DATA SHEET

T 8112 EN

Series V2001 Valves · Type 3321 Globe Valve

With electropneumatic, pneumatic or electric actuator

ANSI version

Ex certified

Application

Control valves designed for mechanical and plant engineering. Suitable for liquids, gases and steam

Nominal size	**NPS ½ to 4**
Pressure rating	**Class 125 to 300**
Temperatures	**14 to 572 °F (-10 to +300 °C)**



Fig. 1: *Type 3321-IP, up to DN 50/NPS 2, with Type 3725 Positioner*



Fig. 2: *Type 3321-IP, DN 65/NPS 2½ and larger, with Type 3725 Positioner*



Fig. 3: *Type 3321-PP*



Fig. 4: *Type 3321-E1*



Fig. 5: *Type 3321-E3*

Special features

The Type 3321 Globe Valve can be equipped with either electropneumatic, pneumatic or electric actuators:

- Electropneumatic actuators with mounted i/p positioner for Type 3321-IP
- Pneumatic actuators for Type 3321-PP
- Electric actuators for Type 3321-E1 or Type 3321-E3

Valve body made of

- Cast iron for Class 150
- Spheroidal graphite iron for Class 150
- Cast steel for Class 300 (up to NPS 2) as well as for Class 150 and 300 (NPS 2½ and larger)
- Stainless steel for Class 300 (up to NPS 2) as well as for Class 150 (NPS 2½ and larger)

Metal or soft-seated valve plug

The control valves can optionally be equipped with positioners, limit switches or contacts and resistance transmitters.

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Versions

- **Type 3321-IP Electropneumatic Globe Valve** · With Type 3372 Electropneumatic Actuator, with Type 3725 Positioner (Fig. 1 and Fig. 2) · Tight-closing function to completely vent the actuator or fill the actuator with air · 4 to 20 mA set point · Max. 90 psi (6 bar) supply air · Fail-close or fail-open · Optionally with limit switch
- **Type 3321-PP Pneumatic Globe Valve** (Fig. 3) · With Type 3371 Pneumatic Actuator with 120 cm² (NPS ½ to 2) or Type 3371 with 350 cm² (NPS 2½ to 4) ·Fail-close or fail-open · Optionally with limit switch
- **Type 3321-E1 Electric Globe Valve** (Fig. 4) Nominal size NPS ½ to 2 with Type 5827-N3 Electric Actuator for 230 V/50 Hz or 24 V/50 Hz · Optionally with limit contacts, resistance transmitter, positioner
- **Type 3321-E3 Electric Globe Valve** (Fig. 5) · With Type 3374 Electric Actuator for 230 V/50 Hz, 230 V/60 Hz, 24 V/50 Hz or 24 V/60 Hz · Optionally with fail-safe action (tested according to DIN EN 14597 with actuator stem extends), limit contacts, resistance transmitter, positioner

Further versions

- **Explosion-protected version** with electric actuators · On request
- **DIN version of Type 3321** · See Data Sheet ▶ T 8111
- **Insulating section**
- **Flow divider ST 1** for noise reduction

Principle of operation

The process medium flows through the valve in the direction indicated by the arrow in the flow-to-open direction (Fig. 7, Fig. 8). The valve plug position determines the cross-sectional area between the seat and plug. The plug stem is connected to the actuator stem by the stem connector and sealed with a self-adjusting packing.

