

## T 8112 EN

### Series V2001 Valves · Type 3321 Globe Valves with electropneumatic, pneumatic or electric actuators

ANSI version



#### Application

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

<b>Valve size</b>	<b>NPS ½ to 4</b>
<b>Pressure rating</b>	<b>Class 150 and 300</b>
<b>Temperature range</b>	<b>14 to 572 °F (–10 to +300 °C)</b>

Type 3321 Globe Valves can be equipped with either electro-pneumatic, pneumatic or electric actuators:

- Electropneumatic actuators with integrated or mounted i/p positioner (Type 3321-IP Control Valve)
- Pneumatic actuators (Type 3321-PP Control Valve)
- Electric actuators (Type 3321-E1 or Type 3321-E3 Control Valve)

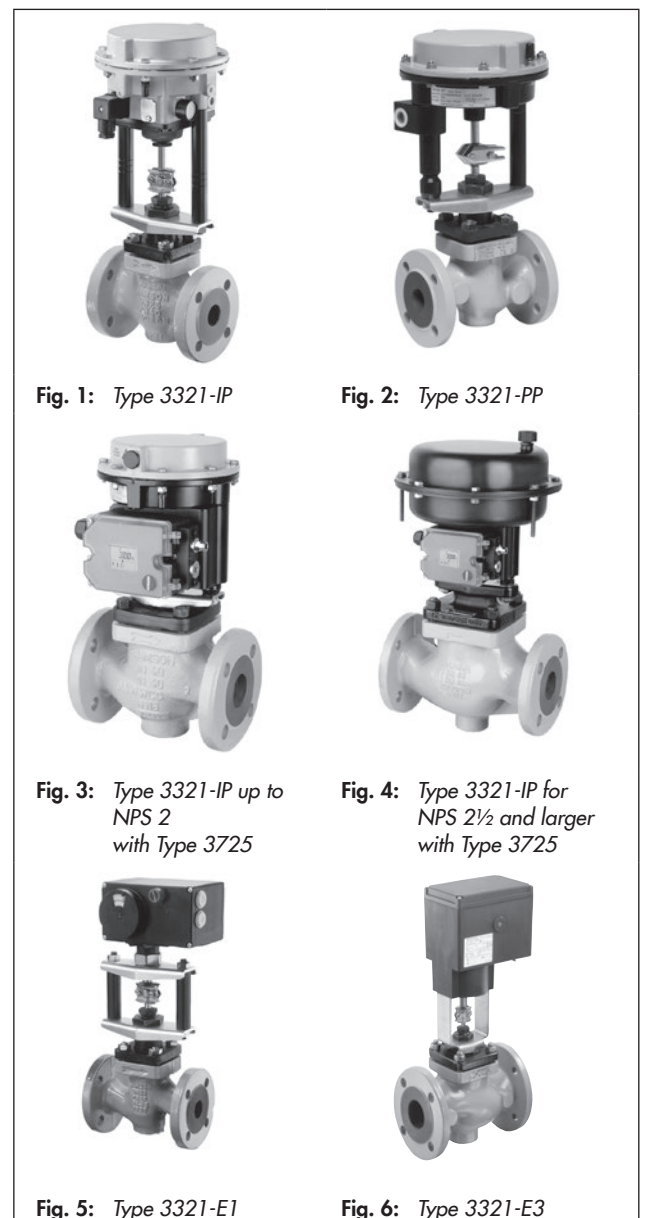
Valve body materials

- Cast iron A 126 B for Class 125
- Cast steel A216 WCC for Class 150 or 300
- Stainless steel A351 CF8M for Class 150 or 300
- Metal or soft-seated valve plug

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

#### Versions

- **Type 3321-IP Electropneumatic Globe Valve** · With Type 3372 Electropneumatic Actuator, optionally with integrated positioner (120 cm<sup>2</sup> only, with plug connector, see Fig. 1) or Type 3725 Positioner (Fig. 3, Fig. 4), tight-closing function for completely venting or filling the actuator with air, reference variable 4 to 20 mA, max. 6 bar supply air, fail-safe position fail-close or fail-open, optionally with limit switch
- **Type 3321-PP Pneumatic Globe Valve** (Fig. 2) · With Type 3371 Pneumatic Actuator with 120 cm<sup>2</sup> (up to NPS 2) or Type 3371 with 350 cm<sup>2</sup> (NPS 2½ and larger), fail-safe position fail-close or fail-open, optionally with limit switch
- **Type 3321-E1 Electric Globe Valve** (Fig. 5) · NPS ½ to 2 with Type 5824-30 Electric Actuator for 230 V/50 Hz or 24 V/50 Hz, optionally with limit contacts, resistance transmitters, positioner



- **Type 3321-E3 Electric Globe Valve** (Fig. 6) · 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 transmitters, positioner

#### Further versions

- **Explosion-protected** version with electric actuators · On request
- **Type 3321 according to DIN standards** · 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. 8, Fig. 9). 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.

