

T 8012-1 EN

Series 240 · Types 3241-1 PSA, -7 PSA, -9 PSA Pneumatic Control Valves

Type 3241 PSA Globe Valve

ANSI version



Application

Control valves for PSA (Pressure Swing Adsorption) plants

Valve sizes	NPS ½ to 6
Pressure rating	Class 150 to 300
Temperatures	14 to 302 °F (-10 to +150 °C)
Standards	ANSI, ASME and ASTM

Special features

Type 3241 Globe Valve operated with

- Type 3271 Pneumatic Actuator (Type 3241-1 Control Valve)
- Type 3277 Pneumatic Actuator (Type 3241-7 Control Valve) for integral positioner attachment
- Type 3275A Pneumatic Piston Actuator (Type 3241-9 Control Valve)

Valve body made of

- Cast stainless steel according to ASTM specifications
- Forged steel or forged stainless steel
- Cast stainless steel
- Undivided valve bonnet

Valve plug

- Soft seal
- High-performance metal seal

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:

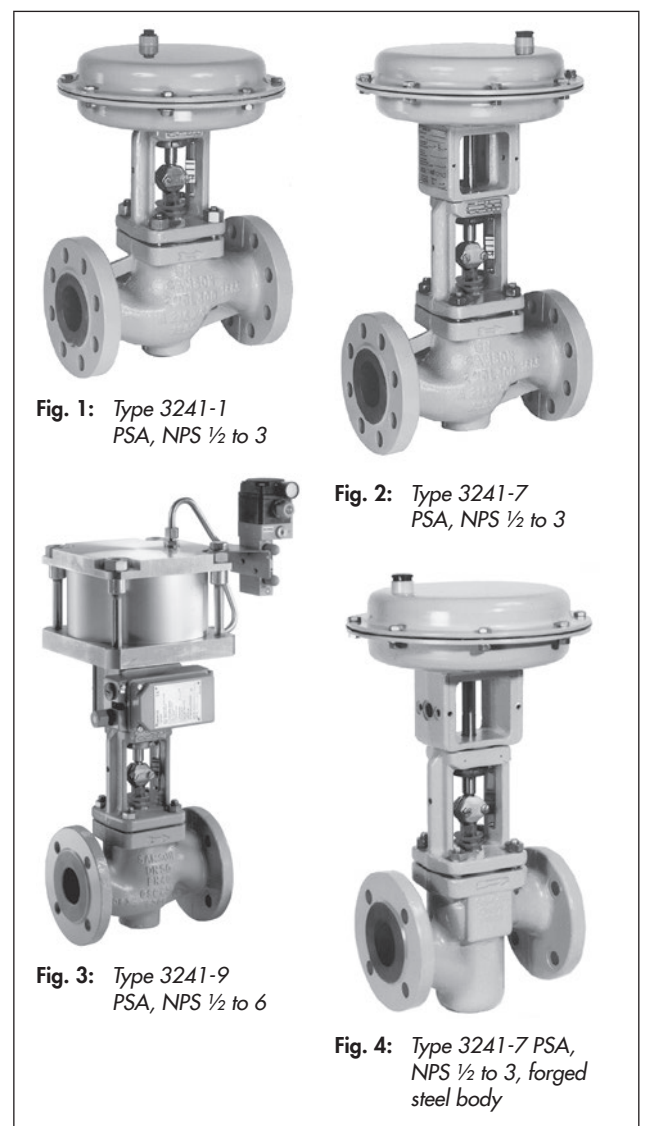
Positioners, solenoid valves and other accessories according to IEC 60534-6-1 ¹⁾ and NAMUR recommendation. Refer to Information Sheet ▶ T 8350 for more details.

Versions

Standard version for temperatures ranging from -14 to 302 °F (-10 to +150 °C)

- **Type 3241-1 PSA** (Fig. 1) · NPS ½ to 3 with Type 3271 Actuator (see Data Sheet ▶ T 8310-1)
- **Type 3241-7 PSA** (Fig. 2 and Fig. 4) · NPS ½ to 3, valve in forged steel up to NPS 3, with Type 3277 Actuator for integral positioner attachment (▶ T 8310-1)
- **Type 3241-9 PSA** (Fig. 3) · NPS ½ to 6, with Type 3275A Piston Actuator (▶ T 8314-1), for integral attachment of a positioner or limit switch

¹⁾ Accessories required. See associated actuator documentation.



Further versions:

- **Flow divider** for noise reduction in both directions of flow
- **DIN version** · See Data Sheet ▶ T 8015-1
- **Versions with dimensions according to Japanese Industry Standard (JIS)** · Details on request

Design and principle of operation

The process medium flows through the valve in both directions. The valve plug position determines the cross-sectional area between the seat and plug.

