Pressure independent control valves

Datasheet **HERZ PICV,** Issue 1025

General information

This product is only intended for the purpose intended by the manufacturer. This also includes compliance with all associated product regulations. Changes or conversions are not permitted.

Disposal

Local and currently applicable legislation must be observed for disposal. The disposal of HERZ pressure independent control valves must not endanger the health or the enviroment.

Materials note

Pursuant to Article 33 of the REACH Regulation (EC No. 1907/2006), we are obliged to point out that the material lead is listed on the SVHC list and that all brass components manufactured in our products exceed 0.1% (w / w) lead (CAS: 7439-92-1 / EINECS: 231-100-4). Since lead is a component part of an alloy, actual exposure is not possible and therefore no additional information on safe use is necessary.

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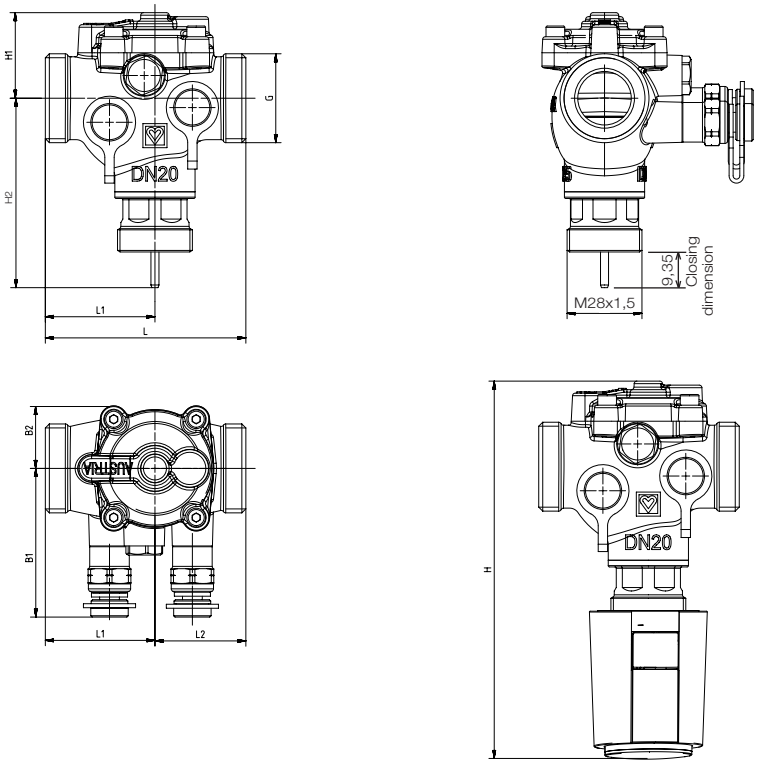
HERZ Pressure independent control valves

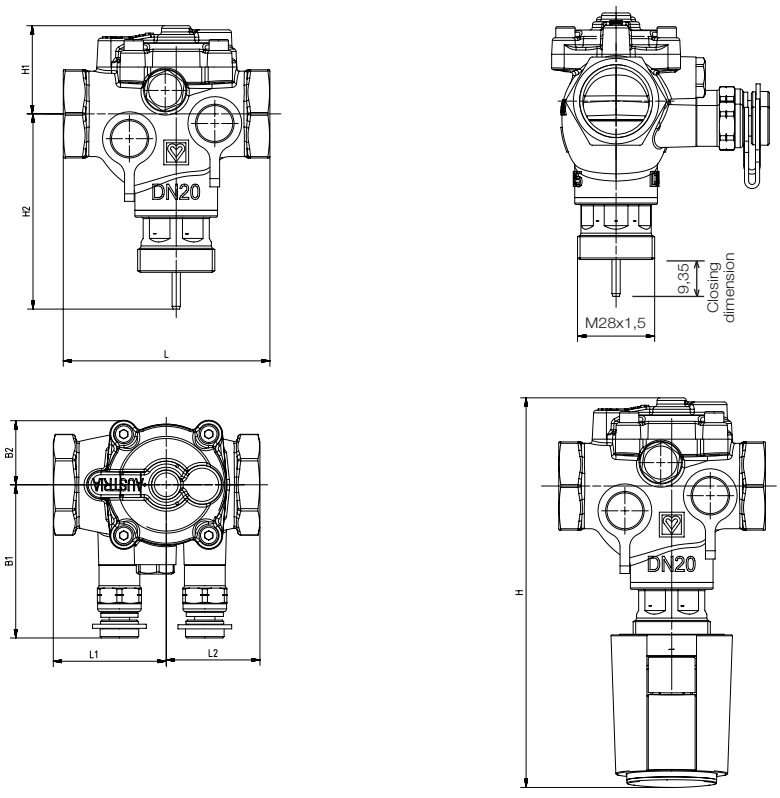
Datasheet 1 **4006** xx, 1 **4406** 2x; 1 **4206** xx; 1 **4206** 3x

