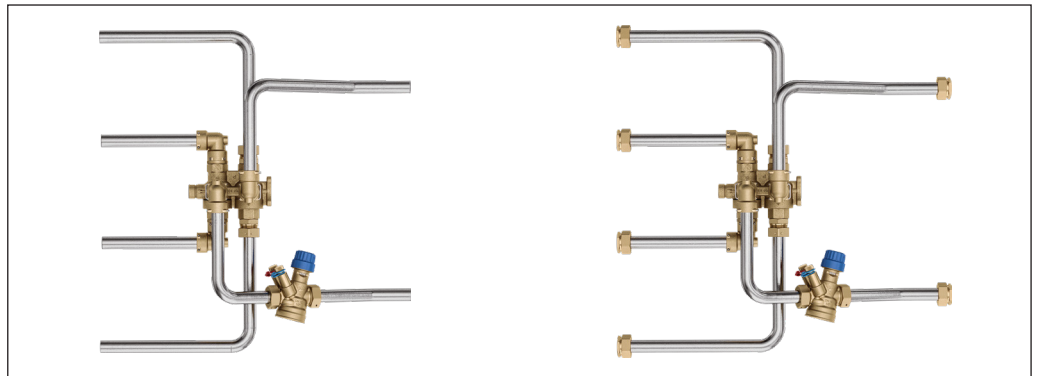


Data sheet

AB-QM 4.0 CO⁶ Flexo, DN 15, PN 16

Description



Danfoss CO⁶ Flexo is a compact and time-saving connections set that combines a 6-way valve with an AB-QM PICV and control in applications with 4-pipe changeover systems, usually for radiant panels or chilled beams. The flow is controlled by the AB-QM for precise temperatures in the room and it avoids overflows which reduce the system's efficiency. The CO⁶ valve performs the switching between cooling and heating in a 4-pipe changeover system.

Installation

Saving time and space

- Pre-assembled design Reduced installation time
- Easy setting and sizing, 100% authority and perfect control.

Trouble-free installations

- Compact and space saving installation
- Minimal built-in height
- Pressure tested at the factory

Service:

Save time and space

- Exchangeable CO⁶
- Exchangeable PICV
- Enables flow validation
- Easy disassembly (using hairpin connections)

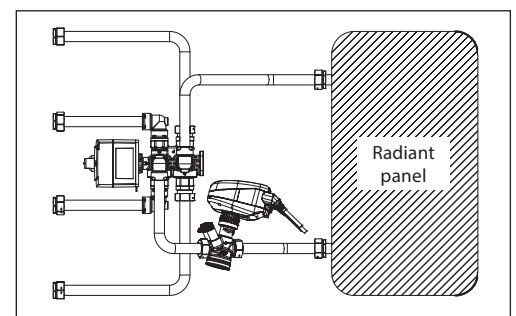
Energy efficiency:

Pressure independent flow control with AB- QM 4.0 Improved indoor comfort with best performance and energy savings. Efficient energy transfer and minimal pumping costs.

Applications

CO⁶ Flexo is a pre-assembled, pressure- tested set used for terminal units, such as radiant panel and chilled beams. The Danfoss CO⁶ Flexo solution comprises AB-QM 4.0 (PICV) connected to 6way valve for switching between cold and hot water.

The AB-QM ensures and controls the required flow on every terminal unit and maintains Hydronic Balance in the system. The control valve has 100% authority and therefore ensures the stability of control. At partial load, there is no overflow, contrary to conventional solutions, because the AB-QM will always limit the flow to what is needed. By installing the AB-QM the whole system is divided into independent control loops.



There is a wide range of Danfoss actuators available for the AB-QM 4.0, suitable for every control need. Actuators are available as On/Off, 0-10 Volt, 4-20 mA, and digital via field bus.

