

PTFE - lined 3 - Way Valve Series 1d

Application:

PTFE diverting valve for severly aggressive or corrosive media, especially for chemical processes:

- Nominal size DN 25 to DN 150 and DN 1" to DN 6",
- Nominal pressure PN 10/16,
- Temperatures to 200°C.

The 3-way control valve consists of a valve body with PTFE lining and a pneumatic gear operated actuator.

The valve is of modular construction and has the following features:

- Streamlined valve body of spheroidal iron EN-JS 1049 (GGG 40.3) with 5-8 mm thick liner in PTFE.
- Seat and plug exchangeable for various Kv values.
- Primary stem sealing by PTFE bellows. Secondary seal by additional safety packing.
- Test connection for monitoring of the bellows primary seal.
- Exchangeable actuator.
- Additional equipment can be added in acc. to DIN EN 60534 and Namur recommendations.
- For DIN-design Face to Face acc. to DIN EN 558-1, basic series 1 (acc. to DIN 3202, F1)
- For ANSI-design Face to Face acc. to DIN EN 558-2, basic series 37 (acc. to IEC 60534-3-1, basic series 37)

Versions:

The series 1d 3-Way Valve is available optionally in the following versions:

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

Special designs:

- Tracement: valve body with heating jacket.
- Lining made of special compounds, e.g. conductive PTFE.
- Valve plug and seat made of special materials (e.g. HC4, titanium, tantalum, aluminium oxide) for erosive media.
- Bellows and Plug stem made of special material (e.g. hastelloy).
- Further components made of special material.

