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**
Nominal pressure	**PN 10 to 400**
Temperatures	**–196 to +550 °C**

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 iron
- 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

The control valves, designed according to the modular assembly principle, can be equipped with various accessories: Positioners, limit switches, solenoid valves and other accessories according to IEC 60534-6 and NAMUR recommendation. Refer to Information Sheet ▶ T 8350 for more details.



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

Versions

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

– **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 Pneumatic Actuator with 350 to 700 cm² actuator area, for integral positioner attachment (see Data Sheet ▶ T 8310-1)

Further versions

– **Insulating section or bellows seal** · See Technical data

– **Additional handwheel** · See Data Sheets ▶ T 8310-1, ▶ T 8310-2, and ▶ T 8310-3

– **ANSI version** · NPS ½ to 20, Class 300 to 2500 · See Data Sheet ▶ T 8056

– **Type 3244** · DN 15 to 150, PN 10 to 40; NPS ½ to 6, Class 150 to 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 (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 (Fig. 4).

Fail-safe position

Depending on how the springs are arranged in the pneumatic actuator (see Data Sheets ▶ T 8310-1, ▶ T 8310-2, and ▶ T 8310-3), the valve has two different fail-safe positions effective upon air supply failure.

- **Actuator stem extends:** when the supply air fails, port B is closed in mixing valves and port A is closed in diverting valves.
- **Actuator stem retracts:** when the supply air fails, port A is closed in mixing valves and port B is closed in diverting valves.

Fig. 2 to Fig. 4 show configuration examples.

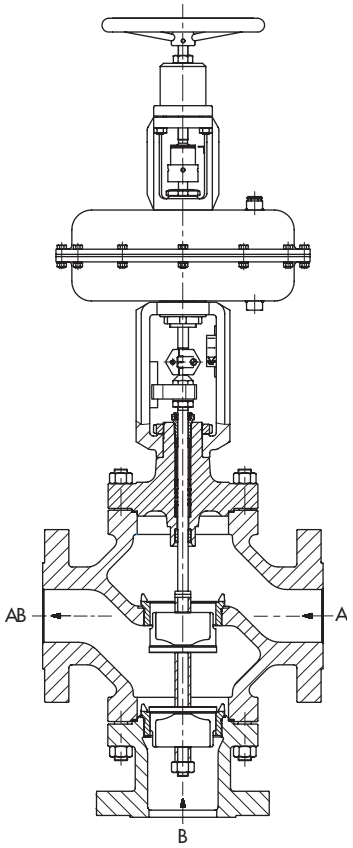


Fig. 2: *Type 3253-1 Control Valve with Type 3271 Pneumatic Actuator and additional handwheel, body version for DN 50 to 500, plug arrangement for mixing service (anti-rotation fixture for DN 50 and higher)*

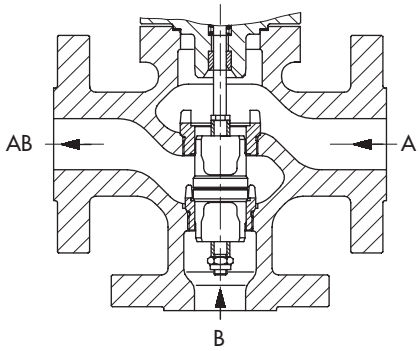


Fig. 3: *Type 3253 Three-way Valve, body version for DN 15 to 40, plug arrangement for mixing service plug arrangement for diverting service DN 15 to 25*

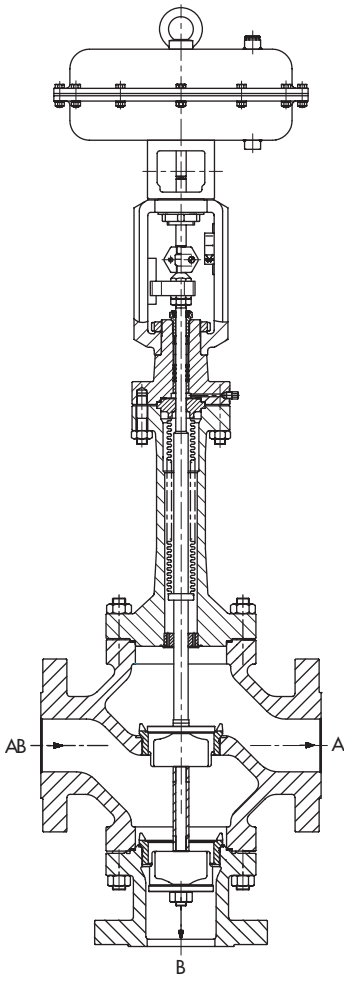


Fig. 4: *Type 3253-7 Control Valve with Type 3277 Pneumatic Actuator (only up to DN 100), body version for DN 40 to 500, plug arrangement for diverting service (anti-rotation fixture for DN 50 and higher)*