Ordering

AB-QM 4.0 CO⁶ Flexo

Picture	Type	Connection	Code No.
	DN15 LF	Straight pipe (18mm)	003Z1580
	DN15		003Z1581
	DN15 LF	Internal thread 1/2"	003Z1560
	DN15		003Z1561

Actuator ChangeOver⁶

Type	Cable length (m)	Power supply	Connection	Code No.
Actuator ChangeOver ⁶	1.5	24V AC	Open end	003Z3152
	5.0	24V AC	Open end	003Z3153
	1.5	230V AC	Open end	003Z3154
Actuator NovoCon ChangeOver ⁶	1	24V AC/DC	Plug-in	003Z8520
Actuator NovoCon ChangeOver ⁶ Energy	1 / Surface temperature sensors 1.5	24V AC/DC	Plug-in	003Z8521
Actuator NovoCon ChangeOver ⁶ Flexible	1.5	24V AC/DC	Open end	003Z8522

Actuator

Type	Speed (s/mm)	Power supply	Feedback signal	Control signal	Communication protocol	Enclosure	Code No.
NovoCon S	3/6/12/24	24V AC/DC	Yes	0-10 V, 2-10V, 0-20mA, 4-20mA	BACnet MS/TP, Modbus RTU	IP54 (IP40 if mounted upside down)	003Z8504
AME 110 NL	24	24V AC	No		–	IP42	082H8057
AME 110 NLX			Yes		–		082H8060

For complete range of actuators, cables and accessories please refer to datasheet for relevant actuator

Accessories

Picture	Description	Material	Code No.
	AB-QM 4.0 DN15 EPP insulation	EPP	003Z7810
	50x washers, o-rings, 50x short hairpin, 5x long hairpins	Washer - P.T.F.E. (TEFLON) O-ring - 70 EPDM 281 Hairpins - Inox	145H3018

Technical data

AB-QM 4.0 Nominal diameter		DN	15LF	15
Flow range	Q _{nom} (100 %)¹)	l/h	200	700
Setting range ¹), ²)		%	10-100	
Diff. pressure ³), ⁴)	Δp _{min} ³), ⁴)	kPa	16	
	Δp _{max}		600	
Pressure stage		PN	25	
Control range			1:1000	
Control valve's characteristic			Linear	
Leakage acc. to standard IEC 534			No visible leakage (at 100N)	
For shut off function			Acc. to ISO 5208 class A - no visible leakage	
Flow medium			Water and water mixture for closed heating and cooling systems according to plant type I for DIN EN 14868. When used in plant Type II for DIN EN 14868 appropriate protective measures are taken. The requirements of VDI 2035, part 1 + 2 are observed.	
Medium temperature ⁵)		°C	+2 ... +120	
AB-QM 4.0 stroke		mm	4	
Connection	Actuator		M30 x 1.5	
CO⁶ valve				
k _{vS}		m³/h	2.4	
k _{vS} of one port			3.4	
Max. operating torque		Nm	3.0	
Shut off		kPa	800	
Pressure stage		PN	16	
Valve neck			Quick fix connection	
Connection			Internal thread Rp ½" (ISO 7/1)	
Certification and standards			PED directive 2014/68/EU Art. 4§	
Medium temperature		°C	0 ... +90	
Flexo set				
Diff. pressure of the set		kPa	20 (at 200l/h = 100% flow of AB-QM DN15 LF)	35 (at 700l/h = 100% flow of AB-QM DN15)
Pressure stage		PN	16	
Connection	Connection port unit side		Internal thread G 1/2" / Straight pipe 18mm	
	Connection port system side		Internal thread G1/2" / Straight pipe 18mm	
Weight	Internal thread G 1/2	kg	3.7	3.7
	Straight pipe 18mm		3.3	3.3
Materials in medium				
Pipes and fittings	Pipes		Stainless Steel (SS304)	
	Tailpiece		Brass (CW617N-DW)	
	Elbow		Brass (CW617N-DW)	
	O-ring		EPDM	
PICV (AB-QM)	Valve bodies		DZR Brass (CW602N)	
	Membranes and O-rings		EPDM	
	Springs		W.Nr. 1.4310	
	Spring support		PPSU	
	Shutter		DZR brass (CW602N)	
	Cone (Cv)		PPSU	
	Seat (Cv)		DZR brass (CW602N)	
	Screw		Stainless Steel (A2)	
6way (CO⁶)	Ball		CW 614 N Chrome plated	
	Seals		P.T.F.E. (TEFLON)	
	O-ring		70 EPDM 281	
Material out of medium				
PICV (AB-QM)	Plastic parts		PA 6	
6way (CO⁶)	Stem		CW614N Nickel Plated	
Fittings	Hairpin		Stainless Steel (SS304)	
	Nuts		Brass (CW617N-DW)	
Accessories				
Accessories	AB-QM 4.0 Insulation		EPP	

¹⁾ Factory setting of the valve is done at nominal setting range.

