

OPTIMA Compact HCR

DN15-DN40

Application

OPTIMA Compact HCR pressure independent balancing & control valves (PIBCV) are used in Industrial applications for heating & cooling of processes and process control.

OPTIMA Compact HCR provides modulating control with full authority regardless of any fluctuations in the differential pressure of the system.

OPTIMA Compact HCR combines an externally adjustable automatic balancing valve, a differential pressure control valve and a full authority modulating control valve.

OPTIMA Compact HCR makes it simple to achieve 100% control of the water flow in the system, while creating high stability and energy savings at the same time.

An additional benefit is that no balancing is required if further stages are added to the system, or if the dimensioned capacity is changed.

Energy saving due to optimal control, lower flow and pump pressure. Maximized ΔT due to faster response and increased system stability.

Benefits

Design

- Less time to define the necessary equipment for a hydraulic balanced system (only flow data are required)
- No need to calculate valve authority. Always one.
- Flexibility if the system is modified after the initial installation

Installation

- No further regulating valves required in the distribution pipework when OPTIMA Compact HCR is installed at the terminals.
- Total number of valves minimized due to the 3-in-1 design
- Minimized commissioning time due to automatic balancing of the system
- No minimum straight pipe lengths required before or after the valve.

Operation

- High comfort for the end-users due to high precision temperature control
- Longer life due to less movements of the actuator

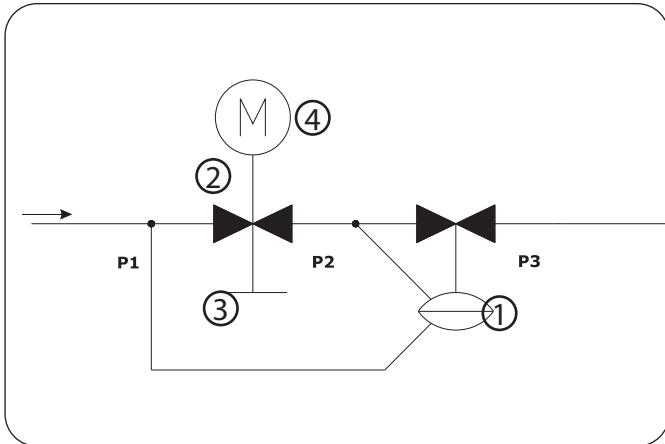


Features

- The presetting function has no impact on the stroke; Full stroke modulation at all times, regardless the preset flow.
- The constant differential pressure across the modulating control component guarantees 100% authority.
- Automatic balancing eliminates overflows, regardless of fluctuating pressure conditions in the system.
- Motoric actuator 0-10 V, 4-20 mA and 3 point control
- Differential pressure operating range up to 600 kPa
- High flows with minimal required differential pressure due to advanced design of the valve
- Small dimensions due to compact housing
- Pressure class PN16/25/40 in same housing
- Higher presetting precision due to stepless analogue scale
- Rangeability > 100:1

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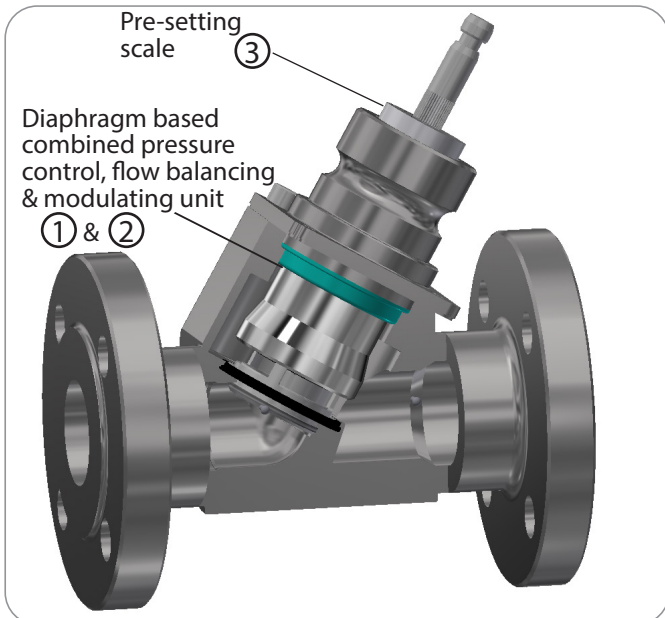
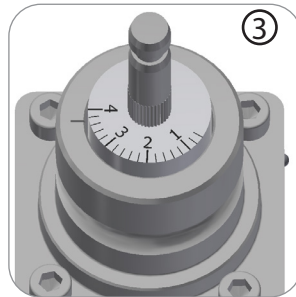


Design

The design of OPTIMA Compact HCR combines high performance with small size and compact construction.

