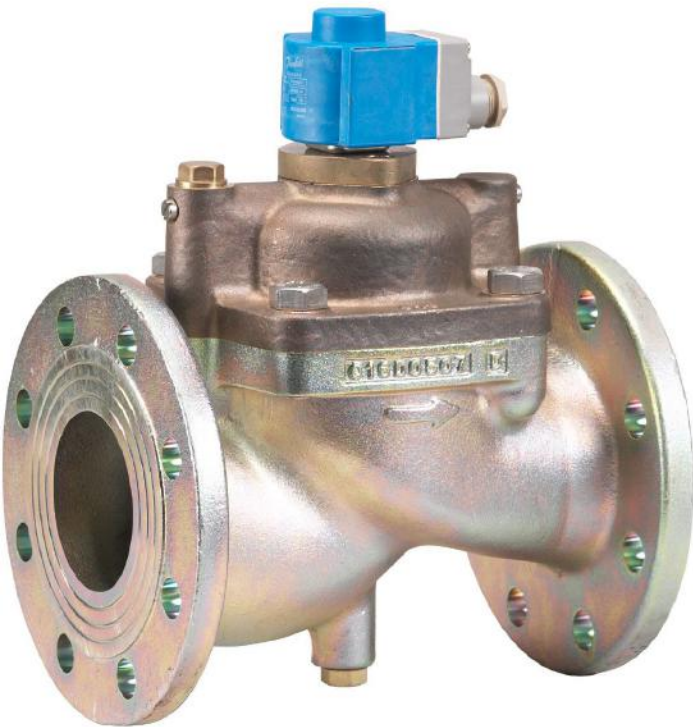


Data Sheet

# Solenoid valves

## Type **EV220B**

**EV220B 65 - 100:** Valves for high capacity applications


EV220B 65 - EV220B 100 is a 2/2-way solenoid valve program for use in robust industrial applications, demanding high flow rates. The valve is designed with cast iron valve body and flanged connection. Water-hammer damped design and built-in pilot filter ensures a reliable operation.

**Features**

- For water and similar neutral media
- Clip on coil
- Ambient temperature: Up to 80 °C
- Coil enclosure: Up to IP67
- Water hammer damped
- Built-in filter for protection of pilot system

## 1 Portfolio overview

Table 1: Portfolio overview

| Features                                 | EV220B 65 - EV220B 100   |
|--|--|
|  |  |
| <b>Body material</b>                     | Cast iron  |
| <b>DN [mm]</b>                           | 65 - 80  |
| <b>Connection</b>                        | G21/2, G3, G4  |
| <b>Sealing material</b>                  | EPDM, NBR  |
| <b>Function</b>                          | NC   |
| <b>K<sub>v</sub> [m<sup>3</sup>/h]</b>   | 50 - 130   |
| <b>Differential pressure range [bar]</b> | 0.25 - 10  |
| <b>Temperature range [°C]</b>            | -25 - 90   |

## 2 Function

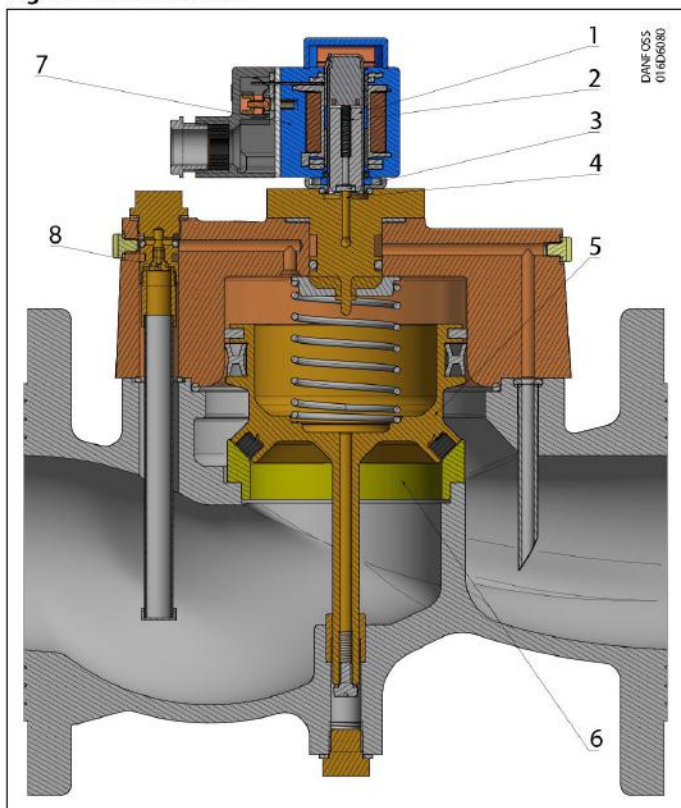
### Coil voltage disconnected (closed)

