

Pneumatic Control Valve Type 3253-1 and Type 3253-7 Three-way Valve Type 3253

Application

Diverting or mixing valves for heavy-duty service in process engineering

Nominal sizes	DN 15 to 500
Nominal pressure	PN 10 to 160
Temperatures	-200 to +500 °C

Type 3253 Three-way Valve optionally operated with:

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

Valve body optionally made of

- Cast iron (DN 250 or larger for PN 10, DN 150/200 for PN 16)
- Cast steel (DN 15 to 100 for PN 63 or greater, DN 150 to DN 500 for PN 16 or greater), DN 400 and DN 500 for up to PN 40
- Cast stainless steel

Stuffing box containing either two spring-loaded PTFE V-ring packings or two adjustable high-temperature (HT) packings.

Optional test connection between the two packings

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

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 IEC 60534-6 and NAMUR recommendation (see Information Sheet T 8350 EN for details).

Versions

Standard version with PTFE packing for temperatures from -10 to +220 °C or with adjustable high-temperature packings for -10 to +350 °C

Type 3253-1 (Fig. 1) · Type 3253 Valve and Type 3271 Actuator with 350 to 2800 cm² (see T 8310-1 EN and T 8310-2 EN)

Type 3253-7 · Type 3253 Valve and Type 3277 Actuator with 350 or 700 cm² (see Data Sheet T 8310-1 EN)

Additional versions with

- **Nominal pressures >PN 160 to 400** · On request
- **Extension bonnet or bellows seal** · See Technical Data
- **Additional handwheel** · See T 8310-1/-2 EN
- **ANSI version** · NPS ½ to 20, ANSI Class 300 to 2500 on request
- **Type 3244** · DN 15 to 150, PN 10 to 40; NPS ½ to 6, ANSI Class 150 to 300 (see Data Sheet T 8026 EN).
- **Type 3253-2 Electric Control Valve** · On request

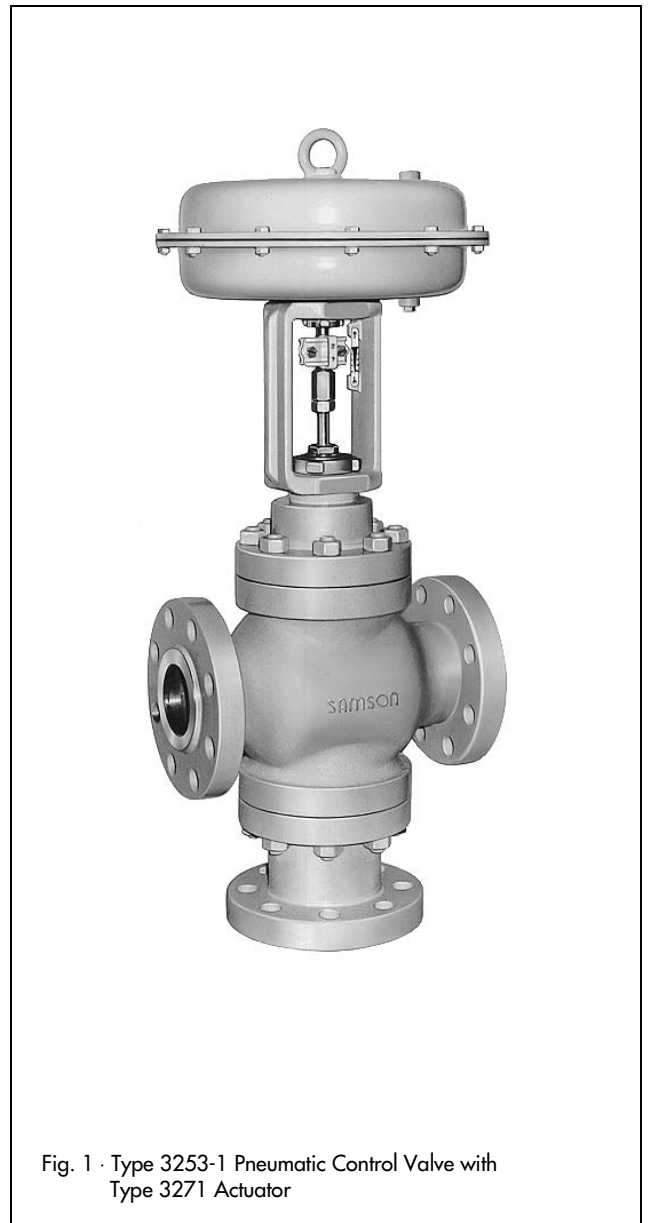


Fig. 1 · Type 3253-1 Pneumatic Control Valve with Type 3271 Actuator

- **Type 3253-3 Hand-operated Valve** · With Type 3273 Hand-operated Actuator (see T 8312 EN for details)

Principle of operation

Depending on plug arrangement, the three-way valve can be used for mixing or diverting service.

