

## Pneumatic Control Valve Type 3248-1 and 3248-7

## Cryogenic Valve Type 3248

## ANSI version

## Application

Globe or angle valve for cryogenic applications · Easy to service thanks to top-entry design

**Valve size** NPS 1 to NPS 6  
**Pressure rating** Class 150 to 600  
**Temperature range** -459 to 428 °F · -273 to 220 °C

The Type 3248 Cryogenic Valve is especially designed to meet the extreme requirements in cryo-engineering.

- Standard metal bellows to meet strict emission requirements
- Minimized heat leak thanks to the use of a metal bellows seal and a cryogenic extension bonnet
- Valve body available in globe or angle styles
- Installation in vacuum-insulated pipelines, air separation plants and peripheral plants made possible by a cover plate on the cryogenic extension bonnet
- Valve maintenance possible without removing it from the pipeline
- Top entry through the cryogenic extension bonnet allows easy access to the seat, plug and bellows after removal of the actuator
- The  $K_{VS}$  coefficients can be modified in wide ranges by replacing the seat and valve plug.

## Versions

**Standard version** · Temperature range from -320 to +428 °F (-196 to 220 °C) · Metal bellows and self-adjusting V-ring packing made of pure PTFE or PTFE/carbon

- **Type 3248-1** · With Type 3271 Pneumatic Actuator with 240 to 700 cm<sup>2</sup> effective diaphragm area (refer to T 8310-1 EN)
- **Type 3248-7** (Figs. 1 and 2) · With Type 3277 Pneumatic Actuator with 240 to 700 cm<sup>2</sup> effective diaphragm area and for integral positioner attachment (refer to T 8310-1 EN)

## Further versions

- Temperature range from -320 down to -459 °F (-196 down to -273 °C)
- Free of oil and grease for oxygen service
- High-purity version
- Pipe jacketing for installation in vacuum-insulated plant components
- Welding-neck ends · On request
- Valve sizes NPS 4 and NPS 6 in Class 300 with 1400 cm<sup>2</sup> pneumatic actuator · On request
- Pneumatic actuator with additional handwheel
- Differential pressures for valves in Class 600 · On request
- Cryogenic valve conforming to DIN EN in DN 25 to 150 and PN 16 to 100 · Refer to Data Sheet T 8093 EN

