BELIMO

Duct/Immersion sensor Temperature

Active sensor (4...20 mA) for measuring temperature in duct applications. In combination with a stainless steel or brass thermowell can also be used for pipe applications. IP65 / NEMA 4X rated enclosure.

Technical data sheet 22DT-54..

5-year warranty

Type Overview

Type	Output signal active temperature	Probe length	Probe diameter
22DT-54H	4...20 mA	2" [50 mm]	0.24" [6 mm]
22DT-54L	4...20 mA	4" [100 mm]	0.24" [6 mm]
22DT-54N	4...20 mA	6" [150 mm]	0.24" [6 mm]
22DT-54P	4...20 mA	8" [200 mm]	0.24" [6 mm]
22DT-54R	4...20 mA	12" [300 mm]	0.24" [6 mm]
22DT-54T	4...20 mA	18" [450 mm]	0.24" [6 mm]

Technical data

Electrical Data	Nominal voltage	DC 24 V
	Nominal voltage range	DC 13.5...26.4 V
	Power consumption DC	0.5 W
	Electrical connection	Pluggable spring loaded terminal block max. 2.5 mm²
	Cable entry	Cable gland with strain relief ø6...8 mm (1/2" NPT conduit adapter included)
Functional Data	Sensor Technology	based on Pt1000 1/3 DIN
	Application	air water
	Multirange	8 measuring ranges selectable
	Current output	1x 4...20 mA, max. resistance 500 Ω
Measuring Data	Measured values	Temperature
	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	-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	✓

Accuracy temperature active	±0.5°C @ 21°C [±0.9°F @ 70°F] @ measuring range setting S2 and S4

Measuring Data	Long-term stability	±0.07°F p.a. @ 70°F [±0.04°C p.a. @ 21°C] [±39.2°F p.a. @ 69.8°F]
	Time constant τ (63%) in air duct	Typical 46 s @ 3 m/s Typical 210 s @ 0 m/s
	Time constant τ (63%) in water pipe	Typical 7 s with thermowell brass Typical 9 s with thermowell stainless steel
Materials	Cable gland	PA6, black
	Housing	Cover: PC, orange Bottom: PC, orange Seal: NBR70, black UV resistant UL94 5VA
	Probe material	AISI 316L
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
	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 temperature	-60...320°F [-50...160°C]
	Housing surface temperature	max. 160°F [70°C]

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

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.

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

Parts included

Description	Type
Mounting clip, with screws and adhesive foil	A-22D-A11
1/2" NPT conduit adapter	

