

T 8046-3 EN

Type 3246-1 and Type 3246-7 Pneumatic Control Valves · Type 3246 Three-way Valve
 With long insulating section and circulation inhibitor · Class 150 and 300/PN 16 and 40



Application

Mixing or diverting valve for cryogenic applications

Valve size NPS ½ to 6 · DN 15 to 150
Pressure rating Class 150 and 300 · PN 16 and 40
Temperatures -325 to +149 °F · -196 to +65 °C

Type 3246 Three-way Valve with

- Type 3271 Pneumatic Actuator (Type 3246-1 Control Valve)
- Type 3277 Pneumatic Actuator (Type 3246-7 Control Valve) for integral positioner attachment

Valve body made of

- Cast stainless steel

Low-noise valve plug

- Metal seal

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 (see Information Sheet ▶ T 8350 for more details).

Version

Standard version with single PTFE packing, long insulating section and circulation inhibitor · Valve size NPS ½ to 6 (DN 15 to 150) · Class 150 and 300 (PN 16 and 40) · Flanges

- **Type 3246-1** · With Type 3271 Actuator with 120 to 750v2 cm² actuator area (see Data Sheet ▶ T 8310-1)
- **Type 3246-7** (Fig. 1) · With Type 3277 Actuator with 120 to 750v2 cm² actuator area (see Data Sheet ▶ T 8310-1)

Further versions

- **Type 3246-1 or Type 3246-7 Globe Valve** · With long insulating section and circulation inhibitor, NPS ½ to 10 (DN 15 to 250), Class 150 and 300 (PN 16 and 40) See Data Sheet ▶ T 8046-1
- **Type 3246-1 or Type 3246-7 Globe Valve** · With long insulating section and circulation inhibitor, NPS ½ to 6 (DN 15 to 150), Class 600 and 900 (PN 100 and 160) See Data Sheet ▶ T 8046-2
- **Perforated plug** · See Data Sheet ▶ T 8086



Fig. 1: Type 3246-7 Three-way Valve with circulation inhibitor, flanges, long insulating section and cover plate with collar

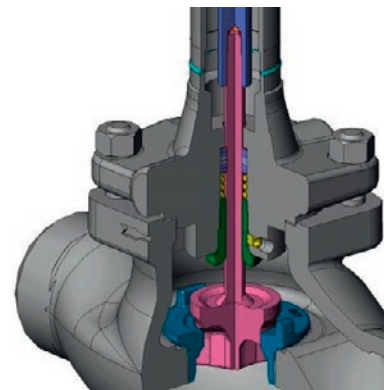


Fig. 2: Type 3246 Valve with circulation inhibitor

Principle of operation

Depending on the version, 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. 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).



Note:

The design of the mixing and diverting valves in sizes NPS 1/2 to 1 (DN 15 to 25) is identical.

Fail-safe position

Depending on how the compression springs are arranged in the pneumatic actuator, the valve has two 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.

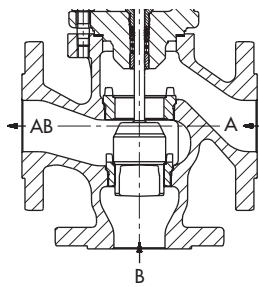


Fig. 3: Type 3246, plug arranged for mixing service, with valves in NPS 1/2 to 1 (DN 15 to 25) also for flow-diverting service

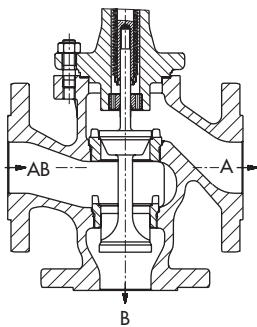


Fig. 4: Type 3246, plug arranged for flow-diverting service with valves in NPS 1/2 to 6 (DN 40 to 150)

2	Intermediate piece	12	Washer
8	Threaded bushing	16	Packing
9	Stem connector nut	25	Plug stem extension
10	Lock nut	39	Seal for intermediate piece
11	Spring		

