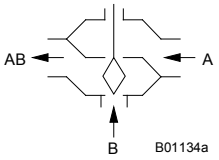
BUG: Flanged three-way valve, PN 25 / 16


T10431


Y07545



B01134a

How energy efficiency is improved
Accurate control with high reliability.

Areas of application
Continuous control of cold/warm/hot water, water vapour and air in HVAC systems, in closed networks. Water quality as per VDI 2035. Assembly with AVP 242 to AVP 244 actuators as a regulating unit.

Features
- Nominal pressure 25 bar for DN15 to DN150, nominal pressure 16 bar for DN15 to DN80
- Satisfies standard for actuators as per DIN 32730[2) 3)]
- Control valve contains no silicone grease; painted black
- Nominal diameters DN15 to DN150
- Equal-percentage characteristic
- Linear mixing passage characteristic
- With the spindle retracted, the valve is closed
- Application as control valve or diverting valve
- Temperature range up to 240°C

Technical description
- Valve with flange connection as per EN 1092-2, Form B, raised face, for PN25 and PN16, depending on type
- Ductile cast iron valve body
- Stainless steel valve seat
- Stainless steel spindle
- Stainless steel plug in nominal diameters DN15 to DN50, with glass-fibre-reinforced PTFE sealing ring
- Stainless steel plug in nominal diameters DN65 to DN150, metal-on-metal seal
- Maintenance-free brass stuffing box with spring-loaded PTFE washer

Type	Nominal diameter DN	Connection PN	k_{VS} value m^3/h	Weight kg
BUG 015 F334	15	25 / 16	1	3.1
BUG 015 F324	15	25 / 16	1.6	3.1
BUG 015 F314	15	25 / 16	2.5	3.1
BUG 015 F304	15	25 / 16	4	3.1
BUG 020 F304	20	25 / 16	6.3	4.0
BUG 025 F304	25	25 / 16	10	4.7
BUG 032 F304	32	25 / 16	16	7.2
BUG 040 F304	40	25 / 16	25	9.2
BUG 050 F304	50	25 / 16	40	11.5
BUG 065 F316 [1)]	65	16	63	28
BUG 065 F304	65	25	63	28
BUG 080 F304	80	25 / 16	100	40
BUG 100 F304	100	25	160	57
BUG 125 F304	125	25	250	82
BUG 150 F304	150	25	340	113

Operating temperature[2)]	–20...240 °C			
Operating pressure	up to 120 °C, 25 bar			
	up to 240 °C, 20 bar			
	–20...–10°C, 18 bar			
Valve characteristic				
control passage	equal-percentage			
mixing passage	linear			
Control ratio	> 50:1			
Stuffing box	Brass / PTFE			
Leakage rate at max. Δp_S				
control passage	≤ 0.05% of k_{VS} value			
mixing passage	≤ 1.0% of k_{VS} value			
Stroke DN 15...50	20 mm			
DN 65...150	40 mm			

Dimension drawing		
	DN 15...50 (65)	M10425
	DN 65...150	M10446
Fitting instructions		
Valve	DN 15...50	MV 505947
Valve	DN 65...150	MV 505973
Assembly	AVP 242	MV 506012
Assembly	AVP 243 / 244	MV 506013
Declaration on materials		MD 76.121

1) The VUG 065 F316 valves do not have TÜV approval. They do not bear the test institute's code and are classified under Category I of the Directive on Pressure Equipment.

2) At temperatures below 0 °C, use the stuffing box heater; at temperatures above 100 °C, use the temperature adaptor (accessory).

3) DIN 32730 has been substituted by DIN EN 14597.

