

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



The AB-QM valve equipped with an actuator is a control valve with full authority and an automatic balancing function / flow limitation. Typical applications are: Temperature control with permanent automatic balancing on terminal units (chillers, air-handling units, fan coils, induction units, radiation panels and heat exchangers). Without an actuator is a flow limiter e.g for one-pipe systems.

# 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. AB-QM can be used also in Industrial refrigeration 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 DN 15 to DN 250 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



# AB-QM DN 15-250

# Ordering

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

		Туре		With test plugs	Without test plugs
Picture	DN	<b>Q</b> nom. (I/h)	<b>Ext. thread</b> (ISO 228/1)	Code No.	Code No.
	15 LF	200		003Z8200	003Z8220
	15	650	G ¾A	003Z8201	003Z8221
79	15 HF	1200		003Z8202	003Z8222
	20	1100	C 14	003Z8203	003Z8223
	20 HF	1900	GIA	003Z8204	003Z8224
	25	2200	C 11/A	003Z8205	-
Accessed in the second s	25HF	3800	GT ¼A	003Z8206	-
	32	3600	C 11/A	003Z8207	-
	32 HF	5000	GT 1/2A	003Z8208	-
Â	40	7500	G 2 A	003Z0770	-
│	50	12500	G 2 ½ A	003Z0771	-
			-		

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

		Туре		With test plugs	Without test plugs
Picture	DN	<b>Q</b> nom. (I/h)	Int. thread (ISO 7/1)	Code No.	Code No.
	15 LF	200		003Z8300	003Z8320
	15	650	Rp ½	003Z8301	003Z8321
-	15 HF	1200		003Z8302	003Z8322
	20	1100	Dr 3/	003Z8303	003Z8323
	20 HF	1900	κp -74	003Z8304	003Z8324
	25	2200	Dr. 1	003Z8305	-
	25 HF	3800	крі	003Z8306	-
	32	3600	D= 11/	003Z8307	-
	32 HF	5000	крі/4	003Z8308	-

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

# **AB-QM** flanged version

Picture	DN	<b>Q</b> nom. (I/h)	Flange connection (EN 1092-2)	Code No.
	50	12500		003Z0772
<b></b>	65	20000		003Z0773
	65 HF	25000		003Z0793
<b>6</b>	80	28000		003Z0774
	80 HF	40000		003Z0794
	100	38000		003Z0775
	100 HF	59000		003Z0795
<u>A</u>	125	90000	PN 16	003Z0705
│ <sub>╊</sub> ∠≞ <u></u>	125 HF	110000		003Z0715
	150	145000		003Z0706
	150 HF	190000		003Z0716
	200	200000		003Z0707
	200 HF	270000		003Z0717
	250	300000		003Z0708
	250 HF	370000		003Z0718

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Ordering (continuous) Accessories & spare parts

<b>-</b>		Comments	C. J. N.
Туре	To pipe	To valve	Code No.
Union connection	R 1/2	DN 15	003Z0232
(CW617N)	R 3/4	DN 20	003Z0233
(i pcs.)	R 1	DN 25	003Z0234
	R 1 1/4	DN 32	003Z0235
	R 11/2	DN 40	003Z0279
	R 2	DN 50	003Z0278
Tailpiece welding		DN 15	003Z0226
(W. Nr. 1.0308)		DN 20	003Z0227
(i pcs.)	Wold	DN 25	003Z0228
	weid.	DN 32	003Z0229
		DN 40	003Z0270
		DN 50	003Z0276
Tailpiece welding		DN 15	003Z1271
(W. Nr. 1.0308)		DN 20	003Z1272
(1 pcs.)	Wold	DN 25	003Z1273
	weid.	DN 32	003Z1274
		DN 40	003Z1275
		DN 50	003Z1276
Tailpieces for soldering (CW614N) (2 nuts, 2 gaskets, 2 soldering plugs	15×1 mm	DN 15	065Z7017
	1	DN 40-100	003Z0695
Handle AB-QM	(o without actuator)	DN 125-150	003Z0696
	e without actuator)	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

