



**HVAC hydronics,  
the goldmine in  
building renovation  
projects.**

**Energy efficiency and comfort in buildings**





Belimo Atrium: Energy efficient renovation at Belimo in Hinwil (Switzerland) using the Smart Readiness Indicator (SRI).

Buildings account for 38% of all CO<sub>2</sub> emissions worldwide, whereby 28% of the gas is emitted during operation and 10% during construction and renovation. Climate change, environmental destruction, reduced access to resources and our own behaviour pose the challenges we face today. The European Union has addressed these factors by launching the European Green Deal in 2019. The objective is to make the transition to a modern, resource-efficient and competitive economy, for which the building sector plays a significant role.

A key measure of the Green Deal is the "renovation wave". Specifically, the target is to achieve a renovation rate of existing buildings of 2% by 2030. Reduced access to resources will be addressed by leveraging the recycling economy plan, whereas the industry's response will be driven by EU taxonomy funding.



## Editorial



"Better comfort in buildings with less energy utilisation" – A contradiction? Wishful thinking? Not at all! Personally, I am convinced that it is exactly what must be the mission that our HVAC industry has to follow in the years to come. And it will work! Every day, HVAC renovation projects are completed that provide noticeably better indoor comfort and healthier indoor air while at the same time delivering significant thermal and electrical energy savings. It is well known that control technology plays a key role here.

We wanted to know in greater detail what contribution field devices make, and what their energy balance is across their entire life cycle. Factors such as the "grey" energy, standby energy and better efficiency involved in the individual application must also be taken into account. Based on the recognised European standard EN 1232

# Statutory requirements.

To help European countries ensure that buildings are not wasting energy, the European Parliament and the Council of the European Union have compiled a set of standards – the Energy Performance of Buildings Directive 2018/844/EU (EPBD) – that outlines the measures necessary for reduction of energy consumption and must be incorporated into national law by 2025.

Among other things, the EPBD stipulates that non-residential buildings with a rated output for a heating system or a combined space heating/air-conditioning and ventilation system of more than 290 kW must be equipped with building automation by 2025.

The EPBD-BACS compliance checklist, developed by eu.bac (European Building Automation Controls Association), can be referred to, to check whether the building automation setup meets the respective requirements.



<https://eubac.org>

(now EN ISO 52120-1), a simulation was conducted with the help of Lucerne University of Applied Sciences and Arts, using a typical HVAC system. The results are encouraging. This brochure provides you with a brief summary of the results and describes what "Factor 24" is all about. This much can be said in advance: The small devices from Belimo have a really big impact on the efficiency of HVAC systems, which is entirely in line with our slogan: "Small devices, big impact."

This has encouraged us to move ahead with retrofitting our field devices in our own Belimo buildings as well. The picture on page two shows the "Belimo Atrium", a newly renovated part of our headquarters in Hinwil. The room climate has noticeably improved as a result of the renovation particularly during our most recent hot summer. In addition, the project has shown us that the hydronic system is a real treasure when it comes to energy efficiency.

By leveraging the latest generation of Belimo Energy Valves and pressure-independent control valves for the chilled ceilings, substantial energy savings could be achieved in this building zone. This is why we are specifically addressing the topic of energy efficiency in hydronic systems in this brochure and showcasing the wide range of our own products available to you for this purpose. I hope you enjoy reading the brochure.

**Dr. Adrian Stauffer**

Head of Group Division EMEA  
BELIMO Automation AG

# Building automation and smart control devices.

## Greater comfort and better energy efficiency

Only what is measured can be analysed and optimised. The "smart" buildings of tomorrow are characterised by a high level of energy efficiency and optimal in-room comfort. Therefore, a building should be able to "communicate" with the user, the maintenance specialist and the energy provider. The EPBD proposes the Smart Readiness Indicator (SRI) for assessment of buildings.

This indicator was developed by the European Commission and evaluates not only maintenance and energy, but also the quality of life of the building occupants. Building automation with smart field devices that can be networked in an HVAC system lay the foundation for this.



Source: European Commission

**Assessment factors of the Smart Readiness Indicator (SRI) and our impact upon them (circled in orange). A higher energy efficiency and quality of life is achieved with products from Belimo:**



