

Application

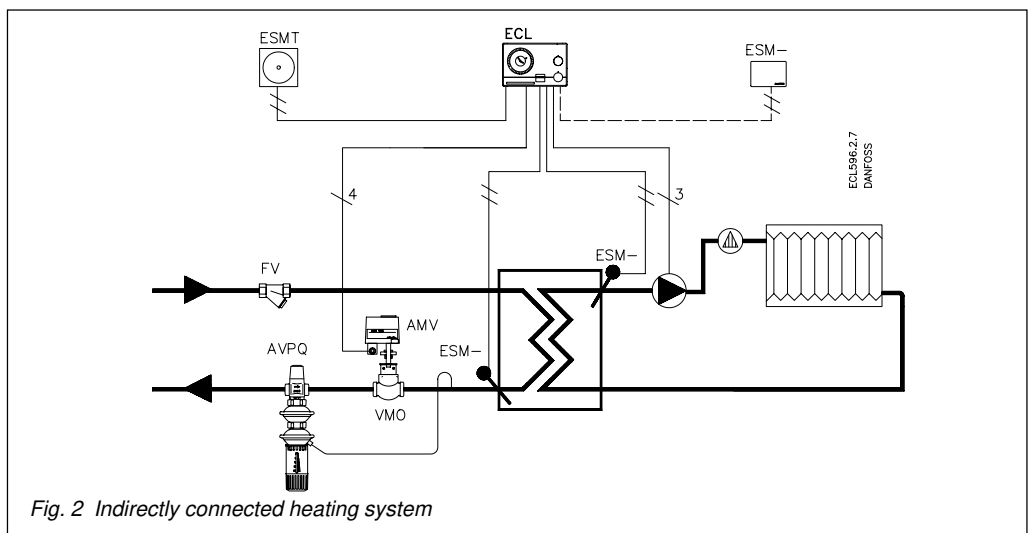
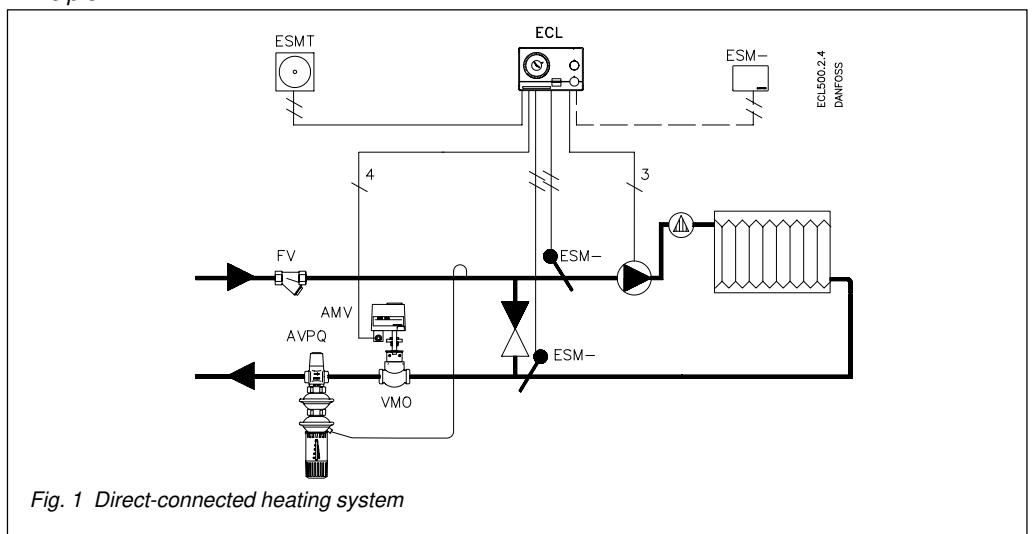


AVPQ is a self-acting differential pressure and flow control primarily for use in district heating systems. AVPQ closes on rising differential pressure or when set max. flow is exceeded.

The control has external threads for heating system connection. Weld-on tailpieces and tailpieces with external threads are available as accessories. The control is supplied complete with compression fittings for connecting Ø6 mm copper impulse tube.

