



BR 01a · PTFE-lined Globe Control Valve

Single-seated Globe Valve · DIN- and ANSI-Version



Application

PTFE-lined control valve for corrosive media, particularly for severe requirements in chemical applications:

- **Nominal size DN 25 to 150 and NPS1 to 6**
- **Nominal pressure PN 10 and 16 or cl150**
- **Temperatures -10 (-40) to 200°C**

The control valve consists of a single-seated globe valve with PTFE- lining and either a pneumatic actuator or hand-operated actuator. The control valve with its modular design has the following features:

- Streamlined valve body made of spheroidal graphite iron (EN-JS 1049/A395) with 5-8 mm thick PTFE lining
- Exchangeable PTFE seat and PTFE plug
- Stem sealed by a PTFE bellows seal and a backup packing
- Test connection for monitoring of the PTFE bellows seal
- Exchangeable actuator
- Additional equipment can be mounted according to IEC 60534 and NAMUR Recommendation
- Face-to-face dimensions according to DIN EN 558, basic series 1 and 37 (NPS1 to 4)

Versions

The BR 01a Control valve is available optionally in the following versions:

- With SAMSON pneumatic actuator
- With hand-operated actuator
- With actuators of other manufacturers on request

Special designs

- Heating of the valve body with heating jacket
- Lining made of special compounds, e.g. conductive PTFE
- Valve plug and seat made of special material (e.g. HC4, tantalum, titanium, aluminium oxide) for erosive media
- Bellows and plug stem made of special material (e.g. Hastelloy)
- Other components made of special material
- Version for process media with intense permeation
- Version for process media that crystallize out
- Version for -40°C