#### Fail-safe action

The control valve has two different fail-safe positions that become effective when the supply air fails:

- **Actuator stem extends (fail-close):** The valve closes when the supply air fails.
- **Actuator stem retracts (fail-open):** The valve opens when the supply air fails.

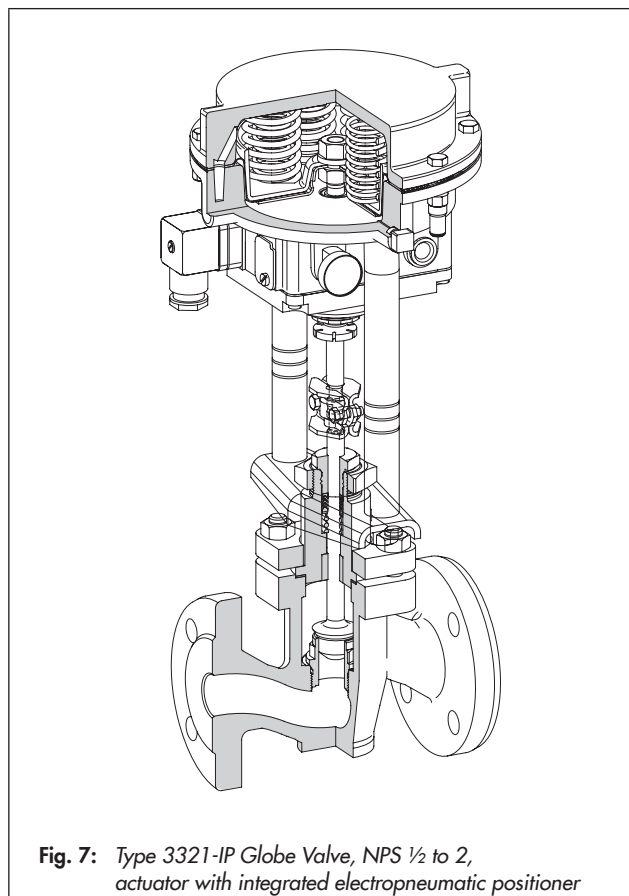


Fig. 7: Type 3321-IP Globe Valve, NPS 1/2 to 2, actuator with integrated electropneumatic positioner

