ENGINEERING
TOMORROW

Data Sheet

Solenoid valve
Type **EV220B** and **EV220BW**

EV220B 6-22 and EV220BW 12 NO:
General purpose valves for water, brine, air and oil applications

EV220B 6 - EV220B 22 and EV220BW 12 NO is a direct servo-operated 2/2-way solenoid valve program with connections from 1/4" to 1". This program is especially for OEM applications demanding a robust solution and moderate flow rates.

Features

- For water, oil, compressed air and similar neutral media
- Clip on coil
- Ambient temperature: Up to 80 °C
- Coil enclosure: Up to IP67

1 Portfolio overview

Table 1: Portfolio overview

Features	EV220B 6 - 22	EV220B 6-10	EV220B 6-12	EV220BW 12
				
Body material	Brass	DZR Brass	Brass	DZR brass
DN [mm]	6 - 22	6 - 10	6 - 12	12
Connection	G1/4" - G1"	G3/8" - G1/2"	G3/8" - G1/2"	G1/2"
Sealing material	EPDM, FKM	EPDM	EPDM, FKM	EPDM
Function	NC	NC	NO	NO
K_v [m^3/h]	0.7 - 6	0.7 - 1.5	0.7 - 2.5	2.5
Differential pressure range [bar]	0.1 - 20	0.1 - 20	0.1 - 10	0.3 - 10
Temperature range [°C]	-30 - 100	-30 - 100	-30 - 100	-30 - 100

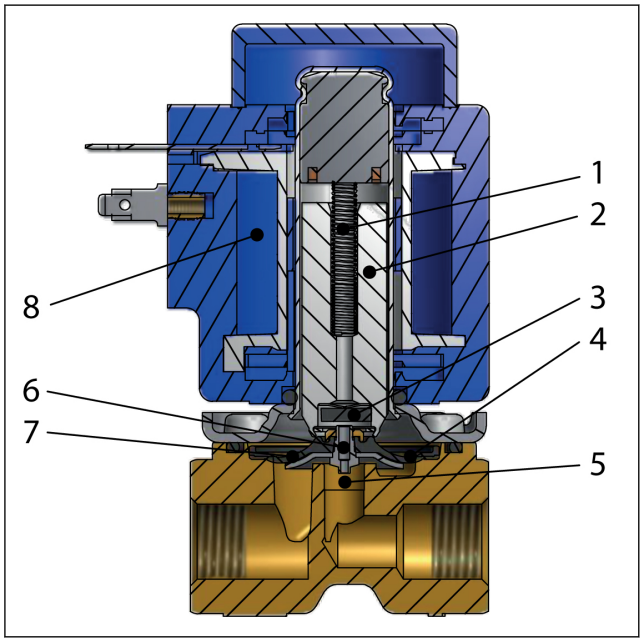
2 Function

2.1 Function NC

Coil voltage disconnected (closed)
When the supply voltage to the coil (8) is disconnected, the valve plate (3) is pressed down against the pilot orifice (6) by the armature spring (1). The pressure across the diaphragm (7) is built up via the equalizing orifice (4). The diaphragm closes the main orifice (5) 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, the pilot orifice (6) is opened. As the pilot orifice is larger than the equalizing orifice (4), the pressure across the diaphragm (7) drops and therefore it is lifted clear of the main orifice (5). The valve is now open 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



