

Type 3249-1 and Type 3249-7 Pneumatic Control Valves

Type 3249 Aseptic Angle Valve



Application

Control valve for aseptic applications in the food and pharmaceutical industries according to DIN or ANSI standards

Valve sizes DN 15 to 100 · NPS ½ to 4
Maximum pressure 10 bar · 150 psi
Temperature range 0 to 160 °C · 32 to 320 °F



Type 3249 Angle Valve with

- Type 3271 Pneumatic Actuator (Type 3249-1 Control Valve)
- Type 3277 Pneumatic Actuator (Type 3249-7 Control Valve) for integral positioner attachment

Valve body made of

- Stainless steel 1.4404 or 316L
- Wetted inside surfaces with a smooth or polished finish
- Categorized in conformity assessment module A of the Pressure Equipment Directive
- Wetted sealing materials comply with FDA regulations
- Both body versions comply with EHEDG regulations

The valve body is designed without cavities. It can be cleaned and sterilized using the CIP or SIP methods. The stem guide is sealed by a diaphragm.

The test connection enables the diaphragm to be monitored for leakages. The valve is suitable for aseptic applications.

Versions

Standard version · Angle valve in ball body version (bar stock body). DN 15 to 100 with welding ends according to DIN 11850, Series 2.

Maximum operating pressure according to Table 1.2.

Designed with clamp connection of the bonnet without packing. The stem is sealed by an EPDM diaphragm with PTFE facing.

- **Type 3249-1** · Type 3249 Valve with Type 3271 Actuator (see Data Sheets ▶ T 8310-1 and ▶ T 8310-2)
- **Type 3249-7** (Fig. 1) · Type 3249 Valve with Type 3277 Actuator (see Data Sheet ▶ T 8310-1)
- **Special version** (Fig. 2) · Bar stock body DN 15 to 80, up to K_{VS} 60, with bolted-on valve bonnet and additional PTFE V-ring packing

Further versions

- **ANSI body**, welding ends according to BS 4825
- **Welding ends** according to DIN EN ISO 1127, ISO 2037 (SMS) or NFA 49249



Fig. 1: Type 3249 Valve in ball body version, bar stock body with welding ends



Fig. 2: Type 3249-7 Control Valve in special version with backup packing, bar stock body with flanges, Type 3277-5 Pneumatic Actuator and integrated Type 3767 Electropneumatic Positioner

- **Threaded connections** according to DIN 11851 (11887)
- **Threaded connections** according to SMS or IDF
- **Clamp connections** according to ISO 2852, DIN 32676, BS 4825
- **Flanges**
- **Aseptic flanges** according to DIN 11864 with groove or collar
- **Nipple fitting for test connection** (optional)
- **Body material 1.4435** · Other materials on request
- Functioning as **on/off valve** with pneumatic piston actuator
- **Heating jacket**
- **Type 3274 Electrohydraulic Actuator**

Principle of operation

The process medium flows through the valve in the flow-to-close direction as indicated by the arrow. The position of the valve plug (3) determines the flow rate across the cross-sectional area of flow released between plug (3) and lathed seat (2).

In the standard version, the plug stem is sealed by the diaphragm (6.2). In the special version, an additional backup packing (4) is used.

In the standard version, the test connection (4.4) allows the valve to be visually checked and monitored. The test connection can be fitted with an additional nipple fitting to allow the safe drainage of any medium that escapes.

In the special version, it is possible to monitor the pressure inside the valve or apply a sealing medium to the diaphragm (6.2).

Fail-safe position

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

- **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.

Legend for Fig. 3 and Fig. 4

- | | |
|-----|-----------------|
| 2 | Seat (lathed) |
| 3 | Plug |
| 4 | Packing |
| 4.4 | Test connection |
| 5 | Valve bonnet |
| 5.1 | Guide bushing |
| 6.2 | Diaphragm |

