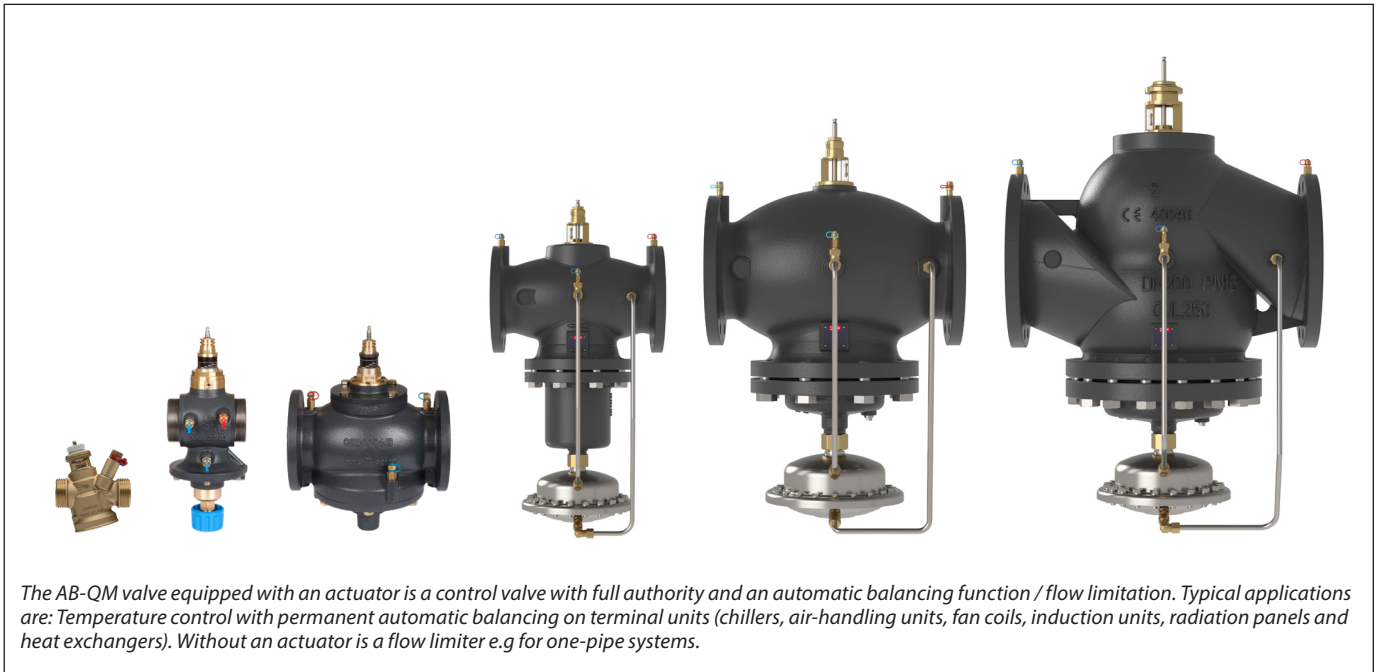


## Data sheet

# AB-QM 4.0 / AB-QM Pressure Independent Control Valves (PICV) DN 15-250



## Description

The Danfoss AB-QM is a Pressure Independent Control Valve (PICV) that combines high accuracy and durability with market leading user-friendliness. The design of the AB-QM is fully geared towards making your project run on time and on budget while delivering the most efficient HVAC system.


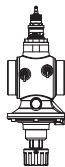
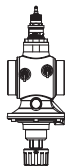
Pressure independent valves are control valves with an automatic balancing function. An in-built pressure controller keeps a constant differential pressure over the control valve, ensuring full authority and automatic flow limitation. By combining two functions in one, control and automatic hydronic balance, Danfoss PICVs provide a cost-efficient solution for the challenges faced by forward-looking designers of HVAC systems.

The Danfoss AB-QM delivers the lowest total cost of ownership because:

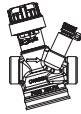

- Precise flow limitation ensures always the right flow at the right time, ensuring minimized pumping energy
- Full range from DN15 to DN250 for flows up to 407 m<sup>3</sup>/h
- Available with internal and external thread for universal applicability
- Danfoss' durability test ensures the AB-QM has best-in-class resistance to scaling and clogging
- Easy troubleshooting because of the always visible setting and the ability to measure flow through test plugs
- Minimum hysteresis for stable and precise temperature control
- Future-ready with a range of smart actuators, ready for data driven and optimized HVAC 4.0

Ordering

AB-QM 4.0 threaded version (with test plugs and without test plugs) - External thread

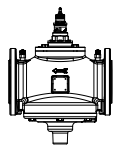
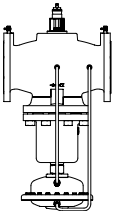
Type				With test plugs	Without test plugs	
Picture	DN	Q <sub>nom.</sub> (l/h)	Ext. thread (ISO 228/1)	Code No.	Code No.	
	15 LF	200	G 3/4 A	003Z8200	003Z8220	
	15	650		003Z8201	003Z8221	
	15 HF	1,200		003Z8202	003Z8222	
		20	1,100	G 1 A	003Z8203	003Z8223
		20 HF	1,900		003Z8204	003Z8224
		25	2,200	G 1 1/4 A	003Z8205	-
		25 HF	3,800		003Z8206	-
		32	3,600		003Z8207	-
32 HF		5,000	G 1 1/2 A	003Z8208	-	
		40	7,500	G 2 A	003Z0770	-
		50	12,500	G 2 1/2 A	003Z0771	-

AB-QM 4.0 threaded version (with test plugs and without test plugs) - Internal thread




Type				With test plugs	Without test plugs	
Picture	DN	Q <sub>nom.</sub> (l/h)	Int. thread (ISO 7/1)	Code No.	Code No.	
	15 LF	200	Rp 1/2	003Z8300	003Z8320	
	15	650		003Z8301	003Z8321	
	15 HF	1,200		003Z8302	003Z8322	
		20	1,100	Rp 3/4	003Z8303	003Z8323
		20 HF	1,900		003Z8304	003Z8324
		25	2,200	Rp 1	003Z8305	-
		25 HF	3,800		003Z8306	-
		32	3,600		003Z8307	-
32 HF		5,000	Rp 1 1/4	003Z8308	-	

\* AB-QM DN 15-32 w/o TP can not be upgraded to version with TP

AB-QM flanged version

Picture	DN	Q <sub>nom.</sub> (l/h)	Flange connection (EN 1092-2)	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

