The Foundation of Comfort

Belimo Sensors

Discover the advantages
www.belimo.us
Belimo, the global leader in the development, production, and marketing of actuators and control valves for heating, ventilation, and air-conditioning (HVAC) systems also provides an innovative line of sensors. Sensors from Belimo offer superior reliability, easy installation, and seamless integration with major Building Automation Systems (BAS). We offer a complete range of sensors for measuring temperature, humidity, pressure, CO₂, volatile organic compounds (VOCs), and flow in pipe, duct, and outdoor applications. All products are backed by world class service and support.
The Belimo sensor range is a result of over four decades of experience, research, and focus on providing value-adding technologies to customers throughout the HVAC industry. The sensors’ unique design offers easy installation and seamless integration, resulting in reduced costs and optimal system performance.

Seamless
Belimo sensors are compatible with major building automation systems, making them suitable for use in any HVAC application.

Reliable
Built from the highest quality materials, Belimo sensors deliver accurate and dependable readings over the entire life cycle of the building. Sensors are backed with a 5-year warranty and conform to NEMA 4X / IP65 requirements.

Intuitive
The sensors compact modular design features a detachable mounting plate and snap-on cover that can be opened and closed without tools, allowing installation and commissioning to be completed in just a few simple steps.

“Our installers like the innovative design of Belimo’s sensor range and have told us that using them reduces their installation time compared to competitive products.”

Brian Dutt, President
Controls & Equipment, Moncton,
New Brunswick (Canada)
Innovation for peace of mind

Sensors from Belimo feature an innovative uniform enclosure, which allows for easy installation and reliability you can count on. The universal enclosure design streamlines the entire product range and complements our existing line of actuators and valves.

**Unique snap-on cover**
Screwless housing design allows for quick installation, easy commissioning, and provides NEMA 4X / IP65 protection.

**Detachable mounting plate**
Designed to be used as a drill template for easy installation.

**NEMA 4X / IP65 and UL compliance**
Enclosure tested to withstand harsh indoor and outdoor conditions, including exposure to dirt, dust, humidity, condensation, rain, and snow.
Universal design enclosure
Increases compatibility and simplifies the selection process.

Modular conduit fitting
Enables various mounting and cable configurations to meet a variety of applications.

Spring loaded removable terminal block
Creates a connection that offers resistance to vibration and maximum pull-out force, saving time during wiring and ensuring contact reliability.

Output protection
Provides reverse-polarity protection, which minimizes the risk of damage caused by incorrect wiring.

BACnet and Modbus communication protocols
Available on selected models.
A comprehensive range of HVAC sensors

A complete range of sensors for temperature, humidity, air quality, pressure, and flow, Belimo serves as your single-source provider of HVAC field-level devices for any building project.

The unique uniform design is easy to install and maintain. The orange characteristic enables the sensors to be quickly identified as Belimo products, which is useful in the commissioning phase. Belimo also provides a variety of mounting accessories that expedite device setup, saving time, money, and manpower.

Temperature sensors
Accurate and reliable temperature readings are essential for optimal building comfort and energy efficiency. Outdoor air, duct, and pipe temperature sensors are designed for easy installation and are compatible with all major BAS.

FEATURES
- Up to eight active measurement ranges simplifies field selection and reduces stock storage for maximum flexibility.
- Variety of output signals: passive NTC, RTD, 0-5/10 VDC, 4 to 20 mA.
- Sintered moisture protection coating on all duct, immersion, and cable sensors protects against condensation, mechanical stress, and vibrations.

PRODUCT SERIES
Outdoor, Duct Averaging, Duct/Immersion, Strap-on, Cable, Low Limit Temperature Detection
Humidity sensors
Controlling humidity in buildings is critical to occupant comfort and in protecting building infrastructure, production processes, stored goods, and museum artwork. Belimo’s range of durable duct, outdoor air, and condensation sensors are manufactured using the highest quality materials to ensure superior reliability, accuracy, and repeatability. Combined temperature and humidity sensors provide a flexible and cost-effective solution.

