

Multi-Stage Globe Control Valve Type 3255

Pneumatic Control Valves Type 3255/3271 and Type 3255/3277

Application

Control valve for process engineering applications for low-noise and low-wear service with high industrial requirements.

Nominal sizes 2" to 16" (50 to 400 mm)

Pressure ratings ANSI Class 150 to 2500

Temperatures -328 to +932 °F (-200 to +500 °C)

These valves comply with ANSI, ASME and ASTM standards

The control valves consist of a body with multi-stage trim, bonnet, yoke and a pneumatic actuator, with optional metal bellows or insulating extension. The valves may also be equipped with electric, electrohydraulic, or hand-operated actuators, as well as control accessories and other instrumentation.

Features

- Modular design, rugged and heavy duty construction, full range of body and trim materials
- Plug available with 3 or 5 stages, depending on service
- Bottom stem guided for additional stability
- Field retrofitable metal bellows seals and extension bonnets
- Self-adjusting, live-loaded PTFE/Carbon V-ring stuffing box
- Excellent dynamic response and high trim stability
- Low profile, reversible, multi-spring/rolling diaphragm actuator
- NAMUR (IEC 534-6) accessory mounting standard
- Complete selection of actuator options, positioners and control accessories

Standard Versions

- **Body materials** · ASTM Cast A 216 WCB, A 217 WC6, A 351 CF8M
- **End connections** · Raised-Face Flanges
- **Packing** · PTFE/Carbon V-ring spring-loaded/self-adjusting, temperature range: 15 to 430 °F (-10 to 220 °C)
- **Trim** · Equal percentage characteristic, metal-to-metal seal

Options

- **Body Materials** · A 217 WC9, A 352 LCB, A 351 CF8, Hastelloy C, Monel, and others
- **Packing** · Adjustable, high-temperature (HT) packing for temperatures from 15 to 660 °F (-10 to 350 °C) and others
- **Extension Bonnet** · For extreme temperatures from -328 to 932 °F (-200 to 500 °C)
- **Metal bellows seal** · For complete seal between process and atmosphere, with test connection and backup PTFE packing
- **Characteristic** · Linear
- **Trim materials** · Stellite 6, ceramic and others
- **Plug seal** · Lapped-in metal seal
- **Pressure balanced version** · For high differential pressures
- **Class 1500 and 2500** · On request
- **End connections** · RTJ, socketweld and buttweld ends
- **Flow divider** · For noise level reduction, see Data Sheet T 8081
- **Heating jacket, versions for sour gas according to NACE** · Details on request

