



The foundation
of comfort.

Belimo sensors

BELIMO[®]

Sensors by Belimo. The perfect complement to actuators and valves.



The sensors from Belimo meet the highest quality and reliability requirements. Using innovative technology ensures easy installation and seamless compatibility with all essential building automation systems.

Belimo offers a full product range of sensors for measuring temperature, humidity, pressure, CO₂, volatile organic compounds (VOC) and flow in pipe, duct and outdoor applications. The new room sensors and room operating units are the perfect addition to Belimo's existing sensor range. All products are backed by world-class service and support.



Seamlessly integrated, reliable and intuitive.

Belimo sensors are the result of years of experience and HVAC expertise and our continuous focus on providing added value to our customers. The innovative design offers easy installation and seamless integration to ensure optimal system performance.



Seamless

The sensors have been designed to work with all major building automation systems ensuring optimised solutions in terms of performance and energy efficiency.



Reliable

The well-known high quality of Belimo guarantees reliable and accurate measuring values over the entire building life cycle. The extremely robust sensors come with a 5-year guarantee and meet NEMA 4X/IP65 requirements.



Intuitive

Installation and commissioning only take a few steps thanks to the well thought out design. The removable mounting plate also serves as a drilling template. Thanks to the specially designed snap-on cover and the removable spring loaded terminal blocks, mounting takes place with hardly any tools.

"I have been working with Belimo for over 17 years. The company has always exceeded my expectations regarding quality, customer service and reliability. The new sensors that can be integrated via BACnet and Modbus are a very exciting addition to the Belimo product range.

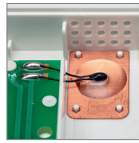
As the very positive experiences with the innovative Energy Valve show, these products offer excellent added value in building automation."

**Andreas Wechner, Project Manager,
Trane (Switzerland) GmbH**

Ease of installation combined with an innovative design.

Short reaction time

Thanks to sophisticated technology, the sensor reacts extremely quickly to changes in temperature.



Aesthetic, timeless design

Extremely thin shape and simple design suitable for every environment.



Tool-free mounting

Thanks to the snap-on cover and spring loaded terminal blocks, the room units can be installed with hardly any tools.



**Digital input**

Enables the connection of an external device (occupancy switch, door contact, etc.) and supplies it with the operating voltage.

**Reverse polarity protection**

Ensures full protection of the electronics in case of incorrect wiring.

**High accuracy**

Precise measuring method and low wall coupling factor reliably ensure a comfortable room climate.

Near Field Communication (NFC)

The Belimo Assistant App enables simple commissioning of the active room sensors and their diagnosis with a smartphone via NFC. The sensors can be parameterised in power-off state.



Room units

The Belimo room units impress with their aesthetic, timeless design with shallow depth between 13 and 22 mm. The room units can be seamlessly integrated into existing controllers. The room units feature quick, tool-free mounting, as well as high long-term stability and short reaction times. The Belimo Assistant App also guarantees simple commissioning of the active room sensors and diagnostics via smartphone. Thanks to NFC, parametrisation is possible even when the room sensor is not connected to the power supply.



FEATURES





- Aesthetic, timeless design
- Fast installation without tools thanks to spring loaded terminal blocks
- Power-off parametrisation via NFC*
- Simple diagnostics function via NFC*
- Short response time
- 0...5 V, 0...10 V, 2...10 V or MP-Bus as output signal in one device*
- Digital input with additional power supply from an external device (e.g. occupancy switch)*
- Reverse polarity protection*

PRODUCT SERIES

- Passive room sensors
- Passive room operating units
- Active room sensors

* For active devices.

Room units at a glance.

| Application | Type code | Measured values | | | | | Measuring ranges | | | Application/comment |
|---|-----------|-----------------|-------------------|-------------------|--------------------|---------------------|------------------|-----------|---|---------------------|
| | | CO ₂ | Relative humidity | Absolute humidity | Temperature active | Temperature passive | CO ₂ | Humidity | Temperature | |
|  | 01RT | | | | ■ | – | – | 0...50 °C | Room sensor | |
|  | P-01RT | | | | ■ | – | – | 0...50 °C | Room control unit | |
|  | 22RT | | | | ■ | – | – | 0...50 °C | Room sensor temperature | |
| | 22RTH | | ■ | ■ | ■ | – | 0...100% | 0...50 °C | Room sensor humidity/temperature | |
|  | 22RTM | ■ | ■ | ■ | ■ | 0...2000 ppm | 0...100% | 0...50 °C | Room sensor CO ₂ /humidity/temperature | |

Innovation for your peace of mind.

