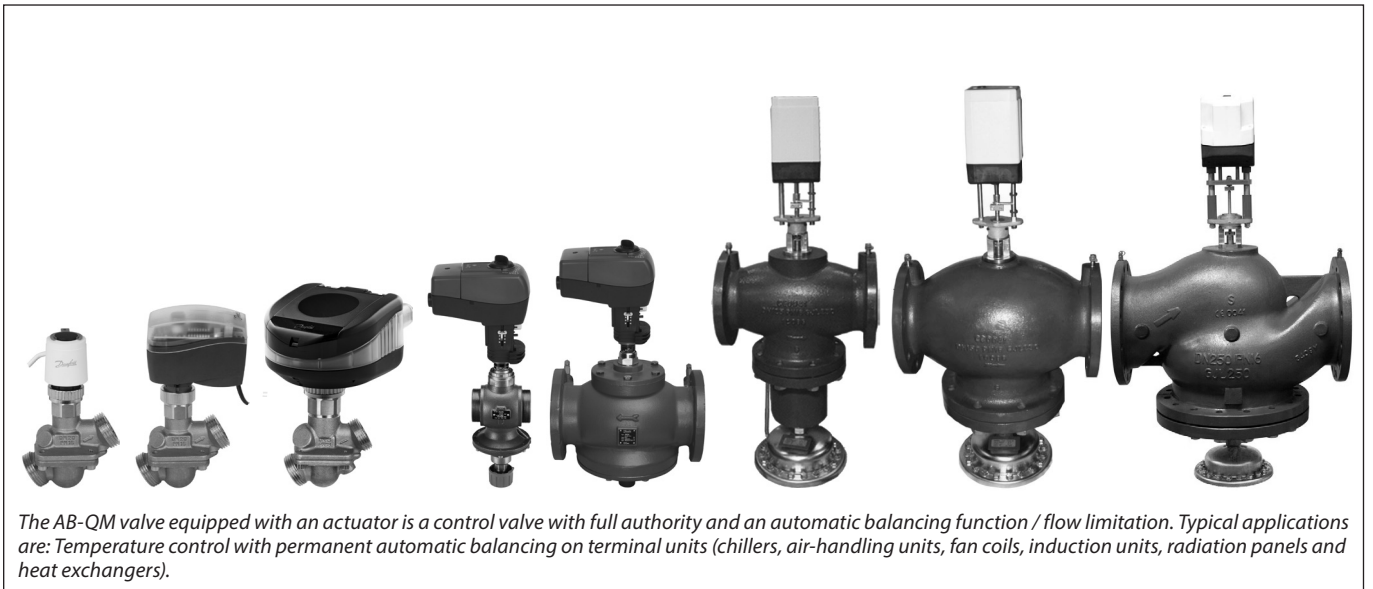


## Data sheet

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



## Description

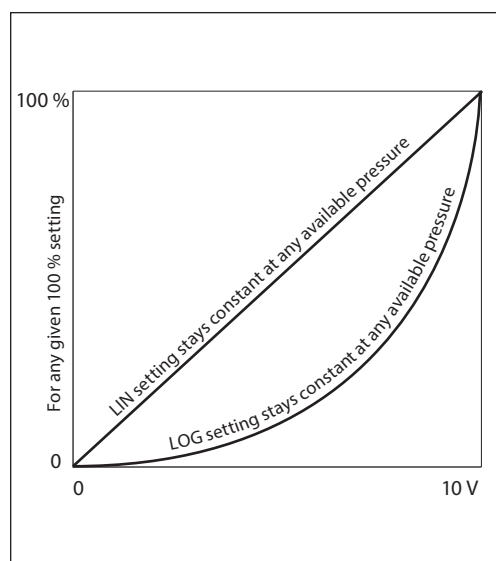
The precise flow control performance of the AB-QM with a Danfoss actuator provides increased comfort and lower Total Cost of Ownership because of savings made on:

- 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 complaints, as the valve performs as designed.
- Minimal blockage complains, as the membrane design makes AB-QM less susceptible to blockage than a cartridge type construction.
- 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**

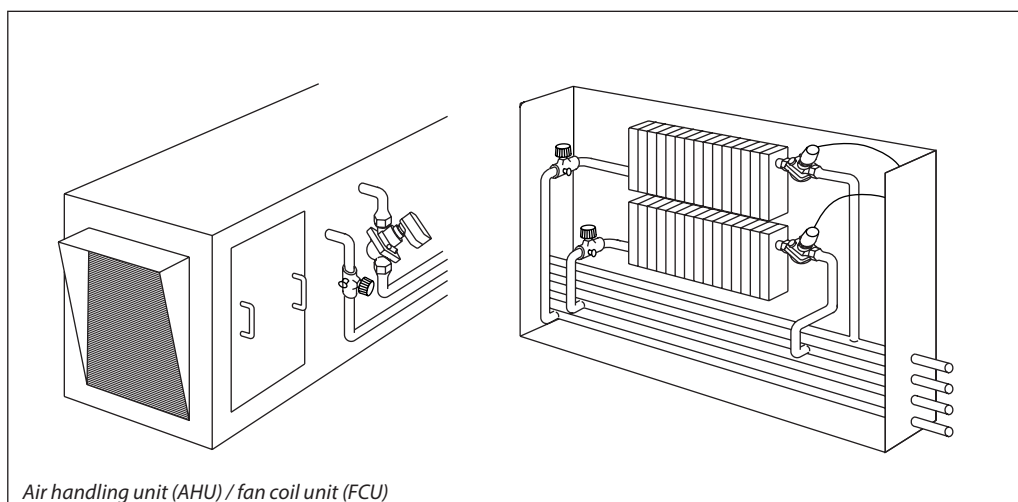
The AB-QM has a linear control characteristic. The AB-QM is pressure independent which means that the control characteristic is independent from the available pressure and is not influenced by a low authority. The flow limitation on the AB-QM is achieved by limiting the stroke and the Danfoss actuators 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 DIP switch setting on the actuator.



**Applications**

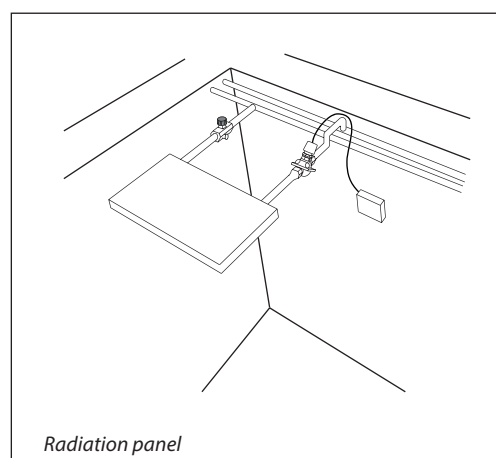
- variable flow systems



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.

