PV Compact

Spectrum-Series, DN15-DN50

Application

PV Compact Spectrum-series can be installed in domestic and commercial heating and cooling systems.

The valve is a dynamic, adjustable differential pressure control valve (DPCV) that ensures the differential pressure across the load or circuit is constant.

The valve ensures good modulating control and reduces the risk of noise from thermostatic radiator valves and 2-port control valves.

Benefits

- High Kv value that achieves a low pressure loss and increased energy efficiency
- Positive close off to prevent rising differential pressure when control valves in the controlled circuit are fully closed
- Eliminates noise problems caused by high differential pressure
- Tamper-proof presetting device on top of the valve, meaning there is no need for valve sealing after presetting
- Differential pressure can be set and adjusted on site
- Simple presetting using the scale on the cap

Features

- Maximum differential pressure: 450 kPa
- Very compact size for easy installation
- Size DN15-DN50
- Maximum flow up to 13,000 l/h
- Thread ISO 228
- Flange connections ISO 7005-2 / EN 1092-2 (DN50)

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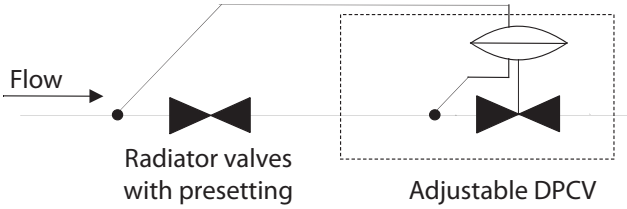
Design

PV Compact, Spectrum-series consists of a differential pressure regulation unit, an adjustable presetting and a capillary tube for connecting to the inlet pipe line.

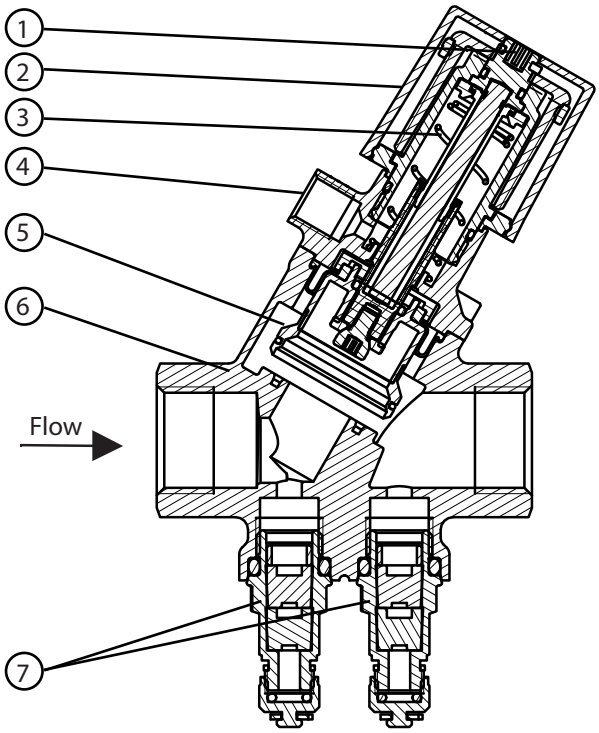
PV Compact, Spectrum-series must be installed in the return line with the capillary tube connected to the inlet line.

Simplified Outline



Cross section drawing

1. Adjustment nut
2. Cover with preset scale
3. Spring
4. Capillary tube connection
5. Piston
6. Housing
7. PT plugs



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Setting the valve

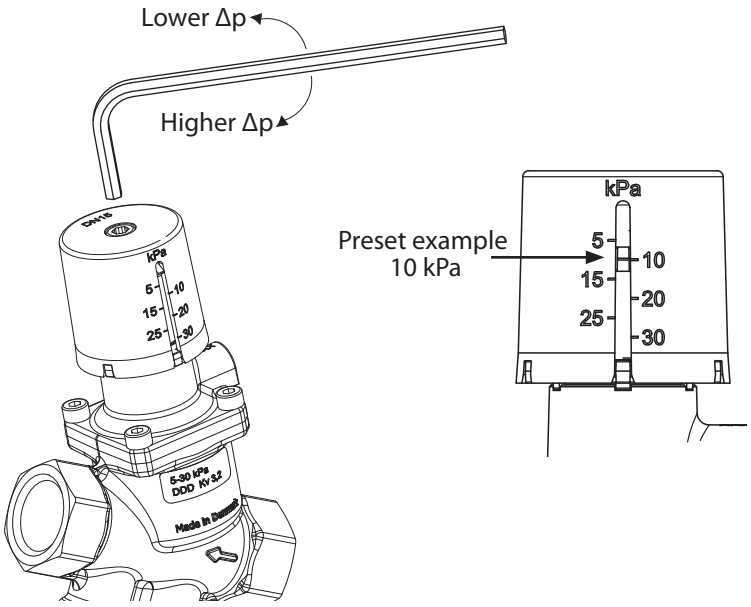
The valve is easily set by means of a 4 mm hexagonal key.

By use of the scale on the cap the required differential pressure can be preset directly.

The differential pressure values on the scale are based on 70 % flow of the maximum flow on the valves.

The 70% flow lines are marked on the flow graphs (Page 6-11).

For other flows the preseting can be adjusted according to the example below

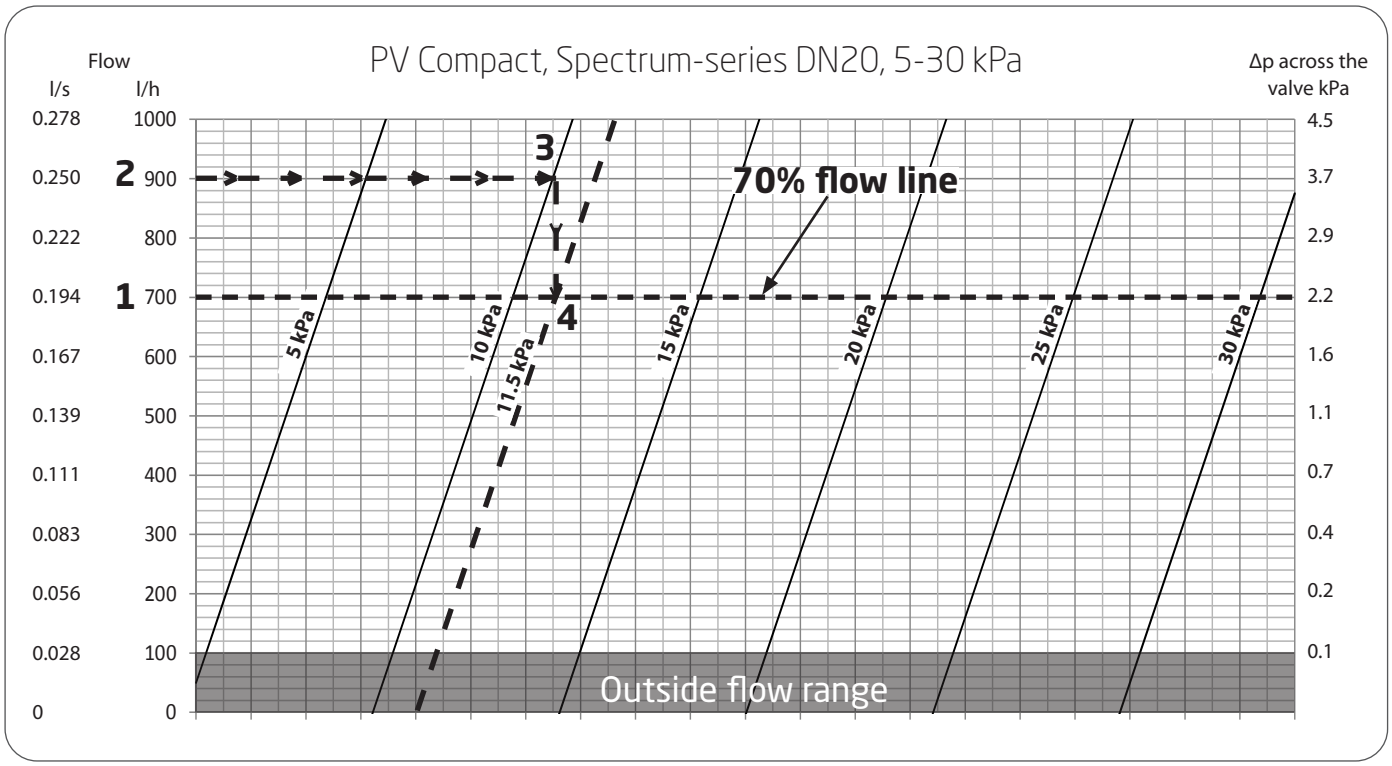


Example - flow higher than 70% of maximum

The scales on all PV Compact, Spectrum-series valves are based on 70 % of maximum flow range.

