

Valveco010...032: 2-way control valve for dynamic hydraulic balance

How energy efficiency is improved

Automatic dynamic hydraulic balance with the SAUTER Valveco control valve ensures correct supply to the consumers and a reduction of temperature fluctuations in the room, so energy use is more accurate and more efficient.

Areas of application

The multi-function valve is used for accurate flow control for air-conditioning, cooling and heating equipment such as fan-coil units, chilled beams, central underfloor heating systems, recirculated-air units and installation sections in conjunction with the AXT211 thermal actuator for unit valves, the AXS215S continuous actuator for unit valves or the AXM117(S) motorised actuator for unit valves.

Features

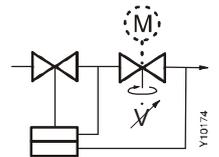
- Control valve with three functions: control, preset maximum volume, automatic flow regulation
- Nominal diameters DN 10, DN 15, DN 20, DN 25 and DN 32
- Wide range: 30...3600 l/h
- Simple presetting of maximum volume flow without having to dismantle the actuator
- Control range 15/20...400 kPa = max. Δp across the valve
- Linear characteristic
- Simple to fit the pressure measurement nipples
- When the stem is pressed in, the valve is closed
- Closes against the pressure
- Stuffing box can be replaced under system pressure
- Slight adaptation of the tried-and-tested SAUTER actuator technology

Technical description

- Control valve with external thread to DIN EN ISO 228-1
- Flat-sealing control valve (the DN 20, without the insert, has a conical sealing surface)
- Differential pressure over the regulating unit is kept constant; valve authority 1
- Valve body of dezincification-resistant (DZR) cast brass
- Plug of Teflon (PTFE)
- Stem of stainless steel
- Medium temperature range $-10...120\text{ }^{\circ}\text{C}$



T10962



Products

Type	Nominal diameter (DN)	Range (l/h)	Control range min Δp ... max Δp (kPa)	Connection	Weight (kg)
VCL010F210	10	30...210	20...400	G ½ B	0.38
VCL010F200	10	90...450	20...400	G ½ B	0.38
VCL015F220	15	30...210	20...400	G ¾ B	0.45
VCL015F210	15	90...450	20...400	G ¾ B	0.45
VCL015F200	15	150...1050	20...400	G ¾ B	0.45
VCL020F210	20	150...1050	20...400	G 1 B	0.52
VCL020F200	20	180...1300	15...400	G 1 B	0.73
VCL025F200	25	300...2000	15...400	G 1¼ B	1.8
VCL032F200	32	600...3600	15...400	G 1¾ B	1.9

Technical data

General characteristics

Nominal pressure	PN 16
Max. operating pressure	16 bar

Version

Valve characteristic	linear
Valve stroke	
VCL010...020F210	2.8 mm
VCL020F200	< 3.5 mm
VCL025F200	4 mm
VCL032F200	4 mm
Leakage rate	0.01% of K_{vs}

Permitted operating conditions

Operating temperature	$-10...120\text{ }^{\circ}\text{C}$
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Additional information

Fitting instructions	MV P100004091
Assembly AXT211	MV P100002547
Assembly AXS215S	MV P100002547
Assembly AXM117/117S	MV 505456033
Assembly AXM117F200	MV 505816033
Material declaration	MD 57.001
Dimension drawing	M11423

Accessories

Type	Description
0378133010*	1 threaded sleeve, R 3/8, flat-sealing, DN 10, with cap nut and flat seal
0378133015*	1 threaded sleeve, R 1/2, flat-sealing, DN 15, with cap nut and flat seal
0378133020*	1 threaded sleeve, R 3/4, flat-sealing, DN 20, with cap nut and flat seal
0378133025*	1 threaded sleeve, R 1, flat-sealing, DN 25, with cap nut and flat seal
0378133032*	1 threaded sleeve, R 1¼, flat-sealing, DN 32, with cap nut and flat seal
0378134010*	1 solder nipple, Ø 12, flat-sealing, DN 10, with cap nut and flat seal
0378134015*	1 solder nipple, Ø 15, flat-sealing, DN 15, with cap nut and flat seal
0378134020*	1 solder nipple, Ø 22, flat-sealing, DN 20, with cap nut and flat seal
0378134025*	1 solder nipple, Ø 28, flat-sealing, DN 25, with cap nut and flat seal
0378134032*	1 solder nipple, Ø 35, flat-sealing, DN 32, with cap nut and flat seal
0570260001	Stuffing box, can be replaced under pressure
0570360001	Pressure measurement nipple, set of 2
0560332015*	Strainer in gun metal, -10...+150 °C, mesh aperture 0.5 mm, DN 15
0560332020*	Strainer in gun metal, -10...+150 °C, mesh aperture 0.8 mm, DN 20
0560332025*	Strainer in gun metal, -10...+150 °C, mesh aperture 0.8 mm, DN 25
0560332032*	Strainer in gun metal, -10...+150 °C, mesh aperture 0.8 mm, DN 32
0560332040*	Strainer in gun metal, -10...+150 °C, mesh aperture 0.8 mm, DN 40
0560332050*	Strainer in gun metal, -10...+150 °C, mesh aperture 0.8 mm, DN 50

