

Data sheet

Pressure independent control valve with integrated flow limiter AVQM (PN 16) - 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 15-32
- k_{VS} 0.4-10 m³/h
- Flow range 0.015-6.0 m³/h
- PN 16
- 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)

Ordering

Example:
Flow controller with integrated control valve for flow rate 0.7 m³/h; PN 16; T_{max} 150 °C; ext. thread

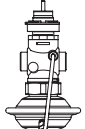
- 1x AVQM DN 15 controller
Code No: **003H6735**

Option:

- 1x Weld-on tailpieces
Code No: **003H6908**

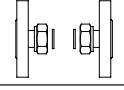
The controller will be delivered completely assembled, inclusive impulse tube between valve and actuator. Electrical actuator AMV(E) must be ordered separately.

AVQM Controller

Picture	DN (mm)	Q _{max} (m³/h)	k _{vs} (m³/h)	Connection		Code No.	
	15	0.18	0.4	Cylindr. ext. thread acc. to ISO 228/1	G ¾ A	003H6733	
		0.4	1.0			003H6734	
		0.9	1.6			003H6735	
		1.6	2.5			003H6736	
		2.4	4.0			003H6737	
	20	3.5	6.3		G 1 A	003H6738	
	25	4.5	8.0		G 1¼ A	003H6739	
	32	6	10		G 1¾ A	003H6740	

Ordering (continuous)

Accessories

Picture	Type designation	DN	Connection	Code No.
	Weld-on tailpieces	15	-	003H6908
		20		003H6909
		25		003H6910
		32		003H6911
	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
	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	10	
	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	10	003H6795
	Type designation	Δp setting range (bar)		Code No.
	Actuator	0.2		003H6825
	Type designation	Code No.		
	Locking ring (Rounding order value-5pc)	003G6400		

Technical data

Valve

Nominal diameter			DN	15					20	25	32	
k _{VS} value of dp controller			m³/h	0.4	1.0	1.6	2.5	4.0	6.3	8.0	10	
Range of max. flow setting	Δp _{MCV} = 0.2 bar	Q _{min}		0.015	0.02	0.03	0.07	0.07	0.16	0.2	0.16	
		Q _{max} ¹⁾		0.18	0.4	0.9	1.6	2.4	3.5	4.5	6.0	
Available Δp required for Q _{max}			bar	0.4	0.4	0.5	0.6	0.6	0.5	0.5	0.6	
Stroke			mm	5					7			
Control valve authority			1 (100%) in the range of flow setting									
Control characteristic			Logarithmic									
Cavitation factor z			≥ 0.6							≥ 0.55		
Leakage acc. to standard IEC 60534-4			% of k _{VS}	≤ 0.02							≤ 0.05	
Nominal pressure			PN	16								
Min. differential pressure			bar	see remark ¹⁾								
Max. differential pressure				12								
Medium			Circulation water / glycolic water up to 30%									
Medium pH			Min. 7, max. 10									
Medium temperature			°C	2 ... 150								
Connections	valve		External thread									
	tailpieces		Weld-on and external thread									
			Flange								-	
Materials												
Valve body			Red bronze CuSn5ZnPb (Rg5)									
Valve seat			Stainless steel, mat. No. 1.4571									
Valve cone			Dezincing free brass CuZn36Pb2As									
Sealing DP			EPDM									
Sealing MCV			Metal									
Pressure relieve system	Control valve insert		-									
	Valve insert		Piston									

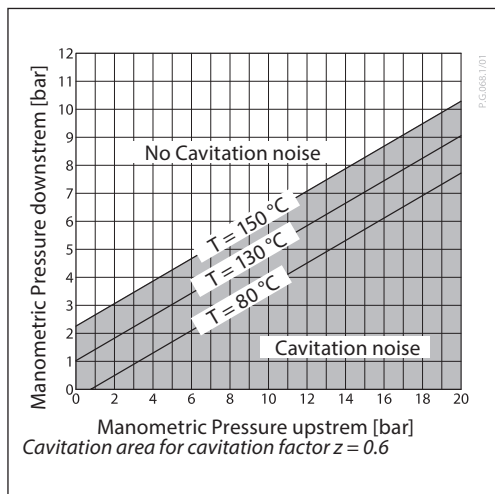
Note:

DP - diff. pressure controller, MCV - control valve

¹⁾ For flows smaller than $Q_{max} > \Delta p_{min} = \left(\frac{Q}{k_{VS}} \right)^2 + \Delta p_{MCV}$

