

Characterised control valve, 2-way, External thread

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



### Type overview

Type	DN	G ["]	Kvs [m³/h]	PN	n(gl)	Sv min.
R409	15	1	0.63	40	3.2	50
R410	15	1	1	40	3.2	50
R411	15	1	1.6	40	3.2	50
R412	15	1	2.5	40	3.2	50
R413	15	1	4	40	3.2	100
R414	15	1	6.3	40	3.2	100
R417	20	1 1/4	4	40	3.2	100
R418	20	1 1/4	6.3	40	3.2	100
R419	20	1 1/4	8.6	40	3.2	100
R422	25	1 1/2	6.3	40	3.2	100
R423	25	1 1/2	10	40	3.2	100
R424	25	1 1/2	16	40	3.2	100
R431	32	2	16	25	3.2	100
R438	40	2 1/4	16	25	3.2	100
R439	40	2 1/4	25	25	3.2	100
R448	50	2 3/4	25	25	3.2	100
R449	50	2 3/4	40	25	3.2	100

### Technical data

<b>Functional data</b>	Fluid	Cold and warm water, water with glycol up to max. 50% vol.
	Fluid temperature	-10...100°C [14...212°F]
	Fluid temperature note	At a fluid temperature of -10...2°C, a valve neck extension is recommended. The allowed fluid temperature can be limited, depending on the type of actuator. Limitations can be found in the respective data sheets of the actuators.
	Close-off pressure $\Delta p_s$	1400 kPa
	Differential pressure $\Delta p_{max}$	200kPa
	Flow characteristic	equal percentage (VDI/VDE 2173), optimised in the opening range
	Leakage rate	air-bubble tight, leakage rate A (EN 12266-1)
	Angle of rotation	90°
	Angle of rotation note	Operating range 15...90°
	Pipe connection	External thread according to ISO 228-1
	Installation orientation	upright to horizontal (in relation to the stem)

**Technical data**

<b>Functional data</b>	Servicing	maintenance-free
<b>Materials</b>	Valve body	Nickel-plated brass body
	Body finish	nickel-plated
	Closing element	Stainless steel
	Spindle	Stainless steel
	Spindle seal	EPDM O-ring
	Seat	PTFE, O-ring Viton
	Characterised disc	ETFE

**Safety notes**


- The valve has been designed for use in stationary heating, ventilation and air-conditioning systems and must not 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 with 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**

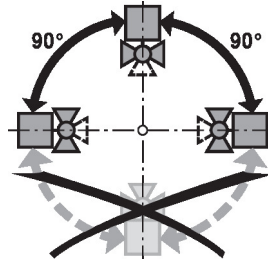
<b>Operating mode</b>	The characterised control valve is adjusted by a rotary actuator. The actuator is controlled by a commercially available modulating or 3-point control system and moves the ball of the valve – the throttling device – to the position dictated by the control signal. Open the characterised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

**Accessories**

<b>Electrical accessories</b>	<b>Description</b>	<b>Type</b>
	Stem heater DN 15...50 (20 W)	ZR24-2
<b>Mechanical accessories</b>	<b>Description</b>	<b>Type</b>
	Valve neck extension for ball valve DN 15...50	ZR-EXT-01
	Pipe connector for ball valve with external thread DN 15 Rp 1/2"	ZR4515
	Pipe connector for ball valve with external thread DN 20 Rp 3/4"	ZR4520
	Pipe connector for ball valve with external thread DN 25 Rp 1"	ZR4525
	Pipe connector for ball valve with external thread DN 32 Rp 1 1/4"	ZR4532
	Pipe connector for ball valve with external thread DN 40 Rp 1 1/2"	ZR4540
	Pipe connector for ball valve with external thread DN 50 Rp 2"	ZR4550

