Series 240

Pneumatic Control Valve Type 3241-1 and Type 3241-7
Globe Valve Type 3241

Application
Control valve for process engineering and industrial applications

Nominal size	**DN 15 to DN 300**
Nominal pressure	**PN 10 to PN 40**
Temperatures	**–196 to 450 °C**

Type 3241 Globe Valve operated with:
- Type 3271 Pneumatic Actuator (Type 3241-1 Control Valve) or
- Type 3277 Pneumatic Actuator (Type 3241-7 Control Valve)

Valve body made of:
- Cast iron
- Spheroidal graphite iron
- Cast steel, cast stainless steel or cast cold-resisting steel
- Forged steel or forged stainless steel
- Special materials

Undivided valve bonnet up to DN 150

Valve plug with:
- Metal sealing
- Soft sealing or
- Lapped-in metal.

The modular design of the control valves allows them to be equipped with various accessories:

Positioners, solenoid valves and other accessories according to IEC 60534-6 and NAMUR recommendation. See Information Sheet T 8350 EN for details.

Versions

Standard version for temperatures ranging from –10 to 220 °C
- **Type 3241-1** (Figs. 1 and 3) · DN 15 to 300 with Type 3271 Pneumatic Actuator (see T 8310-1/-2 EN)
- **Type 3241-7** (Fig. 2) · DN 15 to 150 with Type 3277 Pneumatic Actuator for integral positioner attachment (see T 8310-1 EN)

Additional versions with:
- **Welding ends**
- **Adjustable packing** · See Information Sheet T 8000-1 EN
- **Flow divider or AC-1/AC-2 Trim** for noise reduction · See Data Sheets T 8081 EN and T 8082 EN
- **Valve plug with pressure balancing** · See Technical data
- **Insulating section or bellows seal** · See Technical data
- **Heating jacket** · On request
- **Stainless steel actuator** · See T 8310-1 EN
- **Additional handwheel** · See Data Sheet T 8310-1/-2 EN

Fig. 1 · Type 3241-1
DN 15 to 150

Fig. 2 · Type 3241-7
DN 15 to 80,
forged steel

Fig. 3 · Type 3241-1
≥ DN 200

Associated Information Sheets **T 8000-1/-2/-3 EN**
Associated Data Sheets for Pneumatic Actuators **T 8310-1/-2 EN**

Edition November 2005

Data Sheet **T 8015 EN**

– **Typetested version** · For application in heating systems (see Data Sheet T 8016 EN), DIN/DVGW-tested version for gas (see Data Sheet T 8020 EN), liquid fuels and liquefied petroleum gas in the liquid phase (see Data Sheet T 8022 EN)
– **ANSI version** · See Data Sheet T 8012 EN
– **Versions with dimensions according to Japanese Industry Standard (JIS)** · Details on request

Principle of operation

The process medium flows through the valve in the direction indicated by the arrow. The position of the valve plug determines the cross-sectional area between the seat and plug.

Fail-safe positions

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

Actuator stem extends (FA)
The actuator springs close the valve when the supply air fails.

Actuator stem retracts (FE)
The actuator springs open the valve when the supply air fails.

Note

Figs. 4 to 6 show configuration examples.

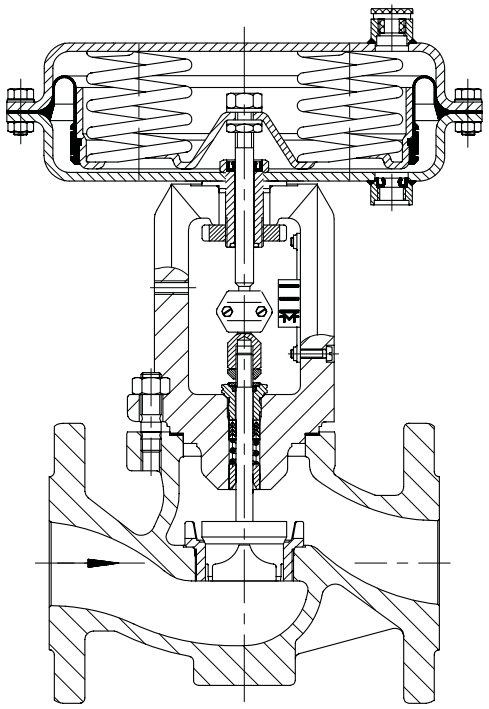


Fig. 4 · Type 3241-1 Control Valve
DN 15 to 150 with Type 3271 Pneumatic Actuator