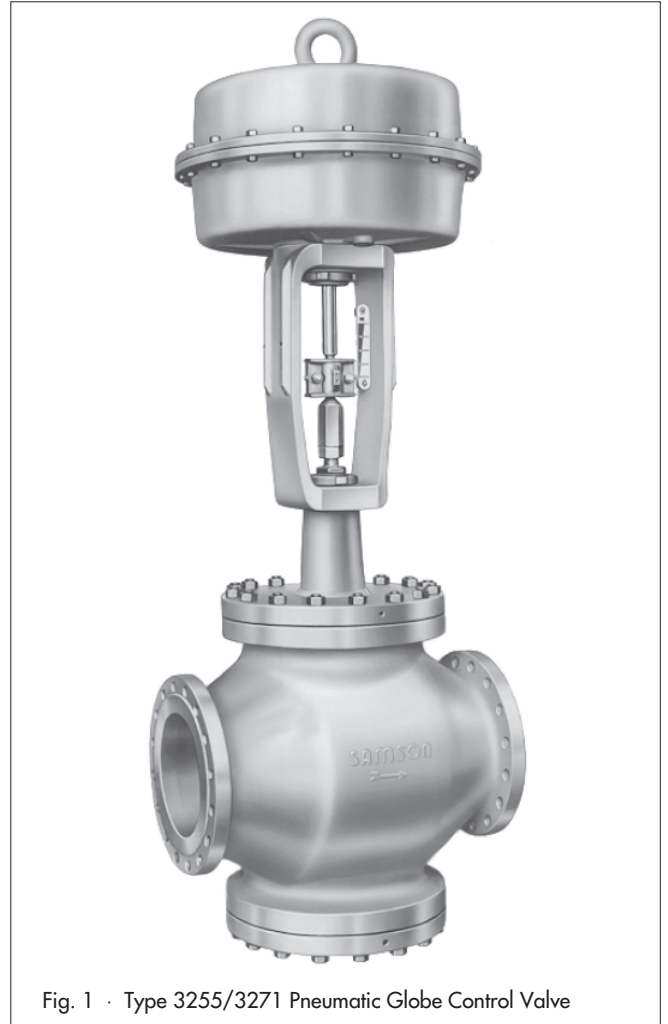


Fig. 1 · Type 3255/3271 Pneumatic Globe Control Valve

Actuator Combinations

Type 3255/3271 (Fig. 1) · With Type 3271 Pneumatic Actuator
· For operation with or without yoke-mounted positioner, details see T 8310

Type 3255/3277 · With Type 3277 Pneumatic Actuator
· For integral positioner/accessory mounting according to SAMSON "Valve Management" System, details see T 8311

DIN Versions · See Data Sheet T 8062 EN **JIS** · On request

Principle of Operation (Figs. 2 and 3)

The process medium flows through the valve in the direction indicated by the arrow on the body. The position of the 3-stage or 5-stage valve plug determines the free area between the valve seats and plugs and hence the pressure drop or flow rate through the valve.

The pressure drop occurs in stages so that critical operating conditions like cavitation, excessive wear and high noise emissions are avoided. Additionally, the plug stem is bottom-guided for added stability and to limit vibrations.

A pressure-balanced version can be used with high differential pressures where the force produced by the actuator in the unbalanced version would be insufficient to close the valve.

The valves can also be equipped with flow dividers to further reduce the noise level.

Fail-safe action

Depending on the arrangement of the diaphragm plate and springs within the actuator, the control valve offers two different fail-safe actions upon loss of air supply (see Technical Data Sheets T 8310 and T 8311 for details):

Actuator "extends" stem (fail-close)

The actuator springs close the valve upon loss of air supply.

Actuator "retracts" stem (fail-open)

The actuator springs open the valve upon loss of air supply.

Selection and sizing of Type 3255 Multi-Stage Control Valves

Control valves with multi-stage plugs must be carefully sized. Therefore, SAMSON will assume the responsibility of properly sizing the Type 3255 control valves.

For correct sizing of these control valves, please supply the following operating data:

Process medium ...	Flow rate ...
Inlet pressure ...	Outlet pressure ...
Temperature ...	
Maximum shut-off Δp for actuator sizing ...	
Air/power supply available for actuator, max./min. ...	