**Installation notes**

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



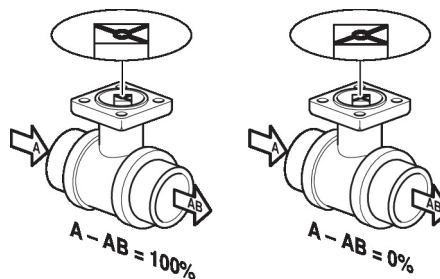
**Water quality requirements** The water quality requirements specified in VDI 2035 must be adhered to. Belimo valves are regulating devices. For the valves to function correctly in the long term, they must be kept free from particle debris (e.g. welding beads during installation work). The installation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

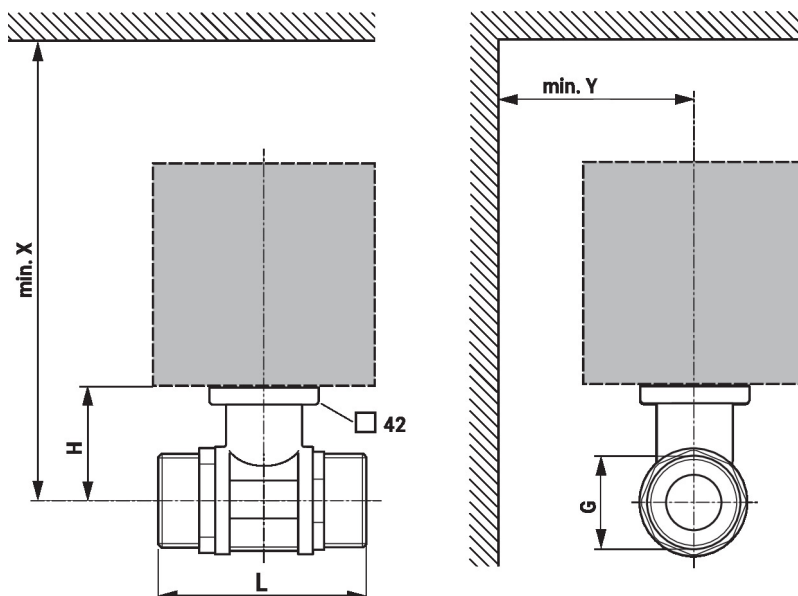
**Servicing** Ball valves and rotary actuators are maintenance-free.

Before any service work on the control element is carried out, it is essential to isolate the rotary actuator from the power supply (by unplugging the electrical cable if necessary). Any pumps in the part of the piping system concerned must also be switched off and the appropriate slide valves closed (allow all components to cool down first if necessary and always 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 correctly reassembled in accordance with the instructions and the pipeline has been refilled by professionally trained personnel.


**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**
**Dimensional drawings**


X/Y: Minimum distance with respect to the valve centre.

The actuator dimensions can be found on the respective actuator data sheet.

Type	DN	G ["]	L [mm]	H [mm]	X [mm]	Y [mm]	
R409	15	1	74	44	220	90	0.50
R410	15	1	74	44	220	90	0.50
R411	15	1	74	44	220	90	0.50
R412	15	1	74	44	220	90	0.50
R413	15	1	74	44	220	90	0.50
R414	15	1	74	44	220	90	0.50
R417	20	1 1/4	85.5	46	220	90	0.76
R418	20	1 1/4	85.5	46	220	90	0.76
R419	20	1 1/4	85.5	46	220	90	0.76
R422	25	1 1/2	84.5	46	220	90	0.77
R423	25	1 1/2	84.5	46	220	90	0.77
R424	25	1 1/2	84.5	46	220	90	0.77
R431	32	2	102	50.5	230	90	1.2
R438	40	2 1/4	103.5	50.5	230	90	1.3
R439	40	2 1/4	103.5	50.5	230	90	1.3
R448	50	2 3/4	115.5	56	240	90	2.2
R449	50	2 3/4	115.5	56	240	90	2.2

**Further documentation**

- The complete product range for water applications
- Data sheets for actuators
- Installation instructions for actuators and/or ball valves
- General notes for project planning