☑ Dimensions in mm

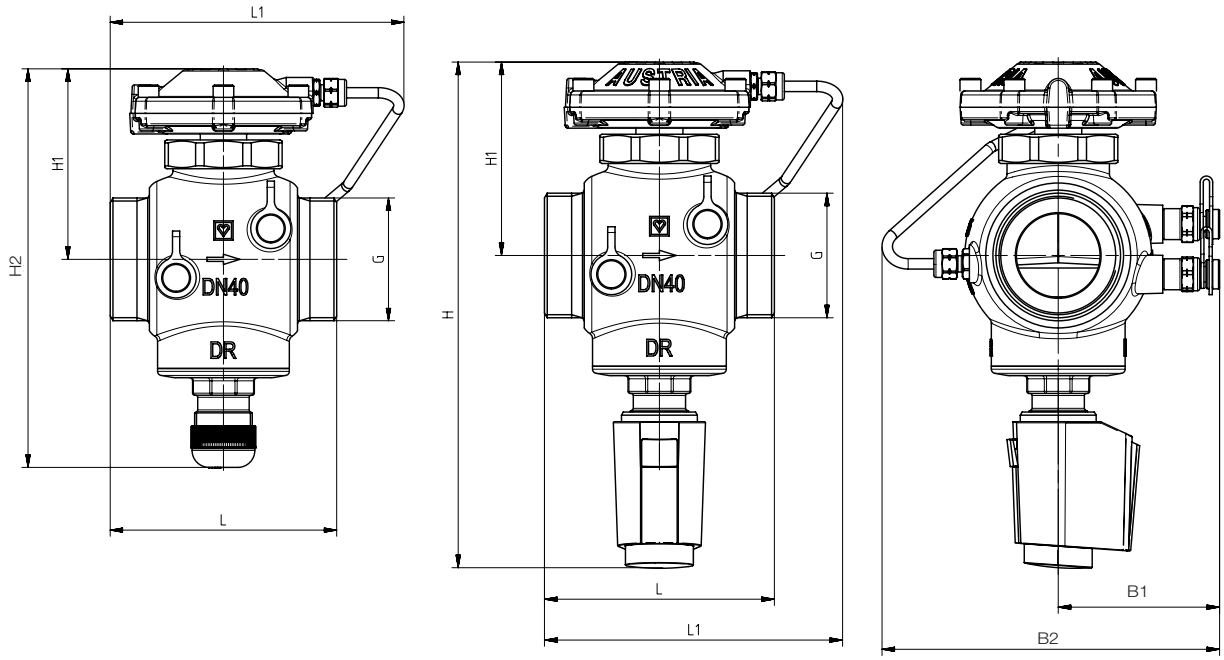
☑ 1 **4006** XX M SMART - **MT**



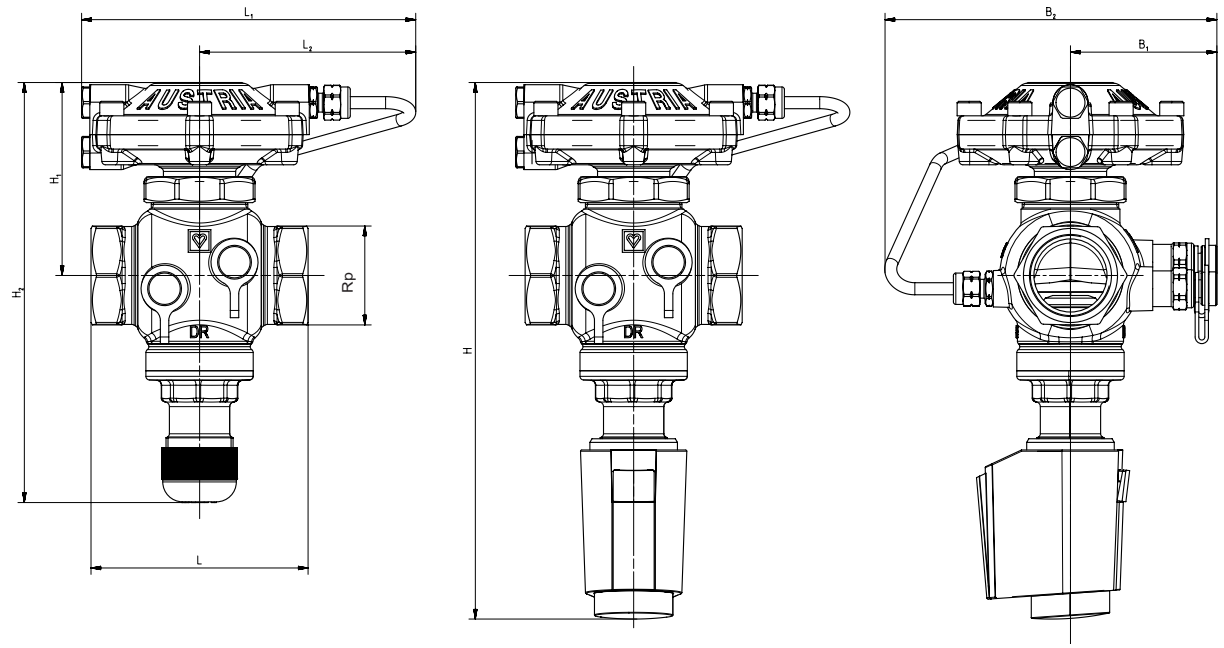
☑ 1 **4206** XX M SMART - **FT**



1 **4406** 2X - **MT**



1 **4206** 3X - **FT**



Installation dimensions mm

Models			Order number	DN	Thread, inch	L, mm	H1, mm	H2, mm	H*, mm	B1, mm	B2, mm	L1, mm	L2, mm
MT - male thread, flat sealing	**4006** SMART	**M** - with test points	1 **4006** 30	15 LF	G ¾“	75	35	69	159	50	23	41	34
			1 **4006** 39	15 MF	G ¾“	75	35	69	159	50	23	41	34
			1 **4006** 51	15 SF	G ¾“	75	32	71	158	54,6	23,3	41	34
			1 **4006** 71	15 HF	G ¾“	75	32	71	158	54,6	23,3	41	34
			1 **4006** 52	20 SF	G 1“	75	32	71	158	55,6	23,2	41	34
			1 **4006** 72	20 HF	G 1“	75	32	71	158	55,6	23,2	41	34
		R - without test points	1 **4006** 91	15 SF	G ¾“	75	32	71	158	30,6	23,3	41	34
			1 **4006** 81	15 HF	G ¾“	75	32	71	158	30,6	23,3	41	34
			1 **4006** 92	20 SF	G 1“	75	32	71	158	31,6	23,2	41	34
			1 **4006** 82	20 HF	G 1“	75	32	71	158	31,6	23,2	41	34
	4406	**M** - with test points	1 **4406** 23	25	G 1 ¼“	75	80	174	222	61	138	135	-
			1 **4406** 24	32	G 1 ¾“	100	98	198	246	69	151	138	-
			1 **4406** 25	40	G 2“	110	97	198	246	68	154	137	-
			1 **4406** 26	50	G 2 ½“	130	102	203	251	77	162	147	-
FT - female thread	**4206** SMART	**M** - with test points	1 **4206** 20	15 LF	Rp ½“	75	35	67	157	50	23	41	34
			1 **4206** 29	15 MF	Rp ½“	75	35	67	157	50	23	41	34
			1 **4206** 01	15 SF	Rp ½“	75	32	70,9	158	55,2	23,2	41	34
			1 **4206** 71	15 HF	Rp ½“	75	32	70,9	158	55,2	23,2	41	34
			1 **4206** 02	20 SF	Rp ¾“	75	32	70,9	158	55,6	23,3	41	34
			1 **4206** 72	20 HF	Rp ¾“	75	32	70,9	158	55,6	23,3	41	34
		R - without test points	1 **4206** 60	15 LF	Rp ½“	75	35	67	157	26	23	41	34
			1 **4206** 69	15 MF	Rp ½“	75	35	67	157	26	23	41	34
			1 **4206** 91	15 SF	Rp ½“	75	32	70,9	158	31,2	23,2	41	34
			1 **4206** 81	15 HF	Rp ½“	75	32	70,9	158	31,2	23,2	41	34
			1 **4206** 92	20 SF	Rp ¾“	75	32	70,9	158	31,6	23,3	41	34
			1 **4206** 82	20 HF	Rp ¾“	75	32	70,9	158	31,6	23,3	41	34
	4206	**M** - with test points	1 **4206** 33	25	Rp 1“	90	80	174	222	61	138	138	89
			1 **4206** 34	32	Rp 1 ¼“	110	98	198	246	69	151	144	89
			1 **4206** 35	40	Rp 1 ½“	130	97	198	247	77	163	138	89
			1 **4206** 36	50	Rp 2“	150	102	203	251	77	165	137	89

* with 1 **7990** 3X actuator

Technical Data

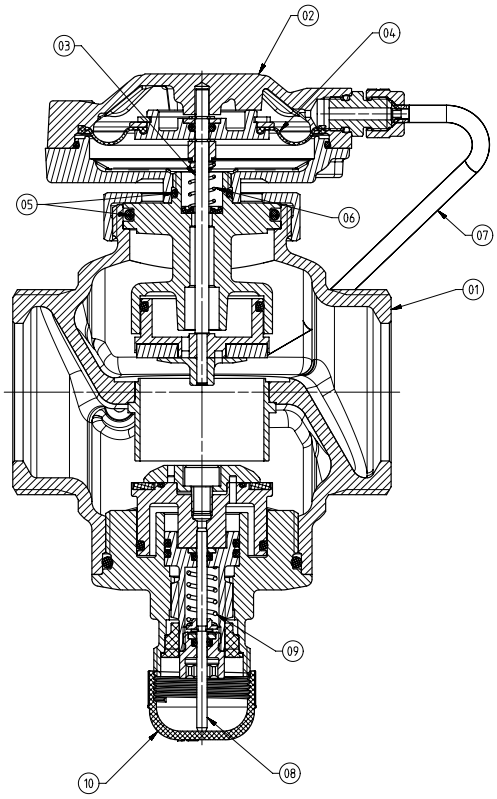
		4006 / **4206** SMART						**4406** / **4206**			
		15LF	15MF	15SF	15HF	DN20SF	20HF	DN25	DN32	DN40	DN50
Max flow l/h	6,5 mm actuator*	120	190	800	1200	1200	2000	3300	6000	7500	12000
	5 mm actuator*							2480	4500	5650	9050
k_{VS}- values		0,22	0,36	1,75	2,62	2,62	3,54	5,6	10,1	13,7	19,0
Flow setting range		20 - 100%									
Diff. pressure across valve, kPa	Δp_{min}	18	20	20	20	20	20-30	35	35	30	40
	Δp_{max}	400	400	600	600	600	600	600	600	600	600
PN		25 bar									
Min. operating temperature		2 °C (water); - 20 °C (non-freezing)									
Max. operating temperature		130 °C								110 °C	
Stroke		4 mm						6 mm			
Actuator connection		M 28 x 1,5									
Water quality		Water purity in accordance with the ÖNORM H 5195 and VDI 2035 standards Ethylene and propylene glycol can be mixed to a ratio of 25 - 50 vol. [%].									

* The integrated control unit together with the actuating drive is responsible for modular control. The max. flow with 6.5 drive is achieved with the 1 **7990** 32, 1 **7708** 27 **and** 1 **7708** 48 actuating drives or with the 1 **7708** 4X geared motors. When using the 1 **7990** 31 and 1 **7708** 52/53 actuators with a 5 mm stroke, the maximum flow rate is reduced. The 4006 / 4206 SMART valves with a 4 mm stroke can be driven with all linear HERZ drives.

Materials

N	Description	Materials
1	Body	DZR brass
2	Membrane body	brass
3	Pin	stainless steel
4	Membrane	EPDM
5	O-rings	EPDM
6	Spring	stainless steel
7	capillary pipe	copper Cu-DHP
8	Pin	stainless steel
9	Spring	stainless steel
10	Protective cap	plastic

The use of ethylene and propylene glycol in a mixture ratio of 25 - 50% by volume [%] is permitted. No hemp should be used for thread sealing because the ammonia contained in hemp can damage the brass. It is recommended to use sealing strip. EPDM seals are swollen by mineral oils or lubricants containing mineral oil and thus lead to failure of the EPDM seals. For frost and corrosion protection agents based on ethylene and propylene glycol can be found in the manufacturer's documentation.



Field of application

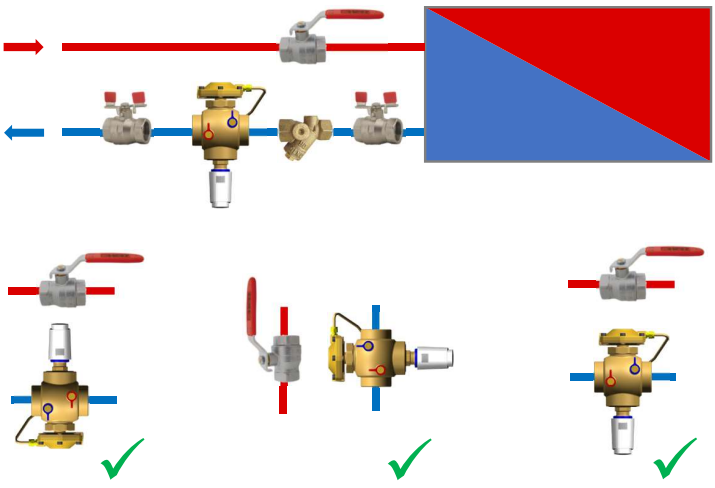
The Pressure Independent Balancing Control Valve (PIBCV) is used in all heating and cooling systems with circulation pumps. The valve automatically maintains flow to the required part of the system constant at the set rate by measuring and immediately adjusting to any variation in pressure.
The valve settings directly affect the volumetric flow through the valve. It is thus possible to set the maximum flow rate based on the flow chart when the valve is fitted. This allows for the balancing of heating circuits, cooling water systems, ceiling cooling and heating panels, air heaters, etc. without any need to first assess the pressure variations in the system.

System flushing

If it is necessary to flush the system in the direction opposite to the direction of valve´s operation, it is important to take into account the maximum allowed differential pressure on the valve for backflushing, equal to 300 kPa. The volume flow during backflushing should be a maximum of three times the nominal flow rate.

