

T 8093-1 EN

Series 240 · Type 3248-1 and Type 3248-7 Pneumatic Control Valves

Type 3248 Cryogenic Valve

ANSI version



Application

Globe or angle valve for cryogenic applications. Easy to service due to top-entry design

Nominal size	NPS 1 to 6
Pressure rating	Class 150 to 600
Temperature range	-425 to +149 °F · -254 to +65 °C

Special features

The Type 3248 Cryogenic Valve is specially designed to meet the requirements of cryogenic applications.

- Standard metal bellows to meet strict emission requirements
- Minimized heat leakage thanks to the use of a bellows seal and a cryogenic extension bonnet
- Globe or angle-style valve body
- 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 C_v coefficients can be modified in wide ranges by replacing the seat and valve plug

Optional with RFID tags with unique identification according to DIN SPEC 91406.

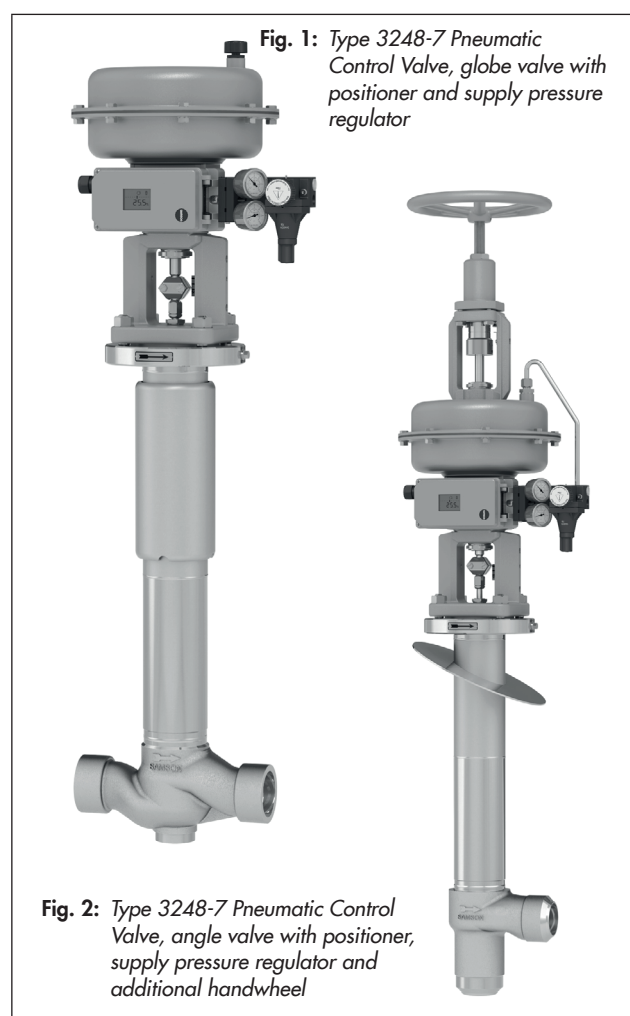
Versions

Standard version · Temperature range from -320 to +149 °F (-196 to +65 °C) · Stem sealed by metal bellows and self-adjusting V-ring packing made of pure PTFE or PTFE/carbon

- **Type 3248-1** · With Type 3271 Pneumatic Actuator, 175v2 to 2800 cm² effective diaphragm area
- **Type 3248-7** · With Type 3277 Pneumatic Actuator for integral positioner attachment, 175v2 to 750v2 cm² effective diaphragm area

Further versions:

- Temperature range from -320 to -425 °F (-196 to -254 °C)
- Temperatures above 149 °F (65 °C) · On request
- Free of oil and grease for oxygen service
- Version for ultrapure gas
- Pipe jacketing for installation in vacuum-insulated plant components



- Welding-neck ends on request
- Pneumatic actuator with additional handwheel
- Cryogenic valves according to DIN EN standard in DN 25 to 150, PN 16 to 100, see Data Sheet ► T 8093

Principle of operation

The medium flows through the cryogenic valve in the direction indicated by the arrow. The position of the valve plug (5) in relation to the seat (4) determines the flow rate. The metal bellows seal (37) guarantees that the medium has no direct contact with the V-ring packing (15). The packing to seal the stem to the atmosphere is self-adjusting. The stem seal can be checked at any time for leakage by removing the screw plug at the test connection (42).