* Dimension drawing or wiring diagram available under same number

Combination VCL with electrical actuator, 24 V

Actuator				AXM117F202	AXM117SF.0.
Valve	Closes against the pressure				
	Δp_{max}	Δp_s	close/off pressure		
VCL010F...	4.0	-	4.0		
VCL015F...	4.0	-	4.0		
VCL020F...	4.0	-	4.0		
VCL025F200	4.0	-	4.0		
VCL032F200	4.0	-	4.0		

Combination VCL with electrical actuator, 230 V

Actuator				AXM117F200
Valve	Closes against the pressure			
	Δp_{max}	Δp_s	close/off pressure	
VCL010F...	4.0	-	4.0	
VCL015F...	4.0	-	4.0	
VCL020F...	4.0	-	4.0	
VCL025F200	4.0	-	4.0	
VCL032F200	4.0	-	4.0	

Combination VCL with thermal and continuous actuator

Actuator				AXT211F...	AXS215SF...
Valve	Closes against the pressure				
	Δp_{\max}	Δp_s	close/off pressure		
VCL010F...	4.0	4.0	4.0		
VCL015F...	4.0	4.0	4.0		
VCL020F...	4.0	4.0	4.0		
VCL025F200	4.0	4.0	4.0		
VCL032F200	4.0	4.0	4.0		

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

Valve: F-variant, for technical data and accessories see table of valve types

Actuator: F-variant, for technical data, accessories and fitting position (see section 55)

Example: VCL015F200 / AXM117SF202

Δp_{\max} [bar]=	Maximum permitted pressure difference across the valve at which the actuator can still reliably open and close the valve. Figures 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 the event of a malfunction, at which the actuator can close the valve
Close/off pressure [bar]=	Pressure difference across the valve in control mode which can overcome the force of the actuator. A reduced lifetime must be expected in this range. Cavitation, erosion and pressure surges may damage the valve. The values are applicable only in the assembled state, in the unit with the valve mounted on the actuator.

Operation

The stem is pressed in to close the control valve. It is reset by spring force (spring in valve). The valve can be controlled to the 'open' or 'closed' positions with the AXT211 thermal actuator for unit valves. In combination with the 'normally closed' actuator version, the valve's control passage closes if there is a power failure.

The valve can be moved to any position with AXS215S continuous actuator for unit valves. Depending on the position of the DIP switch, the valve is adjusted continuously with a control voltage of 0...10 V.

The valve can be moved to any position with the AXM117 motorised actuator for unit valves. In the case of type AXM117S (with positioner), the valve is adjusted continuously with a control voltage of 0...10 V.

Variants:

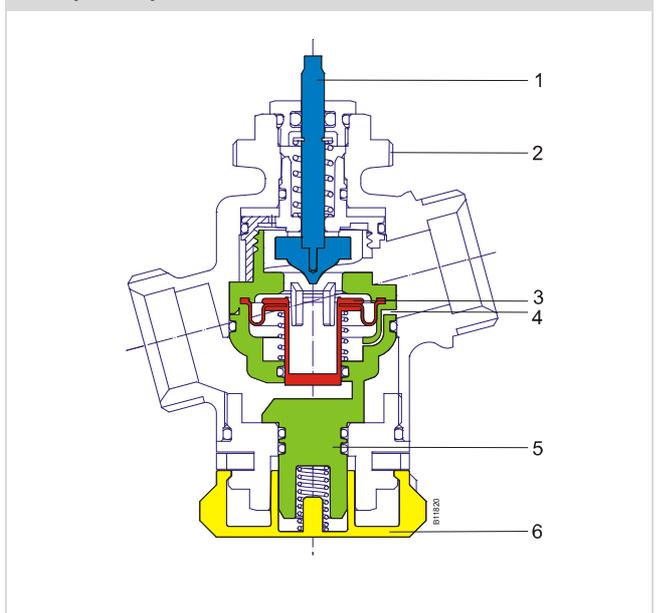
- F202: opens as the control voltage increases
- F302: closes as the control voltage increases

The linear characteristic allows optimal control together with a continuous 0...10 V actuator.

