

Characterised control valve, 3-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 (control path A – AB)



Type overview

Type	DN	G ["]	Kvs [m ³ /h]	PN	n(gl)	Sv min.
R509	15	1	0.63	40	3.2	50
R510	15	1	1	40	3.2	50
R511	15	1	1.6	40	3.2	50
R512	15	1	2.5	40	3.2	50
R513	15	1	4	40	3.2	100
R517	20	1 1/4	4	40	3.2	100
R518	20	1 1/4	6.3	40	3.2	100
R522	25	1 1/2	6.3	40	3.2	100
R523	25	1 1/2	10	40	3.2	100
R529	32	2	10	40	3.2	100
R531	32	2	16	25	3.2	100
R538	40	2 1/4	16	25	3.2	100
R548	50	2 3/4	25	25	3.2	100

Technical data

Functional data	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 Δp_s		1400 kPa
Differential pressure Δp_{max}		200kPa
Flow		Bypass B – AB: 70% of kvs value
Flow characteristic		Control path A – AB: equal percentage (VDI/VDE 2173), optimised in the opening range, Bypass B – AB: linear (VDI/VDE 2173)
Leakage rate		Control path A – AB: air-bubble tight, leakage rate A (EN 12266-1); Bypass B – AB: Leakage class I (EN 1349 and EN 60534-4) 1...2% of the Kvs value with respect to the largest value within the DN
Angle of rotation		90°
Angle of rotation note		Operating range control path A – AB 15...90°, Bypass B – AB 15...70°

Technical data

Functional data	Pipe connection	External thread according to ISO 228-1
	Installation orientation	upright to horizontal (in relation to the stem)
	Servicing	maintenance-free
Materials	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

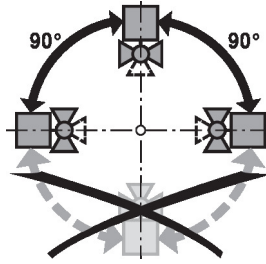
- Operating mode** The characterised control valve is adjusted by a rotary actuator. The actuator is controlled by a commercially available modulating or 3-point control system and moves the ball of the valve – the throttling device – to the position dictated by the control signal. Open the characterised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

Accessories

Electrical accessories	Description	Type
	Stem heater DN 15...50 (20 W)	ZR24-2
Mechanical accessories	Description	Type
	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.



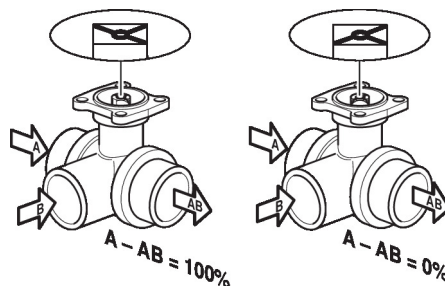
Water quality requirements The water quality requirements specified in VDI 2035 must be adhered to. Belimo valves are regulating devices. For the valves to function correctly in the long term, they must be kept free from particle debris (e.g. welding beads during installation work). The installation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

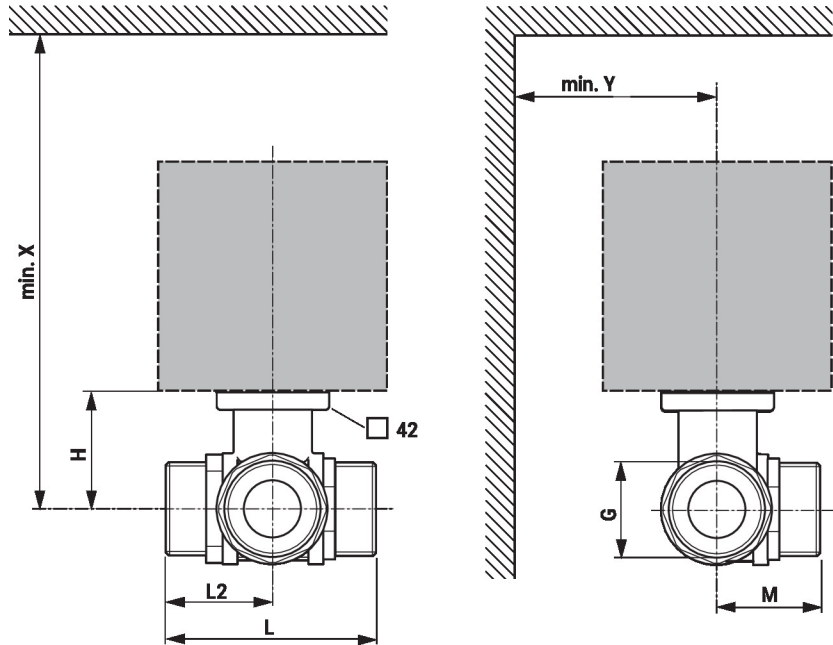
The system must not be returned to service until the ball valve and the rotary actuator have been correctly reassembled in accordance with the instructions and the pipeline has been refilled by professionally trained personnel.

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]	L2 [mm]	M [mm]	H [mm]	X [mm]	Y [mm]	 kg
R509	15	1	74	35	39	44	220	90	0.61
R510	15	1	74	35	39	44	220	90	0.61
R511	15	1	74	35	39	44	220	90	0.61
R512	15	1	74	35	39	44	220	90	0.61
R513	15	1	74	35	39	44	220	90	0.61
R517	20	1 1/4	85.5	42	41.5	46	220	90	0.94
R518	20	1 1/4	85.5	42	41.5	46	220	90	0.94
R522	25	1 1/2	84.5	42	45	46	220	90	1.1
R523	25	1 1/2	84.5	42	45	46	220	90	1.1
R529	32	2	103.5	55	55.5	46	220	90	1.7
R531	32	2	107.5	55	55.5	50.5	230	90	1.8
R538	40	2 1/4	114.5	59	56	50.5	230	90	2.2
R548	50	2 3/4	131.5	69	68	56	240	90	3.7

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