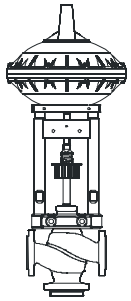
Accessories

0372336 180* Adaptor (required for medium > 130 °C / < 180 °C; MV 505902)
0372336 240* Adaptor (required for medium > 180 °C / < 240 °C; MV 505902)
0378283 001 Replacement pack for stuffing box, nominal diameter DN 15-150; MV 505950
0378284 100* Stuffing box heater, 230 V~; 15 W, for media below 0 °C; MV 505978
0378284 102* Stuffing box heater, 24 V~; 15 W, for media below 0 °C; MV 505978
0378285 001 Stuffing box, stainless steel /PTFE DN 15…150
0378384 001 Anti-torsion device DN 65…150

*) Dimension drawing or wiring diagram available under the same number

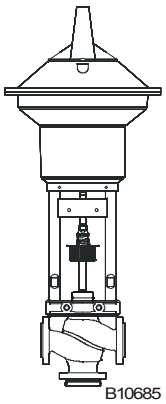
Warranty The technical data and pressure differences indicated here are applicable only in combination with Sauter actuators. Any warranty shall lapse if actuators from other manufacturers are used.

Combination of BUG, PN 25/16 with pneumatic drive AVP 242...244


B10688

Drive Perm. press. p_{stat} Running time 1) Stroke	AVP 242 F021 ≤ 16 bar 8 s 20 mm		
Valve	Δp_{max}	Δp_s	
BUG 015	16.0	16.5	
BUG 020	10.0	13.0	
BUG 025	6.5	8.8	
BUG 032	4.0	5.5	
BUG 040	2.6	3.7	
BUG 050	1.7	2.4	

For temperatures above 130°C, accessories are required


B10685

Drive Perm. press. p_{stat} Running time 1) Stroke	AVP 243 F021 ≤ 16 bar 24 s 20 mm			AVP 244 F021 ≤ 16 bar 40 s 20 mm		
Valve	Δp_{max}	Δp_s		Δp_{max}	Δp_s	
BUG 015	16.0	22.7		16.0	25.0	
BUG 020	16.0	18.0		16.0	25.0	
BUG 025	11.9	12.2		16.0	24.4	
BUG 032	7.4	7.8		15.5	15.5	
BUG 040	4.2	5.2		10.3	10.3	
BUG 050	3.1	3.3		6.5	6.5	

For temperatures above 130°C, accessories are required

Drive Perm. press. p_{stat} Running time 1) Stroke	AVP 243 F031 ≤ 25 bar 24 s 40 mm			AVP 244 F031 ≤ 25 bar 40 s 40 mm		
Valve	Δp_{max}	Δp_s		Δp_{max}	Δp_s	
BUG 065	2.2	2.2		4.4	4.4	
BUG 080	1.5	1.5		3.0	3.0	
BUG 100	1.0	1.0		2.0	2.0	
BUG 125	0.6	0.7		1.3	1.3	
BUG 150	0.4	0.5		1.0	1.0	

For temperatures above 130°C, accessories are required

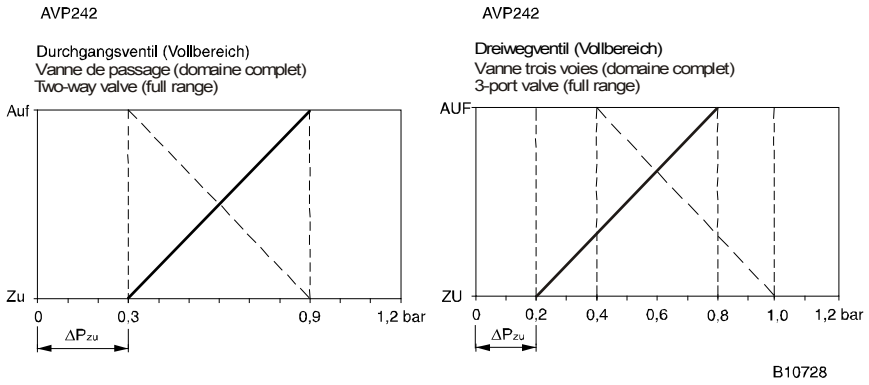
1) In relation to the Centair air rate (400 l_n/h) and to a pipe with length of 20 m and diameter of 4 mm

