

## T 8114 EN

### Series V2001 Valves · Type 3323 Three-way Valve

With electropneumatic, pneumatic or electric actuator

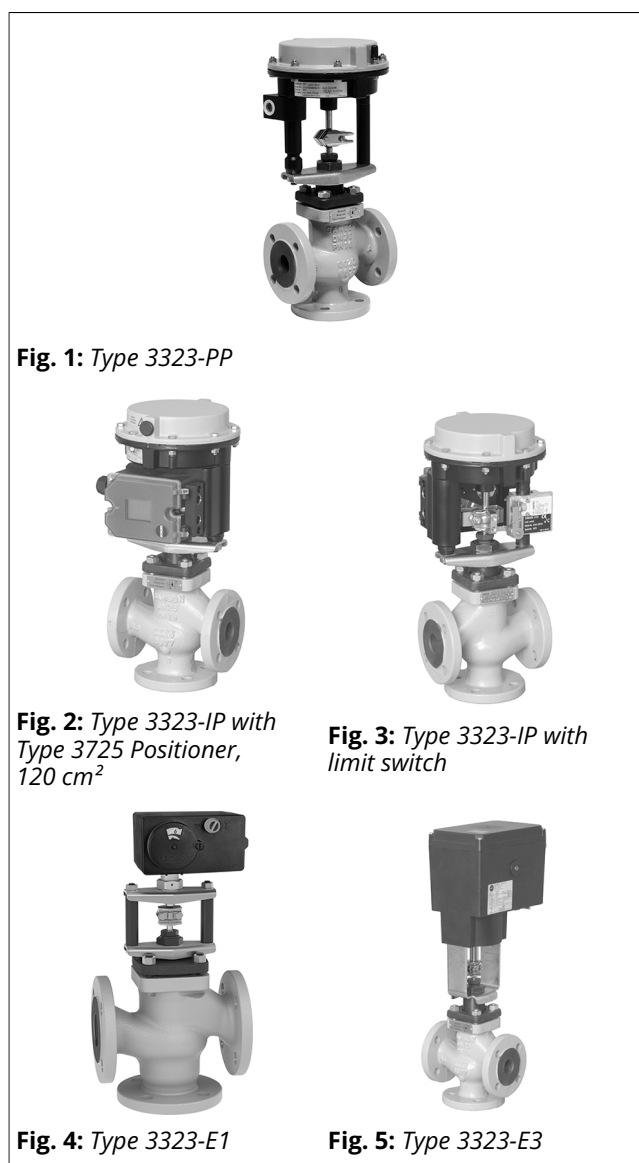
ANSI version



#### Application

Mixing and diverting valve designed for use in industrial plants

<b>Nominal size</b>	<b>NPS ½ to 4</b>
<b>Pressure rating</b>	<b>Class 150 and 300</b>
<b>Temperatures</b>	<b>14 to 572 °F (-10 to +300 °C)</b>



**Fig. 1:** Type 3323-PP

**Fig. 2:** Type 3323-IP with Type 3725 Positioner, 120 cm<sup>2</sup>

**Fig. 3:** Type 3323-IP with limit switch

**Fig. 4:** Type 3323-E1

**Fig. 5:** Type 3323-E3

#### Special features

The Type 3323 Three-way Valve (mixing or diverting valve) can be combined with either electric or pneumatic actuators:

- Electropneumatic actuators for Type 3323-IP
- Pneumatic actuators for Type 3323-PP
- Electric actuators for Type 3323-E1 or Type 3323-E3