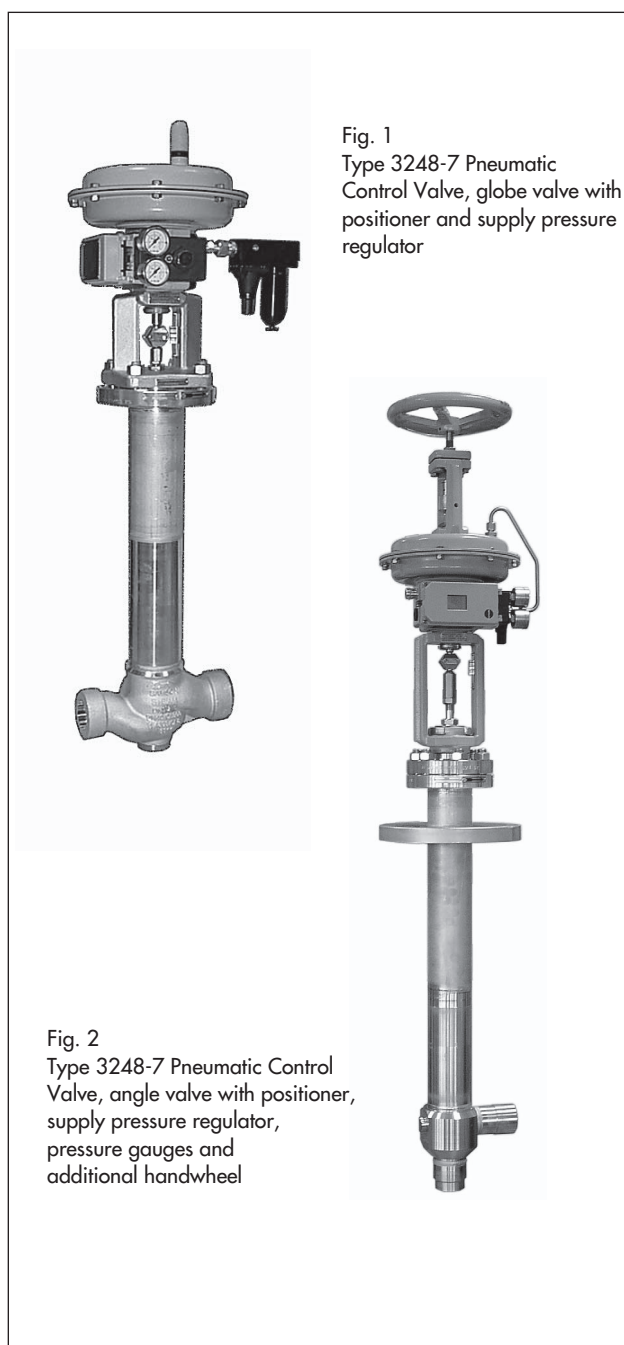


Fig. 1  
Type 3248-7 Pneumatic Control Valve, globe valve with positioner and supply pressure regulator

Fig. 2  
Type 3248-7 Pneumatic Control Valve, angle valve with positioner, supply pressure regulator, pressure gauges and additional handwheel

### Principle of operation

The medium flows through the cryogenic valve in the direction indicated by the arrow. The position of the valve plug (3) in relation to the seat (2) determines the flow rate.

The metal bellows seal (6.3) guarantees that the medium has no direct contact with the V-ring packing (4.2). The packing to seal the stem is self-adjusting.

The stem seal can be checked at any time for leakage by removing the sealing plug at the leak-off connection (4.4).

### Installation

Any mounting position is possible. However, if the mounting position of the valve is inclined, the actuator and the valve must be supported. Avoid attaching the bracket or support in the area around bellows nut (refer to Mounting and Operating Instructions EB 8093 EN).

The medium must flow through the valve in the direction indicated by the arrow on the valve body.

### Fail-safe position

Depending on how the compression springs are arranged in the actuator (refer to Data Sheet T 8310-1 EN for details), the control valve has two fail-safe positions that become effective when the air supply fails:

#### Actuator stem extends (FA)

When the air supply fails, the spring forces move the stem downwards causing the valve to close.

#### Actuator stem retracts (FE)

When the air supply fails, the spring forces move the stem upwards causing the valve to open.

### Legend to Fig. 4

- 1 Valve body
- 1.1 Cryogenic extension bonnet
- 2 Seat
- 3 Plug
- 4.2 V-ring packing
- 4.4 Leak-off connection
- 5 Valve bonnet with yoke
- 6 Plug stem
- 6.3 Plug stem extension with metal bellows

