

Duct Sensor Humidity / Temperature

Active sensor (4...20 mA) 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 |
|-----------|-------------------------------|----------------------------------|
| 22DTH-53M | 4...20 mA | 4...20 mA |

Technical Data

| | | |
|------------------------|---------------------------|---|
| Electrical Data | Power supply DC | 15...24 V, $\pm 10\%$, 0.5 W |
| | Electrical connection | Removable spring loaded terminal block max. 2.5 mm ² |
| | Cable entry | Cable gland with strain relief $\varnothing 6...8$ mm (1/2" NPT conduit adapter included) |
| Functional Data | Sensor Technology | polymer capacitive sensor with stainless steel wire mesh |
| | Multirange | 4 measuring ranges selectable |
| | Output signal active note | current output: max. 500 Ω load |
| | Application | air |

| | | | | |
|-----------------------------|--|--|------------|----------------------------|
| Measuring Data | Measuring values | temperature relative humidity dew point enthalpy 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) | | |
| | | Setting | range [°C] | range [°F] Factory setting |
| | | S0 | -40...60°C | -40...160°F |
| | | S1 | 0...50°C | 40...140°F |
| | | S2 | -15...35°C | 0...100°F |
| | | S3 | -20...80°C | 0...200°F ✓ |
| | 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: 40...140°F [0...50°C] (default setting) 0...200°F [-20...80°C] | | | |
| Accuracy humidity | ±2% between 10...90% r.H. @ 70°F [21°C] | | | |
| Accuracy temperature active | ±0.9°F @ 77°F [±0.5°C @ 25°C] | | | |
| Materials | Cable gland | PA6, black | | |
| | Housing | cover: lexan, orange base: lexan, orange seal: 0467 NBR70, black UV resistant | | |
| Safety Data | Ambient humidity | max. 95% r.H., non-condensing | | |
| | Medium humidity | short-term condensation permitted | | |
| | Ambient temperature | -30...120°F [-35...50°C] | | |
| | Fluid temperature | -30...120°F [-35...50°C] | | |
| | Operating condition air flow | 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 | | |
| | 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 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.

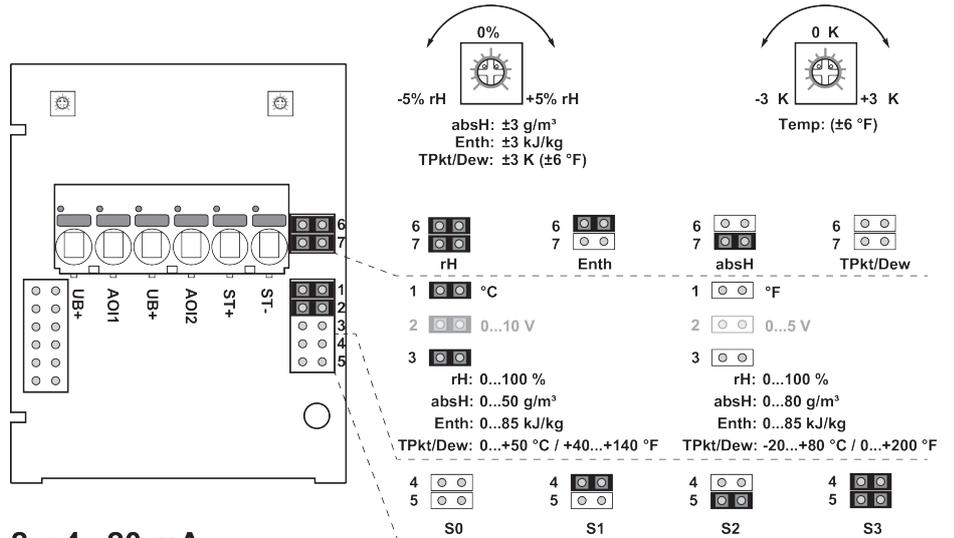
Scope of delivery

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

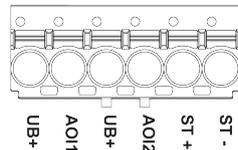
Accessories

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

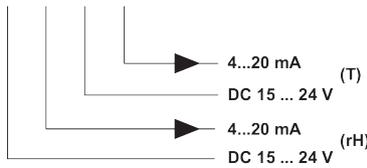
Wiring Diagram



2 x 4...20 mA



rH Relative humidity
 absH Absolute humidity
 Enth Enthalpy
 TPkt/Dew Dew point
 (Measurement value available on Output AOI1)



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

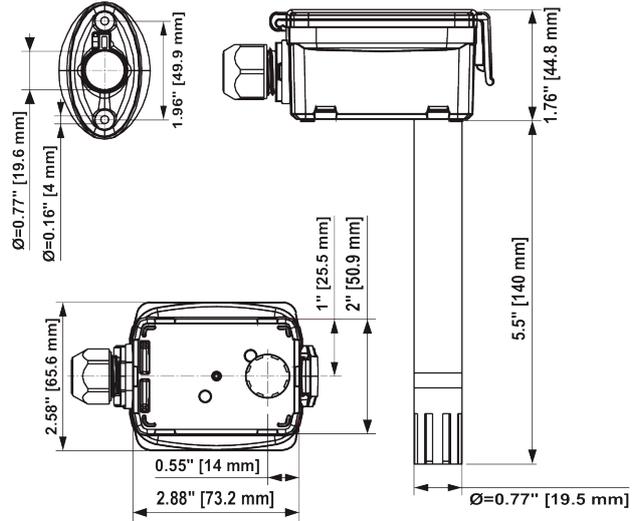
Correct temperature values are only available, when the humidity output AOI1 and both inputs UB + are connected.

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°C | -40...160°F | |
| S1 | 0...50°C | 40...140°F | |
| S2 | -15...35°C | 0...100°F | |
| S3 | -20...80°C | 0...200°F | ✓ |

Dimensions

Dimensions



| Type | Probe length | Weight |
|-----------|---------------|-------------------|
| 22DTH-53M | 5.5" [140 mm] | 0.31 lb [0.14 kg] |