

Data Sheet

Solenoid valve
Type **EV250B**

Assisted lift operated 2/2-way valve program is use in closed circuits with low differential pressure



EV250B with assisted lift can operate from zero and up to 10 bar differential pressure.

This 2/2-way valve program is especially to use in closed circuits with low differential pressure, but demanding moderate flow rates.

Valve body in dezincification resistant brass for ensuring a long life even in connection with aggressive steam media.

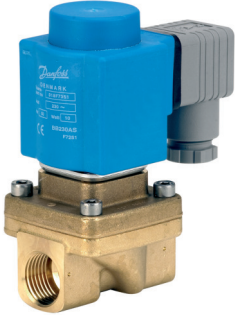
EV250B is compatible with the broad Danfoss coil program with enclosures from IP00 up to IP67. Medium temperatures up to 140 °C (low pressure steam).

Features and versions:

- For water, oil, compressed air and similar neutral media
- Clip on coil
- Ambient temperature: Up to 80 °C
- Coil enclosure: Up to IP67
- The valve can be used for rough vacuum
- Water hammer damped

1 Portfolio overview

Table 1: Portfolio overview

| Features | EV250B |
|--|---|
| |  |
| Body material | DZR Brass |
| DN [mm] | 10 - 22 |
| Connection | G $\frac{3}{8}$ " - G1" |
| Sealing material | EPDM, FKM |
| Function | NC, NO |
| Kv [m³/h] | 2.5 - 7 |
| Differential pressure range [bar] | 0 - 10 |
| Temperature range [°C] | -30 - 140 |

2 Functions

2.1 Function NC

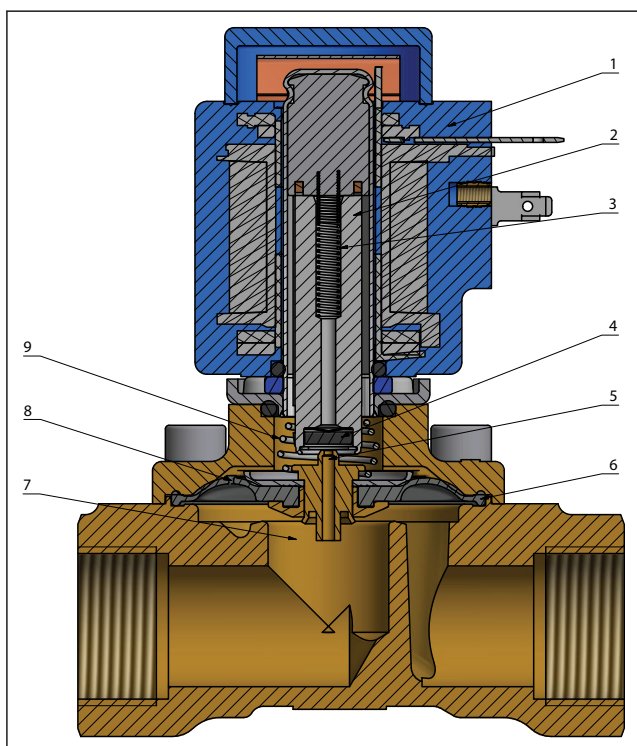
Coil voltage disconnected (closed):

When the supply voltage to the coil (1) is disconnected, the valve plate (4) is pressed down against the pilot orifice (5) by the closing spring (3). The pressure across the diaphragm (6) is built up via the equalizing orifice (8). The diaphragm closes the main orifice (7) as soon as the pressure across the diaphragm is equivalent to the inlet pressure below, due to the larger diameter of the upper side and/or the tension of the closing spring (3). The valve will be closed as long as the voltage to the coil is disconnected.

Coil voltage connected (open):

When voltage is applied to the coil, the armature (2) and the valve plate (4) are lifted clear of the pilot orifice (5).