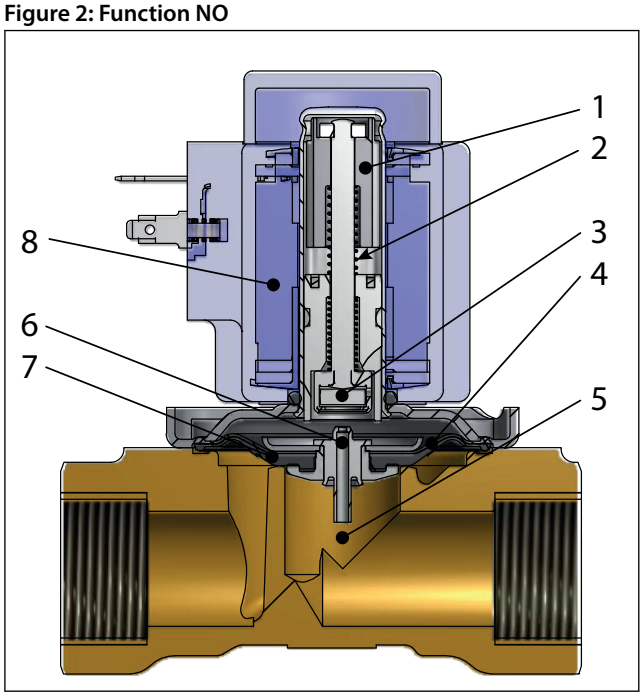
1.	Armature spring
2.	Armature
3.	Valve plate
4.	Equalizing orifice
5.	Main orifice
6.	Pilot orifice
7.	Diaphragm
8.	Coil

2.2 Function NO

Coil voltage disconnected (open)
When the voltage to the coil (8) is disconnected, the pilot orifice (6) is open. As the pilot orifice is larger than the equalizing orifice (4), the pressure across the diaphragm (7) drops and therefore it is lifted clear of the main orifice (5). 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 (6). The pressure across the diaphragm (7) is built up via the equalizing orifice (4). The diaphragm closes the main orifice (5) 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

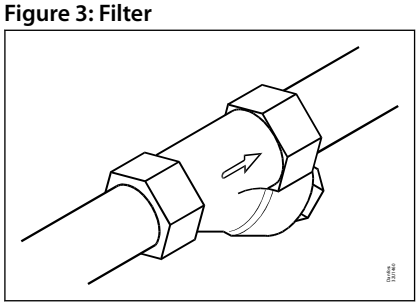


1.	Armature
2.	Opening spring
3.	Valve plate
4.	Equalizing orifice
5.	Main orifice
6.	Pilot orifice
7.	Diaphragm
8.	Coil

3 Applications

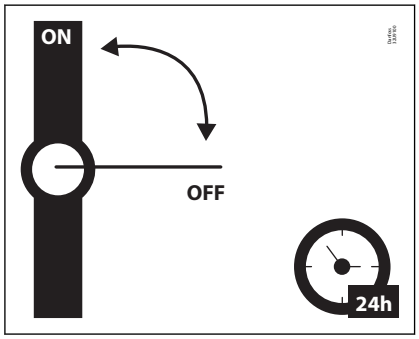
It is recommended to use a filter in front of the valve. Recommended filter 50 mesh (297 microns).

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	Water	
	FKM	Oil and air	
Media temperature [°C]	EPDM	-30-100 °C	
	FKM	0-100 °C (Water max 60 °C)	
	EPDM WRAS	0-90 °C	
Ambient temperature [°C]	BA	Up 40 °C	
	BD/BE DC/BB DC	Up 50 °C	
	BB/BE AC/ BG	Up 80 °C	
K_v value [m^3/h]	DN6	0.7m^3/h	
	DN10 NC	1.5 m^3/h	
	DN10 NO	1.0 m^3/h	
	DN11.5	2.3 m^3/h	
	DN12	2.5 m^3/h	
	DN18	6.0 m^3/h	
	DN22	6.0 m^3/h	
Min. Opening differential pressure [bar]	NC	DN6-10	0.1 bar
		DN11.5-22	0.3 bar
	NO	DN6-10	0.1 bar
		DN12	0.3 bar
Max. Opening differential pressure [bar]	NC	Up to 20 bar	
	NO	10 bar	
Max. working pressure [bar]	NC	Up to 20 bar (Equal to max. differential pressure)	
	NO	10 bar	
Max. test pressure [bar]	DN6 - 10	50 bar	
	DN11.5 - 22	16 bar	
Viscosity [cSt]	Max. 50 cSt		

