

Energy savings
you can see.

Applications room and zone control

Water applications
Edition 2021-06/A

Definition and positioning of Belimo ZoneTight™

Belimo ZoneTight™ designates Belimo regulating devices that are used for room and zone applications in air-conditioning technology.

ZoneTight is made up of two terms:

Zone stands for room and zone applications.

Tight stands for a tightly sealing valve.

The Belimo ZoneTight™ zone valves are based on the characterised control valve technology that has been proven a million times over and optimally meet the requirements.



Energy efficient

- Tight-sealing characterised control valves prevent valve leakages and thus energy losses
- Highly efficient motor technology reduces the current consumption and guarantees a long service life



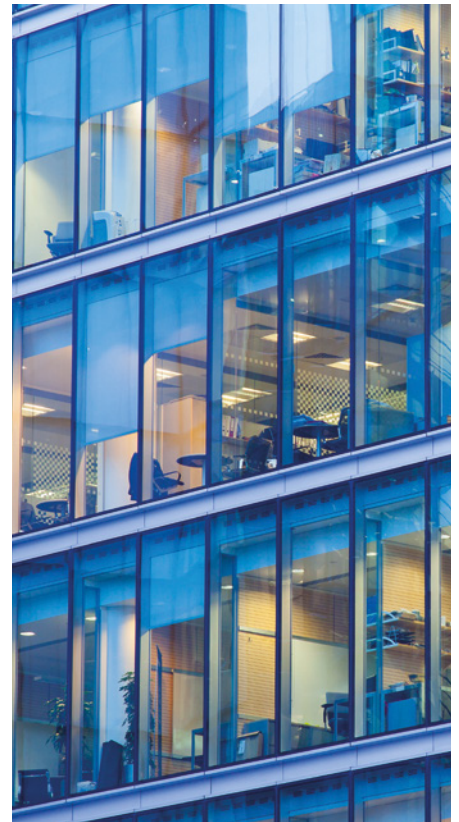
Fail-safe

- The ball valve technology is resistant to contamination
- Tried-and-tested, maintenance-free valve and actuator technology from Belimo guarantees high operating safety and low operating costs
- 5-year warranty on all Belimo products



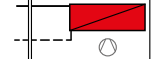
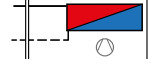









Compact

- Extremely compact design with minimum space requirements in terms of height and width enables space-saving solutions for use in rooms/zones



Room and zone applications

Products and applications

	Fan coil	Fan coil (heating and cooling)	Chilled ceiling	Chilled and heating ceiling	Floor heating	Radiator
						
	■■■	■	■■■	■	■■■	■■■
	■	■	■■■	■	■	
	■■■	■	■■■	■	■■	■■
		■■■		■■■		
		■■■		■■■		

- common use
- recommended use
- possible use

Compact zone valve QCV. Robust, flexible, tight-sealing.

The space-saving QCV (quick compact valve) is available as a 2-way characterised control valve with nominal diameters of DN 15, DN 20 and DN 25 and as a 3-way changeover ball valve with the same nominal diameters.

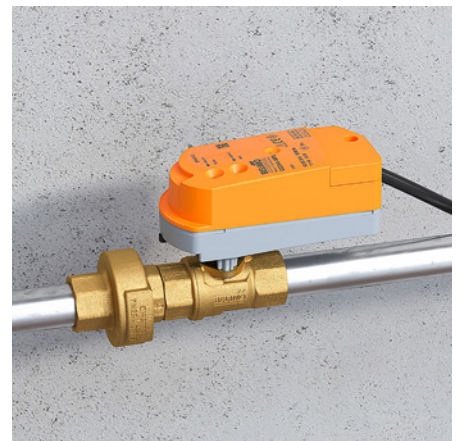
- Tight-sealing characterised control valve prevents circulation losses
- Manually adjustable k_v values with the 2-way characterised control valves
- Automatic adaption to set k_v value
- Minimum power consumption during operation and in standby mode
- Compatible with 24 V, 230 V, open/close, 3-point, modulating, MP-Bus, Modbus and BACnet



Pressure-independent flow limiter valve PIFLV. Simple and resistant.

The PIFLV is a pressure-independent flow limiting valve that was specially developed for zone applications. The valve offers numerous benefits:

- Automatic and permanent hydronic balancing
- High flow capacity even with small nominal diameters
- Design is not sensitive to contamination
- Tight-sealing ball valve prevents circulation losses
- Low power consumption during operation and in standby mode
- Short running times



Pressure-independent zone valve PIQCV. Compact, flexible and efficient.

The pressure-independent PIQCV (pressure-independent quick compact valve) supplies heating/cooling elements constantly with exactly the required amount of water.

- Optimum room comfort since the end devices are neither over-supplied nor under-supplied
- High energy efficiency thanks to low required differential pressure
- Lower planning outlays thanks to rapid and safe valve design
- Time savings through automatic and permanent hydronic balancing
- Flexible, versatile installation options thanks to a compact structure



Precise 6-way zone valve. Compact, safe, economical.

The 6-way characterised control valve is designed to control a combined heating/cooling element in a 4-pipe system. Its unique technology revolutionises the structure of these systems and replaces four 2-way valves, four actuators and two control units.

- Versatile K_{vs} combinations enable precise and effective control
- Compact and can easily be installed in low ceilings
- No installation errors as it is impossible to mix up the valves
- Operating safety due to reliable decoupling of cooling and heating circuit
- Maximum plant safety with integrated pressure relief function (patent pending)



Pressure-independent 6-way zone valve. Functional, easy to install, versatile.

The electronic, pressure-independent 6-way zone valve from Belimo brings together the high planning reliability and efficiency of the electronic pressure-independent EPIV valve and the ease of installation of the 6-way characterised control valve.

- Time-saving and safe valve design for each sequence in accordance with maximum volumetric flow
- Automatic, permanent hydronic balancing by the valve
- Ensuring the correct amount of water with differential pressure changes at partial load
- No installation errors as mixing up valves is impossible
- Maximum plant safety with integrated pressure relief function (patent pending)



Guidance








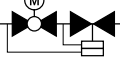



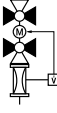


Thank you for your interest in our products. In this brochure you will find information regarding the planning of a building. All Belimo products for room and zone applications are energy-saving, reliable and compact. They enable an optimum room climate with minimum energy consumption.

Please contact us for more information.

All chapters are structured as follows:

- Description of the relevant application
- Bill of material
- Belimo – features and benefits
- Tender text (in a detailed and short form)

Legend

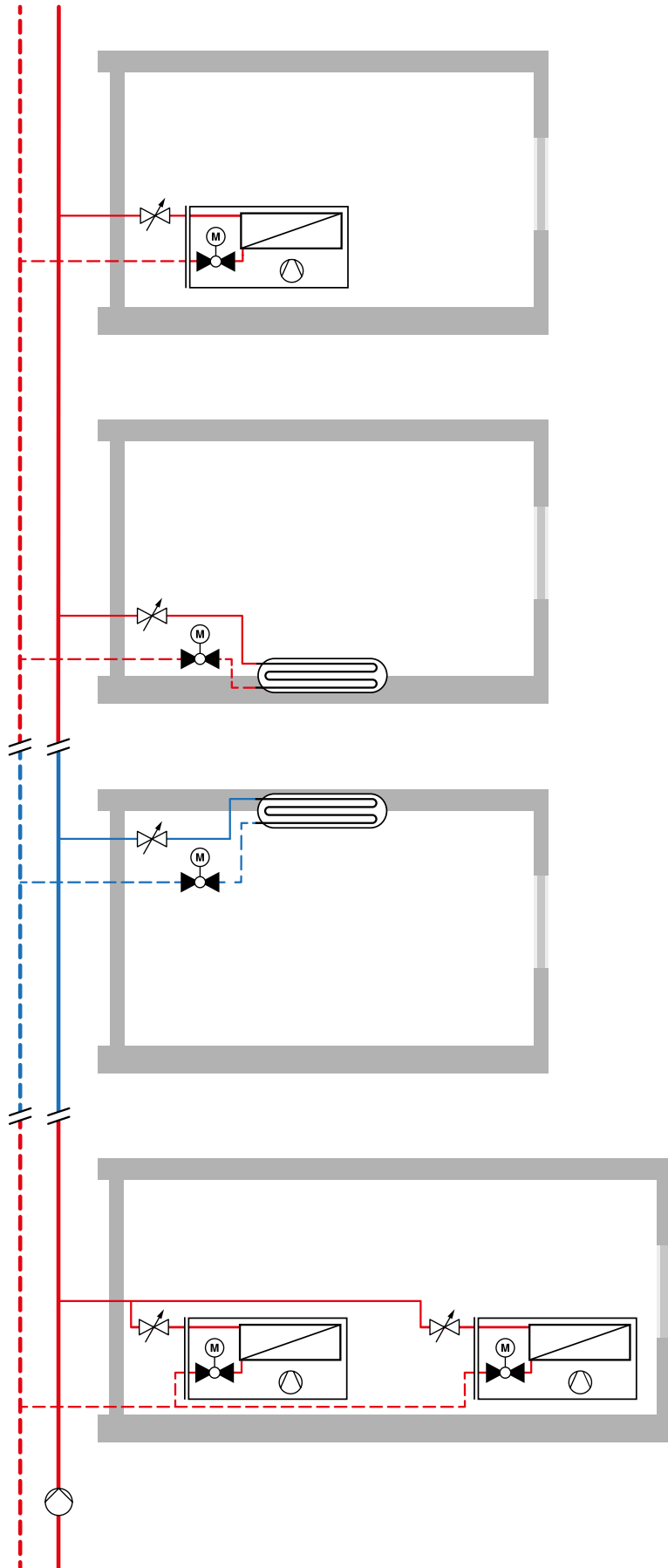
	Room temperature controller		2-way zone valve QCV
	Temperature sensor		3-way zone valve QCV
	Occupancy switch		PIFLV pressure-independent flow limiter valve
	Window contact		Pressure-independent 2-way zone valve PIQCV
	Condensation Sensor		6-way zone valve
	Variable speed pump		Electronic pressure-independent 6-way zone valve EPIV
	Fan		Balancing valve

Disclaimer

Please note that the pictures are examples only and may therefore vary, depending on the type of building. Subject to technical modifications and amendments. Please get in touch with your Belimo contact person to verify the specifications.

Table of Contents

	<u>Page</u>	
<u>Variable-flow 2-pipe system</u>	8	1
<u>Automatically balancing constant-measure 2-pipe system</u>	20	2
<u>Automatically balancing variable-flow 2-pipe system</u>	28	3
<u>Variable-flow 4-pipe system</u>	40	4
<u>Automatically balancing variable-flow 4-pipe system</u>	52	5



1

Variable-flow 2-pipe system

	<u>Page</u>
1.1 Fan coil	10
1.2 Floor heating/radiator	12
1.3 Chilled ceiling	14
1.4 Several fan coils	16
Tender Text	18



1.1 Fan coil

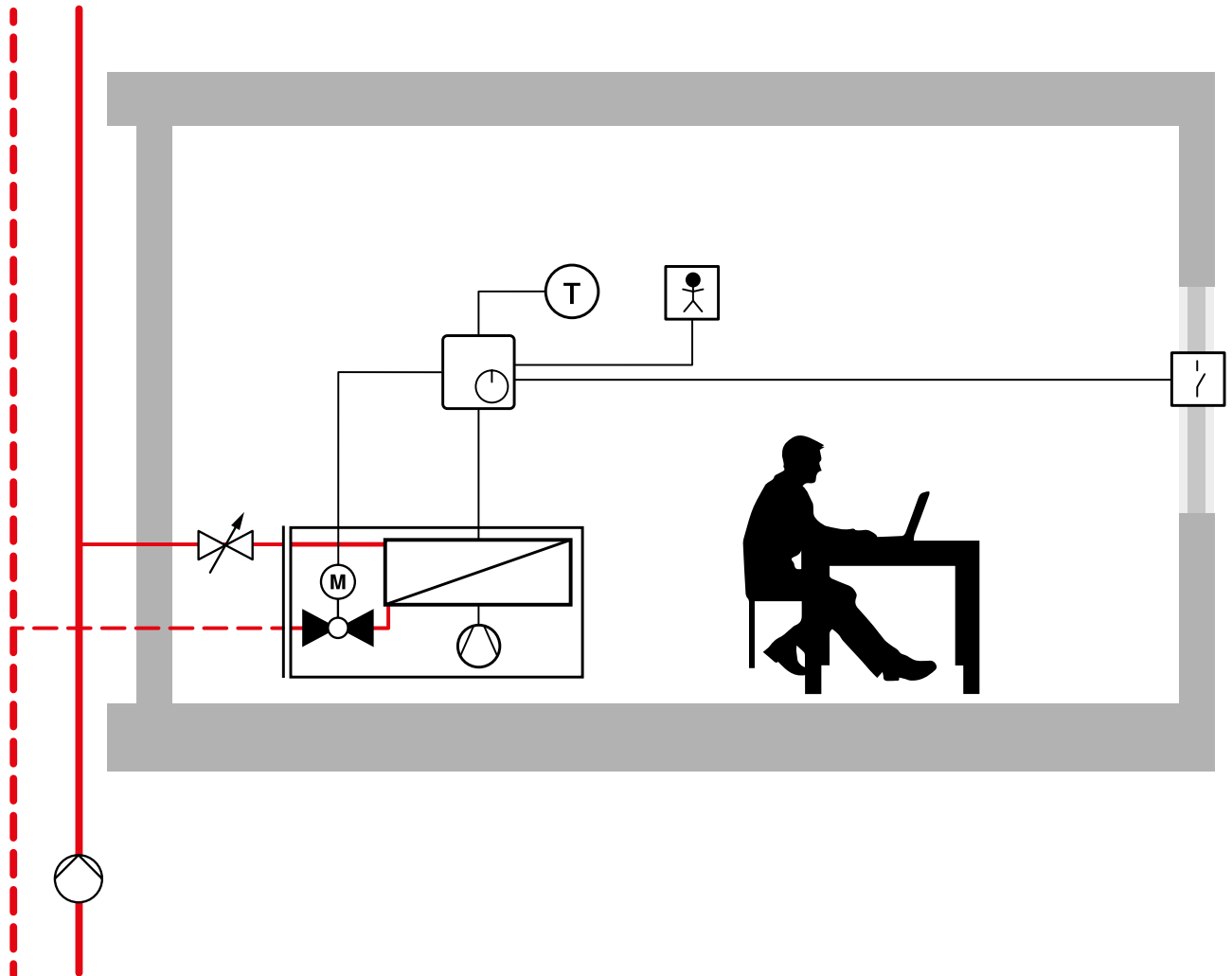


Illustration example

Application description

- Fan coil provides heating energy
- Manual balancing valve for static hydronic balancing of water volume (for full load)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Water and air volume controlled via room temperature controller
- Actuator control options: open/close, 3-point, modulating or via bus communication
- Optional functions: occupancy switch, window contact

Controller

Room temperature controller with:

- Air volume adaptation (3 speeds with 3 DO or modulating with 1 AO)
 - Adaptation of water quantity by means of open/close, 3-point, modulating (0...10 V) or via bus communication
- Optional: integration of an occupancy switch and/or window contact signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
C2..Q.. ¹⁾	2-way zone valve QCV, internal thread, DN ... with adjustable k_v value ...-... m ³ /h	1	
CQ24A-SR ²⁾	Rotary actuator for zone valves, 1 Nm, AC/DC 24 V, modulating	1	
EXT-OC-ZR-C2..Q	Optional: insulation shell for valve C2..Q, 2-way, DN ...	1	
ZR23..	Optional: pipe connector for zone valve, DN ...	2	
ZCQ-E	Optional: spindle extension CQ	1	
	Balancing valve DN ...	1	
	Work service: hydronic balancing	1/2 h	
	Room temperature controller	1	
	Temperature sensor	1	
	Optional sensors: occupancy switch, window contact		

¹⁾ also available with external thread (C4..Q..)

²⁾ other actuator variants available: AC/DC 24 V and AC 230 V, fail-safe, communicative (MP-Bus, BACnet, Modbus)

Belimo – features and benefits

Properties	Benefits
Compact overall structure	Ideal room utilisation and high level of freedom in design
Tight-sealing valve	Complete avoidance of circulation and energy loss
Self-cleaning ball valve	Excellent resistance to contamination, problem-free operation even after long downtimes
Equal-percentage flow characteristic without input step	Can be controlled perfectly even in the lowest partial load range
Manually adjustable k_v values	High flexibility in planning, mounting and during usage phase
Actuator with low power consumption	Energy cost reduction by up to 90% compared to conventional zone valves
5-year warranty	Long-term safety

1.2 Floor heating/radiator

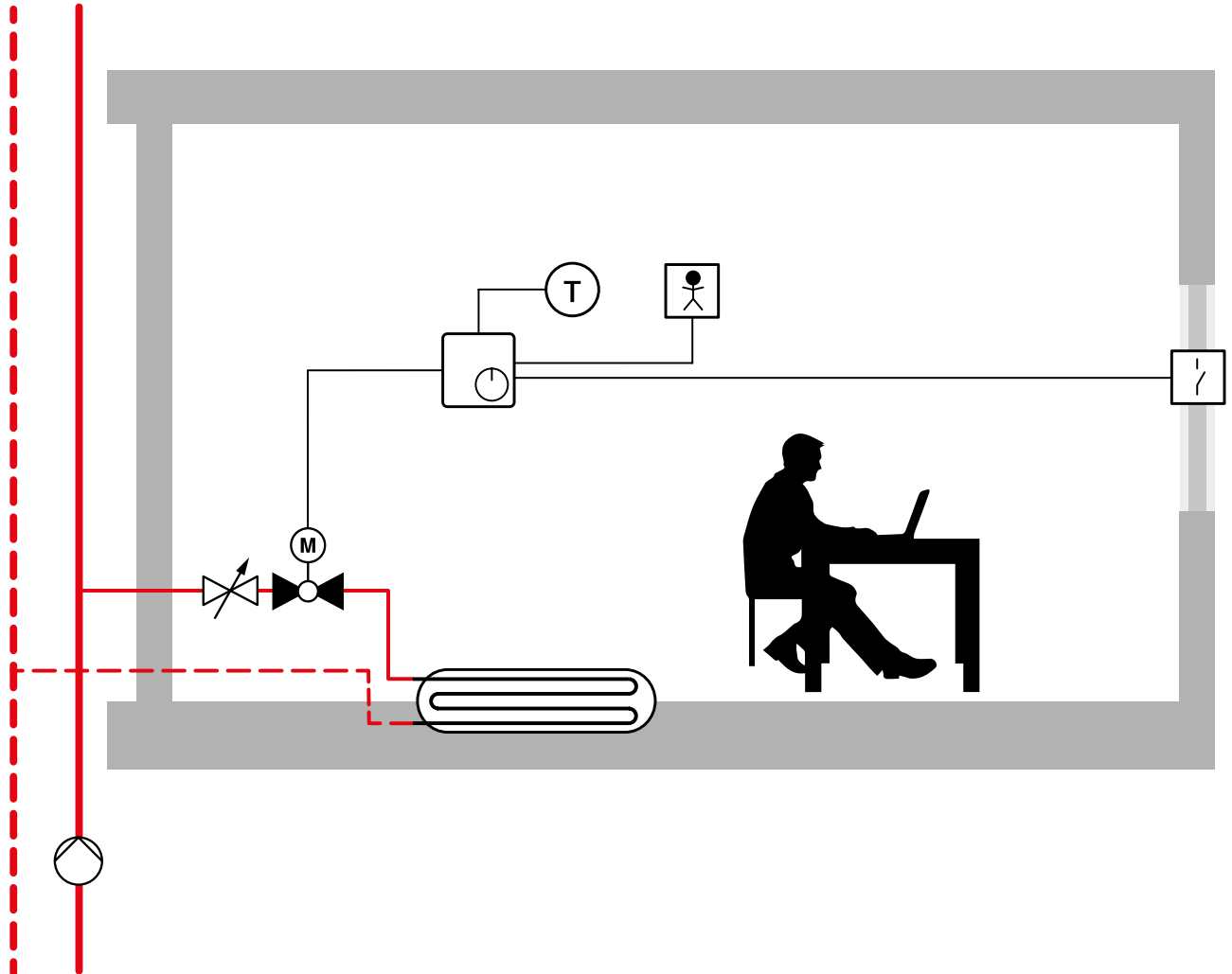


Illustration example

Application description

- Provision of heating energy by means of a heating element mounted on the floor or on the wall
- Manual balancing valve for static hydronic balancing of water volume (for full load)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Water volume controlled via room temperature controller
- Actuator control options: open/close, 3-point, modulating or via bus communication
- Optional functions: occupancy switch, window contact

Controller

Room temperature controller with:

- Adaptation of water quantity by means of open/close, 3-point, modulating (0...10 V) or via bus communication
- Optional: integration of an occupancy switch and/or window contact signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
C2..Q.. ¹⁾	2-way zone valve QCV, internal thread, DN ... with adjustable k _v value ...-... m ³ /h	1	
CQ24A-SR ²⁾	Rotary actuator for zone valves, 1 Nm, AC/DC 24 V, modulating	1	
EXT-OC-ZR-C2..Q	Optional: insulation shell for valve C2..Q, 2-way, DN ...	1	
ZR23..	Optional: pipe connector for zone valve, DN ...	2	
ZCQ-E	Optional: spindle extension CQ	1	
	Balancing valve DN ...	1	
	Work service: hydronic balancing	1/2 h	
	Room temperature controller	1	
	Temperature sensor	1	
	Optional sensors: occupancy switch, window contact		

¹⁾ also available with external thread (C4..Q..)

