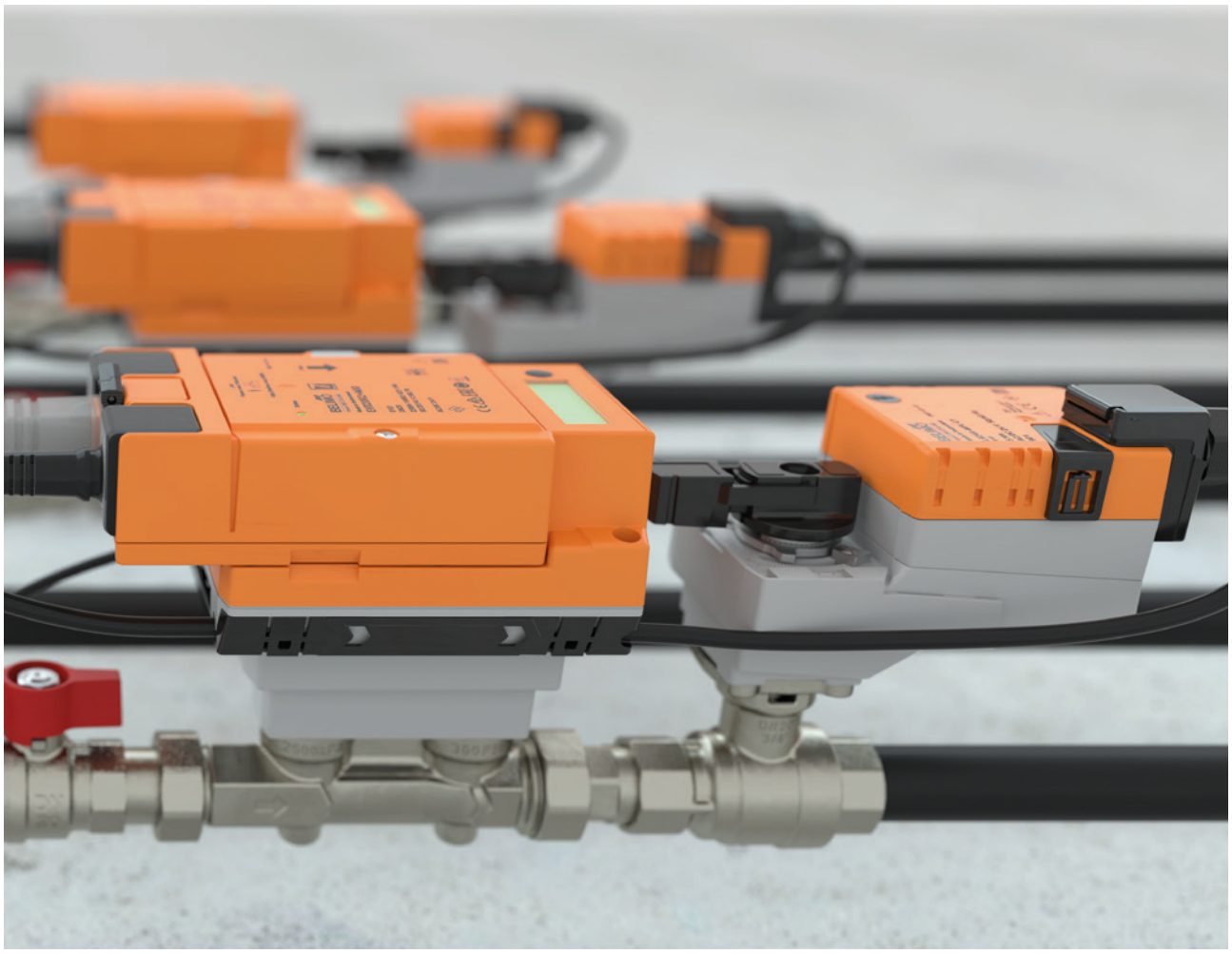
8 reasons to use pressure-independent control valves.

Belimo Energy Valve™, EPIV, PIQCV and 6-way EPIV

BELIMO

Constant flow rate despite pressure fluctuations.



Due to permanent dynamic hydronic balancing, pressure-independent control valves from Belimo ensure lifelong efficiency in buildings – thus dispensing with balancing valves and complicated manual hydronic balancing. They maintain a constant flow rate through all coils/heat exchangers, adjusting it only when the control signal requests it. This results in significant energy savings. There are no fluctuations in the heating or cooling power, so comfort in the building is ensured. No complicated and tedious calculations of pressure losses, valve characteristic values or valve authorities are needed. With the pressure-independent valves from Belimo, you save time and costs in design, installation and building operation.

Training videos on pressure-independent valves

Contents.

1 Valve sizing made easy

2 Reduced installation work

3 User-friendly commissioning

4 Automatic hydronic balancing

5 Invariably correct quantity of water

6 Trouble-free operation

7 Immediate efficiency enhancement

8 Wide range of control options

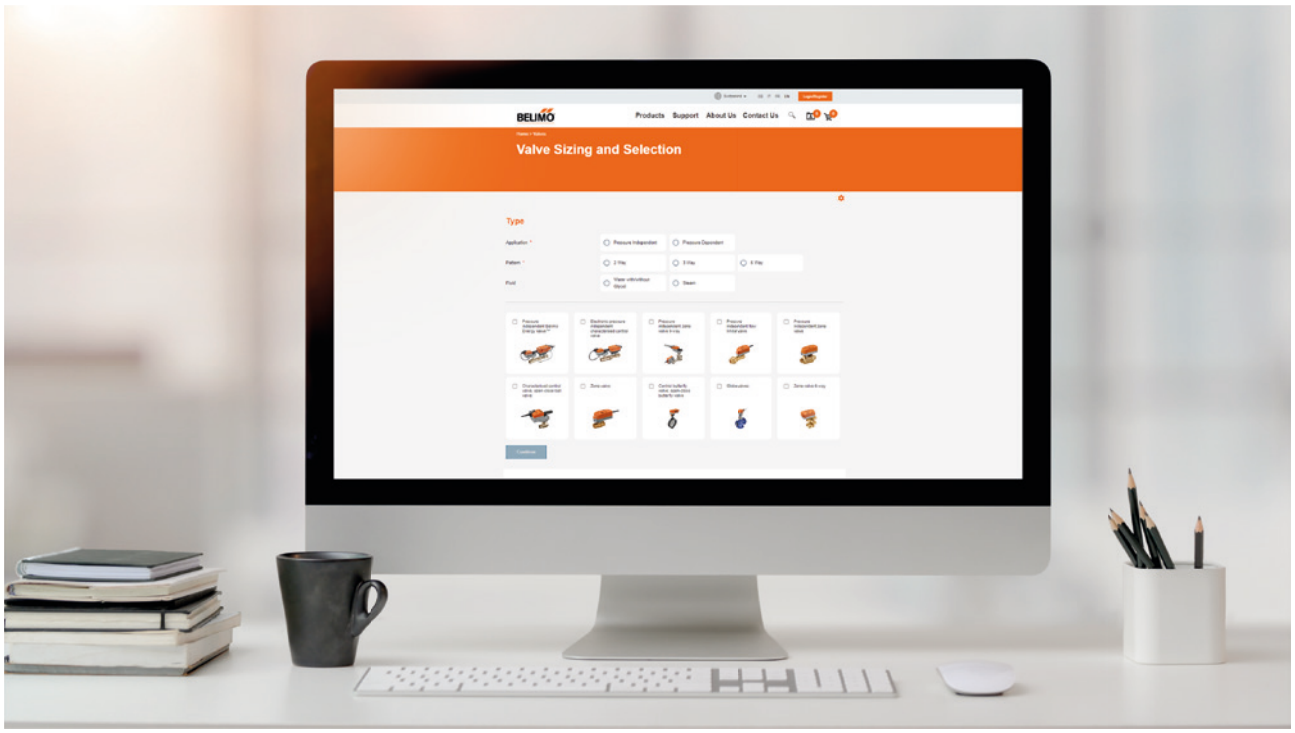
1. Valve sizing made easy.

