connection**  Belimo equipment marked with the NFC logo can be operated and parameterized with the Belimo Assistant App.
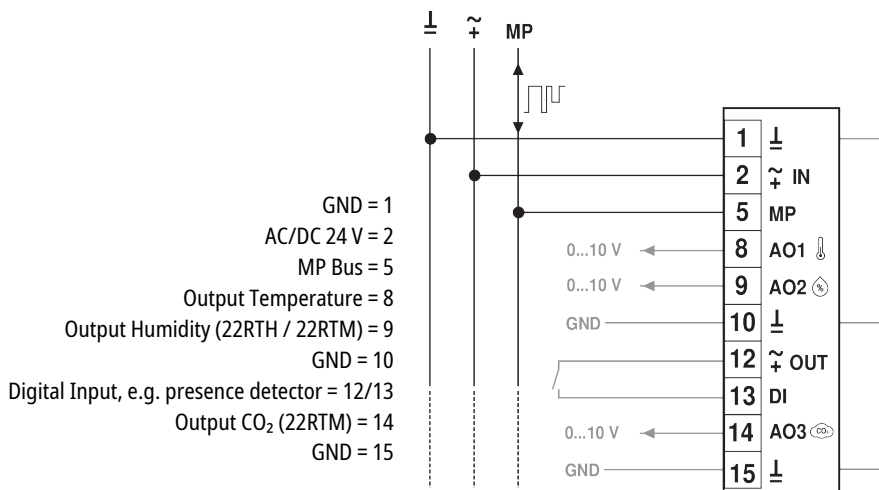
Requirement:

- NFC- or Bluetooth-capable smartphone

- Belimo Assistant App (Google Play & Apple AppStore)

Align NFC-capable smartphone on the sensor so that both NFC antennas are superposed.
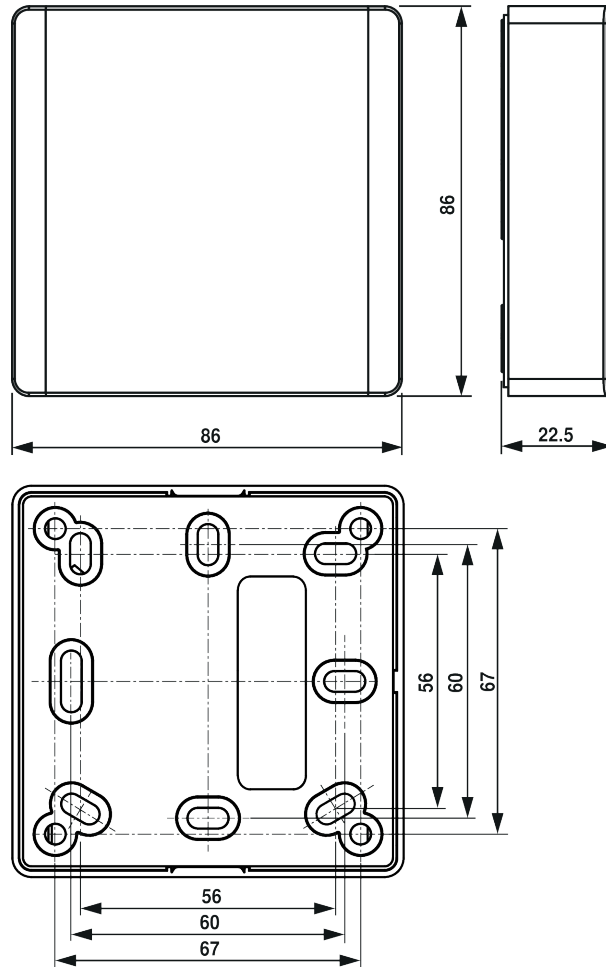
Connect Bluetooth-enabled smartphone via the Bluetooth-to-NFC Converter ZIP-BT-NFC to the sensor. Technical data and operation instructions are shown in the ZIP-BT-NFC data sheet.



## Wiring diagram



GND = 1
AC/DC 24 V = 2
MP Bus = 5
Output Temperature = 8
Output Humidity (22RTH / 22RTM) = 9
GND = 10
Digital Input, e.g. presence detector = 12/13
Output $CO_2$ (22RTM) = 14
GND = 15

| 1 | ⊥ |
| 2 | ∼+ IN |
| 5 | MP |
| 8 | AO1 |
| 9 | AO2 |
| 10 | ⊥ |
| 12 | ∼+ OUT |
| 13 | DI |
| 14 | AO3 |
| 15 | ⊥ |

## Dimensions

| Type | Weight |
|---|---|
| **22RTM-19-1** | 0.124 kg |