

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

### How energy efficiency is improved

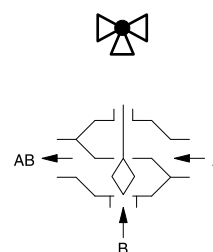
Efficiency means precise and reliable control

### Features

- Continuous control of cold and hot water in closed circuits
- In combination with pneumatic actuators AVP242, AVP243 and AVP244
- 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
- Regulating valve, free of silicone grease, painted black
- The control passage is closed when the spindle is moved out
- Used as a control valve
- Valve body made 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



BUG032F304



### Technical data

#### Parameters

Nominal pressure	PN 16/25
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, control passage	≤ 0.05% of $K_{VS}$ value
Leakage rate, mixing passage	≤ 1.0% of $K_{VS}$ value

#### Ambient conditions

Operating temperature <sup>1)</sup>	-20...200 °C
Operating pressure <sup>2)</sup>	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

#### Overview of types

Type	Nominal diameter	Connection	$K_{VS}$ value	Weight	Valve stroke
BUG015F304	DN 15	PN 25/16	4 m <sup>3</sup> /h	3.1 kg	20 mm
BUG015F314	DN 15	PN 25/16	2.5 m <sup>3</sup> /h	3.1 kg	20 mm
BUG015F324	DN 15	PN 25/16	1.6 m <sup>3</sup> /h	3.1 kg	20 mm
BUG015F334	DN 15	PN 25/16	1 m <sup>3</sup> /h	3.1 kg	20 mm
BUG020F304	DN 20	PN 25/16	6.3 m <sup>3</sup> /h	4 kg	20 mm
BUG025F304	DN 25	PN 25/16	10 m <sup>3</sup> /h	4.7 kg	20 mm

<sup>1)</sup> For cold water applications below 30 °C, use versions BUG\*\*\*F3\*\*S with a stuffing box containing silicone (e.g.: BUG015F304S). BUG\*\*\*F3\*\*S are only available up to DN125.  
Use stuffing box heater at temperatures below 0 °C; use the relevant adapter (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.

<sup>2)</sup> For operating pressure, see table: Pressure / temperature assignment



Type	Nominal diameter	Connection	K <sub>vs</sub> value	Weight	Valve stroke
BUG032F304	DN 32	PN 25/16	16 m³/h	7.2 kg	20 mm
BUG040F304	DN 40	PN 25/16	25 m³/h	9.2 kg	20 mm
BUG050F304	DN 50	PN 25/16	40 m³/h	11.9 kg	20 mm
BUG065F304	DN 65	PN 25	63 m³/h	27.1 kg	40 mm
BUG065F316	DN 65	PN 16	63 m³/h	26.8 kg	40 mm
BUG080F304	DN 80	PN 25/16	100 m³/h	36.3 kg	40 mm
BUG100F304	DN 100	PN 25	160 m³/h	53 kg	40 mm
BUG125F304	DN 125	PN 25	250 m³/h	79.1 kg	40 mm
BUG150F304	DN 150	PN 25	340 m³/h	108.7 kg	40 mm

#### Accessories

Type	Description
0372336180	Adapter (required when temperature of the medium is 130...180 °C)
0372336240	Adaptor (required when temperature of the medium is 180...200 °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

#### Combination of BUG with pneumatic actuator

- 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.*
- i** *The running time is based on the centair air flow rate (400 l<sub>r</sub>/h) and on a supply line with a length of 20 m and a diameter of 4 mm.*


#### Pressure differences

Actuator	AVP242F021	AVP243F021	AVP244F021	AVP243F031	AVP244F031
Admissible pressure p <sub>stat</sub>	≤ 16 bar	≤ 16 bar	≤ 16 bar	≤ 25 bar	≤ 25 bar
Running time	8 s	24 s	40 s	24 s	40 s

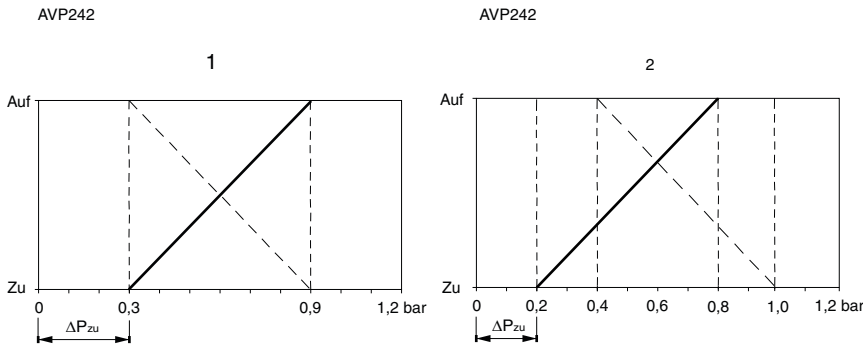
#### $\Delta p$ [bar]