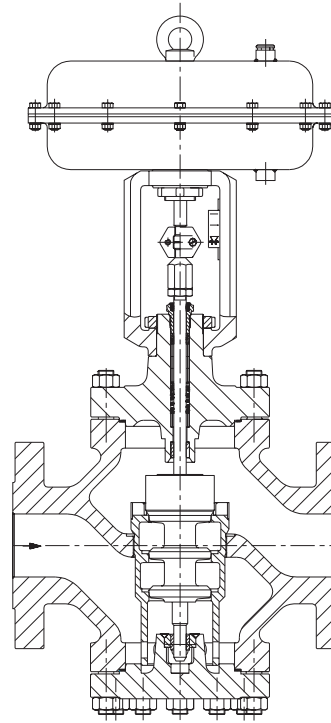


Fig. 2 · Type 3255 Globe Valve with 3-Stage Axial Plug

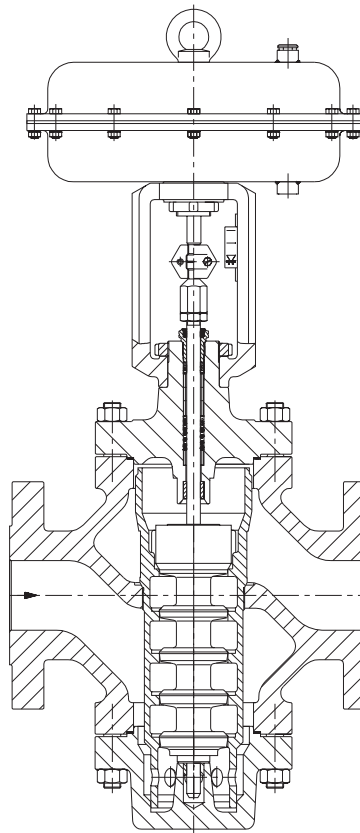


Fig. 3 · Type 3255 Globe Valve with 5-Stage Axial Plug

Table 1 · Technical Data

Nominal Valve Size		2" ... 16"		
Body material, ASTM (also see Table 2)		Carbon steel A 216 WCB	High-Temperature Carbon steel A 217 WC6	Stainless steel A 351 CF8M
End connections	Flanges	RF (raised face) and RTJ (ring-type joint)		
	Welding ends	Socketweld, buttweld, according to ANSI B16.11, B16.25		
Pressure rating	Class	150 ... 900, according to ANSI B16.34 ¹⁾		
Seat/Plug seal		Metal sealing or lapped-in metal sealing		
Packing design		V-ring, spring-loaded, self-adjusting or adjustable		
Flow direction (standard)		Flow to Open (FTO)		
Cv values		See Figure 4		
Characteristic		Equal percentage or linear		
Rangeability		30:1		
Dimensions and Weights		See Tables 3...6		
Temperature ranges in °F (°C) · Max. operating pressures according to Pressure-Temperature Diagrams (see Information Sheet T 8000-2)				
Body without insulating section		15 ... 430 °F (-10 ... 220 °C) · Up to 660 °F (350 °C) with high-temperature packing		
Body with	Insulating or bellows section	-20...800 °F (-29...427 °C)	-20...930 °F (-29...500 °C)	-328...930 °F (-200...500 °C)
Valve plug ²⁾	Standard	Metal sealing	-328...930 °F (-200...500 °C)	
	Balanced	PTFE ring	-328...430 °F (-200...220 °C)	
		Graphite ring	430...930 °F (220...500 °C)	
Leakage rate class according to ANSI/FCI F70-2 (IEC 60 534 Part 4)				
Valve plug	Standard	Metal sealing	IV	
		Lapped-in metal	IV-S2 · 4" and upwards: IV-S1	
	Balanced	Metal sealing	With PTFE balancing seal: IV · With graphite balancing seal: III	

¹⁾ Up to Class 2500 on request.

²⁾ Only in combination with a suitable body material.

Table 2 · Materials

Valve body ¹⁾	Carbon steel ASTM A 216 WCB	High-Temperature Carbon steel ASTM A 217 WC6	Stainless steel ASTM A 351 CF8M
Bonnet	A182 F12		A182 F316
Yoke	A 395 (WN 0.7043)		
Seat and Plug ²⁾	AISI 410 (WN 1.4006)		AISI 316Ti (WN 1.4571)
Pressure balance seal ring	PTFE with carbon · Graphite		
Guide bushings	AISI 440B (WN 1.4112)		Hastelloy C
Stuffing box	V-ring packing	PTFE/Carbon, with spring AISI 301 (WN 1.4310)	
	Adjustable packing	Graphite and carbon rings	
Body gasket	AISI 316Ti (WN 1.4571)		
Insulating/bellows extension housing	A182 F12		A182 F316
Metal bellows insert	AISI 316Ti (WN 1.4571)		
Exterior hardware, nameplates, travel indicator, couplings	AISI 304, AISI 316 and AISI 430F (WN 1.4301, WN 1.4571, WN 1.4104)		

¹⁾ Other materials available upon request

²⁾ Seats and plugs also available with Stellite facing or complete Stellite 6 plug