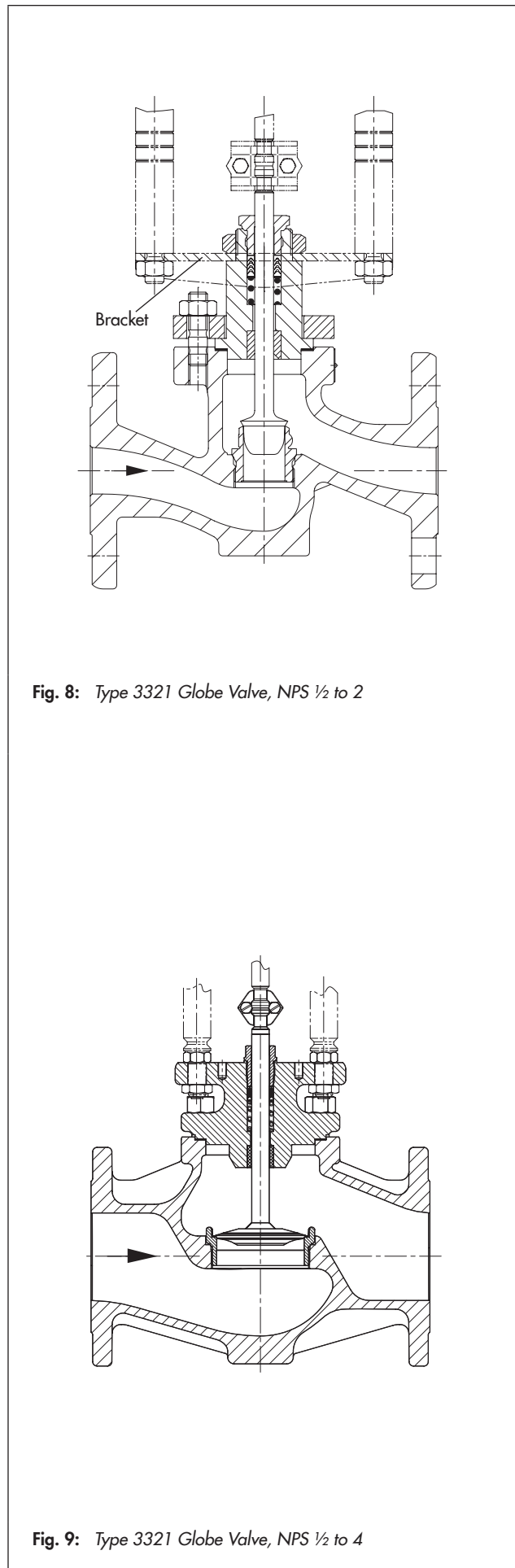


Fig. 8: Type 3321 Globe Valve, NPS 1/2 to 2

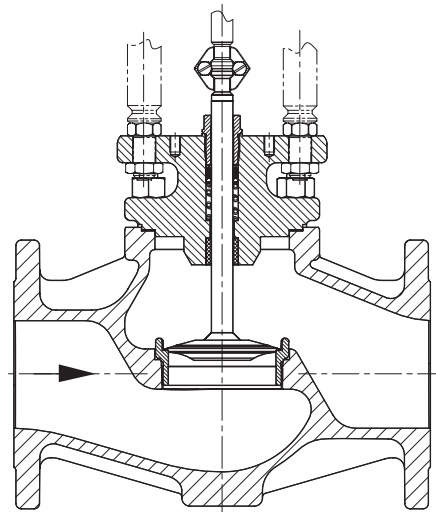


Fig. 9: Type 3321 Globe Valve, NPS 1/2 to 4

### 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 delivered with the product:

- ▶ EB 8111 Type 3321 Globe Valve
- ▶ EB 8313-1 and Actuator for Type 3321-IP
- ▶ EB 8313-3

- ▶ EB 8317 Actuator for Type 3321-PP
- ▶ EB 5824-1 Actuator for Type 3321-E1
- ▶ EB 5824-2
- ▶ EB 8331-1 Actuator for Type 3321-E3
- ▶ EB 8331-4

**Table 1:** Type 3321 Globe Valve

**Table 1.1:** Technical data

Valve size	NPS	1 · 1½ · 2 · 2½ · 3 · 4		½ · ¾ · 1 · 1½ · 2 · 2½ · 3 · 4	
Material		A 126 B		A216 WCC · A351 CF8M	
Connection	Flanges	Flat face (FF)		Raised face · Ra = 3.2 to 6.3 µm	
Pressure rating		Class 125		Class 150 or 300	
Seat-plug seal		Metal or soft sealing			
Characteristic		Inherent characteristic according to ▶ T 8000-3			
Rangeability		50:1 for NPS ½ to 2 · 30:1 for NPS 2½ to 4			
Medium temperature range		14 to 430 °F · (-10 to +220 °C)			
With insulating section <sup>1)</sup>		14 to 572 °F · (-10 to +300 °C)			
Leakage class according to ANSI/FCI 70-2		Metal seal: IV Soft seal: VI <sup>2)</sup>			
Compliance		<b>CE · EAC</b>			

<sup>1)</sup> Not for stainless steel with NPS 2½ to 4

<sup>2)</sup> Not with K<sub>VS</sub> 160/C<sub>V</sub> 190

**Table 1.2:** Materials

Valve size	NPS	½ · ¾ · 1 · 1½ · 2 · 2½ · 3 · 4		
Valve body		A 126 B	Cast steel A216 WCC	Stainless steel A351 CF8M
Valve bonnet		Up to NPS 2: A 105 ≥NPS 2½: A 216 B	Up to NPS 2: A 105 ≥NPS 2½: A216 WCC	Up to NPS 2: A182 F316 ≥NPS 2½: CF8M
Valve flange <sup>1)</sup>		A 105		
Seat and plug	Seat	NPS ½ to 2: A582 430F NPS 2½ and larger: A276 410 T		NPS ½ to 2: CF3M/F316/F316L/ F316/F316L 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 F316L
Packing		V-ring packing: PTFE with carbon		
Body gasket		Graphite on metal core		

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

**Table 1.3:** Overview: Valve sizes, C<sub>V</sub> and C<sub>V1</sub> coefficients (with flow divider ST 1) and seat diameters

Valve size	NPS	½		¾	1	1½	2	2½	3	4									
	DN	15		20	25	40	50	65	80	100									
Flow rate	C <sub>V</sub>	0.3	0.75	2	5	3	7.5	5	12	12	30	20	40	47	120	47	120	47	190
	K <sub>VS</sub>	0.25	0.63	1.6	4	2.5	6.3	4	10	10	25	16	35	40	100	40	100	40	160
With ST 1	C <sub>V1</sub>	-		1.7	4.2	2.6	7	4.2	10.5	10.5	26	17	36	42	105	42	105	42	170
	K <sub>VS1</sub>	-		1.45	3.6	2.2	5.7	3.6	9	9	22	14.5	31	36	90	36	90	36	144
Seat Ø	inch	0.12	0.24	0.47		0.47	0.94	0.47	0.94	0.94	1.50	1.26	1.89	1.89	3.15	1.89	3.15	1.89	3.15
	mm	3	6	12		24	12	24	38	32	48	80	48	80	48	80	48	80	80
Rated travel		0.59" · 15 mm																	1.18" 30 mm

