Data sheet

Differential pressure control AVP

PN 25, return and flow mounting

Application

AVP is a self-acting differential pressure control that closes on rising differential pressure. AVP is primarily used in block and district heating systems.

The control has a valve, a control diaphragm and a handle for differential pressure adjustment.

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 ∅6 mm copper impulse tube.

AVP is available with setting ranges 0.05 - 0.5 bar, 0.2 - 1.0 bar and 0.8 - 1.6 bar.

Data

Pressure stage	PN 25
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. Glyconic water resistant down to –30°C
Medium pH	Min. 7, max. 10

[1] $\frac{k_v}{k_{vs}} \leq 0.5$ in DN 25 and DN 32 versions

Principle flow mounting

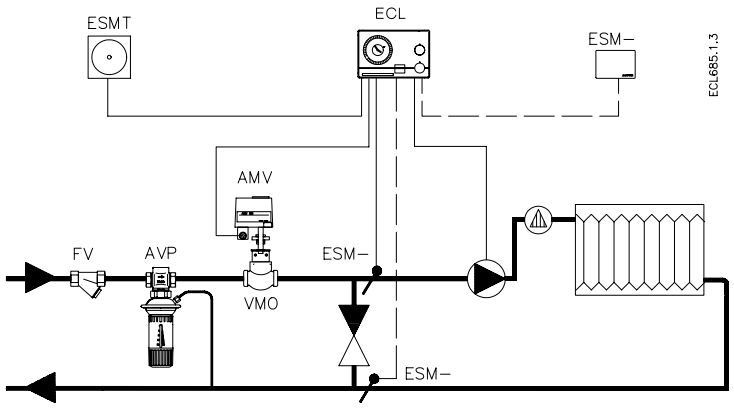


Fig. 1 Direct-connected heating system

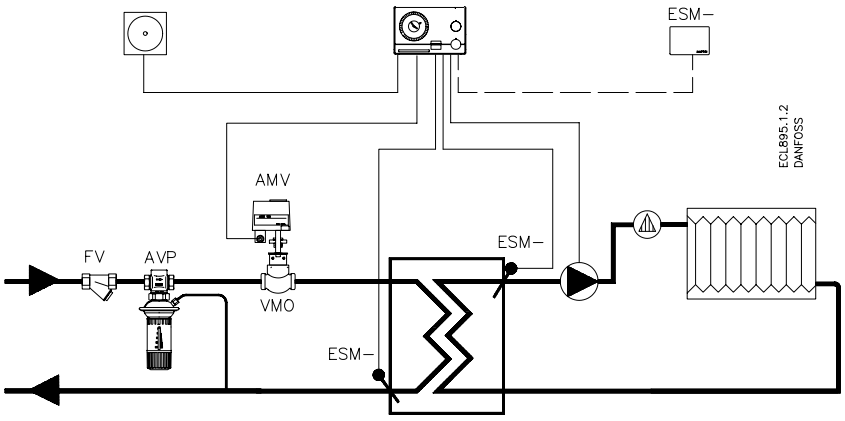


Fig. 2 Indirectly connected heating system

Ordering flow mounting

Complete control with compression fittings for impulse tube connection

Type	DN	External thread ISO 228/1	Setting range 0.05 - 0.5 bar		Setting range 0.2 - 1.0 bar		Setting range 0.8 - 1.6 bar	
			k_v [1] m^3/h	**Code nos.**	k_v [2] m^3/h	**Code nos.**	k_v [3] m^3/h	**Code nos.**
AVP 15	15	G ¾ A	1.6	**003H5021**	1.6	**003H5026**	1.6	**003H5031**
AVP 15	15	G ¾ A	2.5	**003H5022**	2.5	**003H5027**	2.5	**003H5032**
AVP 20	20	G 1 A	4.0	**003H5023**	4.0	**003H5028**	4.0	**003H5033**
AVP 25	25	G 1¼ A	6.3	**003H5024**	6.3	**003H5029**	6.3	**003H5034**
AVP 32	32	G 1½ A	10.0	**003H5025**	10.0	**003H5030**	10.0	**003H5035**