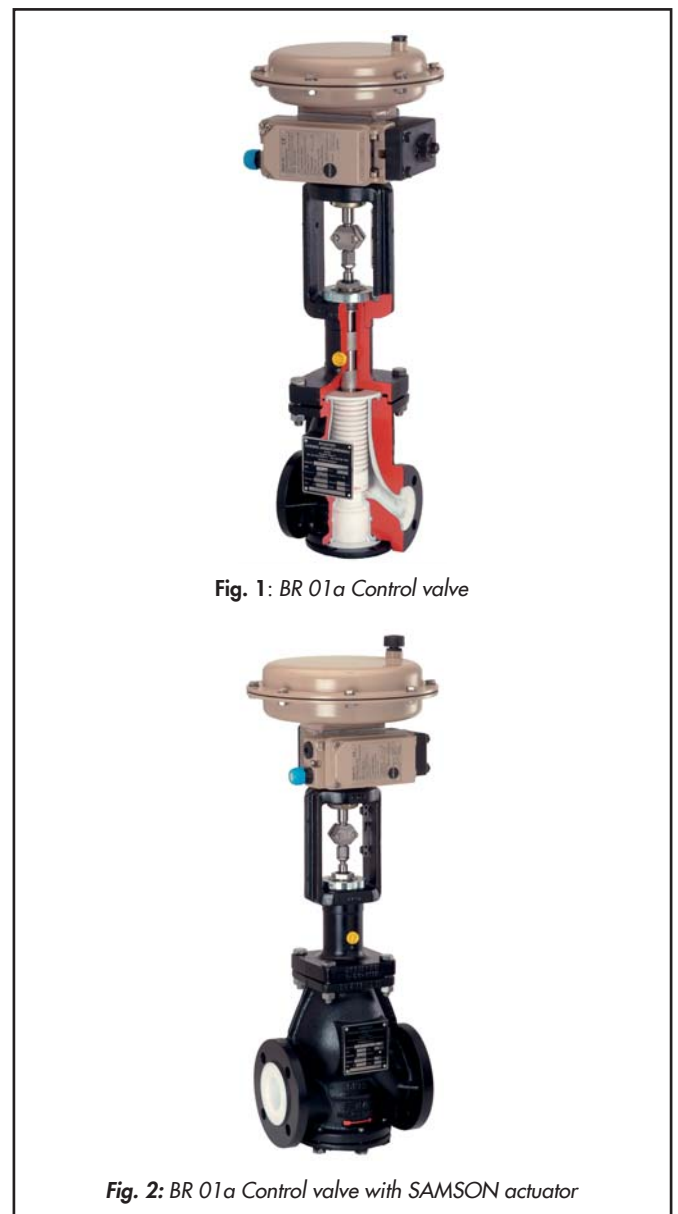


Fig. 1: BR 01a Control valve

Fig. 2: BR 01a Control valve with SAMSON actuator

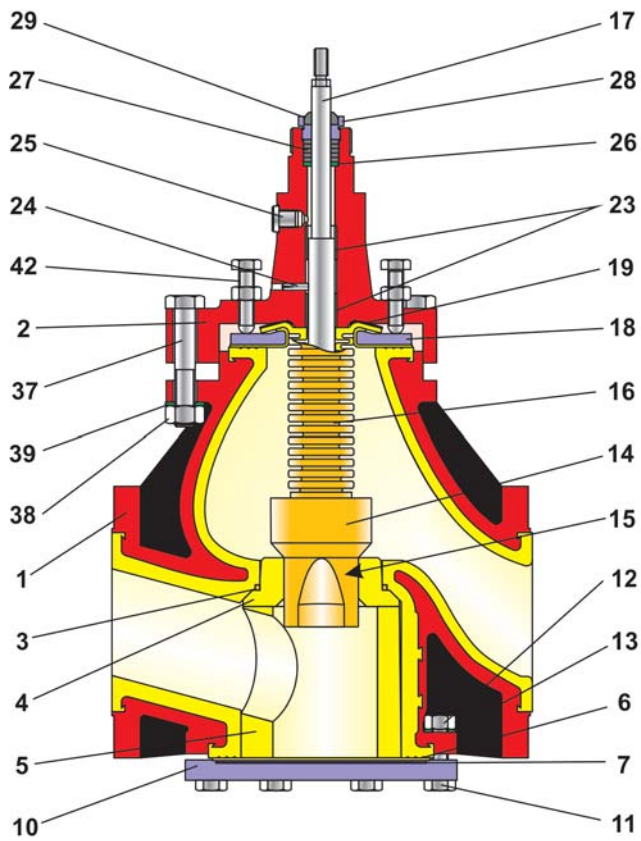


Fig. 3: Sectional diagram through a DIN control valve (DN 80 and larger)

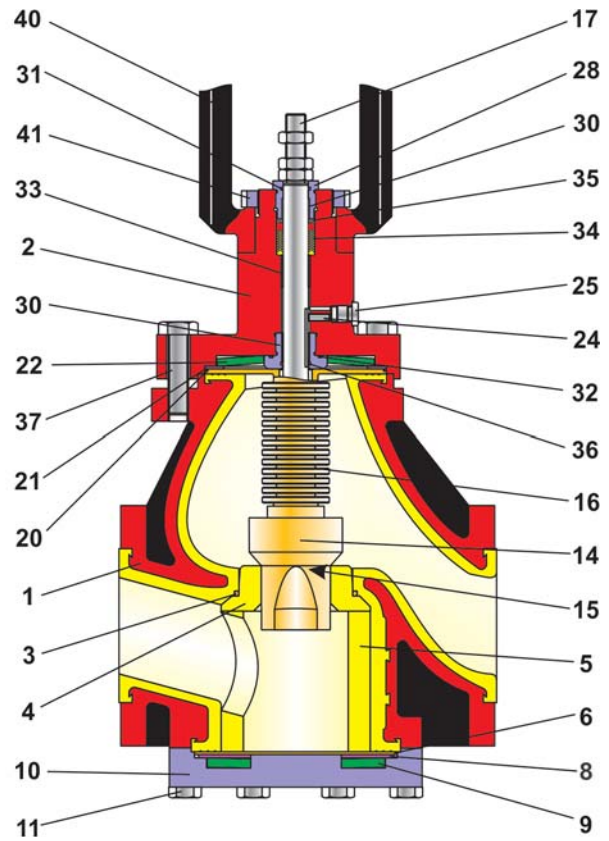


Fig. 4: Sectional diagram through an ANSI control valve (up to NPS 3)