Snap-on cover

The first sensor housing on the market that offers protection according to NEMA 4X/IP65 and can be opened and closed without any tools. This makes the installation not only faster but also more reliable.



BACnet and Modbus communication protocols

Provide direct access to the application data and allow for easy commissioning and parametrisation.



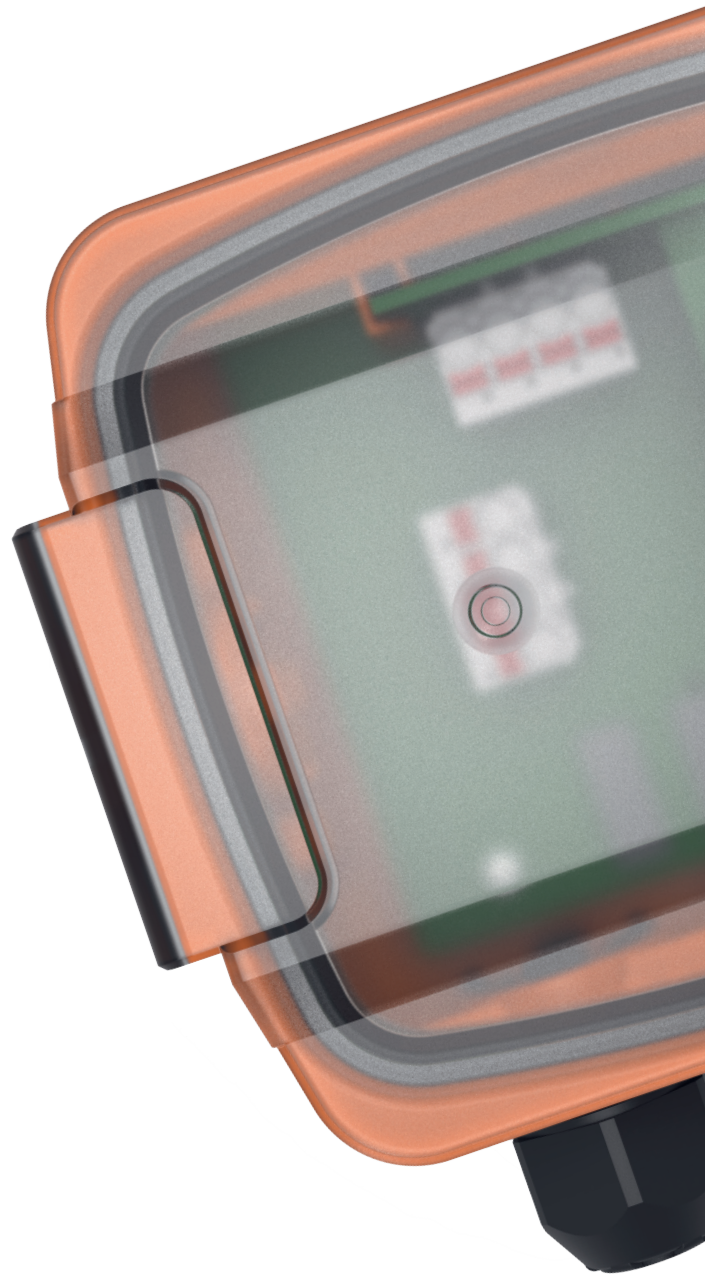
Detachable mounting plate

Serves as a drill template for easy fastening and installation.



Conformity with NEMA 4X/IP65

Belimo sensors with a snap-on cover are suitable for demanding indoor and outdoor applications. They are resistant to UV radiation, dirt, dust, humidity, condensation, rain and snow.





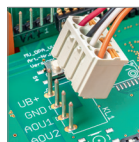
Housing in universal construction

Ensures a streamlined product range, which makes the product selection process and installation quick and easy. The uniform concept prevents errors during installation and reduces mounting time.



Modular cable glands

Enable various mounting and cable configurations to meet a variety of applications.



Removable, push-in spring loaded terminal blocks

Enable tool-free, time-saving wiring when plugged or unplugged and the highest conductor pull-out force for maximum reliability. Thanks to reverse polarity protection, the electronics are fully protected against incorrect wiring.