Depending on how the springs are arranged in the Type 3271 or Type 3277 Actuator (▶ T 8310-1), the valve has two different fail-safe positions that become effective when the supply air fails:

- **Actuator stem extends (fail-close)**
The valve closes when the supply air fails.
- **Actuator stem retracts (fail-open)**
The valve opens when the supply air fails.

The double-acting Type 3275A Piston Actuator does not have a fail-safe action (▶ T 8314-1).

Fig. 5, Fig. 6 and Fig. 7 show configuration examples.

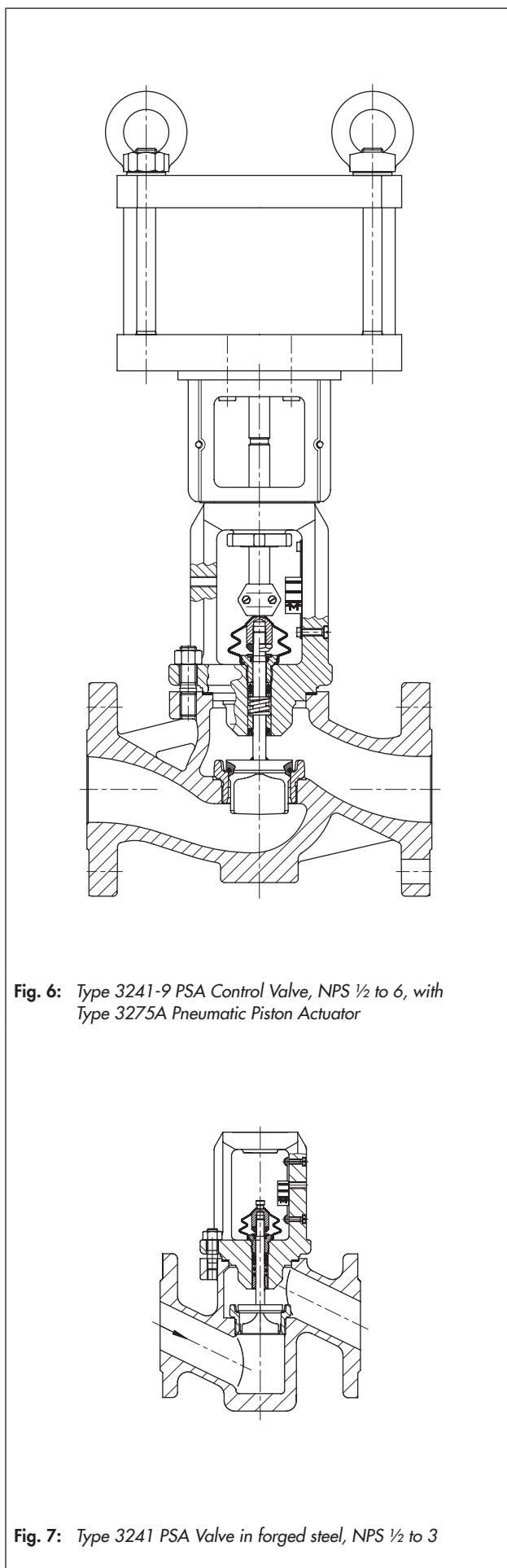
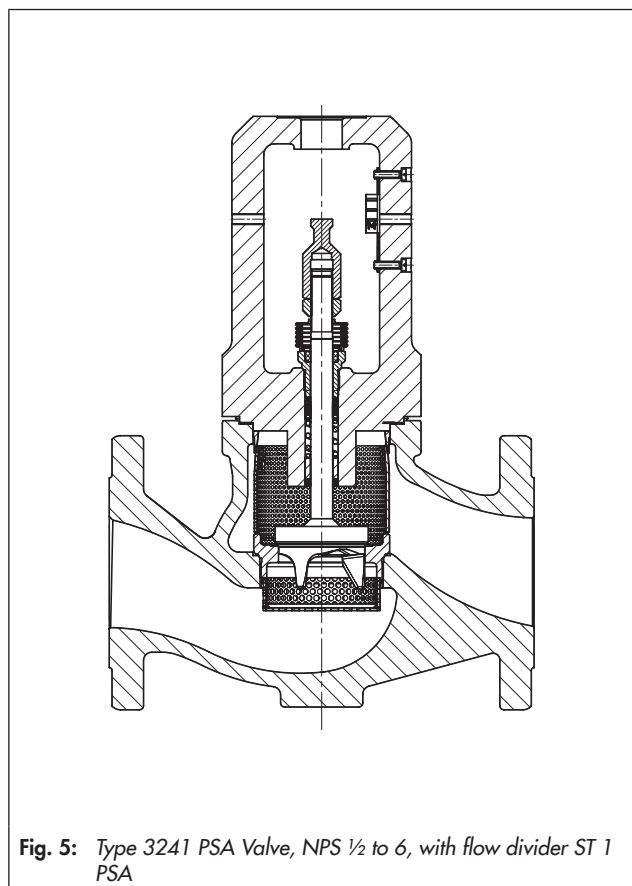