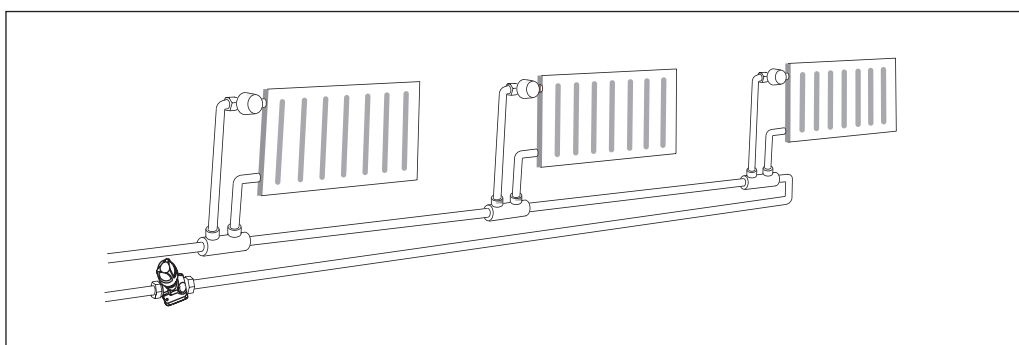
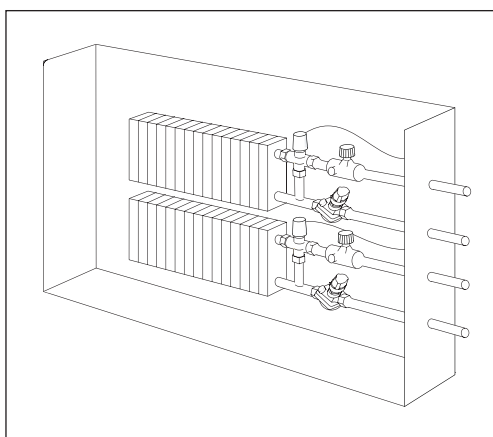
Because of the integrated differential pressure controller the control valve always has 100 % authority and therefore offers always stable control. At partial load there is no overflow, contrary to conventional solutions, because the AB-QM will always limit the flow to exactly what is needed. By installing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



**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	003Z1261		G ½A	003Z1251
	10	275		003Z1211			003Z1201
	15 LF	275	G ¾A	003Z1262		003Z1252	
	15	450		003Z1212		003Z1202	
	15 HF	1,135		003Z1222			
	20	900	G 1A	003Z1213		003Z1203	
	20 HF	1,700		003Z1223			
	25	1,700	G 1 ¼A	003Z1214		003Z1204	
	25HF	2,700		003Z1224			
	32	3,200	G 1 ½A	003Z1215		003Z1205	
	32 HF	4,000		003Z1225			
	40	7,500	G 2A	003Z0770		<i>AB-QM (DN 10-32) can not be upgraded to AB-QM with test plugs!</i>	
	50	12,500	G 2 ½A	003Z0771			

Note: AB-QM DN 10-32 acts as a normally open valve.

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	003Z1761		G ½A	003Z1751
	10	275		003Z1711			003Z1701
	15 LF	275	G ¾A	003Z1762		003Z1752	
	15	450		003Z1712		003Z1702	
	20	900	G 1A	003Z1713		003Z1703	




AB-QM flanged version

Picture	DN	Q <sub>nom.</sub> (l/h)	Flange connection	Code No.
	50	12,500	PN 16	003Z0772
	65	20,000		003Z0773
	65 HF	25,000		003Z0793
	80	28,000		003Z0774
	80 HF	40,000		003Z0794
	100	38,000		003Z0775
	100 HF	59,000		003Z0795
	125	90,000		003Z0705
	125 HF	110,000		003Z0715
	150	145,000		003Z0706
	150 HF	190,000		003Z0716
	200	200,000		003Z0707
	200 HF	270,000		003Z0717
	250	300,000		003Z0708
	250 HF	370,000	003Z0718	

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	003Z1238
	15	450		003Z1242
	20	900	G 1A	003Z1243
	25	1,700	G 1 ¼A	003Z1244
	32	3,200	G 1 ½A	003Z1245

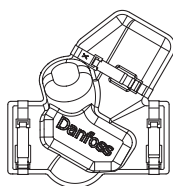
Ordering (continuous)  
Accessories & spare parts

Type	Comments		Code No.
	To pipe	To valve	
Union connection (CW617N) (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
Tailpiece welding (W. Nr. 1.0308) (1 pcs.) 	Weld.	DN 50	003Z0278
		DN 15	003Z0226
		DN 20	003Z0227
		DN 25	003Z0228
		DN 32	003Z0229
		DN 40	003Z0270
Tailpiece welding - INOX (W. Nr. 1.4404) (1 pcs.) 	Weld.	DN 50	003Z0276
		DN 15	003Z1271
		DN 20	003Z1272
		DN 25	003Z1273
		DN 32	003Z1274
		DN 40	003Z1275
Tailpieces for soldering (CW614N) (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 5/4 internal thread for AB-QM, G 5/4A 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
Locking ring AB-QM DN10-32 (5 pcs.)			003Z1236
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
Adapter for ABNM A5			082F1072
Spacer AMI 140			003Z0257
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	Code No.
AB-QM heating insul. cap DN 10	003Z4730
AB-QM heating insul. cap DN 15	003Z4731
AB-QM heating insul. cap DN 20	003Z4732
AB-QM heating insul. cap DN 25	003Z4733
AB-QM heating insul. cap DN 32	003Z4734
AB-QM heating insul. cap DN 40	003Z4735
AB-QM heating insul. cap DN 50	003Z4736

Type	Comments	Code No.
Refrig. insulation ABQM DN 15_ABNM/TWA-Z	DN 15	003Z4787
Refrig. insulation ABQM DN 20_ABNM/TWA-Z	DN 20	003Z4788
Refrig. insulation ABQM DN 25_ABNM/TWA-Z	DN 25	003Z4789
Refrig. insulation ABQM DN 32_ABNM/TWA-Z	DN 32	003Z4790

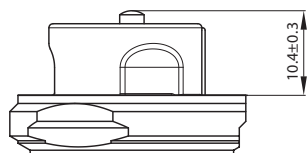
Type	Code No.
Set of needle plug (1 pcs.)	003Z0100
Set of ext. plug (1 pcs.)	003Z0106
Set of measuring needle (1 pcs.)	003Z0107
Elbow test plug extension (1 pcs.)	003Z3944
Straight test plug extension (1 pcs.)	003Z3945
Straight plug extension set (1 pcs.)	003Z3946



Ordering (continuous)

For Valve Sizes DN 10 - 32

Type	Note	Power	Input Signal			Output Signal	Safety Function		Code No.
			On/Off	Float.	Modul.		Up	Down	
NovoCon® S	BACnet & Modbus communication <sup>4)</sup>	24 VAC/DC			•	• <sup>5)</sup>	Selectable	Selectable	003Z8504
NovoCon® S CO6, Energy, I/O	BACnet & Modbus communication <sup>4)</sup>	24 VAC/DC			•	• <sup>5)</sup>	Selectable	Selectable	003Z8503
AME 110 NL		24 VAC			•				082H8057
AME 120 NL		24 VAC			•				082H8059
AME 110 NLX		24 VAC			•	•			082H8060
AME 13 SU	<sup>2), 3)</sup>	24 VAC			•	•	•		082H3044
AME 13 SD	<sup>3)</sup>	24 VAC			•	•		•	082G3006
ABNM A5 NC LOG	5 mm stroke <sup>4)</sup>	24 VAC			•			•	082F1160
ABNM A5 NC LOG	6.5 mm stroke <sup>4)</sup>	24 VAC			•			•	082F1162
ABNM A5 DC NC LOG	6.5 mm stroke <sup>4)</sup>	24 VDC			•			•	082F1166
ABNM A5 DC NO LOG	6.5 mm stroke <sup>4)</sup>	24 VDC			•		•		082F1167
ABNM A5 NO LOG	6.5 mm stroke <sup>4)</sup>	24 VAC			•		•		082F1163
ABNM A5 NC LIN	5 mm stroke <sup>4)</sup>	24 VAC			•			•	082F1161
ABNM A5 NC LIN	6.5 mm stroke <sup>4)</sup>	24 VAC			•			•	082F1164
ABNM A5 NO LIN	6.5 mm stroke <sup>4)</sup>	24 VAC			•		•		082F1165
AMV 110 NL		24 VAC		•					082H8056
AMV 120 NL		24 VAC		•					082H8058
AMV 13 SU	<sup>2), 3)</sup>	24 VAC		•		•	•		082H3043
AMV 13 SD	<sup>3)</sup>	24 VAC		•		•		•	082G3004
TWA-Z NC	<sup>1)</sup>	24 VAC/DC	•					•	082F1262
TWA-Z NC	Halogen free cable <sup>1)</sup>	24 VAC/DC	•					•	082F1380
ABN A5 NC	5 mm stroke <sup>4)</sup>	24 VAC/DC	•					•	082F1150
ABN A5 NC	5 mm stroke, End-switch <sup>4)</sup>	24 VAC/DC	•					•	082F1154
ABN A5 NO	5 mm stroke <sup>4)</sup>	24 VAC/DC	•				•		082F1151
TWA-Z NO	<sup>1)</sup>	24 VAC/DC	•				•		082F1260
AMI 140	<sup>3)</sup>	24 VAC	•						082H8048
TWA-Z NC	<sup>1)</sup>	230 VAC	•					•	082F1266
TWA-Z NC	Halogen free cable <sup>1)</sup>	230 VAC	•					•	082F1382
ABN A5 NC	5 mm stroke <sup>4)</sup>	230 VAC	•					•	082F1152
ABN A5 NO	5 mm stroke <sup>4)</sup>	230 VAC	•				•		082F1153
TWA-Z NO	<sup>1)</sup>	230 VAC	•				•		082F1264
AMI 140	<sup>3)</sup>	230 VAC	•						082H8049



