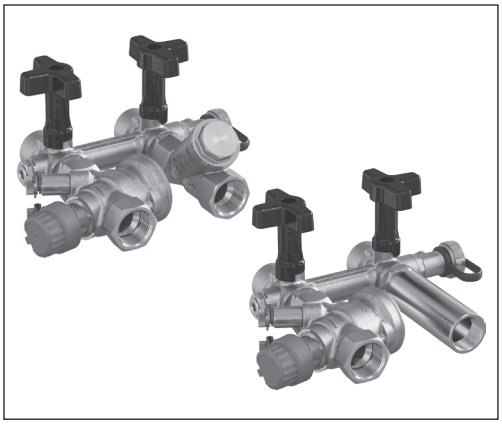
ENGINEERING
TOMORROW

**Data sheet**

# AB-QM 4.0 Flexo, DN 15-20, PN 25

## Description



Danfoss AB-QM 4.0 Flexo with AB-QM valve, 3-way ball valve design, and 80mm 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 thermal unit.

**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

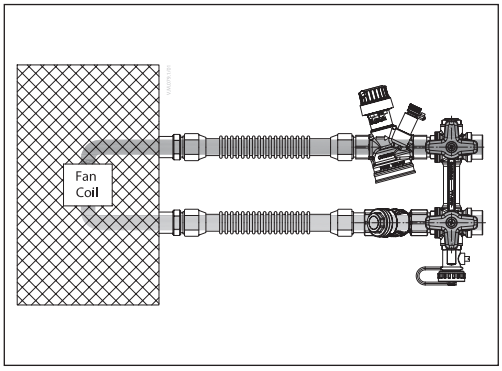
**Service:**
Enable fast servicing, maintenance and trouble shooting
- Easy flushing
- Easy draining
- Easy bypass
- Easy cleaning of filter
- Enables pressure and flow validation

**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.

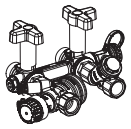
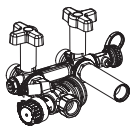



There is a wide range of Danfoss actuators available for the AB-QM 4.0, suitable for every control need. Actuators[1)] are available as On/Off, 0-10 Volt, 4-20 mA, and digital via field bus.

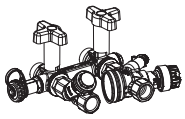
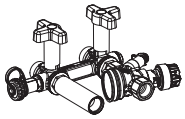
*1) for more details see AB-QM data sheet & actuators.*

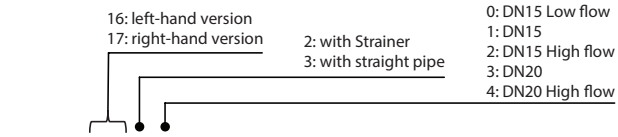
## Ordering

### AB-QM 4.0 Flexo Left-hand version

| Picture | Type | $Q_{nom}$ (l/h) | Connection | Centre (mm) | Code No. |
|---|---|---|---|---|---|
|  | DN15 LF (strainer) | 200 | Internal ½" | 80 | **003Z1620** |
| | DN15 (strainer) | 650 | | | **003Z1621** |
| | DN15 HF (strainer) | 1200 | | | **003Z1622** |
| | DN20 (strainer) | 1100 | Internal ¾" | | **003Z1623** |
| | DN20 HF (strainer) | 1900 | | | **003Z1624** |
|  | DN15 LF | 200 | Internal ½" | 80 | **003Z1630** |
| | DN15 | 650 | | | **003Z1631** |
| | DN15 HF | 1200 | | | **003Z1632** |
| | DN20 | 1100 | Internal ¾" | | **003Z1633** |
| | DN20 HF | 1900 | | | **003Z1634** |

### AB-QM 4.0 Flexo Right-hand version

| Picture | Type | $Q_{nom}$ (l/h) | Connection | Centre (mm) | Code No. |
|---|---|---|---|---|---|
|  | DN15LF w. strainer | 200 | Internal ½" | 80 | **003Z1720** |
| | DN15 w. strainer | 650 | | | **003Z1721** |
| | DN15HF w. strainer | 1200 | | | **003Z1722** |
| | DN20 w. strainer | 1100 | Internal ¾" | | **003Z1723** |
| | DN20HF w. strainer | 1900 | | | **003Z1724** |
|  | DN15LF | 200 | Internal ½" | 80 | **003Z1730** |
| | DN15 | 650 | | | **003Z1731** |
| | DN15HF | 1200 | | | **003Z1732** |
| | DN20 | 1100 | Internal ¾" | | **003Z1733** |
| | DN20HF | 1900 | | | **003Z1734** |



