

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 [m³/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

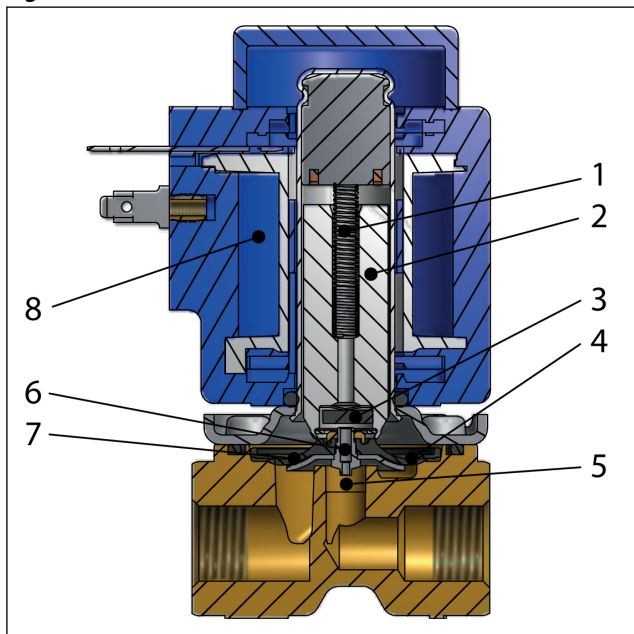
Coil voltage disconnected (closed)

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

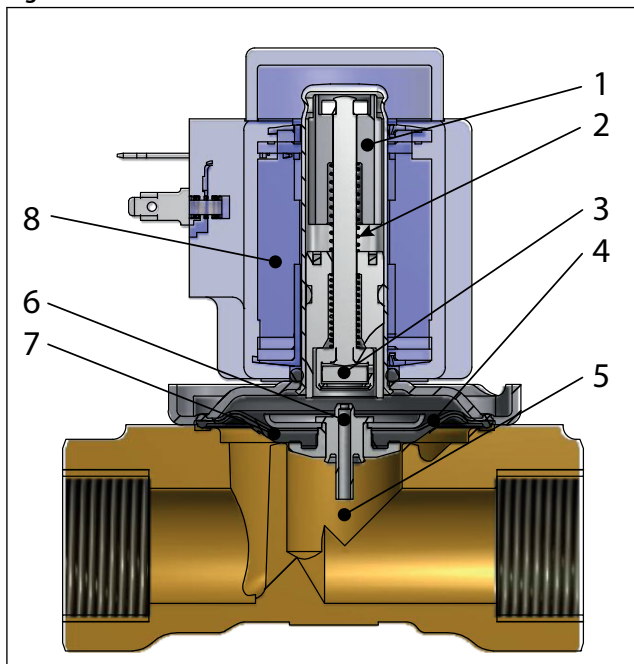
Coil voltage disconnected (open)

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

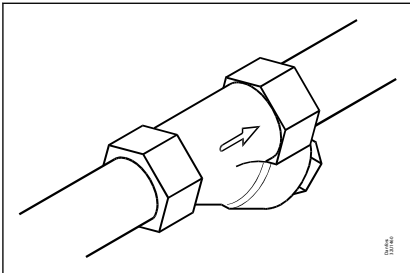


- | | |
|----|--------------------|
| 1. | Armature |
| 2. | Opening spring |
| 3. | Valve plate |
| 4. | Equalizing orifice |
| 5. | Main orifice |
| 6. | Pilot orifice |
| 7. | Diaphragm |
| 8. | Coil |

3 Applications

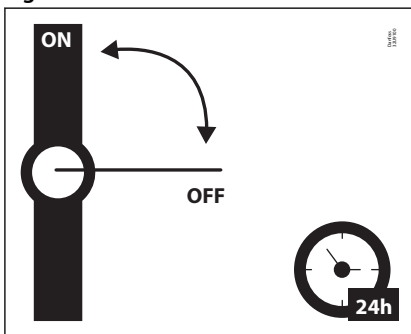
It is recommended to use a filter in front of the valve. Recommended filter 50 mesh (297 microns).