²⁾ other actuator variants available: AC/DC 24 V and AC 230 V, fail-safe, communicative (MP-Bus, BACnet, Modbus)

Belimo – features and benefits

Properties	Benefits
Compact overall structure	Ideal room utilisation and high level of freedom in design
Tight-sealing valve	Complete avoidance of circulation and energy loss
Self-cleaning ball valve	Excellent resistance to contamination, problem-free operation even after long downtimes
Equal-percentage flow characteristic without input step	Can be controlled perfectly even in the lowest partial load range
Manually adjustable k _v values	High flexibility in planning, mounting and during usage phase
Actuator with low power consumption	Energy cost reduction by up to 90% compared to conventional zone valves
5-year warranty	Long-term safety

1.3 Chilled ceiling

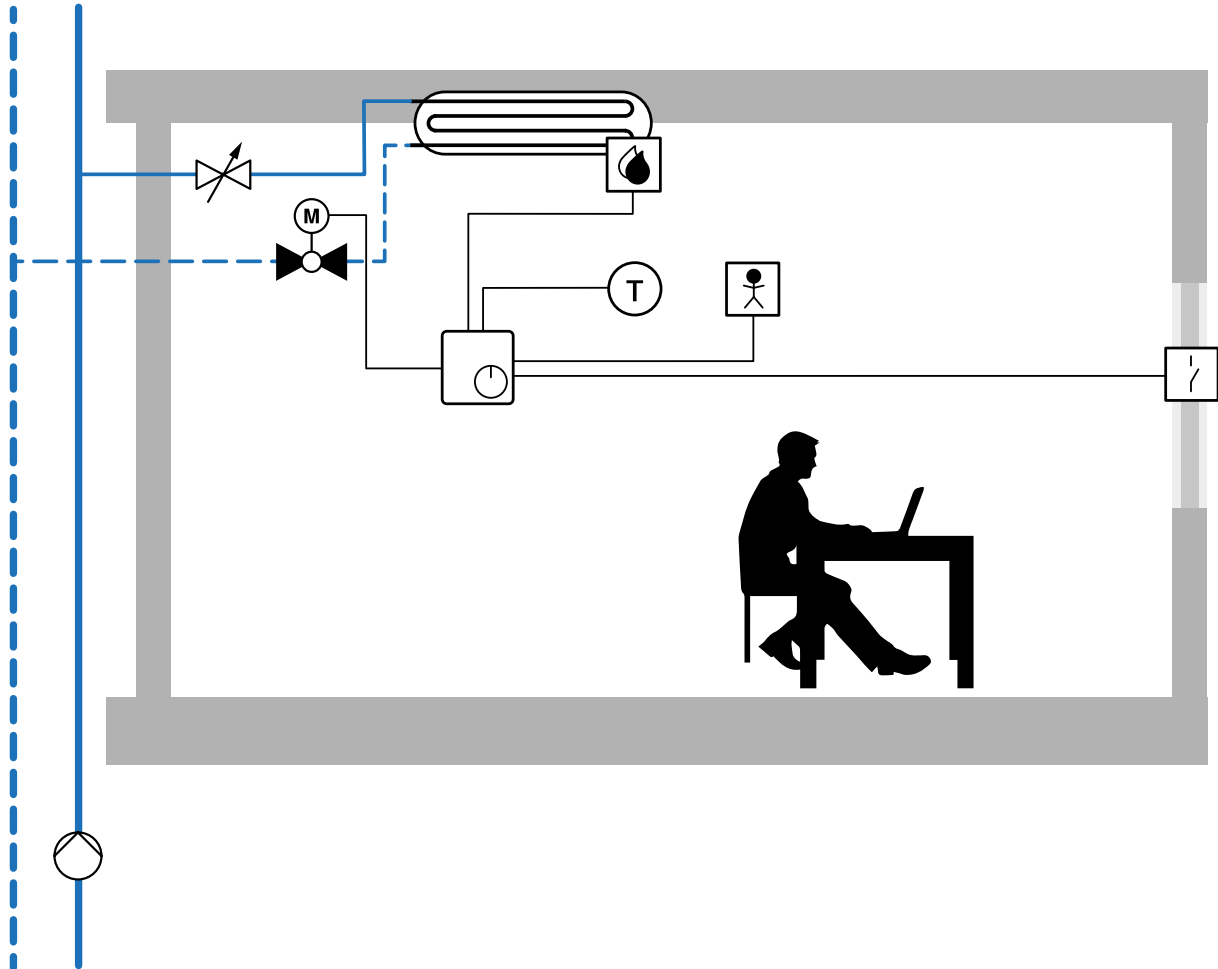


Illustration example

Application description

- Provision of cooling energy by means of a chilled ceiling (additional heating option with central heating/cooling change-over)
- Manual balancing valve for static hydronic balancing of water volume (for full load)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Water volume controlled via room temperature controller
- Automatic shut off if temperature falls below dew point (condensation)
- Automatic shut off if window is open
- Actuator control options: open/close, 3-point, modulating or via bus communication
- Optional function: occupancy switch

Controller

Room temperature controller with:

- Adaptation of water quantity by means of open/close, 3-point, modulating (0...10 V) or via bus communication
- Shut-off of the valve with corresponding signal of the condensation sensor
- Valve shut off if window open

Optional: integration of an occupancy switch signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
C2..Q.. ¹⁾	2-way zone valve QCV, internal thread, DN ... with adjustable k_v value ...-... m ³ /h	1	
CQ24A-SR ²⁾	Rotary actuator for zone valves, 1 Nm, AC/DC 24 V, modulating	1	
ZCQ-W	Optional: housing cover CQ white	1	
ZR23..	Optional: pipe connector for zone valve, DN ...	2	
ZCQ-E	Optional: spindle extension CQ	1	
	Balancing valve DN ...	1	
	Work service: hydronic balancing	1/2 h	
	Room temperature controller	1	
	Temperature sensor	1	
	Condensation sensor	1	
	Window contact	1	
	Optional sensors: occupancy switch, window contact		

¹⁾ also available with external thread (C4..Q..)

²⁾ other actuator variants available: AC/DC 24 V and AC 230 V, fail-safe, communicative (MP-Bus, BACnet, Modbus)

Belimo – features and benefits

Properties	Benefits
Compact overall structure	Ideal room utilisation and high level of freedom in design
Tight-sealing valve	Complete avoidance of circulation and energy loss
Self-cleaning ball valve	Excellent resistance to contamination, problem-free operation even after long downtimes
Equal-percentage flow characteristic without input step	Can be controlled perfectly even in the lowest partial load range
Manually adjustable k_v values	High flexibility in planning, mounting and during usage phase
Actuator with low power consumption	Energy cost reduction by up to 90% compared to conventional zone valves
5-year warranty	Long-term safety

1.4 Several fan coils

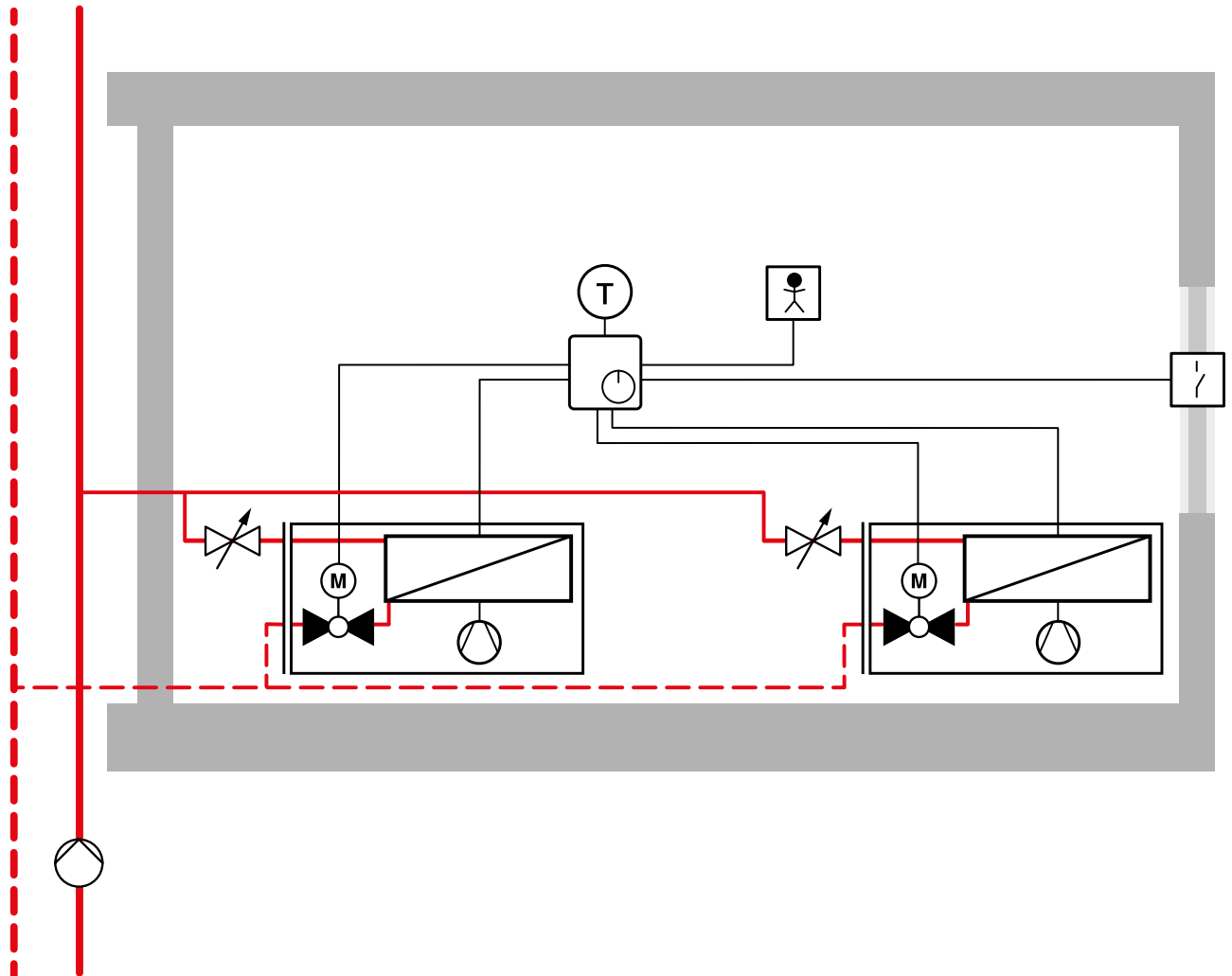


Illustration example

Application description

- Fan coils provide heating energy
- Manual balancing valves for static hydronic balancing of the water volumes (for full load)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Water and air volumes controlled via one room temperature controller per zone
- Actuator control options: open/close, 3-point, modulating or via bus communication
- Optional functions: occupancy switch, window contact

Controller

Room temperature controller with:

- Air volumes adaptation (3 speeds with 3 DO or modulating with 1 AO)
 - Adaptation of water quantities by means of open/close, 3-point, modulating 0...10 V control or via bus communication
- Optional: integration of an occupancy switch and/or window contact signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
C2..Q.. ¹⁾	2-way zone valve QCV, internal thread, DN ... with adjustable k_v value ...-... m ³ /h	(*)	
CQ24A-SR ²⁾	Rotary actuator for zone valves, 1 Nm, AC/DC 24 V, modulating	(*)	
EXT-OC-ZR-C2..Q	Optional: insulation shell for valve C2..Q, 2-way, DN ...	(*)	
ZR23..	Optional: pipe connector for zone valve, DN ...	(*)x2	
ZCQ-E	Optional: spindle extension CQ	(*)	
	Balancing valve DN ...	(*)	
	Work service: hydronic balancing	(*)x1/2 h	
	Room temperature controller	1	
	Temperature sensor	1	
	Optional sensors: occupancy switch, window contact		

(*) Options for controlling several fan coils via one room temperature controller. The maximum number of controllable devices depends on the room temperature controller

¹⁾ also available with external thread (C4..Q..)

²⁾ other actuator variants available: AC/DC 24 V and AC 230 V, fail-safe, communicative (MP-Bus, BACnet, Modbus)

Belimo – features and benefits

Properties	Benefits
Compact overall structure	Ideal room utilisation and high level of freedom in design
Tight-sealing valve	Complete avoidance of circulation and energy loss
Self-cleaning ball valve	Excellent resistance to contamination, problem-free operation even after long downtimes
Equal-percentage flow characteristic without input step	Can be controlled perfectly even in the lowest partial load range
Manually adjustable k_v values	High flexibility in planning, mounting and during usage phase
Actuator with low power consumption	Energy cost reduction by up to 90% compared to conventional zone valves
5-year warranty	Long-term safety

Tender texts

C2..Q..

Zone valve (characterised control valve), 2-way with internal thread. For water-side modulating control or shut-off function in air-handling units and heating systems. Snap-assembly of the actuator.

Delivery and mounting of a tight-sealing 2-way zone valve with equal-percentage characteristic curve and high resistance to contamination.

Construction:	2-way valve, DN 15, DN 20 or DN 25
Connection:	internal thread Rp 1/2" (DN 15), Rp 3/4" (DN 20) or Rp 1" (DN 25)/external thread G 3/4" (DN 15/DN 20)
k_v value:	max. 4.8 m ³ /h, adjustable (DN 15)
k_v value:	max. 8 m ³ /h, adjustable (DN 20)
k_v value:	max. 7 m ³ /h, adjustable (DN 25)
Fluid:	cold and warm water with glycol of up to max. 50% vol.
Air-bubble tight, leakage rate A	(EN 12266-1)
Characteristic curve:	equal percentage, optimised in the opening range
Fluid temperature:	2...90°C
Permissible operating pressure p_s :	1600 kPa
Close-off pressure dp_s :	520 kPa
Differential pressure dp_{max} :	280 kPa
Body:	brass
Closing element:	chrome-plated brass
Spindle:	brass
Stem packing:	O-ring EPDM
Ball seat:	PTFE, O-ring EPDM
Make:	Belimo
Type:	C215Q-F (DN 15)
Type:	C215Q-J (DN 15)
Type:	C220Q-K (DN 20)
Type:	C225Q-K (DN 25)

Other version available:

– External thread G 3/4" (C4..Q..)



C2..Q..

CQ24A-SR

Rotary actuator for zone valves. Direct mounting on zone valve by snapping on. Overload protected and without end switch, current reduction in rest position.

Torque:	1 Nm
Nominal voltage:	AC 24 V 50/60 Hz, DC 24 V
Control:	modulating DC 0...10 V
Operating range:	DC 2...10 V
Power consumption:	
– Operation:	0.4 W
– Rest position:	0.3 W
– Rating:	0.9 VA
Connection:	Cable 1 m, 4x0.34 mm ²
Running time:	75 s/90°
Protection class:	III protective extra low voltage (PELV)
Degree of protection:	IP40
EMC:	CE according to 2004/108/EC

Make:	Belimo
Type:	CQ24A-SR

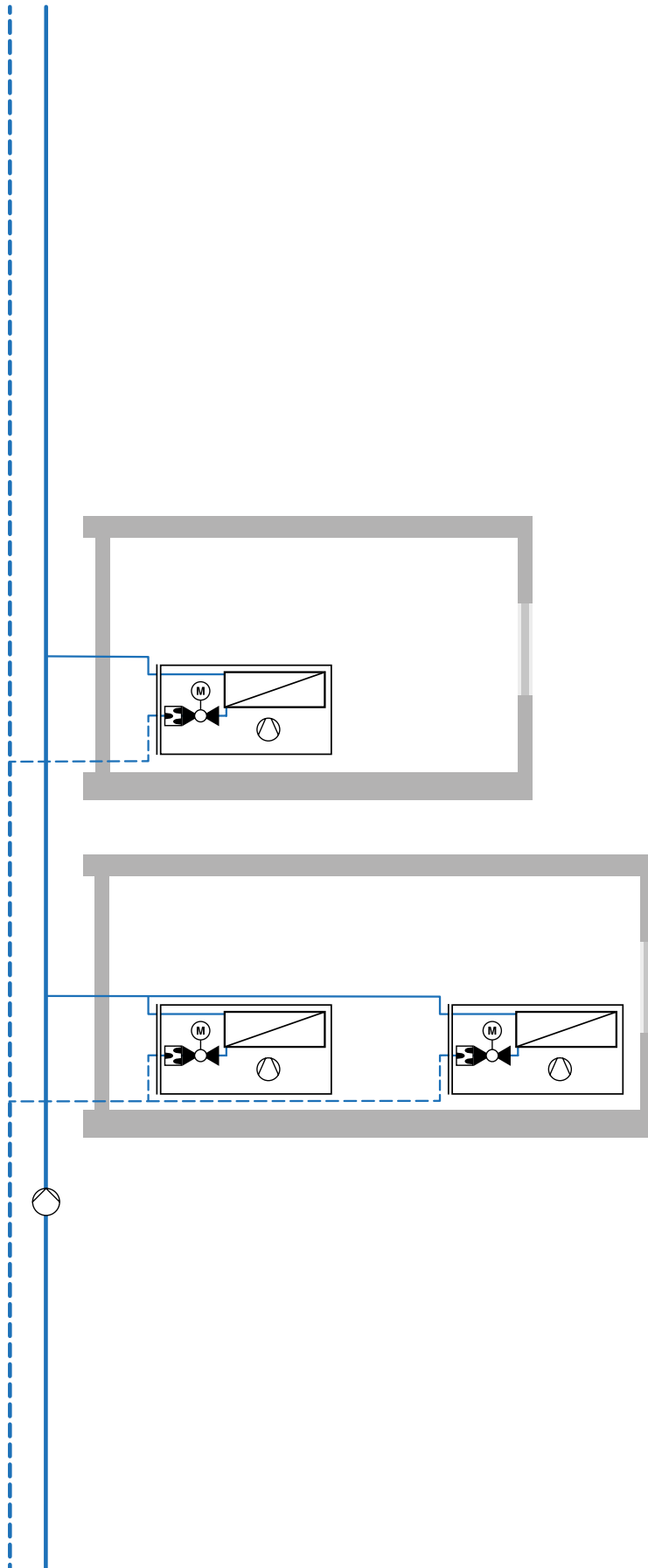
Other actuator variants:

- AC 230 V
- modulating DC 0.5...10 V
- Various bus communication protocols
- Fast running actuators
- Open/close, 3-point
- Fail-safe

Electrical and mechanical accessories included
5-year warranty



CQ24A-SR



2

Automatically balancing constant-measure 2-pipe system

	<u>Page</u>
2.1 Fan coil	22
2.2 Several fan coils	24
Tender Text	26



2.1 Fan coil

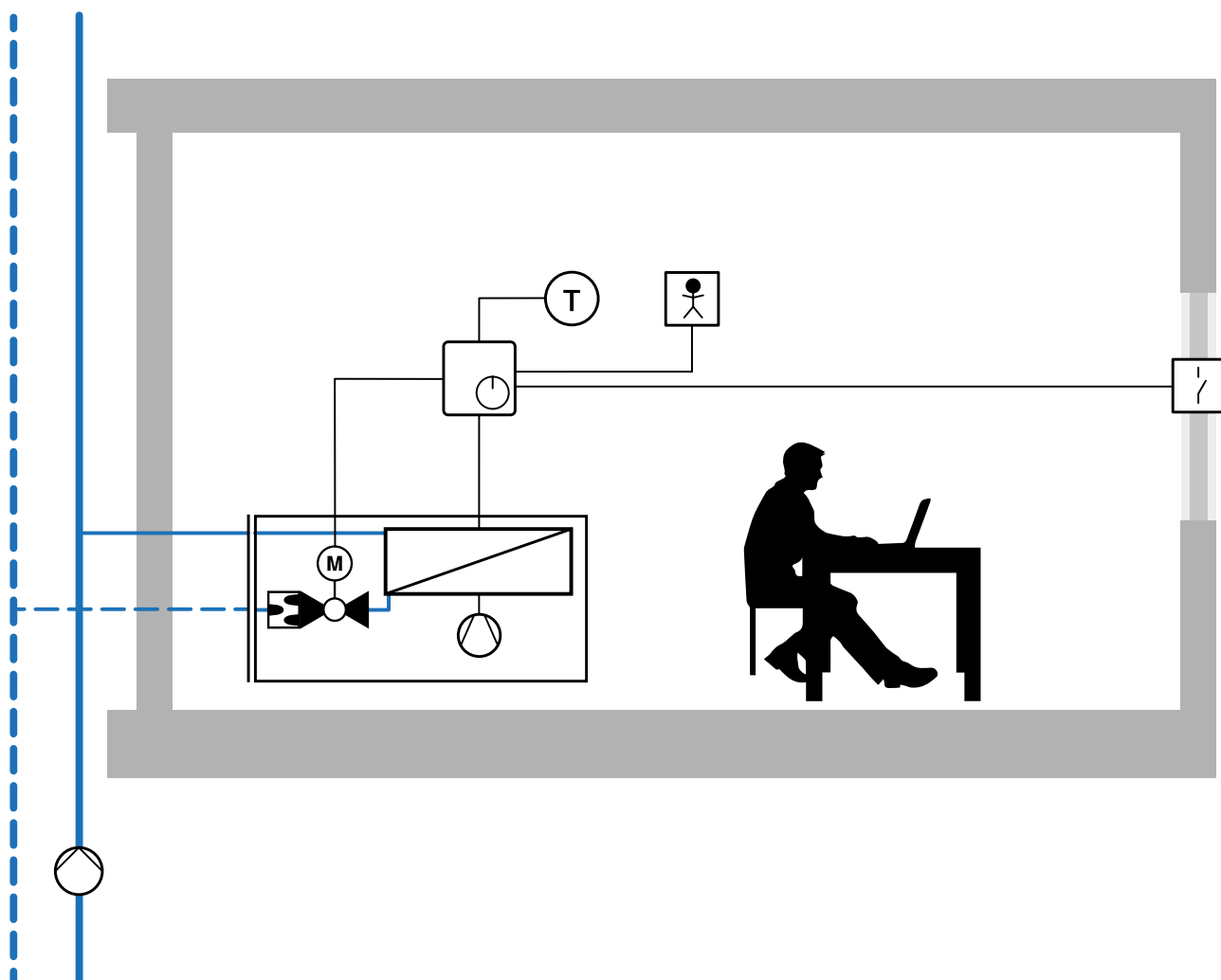


Illustration example

Application description

- Fan coil provides cooling energy
- Pressure-independent zone valve for automatic, permanent hydronic balancing of the constant water volume (for all load states)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Air volume controlled via room temperature controller
- Actuator control options: Open/close or via bus communication (open/close operation only)
- Optional functions: Occupancy switch, window contact

