



Pressure independent balancing and control valves

AB-QM 4.0 Flexo

Description

Danfoss AB-QM 4.0 Flexo with AB-QM valve, 3-way ball valve design, and 80 mm center distance is a compact and time-saving connection set. It's designed for creating optimal hydronic balance in cooling and heating applications with the variable flow (such as fan coil units (FCU) or chilled beams). Flow is controlled by the AB-QM pressure independent control valve to avoid overflow and reduced efficiency of the thermal unit.

Features & benefits

- Installation:
 - Saving time and space (pre-assembled design)
 - Reduced installation time
 - Easy setting and sizing, 100% authority and perfect control (available in left-hand and right-hand version)
 - Trouble-free installations (compact and space saving installation; pressure tested from factory - nominal pressure PN25)
- Service (enable fast servicing, maintenance and troubleshooting):
 - Easy flushing
 - Easy draining
 - Easy bypass
 - Easy cleaning of filter
 - Enables pressure and flow validation
- 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.

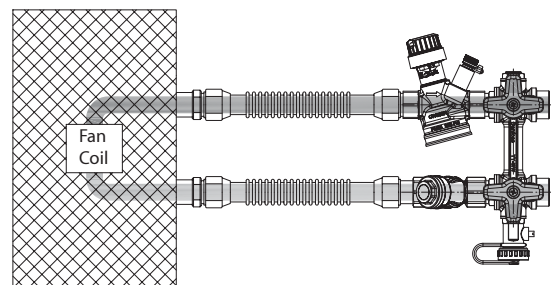
Applications

AB-QM 4.0 Flexo is a pre-assembled, pressure-tested set used for terminal units, such as FCU (Fan Coil Unit). The Danfoss AB-QM 4.0 Flexo solution comprises an H-body (with integrated shut-off valves & the possibility to mount measuring plugs), strainer, drain, and associated Danfoss AB-QM 4.0 pressure independent control valve.

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. Actuators¹⁾ are available as On/Off, 0-10 Volt, 4-20 mA, and digital via field bus.

¹⁾ for more details see AB-QM data sheet & actuators.



Ordering

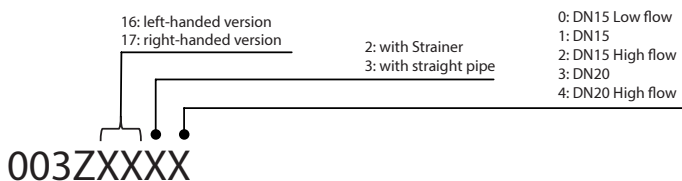
Product code numbers

AB-QM 4.0 Flexo Left-hand version

Type	Q _{nom} (l/h)	Connection	Centre (mm)	Code No.	Only for Danish market VVS-nr.
DN15 LF (strainer)	200	Internal ½"	80	003Z1620	40 6838.402
DN15 (strainer)	700			003Z1621	40 6838.406
DN15 HF (strainer)	1200			003Z1622	40 6838.412
DN20 (strainer)	1100	Internal ¾"	80	003Z1623	40 6838.411
DN20 HF (strainer)	1900			003Z1624	40 6838.419
DN15 LF	200	Internal ½"	80	003Z1630	40 6838.302
DN15	700			003Z1631	40 6838.306
DN15 HF	1200			003Z1632	40 6838.312
DN20	1100	Internal ¾"	80	003Z1633	40 6838.311
DN20 HF	1900			003Z1634	40 6838.319

AB-QM 4.0 Flexo Right-hand version

Type	Q _{nom} (l/h)	Connection	Centre (mm)	Code No.
DN15 LF w. strainer	200	Internal ½"	80	003Z1720
DN15 w. strainer	700			003Z1721
DN15 HF w. strainer	1200			003Z1722
DN20 w. strainer	1100	Internal ¾"	80	003Z1723
DN20 HF w. strainer	1900			003Z1724
DN15 LF	200	Internal ½"	80	003Z1730
DN15	700			003Z1731
DN15 HF	1200			003Z1732
DN20	1100	Internal ¾"	80	003Z1733
DN20 HF	1900			003Z1734



Example: AB-QM Flexo 80 right-hand version with strainer DN15 high flow: 003Z1722

