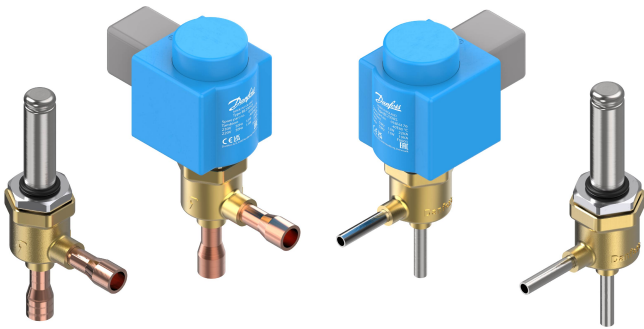


## Data Sheet

Solenoid Valve  
Type **EVT**

EVT high pressure range is a direct or servo operated solenoid valve specially designed to fit into CO<sub>2</sub> transcritical refrigeration systems. They can be applied in following applications:

- EVT 1.2 direct operated for oil return, pressure equalization/relief control, high pressure hot gas bypass/dump and hot gas defrost.
- EVT 2.0 and 3.0 servo operated for high pressure hot gas bypass/dump and hot gas defrost application.

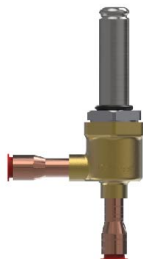
EVT valves and coils are sold separately.

**Features**

- Direct and servo operated mini piston solenoid valve with compact construction
- Simple and fast mounting of Danfoss Clip-on coil
- Designed for media temperature up to 150°C
- Working pressure up to 140 bar with standard coils
- Copper solder connections for brazing
- Stainless steel connections for Swagelok fittings
- Body material in ECO brass (lead free < 0.1%)
- Robust design ensures long lifetime
- Supplied in version normally closed (NC)
- In accordance with
  - RoHS II
  - REACH
  - LVD and PED

## Portfolio overview

Table 1: Portfolio overview

| Features                    | EVT                                                                               | EVT                                                                                 |
|-----------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                             |  |  |
| Connection                  | Copper                                                                            | Stainless steel                                                                     |
| DN [mm]                     | 1.2 – 3.0                                                                         | 1.2 – 3.0                                                                           |
| Connection                  | ODF 3/8"                                                                          | ODM 6mm                                                                             |
| Max. working pressure [bar] | 140                                                                               | 140                                                                                 |
| Function                    | NC                                                                                | NC                                                                                  |

## Functions

### Normally closed (NC)

#### Direct operated

EVT 1.2 is direct operated. This means that the valve can operate at 0bar differential pressure.

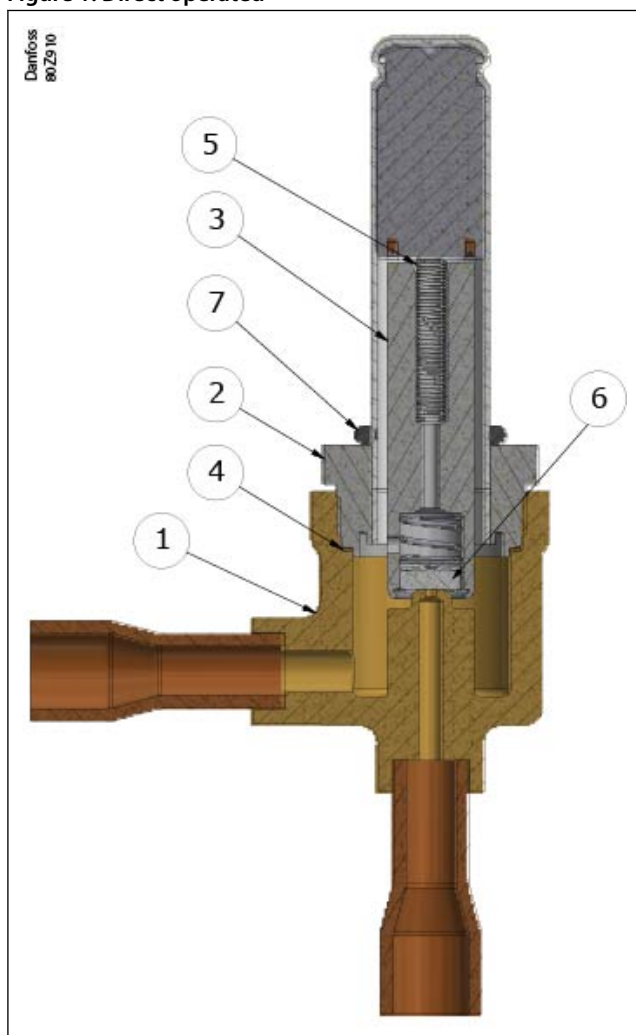
#### **Coil voltage disconnected (closed):**

