

Series 240

Type 3522-1 and Type 3522-7 Pneumatic Control Valves

Type 3522-2 Electropneumatic Control Valve

Type 3522 Globe Valve



Application

Control valve for process engineering applications with high industrial requirements

Valve size	NPS ½ to 2
Pressure rating	Class 300
Temperatures	14 to 430 °F (-10 to +220 °C)
Standards	ANSI, ASME and ASTM



Actuator options for Type 3522 Globe Valve:

- Type 3271 Pneumatic Actuator (Type 3522-1 Control Valve)
- Type 3277 Pneumatic Actuator (Type 3522-7 Control Valve) for integral positioner attachment
- Type 3372 Electropneumatic Actuator with integral positioner (Type 3522-2 Control Valve)
- Type 582x Electric Actuator for HVAC applications

Valve body material

- Aluminum bronze C95200
- Cast stainless steel A351 CF8M acc. to ASTM specification

Valve plug seal

- Metal
- Soft

Other characteristics

- Blowout-protected stems
- Spring-loaded packing
- Stellited® trim

These control valves feature a low profile design and interchangeability of parts that provides the flexibility to meet a wide range of applications. The modular accessory packages available can be configured to satisfy any control requirements.

Versions

- **Type 3522-1** · NPS ½ to 2 with Type 3271 Pneumatic Actuator (see Data Sheet ▶ T 8310-1)
- **Type 3522-2** · NPS ½ to 1 with Type 3372 Electropneumatic Actuator (see Data Sheet ▶ T 8313)
- **Type 3522-7** (Fig. 1) · NPS ½ to 2 with Type 3277 Pneumatic Actuator for integral positioner attachment (see Data Sheet ▶ T 8310-1)

Optionally with

- **Adjustable graphite packing**
- **Additional handwheel** · see Data Sheet ▶ T 8310-1
- **NACE version** acc. to ISO 15156, MR0103:2007, MR0175:2002



Fig. 1: Type 3522-7 Pneumatic Control Valve with Type 3275 Positioner

Fail-safe action

Depending on how the springs are arranged in the pneumatic actuator (see Data Sheets ► T 8310-1 and ► T 8310-2), the valve has two different fail-safe positions effective upon air supply failure:

- **Actuator stem extends (air-to-open/fail-close):** The actuator spring closes the valve upon air supply failure.
- **Actuator stem retracts (air-to-close/fail-open):** The actuator spring opens the valve upon air supply failure.

Notes on the differential pressure tables

- The maximum permissible supply pressure is 90 psi for all valves in sizes NPS ½ to 2.
- The medium flows in the flow-to-open direction through the valve.
- Version with PTFE packing
- The leakage rates specified in Table 1 are not exceeded with the maximum differential pressures specified.
- The specified differential pressure may be restricted by the pressure-temperature diagram.