Controller

Room temperature controller with:

- Adaptation of air volume by means of modulating or bus communication
- Activation of water quantity by means of open/close or via bus communication

Optional: Integration of an occupancy switch signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
C2..FL-.. R225QFL-..	Pressure-independent 2-way flow limiter valve PIFLV from Belimo, DN with constant flow V'_{nom} l/h for waterrelated open/close control	1	
CQ24A ¹⁾ LR24A ¹⁾	Belimo rotary actuator for zone valves, 1 Nm, AC/DC 24 V, open/close rotary actuator for ball valves, 5 Nm, AC/DC 24 V, open/close	1	
ZR23..	Optional: pipe connector for zone valve, DN ...	2	
ZCQ-E	Optional: spindle extension CQ	1	
	Room temperature controller	1	
	Temperature sensor	1	
	Optional sensors: occupancy switch, window contact		

¹⁾ other actuator variants available: AC/DC 24 V and AC 230 V, fail-safe, communicative (MP-Bus, BACnet, Modbus)

2

Belimo – features and benefits

Properties	Benefits
Pressure-independent	Simple, safe valve design using the nominal flow rate Excellent room comfort thanks to constant water volume at all times
Automatic, permanent hydronic balancing	Fast commissioning, no balancing valves required
Compact overall structure	Ideal room utilisation and high level of freedom in design
Tight-sealing valve	Complete avoidance of circulation and energy losses
Self-cleaning ball valve	Excellent resistance to contamination, problem-free operation even after long downtimes
Actuator with low power consumption	Energy cost reduction by up to 90% compared to conventional zone valves
Constant flow V'_{nom}	Simple to plan, mount and use
5-year warranty	Long-term safety

2.2 Several fan coils

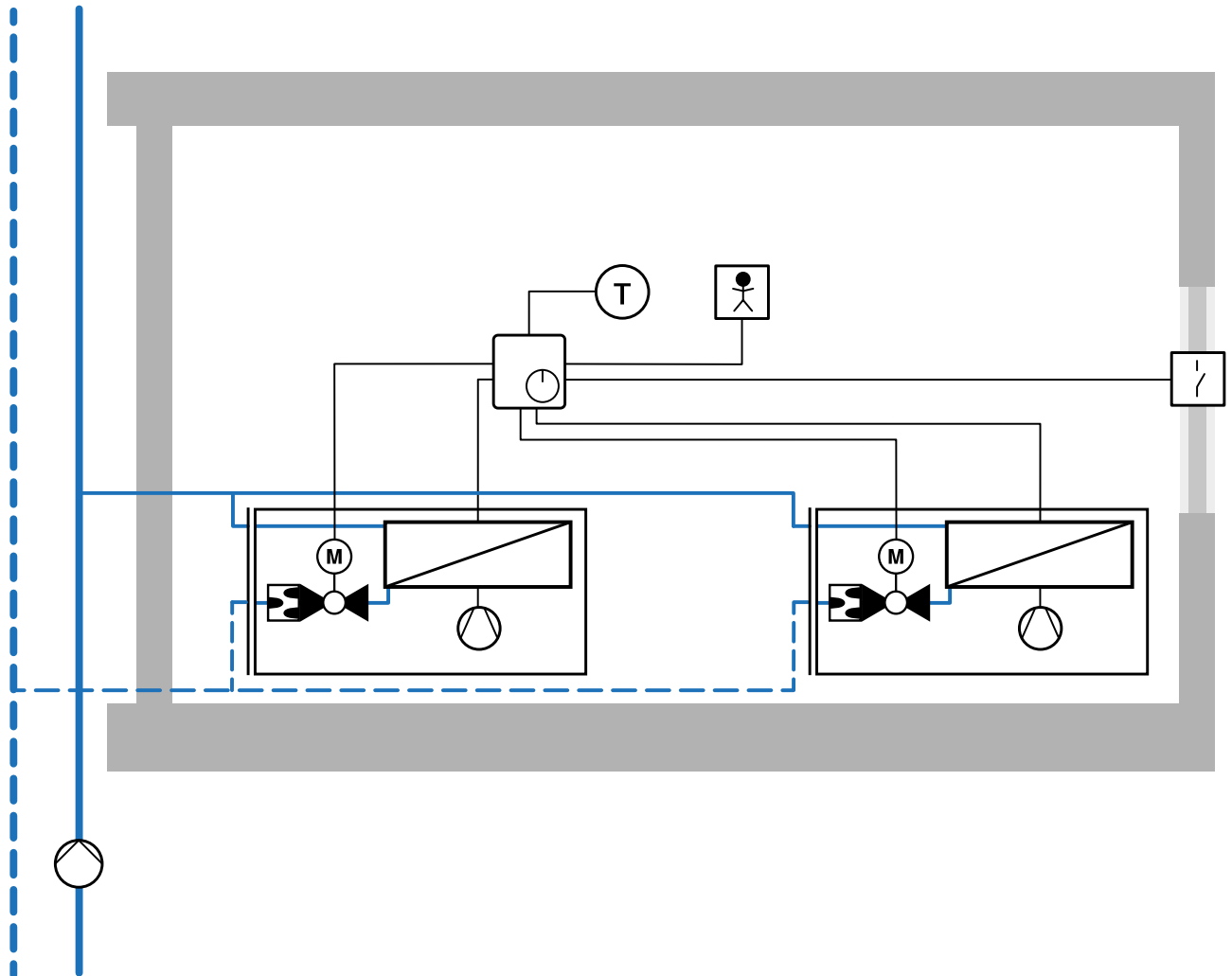


Illustration example

Application description

- Fan coil provides cooling energy
- Pressure-independent zone valve for automatic, permanent hydronic balancing of the constant water volume (for all load states)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Air volume controlled via room temperature controller
- Actuator control options: open/close or via bus communication (open/close operation only)
- Optional functions: occupancy switch, window contact

Controller

Room temperature controller with:

- Adaptation of air volume by means of modulating or bus communication
- Activation of water quantity by means of open/close or via bus communication

Optional: integration of an occupancy switch and/or window contact signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
C2..FL-.. R225QFL-J	Pressure-independent 2-way flow limiter valve PIFLV from Belimo, DN ... with constant flow V'_{nom} ... l/h for water-side open/close control	2	
CQ24A ¹⁾ LR24A ¹⁾	Belimo rotary actuator for zone valves, 1 Nm, AC/DC 24 V, open/close rotary actuator for ball valves, 5 Nm, AC/DC 24 V, open/close	2	
ZR23..	Optional: pipe connector for zone valve, DN ...	4	
ZCQ-E	Optional: spindle extension CQ	2	
	Room temperature controller	1	
	Temperature sensor	1	
	Optional sensors: occupancy switch, window contact		

¹⁾ other actuator variants available: AC/DC 24 V and AC 230 V, fail-safe, communicative (MP-Bus, BACnet, Modbus)

Belimo – features and benefits

Properties	Benefits
Pressure-independent	Simple, safe valve design using the nominal flow rate Excellent room comfort thanks to constant water volume at all times
Automatic, permanent hydronic balancing	Fast commissioning, no balancing valves required
Compact overall structure	Ideal room utilisation and high level of freedom in design
Tight-sealing valve	Complete avoidance of circulation and energy losses
Self-cleaning ball valve	Excellent resistance to contamination, problem-free operation even after long downtimes
Actuator with low power consumption	Energy cost reduction by up to 90% compared to conventional zone valves
Constant flow V'_{nom}	Simple to plan, mount and use
5-year warranty	Long-term safety

Tender texts

C2..FL-..

Pressure-independent zone valve (flow limiter valve), 2-way with internal thread. For water-side open/close control in air handling units and cooling systems. Snap-on actuator mounting, flow limiter valve for constant flow independent of pressure fluctuations.

Supply and mounting of a tight-closing, pressure-independent flow limiting valve, 2-way, with automatic hydraulic balancing for constant water flow, open/close control and high resistance to contamination.

Construction:	flow limiter valve 2-way, DN 15 to DN 25
Connection:	internal thread Rp 1/2" (DN 15), Rp 3/4" (DN 20) or Rp 1" (DN 25)
Flow $V'_{nom.}$:	200 to 1300 l/h (DN 15)
Flow $V'_{nom.}$:	1200 to 2900 l/h (DN 20)
Flow $V'_{nom.}$:	3600 l/h (DN 25)
Fluid:	cold and warm water with glycol of up to max. 50% vol.
Air-bubble tight, leakage rate A	(EN 12266-1)
Fluid temperature:	2...60°C
Permissible operating pressure p_s :	1600 kPa
Close-off pressure dp_s :	520 kPa
Differential pressure $dp_{max.}$:	280 kPa
Valve body:	brass (DN 15/20), nickel-plated brass body (DN 25)
Closing element:	chrome-plated brass
Spindle:	brass (DN 15/20), nickel-plated brass (DN 25)
Stem packing:	O-ring EPDM
Ball seat:	PTFE, O-ring EPDM
Make:	Belimo
Type:	C215QFL-.. (DN 15)
Type:	C220QFL-.. (DN 20)
Type:	R225QFL-J (DN 25)



CQ24A

(Example: CQ24A for PIFLV up to DN 20)

Rotary actuator for zone valves. Direct mounting on zone valve by snapping on. Overload protected and without end switch, current reduction in rest position.

Torque:	1 Nm
Nominal voltage:	AC 24 V 50/60 Hz, DC 24 V
Nominal voltage range:	AC 19.2...28.8 V/DC 21.6...28.8 V
Power consumption:	
– Operation:	0.3 W
– Rest position:	0.2 W
– Rating:	0.6 VA
Connection:	Cable 1 m, 3 x 0.75 mm ²
Running time:	75 s/90°
Protection class:	III protective extra low voltage (PELV)
Degree of protection:	IP40
EMC:	CE according to 2004/30/EU

Make: Belimo
Type: CQ24A

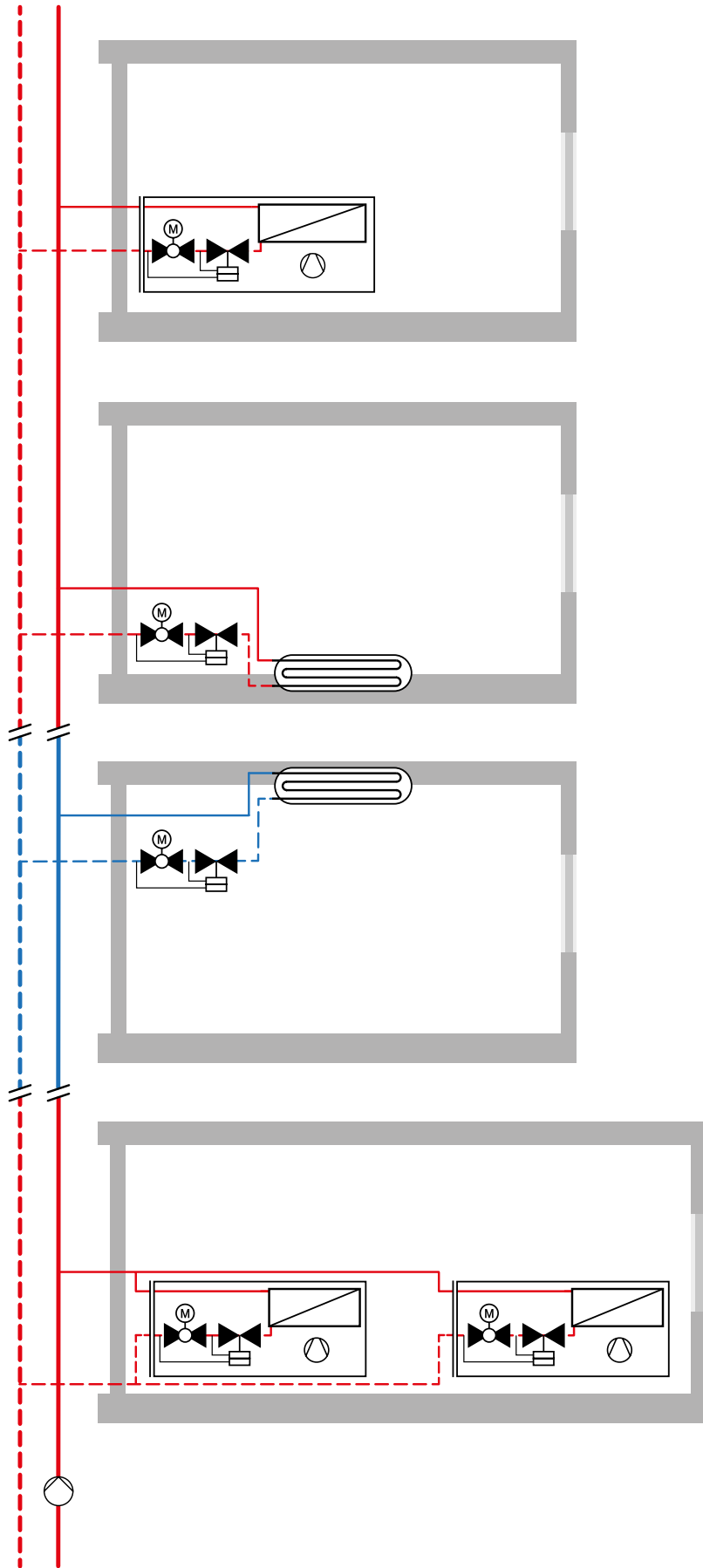
Other actuator variants:

- AC 230 V
- Fast running actuators
- Various bus communication protocols
- Fail-safe

5 Nm for DN 25: LR24A

Electrical and mechanical accessories included
5-year warranty

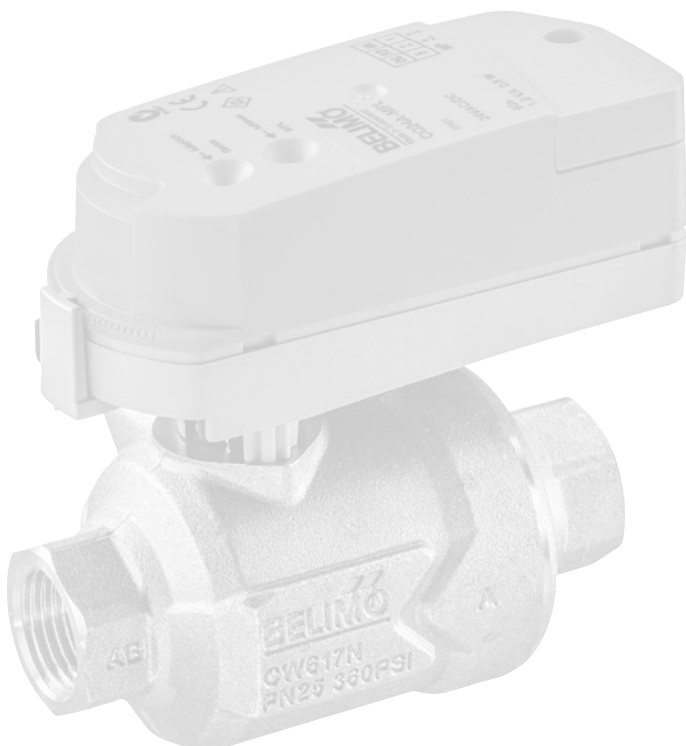
**CQ24A****LR24A**



3

Automatically balancing variable-flow 2-pipe system

	<u>Page</u>
3.1 Fan coil	30
3.2 Floor heating/radiator	32
3.3 Chilled ceiling	34
3.4 Several fan coils	36
Tender Text	38



3.1 Fan coil

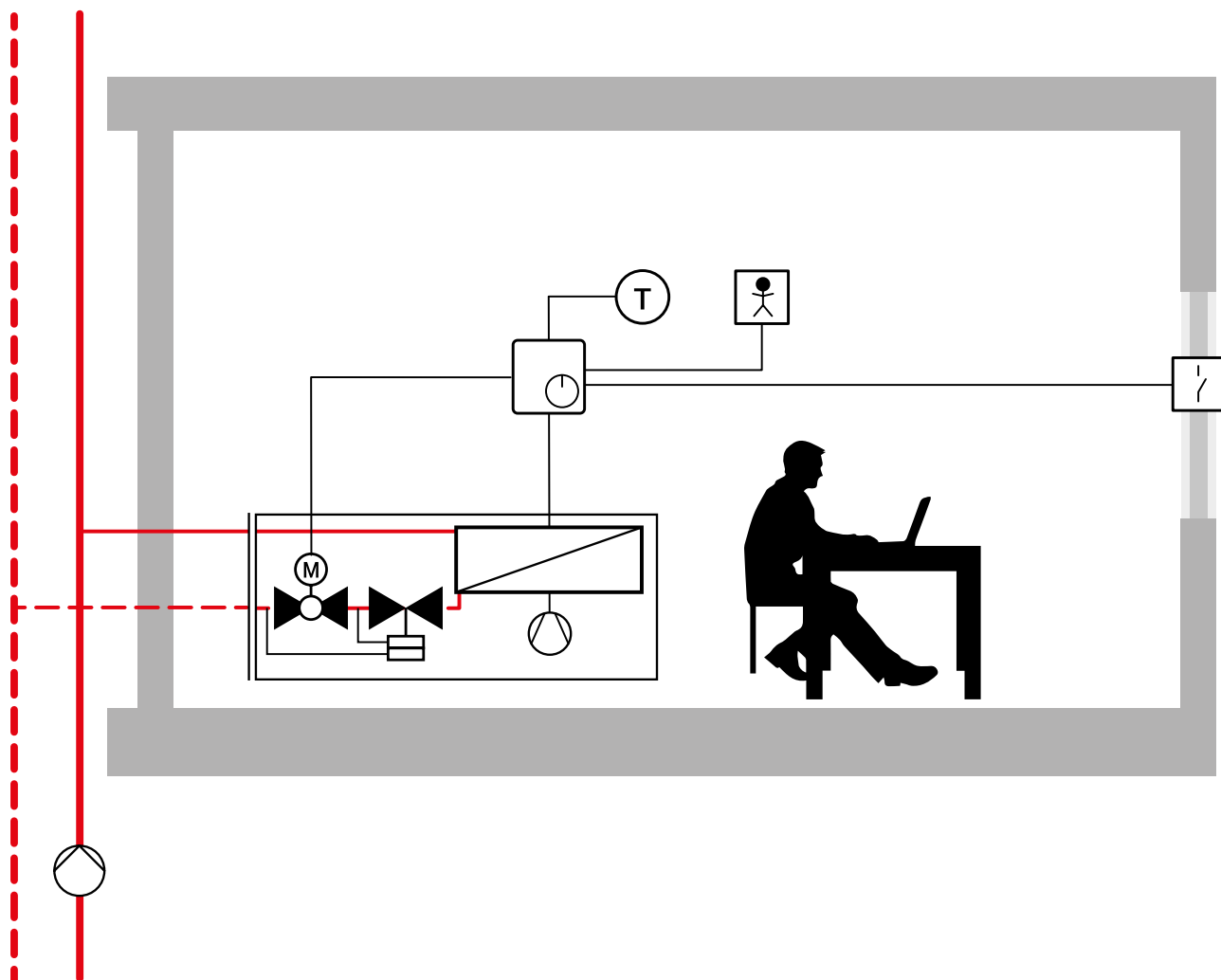


Illustration example

Application description

- Fan coil provides heating energy
- Pressure-independent control valve for automatic, permanent hydronic balancing (for all load states)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Water and air volume controlled via room temperature controller
- Actuator control options: open/close, 3-point, modulating or via bus communication
- Optional functions: occupancy switch, window contact

Controller

Room temperature controller with:

- Air volume adaptation (3 speeds with 3 DO or modulating with 1 AO)
- Adaptation of water quantity by means of open/close, 3-point, modulating (0...10 V) or via bus communication

Optional: integration of an occupancy switch and/or window contact signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
C2..QP(T)..	Pressure-independent 2-way zone valve PIQCV from Belimo, DN ... with adjustable flow V'_{\max} ...-... l/h	1	
CQ24A-SR ¹⁾	Rotary actuator for zone valves, 1 Nm, AC/DC 24 V, modulating	1	
EXT-OC-ZQ..-P(T)	Optional: insulation shell for C2..QP(T) valve, 2-way, DN ...	1	
ZR23..	Optional: pipe connector for zone valve, DN ...	2	
ZCQ-E	Optional: spindle extension CQ	1	
	Room temperature controller	1	
	Temperature sensor	1	
	Optional sensors: occupancy switch, window contact		

