

Acvatix™

## PICV PN16/PN25 with flanged connections

PN16: VPF43../VPF44.., PN25: VPF53../VPF54..



VPF44../VPF54..

VPF43../VPF53..

### Pressure Independent Control Valves (PICV)

- With integrated pressure differential controller
- Valve body made of gray cast iron GJL-250 or nodular cast iron GJS-400
- Available in the range from DN 50 to 200
- Volumetric flow 15 to 280 m<sup>3</sup>/h nominal, with presetting
- Equipped with pressure test points P/T
- Can be equipped with SAX..P., SAV..P., SQV..P., SBX..P or SBV..P electromotoric actuators

## Use

- For use in heating, ventilation and air conditioning systems, district heating, as a control valve
- For closed circuits

## Type summary

	Product number	Stock number	DN	H <sub>100</sub> [mm]	V <sub>min</sub> [m <sup>3</sup> /h]	V <sub>100</sub> [m <sup>3</sup> /h]	ΔP <sub>min</sub> [kPa]
<b>Standard flow rate</b>	VPF44.50F15	S55266-V174	50	20	3.7	14.3	See "Standard flow rate" in Equipment combinations [► 4]
	VPF54.50F15	S55266-V152					
	VPF44.65F25	S55266-V176	65		4.5	24.4	
	VPF54.65F25	S55266-V154					
	VPF44.80F35	S55266-V178	80		6.8	35.7	
	VPF54.80F35	S55266-V156					
	VPF44.100F70	S55266-V142	100	40	12.2	69.6	
	VPF54.100F70	S55266-V158					
	VPF44.125F110	S55266-V144	125		15	112	
	VPF54.125F110	S55266-V180					
	VPF44.150F150	S55266-V146	150	43	19	150	
	VPF54.150F150	S55266-V182					
	VPF43.200F210	S55266-V148	200		95	210	
	VPF53.200F210	S55266-V150					
<b>High flow rate</b>	VPF44.50F25	S55266-V175	50	20	5.7	24.6	See "High flow rate" in Equipment combinations [► 4]
	VPF54.50F25	S55266-V153					
	VPF44.65F35	S55266-V177	65		6.4	37.7	
	VPF54.65F35	S55266-V155					
	VPF44.80F45	S55266-V179	80		8.5	49.0	
	VPF54.80F45	S55266-V157					
	VPF44.100F90	S55266-V143	100	40	14.8	90.9	
	VPF54.100F90	S55266-V159					
	VPF44.125F135	S55266-V145	125		18	132	
	VPF54.125F135	S55266-V181					
	VPF44.150F200	S55266-V147	150	43	26	208	
	VPF54.150F200	S55266-V183					
	VPF43.200F280	S55266-V149	200		130	280	
	VPF53.200F280	S55266-V151					

### Notes:

When valve installed with stem horizontally, the flow rate will reduce by about 5 %.

DN = Nominal size

H<sub>100</sub> = Nominal stroke

V<sub>100</sub> = Volumetric flow through fully open valve (H<sub>100</sub>)

$V_{\min}$  = Smallest pre-settable volumetric flow through fully open valve ( $H_{100}$ )

$\Delta P_{\min}$  = Minimum differential pressure required across the valve's control path, so that the differential pressure regulator works reliably

### Ordering

PICV valve, actuator must be ordered separately.

When ordering please specify the quantity, product name and type code.

Example:

Product number	Stock number	Designation
VPF44.65F25	S55266-V176	PICV PN 16 with flanged connections

### Delivery

- PICVs, actuators and accessories are packed and supplied separately.
- The valves are supplied without counter-flanges and without flange gaskets.

## Equipment combinations

Valves				Actuators									
				SAX..P..		SQV..P..		SAV..P..		SBX..P..		SBV..P..	
		DN	H100 [mm]	$\Delta p_{max}$ [kPa]	$\Delta p_s$ [kPa]	$\Delta p_{max}$ [kPa]	$\Delta p_s$ [kPa]	$\Delta p_{max}$ [kPa]	$\Delta p_s$ [kPa]	$\Delta p_{max}$ [kPa]	$\Delta p_s$ [kPa]	$\Delta p_{max}$ [kPa]	$\Delta p_s$ [kPa]
Standard flow rate	VPF44.50F15 VPF54.50F15	50	20	600	700	600	700	-	-	600	700	-	-
	VPF44.65F25 VPF54.65F25	65											
	VPF44.80F35 VPF54.80F35	80											
	VPF44.100F70 VPF54.100F70	100	40	-	-			600	700	-	-	600	700
	VPF44.125F110 VPF54.125F110	125				600		600					600
	VPF44.150F150 VPF54.150F150	150	43										
	VPF43.200F210 VPF53.200F210	200											
High flow rate	VPF44.50F25 VPF54.50F25	50	20	600	700	600	700	-	-	600	700	-	-
	VPF44.65F35 VPF54.65F35	65											
	VPF44.80F45 VPF54.80F45	80											
	VPF44.100F90 VPF54.100F90	100	40	-	-			600	700	-	-	600	700
	VPF44.125F135 VPF54.125F135	125				600		600					600
	VPF44.150F200 VPF54.150F200	150	43										
	VPF43.200F280 VPF53.200F280	200											

**Note:**

$H_{100}$  = Nominal stroke





$\Delta p_{max}$  = Maximum permissible differential pressure across valve's control path, valid for the entire actuating range of the motorized valve

$\Delta p_s$  = Maximum permissible differential pressure at which the motorized valve will close securely against the pressure (close off pressure)

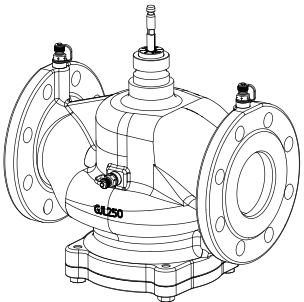
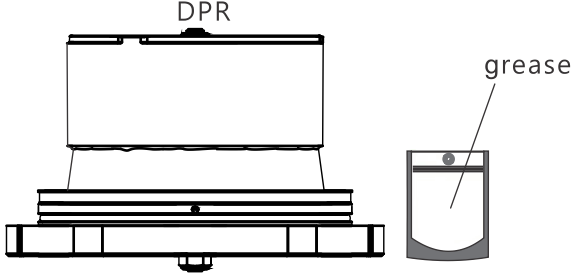
## Actuator overview

