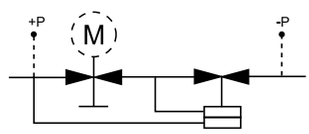
VCL 010…032: 2-way regulating valve for dynamic hydronic balancing, PN 16, Valveco

VCL010F210



How energy efficiency is improved

Automatic dynamic hydronic balancing with the SAUTER Valveco regulating valve provides correct supply to the consumers and a reduction in temperature variations in the room, so that energy use is more accurate and more efficient.

Features

- Regulating valve with three functions: Control, preset maximum volume flow, automatic flow regulation
- Large volume flow range: 30…3600 l/h
- Simple presetting of maximum volume flow without dismantling the actuator
- Control range 15/20…400 kPa = max. Δp over the valve
- Easy fitting of pressure measurement nipples
- Control passage A–AB is closed when the spindle is moved in
- Closing procedure against the pressure
- Stuffing box can be replaced under system pressure
- Slight adaptation of the proven SAUTER actuator technology
- Regulating valve with male thread as per DIN EN ISO 228-1
- Flat-sealing regulating valve (with conical sealing surface for DN 20, without insert)
- Differential pressure across the control unit is kept constant; valve authority 1
- Valve body made of dezincification-resistant (DZR) brass
- Stainless-steel spindle
- Plug of made of PTFE

Technical data

Parameters	
Nominal pressure	PN 16
Valve characteristic	Linear
Leakage rate	0.01%

Ambient conditions	
Operating temperature	-10...120 °C
Operating temperature at valve	100 °C
Admissible operating temperature for valve in combination with AXT 211, AXS 215 and AXM 217 (S)	100 °C at the valve
Maximum operating pressure	16 bar
Pressure and temperature data	EN 764, EN 1333
Flow parameters	EN 60534, page 3

Overview of types

Type	Nominal diameter	Volume flow setting range	Control range Δp	Valve stroke (mm)	Connection	Weight (kg)
VCL010F210	DN 10	30...210 l/h	20...400 kPa	2.8	G½" B	0.38
VCL010F200	DN 10	90...450 l/h	20...400 kPa	2.8	G½" B	0.38
VCL015F220	DN 15	30...210 l/h	20...400 kPa	2.8	G¾" B	0.45
VCL015F210	DN 15	90...450 l/h	20...400 kPa	2.8	G¾" B	0.45
VCL015F200	DN 15	150...1050 l/h	20...400 kPa	2.8	G¾" B	0.45
VCL020F210	DN 20	150...1050 l/h	20...400 kPa	2.8	G1" B	0.52
VCL020F200	DN 20	180...1300 l/h	15...400 kPa	3.5	G1" B	0.73
VCL025F200	DN 25	300...2000 l/h	15...400 kPa	4	G1¼" B	1.8
VCL032F200	DN 32	600...3600 l/h	15...400 kPa	4	G1¾" B	1.9

Accessories

Type	Description
0378133010	1 threaded sleeve, R⅜", flat-sealing, DN 10, with cap nut and flat seal
0378133015	1 threaded sleeve, R½", flat-sealing, DN 15, with cap nut and flat seal

Type	Description
0378133020	1 threaded sleeve, R¾", flat-sealing, DN 20, with cap nut and flat seal
0378133025	1 threaded sleeve, R1", flat-sealing, DN 25, with cap nut and flat seal
0378133032	1 threaded sleeve, R1¼", 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
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

Combination of VCL with electrical actuators

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.