Differential pressure range

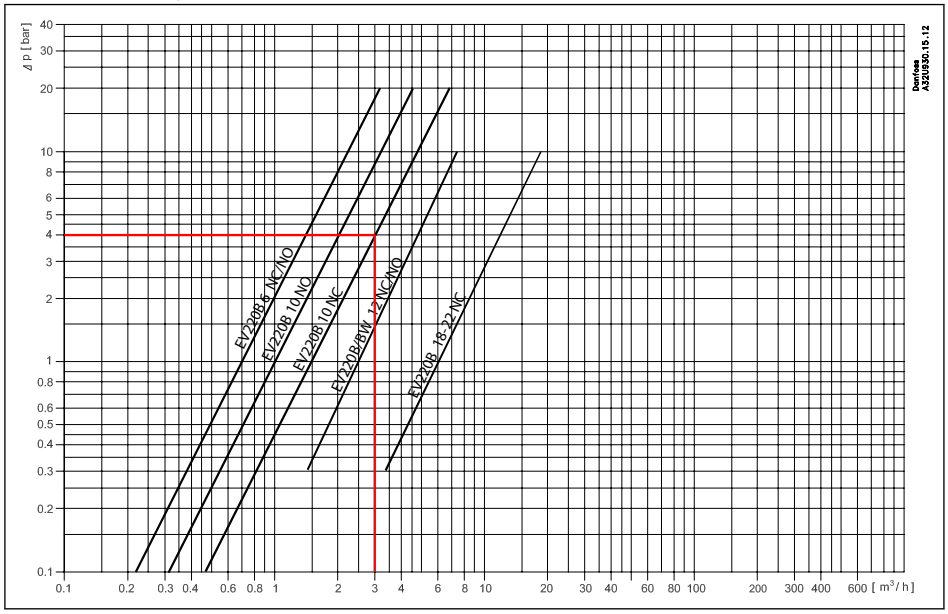
Table 3: Differential pressure range

Connection ISO228/1	Orifice size [mm]	Differential pressure, min. to max [bar]							
		NC				NO			
		BA/BD	BE/BE/BR/BY	BB/BE/BR/BY	BG	BA/BD	BE/BE/BR/BY	BB/BE/BR/BY	BG
		9 [W AC]	10 [W AC]	18 [W DC]	12 [W AC]/ 20 [W DC]	9 [W AC]	10 [W AC]	18 [W DC]	12 [W AC] / 20 [W DC]
G¼"	6	0.1 - 20		0.1 - 10	0.1 - 20	0.1 - 10			
G⅜"	6	0.1 - 20		0.1 - 10	0.1 - 20	0.1 - 10			
G⅜"	10	0.1 - 20		0.1 - 10	0.1 - 20	0.1 - 10			
G½"	10	0.1 - 20		0.1 - 10	0.1 - 20	0.1 - 10			
G½"	11.5	0.1 - 10		0.1 - 10	0.1 - 10				
G½"	12	0.3 - 10			0.3 - 10	0.3 - 10			
G¾"	18	0.3 - 10			0.3 - 10				
G1"	22	0.3 - 10			0.3 - 10				

Capacity diagram

Example, water: EV220B 10 NC, at 4 bar diff. pressure: Approx: 3 m^3/h

Figure 5: Capacity diagram



Time to open/close

Table 4: Time to open/close

Type	EV220B 6	EV220B 10	EV220B / BW 12	EV220B 18	EV220B 22
Time to open [ms](1)	40	50	60	200	200
Time to close [ms](1)	250	300	300	500	500

(1) The times are indicative and apply to water. The exact times will depend on the pressure conditions.