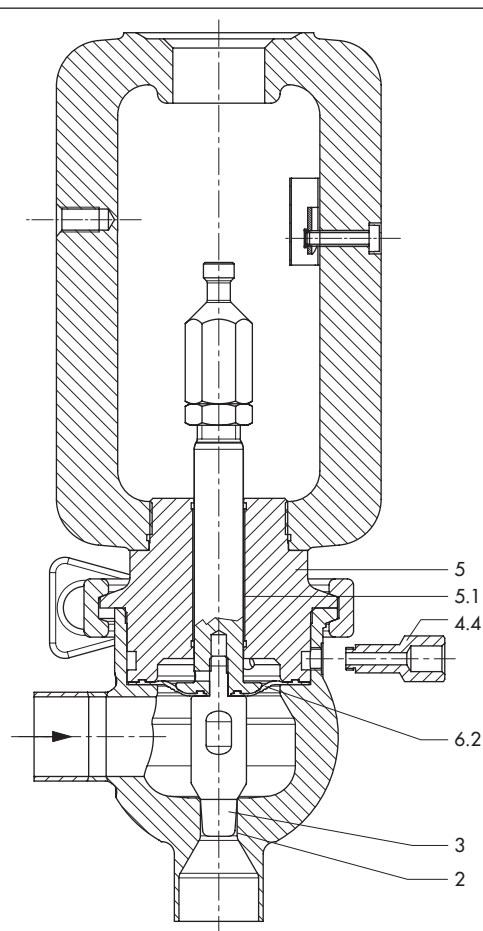


Fig. 3: Type 3249 Angle Valve in standard version with optional nipple fitting for the test connection (4.4)

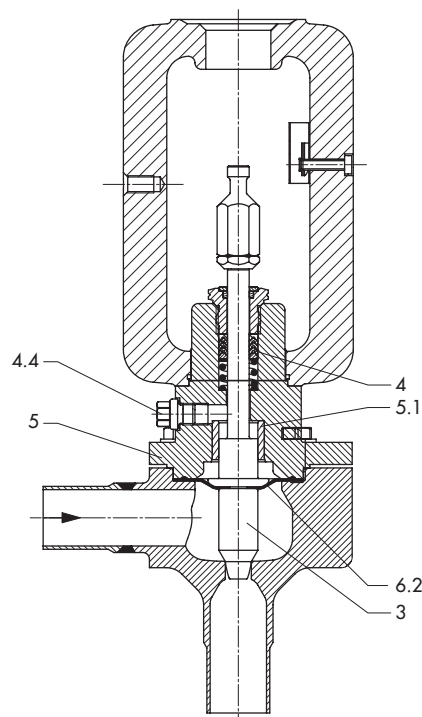


Fig. 4: Special version of Type 3249 Angle Valve

Table 1: Technical data

Table 1.1: Technical data for Type 3249

Version		DIN	ANSI
Valve size		DN 15 to 100	NPS ½ to 4
Maximum pressure	See Table 1.2	10 bar	150 psi
Type of end connections		According to Table 1.2	
Seat/plug seal ¹⁾		Metal seal · Soft seal	
Characteristic		Equal percentage or linear	
Rangeability		50:1 up to DN 50 · 30:1 for DN 65 and larger	
Permissible temperatures	Operating temperature	0 to 130 °C (see Table 1.2)	32 to 266 °F (see Table 1.2)
	Sterilizing temperature	150 °C for up to 30 min	300 °F for up to 30 min
Valid for delivery after Sept. 2008	Operating temperature	160 °C	320 °F
	Sterilizing temperature	180 °C (briefly)	356 °F (briefly)
Leakage class according to IEC 60534-4	Metal seal	IV	
	Soft seal	VI (not for versions complying with EHEDG regulations)	
Peak-to-valley height and surface finish	External	Glass bead blasted	
		$R_a \leq 0.6 \mu\text{m}$ · Polished	
	Internal	$R_a \leq 0.8 \mu\text{m}$ · Fine machine finish	
		$R_a \leq 0.6 \mu\text{m}$ · Polished	
		$R_a \leq 0.4 \mu\text{m}$ · Satin finish	
		$R_a \leq 0.4 \mu\text{m}$ · Mirror finish	
Compliance		ERC	

¹⁾ Conformity to food processing regulations only when a metal-seated plug is used

Table 1.2: End connections · Operating range with maximum pressures and temperature limits

Connection	Standard	Valve sizes DN/NPS	Max. operating pressure	Pressure-tempera- ture diagram	
Welding ends	DIN 11850 Series 2 (11866 A)	DN 15 to 100	10 bar	DIN	
	DIN EN ISO 1127				
	BS 4825	NPS ½ to 1 NPS 1½ to 4	150 psi	ANSI	
	SMS/ISO 2037 (NFA 49249)	DN 25 to 80	10 bar	DIN	
Threaded connections	DIN 11887/11851, connection A	DN 15 to 100	10 bar	DIN	
	SMS	DN 25 to 80	6 bar		
	ISO 2853 (IDF)	NPS 1 to 3	150 psi	ANSI	
Aseptic pipe fitting	DIN 11864 for O-ring and DIN 11850 Series 2	DN 15 to 80	10 bar	DIN	
Clamp connections	ISO 2852 Table 2	DN 25 to 100	10 bar	DIN	
	DIN 32676	DN 15 to 100			
	BS 4825	NPS ½ to 1 NPS 1½ to 3	150 psi	ANSI	
Flanges with smooth raised face, however with $R_a \leq 0.8$	DIN EN 1092-1	DN 15 to 100	PN 10	10 bar	DIN
			PN 6	6 bar	
	ANSI B16.5 RF, Class 150	NPS ½ to 4	150 psi	ANSI	