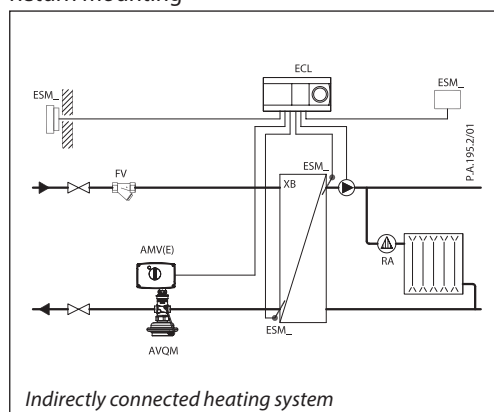
Actuator

Type		AVQM
Actuator size	cm ²	39
Nominal pressure	PN	16
Differential pressure over MCV - motorized control valve	bar	0.2
Materials		
Housing		Zinc plated, DIN 1624, No. 1.0338
Diaphragm		EPDM
Impulse tube		Copper tube Ø 6 × 1 mm

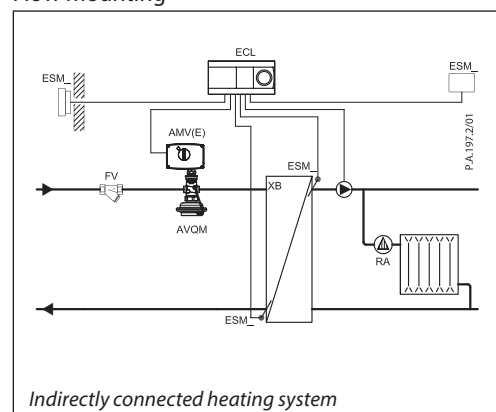


Application principles

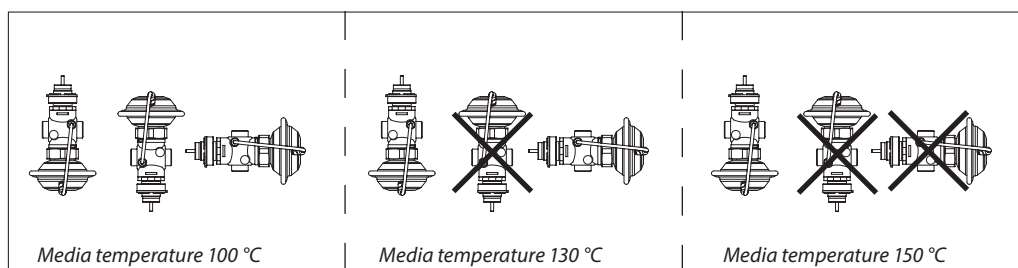
Return mounting



Flow mounting



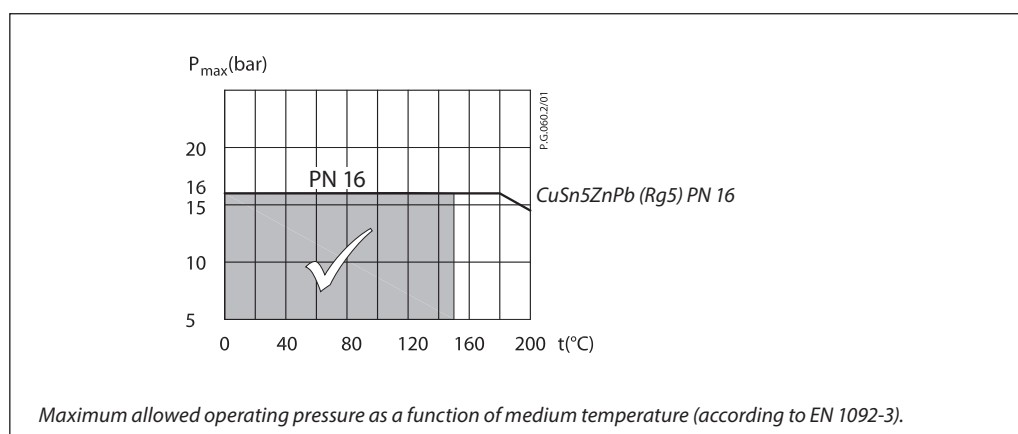
Installation positions



Electrical actuator

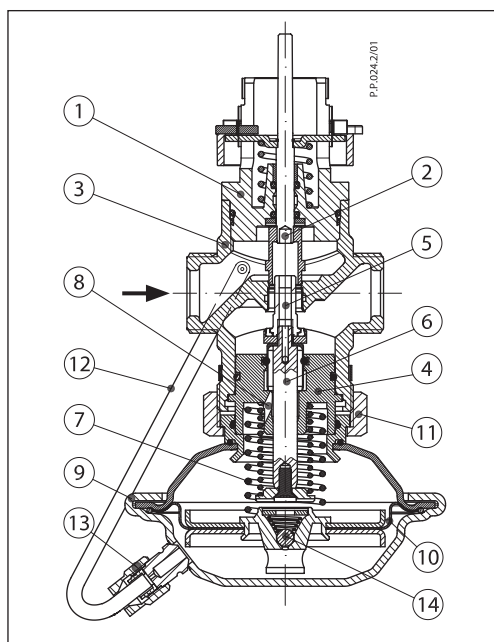
Note!
Installation positions for electrical actuators AMV(E) have to be observed as well. Please see relevant Data sheet.