No more complicated calculations

The valves from Belimo can be conveniently dimensioned through our website with the "Valve sizing and selection" tool. The correct valve is displayed, based on the desired flow rate. Complicated calculations of valve authorities and valve characteristic values are a thing of the past.

BENEFITS

- No complicated and tedious calculation of pressure losses, valve characteristic values or valve authorities
- Time-saving dimensioning of the valves for the desired maximum flow rate using the "Valve sizing and selection" tool from Belimo



2. Reduced installation work.

Quick, tool-free mounting

With the mechanical pressure-independent PIQCV, the actuator can be mounted without tools.

BENEFITS

– All-in-one valve (open/close valve, balancing valve, control valve)

Time savings due to all-in-one solution

Control valves from Belimo are based on ball valve technology, which means they close air-bubble tight. Pressure-independent valves from Belimo eliminate the need to use an additional balancing valve. The electronic pressure-independent valves combine the functions of shutting off, balancing and controlling in a single compact unit. This leads to up to 75% installation time savings compared to field devices requiring individual installation. The Belimo Energy Valve™ provides even more benefits, such as energy monitoring and IoT-based cost accounting.

Shutting off
No leakages due to a characterised control valve that is air-bubble tight.

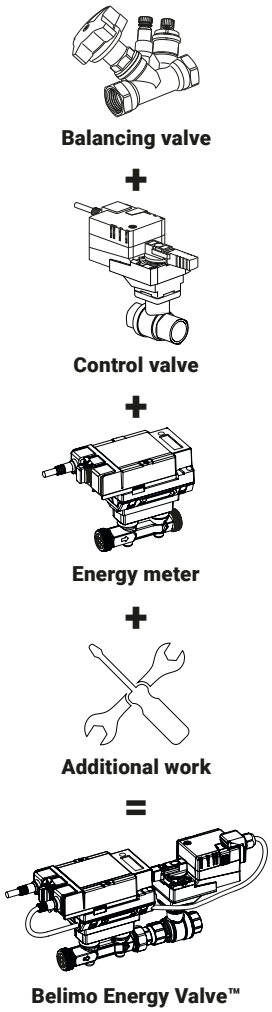
Balancing
Pressure-independent valves always ensure the correct quantity of water – even in case of differential pressure changes and during partial load operation.

Controlling
Control of valve position, flow rate and power for perfect heat exchanger control.

Measuring
Depending on the selected device, flow rate, differential temperature or glycol content are measured.

Energy monitoring
Optimisation potential is identified through the recording of all system data.

Billing
Ready for IoT-based cost accounting.



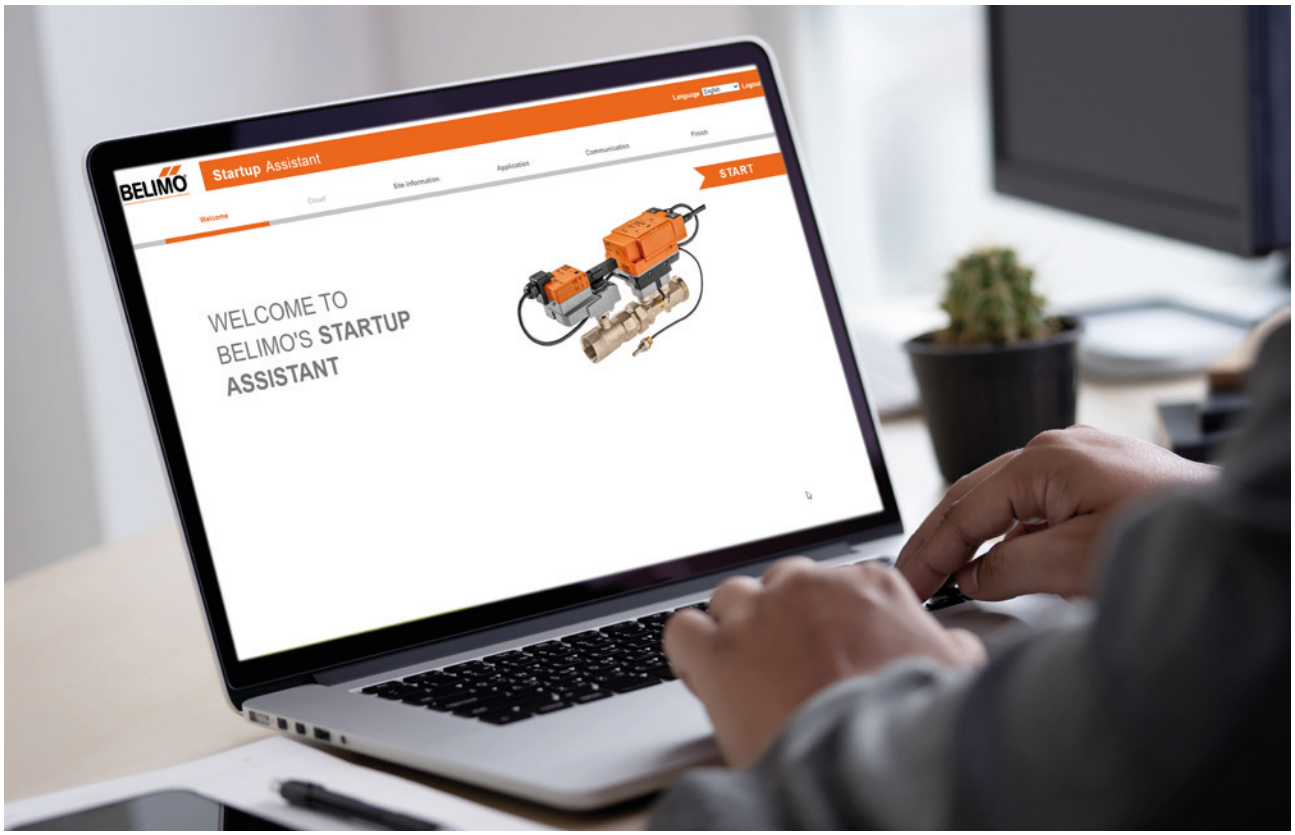
3. User-friendly commissioning.