**Ordering (continuous)  
Accessories & spare parts**

Type	Comments		Code No.
	To pipe	To valve	
Union connection (CW617N) (1 pcs.) 	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 (W. Nr. 1.0308) (1 pcs.) 	Weld.	DN 15	003Z0226
		DN 20	003Z0227
		DN 25	003Z0228
		DN 32	003Z0229
		DN 40	003Z0270
		DN 50	003Z0276
Tailpiece welding (W. Nr. 1.0308) (1 pcs.) 	Weld.	DN 15	003Z1271
		DN 20	003Z1272
		DN 25	003Z1273
		DN 32	003Z1274
		DN 40	003Z1275
		DN 50	003Z1276
Tailpieces for soldering (CW614N) (2 nuts, 2 gaskets, 2 soldering plugs)	15x1 mm	DN 15	065Z7017
Handle AB-QM (necessary accessory if installing valve without actuator)		DN 40-100	003Z0695
		DN 125-150	003Z0696
		DN 200-250	003Z0697
Shut off accessories		DN 15-32	003Z0230
Stem heater for AB-QM DN 40-100 / AME 435 QM			065Z0315
Stem heater for AB-QM DN 125, 150 / AME 55 QM / AME 655			065Z7022
Elbow test plug extension (1 pcs.)			003Z3944
Straight plug extension set (1 pcs.)			003Z3946
AB-QM 4.0 DN 15 EPP insulation			003Z7810
AB-QM 4.0 DN 20 EPP insulation			003Z7811
AB-QM 4.0 DN 25 EPP insulation			003Z7812
AB-QM 4.0 DN 32 EPP insulation			003Z7813
AB-QM DN 125 Impulse tube set			003Z3961
AB-QM DN 150 Impulse tube set			003Z3962
AB-QM DN 200 Impulse tube set			003Z3963
AB-QM DN 250 Impulse tube set			003Z3964

Technical data

		AB-QM 4.0 (threaded version)										AB-QM (threaded version)	
Nominal diameter		DN	15 LF	15	15 HF	20	20 HF	25	25 HF	32	32 HF	40	50
Flow range	$Q_{nom}$ (100 %) <sup>1)</sup>	l/h	200	650	1,200	1,100	1,900	2,200	3,800	3,600	5,000	7,500	12,500
Setting range	<sup>1), 2)</sup>	%	10-100					10-100				40-100	
Diff. pressure <sup>3)</sup>	$\Delta p_{min}$	kPa	16	16	25	16	25	20	30	20	30	30	
	$\Delta p_{max}$		600										
Pressure stage		PN	25									16	
Control range	1:1000												
Control valve's characteristic	Linear (could be converted by actuator to equal percentage)												
Leakage rate with recommended actuators	IEC 60534-4:2007 class IV						IEC 60534-4:2007 class III						
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 WN 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										(-10*) + 2 ... +120	
Storage and transport temp.		-40 ... +70											
Stroke		mm	4									10	
Connection	ext. thread (ISO 228/1)		G ¾ A			G 1 A		G 1¼ A		G 1½ A		G 2 A	G 2 ½ A
	int. thread (ISO 7/1)		Rp ½			Rp ¾		Rp 1		Rp 1 ¼		-	
	actuator		M30 x 1.5									Danfoss standard	

		AB-QM 4.0 (threaded version)										AB-QM (threaded version)		
Materials		DN	15 LF	15	15 HF	20	20 HF	25	25 HF	32	32 HF	40	50	
Materials in the medium	Valve bodies		DZR Brass									Grey iron EN-GJL-250 (GG25)		
	Membranes and O-rings		EPDM											
	Shutter guide		PPSU											
	Shutter		DZR Brass						DZR Brass + PPSU		-			
	Springs		W.Nr.1.4310									W.Nr.1.4310, W.Nr. 1.4568		
	Spring support		PPSU											
	Cone (Pc)		-										CW 614N, W.Nr.1.4305	
	Cone (Cv)		PPSU										CW 614N	
	Seat (Pc)		-										W.Nr. 1.4305	
	Seat (Cv)		DZR Brass										W.Nr. 1.4305	
Materials out of medium	Screw		-										Stainless steel A2	
	Plastic parts		ABS									POM		
	Insert parts and outer screws		-										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.

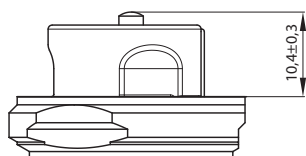
<sup>3)</sup> At min differential pressure valve reaches at least 90% of nominal flow. Declaration of performance is available upon request.

<sup>\*)</sup> If the medium temperature when using AB-QM DN 15-32 is below 2 °C, than ice forming on the spindle must be prevented, therefore valve should be insulated. For AB-QM DN40-100 stem heaters must be used: Code 065Z0315.

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



Closing point (measure)  
for DN 15-32

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), 4)</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*) + 2 ... +120						
Storage and transport temp.			-40 ... 70						
Stroke		mm	10	15					
Connection	flange	PN 16							
	actuator	Danfoss standard							
<b>Materials in the medium</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)</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	600	600	600	600	600	600	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*) + 2 ... +120							
Storage and transport temp.			-40 ... 70							
Stroke		mm	30							
Connection	flange	PN 16								
	actuator	Danfoss standard								
<b>Materials in the medium</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.

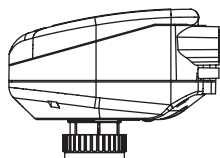
<sup>2)</sup> Regardless of the setting, the valve can modulate below 1 % of set flow.

<sup>3)</sup> When set above 100 %, minimum starting pressure needed is higher, see figures in the ().

<sup>4)</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

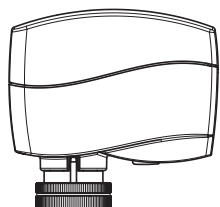
**Actuators overview**  
**AB-QM DN 15-32**



**NovoCon® S**

NovoCon® S is a high accuracy multi-functional field bus actuator, specifically designed for use in combination with the Pressure Independent Balancing Control Valve type AB-QM in sizes from DN 15 LF-32 HF. The actuator with AB-QM is used to control water supply to fan coil units, chilled beams, induction units, small re-heaters, re-coolers, AHU's and other terminal units for zone control, in which heating/ chilled water is the controlled medium.

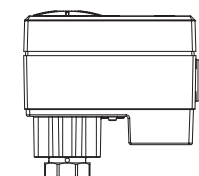
Type	Speed	Power supply	Control signal	Communication protocol	Enclosure	Code No.
NovoCon® S	3/6/12/24 s/mm	24 V ac/dc	0-10 V, 2-10V, 0-20mA, 4-20mA	BACnet MS/TP, Modbus RTU	IP 54 (IP40 if mounted upside down)	<b>003Z8504</b>



**AME(V) 110/120 NL**

The AME 110 and 120 are high precision modulating gear actuators that can be mounted on the AB-QM for precise control. They have a calibration function so the travel of the actuator always matches the stroke of the AB-QM perfectly. The actuator is suitable for both linear and logarithmic characteristics. The AME(V) 110/120 fits to AB-QM DN 15 LF to DN 32 HF.

