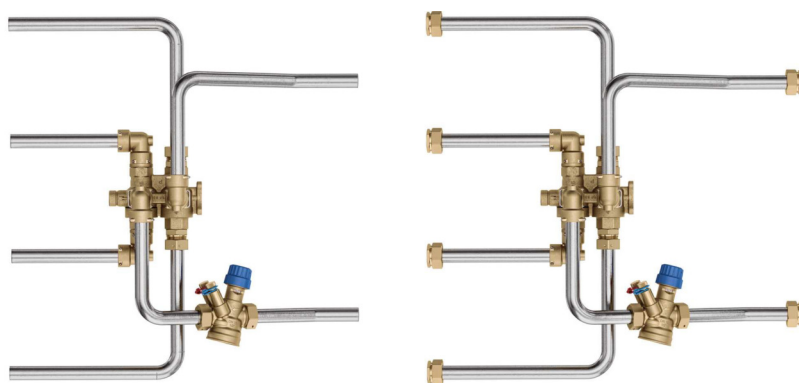




Pressure independent balancing and control valves

AB-QM 4.0 CO⁶ Flexo

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.

Features & benefits

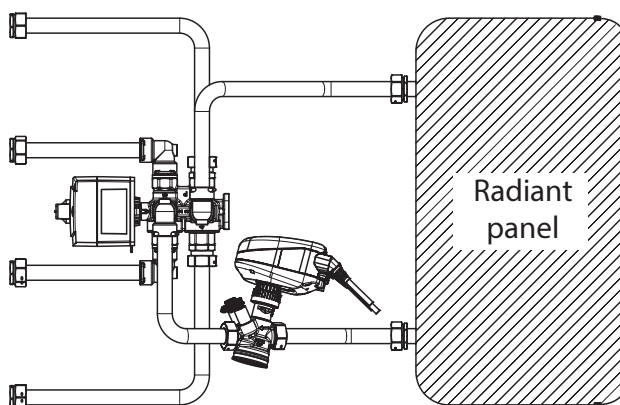
- Saving time and space
 - Pre-assembled design Reduced installation time
 - Easy setting and sizing, 100% authority and perfect control
- Trouble-free installations
 - Compact and space saving installation
 - Minimal built-in height
 - Pressure tested at the factory
- Save time and space
 - Exchangeable 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.

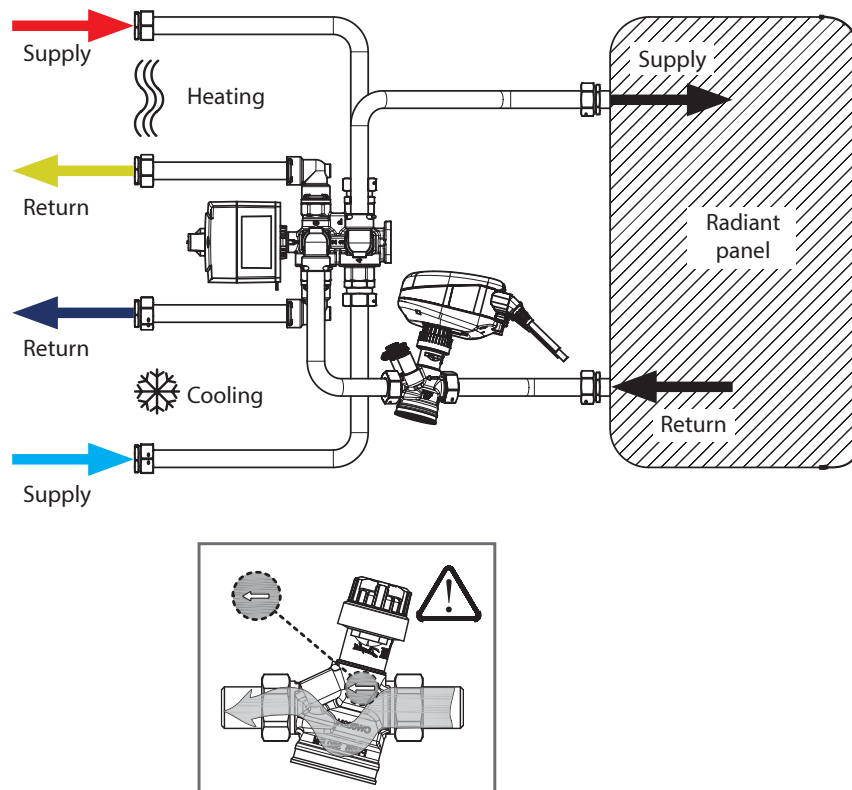
There is a wide range of Danfoss actuators available for the AB-QM 4.0, suitable for every control need. Actuators are available as On/Off, 0-10 Volt, 4-20 mA, and digital via field bus.