²⁾ Regardless of the setting, the valve can modulate below 1 % of set flow.

³⁾ At min differential pressure the valve reaches at least 90% of the nominal flow. A declaration of performance is available upon request.

⁴⁾ AB-QM 4.0

⁵⁾ If the medium temperature when using AB-QM DN 15-20 is below 2 °C, than ice forming on the spindle must be prevented, therefore valve should be insulated with dedicated cooling insulation.

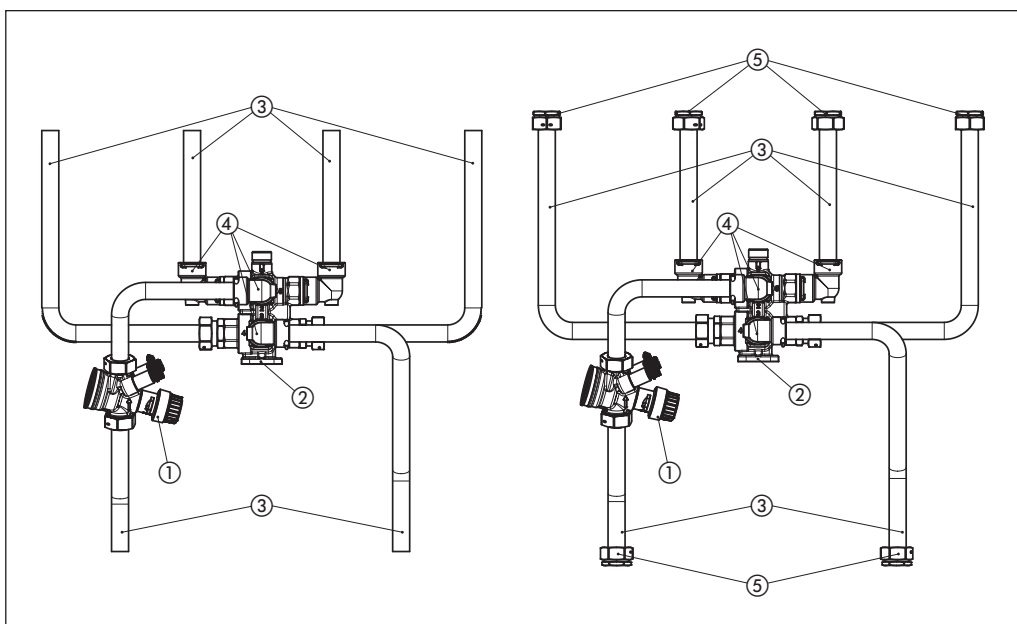
According suitability and usage especially in not oxygen tight systems please mind the instructions given by the coolant producer.

Pc - pressure controller part

Cv - Control valve part

Design

1. AB-QM 4.0.
2. CO⁶ valve
3. Stainless Steel pipe
4. Click fit connections
5. Union nut



Presetting

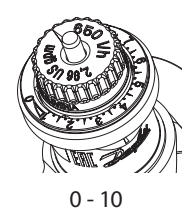
The calculated flow can be adjusted easily without using tools.
To change the presetting (factory setting is 100% (10) follow steps below:

1. Remove the blue protective cap or the mounted actuator
2. Turn the pointer (clockwise to decrease) to the new setting

Note: In case of using digital actuator (NovoCon S), setting shall remain at 100%, for more info refer to NovoCon S datasheet.