Description

This innovative design combines a dynamic flow controller (with a maximum flow that can be preset), a differential pressure controller and a control valve with electrical regulation which is independent of the set volume flow. Presetting is also possible with the actuator fitted.

The dynamic controller keeps the pressure across the control valve constant, regardless of pressure fluctuations in the system. Thanks to this design, the flow is automatically limited to the preset maximum value, with 100 per cent valve authority.

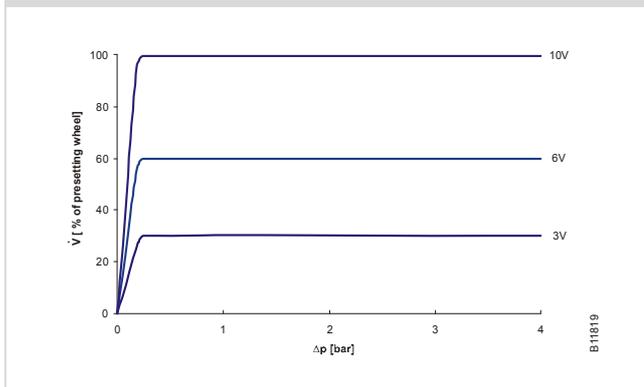
Principle of operation of the SAUTER Valveco control valve

Key

1	Control valve unit with 2.8 mm, 3.5 mm or 4 mm stroke
2	Thread, M30 x 1.5, to accommodate the actuator
3	Membrane to compensate the differential pressure, keeps the differential pressure across the regulating unit and the preset constant
4	Pressure passage
5	Regulating unit for adjustment or limitation of flow
6	Preset wheel

The combination of dynamic hydraulic balance and dynamic regulation in the SAUTER Valveco simplifies the work of planning engineers and installers. No time is wasted on initial measurement

or regulation of plants, and the energy supply for the existing plant is unaffected if extensions are carried out.

Example: flow



Example: DN 15 VCL015F210 with a setting of max. flow 210 l/h. Flow as a function of control voltage (0...10 V continuous control) and differential pressure
Control voltage: 3 V, 6 V and 10 V

Design benefits

- Minimal time is needed to specify the components for hydraulic balance (only the flow data are needed)
- Not necessary to calculate the valve authority
- Less energy is consumed because the rated flow is guaranteed
- Maximum flexibility if system changes are required

Installation benefits

- No additional control valves are required for the controller in question
- Total number of valves required is reduced thanks to the multi-function capability
- Reduced time expenditure – no initial regulation, simple and accurate flow preset
- Differential pressure measurement is possible
- Pressure measurement nipples can be retrofitted in the field as an option
- Built-in shut-off function
- The set flow value can be guaranteed by applying a local seal

Operating benefits

- Constant high comfort level for end users thanks to high-precision flow control
- Pressure fluctuations in the system are picked up and compensated for by the differential pressure controller (interference variable: input pressure); this substantially reduces temperature fluctuations in the controlled room/area (reduced energy consumption). Secondary effect: The run times required for the actuator are reduced so the actuator's lifetime is lengthened.
- When the valve is preset, there is a large amount of stroke available, so precise control is always guaranteed up to 400 kPa across the valve. Regardless of the selected preset, a large amount of travel is always available.

Engineering and fitting notes

To prevent the ingress of impurities in the water (e.g. weld beads and rust particles, etc.) and damage to the differential pressure controller, strainers must be installed (e.g. per storey or pipe run). (See accessories; pay attention to usage and temperature ranges depending on the type.) The requirements for water quality are as per VDI 2035.

All SAUTER Valveco valves must be used in closed circuits only. An excessively high oxygen mixture may damage the control valves in open circuits. To avoid this, an oxygen binding agent must be used; as regards corrosion, compatibility must be clarified with the manufacturer. The materials shown in the list below may be used.

