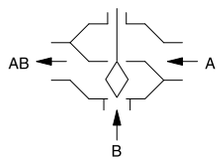
BUS: 3-way flanged valve, PN 40 (el.)

BUS015F2*5



How energy efficiency is improved

Efficiency means precise and reliable control

Features

- Continuous control of cold/warm/hot water in HVAC installations in closed circuits
- In combination with valve actuators AVM 322(S), AVM 234S and AVF 234S as control unit
- Water quality as per VDI 2035
- Not suitable for drinking water
- Valve with flange connection as per EN 1092-2, seal form B
- Regulating valve, free of silicone grease, matt black
- Control passage, linear characteristic, DN 15...100; adjustable with SUT (SAUTER Universal Technology) valve actuators to equal-percentage
- Mixing passage, linear characteristic
- The control passage is closed when the spindle is moved out
- For use only as a control valve
- Valve body made of cast steel
- Stainless-steel seat and plug
- Stainless-steel spindle
- Maintenance-free stuffing box, made of stainless steel, with spring-loaded PTFE washer up to 220 °C, with graphite seal up to 260 °C

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Technical data

Parameters		
	Nominal pressure	PN 40
	Operating pressure	40 bar at −10...50 °C 36.3 bar at 120 °C 29.4 bar at 220 °C 27.8 bar at 260 °C
	Connection	Flange as per EN 1092-2, form B
	Control ratio	> 30: 1
	Mixing passage valve characteristic	Linear
	Control passage leakage rate	≤ 0.05% of K_{VS} value
	Mixing passage leakage rate	≤ 1.0% of K_{VS} value

Ambient conditions		
	Operating temperature[1)]	−10...260 °C

CE/UKCA conformity[2)]		
	Pressure and temperature data	EN 764, EN 1333
	Flow parameters	EN 60534
	PED 2014/68/EU (CE)	Fluid group II (liquids only)
	PESR-2016 (UKCA)	Fluid group II (liquids only)

Overview of types

Type	Nominal diameter	K_{VS} value	Control passage valve characteristic	Valve stroke	Weight
BUS015F225	DN 15	1.6 m³/h	Linear	20 mm	7.2 kg
BUS015F215	DN 15	2.5 m³/h	Linear	20 mm	7.2 kg
BUS015F205	DN 15	4 m³/h	Linear	20 mm	7.2 kg
BUS020F205	DN 20	6.3 m³/h	Linear	20 mm	8.4 kg
BUS025F205	DN 25	10 m³/h	Linear	20 mm	9.4 kg
BUS032F205	DN 32	16 m³/h	Linear	20 mm	12.4 kg

1) *No stuffing box heater required down to –10 °C. At temperatures below −10 °C and down to −60 °C, use special version with bellows seal (available on request, only to DN 100). Application: Water with anti-freeze (glycol up to 55% and brine solution), max. operating pressure 30 bar. Above 130 °C or 180 °C, use the relevant adapter (accessory). Above 220 °C and up to 260 °C, use stuffing box with graphite seal (accessory)*

2) *Explanation of abbreviations in the “Further information” section of the product data sheet and in the appendix to SAUTER’s product catalogues*

Type	Nominal diameter	K_{VS} value	Control passage valve characteristic	Valve stroke	Weight
BUS040F205	DN 40	25 m³/h	Linear	20 mm	15.5 kg
BUS050F205	DN 50	40 m³/h	Linear	20 mm	19.2 kg
BUS065F205	DN 65	63 m³/h	Linear	30 mm	27.6 kg
BUS080F205	DN 80	100 m³/h	Linear	30 mm	36.5 kg
BUS100F205	DN 100	160 m³/h	Linear	30 mm	61.2 kg

CE/UKCA conformity

	EU		UK	
	PED 2014/68/EU	Label	PESR-2016 (UKCA)	Label
BUS015F225 BUS015F215 BUS015F205 BUS020F205 BUS025F205 BUS032F205	Art. 4.3	Without CE	Art. 8.3	Without UKCA
BUS040F205 BUS050F205 BUS065F205 BUS080F205 BUG100F205	Category I	CE	Category I	UKCA

Accessories	
Type	Description
0372336180	Adaptor (required when temperature of the medium is 130...180 °C)
0372336240	Adaptor (required when temperature of the medium is 180...260 °C)
0378373001	Stuffing box with graphite seal for temperatures of 220...260 °C; DN 15…50
0378373002	Stuffing box with graphite seal for temperatures of 220...260 °C; DN 65…100

