Duct/Immersion sensor Temperature

Active sensor (0...10 V) for measuring temperature in duct applications. In combination with a stainless steel or brass thermowell which is also applicable for pipe applications. IP65 / NEMA 4X rated housing.

Picture may differ from product

5 YEAR WARRANTY

## Type Overview

| Type | Output signal active temperature | Probe length | Probe diameter | Accuracy temperature |
|---|---|---|---|---|
| **22DT-12H** | 0...5 V, 0...10 V | 50 mm | 6 mm | ±0.5°C @ 21°C [±0.9°F @ 70°F] @ measuring range setting S2 and S4 |
| **22DT-12L** | 0...5 V, 0...10 V | 100 mm | 6 mm | ±0.5°C @ 21°C [±0.9°F @ 70°F] @ measuring range setting S2 and S4 |
| **22DT-12N** | 0...5 V, 0...10 V | 150 mm | 6 mm | ±0.5°C @ 21°C [±0.9°F @ 70°F] @ measuring range setting S2 and S4 |
| **22DT-12P** | 0...5 V, 0...10 V | 200 mm | 6 mm | ±0.5°C @ 21°C [±0.9°F @ 70°F] @ measuring range setting S2 and S4 |
| **22DT-12R** | 0...5 V, 0...10 V | 300 mm | 6 mm | ±0.5°C @ 21°C [±0.9°F @ 70°F] @ measuring range setting S2 and S4 |
| **22DT-12T** | 0...5 V, 0...10 V | 450 mm | 6 mm | ±0.5°C @ 21°C [±0.9°F @ 70°F] @ measuring range setting S2 and S4 |

## 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 | Pluggable spring loaded terminal block max. 2.5 $mm^2$ |
| | Cable entry | Cable gland with strain relief ø6...8 mm |
| **Functional data** | Medium | Air<br>Water |
| | Multirange | 8 measuring ranges selectable |
| | Voltage output | 1 x 0...5 V, 0...10 V, min. resistance 5 kΩ |
| | Analogue output | Output 0...5/10 V with Jumper adjustable |
| **Measuring data** | Measured values | Temperature |
| **Specification temperature active** | Sensing element technology | Based on Pt1000 class AA |

## Technical data

**Specification temperature active**

| | |
|---|---|
| Measuring range temperature settings | Active sensor: range selectable<br>Attention: The maximum measuring range listed does not indicate the allowable fluid temperature for the sensor. Refer to safety data for the maximum fluid temperature limits. |

| Setting | Range [°C] | Range [°F] | Factory setting |
|---|---|---|---|
| S0 | -50...50 | -30...130 | |
| S1 | -10...120 | 0...250 | |
| S2 | 0...50 | 40...140 | |
| S3 | 0...250 | 30...480 | |
| S4 | -15...35 | 0...100 | |
| S5 | 0...100 | 40...240 | |
| S6 | -20...80 | 40...90 | |
| S7 | 0...160 | 0...150 | ✓ |

| | |
|---|---|
| Long term stability | ±0.04°C p.a. @ 21°C [±0.07°F p.a. @ 70°F] |
| Time constant τ (63%) in water pipe | Typical 7 s with thermowell brass<br>Typical 9 s with thermowell stainless steel |
| Time constant τ (63%) in the air duct | Typical 46 s @ 3 m/s<br>Typical 210 s @ 0 m/s |

**Safety data**

| | |
|---|---|
| Protection class IEC/EN | III, Protective Extra-Low Voltage (PELV) |
| Power source UL | Class 2 Supply |
| Degree of protection IEC/EN | IP65 |
| Degree of protection NEMA/UL | NEMA 4X |
| Housing | 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, CAN/CSA E60730-1/-2-9 |
| Type of action | Type 1 |
| Rated impulse voltage supply | 0.8 kV |
| Pollution degree | 3 |
| Ambient humidity | Max. 95% RH, non-condensing |
| Ambient temperature | -35...50°C [-30...120°F] |
| Fluid temperature | -50...160°C [-60...320°F] |
| Housing surface temperature | Max. 70°C [160°F] |

