Data sheet

Safety pressure relief controller SAVA (PN 25)

Description

SAVA is a self-acting safety pressure relief controller primarily for use in district heating systems.

The controller is normally closed and opens on rising pressure. It is used for pressure relief control and as a protection against excess pressure in front of 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 AGFW guidelines FW 504.

Main data:

- DN 15-50
- k_{VS} 4,0-25 m^3/h
- PN 25
- Setting range:
  1,0-4,5/2,0-7,5/3-11 bar
- Temperature:
  - Circulation water / glycolic water up to 30 %:
    2 … 150 °C
- Connections:
  - Ext. thread (weld-on, ext. thread and flange tailpieces)
  - Flange

Ordering

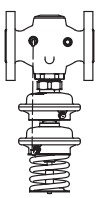
Example:
Safety pressure relief controller, DN 15; k_{VS} 4,0; PN 25; setting range 1,0-4,5 bar; T_{max} 150 °C; ext. thread

- *SAVA DN 15 controller*
  Code No: ***003H6675***

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

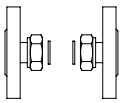
The controller will be delivered completely assembled, inclusive impulse tube between valve and actuator.

SAVA Controller

	DN (mm)	k_{VS} (m^3/h)	Connection		Δp setting range (bar)	Code No.
	15	4,0	Cylindr. ext. thread acc. to ISO 228/1	G ¾ A	1,0-4,5	003H6675
	20	6,3		G 1 A		003H6676
	25	8,0		G 1¼ A		003H6677
	32	12,5		G 1¾ A		003H6678
	40	16		G 2 A		003H6679
	50	20		G 2½ A		003H6680
	15	4,0		G ¾ A	2-7,5	003H6960
	20	6,3		G 1 A		003H6961
	25	8,0		G 1¼ A		003H6962
	32	12,5		G 1¾ A		003H6963
	40	16		G 2 A		003H6964
	50	20		G 2½ A		003H6965
	15	4,0		G ¾ A	3-11	003H6681
	20	6,3		G 1 A		003H6682
	25	8,0		G 1¼ A		003H6683
	32	12,5		G 1¾ A		003H6684
	40	16		G 2 A		003H6685
	50	20		G 2½ A		003H6686
	32	12,5	Flanges PN 25, acc. to EN 1092-2		1,0-4,5	003H6687
	40	20				003H6688
	50	25				003H6689
	32	12,5			2-7,5	003H6966
	40	20				003H6967
	50	25				003H6968
	32	12,5			3-11	003H6690
	40	20				003H6691
	50	25				003H6992

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**
		40		R 1½	**065B2004**
		50		R 2	**065B2005**
	Flange tailpieces	15	Flanges PN 25, acc. to EN 1092-2		**003H6915**
		20			**003H6916**
		25			**003H6917**

Service kits

Picture	Type designation	Δp setting range (bar)	Code No.
	Actuator with setting spring	1,0-4,5	**003H6846**
		3-11	**003H6847**

Technical data

Valve

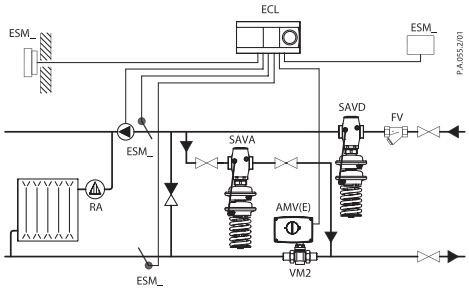
Nominal diameter		DN	15	20	25	32	40	50
k_{VS} value		m^3/h	4,0	6,3	8,0	12,5	16/20[1]	20/25[1]
Cavitation factor z[2]			≥ 0,6					
Nominal pressure		PN	25					
Max. differential pressure		bar	20			16		
Medium			Circulation water / glycolic water up to 30 %					
Medium pH			Min. 7, max. 10					
Medium temperature		°C	2 …150					
Connections	valve		Ext. thread			Ext. 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					

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

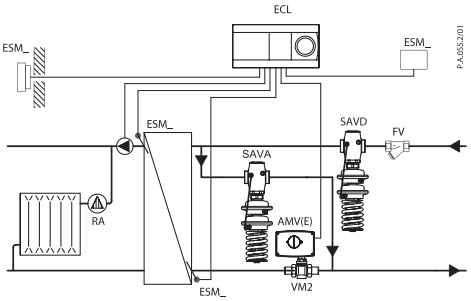
Actuator

Actuator size		cm^2	54		
Nominal pressure		PN	25		
Diff. pressure setting ranges and spring colours		bar	1,0-4,5	2-7,5	3-11
			blue	black	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

