

Duct Sensor Humidity / Temperature

Active sensor (0...10 V) for measuring the relative or absolute humidity and temperature in duct applications. Instead of the humidity signal, the enthalpy or the dewpoint can be selected as an output signal. IP65 / NEMA 4X rated enclosure.


Type Overview

| Type | Output signal active humidity | Output signal active temperature | Probe length |
|-----------|-------------------------------|----------------------------------|--------------|
| 22DTH-11M | 0...5 V, 0...10 V | 0...5 V, 0...10 V | 140 mm |
| 22DTH-11Q | 0...5 V, 0...10 V | 0...5 V, 0...10 V | 270 mm |

Technical Data

| | | |
|------------------------|---------------------------|---|
| Electrical data | Nominal voltage | AC/DC 24 V |
| | Nominal voltage range | AC 21.6...26.4 V / DC 13.5...26.4 V |
| | Power consumption AC | 0.8 VA |
| | Power consumption DC | 0.4 W |
| | Electrical connection | Removable spring loaded terminal block max. 2.5 mm ² |
| Functional data | Cable entry | Cable gland with strain relief Ø6...8 mm |
| | Sensor Technology | Polymer capacitive sensor with stainless steel wire mesh filter |
| | Multirange | 4 measuring ranges selectable |
| | Output signal active note | Output 0...5/10 V with Jumper adjustable Voltage output: min. 10 kΩ load |
| | Application | Air |

| Measuring data | Measuring values | Temperature Relative humidity Dew point Enthalpies Absolute humidity | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------|--|--|------------|-----------------|------------|-----------------|----|----------|-----------|--|----|--------|----------|--|----|----------|---------|--|----|----------|---------|---|
| | Measuring range humidity | 0...100% r.H. non-condensing | | | | | | | | | | | | | | | | | | | | |
| | Measuring range temperature | Active sensor: range selectable Attention: max. measuring temperature is restricted by max. fluid temperature (see Safety data) | | | | | | | | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Setting</th> <th>range [°C]</th> <th>range [°F]</th> <th>Factory setting</th> </tr> </thead> <tbody> <tr> <td>S0</td> <td>-40...60</td> <td>-40...160</td> <td></td> </tr> <tr> <td>S1</td> <td>0...50</td> <td>40...140</td> <td></td> </tr> <tr> <td>S2</td> <td>-15...35</td> <td>0...100</td> <td></td> </tr> <tr> <td>S3</td> <td>-20...80</td> <td>0...200</td> <td>✓</td> </tr> </tbody> </table> | Setting | range [°C] | range [°F] | Factory setting | S0 | -40...60 | -40...160 | | S1 | 0...50 | 40...140 | | S2 | -15...35 | 0...100 | | S3 | -20...80 | 0...200 | ✓ |
| | Setting | range [°C] | range [°F] | Factory setting | | | | | | | | | | | | | | | | | | |
| | S0 | -40...60 | -40...160 | | | | | | | | | | | | | | | | | | | |
| | S1 | 0...50 | 40...140 | | | | | | | | | | | | | | | | | | | |
| | S2 | -15...35 | 0...100 | | | | | | | | | | | | | | | | | | | |
| | S3 | -20...80 | 0...200 | ✓ | | | | | | | | | | | | | | | | | | |
| | Measuring range absolute humidity | adjustable at the transducer: 0...50 g/m ³ (default setting) 0...80 g/m ³ | | | | | | | | | | | | | | | | | | | | |
| | Measuring range enthalpy | 0...85 kJ/kg | | | | | | | | | | | | | | | | | | | | |
| | Measuring range dew point | adjustable at the transducer: 0...50°C (default setting) -20...80°C | | | | | | | | | | | | | | | | | | | | |
| | Accuracy humidity | ±2% between 10...90% r.H. @ 21°C | | | | | | | | | | | | | | | | | | | | |
| | Accuracy temperature active | ±0.5°C @ 21°C [±0.9°F @ 70°F] | | | | | | | | | | | | | | | | | | | | |
| Time constant τ (63%) in air duct | R.H.: typical 10 s @ 3 m/s Temperature: typical 125 s @ 3 m/s | | | | | | | | | | | | | | | | | | | | | |
| Materials | Cable gland | PA6, black | | | | | | | | | | | | | | | | | | | | |
| | Housing | Cover: Lexan, orange Bottom: Lexan, orange Seal: 0467 NBR70, black UV resistant | | | | | | | | | | | | | | | | | | | | |
| Safety data | Ambient humidity | Max. 95% r.H., non-condensing | | | | | | | | | | | | | | | | | | | | |
| | Fluid humidity | Short-term condensation permitted | | | | | | | | | | | | | | | | | | | | |
| | Ambient temperature | -35...50°C [-30...120°F] | | | | | | | | | | | | | | | | | | | | |
| | Fluid temperature | -40...80°C [-40...175°F] | | | | | | | | | | | | | | | | | | | | |
| | Operating condition air flow | max. 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 | | | | | | | | | | | | | | | | | | | | |
| | Degree of protection NEMA/UL | NEMA 4X | | | | | | | | | | | | | | | | | | | | |
| | 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 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 0.5...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 guaranteed 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.