AVPQ standard setting ranges 0.2 - 1.0 bar is standard. AVPQ with setting range 0.1 - 0.5 bar or 0.8 - 1.6 bar is available on request. Differential pressure and flow control AVPQ-F with fixed differential pressure 0.2 or 0.3 bar is also available.

Principle



Ordering

Complete control with compression fittings for impulse tube connection

Type	DN	External thread ISO 228/1	Setting range		$k_v^{1)}$ m ³ /h	Code no.
			Flow	Diff. pressure ²⁾		
AVPQ 15	15	G 3/4 A	0.06 - 1.4 m ³ /h	0.2 - 1.0 bar	1.6	003H2126
AVPQ 15	15	G 3/4 A	0.08 - 1.8 m ³ /h	0.2 - 1.0 bar	2.5	003H2127
AVPQ 20	20	G 1 A	0.09 - 3.0 m ³ /h	0.2 - 1.0 bar	4.0	003H2128
AVPQ 25	25	G 1 1/4 A	0.1 - 4.9 m ³ /h	0.2 - 1.0 bar	6.3	003H2129
AVPQ 32	32	G 1 1/2 A	0.15 - 7.3 m ³ /h	0.2 - 1.0 bar	10.0	003H2130

¹⁾ $X_p = 0.15$ bar for stating actual P-range, see diagram page 7

²⁾ 0.1 - 0.5 bar and 0.8 - 1.6 bar on request

1 set of accessories including 2 tailpieces, 2 union nuts and 2 seals

DN	Weld-on tailpieces	Tailpieces with external threads
	Code No.	Code No.
15	003N5090	003N5070
20	003N5091	003N5071
25	003N5092	003N5072
32	003N5093	003N5073

Spare parts

Spare parts	Code No.
10 compression fittings for impulse tube	003H2300
Adjustment part 0.1 - 0.5 bar and diaphragm	003H2301
Adjustment part 0.2 - 1.0 bar and 0.8 - 1.6 bar diaphragm	003H2302
Diaphragm section AVPQ/-F	003H2320
Valve insert, $k_{vs} = 1.6$ m ³ /h	003H2310
Valve insert, $k_{vs} = 2.5$ m ³ /h	003H2311
Valve insert, $k_{vs} = 4.0$ m ³ /h	003H2312
Valve insert, $k_{vs} = 6.3$ m ³ /h	003H2313
Valve insert, $k_{vs} = 10.0$ m ³ /h	003H2314