With a maximum flow of 1,000 l/h for PV Compact Spectrum-series DN20 5-30 kPa, the scale is based on a flow of 700 l/h **(1)**.

With a desired flow of 900 l/h **(2)** and a desired differential pressure of 10 kPa **(3)** the preset value must be adjusted to approximately 11.5 kPa **(4)** because of the P-band of the valve.



PV Compact

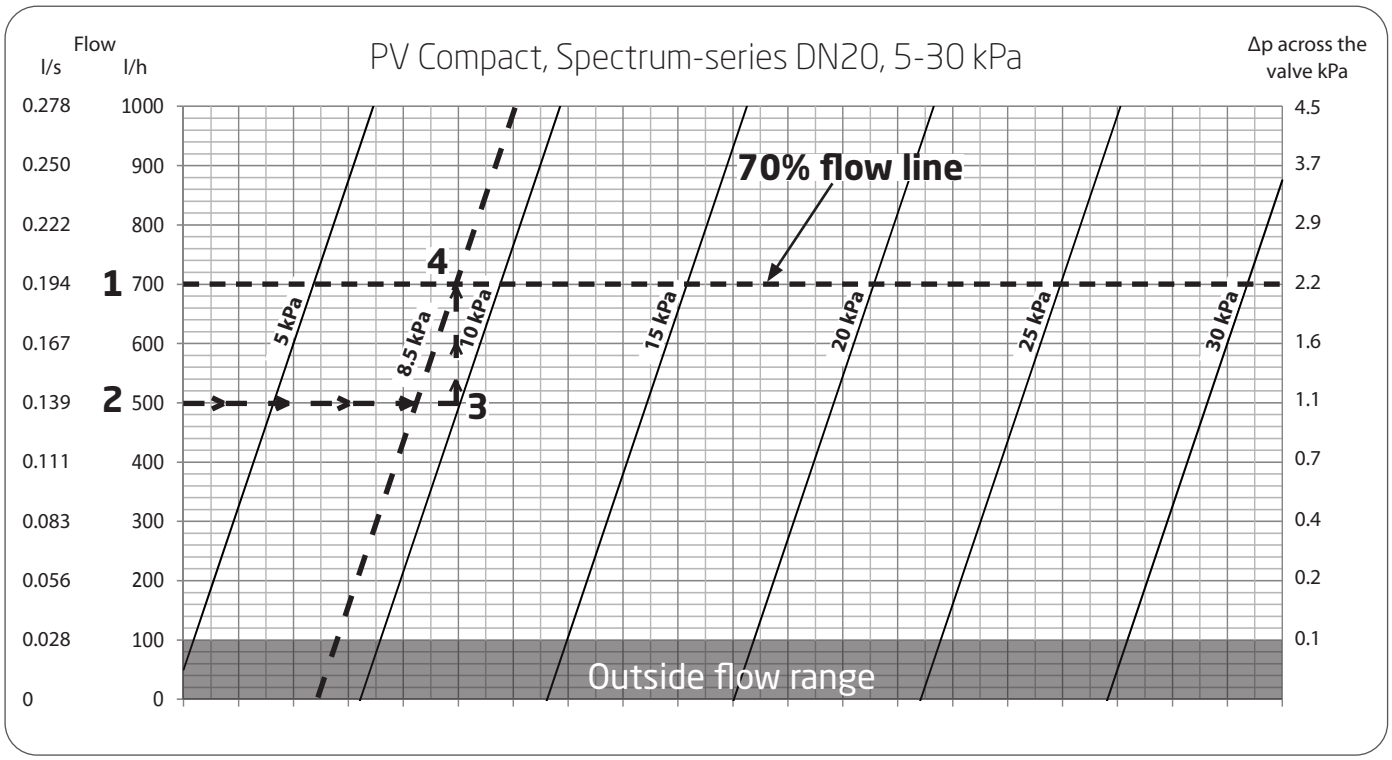
Spectrum-Series, DN15-DN50

Example - flow lower than 70% of maximum

The scales on all PV Compact Spectrum valves are based on 70 % of maximum flow range.

With a maximum flow of 1000 l/h for PV Compact Spectrum-series DN20 5-30 kPa, the scale is based on a flow of 700 l/h **(1)**.

With a desired flow of 500 l/h **(2)** and a desired differential pressure of 10 kPa **(3)** the preset value must be adjusted to approximately 8.5 kPa **(4)** because of the P-band of the valve.

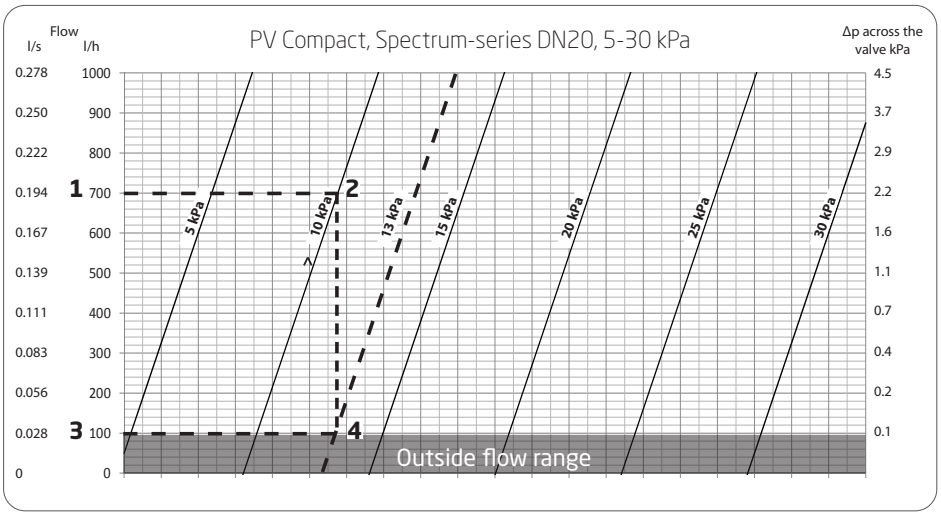


P-band

The P-band can be found in the graphs for the valves, and is defined as the difference between Δp at minimum flow in the system and Δp at maximum flow in the system.

In the example, the maximum flow in the system is 700 l/h **(1)** and the required Δp is 10 kPa **(2)**.