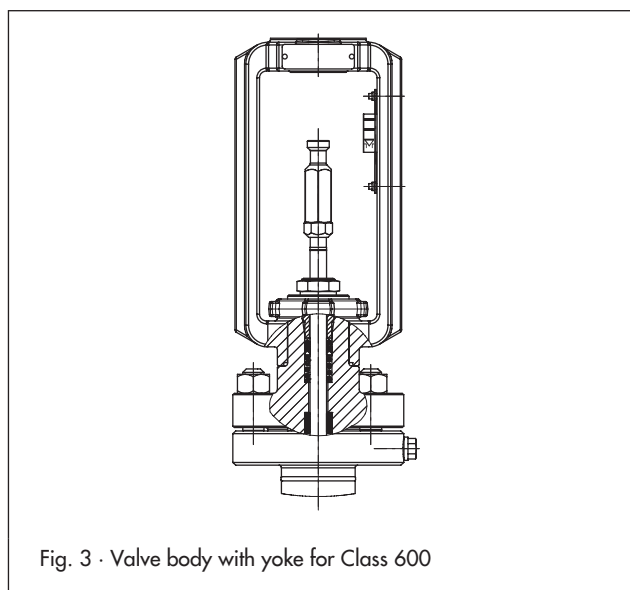


Fig. 3 · Valve body with yoke for Class 600

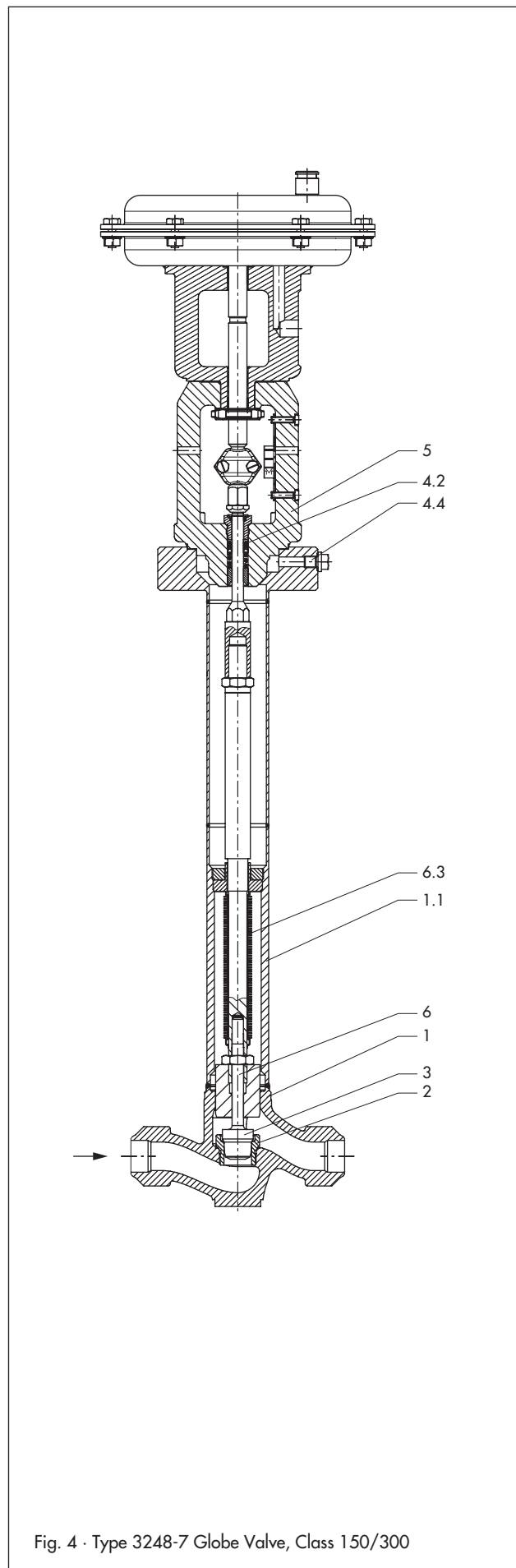


Fig. 4 · Type 3248-7 Globe Valve, Class 150/300

**Table 1 Technical data for Type 3248 Cryogenic Valve**

Version	ANSI			
	Globe valve		Angle valve	
Body style				
Valve size	NPS 1 to NPS 6	NPS 1 to NPS 4	NPS 1 to NPS 6	NPS 1 to NPS 4
Pressure rating	Class 150 to 300	Class 600	Class 150/300	Class 600
Type of connection	Socket weld ends NPS 1 to NPS 2 Butt weld ends ASME B16.25 NPS 3 to NPS 6		Welding-neck ends Edge preparation acc. to ASME B 16.25	
Seat/plug seal	Metal or soft sealing			
Characteristic	Equal percentage or linear			
Rangeability	50:1 up to NPS 2 · 30:1 for NPS 3 to NPS 6			
Temperature range	-321 to 428 °F (-196 to 220 °C) · Down to -459 °F (-273 °C) on request			
Leakage class, ANSI/FCI 70-2	Metal sealing: IV · Soft sealing: VI			

**Table 2 · Materials**

Valve	Globe valve	Angle valve
Valve body	A 351 CF8	316 Ti
Seat <sup>1)</sup>	CrNiMo steel	
Plug <sup>1)</sup>	Metal sealing	CrNiMo steel
	Soft sealing	Seal made of PTFE with glass fiber
V-ring packing	PTFE with carbon or pure PTFE	
Cryogenic extension bonnet, bellows, bushings, plug stem	CrNiMo steel	

<sup>1)</sup> Seats and plugs without soft sealing also available with Stellite hard facing · Plug up to seat bore 48 also available made of solid Stellite

**Table 3 · Flow coefficients (C<sub>V</sub> and K<sub>V</sub>)**

**Table 3a · Overview**

C <sub>V</sub>	0.12 to 0.3	0.5 to 1.2	2 to 5	7.5 to 12	20	30	47	70	95	75	120	190	300			
K <sub>V</sub>	0.1 to 0.25	1.4 to 1	1.6 to 4	6.3 to 10	16	25	40	60	80	63	100	160	260			
Seat	in	0.12"	0.24"	0.47"	0.945"	1.22"	1.5"	1.9"	2.48"	3.15"	2.48"	3.15"	3.94"	5.12"		
	mm	3	6	12	24	31	38	48	63	80	63	80	100	130		
Travel	in/mm										0.59" / 15 mm			1.18" / 30 mm		