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# AB-QM DN 15-250

# **Technical data**

						(th	AB-QM 4.0 areaded version	on)				AB- (threaded	<b>QM</b> d version)
Nominal dia	meter	DN	15 LF	15 LF 15 15 HF 20 20 HF 25 25 HF 32 32 HF					40	50			
Flow range	Qnom (100 %) <sup>1)</sup>	l/h	200	650	1200	1100	1900	2200	3800	3600	5000	7500	12500
Setting range	1), 2)	%			10-100				10-	100		40-	100
Diff.	Δpmin	L.D.	16	16      16      25      16      25      20      30      20      30						3	0		
pressure <sup>3)</sup>	Δpmax	кРа		600									
Pressure stag	e	PN					25					1	6
Control range	2			1:1000									
Control valve	's characteristic			Linear (could be converted by actuator to equal percentage)									
Leakage rate actuators	with recommende	d		IEC 60534-4:2007 class IV IEC 60534-4:2007 class III						I			
For shut off fu	unction					Aco	. to ISO 5208	3 class A - no	visible leak	age			
Flow medium	1		١	Vater and w W	ater mixture hen used in The requ	e for closed Plant type l irements of	heating and II for DIN EN f VDI 2035, p	cooling sys 14868 appre art 1 + 2 or I	tems accord opriate prote 3SRIA BG29 -	ing to plant ective meas ⊦ BG50 are c	type I for DI ures are take observed.	N WN 14868 en.	l.
Medium tem	perature	°C				(-	20*) + 2 +9	95				(-10*) + 2	2 +120
Storage and t	ransport temp.							-40 +70					
Stroke		mm	4						1	0			
	ext. thread (ISO 2	228/1)		G ¾ A G 1 A G 1¼ A G 1½ A					G 2 A	G 2 ½ A			
Connection	int. thread (ISO 7	//1)		Rp ½		R	o ¾	R	o 1	Rp	1 1⁄4	-	
	actuator						M30 x 1.5					Danfoss	standard

				<b>AB-QM 4.0</b> (threaded version)									<b>QM</b> l version)	
Materials		DN	15 LF	15	15 HF	20	20 HF	25	25 HF	32	32 HF	40	50	
	Valve bodies			DZR Brass						Grey iron E (GG	N-GJL-250 25)			
	Membranes and	O-rings						EPDM						
	Shutter guide			PPSU										
	Shutter			DZR Brass DZR Brass + PPSL							ss + PPSU	·SU -		
Materials in	Springs			W.Nr.1.4310								W.Nr.1.4310, W.N 1.4568		
the medium	Spring support			PPSU								-		
	Cone (Pc)				•		-					CW 614N, V	V.Nr.1.4305	
	Cone (Cv)						PPSU					CW 614N		
	Seat (Pc)						-					W.Nr.	1.4305	
	Seat (Cv)			DZR Brass								W.Nr.	1.4305	
	Screw			-								Stainless	steel A2	
	Plastic parts			ABS								PC	M	
of medium	Insert parts and o screws	outer					-					CW 614 1.4310, W.	N, W.Nr. 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.

 $^{*\prime}$  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 value should be insulated with vapor tight insulation glycol. AB-QM DN15-100 were tested for performance and durability with ethylene as well as propylene glycol in a concentration of 50%. For compatibility of different coolants with PICVs, please check with the coolant supplier. For AB-QM DN40-100 stem heaters must be used: Code 065Z0315.

Pc - pressure controller part

Cv - Control valve part



Closing point (measure) for DN 15-32

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# Technical data (continuous)

# AB-QM (flanged version)

Nominal diameter      DN      50      65      65 HF      80      80 HF      100      100        0      (100 (1))      13500      20000      25000      20000      20000      20000      50000 <th>100 HF</th>								100 HF	
Eleverance ele	Qnom (100 %) <sup>1)</sup>	L/h	12500	20000	25000	28000	40000	38000	59000
Flow range	Qhigh	1/n	12500	20000	25000	28000	40000	38000	59000
Setting range <sup>1)</sup>	1, 2)	%				40-100			
Diff. pressure	Δpmin	kDo.	3	0	60	30	60	30	60
3),4)	$\Delta p_{max}$	кга				600			
Pressure stage		PN				16			
Control range			Acc. to s	tandard IEC 5	534 control ra	nge is high a	s Cv characte	ristic is linear	. (1:1000)
Control valve's	characteristic			Linear (cou	uld be conver	ted by actua	tor to equal p	ercentage)	
Leakage rate w actuators	ith recommend	ed			ma	x. 0.05 % of 0	Qnom		
For shut off fun	iction			A	cc. to ISO 520	8 class A - nc	visible leaka	ge	
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 or BSRIA BG29 + BG50 are observed.						
Medium tempe	erature	(-20*) + 2 +120							
Storage and tra	insport temp.					-40 70			
Stroke		mm	10			1	5		
Connection	flange					PN 16			
Connection	actuator				Da	anfoss standa	ard		
Materials in th	ie medium								
Valve bodies					Grey irc	n EN-GJL-25	) (GG25)		
Membranes/ Be	ellow					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)					CuZı	n40Pb3 - CW	614N		
Seat (Cv)						W.Nr. 1.4305			
Screw					Sta	inless Steel (	A2)		
Flat gasket						NBR			