Installation

We recommend mounting the valve at an angle between 15 and 25° to the horizontal plane. Contact SAMSON for smaller mounting angles as additional measures are required in this case. Avoid attaching the bracket or support in the area around bellows nut (41) (refer to the Mounting and Operating Instructions ► EB 8093-1).

The medium must flow through the valve in the direction indicated by the arrow on the valve body (1).

Fail-safe position

Depending on how the springs are arranged in the pneumatic actuator (see Data Sheet ► T8310-1), the valve has two different fail-safe positions that become effective when the supply air fails:

- **Actuator stem extends (FA):** when the air supply fails, the spring force moves the stem downward causing the valve to close.
- **Actuator stem retracts (FE):** when the air supply fails, the spring force moves the stem upwards causing the valve to open.

Differential pressures

Permissible differential pressures are listed in Information Sheet ► T 8000-4:

- Valves in Class 150 to 300 according to Tables 4.1 to 4.3
- Class 600 according to Tables 5.1 to 5.3

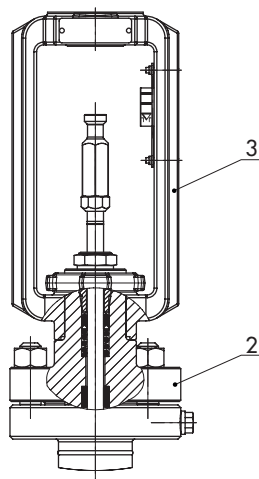
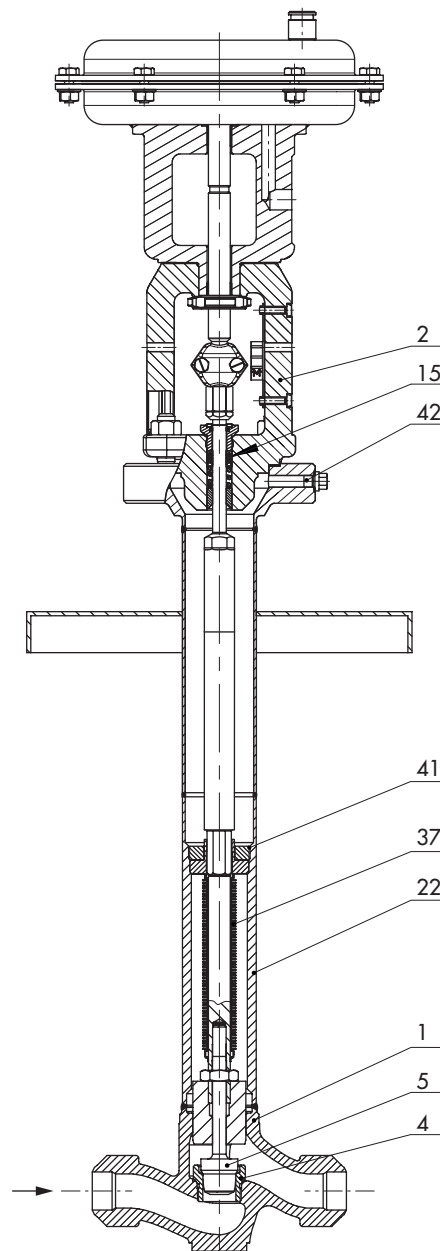


Fig. 3: Bonnet and yoke for Class 600



Legend for Fig. 3 and Fig. 4

- | | |
|----|------------------------------|
| 1 | Body |
| 2 | Bonnet |
| 3 | Yoke |
| 4 | Seat |
| 5 | Plug |
| 15 | V-ring packing |
| 22 | Bellows seal |
| 37 | Plug stem with metal bellows |
| 41 | Bellows nut |
| 42 | Test connection |