¹⁾ other actuator variants available: AC/DC 24 V and AC 230 V, fail-safe, communicative (MP-Bus, BACnet, Modbus)

Belimo – features and benefits

Properties	Benefits
Pressure-independent	Simple, safe valve design using the maximum flow rate, no k_v value calculation required
Automatic, permanent hydronic balancing	Excellent room comfort thanks to correct water volume at all times
Compact overall structure	Fast commissioning, no balancing valves required
Tight-sealing valve	Ideal room utilisation and high level of freedom in design
Self-cleaning ball valve	Complete avoidance of circulation and energy loss
Equal-percentage flow characteristic without input step	Excellent resistance to contamination, problem-free operation even after long downtimes
Variable setting option V'_{\max}	Can be controlled perfectly even in the lowest partial load range
Actuator with low power consumption	Maximum flexibility in planning, mounting and during usage phase
5-year warranty	Energy cost reduction by up to 90% compared to conventional zone valves
	Long-term safety

3.2 Floor heating/radiator

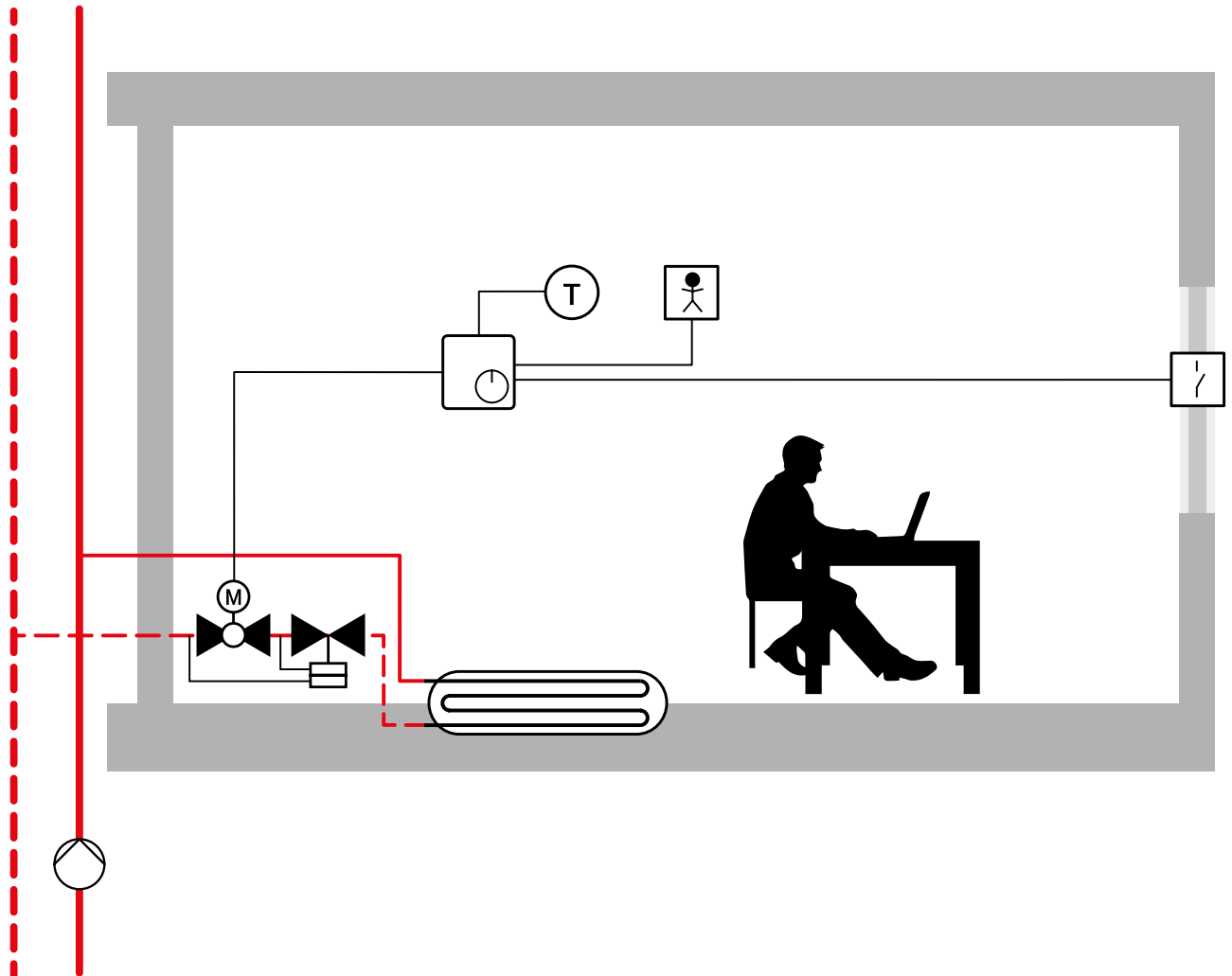


Illustration example

Application description

- Provision of heating energy by means of a heating element mounted on the floor or on the wall
- Pressure-independent control valve for automatic, permanent hydronic balancing (for all load states)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Water volume controlled via room temperature controller
- Actuator control options: open/close, 3-point, modulating or via bus communication
- Optional functions: occupancy switch, window contact

Controller

Room temperature controller with:

- Adaptation of water quantity by means of open/close, 3-point, modulating (0...10 V) or via bus communication

Optional: integration of an occupancy switch and/or window contact signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
C2..QP(T)..	Pressure-independent 2-way zone valve PIQCV from Belimo, DN ... with adjustable flow V'_{\max} ...-... l/h	1	
CQ24A-SR ¹⁾	Rotary actuator for zone valves, 1 Nm, AC/DC 24 V, modulating	1	
EXT-OC-ZQ..-P(T)	Optional: insulation shell for C2..QP(T) valve, 2-way, DN ...	1	
ZR23..	Optional: pipe connector for zone valve, DN ...	2	
ZCQ-E	Optional: spindle extension CQ	1	
	Room temperature controller	1	
	Temperature sensor	1	
	Optional sensors: occupancy switch, window contact		

¹⁾ other actuator variants available: AC/DC 24 V and AC 230 V, fail-safe, communicative (MP-Bus, BACnet, Modbus)

Belimo – features and benefits

Properties	Benefits
Pressure-independent	Simple, safe valve design using the maximum flow rate, no k_v value calculation required Excellent room comfort thanks to correct water volume at all times
Automatic, permanent hydronic balancing	Fast commissioning, no balancing valves required
Compact overall structure	Ideal room utilisation and high level of freedom in design
Tight-sealing valve	Complete avoidance of circulation and energy loss
Self-cleaning ball valve	Excellent resistance to contamination, problem-free operation even after long downtimes
Equal-percentage flow characteristic without input step	Can be controlled perfectly even in the lowest partial load range
Variable setting option V'_{\max}	Maximum flexibility in planning, mounting and during usage phase
Actuator with low power consumption	Energy cost reduction by up to 90% compared to conventional zone valves
5-year warranty	Long-term safety

3.3 Chilled ceiling

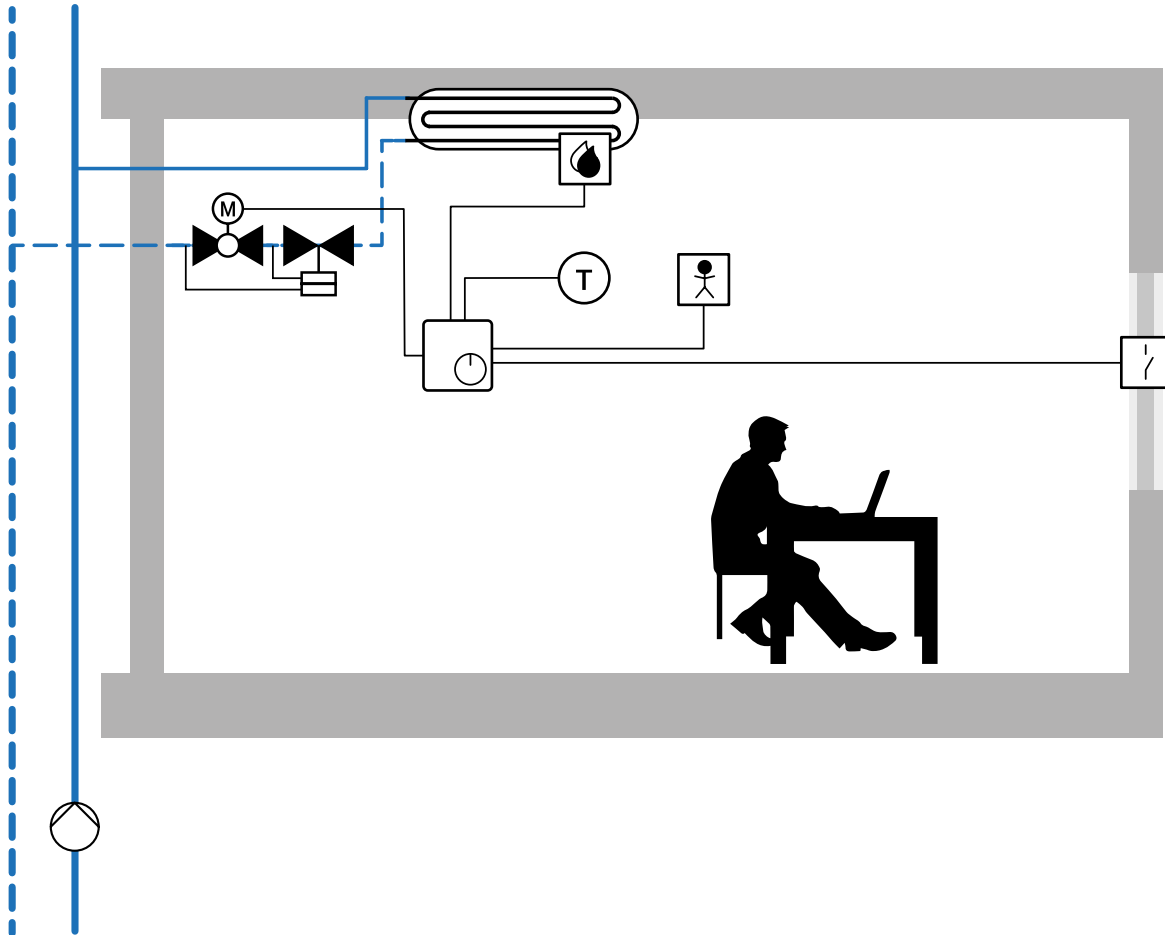


Illustration example

Application description

- Provision of cooling energy by means of a chilled ceiling (additional heating option with central heating/cooling changeover)
- Pressure-independent control valve for automatic, permanent hydronic balancing (for all load states)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Water volume controlled via room temperature controller
- Automatic shut off if temperature falls below dew point (condensation)
- Automatic shut off if window is open
- Actuator control options: open/close, 3-point, modulating or via bus communication
- Optional function: occupancy switch

Controller

Room temperature controller with:

- Adaptation of water quantity by means of open/close, 3-point, modulating (0...10 V) or via bus communication
- Shut-off of the valve with corresponding signal of the condensation sensor
- Valve shut off if window open

Optional: integration of an occupancy switch signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
C2..QP(T)..	Pressure-independent 2-way zone valve PIQCV from Belimo, DN ... with adjustable flow V'_{\max} ...-... l/h	1	
CQ24A-SR ¹⁾	Rotary actuator for zone valves, 1 Nm, AC/DC 24 V, modulating	1	
ZCQ-W	Optional: housing cover CQ white	1	
ZR23..	Optional: pipe connector for zone valve, DN ...	2	
ZCQ-E	Optional: spindle extension CQ	1	
	Room temperature controller	1	
	Temperature sensor	1	
	Condensation sensor	1	
	Window contact	1	
	Optional sensors: occupancy switch, window contact		

¹⁾ other actuator variants available: AC/DC 24 V and AC 230 V, fail-safe, communicative (MP-Bus, BACnet, Modbus)

Belimo – features and benefits

Properties	Benefits
Pressure-independent	Simple, safe valve design using the maximum flow rate, no K_v value calculation required
	Excellent room comfort thanks to correct water volume at all times
Automatic, permanent hydronic balancing	Fast commissioning, no balancing valves required
Compact overall structure	Ideal room utilisation and high level of freedom in design
Tight-sealing valve	Complete avoidance of circulation and energy loss
Self-cleaning ball valve	Excellent resistance to contamination, problem-free operation even after long downtimes
Equal-percentage flow characteristic without input step	Can be controlled perfectly even in the lowest partial load range
Variable setting option V'_{\max}	Maximum flexibility in planning, mounting and during usage phase
Actuator with low power consumption	Energy cost reduction by up to 90% compared to conventional zone valves
5-year warranty	Long-term safety

3.4 Several fan coils

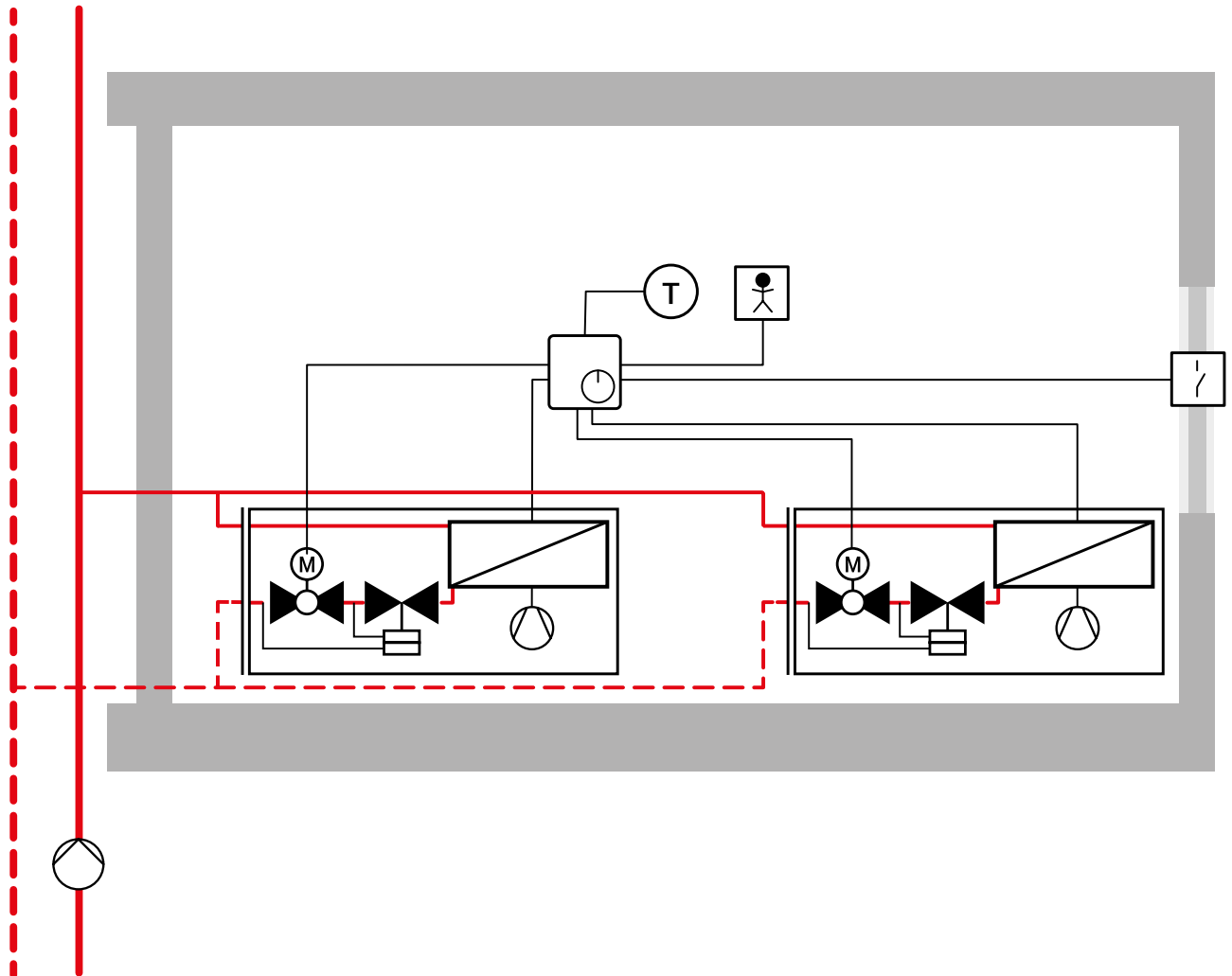


Illustration example

Application description

- Fan coils provide heating energy
- Pressure-independent control valves for automatic, permanent hydronic balancing (for all load states)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Water and air volumes controlled via one room temperature controller per zone
- Actuator control options: open/close, 3-point, modulating or via bus communication
- Optional functions: occupancy switch, window contact

Controller

Room temperature controller with:

- Air volumes adaptation (3 speeds with 3 DO or modulating with 1 AO)
- Adaptation of water quantities by means of open/close, 3-point, modulating 0...10 V control or via bus communication

Optional: integration of an occupancy switch and/or window contact signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
C2..Q(T)-..	Pressure-independent 2-way zone valve PIQCV from Belimo, DN ... with adjustable flow V'_{\max} ...-... l/h	(*)	
CQ24A-SR ¹⁾	Rotary actuator for zone valves, 1 Nm, AC/DC 24 V, modulating	(*)	
EXT-OC-ZQ..-P(T)	Optional: insulation shell for C2..QP(T) valve, 2-way, DN ...	(*)	
ZR23..	Optional: pipe connector for zone valve, DN ...	(*)x2	
ZCQ-E	Optional: spindle extension CQ	(*)	
	Room temperature controller	1	
	Temperature sensor	1	
	Optional sensors: occupancy switch, window contact		

(*) Options for controlling several fan coils via one room temperature controller. The maximum number of controllable devices depends on the room temperature controller

¹⁾ other actuator variants available: AC/DC 24 V and AC 230 V, fail-safe, communicative (MP-Bus, BACnet, Modbus)

Belimo – features and benefits

Properties	Benefits
Pressure-independent	Simple, safe valve design using the maximum flow rate, no k_v value calculation required
Automatic, permanent hydronic balancing	Excellent room comfort thanks to correct water volume at all times
Compact overall structure	Fast commissioning, no balancing valves required
Tight-sealing valve	Ideal room utilisation and high level of freedom in design
Self-cleaning ball valve	Complete avoidance of circulation and energy loss
Equal-percentage flow characteristic without input step	Excellent resistance to contamination, problem-free operation even after long downtimes
Variable setting option V'_{\max}	Can be controlled perfectly even in the lowest partial load range
Actuator with low power consumption	Maximum flexibility in planning, mounting and during usage phase
5-year warranty	Energy cost reduction by up to 90% compared to conventional zone valves
	Long-term safety

Tender texts

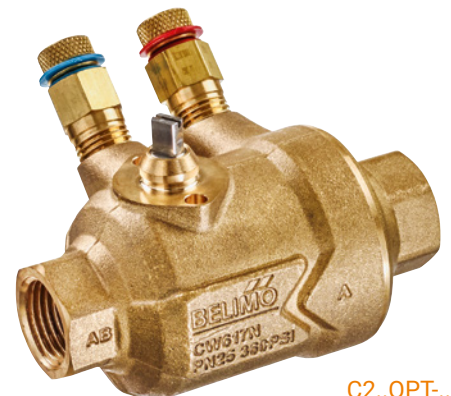
C2..QP(T)-.

Pressure-independent zone valve (characterised control valve), 2-way with internal thread. For water-side modulating control in air-handling and heating systems. Snap assembly of the actuator, integrated pressure regulating valve for constant flow independent of pressure fluctuations. With measurement connections for checking the pressure value (if provided).

Delivery and mounting of a tight-sealing, pressure-independent 2-way valve with automatic hydronic balancing, equal-percentage characteristic curve and high resistance to contamination.

Construction:	straight-through valve 2-way, DN 15, DN 20 or DN 25
Connection:	internal thread Rp 1/2" (DN 15), Rp 3/4" (DN 20) or Rp 1" (DN 25)
Flow V'_{max} :	max. 210 l/h, adjustable [C215QP(T)-B]
Flow V'_{max} :	max. 420 l/h, adjustable [C215QP(T)-D]
Flow V'_{max} :	max. 980 l/h, adjustable [C220QP(T)-F]
Flow V'_{max} :	max. 2100 l/h, adjustable [C225QPT-G]
Fluid:	cold and warm water, Water with max. 50% volume of glycol
Air-bubble tight, leakage rate A	(EN 12266-1)
Characteristic curve:	equal percentage (VDI/VDE 2178), optimised in the opening range
Fluid temperature:	2...90°C
Permissible operating pressure p_s :	1600 kPa
Close-off pressure dp_s :	1400 kPa
Differential pressure:	16...350 kPa
Valve body:	brass
Closing element:	stainless steel
Spindle:	stainless steel
Stem packing:	O-ring EPDM
Ball seat:	PTFE, O-ring EPDM
Diaphragm:	EPDM
Make:	Belimo
Type:	C215QP(T)-B (DN 15, 210 l/h)
Type:	C215QP(T)-D (DN 15, 420 l/h)
Type:	C220QP(T)-F (DN 20, 980 l/h)
Type:	C225QPT-G (DN 25, 2100 l/h)

(T) = version with measurement connector



C2..QP(T)-.