Belimo's sensors feature a unique and uniform housing and mounting concept, which allows for quick installation and makes them fully compatible with all major building automation systems. This design blends seamlessly into the Belimo product range (actuators, valves and sensors). The newly developed housing fully meets the requirements of NEMA 4X/IP65.

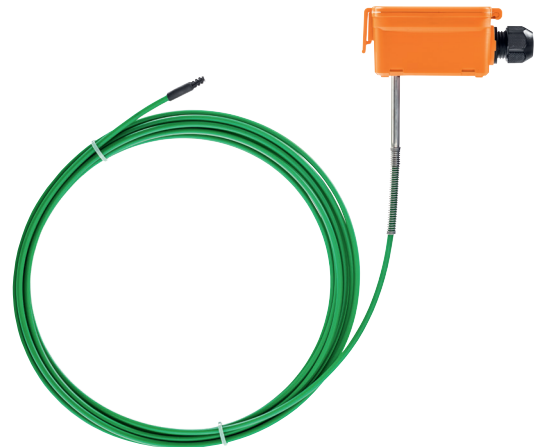
A comprehensive range of duct and pipe sensors.

With a complete product range of sensors, Belimo can offer all HVAC field devices from a single source. Actuators and valves are complemented by an extensive range of sensors for temperature, humidity, air quality and pressure.

Belimo offers standardised sensors, efficient ordering methods, on-time delivery, easy installation, various cable gland options and fast commissioning. The attractive, uniform design makes it easy to install the sensors and also ensures high reliability. In addition, thanks to the characteristic orange housing, the sensors can be immediately recognised as Belimo products, which is particularly useful during commissioning.

Temperature sensors

Accurate and reliable temperature readings are essential for optimal building comfort and energy efficiency. The outside air, duct and pipe temperature sensors are designed for precise and easy measurement and easy mounting.



FEATURES

- A variety of output signals, passive NTC and RTD, 0...5/10 V, 4...20 mA guarantees seamless connections to all major building automation systems.
- Up to eight field-selectable measuring ranges to simplify logistics, reduce inventory and ensure more flexibility.
- Additional sintered moisture protection coating on all duct, immersion and cable sensors protects against condensation, mechanical stress and vibrations.

PRODUCT SERIES

- Outdoor
- Duct mean value
- Duct/Immersion
- Pipe contact
- Cable
- Frost protection

Humidity sensors

Ideal air humidity conditions are essential to ensure optimal comfort in a building and are also important for the building infrastructure, production processes, stored goods or works of art. The product range of long-term stable humidity sensors for ducts, outdoor air and condensation enables energy-optimised operation and ensures compatibility with all major building automation systems. High-quality and reliable sensors guarantee the accuracy and reproducibility of the measured sensor values. Combined sensors for temperature and humidity provide a flexible and cost-saving solution.



FEATURES

- Polymer-capacitance sensor with an accuracy of $\pm 2\%$ relative humidity and long-term drift $< \pm 0.25\%$.
- Multi sensor with selectable output measurement values: relative humidity, absolute humidity, enthalpy and dew point.
- Up to four field-selectable temperature measuring ranges offer flexibility during commissioning, simplify logistics and reduce inventory.

