

## BUL: 3-way unit valve, PN 16

### How energy efficiency is improved

Linear mixture and no loss through leakage in the control passage for energy-efficient regulation

### Features

- Flat-sealing standard version or version with clamping-ring screw fitting for pipe Ø 15 mm with DN 10
- Valve with male thread as per DIN EN ISO 228-1, class B
- Special model for fan coil units with cast-on by-pass T-piece
- Control passage A-AB is closed when the spindle is moved in
- Can be used as a control valve and, thanks to its tight-sealing third passage, as a distribution valve
- Nickel-plated valve body made of cast brass
- Plug with EPDM soft seal for control passage and mixing passage
- Stainless-steel spindle
- Stuffing box with double O-ring seal

### Technical data

#### Parameters

Nominal pressure	PN 16
Valve characteristic, control passage	Equal-percentage
Valve characteristic, mixing passage	Linear
Valve stroke	3.7 mm
Leakage rate of control passage A-AB	0.0001% of $K_{VS}$ value
Leakage rate of mixing passage B-AB	Approx. 0.1% of $K_{VS}$ value

#### Ambient conditions

Admissible operating temperature for valve	2...120 °C
Admissible operating temperature for valve in combination with AXT 211, AXS 215 and AXM 217 (S)	100 °C at the valve
Operating pressure up to 120 °C	16 bar

#### Standards and directives

Pressure and temperature data	EN 764, EN 1333
Flow parameters	VDI/DE 2173
Pressure Equipment Directive	2014/68/EU (fluid group II) No CE label article 4.3

#### Overview of types

**i** The BUL 3-way valve must not be used as a 2-way valve

**i**  $K_{VS}$  value: The  $K_{VS}$  value of the mixing passage (B-AB) is reduced by approx. 30%

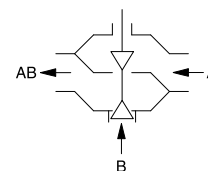
Type	Nominal diameter	$K_{VS}$ value	Connection	Weight
BUL010F330	DN 10	0.4 m <sup>3</sup> /h	G½" B	0.30 kg
BUL010F320	DN 10	0.63 m <sup>3</sup> /h	G½" B	0.30 kg
BUL010F310	DN 10	1 m <sup>3</sup> /h	G½" B	0.30 kg
BUL010F300	DN 10	1.6 m <sup>3</sup> /h	G½" B	0.30 kg
BUL015F310	DN 15	2.5 m <sup>3</sup> /h	G¾" B	0.33 kg
BUL015F300	DN 15	4 m <sup>3</sup> /h	G¾" B	0.33 kg
BUL020F300	DN 20	5 m <sup>3</sup> /h	G1" B	0.36 kg
BUL010F430	DN 10	0.4 m <sup>3</sup> /h	G½" B	0.38 kg
BUL010F420	DN 10	0.63 m <sup>3</sup> /h	G½" B	0.38 kg
BUL010F410	DN 10	1 m <sup>3</sup> /h	G½" B	0.38 kg
BUL010F400	DN 10	1.6 m <sup>3</sup> /h	G½" B	0.38 kg
BUL015F410	DN 15	2.5 m <sup>3</sup> /h	G¾" B	0.42 kg



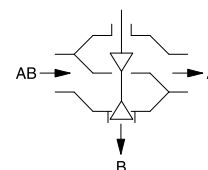
BUL015F310



BUL010F410



Control valve



Distribution valve



Type	Nominal diameter	K <sub>vs</sub> value	Connection	Weight
BUL015F400	DN 15	4 m <sup>3</sup> /h	G¾" B	0.42 kg
BUL020F400	DN 20	5 m <sup>3</sup> /h	G1" B	0.50 kg
BUL010F630	DN 10	0.4 m <sup>3</sup> /h	Clamping ring vers. Ø 15 mm	0.38 kg
BUL010F620	DN 10	0.63 m <sup>3</sup> /h	Clamping ring vers. Ø 15 mm	0.38 kg
BUL010F610	DN 10	1 m <sup>3</sup> /h	Clamping ring vers. Ø 15 mm	0.38 kg
BUL010F600	DN 10	1.6 m <sup>3</sup> /h	Clamping ring	0.38 kg

