

# PFA-lined Control Valve Series 1b

## Application:

PFA-lined globe valve for corrosive media, especially suitable for high requirements in chemical plants:

- Nominal sizes DN 25 to DN 100 and 1" to 4"
- Nominal pressure PN 10/16
- Temperatures up to 200°C

The control valve consists of a single-seated globe valve with PFA lining and either a pneumatic actuator or hand-operated actuator. The valve is designed according to the modular-assembly principle and has the following features:

- Streamlined valve body of spheroidal graphite iron EN-JS 1049 (GGG-40.3), as standard with 4-5 mm thick PFA-lining using transfer molding process.
- Exchangeable PTFE seat and PTFE plug.
- Stem sealed by a PTFE bellows and a backup, spring-loaded PTFE V-ring packing.
- Test connection for monitoring of the primary bellow seal.
- Exchangeable actuator.
- Additional equipment can be mounted according to DIN EN 60534 and NAMUR recommendations.
- Face-to-face dimensions for DIN version acc. to DIN EN 558-1, Series 1 (DIN 3202, Series F1).
- Face-to-face dimensions for ANSI version acc. to DIN EN 558-2, Series 37. (IEC 60534-3-1, Series 37).

## Versions:

The Series 1b Globe Valve is available optionally in the following versions:

- Samson pneumatic actuator (Fig. 1).
- Samson hand-operated actuator.
- Actuators of other manufacturers on request.

## Special versions:

- Lining made of special compounds, e.g. conductive PFA
- Flange with groove.
- We recommend our BR 1a Control Valves to meet special requirements.



Fig. 1 - Series 1b Globe Valve with Samson actuator

# Control Valve BR 1b

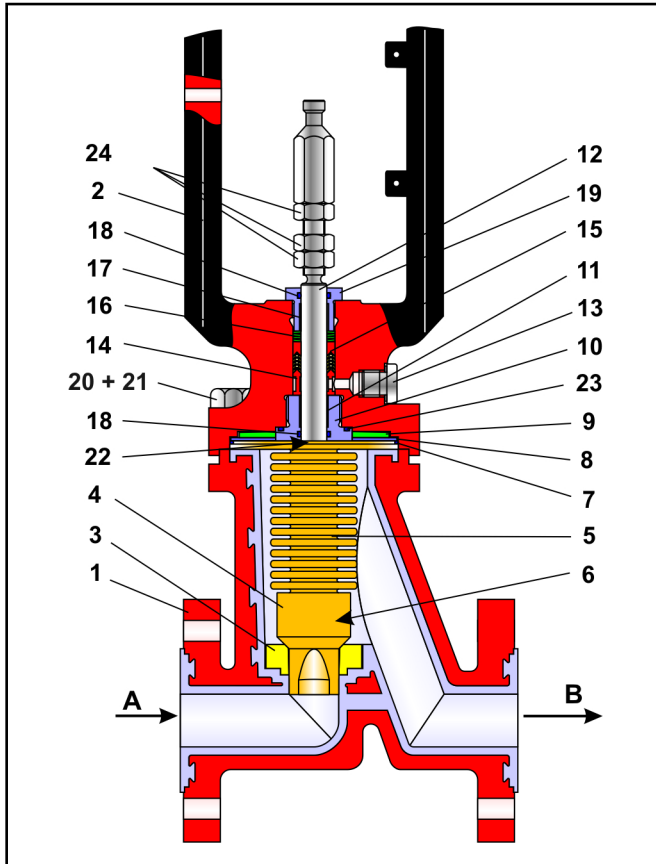


Fig. 2 – Sectional diagram of Series 1b Globe Valve

Item	Description	Item	Description
1	Valve body	13	Locking screw
2	Bonnet flange	14	Distance bushing
3	Seat	15	V-ring packing
4	Plug	16	Set of Belleville washers
5	Bellows	17	Bearing bushing
6	Cord	18	O-ring
7	O-ring	19	Stuffing box
8	Thrust washer	20	Hex bolt
9	Disc spring	21	Nut
10	Guide bushing	22	Retainer ring
11	Bushing	23	O-ring
12	Stem connector	24	Nut

Table 1 – List of parts

## Additional equipment and mounting parts:

The following accessories are optionally available for the valve separately or in combinations:

- Positioner
- Limit switches
- Solenoid valves
- Supply air pressure regulator/filter
- Pressure gauge mounting blocks

Other accessories possible according to specifications on request.