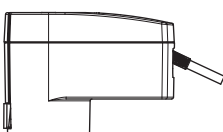
Type	Speed	Feedback signal	Power supply	Control signal	Enclosure	Code No.
AME 110 NL	24 s/mm	No	24 V ac	0-10 V, 2-10V, 0-20mA, 4-20mA	IP 42	<b>082H8057</b>
AME 120 NL	12 s/mm	No				<b>082H8059</b>
AME 110 NLX	24 s/mm	Yes		3 point		<b>082H8060</b>
AMV 110 NL	24 s/mm	No				<b>082H8056</b>
AMV 120 NL	12 s/mm	No			<b>082H8058</b>	



**AME 13 SU/SD**

The AME 13 is a precision gear actuator that has a built-in spring that will close the valve (Spring Down, SD) or open the valve (Spring Up, SU) if the power on the actuator is lost. The characteristic can be set to Logarithmic or Linear with a dip switch. The AME 13 SU/SD fits to AB-QM DN 15 LF to DN 32 HF.

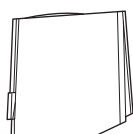
Type	Speed	Spring	Power supply	Control signal	Feedback signal	Enclosure	Code No.
AME 13 SU-1	14 s/mm	Spring to open	24 V ac	0-10 V, 2-10V, 0-20mA, 4-20mA	0-10 V, 2-10V	IP 54	<b>082H5006</b>
AME 13 SD-1		Spring to close					<b>082H5007</b>



**AME 113**

The AME 113 are modulated controlled gear actuators that has a build in battery operated function that opens or closes the valve if the power on the actuator is lost. The AME 113 has a logarithmic characteristic. They have a calibration function so the travel of the actuator always matches the stroke of the AB-QM valve. The AME 113 fits to AB-QM DN 15 LF to DN 32 HF.

Type	Speed	Safety function	Power supply	Control signal	Feedback signal	Enclosure	Code No.
AME 113 NL SD	15 s/mm	Closes the valve	24 V ac/dc	0-10 V	-	IP 54	<b>082H5007M</b>
AME 113 NL SU		Opens the valve					<b>082H5008</b>
AME 113 NLX SD		Closes the valve			0-10 V		<b>082H5000</b>
AME 113 NLX SU		Opens the valve					<b>082H5001</b>



**ABNM-A5**

The ABNM is a thermal modulating actuator. It can be used to modulate the AB-QM if speed or precision is not the first concern. ABNM has either a Logarithmic (LOG) or a Linear (LIN) characteristic which should be chosen to fit the application. It is available in Normally Open (NO) and Normally Closed (NC) versions, as well as in 24V DC and AC. The ABNM-A5 fits to AB-QM DN 15 LF to DN 32 HF.

Cables	Code No.
1 meter	<b>082F1081</b>
5 meter	<b>082F1082</b>
10 meter	<b>082F1083</b>

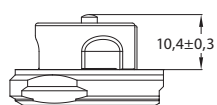
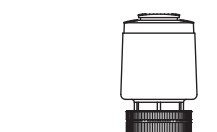
Type	NO/NC	LOG/LIN	Supply voltage	Stroke	Full stroke time	Enclosure	Code No.
ABNM-A5	NC	LOG	24 V ac	5 mm	3-5 min	IP 54	<b>082F1160</b>
ABNM-A5	NC	LIN		5 mm			<b>082F1161</b>
ABNM-A5	NC	LOG		6.5 mm			<b>082F1162</b>
ABNM-A5	NO	LOG		6.5 mm			<b>082F1163</b>
ABNM-A5	NC	LIN		6.5 mm			<b>082F1164</b>
ABNM-A5	NO	LIN		6.5 mm			<b>082F1165</b>
ABNM-A5	NC	LOG	24 V dc	6.5 mm	<b>082F1166</b>		
ABNM-A5	NO	LOG		6.5 mm	<b>082F1167</b>		

Note: ABN & ABNM A5 with 5mm stroke are only able to open AB-QM DN 25-32 90%.

**TWA-Q**

TWA-Q is a thermal actuator that is used for On/Off applications, where control precision and speed are not prioritized. It is available in Normally Open (NO) and Normally Closed (NC) versions and in 24 and 230 Volt. TWA-Q has a position indicator to show if it is open or closed. The TWA-Q fits to AB-QM DN 15 LF to DN 32 HF.

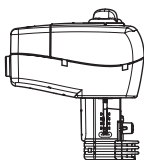
Type	NC/NO	Voltage	Stroke	Full stroke time <sup>1)</sup>	Enclosure	Code No.
TWA-Q	NC	230V AC	5 mm	<3 min.	IP 54	<b>082F1600</b>
TWA-Q	NO	230V AC	5 mm			<b>082F1601</b>
TWA-Q	NC	24V AC/DC	5 mm			<b>082F1602</b>
TWA-Q	NO	24V AC/DC	5 mm			<b>082F1603</b>



Closing point (measure) for DN 15-32

<sup>1)</sup> at room temperature.

**Actuators overview  
AB-QM DN 40-100**



**NovoCon® M**

NovoCon® M is a high accuracy multi-functional field bus actuator, specifically designed for use in combination with the NovoCon Pressure Independent Balancing Control Valve type NovoCon AB-QM in sizes from DN 40-100, please see separate data sheet. The NovoCon® M actuator with AB-QM is used in air handling units AHU, chillers and distribution station applications.

Type	Speed	Power supply	Control signal	Communication protocol	Enclosure	Code No.
NovoCon® M	3/6/12/24 s/mm	24 V ac/dc	0-10 V, 2-10V, 0-20mA, 4-20mA	BACnet MS/TP, Modbus RTU	IP 54	<b>003Z8540</b>

**AME 435 QM**

The AME 435 QM is a high precision modulating gear actuator that can be mounted on the AB-QM for precise control. It has a calibration function, so the travel of the actuator always matches the stroke of the AB-QM perfectly. The actuator is suitable for both linear and logarithmic characteristics. The AME 435 QM fits to AB-QM DN 40 to DN 100 HF.

