

**Duct sensor CO<sub>2</sub> / Humidity / Temperature**

Active sensor (0...10 V) for measuring CO<sub>2</sub>, temperature and humidity. Dual channel CO<sub>2</sub> technology. Optional with LCD display. NEMA 4X / IP65 rated enclosure.



5-year warranty


**Type Overview**

| Type       | Output signal active CO <sub>2</sub> | Output signal active temperature | Output signal active humidity | Display type |
|------------|--------------------------------------|----------------------------------|-------------------------------|--------------|
| 22DTM-51   | 0...5 V, 0...10 V                    | 0...5 V, 0...10 V                | 0...5 V, 0...10 V             | -            |
| 22DTM-5106 | 0...5 V, 0...10 V                    | 0...5 V, 0...10 V                | 0...5 V, 0...10 V             | LCD          |

**Technical data**

|                        |                                 |   |
|------------------------|---------------------------------|---|
| <b>Electrical Data</b> | 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 <sup>2</sup>   |
|                        | Cable entry                     | Cable gland with strain relief Ø6...8 mm (1/2" NPT conduit adapter included)  |
| <b>Functional Data</b> | Sensor Technology               | CO <sub>2</sub> : NDIR (non dispersive infrared) dual channel<br>Relative humidity: with stainless steel wire mesh filter |
|                        | Application                     | air   |
|                        | Voltage output                  | 3 x 0...5 V, 0...10 V, min. resistance 10 kΩ  |
|                        | Output signal active note       | output 0...5/10 V with jumper adjustable  |
|                        | Display                         | LCD, 1.14x1.38 in. [29x35 mm]<br>With backlight<br>Measured values: CO <sub>2</sub> , temperature, relative humidity      |
| <b>Measuring Data</b>  | Measured values                 | CO <sub>2</sub><br>relative humidity<br>Absolute humidity<br>Dew point<br>Enthalpies<br>Temperature                       |
|                        | Measuring range CO <sub>2</sub> | 0...2000 ppm  |
|                        | Measuring range humidity        | 0...100% RH   |
|                        | Measuring range temperature     | 40...140°F [4...60°C]   |
|                        | Accuracy CO <sub>2</sub>        | ±(50 ppm + 3% of measured value)  |
|                        | Accuracy humidity               | ±2% between 0...80% RH @ 77°F [25°C]  |
|                        | Accuracy temperature active     | ±0.3°C @ 25°C [±0.54°F @ 77°F]  |

|                             |  |   |
|-----------------------------|--|---|
| <b>Measuring Data</b>       | Long-term stability                            | ±50 ppm p.a.<br>±0.3% RH p.a. @ 70°F [21°C] @ 50% RH<br>±0.09°F p.a. @ 70°F [±0.05°C p.a. @ 21°C]                       |
|                             | Time constant $\tau$ (63%) in air duct         | CO <sub>2</sub> : typical 33 s @ 1 m/s<br>Relative humidity: typical 10 s @ 3 m/s<br>Temperature: typical 125 s @ 3 m/s |
| <b>Materials</b>            | Cable gland                                    | PA6, black  |
|                             | Housing  | Cover: PC, orange<br>Bottom: PC, orange<br>Seal: NBR70, black<br>UV resistant   |
|                             | Probe material                                 | PA6, black  |
| <b>Safety Data</b>          | Protection class IEC/EN                        | III, Safety Extra-Low Voltage (SELV)  |
|                             | Power source UL                                | Class 2 Supply  |
|                             | Degree of protection IEC/EN                    | IP65  |
|                             | Degree of protection NEMA/UL                   | NEMA 4X   |
|                             | Enclosure                                      | UL Enclosure Type 4X  |
|                             | EU Conformity                                  | CE Marking  |
|                             | Certification IEC/EN                           | IEC/EN 60730-1  |
|                             | Quality Standard                               | ISO 9001  |
|                             | UL Approval                                    | cULus acc. to UL60730-1A/-2-9/-2-13, CAN/CSA E60730-1/-2-9  |
|                             | Mode of operation                              | Type 1  |
|                             | Rated impulse voltage supply                   | 0.8 kV  |
|                             | Construction                                   | Independently mounted control   |
|                             | Pollution degree                               | 3   |
|                             | Ambient humidity                               | Max. 95% RH, non-condensing   |
|                             | Ambient temperature                            | 0...50°C [32...122°F]   |
|                             | Fluid humidity                                 | Max. 95% RH, non-condensing   |
| Fluid temperature           | 0...50°C [32...122°F]                          |   |
| Operating condition airflow | min. 1 ft/s [0.3 m/s]<br>max. 40 ft/s [12 m/s] |   |

