Data sheet

2/2-way assisted lift operated solenoid valve
type EV250B

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
- Flow range: 0.5 – 20 m³/h
- Differential pressure: 0 – 10 bar
- Media temperature from -30 – 140 °C
- Ambient temperature: Up to 80 °C
- Coil enclosure: Up to IP67
- Thread connections: From G ¼ – G 1
- DN 10 – 22
- Viscosity: Up to 50 cst
- The valve can be used for rough vacuum
- Water hammer damped

- DZR brass version in NC and NO
- Also available with NPT thread
DZR brass valve body, NC

<table>
<thead>
<tr>
<th>Connection ISO228/1</th>
<th>Seal material</th>
<th>Orifice size</th>
<th>$k_v$ - value [m³/h]</th>
<th>Differential pressure min. to max. [bar] / coil type</th>
<th>Media temperature min. to max. [°C]</th>
<th>Code number</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3/8</td>
<td>EPDM</td>
<td>10</td>
<td>2.5</td>
<td>BB/BE 10W a.c. / BG 12 W a.c. / BG 20W d.c.</td>
<td>0 – 10</td>
<td>032US250</td>
</tr>
<tr>
<td></td>
<td>FKM</td>
<td></td>
<td></td>
<td>BB/BE 18W d.c.</td>
<td>-30 – 140</td>
<td>032US251</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 – 100</td>
<td>032US252</td>
</tr>
<tr>
<td>G1/2</td>
<td>EPDM</td>
<td>12</td>
<td>4</td>
<td>BG 12 W a.c.</td>
<td>-30 – 140</td>
<td>032US253</td>
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<tr>
<td></td>
<td>FKM</td>
<td></td>
<td></td>
<td></td>
<td>0 – 100</td>
<td>032US254</td>
</tr>
<tr>
<td>G 3/4</td>
<td>EPDM</td>
<td>18</td>
<td>6</td>
<td>BG 20W d.c.</td>
<td>-30 – 140</td>
<td>032US255</td>
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<tr>
<td></td>
<td>FKM</td>
<td></td>
<td></td>
<td></td>
<td>0 – 100</td>
<td>032US256</td>
</tr>
<tr>
<td>G 1</td>
<td>EPDM</td>
<td>22</td>
<td>7</td>
<td>BB/BE 18W d.c.</td>
<td>-30 – 140</td>
<td>032US257</td>
</tr>
<tr>
<td></td>
<td>FKM</td>
<td></td>
<td></td>
<td></td>
<td>0 – 100</td>
<td></td>
</tr>
</tbody>
</table>

1) EPDM is suitable for water.
   -30 – 120 °C: 0 – 10 bar
   120 – 140 °C: 0 – 4 bar
2) FKM is suitable for oil and air. For water at max. 60 °C.
3) Pressure range can be extended to use in rough vacuum, typically up to 99% vacuum (10 mbar), depending on the application.
4) 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.

DZR brass valve body, NO

<table>
<thead>
<tr>
<th>Connection ISO228/1</th>
<th>Seal material</th>
<th>Orifice size</th>
<th>$k_v$ - value [m³/h]</th>
<th>Differential pressure min. to max. [bar] / coil type</th>
<th>Media temperature min. to max. [°C]</th>
<th>Code number</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3/8</td>
<td>EPDM</td>
<td>10</td>
<td>2.5</td>
<td>BB/BE 10W a.c. / 18W d.c. / BG 12 W a.c. / 20W d.c. / BN 20 W a.c.</td>
<td>0 – 10</td>
<td>032US350</td>
</tr>
<tr>
<td></td>
<td>FKM</td>
<td></td>
<td></td>
<td>BG/BE 18W d.c.</td>
<td>-30 – 140</td>
<td>032US351</td>
</tr>
<tr>
<td></td>
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<td></td>
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<td></td>
<td>0 – 100</td>
<td>032US352</td>
</tr>
<tr>
<td>G1/2</td>
<td>EPDM</td>
<td>12</td>
<td>4</td>
<td>BG 12 W a.c. / 20W d.c.</td>
<td>-30 – 140</td>
<td>032US353</td>
</tr>
<tr>
<td></td>
<td>FKM</td>
<td></td>
<td></td>
<td></td>
<td>0 – 100</td>
<td>032US354</td>
</tr>
<tr>
<td>G 3/4</td>
<td>EPDM</td>
<td>18</td>
<td>4.9</td>
<td>BG 20W d.c. / 18W d.c. / BN 20 W a.c.</td>
<td>-30 – 140</td>
<td>032US355</td>
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<tr>
<td></td>
<td>FKM</td>
<td></td>
<td></td>
<td></td>
<td>0 – 100</td>
<td>032US356</td>
</tr>
<tr>
<td>G 1</td>
<td>EPDM</td>
<td>22</td>
<td>5.2</td>
<td>BB/BE 18W d.c. / 20W d.c.</td>
<td>-30 – 140</td>
<td>032US357</td>
</tr>
<tr>
<td></td>
<td>FKM</td>
<td></td>
<td></td>
<td></td>
<td>0 – 100</td>
<td></td>
</tr>
</tbody>
</table>

