Series V2001 Valves

Type 3321 Globe Valve with pneumatic or electric actuator

ANSI version

Application

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

Valve sizes	**NPS ½ to 4**
Pressure rating	**Class 150 and 300**
Temperature range	**14 to 572 °F (–10 to 300 °C)**

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

- Electropneumatic actuators with integrated electropneumatic positioner for Type 3321-IP
- Pneumatic actuators for Type 3321-PP
- Electric actuators for Type 3321-E1 or Type 3321-E3

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 plug

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

Versions

Type 3321-IP Electropneumatic Globe Valve
with Type 3372 Electropneumatic Actuator, optionally with integrated positioner (120 cm² only, with plug connector, see Fig. 1) or Type 3725 Positioner (Fig. 3 and Fig. 4), tight-closing function for completely venting or filling the actuator with air, reference variable 4 to 20 mA, max. 90 psi (6 bar) supply air, fail-close or fail-open, optionally with limit switch

Type 3321-PP Pneumatic Globe Valve (Fig. 2) with Type 3371 Pneumatic Actuator with 120 cm² (up to NPS 2) or Type 3371 with 350 cm² (NPS 2½ and larger), fail-close or fail-open, optionally with limit switch

Type 3321-E1 Electric Globe Valve (Fig. 5) in NPS ½ to 2 with Type 5824-30 Electric Actuator for 230 V/50 Hz or 24 V/50 Hz, optionally with limit switch, resistance transmitters, positioner

Type 3321-E3 Electric Globe Valve (Fig. 6) with Type 3374 Electric Actuator for 230 V or 24 V/50 Hz, 110 V/60 Hz, optionally with fail-safe action (typetested), limit contacts, resistance transmitters, positioner

Fig. 1: *Type 3321-IP*

Fig. 2: *Type 3321-PP*

Fig. 3: *Type 3321-IP up to NPS 2 with Type 3725 Positioner*

Fig. 4: *Type 3321-IP for NPS 2½ and larger with Type 3725 Positioner*

Fig. 5: *Type 3321-E1*

Fig. 6: *Type 3321-E3*

Edition February 2014

Data Sheet **T 8112 EN**

Further versions

- **Explosion-protected version** with electric actuators
- **Type 3321 according to DIN standards** · ▶ T 8111
- **Insulating section**
- **Flow divider St I** for noise reduction · On request

Principle of operation

The process medium flows through the valve in the direction indicated by the arrow (Fig. 8 and Fig. 9) in the flow-to-open direction. 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 position

Depending on how the springs are arranged in the electropneumatic or pneumatic actuator, the control valve has two different fail-safe positions that become effective when the supply air fails:

Actuator stem extends (FA)
The valve closes when the supply air fails.

Actuator stem retracts (FE)
The valve opens when the supply air fails.

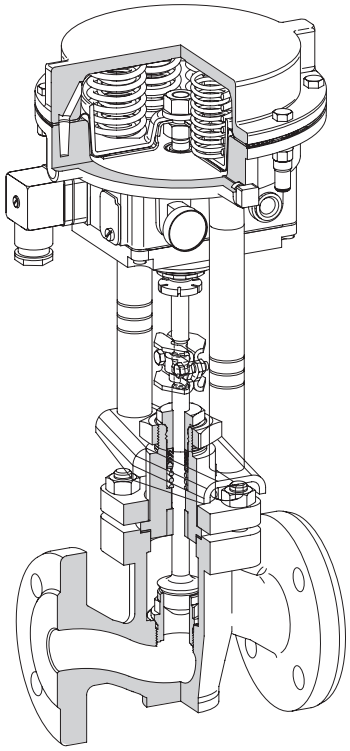


Fig. 7: *Type 3321-IP Globe Valve in valve sizes NPS ½ to 2, actuator with integrated electropneumatic positioner*