Data

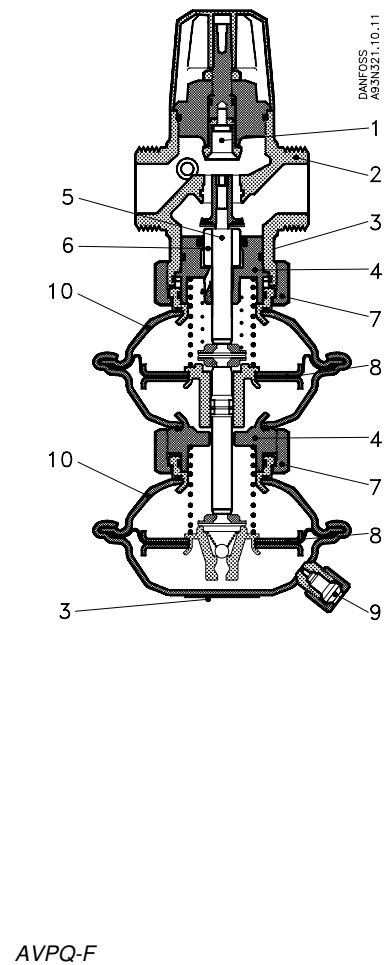
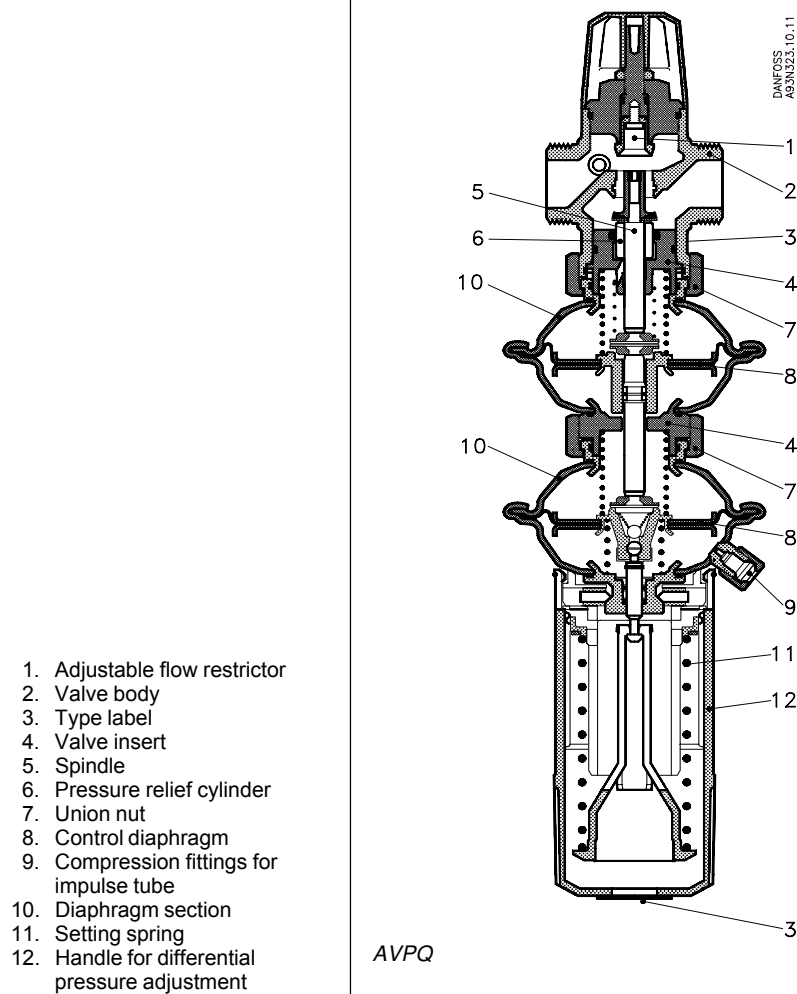
Pressure stage	PN 16
Max. differential pressure	12 bar
Max. water temperature	140 °C
Cavitation factor	$z \geq 0.6$ ¹⁾
Medium	Water for district heating and central heating systems, according to VDI 2035. Glycolic water resistant down to -30 °C
Medium PH	Min. 7, max. 10

¹⁾ $\frac{k_v}{k_{vs}} \leq 0.5$ in DN25 and DN32 versions

Materials, parts in contact with water

Valve body:	RG 5, DIN 1705, W.no.2.1096.01	Pressure relief cylinder:	CrNi steel, DIN 17440, W.no.1.4404
Valve insert:	Dezincing-free brass BS 2874	O-rings:	EPDM
Valve cone:	Dezincing-free brass BS 2874	Springs:	CrNi steel, DIN 17224, W.no.1.4568
Valve plate:	EPDM	Diaphragm body:	Zinc-chromatic steel DIN 1624, W no. 1.0338
Valve seat:	CrNi steel, DIN 17440, W.no.1.4404	Diaphragm:	EPDM

Design



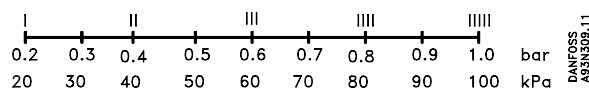
Fitting

The control must be mounted in the heating system return. The positive wire must be fitted in the mixing circuit flow (fig. 1) in direct-connected heating systems and in indirectly connected systems (fig. 2) ahead of the control valve in the direction of flow.

The negative wire is integrated in the valve. The control can be fitted in any position. Further fitting details are described in the instruction accompanying the product.