Table 3a · Dimensions of standard version in inches

Globe Valve		Size	in	2"	3"	4"	6"	8"	10"	12"	16"
Length L	Class 150	in		10.00	11.75	13.88	17.75	21.38	26.50	29.00	40.00
	Class 300	in		10.50	12.50	14.50	18.62	22.38	27.88	30.50	41.62
	Class 600	in		11.25	13.25	15.50	20.00	24.00	29.62	32.25	43.62
	Class 900	in		14.50	15.00	18.00	24.00	29.00	33.00	38.00	44.50
H1 for actuator	700 cm ²	Class 150/900	in	18.11		18.90	28.94	31.69	-		
	1400 cm ²	Class 150/900	in	20.28		21.06	28.94	31.69	33.85	50.79	-
	2800 cm ²	Class 150/900	in	-		-	39.00	41.75	43.90	50.79	
H2 (approx.) for plug	3-Stage	in	7.09	7.48	9.45	12.60	15.35	16.14	18.90	22.05	
	5-Stage	in	8.66	10.04	11.22	16.54	On request				

Pneumatic Actuator		Size	700	1400	2800	2 x 2800
	in ²		108	217	434	434
Diaphragm Ø D	in		15.4	20.9	30.3	30.3
H	in		7.7	11.3	24.4	44.5
H3 ¹⁾	in		7.5	24.0	25.5	25.5
Thread			M30 x 1.5	M 60 x 1.5	M 100 x 2	
a (with Type 3271 Actuator)			NPT 3/8	NPT 3/4	NPT 1	

¹⁾ Minimum clearance for actuator disassembly

Table 3b · Weights of standard version in lbs

Globe Valve		Size	in	2"	3"	4"	6"	8"	10"	12"	16"
Weight, without actuator	Class 150/300	lbs		On request		310	730	1375	On request		
	Class 600	lbs				310	730	1375			
	Class 900	lbs				375	850	1935			

Pneumatic Actuator		Size	700	1400	2800	2 x 2800
	in ²		108	217	434	2 x 434
Weight, Type 3271	Without	lbs	48.5	154	992	2095
	With handwheel	lbs	59.5	Only with side-mounted handwheel, see T 8310		

Fig. 4 · Correlation between valve size and Cv value for liquids

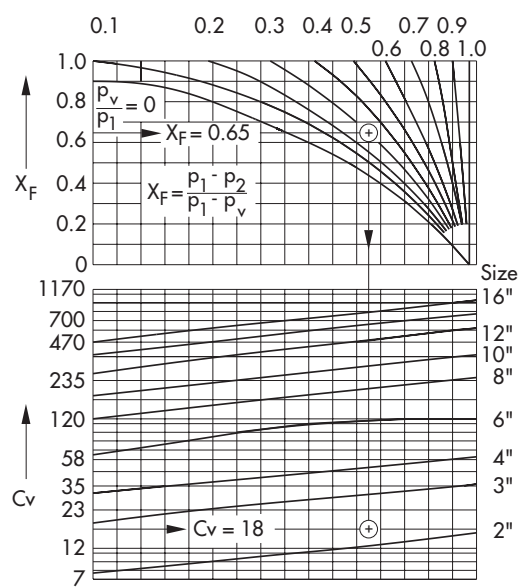
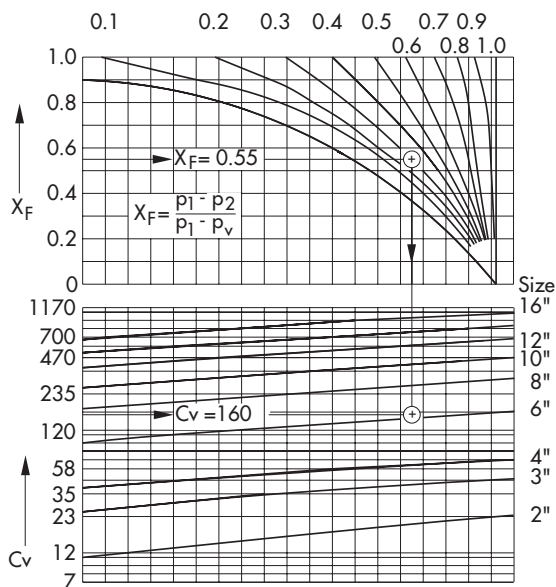