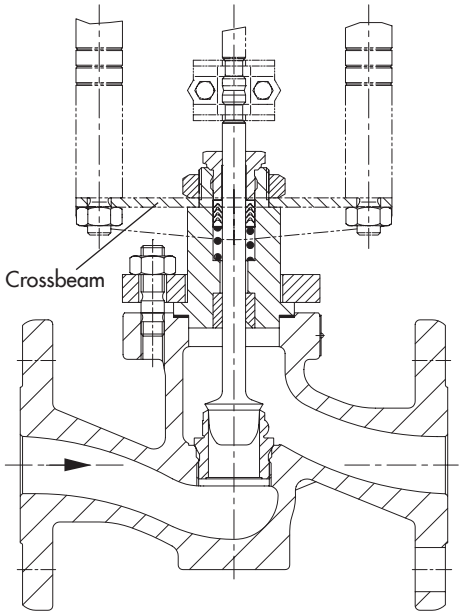


Fig. 8: *Type 3321 Globe Valve, NPS ½ to 2*

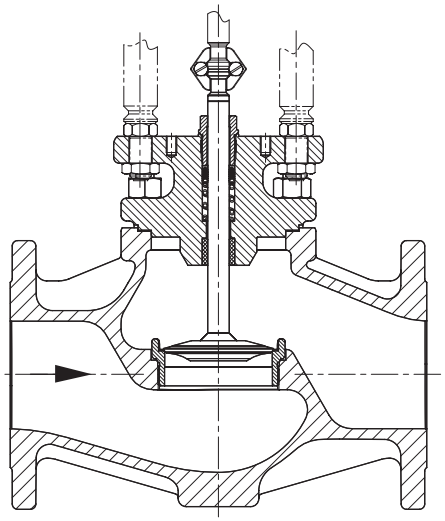


Fig. 9: *Type 3321 Globe Valve, NPS 2½ to 4*

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 Actuator for Type 3321-IP
- EB 5824 Actuator for Type 3321-E1
- EB 8331-1 Actuator for Type 3321-E3
- EB 8313-3 Actuator for Type 3321-IP
- EB 8317 Actuator for Type 3321-PP

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
Nominal pressure	Class 125	Class 150 to 300
Seat/plug sealing	Metal or soft-seated	
Characteristic	Equal percentage	
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 [1]	14 to 572 °F · (–10 to 300 °C)	
Leakage class according to ANSI/FCI 70-2	Metal-seated: IV Soft-seated: VI	

[1] Not for stainless steel in NPS 2½ to 4

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: 1.0460/A 105 NPS 2½ and larger: 1.0619/A216 WCC		Up to NPS 2: A182 F316 NPS 2½ and larger: CF8M
Valve flange [1]		1.0460/A 105		
Seat and plug	Seat	Up to seat diameter 12 mm: 1.4305 Seat diameter 24 mm and higher: 1.4104 NPS 2½ and higher: 1.4006		Up to NPS 2: 1.4305/1.4104 NPS 2½ and higher: in body
	Plug	Up to NPS 2: 1.4305 NPS 2½ and larger: 1.4404		
Seal ring for soft-seated plug		PTFE with glass fiber		
Guide bushing		1.4104		
Packing		V-ring packing: PTFE with carbon		
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)

Table 1.3: *Overview: Valve sizes, C_V and C_Vl coefficients (with flow divider St I) and seat diameters*

Valve size	**NPS**	½				¾		1		1½		2		2½		3		4	
	DN	15				20		25		40		50		65		80		100	
Flow coefficient	C_V	0.3	0.75	2	5	3	7.5	5	12	12	30	20	40	47	120	47	120	47	190
	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
With flow divider St I	C_Vl	–		1.7	4.2	2.6	7	4.2	10.5	10.5	26	17	36	42	105	42	105	42	170
	$K_{VS}l$	–		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
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 cm²	350 cm² (NPS 2½ and larger)	120 cm²	350 cm² (NPS 2½ and larger)
Fail-safe action		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 48 psi/15 mm (2.1 to 3.3 bar)	32 to 55 psi/30 mm (2.2 to 3.8 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)	6 to 20 psi/15 mm (0.4 to 1.4 bar)	22 to 39 psi/30 mm (1.5 to 2.7 bar)
Characteristic		Equal percentage		–	
Hysteresis		≤ 1 %		–	
Variable position		≤ 7 %		–	
Degree of protection		IP 54 with integrated positioner (only for 120 cm²) IP 66 with Type 3725		–	
Permissible ambient temperature		Standard: –4 to 176 °F (–20 to 80 °C) With metal screw fitting: –22 to 176 °F (–30 to 80 °C)		–31 to 194 °F (–35 to 90 °C)	

Table 2.2: *Materials*

Actuator	**Type 3372**		**Type 3371**	
Actuator area	120 cm²	350 cm²	120 cm²	350 cm²
Actuator casing	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				
Rod	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: Metal-seated plug · Fail-safe position: fail-close*