Combination of BUS with electric 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 Δp_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 Δp_{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**	
Actuating power	1000 N	1000 N	2500 N	2000 N	
Control signal	2-/3-point	2-/3-point, 0…10 V, 4…20 mA	2-/3-point, 0…10 V, 4…20 mA	2-/3-point, 0…10 V, 4…20 mA	
Running time for DN 15...50	120/240 s	80/120 s	40/80/120 s	40/80/120 s	
Running time for DN 65...100	–	–	60/120/180 s	60/120/180 s	
As control valve	Δp_{max} [bar]	Δp_{max} [bar]	Δp_{max} [bar]	Δp_{max} [bar]	Δp_s [bar]
BUS015F225 BUS015F215 BUS015F205	35.0	35.0	40.0	40.0	40.0
BUS020F205	35.0	35.0	40.0	34.7	40.0
BUS025F205	17.4	17.4	37.8	29.6	37.0
BUS032F205	12.2	12.2	27.0	21.1	27.0
BUS040F205	6.2	6.2	16.4	12.8	16.0
BUS050F205	3.7	3.7	10.5	8.2	10.0
BUS065F205	–	–	6.1	4.7	6.1

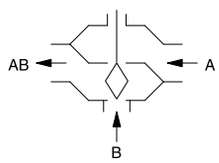
Actuator	AVM322F120 AVM322F122	AVM322SF132	AVM234SF132	AVF234SF132 AVF234SF232	
BUS080F205	–	–	3.9	3.0	3.9
BUS100F205	–	–	2.5	1.9	2.5
Cannot be used as distribution valve					

At temperatures above 130 °C, accessories are required

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 only be used as control valves. Observe the direction of flow shown on the valve. The flow parameters comply with 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 difficult challenges such as spring-controlled closing functions, overcoming high differential pressures, controlling media temperatures and performing the shut-off function, all with a low noise level.
The spindle is automatically and firmly connected to the actuator spindle. The stainless steel plug controls the linear or equal-percentage flow rate in the control passage. The tightness of the valve is ensured by the stainless steel ring pressed into both seats and the corresponding plug.
The stuffing box is maintenance-free. This consists of 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 any particles that are present in the medium from penetrating to the PTFE sealing.

Intended use

This product is only allowed to be used in HVAC building systems for control and regulation purposes. Other uses require the prior consent of the manufacturer.
The section “Description of operation” and all product instructions in this data sheet must be observed.
Modifying or converting the product is not permitted.

Improper use

The product is not suitable for:
- Safety applications
- Drinking water installations
- Steam

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 valve actuators with a spring return. The actuator is mounted directly on the valve and fastened with screws. The actuator is connected with the spindle automatically. During the commissioning of the system, the AVM 322(S), AVM 234S and AVF 234S actuators move out. The connector automatically closes the connection to the valve as soon as 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 leakage levels are always minimised. With the SUT actuators, the characteristic can be set to linear, equal-percentage or quadratic as required. For a more detailed description, see PDS 51.379 “Initialisation and feedback signal”.
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). DIN EN 14336 states, amongst other things, that the system has to be flushed through before being put into service.

Using with water

So that impurities are retained in the water (weld beads, rust particles, etc.) and the spindle 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 glycol is used, the recommended concentration is between 20% and 55%.

Fitting position

The control unit can be mounted in any position up to a media temperature of 130 °C, but suspended mounting is not recommended. 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 valve actuator from excessive heat, the piping must be insulated.

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.

Outdoor installation

We recommend protecting the devices from the weather if they are installed outside buildings.

Hydraulics and noise in plants

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

The pressure difference Δp_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 differential pressure on the valve should not exceed the value Δp_{crit}:

$\Delta p_{crit} = (p1 - p_v) \times 0.5$

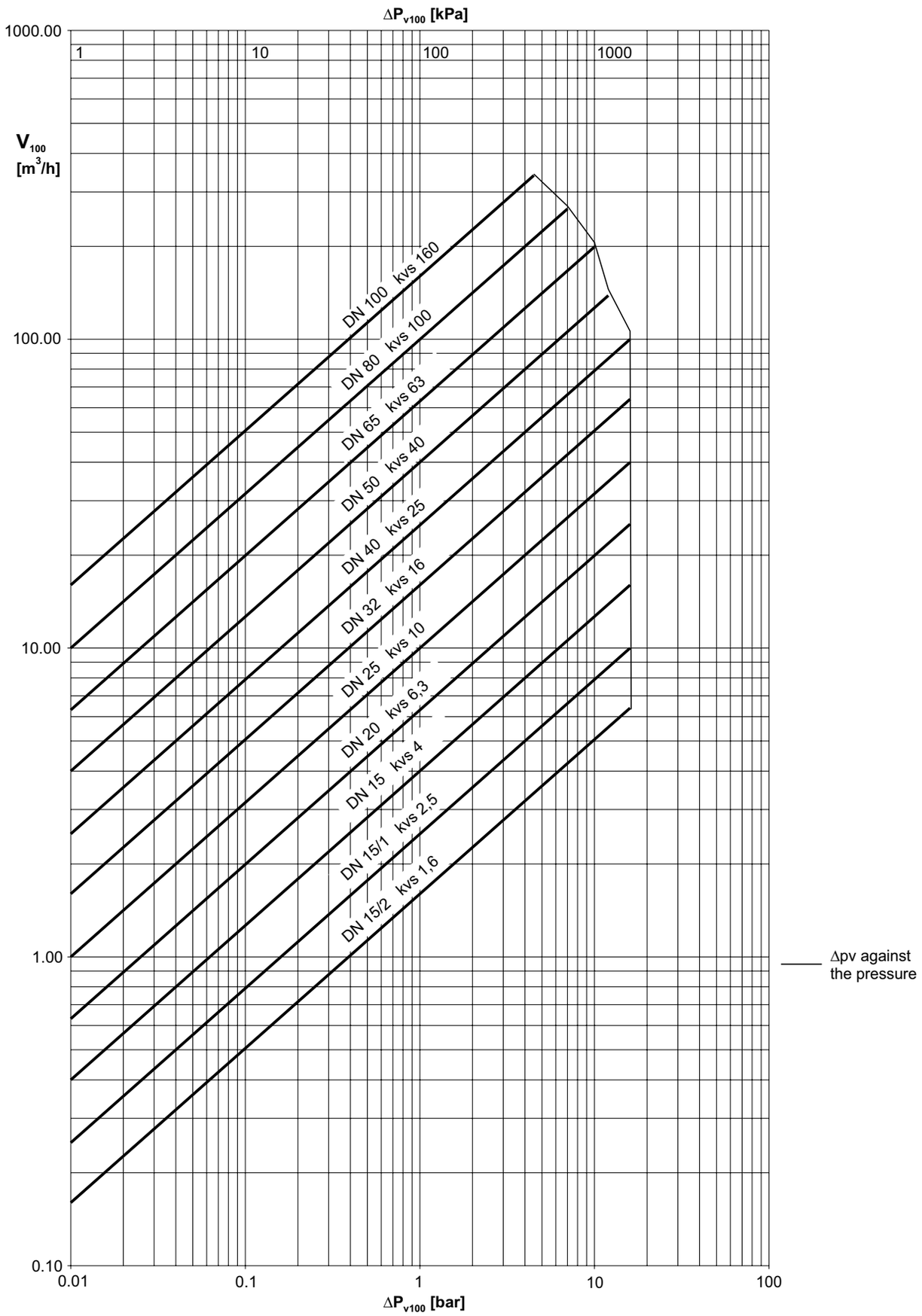
p1 = upstream pressure before the valve (bar)

p_v = pressure at operating temperature (bar)

The calculation works with absolute pressure.

For the spring return, the stated Δp_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 Δp_{max}.

Flow-rate chart

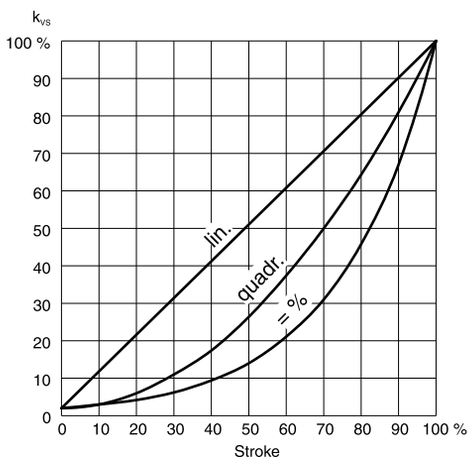


Type	Δp_V [bar] (as control valve)
BUS015F225	40
BUS015F215	40
BUS015F205	40
BUS020F205	40
BUS025F205	40
BUS032F205	40
BUS040F205	40
BUS050F205	30
BUS065F205	30
BUS080F205	25
BUS100F205	25