Heating



Cooling



Warm water



Ventilation



Measure and control



Thermal insulation



Light



Electricity



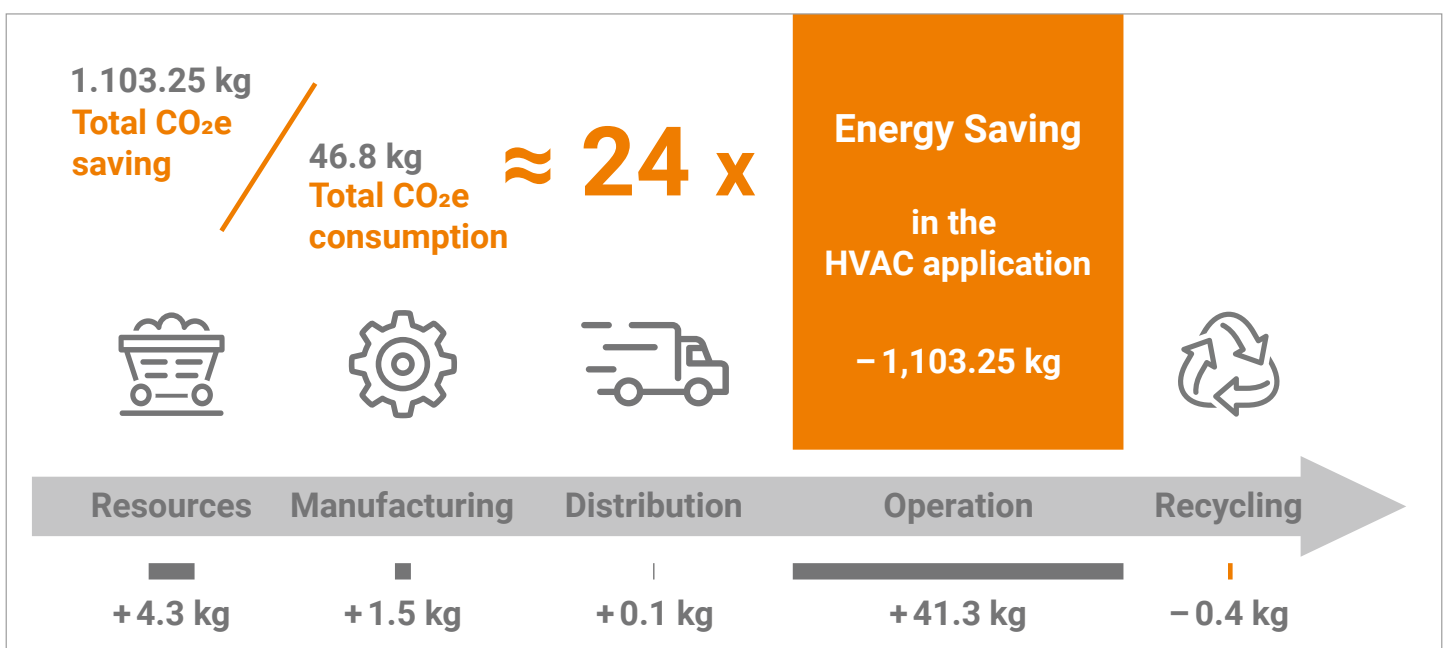
Vehicle charging stations

# Quantifying our impact.

When it comes to sustainability, Belimo not only focuses on the carbon footprint of its own business processes, but also ensures that using Belimo products verifiably minimises our customers' carbon footprint in the long term. An evaluation conducted by Belimo in collaboration with Lucerne University of Applied Sciences and Arts (HLSU) computed the total CO<sub>2</sub> balance of field devices across their entire life cycle.

The results indicate that over a period spanning 15 years, a Belimo field device used in HVAC applications saves 24 times the CO<sub>2</sub> that is required for extracting the requisite resources, manufacturing, logistics and operation. Up to 8.2 million tonnes of CO<sub>2</sub> can thereby be avoided with the 7.8 million Belimo actuators manufactured in 2021.

**Factor 24: Weighted average load from air-related and water-related field devices in kg CO<sub>2</sub>e.**



# HVAC hydronics – the goldmine in building renovation projects.

The smart control of heating, cooling, and ventilation loads has a big impact on the energy efficiency of buildings. A key aspect here is the heating and chilled water circuit, i.e. the hydronics of a building.

1

## Generation

### No energy loss at zero load reduces operating costs.

Energy savings and the reduction of the leakages will become even more important in the future. The generation outputs of boilers or chilling systems are divided up into different performance level categories. Depending on the load, the generators will then be switched on or off. The generators will be shut off in order to minimise performance loss. The pressure drop and leakage rate when the valve is fully open should be as low as possible. This minimises the electrical power consumption of the pumps and thus the operating costs.

### Planning reliability as a first step towards better energy efficiency.

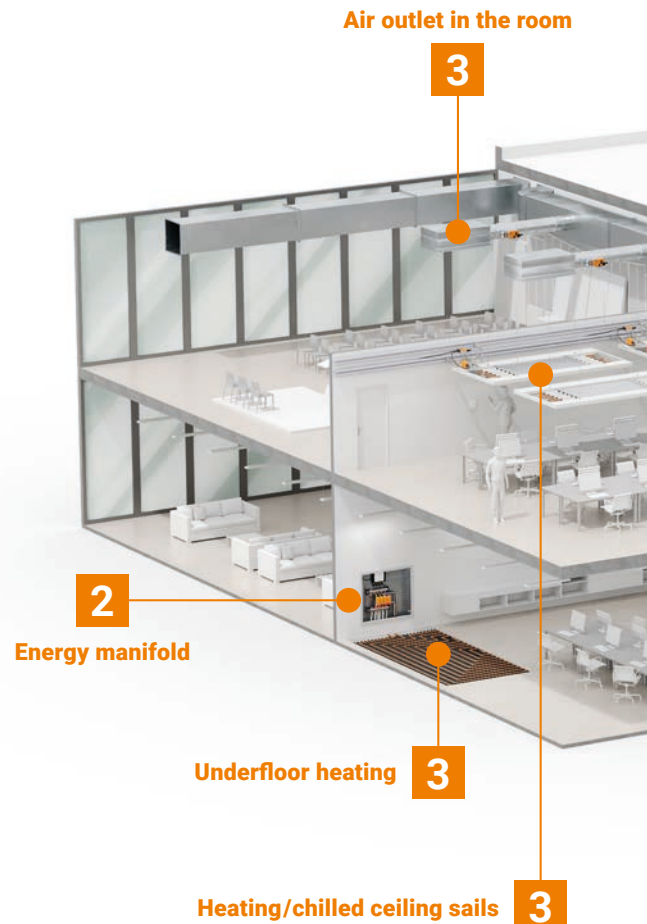
A conventional pressure-dependent valve is designed based on the kv value. For a given nominal flow rate, this depends on the differential pressure across the valve. In order to obtain sufficient quality of control, the valve authority  $P_v$  must also be taken into account for pressure-dependent valves. The sizing is greatly simplified for pressure-independent solutions. Due to the automatic adjustment of flow deviations, the pressure-independent valve always provides the required water quantity, even with differential pressure fluctuations and during partial load operation. Due to dynamic balancing, the valve authority amounts to 1.