Valve: Variant F, for technical data and accessories see Valve Type Table
Drive: Variant F, for technical data, accessories and installation position, see section 71
Example: BUG 040 F304 / AVP 243 F031
Valve control passage A-AB is closed when actuator is pressureless = factory setting
Valve control passage A-AB is open when actuator is pressureless = on request

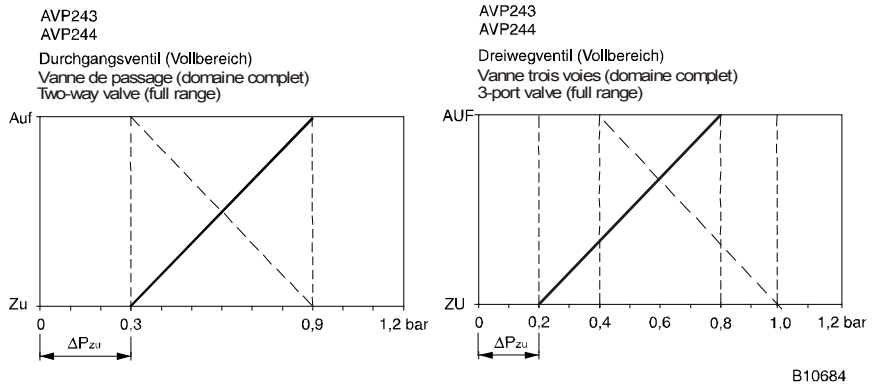
Δp_{max} [bar]= Maximum permitted pressure difference across the valve at which the drive can still reliably open and close the valve, taking account of Δp_V.

Δp_s [bar]= Maximum permitted pressure difference across the valve in case of a fault (pipe break downstream of the valve) at which the drive can close the valve reliably with 'fast' performance of the stroke.

Pressure-stroke characteristic (with valve fitted)
Characteristic is not adjustable:



Characteristic is adjustable:

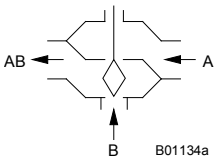


——— = CLOSED without pressure (function E)
····· = OPEN without pressure (function A)

Sequences with XSP31 are possible

Function
The valve can be controlled into any desired intermediate position by means of an electric drive. If the valve stem is extended, the control passage of the valve is closed. These valves may be used as control valves. The direction of flow marked on the valve must be observed. Closure with the pressure is not permissible with pneumatic drives, since it would cause pressure surges.
Parameters related to flow mechanics conform to EN 60534.

Used as a control valve



Description
The key features of these control valves are their high reliability and precision, and they make a major contribution towards environment-friendly control. They meet demanding requirements including safety functions, coping with high differential pressures, controlling the medium temperature and providing a shut-off function; all this is achieved with a low noise level.
An automatic and fixed connection is made between the valve stem and the drive shaft. The Sauter profile plug made of stainless steel controls an equal-percentage flow in the control passage. To compensate the complementary characteristic of the consumer and to guarantee an identical quantity of medium regardless of the valve position, the mixing passage acts with a linear characteristic. The tightness of this valve is guaranteed by the stainless steel ring pressed into the seat and the corresponding valve plug.
The stuffing box is maintenance-free; it consists of 6 conical PTFE rings and a spring. The spring ensures constant tension in the seals, thereby guaranteeing tightness in relation to the valve stem. In addition, a grease reserve ensures constant lubrication of the valve stem. The grease reserve also prevents any particles that might be present in the medium from reaching as far as the PTFE seal.

Engineering and fitting notes

The drive is placed directly on top of the valve and is fixed with screws. The connection between the drive and the valve stem is made automatically. The closing point must be set as described in the installation instructions (MV 506012 AVP 242 or MV 506013 AVP 243/244).