Cannot be used as distribution valve

Characteristic for actuators with positioner (24 V only)

On actuator AVM 322(S), AVM 234S or AVF 234S
Equal-percentage/linear/quadratic



Can be set using coding switch

Additional information

	Document no.
Fitting instructions for VUS/BUS	MV 506071
Fitting instructions for AVM 322	P100011900
Fitting instructions for AVM 234S	MV 505919
Fitting instructions for AVF 234S	MV 505920
SAUTER slide rule for valve sizing	P100013496
Manual for SAUTER slide rule	7000129001
Declaration on materials and the environment	MD 56.126

Abbreviations used

CE	Manufacturer’s Declaration of Conformity for the European Union (EU)
PED	Pressure Equipment Directive 2014/68/EU
PESR-2016	Pressure Equipment (Safety) Regulations 2016 (UK)
UKCA	Manufacturer’s Declaration of Conformity for the United Kingdom of Great Britain and Northern Ireland (UK)

Valve design

SAUTER provides various tools for valve design and engineering:

- ValveDim smartphone app
- ValveDim PC program
- ValveDim slide rule

You can find the tools under the link www.sauter-controls.com/en/performance/valve-calculation/ or scan the QR code

Design and materials

Valve body made of cast steel as per DIN EN 10213, code GP240GH+N, material number 1.0619+N with smooth drilled flanges as per EN 1092-1, seal form B. Valve body protected by matt paint RAL 9005 black. Recommended for the welding flanges 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.
PTFE collar and sealing ring for stuffing box available as spare part no. 0378372

Material numbers as per DIN

	DIN material no.	DIN designation
Valve body	1.0619+N	GP240GH+N
Valve seat	1.4021	X20Cr13
Spindle	1.4021	X20Cr13
Plug	1.4021	X20Cr13
Stuffing box	1.4021	X20Cr13
Seal under stuffing box	Cu	DIN 7603

Definition of pressure differences

Δp_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 both the service life and the operational capacity.

Δp_{max}: Maximum admissible pressure difference over the valve at which the actuator can reliably open and close the valve. The following are considered: Static pressure and flow effects. This value ensures trouble-free stroke movement and tightness. The value Δp_v of the valve is never exceeded.

Δp_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 safety function with a rapid stroke movement, Δp_s can be greater than Δp_{max} or Δp_v. The flow disturbing effects that arise here are quickly passed through. They are of secondary importance with this method of operation. For 3-way valves, the values only apply to the control passage.

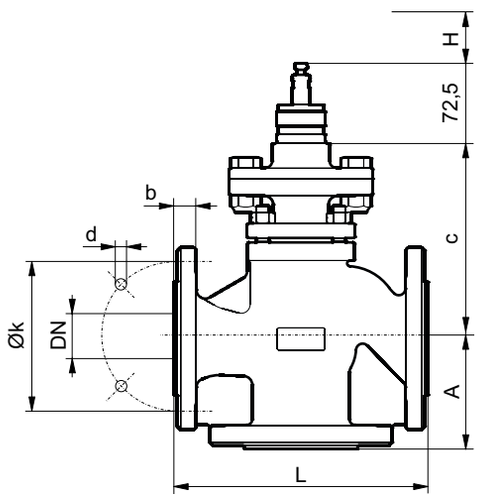
Δp_{stat}: Line pressure behind the valve. This essentially corresponds to the idle pressure when the pump is switched off, caused for example by the fluid level in the system, increased pressure due to pressure tanks or steam pressure. For valves that close with pressure, the static pressure plus the pump pressure are used.

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

All dimensions in mm.