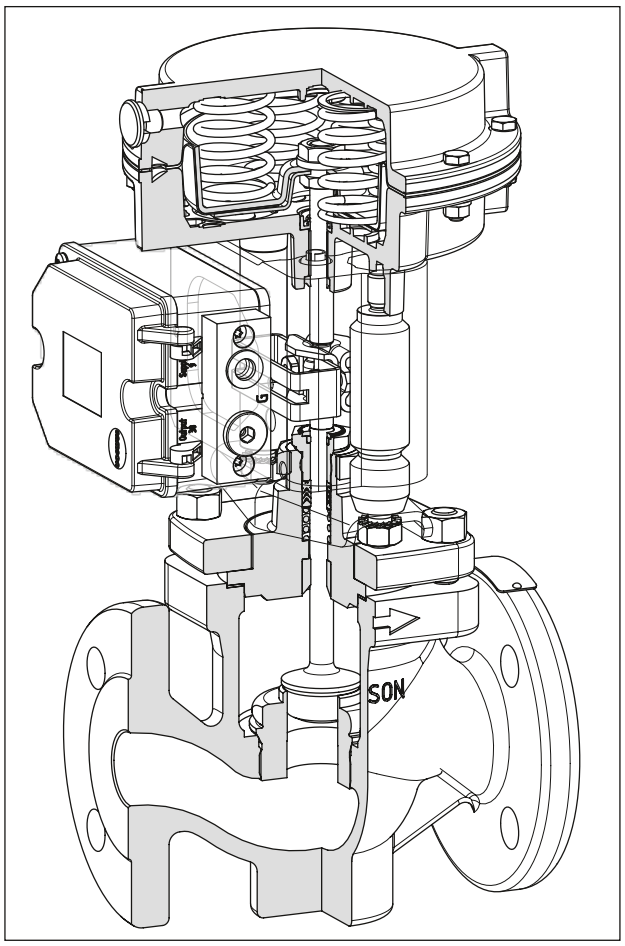


Fig. 6: *Type 3321-IP Globe Valve, with actuator with electropneumatic positioner*

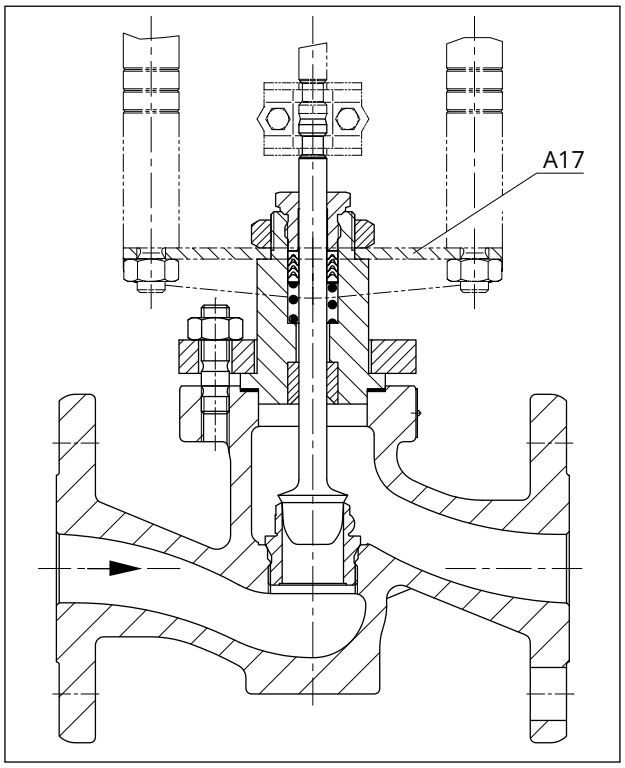


Fig. 7: *Type 3321 Globe Valve in nominal sizes DN 15 to 50/NPS ½ to 2*

A17 Crossbeam

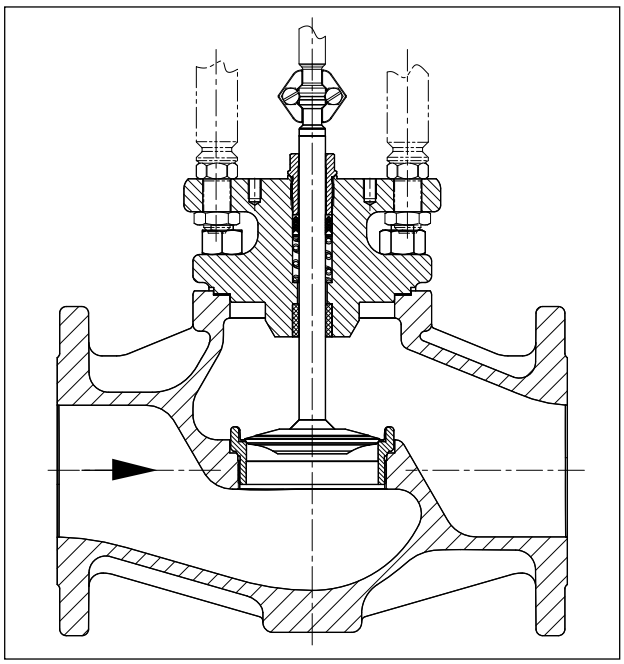


Fig. 8: *Type 3321 Globe Valve in nominal sizes DN 65 to 100/NPS 2½ to 4*

Fail-safe positions

When the valve is combined with a pneumatic actuator with integrated springs or an electric actuator with fail-safe action, the control valve has two different fail-safe positions that become effective when the supply air or control signal fails:

- **Actuator stem extends (fail-close):**
  When the signal pressure is reduced or the air supply fails, the springs move the actuator stem downward. The valve closes upon fail-safe action.
- **Actuator stem retracts (fail-open):**
  When the signal pressure is reduced or the air supply fails, the springs move the actuator stem upward. The valve opens upon fail-safe action.

Associated documentation

Valve and actuator are delivered separately. Instructions on how to mount the valve on the actuator can be found in the mounting and operating instructions:

- EB 8111/8112 Type 3321 Globe Valve
- EB 8313-3 Actuator for Type 3321-IP
- EB 5827-1 Actuator for Type 3321-E1
- EB 5827-2 Actuator for Type 3321-E1
- EB 8331-3 Actuator for Type 3321-E3
- EB 8331-4 Actuator for Type 3321-E3
- EB 8317 Actuator for Type 3321-PP

Table 1: *Technical data for Type 3321 · ANSI version*

Material		A126 B	A216 WCC · A351 CF8M
Nominal size	NPS	½ · ¾ · 1 · 1½ · 2 · 2½ · 3 · 4	
Pressure rating	Class	Class 125	Class 150 or Class 300
Type of end connections	Flanges	ANSI flat face (FF)	Raised face (RF) · Ra = 3.2 to 6.3 µm
Seat-plug seal		Metal or soft seal	
Characteristic		Inherent characteristic according to ▶ T 8000-3	
Rangeability		50:1 for NPS ½ to 2 · 30:1 for NPS 2½ to 4	
Conformity		CE EAC	
Temperature range		14 to 430 °F (-10 to +220 °C)	
With insulating section[1)]		14 to 572 °F (-10 to +300 °C)	
Leakage class according to ANSI FCI 70-2		Metal seal: IV Soft seal: VI	

1) Not in stainless steel with NPS 2½ to 4

Table 2: *Materials for Type 3321 · ANSI version*

Valve body		A126 B	Cast steel A216 WCC	Cast stainless steel A351 CF8M
Valve bonnet		Up to NPS 2: A105 NPS 2½ and larger: A216 B	Up to NPS 2: A105 NPS 2½ and larger: A216 WCC	Up to NPS 2: A182 F316 NPS 2½ and larger: CF8M
Valve flange[1)]		A105		
Seat and plug	Seat	NPS ½ to 2: A582 430F NPS 2½ and larger: A276 410T		NPS ½ to 2: CF3M/F316/316L/316/316L NPS 2½ and larger: in the valve body
	Plug	A479 316/A479 316L		
	Seal for soft-seated plug	PTFE with glass fiber		
Guide bushing		A582 430F		A182 F316
Packing		PTFE with carbon V-ring packing		
Body gasket		Graphite on metal core		

1) No contact with process medium; only up to NPS 2. For NPS 2½ and larger: one-pieced (see valve bonnet for material)

Flow coefficients

Table 3: *Overview for Type 3321: Nominal sizes, flow coefficients and seat Ø*

Nominal size	DN	15				20		25		40		50		65		80		100	
	NPS	½				¾		1		1½		2		2½		3		4	
Flow coefficients	K_{VS}	0.25	0.63	1.6	4	2.5	6.3	4	10	10	25	16	35	40	100	40	100	40	160
	C_V	0.3	0.75	2	5	3	7.5	5	12	12	30	20	40	47	120	47	120	47	190
Flow coefficients with ST 1[1)]	K_{VS}-1	–	–	1.45	3.6	2.2	5.7	3.6	9	9	22	14.5	31	36	90	36	90	36	144
	C_V-1	–	–	1.7	4.2	2.6	7	4.2	10.5	10.5	26	17	36	42	105	42	105	42	170
Seat Ø	mm	3	6	12	12	12	24	12	24	24	38	32	48	48	80	48	80	48	80
	in	0.12	0.24	0.47	0.47	0.47	0.94	0.47	0.94	0.94	1.5	1.26	1.89	1.89	3.15	1.89	3.15	1.89	3.15
Rated travel	mm	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	30
	in	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	1.18