Valve body made of

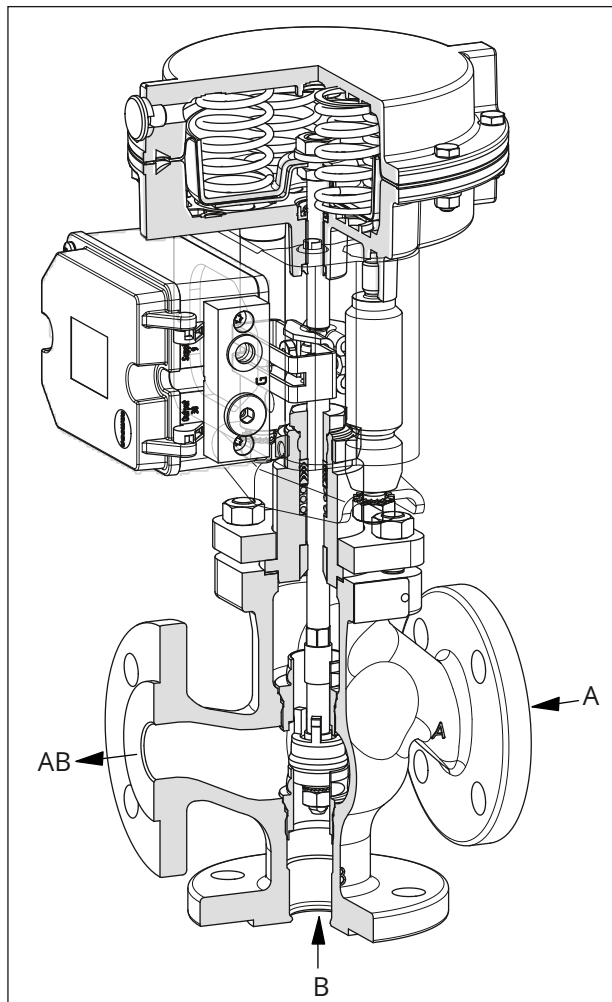
- Cast iron for Class 150
- Spheroidal graphite iron for Class 150
- Cast steel for Class 300 (up to NPS 2) as well as for Class 150 and 300 (NPS 2½ and larger)
- Stainless steel for Class 300 (up to NPS 2) as well as for Class 150 (NPS 2½ and larger)

Metal-seated valve plug

Mixing valves in NPS ½ to 1 can also be used for diverting service.

## Versions

- **Type 3323-IP** Electropneumatic Valve (mixing or diverting valve) for Heat Transfer Oil (Fig. 2)
  - With Type 3372 Pneumatic Actuator, with Type 3725 Positioner
  - Tight-closing function for completely venting or filling the actuator with air
  - 4 to 20 mA set point
  - Max. 90 psi (6 bar) supply air
  - Fail-safe position actuator stem extends or retracts
  - Optionally with Type 4744-2 Limit Switch (Fig. 3) and Series 3730 Positioner
- **Type 3323-PP Pneumatic Valve (mixing or diverting valve)** (Fig. 1)
  - With Type 3371 Pneumatic Actuator, 120 cm<sup>2</sup> (NPS ½ to 4, 15 mm travel) or Type 3371 Pneumatic Actuator, 350 cm<sup>2</sup> (NPS 2½ to 4), fail-safe position actuator stem extends or retracts, optionally with Type 4744-20 Limit Switch
- **Type 3323-E1 Electric Valve (mixing or diverting valve)** (Fig. 4)
  - With Type 5827-N3 Electric Actuator for 230 V/50 Hz or 24 V/50 Hz, optionally with limit contacts, resistance transmitter, positioner
- **Type 3323-E3 Electric Valve (mixing and diverting 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