2

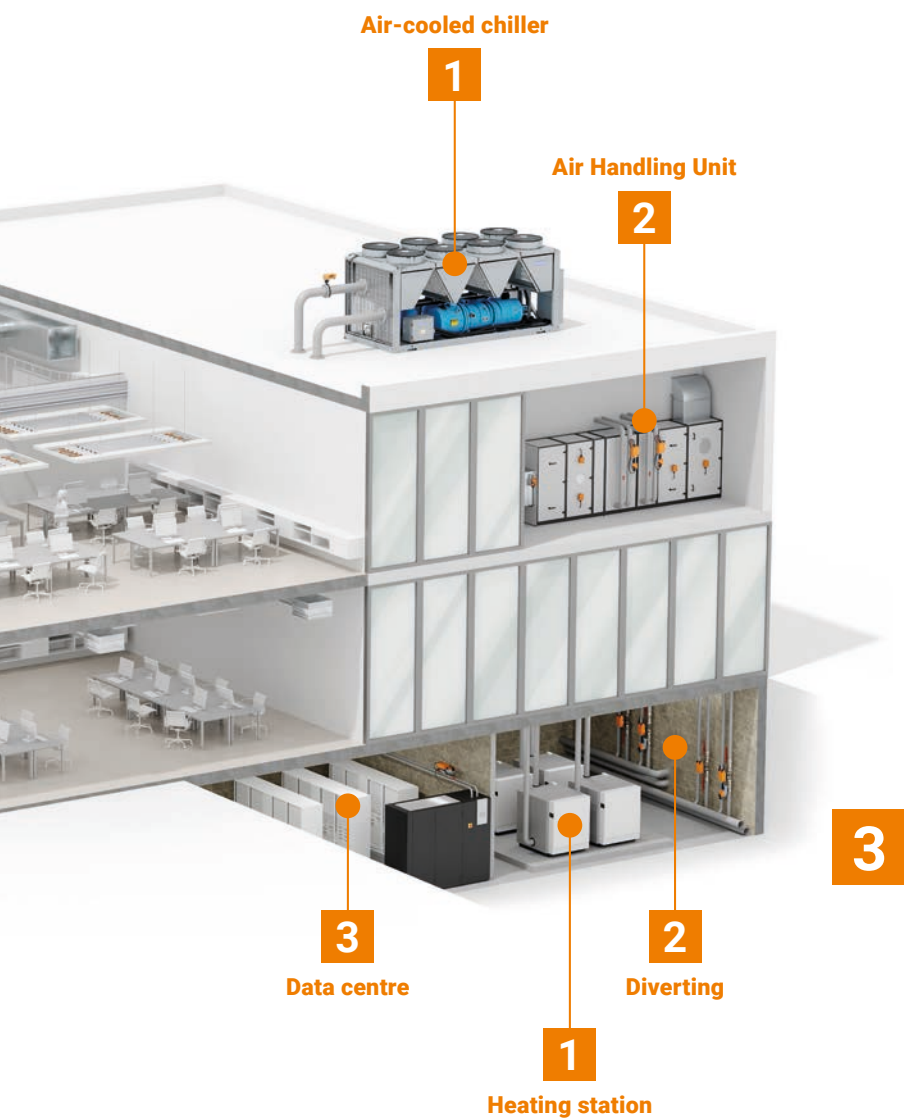
## Distribution

### Pressure fluctuations in distribution lead to lower power output.

In pressure-dependent distribution systems, the typical arrangement consists of a manual balancing valve in series with a pressure-dependent control valve. Complex flow issues caused by pressure fluctuations can arise, resulting in system instabilities. Even the best designed systems still make it challenging to optimise operations, especially during partial load operation. Pressure-dependent valves can suffer from flow fluctu-







ations due to differential pressure changes in the system. These flow fluctuations thereby result in excessively high or low power output at the heat exchanger. Pressure-independent valves help to compensate for fluctuations in flow.

#### **Making energy flow visible.**

The networking of building technology systems enhances comfort, safety and transparency in air-conditioned buildings. Thanks to this transparency, operation can be optimised and overall energy consumption reduced – in new systems as well as in retrofitting or renovation projects. This desired networking of individual components can be easily implemented with bus systems that extend throughout the entire building. Bus systems can be used to exchange unlimited amounts of data between the various bus participants over the same physical lines. The user has unrestricted access to control, feedback and parameters on the individual devices.

## **3**

### **Zone**

#### **Demand-driven zone control.**

To efficiently control the heating and cooling energy used in buildings, these are typically subdivided into zones. Maximum energy efficiency and optimal comfort are provided by a demand-driven zone control system that uses continuously recorded data from various different sensors to determine the load of the individual zones and ensures that they are supplied with the exact amount of energy required i.e. not as much as possible, but exactly what is required at any given moment.

# HVAC hydronics – digging in the goldmine.

## Tight closing

The unique valve design reliably prevents internal leakage in the closed state and thus preventing unwanted consumption at zero load. The heating or cooling energy requirement is reduced as a result.