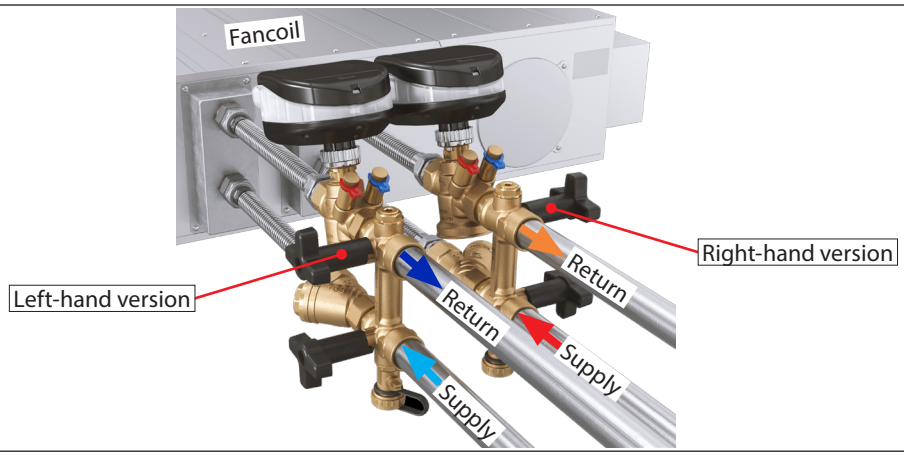

*Example: AB-QM Flexo 80 right-hand version with strainer DN15 high flow: 003Z1722*

### AB-QM 4.0 Flexo Accessories

| Description | Dimension | Material | Comments | Code No. |
|---|---|---|---|---|
| AB-QM 4.0 Flexo Insulation | DN15 | EPP | Heating insulation [1] | **003Z4751** |
| | DN20 | EPP | Heating insulation [1] | **003Z4752** |
| AB-QM 4.0 Flexo flexible pipe, PN25 | DN15 | SS | 300 mm, set of 2 pcs | **003Z4794** |
| | DN20 | SS | 300 mm, set of 2 pcs | **003Z4795** |
| Flexo extended handle (sparepart) | 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.*



## Technical data

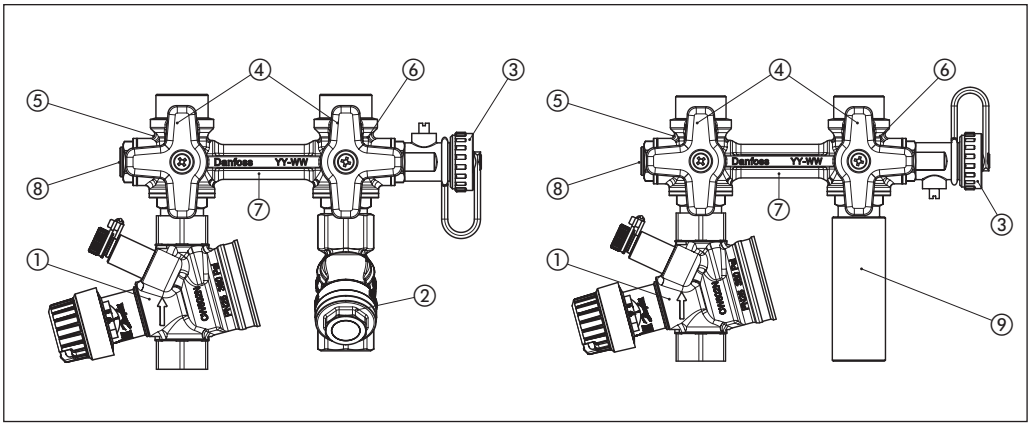
| **Nominal diameter** | | **DN** | **15LF** | **15** | **15 HF** | **20** | **20 HF** |
|---|---|---|---|---|---|---|---|
| Flow range | $Q_{nom}$ (100 %)[1] | l/h | 200 | 650 | 1.200 | 1.100 | 1.900 |
| Setting range [1), 2)] | | % | 10-100 | | | | |
| Diff. pressure [3)] | $\Delta p_{min}$ 4) | kPa | 16 | 16 | 25 | 16 | 25 |
| | $\Delta p_{max}$ | | 600 | | | | |
| $k_{VS}$ [5)] | | $m^3/h$ | 5.6 | | | | |
| $k_{VS}$ with strainer [5)] | | | 3.5 | | | 5 | |
| 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 | | °C | (-10*) +2 ... +95 | | | | |
| Stroke | | mm | 4 | | | | |
| Connection | Connection port fan coil side | | Internal thread Rp ½" (ISO 7/1) | | | Internal thread Rp 3/4" (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 G1/2" (ISO228/1) | | | Internal G3/4" (ISO228/1) | |
| | | | External G½" (ISO228/1) | | | External G¾" (ISO228/1) | |
| | Length | mm | 300 | | | | |
| **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) | | | | |