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.*

Definition of Δp_{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 for VCL010, VCL015, VCL020F210	36 s	36 s	36 s
Running time for VCL20F200	45 s	45 s	45 s
Running time for VCL025, VCL032	52 s	52 s	52 s

Δp [bar]

Closes against the pressure	Δp_{max}	Δp_{max}	Δp_{max}
VCL010F210 VCL010F200 VCL015F220 VCL015F210 VCL015F200 VCL020F210 VCL020F200 VCL025F200 VCL032F200	4.0	4.0	4.0
Cannot be used to close with the pressure			

Pressure differences with thermal actuators

Actuator	AXT211F210 AXT211HF210	AXT211F212 AXT211HF212	AXT211F110 AXT211F110B AXT211F110M AXT211F190 AXT211HF110	AXT211F112 AXT211F112B AXT211F112M AXT211F192 AXT211HF112	AXS215SF122 AXS215SF122B AXS215SF222 AXS215SF222B
Voltage	230 V~	24 V~/=	230 V~	24 V~/=	24 V~
Control signal	2-point	2-point	2-point	2-point	0...10 V
Running time for VCL010, VCL015, VCL020F210	92 s	112 s	92 s	112 s	84 s
Running time for VCL20F200	115 s	140 s	115 s	140 s	105 s
Running time for VCL025, VCL032	132 s	160 s	132 s	160 s	120 s

	Δp [bar]							
Closes against the pressure	Δp_{max}	Δp_{max}	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_{max}	Δp_s
VCL010F210 VCL010F200 VCL015F220 VCL015F210 VCL015F200 VCL020F210 VCL020F200 VCL025F200 VCL032F200	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Cannot be used to close with the pressure								

Description of operation

When the spindle is pressed in, the regulating valve is closed. 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 continuous actuator for unit valves AXS 215S. 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 controlled to any desired position with 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 linear characteristic allows optimal control together with a continuous actuator.
This innovative design combines a dynamic VAV controller (with a maximum volume flow that can be preset), an internal differential pressure controller and a regulating valve with electrical regulation that is independent of the set volume flow. Presetting is also possible with the actuator fitted.
The dynamic controller keeps the differential pressure across the regulating valve constant, regardless of pressure fluctuations in the system. Thanks to this design, the volume flow is automatically limited to the preset maximum value with 100 per cent valve authority.
This multi-function valve is used for precise volume flow control for air-conditioning, cooling and heating equipment, such as fan coil units, chilled ceilings, central underfloor heating systems, air recirculation devices and plant sections, in conjunction with the AXT 211 thermal actuator for unit valves, the AXS 215S continuous actuator for unit valves or the AXM 217(S) motorised actuator for unit valves.

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.

Additional technical data

Technical manual on control units	7 000477 001
Parameters, fitting notes, control, general information	Applicable EN, DIN, AD, TRD and accident prevention regulations, as well as AD codes of practice and TRD directives
CE conformity (no CE marking)	PED 2014/68/EU (fluid group II), Article 4.3

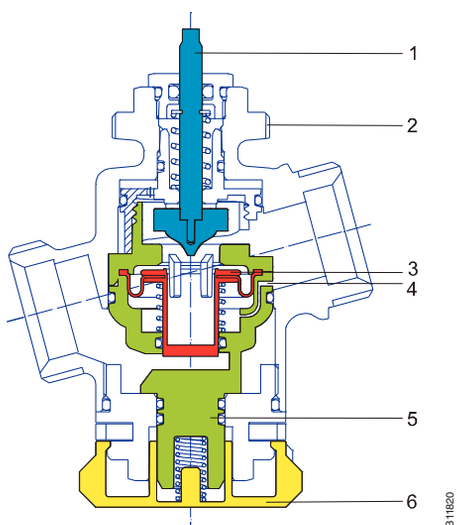
Additional version information

Valve body in dezincification-resistant (DZR) moulded brass with cylindrical male thread as per ISO 228/1, class B, flat seal on body. Stuffing box with O-ring made of EPDM (ethylene propylene).