Accessories

Optional accessories

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

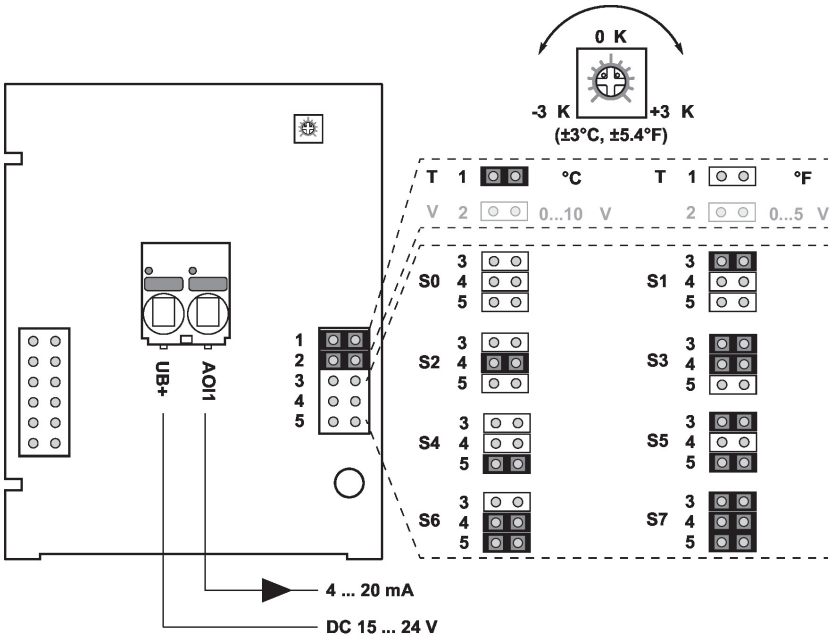
Optional accessories air

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. 260°C, Brass	A-22D-A05

Recommended accessories water

Description	Type
Thermowell (fabricated) Stainless steel, 2" [50 mm], 1/2" NPT, SW = 3/4"	A-22P-A05
Thermowell (fabricated) Brass, 2" [50 mm], 1/2" NPT, SW = 3/4"	A-22P-A17
Thermowell (machined) Stainless steel, 2" [50 mm], 1/2" NPT, SW = 3/4"	A-22P-A36
Syringe with thermal paste	A-22P-A44
Thermowell (fabricated) Stainless steel, 4" [100 mm], 1/2" NPT, SW = 3/4"	A-22P-A07
Thermowell (fabricated) Brass, 4" [100 mm], 1/2" NPT, SW = 3/4"	A-22P-A19
Thermowell (machined) Stainless steel, 4" [100 mm], 1/2" NPT, SW = 3/4"	A-22P-A37
Cold barrier, Plastic, L 50 mm, for thermowell A-22P-A..	A-22P-A51
Thermowell (fabricated) Stainless steel, 6" [150 mm], 1/2" NPT, SW = 3/4"	A-22P-A09
Thermowell (fabricated) Brass, 6" [150 mm], 1/2" NPT, SW = 3/4"	A-22P-A21
Thermowell (machined) Stainless steel, 6" [150 mm], 1/2" NPT, SW = 3/4"	A-22P-A38
Thermowell (fabricated) Stainless steel, 8" [200 mm], 1/2" NPT, SW = 3/4"	A-22P-A11
Thermowell (fabricated) Brass, 8" [200 mm], 1/2" NPT, SW = 3/4"	A-22P-A23
Thermowell (machined) Stainless steel, 8" [200 mm], 1/2" NPT, SW = 3/4"	A-22P-A39
Thermowell (fabricated) Stainless steel, 12" [300 mm], 1/2" NPT, SW = 3/4"	A-22P-A13
Thermowell (fabricated) Brass, 12" [300 mm], 1/2" NPT, SW = 3/4"	A-22P-A25
Thermowell (fabricated) Stainless steel, 18" [450 mm], 1/2" NPT, SW = 3/4"	A-22P-A15
Thermowell (fabricated) Brass, 18" [450 mm], 1/2" NPT, SW = 3/4"	A-22P-A27