As control valve	$\Delta p_{max}$	$\Delta p_s$	$\Delta p_{max}$	$\Delta p_s$	$\Delta p_{max}$	$\Delta p_s$	$\Delta p_{max}$	$\Delta p_s$	$\Delta p_{max}$	$\Delta p_s$
BUG015F304	16.0	16.5	16.0	22.7	16.0	25.0	–	–	–	–
BUG015F314										
BUG015F324										
BUG015F334										
BUG020F304	10.0	13.0	16.0	18.0	16.0	25.0	–	–	–	–
BUG025F304	6.0	8.8	11.9	12.2	16.0	24.0	–	–	–	–
BUG032F304	4.0	5.5	7.4	7.8	15.5	15.5	–	–	–	–
BUG040F304	2.6	3.7	4.2	5.2	10.3	10.3	–	–	–	–
BUG050F304	1.7	2.4	3.1	3.3	6.5	6.5	–	–	–	–
BUG065F304	–	–	–	–	–	–	2.2	2.2	4.4	4.4
BUG065F316	–	–	–	–	–	–	–	–	–	–
BUG080F304	–	–	–	–	–	–	1.5	1.5	3.0	3.0
BUG100F304	–	–	–	–	–	–	1.0	1.0	2.0	2.0
BUG125F304	–	–	–	–	–	–	0.6	0.7	1.3	1.3
BUG150F304	–	–	–	–	–	–	0.4	0.5	1.0	1.0

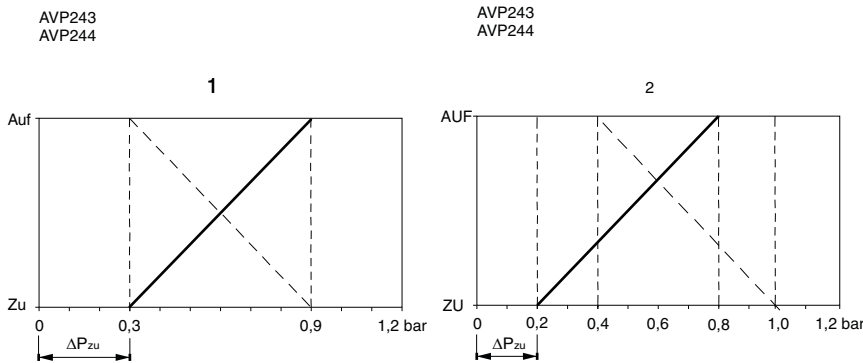
Cannot be used as distribution valve

 At temperatures above 130 °C, accessories are required

**Pressure-stroke characteristic (with valve attached), characteristic not adjustable:**



**Characteristic adjustable:**



————— = normally closed (function E)

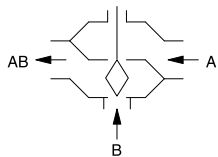
----- = normally open (function A)

Sequences possible with XSP31

**Description of operation**

The valve can be moved to any intermediate position with a pneumatic actuator. When the spindle is moved out, the control passage of the valve is closed. These valves may be used as control valves. Observe the direction of flow shown on the valve. Closing with pressure is not permitted with pneumatic actuators, because this would cause pressure surges. The flow parameters correspond to EN 60534.

**Used as a control valve**



These regulating valves are characterised by their reliability and precision and make an important contribution towards efficient regulation. They meet challenges such as safety functions, overcoming great differential pressures, controlling media temperatures and performing the shut-off function, all in a low-noise form.

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 in the control passage. 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 seat 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 regulations must also be adhered to. Changing or converting the product is not admissible.

### Engineering and fitting notes

The actuator is mounted directly on the valve and fastened with screws. The actuator is connected with the valve spindle automatically. The closing point must be adjusted as described in the fitting instructions (MV 506012 for AVP 242 or MV 506013 for AVP 243/244).

### 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 accident prevention regulations
CE conformity: PED 2014/68/EU Fluid group II, liquid or with steam pressure BUG065F316: CE label BUG: CE-0035 label	Category I Category II
<b>Fitting instructions:</b>	
DN 15...50	MV 505947
DN 65...150	MV 505973
AVP 242	MV 506012
AVP 243/244	MV 505813
Declaration on materials and the environment	MD 76.121

### 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 media 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 adapter for the temperature must be used. The adapter 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.