**Materials**

| | |
|---|---|
| Housing | Cover: PC, orange<br>Bottom: PC, orange<br>Seal: NBR70, black<br>UV resistant |
| Cable gland | PA6, black |
| Probe material | V4A (1.4404) |

## 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 with 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**

When using lengthy connection wires (depending on the cross section used) the measuring result might be falsified due to a voltage drop at the common GND-wire (caused by the voltage current and the line resistance). In this case, 2 GND-wires must be wired to the sensor - one for supply voltage and one for the measuring current.

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.

**Remark: Occurring draft leads to a better carrying-off of dissipative power at the sensor. Thus temporally limited fluctuations might occur upon temperature measurement.**

**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, 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

## Parts included

| Description | Type |
|---|---|
| Mounting clip, with screws and adhesive foil | A-22D-A11 |

## Accessories

**Optional accessories**

| Description | Type |
|---|---|
| Mounting plate S housing | A-22D-A09 |
| Connection adapter flex conduit, M20x1.5, for cable gland 1x 6 mm, Multipack 10 pcs. | A-22G-A01.1 |

**Optional accessories air**

| Description | Type |
|---|---|
| Mounting flange for sensor probe 6 mm, up to max. 120°C [248°F], Plastic | A-22D-A03 |
| Mounting flange for sensor probe 6 mm, up to max. 120°C [248°F], Multipack 50 pcs., Plastic | A-22D-A03.1 |
| Mounting flange for sensor probe 6 mm, up to max. 260°C, Brass | A-22D-A05 |