**Table 2: Pneumatic actuators****Table 2.1: Technical data**

Valve/actuator	Type 3321-IP/Type 3372			Type 3321-PP/Type 3371			
Actuator area	120 cm <sup>2</sup>	350 cm <sup>2</sup> for C <sub>V</sub> 190	350 cm <sup>2</sup> for C <sub>V</sub> 47 and 117	120 cm <sup>2</sup>	350 cm <sup>2</sup> for C <sub>V</sub> 190	350 cm <sup>2</sup> for C <sub>V</sub> 47 and 117	
Fail-safe position	Fail-close or fail-open						
Reference variable	4 to 20 mA			-			
Bench range/rated travel	Fail-close	30 to 48 psi/ 15 mm (2.1 to 3.3 bar)	32 to 55 psi/ 30 mm (2.2 to 3.8 bar)	30 to 39 psi/ 15 mm (2.1 to 2.7 bar)	30 to 48 psi/ 15 mm (2.1 to 3.3 bar)	32 to 55 psi/ 30 mm (2.2 to 3.8 bar)	30 to 39 psi/ 15 mm (2.1 to 2.7 bar)
	Fail-open	6 to 20 psi/ 15 mm (0.4 to 1.4 bar)	22 to 39 psi/ 30 mm (1.5 to 2.7 bar)	22 to 30 psi/ 15 mm (1.5 to 2.1 bar)	6 to 20 psi/ 15 mm (0.4 to 1.4 bar)	22 to 39 psi/ 30 mm (1.5 to 2.7 bar)	22 to 30 psi/ 15 mm (1.5 to 2.1 bar)
Hysteresis	≤1 %			-			
Variable position	≤7 %			-			
Degree of protection	IP 54 with integrated positioner (only for 120 cm <sup>2</sup> ) IP 66 with Type 3725			-			
Permissible ambient temperature	Standard: -4 to +176 °F (-20 to +80 °C) With metal cable gland: -22 to +176 °F (-30...+80 °C)			-31 to +194 °F (-35 to +90 °C)			
Actuator data	▶ T 8313			▶ T 8317			

**Table 2.2: Materials**

Actuator	Type 3372		Type 3371	
Actuator area	120 cm <sup>2</sup>	350 cm <sup>2</sup>	120 cm <sup>2</sup>	350 cm <sup>2</sup>
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				
Integrated version	POM-GF	-	-	-
Type 3725	Polyphthalamide (PPA)		-	
Yoke				
Stem	9SMn28K	1.0715+C	9SMn28K	1.0715+C
Bracket	1.4301	-	1.4301	-
Mounting bracket for Type 3725	Aluminum		-	

**Table 2.3: Permissible differential pressures for metal-seated plug · · Fail-close**

Actuator area		cm <sup>2</sup>	120	350	
Bench range	psi		30 to 48	30 to 39	32 to 55
	bar		2.1 to 3.3	2.1 to 2.7	2.2 to 3.8
Valve travel	mm		15	15	30
Supply pressure	psi		55 to 90	62 to 90	
	bar		3.7 to 6.0	4.3 to 6.0	
C <sub>V</sub>	K <sub>VS</sub>		Δp when p <sub>2</sub> = 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) <sup>1)</sup>	490 (34)	-
120	100		43 (3) <sup>1)</sup>	145 (10)	-
190	160		-	-	145 (10)

<sup>1)</sup> Mounting without crossbeam on actuator (form C attachment), see ▶ EB 8313-3 and ▶ EB 8317

**Table 2.4:** Permissible differential pressures for metal-seated plug · Fail-open

Actuator area		cm <sup>2</sup>	120			350			
Bench range	psi		6 to 20			22 to 30	22 to 39	22 to 30	22 to 39
	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
Valve travel	mm		15			15	30	15	30
Supply pressure	psi	36	50	64	60		90		
	bar	2.5	3.5	4.4	4.0		6.0		
$C_v$	$K_{VS}$	$\Delta p$ when $p_2 = 0$ psi (bar)							
0.3 to 5	0.25 to 4.0	695 (48)	695 (48)	695 (48)	–	–	–	–	
7.5 to 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) <sup>1)</sup>	130 (9) <sup>1)</sup>	220 (15) <sup>1)</sup>	390 (27)	–	580 (40)	–	
120	100	–	45 (3) <sup>1)</sup>	65 (4.5) <sup>1)</sup>	140 (9.5)	–	320 (22)	–	
190	160	–	–	–	–	140 (9.5)	–	320 (22)	

