Aquastrom TV

Thermal Circulation Valves

For hydronic balancing in circulation pipes according to DVGW Code of Practice W 551/W 553. The Aquastrom TV circulation valves are thermally controlled and are available with internal or external thread. Below the set temperature, the valve opens and automatically increases the hot water volume flow. The valve has a fixed residual volume flow, automatically recognises thermal disinfection and enables the maximum volume flow to be limited and shut off via an integrated regulating unit with reproducible presetting.

The valves are made of silicon bronze. Depending on the version, they are equipped with a drain valve with hose connection and a thermometer. A temperature sensor for integration into the building management system can be retrofitted. Depending on the version, an insulation shell made of EPP according to the German Building Energy Act GEG, building material class B2 according to DIN 4102 is included in the scope of delivery or available as accessory.

The Aquastrom TV valves control the hydronic balancing and the temperature-controlled regulation of the volume flows in potable water circulation pipes. The temperature setpoint can be blocked and lead-sealed and the flow rate can be blocked.

Features

- Automatic thermal volume flow control
- Automatic thermal disinfection support
- Limitation of the maximum volume flow
- Lead-sealing and blocking of the temperature setpoint
- Blocking of the flow rate
- Integration into the building management system with optional sensor element

Technical Data

Nominal sizes	DN 15…20
Variants	With internal thread according to EN 10226 With external thread according to EN ISO 228
Operating temperature	0…90 °C
Max. operating pressure	16 bar
Medium	Potable water according to DVGW W551 and W553
Body material	Silicon bronze
O-ring material	EPDM
Insulation shell material	EPP according to German Building Energy Act GEG, building material class B2 according to DIN 4102
Kvs values	DN 15: 1.24 DN 20: 2.21

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Product Details

Functions

The instantaneous provision of hot water at the draw-off points of a potable water pipe network is achieved by distributing the hot water from the potable water heater into one or more circulation pipelines. Each circulation pipeline carries the hot water to the draw-off points in a supply pipe connected to the main pipeline and back to the potable water heater in a return pipe.

The design of such potable water pipe networks is the responsibility of the planner, who must take into account the hydraulics in these pipe networks so that a sufficiently high water temperature is maintained in all circulation pipelines. Conditions must be created in the pipe systems that prevent pathogens (especially legionella) from multiplying in such a way that is it hazardous to health. The calculation of a circulation system in accordance with the DVGW Code of Practice W 553 is available to the planner for this purpose.

The hydraulics are determined on the one hand by the flow losses in the pipework of the circulation pipelines and on the other hand by the heat losses that the hot water experiences when flowing through the circulation pipes. These heat losses depend on various parameters (pipe length and dimension, insulation, ambient and pipe temperature) and must be considered on a system-specific basis. In order to compensate for heat losses and keep the temperature high enough, a certain volume flow or heat flow must flow through the circulation pipe. A larger quantity of hot water must therefore flow in the circulation pipelines that are far away from the potable water heater than in the closer pipelines. This is achieved by throttling the volume flow in the closer circulation pipes by building up a corresponding differential pressure using the regulating valves.

The planner consults the DVGW Code of Practice W 553 to determine these differential pressures while maintaining specified temperature limits. The calculation of a circulation pipe within a service water system can be carried out approximately for stationary operation (without drawing off hot water). As the withdrawal quantities at the various points (bathroom, kitchen, etc.) vary during normal operation, the required circulation water quantity also changes constantly. The Aquastrom TV thermostatic control valve automatically adapts optimally to these changing hydraulic operating conditions.

In order to ensure the hydronic balancing required by DVGW W 553 in a circulation system, the required volume flows of individual pipelines should be calculated. In large potable water circulation systems, large volume flows are required especially in the most remote sections. The control valves must be dimensioned accordingly. If necessary, several pipelines are combined into a group and balanced with each other using a potable water circulation valve as a group valve. In this way, small volume flows can be realised at high differential pressures in nearby pipelines and correspondingly large volume flows can be achieved in distant pipelines.