When the voltage is disconnected, the valve plate (3) is pressed down against the pilot orifice (4) by the pilot system's closing spring (2). The pressure across the servo piston (5) is built up via the equalizing orifice (8). The servo piston closes the main orifice (6) as soon as the pressure across the piston 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 (7), the armature (1) and the valve plate (3) are lifted clear of the pilot orifice (4). As the pilot orifice is larger than the equalizing orifice (8), the pressure across the servo piston (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 there is voltage to the coil.

Figure 1: Function NC

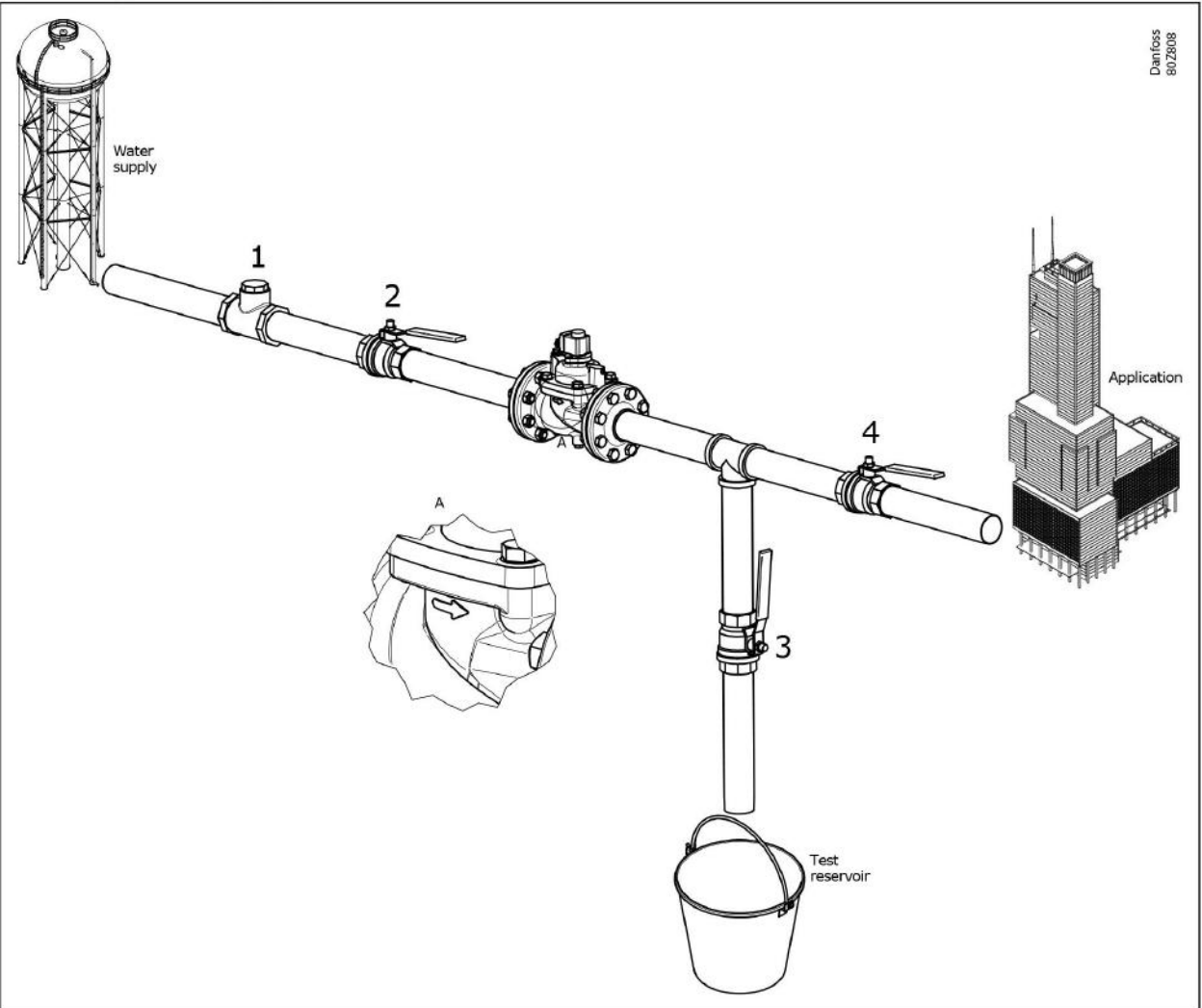


- |    |                                |
|----|--------------------------------|
| 1. | Armature                       |
| 2. | Closing spring in pilot system |
| 3. | Valve plate                    |
| 4. | Pilot orifice                  |
| 5. | Servo piston                   |
| 6. | Main orifice                   |
| 7. | Coil                           |
| 8. | Equalizing orifice             |