<sup>1)</sup> Mounting without crossbeam on actuator (form C attachment), see ► EB 8313-3 and ► EB 8317

**Table 2.5:** Permissible differential pressures for soft-seated plug · Fail-close

Actuator area		cm <sup>2</sup>	120		350		
Bench range	psi		30 to 48		30 to 39		32 to 55
	bar		2.1 to 3.3		2.1 to 2.7		2.2 to 3.8
Valve travel	mm		15		15		30
Supply pressure	psi		55 to 90		62 to 90		
	bar		3.7 to 6.0		4.3 to 6.0		
$C_v$	$K_{VS}$	$\Delta p$ when $p_2 = 0$ psi (bar)					
0.3 to 5	0.25 to 4.0	695 (48)		–		–	
7.5 to 12	6.3 · 10	580 (40)		–		–	
20	16	390 (27)		–		–	
30	25	275 (19)		–		–	
40	35	175 (11)		–		–	
47	40	145 (10) <sup>1)</sup>		520 (36)		–	
120	100	45 (3) <sup>1)</sup>		145 (10)		–	

<sup>1)</sup> Mounting without crossbeam on actuator (form C attachment), see ► EB 8313-3 and ► EB 8317

**Table 2.6:** Permissible differential pressures for soft-seated plug · Fail-open

Actuator area		cm <sup>2</sup>	120			350			
Bench range	psi		6 to 20			22 to 30	22 to 39	22 to 30	22 to 39
	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
Valve travel	mm		15			15	30	15	30
Supply pressure	psi	36	50	64	60		90		
	bar	2.5	3.5	4.4	4.0		6.0		
$C_v$	$K_{VS}$	$\Delta p$ when $p_2 = 0$ psi (bar)							
0.3 to 5	0.25 to 4.0	695 (48)	695 (48)	695 (48)	–	–	–	–	
7.5 to 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) <sup>1)</sup>	145 (10) <sup>1)</sup>	220 (15) <sup>1)</sup>	420 (29)	–	580 (40)	–	
120	100	–	45 (3) <sup>1)</sup>	80 (5.5) <sup>1)</sup>	145 (10)	–	335 (23)	–	

<sup>1)</sup> Mounting without crossbeam on actuator (form C attachment), see ► EB 8313-3 and ► EB 8317

**Table 3:** Electric actuators

**Table 3.1:** Permissible differential pressures for metal-seated plug · All pressures in psi (bar)

Globe valve		Type	3321-E1	3321-E3		
With actuator		Type	5824-30	3374-10/-11	3374-21/-31	3374-10/-11
Positioning force			0.7 kN	1.25 kN	2.0 kN	2.5 kN
$C_v$	$K_{vs}$	$\Delta p$ when $p_2 = 0$ psi (bar)				
0.3 to 5	0.25 to 4.0	695 (48)	695 (48)	695 (48)	695 (48)	695 (48)
7.5 · 12	6.3 · 10	130 (9)	261 (18)	464 (32)	580 (40)	580 (40)
20	16	65 (4.5)	130 (9)	250 (17)	360 (25)	360 (25)
30	25	43 (3)	87 (6)	175 (12)	250 (17)	250 (17)
40	35	21 (1.5)	43 (3)	101 (7)	145 (10)	145 (10)
47	40	–	43 (3)	108 (7.5)	145 (10)	145 (10)
120	100	–	–	29 (2)	43 (3)	43 (3)
190 <sup>1)</sup>	160 <sup>1)</sup>	–	–	–	43 (3) <sup>2)</sup>	43 (3) <sup>2)</sup>
Actuator data		See Data Sheet	▶ T 5824	▶ T 8331		