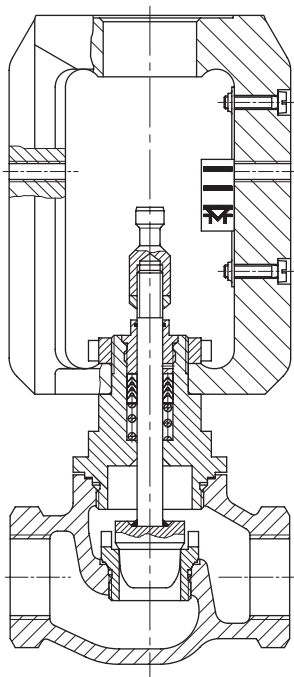


Fig. 2: Type 3522, NPS ½ to 1

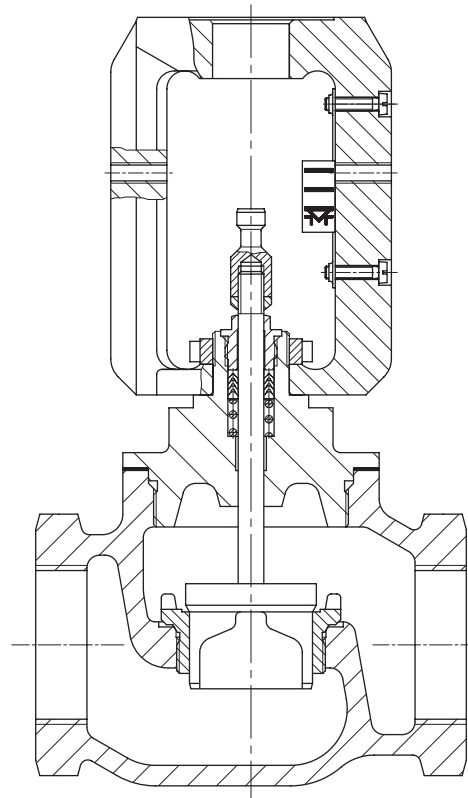


Fig. 3: Type 3522, NPS ¼ to 2, version with forged yoke design

Table 1: Technical data

Size	NPS ½...2	
ASTM material	Aluminum bronze C95200	Cast stainless steel A351 CF8M
Type of connection	Female thread	
Type of thread	NPT ¹⁾	
Pressure rating	Class 300	
Seat/plug seal	Metal or soft	
Characteristic	Equal percentage or linear	
Rangeability	50:1	
Temperature ranges in °F (°C) · Permissible operating pressures acc. to pressure-temperature diagrams (see Information Sheet ► T 8000-2)		
Body	14...430 °F (-10...+220 °C)	
Valve plug Standard	Metal seal	14...430 °F (-10...+220 °C)
	Soft seal	14...430 °F (-10...+220 °C)
Leakage class according to ANSI/FCI 70-2		
Valve plug	Metal seal	Standard: IV · High-performance: V
	Soft seal	VI

¹⁾ Other versions on request

Table 2: Materials (ASTM/AISI material description)

Standard version		
Valve body ¹⁾	Aluminum bronze C95200	Cast stainless steel A351 CF8M
Valve bonnet	Aluminum bronze C95200	Cast stainless steel A351 CF8M
Seat and plug ^{2) 3)}	410-2/F6a Cl.2	316 L
	Sealing ring for soft seal: PTFE	
Packing ⁴⁾	V-ring packing: PTFE with carbon · Spring: Stainless steel (AISI 301)	
Body gasket	Copper	Stainless steel

¹⁾ Refer to pressure-temperature diagram, other materials available on request

²⁾ All seats and plugs with metal seal also available with Stellite facing

³⁾ Other materials on request

⁴⁾ Other packings on request

Table 3: C_v and K_{vs} coefficients

Terms for control valve sizing according to ISA S75.01/IEC 60534 Parts 2-1 and 2-2: $F_L = 0.95$, $x_T = 0.75$ (at 75 % rated travel)
Conversion of valve sizing coefficients: $C_v = K_{vs}/0.865$

Table 3.1: Overview

C_v	0.12	0.2	0.3	0.5	0.75	1.2	2	3	5	7.5	12	20	30	40
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	35
Seat ØD	in	0.12		0.24		0.47		0.945		1.22	1.5	1.9		
	mm	3		6		12		24		31	38	48		
Travel	in	0.6												
	mm	15												

Table 3.2: Standard version

C_v	0.12	0.2	0.3	0.5	0.75	1.2	2	3	5	7.5	12	20	30	40
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	35
NPS	DN													
½	15	•	•	•	•	•	•	•	•					
¾	20	•	•	•	•	•	•	•	•	•				
1	25	•	•	•	•	•	•	•	•	•	•			
1¼	40			•	•	•	•	•	•	•	•	•		
1½	40			•	•	•	•	•	•	•	•	•	•	
2	50			•	•	•	•	•	•	•	•	•	•	•

Table 4: Differential pressure · Unbalanced valve plugs

- Values specified in the gray-shaded columns correspond to the bench range
- Differential pressures specified in the white columns apply to maximum pretensioned springs
- Differential pressures in parentheses refer to the values in parentheses in the bench range row
- See Notes on the differential pressure tables

Table 4.1: Permissible differential pressures Δp · Pressures stated in psi

For actuators employing fail-safe action: actuator stem extends · Valve closed at supply pressure 0 psi

