

## BUG: 3-way flanged valve, PN 25/16 (el.)

### How energy efficiency is improved

Efficiency means precise and reliable control

### Features

- Continuous control of cold and hot water in closed circuits
- In combination with valve actuators AVM 322(S), AVM 234S, AVN 224S and AVF 234S as control unit
- Water quality as per VDI 2035
- Valve with flange connection as per EN 1092-2, seal form B
- Nominal pressure 25 bar; except BUG065F316, nominal pressure 16 bar
- Complies with standard for control units as per DIN EN 14597 <sup>1)</sup>
- Regulating valve, free of silicone grease, painted black
- Equal-percentage characteristic, can be set with SUT valve actuators to linear or quadratic
- The control passage is closed when the spindle is moved out
- Can be used as a control valve or a distribution valve
- Valve body of ductile cast iron
- Stainless-steel seat and spindle
- Plugs of nominal diameter DN 15...50 made of stainless steel with glass-fibre-reinforced PTFE sealing ring
- Plugs of nominal diameter DN 65...150 made of stainless steel with metal-to-metal seal
- Maintenance-free stuffing box in brass with spring-loaded PTFE washer

### Technical data

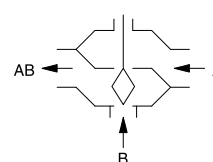
Parameters		
	Nominal pressure	PN16/25
	Connection	Flange as per EN 1092-2, form B
	Control ratio	> 50 : 1
	Valve characteristic, control passage	Equal-percentage
	Valve characteristic, mixing passage	Linear
Leakage rate at max. $\Delta p_s$	Leakage rate of control passage	$\leq 0.05\%$ of $k_{VS}$ value
	Leakage rate, mixing passage	$\leq 1.0\%$ of $k_{VS}$ value
Ambient conditions		
	Operating temperature <sup>2)</sup>	30...200 °C
	Operating pressure	PN 16: 30 °C, 16 bar At 120 °C, 16 bar At 200 °C, 14 bar PN 25: 30 °C, 25 bar Up to 120 °C, 25 bar At 200 °C, 21.7 bar
Standards and directives		
	Pressure and temperature data	EN 764, EN 1333
	Flow parameters	EN 60534
	Test marks	TÜV ID: 0000018388

<sup>1)</sup> The BUG065F316 valve does not have TÜV approval. It does not bear the test institute code and is classified under category I of the Directive on Pressure Equipment. These valves can be used with the AVN224SF\*\*\* actuator, but not as a safety device. Use stuffing box heater at temperatures below 0 °C; use the relevant adaptor (accessory) at temperatures above 130 °C or 180 °C. Down to -10 °C, as per AD code of practice W 10, use water with anti-freeze and brine solution. For use as per DIN/EN 14597. Valve combined with AVN 224S, admissible media temperature > 0 °C.

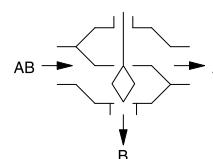
<sup>2)</sup> For cold water applications below 30 °C, use versions BUG\*\*\*F3\*\*S with a stuffing box containing silicone (e.g.: BUG015F304S). The BUG\*\*\*F3\*\*S valves do not comply with the standard for control units as per DIN EN 14597. BUG\*\*\*F3\*\*S are only available up to DN125. Use stuffing box heater at temperatures below 0 °C; use the relevant adaptor (accessory) at temperatures above 130 °C or 180 °C. Down to -10 °C, as per AD code of practice W 10, use water with anti-freeze and brine solution.



