ENGINEERING TOMORROW

Data Sheet

Solenoid valve
Type **EV220BW** and **EV228BW**

Indirect servo operated valves for drinking water

Solenoid valve range with drinking water approvals

- For water supply
- Houses and large apartments
  - Kitchen and bathrooms
- Commercial buildings
- Industrial buildings
- Zoning
- Laundry
- Diswashing
- Main inlet valves
- Machines and food processing

Features

- Clip-on coil
- Ambient temperature: Up to 70 °C
- Coil enclosure: Up to IP67
- Water hammer damped
- Built-in filter
- Body material in Eco brass (Lead free < 0,1 %) or Stainless steel
- New generation EPDM sealings recommended for drinking water

1 Portfolio overview

Table 1: Portfolio overview

Features	EV220BW	EV220BW	EV228BW	EV228BW
				
Body material	Eco brass	Stainless steel	Eco brass	Stainless steel
DN [mm]	15 - 50	15 - 50	15 - 50	15 - 50
Connection	G1/2" - G2"	G1/2" - G2"	G1/2" - G2"	G1/2" - G2"
Sealing material	EPDM	EPDM	EPDM	EPDM
Function	NC/NO	NC/NO	UN	UN
K_v [m^3/h]	4 - 40	4 - 40	4 - 40	4 - 40
Differential pressure range [bar]	0.3 - 10	0.3 - 10	0.3 - 10	0.3 - 10
Temperature range [°C]	-30 - 90	-30 - 90	-30 - 70	-30 - 70

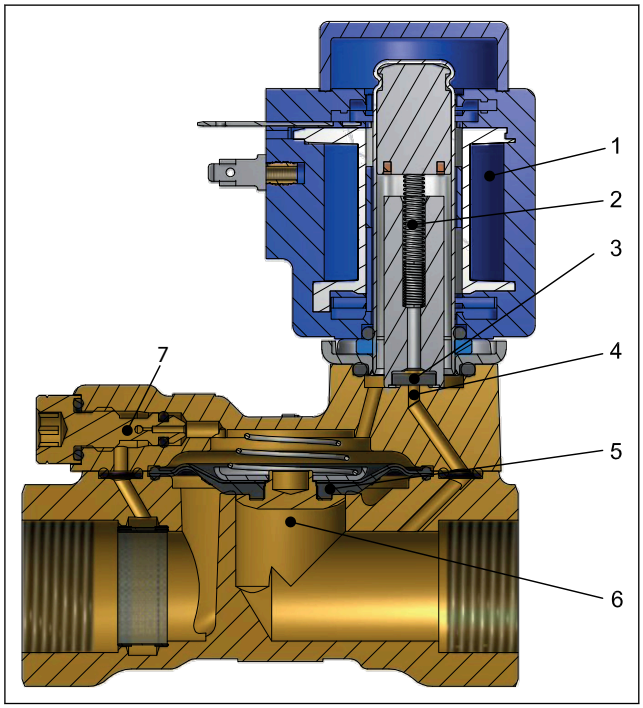
2 Functions

2.1 Function, NC

Coil voltage disconnected (closed)
When the voltage is disconnected, the valve plate (3) is pressed down against the pilot orifice (4) by the armature spring (2). The pressure across the diaphragm (5) is built up via the equalizing orifice (7). The diaphragm closes the main orifice (6) as soon as the pressure across the diaphragm is equivalent to the inlet pressure. The valve will be closed for as long as the voltage to the coil is disconnected.

Coil voltage connected (open)
When voltage is applied to the coil (1), the pilot orifice (4) is opened. As the pilot orifice is larger than the equalizing orifice (7), the pressure across the diaphragm (5) drops and therefore it is lifted clear of the main orifice (6). The valve is now open for unimpeded flow and will be open for as long as the minimum differential pressure across the valve is maintained, and for as long as there is voltage to the coil.