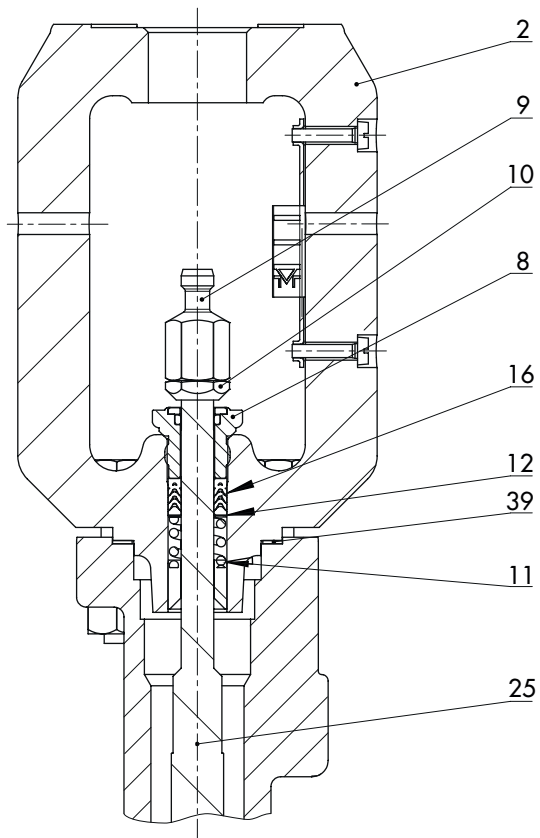


Fig. 5: Intermediate piece

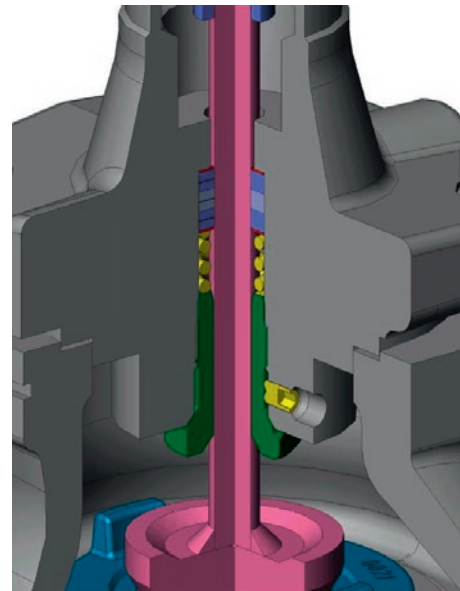


Fig. 6: Circulation inhibitor and hex socket grub screw

Table 1: Technical data for Type 3246 Three-way Valve with circulation inhibitor

Valve size	NPS ½ to 6 · DN 15 to 150	
Pressure rating	Class 150 or 300 · PN 16 or 40	
Type of end connections	ANSI	Flanges with raised face
	DIN	Flanges B1
Seat/plug seal	Metal seal	
Characteristic	Linear	
Rangeability	50:1 · 30:1 for NPS 3 (DN 80) and larger	
Compliance	CE · EAC	
Temperature ranges · Permissible operating pressures according to pressure-temperature diagrams (see Information Sheet ► T 8000-2)		
Valve with	PTFE packing	-325 to +149 °F · -196 to +65 °C
Leakage class according to ANSI/FCI 70-2 or IEC 60534-4		
Valve plug	Metal seal	0.05 % of C _v (K _{vS}) coefficient

Table 2: Materials

Standard version	Cast stainless steel	
Body and flanges	A351 CF8M/1.4408	
Seat and plug ¹⁾	Metal seal	1.4404 · 1.4409 · 316L · CF3M
Guide bushings	1.4404 · 316L	
Packing	Self-adjusting	PTFE V-ring packing · Spring: 1.4310
Circulation inhibitor	PTFE with silk cord · Bushing 2.4360 (Monel)	
Body gasket	Graphite on metal core	
Insulating section	A182 F316/1.4401	
	A182 F316L/1.4404	

¹⁾ Seats and metal-seated plug also with Stellite facing or plug made of solid Stellite available.

