

Solenoid valve

EVT

Description

EVT high pressure range is a direct or servo operated solenoid valve specially designed to fit into CO₂ 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 & benefits

- 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
- Body material in ECO brass (lead free < 0.1%)
- Stainless steel connections for Swagelok fittings
- Robust design ensures long lifetime
- Supplied in version normally closed (NC)
- In accordance with
 - RoHS II
 - REACH
 - LVD and PED
 - UL 429

Ordering

Product code numbers

Type	Connection material	Inlet connection type	Inlet size [in]	Inlet size [mm]	Kv value [m ³ /h]	Packing format	Code number
EVT 1.2	Copper	Solder, ODF	3/8 in		0.050	Multi pack	068F0600
EVT 1.2	Copper	Solder, ODF	3/8 in		0.050	Industrial pack	068F0625
EVT 1.2	Stainless steel	Solder, ODM		6.00	0.050	Industrial pack	068F0626
EVT 1.2	Stainless steel	Solder, ODM		6.00	0.050	Multi pack	068F0622
EVT 2.0	Copper	Solder, ODF	3/8 in		0.100	Multi pack	068F0601
EVT 2.0	Stainless steel	Solder, ODM		6.00	0.100	Multi pack	068F0621
EVT 2.0	Copper	Solder, ODF	3/8 in		0.100	Industrial pack	068F0627
EVT 2.0	Stainless steel	Solder, ODM		6.00	0.100	Industrial pack	068F0628
EVT 3.0	Stainless steel	Solder, ODM		6.00	0.230	Industrial pack	068F0630
EVT 3.0	Copper	Solder, ODF	3/8 in		0.230	Multi pack	068F0611
EVT 3.0	Copper	Solder, ODF	3/8 in		0.230	Industrial pack	068F0629
EVT 3.0	Stainless steel	Solder, ODM		6.00	0.230	Multi pack	068F0620

Table: Coils

Type	T _{ambient}	Supply voltage	Voltage variation	Frequency	Power consumption	IP rating	Code no
	[°C]	[V]		[Hz]	[W]		
BE230AS	-40T50	220	-15%, +10%	50	11	IP67	018F6701
		230	-15%, +10%	50	12	IP20	018F6176
BT240C	-40T50	110	-10%, +10%	50	12	IP30	018F4180
		110 – 120		60			
		230		50			
		208 – 240		60			
BU240C	-40T50	110	-10%, +10%	50	12	IP54	018F4181
		110-120		60			
		230		50			
		208-240		60			

Spare parts code numbers

Table: Spare part kits

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

Overview

Product portfolio

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

Performance and environmental conditions

Normally closed (NC)

Direct operated

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

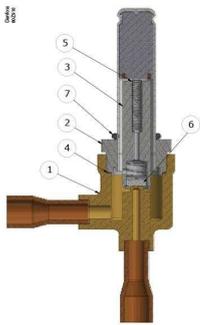
Coil voltage disconnected (closed):

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: 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.

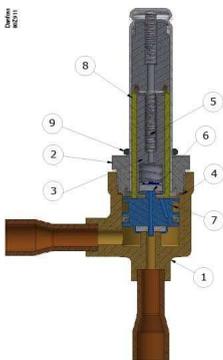
Coil voltage disconnected (closed):

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: 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

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 details

General data

Identification

Figure: Type EVT

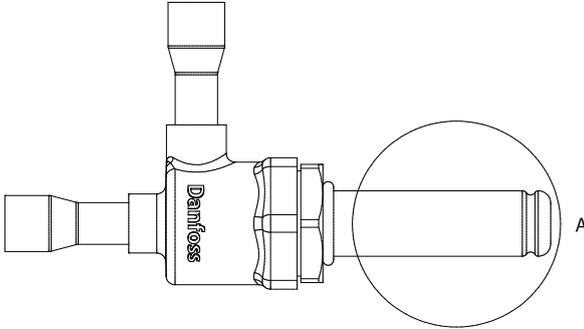
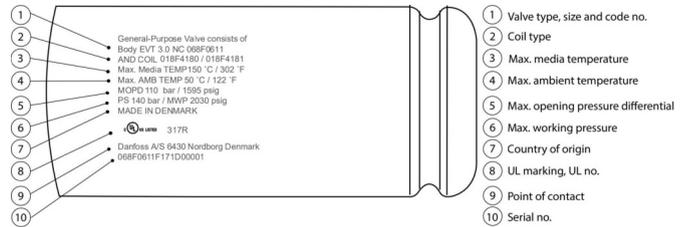


Figure: Label



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

Capacity

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.

Pressure and temperature 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 [m³/h] at a pressure drop across valve of 1 bar, $\rho = 1000 \text{ kg/m}^3$.

Opening differential pressure range

Table: 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.