To increase the functional reliability of the valves, the system should conform to DIN EN 14336 (heating systems in buildings). Among other things, DIN EN 14336 specifies that the system must be tested before commissioning.

If a split range of adjustment, more precise positioning, faster positioning, increased air capacity or reversible direction of operation is required, the actuator can be equipped with an XSP 31 positioner; see section 79.

### Using with steam

The valves can be used for steam applications up to 200 °C with the same  $\Delta p_{max}$  values as listed in the combination tables. When used as a regulating valve, make sure that the valve does not operate mainly on the lower third of its stroke range. This position leads to an extremely high flow speed, which greatly reduces the serviceable life of the valve.

### 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. Water requirements according to 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 material table shown below may be used. When using glycol we recommend a concentration between 20% and 55%.

### 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. Cavitation accelerates wear and causes noises. To prevent cavitation, which mainly occurs in applications with water or steam, the differential pressure  $\Delta p_{\max}$  should not exceed the  $\Delta p_{\text{crit}}$  value:

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

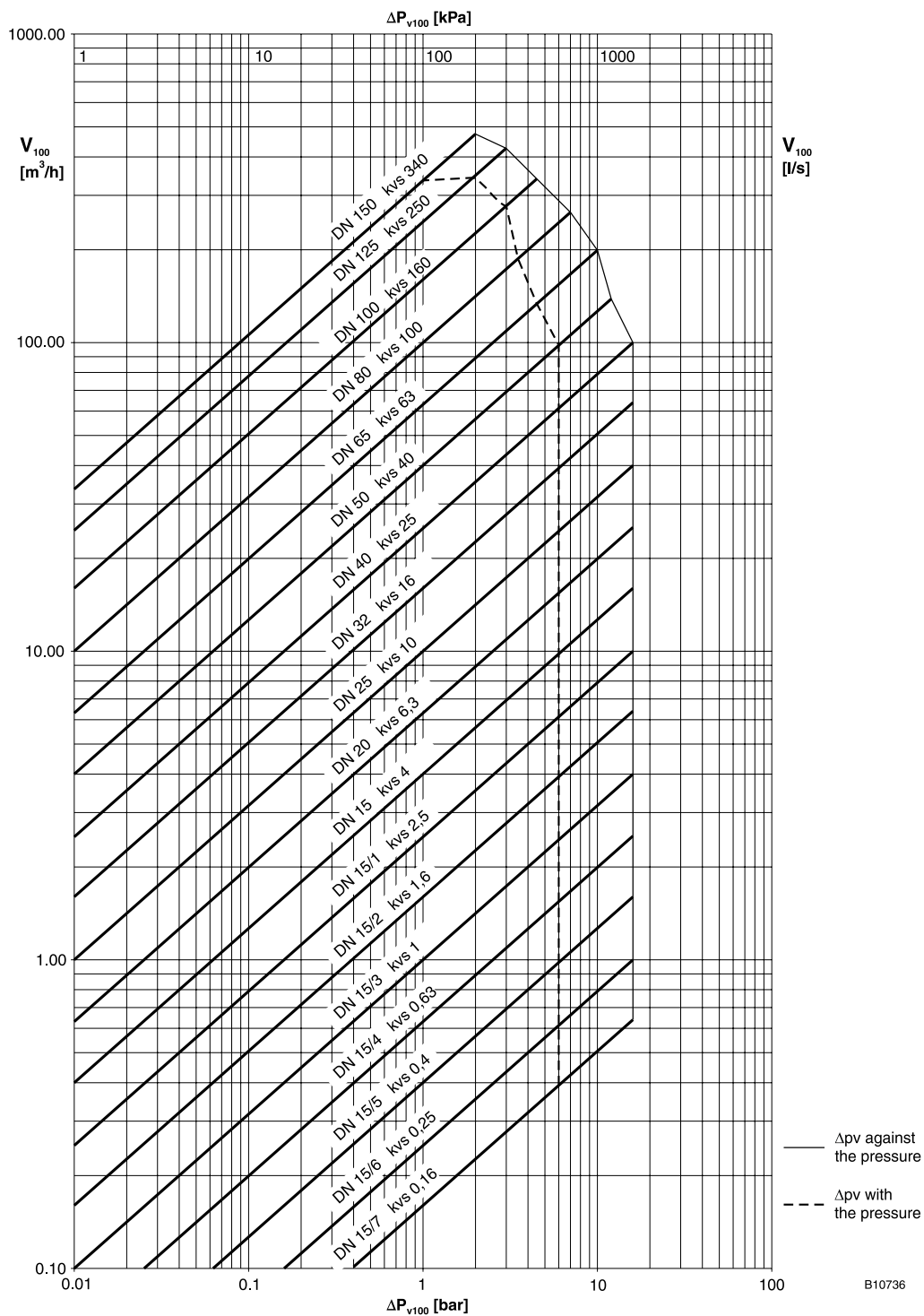
$p_1$  = upstream pressure in front of the valve (bar)