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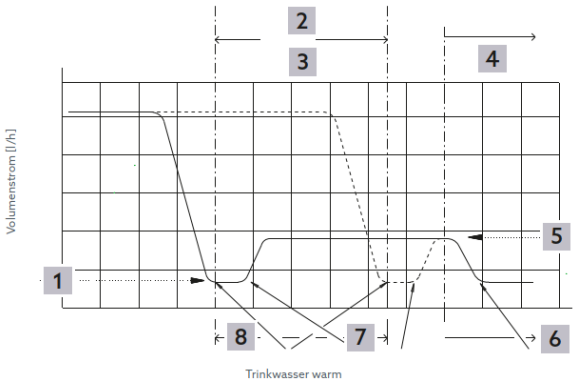
Thermal control behaviour



1	Residual volume flow according to DIN 35861
2	Adjustable control range 50 °C – 65 °C
3	Recommended control range 55 °C – 60 °C
4	Disinfection range >70 °C
5	Disinfection volume flow
6	Valve throttles back to residual volume flow from approx. 73 °C
7	Valve opens approx. 6 °C after the minimum residual volume flow is reached
8	At the set temperature setpoint, the valve throttles the volume flow down to a residual volume flow

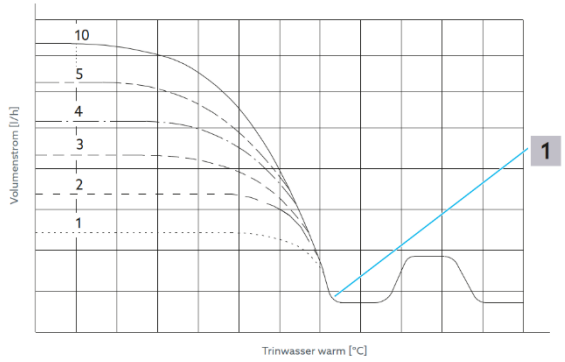
The thermal control behaviour of the circulation valve is described in the illustrated chart. In normal operation (temperature range up to 60 °C), the circulation valve throttles the volume flow to a residual volume flow at the set temperature setpoint.

The Oventrop Aquastrom TV valve installed in a circulation pipeline automatically regulates from a minimum volume flow to a higher flow rate value during the disinfection phase when the water temperature rises from approx. 6 K above the set control temperature. This increased flow rate is throttled back to the minimum volume flow from a temperature of approx. 73 °C. This builds up a higher differential pressure in the corresponding pipeline, which accelerates thermal disinfection in the downstream pipelines.

These pipes therefore reach the required disinfection temperature more quickly than pipes that are not hydraulically supported during the disinfection phase. This hydraulic support can therefore shorten the disinfection phase in a circulation system, which in turn can lead to energy savings.

Once disinfection is complete, the Aquastrom TV returns to normal operation to the preset temperature setpoint when the temperature drops.

Volume flow limitation



1	Set temperature setpoint

The Aquastrom VT circulation valve can also be used to limit the maximum volume flow (this is within the temperature range before the set temperature setpoint). This enables hydronic balancing of the circulation pipes, particularly in the event of a sharp drop of temperature, e.g. due to boiler failure or excessive water consumption.

The temperature control reduces the volume flow within the preset volume flow range according to the control characteristics shown in the chart.

The flow rate values and the associated preset values can be found in the design charts.

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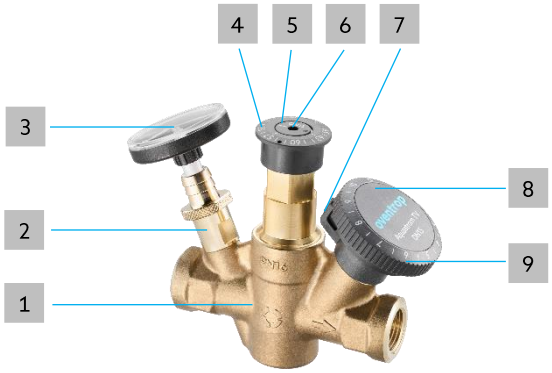
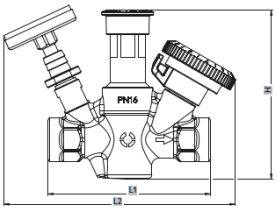
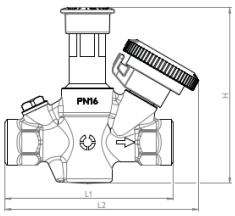
Design