Installation

The installation takes place in the return or in the supply, the installation position does not matter. The direction of flow is indicated in the direction of the arrow on the housing. It is recommended to install a shut-off valve before and after the combination valve. The combination valve is shut off with the HERZ setting tool (1 **4006** 02). The desired flow rate is set in % of the maximum flow rate. Shut off by turning to the right to the stop (display < 0% red area).



Application field

It is assumed that a consumer needs a volume flow of 600 l/h. The setting value is searched for the HERZ combination valve SMART DN 15SF (1 4006 51/91, 1 4206 01/91). The maximum flow at valve DN 15SF is 800 l / h, that corresponds to the setting 100%:

$$\frac{600\ \text{l/h}}{800\ \text{l/h}} \times 100\ \% = 75\ \%$$

The 600 l/h is required thus presetting is 75%, which must be set on the valve. A control measurement is then to be carried out. Please note that a minimum differential pressure according to the data sheet must be available for correct operation on the valve.

The HERZ combi valve 4006 is operated with 2-point or continuously acting actuators. However, continuous control is always recommended. The reason for this is that constant and energy-saving control is essential for fast-working systems such as cooling systems or air heaters. Maximum energy savings can only be achieved with regulating valves.

With continuous control, the volume flow is controlled continuously with the slightest fluctuations between minimum and maximum flow. The continuous control also protects all other system-specific components, right down to the pump. The 2-point control is recommended for slow systems such as underfloor heating.

HERZ 4006 PICVs have several advantages over conventional series connection of volume flow controller and differential pressure controller, since the volume flow controller limits the flow depending on the differential pressure of the system, while the differential pressure is variable. If the amount of water is reduced when the room temperature is reached, the differential pressure increases. The resulting operating point is completely different from that of hydraulic balancing. This means that valves connected in series interfere with themselves.

The valve authority for the HERZ combination valve is ideally “1”. A valve authority below 0.3 is an ON / OFF control. In order to ensure the efficiency of your system and proper operation, modular control with an authority greater than 0.5 should be aimed for. Since the HERZ valve 4006 compensates for the different differential pressures, the volume flow to the consumer is kept constant. An over or under supply of the individual consumers is therefore excluded.
Hydraulic balancing is always a relevant topic in building technology. The combination valves 4006, 4006 SMART and 4206, 4206 SMART enable the construction of a technical building system with reduced planning effort.

For systems with a large number of PICVs installed, the use of a differential pressure control valves 4002 is recommended to avoid noise problems, the occurrence of water hammer and an unstable system operation.

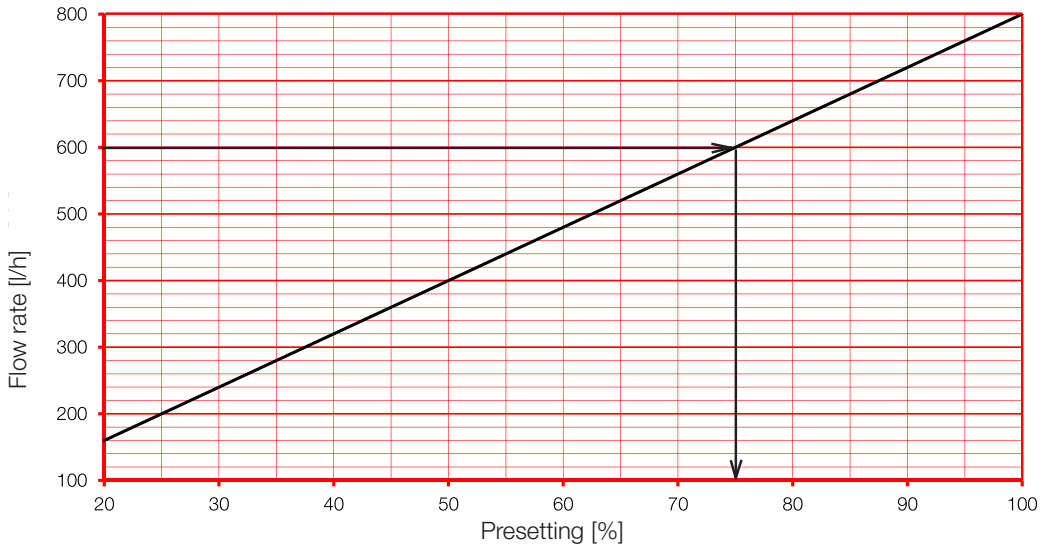
Valve selection

Select the valve with the smallest dimension that guarantees the necessary nominal flow with an additional safety surcharge. The setting should be as open as possible.
The flow rate calculation is based on the following formula:

$$V = \frac{3600 \times Q}{c \times \rho \times \Delta T} \times 1000, [l/h]$$

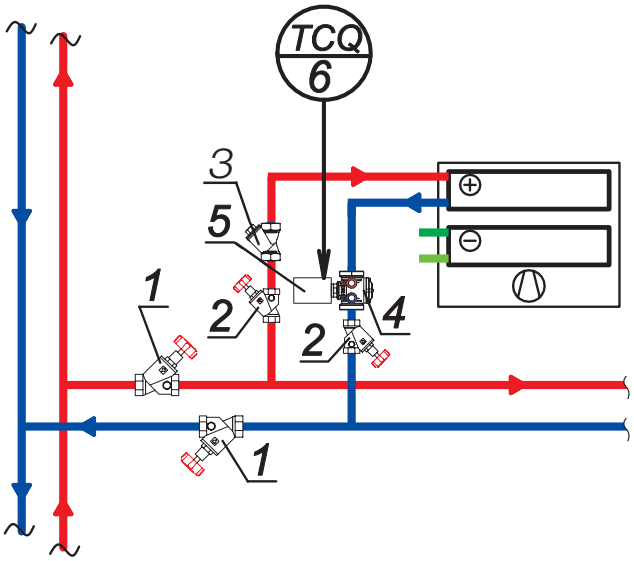
V ... volume flow [l/h]
Q ... heat output [kW]
c ... specific heat capacity 4.19 [kJ/kgK]
ρ ... density of water [kg/m³]
ΔT ... temperature difference flow and return [K]

With the help of the kv diagram, the respective minimum differential pressure [kPa] can be determined depending on the flow [l/h] and the default setting [%].



Application example

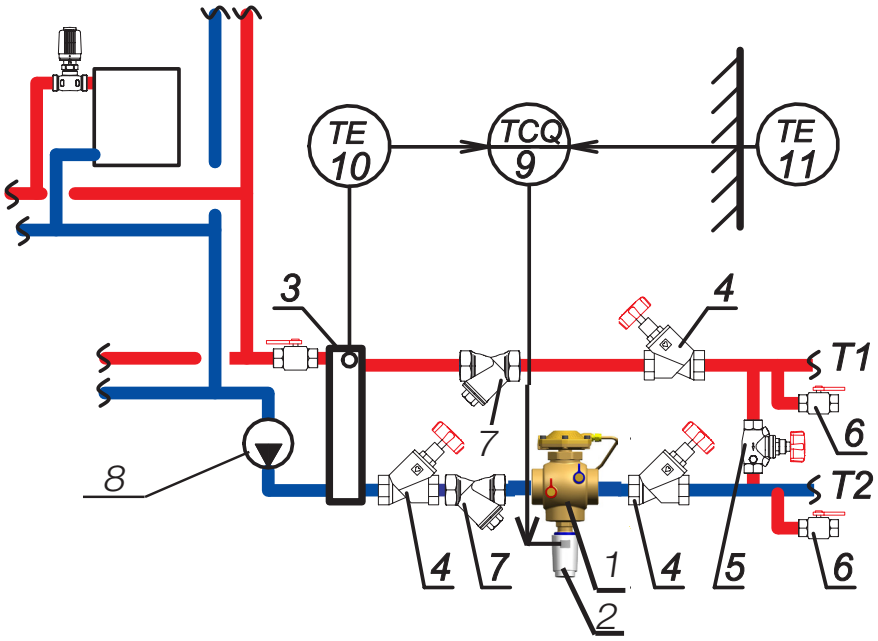
Combi valves are used in fan coil heat supply systems. A combination valve is installed in the return of each fan coil and acts as regulating valve.



Shema of a four-pipes fan coil heat supply system (extract)

1 2	**4115** shut-off valve STRÖMAX-A
3	**4111** strainer
4	**4006** PICV SMART
5	**7990** actuating drive
6	**7793** electronic continuous controller

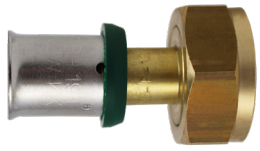
PICVs in use with a hydraulic distributor



1	**4406** PICV
2	**7990** actuating drive
3	**4513** hydraulic switch
4	**4115** shut-off valve STRÖMAX-A
5	**4217** commissioning valve STRÖMAX-GM
6	**4119** Boiler filling and draining valve THERMOFLEX
7	**4111** strainer
8	circulation pump
9	**7793** electronic continuous controller
10	**7793** heating water temperature sensor
11	Outside temperature sensor

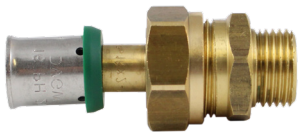
Press fitting screw connection

T 70XX Junction press fitting screw connection for composite pipes PE-RT for valve with male thread, flat-sealing



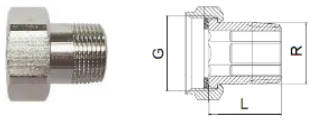
Order number	Valve dimension	G	Pipe
T **7016** 41	DN 15	G ¾"	16 x 2
T **7020** 41	DN 15	G ¾"	20 x 2
T **7016** 42	DN 20	G 1"	16 x 2
T **7020** 42	DN 20	G 1"	20 x 2
T **7026** 42	DN 20	G 1"	26 x 3
T **7026** 43	DN 25	G 1 ¼"	26 x 3
T **7032** 43	DN 25	G 1 ¼"	32 x 3
T **7040** 43	DN 25	G 1 ¼"	40 x 3,5
T **7040** 45	DN 40	G 2"	40 x 3,5
T **7050** 45	DN 40	G 2"	50 x 4