💡 **BUL0\*\*F4\*\***: Version with bypass T-piece

#### Accessories

Type	Description
0378133010	1 threaded sleeve, R¾", flat-sealing, with cap nut and flat seal, G½ - R¾
0378133015	1 threaded sleeve, R½", flat-sealing, with cap nut and flat seal, G¾ - R½
0378133020	1 threaded sleeve, R¾", flat-sealing, with cap nut and flat seal, G1 - R¾
0378134010	1 solder nipple, Ø 12, flat-sealing, with cap nut and flat seal, G½
0378134015	1 solder nipple, Ø 15, flat-sealing, with cap nut and flat seal, G¾
0378134020	1 solder nipple, Ø 22, flat-sealing, with cap nut and flat seal, G1
0378135010	1 clamping-ring screw fitting for pipe Ø 15 mm, DN 10
0378145015	1 clamping-ring screw fitting for pipe Ø 15 mm, DN 15, flat-sealing, ¾" B
0378145020	1 clamping-ring screw fitting for pipe Ø 22 mm, DN 20, flat-sealing, 1" B
0378126001	Stuffing box for BUL valves
0378126002	Stuffing box for BUL valves as of manufacturing date 1501

#### Combination of BUL 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  $\Delta p_s$ :** Maximum admissible pressure drop in the event of a malfunction (pipe break after the valve) at which the actuator reliably closes the valve.
- 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 with motorised actuators

Actuator	AXM217F200	AXM217F202	AXM217SF402
Voltage	230 V~	24 V~/=	24 V~/=
Control signal	3-point	3-point	0/2...10 V, 0...5 V, 5...10 V, 0/4...20 mA
Running time	48 s	48 s	48 s

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

As control valve	$\Delta p_{max}$	$\Delta p_{max}$	$\Delta p_{max}$
BUL010F330	1.7	1.7	1.7
BUL010F320			
BUL010F310			
BUL010F300			
BUL010F430			
BUL010F420			
BUL010F410			
BUL010F400			
BUL010F630			
BUL010F620			
BUL010F610	1.4	1.4	1.4
BUL010F600			
BUL015F310	1.4	1.4	1.4
BUL015F410			

Actuator	AXM217F200	AXM217F202	AXM217SF402
BUL015F300 BUL015F400	1.2	1.2	1.2
BUL020F300 BUL020F400	1.0	1.0	1.0
As distribution valve	$\Delta p_{max}$	$\Delta p_{max}$	$\Delta p_{max}$
BUL010F330 BUL010F320 BUL010F310 BUL010F300 BUL010F430 BUL010F420 BUL010F410 BUL010F400 BUL010F630 BUL010F620 BUL010F610 BUL010F600	1.9	1.9	1.9
BUL015F310 BUL015F300 BUL020F300 BUL015F410 BUL015F400 BUL020F400	1.2	1.2	1.2

## Pressure differences with thermal actuators

Actuator	AXT211F210 AXT211HF210	AXT211F212 AXT211HF212	AXT211F110 AXT211F110B AXT211F110M AXT211F190 AXT211HF110	AXT211F112 AXT211F112B AXT211F192 AXT211HF112	AXT211F112M
Voltage	230 V~	24 V~/=	230 V~	24 V~/=	24 V~/=
Control signal	2-point	2-point	2-point	2-point	2-point
Running time	122 s	148 s	122 s	148 s	148 s

 $\Delta p$  [bar]

As control valve	$\Delta p_{max}$	$\Delta p_{max}$	$\Delta p_{max}$	$\Delta p_s$	$\Delta p_{max}$	$\Delta p_s$	$\Delta p_{max}$	$\Delta p_s$
BUL010F330 BUL010F320 BUL010F310 BUL010F300 BUL010F430 BUL010F410 BUL010F400 BUL010F630 BUL010F620 BUL010F610 BUL010F600	1.7	1.7	1.7	1.8	1.7	1.8	1.7	1.8
BUL015F310 BUL015F410	1.4	1.4	1.4	1.5	1.4	1.5	1.4	1.5
BUL015F300 BUL015F400	1.2	1.2	1.2	1.3	1.2	1.3	1.2	1.3
BUL020F300 BUL020F400	1.0	1.0	1.0	1.1	1.0	1.1	1.0	1.1
BUL010F420	1.7	1.7	1.7	1.8	1.7	1.8	1.8	1.8