## Energy saving actuators

The use of actuators with durable brushless direct-current motors, combined with specially constructed gear and the patented motor control ensures safe, power-saving operation of all Belimo actuators. The electro thermal actuators often used in zone and room solutions work with a heating element that expands and changes the position of the valve. Operating costs can be significantly reduced by using the maintenance-free Belimo zone valves with their energy efficient actuators. Belimo also offers standard and customer-specific retrofit solutions with short delivery times to quickly get your HVAC system working efficiently again. Your advantage, minimal downtime.



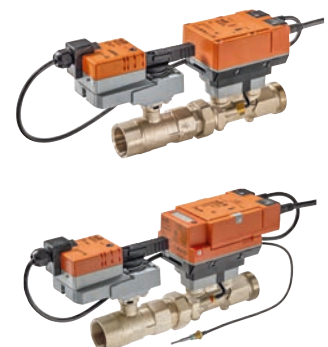
## Mechanical, pressure-independent valves

Pressure-independent valves maintain a constant flow through all of the coils and heat exchangers, permitting flow changes only when commanded by the control signal to do so. This avoids fluctuations in heating or cooling output due to differential pressure variations. In addition to reducing operating costs while providing better comfort levels, the costs for installing and commissioning are also significantly reduced as labour-intensive hydronic balancing is no longer required.



## Electronic pressure-independent valves

An electronic pressure-independent control valve automatically adjusts the valve opening to ensure the flow required by the building automation system (BMS). By using algorithms, the control signal is interpreted into a flow requirement that positions the valve to provide the correct flow rate at all times, even in partial-load scenarios.





Electronic PI valves typically have a much lower pressure drop than mechanical ones, and therefore require significantly lower differential pressures, thus saving energy.

The valve opening position can be read out via the building automation system. Recording the feedback signals from all of the valves allows the weak point in the system to be determined. The pump head can be controlled on the basis of the valve that is widest open in the current operating state, thereby enabling energy efficient pump operation.



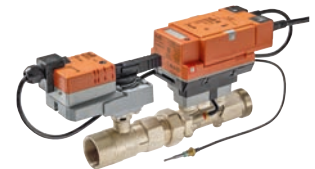
## Control taking into account temperature spread and flow

The temperature spread (delta T) and flow rate together are excellent indicators of heat exchange efficiency. A low delta T means that too much water is flowing through the heat exchanger, thus leading to inefficiency. The Belimo Energy Valve™ ensures the minimum delta T. The delta T manager monitors the value at the coil and throttles the valve position to reduce the flow, thereby bringing the delta T closer to the setpoint. The energy valve therefore offers a simple-to-understand method for the reduction of flows to allow optimum heat exchange.



## Control power

Power control is a control algorithm that creates a linear relationship between control signal and power output. Being both temperature and pressure independent, power control offers a control stability not previously seen from a control valve. Heat exchanger power output remains constant even if the differential temperature and flow change. Power control is the only method that creates a truly linear relationship between the control signal and the heating or cooling output.



# HVAC hydronics – digging in the goldmine.

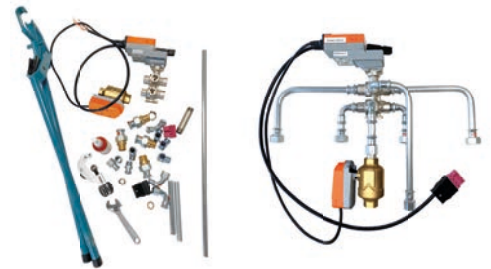
## Sensors in hydronic circuits

What cannot be measured, cannot be monitored and controlled. Belimo offers a wide range of immersion and surface sensors for the precise measurement of temperature, condensation, static pressure and differential pressure. In addition to their precision, Belimo sensors are characterized by a short response time and a low drift rate. This ensures long-term stability.



## Saving energy and time – your pre-mounted and tested assembly.

"Doing everything possible to simplify installation work on the construction site, shorten construction time and prevent possible errors in advance" – that is why Belimo offers complete assemblies according to our customer's requirements, tests and, if desired, parametrises them. This results in ready-made assemblies that can be installed directly on the construction site.



Individual components → Custom-made

## Knowing where the energy flows.

The networking of building technology systems enhances comfort, safety and transparency in air-conditioned buildings. The transparency gained means that operation can be optimised and overall energy consumption reduced. The communicative Belimo field devices also support all common building automation communication protocols.

Belimo's IoT-ready products allow field devices to be connected directly to modern building IoT platforms. All thermal energy meters and Belimo Energy Valves can be integrated via PoE (Power over Ethernet). This allows the device to be powered and the data to be transmitted simultaneously via an Ethernet cable.



# Belimo Energy Valve™

## The multifunctional all-in-one solution



### Measuring

Integrated sensors for measuring temperature spread, flow (incl. compensation of glycol content) and thus power as well.



### Controlling

Control of valve position, flow or power for optimum control of the heat exchanger.



### Balancing

The Belimo Energy Valve™ always ensures the correct amount of water – even if there are differential pressure changes and during partial load operation.



### Shutting off

No leakages thanks to air-bubble tight-closing characterised control valve.



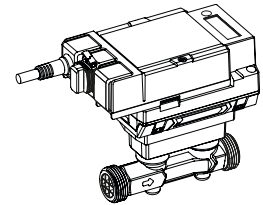
### Energy monitoring

Indication of optimisation potential by recording all system data.