<sup>1)</sup> With 30 mm travel

<sup>2)</sup> Only with Type 3374-10

**Table 3.2:** Permissible differential pressures for soft-seated plug · All pressures in psi (bar)

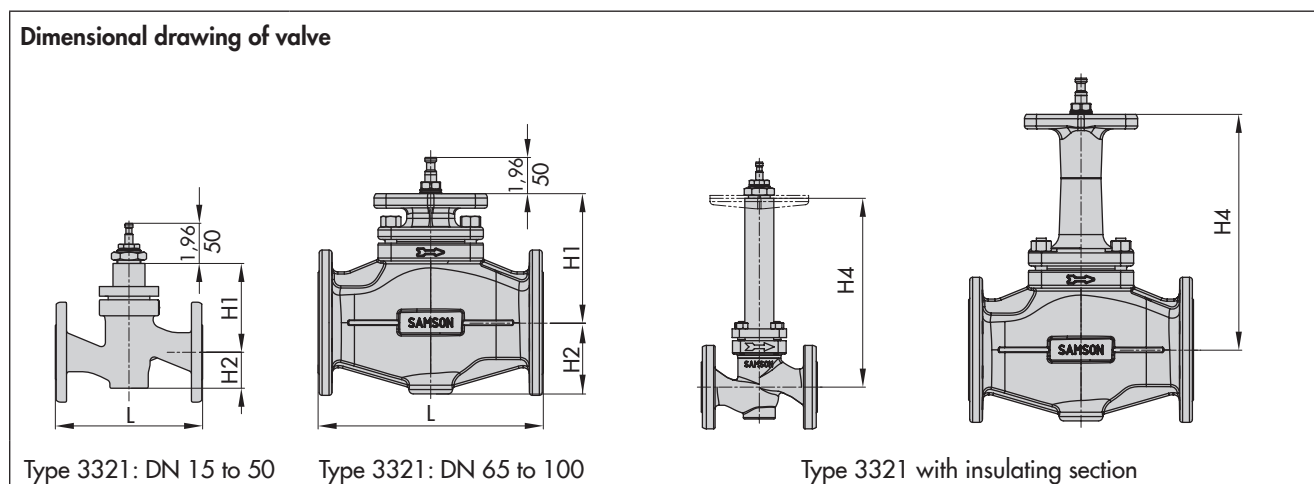
Globe valve		Type	3321-E1	3321-E3		
With actuator		Type	5824-30	3374-10/-11	3374-21/-31	3374-10/-11
Positioning force			0.7 kN	1.25 kN	2.0 kN	2.5 kN
$C_v$	$K_{vs}$	$\Delta p$ when $p_2 = 0$ psi (bar)				
0.3 to 5	0.25 to 4.0	695 (48)	695 (48)	695 (48)	695 (48)	695 (48)
7.5 · 12	6.3 · 10	175 (12)	304 (21)	464 (32)	580 (40)	580 (40)
20	16	94 (6.5)	175 (12)	250 (17)	390 (27)	390 (27)
30	25	65 (4.5)	116 (8)	175 (12)	275 (19)	275 (19)
40	35	43 (3)	72 (5)	101 (7)	175 (12)	175 (12)
47	40	–	72 (5)	130 (9)	145 (10)	145 (10)
120	100	–	–	43 (3)	58 (4)	58 (4)
Actuator data		See Data Sheet	▶ T 5824	▶ T 8331		

**Table 4:** Type of attachment and required adapter

Type 3321 Valve			NPS ½ to 2	NPS 2½ to 4
Type 3372 Actuator with connector (Fig. 1)	Version:	IP	Mounting with crossbeam (form B)	–
Type 3372 Actuator with Type 3725 Positioner (Fig. 3, Fig. 4)		IP	Mounting with crossbeam (form B)	Mounting without crossbeam (form C)
Type 5824-30 Actuator (Fig. 5)		E1	With adapter (1400-7414)	–
Type 3374-11/-21/-31 Actuator (Fig. 6)		E3	Mounting with crossbeam (form B)	With adapter (1400-9515)
Type 3374-10 Actuator		E3	–	With adapter (1400-9515)
Type 3371 Actuator (Fig. 2)		PP	Mounting with crossbeam (form B)	Mounting without crossbeam (form C)

