

T 8055 EN**Series 250 · Type 3253-1 and Type 3253-7 Pneumatic Control Valves****Type 3253 Three-way Valve**

DIN version

**Application**

Mixing or diverting valve for process engineering applications with high industrial requirements

Nominal size	DN 15 to 500
Pressure rating	PN 16 to 160
Temperatures	-196 to +550 °C



Fig. 1: Type 3253-1 Pneumatic Control Valve with Type 3271 Actuator

Special features

Type 3253 Three-way Valve with

- Type 3271 Pneumatic Actuator (Type 3253-1 Control Valve)
- Type 3277 Pneumatic Actuator (Type 3253-7 Control Valve) for integral positioner attachment

Valve body made of

- Cast steel
- Cast stainless steel, high-temperature cast steel or cast cold-resisting steel

Two spring-loaded PTFE V-ring packings or two adjustable high-temperature packings. On request with a test connection between the two packings.

Conversion between mixing and diverting services by reversing the seat-guided valve plug

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

Operating temperature (medium temperature) with PTFE packing for temperatures from -10 to +220 °C or with adjustable

high-temperature packing for -10 to +350 °C, nominal sizes DN 15 to 500, PN 16 to 160

- **Type 3253-1** (Fig. 1) • Type 3253 Valve and Type 3271 Actuator with 350 to 2800 cm² actuator area (see Data Sheets ▶ T 8310-1, ▶ T 8310-2 and ▶ T 8310-3)
- **Type 3253-7** • Type 3253 Valve and Type 3277 Actuator with 350 to 750v2 cm² actuator area for integral positioner attachment (see Data Sheet ▶ T 8310-1)

Further versions

- **Version with insulating section**
- **Version with bellows seal**
- **Additional handwheel** • See Data Sheets ▶ T 8310-1, ▶ T 8310-2 and ▶ T 8310-3
- **ANSI version** • Nominal sizes NPS ½ to 20, Class 150 to 900 • See Data Sheet ▶ T 8056
- **Type 3244** • DN 15 to 150, PN 10 to 40 • NPS ½ to 6, Class 150 and 300 • See Data Sheet ▶ T 8026
- **Type 3253-2 Electric Control Valve** • Details on request
- **Type 3253-3 Manually Operated Valve** • With Type 3273 Hand-operated Actuator • See Data Sheet ▶ T 8312

Principle of operation

Depending on the plug arrangement, the three-way valve can be used either as a mixing or diverting valve.

In mixing valves, the process media to be mixed enter at valve ports **A** and **B**. The combined flow exits the valve at port **AB** (see Fig. 2 and Fig. 3). The flow rate from ports A or B to AB depends on the cross-sectional area of flow between the seats and plugs.

In diverting valves, the process medium enters at the valve port **AB** and the partial flows exit at ports **A** and **B** (see Fig. 4).

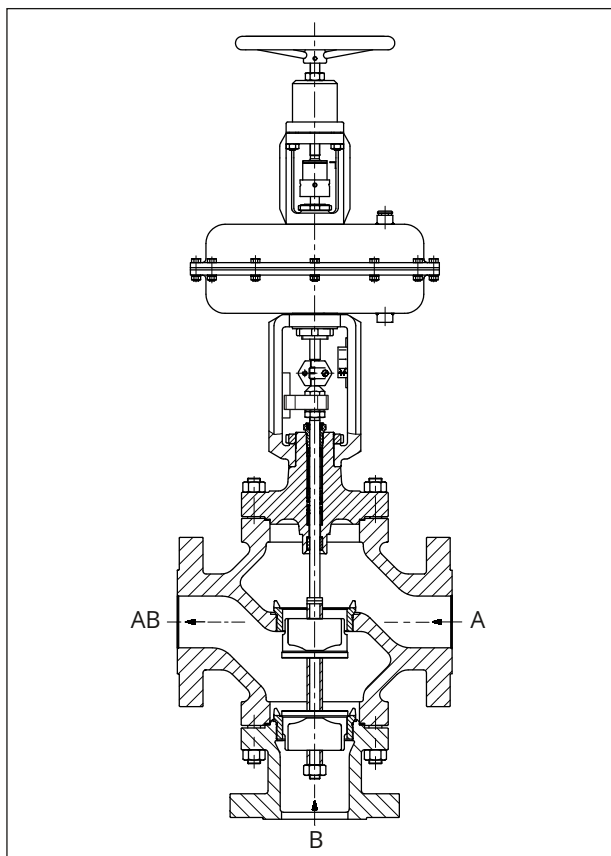


Fig. 2: Type 3253-1 Control Valve with Type 3271 Pneumatic Actuator and additional handwheel • Valve body version for DN 50 to 500/NPS 2 to 20 • Plug arrangement for mixing service • (anti-rotation fixture for DN 50/NPS 2 and larger)

