

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
22DTH-51M	DC 0...5 V, DC 0...10 V	DC 0...5 V, DC 0...10 V

Technical Data

Electrical Data	Power supply DC	15...24 V, $\pm 10\%$, 0.4 W
	Power supply AC	24 V, , $\pm 10\%$, 0.8 VA
	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	output DC 0...5/10 V with jumper adjustable voltage output: min. 10 k 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 recalibration 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.

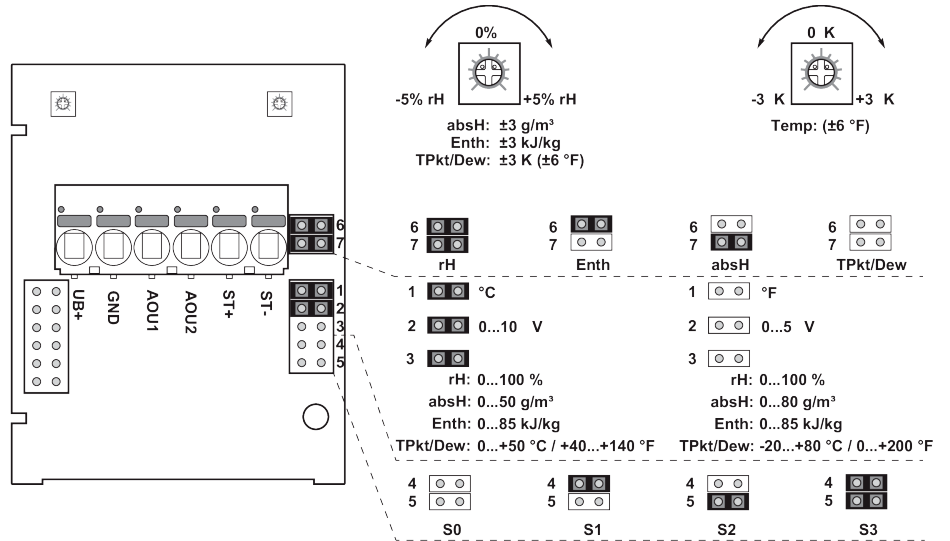
Scope of delivery

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

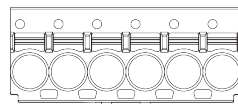
Accessories

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

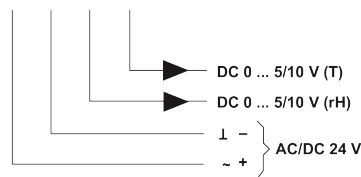
Wiring Diagram



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.

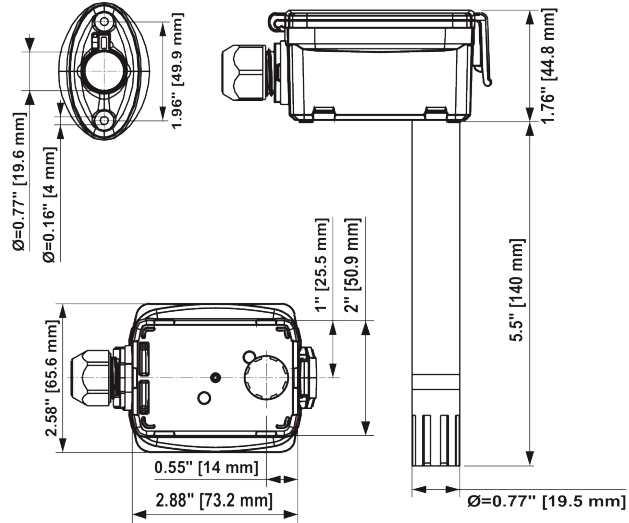
The adjustment of the measuring ranges is made by changing the bonding jumpers.

The output value in the new measuring range is available after 2 seconds.

Setting	range [°C]	range [°F]	Factory setting
S0	-40...60°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-51M	5.5'' [140 mm]	0.31 lb [0.14 kg]