Modern parametrisation

With the Belimo Assistant 2, the innovative valve-actuator units can already be parametrised via Bluetooth or NFC before installation. Work at dangerous positions, e.g. on ladders, is thus minimised. Once a connection to the device has been established, the rest of the work can be carried out safely from the ground. In addition, the Belimo Energy Valve™ is equipped with an integrated web server with a user interface that can be used for commissioning in just a few steps with the intuitive startup assistant.

BENEFITS

- Parametrisation before installation with user-friendly tools (NFC, Bluetooth, Ethernet)
- High flexibility due to free choice of interfaces and parametrisation options



Belimo Assistant 2

4. Automatic hydronic balancing.

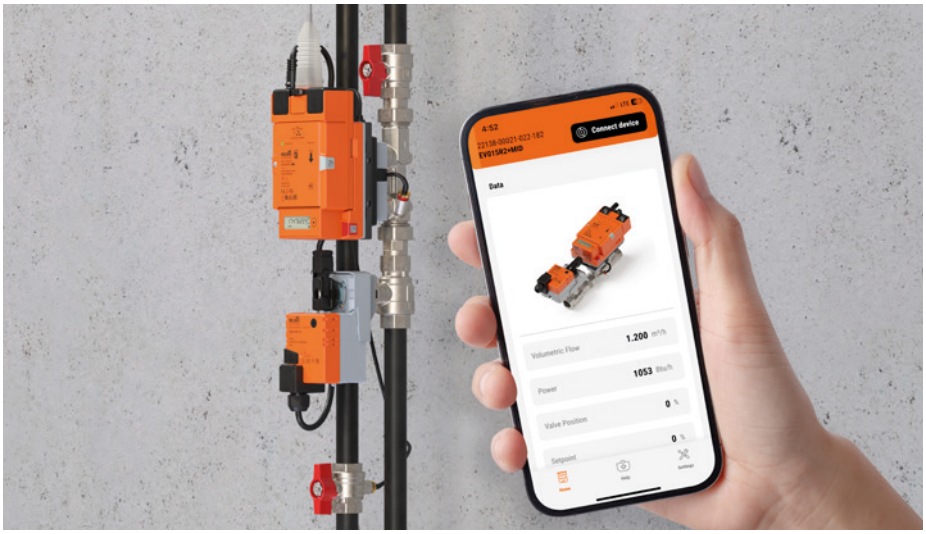
The correct amount of energy at the right location

The conditions in hydronic distribution networks undergo continuous changes. This can lead to either overflow or underflow at the consumer. Pressure-independent valves can counteract this.

With the aid of the Belimo Assistant 2, values such as control type, maximum flow rate and other settings can be defined, automatically implementing hydronic balancing during operation. This means that manual hydronic balancing with presetting and follow-up measurement becomes a thing of the past. The necessary information can be written to NFC-capable devices from Belimo prior to installation. This simplifies commissioning considerably, as the devices are then immediately ready for operation.

BENEFITS

- Hydronic balancing requires 66 % less time compared to static control valves
- With the pressure-independent quick compact valve PIQCV, hydronic balancing takes place according to a simple presetting at the valve



5. Invariably correct quantity of water.

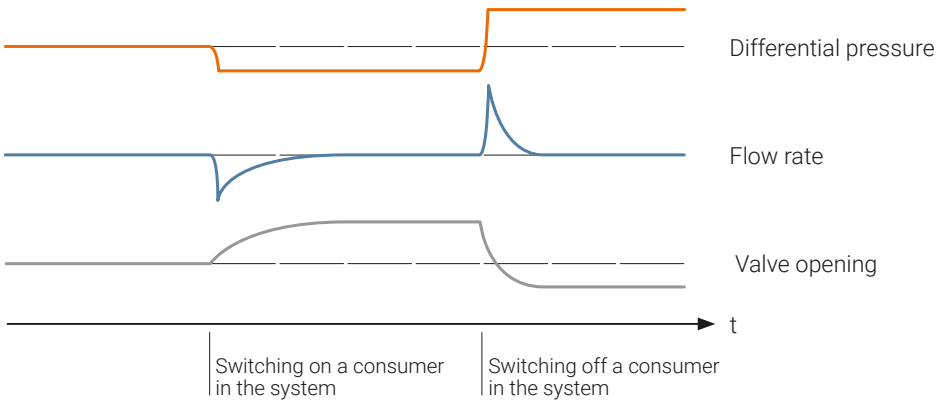
Compensating for pressure fluctuations

Energy, whether heat or cold, is frequently transferred by a heat or cold exchanger. To enable perfect energy transfer, it is important to ensure that the water flow rate is always correct.

Pressure-dependent valves such as balancing valves cannot compensate for pressure fluctuations during operation, which in turn results in flow rate fluctuations in the system. Pressure-independent valves, mechanical or electronic, can on the other hand ensure the desired flow rate and are therefore independent of changes in the system. Precisely this requirement can be met by means of flow control with the electronic pressure-independent EPIV control valves and the Belimo Energy Valve™.

BENEFITS

- Pressure fluctuations do not affect the controlled quantity of water
- No increased flow velocity and thus no noise formation or oversupply



The flow rate is controlled to remain constant.

6. Trouble-free operation.

Transparent and proven

Energy-efficient system operation is guaranteed throughout the entire service life by measuring, calculating and visualising important system data and implementing the corresponding optimisation measures. The Belimo Energy Valve™ can be connected to the Belimo Cloud, thus providing easy access to data and to the performance reports made available by Belimo – anytime, anywhere.

Easy system expansion

System expansion with pressure-independent valves is simple and unproblematic, as no other heating/cooling groups need to be taken into account. The system is self-regulating and always guarantees the correct flow rate without diminishing comfort.

The future of HVAC systems is connected

Pressure-independent valves from Belimo support all conventional bus protocols used in building automation (BACnet MS/TP and Modbus RTU, Belimo MP-Bus). The Belimo Energy Valve™ can be connected via BACnet/IP or with a converter with the M-Bus while simultaneously being supplied with voltage via an Ethernet cable with PoE (Power over Ethernet).