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 $\mu\text{S}/\text{cm}$ 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 [m³/h] | DN6 | 0.7m³/h | |
| | DN10 NC | 1.5 m³/h | |
| | DN10 NO | 1.0 m³/h | |
| | DN11.5 | 2.3 m³/h | |
| | DN12 | 2.5 m³/h | |
| | DN18 | 6.0 m³/h | |
| | DN22 | 6.0 m³/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

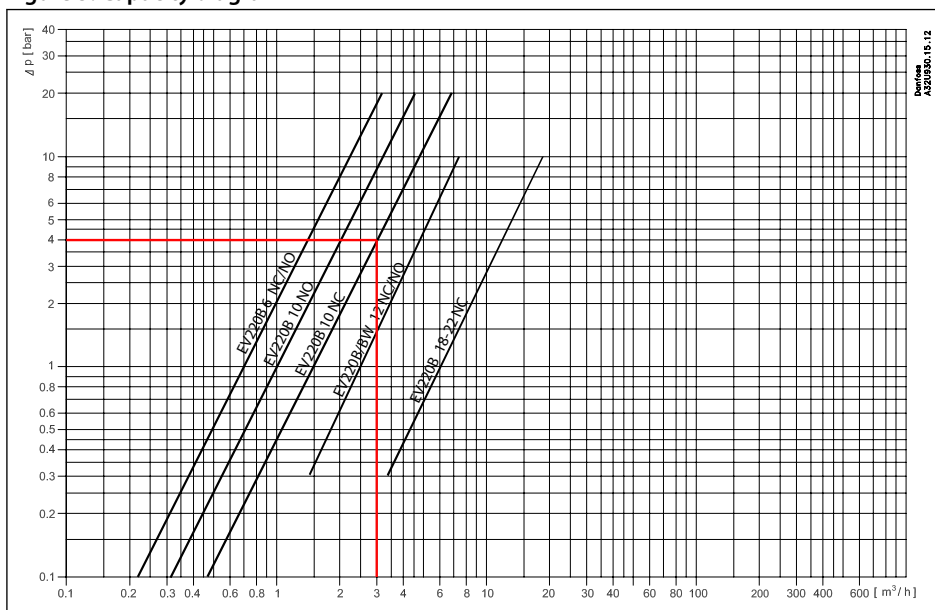
Table 3: Differential pressure range

| 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] |
| G1/4" | 6 | 0.1 - 20 | | 0.1 - 10 | 0.1 - 20 | 0.1 - 10 | | | |
| G3/8" | 6 | 0.1 - 20 | | 0.1 - 10 | 0.1 - 20 | 0.1 - 10 | | | |
| G3/8" | 10 | 0.1 - 20 | | 0.1 - 10 | 0.1 - 20 | 0.1 - 10 | | | |
| G1/2" | 10 | 0.1 - 20 | | 0.1 - 10 | 0.1 - 20 | 0.1 - 10 | | | |
| G1/2" | 11.5 | 0.1 - 10 | | 0.1 - 10 | 0.1 - 10 | | | | |
| G1/2" | 12 | 0.3 - 10 | | | 0.3 - 10 | 0.3 - 10 | | | |
| G3/4" | 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 m³/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

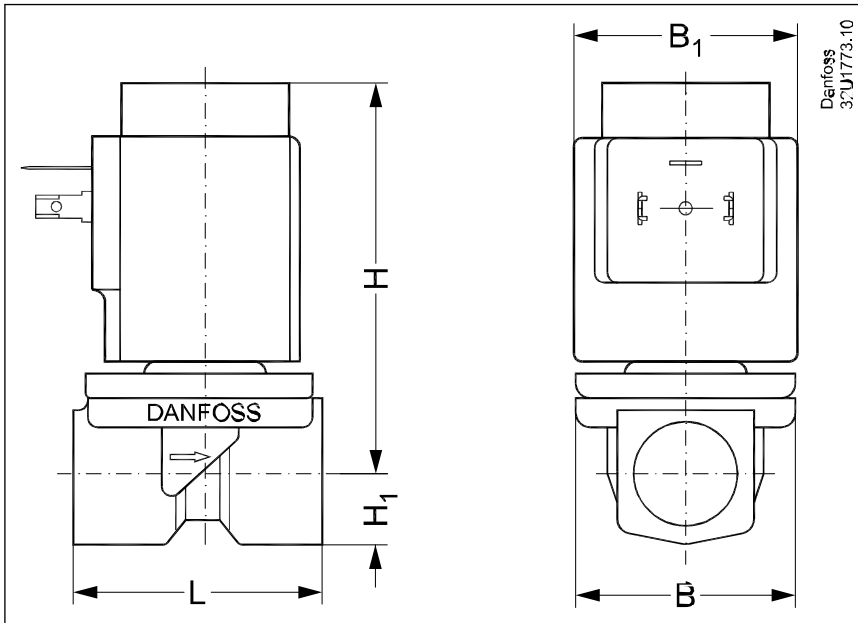
| Components | Materials | Specifications |
|----------------------|--------------------|------------------------------------|
| Valve body | Brass DZR Brass | W.no.2.0402 CNZn36Pb2AS (CZ132) |
| Armature | Stainless steel | W.no. 1.4105 / AISI 430FR |
| Armature tube | Stainless steel | W.no. 1.4306 / 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

