

Pneumatic Control Valve Type 3259-1 and 3259-7 Angle Valve Type 3259

Application

Control valve for industrial high pressure plants according to the IG standard

Nominal sizes **DN 16 to DN 90**
 Nominal pressure **PN 325**
 Temperature range **-200 to 450 °C**

Type 3259 Angle Valve optionally operated with a:

- Type 3271 Pneumatic Actuator as Type 3259-1 Control Valve or
- Type 3277 Pneumatic Actuator as Type 3259-7 Control Valve for integral positioner attachment.

The valve body is made of stainless forged steel. The end connections are screwed flanges with lens ring gaskets.

Valve plug optionally with:

- metal sealing or
- lapped-in metal.

The control valves, designed according to the modular assembly principle, can be equipped with various accessories:

Positioners, limit switches, solenoid valves and other equipment according to DIN EN 60 534-6 and NAMUR recommendation (see Information Sheet T 8350 EN for details).

Versions

Standard versions with spring-loaded double stuffing box for temperatures between -10 and 220 °C; nominal sizes DN 16, 24, 30, 45, 58, 70 and 90; nominal pressure PN 325.

Body of WN 1.4571 with intermediate flange of WN 1.7258, end connection with screwed flanges and lens ring gaskets.

- **Type 3259-1** · Type 3259 Valve and Type 3271 Actuator with 350 to 2800 cm² effective area (see T 8310 EN)
- **Type 3259-7** · Type 3259 Valve and Type 3277 Actuator with 350 and 700 cm² effective area for the integral positioner attachment (see T 8311 EN)

Additional versions with

- **Adjustable high-temperature packing** · For temperatures from -10 to 350 °C
- **Insulating section** · For temperatures from -200 to 450 °C (see pressure-temperature diagram for pressures and temperatures)
- **Heating jacket** · Available on request
- **Metal bellows sealing** · Material 2.4819 with additional safety stuffing box and test connection
- **Nominal size DN 120** · Available on request
- **Nominal sizes DN 6 and DN 10** · As Type 3510 Micro-flow Valve version



Fig. 1 · Type 3259-1 Control Valve, DN 70, PN 325 according to the IG standard, pneumatic actuator with 2800 cm² effective diaphragm area

Principle of operation

The medium flows through the valve against the closing direction (FTO). The position of the valve plug determines the cross-sectional area of flow between the valve seat and plug. The plug stem is sealed with a spring-loaded double PTFE stuffing box.

A metal bellows seal (Fig. 3) can be used for higher requirements.

A test connection is available on request for both versions.

The actuators are designed for pressure from both sides (see Tables 4b and 5b).

Fail-safe position

Depending on how the compression springs are arranged in the actuator (see Data Sheets T 8310 EN and T 8311 EN for further details), the control valve offers two different fail-safe positions effective upon air supply failure:

Actuator stem "extends":

When the air supply fails, the valve is closed (fail-close).

Actuator stem "retracts":

When the air supply fails, the valve is opened (fail-open).