When used as a mixing valve, the process media to be mixed enter through valve ports A and B. The combined stream leaves at port AB (Fig. 2 and 3). The flow rate from valve ports A and B to port AB depends on the cross-sectional area of flow between the seats and the valve plugs.

When used as a diverting valve, the process medium enters at port AB and the partial streams leave at valve ports A and B (Fig. 4).

Fail-safe action

Depending on how the compression springs are arranged in the pneumatic actuator (see T 8310-1 EN and T 8310-2 EN for further details), the control valve has two different fail-safe actions which become effective upon a supply air failure:

Actuator stem extends:

Whenever the air supply fails, either valve port B (mixing valve) or valve port A (diverting valve) is closed.

Actuator stem retracts:

Whenever the air supply fails, either valve port A (mixing valve) or valve port B (diverting valve) is closed.

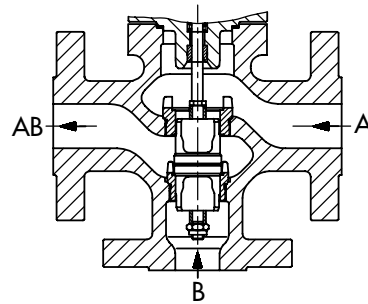


Fig. 3 · Type 3253 Three-way Valve
Body version for DN 15 to DN 40,
Plug arrangement for mixing service,
Plug arrangement for diverting service DN 15 to 25

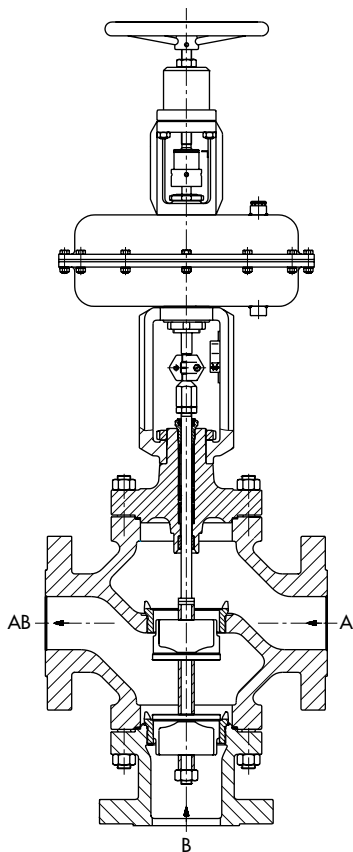


Fig. 2 · Type 3253-1 Control Valve with Type 3271
Pneumatic Actuator and additional handwheel,
Body version for DN 50 to DN 500,
Plug arrangement for mixing service

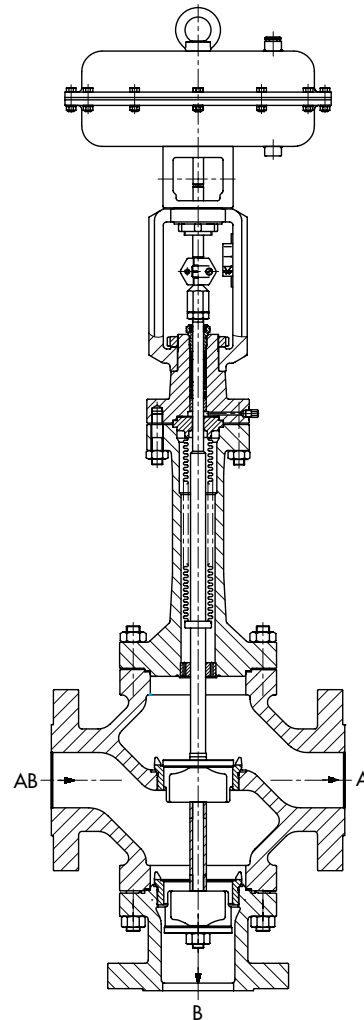


Fig. 4 · Type 3253-7 Control Valve with Type 3277
Pneumatic Actuator (only up to DN 100),
Body version for DN 40 to DN 500,
Plug arrangement for diverting service