If there is a differential pressure across the valve, the pressure above the diaphragm (6) drops as the pilot orifice is larger than the equalizing orifice. Therefore the diaphragm is lifted clear of the main orifice (7). If there is no differential pressure across the valve, the armature (2) draws the diaphragm (6) clear of the main orifice (7) using the assisted lift (9). The valve will be open for as long as there is voltage to the coil.



| | |
|---|--------------------|
| 1 | Coil |
| 2 | Armature |
| 3 | Closing spring |
| 4 | Valve plate |
| 5 | Pilot orifice |
| 6 | Diaphragm |
| 7 | Main orifice |
| 8 | Equalizing orifice |
| 9 | Assisted lift |

2.2 Function NO

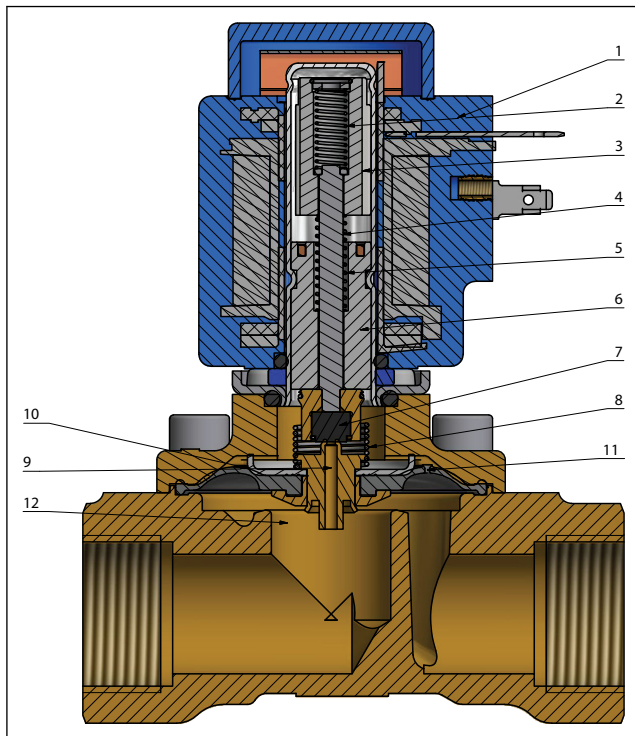
Coil voltage disconnected (valve is open):

When the supply voltage to the coil (1) is disconnected, the valve plate (7) are lifted clear of the pilot orifice (9) if there is a differential pressure across the valve. The pressure above the diaphragm (10) drops as the pilot orifice is larger than the equalizing orifice. Therefore the diaphragm is lifted clear of the main orifice (12). If there is no differential pressure across the valve, the opening spring (5) draws the diaphragm (10) clear of the main orifice (12) using the assisted lift (8). The valve will be open for as long as there is no voltage to the coil.

Coil voltage connected (valve is closed):

When the supply voltage to the coil (1) is connected, the armature (3) will compress the opening spring (5) and the closing spring will push the spindle (4)/ valve plate down against the pilot orifice (9). The pressure across the diaphragm (10) is built up via the equalising orifice (11). The diaphragm closes the main orifice (12) as soon as the pressure across the diaphragm is equivalent to the inlet pressure below, due to the larger diameter of the upper side and / or the tension of the closing spring (2). The valve will be closed as long as coil voltage is connected.

Solenoid valve, type EV250B

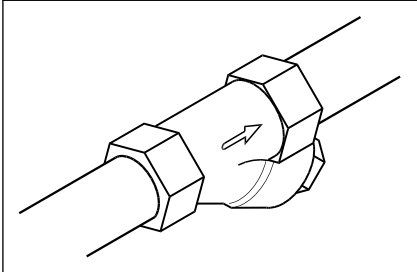


| | |
|----|--------------------|
| 1 | Coil |
| 2 | Closing spring |
| 3 | Armature |
| 4 | Spindle |
| 5 | Opening spring |
| 6 | Armature stop |
| 7 | Valve plate |
| 8 | Assisted lift |
| 9 | Pilot orifice |
| 10 | Diaphragm |
| 11 | Equalising orifice |
| 12 | Main orifice |

3 Applications

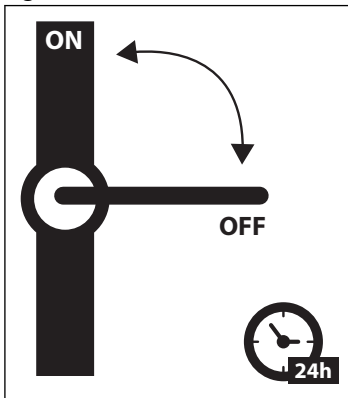
It is recommended to use a filter in front of the valve. Recommended filter 50 mesh (297 microns).