At a minimum flow of 100 l/h **(3)** the Δp will be 13 kPa **(4)** and therefore the P-band is: 13 kPa - 10 kPa = **3 kPa**



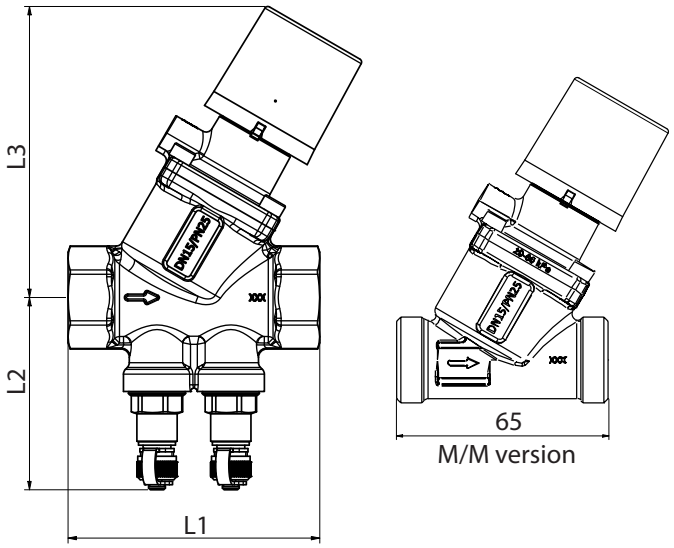
PV Compact

Spectrum-Series, DN15-DN50

Technical data

Housing DN15-32:	DZR Brass
DN40-50:	Ductile Iron
DP controller:	PPS 40 % glass
Spring:	Stainless steel
Diaphragm:	HNBR
O-rings and seat:	EPDM
Pressure class:	PN25
Max. differential pressure:	450 kPa
Temperature range:	-10 °C to 120 °C
Capillary tube:	Ø3, L = 1000 mm

The pipe system shall be properly ventilated to avoid risk of air pockets. Glycolic mixtures up to 50% are applicable (both ethylene and propylene).
Recommendation: Water treatment to VDI 2035.



Dimension & Weight · DN15-DN25

Dimension		DN15		DN20		DN25
Control range	kPa	5 - 30	20 - 60	5 - 30	20 - 60	5 - 30
Flow rate	l/s	0.014-0.167	0.028-0.278	0.028-0.278	0.042-0.556	0.167-0.583
	l/h	50-600	100-1000	100-1000	150-2000	600-2100
	gpm	0.22-2.65	0.44-4.41	0.44-4.41	0.66-8.82	2.65-9.25
Kvs	m³/h	2.9		3.5		4.0
Dim. [mm]	L1	75		79		83
	L2	57		57		59
	L2 *	66		66		68
	L3	87		87		90
Weight	kg	0.71		0.73		0.83

(*) Valves with drain

Dimension & Weight · DN25L-DN50 Ultra

Dimension		DN25L		DN32	DN40	DN50	DN50 Ultra
Control range	kPa	5 - 30	20 - 80	20 - 80	20 - 80	20 - 80	20 - 80
Flow rate	l/s	0.167-0.694	0.208-1.167	0.278-1.389	0.833-2.222	1.389-3.194	0.89-3.61
	l/h	600-2500	750-4200	1000-5000	3000-8000	5000-11500	3200-13000
	gpm	2.65-11.02	3.30-18.52	4.41-22.05	13.21-35.22	22.01-50.63	14.1-57.2
Kvs	m³/h	8.7		10.1	15.8	16.2	18.6
Dim. [mm]	L1	100		104	138	138	230
	L2	63		68	71	77	83
	L2 *	72		77	80	86	-
	L3	142		142	161	161	161
Weight	kg	1.6		1.7	3.1	3.6	10.7

(*) Valves with drain

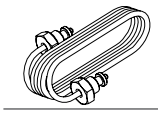
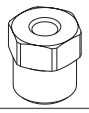
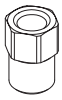
PV Compact

Spectrum-Series, DN15-DN50

Product programme

Dimension	DN15		DN20		DN25	DN25L		DN32	DN40	DN50	DN50 Ultra
Control range kPa	5-30	20-60	5-30	20-60	5-30	5-30	20-80	20-80	20-80	20-80	20-80
M/M, capillary tube, 1/4" adapter	53-3400	53-3401	-	-	-	-	-	-	-	-	-
M/M, capillary tube, 1/2" adapter	53-3402	53-3403	-	-	-	-	-	-	-	-	-
Drain/P/T plug, capillary tube & 1/4" adapter	53-3442	53-3443	53-3444	53-3445	53-3451	53-3446	53-3447	53-3448	53-3449	53-3450	-
P/T plugs, capillary tube & 1/4" adapter	53-3404	53-3405	53-3406	53-3407	53-3408	53-3410	53-3411	53-3414	53-3416	53-3418	53-5240 PN16 53-5241 PN25

Accessories

	Frese no.	Description
	48-0004	Frese capillary tube ø3mm x 1000 mm
	48-0030	PV Compact Capillary Adapter 1/2"
	48-0031	PV Compact Capillary Adapter 1/4"
	43-2330	Couplings for DN15 M/M incl. gaskets. Set with 2 pcs.

Insulation - for heating applications only

Material: EPP, max temperature 120 °C

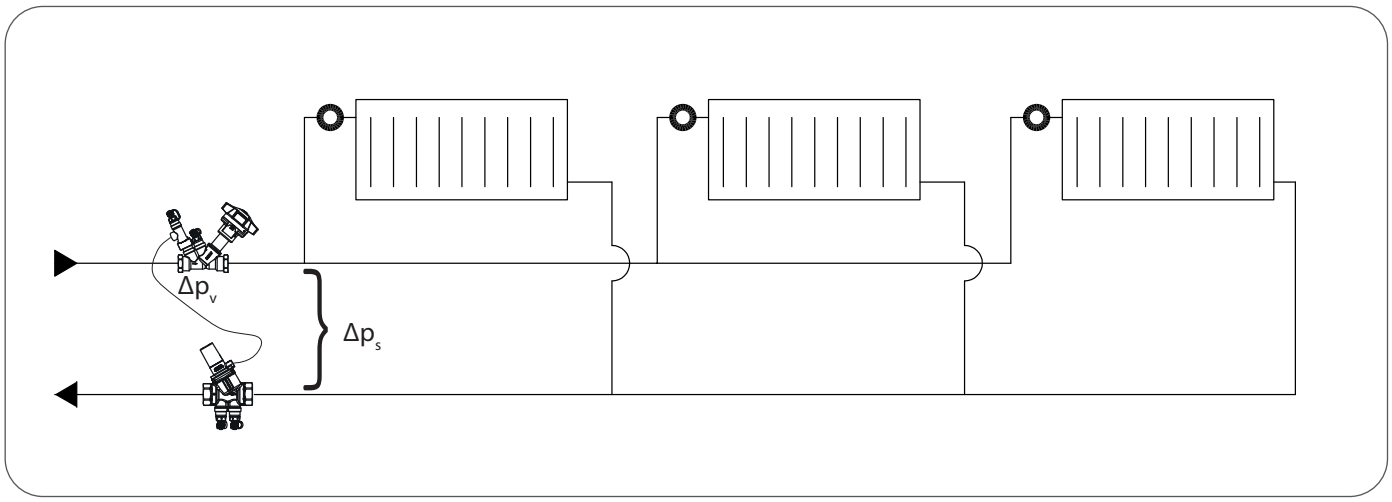
	Frese no.	For dimensions
	38-0857	DN15-20
	38-0858	DN25
	38-0860	DN25L-32
	38-0877	DN40-50 (Not suitable for DN50 Ultra)

PV Compact

Spectrum-Series, DN15-DN50

Partner valves

PV Compact can be combined with static balancing valves (Frese STBV VODRV) to control the differential pressure and the flow in the system.
The capillary from PV Compact is connected to the inlet side of the static balancing valve. To preset the required differential pressure on PV Compact, both the required differential pressure across the static balancing valve (Δp_v) and the differential pressure across system (Δp_s) must be added. PV Compact preset = (Δp_s) + (Δp_v)
See Frese STBV VODRV Technote for specifications on the static balancing valves and use the Frese APP to calculate preset values.



PV Compact installed in a radiator system with Frese STBV VODRV static balancing valve. The solution can be used for radiator systems with TRV's with or without presetting.

