BUT: Three-way unit valve, PN 16





How energy efficiency is improved
Linear mixture and no leak losses in the control passage for energy-efficient regulators.

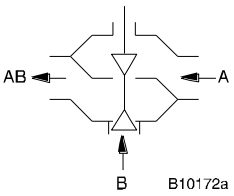
Areas of application
Regulating valve for fan-coil units, air secondary-treatment appliances for heating zones and two-line systems with heat exchanger in combination with the AXT 211 or AXT 201 thermal actuator for unit valves, the AXS 215S continuous actuator for unit valves or the AXM 117(S) motorised actuator for unit valves.

Features
- Nominal pressure 16 bar
- Nominal diameter DN10 to DN20
- Characteristic on/off almost linear
- Characteristic of mixing passage linear, not reduced
- Standard version with flat seal
- Special model for fan-coil units with cast-on bypass T-piece
- When the spindle is retracted, the control passage is closed
- To be used as a control valve

Technical description
- Valve with male thread according to DIN EN ISO 228-1, class B
- Valve body of cast brass
- Spindle of nickel-plated brass
- Plug with EPDM soft seal for control passage and mixing passage
- Stuffing box with O-ring seal

Type [1]	Nominal diameter DN	k_{VS} value[1] m^3/h	Connection	Weight kg
BUT 010 F200	10	1.0	G1/2B	0.30
BUT 015 F210	15	2.5	G3/4B	0.33
BUT 020 F200	20	4.5	G1B	0.36
Model with bypass T-piece				
BUT 010 F420	10	0.63	G1/2B	0.38
BUT 010 F410	10	1.0	G1/2B	0.38
BUT 010 F400	10	1.6	G1/2B	0.38
BUT 015 F410	15	2.5	G3/4B	0.42
BUT 015 F400	15	3.5	G3/4B	0.42
BUT 020 F400	20	4.5	G1B	0.50



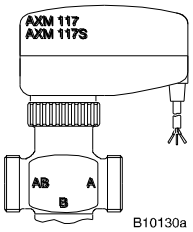


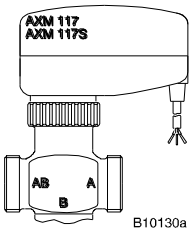
Nominal pressure	PN 16	Dimension drawings	M11472
Maximum operating pressure	up to 120 °C 16 bar		M11473
Perm. operating temp.	2…120 °C	Fitting instructions	MV P100007308
Control passage characteristic	almost linear	Fitted to AXT211/AXS215S	MV P100002547
Mixing passage characteristic	linear	With auxiliary contact	
Valve stroke DN10…15	3 mm	Fitted to AXM 117/117S	MV 505456
DN15F400…DN20	4 mm	Fitted to AXM 117 F200	MV 505816
Leakage rate of control passage A-AB	0.0001% of k_{VS}		
Leakage rate of mixing passage B-AB	approx. 0.1% of k_{VS}	Material declaration	MD 55.109

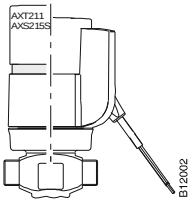
Accessories
0378133 010* 1 threaded sleeve, R ⅜, flat-sealing, DN 10, with cap nut and flat seal
0378133 015* 1 threaded sleeve, R ½, flat-sealing, DN 15, with cap nut and flat seal
0378133 020* 1 threaded sleeve, R ¾, flat-sealing, DN 20, with cap nut and flat seal
0378134 010* 1 solder nipple, Ø 12, flat-sealing, DN 10, with cap nut and flat seal
0378134 015* 1 solder nipple, Ø 15, flat-sealing, DN 15, with cap nut and flat seal
0378134 020* 1 solder nipple, Ø 22, flat-sealing, DN 20, with cap nut and flat seal

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

1) Not to be used as a through or a diverting valve. Mixing passage is not reduced.







