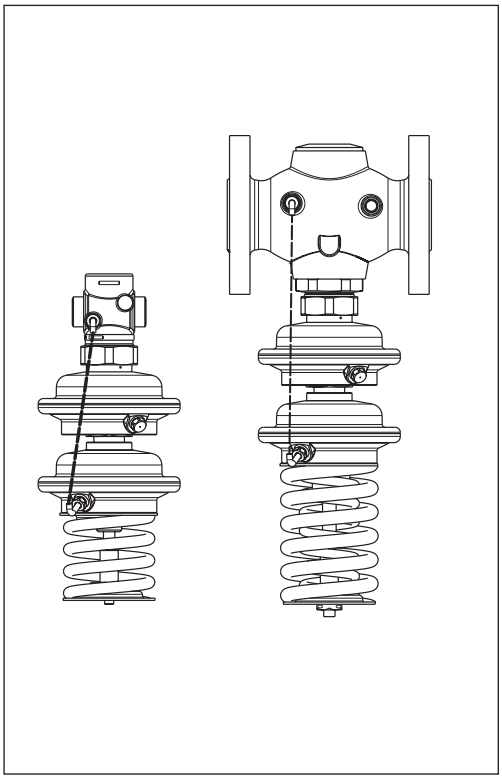
Data sheet

Safety pressure reduction controller SAVD (PN 25)

Description



The controller is a self-acting safety pressure reduction controller primarily for use in district heating systems. The controller is normally opened and closes on rising pressure. It is used for pressure reduction control and as a protection against excess pressure behind the valve.

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

Design-tested according to DIN 4747 (SAV) and the AGFW guide lines.

Main data:

- DN 15 - 50
- k_{vs} 4.0 - 25 m³/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

Ordering

Example:
Safety pressure reduction controller, DN 15, k_{vs} 4.0, PN 25, setting range 1 - 5 bar, t_{max} 150 °C, ext. thread

- *SAVD DN 15 controller*
  Code No: ***003H6693***

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

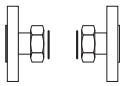
The controller will be delivered completely assembled, inclusive impulse tube between valve and actuator.

SAVD Controller

Picture	DN (mm)	k_{vs} (m³/h)	Connection		Δp setting range (bar)	Code No.	Δp setting range (bar)	Code No.
	15	4.0	Cylindr. ext. thread acc. to ISO 228/1	G ¾ A	1 - 5	**003H6693**	3 - 12	**003H6699**
	20	6.3		G 1 A		**003H6694**		**003H6700**
	25	8.0		G 1¼ A		**003H6695**		**003H6701**
	32	12.5		G 1¾ A		**003H6696**		**003H6702**
	40	16		G 2 A		**003H6697**		**003H6703**
	50	20		G 2½ A		**003H6698**		**003H6704**
	32	12.5	Flanges PN 25, acc. to EN 1092-2			**003H6705**		**003H6708**
	40	20				**003H6706**		**003H6709**
	50	25				**003H6707**		**003H6710**

Ordering *(continuous)*

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**
	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	4.0	**003H6873**
		20	6.3	**003H6874**
		25	8.0	**003H6875**
		32 / 40 / 50	12.5 / 16 / 20 / 25	**003H6876**

Picture	Type designation	Δp setting range (bar)	Code No.
	Actuator with setting spring	1 - 5	**003H6846**
		3 - 12	**003H6847**

Technical data

Valve

Nominal diameter		DN	15	20	25	32	40	50
k_{vs} value		m³/h	4.0	6.3	8.0	12.5	16/20 [1)]	20/25 [1)]
Cavitation factor z *			≥ 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			2 …150 °C					
Connections	valve		Thread			Thread and flange		
	tailpieces		Weld-on and flange			Weld-on		
			External thread				-	
Materials								
Valve body	thread		Red bronze CuSn5ZnPb (Rg5)			Ductile iron EN-GJS-400-18-LT (GGG 40.3)		
	flange		-					
Valve seat			Stainless steel, mat. No. 1.4571					
Valve cone			Dezincing free brass CuZn36Pb2As					
Sealing			EPDM					

