DATA SHEET

T 8046-3 EN

Type 3246 Three-way Valve

Type 3246-1 and Type 3246-7 Pneumatic Control Valves

With long insulating section and circulation inhibitor
Class 150 and 300/PN 16 and 40

Application

Mixing or diverting valve for cryogenic applications

Nominal 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**



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

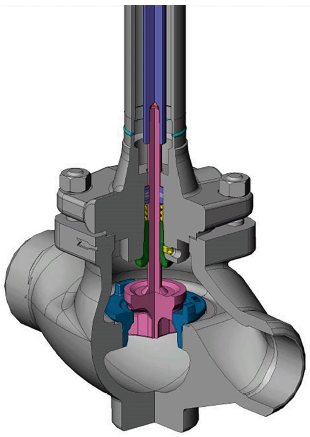


Fig. 2: *Type 3246 Valve with circulation inhibitor*

Special features

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

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 60534-6-1[1)] and NAMUR Recommendation (see Information Sheet ▶ T 8350).

1) Accessories required. See associated actuator documentation.

Versions

Standard version with single PTFE packing, long insulating section and circulation inhibitor · Nom-

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inal size NPS ½ to 6 (DN 15 to 150) · Class 150 and 300 (PN 16 and 40) · Flanges

- **Type 3246-1** · With Type 3271 Pneumatic Actuator with 120 to 750v2 cm² actuator area (see Data Sheet ▶ T 8310-1)
- **Type 3246-7** · With Type 3277 Pneumatic Actuator with 120 to 750v2 cm² actuator area for integral positioner attachment (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 12 (DN 15 to 300), 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 8 (DN 15 to 200), Class 600 and 900 (PN 100 and 160) · See Data Sheet ▶ T 8046-2
- **Perforated plug** · See Data Sheet ▶ T 8086

Principle of operation

Depending on the version, the three-way valve can be used either as a mixing or diverting valve (see Fig. 3).

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**. 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**.

Note: The design of the mixing and diverting valves in nominal sizes NPS ½ to 1 (DN 15 to 25) is identical.

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

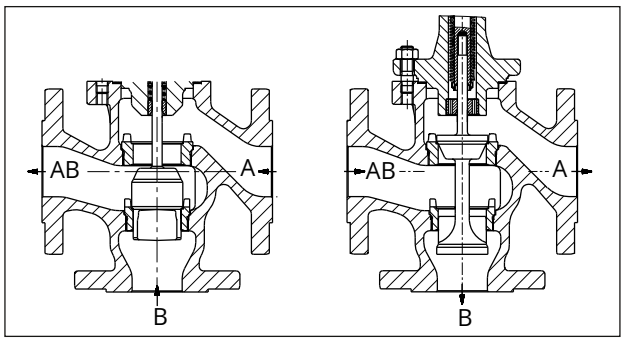


Fig. 3: *Type 3246 Three-way Valve*
Left: Plug arrangement for mixing service; valves NPS ½ to 1 (DN 15 to 25) also for diverting service
Right: Plug arrangement for diverting service; valves NPS 1½ to 6 (DN 40 to 150)

