

## Data Sheet

Solenoid valve  
Type **EV225B**

Servo diaphragm operated for steam applications



EV225B is a servo-operated 2/2-way solenoid valve for use in steam applications.

The design is based on a PTFE diaphragm concept, ensuring highly reliable function when used in connection with contaminated steam.

Each valve body is made of dezincification resistant brass and the valve seats are made of stainless steel.

This ensures a long life even in when used with highly aggressive steam.

**Features and versions**

- Specifically designed for steam applications, 160 °C or 185 °C
- Clip on coil
- Ambient temperature: up to 40 °C
- Coil enclosure: up to IP65
- EV225B used with BQ coil:  
AC voltage up to 185 °C
- EV225B used with BN coil:  
DC voltage up to 160 °C
- EV225B used with BB coil:  
AC voltage up to 160 °C  
DC voltage up to 140 °C
- Connection: ISO 228/1

## 1 Portfolio overview

Table 1: Portfolio overview

| Features                                 | EV225B                                                                            |                                                                                    |                                                                                     |
|------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                          |  |  |  |
| <b>Body material</b>                     | DZR brass                                                                         | DZR brass                                                                          | DZR brass                                                                           |
| <b>DN [mm]</b>                           | 6-25                                                                              | 10-25                                                                              | 10-25                                                                               |
| <b>Connection</b>                        | G1/4" - G1"                                                                       | G1/2"-G1"                                                                          | G1/2"-G1"                                                                           |
| <b>Sealing material</b>                  | PTFE                                                                              | PTFE                                                                               | PTFE                                                                                |
| <b>Function</b>                          | NC                                                                                | NC                                                                                 | NC                                                                                  |
| <b>K<sub>v</sub> [m<sup>3</sup>/h]</b>   | 0.9 - 6.0                                                                         | 2.2 - 6.0                                                                          | 2.2 - 6.0                                                                           |
| <b>Differential pressure range [bar]</b> | 0.2 - 10                                                                          | 0.2-10                                                                             | 0.2 - 5                                                                             |
| <b>Temperature range [°C]</b>            | 0 - 185                                                                           | 0 - 185                                                                            | 0 - 160                                                                             |

## 2 Functions

### 2.1 Function NC

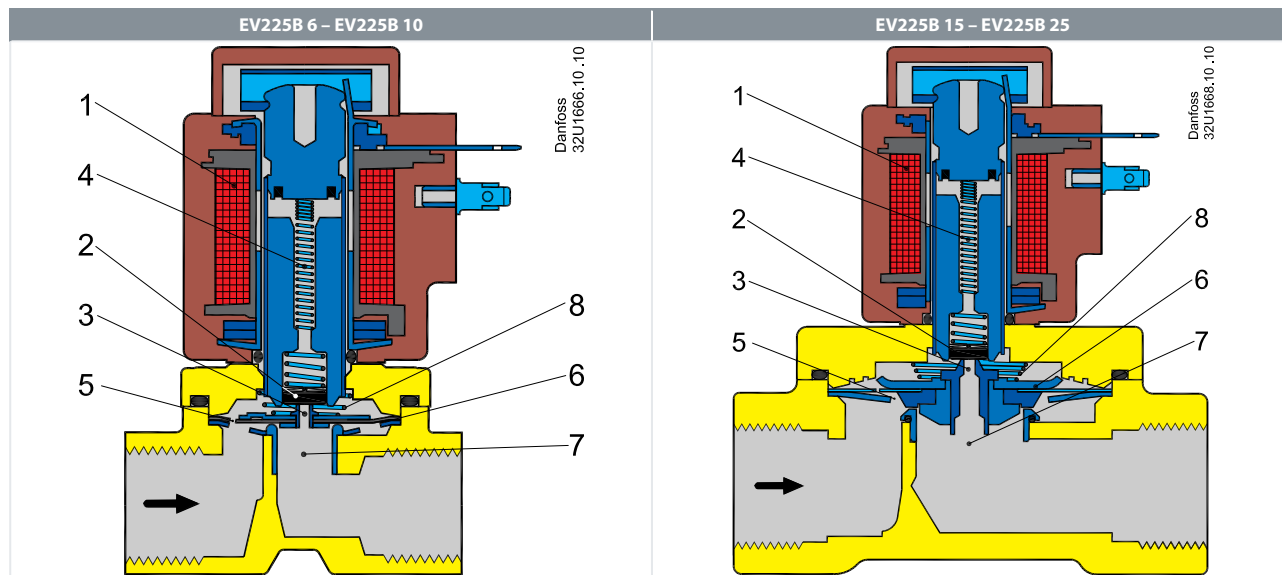
#### Coil voltage disconnected (closed)