Materials

Table 5: Materials

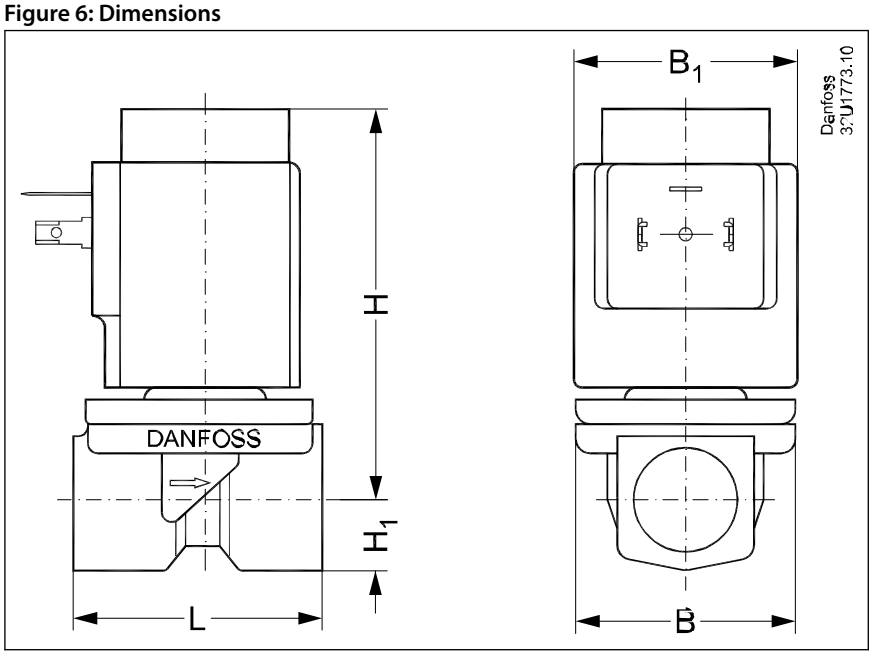
Components	Materials	Specifications
Valve body	Brass	W.no.2.0402
	DZR Brass	CNZn36Pb2AS (CZ132)
Armature	Stainless steel	W.no. 1.4105 / AISI 430FR
Armature tube	Stainless steel	W.no. 1.4306 / AISI 304L
Armature stop	Stainless steel	W.no. 1.4105 / AISI 430FR
Springs	Stainless steel	W.no. 1.4310 / AISI 301
O-rings	EPDM or FKM	
Valve plate	EPDM or FKM	
Diaphragm	EPDM or FKM	

4.2 Dimensions and weight

Table 6: Dimensions and weight: Brass, DZR brass, NC and NO

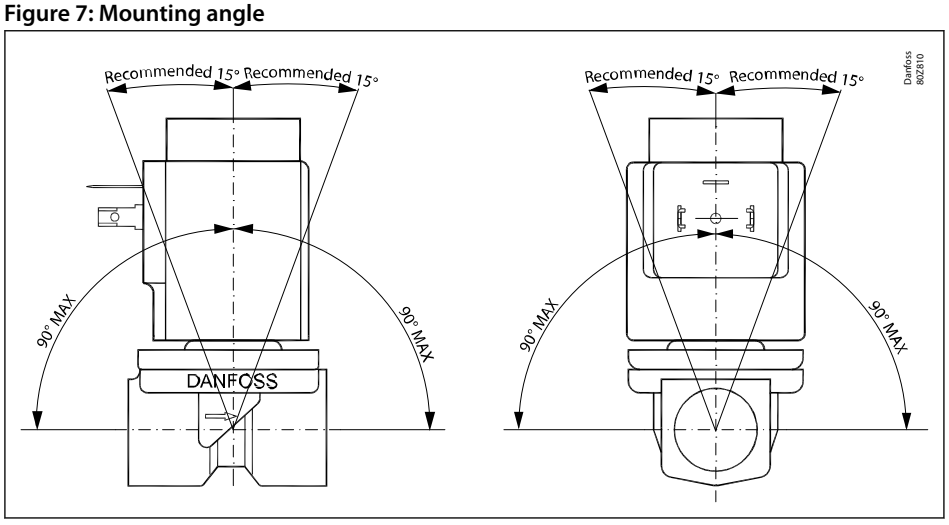
Type	Weight gross valve body without coil [kg]	L [mm]	B [mm]	B_1 [mm] / Coil type			H [mm]	H_1 [mm]
				BA	BB / BE	BG		
EV220B 6B	0.22	45.5	43.5	32	46	68	78	13
EV220B 10B	0.29	51.5	48	32	46	68	81	13
EV220B 11.5B	0.29	51.5	48	32	46	68	81	13
EV220B 12	0.35	58	54	32	46	68	81	13
EV220BW 12	0.35	58	54	32	46	68	81	13
EV220B 18B	0.65	90	60	32	46	68	87	22
EV220B 22B	0.65	90	60	32	46	68	91	22