Material numbers as per DIN

	DIN material no.	DIN designation
Valve body	CW 602 N	Cu Zn 36 Pb2 As
Valve seat	PES	
Spindle	1.4305	X 12 Cr Ni S 18-8
Plug	PA/PES	
Spindle seal	PTFE	
Stuffing box	CW 602 N	Cu Zn 36 Pb2 As

Operating principle of the SAUTER Valveco regulating valve

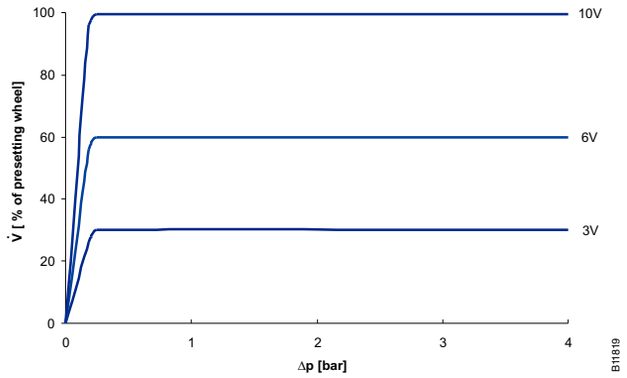


Key

1	Regulating valve unit with 2.8 mm, 3.5 mm or 4 mm of stroke
2	Thread, M30 × 1.5, to accommodate the actuator
3	Membrane to compensate the differential pressure; keeps the differential pressure across the control unit and the preset constant
4	Pressure channel
5	Regulating unit for setting or limiting the volume flow
6	Preset wheel

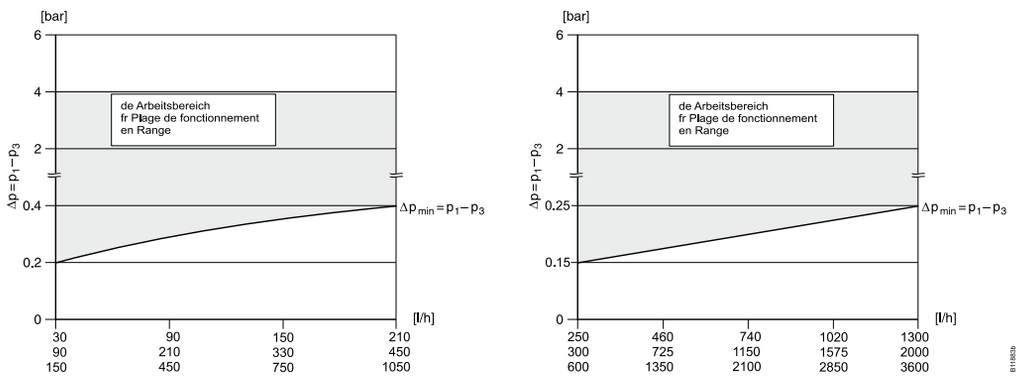
The combination of dynamic hydronic balancing and dynamic regulation in the SAUTER Valveco simplifies the work of planning engineers and installers. No time-consuming initial measurement or regulation of the systems is required, and the energy supply for the existing system is not affected in the event of extensions.

Example of volume flow



Example function: DN 15 VCL015F210 with preset max. volume flow 210 l/h
Volume flow as a function of the control voltage (e.g. 0…10 V continuous control) and the differential pressure
Control voltage 3 V, 6 V and 10 V

Minimum differential pressure



The required minimum differential pressure (min. Δp) over the valve can be found in the diagrams.
The system can be set to this value precisely using the two pressure measurement nipples.

Design benefits

- Minimal labour time is needed in order to specify the components for hydronic balancing (only the volume flow data is needed)
- The valve authority does not have to be calculated
- Less energy is consumed because the design volume flow is guaranteed
- Maximum flexibility whenever changes have to be made to the system

Installation benefits

- No additional regulating valves are required for the consumer in question
- Total number of valves required is reduced due to the multi-function capability
- Reduced labour time; no initial regulation; simple and accurate method of presetting the volume flow
- Differential pressure measurement is possible
- Pressure measurement nipples can be retrofitted in the field as an option
- Built-in shut-off function
- The set volume flow value can be secured by applying a local seal