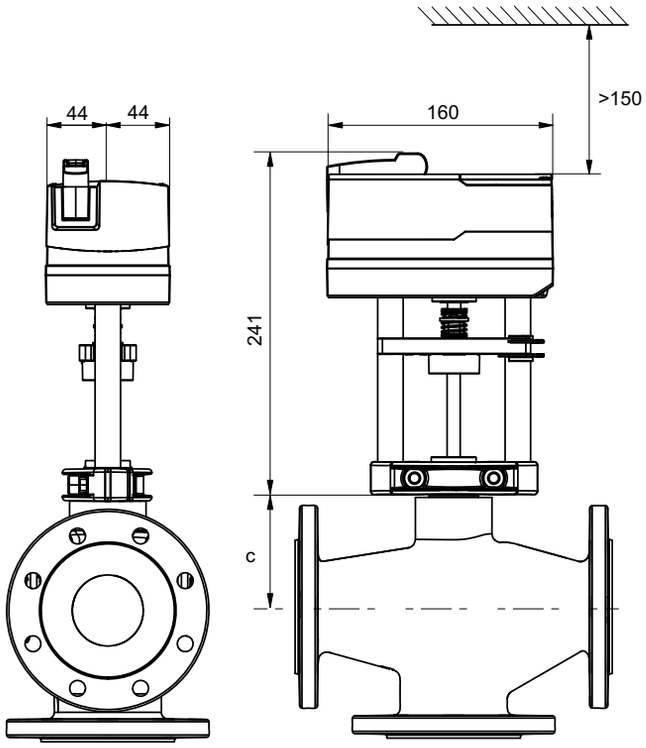


DN	A (mm)	c (mm)	L (mm)	H (mm)	k (mm)	d (mm)	b (mm)
15	65	143	130	20	65	14 × 4	16
20	70	143	150	20	75	14 × 4	18
25	75	147	160	20	85	14 × 4	18
32	80	173	180	20	100	19 × 4	18
40	90	179	200	20	110	19 × 4	18
50	100	177	230	20	125	19 × 4	20
65	120	213	290	30	145	19 × 8	22
80	130	229	310	30	160	19 × 8	24
100	150	248	350	30	190	23 × 8	24

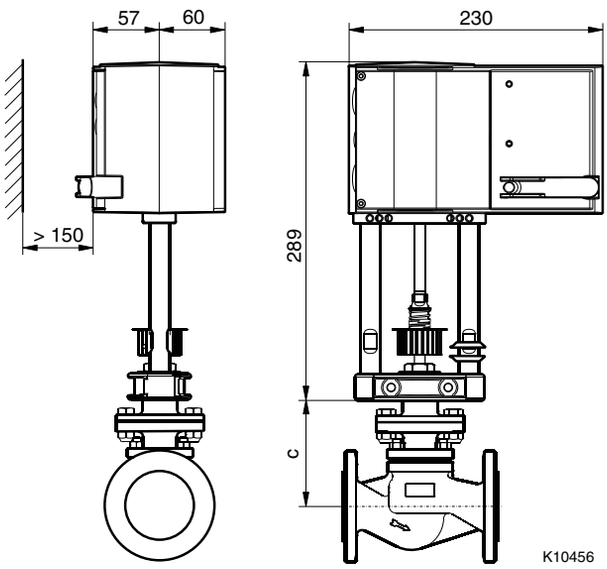
Combinations

i *For dimension c, see table above.*

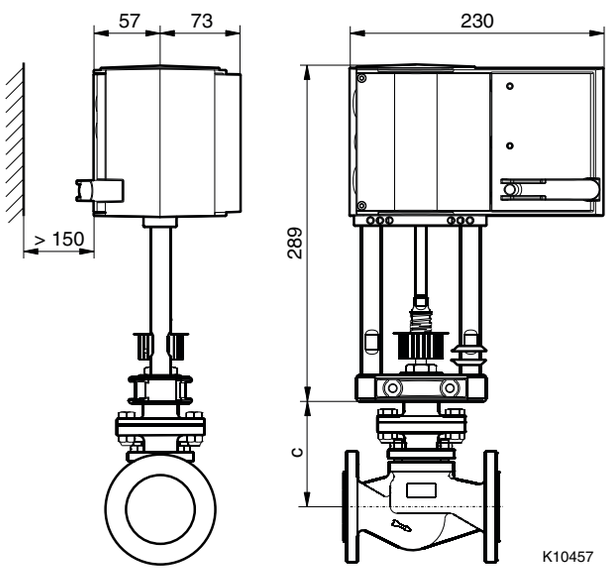
AVM 322(S)



AVM 234S

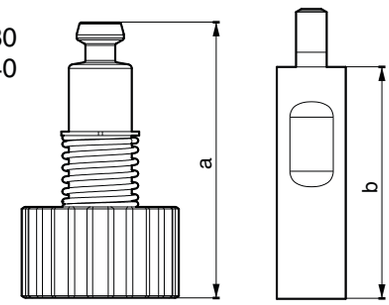


AVF 234S



Accessories

0372336 180
0372336 240



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

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