FEATURES
- Complementary Metal Oxide Semiconductor (CMOS) based polymer-capacitance sensor with an accuracy of ±2% relative humidity as standard and long-term drift <±0.25% not affected by high humidity and contaminants.
- Multi-sensor with selectable output measurement values: relative humidity, absolute humidity, enthalpy, and dew point.
- Up to four active temperature measurement ranges simplifies field selection and reduces stock storage, providing flexibility for change requests during commissioning.
- BACnet and Modbus communication protocols provide superior application data access and enable easy commissioning and configuration.

PRODUCT SERIES
Outdoor Air, Duct, and Condensation
Air quality sensors
Air quality sensors provide occupant comfort and energy efficiency. We offer a wide range of combined multi-sensors for CO₂, humidity, temperature, and VOCs designed to ensure air quality and maximize energy savings over the life cycle of the building.

FEATURES
- Dual Channel CO₂ sensor based on NDIR technology. The additional reference channel allows effective compensation of long term drift, thus providing precise accuracy and long-term stability.
- Sensors are completely maintenance free.
- Integrated temperature, humidity, and VOC sensors are available for building applications that require sensors with multi-functional capabilities.
- Dual Channel self-calibration technology allows the Belimo CO₂ sensors to be used for all types of buildings and applications where ABC logic can not be used.
- BACnet communication protocol provides superior application data access and enables easy commissioning and configuration.

PRODUCT SERIES
CO₂, CO₂ + Temperature
CO₂ + Humidity + Temperature
CO₂ + VOC
CO₂ + VOC + Temperature
CO₂ + VOC + CO₂/VOC + Temperature
Pressure sensors
Accurate pressure measurement is important for optimal HVAC system performance. Pressure sensors from Belimo are capable of measuring extremely high and low pressures in air and water applications. The sensors offer precise measurement of pressure, differential pressure, and velocity for reliable monitoring. Selectable measuring ranges are available for application flexibility.

FEATURES
DIFFERENTIAL AIR PRESSURE SENSOR
- Eight field selectable pressure ranges in one unit.
- Excellent zero-point stability and high accuracy.
- Auto-zero or manual calibration option.
- LCD display optional.
- Modbus communication protocol provides superior application data access and enables easy commissioning and configuration.

DIFFERENTIAL AIR PRESSURE SWITCH
- Field-adjustable switch point.
- Mechanical working life $10^6+$ switching operations.

DIFFERENTIAL WATER PRESSURE SENSOR
- Highly stable resistive sensor element on ceramic substrate.
- Rugged stainless steel housing.

WATER PRESSURE SENSOR
- Resistive sensor element on stainless steel membrane.
- All wetted material is made from stainless steel.

PRODUCT SERIES
Differential Air Pressure Sensor, Differential Air Pressure Switch, Differential Water Pressure Sensor, Water, and Pressure Sensor
Flow sensors
Reliable measurement of flow plays an important role in maximizing HVAC system efficiency and conserving energy. Belimo's inline flow meters utilize ultrasonic transit-time technology to provide accurate and repeatable flow measurement in any application. Their compact size and robust design makes them suitable for use with chilled water, hot water, and water/glycol solutions at temperatures ranging from -4°F to +250°F [-20°C to +120°C]. The meters are fabricated from corrosion-resistant materials, ensuring reliable operation and extended product life.

FEATURES
- Multi-point wet calibrated to ensure accuracy and repeatability.
- Patented temperature and glycol compensation logic eliminates manual calibration.
- ±2% accuracy of reading and ±0.5% repeatability ensure accurate and precise flow measurement.
- Ultra-compact size with a short inlet length of 5 x nominal pipe diameter and no output-length requirements allow the ultrasonic flow sensor to be installed in tight spaces.
- Low power consumption of 0.5W saves energy and transformer capacity.

PRODUCT SERIES
Ultrasonic Flow (Volumetric Flow)
The sensor offering stems from the release of the Belimo Energy Valve™, an innovative solution that features a unique combination of a valve, IoT actuator, sensors and an ultrasonic flow meter.

Belimo Energy Valve™
The Belimo Energy Valve is an Internet of Things (IoT) cloud device utilizing advanced analytic technology leveraging captured system data to improve coil and system performance while achieving increased energy savings. Connecting to the Belimo Cloud offers lifetime data storage, setpoint recommendations, and performance reporting, along with an additional two years of warranty. Local data storage and trending capability coupled with BACnet, Modbus, and analog communication provides the ability to monitor energy usage and develop energy savings strategies through the BAS. Belimo Energy Valves are available in sizes ½ to 6 inches.

FEATURES
– Patented Power Control and Delta T Manager logic optimizes the available energy of the coil by maintaining Delta T.
– Glycol monitoring ensures concentration meets design needs while reducing additional pumping, providing optimized heat exchange, and promoting safe operation.
– Dynamic coil performance illustrates the real time operation of the coil while accurately providing transparency of power degradation and other operational issues.
– Simplified commissioning with flow measurement and verification.

1. Return temperature measurement
2. Supply temperature measurement
3. Volumetric flow measurement
Belimo offers a variety of selection tools for planning and designing energy efficient solutions for buildings.

**SelectPro**
A tool for accurately sizing and selecting valves, actuators, and replacement solutions. SelectPro is available for download on www.belimo.us.

**Retrofit App**

**Belimo Website**
A user-friendly platform that features the latest information and resources on HVAC products that allows customers to easily select and order.

**FEATURES**
- Search for one to one replacement products from other manufacturers.
- View and print data sheets and mounting instructions.
- Seamlessly move from selection to schedule to ordering.
- Create, store, and upload project schedules with product tagging information.
- E-mail project selection(s).

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Belimo 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

<table>
<thead>
<tr>
<th>Application</th>
<th>Type code</th>
<th>Output signal</th>
<th>Measurement range</th>
<th>Probe length</th>
<th>Application/comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outdoor air</strong></td>
<td>01UT</td>
<td>Passive Active Switch</td>
<td>-30°F to +122°F [-35°C to +50°C]</td>
<td>-</td>
<td>Outdoor temperature Wall temperature with NEMA 4X / IP65 protection</td>
</tr>
<tr>
<td></td>
<td>22UT</td>
<td></td>
<td></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td><strong>Duct immersion</strong></td>
<td>01DT</td>
<td></td>
<td>Sensor dependent</td>
<td>-</td>
<td>Duct temperature Immersion sensor and thermowell pockets in brass or stainless steel</td>
</tr>
<tr>
<td></td>
<td>22DT</td>
<td></td>
<td>0°F to 150°F [0°C to 160°C]</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td><strong>Duct averaging</strong></td>
<td>01MT</td>
<td></td>
<td>Sensor dependent</td>
<td>-30°F to +212°F [-35°C to +100°C]</td>
<td>10 ft [3 m], 20 ft [6 m] Duct averaging temperature sensor for air-handling units or larger ducts with air stratification</td>
</tr>
<tr>
<td></td>
<td>22MT</td>
<td></td>
<td>40°F to 90°F [0°C to 80°C]</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td><strong>Strap-on</strong></td>
<td>01ST</td>
<td></td>
<td>-30°F to +212°F [-35°C to +100°C]</td>
<td>-</td>
<td>Pipe strap-on temperature sensors for heating systems, 01ST without housing and 01HT, 22HT with housing</td>
</tr>
<tr>
<td></td>
<td>01HT</td>
<td></td>
<td>-30°F to +194°F [-35°C to +90°C]</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>22HT</td>
<td></td>
<td>40°F to 240°F [0°C to 100°C]</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td><strong>Cable</strong></td>
<td>01CT</td>
<td></td>
<td>-30°F to +212°F [-35°C to +100°C]</td>
<td>-</td>
<td>Cable temperature sensor passive (without housing) and active (with housing)</td>
</tr>
<tr>
<td></td>
<td>22CT</td>
<td></td>
<td>0°F to 150°F [0°C to 160°C]</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td><strong>Low temperature detection</strong></td>
<td>01DTS</td>
<td></td>
<td>14°F to 54°F [-10°C to +12°C]</td>
<td>-</td>
<td>Low temperature detection for frost protection in air-handling units available with automatic or manual reset</td>
</tr>
</tbody>
</table>

