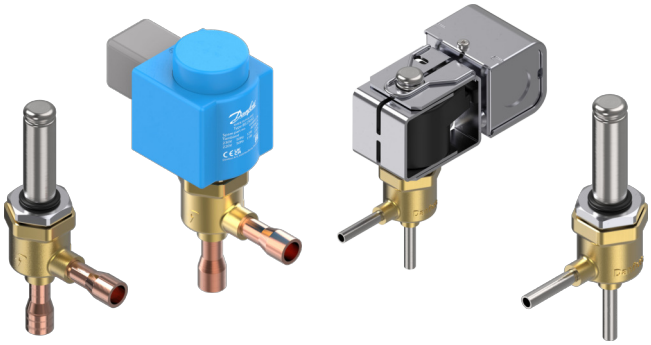
ENGINEERING TOMORROW

Data Sheet

Solenoid Valve Type **EVT**



EVT high pressure range is a direct or servo operated solenoid valve specially designed to fit into CO_2 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.

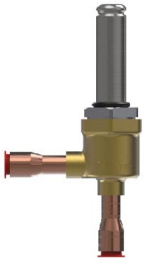
EVT valves and coils are sold separately.

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
  - UL 429

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)

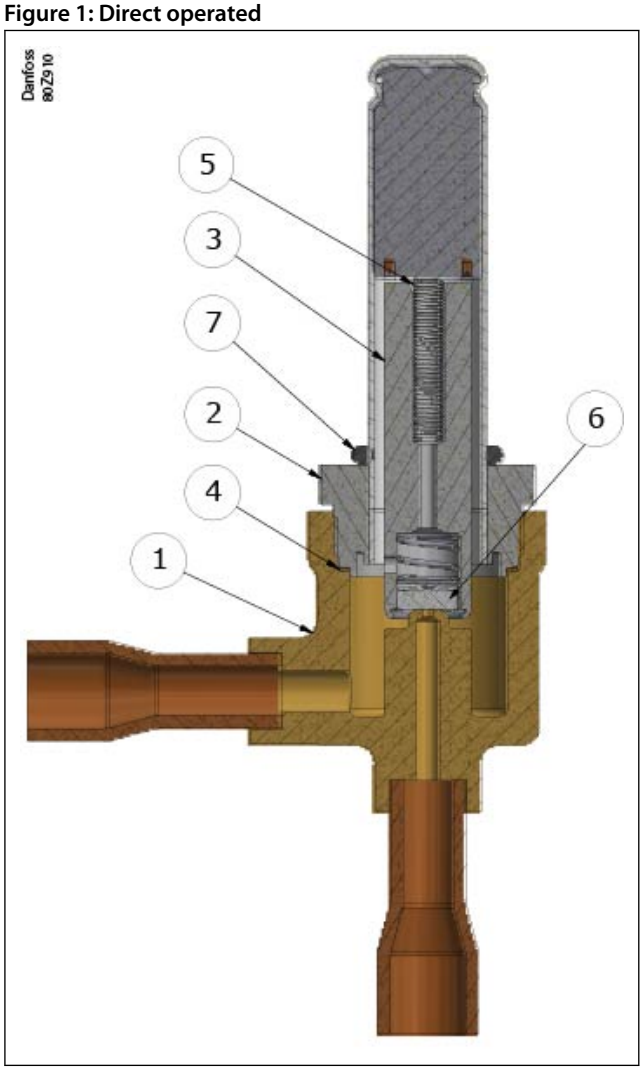
Direct operated

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

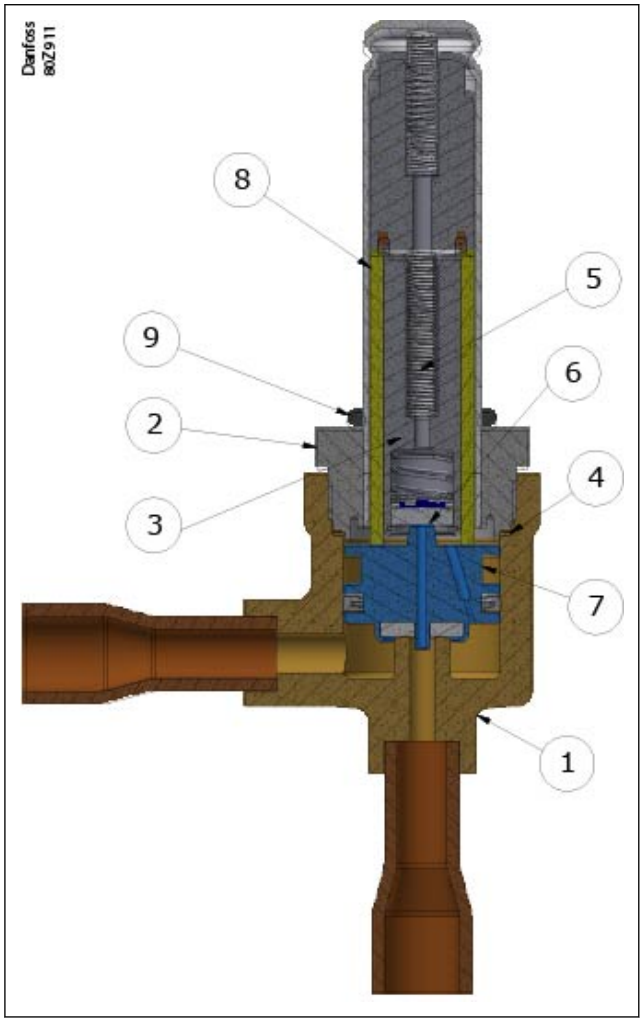
EVT 2.0 and 3.0 is servo operated piston solenoid valves. The servo piston principle results in a fast operating and compact valve that can open against a high differential pressure.