BENEFITS

- Reduced work required for hydronic planning for a system expansion with pressure-independent valves
- No follow-up measurement and regulation of individual groups following the system expansion (e.g. building conversion)
- Trouble-free operation due to transparency and proven technology with additional, comprehensive fault detection
- The integrated condensation monitoring (optional) detects condensation at an early stage and protects systems from moisture damage

7. Immediate efficiency enhancement.

Reduction of energy consumption

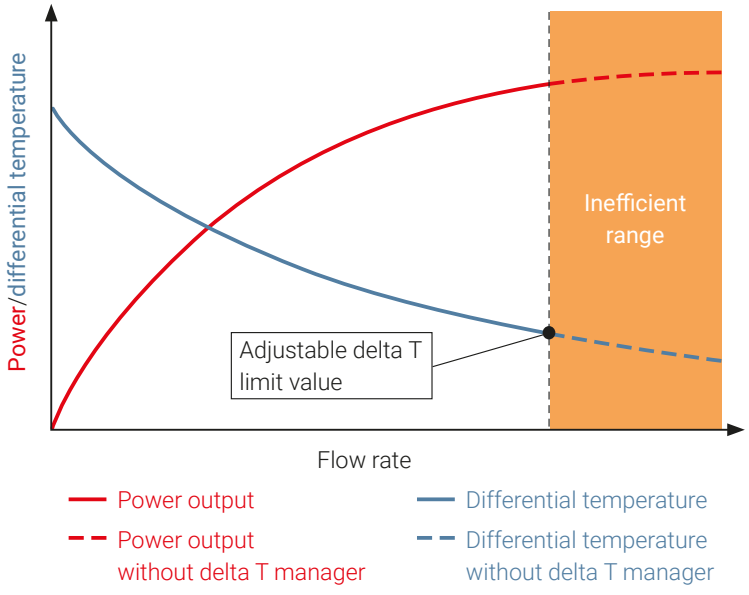
The system can be easily optimised as pressure-independent valves automatically compensate for any fluctuating differential pressure across the valve. With the help of a building management system, which collects and checks all control signals from either the Belimo Energy Valve™ or the electronic pressure-independent valve EPIV, the branch can be identified according to which the pump head shall be optimised for the current operating point. For optimisation, the pump pressure can be reduced until the valve has typically reached an opening position of 90%, thus causing the pump to consume as little energy as possible.

BENEFITS

- Reduction of energy consumption at the same level of comfort
- Active prevention of the low delta T syndrome through the monitoring of all the necessary data
- Optimum operating point for the energy exchanger

Prevention of low delta T syndrome

The delta T manager integrated in the Belimo Energy Valve™ is a function that continuously measures the differential temperature and compares it with the system-specific limit value. If it falls below this limit value, the Belimo Energy Valve™ automatically adjusts the flow rate so that only the quantity of water needed to establish the desired power is used. As a result, the integrated logic prevents the occurrence of low delta T syndrome and ensures maximum comfort with the lowest possible energy consumption. Energy exchangers can thus work in the optimum design point or operating point and have maximum efficiency.



8. Wide range of control options.

Type of control, depending on requirement

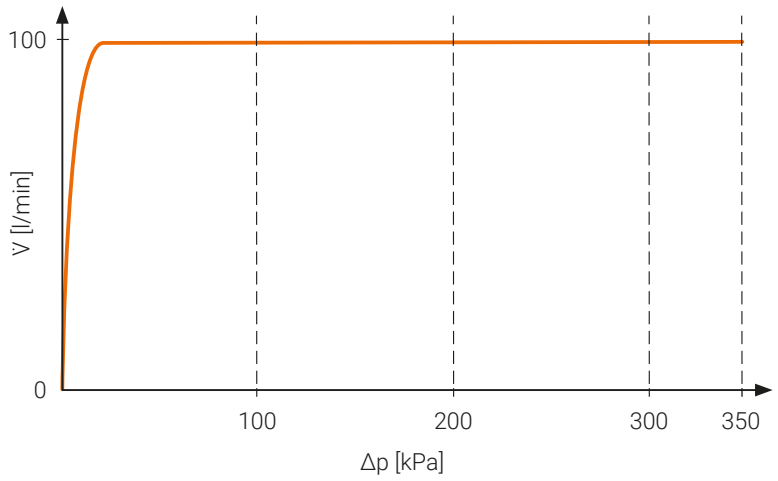
Depending on requirements, various types of control can be selected with the EPIV an the Belimo Energy Valve™.

BENEFITS

- Control options adapted to the market enable the best and most efficient control
- The power control of the Belimo Energy Valve™ eliminates any influence of differential pressure and temperature fluctuations on the power of the heat exchanger

Position control

The EPIV and the Belimo Energy Valve™ work like a pressure-dependent valve. The actuator is positioned based on the flow rate control signal.

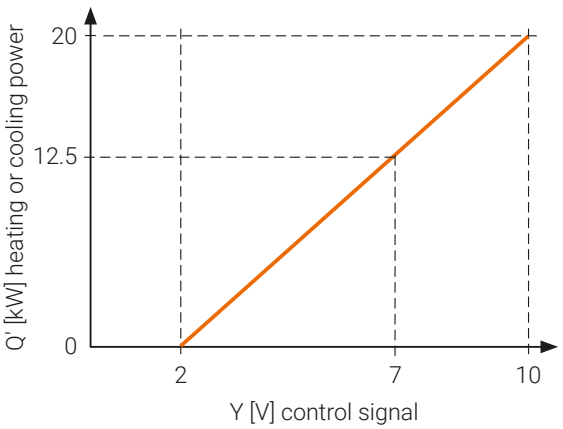


Flow control

EPIV and Belimo Energy Valve™ work as a pressure-independent control valve. The valve responds to all pressure and/or flow rate changes, and the actuator positions the valve to maintain the flow rate setpoint based on the flow rate control signal.

Power control

The Belimo Energy Valve™ controls the flow rate to maintain the thermal power setpoint. If the measured power is below the setpoint, the flow rate is increased. If the measured power is above the setpoint, the flow rate is reduced as long as the defined $\dot{V}_{max}$ value is not exceeded.



Pressure-independent products from Belimo at a glance.

With the pressure-independent valve technology from Belimo, only one valve is required to maintain the correct flow rate through every circuit. Every valve is supplied ex works with a flow rate setting that can be changed on-site so that no additional balancing is required. The system functions perfectly from the very start. Hydronic balancing remains in effect when new circuits are added to a system due to expansions.