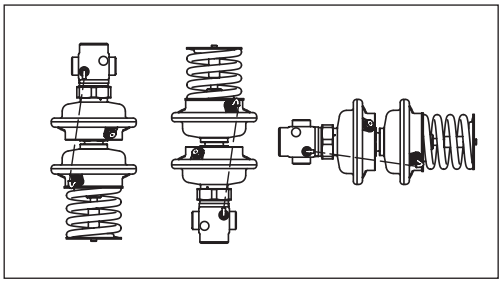


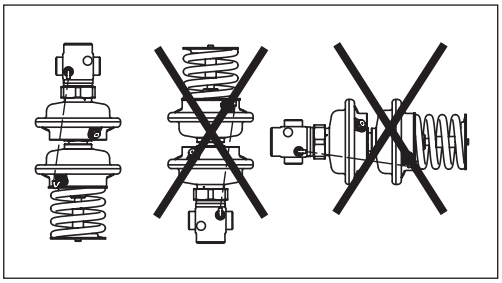
Indirectly connected heating system

Installation positions

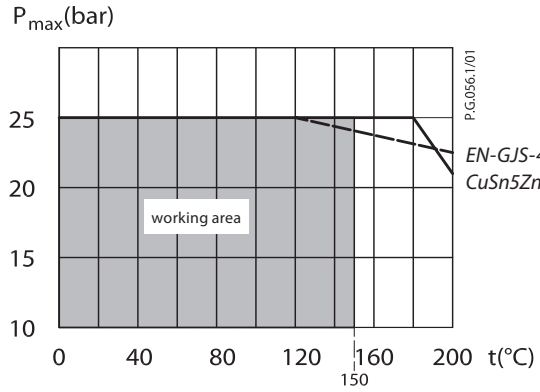
Up to medium temperature of 100 °C the controllers can be installed in any position.

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





Pressure temperature diagram



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

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

Sizing

Given data:
Q_{max} = 2,2 m³/h
Δp_{min} = 1,4 bar

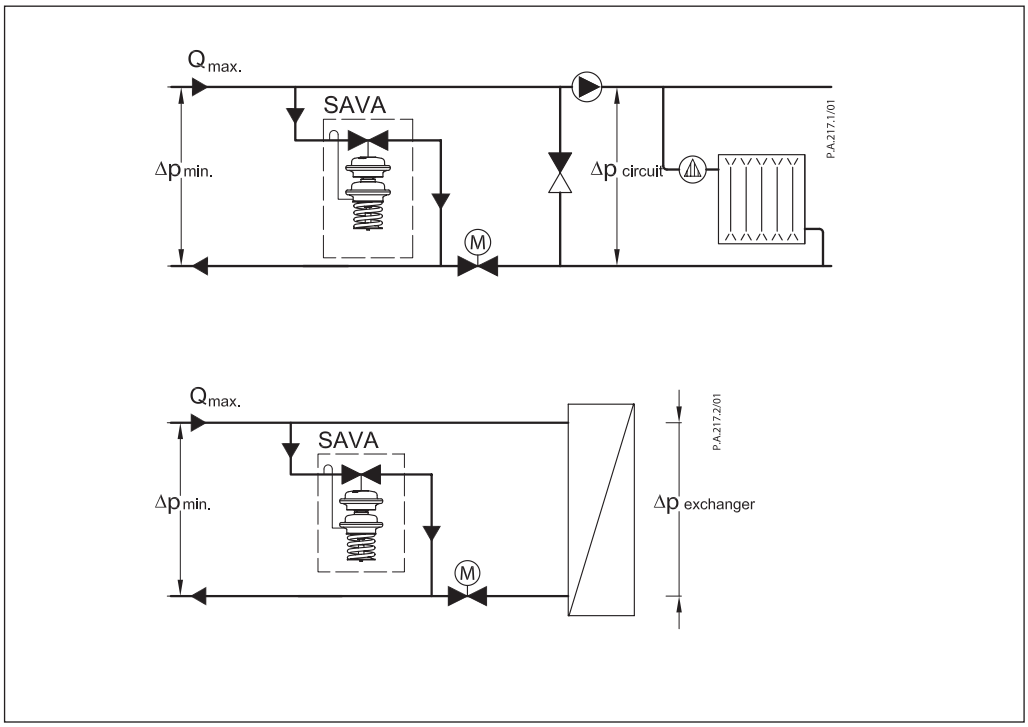
Nominal pressure PN 25

k_v value is calculated according to formula:

$$k_v = \frac{Q_{max}}{\sqrt{\Delta p_{min}}} = \frac{2,2}{\sqrt{1,4}}$$

k_v = 1,9 m³/h

Solution:
The example selects SAVA DN 15, k_{VS} value 4,0;
with pressure setting range 1,0-4,5 bar.

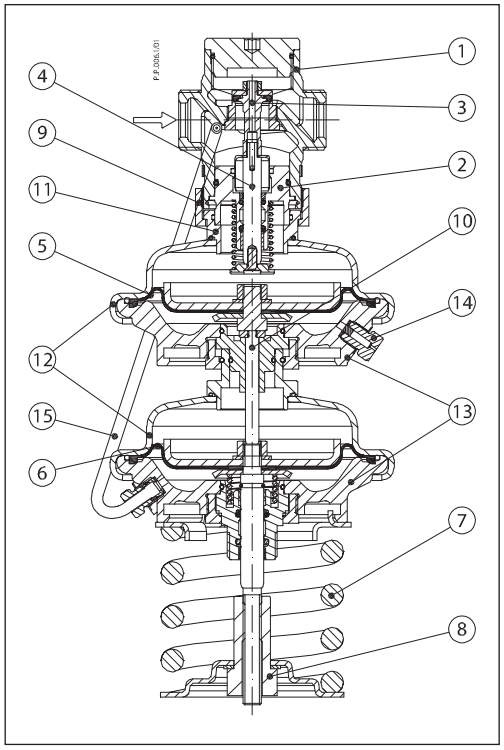


Sizing of Safety Valve SV or Safety Pressure Relief Valve SÜV

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 relief controller controls the pressure and protects the system against excess pressure in front of the valve. The valve cone is softsealed and pressure balanced.