Principles

Application principles

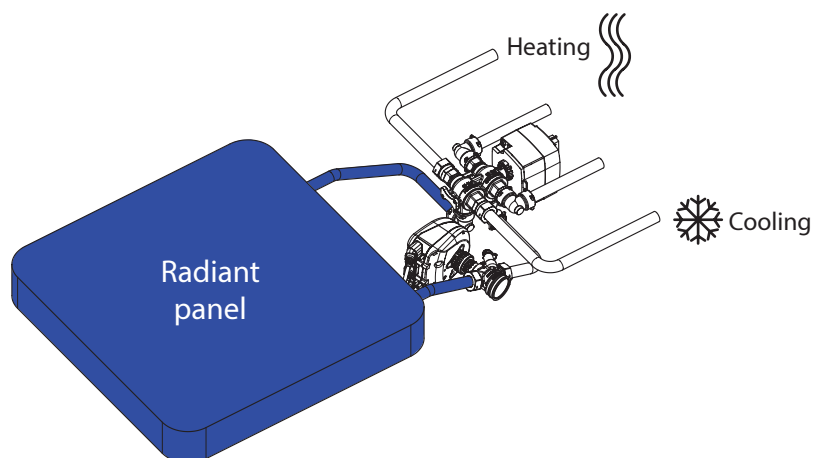
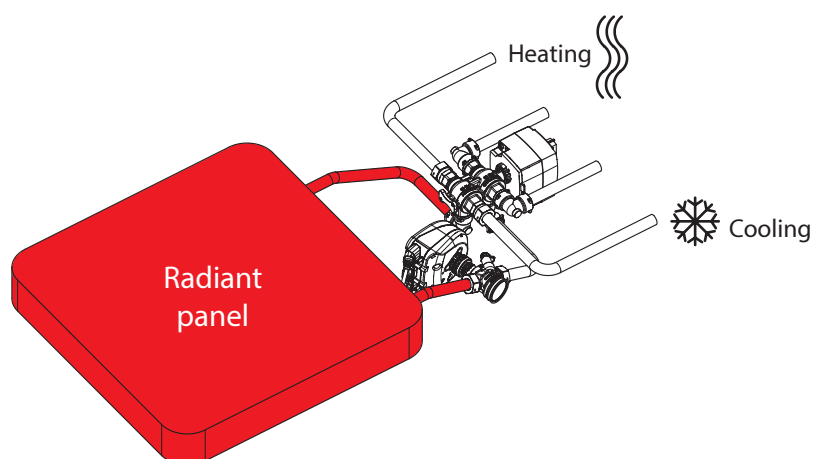
Inlet / outlet ports:



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.

AB-QM 4.0 CO⁶ Flexo**Anti-sticking requirements:**

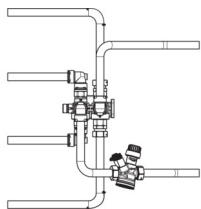
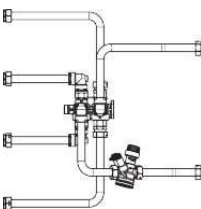
To reduce the risk of the ball valve sticking due to water quality, it is recommended that the valve is partially rotated at least once every 7 days. If the NovoCon actuator is used, this will can be handled by default.

