

## 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>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>

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

- Electropneumatic actuators with integrated i/p positioner for Type 3323-IP
- Pneumatic actuators for Type 3323-PP
- Electric actuators for Type 3323-E1 or Type 3323-E3

Valve body made of

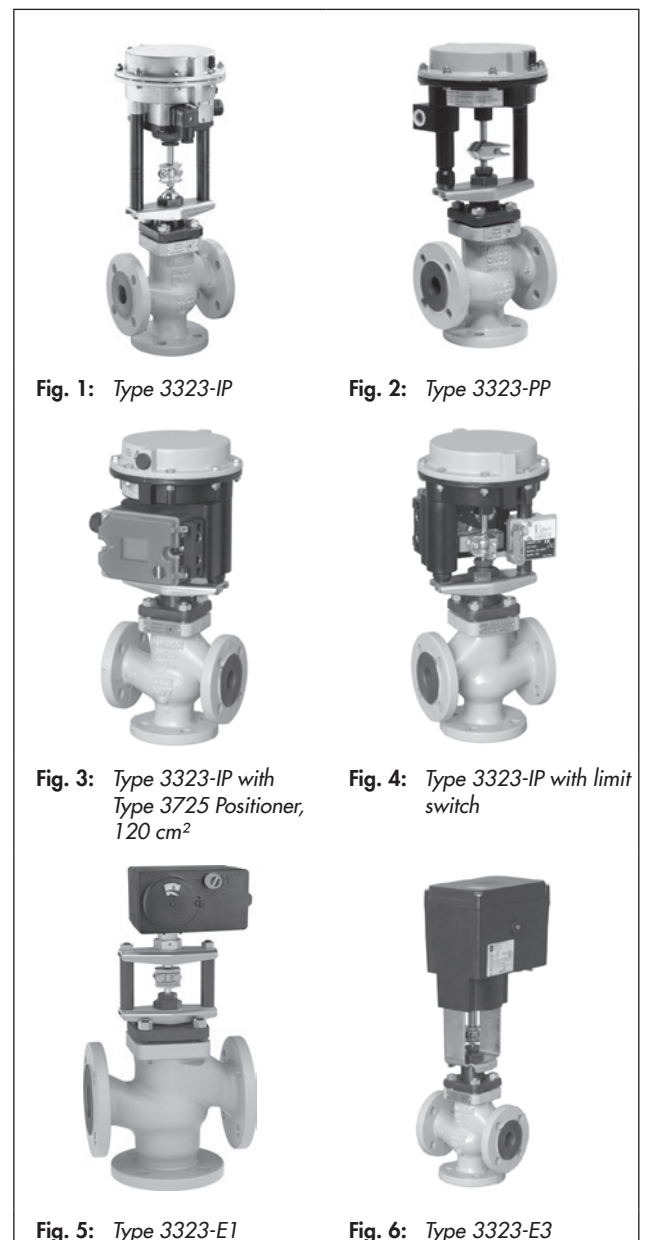
- Cast iron for Class 150
- Spheroidal graphite iron for Class 150
- Cast steel for Class 300 (up to NPS 2) as well as for Class 150 and 300 (NPS 2½ and larger)
- Stainless steel for Class 300 (up to NPS 2) as well as for Class 150 (NPS 2½ and larger)

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)** (Fig. 1) · With Type 3372 Electropneumatic Actuator, optionally with integrated positioner (120 cm<sup>2</sup> only, with plug connector) or Type 3725 Positioner (Fig. 3), tight-closing function to completely vent or fill the actuator with air, 4 to 20 mA reference variable, max. 90 psi (6 bar) supply air, fail-safe action: stem extends or retracts, optionally with Type 4744-2 Limit Switch (Fig. 4) and Type 3730 Positioner
- **Type 3323-PP Pneumatic Valve (mixing or diverting valve)** (Fig. 2) · 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 action: actuator stem extends or retracts, optionally with Type 4744-2 Limit Switch
- **Type 3323-E1 Electric Valve (mixing or diverting valve)** (Fig. 5) · With Type 5824-30 or 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. 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 transmitter, positioner

#### Further versions

- **Explosion-protected version** with electric actuators on request
- **Type 3323 according to DIN standards** · 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 (Fig. 7). 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 (Fig. 8).