1) Flow divider ST 1

Pneumatic actuators with Type 3321

Table 4: *Technical data for pneumatic actuators*

Valve/actuator		Type 3321-IP with Type 3372 Actuator			Type 3321-PP with Type 3371 Actuator		
Actuator area		120 cm²	350 cm² for C_V 190	350 cm² for C_V 47 and 117	120 cm²	350 cm² for C_V 190	350 cm² for C_V 47 and 117
Fail-safe action		Actuator stem extends (FA) or actuator stem retracts (FE) Fail-close or fail-open					
Set point		4 to 20 mA			–		
Bench range/rated travel	FA: Fail-close	2.1 to 3.3 bar/ 15 mm 30 to 48 psi/ 15 mm	2.2 to 3.8 bar/ 30 mm 32 to 55 psi/ 30 mm	2.1 to 2.7 bar/ 15 mm 30 to 39 psi/ 15 mm	2.1 to 3.3 bar/ 15 mm 30 to 48 psi/ 15 mm	2.2 to 3.8 bar/ 30 mm 32 to 55 psi/ 30 mm	2.1 to 2.7 bar/ 15 mm 30 to 39 psi/ 15 mm
	FE: Fail-open	0.4 to 1.4 bar/ 15 mm 6 to 20 psi/ 15 mm	1.5 to 2.7 bar/ 30 mm 22 to 39 psi/ 30 mm	1.5 to 2.1 bar/ 15 mm 22 to 30 psi/ 15 mm	0.4 to 1.4 bar/ 15 mm 6 to 20 psi/ 15 mm	1.5 to 2.7 bar/ 30 mm 22 to 39 psi/ 30 mm	1.5 to 2.1 bar/ 15 mm 22 to 30 psi/ 15 mm
Hysteresis		≤1 %			–		
Variable position		≤7 %			–		
Degree of protection		IP66 with Type 3725			–		
Permissible ambient temperature		Standard:	-20 to +80 °C -4 to +176 °F		-35 to +90 °C -31 to +194 °F		
		With metal cable gland:	-30 to +80 °C -22 to +176 °F				
See data sheet for actuator data		▶ T 8313			▶ T 8317		

Table 5: *Materials for pneumatic actuators*

Actuator	Type 3372		Type 3371	
Actuator area	120 cm²	350 cm²	120 cm²	350 cm²
Actuator housing	GD-AlSi12	1.0330	GD-AlSi12	1.0330
Diaphragm	NBR		NBR	
Actuator stem	1.4305	1.4571	1.4305	1.4571
Positioner housing				
Type 3725	Polyphthalamide (PPA)		–	
Yoke				
Stem	9SMn28K	1.0715+C	9SMn28K	1.0715+C
Crossbeam	1.4301	–	1.4301	–
Mounting bracket for Type 3725	Aluminum		–	

Table 6: *Permissible differential pressures · Type 3321/3371 or Type 3321/3372 Pneumatic Control Valve · Metal-seated plug · Fail-close*

Actuator area		**cm²**	**120**	**350**	**350**
Bench range		**bar**	**2.1 to 3.3**	**2.1 to 2.7**	**2.2 to 3.8**
		psi	**30 to 48**	**30 to 39**	**32 to 55**
Valve travel		**mm**	**15**	**15**	**30**
		in	**0.59**	**0.59**	**1.18**
Supply pressure		**bar**	**3.7 to 6.0**	**4.3 to 6.0**	**4.3 to 6.0**
		psi	**55 to 90**	**62 to 90**	**62 to 90**
	C_v	**K_{vs}**	**Δp when p_2 = 0 psi (bar)**		
	0.3 to 5	0.25 to 4.0	695 (48)	–	–
	7.5 · 12	6.3 · 10	580 (40)	–	–
	20	16	360 (25)	–	–
	30	25	250 (17)	–	–
	40	35	160 (11)	–	–
	47	40	145 (10)[1)]	490 (34)	–
	120	100	43 (3)[1)]	145 (10)	–
	190	160	–	–	145 (10)

[1)] Mounting without crossbeam on actuator (form C), see ▶ EB 8313-3 and ▶ EB 8317

Table 7: *Permissible differential pressures · Type 3321/3371 or Type 3321/3372 Pneumatic Control Valve · Metal-seated plug · Fail-open*

