

Product Family Master Plan



Customer View

The customer view describes the solenoid valves family that Danfoss A/S offers. It shows all the characteristics and features that each customer can choose between.

The order of the features and characteristics goes from the more relevant ones for the customers to the less relevant.

This view also includes some brief descriptions on the terminology used on the solenoid valves.

Customer View

Medium

The medium is the fluid for which the valve is designed to open or close to. This parameter will determine the packing material.

Connections

Both, connection type and size can be specified.

- Tradition in the specific trade
- Diameter of the tubes
 - Specified in inches [in, G]
 - Specified in millimeters [mm]

Capacity [m³/h]

The capacity is a measure for the flow of medium in the valve in m³ per hour.

Maximum Working Pressure (MWP) [bar]

The pressure that the valve is approved for.

Working principle / Function

The working principle states whether the valve is Normally Open (NO) or normally Closed (NC); representing the state when the coil is without power.

2 / 3 Way

Defines the amount of conducts the valve has.

Fixing / Installation to back plate or brackets

Defines the way the valves are screwed.

Fixing of the coil to the valve

Attachment of the coils.

- Coolant
- Other mediums

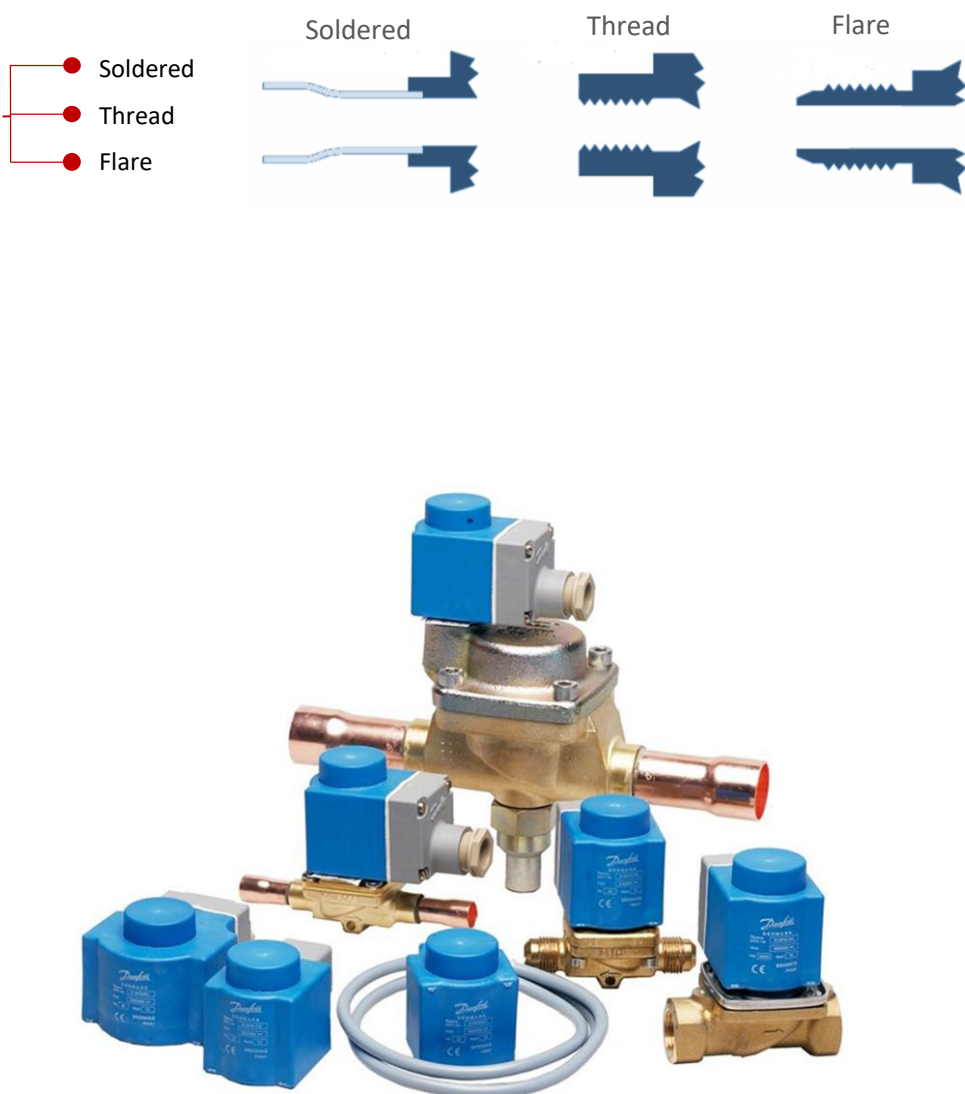
- 1/2
- 1/4
- 1/8
- 3/8
- 5/8
- 7/8
- 6
- 10
- 12
- 16

- Normally Closed (NC)
- Normally Opened (NO)

- 2 way
- 3 way

- Place of screw:
 - From the side
 - From underneath
- Holes
 - With threat
 - Without threat

- Clicked with a Click-On system
- Screwed



Engineering View

The engineering view describes solenoid valves from an engineering point of view. It shows the structures, organs and organisms used in the product family.