Dimensions

Figure: EVT ODF

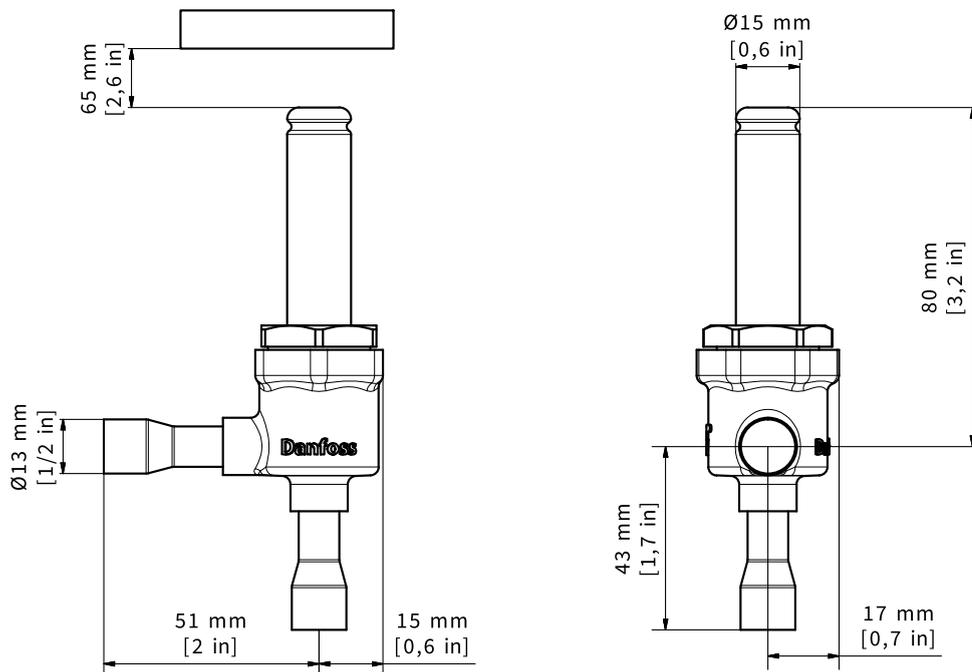


Figure: EVT ODM

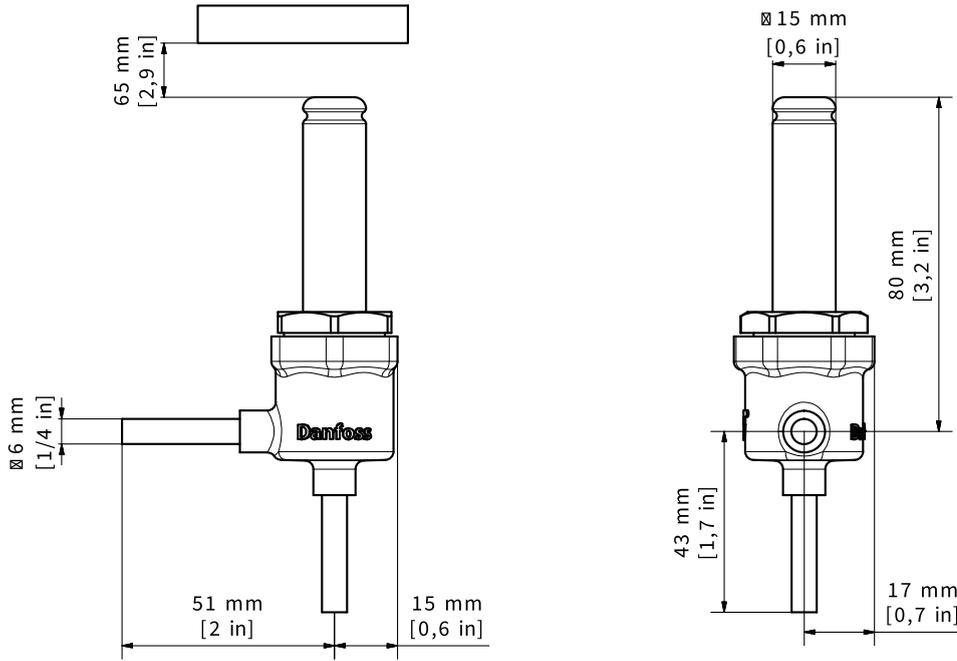


Table: Dimension and weight

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

NOTE:

- Net weight of coil 018F6176 is approx. 0.27 kg.
- Net weight of coil 018F4180 is approx. 0.36 kg

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.

When you click on the link you will be directed to the latest version of the 'Declaration of Conformity'. Products developed and sold before this date of issue conform to the directives/standards in force at the time of their sale.

Approval type	Title	Certification body	Approval topic
Mechanical Safety Certificate	UL-CA-2234211-0 MH7648-20220831	UL - Underwriters Laboratories inc.	
Manufacturer's Declaration	Danfoss MD 033F0687.AH	Danfoss	EU RoHS
Export Control Declaration	Commercial refrigeration solenoid valves and coils - Other - Polymer, Bronze, Brass and cast iron	Danfoss	
Manufacturer's Declaration	Danfoss MD 033F1035.AR	Danfoss	PED, Pressure
Mechanical Safety Certificate	UL MH7648	UL - Underwriters Laboratories inc.	
EU Declaration	Danfoss EU 033F0688.AK	Danfoss	LVD, EMC

Contact details

Online support

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



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