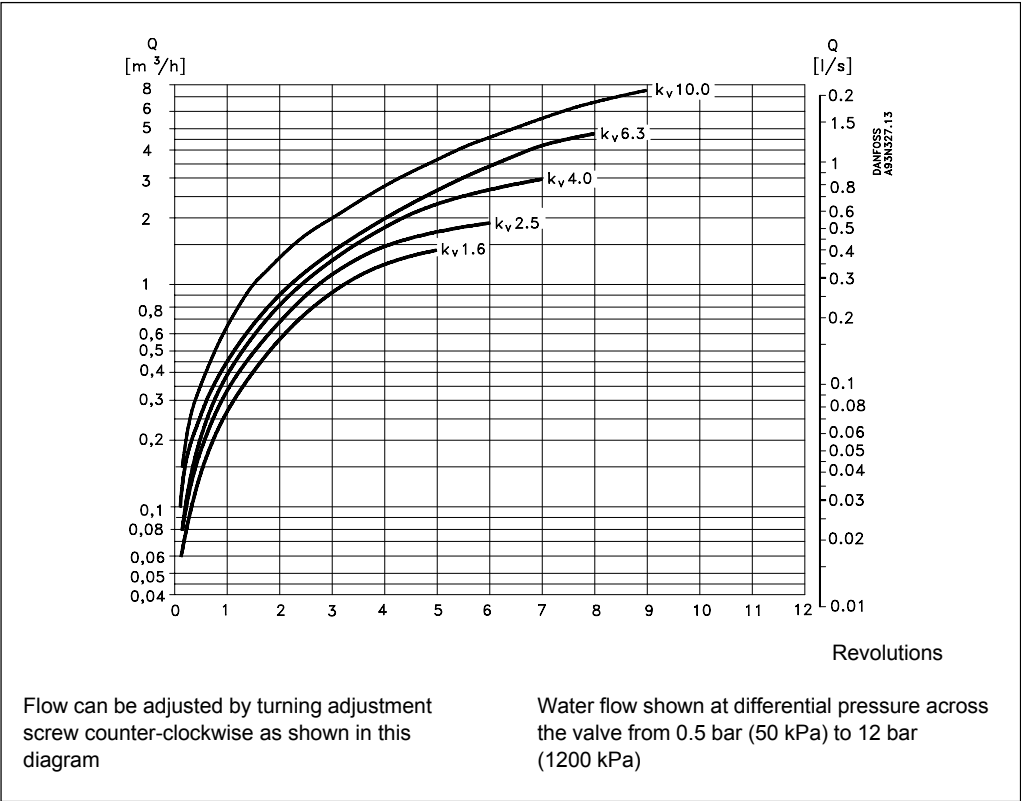
Differential pressure adjustment

Relation between scale figures and differential pressure. Values given are approximate.



Flow adjustment

Relation between adjusted flow and actual flow. Values given are approximate.



Sizing

Example 1

Motor valve for mixing circuit in direct-connected heating systems requires differential pressure of 0.2 bar (20 kPa) and flow less than 350 litres (figs. 1 and 3)

Given:

$Q_{\max}$	= 0.35 m ³ /h (350 l/h)
$\Delta p_{\min}$	= 0.7 bar (70 kPa)
$\Delta p_{\text{circuit}}$	= 0.1 bar (10 kPa)
$\Delta p_{\text{motor valve}}$	= 0.2 bar (20 kPa)
$\Delta p_{\text{restrictor}}$	= 0.2 bar (20 kPa)
Δp_{AVPQ}	= $\Delta p_{\min} - \Delta p_{\text{motor valve}}$
	= 0.7 - 0.2 = 0.5 bar (50 kPa)

Possible pipe pressure losses are not included.

k_v value is calculated according to formula:

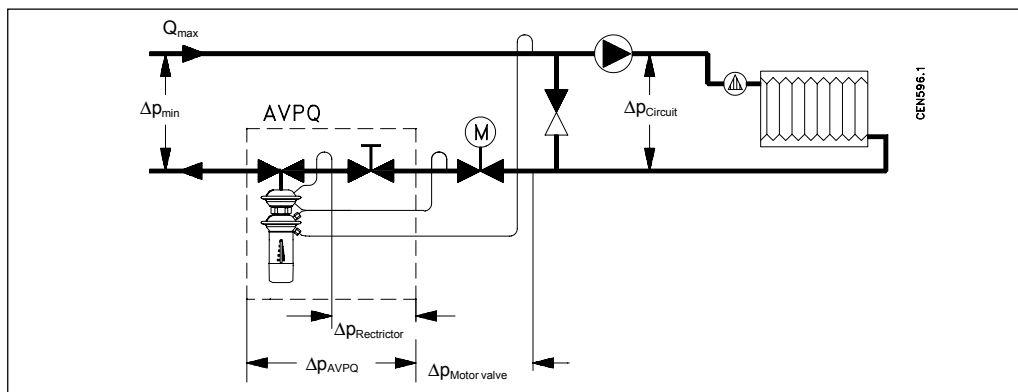
$$k_v = \frac{Q_{\max}}{\sqrt{\Delta p_{\text{AVPQ}} - \Delta p_{\text{restrictor}}}} = \frac{0.35}{\sqrt{0.5 - 0.2}} = 0.64 \text{ m}^3/\text{h}$$

or read from sizing diagram by taking a line through Q -scale (0.35 m³/h) and Δp_v scale (0.5 - 0.2 = 0.3 bar) to intersect k_v axis at 0.64 m³/h.

From k_v value 0.64 m³/h take a line horizontally to the right to intersect vertical X_p lines.

Solution:

The example selects AVPQ 15 with differential pressure setting range 0.1 - 0.5 bar, $X_p = 0.02$ bar, $k_v = 1.6$. At 0.2 bar control setting AVPQ varies between 0.2 bar at open valve and 0.2 + 0.02 = 0.22 bar at closed valve.



Example 2

Motor valve for indirectly connected heating system control requires differential pressure of 0.3 bar and flow less than 1.25 m³/h (figs. 2 and 4)

Given:

$Q_{\max}$	= 1.25 m ³ /h
$\Delta p_{\min}$	= 1.0 bar (100 kPa)
$\Delta p_{\text{exchanger}}$	= 0.05 bar (5 kPa)
$\Delta p_{\text{motor valve}}$	= 0.3 bar (30 kPa)
$\Delta p_{\text{restrictor}}$	= 0.2 bar (20 kPa)
Δp_{AVPQ}	= $\Delta p_{\min} - \Delta p_{\text{exchanger}} - \Delta p_{\text{motor valve}}$
Δp_{AVPQ}	= 1,0 - 0,05 - 0,3
Δp_{AVPQ}	= 0,65 bar (65 kPa)

Possible pipe pressure losses are not included.

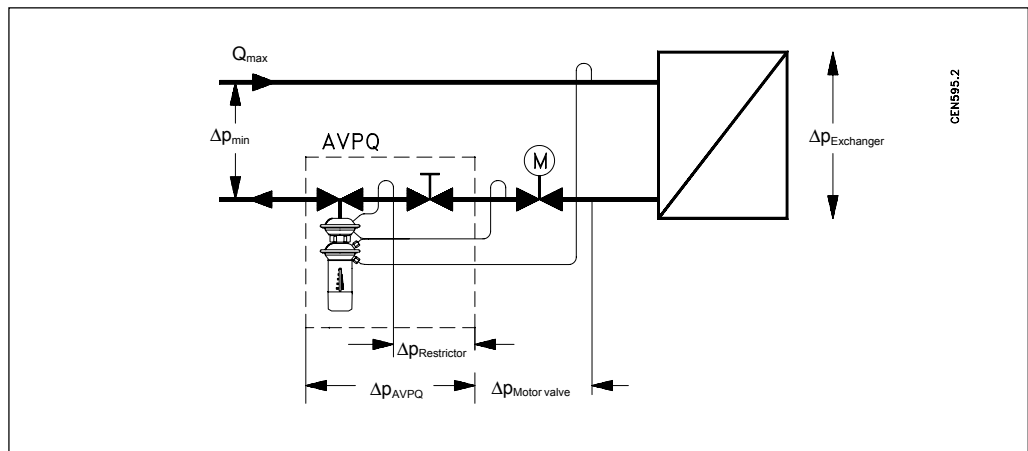
k_v value is calculated according to formula:

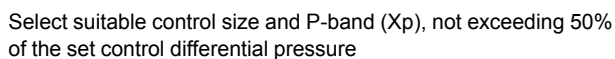
$$k_v = \frac{Q_{\max}}{\sqrt{\Delta p_{\text{AVPQ}} - \Delta p_{\text{restrictor}}}} = \frac{1.25}{\sqrt{0.65 - 0.2}} = 1.9 \text{ m}^3 / \text{h}$$

From k_v value 1.9 m³/h take a line horizontally to the right to intersect vertical X_p lines.