Table 1: List of parts

Item	Description
1	Valve body
2	Bonnet flange
3	O-ring
4	Seat
5	Spacer
6	Washer
7	Washer
8	Washer
9	Spring washer
10	Bottom flange
11	Screw
12	Nut
13	Spring washer
14	Plug
15	Cord
16	Bellows
17	Stem
18	Bordered flange
19	Washer
20	O-ring
21	Thrust washer

Item	Description
22	Spring washer
23	Buchse
24	Grooved pin
25	Locking screw
26	Washer
27	Packing
28	Stuffing box
29	Wiper ring
30	Bearing bushing
31	O-ring
32	Guide bushing
33	Bushing
34	V-ring packing
35	Set of spring washers
36	O-ring
37	Screw
38	Nut
39	Spring washer
40	Yoke
41	Slotted nut
42	Screw

Principle of operation

The process medium flows through the globe valve in the flow-to-open direction. The valve plug position determines the cross-sectional area of flow between the seat (4) and the plug (14). The plug is connected over the stem (17) to the actuator stem.

The PTFE bellows (16) seals the area between the valve body (1) and stem (17).

The PTFE/graphite packing (27) is used as a backup stem sealing. A test connection port (25) allows the bellows seal (16) to be monitored for leakage, e.g. by connecting a suction line or inert gas line.

The plug (14) is easily exchanged thanks to its tongue and groove connection to the PTFE bellows which is secured by a strong PTFE cord (15).

The bottom flange (10) with elastomer washers (7), PTFE washer (6) and PTFE spacer (5) fix the exchangeable PTFE seat (4) in position.



NOTICE:

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



Note:

Before using the valve in hazardous areas, check whether this is possible according to **ATEX 2014/34/EU** by referring to the Operating Instructions <BA 01a>.

Fail-safe position

Depending on how the pneumatic actuator is mounted to 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:

- **Fail-close valve [STAF]**

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

- **Fail-open valve [STEF]**

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

Additional equipment and add-on pieces

For the control valves, the following accessories are available either individually or in combination:

- Positioner
- Limit switch
- Solenoid valves
- Supply air pressure regulator/filter
- Pressure gauge mounting blocks
- Pneumatic volume booster