When the voltage is disconnected, the valve plate (2) is pressed down against the pilot orifice (3) by the armature spring (4). The pressure across the diaphragm (6) is built up via the equalizing orifice (5). The diaphragm/piston closes the main orifice (7) as soon as the pressure across the diaphragm/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 (1), the pilot orifice (3) is opened. As the pilot orifice is larger than the equalizing orifice (5), the pressure across the diaphragm (6) drops and therefore it is lifted clear of the main orifice (7). The valve is now open for unimpeded flow 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.

Table 2: Function NC

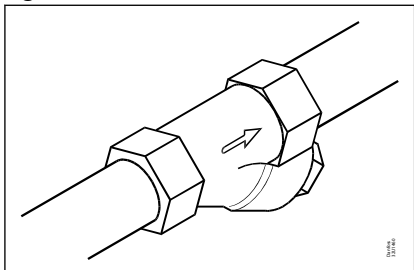


|    |                    |
|----|--------------------|
| 1. | Coil               |
| 2. | Valve plate        |
| 3. | Pilot orifice      |
| 4. | Armature spring    |
| 5. | Equalizing orifice |
| 6. | Diaphragm          |
| 7. | Main orifice       |
| 8. | Closing spring     |

### 3 Applications

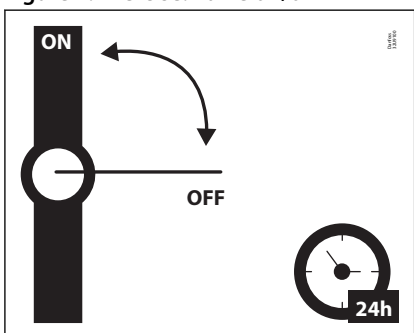
It is recommended to use a filter in front of the valve. Recommended filter 50 mesh (297 microns).

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 3: Technical data

|                                                                   |                                                    |                      |
|-------------------------------------------------------------------|----------------------------------------------------|----------------------|
| Media                                                             | PTFE                                               | Steam 160°C or 185°C |
| Media temperature [°C] (Depending on which type of coil you used) | AC coil                                            | 0-185°C              |
|                                                                   | DC coil                                            | 0-160°C              |
| Ambient temperature [°C]                                          | Max. 40 °C at a medium temperature of 185 °C       |                      |
| K <sub>v</sub> value [m³/h]                                       | DN6                                                | 0.9 m³/h             |
|                                                                   | DN10                                               | 2.2 m³/h             |
|                                                                   | DN15                                               | 3.0 m³/h             |
|                                                                   | DN20                                               | 5.0 m³/h             |
|                                                                   | DN25                                               | 6.0 m³/h             |
| Min. Opening differential pressure [bar]                          | 0.2 bar                                            |                      |
| Max. Opening differential pressure [bar]                          | Up to 10 bar                                       |                      |
| Max. working pressure [bar]                                       | Up to 10 bar (Equal to max. differential pressure) |                      |
| Max. test pressure [bar]                                          | 25 bar (UL 429: 24.1 bar)                          |                      |
| Viscosity [cSt]                                                   | Max. 50 cSt                                        |                      |