1) EPDM is suitable for water.
   -30 – 120 °C: 0 – 10 bar
   120 – 140 °C: 0 – 4 bar
2) FKM is suitable for oil and air. For water at max. 60 °C.
Solenoid valves, type EV250BD, dezincification resistant brass

Technical data, NC and NO

<table>
<thead>
<tr>
<th>Main type</th>
<th>EV250B 10BD</th>
<th>EV250B 12BD</th>
<th>EV250B 18BD</th>
<th>EV250B 22BD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to open [ms]</td>
<td>100</td>
<td>100</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Time to close [ms]</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

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

Installation

- Vertical solenoid system is recommended
- Max. test pressure: 25 bar

Tightness

- Internally: Better than 0.4 mbar l/sec (25ccm air per min.)
- Externally: Better than 1*10-3 mbar l/sec (100% He)

Viscosity

- Max. 50 cSt

Materials

- Valve body: DZR brass, CuZn36Pb2Au/CZ 132
- Cover: Brass, W.no. 2.0402
- 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 or FKM
- Valve plate: EPDM or FKM
- Diaphragm: EPDM or FKM
## Dimensions and weight: DZR brass, NC and NO

<table>
<thead>
<tr>
<th>Type</th>
<th>Weight gross, valve body without coil [kg]</th>
<th>L [mm]</th>
<th>B [mm]</th>
<th>B₁ [mm]</th>
<th>H [mm]</th>
<th>H₁ [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>EV250BD 10</td>
<td>0.6</td>
<td>58</td>
<td>52.3</td>
<td>46</td>
<td>68</td>
<td>91</td>
</tr>
<tr>
<td>EV250BD 12</td>
<td>0.6</td>
<td>58</td>
<td>52.3</td>
<td>46</td>
<td>68</td>
<td>91</td>
</tr>
<tr>
<td>EV250BD 18</td>
<td>0.8</td>
<td>90.5</td>
<td>58</td>
<td>46</td>
<td>68</td>
<td>92</td>
</tr>
<tr>
<td>EV250BD 22</td>
<td>1.1</td>
<td>90</td>
<td>58</td>
<td>46</td>
<td>68</td>
<td>96.3</td>
</tr>
</tbody>
</table>

### Dimensions

![Diagram of solenoid valve](image-url)
Solenoid valves, type EV250BD, dezincification resistant brass

Below coils can be used with EV250B:

<table>
<thead>
<tr>
<th>Coil</th>
<th>Type</th>
<th>Power consumption</th>
<th>Enclosure</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>BB, clip on</td>
<td>10 W a.c. 18 W d.c.</td>
<td>IP00 with spade connector</td>
<td>IP20 with protective cap, IP65 with cable plug</td>
<td></td>
</tr>
<tr>
<td>BE, clip on</td>
<td>10 W a.c. 18 W d.c.</td>
<td>IP67</td>
<td>With terminal box</td>
<td></td>
</tr>
<tr>
<td>BF, clip on</td>
<td>10 W a.c. 18 W d.c.</td>
<td>IP67</td>
<td>With 1 m cable</td>
<td></td>
</tr>
<tr>
<td>BG, clip on</td>
<td>12 W a.c. 20 W d.c.</td>
<td>IP67</td>
<td>With terminal box</td>
<td></td>
</tr>
<tr>
<td>BN, clip on</td>
<td>20 W 26 VA</td>
<td>IP67</td>
<td>Hum free With terminal box and 1 m cable</td>
<td></td>
</tr>
</tbody>
</table>
Solenoid valves, type EV250BD, dezincification resistant brass

Unversal electronic multi-timer, type ETM

<table>
<thead>
<tr>
<th>Application</th>
<th>Voltage</th>
<th>To use with coil</th>
<th>Ambient temperature [°C]</th>
<th>Code number</th>
</tr>
</thead>
<tbody>
<tr>
<td>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 175301-803-A</td>
<td>24 – 240 V a.c.</td>
<td>BB</td>
<td>-10 – 50</td>
<td>042N0185</td>
</tr>
</tbody>
</table>

- Outside adjustments
- Light weight and small size
- External adjustable timing from 1 minute to 45 minutes with 1 to 15 seconds drain open
- One solid state timer fits all coil voltages from 24–240 V a.c

Light diodes for indication
- All in one unit
- Manual override (test button)

Technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>ET 20 M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>24–240 V a.c / 50-60 Hz</td>
</tr>
<tr>
<td>Power rating</td>
<td>Max. 20 Watt</td>
</tr>
<tr>
<td>Enclosure</td>
<td>IP00, IP65 with cable plug</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>DIN connector (DIN 43650-A)</td>
</tr>
<tr>
<td>Ambient operating temperature range</td>
<td>-10 – 50 °C</td>
</tr>
<tr>
<td>Function</td>
<td>Start with pulse</td>
</tr>
<tr>
<td>Interval timer</td>
<td>1 – 45 min.</td>
</tr>
<tr>
<td>Weight</td>
<td>0.084 kg</td>
</tr>
</tbody>
</table>

Dimensions, ETM timer

![Dimensions diagram]
Solenoid valves, type EV250BD, dezincification resistant brass

Spare parts kit for NC
EPDM seal material

1. O-ring for coil
2. 4 screws
3. Complete NC actuator unit with:
   - Diaphragm
   - Assist spring
   - Armature
   - Closing spring
   - Cover
   - Armature tube

For valve type | Seal material | Code number
--- | --- | ---
EV250B 10 - 12BD | EPDM | 032U5315
EV250B 18 - 22BD | EPDM | 032U5317

The spare parts kit comprises:
- O-ring for coil
- 4 screws
- Complete NC actuator unit with:
  - Diaphragm
  - Assist spring
  - Armature
  - Closing spring
  - Cover
  - Armature tube

Spare parts kit for NC
FKM seal material

1. O-ring
2. Service element consisting of an armature with:
   - Valve plate
   - Spring fitted on the diaphragm

For valve type | Seal material | Code number
--- | --- | ---
EV250B 10 - 12BD | FKM | 032U5271
EV250B 18 - 22BD | FKM | 032U5273

The spare parts kit comprises:
- O-ring
- Service element consisting of an armature with:
  - Valve plate
  - Spring fitted on the diaphragm

Spare parts kit for NO

1. O-ring for coil
2. 4 screws
3. Complete NO actuator unit with:
   - Diaphragm
   - Assist spring
   - NO armature unit and cover

For valve type | Seal material | Code number
--- | --- | ---
EV250B 10 - 12BD | EPDM | 032U5319
EV250B 10 - 12BD | FKM | 032U5320
EV250B 18 - 22BD | EPDM | 032U5321
EV250B 18 - 22BD | FKM | 032U5322

The spare parts kit comprises:
- O-ring for coil
- 4 screws
- Complete NO actuator unit with:
  - Diaphragm
  - Assist spring
  - NO armature unit and cover
**Function NO**

1. Coil
2. Closing spring
3. Armature
4. Valve plate
5. Opening spring
6. Armature stop
7. Valve plate
8. Assisted lift
9. Equalising orifice
10. Main orifice

**Coil voltage disconnected (valve is open):**
When the supply voltage to the coil (1) is disconnected, the valve plate (4) is lifted clear of the pilot orifice (5) if there is a differential pressure across the valve. If there is no differential pressure across the valve, the armature (2) and the valve plate (4) are lifted clear of the pilot orifice (5).

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.

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

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 closed as long as there is voltage to the coil.

**Function NC**

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

**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).

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.
Capacity diagram:

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