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

Table 1: Technical data for Type 3248 Cryogenic Valve

Version	ANSI		
Body style	Globe valve		Angle valve
Nominal size	NPS 1 to 6	NPS 1 to 6	NPS 1 to 6
Pressure rating	Class 150 to 300	Class 600	Class 150 to 600
Type of connection	Welding ends: Socket weld ends NPS 1 to 2 Welding ends: Butt weld ends ASME B16.25 for NPS 3 to 6		Welding ends: Butt weld ends ASME B16.25
Seat-plug seal	Metal seal · Soft seal · High-performance metal seal		
Characteristic	Equal percentage or linear		
Rangeability	50:1 up to NPS 2 · 30:1 for NPS 3 to 6		
Temperature range	-321 to +149 °F (-196 to +65 °C) · Up to -425 °F (-254 °C) on request		
	Permissible temperature range at the (optional) RFID tag: -40 to +185 °F (-40 to +85 °C)		
Leakage class according to ANSI/FCI 70-2	Metal seal: IV · Soft seal: VI · High-performance metal seal: V		
RFID tag (optional)	Application range according to the technical specifications and the explosion protection certificates. Documents ► www.samsongroup.com > Products > Electronic nameplate		
Conformity			

Table 2: Materials**Table 2.1:** Temperature range down to -321 °F (-196 °C)

Valve	Globe valve	Angle valve
Valve body	A351 CF8	
Seat ¹⁾	CrNiMo steel	
Plug ¹⁾	Metal seal	CrNiMo steel
	Soft seal	Seal ring made of PTFE with glass fiber
V-ring packing	PTFE with carbon or pure PTFE	
Cryogenic extension bonnet, metal bellows, bushings, plug stem	CrNiMo steel	

¹⁾ Seats and plugs without soft seal also with Stellite® facing · Plug up to seat bore 48 made of solid Stellite® available.

Table 2.2: Temperature range from -321 to -425 °F (-196 to -254 °C)

Valve	Globe valve	Angle valve
Valve body	316L	
Seat ¹⁾	CrNiMo steel	
Plug	Metal seal	CrNiMo steel
	Soft seal	PCTFE seal
V-ring packing	PTFE with carbon or pure PTFE	
Cryogenic extension bonnet, metal bellows, bushings, plug stem	CrNiMo steel	

¹⁾ Integrated seat on request

Table 3: C_v and K_{vs} coefficients**Table 3.1:** Overview

C_v		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_{vs}		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 Ø	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									1.18/30			

Table 3.2: Nominal sizes and associated C_v coefficients · Applicable to globe valves made of cast materials and angle valves made of cast or forged materials

C_v		0.12 0.2 0.3	0.5 0.75 1.2	2 3 5	7.5 12	20	30	47	70	95	75	120	190	300
NPS	DN													
1	25	•	•	•	•									
1½	40		•	•	•	•	•							
2	50		•	•	•	•	•	•						
3	80						•	•	•	•				
4	100										•	•	•	
6	150										•	•	•	•

Table 3.3: Nominal sizes and associated C_v coefficients · Applicable to globe valves made of forged materials

Seat bore		3	6	12	24	31	38	48	63	80	100	110 ¹⁾	130
NPS	DN	C_v coefficients											
1	25	0.12 0.2 0.3		2 3 5	7.5 10.5								
1½	40		0.5 0.75 1.2	2 3 5	7.5 12	20	26	35					
2	50			2 3 5	7.5 12	20	30	47					
3	80						30	47	70	95			
4	100								75	105	145		
6	150								75	120	190	235	255

¹⁾ No standard

Table 4: Dimensions and weights for Type 3248 Valve (globe-style body)**i Note**

Height H7 is the minimum clearance for service work. The actuator dimensions and the height H3 in Table 6.1 must also be observed. The largest value applies.

Height H1 and the specified weights are reference values. The exact dimensions and weights depend on various factors, e.g. actuator size and overall height.