3 Application

3.1 Application for EV220B 65 - EV220B 100

Figure 2: Application diagram

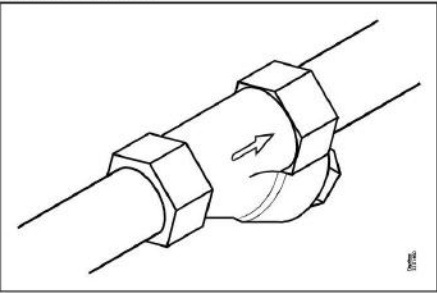


- 1. Filter
- 2. Ball valve, Water supply
- 3. Ball valve, Test reservoir
- 4. Ball valve, Application

Recommendations

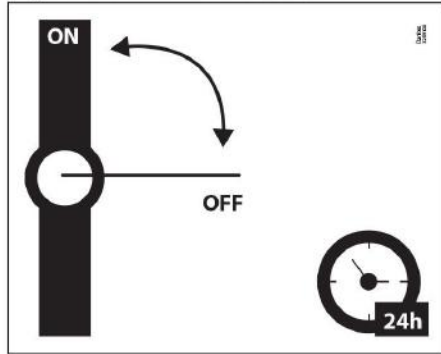
It is recommended to use a filter in front of the valve. Recommended filter 50 mesh (297 microns).

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

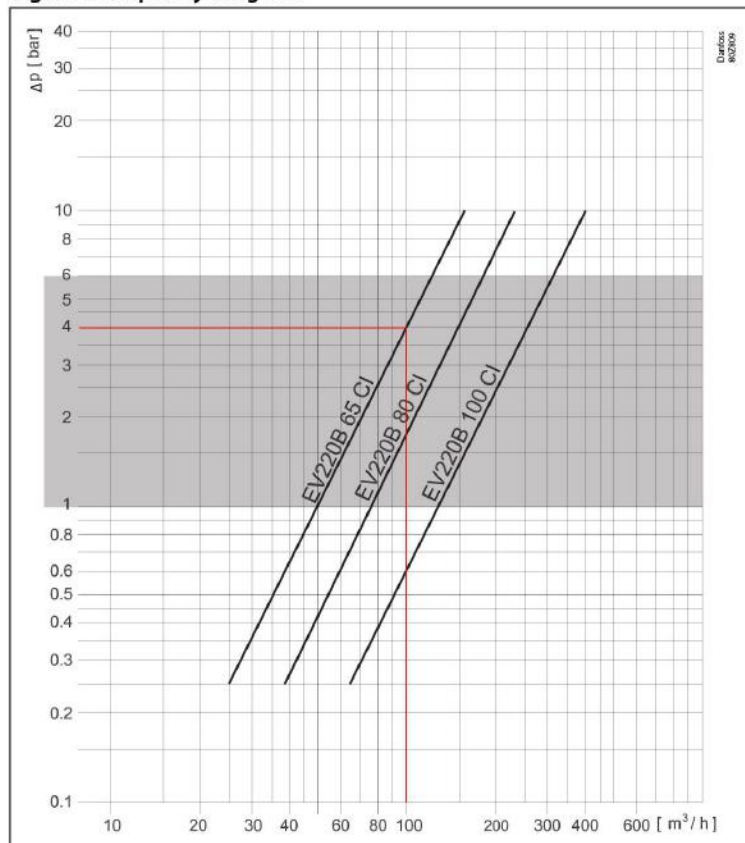
|  |             |                         |
|--|-------------|-------------------------|
| Media                                    | EPDM        | Water, brine and glycol |
|  | NBR         | Air and oil             |
| Media temperature [°C]                   | EPDM/NBR    | -25-90 °C               |
| Ambient temperature [°C]                 | Up to 80 °C |                         |
| K <sub>v</sub> value [m <sup>3</sup> /h] | DN65        | 50 m <sup>3</sup> /h    |
|  | DN80        | 75 m <sup>3</sup> /h    |
|  | DN100       | 130 m <sup>3</sup> /h   |
| Min. Opening differential pressure [bar] | 0.25 Bar    |                         |
| Max. Opening differential pressure [bar] | 10 Bar      |                         |
| Max working pressure [bar]               | 10 Bar      |                         |
| Max test pressure [bar]                  | 15 bar      |                         |
| Viscosity [cSt]                          | Max. 50 cSt |                         |

