

Data sheet

Pressure independent control valve with integrated flow limiter AVQM (PN 25) - return and flow mounting

Description



AVQM is a self-acting flow controller with integrated control valve developed for the use in district heating / cooling systems. The controller prevents flow to exceed set max flow. In a combination with electrical actuators AMV(E) and ECL electronic controllers the flow and temperature can be controlled to achieve highest energy savings.

AVQM has a control valve with adjustable flow limiter, connection neck for electrical actuator and a pressure actuator with one control diaphragm.

Controllers are used together with Danfoss electrical actuators:

- AMV 150 ¹⁾
- AMV(E) 10 ¹⁾ / AMV(E) 20 / AMV(E) 30
- AMV(E) 13 ¹⁾ / AMV(E) 23 / AMV(E) 33 with spring return function
- AMV(E) 23 SU (spring up)
- AMV 20 SL / AMV 23 SL / AMV 30 SL with stroke limitation

¹⁾ AMV 150 / AMV(E) 10 / AMV(E) 13 can be combined with DN 15 controller only.

AVQM combined with AMV(E) 13, AMV(E) 23 (SL) or AMV(E) 33 (SL) has been approved according to DIN EN 14597.

Main data:

- DN 15-50
- k_{vs} 0.4-25 m³/h
- Flow range: 0.015-14 m³/h
- PN 25
- Differential pressure over control valve Δp_{MCV} : 0.2 bar
- Temperature:
 - Circulation water / glycolic water up to 30 %: 2 ... 150 °C
- Connections:
 - Ext. thread (weld-on, thread and flange tailpieces)
 - Flange

Ordering

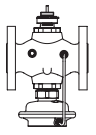
Example:
Flow controller with integrated control valve for flow rate;
1.6 m³/h; PN 25;
 T_{max} 150 °C; ext. thread

1× AVQM DN 15 controller
Code No: **003H6748**

Option:
1× Weld-on tailpieces
Code No: **003H6908**

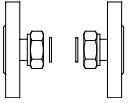
The controller will be delivered completely assembled, inclusive impulse tube between valve and actuator. Electrical actuator AMV(E) must be ordered separately.

AVQM Controller

Picture	DN (mm)	Q_{max} (m ³ /h)	k_{vs} (m ³ /h)	Connection		Code No.
	15	0.18	0.4	Cylindr. ext. thread acc. to ISO 228/1	G ¾ A	003H6746
		0.4	1.0			003H6747
		0.9	1.6			003H6748
		1.6	2.5			003H6749
		2.4	4.0			003H6750
	20	3.5	6.3		G 1 A	003H6751
	25	4.5	8.0		G 1¼ A	003H6752
	32	10	12.5		G 1¾ A	003H6753
	40	10.5	16	Flanges PN 25, acc. to EN 1092-2	G 2 A	003H6754
	50	12	20		G 2½ A	003H6755
	32	10	12.5			003H6756
	40	12	20			003H6757
	50	14	25			003H6758

Ordering (continuous)

Accessories

Picture	Type designation	DN	Connection	Code No.
	Weld-on tailpieces	15	-	003H6908
		20		003H6909
		25		003H6910
		32		003H6911
		40		003H6912
		50		003H6913
	External thread tailpieces	15	Conical ext. thread acc. to EN 10226-1	R 1/2 003H6902
		20		R 3/4 003H6903
		25		R 1 003H6904
		32		R 1 1/4 003H6905
		40		R 1 1/2 065B2004
		50		R 2 065B2005
	Flange tailpieces	15	Flanges PN 25, acc. to EN 1092-2	003H6915
		20		003H6916
		25		003H6917

Service kits

Picture	Type designation	DN	k _{vs} (m³/h)	Code No.
	Valve insert	15	0.4	003H6861
			1.0	003H6862
			1.6	003H6863
			2.5	003H6864
			4.0	003H6865
		20	6.3	003H6996
		25	8.0	003H6867
		32/40/50	12.5/16/20/25	003H6868
	Control valve insert	15	0.4	003H6886
			1.0	003H6887
			1.6	003H6888
			2.5	003H6889
			4.0	003H6890
		20	6.3	003H6891
		25	8.0	003H6892
		32/40/50	12.5/16/20/25	003H6885
	Type designation	Δp setting range (bar)		Code No.
	Actuator	0.2		003H6841
	Type designation	Code No.		
	Locking ring (Rounding order value-5pc)	003G6400		