Table 4.1: Type 3248 Globe Valve in stainless steel, short pattern, Class 150 to 300, without cover plate (Fig. 5)

Valve	NPS	1	1½	2	3	4	6
		Socket weld ends			Butt weld ends (Schedule 10s)		
L	in	7.75	9.25	10.50	12.50	14.50	17.75
	mm	197	235	267	318	368	451
H1	in	29.75	29.90	29.90	33.0	38.74	44.76
	mm	756	760	760	838	984	1137
H2	in	1.73	2.80	2.80	3.66	4.37	6.85
	mm	44	71	71	93	111	174
H5	in	24.0	24.0	24.0	24.0	30.31	36.34
	mm	610	610	610	610	770	923
H6	in	9.45	9.45	9.45	–	–	–
	mm	200	200	200	–	–	–
H7	in	41.34	35.43	35.43	35.43	43.31	43.31
	mm	1050	900	900	900	1100	1100
ØC	in	1.35	1.95	2.45	–	–	–
	mm	34.5	49.5	62	–	–	–
D	in	0.5	0.62	0.70	–	–	–
	mm	12.7	15.8	17.5	–	–	–
Weight ²⁾ without actuator	lbs	38	62	62	122	210	289
	kg	17	30	30	55	95	131

Table 4.2: Type 3248 Globe Valve in stainless steel, long pattern, Class 150 to 300, with cover plate (Fig. 6)

Valve	NPS	1	1½	2	3	4	6
		Socket weld ends			Butt weld ends (Schedule 10s)		
L	in	8.25	9.88	11.25	13.25	15.50	20.0
	mm	210	251	286	337	394	508
H	in	26.77	26.93	26.93	30.0	30.43	35.43
	mm	680	684	684	762	773	900
H2	in	1.73	2.80	2.80	3.66	4.37	6.85
	mm	44	71	71	93	111	174
H4	in	17.36	17.36	17.36	17.36	17.36	21.69
	mm	441	441	441	441	441	551
H5	in	21.0	21.0	21.0	21.0	22.0	27.0
	mm	534	534	534	534	559	686
H6	in	3.15	3.94	3.94	–	–	–
	mm	80	100	100	–	–	–
H7	in	41.34	35.43	35.43	35.43	43.31	43.31
	mm	1050	900	900	900	1100	1100
Ød ¹⁾	in	9.84	10.63	10.63	14.57	16.93	16.93
	mm	250	270	270	370	430	430
ØC	in	1.33	1.91	2.41	–	–	–
	mm	33.8	48.6	61.1	–	–	–
D	in	0.50	0.50	0.50	–	–	–
	mm	12.7	12.7	12.7	–	–	–
Weight ²⁾ without ac- tuator	lbs	38	62	62	122	210	289
	kg	17	30	30	55	95	131

Table 4.3: Deviating dimensions for the forged version of Type 3248 Globe Valve for temperatures down to –425 °F (–254 °C), Class 150 to 300

Valve	NPS	1	1½	2	3	4	6
L	in	8.25	9.88	11.25	13.25	15.50	20.0
	mm	210	251	286	337	394	508
H1	in	33.62	42.72	42.72	46.65	45.20	46.81
	mm	854	1085	1085	1185	1148	1189
H5	in	27.87	36.81	36.81	37.68	36.77	38.39
	mm	708	935	935	957	934	975

Table 4.4: Type 3248 Globe Valve in stainless steel, long pattern, Class 600, without cover plate (Fig. 5)

Valve	NPS	1	1½	2	3	4	6
		Socket weld ends			Butt weld ends (Schedule 10s)		
L	in	8.25	9.88	11.25	13.25	15.50	20.0
	mm	210	251	286	337	394	508
H1	in	35.31	35.2	35.2	35.71	42.03	58.43
	mm	897	894	894	907	1067.5	1484
H2	in	1.73	2.80	2.80	3.66	4.37	6.85
	mm	44	71	71	93	111	174
H3	in	35.43	23.62	23.62	27.56	31.50	39.37
	mm	900	600	600	700	800	1000
H5	in	24.0	24.0	24.0	24.0	30.31	36.34
	mm	610	610	610	610	770	923
H7	in	41.34	35.43	35.43	35.43	43.31	43.31
	mm	1050	900	900	900	1100	1100
ØC	in	1.35	1.95	2.45	–	–	–
	mm	34.5	49.5	62	–	–	–
D	in	0.5	0.62	0.70	–	–	–
	mm	12.7	15.8	17.5	–	–	–
Weight ²⁾ without actuator	lbs	42	78	78	177	239	419
	kg	19	35	35	80	108	190