Installation position
The final control element can be installed in any position, except facing downwards. Condensate and water drips etc. must be prevented from penetrating into the drive. With a horizontal installed position, the permitted maximum weight on the valve is 25 kg unless a support is provided by the customer or others.

up to 130 °C: in any position, but not facing downwards.

above 130 °C: at temperatures above 130 °C or 180 °C respectively, the horizontal installed position is recommended and the adaptor corresponding to the temperature must be inserted. However, the adaptor can also serve as an extension so as to bring the drive out of the pipe insulation. The pipes must be insulated to protect the actuator against great heat.

When fitting the drive onto the valve, you must make sure that the plug is not rotated on the stainless steel seat (this would damage the sealing surfaces). If the valve is insulated, the insulation must only extend as far as the connecting clip of the drive.
If there is a requirement for a split range of adjustment, improved setting accuracy, increased setting speed and air rate or reversible direction of operation, the drive can be fitted with positioner XSP 31, see section 79.

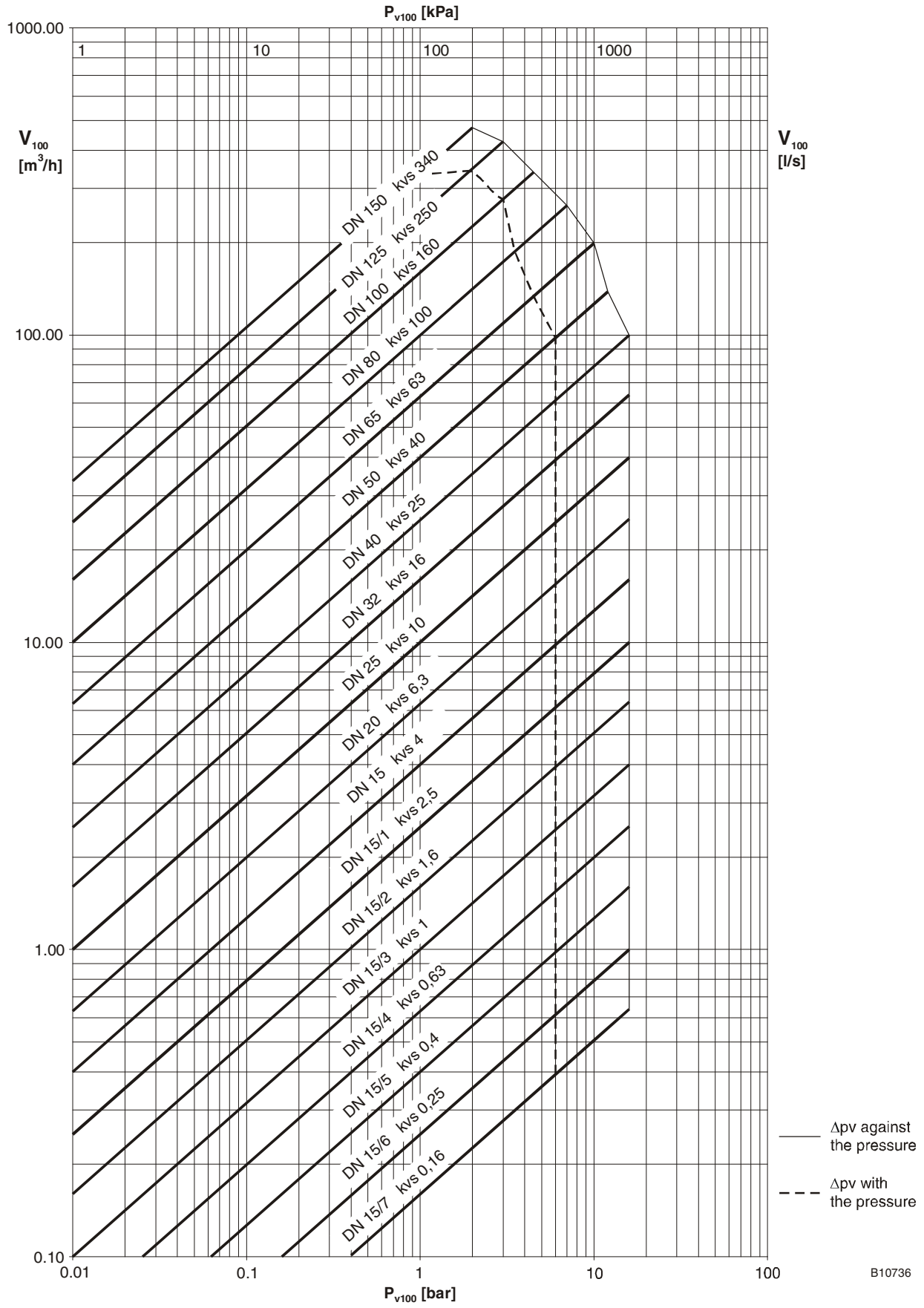
Applications with steam
The valves can be used for steam applications up to 200 °C with the same Δp_{max} values shown in the combination tables. However, we advise you only to use the valves for OPEN-CLOSED switching. For use as a control valve, you should make sure that the majority of the work is not done in the lower third of the valve stroke range. In this position, an extremely high flow speed would develop, severely reducing valve's lifetime.

