

Safety valves for drinking water installations

Better to be safe





Safety valves for drinking water installations – better to be safe

Drinking water is an extremely valuable commodity that needs special protection. In 2010, the right to have access to clean water was recognized as a human right. This shows the immense importance of drinking water.

However, the availability of clean, hygienic drinking water is not a matter of course. Therefore, the protection of drinking water is important. Many national standards and specifications aim at the following: according to the Austrian food book (Codex alimentarius) drinking water, which is available naturally or after processing, has to be „consumable by humans without endangering their health and the odor, taste and the appearance has to be impeccable“.

A negative influence or change on drinking water is to be avoided in any case. On the one hand, this affects the materials with which drinking water comes into contact. On the other hand, it must be that drinking water should be prevented from being contaminated by non-drinking water. For that there are corresponding safety valves from HERZ available, which are summarized in this brochure.

Advantages

- ☑ Development, design and production from HERZ
- ☑ Wide product range
- ☑ Well thought-out design
- ☑ Conforming to standards, i.e. EN 1717 and DIN 1988-100
- ☑ Partially DVGW certified
- ☑ ÖVGW certification
- ☑ Manufactured in the EU



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Normative specifications

The backflow, back-suction or back-pressure of non-drinking water in drinking water systems has to be avoided. To ensure hygienic protection of drinking water, appropriate security devices must be used.

The standards EN 1717 and DIN 1988-100 set the requirements for the design and installation of safety devices for drinking water installations:

EN 1717 - Protection of drinking water from contamination in drinking water systems and general requirements for safety devices to prevent drinking water contamination by backflow.

DIN 1988-100 - Technical regulation for drinking water installations - Part 100: Protection of drinking water; Preservation of drinking water quality; Technical regulation by DVGW

According to EN 1717, there are five fluid categories

| | |
|------------|--|
| Category 1 | Drinking water that does not pose a risk to health and that does not affect the smell, the taste or the colour. This includes cold drinking water under low or high pressure. |
| Category 2 | Liquid which does not pose a risk to health. Smell, taste or colour may be affected. For example, drinks such as tea and coffee or drinking water from drinking water dispensers and drinking water, which was heated and cooled down after. |
| Category 3 | Liquids which pose a risk to health because of toxic or very toxic substances. These include softened non-drinking waters, heating water without additives or antifreeze mixtures including low toxicity anti-freeze agents. |
| Category 4 | Liquids which pose a risk to health because of toxic or very toxic substances as well as mutagenic, carcinogenic or radioactive substances. These substances can endanger your life. Typical examples are liquid insecticides, water in dry-cleaning processes, drug contaminated water or galvanic baths. |
| Category 5 | Liquids which pose a risk to health by disease-transmitting viral or microbial pathogens. They can be life threatening. These include sewage, water from swimming pools but also water in animal waterers. |

EN 1717 provides a tabular overview of possible safety devices for various applications.

Normative specifications

☑ Application table for safety devices according to EN 1717

| Safety device | | | Usable according to DIN EN 1717 for safeguarding the liquid category | | | | |
|----------------|------|---|--|---|---|---|---|
| Group | Type | Description | 1 | 2 | 3 | 4 | 5 |
| A ¹ | A | Free outlet | O | O | O | O | O |
| | B | Free outlet with overflow | O | O | O | O | O |
| | C | Free outlet with vented overflow | O | O | O | - | - |
| | D | Free outlet with injector | O | O | O | O | O |
| B | A | Separator with reduced middle pressure zone | O | O | O | O | - |
| C | A | Separator with various, not controllable pressure zones | O | O | O | - | - |
| D | A | Pipe ventilator in flow form | Δ | Δ | Δ | - | - |
| | B | Pipe interrupter with moving parts | Δ | Δ | Δ | Δ | - |
| | C | Pipe interrupter with constant connection to atmosphere | Δ | Δ | Δ | Δ | Δ |
| E | A | Controllable back-flow preventer | O | O | - | - | - |
| | B | Uncontrollable back-flow preventer | Only for domestic use | | | | |
| | C | Controllable double back-flow preventer | O | O | O | - | - |
| | D | Uncontrollable double back-flow preventer | Only for domestic use | | | | |
| G | A | Backflow preventer, not flow- controlled | O | O | O | - | - |
| | B | Backflow preventer, flow- controlled | O | O | O | O | - |
| H | A | Hose connection with back-flow preventer | O | O | Δ | - | - |
| | B | Pipe ventilator for hose connections | Δ | Δ | - | - | - |
| | C | Automatic diverter | Only for domestic use | | | | |
| | D | Pipe ventilator for hose connections, combined with back-flow preventer (fitting combination) | O | O | Δ | - | - |
| L | A | Pressurized ventilator | Δ | Δ | - | - | - |
| | B | Pressurized ventilator, combined with downstream back-flow preventer | O | O | Δ | - | - |

¹ = Selection
O = Protection from back-suction and back-pressure
Δ = Protection from back-suction, no sufficient protection from back-pressure
- = Not suitable

The application table presents a selection of safety devices, depending on the hazard classes of drinking water. Corresponding liquid categories are defined according to EN 1717. HERZ RPZ valves I 0303 or I 0305 belong to safety device type „BA“ and are therefore only suitable for use with liquid media up to category 4.