PRODUCT SERIES

- Outdoor
- Duct
- Condensation

Air quality sensors

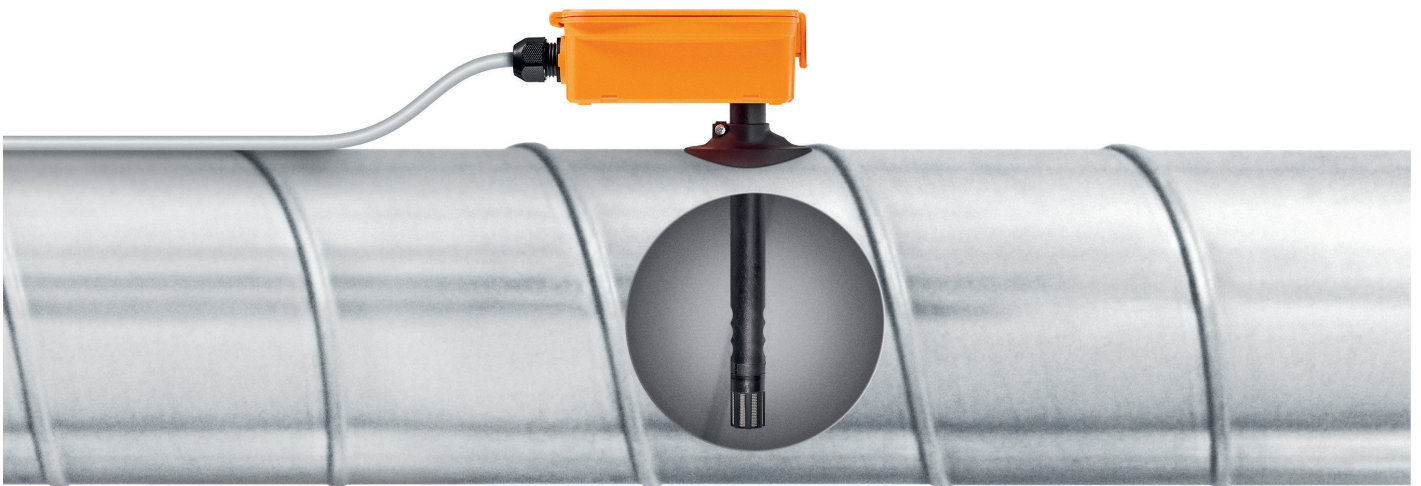
Air quality sensors from Belimo, such as CO₂ and VOC sensors, guarantee optimal indoor air quality with increased comfort and maximised energy savings in buildings. Combined temperature and humidity sensors are also available.

FEATURES

- Dual-channel CO₂ sensor based on NDIR technology. The additional reference channel enables reliable compensation of long-term and temperature drifts and ensures maximum accuracy and long-term stability.
- Wide range of combined multi sensors for CO₂, humidity, temperature and VOC offer reduced labour and material costs.
- Dual-channel self-calibration technology allows the use of CO₂ sensors from Belimo in all buildings and applications, including where the ABC method (Automatic Background Calibration) cannot be used.

PRODUCT SERIES

- CO₂
- CO₂ + Temperature
- CO₂ + Humidity + Temperature
- CO₂ + VOC
- CO₂ + VOC + Temperature
- CO₂ + VOC + Mix CO₂/VOC + Temperature



Pressure sensor range

Precise pressure measurements are important for optimal HVAC system performance. Pressure sensors from Belimo measure very low to high pressure in air, water and water/glycol mixtures. The sensors measure pressure and differential pressure and calculate the volumetric flow precisely for reliable control and monitoring. Selectable measuring ranges are available for application flexibility.



FEATURES DIFFERENTIAL PRESSURE SENSOR FOR AIR

- Eight field-selectable differential pressure measuring ranges.
- Optional volume flow output: calculation formulas of major ventilation manufacturers are stored in the sensor.
- Excellent zero point stability and high accuracy.
- Auto-zero or manual-calibration option.
- Optional LCD display.
- Also available with two independent measuring systems.

FEATURES DIFFERENTIAL PRESSURE SWITCH FOR AIR

- Durable pressure switch: over 10^6 switching cycles.
- Switch point adjustable on the sensor.

FEATURES DIFFERENTIAL PRESSURE SENSOR FOR WATER

- Highly stable resistance sensor element on ceramic substrate.
- Robust stainless-steel housing.

FEATURES PRESSURE SENSOR FOR WATER

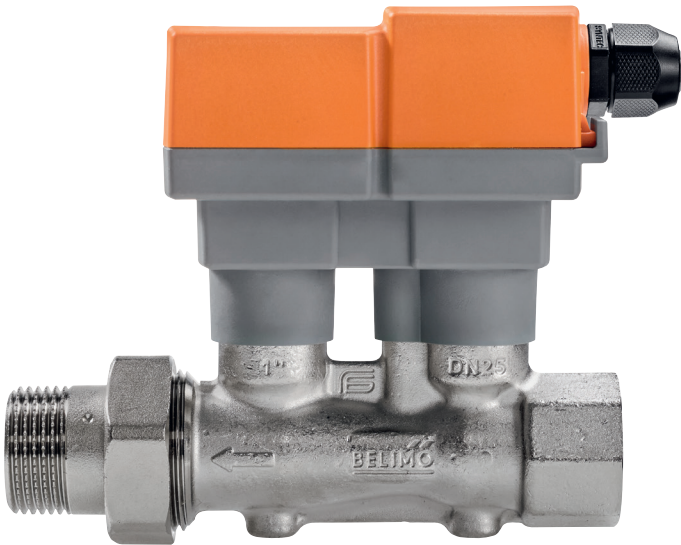
- Resistance sensor element on stainless steel membrane.
- All wetted material made of stainless-steel.