Figure 1: Function, NC



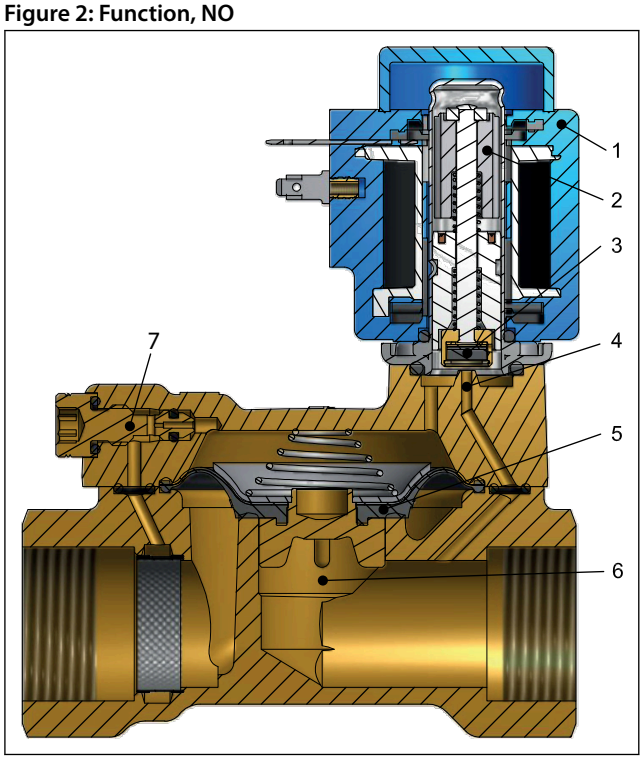
1.	Coil
2.	Armature spring
3.	Valve plate
4.	Pilot orifice
5.	Diaphragm
6.	Main orifice
7.	Equalizing orifice

2.2 Function, NO

Coil voltage disconnected (open)
When the voltage to the coil (1) is disconnected, the pilot orifice (4) is open. As the pilot orifice is larger than the equalizing orifice (7), the pressure across the diaphragm (5) drops and therefore it is lifted clear of the main orifice (6). The valve will be open for as long as the minimum differential pressure across the valve is maintained, and for as long as the voltage to the coil is disconnected.

Coil voltage connected (closed)
When voltage is applied to the coil, the valve plate (3) is pressed down against the pilot orifice (4). The pressure across the diaphragm (5) is built up via the equalizing orifice (7). The diaphragm closes the main orifice (6) as soon as the pressure across the diaphragm is equivalent to the inlet pressure. The valve will be closed for as long as there is voltage to the coil.

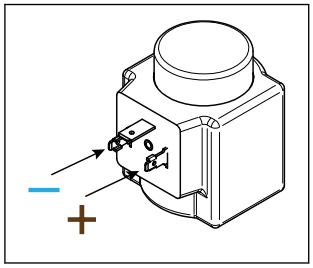
Figure 2: Function, NO



1.	Coil
2.	Armature
3.	Valve plate
4.	Pilot orifice
5.	Diaphragm
6.	Main orifice
7.	Equalizing orifice

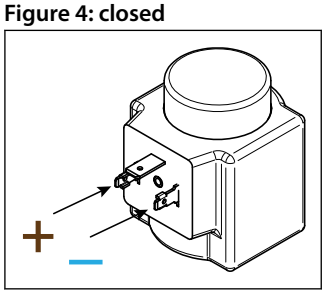
2.3 Function UN, latching

Figure 3: Open



When (minus) is supplied to the left terminal pin and (plus) to the right (see figure 3), the pilot orifice (4) is opened. As the pilot orifice is larger than the equalizing orifice (7), the pressure across the diaphragm (5) drops and therefore it is lifted clear of the main orifice (6). The valve is now open for flow and will stay open as long as the minimum differential pressure across the valve is maintained, until the poles are switched back (see Figure 4: closed)