The main components of the valve are:

- ① Differential pressure control
- ② Modulating control component
- ③ Presetting scale (not accessible when the actuator is mounted)
- ④ Actuator



Function

The OPTIMA Compact HCR can be flushed and commissioned before the actuator is installed.

The presetting of the dial is user-friendly requiring only a simple flow vs. presetting graph. Once the flow is set, the actuator can be mounted and the valve ready to operate.

For lowest energy consumption, check the differential pressure at the index valve to set the pump at minimum speed.

Operating Pressure

OPTIMA Compact HCR DN15-DN40 can operate to a maximum differential pressure of 600 kPa (6 bar).

Close Off Pressure

The OPTIMA Compact HCR is capable of closing against the following differential pressures to EN 1349 Class IV:

DN15- DN32:
600 kPa (6 bar) - based on 250N actuator force

DN40:
600 kPa (6 bar) - based on 400N actuator force

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Operation principle

The innovative design of OPTIMA Compact HCR features a modulating control component that retains 100% authority at all times.

With the OPTIMA Compact HCR, there are two independent movements for the presetting and the modulating function.

During presetting, the inlet area moves radially without interfering with the length of the stroke. During modulating, the inlet area moves axial taking advantage of the full stroke.

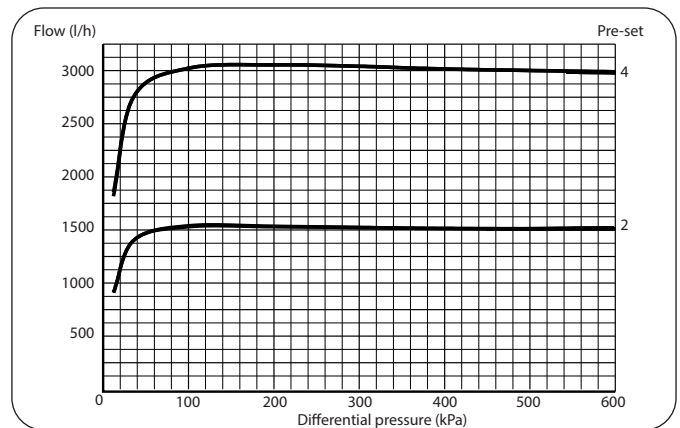
Whilst the control component provides proportional

modulation irrespective of the preset flow, the automatic balancing guarantees that the flow will never exceed the maximum preset flow.

Regardless of pressure fluctuations in the system, the maximum flow is kept constant up to a maximum differential pressure of 600 kPa.