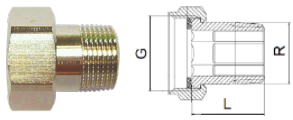
T 70XX Press fitting screw connection for composite pipes PE-RT for valve with female thread, flat-sealing



Order number	Valve dimension	R	Pipe
T **7016** 61	DN 15	R ½"	16 x 2
T **7020** 61	DN 15	R ½"	20 x 2
T **7016** 62	DN 20	R ¾"	16 x 2
T **7020** 62	DN 20	R ¾"	20 x 2
T **7026** 62	DN 20	R ¾"	26 x 3

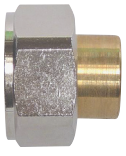
6220 Iron pipe connection flat seal with nut and seal

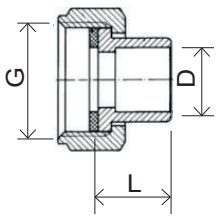




Order number	Valve dimension	G	R	L, mm
1 **6220** 21	DN 15	G ¾"	R ½"	26,3
1 **6220** 12	DN 20	G 1"	R ¾"	31,4
1 **6220** 63	DN 25	G 1 ¼"	R 1"	35,3
1 **6220** 65	DN 32	G 1 ¾"	R 1 1/2"	49
1 6220 94	DN32	G 1 ¾"	R 1 1/4"	37,7
1 6220 95	DN40	G 2"	R 1 1/2"	49
1 6220 96	DN50	G 2 1/2"	R 2"	56

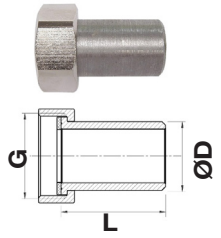
6236 Solder connection





Order number	Valve dimension	G	Ø D, mm	L, mm
1 **6236** 01	DN 15	G ¾"	Ø 12	14
1 **6236** 11	DN 15	G ¾"	Ø 15	17
1 **6236** 21	DN 15	G ¾"	Ø 18	19
1 **6236** 02	DN 20	G 1"	Ø 15	18
1 **6236** 12	DN 20	G 1"	Ø 18	19
1 **6236** 22	DN 20	G 1"	Ø 22	23
1 **6236** 63	DN 25	G 1 ¼"	Ø 28	24
1 **6236** 65	DN 32	G 1 ¾"	Ø 42	31
1 **6240** 74	DN 40	G 2"	Ø 35	27

6240 Welding connection flat seal



Order number	Valve dimension	G	Ø D, mm	L, mm
1 **6240** 01	DN 15	G ¾"	Ø 21,3	45
1 **6240** 02	DN 20	G 1"	Ø 26,8	45
1 **6240** 63	DN 25	G 1 ¼"	Ø 33,7	51
1 **6240** 65	DN 32	G 1 ¾"	Ø 47,5	57

Accessories

Order number	Description	Image
1 **7990** 32	**HERZ actuating drive for continuous control, NC** M 28 x 1.5, 0..10 V, 6.5 mm stroke, adapter M 28 x 1.5 colour blue integrated, male connector, cable loose, without limit switch. Closing force 125 N, 1.2 watt with valve stroke detection.	
1 **7990** 31	**HERZ actuating drive for continuous control, NC** M 28 x 1.5, 0..10 V, 5 mm stroke, adapter M 28 x 1.5 colour blue integrated, male connector, cable loose, without limit switch. Closing force 100 N, 1.2 watt.	
1 **7708** 53	**HERZ actuating drive for 2-point control forfloor heating circuit distributors and valves, NC, 230 V/AC,** M 28 x 1.5, 2-point, also suitable for pulse-pause operation, 5 mm stroke, adapter M 28 x 1.5 colour red integrated, cable fixed, without limit switch. Closing force 100 N. Power consumption 1 watt.	
1 **7708** 52	**HERZ actuating drive for 2-point control for floor heating circuit distributors and valves, NC, 24 V/AC/DC,** M 28 x 1.5, 2-point,also suitable for pulse-pause operation, 5 mm stroke, adapter M 28 x 1.5 colour red integrated, cable fixed, without limit switch. Closing force 100 N. Power consumption 1 watt	
1 **7708** 27	**HERZ actuating drive for 2-point control forfloor heating circuit distributors and valves, NC, 230 V/AC,** M 28 x 1.5, 2-point, also suitable for pulse-pause operation, 6.5 mm stroke, adapter M 28 x 1.5 colour blue integrated, cable fixed, without limit switch. Closing force 125 N. Power consumption 1.2 watt.	
1 **7708** 48	**HERZ actuating drive for 2-point control forfloor heating circuit distributors and valves, NC, 24 V/AC/DC,** M 28 x 1.5, 2-point, also suitable for pulse-pause operation, 6.5 mm stroke, adapter M 28 x 1.5 colour blue integrated, cable fixed, without limit switch. Closing force 125 N. Power consumption 1.2 watt.	
1 **7708** 40	**HERZ geared motor 3-point, 24V/AC/DC** Adapter M 28 x 1.5 colour red integrated, 24 V, stroke distance max. 8.5 mm, max. actuation force 200 N.	
1 **7708** 41	**HERZ geared motor 3-point, 230V/AC** Adapter M 28 x 1.5 colour red integrated, 230 V, stroke distance max. 8.5 mm, max. actuation force 200 N.	
1 **7708** 42	**HERZ geared motor DDC 0–10 V** Adapter M 28 x 1.5 colour red integrated, 24 V, stroke distance max. 8.5 mm, max. actuation force 200 N. Operating voltage 24V/AC/DC.	
1 **7708** 46	**HERZ geared motor DDC 0–10 V** Adapter M 28 x 1.5 colour red integrated, 24 V, stroke distance max. 8.5 mm, max. actuation force 200 N. With valve port detection and feedback channel. Operating voltage 24V/AC/DC.	

Accessories and spare parts

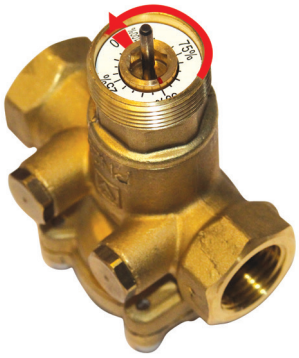
Order number	Dim.	Description	Model
1 **0284** 05	1/8”	Quick test point for combi valve - pressure-independent control valve SMART, brass version, blue cap (return) for pressure transducer	
1 **0284** 01	1/4”	Quick test point for combi valve - pressure-independent control valve, brass version, blue cap (return) for pressure transducer	
1 **0284** 06	1/8”	Quick test point for combi valve - pressure-independent control valve SMART, brass version, red cap (supply) for pressure transducer	
1 **0284** 02	1/4”	Quick test point for combi valve - pressure-independent control valve, brass version, red cap (supply) for pressure transducer	
1 **0284** 11	1/4”	Quick test point for combi valve - pressure-independent control valve. brass version, blue cap (return) for pressure transducer, extended design for valves with an insulation thickness up to 40 mm	
1 **0284** 12	1/4”	Quick test point for combi valve - pressure- independent control valve. brass version, red cap (supply) for pressure transducer, extended design for valves with an insulation thickness up to 40 mm	
1 **4006** 02		Pre-setting key HERZ Combi valve pressure-independent control valve for 4006/4206	

Pressetting

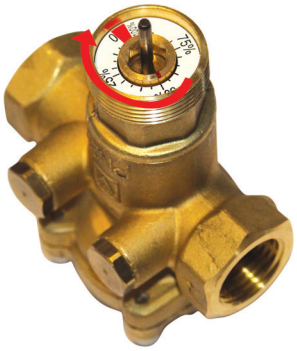
The respective setting of the control unit is clearly shown in percentages. The valve is preset with the HERZ setting key (1 4006 02). The desired flow is set in% of the maximum flow. To shut off, turn to the right to <0% (red area).

VE [%] = (Desired flow / maximum flow)*100

open = anticlockwise



close = clockwise



1 **4006** 02

How to perform a flow measurement:

- Connect the measuring computer to the measuring nipple
- Enter the dimensions, valve type and setting -> display flow