[1] At X_P = 0.10 bar
[2] At X_P = 0.15 bar
[3] At X_P = 0.25 bar

Principle return mounting

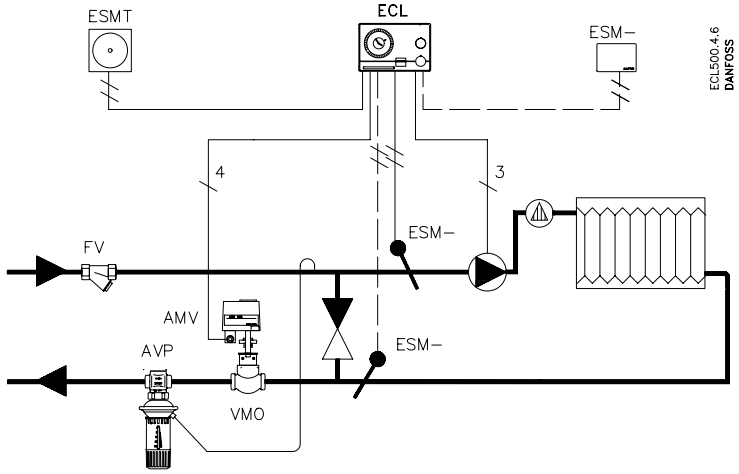


Fig. 3 Direct-connected heating system

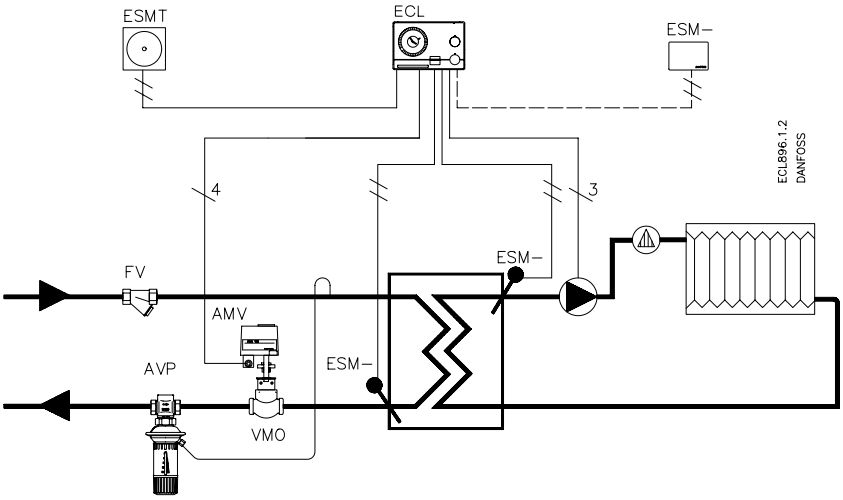


Fig. 4 Indirectly connected heating system

Ordering return mounting

Complete control with compression fittings for impulse tube connection

Type	DN	External thread ISO 228/1	Setting range 0.05 - 0.5 bar		Setting range 0.2 - 1.0 bar		Setting range 0.8 - 1.6 bar	
			k_v [1] m^3/h	**Code nos.**	k_v [2] m^3/h	**Code nos.**	k_v [3] m^3/h	**Code nos.**
AVP 15	15	G ¾ A	1.6	**003H4021**	1.6	**003H4026**	1.6	**003H4031**
AVP 15	15	G ¾ A	2.5	**003H4022**	2.5	**003H4027**	2.5	**003H4032**
AVP 20	20	G 1 A	4.0	**003H4023**	4.0	**003H4028**	4.0	**003H4033**
AVP 25	25	G 1¼ A	6.3	**003H4024**	6.3	**003H4029**	6.3	**003H4034**
AVP 32	32	G 1½ A	10.0	**003H4025**	10.0	**003H4030**	10.0	**003H4035**