Closing point (measure) for DN 10-32

Information regarding safety function is relevant only for AB-QM valves.

<sup>1)</sup> Size AB-QM: DN 10LF - DN 20 enables setting to 120%; DN 25 - 32 enables setting up to 60%

<sup>2)</sup> Requires **003Z3960** adapter

<sup>3)</sup> Requires spacer **003Z0257**

<sup>4)</sup> Cable needs to be ordered as separate code nr.

<sup>5)</sup> Feedback signal over field bus

The code no. listed are for actuators with standard cable lengths when cables are included, others lengths are available referring to data sheet for actuators.

For Valve Sizes DN 40 - 100

Type	Power	Input Signal			Output Signal (0-10VDC)	Safety Function		Code No.
		On/Off	Floating	Modulating		Up	Down	
AME 435 QM	24 VAC/DC			•	•	•**	•**	082H0171
AMV 435	24 VAC/DC		•		•			082H0162
AMV 435	230 VAC		•		•			082H0163
AME 25 SU*	24 VAC		•	•	•	•		082H3041
AME 25 SD*	24 VAC		•	•	•		•	082H3038
AMV 25 SD*	24 VAC		•				•	082H3036
AMV 25 SU*	24 VAC		•			•		082H3039
AMV 25 SD*	230 VAC		•				•	082H3037
AMV 25 SU*	230 VAC		•			•		082H3040

\* Adapter required for 2nd gen valve. Part # **003Z0694**

\*\*Available battery backup assembly for safety function, AM-PBU25, **082H7090**, one per four AME 435 QM actuators

AB-QM DN 65-100 with AME 25 SD has limited flow to 90% of  $Q_{nom}$ . Actuators for valves DN 40-100 are delivered without cables.

**Ordering (continuous)**
**For Valve Sizes DN 125-150**

Type	Power	Input Signal			Output Signal (0-10VDC)	Safety Function		Code No.
		On/Off	Floating	Modulating		Up	Down	
AME 55 QM	24 VAC		•	•	•	•*	•*	082H3078
AME 655	24 VAC/DC		•	•	•			082G3442
AME 655	230 VAC/DC		•	•	•			082G3443
AME 658 SU	24 VAC/DC		•	•	•	•		082G3450
AME 658 SU	230 VAC/DC		•	•	•	•		082G3451
AME 658 SD	24 VAC/DC		•	•	•		•	082G3448
AME 658 SD	230 VAC/DC		•	•	•		•	082G3449

\* Available battery backup assembly for safety function, AM-PBU25, **082H7090**, one per two AME 55 QM actuators

**For Valve Sizes DN 200-250**

Type	Power	Input Signal			Output Signal (0-10VDC)	Safety Function		Code No.
		On/Off	Floating	Modulating		Up	Down	
AME 85 QM	24VAC		•	•	•	•**	•**	082G1453

\*\* Available battery backup assembly for safety function, AM-PBU25, **082H7090**, one per AME 85 QM actuator

Actuators for valves DN 125-250 are delivered without cables.

Closing pressure for AB-QM on all above actuators is 16 bar.  
More information regarding the actuators can be found in the individual data sheets.

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

Nominal diameter		DN	10 LF	10	15 LF	15	15 HF	20	20 HF	25	25 HF	32	32 HF	40	50		
Flow range	Q <sub>nom</sub> (100 %) <sup>1)</sup>	l/h	150	275	275	450	1,135	900	1,700	1,700	2,700	3,200	4,000	7,500	12,500		
	Q <sub>high</sub> <sup>3)</sup>		180	330	330	540	1,250 <sup>4)</sup>	1,080	1,870 <sup>4)</sup>	1,870 <sup>4)</sup>	2,970 <sup>4)</sup>	3,520 <sup>4)</sup>	4,400 <sup>4)</sup>	7,500	12,500		
Setting range <sup>1), 2)</sup>		%	20-120				20-110	20-120	20-110 <sup>4)</sup>				40-100				
Diff. pressure <sup>3), 5)</sup>	Δp <sub>min</sub>	kPa	16 (18)				35 (40)	16 (18)	35 (40)	20 (25)	35 (40)	25 (30)	35 (40)	30			
	Δp <sub>max</sub>		600														
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 <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*) + 2 ... 120														
Storage and transport temp.			-40 ... 70														
Stroke		mm	2.25				4	2.25	4	4.5				10			
Connection	ext. thread (ISO 228/1)	G ½ A		G ¾ A			G 1 A		G 1¼ A		G 1½ A		G 2 A		G 2½ A		
	actuator	M30 x 1.5															
Materials in the water																	
Valve bodies		DZR Brass (CuZn36Pb2As - CW 602N)											Grey iron EN-GJL-250 (GG25)				
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															
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															
Materials out of the water																	
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> When set above 100 %, minimum starting pressure needed is higher, see figures in the ().

<sup>4)</sup> Actuator with compatible stroke must be selected.

<sup>5)</sup> At min differential pressure valve reaches at least 90% of nominal flow. Declaration of performance is available upon request.

\* If the medium temperature is below 2°C for AB-QM DN10-32 refriger. insulation must be used to cover both the valve and actuator: Code 003Z4787-003Z4790. For AB-QM DN40-100 stem heaters must be used: Code 065B2171, 065Z0315 or 065Z7022.

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 (flanged version)

Nominal diameter		DN	50	65	65 HF	80	80 HF	100	100 HF	
Flow range	Q <sub>nom</sub> (100 %) <sup>1)</sup>	l/h	12,500	20,000	25,000	28,000	40,000	38,000	59,000	
	Q <sub>high</sub>		12,500	20,000	25,000	28,000	40,000	38,000	59,000	
Setting range <sup>1), 2)</sup>		%	40-100							
Diff. pressure <sup>3), 5)</sup>	Δp <sub>min</sub>	kPa	30	60	30	60	30	60		
	Δp <sub>max</sub>		600							
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>3)</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), 5)</sup>	Δp <sub>min</sub>	kPa	40 (60)	60 (80)	40 (60)	60 (80)	45 (65)	60 (80)	45 (65)	60 (80)
	Δp <sub>max</sub>		600							
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 (GG25)								
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> When set above 100 %, minimum starting pressure needed is higher, see figures in the ().

<sup>4)</sup> In case AB-QM is used above 400 kPa differential pressure contact Danfoss design center to assure proper design.