PRODUCT SERIES

- Differential pressure for air
- Differential pressure switch for air
- Differential pressure for water
- Absolute pressure for water

Flow sensors

Reliable flow measurement plays a crucial role in optimising the efficiency of HVAC systems. Sensors from Belimo utilise the ultrasonic transit time method to provide accurate flow measurements for water and water-glycol mixtures throughout the entire temperature range from -20 to 120 °C. The sensor is made of corrosion-resistant materials and is insensitive to dirt due to the ultrasound measuring principle. This ensures reliable operation and a long service life.



FEATURES

- Multipoint wet calibration ensures high accuracy and reproducibility over the entire measuring range.
- The patented logic for temperature and glycol compensation ensures accuracy over the entire temperature and concentration range.
- $\pm 2\%$ accuracy of reading and $\pm 0.5\%$ reproducibility ensure accurate and precise flow measurement.
- Ultra-compact size: with a short inlet length of $5 \times \text{DN}$ and no outlet-length requirements, the ultrasonic flow sensor from Belimo can also be installed in confined spaces.
- Low energy consumption of 0.5 W .

PRODUCT SERIES

Ultrasonic Flow (Volumetric Flow)

A seamless approach.

For over 40 years, Belimo has been constantly developing and expanding its range of new products and technologies to improve efficiency in buildings. The new sensor product range stems from pioneering developments from Belimo – for example the VAV controller, a combination of damper actuator and extremely stable differential pressure sensor or the Belimo Energy Valve™, an innovative solution that integrates sensors and a control valve.

The Belimo Energy Valve™ is a pressure-independent valve that measures and manages the heat exchanger energy by using an integrated ultrasonic flow meter, along with supply and return water temperature sensors. The Belimo Energy Valve™ has a patented power control and integrated Delta-T manager logic, which monitors energy in the heat exchanger and optimises the energy available there with regard to the differential temperature from the supply and return.

Since its introduction, the Belimo Energy Valve™ has won many major HVAC industry awards worldwide.

SelectPro

SelectPro is a simple tool for accurately sizing and selecting valves and actuators. By adding sensors, all field devices can now be selected with a single tool.



SelectPro can be downloaded here:
www.belimo.eu/selectpro

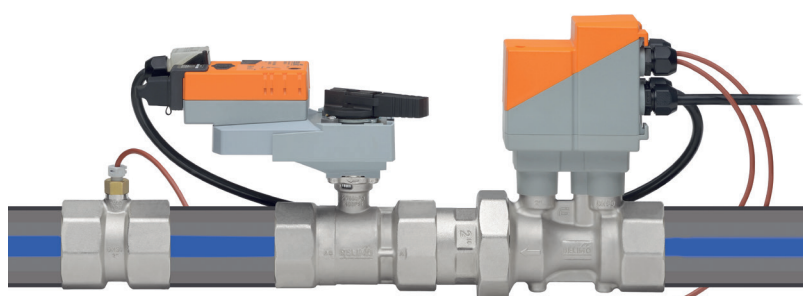
Retrofit App

The Belimo Retrofit App allows you to quickly and easily search for replacement solutions for valves, actuators and sensors. It can be downloaded for free from Google Play or the App Store.



The function of the Retrofit App is also available online at:
toolbox.belimo.xiag.ch/retrofit

Volumetric flow measurement **3**



1 Return temperature measurement








2 Supply temperature measurement

Duct and pipe sensors at a glance.

The following tables provide an overview of Belimo's wide range of sensors for each application and their technical specifications.

