

## 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

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



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 leak 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

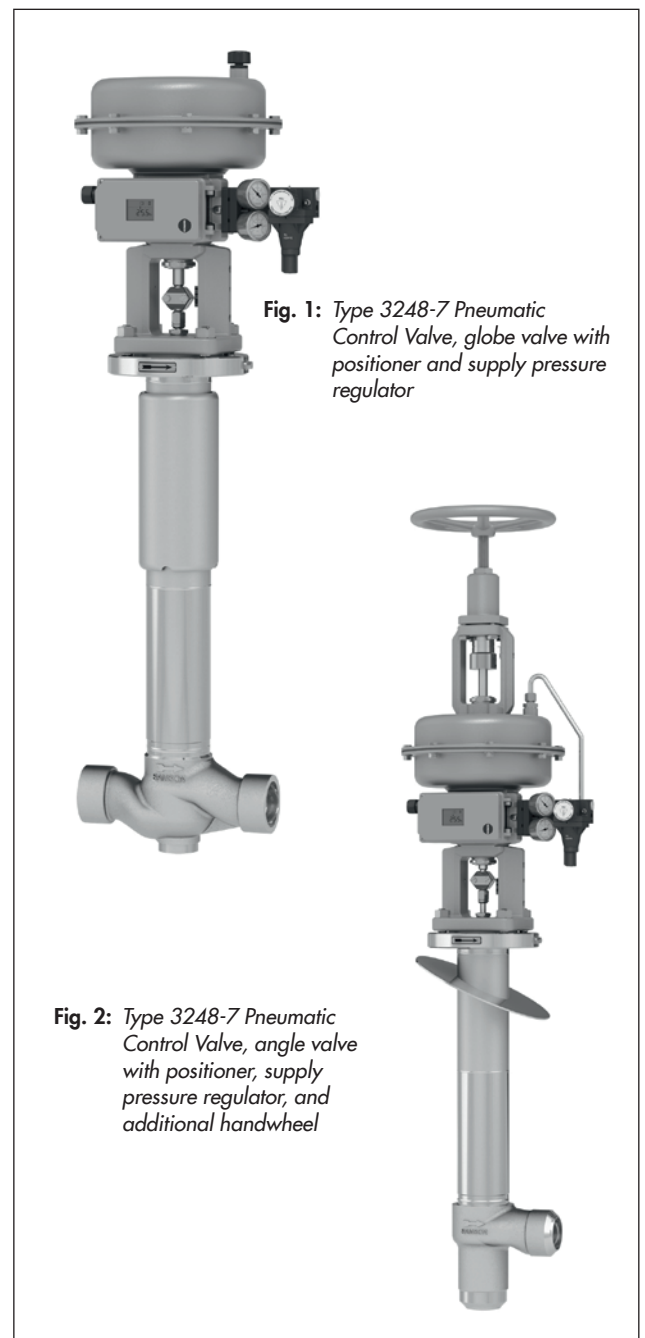
### Versions

**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 cm<sup>2</sup> effective diaphragm area
- **Type 3248-7** · With Type 3277 Pneumatic Actuator for integral positioner attachment, 175v2 to 750v2 cm<sup>2</sup> 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



Associated Information Sheets

T 8000-X

Edition December 2017

Associated Data Sheet  
for pneumatic actuators

T 8310-x

Data Sheet

T 8093-1 EN

## 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. Please 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).

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 ► T 8310-1), the valve has two different fail-safe positions effective upon air supply failure:

- **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

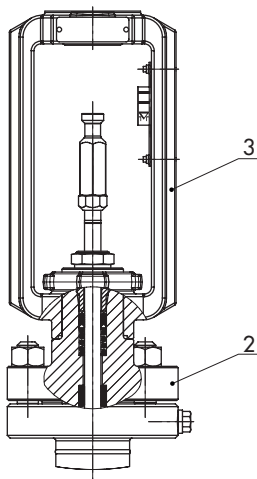
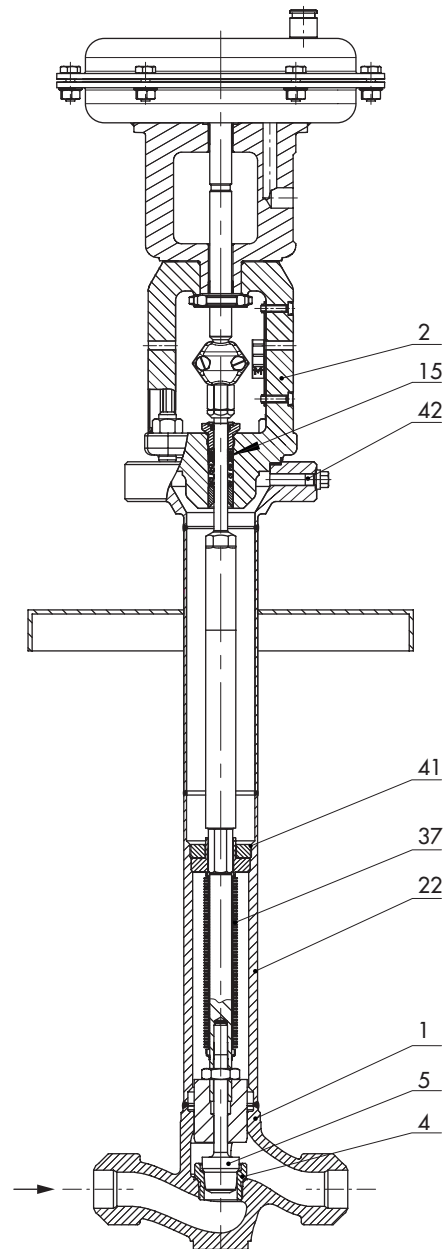


Fig. 3: Bonnet and yoke for Class 600



### 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 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

Implementation	ANSI		
	Globe valve		Angle valve
Body style			
Valve 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		
Leakage class according to ANSI/FCI 70-2	Metal seal: IV · Soft seal: VI · High-performance metal seal: V		
Compliance	CE · EAC		

**Table 2:** Materials

Valve	Globe valve	Angle valve
Valve body	A351 CF8	
Seat <sup>1)</sup>	CrNiMo steel	
Plug <sup>1)</sup>	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	

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

**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 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
Ø 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:** Valve sizes and associated  $C_v$  coefficients

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

**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 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
H1	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 <sup>1)</sup>	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 without actuator	lbs	38	62	62	122	210	289
	kg	17	30	30	55	95	131

<sup>1)</sup> 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.

**Table 4.3:** 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 without actuator	lbs	42	78	78	177	239	419
	kg	19	35	35	80	108	190

**Table 4.4:** 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 <sup>1)</sup>	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 without actuator	lbs	42	78	78	177	239	419
	kg	19	35	35	80	108	190

<sup>1)</sup> 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.

**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 without actuator	lbs	38	62	62	115	203	283
	kg	17	30	30	52	92	128

**Table 5.2:** 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 without actuator	lbs	42	78	78	170	232	389
	kg	19	35	35	77	105	176