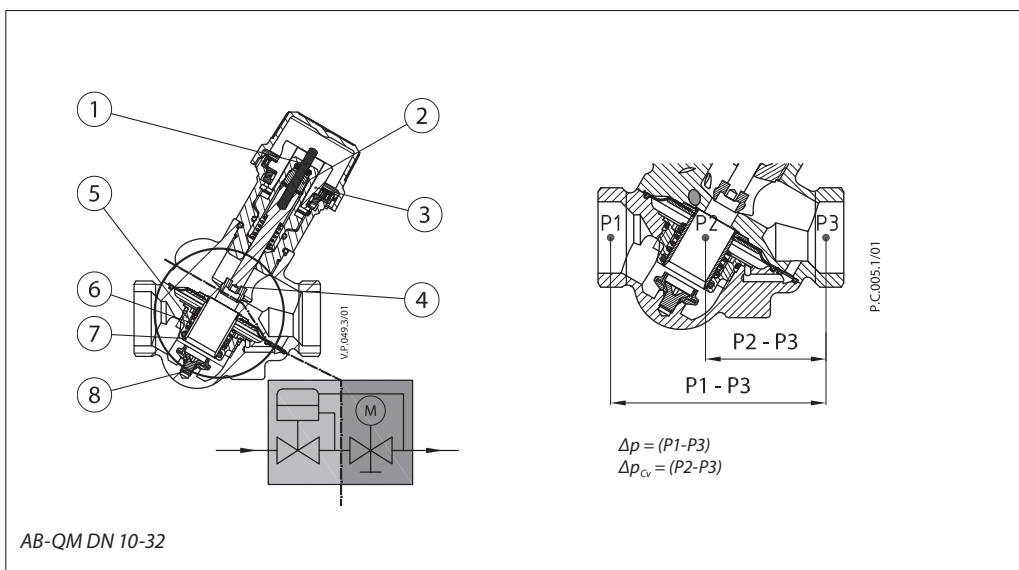
<sup>5)</sup> At min differential pressure valve reaches at least 90% of nominal flow. Declaration of performance is available upon request.

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

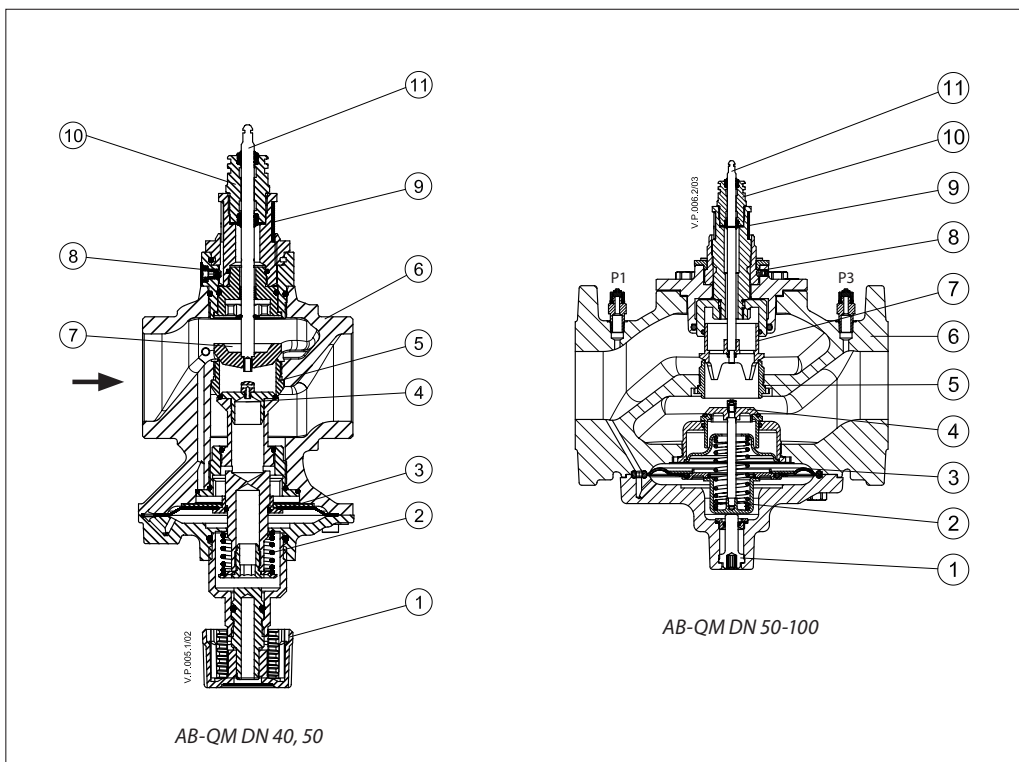
**1. Differential pressure controller DPC**

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**

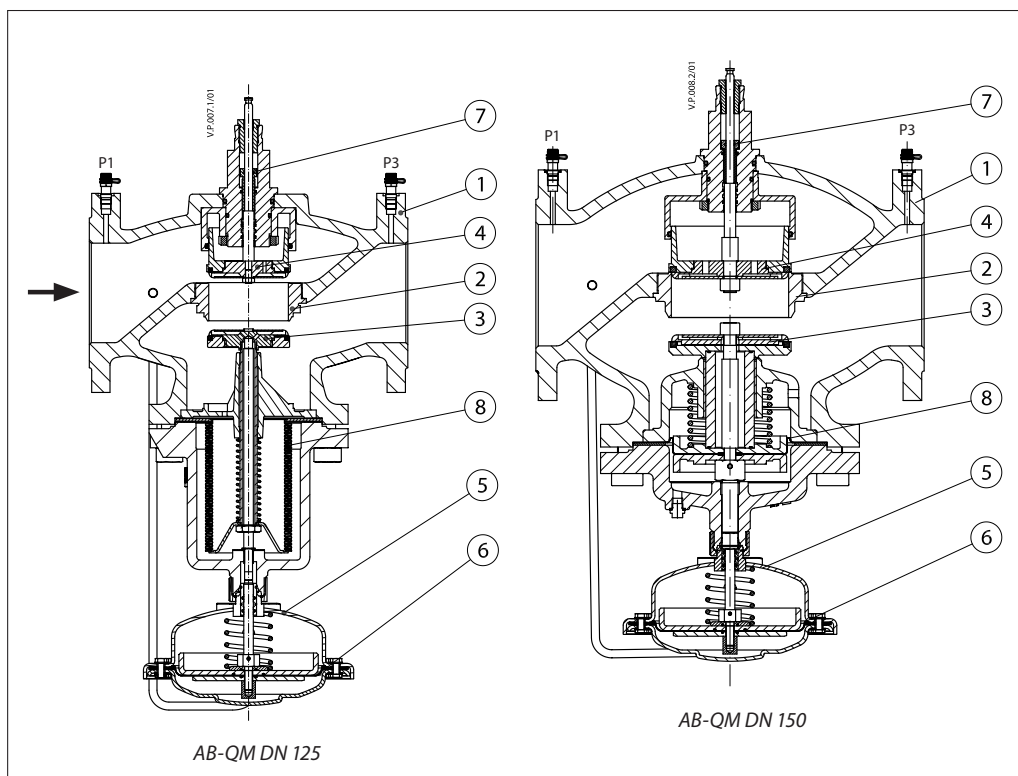
The control valve has a linear characteristic. It features a stroke limitation function that allows adjustment of the Kv value. The percentage marked on the scale equals the percentage of 100 % flow marked on the pointer. Changing the stroke limitation is done by lifting the blocking mechanism and turning 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