Actuator area		**cm²**	**120**			**350**			
Bench range		**bar**	**0.4 to 1.4**			**1.5 to 2.1**	**1.5 to 2.7**	**1.5 to 2.1**	**1.5 to 2.7**
		psi	**6 to 20**			**22 to 30**	**22 to 39**	**22 to 30**	**22 to 39**
Valve travel		**mm**	**15**			**15**	**30**	**15**	**30**
		in	**0.59**			**0.59**	**1.18**	**0.59**	**1.18**
Supply pressure		**bar**	**2.5**	**3.5**	**4.4**	**4.0**		**6.0**	
		psi	**36**	**50**	**64**	**60**		**90**	
	C_v	**K_{vs}**	**Δp when p_2 = 0 psi (bar)**						
	0.3 to 5	0.25 to 4.0	695 (48)	695 (48)	695 (48)	–	–	–	–
	7.5 · 12	6.3 · 10	320 (22)	580 (40)	580 (40)	–	–	–	–
	20	16	160 (11)	360 (25)	495 (34)	–	–	–	–
	30	25	115 (8)	250 (17)	350 (24)	–	–	–	–
	40	35	65 (4.5)	145 (10)	220 (15)	–	–	–	–
	47	40	60 (4)[1)]	130 (9)[1)]	220 (15)[1)]	390 (27)	–	580 (40)	–
	120	100	–	45 (3)[1)]	65 (4.5)[1)]	140 (9.5)	–	320 (22)	–
	190	160	–	–	–	–	140 (9.5)	–	320 (22)

[1)] Mounting without crossbeam on actuator (form C), see ▶ EB 8313-3 and ▶ EB 8317

Table 8: *Permissible differential pressures · Type 3321/3371 or Type 3321/3372 Pneumatic Control Valve · Soft-seated plug · Fail-close*

Actuator area		**cm²**	**120**	**350**	**350**
Bench range		**bar**	**2.1 to 3.3**	**2.1 to 2.7**	**2.2 to 3.8**
		psi	**30 to 48**	**30 to 39**	**32 to 55**
Valve travel		**mm**	**15**	**15**	**30**
		in	**0.59**	**0.59**	**1.18**
Supply pressure		**bar**	**3.7 to 6.0**	**4.3 to 6.0**	**4.3 to 6.0**
		psi	**55 to 90**	**62 to 90**	**62 to 90**
	C_v	**K_{vs}**	**Δp when p_2 = 0 psi (bar)**		
	0.3 to 5	0.25 to 4.0	695 (48)	–	–
	7.5 · 12	6.3 · 10	580 (40)	–	–
	20	16	390 (27)	–	–
	30	25	275 (19)	–	–
	40	35	175 (11)	–	–
	47	40	145 (10)[1)]	520 (36)	–
	120	100	45 (3)[1)]	145 (10)	–
	190	160	–	–	–

[1)] Mounting without crossbeam on actuator (form C), see ▶ EB 8313-3 and ▶ EB 8317

Table 9: *Permissible differential pressures · Type 3321/3371 or Type 3321/3372 Pneumatic Control Valve · Soft-seated plug · Fail-open*

Actuator area		**cm²**	**120**			**350**			
Bench range		**bar**	**0.4 to 1.4**			**1.5 to 2.1**	**1.5 to 2.7**	**1.5 to 2.1**	**1.5 to 2.7**
		psi	**6 to 20**			**22 to 30**	**22 to 39**	**22 to 30**	**22 to 39**
Valve travel		**mm**	**15**			**15**	**30**	**15**	**30**
		in	**0.59**			**0.59**	**1.18**	**0.59**	**1.18**
Supply pressure		**bar**	**2.5**	**3.5**	**4.4**	**4.0**		**6.0**	
		psi	**36**	**50**	**64**	**60**		**90**	
	C_v	**K_{vs}**	**Δp when p_2 = 0 psi (bar)**						
	0.3 to 5	0.25 to 4.0	695 (48)	695 (48)	695 (48)	–	–	–	–
	7.5 · 12	6.3 · 10	360 (25)	580 (40)	580 (40)	–	–	–	–
	20	16	205 (14)	390 (27)	520 (36)	–	–	–	–
	30	25	140 (9.5)	275 (19)	375 (26)	–	–	–	–
	40	35	90 (6)	175 (12)	230 (16)	–	–	–	–
	47	40	65 (4.5)[1)]	145 (10)[1)]	220 (15)[1)]	420 (29)	–	580 (40)	–
	120	100	–	45 (3)[1)]	80 (5.5)[1)]	145 (10)	–	335 (23)	–
	190	160	–	–	–	–	–	–	–

[1)] Mounting without crossbeam on actuator (form C), see ▶ EB 8313-3 and ▶ EB 8317

Electric actuators with Type 3321

Table 10: *Permissible differential pressures for metal-seated plug*

Globe valve		Type 3321-E1	Type 3321-E3		
Type ... Actuator		5827-N3	3374-10/-11	3374-21/-31	3374-10/-11
Positioning force		0.7 kN	1.25 kN	2.0 kN	2.5 kN
C_V coefficients	K_{VS} coefficients	Δp when p_2 = 0 psi (bar)	Δp when p_2 = 0 psi (bar)		
0.3 to 5	0.25 to 4.0	695 (48)	695 (48)	695 (48)	695 (48)
7.5 to 12	6.3 to 10	130 (9)	261 (18)	464 (32)	580 (40)
20	16	65 (4.5)	130 (9)	250 (17)	360 (25)
30	25	43 (3)	87 (6)	175 (12)	250 (17)
40	35	21 (1.5)	43 (3)	101 (7)	145 (10)
47	40	–	43 (3)	108 (7.5)	145 (10)
120	100	–	–	29 (2)	43 (3)
190[1]	160[1]	–	–	–	43 (3)[2]
See data sheet for actuator data		▶ T 5827	▶ T 8331		

[1] With 30 mm travel

[2] Only with Type 3374-10

Table 11: *Permissible differential pressures for soft-seated plug*

Globe valve		Type 3321-E1	Type 3321-E3		
Type ... Actuator		5827-N3	3374-10/-11	3374-21/-31	3374-10/-11
Positioning force		0.7 kN	1.25 kN	2.0 kN	2.5 kN
C_V coefficients	K_{VS} coefficients	Δp when p_2 = 0 psi (bar)	Δp when p_2 = 0 psi (bar)		
0.3 to 5	0.25 to 4.0	695 (48)	695 (48)	695 (48)	695 (48)
7.5 to 12	6.3 to 10	175 (12)	304 (21)	464 (32)	580 (40)
20	16	94 (6.5)	175 (12)	250 (17)	390 (27)
30	25	65 (4.5)	116 (8)	175 (12)	275 (19)
40	35	43 (3)	72 (5)	101 (7)	175 (12)
47	40	–	72 (5)	130 (9)	145 (10)
120	100	–	–	43 (3)	58 (4)
190[1]	160[1]	–	–	–	–
See data sheet for actuator data		▶ T 5827	▶ T 8331		

[1] With 30 mm travel

Mounting actuators

Table 12: *Type of mounting and required adapter*

Type 3321 Valve			NPS ½ to 2	NPS 2½ to 4
Type 3372 Actuator with Type 3725 Positioner	Version:	IP	Mounting with crossbeam (form B)	Mounting without crossbeam (form C)
Type 5827-N3 Actuator		E1	With adapter (1400-7414)	–
Type 3374-11/-21/-31 Actuator		E2	Mounting with crossbeam (form B)	With adapter (1400-9515)
Type 3374-10 Actuator		E3	–	With adapter (1400-9515)
Type 3371 Actuator		PP	Mounting with crossbeam (form B)	Mounting without crossbeam (form C)

Dimensions

Table 13: *Dimensions for Type 3321 Valve · ANSI version*

Valve	NPS	½	¾	1	1½	2	2½	3	4
	DN	15	20	25	40	50	65	80	100
Height H1	in	4.3			4.5		7.0		7.9
	mm	110			115		178		201
Height H2	in	1.6			2.8		3.9		4.4
	mm	40			72		98		113
With standard bonnet									
Class 150									
Length L	in	7.25	7.25	7.25	8.75	10	10.87	11.75	13.87
	mm	184	184	184	222	254	276	298	352
Class 300									
Length L	in	7.5	7.62	7.75	9.25	10.5	11.5	12.5	14.5
	mm	191	194	197	235	267	292	318	368
With insulating section									
Height H4	in	10.3			10.4		12.8		12.8
	mm	261			265		325		325