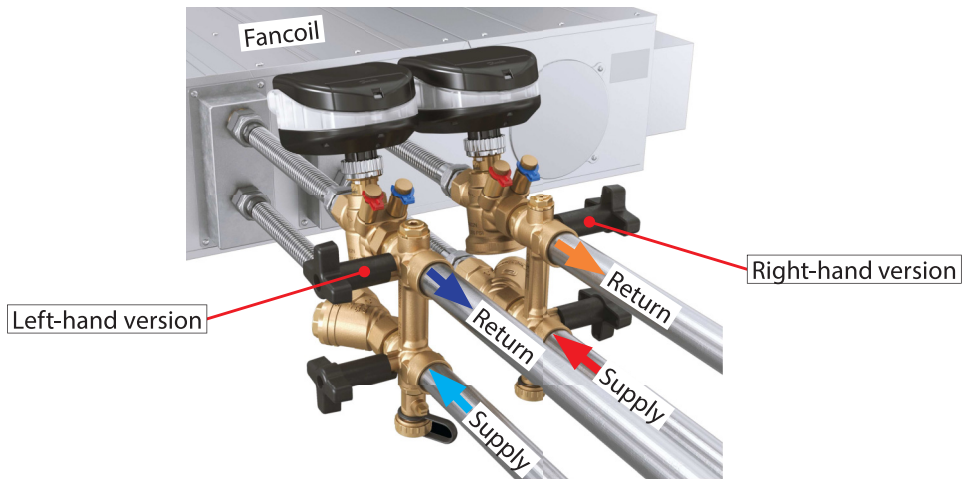
Accessories code numbers

AB-QM 4.0 Flexo Accessories

Description	Dimension	Material	Comments	Code No.	Only for Danish market VVS-nr.
AB-QM 4.0 Flexo Insulation	DN15	EPP	Heating insulation ¹⁾	003Z4751	40 6838.914
	DN20	EPP	Heating insulation ¹⁾	003Z4752	40 6838.916
AB-QM 4.0 Flexo flexible pipe, PN25	DN15	SS	300 mm, set of 2 pcs	003Z4794	40 6838.924
	DN20	SS	300 mm, set of 2 pcs	003Z4795	40 6838.926
Flexo extended handle (spare part)	DN15-DN20	PA66	Black	003Z4827	-
Test plug	DN15-DN20	DZR Brass	-	003Z0104	-
Measuring connector for drain	DN15-DN20	Brass	-	003L8143	-

¹⁾ insulation is compatible with left-hand version

For complete range of AB-QM actuators, accessories and spare parts please refer to AB-QM data sheet.



Functions

Operation

Flushing

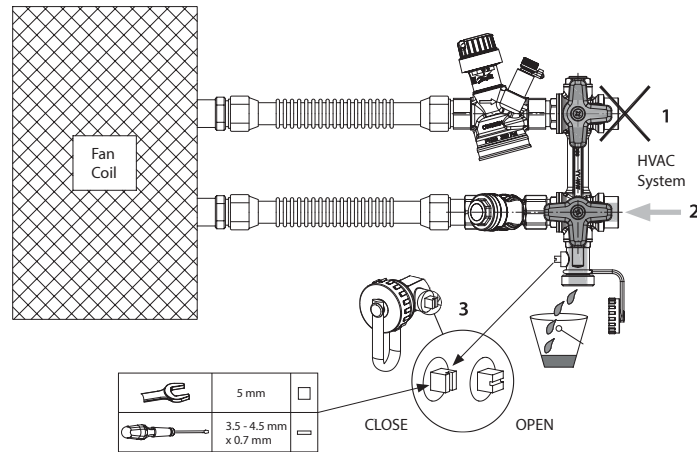


Fig. 1

There are three basic modes during flushing:

Forward flushing and draining of system should be done via drain connection. Use the following procedure to drain (Fig. 1):

1. Connect pipe on drain connection
2. Adjust outlet 3-way valve to open bypass ①
3. Open 3-way valve on inlet side ②
4. Open shut-off valve on drain ③
5. Drain the system

Flushing of main pipe (bypass)

High level of cleanliness of main pipe network flushing is achievable since thermal units are isolated.