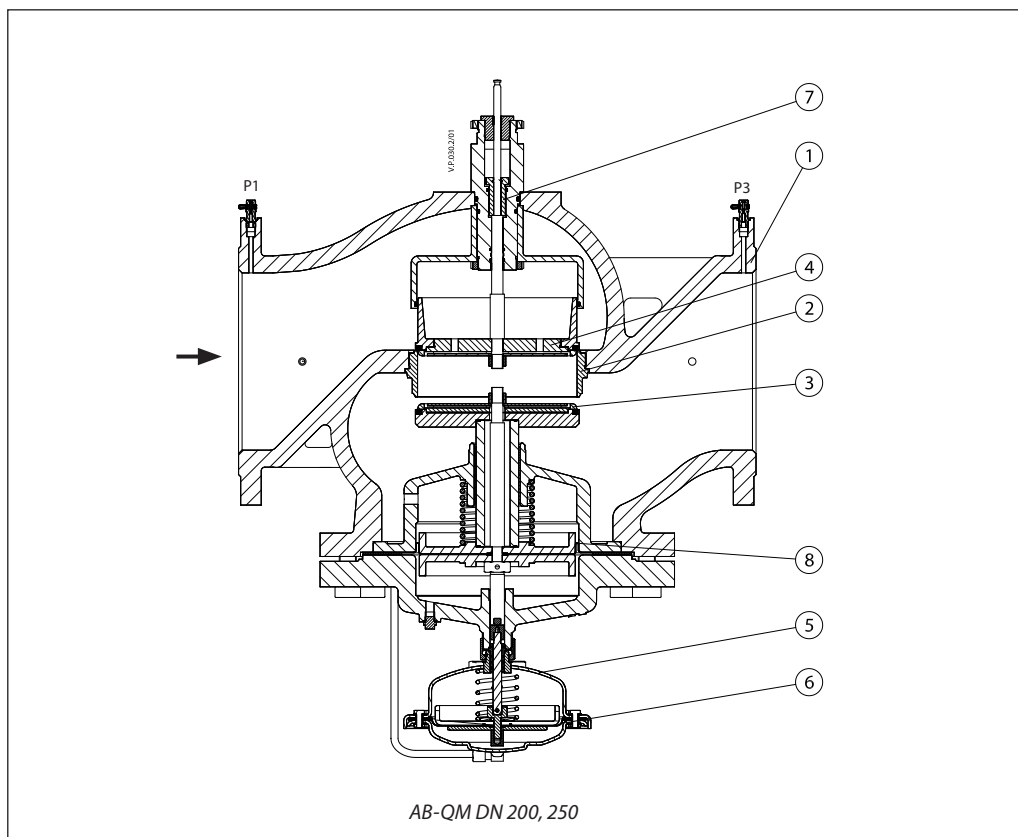


Design (continuous)

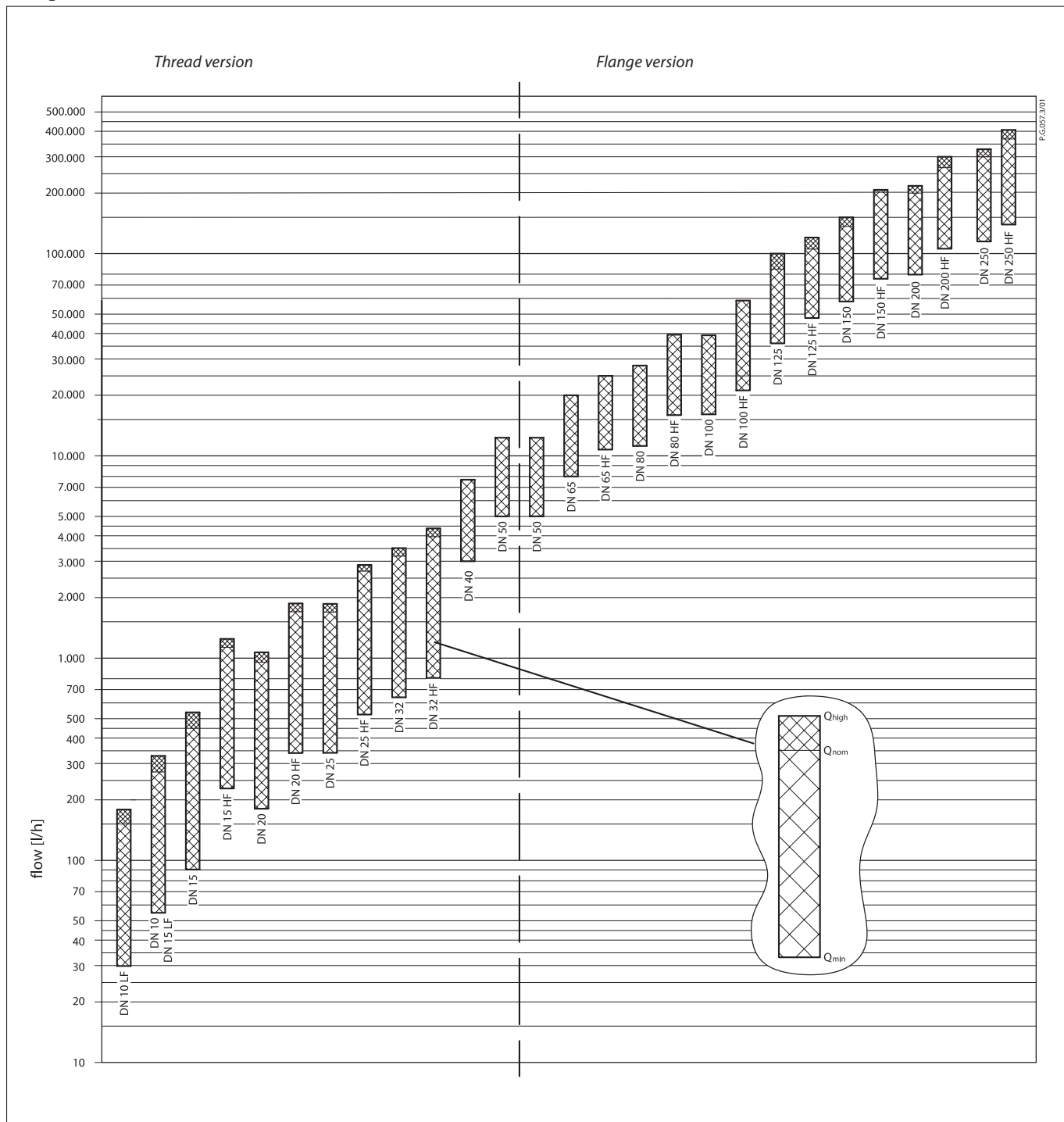
1. Valve body
2. Valve seat
3. DPC cone
4. CV cone
5. Controller casting
6. Rolling diaphragm
7. Adjusting screw
8. Bellow for pressure relief on DPC cone