Cooling:**Heating:**

Ordering

Product code numbers

AB-QM 4.0 CO⁶ Flexo

Picture	Type	Connection	Code No.
	DN15 LF	Straight pipe (18mm)	003Z1580
	DN15		003Z1581
	DN15 LF	Internal thread ½"	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	24	24V AC	Yes		-	IP42	082H8060

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

Accessories code numbers



003Z7810

AB-QM 4.0 DN15 EPP INSULATION

AB-QM 4.0 DN15 EPP INSULATION

Spare parts code numbers



145H3018

Flat stations spare parts

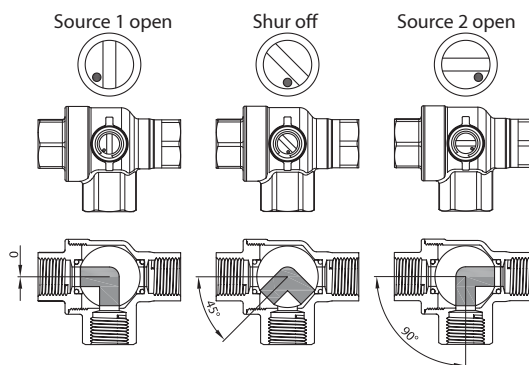
Hairpins, O-rings & washers for
EvoFlat

Functions

No mixing

Note:

Default position
of CO⁶ valve is
source 1 open



Shut off and manual override for service purposes only

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.

Presettings

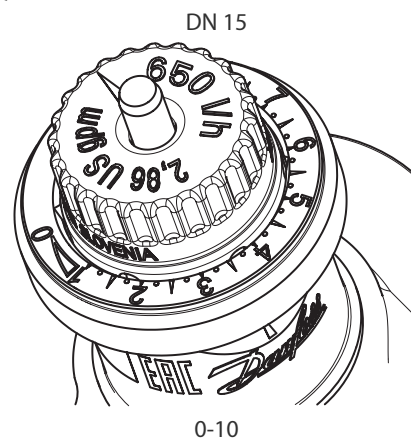
The calculated flow can be adjusted easily without using tools.

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



Product details

General 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	
CO ⁶ valve				
k _V S	m ³ /h		2.4	
k _V S 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	

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

AB-QM 4.0 Nominal diameter		DN	15LF	15
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

Sizing

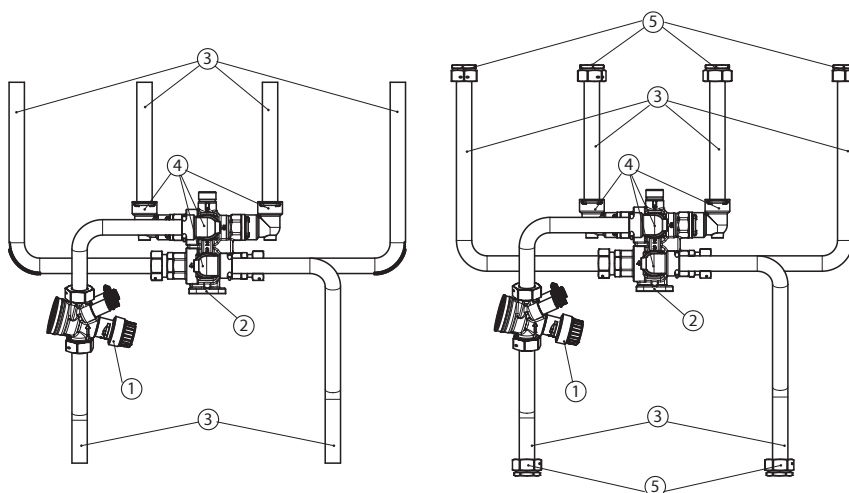
Example:

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} = 700l/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 %.

Design

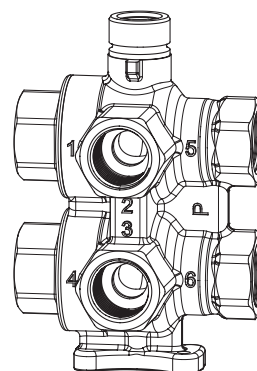
1. AB-QM 4.0.
2. CO⁶ valve
3. Stainless Steel pipe
4. Click fit connections
5. Union nut



Marking

Ports 1, 2 and 5 shall be outlet (return)

Ports 4, 3 and 6 shall be inlet (supply)