Use the following procedure for flushing main pipe via bypass pipeline (Fig. 2):

1. Adjust both 3-way valves to open bypass ① ②
2. Start with flushing procedure

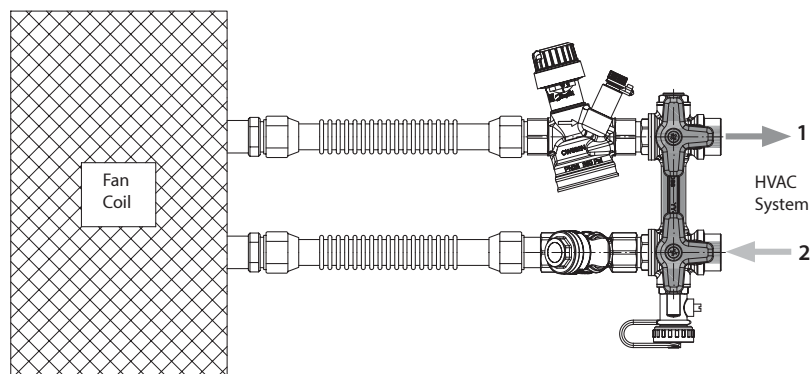


Fig. 2

Backward flushing and draining

Offers cleaning of thermal unit. Backward flushing of fan coil should be done only with full open valve or full open actuator mounted on the valve. Use the following procedure for flushing main pipe via bypass pipeline (Fig. 3):

1. Connect pipe on drain connection ①
2. Close inlet 3-way valve ②
3. Open shut-off valve on drain ③
4. Start with flushing procedure

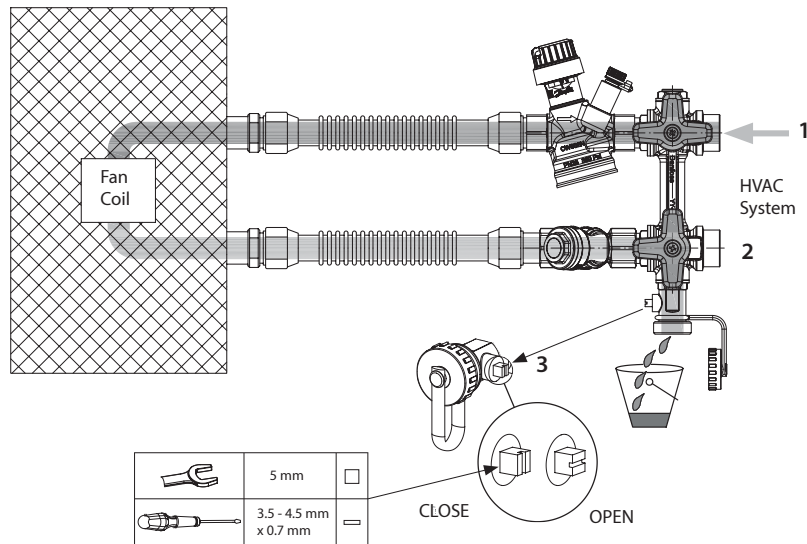


Fig. 3

Presettings

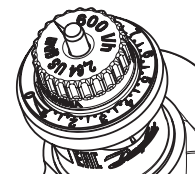
The calculated flow can be adjusted easily without using special tools.

The change of 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.

AB-QM 4.0

DN 15, 20



0 - 10

Product details

General data

Technical data

Nominal diameter		DN	15 LF	15	15 HF	20	20 HF
Flow range	Q_{nom} (100%) ¹⁾	l/h	200	700	1.200	1.100	1.900
Setting range ^{1),2)}		%	10-100				
Diff. pressure ³⁾	Δp_{min} ⁴⁾	kPa	16	16	25	16	25
	Δp_{max}		600				
k_{vs} ⁵⁾	m^3/h		5.6				
k_{vs} with strainer ⁵⁾			3.5			5	
Pressure stage		PN	25				
Mesh size		μm	500				
Number of meshes		n/cm ²	50				
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		°C	(-10*) +2 ... +95				
Stroke		mm	4				
Connection	Connection port fan coil side		Internal thread Rp ½" (ISO 7/1)			Internal thread Rp ¾" (ISO 7/1)	
	Connection port system side		Internal thread G½" (ISO228/1)			Internal thread G¾" (ISO228/1)	
	Actuator		M30 x 1.5				
Insulation							
Density		g/l	60				
Water absorption		%	1.2±0.6				
Insulation property / thermal conductivity			39 mW/m/K				
Fire behavior classification			Building, Euroclass E				
Flex pipe	Connection port		Internal G½" (ISO228/1)			Internal G¾" (ISO228/1)	
			External G½" (ISO228/1)			External G¾" (ISO228/1)	
	Length	mm	300				

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 valve reaches at least 90% of nominal flow. Declaration of performance is available upon request.