** $k_v/k_{vs} \leq 0.5$ at DN 25 and higher*

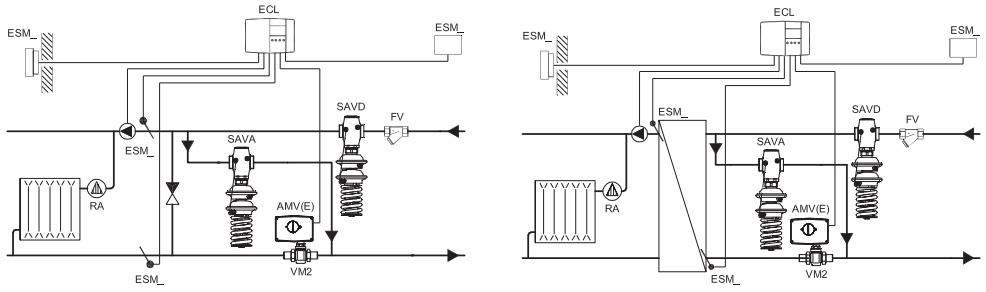
[1)] Flange valve body

Technical data *(continuous)*

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 Ø6 × 1 mm	

Application principles



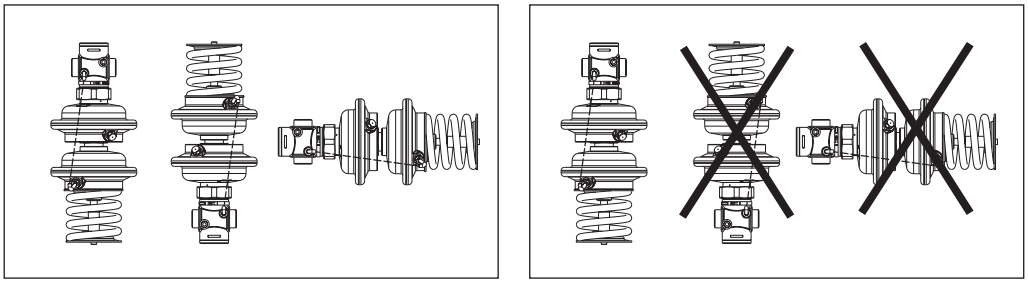
Direct-connected heating system

Indirectly connected heating system

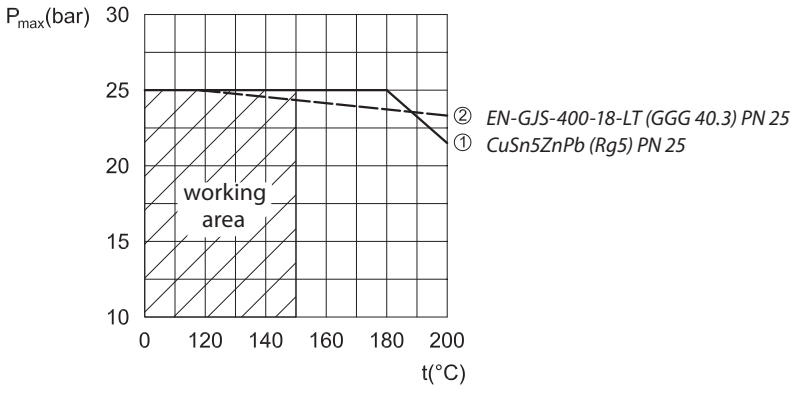
Installation positions

Up to medium temperature of 100°C the controllers can be installed in any position.

For higher temperatures the controllers have to be installed in horizontal pipes only, with a pressure actuator oriented downwards.



Pressure temperature diagram



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

Sizing

Safety pressure reduction controller has to control 5.0 bar behind the controller. Max. flow through the system is less than 2.2 m³/h, min. flow pressure is 6.2 bar.