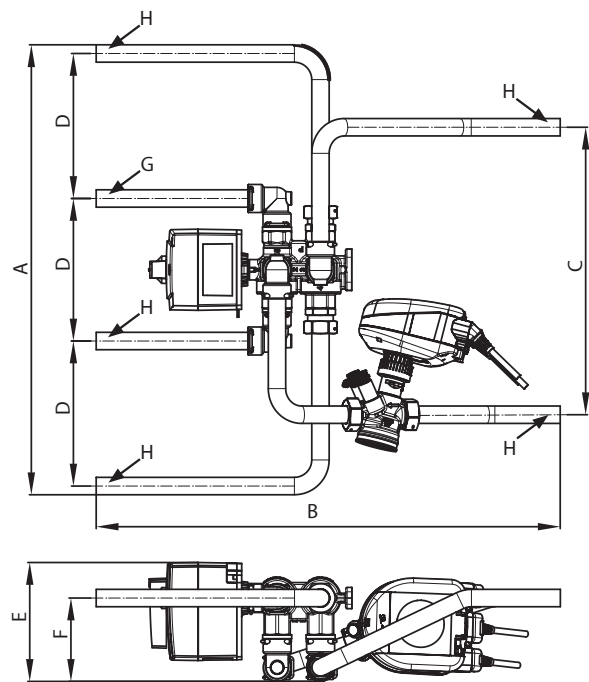


Materials

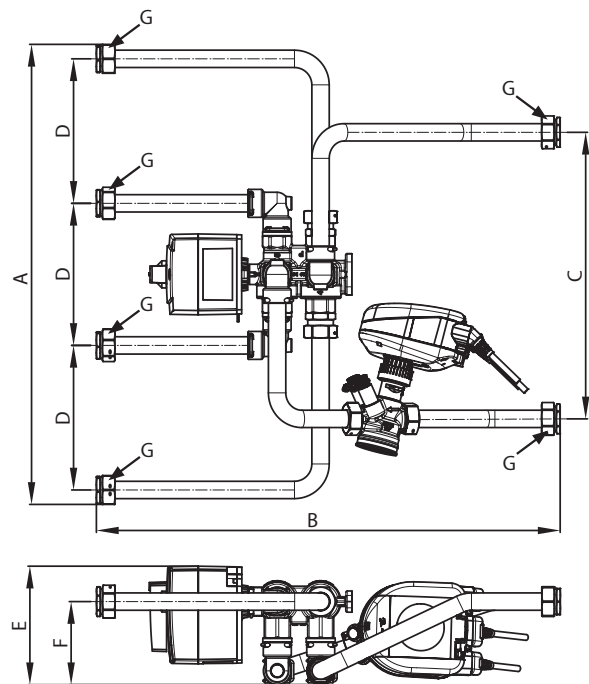
Materials in medium		
Pipes and fittings	Pipes	Stainless Steel (SS304)
	Tailpiece	Brass (CW617N-DW)
	Elbow	Brass (CW617N-DW)
	O-ring	EPDM
PICV (AB-QM)	Valve bodies	DZR Brass (CW602N)
	Membranes and O-rings	EPDM
	Springs	W.Nr. 1.4310
	Spring support	PPSU
	Shutter	DZR brass (CW602N)
	Cone (Cv)	PPSU
	Seat (Cv)	DZR brass (CW602N)
	Screw	Stainless Steel (A2)
6way (CO ⁶)	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 (CO ⁶)	Stem	CW614N Nickel Plated
Fittings	Hairpin	Stainless Steel (SS304)
	Nuts	Brass (CW617N-DW)
Accessories		
Accessories	AB-QM 4.0 Insulation	EPP



Dimensions



Straight pipe ending		
	DN15 LF	DN15
A	465 mm	
B	448 mm	
C	300 mm	
D	150 mm	
E	125 mm	
F	86 mm	
H	Straight pipe 18mm	



Internal thread ending		
	DN15 LF	DN15
A	477 mm	
B	480 mm	
C	300 mm	
D	150 mm	
E	125 mm	
F	86 mm	
G	Internal G ½"	