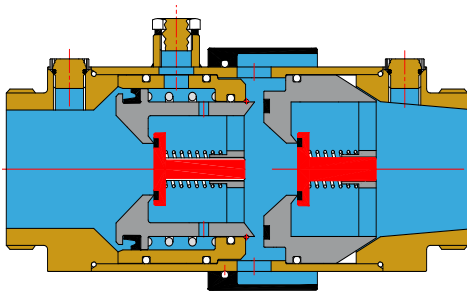
HERZ system separator type BA according to EN 1717 and DIN 1988-100

In general

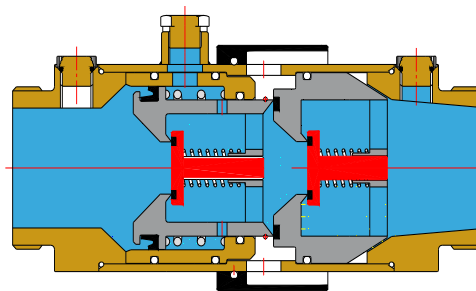
HERZ system separators are separators with reduced middle-pressure zone of safety device type BA. They can therefore be used to separate drinking water and liquids of categories 1 to 4. Category 4 is the highest hazard class. For this class, protection may be given with one valve.

Functional principle

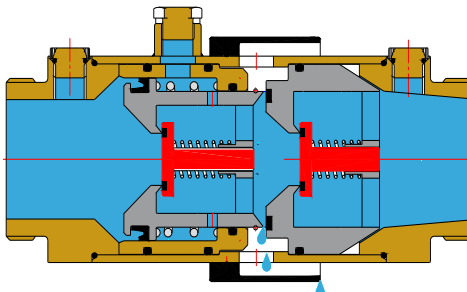
HERZ system separators comply with the product standard EN 12729. They work according to the three-chamber system, with a mid-chamber with connection to the atmosphere being separated by a back-flow preventer from the inlet chamber and the outlet chamber. Under normal operating conditions, a pressure gradient is present from one chamber to the other chamber in the direction of flow, so that backflow is prevented. If the pressure gradient between the inlet chamber and the mid-chamber decreases to 0.14 bar or less, the mid-chamber is vented to the atmosphere. The result is a water free zone between the drinking water connection and the liquid after the system separator.



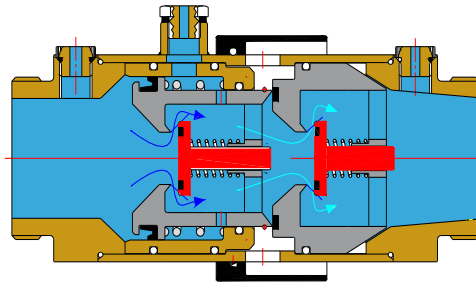
System separator in
depressurized condition



System separator under
operating pressure at zero flow



Dropping point at zero flow



System separator in flow position

System separator for tapping points

The **tap valve I 0300** with integrated system separator (BA) is designed for installation above a drain installation or for outdoors (garden tap). The fitting comprises an intake-side ball valve and a downstream system separator with an exchangeable cartridge.

The **tap valve I 0302** is for retrofitting of discharge valves. Due to the compact body it closes the gap wherever a connection with a drain valve is necessary. The system separator is frost-proof.

Body of forged brass (CW617N), chrome-plated. The system separator cartridge consists of high quality, lime-repellent plastic. The sealing elements are produced from EPDM. Nominal pressure PN 10; max. operating temperature: 65 °C, short-term 80 °C. Installation position only vertical with flow direction from top to bottom.