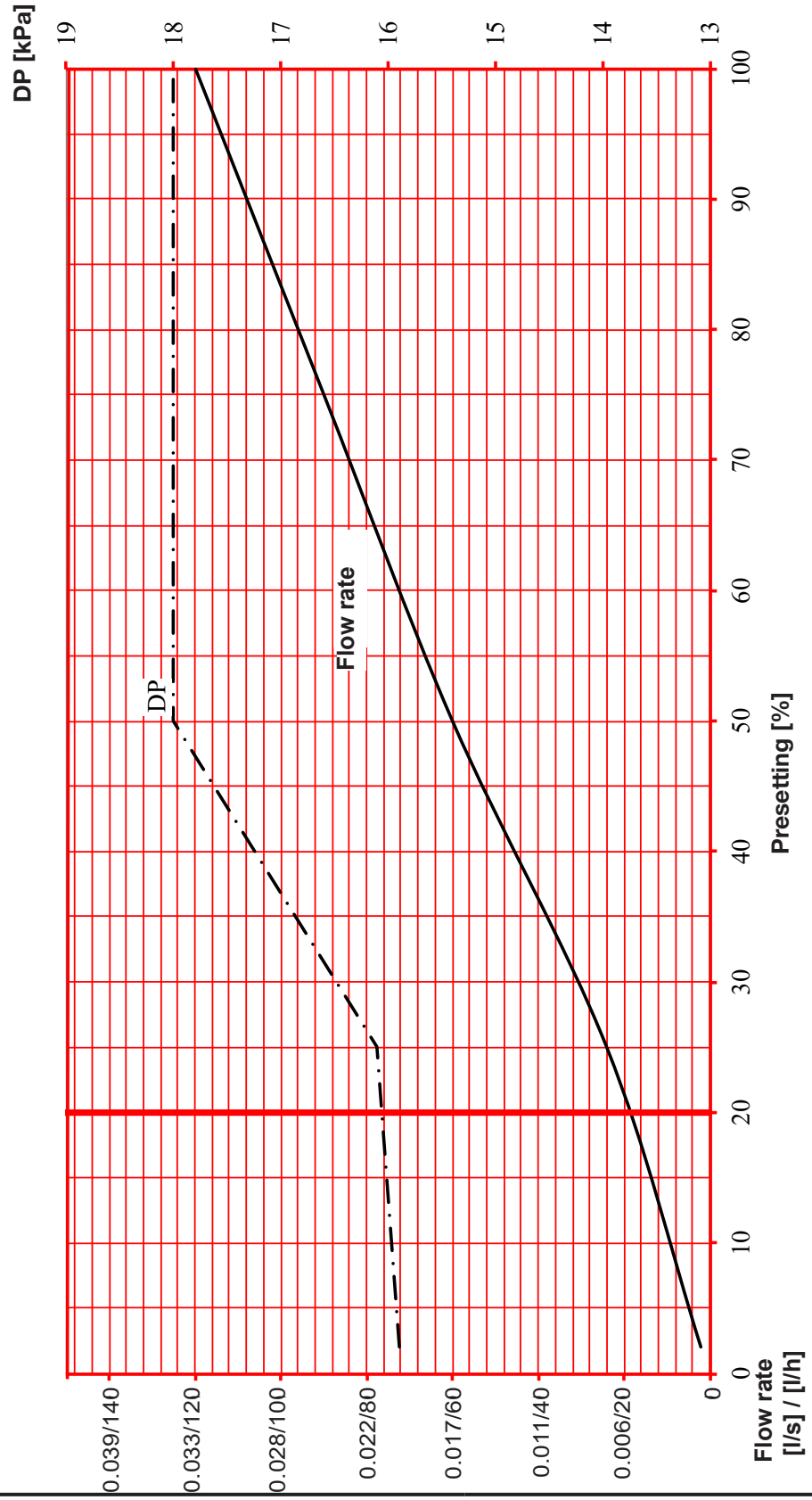
Warning notices

The valves must be installed for the correct application using clean fittings. A HERZ strainer (4111) should be fitted to prevent impurities

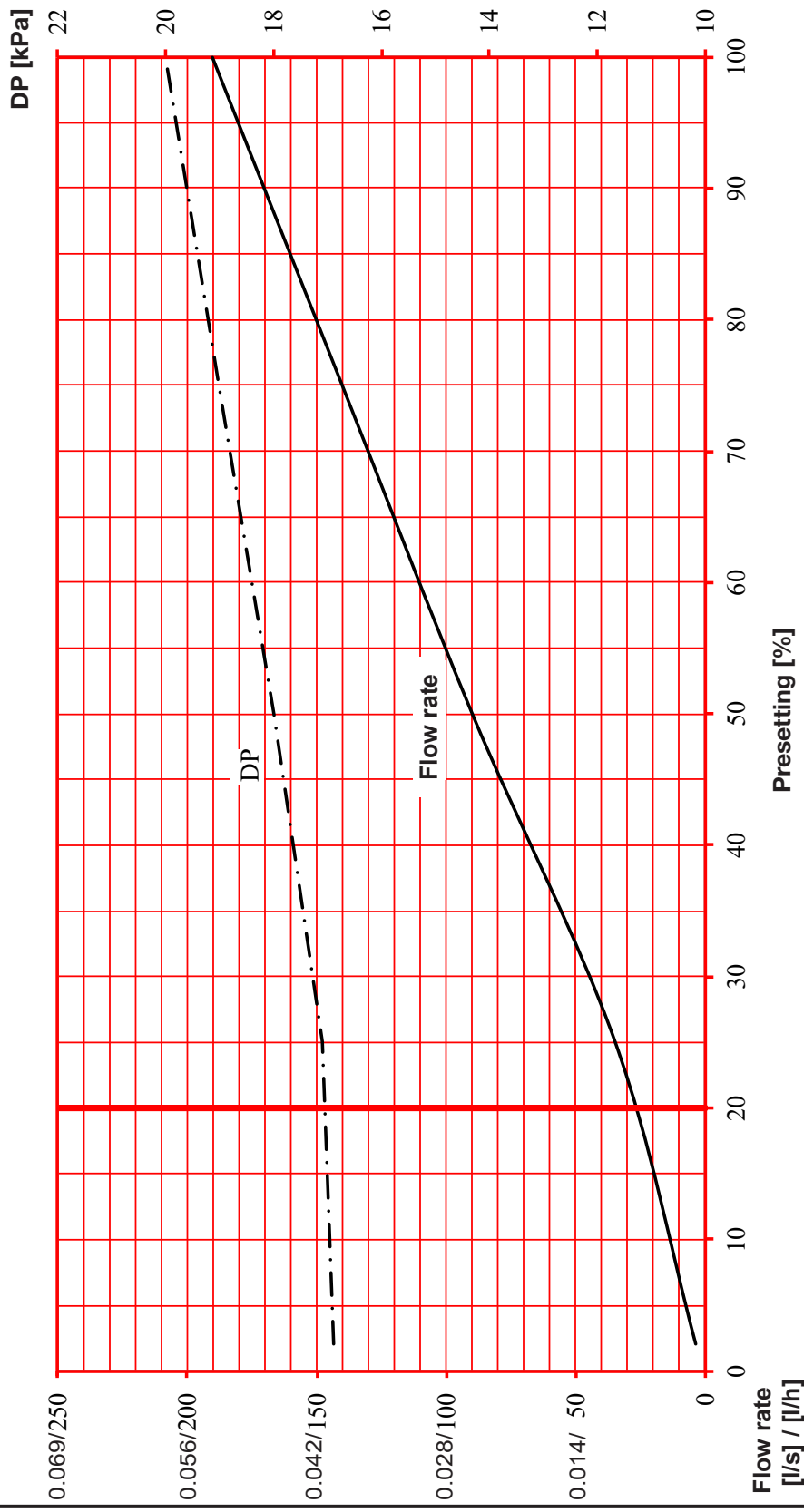
Test points

Two test points are fitted on the same side of the valve and factory sealed. Thanks to this arrangement they are easily accessible and measurement devices can be quickly fitted, no matter in what position the valve has been installed.

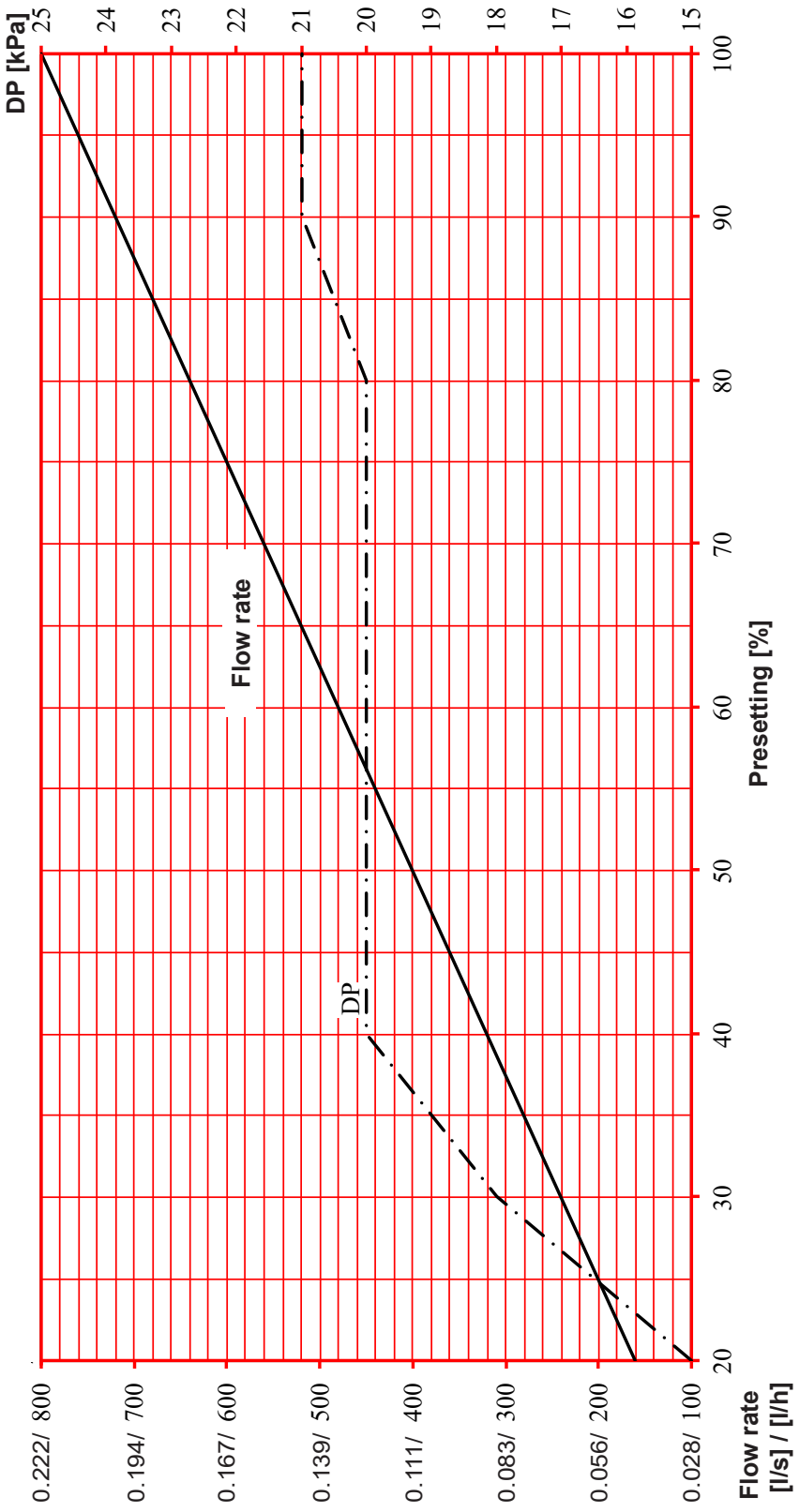
HERZ - Standard diagram	HERZ - PICV SMART
1 **4206** 20 , 1 **4006** 30 1 **4206** 60	DN 15 LF