Table 1: *Technical data for Type 3253*

Material		**Cast iron EN-JL1040**		**Cast steel 1.0619**		**Cast steel 1.7357**	**Cast stainless steel 1.4408**	
Nominal size [1]	DN	150 to 200	250 to 500	15 to 100	150 to 300	15 to 300	15 to 100	150 to 300
Nominal pressure [1]	PN	16	10	16 to 160	16 to 160	16 to 160	16 to 160	16 to 160
Type of connection	Flanges	All DIN EN versions						
Seat-plug seal		Metal seal						
Characteristic		Linear						
Rangeability		50:1						
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 °C · Up to +350 °C with high-temperature packing						
Body with insulating section or bellows seal		–10 to +300		–10 to +400		–10 to +500	–196 to +550	
Valve plug	Metal seal	–196 to +550						
Leakage class according to IEC 60534-4		≤ 0.05 % of K_{VS} coefficient						
Compliance		CE · EAC						

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

Table 2: *Materials (EN material number)*

Standard version Body	**Cast iron EN-JL1040**	**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 · High-temperature packing			
Body gaskets	Graphite seal on metal core			
Insulating section	1.0460/1.0619			1.4408/1.4401
Metal bellows seal				
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 8000-1)
[3] Other bellows material on request

Table 3: *Available K_{VS} coefficients*

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

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

Notes on the differential pressure tables

- Bench ranges highlighted in gray apply to standard operation (p_2 = 0), i.e. at rated travel · Bench ranges not highlighted apply to the maximum pretensioned springs
- Bench ranges not highlighted 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: Differential pressures

Table 4.1: *Permissible differential pressures Δp for valves with and without bellows seal · Fail-safe position "actuator stem extends" · Pressures in bar*

Bench range [bar] with actuator area [cm²]				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					
				1400			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)
				2800	–			1.1 to 2.3 (2.0 to 2.6)	1.3 to 3.3
				2 x 2800					
Required supply pressure					Lower spring range value + Upper spring range value				
DN	K_{VS}	Travel [mm]	Seat bore [mm]	Actuator [cm²]	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)	–
				2x2800	–	(25)	(32)	(32)	–
250	800	60	250	2800	–	–	–	(10)	–
				2x2800	–	–	–	(20)	–
300	1500	120	300	2800	–	–	–	3.5	–
				2x2800	–	–	–	7.5	–
400	2500	120	400	2800	–	–	–	–	2.3
				2x2800	–	–	–	–	5
500	3600	120	500	2x2800	–	–	–	–	3

Table 4.2: *Permissible differential pressures Δp for valves with and without bellows seal · Fail-safe position "actuator stem retracts" · Pressures in bar*

Bench range [bar] with actuator area [cm²]				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					
				1400			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)
				2800	–			1.1 to 2.3 (1.1 to 2.7)	1.3 to 3.3 (1.3 to 2.3)
				2 x 2800					
Required supply pressure					Lower spring range value + Upper spring range value				
DN	K_{VS}	Travel [mm]	Seat bore [mm]	Actuator cm²	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)	–
				2x2800	–	(5.5)	(7)	(17)	–
250	800	60	250	2800	–	–	–	(5)	(13)
				2x2800	–	–	(4.5)	(10)	–
300	1500	120	300	2800	–	–	–	–	–
				2x2800	–	–	–	7.5	9
400	2500	120	400	2800	–	–	–	–	–
				2x2800	–	–	–	–	5
500	3600	120	500	2x2800	–	–	–	–	3

Table 5: *Dimensions in mm for standard versions of Type 3253-1 and Type 3253-7*

Table 5.1: *Type 3253 Three-way Valve*

Valve	DN	15	25	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]
Height H4	PN 10 to 40	152	152	164	217	222	242	315	389	441	637	637	735
	PN 63 to 160									518		–	
	PN 250 to 400	186	186	195	251	288	348	445	544	699	811	–	
H8 for actuator	350 cm²	240	240	240	240	240	240	–					
	700 cm²	240	240	240	240	240	240	418	418	418	–		
	1400-60 cm²	–			295	295	295	418	418	418	503	503	503
	1400-120 cm² 2800 cm²				480	480	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	–	
	PN 250 to 320	140	On request					587	On request				
	PN 400	On request					457	626	On request				

[1] DN 400, up to PN 63
[2] DN 500, up to PN 40
[3] H8 = 650 mm with 250 mm seat bore

Table 5.2: *Types 3271 and 3277 Pneumatic Actuators*

Actuator area		cm²	350	700	1400-60	1400-120	2800	2 x 2800
Diaphragm ØD		mm	280	390	530	534	770	770
H [1]		mm	82	199	287	490 [3]/ 580 [4]	630 [3]/ 695 [4]	1130 [3]/ 1195 [4]
H3 [2]		mm	110	190	610	650	650	650
H5	Type 3277	mm	101	101	–	–	–	–
Thread	Type 3271		M30 x 1.5	0	0	0	M60 x 1.5	0
	Type 3277		M30 x 1.5	0	0	0	–	–
a	Type 3271		G ⅜ (⅜ NPT)	G ⅜ (⅜ NPT)	G ¾ (¾ NPT)	G 1 (1 NPT)	G 1 (1 NPT)	G 1 (1 NPT)
a2	Type 3277		G ⅜	G ⅜	–	–	–	–