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

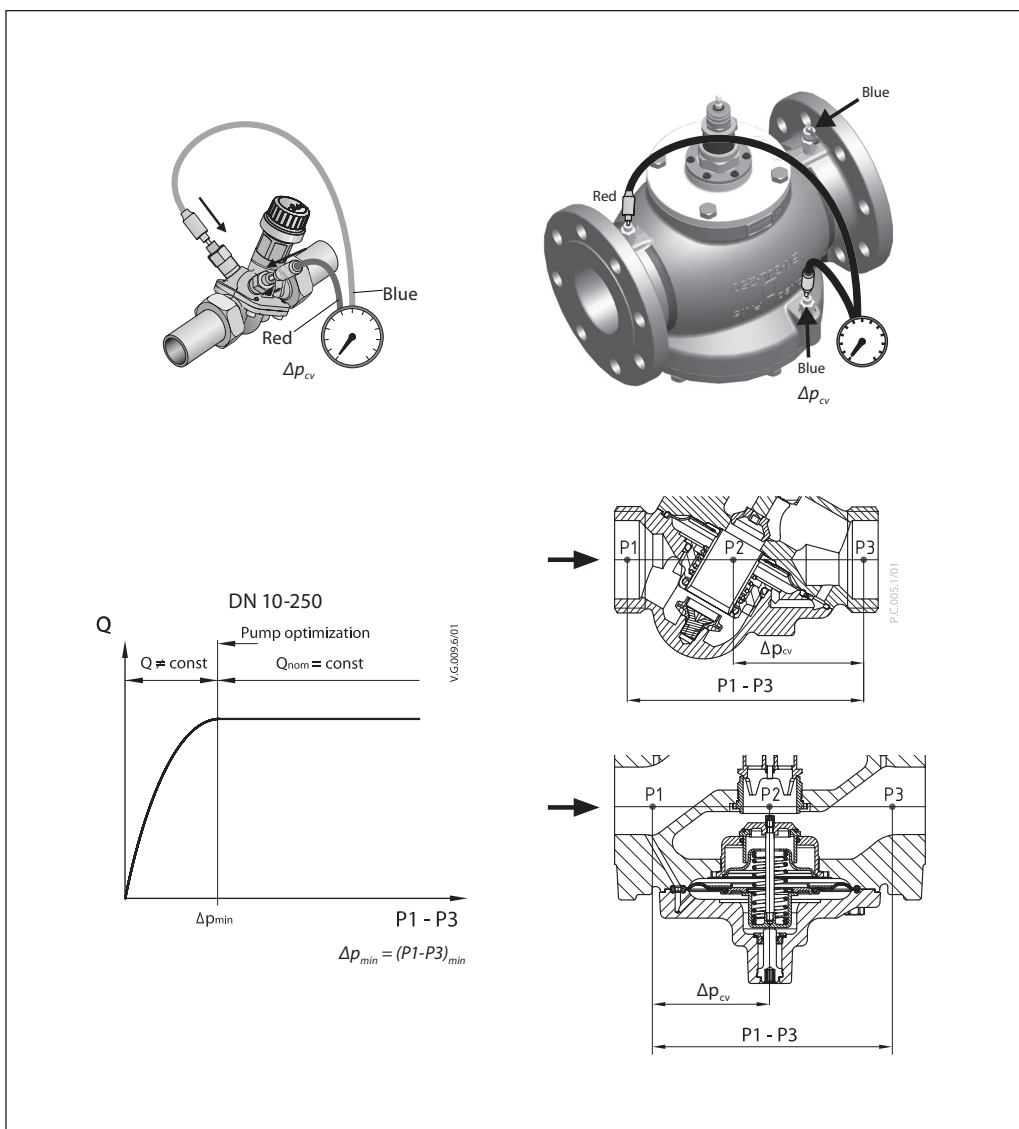
Dimension and condition acceptable, velocity below 1.0 m/s.

Presenting 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.

Measuring differential pressure / Trouble shooting



The AB-QM (DN 10-250) features test plugs that allow measuring of the differential pressure over the control valve (dpcv) either differential pressure over the whole valve (dpv). If the pressure difference (dpv) exceeds the minimal required pressure the dp controller is operational and the flow limitation is achieved. For detailed information how to measure the flow on AB-QM DN 40-250 please refer to Flow checker document and for detailed explanation how to do pump optimisation please refer to Pump optimisation document. 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.

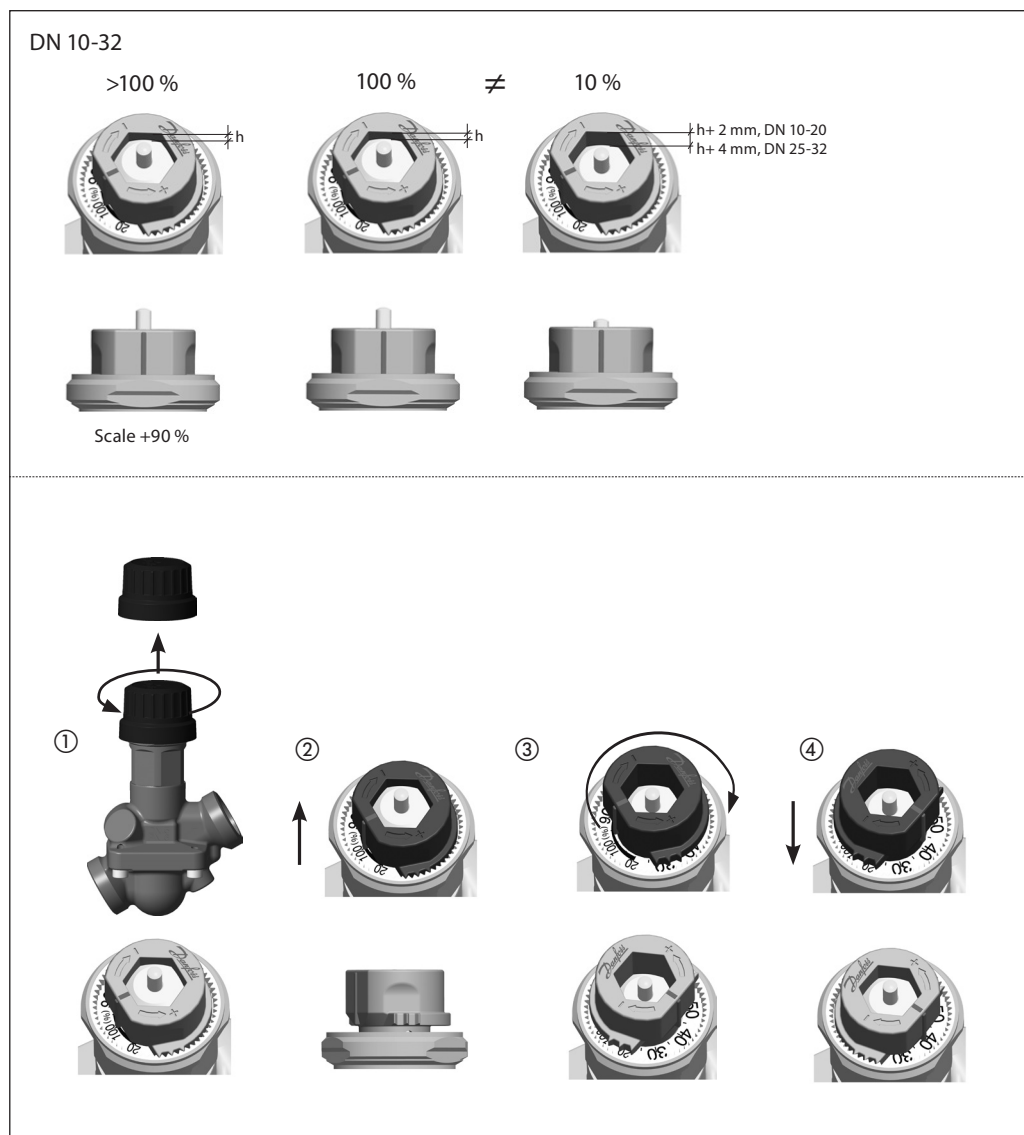
To change the presetting (factory setting is 100 %) follow the four steps below:

- 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.

