ENGINEERING
TOMORROW

Data Sheet

Solenoid valve
Types **EV220B** and **EV220BW**

Types **EV220B 15-50** and **EV220BW 40-50**

EV220B 15-50 and EV220BW 40-50 are a universal indirect servo-operated 2/2-way solenoid valve program. Valve body in brass, dezincification resistant brass and stainless steel ensures that a broad variety of application can be covered. Built-in pilot filter as standard, adjustable closing time and enclosures up to IP67 ensures optimal performance even under critical working conditions.

Features

- For water, steam, oil, compressed air and gases
- Ambient temperature: Up to 80 °C
- Coil enclosure: Up to IP67
- Water hammer damped
- Built in filter for protection of pilot system
- Adjustable closing time available
- EV220B 15-50 NC and NO brass version for neutral liquids and gasses
- EV220B 15-50 NC DZR brass version for neutral and slightly aggressive liquids and gases
- EV220B 15-50 NC Stainless Steel version for neutral and aggressive liquids and gases
- EV220BW 40-50 NC+NO EPDM and WRAS for drinking water

1 Portfolio overview

Table 1: Portfolio overview

Features	EV220B 15-50	EV220B 15-50	EV220BW 40-50	EV220B 15-50
				
Body material	Brass	DZR brass	Brass	Stainless steel
DN [mm]	15 - 50	15 - 50	40 - 50	15 - 50
Connection	G1/2 – G2	G1/2 - G2	G11/2 - G2	G1/2 - G2
Sealing material	EPDM/FKM/NBR	EPDM	EPDM	EPDM/FKM
Function	NC/NO	NC	NC/NO	NC
K_v [m³/h]	4 - 40	4 - 40	24 - 40	4 - 40
Differential pressure range [bar]	0.3 - 16	0.3 - 16	0.3 - 10	0.3 - 16
Temperature range [°C]	-30 - 120	-30 - 120	0 - 90	-30 - 120