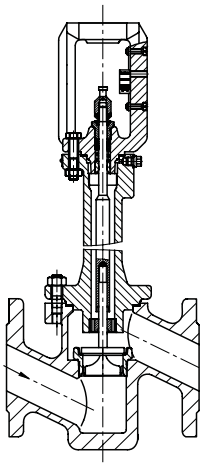


Fig. 5 · Type 3241 Valve, forged steel version
DN 15 to 80 with insulating section

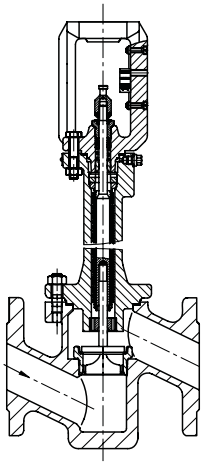


Fig. 6 · Type 3241 Valve, forged steel version
DN 15 to 80 with metal bellows seal

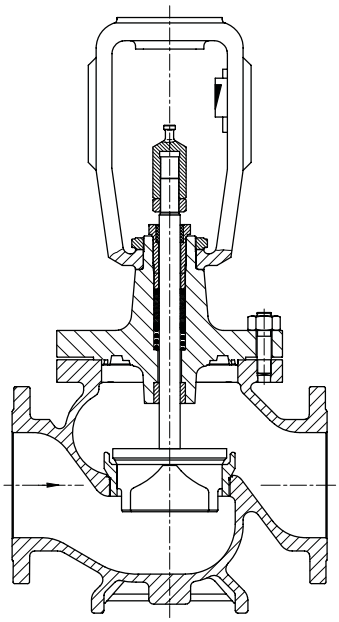


Fig. 7 · Type 3241 Control Valve, DN 200 to 300

Table 1 · Technical data for Type 3241

Nominal size	**DN**	**15 … 250**	**15 … 150**	**15 … 300**		**15 · 25 · 40 · 50 · 80**	
Material		Cast iron EN-JL1040	Spheroidal graphite iron EN-JS1049	Cast steel 1.0619	Cast stainless steel 1.4581	Forged steel 1.0460	Forged stainless steel 1.4571
Nominal pressure	PN	10 · 16	16 · 25	10 · 16 · 25 · 40			
End connections	Flanges	All DIN versions					
	Welding ends	–		DIN 3239 Part 1		–	
Seat-plug sealing		Metal sealing · Soft sealing · Lapped-in metal					
Characteristic		Equal percentage · Linear					
Rangeability		50 : 1 for DN 15 … 50 · 30 : 1 for DN 65 and larger					
Heating jacket	Up to DN 100	PN 25					
	DN 125 and larger	PN 16					
Temperature ranges in °C · Permissible operating pressures according to pressure-temperature diagrams (see Information Sheet T 8000-2 EN)							
Valve body without insulating section		**–10 … 220 °C**					
Body with	Insulating section Short	–10…300 °C	–10…350 °C	–10…400 °C	–10…450 °C	–10…400 °C	–50…450 °C
	Insulating section Long	–					–196…450 °C
	Bellows seal Short	–10…300 °C	–10…350 °C	–10…400 °C	–10…450 °C	–10…400 °C	–50…450 °C
	Bellows seal Long	–					–196…450 °C
Valve plug	Standard Metal sealing	–196 … 450 °C					
	Standard Soft sealing	–196 … 220 °C					
	Balanced with PTFE ring	–196 … 220 °C					
	Balanced with graphite ring	220 … 450 °C					
Leakage class according to DIN EN 1349							
Valve plug	Standard Metal sealing	IV					
	Standard Soft sealing	VI					
	Standard Lapped-in metal	IV-S2 · DN 100 and larger: IV-S1					
	Balanced Metal sealing	With PTFE ring: IV · With graphite ring: III					