BUG032F304



Control valve



Distribution valve



## Overview of types

Type	Nominal diameter	$k_{VS}$ value	Valve stroke	Connection	Weight
BUG015F334	DN 15	1 m³/h	20 mm	PN 25/16	3.1 kg
BUG015F324	DN 15	1.6 m³/h	20 mm	PN 25/16	3.1 kg
BUG015F314	DN 15	2.5 m³/h	20 mm	PN 25/16	3.1 kg
BUG015F304	DN 15	4 m³/h	20 mm	PN 25/16	3.1 kg
BUG020F304	DN 20	6.3 m³/h	20 mm	PN 25/16	4 kg
BUG025F304	DN 25	10 m³/h	20 mm	PN 25/16	4.7 kg
BUG032F304	DN 32	16 m³/h	20 mm	PN 25/16	7.2 kg
BUG040F304	DN 40	25 m³/h	20 mm	PN 25/16	9.2 kg
BUG050F304	DN 50	40 m³/h	20 mm	PN 25/16	11.9 kg
BUG065F316	DN 65	63 m³/h	40 mm	PN 16	26.8 kg
BUG065F304	DN 65	63 m³/h	40 mm	PN 25	27.1 kg
BUG080F304	DN 80	100 m³/h	40 mm	PN 25/16	36.3 kg
BUG100F304	DN 100	160 m³/h	40 mm	PN 25	53 kg
BUG125F304	DN 125	250 m³/h	40 mm	PN 25	79.1 kg
BUG150F304	DN 150	340 m³/h	40 mm	PN 25	108.7 kg

## Accessories

Type	Description
0372336180	Adapter (required when temperature of the medium is 130...150 °C) from DN 65
0372336240	Adaptor (required when temperature of the medium is 180...240 °C)
0378284100	Stuffing box heater 230V~, 15 W for medium below 0 °C
0378284102	Stuffing box heater 24V~, 15 W for medium below 0 °C
0378384001	Torsion protection DN 65...150
0560260001	Stuffing box for VUG/BUG for cold water application with grease containing silicone

## Combination of BUG with electrical actuators

**i** *Warranty: The technical data and pressure differences indicated here are applicable only in combination with SAUTER valve actuators. The warranty does not apply if used with valve actuators from other manufacturers.*

**i** *Definition of  $\Delta p_s$ : Maximum admissible pressure drop in the event of a malfunction (pipe break after the valve) at which the actuator reliably closes the valve by means of a return spring.*

**i** *Definition of  $\Delta p_{max}$ : Maximum admissible pressure drop in control mode at which the actuator reliably opens and closes the valve.*

## Pressure differences

Actuator	AVM322F120 AVM322F122	AVM322SF132	AVM234SF132	AVF234SF132 AVF234SF232	AVN224SF132 AVN224SF232
Actuating power	1000 N	1000 N	2500 N	2000 N	1100 N
Control signal	2-/3-point	2-/3-pt., 0...10 V, 4...20 mA	2-/3-pt., 0...10 V, 4...20 mA	2-/3-pt., 0...10 V, 4...20 mA	2-/3-pt., 0...10 V, 4...20 mA
Running time DN 15...50	120/240 s	80/120 s	40/80/120 s	40/80/120 s	40/80/120 s
Running time DN 65...150	—	—	80/160/240 s	80/160/240 s	80/160/240 s

 $\Delta p$  [bar]

As control valve	$\Delta p_{max}$	$\Delta p_{max}$	$\Delta p_{max}$	$\Delta p_{max}$	$\Delta p_s$	$\Delta p_{max}$	$\Delta p_s$
BUG015F334 BUG015F324 BUG015F314 BUG015F304 BUG020F304	16.0	16.0	16.0	16.0	25.0	16.0	25.0
BUG025F304	15.2	15.2	16.0	16.0	25.0	16.0	17.0
BUG032F304	9.4	9.4	16.0	16.0	21.0	10.5	10.5
BUG040F304	6.1	6.1	16.0	13.5	13.5	6.5	6.5
BUG050F304	4.0	4.0	11.0	8.5	8.5	4.0	4.0

Actuator	AVM322F120 AVM322F122	AVM322SF132	AVM234SF132	AVF234SF132 AVF234SF232	AVN224SF132 AVN224SF232		
BUG065F316	—	—	7.1	5.6	5.6	—	—
BUG065F304	—	—	7.1	5.6	5.6	3.0	3.0
BUG080F304	—	—	4.7	3.4	3.4	2.0	2.0
BUG100F304	—	—	3.0	2.2	2.2	1.1	1.1
BUG125F304	—	—	2.0	1.6	1.6	0.8	0.8
BUG150F304	—	—	1.5	1.2	1.2	0.6	0.6