Further accessories are available on request for customer specifications

Pressure-temperature diagram

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

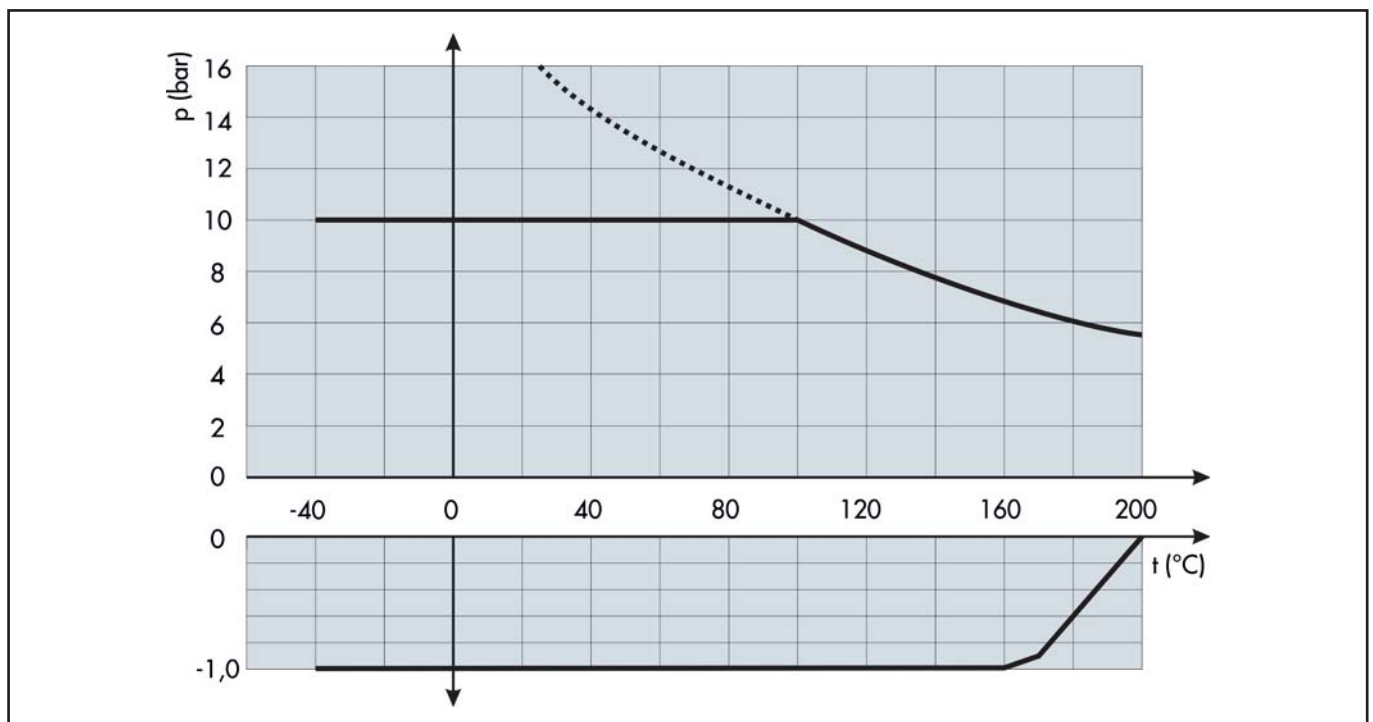


Fig. 5: Pressure-temperature diagram

Table 2: General technical data

Nominal size	DN 25 ... 150	NPS1 ... NPS4	NPS6
Nominal pressure	PN 10/16	cl150	cl150 (FTF 480 mm)
Temperature range	See pressure-temperature diagram		
Characteristic	Equal percentage / linear		
Leakage rate (soft seal)	Leakage rate A according to DIN EN 12266-1, P12 (leakage rate 1 BO according to DIN 3230 Part 3)		
Rangeability	20:1 (up to Kvs 0.1) / 50:1 (Kvs 0.25 and higher) / 30:1 (DN 80/NPS 3 and larger)		
End connections	DIN EN 1092-2, Form B	cl150	

Table 3: Materials

Nominal size	DN 25 ... 150	NPS1 ... NPS3	NPS4 ... NPS6
Valve body	EN-JS 1049 (GGG 40.3)	ASTM A395	
Lining	PTFE, optionally conductive PTFE		
Bottom flange	EN-JS 1049 (GGG 40.3) or 1.0460	ASTM A395 or ASTM A105	
Plug and seat	PTFE ¹⁾ , optionally special material		
Bellows	PTFE, optionally special material		
Retainer	PTFE		
Packing	PTFE/graphite packing	PTFE V-ring packing loaded by spring washers	PTFE/graphite packing
Stem	Corrosion-resistant steel 1.4571		
Connecting elements	A2-70	A193-B7	A193-B7 (A2-70)
Paint coating	Two-component polyurethane coat, grey beige, (RAL 1019)		