Table 2 · Materials

Nominal pressure PN	**10 · 16**	**25**	**16 · 40**			
Valve body [1]	Cast iron EN-JL1040	Spheroidal graphite iron EN-JS1049	Cast steel 1.0619	Cast stainless steel 1.4581	Forged steel 1.0460	Forged stainless steel 1.4571
Valve bonnet	1.0460			1.4571	1.0460	1.4571
Seat and plug [2]	1.4006			1.4571	1.4006	1.4571
	Sealing ring for soft sealing: PTFE with glass fiber					
	Sealing ring for balanced plug: PTFE with carbon or graphite ring				–	
Guide bushing	1.4104			1.4571	1.4104	1.4571
Packing [3]	V-ring packing PTFE with carbon · Spring 1.4310					
Body gasket	Metal and graphite					
Insulating section	1.0460			1.4571	1.0460	1.4571
Metal bellows seal						
Intermediate piece	1.0460			1.4571	1.0460	1.4571
Metal bellows	1.4571					
Heating jacket	–		1.4404			

1) Special materials for cryogenic applications: 1.1138, 1.4308; Ni-based alloy: 9.4610; other special materials on request

2) All seats and plugs with metal sealing are also available with Stellite facing; for ≤ DN 100, plugs in SB 48 and larger are also available made of solid Stellite.

3) Other packings available on request (see T 8000-1 EN).

Table 3 · K_{VS} coefficients

Table 3a · Overview (with flow divider St I (K_{VS} I) or St III (K_{VS} III))

K_{VS}	0.1 0.16 0.25	0.4	0.63	1.0	1.6	2.5	4.0	6.3	10	16	25	40	60	80	63	100	160	200	250	260	360	630	1000	1500
K_{VS} I	–				1.45	2.2	3.6	5.7	9	14.5	22	36	54	72	57	90	144	180	225	234	320	560	900	1350
K_{VS} III	–								7.5	–	20	30	–	–	47	75	120	–	190	–	270	480	750	1100
Seat ∅ [mm]	3	6			12			24		31	38	48	63	80	63	80	100	110	125	130	150	200	250	300
Travel [mm]	15														30				60	30	60		120	

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

Table 3b · Versions without flow divider · Gray-shaded areas indicate versions also with pressure balancing

K_{VS}	0.1 0.16 0.25	0.4	0.63	1.0	1.6	2.5	4.0	6.3	10	16	25	40	60	80	63	100	160	200	250	260	360	630	1000	1500
DN																								
15	•	•	•	•	•	•	•																	
20	•	•	•	•	•	•	•	•																
25	•	•	•	•	•	•	•	•	•															
32		•	•	•	•	•	•	•	•	•														
40		•	•	•	•	•	•	•	•	•	•													
50		•	•	•	•	•	•	•	•	•	•	•												
65											•	•	•				With 19 mm overtravel							
80											•	•	•	•		•								
100															•	•	•							
125																•	•	•						
150															•	•	•			•				
200																			•		•	•		
250																			•		•	•	•	
300																							•	•

Table 3c · Versions with flow divider St I (K_{VS} I) · Gray-shaded areas indicate versions also with pressure balancing

K_{VS}	–	1.45	2.2	3.6	5.7	9	14.5	22	36	54	72	57	90	144	180	225	234	320	560	900	1350
DN																					
15		•	•	•																	
20		•	•	•																	
25		•	•	•																	
32					•	•	•														
40					•	•	•	•													
50					•	•	•	•	•												
65								•	•	•											
80								•	•	•	•		•								
100												•	•	•							
125													•	•	•						
150												•	•	•			•				
200																•		•	•		
250																•		•	•	•	
300																				•	•

Table 3d · Versions with flow divider St III (K_{VS} III) · Gray-shaded areas indicate versions also with pressure balancing

