# Technical data sheet 22DTM-56

**Duct Sensor $CO_2$ / Humidity / Temperature**

**For measuring $CO_2$, with integrated temperature and humidity sensor. Dual channel $CO_2$ technology. With BACnet MS/TP communication and integrated 0 ... 10V outputs. IP65 / NEMA 4X rated enclosure.**

## Type Overview

| Type | Output signal | Output signal active $CO_2$ | Output signal active temperature |
|---|---|---|---|
| **22DTM-56** | BACnet | DC 0...5 V,<br>DC 0...10 V | DC 0...5 V,<br>DC 0...10 V |

## Technical Data

| | | |
|---|---|---|
| **Electrical Data** | Power supply DC | 15...24 V, ±10%, 0.3 W |
| | Power supply AC | 24 V, , ±10%, 6 VA |
| | Electrical connection | Removable spring loaded terminal block max. 2.5 mm² |
| | Cable entry | Cable gland with strain relief 2 x Ø6 mm (1/2" NPT conduit adapter included) |
| **Functional Data** | Sensor Technology | $CO_2$: NDIR (non dispersive infrared) dual channel<br>r.H.: with stainless steel wire mesh filter |
| | Communicative control | BACnet MS/TP |
| | Output signal active note | Output DC 0...5/10 V selectable with switch |
| | Application | air |

| | | |
|---|---|---|
| **Measuring Data** | Measuring values | $CO_2$<br>temperature<br>relative humidity<br>absolute humidity<br>enthalpy<br>dew point |
| | Measuring range $CO_2$ | 0...2000 ppm<br>selectable via BACnet |
| | Measuring range humidity | 0...100% r.H.<br>selectable via BACnet |
| | Measuring range temperature | 40...140°F [4...60°C]<br>selectable via BACnet<br>Attention: max. measuring temperature is restricted by max. fluid temperature (see Safety data) |
| | Measuring range absolute humidity | 0...80 g/m³<br>selectable via BACnet |
| | Measuring range enthalpy | 0...85 kJ/kg<br>selectable via BACnet |
| | Measuring range dew point | 0...200°F [-20...80°C]<br>selectable via BACnet |
| | Accuracy $CO_2$ | ±(50 ppm + 3% of measuring value) |
| | Accuracy humidity | ±2% between 10...90% r.H. @ 70°F [21°C] |
| | Accuracy temperature active | ±0.9°F @ 70°F [±0.5°C @ 21°C] |
| **Materials** | Cable gland | PA6, black |
| | Housing | cover: lexan, orange<br>base: lexan, orange<br>seal: 0467 NBR70, black<br>UV resistant |
| | Probe material | PA6, black |
| **Safety Data** | Ambient humidity | max. 95% r.H., non-condensing |
| | Medium humidity | max. 95% r.H., non-condensing |
| | Ambient temperature | 30...120°F [0...50°C] |
| | Fluid temperature | 30...120°F [0...50°C] |
| | Operating condition air flow | min. 1 ft/s [0.3 m/s]<br>max. 40 ft/s [12 m/s] |
| | Protection class IEC/EN | III safety extra-low voltage (selv) |
| | Protection class UL | 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 E60730-1:02/-2-9 |
| | Degree of protection IEC/EN | IP65 |
| | 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**

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 the 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. This dissipative power should be taken into account when measuring temperature. 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 re-calibration should become necessary later directly on the sensor, this can be done by means of a trimming potentiometer on the sensor board.

**Application Notice for Humidity Sensors**

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

For standard environmental conditions the manufacturing accuracy specified in the datasheet will be covered by the calibration warranty for two years. 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 specified accuracy. Replacement of deteriorated humidity sensors due to harsh environmental conditions are not subject of the general warranty.