**Fig. 6:** Type 3323-IP Electropneumatic Valve (mixing valve) in DN 15 to 50/NPS ½ to 2

## Further versions

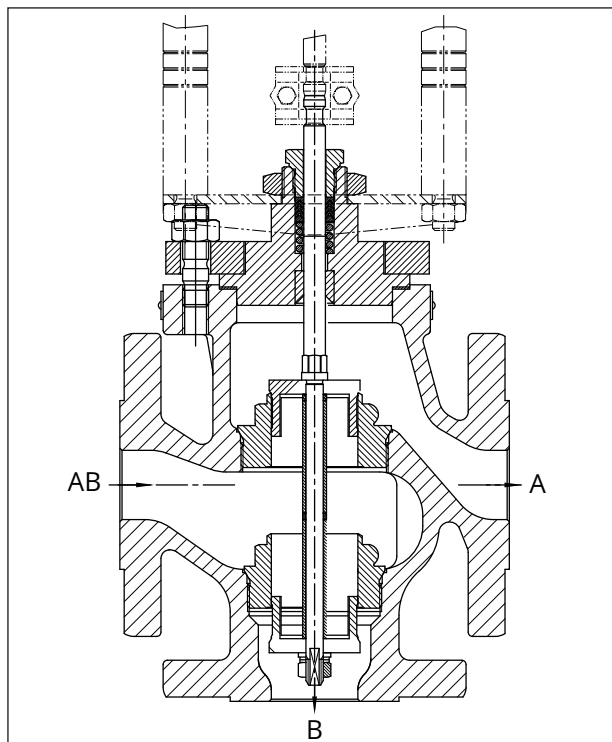
- **Explosion-protected version** with electric actuators · On request
- **DIN version of Type 3323** · See Data Sheet  
▶ T 8113

## Principle of operation

Depending on the version, the three-way valve can be used either as a mixing or diverting valve.

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** (see Fig. 6). 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** (see Fig. 7).



**Fig. 7:** Type 3323-IP (diverting valve) in DN 32 to 50/NPS 1½ to 2

## Fail-safe positions

The control 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.

Port **B** of diverting valves in DN 15 to 25 (NPS ½ to 1) is closed since these valves have the same construction as mixing valves.

– **Actuator stem retracts:**

Port **A** in mixing valves is closed and port **B** in diverting valves is closed when the supply air fails.

Port **A** of diverting valves in DN 15 to 25 (NPS ½ to 1) is closed since these valves have the same construction as mixing valves.

## 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 8113/8114 Type 3323 Three-way Valve
- ▶ EB 8313-3 Actuator for Type 3323-IP
- ▶ EB 5827-1 Actuator for Type 3323-E1
- ▶ EB 5827-2 Actuator for Type 3323-E1
- ▶ EB 8331-3 Actuator for Type 3323-E3
- ▶ EB 8331-4 Actuator for Type 3323-E3
- ▶ EB 8317 Actuator for Type 3323-PP

**Table 1: Technical data for Type 3323 · ANSI version**

Material		Cast steel A216 WCC	Cast stainless steel A351 CF8M
Nominal size	NPS	½ · ¾ · 1 · 1½ · 2 · 2½ · 3 · 4	
Pressure rating	Class	Up to NPS 2: Class 300 NPS 2½ and larger: Class 150 and 300	Up to NPS 2: Class 300 NPS 2½ and larger: Class 150
Type of end connections	Flanges	Raised face (RF) · Ra = 3.2 to 6.3 µm	
Seat-plug seal		Metal seal	
Characteristic		Linear	
Rangeability		30:1 up to NPS 1 · 50:1 for NPS 1½ and larger	
Conformity		CE	
Temperature range		14 to 430 °F (-10 to +220 °C)	
	With insulating section	14 to 572 °F <sup>1)</sup> (-10 to +300 °C)	
Leakage class according to ANSI FCI 70-2		Metal seal: I (0.05 % of C <sub>v</sub> )	

<sup>1)</sup> Version for lower temperatures on request

**Table 2: Materials for Type 3323 · ANSI version**

Valve body	Cast steel A216 WCC	Cast stainless steel A351 CF8M
Valve bonnet	Up to NPS 2: A105 NPS 2½ and larger: A216 WCC	Up to NPS 2: A182 F316 NPS 2½ and larger: CF8M
Valve flange <sup>1)</sup>	A105	
Seat	NPS ½ to 1: A582 430F <sup>2)</sup> NPS 1½ to 2: A582 430F NPS 2½ and larger: A276 410T	NPS ½ to 1: A582 430F <sup>2)</sup> NPS 1½ and larger: A479 316/A479 316L
Plug	Up to NPS 2: 1.4305 NPS 2½ and larger: A276 410T	A479 316L
Guide bushing	A582 430F	
Packing	PTFE	
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-pieced (see valve bonnet for material)