Table 1 · Technical Data for Type 3253 Three-way Valve

Material		Cast iron EN-JL1040		Cast steel 1.0619		Cast stainless steel 1.4581	
Nominal sizes	DN	15 ... 200	200 ... 500	15 ... 100	150 ... 500	15 ... 100	150 ... 500
Nominal pressure ¹⁾	PN	16	10	63 ... 160	16 ... 160	63 ... 160	16 ... 100
End connection	Flanges	All DIN EN versions · Other connections on request					
Seat/plug sealing		Metal sealing					
Characteristic		Linear					
Rangeability		50 : 1					
Temperature ranges in °C · Permissible operating pressures according to pressure-temperature diagram (see Information Sheet T 8000-2 EN)							
Body without extension bonnet		-10 ... 220 °C · up to 350 °C with HT packing					
Body with	Ext. bonnet	-10 ... 300		-10 ... 400 ²⁾		-10 ... 450	
	Bellows	-10 ... 300		-10 ... 400 ²⁾		-10 ... 450	
Valve plug	Metal sealing	-200 ... 450					
Leakage rate Acc. to DIN EN 1349: 2000		I					

¹⁾ Up to PN 400 on request, DN 400 to DN 500 only for up to PN 40

²⁾ In connection with suitable body material; for temperatures exceeding 500 °C: 1.7380

Table 2 · Materials (material numbers according to EN)

Standard version Valve body and bonnet	Cast iron EN-JL1040	Cast steel 1.0619	Cast stainless steel 1.4581
Seat and plug ¹⁾	1.4006		1.4571
Guide bushings	1.4112		2.4610
Stuffing box packing	V-ring packing PTFE with carbon, spring 1.4310 or HT packing		
Body gaskets	Metal		
Extension bonnet	1.0460	1.7335	1.4571
Metal bellows seal			
Intermediate piece	1.0460/1.0619	1.7335/1.0619	1.4571
Metal bellows	1.4571		

¹⁾ All seats and plugs also available with Stellite facing

Table 3 · Available K_{Vs} coefficients

K _{Vs}	4	10	25	40	100	160	360	630	800	1500	2500	4000
Seat Ø	24		38	50	80	100	150	200	250	300	400	500
Travel	15			30			60			120		
DN												
15	•											
25		•										
40			•									
50				•								
80					•							
100						•						
150							•					
200								•				
250									•			
300										•		
400											•	
500												•

Table 4a · Permissible differential pressures Δp for valves with and without metal bellows seal
Fail-safe action "Actuator stem extends" · Pressures in bar

Values specified in the columns highlighted in gray correspond to the standard bench range, i.e. applied at rated travel · Values specified in the other columns apply to maximum pretensioned springs.

Bench range (bar) for actuator area (cm ²)		350	0.2 ... 1.0 (0.8 ... 1.2)	0.4 ... 2.0 (1.6 ... 2.4)	1.4 ... 2.3 (1.85 ... 2.3)	2.1 ... 3.3 (2.7 ... 3.3)	–	–	–
		700			0.5 ... 2.5 (2 ... 3)	1.1 ... 2.4 (2.05 ... 2.7)	1.3 ... 2.8 (2.45 ... 3.2)	–	–
		1400	–	0.9 ... 1.6 (1.4 ... 1.7)		1.0 ... 2.1 (1.8 ... 2.3)	1.1 ... 2.6 (2.2 ... 3.0)	–	
		2800		–	–	–	–		
		2 x 2800		–	–	–	1.6 ... 3.2		
Required supply pressure		Lower spring range value + upper spring range value							
DN	K _{vs}	Actuator cm ²	Δp in bar						
15	4	350	8.5	22.5	92	141	–	–	–
		700	(106)	(217)	(252)	(370)	–	–	–
25	10	350	8.5	22.5	92	140	–	–	–
		700	(106)	(217)	(252)	(370)	–	–	–
40	25	350	–	8.2	36	55	–	–	–
		700	(41.5)	(86)	(100)	(147)	–	–	–
50	40	700	4.2	10.6	42.7	65	–	–	–
		1400	(49)	(100)	(126)	(129)	(155)	–	–
80	100	700	–	–	16.4	25	–	–	–
		1400	(18.8)	(38.9)	(49)	(50.2)	(60.2)	–	–
100	160	700	–	–	10.3	15.9	–	–	–
		1400	(11.2)	(24.7)	(31.2)	(32)	(38.4)	–	–
150	360	1400	–	10.8	13.6	14	16.8	–	–
		2800	–	(22.2)	(27.9)	(19.3)	(25)	(30.7)	–
200	630	1400	–	–	–	4	4.7	–	–
		2800	–	(12.4)	(15.5)	(10.7)	(13.9)	(17.2)	–
		2x2800	(16.6)	(25)	(31)	(21.4)	(27.8)	(34.4)	–
250	800	2800	–	–	–	(6.8)	(8.8)	(10.9)	–
		2x2800	–	–	–	(13.6)	(17.6)	(21.8)	–
300	1500	2800	–	–	–	–	–	3.6	–
		2x2800	–	–	–	–	–	7.2	–
400	2500	2800	–	–	–	–	–	–	–
		2x2800	–	–	–	–	–	4	–
500	4000	2x2800	–	–	–	–	–	–	3.5