¹⁾ Tantalum or other metals only for 2 mm seat diameter

Dimensions and weights

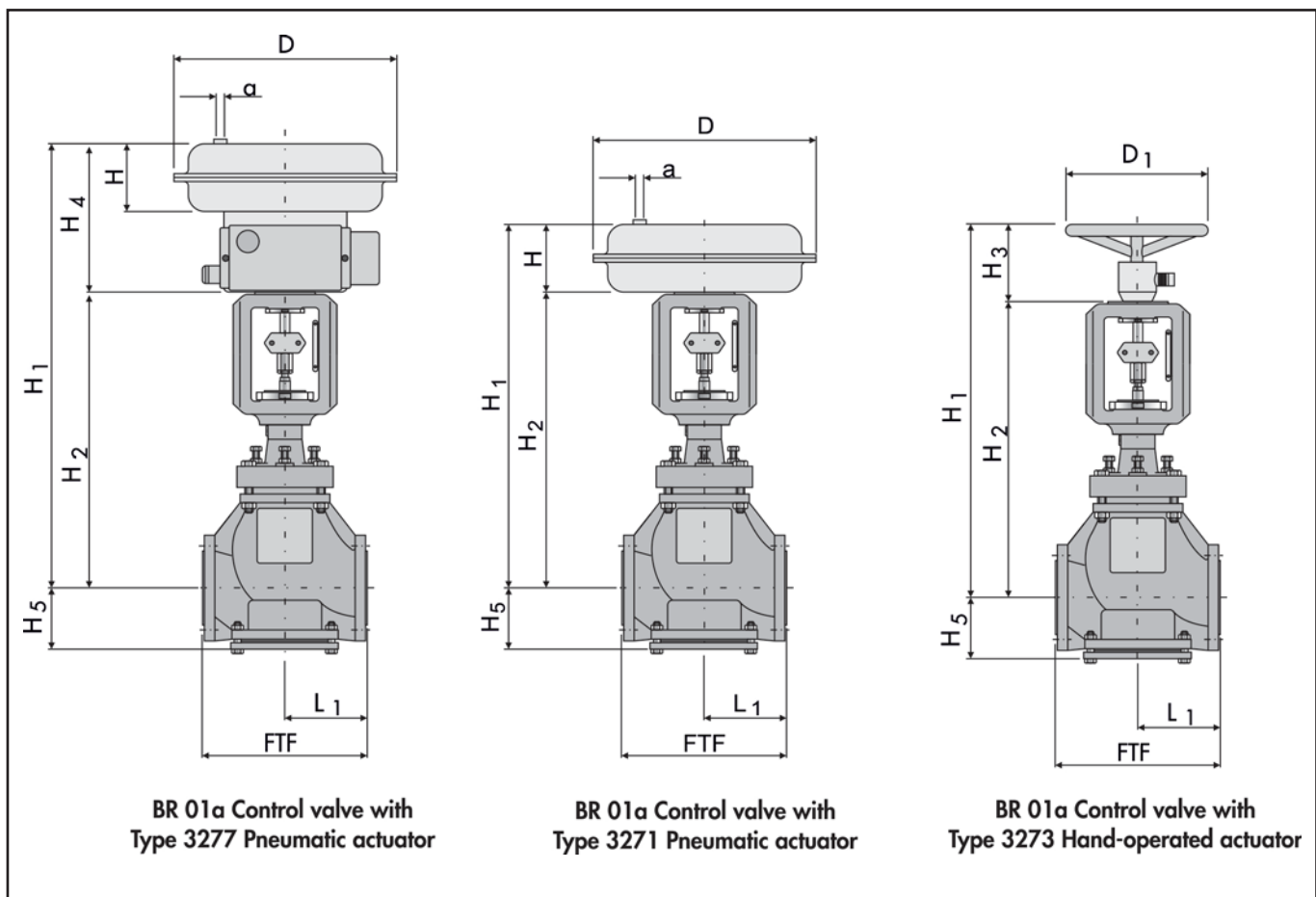


Fig. 6: Dimensional drawing

Table 4: Dimensions in mm and weights in kg

Nominal size		DN 25	DN 40	DN 50	DN 80	DN 100	DN 150
FTF	Basic series 1	160	200	230	310	350	480
L1	Basic series 1	80	100	115	155	179.5 / 170.5	240
H1	Samson Type 3271	H2 + H					
	Samson Type 3277	H2 + H4					
	Samson Type 3273	H2 + H3					
H2	Actuator 240 ... 700 cm ²	425	462	464	526	705	719
	Actuator 1400 cm ²					795	809
H5		60	77	84	117	139	201
Weight of valve in kg		14	18	21	45	85	145
Actuator	175v2 cm ²	•	•	•			
	240 cm ²	•	•	•			
	350 cm ²	•	•	•			
	700 cm ²				•	•	•
	750v2 cm ²			•	•	•	•
	1400 cm ²					•	•
D1		180	180	180	250	250	250
H3		110	110	110	115	115	115
Weight of Type 3273 in kg		2	2	2	2.5	2.5	2.5

Nominal size		NPS1	NPS1½	NPS2	NPS3	NPS4	NPS6
FTF	Basic series 37	184	222	254	298	352	480 ¹⁾
L1	Basic series 37	92	111	127	139.5 / 158.5	172.5	240
H1	Samson Type 3271	H2 + H					
	Samson Type 3277	H2 + H4					
	Samson Type 3273	H2 + H3					
H2	Actuator 240 ... 700 cm ²	366	405	403	535	488.5	719
	SteActuator 1400 cm ²					794.5	809
H5		72	82	95	128	147	201
Weight of the valve in kg		16	21	24	45	90	145
Actuator	175v2 cm ²	•	•	•			
	240 cm ²	•	•	•			
	350 cm ²	•	•	•			
	700 cm ²		•		•	•	•
	750v2 cm ²			•	•	•	•
	1400 cm ²					•	•
D1		180	180	180	250	250	250
H3		110	110	110	115	115	115
Weight of Type 3273 in kg		2	2	2	2.5	2.5	2.5

Pneumatic actuator in cm ²	175v2	240	350	700	750v2	1400
Diaphragm D	215	240	280	390	394	530
Height H	78	65	82	135	171	197
Height H4	179	166	183	236	272	-