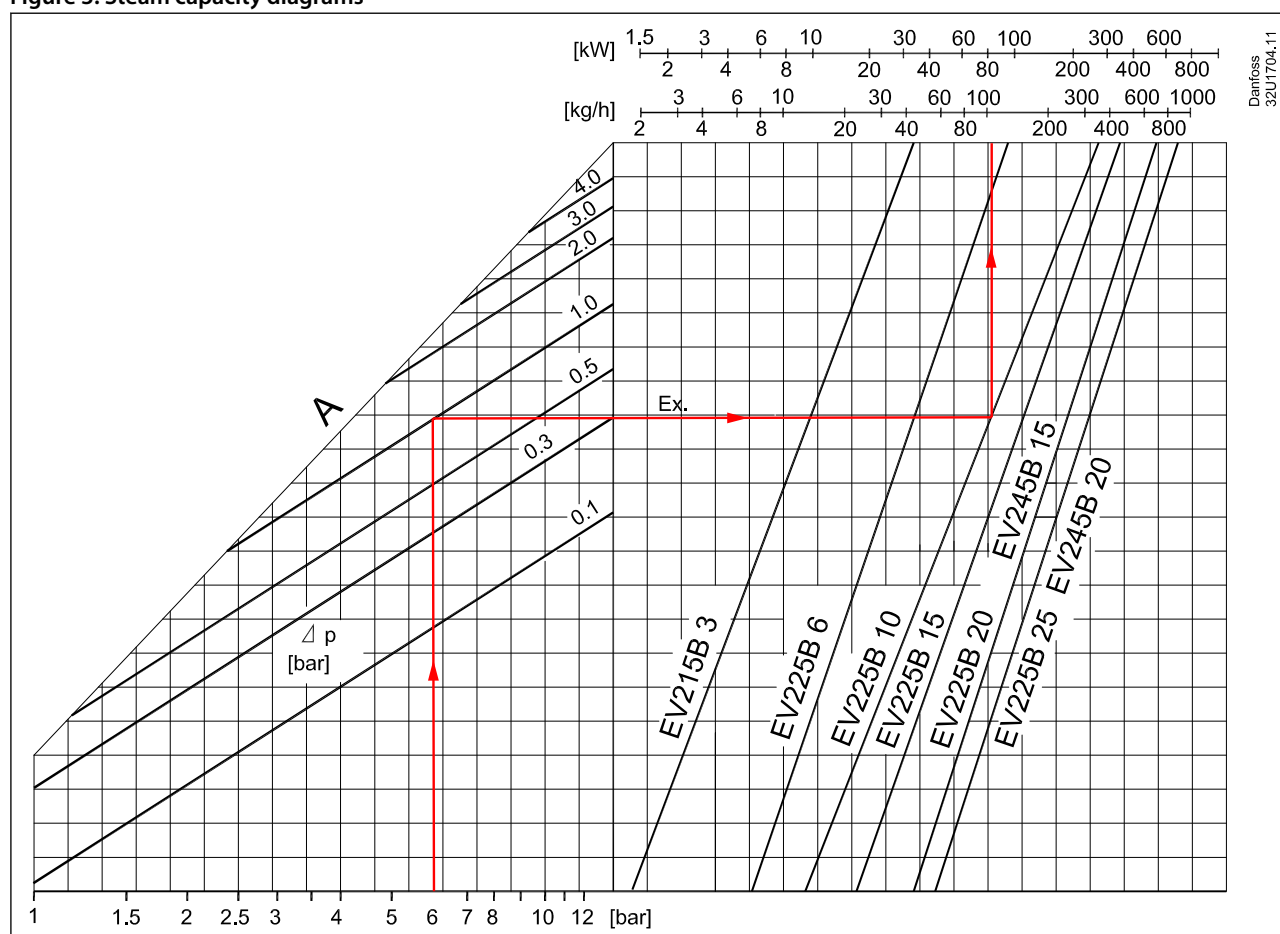
### Steam capacity diagrams

#### Example:

Capacity for EV225 10BD inlet pressure (p<sub>1</sub>) of 6 bar absolute, at differential pressure at 1 bar.

