BUE: Flanged three-way valves, PN 16 / 10

How energy efficiency is improved

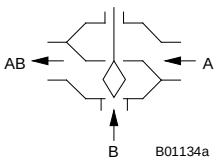
Precision control with high level of reliability means efficiency.

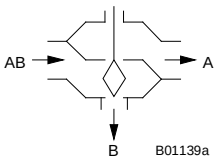
Areas of application

Continuous control of cold and hot water in closed networks[1]. Water quality as per VDI 2035. Together with actuators AVM 105, AVM 115, AVM 124/125, AVF 124/125, AVM 234S and AVF 234S as regulating unit. These valves are not suitable for drinking water or potentially explosive atmospheres.

Features

- Nominal pressure 16 bar
- Control valve, contains no silicone grease; painted black
- Nominal diameters DN15 to DN150
- Equal percentage characteristic in the case of F300, adjustable with SUT actuators to linear or quadratic
- Linear characteristic in the case of F200 from DN50 with increased kvs value, adjustable with SUT actuators to equal percentage or quadratic
- Linear mixing passage characteristic
- With the spindle retracted, the control branch is closed
- Can be used as control valve or diverting valve





Technical description

- Valve with flange connection as per EN 1092-2, Form B, raised face, for PN16 and PN10
- Valve body and seat made of cast iron
- Stainless steel spindle
- Nominal diameter DN15 to DN50 cones in brass with glass-fibre reinforced Teflon sealing ring
- Cone nominal diameter DN65 to DN150 in brass, metal-to-metal seal
- Stuffing box made of brass with wiper ring and double O-ring seal in EPDM

Type	Nominal diameter DN	Connection PN	k_{VS} value m³/h	Weight kg
BUE015F330	15	16 / 10	1.0	3.2
BUE015F320	15	16 / 10	1.6	3.2
BUE015F310	15	16 / 10	2.5	3.2
BUE015F300	15	16 / 10	4.0	3.2
BUE020F300	20	16 / 10	6.3	4.1
BUE025F300	25	16 / 10	10	4.7
BUE032F300	32	16 / 10	16	7.1
BUE040F300	40	16 / 10	22	8.4
BUE050F300	50	16 / 10	28	11.2
BUE050F200	50	16 / 10	40	11.2
~~**BUE065F300**~~	~~65~~	~~16 / 10~~	~~49~~	~~17.3~~
~~**BUE065F200**~~	~~65~~	~~16 / 10~~	~~63~~	~~17.3~~
~~**BUE080F300**~~	~~80~~	~~16 / 10~~	~~78~~	~~22.9~~
~~**BUE080F200**~~	~~80~~	~~16 / 10~~	~~100~~	~~22.9~~
~~**BUE100F300**~~	~~100~~	~~16 / 10~~	~~124~~	~~33.0~~
~~**BUE100F200**~~	~~100~~	~~16 / 10~~	~~160~~	~~33.0~~
~~**BUE125F300**~~	~~125~~	~~16 / 10~~	~~200~~	~~48.0~~
~~**BUE125F200**~~	~~125~~	~~16 / 10~~	~~240~~	~~48.0~~
~~**BUE150F300**~~	~~150~~	~~16 / 10~~	~~300~~	~~68.0~~
~~**BUE150F200**~~	~~150~~	~~16 / 10~~	~~320~~	~~68.0~~

Operating temperature		–10....150 °C [2]	
Operating pressure	PN 16	up to 120 °C	16 bar
		130 °C	14.4 bar
	PN 10	up to 150 °C	10 bar
		150 °C	9 bar
Valve characteristic for			
control passage	F200	linear	
	F300	equal-percentage	
mixing passage		linear	
Valve control ratio		> 50:1	
Stuffing box		2 O-rings, EPDM	
Leakage rate for			
control passage		< 0.05% of k_{VS} value	
mixing passage		< 1% of k_{VS} value	
Valve stroke DN 15....50		8 mm	
Valve stroke DN 65....80		20 mm	
Valve stroke DN 100....150		40 mm	

Dimension drawing	
DN 15....50	M10437
DN 65....150	M10441
Fitting instructions	
DN 15....50	MV 506008
DN 65....150	MV 505964
AVM 105, 115, 105S, 115S	MV 506065
AVM 124	MV 505809
AVM 125S	MV 506066
AVF 124	MV 505851
AVF 125S	MV 506067
AVM 234 assembly	MV 505919
AVF 234 assembly	MV 505920
Declaration on materials	MD 56.116