Signal pressure connection a	G¼"			G¾"		
Weight of actuator Type 3271 in kg	6	5	8	22	36	70
Weight of actuator Type 3277 in kg	10	9	12	26	40	-

¹⁾ Face-to-face dimension according to DIN (basic series 1)

Table 5: Permissible differential pressures Δp

The permissible differential pressures specified apply to soft-seated valves only.

Signal pressure range				Fail-close valve								Fail-open valve ¹⁾							
				0.2 ... 1.0	0.4 ... 2.0	0.5 ... 2.5	0.6 ... 3.0	1.1 ... 2.4	1.3 ... 2.9	1.4 ... 2.3	2.1 ... 3.3	0.2 ... 1.0							
Supply pressure				Required supply pressure								Max. supply pressure							
				1.4	2.4	2.9	3.4	2.8	3.3	2.7	3.7	1.2	1.4	1.6					
DN	NPS	Seat \varnothing in mm	Actuator in cm ²	Δp when $p_2 = 0$															
25	1	2	175v2	16	16														
			240	16 ²⁾									16						
		6	175v2	16															
			240	16										16					
		13	175v2	3	16											16			
			240		16											16			
		24	175v2		4	7	10			16									
			240		9		16									9	16		
			350	4	16									4	16				
		40	1½	30	175v2		1	3	5		16								
					240		5		11							5	11		
					350		10		16							10	16		
50	2	38	175v2			1	2		11										
			240		3		6								6				
			350		5		11							5	11				
			750v2 ³⁾	5 ³⁾	16 ³⁾														
80	3	55	700		7		12							7	12				
			750v2			9				16									
80-100	3-4	65	700		4		8							4	8				
			750v2			6				16									
100	4	85	700				4									4			
			750v2							13									
			1400		5	7	10						10						
150	6	110	1400		4	6	8							10					
			700							7	10					3			
		120	1400			3				6					3	6			
			700								5	9					2		
			1400			3			5					3	5				