*[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*

## 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



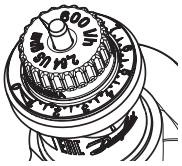

## Presetting

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



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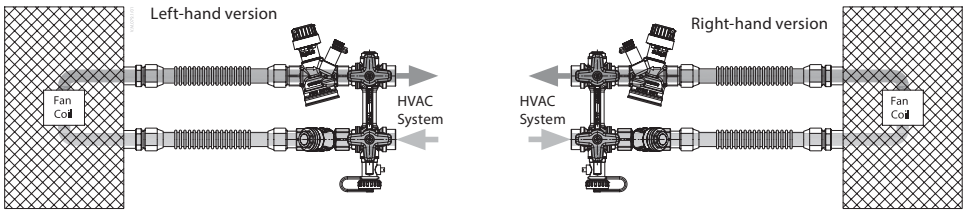
## Installation

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 applicationss.*
*In cooling application depending on design condition and humidity, Flexo set shall be insulated fully with vapor tight insulation.*

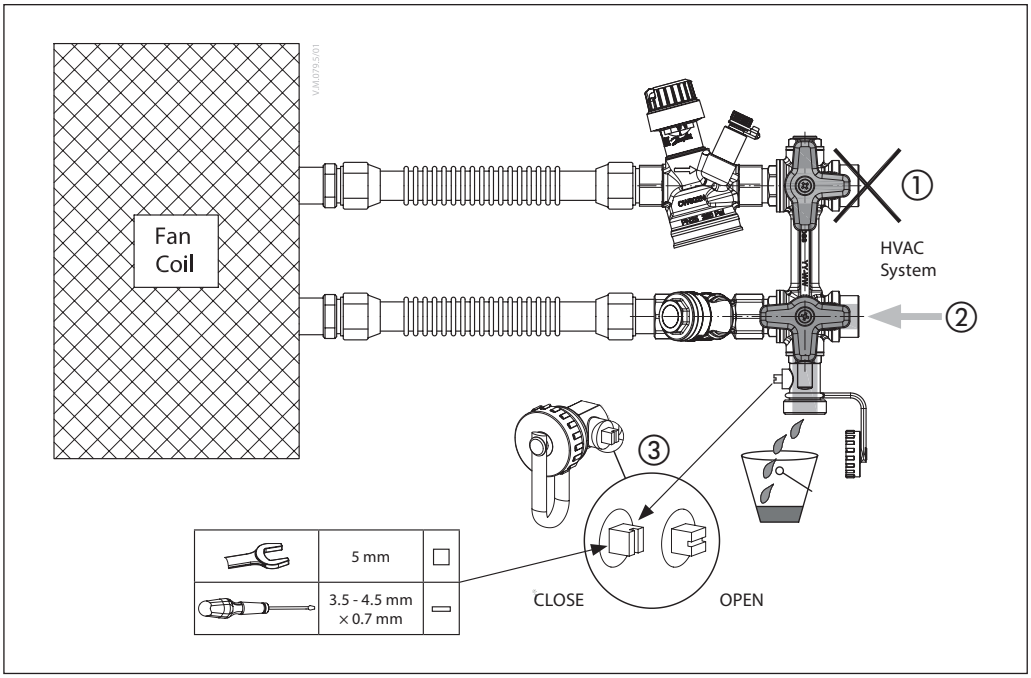



## Sizing

**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 (*Fig.2*) 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 %.