Combination with electric actuator, 24 V

Actuator	Use as mixing valve						AXM 117 F202	AXM 117S F.0.
Valve	**Δp_{max}**	**Δp_s**	**Close/off pressure**					
BUT 010 F...	1.7	–	1.8					
BUT 015 F.10	1.4	–	1.5					
BUT 015 F.00	1.2	–	1.3					
BUT 020 F.00	1.0	–	1.1					

Combination with electric actuator, 230 V

Actuator	Use as mixing valve						AXM 117 F200
Valve	**Δp_{max}**	**Δp_s**	**Close/off pressure**				
BUT 010 F...	1.7	–	1.8				
BUT 015 F.10	1.4	–	1.5				
BUT 015 F.00	1.2	–	1.3				
BUT 020 F.00	1.0	–	1.1				

Combination with thermal and continuous actuator

Actuator	Use as mixing valve						AXT 211 F…	AXS 215S F…
Valve	**Δp_{max}**	**Δp_s** 1)	**Close/off pressure**					
BUT 010 F...	1.7	1.8	1.8					
BUT 015 F.10	1.4	1.5	1.5					
BUT 015 F.00	1.2	1.3	1.3					
BUT 020 F.00	1.0	1.1	1.1					

Combination with thermal actuator

Actuator	Use as mixing valve						AXT 201 F…	
Valve	**Δp_{max}**	**Δp_s** 1)	**Close/off pressure**					
BUT 010 F...	1.5	1.8	1.8					
BUT 015 F.10	1.2	1.5	1.5					
BUT 015 F.00	1.0	1.3	1.3					
BUT 020 F.00	0.9	1.1	1.1					

Complete type designation for valve and actuator, each with F-variant

Valve: For F-variant, technical data and accessories, see valve type table

Actuator: For F-variant, technical data, accessories and fitting position, see section 51

Example: BUT015 F410 / AXS 215S F122

Δp_{max} [bar]= Maximum permitted pressure difference across the valve at which the actuator can still reliably open and close the valve. Information for static pressure of 6 bar; at a static pressure of 16 bar these values are reduced by 15%,

Δp_S [bar]= Maximum permitted pressure difference across the valve in case of a fault, at which the actuator can close the valve.

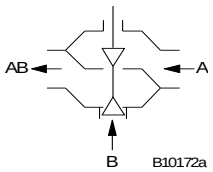
Close/off pressure: Pressure difference across the valve in control mode which can overcome the force of the actuator. A reduced lifetime must be expected in this mode. Cavitation, erosion and pressure surges can damage the valve. The values are applicable only in the assembled state, in the unit with the valve mounted on the actuator.

1) Only for NC variants

Operation

When the spindle is retracted, the control passage (passage A-AB) is closed and the mixing passage B-AB is opened. It is reset by spring force (spring in valve). The valve can be controlled to the ‘open’ or ‘closed’ positions using the AXT 211 thermal actuator for unit valves. In combination with the ‘normally closed’ actuator version, the valve's control passage closes in the event of a power failure.

Used as a mixing valve



The valve can be moved to any position using 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, –2…10 V / 10…2 V. The control signal is then assigned to the valve stroke on a linear basis and produces the almost linear characteristic in the valve. The integrated positioner 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 moved to any position using the actuator AXM 117 motorised actuator for unit valves. In the case of type AXM 117S (with positioner) the valve is adjusted continuously with a control voltage of 0…10 V. Variants: F202 opens the control passage as the control voltage rises; F302 closes the control passage as the control voltage rises.
When used together with a thermal actuator, the approximate on/off and subsequent linear characteristic in the control passage enables the valve to be opened quickly.

Engineering and fitting notes

The control unit can be fitted in any position. To prevent any flow noise from being audible in very quiet rooms, the pressure difference across the valve must not exceed 0.5 bar.
So that impurities are retained in the water (e.g. welding beads, rust particles etc.) and the spindle seal is not damaged, we recommend inserting collective filters, e.g. per floor or per line. Requirements for water quality are as per VDI 2035. The medium must have a minimum of 16% and a maximum of 40% coolant, such as glycol.
The unit valve should be insulated only up to the level of the cap nut or the bayonet ring on the actuator.