$p_v$  = steam pressure

It is calculated using 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  $\Delta p_{\max}$ .

**BUG flow-rate chart**



B10736

Type	$\Delta p_v$	
	Against the pressure [bar]	With the pressure [bar]
BUG015F334	16	-
BUG015F324	16	-
BUG015F314	16	-
BUG015F304	16	-
BUG020F304	16	-
BUG025F304	16	-
BUG032F304	16	-
BUG040F304	16	-
BUG050F304	12	-
BUG065F304	10	-

Type	$\Delta p_v$	
BUG080F304	7	-
BUG100F304	4.5	-
BUG125F304	3	-
BUG150F304	2	-

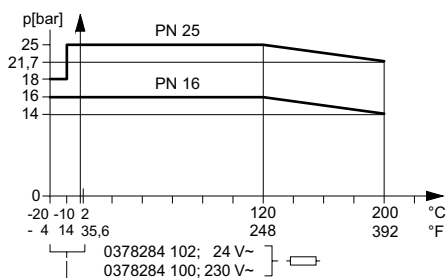
### Additional version information

Valve body made of ductile cast iron as per EN 1563, code EN-GJS-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 in each stroke position, limited by noise level and erosion.

This parameter characterises the valve 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.

This takes account of static pressure and flow effects. 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.

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

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

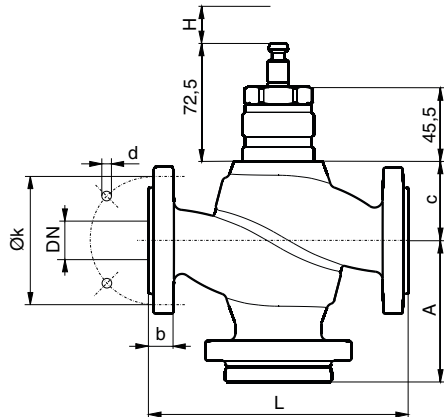
Line pressure behind the valve. This essentially corresponds to the idle pressure when the pump is switched off, caused for example by the fluid level in the system, increased pressure due to pressure tanks, steam pressure, etc.

**Disposal**

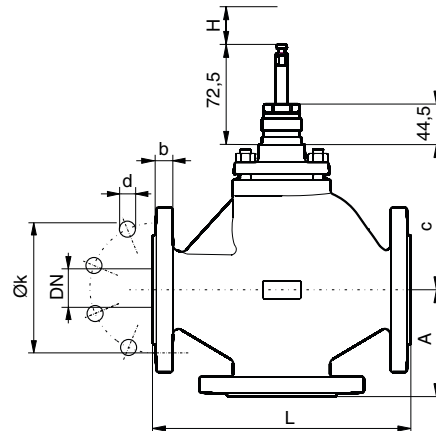
When disposing of the product, observe the currently applicable local laws.

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

**Dimension drawings**

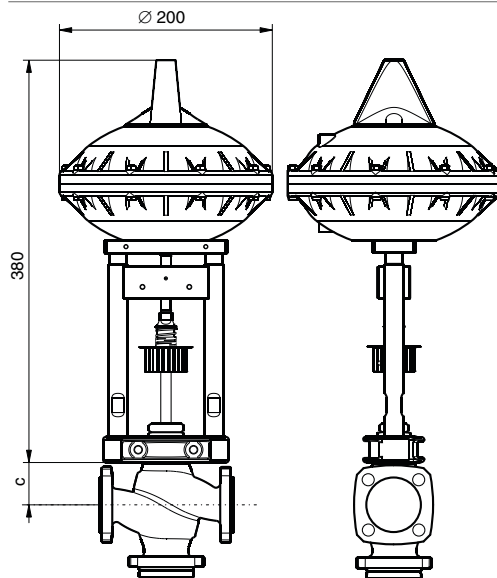


BUG	DN	A	c	L	H	k	d	b
015	15	75,5	54	130	20	65	14 x 4	14
020	20	83,5	48	150	20	75	14 x 4	16
025	25	86,5	50	160	20	85	14 x 4	16
032	32	99,5	59	180	20	100	19 x 4	18
040	40	105,5	63	200	20	110	19 x 4	19
050	50	113,5	67	230	20	125	19 x 4	19
065	65/ PN16	120,0	163	290	40	145	19 x 4	19