Table 4.5: Type 3248 Globe Valve in stainless steel, long pattern, Class 600, with cover plate (Fig. 6)

Valve	NPS	1	1½	2	3	4	6
		Socket weld ends			Butt weld ends (Schedule 10s)		
L	in	8.25	9.88	11.25	13.25	15.50	20.0
	mm	210	251	286	337	394	508
H1	in	32.36	32.17	32.17	32.76	38.74	51.10
	mm	822	817	817	832	984	1298
H2	in	1.73	2.80	2.80	3.66	4.37	6.85
	mm	44	71	71	93	111	174
H3	in	35.43	23.62	23.62	27.56	31.50	39.37
	mm	900	600	600	700	800	1000
H4	in	17.36	17.36	17.36	17.36	21.69	23.62
	mm	441	441	441	441	551	600
H5	in	21.0	21.0	21.0	21.0	27.0	29.0
	mm	534	534	534	534	686	737
H7	in	41.34	35.43	35.43	35.43	43.31	43.31
	mm	1050	900	900	900	1100	1100
Ød ¹⁾	in	9.84	10.63	10.63	14.57	16.93	16.93
	mm	250	270	270	370	430	430
ØC	in	1.33	1.91	2.41	–	–	–
	mm	33.8	48.6	61.1	–	–	–
D	in	0.50	0.50	0.50	–	–	–
	mm	12.7	12.7	12.7	–	–	–
Weight ²⁾ without actuator	lbs	42	78	78	177	239	419
	kg	19	35	35	80	108	190

¹⁾ The cover plate is prepared for mounting at an angle of 25°, mounted unattached and not welded to the insulating section. Other angles for mounting the cover plate on request.

²⁾ The weights specified apply to a specific standard device configuration. Weights of other valve configurations may differ depending on the version (material, trim etc.).

Table 5: Dimensions in mm and weights in kg for Type 3248 Angle Valve**i Note**

Height H7 is the minimum clearance for service work. The actuator dimensions and the height H3 in Table 6.1 must also be observed. The largest value applies.

Height H1 and the specified weights are reference values. The exact dimensions and weights depend on various factors, e.g. actuator size and overall height.

Table 5.1: Type 3248 Angle Valve in stainless steel version, Class 300 (Fig. 7)

Valve	NPS	1	1½	2	3	4	6
L	in	3.86	5.25	5.25	6.25	7.25	9.31
	mm	98	133	133	159	184	236
H1	in	32.68	33.27	33.27	40.04	43.62	43.35
	mm	830	845	845	1017	1108	1101
H4	in	23.62	23.62	23.62	25.59	29.53	29.53
	mm	600	600	600	650	750	750
H5	in	26.93	27.36	27.36	31.02	35.16	34.92
	mm	684	695	695	788	893	887
H7	in	41.34	35.43	35.43	35.43	43.31	43.31
	mm	1050	900	900	900	1100	1100
Ød	in	11.10	11.10	11.10	11.10	11.10	11.10
	mm	282	282	282	282	282	282
Butt weld ends/pipe connection		SCH 10S	SCH 10S	SCH 10S	SCH 10S	SCH 10S	SCH 10S
Weight ¹⁾ without actuator	lbs	38	62	62	115	203	283
	kg	17	30	30	52	92	128

Table 5.2: Deviating dimensions for the forged version of Type 3248 Angle Valve for temperatures down to -425 °F (-254 °C), Class 300

Valve	NPS	1	1½	2	3	4	6
L	in	3.86	5.25	5.25	6.25	7.25	9.31
	mm	98	133	133	159	184	236
H1	in	32.68	41.38	41.38	44.70	42.99	43.35
	mm	830	1051	1051	1135.5	1092	1101
H5	in	26.93	35.47	35.47	35.69	34.53	34.92
	mm	684	901	901	906.5	877	887

Table 5.3: Type 3248 Angle Valve in stainless steel version, Class 600 (Fig. 7)