[1] At X_P = 0.10 bar
[2] At X_P = 0.15 bar
[3] At X_P = 0.25 bar

Ordering

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

DN	Weld-on tailpieces	Tailpieces with external threads
	Code nos.	**Code nos.**
15	**003N5090**	**003N5070**
20	**003N5091**	**003N5071**
25	**003N5092**	**003N5072**
32	**003N5093**	**003N5073**

Spare parts

Spare parts	**Code nos.**
10 compression fittings for impulse tube	**003H2300**
Adjustment section 0.05 - 0.5 bars and diaphragm, return mounting	**003H2301**
Adjustment section 0.2 - 1.0 bar and 0.8 - 1.6 bars and diaphragm, return mounting	**003H2302**
Adjustment section 0.05 - 0.5 bars and diaphragm, flow mounting	**003H2303**
Adjustment section 0.2 - 1.0 bars and 0.8 - 1.6 bars diaphragm, flow mounting	**003H2304**
Valve insert, k_v = 1.6 m³/h, return mounting	**003H2310**
Valve insert, k_v = 2.5 m³/h, return mounting	**003H2311**
Valve insert, k_v = 4.0 m³/h, return mounting	**003H2312**
Valve insert, k_v = 6.3 m³/h, return mounting	**003H2313**
Valve insert, k_v = 10.0 m³/h, return mounting	**003H2314**
Valve insert, k_v = 1.6 m³/h, flow mounting	**003H2315**
Valve insert, k_v = 2.5 m³/h, flow mounting	**003H2316**
Valve insert, k_v = 4.0 m³/h, flow mounting	**003H2317**
Valve insert, k_v = 6.3 m³/h, flow mounting	**003H2318**
Valve insert, k_v = 10.0 m³/h, flow mounting	**003H2319**

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 steeel, DIN 17224, W.no. 1.4568
Valve plate:	EPDM	Diaphragm body:	CrNi steel, DIN 17440, W.no. 1.4539
Valve seat:	CrNi steel, DIN 17440, W.no. 1.4404	Diaphragm:	EPDM

Fitting

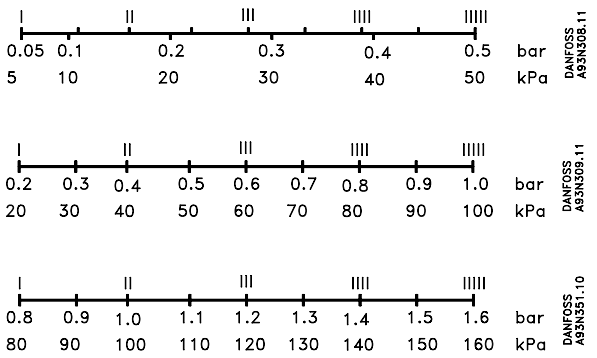
Flow mounting
The control must be mounted in the heating system flow. The negative wire (external impulse tube) must be fitted in the return of the heating systems (fig. 1) and (fig. 2).

The positive wire is integrated in the valve. The control can be fitted in any postion. Further details on fitting and start-up are described in the instruction accompanying the product and **must** be observed.

Return mounting
The control must be mounted in the heating system return. The positive wire must be fitted in the flow of the heating systems (fig. 3) and (fig. 4).

The negative wire is integrated in the valve. The control can be fitted in any postion. Further details on fitting and start-up are described in the instruction accompanying the product and **must** be observed.