Type **BA**, see page 5



☒ Tap valve
with integrated system separator

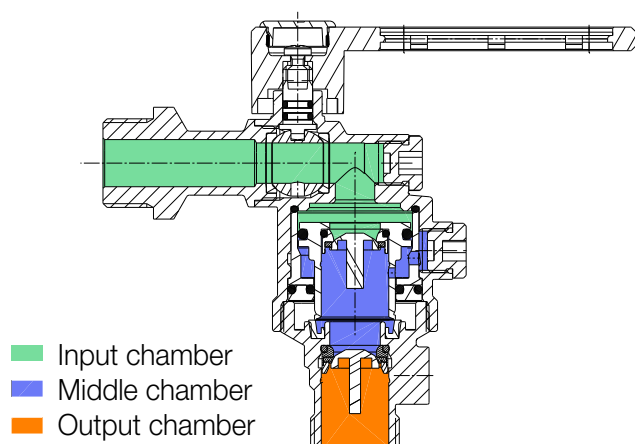
Type **BA**, see page 5



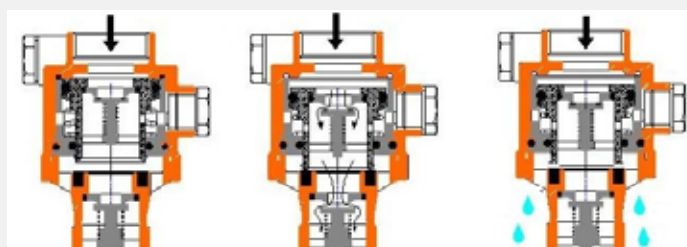
☒ System separator
for retrofitting of discharge valves

| Dimension | Order number | Dimension | Order number |
|-----------|--------------|-----------|--------------|
| 1/2 x 3/4 | I 0300 01 | 3/4 x 3/4 | I 0302 02 |
| 3/4 x 3/4 | I 0300 02 | 1 x 3/4 | I 0302 03 |
| 3/4 x 1 | I 0300 12 | 1 x 1 | I 0302 13 |

☒ Schematic view



☒ Functional principle



Pressureless

Flow pressure
Nominal flow



Dropping point
at zero flow

System separator for standpipes

The backflow preventer is an economical solution for retrofitting into standpipes that are required to have a mandatory safety valve according to DIN EN 1717 for preventing the back-suction, back-flowing or back-pressuring of non-drinking water into the drinking water line. The backflow preventer is suitable for horizontal installation. It can also be fitted vertically, although only pointing downwards. It is not approved for installation in a riser.

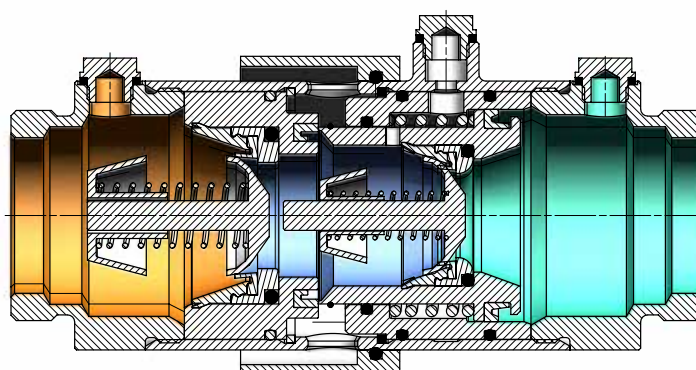
The functional unit is designed as a single-piece cartridge with large-dimension control piston and pressure surge-damped discharge valve system. Threaded connections are mutually interchangeable, whereby 16 possible connection variants exist (intake and outlet side available in 1 1/2" inner or outer thread, alternatively in 2" inner or outer thread).

Body of stainless steel (electropolished); nominal pressure PN 10; max. operating temperature 65 °C, briefly 80 °C.

| Type BA , see page 5   <input checked="" type="checkbox"/> System separator | Dimension | Order number |
|--|------------------------|----------------|
| | 1 1/2 x 1 1/2, IG x IG | 0307 01 |
| | 1 1/2 x 1 1/2, IG x AG | 0307 02 |
| | 1 1/2 x 1 1/2, AG x AG | 0307 03 |
| | 1 1/2 x 1 1/2, AG x IG | 0307 04 |
| | 2 x 2, IG x IG | 0307 05 |
| | 2 x 2, IG x AG | 0307 06 |
| | 2 x 2, AG x AG | 0307 07 |
| | 2 x 2, AG x IG | 0307 08 |
| | 1 1/2 x 2, IG x IG | 0307 09 |
| | 1 1/2 x 2, IG x AG | 0307 10 |
| | 1 1/2 x 2, AG x AG | 0307 11 |
| | 1 1/2 x 2, AG x IG | 0307 12 |
| | 2 x 1 1/2, IG x IG | 0307 13 |
| | 2 x 1 1/2, IG x AG | 0307 14 |
| | 2 x 1 1/2, AG x AG | 0307 15 |
| | 2 x 1 1/2, AG x IG | 0307 16 |

☒ Sectional view

System separator under pressure, without flow -> backflow preventer closed.



