

Duct sensor CO₂ / Humidity / Temperature

For measuring CO₂, with integrated temperature and humidity sensor. Dual channel CO₂ technology. With BACnet MS/TP communication and integrated 0...10 V outputs. IP65 / NEMA 4X rated enclosure.


Type Overview

| Type | Communication | Output signal active CO ₂ | Output signal active temperature |
|----------|---------------|--------------------------------------|----------------------------------|
| 22DTM-16 | BACnet MS/TP | 0...5 V, 0...10 V | 0...5 V, 0...10 V |

Technical data

| | | |
|------------------------|-----------------------------------|---|
| Electrical data | Nominal voltage | AC/DC 24 V |
| | Nominal voltage range | AC 19...29 V / DC 15...35 V |
| | Power consumption AC | 4.3 VA |
| | Power consumption DC | 2.3 W |
| | Electrical connection | Pluggable spring loaded terminal block max. 2.5 mm ² |
| | Cable entry | Cable gland with strain relief 2 x Ø6 mm |
| Functional data | Sensor Technology | CO ₂ : NDIR (non dispersive infrared) dual channel Relative humidity: with stainless steel wire mesh filter |
| | Application | Air |
| | Communication | BACnet MS/TP |
| | Voltage output | 2x 0...5 V, 0...10 V, min. load 10 kΩ |
| | Output signal active note | Output 0...5/10 V with Jumper adjustable |
| Measuring data | Measured values | CO ₂ Relative humidity Absolute humidity Dew point Enthalpies Temperature |
| | Measuring range CO ₂ | Adjustable via BACnet Default setting: 0...2000 ppm |
| | Measuring range humidity | Adjustable via BACnet Default setting: 0...100% RH |
| | Measuring range temperature | Adjustable via BACnet Default setting: 0...50°C [-32...122°F] Attention: max. measuring temperature is restricted by max. fluid temperature (see Safety data) |
| | Measuring range absolute humidity | Adjustable via BACnet Default setting: 0...50 g/m ³ |
| | Measuring range enthalpy | Adjustable via BACnet Default setting: 0...85 kJ/kg |
| | Measuring range dew point | Adjustable via BACnet Default setting: 0...50°C [-30...120°F] |

| | | |
|-----------------------|-----------------------------------|---|
| Measuring data | Accuracy CO ₂ | ±(50 ppm + 3% of measured value) |
| | Accuracy humidity | ±2% between 0...80% RH @ 25°C |
| | Accuracy temperature active | ±0.3°C @ 25°C [±0.54°F @ 77°F] |
| | Long-term stability | ±50 ppm p.a. ±0.3% RH p.a. @ 21°C @ 50% RH ±0.05°C p.a. @ 21°C [±0.09°F p.a. @ 70°F] |
| | Time constant τ (63%) in air duct | CO ₂ : typical 33 s @ 1 m/s Relative humidity: typical 10 s @ 3 m/s Temperature: typical 125 s @ 3 m/s |
| Materials | Cable gland | PA6, black |
| | Housing | Cover: PC, orange Bottom: PC, orange Seal: NBR70, black UV resistant |
| | Probe material | PA6, black |
| Safety data | Ambient humidity | Max. 95% RH, non-condensing |
| | Fluid humidity | Max. 95% RH, non-condensing |
| | Ambient temperature | 0...50°C [30...120°F] |
| | Fluid temperature | 0...50°C [30...120°F] |
| | Operating condition air flow | min. 0.3 m/s max. 12 m/s |
| | Protection class IEC/EN | III, Safety Extra-Low Voltage (SELV) |
| | Power source UL | Class 2 Supply |
| | EU Conformity | CE Marking |
| | Certification IEC/EN | IEC/EN 60730-1 |
| | Certification UL | cULus acc. to UL60730-1A/-2-9/-2-13, CAN/CSA E60730-1/-2-9 |
| | Degree of protection IEC/EN | IP65 |
| | Degree of protection NEMA/UL | NEMA 4X |
| | Enclosure | UL Enclosure Type 4X |
| | Quality Standard | ISO 9001 |
| | Mode of operation | Type 1 |
| | Pollution degree | 3 |
| | Rated impulse voltage supply | 0.8 kV |
| Construction | Independently mounted control | |

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 Sensing devices with a transducer should always be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of transducer electronics should be kept constant. The transducers must be operated at a constant supply voltage (±0.2 V). When switching the supply voltage on/off, onsite power surges must be avoided.

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% RH. Long-term exposure to conditions outside normal range, especially at high humidity, may temporarily offset the humidity signal (e.g. +3% RH after 60h kept at >80% RH). After returning into the normal temperature and humidity range, the sensor will slowly come back to calibration state by itself.

Information self-calibration feature CO₂

All CO₂ 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 hospitals or other commercial applications. Manual calibration is not required.