Applications with water
To ensure that impurities in the water (such as welding beads or particles of rust, etc.) are retained and the plug seal is not damaged, it is advisable to install collective filters, e.g. for each storey or pipe run. Water quality requirements conform to VDI 2035. If an additional medium is used, the compatibility of the valve materials must be clarified with the manufacturer of the medium. The Material Table shown below can be used for this purpose. If glycol is used, we recommend that a concentration of between 20% and 55% should be selected.
The valves are not suitable for drinking water or in zones where there is a risk of explosions.

Other notes concerning hydraulics and noises in systems
The valves can be used in a low-noise environment. To avoid noises, the pressure differences Δp listed below should not be exceeded. These are shown as recommended values in the pressure loss table.
Pressure difference Δp_v is the maximum pressure that may be present on the valve, regardless of the stroke position, so that the danger of cavitation and erosion is limited. These values are independent of the drive force. Cavitation accelerates wear and causes noises. To prevent cavitation, which mainly occurs with applications involving vapour or steam, differential pressure Δp_{max} should not exceed value Δp_{krit}:
$\Delta p_{krit} = (p1 - p_v) \times 0{,}5$
p1 = upstream pressure in front of the valve (bar) p_v = steam/vapour pressure
Absolute pressure is used for the calculations.

The close/off pressure values which are also listed represent the maximum pressures at which the drive can still use its own force to move the valve. It should be pointed out here that if these pressures are used and the pressure difference Δp_{max} is exceeded, the valve may sustain damage due to cavitation and erosion. In case of a spring return function, the stated Δp_s values also represent the permitted differential pressure up to which the drive guarantees closure of the valve in case of an incident. As this is a safety function with 'fast' passage through the stroke (by means of the spring), this value may exceed Δp_{max}. The valves are not suitable for drinking water or in zones where there is a risk of explosions.

Flow-rate chart BUG



Additional technical data

Type	Δpv	
	against the pressure	with the pressure
BUG 015 F334	16 bar	–
BUG 015 F324	16 bar	–
BUG 015 F314	16 bar	–
BUG 015 F304	16 bar	–
BUG 020 F304	16 bar	–
BUG 025 F304	16 bar	–
BUG 032 F304	16 bar	–
BUG 040 F304	16 bar	–
BUG 050 F304	12 bar	–
BUG 065 F304	10 bar	–
BUG 080 F304	7 bar	–
BUG 100 F304	4.5 bar	–
BUG 125 F304	3 bar	–
BUG 150 F304	2 bar	–

☐Pressure and temperature data	EN 764, EN 1333
☐Parameters related to flow mechanics	EN 60534
☐Sauter slide rule for valve sizing	7 090011 001
☐Manual for slide rule	7 000129 001
☐Technical manual: 'Regulating Units'	7 000477 001
☐Parameters, installation notes, control, general	Valid EN, DIN, AD, TRD and UVV specifications /regulations

CE conformity, Pressure Equipment Directive (fluid group II)		97/23/EC
BUG 065 F316	CE symbol	Category I
BUG:	CE-0035 symbol	Category II

Additional information

Valve body made of ductile cast iron to EN 1563. Code EN-GJS-400-18-LT. Material number EN-JS1025 with smooth drilled flanges to EN 1092-2, form B, sealing strip. Valve body to RAL 9005, dark black. Overall valve length to EN 558-1, basic series 1. Flat seal on valve body made of asbestos-free material.

