DATA SHEET

T 8012-1 EN

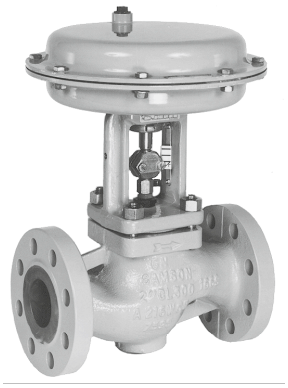
Series 240 · Types 3241-1 PSA, -7 PSA, -9 PSA Pneumatic Control Valves

Type 3241PSA Globe Valve · ANSI version

Application

Control valves for PSA (Pressure Swing Adsorption) plants

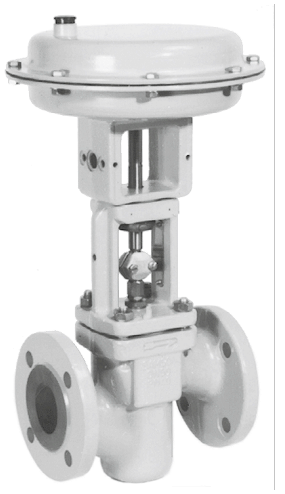
Nominal size	**NPS ½ to 6**
Pressure rating	**Class 150 to 300**
Temperatures	**14 to 302 °F (-10 to +150 °C)**
Standards	**ANSI, ASME and ASTM**



Type 3241-1 PSA
NPS ½ to 3

Type 3241-7 PSA
NPS ½ to 3

Type 3241-9 PSA
NPS ½ to 6



Type 3241-7 PSA
NPS ½ to 3
Forged steel

Special features

Type 3241 PSA Globe Valve operated with

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

Valve body made of

- Cast stainless steel according to ASTM specifications
- Cast stainless steel
- Forged steel
- Forged 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, such as positioners, limit switches, solenoid valves and other devices according to DIN EN 60534-6-1[1)] and NAMUR Recommendation (see Information Sheet ▶ T 8350).

[1)] Accessories required. See associated actuator documentation.

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Versions

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

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

Further versions

- **Flow divider** for cast valves 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)** · See Data Sheet ▶ T 8012-2

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 (see Data Sheet ▶ 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 is closed upon air supply failure.
- **Actuator stem retracts (fail-open):** The valve is opened upon air supply failure.

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

The following diagrams show configuration examples.

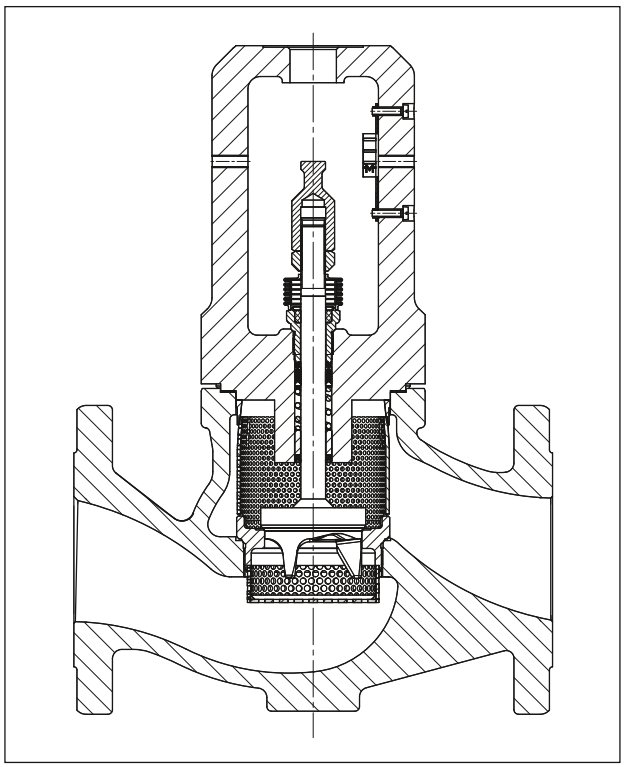

Fig. 1: *Type 3241 PSA Valve with flow divider ST 1 PSA*

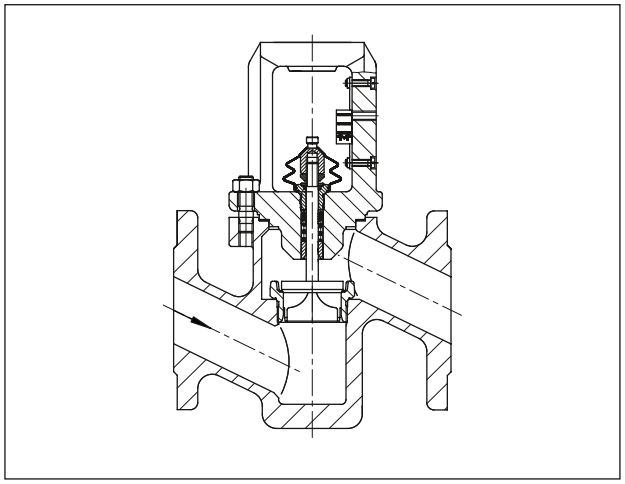

Fig. 2: *Type 3241 PSA Valve · Forged steel version · NPS ½ to 3*

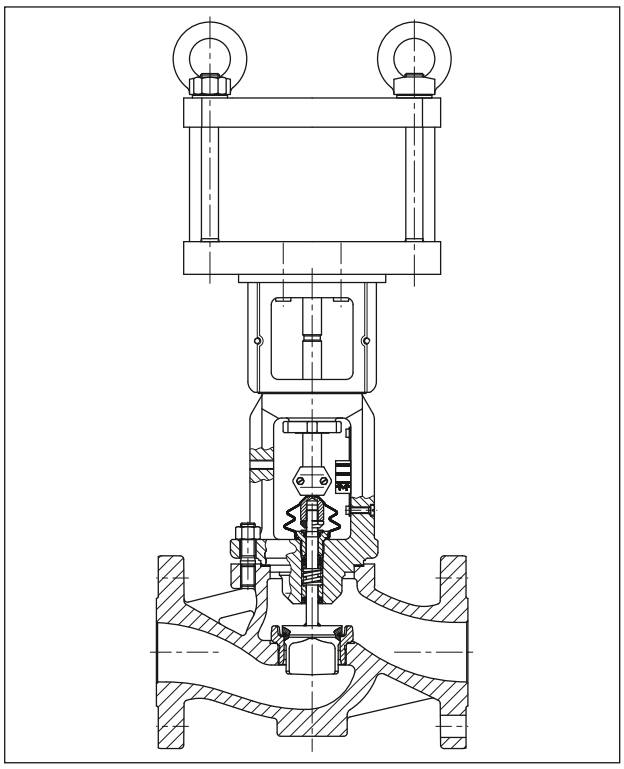

Fig. 3: *Type 3241 Valve with Type 3275A Pneumatic Piston Actuator (Type 3241-9 Control Valve)*

Table 1: *Technical data for Type 3241 PSA*

Nominal size	**NPS**	**½, ¾[1], 1, 1½, 2, 2½[1], 3, 4, 6**	**½, 1, 1½, 2, 3**	**½, ¾[1], 1, 1½, 2, 2½[1], 3, 4, 6**	**½, 1, 1½, 2, 3**
ASTM material		**A216 WCC**	**A105**	**A351 CF8M**	**A182 F316**
Pressure rating	Class	150/300	300	150/300	300
Type of end connections	Flanges	RF[2]			
Seat-plug seal		Soft seal · High-performance metal seal			
Characteristic		Equal percentage · Linear			
Rangeability		50:1 for NPS ½ to 2 · 30:1 for NPS 2½ to 6			
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).			
Conformity		CE			
Temperature ranges in °F (°C) · Permissible operating pressures according to pressure-temperature diagram (see Information Sheet ▶ T 8000-2)					
Valve		14 to 302 (-10 to +150)			
Leakage class according to ANSI FCI 70-2					
Valve plug	Soft seal	VI			
	High-performance metal seal	V			

1) Nominal sizes on request

2) Other versions on request

Note: The temperature limits for DIN and ANSI versions are not directly converted temperatures.