Scope of delivery

| Scope of delivery | Description | Type |
|-------------------|--|-----------|
| | Mounting flange for duct sensor 19.5 mm, up to max. 120°C [248°F], Plastic | A-22D-A35 |
| | Cable Gland with strain relief Ø6...8 mm | |

Accessories

| Optional accessories | Description | Type |
|----------------------|--|-------------|
| | Replacement filter, wire mesh, Stainless steel | A-22D-A06 |
| | Connection adapter, M20x1.5, for cable 1x6 mm, Multipack 10 pcs. | A-22G-A01.1 |
| | Connection adapter, M20, for cable 2 x 6 mm, Multipack 10 pcs. | A-22G-A02.1 |
| | Mounting plate L housing | A-22D-A10 |

| Service tools | Description | Type |
|---------------|---|----------------------------------|
| | Belimo Duct Sensor Assistant App | Belimo Duct Sensor Assistant App |
| | Bluetooth dongle for Belimo Duct Sensor Assistant App | A-22G-A05 |
| | * Bluetooth dongle A-22G-A05 | |
| | Certified and available in North America, European Union, EFTA States and UK. | |

Service

Service tools connection This sensor can be operated and parametrised using the Belimo Duct Sensor Assistant App. When using the Belimo Duct Sensor Assistant App, the bluetooth dongle is required to enable communication between the app and the Belimo sensor.

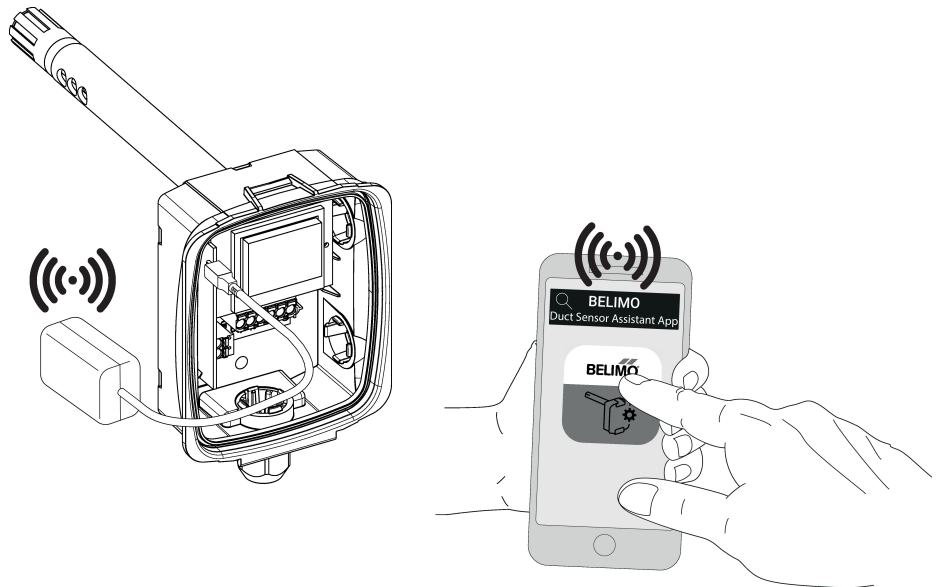
For the standard operation and parametrisation of the sensor the bluetooth dongle and the Belimo Duct Sensor Assistant App are not needed. The sensor will arrive pre-configured with the factory default settings shown above.

Requirement:

- Bluetooth dongle (Belimo Part No: A-22G-A05)
- Bluetooth-capable smartphone
- Belimo Duct Sensor Assistant App (Google Play & Apple App Store)

Procedure:

- Plug the Bluetooth dongle into the sensor via the Micro-USB connector or by means of the interface PCB
- Connect Bluetooth-capable smartphone with Bluetooth dongle
- Select parametrisation in the Belimo Duct Sensor Assistant App