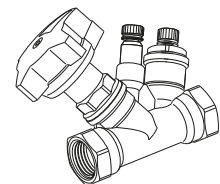


### Billing

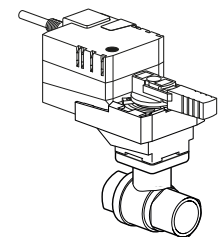
Ready for IoT-based cost accounting.



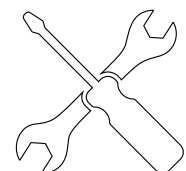
Energy meter



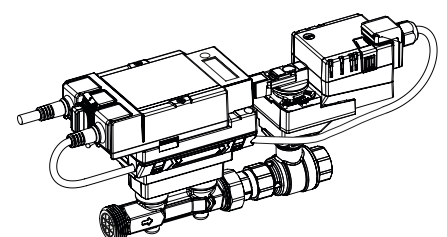
Balancing valve



Control valve





Additional work





Belimo Energy Valve™

# Control Valves for greater energy savings and comfort.

## Belimo ZoneTight™




Product range	Types	Application	Properties
	<p><b>Characterised control valve (QCV)</b></p> <ul style="list-style-type: none"> <li>– 2-way valve with rotary actuator</li> <li>– With internal or external thread</li> </ul> <p><b>Changeover ball valve (QCV)</b></p> <ul style="list-style-type: none"> <li>– 3-way valve with rotary actuator</li> <li>– With internal or external thread</li> </ul>	<ul style="list-style-type: none"> <li>– For cold and hot water</li> <li>– Fan coils</li> <li>– Cooling ceilings</li> <li>– Zone air heaters/air coolers</li> <li>– Floor heaters</li> <li>– Radiators</li> </ul>	<ul style="list-style-type: none"> <li>– Nominal diameters DN 15/20/25</li> <li>– Permissible pressure 1600 kPa</li> <li>– Optional fail-safe</li> </ul>
	<p><b>Mechanical pressure-independent zone valve (PIQCV)</b></p> <ul style="list-style-type: none"> <li>– 2-way valve with rotary actuator</li> <li>– Pressure-independent flow control</li> <li>– With internal thread</li> </ul>		
	<p><b>Mechanical pressure-independent flow limiting valve (PIFLV)</b></p> <ul style="list-style-type: none"> <li>– 2-way valve with rotary actuator</li> <li>– Pressure-independent flow limiting</li> <li>– With internal thread</li> </ul>	<ul style="list-style-type: none"> <li>– Cold water</li> <li>– Cooling ceilings</li> <li>– Fan coils</li> </ul>	<ul style="list-style-type: none"> <li>– Nominal diameters DN 15/20/25</li> <li>– Permissible pressure 1600 kPa</li> <li>– Optional fail-safe</li> </ul>
	<p><b>6-way characterised control valve</b></p> <ul style="list-style-type: none"> <li>– 6-way valve with rotary actuator</li> <li>– With internal thread</li> </ul>	<ul style="list-style-type: none"> <li>– For cold and hot water</li> <li>– Combined heating/cooling elements in four-pipe systems</li> <li>– Fan coils</li> <li>– Heated and chilled ceilings</li> </ul>	<ul style="list-style-type: none"> <li>– Nominal diameters DN 15/20/(25)</li> <li>– Permissible pressure 1600 kPa</li> </ul>
	<p><b>Electronic pressure-independent 6-way characterised control valve</b></p> <ul style="list-style-type: none"> <li>– 6-way valve with rotary actuator</li> <li>– Pressure-independent flow control</li> <li>– With internal thread</li> </ul>		

## Retrofit Water Solutions


Product range	Types	Application	Properties
	<p><b>Globe valve actuators for different manufacturers</b></p>	<ul style="list-style-type: none"> <li>– Motorisation of numerous globe valves</li> </ul>	<ul style="list-style-type: none"> <li>– Motorisation of globe valves with nominal diameters DN 15...250</li> <li>– With universal valve adapter</li> <li>– Optional fail-safe</li> </ul>
	<p><b>Rotary actuators for different manufacturers</b></p> <ul style="list-style-type: none"> <li>– Ball valves</li> <li>– Butterfly Valves</li> <li>– Mixing valve</li> </ul>	<ul style="list-style-type: none"> <li>– Motorisation of different valves</li> </ul>	<ul style="list-style-type: none"> <li>– Motorisation of mixing valves and valves with: <ul style="list-style-type: none"> <li>– Interface ISO 5211: F03/F04/F05/F07 or F10</li> <li>– 12 mm round shaft</li> </ul> </li> <li>– Up to nominal diameter DN 700</li> <li>– Other versions on request</li> </ul>