Accessories: partner valves

Frese STBV VODRV with connection for PV Compact Capillary

	DN15	DN20	DN25	DN32	DN40	DN50
	53-2590	53-2591	53-2592	53-2593	53-2594	53-2595
Kv Total (Fully open valve)	3.5	6.5	10.5	21	26	40

Frese partner valve with DN15 drain and connection for PV Compact Capillary

	DN15	DN20	DN25	DN32	DN40	DN50
	48-1039	48-1049	48-1059	48-1069	48-1079	48-1089

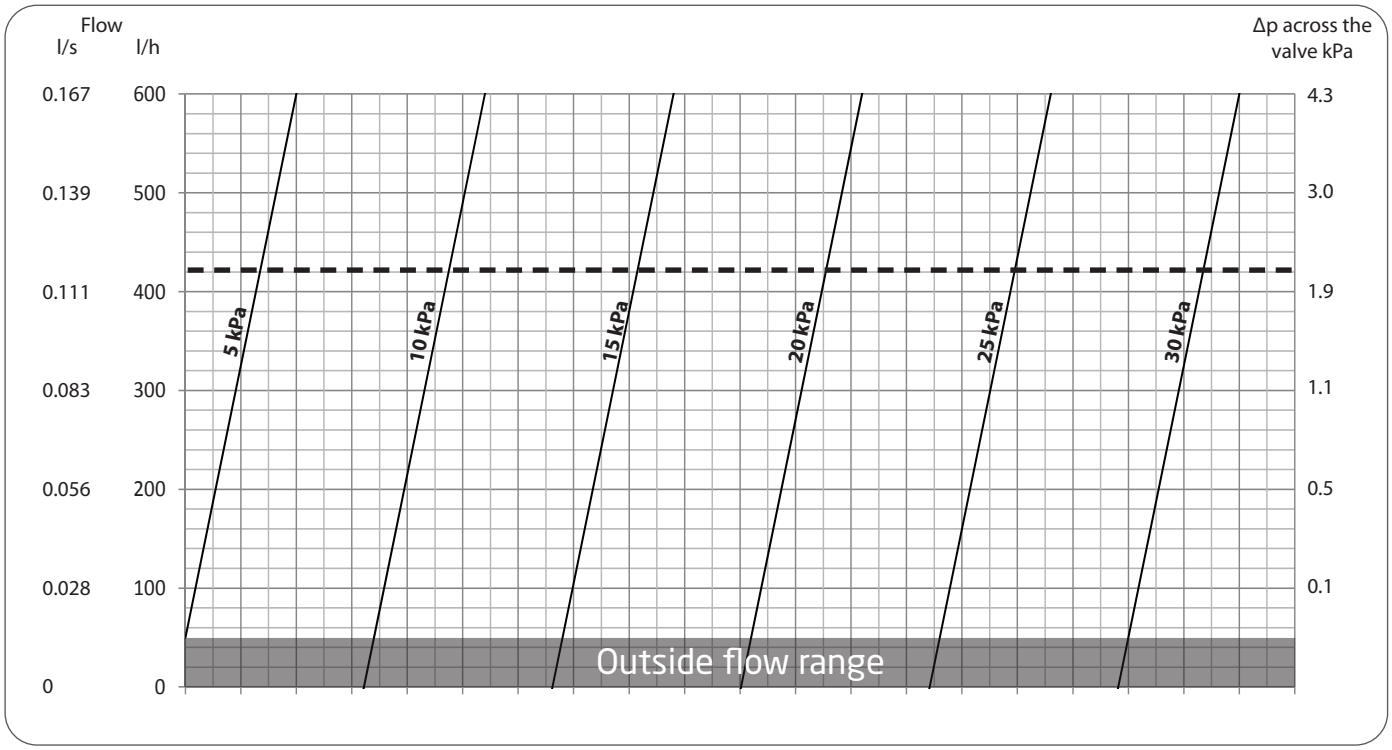
Frese partner valve with DN20 drain and connection for PV Compact Capillary