### Capacity diagram

Recommended operating range: Grey area 1-6 bar differential pressure

**Example, water:** Capacity for EV220B 65 at differential pressure of 4 bar: Approx. 100 m<sup>3</sup>/h

Figure 5: Capacity diagram



### Time to open/close

Table 3: Time to open/close

| Main type                        | EV220B 65 | EV220B 80 | EV220B 100 |
|----------------------------------|-----------|-----------|------------|
| Time to open [s] <sup>(1)</sup>  | 5         | 5         | 5          |
| Time to close [s] <sup>(1)</sup> | 7         | 15        | 29         |

<sup>(1)</sup> The times are indicative and apply to water.

## Materials

Table 4: Materials

| Components    | Materials       | Specifications                       |
|---------------|-----------------|--------------------------------------|
| Valve body    | Cast iron       | W.no. 0.6020                         |
| Armature      | Stainless steel | W.no. 1.4105/AISI 430L               |
| Armature tube | Stainless steel | W.no. 1.4306/AISI 304L               |
| Springs       | Stainless steel | W.no. 1.4310/AISI 301                |
| Pilot body    | Brass           |                                      |
| Ring          | Copper          |                                      |
| Sealing       | EPDM version    | NBR, Cetellen WS3820, PTFE, EPDM, CR |
|               | NBR version     | NBR, centellen WS3820, PTFE          |

## 4.2 Dimensions and weights

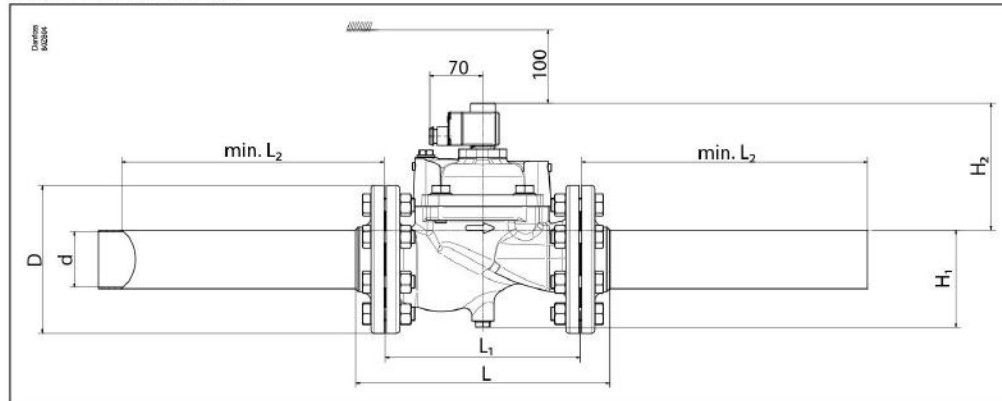
Table 5: Dimensions and weight

| Type       | L [mm] | L <sub>1</sub> [mm] | Required min. L <sub>2</sub> <sup>(1)</sup> [mm] | B <sub>1</sub> [mm] Coil type |    | øD [mm] | H <sub>1</sub> [mm] | H <sub>2</sub> [mm] | Weight without coil [kg] | Required min. inside tube diameter d <sup>(2)</sup> [mm] |
|------------|--------|---------------------|--|-------------------------------|----|---------|---------------------|---------------------|--------------------------|--|
|            |        |                     |  | BB/BE                         | BG |         |                     |                     |                          |  |
| EV220B 65  | 320    | 224                 | 300  | 46                            | 66 | 185     | 85                  | 185                 | 24                       | 65   |
| EV220B 80  | 370    | 265                 | 350  | 46                            | 66 | 200     | 93                  | 215                 | 34                       | 80   |
| EV220B 100 | 430    | 315                 | 400  | 46                            | 66 | 220     | 103                 | 240                 | 44                       | 100  |

<sup>(1)</sup> Avoid closing problems caused by turbulent flow it is required to have a straight tube on both sides of the valve.