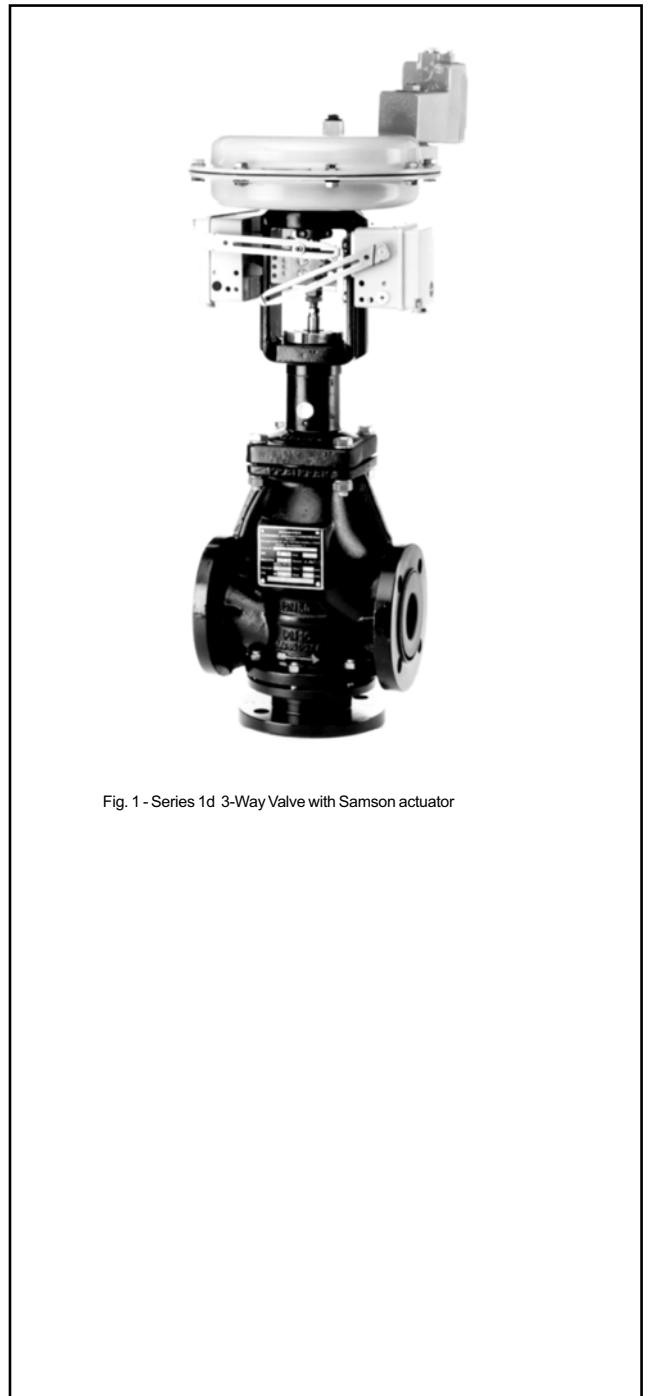


Fig. 1 - Series 1d 3-Way Valve with Samson actuator

3-Way Valve Series 1d

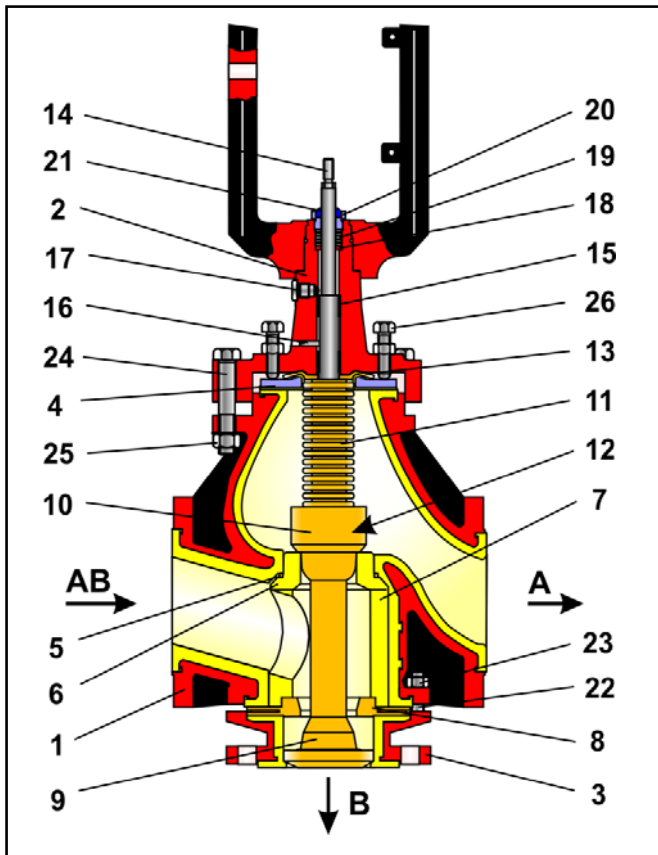


Fig. 2 – Sectional diagram of Series 1d 3-Way Valve

Item	Description	Item	Description
1	Valve body	14	Stem connector
2	Bonnet flange	15	Bearing
3	3-way body	16	Grooved pin
4	Bordered flange	17	Locking screw
5	O-ring	18	Washer
6	Seat	19	PTFE-graphite packing
7	Spacer	20	Stuffing box
8	Seat	21	Wiper ring
9	Plug head	22	Stud bold
10	Plug stem	23	Nut
11	Bellows	24	Screw
12	Cord	25	Nut
13	Washer	26	Screw

Table 1 – List of parts

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
- air sets
- gauge block

Further accessories are available on request for customer specifications.

Principle of operation:

The Series 1d 3-way valve is designed as a diverting valve.

The medium flows through the valve entry **AB**. The entry flow is splitted into two partial flows at port **A** and **B**.

The valve plug (9 and 10) positions determines the cross-sectional area of flow between each seat and plug pair (6 and 10; 8 and 9).

The plug stem (14) is connected to the actuator stem via the stem connector and tightly sealed by means of a PTFE-bellow (11), backed up by an additional carbon graphite safety packing (19).

A test connection port (17) allows monitoring of the bellow for leakage, e.g. by connecting a suction line or inert gas line.

The plugs (9 and 10) are easily accessed and exchanged due to the locking to the bellow assembly by means of a PTFE tongue (cord 12) and groove.

The body (3) and the PTFE spacer (7) carry both seats (6 and 8).



Note : In the event that cavitation may occur, we recommend the use of a guided plug for differential pressures over 3 bars 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/EG by referring to the Operating Instructions < BA 01d >.



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:

• Globe valve with actuator “ spring closes port A “:

Reducing air supply causes valve closing to port A through releasing the springs, respectively in case of air failure.

• Globe valve with actuator “ spring opens port A “:

Reducing air supply causes valve opening to port A through releasing the springs, respectively in case of air failure.

Pressure-temperature diagram:

The operating range is determined by the pressure-temperature diagram. Process data and media can influence the values of the diagram.