Technical data

Valve

Nominal diameter			DN	15					20	25	32	40	50	
k _{VS} value of dp controller			m³/h	0.4	1.0	1.6	2.5	4.0	6.3	8.0	12.5	16/20 ¹⁾	20/25 ¹⁾	
Range of flow setting	Δp _{MCV} = 0.2 bar	Q _{min}		0.015	0.02	0.03	0.07	0.07	0.16	0.2	0.4	0.8	0.8	
		Q _{max}		0.18	0.4	0.9	1.6	2.4	3.5	4.5	10	10.5/12 ¹⁾	12/14 ¹⁾	
Available Δp required for Q _{max} ²⁾			bar	0.4	0.4	0.5	0.6	0.6	0.5	0.5	0.8	0.8/0.6 ¹⁾	0.8/0.6 ¹⁾	
Stroke			mm	5					7		10			
Control valve authority			1 (100%) in the range of flow setting											
Control characteristic			Logarithmic											
Cavitation factor z			≥ 0.6							≥ 0.55		≥ 0.5		
Leakage acc. to standard IEC 60534-4			% of k _{VS}	≤ 0.02							≤ 0.05			
Nominal pressure			PN	25										
Min. differential pressure			bar	see remark ²⁾										
Max. differential pressure				20							16			
Medium			Circulation water / glycolic water up to 30%											
Medium pH			Min. 7, max. 10											
Medium temperature			°C	2 ...150										
Connections	valve		External thread							Ext. thread and flange				
	tailpieces		Weld-on and external thread											
			Flange							-				
Materials														
Valve body	thread		Red bronze CuSn5ZnPb (Rg5)							Ductile iron EN-GJS-400-18-LT (GGG 40.3)				
	flange		-											
Valve seat			Stainless steel, mat. No. 1.4571											
Valve cone			Dezincing free brass CuZn36Pb2As											
Sealing DP			EPDM											
Sealing MCV			Metal							EPDM				
Pressure relieve system	Control valve insert		-							Piston				
	Valve insert		Piston											

Note:

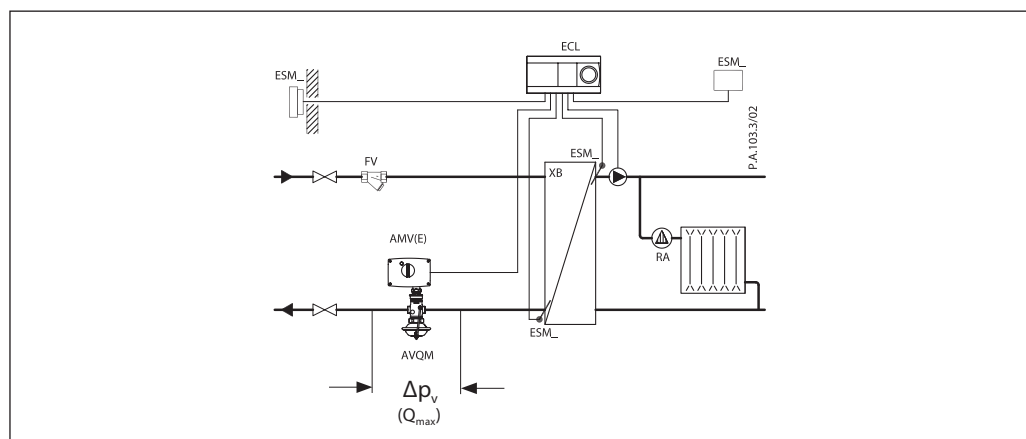
DP - diff. pressure controller, MCV - control valve

