Data sheet

Pressure reduction controllers (PN 25)

AVD - for water

AVDS - for steam

Description

AVD *AVDS*

AVD(S) is a self-acting pressure reduction controller primarily for use in district heating systems. The controller is normally opened and closes on rising pressure.

The controller has a control valve, an actuator with one control diaphragm and a spring(s) for pressure setting.

Main data AVD:

- DN 15-50
- k_{VS} 0,4-25 m^3/h
- PN 25
- Setting range:
  1-5 bar / 3-12 bar
- Temperature:
  - Circulation water/glycolic water up to 30 %:
    2 … 150 °C
- Connections:
  - Ext. thread (weld-on, thread and flange tailpieces)
  - Flange

Main data AVDS:

- DN 15-25
- k_{VS} 1,0-6,3 m^3/h
- PN 25
- Setting range:
  1-5 bar / 3-12 bar
- Temperature:
  - Steam/circulation water/glycolic water up to 30 %: 2 … 200 °C
- Connections:
  - External thread (weld-on, thread and flange tailpieces)

Ordering

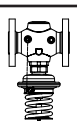
*Example 1 - **AVD** controller:*
Pressure reduction controller for water, DN 15, k_{VS} 4,0, PN 25, setting range 1-5 bar, t_{max} 150 °C, ext. thread

- *1× AVD DN 15 controller*
  *Code No: **003H6644***

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

The controller will be delivered completely assembled, inclusive impulse tube between valve and actuator.

AVD Controller

Picture	DN (mm)	k_{VS} (m^3/h)	Connection		Δp setting range (bar)	Code No.	Δp setting range (bar)	Code No.
	15	0,4	Cylindr. ext. thread acc. to ISO 228/1	G ¾ A	1-5	003H6957	3-12	003H6978
		1,0				003H6958		003H6979
		4,0				003H6644		003H6650
	20	6,3		G 1 A		003H6645		003H6651
	25	8,0		G 1¼ A		003H6646		003H6652
	32	12,5	Flanges PN 25, acc. to EN 1092-2			003H6659		003H6662
	40	20				003H6660		003H6663
	50	25				003H6661		003H6664

***Note:** other controllers available on request.*

Ordering *(continuous)*

*Example 2 - **AVDS** controller: Pressure reduction controller for steam, DN 15, k_{VS} 3,2, PN 25, setting range 1-5 bar, t_{max} 200 °C, ext. thread*

- *1× AVDS DN 15 controller Code No: **003H6667***

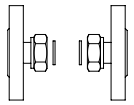
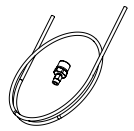
Option:
- *1× Impulse tube set AV ⅛ Code No: **003H6852***
- *1× Weld-on tailpieces Code No: **003H6908***
- *1× Seal pot Code No: **003H0277***

The controller will be delivered completely assembled. External impulse tube (AV) and seal pot must be ordered separately.

AVDS Controller

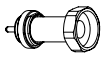
Picture	DN (mm)	k_{VS} (m^3/h)	Connection		Δp setting range (bar)	Code No.	Δp setting range (bar)	Code No.
	15	1,0	Cylindr. ext. thread acc. to ISO 228/1	G ¾ A	1-5	**003H6665**	3-12	**003H6670**
		1,6				**003H6666**		**003H6671**
		3,2				**003H6667**		**003H6672**
	20	4,5		G 1 A		**003H6668**		**003H6673**
	25	6,3		G 1¼ A		**003H6669**		**003H6674**