## Principle of operation:

The process medium flows through the Series 1b Globe Valve in the flow-to-open direction.

The valve plug position determines the cross-sectional area of flow between the plug ( 4 ) and seat ( 3 ). The plug is connected over the stem connector ( 12 ) to the actuator stem.

The PTFE bellows ( 5 ) seals the area between the valve body ( 1 ) and stem connector ( 12 ). The PTFE V-ring packing ( 15 ) is used as a backup stem sealing.

A test connection port ( 13 ) allows the bellows to be monitored for leakage, e.g. by connecting a suction line or inert gas line.

The plug ( 4 ) is easily exchanged thanks to its tongue and groove connection to the PTFE bellows which is secured by a strong silk cord ( 6 ).

With a suitable thread of plastic, the PTFE seat ( 3 ) is screwed into the valve body ( 1 )



**Note:** In the event that cavitation may occur, we recommend the use of a guided plug for differential pressures above 3 bar and differential pressure ratio  $p_2 < \Delta p$ .



**Note:** Before using the valve in hazardous areas, check whether this is possible according to ATEX 94/9/EC. by referring to the Operating Instructions <BA 01a>.



**Fail-safe position:** Depending on how the pneumatic actuator is mounted on the valve, the valve has two fail-safe positions which become effective when the air pressure in the actuator is relieved or when the supply air fails:

## Control valve with actuator “Spring closes”:

Upon air failure, the valve is closed. The valve opens when the signal pressure increases, acting against the force of the springs.

## Control valve with actuator “Spring opens”:

Upon air failure, the valve is opened. The valve closes when the signal pressure increases, acting against the force of the springs.

## Pressure-temperature diagram:

The range of application is determined by the pressure-temperature diagram. Process data and medium can affect the values in the diagram.

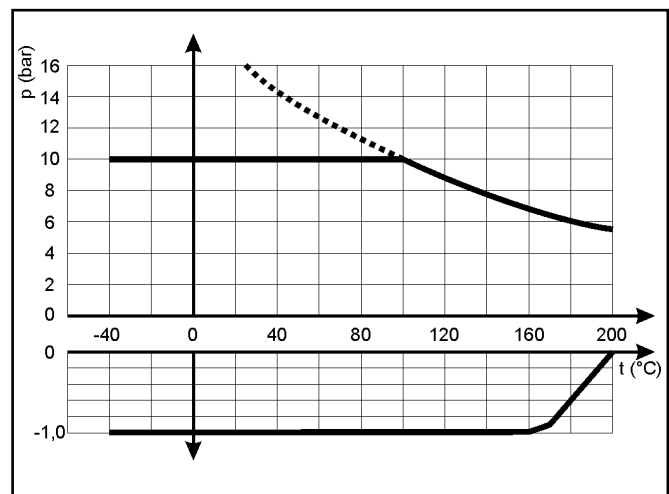


Fig. 3 – Pressure-temperature diagram

**Technical data:**

Nominal size	DN 25 to DN 100	1" to 4"
Nominal pressure	PN 10 / 16	PN 10 / 16 Flanges ANSI Class 150
Temperature range	See pressure-temperature diagram	
Characteristic	Equal percentage / linear	
Leakage rate	Leakage rate A acc. to DIN EN 12266-1, P12 Leakage rate 1 BO acc. to DIN 3230 Part 3	
Plug stem sealing	PTFE bellows with backup packing and test connection	
Rangeability	20 : 1 (to kvs 0,1) / 50 : 1 (from kvs 0,25)	
End connections	as per DIN EN 1092-2, Form B resp. ANSI 150 lbs	