#### As distribution valve

BUG015F334							
BUG015F324							
BUG015F314							
BUG015F304	6.0	6.0	6.0	6.0	25.0	6.0	25.0
BUG020F304							
BUG025F304							
BUG032F304							
BUG040F304	5.5	5.5	6.0	6.0	25.0	6.0	25.0
BUG050F304	3.5	3.5	6.0	6.0	25.0	4.0	25.0
BUG065F316	—	—	4.5	4.5	25.0	—	—
BUG065F304	—	—	4.5	4.5	25.0	2.6	25.0
BUG080F304	—	—	3.5	3.4	25.0	1.7	25.0
BUG100F304	—	—	3.0	2.2	25.0	1.1	25.0
BUG125F304	—	—	2.0	1.6	25.0	0.8	25.0
BUG150F304	—	—	1.0	1.0	25.0	0.6	25.0

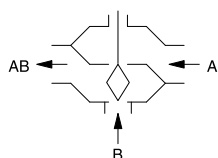
💡 At temperatures above 130 °C, accessories are required

💡 Combination with AVN 224S: with safety function as per DIN 32730 and DIN EN 14597

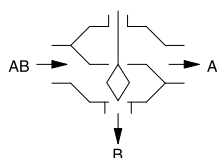
### Description of operation

The valve can be moved to any intermediate position with an electric actuator. When the spindle is moved out, the control passage of the valve is closed. These valves may be used as control valves or distribution valves. The direction of flow on the valve must be considered, or must be pasted over when “using as a distribution valve” (adhesive to be found in fitting instructions). The flow parameters correspond to EN 60534.

#### Used as a control valve



#### Used as a distribution valve



These control valves are characterised by their reliability and precision and make an important contribution towards efficient regulation. They meet difficult challenges such as the safety functions, overcoming high differential pressures, controlling medium temperatures and performing the shut-off function, all with a low noise level.

The valve spindle is automatically and firmly connected to the actuator spindle. The de luxe stainless steel SAUTER plug controls the equal-percentage flow rate. To compensate for the complementary characteristic of the consumer and ensure a constant quantity of medium regardless of the valve position, the mixing passage acts with a linear characteristic. The tightness of the valve is ensured by the stainless steel ring pressed in the housing and the corresponding plug.

The stuffing box is maintenance-free. This consists of 6 tapered PTFE rings and a spring. The spring ensures permanent tension on the seals, thus guaranteeing that they are leaktight against the spindle. In addition, a grease reserve ensures that the spindle is constantly lubricated. The grease reserve also stops particles that are present in the medium from penetrating to the PTFE seal.

### Intended use

This product is only suitable for the purpose intended by the manufacturer, as described in the “Description of operation” section.

All related product documents must also be adhered to. Changing or converting the product is not admissible.

### Engineering and fitting notes

The valves are combined with the AVM 322(S) or AVM 234S valve actuators without a spring return or with the AVF 234S or AVN 224S valve actuators with a spring return. The actuator is mounted directly on the valve and fastened with screws. The actuator is connected with the valve spindle automatically. When the system is commissioned, the AVM 322(S), AVM 234 S and AVF 234 S actuator moves out and the connector automatically closes the connection to the valve when it reaches the lower valve seat. The stroke of the valve is also detected by the actuator, and no further adjustments are required. Therefore the force on the seat is always the same and the smallest amount of leakage is ensured. With the SUT actuators, the characteristic can be set to linear or quadratic as required. When using AVN 224 S valve actuators, the actuator must be initialised manually. For a more detailed description, see PDS 51.379 "Initialisation and feedback signal".