K_{VS}	–	7.5	–	20	30	–	–	47	75	120	–	190	–	270	480	750	–
DN																	
15																	
20																	
25																	
32																	
40																	
50		•															
65				•	•												
80				•	•												
100								•									
125									•								
150								•	•	•							
200								•	•	•		•		•			
250												•		•	•		
300								•	•	•		•		•	•	•	

Table 4 · Differential pressure tables

Permissible differential pressures Δp for unbalanced plug with metal sealing when p_2 = 0 · Pressures in bar

Values specified in shaded columns apply to standard cases · Differential pressures specified in white columns apply to maximum pretensioned springs · Differential pressures in parentheses in the table refer to the values in parentheses in the bench range row · See notes concerning the differential pressure table on the next page.

Table 4a · Fail–safe position "Actuator stem extends"														**4b · "Stem retracts"**		
Bench range (bar) for actuators (cm^2)		240	0.2...1.0	0.3...1.1	0.4...2.0	–	0.6...2.2	0.6 ...3.0[1]	0.9...3.3	–	–	–	0.2 ... 1.0		
		120		0.4...1.2			0.8...2.4		1.2...3.6		1.4...2.3	2.1...3.3			
		350, 700			(1.2...2.0)			(1.8...3.0)			(1.85...2.3)	(2.7...3.3)			
		700													
		1400	–		0.4...2.0	0.5...2.5		–	–	1.0...3.0	–	–	0.4 ... 2.0		
		2800		0.8...1.2	–	2.0...3.0	1.6...2.4	–	2.4...3.6	–			0.3 ... 1.1		
Required supply pressure			1.4	1.4	2.2	2.7	2.6	3.2	3.8	3.2	2.5	3.5	1.2	2.4	4.0
DN	K_{VS}	Actuator cm^2	Δp when p_2 = 0 bar												
15 to 25	0.1 to 0.25	120	40	–	40	–	–	–	–	–	–	–	23	40	–
		240	40	40	–	–	–	–	–	–	–	–	40		–
15 to 50	0.4 to 1.0	120	40	–	40	–	–	–	–	–	–	–	23	40	–
		240	40	40	40	–	–	–	–	–	–	–	40	40	–
	1.6 2.5 4.0	120	9	–	28	–	–	–	–	–	40	–	9	40	–
		240	28	40	40	–	40	40	40	–	–	–	28	40	–
		350	40	40	40	–	40	40	–	–	40	–	40	40	–
20 to 50	6.3 10	120	–	–	5.5	–	–	–	–	–	30	40	0.6	31	40
		240	5.2	9.3	14.8	–	24	24	39	–	–	–	5.2	40	40
		350	10	24	24	–	38	38	40	–	40	40	10	40	40
		700	–	–	(40)	–	–	–	–	–	–	–	24	40	–
32 to 50	16	120	–	–	3	–	–	–	–	–	18	28	–	18	40
		240	2.5	5.2	8.0	–	14	14	23	–	–	–	2.5	37	40
		350	5.2	13.5	13.5	–	30	22	47	–	40	40	5.2	40	40
		700	–	–	(40)	–	–	(40)	–	–	–	–	13.5	40	–
40 to 80	25	120	–	–	1.5	–	–	–	–	–	12	19	–	11	28
		240	1.3	3.1	5.0	–	9.0	9.0	15	–	–	–	1.3	24	40
		350	3.1	8.5	8.5	–	20	14	31	–	37	40	3.1	37	40
		700	–	–	(40)	–	–	(40)	–	–	–	–	8.7	40	40
50 to 80	40	240	–	–	3.0	–	5.0	5.0	9.0	–	–	–	0.5	15	34
		350	1.6	5.0	5.0	–	12	8.5	19	–	23	35	1.6	23	40
		700	–	–	(40)	–	–	(40)	–	–	–	–	5.0	40	40
65 80	60	240	–	–	1.4	–	2.8	2.8	5.0	–	–	–	–	8.5	20
		350	0.8	2.7	2.7	–	6.5	4.5	10.5	–	13	20	0.6	13	29
		700	–	–	(23)	–	–	(35)	–	–	(36)	(40)	2.7	27	40
80	80	240	–	–	0.6	–	1.5	1.5	2.8	–	–	–	–	5.0	12
		350	–	1.4	1.4	–	4.0	2.7	6.5	–	8	12	0.2	7.8	18
		700	–	–	(14)	–	–	(21)	–	–	(22)	(33)	1.4	16	37
100	63	700	2.6	6.5	6.5	–	15	10.5	23	–	27	40	2.6	27	40
80 to 125	100	700	1.4	4.0	4.0	–	9.0	6.5	14	–	16.5	25	1.4	16	36
100 150	160	700	0.7	2.3	2.3	–	5.5	4.0	8.5	–	10.4	15.5	0.7	10	23
125	200	700	0.5	1.9	1.9	–	4.5	3.0	7.0	–	8.5	13	0.5	8.5	19
150	260	700	0.3	1.2	1.2	–	3.0	2.2	6.0	–	6.0	9.5	0.3	6.0	13.5
200 to 300	250	1400	–	3.4	3.4	4.4	7.5	–	–	9.6	–	–	1.3	13.7	30.3
		2800	–	15.8	–	40	32.4	–	40	–	–	–	3.4	28.3	40
	360	1400	–	2.3	2.3	3.0	5.1	–	–	6.6	–	–	–	9.5	21
		2800	–	10.8	–	28.2	22.4	–	33.9	–	–	–	2.3	19.5	40
	630	1400	–	–	–	1.6	2.8	–	–	3.6	–	–	–	5.2	11.7
		2800	–	6	–	15.8	12.5	–	19	–	–	–	–	10.9	23.9
250 300	1000	2800	–	–	–	4.8	–	–	5.8	–	–	–	–	6.8	15
		2x2800	–	–	–	9.6	7.4	–	11.6	–	–	–	–	13.6	30
300	1500	2800	–	–	–	–	–	–	4	–	–	–	–	4.7	10.4
		2x2800	–	–	–	6.6	5	–	8	–	–	–	–	9.4	20.8