Dimensional drawings of valve

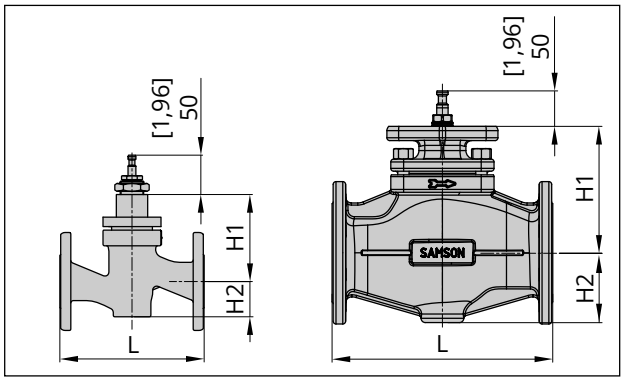


Fig. 9: *Type 3321 Globe Valve · Specifications in mm [inch]*
Left: DN 15 to 50/NPS ½ to 2
Right: DN 65 to 100/NPS 2½ to 4

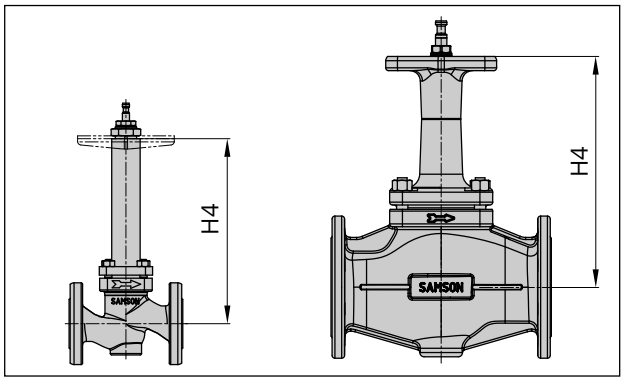


Fig. 10: *Type 3321 Globe Valve with insulating section*
Left: DN 15 to 50/NPS ½ to 2
Right: DN 65 to 100/NPS 2½ to 4

Dimensional drawings · Actuators for electropneumatic control valves

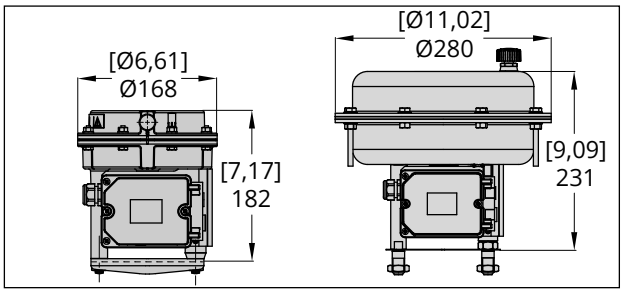


Fig. 11: *Specifications in mm [inch]*
Left: Type 3372/120 cm² with Type 3725 Positioner
Right: Type 3372/350 cm² with Type 3725 Positioner
fail-open/fail-close

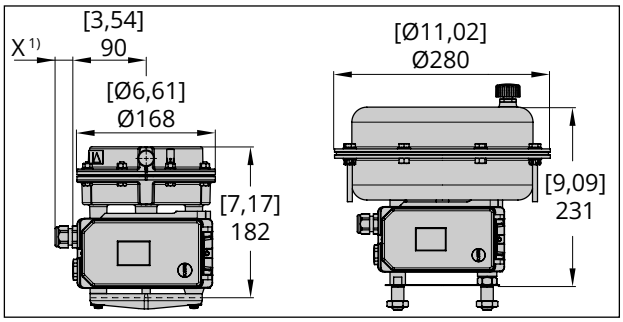


Fig. 12: *Specifications in mm [inch]*
Left: Type 3372/120 cm² with Series 3730 Positioner, fail-open/fail-close
Right: Type 3372/350 cm² with Series 3730 Positioner, fail-open/fail-close

1) The dimension X depends on the cable gland used.