Table 2 – Technical data

**Materials:**

Body	EN-JS 1049 ( ASTM A 395 ) with PFA - lining
Bonnet flange	EN-JS 1049 ( ASTM A 395 )
Valve plug, seat	PTFE <sup>1)</sup>
Bellow	PTFE
Plug stem	corrosion-resistant steel 1.4571
Packing	PTFE V-ring packing loaded by Belleville washers (1.8159)
Coating	2-Components-Pur-Varnish Colour: Black, RAL 9005

Table 3 – Materials

<sup>1)</sup> when seat diameter 2 mm, only tantalum or other metals

**z values depending on Kvs value and nominal size**

DN	25 1"		40 1 1/2"	50 2"	80 3"	100 4"		
	Acoustical valve coefficient z							
Seat- $\phi$ in mm	2	13	24	30	40	65	95	
Travel in mm	10 <sup>2)</sup>	15			30			
kvs	Cv							
0.005	0.006	0.85						
0.01	0.01							
0.025	0.03							
0.05	0.06							
0.1	0.12							
0.25	0.29		0.65					
0.63	0.74		0.65					
1.0	1.17							
1.6	1.9		0.6					
2.5	2.9							
4	4.7			0.55	0.55			
6.3	7.4			0.45	0.5	0.5		
10	12			0.4	0.45	0.45		
16	19				0.4	0.4	0.45	
25	29					0.35	0.4	0.4
28	33					0.4		
40	47						0.35	0.35
63	74						0.3	0.3
80	94						0.25	0.25
100	117							0.25
125	146							0.2

Table 4 - Acoustical valve coefficient z in accordance with VDMA 24422

<sup>2)</sup> when seat diameter 2 mm, only linear characteristic line available.

**Terms for noise level calculation:**

according to VDMA 24422.  
z = acoustical valve coefficient

**Terms for control valve sizing:**

according to DIN EN 60534-2-1:  
**FL = 0.95      xT = 0.75**

**Correction terms:**

For gases and vapours:  $\Delta LG = 0$ ,  
For liquids:  $\Delta LF = 0$

**Permissible differential pressures  $\Delta p$ :**

Signal pressure range			0.2 - 1.0	0.3 - 1.1	0.4 - 1.2	0.4 - 2.0	0.6 - 3.0	0.2 - 1.0			
Required supply pressure			1.3	1.4	1.4	2.3	3.3	1.2	1.4	1.6	
DN	Seat $\phi$ mm	Actuator cm <sup>2</sup>	$\Delta p$ with p <sub>2</sub> = 0								
25 / 1"	2	240	> 16	-	-	-	-	> 16	-	-	
	13	240	12	> 16	-	-	-	12	-	-	
	24	240	-	5	9	9	> 16	-	9	> 16	
350		4	11	> 16	> 16	-	4	> 16	-		
40 / 1 1/2"	30	240	-	-	5	5	11	-	5	11	
		350	-	6	10	10	> 16	-	10	> 16	
50 / 2"	40	240	-	-	-	-	5	-	-	5	
		350	-	-	5	5	10	-	5	10	
80 / 3"	65	700	-	-	4	4	8	-	4	8	
100 / 4"	95	700	-	-	-	-	3	-	-	3	

Table 5a - Valves with Samson spring closing actuator  
Valve with signal pressure 0 bar closed.

Table 5b - Valves with Samson actuator (spring opening)  
Valve with required signal pressure closed.

The shaded columns of the table show the standard values. The differential pressures in the white columns of table 5a apply to pre-loaded springs. The permissible differential pressures quoted are only valid for soft-sealing valves.