Table 2: *Materials*

Valve body[1]	**Cast steel A216 WCC**	**Cast stainless steel A351 CF8M**	**Forged steel A105**	**Forged stainless steel A182 F316**
Valve bonnet	A105	A182 F316	A105	A182 F316
Seat and plug	1.4006	1.4404	1.4006	1.4404
	Seal ring for soft-seated plug: PTFE with glass fiber			
Guide bushing	1.4104	1.4404	1.4104	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

C_V and K_{VS} coefficients

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

Conversion of flow coefficients: C_V (US gallons/min) = 1.17 · K_{VS} (m^3/h) or $K_{VS}/C_V = 0.865$

Table 3: *Versions with flow divider ST 1 PSA (C_V-1, K_{VS}-1)*

C_V		**2**	**3**	**5**	**7.5**	**12**	**20**	**30**	**47**	**70**	**95**	**75**	**120**	**190**	**300**
K_{VS}		**1.6**	**2.5**	**4.0**	**6.3**	**10**	**16**	**25**	**40**	**60**	**80**	**63**	**100**	**160**	**260**
C_V-1		1.5	2.3	3.7	6	9.5	15	23	37	56	75	60	95	145	245
K_{VS}-1		1.3	2	3.2	5	8	13	20	32	48	63	50	80	125	210
Seat Ø	in	0.47			0.945		1.22	1.5	1.9	2.48	3.15	2.48	3.15	3.94	5.12
	mm	12			24		31	38	48	63	80	63	80	100	130
Travel	in	0.59										1.18			
	mm	15										30			

Table 4: *Versions without flow divider*

C_V		**2**	**3**	**5**	**7.5**	**12**	**20**	**30**	**47**	**70**	**95**	**75**	**120**	**190**	**300**
K_{VS}		**1.6**	**2.5**	**4.0**	**6.3**	**10**	**16**	**25**	**40**	**60**	**80**	**63**	**100**	**160**	**260**
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] Nominal sizes on request

Table 5: *Versions with flow divider ST 1 PSA (C_V-1, K_{VS}-1) · Cast valve bodies*

C_V-1		1.5	2.3	3.7	6	9.5	15	23	37	56	75	60	95	145	245
K_{VS}-1		1.3	23	3.2	5	8	13	20	32	48	63	50	80	125	210
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)] Nominal 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 Type 3275A Actuators in combination with the Type 3241 PSA Valve depending on the given operating conditions.

Dimensions and weights

The tables below provide an overview of the dimensions and weights of the standard version of Type 3241 PSA Valve.

Dimensions (in mm and inch) and weights (in kg and lbs)

Table 6: *Dimensions for 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	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	190	194	197	235	267	292	318	368	473
H1		in	8.66	8.66	8.66	8.66	8.66	13	13	13.74	15.34
		mm	220	220	220	220	220	330[1]	330[1]	350[1]	390[1]
H2[2] (approx.)		in	1.73[3]	1.73[3]	1.73[3]	2.83[3]	2.83[3]	3.86	3.86[3]	4.65	6.89
		mm	44[3]	44[3]	44[3]	72[3]	72[3]	98	98[3]	118	175
H2[2] (approx., forged steel version)		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 channel 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] Nominal sizes on request

Table 7: *Further dimensions[1] in combination with Type 3271 Pneumatic Actuator or Type 3277 Pneumatic Actuator*