Material numbers as per DIN

	DIN material number	DIN designation
Valve body	EN-JS1025	EN-GJS-400-18-LT (GGG40.3)
Valve seat	1.4021	X 20 Cr 13
Stem	1.4305	X 8 Cr Ni S 18-9
Plug	1.4305	X 8 Cr Ni S 18-9
Plug seal	PTFE	glass-fibre reinforced
Stuffing box	CW 617 N	Cu Zn 40 Pb 2
Seal under stuffing box	CW024A	Cu-DHP

Detailed information on pressure difference definitions

Δp_v:
Maximum permitted pressure difference across the valve for every position of the stroke, limited by noise level and erosion.
This parameter specifically characterises the hydraulic behaviour of the valve as an element through which a flow passes. Monitoring of cavitation and erosion, and the associated development of noise, will improve the valve's lifetime as well as its usability.

Δp_{max}:
Maximum permitted pressure difference across the valve at which the drive can reliably open and close the valve.
The following are taken into account: static pressure and influences related to flow mechanics. Faultless performance of the stroke and tightness are guaranteed with this value, and in no case is valve value Δp_v exceeded.

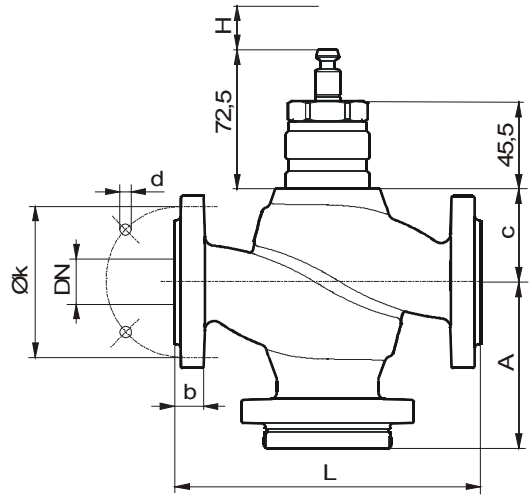
The following are included: static pressure and fluidic influences. This value ensures that the stroke movement and the valve closure are performed properly. Furthermore, the Δp_v value of the valve is never exceeded.

Δp_s:
Maximum permitted pressure difference across the valve in case of a fault (such as a voltage failure, excessive increase in temperature and pressure, and pipe break) at which the drive can close the valve tightly and can hold the full operating pressure against atmospheric pressure if need be. As this is a safety function with a 'fast' performance of the stroke, Δp_s may be greater than Δp_{max} or Δp_v. The disruptive influences arising here in connection with flow mechanics are quickly passed through, and are of secondary importance in this functioning mode.
For three-way valves, the values only apply to the control passage.

Δp_{stat}:
Line pressure across the valve. Essentially corresponds to the dead pressure with the pump switched off, caused (for example) by the fluid level in the system, increase in pressure due to the pressure tank, steam pressure, etc.