	DN15	DN20	DN25	DN32	DN40	DN50
	48-2039	48-2049	48-2059	48-2069	48-2079	48-2729

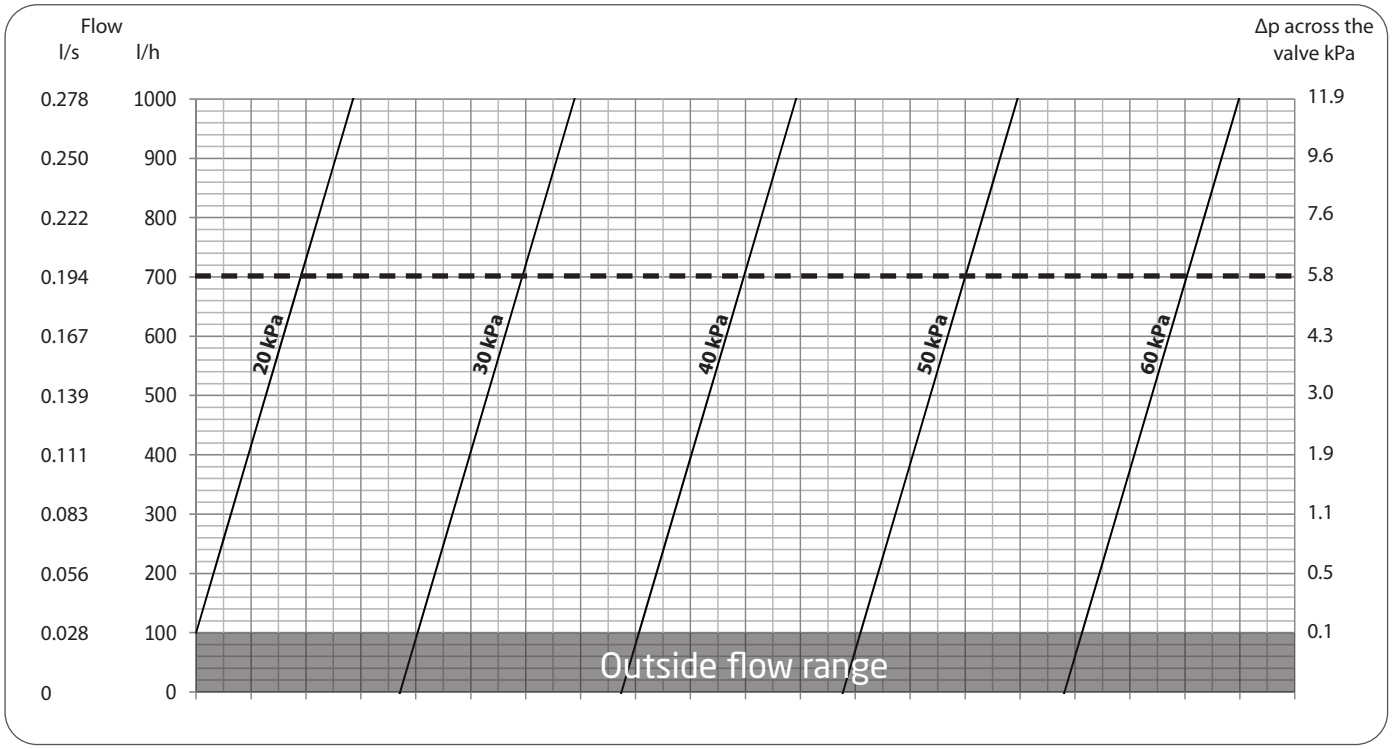
PV Compact

Spectrum-Series, DN15-DN50

Flow Graph · DN15, 5-30 kPa



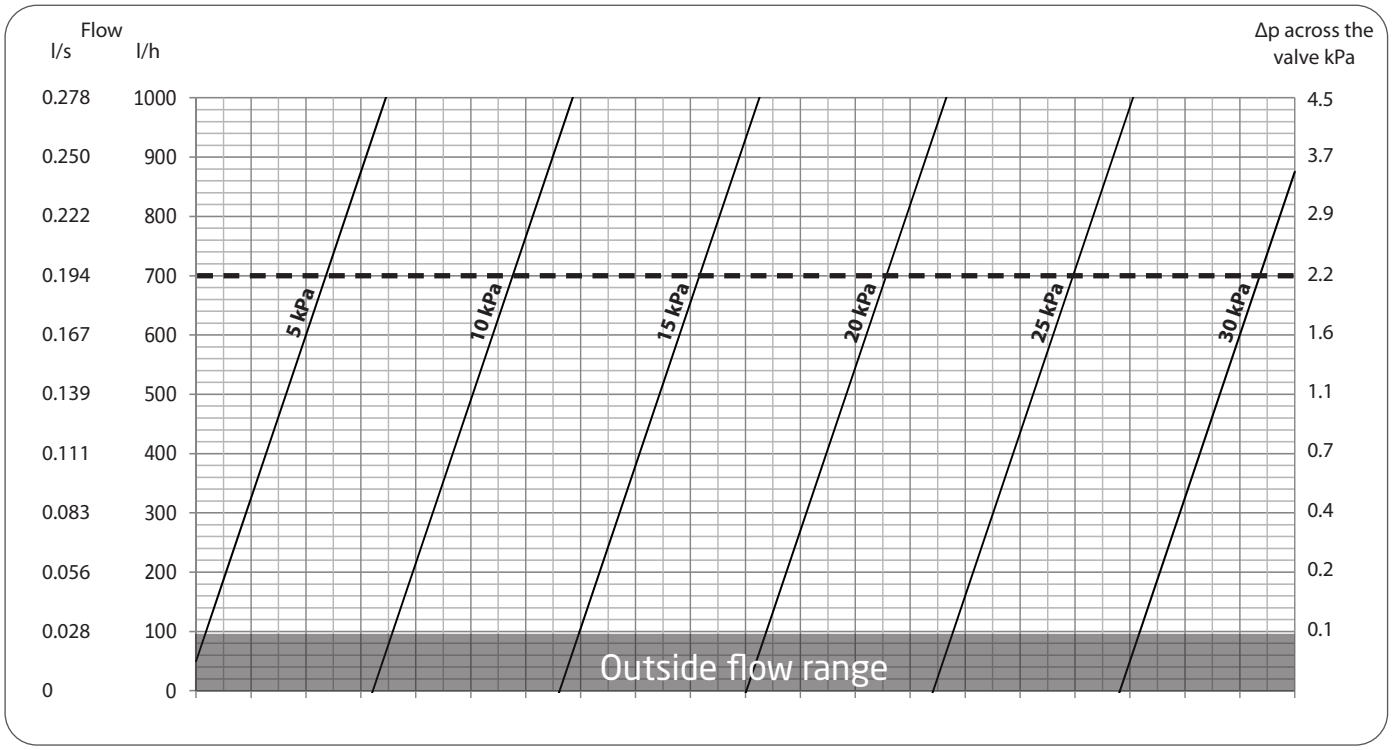
Flow Graph · DN15, 20-60 kPa



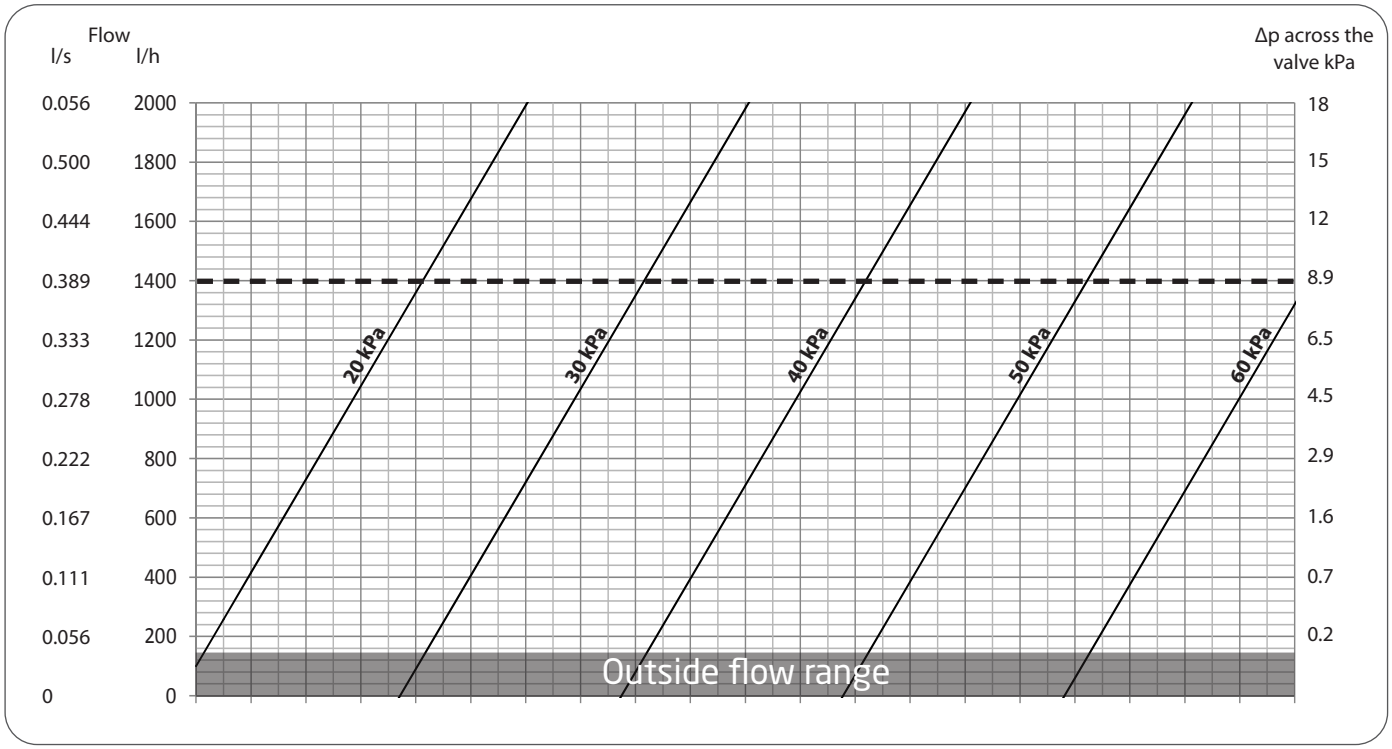
PV Compact

Spectrum-Series, DN15-DN50

Flow Graph · DN20, 5-30 kPa



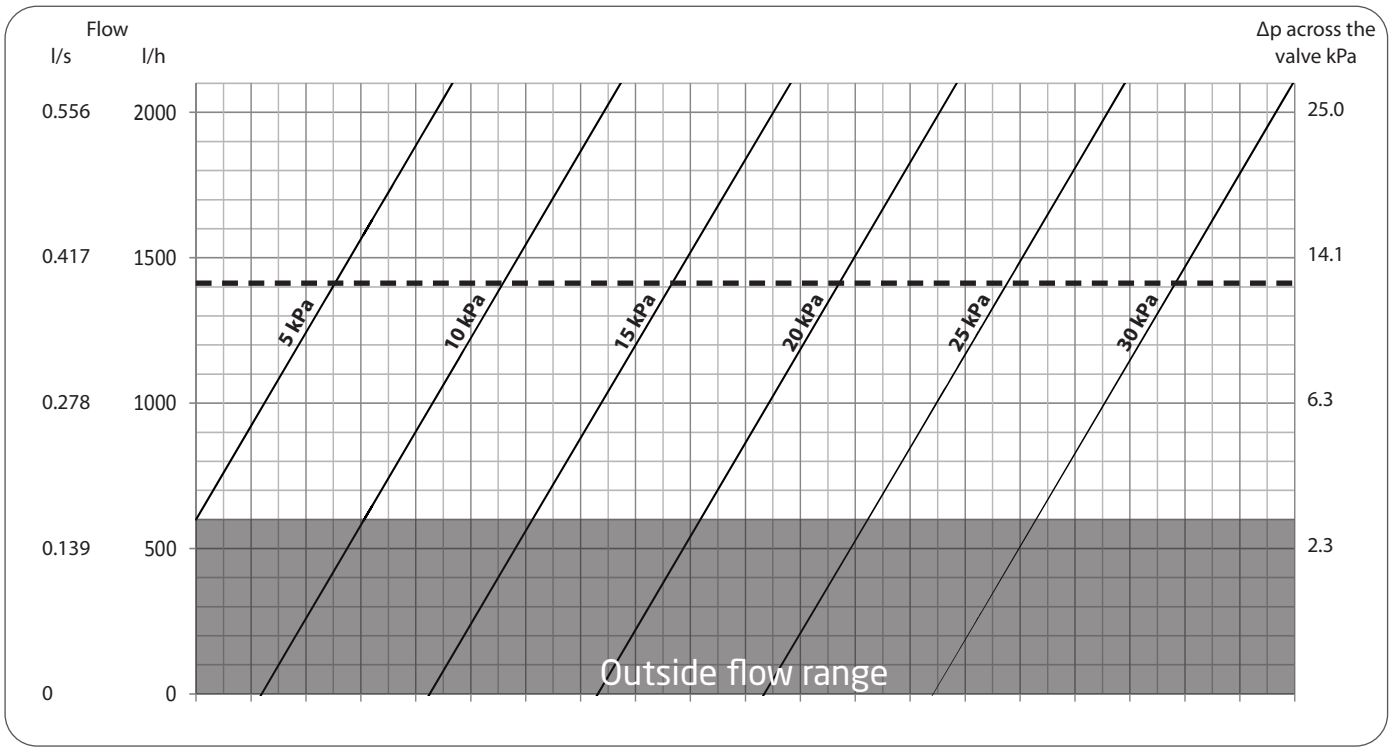
Flow Graph · DN20, 20-60 kPa