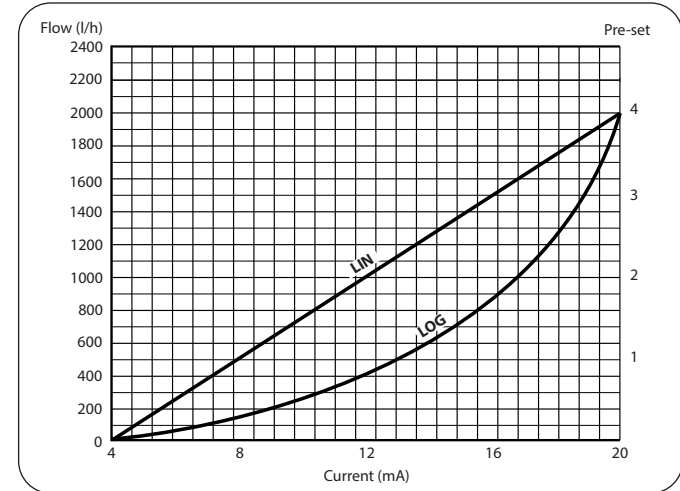
Flow rate vs. Differential Pressure

Preset flow: 3000 l/h, 1500 l/h



Flow rate vs. Voltage

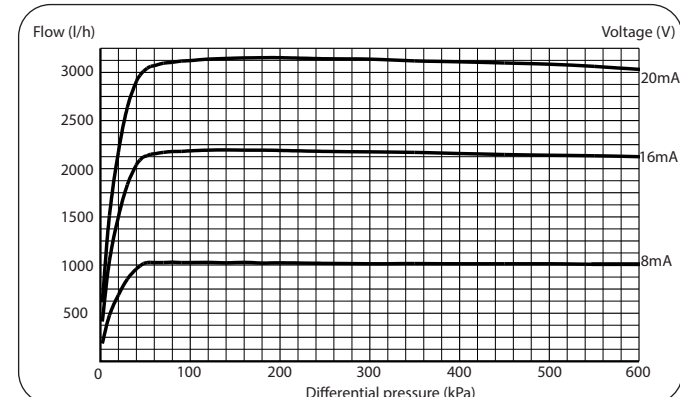
Preset flow: 2000 l/h



Flow rate vs. Differential Pressure

Preset flow: 3000 l/h

Voltage: 20mA, 16mA, 8mA



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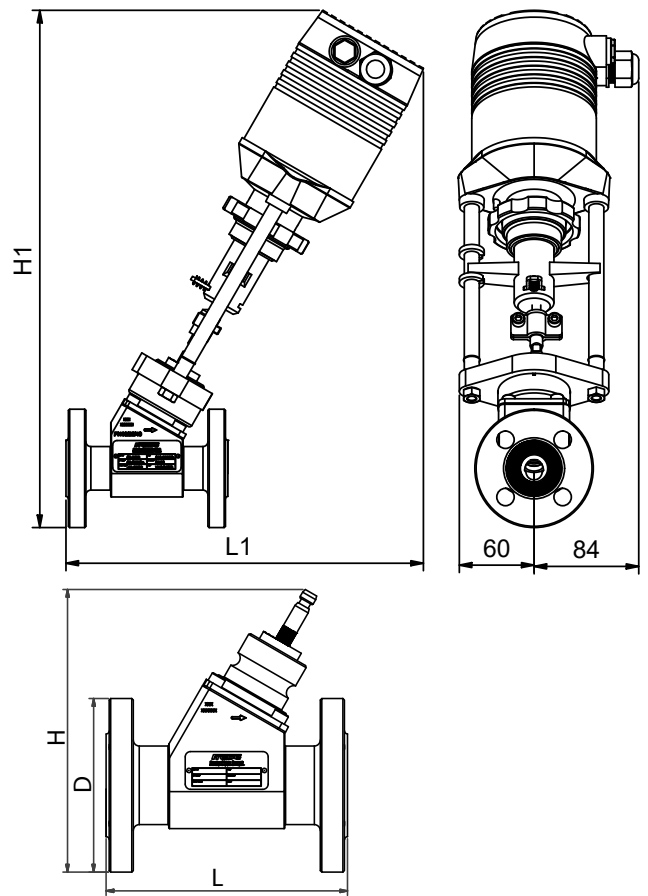
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Technical data

Valve housing DN15-DN40:	AISI316L
DP controller:	AISI 316L
Spring:	Stainless steel
Diaphragm:	Reinforced HNBR
O-rings:	EPDM*
*) Other materials on request. Please contact Frese for your specific application	
Pressure class:	PN16/25/40
Flange connections:	ISO 7005-1 / EN 1092-1
Max. differential pressure:	600 kPa
Medium temperature:	-20°C to 120°C

When used at temperatures below 0°C, a stem heater must be used, to prevent ice on the spindle.

The pipe system shall be properly ventilated to avoid risk of air pockets.



Dimension & Weight

Dim.		DN15	DN20	DN25	DN32	DN40
Dim [mm]	L	130	150	160	180	200
	L1	287	297	309	318	333
	D	95	105	115	140	150
	H	164	169	187	200	232
	H1*	415	420	438	451	475
Flange holes (n) x ø[mm]		(4) x 14	(4) x 14	(4) x 14	(4) x 18	(4) x 18
Weight [kg]		3.5	4.4	5.4	6.6	11.0

*) Dimension with Frese HO-series actuators

Flow

Dim.		DN15	DN20	DN25	DN32	DN40
Stroke	mm	5.5	5.5	5.5	5.5	15
Flow	l/h	525-2000	525-2000	850-4100	850-4100	2000-9500
	l/s	0.146-0.556	0.146-0.556	0.236-1.139	0.236-1.139	0.556-2.639
	gpm	2.31-8.81	2.31-8.81	3.74-18.05	3.74-18.05	8.81-41.83