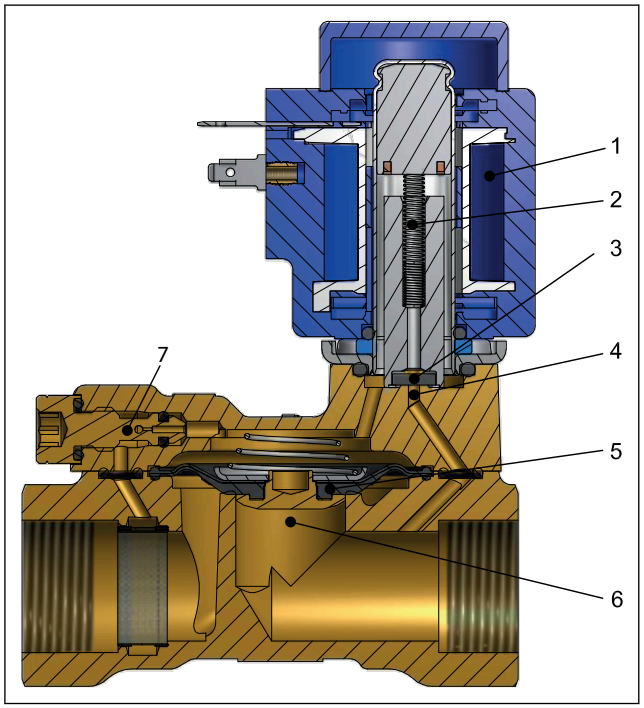
2 Functions

2.1 Function NC, brass, DZR brass and stainless steel

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



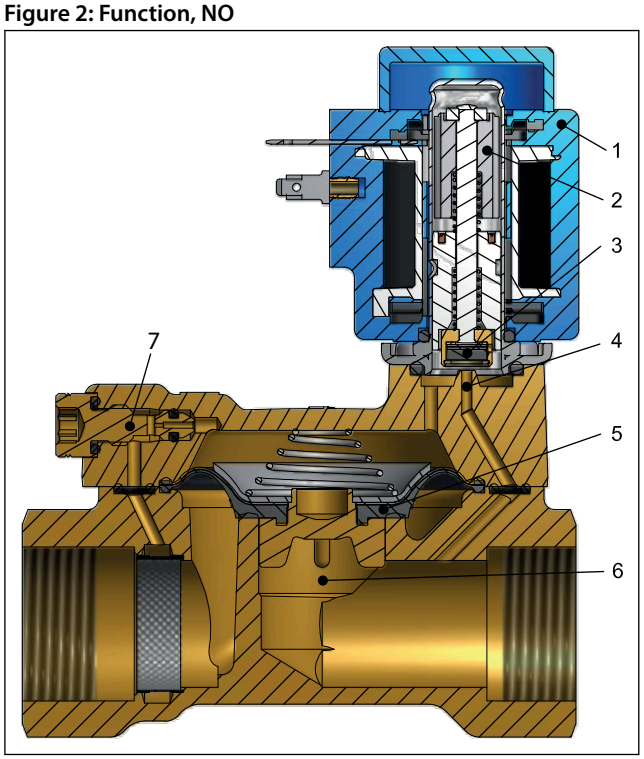
1.	Coil
2.	Armature spring
3.	Valve plate
4.	Pilot orifice
5.	Diaphragm
6.	Main orifice
7.	Equalizing orifice

2.2 Function NO, brass

Coil voltage disconnected (open)
When the voltage to the coil (2) 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

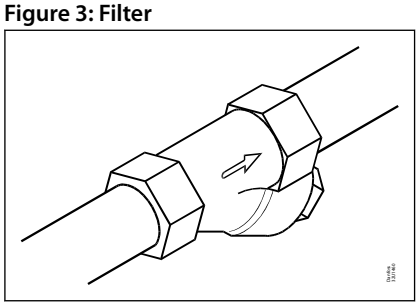


1.	Coil
2.	Armature spring
3.	Valve plate
4.	Pilot orifice
5.	Diaphragm
6.	Main orifice
7.	Equalizing orifice

3 Applications

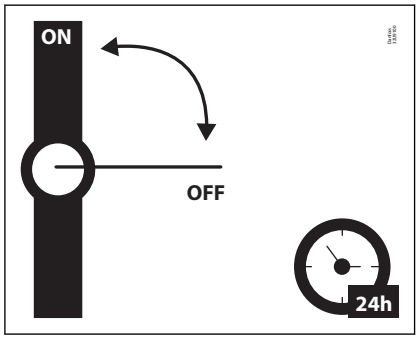
It is recommended to use a filter in front of the valve. Recommended filter 50 mesh (297 microns).

Figure 3: 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 4: Exercise: Valve on/off



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.

4 Product specification

4.1 Technical data

Table 2: Technical data

Media	EPDM	For water and drinking water
	FKM	For oil and air. For water max. 60 °C
	NBR	For oil, water and air
Media temperature [°C]	EPDM	-30-120 °C [1]
	FKM	0-100 °C [2]
	NBR	-10-90 °C
	EPDM, WRAS	0-90 °C
Ambient temperature [°C]	Up to 80 °C	
K_v value [m³/h]	DN15	4 m³/h
	DN20	7.5 - 8 m³/h
	DN25	11 m³/h
	DN32	18 m³/h
	DN40	24 m³/h
	DN50	40 m³/h
Min. Opening differential pressure [bar]	0.3 Bar	
Max. Opening differential pressure [bar]	Up to 16 bar	
Max. working pressure [bar]	Up to 16 bar (Equal to max. differential pressure)	
Max test pressure [bar]	20 bar	
Viscosity [cSt]	Max. 50 cSt	

[1] Low pressure steam, 4 bar: Max. 140 °C.
BA AC/DC and BB/BE DC coils: Max. 100 °C.
BO and BP coils: Max. 90 °C.
[2] BO and BP coils: Max. 90 °C.