Actuator area		cm²	120	175v2	350	350v2	355v2	750v2
Diaphragm ØD		in	6.61	8.46	11.02	11.02	11.02	15.51
Diaphragm ØD		mm	168	215	280	280	280	394
H[2]	Type 3271	in	2.71	3.07	3.23	3.62	5.16	9.29
H[2]	Type 3271	mm	69	78	82	92	131	236
H[2]	Type 3277	in	2.71	3.07	3.23	3.23	4.76	9.29
H[2]	Type 3277	mm	69	78	82	82	121	236
H3[3]		in	4.33	4.33	4.33	4.33	4.33	7.48
H3[3]		mm	110	110	110	110	110	190
H5	Type 3277	in	3.46	3.98	3.98	3.98	3.98	3.98
H5	Type 3277	mm	88	101	101	101	101	101
Thread	Type 3271		M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5
Thread	Type 3277		M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5
a	Type 3271		G ⅛ (⅛ NPT)	G ¼ (¼ NPT)	G ⅜ (⅜ NPT)	G ⅜ (⅜ NPT)	G ⅜ (⅜ NPT)	G ⅜ (⅜ NPT)
a2	Type 3277		–	G ⅜	G ⅜	G ⅜	G ⅜	G ⅜

[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

Table 8: *Further dimensions in combination with Type 3275A Pneumatic Actuator*

Actuator area	cm²	314	380	490	804
Piston ØD	in	10.55	11.34	12.52	15.94
Piston ØD	mm	268	288	318	405

Actuator area	cm²	314	380	490	804
H including lifting eyelet	in	8.15	8.15	8.15	8.43
H including lifting eyelet	mm	207	207	207	214
H3[1)]	in	4.33	4.33	4.33	22.83
H3[1)]	mm	110	110	110	580
H5	in	4.02	4.02	4.02	–
H5	mm	102	102	102	–
Thread		M30x1.5	M30x1.5	M30x1.5	M60x1.5

1) Minimum clearance required to remove the actuator

Dimensional drawings

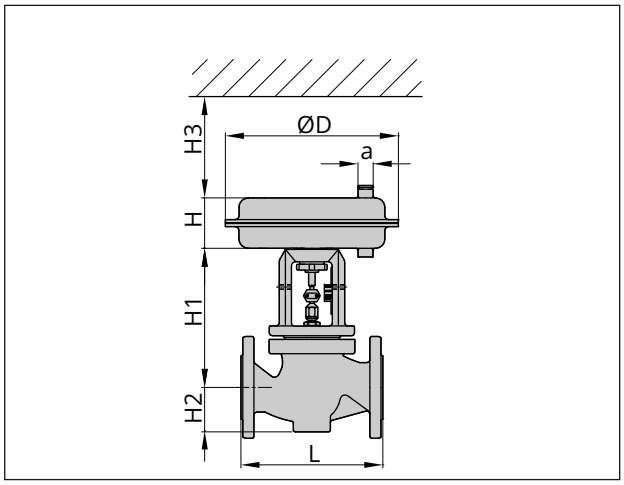

Fig. 4: *Type 3241-1 PSA (Type 3271 Pneumatic Actuator) up to nominal size DN 80/NPS 3*

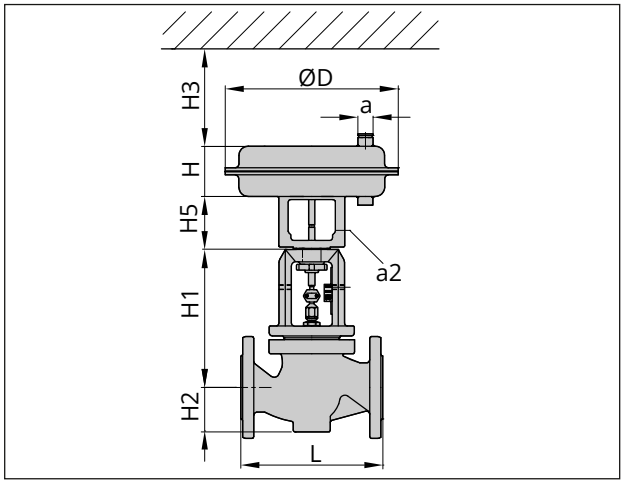

Fig. 5: *Type 3241-7 PSA (Type 3277 Pneumatic Actuator) up to nominal size DN 80/NPS 3*