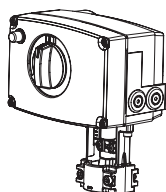
Type	Speed	Power supply	Control signal	Feedback signal	Enclosure	Code No.
AME 435 QM	7.5/15 s/mm	24 V ac/dc	0-10 V, 2-10V, 0-20mA, 4-20mA	0-10 V, 2-10V	IP 54	<b>082H0171</b>

**AME 25 SU/SD**

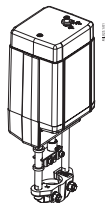
The AME 25 SU/SD is a precision gear actuator that has a built-in spring that will close the valve (Spring Down, SD) or open the valve (Spring Up, SU) if the power on the actuator is lost. The characteristic can be set to Logarithmic or Linear with a dip switch. The AME 25 SU/SD fits to AB-QM DN 40 to DN 100 HF.

Type	Speed	Power supply	Control signal	Feedback signal	Enclosure	Code No.
AME 25 SD	15 s/mm	24 V ac	0-10 V, 2-10V, 0-20mA, 4-20mA	0-10 V, 2-10V	IP 54	<b>082H3038</b>
AME 25 SU						<b>082H3041</b>

Please consider adapter is needed **003Z0694**



**Actuators overview  
AB-QM DN 125-150**



**AME 55 QM**

AME 55 QM and AME 655-1 actuators are used with pressure independent balancing and control valve type AB-QM DN 125 and DN 150.

Type	Speed	Power supply	Control signal	Feedback signal	Enclosure	Code No.
AME 55 QM	8 s/mm	24 V ac	0-10 V, 2-10V, 0-20mA, 4-20mA	0-10 V, 2-10V	IP 54	<b>082H3078</b>

**AME 655-1**

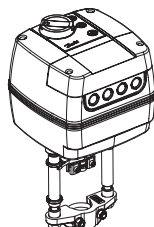
Type	Speed	Power supply	Control signal	Feedback signal	Enclosure	Code No.
AME 655-1	2/6 s/mm	24 V ac/dc	0-10 V, 2-10V, 0-20mA, 4-20mA	0-10 V, 2-10V, 0-20mA, 4-20mA	IP 54	<b>082H5010</b>

**AME 658 SU/SD-1**

AME 658 SU/SD-1 actuator is used together with pressure independent balancing and control valves type AB-QM DN 125 and DN 150. The AME 658 SU/SU-1 is a precision gear actuator that has a built-in spring that will close the valve (Spring Down, SD) or open the valve (Spring Up, SU) if the power on the actuator is lost. The characteristic can be set to Logarithmic or Linear with a dip switch.

Type	Speed	Power supply	Control signal	Feedback signal	Enclosure	Code No.
AME 658 SU-1	4/6 s/mm	24 V ac/dc	0-10 V, 2-10V, 0-20mA, 4-20mA	0-10 V, 2-10V, 0-20mA, 4-20mA	IP 54	<b>082H5012</b>
AME 658 SD-1						<b>082H5011</b>

All actuators type "-1" are UL certified.

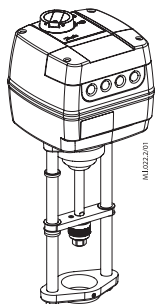


**NovoCon® L**

NovoCon® L is a high accuracy multi-functional fieldbus actuator, specifically designed for use in combination with the Pressure Independent Control Valve type AB-QM in sizes from DN 125-150 used in air handling units AHU, chillers and distribution station applications. NovoCon® L SU/SD has a built-in a spring that will close the valve (Spring Down, SD) or open the valve (Spring Up, SU) if the power on the actuator is lost.

Type	Speed	Power supply	Control signal	Communication protocol	Enclosure	Code No.
NovoCon® L	3/6/12/24 s/mm	24 V ac/dc	0-10 V, 2-10V, 0-20mA, 4-20mA	BACnet MS/TP, Modbus RTU	IP 54	<b>003Z8560</b>
NovoCon® L SU						<b>003Z8561</b>
NovoCon® L SD						<b>003Z8562</b>

**Actuators overview**  
**AB-QM DN 200-250**



**AME 685-1**

AME 685-1 are used together with large pressure independent balancing and control valves type AB-QM DN 200 and DN 250.

Type	Speed	Power supply	Control signal	Feedback signal	Enclosure	Code No.
AME 685-1	3/6 s/mm	24 V ac/dc	0-10 V, 2-10V, 0-20mA, 4-20mA	0-10 V, 2-10V, 0-20mA, 4-20mA	IP 54	<b>082H5013</b>

**NovoCon® XL**

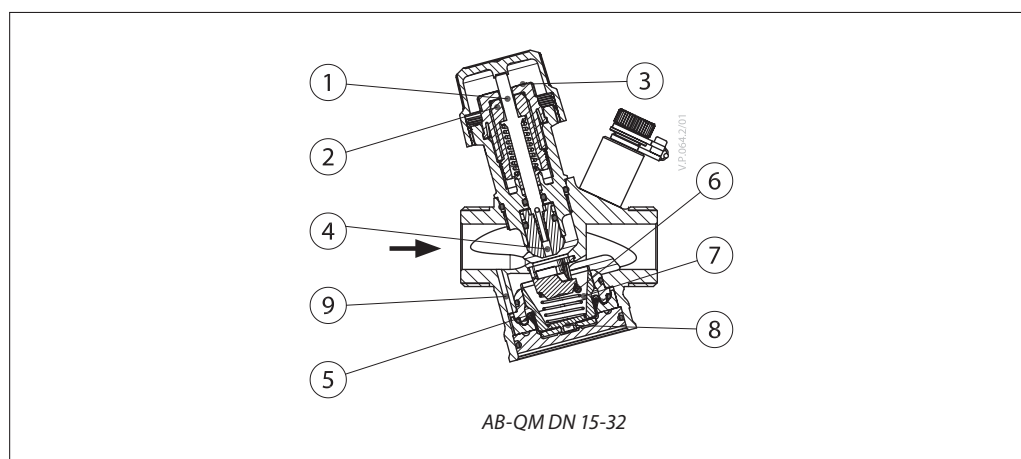
NovoCon® XL is a high accuracy multi-functional fieldbus actuator, specifically designed for use in combination with the Pressure Independent Control Valve type AB-QM in sizes from DN 200- 250 used in air handling units AHU, chillers and distribution station applications.