Differential pressure range

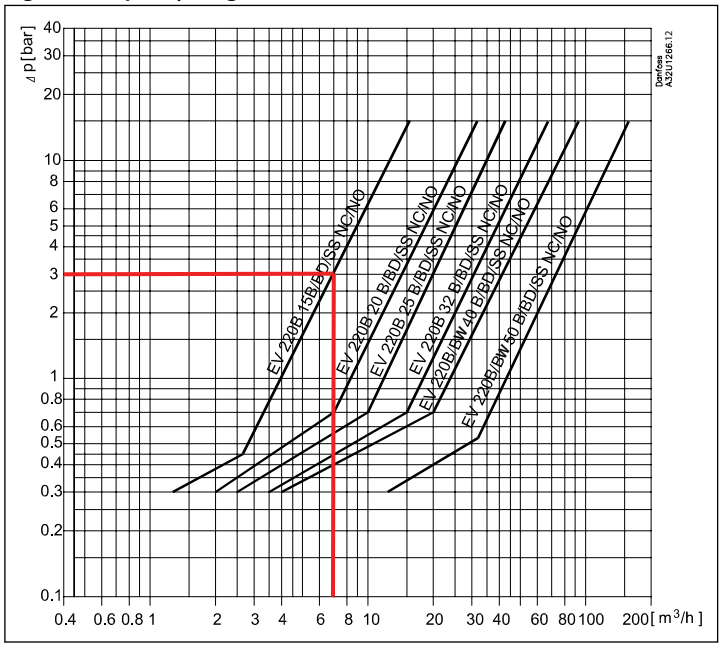
Table 3: Differential pressure range

ISO228/1 connection	Seal Material	Orifice [mm]	Differential pressure min. to max. [bar]	
			NC	NO
G1/2	EPDM	15	0.3-16	0.3-10
	NBR		0.3-16	
	FKM		0.3-10	
	EPDM WRAS		0.3-16	
G3/4	EPDM	20	0.3-16	
	NBR		0.3-16	
	FKM		0.3-10	
	EPDM WRAS		0.3-16	
G1	EPDM	25	0.3-16	
	NBR		0.3-16	
	FKM		0.3-10	
	EPDM WRAS		0.3-16	
G1 1/4	EPDM	32	0.3-12	
	NBR		0.3-12	
	FKM		0.3-10	
	EPDM WRAS		0.3-12	
G1 1/2	EPDM	40	0.3-12	
	NBR		0.3-12	
	FKM		0.3-10	
	EPDM WRAS		0.3-10	
G2	EPDM	50	0.3-12	
	NBR		0.3-12	
	FKM		0.3-10	
	EPDM WRAS		0.3-10	

Capacity diagram

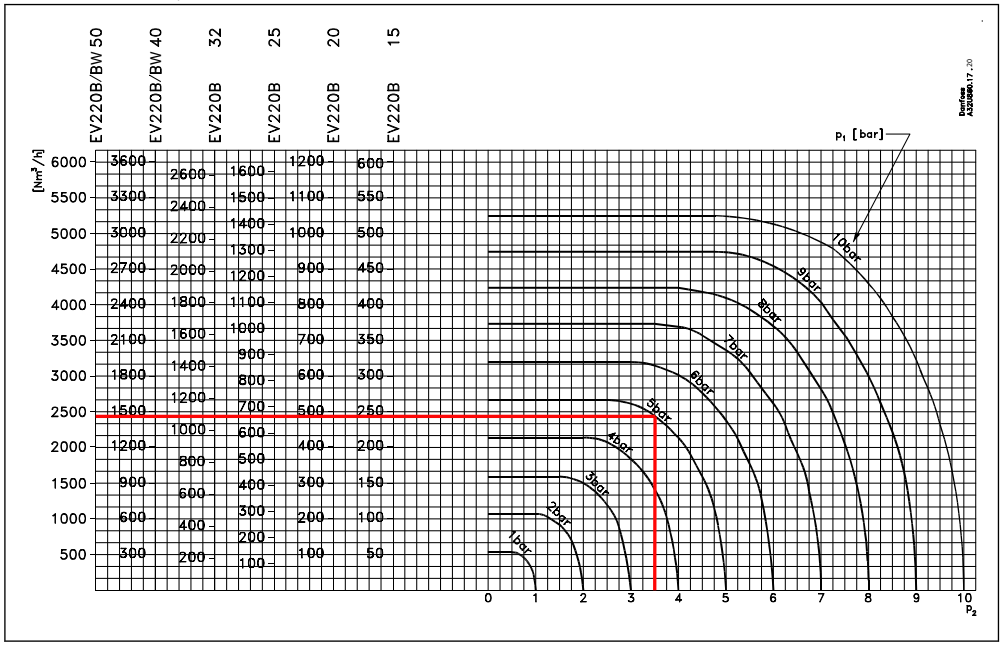
Example, water: Capacity for EV220B 15B at differential pressure of 3 bar. Approx. 7 m^3/h