CQ24A-SR

Rotary actuator for zone valves. Direct mounting on zone valve by snapping on. Overload protected and without end switch, current reduction in rest position.

Torque:	1 Nm
Nominal voltage:	AC 24 V 50/60 Hz, DC 24 V
Control:	modulating DC 0...10 V
Operating range:	DC 2...10 V
Power consumption:	
– Operation:	0.4 W
– Rest position:	0.3 W
– Rating:	0.9 VA
Connection:	cable 1 m, 4x0.34 mm ²
Running time:	75 s/90°
Protection class:	III Protective extra low voltage (PELV)
Degree of protection:	IP40
EMC:	CE according to 2004/108/EC

Make:	Belimo
Type:	CQ24A-SR

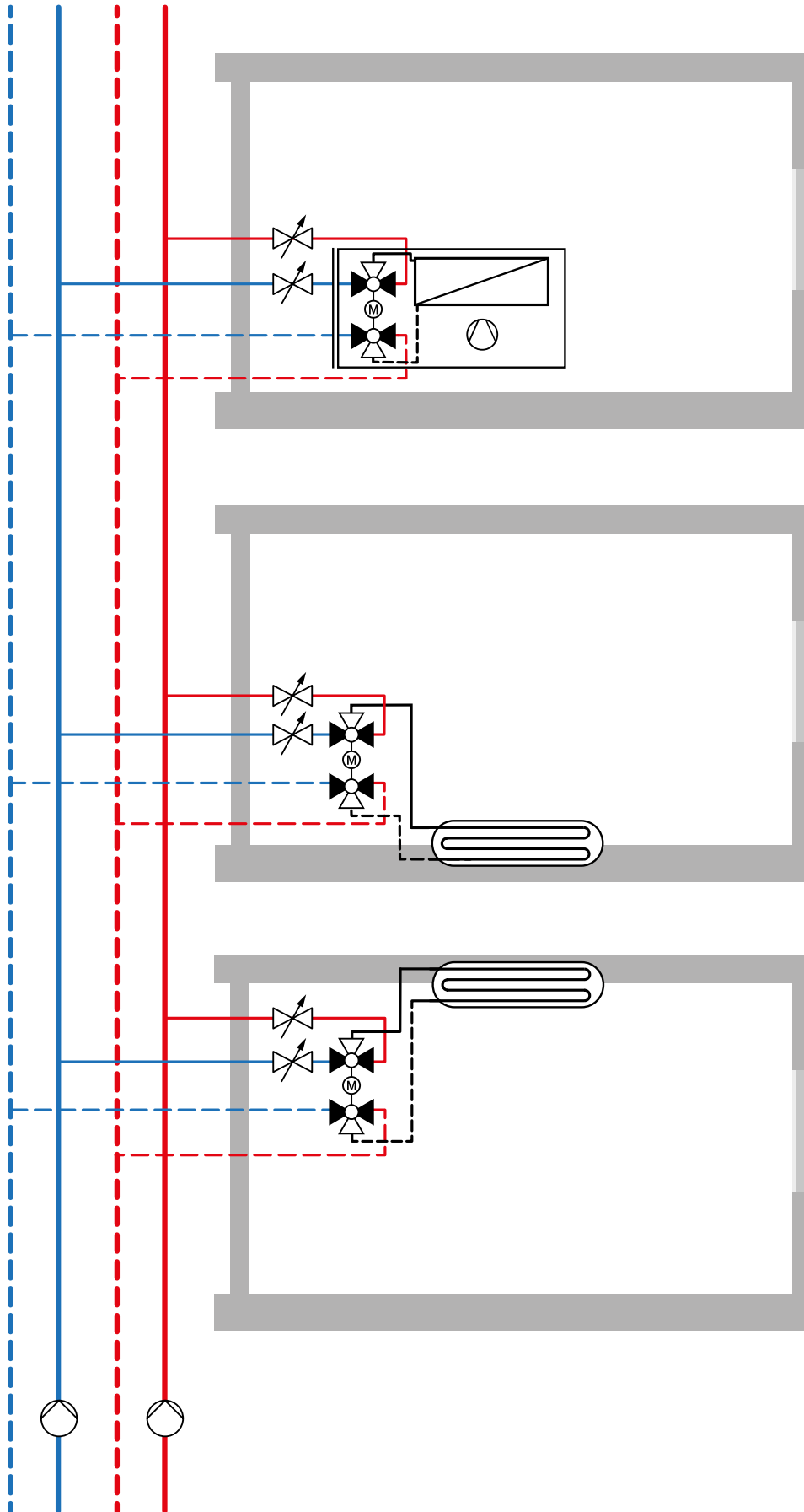
Other actuator variants:

- AC 230 V
- Modulating (0.5...10 V)
- Various bus communication protocols
- Fast running actuator
- Open/close, 3-point
- Fail-safe

Electrical and mechanical accessories included
5-year warranty



CQ24A-SR

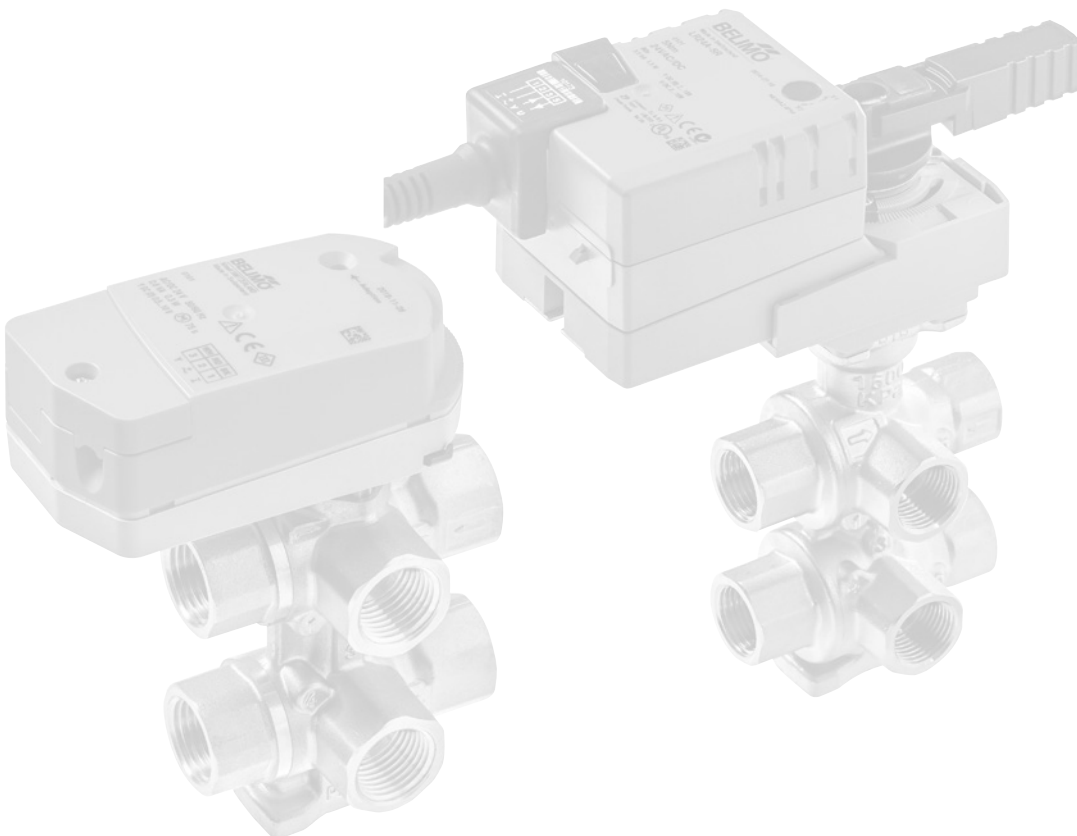


4

Variable-flow 4-pipe system

Page

4.1 Fan coil	42
4.2 Floor heating/radiator	44
4.3 Chilled and heating ceiling	46
Tender Text	48



4.1 Fan coil

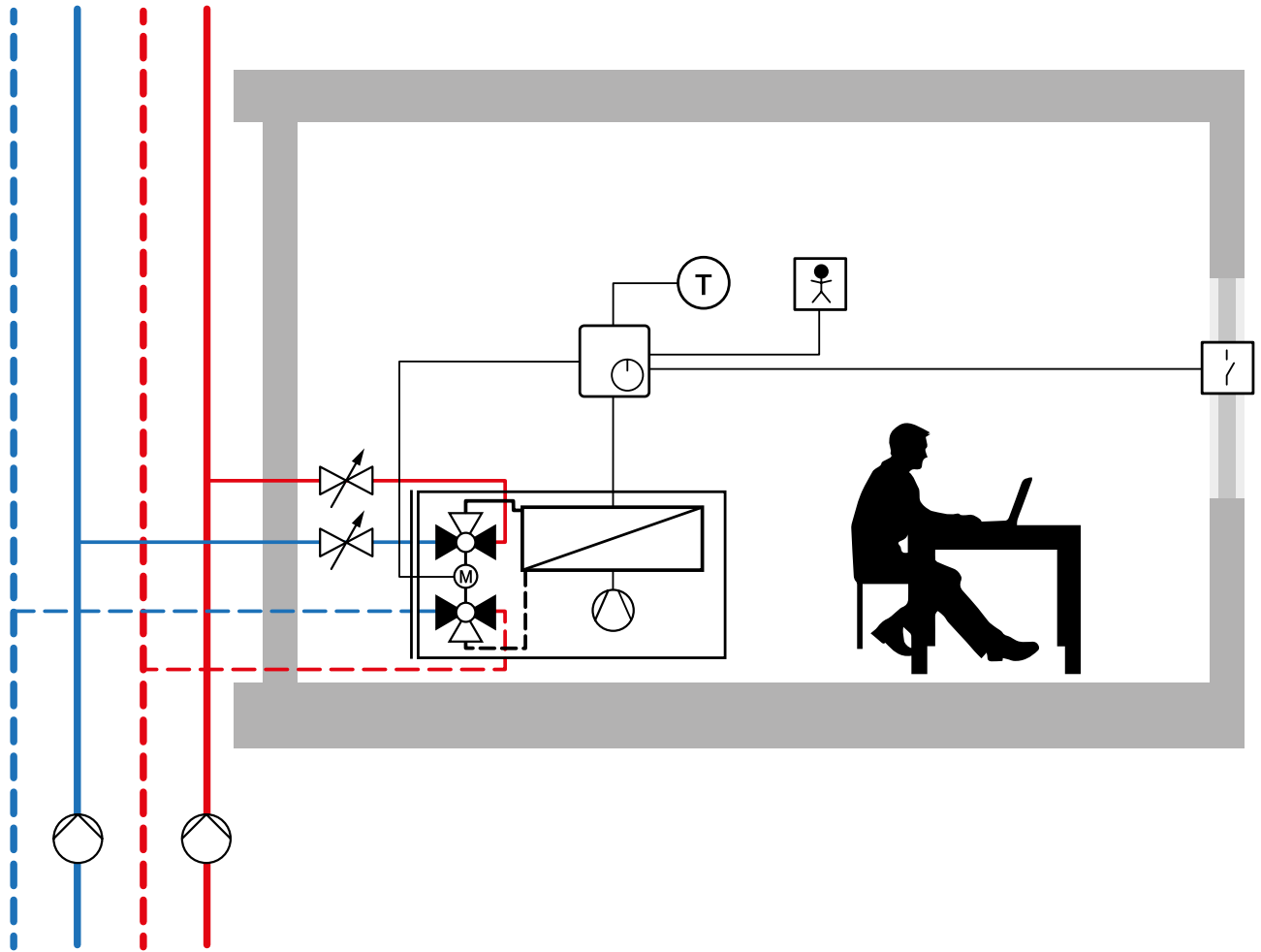


Illustration example

Application description

- Fan coil (with a heat exchanger) provides heating and cooling energy
- 4-pipe system ensures immediate availability of warm and cold water
- 4-pipe system enables cooling of certain rooms while others are being heated
- Manual balancing valve for static hydraulic balancing of water volume (for full load)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Water and air volume controlled via room temperature controller
- Control options, actuator: modulating or via bus communication
- Optional functions: occupancy switch, window contact

Controller

Room temperature controller with:

- Air volume adaptation (3 speeds with 3 DO or modulating with 1 AO)
 - Adaptation of water quantity by means of continuous 0...10 V control or via bus communication
- Optional: integration of an occupancy switch and/or window contact signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
R30..-.-.-B..	6-way zone valve from Belimo, DN .., k_{vs1} ... m^3/h , k_{vs2} ... m^3/h	1	
CQ24A-SR ¹⁾ , LR24A-SR ¹⁾ , NR24A-SR ¹⁾	Rotary actuator 1 Nm, 24 V, modulating control for DN 15 Rotary actuator 5 Nm, 24 V, modulating control for DN 15 and DN 20 Rotary actuator 10 Nm, 24 V, modulating control for DN 25	1	
EXT-OC-ZR30..	Optional: insulation shell for 6-way valve, DN ...	1	
ZR23..	Optional: pipe connector for zone valve, DN ...	6	
P2P.PE-1GE	Optional: angle 90° internal/external thread for 6-way valve, DN ...	1	
ZR-004	Optional: fastening angle for 6-way valve DN 15 and DN 20	1	
ZR-005	Optional: fastening angle for 6-way valve DN 25		
	Balancing valve DN ...	2	
	Work service: hydronic balancing	1 h	
CRK24-B1	Room temperature controller for 6-way zone valve	1	
	Temperature sensor	1	
	Optional sensors: occupancy switch, window contact		

¹⁾ other actuator variants available: AC/DC 24 V and AC 230 V, fail-safe, communicative (MP-Bus, BACnet, Modbus)

Belimo – features and benefits

Properties	Benefits
Tight-sealing valve	Complete avoidance of circulation and energy losses
Self-cleaning ball valve	Excellent resistance to contamination, problem-free operation even after long downtimes
Assumes the function of up to four 2-way valves	Reduces planning work, lowers mounting and operating costs Eliminates mounting errors Only requires one control sequence
Integrated pressure release function	Maximum plant safety
Different kvs values for sequences 1 and 2	Enables optimum design of the cooling and heating sequence
5-year warranty	Long-term safety

4.2 Floor heating (with cooling)

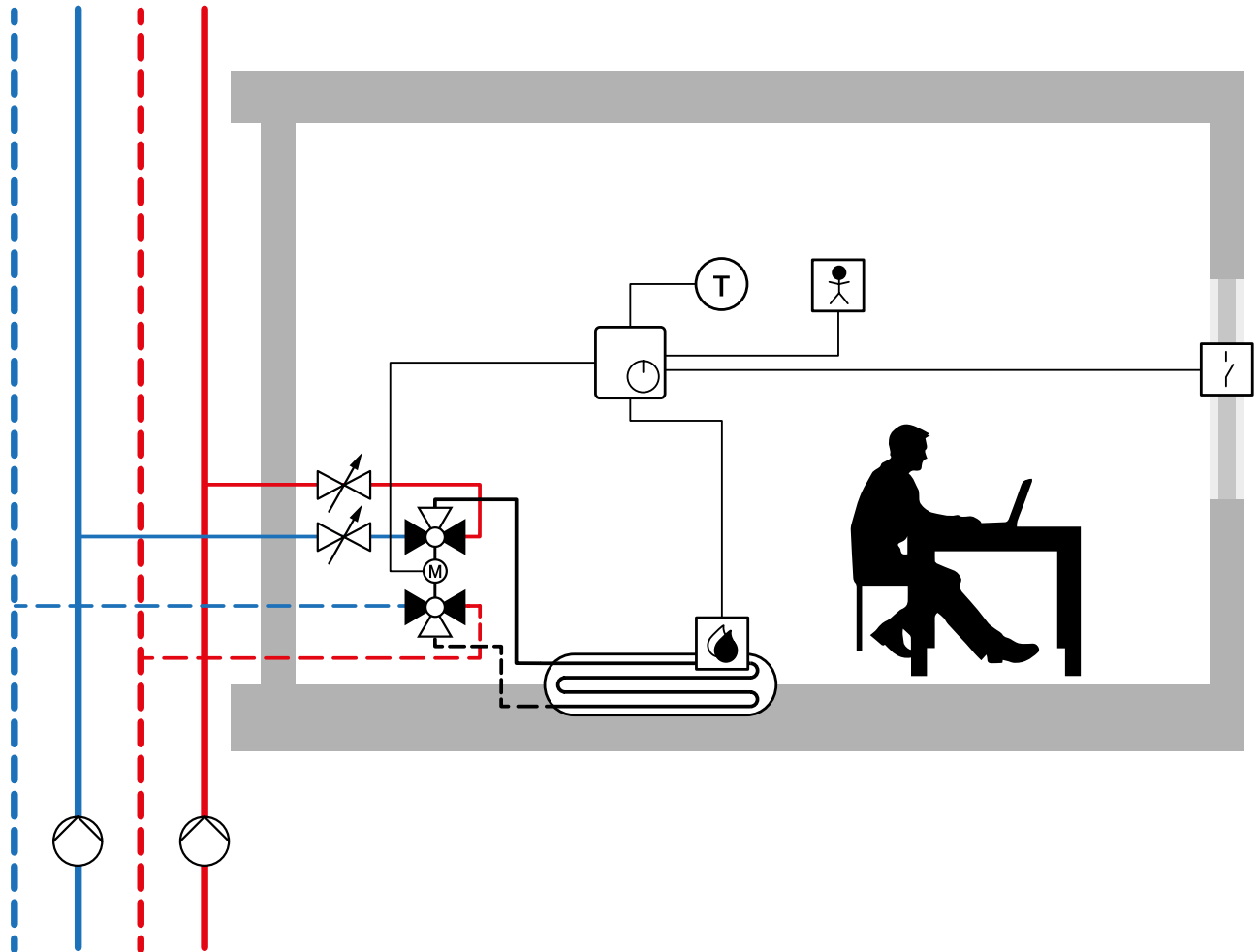


Illustration example

Application description

- Provision of heating energy by means of a heating element mounted on the floor or on the wall
- 4-pipe system ensures immediate availability of warm and cold water
- 4-pipe system enables cooling of certain rooms while others are being heated
- Manual balancing valve for static hydronic balancing of water volume (for full load)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Water volume controlled via room temperature controller
- Automatic shut off if temperature falls below dew point (condensation)
- Automatic shut off if window is open
- Control options, actuator: modulating or via bus communication
- Optional functions: occupancy switch

Controller

Room temperature controller with:

- Adaptation of water quantity by means of continuous 0...10 V control or via bus communication
- Shut-off of the valve with corresponding signal of the condensation sensor
- Valve shut off if window open

Optional: integration of an occupancy switch signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
R30...-...-B..	6-way zone valve from Belimo, DN .., k_{vs1} ... m^3/h , k_{vs2} ... m^3/h	1	
CQ24A-SR ¹⁾ , LR24A-SR ¹⁾ , NR24A-SR ¹⁾	Rotary actuator 1 Nm, 24 V, modulating control for DN 15 Rotary actuator 5 Nm, 24 V, modulating control for DN 15 and DN 20 Rotary actuator 10 Nm, 24 V, modulating control for DN 25	1	
EXT-OC-ZR30..	Optional: insulation shell for 6-way valve, DN ...	1	
ZR23..	Optional: pipe connector for zone valve, DN ...	6	
P2P.PE-1GE	Optional: angle 90° internal/external thread for 6-way valve, DN ...	1	
ZR-004	Optional: fastening angle for 6-way valve DN 15 and DN 20	1	
ZR-005	Optional: fastening angle for 6-way valve DN 25		
	Balancing valve DN ...	2	
	Work service: hydronic balancing	1 h	
CRK24-B1	Room temperature controller for 6-way zone valve	1	
	Temperature sensor	1	
	Optional sensors: occupancy switch, window contact		

¹⁾ other actuator variants available: AC/DC 24 V and AC 230 V, fail-safe, communicative (MP-Bus, BACnet, Modbus)

Belimo – features and benefits

Properties	Benefits
Tight-sealing valve	Complete avoidance of circulation and energy loss
Self-cleaning ball valve	Excellent resistance to contamination, problem-free operation even after long downtimes
Assumes the function of up to four straight-through valves	Reduces planning work, lowers mounting and operating costs Eliminates mounting errors Only requires one control sequence
Integrated pressure release function	Maximum plant safety
Different k_{vs} values for sequences 1 and 2	Enables the optimum design of the cooling and heating sequence
5-year warranty	Long-term safety