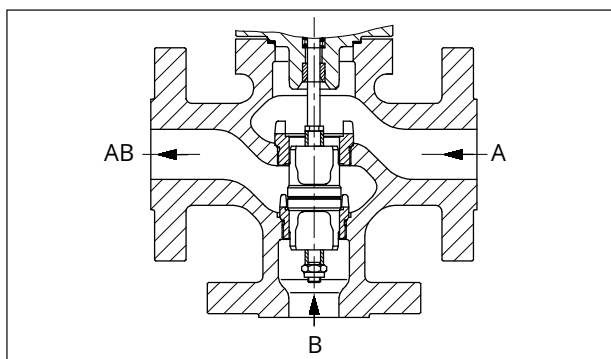


Fig. 3: Type 3253 Three-way Valve • Body version for DN 15 to 40/NPS ½ to 1½ • Plug arrangement for mixing service • Plug arrangement for diverting service DN 15 to 25/NPS ½ to 1

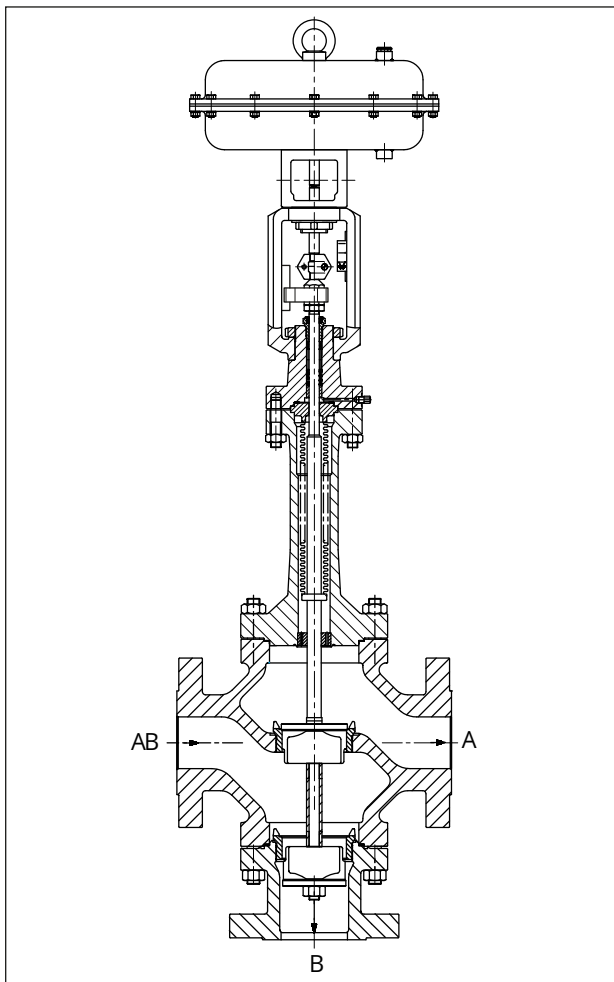



Fig. 4: Type 3253-7 Control Valve with Type 3277 Pneumatic Actuator (only up to DN 100/NPS 2) • Valve body version for DN 40 to 500/NPS 1½ to 20 • Plug arrangement for diverting service • (anti-rotation fixture for DN 50/NPS 2 and larger)

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:**
 Port **B** in mixing valves is closed and port **A** in diverting valves is closed when the supply air fails.
 Port **B** of diverting valves in DN 15 to 25 is closed since these valves have the same design as mixing valves.
- **Actuator stem retracts:**
 Port **A** in mixing valves is closed and port **B** in diverting valves is closed when the supply air fails.
 Port **A** of diverting valves in DN 15 to 25 is closed since these valves have the same design as mixing valves.