Figure 5: Capacity diagram



Example, air:
Capacity for EV220B 15B at inlet pressure (p^1) of 5 bar and outlet pressure (p_2) of 3.5 bar: Approx. 245 Nm^3/h

Figure 6: Capacity diagram



Time to open/close

Table 4: Time to open/close

Main	EV220B 15B/BD/SS	EV220B 20B/BD/SS	EV220B 25B/BD/SS	EV220B 32B/BD/SS	EV220B/BW 40B/BD/SS	EV220B/BW 50B/BD/SS
Time to open [ms][1]	40	40	300	1000	1500	5000
Time to open [ms] [1]	350	1000	1000	2500	4000	10000

[1] The times are indicative and apply to water. The exact times wil depend on the pressure conditions. Closing timescan be changes by replacement of the equalizing orifice.

Materials

Table 5: Materials

Components	Materials	Specifications
Valve body/cover	Stainless steel	W.no. 1.4581 / AISI 318
	Brass	W.no. 2.0402
	DZR brass	CuZn36Pb2As / CZ132
Armature	Stainless steel	W.no. 1.4105 / AISI 430 FR
Armature tube	Stainless steel	W.no. 1.4306 / AISI 304L
Armature stop	Stainless steel	W.no. 1.4105 / AISI 430FR
Springs	Stainless steel	W.no. 1.4310 / AISI 301
Orifices	Stainless steel	W.no. 1.4404 / AISI316L
O-rings	EPDM, NBR or FKM	
Valve plate	EPDM, NBR or FKM	
Diaphragm	EPDM, NBR or FKM	

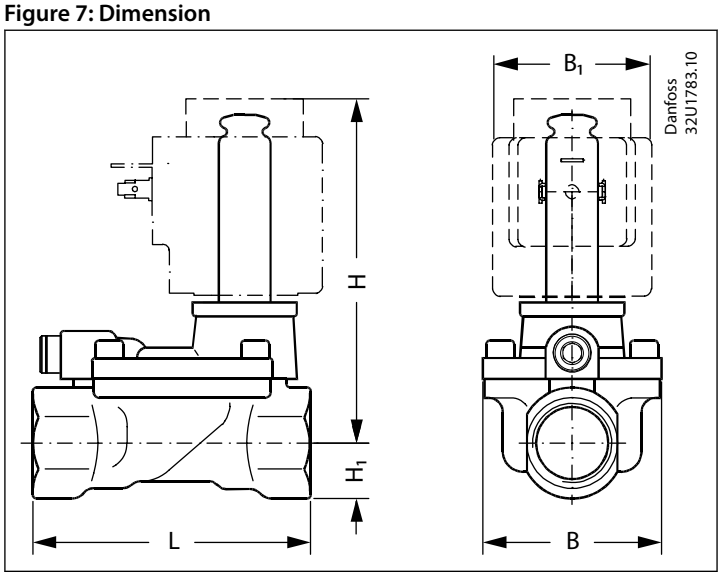
4.2 Dimension and weight

Table 6: Dimension and weight: Brass, DZR brass and stainless steel, NC and NO

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]
EV220B 15	80	52	32	46	68	45	99	15	0.7
EV220B 20	90	58	32	46	68	45	103	18	0.9
EV220B 25	109	70	32	46	68	45	113	22	1.3