Actuator	AXT211F210 AXT211HF210	AXT211F212 AXT211HF212	AXT211F110 AXT211F110B AXT211F110M AXT211F190 AXT211HF110		AXT211F112 AXT211F112B AXT211F192 AXT211HF112		AXT211F112M	
	$\Delta p_{max}$	$\Delta p_{max}$	$\Delta p_{max}$	$\Delta p_s$	$\Delta p_{max}$	$\Delta p_s$	$\Delta p_{max}$	$\Delta p_s$
BUL010F330 BUL010F320 BUL010F310 BUL010F300 BUL010F430 BUL010F420 BUL010F410 BUL010F400 BUL010F630 BUL010F620 BUL010F610 BUL010F600	1.9	1.9	1.9	4.0	1.9	4.0	1.9	4.0
BUL015F310 BUL015F410	1.6	1.6	1.6	2.1	1.6	2.1	1.6	2.1
BUL015F300 BUL015F400	1.4	1.4	1.4	2.1	1.4	2.1	1.4	2.1
BUL020F300 BUL020F400	1.2	1.2	1.2	2.0	1.2	2.0	1.2	2.0

Actuator	AXS215SF222 AXS215SF222B	AXS215SF122 AXS215SF122B
Voltage	24 V~	24 V~
Control signal	0...10 V	0...10 V
Running time	111 s	111 s

 $\Delta p$  [bar]

As control valve	$\Delta p_{max}$	$\Delta p_{max}$	$\Delta p_s$
BUL010F330 BUL010F320 BUL010F310 BUL010F300 BUL010F430 BUL010F420 BUL010F410 BUL010F400 BUL010F630 BUL010F620 BUL010F610 BUL010F600	1.7	1.7	1.8
BUL015F310 BUL015F410	1.4	1.4	1.5
BUL015F300 BUL015F400	1.2	1.2	1.3
BUL020F300 BUL020F400	1.0	1.0	1.1

As distribution valve	$\Delta p_{max}$	$\Delta p_{max}$	$\Delta p_s$
BUL010F330 BUL010F320 BUL010F310 BUL010F300 BUL010F430 BUL010F420 BUL010F410 BUL010F400 BUL010F630 BUL010F620 BUL010F610 BUL010F600	1.9	1.9	4.0

Actuator	AXS215SF222 AXS215SF222B	AXS215SF122 AXS215SF122B	
BUL015F310 BUL015F410	1.6	1.6	2.1
BUL015F300 BUL015F400	1.4	1.4	2.1
BUL020F300 BUL020F400	1.2	1.1	1.2

### Additional technical data

#### kvs value in m<sup>3</sup>/h

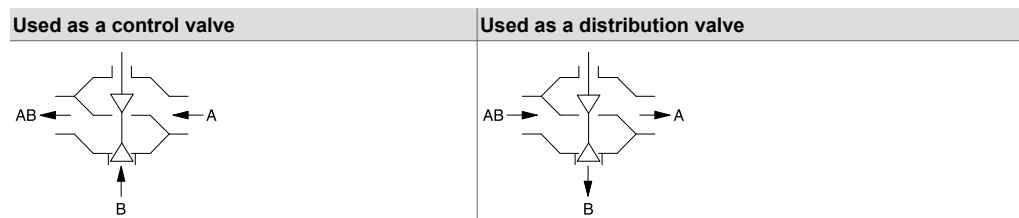
Valve	Control passage	Mixing passage
BUL010F*30	0.40	0.30
BUL010F*20	0.63	0.47
BUL010F*10	1.0	0.75
BUL010F*00	1.6	1.2
BUL015F*10	2.5	1.9
BUL015F*00	4.0	3.0
BUL020F*00	5.0	3.8

Technical information	
SAUTER slide rule for valve sizing	7090011001
Manual on slide rule	7000129001
Software tool for valve and actuator sizing	7000675001
Valvedim.exe	
Technical manual on control units	7000477001

### Description of operation

The BUL 3-way unit valve is used as a control or distribution valve in the heating and cooling circuits of HVAC installations and must only be used for these purposes.