Type	Stock no.	Stroke	Pos. force	Operating voltage	Positioning signal	Spring return time	Spring return direction	Positioning time	LED	Manual adjuster	Extra functions		
SAX31P03	S55150-A118	20 mm	500 N	AC 230 V	3-position	-	-	30 s	-	Push and fix	1)		
SAX61P03	S55150-A114			AC/DC 24 V	DC 0...10 V DC 4...20 mA 0...1000 Ω	-	-	30 s	√		2)3)		
SAX81P03	S55150-A116			3-position	-	-	30 s	-	1)				
SQV91P30	S55150-A130	20 mm 40 mm	1100 N	AC/DC 24 V AC 230 V <sup>4)</sup>	3-position DC 0...10 V DC 4...20 mA	30 s	Pull to open or push to close <sup>5)</sup>	< 120 s <sup>5)</sup>	√	Turn and fix	1)6)		
SQV91P40	S55150-A131												
SAV31P00	S55150-A121	40 mm	1100 N	AC 230 V	3-position	-	-	120 s	-	Push and fix	1)		
SAV61P00	S55150-A119			AC/DC 24 V	DC 0...10 V DC 4...20 mA 0...1000 Ω				√		2)3)		
SAV81P00	S55150-A120			3-position	-				1)				
SAV61P00/ MO <sup>7)</sup>	S55150-A144	40 mm	1100 N	AC/DC 24 V	Modbus RTU	-	-	120 s	√	Push and fix	6)		
SAX61P03/ MO <sup>8)</sup>	S55150-A143	20 mm	500 N	AC/DC 24 V	Modbus RTU	-	-	30 s	√	Push and fix	3)6)		
SBX31P	S55160-A110	20 mm	700 N	AC 230 V	3-position	-	-	120 s	-	Turnkey	9)		
SBX61P	S55160-A111			AC/DC 24 V	DC 0...10 V							-	-
SBX81P	S55160-A112			3-position	-							-	
SBV31P	S55160-A113	40 mm	1600 N	AC 230 V	3-position	-	-	180 s	-	Turnkey	9)		
SBV61P	S55160-A114			AC/DC 24 V	DC 0...10 V							-	-
SBV81P	S55160-A115			3-position	-							-	

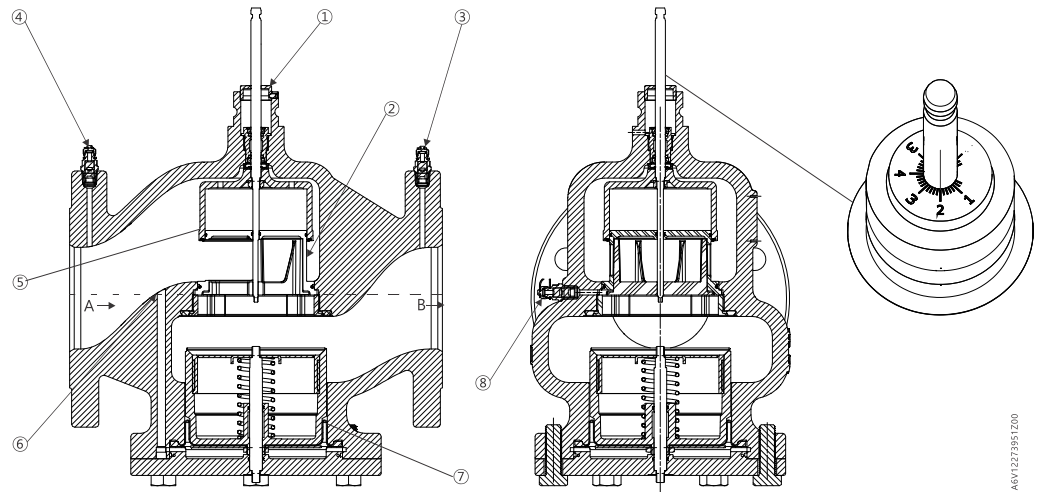
- 1) Optional accessories: Auxiliary switch, potentiometer
- 2) Position feedback, forced control, change of flow characteristic
- 3) Optional accessories: Auxiliary switch, sequence control, acting direction
- 4) Voltage adapter required, order separately
- 5) Selectable
- 6) Position feedback, forced control
- 7) UL certified
- 8) UL certified and CE conform
- 9) Optional accessories: 4...20 mA control signal with AZX420 function module

Product no.	Order number	Designation	Description
ALE10	ALE10		<p>Electronic manometer excluding measuring lines and measuring tips. Measuring range 0 .. 700 kPa. A differential pressure of more than 1000 kPa will destroy the pressure sensor.</p> <p>For measuring the differential pressure between <math>p_1</math>, and <math>P_2/p_3</math> of the PICVs (see diagram under "Functional principle").</p> <p>Functions of the manometer:</p> <ul style="list-style-type: none"> <li>• Start/stop</li> <li>• Automatic zero position</li> <li>• Backlit display</li> <li>• Display: Out - outside the measuring range</li> <li>• Holding function</li> </ul>
ALE11	ALE11		<p>Measuring lines and straight measuring tips for use with Siemens PICVs.</p> <p>Equipped with G 1/8" connection with 2 x 40 mm needles.</p>
ALP45	ALP45		<p>Spare nipples P/T port (set of 2).</p> <p>Set contains 1 piece each with a red and blue ribbon.</p> <p>Port: External threads G 1/8" to ISO 228</p> <p>Connection to valve body: G 1/4" to ISO 228, including O-ring</p> <p>Length: 40 mm</p>
ALP46 (only for $p_1, p_3$ )	S55264-V115		<p>Blanking plugs for P/T ports</p> <p>Connection to valve body: G 1/4" to ISO 228, inclusive O-ring</p>
ALP47 (only for $p_1, p_3$ )	S55264-V116		<p>Drain ball valve inclusive O-ring</p> <p>Port: External threads G 1/2" to ISO 228</p> <p>Connection to valve body: G 1/4" to ISO 228, inclusive O-ring</p> <p>Length: 48 mm</p>
ALP48 (only for $p_1, p_3$ )	S55264-V117		<p>Combined P/T port and drain ball valve</p> <p>Port: External threads G 1/6" to ISO 228</p> <p>Connection to valve body: G 1/4" to ISO 228, inclusive O-ring</p> <p>Length: 80 mm</p>
ALP49	S55264-V118		<p>Long P/T ports (set of 2 pieces)</p> <p>Set contains 1 piece each with a red and blue ribbon.</p> <p>Port: External threads G 1/6" to ISO 228</p> <p>Connection to valve body: G 1/4" to ISO 228, inclusive O-ring</p> <p>Length: 120 mm</p>