Table 1: Technical data for Type 3253 · DIN version

Material		Cast steel 1.0619		Cast steel 1.7357	Cast stainless steel 1.4408	
Nominal size ¹⁾	DN	15 to 100	150 to 300	15 to 300	15 to 100	150 to 300
Pressure rating ¹⁾	PN	16 to 160	16 to 160	16 to 160	16 to 160	16 to 160
Type of end connections	Flanges	All DIN EN versions				
Seat-plug seal		Metal seal				
Characteristic		Linear				
Rangeability		50:1				
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 permissible range for temperatures at the RFID tag is between -40 and +85 °C.				
Temperature ranges in °C · Permissible operating pressures acc. to pressure-temperature diagrams (see Information Sheet ► T 8000-2)						
Body without insulating section		-10 to +220 · Up to +350 with high-temperature packing				
Body with	Insulating section	-10 to +400 ²⁾	-10 to +500	-196 to +550		
	Bellows seal	-10 to +400 ²⁾	-10 to +500	-196 to +550		
Valve plug	Metal seal	-196 to +550				
Leakage class according to DIN EN 60534-4		0.05 % of K _{vs}				

¹⁾ Up to PN 400 on request · DN 400: PN 16 to 40 · DN 500: PN 16 to 40

²⁾ Version for lower temperatures on request

Table 2: Materials for Type 3253 · DIN version

Standard version Body	Cast steel 1.0619	Cast steel 1.7357	Cast stainless steel 1.4408
Valve bonnet	1.0460/1.0619		1.4408/1.4401
Seat and plug ¹⁾	1.4006/1.4008		1.4409/1.4404
Guide bushings	1.4112		2.4610
Packing ²⁾	V-ring packing: PTFE with carbon; spring: 1.4310 or high-temperature packing		
Body gasket	Graphite seal on metal core		
Insulating section	1.0460/1.0619		1.4408/1.4401
Bellows seal ⁴⁾			
Intermediate piece	1.0460/1.0619		1.4408/1.4401
Metal bellows	1.4571 ³⁾		

¹⁾ All seats and plugs also available with Stellite® facing

²⁾ Other packings on request (► T 8000-6)

³⁾ Other bellows material on request

⁴⁾ Bellows with both >DN 200 and >PN 100 on request

Flow rate

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

Table 3: Available K_{VS} coefficients

K_{VS}	4	8	25	40	100	160	360	630	800	1500	2500	3600
Seat Ø in mm	24	24	38	50	80	100	150	200	250	300	400	500
Rated travel in mm	15	15	15	30	30	30	60	60	60	120	120	120
DN												
15	.											
25		.										
40			.									
50				.								
80					.							
100						.						
150							.					
200								.				
250 ¹⁾									.			
300										.		
400											.	
500												.

¹⁾ Special version K_{VS} 1000 only for DN 250 as mixing valve with 120 mm travel

Differential pressures

Notes on the differential pressure tables:

- Bench ranges not marked apply to standard operation ($p_2 = 0$), i.e. at rated travel.
- Values marked with * apply to the maximum pretensioned springs.
- Differential pressures in parentheses refer to the values for half travel in parentheses in the bench range row.
- The springs in actuators with fail-safe action "actuator stem retracts" cannot be preloaded.

Table 4: Permissible differential pressures Δp for valves with and without bellows seal: Fail-safe action "actuator stem extends" • Pressures in bar