### Additional technical data

SAUTER slide rule for valve sizing	P100013496
Technical manual on control units	7 000477 001
Parameters, fitting notes, control, general information	Applicable EN, DIN, AD, TRD and UVV regulations
CE conformity as per PED 97/23/EC (fluid group II)	Category I
BUG065F316: CE label	Category IV, DIN 32730
BUG with AVN224SF132: CE-0035 label	Category II
BUG without AVN224SF132: CE-0035 label	
<b>Fitting instructions:</b>	
DN 15...15	MV 505947
DN 65...150	MV 505973
AVM 322	P100011900
AVM 234S	MV 505919
AVF 234S	MV 505920
AVN 224S	MV 505927
Declaration on materials and the environment	MD 56.121

### Fitting position

The control unit can be fitted in any position, but the hanging position is not recommended. Condensate, drops of water, etc. must be prevented from entering the actuator. With horizontal installation and no structural support for the actuator, the maximum admissible weight on the valve is 25 kg.

*At a medium temperature*

- **up to 130 °C:**
  - In any position except suspended.
- **over 130 °C:**
  - At temperatures of over 130 °C or over 180 °C, a horizontal fitting position is recommended, and the appropriate adaptor for the temperature must be used. The adaptor can also be used as an extension to come out of the pipe insulation with the actuator. To protect the actuator from excessive heat, the piping must be insulated.

When the actuator is mounted on the valve, make sure the plug is not twisted on the stainless steel seat (this can damage the sealing surface). When insulating the valve, it may only be insulated up to the connecting clip of the actuator.

### Using with water

So that impurities are retained in the water (welding beads, rust particles, etc.) and the plug seal is not damaged, we recommend installing collecting filters, for example one for each floor or pipe run. Requirements for water quality as per VDI 2035.

When using an additive in the water, the compatibility of the valve materials must be checked with the manufacturer of the medium. The materials table shown below may be used. When using glycol we recommend a concentration between 20% and 55%.

### Approval for DIN/EN 14597

With the exception of the BUG065F316/F310, the valves can be used together with the valve actuator with emergency function AVN 224S as per DIN/EN 14597.

### Other information regarding hydraulics and noise in systems

The valves can be used in a low-noise environment. To prevent noise, the pressure differences  $\Delta p_{\max}$  listed below should not be exceeded. These are listed as recommended values in the table of pressure losses.

The pressure difference  $\Delta p_v$  is the maximum pressure that may act on the valve regardless of the stroke position, in order that the risk of cavitation and erosion is limited. These values are irrespective of the actuator force. The cavitation accelerates wear on the plug and seat in the valve and causes noises. To prevent cavitation, the pressure differential on the valve should not exceed the value  $\Delta p_{\text{krit}}$ :