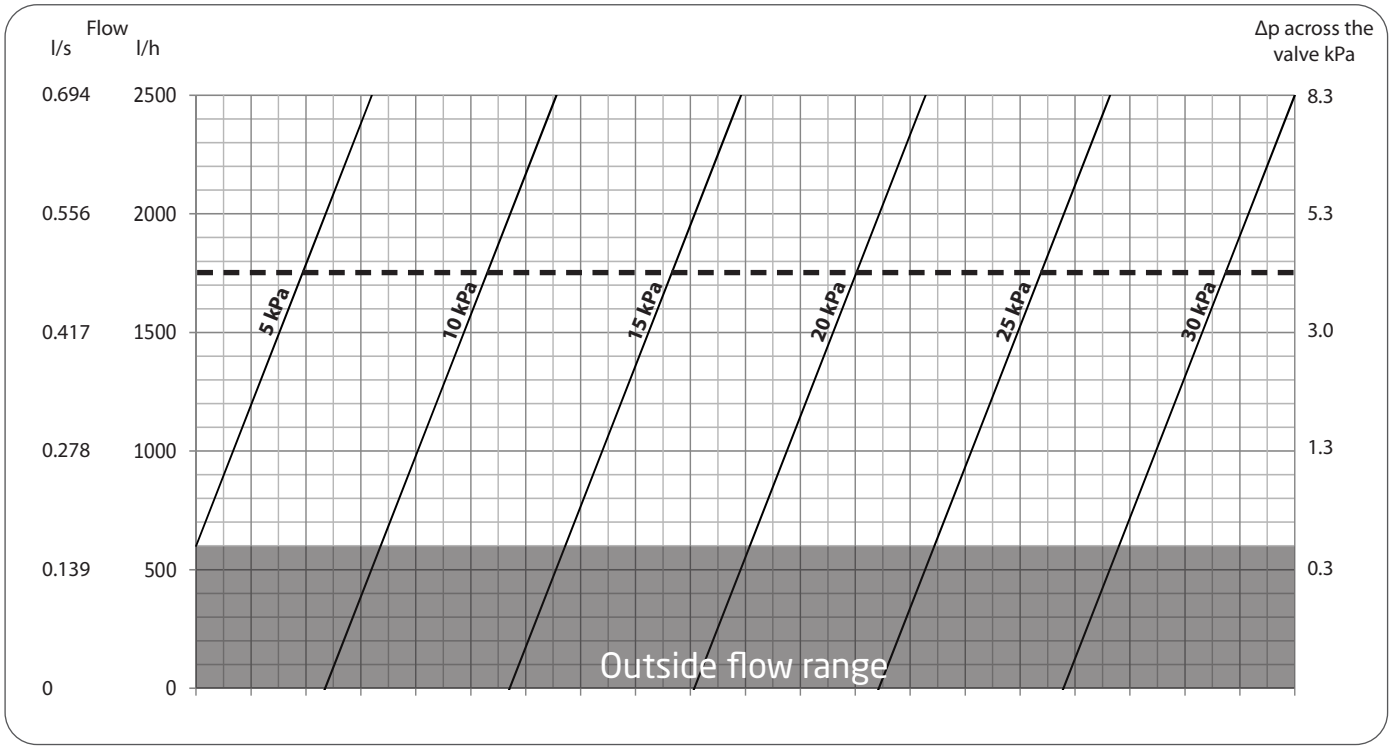
PV Compact

Spectrum-Series, DN15-DN50

Flow Graph · DN25, 5-30 kPa



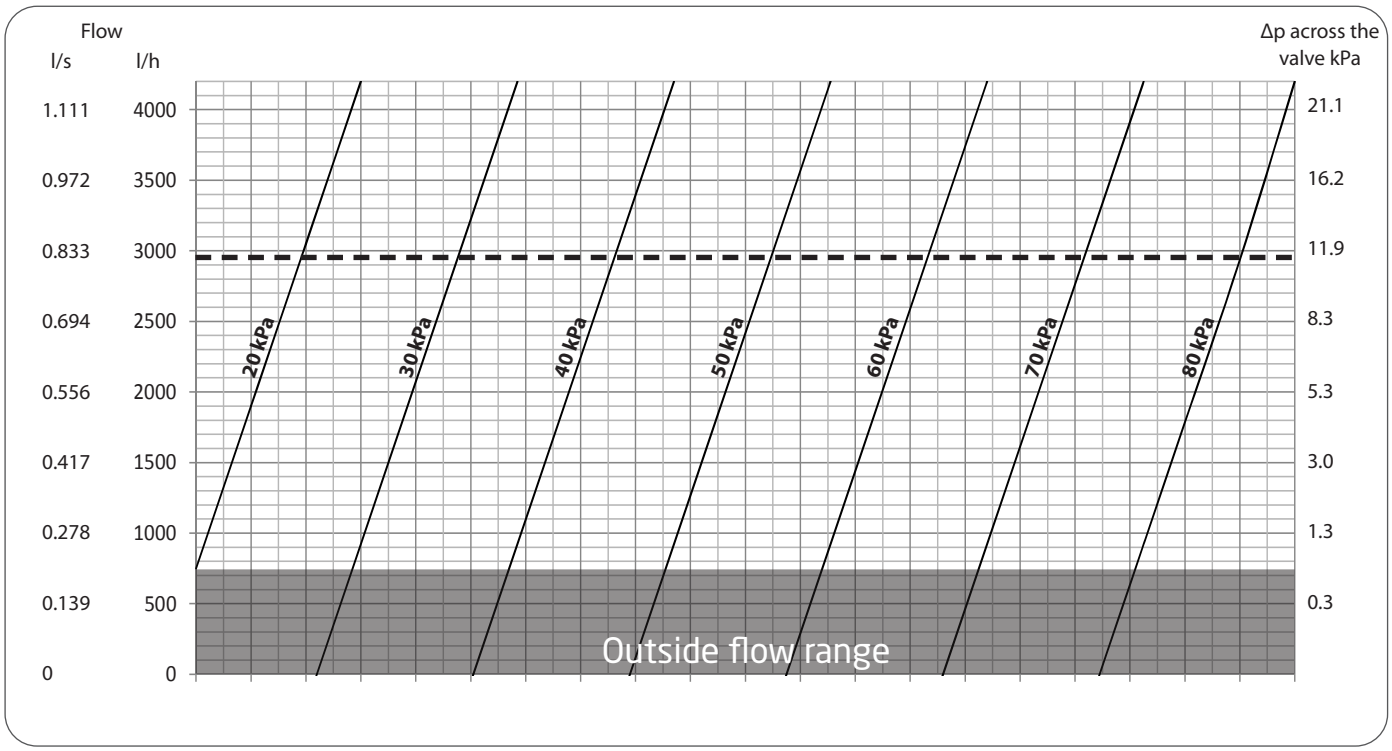
Flow Graph · DN25L, 5-30 kPa



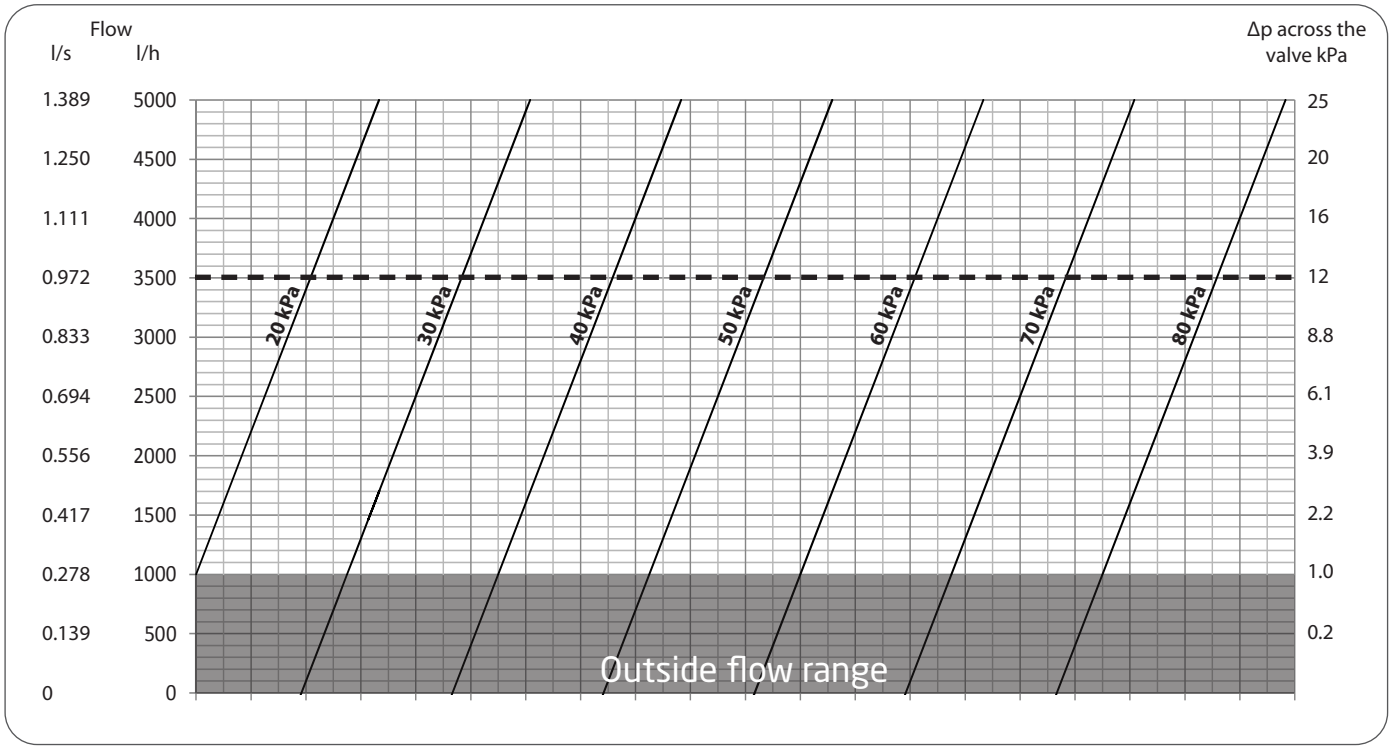
PV Compact

Spectrum-Series, DN15-DN50

Flow Graph · DN25L, 20-80 kPa



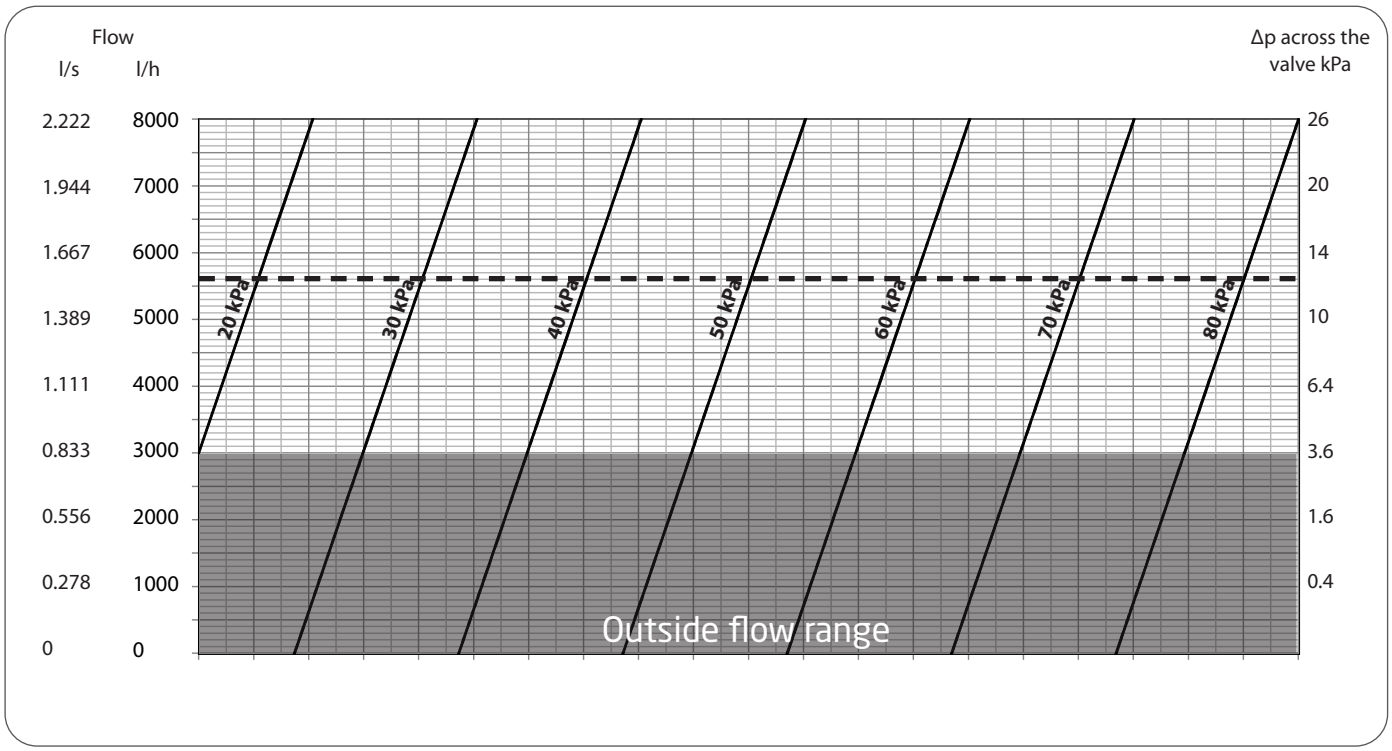
Flow Graph · DN32, 20-80 kPa



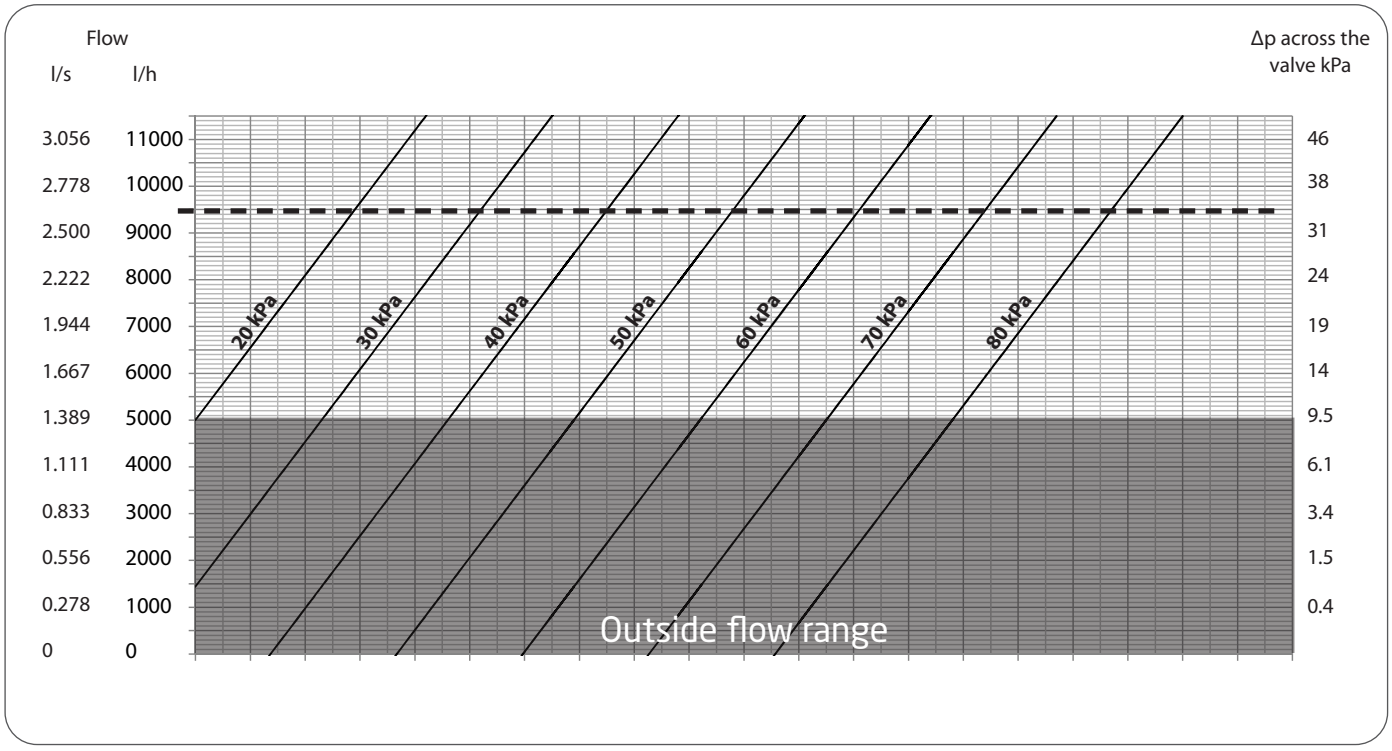
PV Compact

Spectrum-Series, DN15-DN50

Flow Graph · DN40, 20-80 kPa