Operating benefits

- Constant high level of comfort for end users thanks to high-precision volume flow control
- Pressure variations in the system are compensated by the differential pressure controller (disturbance value: input pressure); this substantially reduces temperature variations in the controlled room/area (reduced energy consumption).
  Secondary effect: The required running times are reduced, thereby prolonging the actuator’s service life.
- With a preset valve, a large stroke is available; therefore, control is always accurate up to 400 kPa over the valve

Engineering and fitting notes

So that impurities are retained in the water (e.g. weld beads, rust particles, etc.) and the differential pressure controller is not damaged, dirt filters must be fitted (e.g. on each floor or pipe run) (see accessories; observe the temperature range and the application, depending on the type). Requirements for water quality as per VDI 2035.
All SAUTER Valveco valves must be used in closed circuits only. An excessively high oxygen mixture may damage the regulating valves in open circuits. To avoid this, an oxygen binding agent must be used; compatibility must be clarified with the manufacturer regarding corrosion. The material list shown below may be used here.
The fittings are usually insulated in the systems. However, note that no insulation is to be applied up to the actuator housing.
To prevent any disturbing flow noise from being audible in quiet rooms, the pressure difference over the regulating valve must not exceed 70% of the indicated maximum values.
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 14663 (heating systems in buildings). DIN EN 14336 states, amongst other things, that the system has to be flushed through before being put into service.

Further information

Fitting instructions	MV P100004091
Assembly of AXT 211	MV P100002547
Assembly of AXS 215S	MV P100002547
Assembly of AXM 217/217S	MV P100011418
Assembly of AXM217F200	MV P100000986
Declaration on materials and the environment	MD 57.001

Using with water

When using water mixed with glycol or an inhibitor, the compatibility of the materials and seals used in the regulating valve should be clarified with the additive manufacturer in order to ensure compatibility. The material list shown below may be used here. When glycol is used, we recommend using a concentration of between 20% and 50%.

Fitting position

The control unit can be fitted in any position, but the hanging position is not admissible. Condensate, drops of water, etc. must be prevented from entering the actuator.

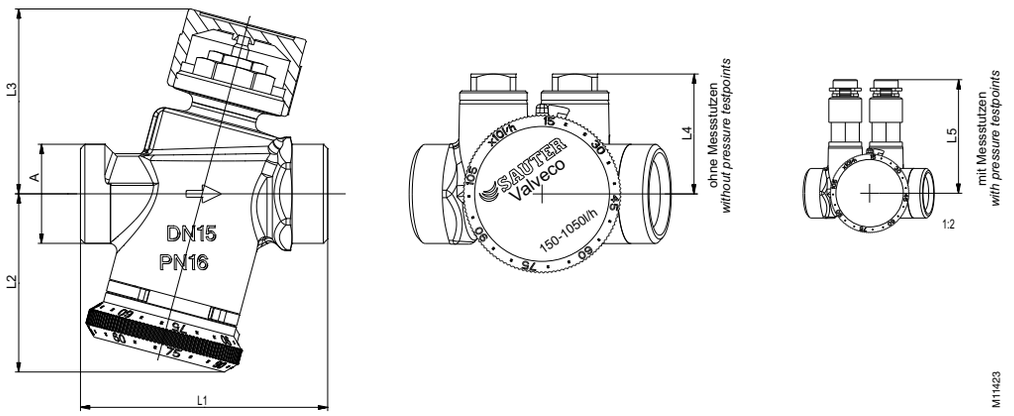
Installation and setting

The SAUTER Valveco is supplied with a protective cap. Rotate the protective cap to change the stroke position of the control unit; this allows the full volume flow through the valve before the actuator for unit valves is fitted. The valve is open when the spindle is moved out.
The maximum design volume flow can be set either before or 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 indicates a recommended value for the flow rate (× 10 l/h or × 0.1 m³/h).
The installer can secure the set maximum volume flow by affixing a seal.

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



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

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