<sup>2)</sup> Top seat made of 1.4305

## Flow coefficients and seat diameters

**Table 3: Type 3323 (as mixing valve)**

Nominal size	DN	15	20	25	40	50	65	80	100
	NPS	½	¾	1	1½	2	2½	3	4
Flow rate	K <sub>vs</sub>	4	6.3	8	20	32	60	80	160
	C <sub>v</sub>	5	7.5	9.4	23	37	70	95	190
Seat Ø	mm	24	24	24	40	40	63	75	100
	in	0.945	0.945	0.945	1.57	1.57	2.5	2.95	3.94
Rated travel	mm	15	15	15	15	15	15	15	30
	in	0.59	0.59	0.59	0.59	0.59	0.59	0.59	1.2

**Table 4: Type 3323 (as diverting valve)**

Nominal size	DN	15	20	25	40	50	65	80	100
	NPS	½	¾	1	1½	2	2½	3	4
Flow rate	K <sub>vs</sub>	-	-	-	20	32	60/40	80/60	160/100
	C <sub>v</sub>	-	-	-	23	37	70/47	95/70	190/120
Seat Ø	mm	-	-	-	40	40	63/48	75/63	100/80
	in	-	-	-	1.57	1.57	2.5/1.9	2.95/2.5	3.94/3.15

Nominal size	DN	15	20	25	40	50	65	80	100
	NPS	½	¾	1	1½	2	2½	3	4
Rated travel	mm	-	-	-	15	15	15	15	30
	in	-	-	-	0.59	0.59	0.59	0.59	1.2

## Pneumatic actuators with Type 3323

**Table 5:** Technical data for pneumatic actuators

Valve/actuator		Type 3323-IP with Type 3372 Actuator		Type 3323-PP with Type 3371 Actuator	
Actuator area		120 cm <sup>2</sup>		350 cm <sup>2</sup>	
Mounting on Type 3323	DN	15 to 50		65 to 100	
	NPS	NPS ½ to 2		NPS 2½ to 4	
Fail-safe action		Actuator stem extends (FA) or actuator stem retracts (FE)			
Set point		4 to 20 mA		-	
Bench range/ rated travel	Stem extends (FA)	1.4 to 2.3 bar/15 mm 20 to 35 psi/15 mm	2.2 to 3.8 bar/30 mm 32 to 55 psi/30 mm	1.4 to 2.3 bar/15 mm 20 to 35 psi/15 mm	2.2 to 3.8 bar/30 mm 32 to 55 psi/30 mm
	Stem retracts (FE)	1.4 to 2.3 bar/15 mm 20 to 35 psi/15 mm	1.5 to 2.7 bar/30 mm 22 to 39 psi/30 mm	1.4 to 2.3 bar/15 mm 20 to 35 psi/15 mm	1.5 to 2.7 bar/30 mm 22 to 39 psi/30 mm
Characteristic		Linear, deviation from terminal-based linearity ≤2 %		-	
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		

**Table 6:** Materials for pneumatic actuators

Actuator	Type 3372		Type 3371	
	Actuator area	120 cm <sup>2</sup>	350 cm <sup>2</sup>	120 cm <sup>2</sup>
Actuator housing	GD-AISI12	1.0330	GD-AISI12	1.0330
Diaphragm	NBR		NBR	
Actuator stem	1.4305	1.4571	1.4571	1.4571
<b>Positioner housing</b>				
Type 3725	Polyphthalamide (PPA)		-	-
<b>Yoke</b>				
Stem	9SMn28K	1.0715+C	9SMn28K	1.0715+C
Crossbeam	1.4301	-	1.4301	-
Mounting bracket for Type 3725	Aluminum		-	-