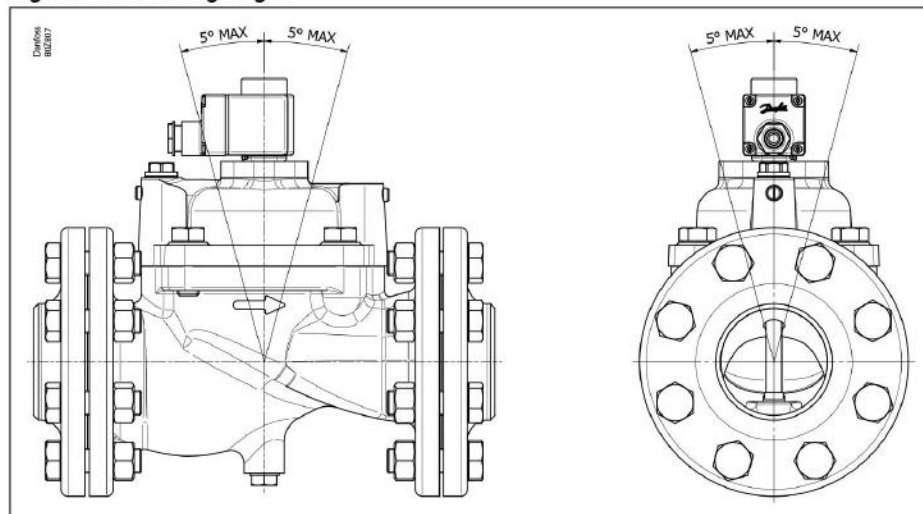
<sup>(2)</sup> Required to keep same tube size for entire application, same or bigger inside diameter as valve orifice 65 / 80 / 100 mm.

Figure 6: Dimensions



## 4.3 Mounting

Figure 7: Mounting angle



## 5 Ordering

### 5.1 Parts program

Table 6: Cast iron, valve body NC

| ISO228/1 connection | Seal Material | Orifice | K <sub>v</sub> value | Function |
|---------------------|---------------|---------|----------------------|----------|
|                     |               | [mm]    | [m <sup>3</sup> /h]  | NC       |
| G2 1/2              | EPDM          | 65      | 50                   | 016D6065 |
|                     | NBR           |         |                      | 016D3330 |
| G3                  | EPDM          | 80      | 75                   | 016D6080 |
|                     | NBR           |         |                      | 016D3331 |
| G4                  | EPDM          | 100     | 130                  | 016D6100 |

### 5.2 Accessories

#### Coils

Table 7: Below coils can be used with EV220B

| Coil   | Type        | Power consumption | Enclosure                 | Features                                       |
|--|-------------|-------------------|---------------------------|--|
|    | BB, clip on | 10 W AC 18 W DC   | IP00 with spade connector | IP20 with protective cap, IP65 with cable plug |
|  | BE, clip on | 10 W AC 18 W DC   | IP67                      | With terminal box                              |
|  | BG, clip-on | 12 W AC 20 W DC   | IP67                      | With terminal box                              |

#### Cable plug

Figure 8: Cable plug



Table 8: Cable plug

| Application  | Code number |
|--|-------------|
| GDM 2011 (grey) cable plug according to DIN 43650-A PG11 | 042N0156    |



## Universal electronics multi-timer, type ET20M

Figure 9: Universal electronic multi-timer, type ET20M



Table 9: EV220B 65-100

| Application   | Voltage [V AC] | To use with coil | Ambient temperature [°C] | Code no. |
|---|----------------|------------------|--------------------------|----------|
| 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 |

## Flange set

Figure 10: Flange set

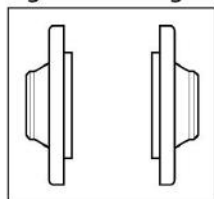


Table 10: Flange

| Connection                                    | Type       | Code number |
|---|------------|-------------|
| 2 1/2 weld type 11 according to DIN EN 1092-1 | EV220B 65  | 027N3065    |
| 3 weld type 11 according to DIN EN 1092-1     | EV220B 80  | 027N3080    |
| 4 weld type 11 according to DIN EN 1092-1     | EV220B 100 | 027N3100    |