Valve	NPS	1	1½	2	3	4	6
L	in	3.86	5.25	5.25	6.25	7.25	9.31
	mm	98	133	133	159	184	236
H1	in	31.42	31.42	31.42	31.32	37.13	47.64
	mm	798	798	798	795.5	943	1210
H4	in	15.75	15.75	15.75	15.75	16.69	21.65
	mm	400	400	400	400	500	550
H5	in	20.08	20.28	20.28	19.61	25.39	25.55
	mm	510	515	515	498	645	649
H7	in	41.34	35.43	35.43	35.43	43.31	43.31
	mm	1050	900	900	900	1100	1100
Ød	in	11.10	11.10	11.10	11.10	11.10	11.10
	mm	282	282	282	282	282	282
Butt weld ends/pipe connection		SCH 40S	SCH 40S	SCH 40S	SCH 40S	SCH 40S	SCH 40S
Weight ¹⁾ without actuator	lbs	42	78	78	170	232	389
	kg	19	35	35	77	105	176

¹⁾ The weights specified apply to a specific standard device configuration. Weights of other valve configurations may differ depending on the version (material, trim etc.).

Dimensional drawings

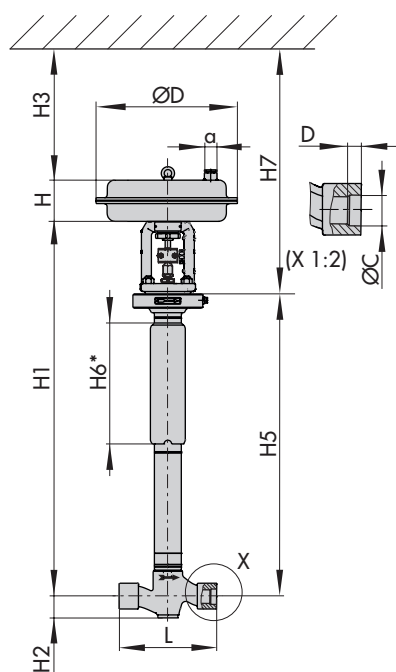


Fig. 5: Type 3248-1 Globe Valve

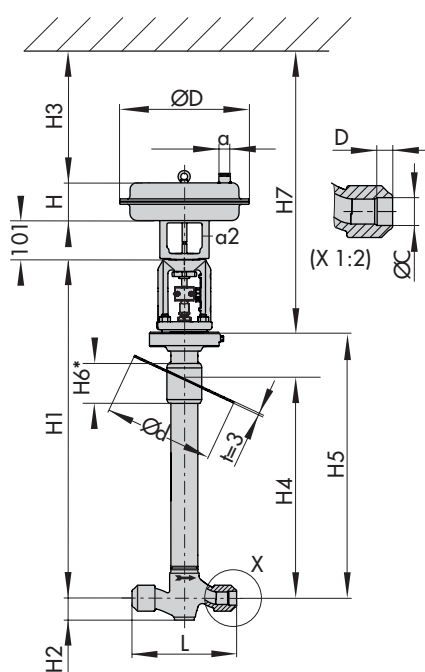


Fig. 6: Type 3248-7 Globe Valve

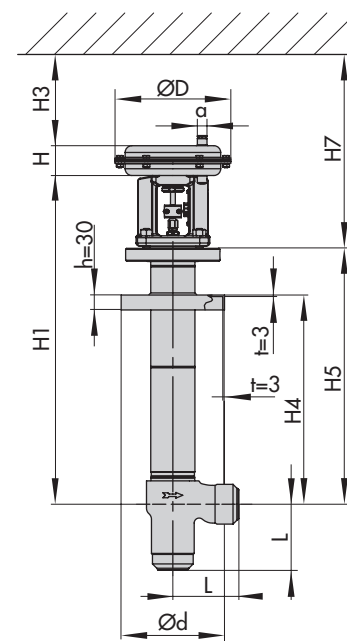


Fig. 7: Type 3248-1 Angle Valve

* H6 only in Class 150 to 300 and NPS 1 to 2

Table 6: Dimensions and weights for Type 3271 and Type 3277 Pneumatic Actuators**Table 6.1:** Dimensions in inches and mm