**Table 4b · Permissible differential pressure Δp for valves with or without metal bellows seal
Fail-safe action "actuator stem retracts" · Pressures in bar**

Values specified in the columns highlighted in gray correspond to the standard bench range, i.e. applied at rated travel · Values specified in the other columns apply to maximum pretensioned springs.

Bench range (bar) for actuator area (cm ²)			350	0.2 ... 1.0 (0.2 ... 0.6)	0.4 ... 2.0 (0.4 ... 1.2)	1.4 ... 2.3 (1.4 ... 1.85)	2.1 ... 3.3 (2.1 ... 2.7)	–	–	–
			700			0.5 ... 2.5 (0.5 ... 1.5)	1.1 ... 2.4 (1.1 ... 1.75)	1.3 ... 2.8 (1.3 ... 2.05)	–	–
Required supply pressure			1400							
			2800							
2 x 2800										
Required supply pressure			Lower spring range value + upper spring range value							
DN	K _{vs}	Actuator cm ²	Δp in bar							
15	4	350	8.5	22.5	92	141	–	–	–	
		700	(22.5)	(50)	(189)	(287)	–	–	–	
25	10	350	8.5	22.5	92	141	–	–	–	
		700	(22.5)	(50)	(189)	(287)	–	–	–	
40	25	350	–	8.2	36	55.4	–	–	–	
		700	(8.2)	(19.4)	(75)	(114)	–	–	–	
50	40	700	4.2	10.6	42.7	65	–	–	–	
		1400	(10.5)	(23.5)	(30)	(68.4)	(17)	–	–	
80	100	700	–	–	16.3	25	–	–	–	
		1400	(4)	(8.8)	(11.3)	(26.4)	(31.4)	–	–	
100	160	700	–	–	10.3	7.9	–	–	–	
		1400	–	(5.5)	(7.1)	(16.7)	(19.9)	–	–	
150	360	1400	–	–	–	7.2	8.6	–	–	
		2800	–	(5.1)	(6.5)	(12.2)	(13.6)	(15)	–	
200	630	1400	–	–	–	4	4.7	–	–	
		2800	–	–	–	(6.7)	(7.5)	(8.3)	–	
		2x2800	–	(5.4)	(7)	(13.4)	(15)	(16.6)	–	
250	800	2800	–	–	–	(4.2)	(4.8)	(5.3)	–	
		2x2800	–	–	(4.4)	(8.4)	(9.6)	(10.6)	–	
300	1500	2800	–	–	–	–	–	–	–	
		2x2800	–	–	–	5.8	6.6	7.2	–	
400	2500	2800	–	–	–	–	–	–	–	
		2x2800	–	–	–	–	–	4	–	
500	4000	2x2800	–	–	–	–	–	–	3.5	

Table 5 · Dimensions in mm for Type 3253-1 and Type 3253-7 Pneumatic Control Valve in standard version

Valve	DN	15	25	40	50	80	100	150	200	250	300	400	500	
Length L	PN 10 ... 40	-						480	600	730	850	1100	1250	
	PN 63 ...160	210	230	260	300	380	430	550	650	775	900	1150	-	
H1 for actuator	350 cm ²	392	392	404	457	462	482	-						
	700 cm ²	392	392	404	457	462	482	732	805	860	1035	1035	-	
	1400 cm ²	-			512	517	537	732	805	860	1035	1035	1258	
	2800 cm ²	-			697	702	722	817	890	1094	1290	1290	1410	
H2 approx.	PN 10 ... 40	-						480	520	595	740	830	985	
	PN 63 ...160	115	115	130	275	275	370	535	590	730	-	-	-	