The fittings are usually insulated in the plants. However, note that no insulation is applied up to the actuator seating.

To prevent any disturbing noise in quiet rooms, the pressure difference across the control valve should not exceed 70% of the indicated maximum values.

To prevent the valve from jamming, a full valve stroke must be performed at least once every week, using the actuator governed by the controller.

Application with water

When using water mixed with glycol or an inhibitor, the compatibility of the materials and seals used in the control valve should be clarified with the manufacturer just to be on the safe side. The materials shown in the list below may be used. When glycol is used, we recommend a concentration of 20% to 50%.

Fitting position

The unit can be fitted in any position except upside down. The ingress of condensate and dripping water etc. should be prevented.

Installation and setting

The SAUTER Valveco is supplied with a protective cap. Rotate this cap to change the stroke position of the regulating unit; this allows the full flow through the valve before the actuator is fitted. The valve is open when the stem is extended.

The maximum rated flow can be set both before and after the actuator is fitted, using the preset scale located at the bottom of the valve. No conversion table is required. The scale on the preset wheel states a guidance value for the flow (× 10 l/h or × 0.1 m³/h).

The installer can secure the set maximum flow by applying a seal.

Additional technical data

Technical information	
Pressure and temperature data	EN 764, EN 1333
Fluidic parameters	EN 60534, page 3
Technical manual: 'Valves and actuators'	7000477001
Key variables, fitting notes, control, general information	Applicable regulations as per EN, DIN and UVV, also AD information sheets and TRD guidelines
Declaration of conformity (no CE identification)	As per Pressure Equipment Directive 97/23/EC, article 3.3 for fluid group 2

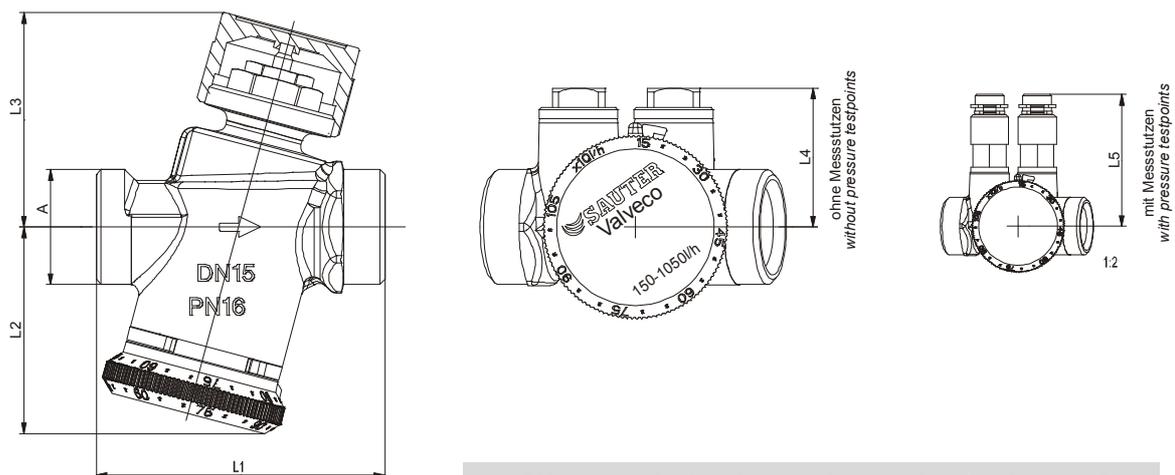
Additional information on specifications

Valve body in DZR cast brass with cylindrical external thread to ISO 228/1, class B, flat seal on body. Stuffing box with O-ring in EPDM (ethylene-propylene).

Materials

	DIN material number	DIN designation
Valve body	CW 602 N	Cu Zn 36 Pb2 As
Valve seat	PES	
Stem	1.4305	X 12 Cr Ni S 18-8
Valve insert	PA/PES	
Stem seal	PTFE	
Stuffing box	CW 602 N	Cu Zn 36 Pb2 As

Dimension drawing



DN	A	L1	L2	L3	L4	L5
10	G ½ B	65	48	52	32	61
15	G ¾ b	65	48	52	32	61
20 (...F210)	G 1 B	74	48	52	42	71
20 (...F200)	G 1 B	88	55	57	42	71
25	G 1¼ B	118	80	66	51	80
32	G 1¾ B	124	80	66	51	80