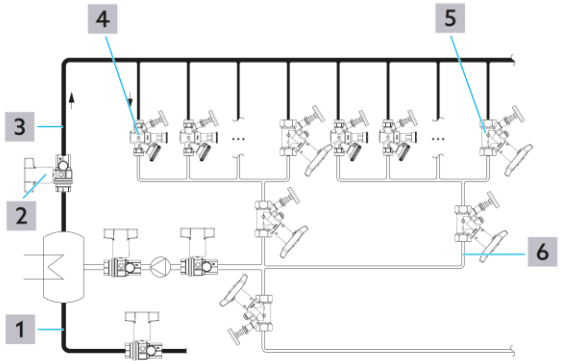
1	Body
2	Drain valve
3	Dial thermometer
4	Temperature setting scale
5	Temperature setting mark
6	Opening in the setting scale (for temperature setting)
7	Flow rate setting mark
8	Handwheel
9	Flow rate setting scale

Dimensions

Aquastrom TV

	Nominal size	L1 [mm]	L2 [mm]	B [mm]	H [mm]
	DN 15	110	157	53	115
	DN 20	123	162	53	117
	DN 15	110	127	53	115
	DN 20	123	135	53	117

Applications



1	Potable water cold
2	Shutoff ball valve (e.g. Optibal TW)
3	Potable water hot
4	Potable water circulation valve (e.g. Aquastrom TV)
5	Double regulating valve (e.g. Aquastrom C)
6	Potable water circulation

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Selection

Item Numbers

Aquastrom TV with internal thread

	Nominal size	Connection	Kvs	Item no.
	DN 15	Rp ½	1.24	4202504
	DN 20	Rp ¾	2.21	4202506

Aquastrom TV with external thread, flat sealing

	Nominal size	Connection	Kvs	Item no.
	DN 15	G ¾	1.24	4202704
	DN 20	G 1	2.21	4202706

Aquastrom TV with internal thread, without accessories

	Nominal size	Connection	Kvs	Item no.
	DN 15	Rp ½	1.24	4202604
	DN 20	Rp ¾	2.21	4202606

Aquastrom TV with external thread, flat sealing, without accessories

	Nominal size	Connection	Kvs	Item no.
	DN 15	G ¾	1.24	4202804
	DN 20	G 1	2.21	4202806

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Accessories and spare parts

Selected accessories and spare parts for Aquastrom TV valves. For a complete overview, see the product catalogue.

Description	Art.-Nr.
Insulation shells for valves DN 15 und DN 20	4209610
Drain valve for hose connection DN 8, G ¼ ET	4205593
Dial thermometer	4205591
Wire seal kit	4208091
Sensor LW TQ sensor element PT 1000 for remote monitoring of the pipeline temperature	1150090
Sensor LW TQ insertion sensor element PT 1000 for remote monitoring of the pipeline temperature	4205592
Aquastrom P water sampling valve DN 8, G ¼ ET	4209102
Drain valve DN 8, G ¼ ET	4209602
Drain ball valve DN 8, G ¼ ET	4200191