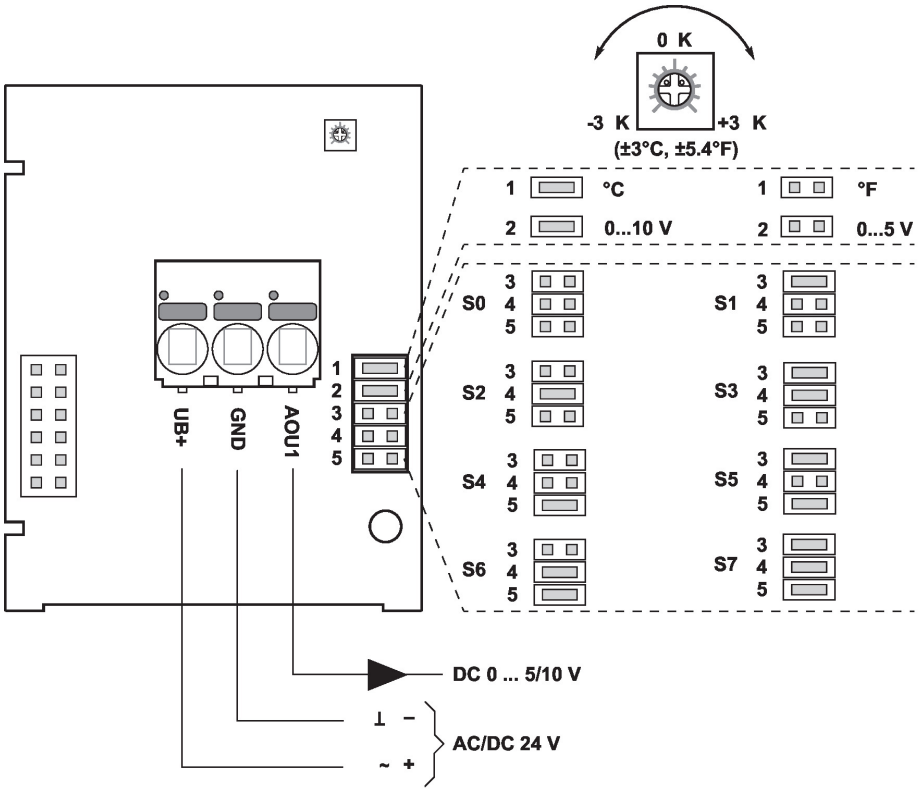
**Recommended accessories water**

| Description | Type |
|---|---|
| Thermowell Stainless steel, 50 mm, G 1/2", SW27 | A-22P-A06 |
| Thermowell Brass, 50 mm, R 1/2", SW22 | A-22P-A18 |
| Thermal contact fluid | A-22P-A44 |
| Compression fitting, Stainless steel, G 1/4" (external thread) for 6 mm, with cutting ring | A-22P-A45 |
| Thermowell Stainless steel, 100 mm, G 1/2", SW27 | A-22P-A08 |
| Thermowell Brass, 100 mm, R 1/2", SW22 | A-22P-A20 |
| Cold barrier, Plastic, L 50 mm, for thermowell A-22P-A.. | A-22P-A51 |
| Adapter for Siemens thermowell | A-22P-A53 |
| Thermowell Stainless steel, 150 mm, G 1/2", SW27 | A-22P-A10 |
| Thermowell Brass, 150 mm, R 1/2", SW22 | A-22P-A22 |

## Accessories

| Description | Type |
|---|---|
| Thermowell Stainless steel, 200 mm, G 1/2", SW27 | A-22P-A12 |
| Thermowell Brass, 200 mm, R 1/2", SW22 | A-22P-A24 |
| Thermowell Stainless steel, 300 mm, G 1/2", SW27 | A-22P-A14 |
| Thermowell Brass, 300 mm, R 1/2", SW22 | A-22P-A26 |
| Thermowell Stainless steel, 250 mm, G 1/2", SW27 | A-22P-A29 |
| Thermowell Brass, 250 mm, R 1/2", SW22 | A-22P-A30 |
| Thermowell Stainless steel, 450 mm, G 1/2", SW27 | A-22P-A16 |
| Thermowell Brass, 450 mm, R 1/2", SW22 | A-22P-A28 |