4.3 Chilled and heating ceiling

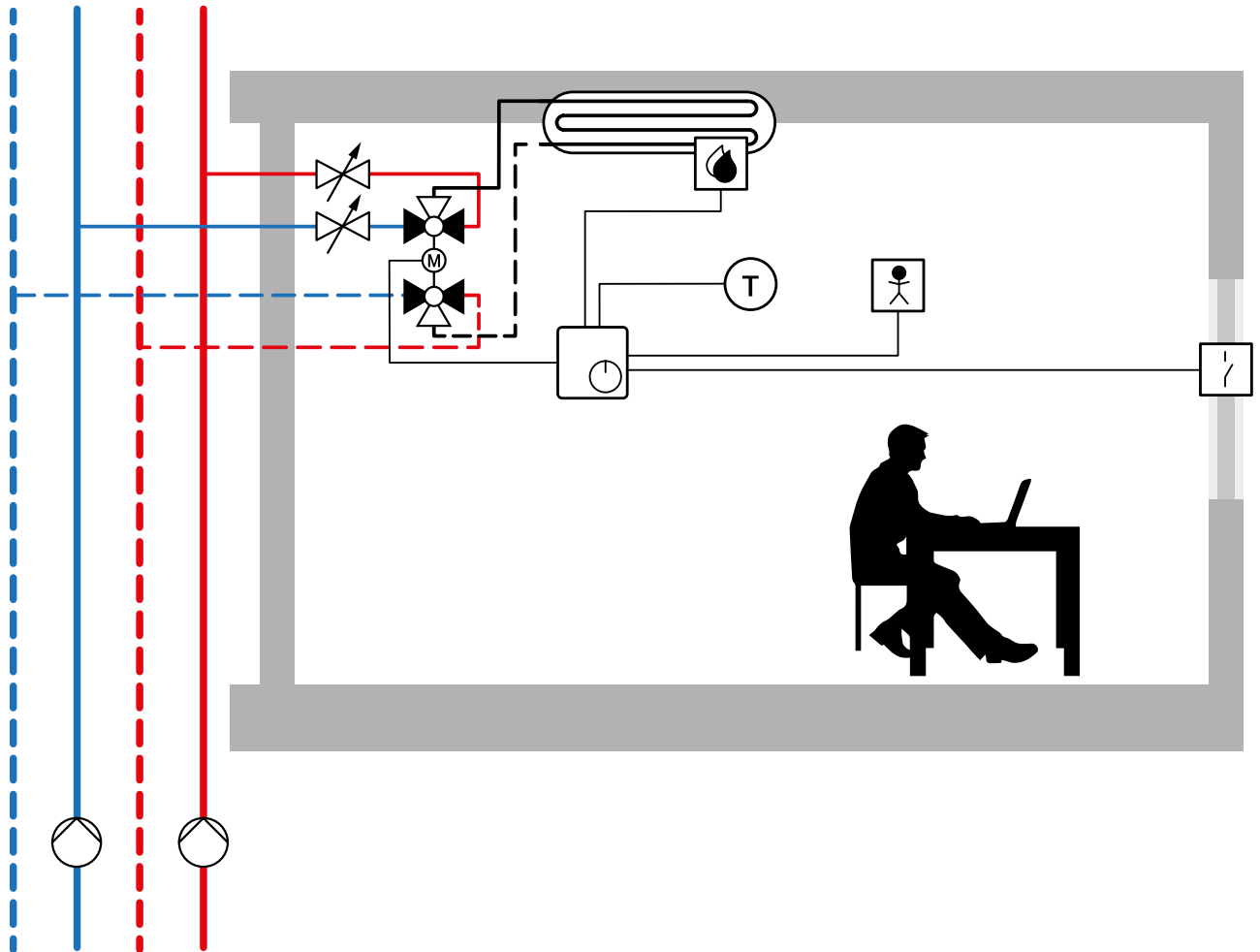


Illustration example

Application description

- Provision of heating energy by means of a combined chilled and heated ceiling
- 4-pipe system ensures immediate availability of warm and cold water
- 4-pipe system enables cooling of certain rooms while others are being heated
- Manual balancing valve for static hydronic balancing of water volume (for full load)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Water volume controlled via room temperature controller
- Automatic shut off if temperature falls below dew point (condensation)
- Automatic shut off if window is open
- Control options, actuator: modulating or via bus communication
- Optional functions: occupancy switch

Controller

Room temperature controller with:

- Adaptation of water quantity by means of continuous 0...10 V control or via bus communication
- Shut-off of the valve with corresponding signal of the condensation sensor
- Valve shut off if window open

Optional: integration of an occupancy switch signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
R30...-...-B..	6-way zone valve from Belimo, DN .., k_{vs1} ... m^3/h , k_{vs2} ... m^3/h	1	
CQ24A-SR ¹⁾	Rotary actuator 1 Nm, 24 V, modulating control for DN 15		
LR24A-SR ¹⁾	Rotary actuator 5 Nm, 24 V, modulating control for DN 15 and DN 20	1	
NR24A-SR ¹⁾	Rotary actuator 10 Nm, 24 V, modulating control for DN 25		
EXT-OC-ZR30..	Optional: insulation shell for 6-way valve, DN ...	1	
ZR23..	Optional: pipe connector for zone valve, DN ...	6	
P2P.PE-1GE	Optional: angle 90° internal/external thread for 6-way valve, DN ...	1	
ZR-004	Optional: fastening angle for 6-way valve DN 15 and DN 20	1	
ZR-005	Optional: fastening angle for 6-way valve DN 25		
	Balancing valve DN ...	2	
	Work service: hydronic balancing	1 h	
CRK24-B1	Room temperature controller for 6-way zone valve	1	
	Temperature sensor	1	
	Optional sensors: occupancy switch, window contact		

¹⁾ Other actuator variants available: AC/DC 24 V and AC 230 V, fail-safe, communicative (MP-Bus, BACnet, Modbus)

Belimo – features and benefits

Properties	Benefits
Tight-sealing valve	Complete avoidance of circulation and energy loss
Self-cleaning ball valve	Excellent resistance to contamination, problem-free operation even after long downtimes
Assumes the function of up to four 2-way valves	Reduces planning work, lowers mounting and operating costs
	Eliminates mounting errors
	Only requires one control sequence
Integrated pressure release function	Maximum plant safety
Different k_{vs} values for sequences 1 and 2	Enables the optimum design of the cooling and heating sequence
5-year warranty	Long-term safety

Tender texts

R30...-...-B..

Zone valve (characterised control valve), 6-way with internal thread. For water-side changeover or modulating control of thermal heating/cooling elements, with integrated pressure release function.

Delivery and mounting of a tightly closing 6-way valve with two control sequences (heating/cooling) and high resistance to contamination.

Construction: 6-way valve, DN 15, DN 20 or DN 25
 Connection: internal thread Rp 1/2" (DN 15), Rp 3/4" (DN 20) or Rp 1" (DN 25)
 k_{vs} value:
 – Cooling: ... m³/h
 – Heating: ... m³/h
 Fluid: cold and warm water with glycol of up to max. 50% vol.

Air-bubble tight, leakage rate A (EN 12266-1)
 Characteristic curve: linear
 – Sequence 1: 0...30°C (Cooling recommended)
 – Dead zone: 30...60°C
 – Sequence 2: 60...90°C (Heating recommended)
 Fluid temperature: 6...80°C
 Permissible operating pressure p_s : 1600 kPa
 Differential pressure dp_{max} : 100 kPa

R3015...-...-B1
 Valve body: brass
 Closing element: chrome-plated brass
 Spindle: brass
 Stem packing: o-ring EPDM
 Ball seat: PTFE, o-ring EPDM
 Flow rate diaphragms: brass

Make: Belimo
 Type: R3015...-...-B1 (DN 15) with CQ24A-.. actuator

R30...-...-B2/B3
 Housing: nickel-plated brass body
 Closing element: chrome-plated brass
 Spindle: nickel-plated brass
 Stem packing: o-ring EPDM
 Ball seat: PTFE, o-ring EPDM
 Flow rate diaphragms: stainless steel

Make: Belimo
 Type: R3015...-...-B2 (DN 15) with LR24A-.. actuator
 Type: R3020...-...-B2 (DN 20) with LR24A-.. actuator
 Type: R3025...-...-B3 (DN 25) with NR24A-.. actuator



R3015...-...-B1



R3015...-...-B2

CQ24A-SR

Rotary actuator for zone valves R3015-...-B1. Direct mounting on zone valve by snapping on. Overload protected and without end switch, current reduction in rest position.

Torque:	1 Nm
Nominal voltage:	AC 24 V 50/60 Hz, DC 24 V
Control:	modulating DC 0...10 V
Operating range:	DC 2...10 V
Power consumption:	
– Operation:	0.4 W
– Rest position:	0.3 W
– Rating:	0.9 VA
Connection:	cable 1 m, 4x0.34 mm ²
Running time:	75 s/90°
Protection class:	III protective extra low voltage (PELV)
Degree of protection:	IP40
EMC:	CE according to 2004/108/EC

Make: Belimo
Type: R3015-...-B1 CQ24A-SR

Electrical and mechanical accessories included
5-year warranty



CQ24A-SR

LR24A-SR

Rotary actuator for zone valves R30...-B2. Direct mounting on zone valve with one central screw. Overload protected and end switchless, current reduction in rest position.

Torque:	5 Nm
Nominal voltage:	AC 24 V 50/60 Hz, DC 24 V
Control:	modulating DC 0...10 V
Operating range:	DC 2...10 V
Power consumption:	
– Operation:	1.5 W
– Rest position:	0.4 W
– Rating:	3 VA
Connection:	cable 1 m, 4x0.75 mm ²
Running time:	90 s/90°
Protection class:	III protective extra low voltage (PELV)
Degree of protection:	IP54
EMC:	CE according to 2004/108/EC

Make: Belimo
Type: R30...-B2 LR24A-SR

Other actuator variants:

- modulating DC 0.5...10 V
- Various bus communication protocols
- Fast running actuators

Electrical and mechanical accessories included
5-year warranty



LR24A-SR

NR24A-SR

Rotary actuator for zone valves R3025...-B3. Direct mounting on zone valve with one central screw. Overload protected and end switchless, current reduction in rest position.

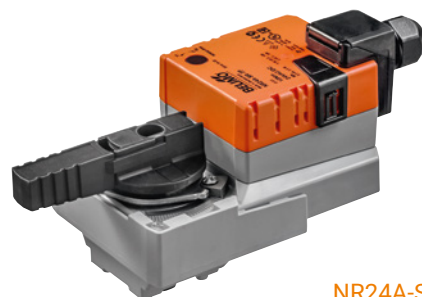
Torque:	10 Nm
Nominal voltage:	AC 24 V 50/60 Hz, DC 24 V
Control:	modulating DC 0...10 V
Operating range:	DC 2...10 V
Power consumption:	
– Operation:	2.5 W
– Rest position:	0.4 W
– Rating:	5 VA
Connection:	cable 1 m, 4x0.75 mm ²
Running time:	90 s/90°
Protection class:	III protective extra low voltage (PELV)
Degree of protection:	IP54
EMC:	CE according to 2004/108/EC

Make:	Belimo
Type:	R3025...-B3 NR24A-SR

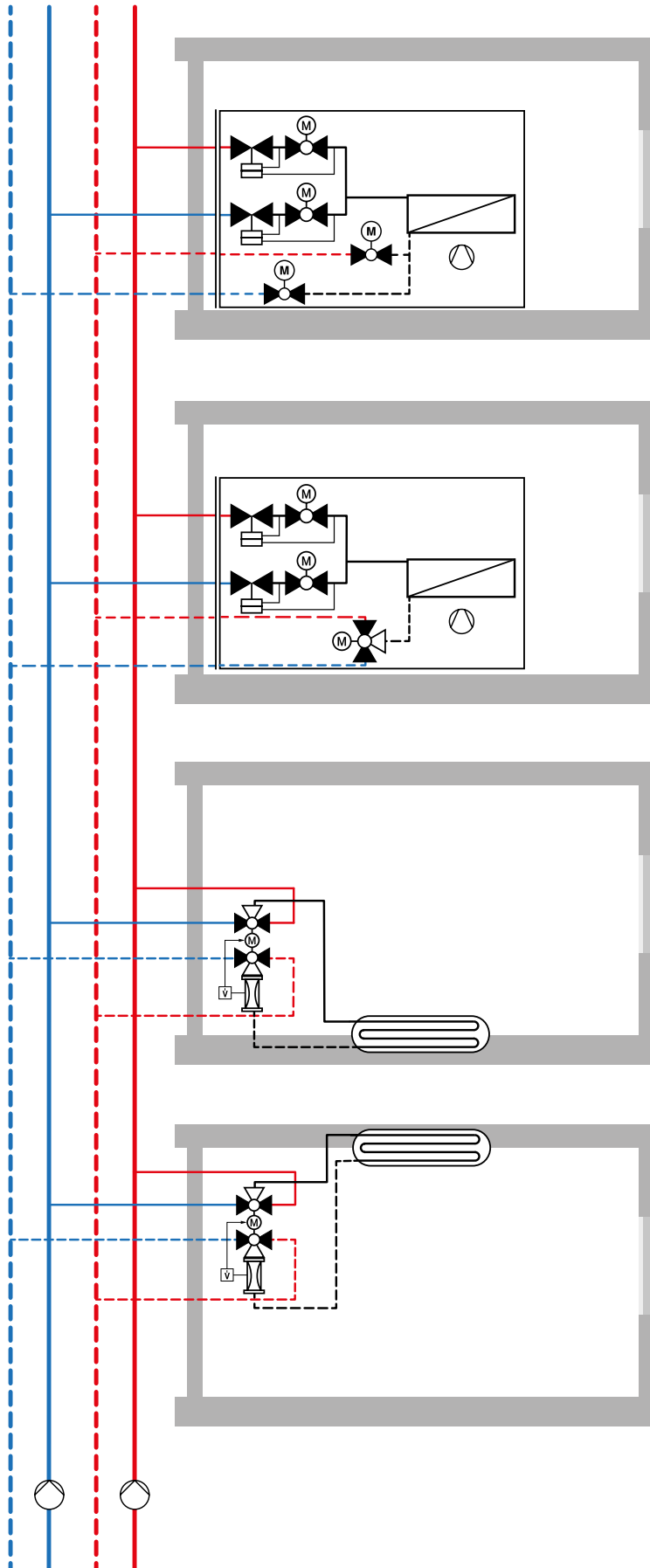
Other actuator variants:

- modulating DC 0.5...10 V
- Various bus communication protocols
- Fast running actuators

Electrical and mechanical accessories included
5-year warranty



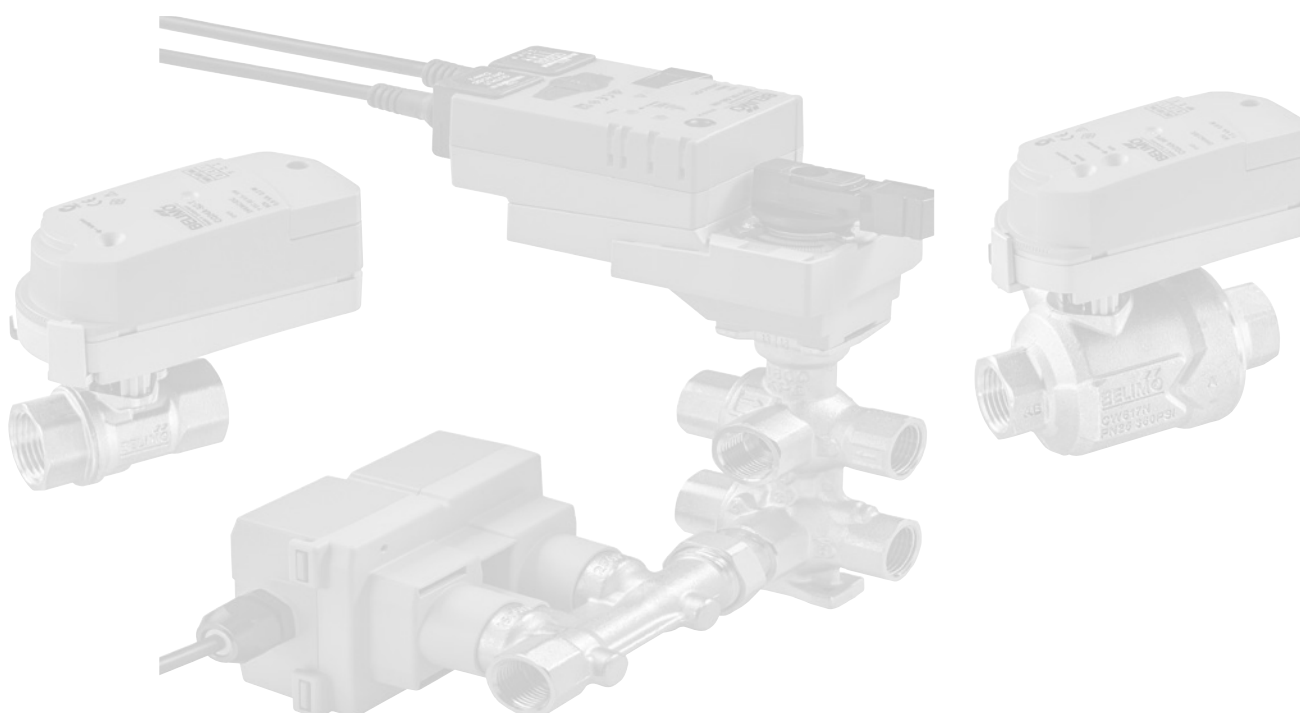
NR24A-SR



5

Automatically balancing variable-flow 4-pipe system

	<u>Page</u>
5.1 Fan coil	54
5.1.1 Fan coil	56
5.1.2 Fan coil	58
5.2 Floor heating/radiator	60
5.3 Chilled and heating ceiling	62
Tender Text	64



5.1 Fan coil

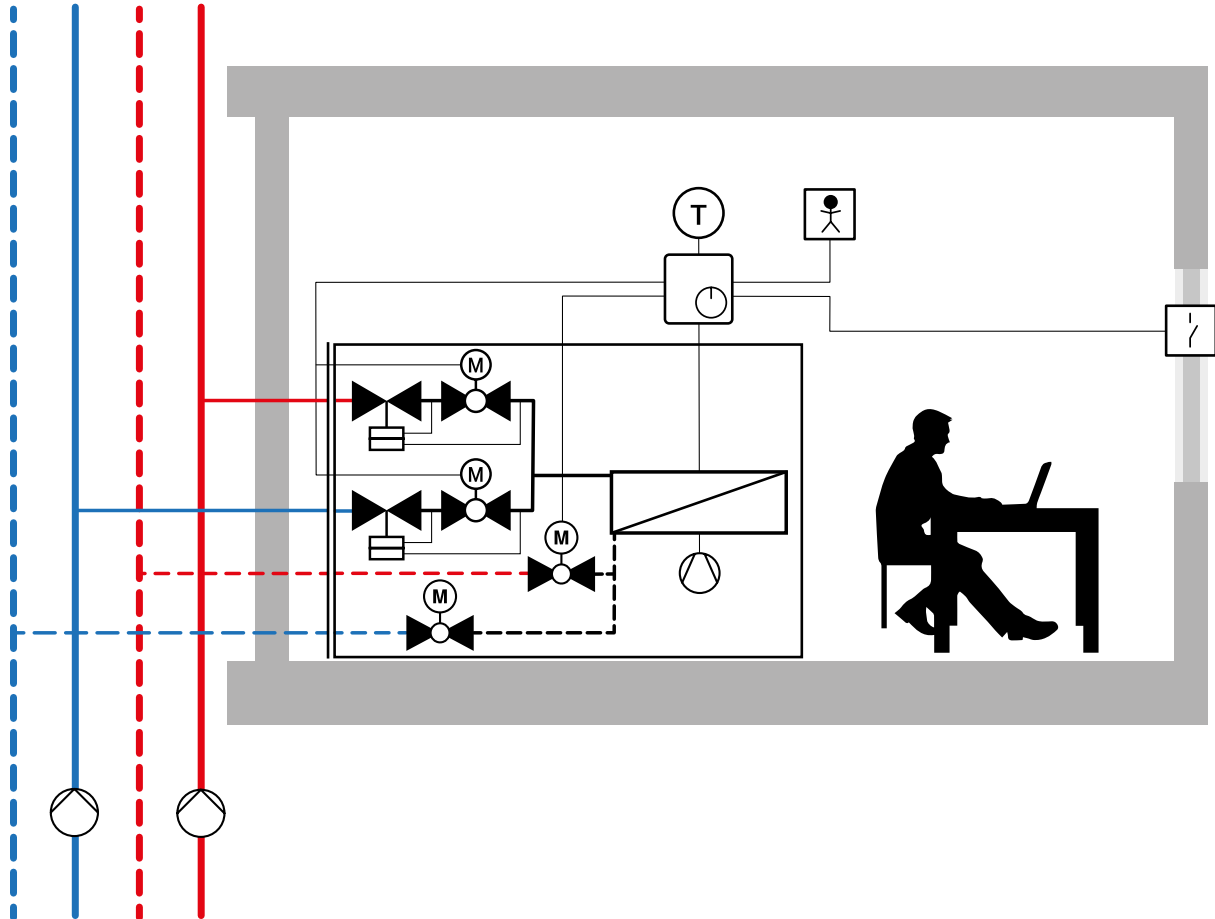


Illustration example

Application description

- Fan coil (with a heat exchanger) provides heating and cooling energy
- 4-pipe system ensures immediate availability of warm and cold water
- 4-pipe system enables cooling of certain rooms while others are being heated
- Pressure-independent control valve for automatic, permanent hydronic balancing (for all load states)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Water and air volume controlled via room temperature controller
- Actuator control options (closed-loop control): 3-point, modulating or via bus communication
- Actuator control options (cooling/heating changeover): open/close or via bus communication
- Optional functions: occupancy switch, window contact

Controller

Room temperature controller with:

- Air volume adaptation (3 speeds with 3 DO or modulating with 1 AO)
 - Water-side control for warm and cold water by means of two modulating signals 0...10 V or 3-point or via bus communication
 - Distinction of warm and cold water sequence using two open/close signals
- Optional: integration of an occupancy switch and/or window contact signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
C2..QP(T)-..	Pressure-independent 2-way zone valve PIQCV from Belimo, DN ... with adjustable flow V'_{\max} ...-... l/h	2	
CQ24A-SR	Belimo actuator for zone valves, ... V, control: ...	2	
EXT-OC-ZQ..-P(T)	Optional: insulation shell for valve C2..QP(T), 2-way, DN ...	2	
C2..Q..	2-way zone valve QCV from Belimo, DN ... with adjustable k_v value ...-... m ³ /h	2	
CQ24A	Belimo actuator for zone valves, 24 V, control: open/close (*)	2	
EXT-OC-ZR-C2..Q	Optional: insulation shell for valve C2..Q, 2-way, DN ...	2	
ZR23..	Optional: pipe connector for zone valve, DN ...	8	
ZCQ-E	Optional: spindle extension CQ	4	
	Room temperature controller, 2 analogue outputs, 2 digital outputs	1	
	Temperature sensor	1	
	Optional sensors: occupancy switch, window contact		