## DPR assembly replacement

		
VPF44.50F15	ALR50F15	S55264-V155
VPF54.50F15		
VPF44.50F25	ALR50F25	S55264-V156
VPF54.50F25		
VPF44.65F25	ALR65F25-LP	S55264-V157
VPF54.65F25	ALR65F25-HP	S55264-V163
VPF44.65F35	ALR65F35-LP	S55264-V158
VPF54.65F35	ALR65F35-HP	S55264-V164
VPF44.80F35	ALR80F35	S55264-V159
VPF54.80F35		
VPF44.80F45	ALR80F45	S55264-V160
VPF54.80F45		
VPF44.100F70	ALR100F70	S55264-V161
VPF54.100F70		
VPF44.100F90	ALR100F90	S55264-V162
VPF54.100F90		

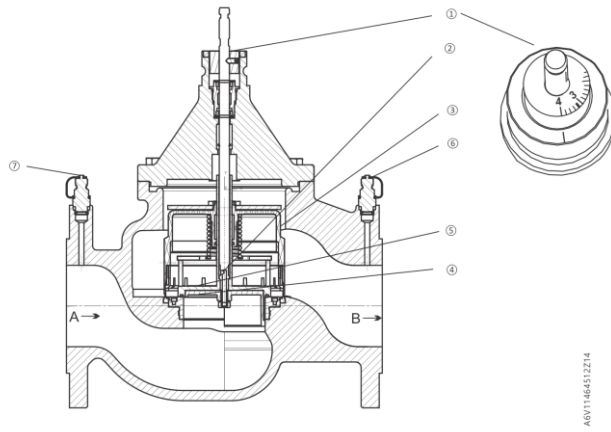
VPF44../VPF54..



1	Ring with dial for presetting
2	Seat with variable presetting opening
3	Pressure test point (P/T) at outlet port B, blue ribbon, $p_3$
4	Pressure test point (P/T) at inlet port A, red ribbon, $p_1$
5	Control valve
6	Aperture for the differential pressure regulator is linked with inlet port A
7	Differential pressure controller - DPR
8	Pressure test point (P/T) at outlet of control valve, blue ribbon, $p_2$
A	Inlet port A
B	Outlet port B



VPF43../VPF53..



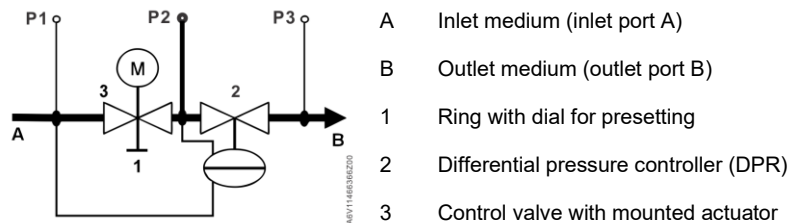
1	Ring with dial for presetting
2	Aperture for the differential pressure controller is linked with outlet port B
3	Differential pressure controller
4	Plug with variable presetting opening
5	Control valve
6	Pressure test point (P/T) at outlet port B, blue ribbon, $p_3$
7	Pressure test point (P/T) at inlet port A, red ribbon, $p_1$
A	Inlet port A
B	Outlet port B

## Functional principle

The PICVs VPF43../VPF44../VPF53../VPF54.. combine three functions:

- a control valve for controlling the volumetric flow
- an adjustable mechanism with a dial for a pre-settable maximum volumetric flow
- a DPR for balancing pressure fluctuations in the hydraulic system respectively across the control valve

The mechanical series-connected differential pressure controller keeps the differential pressure ( $p_1 - p_2$ ) constant across the control valve and thus the volumetric flow too. The desired maximum volumetric flow  $V_{100}$  can be preset with the adjusting mechanism. The controller (not shown) and the actuator regulate the volumetric flow and consequently the desired temperature in buildings, rooms or zones.



$p_1$	P/T port with red ribbon, pressure test point at inlet port A of PICV
$p_2$	P/T port with blue ribbon, pressure at outlet port of control valve (3)
$p_3$	P/T port with blue ribbon, pressure test point at outlet port B of PICV

### Medium flow

The medium entering the PICV (inlet port A) first passes through the control valve (3) with a linear characteristic and a stroke of 20 mm (DN 50...80) respectively 40 mm (DN 100...125) and 43 mm (DN 150...200). The actuator (not shown here) opens or closes accurately the control valve. Then, the medium flows through the variable presetting opening which is connected to the ring with dial (1) for presetting the desired maximum volumetric flow  $V_{100}$ .

Before leaving the PICV (outlet port B), the medium passes through a built-in mechanical differential pressure controller. This differential pressure controller is the heart of the PICV and ensures that the selected volumetric flow is maintained across the whole working range and independent of the inlet pressure  $P_1$ .

### Pressure test points

The PICV VPF44../VPF54.. are equipped with three pressure test points ( $p_1$ ,  $p_3$ ,  $p_2$ ) for measuring and monitoring the differential pressure across the control valve and PICV during commissioning or for analysis during operation. The PICV VPF43../VPF53.. are equipped with two pressure test points ( $p_1$ ,  $p_3$ ) for measuring and monitoring the differential pressure across the valve during commissioning or operation. For that purpose, the electronic manometer ALE10 can be used.

### Manual control

Only possible with mounted actuator.

### Advantages

The advantages of PICVs are that:

- Once the flow limiter (presetting) is set to the desired nominal flow, the hydraulic circuit is self-balanced, even when changes to the system are made, such as additions.
- For any heat or cold demand the PICV with mounted actuator can be set to the desired volumetric flow and will be relatively constant regardless of pressure fluctuations in the system.

Constant flow regardless of pressure changes in the system reduces hydraulic interdependence between hydraulic groups and leads to a more stable control.

**Notes:** PICV can't be used as flow limiting valve without an actuator mounted on top.

**Engineering Example**

$$\dot{V} = \frac{Q[\text{kW}] \cdot 1000}{1.163 \cdot \Delta T[\text{K}]} \left[ \frac{\text{l}}{\text{h}} \right]$$

Basis of design

1. Determine heat/cold demand Q [kW]
2. Determine temperature spread  $\Delta T$  [K]
3. Calculate volumetric flow
4. Select suitable PICV VPF43../VPF44../VPF53../VPF54..
5. Determine dial setting using volumetric flow/dial presetting tables, see below.