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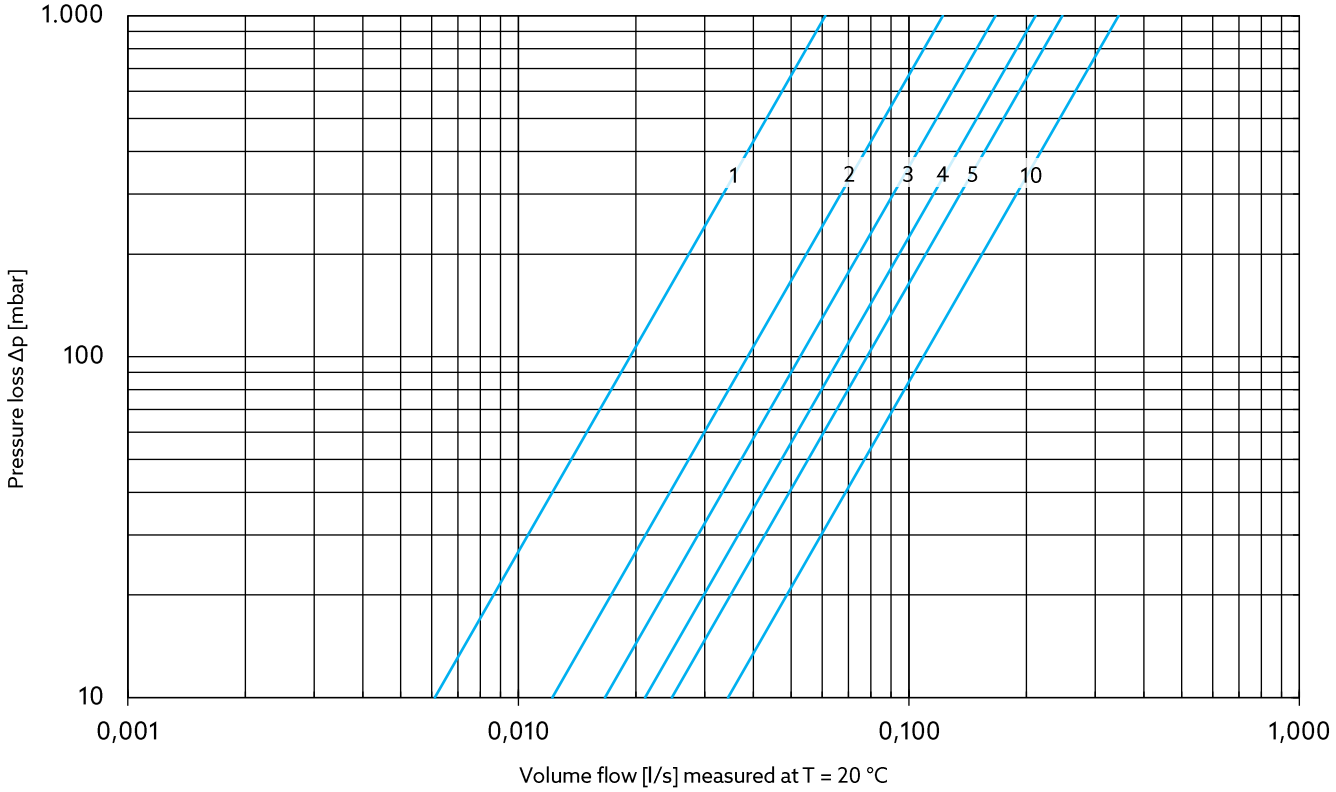
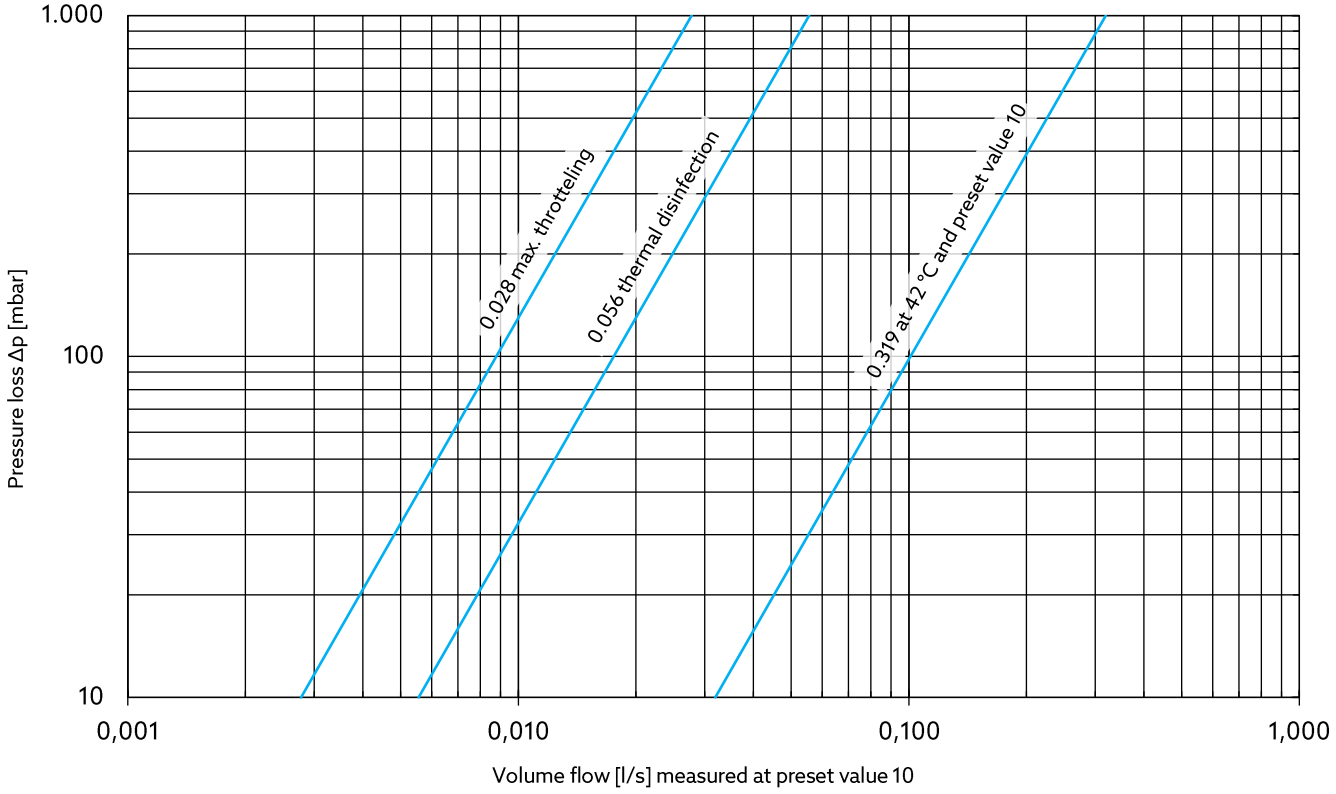
Design Charts