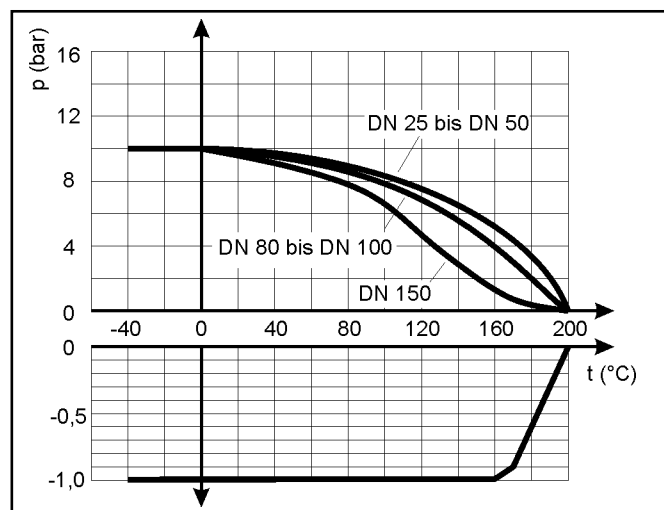


Fig. 3 - Pressure-temperature diagram

Technical data:

Nominal size	DN25 - DN150	DN 1" - DN 4"	DN 6"
Nominal pressure	PN 10 / 16	PN 10 / 16 flanges, face to face as per ANSI 150 lbs	PN 10 / 16 flanges as per ANSI 150 lbs
Temperature range	see pressure-temperature diagram		
Characteristic	linear		
Leakage rate	Leakage rate A acc. to DIN EN 12266-1, P12 (Leakage rate 1 BO acc. to DIN 3230 Part 3)		
Rangeability	30 : 1		
End connections	as per DIN EN 1092-2, Form B resp. ANSI 150 lbs		

Table 2 – Technical data

Materials:

Body	EN-JS 1049 (GGG40.3) with PTFE-lining
3-way body, Bonnet flange	EN-JS 1049 (GGG 40.3)
Valve plug, seat	depending of DN, PTFE or precious metal
Bellows	PTFE, optionally HC4
Spacer	PTFE
Packing	PTFE-graphite packing
Plug stem	corrosion-resistant steel 1.4571 optionally HC4
Coating	2-Components-Pur-Varnish Colour: Black, RAL 9005

Table 3 - Materials

z-values depending on kvs – value and nominal diameter:

DN	25 1"	40 1 1/2"	50 2"	80 3"	100 4"	150 6"		
Seat-ø in mm	24	30	38	55	65	85	110	120
Travel in mm	15		30			30 / 45		
kvs	Cv	Acoustical valve coefficient z						
4	4.7	0.55						
6.3	7.4	0.45	0.5	0.5				
10	12		0.45	0.45				
16	19			0.4	0.45			
25	29				0.4	0.4		
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	0.2
150	175							0.2
260	304							0.2

Table 4 – acoustically determined valve parameter "z" in accordance with VDMA 24422

Permissible differential pressures Δp:

Signal pressure range	0.2...1.0 (0.2..0.8)	0.3...1.1	0.4...1.2 (0.4..1.0)	0.4...2.0 (0.4..1.6)	0.6...3.0 (0.5..1.7)	0.2...1.0 (0.4..1.0)				
Required supply pressure	1.3	1.4	1.4	2.3	3.3	1.2	1.4	1.6		
DN	Seat ø mm	Actuator cm ²	Δ p with p2 = 0							
25 / 1"	24	240	-	3.5	-	7.6	15.8	-	7.6	15.8
		350	3.2	-	15.2	15.2	-	3.2	15.2	-
40 / 1 1/2"	30	240	-	1.1	-	3.9	9.3	-	3.9	9.3
		350	0.9	-	8.9	8.9	> 16	0.9	8.9	-
50 / 2"	38	240	-	-	-	1.5	4.9	-	1.5	4.9
		350	-	-	4.7	4.7	9.7	-	4.7	9.7
80 / 3"	55	700	1.2	-	5.2	5.2	-	1.2	5.2	-
80 - 100 3" - 4"	65	700	0.5	-	4.1	4.1	7.7	0.5	4.1	7.7
100 / 4"	85	700	-	-	1.9	1.9	4.0	-	1.9	4.0
150 / 6"	110	1400	(0.7)	-	(3.3)	(3.3)	(4.6)	(0.7)	(3.3)	(4.6)
		120	1400	(0.5)	-	(2.7)	(2.7)	(3.7)	(0.5)	(2.7)

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

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

Parameters for the calculation of noise:

in accordance with VDMA 24422z.
acoustically determined valve parameter.

Parameters:

For the calculation of flow in
accordance with DIN EN 60534-2-1:
FL = 0,95 xT = 0,75

Valve-specific correction terms:

For gases and vapours : ΔLG = 0,
For liquids: ΔLF = 0

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 values in brackets in the column "control pressure range" refer to the differential pressure values in brackets. The permissible differential pressures quoted are only valid for soft-sealing valves.