Bench range [bar] with actuator area [cm ²]					350	0.2 to 1.0 (0.8 to 1.2)	0.4 to 2.0 (1.6 to 2.4)	1.4 to 2.3 (1.85 to 2.3)	2.1 to 3.3 (2.7 to 3.3)	-
					700			0.5 to 2.5 (2 to 3)	1.1 to 2.4 (2.05 to 2.7)	1.3 to 2.8 (2.45 to 3.2)
Required supply pressure					1400	-		1.1 to 2.3 (2.0 to 2.6)	1.3 to 3.3	
					2800					
					2x 2800					
					Lower bench range value + Upper bench range value					
DN	K _{vs}	Travel [mm]	Seat bore [mm]	Actuator [cm ²]	Δp in bar					
15	4	15	24	350	8	22	90	140	-	
				700	(105)	(215)	(250)	(370)	-	
25	8	15	24	350	8	22	90	140	-	
				700	(105)	(215)	(250)	(370)	-	
40	25	15	38	350	-	8	35	55	-	
				700	(140)	(85)	(100)	(145)	-	
50	40	30	50	700	4	10	42	65	-	
				1400	(49)	(100)	(126)	(129)	(155)	
80	100	30	80	700	-	-	(16)	25	-	
				1400	(18)	(38)	(49)	(50)	(60)	
100	160	30	100	700	-	-	10	15	-	
				1400	(11)	(24)	(31)	(32)	(38)	
150	360	60	150	1400	-	2	3	7	8.5	
				2800	-	(22)	(28)	(28)	-	
200	630	60	200	1400	-	-	-	4	4.5	
				2800	-	(12)	(15.5)	(15.5)	-	
				2x 2800	-	(25)	(32)	(32)	-	
250	800	60	250	2800	-	-	-	(10)	-	
				2x 2800	-	-	-	(20)	-	
300	1500	120	300	2800	-	-	-	3.5	-	
				2x 2800	-	-	-	7.5	-	
400	2500	120	400	2800	-	-	-	-	2.3	
				2x 2800	-	-	-	-	5	
500	3600	120	500	2x 2800	-	-	-	-	3	

Table 5: Permissible differential pressures Δp for valves with and without bellows seal: Fail-safe action "actuator stem retracts" • Pressures in bar

Bench range [bar] with actuator area [cm ²]					350	0.2 to 1.0 (0.2 to 0.6)	0.4 to 2.0 (0.4 to 1.2)	1.4 to 2.3 (1.4 to 1.85)	2.1 to 3.3 (2.1 to 2.7)	-
					700			0.5 to 2.5 (0.5 to 1.5)	1.1 to 2.4 (1.1 to 1.75)	1.3 to 2.8 (1.3 to 2.05)
Required supply pressure					1400	-			1.1 to 2.3 (1.1 to 1.7)	1.3 to 3.3 (1.3 to 2.3)
					2800					2x 2800
Required supply pressure					Lower bench range value + Upper bench range value					
DN	K _{vs}	Travel [mm]	Seat bore [mm]	Actuator [cm ²]	Δp in bar					
15	4	15	24	350	8.5	22.5	92	141	-	
				700	(22.5)	(50)	(189)	(287)	-	
25	8	15	24	350	8.5	22.5	92	141	-	
				700	(22.5)	(50)	(189)	(287)	-	
40	25	15	38	350	-	8	36	55	-	
				700	(8.5)	(19)	(75)	(114)	-	
50	40	30	50	700	4	10.5	42.5	65	-	
				1400	(10.5)	(23.5)	(30)	(68)	(80)	
80	100	30	80	700	-	-	16	25	-	
				1400	(3.5)	(9)	(11.5)	(26)	(31.5)	
100	160	30	100	700	-	-	10.5	16	-	
				1400	-	(5.5)	(7)	(16.5)	(20)	
150	360	60	150	1400	-	-	-	7	8.5	
				2800	-	(5)	(6.5)	(15)	-	
200	630	60	200	1400	-	-	-	4	4.5	
				2800	-	-	-	(8)	-	
				2x 2800	-	(5.5)	(7)	(17)	-	
250	800	60	250	2800	-	-	-	(5)	(13)	
				2x 2800	-	-	(4.5)	(10)	-	
300	1500	120	300	2800	-	-	-	-	-	
				2x 2800	-	-	-	7.5	9	
400	2500	120	400	2800	-	-	-	-	-	
				2x 2800	-	-	-	-	5	
500	3600	120	500	2x 2800	-	-	-	-	3	