**Table 3b · Nominal sizes and the associated flow coefficients (C<sub>V</sub>)**

C <sub>V</sub>	0.12	0.5	2	7.5	20	30	47	70	95	75	120	190	300	
	0.2	0.75	3	12										
	0.3	1.2	5											
Size														
NPS	mm													
1	25	•	•	•	•									
1½	40		•	•	•	•	•							
2	50		•	•	•	•	•	•						
3	80					•	•	•	•					
4	100									•	•	•		
6	150									•	•	•	•	

**Table 4 · Permissible differential pressures for valves up to ANSI Class 300**

The values stated are theoretical and are restricted by the pressure rating of the valve body. The specifications apply to a plug with metal sealing.

**Table 4a · Valves with fail-safe position "actuator stem extends"  
Valve closed at a supply pressure of 0 bar · All pressures in bar**

Bench range in bar and spring compression in %		0 %		-					
		12.5 %		0.3 to 1.1	0.6 to 2.2	0.9 to 3.3	-		
		25 %		0.4 to 1.2	0.8 to 2.4	1.2 to 3.6	1.4 to 2.3	2.1 to 3.3	2.6 to 4.3
		75 %		0.8 to 1.2	1.6 to 2.4	2.4 to 3.6	1.85 to 2.3	2.7 to 3.3	-
Required supply pressure				1.4	2.6	3.8	2.5	3.5	4.5
NPS	Cv	Act. cm <sup>2</sup>	Compression in %	$\Delta p$ when $p_2 = 0$ bar					
1	0.12 to 0.3	240	12.5	18.6	39.5	50	-		
1 2	0.5 to 1.2			18	38.9	50	-		
	2 to 5			16.8	37.7	48.5	-		
	7.5 to 12			10	24.5	39	-		
1½ 2	20	350	25	23.7	50	-	-		
		240	12.5	5.4	14.1	22.8	-		
1½ 2, 3	30	350	25	13.6	30.5	40	50	-	-
		240	12.5	3.2	9	14.8	-		
2 3	47	350	25	8.7	19.9	31.1	36.7	50	-
		240	12.5	1.7	5.3	8.9	-		
		700	75	26.2	50	-	-		
3	70	350	25	2.7	6.7	10.8	12.9	20	-
		700	75	14.9	31.2	40	36.3	50	-
	95	350	25	1.4	4	6.5	7.8	12.2	-
		700	75	9	19.2	29.3	22.3	33.1	-
4	70	700	25	6.7	14.9	23.1	27.1	40	50
	120			4	9	14.1	16.6	25.5	31.8
4, 6	190			2.4	5.6	8.9	10.5	16.2	20.2
6	300			1.3	3.2	5.1	6.1	9.4	11.8

**Table 4b · Valves with fail-safe position “actuator stem extends” · All pressures in psi**

Bench range in psi and compression in %				0 %		–					
				12.5 %		4 to 17	9 to 32	13 to 48	–		
				25 %		6 to 18	12 to 35	18 to 52	20 to 34	30 to 40	38 to 63
				75 %		12 to 18	23 to 35	34 to 52	26 to 34	39 to 50	–
Required supply pressure				21	38	55	38	55	66		
NPS	C <sub>v</sub>	Actuator cm <sup>2</sup>	Compression in %	Δp when p <sub>2</sub> = 0 psi							
1	0.12...0.3	240	12.5	273	580	735	–				
1 2	0.5 to 1.2			264	572	735	–				
	2 to 5			247	554	713	–				
	7.5 to 12			145	360	573	–				
1½ 2	20	350	25	348	735	–	–				
		240	12.5	79	207	335	–				
1½ 2, 3	30	350	25	200	448	588	735	–			
		240	12.5	47	132	217	–				
2 3	47	350	25	128	292	457	539	735	–		
		240	12.5	25	78	130	–				
		700	75	385	735	–	–				
3	70	350	25	39	98	158	189	294	–		
		700	75	219	458	588	533	735	–		
	95	350	25	20	58	95	114	179	–		
		700	75	132	282	430	327	486	–		
4	75	700	25	98	219	339	398	588	735		
	120			59	132	207	244	375	467		
4, 6	190			35	82	130	145	238	297		
6	300			19	47	75	89	138	173		

**Table 4c Valves with fail-safe position "actuator stem retracts" · Valve closed with required supply pressure**

The actuators with fail-safe action "actuator stem retracts" do not have compressed springs.