Actuator	cm ²	350	700	1400	2800	2 x 2800
Diaphragm Ø D		280	390	530	770	
H 1) ¹⁾		82	200	287	620	1134
H3 2) ²⁾		110	190	610	650	
Thread		M 30 x 1.5		M 60 x 1.5	M 100 x 2	
α (with Type 3271 Actuator)		G 3/8 (3/8 NPT)		G 3/4 (3/4 NPT)	G 1 (1 NPT)	
α2 (with Type 3277 Actuator)		G 3/8 (3/8 NPT)		-		

1) Actuator 350 cm² without lifting ring

2) Minimum clearance required to disassemble the actuator

Table 6 · Weights for Type 3253-1 and Type 3253-7 Pneumatic Control Valve in standard version

Valve	DN	15	25	40	50	80	100	150	200	250	300	400	500
Valve without actuator (approx. kg)	PN 10 ... 40	1)							395	645	1550	2000	3700
	PN 63 ...160	32	37	50	93	129	165	365	1)		-	-	

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

1) Weights on request

2) Top row without handwheel, bottom row with handwheel

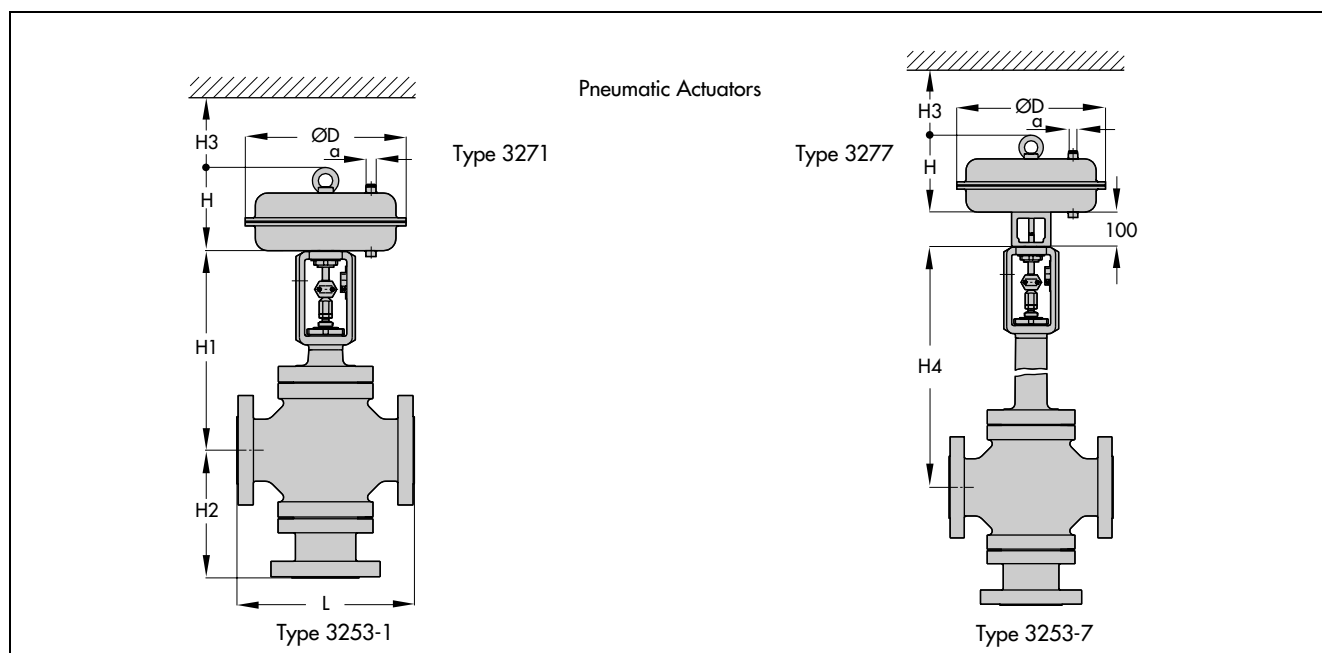


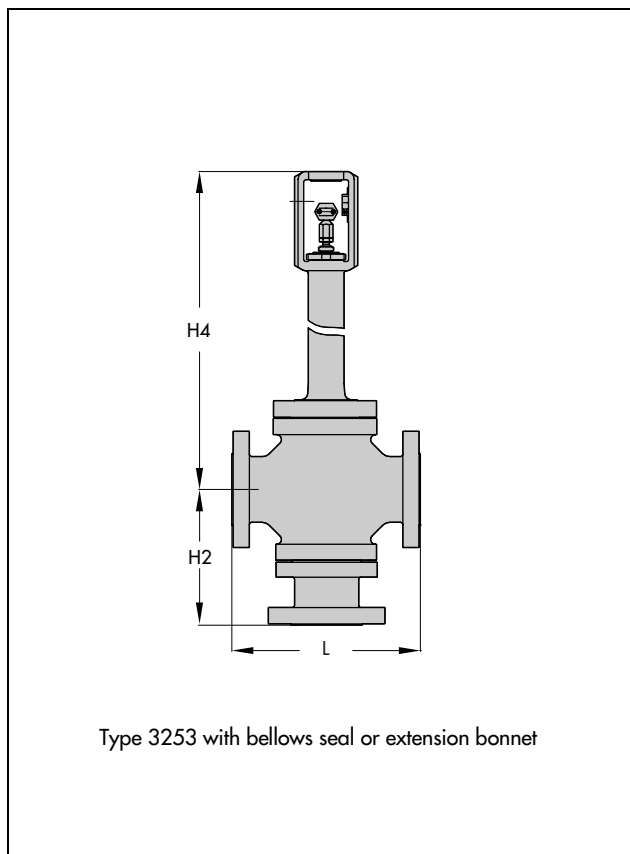
Table 7 · Dimensions in mm and weights for Type 3253 Valve in standard version with extension bonnet · Without actuator

Nominal sizes	DN	15	25	40	50	80	100	150	200	250	300	400	500	
Height H4 for actuator	350	593	593	605	727	732	752	-						
	700	593	593	605	727	732	752	1083	1365	1485	1555	1615	-	
	1400	-			782	787	807	1083	1365	1485	1555	1615	1)	
	2800	-			967	972	992	1168	1450	1719	1810	1870	1)	
Weight without actuator (approx. kg)	PN 16 ... 40	1)							1)					
	PN 63 ...160	37	42	55	103	139	175	380	1)			-	-	

Table 8 · Dimensions in mm and weights for Type 3253 Valve in standard version with bellows seal · Without actuator

Nominal sizes	DN	15	25	40	50	80	100	150	200	250	300	400	500		