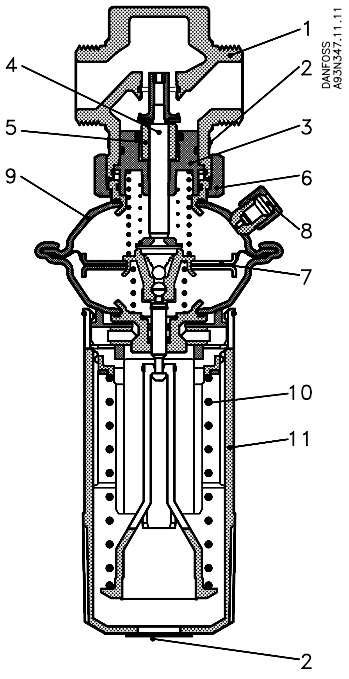
Adjustment



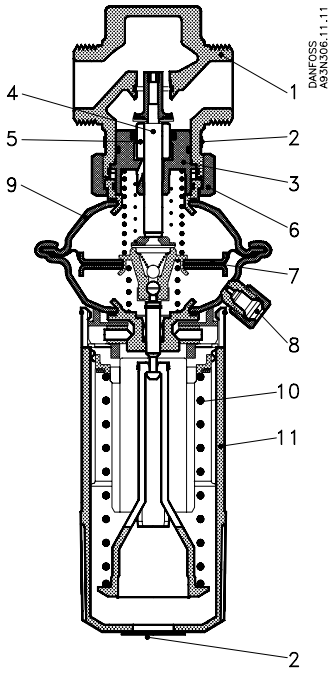
Relation between scale figures and differential pressure. Values given are approximate.

Design

1. Valve body
2. Type label
3. Valve insert
4. Spindle
5. Pressure relief cylinder
6. Union nut
7. Control diaphragm
8. Compression fittings for impulse tube
9. Diaphragm section
10. Setting spring
11. Handle



AVP - flow mounting



AVP - return mounting

Sizing

Example 1
Motor valve for mixing circuit in direct-connected heating systems requires differential pressure of 0.2 bar (fig. 1 and 3)

Given:

Q_{max}	=	550 l/h (0.55 m^3/h)
Δp_{min}	=	0.5 bar (50 kPa)
$\Delta p_{circuit}$	=	0.1 bar (10 kPa) corresponds to the required pump pressure in the heating circuit and is not to be considered when sizing the AVP
$\Delta p_{motor\ valve}$	=	0.1 bar (10 kPa) selected

The differential pressure set value is:

$\Delta p_{set\ point}$	=	$\Delta p_{motor\ valve}$
$\Delta p_{set\ point}$	=	0.2 bar (20 kPa)

The total pressure loss across the control is:

Δp_{AVP}	=	Δp_{min} - $\Delta p_{motor\ valve}$
Δp_{AVP}	=	0.5 - 0.2 = 0.3 bar (30 kPa)

Possible pipe pressure losses in tubes, shut-off fittings, heatmeters, etc. are not included.

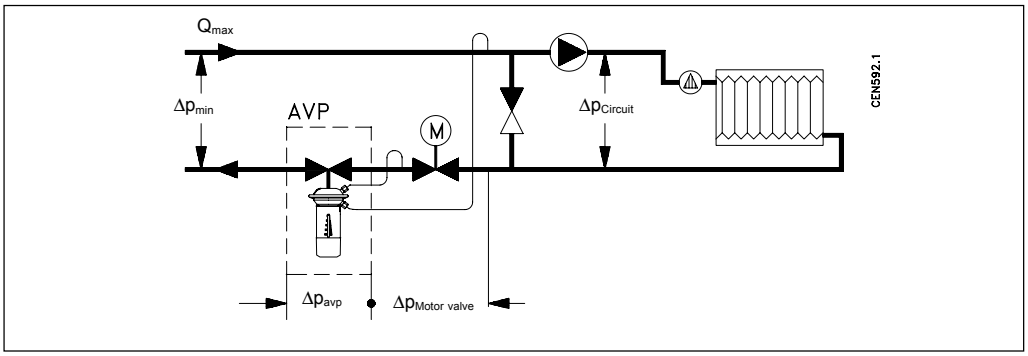
k_v value is calculated according to formula:

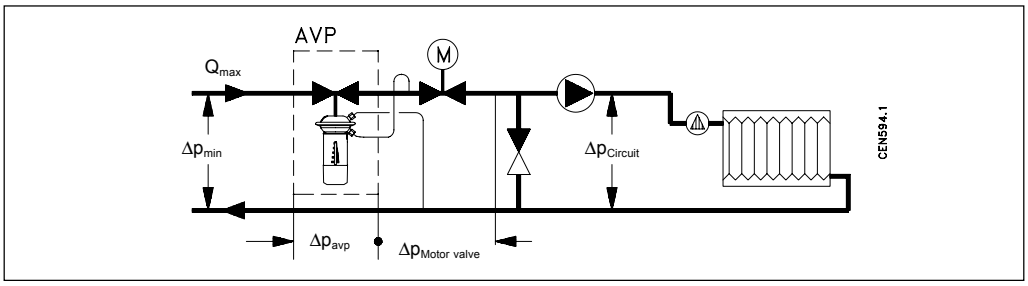
$$k_v = \frac{Q_{max}}{\sqrt{\Delta p_{AVP}}} = \frac{0.55}{\sqrt{0.3}} = 1.0\ m^3/h$$

or read from sizing diagram by taking a line through Q-scale (0.55 m^3/h) and Δp_v scale (0.3 bar) to intersect k_v-axis at 1.0 m^3/h.

Solution:
The example selects AVP 15 with setting range 0.05 - 0.5 bar, k_v = 1.6.
The P-range (X_P) can also be read from the sizing diagram, page 7. Take a horizontal line from the k_v-scale (1.0 m^3/h) to intersect the X_P-scale (0.003 bar), i.e. k_v = 1.6.

At a set value of 0.2 bar and a X_P of 0.03 bar the AVP controls between 0.2 bar with open control valve (0.55 m^3/h) and 0.2 + 0.03 bar = 0.23 bar at almost closed control valve.





Example 2
Motor valve for indirectly connected heating systems requires differential pressure of 0.5 bar (50 kPa) (fig. 2 and 4)

Given:

Q_{max}	=	1.15 m^3/h
Δp_{min}	=	1.0 bar (100 kPa)
$\Delta p_{exchanger}$	=	0.05 bar (5 kPa)
$\Delta p_{motor\ valve}$	=	0.5 bar (50 kPa) selected

The differential pressure set value is:

$\Delta p_{set\ point}$	=	$\Delta p_{exchanger} + \Delta p_{motor\ valve}$
$\Delta p_{set\ point}$	=	0.05 + 0.5 = 0.55 bar (55 kPa)

The total pressure loss across the control is:

Δp_{AVP}	=	$\Delta p_{min} - \Delta p_{exchanger} - \Delta p_{motor\ valve}$
Δp_{AVP}	=	1.0 – 0.05 – 0.5 = 0.45 bar (45 kPa)

Possible pipe pressure losses in tubes, shut-off fittings, heatmeters, etc. are not included.

k_v value is calculated according to formula:

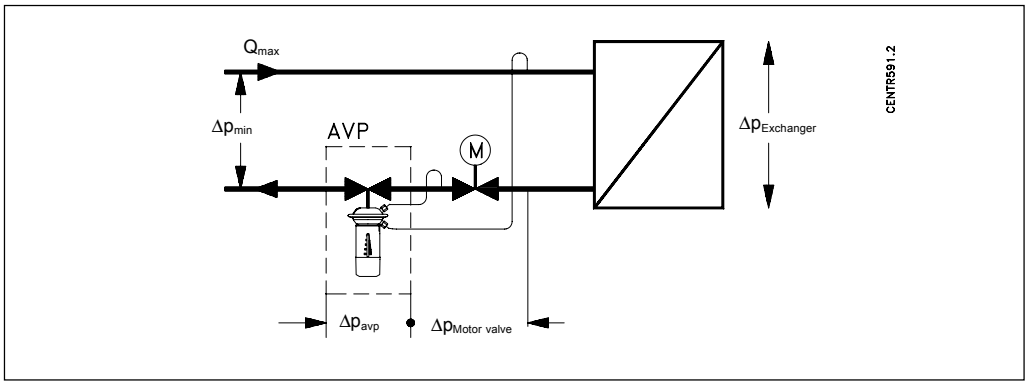
$$k_v = \frac{Q_{max}}{\sqrt{\Delta p_{AVP}}} = \frac{1.15}{\sqrt{0.45}} = 1.7\ m^3/h$$