Table 4a · Dimensions of standard version in mm

Globe Valve	Size	in	2"	3"	4"	6"	8"	10"	12"	16"
		mm	50	80	100	150	200	250	300	400
Length L	Class 150	mm	254	298	353	451	543	673	737	1016
	Class 300	mm	267	318	368	473	568	708	775	1057
	Class 600	mm	286	337	394	508	610	752	819	1108
	Class 900	mm	368	381	457	610	737	838	965	1130
H1 for actuator	700 cm ² Class 150/900	mm	460		480	735	805	-		
	1400 cm ² Class 150/900	mm	515		535	735	805	860	1290	-
	2800 cm ² Class 150/900	mm	-		-	990	1060	1115	1290	
H2 (approx.) for plug	3-Stage	mm	180	190	240	320	390	410	480	560
	5-Stage	mm	220	255	285	420	On request			
Pneumatic Actuator	Size		700		1400		2800		2 x 2800	
	cm ²		700		1400		2800		2800	
Diaphragm Ø D	mm		390		530		770			
H	mm		196		287		620		1130	
H3 ¹⁾	mm		190		610		648			
Thread			M30 x 1.5		M 60 x 1.5		M 100 x 2			
α (with Type 3271 Actuator)			NPT 3/8		NPT 1/4		NPT 1			

1) Minimum clearance for actuator disassembly

Table 4b · Weights of standard version in kg

Globe Valve	Size	in	2"	3"	4"	6"	8"	10"	12"	16"
		mm	50	80	100	150	200	250	300	400
Weight, without actuator	Class 150/300	kg	On request		141	332	625	On request		
	Class 600	kg			141	332	625			
	Class 900	kg			171	386	880			
Pneumatic Actuator	Size		700		1400		2800		2 x 2800	
	cm ²		700		1400		2800		2 x 2800	
Weight, Type 3271	Without	kg	22		70		450		950	
	With handwheel	kg	27		Only with side-mounted handwheel, see T 8310					