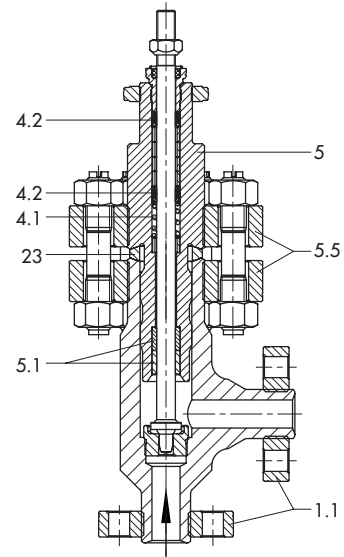


Fig. 2 · Type 3259 Valve as standard version

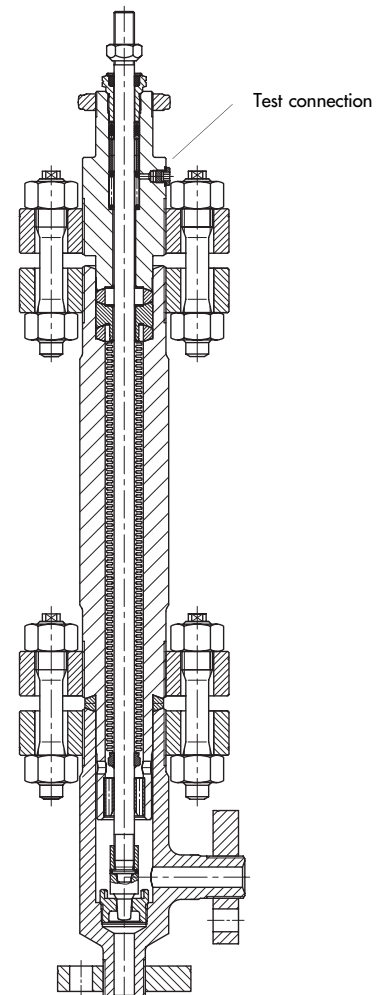


Fig. 3 · Type 3259 Valve with metal bellows seal and test connection

Legend to Fig. 2

- 1.1 Connecting flange
- 4.1 Spring
- 4.2 PTFE V-ring packing (2-pieced)
- 5 Bonnet
- 5.1 Guide bushing
- 5.5 Intermediate flange
- 23 Lens ring gasket

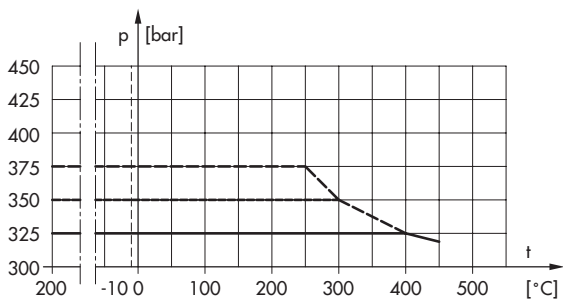


Fig. 4 · Pressure-Temperature Diagram for 1.4571

Table 1 · Technical data

Nominal size	DN	16 · 24 · 30 · 45 · 58 · 70 · 90
Nominal pressure	PN	325
End connection		Screwed flanges with lens ring gaskets according to the IG standard
Seat/plug sealing		Metal sealing or lapped-in metal
Characteristic		Equal percentage or linear
Rangeability		50 : 1 with $K_{vs} \geq 1$ · 30 : 1 with $K_{vs} < 1$
Temperature ranges in °C · Permissible operating pressures according to Pressure-Temperature Diagram		
Body without insul. section	PTFE packing	-10 ... 220
	HT packing	-10 ... 350
Body with	Insulating section	-200 ... 450
	Bellows section	-200 ... 450
Leakage rate acc. to DIN EN 1349		
Valve plug	Metal sealing	IV
	Lapped-in metal	IV-S2

Table 2 · Materials

Standard version		1.4571 / 1.0460
Body		
Flanges		1.7258
Bolts		1.7258
Seat and plug		1.4571 Seat: 1.4571 stellite · Plug: Stellite 6 1.4112 hardened
Guide bushings		2.4610 / 1.4112
Stuffing box packing		V-ring packing PTFE carbon compound
Body gaskets		Lens ring gaskets 1.4571/1.0460
Insulating section		1.4571/1.0460
Metal bellows seal		
Intermediate piece		1.4571/1.0460
Metal bellows		2.4819

Table 3 · K_{vs} values
Table 3a · Overview

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	63	100	
Seat-Ø	6			12			24			31	38	50	63	80
Travel	15										30			

Table 3b · Versions

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	63	100
DN													
16	•	•	•	•	•	•							
24	•	•	•	•	•	•	•	•					
30	•	•	•	•	•	•	•	•					
45				•	•	•	•	•	•	•			
58						•	•	•	•	•			
70									•	•	•	•	
90									•	•	•	•	•

Table 4a · Actuator sizing for Type 3259 Valve without metal bellows; fail-safe position actuator stem "extends" (fail-close)