Coil voltage disconnected (closed):

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_2)
Oil	POE 60cST, 85cST (piston compressors); 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

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^3/h] at a pressure drop across valve of 1 bar, ρ = 1000 kg/m^3.

Opening differential pressure range
Table 3: MOPD

Type	Opening differential pressure with standard coil ΔP [bar]				
	Min.	Max. (=MOPD) Gas	Max. (=MOPD) Oil		
			018F6176	018F4180 (Min. voltage)	018F4180 (Norm. voltage)
EVT 1.2 NC	0	110	110	95	110
EVT 2.0 NC	2	110	110	95	110
EVT 3.0 NC	2	110	110	95	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

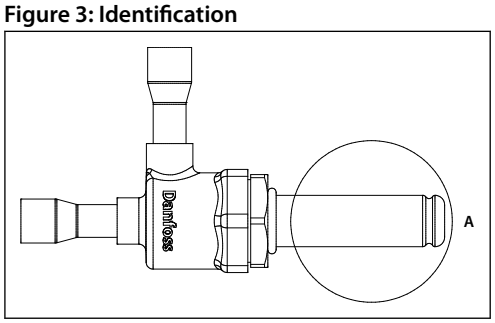
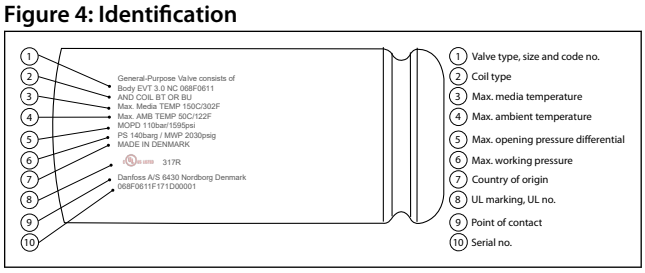