1) Air humidity must not exceed 75%

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

Accessories

0372240 001* Manual adjustment for valves with stroke of 8 mm; MV 505813

0372249 001* Intermediate piece required for media temperature >100 °C up to 130 °C (recommended at a temperature of < 10 °C), DN 15…50, MV 505932

0372249 002* Intermediate piece required for media temperature >130 °C up to 150 °C , DN 15…50, MV 505932

0372336 180 Intermediate piece required for media temperature >130 °C / >150 °C from DN 65, MV 505902

0378284 100* Stuffing box heater, 230 V~; 15 W, for media below 0 °C, DN 15....150, MV 505978

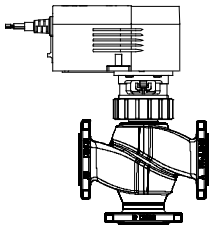
0378284 102* Stuffing box heater, 24 V~; 15 W, for media below 0 °C, DN 15....150, MV 505978

0378368 001 Complete replacement stuffing box for DN 15 to DN 50

0378369 001 Complete replacement stuffing box for DN 65 to DN 150

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

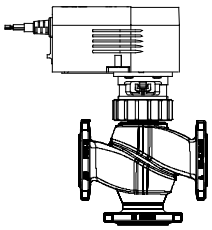
Warranty The technical data and pressure differences indicated here are only applicable in combination with Sauter actuators. Any warranty shall lapse if actuators from other manufacturers are used.



B10668

Combination: BUE with electric drive, pushing force 250 N

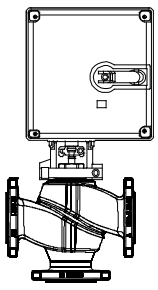
Drive Input: Running time:	**> 100 °C accessories required**			**AVM105F12.** **2-/3-point** **120 s**	**AVM105F100** **2-/3-point** **30 s**	**AVM105S** **2-/3-point, 0...10 V** **35 / 60 / 120 s**
Valve	Used as control valve			**Total weight kg**	**Total weight kg**	**Total weight kg**
	Δp_{max}	**Δp_s**	**close/off pressure**			
BUE015	4	–	6.7	3.9	3.9	3.9
BUE020	4	–	4.5	4.8	4.8	4.8
BUE025	2.8	–	2.8	5.4	5.4	5.4
BUE032	2.1	–	2.1	8.0	8.0	8.0
BUE040	1.4	–	1.4	9.3	9.3	9.3
BUE050	0.9	–	0.9	11.9	11.9	11.9



B10668

Combination: BUE with electric drive, pushing force 500 N

Drive Input: Running time:	**> 100 °C accessories required**			**AVM115F12.** **2-/3-point** **120 s**	**AVM115S** **2-/3-point, 0...10 V** **60 / 120 s**
Valve	Used as control valve			**Total weight kg**	**Total weight kg**
	Δp_{max}	**Δp_s**	**close/off pressure**		
BUE015	6	–	16	3.9	3.9
BUE020	6	–	11	4.8	4.8
BUE025	6	–	6.8	5.4	5.4
BUE032	5.2	–	5.2	8.0	8.0
BUE040	3.3	–	3.3	9.3	9.3
BUE050	2	–	2	11.9	11.9



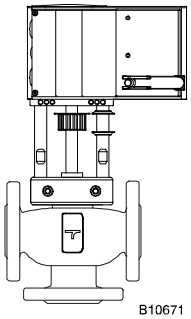
B10669

Combination: BUE with electric drive, pushing force 800 N

Drive Input: Running time:	**> 100 °C accessories required**						**AVM124** **2-/3-point** **120 s**	**AVM125S** **2-/3-point, 0...10 V** **30 / 60 / 120 s**
Valve	Application as control valve			as diverting valve			**Total weight kg**	**Total weight kg**
	Δp_{max}	**Δp_s**	**close/off pressure**	**Δp_{max}**	**Δp_s**	**close/off pressure**		
BUE015	10	–	16	6	–	16	5.3	5.3
BUE020	10	–	16	6	–	16	6.2	6.2
BUE025	10	–	11.7	5	–	13.8	6.8	6.8
BUE032	9	–	9	4	–	8.7	9.4	9.4
BUE040	5.7	–	5.7	2.5	–	5.3	10.7	10.7
BUE050	3.4	–	3.4	1.5	–	3.2	13.3	13.3