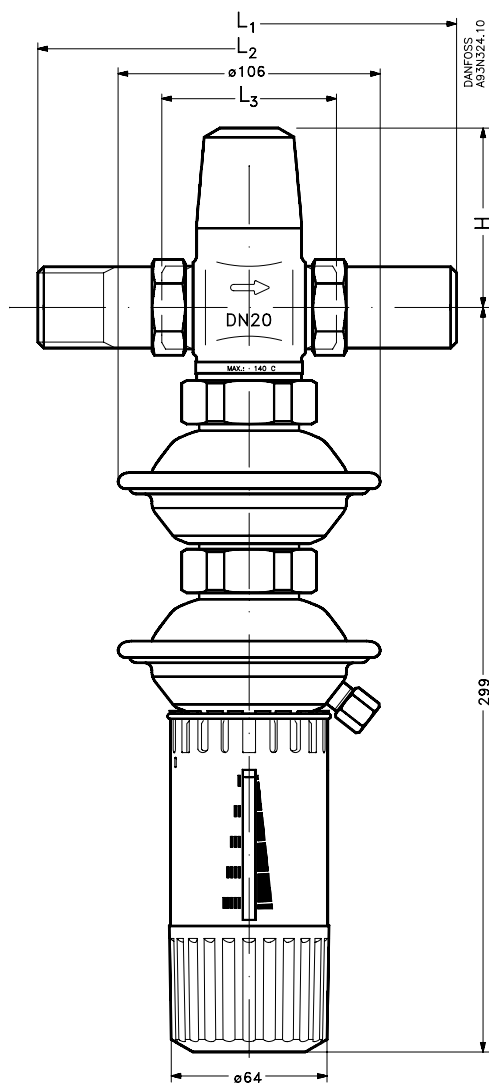
Solution:

The example selects AVPQ with setting range 0.2 - 1.0 bar, $X_p = 0.07$ bar, $k_v = 2.5$. At 0.3 bar control setting AVPQ varies between 0.3 bar at open valve and 0.3 + 0.07 = 0.37 bar at closed valve.

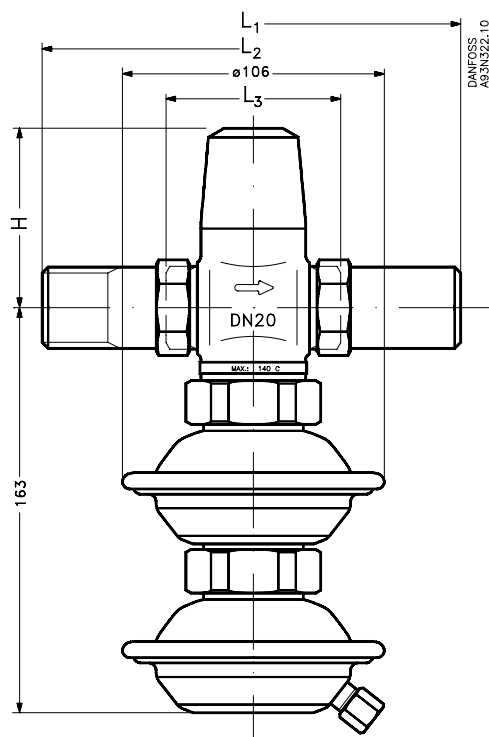




Dimensions

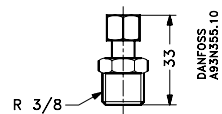


AVPQ



AVPQ-F

	H mm	L ₁ mm	L ₂ mm	L ₃ mm	a ISO 228/1
DN 15	71	139	131	65	G 3/4 A
DN 20	71	154	142	70	G 1 A
DN 25	75	159	159	75	G 1 1/4 A
DN 32	75	184	196	100	G 1 1/2 A



Nipple for impulse tube

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