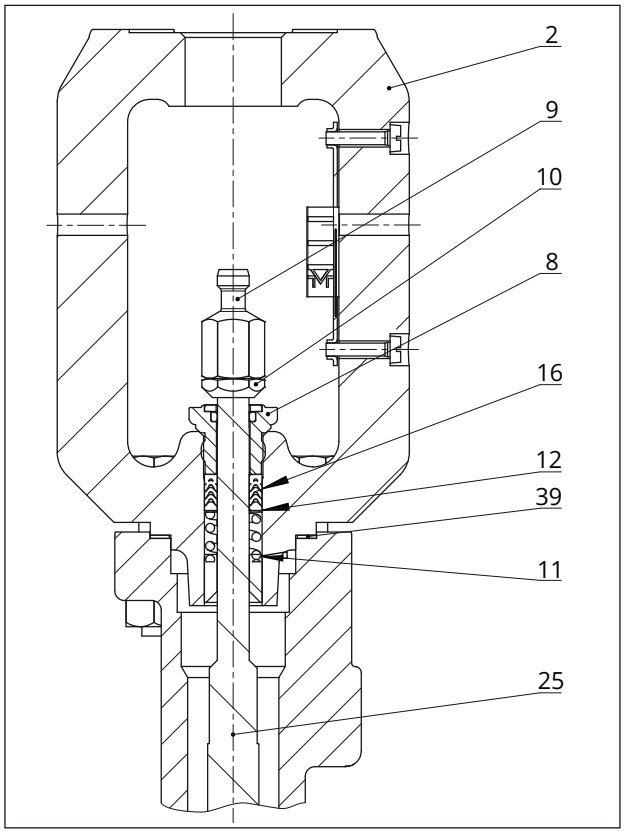


Fig. 4: *Intermediate piece*

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		

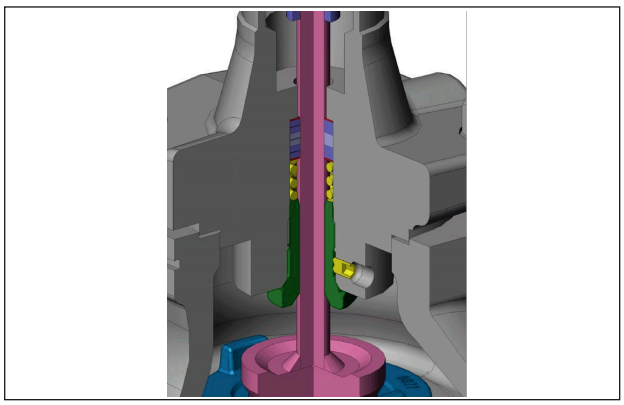


Fig. 5: *Circulation inhibitor and set screw*

Table 1: *Technical data for Type 3246 Three-way Valve with long insulating section and circulation inhibitor*

Material		**Cast stainless steel A351 CF8M/1.4408**
Nominal 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 form B1
Seat-plug seal		Metal seal
Characteristic		Linear
Rangeability		50:1 · 30:1 for NPS 3 (DN 80) and larger
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 (-40 and +185 °F).
Conformity		CE
Temperature ranges in °C (°F) · Permissible operating pressures according to pressure-temperature diagrams (see Information Sheet ▶ T 8000-2)		
Valve with PTFE packing		-196 to +65 °C (-325 to +149 °F)
Leakage class according to ANSI FCI 70-2 or DIN EN 60534-4		
Valve plug	Metal seal	0.05 % of C_V/K_{VS}

Table 2: *Materials for Type 3246 Three-way Valve with long insulating section and circulation inhibitor*

Standard version Body and flanges		**Cast stainless steel 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 Three-way Valve (mixing) · Pressures in psi*

Bench range in psi with actuator area					120 cm²	–	6 to 30 (18 to 30)	–	20 to 34	30 to 48
					350 cm²	3 to 15		9 to 45 (26 to 45)	20 to 34 (26 to 34)	30 to 48 (39 to 48)
					700 cm²	–				
Required supply pressure in psi						**18**	**35 (47)**	**52 (70)**	**54 (61)**	**78 (87)**
Nominal size		**C_V for mixing valve**	**Seat Ø inch (mm)**	**Rated travel inch (mm)**	**Actuator area cm²**	**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								
1½ and 2	40 and 50	7.5 · 12	0.94 (24)		120	–	–	–	247	393
		20	1.22 (31)		350	75	197	319	580	580
		30	1.49 (38)		120	–	–	–	158	257
					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
		47	1.89 (48)		700	–	(580)	(580)	–	–
		70	2.48 (63)		350	–	39	68	187	290
					700	–	(355)	(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 4: *C_V coefficients and permissible differential pressures for Type 3246 Three-way Valve (mixing) · Pressures in bar*