Additional information

Valve body of pressed brass, external thread as per ISO 228/1, class B, flat seal on body. Stuffing box with O-ring in ethylene-propylene. No plastic protective cap (or manual adjusting knob); spindle is protected by the packaging.

Material numbers according to DIN

	DIN material no.	DIN designation
Valve body	CW617N	Cu Zn 40 Pb2 nach EN 12164
Valve seat	CW617N	Cu Zn 40 Pb2 nach EN 12164
Stem	1.4305	X 8 Cr Ni S 18-9 according to EN188-1
Cone	CW617N	Cu Zn 40 Pb 2 according to EN12164
Stuffing box	CW617N	Cu Zn 40 Pb 2 according to EN12164

Technical information

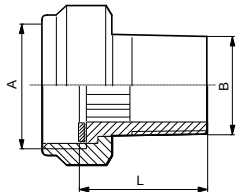
– Pressure and temperature data	EN764, EN1333
– Fluidic parameters	VDI/VDE 2173
– Sauter slide rule for valve sizing	7 090011 001
– Manual on slide rule	7 000129 001
– PC program for valve and actuator sizing	7 000675 001
– Valvedim.exe	
– Technical manual "Regulating units"	7 000477 001
– CE conformity for pressure equipment, directive 97/23/EC, article 3.3	