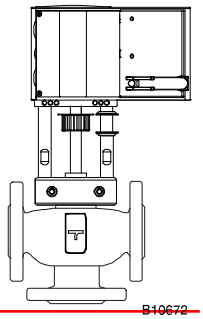
Combination: BUE with electric drive, with spring return, pushing force 500 N

Drive Input: Running time: Spring return:	**> 100 °C accessories required**						**AVF124** **3-pt.** **60 / 120 s** **18 ± 10 s**	**AVF125S** **2-/3-pt., 0...10 V** **60 / 120 s** **18 ± 10 s**
Valve	Application as control valve			as diverting valve			**Total weight kg**	**Total weight kg**
	Δp_{max}	**Δp_s**	**close/off pressure**	**Δp_{max}**	**Δp_s**	**close/off pressure**		
BUE015	6	16	16	6	16	16	5.6	5.6
BUE020	6	11	11	6	16	14	6.5	6.5
BUE025	6	6.8	6.8	5	16	8.5	7.1	7.1
BUE032	5.2	5.2	5.2	4	16	5.1	9.7	9.7
BUE040	3.3	3.3	3.3	2.5	16	3.1	11.0	11.0
BUE050	2	2.0	2.0	1.5	16	1.9	13.6	13.6



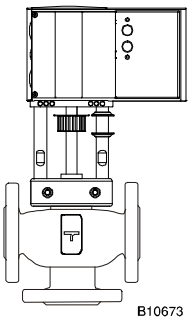
~~Combination: BUE with electric drive, pushing force 2500 N~~

~~**Drive**~~ ~~Input:~~ ~~Running time DN 65/80:~~ ~~Running time DN 100...150:~~	~~**AVM 234S F132**~~ ~~**2-/3-pt.; 0...10 V / 4...20 mA; 24 V; with accessories 3-pt. 230 V**~~ ~~**40 / 80 / 120 s**~~ ~~**80 / 160 / 240 s**~~						~~**> 130 °C accessories required**~~
~~**Valve**~~	~~Application~~ ~~as control valve~~			~~as diverting valve~~			~~**Total weight kg**~~
	~~**Δp_{max}**~~	~~**Δp_s**~~	~~**close/off pressure**~~	~~**Δp_{max}**~~	~~**Δp_s**~~	~~**close/off pressure**~~	
~~**BUE065**~~	~~3~~	~~–~~	~~6.5~~	~~1~~	~~–~~	~~6.9~~	~~21.4~~
~~**BUE080**~~	~~3~~	~~–~~	~~4.4~~	~~0.75~~	~~–~~	~~4.6~~	~~27.0~~
~~**BUE100**~~	~~2~~	~~–~~	~~2.8~~	~~0.5~~	~~–~~	~~2.9~~	~~37.1~~
~~**BUE125**~~	~~1.5~~	~~–~~	~~1.8~~	~~0.5~~	~~–~~	~~1.9~~	~~52.1~~
~~**BUE150**~~	~~1~~	~~–~~	~~1.4~~	~~0.5~~	~~–~~	~~1.3~~	~~72.1~~



~~Combination: BUE with electric drive, with spring return, pushing force 2000 N~~