Dimension drawings

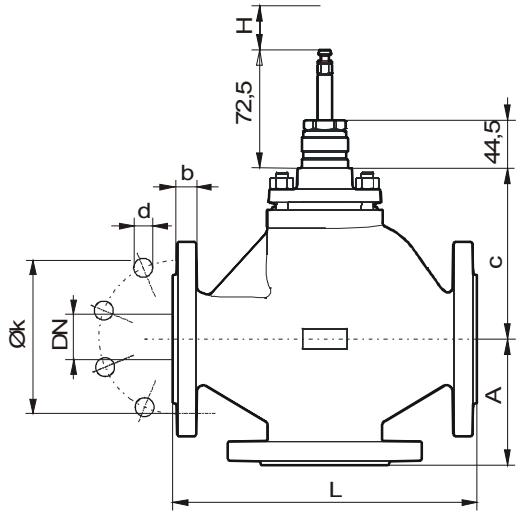
DN 15…50 (65)



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

M10425c

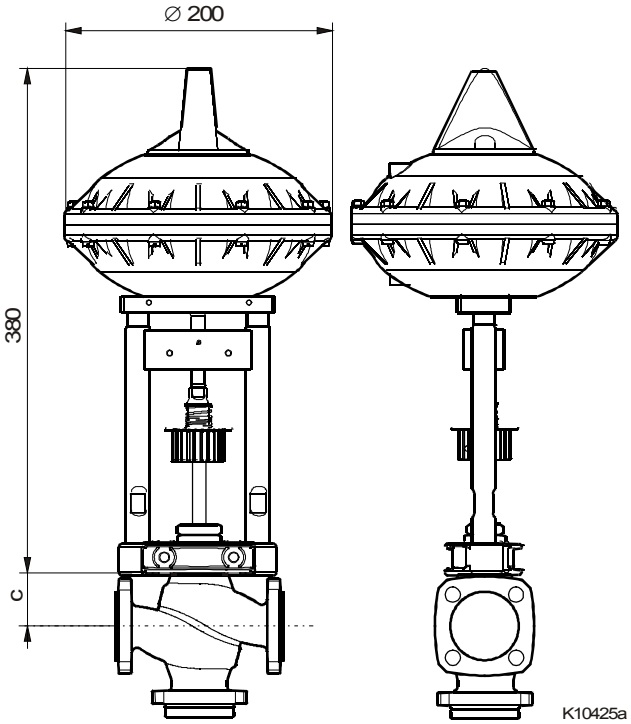
DN65…150



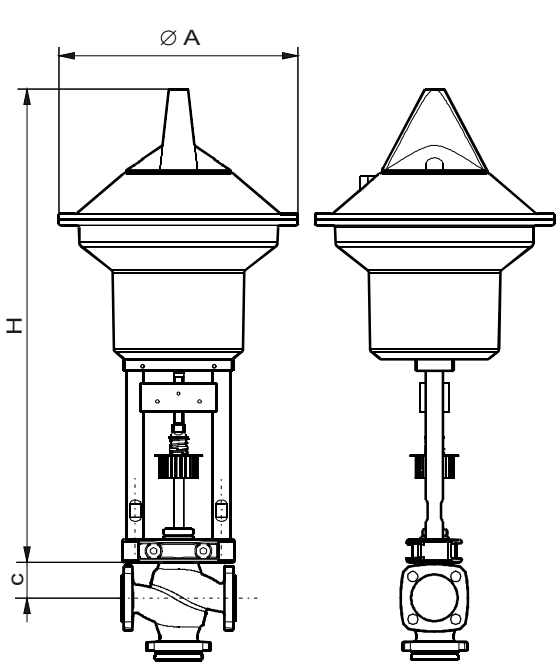
BUG	DN	A	c	L	H	k	d	b
065	65/PN25	120	163	290	40	145	19 x 8	19
080	80	130	182	310	40	160	19 x 8	19
100	100	150	183	350	40	190	23 x 8	19
125	125	200	223	400	40	220	28 x8	19
150	150	210	257	480	40	250	28 x 8	20