Table 5a - Valves with SAMSON actuator (fail-close)
Valve closed with 0 bar signal pressureTable 5b - Valves with SAMSON actuator (fail-open)
Valve closed when required signal pressure is applied¹⁾ The supply air must be restricted or an actuator with travel stop must be used.²⁾ Actuator with travel stop³⁾ At stroke 30 mm

Table 6: z values depending on K_{vs} coefficient, valve size and seat diameter

Nominal size		DN 25				DN 40	DN 50	DN 80	DN 100			DN 150			
		NPS1				NPS1½	NPS2	NPS3		NPS4			NPS6		
Seat-ø in mm ¹⁾		2	6	13	24	30	38	55	65	65	85	90	110	120	
kvs	Cv	Acoustical valve coefficient z													
0.005	0.006	0.85													
0.01	0.01														
0.025	0.029														
0.05	0.06														
0.1	0.12														
0.25	0.29		0.65	0.65											
0.63	0.74														
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				
35	41							0.35							
40	47								0.35		0.35			0.4	
63	74								0.3		0.3			0.35	
80	94									0.25	0.25			0.3	
100	117											0.25		0.3	
125	146											0.2			
150	175												0.2	0.2	
260	304													0.2	
300	351													0.2	

¹⁾ Linear characteristic only possible with 2 mm seat diameter

Table 7: kvs coefficient, travel and seat diameter of parabolic plugs and anti-cavitation plugs

Nominal size		DN 25				DN 40	DN 50	DN 80	DN 100			DN 150						
		NPS1				NPS1½	NPS2	NPS3		NPS4			NPS6					
Seat-ø in mm		2	6	13	24	30	38	40	55	65	65	85	90	110	120			
Travel in mm		10	15			30	15	30	15	30			50	60	30	50	30	50
kvs	Cv																	
0.005	0.006	P																
0.01	0.01																	
0.025	0.029																	
0.05	0.06																	
0.1	0.12	P	P															
0.16	0.16		P															
0.25	0.29																	
0.4	0.4																	
0.63	0.74		P	T														
1.0	1.17																	
1.6	1.9			P+T														
2.5	2.9																	
4	4.7			P	T	P+T												
6.3	7.4				P+T	P+T		P+T										
10	12				P+T	P+T		P+T		T ¹⁾								
16	19					P+T		P+T										
21	25						T											
25	29							P+T		T ¹⁾	P+T			T				
35	41								P+T									
40	47									P+T				P+T	T			
63	74									P+T				P+T	T			
80	94										P+T	P+T		P+T				
100	117									P	P	P+T	T	P+T	T			
125	146											P+T ²⁾	T					
150	175											P	T ²⁾	T ³⁾	P+T ²⁾		T	
260	304															P	T	
300	351															P ⁴⁾	T ⁴⁾	

P = Parabolic plug, T = Anti-cavitation plug

¹⁾ Version in ceramic or special metal

²⁾ Linear only

³⁾ Equal percentage only

⁴⁾ Contact PFEIFFER

Terms for control valve sizing

According to IEC 60534-2-1:

$$FL = 0.95 \quad xT = 0.75$$



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 confirmation.

Correction terms

For gases and vapors : $\Delta LG = 0,$

For liquids: $\Delta LF = 0$

Associated data sheets

- for Pneumatic actuator T8310-1 to T8310-3

Selection and sizing of the control valve

1. Calculate the appropriate Kvs coefficient according to IEC 60534
2. Select the valve size and Kvs coefficient from Table 7
3. Determine the differential pressure, select the appropriate actuator from Tables 5a and 5b.
4. Check the application based on the pressure-temperature diagram.
5. Additional equipment

Ordering text:

BR 01a Control Valve

Nominal size:

Nominal pressure:

Flow coefficient: kvs

Characteristic: equal percentage / linear

Body: EN-JS 1049/white PTFE

Flange design:

Special design:

Actuator: SAMSON Type cm²

Signal pressure range: bar

Fail-safe position:

Limit switch (brand name):

Solenoid valve (brand name):

Positioner (brand name):

Others: