

T 8006-GR EN

Series SMS · SMS HG-1 and SMS HG-7 Pneumatic Control Valves

Type 261GR Globe Valve

ANSI version



Application

Control valve for process engineering applications with high industrial requirements

Nominal size	NPS 1 to 3
Pressure rating	Class 300 to 900
Temperatures	-58 to +797 °F (-50 to +425 °C)



Fig. 1: SMS HG-1: Type 261GR Globe Valve with Type 3271 Pneumatic Actuator

Type 261GR Globe Valve operated with

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

Special features

- 3-, 4- or 6-stage CDST plug fully replaceable in the field
- Body made of cast steel
- Body made of cast stainless steel
- Metal seal
- High-performance metal seal
- Balanced to handle high differential pressures

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

The control valves with their modular design can be equipped with various accessories, such as positioners, limit switches, solenoid valves and other devices according to DIN EN 60534-6-1¹⁾ and NAMUR Recommendation (see Information Sheet ► T 8350).

¹⁾ Accessories required. See associated actuator documentation.

Versions

- **SMS HG-1** • Type 261GR Globe Valve and Type 3271 Actuator with 350 to 1400-60 cm² actuator area (see Data Sheets ► T 8310-1, ► T 8310-2 and ► T 8310-3)
- **SMS HG-7** • Type 261GR Globe Valve and Type 3277 Actuator with 350 to 750v2 cm² actuator area for integral positioner attachment (see Data Sheet ► T 8310-1)

Further versions

- **Valve plug with pressure balancing**
- **Additional handwheel** • See Data Sheet ▶ T 8310-1
- **Type 261GR Valve with Type 3273 Hand-operated Actuator** • For valves with max. 30 mm rated travel and side-mounted handwheel for travel >30 mm • See Data Sheet ▶ T 8312
- **SMS HG-TP Electric Control Valve** • On request

Principle of operation of version with multi-stage CDST plug

The valves have a CDST (cavitation dirty service trim) plug, which is specially constructed for media containing solid matter or dirty media. The circumferential guide over the full length of the CDST plug makes it resistant to vibration.

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

Compared to standard valve trims, the CDST trims considerably reduce the sound pressure level for differential pressure ratios between $X_F = 0.25$ and $X_F = 0.99$ by shifting the point of incipient cavitation.

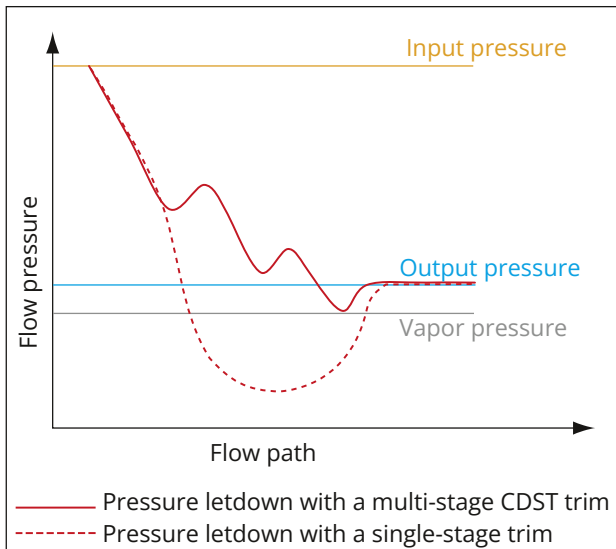


Fig. 2: Pressure drop across a multi-stage and single-stage trim

Pressure balancing must be used when high pressures or differential pressures act on the plug.

Fig. 3 to Fig. 5 show configuration examples.

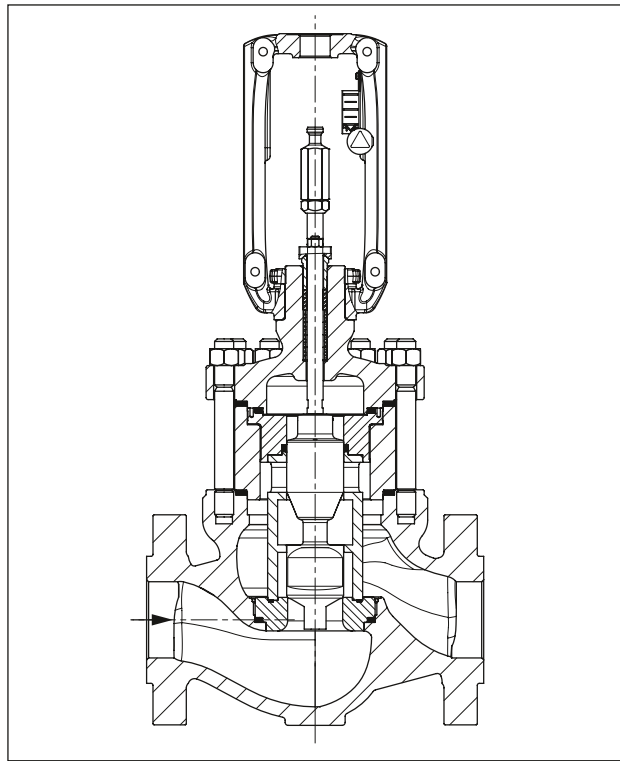


Fig. 3: Type 261GR Globe Valve with 3-stage CDST plug

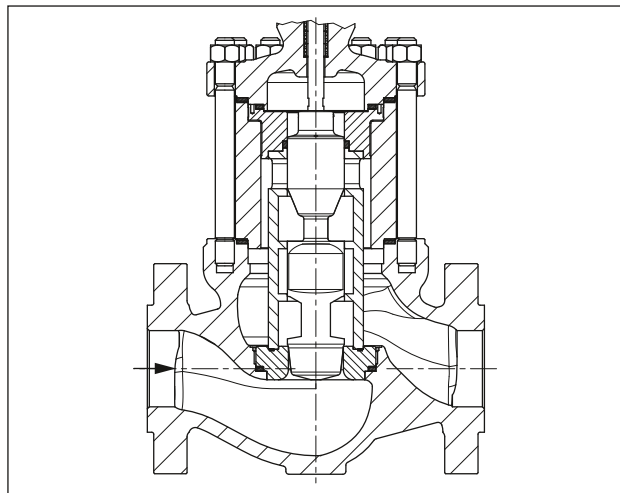


Fig. 4: Type 261GR Globe Valve with 4-stage CDST plug

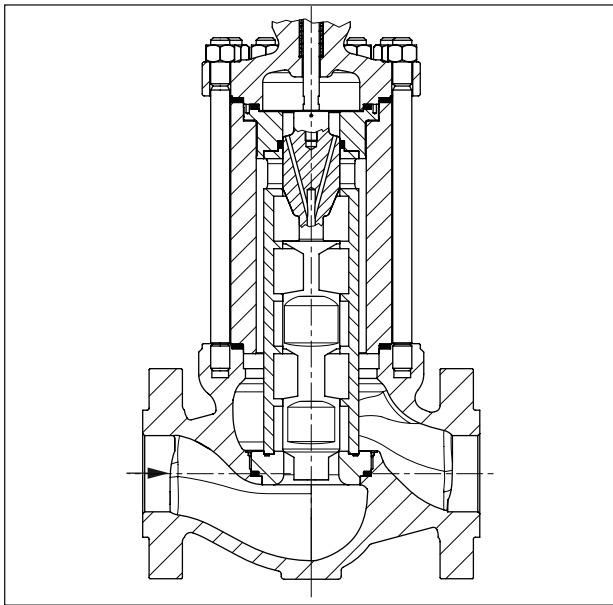


Fig. 5: Type 261GR Globe Valve with 6-stage CDST plug and pressure balancing

Fail-safe positions

Depending on how the springs are arranged in the Type 3271 or Type 3277 Pneumatic Actuator (see Data Sheets ► T 8310-1, ► T 8310-2 and ► T 8310-3), the valve has two different fail-safe positions that become effective when the supply air fails:

- **Actuator stem extends (fail-close):**
The valve is closed upon air supply failure.
- **Actuator stem retracts (fail-open):**
The valve is opened upon air supply failure.

Table 1: Technical data for Type 261GR · ANSI version

Material		Cast steel A216 WCC	Cast stainless steel A351 CF8M
Nominal size and pressure rating		NPS 1 to 3 Class 300 to 900	
Type of end connections	Flanges	RF and RTJ according to ASME B16.5	
	Welding ends	According to ASME B16.25	
Seat-plug seal		Metal seal · High-performance metal seal	
Characteristic		Linear ²⁾	
Rangeability		On request (depending on nominal size, valve version and number of trim stages)	
Conformity			
Optional RFID tag		Application range according to the technical specifications and the explosion protection certificates. These documents are available on our website: ► www.samsongroup.com > Products > Electronic nameplate The maximum permissible temperature at the RFID tag is 185 °F (85 °C).	
Temperature ranges in °F (°C) · Permissible operating pressures according to pressure-temperature diagrams (see Information Sheet ► T 8000-2)			
Body with standard bonnet		14 to 482 (-10 to +250) with PTFE packing Up to +797 (+425) with graphite packing	-58 to +482 (-50 to +250) with PTFE packing Up to +797 (+425) with graphite packing
Trim ¹⁾	Metal seal	-58 to +797 (-50 to +425)	
	Balanced with PTFE	-58 to +482 (-50 to +250)	
Leakage class according to ANSI FCI 70-2			
Trim	Metal seal	Standard: IV · High-performance metal seal: V	
	Balanced, metal seal	With PTFE ring (standard): IV · High-performance metal seal: V	

¹⁾ Only in combination with suitable body material

²⁾ Other on request

Table 2: Materials for Type 261GR · ANSI version

Body of standard version		Cast steel A216 WCC	Cast stainless steel A351 CF8M
Valve bonnet		A216 WCC	A351 CF8M
Intermediate piece		A105	316/316L
Plug stem		XM-19-H	
Seal ring for balanced plug		PTFE with carbon · Graphite	
Packing		PTFE packing loaded by internal or external springs or adjustable graphite packing	
Body gasket		Spiral wound gasket, graphite/316L	
Version with clamped-in seat and plug	Plug ³⁾	316/316L/440C ¹⁾	316/316L ⁴⁾
	Seat	316/316L/440C ¹⁾	316/316L ²⁾
	Liner	316/316L/440C ¹⁾	316/316L ³⁾
	Cylinder	316/316L/440C ¹⁾	316/316L ³⁾

¹⁾ Heat treated

²⁾ Also with Stellite®-faced facing and guide for media containing solid matter

³⁾ Kolsterized

⁴⁾ Kolsterized for media containing solid matter

C_v and K_{vs} coefficients for version with plug¹⁾ • Linear

¹⁾ CDST • Values for other plug versions on request

Table 3: Flow coefficients for version with CDST trim

C _v		0.76	1.5	3.1	2.1	5.7	11.7	9.3	19	24.5
K _{vs}		0.66	1.29	2.65	1.81	4.91	10.1	8	16.4	21.2
CDST stages		6	4	3	6	4	3	6	4	3
Seat bore	in	0.71	0.71	0.71	1.38	1.38	1.38	2.17	2.17	2.17
	mm	18	18	18	35	35	35	55	55	55
Travel	in	0.39	0.39	0.39	0.59	0.59	0.59	0.98	0.98	0.98
	mm	10	10	10	15	15	15	25	25	25
NPS										
1		•	•	•						
2					• ¹⁾	• ¹⁾	• ¹⁾			
3								• ¹⁾	• ¹⁾	• ¹⁾

¹⁾ Versions also with PTFE pressure balancing

Entrained dirt particles

SAMSON has calculated the maximum diameter of entrained dirt particles that can be flushed out of a fully open valve. Depending on how far the valve is opened during throttling service, even smaller sized particles may clog up the valve. It may be necessary to briefly move the valve to the fully open position to flush out the valve. How often the valve needs to be flushed out may vary due to the operating conditions and the individual case of use.

Table 4: Maximum permissible size of entrained dirt particles at 100 % travel for version with type A CDST plug

NPS	C _v coefficient	CDST stages	Max. perm. particle diameter
1	3.1	3	3.5 mm (0.137 in)
	1.5	4	0.4 mm (0.015 in)
	0.76	6	0.2 mm (0.007 in)
2	11.7	3	7.8 mm (0.307 in)
	5.7	4	1.0 mm (0.039 in)
	2.1	6	0.3 mm (0.011 in)
3	24.5	3	11.1 mm (0.437 in)
	19	4	2.8 mm (0.110 in)
	9.3	6	1.2 mm (0.047 in)

Dimensions

Table 5: Dimensions in inch and mm for SMS HG-1 and SMS HG-7 Control Valves

Valve		NPS	1	2	3
Length L (RF flanges)	CI 300	in	7.75	10.5	12.5
		mm	197	267	318
	CI 600	in	8.25	11.25	13.25
		mm	210	286	337
	CI 900	in	11.5	14.75	17.38
		mm	292	375	441

Valve		NPS	1	2	3
Length L (RTJ flanges)	CI 300	in	8.25	11.12	13.12
		mm	210	283	334
	CI 600	in	8.25	11.37	13.37
		mm	210	289	340
	CI 900	in	11.5	14.87	17.5
		mm	292	378	444
Height H4 (version with standard bonnet)	3-stage CDST	in	7.54	8.94	11.81
		mm	192	227	300
	4-stage CDST	in	8.56	10.31	13.88
		mm	218	262	353
	6-stage CDST	in	10.61	13.07	18.01
		mm	270	332	458
H8 for actuator	350 cm ²	in	11.26	11.26	11.26
		mm	286	286	286
	350v2 cm ²	in	11.26	11.26	11.26
		mm	286	286	286
	355v2 cm ²	in	11.26	11.26	11.26
		mm	286	286	286
	750 cm ²	in	11.26	11.26	11.26
		mm	286	286	286
	1000 cm ²	in	13.43	13.43	13.43
		mm	341	341	341
H2 ¹⁾	CI 300 to 600	in	2.44	3.25	4.15
		mm	62	82.5	106
	CI 900	in	2.93	4.25	4.74
		mm	74.5	108	121

¹⁾ The H2 dimension is the distance from the middle of the flow channel to the bottom of the valve body. The dimension up to the bottom of the flange may differ. It may be lower or higher. Flange standards (see Table 1).

Table 6: Further dimensions¹⁾ in combination with Type 3271 Pneumatic Actuator or Type 3277 Pneumatic Actuator

Actuator area		cm ²	350	350v2	355v2	750v2	1000	1400-60
Diaphragm ØD		in	11.02	11.02	11.02	15.51	18.19	20.87
Diaphragm ØD		mm	280	280	280	394	462	530
H ²⁾	Type 3271	in	3.23	3.62	5.16	9.29	15.87	13.27
H ²⁾	Type 3271	mm	82	92	131	236	403	337
H ²⁾	Type 3277	in	3.23	3.23	4.76	9.29	–	–
H ²⁾	Type 3277	mm	82	82	121	236	–	–
H3 ³⁾		in	4.33	4.33	4.33	7.48	24.02	24.02
H3 ³⁾		mm	110	110	110	190	610	610
H5	Type 3277	in	3.98	3.98	3.98	3.98	–	–
H5	Type 3277	mm	101	101	101	101	–	–
Thread	Type 3271		M30x1.5	M30x1.5	M30x1.5	M30x1.5	M60x1.5	M60x1.5
Thread	Type 3277		M30x1.5	M30x1.5	M30x1.5	M30x1.5	–	–