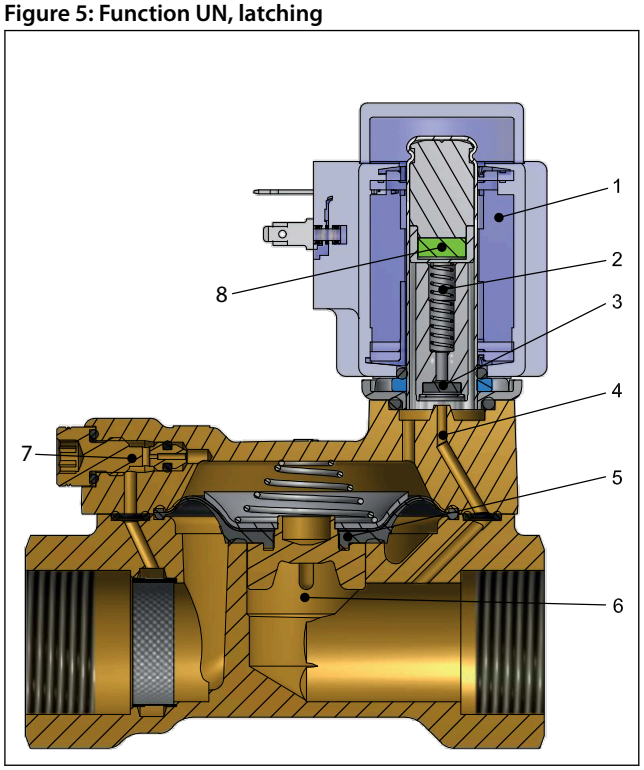
Figure 4: closed



Switching poles

When (plus) is supplied to the left terminal pin and (minus) to the right (see figure 4), the valve plate is pressed down against the pilot orifice (4) by the armature spring (2). The pressure across the diaphragm (5) is built up via the equalizing orifice (7). The diaphragm closes the main orifice (6) as soon as the pressure across the diaphragm is equivalent to the inlet pressure. The valve will stay closed, until the poles are switched (see Figure 3: Open)

Figure 5: Function UN, latching

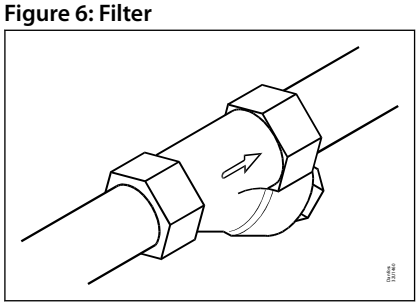


1.	Coil
2.	Armature spring
3.	Valve plate
4.	Pilot orifice
5.	Diaphragm
6.	Main orifice
7.	Equalizing orifice
8.	Permanent magnet

3 Applications

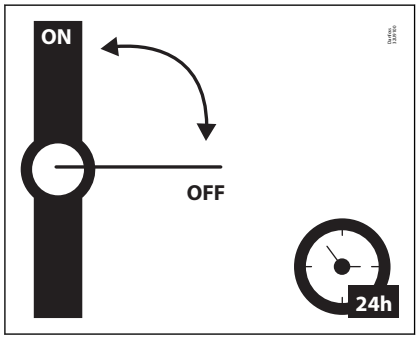
It is recommended to use a filter in front of the valve. Recommended filter 50 mesh (297 microns).

Figure 6: Filter



In water applications, exercise the valves at least once every 24 hours, meaning change the state of the valve. The valve exercise will minimize the risk of the valve sticking due to calcium carbonate, zinc or iron oxide build-up.

Figure 7: Exercise: Valve on/off



Guidelines for water

To minimize scaling, and corrosion attack it is recommended that the water passing the valve have the following values:

- Hardness 6-18 °dH to avoid scaling (chalk / lime stone build up).
- Conductivity 50 – 800 µS/cm to avoid brass dezincification and corrosion.
- Above 25°C media temperature avoid stagnant water inside the valve to avoid dezincification and corrosion attack.
- Drinking water (Ph 6-9)