Accessories

Picture	Type designation	DN	Connection		Code No.
	Weld-on tailpieces	15	-		**003H6908**
		20			**003H6909**
		25			**003H6910**
	External thread tailpieces	15	Conical ext. thread acc. to EN 10226-1	R ½	**003H6902**
		20		R ¾	**003H6903**
		25		R 1	**003H6904**
	Flange tailpieces	15	Flanges PN 25, acc. to EN 1092-2		**003H6915**
		20			**003H6916**
		25			**003H6917**
	Impulse tube set AV	Description: - 1× copper tube Ø 6 × 1 × 1500 mm - 1× compression fitting) for imp. tube connection to pipe Ø 6 × 1 mm		R ⅛	**003H6852**
				R ⅜	**003H6853**
				R ½	**003H6854**
	[1] 10 compression fittings for impulse tube connection to pipe, Ø 6 × 1 mm R ⅛				**003H6857**
	[1] 10 compression fittings for impulse tube connection to pipe, Ø 6 × 1 mm R ⅜				**003H6858**
	[1] 10 compression fittings for impulse tube connection to pipe, Ø 6 × 1 mm R ½				**003H6859**
	[1] 10 compression fittings for impulse tube connection to actuator, Ø 6 × 1 mm G ⅛				**003H6931**
	Shut off valve Ø 6 mm				**003H0276**
	Seal pot, 0,3 l, with two compression fittings Ø 6 × 1 mm				**003H0277**

[1] *Compression fitting consists of a nipple, compression ring and nut.*

Service kits

Picture	Type designation	DN	k_{VS} (m^3/h)	Code No.
	Valve insert [1]	15	0,4	**003H6869**
			1,0	**003H6870**
			4,0	**003H6873**
		20	6,3	**003H6874**
		25	8,0	**003H6875**
		32/40/50	12,5/20/25	**003H6876**
	Valve neck with stuffing box [2]	15	3,2	**003H6877**
		20	4,5	
		25	6,3	

Picture	Type designation	Δp setting range (bar)	Code No.
	Actuator with setting spring	1-5	**003H6844**
		3-12	**003H6845**

[1] *for AVD controller only*

[2] *for AVDS controller only*

Technical data

Valve (AVD)

Nominal diameter	**DN**	**15**			**20**	**25**	**32**	**40**	**50**
k_{VS} value	m^3/h	0,4	1,0	4,0	6,3	8,0	12,5	20	25
Cavitation factor z [1]		≥ 0,6							
Nominal pressure	PN	25							
Max. differential pressure	bar	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					Flange		
	tailpieces	Weld-on, external thread and flange					-		
Materials									
Valve body	thread	Red bronze CuSn5ZnPb (Rg5)					-		
	flange	-					Ductile iron EN-GJS-400-18-LT (GGG 40.3)		
Valve seat		Stainless steel, mat. No. 1.4571							
Valve cone		Dezincing free brass CuZn36Pb2As							
Sealing		EPDM							

[1] $k_v/k_{VS} \leq 0.5$ at DN 25 and higher

Valve (AVDS)

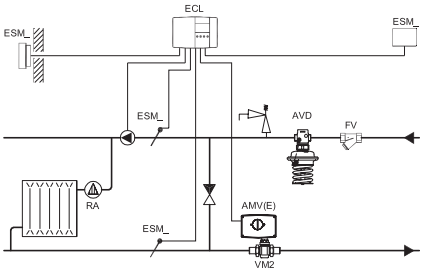
Nominal diameter	**DN**	**15**			**20**	**25**
k_{VS} value	m^3/h	1,0	1,6	3,2	4,5	6,3
Cavitation factor z [1]		≥ 0,6				
Nominal pressure	PN	25				
Max. differential pressure	bar	10				
Medium		Steam / Circulation water / glycolic water up to 30 %				
Medium pH		Min. 7, max. 10				
Medium temperature	°C	2 … 200				
Connections	valve	External thread				
	tailpieces	Weld-on, external thread and flange				
Materials						
Valve body		Red bronze CuSn5ZnPb (Rg5)				
Valve seat		Stainless steel, mat. No. 1.4571				
Valve cone		Stainless steel, mat. No. 1.4122				