Temperature

| Application | Type code | Output signal | | | Measurement range ¹ Factory setting | Multirange (selectable) | Probe length [mm] | Application/comment |
|---|-----------|---------------|--------|--------|---|----------------------------|--------------------------------|---|
| | | Passive | Active | Switch | | | | |
|  Outdoor | 01UT | ■ | | | -35...50 °C | - | - | - Outdoor temperature sensor - Room temperature sensor with NEMA 4X/IP65 protection |
| | 22UT | | ■ | | -50...50 °C | 8 | - | |
|  Duct / Immersion | 01DT | ■ | | | Sensor- dependent | - | 50, 100, 150, 200, 300, 450 | - Duct temperature sensor - Immersion temperature sensor, compression fitting or thermowell required |
| | 22DT | | ■ | | 0...160 °C | 8 | 50, 100, 150, 200, 300, 450 | |
|  Duct averaging | 22MT | | ■ | | -20...80 °C | 8 | 6000 | Duct averaging temperature sensor for air-handling units or larger ducts with stratification |
|  Clamp-on | 01ST | ■ | | | -35...100 °C | - | - | Strap-on temperature sensors for heating systems and solar collectors, passive (ST, without housing) and passive or active (HT, with housing) |
| | 01HT | ■ | | | -35...90 °C | - | - | |
| | 22HT | | ■ | | 0...100 °C | 8 | - | |
|  Cable | 01CT | ■ | | | -35...100 °C | - | 2000 | Cable temperature sensor pas- sive (without housing) and active (with housing) |
| | 22CT | | ■ | | 0...160 °C | 8 | 2000 | |



Belimo sensors feature:

Active: 0...5/10 V, 4...20 mA





Passive: Pt100, Pt1000, Ni1000, NiTK5000, Ni891, NTC10K, NTC10K Precon, NTC20K

Communication: Modbus RTU, BACnet MS/TP

Supply voltage: DC 15...24 V, AC 24 V





Protection: NEMA 4X/IP65 (exceptions are 01APS and FM: IP54, MS: IP40)

Temperature


| Application | Type code | Output signals | | | | Measured range ¹ Factory Setting | Probe length [mm] | Application / comment |
|--|----------------|----------------|--------|--------|--|--|-------------------|--|
| | | Passive | Active | Switch | Modulating valve control DC 0...10 V | | | |
|  Frost monitor | 01ATS | ■ | ■ | | | -10...15 °C | 3000, 6000 | Frost detection for air handling units according to the hot water register |
|  Frost monitor | 20DTS | | ■ | ■ | ■ | 1...10 °C | 2000, 6000 | Protection against frost damage on air conditioning systems, heat exchangers, heating coils, etc. |
|  Temperature monitor TW | 01HT-1...A | | | ■ | | 30...90 °C | 1000 | Monitoring of heat generation systems, underfloor heating or other applications of HVAC technology |
|  Safety temperature limiter STB | EXT-J-0073464. | | | ■ | | 50...130 °C | 1000 | |

1) The factory setting is specified for active sensors with several selectable temperature measuring ranges (multirange). For the other areas as well as the approved ambient and media temperature ranges see data sheet.

Humidity





| Application | Type code | Measured values | | | | | | Output signals | | | | Measuring ranges | | | Application / comment |
|---|-----------|-----------------|-------------|----------|-----------|---------------|--------------|----------------|------------|--------------|---------------|------------------|--|--|-----------------------|
| | | Rel. humidity | Temperature | Enthalpy | Dew point | Abs. humidity | Condensation | Active | Modbus RTU | BACnet MS/TP | Switch | Humidity | Temperature ¹ Factory setting | Multirange (selectable) | |
|  Outdoor | 22UTH | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 0...100% r.H. | -20...80 °C | 4 | <ul style="list-style-type: none"> – Outdoor sensor humidity/temperature – Room sensor humidity/temperature with NEMA 4X/IP65 protection – Option: weather protection | |
|  Duct | 01DH | ■ | | | | | | | | ■ | 15...95% r.H. | – | – | Duct sensor humidity and humidity/temperature | |
|  Duct | 22DTH | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | 0...100% r.H. | -20...80 °C | 4 | | |
|  Condensation | 22HH | | | | | | ■ | | | ■ | – | – | – | Condensation sensor Option: external sensor | |

Air quality



| Application | Type code | Measured values | | | | | Output signals | | | Measuring ranges | | | Application / comment |
|---|-----------|-----------------|-------------|----------|-----|--------------------------|----------------|------------|--------------|------------------|-------------|---------------|--|
| | | CO ₂ | Temperature | Humidity | VOC | Mix CO ₂ /VOC | Active | Modbus RTU | BACnet MS/TP | CO ₂ | Temperature | Humidity | |
|  Duct | 22DC | ■ | | | | | ■ | | | 0...2000 ppm | – | – | Duct sensor CO ₂ |
| | 22DTC | ■ | ■ | | | | ■ | | | 0...2000 ppm | – | – | Duct sensor CO ₂ , T |
| | 22DTM | ■ | ■ | ■ | | | | ■ | ■ | 0...2000 ppm | 0...50 °C | 0...100% r.H. | Duct sensor CO ₂ , H, T |
| | 22DCV | ■ | | | ■ | | ■ | | | 0...2000 ppm | – | – | Duct sensor CO ₂ , VOC, CO ₂ /VOC, T |
| | 22DCM | ■ | ■ | | ■ | | ■ | | | 0...2000 ppm | 0...50 °C | – | Duct sensor CO ₂ , VOC, T |
| | 22DCK | ■ | ■ | | ■ | ■ | ■ | | | 0...2000 ppm | 0...50 °C | – | Duct sensor CO ₂ , VOC, CO ₂ /VOC, T |