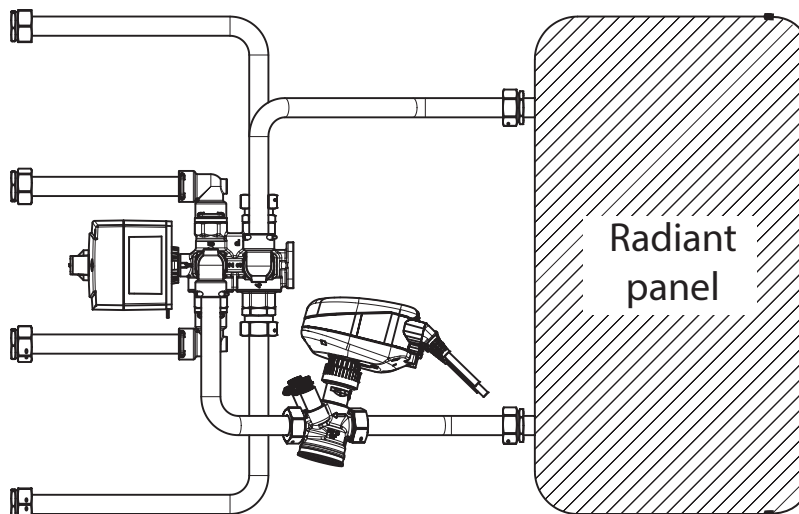
Installation

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..



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
Export Control Declaration	Automatic balancing and Pressure independent control valves	Danfoss	
Manufacturer's Declaration	Danfoss MD 240424EN2896101.01	Danfoss	EU RoHS, PED, Pressure

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 k_{vs} 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

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.



The Danfoss Design center

Discover the Design Center, our advanced digital platform that streamlines product selection. With integrated tools and enhanced type pages, it's simpler than ever to access product information and documentation, and to select the right products. Check the availability of Danfoss products at partner locations and enjoy seamless transitions from selection to purchase with our basket-to-basket functionality. Whether you're buying from our distributors or directly from the Product Store, the Design Center simplifies your experience. Learn more at: designcenter.danfoss.com.



The Danfoss product store

The Danfoss Product Store is a one-stop shop available 24/7 for our customers, no matter where you are in the world or what area of industry you work in. Browse our catalog, check product details and documentation, view your prices and product availability, and quickly finalize your purchase. Start browsing at: store.danfoss.com.



Danfoss Partner Portal/Product Data tool

Designed to support you with easy access to product data extracts, essential resources, tools, and information. The Partner Portal provides a centralized hub for product documentation, training materials, marketing assets, and technical support, ensuring you have everything you need to succeed and grow your business with Danfoss. The Partner Portal is available 24/7 at: partner.danfoss.com and is ready to support your business.



Find technical documentation

Find technical documentation you need to get your project up running. Get direct access to our official collection of data sheets, certificates and declarations, manuals and guides, 3D models and drawings, case stories, brochures, and much more. Start searching now at: documentation.danfoss.com.



Danfoss Learning

Danfoss Learning is a free online learning platform. It features courses and materials specifically designed to help engineers, installers, service technicians, and wholesalers better understand the products, applications industry topics, and trends that will help you do your job better. Find your local Danfoss website here: learning.danfoss.com.



Get local information and support

Local Danfoss websites are the main sources for help and information about our company and products. Find product availability, get the latest regional news, or connect with a nearby expert - all in your own language. Find your local Danfoss website here: danfoss.com.

Danfoss A/S

Climate Solutions . danfoss.com . +45 7488 2222

Any information, including, but not limited to information on selection of product, its application or use, product design, weight, dimensions, capacity or any other technical data in product manuals, catalogues description, advertisements, etc. and whether made available in writing, orally, electronically, online or via download, shall be considered informative, and is only binding if and to the extent, explicit reference is made in a quotation or order confirmation. Danfoss cannot accept any responsibility for possible errors in catalogues, brochures, videos and other material. Danfoss reserves the right to alter its products without notice. This also applies to products ordered but not delivered provided that such alterations can be made without changes to form, fit or function of the products. All trademarks in this material are property of Danfoss A/S or Danfoss group companies. Danfoss and the Danfoss logo are trademarks of Danfoss A/S. All rights reserved.