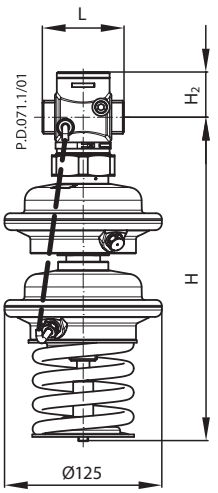
Control function
The pressure in front of the control valve is being transferred through the impulse tube into the lower (+) chamber of the control diaphragm. The pressure generates a force on the control diaphragm which counteracts the force of the setting spring. This difference in forces acts through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

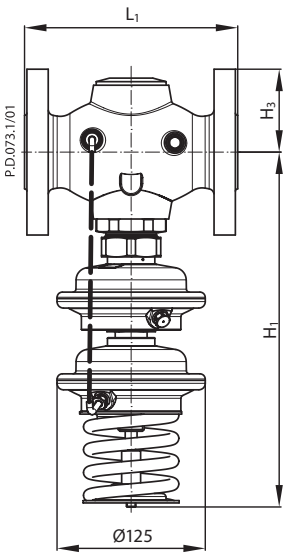
Settings

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 = 1,0-4,5 bar



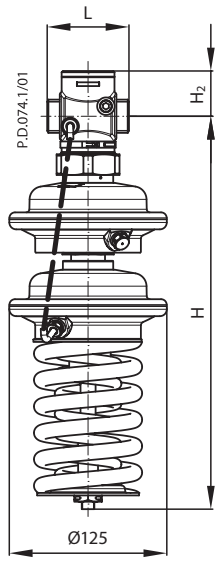
DN 32-50
Δp = 1,0-4,5 bar

SAVA (Δp = 1,0-4,5 bar)

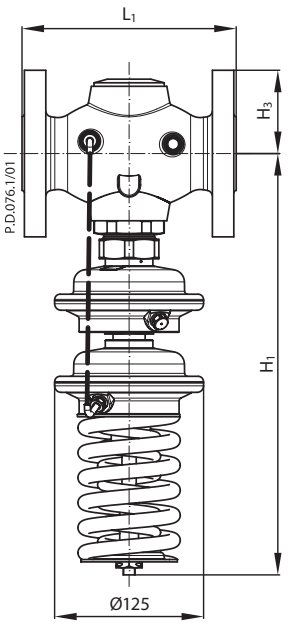
DN		15	20	25	32	40	50
L	mm	65	70	75	100	110	130
L_1		-	-	-	180	200	230
H		257	257	257	299	299	299
H_1		-	-	-	299	299	299
H_2		34	34	37	62	62	62
H_3		-	-	-	70	75	82
Weight (thread)	kg	5,3	5,3	5,5	7,5	7,7	8,4
Weight (flange)		-	-	-	12,2	13,7	15,6

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

Dimensions *(continuous)*



DN 15-50
Δp = 2-7,5 & 3-11 bar

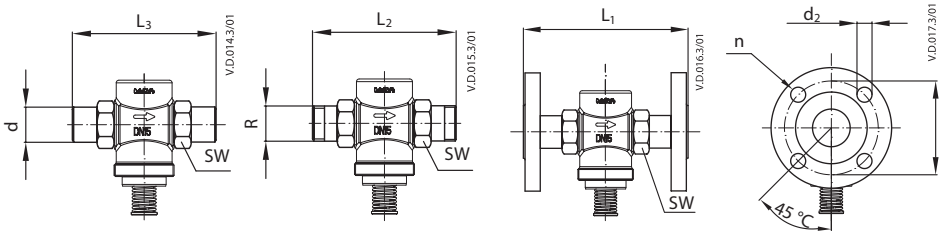


DN 32-50
Δp = 2-7,5 & 3-11 bar

SAVA (Δp = 2-7,5 & 3-11 bar)

DN		15	20	25	32	40	50
L	mm	65	70	75	100	110	130
L_1		-	-	-	180	200	230
H		313	313	313	355	355	355
H_1		-	-	-	355	355	355
H_2		34	34	37	62	62	62
H_3		-	-	-	70	75	82
Weight (thread)	kg	5,4	5,4	5,6	7,7	7,8	8,5
Weight (flange)		-	-	-	12,3	13,9	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	1 ½	2
L_1 [2)]		130	150	160	-	-	-
L_2		131	144	160	177	195	252
L_3		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*