System separator combinations

Preferred application fields are softening, de-acidification and de-carbonisation plants. Furthermore, the RPZ valves can also be used in disinfection plants or upstream of chemical cleaning apparatus, in order to prevent the back-flowing of chemically contaminated water.

Refilling combination for the filling and top-up of heating systems. Expands the functions of the RPZ valve I **0303** xx additionally with a pressure regulator (initial pressure adjustable from 1 to 5 bar) and a manometer. Furthermore, automation of the filling process is also possible.

Pushed back, contaminated water on the outlet side of the system separator will be discharged via the differential pressure regulating discharge valve and the drain pipe which is located next to the outlet of the vent hole. The system separator has an integrated filter in the cartridge and is soundproofed according to DIN EN ISO 3822. Nominal pressure PN 10; max. operating temperature: 65 °C, short term 80 °C.

Type **BA**, see page 5



☒ System separator combination



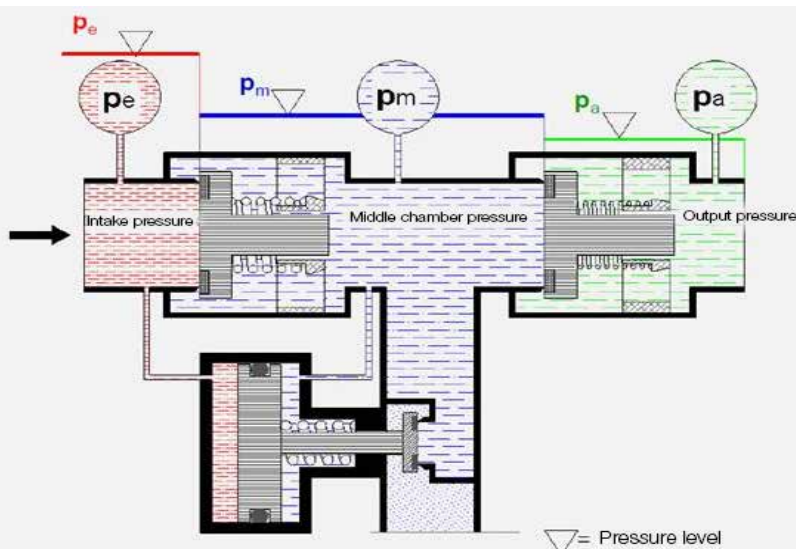
☒ System separator refilling combination



☒ System separator refilling combination with insulation box

| Dimension | kvs | Order number | Order number | Order number |
|-----------|------|------------------|------------------|------------------|
| DN 15 | 3.40 | I 0303 01 | I 0305 01 | I 0305 11 |
| DN 20 | 3.40 | I 0303 02 | I 0305 02 | I 0305 12 |

☒ Active principle of system separator type BA (active principle with reduced pressure zones (p_e - p_m - p_a))




Heating refilling station

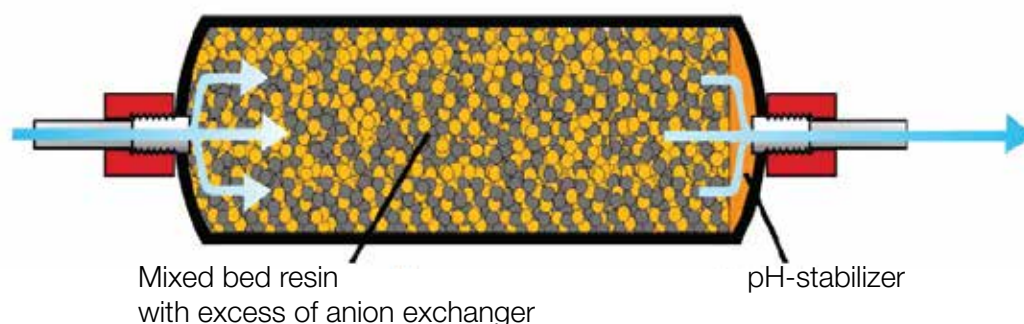
If a heating system is operated with water that is of inadequate quality, corrosion, calciferous deposits, sludge and the formation of gas will result. Defects and faults with pumps and thermostatic valves, right through to the generation of noise and boiler damage are the ultimate consequences.