4 Product specification

4.1 Technical data

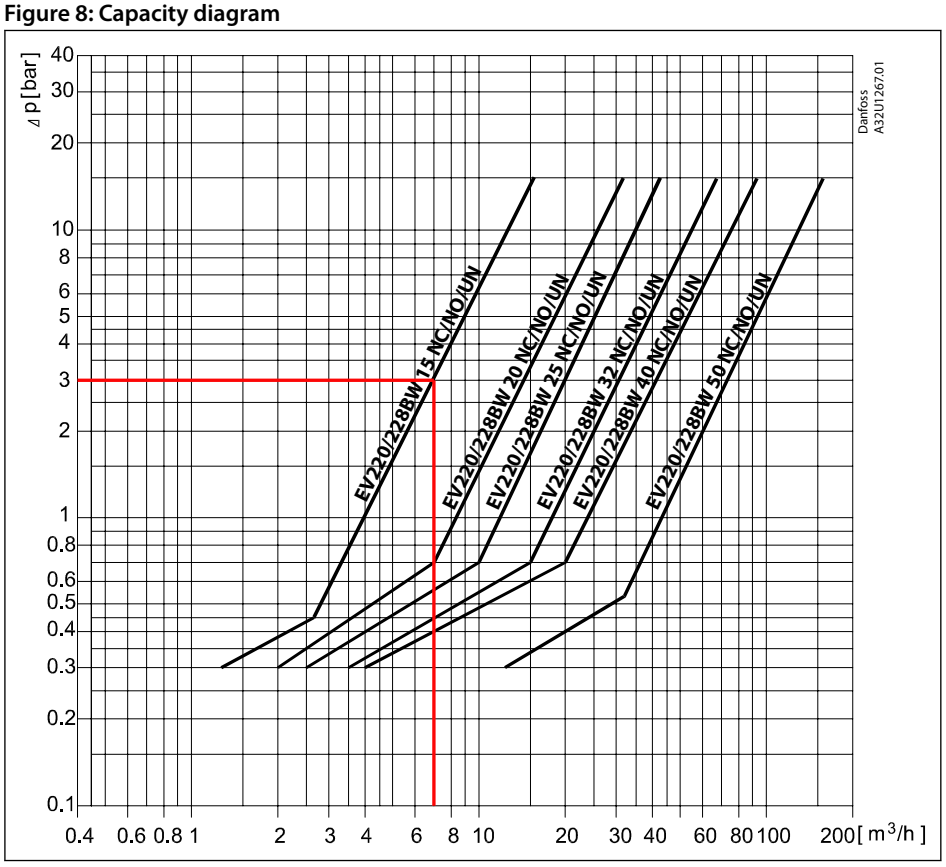
Table 2: Technical data

Media	EPDM	Drinking water
Media temperature [°C]	EV220BW EPDM	-30 - 90 °C
	EV228BW EPDM	-30 - 70 °C (RISE 0-60 °C)
Ambient temperature [°C]	BB DC	Up 50 °C
	BB AC	Up 80 °C
	EEC BE240CS	Up 55 °C
K_v value [m^3/h]	DN15	4 m^3/h
	DN20	8 m^3/h
	DN25	11 m^3/h
	DN32	18 m^3/h
	DN40	24 m^3/h
	DN50	40 m^3/h
Min. Opening differential pressure [bar]	0.3 bar	
Max. Opening differential pressure [bar]	10 bar	
Max. working pressure [bar]	10 bar	
Max. test pressure [bar]	15 bar	
Viscosity [cSt]	Max. 50 cSt	

Capacity diagram

Example, water: Capacity for EV220BW 15B at differential pressure of 3 bar: Approx. 7 m^3/h

Figure 8: Capacity diagram



Time to open/close

Table 3: Time to open/close

Main type	EV220/228BW 15	EV220/228BW 20	EV220/228BW 25	EV220/228BW 32	EV220/228BW 40	EV220/228BW 50
Time to open [ms][(1)]	40	40	300	1000	1500	5000
Time to close [ms][(1)]	350	1000	1000	2500	4000	10000

[(1)] The times are indicative and apply to water. The exact times will depend on the pressure conditions. Closing times can be changed by replacement of the equalizing orifice.

