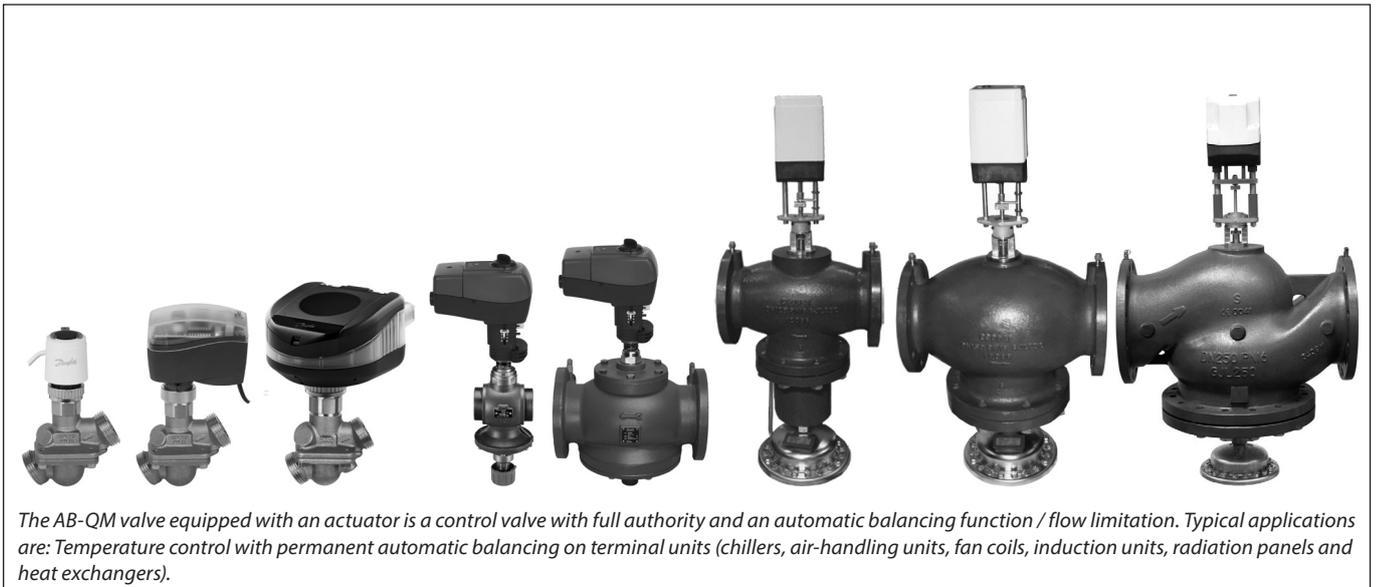


## Data sheet

# Pressure independent balancing and control valve AB-QM DN 10-250



## Description

The **precise flow control performance** of the AB-QM with a Danfoss actuator provides increased comfort and **superior Total Cost of Ownership** because of savings made on:

- Efficient energy transfer and minimal pumping costs since there are no overflows at partial loads because of the exact pressure independent flow limitation.
- Smaller pump investments and lower energy consumption as the pump head needed is lower than in the traditional setup. With the built in test plugs it is easy to troubleshoot and find the optimal setpoint for the pump.
- Reduced movements of the actuator since the built-in differential pressure controller ensure the pressure fluctuations do not influence the room temperature.
- Achieving a stable temperature in a room leading to a lower average temperature at the same comfort level.
- Minimal flow complains, as the valve performs as designed.
- Minimal blockage complains, as the membrane design makes AB-QM less susceptible to blockage than a cartridge type constriction.
- Trouble-free segmentation of the building

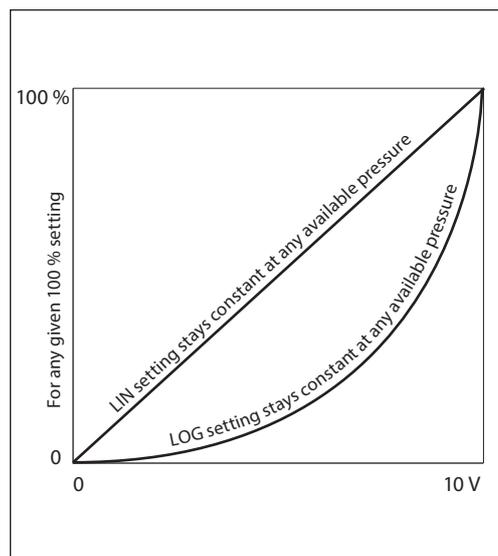
project. When sections of a project are finished they can normally not be handed over to the customer with a fully functional HVAC installation. However the AB-QM with a Danfoss actuator will automatically control the flow, even when other parts of the installation are still unfinished. It's not needed to adjust the AB-QM after finalisation of the project.

- Commissioning costs, the costs are close to zero because of a convenient setting procedure without the need for flow charts, calculations or measuring equipment. The AB-QM valves can be set to a precise design value even when the system is up and running.
- Halved mounting costs as the AB-QM valve covers two functions, Balancing & Control

**Control performance**

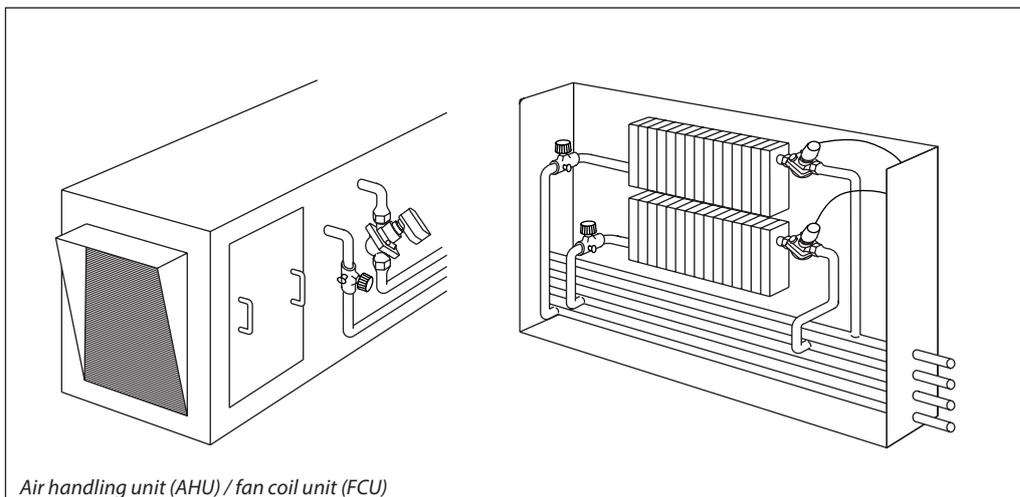
The AB-QM has a linear control characteristic. The AB-QM is pressure independent which means that the control characteristic is independent from the available pressure and is not influenced by a low authority. The flow limitation on the AB-QM is achieved by limiting the stroke and the Danfoss actuators calibrate to the stroke of the valves. This means that the AB-QM keeps its linear characteristic independent of the setting or differential pressure.

Because of the predictable characteristic the actuators on the AB-QM can be used to change the response from linear to logarithmic (equal percentage). That makes the AB-QM suitable for all applications, including AHUs, where the equal percentage characteristic is needed to get a stable control loop. The actuators can be switched from linear to logarithmic by changing a dipswitch setting on the actuator.



**Applications**

- variable flow systems

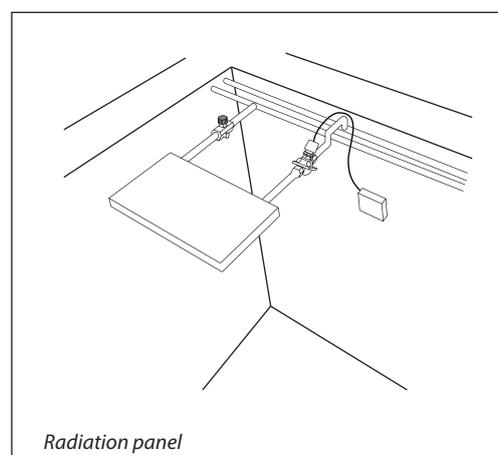


*Air handling unit (AHU) / fan coil unit (FCU)*

An AB-QM with a Danfoss actuator is used as a control valve for terminal units, like an AHU (Air Handling Unit), FCU (Fan Coil Unit) or radiation panel. The AB-QM ensures and control the required flow on every terminal unit and maintains Hydronic balance in the system.

Because of the integrated differential pressure controller the control valve always has 100 % authority and therefore offers always stable control. At partial load there is no overflow, contrary to conventional solutions, because the AB-QM will always limit the flow to exactly what is needed. By installing the AB-QM the whole system is divided in completely independent control loops.