DN	K _{vs}	Actuator/cm ²	Bench range in bar applicable when			
			Δp=50 bar	Δp=100 bar	Δp=200 bar	Δp=325 bar
16	0.1 to 1.0	350	0.4 ... 1.2	0.8 ... 2.4	1.4 ... 2.3	2.1 ... 3.3
		700	–	–	0.8 ... 1.2	1.6 ... 2.4
	1.6 to 2.5	350	0.4 ... 1.2	0.8 ... 2.4	1.4 ... 2.3	2.1 ... 3.3
		700	–	0.8 ... 1.2	0.8 ... 1.2	1.6 ... 2.4
16 to 58	4.0 to 10	1400	–	–	–	1.0 ... 1.2
		350	0.8 ... 2.4	2.1 ... 3.3	–	–
		700	–	1.6 ... 2.4	1.6 ... 2.4	2.7 ... 3.3
45 to 90	16	1400	–	–	1.0 ... 1.2	2.0 ... 2.4
		350	1.4 ... 2.3	–	–	–
		700	0.8 ... 1.2	1.6 ... 2.4	2.7 ... 3.3	–
	25	350	2.1 ... 3.3	–	–	–
		700	1.6 ... 2.4	2.7 ... 3.3	–	–
		1400	–	1.0 ... 1.2	2.0 ... 2.4	–
		2800	–	–	–	2.2 ... 2.4
70 to 90	40	700	2.1 ... 3.3	–	–	–
		1400	0.8 ... 1.2	1.6 ... 2.4	–	–
		2800	–	–	2.0 ... 2.43	3.0 ... 3.6
	63	700	2.6 ... 4.3	–	–	–
		1400	1.6 ... 2.4	–	–	–
		2800	–	2.0 ... 2.4	2.5 ... 3.0	–
		2x2800	–	–	–	2.0 ... 2.4
90	100	1400	2.0 ... 3.0	–	–	–
		2800	1.0 ... 1.2	2.0 ... 2.4	–	–
		2x2800	–	–	2.0 ... 2.4	3.3 ... 3.9

Table 4b · Actuator sizing for Type 3259 Valve without metal bellows; fail-safe position actuator stem "retracts" (fail-open)

DN	K _{vs}	Actuator/cm ²	Bench range	Required supply pressure in bar applicable when			
				Δp=50 bar	Δp=100 bar	Δp=200 bar	Δp=325 bar
16	0.1 to 1.0	350	0.2 ... 1.0	1.5	1.8	2.4	3.1
		700		–	–	1.4	1.8
16	1.6 to 2.5	350	0.2 ... 1.0	1.5	1.8	–	–
		700		–	–	1.4	1.8
16 to 58	4.0 to 10	350	0.2 ... 1.0	1.9	2.5	–	–
		700		1.1	1.5	2.1	2.9
		1400	0.4 ... 2.0	–	–	1.7	2.0
45 to 90	16	350	0.2 ... 1.0	2.2	–	–	–
		700		1.4	1.9	2.0	–
		1400	0.4 ... 2.0	–	1.5	2.1	2.8
	25	350	0.2 ... 1.0	2.8	–	–	–
		700		1.6	2.5	–	–
		1400	0.4 ... 2.0	–	1.8	2.6	3.7
70 to 90	40	700	0.2 ... 1.0	2.6	–	–	–
		1400		2.0	2.2	–	–
		2800	0.4 ... 2.0	–	1.7	2.4	3.3
	63	700	0.2 ... 1.0	3.5	–	–	–
		1400		2.1	3.1	–	–
		2800	0.4 ... 2.0	–	2.1	3.2	–
		2x2800	–	–	2.1	2.8	
90	100	1400	0.2 ... 1.0	2.6	–	–	–
		2800	0.4 ... 2.0	2.0	2.8	–	–
		2x2800		–	1.9	2.8	4.0

