

Characterised control valve, 2-way,  
External thread

- For open and closed cold and warm water systems
- For modulating water-side control of air handling units and heating systems
- Air bubble tight


**Type overview**

Type	kvs [ m <sup>3</sup> /h]	DN [ ]	G ["]	PN [ ]	n(gl) [ ]	Sv min. [ ]
R405K	0.25	10	3/4	16	3.2	50
R406K	0.4	10	3/4	16	3.2	50
R407K	0.63	10	3/4	16	3.2	50
R408K	1	10	3/4	16	3.2	50
R409K	1.6	10	3/4	16	3.2	50
R409	0.63	15	1	16	3.2	50
R410	1	15	1	16	3.2	50
R411	1.6	15	1	16	3.2	50
R412	2.5	15	1	16	3.2	50
R413	4	15	1	16	3.9	100
R414	6.3	15	1	16	3.9	100
R417	4	20	1 1/4	16	3.9	100
R418	6.3	20	1 1/4	16	3.9	100
R419	8.6	20	1 1/4	16	3.9	100
R422	6.3	25	1 1/2	16	3.9	100
R423	10	25	1 1/2	16	3.9	100
R424	16	25	1 1/2	16	3.9	100
R429	10	32	2	16	3.9	100
R431	16	32	2	16	3.9	100
R438	16	40	2 1/4	16	3.9	100
R439	25	40	2 1/4	16	3.9	100
R448	25	50	2 3/4	16	3.9	100
R449	40	50	2 3/4	16	3.9	100

**Technical data**

<b>Functional data</b>	Media	Cold and warm water, water with glycol up to max. 50% vol.
	Medium temperature	6...100°C
	Medium temperature note	-10°C with stem heating (without R4..K) The allowed media temperature can be limited, depending on the type of actuator. Limitations can be found in the respective data sheets of the actuators.
	Rated pressure ps	1600 kPa
	Closing pressure Δps	1400 kPa
	Differential pressure Δpmax	200 kPa
	Flow characteristic	Equal percentage (VDI/VDE 2178), optimised in the opening range
	Leakage rate	Leakage rate A, air-bubble-tight (EN 12266-1)
	Pipe connectors	External thread according to ISO 228-1
	Angle of rotation	90° (Operating range 15...90°)
	Installation position	Upright to horizontal (in relation to the stem)
	Maintenance	Maintenance-free
	<b>Materials</b>	Housing
Closing element		Stainless steel

## Technical data

Materials		
Stem		Stainless steel
Stem seal		O-ring EPDM
Valve seat		PTFE, O-ring Viton
Characterising disc		TEFZEL

## Safety notes



- The valve has been designed for use in stationary heating, ventilation and air-conditioning systems and is not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- The valve does not contain any parts that can be replaced or repaired by the user.
- The valve may not be disposed of as household refuse. All locally valid regulations and requirements must be observed.
- When determining the flow rate characteristic of controlled devices, the recognised directives must be observed.

## Product features

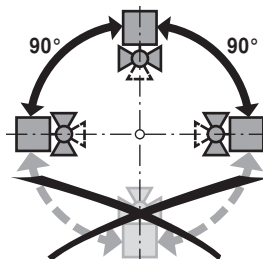
<b>Mode of operation</b>	The characterised control valve is adjusted by a rotary actuator. The actuator is controlled by a commercially available modulating or 3-point control system and moves the ball of the valve – the throttling device – to the position dictated by the positioning signal. Open the characterised control valve counterclockwise and close it clockwise.
<b>Flow characteristic</b>	Equal percentage flow control is ensured by the integrated characterising disc.

## Accessories

	Description	Type
<b>Electrical accessories</b>	Spindle heating DN 15-50 (5W)	ZR24-1
	Description	Type
<b>Mechanical accessories</b>	Pipe connector to ballvalves DN 10 Rp 3/8"	ZR4510
	Pipe connector to ballvalves DN 15 Rp 1/2"	ZR4515
	Pipe connector to ballvalves DN 20 Rp 3/4"	ZR4520
	Pipe connector to ballvalves DN 25 Rp 1"	ZR4525
	Pipe connector to ballvalves DN 32 Rp 1 1/4"	ZR4532
	Pipe connector to ballvalves DN 40 Rp 1 1/2"	ZR4540
	Pipe connector to ballvalves DN 50 Rp 2"	ZR4550

## Installation notes

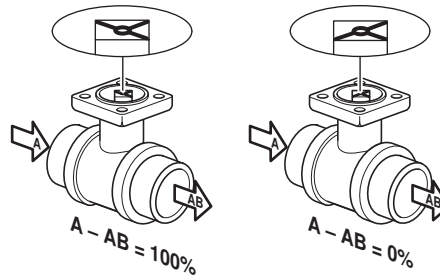
**Recommended installation positions** The ball valve can be installed upright to horizontal. The ball valve may not be installed in a hanging position, i.e. with the stem pointing downwards.