Actuator area		cm ²	350	350v2	355v2	750v2	1000	1400-60
a	Type 3271		G 3/8 (3/8 NPT)	G 3/8 (3/8 NPT)	G 3/8 (3/8 NPT)	G 3/8 (3/8 NPT)	G 3/4 (3/4 NPT)	G 3/4 (3/4 NPT)
a2	Type 3277		G 3/8	G 3/8	G 3/8	G 3/8	–	–

- 1) The specified dimensions are theoretical maximum design values for a specific standard device configuration. They do not reflect every possible case of use. The actual values for individual devices may differ depending on the device configuration and the specific application.
- 2) 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.
- 3) Minimum clearance required to remove the actuator

Dimensional drawings

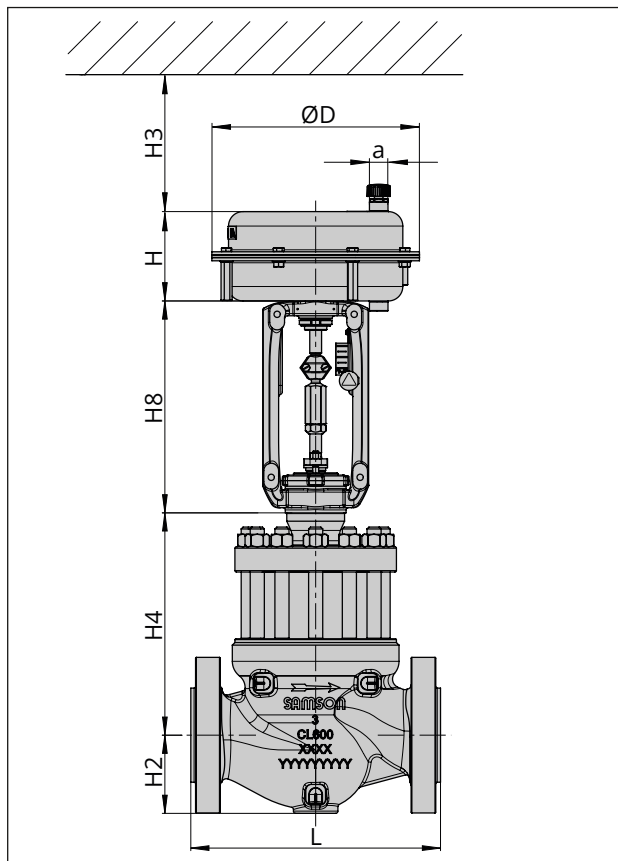


Fig. 6: SMS HG-1 Control Valve: Type 261GR Valve with Type 3271 Pneumatic Actuator

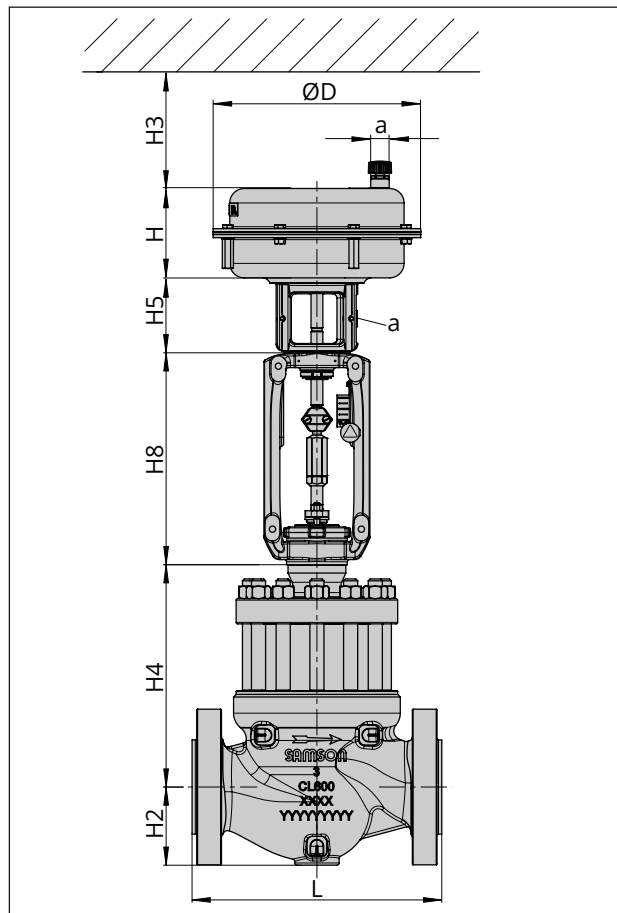


Fig. 7: SMS HG-7 Control Valve: Type 261GR Valve with Type 3277 Pneumatic Actuator