## Dimensional drawings

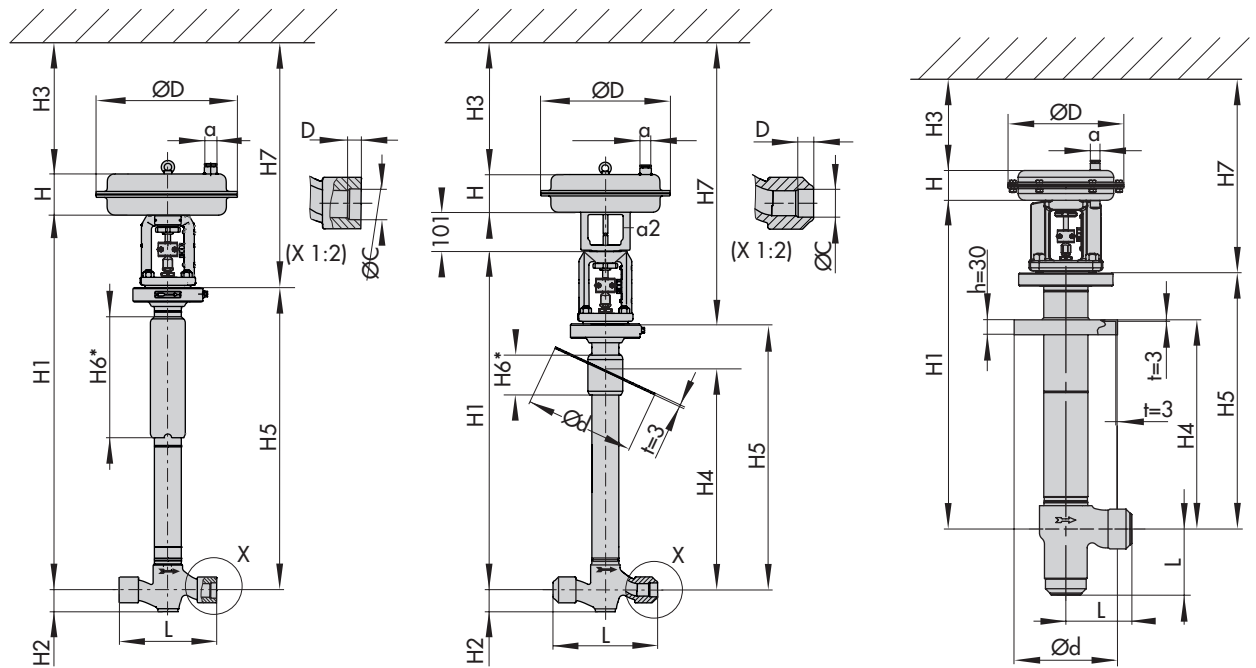


Fig. 5: Type 3248-1 Globe Valve

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 <sup>2</sup>	175v2	240	350	355v2	700	750v2	1000	1400-60	1400-120	2800
Diaphragm ØD	in	8.46	9.45	11.02	11.02	15.35	15.51	18.19	20.87	21.02	30.32
	mm	215	240	280	280	390	394	462	530	534	770
H <sup>1)</sup>	in	3.07	2.44	3.23	4.76	7.83	9.29	15.87	13.1	19.29 <sup>3)</sup> / 22.83 <sup>4)</sup>	24.80 <sup>3)</sup> / 27.36 <sup>4)</sup>
	mm	78	62	82	121	199	236	403	333	490 <sup>3)</sup> / 580 <sup>4)</sup>	630 <sup>3)</sup> / 695 <sup>4)</sup>
H3 <sup>2)</sup>	in	4.33	4.33	4.33	4.33	7.48	7.48	24.02	24.02	25.59	25.59
	mm	110	110	110	110	190	190	610	610	650	650
Height of yoke	Type 3277 in	3.98	3.98	3.98	3.98	3.98	3.98	-	-	-	-
	Type 3277 mm	101	101	101	101	101	101	-	-	-	-
Thread	Type 3271	M30 x 1.5						M60 x 1.5		M100 x 2	
	Type 3277	M30 x 1.5						-	-	-	-
α	Type 3271	G ¼ (¼ NPT)	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)
	Type 3277	G ⅜	G ⅜	G ⅜	G ⅜	G ⅜	G ⅜	-	-	-	-

1) Height with welded-on lifting eyelet or height of eyebolt according to DIN 580. Height of the swivel lifting hook may differ. Actuators up to 355v2 cm<sup>2</sup> without lifting eyelet

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

3) Height for version with welded-on lifting eyelet (material EN-JS1030)

4) Height for version with female thread (material 1.5638/A352 LC3)

**Table 6.2: Dimensions in lbs and kg**

Actuator area	cm <sup>2</sup>	175v2	240	350	355v2	700	750v2	1000	1400-60	1400-120	2800	
Weight	Type 3271	lbs	13	11	18	33	49	79	176	154	386	993
		kg	6	5	8	15	22	36	80	70	175	450
	Type 3277	lbs	22	20	26	42	57	88	–	–	–	–
		kg	10	9	12	19	26	40	–	–	–	–

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

Valve size	Stem diameter	Actuator
NPS 1 to 2	0.39 in (10 mm)	175v2 to 750v2 cm <sup>2</sup>
NPS 3	0.63 in (16 mm)	350 to 750v2 cm <sup>2</sup>
NPS 4 to 6	0.63 in (16 mm)	350 to 1400-60 cm <sup>2</sup>

**Table 7.2: Class 600**

Valve size	Stem diameter	Actuator
NPS ½ to 1	0.47 in (12 mm)	175v2 to 750v2 cm <sup>2</sup>
NPS 1½ to 3	0.63 in (16 mm)	350 to 1400-60 cm <sup>2</sup>
NPS 4	0.63 in (16 mm)	350 to 1400-120 cm <sup>2</sup>
NPS 6	1.58 in (40 mm)	1000 to 2800 cm <sup>2</sup>

**The following specifications are required on ordering:**

Type 3248 Valve	Globe or angle valve
Valve size	NPS ...
Pressure rating	Class ...
Flow coefficient	C <sub>v</sub> ...
Characteristic	Equal percentage or linear
Body material	According to 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 <sup>2</sup>
Bench range	... bar or psi
Fail-safe position	Fail-close or fail-open

Specifications subject to change without notice