¹⁾ Flanged version

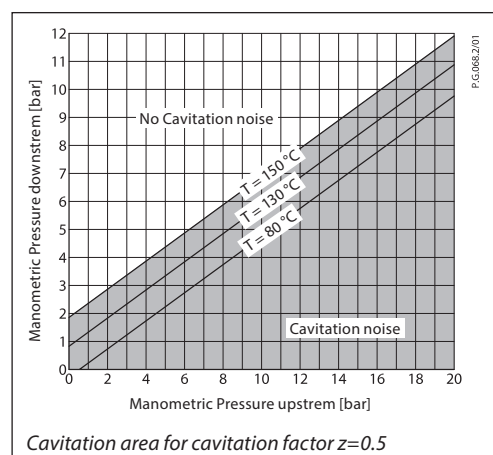
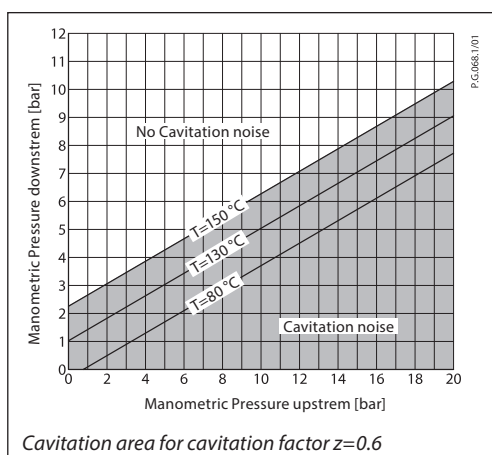
²⁾ For flows smaller than Q_{max} → Δp_{min} = $\left(\frac{Q}{k_{VS}}\right)^2 + \Delta p_{MCV}$

Actuator

Type		AVQM
Actuator size	cm ²	54
Nominal pressure	PN	25
Diff. pressure over MCV - motorized control valve	bar	0.2
Materials		
Housing	Upper housing of actuator	Stainless steel, mat. No. 1.4301
	Lower housing of actuator	Dezincing free brass CuZn36Pb2As
Diaphragm		EPDM
Impulse tube		Copper tube Ø 6 × 1 mm

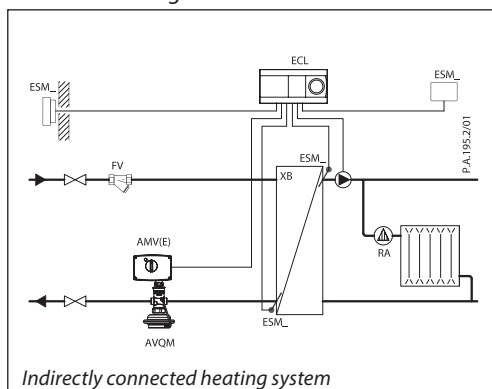


Technical data (continuous)