Weights

Table 7: Weights in lbs and kg for Type 261GR Valve with RF flanges according to ASME B16.5

Valve			NPS	1	2	3
Version with standard bonnet						
Valve ¹⁾ without actuator	CI 300	3-stage CDST	lbs (approx.)	44	106	180
			kg (approx.)	20	48	82
		4-stage CDST	lbs (approx.)	44	110	194
			kg (approx.)	20	50	88
		6-stage CDST	lbs (approx.)	48	121	220
			kg (approx.)	22	55	100
	CI 600	3-stage CDST	lbs (approx.)	57	106	194
			kg (approx.)	26	48	88
		4-stage CDST	lbs (approx.)	57	110	207
			kg (approx.)	26	50	94
		6-stage CDST	lbs (approx.)	62	123	233
			kg (approx.)	28	56	106
	CI 900	3-stage CDST	lbs (approx.)	68	143	251
			kg (approx.)	31	65	114
		4-stage CDST	lbs (approx.)	70	147	268
			kg (approx.)	32	67	122
		6-stage CDST	lbs (approx.)	75	161	304
			kg (approx.)	34	73	138

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.).

Table 8: Weights¹⁾ for Type 3271 and Type 3277 Pneumatic Actuators

Type ... Actuator	Actuator area in cm ²		350	350v2	355v2	750v2	1000	1400-60
3271	Without handwheel	lbs	18	26	33	79	176	154
3271	Without handwheel	kg	8	11.5	15	36	80	70
3271	With handwheel	lbs	29	37	44	90	397	386
3271	With handwheel	kg	13	16.5	20	41	180	175
3277	Without handwheel	lbs	27	33	42	89	–	–
3277	Without handwheel	kg	12	15	19	40	–	–

Type ... Ac- tuator	Actuator area in cm ²		350	350v2	355v2	750v2	1000	1400-60
3277	With handwheel	lbs	38	44	53	100	–	–
3277	With handwheel	kg	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.).

Selection and sizing of the valve

- 1. Calculate C_v coefficient according to DIN EN 60534-1.
- 2. Select nominal size NPS and C_v coefficient.
- 3. Calculation of permissible differential pressure Δp on request
- 4. Select the valve body material from Table 1 and Table 2 as well as from the pressure-temperature diagrams (see Information Sheet ► T 8000-2).
- 5. Select accessories from Table 1 and Table 2.

Ordering text

The following specifications are required on ordering:

Nominal size	NPS ...
Pressure rating	Class ...
Body material	See Table 2
Bonnet	Standard
Type of end connections	Flanges or welding ends
Plug	CDST: 3-stage, 4-stage or 6-stage Standard or balanced Metal seal or high-performance metal seal
Characteristic Actuator	Linear Type 3271 or Type 3277 (see Data Sheets ► T 8310-1, ► T 8310-2 and ► T 8310-3)
Fail-safe action	Fail-close or fail-open
Process medium	Density in lb/cu.ft or kg/m ³ and temperature in °F or °C
Flow rate	lbs/h or kg/h or cu.ft/min or m ³ /h in standard or operating state
Pressure	p ₁ and p ₂ in bar or psi (absolute pressure p _{abs}), with minimum, normal and maximum flow rate
RFID tag	Yes/No
Valve accessories	Positioner and/or limit switch

Associated Information Sheet	► T 8000-X
Associated Data Sheets for pneumatic actuators	► T 8310-1 to ► T 8310-3
Associated Mounting and Operating Instructions	► EB 8006-GR