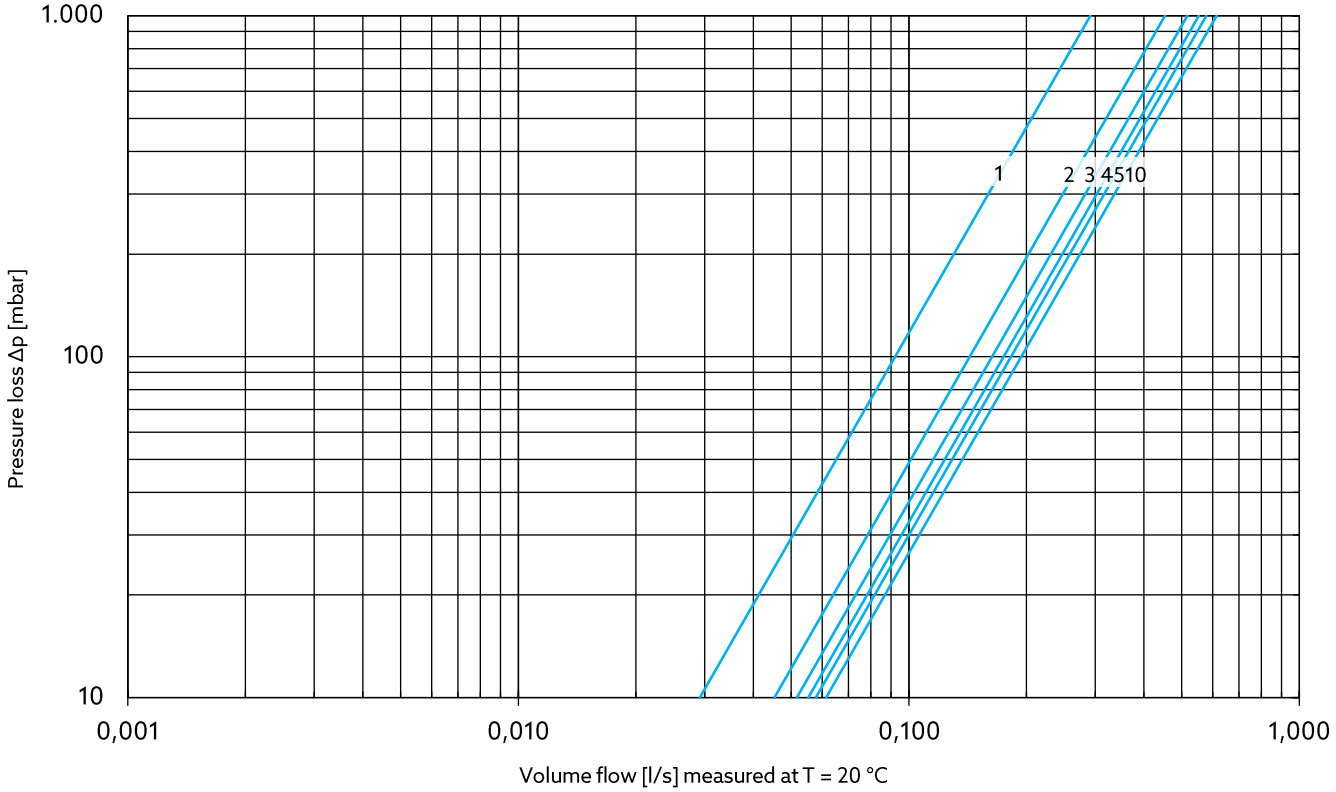
Volume flow preset values Aquastrom TV DN 15