AB-QM 4.0

DN 15



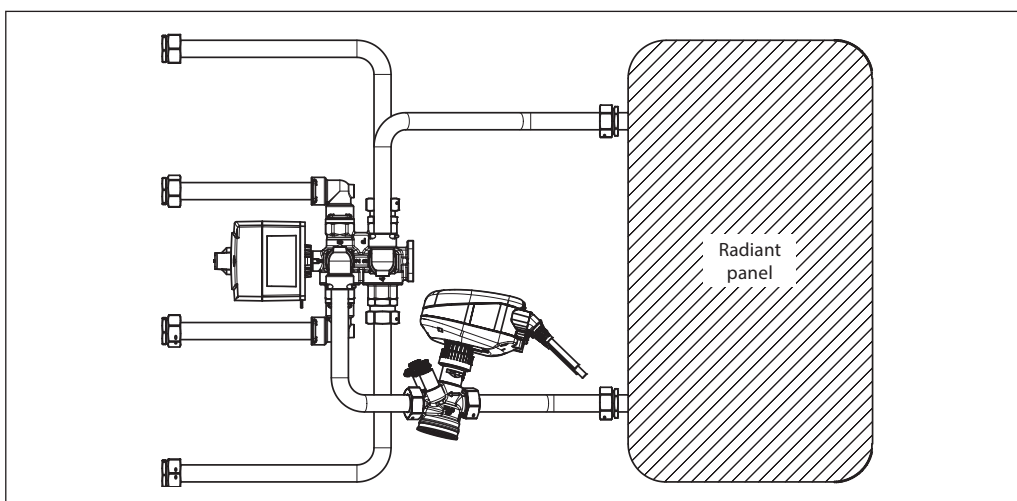
Installation

Small installation dimensions enable easy installation of the Flexo connection set even in limited spaces. The PICV valve should be installed in the return pipe from the thermal unit with the flow in the direction of the arrow on the AB-QM valve body.

Note:

The connection set can be installed in both cooling and heating applications.

- the connection and fittings and hairpins shall be tightened and fixed by customer after transportation.
- for the version with straight pipe ending, deburring shall be done by customer.
- The AB-QM 4.0 CO⁶ Flexo Set valve must be fixed or hanged to/ from the ceiling
- To reduce heat loss, customer can insulate the set..



Sizing

Example:

Given:

Design flow in system 0.11 l/s (0.39m³/h = 390l/h),

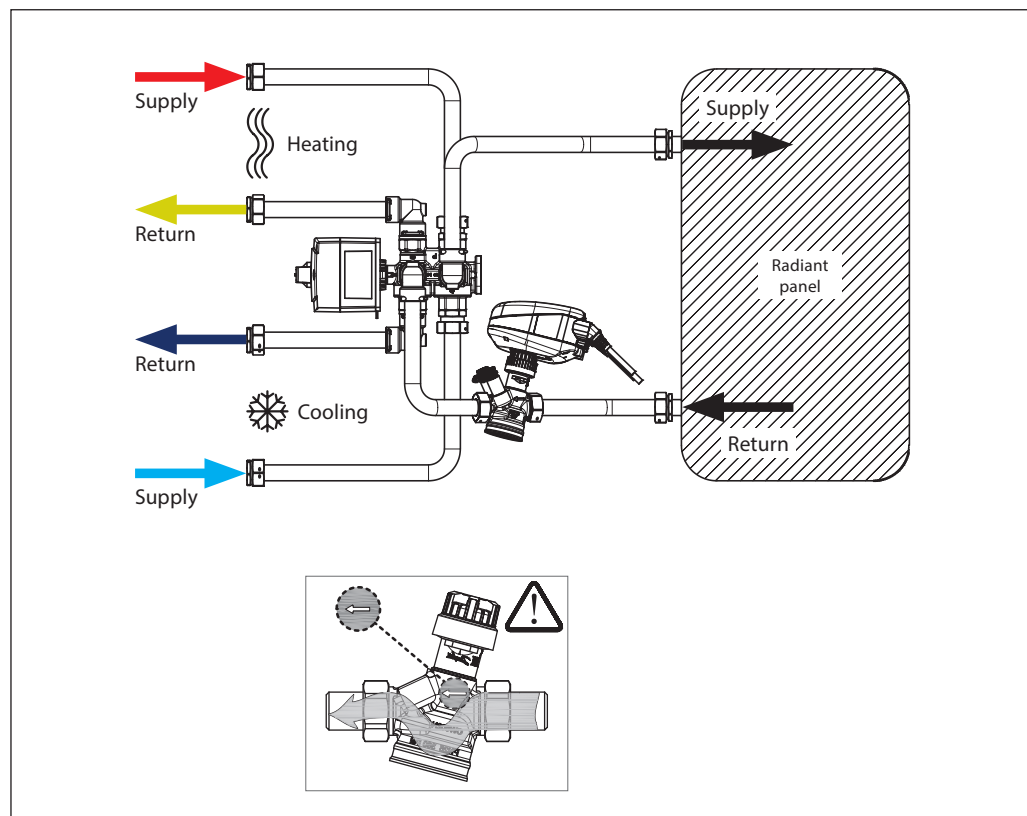
Solution:

In this case we can select AB-QM 4.0 DN15 with

$Q_{nom} = 700 \text{ l/h}$

Setting on the valve AB-QM 4.0 DN15 is design flow divided by nominal valve capacity, 390 l/h divided by 700 l/h = 55 %.