When the voltage to the coil is disconnected, the armature (3) with the seat plate (6) is pressed down against the valve orifice by the closing spring (5) and inlet pressure. The valve will be closed for as long as the coil is disconnected.

#### **Coil voltage connected (open):**

The valve opens directly for full flow when the voltage is applied to coil, the armature (3) with seat plate is lifted clear of the valve orifice. The valve will be open for as long as there is voltage to the coil.

Figure 1: Direct operated



|   |                   |
|---|-------------------|
| 1 | Valve housing     |
| 2 | Cover             |
| 3 | Armature assembly |
| 4 | Gasket            |
| 5 | Armature spring   |
| 6 | Seat plate        |
| 7 | Coil O-ring       |

#### Servo operated

EVT 2.0 and 3.0 is servo operated piston solenoid valves. The servo piston principle results in a fast operating and compact valve that can open against a high differential pressure.

#### **Coil voltage disconnected (closed):**

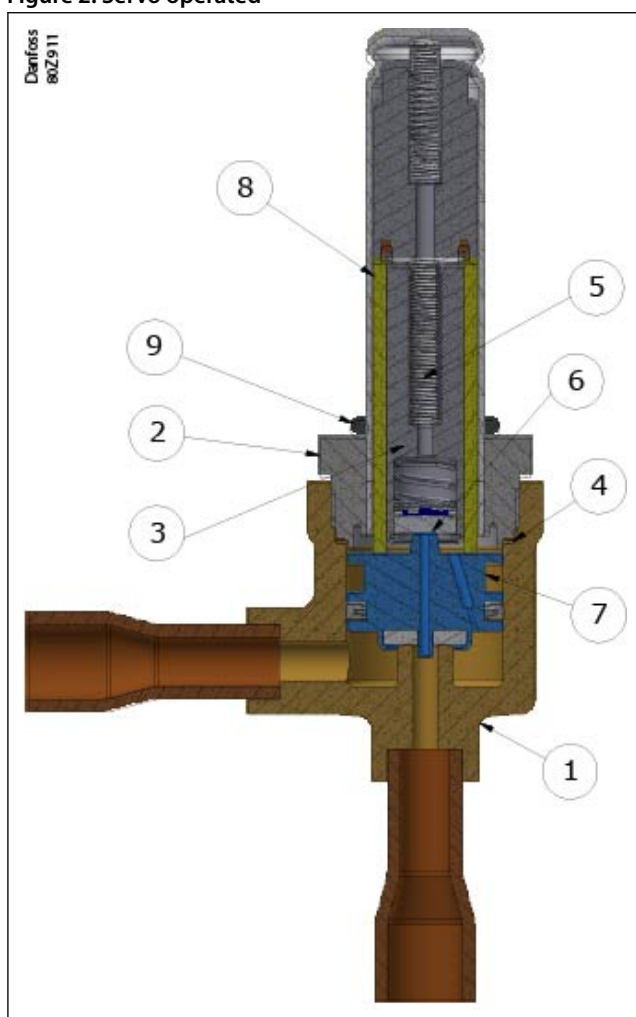
## Solenoid Valve, Type EVT

When the coil is disconnected, the armature (3) with seat plate (6) is pressed down against the pilot orifice by the armature spring (8). Via the equalization orifice in the piston (5), the pressure above the piston rises to the same value as the inlet pressure and the piston closes the main orifice. The valve will be closed for as long as the coil is disconnected.