Type	Speed	Power supply	Control signal	Communication protocol	Enclosure	Code No.
NovoCon® XL	3/6/12/24 s/mm	24 V ac/dc	0-10 V, 2-10V, 0-20mA, 4-20mA	BACnet MS/TP, Modbus RTU	IP 54	<b>003Z8563</b>

*In case other types of actuators are needed please contact our local sales representative.*

**Design**

1. Spindle
2. Stuffing box
3. Pointer
4. Control valve's cone
5. Membrane
6. Differential pressure controller spring
7. Shutter
8. Membrane plate
9. Internal impulse tube



**Function:**

The AB-QM valve consists of two parts:

1. Differential pressure controller
2. Control valve

**1. Differential pressure controller DPC**

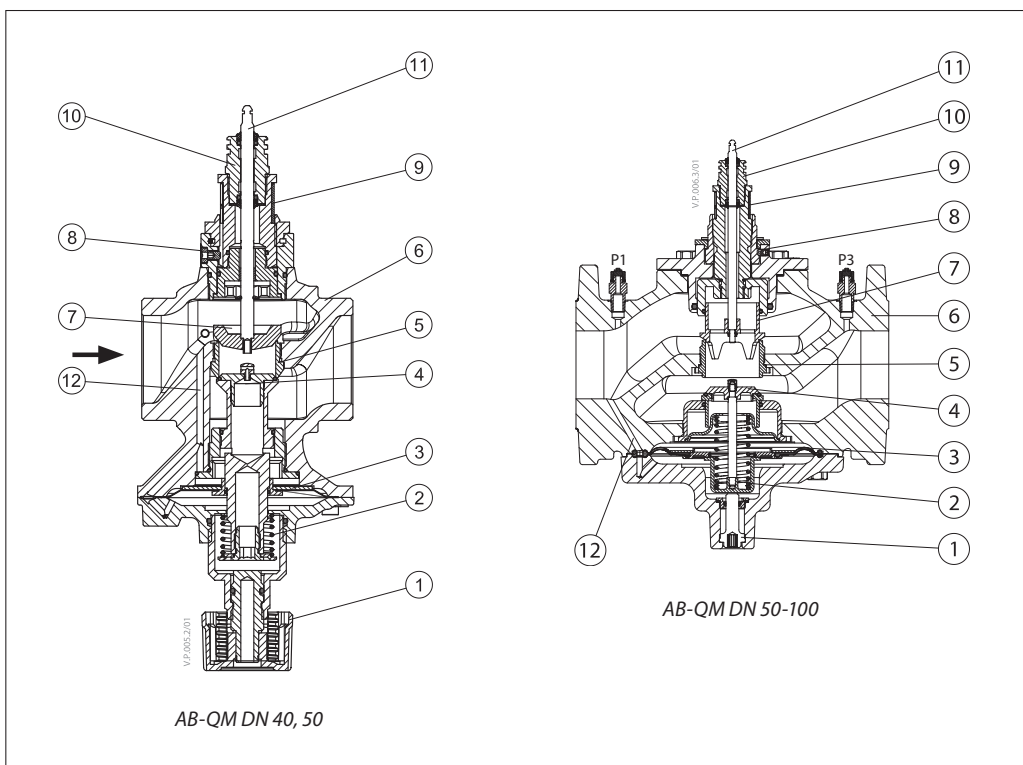
The differential pressure controller maintains a constant differential pressure across the control valve. The pressure difference  $\Delta p_{CV}$  ( $p_1-p_2$ ) on the membrane is balanced with the force of the spring. Whenever the differential pressure across the control valve changes (due to a change in available pressure, or movement of the control valve) the differential pressure controller 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**

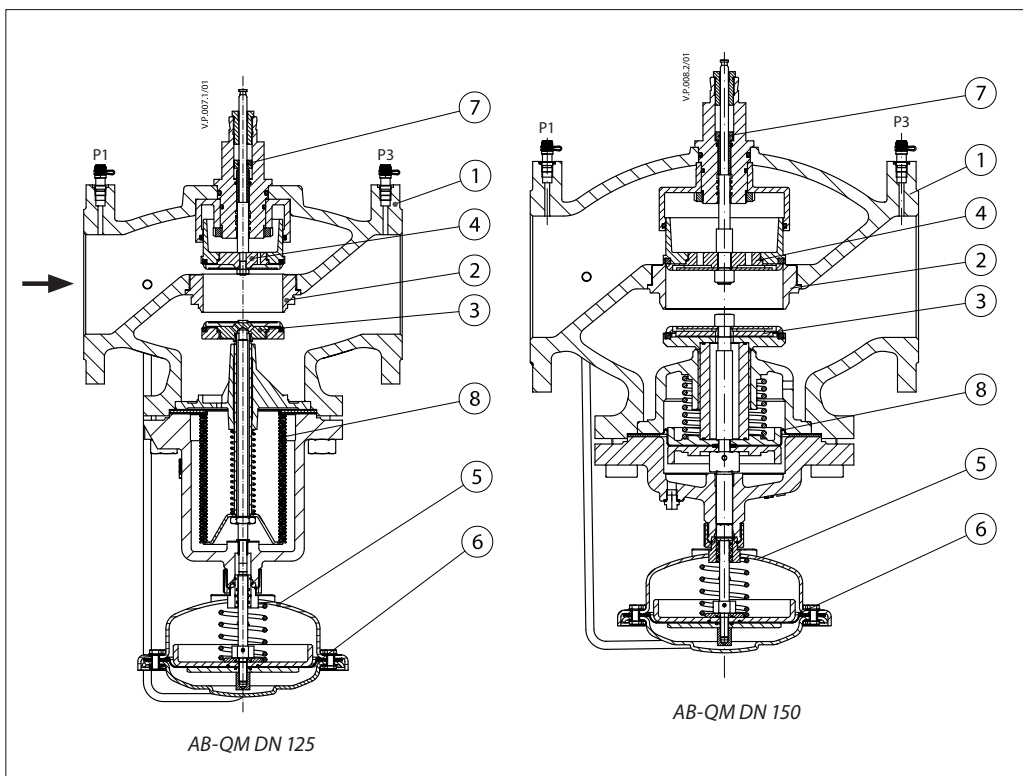
The control valve has a linear characteristic. It features a stroke limitation function that allows adjustment of the  $K_v$  value. The percentage marked on the scale equals the percentage of 100 % flow marked on the pointer. Setting is done by turning the setting knob to the desired position.

