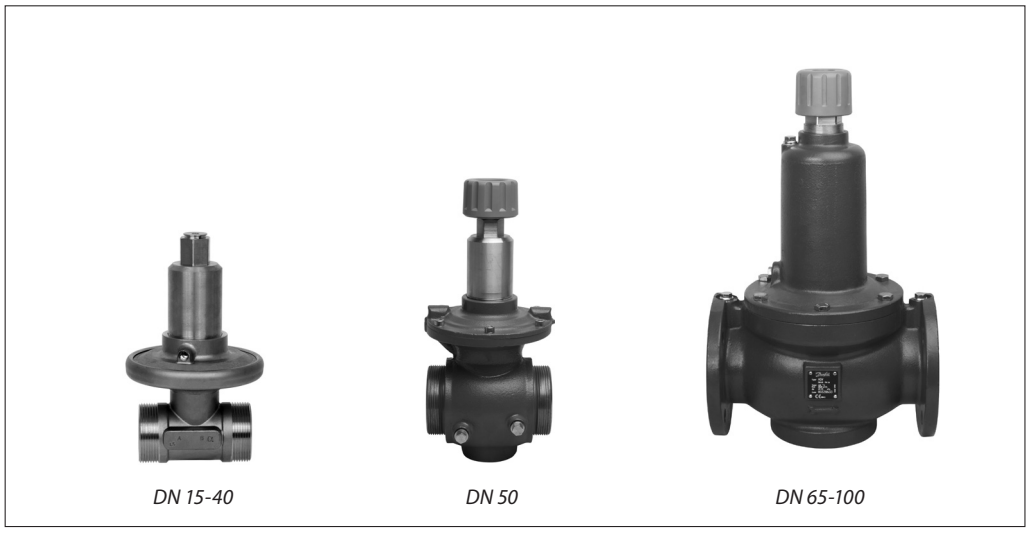
Data sheet

Differential pressure controller (PN 16)

AHP - return mounting, adjustable setting

Description



DN 15-40 *DN 50* *DN 65-100*

AHP is a self-acting differential pressure controller primarily for use in district heating systems or in secondary district heating systems as well. The controller closes on rising differential pressure.

The controller has a control valve, an actuator with one control diaphragm and setting spindle for differential pressure setting.

Main data:

- DN 15-100
- k_{VS} 1.6-80 m^3/h
- PN 16
- Setting range:
  0.2-0.4 bar/0.35-0.75 bar/0.6-1.0 bar
- Temperature:
  - Circulation water/glycolic water up to 30%:
    2 … 120 °C
- Connections:
  - Ext. thread (weld-on, thread and flange tailpieces)
  - Flange

Ordering

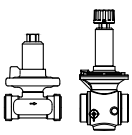
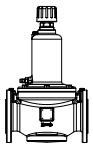
Example:
Differential pressure controller, return mounting, DN 65, k_{VS} 32, PN 16, setting range 0.2-0.4 bar, t_{max} 120 °C, flange

- *1× AHP DN 65 controller*
  Code No.: ***003L3630***

Option:
- *1× Impulse tube set AH, 2.5m*
  Code No.: ***003L5043***
- *1× Nipple for imp. tube*
  Code No.: ***003L5042***

External impulse tube (AH) and nipple for imp. tube must be ordered separately.

AHP Controller (return mounting)

Picture	DN (mm)	k_{VS} (m^3/h)	Connection		Δp setting range (bar)	Code No.	Δp setting range (bar)	Code No.	Δp setting range (bar)	Code No.
	15	1.6	Cylindr. ext. thread acc. to ISO 228/1	G ¾ A	0.2-0.4	**003L3619**	0.35-0.75	–	0.6-1.0	–
	20	2.5		G 1 A		**003L3620**				
	25	4.0		G 1¼ A		**003L3621**				
	32	6.3		G 1¾ A		**003L3622**				
	40	10		G 2 A		**003L3623**				
	50	20		G 2½ A		**003L3624**		**003L3625**		**003L3626**
	65	32	Flange EN 1092-2			**003L3630**		**003L3633**		**003L3636**
	80	50				**003L3631**		**003L3634**		**003L3637**
	100	80				**003L3632**		**003L3635**		**003L3638**