Actuator size	**cm²**	**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}	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)	490 (34)	–
120	100	43 (3)	145 (10)	–
190	160	–	–	145 (10)

Table 2.4: *Permissible differential pressures: Metal-seated plug · Fail-safe position: fail-open*

Actuator size	**cm²**	**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						
Supply pressure	psi	36	50	64	60		90	
	bar	2.5	3.5	4.4	4.0		6.0	
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 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) [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] Attachment without crossbeam on actuator (form C attachment). Refer to ▶ EB 8313-3 and ▶ EB 8317

Table 2.5: *Permissible differential pressures: Soft-seated plug · Fail-safe position: fail-close*

Actuator size	**cm²**	**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}	Δp 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) [1]	520 (36)	–
120	100	45 (3) [1]	145 (10)	–
190	160	–	–	145 (10)

[1] Attachment without crossbeam on actuator (form C attachment). Refer to ▶ EB 8313-3 and ▶ EB 8317

Table 2.6: *Permissible differential pressures: Soft-seated plug · Fail-safe position: fail-open*

Actuator size	**cm²**	**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}	Δp 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) [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	–	–	–	–	145 (10)	–	335 (23)

[1] Attachment without crossbeam on actuator (form C attachment). Refer to ▶ EB 8313-3 and ▶ EB 8317

Table 3: *Electric actuators*

Table 3.1: *Permissible differential pressures: 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
Thrust		0.7 kN	1.25 kN	2.0 kN	2.5 kN
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)	695 (48)
7.5 · 12	6.3 · 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]
Actuator data	Refer to data sheet	▶ T 5824	▶ T 8331		

[1] Only with 30 mm travel
[2] Only with Type 3374-10

Table 3.2: *Permissible differential pressures: 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
Thrust		0.7 kN	1.25 kN	2.0 kN	2.5 kN
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)	695 (48)
7.5 · 12	6.3 · 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]	–	–	–	58 (4) [2]
Actuator data	Refer to data sheet	▶ T 5824	▶ T 8331		

[1] Only with 30 mm travel
[2] Only with Type 3374-10

Table 4: *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	Attachment with crossbeam (form B)	–
Type 3372 Actuator with Type 3725 Positioner (Fig. 3 and Fig. 4)		IP	Attachment with crossbeam (form B)	Attachment without crossbeam (form C)
Type 5824-30 Actuator (Fig. 5)		E1	With adapter (1400-7414)	–
Type 3374-11/-21/-31 Actuator (Fig. 6)		E3	Attachment with crossbeam (form B)	With adapter (1400-9515)
Type 3374-10 Actuator		E3	–	With adapter (1400-9515)
Type 3371 Actuator (Fig. 2)		PP	Attachment with crossbeam (form B)	Attachment without crossbeam (form C)

Table 5: *Dimensions and weights · Type 3321 Globe Valve*

Table 5.1: *Valve with standard bonnet*

Valve size	NPS	½	¾	1	1½	2	2½	3	4
	DN	15	20	25	40	50	65	80	100
Face-to-face dimension L for Class 150	in	7.25			8.75	10.0	10.87	11.75	13.87
	mm	184			222	254	276	298	352
Face-to-face dimension L for 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	315	368
Height H	in	4.3			4.5		6.3		7.2
	mm	110			115		160		183
Weight, approx.	lb	14	16	18	27	36	58	71	97
	kg	6	7	8	12	16	26	32	44

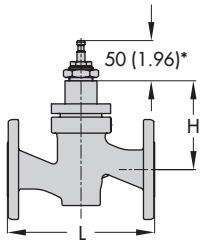
Table 5.2: *Valve with insulating section*

Valve size	NPS	½	¾	1	1½	2	2½	3	4
	DN	15	20	25	40	50	65	80	100
Face-to-face dimension L for 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
Face-to-face dimension L for 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	315	368
Height H	in	14.5			14.7		16.8		17.1
	mm	396			374		427		434
Weight, approx.	lb	19.8	22.1	24.3	39.7	48.5	75	88.2	136.7
	kg	9	10	11	18	22	34	40	62

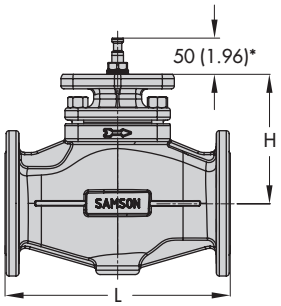
Table 5.3: *Weight of Type 3371, Type 3372, Type 5824 and Type 3374 Actuators*