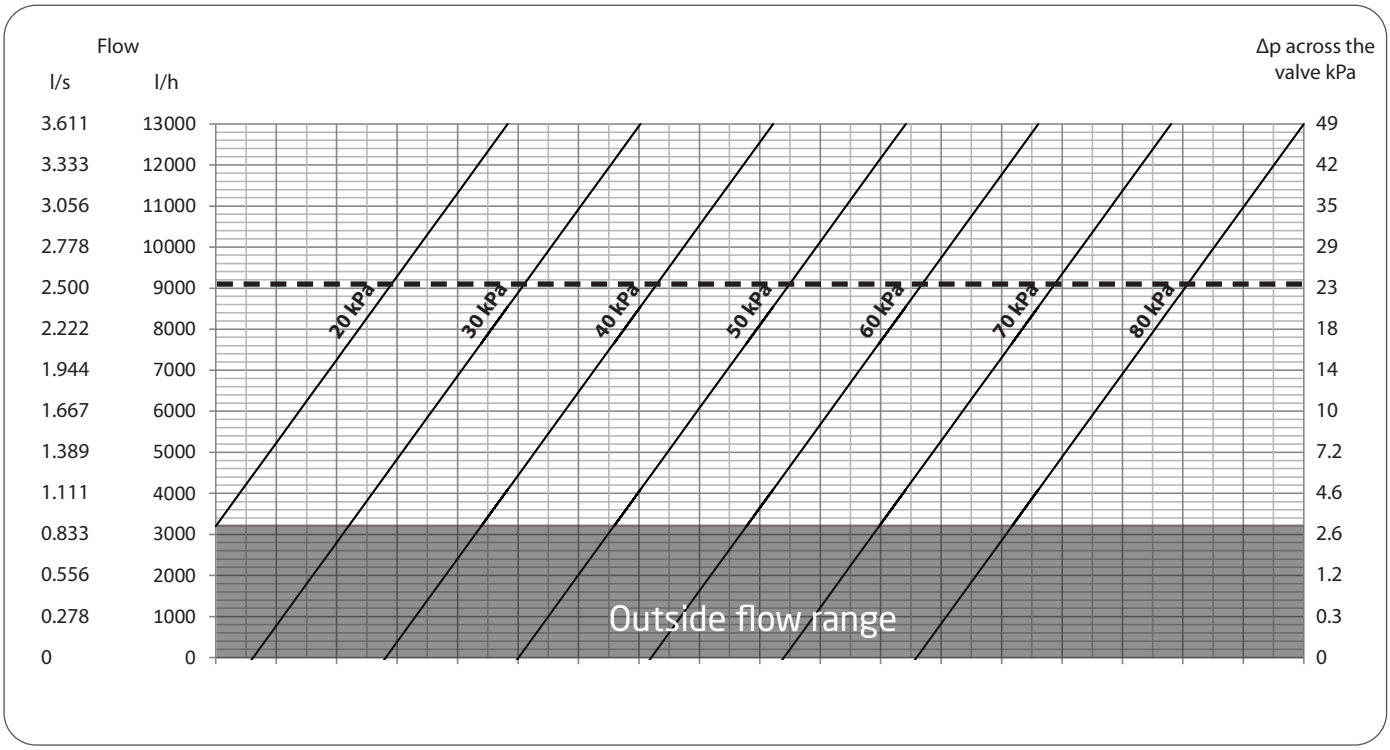
Flow Graph · DN50, 20-80 kPa



PV Compact

Spectrum-Series, DN15-DN50

Flow Graph · DN50 Ultra, 20-80 kPa



Text for technical specifications

The valve should be a dynamic differential pressure control valve with the option of setting the differential pressure on site without suspension of operation.

The valve should limit the differential pressure in a circuit.

The valve scale should only be adjustable by means of a hexagonal key.

The valve should be permanently marked with an indicator for flow direction.

The valve should be pressure rated PN25 for threaded valves and PN16 or PN25 for flanges valves.

The valve shall operate with a differential pressure up to 450 kPa.

The valve shall have a control range of 5-30 kPa, 20-60 kPa or 20-80 kPa.

The valve shall have a rubber seat to provide positive close off.

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