Figure 4: Identification



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

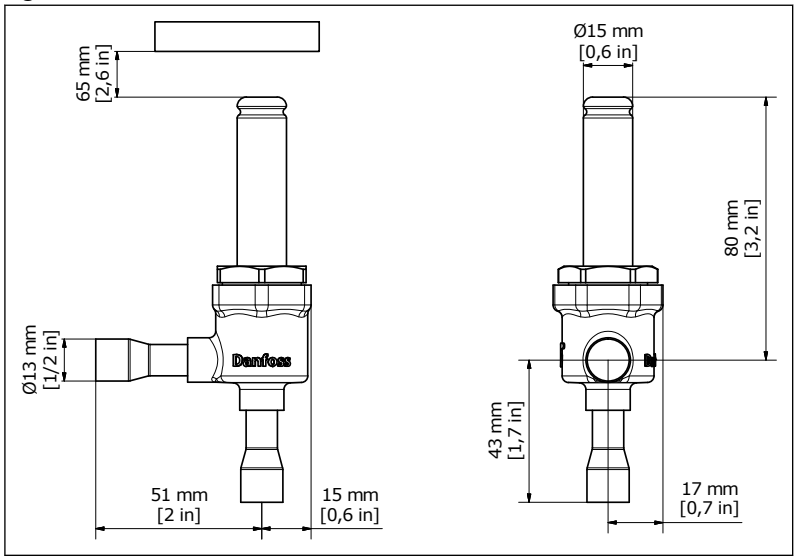


Figure 6: EVT ODM

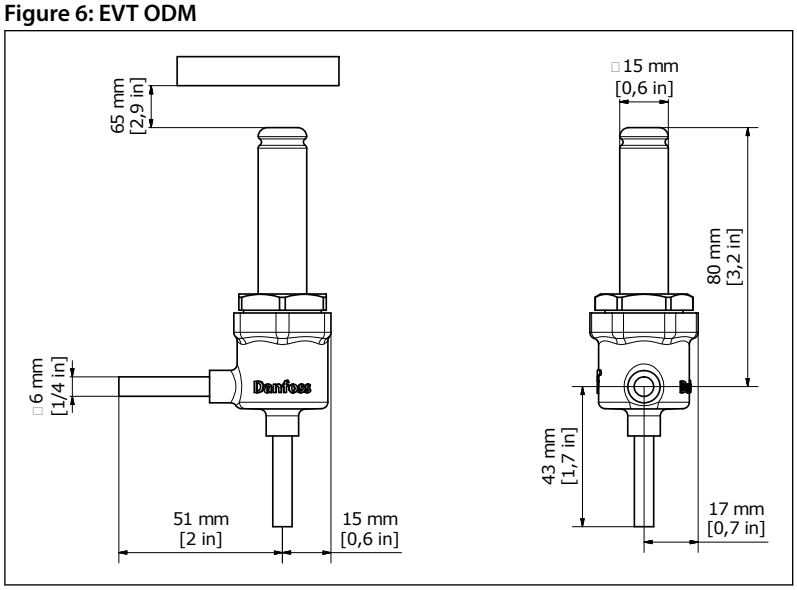


Table 5: Dimension and weight

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.
- Net weight of coil 018F4180 is approx. 0.36 kg

Ordering

Parts program

Type	Connection size		K_v value [m^3/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]	[W]	
BE230AS	-40T50	220	-15%, +10%	50	11	018F6176
		230	-15%, +10%	50	12	
BT240C	-40T50	110	-10%, +10%	50	12	018F4180
		110 - 120	-10%, +10%	60	12	
		230	-10%, +10%	50	12	
		208 - 240	-10%, +10%	60	12	

Accessories

Spare parts kits

Table 7: Spare part kits

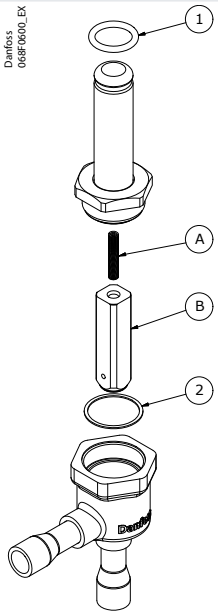
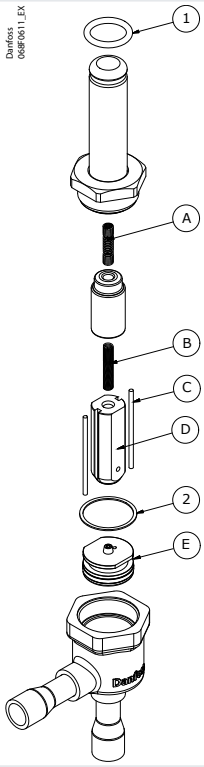
Type	EVT 1.2	EVT 2.0 & 3.0
Seal Kit	068F0697	068F0697
Service Kit	068F0698	068F0699
		
	Seal kit contains: 1. Coil O-ring 2. Gasket **Service kit contains:** A Spring B Armature 1. Coil O-ring 2. Gasket	**Seal kit contains:** 1. Coil O-ring 2. Gasket **Service kit contains:** A Spring B Spring C Guided pins D Armature E Piston 1. Coil O-ring 2. Gasket

Table 8: Spare part kits

Part	Description	Code no.	
		Industrial pack	Pcs.
	Mounting bracket for fixing of valve	068F0694	40

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 or contact your local Danfoss representative if you have any questions.

Valid approvals

Table 9: Valid approvals

File name	Document type	Document topic	Approval authority
033F0688	EU declaration	LVD, EMC	Danfoss
033F1035	EU declaration	PED	Danfoss
033F0687	EU declaration	RoHS	Danfoss

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