The **first filling cartridge I 0322 00** is a disposable demineralisation unit for the treatment of heating system top-up water according to VDI 2035. The first filling cartridge, which contains a mixture of selected ion exchange resins and a pH stabiliser, largely demineralises the water and simultaneously alkalizes it to a pH value of between 8.2 and 8.7, whereby the hardness is reduced to less than 0.5° d with a residual conductivity of below 100 µS/cm. Because corrosive ions such as chloride and sulphate are also removed, permanent corrosion protection is also provided without chemical inhibitors. Additional connection of the system separator I 0302 xx is also recommended for first filling. Max. operating pressure: 6 bar, max. operating temperature: 65 °C

The **heating system top-up station I 0321 xx** consists of the heating system top-up unit complete with system separator of type BA and heating water demineralisation cartridge with integrated water meter in the connection head. This can be simply used after filling with the first filling cartridge. With the top-up station I 0321 xx the pH value stabiliser is omitted and fully demineralised water is produced. Refilling cartridge for heating refilling stations: I 0321 10.

|  | | | |
|--|--------------|--------------|--------------|
| <div> <input checked="" type="checkbox"/> Heating refilling station, complete </div> <div> <input checked="" type="checkbox"/> Refilling cartridge for heating refilling stations </div> <div> <input checked="" type="checkbox"/> Heating cartridge for the initial filling with threaded connection on both sides </div> | | | |
| DN | Order number | Order number | Order number |
| DN 15 | I 0321 01 | | |
| DN 20 | I 0321 02 | | |
| 3/4 | | I 0321 10 | |
| - | | | I 0322 00 |

☒ Function of the heating cartridge for first filling




Operation and maintenance

In order to obtain the desired back flow prevention, the function should be checked and tested once a year. For easy implementation of functionality and maintenance we developed a special testing device.

Testing device

Testing device for the functionality of system separators which are used with an inlet pressure up to 10 bar and ΔP max. 1.5 bar. Plastic box is included. Precision class 2.5.

| | |
|--|--------------|
|  <p><input checked="" type="checkbox"/> HERZ testing device</p> | Order number |
| | I 0300 00 |

☒ Test method

Connect the metal pipe as shown:

Outlet **OUT** – (figure 1) of the testing device with connection **B** of the system separator (figure 2). Inlet **IN +** (figure 3) of the testing device with connection **A** of the system separator (figure 2). The red handle **C** (figure 3) must be in a closed position. Put the system separator under pressure.

The manometer **D** (figure 1) will measure the inlet pressure; the differential pressure manometer **E** will display the ΔP . This value should be around 0.6 bar. No water should flow out of the discharge valve.

Open handle **C** -> water flow out of the discharge valve. Close handle **C** -> no water should flow out of the discharge valve anymore. If the system separator works accurately, the differential pressure manometer **E** should display a value around 0.3 – 0.4 bar.

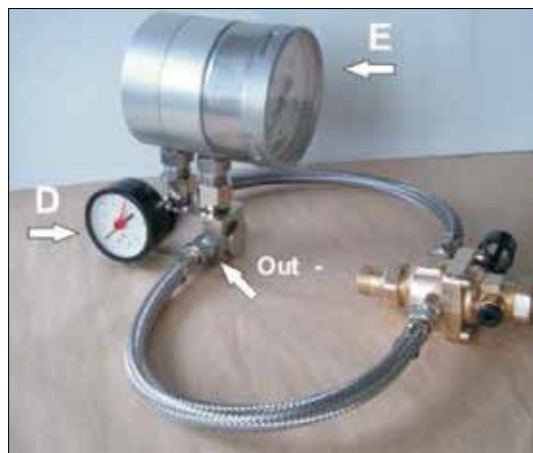


Figure 1

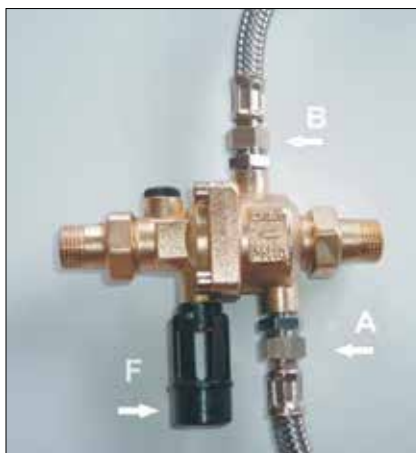


Figure 2

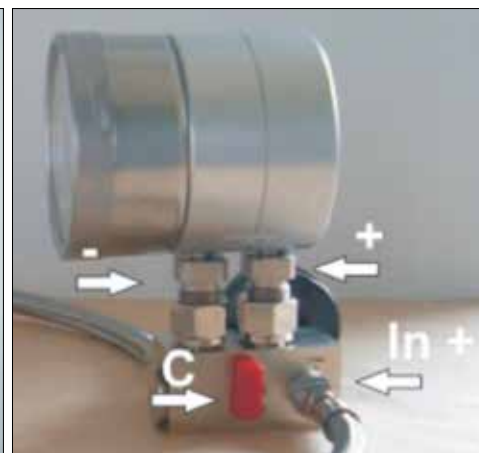


Figure 3

HERZ Backflow preventer


Drinking water is heated in domestic installations, which means it falls already in category 2 according to EN 1717 (see also page 4).