⁴⁾ AB-QM 4.0

⁵⁾ Flexo connection set without AB-QM 4.0

⁶⁾ 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

Sizing

Example:

Given:

Design flow in system 0.2 l/s
(0,72m³/h = 720l/h),

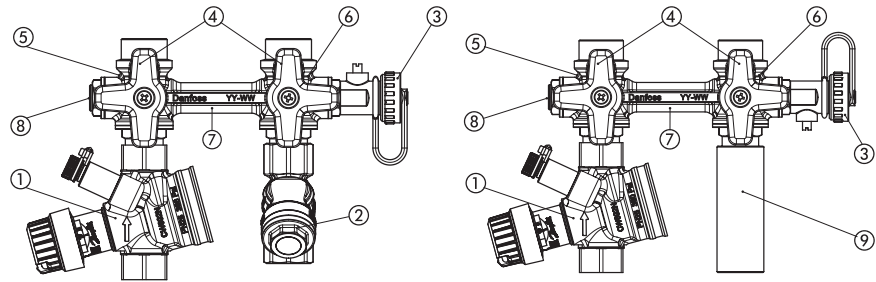
Solution:

In this case we can select AB-QM 4.0 DN15HF with $Q_{nom} = 1200$ l/h AB-QM and presetting.

Setting on the valve AB-QM DN 15 HF is design flow divided by nominal valve capacity, 720 l/h divided by 1200 l/h = 60 %.

Design

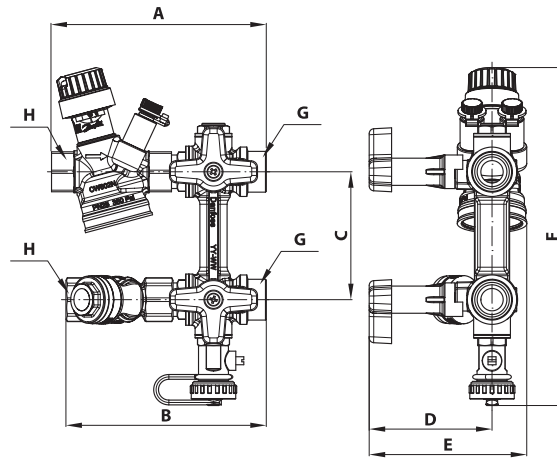
1. AB-QM 4.0.
2. Strainer
3. Drain connection & measuring station
4. Black handle
5. 3-way return valve
6. 3-way inlet valve
7. Bypass
8. Optional test plug connections
9. Stainless steel pipe



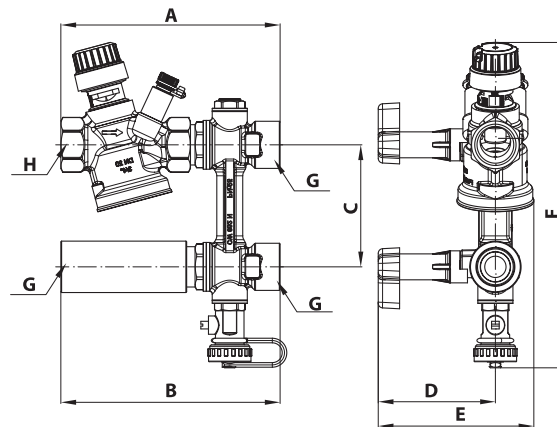
Materials

Materials in medium			
Flexo H-piece	Body and connection		DZR Brass (CW602N)
	Strainer		
	Drain valve		
	Fittings, unions		
	Gasket		PTFE
Material out of medium			
Flexo H-piece	Operating handles		PA66
	Handwheel screw		Stainless steel
Materials in medium			
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)
Material out of medium			
PICV (AB-QM)	Plastic parts		PA 6
Accessories			
Accessories	Insulation		EPP
	Flexible pipe	Pipe	Stainless steel (1.4401)
		Union	Nickel plated Brass (CW602N, Ni 2)
		Nut	Nickel plated Brass (CW602N, Ni 2)
		Washer	EPDM
	Test plug		DZR (CW602N)