[1] Not for actuators with 120 cm^2 effective area.

Table 5 · Differential pressure tables for balanced valve plugs with metal sealing and with PTFE ring

Values specified in shaded columns apply to standard cases · Differential pressures specified in white columns apply to maximum pretensioned spring · Differential pressures in parentheses in the table refer to the values in parentheses in the bench range row

Fail-safe position "Actuator stem extends" · Valve closed at a supply pressure of 0 bar.

Fail-safe position"Actuator stem retracts" · Valve closed when the required supply pressure is applied.

Table 5a and 5b · Valves without metal bellows seal · Pressures in bar

Table 5a · Fail–safe position "Actuator stem extends"							**5b · "Actuator stem retracts"**		
Bench range			0.2 … 1.0	0.4 … 1.2	0.4 … 2.0	0.8 …2.4	0.2 … 1.0	0.2 … 1.0	0.4 … 2.0
Required supply pressure			1.2	1.4	2.2	2.6	1.2	2.0	3.0
DN	K_{VS}	Actuator [cm^2]	Δp when p_2 = 0 bar						
65 80	60	350	–	40	40	40	–	40	40
		700	40	40	–	–	40	–	–
80	80	350	–	40	40	40	–	40	40
		700	40	40	–	–	40	–	–
100	63	700	30	40	40	40	30	40	40
125	100	700	22	40	40	40	22	40	40
100 150	160	700	12	40	40	40	12	40	40
125	200	700	7.5	40	40	40	7.5	40	40
150	260	700	–	40	40	40	–	40	40