Materials

Table 4: Materials

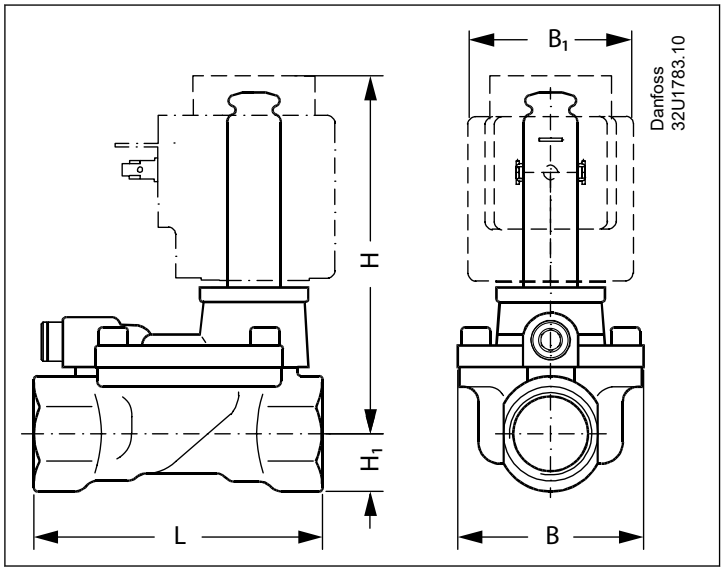
Components	Materials	Specifications
Valve body/cover	Eco brass	CW724R
	Stainless steel	W. no. 1.4404 / AISI 316L
Equalizing orifice	Eco brass	CW724R
	Stainless steel	W. no. 1.4404 / AISI 316L
Armature	Stainless steel	W.no. 1.4105 / AISI 430 FR
Armature tube	Stainless steel	W.no. 1.4306 / AISI 304 L
Armature stop	Stainless steel	W.no. 1.4105 / AISI 430 FR
Springs	Stainless steel	W.no. 1.4310 / AISI 301
O-rings	EPDM	
Valve plate	EPDM	
Diaphragm	EPDM	

4.2 Dimension and weight

Table 5: Dimension and weight

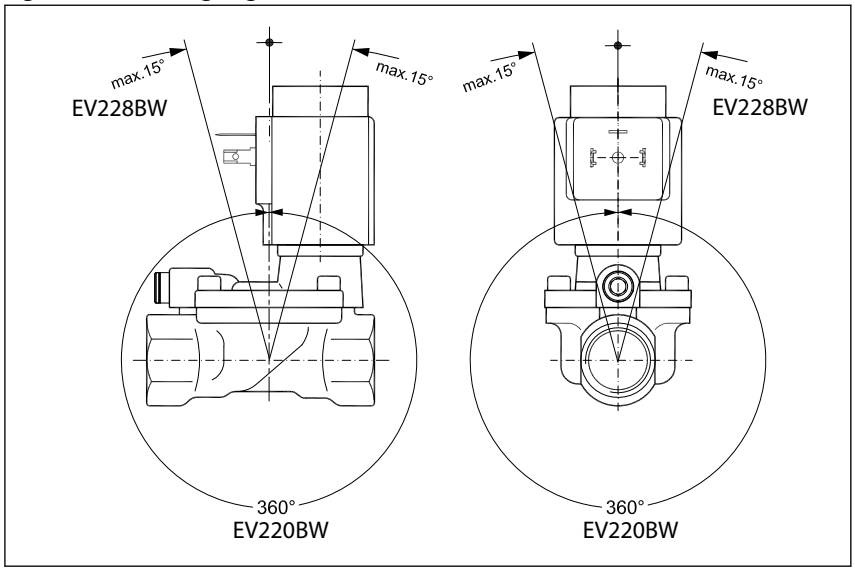
Type	L	B	B_1 [mm] / coil type				H	H_1	Weight without coil
	[mm]	[mm]	BA	BB / BE	BG / BO	BP	[mm]	[mm]	[kg]
EV220/228BW 15	80.0	52.0	32	46	68	45	99	15.0	0.7
EV220/228BW 20	90.0	58.0	32	46	68	45	103	18.0	0.9
EV220/228BW 25	109.0	70.0	32	46	68	45	113	22.0	1.3
EV220/228BW 32	120.0	82.0	32	46	68	45	120	27.0	2.0
EV220/228BW 40	130.0	95.0	32	46	68	45	129	32.0	3.0
EV220/228BW 50	162.0	113.0	32	46	68	45	135	37.0	4.8