$$\Delta p_{\text{krit}} = (p_1 - p_v) \times 0.5$$

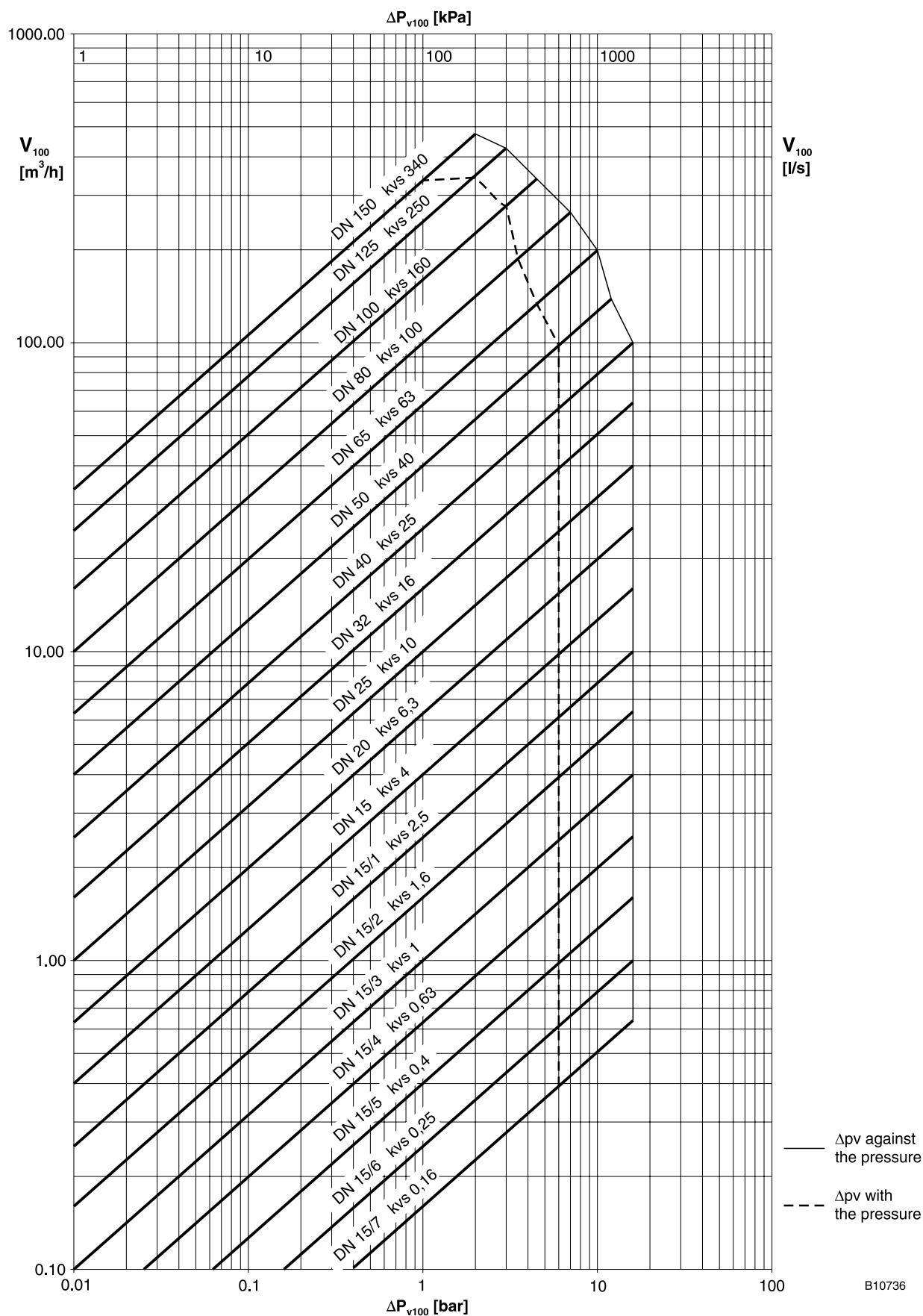
$p_1$  = upstream pressure before the valve (bar)

$p_v$  = steam pressure at operating temperature (bar)

The calculation works with absolute pressure.

For the spring return, the stated  $\Delta p_s$  values are also the permissible differential pressure up to which the actuator can guarantee that the valve is closed in the event of an incident. Because this is an emergency function with a fast stroke movement (using a spring), this value can exceed  $\Delta p_{\max}$ .

Flow-rate chart



B10736

Type	$\Delta p_v$	
	Against the pressure [bar]	With the pressure [bar]
BUG015F334	16	6

Type	$\Delta p_v$	
BUG015F324	16	6
BUG015F314	16	6
BUG015F304	16	6
BUG020F304	16	6
BUG025F304	16	6
BUG032F304	16	6
BUG040F304	16	6
BUG050F304	12	6
BUG065F304	10	4.5
BUG065F316	10	4.5
BUG080F304	7	3.5
BUG100F304	4.5	3
BUG125F304	3	2
BUG150F304	2	1

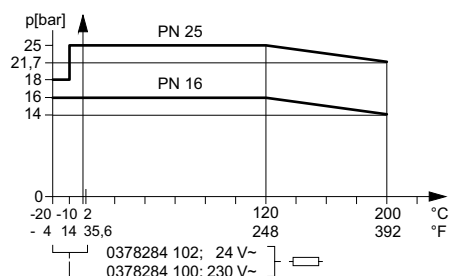
### Additional version information

Valve body made of ductile cast iron as per EN 1563, code EN-GJL-400-18-LT, material number EN-JS 1025 with smooth drilled flanges as per EN 1092-2, seal form B. Valve body protected by matt paint RAL 9005 jet black. Recommended for the welding flange as per EN 1092-1. Valve fitting length as per EN 558-1, basic series 1. Flat seal on valve body made of asbestos-free material.