Nominal diam	eter	DN	125	125 HF	150	150 HF	200	200 HF	250	250 HF
<b>F</b> I	Qnom (100 %) <sup>1)</sup>	1.4.	90000	110000	145000	190000	200000	270000	300000	370000
Flow range	Qhigh 3)	i/n	100000	120000	160000	209000	220000	300000	330000	407000
Setting range <sup>2</sup>	)	%				40	0-110			
Diff. pressure	ff. pressure  Δpmin  k    assure stage  P    ntrol range  P    ntrol valve's characteristic    akage rate with recommended    tuators			60 (80)	40 (60)	60 (80)	45 (65)	60 (80)	45 (65)	60 (80)
3), 4)	$\Delta p_{max}$	кга	600      600      600      600      600      600      600							
Pressure stage		PN	16							
Control range				1:1000						
Control valve's	characteristic			Linear	(could be c	onverted b	y actuator	to equal pe	rcentage)	
Leakage rate w actuators	ith recommend	ed				max.0.0	1 % of Q <sub>nom</sub>			
Flow medium Water and water mixture for closed heating and according to plant type I for DIN EN 14868. Whe Type II for DIN EN 14868 appropriate protective m The requirements of VDI 2035, part 1 + 2 or BSRIA BG29							ng and cool 8. When us ctive measu A BG29 + BG	ing systems ed in plant ires are take G50 are obs	n. erved.	
Medium tempe	erature			(-10*) + 2 +120						
Storage and tra	insport temp.	°C				-40	) 70			
Stroke		mm	30							
<i>c</i>	flange		PN 16							
Connection	actuator					Danfos	s standard			
Materials in th	ne medium									
Valve bodies					G	rey iron EN	-GJL-250 (G	G 25)		
Membranes/ Be	ellow		W.Nr.1	1.4571			E	PDM		
O-rings						E	PDM			
Springs			W.Nr.1	1.4401			W.N	r.1.4310		
Cone (Pc) W.Nr.1.4404NC W.Nr.1.4021						r.1.4021				
Seat (Pc)	eat (Pc) W.Nr.1.4027									
Cone (Cv)			W.Nr.1.4	4404NC			W.N	r.1.4021		
Seat (Cv)					·	W.N	r.1.4027			
Screw						W.N	r.1.1181			
Flat gasket			Graphit	e gasket			Non	asbestos		

- <sup>1)</sup> Factory setting of the valve is done at nominal setting range.
- Regardless of the setting, the valve can modulate below 1 % of set flow.
  When set above 100 %, minimum starting pressure needed is higher, see figures in the ().
- 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

















Closing point (measure) for DN 15-32

#### NovoCon<sup>®</sup> S

NovoCon<sup>®</sup> 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.

Туре	Speed	Power supply	Control signal	<b>Communication protocol</b>	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)	003Z8504

#### 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.

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

#### 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-OM DN 15 LF to DN 32 HF.

Туре	Speed	Spring	Power supply	Control signal	Feedback signal	Enclosure	Code No.
AME 13 SU-1	14 s/	Spring to open	24.1/26	0-10 V, 2-10V,	0.101/ 0.101/		082H5006
AME 13 SD-1	mm	Spring to close	24 V dC	0-20mA, 4-20mA	0-10 v, 2-10v	IP 54	082H5007

# **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.

Туре	Speed	Safety function	Power supply	<b>Control signal</b>	Feedback signal	Enclosure	Code No.
AME 113 NL SD		Closes the valve					082H5007M
AME 113 NL SU	15 s/	Opens the valve	24 V ac/dc	0.101/	-	ID 54	082H5008
AME 113 NLX SD	mm	Closes the valve	24 V aC/UC	0-10 v	0.10.1	IP 54	082H5000
AME 113 NLX SU		Opens the valve			0-10 V		082H5001

#### 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.

						<b>C C</b>	
Туре	NO/NC	LOG/LIN	Supply voltage	Stroke	Full stroke time	Enclosure	Code No.
ABNM-A5	NC	LOG	-	5 mm		IP 54	082F1160
ABNM-A5	NC	LIN		5 mm			082F1161
ABNM-A5	NC	LOG	241/	6.5 mm	3-5 min		082F1162
ABNM-A5	NO	LOG	24 V aC	6.5 mm			082F1163
ABNM-A5	NC	LIN	] [	6.5 mm			082F1164
ABNM-A5	NO	LIN	] [	6.5 mm			082F1165
ABNM-A5	NC	LOG	24)/ da	6.5 mm			082F1166
ABNM-A5	NO	LOG	24 V dC	6.5 mm			082F1167

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

# TWA-O

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

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.