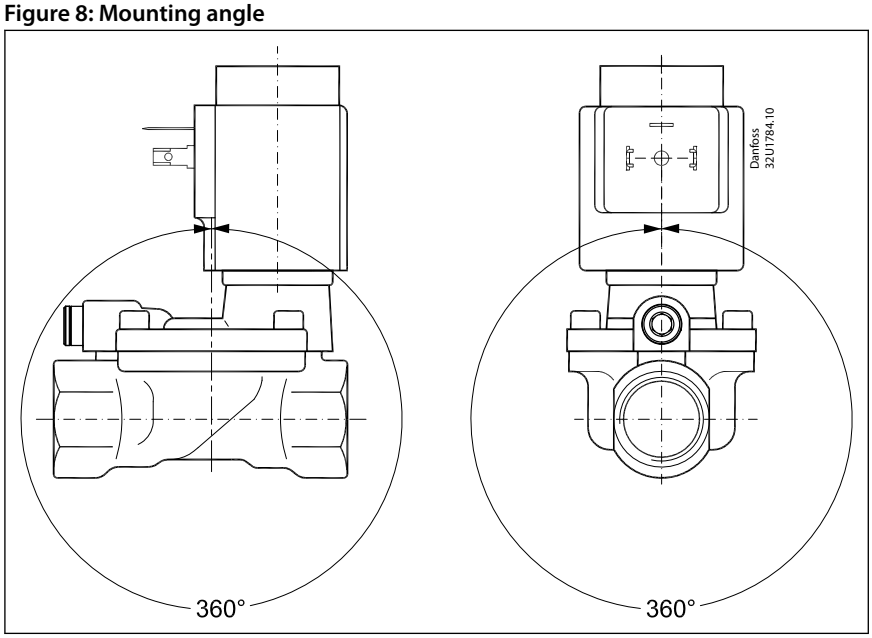
Type	L	B	B_1 [mm] / coil type				H	H_1	Weight without coil
	[mm]	[mm]	BA	BB / BE	BG / BO	BP	[mm]	[mm]	[kg]
EV220B 32	120	82	32	46	68	45	120	27	2
EV220B / BW 40	130	95	32	46	68	45	129	32	3
EV220B / BW 50	162	113	32	46	68	45	135	37	4.8

Figure 7: Dimension



4.3 Mounting

Figure 8: Mounting angle



5 Ordering

5.1 Parts program

Table 7: Brass, DZR brass and stainless stel, valve body NC and NO

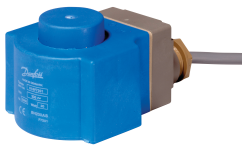
ISO228/1 connection	Orifice	K_v value	Seal Material	Approval	Type and function					
					EV220B brass		EV220B DZR	EV220B SS	EV220BW brass	
	[mm]	[m³/h]			NC	NO	NC	NC	NC	NO
G1/2	15	4	EPDM	WRAS	032U7115	032U7117	032U5815			
								032U8500		
			NBR		032U7170	032U7180				
			FKM		032U7116	032U7118		032U8506		
G3/4	20	8	EPDM	WRAS	032U7120	032U7122	032U5820			
								032U8501		
		7.5	NBR		032U7171	032U7181				
		8	FKM		032U7121	032U7123		032U8507		
G1	25	11	EPDM	WRAS	032U7125	032U7127	032U5825			
								032U8502		
			NBR		032U7172	032U7182				
			FKM		032U7126	032U7128		032U8508		
G11/4	32	18	EPDM	WRAS	032U7132	032U7134	032U5832			
								032U8503		
			NBR		032U7173	032U7183				
			FKM		032U7133	032U7135		032U8509		
G11/2	40	24	EPDM	WRAS					132U4003	132U4004
					032U7140	032U7142	032U5840	032U8504		
			NBR		032U7174	032U7184				
			FKM		032U7141	032U7143		032U8510		
G2	50	40	EPDM	WRAS					132U5003	132U5004
					032U7150	032U7152	032U5850	032U8505		
			NBR		032U7175	032U7185				
			FKM		032U7151	032U7153		032U8511		