Actuator type		Pneumatic		Electropneumatic			Electric	
Type		3371/120	3371/350	3372/120	3372/120	3372/350	E1/5824	E3/3374
Positioner		–		Integrated	Type 3725		Optional, integrated	
Weight, approx.	lb	8.8	28.7	13.3	15.4	35.3	2.8	8.8
	kg	4	13	6	7	16	1.25	Max. 4

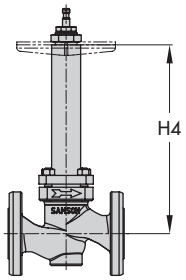
Dimensional drawings for Type 3321 Valve

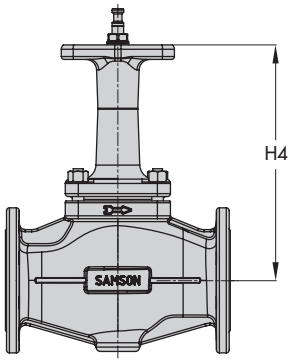


NPS ½ to 2



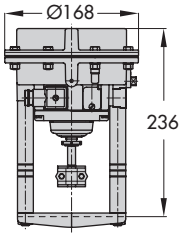
NPS 2½ to 4



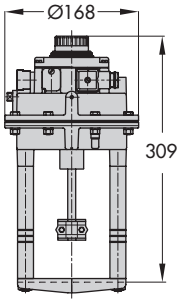


Valve with insulating section

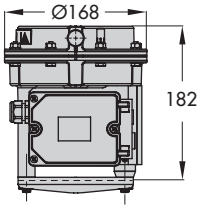
Dimensional drawings for actuators



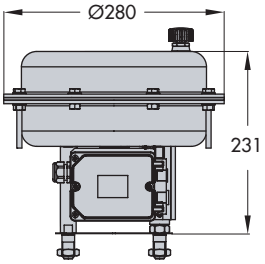
Type 3372/120 cm²
integrated, fail-close



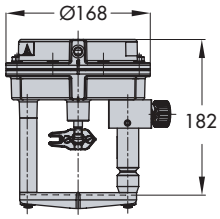
Type 3372/120 cm²
integrated, fail-open



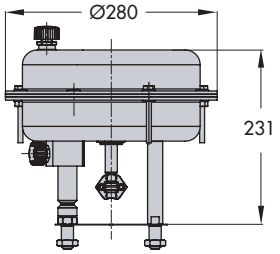
Type 3372/120 cm²
with Type 3725
fail-close and fail-open



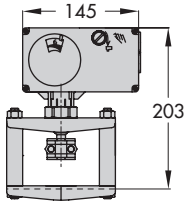
Type 3372/350 cm²
with Type 3725
fail-close and fail-open



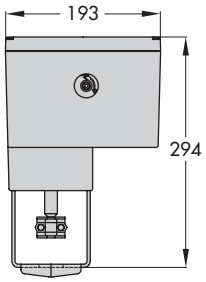
Type 3371/120 cm²



Type 3371/350 cm²



Actuator E1
Types 5824 and 5825



Actuator E3
Type 3374

Ordering text

The following specifications are required on ordering:

Type 3321 Globe Valve	
Valve size	NPS …
Flow coefficient	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
Optional	– Flow divider St I – Insulating section
Actuators	
for **Type 3321-IP:** Type 3372 Electropneumatic Actuator	
120 cm² effective area with integrated positioner, 4 to 20 mA	
350 cm² effective area with Type 3725 or Type 3730-x Positioner, 4 to 20 mA	
Optional	Intrinsically safe ⟨Ex⟩ 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	
Power supply	– 230 V/50 Hz – 24 V/50 Hz
Additional equipment	– 2 limit contacts – Resistance transmitter 0 to 1000 Ω – Positioner input 0/4 to 20 mA or 0/2 to 10 V
for **Type 3321-E3:** Type 3374 Electric Actuator	
Fail-safe position	Fail-close or fail-open
Thrust	
with fail-safe action	2 kN
without fail-safe action	1.25 kN, 2.5 kN
Power supply	– 230 V/50 Hz – 24 V/50 Hz – 110 V/60 Hz
Additional equipment	– 2 limit contacts – Resistance transmitter 0 to 1000 Ω – Digital positioner input and output 0/4 to 20 mA or 0/2 to 10 V

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
samson@samson.de · www.samson.de

T 8112 EN

2015-04-17 · English