Category 2 fluids have to be separated from the drinking water supply system at least by a backflow preventer. Backflowing, restoring or re-suctioning has to be prevented.

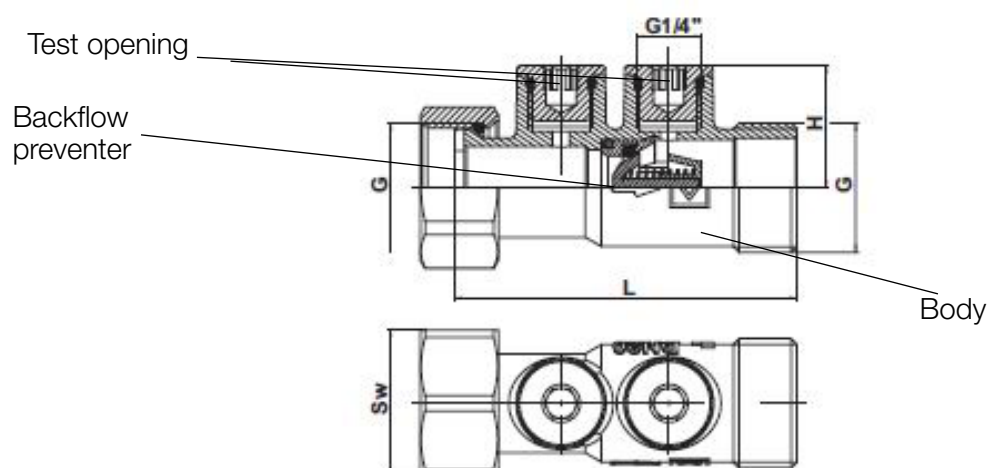
HERZ also offers a protection valve type EA (controllable backflow preventer) for the standard-conforming installation of a domestic water supply or rather for standard-conforming separation of categories 1 and 2 fluids.

HERZ backflow preventer with test points

According to EN 1717. Body and water-carrying parts of dezincification-resistant brass. Operates silently and generates no hydraulic shock (pressure jolts). Two 1/4 test points. Max. operating pressure: 16 bar; min. operating temperature: - 10 °C (water 0.5 °C); max. operating temperature: 95 °C

| Type EA , see page 5  <input checked="" type="checkbox"/> HERZ backflow preventer | DN | Order number |
|---|----|------------------|
| | 20 | 1 2623 02 |
| | 25 | 1 2623 03 |
| | 32 | 1 2623 04 |

☒ Cutting pattern



Shut-off valve with integrated check valve

Inclined isolation valve with embedded backflow preventer for isolating drinking water installations and circulation pipes in buildings. Body of dezincification resistant brass body with both sides female threaded and non rising spindle. All metals parts in contact with drinking water consist of brass which is suitable for drinking water. Sealing materials consist of physiologically harmless material. The upper part is O-ring sealed in the body. Spindle sealing by double O-rings. The backflow preventer models DN 15 – DN 20 have three bores 1/4, DN 25 – DN 50 four bores 1/4 – all plugged with screw plug 2 **0273** 09. Max. operating pressure: 16 bar; max. operating temperature: 80 °C, short-term 95 °C.

Type **EA**, see page 5



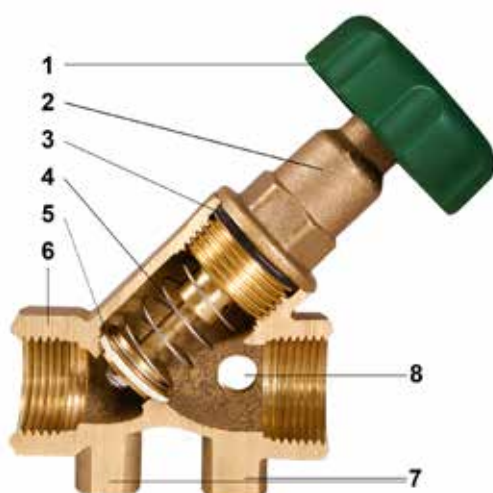
☒ HERZ backflow preventer



☒ Upper part for
HERZ backflow preventer 4126

| min. l/s | DN | Order number | Order number |
|----------|----|------------------|------------------|
| 0.42 | 15 | 2 4126 01 | |
| 1.00 | 20 | 2 4126 02 | 2 6389 12 |
| 1.75 | 25 | 2 4126 03 | 2 6389 13 |
| 3.00 | 32 | 2 4126 04 | 2 6389 14 |
| 4.00 | 40 | 2 4126 05 | 2 6389 15 |
| 6.75 | 50 | 2 4126 06 | 2 6389 16 |