[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 350 cm² without lifting eyelet
[2] Minimum clearance required to remove the actuator
[3] Height for version with welded-on lifting eyelet (material EN-JS1030)
[4] Height for version with female thread (material 1.5638/A352 LC3)

Table 6: *Weights for Type 3253-1 and Type 3253-7 in standard version*

Table 6.1: *Type 3253 Three-way Valve*

Valve	DN	15	25	40	50	80	100	150	200	250	300	400	500
Valve without actuator (approx. kg) [1]	PN 10 to 40	On request											
	PN 63 to 160	32	37	50	93	129	165	365	On request			–	–

[1] Weights in kg for Type 3253 in PN 250 to 400 on request

Table 6.2: *Types 3271 and 3277 Pneumatic Actuators*

Actuator	cm²	350	700	1400-60	1400-120	2800	2 x 2800
Type 3271 (approx. kg)	Without handwheel	8	22	70	175	450	950
	With handwheel	13	27	175	300 [1]/425 [2]	575 [1]/700 [2]	On request
Type 3277 (approx. kg)	Without handwheel	12	26	–			
	With handwheel	17	31				

[1] Side-mounted handwheel up to 80 mm travel
[2] Side-mounted handwheel above 80 mm travel

Table 7: *Dimensions in mm and weights in kg for Type 3253 Valve with insulating section · Without actuator*

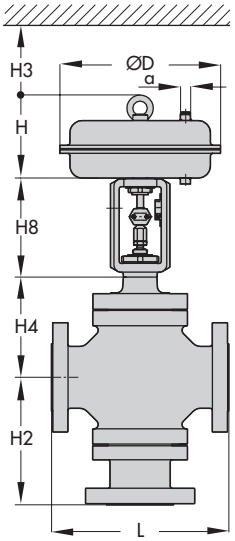
Valve size	DN	15	25	40	50	80	100	150	200	250	300	400	500
Height H4	PN 10 to 160	353	353	365	487	492	512	665	944	1064	1135	1136	1200
	PN 250 to 400	382	382	391	516	546	598	789	1068	On request			
Weight without actuator (approx.)	PN 10 to 40	On request											
	PN 63 to 160	36	41	53	99	135	171	401	On request			–	

Table 8: *Dimensions in mm and weights in kg for Type 3253 with bellows seal · Without actuator*

Valve size		DN	15	25	40	50	80	100	150	200	250	300	400	500
Height H4	15-120 mm travel	PN 10 to 40	350	350	362	596	601	601	722	1038	1493	1505	1507	–
	15-60 mm travel	PN 63 to 160	350	350	362	596	601	601	856	1438	On req.	–		
	15-60 mm travel	PN 250 to 320	621	621	623	840	842	On request				–		
	15-60 mm travel	PN 400	On request									–		
Weight without actuator (approx.)		PN 10 to 40	On request											
		PN 63 to 160	37	42	54	100	136	172	406	On request			–	–

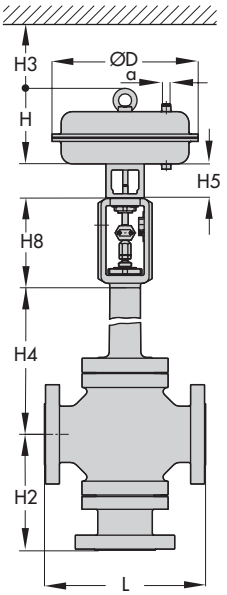
Dimensional drawings

Type 3271 Pneumatic Actuator

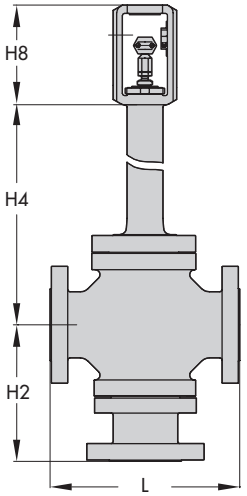


Type 3253-1

Type 3277 Pneumatic Actuator



Type 3253-7



Type 3253 with bellows seal or insulating section

Selection and sizing of the control valve

1. Calculate K_V coefficient according to IEC 60534-6
2. Select nominal size DN and K_{VS} coefficient from Table 3 and Table 4
3. Determine the permissible differential pressure Δp from Table 4
4. Select the valve body material from Table 1 and Table 2 as well as from the pressure-temperature diagrams in Information Sheet ▶ T 8000-2
5. Select accessories from Table 1 and Table 2.

Order specifications:

Nominal size	DN
Nominal pressure	PN
Body material	According to Table 2
Bonnet	Standard bonnet, insulating section or bellows seal
Type of connection	Flanges
Actuator	Type 3271 or Type 3277 (see Data Sheets ▶ T 8310-1, ▶ T 8310-2, and ▶ T 8310-3)
Fail-safe position	Actuator stem extends/retracts
Process medium	Density in kg/m³ and temperature in °C
Flow rate	kg/h or m³/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
Valve accessories	Positioner and/or limit switch

Specifications subject to change without notice

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