Table 3: C_v coefficients and permissible differential pressures for Type 3246 Mixing Valve

Table 3.1: Pressures in psi

Bench range in psi with actuator area						120 cm ²	–	6 to 30 (18 to 30)	–	20 to 34	30 to 48
						350 cm ²	3 to 15		9 to 45 (26 to 45)	20 to 34 (26 to 34)	30 to 48 (39 to 48)
						700 cm ²	–		–	–	–
Required supply pressure in psi						18	35 (47)	52 (70)	54 (61)	78 (87)	
Valve size		C_v Mixing valve	Seat Ø inch (mm)	Rated travel inch (mm)	Actuator area (cm ²)	Δp when $p_2 = 0$ psi					
NPS	DN					–	–	–	–	–	
½	15	2.3 · 5	0.94 (24)	0.59 (15)	120	–	75	–	425	580	
¾	20	2.3 · 5 · 7.5			350	139	344	548	580	580	
1	25	2.3 · 5 7.5 · 12			120	–	–	–	247	393	
1½ and 2	40 and 50	7.5 · 12	0.94 (24)		350	75	197	319	580	580	
		20	1.22 (31)		120	–	–	–	158	257	
		30	1.49 (38)		350	45	126	207	532	580	
2	50	47	1.89 (48)		120	–	–	–	94	155	
					350	23	74	125	329	508	
					700	–	(580)	(580)	–	–	
3	80	30	1.49 (38)		350	23	74	125	329	508	
					700	–	(580)	(580)	–	–	
		70	2.48 (63)		350	–	39	68	187	290	
				700	–	(335)	(512)	(526)	(580)		
		95	2.95 (75)	350	–	25	45	129	202		
				700	–	(233)	(358)	(370)	547		
4	100	120	3.15 (80)	1.18 (30)	700	20	57	93	241	368	
		190	3.93 (100)			–	33	58	151	233	
6	150	230	4.33 (110)			–	28	46	125	193	
		350	5.12 (130)			–	17	32	87	136	

Table 3.2: Pressures in bar

Bench range in bar with actuator area						120 cm ²	–	0.4...2.0 (1.2 to 2.0)	–	1.4 to 2.3	2.1 to 3.3
						350 cm ²	0.2 to 1.0		0.6 to 3.0 (1.8 to 3.0)	1.4 to 2.3 (1.85 to 2.3)	2.1 to 3.3 (2.7 to 3.3)
						700 cm ²	–				
Required supply pressure in bar						1.2	2.4 (3.2)	3.6 (4.8)	3.7 (4.2)	5.4 (6.0)	
Valve size		C _v Mixing valve	Seat Ø inch (mm)	Rated travel inch (mm)	Actuator area (cm ²)	Δp when p ₂ = 0 bar					
NPS	DN										
½	15	2.3 · 5	0.94 (24)	0.59 (15)	120	–	5.2	–	29.3	40	
¾	20	2.3 · 5 · 7.5			350	9.6	23.7	37.8	40	40	
1	25	2.3 · 5 7.5 · 12			120	–	–	–	17	27.1	
1½ and 2	40 and 50	7.5 · 12	0.94 (24)		350	5.2	13.6	22.0	40	40	
		20	1.22 (31)		120	–	–	–	10.9	17.7	
		30	1.49 (38)		350	3.1	8.7	14.3	36.7	40	
2	50	47	1.89 (48)		120	–	–	–	6.5	10.7	
					350	1.6	5.1	8.6	22.7	35	
					700	–	(40)	(40)	–	–	
3	80	30	1.49 (38)		350	1.6	5.1	8.6	22.7	35	
				700	–	(40)	(40)	–	–		
				47	1.89 (48)	350	–	2.7	4.7	12.9	20
				70	2.48 (63)	700	–	(23.1)	(35.3)	(36.3)	(40)
				95	2.95 (75)	350	–	1.7	3.1	8.9	13.9
700	–	(16.1)	(24.7)	(25.5)	37.7						
4	100	120	3.15 (80)	1.18 (30)	700	1.4	3.9	6.4	16.6	25.4	
		190	3.93 (100)			–	2.3	4.0	10.4	16.1	
6	150	230	4.33 (110)			–	1.9	3.2	8.6	13.3	
		350	5.12 (130)			–	1.2	2.2	6.0	9.4	

Table 4: C_v coefficients and permissible differential pressures for Type 3246 Diverting Valve

Table 4.1: Pressures in psi

Valves in NPS 3 to 6:

- Direction of flow AB \Rightarrow A with maximum C_v
- Direction of flow AB \Rightarrow B with reduced C_v