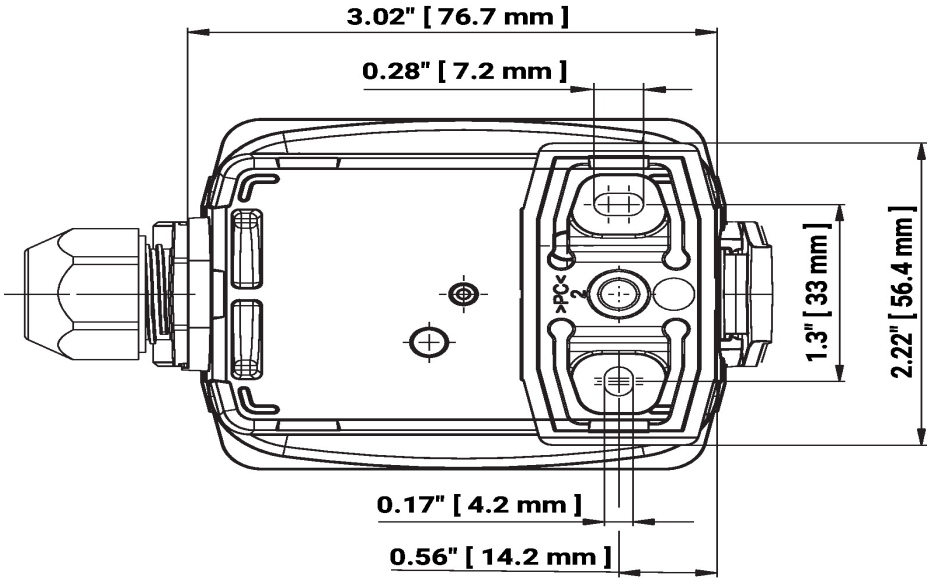
Wiring Diagram

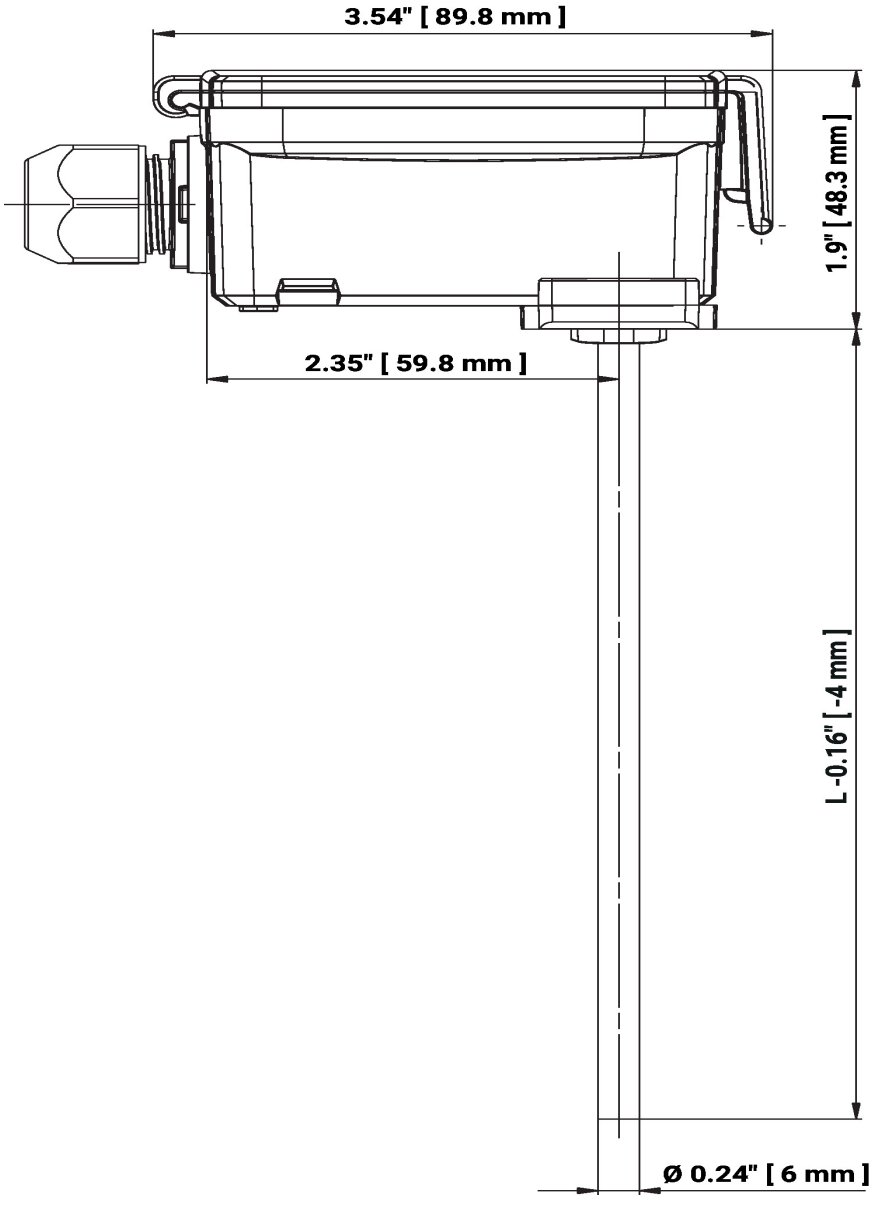


The adjustment of the measuring ranges is made by changing the bonding jumpers.
The output value in the new measuring range is available after 2 seconds.

Setting	Range [°C]	Range [°F]	Factory setting
S0	-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-54H	2" [50 mm]	0.26 lb [0.12 kg]
22DT-54L	4" [100 mm]	0.29 lb [0.13 kg]
22DT-54N	6" [150 mm]	0.29 lb [0.13 kg]
22DT-54P	8" [200 mm]	0.31 lb [0.14 kg]
22DT-54R	12" [300 mm]	0.33 lb [0.15 kg]
22DT-54T	18" [450 mm]	0.35 lb [0.16 kg]

Further documentation

- Installation instructions
- Sensor length calculator