Design (continuous)

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
12. Internal impulse tube

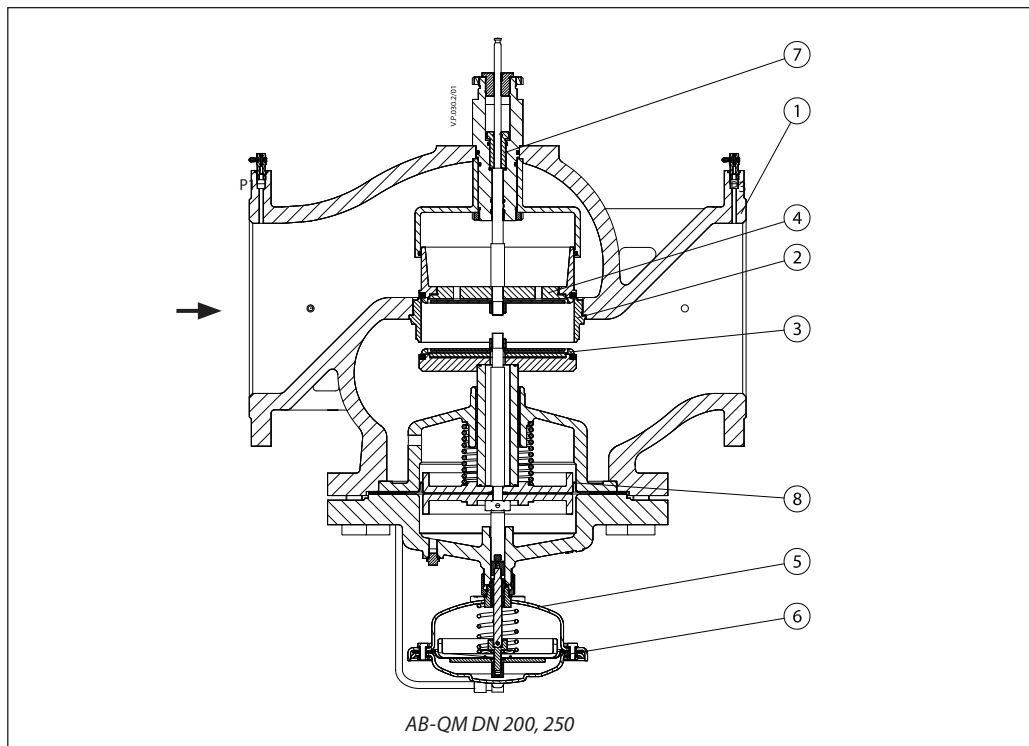


1. Valve body
2. Valve seat
3. DPC cone
4. CV cone
5. Controller casting
6. Rolling diaphragm
7. Adjusting screw
8. Bellow for pressure relief on DPC cone



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



Presetting

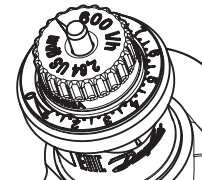
DN 15-32

The calculated flow can be adjusted easily without using special tools. The change of presetting (factory setting is 100% (10) follow steps below:

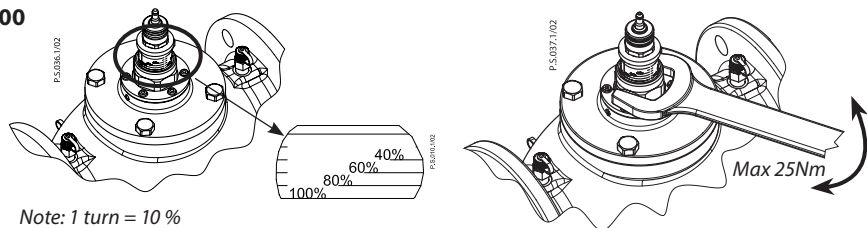
1. Remove the blue protective cap or the mounted actuator
2. Turn the pointer (clockwise to decrease) to the new setting
3. Clockwise turning would decrease the flow value while counter clock wise would increase it.

DN 15 - 32

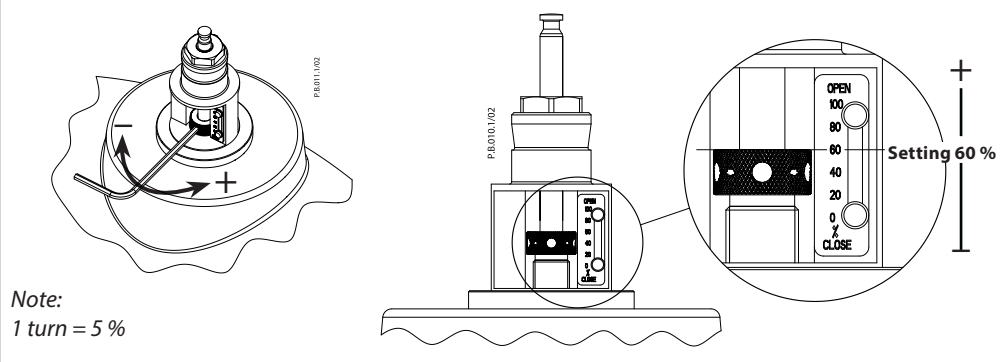
Setting: 0 = 0%  
10 = 100%



DN 40 - 100



DN 125-250



**Method of measurement**

AB-QM DN 40-250  
 AB-QM DN 15-32

The test plugs are placed in a way that differential pressure  $p_1-p_2$  is measured (see figure 1).

Therefore the measured differential pressure can be used to calculate the flow directly. Since the measurements across the measuring points are influenced by the dynamic pressure, turbulences, flow patterns, internal tolerances, setting accuracy and accuracy of the measuring equipment we believe that the total accuracy of the measurement is lower than performance of the valve. However accuracy of the flow measurements will always be within  $\pm 10\%$

within setting range 20 - 100 % (DN 15-32) or 40 - 100 % (DN 40-250) and from  $dp_{min}$  to  $dp_{max}$ .

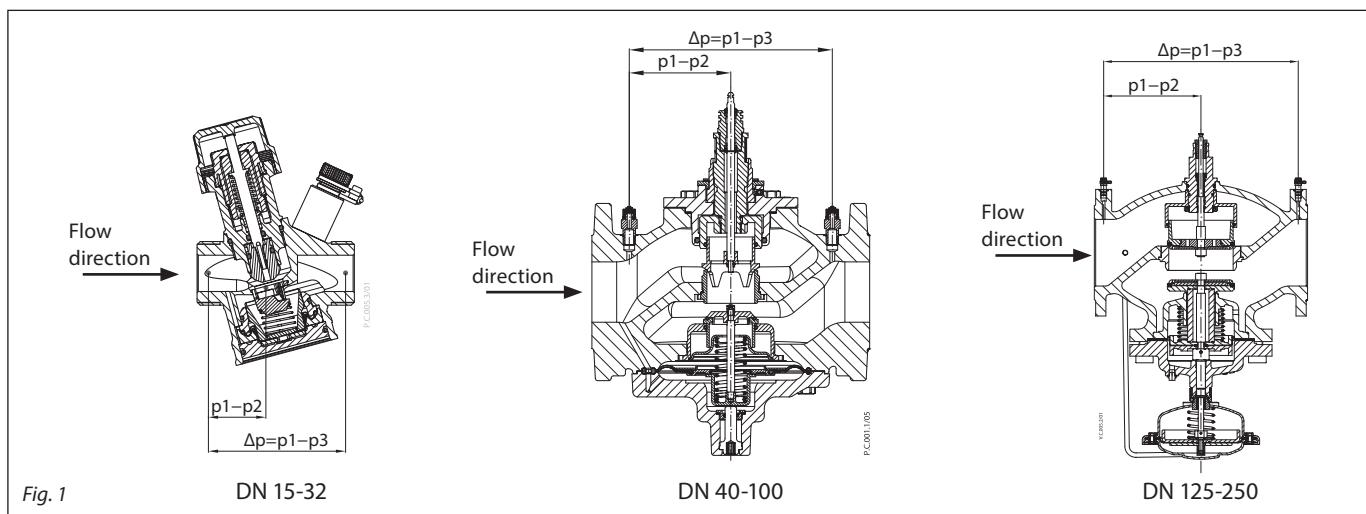
Therefore we recommend not to adjust the setting when the results are within 10 % of the expected flow.