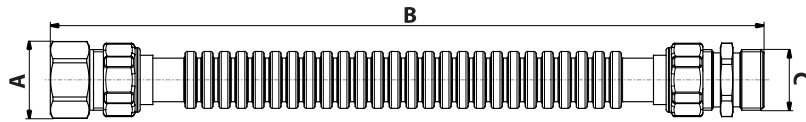
Dimensions



	DN15LF	DN15	DN15HF	DN20	DN20HF
A		134.5		144	
B		125		138	
C		80		80	
D		77		77	
E		98.5		102	
F		211		213	
G		Internal G1/2" (ISO 228/1)		Internal G3/4" (ISO 228/1)	
H		Internal Rp1/2" (ISO 7/1)		Internal Rp3/4" (ISO 7/1)	

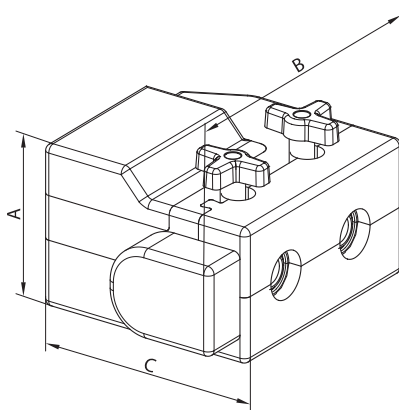


	DN15LF	DN15	DN15HF	DN20	DN20HF
A		134.5		144	
B		134.5		144	
C		80		80	
D		77		77	
E		98.5		102	
F		211		213	
G		Internal G1/2" (ISO 228/1)		Internal G3/4" (ISO 228/1)	
H		Internal Rp1/2" (ISO 7/1)		Internal Rp3/4" (ISO 7/1)	



	A	B*	C
DN15	Internal G1/2" (ISO228/1)	298	External G1/2" (ISO 228/1)
DN20	Internal G3/4" (ISO228/1)	310	External G3/4" (ISO 228/1)

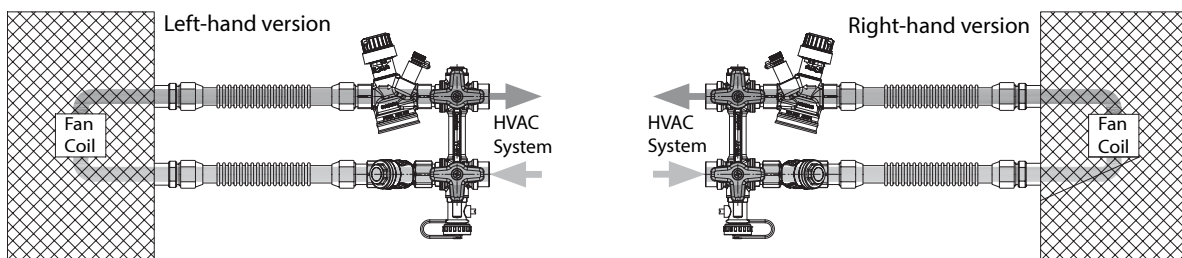
*The length of the flexible pipes might deviate +20 or -10mm.



	A	B	C
DN15	95	215	160
DN20	120	220	167

Installation

Small installation dimensions enable easy installation of Flexo connection set even in limited space. 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. Danfoss highly recommends installing Flexo using flexible pipes.



Note: The connection set can be installed in both cooling and heating applications. In cooling application depending on design condition and humidity, Flexo set shall be insulated fully with vapor tight insulation.

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	

Tender text

The terminal units shall be connected to the system by way of a valve assembly. This valve assembly shall have the following characteristics:

- The valve set shall comprise of the following components, PICV, H-piece valve body, measuring points, strainer valve, drain, operating handles.
- The assembly shall have a bypass line that, by manipulating the ball valves, will be able to insulate the terminal unit and PICV to allow forwards- and backward flushing of the system
- The valve set shall have extended handles to allow operation with the insulation.
- It shall be possible to shut off the bypass
- The set shall be suitable for 25 Bars of static pressure (PN25)
- The set shall be leak tested
- If required, the set shall be insulated by an EPP form-fitting shell

The PICV shall have the following characteristics:

- Flow limitation function
- Modulating below 1% of set flow, regardless of the setting,
- Authority of 1 at all settings
- Able to close against 16 bars of differential pressure.
- Linear control characteristic
- Setting scale in the percentage of flow
- Control ratio 1:1000
- Test plugs for pump optimization and flow measuring
- Characteristic changed from linear to equal percentage characteristic at all sizes by adjusting actuator settings
- Leakage rate Class IV

Contact details

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