### Coil voltage connected (open):

When current is applied to the coil, the armature (3) is drawn up into the magnetic field and opens the pilot orifice. This relieves the pressure above the piston (7), i.e. the space above the piston becomes connected to the outlet side of the valve. The differential pressure between inlet and outlet sides then presses the piston away from the main orifice and now the main orifice opens for full flow. Therefore, a minimum differential pressure of 2 bar is necessary to open the valve and 0.4 bar to keep it open.

Figure 2: Servo operated



|   |                   |
|---|-------------------|
| 1 | Valve housing     |
| 2 | Cover             |
| 3 | Armature assembly |
| 4 | Gasket            |
| 5 | Armature spring   |
| 6 | Seat plate        |
| 7 | Piston assembly   |
| 8 | Guide pin         |
| 9 | Coil O-ring       |

## Media

Table 2: Media

|                                |                                                                                             |
|--------------------------------|---------------------------------------------------------------------------------------------|
| Refrigerants                   | R744 (CO <sub>2</sub> )                                                                     |
| Oil                            | POE 60cST, 85cST (piston compressors);<br>PAG 68cST, 100cST (piston and rotary compressors) |
| Media temperature range        | -40 - 150 °C / -40 - 302 °F                                                                 |
| Max. working pressure (PS/MWP) | 140 bar / 2030.5 psi                                                                        |

**i NOTE:**

- Media temperature of 0°C or higher when operating the valve for oil management lines.
- Danfoss recommends that a suitable filter or filter drier (< 40 microns) should be installed ahead of each solenoid valve to keep scale, solder material and other foreign dirt and particles out of the valve.

## Product specification

### Technical data

#### Ambient temperature

-40°C to 50°C

#### Max. working pressure

140 bar with copper connections and stainless steel connections.

#### Flow capacity

- For  $K_v$  values please refer to the tables in Ordering.
- The  $K_v$  value of the water flow in [m<sup>3</sup>/h] at a pressure drop across valve of 1 bar,  $\rho = 1000 \text{ kg/m}^3$ .

#### Opening differential pressure range

Table 3: MOPD

| Type       | Opening differential pressure with standard coil $\Delta P$ [bar] |                           |
|------------|-------------------------------------------------------------------|---------------------------|
|            | Min.                                                              | Max. (=MOPD) liquid       |
|            |                                                                   | 220V-230V 50Hz / 018F6176 |
| EVT 1.2 NC | 0                                                                 | 110                       |
| EVT 2.0 NC | 2                                                                 | 110                       |
| EVT 3.0 NC | 2                                                                 | 110                       |

#### NOTE:

EVT 2.0 and 3.0 need 0.4 bar to keep open and can't be used as relief valve if the differential pressure is lower than 0.4 bar.

### Valve selection based on capacity calculation

As for extended capacity calculations and valve selection based on capacities and refrigerants, please refer to Coolselector®2. Rated and extended capacities are calculated with Coolselector®2 calculation engine to ARI standards with the ASEREP equations based on laboratory measurements of selected valves.

### Identification

Figure 3: Identification

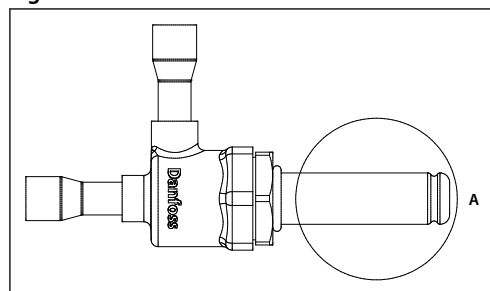
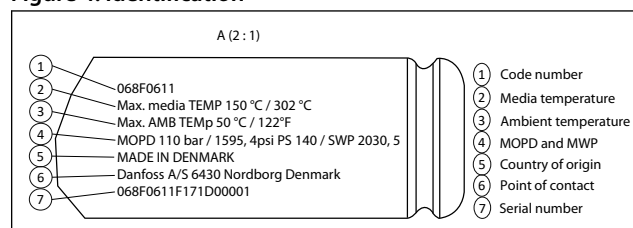