**Calculating the flow**

$$\Delta p_{cv} = p_1 - p_2$$

$$Q = k_{vcv} \times \sqrt{\Delta p_{cv}}$$

For  $k_{vcv}$  values please follow the link to AB-QM flow checker document:  
<https://assets.danfoss.com/documents/latest/195768/AM322356127863en-010102.pdf>



**Service**

**DN 15-32**

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

**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%.

**Tender text**

A pressure independent balancing and control valve with a linear control characteristic that is independent of the available pressure and setting. Make: Danfoss AB-QM or equivalent.

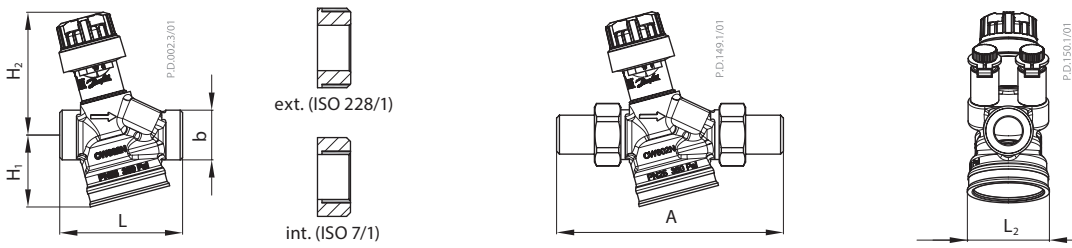
The pressure independent valve should have the following features:

- Automatic flow limitation function
- Membrane driven design for reduced clogging risk
- Modulating below 1% of set flow, regardless of the setting
- Maximum flow clearly marked on the valve
- Authority of 1 at all settings
- Ability to close against 16 Bar of differential pressure.
- Linear control characteristic
- Linear setting
- Control ratio 1:1000
- Test plugs for pump optimization and flow verification for DN 15-250. Available in the range from DN 15 – 250 from one supplier.
- Option to change the characteristic from linear to equal percentage at all sizes by adjusting actuator settings.
- Leakage rate of no visible leakage (IEC 60534-4:2007 class IV) for DN 15-20 in combination with recommended actuator
- Leakage of 0.05 % of the  $Q_{nom}$  for DN 25-100 (IEC 60534-4:2007 class III) in combination with recommended actuator
- Leakage of 0.01 % of the  $Q_{nom}$  for DN 125-250 (IEC 60534-4:2007 class IV) in combination with recommended actuator
- Flow measurements via test plugs according to BS7350:1990

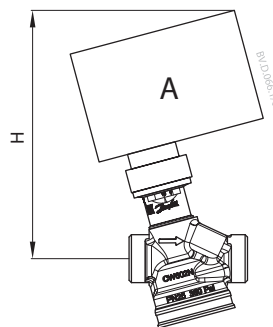
Insulation

DN	L	H1	H2	D	Fire class
	mm				
15	113	62	56	68	E (EN 13501-1), B2 (DIN 4102)
20	120	62	60	75	
25	162	69	71	94	
32	193	74	90	120	

Dimensions



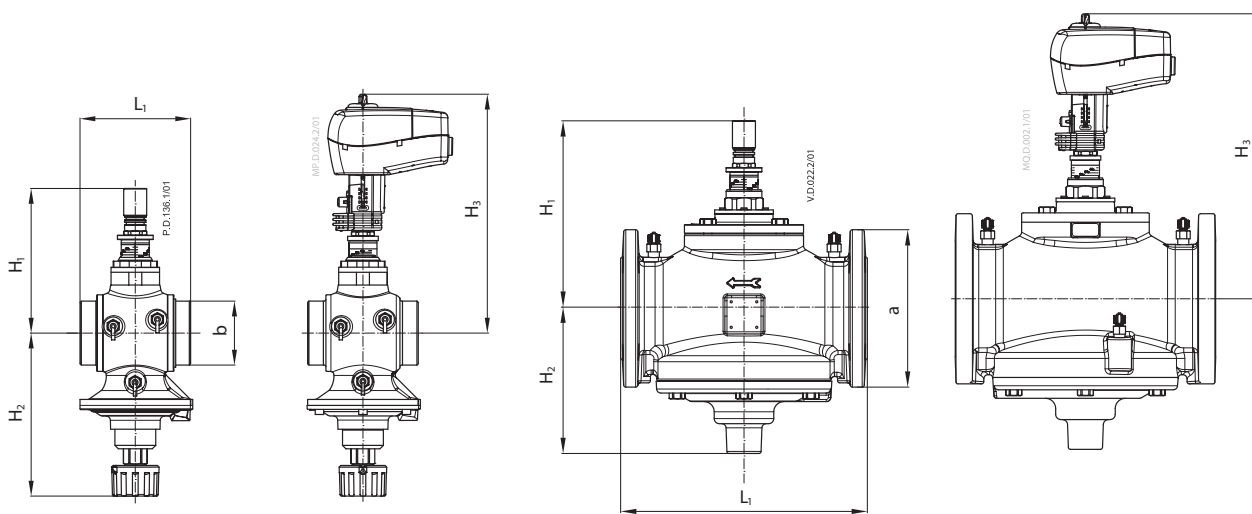
DN	Length				Height		Threaded	Welded	L <sub>2</sub> (mm)
	external		internal		H <sub>1</sub>	H <sub>2</sub>	A		
	L (mm)	b	L (mm)	b	(mm)				
15	65	G ¾A	75	Rp ½	38.2	65.2	120	139	42.6
20	82	G 1A	85	Rp ¾	43.9	67.2	143	166	49.4
25	104	G 1 ¼A	104	Rp 1	49.9	71.8	174	188	65.8
32	130	G 1 ½A	130	Rp 1 ¼	64.5	73.8	207	214	79.4