Actuator area		cm ²	175v2	350	350v2	355v2	750v2	1000	1400-60	1400-120	2800
Diaphragm ØD	in		8.46	11.02	11.02	11.02	15.51	18.19	20.87	21.02	30.32
	mm		215	280	280	280	394	462	530	534	770
H ¹⁾	Type 3271	in	3.07	3.23	3.62	5.16	9.29	15.87	13.27	23.54	28.07
		mm	78	82	92	131	236	403	337	598	713
	Type 3277	in	3.07	3.23	3.23	4.76	9.29	–	–	–	–
		mm	78	82	82	121	236	–	–	–	–
H3 ²⁾	in		4.33	4.33	4.33	4.33	7.48	24.02	24.02	25.59	25.59
	mm		110	110	110	110	190	610	610	650	650
H5	Type 3277	in	3.98	3.98	3.98	3.98	3.98	–	–	–	–
		mm	101	101	101	101	101	–	–	–	–
Thread	Type 3271		M30x1.5					M60x1.5		M100x2	
	Type 3277		M30x1.5					–	–	–	–
α	Type 3271		G ¼ (¼ NPT)	G ⅜ (⅜ NPT)	G ⅜ (⅜ NPT)	G ⅜ (⅜ NPT)	G ⅜ (⅜ NPT)	G ¾ (¾ NPT)	G ¾ (¾ NPT)	G 1 (1 NPT)	G 1 (1 NPT)
α2	Type 3277		G ⅜	G ⅜	G ⅜	G ⅜	G ⅜	–	–	–	–

¹⁾ Height including lifting eyelet or female thread and eyebolt according to DIN 580. Height of the swivel hoist may differ. Actuators up to 355v2 cm² without lifting eyelet or female thread

²⁾ Minimum clearance required to remove the actuator. Additionally observe H7 in Table 4 and Table 5. The largest value applies.

Table 6.2: Dimensions in lbs and kg (approx.)

Actuator area		cm ²	175v2	350	350v2	355v2	750v2	1000	1400-60	1400-120	2800
Weight ¹⁾	Type 3271	Without handwheel	lbs	13	18	26	33	79	176	154	992
			kg	6	8	11.5	15	36	80	70	450
		With handwheel	lbs	22	29	37	44	90	397	386	661 ²⁾ /937 ³⁾
			kg	10	13	16.5	20	41	180	175	300 ²⁾ /425 ³⁾
	Type 3277	Without handwheel	lbs	22	27	33	42	89	–	–	–
			kg	10	12	15	19	40	–	–	–
		With handwheel	lbs	31	38	44	53	100	–	–	–
			kg	14	17	20	24	45	–	–	–

¹⁾ The weights specified apply to a specific standard device configuration. Weights of other actuator configurations may differ depending on the version (material, number of actuator springs etc.).

²⁾ Side-mounted handwheel up to 80 mm travel

³⁾ Side-mounted handwheel above 80 mm travel

Table 7: Valve/actuator assignment**Table 7.1:** Class 150/300

Nominal valve size	Stem diameter	Actuator
NPS 1 to 2	0.39 in (10 mm)	175v2 to 750v2 cm ²
NPS 3	0.63 in (16 mm)	350 to 750v2 cm ²
NPS 4 to 6	0.63 in (16 mm)	350 to 1400-60 cm ²

Table 7.2: Class 600

Nominal valve size	Stem diameter	Actuator
NPS 1	0.47 in (12 mm)	175v2 to 750v2 cm ²
NPS 1½ to 3	0.63 in (16 mm)	350 to 1400-60 cm ²
NPS 4	0.63 in (16 mm)	350 to 1400-120 cm ²
NPS 6	1.58 in (40 mm)	1000 to 2800 cm ²

The following specifications are required on ordering:

Type 3248 Valve	Globe or angle valve
Nominal size	NPS ...
Pressure rating	Class ...
Flow coefficient	C _v ...
Characteristic	Equal percentage or linear
Body material	See Table 2
Connection	Welding ends according to Table 1, welding-neck ends on request Pipe dimensions Height Cover plate
Pneumatic actuator	Type 3271 or Type 3277
Actuator area	... cm ²
Bench range	... bar or psi
Fail-safe position	Fail-close or fail-open
RFID tag	Yes/No