Figure 6: Dimensions



4.3 Mounting

Figure 7: Mounting angle



5 Ordering

5.1 Parts program

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

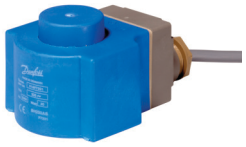
ISO228/1 connection	Orifice [mm]	K_v value [m^3/h]	Seal Material	Function			
				Brass		DZR brass	
				NC	NO	NC	NO
G1/4	6	0.7	EPDM	032U1236			
			FKM	032U1237			
G3/8			EPDM	032U1241	032U1238	032U5807	
			FKM	032U1242	032U1239		
	10	1.15	EPDM	032U1246		032U5809	
			FKM	032U1247			
G1/2			EPDM	032U1251		032U5810	
			FKM	032U1252			
		1.0	FKM		032U1249		
	11.5	2.3	EPDM	032U1279			
	12	2.5	EPDM	032U1256	132U1261		132U1267
			FKM	032U1255			
G3/4	18	6.0	EPDM	032U1261			
			FKM	032U1260			
G1	22		EPDM	032U1263			
			FKM	032U1266			

5.2 Accessories

Coils

Table 8: Coils used with EV220B 6 - EV220B 22

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
	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

Coil	Type	Power consumption	Enclosure	Features
	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

For further information and for ordering, see separate data sheet for coils.

Cable plug

Figure 8: 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 9: Universal electronic multi-timer, type ET20M

Table 10: Universal electronic multi-timer

Application	Voltage [V AC]	To use with coil	Ambient temperature [°C]	Code number
External adjustable timing from 1 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

Spare part

Table 11: Actuator kit NC brass

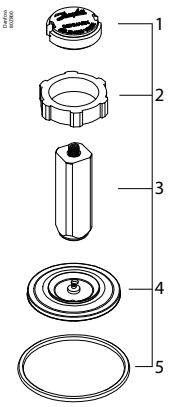
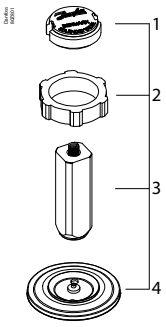
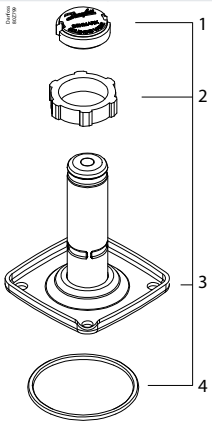
Type	Actuator kit NC			
	Sealing			
	EPDM	FKM	EPDM	FKM
EV220B 6B	032U1062	032U1063		
EV220B 10B-11.5B	032U1065			
EV220B 10B		032U1066		
EV220B 12B			032U1068	032U1067
EV220B 18B-22B			032U1070	032U1069
				
	1. Locking button 2. Nut for the coil 3. Armature with valve plate and spring 4. Diaphragm 5. O-ring		1. Locking button 2. Nut for the coil 3. Armature with valve plate and spring 4. Diaphragm	

Table 12: Assembled NO unit

Type	Assembled NO unit	
	Sealing	
	EPDM	FKM
EV220B 6B	032U0165	032U0166
EV220B 10B		032U0167
		
	1. Locking button 2. Locking nut 3. NO actuator unit 4. O-ring	

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