DN 15 - 32

DN	TWA-Q	ABNM A5	AME/AMV 110NL, 120 NL, AMI 140	NovoCon S	AME 13 SU	AME 113NLX	Valve weight (kg)	
	H (mm)						external	internal
15	110.8	97.8	131.3	130.1	210.7	118	0.56	0.59
20	112	99	132.5	131.3	212.1	119.2	0.75	0.73
25	116	103.8	137.2	136	216.7	123.9	1.23	1.19
32	118	105.8	139.3	138	218.7	125.9	1.78	1.81

Dimensions (continuous)



AB-QM DN 40, 50

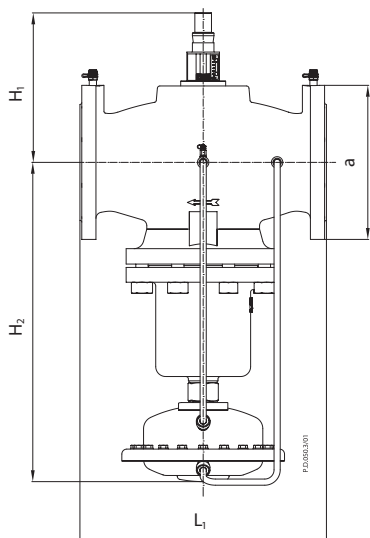
AB-QM + AME 435 QM  
NovoCon® M

AB-QM DN 50-100

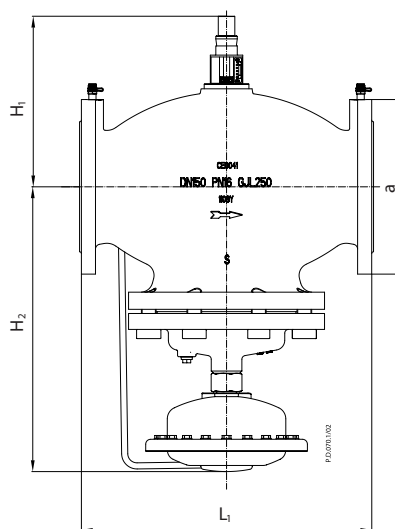
AB-QM + AME 435 QM  
NovoCon® M

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

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



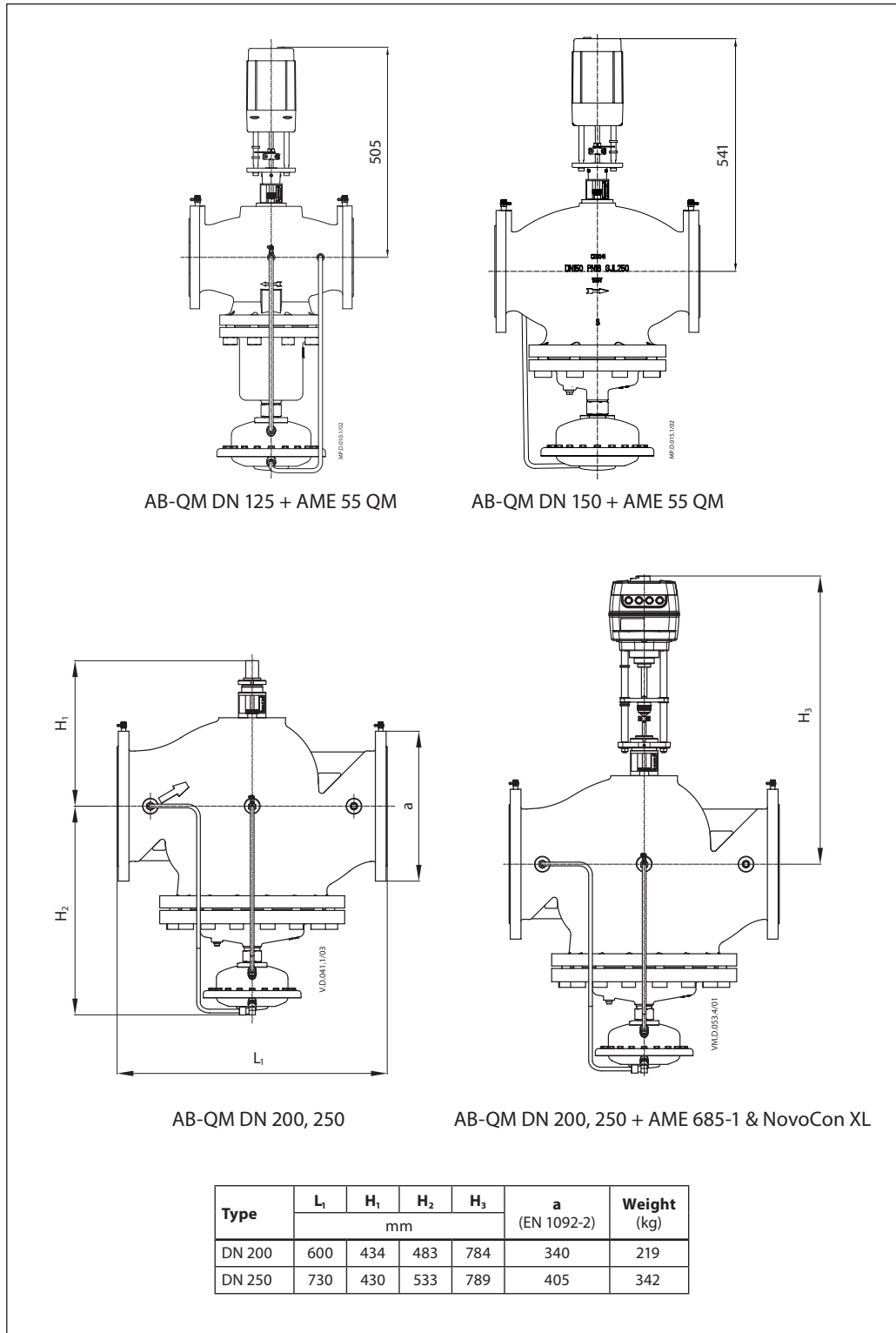
AB-QM DN 125



AB-QM DN 150

DN	L <sub>1</sub>	H <sub>1</sub>	H <sub>2</sub>	a (EN 1092-2)	Weight (kg)
	mm				
125	400	234	532	250	85.3
150	480	308	465	285	138

Dimensions (continuous)



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