Feature	PIQCV	6-way EPIV	EPIV	Belimo Energy Valve™
Position feedback	■	■	■	■
Monitoring of glycol and air bubbles		■	■	■
Energy monitoring				■
Hydronic balancing	■	■	■	■
Energy meter				■
Position control	■	■	■	■
Flow control	■	■	■	■
Power control				■
Delta T manager				■
Power supply via Ethernet (PoE)				■
Cloud analytics				■
Live data		■	■	■
Data recording				■
Characterised control valve technology	■	■	■	■
Air-bubble tight	■	■	■	■
Condensation monitoring		■		
Parametrisation in the field	□	■	■	■
Parametrisation prior to installation	□	■	■	■
BACnet MS/TP, Modbus RTU, MP-Bus and analogue	■	■	■	■
BACnet/IP and Modbus TCP/IP				■
Belimo Assistant 2	□	■	■	■
Web server				■

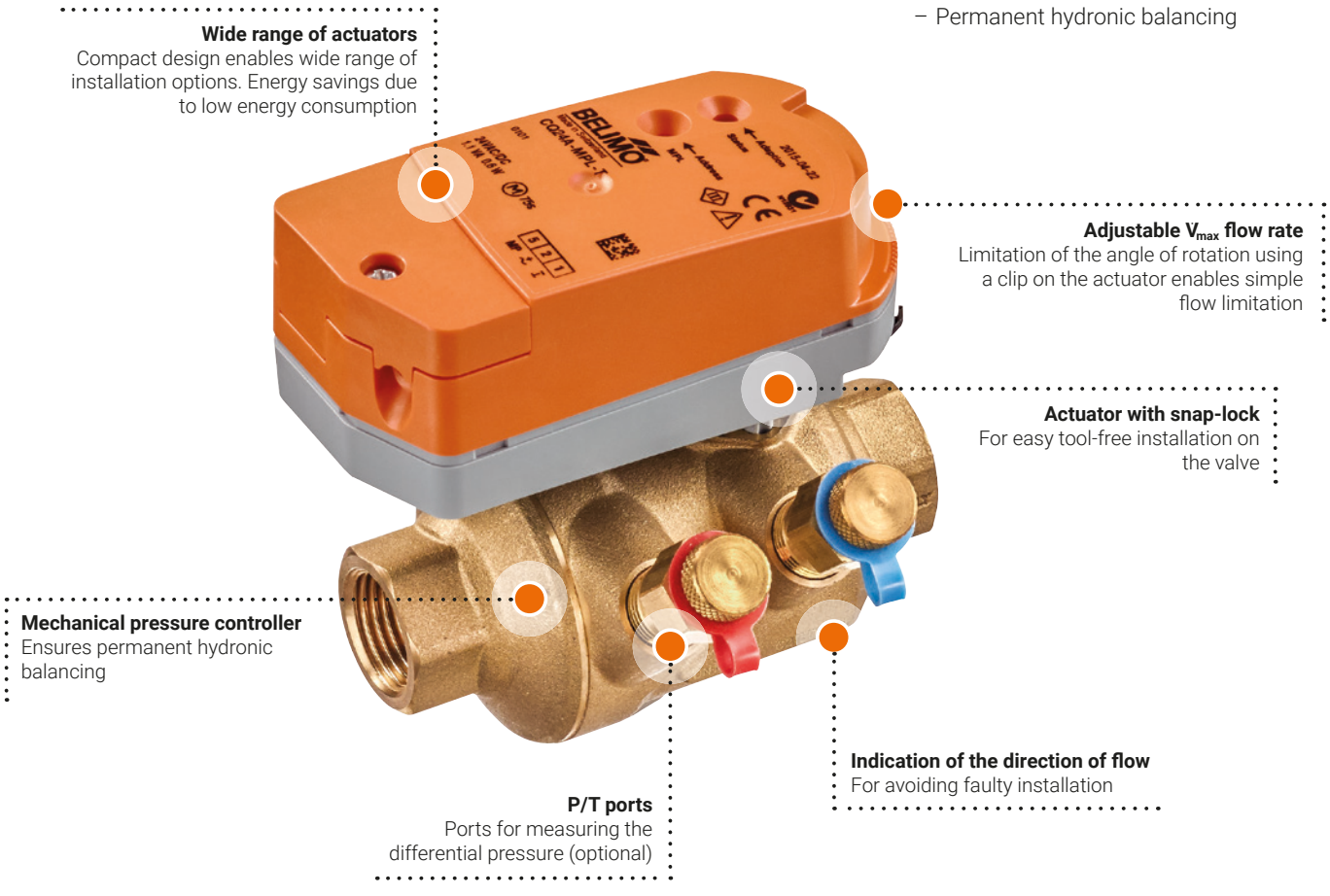
□ Possible only with CQ24A-BAC

PIQCV

The PIQCV combines a differential pressure controller with a 2-way control valve to provide a specific flow rate for each opening angle, independently of system pressure fluctuations. The valve meets the function of a balancing and control valve in a single unit. Available in sizes DN 15, 20, and 25.

BENEFITS

- Easy-to-adjust maximum flow rate $\dot{V}_{max}$
- Wide range of installation and application options due to compact design
- Low required differential pressure for optimised pump power and pump current savings
- Reduced planning effort and time savings due to simple valve sizing
- Optimum room comfort because the end devices are neither over-supplied nor under-supplied
- Permanent hydronic balancing