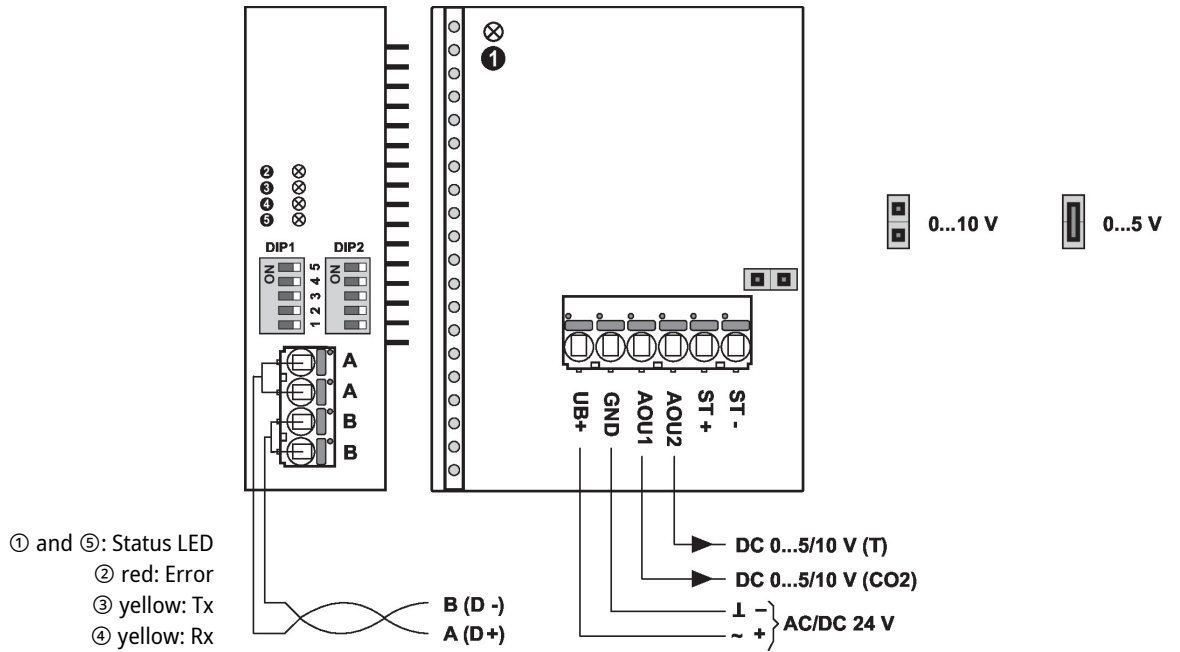
Wiring diagram

Notes Supply from isolating transformer.



The wiring of the line for BACnet (MS/TP) has to be carried out in accordance with applicable RS485 regulations.

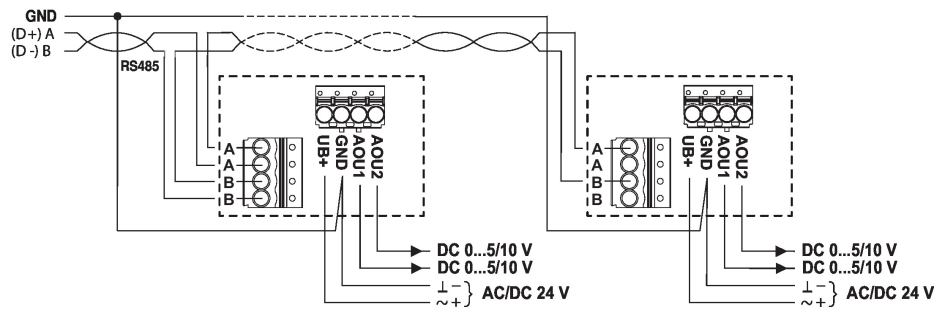
BACnet GND: Supply and communication are not galvanically isolated. Connect earth signal of the devices with one another.



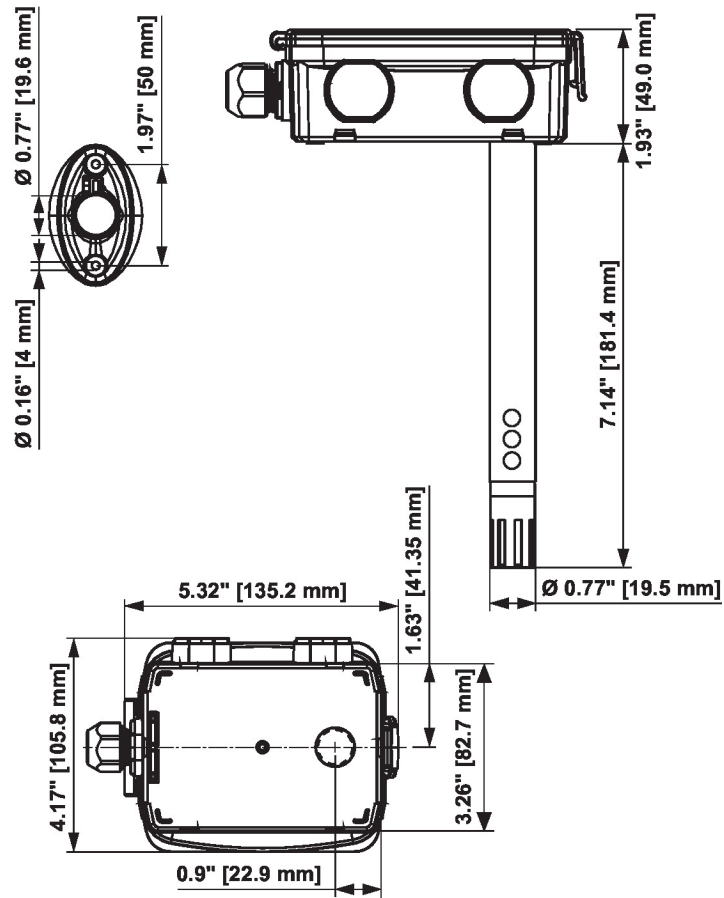
Detailed documentation

The separate document, BACnet PICS, informs about the PICS, MAC addressing and bus termination (DIP1 & DIP2).

Wiring RS485 BACnet MS/TP



Dimensions



| Type | Probe length | Weight |
|----------|--------------|---------|
| 22DTM-16 | 180 mm | 0.28 kg |