~~**Drive**~~ ~~Input:~~ ~~Running time DN 65/80:~~ ~~Running time DN 100...150:~~ Spring return:	~~**AVF234SF132, F232**~~ ~~**2-/3-pt.; 0...10 V / 4...20 mA; 24 V; with accessories 3-pt. 230 V**~~ ~~**40 / 80 / 120 s**~~ ~~**80 / 160 / 240 s**~~ **15…30 s, with F132 NC, with F232 NO**						~~**> 130 °C accessories required**~~
~~**Valve**~~	~~Application~~ ~~as control valve~~			~~as diverting valve~~			~~**Total weight kg**~~
	~~**Δp_{max}**~~	~~**Δp_s**~~	~~**close/off pressure**~~	~~**Δp_{max}**~~	~~**Δp_s**~~	~~**close/off pressure**~~	
~~**BUE065**~~	~~3~~	~~5.1~~	~~5.1~~	~~1~~	~~16~~	~~5.4~~	~~22.9~~
~~**BUE080**~~	~~3~~	~~3.4~~	~~3.4~~	~~0.75~~	~~16~~	~~3.6~~	~~28.5~~
~~**BUE100**~~	~~2~~	~~2.2~~	~~2.2~~	~~0.5~~	~~16~~	~~2.3~~	~~38.6~~
~~**BUE125**~~	~~1.4~~	~~1.4~~	~~1.4~~	~~0.5~~	~~16~~	~~1.5~~	~~53.6~~
~~**BUE150**~~	~~1~~	~~1.1~~	~~1.1~~	~~0.5~~	~~16~~	~~1.0~~	~~73.6~~

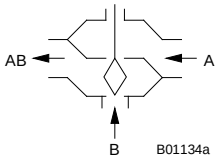


Valve: Variant F, for technical data and accessories see Valve Type Table
Drive: Variant F, for technical data, accessories and installation position see section 51
Example: BUE065F300 / AVM234SF132

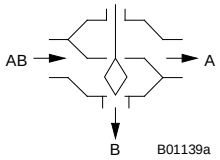
Δp_{max} [bar]=	Maximum permitted pressure difference across the valve at which the drive can still reliably open and close the valve, taking account of Δp_V.
Δp_S [bar]=	Maximum permitted pressure difference across the valve in case of a fault (pipe break downstream of the valve) at which the drive can close the valve reliably with "fast" performance of the stroke.
Close/off pressure [bar]=	Maximum admissible pressure difference over the valve in control mode, at which the drive can still firmly open and close the valve. The serviceable life may be reduced. Cavitation, erosion and surges may damage the valve. The values apply only when the valve is fitted to the drive as a unit.

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 as well as diverting valves. The direction of flow marked on the valve must be observed. Parameters related to flow mechanics conform to EN 60534.

Used as a control valve



Used as a diverting 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 quick-close functions, coping with differential pressures, controlling the medium temperature and providing a shut-off function - and 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 cone (which is made of brass) controls an equal-percentage flow in the control passage. To compensate for 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 seat which is machined in the body.
The stuffing box is maintenance-free; it consists of a brass body, 2 O-rings, a wiper ring and the grease reserve. This is free of silicone grease and no silicone oil must be used for the stem.

Engineering and fitting notes
The valves are combined with actuators without spring return action, or actuators with spring return action. The drive is placed directly on top of the valve and is fixed either with a nut or with screws. The connection between the drive and the valve stem is made automatically. When the plant is operated for the first time, the drive moves out and the lock closes automatically once it has reached the lower valve seat. The valve stroke is also detected by the drive and no further adjustments are required. This means that the force on the seat is always equal and the lowest leakage rate is always guaranteed. With the SUT drives, the characteristic can be changed over to linear or quadratic as desired. For the combination AVM 105S with DN50 F200 it is not possible to change the character from linear to equal-percentage.

Installation position
The final control element can be installed in any desired position, but the installed position facing downwards is not recommended. Condensate and water drips etc. must be prevented from penetrating into the drive. With nominal diameters DN 65 to DN 150 in a horizontal installed position and in relation to the valve stem, the permitted maximum drive (or other) weight is 25 kg unless a support is provided by the customer or others.
When fitting the drive onto the valve, you must make sure that the cone is not rotated on the seat (this would damage the sealing surface). If the valve is insulated, the insulation must only extend as far as the connecting clip of the drive.

To increase the functional reliability of the valve, the system must conform to DIN EN 14336 (heating systems in buildings). DIN EN 14336 states, amongst other things, that the system has to be flushed through before being put into service.

Applications with water
To ensure that impurities in the water (such as welding beads or particles of rust, etc.) are retained and the cone 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 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.