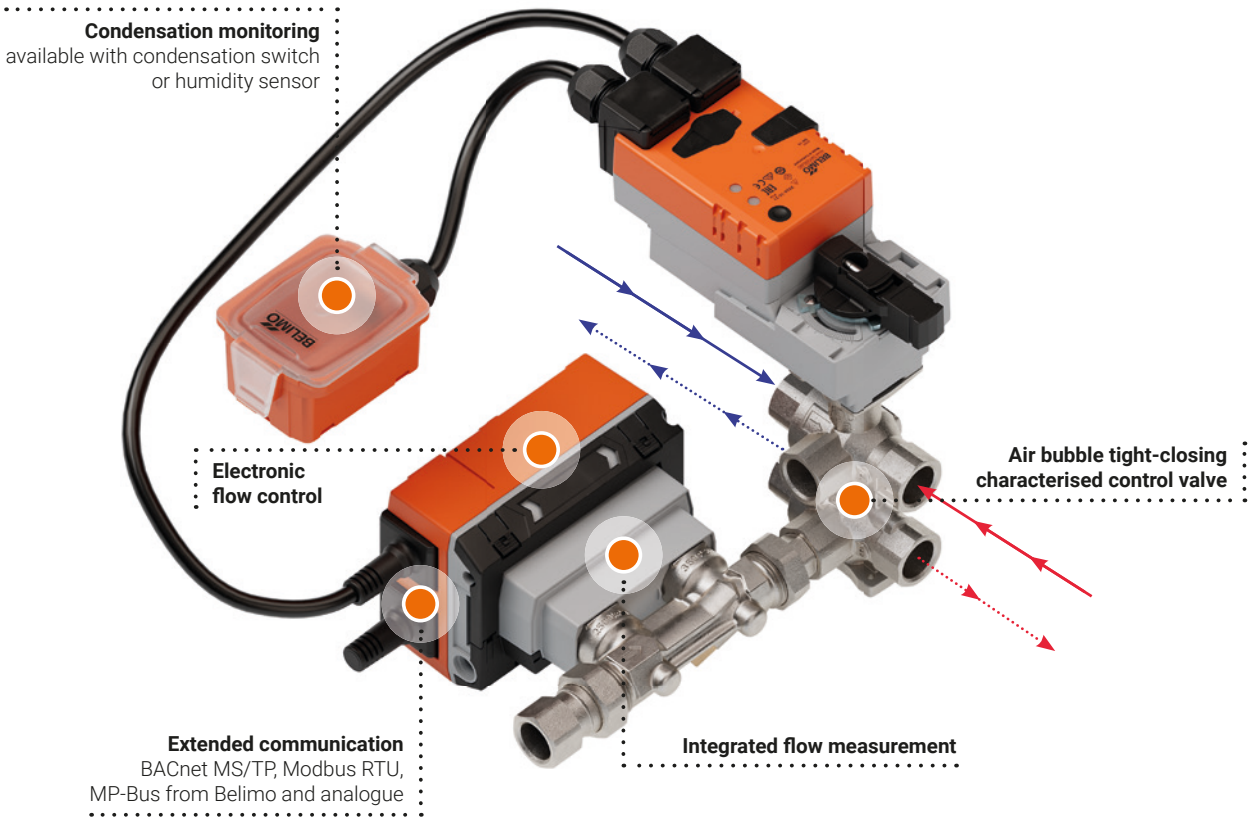
6-way zone valve EPIV

The electronic pressure-independent 6-way EPIV from Belimo combines the advantages of a 6-way zone valve with the functions of the electronic pressure-independent valve. Thanks to the ultrasonic flow measurement, the right amount of water is always guaranteed, which ensures a high level of room comfort. Commissioning is quick and intuitive using the Belimo Assistant 2 (NFC), even if the device is not connected to the power supply. Available in sizes DN 15/20/25.

Belimo's electronic pressure-independent 6-way zone valve is now available with intelligent condensation monitoring. If condensation occurs due to low flow temperatures, moisture damage can be prevented thanks to the integrated logic.

PROS

- Time-saving and safe valve selection in accordance with maximum flow rate for each sequence
- Automatic, permanent hydronic balancing through the valve
- Securing the correct amount of water with differential pressure changes and with partial load
- Maximum plant safety with integrated pressure-release function (Patent: EP3143315B1)
- Versatile control options, simple commissioning and control via NFC

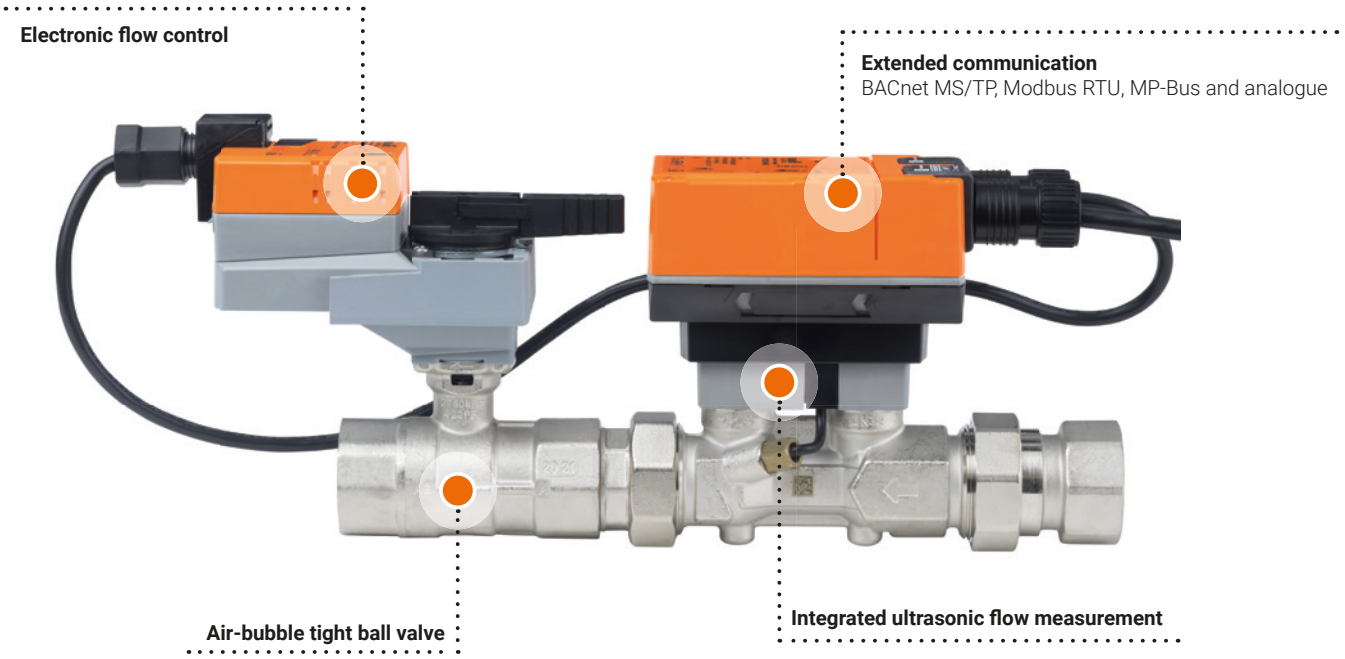


EPIV

The EPIV is an electronic pressure-independent control valve with an integrated flow meter and a powerful control algorithm. The EPIV ensures hydronic balancing to maintain the system power. The integrated control signal maintains a flow rate setpoint independent of system pressure fluctuations, for which the algorithm modulates the valve based on the measured flow rate. The valves are dimensioned and selected according to the flow rate needed by the heat or cooling consumer. Valve authority and Kvs calculations are not required. Electronic pressure-independent valves typically have a much lower pressure drop than mechanical ones do and therefore require a significantly lower differential pressure to achieve the intended flow rate, thus saving energy. Available in sizes from DN 15 to 150.

BENEFITS

- Ultrasonic flow measurement technology and glycol compensation enable proper flow measurements
- A temperature sensor integrated in the flow sensor body enables the precise measurement of the fluid temperature and the monitoring of the glycol mixture
- Pressure-independent operation makes manual balancing valves superfluous and reduces installation and commissioning work
- Digital work sequences support the commissioning and operation of devices with the Belimo Assistant 2
- The app enables commissioning via NFC and the reading out of the commissioning report