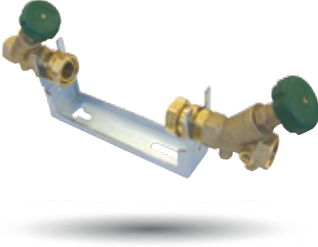
☒ Sectional view 4126



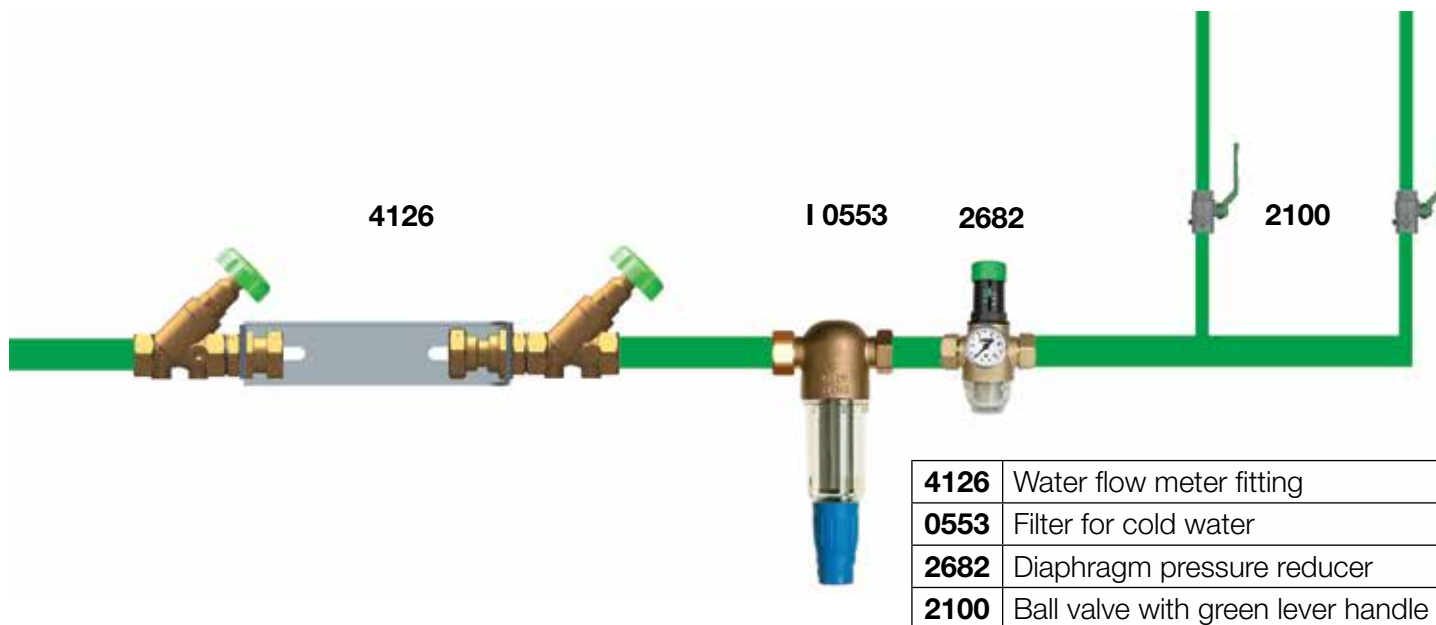
- 1 plastic hand wheel
- 2 upper part
- 3 O-ring EPDM
- 4 spring check valve
- 5 seat sealing PTFE
- 6 valve body
- 7 test opening
- 8 connection for draining valve 1/4 2 **0275** 09 or
draining valve with hose 1/4 2 **0276** 09

Water flow meter connection valve

The HERZ water meter set consists of a galvanised sheet steel bracket, on which the isolation valve according EN 1213 is mounted before the water flow meter and the backflow preventer with isolation valve according EN 1717 is mounted after the water flow meter. This guarantees a tension free installation, between the two fittings, of any conventional water meter in accordance with ÖNORM B 2535. The meter installation is radial and flat sealing, and it is fitted using the threaded connections supplied. The water meter set can be mounted in the appropriate position, vertically or horizontally. Sealing of the inlet-side union nut is prepared. Max. operating pressure: 16 bar; min. operating temperature: 2 °C; max. operating temperature: 90 °C

| Type EA , see page 5  <input checked="" type="checkbox"/> HERZ water flow meter fitting according to ÖNORM B 2535 | min. l/s | DN | Order number |
|--|----------|----|------------------|
| | 1.00 | 20 | 2 4126 62 |
| | 1.75 | 25 | 2 4126 63 |
| | 3.00 | 32 | 2 4126 64 |
| | 4.00 | 40 | 2 4126 65 |
| | 6.75 | 50 | 2 4126 66 |