Other notes concerning hydraulics and noises in systems

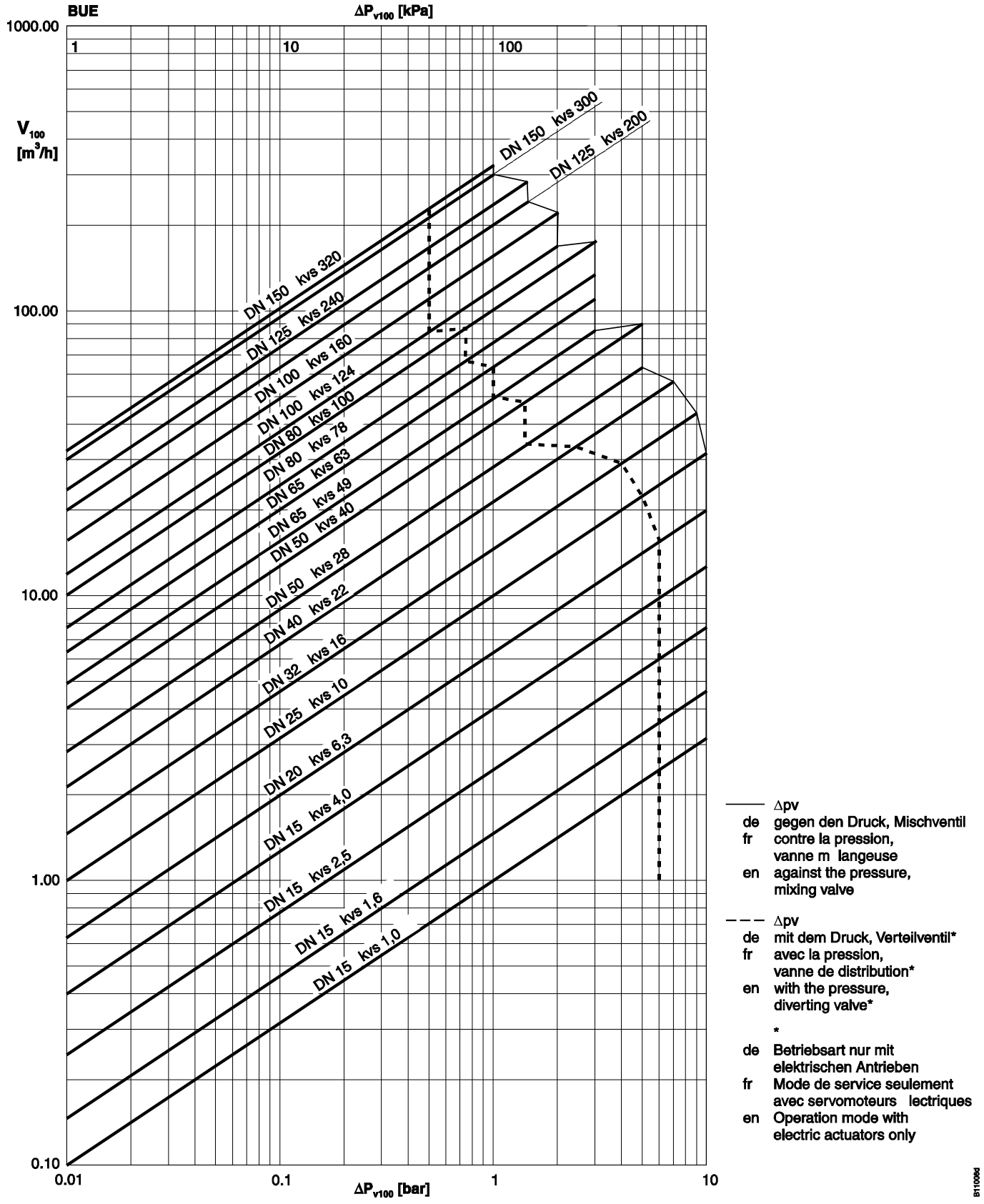
The valves can be used in a low-noise environment. To avoid noises, the pressure differences Δp_{max} listed below should not be exceeded.

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, the differential pressure 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 pressure at operating temperature (bar)
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 quick-close function with 'fast' passage through the stroke (by means of the spring), this value may exceed Δp_{max}.

