

Duct Sensor Humidity / Temperature

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 passive temperature
22DTH-51MB	0...5 V, 0...10 V	Pt1000
22DTH-51ME	0...5 V, 0...10 V	Ni1000 (JCI)
22DTH-51ML	0...5 V, 0...10 V	NTC10k (10k2)
22DTH-51MM	0...5 V, 0...10 V	NTC10k Pre (10k3)
22DTH-51MQ	0...5 V, 0...10 V	NTC20k

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
	Cable entry	Cable gland with strain relief Ø6...8 mm (1/2" NPT conduit adapter included)
Functional data	Sensor Technology	Polymer capacitive sensor with stainless steel wire mesh filter
	Output signal passive temperature	Pt1000 Ni1000 (JCI) NTC10k (10k2) NTC10k Pre (10k3) NTC20k
	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	Passive sensor: -35...70°C [-30...160°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: 0...50°C (default setting) -20...80°C	
	Accuracy humidity	±2% between 10...90% r.H. @ 21°C	
	Accuracy temperature passive	Passive Sensors depending on used type Pt.. : Class B, ±0.3°C @ 0°C [±0.5°F @ 32°F] Ni.. : ±0.4°C @ 0°C [±0.7°F @ 32°F] NTC.. : ±0.2°C @ 25°C [±0.35°F @ 77°F]	
	Time constant τ (63%) in air duct	R.H.: typical 10 s @ 3 m/s Temperature: typical 136 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.

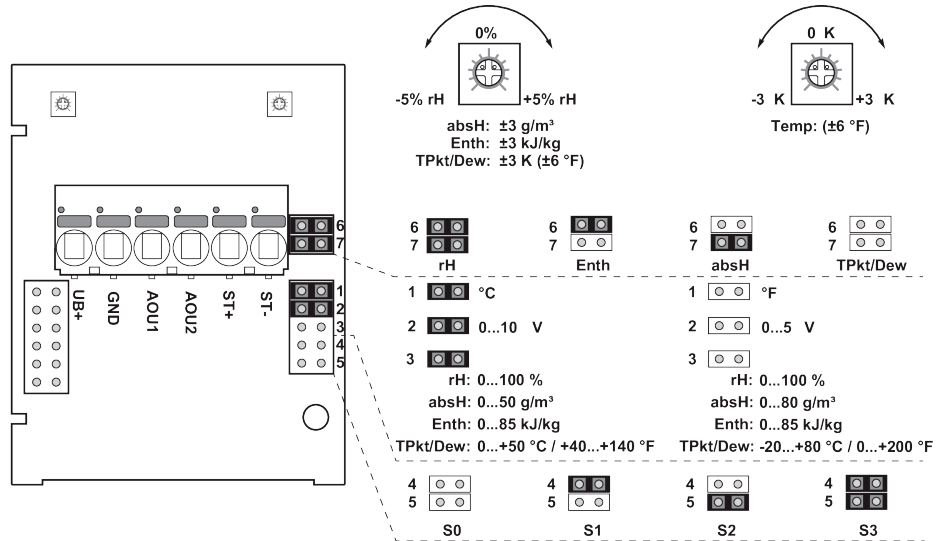
Scope of delivery

Scope of delivery	Description	Type
	Mounting flange for duct sensor 19.5 mm, up to max. 120°C [248°F], Plastic	A-22D-A34
	1/2" NPT conduit adapter	

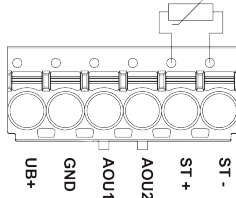
Accessories

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

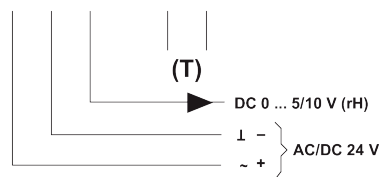
Wiring diagram



0...5/10 V + ST

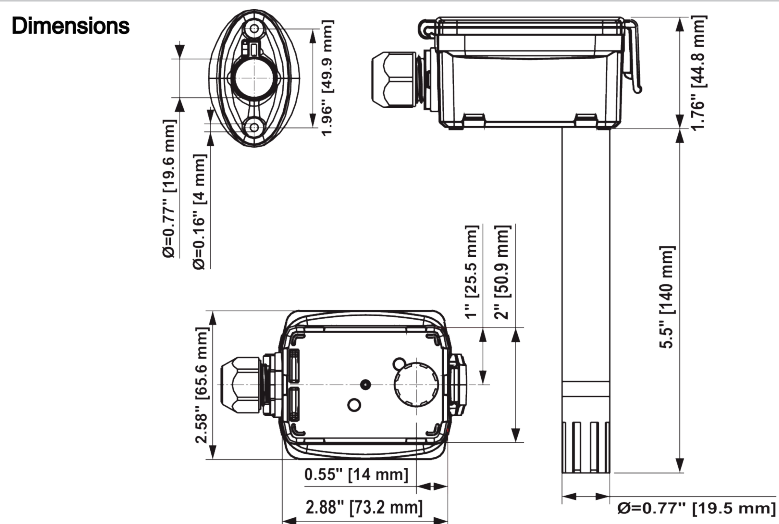


rH Relative humidity
absH Absolute humidity
Enth Enthalpy
TPkt/Dew Dew point
(Measurement value available on Output AOU1)



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.

Dimensions



Type	Probe length	Weight
22DTH-51MB	140 mm	0.14 kg
22DTH-51ME	140 mm	0.14 kg
22DTH-51ML	140 mm	0.14 kg
22DTH-51MM	140 mm	0.14 kg
22DTH-51MQ	140 mm	0.14 kg