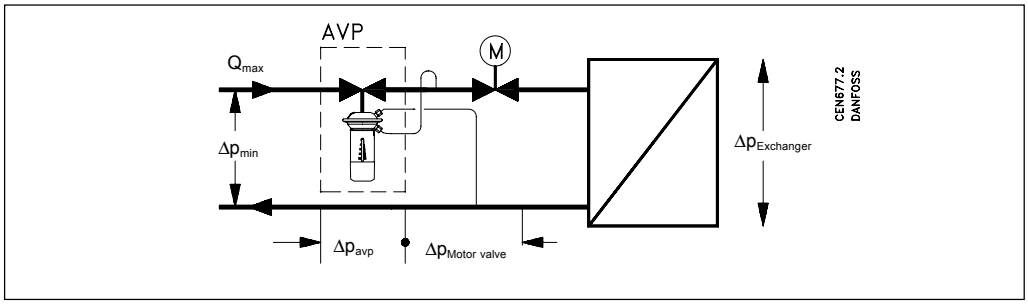
or read from sizing diagram (page 7) by taking a line through Q-scale (1.15 m^3/h) and Δp_V scale (0.45 bar) to intersect k_v axis at 1.7 m^3/h.

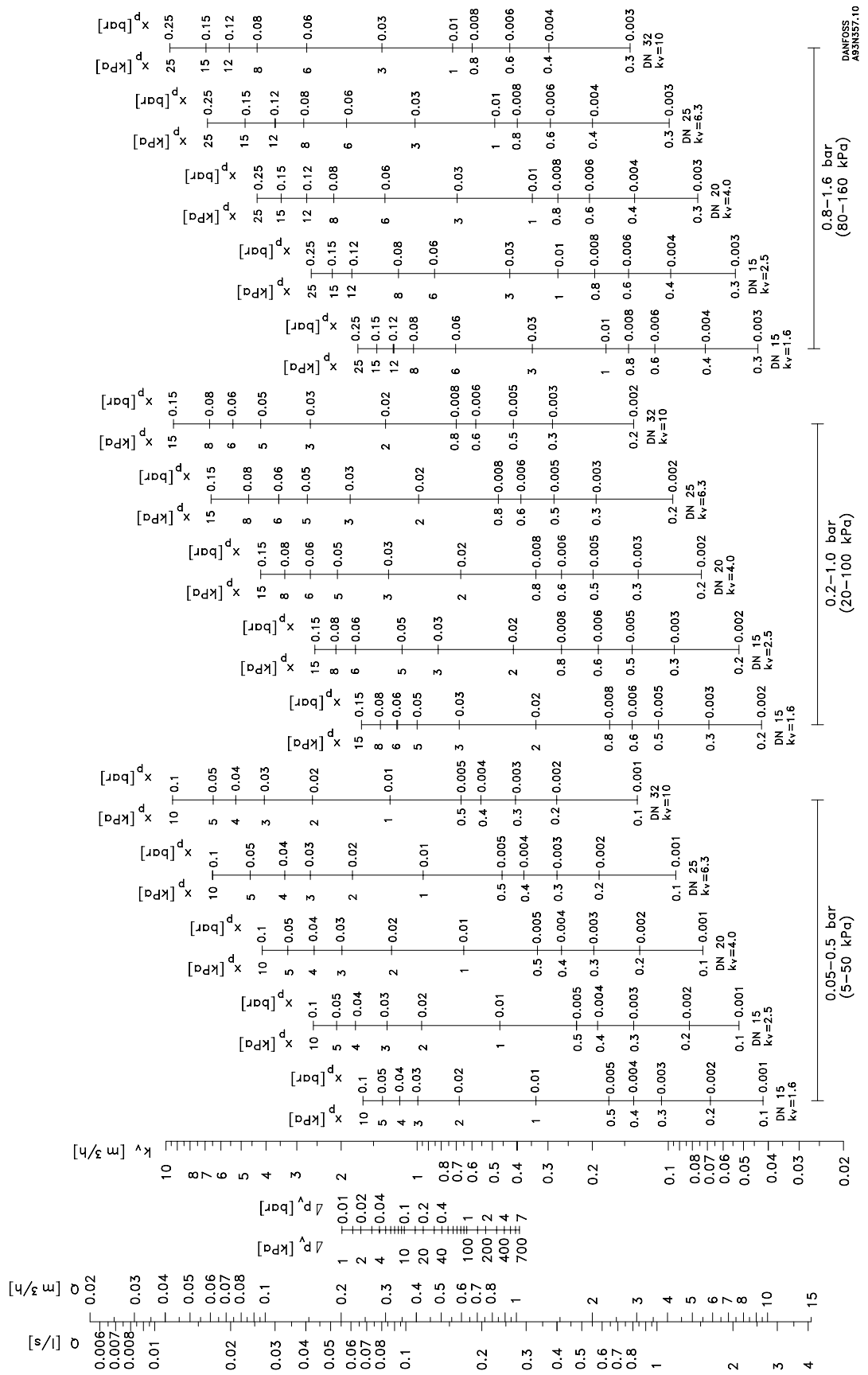
Solution:
The example selects AVP 15 with setting range 0.2 - 1.0 bar, k_v = 2.5.