The spindle is pressed in to close the control passage (passage A-AB) and open the mixing passage B-AB. It is returned by the spring force from the spring in the valve. The valve can be controlled to the OPEN or CLOSED positions with the thermal actuator for unit valves AXT 211. Used in combination with the “normally closed” version of the actuator, the control passage of the valve closes in the event of a power failure.



The valve can be controlled to any desired position with the AXS 215S continuous actuator for unit valves. Depending on the position of the DIP switches, the valve is adjusted continuously with a control voltage of 0...10 V / 10...0 V or 2...10 V / 10...2 V. The control signal is then assigned linearly to the valve stroke and produces the equal-percentage characteristic in the valve. The positioner integrated into the actuator controls the actuator according to the setting of the DIP switches and positioning signal y. The continuous actuator positions the valve and, as soon as the position is reached, it stops.

The valve can be controlled to any desired position with the motorised actuator for unit valves AXM 217. With type AXM 217S (with positioner) the valve is continuously adjusted using a 0...10 V or 4...20 mA control signal, according to the position of the DIP switches. The kvs values in the by-pass are reduced by approx. 30% compared to the kvs values of the control passage. This takes into account the flow rate resistance of the consumer, so that the total flow rate remains as constant as possible in every stroke position. The practically equal-percentage characteristic in the control passage allows optimal control together with a continuous 0...10 V actuator.

### 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 control unit can be fitted in any desired position, but not in a suspended fitting position. Condensate, dripping water, etc. must be prevented from entering the actuator.

To prevent any flow noise from being audible in very quiet rooms, the pressure difference over the valve must not exceed the following values:

BUL010F\*30 = 0.5 bar, F\*20 = 0.6 bar / F\*10 and F\*00 = 0.8 bar

BUL015F\*10 = 0.6 bar, F\*00 = 0.8 bar

BUL020F\*00 = 0.5 bar

So that impurities are retained in the water (welding 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. Medium with coolant such as glycol, min. 16%, max. 40%.

To prevent damage resulting from non-usage, the valves should be activated for a short time at regular intervals. We recommend performing a stroke movement of at least 10% every month.

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.

When insulating the unit valve, it may only be insulated up to the cap nut or the bayonet ring of the actuator.

### Further information

Fitting instructions	MV 505864
Assembly of AXT 211/AXS 215S	MV P100002547
With auxiliary contact:	
Assembly of AXM 217/217S	MV P100011418
Assembly of AXM217F200	MV P100000986
Declaration on materials and the environment	MD 55.009

### Additional version information

Valve body and T-piece of permanent mould casting nickel-plated, and male thread as per ISO 228/1, class B, flat seal on body. Stuffing box with O-ring made of ethylene propylene, plug made of brass with EPDM sealing ring, spindle made of stainless steel, protective cap (or manual adjustment knob) made of plastic.