Bench range in psi with actuator area		120 cm ²	-	6 to 30 (18 to 30)	-	20 to 34	30 to 48			
		350 cm ²	3 to 15		9 to 45 (26 to 45)	20 to 34 (26 to 34)	30 to 48 (39 to 48)			
		700 cm ²	-		-	-				
Required supply pressure in psi		18	35 (47)	52 (70)	54 (61)	78 (87)				
Valve size		C_v Diverting valve	Seat \varnothing inch (mm)	Rated travel inch (mm)	Actuator area (cm ²)	Δp when $p_2 = 0$ psi				
NPS	DN									
1/2	15	2.3 · 5	0.94 (24)	0.59 (15)	120	-	75	-	425	580
3/4	20	2.3 · 5 · 7.5			350	139	344	548	580	580
1	25	2.3 · 5 7.5 · 12			120	-	-	-	247	393
1 1/2 and 2	40 and 50	7.5 · 12	0.94 (24)		350	75	197	319	580	580
		20	1.22 (31)		120	-	-	-	158	257
		30	1.49 (38)		350	45	126	207	532	580
2 to 3	50 to 80	47	1.89 (48)		120	-	-	-	94	155
					350	23	74	125	329	508
					700	-	(580)	(580)	-	-
3	80	30	1.49 (38)		350	23	74	125	329	508
		47	1.89 (48)		700	-	(580)	(580)	-	-
		70	2.48 (63)		350	-	39	68	187	290
		95/70	2.95/2.48 (75/63)	700	-	(335)	(512)	(526)	(580)	
			350	-	25	45	129	202		
700	-	(233)	(358)	(370)	547					
4	100	120	3.15 (80)	1.18 (30)	700	20	57	93	241	368
		190/120	3.93/3.15 (100/80)			-	33	58	151	233
6	150	230	4.33 (110)			-	28	46	125	193
		350/230	5.12/4.33 (130/110)			-	17	32	87	136

Table 4.2: Pressures in bar

Valves in NPS 3 to 6:

- Direction of flow AB ⇒ A with maximum C_v
- Direction of flow AB ⇒ B with reduced C_v

Bench range in bar with actuator area						120 cm ²	-	0.4 to 2.0 (1.2 to 2.0)	-	1.4 to 2.3	2.1 to 3.3
						350 cm ²	0.2 to 1.0		0.6 to 3.0 (1.8 to 3.8)	1.4 to 2.3 (1.85 to 2.3)	2.1 to 3.3 (2.7 to 3.3)
						700 cm ²	-				
Required supply pressure in bar						1.2	2.4 (3.2)	3.6 (4.8)	3.7 (4.2)	5.4 (6.0)	
Valve size		C_v Diverting valve	Seat Ø inch (mm)	Rated travel inch (mm)	Actuator area (cm ²)	Δp when $p_2 = 0$ bar					
NPS	DN										
½	15	2.3 · 5	0.94 (24)	0.59 (15)	120	-	5.2	-	29.3	40	
¾	20	2.3 · 5 · 7.5			350	9.6	23.7	37.8	40	40	
1	25	2.3 · 5 7.5 · 12			120	-	-	-	17	27.1	
1½ and 2	40 and 50	7.5 · 12	0.94 (24)		350	5.2	13.6	22.0	40	40	
		20	1.22 (31)		120	-	-	-	10.9	17.7	
		30	1.49 (38)		350	3.1	8.7	14.3	36.7	40	
2 to 3	50 to 80	47	1.89 (48)		120	-	-	-	6.5	10.7	
					350	1.6	5.1	8.6	22.7	35	
					700	-	(40)	(40)	-	-	
3	80	30	1.49 (38)		350	-	-	-	-	-	
		47	1.89 (48)	700	-	-	-	-	-		
		70	2.48 (63)	350	-	2.7	4.7	12.9	20		
		95/70	2.95/2.48 (75/63)	700	-	(23.1)	(35.3)	(36.3)	(40)		
				350	-	1.7	3.1	8.9	13.9		
				700	-	(16.1)	(24.7)	(25.5)	(37.7)		
4	100	120	3.15 (80)	1.18 (30)	700	1.4	3.9	6.4	16.6	25.4	
		190/120	3.93/3.15 (100/80)			-	2.3	4.0	10.4	16.1	
6	150	230	4.33 (110)			-	1.9	3.2	8.6	13.3	
		350/230	5.12/4.33 (130/110)			-	1.2	2.2	6.0	9.4	