## Pressure-independent characterised control valves


Product range	Types	Application	Properties
	<b>Belimo Energy Valve™</b> <ul style="list-style-type: none"> <li>– 2-way valve with rotary actuator and flow measurement</li> <li>– Pressure-independent flow control</li> <li>– Temperature and pressure-independent power control</li> <li>– With internal thread, external thread or flange</li> </ul>	<ul style="list-style-type: none"> <li>– For cold and hot water</li> <li>– Balancing, measuring, controlling, shutting off and energy monitoring with a single valve unit</li> </ul>	<ul style="list-style-type: none"> <li>– Nominal diameters DN15...150</li> <li>– DN 15...50 with MID approval</li> <li>– Permissible pressure 1600 kPa</li> <li>– Optional fail-safe</li> <li>– Integrated monitoring and recording function</li> <li>– Electronic flow measurement</li> <li>– Permanent hydronic balancing</li> <li>– Power control</li> <li>– Glycol alarm or compensation</li> <li>– Connection to Belimo Cloud</li> </ul>
	<b>Belimo Energy Valve™</b> <ul style="list-style-type: none"> <li>– 3-way valve with rotary actuator</li> <li>– Pressure-independent flow control</li> <li>– Temperature and pressure-independent power control</li> <li>– With internal or external thread</li> </ul>	<ul style="list-style-type: none"> <li>– For cold and hot water</li> <li>– Balancing, measuring, controlling, shutting off and energy monitoring with a single valve unit for 3-way applications</li> <li>– Creates system transparency in 3-way applications</li> </ul>	<ul style="list-style-type: none"> <li>– Nominal diameters DN15...50</li> <li>– With MID approval</li> <li>– Permissible pressure 1600 kPa</li> <li>– Optional fail-safe</li> <li>– Integrated monitoring and recording function</li> <li>– Electronic flow measurement</li> <li>– Power control</li> <li>– Glycol Monitoring</li> <li>– Connection to Belimo Cloud</li> </ul>
	<b>Electronic pressure-independent characterised control valve (EPIV)</b> <ul style="list-style-type: none"> <li>– 2-way valve with rotary actuator</li> <li>– Pressure-independent flow control</li> <li>– With internal thread or flange</li> </ul>	<ul style="list-style-type: none"> <li>– For cold and hot water</li> <li>– Balancing, measuring, controlling and shutting off with a single valve unit</li> </ul>	<ul style="list-style-type: none"> <li>– Nominal diameters DN15...150</li> <li>– Permissible pressure 1600 kPa</li> <li>– Optional fail-safe</li> <li>– Electronic flow measurement</li> <li>– Permanent hydronic balancing</li> </ul>

## Characterised control valves


Product range	Types	Application	Properties
	<b>Characterised control valve</b> <ul style="list-style-type: none"> <li>– 2-way valve with rotary actuator</li> <li>– 3-way valve with rotary actuator</li> <li>– With internal thread, external thread or flange</li> </ul>	<ul style="list-style-type: none"> <li>– For cold and hot water</li> <li>– Shutting off, controlling, mixing</li> </ul>	<ul style="list-style-type: none"> <li>– Nominal diameters DN 15...150 (2-way)</li> <li>– Nominal diameters DN 15...50 (3-way)</li> <li>– Permissible pressure 1600 kPa, 2700 kPa (type-specific)</li> <li>– Optional: <ul style="list-style-type: none"> <li>– Fast running actuators</li> <li>– Very fast running actuators</li> <li>– Fail-safe</li> </ul> </li> </ul>

# Control Valves for greater energy savings and comfort.


## Open/close and changeover valves

Product range	Types	Application	Properties
	<b>Ball valve with open/close or switching function</b> <ul style="list-style-type: none"> <li>– 2-way valve with rotary actuator</li> <li>– 3-way valve with rotary actuator</li> <li>– With internal or external thread</li> </ul>	<ul style="list-style-type: none"> <li>– For cold and hot water</li> <li>– Shutting off or changing over</li> </ul>	<ul style="list-style-type: none"> <li>– Nominal diameters DN15...50</li> <li>– Permissible pressure 1600 kPa</li> <li>– Optional fail-safe</li> </ul>


## Control, shut-off and changeover valves for outdoor applications

Product range	Types	Application	Properties
	<b>Characterised control valve</b> <ul style="list-style-type: none"> <li>– 2-way valve with rotary actuator</li> <li>– 3-way valve with rotary actuator</li> <li>– With internal or external thread</li> </ul>	<ul style="list-style-type: none"> <li>– For cold and hot water</li> <li>– Controlling, shutting off or changing over</li> <li>– For outdoor applications</li> </ul>	<ul style="list-style-type: none"> <li>– Nominal diameters DN15...50</li> <li>– Permissible pressure 1600 kPa</li> <li>– Optional fail-safe</li> </ul>


## Potable water valves

Product range	Types	Application	Properties
	<b>Ball valve with open/close function</b> <ul style="list-style-type: none"> <li>– 2-way valve with rotary actuator</li> <li>– With internal thread</li> </ul>	<ul style="list-style-type: none"> <li>– Potable water</li> <li>– Certified in accordance with DVGW, ACS, WRAS*, KIWA* and ÖVGW*</li> </ul> <p>* Launch planned in Q1/23</p>	<ul style="list-style-type: none"> <li>– Nominal diameters DN15...50</li> <li>– Permissible pressure 1600 kPa</li> <li>– Optional fail-safe</li> </ul>



## Globe valves

Product range	Types	Application	Properties
	<b>Globe valves with globe valve actuator</b> <ul style="list-style-type: none"> <li>– 2-way valve with actuator</li> <li>– 3-way valve with actuator</li> <li>– With internal thread, external thread or flange</li> </ul>	<ul style="list-style-type: none"> <li>– Shutting off, changing over, controlling, mixing and diverting cold water, warm water, hot water and steam (type-specific)</li> </ul>	<ul style="list-style-type: none"> <li>– Nominal diameters DN15...250</li> <li>– Permissible pressure 600 kPa, 1600 kPa or 2500 kPa (type-specific)</li> <li>– Optional: <ul style="list-style-type: none"> <li>– Fast running actuators</li> <li>– Fail-safe</li> </ul> </li> </ul>

## Butterfly valves

Product range	Types	Application	Properties
	<b>Butterfly valves</b> <ul style="list-style-type: none"> <li>– 2-way butterfly valve with rotary actuator</li> <li>– 3-way butterfly valve with rotary actuators</li> </ul>	<ul style="list-style-type: none"> <li>– Shutting off, changing over, controlling, mixing and diverting cold and warm water</li> </ul>	<ul style="list-style-type: none"> <li>– Nominal diameters DN25...700</li> <li>– Permissible pressure 1600 kPa</li> <li>– Optional: <ul style="list-style-type: none"> <li>– Heating with humidistat / thermostat</li> <li>– Integrated auxiliary switch or potentiometer</li> <li>– Fail-safe</li> </ul> </li> </ul>

## Thermal Energy Meters

Product range	Types	Application	Properties
	<b>Thermal Energy Meter MID</b> <ul style="list-style-type: none"> <li>– With external thread</li> </ul>	<ul style="list-style-type: none"> <li>– For direct, calibrated energy cost billing</li> </ul>	<ul style="list-style-type: none"> <li>– Fulfils EN 1434 requirements</li> <li>– Type approval in accordance with European Measuring Instruments Directive 2014/32/EU (MI-004)</li> <li>– Approved as a heat meter</li> </ul>
	<b>Thermal energy meter standard</b> <ul style="list-style-type: none"> <li>– With external thread</li> </ul>	<ul style="list-style-type: none"> <li>– For thermal energy metering for interior operational purposes and when glycol compensation is required</li> </ul>	<ul style="list-style-type: none"> <li>– Automatic glycol compensation</li> </ul>


# Sensors for more comfort, safety and efficiency.

## Temperature





Product range	Types	Applications	Properties
	<b>Outdoor sensor</b>	Sensors for outdoor temperature or for room solutions with increased requirements, e.g., in cold stores and greenhouses as well as in production halls and warehouses.	<ul style="list-style-type: none"> <li>– Sensor-dependent temperature ranges</li> <li>– Active sensors with 8 selectable temperature ranges</li> </ul>
	<b>Duct/Immersion sensor</b>	For measuring the temperature in the duct. Also suitable for liquid fluids when use in conjunction with a thermowell made of brass or stainless steel.	<ul style="list-style-type: none"> <li>– Sensor-dependent temperature ranges</li> <li>– Active sensors with 8 selectable temperature ranges</li> <li>– Suitable for air and water applications</li> <li>– Probe length: 50...450 mm</li> </ul>
	<b>Average value sensor</b>	Duct average temperature sensor for air handling units or larger ducts with layer formation.	<ul style="list-style-type: none"> <li>– Sensor-dependent temperature ranges</li> <li>– Active sensors with 8 selectable temperature ranges</li> <li>– Passive sensors with Pt1000</li> <li>– Probe length: 3 m / 6 m</li> </ul>
	<b>Contact sensor</b>	Contact temperature sensors for heating systems and solar collectors, passive and active.	<ul style="list-style-type: none"> <li>– Active and passive contact temperature sensors for pipe applications</li> <li>– Sensor-dependent temperature ranges</li> <li>– Metal probe or spring-loaded brass pin guarantees fast reaction times</li> </ul>
	<b>Cable sensor</b>	Temperature measurement in the gaseous fluids used in heating, ventilation and air-conditioning systems. With stainless steel probe. Immersion temperature sensor in combination with a thermowell.	<ul style="list-style-type: none"> <li>– Cable temperature sensor, active and passive</li> <li>– Sensor-dependent temperature ranges</li> <li>– Probe length: 50...200 mm</li> </ul>
	<b>Frost monitors</b>	Frost detection for air handling units downstream from the heating coil.	<ul style="list-style-type: none"> <li>– Output, switch</li> <li>– Modulating output 0...10 V (valve control)</li> <li>– Manual or automatic reset</li> <li>– Capillary tube length: 2 m / 3 m / 6 m</li> </ul>
	<b>Temperature monitor</b>	For monitoring the temperature in heat generation systems, underfloor heating or in other applications of HVAC technology.	<ul style="list-style-type: none"> <li>– 30...90 °C</li> <li>– Probe length, 1 m</li> <li>– Automatic reset</li> </ul>
	<b>Security temperature limiter</b>	For monitoring the temperature in heat generation systems, underfloor heating or in other applications of HVAC technology.	<ul style="list-style-type: none"> <li>– 50...80 °C</li> <li>– 70...130 °C</li> <li>– Probe length, 1 m</li> <li>– Manual reset</li> </ul>




## Air quality

Product range	Type	Applications	Properties
	<b>Duct sensor</b>	Dual-channel self-calibration technology enables the use of Belimo CO <sub>2</sub> sensors in all buildings and applications, even where the ABC (Automatic Background Calibration) method cannot be used.	<ul style="list-style-type: none"> <li>– Wide range of combined multi sensors for CO<sub>2</sub>, humidity, temperature and VOC</li> <li>– Dual-channel CO<sub>2</sub> sensor based on NDIR technology</li> </ul>