### Material numbers as per DIN

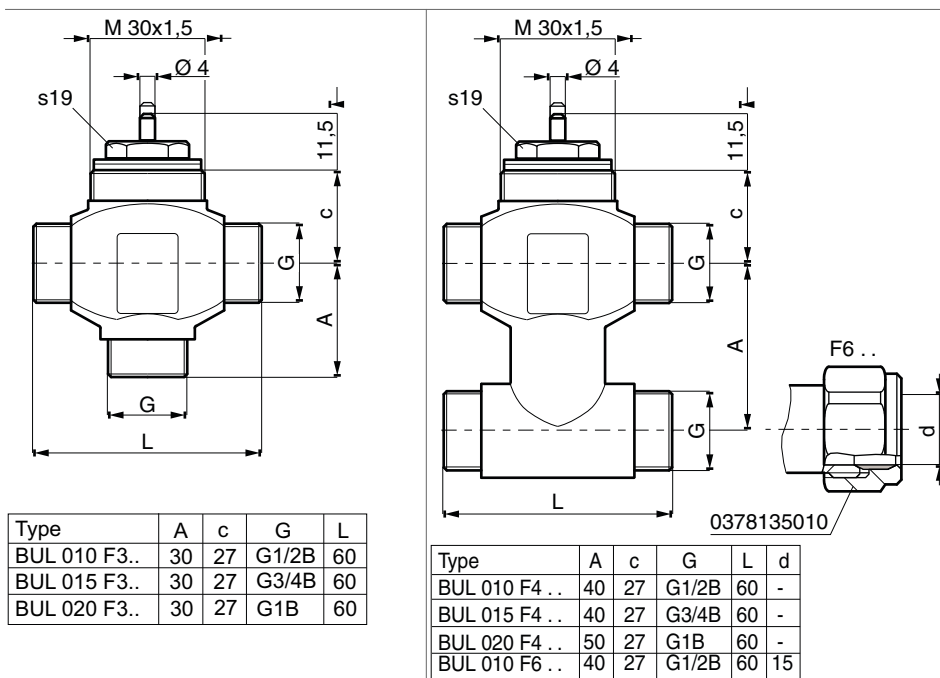
	DIN material no.	DIN designation
Valve body	CC 754S-GM	Cu Zn 39 Pb 1 Al-C according to EN1982
Valve seat	CC 754S-GM	Cu Zn 39 Pb 1 Al-C according to EN1982
Spindle	1.4305	X 8 Cr Ni S 18-9 according to EN188-1
Plug	CW617N	Cu Zn 40 Pb 2 according to EN12164
Stuffing box	CW617N	Cu Zn 40 Pb 2 according to EN12164

### 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.

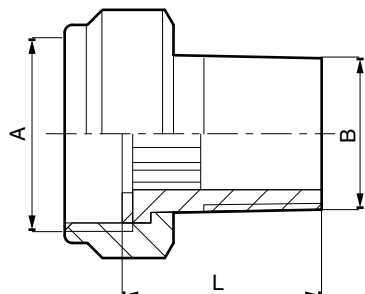
Dimension drawing



Accessories

Threaded fitting

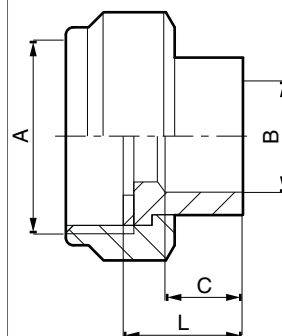
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DN	A	B	L
10	G1/2	R3/8	24
15	G3/4	R1/2	27,5
20	G1	R3/4	32,5

Solder-joint screw fitting

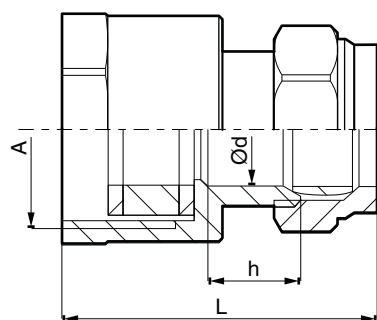
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DN	A	B	C	L
10	G1/2	12	8,6	14
15	G3/4	15	10,6	15,5
20	G1	22	15,4	20

Clamping ring screw fitting

0378145



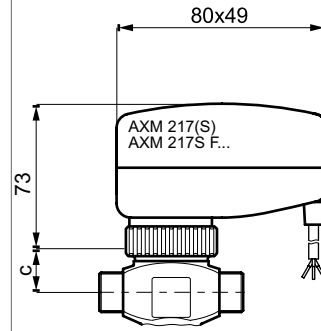
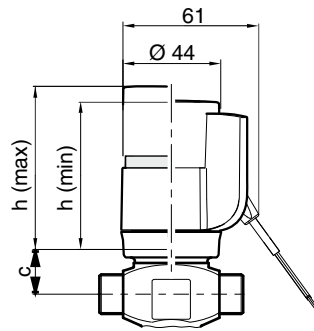
DN	A	L	Ød	h
15	G3/4	39	15,2	12,5
20	G1	41,5	22,2	16

**Assembly**

Combinations with thermal actuator AXT and motorised actuator AXM

AXT 211/AXS 215S

AXM 217/217S



	H (min)	H (max)
NC	59	66
NO	59	64
Manually	66.5	73.5

**Table of pressure losses for VUL and BUL valves**