Bench range in psi with actuator area					120 cm²	–	0.4 to 2.0 (1.2 to 2.0)	–	1.4 to 2.3	2.1 to 3.3
					350 cm²	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 cm²	–				
Required supply pressure in bar						**1.2**	**2.4 (3.2)**	**3.6 (4.8)**	**3.7 (4.2)**	**5.4 (6.0)**
Nominal size		**C_V for mixing valve**	**Seat Ø inch (mm)**	**Rated travel inch (mm)**	**Actuator area cm²**	**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								
1½ and 2	40 and 50	7.5 · 12	0.94 (24)		120	–	–	–	17	27.1
		20	1.22 (31)		350	5.2	13.6	22	40	40
		30	1.49 (38)		120	–	–	–	10.9	17.7
					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
		47	1.89 (48)		700	–	(40)	(40)	–	–
		70	2.48 (63)		350	–	2.7	4.7	12.9	20
					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	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	9.4

Table 5: *C_V coefficients and permissible differential pressures for Type 3246 Three-way Valve[1] (diverting) · Pressures in psi*

Bench range in psi with actuator area					120 cm²	–	6 to 30 (18 to 30)	–	20 to 34	30 to 48
					350 cm²	3 to 15		9 to 45 (26 to 45)	20 to 34 (26 to 34)	30 to 48 (39 to 48)
					700 cm²	–				
Required supply pressure in psi						**18**	**35 (47)**	**52 (70)**	**54 (61)**	**78 (87)**
Nominal size		**C_V for diverting valve**	**Seat Ø inch (mm)**	**Rated travel inch (mm)**	**Actuator area cm²**	**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								
1½ and 2	40 and 50	7.5 · 12	0.94 (24)		120	–	–	–	247	393
		20	1.22 (31)		350	75	197	319	580	580
		30	1.49 (38)		120	–	–	–	158	257
					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
					700	–	(355)	(512)	(526)	(580)
		95/70	2.95/2.48 (75/63)		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

[1] **Valves in NPS 3 to 6:**

- Direction of flow AB → A with maximum C_V
- Direction of flow AB → B with reduced C_V

Table 6: *C_V coefficients and permissible differential pressures for Type 3246 Three-way Valve[1] (diverting) · Pressures in bar*

Bench range in psi with actuator area					120 cm²	–	0.4 to 2.0 (1.2 to 2.0)	–	1.4 to 2.3	2.1 to 3.3
					350 cm²	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 cm²	–				
Required supply pressure in bar						**1.2**	**2.4 (3.2)**	**3.6 (4.8)**	**3.7 (4.2)**	**5.4 (6.0)**
Nominal size		**C_V for diverting valve**	**Seat Ø inch (mm)**	**Rated travel inch (mm)**	**Actuator area cm²**	**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								
1½ and 2	40 and 50	7.5 · 12	0.94 (24)		120	–	–	–	17	27.1
		20	1.22 (31)		350	5.2	13.6	22	40	40
		30	1.49 (38)		120	–	–	–	10.9	17.7
					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
					700	–	(23.1)	(35.3)	(36.3)	(40)
		95/70	2.95/2.48 (75/63)		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	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	9.4

[1] **Valves in NPS 3 to 6:**

- Direction of flow AB → A with maximum C_V
- Direction of flow AB → B with reduced C_V

Dimensions

Table 7: *Dimensions in inches and mm for Type 3246 Three-way Valve with long insulating section and circulation inhibitor*

Valve		NPS	½	¾	1	1½	2	3	4	6
Length L	Class 150	in	7.25			8.75	10	11.75	13.88	17.75
		mm	184			222	254	298	352	451
	Class 300	in	7.5	7.62	7.75	9.25	10.5	12.5	14.5	18.62
		mm	190	194	197	235	267	318	368	473
H2	Class 150	in	3.62			4.37	5	5.87	6.93	8.88
		mm	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					27		33
		mm	610					686		838
H5		in	29.13					31.3	33.66	39.29
		mm	740					795	855	998

Valve		NPS	½	¾	1	1½	2	3	4	6
H8 for actuator	≤750v2 cm²	in	6.3						9.06	
		mm	160						230	
Cover plate	Ød	in	5.98					7.99		10
		mm	152					203		254
	h	in	1.57							
		mm	40							