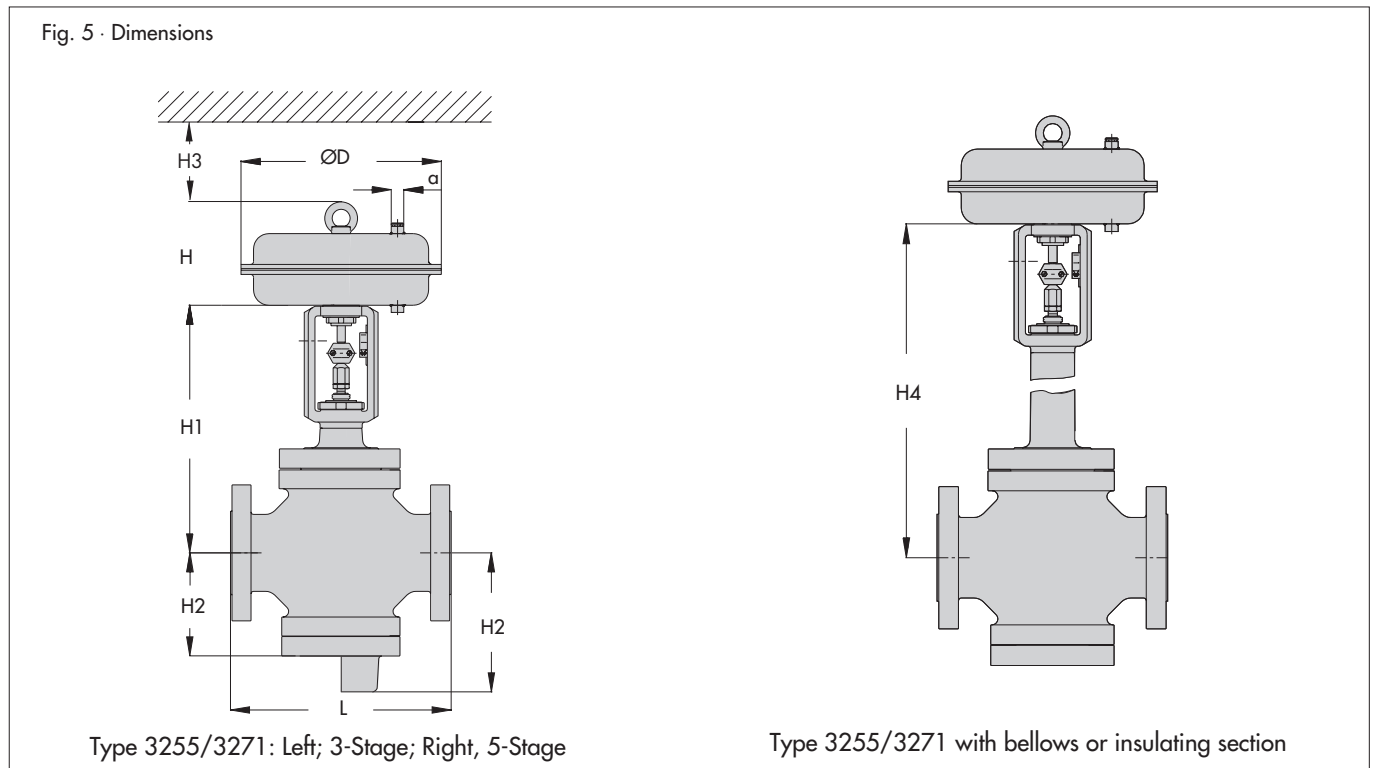


Table 5a · Dimensions and weights of standard version with insulating section in inches and lbs · Without actuator

Nominal size		2"	3"	4"	6"	8"	10"	12"	16"
H4 for actuator	108 in ² /700 cm ²	in	29.13	29.92	42.72	-			
	217 in ² /1400 cm ²	in	31.30	32.09	42.72	53.74	58.46	71.26	-
	434 in ² /2800 cm ²	in	-		52.76	63.78	68.50	71.26	73.62
Weight, without actuator for	Class 150...900	lb	On request						

Table 5b · Dimensions and weights of standard version with metal bellows in inches and lbs · Without actuator

Nominal size		2"	3"	4"	6"	8"	10"	12"	16"
H4 for actuator	108 in ² /700 cm ²	in	26.77	27.76	42.72	46.85	-		
	217 in ² /1400 cm ²	in	28.94	29.92	44.88	46.85	51.97	64.57	-
	434 in ² /2800 cm ²	in	-		55.12	57.09	61.81	64.57	67.72
Weight, without actuator for	Class 150...900	lb	On request						

Table 6a · Dimensions and weights of standard version with insulating section in mm and kg · Without actuator

Nominal size		in	2"	3"	4"	6"	8"	10"	12"	16"
		mm	50	80	100	150	200	250	300	400
H4 for actuator	108 in ² /700 cm ²	mm	740	760	1085	-				
	217 in ² /1400 cm ²	mm	795	815	1085	1365	1485	1810	-	
	434 in ² /2800 cm ²	mm	-		1340	1620	1740	1810	1870	
Weight, without actuator for	Class 150...900	kg	On request							

Table 6b · Dimensions and weights of standard version with metal bellows in mm and kg · Without actuator

Nominal size		in	2"	3"	4"	6"	8"	10"	12"	16"
		mm	50	80	100	150	200	250	300	400
H4 for actuator	108 in ² /700 cm ²	mm	680	705	1085	1190	-			
	217 in ² /1400 cm ²	mm	735	760	1140	1190	1320	1640	-	
	434 in ² /2800 cm ²	mm	-		1400	1450	1570	1640	1720	
Weight, without actuator for	Class 150...900	kg	On request							

Specifications subject to change without notice



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