5.2 Accessories

Coils

Table 8: Below coils can be used with EV220B 15 – EV220B 50, EV220BW 40-50

Coil	Type	Power consumption	Enclosure	Features
	BA / BD, screw on	8.5 - 15 W AC 14 W DC	IP00 with spade connector	IP20 with protective cap, IP67 with cable plug
	BB / BY, clip on	11 - 16 W AC 14 - 16 W DC	IP00 with spade connector	IP20 with protective cap, IP67 with cable plug
	BR, clip on	12 - 14 W AC 16 W DC	IP00 with spade connector	IP20 with protective cap, IP67 with cable plug Design for marine application

Coil	Type	Power consumption	Enclosure	Features
	BE, clip on	11 - 17 W AC 15 - 16 W DC	IP67	With terminal box
	BF, clip on	11 - 15 W AC 14 - 16 W DC	IP67	With 1 m cable
	BG, clip on	11 - 16 W AC 16 - 20 W DC	IP67	With terminal box
	BN, clip on	22 W AC 20 W DC	IP67	Hum free With terminal box and 1 m cable
	BO, screw on	10 W AC 10 W DC	IP67 only including seal kit 018Z0090	For explosion-risk environment zone 1. With terminal box and 5 m cable

Cable plug

Figure 9: Cable plug

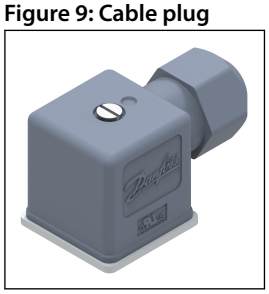


Table 9: Cable plug

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

Universal electronic multi-timer, Type ET20M

Figure 10: Type ET20M

Table 10: Type ET20M

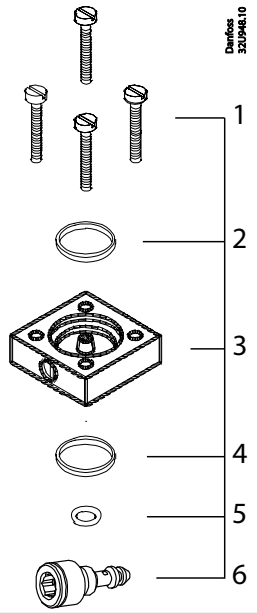
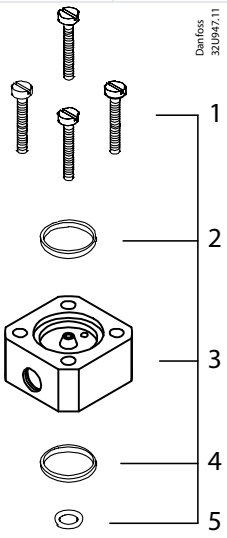
Application	Voltage [V AC]	To use with coil	Ambient temperature [°C]	Code no.
External adjustable timings from1 to 45 minutes with 1 to 15 seconds drain open. with manual override (test button). Electrical connection DIN 43650 A/EN 175-301-803-A	24 - 240	BA, BD, BB	-10 - 50	042N0185

Manual override unit, tool operated

Manual override kit, used in event of power failure.

NOTE:
Valve height is increased by 16 mm.