1) The factory setting is specified for active sensors with several selectable temperature measuring ranges (multirange). For the other areas as well as the approved ambient and media temperature ranges see data sheet.

Pressure

| Application | Type code | Measured values | | | Output signals | | | Fluid | | | Measured range ¹ | Options | | | Application/comment | |
|--|-----------|-----------------------|-------------------|--|----------------|------------|--------|--------|-----|-------|---|------------------|----------|--|---------------------|---|
| | | Differential pressure | Relative pressure | Flow rate ² (Volumetric flow) | Active | Modbus RTU | MP-Bus | Switch | Air | Water | | Water/glycol mix | Pressure | 2 Meas. systems 4 Analogue outputs 4 Air connections | | Multirange (selectable) |
|  Duct | 22ADP | ■ | ■ | ■ | ■ | | | ■ | | | 250 Pa, 2500 Pa, 7000 Pa | ■ | ■ | ■ | ■ | Differential pressure sensor air |
|  Duct | 01APS | ■ | | | | | | ■ | ■ | | 20...300 Pa, 50...500 Pa, 200...1000 Pa, 500...2500 Pa | | | | | Duct differential pressure switch air |
|  Pipe | 22WP | | ■ | ■ | | | | ■ | ■ | ■ | 4, 6, 10, 16 bar | | | | | Pressure sensor water and water/glycol mixtures |
|  Pipe | 22WDP | ■ | | ■ | | | | | ■ | | 1, 2.5, 4, 6 bar | | | | | Differential pressure sensor water |

Flow

| Application | Type code | DN [mm] | FS [l/s] | Δp [kPa] | Output signals | Fluid | | Application/comment |
|--|------------|---------|----------|------------------|----------------|-------|------------------------------|---|
| | | | | | | Water | Water/glycol mixtures (<60%) | |
|  Pipe | FM015R-SZ | 15 | 0.42 | 13 | 0...10 V | ■ | ■ | Flow measurement with glycol compensation |
| | FM020R-SZ | 20 | 0.78 | 13 | | | | |
| | FM025R-SZ | 25 | 1.38 | 9 | | | | |
| | FM032R-SZ | 32 | 2.16 | 7 | | | | |
| | FM040R-SZ | 40 | 3.00 | 7 | | | | |
| | FM050R-SZ | 50 | 5.76 | 16 | | | | |
|  Pipe | FM065F-SZ | 65 | 9.60 | 12 | 0...10 V | ■ | ■ | Flow measurement with glycol compensation |
| | FM080F-SZ | 80 | 13.60 | 13 | | | | |
| | FM0100F-SZ | 100 | 24.00 | 12 | | | | |
| | FM0125F-SZ | 125 | 37.50 | 13 | | | | |
| | FM0150F-SZ | 150 | 54.00 | 15 | | | | |

1) For pressure sensors with several measurement ranges (multirange), the maximal range is noted. For the other ranges see data sheet.

2) For sensors with Modbus RTU only.

All inclusive.

Belimo as a global market leader develops innovative solutions for the controlling of heating, ventilation and air-conditioning systems. Actuators, valves and sensors represent our core business.

Always focusing on customer added value, we deliver more than only products. We offer you the complete product range for the regulation and control of HVAC systems from a single source. At the same time, we rely on tested Swiss quality with a five-year warranty. Our worldwide representatives in over 80 countries guarantee short delivery times and comprehensive support through the entire product life. Belimo does indeed include everything.

The "small" Belimo devices have a big impact on comfort, energy efficiency, safety, installation and maintenance. In short: Small devices, big impact.



5-year warranty



On site around the globe



Complete product range



Tested quality



Short delivery times



Comprehensive support



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BELIMO[®]