Table 5c and 5d · Valves with metal bellows seal · Pressures in bar

Table 5c · Fail–safe position "Actuator stem extends"								**5d · "Actuator stem retracts"**		
Bench range			0.2...1.0	0.4...1.2	0.4...2.0 (1.2...2.0)	0.8...2.4	0.6...3.0	1.2...3.6	0.2...1.0	0.4...2.0	0.6...3.0
Required supply pressure			1.2	1.4	2.2	2.6	3.2	3.8	1.2	3.0	4.0
DN	K_{VS}	Actuator [cm^2]	Δp when p_2 = 0 bar								
65 80	60	350	–	17	17	40	36	40	–	–	40
		700	17	40	(40)	–	–	–	17	40	–
80	80	350	–	12	12	40	31	40	–	–	40
		700	12	40	(40)	–	–	–	12	40	–
100	63	700	5.0	17	17	40	30	40	5.0	–	40
125	100	700	3.0	16	16	40	28	40	3.0	–	40
100 150	160	700	–	14	14	38	26	40	1.5	–	40
125	200	700	–	13	13	37	25	40	1.0	–	40
150	260	700	–	11	11	35	23	40	–	–	40

Notes concerning the differential pressure tables 4a to 5d

The differential pressure tables were prepared under the following conditions:

- The maximum permissible supply pressure is 4 bar for valves in nominal sizes DN 15 to DN 80 and actuators with an effective area of 700 cm^2
- Direction of flow: FTO
- Version with PTFE packing
- The leakage rates specified in Table 1 are not exceeded with the maximum differential pressures specified.
- The specified differential pressure can be limited by the values given in the pressure-temperature diagram.

The actuator sizing needs to be checked separately for versions with metal bellows seal and $p_2 \neq 0$ bar.

Table 6 · Dimensions in mm for standard versions of Type 3241-1 and Type 3241-7

Valve	DN	15	20	25	32	40	50	65	80	100	125	150	200	250	300
Length L	mm	130	150	160	180	200	230	290	310	350	400	480	600	730	850
H1 for actuators	≤ 700 cm²	220						260		350	360	390	–		
											380 [1]	415 [1]			
	1400 cm²	–								415	425	455	805		
	2800 cm²	–											1060		1290
H2 for version	Cast steel	44			72			98		118	144	175	235	260	480
	Forged steel	53	–	70	–	92	98	–	128	–					

Actuator	cm²	120	240	350	700	1400	2800
Diaphragm ∅ D		168	240	280	390	530	770
H (700 cm² and larger including lifting ring)		62		82	200	287	620
H3 (Type 3271 and Type 3277 Actuators) [2]		110			190	610	648
Thread		M30 x 1.5				M60 x 1.5	M100 x 2
a (for Type 3271 Actuator)		G ¼ (¼ NPT)		G ⅜ (⅜ NPT)		G ¾ (¾ NPT)	G 1 (1 NPT)
a2 (for Type 3277 Actuator)		–	G ⅜ (⅜ NPT)			–	

[1] For valve body made of EN-JL1040

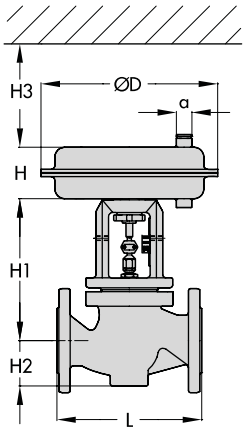
[2] Minimum clearance required to remove the actuator

Table 7 · Weights in kg for standard versions of Type 3241-1 and Type 3241-7

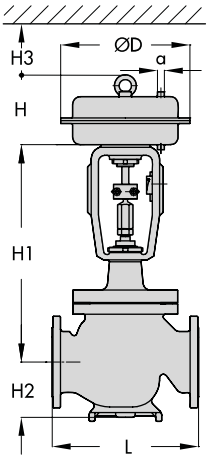
Valve	DN	15	20	25	32	40	50	65	80	100	125	150	200	250	300
Weight without actuator in kg		5	6	7	11	12	15	24	30	42	80	120	330	380	1081

Actuator	cm²	120	240	350	700	1400	2800
Type 3271 Actuator	Without	3	5	8	22	70	450
	With handwheel		9	13	27	155	575
Type 3277 Actuator	Without	5	9	12	26		
	With handwheel		13	17	31		