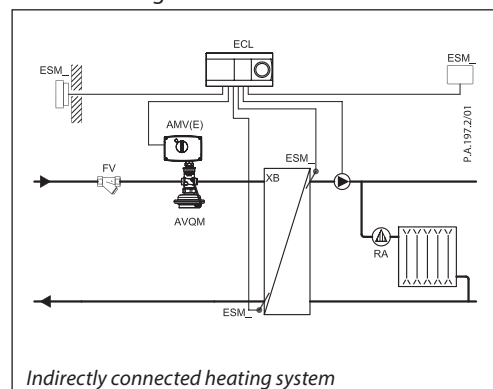


Application principles

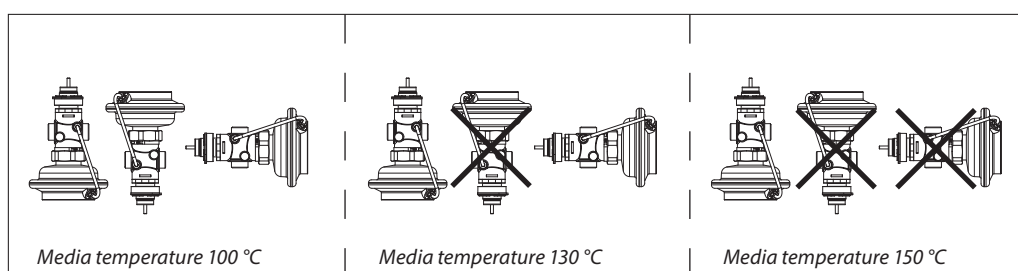
Return mounting



Flow mounting



Installation positions

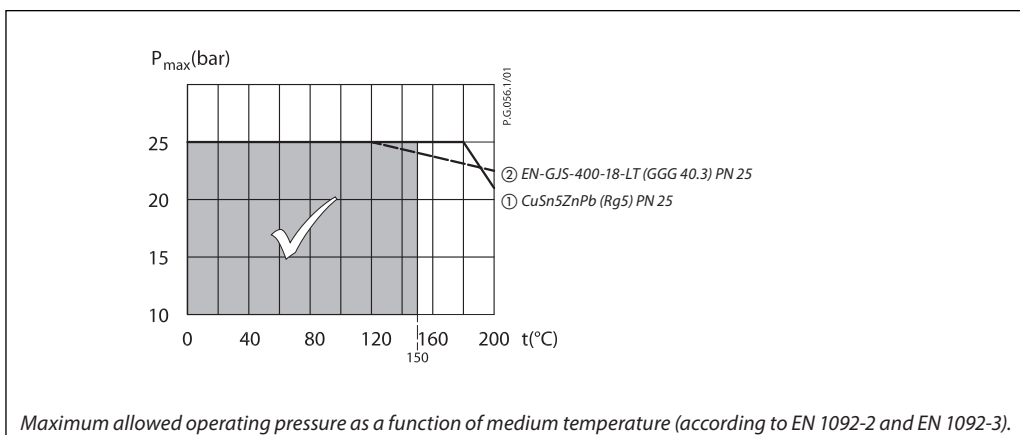


Electrical actuator

Note!

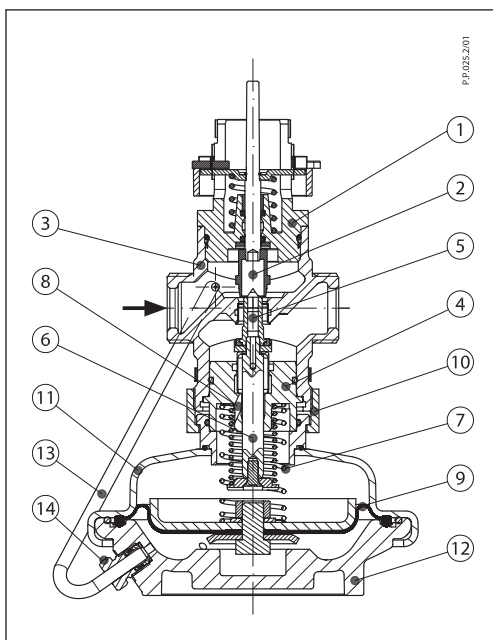
Installation positions for electrical actuators AMV(E) have to be observed as well. Please see relevant Data sheet.

Pressure temperature diagram



Design

1. Control valve insert
2. Adjustable flow restrictor
3. Valve body
4. Valve insert
5. Pressure relieved valve cone
6. Valve stem
7. Built-in spring for flow rate control
8. Control drain
9. Control diaphragm
10. Union nut
11. Upper casing of diaphragm
12. Lower casing of diaphragm
13. Impulse tube
14. Compression fitting for impulse tube



Function

Flow volume causes pressure drop across the adjustable flow restrictor. Resulting pressures are being transferred through the impulse tubes and/or control drain in the actuator stem to the actuator chambers and act on control diaphragm for flow control. The flow restrictor diff. pressure is controlled and limited by means of built-in spring for flow control. Control valve closes on rising differential pressure and opens on falling differential pressure to control max flow.

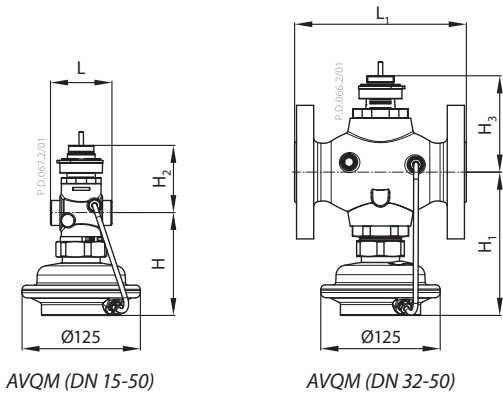
Additionally the electrical actuator will operate from zero to set max. flow according to the load.