Figure 1: 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 2: 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

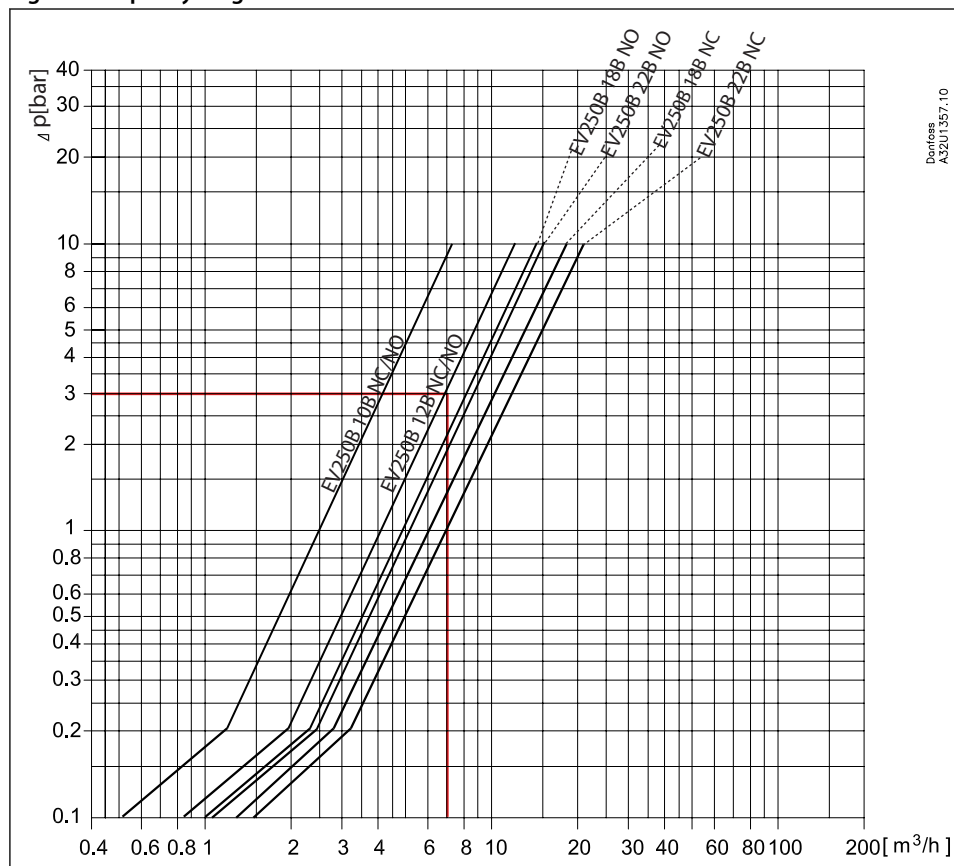
Table 2: Technical data

| | | |
|---|--|---------------------------------|
| Media | EPDM | Water |
| | FKM | Oil, air and water |
| Media temperature [°C] | EPDM | -30 °C - 120 °C at 0 - 10 bar |
| | FKM | 120 °C - 140 °C at 0 - 4 bar |
| Ambient temperature [°C] | Up to 80 °C | 0 - 100 °C, for water max 60 °C |
| Kv value [m³/h] | DN10 | 2.5 m³/h |
| | DN12 | 4 m³/h |
| | DN18 | 6 m³/h NC / 4.9 m³/h NO |
| | DN22 | 7 m³/h NC / 5.2 m³/h NO |
| Min. Opening differential pressure [bar] | 0 bar | |
| Max. Opening differential pressure [bar] | 10 bar | |
| Max. working pressure [bar] | 10 bar | |
| Max. test pressure [bar] | 15 bar | |
| Pressure | Pressure range can be extended to use in rough vacuum, typically up to 99% vacuum (10 mbar), depending on the application. | |
| Tightness | Internally: Better than 0.4 mbar l/sec (25 ccm air per min.) Externally: Better than 1* 10 ⁻³ mbar l/sec (100% He) | |
| Viscosity [cSt] | Max. 50 cSt | |

Capacity diagram

Example, water: EV250B 12 at differential pressure of 3 bar: Approx. 7 m³/h

Figure 3: Capacity diagram



Differential pressure range

Table 3: Differential pressure range

| Connection ISO228/1 | Function | Coil type BB, BE, BR, BY 10W AC BG 12W AC BG 20W DC BN 20W AC | Coil type BB/BE/BR/BY 18W DC ⁽¹⁾ |
|------------------------|----------|--|---|
| | | [Bar] | [Bar] |
| G $\frac{3}{8}$ - G1 | NC | 0-10 | 0-6 |
| | NO | 0-10 | 0-10 |

⁽¹⁾ 6 bar max. opening differential pressure is measured at 6% undervoltage (22.6 V DC hot coil), 50 °C ambient and 90 °C media temperature.