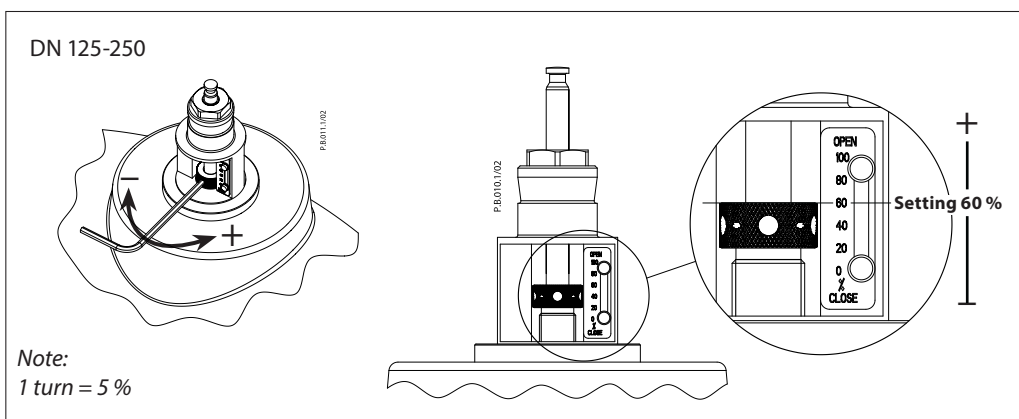
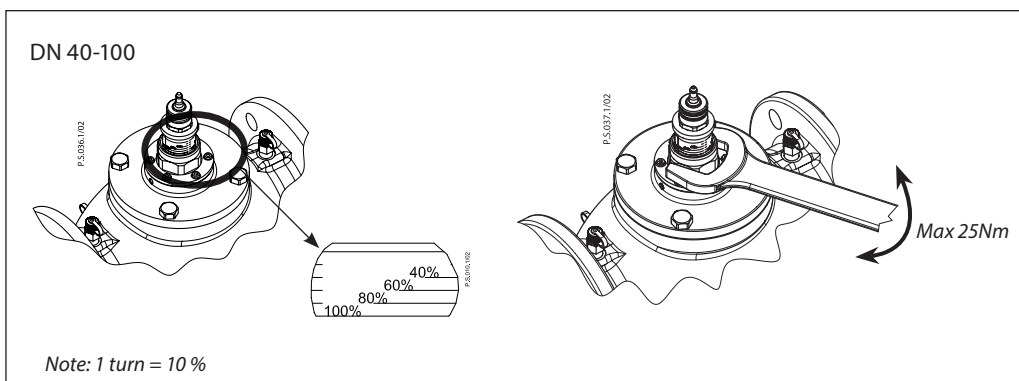
The presetting scale indicates values from 100 % flow to 0 %. Clock wise turning would decrease the flow value while counter clock wise would increase it.

If the valve is a DN 15 then the nominal 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 protection cap. When closing against higher differential pressure please use accessory - shut-off & protection piece (003Z1230) or set the value to 0 %.

**DN 40-100**

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.

**DN 125-250**

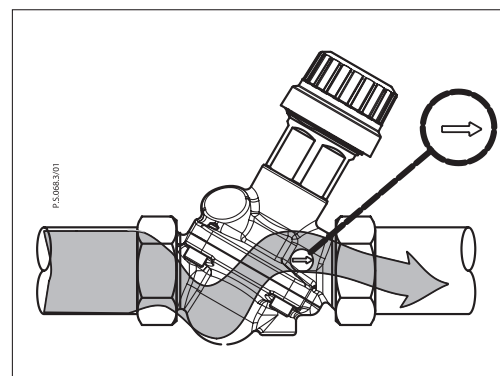
For the service shut-off function, the valve can be installed in either supply or return pipe.

For shut-off set the valve to 0%.

**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.





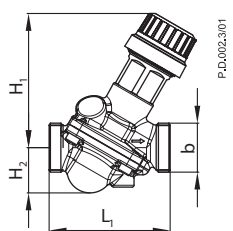
**Tender text**

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.

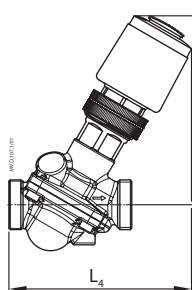
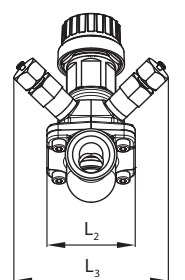
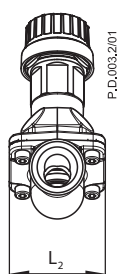
AB-QM has following features:

- 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
- 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

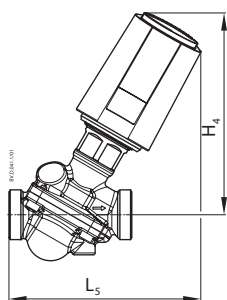
Dimensions



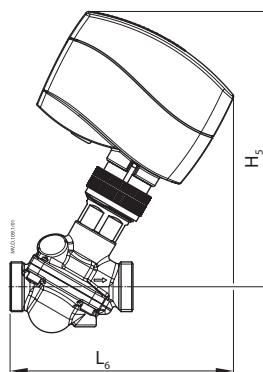
AB-QM DN 10-32



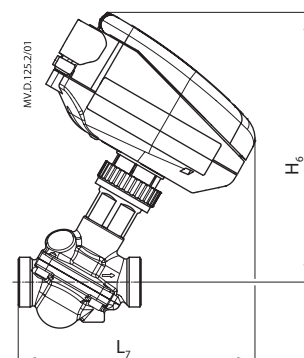
AB-QM + TWA-Z



AB-QM + ABNM

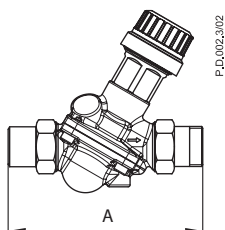


AB-QM + AMV (E) 110 NL  
AB-QM + AMI 140



AB-QM + NovoCon™

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

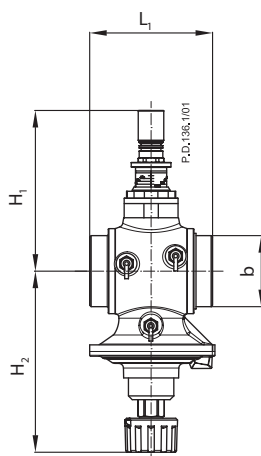


AB-QM DN 10-50

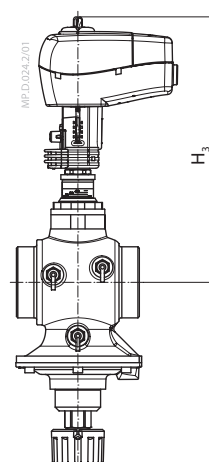
DN	Union connection A* (mm)	Tailpiece welding A* (mm)	Tailpieces for soldering A* (mm)
10	105	-	87
15	120	139	109
20	143	166	-
25	174	188	-
32	207	214	-
40	200	204	-
50	244	234	-

\* Length is decreased with installation due to deformation of the gasket.

Dimensions (continuous)