## Humidity




Product range	Types	Applications	Properties
	<b>Outdoor sensor</b>	Sensors for outdoor temperature / humidity or for room solutions with increased requirements, e.g., in cold stores and greenhouses as well as in production halls and warehouses. Option, weather protection.	<ul style="list-style-type: none"> <li>– Multi sensors for relative and absolute humidity, temperature, enthalpy, dew point and condensation</li> <li>– 0...100% rel. humidity</li> <li>– 4 temperature measuring ranges</li> <li>– Output signals: 0...10 V, Modbus RTU, BACnet MS/TP</li> </ul>
	<b>Duct sensor</b>	Active sensor for measuring the relative or absolute humidity and temperature in duct applications.	<ul style="list-style-type: none"> <li>– Output signals: 0...5 V, 0...10 V, Modbus RTU, BACnet MS/TP</li> <li>– Probe length: 140 mm / 270 mm</li> <li>– 0...100% rel. humidity</li> <li>– 4 temperature measuring ranges</li> </ul>
	<b>Condensation switch</b>	For detection of condensation on chilled surfaces (e.g. chilled beams). Option, external sensor.	<ul style="list-style-type: none"> <li>– With signal LED and relay contact for connecting to controller and display systems</li> <li>– Output signal, switch</li> </ul>
	<b>Duct humidistat</b>	Duct humidistat for regulating or controlling fans, drying units and humidifiers. Installation in a duct or on a wall.	<ul style="list-style-type: none"> <li>– 15...95% rel. humidity</li> <li>– Probe length, 156 mm</li> <li>– Adjustable switch range</li> <li>– Output signal, switch</li> <li>– Temperature compensation</li> </ul>

## Flow



Product range	Types	Applications	Properties
	<b>Pipe connections:</b> <ul style="list-style-type: none"> <li>– DN 15...50 with thread</li> <li>– DN 65...150 with flange</li> </ul>	Flow measurement of water and water-glycol mixtures.	Flow measurement with automatic glycol compensation: <ul style="list-style-type: none"> <li>– 0.42, 0.78, 1.38, 2.16, 3.00, 5.76 l/s</li> <li>– 9.60, 13.60, 24.00, 37.50, 54.00 l/s</li> </ul>

# Sensors for more comfort, safety and efficiency.




## Pressure

Product range	Types	Applications	Properties
	<b>Duct sensor</b>	<ul style="list-style-type: none"> <li>– Measurement and monitoring of differential air pressure</li> <li>– Air filter monitoring</li> <li>– Suitable for pressure control of fans</li> </ul>	<ul style="list-style-type: none"> <li>– Differential air pressure sensor</li> <li>– Sensor-dependent pressure ranges 150...7'000 Pa</li> <li>– Selectable pressure ranges</li> <li>– Auto-Zero</li> <li>– LCD display</li> <li>– 2 independent measuring systems in the same housing</li> <li>– Output signals: 0...5 V / 0...10 V / 4...20 mA, Modbus RTU, BACnet MS/TP</li> </ul>
		<p>Typical application in HVAC systems for monitoring filters or fan V-belts.</p>	<ul style="list-style-type: none"> <li>– Duct differential air-pressure switch</li> <li>– Type-dependent pressure ranges 20...5'000 Pa</li> <li>– Output signal, switch (1 x SPDT)</li> <li>– Setpoint adjustment and automatic reset function</li> </ul>
	<b>Pipe sensor</b>	Pressure and differential pressure sensor for water and refrigerant.	<ul style="list-style-type: none"> <li>– Pressure sensor for liquid fluids</li> <li>– Pressure sensors for various pressure ranges: 4, 6, 10, 16 and 25 bar</li> <li>– Differential pressure sensors for various pressure ranges: 1, 2.5, 4, and 6 bar</li> <li>– PDP: 5, 10, 35 bar, LCD display, offset sensors for easy mounting</li> </ul>

## Thermal Energy Meter

Product range	Types	Applications	Properties
	<b>Thermal Energy Meter MID</b>	For direct energy cost billing with a calibrated meter.	<ul style="list-style-type: none"> <li>– Meets the requirements of EN 1434, and has construction approval according to the European Measuring Instruments Directive 2014/32/EU (MI-004)</li> <li>– Approved as a heat meter</li> </ul>
	<b>Thermal energy meter standard</b>	For thermal energy recording for interior operational purposes and when glycol compensation is required.	<ul style="list-style-type: none"> <li>– Automatic glycol compensation</li> </ul>

## Room units

Product range	Types	Applications	Properties
	<b>Room Sensor</b>	<ul style="list-style-type: none"> <li>– Room temperature measurement, CO<sub>2</sub> and humidity</li> <li>– Display of indoor air quality by means of an LED (22RT)</li> </ul>	<ul style="list-style-type: none"> <li>– Passive / active</li> <li>– Temperature range: 0...50 °C</li> <li>– CO<sub>2</sub>: 0...2'000 ppm</li> <li>– Humidity: 0...100%</li> </ul>
	<b>Room control unit</b>	Room temperature measurement incl. setpoint adjustment.	<ul style="list-style-type: none"> <li>– Passiv</li> <li>– Temperature range: 0...50 °C</li> </ul>
		<ul style="list-style-type: none"> <li>– Room temperature measurement, CO<sub>2</sub> and humidity</li> <li>– Setting the setpoint for temperature and fan stage</li> <li>– Display of indoor air quality by means of an LED</li> </ul>	<ul style="list-style-type: none"> <li>– Active</li> <li>– Operation per ePaper touch display or via Smartphone (Display App)</li> <li>– Temperature, CO<sub>2</sub> and humidity</li> <li>– 0...10 V, MP-Bus, Modbus und BACnet</li> </ul>

# All inclusive.

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

Always focusing on customer 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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