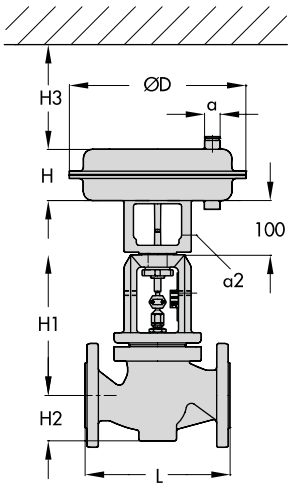
Dimensions in mm



Type 3241-1 · DN 15 to 150



Type 3241-1 · DN 200 to 300



Type 3241-7 · DN 15 to 150

Table 8a · Dimensions and weights for Type 3241 with insulating section or bellows seal DN 15 to 150 - without actuator

Nominal size	DN	15	20	25	32	40	50	65	80	100	125	150
Height H4	Short ins. section or bellows seal	408			408			450		635	645	672
	Long ins. section or bellows seal	710			712			754		883	886	913
Weight in kg	Short/with bellows	8	9	10	17	18	21	32	38	60	105	150
	Long/long with bellows	12	13	14	21	22	25	26	42	68	113	158

[1] For valve body material EN-JL1040.

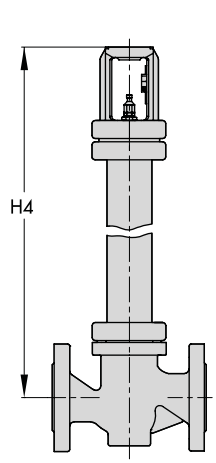
Table 8b · **Dimensions and weights for Type 3241 with insulating section or bellows seal DN 200 to 300** - without actuator

Version with		Insulating section		Metal bellows seal	
Actuator	cm^2	1400	2800	1400	2800
Height H4 in mm	DN 200	1250	1335	1453	1540
	DN 250	1250	1335	1453	1540
	DN 300	–	1810	–	2150
Weight in kg	DN 200	380	400	390	410
	DN 250	430	450	440	460
	DN 300	–	On request	–	On request

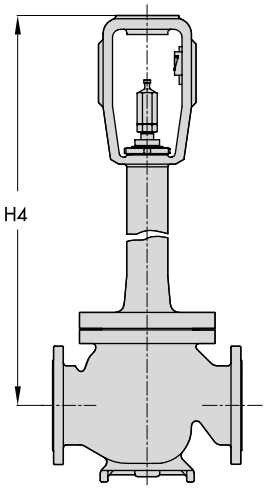
Table 8c · Dimensions in mm for Type 3241 with heating jacket - Not for valves with body materials EN-JL1040 or EN-JS1049

Nominal size	DN	25	40/50	80	100	150	200 … 300
a		110	140	180	200	265	On request
b		15	20	35	50	On request	
c		140	170	215	255	130	
d		190	190	230	320	355	

Type 3241 with insulating section or metal bellows seal

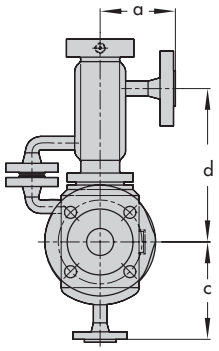


DN 15 to 150

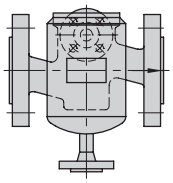


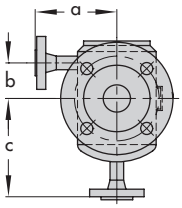
DN 200 to 300

Type 3241 with heating jacket



Bellows seal version with heating jacket





Flange DN 15 or 25, PN 25, DIN 2635

Ordering text

Globe valve	Type 3241, DN … PN …	Process medium	Density and temperature
Valve body material	According to Table 2	Maximum flow rate	in kg/h or m^3/h
End connections	Flanges or welding ends	Pressure	p_1 and p_2 in bar (absolute pressure)
Seat and plug	Metal sealing/soft sealing/ lapped-in metal	Accessories	Positioner and/or limit switch
Characteristic	Equal percentage or linear		
Pneumatic actuator	Type 3271 or Type 3277		
Fail-safe position	Valve CLOSED or OPEN		

Specifications subject to change without notice.

SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt am Main · Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
Internet: http://www.samson.de