**Table 5: Dimensions and weights for Type 3321 Valve**

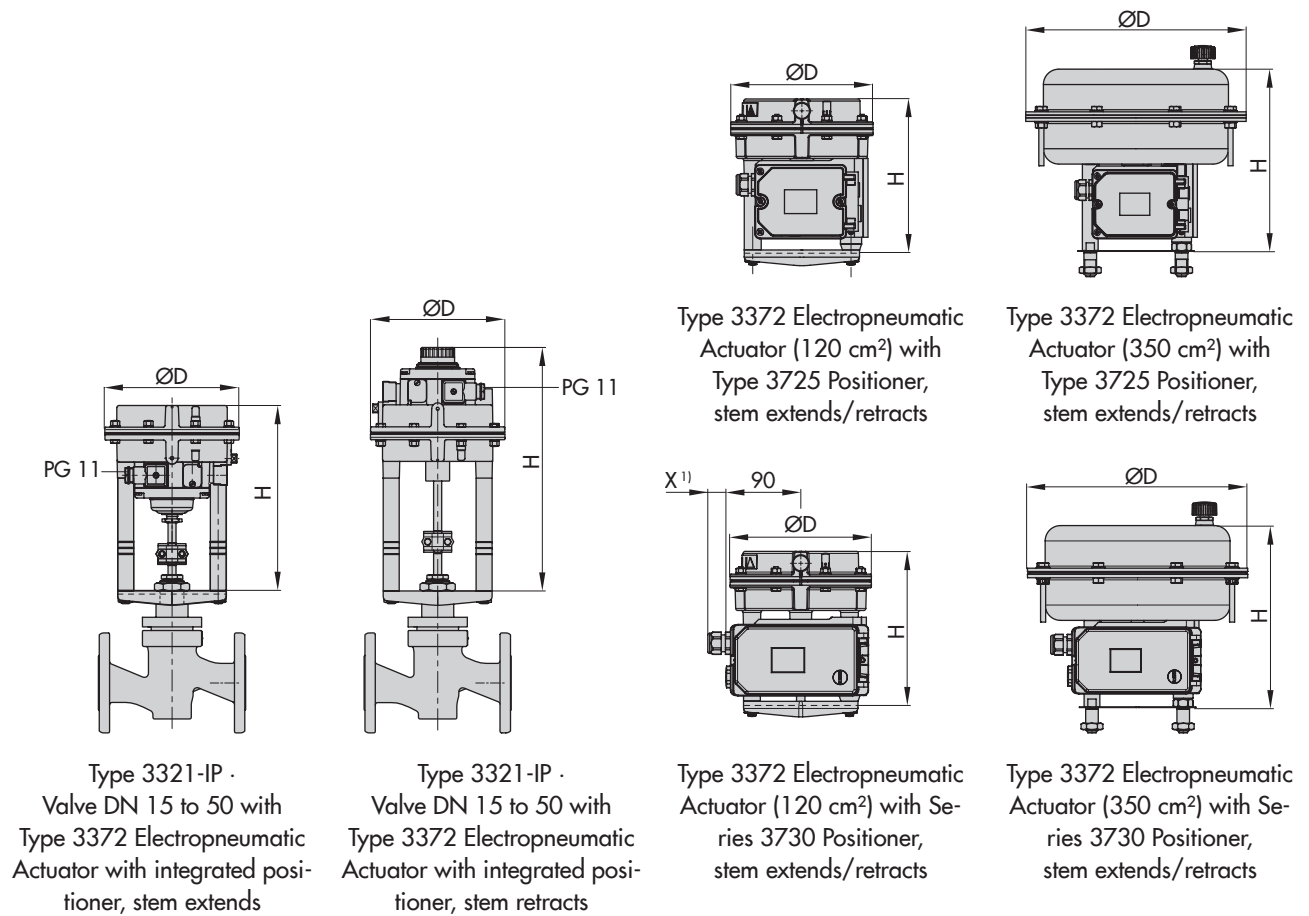
Valve size	NPS	½	¾	1	1½	2	2½	3	4
	DN	15	20	25	40	50	65	80	100
L Class 150	in	7.25	7.25	7.25	8.75	10.0	10.87	11.75	13.87
	mm	184	184	184	222	254	276	298	352
L Class 300	in	7.50	7.62	7.75	9.25	10.50	11.50	12.50	14.50
	mm	191	194	197	235	267	292	318	368
H1	in	4.3	4.3	4.3	4.5	4.5	7.0	7.0	7.9
	mm	110	110	110	115	115	178	178	201
H2	in	1.6	1.6	1.6	2.8	2.8	3.9	3.9	4.4
	mm	40	40	40	72	72	98	98	113
H4 (with insulating section)	in	10.3	10.3	10.3	10.4	10.4	12.8	12.8	12.8
	mm	261	261	261	265	265	325	325	325
Weight	lbs	14	16	18	27	36	58	71	97
	kg	6	7	8	12	16	26	32	44
Weight (with insulating section)	lbs	19.8	22.1	24.3	39.7	48.5	75	88.2	136.7
	kg	9	10	11	18	22	34	40	62



**Table 6: Dimensions and weights for Type 3372 Electropneumatic Actuator**

Positioner		Integrated		Type 3725	
Actuator area	cm <sup>2</sup>	120	120	120	350
Fail-safe position <sup>1)</sup>		Stem extends	Stem retracts	Stem extends/retracts	
Height H	in	9.3	12.2	7.2	9.1
	mm	236	309	182	231
ØD	in	6.6	6.6	6.6	11.0
	mm	168	168	168	280
Weight (without positioner)	lbs	8.2	8.2	7.3	33.1
	kg	3.7	3.7	3.3	15

**Dimension diagrams for electropneumatic control valves**



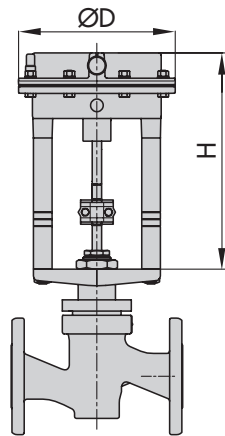
<sup>1)</sup> The dimension X depends on the cable gland used.