Figure 4: Identification



### Materials

Table 4: Materials

| Pos. no. | Descriptions      | Materials       |
|----------|-------------------|-----------------|
| 1        | Valve housing     | ECO Brass       |
| 2        | Cover             | Stainless steel |
| 3        | Armature assembly | Stainless steel |
| 4        | Gasket            | Copper          |
| 5        | Spring            | Stainless steel |
| 6        | Seat plate        | PEEK            |
| 7        | Piston            | ECO Brass       |
| 8        | Guide pin         | Stainless steel |

## Dimension and Weight

Figure 5: EVT ODF

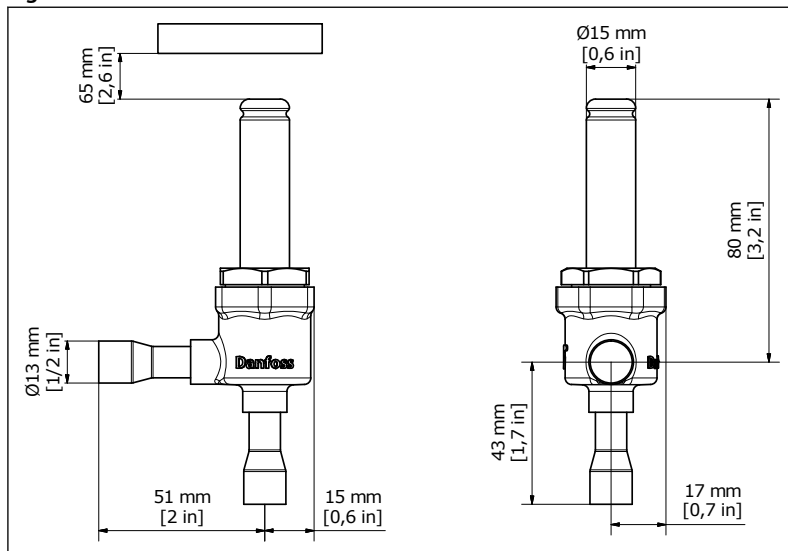


Figure 6: EVT ODM

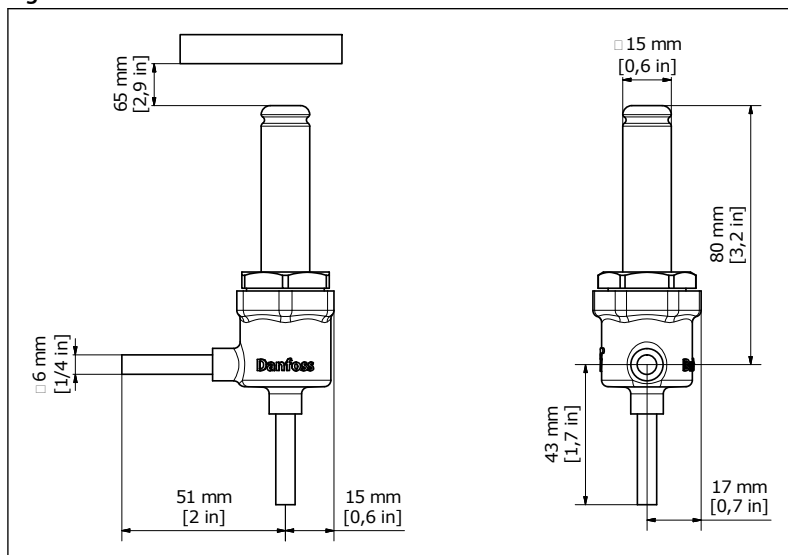


Table 5: Dimension and weight

| Type    | Net weight without coil |
|---------|-------------------------|
|         | [kg]                    |
| EVT 1.2 | 0.22 kg                 |
| EVT 2.0 | 0.24 kg                 |
| EVT 3.0 | 0.24 kg                 |

**NOTE:**

Net weight of coil 018F6176 is approx. 0.27 kg.