Approx. 100kg/h/80kW

Figure 3: Steam capacity diagrams



## Solenoid valve, type EV225B

### Differential pressure range, NC

Table 4: Differential pressure range

| Connection<br>ISO228/1 | Coil type BQ AC | Coil type BN DC | Coil type BB AC | Coil type BB DC |
|------------------------|-----------------|-----------------|-----------------|-----------------|
|                        | [Bar]           | [Bar]           | [Bar]           | [Bar]           |
| G1/4 - G1              | 0.2 - 10        | 0.2 - 5         | 0.2 - 5         | 0.2 - 3.6       |

### Time to open/close

Table 5: Time to open/close

| Main type                         | EV225B 6 - EV225B 25 |
|-----------------------------------|----------------------|
| Time to open [ms] <sup>(1)</sup>  | Max. 0.2 s           |
| Time to close [ms] <sup>(1)</sup> | Max. 0.2 s           |

<sup>(1)</sup> The times are indicative. The exact times will depend on the pressure conditions.

### Materials

Table 6: Materials

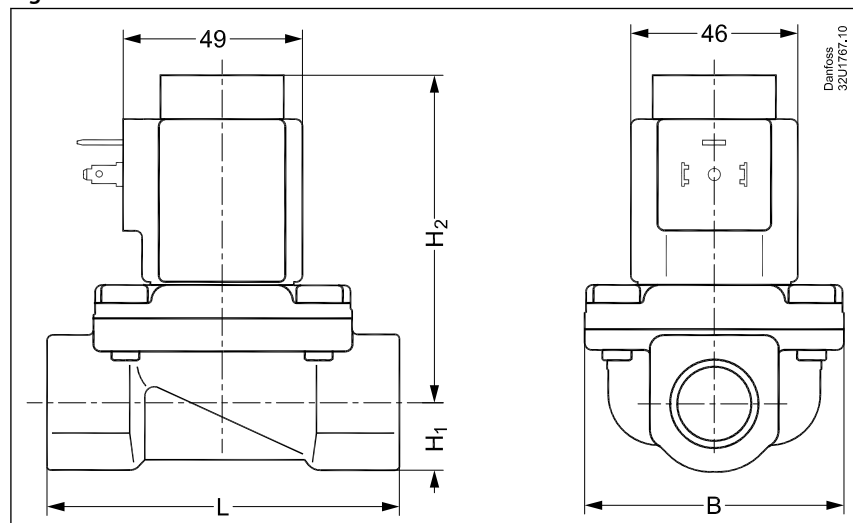
| Components             | Materials       | Specifications             |
|------------------------|-----------------|----------------------------|
| Valve body             | DZR brass       |                            |
| Armature/armature stop | Stainless steel | W. no. 1.4105 / AISI 430FR |
| Spring                 | Stainless steel | W. no. 1.4306 / AISI 304L  |
| Armature tube          | Stainless steel | W. no. 1.4310 / AISI 301   |
| Diaphragm              | PTFE            |                            |
| Valve plate            | PTFE            |                            |
| Valve seat             | Stainless steel |                            |
| External gaskets       | O-ring: AFLAS   |                            |