## Dimensions and weights:

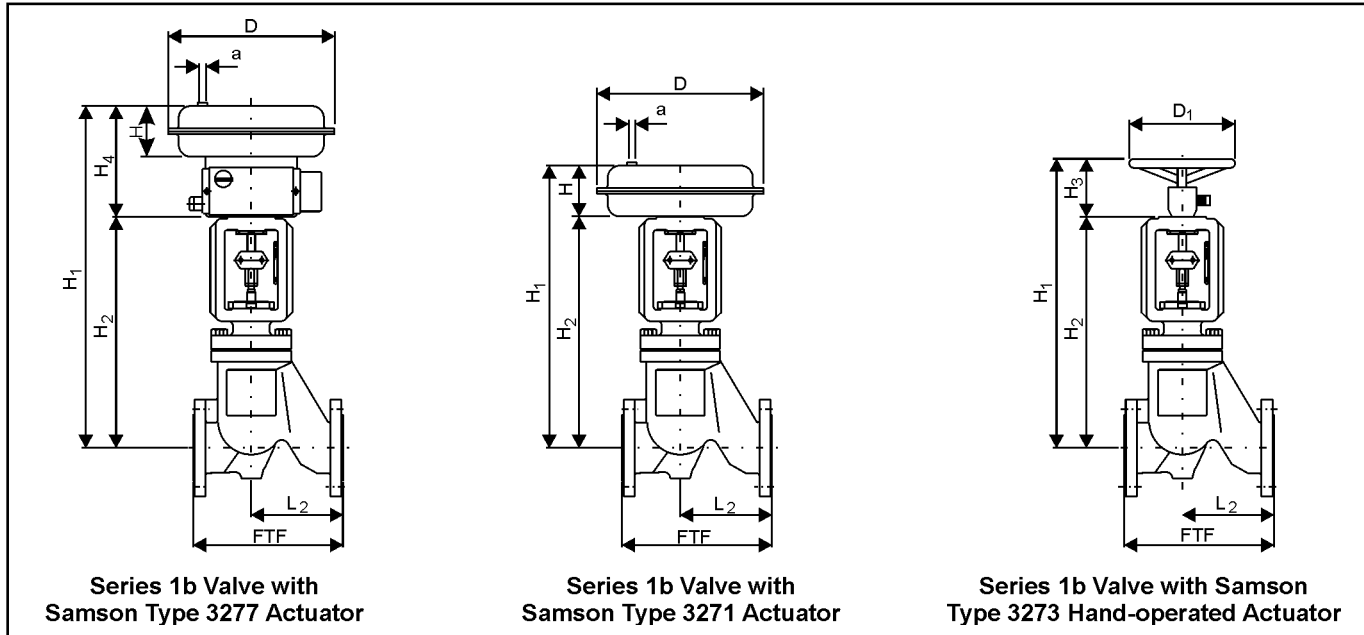


Fig. 5 – Dimensional drawing

DN	25 / 1"	40 / 1 1/2"	50 / 2"	80 / 3"	100 / 4"	
FTF	Basic series 1 (DIN)	160	200	230	310	350
	Basic series 37 (ANSI)	184	222	254	298	352
L2	96	121	146	190	239	
H1	Samson Type 3271	H2 + H				
	Samson Type 3277	H2 + H4				
	Samson Type 3273	H2 + H3				
H2	358	369	383.5	544	582	
H4	240 cm <sup>2</sup>	161	161	161		
	350 cm <sup>2</sup>		186	186		
	700 cm <sup>2</sup>				236	236
Weight of the valve in kg	11.5	18	21.5	40	57	
Diaphragm area in cm <sup>2</sup>	240		350	700		
D	240		280	390		
H	65		85	135		
a	G 1/4"		G 3/8"			
Weight of Type 3271	5		8	22		
Weight of Type 3277	9		12	26		
D1	180	180	180	250	250	
H3	92	92	92	92	92	
Weight of Type 3273	2	2	2	2.5	2.5	

Table 6 – Dimensions in mm and weights in kg

### Selection and sizing of the control valve:

1. Calculate the appropriate Kvs according to DIN EN 60534-2-1
2. Select valve size and Kvs acc. to Table 4.
3. Determine the differential pressure and select the suitable actuator acc. to Table 5a and 5b.
4. Check the application against the pressure-temperature diagram.
5. Select additional equipment.

### Ordering text:

Series 1b valve,  
 DN....., PN....., Kvs.....,  
 Body: ENJS 1049/PFA, Flange type....  
 Characteristic: Equal percentage/linear  
 Special design  
 Actuator: Samson Type ....., .....cm<sup>2</sup>. Signal pressure.....bar,  
 Mounting of positioner, limit switch, and/or a solenoid valve.



**Note:** All relevant details regarding the version ordered, which deviate from the specified version in this technical description data, can be taken if required, from the corresponding order confirm.

Please contact our technical sales team for your special requirements

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