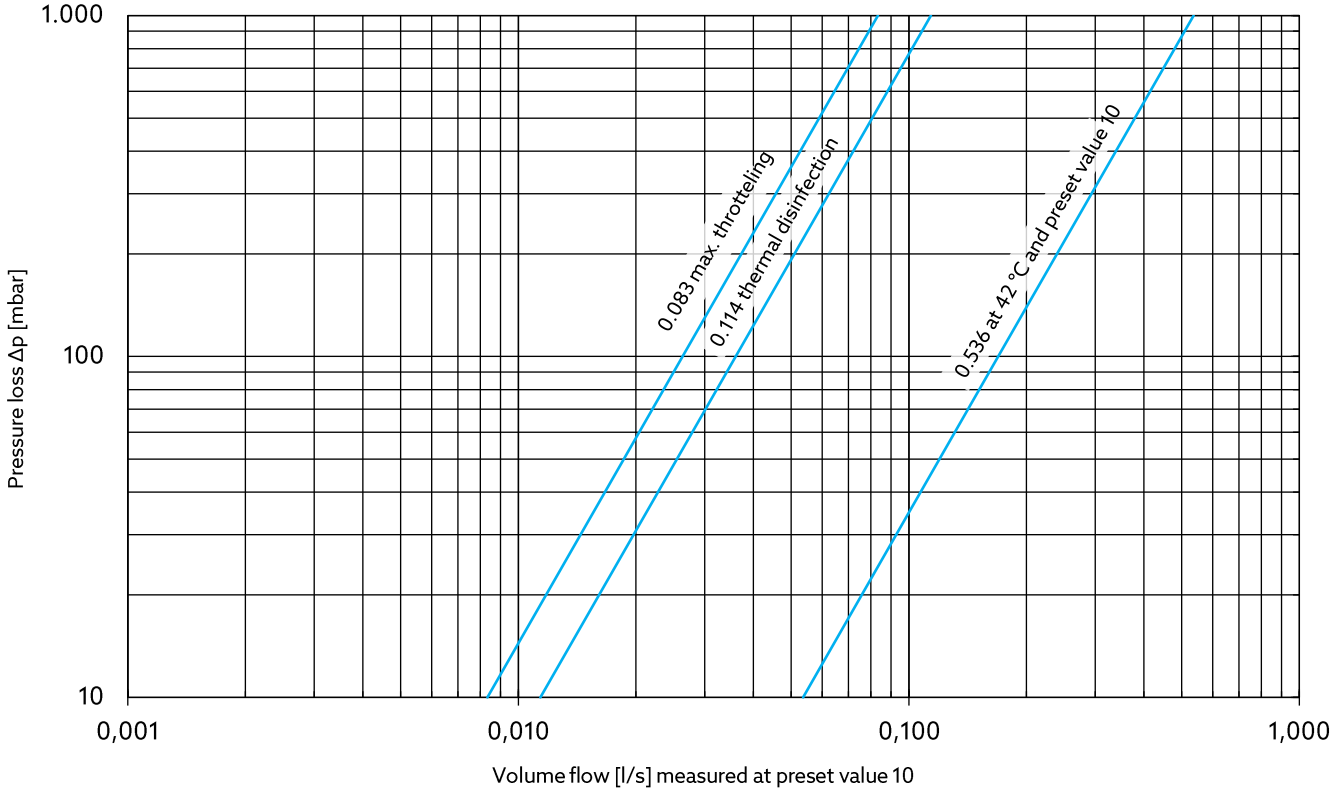
Volume flow thermal control Aquastrom TV DN 15