[1] $k_v/k_{VS} \leq 0,5$ at DN 25 and higher

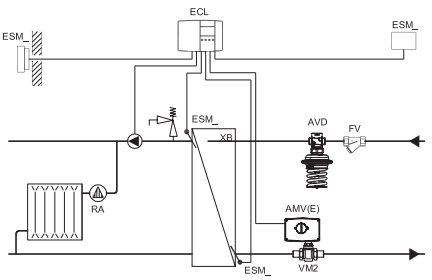
Actuator

Actuator size		**cm²**	**54**	
Nominal pressure		PN	25	
Diff. pressure setting ranges and spring colours		bar	1-5	3-12
			blue	black, green
Materials				
Actuator housing	Upper casing of diaphragm		Stainless steel, mat. No.1.4301	
	Lower casing of diaphragm		Dezincing free brass CuZn36Pb2As	
Diaphragm			EPDM	
Impulse tube			Copper tube Ø 6 × 1 mm	

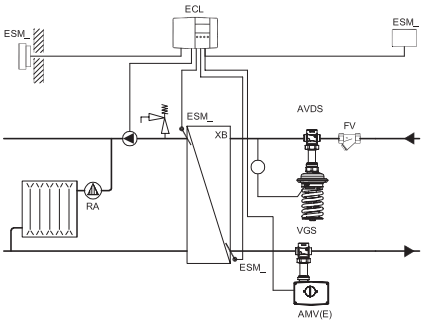
Application principles



Direct-connected heating system

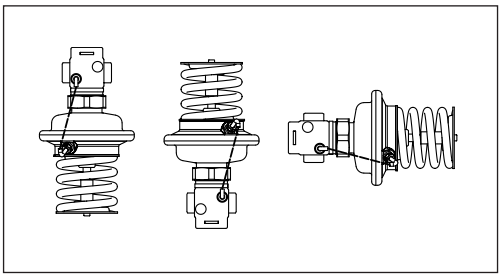


Indirectly connected heating system

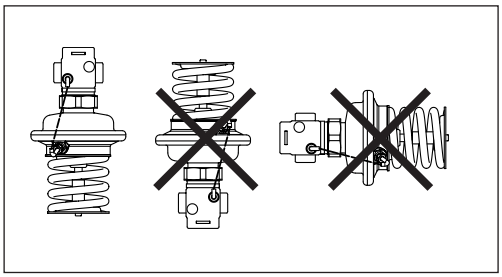


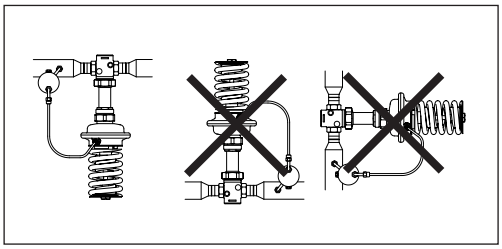
Installation positions

Up to medium temperature of 100 °C the controllers can be installed in any position (valid for AVD controller only).



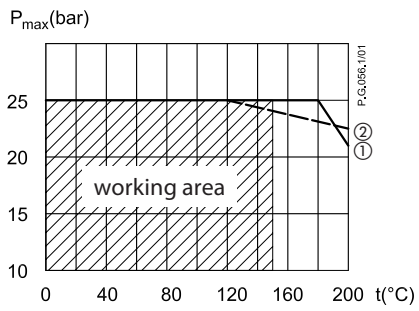
For higher temperatures (valid for AVD controller) and **always** in steam applications (AVDS controller) the controllers have to be installed in horizontal pipes only, with a pressure actuator oriented downwards.



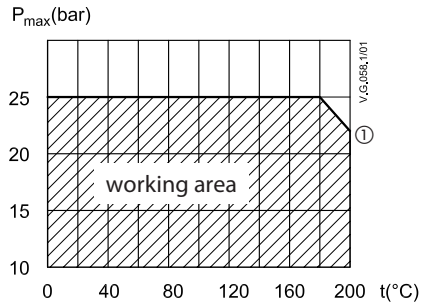


Pressure temperature diagram

AVD



AVDS



① *CuSn5ZnPb (Rg5) PN 25*
② *EN-GJS-400-18-LT (GGG 40.3) PN 25*

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

Sizing

Pressure reduction controller has to control 6,0 bar behind the controller. Max. flow through the system is less than 2,0 m^3/h, min. flow pressure is 7,5 bar.

Given data:
Q_{max} = 2,0 m^3/h
$p_{1\,min}$ = 7,5 bar
$p_{reduced}$ = 6,0 bar

Nominal pressure PN 25

The min. differential pressure across the controller is calculated from the formula:

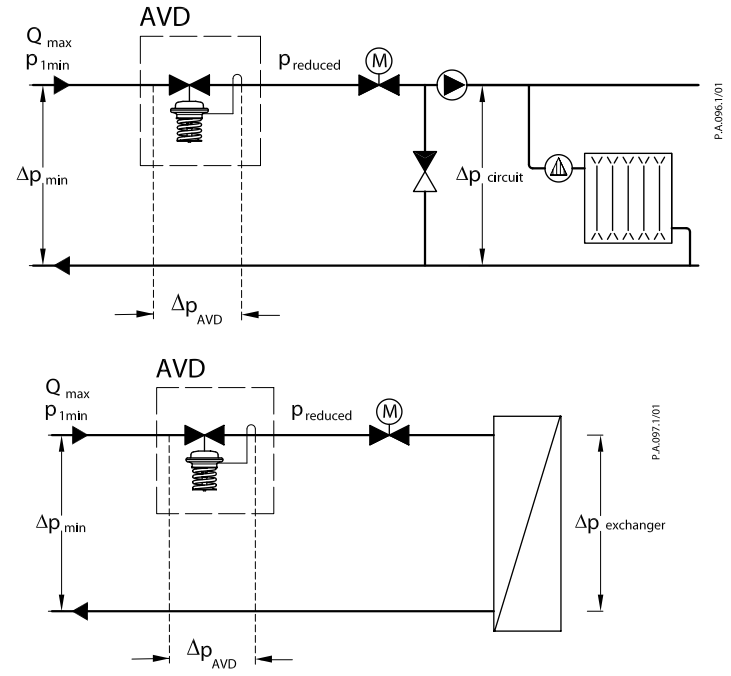
$\Delta p_{AVD} = p_{1\,min} - p_{reduced} = 7,5 - 6,0$

Δp_{AVD} = 1,5 bar
k_v value is calculated according to formula:

$$k_v = \frac{Q_{max}}{\sqrt{\Delta p_{AVD}}} = \frac{2,0}{\sqrt{1,5}}$$

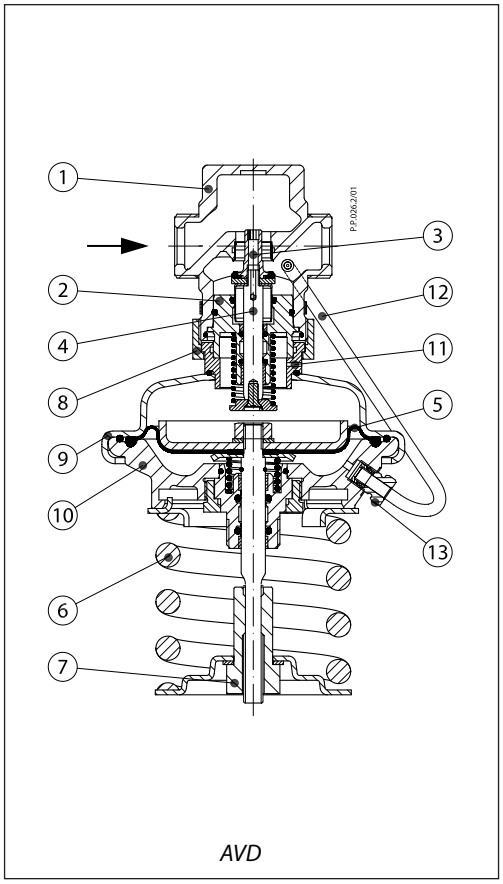
k_v = 1,6 m^3/h

Solution:
The example selects AVD DN 15, k_{VS} value 4,0, with pressure setting range 3-12 bar

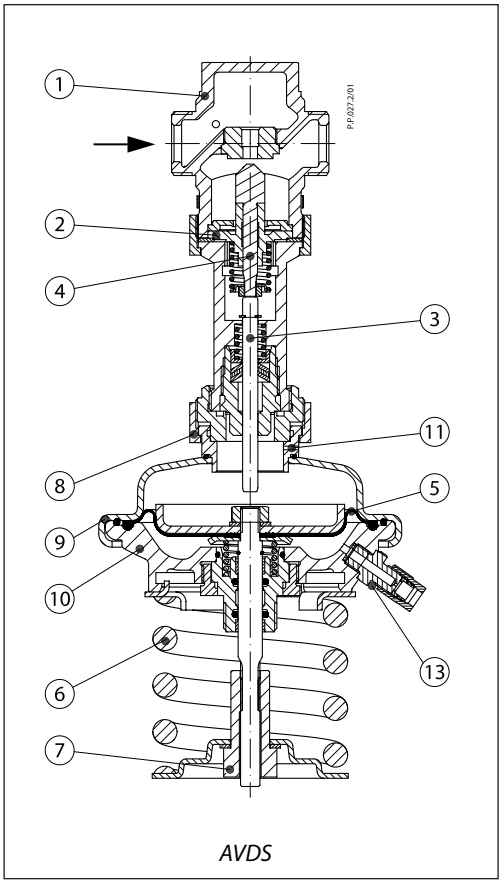


Design

1. Valve body
2. Valve insert
3. Pressure relieved valve cone
4. Valve stem
5. Control diaphragm
6. Setting spring for pressure control
7. Adjuster for pressure setting, prepared for sealing
8. Union nut
9. Upper casing of diaphragm
10. Lower casing of diaphragm
11. Air space bore
12. Impulse tube
13. Compression fitting for impulse tube



AVD



AVDS

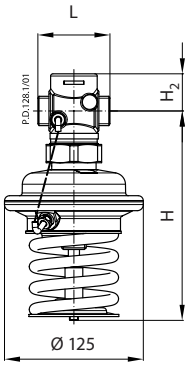
Function

The pressure behind of the control valve is being transferred through the impulse tube to the actuator chamber and act on control diaphragm. On the other side of the diaphragm atmospheric pressure is acting. Control valve is normally opened. It closes on rising pressure and opens on falling pressure to maintain constant pressure.

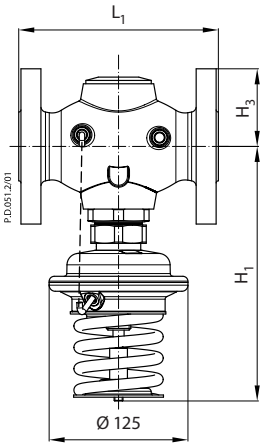
Settings

Pressure setting
Pressure setting is being done by the adjustment of the setting spring for pressure control. The adjustment can be performed on the basis of pressure adjustment diagram (see relevant instructions) and/or pressure indicator.

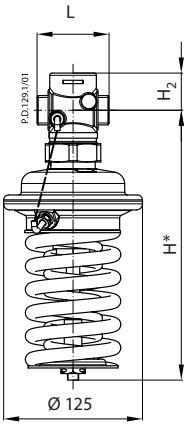
Dimensions



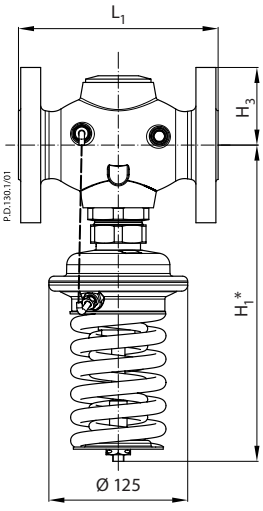
AVD
DN 15-25
Δp = 1-5 bar



AVD
DN 32-50
Δp = 1-5 bar



AVD
DN 15-25
Δp = 3-12 bar

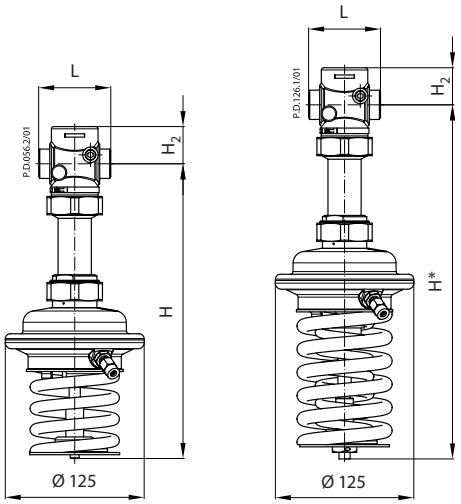


AVD
DN 32-50
Δp = 3-12 bar

DN		15	20	25	32	40	50
L	mm	65	70	75	-	-	-
L_1		-	-	-	180	200	230
H		189	189	189	-	-	-
H*		243	243	243	-	-	-
H_1		-	-	-	231	231	231
H_1*		-	-	-	285	285	285
H_2		34	34	37	-	-	-
H_3		-	-	-	70	75	82
Weight (1-5 bar)	kg	3,5	3,5	3,7	10,2	11,8	13,9
Weight (3-12 bar)		3,7	3,7	3,8	10,4	11,9	14,0

Note: *Other flange dimensions - see table for tailpieces.*

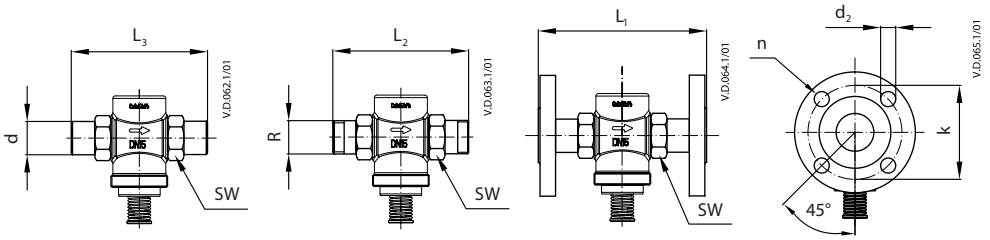
Dimensions *(continuous)*



AVDS
DN 15-25
Δp = 1-5 bar

AVDS
DN 15-25
Δp = 3-12 bar

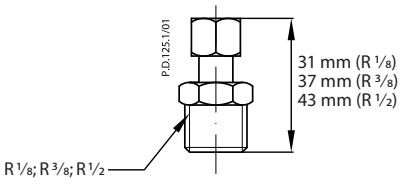
DN		15	20	25
L	mm	65	70	75
H		266	266	266
H*		320	320	320
H_2		34	34	37
Weight (1-5 bar)	kg	3,5	3,5	3,7
Weight (3-12 bar)		3,7	3,7	3,9



DN		15	20	25	32	40	50
SW	mm	32 (G ¾A)	41 (G 1A)	50 (G 1¼A)			
d		21	26	33			
R [1]		½	¾	1			
L1 [2]		130	150	160			
L2		131	144	160			
L3		139	154	159			
k		65	75	85	100	110	125
d_2		14	14	14	18	18	18
n		4	4	4	4	4	4

[1] *Conical ext. thread acc. to EN 10226-1*
[2] *Flanges PN 25, acc. to EN 1092-2*

Compression fittings



Seal pot