Bench range [psi] for actuators [cm ²]		240	3...15	5...17	6...30	9...33	9...45 ¹⁾	13...49	–	–		
		120, 350		6...18		12...36		18...54	20...34	30...48		
Required supply pressure [psi]			18	21	33	39	48	57	37	51		
Size		C _v	K _{vS}	Actuator size	Δp when p ₂ = 0							
NPS	DN											
½...1	15...25	0.12... 0.3	0.1... 0.25	120	320	–	580	–	–	–	–	–
				240	580	580	–	–	–	–	–	–
½...2	15...50	0.5...1.2	0.4...1.0	120	320	–	580	–	–	–	–	–
				240	580	580	580	–	–	–	–	–
		2...5	1.6...4	120	130	–	405	–	–	–	580	–
				240	406	580	580	580	580	580	580	–
350	580	580	580	580	580	–	580	–	–			
¾...2	20...50	7.5 12	6.3 10	120	–	–	80	–	–	–	435	580
				240	75	135	215	350	350	565	–	–
				350	145	350	350	550	550	580	580	580
1¼ and 2	40 and 50	20	16	120	–	–	44	–	–	–	260	405
				240	36	75	115	200	200	335	–	–
				350	75	195	195	435	320	580	580	580
1½...2	40...50	30	25	120	–	–	22	–	–	–	175	275
				240	19	45	72	130	130	218	–	–
				350	45	125	125	290	200	450	535	580
2	50	40	35	240	–	–	43	72	72	130	–	–
				350	23	72	72	175	123	275	330	507

¹⁾ Not for actuator 120 cm²

Table 4.2: Permissible differential pressures Δp · Pressures stated in bar

For actuators employing fail-safe action: actuator stem extends · Valve fully closed at supply pressure 0 bar

Bench range [bar] for actuators [cm ²]		240	0.2...1.0	0.3...1.1	0.4...2.0	0.6...2.2	0.6... 3.0 ¹⁾	0.9...3.3	–	–		
		120, 350		0.4...1.2		0.8...2.4		1.2...3.6	1.4...2.3	2.1...3.3		
Required supply pressure [bar]			1.2	1.4	2.2	2.6	3.2	3.8	2.5	3.5		
Size		C _v	K _{vS}	Actuator size	Δp when p ₂ = 0							
NPS	DN											
½...1	15...25	0.12... 0.3	0.1... 0.25	120	40	–	40	–	–	–	–	–
				240	40	40	–	–	–	–	–	
½...2	15...50	0.5...1.2	0.4...1.0	120	22	–	40	–	–	–	–	–
				240	40	40	40	–	–	–	–	–
				350	40	40	40	40	40	–	40	–
		2...5	1.6...4	120	9	–	28	–	–	–	40	–
				240	28	40	40	40	40	40	–	–
				350	40	40	40	40	40	–	40	–
¾...2	20...50	7.5 12	6.3 10	120	–	–	5.5	–	–	–	30	40
				240	5.2	9.3	14.8	24	24	39	–	–
				350	10	24	24	38	38	40	40	40
1¼ and 2	40 and 50	20	16	120	–	–	3	–	–	–	18	28
				240	2.5	5.2	8.0	14	14	23	–	–
				350	5.2	13.5	13.5	30	22	47	40	40
1½...2	40...50	30	25	120	–	–	1.5	–	–	–	12	19
				240	1.3	3.1	5.0	9.0	9.0	15	–	–
				350	3.1	8.5	8.5	20	14	31	37	40
2	50	40	35	240	–	–	3.0	5.0	5.0	9.0	–	–
				350	1.6	5.0	5.0	12	8.5	19	23	35

¹⁾ Not for actuator 120 cm²**Table 4.3:** Permissible differential pressures Δp · Pressures stated in psi and bar

For actuators employing fail-safe action: Actuator stem "retracts" · Valve closed at required supply pressure