**Water quality requirements** The water quality requirements specified in VDI 2035 must be adhered to. Belimo valves are regulating devices. For the valves to function correctly in the long term, they must be kept free from particle debris (e.g. welding beads during installation work). The installation of suitable strainer is recommended.

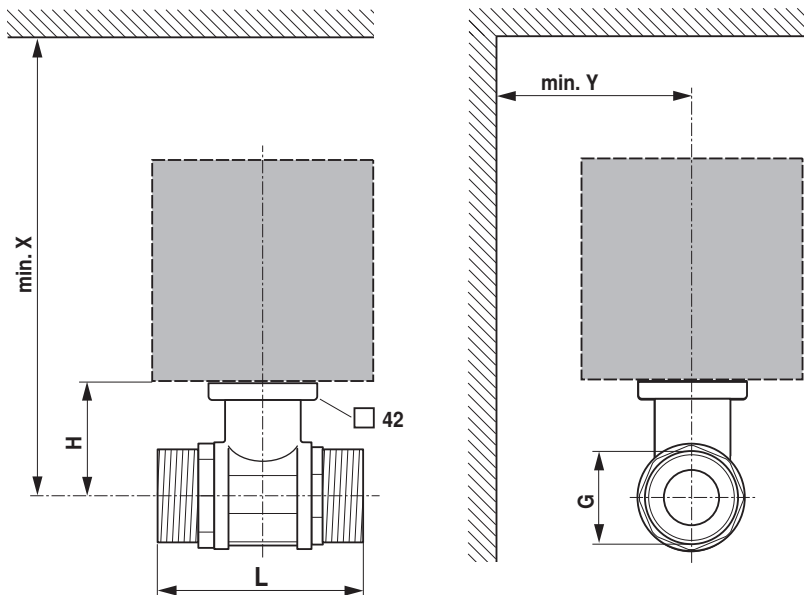
## Installation notes

- Maintenance** Ball valves and rotary actuators are maintenance-free. Before any kind of service work is carried out on the actuator, it is essential to isolate the rotary actuator from the power supply (by unplugging the electrical cable). Any pumps in the part of the piping system concerned must also be switched off and the appropriate slide valves closed (allow everything to cool down first if necessary and reduce the system pressure to ambient pressure level). The system must not be returned to service until the ball valve and the rotary actuator have been properly reassembled in accordance with the instructions and the pipeline has been refilled in the proper manner.
- Flow direction** The direction of flow, specified by an arrow on the housing, is to be complied with, since otherwise the ball valve could become damaged. Please ensure that the ball is in the correct position (marking on the spindle).



## Dimensions / Weight

### Dimensional drawings



X/Y: Minimum distance with respect to the valve centre.  
The actuator dimensions can be found on the respective actuator data sheet.

### Dimensions / Weight

Type	DN [ ]	G ["]	L [ mm]	H [ mm]	X [ mm]	Y [ mm]	Weight approx. [ kg]
R405K	10	3/4	69	31.5	220	90	0.4
R406K	10	3/4	69	31.5	220	90	0.4
R407K	10	3/4	69	31.5	220	90	0.4
R408K	10	3/4	69	31.5	220	90	0.4
R409K	10	3/4	69	31.5	220	90	0.4
R409	15	1	74	44	220	90	0.6
R410	15	1	74	44	220	90	0.6
R411	15	1	74	44	220	90	0.6
R412	15	1	74	44	220	90	0.6
R413	15	1	74	44	220	90	0.6
R414	15	1	74	44	220	90	0.6
R417	20	1 1/4	85.5	46	220	90	0.8
R418	20	1 1/4	85.5	46	220	90	0.8
R419	20	1 1/4	85.5	46	220	90	0.8
R422	25	1 1/2	84.5	46	220	90	0.9
R423	25	1 1/2	84.5	46	220	90	0.9
R424	25	1 1/2	84.5	46	220	90	0.9
R429	32	2	97.5	46	220	90	1.1
R431	32	2	102	50.5	230	90	1.3
R438	40	2 1/4	103.5	50.5	230	90	1.4
R439	40	2 1/4	103.5	50.5	230	90	1.4
R448	50	2 3/4	115.5	56	240	90	2.3
R449	50	2 3/4	115.5	56	240	90	2.3

### Further documentation

- Overview Valve-actuator combinations
- Data sheets for actuators
- Installation instructions for actuators and/or ball valves
- General notes for project planning