### Humidity

<table>
<thead>
<tr>
<th>Application</th>
<th>Type code</th>
<th>Output signal</th>
<th>Measured values</th>
<th>Measurement range</th>
<th>Application/comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outdoor</strong></td>
<td>22UTH</td>
<td></td>
<td>Humidity, Temperature, Enthalpy, Dew Point, Absolute Humidity</td>
<td>0 to 100% rH non-condensing</td>
<td>Outdoor humidity temperature sensor Wall humidity temperature sensor with NEMA 4X / IP65 protection Option: weather/rain shield protection</td>
</tr>
<tr>
<td></td>
<td>22DTH</td>
<td></td>
<td>Humidity, Temperature, Enthalpy, Dew Point, Absolute Humidity</td>
<td>0 to 100% rH non-condensing</td>
<td>Duct humidity temperature sensor</td>
</tr>
<tr>
<td><strong>Condensation</strong></td>
<td>22HH</td>
<td></td>
<td>Condensation</td>
<td>-</td>
<td>Condensation sensor Optional: external sensor</td>
</tr>
</tbody>
</table>

Please note: For temperature and humidity sensors, the °F and °C are not direct conversions. °F is the standard range for the United States, and °C is the standard range for Canada and Latin America.
### Air Quality

<table>
<thead>
<tr>
<th>Application</th>
<th>Type code</th>
<th>Output signal</th>
<th>Measured values</th>
<th>Measurement range</th>
<th>Options</th>
<th>Application/ comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duct</td>
<td>22DC</td>
<td>Active, Modbus RTU</td>
<td>CO₂</td>
<td>0 to 2000 ppm</td>
<td>–</td>
<td>Duct CO₂</td>
</tr>
<tr>
<td>Switch</td>
<td>22DC</td>
<td>Modbus RTU</td>
<td>CO₂, Temperature</td>
<td>0 to 5000 ppm</td>
<td>32°F to 122°F (0°C to 50°C)</td>
<td>–</td>
</tr>
<tr>
<td>Pipe</td>
<td>22DP</td>
<td>Differential Pressure</td>
<td>CO₂, Temperature, VOC</td>
<td>0 to 2000 ppm</td>
<td>32°F to 122°F (0°C to 50°C)</td>
<td>–</td>
</tr>
</tbody>
</table>

### Pressure

<table>
<thead>
<tr>
<th>Application</th>
<th>Type code</th>
<th>Output signal</th>
<th>Measured values</th>
<th>Media</th>
<th>Measurement range (22ADP factory default settings shown)</th>
<th>Options</th>
<th>Application/ comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duct</td>
<td>22ADP</td>
<td>Active, Modbus RTU</td>
<td>Differential Pressure, Volumetric Flow</td>
<td>Air</td>
<td>0 to 1&quot;wc [250Pa] 0 to 10&quot;wc [2500Pa] 0 to 28&quot;wc [7000Pa]</td>
<td>8</td>
<td>–</td>
</tr>
<tr>
<td>Switch</td>
<td>01APS</td>
<td>Active, Modbus RTU</td>
<td>Differential Pressure</td>
<td>Air</td>
<td>0.08 to 1.20&quot;wc [20 to 300Pa] 0.20 to 2.00&quot;wc [50 to 500Pa] 0.80 to 4.00&quot;wc [200 to 1000Pa] 2.00 to 10.00&quot;wc [500 to 2500Pa]</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Pipe</td>
<td>22WP</td>
<td>Active, Modbus RTU</td>
<td>Pressure</td>
<td>Air, Water</td>
<td>0 to 15 psi 0 to 50 psi 0 to 100 psi 0 to 200 psi</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>22WDP</td>
<td>Active, Modbus RTU</td>
<td>Differential Pressure</td>
<td>Water</td>
<td>0 to 15 psi 0 to 50 psi 0 to 100 psi</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

