BELIMO

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. With Modbus RTU communication and integrated 0...10V outputs. Nema 4X / IP65 rated enclosure.

Technical data sheet 22DTH-55M

5-year warranty

Type Overview

Type	Communication	Output signal active temperature	Output signal active humidity
22DTH-55M	Modbus RTU	0...5 V, 0...10 V	0...5 V, 0...10 V

Technical data

Electrical Data	Nominal voltage	AC/DC 24 V
	Nominal voltage range	AC 19...29 V / DC 15...35 V
	Power consumption AC	4.3 VA
	Power consumption DC	2.3 W
	Electrical connection	Pluggable spring loaded terminal block max. 2.5 mm²
	Cable entry	Cable gland with strain relief 2x ø6 mm (1/2" NPT conduit adapter included)
Data bus communication	Communication	Modbus RTU
	Number of nodes	Modbus see interface description
Functional Data	Sensor Technology	polymer capacitive sensor with stainless steel wire mesh
	Application	air
	Voltage output	2 x 0...5 V, 0...10 V, min. resistance 10 kΩ
	Output signal active note	output 0...5/10 V with jumper adjustable
Measuring Data	Measured values	relative humidity Absolute humidity Dew point Enthalpies Temperature
	Measuring range humidity	adjustable via Modbus Default setting: 0...100% RH
	Measuring range temperature	Adjustable via Modbus Default setting: -4...176°F [-20...80°C] Attention: max. measuring temperature is restricted by max. fluid temperature (see Safety data)
	Measuring range absolute humidity	adjustable via Modbus default setting: 0...80 g/m³
	Measuring range enthalpy	adjustable via Modbus default setting: 0...85 kJ/kg
	Measuring range dew point	adjustable via Modbus default setting: -5...175°F [-20...80°C]
	Accuracy humidity	±2% between 0...80% RH @ 77°F [25°C]
	Accuracy temperature active	±0.3°C @ 25°C [±0.54°F @ 77°F]

Measuring Data	Long-term stability	±0.3% RH p.a. @ 70°F [21°C] @ 50% RH ±0.09°F p.a. @ 70°F [±0.05°C p.a. @ 21°C]
	Time constant τ (63%) in air duct	Relative humidity: typical 10 s @ 3 m/s Temperature: typical 125 s @ 3 m/s
Materials	Cable gland	PA6, black
	Housing	Cover: PC, orange Bottom: PC, orange Seal: NBR70, black UV resistant UL94 5VA
Safety Data	Protection class IEC/EN	III, Safety Extra-Low Voltage (SELV)
	Power source UL	Class 2 Supply
	Degree of protection IEC/EN	IP65
	Degree of protection NEMA/UL	NEMA 4X
	Enclosure	UL Enclosure Type 4X
	EU Conformity	CE Marking
	Certification IEC/EN	IEC/EN 60730-1
	Quality Standard	ISO 9001
	UL 2043 Compliant	Suitable for use in air plenums per Section 300.22(C) of the NEC and Section 602 of the IMC
	Type of action	Type 1
	Rated impulse voltage supply	0.8 kV
	Installation method	Independently mounted control
	Pollution degree	3
	Ambient humidity	Max. 95% RH, non-condensing
	Ambient temperature	-35...50°C [-30...122°F]
	Fluid humidity	short-term condensation permitted
	Fluid temperature	-40...175°F [-40...80°C]
	Operating condition airflow	max. 40 ft/s [12 m/s]

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. Unauthorized 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 authorized 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, 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

Application notice for humidity sensors

Refrain from touching the sensitive humidity sensor element. Touching the sensitive surface will void warranty.

The sensor shows best performance when operated within recommended normal temperature range of 5...60°C and humidity range of 20...80% RH. Long-term exposure to conditions outside normal range, especially at high humidity, may temporarily offset the humidity signal (e.g. +3% RH after 60h kept at >80% RH). After returning into the normal temperature and humidity range, the sensor will slowly come back to calibration state by itself.

Parts included

Parts included

Description	Type
Mounting flange for duct sensor 19.5 mm, up to max. 120°C [248°F], Plastic	A-22D-A34
Cable Gland with strain relief ø6...8 mm 1/2" NPT conduit adapter	

Accessories

Optional accessories

Description	Type
Replacement filter sensor probe tip, wire mesh, Stainless steel	A-22D-A06
Mounting plate L housing	A-22D-A10