Bench range			Pressures in bar			Pressures in psi		
			0.2 to 1.0 bar (0.2 to 0.6 bar)			3 to 15 psi (3 to 9 psi)		
Required supply pressure			1.2 bar	2.4 bar	3 bar	18 psi	35 psi	44 psi
NPS	C <sub>v</sub>	Actuat. cm <sup>2</sup>	Δp when p <sub>2</sub> = 0 bar			Δp when p <sub>2</sub> = 0 psi		
1	0.12 to 0.3	240	11.7	50	–	172	735	–
1 2	0.5 to 1.2		11.1	50	–	163	735	–
	2 to 5		9.9	50	–	145	735	–
	7.5 to 12		5.2	50	–	76	735	–
1½ 2	20	350	9.6	50	–	141	735	–
		240	2.5	37.2	50	36	547	735
1½ 2, 3	30	350	5.2	50	–	76	735	–
		240	1.3	24.4	35.9	19	358	528
2 3	47	350	3.1	36.7	50	45	539	735
		240	0.5	14.9	22.2	7	219	326
		350	1.6	22.7	33.2	23	333	488
3	70	700	(5.1)	(50)	–	(75)	(735)	–
		350	0.6	12.9	19	8.8	189	279
	95	700	(2.7)	(27.1)	(50)	(39)	(398)	(735)
		350	0.2	7.8	11.6	2.9	114	170
4	70	700	(1.4)	(16.6)	(35)	(20)	(244)	(514)
		350	2.7	27.1	39.4	39	398	579
4, 6	120	700	1.4	16.6	24.2	20	244	355
			0.8	10.5	15.3	11	154	225
6	190	700	0.3	6.1	8.9	4.4	89	130
6	300	700						

**Table 5 · Dimensions and weights for Type 3248 Globe Valve****Table 5a · Type 3248 Globe Valve in stainless steel, short pattern, Class 150 to 300 (Fig. 5)**

Valve		NPS 1	NPS 1½	NPS 2	NPS 3	NPS 4	NPS 6
		Socket weld ends (SWE)			Butt weld ends (BWE, Schedule 10s)		
L	in/mm	7.75"/197	9.25"/235	10.50"/267	12.50"/318	14.50"/368	17.75"/451
H1	in/mm	29.75"/756	29.90"/760	29.90"/760	33.0"/838	32.45"/824	35.45"/900
H2	in/mm	1.75"/44	2.80"/71	2.80"/71	3.65"/93	4.37"/111	6.85"/174
H3	in/mm	19.70"/500	23.60"/600	23.60"/600	27.55"/700	31.50"/800	39.37"/1000
H5	in/mm	24.0"/610	24.0"/610	24.0"/610	24.0"/610	24.0"/610	27.0"/686
∅-C	in/mm	1.35"/34.5	1.95"/49.5	2.45"/62	-		
D	in/mm	0.5"/12.7	0.62"/15.8	0.70"/17.5			
Weight w/o actuator	kg	15.5	25.5	25.5	53	87	144

**Table 5b · Type 3248 Globe Valve in stainless steel, long pattern, Class 150 to 300 (Fig. 6)**

Valve		NPS 1	NPS 1½	NPS 2	NPS 3	NPS 4	NPS 6
		Socket weld ends (SWE)			Butt weld ends (BWE, Schedule 10s)		
L	in/mm	8.27"/210	9.88"/251	11.26"/286	13.27"/337	15.51"/394	20.0"/508
H1	in/mm	26.77"/680	26.93"/684	26.93"/684	30.0"/762	30.43"/773	35.43"/900
H2	in/mm	1.73"/44	2.80"/71	2.80"/71	3.66"/93	4.37"/111	6.85"/174
H3	in/mm	19.69"/500	23.62"/600	23.62"/600	27.56"/700	31.50"/800	39.37"/1000
H4	in/mm	17.36"/441	17.36"/441	17.36"/441	17.36"/441	17.36"/441	21.69"/551
H5	in/mm	21.0"/534	21.0"/534	21.0"/534	21.0"/534	22.0"/559	27.0"/686
∅-d <sup>1)</sup>	in/mm	9.84"/250	10.63"/270	10.63"/270	14.57"/370	16.93"/430	16.93"/430
∅-C	in/mm	1.33"/33.8	1.91"/48.6	2.41"/61.1	-		
D	in/mm	0.50"/12.7	0.50"/12.7	0.50"/12.7			
Weight w/o actuator	kg	15	25	25	52	85	144