Table 5: Dimensions (in inch and mm) and weights (in lbs and kg)

Table 5.1: Type 3246 Three-way Valve with long insulating section and circulation inhibitor

Valve	NPS	1/2	3/4	1	1 1/2	2	3	4	6	
Length L	Class 150	in	7.25	7.25	7.25	8.75	10.0	11.75	13.88	17.75
		mm	184	184	184	222	254	298	352	451
	Class 300	in	7.50	7.62	7.75	9.25	10.50	12.50	14.50	18.62
		mm	190	194	197	235	267	318	368	473
H2	Class 150	in	3.62	3.62	3.62	4.37	5.0	5.87	6.93	8.88
		mm	92	92	92	111	127	149	176	225.5
	Class 300	in	3.76	3.82	3.88	4.63	5.26	6.26	7.24	9.31
		mm	95	97	98.5	117.5	133.5	159	184	236.5
H4	Class 150	in	24	24	24	24	24	27	27	33
		mm	610	610	610	610	610	686	686	838
H5		in	29.13	29.13	29.13	29.13	29.13	31.30	33.66	39.29
		mm	740	740	740	740	740	795	855	998
H8		in	6.30	6.30	6.30	6.30	6.30	6.30	9.06	9.06
		mm	160	160	160	160	160	160	230	230
Cover plate	Ød	in	5.98	5.98	5.98	5.98	5.98	7.99	7.99	10.0
		mm	152	152	152	152	152	203	203	254
	h	in	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
		mm	40	40	40	40	40	40	40	40

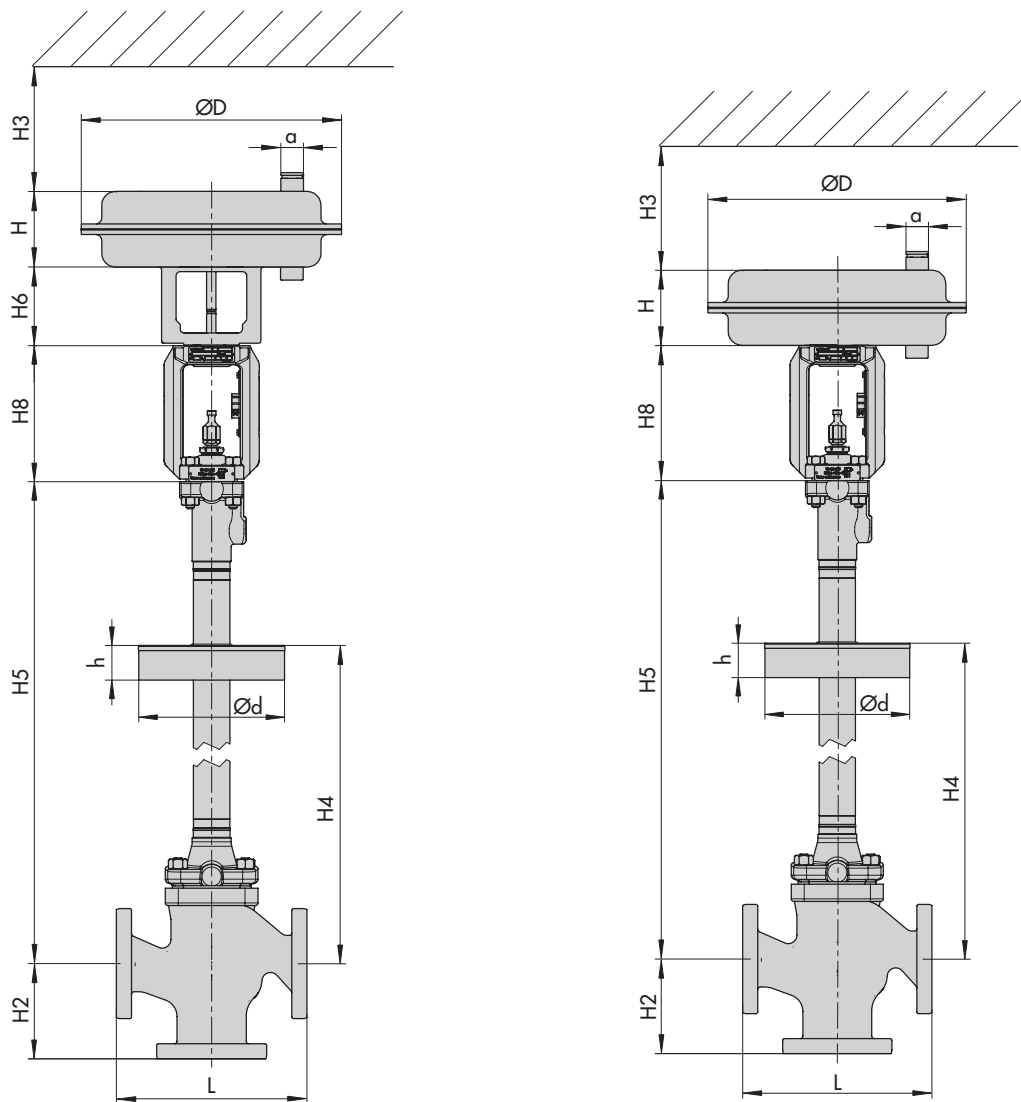
Table 5.2: Types 3271 and 3277 Pneumatic Actuators