## 4.2 Dimension and weight

Table 7: Dimension and weight

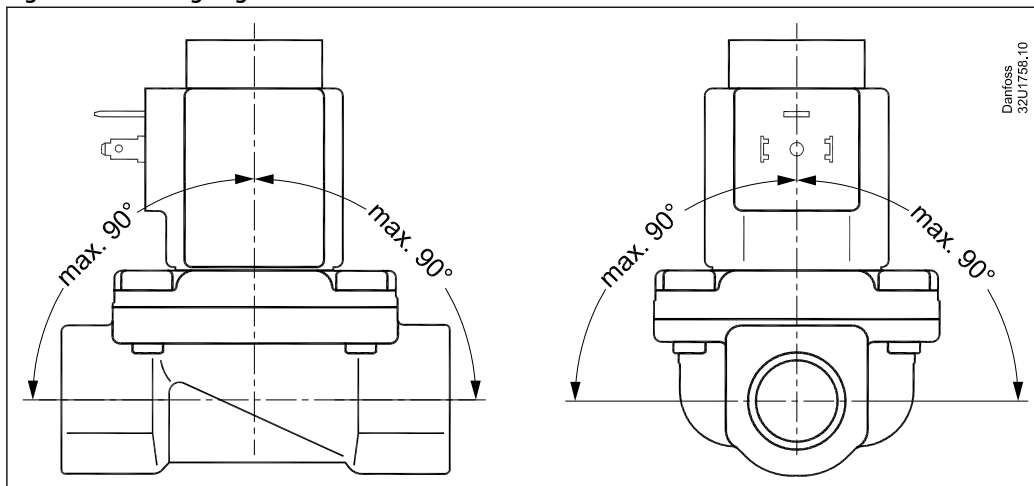
| Type         | L    | B    | H    | H <sub>1</sub> | H <sub>2</sub> | Weight gross valve body<br>with coil BQ, BB | Weight gross valve body<br>with coil BN |
|--------------|------|------|------|----------------|----------------|---------------------------------------------|-----------------------------------------|
|              | [mm] | [mm] | [mm] | [mm]           | [mm]           | [kg]                                        | [kg]                                    |
| EV225B 6 BD  | 62   | 46   | 98   | 13             | 85             | 0.75                                        | 1.03                                    |
| EV225B 10 BD | 62   | 46   | 98   | 13             | 85             | 0.72                                        | 1.00                                    |
| EV225B 15 BD | 81   | 56   | 102  | 15             | 87             | 0.86                                        | 1.14                                    |
| EV225B 20 BD | 98   | 72   | 110  | 18             | 92             | 1.4                                         | 1.68                                    |
| EV225B 25 BD | 106  | 72   | 117  | 21             | 96             | 1.7                                         | 1.98                                    |

Figure 4: Dimension



### 4.3 Mounting

Figure 5: Mounting angle



## 5 Ordering

### 5.1 Parts program

Table 8: DZR brass, valve body NC

| ISO228/1 connection | Orifice | K <sub>v</sub> value | Seal material | Code no. without coil | Code no. valve body with coil and power connector |                                      |                                                      |                             |
|---------------------|---------|----------------------|---------------|-----------------------|---------------------------------------------------|--------------------------------------|------------------------------------------------------|-----------------------------|
|                     | [mm]    | [m³/h]               | PTFE          |                       | Coil type BQ024CS<br>24 V 60 Hz<br>24 V 50 Hz     | Coil type BQ120BS<br>110-120 V 60 Hz | Coil type BQ024 CS<br>208-240 V 60 Hz<br>230 V 50 Hz | Coil type BN024DS<br>24V DC |
| G1/4                | 6       | 0.9                  | PTFE          | 032U3802              |                                                   |                                      |                                                      |                             |
| G3/8                | 10      | 2.2                  |               | 032U3803              |                                                   |                                      |                                                      |                             |
| G1/2                | 10      | 2.2                  |               | 032U3804              | 032U380416                                        | 032U380420                           | 032U380431                                           | 032U380402                  |
| G1/2                | 15      | 3.0                  |               | 032U3805              | 032U380516                                        | 032U380520                           | 032U380531                                           | 032U380502                  |
| G3/4                | 20      | 5.0                  |               | 032U3806              | 032U380616                                        | 032U380620                           | 032U380631                                           | 032U380602                  |
| G1                  | 25      | 6.0                  |               | 032U3807              | 032U380716                                        | 032U380720                           | 032U380731                                           | 032U380702                  |