Table 5a · Actuator sizing for Type 3259 Valve with metal bellows; fail-safe position actuator stem "extends" (fail-close)

DN	K _{vs}	Actuator/cm ²	Bench range applicable when			
			Δp=50 bar	Δp=100 bar	Δp=200 bar	Δp=325 bar
16	0.1 to 1.0	350	0.8 ... 2.4	1.4 ... 2.3	–	–
		700	–	–	1.6 ... 2.4	2.4 ... 3.6
	1.6 to 2.5	350	0.8 ... 2.4	1.4 ... 2.3	–	–
		700	–	–	1.6 ... 2.4	2.4 ... 3.6
16 to 58	4.0 to 10	350	1.4 ... 2.3	2.1 ... 3.3	–	–
		700	–	1.6 ... 2.4	1.6 ... 2.4	2.7 ... 3.3
		1400	–	–	1.0 ... 1.2	2.0 ... 2.4
45 to 90	16	350	2.1 ... 3.3	–	–	–
		700	–	2.7 ... 3.3	–	–
		1400	–	–	2.0 ... 2.4	2.0 ... 2.4
	25	350	2.1 ... 3.3	–	–	–
		700	1.6 ... 2.4	2.7 ... 3.3	–	–
		1400	–	1.0 ... 1.2	2.0 ... 2.4	2.83 ... 3.2
70 to 90	40	700	2.1 ... 3.3	–	–	–
		1400	1.0 ... 1.2	2.0 ... 3.0	–	–
		2800	–	1.0 ... 1.2	2.0 ... 2.4	3.0 ... 3.8
	63	700	2.6 ... 4.3	–	–	–
		1400	2.0 ... 2.4	–	–	–
		2800	–	2.0 ... 2.4	3.0 ... 3.6	–
		2x2800	–	–	2.0 ... 2.4	2.5 ... 3.0
90	100	1400	2.5 ... 3.0	–	–	–
		2800	2.0 ... 2.4	2.5 ... 3.0	3.0 ... 3.8	–
		2x2800	–	–	–	3.3 ... 3.8

Table 5b · Actuator sizing for Type 3259 Valve with metal bellows; fail-safe position actuator stem "retracts" (fail-open)

DN	K _{vs}	Actuator/cm ²	Bench range	Required supply pressure in bar applicable when			
				Δp=50 bar	Δp=100 bar	Δp=200 bar	Δp=325 bar
16	0.1 to 1.0	350	0.2 ... 1.0	1.9	2.5	–	–
		700		–	–	1.9	2.6
	1.6 to 2.5	350	0.2 ... 1.0	1.9	2.5	–	–
		700		–	1.5	1.9	2.6
16 to 58	4.0 to 10	350	0.2 ... 1.0	2.1	2.7	–	–
		700		–	1.5	2.2	3.0
		1400	0.4 ... 2.0	–	–	1.5	2.1
45 to 90	16	350	0.2 ... 1.0	2.5	–	–	–
		700		–	2.0	3.0	–
		1400		0.4 ... 2.0	–	1.6	2.1
	25	350	0.2 ... 1.0	3.0	–	–	–
		700		1.7	2.5	–	–
		1400		0.4 ... 2.0	–	1.8	2.7
70 to 90	40	700	0.2 ... 1.0	2.7	–	–	–
		1400		2.0	2.7	–	–
		2800		0.4 ... 2.0	–	1.7	2.4
	63	700	0.2 ... 1.0	3.6	–	–	–
		1400		2.4	3.5	–	–
		2800		–	2.1	3.3	–
		2x2800		0.4 ... 2.0	–	–	2.1
90	100	1400	0.2 ... 1.0	3.0	–	–	–
		2800		2.9	2.8	–	–
		2x2800		–	2.0	2.8	4.0

Table 6 · Dimensions in mm for Type 3259-1 and Type 3259-7 as standard version

Valve	DN	16	24	30	45	58	70	90
Length L		95	110	120	150	170	200	235
H1 for actuator with	350 cm ²	470	470	470	560	560	–	
	700 cm ²	470	470	470	560	560	820	820
	1400 cm ²	525			615	615	820	820
	2800 cm ²	–			800	800	905	905
	2x2800 cm ²	–					905	905