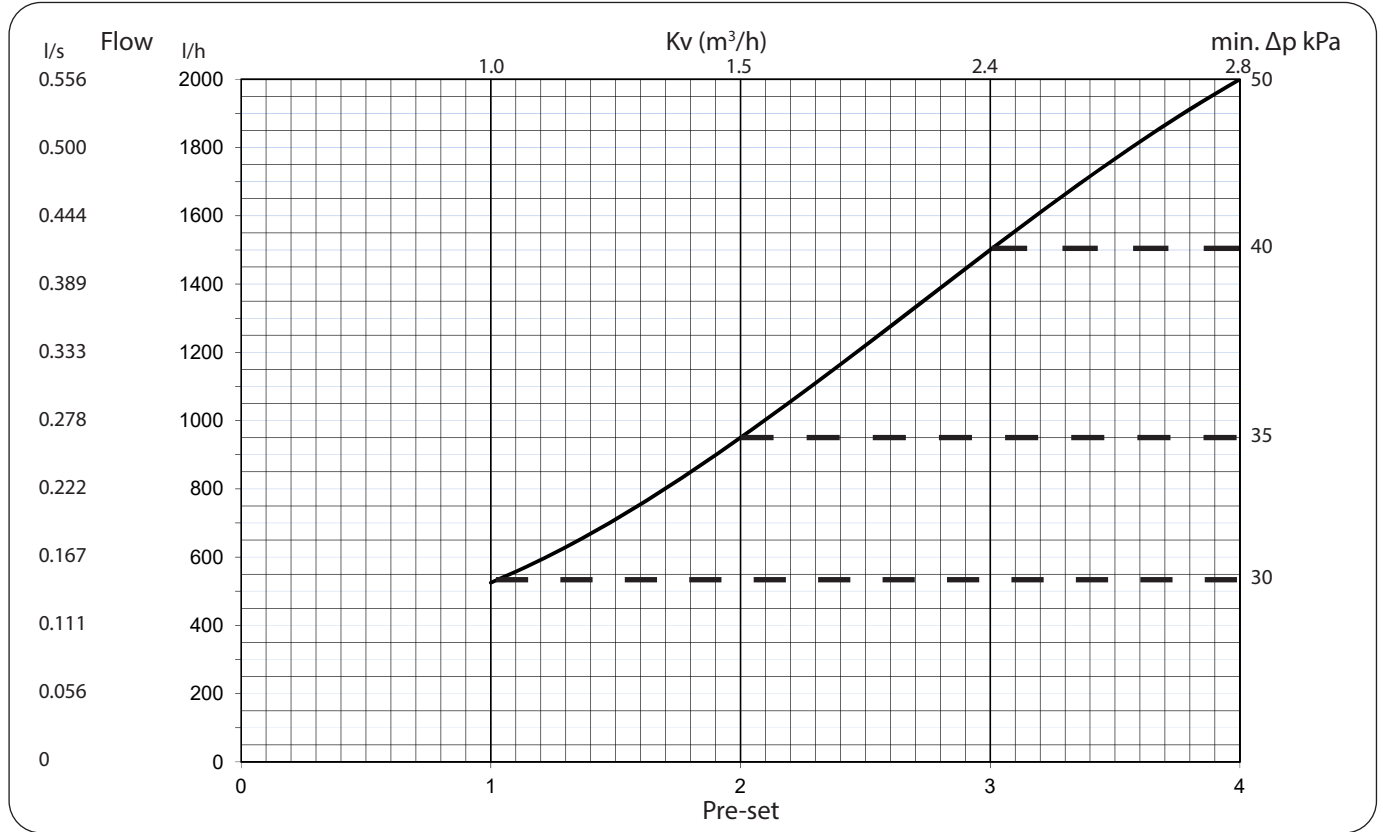
Product programme

Dim.	Type	Flow l/h	Item no.
DN15	HCR	525-2000	58-8180
DN20	HCR	525-2000	58-8181
DN25	HCR	850-4100	58-8182
DN32	HCR	850-4100	58-8183
DN40	HCR	2000-9500	58-8184