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.

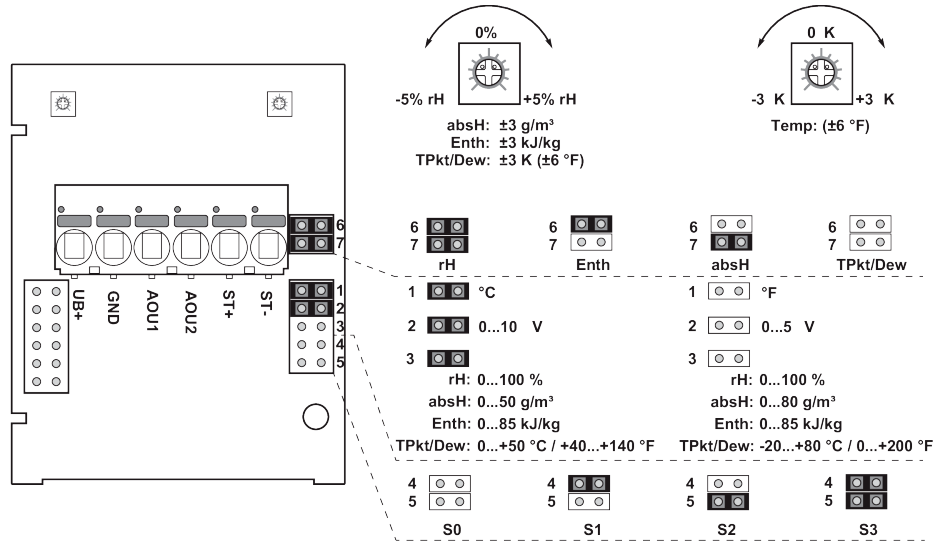
Scope of delivery

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

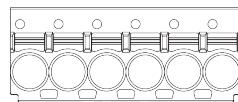
Accessories

| Optional accessories | Description | Type |
|----------------------|--|-------------|
| | Replacement filter, wire mesh, Stainless steel | A-22D-A06 |
| | Connection adapter, M20x1.5, for cable 1x6 mm, | A-22G-A01.1 |

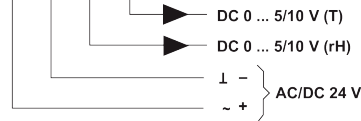
Wiring diagram



2 x 0...5/10 V



rH Relative humidity
 absH Absolute humidity
 Enth Enthalpy
 TPkt/Dew Dew point
 (Measurement value available on Output AOU1)

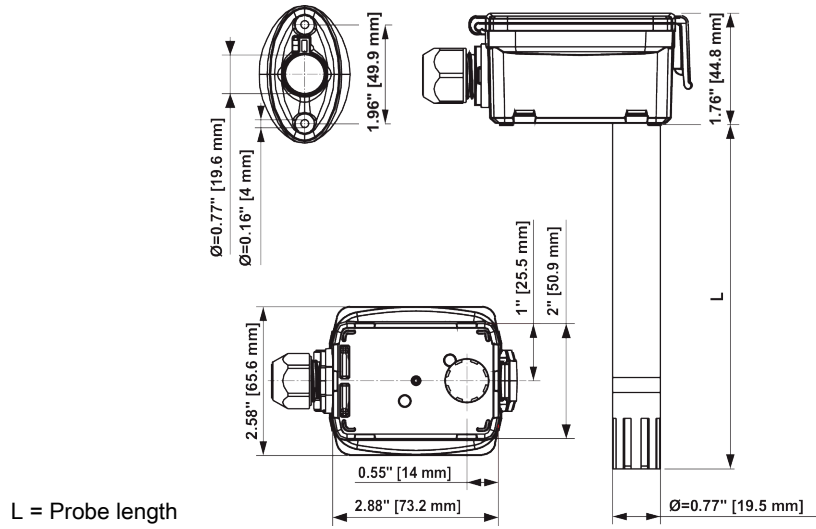


Connectors ST+ / ST- are only used for sensor types which additionally have a passive resistance sensor element for temperature measurement.

The adjustment of the measuring ranges is made by changing the bonding jumpers. The output value in the new measuring range is available after 2 seconds.

| Setting | range [°C] | range [°F] | Factory setting |
|---------|------------|------------|-----------------|
| S0 | -40...60 | -40...160 | |
| S1 | 0...50 | 40...140 | |
| S2 | -15...35 | 0...100 | |
| S3 | -20...80 | 0...200 | ✓ |

Dimensions



| Type | Probe length | Weight |
|-----------|--------------|---------|
| 22DTH-11M | 140 mm | 0.14 kg |
| 22DTH-11Q | 270 mm | 0.20 kg |