M10446c

AVP 242 F021

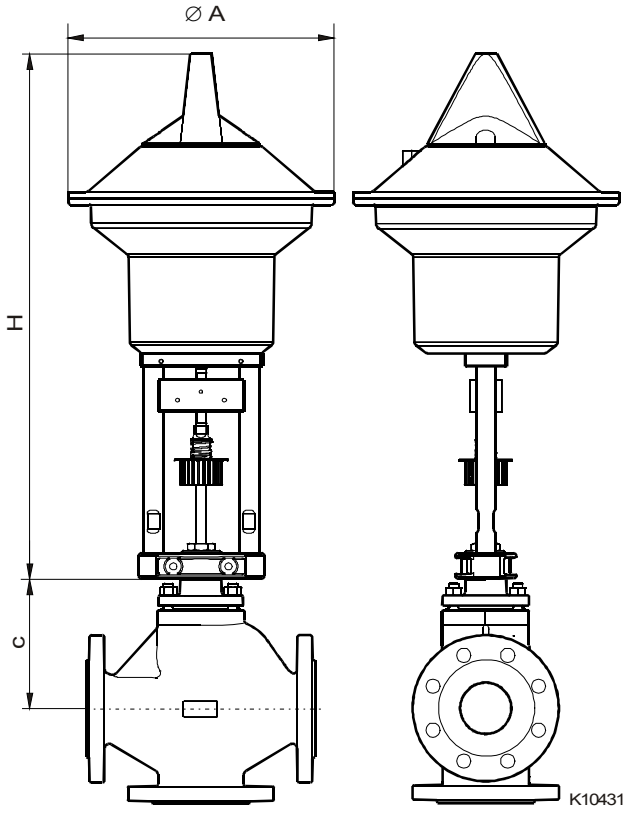


AVP 243/244



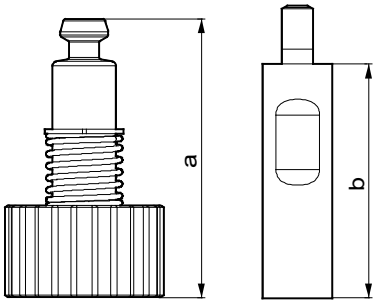
AVP . . .	A	H
243 F021	250	497
243 F031	250	517
244 F021	335	536
244 F031	335	556

K10429a



Accessories

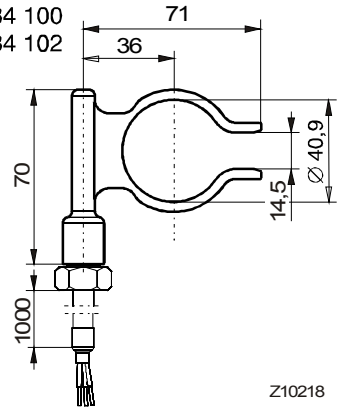
0372336 180
0372336 240



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

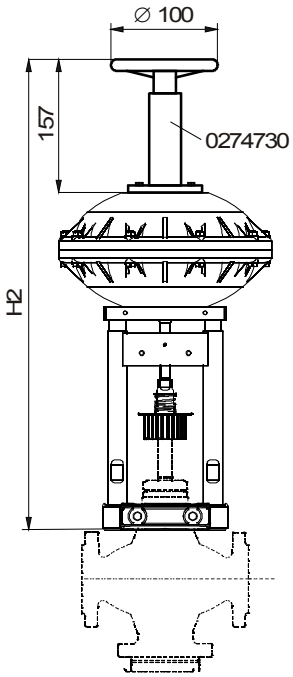
Z10217

0378284 100
0378284 102



Z10218

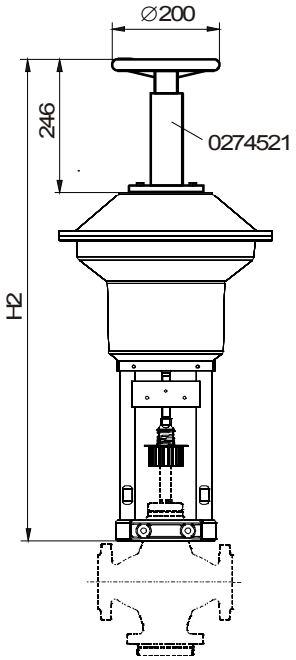
AVP 242



AVP . . .	H2
242 F001	472
242 F021	474

K10454b

AVP 243/244



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

K10455b

7176121003 05