Actuator	cm ²	350	700	1400	2800	2 x 2800
Diaphragm Ø D		280	390	530	770	
H ¹⁾		82	200	287	620	1130
H3 ²⁾		110	190	610	648	
Thread		M 30 x 1.5		M 60 x 1.5	M 100 x 2	
a (with Type 3271 Actuator)		G 3/8 (3/8 NPT)		G 3/4 (3/4 NPT)	G 1 (1 NPT)	
a2 (with Type 3277 Actuator)		G 3/8 (3/8 NPT)		–		

¹⁾ Actuator 350 cm² without lifting ring

²⁾ Minimum clearance for actuator disassembly

Table 7 · Weights for Type 3259-1 and Type 3259-7 as standard version

Valve	DN	16	24	30	45	58	70	90
Valve without actuator (approx. kg)		35	40	45	85 ¹⁾	90 ¹⁾	220 ¹⁾	230 ¹⁾

¹⁾ The weight increases by 30 kg with an actuator with 2800 cm² or 2x2800 cm²

Actuator	cm ²	350	700	1400	2800	2 x 2800
Type 3271 (approx. kg) ¹⁾	without	8	22	70	450	950
	with handwheel	13	27	Only with side-mounted handwheel, see T 8310 EN		
Type 3277 (approx. kg) ¹⁾	without	12	26	–		
	with handwheel	17	31	–		

¹⁾ Top row without handwheel, bottom row with handwheel

Table 8a · Dimensions and weights for Type 3259 as standard version with insulating section · Without actuator

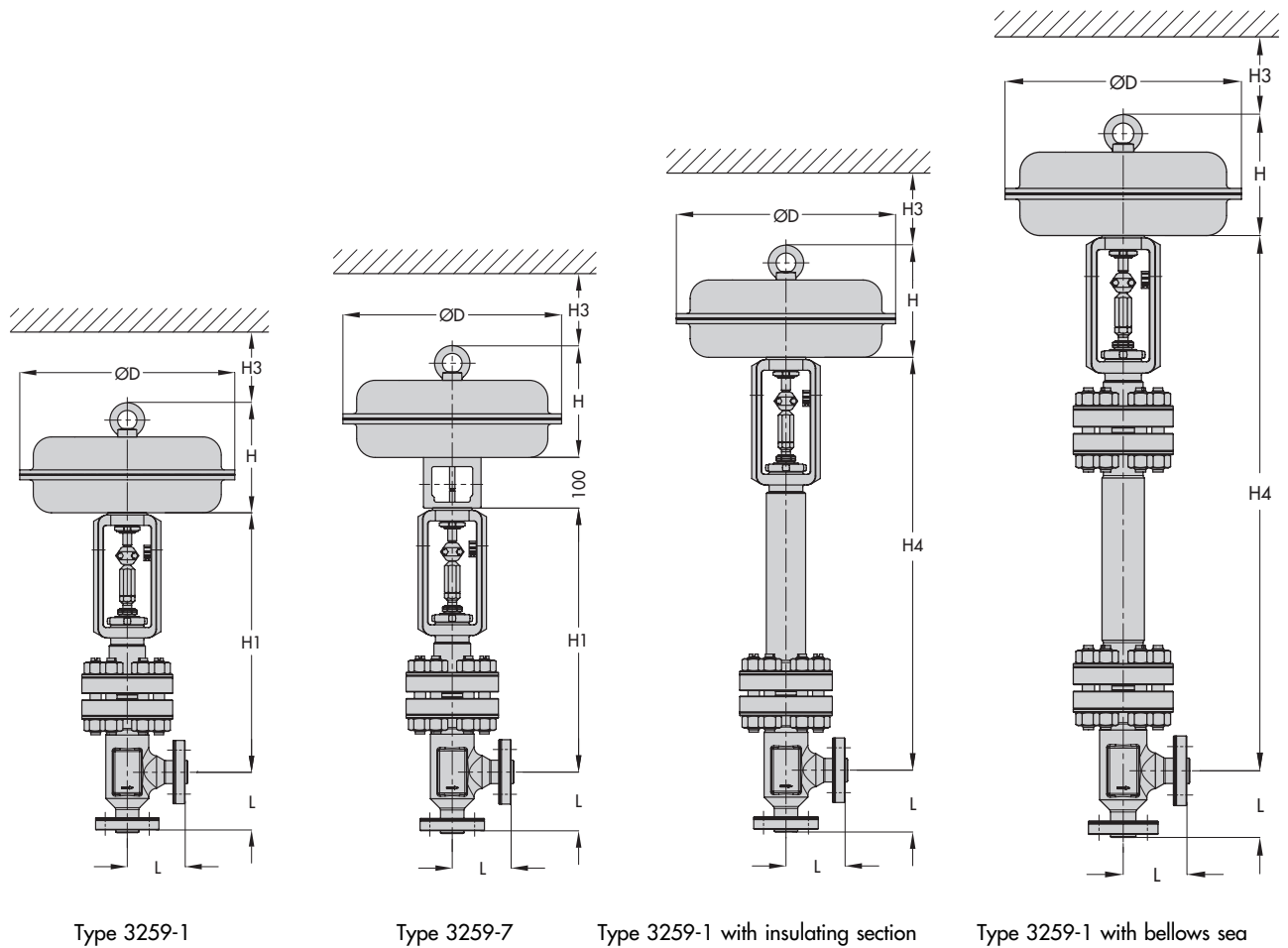
Nominal size	DN	16	24	30	45	58	70	90
Height H4 for actuator with	350 cm ²	735	735	735	810	810	–	
	700 cm ²	735	735	735	810	810	1175	1175
	1400 cm ²	790	790	790	865	865	1175	1175
	2800 cm ²	–			1050	1050	1260	1260
	2x2800 cm ²	–					1260	1260
Weight without actuator	kg	45	48	53	100 ¹⁾	1051)	295 ¹⁾	305 ¹⁾