Given data:
Q_{max} = 2.2 m³/h
$p_{1\ min}$ = 6.2 bar
$p_{reduced}$ = 5 bar

Nominal pressure PN 25

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

$\Delta p_{SAVD} = p_{1\ min} - p_{reduced} = 6.2 - 5.0$

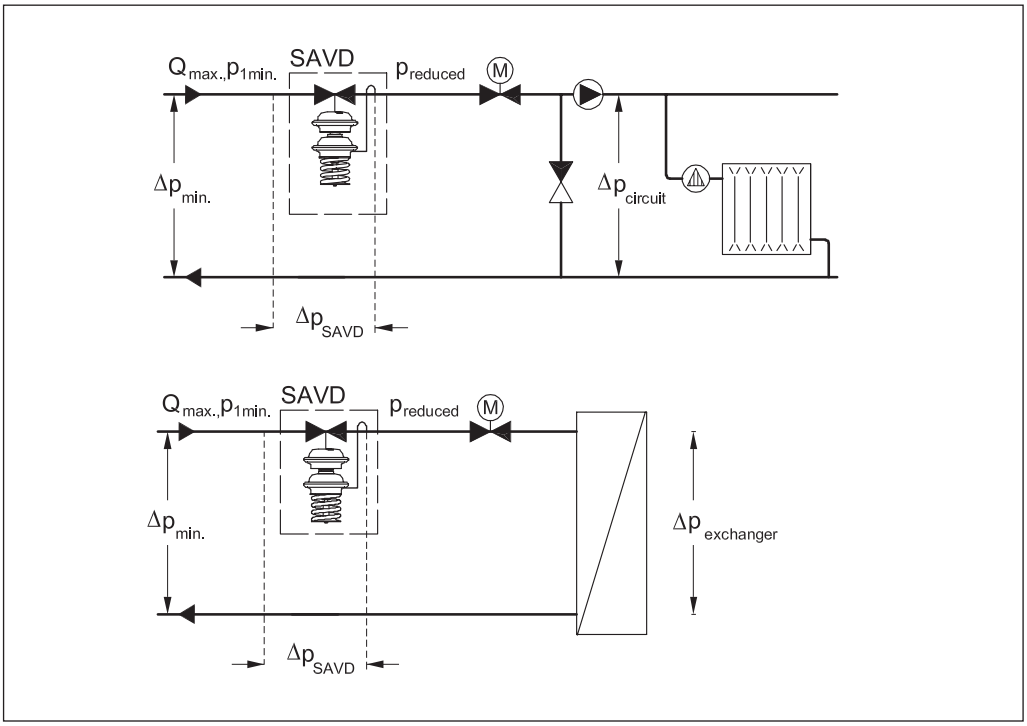
$\Delta p_{SAVD} = 1.2$ bar

k_v value is calculated according to formula:

$$k_v = \frac{Q_{max}}{\sqrt{\Delta p_{SAVD}}} = \frac{2.2}{\sqrt{1.2}}$$

$k_v = 2.0$ m³/h

Solution:
The example selects SAVD DN 15, k_{vs} value 4.0, with pressure setting range 1 - 5 bar.

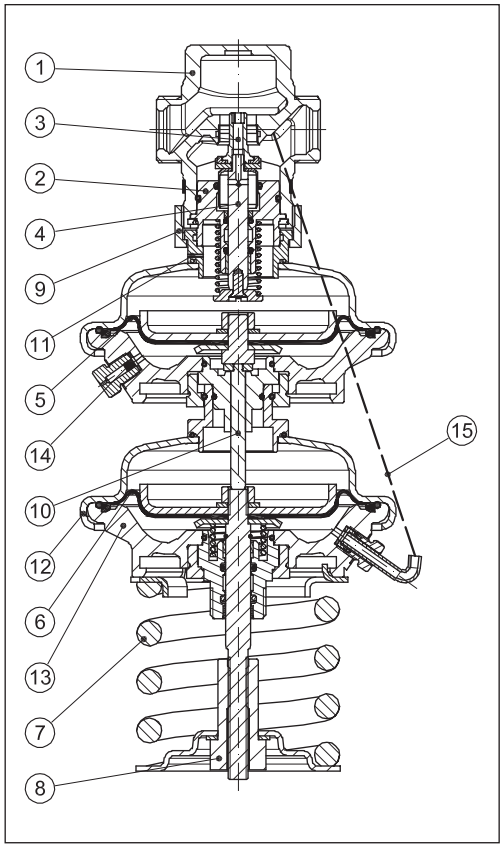


Sizing of Safety Valve SV or Safety Pressure Relief Valve SÜV

If pressure protection is performed by a safety pressure reduction controller (SAV) the downstream safety units (safety valve SV or safety pressure relief valve SÜV) must be designed for a flow rate of at least 1 % of the k_{vs} value of the safety pressure reduction controller (SAV). More details see in standard DIN 4747-1.

Design

1. Valve body
2. Valve insert
3. Pressure relieved valve cone
4. Valve stem
5. Safety diaphragm
6. Control diaphragm
7. Setting spring for pressure control
8. Adjuster for pressure setting, prepared for sealing
9. Union nut
10. Connection stem
11. Air space bore
12. Upper casing of diaphragm
13. Lower casing of diaphragm
14. Threaded joint with sintering filter
15. Impulse tube



Function

Mode of Operation
The safety pressure reduction controller controls the pressure and protects the system against excess pressure behind the valve. The valve cone is softsealed and pressure balanced.

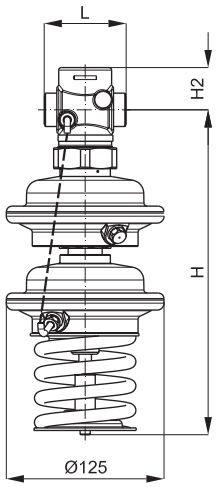
Control function
The pressure behind the control valve is being transferred through the impulse tube into the lower (+) chamber of the control diaphragm. The pressure generates a force on the control diaphragm which counteracts the force of the setting spring. This difference in forces act through the connection stem and the valve stem upon the valve cone. The valve closes when the pressure behind the valve rises and opens when the pressure decreases.