Table 6: Dimensions in mm for Type 3253 Three-way Valve · DIN version

Valve	DN	15	20	40	50	80	100	150	200	250	300	400	500	
Length L	PN 10 to 40	130	160	200	230	310	350	480	600	730	850	1100	1250	
	PN 63 to 160	210	230	260	300	380	430	550	650	775	900	1150 ¹⁾	1400 ²⁾	
H4	PN 10 to 40	152	152	164	217	222	242	315	389	441	637	637	735	
	PN 63 to 160	152	152	164	217	222	242	315	389	518	637	-	-	
H8 for actuator	350 cm ²	240	240	240	240	240	240	-	-	-	-	-	-	
	350v2 cm ²	240	240	240	240	240	240	-	-	-	-	-	-	
	355v2 cm ²	240	240	240	240	240	240	418	-	-	-	-	-	
	750v2 cm ²	240	240	240	240	240	240	418	418	418	-	-	-	
	1000 cm ²	-	-	-	295	295	295	418	On req.	On req.	On req.	On req.	On req.	
	1400-60 cm ²	-	-	-	295	295	295	418	418	418	503	503	503	
	1400-120 cm ²	-	-	-	480	480	480	503	503	503 ³⁾	650	650	650	
	2800 cm ²	-	-	-	480	480	480	503	503	503 ³⁾	650	650	650	
2 x 2800 cm ²	-	-	-	-	-	480	503	503	503 ³⁾	650	650	650		
H2 (approx.)	PN 10 to 40	115	115	130	230	275	305	480	520	595	740	830	982	
	PN 63 to 160	115	115	130	275	310	370	535	590	730	790	-	-	
With insulating section														
H4	PN 10 to 160	353	353	365	487	492	512	665	944	1064	1135	1136 ⁴⁾	-	
With bellows seal														
H4	15 to 120 mm travel	PN 10 to 40	350	350	362	596	601	601	722	1038	1493	1505	1507	-
	15 to 120 mm travel	PN 63 to 160	350	350	362	596	601	601	856	1438	On req.	-	-	-

1) DN 400, up to PN 63

2) DN 500, up to PN 40

3) H8 = 650 mm with 250 mm seat bore

4) DN 400, up to PN 40

Table 7: Further dimensions¹⁾ in combination with Type 3271 Pneumatic Actuator or Type 3277 Pneumatic Actuator

Actuator area	cm ²	350	350v2	355v2	750v2	1400-60	1400-120	2800	2x 2800
Diaphragm ØD	mm	280	280	280	394	530	534	770	770
H ²⁾	Type 3271	mm	82	92	131	236	337	598	713
	Type 3277	mm	82	82	121	236	-	-	-
H ³⁾	mm	110	110	110	190	610	650	650	650
H5	Type 3277	mm	101	101	101	101	-	-	-
Thread	Type 3271	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M60x1.5	M100x2	M100x2	M100x2
Thread	Type 3277	M30x1.5	M30x1.5	M30x1.5	M30x1.5	-	-	-	-
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 1 (1 NPT)	G 1 (1 NPT)	G 1 (1 NPT)
a2	Type 3277	G 3/8 ⁴⁾	G 3/8 ⁴⁾	G 3/8 ⁴⁾	G 3/8 ⁴⁾	-	-	-	-

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

4) An adapter G 3/8 to 3/8 NPT is available for the a2 connection. It can be ordered separately using the following article number: 100160362