This view is also used for indicate how the processes and functions (described in the customer view part) are realised in the product.

Moreover, in this part of the PFMP, some sketches show the functionality of some of the organs and organisms the solenoid valves include.

Engineering View

Actuator principle

the functionality of the solenoid valves is based on the actuator principle.

Media and packaging materials

The packaging parameters depend on the medium that flows through the valve, which is selected by the customer.

Density packaging

Material used in the valves

Connections

Each sector, cooling or industry, will need different types of connection. The size and specific type will be specified by the customer, those are showed in the Part View.

- Cooling
 - Copper Toad (solder ODF)
 - Flare connections

Industry

- European pipe threads
- American NPT thread

Operation of the valve

Characterized by the existence or lack of a servomechanism in the operation system of the valve. This specification depends on the characteristic pressures of the valve.

- Maximum Working Pressure (MWP)
 - The pressure that the valve is approved for.

Bursting Pressure

The maximum pressure that the valve can stand.

Maximum Opening Pressure Differential (MOPD)

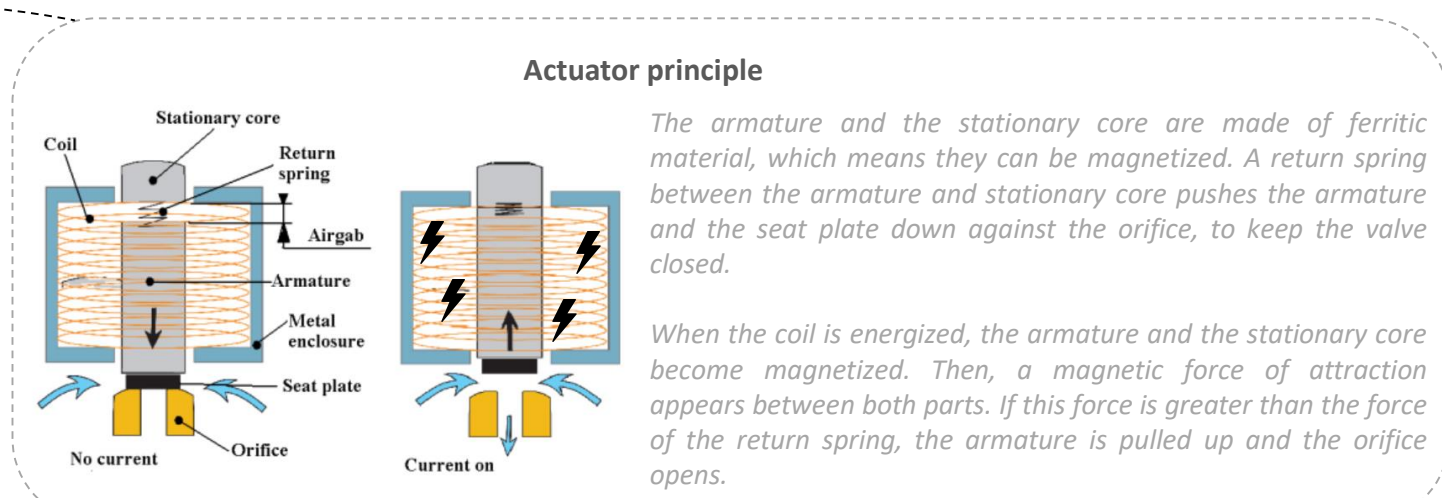
Maximum pressure difference under which the valve is still able to open.

- Minimum Opening Differential Pressure (MODP)
 - Minimum pressure difference needed to open the valve.
 - Only relevant to servo-operated solenoid valves.

Working principle / Function

Is the parameter that determines whether the valve remains opened or closed in a normal basis.