Bench range [psi/bar] for actuators [cm ²]		Pressures in psi			Pressures in bar					
		120 ... 350	3...15		0.2...1.0					
Required supply pressure [psi/bar]				18	36	58	1.2	2.4	4	
Size		C _v	K _{vS}	Actuator size	Δp when p ₂ = 0			Δp when p ₂ = 0		
NPS	DN									
½...1	15...25	0.12... 0.3	0.1... 0.25	120	330	580	–	23	40	–
				240	580	–	–	40	–	–
½...2	15...50	0.3...1.2	0.4...1.0	120	330	580	–	23	40	–
				240	580	580	–	40	40	–
				350	580	580	–	40	40	–
		2...5	1.6...4	120	130	580	–	9	40	–
				240	410	580	–	28	40	–
				350	580	580	–	40	40	–
¾...2	20...50	7.5 12	6.3 10	120	10	450	580	0.6	31	40
				240	80	580	580	5.2	40	40
				350	145	580	580	10	40	40
1¼ and 2	40 and 50	20	16	120	–	260	580	–	18	40
				240	35	540	580	2.5	37	40
				350	75	580	580	5.2	40	40
1½...2	40...80	30	25	120	–	160	410	–	11	28
				240	20	350	580	1.3	24	40
				350	45	540	580	3.1	37	40
2	50	40	35	240	10	220	490	0.5	15	34
				350	25	330	580	1.6	23	40

Table 5: Dimensions in inch and millimeters**Table 5.1:** Dimensions for Type 3522 Valve in standard version

Globe valve	Size	NPS	1/2	3/4	1	1 1/4	1 1/2	2
Length L	Class 300	in	3.5	3.5	4.31	4.63	5.31	6.66
		mm	89	89	109	118	135	169
H1 for actuators	Type 3271, Type 3277 ≤350 cm ²	in	9.25			8.75	8.62	8.88
		mm	235			222	219	225
	Type 3372	in	10.6			-		
		mm	269					
H2 (approx.)		in	1.13	1.13	1.38	1.50	1.68	1.75
		mm	28.5	28.5	35	38	43	44.5

Table 5.2: Dimensions for Type 3271 and Type 3277 Pneumatic Actuators

Type 3271 and Type 3277 Pneumatic Actuators	Size	[cm ²]	120	240	350
		[in ²]	18.6	37.2	54.3
Diaphragm ØD	in	6.6	9.5	11.0	
	mm	168	240	280	
H	in	2.72	2.56	3.35	
	mm	69	65	85	
H3 ¹⁾	in	4.33			
	mm	110			
Thread		M30 x 1.5			
α (for Type 3271 Actuator)		1/8 NPT (G 1/8)	1/4 NPT (G 1/4)	3/8 NPT (G 3/8)	
α2 (for Type 3277 Actuator)		-	3/8 NPT (G 3/8)		

¹⁾ Minimum clearance to remove the actuator

Table 5.3: Dimensions for Type 3372 Electropneumatic Actuator

Type 3372 Electro-pneumatic Actuator	Size	[cm ²]	120
		[in ²]	18.6
Diaphragm ØD	in	6.6	
	mm	168	
H	in	Stem extends: 7.5 · Stem retracts: 10.4	
	mm	Stem extends: 190 · Stem retracts: 263	
H3 ¹⁾	in	4.33	
	mm	110	
α3 (for Type 3372 Actuator)		1/8 NPT (G 1/8)	