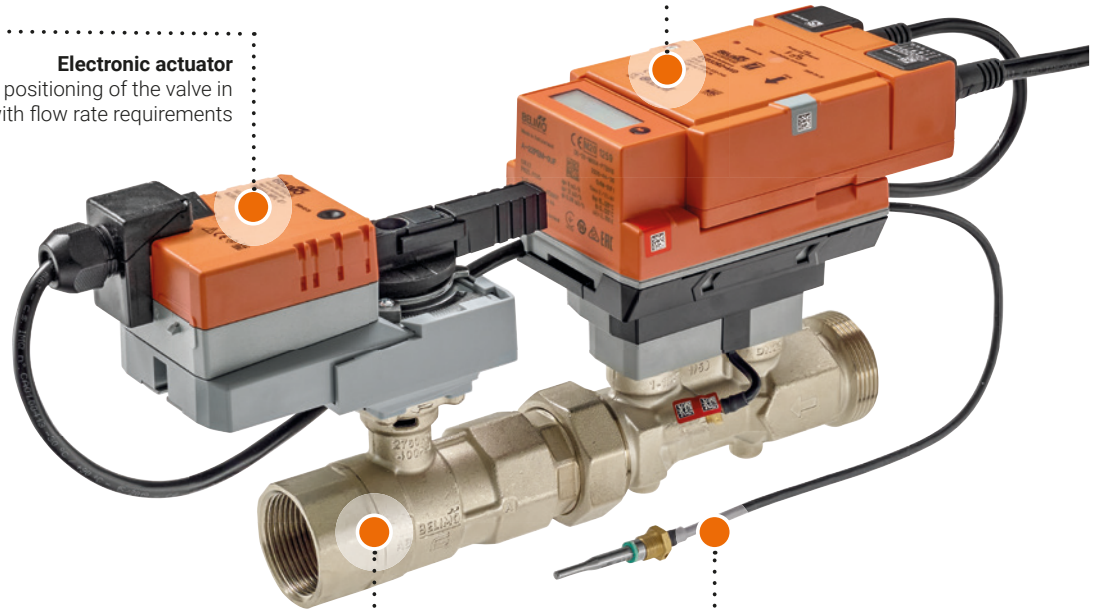


Belimo Energy Valve™

Integrating the thermal energy meter into the energy valve (DN 15...50) enables simple energy monitoring and transparent cost accounting in accordance with EN 1434/MID. The Belimo Energy Valve™ combines the precise measurement and monitoring of energy consumption in a heating and cooling system with direct IoT-based cost accounting in a single device. The connection to the Belimo Cloud provides lifelong data storage, setpoint recommendations and power reports. Local data storage and trending functions in combination with BACnet, Modbus, MP-Bus and analogue communication enable monitoring and optimising the energy consumption through the building automation system. Available in sizes from DN 15 to DN 150.

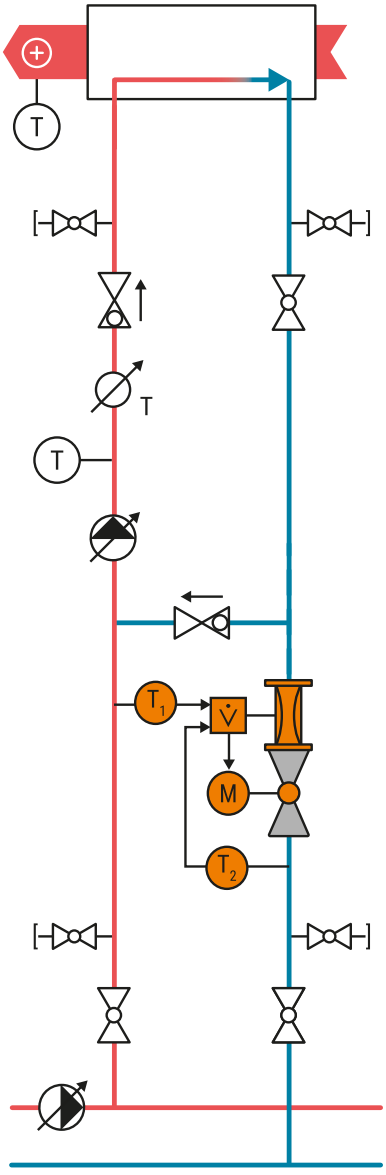
BENEFITS

- Control the valve position, flow or power, for optimal operation of the heat exchanger
- Automatic compensation of differential pressure changes at full and partial load
- Absolute tightness in the closed position, thanks to ball-valve technology
- Simple setup and parametrisation with the Belimo Assistant 2
- Power supply and data transmission directly via Ethernet cable (PoE)
- Continuous monitoring of glycol content during system operation. In addition, energy measurement always takes place with the correct flow rate

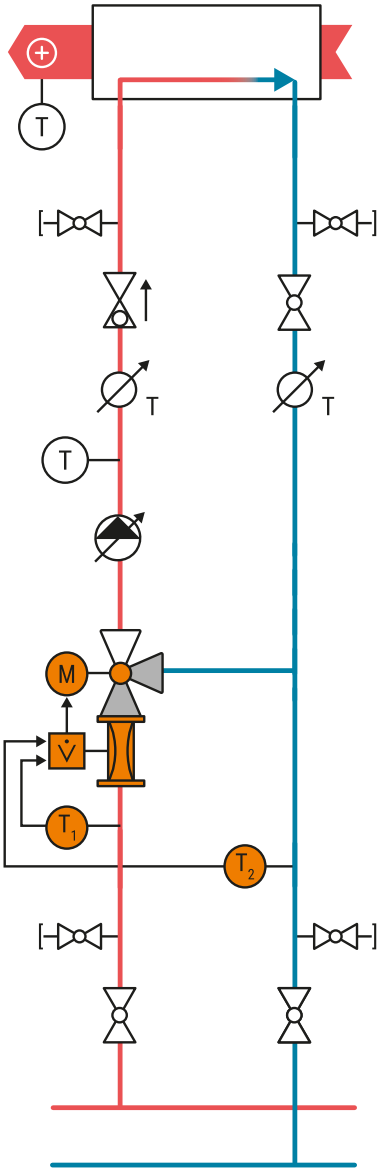


Basic hydronic circuits for heating applications with Belimo Energy Valve™

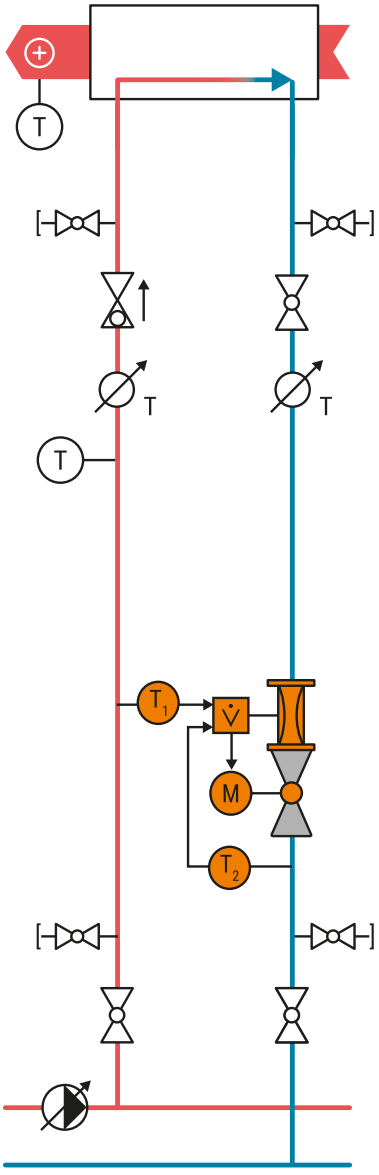
The mixing circuit and the injection circuit with its 2-way valve control the quantity of water in the consumer circuit. Adapting the supply temperature at the consumer controls the power output of the heating coil, which operates at a constant volume. In the throttle circuit, the supply temperature to the heating coil is not changed. The heating power is controlled by changing the flow rate in the consumer circuit.