Example

1. Heat demand Q = 150 kW
2. Temperature spread  $\Delta T = 6$  K
3. Volumetric flow

$$\dot{V} = \frac{150 \text{ kW} \cdot 1000}{1.163 \cdot 6 \text{ K}} = 21'654 \text{ l/h} = 21.6 \text{ m}^3/\text{h}$$

Hint: You can also determine the volumetric flow using the valve slide rule.

4. PN class: PN 16
5. Select PICV VPF44., PN 16  
Ideally, PICVs should be selected such that they operate at about 80% of their maximum flow, enabling them to deliver spare capacity, if required.  
Selections:  
VPF44.65F25  $\Delta p_{\min} = 25$  kPa  
VPF44.65F35  $\Delta p_{\min} = 40.5$  kPa
6. Determine dial setting using volumetric flow/dial presetting tables:  
VPF44.65F25 Volumetric flow 21.6 m<sup>3</sup>/h  
Dial setting 3.7  
VPF44.65F35 Volumetric flow 21.6 m<sup>3</sup>/h  
Dial setting 2.5

## Volumetric flow/dial presetting

Tables to determine the dial setting for a desired volumetric flow.  
 $\Delta p_{\min}$  [kPa] based on volumetric flow; interpolate missing values.

	Presetting range linear to VDI/VDE 2173
-	Presetting range not permitted

### Standard flow rate

VPF44.50F15/VPF54.50F15, 15 m <sup>3</sup> /h nominal																					
$\dot{V}$ [m <sup>3</sup> /h]	-	-	-	3.7	4.2	4.9	5.6	6.3	7.0	7.7	8.4	9.2	10.0	11.0	11.9	12.6	13.2	13.5	13.8	14.1	14.3
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
$\Delta p_{\min}$ [kPa]				13	14	15	16	16	17	18	18	19	20	21	21	22	23	23	24	25	25

VPF44.65F25/VPF54.65F25, 25 m <sup>3</sup> /h nominal																					
$\dot{V}$ [m <sup>3</sup> /h]	-	-	-	4.5	5.3	6.2	7.1	7.9	8.7	9.9	11.1	12.5	13.8	15.3	16.7	17.9	19.1	20.4	21.6	23.0	24.4
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
$\Delta p_{\min}$ [kPa]				28	29	29	29	29	30	30	30	30	31	31	31	31	32	32	32	32	32

VPF44.80F35/VPF54.80F35, 35 m <sup>3</sup> /h nominal																					
$\dot{V}$ [m <sup>3</sup> /h]	-	-	-	6.8	8.4	9.6	10.7	12.2	13.7	15.5	17.3	19.4	21.4	23.3	25.1	27.2	29.3	31.2	33.2	34.5	35.7
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
$\Delta p_{\min}$ [kPa]				18	19	19	19	19	20	20	20	20	21	21	21	21	22	22	22	22	22

VPF44.100F70/VPF54.100F70, 70 m <sup>3</sup> /h nominal																					
$\dot{V}$ [m <sup>3</sup> /h]	-	-	-	12.2	14.8	17.3	19.8	22.5	25.2	29.1	33.0	37.1	41.2	46.2	51.1	56.3	61.5	64.3	67.2	68.4	69.6
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
$\Delta p_{\min}$ [kPa]				18	19	20	21	22	23	24	25	26	26	27	28	29	30	31	32	33	33

VPF44.125F110/VPF54.125F110, 110 m <sup>3</sup> /h nominal																					
$\dot{V}$ [m <sup>3</sup> /h]	-	-	-	15	19	22	26	31	36	40	45	52	57	65	73	83	89	96	103	109	112
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
$\Delta p_{\min}$ [kPa]				20	20	22	22	23	24	24	25	25	26	26	26	28	28	28	28	29	30

VPF44.150F150/VPF54.150F150, 150 m <sup>3</sup> /h nominal																					
$\dot{V}$ [m <sup>3</sup> /h]	-	-	-	19	23	28	33	39	45	51	58	66	75	84	94	104	111	120	129	139	150
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
$\Delta p_{\min}$ [kPa]				17	17	18	18	19	20	20	22	22	23	23	24	25	26	28	28	29	30

VPF43.200F210/VPF53.200F210, 210 m <sup>3</sup> /h nominal																					
$\dot{V}$ [m <sup>3</sup> /h]	-	-	-	-	-	95	100	105	112	118	124	132	140	149	157	165	173	182	192	200	210
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
$\Delta p_{\min}$ [kPa]						11	12	12	14	15	16	17	19	21	22	24	26	27	29	30	32

## High flow rate

VPF44.50F25/VPF54.50F25, 25 m <sup>3</sup> /h nominal																					
$\dot{V}$ [m <sup>3</sup> /h]	-	-	-	5.7	6.9	7.8	8.8	9.9	11.1	12.3	13.5	15.0	16.5	18.1	19.7	21.0	22.2	22.9	23.5	24.0	24.6
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
$\Delta p_{\min}$ [kPa]				30	32	33	35	36	38	39	41	42	44	45	47	48	50	51	53	54	55

VPF44.65F35/VPF54.65F35, 35 m <sup>3</sup> /h nominal																					
$\dot{V}$ [m <sup>3</sup> /h]	-	-	-	6.4	7.8	8.8	10.1	11.2	12.3	14.2	16.1	18.1	20.2	22.4	24.6	26.5	28.5	30.6	32.7	35.2	37.7
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
$\Delta p_{\min}$ [kPa]				30	32	33	34	35	36	38	39	40	41	42	43	45	46	47	48	49	50

VPF44.80F45/VPF54.80F45, 45 m <sup>3</sup> /h nominal																					
$\dot{V}$ [m <sup>3</sup> /h]	-	-	-	8.5	10.5	12.2	13.9	16.0	18.0	20.2	22.4	24.7	27.0	30.2	33.4	36.5	39.6	42.5	45.4	47.2	49.0
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
$\Delta p_{\min}$ [kPa]				22	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