### 5.2 Accessories

#### Coil

#### Coil type BQ AC Steam coil to 185 °C

Figure 6: Coil type BQ AC



Table 9: Coil type BQ AC Steam coil to 185 °C

| Type    | Tambient | Supply voltage | Voltage variation | Frequency | Power consumption |      | Approval | Code no. |
|---------|----------|----------------|-------------------|-----------|-------------------|------|----------|----------|
|         | [°C]     | [V]            |                   | [Hz]      | [W]               | [VA] |          |          |
| BQ024CS | -40 – 40 | 24             | -15%, 10%         | 50        | 10                | 17   | cULus    | 018F4517 |
|         |          | 24             | -15%, 10%         | 60        | 9.0               | 16   |          |          |
| BQ120BS | 40 – 40  | 110 / 120      | -15%, 6%          | 60        | 13.5              | 19   | cULus    | 018F4519 |
| BQ240CS | -40 – 40 | 230            | -15%, 6%          | 50        | 10                | 17   | cULus    | 018F4511 |
|         |          | 208 / 240      | -6%, 6%           | 60        | 9.5               | 16   |          |          |

#### Coil type BN DC Steam coils to 160 °C

Figure 7: Coil type BN DC



## Solenoid valve, type EV225B

Table 10: Coil type BN DC Steam coils to 160 °C

| Type    | T ambient | Supply voltage | Voltage variation | Frequency | Power consumption |      | Approval | Code no. |
|---------|-----------|----------------|-------------------|-----------|-------------------|------|----------|----------|
|         | [°C]      | [V]            |                   | [Hz]      | [W]               | [VA] |          |          |
| BN024DS | -40 – 50  | 24             | ±10%              | DC        | 20                |      |          | 018F6968 |

## Coil type BB AC Steam coils to 160 °C

Figure 8: Coil type BB AC



Table 11: Coil type BB AC Steam coils to 160 °C

| Type    | T ambient | Supply voltage | Voltage variation | Frequency | Power consumption |          | Code no. |
|---------|-----------|----------------|-------------------|-----------|-------------------|----------|----------|
|         | [°C]      | [V]            |                   | [Hz]      | [W]               | [VA]19   |          |
| BB024AS | -40 – 80  | 24             | -15%, 10%         | 50        | 11                | 018F7358 |          |
| BB115AS | -40 – 50  | 115            | -15%, 10%         | 50        | 11                | 19       | 018F7361 |
| BB230AS | -40 – 80  | 220 / 230      | -15%, 10%         | 50        | 11                | 19       | 018F7351 |
| BB240AS | -40 – 80  | 240            | -15%, 10%         | 50        | 11                | 19       | 018F7352 |
| BB440CS | -40 – 80  | 400            | ±10%              | 50        | 14                | 24       | 018F7353 |
|         |           | 440            | ±10%              | 60        | 15                | 24       |          |
| BB024BS | -40 – 80  | 24             | -15%, 10%         | 60        | 14                | 23       | 018F7365 |
| BB110CS | -40 – 50  | 110            | ±10%              | 50        | 15                | 28       | 018F7360 |
|         |           | 110            | ±10%              | 60        | 13                | 22       |          |
| BB230CS | -40 – 50  | 220 / 230      | ±10%              | 60        | 13                | 24       | 018F7363 |
|         |           | 220 / 230      | ±10%              | 50        | 16                | 31       |          |

## Type BB DC Steam coils to 140 °C

Table 12: Type BB DC Steam coils to 140 °C

| Type    | T ambient | Supply voltage | Voltage variation | Frequency | Power consumption |      | Code no. |
|---------|-----------|----------------|-------------------|-----------|-------------------|------|----------|
|         | [°C]      | [V]            |                   | [Hz]      | [W]               | [VA] |          |
| BB012DS | -40 – 50  | 12             | ±10%              | DC        | 14                | –    | 018F7396 |
| BB024DS | -40 – 50  | 24             | ±10%              | DC        | 16                | –    | 018F7397 |