## Flushing




There are three basic modes during flushing:

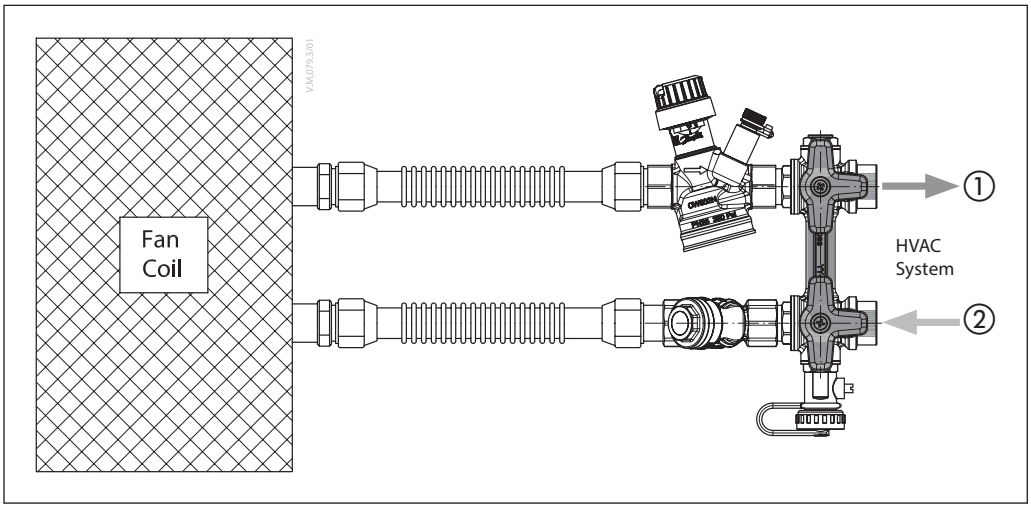
**Forward flushing and draining** of system should be done via drain connection. Use the following procedure to drain (Fig. 3):

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. 4*):