### Material numbers as per DIN

	DIN material no.	DIN designation
Valve body	EN-JS1025	EN-GJS-400-18-LT (GGG40.3)
Valve seat	1.4021	X20Cr13
Spindle	1.4305	X8CrNiS18-9
Plug	1.4305	X8CrNiS18-9
Plug seal	PTFE	Glass-fibre reinforced
Stuffing box	CW617N	CuZn40Pb2
Seal under stuffing box	CW024A	Cu-DHP

### Pressure / temperature assignment



### Additional details on the definitions of pressure difference

#### $\Delta p_v$ :

Maximum admissible pressure difference over the valve at every stroke position, limited by noise level and erosion.

With this parameter, the valve is characterised as a flow element with specific hydraulic behaviour. Monitoring the cavitation and erosion along with the associated noise increases the service life and the operational capacity.

#### $\Delta p_{max}$ :

Maximum admissible pressure difference over the valve at which the actuator can reliably open and close the valve.

Static pressure and flow effects are considered. This value ensures trouble-free stroke movement and closing of the valve. The value  $\Delta p_v$  of the valve is never exceeded.

#### $\Delta p_s$ :

Maximum admissible pressure difference over the valve in the event of a malfunction (e.g. power failure, excessive temperature or pressure, pipe break) at which the actuator can close the valve tightly and, if necessary, maintain the entire operating pressure against atmospheric pressure. Because this

is a quick-closing function with a rapid stroke movement,  $\Delta p_s$  can be greater than  $\Delta p_{\max}$  or  $\Delta p_v$ . The disruptive flow effects that arise here are quickly passed through and are of minor importance in this mode of operation.

For 3-way valves, the values only apply to the control passage.

#### $\Delta p_{\text{stat}}$ :

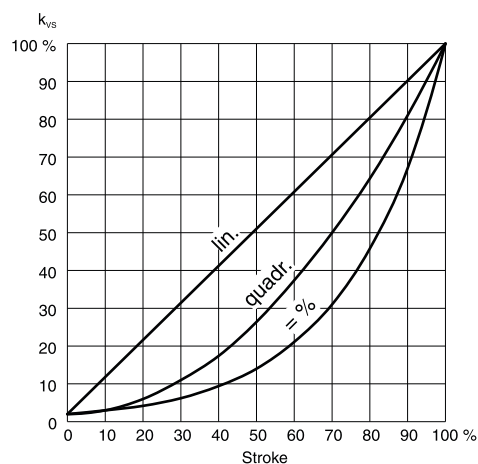
Line pressure behind the valve. This essentially corresponds to the idle pressure when the pump is switched off, caused for example by the fluid level in the system, increased pressure due to pressure tanks, steam pressure, etc.

For valves that close with pressure, the static pressure plus the pump pressure are used.

#### Characteristic for actuators with positioner (only 24 V)

On actuator AVM 322(S), AVM 234S, AVF 234S or AVN 224S

Equal-percentage/linear/quadratic



Can be set using coding switch

#### Disposal

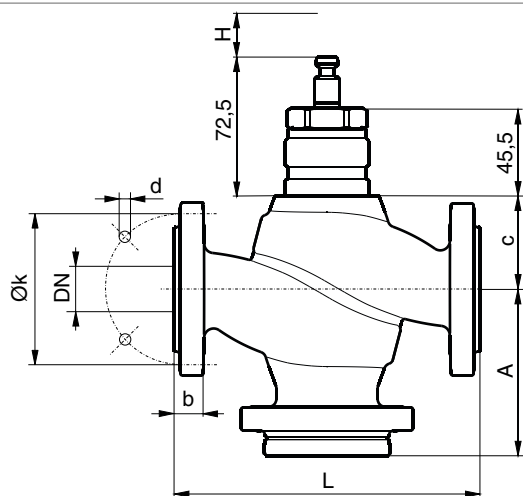
When disposing of the product, observe the currently applicable local laws.

More information on materials can be found in the Declaration on materials and the environment for this product.