The P-range (X_P) can also be read from the sizing diagram, page 7. Take a horizontal line from the k_v-scale (1.7 m^3/h) to intersect the X_P-scale (0.006 bar), i.e. k_v = 2.5.

At a set value of 0.55 bar and a X_P of 0.06 bar the AVP controls between 0.55 bar with open control valve (1.15 m^3/h, Δp across the heat exchanger = 0.05 bar) and 0.55 + 0.06 bar = 0.61 bar at almost closed control valve (total pressure loss across the control valve).

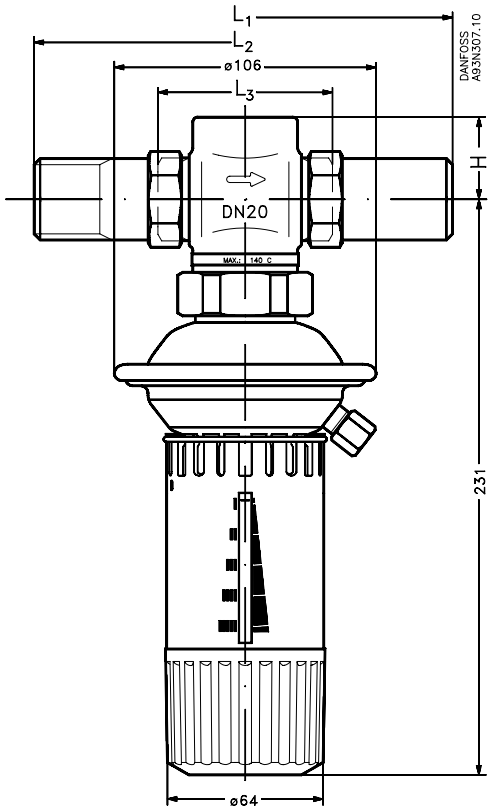




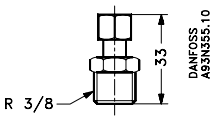


Select suitable control size and P-band (X_P) not exceeding 50% of the set control differential pressure

Dimensions



AVP



Nipple for impulsetube

	H mm	L_1 mm	L_2 mm	L_3 mm	a ISO 228/1
DN 15	33	139	131	65	G ¾ A
DN 20	33	154	142	70	G 1 A
DN 25	37	159	159	75	G 1¼ A
DN 32	37	184	196	100	G 1½ A