VPF44.100F90/VPF54.100F90, 90 m <sup>3</sup> /h nominal																					
$\dot{V}$ [m <sup>3</sup> /h]	-	-	-	14.8	18.2	21.3	24.4	27.6	30.8	35.4	39.9	43.7	47.4	55.7	64.0	70.8	77.5	82.3	87.1	89.0	90.9
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
$\Delta p_{\min}$ [kPa]				20	22	23	25	26	28	29	31	32	34	35	37	38	40	41	43	44	45

VPF44.125F135/VPF54.125F135, 135 m <sup>3</sup> /h nominal																					
$\dot{V}$ [m <sup>3</sup> /h]	-	-	-	18	23	25	30	36	41	45	51	59	65	74	85	94	100	109	120	126	132
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
$\Delta p_{\min}$ [kPa]				20	22	24	25	26	28	29	31	32	34	35	37	38	40	42	42	43	45

VPF44.150F200/VPF54.150F200, 200 m <sup>3</sup> /h nominal																					
$\dot{V}$ [m <sup>3</sup> /h]	-	-	-	26	34	38	45	53	63	69	79	91	102	116	131	143	153	167	183	194	208
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
$\Delta p_{\min}$ [kPa]				20	20	22	24	24	26	28	32	36	36	38	40	42	44	45	48	48	50

VPF43.200F280/VPF53.200F280, 280 m <sup>3</sup> /h nominal																					
$\dot{V}$ [m <sup>3</sup> /h]	-	-	-	-	-	130	137	145	153	162	170	180	189	199	209	220	232	243	256	267	280
Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max.
$\Delta p_{\min}$ [kPa]						31	32	33	35	38	41	45	49	53	57	61	65	69	73	75	78

**Notes:** When valve installed with stem horizontally, the flow rate will reduce by about 5 %.


Topic	Title	Document ID
Mounting and installation	VPF43../VPF44../ VPF53../VPF54.. Mounting instructions	A6V12190279
Product environmental compatibility	VPF44../VPF54.. The product environmental declaration A5W00159028A contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	A5W00159028A
	VPF43../VPF53.. The product environmental declaration CE1E4315en contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	CE1E4315en
EU Conformity (CE)	VPF44../ VPF54..	A5W00159722A
	VPF43../ VPF53..	CE1T4315xx

Related documents such as the environmental declarations, declarations of conformity, etc., can be downloaded from the following Internet address:

[www.siemens.com/bt/download](http://www.siemens.com/bt/download)

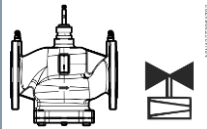
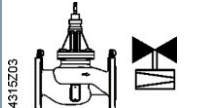
Notes

Safety

<b>⚠ CAUTION</b>	
	<p><b>National safety regulations</b></p> <p>Failure to comply with national safety regulations may result in personal injury and property damage.</p> <ul style="list-style-type: none"> <li>Observe national provisions and comply with the appropriate safety regulations.</li> </ul>

Engineering

Valve and actuator combination

Valve	Symbols / Direction of flow	Flow in control mode	Valve stem	
			Stem retracts	Stem extends
PICV VPF44../54..		Variable	Valve closes	Valve opens
PICV VPF43../53..				

### Valve and actuator combination

SAX61P../SAV61P.. SQV91P..	Actuator set to Direct acting	Actuator set to Reverse acting
Positioning signal Y: DC 0...10 V 4...20 mA Positioning signal Z: 0...1000 Ω		
Y, Z	Positioning signal	
V	Volumetric flow	
—————	Acting direction: Direct	
- - - - -	Acting direction: Reverse	

SAX61P../SAV61P.. SQV91P..	Actuator	VPF.. PICV	Actuator and VPF.. PICV combination
Log			
Lin			
Y, Z	Positioning signal		
H	Stroke		
V	Volumetric flow		
—————	Acting direction: Direct		
- - - - -	Acting direction: Reverse		

SB..61P	Actuator	VPF.. PICV	Actuator and VPF.. PICV combination
<b>Y, Z</b>	Positioning signal		
<b>H</b> <sup>1)</sup>	Stroke		
<b>V</b>	Volumetric flow		

1): The feedback signal reflects the actual stroke, refer to the table below:

Positioning signal Y		Stroke H	Feedback signal U	
0-10 V	4-20 mA	%	0-10 V	4-20 mA
0.0	4.0	0.0	0.0	4.0
0.5	4.8	2.0	0.2	4.3
1.0	5.6	4.1	0.4	4.6
1.5	6.4	6.1	0.6	5.0
2.0	7.2	8.1	0.8	5.3
2.5	8.0	10.2	1.0	5.6
3.0	8.8	12.2	1.2	5.9
3.5	9.6	14.2	1.4	6.3
4.0	10.4	16.5	1.7	6.6
4.5	11.2	19.2	1.9	7.1
5.0	12.0	22.3	2.2	7.6
5.5	12.8	25.9	2.6	8.1
6.0	13.6	30.1	3.0	8.8
6.5	14.4	35.0	3.5	9.6
7.0	15.2	40.7	4.1	10.5
7.5	16.0	47.2	4.7	11.6
8.0	16.8	54.9	5.5	12.8
8.5	17.6	63.8	6.4	14.2
9.0	18.4	74.1	7.4	15.9
9.5	19.2	86.1	8.6	17.8
10.0	20.0	100.0	10.0	20.0




## ⚠ WARNING



### The direction of flow indicated (arrow on the valve body) is mandatory!

The valves should preferably be mounted in the return pipe where temperatures are lower (for heating circuits), and where the sealing gland is less affected by strain.  
Valve's factory default position (without actuator) = CLOSED.

### Symbol

Symbol used in catalogs and application descriptions	Symbol used in diagrams
	There are no standard symbols for PICVs in diagrams

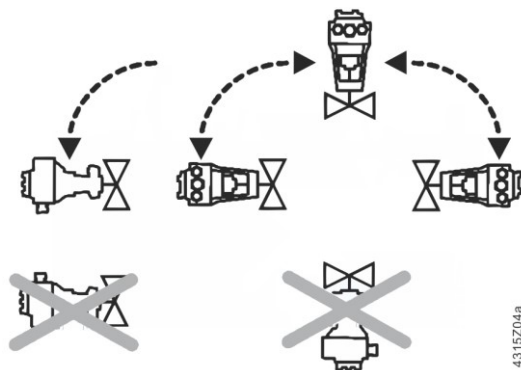
### Recommendation

- A strainer or dirt trap should be fitted upstream of the valve to enhance reliability and service life.
- Remove dirt, welding beads etc. from valves and pipes.
- Do not insulate the actuator bracket, as air circulation must be ensured!
- If flow measurement section is used (VPF44../VPF54.. only), make sure the flow measuring device is installed in a low turbulence area. In general, use the  $5 \times \text{DN} / 10 \times \text{DN}$  rule, whenever possible and maintain a distance of more than 10D from the pump.