Table 2: Materials

Version ¹⁾	DIN	ANSI
Body version with lathed seat	1.4404	316L
Bonnet	1.4404	316L
Plug	1.4404	316L
Guide bushing	PTFE-coated stainless steel	
Packing Special version	PTFE V-ring packing	
Diaphragm	EPDM with PTFE facing	

¹⁾ Suitable for Groups 1 and 2 fluids according to European Pressure Equipment Directive 97/23/EC

Table 3: K_{VS} and C_V coefficients and associated valve sizes

K_{VS}	0.1	0.16	0.25	0.4	0.63	1.0	1.6	2.5	4	6.3	10	16	25	40	60	80 ¹⁾	100 ¹⁾	160 ¹⁾	
C_V	0.12	0.2	0.3	0.50	0.75	1.2	2	3	5	7.5	12	20	30	47	70	95	120	190	
Seat Ø [mm]	6						12				24 up to DN 25 31 up to DN 32		31	38	48	63	80		100
Rated travel [mm]	7.5 mm up to DN 25											-							
	-									15 mm for DN 32 and larger						30			
DN	NPS																		
15	½	•	•	•	•	•	•	•	•	•									
20	¾	•	•	•	•	•	•	•	•	•									
25	1	•	•	•	•	•	•	•	•	•	•								
32	1¼									•	•	•							
40	1½									•	•	•	•						
50	2									•	•	•	•	•					
65	2½									•	•	•	•	•	•				
80	3									•	•	•	•	•	•	•			
100	4																	•	•

¹⁾ Only available in standard version with ball body

Table 4: Permissible differential pressures for Type 3249 in standard and special version

Table 4.1: Pressures in bar

Fail-safe position				Actuator stem extends (fail-close)				Actuator stem retracts (fail-open)			Force applied by the valve diaphragm in N/bar	
Bench ranges [bar] for		Travel = 7.5 mm		0.6 to 1.0	1.2 to 2.0	-		0.2 to 0.6	-			
		Travel = 15/30 mm		0.2 to 1.0	0.4 to 2.0	1.4 to 2.3	2.1 to 3.3	-	0.2 to 1.0			
Required supply pressure bar				1.4	2.2	2.5	3.5	1.8	2.4	3.1		
DN	K _{vs}	Actuator cm ²	Rated travel	Max. upstream pressure p ₁ when p ₂ = 0 bar								
15	0.1 to 4	120	7.5 mm	5.5	10	-		10	-	-	130	
		240		10	10	-		10	-	-		
20	0.1 to 4	120		5.5	10	-		10	-	-		
		240		10	10	-		10	-	-		
25	0.1 to 10	120		5.5	10	-		10	-	-		
		240		10	10	-		10	-	-		
32	6.3 to 16	240		-	2	-	-	2.0	8	10		400
		350		1.5	3	10	-	3.0	10	-		
40	6.3 to 25	240	-	2	-	-	2.0	8	10			
		350	1.5	3	10	-	3.0	10	-			
50	6.3 to 40	240	-	2	-	-	2.0	8	10			
		350	1.5	3	10	-	3.0	10	-			
65 · 80	60	240	-	2	-	-	2.0	8	10			
		350	1.5	3	10	-	3.0	10	-			
80 · 100	80 100 160	700	30 mm	-	1.5	6.5	10	1.5	6.5	10	1450	