Dimensions and weights:

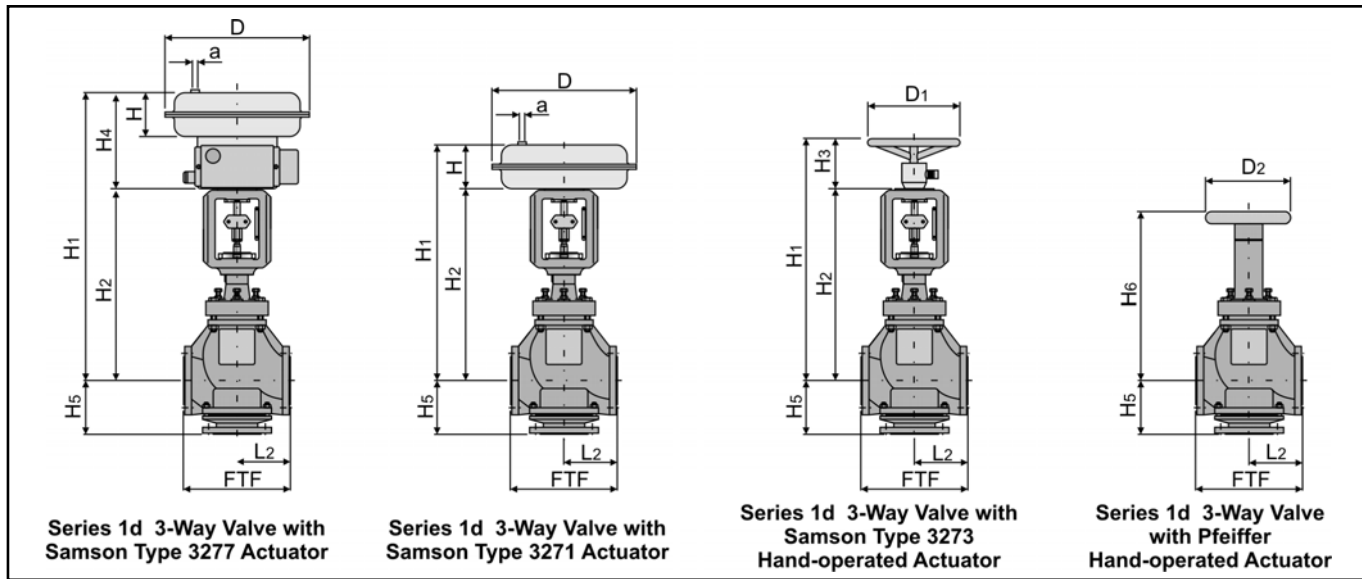


Fig. 4 – Dimensional drawing

DN	25 / 1"	40/11/2"	50 / 2"	80 / 3"	100/4"	150/6"	
FTF	Basic series 1 (DIN)	160	200	230	310	350	480
	Basic series 37 (ANSI)	184	222	254	298	352	480*
L2	Basic series 1 (DIN)	80	100	115	155	175	240
	Basic series 37 (ANSI)	92	111	127	149	175	240*
H2 + H							
H1	Samson Typ 3271	H2 + H4					
	Samson Typ 3277	H2 + H4					
H2 + H3							
H2	435	475	475	525	730	920	
H5	87	129	132,5	155		250	
Weight of valve in kg	16	20	24	49	91	155	
Actuator	240ccm	x	x	x			
	350ccm	x	x	x			
	700ccm			x	x	x	x
D1	180	180	180	250	250	250	
H3	110	110	110	115	115	115	
Weight of Type 3273	2	2	2	2,5	2,5	2,5	
D2	130	130	130	130	250	400	
H6	340	375	375	450	600	630	
Weight of Type Pfeiffer	1	1	1	1	7	10	

Actuator in ccm	240	350	700	1400
Diaphragm D	240	280	390	530
Height H	65	85	135	197
Height H4	166	186	236	-
Signal pressure connection a	G1/4"		G3/8"	
Weight of actuator Type 3271	5	8	22	70
Weight of actuator Type 3277	9	12	26	-

Table 6 – Dimensions in mm and weights in kg *) Face to Face dimension as per DIN

Selection and sizing of the control valve:

1. Calculation of the appropriate kvs-value in accordance with DIN EN 60534
2. Selection of DN and kvs-value in acc. with table 4.
3. Determination of the Δp occurring, selection of the appropriate actuator in acc. with tables 5a and 5b.
4. Checking the application in view of the pressure-temperature diagram.
5. Additional equipment

Order text:

Series 1d 3-Way Valve,
 DN, PN, kvs

Basic characteristic curve: only linear
 Body: EN-JS 1049 / PTFE-white, Flange design:

Special design:

Actuator: Samson Type, cm²,
 Control pressure range: bar,
 Connection of a positioner, a 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.

For your special requirements please contact our technical sales department.

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Values subject to change