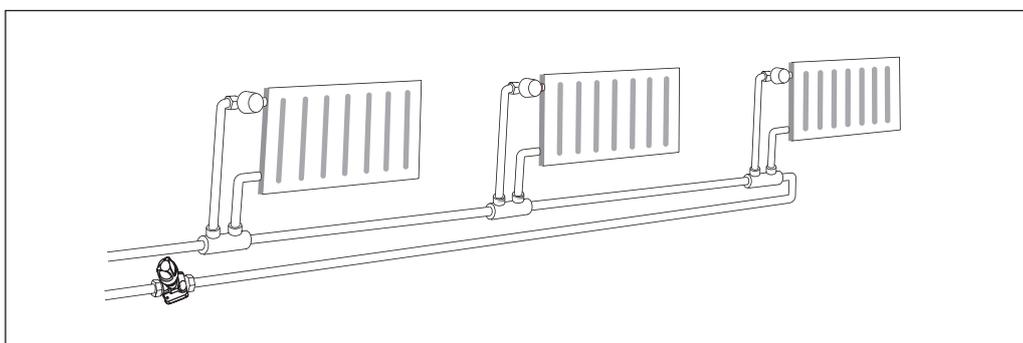
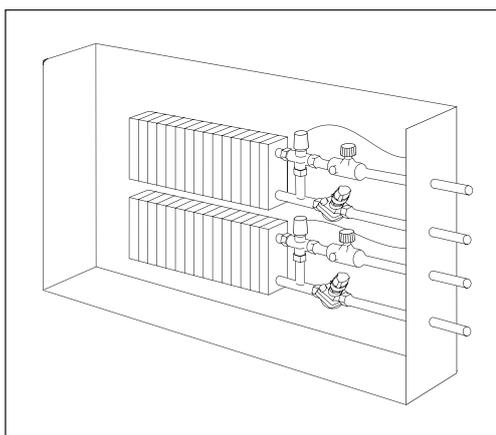
There is a full range of Danfoss actuators available for the AB-QM, suitable for every control strategy. Actuators are available for On/Off, 0-10 Volt, 4-20 mA or floating point.



*Radiation panel*

**Applications**

- constant flow systems



In constant flow system with FCUs or in a one pipe heating system the AB-QM can be installed as an automatic balancing valve in every riser. The AB-QM limits the flow to the set value, thus automatically achieving hydronic balance in the system.

*There are numerous applications in which AB-QM can be used. Every time you need an automatic flow limiter or a control valve you can take advantage of the cost-saving properties of the AB-QM. That includes systems with (floor) heating/cooling, concrete core activation or radiation panels.*

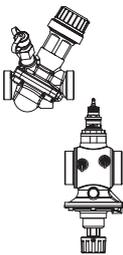
**Note: For more application examples please contact your local Danfoss organization.**

**Easy implementation**

- No Kv or authority calculations needed. Flow is the only parameter to be considered when designing.
- The AB-QM always fits the application because the maximum setting of the AB-QM corresponds with international standards for flow velocity in pipes.
- The AB-QM can be used for all HVAC applications since it can have a linear or logarithmic characteristic when combined with thermal electric or gear actuators.
- Compact design, essential when only limited space is available. For example in fan-coil units.
- Easy commissioning. No specialized staff or measuring equipment needed.
- Easy trouble shooting.
- Fast start-up because AB-QM valves don't need to be flushed or de-aired before use.
- Trouble-free segmentation of the building project. The AB-QM will automatically control the flow, even when parts of the installation are still unfinished. It's not needed to adjust the AB-QM after finalisation of the building project.

Ordering

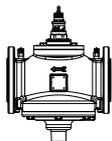
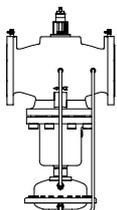
AB-QM threaded version (with test plugs and without test plugs)

Picture	DN	Q <sub>nom.</sub> (l/h)	Ext. thread (ISO 228/1)	Code No.	AB-QM	Ext. thread (ISO 228/1)	Code No.	
	10 LF	150	G ½A	<b>003Z1261</b>		G ½A	<b>003Z1251</b>	
	10	275		<b>003Z1211</b>			<b>003Z1201</b>	
	15 LF	275	G ¾A	<b>003Z1262</b>		<b>003Z1252</b>		
	15	450		<b>003Z1212</b>		<b>003Z1202</b>		
	20	900	G 1A	<b>003Z1213</b>		G 1A	<b>003Z1203</b>	
	25	1.700	G 1 ¼A	<b>003Z1214</b>		G 1 ¼A	<b>003Z1204</b>	
	32	3.200	G 1 ½A	<b>003Z1215</b>		G 1 ½A	<b>003Z1205</b>	
	40	7.500	G 2A	<b>003Z0770</b>		<i>AB-QM (DN 10-32) can not be upgraded to AB-QM with test plugs!</i>		
	50	12.500	G 2 ½A	<b>003Z0771</b>				

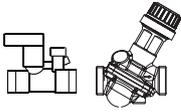
AB-QM industry pack (with test plugs and without test plugs)

Picture	DN	Q <sub>nom.</sub> (l/h)	Ext. thread (ISO 228/1)	Code No.	AB-QM	Ext. thread (ISO 228/1)	Code No.
	10 LF	150	G ½A	<b>0003z1761</b>		G ½A	<b>0003z1751</b>
	10	275		<b>0003z1711</b>			<b>0003z1701</b>
	15 LF	275	G ¾A	<b>0003z1762</b>		<b>0003z1752</b>	
	15	450		<b>0003z1712</b>		<b>0003z1702</b>	
	20	900	G 1A	<b>0003z1713</b>		G 1A	<b>0003z1703</b>

AB-QM flanged version

Picture	DN	Q <sub>nom.</sub> (l/h)	Flange connection	Code No.
	50	12.500	PN 16	<b>003Z0772</b>
	65	20.000		<b>003Z0773</b>
	80	28.000		<b>003Z0774</b>
	100	38.000		<b>003Z0775</b>
	125	90.000		<b>003Z0705</b>
	125 HF	110.000		<b>003Z0715</b>
	150	145.000		<b>003Z0706</b>
	150 HF	190.000		<b>003Z0716</b>
	200	200.000		<b>003Z0707</b>
	200 HF	270.000		<b>003Z0717</b>
	250	300.000		<b>003Z0708</b>
	250 HF	370.000		<b>003Z0718</b>

Set-pack (one MSV-S and one AB-QM without test plugs)

Picture	DN	Q <sub>nom.</sub> (l/h)	Ext. thread (ISO 228/1)	Code No.
	15 LF	275	G ¾A	<b>003Z1238</b>
	15	450		<b>003Z1242</b>
	20	900	G 1A	<b>003Z1243</b>
	25	1.700	G 1 ¼A	<b>003Z1244</b>
	32	3.200	G 1 ½A	<b>003Z1245</b>

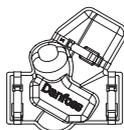
Ordering (continuous)

Accessories & spare parts

Type	Comments		Code No.
	To pipe	To valve	
Union connection (1 pcs.)  	R 3/8	DN 10	003Z0231
	R 1/2	DN 15	003Z0232
	R 3/4	DN 20	003Z0233
	R 1	DN 25	003Z0234
	R 1 1/4	DN 32	003Z0235
	R 1 1/2	DN 40	003Z0279
	R 2	DN 50	003Z0278
Tailpiece welding (1 pcs.)  	Weld.	DN 15	003Z0226
		DN 20	003Z0227
		DN 25	003Z0228
		DN 32	003Z0229
		DN 40	003Z0270
Tailpiece welding (1 pcs.)  	Weld.	DN 15	003Z1271
		DN 20	003Z1272
		DN 25	003Z1273
		DN 32	003Z1274
		DN 40	003Z1275
Tailpieces for soldering (2 nuts, 2 gaskets, 2 soldering plugs)	12x1 mm	DN 10	065Z7016
	15x1 mm	DN 15	065Z7017
Shut-off & protection piece (max. closing pressure 16 bar)		DN 10-32	003Z1230
Shut-off - plastic (max. closing pressure 1 bar)			003Z0240
Handle AB-QM (necessary accessory if installing valve without actuator)	DN 40-100		003Z0695
	DN 125-150		003Z0696
	DN 200-250		003Z0697
Adapter for AB-QM DN 10, G 1/2 internal thread for AB-QM, G 3/8 internal thread (1 pcs.)			003Z3954
Adapter for AB-QM DN 15, G 3/4 internal thread for AB-QM, G 3/4A external thread (1 pcs.)			003Z3955
Adapter for AB-QM DN 20, G 1 internal thread for AB-QM, G 1A external thread (1 pcs.)			003Z3956
Adapter for AB-QM DN 25, G 3/4 internal thread for AB-QM, G 3/4A external thread (1 pcs.)			003Z3957
Adapter AMV(E) 25/35 (AB-QM DN 40-100, 2nd. generation)			003Z0694
Adapter AME 435 for AB-QM DN 40-100 (1st. generation)			065Z0313
Stroke limiter - TWA (5 pcs. in a bag)			003Z1237
Adapter AME 13 SU for AB-QM (1st. generation)			003Z3959
Adapter AME 13 SU for AB-QM (2nd. generation)			003Z3960
Stem heater for AB-QM DN 40-100 / AME 15 QM			065B2171
Stem heater for AB-QM DN 40-100 / AME 435 QM			065Z0315
Stem heater for AB-QM DN 125, 150 / AME 55 QM			065Z7022

Type	PCL	Start No.	EAN-code single-pack	EAN-code multi-pack	Code No.
AB-QM heating insul. cap DN10	629	28062	5702425111297	5702425112690	003Z4730
AB-QM heating insul. cap DN15	629	28062	5702425111310	5702425112706	003Z4731
AB-QM heating insul. cap DN20	629	28062	5702425111327	5702425112713	003Z4732
AB-QM heating insul. cap DN25	629	28062	5702425111334	5702425112720	003Z4733
AB-QM heating insul. cap DN32	629	28062	5702425111341	5702425112737	003Z4734
AB-QM heating insul. cap DN40	629	28062	5702425111358	N/A	003Z4735
AB-QM heating insul. cap DN50	629	28062	5702425111365	N/A	003Z4736

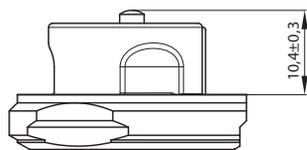
Connection	Description	PCL	Start No.	EAN-code single-pack	Code No.
DN15	Refrig. instalation ABQM DN15_ABNM/TWA-Z	629	28062	5702420120805	003Z4787
DN20	Refrig. instalation ABQM DN20_ABNM/TWA-Z	629	28062	5702420120829	003Z4788
DN25	Refrig. instalation ABQM DN25_ABNM/TWA-Z	629	28062	5702420120843	003Z4789
DN32	Refrig. instalation ABQM DN32_ABNM/TWA-Z	629	28062	5702420124209	003Z4790



Ordering (continuous)

Combinations AB-QM with electrical actuators (AB-QM DN 10-100) <sup>1)</sup>

Valve type	Stroke (mm)	TWA-Z <sup>3)</sup>	AMI 140	ABNM	AMV 110/120 NL AME 110/120 NL	NovoCon™	AME 435 QM
		Recommended ordering code numbers (for details refer to data sheets for these actuators)					
		082F1266 NC, 230 V	082H8048 AMI 140 24 V, 12 s/mm, 2-point control	082F1160 Thermal act. LOG 24 V (0-10 V)  082F1161 Thermal act. LIN 24 V (0-10 V)	082H8056 AMV 110 NL 24 V, 24 s/mm, 3-point control  082H8057 AME 110 NL 24 V, 24 s/mm, 0-10 V	003Z8500 NovoCon™ S Hybrid, 24 V AC/DC MDF/LOG  003Z8501 NovoCon™ S Digital, 24 V AC/DC MDF/LOG	082H0171 AME 435 QM 24 V
DN 10-20	2,25	✓	✓	✓	✓	✓	-
DN 25, 32	4,50	✓ <sup>2)</sup>	✓	✓ <sup>4)</sup>	✓	✓	-
DN 40, 50	10	-	-	-	-	-	✓
DN 65-100	15	-	-	-	-	-	✓



Closing point (measure)  
for DN 10-32

<sup>1)</sup> Minimum recommended AB-QM setting is 20 %

<sup>2)</sup> up to 60 % of  $Q_{nom}$

<sup>3)</sup> Please be aware that only this type of TWA actuator is to be used with AB-QM

<sup>4)</sup> up to 90 % of  $Q_{nom}$

Additional actuator's functionality available, for more info please contact your local Danfoss organization.

Combinations AB-QM with electrical actuators (AB-QM, DN 125-250)

Valve type	Stroke (mm)	AME 55 QM	AME 85 QM
		Recommended ordering code numbers (for details refer to data sheets for these actuators)	
		082H3078 24 V, 8 s/mm, 0-10 V	082G1453 24 V, 8 s/mm, 0-10 V
DN 125	30	✓	-
DN 150		✓	-
DN 200		-	✓
DN 250		-	✓

Operational pressure for all AB-QM valves is 6 bar. Closing pressure for all actuators is 16 bar.

Additional actuator's functionality available, for more info please contact your local Danfoss organization.

**Technical data**
**AB-QM (thread version)**

Nominal diameter		DN	10 LF	10	15 LF	15	20	25	32	40	50	
Flow range	$Q_{nom}$ (100%) <sup>1)</sup>	l/h	150	275	275	450	900	1.700	3.200	7.500	12.500	
	$Q_{high}$ <sup>4)</sup>		180	330	330	540	1.080	1.870 <sup>5)</sup>	3.520 <sup>5)</sup>	7.500	12.500	
Setting range <sup>2)</sup>		%	20-120				20-110			40-100		
Diff. pressure <sup>3), 4)</sup>	$\Delta p_{Qnom}$ <sup>6)</sup>	kPa	16-400/600 <sup>6)</sup>				20-400/600 <sup>6)</sup>			30-400/600 <sup>6)</sup>		
	$\Delta p_{Qhigh}$ <sup>6)</sup>		18-400/600 <sup>6)</sup>				25-400/600 <sup>6)</sup>					
Pressure stage		PN	16									
Control range			1:1000									
Control valve's characteristic			Linear (could be converted by actuator to equal percentage)									
Leakage rate with recommended actuators			No visible leakage						max. 0,05 % of $Q_{nom}$			
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 ... +120									
Storage and transport temp.			-40 ... 70									
Stroke		mm	2,25				4,5			10		
Connection	ext. thread (ISO 228/1)		G ½ A	G ½ A	G ¾ A	G ¾ A	G 1 A	G 1¼ A	G 1½ A	G 2 A	G 2½ A	
	actuator		M30 × 1.5							Danfoss standard		
<b>Materials in the water</b>												
Valve bodies			DZR Brass (CuZn36Pb2As - CW 602N)						Grey iron EN-GJL-250 (GG 25)			
Membranes and O-rings			EPDM									
Springs			W.Nr. 1.4568, W.Nr. 1.4310									
Cone (Pc)			W.Nr. 1.4305						CuZn40Pb3-CW 614N, W.Nr. 1.4305			
Seat (Pc)			EPDM						W.Nr. 1.4305			
Cone (Cv)			CuZn40Pb3 - CW 614N									
Seat (Cv)			DZR Brass (CuZn36Pb2As - CW 602N)						W.Nr. 1.4305			
Screw			Stainless Steel (A2)									
Flat gasket			NBR									
Sealing agent (only for valves with test plugs)			Dimethacrylate Ester									
<b>Materials out of the water</b>												
Plastic parts			PA						POM			
Insert parts and outer screws			CuZn39Pb3 - CW 614N; W.Nr. 1.4310; W.Nr. 1.4401						-			

<sup>1)</sup> factory setting of the valve is done at nominal setting range.

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

<sup>3)</sup>  $\Delta p = (P1 - P3) \text{ min} \sim \text{max}$

<sup>4)</sup> When set above 100 %, minimum starting pressure needed is higher, see figures in the ().

<sup>5)</sup> When set above 100 %, it can be used as a flow limiter only.

<sup>6)</sup> In case AB-QM is used above 400 kPa differential pressure contact Danfoss design center to assure proper design.

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

Technical data (continuous)

AB-QM (flange version)

Nominal diameter		DN	50	65	80	100
Flow range	Q <sub>nom</sub> (100 %) <sup>1)</sup>	l/h	12.500	20.000	28.000	38.000
	Q <sub>high</sub> <sup>4)</sup>		12.500	20.000	28.000	38.000
Setting range <sup>2)</sup>		%	40-100			
Diff. pressure <sup>3), 4)</sup>	Δp <sub>Qnom</sub>	kPa	30-400/600 <sup>5)</sup>			
	Δp <sub>Qhigh</sub>					
Pressure stage		PN	16			
Control range		Acc. to standard IEC 534 control range is high as Cv characteristic is linear. (1:1000)				
Control valve's characteristic		Linear (could be converted by actuator to equal percentage)				
Leakage rate with recommended actuators		max. 0,05 % of Q <sub>nom</sub>				
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 ... +120			
Storage and transport temp.			-40 ... 70			
Stroke		mm	10	15		
Connection	flange	PN 16				
	actuator	Danfoss standard				
<b>Materials in the water</b>						
Valve bodies		Grey iron EN-GJL-250(GG25)				
Membranes/ Bellow		EPDM				
O-rings		EPDM				
Springs		W.Nr. 1.4568, W.Nr. 1.4310				
Cone (Pc)		CuZn40Pb3 - CW 614N, W.Nr. 1.4305				
Seat (Pc)		W.Nr. 1.4305				
Cone (Cv)		CuZn40Pb3 - CW 614N				
Seat (Cv)		W.Nr. 1.4305				
Screw		Stainless Steel (A2)				
Flat gasket		NBR				

Nominal diameter		DN	125	125 HF	150	150 HF	200	200 HF	250	250 HF
Flow range	Q <sub>nom</sub> (100 %) <sup>1)</sup>	l/h	90.000	110.000	145.000	190.000	200.000	270.000	300.000	370.000
	Q <sub>high</sub> <sup>4)</sup>		100.000	120.000	160.000	209.000	220.000	300.000	330.000	407.000
Setting range <sup>2)</sup>		%	40-110							
Diff. pressure <sup>3), 4)</sup>	Δp <sub>Qnom</sub>	kPa	30-600 <sup>5)</sup>	60-600 <sup>5)</sup>						
	Δp <sub>Qhigh</sub>		50-600 <sup>5)</sup>	80-600 <sup>5)</sup>						
Pressure stage		PN	16							
Control range		1:1000								
Control valve's characteristic		Linear (could be converted by actuator to equal percentage)								
Leakage rate with recommended actuators		max.0,01 % of Q <sub>nom</sub>								
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 ... +120							
Storage and transport temp.			-40 ... 70							
Stroke		mm	30							
Connection	flange	PN 16								
	actuator	Danfoss standard								
<b>Materials in the water</b>										
Valve bodies		Grey iron EN-GJL-250 (GG 25)								
Membranes/ Bellow		W.Nr.1.4571	EPDM							
O-rings		EPDM								
Springs		W.Nr.1.4401	W.Nr.1.4310							
Cone (Pc)		W.Nr.1.4404NC	W.Nr.1.4021							
Seat (Pc)		W.Nr.1.4027								
Cone (Cv)		W.Nr.1.4404NC	W.Nr.1.4021							
Seat (Cv)		W.Nr.1.4027								
Screw		W.Nr.1.1181								
Flat gasket		Graphite gasket	Non asbestos							

<sup>1)</sup> factory setting of the valve is done at nominal setting range.

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

<sup>3)</sup> Δp = (P1-P3) min~max

<sup>4)</sup> When set above 100 %, minimum starting pressure needed is higher, see figures in the ().

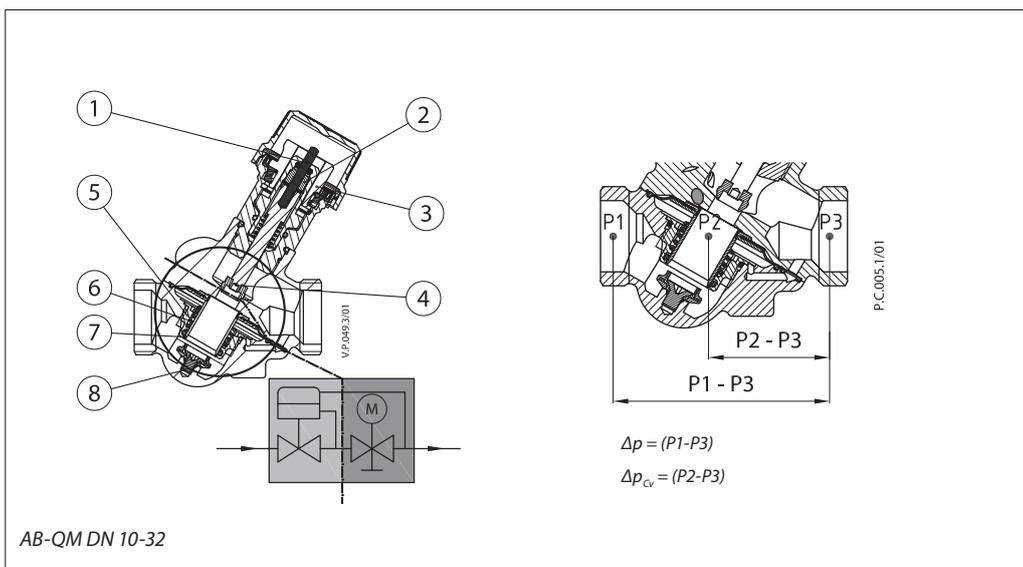
<sup>5)</sup> In case AB-QM is used above 400 kPa differential pressure contact Danfoss design center to assure proper design.

Pc - pressure controller part

Cv - Control valve part

**Design**

1. Spindle
2. Stuffing box
3. Pointer
4. Control valve's cone
5. Membrane
6. Main spring
7. Hollow cone (pressure controller)
8. Vulcanized seat (pressure controller)



**Function:**

The AB-QM valve consists of two parts:

1. Differential pressure controller
2. Control valve

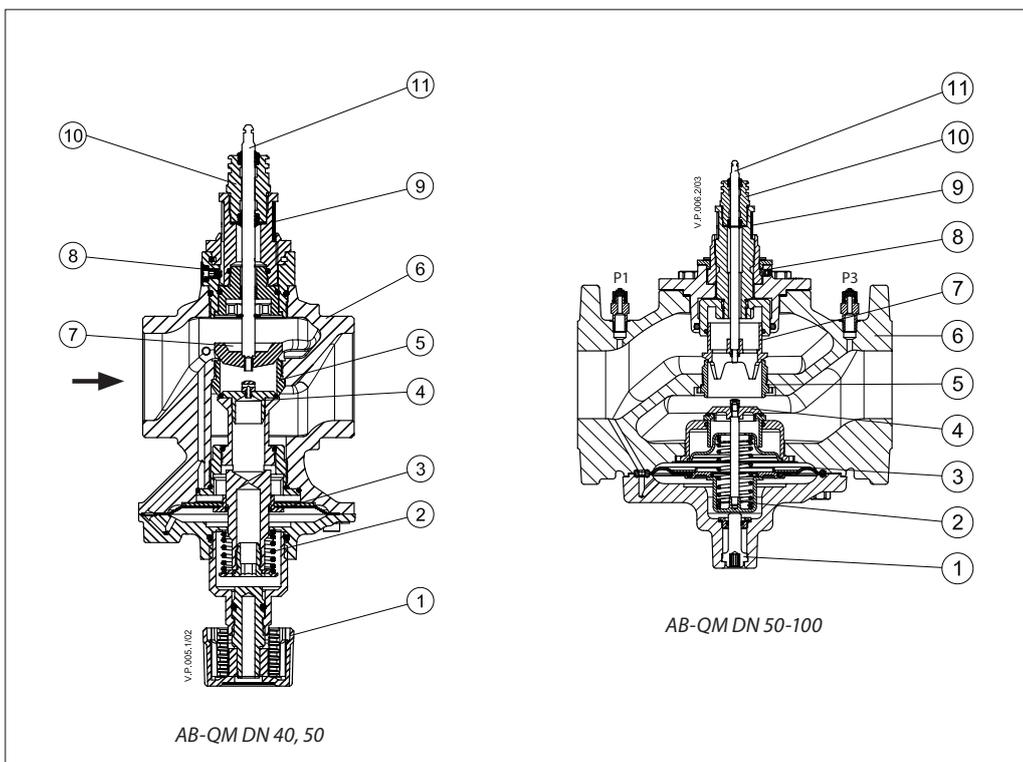
**1. Differential pressure controller DPC**

The differential pressure controller maintains a constant differential pressure across the control valve. The pressure difference  $\Delta p_{cv}$  (P2-P3) on the membrane is balanced with the force of the spring. Whenever the differential pressure across the control valve changes (due to a change in available pressure, or movement of the control valve) the hollow cone is displaced to a new position which brings a new equilibrium and therefore keeps the differential pressure at a constant level.

**2. Control valve Cv**

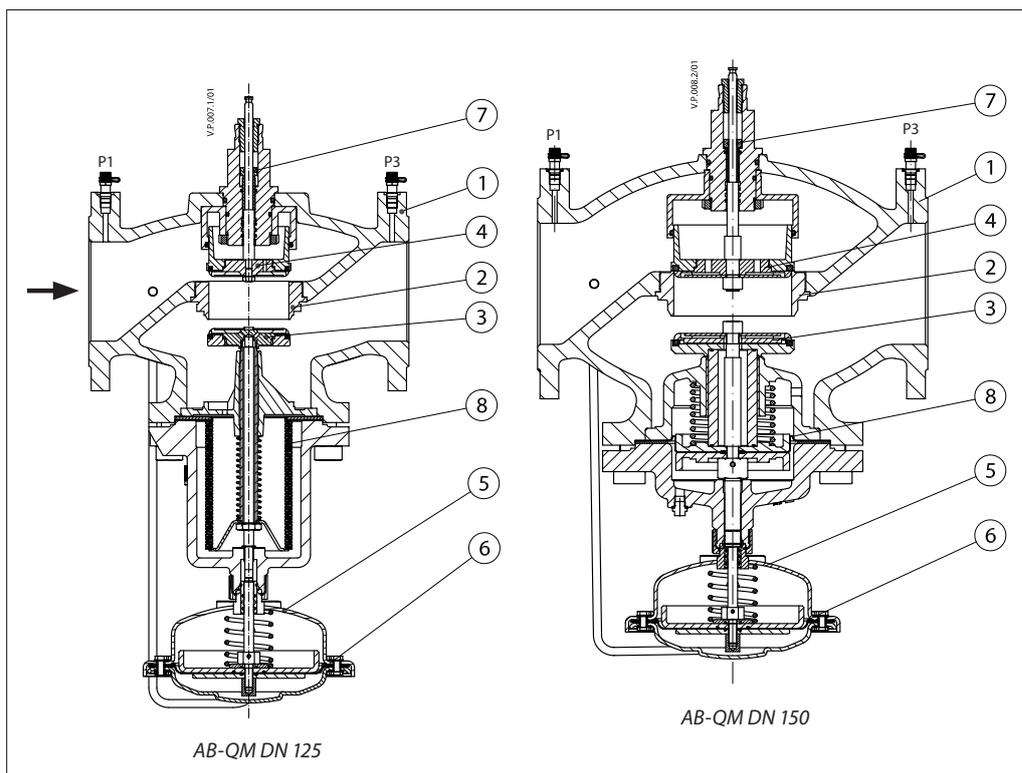
The control valve has a linear characteristic. It features a stroke limitation function that allows adjustment of the Kv value. The percentage marked on the scale equals the percentage of 100 % flow marked on the pointer. Changing the stroke limitation is done by lifting the blocking mechanism and turning the top of the valve to the desired position, showed on the scale as a percentage. A blocking mechanism automatically prevents unwanted changing of the setting.

1. Shut off screw
2. Main spring
3. Membrane
4. DP cone
5. Seat
6. Valve body
7. Control valves cone
8. Locking screw
9. Scale
10. Stuffing box
11. Spindle

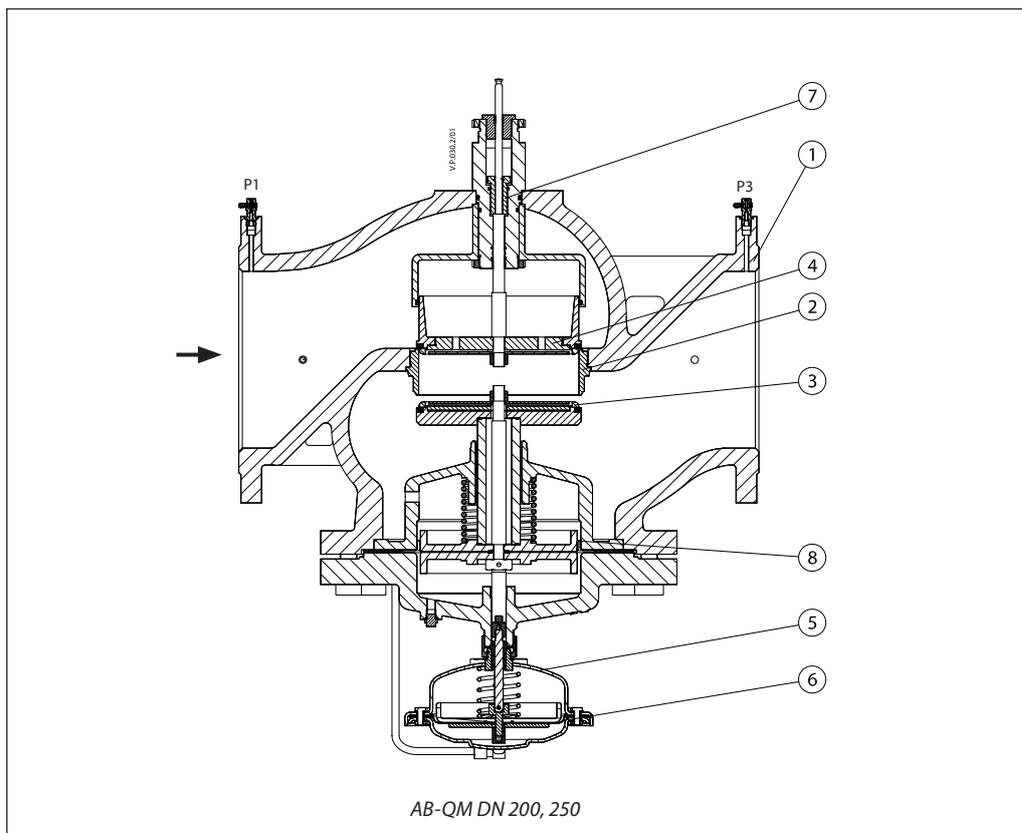


Design (continuous)

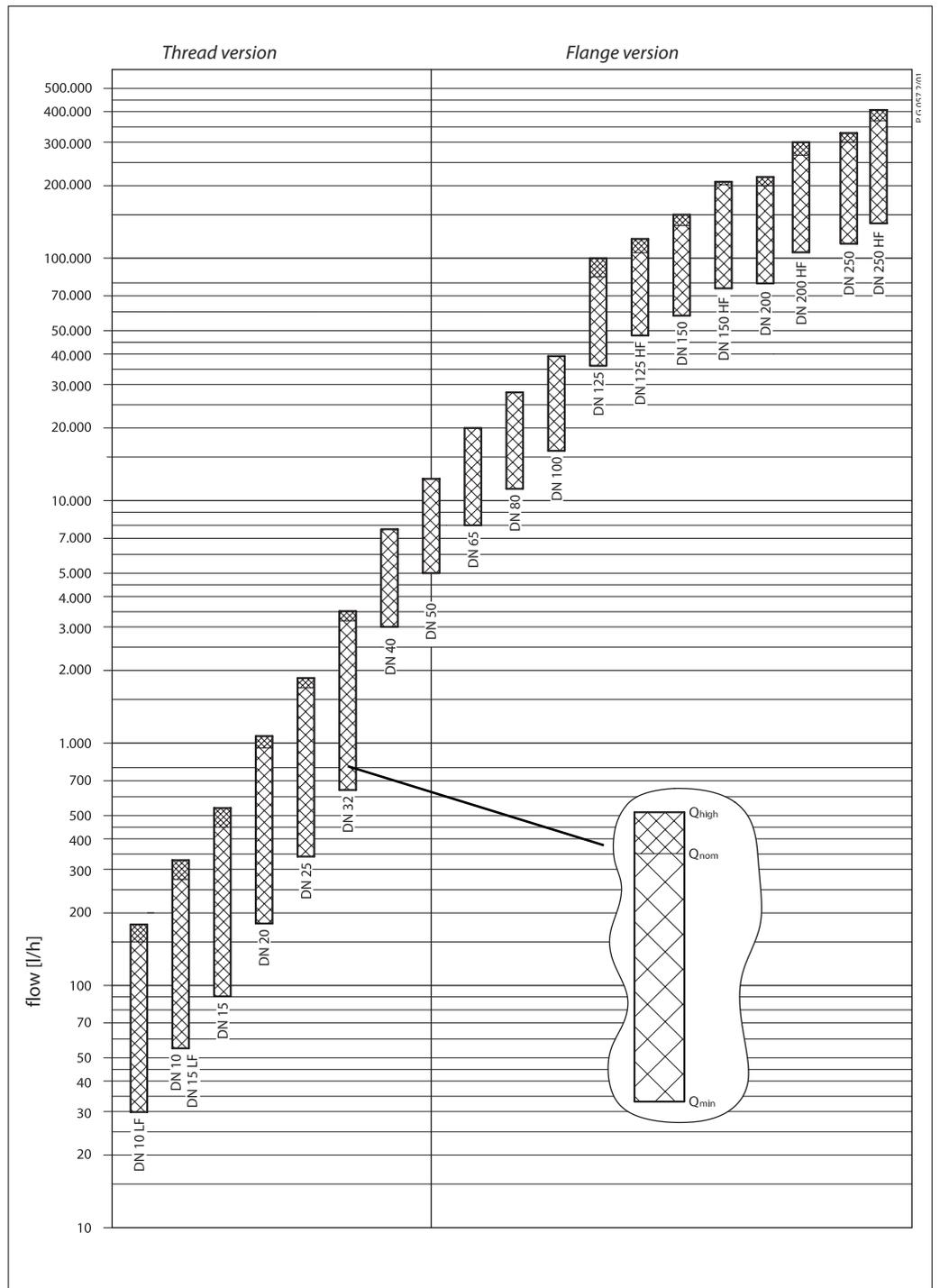
1. Valve body
2. Valve seat
3. DPC cone
4. CV cone
5. Controller casting
6. Rolling diaphragm
7. Adjusting screw
8. Bellow for pressure relief on DPC cone



1. Valve body
2. Valve seat
3. DPC cone
4. CV cone
5. Controller casting
6. Rolling diaphragm
7. Adjusting screw
8. Bellow for pressure relief on DPC cone



Sizing



Sizing (continuous)

**Example 1: Variable flow system**

Given:

Cool requirement per unit : 1000 W  
 Flow temperature in the system: 6 °C  
 Return temperature in the system: 12 °C

Required - control and balancing valves:

AB-QM and actuators type for BMS system.

Solution:

Flow in the system: Q (l/h)  
 $Q = 0,86 \times 1000 / (12 - 6) = 143 \text{ l/h}$

Selected:

AB-QM DN 10 mm with  $Q_{nom} = 275 \text{ l/h}$  presetting on  $143/275 = 0,52 = 52 \%$  of nominal opening.  
 Actuators: AMV 110NL - 24 V

Remarks:

required minimum differential pressure across the AB-QM DN 10: 16 kPa.

**Example 2: Constant flow system**

Given:

Cool requirement per unit : 4000 W  
 Flow temperature in the system : 6 °C  
 Return temperature in the system : 12 °C

Required - automatic flow limiter:

AB-QM and presetting.

Solution:

Flow in the system : Q (l/h)  
 $Q = 0,86 \times 4000 / (12 - 6) = 573 \text{ l/h}$

Selected:

AB-QM DN 20 mm with  $Q_{nom} = 900 \text{ l/h}$  presetting on  $573/900 = 0,64 = 64 \%$  of maximum opening.

Remarks:

required minimum differential pressure across the AB-QM DN 20: 16 kPa.

**Example 3: Sizing AB-QM according pipe dimension**

Given:

Flow in system 1.4 m<sup>3</sup>/h (1400 l/h = 0,38 l/s), pipe dimension DN 25 mm

Required - automatic flow limiter:

AB-QM and presetting.

Solution:

In this case we can selected AB-QM DN 25 mm with  $Q_{nom} = 1700 \text{ l/h}$

In this case it will be recommended to check the maximum velocity in the pipe. For this we calculate velocity in the pipe for condition:  
 DN 25 mm – Di 27.2 mm

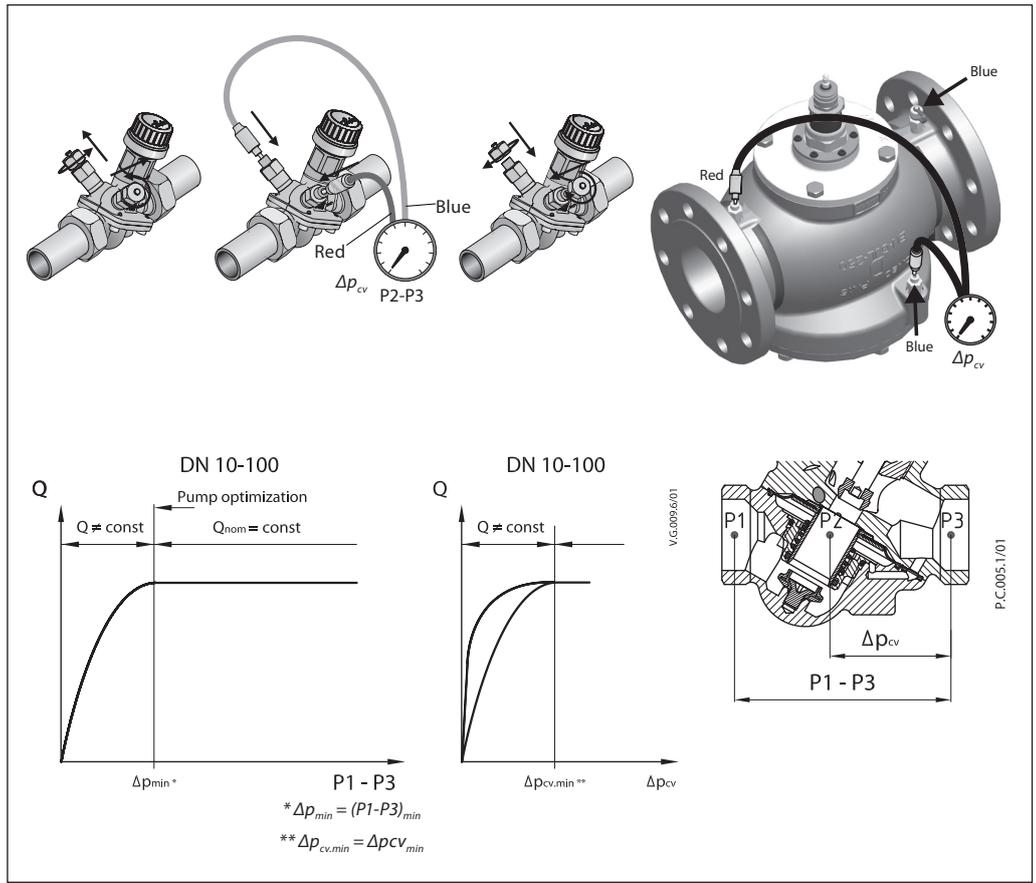
Dimension and condition acceptable, velocity below 1.0 m/s.

Presetting on the valve AB-QM DN 25 mm  $1400/1700 = 0,82 = 82 \%$  of nominal opening.

Remarks:

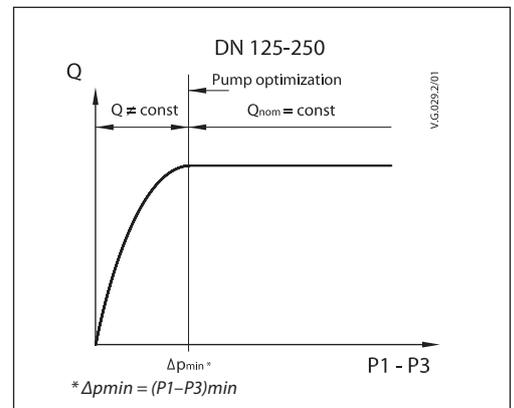
required minimum differential pressure across the AB-QM DN 25: 20 kPa.

Pump optimising /  
Trouble shooting



The AB-QM (DN 10-100) features test plugs that allow measuring of the pressure difference  $\Delta p_{\text{cv}}$  across the control valve. If the pressure difference exceeds the minimal required pressure and the flow limitation is achieved. The measuring function can be used to verify if enough pressure difference is available and thus verify the flow or measure the flow directly. For detail information how to measure flow on DN 40-250 please refer to Flow checker document **VF.A7.A2.02**.

It can also be used to optimize the pump head. The pump head can be decreased until no more than the minimal required pressure is available on the most critical valve (in terms of hydronic). This optimal point is to be found when proportionality between pump head and measured differential pressure cease to exist. Verifying the pressure can be done by using for example Danfoss PFM device (for more details please refer to AB-QM Tech Note).



**Presetting**

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

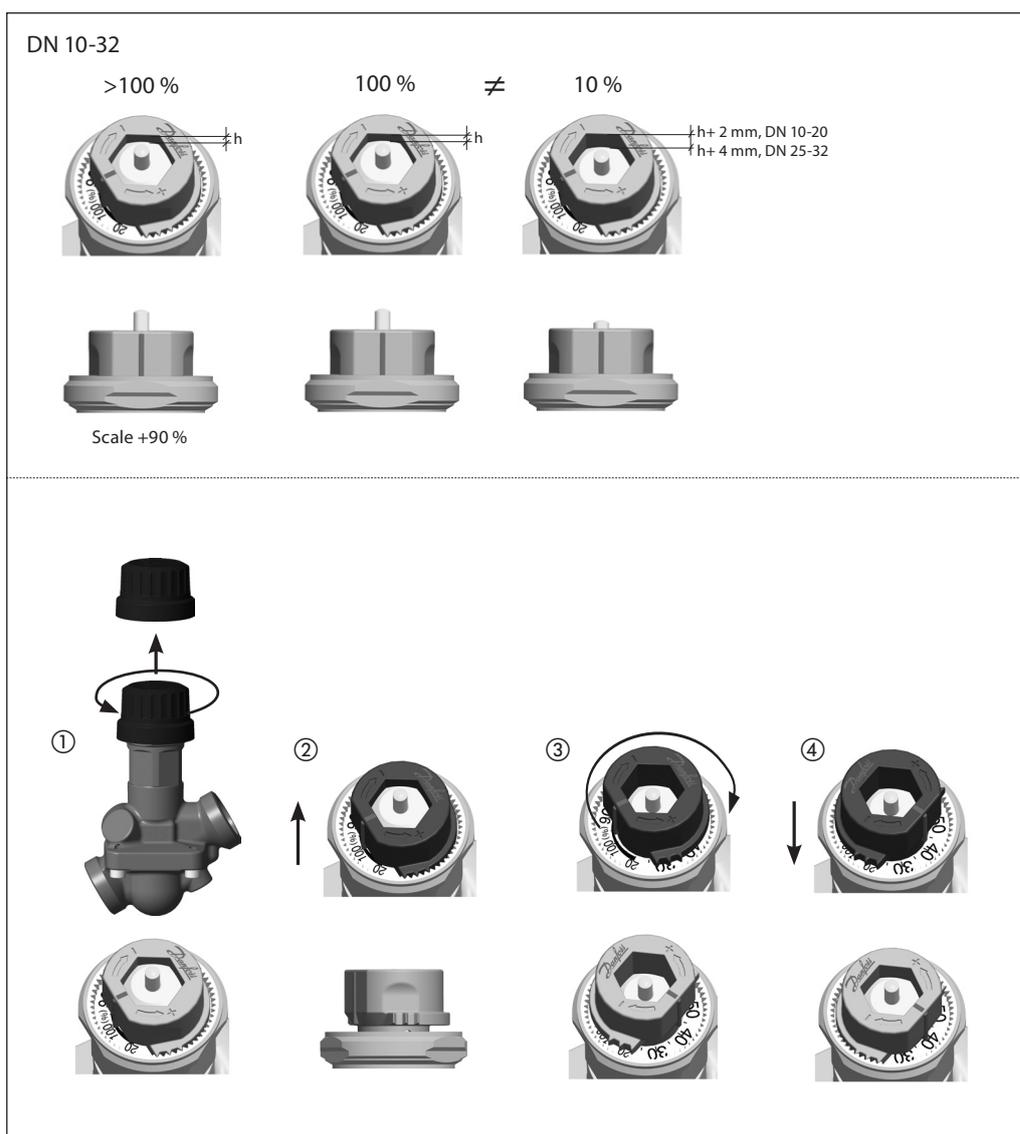
To change the presetting (factory setting is 100 %) follow the four steps below:

- ① Remove the blue protective cap or the mounted actuator
- ② Raise the grey pointer
- ③ Turn (clock wise to decrease) to the new presetting
- ④ Press grey pointer back into lock position. After click presetting is locked.

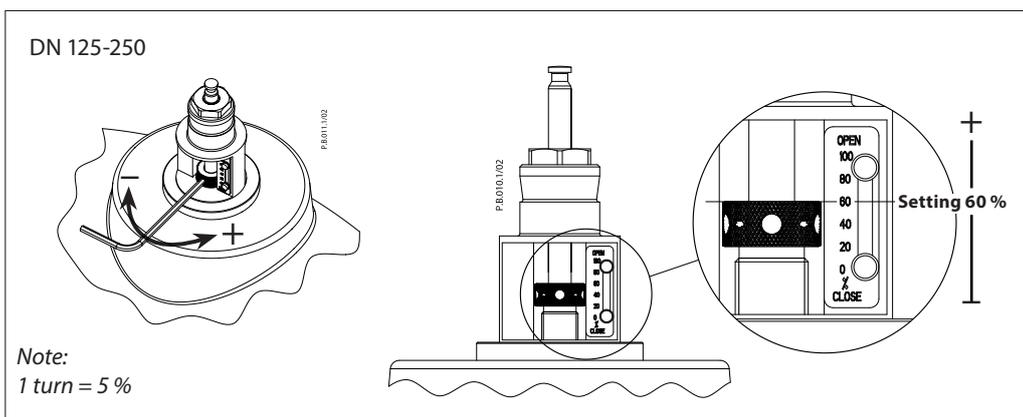
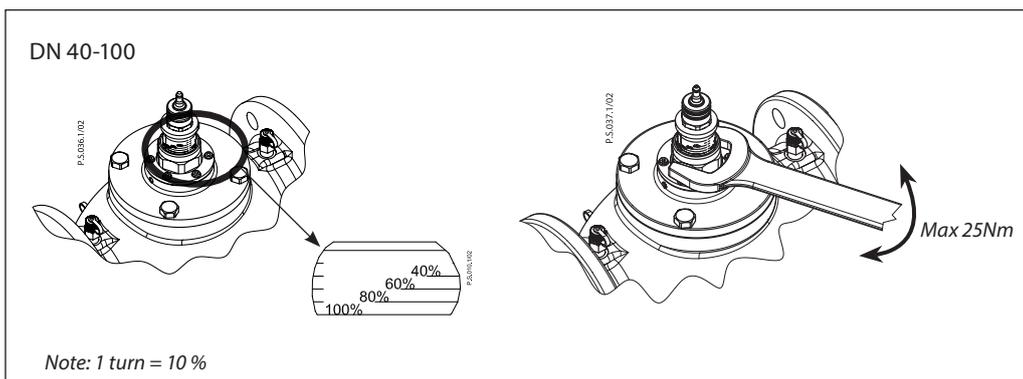
The presetting scale indicates values from 100 % flow to 0 %. Clock wise turning would decrease the flow value while counter clock wise would increase it.

If the valve is a DN 15 then the nom flow = 450 l/h = 100 % presetting. To set a flow of 270 l/h you have to set:  $270/450 = 60\%$ .

Danfoss recomends a presetting/flow from 20 % to 100 %. Factory presetting is 100 %.



**Presetting** (continuous)



**Service**

**DN 10-32**

For the service shut off function, it is recommended to install the valve in the supply water pipe.

Valves are equipped with plastic shut-off mechanism that is to be used for isolating function up to 1 bar differential pressure. When closing against higher differential pressure please use accessory - shut-off & protection piece (003Z1230) or set the value to 0 %.

**DN 40-250**

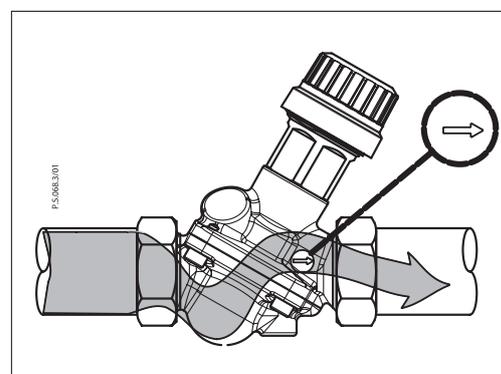
For the service shut off function, the valve can be installed in either supply or return pipe.

Valves are equipped with manual shut-off for isolating function up to 16 bar.

**Installing**

AB-QM valve is mono-directional meaning that the valve operates when arrow on the valve body is aligned with flow direction. When this rule is disobeyed the valve acts like variable orifice that cause water hammer at sudden closing when available pressure has increased or valve have been set to lower value.

In case when system condition allows backflows it is strongly recommended to use backflow preventer in order to avoid possible water hammer that can damage the valve as well as other elements in the system.



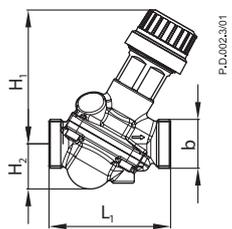
**Tender text**

The pressure independent balancing and control valve which means that the control characteristic is independent from the available pressure. The precise flow control performance of the AB-QM with a Danfoss actuator provides increased comfort and superior Total Cost of Ownership. The AB-QM ensures and control the required flow on every terminal unit and maintains Hydronic balance in the system.

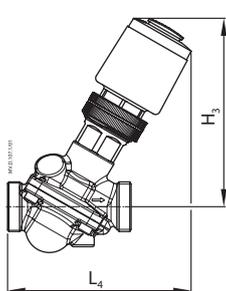
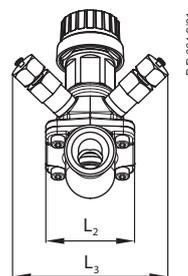
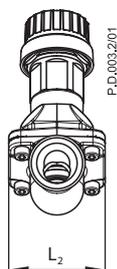
AB-QM has following features:

- Flow limitation function
- Modulating below 1% of set flow, regardless of the setting,
- Authority of 1 at all settings
- Able to close against 16 bar of differential pressure.
- Linear control characteristic
- Scale in percentage of flow
- Control ratio 1:1000
- Test plugs for pump optimization and flow verification for DN 10-250. Available in the range from DN 10 – 250 from one supplier.
- Characteristic changed from linear to equal percentage characteristic at all sizes by adjusting actuator settings.
- Lockable setting
- Starting pressure of 16 kPa for DN 10 – DN 20
- Starting pressure of 20 kPa for DN 25 – DN 32
- Starting pressure of 30 kPa for DN 40 – DN 250
- Leakage rate of no visible leakage for DN 10 - DN 20 in combination with recommended actuator
- Leakage of 0.05 % of the  $Q_{nom}$  for DN 25 - DN 100 in combination with recommended actuator
- Leakage of 0.01 % of the  $Q_{nom}$  for DN 125 - DN 250 in combination with recommended actuator

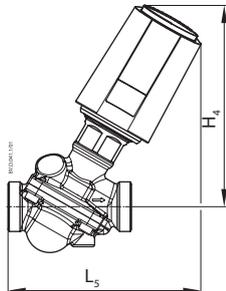
Dimensions



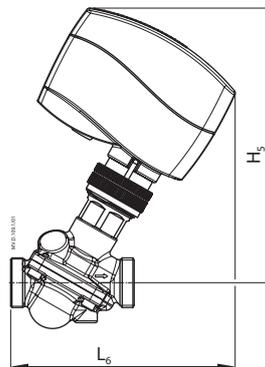
AB-QM DN 10-32



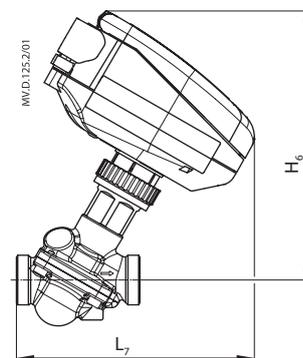
TWA-Z + AB-QM



ABNM + AB-QM

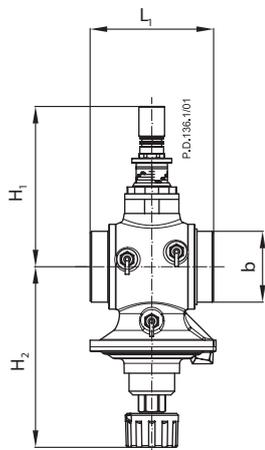


AMV (E) 110 NL + AB-QM  
AMI 140 + AB-QM

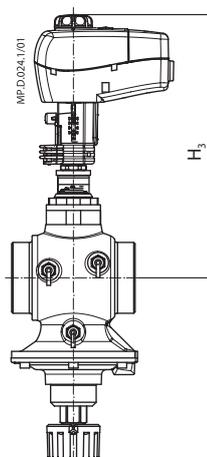


NovoCon™ + AB-QM

Type	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	L <sub>5</sub>	L <sub>6</sub>	L <sub>7</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	H <sub>5</sub>	H <sub>6</sub>	b ISO 228/1	Valve weight (kg)
	mm														
DN 10	53	36	79	92	104	109	119	69	20	100	104	138	140	G ½	0,38
DN 15	65	45	79	98	110	116	126	72	25	102	108	141	143	G ¾	0,48
DN 20	82	56	79	107	120	125	134	74	33	105	112	143	145	G 1	0,65
DN 25	104	71	79	124	142	142	149	82	42	117	124	155	153	G 1 ¼	1,45
DN 32	130	90	79	142	154	160	167	93	50	128	136	166	164	G 1 ½	2,21



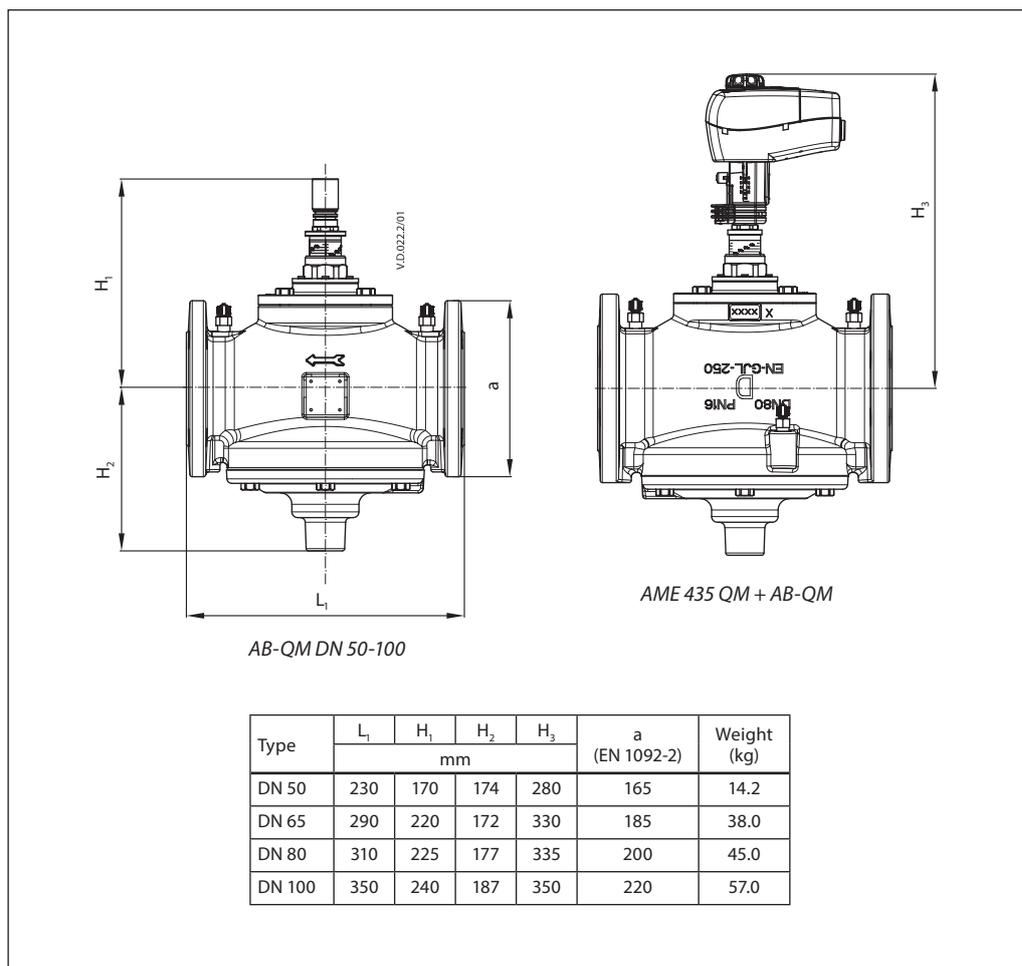
AB-QM DN 40, 50



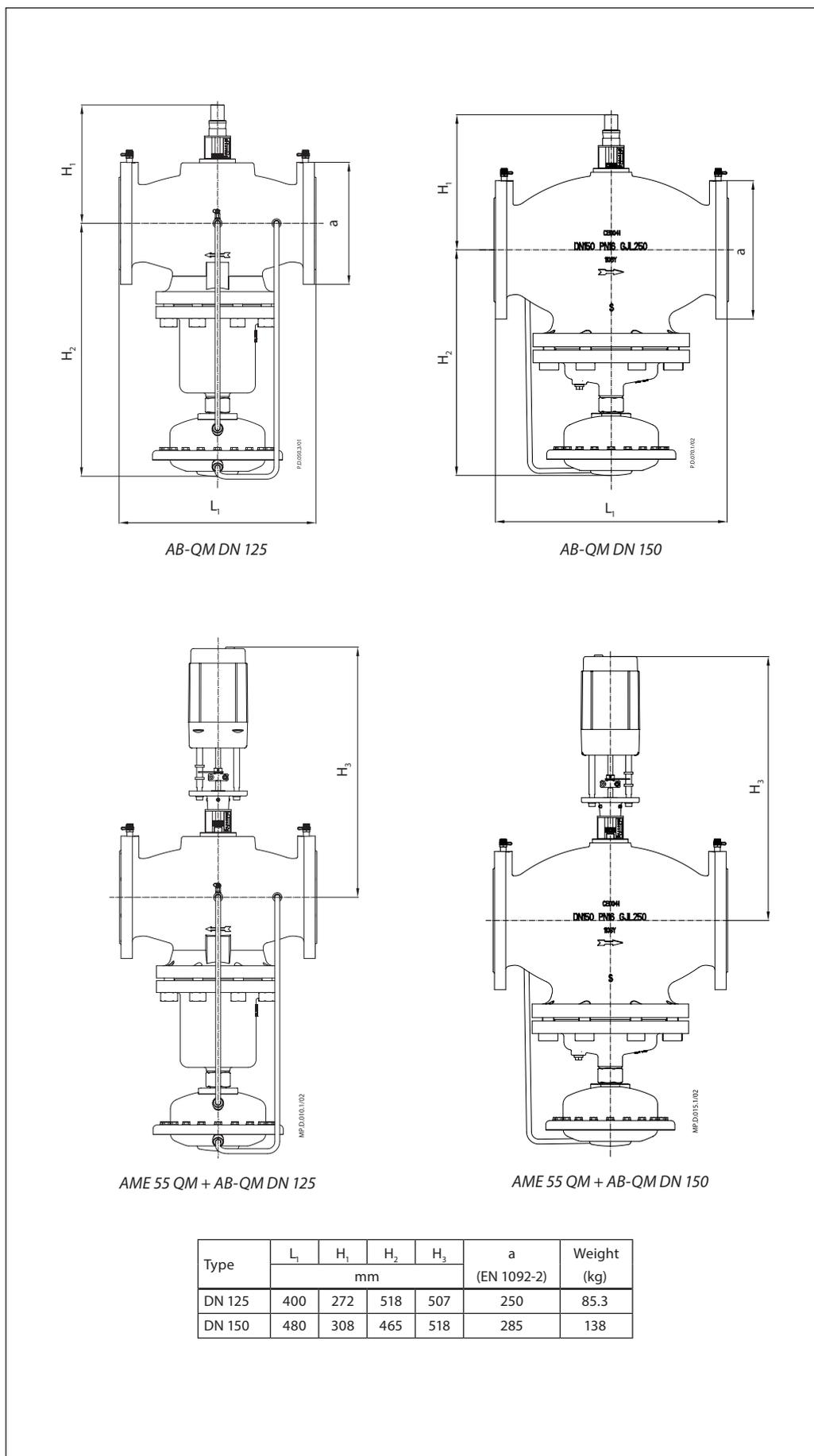
AME 435 QM + AB-QM

Type	L <sub>1</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	b ISO 228/1	Weight kg
	mm					
DN 40	110	170	174	280	G 2	6.9
DN 50	130	170	174	280	G 2 ½	7.8

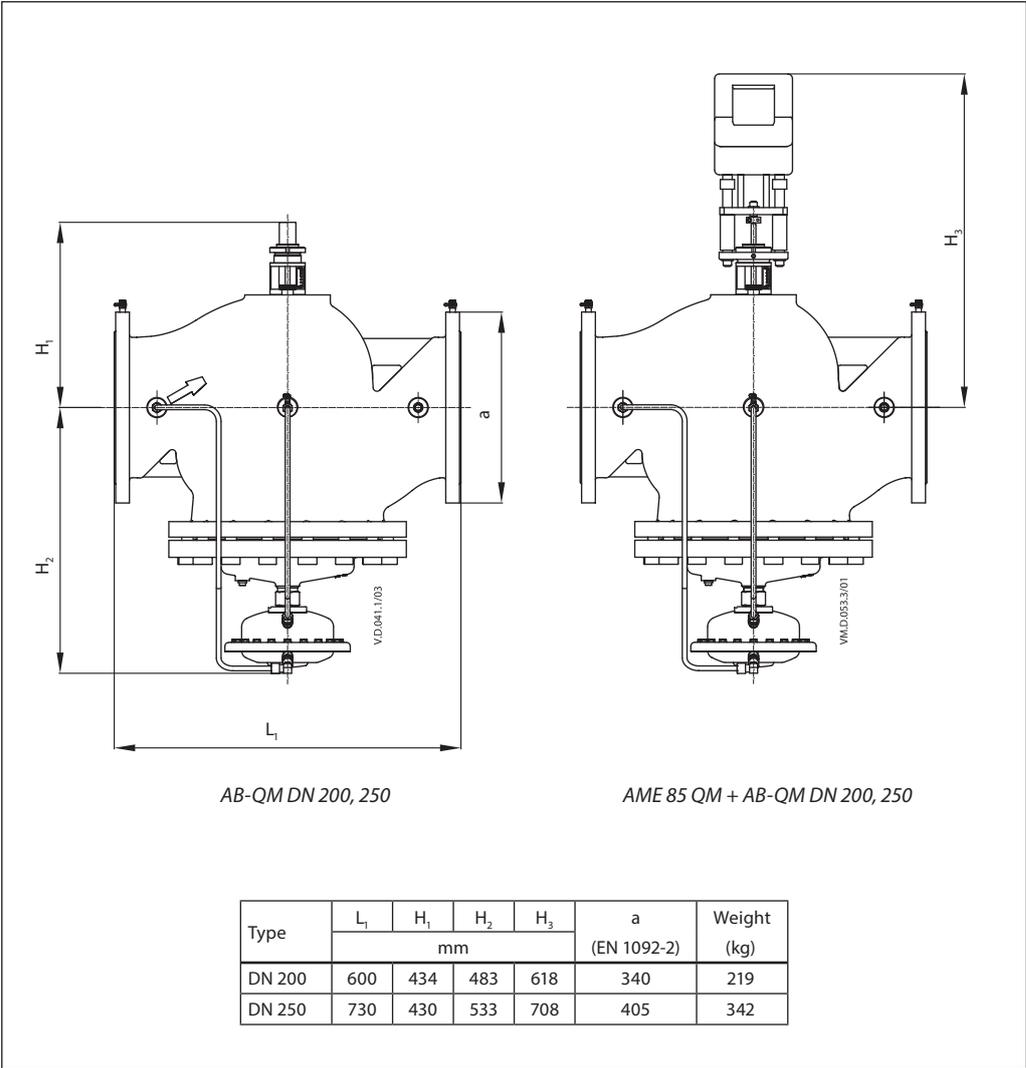
Dimensions (continuous)



Dimensions (continuous)



Dimensions (continuous)



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