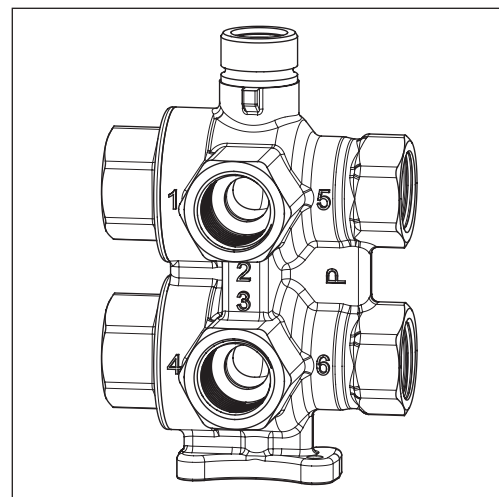
Application principles Inlet / outlet ports:



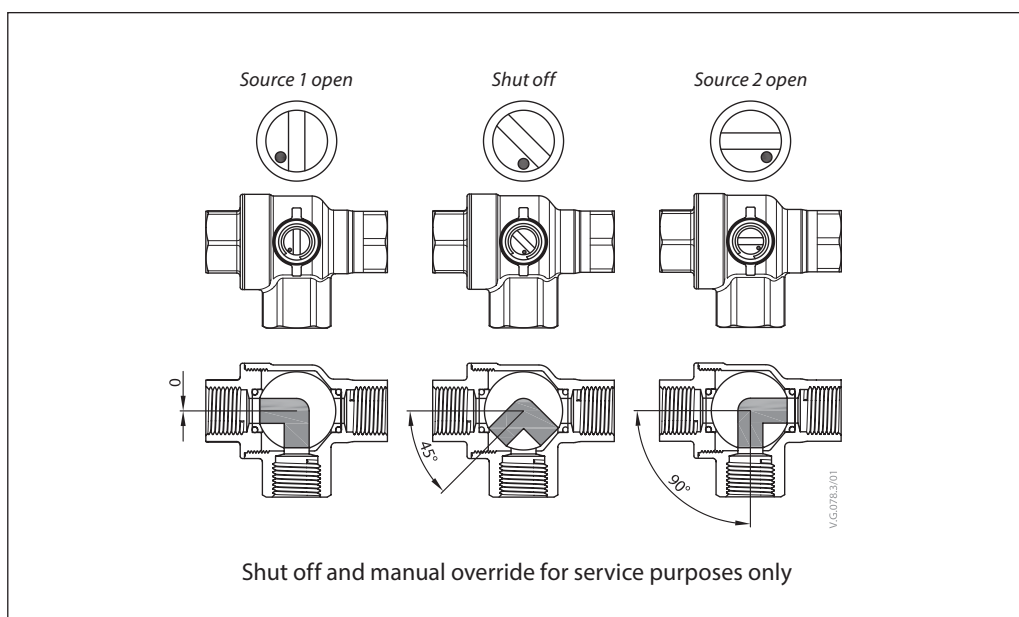
The inlet and outlet ports is determined according to AB-QM 4.0 flow direction and can be changed by flipping the AB-QM 4.0 valve.

Marking

Ports 1, 2 and 5 shall be outlet (return)
Ports 4, 3 and 6 shall be inlet (supply)



No mixing



Note:
Default position of CO⁶ valve is source 1 open

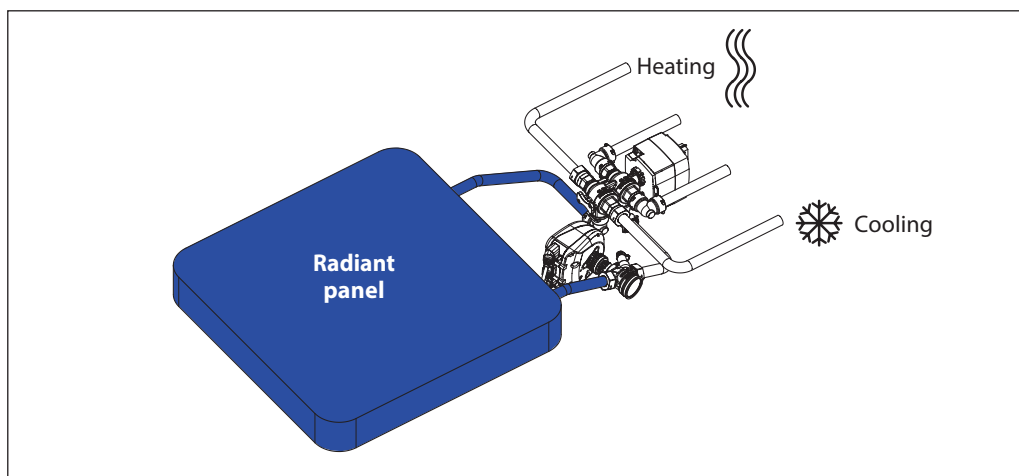
CO⁶, unlike many other 6-way ball valves, includes a shut off function. This function can be used only during maintenance and replaces the need for four ball valves.