## Ordering

### Parts program

| Type    | Connection size |                 | K <sub>v</sub> value [m³/h] | Code no. | Packing    |
|---------|-----------------|-----------------|-----------------------------|----------|------------|
|         | ODF [in]        | ODM [mm]        |                             |          |            |
|         | Copper          | Stainless Steel |                             |          |            |
| EVT 1.2 | 3/8             | -               | 0.05                        | 068F0600 | Multi-pack |
|         |                 |                 |                             | 068F0625 | I-pack     |
|         | -               | 6               |                             | 068F0622 | Multi-pack |
|         |                 |                 |                             | 068F0626 | I-pack     |
| EVT 2.0 | 3/8             | -               | 0.1                         | 068F0601 | Multi-pack |
|         |                 |                 |                             | 068F0627 | I-pack     |
|         | -               | 6               |                             | 068F0621 | Multi-pack |
|         |                 |                 |                             | 068F0628 | I-pack     |
| EVT 3.0 | 3/8             | -               | 0.23                        | 068F0611 | Multi-pack |
|         |                 |                 |                             | 068F0629 | I-pack     |
|         | -               | 6               |                             | 068F0620 | Multi-pack |
|         |                 |                 |                             | 068F0630 | I-pack     |

### Coils

Table 6: Coils

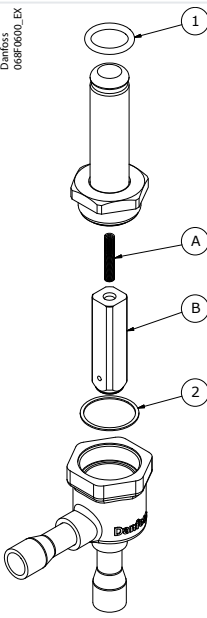
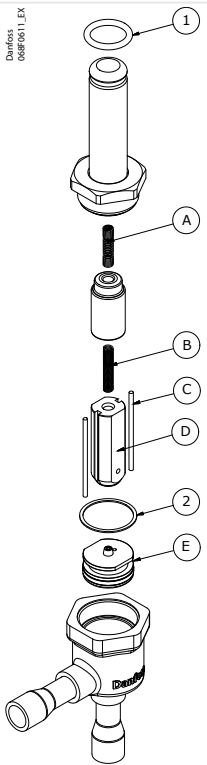
| Type    | Tambient | Supply voltage | Voltage variation | Frequency | Power consumption | Code no. |
|---------|----------|----------------|-------------------|-----------|-------------------|----------|
|         | [°C]     | [V]            |                   | [Hz]      |                   |          |
| BE230AS | -40T50   | 220            | -15%, +10%        | 50        | 11 W              | 018F6176 |
|         |          | 230            | -15%, +10%        | 50        | 12 W              |          |

## Solenoid Valve, Type EVT

### Accessories

### Spare parts kits

Table 7: Spare part kits

| Type        | EVT 1.2                                                                                                                                                                                                                                                                    | EVT 2.0 & 3.0                                                                                                                                                                                                                                                                                                            |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Seal Kit    | 068F0697                                                                                                                                                                                                                                                                   | 068F0697                                                                                                                                                                                                                                                                                                                 |
| Service Kit | 068F0698                                                                                                                                                                                                                                                                   | 068F0699                                                                                                                                                                                                                                                                                                                 |
|             |  <p><b>Seal kit contains:</b></p> <ol style="list-style-type: none"> <li>1. Coil O-ring</li> <li>2. Gasket</li> </ol> <p><b>Service kit contains:</b></p> <p>A Spring<br/>B Armature</p> |  <p><b>Seal kit contains:</b></p> <ol style="list-style-type: none"> <li>1. Coil O-ring</li> <li>2. Gasket</li> </ol> <p><b>Service kit contains:</b></p> <p>A Spring<br/>B Spring<br/>C Guided pins<br/>D Armature<br/>E Piston</p> |

## Certificates, declarations and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

Some approvals may change over time. You can check the most current status at [danfoss.com](https://danfoss.com) or contact your local Danfoss representative if you have any questions.

### Valid approvals

Table 8: Valid approvals

| File name | Document type  | Document topic | Approval authority |
|-----------|----------------|----------------|--------------------|
| 033F0688  | EU declaration | LVD, EMC       | Danfoss            |
| 033F1035  | EU declaration | PED            | Danfoss            |

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