## Manual override kit, hand operated

Figure 11: Manual override kit

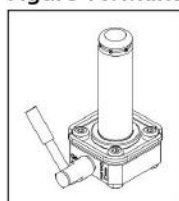


Table 11: Manual override

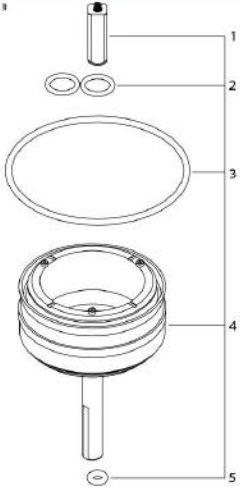
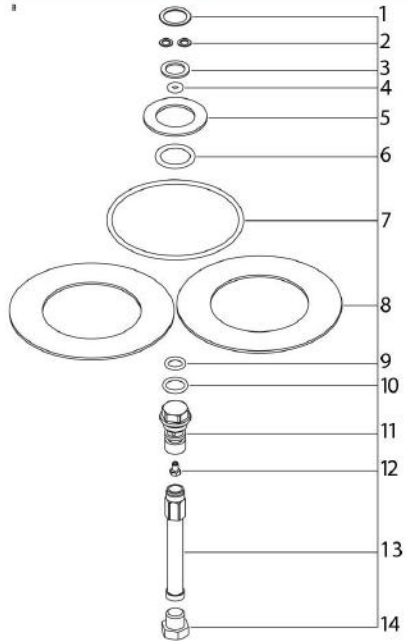
| Seal material | Description   | Code number |
|---------------|---|-------------|
| EPDM          | Manuel override kit. used for manuel override in event of power failure.]<br>Note: Valve height is increased by 16 mm | 032U7390    |

### 5.3 Spare part kit

Table 12: Spare part kit and seal kit

| Type       | Spare part kit EPDM | Spare part kit NBR | Seal kit EPDM | Seal kit NBR |
|------------|---------------------|--------------------|---------------|--------------|
| EV220B 65  | 016D0078            | 016D0095           | 016D0075      | 016D0084     |
| EV220B 80  | 016D0079            | 016D0096           | 016D0076      | 016D0085     |
| EV220B 100 | 016D0080            |                    | 016D0077      | 016D0086     |

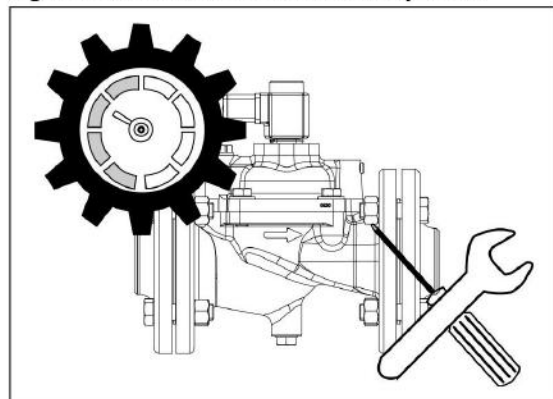
|  |  |
|--|--|
|   |   |
| <ol style="list-style-type: none"> <li>1. Armature +Spring</li> <li>2. 2x O-ring</li> <li>3. O-ring</li> <li>4. Piston</li> <li>5. O-ring</li> </ol> | <ol style="list-style-type: none"> <li>1. Steam gasket</li> <li>2. 2x Sealing</li> <li>3. Sealing</li> <li>4. O-ring</li> <li>5. Rubber gasket</li> <li>6. O-ring</li> <li>7. O-ring</li> <li>8. 2x Steam gasket</li> <li>9. O-ring</li> <li>10. O-ring</li> <li>11. Filter holder</li> <li>12. Orifice</li> <li>13. Filter</li> <li>14. Drain plug</li> </ol> |

For detailed guidance see installation guides for EV220B 65-100 valve, spare part kit and seal kit.

### 5.4 Maintenance

Maintenance/Inspection every 6 to 12 months recommended.

Figure 12: Periodic maintenance/inspection



**Before starting maintenance/inspection be sure:**

- Coil is not energized when removed from the armature tube.
- System/solenoid valve is not pressurized. Eventually close ball valves on each side of the valve.
- Be sure any pumps on the upstream (inlet supply) will not be energized or a pressure sensor or switch will not start the pump.
- After cleaning and service, eventually with Danfoss spare part kit, it is recommended to lubricate piston and piston sealing with a thin layer of lubrication included into the spare part kit.

Frequency and maintenance depend largely on the application and the medium used in the valve. Mechanical contaminants, iron,

excessive mineralization, through the valve or may cause problems with the operation of the valves. All maintenance and repair

work should be carried out by technically trained personnel who are familiar with the operation of the installation. In case of large impurities visible on the filter, piston scale and cover, other impurities inside the valve, the frequency of inspections should be increased.

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