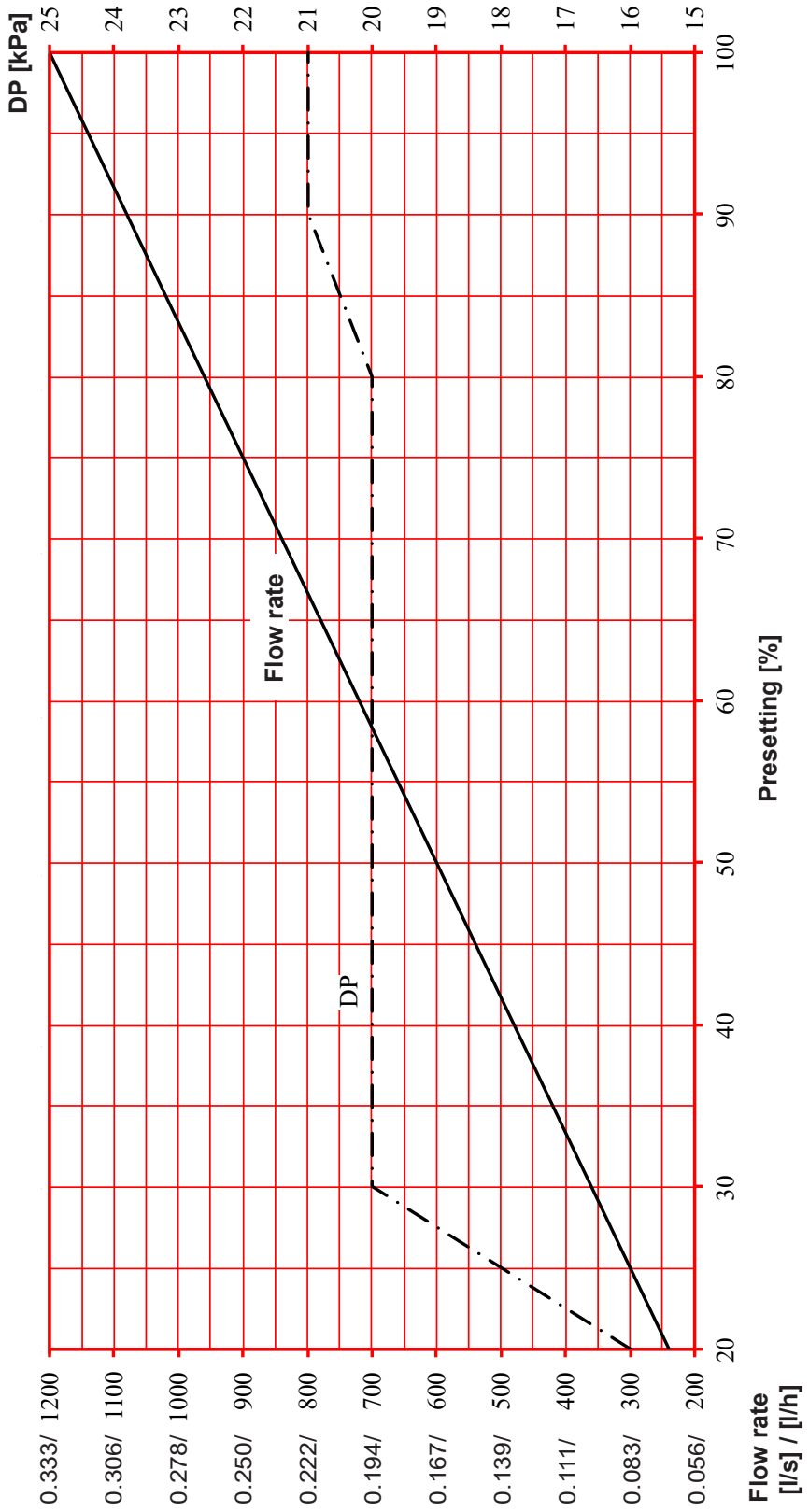
HERZ - Standard diagram	HERZ - PICV SMART
1 **4206** 29, 1 **4006** 39 1 **4206** 69	DN 15MF



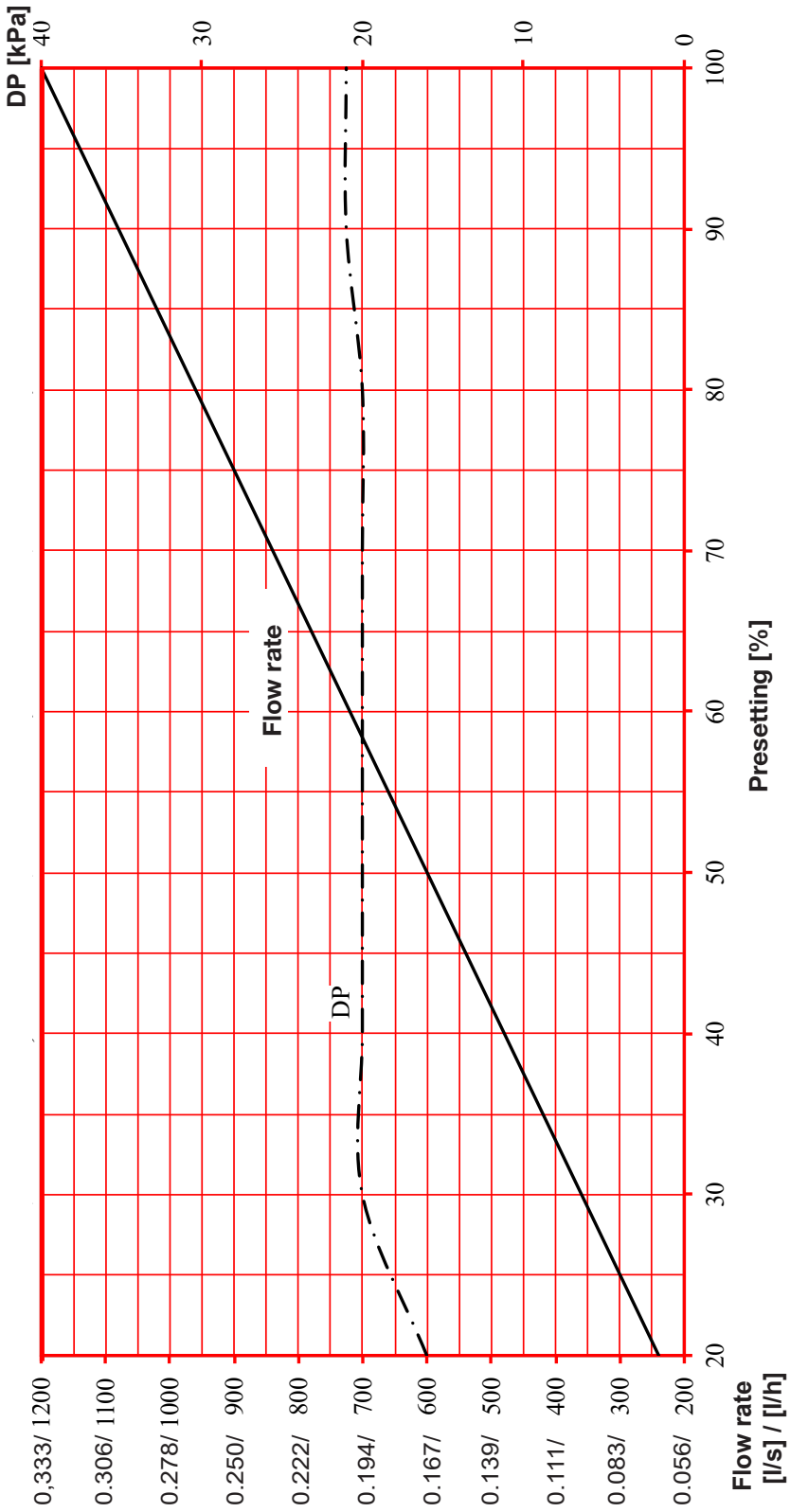
HERZ - Standard diagram	HERZ - PICV SMART
1 **4206** 01, 1 **4006** 51 1 **4206** 91, 1 **4006** 91	DN 15 SF