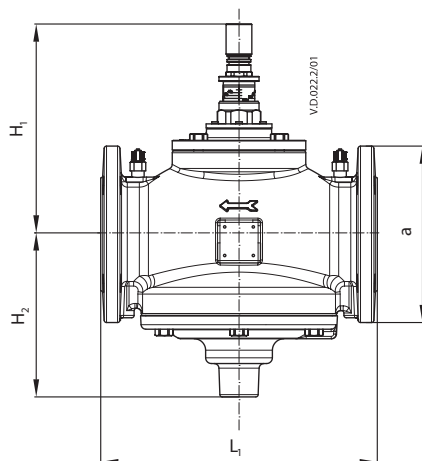


AB-QM

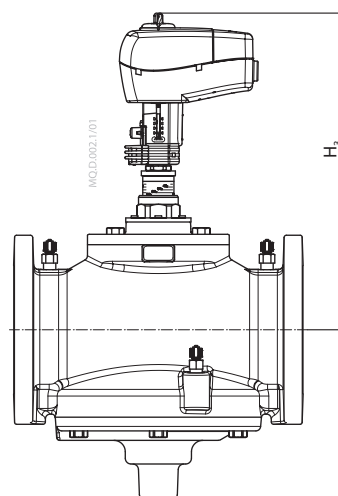


AB-QM DN 40, 50 + AME 435 QM

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



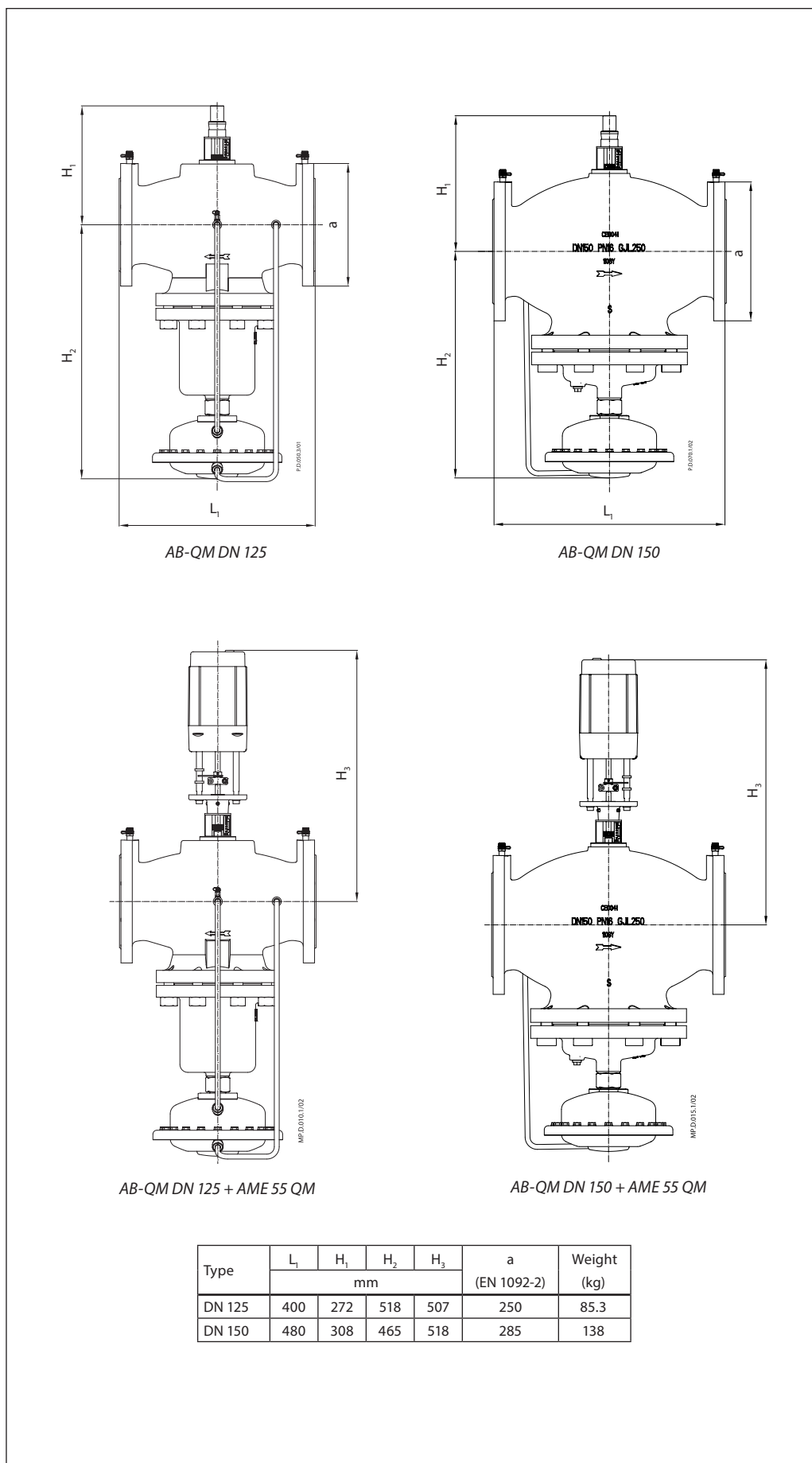
AB-QM



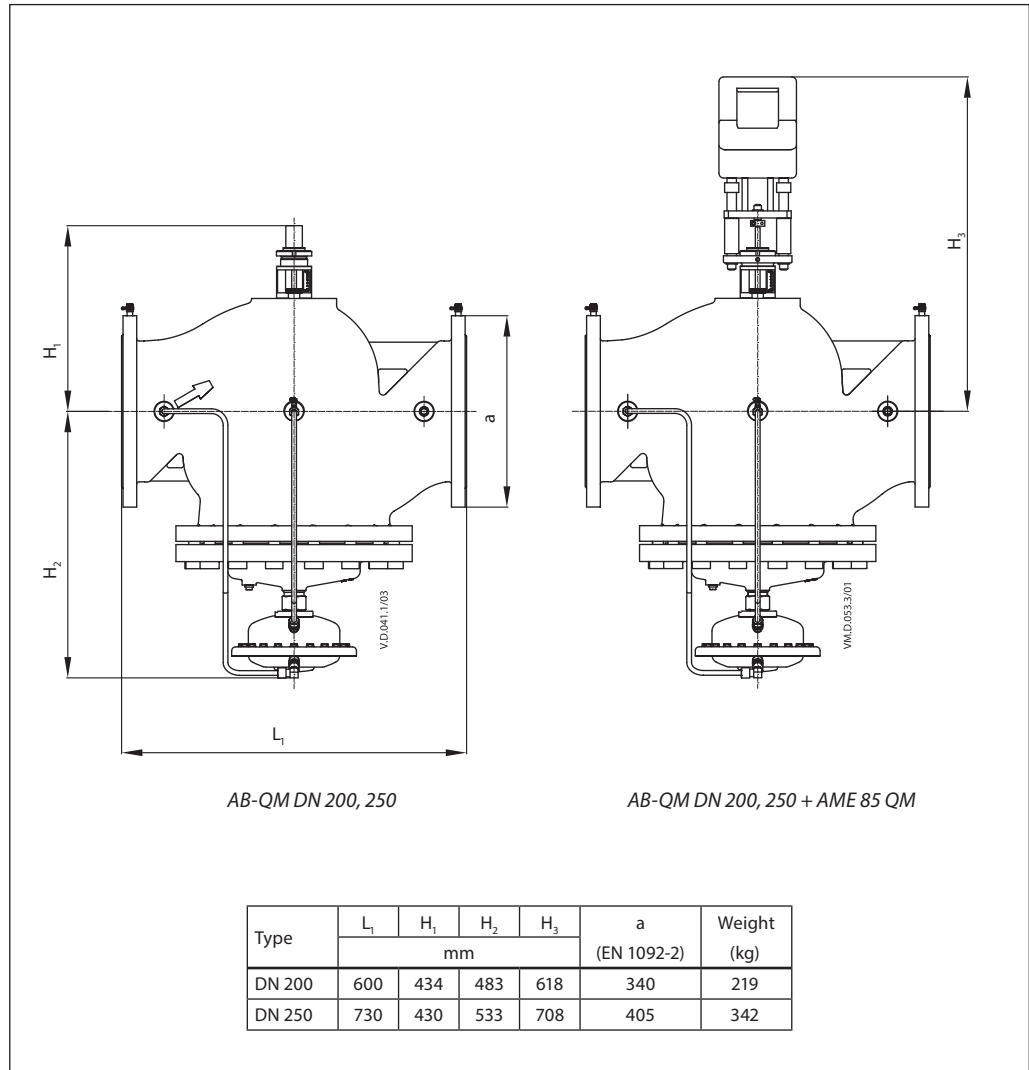
AB-QM DN 50-100 + AME 435 QM

Type	L <sub>1</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	a (EN 1092-2)	Weight (kg)
	mm					
DN 50	230	170	174	280	165	14.2
DN 65	290	220	172	330	185	38.0
DN 80	310	225	177	335	200	45.0
DN 100	350	240	187	350	220	57.0

Dimensions (continuous)



Dimensions (continuous)



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