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

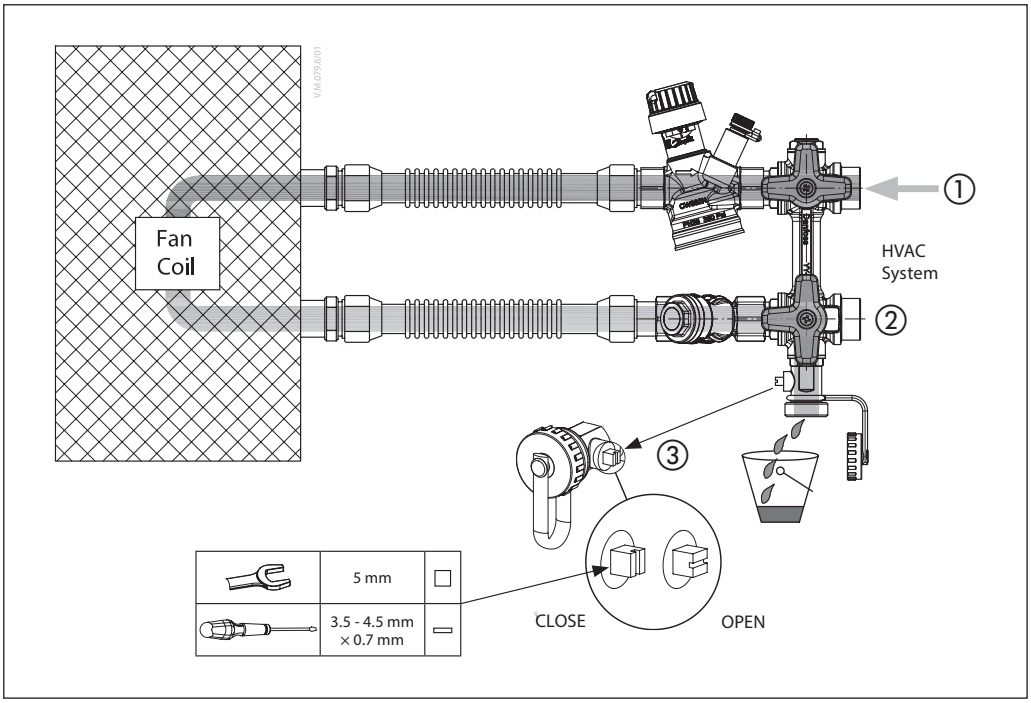


**Flushing** *(continuous)*

**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. 5*):

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




**Tender text**

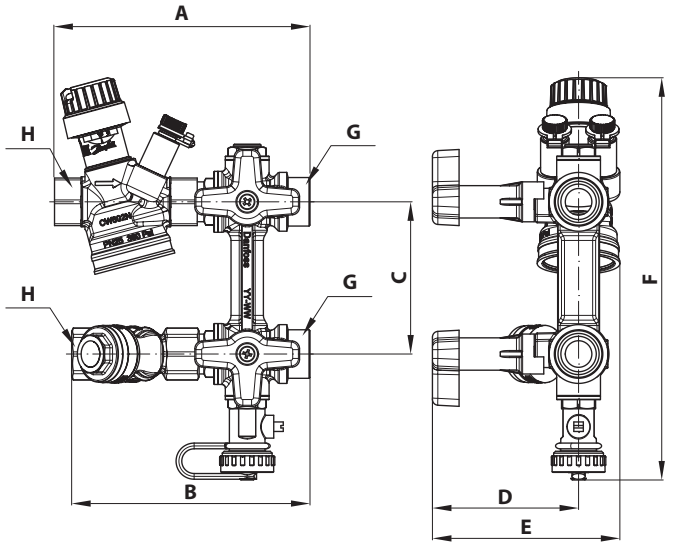
The terminal units shall be connected to the system by way of a valve assembly. This valve assembly shall have the following characteristics:

- 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

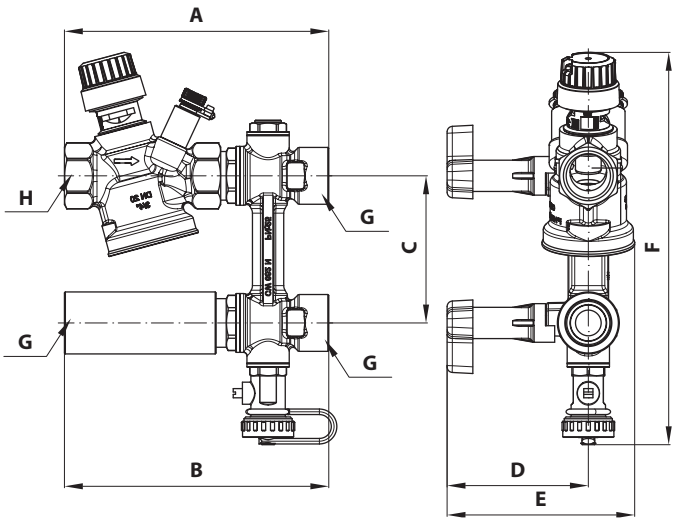
The PICV shall have the following characteristics:

- 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

## Dimensions



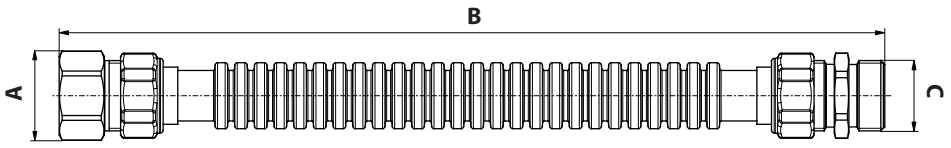

| | DN15LF | DN15 | DN15HF | DN20 | DN20HF |
|---|---|---|---|---|---|
| **A** | 134.5 | | | 144 | |
| **B** | 125 | | | 138 | |
| **C** | 80 | | | 80 | |
| **D** | 77 | | | 77 | |
| **E** | 98.5 | | | 102 | |
| **F** | 211 | | | 213 | |
| **G** | Internal G½" (ISO 228/1) | | | Internal G¾" (ISO 228/1) | |
| **H** | Internal Rp½" (ISO 7/1) | | | Internal Rp¾" (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 G½" (ISO 228/1) | | | Internal G¾" (ISO 228/1) | |
| **H** | Internal Rp½" (ISO 7/1) | | | Internal Rp¾" (ISO 7/1) | |

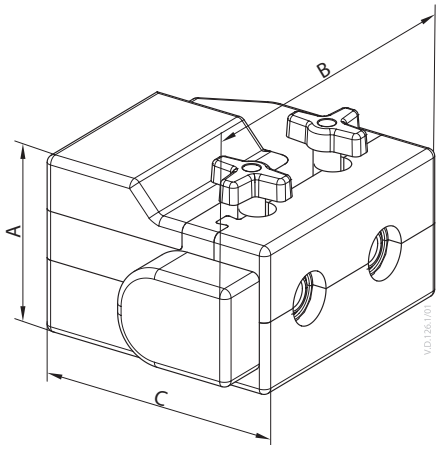
**Data sheet** **AB-QM 4.0 Flexo**

**Dimensions** *(continuous)*




| | A | B* | C |
|---|---|---|---|
| **DN15** | Internal G1/2" (ISO228/1) | 298 | External G½" (ISO 228/1) |
| **DN20** | Internal G3/4" (ISO228/1) | 310 | External G¾" (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 |

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