**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.

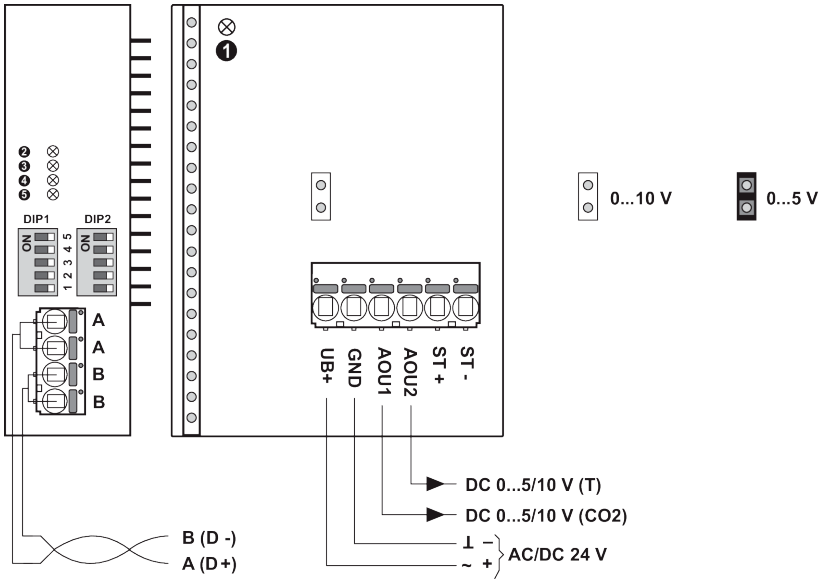
## Scope of delivery

| Scope of delivery | Description | Type |
|---|---|---|
| | Mounting flange for duct sensor 19.5 mm, Plastic | A-22D-A34 |
| | 1/2" NPT conduit adapter | |

## Accessories

| Optional accessories | Description | Type |
|---|---|---|
| | Replacement filter, wire mesh, Stainless steel | A-22D-A06 |

## Wiring Diagram




① and ⑤: Status LED
② red: Error
③ yellow: Tx
④ yellow: Rx

**Detailed documentation**

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

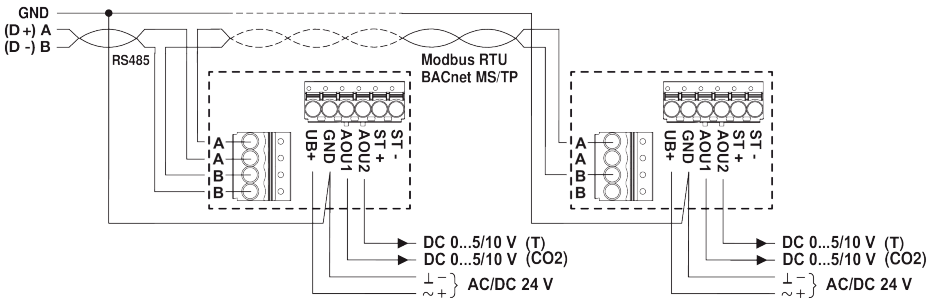
**Notes Wiring RS485**

Connection via safety isolating transformer.
Parallel connection of other devices possible. Observe the performance data.

The wiring of the line for BACnet MS/TP / Modbus RTU is to be carried out in accordance with applicable RS485 regulations.

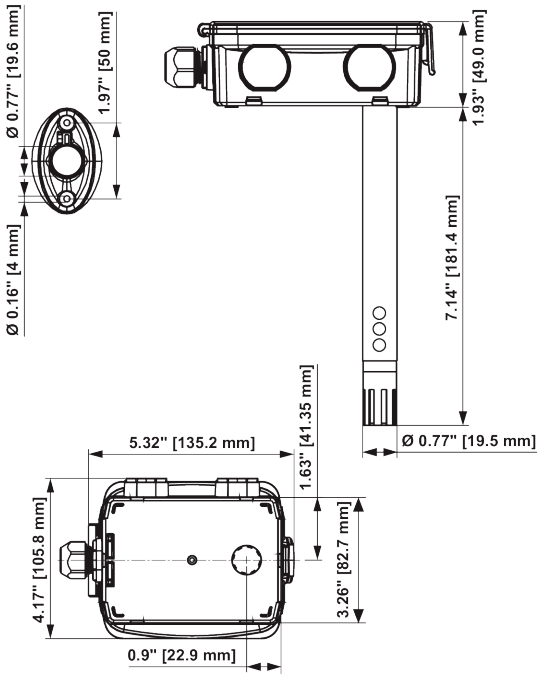
Modbus / BACnet: Supply and communication are not galvanically isolated. Connect earth signal of the devices with one another.

**Wiring RS485 (Modbus RTU & BACnet MS/TP)**



## Dimensions

Dimensions




| Type | Probe length | Weight |
|---|---|---|
| 22DTM-56 | 7" [180 mm] | 0.62 lb [0.28 kg] |