**Table 7: Permissible differential pressures for metal-seated plug**

Fail-safe action		Actuator stem extends		Actuator stem retracts	
Actuator area		120 cm <sup>2</sup>	350 cm <sup>2</sup>	120 cm <sup>2</sup>	350 cm <sup>2</sup>
Bench range Travel (in parentheses)		20 to 35 psi 1.4 to 2.3 bar	32 to 55 psi 2.2 to 3.8 bar (30 mm) 30 to 39 psi 2.1 to 2.7 bar (15 mm)	20 to 35 psi 1.4 to 2.3 bar	22 to 39 psi 1.5 to 2.7 bar (30 mm) 22 to 30 psi 1.5 to 2.1 bar (15 mm)
C <sub>v</sub> coefficients	K <sub>vs</sub> coefficients	Δp when p <sub>2</sub> = 0 psi (bar)		Δp when p <sub>2</sub> = 0 psi (bar)	
5 to 9.4	4.0 to 8	230 (16)	-	230 (16)	-
20 to 37	16 to 32	145 (10)	-	145 (10)	-
70	60	-	145 (10)	-	145 (10)
94	80	-	145 (10)	-	145 (10)
190	160	-	145 (10)	-	145 (10)

## Electric actuators with Type 3323

**Table 8: Permissible differential pressures for metal-seated plug**

Three-way valve		Type 3323-E1	Type 3323-E3		
Type ... Actuator		5827-N3	3374-21/-31		3374-10/-11
Thrust (actuator stem retracts)		0.7 kN	0.5 kN		2.5 kN
Thrust (actuator stem extends)		0.7 kN	2.0 kN		2.5 kN
C <sub>v</sub> coefficients	K <sub>vs</sub> coefficients	Δp when p <sub>2</sub> = 0 psi (bar)			Δp when p <sub>2</sub> = 0 psi (bar)
5 to 9.4	4.0 to 8	145 (10)	72 (5)	260 (18) <sup>1)</sup>	360 (25)
20 to 37	16 to 32	43 (3)	17 (1.2)	87 (6) <sup>1)</sup>	145 (10)
70	60	-	-	29 (2) <sup>1)</sup>	80 (5.5)
94	80	-	-		46 (3.2)
190	160	-	-		27 (1.9)
See data sheet for actuator data		▶ T 5827	▶ T 8331		

<sup>1)</sup> Applies to diverting valves (identical outlet pressure at port A and port B) and mixing valves (identical inlet pressure at port A and port B)

## Mounting actuators

**Table 9: Type of mounting and required adapter**

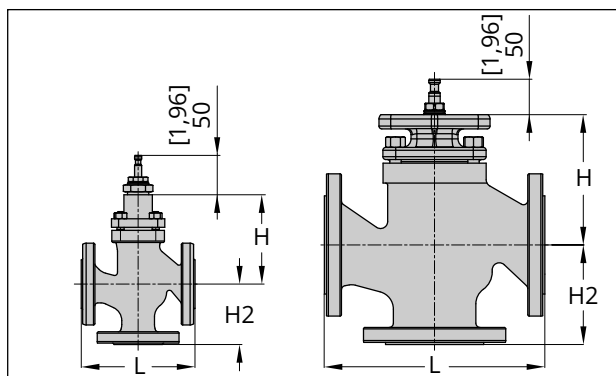
Type 3323 Valve		NPS ½ to 2		NPS 2½ to 4
Type 3372 Actuator with Type 3725 Positioner	Version:	IP	Mounting with crossbeam (form B)	Mounting without crossbeam (form C)
Type 5827-N3 Actuator		E1	With adapter (1400-7414) and spacer (0340-3031)	-
Type 3374-11/-21/-31 Actuator		E2	Mounting with crossbeam (form B)	With adapter (1400-9515) and spacer (0340-3031)
Type 3374-10 Actuator		E3	-	With adapter (1400-9515) and spacer (0340-3031)
Type 3371 Actuator		PP	Mounting with crossbeam (form B)	Mounting without crossbeam (form C)