Pressure loss table



Type	Δpv	
	Used as a control valve	Used as a diverting valve
BUE015	10	6
BUE020	10	6
BUE025	10	5
BUE032	9	4
BUE040	7	2.5
BUE050	5	1.5
~~**BUE065**~~	~~3~~	~~1.0~~
~~**BUE080**~~	~~3~~	~~0.75~~
~~**BUE100**~~	~~2~~	~~0.5~~
~~**BUE125**~~	~~1.5~~	~~0.5~~
~~**BUE150**~~	~~1.0~~	~~0.5~~

Additional technical data

☐Pressure and temperature data	EN 764. EN 1333
☐Parameters related to flow mechanics	EN 60534 page 3
☐Sauter slide rule for valve sizing	7 090011 003
☐Manual for slide rule	7 000129 003
☐Technical manual: 'Regulating Units'	7 000477 003
☐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
☐BUE 015 up to BUE 050: no CE symbol	Article 3.3
☐BUE 065 up to BUE 150: CE symbol	Category I

Additional information

Valve body made of grey cast iron to EN 1561, code EN-GJL-250, material number EN-JL 1040 with smooth drilled flanges to EN 1092-2, form B, sealing strip. Valve body protected by matt paint to RAL 9005, dark black. Recommendation for welding-neck flange as per EN 1092-1. Overall valve length to EN 558-1, basic series 1. Flat seal on valve body made of asbestos-free material.

DIN material numbers

	DIN material number	DIN designation
Valve body	EN-JL 1040	EN-GJL-250 (GG25)
Valve seat	EN-JL 1040	EN-GJL-250
Stem	1.4305	X8CrNiS18-9
Cone	CW617W	CuZn40Pb2
Conical seal	PTFE	
Stuffing box	CW617W	CuZn40Pb2

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.

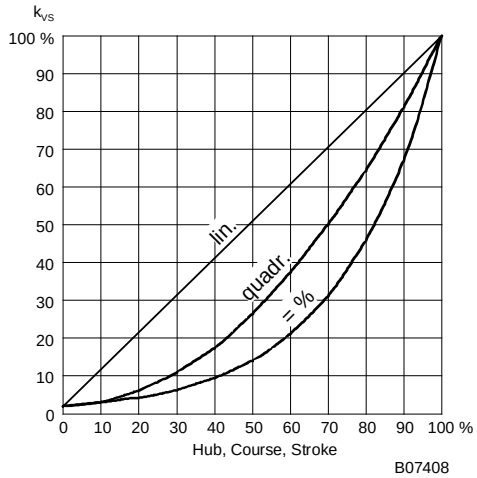
Δp_{max}:
Maximum permitted pressure difference across the valve at which the drive can reliably open and close the valve.
The following are taken into account: static pressure and influences related to flow mechanics. Faultless performance of the stroke and tightness are guaranteed with this value,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

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 quick-close 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}:
Pipe pressure upstream of 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.
For valves which close with the pressure, the static pressure added to the pump pressure must be used for this purpose.

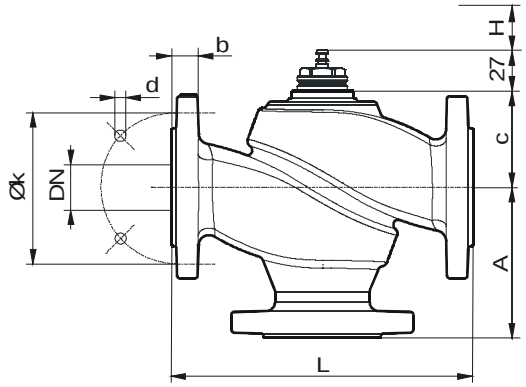
Close/off pressure:
Maximum admissible pressure difference over the valve in control mode at which the actuator can still open and close the valve. A reduced service life should be expected in this mode. Cavitation, erosion and pressure surges may damage the valve. The values apply only when the valve is fitted to the actuator.

Characteristic for drives with a positioner
On drive AVM 105S or AVM 115S
Equal-percentage / linear
On drives AVM 125S, AVF 125S, AVM 234S or AVF 234S
Equal-percentage / linear / quadratic