¹⁾ Minimum clearance to remove the actuator

Dimensional drawings

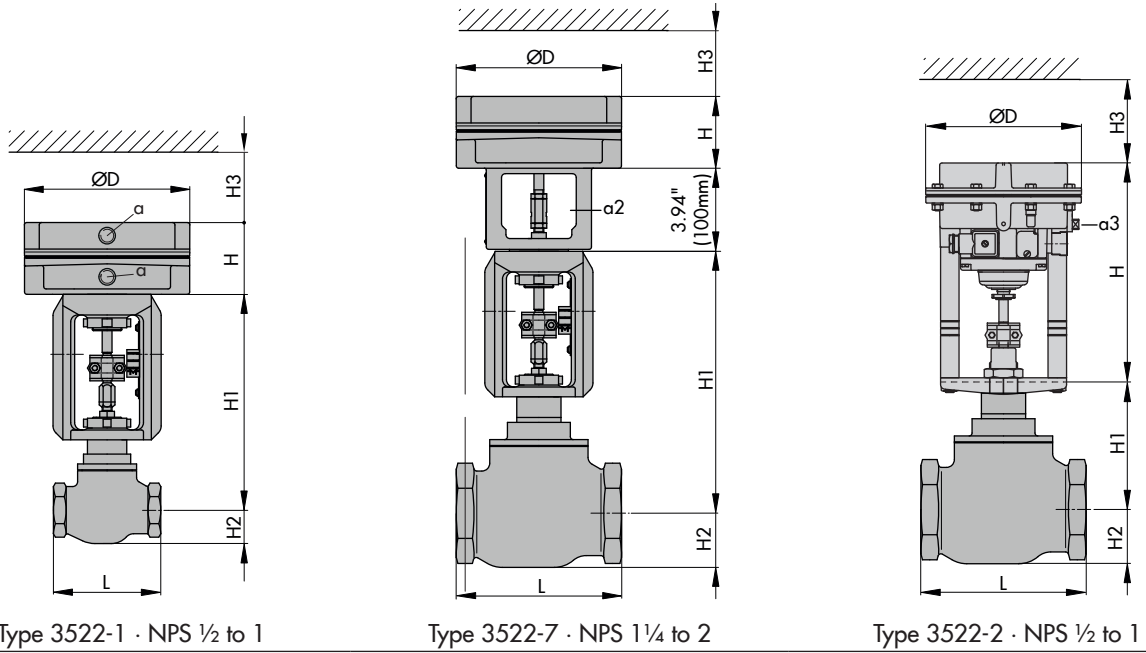


Table 6: Weights in lbs and kg

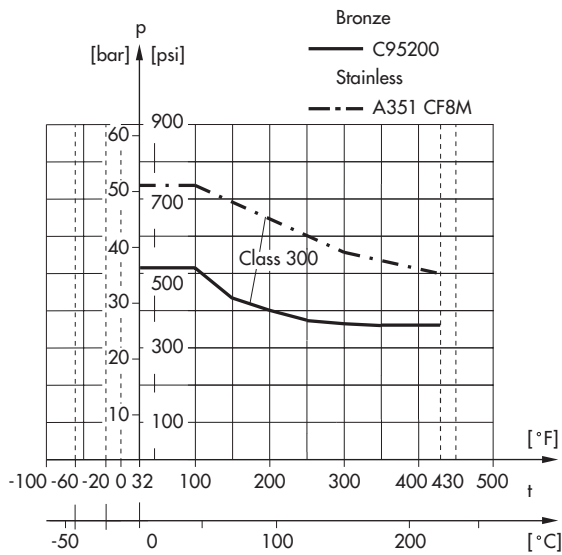
Table 6.1: Weights for Type 3522 Valve

Globe valve	Size	NPS	½	¾	1	1¼	1½	2
Weight without actuator		lbs	7	7.5	9	11	12	17
		kg	3	3.4	4	5	5.4	7.7

Table 6.2: Weights for Type 3271 and Type 3277 Pneumatic Actuators and for Type 3372 Electropneumatic Actuator

Actuator	Size	120	240	350
	in ²	18.6	37.2	54.25
Weight of Type 3271	lbs	6.6	11	18
	kg	3	5	8
Weight of Type 3277	lbs	7.7	20	26.5
	kg	3.5	9	12
Weight of Type 3372	lbs	7.7	–	–
	kg	3.5	–	–

Pressure-Temperature diagram according to ASME/ANSI B16.1 and B16.34



Ordering text

Size	NPS ...
Pressure rating	Class 300
Body material	According to Table 2
Type of connection	NPT female thread
Valve plug	Metal or soft seal
Characteristic	Equal percentage or linear
Actuator	Type 3271 or Type 3277 Pneumatic Actuator ▶ T 8310-1 Type 3372 Electropneumatic Actuator ▶ T 8313
Fail-safe action	Fail-close or fail-open
Process fluid	Density in lb/cu.ft or kg/m ³ and temperature in °F or °C
Flow rate	Flow rate in lb/hr, scfh under standard or operating condi- tions
Pressure	p ₁ in psia (absolute pressure) p ₂ in psia (absolute pressure) with minimum, normal and maximum flow rate
Valve accessories	Versions according to ▶ T 8350

Specifications subject to change without notice



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