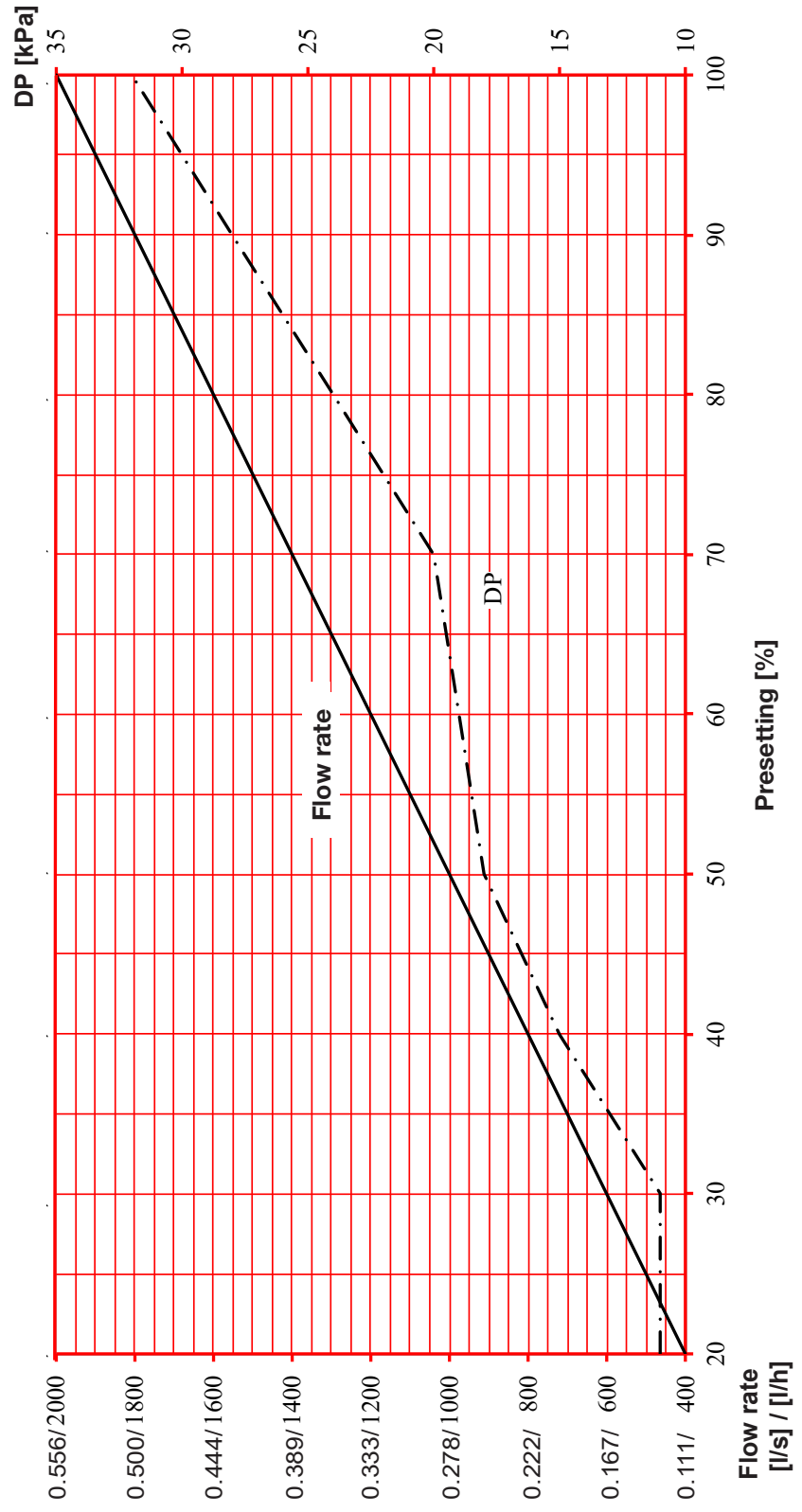
HERZ - Standard diagram	HERZ PICV SMART
1 **4206** 71, 1 **4006** 71, 1 **4206** 81 , 1 **4006** 81	DN 15 HF



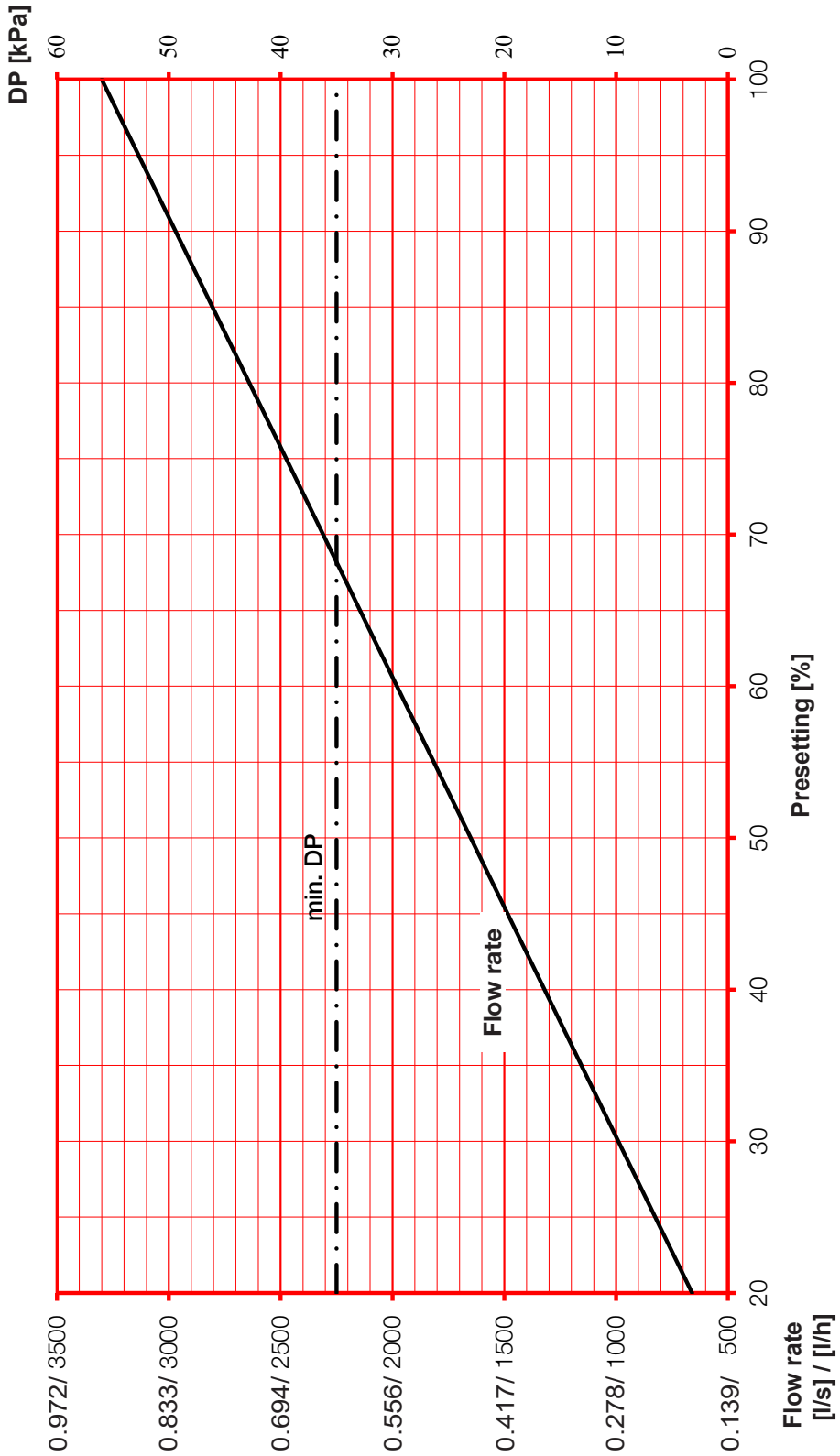
HERZ - Standard diagram	HERZ PICV SMART
1 **4206** 02, 1 **4006** 52, 1 **4206** 92 , 1 **4006** 92	DN 20 SF



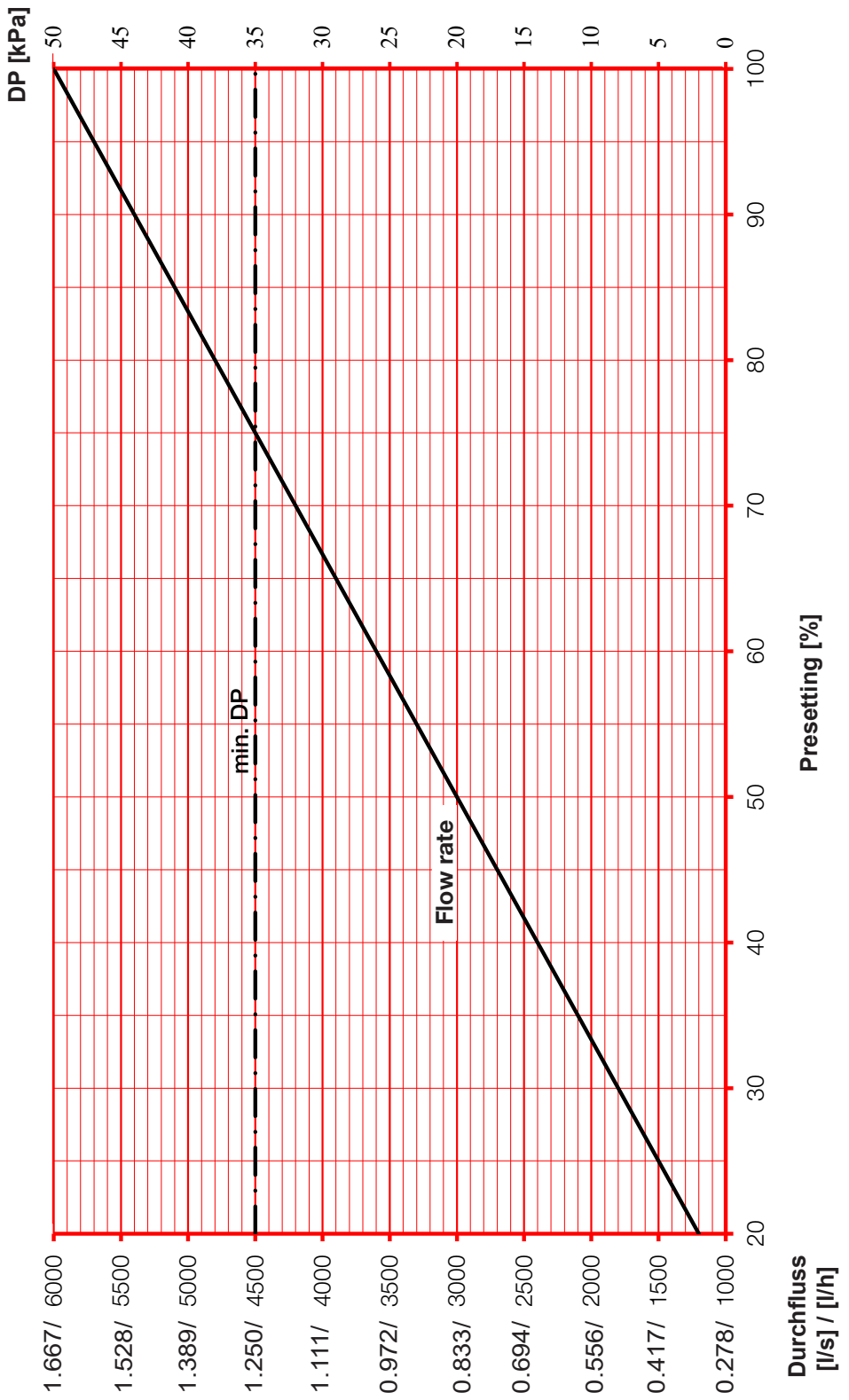
HERZ - Standard diagram	HERZ - PICV SMART
1 **4206** 72 / 1 **4006** 72 1 **4206** 82 / 1 **4006** 82	DN 20 HF