Dimension drawings

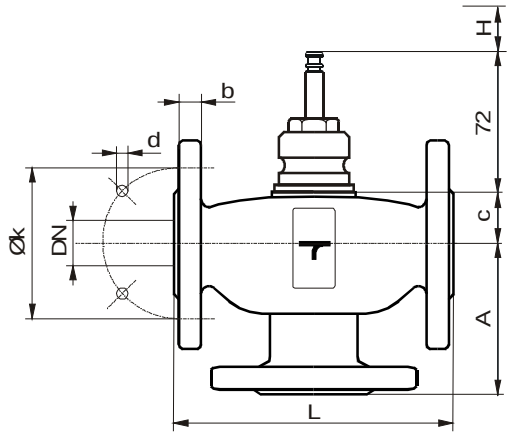
DN 15…50



VUE, BUE	DN	A	c	L	H	k	d	b
015	15	70	41,5	130	8	65	14 x 4	14
020	20	75	48	150	8	75	14 x 4	16
025	25	80	54,5	160	8	85	14 x 4	16
032	32	95	60,5	180	8	100	19 x 4	18
040	40	100	70,5	200	8	110	19 x 4	18
050	50	115	71	230	8	125	19 x 4	20

M10437c

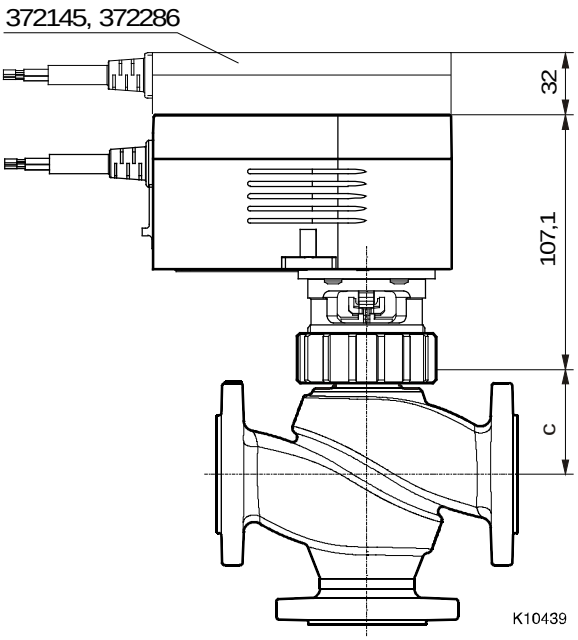
~~**DN 65…150**~~



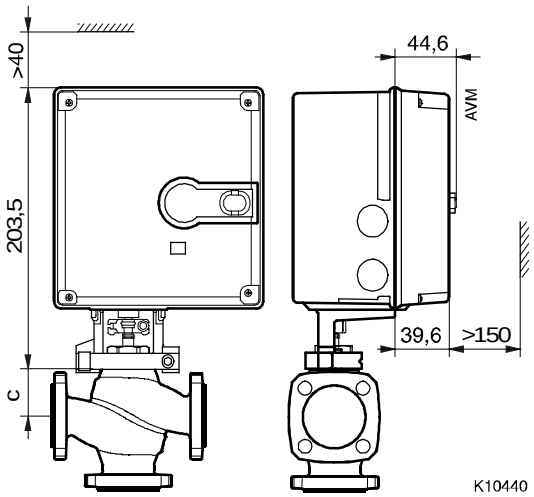
~~BUE~~	~~DN~~	~~A~~	~~c~~	~~L~~	~~H~~	~~k~~	~~d~~	~~b~~
~~065~~	~~65~~	~~145~~	~~62~~	~~290~~	~~20~~	~~145~~	~~19 x 4~~	~~20~~
~~080~~	~~80~~	~~155~~	~~62~~	~~310~~	~~20~~	~~160~~	~~19 x 8~~	~~22~~
~~100~~	~~100~~	~~175~~	~~93~~	~~350~~	~~40~~	~~180~~	~~19 x 8~~	~~24~~
~~125~~	~~125~~	~~200~~	~~105,5~~	~~400~~	~~40~~	~~210~~	~~19 x 8~~	~~26~~
~~150~~	~~150~~	~~240~~	~~120~~	~~480~~	~~40~~	~~240~~	~~23 x 8~~	~~26~~