Actuator area	cm ²	120	175v2	350	355v2	700	750v2
Diaphragm ØD	in	6.61	8.46	11.02	11.02	15.35	15.51
	mm	168	215	280	280	390	394
H ¹⁾	in	2.71	3.07	3.23	4.76	7.83	9.29
	mm	69	78	82	121	199	236
H3 ²⁾	in	4.33	4.33	4.33	4.33	7.48	7.48
	mm	110	110	110	110	190	190
H5	Type 3277 in	3.46	3.98	3.98	3.98	3.98	3.98
	Type 3277 mm	88	101	101	101	101	101
Thread	Type 3271	M30 x 1.5					
	Type 3277	M30 x 1.5					
α	Type 3271	G 1/8 (1/8 NPT)	G 1/4 (1/4 NPT)	G 3/8 (3/8 NPT)	G 3/8 (3/8 NPT)	G 3/8 (3/8 NPT)	G 3/8 (3/8 NPT)
α2	Type 3277	–	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8

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 355v2 cm² without lifting eyelet

²⁾ Minimum clearance required to remove the actuator

Dimensional drawings



Versions with flanges

Table 6: Weights for Type 3246-1 and Type 3246-7 Control Valves with long insulating section and circulation inhibitor**Table 6.1:** Type 3246 Three-way Valve

Valve	NPS	½	¾	1	1½	2	3	4	6
Weight, approx.	lbs	33	33	33	44	53	100	190	444
	kg	15	15	15	20	24	45	86	201

Table 6.2: Type 3271 and Type 3277 Pneumatic Actuators

Actuator area		cm ²	120	175v2	350	355v2	700	750v2
Weight for Type 3271 without/with handwheel	Without	lbs	4.4	13	18	33	48.5	79
		kg	2	6	8	15	22	36
	With	lbs	–	–	29	40	59.5	70.5
		kg	–	–	13	20	27	41
Weight for Type 3277 without/with handwheel	Without	lbs	7.05	22	26.5	42	57.5	88
		kg	3.2	10	12	19	26	40
	With	lbs	–	–	37.5	53	68	99
		kg	–	–	17	24	31	45

Order specifications:

Mixing or diverting valve	Type 3246
Valve size	NPS .../DN ...
Nominal pressure	Class .../PN ...
Actuator	Type 3271 or Type 3277 (see ► T 8310-1)
Fail-safe position	Actuator stem extends/retracts
Process medium	...
Density	kg/m ³ or lb/ft ³
Temperature	°C or °F
Flow rate in	kg/h or cu. ft/min in standard or operating state
Upstream pressure	p ₁ and p ₂ in bar (psi) (absolute pressure p _{abs}) (with minimum, normal and maximum flow rate)
Valve accessories	Positioner and/or limit switch

Note: The temperature limits for DIN and ANSI versions are not directly converted temperatures.