Application principles AB-QM 4.0 CO⁶ Flexo

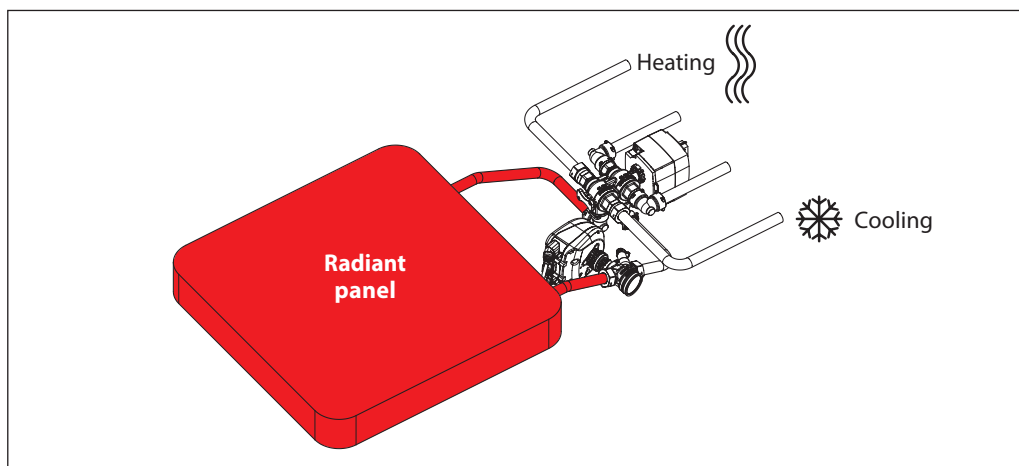
Anti-sticking requirements:

To reduce the risk of the ball valve sticking due to water quality, it is recommended that the valve is partially rotated at least once every 7 days. If the NovoCon actuator is used, this will can be handled by default.