**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. Unauthorized 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 authorized 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 ( $\pm 0.2$  V), this is normally done by adding or reducing a constant offset value. As Belimo transducers work with a variable operating voltage, for reasons of production engineering only one operating voltage can be taken into consideration. Transducers 0...10 V / 4...20 mA have a standard setting at an operating voltage of DC 24 V. This 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 with 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 the recommended normal temperature range of 41...122°F [5...50°C] and a humidity range of 20...80% RH. Long-term exposure to conditions outside the normal range, especially at high humidity, may temporarily offset the humidity signal (e.g. 3% RH after 60 h kept at >80% RH). After returning into the normal temperature and humidity ranges, the sensor will slowly come back to calibration state by itself.

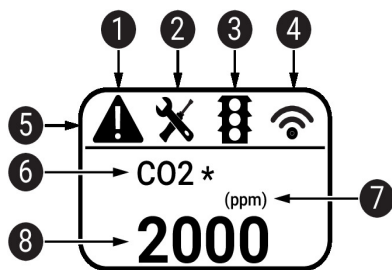
**Information self-calibration feature CO<sub>2</sub>**

All CO<sub>2</sub> 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.

**Operating controls and indicators**

**Indicator elements**

Depending on the device and the number of measured values, the display automatically scales. Parameters, such as the fading in/out of measured values, brightness and traffic light function, are changed via the app or bus system. During the boot process, the software and hardware versions are displayed.



- 1 Fault / sensor failure
- 2 Service / visual inspection due
- 3 TLF (traffic light function) active (thresholds for display colour changes)
- 4 Radio active (not available)
- 5 Status bar
- 6 Measured value (\* appears when TLF function is activated for this value)
- 7 Unit of measure
- 8 Measured value

**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-A34 |
|                   | 1/2" NPT conduit adapter   |           |

**Accessories**

| Optional accessories | Description   | Type                             |
|----------------------|---|----------------------------------|
|                      | Replacement filter sensor probe tip, wire mesh, Stainless steel               | A-22D-A06<br>F6200LU             |
|                      | Mounting plate L housing  | A-22D-A10<br>UFLK6924            |
| 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**

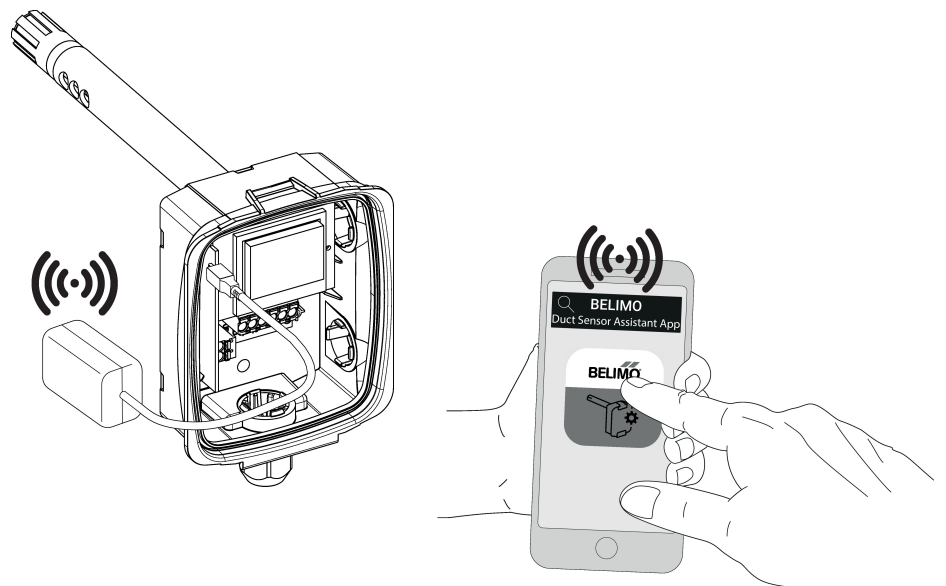
**Service tools connection** This sensor can be operated and parametrized using the Belimo Assistant App. When using the Belimo Duct Sensor Assistant App, the Bluetooth dongle is required to enable communication between the app and the Belimo sensor. For the standard operation and parametrization of 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:

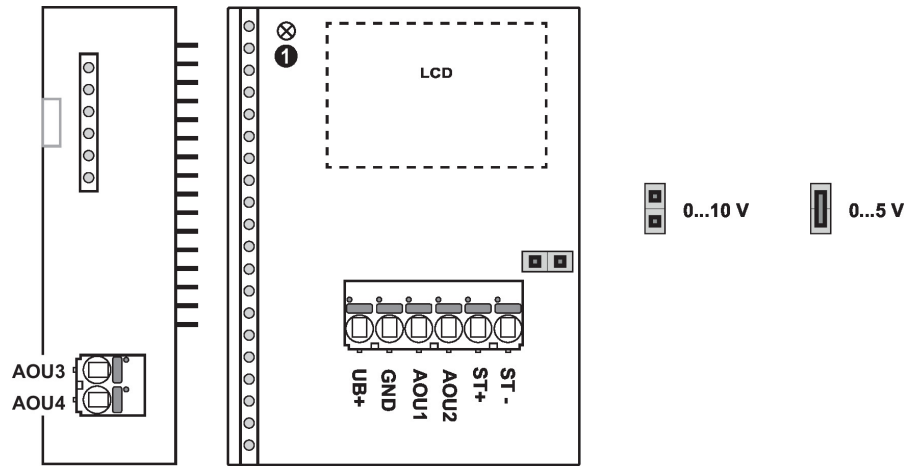
- Bluetooth dongle (Belimo Part No: A-22G-A05)
- Bluetooth-capable smartphone
- Belimo Duct Sensor Assistant App (Google Play & Apple App Store)

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 parametrization in the Belimo Assistant App

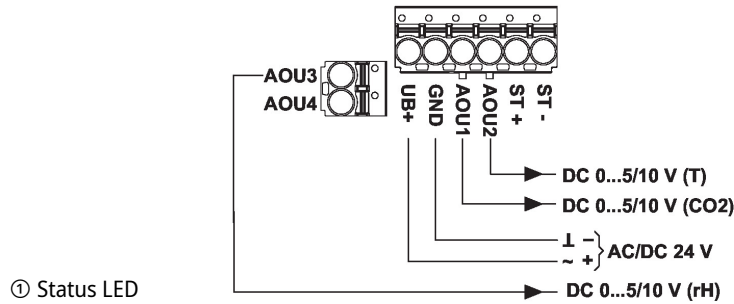


Wiring Diagram

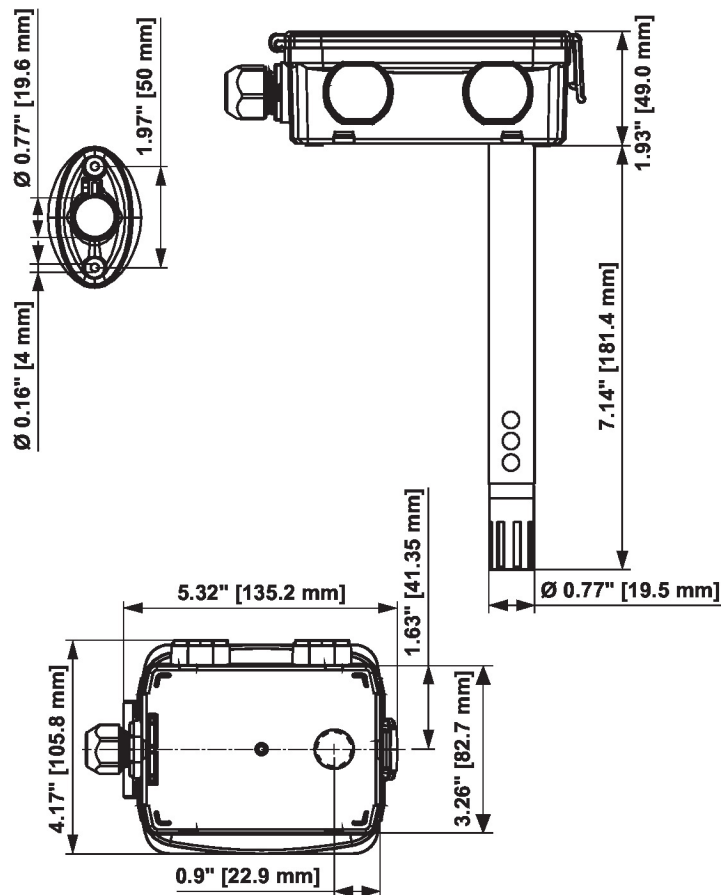


22DTM-11.. / 22DTM-51..

3 x DC 0...5/10 V



Dimensions



| Type       | Probe length | Weight            |
|------------|--------------|-------------------|
| 22DTM-51   | 7" [180 mm]  | 0.62 lb [0.28 kg] |
| 22DTM-5106 | 7" [180 mm]  | 0.66 lb [0.30 kg] |