Table 4.2: Pressures in psi

Fail-safe position				Actuator stem extends (fail-close)				Actuator stem retracts (fail-open)			Force applied by the valve diaphragm in N/bar	
Bench ranges [psi] for		Travel = 7.5 mm		9 to 15	18 to 30	-		3 to 9	-			
		Travel = 15/30 mm		3 to 15	6 to 30	20 to 34	30 to 48	-	3 to 15			
Required supply pressure psi				20	32	36	50	26	35	45		
NPS	C _v	Actuator cm ²	Rated travel	Max. upstream pressure p ₁ when p ₂ = 0 psi								
½	0.12 to 5	120	7.5 mm	80	145	-		145	-	-	130	
		240		145	145	-		145	-	-		
¾	0.12 to 5	120		80	145	-		145	-	-		
		240		145	145	-		145	-	-		
1	0.12 to 12	120		80	145	-		145	-	-		
		240		145	145	-		145	-	-		
1¼	7.5 to 20	240		-	29	-	-	29	116	145		400
		350		22	44	145	-	44	145	-		
1½	7.5 to 30	240	-	29	-	-	29	116	145			
		350	22	44	145	-	44	145	-			
2	7.5 to 47	240	-	29	-	-	29	116	145			
		350	22	44	145	-	44	145	-			
2½ · 3	70	240	-	29	-	-	29	116	145			
		350	22	44	145	-	44	145	-			
3 · 4	95 · 120 190	700	30 mm	-	22	94	145	22	94	145	1450	

Table 5: Dimensions for Types 3249-1 and 3249-7 Control Valves · Dimensions in mm

Table 5.1: Standard version (N) with ball body and special version (S) with backup packing

Valve	DN	15	20	25	32	40	50	65	80		100
	NPS	½	¾	1	1¼	1½	2	2½	3		4
Rated travel	mm	7.5			15					30	
Welding ends for pipes according to DIN 11850 Series 2	L (N)	70 ¹⁾	70 ¹⁾	70 ¹⁾	105 ¹⁾	105 ¹⁾	105 ¹⁾	105 ¹⁾	105 ¹⁾	150 ¹⁾	150 ¹⁾
	L (S)	90	90	90	105	105	115	115	115	–	–
	Ød2	19	23	29	35	41	53	70	85		104
	t	1.5	1.5	1.5	1.5	1.5	1.5	2	2		2
Welding ends for pipes acc. to DIN EN ISO 1127	L (N)	70 ¹⁾	70 ¹⁾	70 ¹⁾	105 ¹⁾	105 ¹⁾	105 ¹⁾	105 ¹⁾	105 ¹⁾	150 ¹⁾	150 ¹⁾
	L (S)	90	90	90	105	105	115	115	115	–	–
	Ød2	21.3	26.9	33.7	42.4	48.3	60.3	76.1	88.9		114.3
	t	1.6	1.6	2	2	2	2.6	2.6	2.6		2.6
Welding ends for pipes according to BS 4825	L (N)	70 ¹⁾	70 ¹⁾	70 ¹⁾	–	105 ¹⁾	105 ¹⁾	105 ¹⁾	105 ¹⁾	150 ¹⁾	150 ¹⁾
	L (S)	90	90	90		105	115	115	115	–	–
	Ød2	12.7	19.1	25.4		38.1	50.8	63.5	76.2		97.6
	t	1.6	1.6	1.6		1.6	1.6	1.6	1.6		2
Welding ends for pipes according to ISO 2037 (SMS), NFA 49-249	L (N)	–	–	70 ¹⁾	105 ¹⁾	105 ¹⁾	105 ¹⁾	105 ¹⁾	105 ¹⁾	150 ¹⁾	150 ¹⁾
	L (S)			90	105	105	115	115	115	–	–
	Ød2			25	33.7	38	51	63.5	76.1		104 ¹⁾
	t			1.2	1.2	1.2	1.2	1.6	1.6		2 ¹⁾
Thread according to DIN 11887	L1 (N)	64 ¹⁾	64 ¹⁾	64	100 ¹⁾	100 ¹⁾	100 ¹⁾	100	115	155 ¹⁾	155 ¹⁾
	Ød1	16	20	26	32	38	50	66	81		100
	ØC1	34 x ½"	44 x ½"	52 x ½"	58 x ½"	65 x ½"	78 x ½"	95 x ½"	110 x ¼"		130 x ¼"
Thread according to SMS 1146	L2 (N)	–	–	55 ¹⁾	105 ¹⁾	105 ¹⁾	105 ¹⁾	105	110	155 ¹⁾	155 ¹⁾
	Ød1			22.6	29.6	35.6	48.6	60.3	72.9		100 ¹⁾
	ØC2			40 x ½"	48 x ½"	60 x ½"	70 x ½"	85 x ½"	98 x ½"		125 x ¼"
Clamp connections acc. to ISO 2852 (pipeline acc. to ISO 2037)	L3 (N)	60.3 ¹⁾	60.3 ¹⁾	60.3 ¹⁾	88.9 ¹⁾	88.9 ¹⁾	88.9 ¹⁾	88.9 ¹⁾	95.3 ¹⁾	150 ¹⁾	150 ¹⁾
	Ød1			22.6	31.3	35.6	48.6	60.3	72.9		97.6
	ØC3			50.5	50.5	50.5	64	77.5	91		119
Flanges acc. to DIN EN 1092-1 (EN 558-1, S 8)	L4 (N)	90	95	100	105	115	125	145	155	155 ¹⁾	175
	Ød1	16	20	26	32	38	50	66	81		100
Common dimensions	A	80	80	80	110	110	110	110	110	155	155
	H1 (N)	225	228	231	257	260	265	275	280	300	310