~~M10441b~~

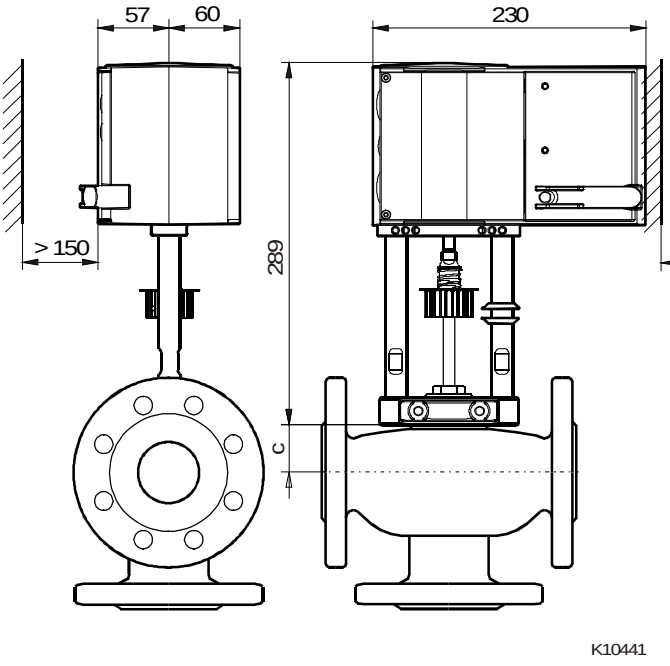
AVM 104 / 105 / 114 / 115 /S



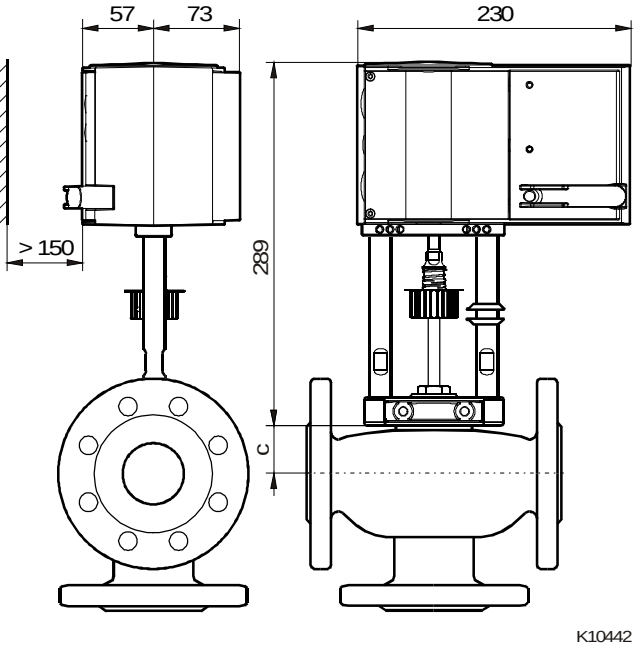
AVM / AVF / 124 / 125 /S



AVM 234S

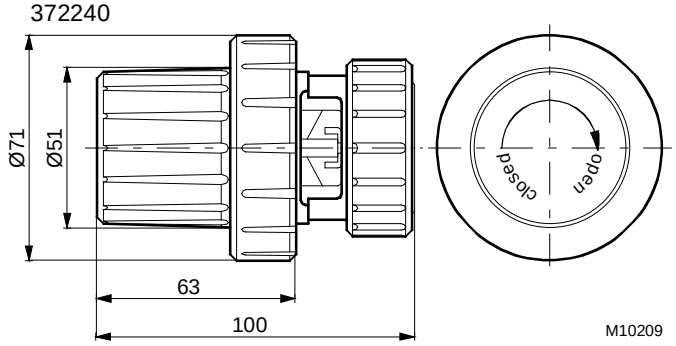


AVF 234S

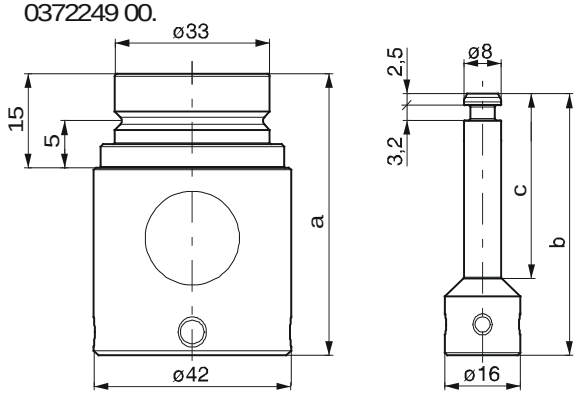


Accessories

372240



0372249 00.



	a [mm]	b [mm]	c [mm]
0372249 001	60	55,8	40
0372249 002	80	75,8	60

Z10220

0378284 100
0378284 102