## Cable plug

Figure 9: Cable plug

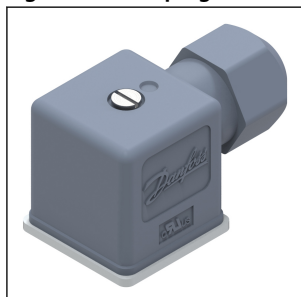


Table 13: Cable plug

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

## Universal electronic multi-timer, Type ET 20 M

Figure 10: Type ET 20 M

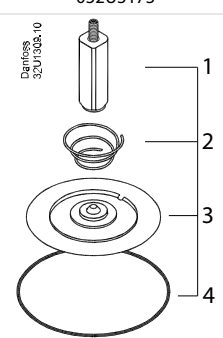


Table 14: Universal electronic multi-timer, Type ET 20 M

| Type   | Voltage  | Suitable for coil types    | Code no. |
|--------|----------|----------------------------|----------|
|        | [V]      |                            |          |
| BA024A | 24 - 240 | AL, AM, AS, AZ, BA, BD, BB | 042N0185 |

## Spare parts

Table 15: Actuator/diaphragm kit

| Type           | Actuator/diaphragm kit                                                                                                                                        |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                | Sealing                                                                                                                                                       |
|                | PTFE                                                                                                                                                          |
| EV225B 6 – 10  | 032U3171                                                                                                                                                      |
| EV225B 15      | 032U3172                                                                                                                                                      |
| EV225B 20 – 25 | 032U3173                                                                                                                                                      |
|                |                                                                          |
|                | <ol style="list-style-type: none"> <li>1. Armature with valve plate and spring</li> <li>2. Closing spring</li> <li>3. Diaphragm</li> <li>4. O-ring</li> </ol> |

## 6 Online support

Danfoss offers a wide range of support along with our products, including digital product information, software, mobile apps, and expert guidance. See the possibilities below.

### The Danfoss Product Store



The Danfoss Product Store is your one-stop shop for everything product related—no matter where you are in the world or what area of the cooling industry you work in. Get quick access to essential information like product specs, code numbers, technical documentation, certifications, accessories, and more.

Start browsing at [store.danfoss.com](https://store.danfoss.com).

### Find technical documentation



Find the technical documentation you need to get your project up and running. Get direct access to our official collection of data sheets, certificates and declarations, manuals and guides, 3D models and drawings, case stories, brochures, and much more.

Start searching now at [www.danfoss.com/en/service-and-support/documentation](https://www.danfoss.com/en/service-and-support/documentation).

### Danfoss Learning



Danfoss Learning is a free online learning platform. It features courses and materials specifically designed to help engineers, installers, service technicians, and wholesalers better understand the products, applications, industry topics, and trends that will help you do your job better.

Create your Danfoss Learning account for free at [www.danfoss.com/en/service-and-support/learning](https://www.danfoss.com/en/service-and-support/learning).

### Get local information and support



Local Danfoss websites are the main sources for help and information about our company and products. Find product availability, get the latest regional news, or connect with a nearby expert—all in your own language.

Find your local Danfoss website here: [www.danfoss.com/en/choose-region](https://www.danfoss.com/en/choose-region).

### Spare Parts



Get access to the Danfoss spare parts and service kit catalog right from your smartphone. The app contains a wide range of components for air conditioning and refrigeration applications, such as valves, strainers, pressure switches, and sensors.

Download the Spare Parts app for free at [www.danfoss.com/en/service-and-support/downloads](https://www.danfoss.com/en/service-and-support/downloads).

Any information, including, but not limited to information on selection of product, its application or use, product design, weight, dimensions, capacity or any other technical data in product manuals, catalogues descriptions, advertisements, etc. and whether made available in writing, orally, electronically, online or via download, shall be considered informative, and is only binding if and to the extent, explicit reference is made in a quotation or order confirmation. Danfoss cannot accept any responsibility for possible errors in catalogues, brochures, videos and other material. Danfoss reserves the right to alter its products without notice. This also applies to products ordered but not delivered provided that such alterations can be made without changes to form, fit or function of the product. All trademarks in this material are property of Danfoss A/S or Danfoss group companies. Danfoss and the Danfoss logo are trademarks of Danfoss A/S. All rights reserved.