Dimensional drawings

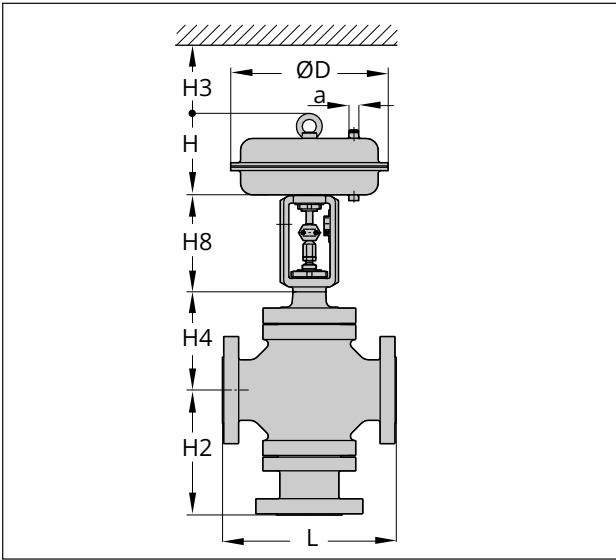


Fig. 5: Type 3253-1

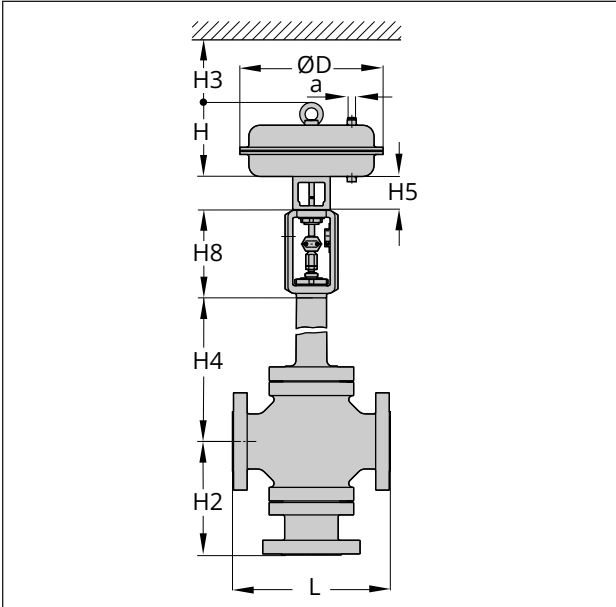


Fig. 6: Type 3253-7

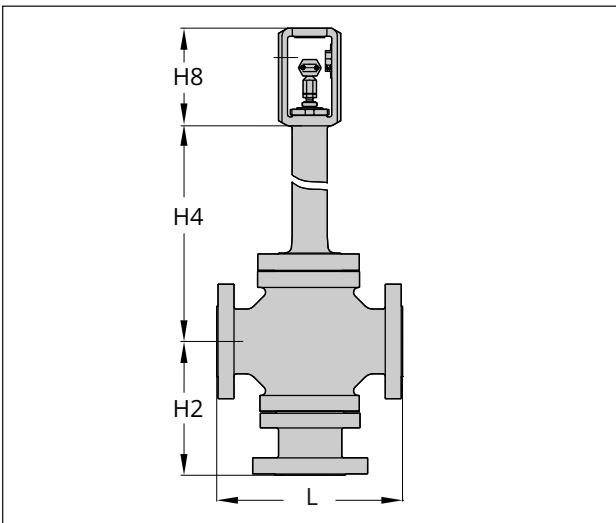


Fig. 7: Type 3253 with insulating section or bellows seal

Table 8: Weights in kg for Type 3253 Three-way Valve · DIN version

Valve	DN	15	20	40	50	80	100	150	200	250	300	400	500
Weight ¹⁾ without actuator	PN 10 to 160	kg	On req.	On req.	On req.	On req.	On req.	On req.	On req.	On req.	On req.	On req.	On req.
With insulating section													
Weight ¹⁾ without actuator	PN 10 to 160	kg	On req.	On req.	On req.	On req.	On req.	On req.	On req.	On req.	On req.	On req.	On req.
With bellows seal													
Weight ¹⁾ without actuator	PN 10 to 160	kg	On req.	On req.	On req.	On req.	On req.	On req.	On req.	On req.	On req.	On req.	On req.

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 9: Weights¹⁾ for Type 3271 and Type 3277 Pneumatic Actuators

Type ... Actuator	Actuator area in cm ²	350	350v2	355v2	750v2	1400-60	1400-120	2800	2x 2800	
3271	Without handwheel	kg	8	11.5	15	36	70	175	450	950
3271	With handwheel	kg	13	16.5	20	41	175	300 ^{2)/} 425 ³⁾	575 ^{2)/} 700 ³⁾	On req.
3277	Without handwheel	kg	12	15	19	40	-	-	-	-
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.).

²⁾ Side-mounted handwheel up to 80 mm travel

³⁾ Side-mounted handwheel with travel higher than 80 mm travel

Selection and sizing of the valve

1. Calculate K_{VS} coefficient according to DIN EN 60534-1.
2. Select nominal size DN and K_{VS} coefficient from Table 3 .
3. Actuator sizing and 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	DN ...
Pressure rating	PN ...
Body material	See Table 2
Bonnet	Standard bonnet, insulating section or bellows seal
Type of end connections	Flanges
Actuator	Type 3271 or Type 3277 (see Data Sheets ► T 8310-1, ► T 8310-2 and ► T 8310-3)
Fail-safe action	Actuator stem extends/retracts
Process medium	Density in kg/m^3 and temperature in $^{\circ}\text{C}$
Flow rate	in kg/h or m^3/h in standard or operating state
Pressure	p_1 and p_2 in bar (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 8055

