**Characterized control valves, 2-way, with external thread**

- **For open and closed cold and hot water systems**
- **For modulating control on the water side of domestic water in district heating applications as well as for heated drinking water**
- **Air bubble-tight**

## Type overview

| Type | $k_{vs}$ [$m^3/h$] | DN [mm] | G [1] [inches] | $S_v$ |
|---|---|---|---|---|
| **R404DK** | 0.3 | 10 | 3/4" | >50 |
| **R405DK** | 0.4 | 10 | 3/4" | >50 |
| **R406DK** | 0.63 | 10 | 3/4" | >50 |
| **R407DK** | 1 | 10 | 3/4" | >50 |
| **R408DK** | 1.6 | 10 | 3/4" | >50 |
| **R409DK** | 2.5 | 10 | 3/4" | >50 |
| **R412D** | 2.5 | 15 | 1" | >100 |
| **R413D** | 4 | 15 | 1" | >100 |
| **R414D** | 6.3 | 15 | 1" | >100 |
| **R417D** | 6.3 | 20 | 1 1/4" | >100 |
| **R418D** | 10 | 20 | 1 1/4" | >200 |
| **R419D** | 16 | 20 | 1 1/4" | >200 |

[1] Connection thread

## Technical data

| | | | |
|---|---|---|---|
| **Functional data** | Flow media | | Cold, warm and hot water, drinking water<br>low-temperature steam |
| | Media temperature | For water<br>For steam | +2°C ... +130°C<br>+2°C ... +120°C |
| | Rated pressure $p_s$ | | 2700 kPa |
| | Flow characteristic | | Control path A – AB: equal percentage (VDI/VDE 2173)<br>n(gl): 3.2, optimized in the opening range |
| | Rangeability $S_v$ | | see «Overview of types» |
| | Leakage rate A | | Air bubble-tight (EN 12266) |
| | Z Value [2] | | Min. 0.3 (EN 60534-8-2) |
| | Pressure difference | $\Delta p_{v100}$<br>$\Delta p_{v0}$ | Max. 400 kPa<br>Max. 800 kPa |
| | Closing pressure $\Delta p_s$ | | 1400 kPa |
| | Angle of rotation | | 90°∢ (Operating range 15 ... 90°∢) |
| | Pipe connectors | | External thread to ISO 228/1 |
| | Installation position | | Standing to lying (in relation to the stem) |
| | Maintenance | | Maintenance-free |
| **Materials** | Fitting | | Low-lead red casting brass (CuSn4Zn6P6) |
| | Valve cone and spindle | | Stainless steel |
| | Stem seal / stem bearing | | EPDM / Teflon (PTFE-GF15%) |
| | Grease | | UNIsilikon (drinking water grade) |
| | Actuator seat | | Plastic (PA66-GF30%) |
| | Stem end | | Plastic (PA66-GF30%) |
| | Ball seat | | TEFZEL |
| | Characterising disk | | TEFZEL |
| **Dimensions / weights** | See «Dimensions and weights» on page 3 | | |
| **Motorizing** | See complete range of water solutions | | |

[2] Cavitation factor with a fully open valve

## Safety notes

- **The ball valve was designed for use in stationary, heating, ventilation and air conditioning systems and may not be used outside of the specific field of application, especially in aircraft or in any other airborne means of transport.**
- **Assembly must be carried out by trained personnel. All applicable legal or institutional installation regulations must be complied with.**
- **Installation in existing pipe flanges as a substitute for globe valves with only three screws is not permitted.**
- **The ball valve does not contain any parts that can be replaced or repaired by the user.**
- **The rotary valve may not be disposed of as household refuse. The local and currently valid regulations and requirements must be observed.**
- **When determining the flow rate characteristic of final controlling elements, the recognised directives must be observed.**
- **When using the ball valve in drinking water applications, the national regulations must be observed.**

## Product features

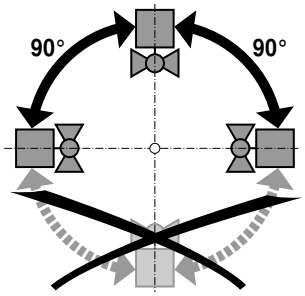
**Mode of operation**
The characterised control valve is operated by a rotary actuator. The actuator is controlled by a standard modulating or 3-point control system and moves the ball of the valve – the throttling device – to the position dictated by the control signal. The valve is opened counterclockwise and closed clockwise.