## Dimensions

**Table 10:** Dimensions for Type 3323 Valve · ANSI version

Valve	NPS	½	¾	1	1½	2	2½	3	4
	DN	15	20	25	40	50	65	80	100
Height H	in	4.84			4.96		7.17		8.11
	mm	123			126		182		206
<b>With standard bonnet</b>									
<b>Class 150</b>									
Length L	in	7.25	7.25	7.25	8.75	10	10.87	11.73	13.86
	mm	184	184	184	222	254	276	298	352
Height H2	in	3.62	3.62	3.62	4.37	5	5.43	5.87	1.93
	mm	92	92	92	111	127	138	149	176
<b>Class 300</b>									
Length L	in	7.5	7.62	7.75	9.25	10.5	11.5	12.5	14.5
	mm	190	194	197	235	267	292	318	368
Height H2	in	3.76	3.82	3.88	4.63	5.26	5.75	6.26	7.24
	mm	95	97	98.5	117.5	133.5	146	159	184
<b>With insulating section</b>									
Height H4	in	10.79	10.79	10.79	10.95	10.95	12.99	12.99	12.99
	mm	274	274	274	278	278	330	330	330

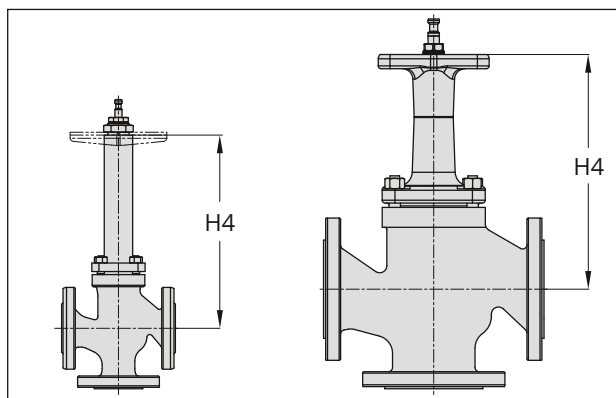
### Dimensional drawing of valve



**Fig. 8:** Type 3323 Three-way Valve · Specifications in mm [inch]

Left: DN 15 to 50/NPS ½ to 2

Right: DN 65 to 100/NPS 2½ to 4

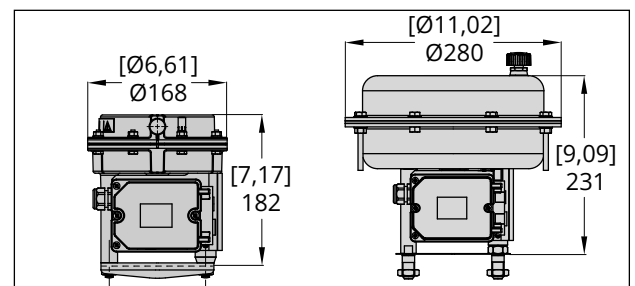


**Fig. 9:** Type 3323 Three-way Valve with insulating section

Left: DN 15 to 50/NPS ½ to 2

Right: DN 65 to 100/NPS 2½ to 4

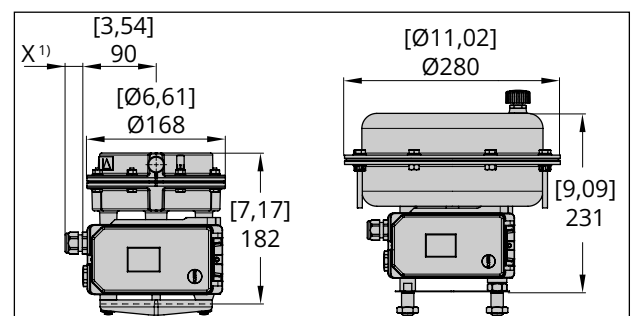
### Dimensional drawings · Actuators for electropneumatic control valves