Figure 9: Dimension



4.3 Mounting

Figure 10: Mounting angle



5 Ordering

5.1 Parts program

Table 6: Eco brass and stainless steel, valve body NC, NO and UN

ISO228/1 connection	Orifice	K_v value	Body material	Function		
	[mm]	[m³/h]	Eco brass /Stainless steel	EV220BW		EV228BW
				NC	NO	UN
G1/2	15	4	Eco brass	132U1500	132U1501	132U2400
			Stainless steel	132U1580	132U1581	132U2401
G3/4	20	8	Eco brass	132U2000	132U2001	132U2402
			Stainless steel	132U2080	132U2081	132U2403
G1	25	11	Eco brass	132U2500	132U2501	132U2404
			Stainless steel	132U2580	132U2581	132U2405
G11/4	32	18	Eco brass	132U3200	132U3201	132U2406
			Stainless steel	132U3280	132U3281	132U2407
G11/2	40	24	Eco brass	132U4000	132U4001	132U2408
			Stainless steel	132U4080	132U4081	132U2409
G2	50	40	Eco brass	132U5000	132U5001	132U2410
			Stainless steel	132U5080	132U5081	132U2411

5.2 Accessories

Coil

BB / BY, High performance coils

Figure 11: BB / BY, High performance coils

Table 7: BB / BY, High performance coils

Type	Tambient	Supply voltage	Voltage variation	Frequency	Control	Power consumption		Code no.
	[°C]	[V]		[Hz]		[W]	[VA]	
BB024AS	-40 – 80	24	-15%, +10%	50	NO, NC	11	19	018F7358
BB230AS	-40 – 80	220 - 230	-15%, +10%	50	NO, NC	11	19	018F7351
BB012DS	-40 – 50	12	±10%	DC	NC, NO, UN (Latching)	13		018F7396
BB024DS	-40 – 50	24	±10%	DC	NC, NO, UN (Latching)	16		018F7397

EEC and coil controller

Figure 12: EEC and coil controller

Table 8: Technical data

Type	Tambient	Supply voltage	Voltage variation	Frequency	Control	Power consumption	Code no.
	[°C]	[V]		[Hz]		[W]	
BE240CS	-25 – 55	208 - 240	±10%	60	NC, NO	4	018F6783
		208 - 240	±10%	50	NC, NO	4	