**Flow characteristic**
Equal-percentage flow control is ensured by the integrated characterising disc.

**Patent**
Applied for.

## Installation instructions

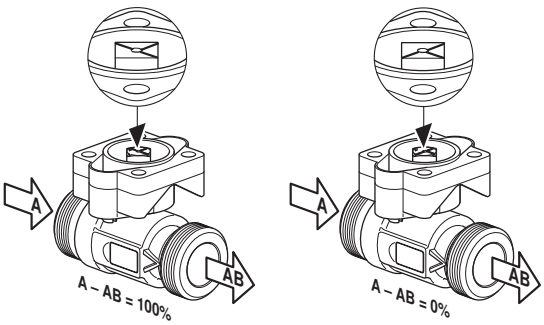
**Recommended installation positions**
The ball valves may be mounted either **vertically** or **horizontally**
The ball valves may not be installed in a hanging position i.e. with the stem pointing downwards.




**Water quality requirements**
- The water quality requirements specified in VDI 2035 must be adhered to.
- Ball valves are sensitive control devices. In order to ensure a long service life, it is advisable to fit a **strainer**.

**Maintenance**
- Ball valves and rotary actuators are maintenance-free.
- Before any kind of service work is carried out on actuator sets of this type, it is essential to isolate the rotary actuator from the power supply (by unplugging the power lead). Any pumps in the part of the piping system concerned must also be switched off and the appropriate isolating fittings closed (allow everything to cool down first if necessary and reduce the pressure in the system to atmospheric).
- 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 pipework 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 can be damaged.

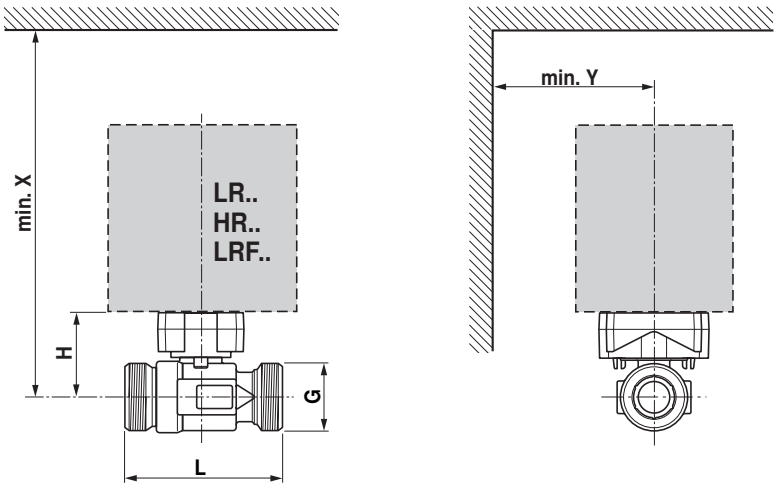


## Accessories

| | Description |
|---|---|
| Mechanical accessories | Pipe connector ZR45.. (not allowed for drinking water) |

## Dimensions and weights

**Dimensional drawings**




| | | | | LR.. / TRC.. | | HR.. | | LRF.. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| DN [mm] | L [mm] | H [mm] | G [inches] | X [mm] | Y [mm] | X [mm] | Y [mm] | X [mm] | Y [mm] | Weight [kg] |
| 10 | 65 | 38 | 3/4“ | 160 | 70 | 190 | 70 | 170 | 70 | 0.25 |
| 15 | 75 | 42 | 1” | 165 | 70 | 195 | 70 | 175 | 70 | 0.35 |
| 20 | 107 | 55 | 1 1/4“ | 180 | 70 | 200 | 70 | 190 | 70 | 0.55 |

1) The actuator dimensions can be found on the respective actuator data sheet.
2) For DN15 and DN20, M4 central screws are used. They are enclosed with the TRC.., LR.., LRF actuators as ZM4-001.

**Further documentations**

- Complete overview «The complete range of water solutions»
- Data sheets for actuators
- Installation instructions for ball valves and/or actuators
- Notes for project planning (hydraulic characteristic curves and circuits, installation regulations, commissioning, maintenance etc.)