☒ Application example for domestic cold water supply




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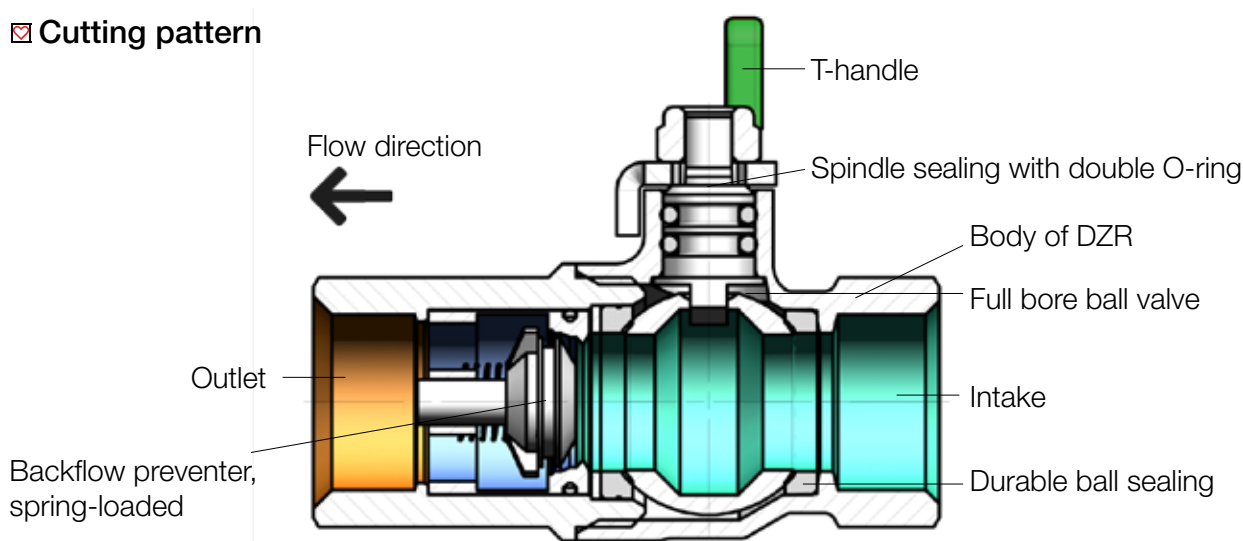
In accordance with article 33 of the REACH Regulation (EC No. 1907/2006) we are obliged to point out that the substance lead is listed on the SVHC list and that all components made of brass that are processed in our products exceed 0.1% (w / w) lead (CAS: 7439-92-1 / EINECS: 231-100-4). Since lead is firmly bound as an alloy constituent, no exposures are to be expected and therefore no additional information on safe use is necessary.

Ball valve with backflow preventer

HERZ ball valve with check valve is used as an isolation valve. The valve is used in a potable water system. Ball valves are used when the flow of the medium has to be isolated reliably. The check valve has a function of a back-flow preventer. HERZ ball valves for drinking water systems are free of dead space by flushing behind the ball. Body of forged dezincification-resistant brass according to EN 12165. Seals made of PTFE and EPDM, spindle sealing with double O-ring. Operating temperature: - 10 °C to + 85 °C.

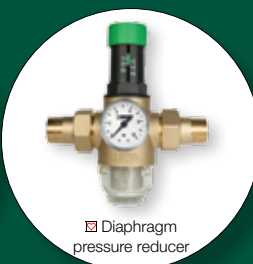
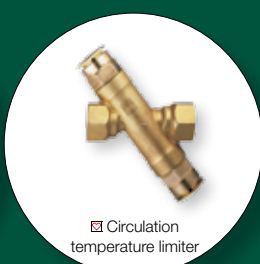
| Type EB , see page 5 | PN | DN | Order number |
|--|----|----|------------------|
| | 16 | 15 | 2 2110 01 |
|  <input checked="" type="checkbox"/> Ball valve with T-handle and flushing behind ball, 2 x socket | 16 | 20 | 2 2110 02 |

☒ Cutting pattern



HERZ – THE expert for drinking water installations

Additional to the wide range of protection valves, HERZ also offers a large selection of drinking water valves and accessories for any field of application, e.g.





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