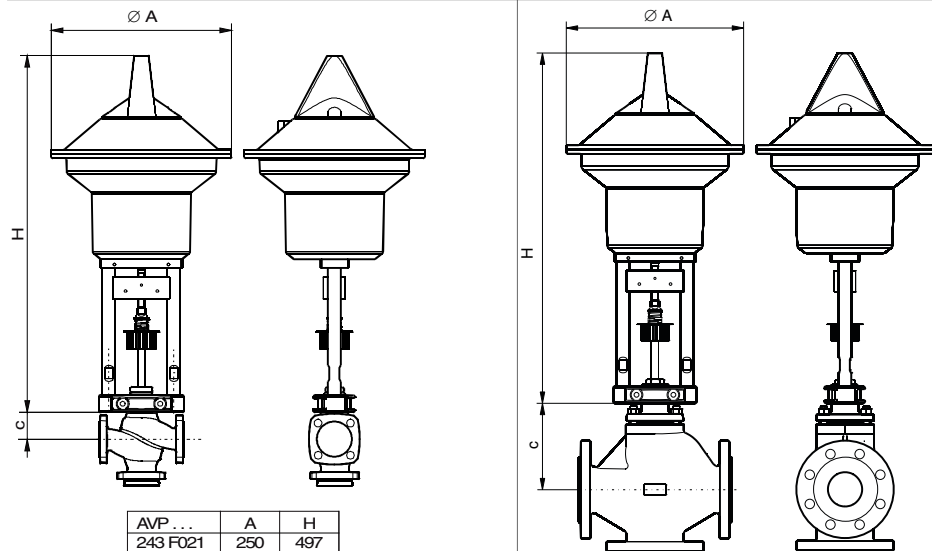
BUG	DN	A	c	L	H	k	d	b
065	65/PN25	120	163	290	40	145	19 x 8	19
080	80	130	182	310	40	160	19 x 8	19
100	100	150	183	350	40	190	23 x 8	19
125	125	200	223	400	40	220	28 x 8	19
150	150	210	257	480	40	250	28 x 8	20

**AVP242F021**





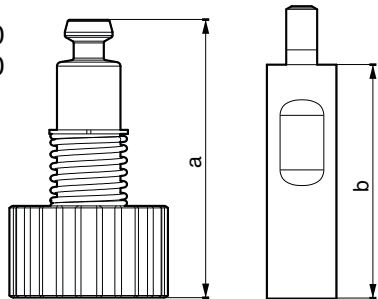
AVP 243/244



AVP ...	A	H
243 F021	250	497
243 F031	250	517
244 F021	335	536
244 F031	335	556

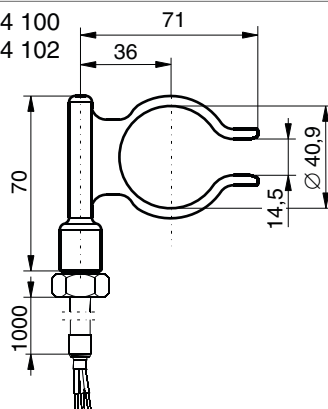
Accessories

0372336 180  
0372336 240

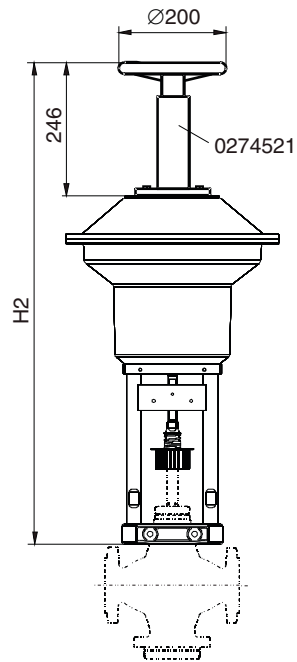


0372336	T (°C)	a (mm)	b (mm)
180	180	69,4	60
240	240	109,4	100

0378284 100  
0378284 102



**AVP 243/244**



AVP ...	H2
243 F021	656
243 F031	676
244 F021	695
244 F031	715