Ordering *(continued)*

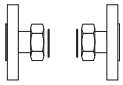
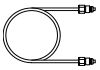
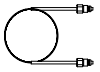
Example:
Differential pressure controller, return mounting, DN 65, k_{VS} 30, PN 16, setting range 0.2-0.4 bar, t_{max} 120 °C, flange

- *1× AHP DN 65 controller Code No.:* ***003L3630***

Option:
- *1× Impulse tube set AH, 2.5m Code No.:* ***003L5043***
- *1× Nipple for imp. tube Code No.:* ***003L5042***

External impulse tube (AH) and nipple for imp. tube must be ordered separately.

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 ½	003H6902
		20		R ¾	003H6903
		25		R 1	003H6904
		32		R 1¼	003H6905
		40		R 1½	065F6061
		50		R 2	065F6062
	Flange tailpieces	15	Flanges PN 25, acc. to EN 1092-2		003H6915
		20			003H6916
		25			003H6917
	Impulse tube set AH	Description: - 1× copper tube Ø 3.0 × 1 mm - 2× fitting for imp. tube connection to actuator and pipe G 1/16		1.5 m	003L3561
				2.5 m	003L5043
				5 m	003L3562
	Impulse tube set AH for pressure reduction	Description: - 1× stainless steel tube Ø 0.8 × 0.2 mm - 2× fitting for imp. tube connection to actuator and pipe G 1/16		0.8 m	003L3560
	Fitting for impulse tube connection to pipe			G 1/16-R 3/8	003L5042
				G 1/16-R ¼	003L8151
	10 EPDM o-rings for impulse tube				003L8175

Technical data

Valve

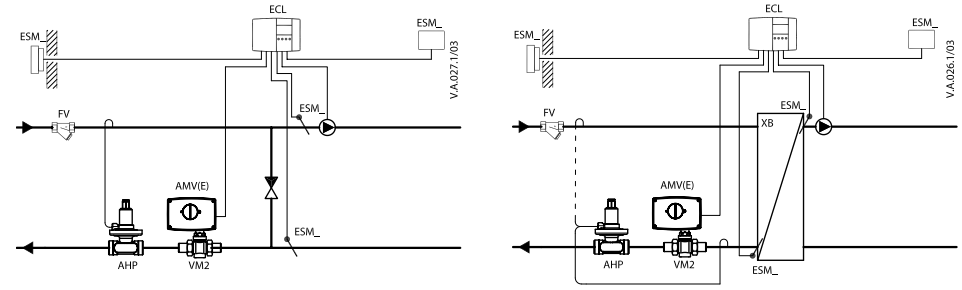
Nominal diameter		DN	15	20	25	32	40	50	65	80	100
k_{VS} value		m³/h	1.6	2.5	4.0	6.3	10	20	32	50	80
Nominal pressure		PN	16								
Max. differential pressure		bar	2.5								
Medium			Circulation water / glycolic water up to 30%								
Medium pH			Min. 7, Max. 10								
Medium temperature		°C	2 … 120								
Connections	valve		External thread						Flange		
	tailpieces		Weld-on and flange				Weld-on		–		
			External thread						–		
Materials											
Valve body			Dezincing free brass CuZn36Pb2As						Grey cast iron EN-GJL-250 (GG-25)		
Valve seat			Stainless steel, mat. No. 1.4305						Stainless steel, mat. No. 1.4404		
Valve cone									CuZN36Pb2As (CW 602N)		
Sealing			Metal sealing						EPDM		

Actuator

Type	DN	15	20	25	32	40	50	65	80	100
Actuator size	cm²	16	25	41	64			143	169	227
Nominal pressure	PN	16								
Diff. pressure setting	bar	0.2-0.4					0.2-0.4; 0.35-0.75; 0.6-1.0			
Materials										
Actuator housing		Dezincing free brass CuZn36Pb2As (DN 15-40) Grey cast iron EN-GJL-250 (GG-25) (DN 50-100)								
Diaphragm		EPDM								
Impulse tube		Copper tube Ø 3.0 × 1 mm								
		Stainless steel tube Ø 0.8 × 0.2 × 800 mm								

Application principles

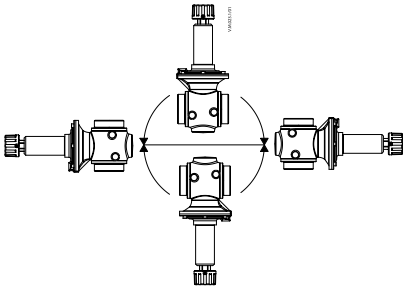
AHP controller must be installed in the return pipe only.



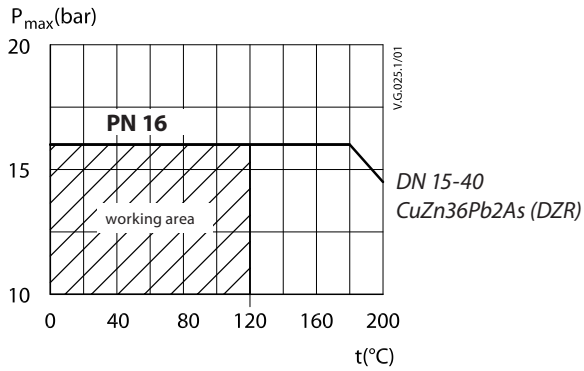
Direct-connected heating system *Indirectly connected heating system*

Installation positions

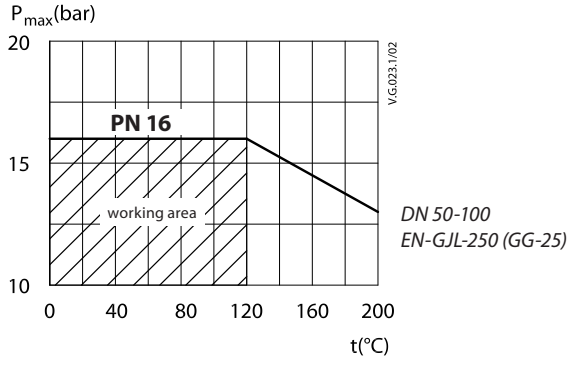
The controllers can be installed in any position.



Pressure temperature diagram



DN 15-40
CuZn36Pb2As (DZR)



DN 50-100
EN-GJL-250 (GG-25)

Maximum allowed operating pressure as a function of medium temperature (according to EN 1092-2 and EN 1092-3).

Sizing

- *Directly connected heating system*

Example 1
Motorised control valve (MCV) for mixing circuit in direct-connected heating system requires differential pressure of 0.3 bar (30 kPa).

Given data:
Q_{max} = 1.3 m³/h (1300 l/h)
Δp_{min} = 0.7 bar (70 kPa)
*$\Delta p_{circuit}$ = 0.1 bar (10 kPa)
Δp_{MCV} = 0.3 bar (30 kPa) selected

*Remark
$\Delta p_{circuit}$ corresponds to the required pump pressure in the heating circuit and is not to be considered when sizing the AHP

The differential pressure set value is:
$\Delta p_{set\ value} = \Delta p_{MCV}$
$\Delta p_{set\ value}$ = 0.3 bar (30 kPa)

The total pressure loss across the controller is:
$\Delta p_{AHP} = \Delta p_{min} - \Delta p_{MCV} = 0.7 - 0.3$
Δp_{AHP} = 0.4 bar (40 kPa)

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

k_v value is calculated according to formula:

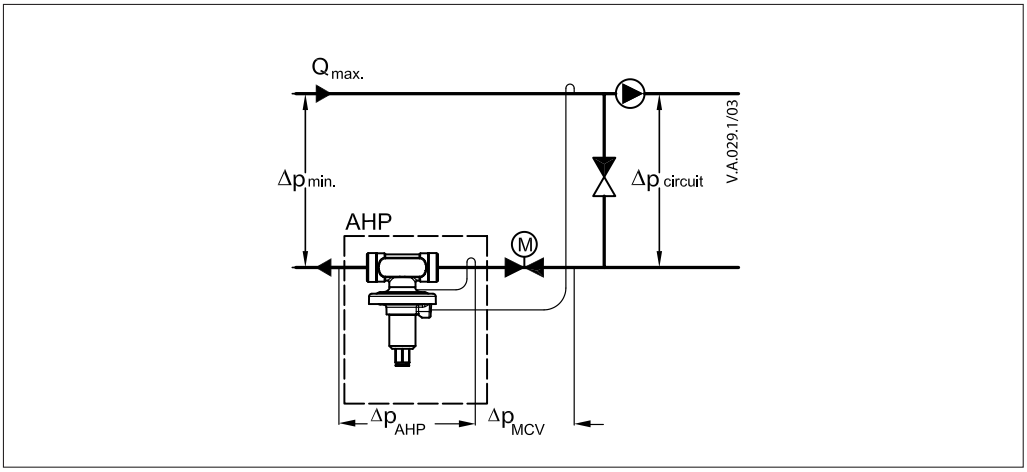
$$k_v = \frac{Q_{max}}{\sqrt{\Delta p_{AHP}}} = \frac{1.3}{\sqrt{0.4}}$$

k_v = 2.0 m³/h

or read from the sizing diagram, page 6, by taking a line from Q-scale (1.3 m³/h) through Δp_v-scale (0.4 bar) to intersect k_v-scale at 2.0 m³/h.

Solution:
The example selects AHP DN 20, k_{VS} value 2.5, with differential pressure setting range 0.2-0.4 bar.

The P-band (Xp) can also be read from the sizing diagram. Take a horizontal line from the k_v-scale (2.0 m³/h) to the right to intersect the Xp-scale (0.07 bar). At a set value of 0.3 bar and a Xp of 0.07 bar the AHP controller controls between 0.3 bar with open motorised control valve and 0.3 + 0.07 = 0.37 bar at almost closed motorised control valve (i.e. total pressure loss across the motorised control valve).



Sizing *(continued)*

- *Indirectly connected heating system*

Example 2
Motorised control valve (MCV) for indirectly connected heating system requires differential pressure of 0.3 (30 kPa) bar.

Given data:
Q_{max} = 0.8 m³/h (800 l/h)
Δp_{min} = 0.8 bar (80 kPa)
$\Delta p_{exchanger}$ = 0.05 bar (5 kPa)
Δp_{MCV} = 0.3 bar (30 kPa) selected

The differential pressure set value is:
$\Delta p_{set\ value} = \Delta p_{exchanger} + \Delta p_{MCV} = 0.05 + 0.3$

$\Delta p_{set\ value}$ = 0.35 bar (35 kPa)

The total pressure loss across the controller is:
$\Delta p_{AHP} = \Delta p_{min} - \Delta p_{exchanger} - \Delta p_{MCV}$

$= 0.8 - 0.05 - 0.3$

Δp_{AHP} = 0.45 bar (45 kPa)

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

k_v value is calculated according to formula:

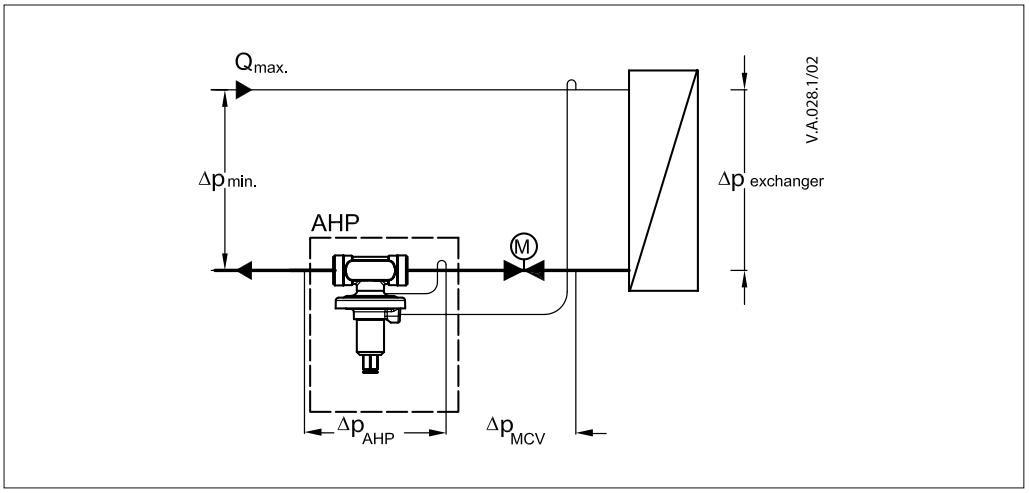
$$k_v = \frac{Q_{max}}{\sqrt{\Delta p_{AHP}}} = \frac{0.8}{\sqrt{0.45}}$$

k_v = 1.2 m³/h

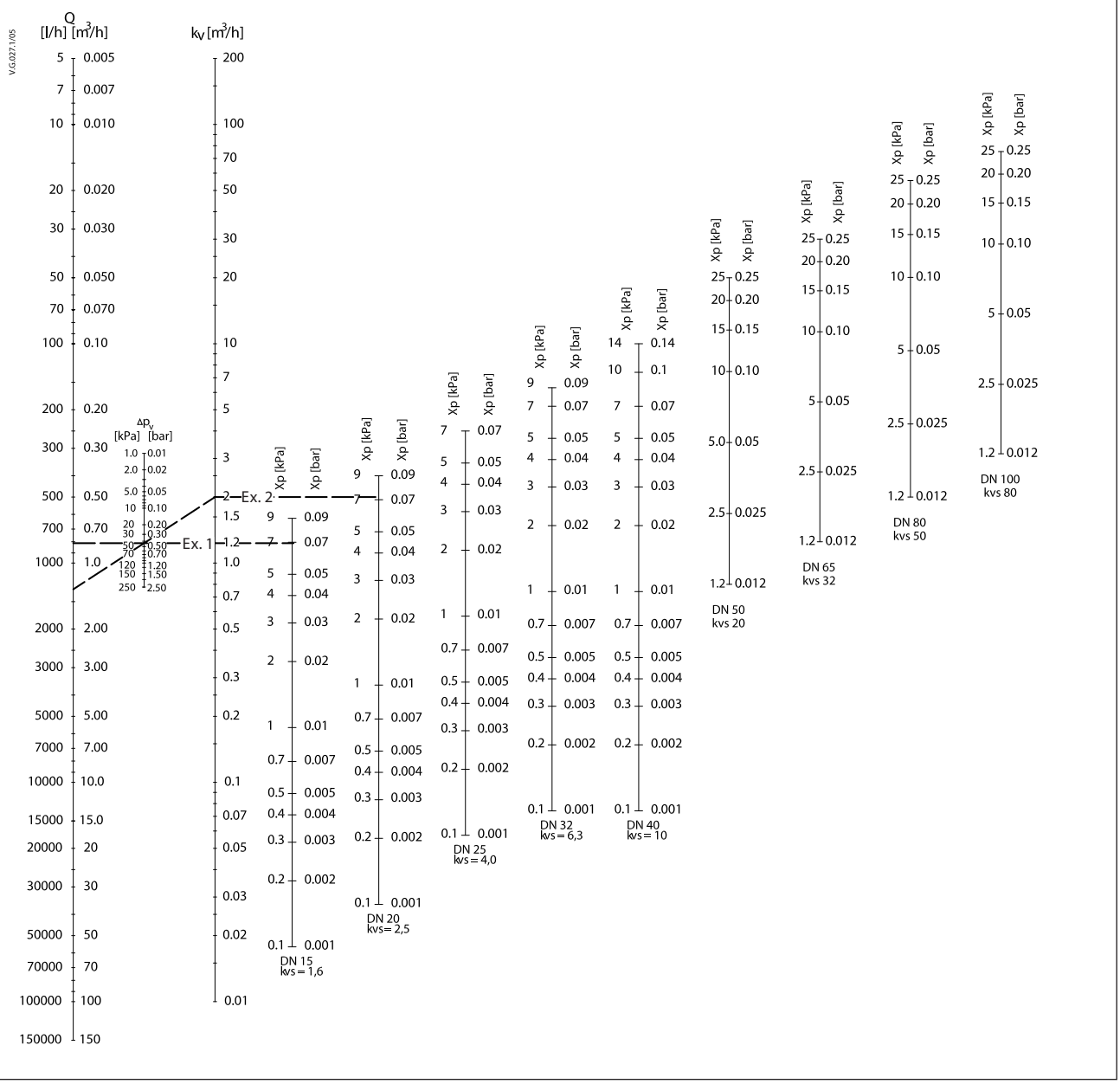
or read from the sizing diagram, page 6, by taking a line from Q-scale (0.8 m³/h) through Δp_v-scale (0.45 bar) to intersect k_v-scale at 1.2 m³/h.

Solution:
The example selects AHP DN 15, k_{VS} value 1.6, with differential pressure setting range 0.2-0.4 bar.

The P-band (Xp) can also be read from the sizing diagram. Take a horizontal line from the k_v-scale (1.2 m³/h) to the right to intersect the Xp-scale (0.07 bar). At a set value of 0.35 bar and a Xp of 0.07 bar the AHP controller controls between 0.35 bar with open motorised control valve and 0.35 + 0.07 = 0.42 bar at almost closed motorised control valve (i.e. total pressure loss across the motorised control valve).



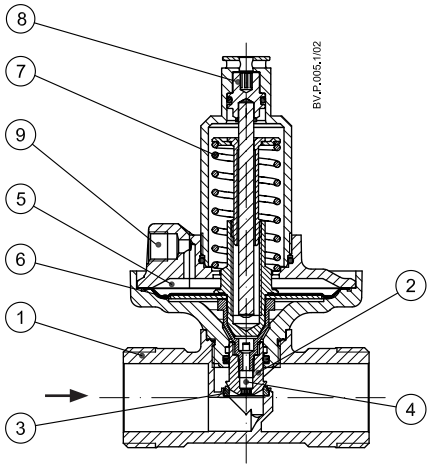
Sizing *(continued)*



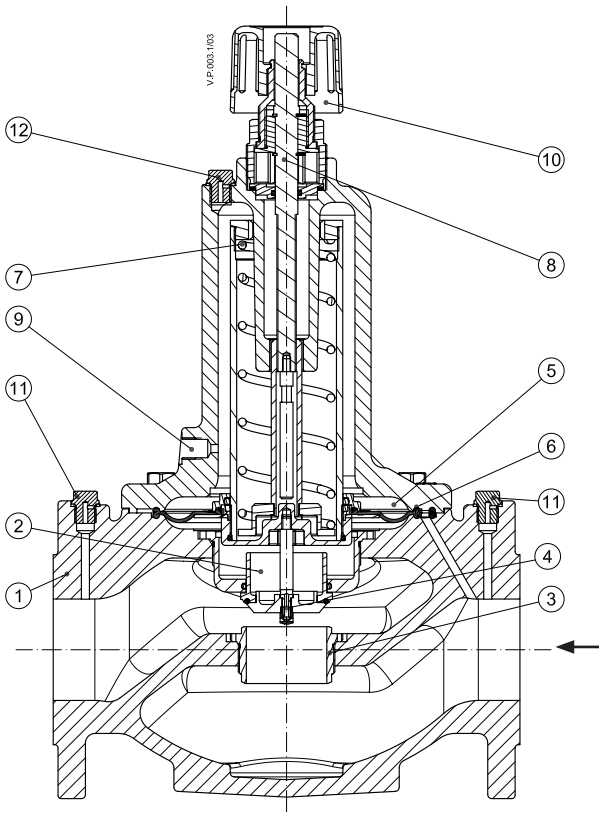
Design

1. Valve body
2. Pressure relieved valve cone
3. Valve seat
4. Control drain
5. Actuator
6. Control diaphragm
7. Setting spring for diff. pressure control
8. Spindle for diff. pressure setting, prepared for sealing
9. Connection for impulse tube
10. Shut-off knob
11. Measuring holes-plugged
12. Air-vent

DN 15-50



DN 65-100



Function

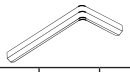
Pressure changes from the flow and return pipe are being transferred through the impulse tubes and/or control drain in the actuator stem to the actuator chambers and act on control diaphragm. Control valve closes on rising differential pressure and opens on falling differential pressure to maintain constant differential pressure.

Settings

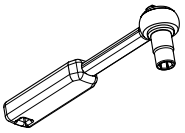
Differential pressure setting
Differential pressure setting is being done by the adjustment of the setting spindle for diff. pressure control. The adjustment can be performed on the basis of diff. pressure adjustment table and/or pressure indicators.

The controllers are factory set to value as written in Factory presetting table. Turning the setting spindle right (clockwise) increases the setting, turning the setting spindle left (counter clockwise) reduces the setting.

In case of unknown diff. pressure setting, turn the setting spindle fully clockwise to max value. Then turn the setting spindle left (counter clockwise) by determined number of turns (n) as described in tables.



DN	15	3
	20	3
	25	4
	32	5
	40	5
	50	5



DN	65	13
	80	13
	100	13

n (turns)	DN 15-40	DN 50		
	0.2-0.4	0.2-0.4	0.35-0.75	0.6-1.00
	bar			
0		0.40	0.75	1.00
1		0.39	0.73	0.98
2		0.38	0.71	0.96
3		0.37	0.69	0.94
4		0.36	0.67	0.92
5	0.40	0.35	0.65	0.90
6	0.39	0.34	0.63	0.88
7	0.38	0.33	0.61	0.86
8	0.37	0.32	0.59	0.84
9	0.36	0.31	0.57	0.82
10	0.35	0.30	0.55	0.80
11	0.34	0.29	0.53	0.78
12	0.33	0.28	0.51	0.76
13	0.32	0.27	0.49	0.74
14	0.31	0.26	0.47	0.72
15	0.30	0.25	0.45	0.70
16	0.29	0.24	0.43	0.68
17	0.28	0.23	0.41	0.66
18	0.27	0.22	0.39	0.64
19	0.26	0.21	0.37	0.62
20	0.25	0.20	0.35	0.60
21	0.24			
22	0.23			
23	0.22			
24	0.21			
25	0.20			

Note: *n = 360 °*

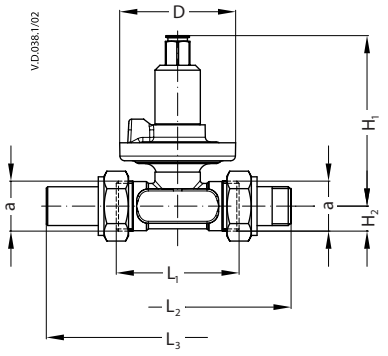
Factory presetting

Δp setting range (bar)	bar
0.2-0.4	0.30
0.35-0.75	0.60
0.6-1.0	0.80

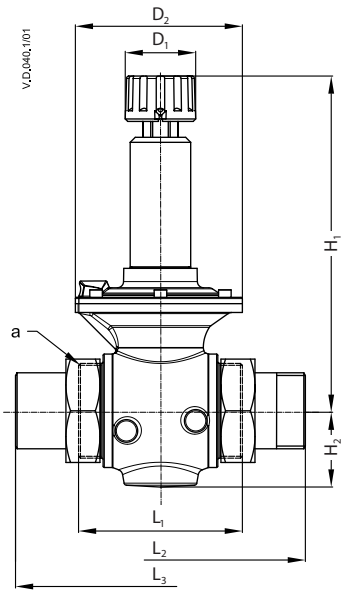
DN 65-100 n (turns)	0.2-0.4	0.35-0.75	0.6-1.00
	bar		
0	0.40	0.75	1.00
1	0.39	0.74	0.99
2	0.38	0.73	0.98
3	0.37	0.72	0.97
4	0.36	0.71	0.96
5	0.35	0.70	0.95
6	0.34	0.69	0.94
7	0.33	0.68	0.93
8	0.32	0.67	0.92
9	0.31	0.66	0.91
10	0.30	0.65	0.90
11	0.29	0.64	0.89
12	0.28	0.63	0.88
13	0.27	0.62	0.87
14	0.26	0.61	0.86
15	0.25	0.60	0.85
16	0.24	0.59	0.84
17	0.23	0.58	0.83
18	0.22	0.57	0.82
19	0.21	0.56	0.81
20	0.20	0.55	0.80
21		0.54	0.79
22		0.53	0.78
23		0.52	0.77
24		0.51	0.76
25		0.50	0.75
26		0.49	0.74
27		0.48	0.73
28		0.47	0.72
29		0.46	0.71
30		0.45	0.70
31		0.44	0.69
32		0.43	0.68
33		0.42	0.67
34		0.41	0.66
35		0.40	0.65
36		0.39	0.64
37		0.38	0.63
38		0.37	0.62
39		0.36	0.61
40		0.35	0.60

Note: *n = 360 °*

Dimensions

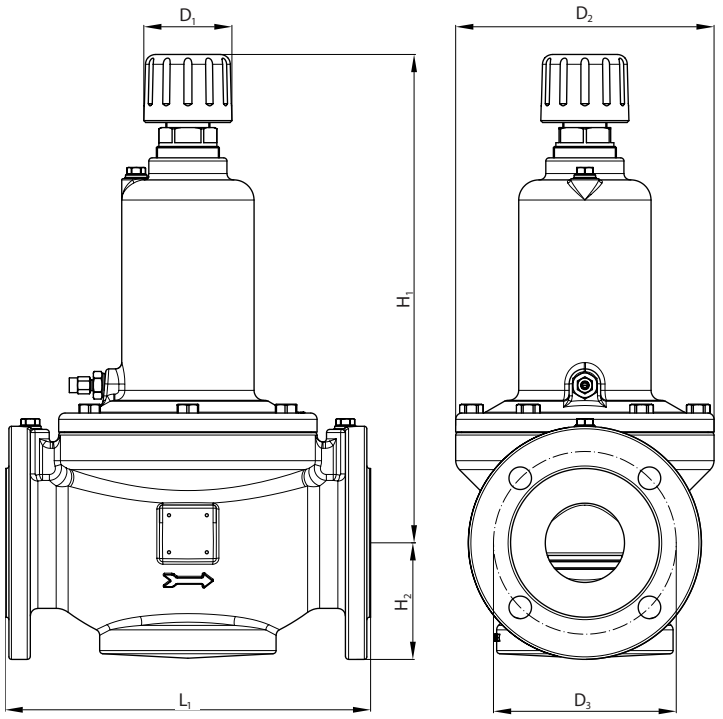


DN	L_1	L_2	L_3	H_1	H_2	D	a
	mm						ISO 228/1
15	65	120	139	90.2	13.2	61	G ¾ A
20	75	136	159	111.2	16.6	76.5	G 1 A
25	85	155	169	141	21	98	G 1¼ A
32	95	172	179	175.2	23.9	122.5	G 1¾ A
40	100	206	184	179.7	26.9	122.5	G 2 A



DN	Δp setting range	L_1	L_2	L_3	H_1	H_2	D_1	D_2	a
	(bar)	mm							ISO 228/1
50	0.2-0.4	130	244	234	232	61	55	133	G 2½
	0.35-0.75				273				
	0.6-1.0								

Dimensions *(continued)*



DN	L_1	H_1	H_2	D_1	D_2	D_3
	mm					
65	290	385	93	68	205	145
80	310	390	100	68	218	160
100	347	446	112	68	248	180

Fittings