Table 8: *Further dimensions[1] in combination with Type 3271 Pneumatic Actuator or Type 3277 Pneumatic Actuator*

Actuator area		cm²	120	175v2	350	350v2	355v2	750v2
Diaphragm ØD		in	6.61	8.46	11.02	11.02	11.02	15.51
Diaphragm ØD		mm	168	215	280	280	280	394
H[2]	Type 3271	in	2.71	3.07	3.23	3.62	5.16	9.29
H[2]	Type 3271	mm	69	78	82	92	131	236
H[2]	Type 3277	in	2.71	3.07	3.23	3.23	4.76	9.29
H[2]	Type 3277	mm	69	78	82	82	121	236
H3[3]		in	4.33	4.33	4.33	4.33	4.33	7.48
H3[3]		mm	110	110	110	110	110	190
H5	Type 3277	in	3.46	3.98	3.98	3.98	3.98	3.98
H5	Type 3277	mm	88	101	101	101	101	101
Thread	Type 3271		M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5
Thread	Type 3277		M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5
a	Type 3271		G ⅛ (⅛ NPT)	G ¼ (¼ NPT)	G ⅜ (⅜ NPT)	G ⅜ (⅜ NPT)	G ⅜ (⅜ NPT)	G ⅜ (⅜ NPT)
a2	Type 3277		–	G ⅜[4]	G ⅜[4]	G ⅜[4]	G ⅜[4]	G ⅜[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 ⅜ to ⅜ NPT is available for the a2 connection. It can be ordered separately using the following article number: 100160362

Weights

Table 9: *Weights in lbs and kg for Type 3246 Three-way Valve with long insulating section and circulation inhibitor*

Valve	NPS	½	¾	1	1½	2	3	4	6
	DN	15	20	25	40	50	80	100	150
Weight[1], approx.	lbs	33			44	53	100	190	444
	kg	15			20	24	45	86	201

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 10: *Weights[1] for Type 3271 and Type 3277 Pneumatic Actuators*

Type ... Actuator	Actuator area in cm²		120	175v2	350	350v2	355v2	750v2
3271	Without handwheel	lbs	6	13	18	26	33	79
3271	Without handwheel	kg	2.5	6	8	11.5	15	36
3271	With handwheel	lbs	9	22	29	37	44	90
3271	With handwheel	kg	4	10	13	16.5	20	41
3277	Without handwheel	lbs	7	22	27	33	42	89
3277	Without handwheel	kg	3.2	10	12	15	19	40
3277	With handwheel	lbs	10	31	38	44	53	100
3277	With handwheel	kg	4.5	14	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.).