**All sensors feature:**

- **Active:** 0…5/10 V, 4…20 mA
- **Passive:** PT100, PT1000, Ni1000, 10K2, 10K3, NTC20K
- **Supply voltage:** 15…24 VDC, 24 VAC
- **UL:** cULus listing
- **Protection:** NEMA 4X / IP65 (except for 01DTS, 01APS, 22WP, 22WDP)

*For active temperature sensors with several measurement ranges, the default range is noted. For additional and allowable operating temperature ranges refer to the data sheet.

For pressure sensors with several measurement ranges, the maximum range is noted, refer to the data sheet for additional ranges.
## Flow

<table>
<thead>
<tr>
<th>Application</th>
<th>Type code</th>
<th>Output signal</th>
<th>Measured values</th>
<th>Media</th>
<th>Pipe size</th>
<th>Body pressure rating</th>
<th>Measurement range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe</td>
<td>FM050</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>½” [15]</td>
<td>■</td>
<td>6.6</td>
</tr>
<tr>
<td></td>
<td>FM075</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>¾”[20]</td>
<td>■</td>
<td>12.4</td>
</tr>
<tr>
<td></td>
<td>FM100</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>1”[25]</td>
<td>■</td>
<td>21.8</td>
</tr>
<tr>
<td></td>
<td>FM125</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>1¼”[32]</td>
<td>■</td>
<td>34.2</td>
</tr>
<tr>
<td></td>
<td>FM150</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>1½”[40]</td>
<td>■</td>
<td>47.5</td>
</tr>
<tr>
<td></td>
<td>FM200</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>2”[50]</td>
<td>■</td>
<td>91.2</td>
</tr>
<tr>
<td></td>
<td>FM250</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>2½”[65]</td>
<td>■</td>
<td>152</td>
</tr>
<tr>
<td></td>
<td>FM250-250</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>2½”[65]</td>
<td>■</td>
<td>152</td>
</tr>
<tr>
<td></td>
<td>FM300</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>3”[80]</td>
<td>■</td>
<td>215</td>
</tr>
<tr>
<td></td>
<td>FM300-250</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>3”[80]</td>
<td>■</td>
<td>215</td>
</tr>
<tr>
<td></td>
<td>FM400</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>4”[100]</td>
<td>■</td>
<td>380</td>
</tr>
<tr>
<td></td>
<td>FM400-250</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>4”[100]</td>
<td>■</td>
<td>380</td>
</tr>
<tr>
<td></td>
<td>FM500</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>5”[125]</td>
<td>■</td>
<td>594</td>
</tr>
<tr>
<td></td>
<td>FM500-250</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>5”[125]</td>
<td>■</td>
<td>594</td>
</tr>
<tr>
<td></td>
<td>FM600</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>6”[160]</td>
<td>■</td>
<td>855</td>
</tr>
<tr>
<td></td>
<td>FM600-250</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>6”[150]</td>
<td>■</td>
<td>855</td>
</tr>
</tbody>
</table>

**NOTE:** Vnom accounts for 20% overflow (120% flow is the max output reading at 10V).
Exceptional service

At Belimo, we continually invest in new technologies that increase customer value by improving occupant comfort, energy efficiency, simplified installation, and maintenance-free operation. Our sales team is available to consult and provide insight and advice on how to achieve the best solution to help increase your system performance. Belimo will continue to focus on providing you with exceptional product availability, fast delivery times, and world-class customer service and technical support. We remain dedicated to continuously improve our standards and are committed to providing you the highest value possible.

Whatever your HVAC application, our global network of support experts are on hand and ready to assist.