### Mounting

- PICV and actuator can easily be assembled on site. Neither special tools nor adjustments, besides flow rate presetting are required.
- The valve is supplied with Mounting Instructions A6V11464512.

### Orientation



### Direction flow

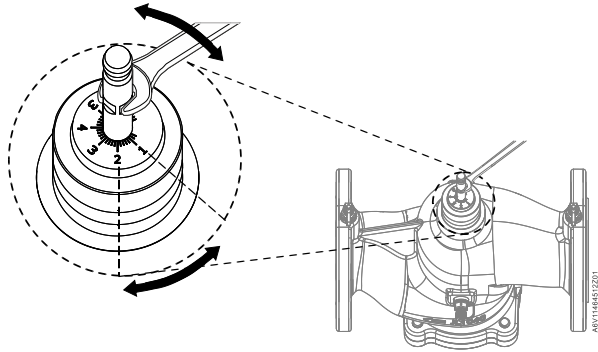
Pay attention to the valve's flow direction symbol during mounting.

**Presetting**

It is recommended to mount the actuator before the presetting is made.

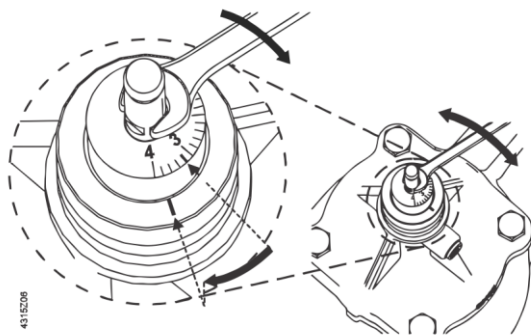
1. Mount actuator and fix valve neck coupling
2. Mount valve stem coupling and tighten slightly
3. Make presetting according to table under "Volumetric flow / dia presetting". Do NOT adjust presetting to a dial reading lower than "0.6".
4. Tighten stem coupling

**VPF44../VPF54..** (    $\dot{V}$  [m<sup>3</sup>/h],  8 mm)



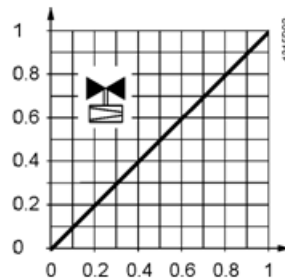
VPF44../VPF54.. has a symmetric pre-setting scale for easy commissioning. Identical pre-setting positions give identical flow rate.

**VPF43../VPF53..** (    $\dot{V}$  [m<sup>3</sup>/h],  8 mm)



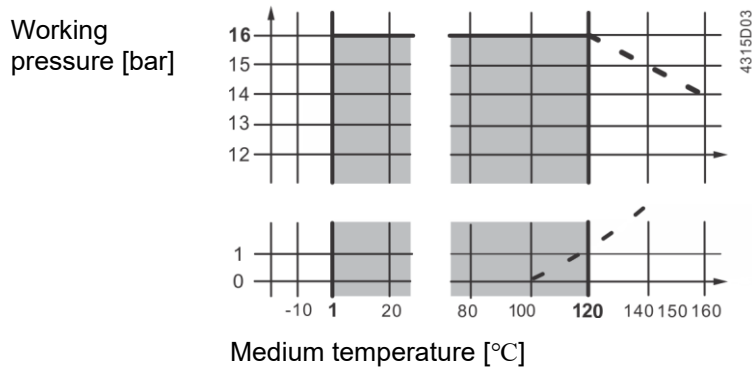
**Valve characteristic**

Volumetric flow  $V / V_{100}$

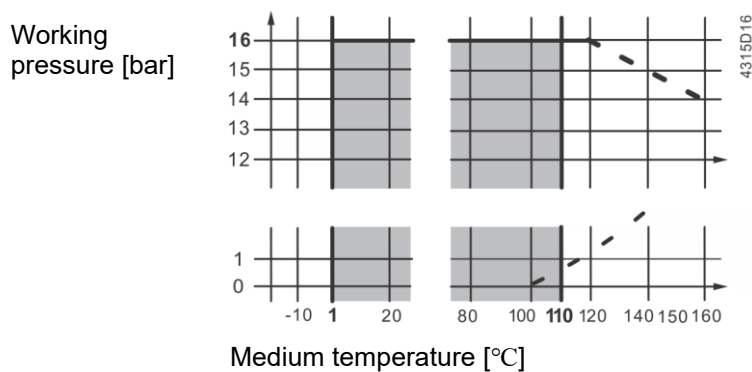


Stroke  $H / H_{100}$

**Working pressure and medium temperature**  
**Medium temperature [°C] for VPF44../VPF54..**



**Medium temperature [°C] for VPF43../VPF53..**



Working pressure and medium temperature staged as per ISO 7005.

<b>⚠ WARNING</b>	
	<b>Current local legislation must be observed.</b>

**Commissioning**

<b>NOTICE</b>	
	<ul style="list-style-type: none"> <li>• Consequences The valves must be commissioned with the actuator correctly fitted. Strong pressure impacts can damage closed PICVs.</li> <li>• The valves must be open when flushing or pressure testing the system. Strong pressure impacts can damage closed PICVs.</li> <li>• Differential pressure P<sub>max</sub> across the valve's control path is not allowed to exceed 600 kPa.</li> <li>• Valve's factory default position (without actuator) = CLOSED.</li> </ul>

## Maintenance

All VPF.. PICVs are maintenance-free. Maintenance for VPF44../VPF54.. allows easy exchange of the differential pressure controller (DPR).

### WARNING



#### When performing service work on the valve or actuator:

- Switch off the pump and disconnect power supply.
- Close the shut-off valves in the piping network.
- Fully reduce pressure in the piping network and allow the pipes to cool down completely.
- Remove the electrical connections only if necessary.

#### Sealing gland

The stem sealing gland cannot be exchanged. In case of leakage the whole valve must be replaced.