Dimension drawings

Accessories

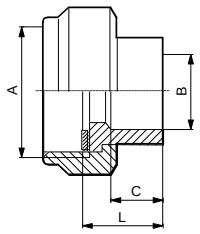
Threaded fitting

378133



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

378134

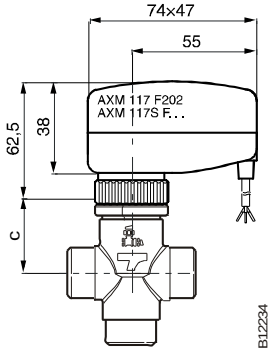


DN	A	B	C	L
10	G1/2	12	8,6	14
15	G3/4	15	10,6	15,5
20	G1	22	15.4	20

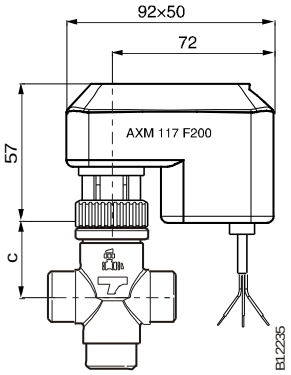
Assembly

Combinations with AXT thermal actuator and AXM motorised actuator

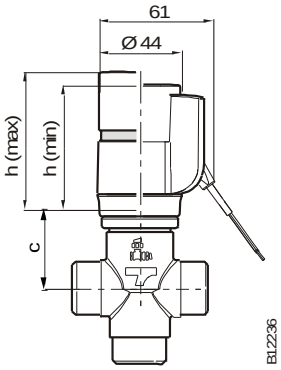
AXM 117/117S



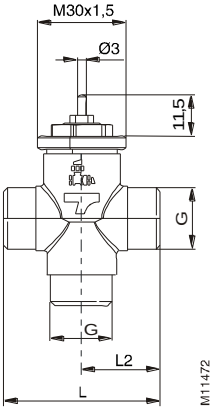
AXM 117 F200



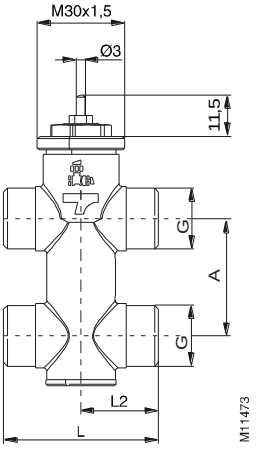
AXT 211/215S



Dimension drawings for BUT

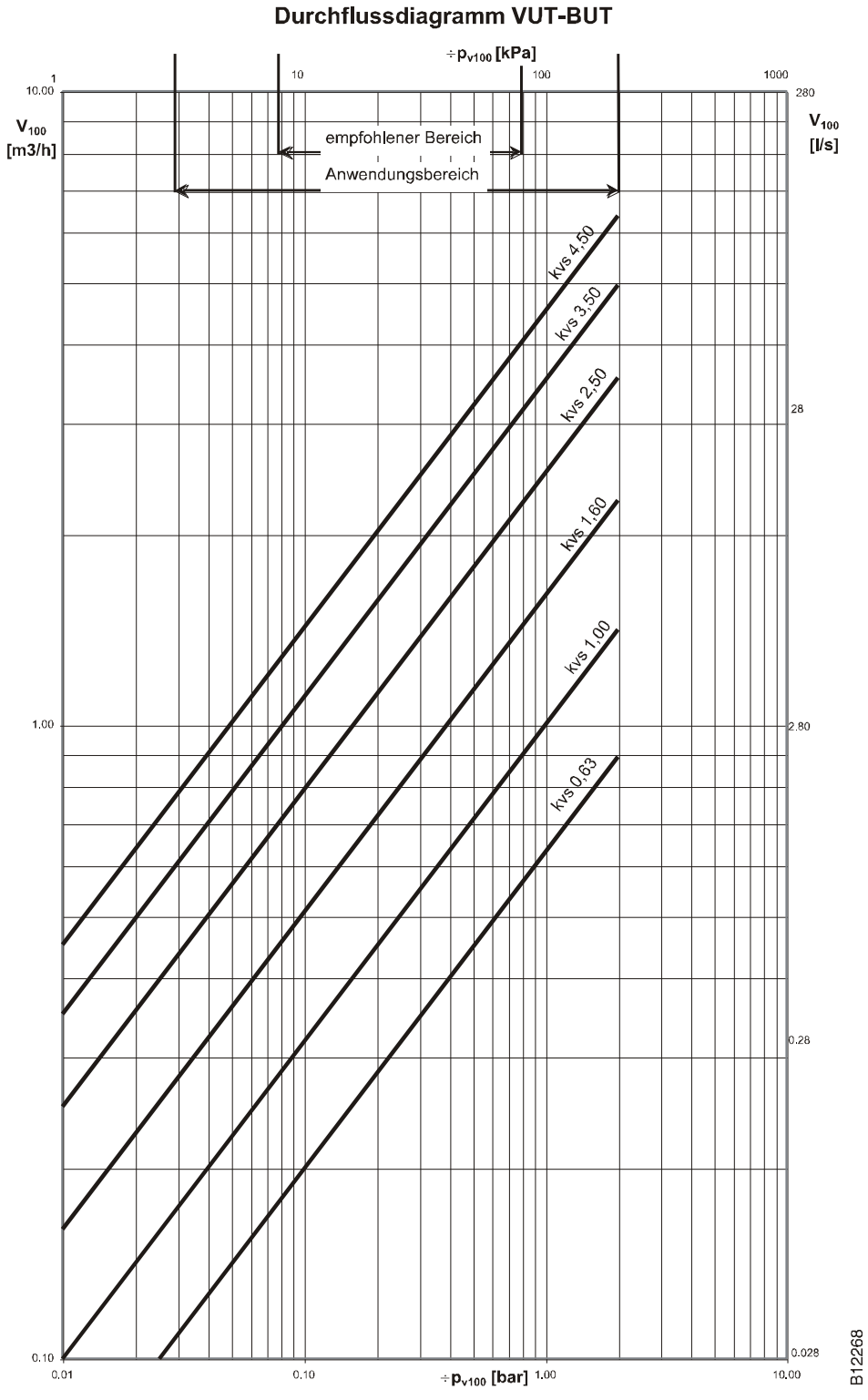


BUT, 3-way	Dimension "c"	Dimen-sion "L"	Dimen-sion "G"
10	29.2	52	G ½ B
15	29.2	56	G ¾ B
20	30.2	65	G 1 B



BUT, 4-way	Dimension "c"	Dimen-sion "L"	Dimen-sion "G"	Dimen-sion "A"
10	29.2	52	G ½ B	40
15	30.2	56	G ¾ B	40
20	30.2	65	G 1 B	50

Pressure loss table for valves VUT and BUT



Printed in Switzerland
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7155109003 03