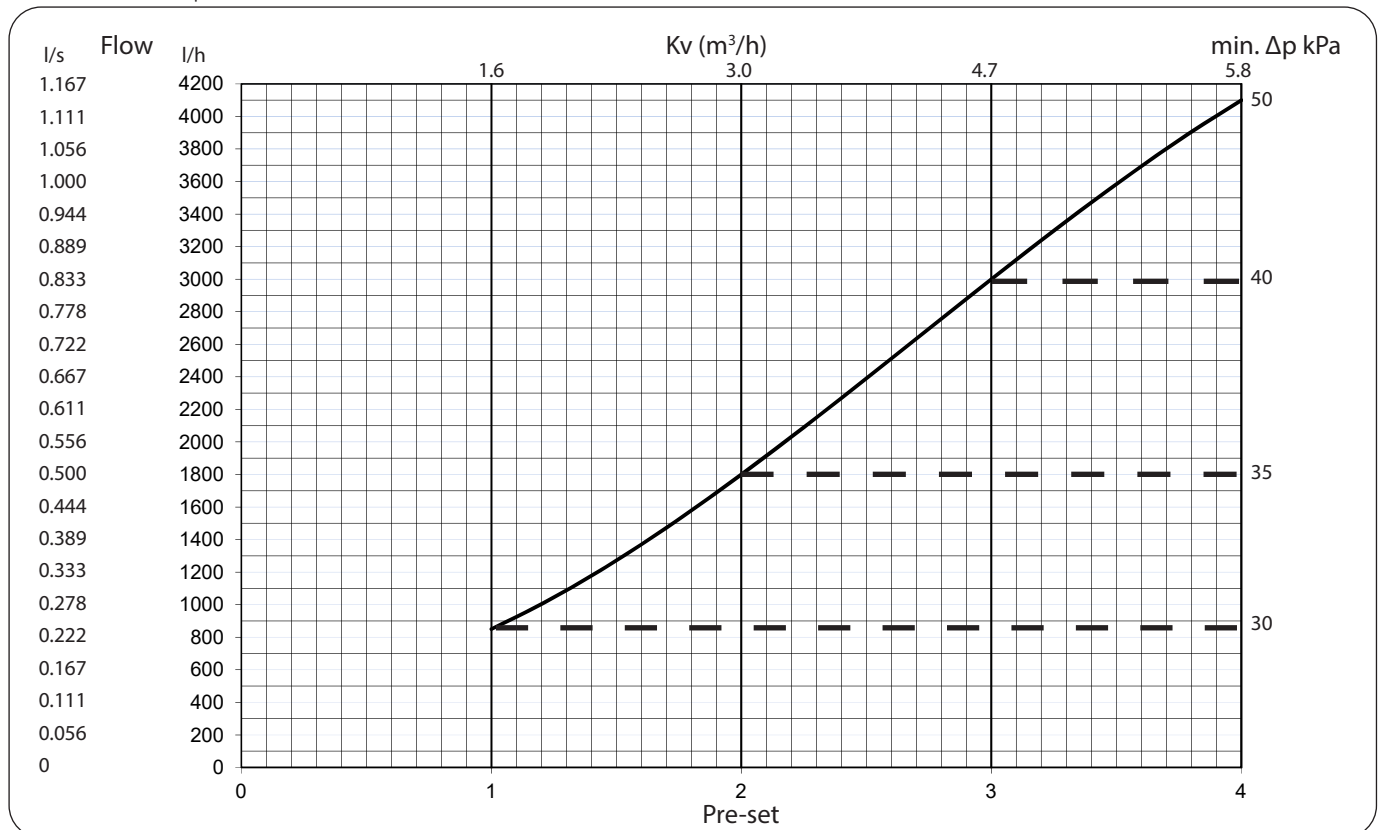
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OPTIMA Compact HCR · DN15/20