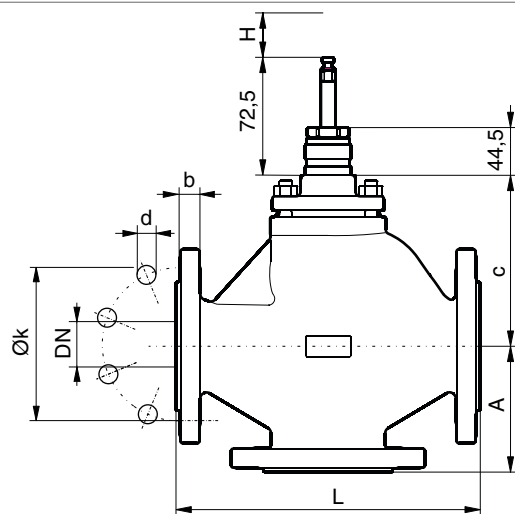
## Dimension drawing

## DN 15...65/PN16

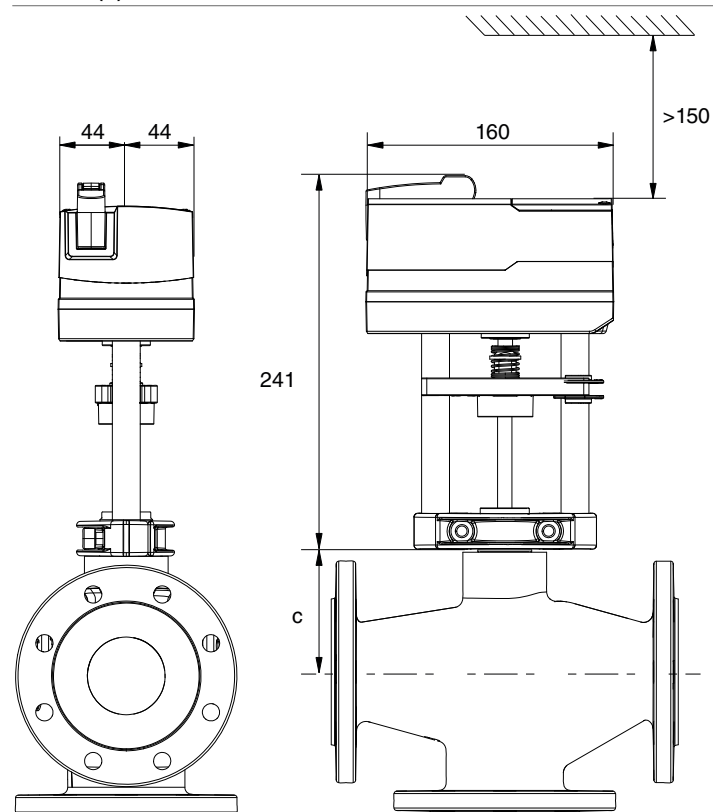
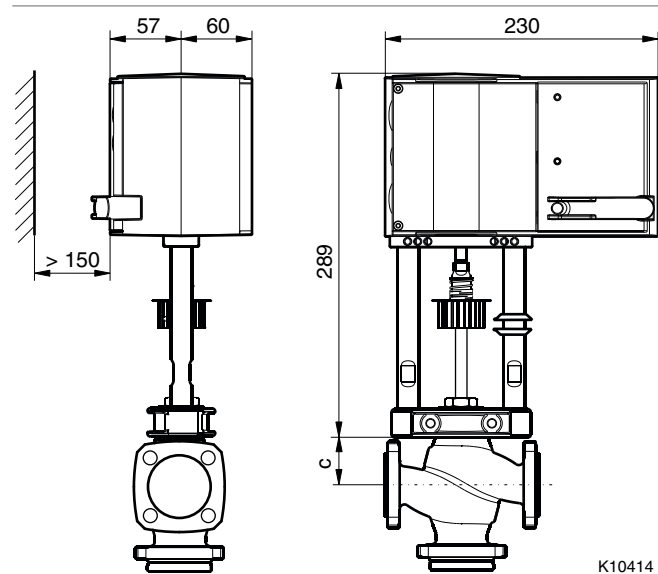