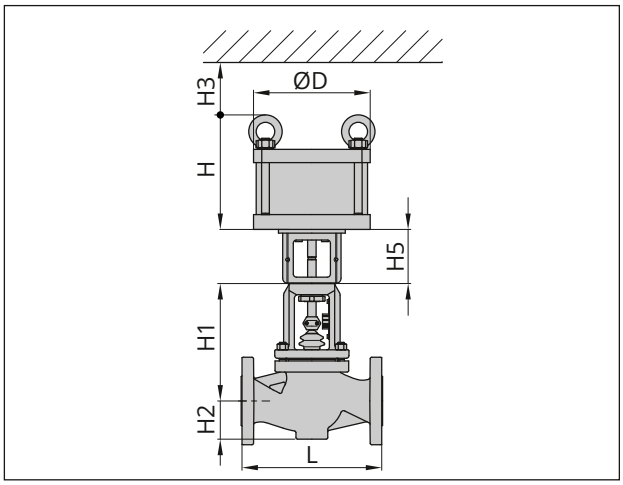

Fig. 6: *Type 3241-9 PSA, up to nominal size DN 150/NPS 6, with Type 3275A Pneumatic Piston Actuator (314/380/490 cm²)*

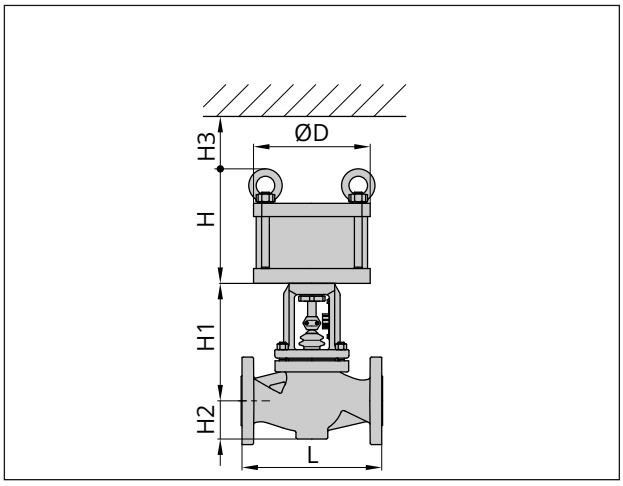

Fig. 7: *Type 3241-9 PSA, nominal sizes DN 100 to 150/NPS 4 to 6, with Type 3275A Pneumatic Piston Actuator (804 cm²)*

Table 9: *Weights for Type 3241 PSA Valve*

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

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.).

2) Nominal sizes on request

Table 10: *Weights[1)] for Type 3271 and Type 3277 Pneumatic Actuators*

Type ... Actuator	Actuator area in cm²		120	175v2	350	350v2	355v2	750v2
3271	Without handwheel	lbs	6	13	18	26	33	79
3271	Without handwheel	kg	2.5	6	8	11.5	15	36
3271	With handwheel	lbs	9	22	29	37	44	90
3271	With handwheel	kg	4	10	13	16.5	20	41
3277	Without handwheel	lbs	7	22	27	33	42	89
3277	Without handwheel	kg	3.2	10	12	15	19	40
3277	With handwheel	lbs	10	31	38	44	53	100
3277	With handwheel	kg	4.5	14	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.).

Table 11: *Weights for Type 3275A Pneumatic Piston Actuator*

Actuator area	cm²	314	380	490	804
Weight (standard)	lbs (approx.)	38	44	51	91
Weight (standard)	kg (approx.)	17	20	23	41
Weight (heavy duty)	lbs (approx.)	124	137	150	234
Weight (heavy duty)	kg (approx.)	56	62	68	106

Ordering text

Globe valve	Type 3241 PSA
Nominal size	NPS ...
Pressure rating	Class ...
Body material	See Table 2
Type of end connections	Flanges (RF)
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/m³ and temperature in °F or °C
Flow rate	lbs/h or kg/h or cu.ft/min or m³/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/limit switch

Associated Information Sheets	▶ T 8000-X
Associated Data Sheets for Types 3271/3277 Pneumatic Actuators	▶ T 8310-1
Associated Data Sheet for Type 3275A Pneumatic Piston Actuator	▶ T 8314-1
Associated Mounting and Operating Instructions	▶ EB 8012