¹⁾ The weight increases by 30 kg with an actuator with 2800 cm² or 2x2800 cm²
Table 8b · Dimensions and weights for Type 3259 as standard version with metal bellows seal · Without actuator

Nominal size	DN	16	24	30	45	58	70	90
Height H4 for actuator with	350 cm ²	885	885	885	875	895	–	
	700 cm ²	885	885	885	875	875	1485	1485
	1400 cm ²	940	940	940	930	930	1485	1485
	2800 cm ²	–			1115	1115	1570	1570
	2x2800 cm ²	–					1570	1570
Weight without actuator	kg	50	53	55	100 ¹⁾	1051)	357 ¹⁾	365 ¹⁾

¹⁾ The weight increases by 30 kg with an actuator with 2800 cm² or 2x2800 cm²

Dimensional diagrams



Selection and sizing of the control valve

1. Calculate the K_v value according to DIN EN 60 534.
2. Select the nominal size DN and K_{vs} value according to Tables 3 to 5.
3. Determine the permissible differential pressure Δp according to Tables 4 and 5.
4. Accessories according to Tables 1 and 2.

The following details are required on ordering

Nominal size	DN
Direction of flow	FTO or FTC
Plug	Metal sealing or lapped-in metal
Characteristic	Equal percentage or linear
Actuator	Type 3271 or Type 3277 (see T 8310 EN or T 8311 EN)
Fail-safe action	Valve CLOSED or valve OPEN
Process medium	Density in kg/m^3 and temperature in $^{\circ}\text{C}$
Flow rate	kg/h or m^3/h in standard or operating condition
Pressure	p_1 and p_2 in bar (absolute pressure p_{abs}), both with minimum, standard and maximum flow
Accessories	Positioner and/or limit switches

Specifications subject to change without notice.



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