Time to open/close

Table 4: Time to open/close

| Main type | EV250B 10BD | EV250B 12BD | EV250B 18BD | EV250B 22BD |
|-----------------------------------|-------------|-------------|-------------|-------------|
| Time to open [ms] ⁽¹⁾ | 100 | 100 | 150 | 150 |
| Time to close [ms] ⁽¹⁾ | 100 | 100 | 100 | 100 |

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

Material

Table 5: Materials

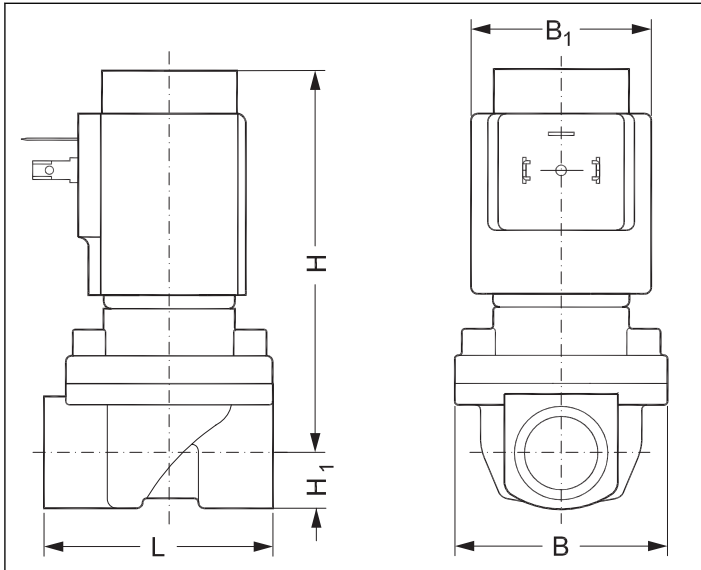
| Components | Materials | Specifications |
|-------------------------------|-----------------|----------------------------|
| Valve body | DZR Brass | CuZn36Pb2As/CZ 132 |
| Cover | Brass | W.no. 2.0402 |
| Armature/armature stop | Stainless steel | W. no. 1.4105 / AISI 430FR |
| Armature tube | Stainless steel | W. no. 1.4306 / AISI 304L |
| Springs | Stainless steel | W. no. 1.4310 / AISI 301 |
| O-ring | EPDM or FKM | |
| Valve plate | EPDM or FKM | |
| Diaphragm | EPDM or FKM | |

4.2 Dimensions and Weights

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

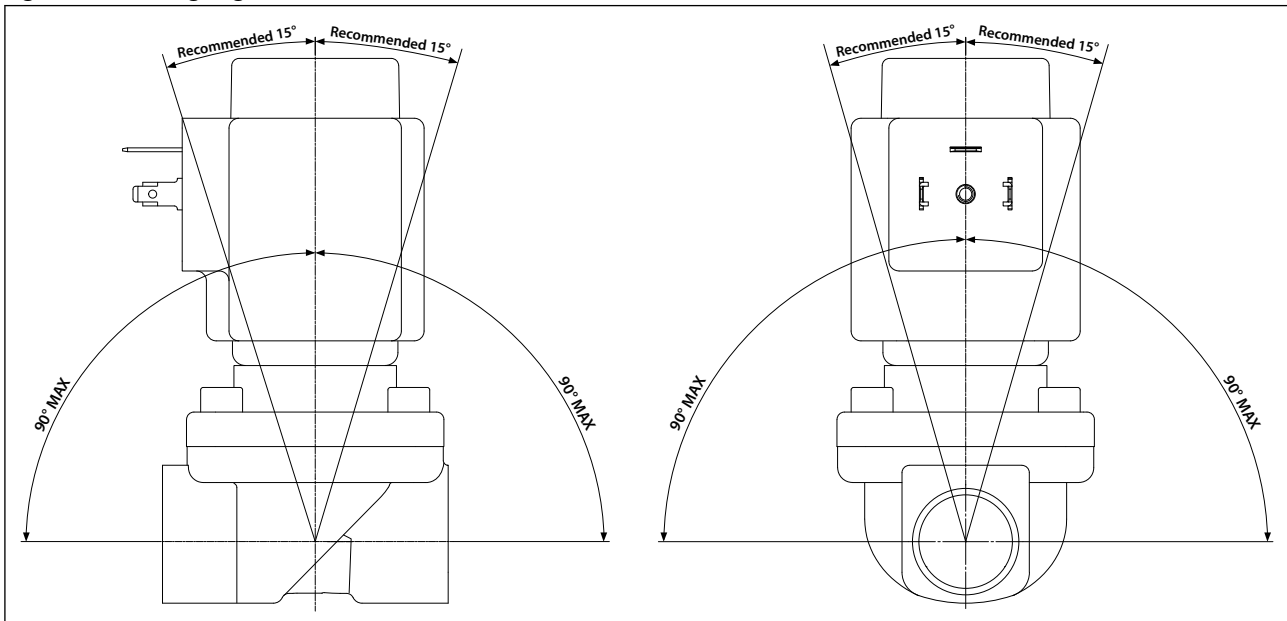
| Type | Weight gross, valve body without coil [kg] | L [mm] | B [mm] | B ₁ [mm] / Coil type | | H [mm] | H ₁ [mm] |
|-----------|--|--------|--------|---------------------------------|-------|--------|---------------------|
| | | | | BB/BE/BR/BY | BG/BN | | |
| EV250B 10 | 0.6 | 58 | 52.3 | 46 | 68 | 91 | 12.5 |
| EV250B 12 | 0.6 | 58 | 52.3 | 46 | 68 | 91 | 12.5 |
| EV250B 18 | 0.8 | 90.5 | 58 | 46 | 68 | 92 | 18 |
| EV250B 22 | 1.1 | 90 | 58 | 46 | 68 | 96.3 | 22.3 |