H4 for PN 16 ... 40 for actuator	350	590	590	602	836	841	841	-							
	700	590	590	602	836	841	841	1139	1455	1905	1895	1925	-		
	1400	-			891	896	896	1139	1455	1905	1895	1925	1)		
	2800	-			1076	1081	1081	1224	1540	2139	2150	2180	1)		
H4 for PN 63 ... 160 for actuator	350	590	590	602	836	841	841	-				-	-		
	700	590	590	602	836	841	841	1271	1855	1)		-	-		
	1400	-			891	896	896	1271	1855	1)		-	-		
	2800	-			1076	1081	1081	1356	1940	1)		-	-		
Weight without actuator (approx. kg)	PN 16 ... 40	1)							370	1)				-	-
	PN 63 ...160	37	42	55	103	139	175	1)				-	-		

1) Data on request



Selection and sizing of the control valve

1. Calculate the appropriate K_v coefficient acc. to IEC 60534
2. Select the nominal size DN and K_{vs} coefficient according to Tables 3 and 4
3. Determine the permissible differential pressure Δp according to Table 4
4. Select the body material according to Tables 1 and 2 and the pressure-temperature diagram in Information Sheet T 8000-2 EN
5. Select accessories according to Tables 1 and 2

The following details are required on ordering

Nominal size	DN
Nominal pressure	PN
Body material	According to Table 2
End connection	Flanges
Actuator	Type 3271 or Type 3277 (see T 8310-1 EN or T 8310-2 EN)
Fail-safe action	Actuator stem extends/retracts
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 state
Pressure	p_1 und p_2 in bar (absolute pressure p_{abs}) both with minimum, normal and maximum flow rate
Accessories	Positioner and/or limit switches

Specifications subject to change without notice.



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