Table 1: Technical data for Type 3241 PSA Valve

Valve size	NPS	1/2, 3/4 ¹⁾ , 1, 1 1/2, 2, 2 1/2 ¹⁾ , 3, 4, 6	1/2, 1, 1 1/2, 2, 3	1/2, 3/4 ¹⁾ , 1, 1 1/2, 2, 2 1/2 ¹⁾ , 3, 4, 6	1/2, 1, 1 1/2, 2, 3
ASTM material		A216 WCC	A105	A351 CF8M	A182 F316
Type of connection		Flange	Flange	Flange	Flange
Flange type		RF ²⁾	RF ²⁾	RF ²⁾	RF ²⁾
Pressure rating		Class 150/300	Class 300	Class 150/300	Class 300
Seat-plug seal		Soft seal or high-performance metal seal			
Characteristic		Equal percentage or linear			
Rangeability		50:1 for NPS 1/2 to 2 · 30:1 for NPS 2 1/2 to 6			
RFID tag (optional)		Application range according to the technical specifications and the explosion protection certificates. Documents ► www.samsongroup.com > Service & Support > Electronic nameplate			
Conformity		CE · UK · EAC			
Temperature ranges in °C (°F) · Permissible operating pressures acc. to pressure-temperature diagram (see Information Sheet ► T 8000-2)					
Valve		-10 to +150 °C (14 to 302 °F)			
RFID tag (optional)		Max. permissible temperature at the RFID tag: 85 °C (185 °F)			
Leakage class according to ANSI/FCI 70-2					
Valve plug	Soft seal	VI			
	High-performance metal seal	V			

¹⁾ Valve sizes on request

²⁾ Other versions on request

Table 2: Materials

Standard version				
Valve body ¹⁾	Cast steel A216 WCC	Forged steel A105	Cast stainless steel A351 CF8M	Forged stainless steel A182 F316
Valve bonnet	A105	A105	A 182 F 316	A 182 F 316
Seat and plug	1.4006	1.4006	1.4404	1.4404
	Seal ring for soft-seated plug: PTFE with glass fiber			
Guide bushings	1.4104	1.4104	1.4404	1.4404
Packing	V-ring packing: PTFE with carbon · Spring: 1.4310 · Stem protective ring			
Body gasket	Graphite on metal core			

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

Table 3: C_V and K_{VS} coefficients

Terms for control valve sizing according to IEC 60534, Parts 2-1 and 2-2: $F_L = 0.95$, $X_T = 0.75$

Conversion of flow coefficients: C_V (US gallons/min.) = $1.17 \times K_{VS}$ (m³/h) or $K_{VS}/C_V = 0.865$

Table 3.1: Overview with flow divider ST 1 PSA (C_{V1} , K_{VS1})

C_V		2	3	5	7.5	12	20	30	47	70	75	95	120	190	300
K_{VS}		1.6	2.5	4.0	6.3	10	16	25	40	60	63	80	100	160	260
C_{V1}		1.5	2.3	3.7	6	9.5	15	23	37	56	60	75	95	145	245
K_{VS1}		1.3	2	3.2	5	8	13	20	32	48	50	63	80	125	210
Seat ØD	in	0.47	0.47	0.47	0.945	0.945	1.22	1.5	1.9	2.48	2.48	3.15	3.15	3.94	5.12
	mm	12	12	12	24	24	31	38	48	63	63	80	80	100	130
Travel	in	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	1.18	0.59	1.18	1.18	1.18
	mm	15	15	15	15	15	15	15	15	15	30	15	30	30	30

Table 3.2: Versions without flow divider

C_V		2	3	5	7.5	12	20	30	47	70	75	95	120	190	300
K_{VS}		1.6	2.5	4.0	6.3	10	16	25	40	60	63	80	100	160	260
Valve size NPS/DN															
½	15	•	•	•											
¾ ¹⁾	20 ¹⁾		•	•	•										
1	25			•	•	•									
1½	40					•	•	•							
2	50						•	•	•						
2½ ¹⁾	65 ¹⁾							•	•	•					
3	80								•	•		•			
4	100										•		•	•	
6	150												•	•	•