Table 11: Manual override unit, tool operated

Type	Manual override unit, NBR		
	Body material		
	Brass		Stainless steel
DN15-32		032U0150	032U0149
DN40-50	032U0260		032U0149
			
	1. 4 x Screws 2. O-ring 3. Manual override body 4. O-ring 5. O-ring 6. Equalizing orifice size III [1]	1. 4 x Screws 2. O-ring 3. Manual override body 4. O-ring 5. O-ring	

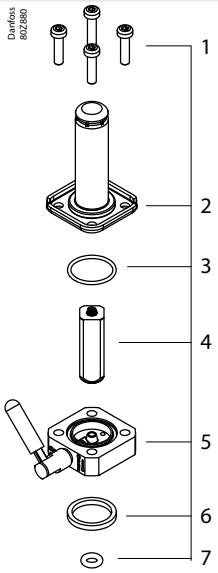
[1] For FKM and NBR valves, it is recommended to change the equalizing orifice to size III, to obtain a proper function.

Manual override unit, hand operated

Manual override kit, used for manual override in event of power failure.

NOTE:
Valve height is increased by 16 mm.

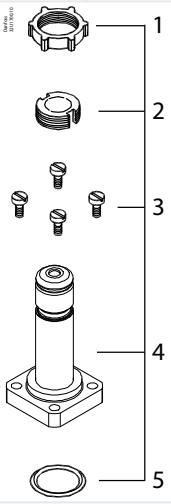
Table 12: Manual override unit, hand operated

Type	Manual override unit stainless steel, EPDM
DN15-50	032U7390
	
	1. 4 x Screws 2. Armature tube 3. O-ring 4. Armature incl. closing spring 5. Stainless steel valve body 6. O-ring 7. O-ring

Isolating diaphragm kit

The isolating diaphragm design ensures that no fluid enters the armature area, which gives the following advantages:
The valve is resistant to aggressive fluids, impurities in the fluid and to calcarous and scale deposits.

Table 13: Isolating diaphragm kit

Type	Isolating diaphragm kit	
	EPDM[1]	FKM[2]
DN 15-50	042U1009	042U1010
		
	1. Locking buttom 2. Locking nut 3. 4 x screws 4. Assembled isolating unit 5. O-ring	

(1) Media temperature -20 - 50°C
(2) Media temperature 0 - 50°C

Orifice

Equalizing orifice

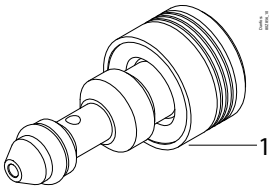
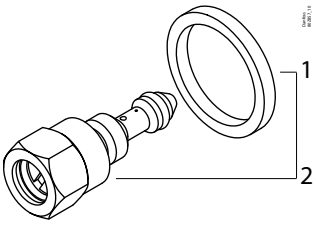
A shorter closing time is obtained with a larger orifice (the shorter closing time, the greater risk of water hammering). A longer closing time is obtained with a smaller orifice.
The valves closing time can be changed by installing an equalizing orifice of a size which deviates from the standard valve.

Adjustable orifice

The valves closing time can be adjusted by turning the setting screw.

- A shorter closing time is obtained with a larger orifice (the shorter closing time, the greater risk of water hammering).
- A longer closing time is obtained with a smaller orifice.

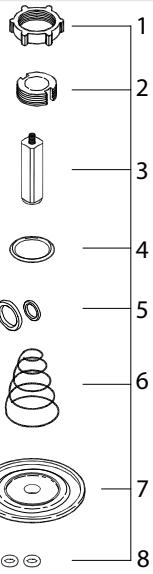
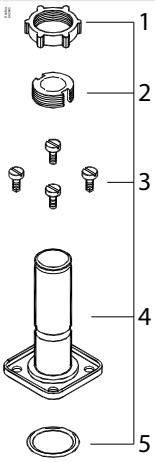
Table 14: Equalizing orifice