Dimensional drawings

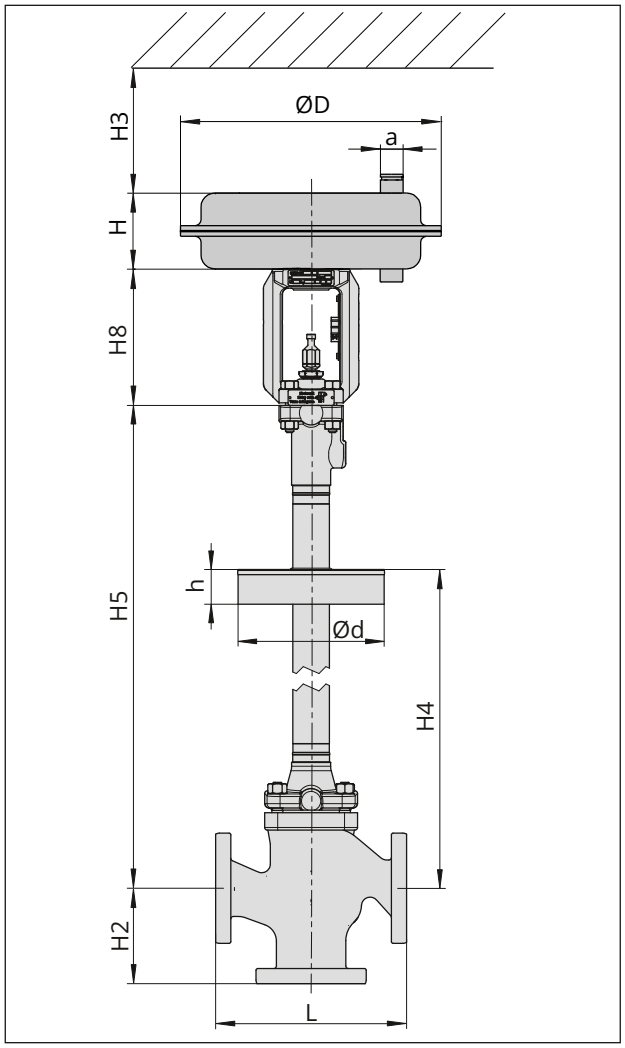


Fig. 6: *Type 3246-1 · Version with flanges*

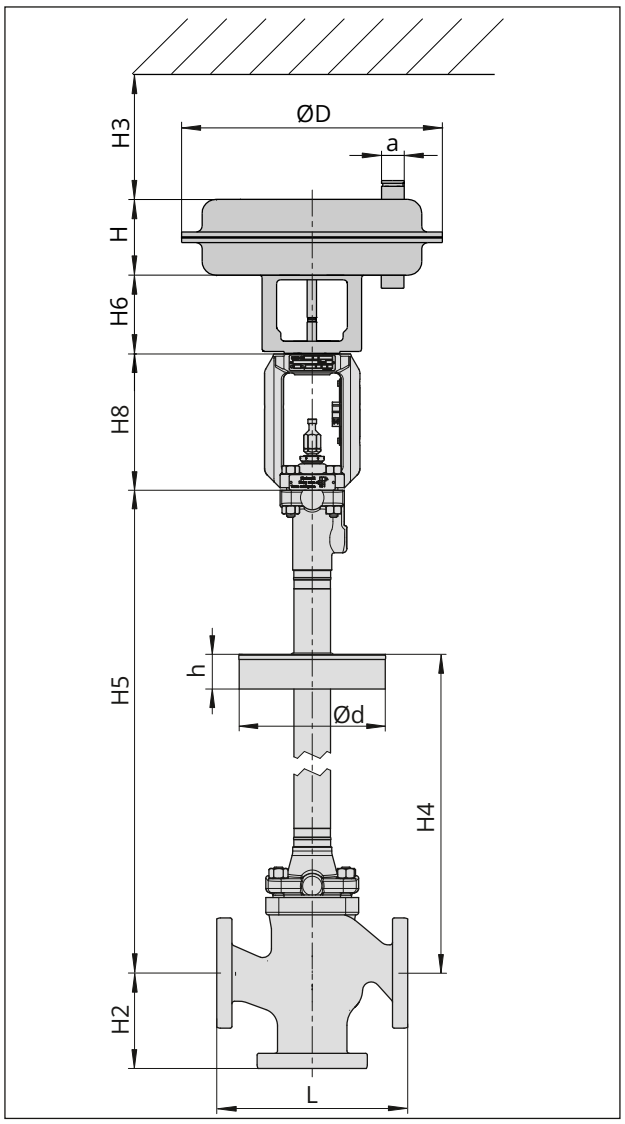


Fig. 7: *Type 3246-7 · Version with flanges*

Ordering text

The following specifications are required on ordering:

Type 3246 Valve	Three-way valve for **mixing** or **diverting** service
Nominal size	DN ... NPS ...
Pressure rating	PN ... Class ...
Actuator	Type 3271 or Type 3277 (see Data Sheet ▶ T 8310-1)
Fail-safe action	Actuator stem extends/retracts
Process medium	...
Density	kg/m³ or lb/cu.ft
Temperature	°C or °F
Flow rate	lbs/h or kg/h or cu.ft/min or m³/h in standard or operating state
Upstream pressure	p_1 and p_2 in bar or psi (absolute pressure p_{abs}), with minimum, normal and maximum flow rate
RFID tag	Yes/No
Valve accessories	Positioner and/or limit switch

Associated Information Sheets ▶ T 8000-X
Associated Mounting and Operating Instructions ▶ EB 8046

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