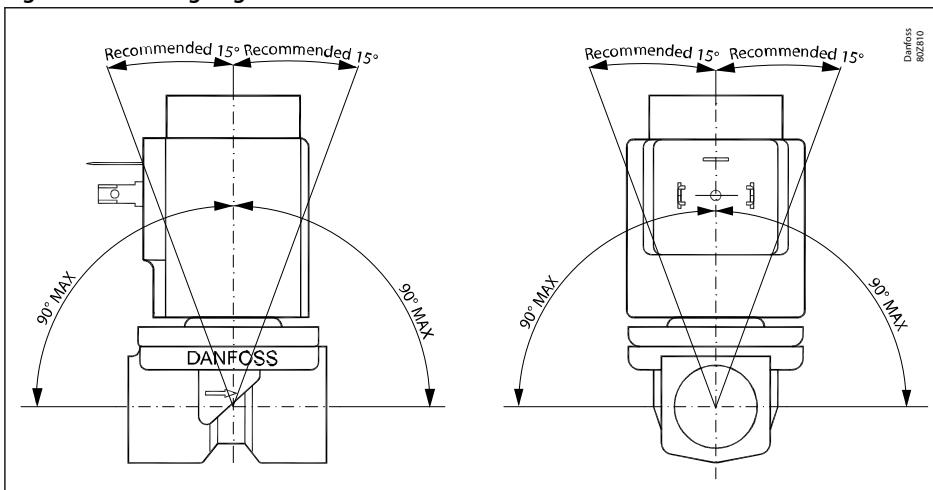
| Type | Weight gross valve body without coil [kg] | L [mm] | L [mm] | B ₁ [mm] / Coil type | | | H [mm] | H ₁ [mm] |
|--------------|---|--------|--------|---------------------------------|---------|----|--------|---------------------|
| | | | | BA | BB / BE | BG | | |
| EV220B 6B | 0.22 | 45.5 | 43.5 | 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 | | |
| G1/2 | 10 | 1.15 | EPDM | 032U1246 | | 032U5809 | | |
| | | | FKM | 032U1247 | | | | |
| | | | EPDM | 032U1251 | | 032U5810 | | |
| | | | FKM | 032U1252 | | | | |
| G1/2 | 11.5 | 2.3 | FKM | | 032U1249 | | | |
| | | | 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 | | | |


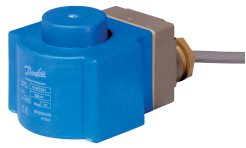

5.2 Accessories

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 |

Solenoid valve, Type EV220B and EV220BW

| 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

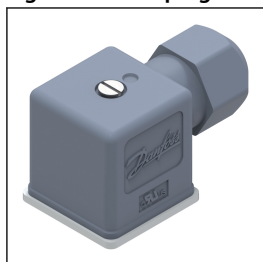


Table 9: Cable plug

| 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 |
| | | | | |
| | <ol style="list-style-type: none"> 1. Locking button 2. Nut for the coil 3. Armature with valve plate and spring 4. Diaphragm 5. O-ring | | <ol style="list-style-type: none"> 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 |
| | | |
| | <ol style="list-style-type: none"> 1. Locking button 2. Locking nut 3. NO actuator unit 4. O-ring | |

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