Type	Equalizing orifice size	Equalizing orifice				Adjustable orifice	
		Brass		DZR brass/ Stainless steel		Brass	
	[mm]	EPDM(1)	FKM	EPDM(1)	FKM	EPDM	FKM
EV220B 15-20	0.5	032U0082		032U6310		032U0682	032U0683
EV220B 25-32-40	0.8	032U0084		032U6311			
EV220B 25-32	1.2		032U0085		032U6314		
EV220B 50	1.2	032U0086		032U6312			
EV220B 40-50	1.4		032U0087		032U6315		
							
		1. Equalizing orifice with 2 o-rings				1. Gasket 2. Adjustable orifice with o-ring	

(1) Approved by WRAS.
Approved by Attestation de Conformite Sanitaire (ACS).
EPDM is recommended of water (Steam max. 40 °C / 4 Bar).

Spare part kit for NC and NO

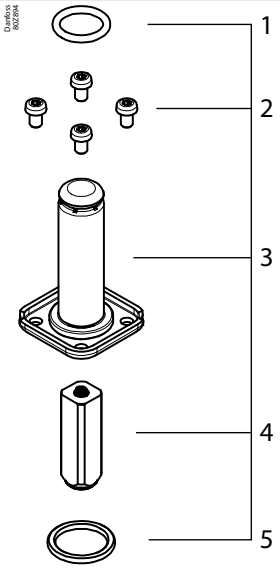
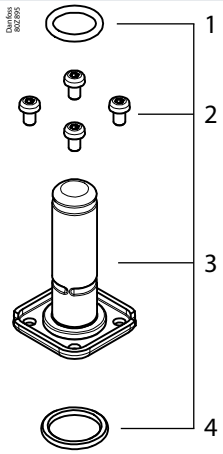
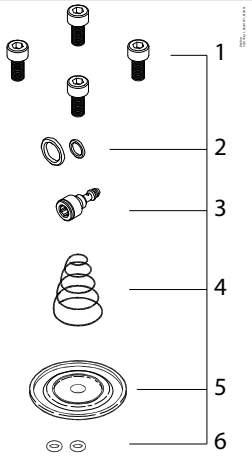
Table 15: Spare parts kit, NC and NO

Type	Actuator kit NC brass			Actuator kit NC DZR / SS		Actuator kit NO		
	EPDM[1]	FKM	NBR	EPDM	FKM	EPDM[2]	FKM	NBR
EV220B 15	032U1071	032U1072	032U6013	032U6320	032U6326	032U0296	032U0295	032U0299
EV220B 20	032U1073	032U1074	032U6014	032U6321	032U6327			
EV220B 25	032U1075	032U1076	032U6015	032U6322	032U6328			
EV220B 32	032U1077	032U1078	032U6016	032U6323	032U6329			
EV220B 40	032U1079	032U1080	032U6017	032U6324	032U6330			
EV220B 50	032U1081	032U1082	032U6018	032U6325	032U6331			
								
	1. Locking button 2. Locking nut 3. Armature with valve plate and spring 4. O-ring for the armature tube 5. 2x O-rings for the equalizing orifice 6. Closing spring 7. Diaphragm 8. 2 x O-rings for the pilot system					1. Locking button 2. Locking nut 3. NO actuator unit 4. O-ring for armature unit		

[1] DN 15-32 approved by WRAS.
DN 15-50 (Brass and DZR) approved by attestation de conformite Sanitaire (ACS) and PZH.
DN 15-50 SS approved by PZH.
EPDM is recommended for water. (steam max. 140 °C/4 bar).
[2] EPDM is recommended for water. (steam max. 140 °C/4 bar)

Spare part kit DN40 and DN50, EPDM WRAS approved

Table 16: Spare part kits DN40 and DN50

Type	Actuator kit NC	Actuator kit NO	Diaphragm kit NC and NO
EV220BW DN40	132U8080	132U8081	132U8041
EV220BW DN50			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 actuator unit 4. O-ring	1. 4 x screws 2. 2 x o-rings for equalizing orifice 3. Equalizing orifice 4. Closing spring 5. Diaphragm 6. 2 x O-rings for the pilot system

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