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. Actuator
10. Control diaphragm
11. Union nut
12. Impulse tube
13. Compression fitting for impulse tube
14. Excess pressure safety valve



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.

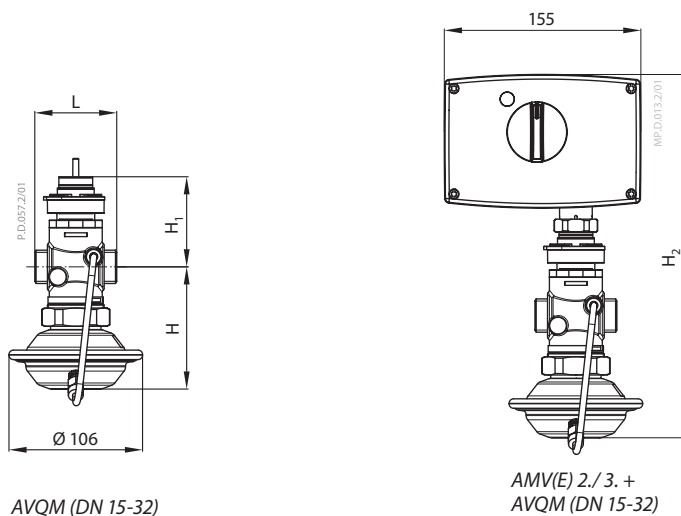
Controller is equipped with excess pressure safety valve, which protects control diaphragm for flow control from too high differential pressure.

Settings

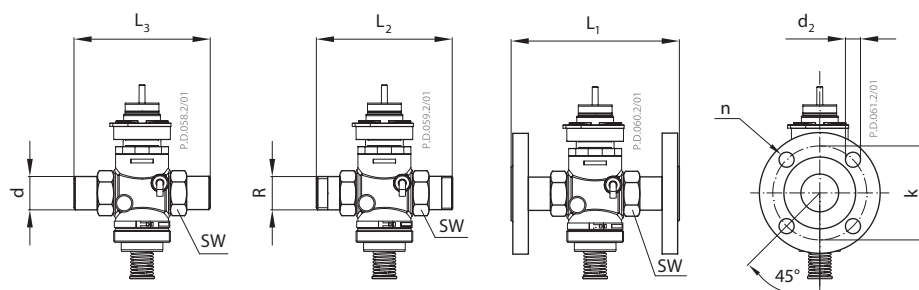
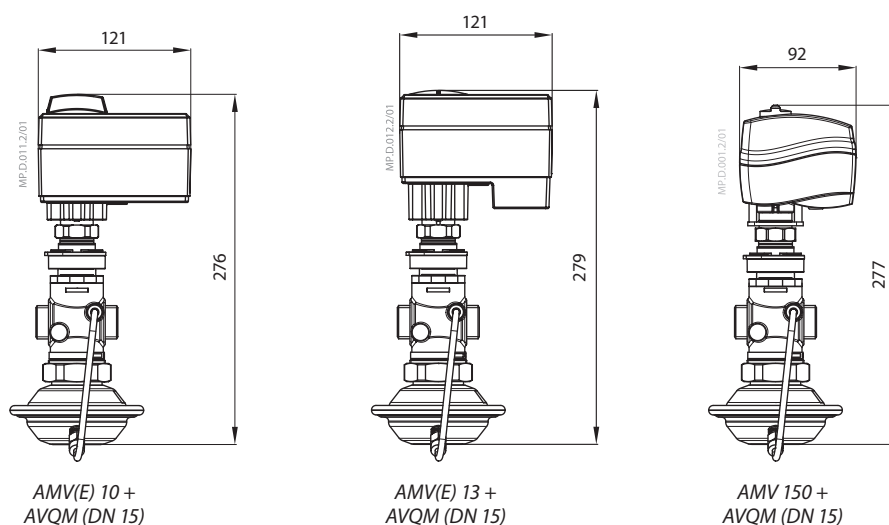
Max flow limiting

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	H	H ₁	H ₂	Weight (kg)
	mm				
15	65	97	72	289	1.9
20	70	97	72	289	1.9
25	75	97	75	292	2.0
32	100	97	76	293	2.5



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

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

²⁾ Flanges PN 25, acc. to EN 1092-2



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