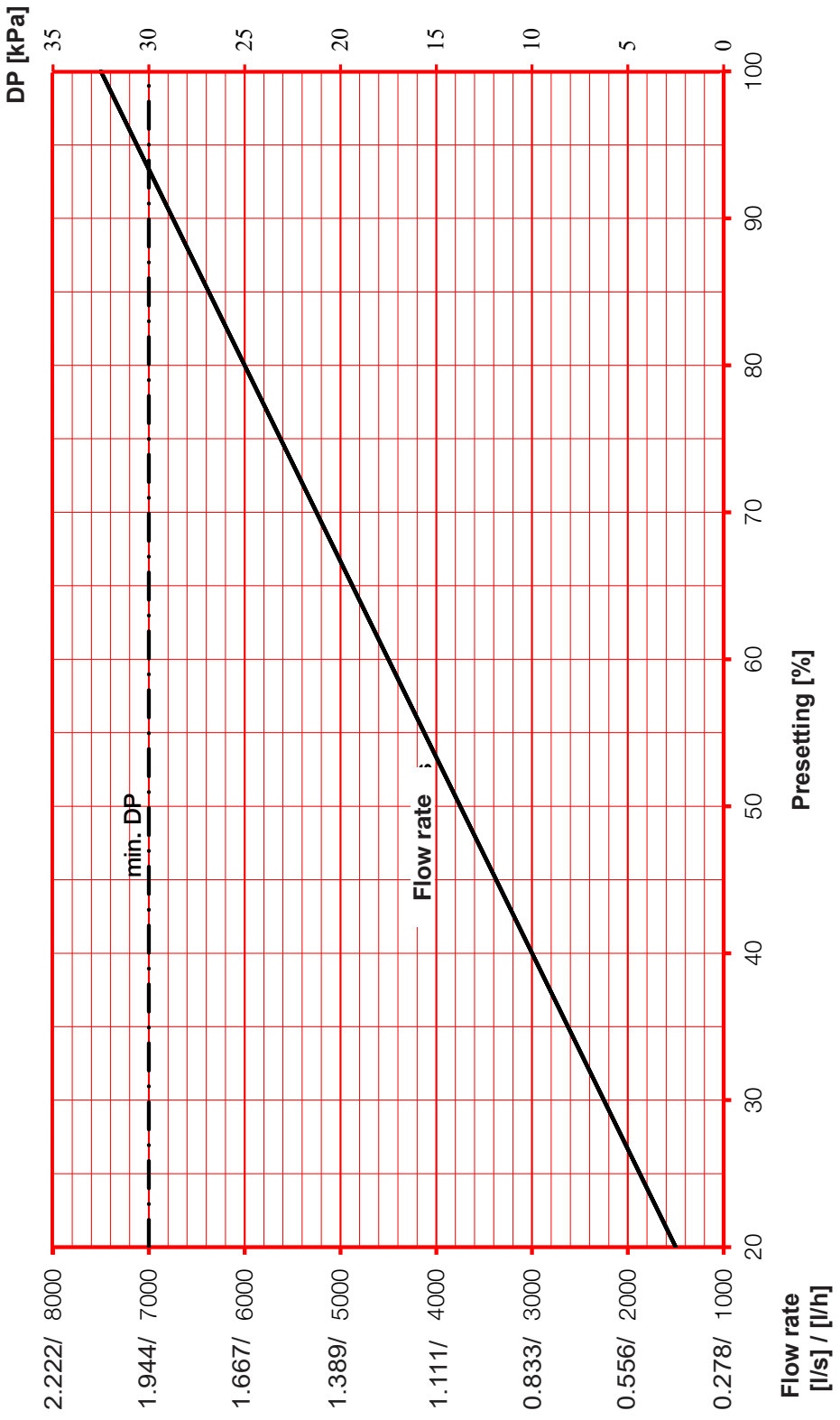
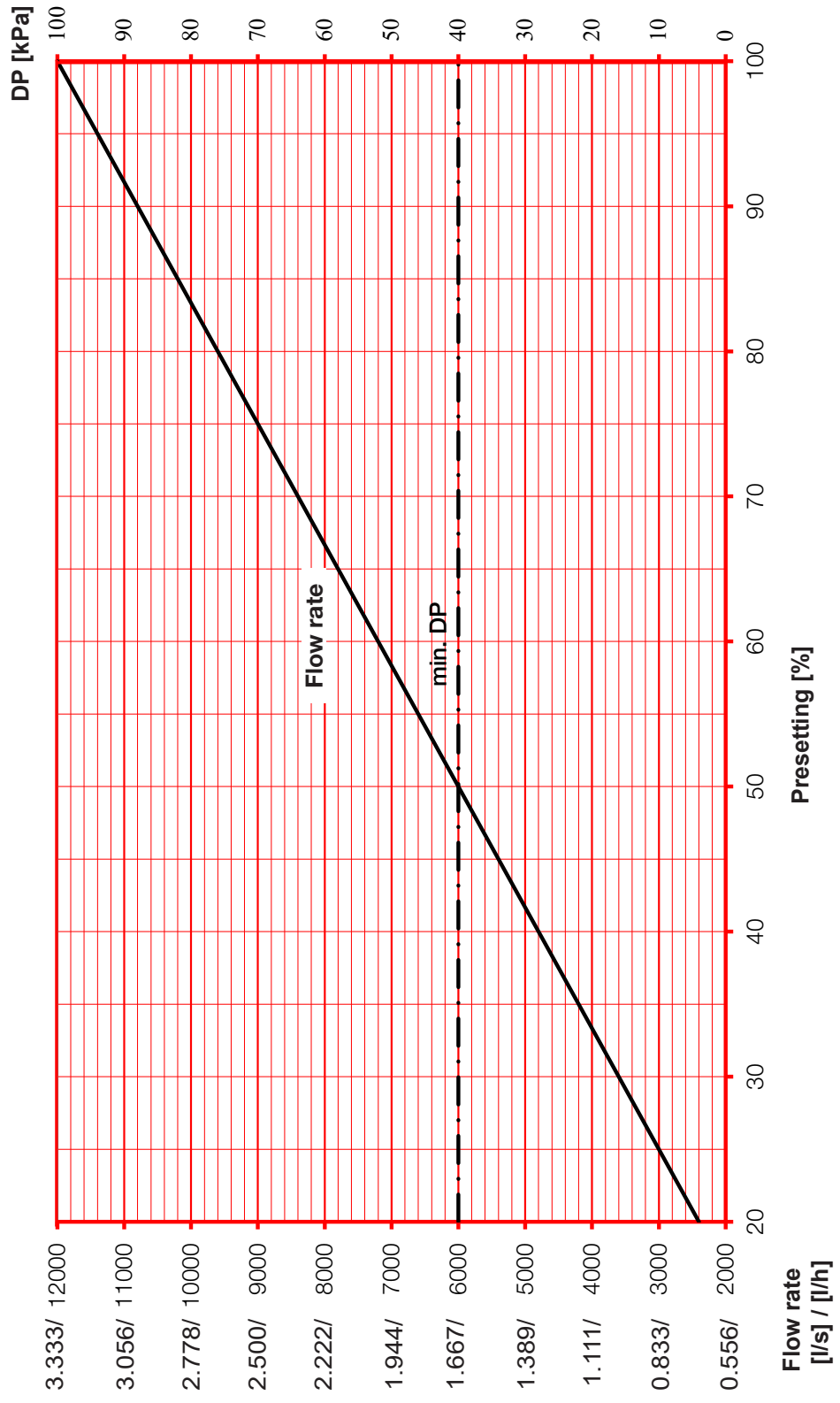
HERZ - Standard diagram	HERZ - PICV
1 **4406** 23 / 1 **4206** 33	DN 25



HERZ - Standard diagram	HERZ - PICV
1 **4406** 24 / 1 **4206** 34	DN 32



HERZ - Standard diagram	HERZ - PICV
1 **4406** 25 / 1 **4206** 35	DN 40



HERZ - Standard diagram	HERZ - PICV
1 **4406** 26 / 1 **4206** 36	DN 50