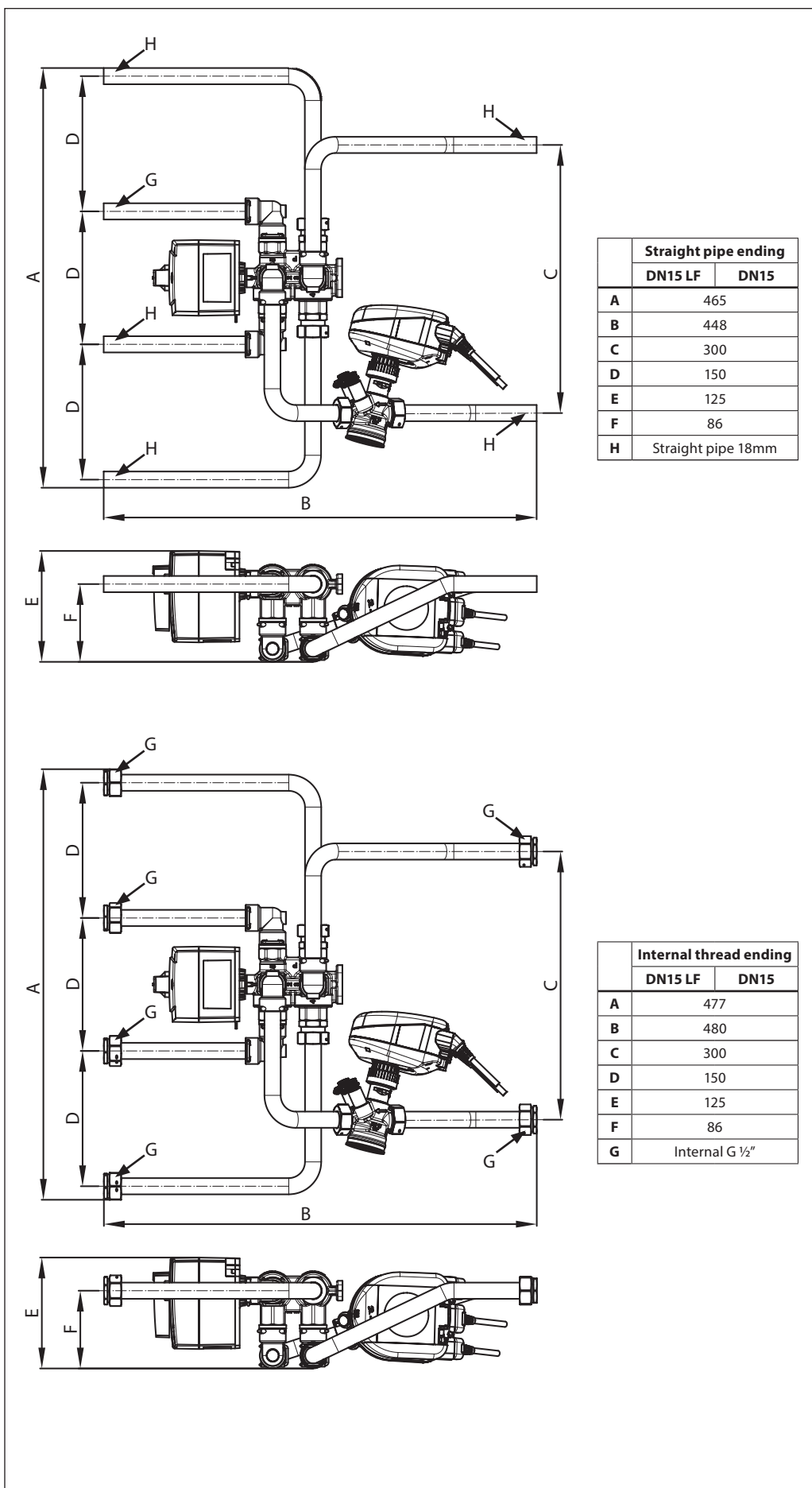
Cooling:



Heating:



Dimensions



Tender text

Valve assembly for flexible installation of heating and cooling ceiling systems and fan coils to a 4-pipe system. The valve assembly shall have the following features and characteristics:

- The assembly consisting of the following components: pressure-independent balancing and control valve (PICV), 6-way changeover valve, test plug for flow validation.
- Valve assembly shut-off via 6-way changeover valve and pressure-independent control valve (PICV)
- Pressure rating PN 16.
- Leak tested.
- Adjustable direction (up to 90°) of the connecting pipes to the heating/cooling ceiling
- Flexible assembly and disassembly of the connected pipes by means of "click-fit" hairpin connections.
- Pipe made of stainless steel, diameter 18mm, connection suitable for press fittings or with Rp 1/2" female thread.
- Installation height including actuators 125 mm

The Pressure Independent Control Valve (PICV) with the following features and properties:

- Flow limitation function
- Linear Control Characteristics
- Control ratio 1:1000
- Modulate below 1% of the set flow, regardless of the presetting.
- Presetting range 10 ... 100 %
- Adjustment scale as a percentage of flow
- Valve authority $a=1$ at all settings
- Minimum differential pressure 16 kPa (LF/NF version), 25 kPa (HF version)
- Max. differential pressure via control valve 600 kPa (6 bar)
- Closing pressure 16 bar, pressure rating PN 25
- Class IV Leak Rate
- Test plugs for flow measurement and pump optimization
- Conversion of the characteristic curve from linear to equal percent by adjusting the actuator
- Material valve body: brass, dezincification resistant (DZR)
- Temperature range (-10°C) +2°C ... +95°C

The 6-Way Valve Changeover Valve (CO⁶) with the following features and properties:

- No crossflow between the heating and cooling circuits
- Blocking of all 6 ports in the middle position
- Closing pressure 8 bar, pressure rating PN 16
- Total kvs value = 2.4 m³/h
- Max. differential pressure for DN15 is <8.5 kPa (for 700 l/h), for DN15LF <0.7 kPa (for 200 l/h)
- Material valve body: brass, dezincification resistant (DZR)
- Temperature range 0°C ... +90°C

Danfoss A/S

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