Туре	NC/NO	Voltage	Stroke	Full stroke time 1)	Enclosure	Code No.
TWA-Q	NC	230V AC	5 mm		IP 54	082F1600
TWA-Q	NO	230V AC	5 mm	<2 min		082F1601
TWA-Q	NC	24V AC/DC	5 mm	<5 mm.		082F1602
TWA-Q	NO	24V AC/DC	5 mm			082F1603



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

Data sheet

# NovoCon® M

NovoCon<sup>®</sup> 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.

Туре	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	003Z8540

#### 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.

Туре	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	082H0171

# 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.

Туре	Speed	Power supply	Control signal	Feedback signal	Enclosure	Code No.
AME 25 SD	1E c/mm	241/25	0-10 V, 2-10V,	0.101/ 0.101/		082H3038
AME 25 SU	15 s/mm	15 s/mm 24 V ac 0-20mA, 4-20mA	0-20mA, 4-20mA	0-10 v, 2-10v	IP 54	082H3041

Please consider adapter is needed 003Z0694

# AME 55 QM

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

Туре	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	082H3078

# AME 655-1

Туре	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	082H5010

# 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.

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

All actuators type "-1" are UL certified.

#### NovoCon® L

NovoCon<sup>®</sup> 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<sup>®</sup> 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.

Туре	Speed	Power supply	Control signal	<b>Communication protocol</b>	Enclosure	Code No.
NovoCon <sup>®</sup> L						003Z8560
NovoCon <sup>®</sup> L SU	3/6/12/24 s/mm	nm 24 V ac/dc	0-10 V, 2-10V, 0-20mA 4-20mA	BACnet MS/TP, Modbus	IP 54	003Z8561
NovoCon <sup>®</sup> L SD			0 2011/7, 4 2011/7			003Z8562





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



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# **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.	

Туре	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	082H5013

# NovoCon<sup>®</sup> 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.

Туре	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	003Z8563

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

#### Design

- 1. Spindle
- 2. . Stuffing box
- Pointer 3.
- 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  $\Delta p_{cv}$  (p1-p2) 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<sub>v</sub> 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.

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# Design (continuous)

Shut off screw
 Main spring

Data sheet

- 3. Membrane
- 4. DP cone
- 5. Seat
- 6. Valve body
- 7. Control valves cone 8. Locking screw

- 9. Scale10. Stuffing box
- 11. Spindle
- **12.** Internal imulse tube



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





# **Design** (continuous)

- Valve body
  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.



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#### **Method of measurement** AB-QM DN 40-250 AB-QM DN 15-32

The test plugs are placed in a way that differential pressure p1–p2 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

 $\Delta p_{cv} = p1 - p2$  $Q = kv_{Cv} \times \sqrt{\Delta p_{Cv}}$ 

For kv<sub>Cv</sub> values please follow the link to AB-QM flow checker document: <u>https://assets.danfoss.com/documents/latest/195768/</u> 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
- Full authority at all settings
  Ability to all set and 16 Days of differentiations
- 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  $Q_{\rm nom}$  for DN 25-100 (IEC 60534-4:2007 classed)) in combination with recommended actuator
- Leakage of 0.01 % of the  $Q_{\text{nom}}$  for DN 125-250 (IEC 60534-4:2007 class IV) in combination with recommended actuator
- Flow measurements via test plugs according to BS7350:1990



AB-QM DN 15-250

# Insulation (for heating)



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

# Dimensions



	Length			Hei	ght	Threaded	Welded	-	
DN	exte	rnal	inte	rnal	H <sub>1</sub>	H <sub>2</sub>	4	۱	L <sub>2</sub> (mm)
	<b>L</b> (mm)	b	<b>L</b> (mm)	b		(m	m)		()
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 113 NLX	<b>Valve</b> (k	<b>weight</b> g)
	H (mm)							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

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AB-QM DN 125

DN	L	H1	H₂	H₃	b	Weight
DN		mm			(ISO 228/1)	kg
40	110	170	174	280	G 2	6.9
50	130	170	174	280	G 2 ½	7.8

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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>	H₃	а	Weight
DN		m	m		(EN 1092-2)	(kg)
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 150

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





# Dimensions (continuous)



#### **Danfoss A/S**

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