<sup>1)</sup> The cover plate is prepared for mounting at angle of 25°, mounted loosely and not welded to the extension bonnet.  
Other angles for mounting the cover plate on request.

**Table 5c · Type 3248 Globe Valve in stainless steel, long pattern, Class 600 (Fig. 6)**

Valve		NPS 1	NPS 1½	NPS 2	NPS 3	NPS 4
		Socket weld ends (SWE)			Butt weld ends (BWE, Sched. 40s)	
L	in/mm	8.27"/210	9.88"/251	11.26"/286	13.27"/337	15.51"/394
H1	in/mm	32.36"/822	32.17"/817	32.17"/817	32.76"/832	38.74"/984
H2	in/mm	1.73"/44	2.80"/71	2.80"/71	3.66"/93	4.37"/111
H3	in/mm	19.69"/500	23.62"/600	23.62"/600	27.56"/700	31.50"/800
H4	mm	17.36"/441	17.36"/441	17.36"/441	17.36"/441	21.69"/551
H5	mm	21.0"/534	21.0"/534	21.0"/534	21.0"/534	27.0"/686
∅-d <sup>1)</sup>	mm	9.84"/250	10.63"/270	10.63"/270	14.57"/370	16.93"/430
∅-C	mm	1.33"/33.8	1.91"/48.6	2.41"/61.1	-	
D	mm	0.50"/12.7	0.50"/12.7	0.50"/12.7		
Weight w/o actuator	kg	17	30	30	59	106

<sup>1)</sup> The cover plate is prepared for mounting at angle of 25°, mounted loosely and not welded to the extension bonnet.  
Other angles for mounting the cover plate on request.