¹⁾ Valve sizes on request

Table 3.3: Versions with flow divider ST 1 PSA (C_{V1} , K_{VS1}) · Versions with cast bodies only

C_{V1}		1.5	2.3	3.7	6	9.5	15	23	37	56	60	75	95	145	245
K_{VS1}		1.3	2	3.2	5	8	13	20	32	48	50	63	80	125	210
Valve size NPS/DN															
½	15	•	•	•											
¾ ¹⁾	20 ¹⁾	•	•	•											
1	25	•	•	•	•										
1½	40				•	•	•	•							
2	50						•	•	•						
2½ ¹⁾	65 ¹⁾							•	•	•					
3	80								•	•		•			
4	100										•		•	•	
6	150												•	•	•

¹⁾ Valve sizes on request

Differential pressures

The possible differential pressures must be calculated on a case-by-case basis when using the Type 3271, Type 3277 and Typ 3275A Actuators in combination with the Type 3241 PSA Valve depending on the given operating conditions.

Table 4: Dimensions for Type 3241-1 PSA, Type 3241-7 PSA and Type 3241-9 PSA in standard version**Table 4.1:** Type 3241 PSA Valve

Valve	NPS	½	¾ ⁴⁾	1	1½	2	2½ ⁴⁾	3	4	6	
	DN	15	20 ⁴⁾	25	40	50	65 ⁴⁾	80	100	150	
Length L	Class 150 RF	in	7.25	7.25	7.25	8.75	10.0	10.88	11.75	13.88	17.75
		mm	184	184	184	222	254	276	298	352	451
	Class 300 RF	in	7.50	7.62	7.75	9.25	10.50	11.50	12.50	14.50	18.62
		mm	191	194	197	235	267	292	318	368	473
H1	in	8.66	8.66	8.66	8.66	8.66	13.00	13.00	13.78	15.34	
	mm	220	220	220	220	220	330 ¹⁾	330 ¹⁾	350 ¹⁾	390 ¹⁾	
H2 ²⁾ (approx.)	in	1.73 ³⁾			2.83 ³⁾		3.86	3.86 ³⁾	4.65	6.89	
	mm	44 ³⁾			72 ³⁾		98	98 ³⁾	118	175	
H2 ²⁾ Forged steel version (approx.)	in	2.1	-	2.76	3.7	3.93	-	5.2	-	-	
	mm	53		70	94	100		132			

1) Add 65 mm to H1 when a Type 3275A Actuator with 804 cm² actuator area is mounted.

2) The H2 dimension is the distance from the middle of the flow path to the bottom of the valve body.

3) The H2 dimension in this valve is not the lowest point of the valve. This valve's lowest point is the bottom of the connecting flanges. The flange dimensions comply with the corresponding flange standard.

4) Valve sizes on request

Table 4.2: Type 3271 and Type 3277 Pneumatic Actuators

Actuator area	cm ²	120	175v2	350v2	355v2	750v2
Diaphragm ØD	in	6.61	8.46	11.02	11.02	15.51
	mm	168	215	280	280	394
H ¹⁾	in	2.71	3.07	3.19	4.76	9.29
	mm	69	78	81	121	236
H3 ²⁾	in	4.33	4.33	4.33	4.33	7.48
	mm	110	110	110	110	190
H5	Type 3277 in	3.46	3.98	3.98	3.98	3.98
	Type 3277 mm	88	101	101	101	101
Thread	Type 3271	M30x1.5				
	Type 3277	M30x1.5				
α	Type 3271	G ½ (½ NPT)	G ¼ (¼ NPT)	G ¾ (¾ NPT)	G ¾ (¾ NPT)	G ¾ (¾ NPT)
α2	Type 3277	-	G ¾	G ¾	G ¾	G ¾

1) Height with welded-on lifting eyelet or height of eyebolt according to DIN 580. Height of the swivel hoist may differ. Actuators up to 350 cm² without lifting eyelet

2) Minimum clearance required to remove the actuator

Table 4.3: Type 3275A Piston Actuator

Actuator area	cm ²	314	380	490	804
Piston ØD	in	10.55	11.34	12.52	15.94
	mm	268	288	318	405
H	in	8.15	8.15	8.15	8.43
	mm	207	207	207	214
H3 ¹⁾	in	4.33	4.33	4.33	22.83
	mm	110	110	110	580
H5	in	4.02	4.02	4.02	-
	mm	102	102	102	-
Thread		M30x1.5	M30x1.5	M30x1.5	M60x1.5