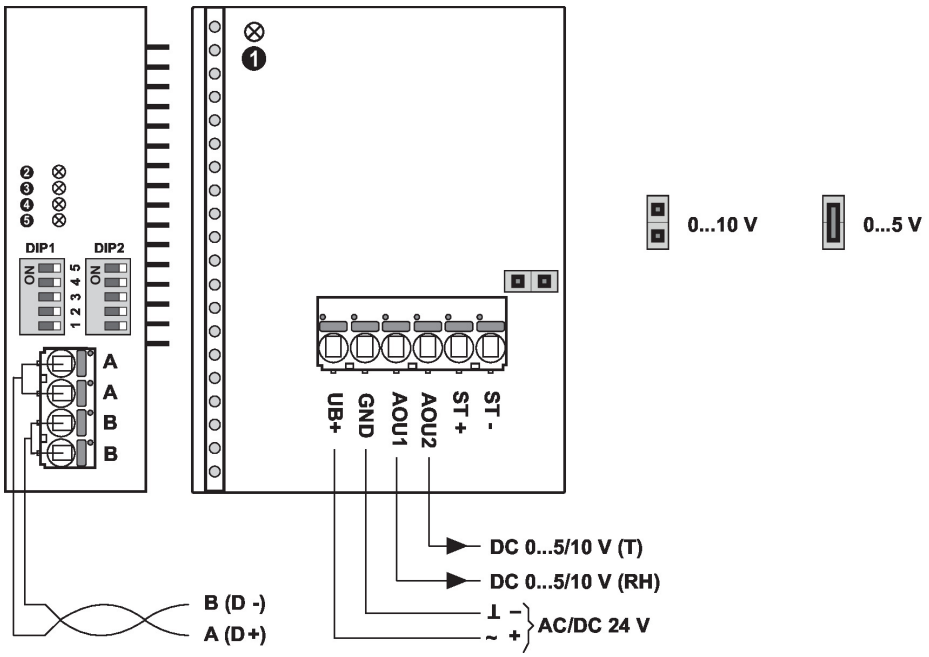
Wiring Diagram

Notes

Supply from isolating transformer.

The wiring of Modbus RTU (RS-485) is to be carried out in accordance with applicable regulations (www.modbus.org). The device has switchable resistors for bus termination.

Modbus-GND: Supply and communication are not galvanically isolated. Connect earth signal of the devices with one another.



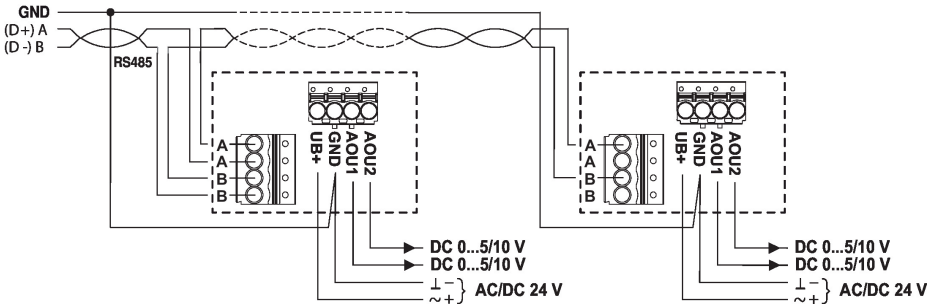
① and ⑤: Status LED
② red: Error
③ yellow: Tx
④ yellow: Rx

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.

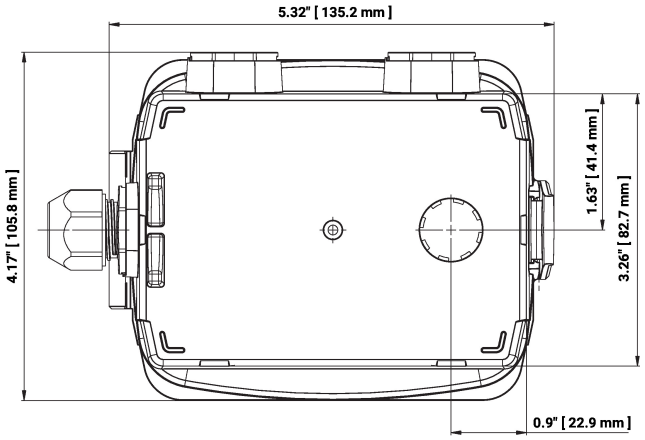
Detailed documentation

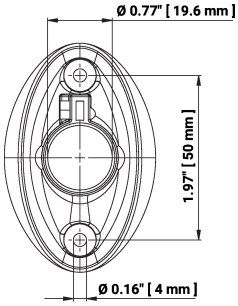
The separate document Sensor Modbus-Register informs about Modbus register, addressing, parity and bus termination (DIP1: address, DIP2: baud rate, parity, bus termination)

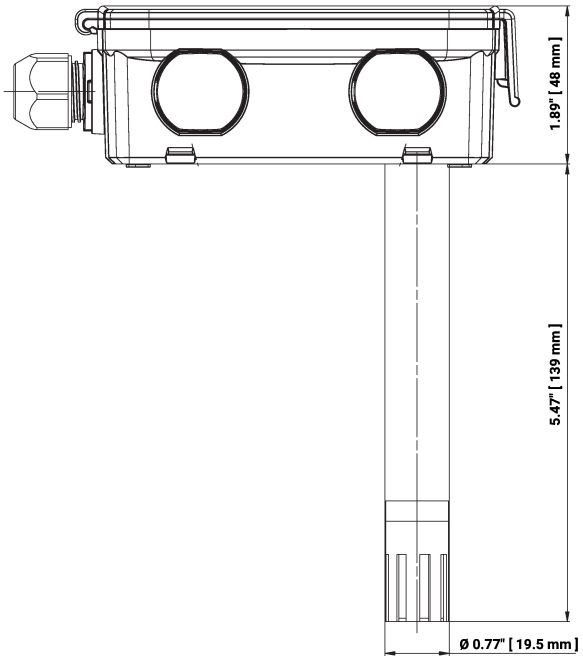
Wiring RS485 Modbus RTU



Dimensions







Type	Probe length	Weight
22DTH-55M	5.5" [140 mm]	0.57 lb [0.26 kg]

Further documentation

- Modbus Interface description
- Installation instructions