Dimensional drawings · Actuators for pneumatic control valves

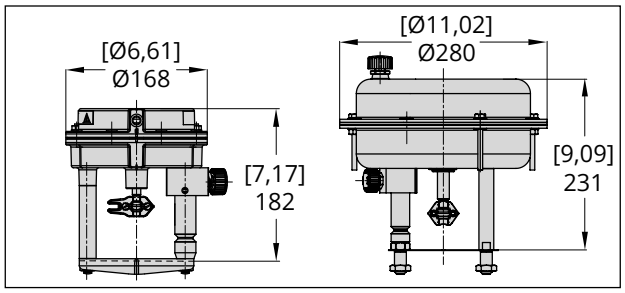


Fig. 13: *Specifications in mm [inch]*
Left: Type 3371/120 cm²
Right:Type 3371/350 cm²

Dimensional drawings · Actuators for electric control valves

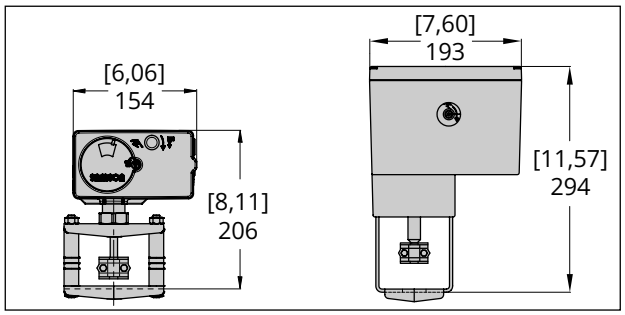


Fig. 14: *Specifications in mm [inch]*
Left: E1 actuator, Type 5827
Right: E3 actuator, Type 3374

Weights

Table 14: *Weights[1] for Type 3321 Valve · ANSI version*

Valve	DN	15	20	25	40	50	65	80	100
	NPS	½	¾	1	1½	2	2½	3	4
With standard bonnet									
Weight, approx.	kg	6	7	8	12	16	26	32	44
	lbs	14	16	18	27	36	58	71	97
With insulating section									
Weight, approx.	kg	9	10	11	18	22	34	40	62
	lbs	19.8	22.1	24.3	39.7	48.5	75	88.2	136.7

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 15: *Weights of Type 3371, Type 3372, Type 5827 and Type 3374 Actuators*

Actuator type		Pneumatic		Electropneumatic		Electric	
Type		3371/120	3371/350	3372/120	3372/350	E1/5827	E3/3374
Positioner		–		Type 3725		Optional, integrated	
Weight, approx.	lbs	8.8	28.7	15.4	35.2	2.8	8.8
Weight, approx.	kg	4	13	7	16	1.25	Max. 4

Ordering text

The following specifications are required on ordering:

Valve	
Type 3321 Globe Valve	
Nominal size	NPS ...
Pressure rating	Class ...
Flow coefficients	C_V ...
Body material	See Table 2
Bonnet	Standard bonnet or insulating section
Flow divider ST 1	Yes/No
Seat-plug seal	Metal or soft seal
Actuators	
for **Type 3321-IP:** Type 3372 Electropneumatic Actuator	
With positioner	Type 3725/Series 3730
Optional	Intrinsically safe Ex ia
Additional equipment	1 or 2 limit switches
for **Type 3321-PP:** Type 3371 Pneumatic Actuator	
Fail-safe action	Fail-close or fail-open
Bench range	20 to 34 psi (1.4 to 2.3 bar)
Additional equipment	1 or 2 limit switches
for **Type 3321-E1:** Type 5827-N3 Electric Actuator	
Supply voltage	– 230 V/50 Hz – 24 V/50 Hz

Additional equipment	– 2 limit contacts
	– Resistance transmitter 0 to 1000 Ω
	– Digital positioner
	  – Input: 0/4 to 20 mA or 0/2 to 10 V
	  – Output: 0/2 to 10 V

for **Type 3321-E3:** Type 3374 Electric Actuator	
Fail-safe action	With fail-safe action: Actuator stem extends or retracts
Thrust	
Without fail-safe action	1.25 kN; 2.5 kN
With fail-safe action	2 kN (actuator stem extends) 500 N (actuator stem retracts)
Supply voltage	– 230 V/50 Hz – 230 V/60 Hz – 24 V/50 Hz – 24 V/60 Hz
Additional equipment	– 2 limit contacts – Resistance transmitter 0 to 1000 Ω – Digital positioner with input and output: 0/4 to 20 mA or 0/2 to 10 V

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