(*) also available as a 230 V version -> CQ230A

Belimo – features and benefits

Properties	Benefits
Pressure-independent	Simple, safe valve design using the maximum flow rate, no k_v value calculation required
Automatic, permanent hydronic balancing	Excellent room comfort thanks to correct water volume at all times
Compact overall structure	Fast commissioning, no balancing valves required
Tight-sealing valve	Ideal room utilisation and high level of freedom in design
Self-cleaning ball valve	Complete avoidance of circulation and energy loss
Equal-percentage flow characteristic without input step	Excellent resistance to contamination, problem-free operation even after long downtimes
Variable setting option V'_{\max}	Can be controlled perfectly even in the lowest partial load range
Actuator with low power consumption	Maximum flexibility in planning, installation and during usage phase
5-year warranty	Energy cost reduction by up to 90% compared to conventional zone valves
	Long-term safety

5.1.1 Fan coil

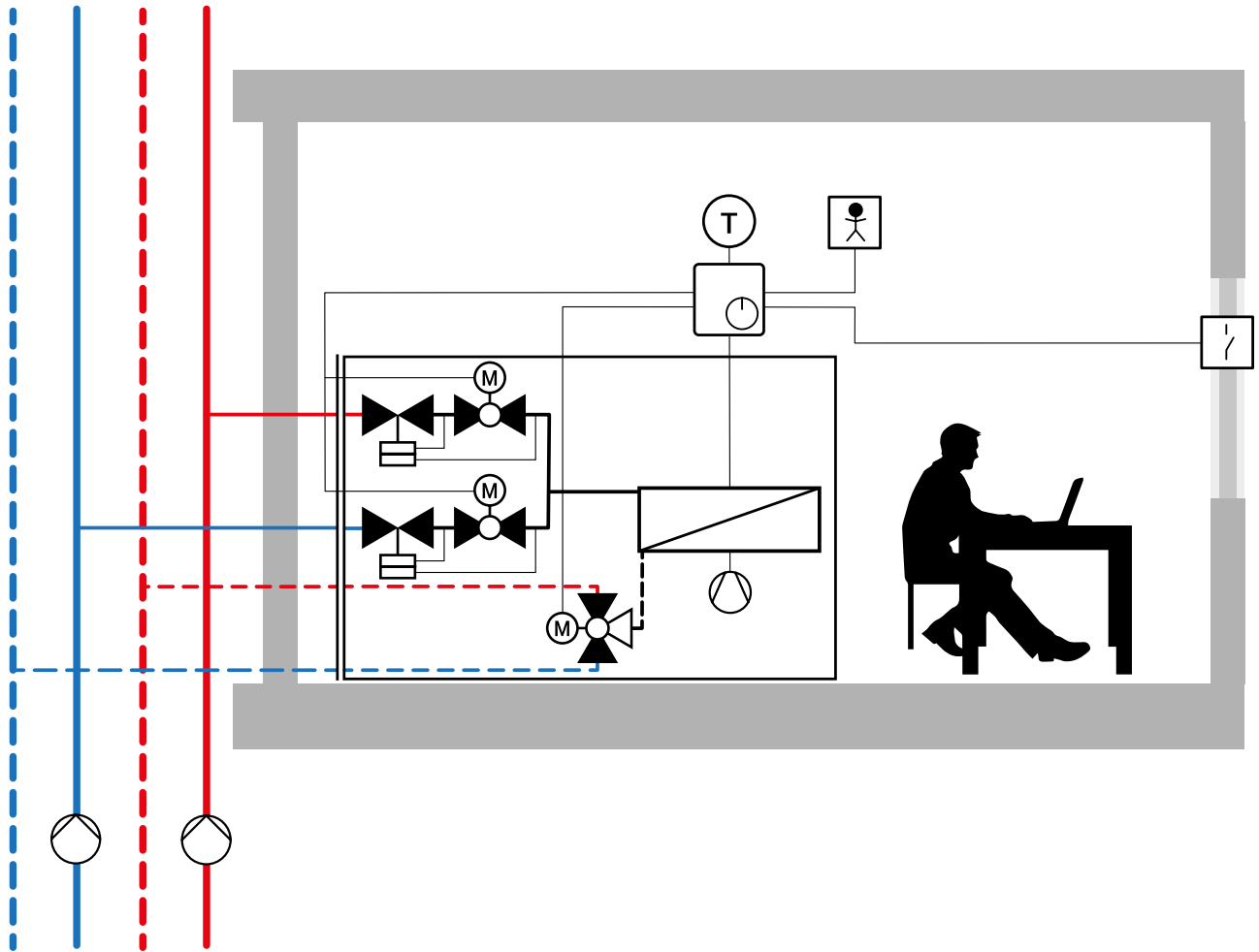


Illustration example

Application description

- Fan coil (with a heat exchanger) provides heating and cooling energy
- 4-pipe system ensures immediate availability of warm and cold water
- 4-pipe system enables cooling of certain rooms while others are being heated
- Pressure-independent control valve for automatic, permanent hydronic balancing (for all load states)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Water and air volume controlled via room temperature controller
- Actuator control options (closed-loop control): 3-point, modulating or via bus communication
- Actuator control options (cooling/heating changeover): open/close or via bus communication
- Optional functions: occupancy switch, window contact

Controller

Room temperature controller with:

- Air volume adaptation (3 speeds with 3 DO or modulating with 1 AO)
 - Water-side control for warm and cold water by means of two modulating signals 0...10 V or 3-point or via bus communication
 - Distinction of the warm and cold water sequence using 1 changeover signal
- Optional: integration of an occupancy switch and/or window contact signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
C2..QP(T)-..	Pressure-independent 2-way zone valve PIQCV from Belimo, DN ... with adjustable flow V'_{\max} ...-... l/h	2	
CQ24A-SR	Belimo actuator for zone valves, ... V, control: ...	2	
EXT-OC-ZQ..-P(T)	Optional: insulation shell for valve C2..QP(T), 2-way, DN ...	2	
C3..Q..	Belimo 3-way changeover zone valve QCV, DN ...	1	
CQ24A	Belimo actuator for zone valves, 24 V, control: open/close (*)	1	
EXT-OC-ZR-C3..Q-..	Optional: insulation shell for valve C3..Q, 3-way, DN ...	1	
ZR23..	Optional: pipe connector for zone valve, DN ...	7	
ZCQ-E	Optional: spindle extension CQ	3	
	Room temperature controller, 2 analogue outputs, 1 digital output	1	
	Temperature sensor	1	
	Optional sensors: occupancy switch, window contact		

(*) also available as a 230 V version -> CQ230A

Belimo – features and benefits

Properties	Benefits
Pressure-independent	Simple, safe valve design using the maximum flow rate, no K_v value calculation required
Automatic, permanent hydronic balancing	Excellent room comfort thanks to correct water volume at all times
Compact overall structure	Fast commissioning, no balancing valves required
Tight-sealing valve	Ideal room utilisation and high level of freedom in design
Self-cleaning ball valve	Complete avoidance of circulation and energy loss
Equal-percentage flow characteristic without input step	Excellent resistance to contamination, problem-free operation even after long downtimes
Variable setting option V'_{\max}	Can be controlled perfectly even in the lowest partial load range
Actuator with low power consumption	Maximum flexibility in planning, mounting and during usage phase
5-year warranty	Energy cost reduction by up to 90% compared to conventional zone valves
	Long-term safety

5.1.2 Fan coil

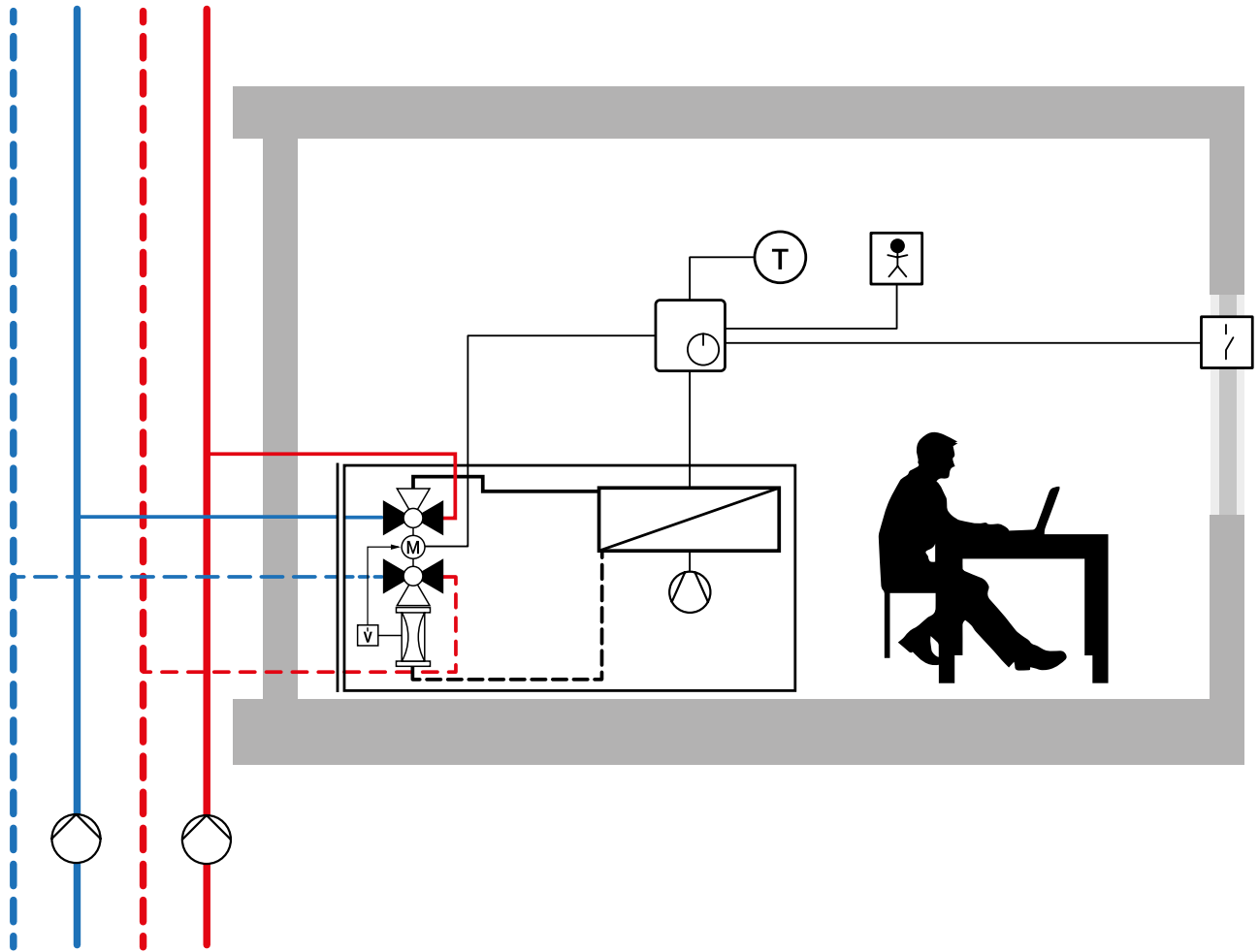


Illustration example

Application description

- Fan coil (with a heat exchanger) provides heating and cooling energy
- 4-pipe system ensures immediate availability of warm and cold water
- 4-pipe system enables cooling of certain rooms while others are being heated
- Pressure-independent control valve for automatic, permanent hydronic balancing (for all load states)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Optional realisation of a pump optimiser possible (pump control as required)
- Water and air volume controlled via room temperature controller
- Actuator control options (cooling/heating changeover): open/close or via bus communication
- Optional functions: occupancy switch, window contact

Controller

Room temperature controller with:

- Air volume adaptation (3 speeds with 3 DO or modulating with 1 AO)
 - Water-side control for warm and cold water by means of two modulating signals 0...10 V or via bus communication
 - Distinction of the warm and cold water sequence using 1 changeover signal
- Optional: integration of an occupancy switch and/or window contact signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
EP..R-R6+BAC	Electronic pressure-independent characterised control valve, 6-way characterised control valve from Belimo, DN ...	1	
EXT-OC-ZR30..	Optional: insulation shell for 6-way valve, DN ...	1	
ZR23..	Optional: pipe connector for zone valve, DN	6	
P2P..PE-1GE	Optional: elbow 90° internal/external thread for 6-way valve, DN ...	1	
ZR-004..	Optional: fastening angle for 6-way valve DN 15 and DN 20	1	
	Room temperature controllers	1	
	Temperature sensor	1	
	Optional sensors: occupancy switch, window contact		

(*) also available as a 230 V version --> CQ230A

Belimo – features and benefits

Properties	Benefits
Pressure-independent	Simple, safe valve design using the maximum flow rate, no K_v value calculation required
Automatic, permanent hydronic balancing	Excellent room comfort thanks to correct water volume at all times
Tight-sealing valve	Fast commissioning, no balancing valves required
Self-cleaning ball valve	Complete avoidance of circulation and energy loss
Equal-percentage flow characteristic without input step	Excellent resistance to contamination, problem-free operation even after long downtimes
Variable setting option V'_{max}	Can be controlled perfectly even in the lowest partial load range
Actuator with low power consumption	Maximum flexibility in planning, mounting and during usage phase
5-year warranty	Energy cost reduction by up to 90% compared to conventional zone valves
	Long-term safety

5.2 Floor heating (with cooling)

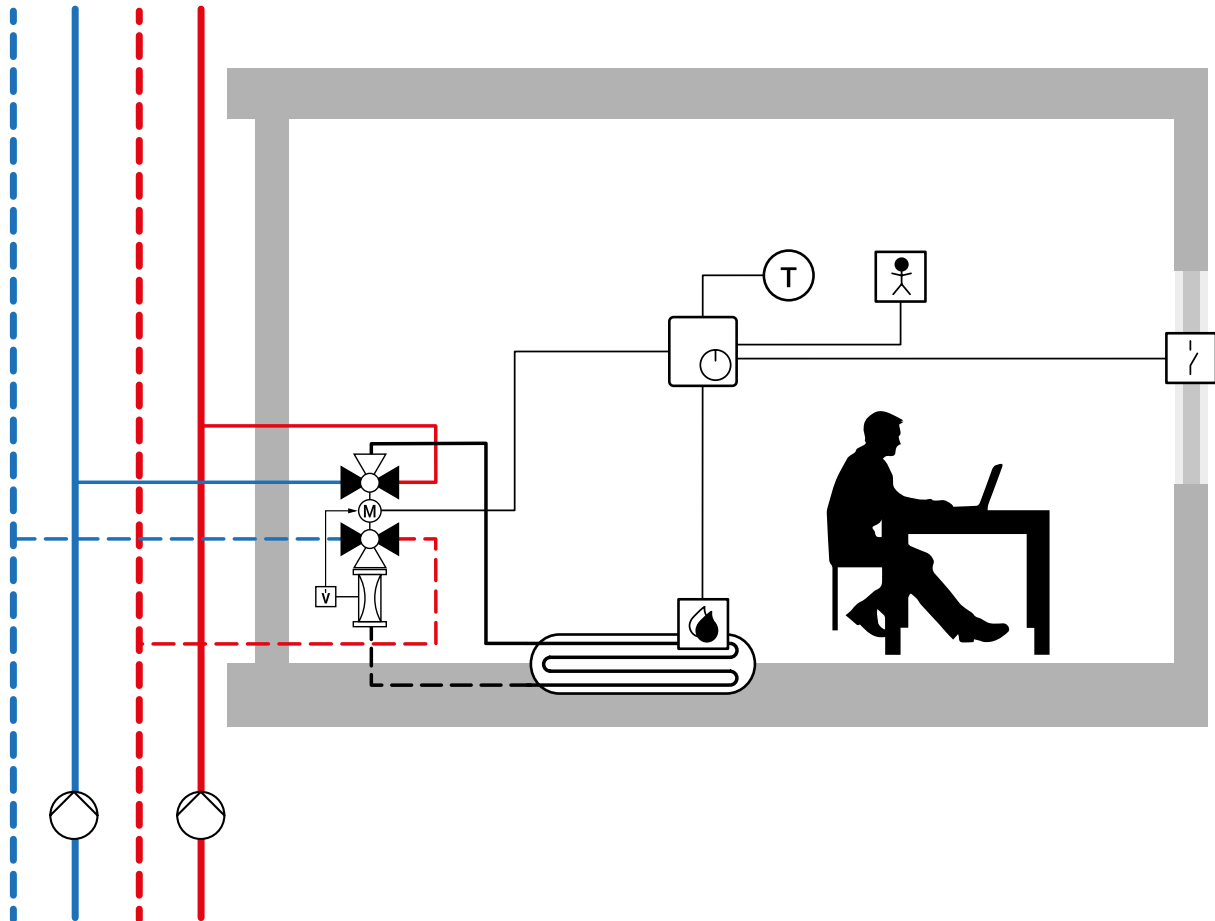


Illustration example

Application description

- Provision of heating energy by means of a heating element mounted on the floor or on the wall
- 4-pipe system ensures immediate availability of warm and cold water
- 4-pipe system enables cooling of certain rooms while others are being heated
- Pressure-independent control valve for automatic, permanent hydronic balancing (for all load states)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Optional realisation of a pump optimiser possible (pump control as required)
- Water volume controlled via room temperature controller
- Automatic shut off if temperature falls below dew point (condensation)
- Automatic shut off if window is open
- Control options, actuator: modulating or via bus communication
- Optional functions: occupancy switch

Controller

Room temperature controller with:

- Water volume adaptation by means of continuous 0...10 V control
- Shut-off of the valve with corresponding signal of the Condensation sensor
- Valve shut off if window open

Optional: integration of an occupancy switch signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
EP..R-R6+BAC	Electronic pressure-independent 6-way characterised control valve from Belimo, DN ...	1	
EXT-OC-ZR30..	Optional: insulation shell for 6-way valve, DN ...	1	
ZR23..	Optional: pipe connector for zone valve, DN ...	6	
P2P..PE-1GE	Optional: elbow 90° internal/external thread for 6-way valve, DN ...	1	
ZR-004	Optional: fastening angle for 6-way valve DN 15 and DN 20	1	
	Room temperature controllers	1	
	Temperature sensor	1	
	Condensation sensor	1	
	Optional sensors: occupancy switch, window contact		

Belimo – features and benefits

Properties	Benefits
Pressure-independent	Simple, safe valve design using the maximum flow rate, no K_v value calculation required
Automatic, permanent hydronic balancing	Excellent room comfort thanks to correct water volume at all times
Tight-sealing valve	Fast commissioning, no balancing valves required
Self-cleaning ball valve	Complete avoidance of circulation and energy loss
Equal-percentage flow characteristic without input step	Excellent resistance to contamination, problem-free operation even after long downtimes
Variable setting option V_{max}^i	Can be controlled perfectly even in the lowest partial load range
Actuator with low power consumption	Maximum flexibility in planning, mounting and during usage phase
5-year warranty	Energy cost reduction by up to 90% compared to conventional zone valves
	Long-term safety