## Dimensional drawings

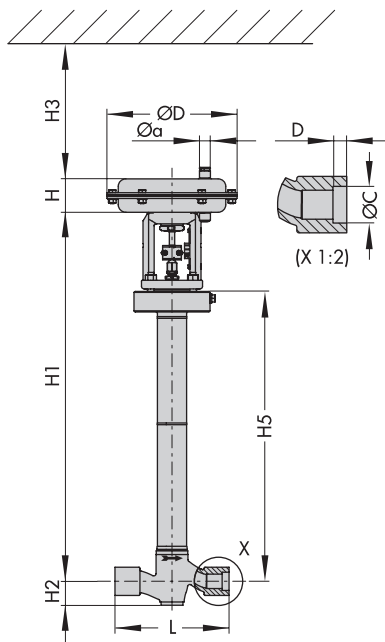


Fig. 5 · Type 3248-1 Globe Valve

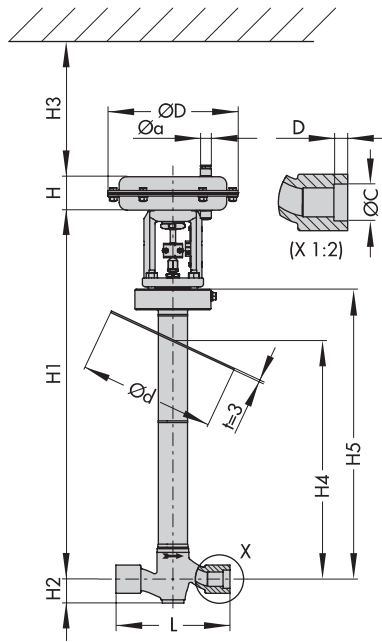


Fig. 6 · Type 3248-1 Globe Valve

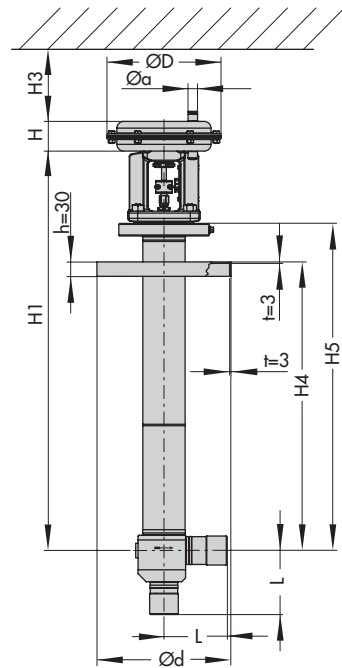


Fig. 7 · Type 3248-1 Angle Valve

**Table 6 · Dimensions and weights for Type 3248 Angle Valve**

**Table 6a · Type 3248 Angle Valve in stainless steel, ANSI Class 300 (Fig. 7)**

Valve		NPS 1	NPS 1½	NPS 2	NPS 3	NPS 4	NPS 6
L	in/mm	3.86"/98	5.24"/133	5.24"/133	6.26"/159	7.24"/184	9.29"/236
H1	in/mm	32.68"/830	32.68"/830	32.68"/830	39.33"/999	42.95"/1091	43.35"/1101
H3	in/mm	19.69"/500	23.62"/600	23.62"/600	27.56"/700	31.50"/800	39.37"/1000
H4	in/mm	23.62"/600	23.62"/600	23.62"/600	25.59"/650	29.53"/750	29.53"/750
H5	in/mm	26.93"/684	26.77"/680	26.77"/680	30.35"/771	34.53"/877	34.92"/887
Ø-d	in/mm	11.10"/282	11.10"/282	11.10"/282	11.10"/282	11.10"/282	11.10"/282
Welding-neck pipe connection - BWE		Schedule 10S	Schedule 10S	Schedule 10S	Schedule 10S	Schedule 10S	Schedule 10S
Weight w/o actuator	kg	16.5	27	27	57	98	127

**Table 6b · Type 3248 Angle Valve in stainless steel, ANSI Class 600 (Fig. 7)**

Valve		NPS 1	NPS 1½	NPS 2	NPS 3	NPS 4
L	in/mm	3.86"/98	5.24"/133	5.24"/133	6.26"/159	7.24"/184
H1	in/mm	31.42"/798	30.83"/783	30.83"/783	30.78"/781	36.56"/928.5
H3	in/mm	19.69"/500	23.62"/600	23.62"/600	27.56"/700	31.50"/800
H4	in/mm	15.75"/400	15.75"/400	15.75"/400	15.75"/400	16.69"/500
H5	in/mm	20.08"/510	19.69"/500	19.69"/500	19.04"/483.5	24.82"/630.5
Ø-d	in/mm	11.10"/282	11.10"/282	11.10"/282	11.10"/282	11.10"/282
Welding-neck pipe connection - BWE		Schedule 40S	Schedule 40S	Schedule 40S	Schedule 40S	Schedule 40S
Weight w/o actuator	kg	18	31	31	61	107

**Table 7 · Dimensions and weights in kg for Type 3271 and Type 3277 Pneumatic Actuators**

Actuator	cm <sup>2</sup>	240	350	700
Diaphragm Ø D	in/mm	9.45"/240	11.02"/280	15.35"/390
H in/mm (700 cm <sup>2</sup> and larger including lifting ring)	Type 3271	2.44"/62	3.23"/82	7.72"/196
	Type 3277	2.56"/65	3.35"/85	7.83"/199
With Type 3277 Actuator	Additional 3.98"/101 mm for yoke for integrated positioner attachment			
Thread to attach actuator	M30x1.5			
a (With Type 3271 or 3277 Actuator)	G ¼ (¼ NPT)		G ⅜ (⅜ NPT)	
a2 (With Type 3277 Actuator)	G ⅜			
<b>Weight in kg (without handwheel)</b>				
Type 3271	5		8	22
Type 3277	9		12	26

**Ordering text**

Valve Type 3248	Globe or angle style	Pneumatic Actuator	Type 3271 or Type 3277
Valve size	NPS ...	Effective diaphragm area	... cm <sup>2</sup>
Pressure rating	ANSI Class ...	Bench range	... bar or psi
Flow coefficient	Cv ...	Fail-safe position	Valve CLOSED or valve OPEN
Characteristic	Equal percentage or linear		
Body material	According to Table 2		
Connection	Welding ends or welding-neck ends acc. to Table 1		
	Pipe dimensions		
	Height		
	Cover plate		

Specifications subject to change without notice.



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