Safety function in case of diaphragm break
If the control diaphragm breaks, pressure gets in the two intermediate chambers. This pressure acts upon the safety diaphragm and causes the valve to close. The control function does not operate. A slight water leakage at the threaded joint on the safety diaphragm indicates a break of the control diaphragm.

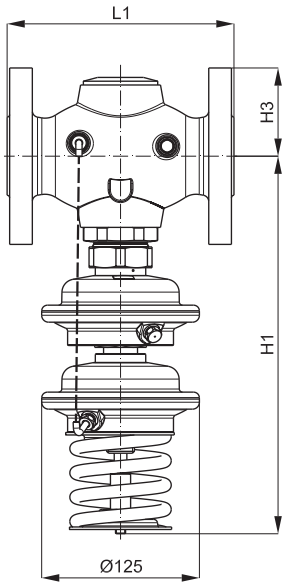
Settings

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



DN 15 - 50
Δp = 1 - 5 bar



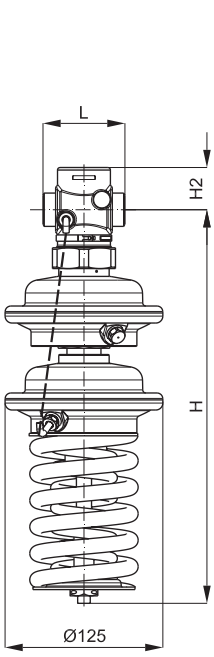
DN 32 - 50
Δp = 1 - 5 bar

SAVD (Δp = 1 - 5 bar)

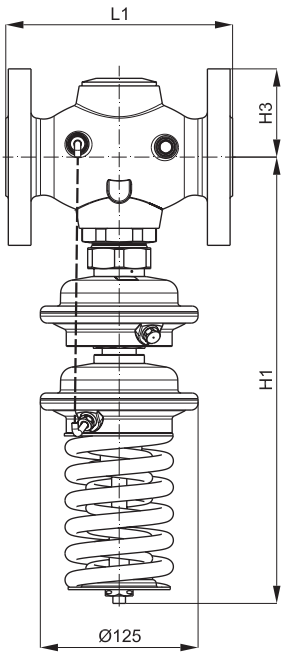
DN		15	20	25	32	40	50
L	mm	65	70	75	100	110	130
L1		-	-	-	180	200	230
H		257	257	257	299	299	299
H1		-	-	-	299	299	299
H2		34	34	37	62	62	62
H3		-	-	-	70	75	82
Weight (thread)	kg	5.2	5.3	5.5	7.5	7.6	8.3
Weight (flange)		-	-	-	12.0	13.5	15.6

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

Dimensions *(continuous)*



DN 15 - 50
Δp = 3 - 12 bar

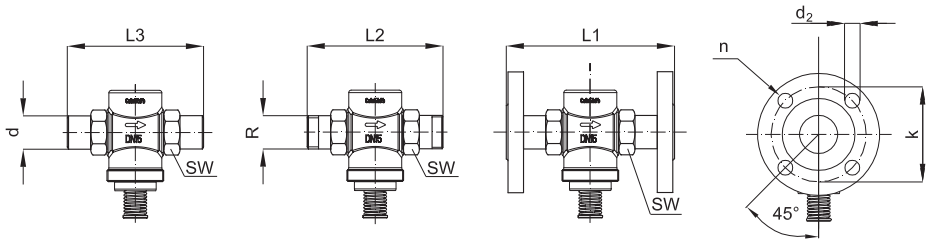


DN 32 - 50
Δp = 3 - 12 bar

SAVD (Δp = 3 - 12 bar)

DN		15	20	25	32	40	50
L	mm	65	70	75	100	110	130
L1		-	-	-	180	200	230
H		313	313	313	355	355	355
H1		-	-	-	355	355	355
H2		34	34	37	62	62	62
H3		-	-	-	70	75	82
Weight (thread)	kg	5.4	5.4	5.6	7.7	7.8	8.5
Weight (flange)		-	-	-	12.1	13.7	15.8

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



DN		15	20	25	32	40	50
SW	mm	32 (G ¾A)	41 (G 1A)	50 (G 1¼A)	63 (G 1¾A)	70 (G 2A)	82 (G 2½A)
d		21	26	33	42	47	60
R [1)]		½	¾	1	1 ¼	-	-
L1[2)]		130	150	160	-	-	-
L2		131	144	160	177	-	-
L3		139	154	159	184	204	234
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*