5.3 Chilled and heating ceiling

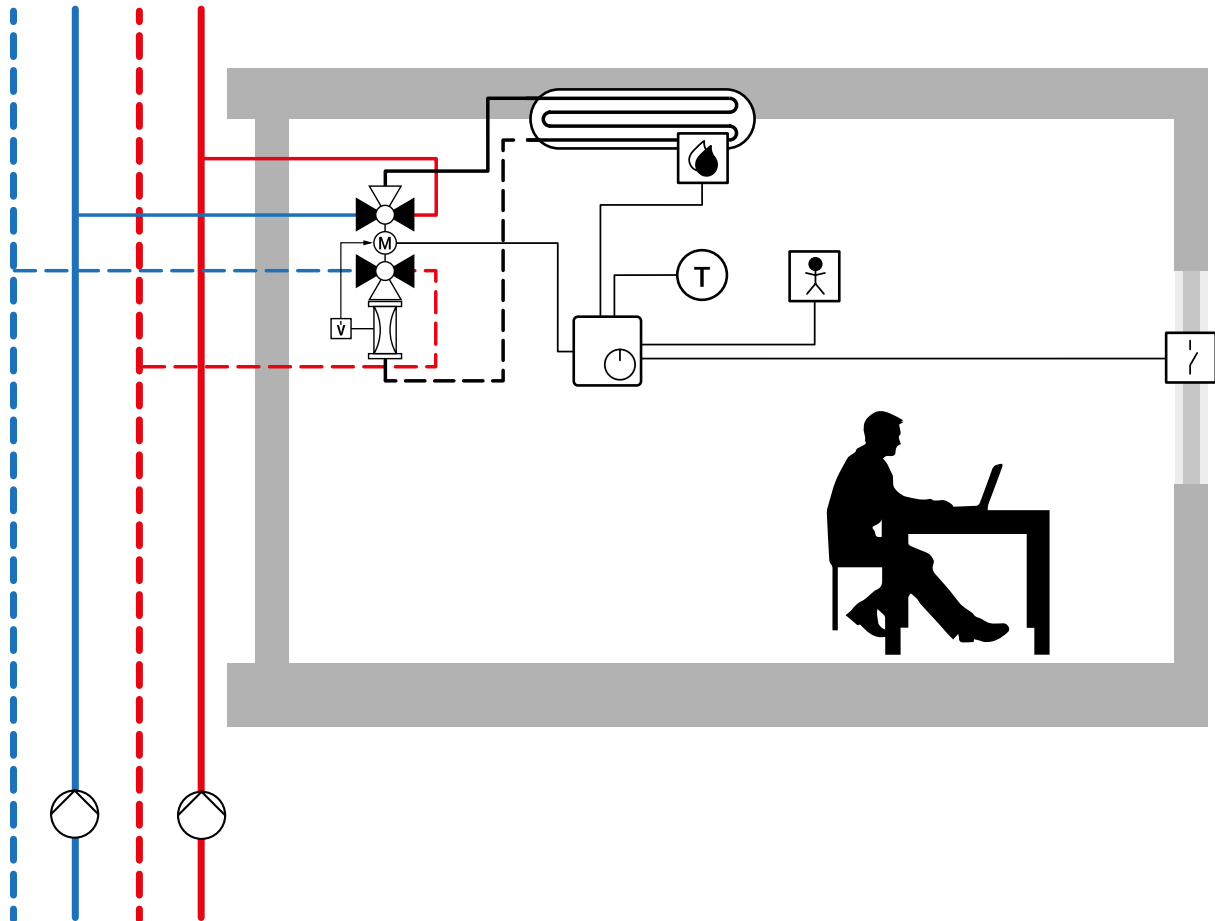


Illustration example

Application description

- Provision of heating energy by means of a combined chilled and heating ceiling
- 4-pipe system ensures immediate availability of warm and cold water
- 4-pipe system enables cooling of certain rooms while others are being heated
- Pressure-independent control valve for automatic, permanent hydronic balancing (for all load states)
- Pump speed control due to the differential pressure at the system's lowest point of pressure
- Optional realisation of a pump optimiser possible (pump control as required)
- Water volume controlled via room temperature controller
- Automatic shut off if temperature falls below dew point (condensation)
- Automatic shut off if window is open
- Control options, actuator: modulating or via bus communication
- Optional functions: occupancy switch

Controller

Room temperature controller with:

- Water volume adaptation by means of continuous 0...10 V control
- Shut-off of the valve with corresponding signal of the Condensation sensor
- Valve shut off if window open

Optional: integration of an occupancy switch signal

Bill of material

Product type from Belimo	Description	Quantity	Costs
EP..R-R6+BAC	Electronic pressure-independent 6-way characterised control valve from Belimo, DN ...	1	
EXT-OC-ZR30..	Optional: insulation shell for 6-way valve, DN ...	1	
ZR23..	Optional: pipe connector for zone valve, DN ...	6	
P2P..PE-1GE	Optional: elbow 90° internal/external thread for 6-way valve, DN ...	1	
ZR-004	Optional: fastening angle for 6-way valve DN 15 and DN 20	1	
	Room temperature controllers	1	
	Temperature sensor	1	
	Condensation sensor	1	
	Optional sensors: occupancy switch, window contact		

Belimo – features and benefits

Properties	Benefits
Pressure-independent	Simple, safe valve design using the maximum flow rate, no k_v value calculation required
	Excellent room comfort thanks to correct water volume at all times
Automatic, permanent hydronic balancing	Fast commissioning, no balancing valves required
Tight-sealing valve	Complete avoidance of circulation and energy loss
Self-cleaning ball valve	Excellent resistance to contamination, problem-free operation even after long downtimes
Assumes the function of up to four straight-through valves	Reduces planning work, lowers mounting and operating costs
	Eliminates mounting errors
	Only requires one control sequence
Integrated pressure release function	Maximum plant safety
Different V'_{max} values for sequences 1 and 2	Enables the optimum design of the cooling and heating sequence
5-year warranty	Long-term safety

Tender texts

C2..QP(T)-.

Pressure-independent zone valve (characterised control valve), 2-way with internal thread. For water-side modulating control in air-handling and heating systems. Snap assembly of the actuator, integrated pressure regulating valve for constant flow independent of pressure fluctuations. With measurement connections for checking the pressure value (if provided).

Delivery and mounting of a tight-sealing, pressure-independent 2-way valve with automatic hydronic balancing, equal-percentage characteristic curve and high resistance to contamination.

Construction:	straight-through valve 2-way, DN 15, DN 20 or DN 25
Connection:	internal thread Rp 1/2" (DN 15), Rp 3/4" (DN 20) or Rp 1" (DN 25)
Flow V'_{max} :	max. 210 l/h, adjustable [C215QP(T)-B]
Flow V'_{max} :	max. 420 l/h, adjustable [C215QP(T)-D]
Flow V'_{max} :	max. 980 l/h, adjustable [C220QP(T)-F]
Flow V'_{max} :	max. 2100 l/h, adjustable [C225QPT-G]
Fluid:	cold and warm water, Water with max. 50% volume of glycol
Air-bubble tight, leakage rate A	(EN 12266-1)
Characteristic curve:	equal percentage (VDI/VDE 2178), optimised in the opening range
Fluid temperature:	2...90°C
Permissible operating pressure p_s :	1600 kPa
Close-off pressure dp_s :	1400 kPa
Differential pressure:	16...350 kPa
Body:	brass
Closing element:	stainless steel
Spindle:	stainless steel
Stem packing:	o-ring EPDM
Ball seat:	PTFE, o-ring EPDM
Diaphragm:	EPDM
Make:	Belimo
Type:	C215QP(T)-B (DN 15, 210 l/h)
Type:	C215QP(T)-D (DN 15, 420 l/h)
Type:	C220QP(T)-F (DN 20, 980 l/h)
Type:	C225QPT-G (DN 25, 2100 l/h)

(T) = version with measurement connector



C2..QP-.

C2..Q..

Zone valve (characterised control valve), 2-way with internal thread. For water-side modulating control or shut-off function in air-handling and heating systems. Snap-assembly of the actuator.

Delivery and mounting of a tight-sealing 2-way zone valve with equal-percentage characteristic curve and high resistance to contamination.

Construction:	straight-through valve 2-way, DN 15, DN 20 or DN 25
Connection:	internal thread Rp 1/2" (DN 15), Rp 3/4" (DN 20) or 1" (DN 25)/external thread G 3/4" (DN 15/DN 20)
k_v value:	max. 4.8 m ³ /h, adjustable (DN 15)
k_v value:	max. 8 m ³ /h, adjustable (DN 20)
k_v value:	max. 7 m ³ /h, adjustable (DN 25)
Fluid:	cold and warm water with glycol of up to max. 50% vol.
Air-bubble tight, leakage rate A	(EN 12266-1)
Characteristic curve:	equal percentage, optimised in the opening range
Fluid temperature:	2...90°C
Permissible operating pressure p_s :	1600 kPa
Close-off pressure dp_s :	520 kPa
Differential pressure dp_{max} :	280 kPa
Body:	brass
Closing element:	chrome-plated brass
Spindle:	brass
Stem packing:	o-ring EPDM
Ball seat:	PTFE, o-ring EPDM

Make:	Belimo
Type:	C215Q-F (DN 15)
Type:	C215Q-J (DN 15)
Type:	C220Q-K (DN 20)
Type:	C225Q-K (DN 25)

Other version available:
– External thread G 3/4" (C4..Q..)

**C2..Q..**

CQ24A-SR

Rotary actuator for zone valves. Direct mounting on zone valve by snapping on. Overload protected and without end switch, current reduction in rest position.

Torque:	1 Nm
Nominal voltage:	AC 24 V 50/60 Hz, DC 24 V
Control:	modulating DC 0...10 V
Operating range:	DC 2...10 V
Power consumption:	
– Operation:	0.4 W
– Rest position:	0.3 W
– Rating:	0.9 VA
Connection:	cable 1 m, 4x0.34 mm ²
Running time:	75 s/90°
Protection class:	III protective extra low voltage (PELV)
Degree of protection:	IP40
EMC:	CE according to 2004/108/EC
Make:	Belimo
Type:	CQ24A-SR

Other actuator variants:

- AC 230 V
- Modulating (0.5...10 V)
- Various bus communication protocols
- Fast running actuators
- Open/close, 3-point
- Fail-safe

Electrical and mechanical accessories included



CQ24A-SR

CQ24A

Rotary actuator for zone valves. Direct mounting on zone valve by snapping on. Overload protected and without end switch, current reduction in rest position.

Torque:	1 Nm
Nominal voltage:	AC 24 V 50/60 Hz, DC 24 V
Control:	open/close, 3-point
Power consumption:	
– Operation:	0.3 W
– Rest position:	0.2 W
– Rating:	0.6 VA
Connection:	cablc 1 m, 3x0.75 mm ²
Running time:	75 s/90°
Protection class:	III protective extra low voltage (PELV)
Degree of protection:	IP40
EMC:	CE according to 2004/108/EC

Make:	Belimo
Type:	CQ24A

Other actuator variants:

- AC 230 V
- Various bus communication protocols
- Fast running actuators
- Open/close, 3-point
- Fail-safe

Electrical and mechanical accessories included
5-year warranty



CQ24A

C3..Q..

3-way changeover zone valve with internal thread for water-side changeover function in air-handling and heating systems.

Delivery and mounting of a 3-way changeover valve with high resistance to contamination.

Construction:	3-way changeover valve, DN 15, DN 20 or DN 25
Connection:	internal thread Rp 1/2" (DN 15), Rp 3/4" (DN 20) or Rp 1" (DN 25)
k_{vs} value:	2.5 m ³ /h (DN 15)/4 m ³ /h (DN 20 and DN 25)
Fluid:	cold and warm water with glycol of up to max. 50% vol.
Air-bubble tight, leakage rate A	(EN 12266-1)
Fluid temperature:	2...90°C
Permissible operating pressure p_s :	1600 kPa
Close-off pressure dp_s :	350 kPa
Differential pressure dp_{max} :	280 kPa

Body:	brass
Closing element:	chrome-plated brass
Spindle:	brass
Stem packing:	o-ring EPDM
Ball seat:	PTFE, o-ring EPDM

Make:	Belimo
Type:	C315Q-H (DN 15)
Type:	C320Q-J (DN 20)
Type:	C325Q-J (DN 25)

Other version available:

– External thread G 3/4" (C5..Q..)



C3..Q..

EP..R-R6+BAC

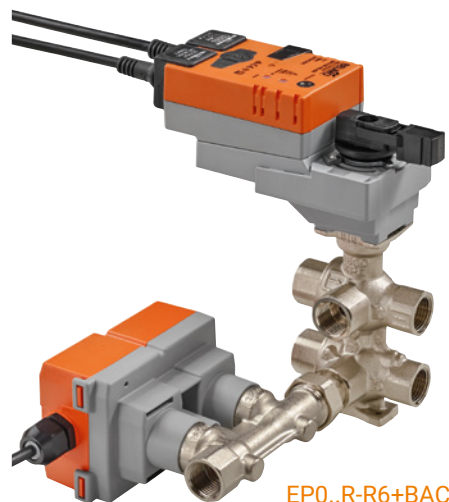
Zone valve, 6-way characterised control valve with sensor-operated flow control for water-side changeover or control of thermal heating/cooling elements, with integrated pressure release function. Consisting of 6-way characterised control valve with actuator and measuring pipe with volumetric flow sensor, parametrisable with ZTH EU.

Supply and mounting of a tight-sealing, electronic, pressure-independent 6-way zone valve with automatic permanent hydronic balancing and high resistance to contamination.

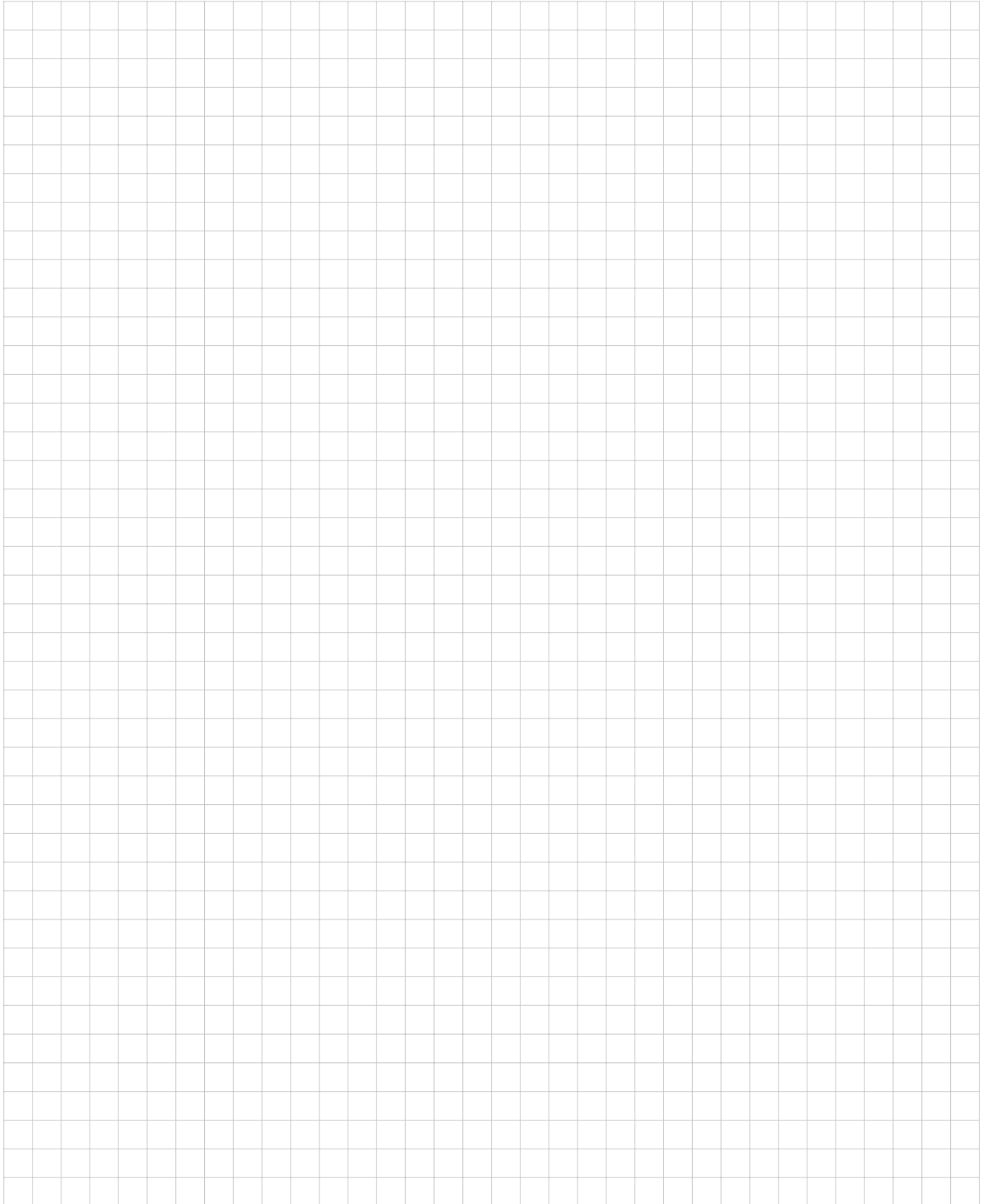
Construction:	6-way characterised control valve, DN 15, DN 20
Connection:	internal thread Rp 1/2" (DN 15), Rp 3/4" (DN 20)
V' _{nom} sequence 1:	21 l/min (DN 15)/39 l/min (DN 20)
V' _{nom} sequence 2:	21 l/min (DN 15)/39 l/min (DN 20)
Flow V' _{max} :	1.1...21 l/min, adjustable (5...100% of V' _{nom}) (DN 15)
Flow V' _{max} :	2...39 l/min, adjustable (5...100% of V' _{nom}) (DN 20)
Fluid:	cold and warm water with glycol of up to max. 50% vol.
Air-bubble tight, leakage rate A	(EN 12266-1)
Characteristic curve:	linear
– Sequence 1:	2...4.7 V (cooling recommended)
– Dead zone:	4.7...7.3 V
– Sequence 2:	7.3...10 V (heating recommended)
Fluid temperature:	6...80°C
Permissible operating pressure p _s :	1600 kPa
Differential pressure dp _{max} :	110 kPa
Theoretical k _{vs} value:	1.2 m ³ /h (DN 15)/2.3 m ³ /h (DN 20)
Torque:	5 Nm
Nominal voltage:	AC 24V 50/60 Hz, DC 24 V
Control signal Y:	DC 0...10 V
Operating range:	DC 2...10 V
Power consumption:	
– Operation:	2 W
– Rest position:	1.5 W
– Rating:	4.5 VA
Connection:	cable 1 m, 6x0.75 mm ²
Manual override:	gear disengagement with pushbutton
Protection class:	III protective extra low voltage (PELV)
Degree of protection:	IP54
EMC:	CE according to 2004/108/EC

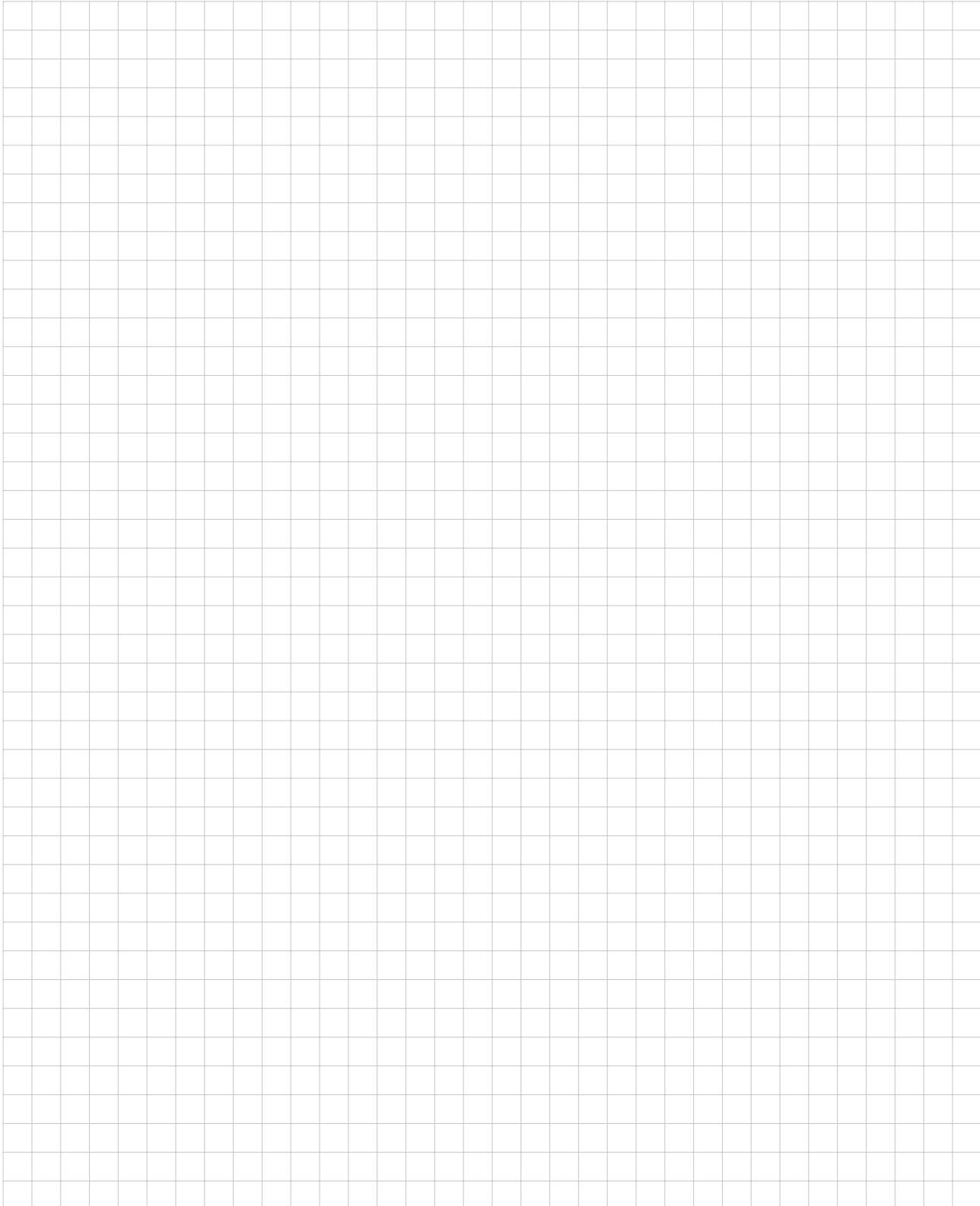
Valve body:	nickel-plated brass
Closing element:	chrome-plated brass
Spindle:	nickel-plated brass
Stem packing:	o-ring EPDM
Ball seat:	PTFE, o-ring EPDM
Measuring pipe:	nickel-plated brass body

Make:	Belimo
Type:	EP015R-R6+BAC (DN 15)
Type:	EP020R-R6+BAC (DN 20)
Electrical and mechanical accessories included	
5-year warranty	



EP0..R-R6+BAC





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 5-year warranty. Our worldwide representatives in over 80 countries warranty short delivery times and extensive 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



BELIMO Automation AG

Brunnenbachstrasse 1, 8340 Hinwil, Switzerland
+41 43 843 61 11, info@belimo.ch, www.belimo.com

BELIMO[®]