BUG	DN	A	c	L	H	k	d	b
015	15	75,5	54	130	20	65	14 x 4	14
020	20	83,5	48	150	20	75	14 x 4	16
025	25	86,5	50	160	20	85	14 x 4	16
032	32	99,5	59	180	20	100	19 x 4	18
040	40	105,5	63	200	20	110	19 x 4	19
050	50	113,5	67	230	20	125	19 x 4	19
065	65/ PN16	120,0	163	290	40	145	19 x 4	19

## DN 65/PN25...DN 150

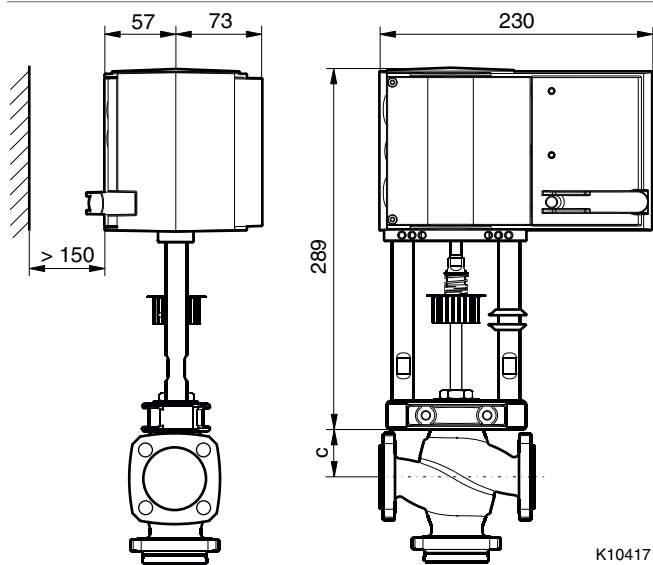


BUG	DN	A	c	L	H	k	d	b
065	65/PN25	120	163	290	40	145	19 x 8	19
080	80	130	182	310	40	160	19 x 8	19
100	100	150	183	350	40	190	23 x 8	19
125	125	200	223	400	40	220	28 x 8	19
150	150	210	257	480	40	250	28 x 8	20

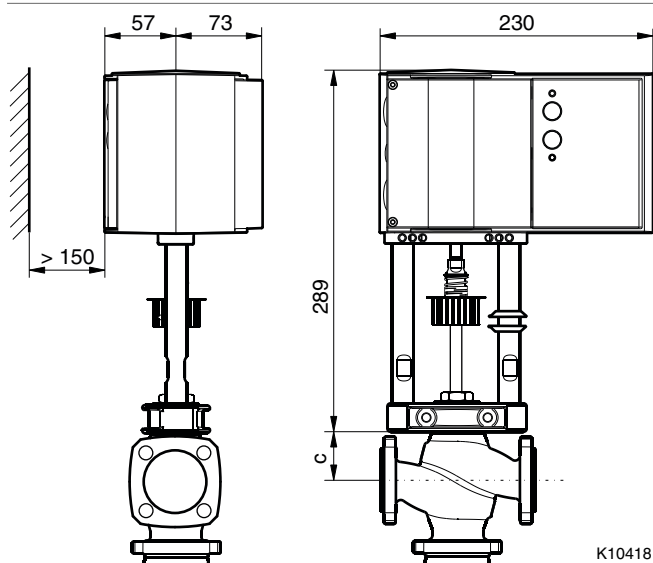
**Combinations****AVM 322(S)****AVM 234S**

K10414

**AVF 234S**

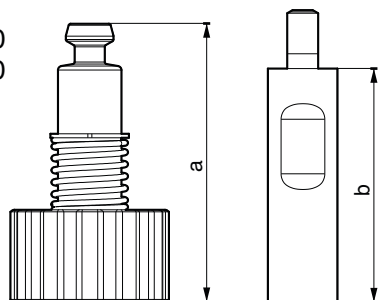


AVN 224S



## Accessories

0372336 180  
0372336 240



0372336	T (°C)	a (mm)	b (mm)
180	180	69,4	60
240	240	109,4	100

0378284 100  
0378284 102