Cable plug

Figure 13: Cable plug

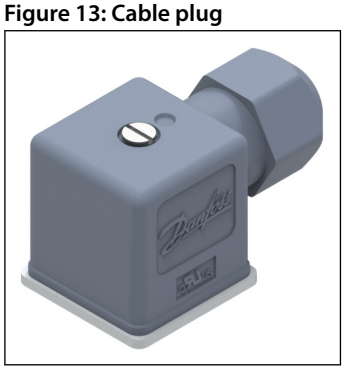


Table 9: Cable plug

Cable plug size	Description	Code no.
DIN 18	Cable plug IP67	042N1256

Universal electronic multi-timer, Type ET 20 M

Figure 14: Type ET 20 M

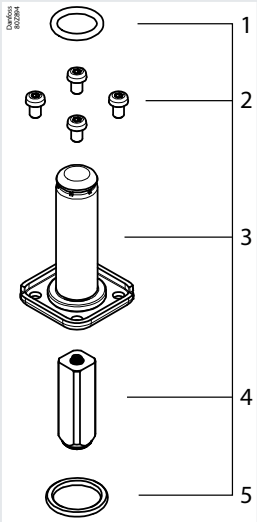
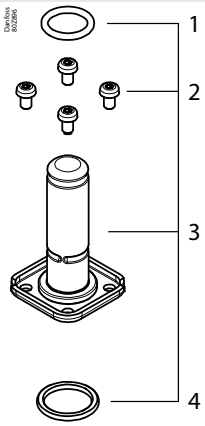
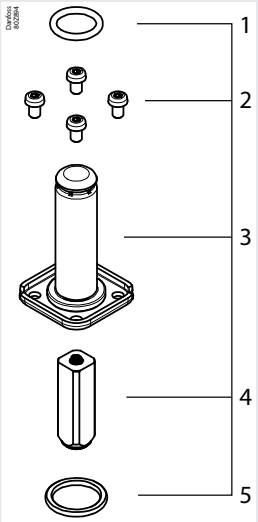
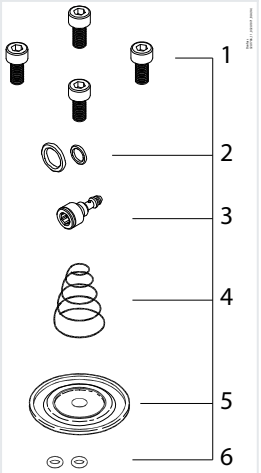
Table 10: Type ET 20 M

Type	Voltage	Suitable for coil types	Code no.
	[V]		
BA024A	24 - 240	AL, AM, AS, AZ, BA, BD, BB	042N0185

Spare part kits

Table 11: Spare part kit DN15-50 in EPDM and stainless steel

Type	Actuator kit NC for EV220BW	Actuator kit NO for EV220BW	Actuator kit UN for EV228BW	Diaphragm kit for EV220/EV228BW
EV220/EV228BW DN 15	132U8080	132U8081	132U8082	132U8016
EV220/EV228BW DN 20	132U8080	132U8081	132U8082	132U8021
EV220/EV228BW DN 25	132U8080	132U8081	132U8082	132U8026
EV220/EV228BW DN 32	132U8080	132U8081	132U8082	132U8033
EV220/EV228BW DN 40	132U8080	132U8081	132U8082	132U8041

Type	Actuator kit NC for EV220BW	Actuator kit NO for EV220BW	Actuator kit UN for EV228BW	Diaphragm kit for EV220/EV228BW
EV220/EV228BW DN 50	132U8080	132U8081	132U8082	132U8051
				
	1. O-ring 2. 4 x Screws 3. Armature tube 4. Armature with spring 5. O-ring	1. O-ring 2. 4 x Screws 3. NO unit 4. O-ring	1. O-ring 2. 4 x Screws 3. Armature tube 4. Armature with spring 5. O-ring	1. 4 x Screws 2. 2 x O-rings 3. Equalizing orifice 4. Closing spring 5. Diaphragm 6. 2 x O-ring

6 Certificates, declarations and approvals

6.1 Directives, approvals and certificates

In accordance with

- Low Voltage Directive 2014/35/EU
- EN60730-1
- EN60730-2-8
- Pressure Equipment Directive 2014/68/EU
- RoHS Directive 2011/65/EU

6.2 Drinking water approvals

Figure 15: Rise

Valves are certified by RISE, notified body 1002. Valid in Denmark and Sweden. In accordance with Boverket Building Regulations (BBR 21, 2014-06-17) Certificate number SCO155-18

Figure 16: SINTEF

Valves are certified by SINTEF. Valid in Norway. In accordance with NKB Product rules nr. 13, pkt. 3.2 – 3.6 :

- NT VVS 100, pkt. 6.4.2 & 6.4.8
- EN ISO 6509

Figure 17: DTI

Inspection by DTI

Figure 18: ACS

Valves are certified by Carso according to ACS guidelines, Circulaire 2002/571.

Figure 19: PZH

Hygenic certificate B-BK-60210-1275/19. Issued by Polish National Institute of Public health (PZH).

Wetted materials in accordance with 4MS (4 member states Germany, Holland, France and UK), DVGW, BWGL, KTW and W270.

Figure 20: WRAS

Valves are examined, tested and found, when correctly installed, to comply with the requirements of the United Kingdom Water Supply (Water Fittings) Regulations and Scottish Water Byelaws."

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