**Fig. 10:** Specifications in mm [inch]

Left: Type 3372/120 cm<sup>2</sup> with Type 3725 Positioner

Right: Type 3372/350 cm<sup>2</sup> with Type 3725 Positioner, fail-safe action: stem retracts/extends



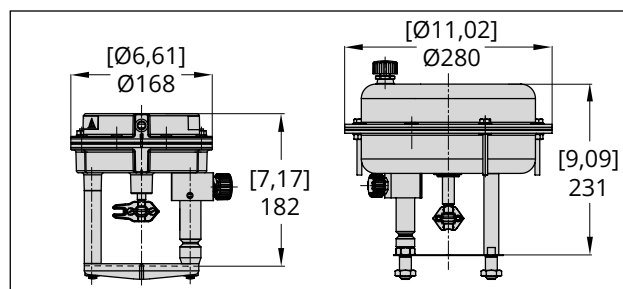
**Fig. 11:** Specifications in mm [inch]

Left: Type 3372/120 cm<sup>2</sup> with Series 3730 Positioner, fail-safe action: stem retracts/extends

Right: Type 3372/350 cm<sup>2</sup> with Series 3730 Positioner, fail-safe action: stem retracts/extends

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

## Dimensional drawings · Actuators for pneumatic control valves

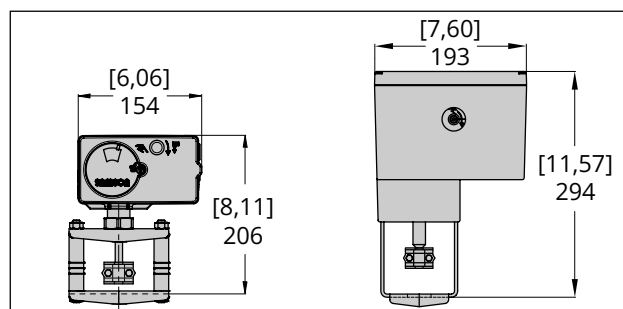


**Fig. 12:** Specifications in mm [inch]

Left: Type 3371/120 cm<sup>2</sup>

Right: Type 3371/350 cm<sup>2</sup>

## Dimensional drawings · Actuators for electric control valves



**Fig. 13:** Specifications in mm [inch]

Left: E1 actuator, Type 5827

Right: E3 actuator, Type 3374

## Weights

**Table 11:** Weights<sup>1)</sup> for Type 3323 Valve

Valve	DN	15	20	25	40	50	65	80	100
	NPS	½	¾	1	1½	2	2½	3	4
<b>With standard bonnet</b>									
Weight, approx.	kg	5	6	7	12	15	31	37	49
	lbs	11	13.2	15.4	26.5	33.1	68.3	81.6	108
<b>With insulating section</b>									
Weight, approx.	kg	8	9	10	18	21	40	45	68
	lbs	17.6	19.8	22	39.7	46.3	88.2	99.2	150

<sup>1)</sup> 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 12:** 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:

<b>Valve</b>	
<b>Type 3323</b> Three-way Valve	Mixing or diverting valve
Nominal size	NPS ...
Pressure rating	Class ...
Flow rate	C <sub>v</sub> ...
Body material	See Table 2
Bonnet	Standard bonnet or insulating section
Seat-plug seal	Metal seal
<b>Actuators</b>	
for <b>Type 3323-IP:</b> Type 3372 Electropneumatic Actuator	
With positioner	Type 3725/Series 3730
Optional	Intrinsically safe Ex ia
Additional equipment	1 or 2 limit switches
for <b>Type 3323-PP:</b> Type 3371 Pneumatic Actuator	
Fail-safe action	Actuator stem extends or retracts
Bench range	20 to 34 psi (1.4 to 2.3 bar)
Additional equipment	1 or 2 limit switches
for <b>Type 3323-E1:</b> 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 <b>Type 3323-E3:</b> 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