Settings

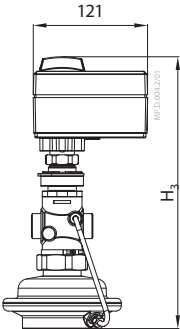
Max flow limiting

Max flow limiting is being done by the adjustment of the flow restrictor position. The adjustment can be performed on the basis of flow adjustment diagram (see relevant instructions) and / or by the means of heat meter.

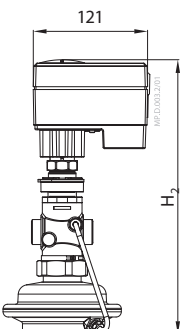
Dimensions



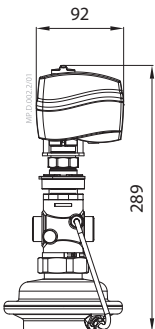
DN	L	L ₁	H	H ₁	H ₂	H ₃	Weight (kg)	
	mm						thread	flange
15	65	-	109	-	72	-	3.0	-
20	70	-	109	-	72	-	3.0	-
25	75	-	109	-	75	-	3.2	-
32	100	180	150	150	101	101	5.8	10.3
40	110	200	150	150	101	101	5.9	11.8
50	130	230	150	150	101	101	6.6	13.9



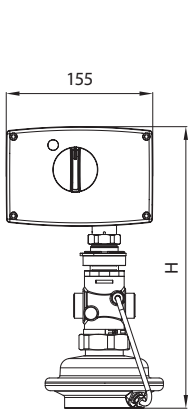
AMV(E) 10 +
AVQM (DN 15)



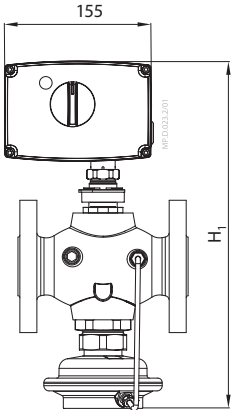
AMV(E) 13 +
AVQM (DN 15)



AMV 150 +
AVQM (DN 15)



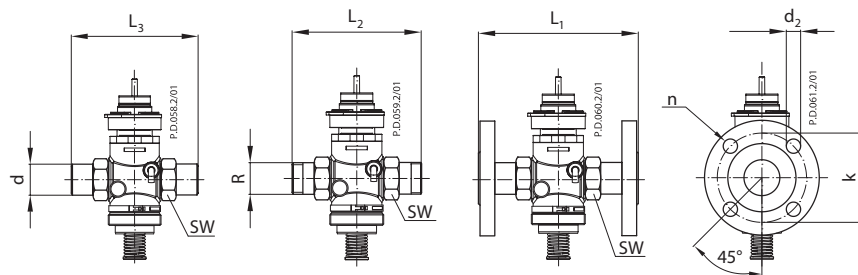
AMV(E) 2./3. +
AVQM (DN 15-50)



AMV(E) 2./3. +
AVQM (DN 32-50)

DN	H	H ₁	H ₂	H ₃
	mm			
15	301	-	291	288
20	301	-	-	-
25	304	-	-	-
32	371	386	-	-
40	371	386	-	-
50	371	386	-	-

Dimensions (continuous)



DN	R ¹⁾	SW	d	L ₁ ²⁾	L ₂	L ₃	k	d ₂	n
		mm							
15	½	32 (G ¾A)	21	130	120	139	65	14	4
20	¾	41 (G 1A)	26	150	131	154	75	14	4
25	1	50 (G 1¼A)	33	160	145	159	85	14	4
32	1¼	63 (G 1¾A)	42	-	177	184	100	18	4
40	1 ½	70 (G 2A)	47	-	200	204	110	18	4
50	2	82 (G 2½A)	60	-	244	234	125	18	4

¹⁾ Conical ext. thread acc. to EN 10226-1

²⁾ Flanges PN 25, acc. to EN 1092-2



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