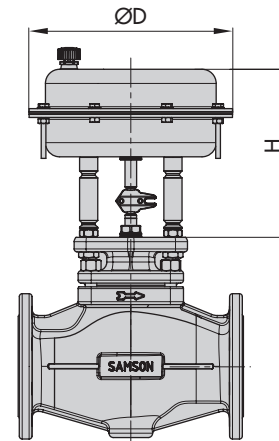
**Table 7: Dimensions and weights for Type 3371 Pneumatic Actuator**

Actuator area	cm <sup>2</sup>	120	350
Fail-safe position		Stem extends/retracts	Stem extends/retracts
Height H	in	7.2	9.1
	mm	182	231
ØD	in	6.6	11.0
	mm	168	280
Weight	lbs	7.3	33.1
	kg	3.3	15

**Dimension diagrams for pneumatic control valves**



Type 3321-PP ·  
Valve DN 15 to 50 with Type 3371 Pneumatic Actuator  
(120 cm<sup>2</sup>), stem extends/retracts

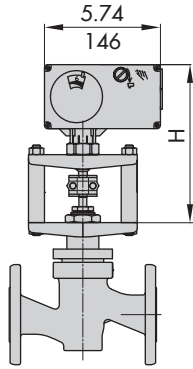


Type 3321-PP ·  
Valve DN 65 to 100 with Type 3371 Pneumatic Actuator  
(350 cm<sup>2</sup>), stem extends/retracts

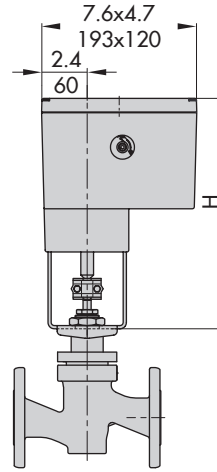
**Table 8:** Dimensions and weights for Type 5824 and Type 3374 Electric Actuators

Type		5824	3374
Height H	in	8.0	11.6
	mm	203	294
Weight (max.)	lbs	2.8	8.8
	kg	1.25	4

**Dimension diagrams for electric control valves**



Type 3321-E1  
Valve with Type 5824 Electric Actuator



Type 3321-E3  
Valve with Type 3374 Electric Actuator

## Ordering text

The following specifications are required on ordering:

### Type 3321 Globe Valve

Valve size	NPS ...
Flow coefficients	$C_V$ ... or $K_{VS}$ ...
Pressure rating	Class 150 or 300
Body material	Cast iron, cast steel or stainless steel
Seat-plug seal	– Metal seal – Soft seal
Options	– Flow divider ST 1 – Insulating section

### Actuators

for **Type 3321-IP**: Type 3372 Electropneumatic Actuator

120 cm<sup>2</sup> actuator area:

- with integrated positioner, 4 to 20 mA
- with Type 3725 or Series 3730 Positioner

350 cm<sup>2</sup> actuator area:

- with Type 3725 or Series 3730 Positioner

Optional Intrinsicly safe Ex ia

Additional equipment 1 or 2 limit switches

for **Type 3321-PP**: Type 3371 Pneumatic Actuator

Fail-safe position	Fail-close or fail-open
Bench range	Fail-close: 30 to 48 psi (1.4 to 2.3 bar) Fail-open: 6 to 20 psi (0.4 to 1.4 bar)

Additional equipment 1 or 2 limit switches

For **Type 3321-E1**: Type 5824-30 Electric Actuator

Supply voltage	– 230 V/50 Hz – 24 V/50 Hz
Additional equipment	– Limit contact 2 – Resistance transmitter 0 to 1000 $\Omega$ – Digital positioner: <ul style="list-style-type: none"><li>– Input: 0/4 to 20 mA or 0/2 to 10 V</li><li>– Output: 0/2 to 10 V</li></ul>

For **Type 3321-E3**: Type 3374 Electric Actuator

Fail-safe action	With fail-safe action: Actuator stem extends or retracts
Thrust	
With fail-safe action	2 kN (actuator stem extends) 500 N (actuator stem retracts)
Without fail-safe action	1.25 kN; 2.5 kN
Supply voltage	– 230 V/50 Hz – 230 V/60 Hz – 24 V/50 Hz – 24 V/60 Hz
Additional equipment	– Limit contact 2 – Resistance transmitter 0 to 1000 $\Omega$ – Digital positioner with input and output 0/4 to 20 mA or 0/2 to 10 V