## Disposal



The valve is considered an electronic device for disposal in accordance with European guidelines and may not be disposed of as domestic waste.

- Dispose of the valve through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

## Warranty

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

<b>Functional data</b>			
PN class	PN 16 / PN 25 as per EN 1333		
Permissible operating pressure	1600 kPa (16 bar) / 2500 kPa (25 bar) as per ISO 7628 / EN 1333		
Valve characteristic	Linear as per VDI / VDE 2173		
Leakage rate	Class IV (0...0.01 % of volumetric flow $V_{100}$ ) to EN 1349		
Operating direction	Valve stem retracts (pushed down) to close Valve stem extends (pulled up) to open		
Permissible media	Low temperature hot water, medium temperature hot water, chilled water, water with anti-freeze Recommendation: water treatment to VDI 2035		
Medium temperature	PN 16, PN 25	DN 50...150: 1...120 °C DN 200 1...110 °C	
Rangeability	1:100		
Average flow accuracy	± 10 %	from $\Delta p_{\min}$ up to 70 kPa from $\Delta p_{\min}$ up to 105 kPa from $\Delta p_{\min}$ up to 600 kPa	(DN 50...80) (DN 100...150) (DN 200)
	± 5 %	from 70...600 kPa from 105...600 kPa	(DN 50...80) (DN 100...150)
Nominal stroke	DN 50, 65, 80: 20 mm DN 100, 125: 40 mm DN 150, 200: 43 mm		
Low-noise operation	To operate the valve at a low noise level, a differential pressure of 150 kPa should not be exceeded.		

\* Tested in clean water conditions, represents the maximum deviation from the average measured flow

<b>Materials</b>	
Valve body	DN50...100 (PN16): Gray cast iron GJL-250 DN50...100 (PN25), DN125...200 (PN16/PN25): Nodular cast iron GJS-400-18RT
Stem, spring	Stainless steel
Sleeve	Brass
Regulator	Stainless steel
Seals	EPDM

Norms and standards		
VPF44../VPF54.. EU Conformity (CE)		A5W00159722A
UKCA (VPF44../VPF54..)		A5W00236773A
EAC conformity		VPF43../VPF44../VPF53../VPF54.. Eurasia conformity
Pressure Equipment Directive		PED 2014/68/EU
Pressure accessories		Scope: Article 1, section 1 Definitions: Article 2, section 5
Fluid group 2 (for VPF43../VPF53..)	DN 200 <sup>3)</sup> (PN 16, PN 25)	Without CE-marking as per article 4, section 3 (sound engineering practice) <sup>1)</sup>
Fluid group 2 (for VPF44../VPF54..)	DN 50 (PN 16)	Without CE-marking as per article 4, section 3 (sound engineering practice) <sup>1)</sup>
	DN 65...150 (PN 16) DN 50...125 (PN 25)	Category I, module A, with CE-marking, as per article 14, section 2
	DN 150 (PN 25)	Category II, module A2, with CE-marking, as per article 14, section 2, notified body number 0035
Environmental conformity		The product environmental declaration CE1E4315en <sup>2)</sup> (for VPF43../ VPF53..), A5W00159028A <sup>2)</sup> (for VPF44../ VPF54..) contain data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).
<ol style="list-style-type: none"> <li>1. Valves where PS x DN &lt; 1000, do not require special testing and cannot carry the CE label.</li> <li>2. The documents can be downloaded from <a href="http://siemens.com/bt/download">http://siemens.com/bt/download</a>.</li> <li>3. Warm water temperature not greater than 110°C, do not require special testing and cannot carry the CE label.</li> </ol>		

General ambient conditions			
	Operation	Transport	Storage
Temperature	1...55 °C	-30...65 °C	-15...50 °C
Humidity	5...95 % r. h.	<95 % r. h.	5...95 % r. h.

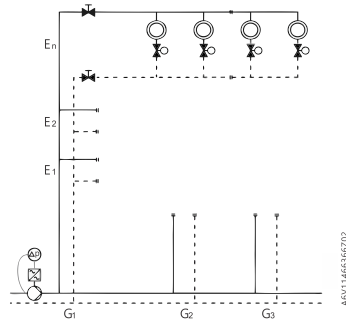
Dimensions/weight	
Dimensions	See Dimensions [▶ 24]
Weight	See Dimensions [▶ 24]
Flange connections	ISO 7005-2
Pressure test points (P / T points)	G ¼ inch (connection) 2 mm x 40 mm (measuring tips)

## Application examples

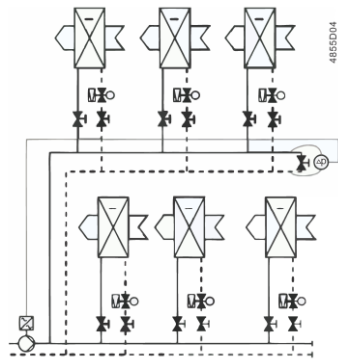
PICVs in HVAC systems combined with variable speed pumps provide even higher energy efficiency. When sizing the pump, it must be made certain that the most critical branch or consumer in the system – usually the remotest from the pump – gets enough pressure (pump head). Thus, it is recommended to use a variable speed pump in constant-pressure mode with end-point feedback, to maintain a minimum differential pressure across the critical valve.

### Residential buildings

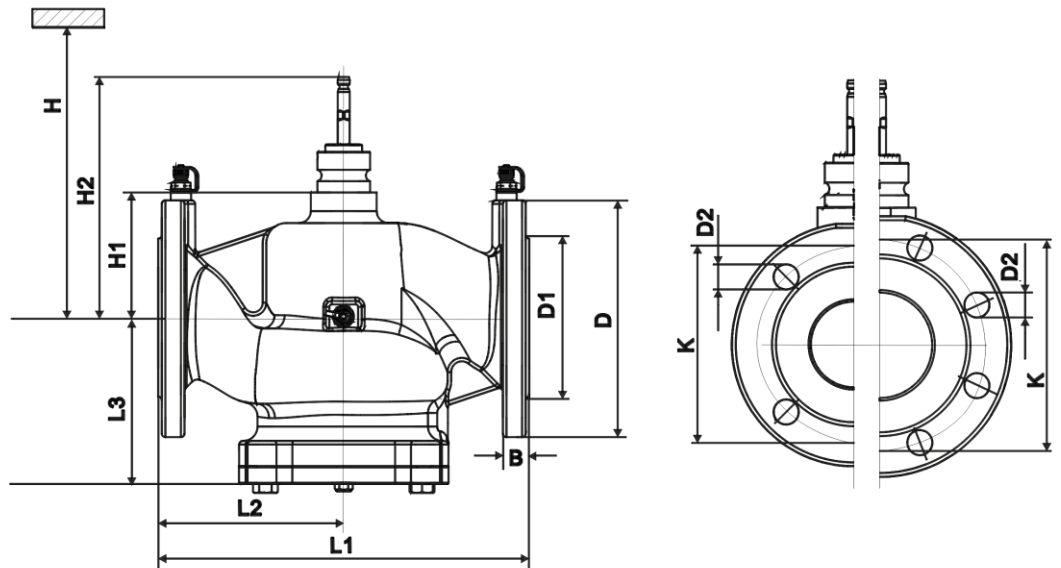
Residential buildings with for example self-contained flat heating systems:



- E = Floor
- G = Group or zone Non-residential buildings  
Commercial buildings with for example Fan Coil Units or heat exchangers for heating or cooling



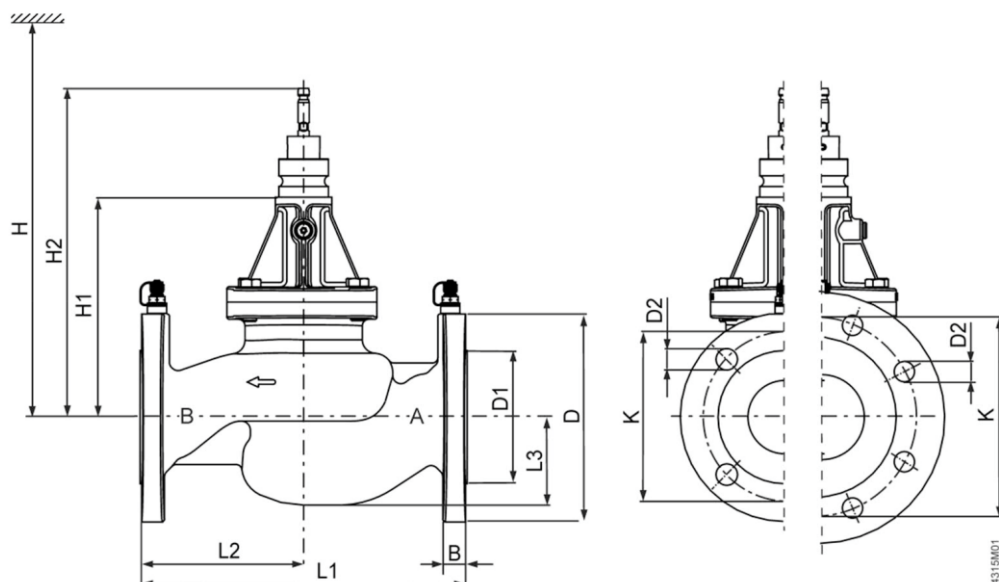
Dimensions in mm: VPF44../VPF54..



Product no.	DN	B	Ø D	Ø D1	Ø D2	L1	L2	L3	Ø K	H1	H2	H					Weight
												SAX..P	SAV..P	SQV..P	SBX..P	SBV..P	
												[mm]	[mm]	[mm]	[mm]	[mm]	
VPF44..	50	17	165	99	19 (4x)	230	115	115	125	102.5	199	545	-	492	608.5	-	15
	65	17	185	118	19 (4x)	290	145	122	145	104	200.5	546	-	493	610	-	19
	80	19	200	132	19 (8x)	310	155	139	160	104.5	201	547	-	494	610.5	-	28
	100	21	220	156	19 (8x)	350	175	174.5	180	169	285.5	-	637	557	-	735	49
	125	19	250	184	19 (8x)	400	200	203	210	203.5	320	-	670	600	-	769.5	77
	150	19	285	211	23 (8x)	480	240	233	240	197	316.5	-	660	590	-	763	110
VPF54..	50	16	165	99	19 (4x)	230	115	115	125	102.5	199	545	-	492	608.5	-	15
	65	16	185	118	19 (8x)	290	145	122	145	104	200.5	546	-	493	610	-	20
	80	16	200	132	19 (8x)	310	155	139	160	104.5	201	547	-	494	610.5	-	29
	100	16	235	156	23 (8x)	350	175	174.5	190	169	285.5	-	637	557	-	735	50
	125	19	270	184	28 (8x)	400	200	203	220	203.5	320	-	670	600	-	769.5	79
	150	20	300	211	28 (8x)	480	240	233	250	197	316.5	-	660	590	-	763	115



Dimensions in mm: VPF43../VPF53..



Product number	DN	B	Ø D	Ø D1	Ø D2	L1	L2	L3	Ø K	H1	H2	H			Weight
												SAV..P	SQV..P	SBV..P	
												[mm]	[mm]	[mm]	
VPF43..	200	28	380	266	23 (12x)	600	300	300	295	401	521	870	790	967	175
VPF53..	200	28	380	274	28 (12x)	600	300	300	310	401	521	870	790	967	175

Note:

- DN = Nominal size
- H = Total actuator height plus minimum distance to the wall or the ceiling for mounting, connection, operation, maintenance etc.
- H1 = Dimension from the pipe center to install the actuator (upper edge)
- H2 = Valve in the «OPEN» position means that the valve stem is fully extended.

## Revision numbers

Product number	Valid from rev. no.	Product number	Valid from rev. no.
VPF44.50F15	..B	VPF44.50F25	..B
VPF44.65F25	..B	VPF44.65F35	..B
VPF44.80F35	..B	VPF44.80F45	..B
VPF44.100F70	..A	VPF44.100F90	..A
VPF44.125F110	..A	VPF44.125F135	..A
VPF44.150F150	..A	VPF44.150F200	..A
VPF43.200F210	..A	VPF43.200F280	..A
VPF54.50F15	..A	VPF54.50F25	..A
VPF54.65F25	..A	VPF54.65F35	..A
VPF54.80F35	..A	VPF54.80F45	..A
VPF54.100F70	..A	VPF54.100F90	..A
VPF54.125F110	..A	VPF54.125F135	..A
VPF54.150F150	..A	VPF54.150F200	..A
VPF43.200F210	..A	VPF43.200F280	..A



Issued by  
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Document ID    A6V14385544\_enAP\_b  
Edition        2023-12-29