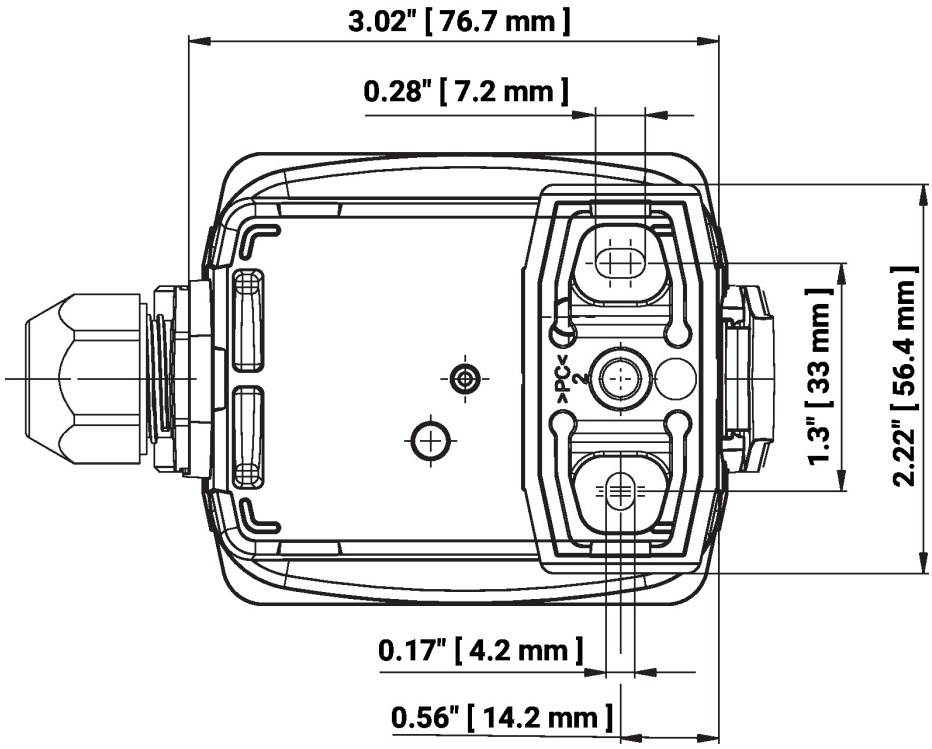
## Wiring diagram

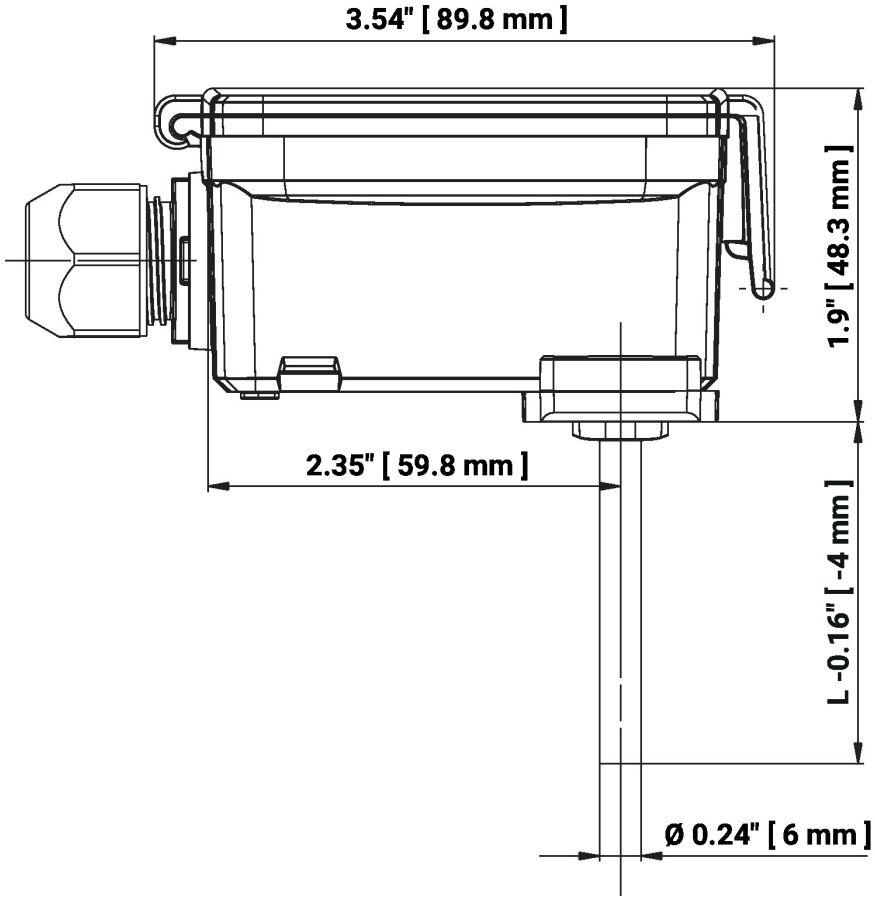



The following measuring ranges can be adjusted through the jumper settings:

| Setting | Range [°C] | Range [°F] | Factory setting |
|---|---|---|---|
| S0 | -50...50 | -30...130 | |
| S1 | -10...120 | 0...250 | |
| S2 | 0...50 | 40...140 | |
| S3 | 0...250 | 30...480 | |
| S4 | -15...35 | 0...100 | |
| S5 | 0...100 | 40...240 | |
| S6 | -20...80 | 40...90 | |
| S7 | 0...160 | 0...150 | ✓ |

## Dimensions




L = Probe length

| Type | Probe length | Weight |
|---|---|---|
| 22DT-12H | 50 mm | 0.12 kg |
| 22DT-12L | 100 mm | 0.13 kg |
| 22DT-12N | 150 mm | 0.13 kg |
| 22DT-12P | 200 mm | 0.14 kg |

## Dimensions

| Type | Probe length | Weight |
|---|---|---|
| 22DT-12R | 300 mm | 0.15 kg |
| 22DT-12T | 450 mm | 0.16 kg |

## Further documentation

- Installation instructions
- Sensor length calculator