Figure 4: Dimensions



4.3 Mounting

Figure 5: Mounting angle



5 Ordering

5.1 Parts program

Table 7: DZR brass, valve body NC and NO

| Connection ISO228/1 | Seal Material | Orifice [mm] | Kv value [m³/h] | Function | |
|---------------------|---------------|-----------------|--------------------|----------|----------|
| | | | | NC | NO |
| G 3/8 | EPDM | 10 | 2.5 | 032U5250 | 032U5350 |
| | FKM | | | 032U5251 | 032U5351 |
| G 1/2 | EPDM | 12 | 4 | 032U5252 | 032U5352 |
| | FKM | | | 032U5253 | 032U5353 |
| G 3/4 | EPDM | 18 | 6 | 032U5254 | |
| | FKM | | | 032U5255 | |
| | EPDM | 4.9 | | 032U5354 | |
| | FKM | | | 032U5355 | |
| G 1 | EPDM | 22 | 7 | 032U5256 | |
| | FKM | | | 032U5257 | |
| | EPDM | 5.2 | | 032U5356 | |
| | FKM | | | 032U5357 | |

5.2 Accessories

Coils

Table 8: Below coils can be used with EV250B:

| Coil | Type | Power consumption | Enclosure | Features |
|------|------------------|------------------------------|---------------------------|--|
| | BB / BY, clip on | 11 - 16W AC 14 - 16W 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 - 16 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 ca- ble |

Solenoid valve, type EV250B

Cable plug

Figure 6: Cable plug

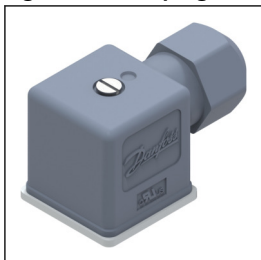


Table 9: Cable plug

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

Universal electronic multi-timer, type ET20M

Figure 7: ET20M



| 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 | BB | -10 – 50 | 042N0185 |

Solenoid valve, type EV250B

Spare parts

Table 10: Actuator units NC/NO DZR

| Type | Actuator unit NC | | Actuator unit NO | |
|----------------|---|--|--|----------|
| | EPDM | FKM | EPDM | FKM |
| EV250B 10-12BD | 032U5315 | 032U5271 | 032U5319 | 032U5320 |
| EV250B 18-22BD | 032U5317 | 032U5273 | 032U5321 | 032U5322 |
| | | | | |
| | <p>1. O-ring for coil 2. 4 x screws 3. Armature tube 4. O-ring 5. Cover NC actuator unit with: 6. Armature + spring 7. Assist spring 8. Diaphragm</p> | <p>1. O-ring NC actuator unit with: 2. Armature + spring 3. Assist spring 4. Diaphragm</p> | <p>1. O-ring for coil 2. 4 x screws Complete NO actuator unit with: 3. Armature tube 4. O-ring 5. Cover 6. Assist spring 7. Diaphragm</p> | |

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