Volume flow preset values Aquastrom TV DN 20



Volume flow thermal control Aquastrom TV DN 20



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Presetting and Kv values

The Aquastrom TV circulation valves enable both thermal and hydronic presetting. For the design, it is recommended to take into account the Kv values at a proportional deviation (P-deviation) of 2 Kelvin.

For adaptation to lower volume flows, this can be achieved by reducing the proportional deviation and/or by selecting an appropriate hydronic presetting. To achieve higher volume flows and reach the setpoint, a larger thermal value (proportional deviation) can be used.

Aquastrom TV DN 15

	P-deviation											
VE	0 K	1 K	2 K	3 K	4 K	5 K	6 K	7 K	8 K	9 K	10 K	Kvs
1	0.04	0.17	**0.24**	0.26	0.27	0.27	0.28	0.28	0.28	0.28	0.28	**0.28**
2	0.06	0.21	**0.32**	0.38	0.42	0.45	0.47	0.48	0.49	0.50	0.50	**0.50**
3	0.07	0.23	**0.37**	0.45	0.52	0.58	0.61	0.64	0.65	0.67	0.68	**0.68**
4	0.08	0.24	**0.40**	0.50	0.58	0.64	0.70	0.74	0.77	0.79	0.81	**0.82**
5	0.09	0.25	**0.42**	0.54	0.63	0.70	0.76	0.81	0.84	0.88	0.91	**0.92**
6	0.10	0.26	**0.45**	0.57	0.66	0.74	0.82	0.87	0.92	0.97	1.01	**1.02**
7	0.10	0.27	**0.47**	0.60	0.69	0.78	0.85	0.92	0.97	1.03	1.07	**1.09**
8	0.10	0.28	**0.48**	0.62	0.71	0.80	0.89	0.96	1.02	1.08	1.13	**1.17**
9	0.10	0.29	**0.49**	0.63	0.73	0.82	0.91	0.99	1.05	1.11	1.17	**1.22**
10	**0.10**	**0.30**	**0.50**	**0.64**	**0.74**	**0.84**	**0.93**	**1.00**	**1.07**	**1.13**	**1.21**	**1.24**

Aquastrom TV DN 20

	P-deviation											
VE	0 K	1 K	2 K	3 K	4 K	5 K	6 K	7 K	8 K	9 K	10 K	Kvs
1	0.24	0.37	**0.45**	0.53	0.69	0.81	0.89	0.95	0.99	1.02	1.05	**1.05**
2	0.26	0.38	**0.46**	0.55	0.77	0.95	1.09	1.20	1.28	1.37	1.46	**1.63**
3	0.27	0.38	**0.47**	0.57	0.79	1.00	1.17	1.29	1.40	1.51	1.63	**1.86**
4	0.28	0.39	**0.51**	0.60	0.80	1.05	1.22	1.35	1.48	1.61	1.74	**1.99**
5	0.29	0.39	**0.52**	0.61	0.83	1.06	1.24	1.38	1.49	1.63	1.77	**2.08**
6	0.30	0.40	**0.53**	0.63	0.85	1.07	1.25	1.40	1.52	1.67	1.82	**2.12**
7	0.30	0.40	**0.54**	0.64	0.86	1.09	1.26	1.42	1.53	1.70	1.84	**2.16**
8	0.30	0.41	**0.55**	0.65	0.87	1.10	1.27	1.43	1.54	1.71	1.86	**2.18**
9	0.30	0.41	**0.56**	0.65	0.88	1.11	1.28	1.44	1.55	1.72	1.87	**2.19**
10	**0.30**	**0.42**	**0.57**	**0.66**	**0.89**	**1.12**	**1.29**	**1.45**	**1.56**	**1.73**	**1.90**	**2.21**

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