1) Minimum clearance required to remove the actuator

Dimensional drawings

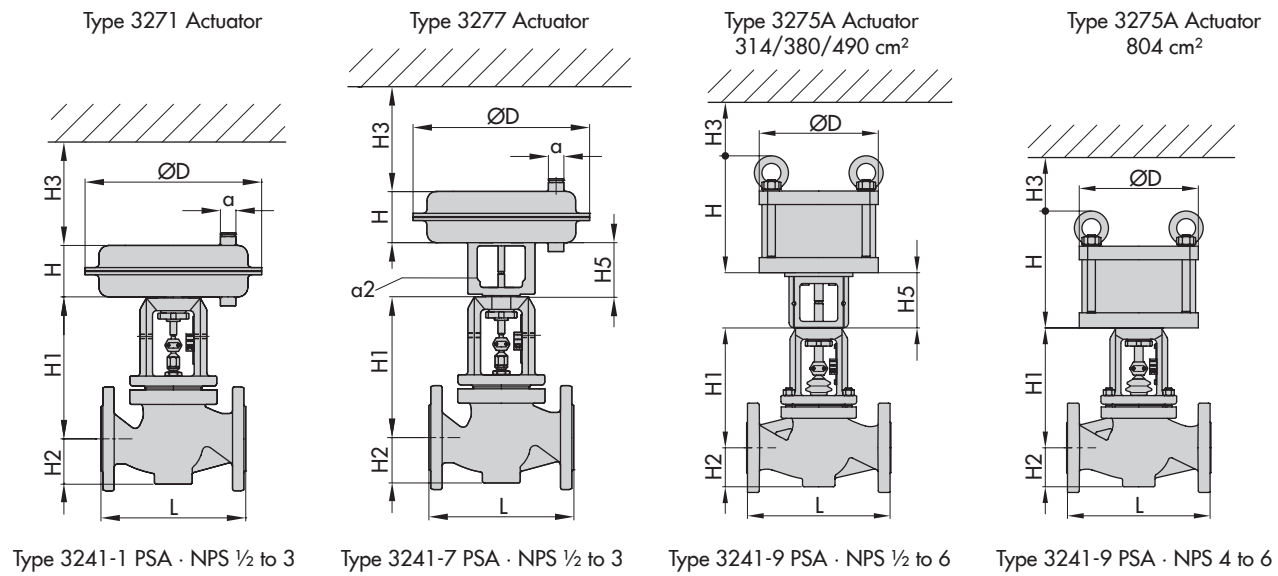


Table 5: Weights ²⁾ for Type 3241-1 PSA, Type 3241-7 PSA and Type 3241-9 PSA

Table 5.1: Type 3241 PSA Valve

Valve	NPS	½	¾ ¹⁾	1	1½	2	2½ ¹⁾	3	4	6
	DN	15	20 ¹⁾	25	40	50	65 ¹⁾	80	100	150
Weight without actuator	lbs	11	13	15	26	33	53	66	92	264
	kg	5	6	7	12	15	24	30	42	120

¹⁾ Valve sizes on request

Table 5.2: Type 3271, Type 3277 and Type 3275A Actuators

Actuator		Type 3271					Type 3277					Type 3275A				
Actuator area	cm ²	120	175v2	350v2	355v2	750v2	120	175v2	350v2	355v2	750v2	314	380	490	804	
Weight, approx.	Standard	lbs	5.5	13.2	25.4	33.1	79.4	7.1	22	33.1	41.9	88.2	37.5	44.1	50.7	90.4
		kg	2.5	6	11.5	15	36	3.2	10	15	19	40	17	20	23	41
	Heavy duty	lbs	-					-					123.5	136.7	149.9	233.7
		kg	-					-					56	62	68	106

²⁾ The weights specified apply to a specific standard device configuration. Weights of other device configurations may differ depending on the version (material, trim or number of actuator springs etc.)

Ordering text

Globe valve	Type 3241 PSA
Valve size	NPS ...
Class	...
Body material	Refer to Table 2
Type of connection	Flanges (RF or FF) or NPT thread
Seat-plug seal	Soft seal or high-performance metal seal
Characteristic	Equal percentage or linear
Pneumatic actuator	Type 3271, Type 3277 or Type 3275A
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 or p ₂ in bar or psi (absolute pressure) 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:

Type 3271 and Type 3277 ▶ **T 8310-1**

Type 3275A ▶ **T 8314-1**

Associated Mounting and Operating Instructions ▶ **EB 8012**