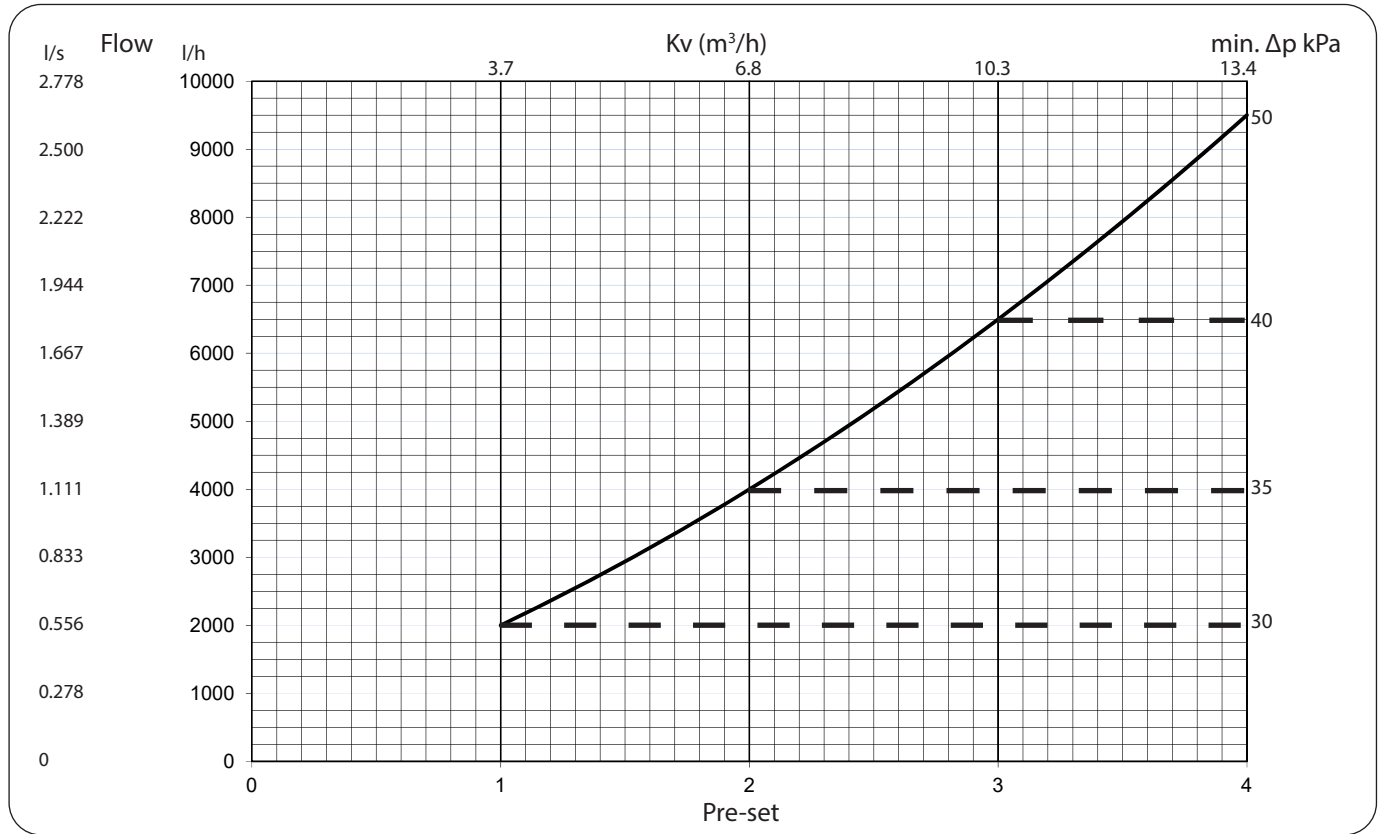
OPTIMA Compact HCR · DN25/32



OPTIMA Compact HCR

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OPTIMA Compact HCR · DN40



Setting and Flow

Dim.	DN15/20			DN25/32			DN40		
	Pre-set	Flow l/h	Flow l/s	Flow gpm	Flow l/h	Flow l/s	Flow gpm	Flow l/h	Flow l/s
1.0	525	0,146	2,31	850	0,236	3,74	2000	0,556	8,81
1.2	592	0,164	2,60	1003	0,279	4,42	2360	0,656	10,39
1.4	669	0,186	2,94	1178	0,327	5,18	2740	0,761	12,06
1.6	755	0,210	3,32	1370	0,381	6,03	3140	0,872	13,82
1.8	849	0,236	3,74	1579	0,439	6,95	3560	0,989	15,67
2.0	950	0,264	4,18	1800	0,500	7,93	4000	1,111	17,61
2.2	1056	0,293	4,65	2031	0,564	8,94	4460	1,239	19,64
2.4	1165	0,324	5,13	2270	0,630	9,99	4940	1,372	21,75
2.6	1276	0,354	5,62	2512	0,698	11,06	5440	1,511	23,95
2.8	1388	0,386	6,11	2757	0,766	12,14	5960	1,656	26,24
3.0	1500	0,417	6,60	3000	0,833	13,21	6500	1,806	28,62
3.2	1610	0,447	7,09	3239	0,900	14,26	7060	1,961	31,08
3.4	1716	0,477	7,55	3472	0,964	15,28	7640	2,122	33,64
3.6	1817	0,505	8,00	3694	1,026	16,27	8240	2,289	36,28
3.8	1912	0,531	8,42	3905	1,085	17,19	8860	2,461	39,01
4.0	2000	0,556	8,81	4100	1,139	18,05	9500	2,639	41,83

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Documentation formula

Valve ID (own choice)	Valve type	Dimension	Pre-setting	Verified Δp [kPa]	Min. Δp (see flow rate graph) [kPa]	Flow

Pump type	Regulation mode	Set point
Installation		
Signature	Date	

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