Injection circuit



Mixing circuit



Throttling circuit

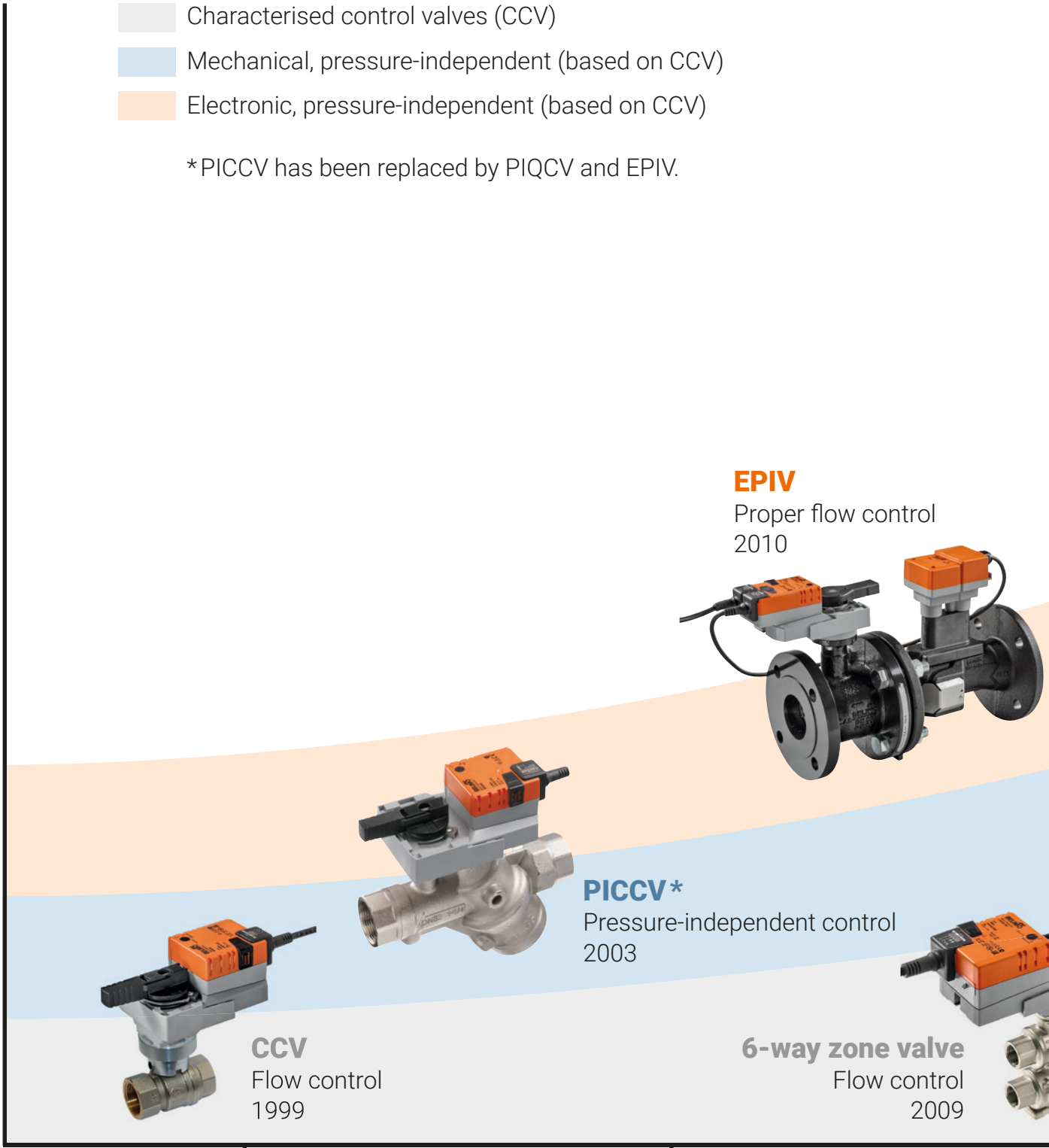
Evolution of the valves from Belimo since 1999.

Characterised control valves (CCV)

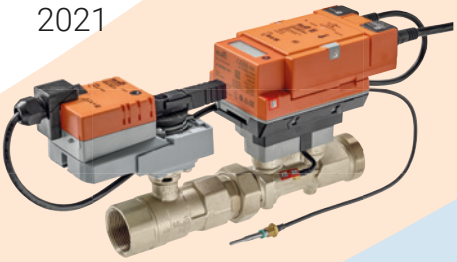
Mechanical, pressure-independent (based on CCV)

Electronic, pressure-independent (based on CCV)

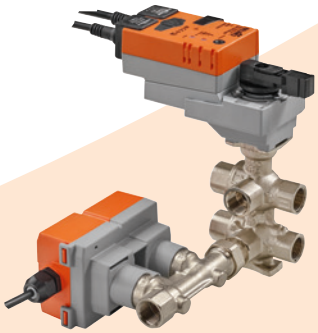
*PICCV has been replaced by PIQCV and EPIV.



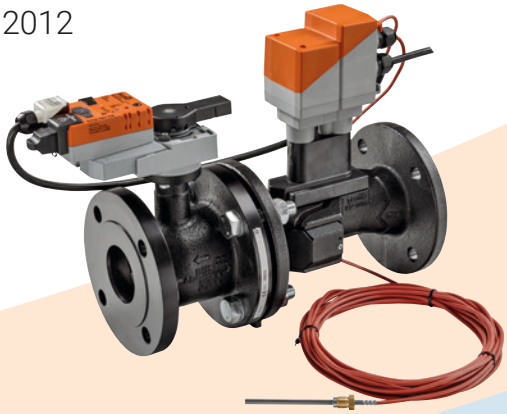
Belimo Energy Valve™ 4
Energy billing
2021



6-way zone valve EPIV
Pressure-independent
zone valve
2015



Belimo Energy Valve™
Power control and
delta T management
2012



PIQCV
Pressure-independent
quick compact valve
2015

3-way control butterfly valve
Flow control
2018

QCV
Compact zone valve
2013

2010 2015 2020

All inclusive.

Belimo is the global market leader in the development, production, and sales of field devices for the energy-efficient control of heating, ventilation and air-conditioning systems. The focus of our core business is on damper actuators, control valves, sensors and meters.

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

EN – 03.2024 – Subject to technical modifications

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