Series 250

Pneumatic Control Valve Type 3251-1 and Type 3251-7
Globe Valve Type 3251

ANSI version

Application

Control valve for process engineering applications with high industrial requirements

Valve sizes	**NPS ½ to 8**
Pressure rating	**ANSI Class 150 to Class 2500**
Temperatures	**–200 to 500 °C (–325 to 930 °F)**

Type 3251 Globe Valve optionally operated with:

- Type 3271 Pneumatic Actuator (Type 3251-1 Control Valve)
- Type 3277 Pneumatic Actuator (Type 3251-7 Control Valve) for integral positioner attachment

Valve body optionally made of:

- Carbon steel
- Stainless carbon steel or
- High-temperature or cold-resisting carbon steel

Low-noise valve plugs optionally with:

- Metal sealing
- Soft sealing or
- Lapped-in metal sealing
- Balanced for handling large differential pressures

The control valves, designed according to the modular assembly principle, can be equipped with various accessories:

Positioners, limit switches, solenoid valves and other equipment according to IEC 60534-6 and NAMUR recommendation (see Information Sheet T 8350 EN for details).

Versions

Standard version with PTFE packing for temperatures from –10 to 220 °C (15 to 428 °F) or with adjustable high-temperature (HT) packing for temperatures for –10 to 350 °C (15 to 660 °F), valve sizes NPS ½ to 8, ANSI Class 150 to 900

Type 3251-1 (Fig. 1) · Type 3251 Valve and Type 3271 Actuator with 350 to 2800 cm^2 effective areas (see Data Sheets T 8310-1 EN and T 8310-2 EN)

Type 3251-7 · Type 3251 Valve with Type 3277 Actuator with 350 or 700 cm^2 effective areas (see Data Sheet T 8310-1 EN)

Further versions with

- **Class 1500 and 2500** · On request
- **Welding ends or welding-neck ends** acc. ANSI B16.25
- **Flow divider** · For noise level reduction, see T 8081 EN
- **AC-Trim** · See Data Sheets T 8082 EN and T 8083 EN
- **Extension bonnet or bellows seal** · See Technical data
- **Heating jacket** · Details on request
- **Additional handwheel** · See T 8310-1/-2 EN
- **DIN version** · DN 15 to 200, nominal pressure PN 16 to 400, see Data Sheet T 8051 EN

Fig. 1 · Type 3251-1 Pneumatic Control Valve with Type 3271 Pneumatic Actuator

- **Type 3251-3 Hand-operated Valve** · With Type 3273 Hand-operated Actuator, for valves with max. 30 mm rated travel, see Data Sheet T 8312 EN
- **Type 3251-2 Electric Control Valve** · Details on request

Principle of operation

The process medium flows through the valve in the direction indicated by the arrow. The valve plug position determines the cross-sectional area of flow.

The version with the metal bellows seal (Fig. 4) is equipped with a test connection to allow the monitoring of the stainless steel bellows.

A pressure-balanced plug (Fig. 3) can be used when high pressures or differential pressures act on the valve plug and the force produced by the actuator is insufficient.

The control valves can be equipped with a Flow Divider St I or St III (Fig. 4, see Data Sheet T 8081 EN for details).

Fail-safe positions

Depending on how the compression springs are arranged in the actuator (see Data Sheets T 8310-1 EN and T 8310-2 EN for details), the control valve offers two different fail-safe positions effective upon air supply failure:

"Actuator stem extends" (fail-close):
Upon air supply failure, the force of the compression springs causes the valve to close.

"Actuator stem retracts" (fail-open):
Upon air supply failure, the force of the compression springs causes the valve to open.

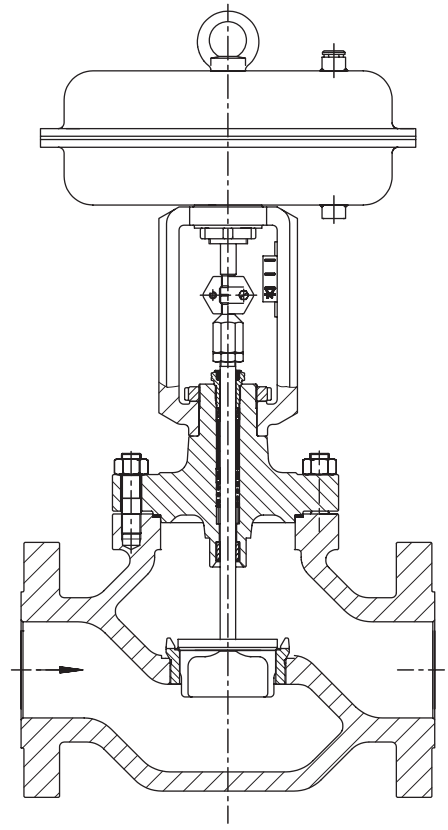


Fig. 2 · Type 3251-1 Control Valve with Type 3271 Pneumatic Actuator

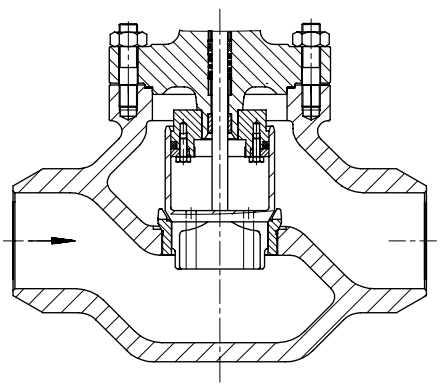


Fig. 3 · Type 3251 Globe Valve with welding ends and balanced valve plug

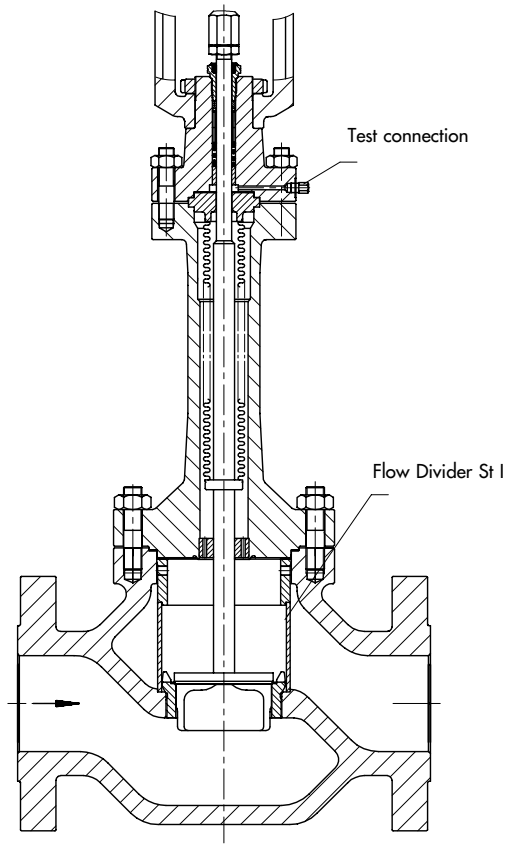


Fig. 4 · Type 3251 Globe Valve with Flow Divider St I and additional metal bellows seal with test connection

Table 1 · Technical Data for Type 3251 Globe Valve

Materials			Carbon steel A 216 WCC	Carbon steel A 217 WC6	Stainless carbon steel A 351 CF8M
Valve sizes			NPS ½ ... 6 · NPS 8 in Class 600		
Pressure rating [1]		Class	150 ... 900		
End connection		Flanges	All ANSI versions		
		Welding ends	Acc. to ANSI B 16.25		
Plug sealing			Metal sealing, soft sealing or lapped-in metal		
Characteristic			Equal percentage or linear		
Rangeability			50 : 1		
Temperature ranges in °C (°F) · Permissible operating pressures acc. to pressure-temperature diagrams (see Information Sheet T 8000-2 EN)					
Valve body without extension bonnet			–10 ... 220 °C (14 ... 428 °F) · Up to 350 °C (660 °F) with high-temperature packing		
Body with		Extension bonnet	–29...427 °C (–20...800 °F)	–29...500 °C (–20...930 °F)	–200...450 °C (–325...842 °F)
		Bellows seal	–29...427 °C (–20...800 °F)	–29...500 °C (–20...930 °F)	–200...450 °C (–325...842 °F)
Valve plug[2]	Standard	Metal sealing	–200...500 °C (–325...930 °F)		
		Soft sealing	–200...220 °C (–325...428 °F)		
	Balanced	PTFE ring	–200...220 °C (–325...428 °F)		
		Graphite ring	220...500 °C (428...930 °F)		
Leakage class according to DIN EN 1349: 2000 / ANSI/FCI 70-2-1991					
Valve plug	Standard	Metal sealing	IV		
		Soft sealing	VI		
		Lapped-in metal	IV-S2 · NPS 4 and larger IV-S1		
	Balanced, metal sealing		With PTFE ring: IV · With graphite ring: III		

[1] Up to Class 2500 on request.

[2] Only in combination with a suitable body material.

Table 2 · Materials

Standard version Valve body and flanges [1]		Carbon steel A 216 WCC	Carbon steel A 217 WC6	Stainless carbon steel A 351 CF8M
Seat and plug [2]	Metal sealing	1.4006/1.4008		1.4571/1.4581
Seal ring with	Soft sealing	PTFE with 15 % glass fiber		
	Balanced	PTFE with carbon · Graphite		
Guide bushings		1.4112		2.4610
Stuffing box packing		V-ring packing, PTFE with carbon, spring of 1.4310 or high-temperature packing		
Body gasket		Metal		
Extension bonnet [3]		A 217 WC6/A 182 F12		A 351 CF8M/A 182 F316
Metal bellows seal				
Intermediate piece [3]		A 217 WC6/A 182 F12		A 351 CF8M/A 182 F316
Metal bellows		1.4571		
Heating jacket		1.4541		

1) See also Pressure-Temperature Diagram (T 8000-2 EN); material for cryogenic service: A 352 LCC.
2) All seats and plugs with metal sealing also available stellited or plug made of solid Stellite.
3) Depending on the valve bonnet material.

Table 3 · **C_v and K_{vs} coefficients** · Versions in shaded areas also available with balanced plug

Table 3a · **Overview with Flow Divider St I (C_v I/K_{vs} I) and St III (Cv III/K_{vs} III)**

C_v	0.12	0.2	0.3	0.5	0.75	1.2	2	3	5	7.5	12	20	30	47	75	120	190	290	420	735
K_{vs}	0.1	0.16	0.25	0.4	0.63	1.0	1.6	2.5	4.0	6.3	10	16	25	40	63	100	160	250	360	630
C_v I	–						1.7	2.6	4.2	7	10.5	17	26	42	67	105	170	265	375	650
K_{vs} I							1.45	2.2	3.6	5.7	9	14.5	22	36	57	90	144	225	320	560
C_v III	–								3.5	5.6	9	14	23	35	55	90	140	220	315	–
K_{vs} III									3	4.8	7.5	12	20	30	47	75	120	190	270	–
Seat ∅ mm	6						12		24			31	38	50	63	80	100	125	150	200
Rated travel mm	15													30				60		
Rated travel in	0.5″													1.18″				2.36″		

Table 3b · **Versions without flow divider**

C_v		0.12	0.2	0.3	0.5	0.75	1.2	2	3	5	7.5	12	20	30	47	75	120	190	290	420	735
NPS	DN																				
½	15	•	•	•	•	•	•	•	•	•											
1	25	•	•	•	•	•	•	•	•	•	•	•									
1½	40	•	•	•	•	•	•	•	•	•	•	•	•	•							
2	50									•	•	•	•	•	•						
3	80									•	•	•	•	•	•	•	•				
4	100													•	•	•	•	•			
6	150															•	•	•	•	•	
8	200																	•	•	•	•

Table 3c · **Versions with Flow Divider St I**

C_v I		–						1.7	2.6	4.2	7	10.5	17	26	42	67	105	170	265	375	650
NPS	DN																				
½	15							•	•	•											
1	25							•	•	•	•	•									
1½	40							•	•	•	•	•	•	•							
2	50									•	•	•	•	•	•						
3	80									•	•	•	•	•	•	•	•				
4	100													•	•	•	•	•			
6	150															•	•	•	•	•	
8	200																	•	•	•	•

Table 3d · **Versions with Flow Divider St III**

C_v III		–								3.5	5.6	9	14	23	35	55	90	140	220	315	–
NPS	DN																				
2*	50									•	•	•									
3	80									•	•	•	•	•	•						
4	100													•	•	•					
6	150															•	•	•	•		
8	200																	•	•	•	

* NPS 2 version (DN 50) and St III not available with bellows seal

Notes on differential pressure tables

The differential pressure tables were prepared under the following conditions:

- Direction of flow: FTO
- Valve plug with metal sealing
- Version with PTFE packing
- Tables 4a and 4b apply to unbalanced valve plug with a downstream pressure p_2 = 0 bar (psi)
- For the maximum differential pressures listed and the previously mentioned conditions, the leakage rate stated in Table 1 is not exceeded
- All pressures mentioned are in bar and psi
- The differential pressure stated can be limited by the pressure-temperature diagram (see T 8000-2 EN).

Note on fail-safe position "Valve CLOSED": Always use pretensioned spring ranges for actuators with reduced travels.

Overview: Valve versions of the Δp tables

Table 4a and 4b: Valve with **unbalanced** plug without metal bellows seal; fail-safe position "Valve CLOSED"

Table 5a and 5b: Valve with **balanced** plug with PTFE ring, without metal bellows seal; fail-safe position "Valve CLOSED" or "Valve OPEN"

Table 6a and 6b: Valve with **unbalanced** plug without metal bellows seal; "Valve OPEN"

Note: Permissible differential pressures for special versions with soft sealing or lapped-in metal plugs, with metal bellows seal or balanced plug with graphite ring are available on request.

Table 4a · Permissible differential pressures Δp for valves with unbalanced plug with metal sealing and without metal bellows seal; fail-safe position "Valve CLOSED" · Pressures in bar

The bench ranges in the shaded areas indicate normal operation, i.e. operation at rated travel · Values in non-shaded areas apply to springs pre-tensioned to maximum · Values in parentheses apply to half travel

Fail-safe position "Valve CLOSED" (fail-close)												
Bench range (bar) with actuator (cm^2)		350	0.2...1.0	0.4...1.2	0.4...2.0	0.8...2.4	0.6...3.0	1.2...3.6	1.4...2.3	2.1...3.3	–	–
		700		0.4...1.2 (0.8...1.2)		0.8...2.4 (1.6...2.4)		1.2...3.6 (2.4...3.6)	1.4...2.3 (1.85...2.3)	2.1...3.3 (2.7...3.3)	2.35...3.8 (3.05...3.8)	2.6...4.3 (3.45...4.3)
		1400					0.5...2.5	1.0...3.0 (2.0...3.0)	1.1...2.4	1.4...2.7 (2.05...2.7)	1.3...2.8	1.7...3.2 (2.45...3.2)
		2800	0.4...1.2 (0.8...1.2)	0.8...2.4 (1.6...2.4)	1.0...3.0 (2.0...3.0)	1.2...3.6 (2.4...3.6)	0.9...1.6	1.1...1.8 (1.25...1.6)	1.0...2.1	1.25...2.35 (1.55...2.1)	1.1...2.6	1.5...3.0 (1.85...2.6)
		2x2800										
Required supply pressure			Upper spring range value + 0.2 bar									
NPS	C_v	Actuator cm^2	Δp when p_2 = 0 bar									
½ to 1½	0.12 to 1.2	350	46.1	102	102	213	158	325	380	400	–	–
	2 to 3	350	46.1	102	102	213	158	325	380	400	–	–
	5 to 12	350	8.7	22.4	22.4	50.5	36.6	78.4	92.3	141	–	–
		700	–	(106)	–	(217)	–	(329)	(252)	(370)	(400)	–
2		350	8.1	22	22	49.9	35.9	77.7	91.7	140	–	–
		700	–	(105)	–	(217)	–	(328)	(252)	(370)	(400)	–
1½ to 3	20	350	4.3	12.7	12.7	29.4	21	45.1	54.4	83.6	–	–
		700	–	(62.7)	–	(129)	–	(196)	(150)	(221)	(250)	(284)
1½ to 4	30	350	–	8.1	8.1	19.2	13.6	30.3	35.8	55.3	–	–
		700	–	(41.4)	–	(85.8)	–	(130)	(99.7)	(147)	(166)	(188)
2 to 4	47	700	4.3	10.7	10.7	23.6	17.1	36.4	42.8	65.3	73.3	81.3
		1400	–	(49.2)	–	(100)	–	(126)	–	(129)	–	(155)
3 to 6	75	700	–	6.3	6.3	14.4	10.4	22.5	26.5	40.7	45.7	50.8
		1400	–	(30.6)	–	(62.9)	–	(79.1)	–	(81.1)	–	(97.3)
3 to 6	120	700	–	–	–	8.7	6.2	13.7	16.3	25	28.2	31.3
		1400	–	(18.8)	–	(38.8)	–	(48.8)	–	(50.1)	–	(60.1)
4 to 6	190	700	–	–	–	5.4	–	8.7	10.3	15.9	17.9	19.9
		1400	–	(11.9)	–	(24.7)	–	(31.1)	–	(31.9)	–	(38.3)
8	190	700	–	–	–	5.4	–	8.6	10.2	15.8	17.8	19.8
		1400	–	(11.8)	–	(24.6)	–	(31)	–	(31.8)	–	(38.2)
6	290	1400	–	–	–	7.5	4.4	9.5	10.5	13.6	12.6	16.7
		2800	(15.7)	(32.1)	(40.3)	(48.5)	–	(24.9)	–	(31.1)	–	(37.2)
8	290	1400	–	–	–	7.4	4.3	9.5	10.5	13.6	12.5	16.6
		2800	(15.6)	(32)	(40.3)	(48.5)	–	(24.9)	–	(31)	–	(37.2)
		2x2800	(31.2)	(64)	(80.6)	(97)	–	(49.8)	–	(62)	–	(74.4)
6	420	1400	–	–	–	5.1	–	6.5	7.2	9.4	8.7	11.5
		2800	(10.8)	(22.2)	(27.9)	(33.6)	–	(17.2)	–	(21.5)	–	(25.8)
8	420	1400	–	–	–	5.1	–	6.5	7.2	9.3	8.6	11.5
		2800	(10.7)	(22.2)	(27.9)	(33.6)	–	(17.2)	–	(21.5)	–	(25.7)
		2x2800	(21.4)	(44.4)	(55.8)	(67.2)	–	(34.4)	–	43	–	(51.4)
8	735	1400	–	–	–	–	–	–	4	5.2	4.7	6.4
		2800	(6)	(12.4)	(15.6)	(18.8)	–	(9.6)	–	(12)	–	(14.4)
		2x2800	(12)	(24.8)	(31.2)	(37.6)	–	(19.2)	–	(24)	–	(28.8)

Table 4b · Permissible differential pressures Δp for valves with unbalanced plug with metal sealing and without metal bellows seal; fail-safe position "Valve CLOSED" · Pressures in psi

The bench ranges in the shaded areas indicate normal operation, i.e. operation at rated travel · Values in non-shaded areas apply to springs pre-tensioned to maximum · Values in parentheses apply to half travel

Fail-safe position "Valve CLOSED" (fail-close)												
Bench range (psi) with actuator (cm^2)		350	3...15	6...18	6...30	12...36	9...45	18...52	20...34	30...48	–	–
		700		6...18 (12...18)		12...36 (23...36)		18...52 (35...52)	20...34 (27...34)	30...48 (39...48)	35...55 (44...55)	36...62 (50...62)
		1400					7...36	15...45 (30...45)	16...36	20...39 (30...39)	19...41	25...46 (36...46)
		2800	6...18 (12...18)	12...36 (23...36)	15...45 (30...45)	18...52 (35...52)	13...23	16...26 (18...23)	15...30	18...34 (22...30)	17...36	22...45 (27...36)
		2x2800										
Required supply pressure			Upper spring range value + 3 psi									
NPS	C_v	Actuator cm^2	Δp when p_2 = 0 psi									
½ to 1½	0.12 to 1.2	350	668	1479	1479	3088	2291	4712	5510	5800	–	–
	2 to 3	350	668	1479	1479	3088	2291	4712	5510	5800	–	–
	5 to 12	350	126	325	325	732	530	1137	1338	2044	–	–
		700	–	(1537)	–	(3146)	–	(4770)	(3654)	(5365)	(5800)	–
2		350	117	319	319	723	520	1126	1329	2030	–	–
		700	–	(1522)	–	(3146)	–	(4756)	(3654)	(5365)	(5800)	–
1½ to 3	20	350	62	184	184	426	304	654	789	1212	–	–
		700	–	(909)	–	(1870)	–	(2842)	(2175)	(3204)	(3625)	(4118)
1½ to 4	30	350	–	117	117	278	197	439	519	801	–	–
		700	–	(600)	–	(1244)	–	(1885)	(1445)	(2131)	(2407)	(2726)
2 to 4	47	700	62	155	155	342	248	527	620	947	1063	1178
		1400	–	(713)	–	(145)	–	(1827)	–	(1870)	–	(2247)
3 to 6	75	700	–	91	91	209	151	326	384	590	662	736
		1400	–	(443)	–	(912)	–	(1147)	–	(1176)	–	(1411)
3 to 6	120	700	–	–	–	126	90	198	236	362	409	454
		1400	–	(272)	–	(562)	–	(707)	–	(726)	–	(871)
4 to 6	190	700	–	–	–	78	–	126	149	230	259	288
		1400	–	(172)	–	(358)	–	(451)	–	(462)	–	(555)
8	190	700	–	–	–	78	–	124	148	224	258	287
		1400	–	(171)	–	(356)	–	(449)	–	(461)	–	(554)
6	290	1400	–	–	–	108	64	137	152	197	183	242
		2800	(227)	(465)	(584)	(703)	–	(361)	–	(451)	–	(539)
8	290	1400	–	–	–	107	62	137	152	197	181	240
		2800	(226)	(464)	(584)	(703)	–	(361)	–	(449)	–	(539)
		2x2800	(452)	(928)	(1168)	(1406)	–	(722)	–	(899)	–	(1079)
6	420	1400	–	–	–	74	–	94	104	136	126	166
		2800	(156)	(322)	(404)	(487)	–	(249)	–	(312)	–	(374)
8	420	1400	–	–	–	74	–	94	104	135	125	166
		2800	(155)	(322)	(404)	(487)	–	(249)	–	(312)	–	(372)
		2x2800	(310)	(644)	(809)	(974)	–	(499)	–	(623)	–	(745)
8	735	1400	–	–	–	–	–	–	58	75	68	93
		2800	(87)	(180)	(226)	(272)	–	(139)	–	(174)	–	(209)
		2x2800	(174)	(359)	(452)	(545)	–	(278)	–	(348)	–	(417)

Table 5a · Permissible differential pressures Δp for valves with balanced plug with metal sealing and PTFE ring, without metal bellows seal · Pressures in bar

The bench ranges in the shaded areas indicate normal operation, i.e. operation at rated travel · Values in non-shaded areas apply to springs pre-tensioned to maximum · Values in parentheses apply to half travel

Fail-safe position			**"Valve CLOSED" (fail-close)**						**"Valve OPEN" (fail-open)**		
Bench range (bar) with actuator (cm^2)		700	0.4...2.0	0.8...2.4 (1.6...2.4)	–	–	0.6...3.0	1.2...3.6	0.4 ... 2.0 (0.4 ... 1.2)		
		1400			0.5...2.5	1.0...3.0 (2.0...3.0)	–	–			
		2800					0.6...3.0	1.2...3.6 (2.4...3.6)			
		2x2800									
Required supply pressure			Upper spring range value + 0.2 bar						2.4	4.0	6.0
NPS	C_v	Actuator cm^2	Δp when p_2 = 0 bar								
3 4	75	700	57.4	155	–	–	106	252	57.4	400	–
		1400	–	(400)	–	(400)	–	–	(400)	–	–
6	75	700	22.2	62.1	–	–	42.2	102	22.2	182	382
		1400	–	(302)	–	(381)	–	–	(221)	(400)	–
3 4	120	700	48.1	146	–	–	96.8	243	48.1	400	–
		1400	–	(400)	–	(400)	–	–	(400)	–	–
6	120	700	18.4	58.3	–	–	38.4	98.3	18.4	178	378
		1400	–	(298)	–	(378)	–	–	(218)	(400)	–
4	190	700	37.2	135	–	–	85.9	232	37.2	400	–
		1400	–	(400)	–	(400)	–	–	(400)	–	–
6	190	700	13.9	53.8	–	–	33.9	93.8	13.9	174	373
		1400	–	(293)	–	(373)	–	–	(213)	(400)	–
8	190	700	4.6	20.2	–	–	12.4	35.8	4.6	67	145
		1400	–	(114)	–	(145)	–	–	(82.6)	(207)	(363)
6	290	1400	48.3	128	68.2	168	–	–	48.3	368	400
		2800	–	(400)	–	(400)	–	(400)	(400)	–	–
8	290	1400	18	49.2	25.8	64.8	–	–	18	143	299
		2800	–	(236)	–	(298)	–	(361)	(174)	(400)	–
		2x2800	–	(400)	–	(400)	–	(400)	(348)	(400)	–
6	420	1400	42.6	123	62.6	162	–	–	42.7	362	400
		2800	–	(400)	–	(400)	–	(400)	(400)	–	–
8	420	1400	15.8	47	23.6	62.6	–	–	15.3	109	265
		2800	–	(234)	–	(296)	–	(359)	(172)	(400)	–
		2x2800	–	(400)	–	(400)	–	(400)	(344)	(400)	–
8	735	1400	11.4	42.6	19.2	58.2	–	–	11.4	136	292
		2800	–	(230)	–	(292)	–	(354)	(167)	(400)	–
		2x2800	–	(400)	–	(400)	–	(400)	(334)	(400)	–

Table 5b · Permissible differential pressures Δp for valves with balanced plug with metal sealing and PTFE ring, without metal bellows seal · Pressures in psi

The bench ranges in the shaded areas indicate normal operation, i.e. operation at rated travel · Values in non-shaded areas apply to springs pre-tensioned to maximum · Values in parentheses apply to half travel

Fail-safe position			**"Valve CLOSED" (fail-close)**						**"Valve OPEN" (fail-open)**		
Bench range (psi) with actuator (cm^2)		700	6...30	12...36 (23...36)	–	–	9...45	18...52	6 ... 30 (6 ... 18)		
		1400			7...36	15...44 (30...45)	–	–			
		2800					9...45	18...52 (36...52)			
		2x2800									
Required supply pressure			Upper spring range value + 3 psi						36	60	90
NPS	C_v	Actuator cm^2	Δp when p_2 = 0 psi								
3 4	75	700	832	2247	–	–	1537	3654	832	5800	–
		1400	–	(5800)	–	(5800)	–	–	(5800)	–	–
6	75	700	322	900	–	–	615	1479	322	2639	5539
		1400	–	(4379)	–	(5524)	–	–	(3204)	(5800)	–
3 4	120	700	697	2117	–	–	1403	2523	697	5800	–
		1400	–	(5800)	–	(5800)	–	–	(5800)	–	–
6	120	700	267	845	–	–	557	1425	267	2581	5481
		1400	–	(4321)	–	(5481)	–	–	(3161)	(5800)	–
4	190	700	539	1957	–	–	1245	3364	539	5800	–
		1400	–	(5800)	–	(5800)	–	–	(5800)	–	–
6	190	700	201	780	–	–	491	1360	201	2523	5408
		1400	–	(4248)	–	(5408)	–	–	(3088)	(5800)	–
8	190	700	66	293	–	–	179	519	66	971	2102
		1400	–	(1653)	–	(2102)	–	–	(1197)	(3001)	(5263)
6	290	1400	700	1856	989	2436	–	–	700	5336	5800
		2800	–	(5800)	–	(5800)	–	(5800)	(5800)	–	–
8	290	1400	261	713	374	939	–	–	261	2073	4335
		2800	–	(3422)	–	(4321)	–	(5234)	(2523)	(5800)	–
		2x2800	–	(5800)	–	(5800)	–	(5800)	(5046)	(5800)	–
6	420	1400	617	1783	907	2349	–	–	619	5249	5800
		2800	–	(5800)	–	(5800)	–	(5800)	(5800)	–	–
8	420	1400	229	681	342	907	–	–	221	1580	3842
		2800	–	(3393)	–	(4292)	–	(5205)	(2494)	(5800)	–
		2x2800	–	(5800)	–	(5800)	–	(5800)	(4988)	(5800)	–
8	735	1400	165	617	278	844	–	–	165	1972	4234
		2800	–	(3335)	–	(4234)	–	(5133)	(2421)	(5800)	–
		2x2800	–	(5800)	–	(5800)	–	(5800)	(4843)	(5800)	–

Table 6 · Permissible differential pressures Δp for valves with unbalanced plug with metal sealing and without metal bellows seal · Fail-safe position "Valve OPEN"

			Table 6a · Pressures in bar				Table 6b · Pressures in psi			
Nominal bench range in bar/psi with actuator (cm^2)		350	0.2 ... 1.0 (0.2 ... 0.6)				3 ... 15 (3 ... 9)			
		700								
		1400								
		2800								
		2x2800								
Required supply pressure			1.4	2.4	4.0	6.0	20	36	60	90
NPS	C_v	Actuator cm^2	Δp when p_2 = 0 bar				Δp when p_2 = 0 psi			
½ to 1½	0.12 to 1.2	350	102	380	400	–	1479	5510	5800	–
	2 to 3	350	101	380	400	–	1464	5510	5800	–
	5 to 12	350	22.4	92.1	203	343	325	1335	2943	4973
		700	(106)	(245)	(400)	–	(1537)	(3552)	(5800)	–
2		350	21.6	91.3	203	342	313	1324	2943	4959
		700	(105)	(244)	(400)	–	(1522)	(3538)	(5800)	–
1½ to 3	20	350	12.4	54.2	121	204	180	786	1754	2958
		700	(62.5)	(146)	(280)	–	(906)	(2117)	(4060)	–
1½ to 4	30	350	7.9	35.7	80.1	136	114	517	1161	1972
		700	(41)	(97)	(185)	–	(594)	(2682)	(2682)	–
2 to 4	47	700	10.6	42.7	94.1	158	153	619	1364	2291
		1400	(49)	(113)	(216)	–	(710)	(1638)	(3132)	–
3 to 6	75	700	6.2	26.4	58.7	99.2	90	383	851	1438
		1400	(30.4)	(71)	(135)	–	(441)	(1029)	(1957)	–
3 to 6	120	700	–	16.2	36.2	61.3	–	235	525	889
		1400	(18.7)	(43.7)	(84)	(134)	(271)	(633)	(1218)	(1943)
4 6	190	700	–	10.2	23	39.1	–	148	333	567
		1400	(11.8)	(27.8)	(53.5)	(85)	(171)	(403)	(775)	(1232)
8	190	700	–	10.0	22.9	38.9	–	145	332	564
		1400	(11.6)	(27.7)	(53.3)	(85)	(168)	(401)	(773)	(1232)
6	290	1400	–	13.6	30	50.6	–	197	435	733
		2800	(15.6)	(36.2)	(69)	–	(226)	(525)	(1000)	–
8	290	1400	–	13.5	29.9	50.4	–	195	433	731
		2800	(15.5)	(36.1)	(69)	–	(224)	(523)	(1000)	–
		2x2800	(31)	(72)	(138)	–	(449)	(1044)	(2001)	–
6	420	1400	–	9.4	20.8	35	–	136	301	507
		2800	(10.8)	(25)	(47.8)	–	(156)	(362)	(693)	–
8	420	1400	–	9.3	20.7	34.9	–	135	300	506
		2800	(10.7)	(25)	(47.8)	–	(156)	(362)	(693)	
		2x2800	(21.4)	(50)	(95.6)	–	(310)	(725)	(1386)	–
8	735	1400	–	5.1	11.5	19.5	–	74	166	282
		2800	(5.9)	(13.9)	(26.8)	(42.8)	(85)	(201)	(388)	(620)
		2x2800	(11.8)	(27.8)	(53.6)	–	(171)	(403)	(777)	–

Table 7 · Dimensions for Type 3251-1 and Type 3251-7 Pneumatic Control Valve as standard version

Valve			NPS	½	1	1½	2	3	4	6	8
Length L		Class 150	mm	184	184	222	254	298	352	451	543
			in	7.24	7.24	8.74	10	11.73	13.83	17.75	21.37
		Class 300	mm	191	197	235	267	318	368	473	568
			in	7.52	7.75	9.25	10.52	12.52	14.49	18.62	22.36
		Class 600	mm	203	210	251	286	337	394	508	609
			in	7.99	8.26	9.88	11.26	13.26	15.51	20	23.97
		Class 900	mm	216	254	305	368	381	457	609	737
			in	8.5	10	12	14.49	15	17.99	23.97	29.01
H1 for actuator	350 cm²	Class 150/600	mm	392	392	404	457	462	482	–	
			in	15.43	15.43	15.9	17.99	18.19	18.97		
		Class 900	mm	426	426	435	491	462	482		
			in	16.77	16.77	17.12	19.33	18.19	18.97		
	700 cm²	Class 150/600	mm	392	392	404	457	462	482	732	805
			in	15.43	15.43	15.9	17.99	18.19	18.97	29.01	31.69
		Class 900	mm	426	426	435	491	462	482	732	805
			in	16.77	16.77	17.12	19.33	18.19	18.97	29.01	31.69
	1400 cm²	Class 150/600	mm	–			512	517	537	732	805
			in				20.16	20.35	21.14	29.01	31.69
		Class 900	mm				546	517	537	732	805
			in				21.49	20.35	21.14	29.01	31.69
	2800 cm²	Class 150/600	mm	–					722	817	890
			in						28.42	32.16	35.04
		Class 900	mm						722	817	890
			in						28.42	32.16	35.04
H2 With foot for NPS 4 and larger		Class 150	mm	50	60	80	90	100	160	220	250
			in	1.97	2.36	3.15	3.54	3.93	6.29	8.66	9.84
		Class 300/600	mm	60	70	90	100	120	180	235	270
			in	2.34	2.75	3.54	3.93	4.72	7.02	9.25	10.63
		Class 900	mm	70	80	100	110	120	180	235	270
			in	2.75	3.15	3.93	4.33	4.72	7.08	9.25	10.63

Actuator	cm²	350	700	1400	2800	2 x 2800
Diaphragm ∅	mm	280	390	530	770	
	in	11.02	15.35	20.86	30.3	
H [1]	mm	82	200	287	620	1130
	in	3.23	7.87	11.3	24.41	44.49
H3 [2]	mm	110	190	610	650	
	in	4.33	7.48	24	25.5	
Thread		M 30 x 1.5		M 60 x 1.5	M 100 x 2	
a (with Type 3271 Actuator)		G ⅜ (NPT ⅜)		G ¾ (NPT ¾)	G 1 (NPT 1)	
a2 (with Type 3277 Actuator)		G ⅜ (NPT ⅜)		–		

[1] Actuator 350 cm² without lifting ring

[2] Minimum clearance for actuator disassembly

Table 8 · Weights for Type 3251 Globe Valve in standard version

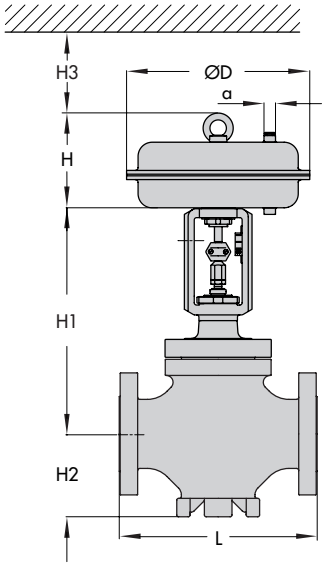
Valve		NPS	½	1	1½	2	3	4	6	8
Valve without actuator (approx.)	Cl 150/300	kg	15.5	17.5	21.5	38	59	78	201	427
		lbs	34.2	38.6	47.4	83.8	130	172	443	1191
	Class 600	kg	22	28	36	64	102	137	340	540
		lbs	49	62	80	141	225	302	750	1191
	Class 900	kg	35	41	60	97	120	160	380	650
		lbs	77	90	132	214	265	353	838	1433

Actuator		cm^2	350	700	1400	2800	2 x 2800
Type 3271 (approx.)	Without	kg	8	22	70	450	950
		lbs	17.6	48.5	154.5	992	2095
	With handwheel	kg	13	27	Only with side-mounted handwheel, see T 8310-2 EN		
		lbs	28.7	59.5			
Type 3277 (approx.)	Without	kg	12	26	–		
		lbs	26.5	57.6			
	With handwheel	kg	17	31			
		lbs	37.5	68.5			

1) Top row without handwheel, bottom row with handwheel

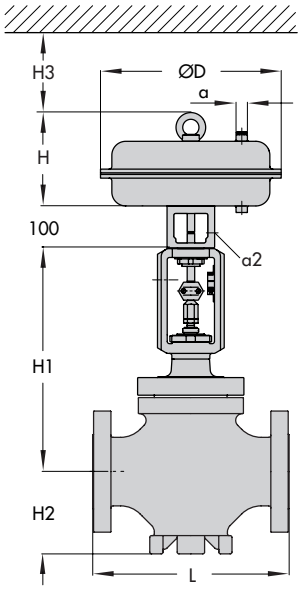
Pneumatic Actuators

Type 3271

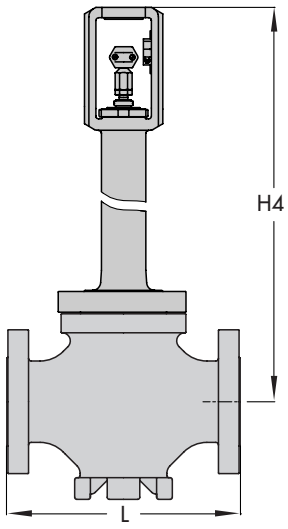


Type 3251-1

Type 3277



Type 3251-7



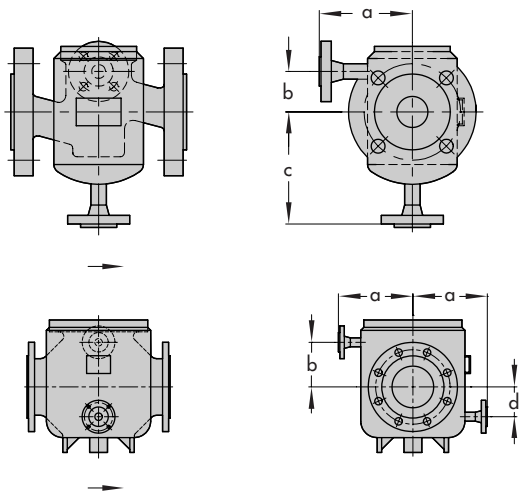
Type 3251 with bellows seal or extension bonnet

Table 9 · Dimensions and weights for Type 3251 Globe Valve in standard version with extension bonnet · Without actuator

Nominal size		NPS	½	1	1½	2	3	4	6	8
		DN	15	25	40	50	80	100	150	200
Class 150 ... 600 H4 for actuator	350 cm²	mm	593	593	605	727	732	752	–	
		in	23.34	23.34	23.82	28.62	28.82	29.6		
	700 cm²	mm	593	593	605	727	732	752	1083	1365
		in	23.34	23.34	23.82	28.62	28.82	29.6	42.64	53.74
	1400 cm²	mm	–			782	787	807	1083	1365
		in				30.78	30.98	31.77	42.62	53.74
	2800 cm²	mm	–					992	1168	1450
		in						39.05	45.98	57.08
Class 900 H4 for actuator	350 cm²	mm	622	622	631	756	732	752	–	
		in	24.48	24.48	24.84	29.76	28.82	29.6		
	700 cm²	mm	622	622	631	756	732	752	1083	1365
		in	24.48	24.48	24.84	29.76	28.82	29.6	42.64	53.74
	1400 cm²	mm	–			811	787	807	1083	1365
		in				31.93	30.98	31.77	42.64	53.76
	2800 cm²	mm	–					992	1168	1450
		in						39.05	45.98	57.08
Weight (kg) without actuator for	Cl 150...600	kg	30	36	44	72	110	156	360	640
		lbs	66.5	79.5	97	159	242.5	344	794	1411
	Class 900	kg	43	49	68	105	130	180	400	730
		lbs	95	108	150	231.5	287	397	882	1610

Table 10 · Dimensions and weights for Type 3251 Globe Valve in standard version with bellows seal · Without actuator

Nominal size		NPS	½	1	1½	2	3	4	6	8
		DN	15	25	40	50	80	100	150	200
Cl 150 H4 for actuator	350 cm²	mm	590	590	602	836	841	841	–	
		in	23.23	23.23	23.7	32.9	33.1	33.1		
	700 cm²	mm	590	590	602	836	841	841	1139	1455
		in	23.23	23.23	23.7	32.9	33.1	33.1	44.85	57.3
	1400 cm²	mm	–			891	896	896	1139	1455
		in				35.1	35.3	35.3	44.85	57.3
	2800 cm²	mm	–					1081	1224	1540
		in						42.56	48.2	60.63
Cl 300/600 H4 for actuator	350 cm²	mm	590	590	602	836	841	841	–	
		in	23.23	23.23	23.7	32.9	33.1	33.1		
	700 cm²	mm	590	590	602	836	841	841	1271	1855
		in	23.23	23.23	23.7	32.9	33.1	33.1	50.04	73.03
	1400 cm²	mm	–			891	896	896	1271	1855
		in				35.1	35.3	35.3	50.04	73.03
	2800 cm²	mm	–					1081	1356	1940
		in						42.56	53.4	76.4
Cl 900 H4 for actuator	350 cm²	mm	583	583	593	825	841	841	–	
		in	22.95	22.95	23.35	32.5	33.1	33.1		
	700 cm²	mm	583	583	593	825	841	841	1271	1990
		in	22.95	22.95	23.35	32.5	33.1	33.1	50.04	78.35
	1400 cm²	mm	–			880	896	896	1271	1990
		in				34.64	35.27	35.27	50.04	78.35
	2800 cm²	mm	–					1081	1356	2075
		in						42.56	53.4	81.7
Weight without actuator for	Class 150/300	kg	–						360	–
		lbs							794	
	Class 600	kg	30	36	44	72	110	156	360	640
		lbs	66.5	95	97	159	243	344	794	1411
	Class 900	kg	43	49	68	105	130	180	400	730
		lbs	95	108	150	232	287	297	882	1610



Type 3251 with heating jacket · Dimensions on request

Selection and sizing of the control valve

1. Calculate the C_v (K_v) coefficient according to IEC 60534.
2. Select the nominal size and C_v (K_{vs}) coefficient from Tables 3 to 5.
3. Determine the permissible differential pressure Δp from Tables 4 and 5.
4. Select the valve body material from Tables 1 and 2 as well as the pressure-temperature diagrams in the Information Sheet T 8000-2 EN.
5. Select additional equipment from Tables 1 and 2.

The following details are required on ordering

Nominal size	NPS ....
Nominal pressure	ANSI Class ....
Body material	According to Table 2
End connection	Flanges/welding ends
Plug	Standard/balanced Soft sealing, metal sealing or lapped-in metal
Characteristic	Equal percentage or linear
Actuator	Type 3271 or Type 3277 (see T 8310-1 EN or T 8310-2 EN)
Fail-safe position	Valve CLOSED or valve OPEN
Process medium	Density in lb/cu.ft or kg/m^3 and temperature in °C (°F)
Flow rate	lbs/h or kg/h or cu.ft/min or m^3/h in standard or operating condition
Pressure	p_1 and p_2 in bar (psi) (absolute pressure p_{abs}), both with minimum, standard and maximum flow
Accessories	Positioner and/or limit switches

Specifications subject to change without notice.

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