¹⁾ Not standardized

Table 5.2: Dimensions for Type 3271 and Type 3277 Actuators

Actuator area	cm ²	120	240	350	700
Diaphragm ØD	mm	168	240	280	390
H ¹⁾	mm	69	62	82	199
H3 ²⁾	mm	110	110	110	190
H5	Type 3277 mm	88	101	101	101
Thread	Type 3271	M30 x 1.5			
	Type 3277	M30 x 1.5			
α	Type 3271	G ½ (½ NPT)	G ¼ (¼ NPT)	G ¾ (¾ NPT)	G ¾ (¾ NPT)
α2	Type 3277	–	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 lifting hook may differ. Actuators up to 355 cm² without lifting eyelet

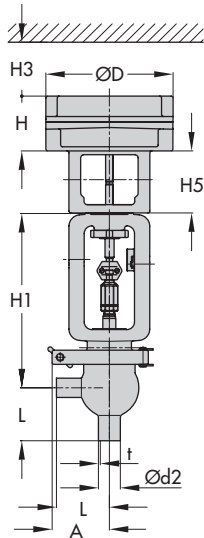
²⁾ Minimum clearance required to remove the actuator

Table 6: Weights for Type 3249 Valve - Weights in kg

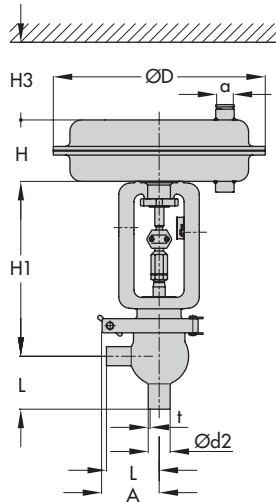
Valve	DN	15	20	25	32	40	50	65	80	100
	NPS	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
Weight with welding ends	kg (approx.)	6			16			20	36	40
(30 mm travel)										

Actuator	Type	3271-5	3271		3277-5	3277			
Actuator area	cm ²	120	240	350	700	120	240	350	700
Weight	kg (approx.)	2.5	5	8	22	3.2	9	12	26

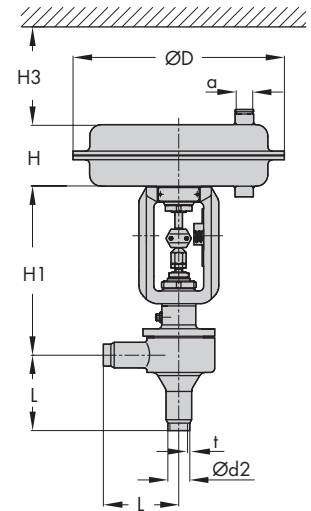
Dimensional drawings



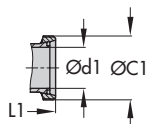
Type 3249-7, ball body with welding ends



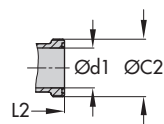
Type 3249-1, ball body with welding ends



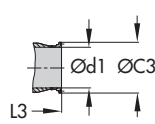
Type 3249-1, special version with welding ends



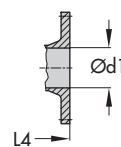
Threaded couplings according to DIN 11887



Threaded couplings according to SMS 1146



Clamp connections according to ISO 2852



Flange according to DIN EN 1092-1

Ordering data

Type 3249 Valve for aseptic service

Body version	Ball body or special version with backup packing
Valve size	DN ... or NPS ...
K_{VS}/C_V	...
Seat/plug seal	Metal or soft sealing
End connections	Welding ends, threaded couplings, clamp connections or flanges
Characteristic	Equal percentage or linear
Actuator	Type 3271 or Type 3277
Actuator area	... cm ²
Travel	... mm
Fail-safe position	Fail-close or fail-open
Bench range	...

Specifications subject to change without notice



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2016-04-14 · English