- Internal density
 - The gasket closes the flow in the valve
- External density
 - The gasket holds the valve tight again the surroundings



Direct-operated solenoid valve

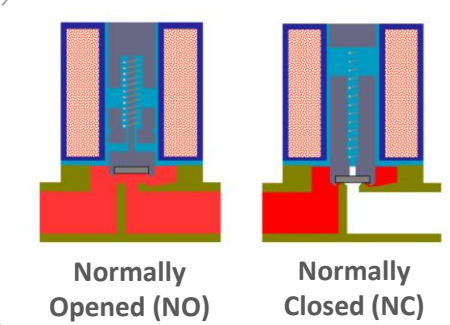
- When the coil is de-energized the valve remains closed (NC valve).
- The coil is energized.
- The armature moves up, together with the seal, and opens the orifice. The valve is now open.
- If the coil is de-energized, the valve will start closing again.
- The armature moves down, together with the seal plate, and closes the orifice. The valve is now close.

Servo-operated solenoid valve

- When the coil is de-energized the valve remains closed (NC valve).
- The coil is energized and the armature moves up.
- The media pressure lifts the membrane up and the valve opens.
- If the coil is de-energized, the valve will start closing again.
- The membrane moves down and stops the flow. The spring and the media pressure push down and close the valve.

	EVR			EV2/EV3													
	A	B	C	D	E	F	G	H	I	J	K	L	M	N			
Direct	X			X	X	X					X	X					
Servo		X	X				X	X				X	X	X	X		

- Normally Closed (NC)
 - The valve is closed while there is no current.
 - The armature and the non-moveable part remain separated. Once the coil is energized, they will join opening the valve.
- Normally Opened (NO)
 - The valve is opened while there is no current.
 - The armature and the non-moveable part remain separated. Once the coil is energized, they will join closing the valve.



	EVR			EV2/EV3													
	A	B	C	D	E	F	G	H	I	J	K	L	M	N			
NO				X			X	X	X	X		X	X	X			X
NC	X	X		X	X	X	X	X		X	X	X		X			

Part View

Actuator

- [1-1] Armature
- [1-1] Armature Tube
- Head/Top
- Pipe
- [0-2] Seat Plate
- [0-1] Stationary Core
- [1-1] Winding Damper
- [0-1] Spacer Ring
- [0-1] Cover Plate
- [1-1] Cap

Valve House

- [1-1] Valve House
- [1-1] Nozzle
- [0-1] "Milk Kneeler" (Only F)
- [0-1] Bottom (Only F)

Membrane

- [0-1] Teflon Membrane
- [0-1] Metal pieces (x2)
- [0-1] Nozzle

Rings/Washers

- [1-4]
- [1-3] Gaskets and O-Rings

Screws

- [1-3]
- [0-1] Spring Sticks

Pin

- [0-1] Filter

		EVR			EV2/EV3													
		A	B	C	D	E	F	G	H	I	J	K	L	M	N			
Ø (mm)	9				X	X	X	X	X									
	13,5									X	X	X	X	X	X			
	2/3-way																	
Head connection	2-way	X	X	X	X		X	X	X	X	X	X	X	X	X			
	3-way					X												
3-way hole	Threat				X	X	X	X	X									
	Click-On	X	X	X						X	X	X	X	X	X			
Bertling																		
				X						X		X		X				
Material	Teflon	X	X	X						X								
	EPDM				X	X		X	X	X	X	X	X	X	X			
	FKM				X	X	X	X	X	X	X	X	X	X	X			
	NBR						X	X	X	X				X	X			
Stationary Core				X						X		X		X				
	Flange		X							X	X	X	X	X	X			
Spacer Ring										X	X			X	X			
	X	X																
Cover Plate				X	X													
	X	X																
Heat Pressed				X	X			X	X					X	X			
	Stamped Out					X	X		X	X								
Connections	Solder Pipe	X	X	X														
	Flare	X	X	X														
	Threat				X	X	X	X	X	X	X	X	X	X	X			
Membrane																		
	X	X						X	X			X	X	X	X			



		Valve House Inlet/Outlet Ø															
		EVR			EV2/EV3												
in		A	B	C	D	E	F	G	H	I	J	K	L	M	N		
		1/2	X	X				X	X			X	X	X	X		
		1/4	X		X	X		X	X	X	X	X	X				
		1/8			X	X	X			X	X	X					
		3/8	X	X	X			X	X	X		X	X				
		5/8	X	X													
mm		7/8	X	X													
		6	X														
		10	X	X	X												
		12	X	X													
		16	X	X													
		Nozzle Ø (mm)															
	1,2				X	X											
	1,5				X	X	X				X	X					
	2				X	X	X				X	X					
	2,3		X														
	2,5				X	X											
	3				X	X					X	X					
	3,3		X														
	3,5				X	X											
	4,5										X	X					
	6		X	X				X	X				X	X			
	7		X														
	10		X	X				X	X				X	X			
	12							X	X				X				
	14		X	X				X	X								
	15															X	X