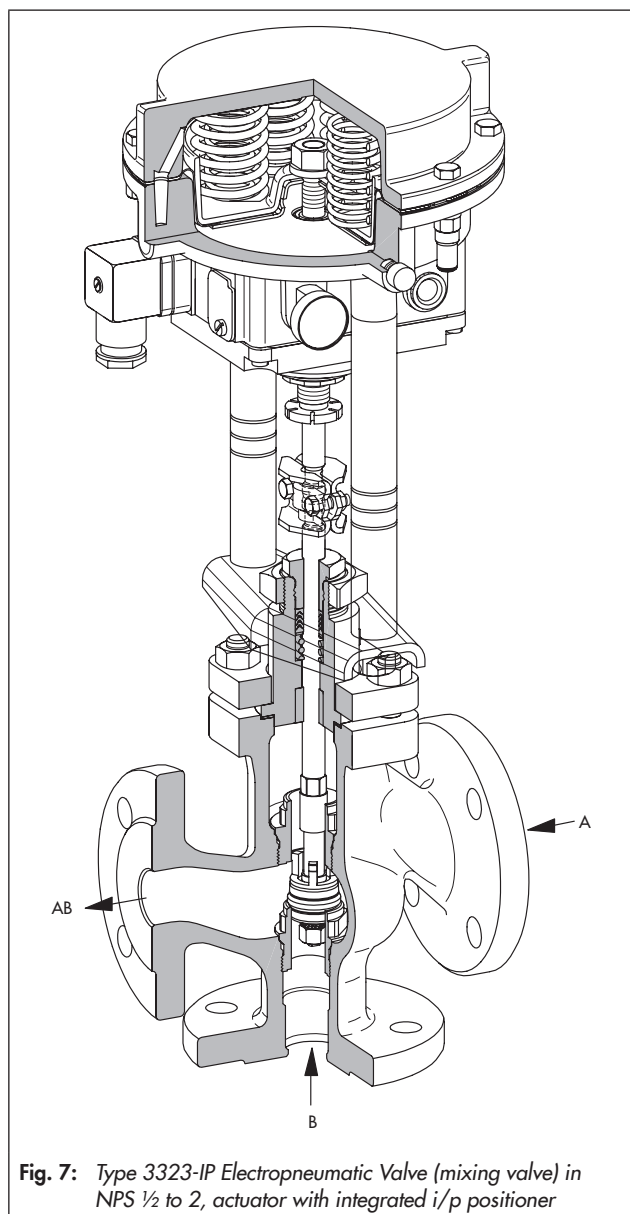


Fig. 7: Type 3323-IP Electropneumatic Valve (mixing valve) in NPS 1/2 to 2, actuator with integrated i/p positioner

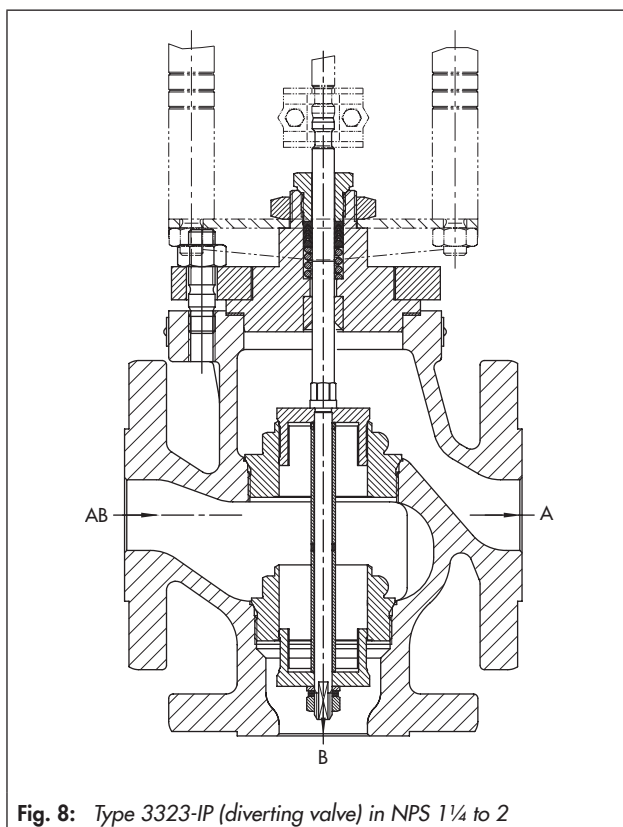


Fig. 8: Type 3323-IP (diverting valve) in NPS 1 1/4 to 2

#### Fail-safe position

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

- **Actuator stem extends:** when the supply air fails, port B is closed in mixing valves and port A is closed in diverting valves.  
Port B of diverting valves in sizes NPS 1/2 to 1 is closed as these valves have the same construction as mixing valves.
- **Actuator stem retracts:** when the supply air fails, port A is closed in mixing valves and port B is closed in diverting valves.  
Port A of diverting valves in sizes NPS 1/2 to 1 is closed as 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            Type 3323 Three-way Valve
- ▶ EB 8313-1        Actuator for Type 3323-IP
- ▶ EB 5824-1        Actuator for Type 3323-E1
- ▶ EB 5824-2        Actuator for Type 3323-E1
- ▶ 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 8313-3        Actuator for Type 3323-IP
- ▶ EB 8317            Actuator for Type 3323-PP

**Table 1: Type 3323 Three-way Valve****Table 1.1: Technical data**

Valve size	NPS	$\frac{1}{2} \cdot \frac{3}{4} \cdot 1 \cdot 1\frac{1}{2} \cdot 2 \cdot 2\frac{1}{2} \cdot 3 \cdot 4$	
Material		A216 WCC	A351 CF8M
Connection	Flanges	Raised face (RF) Ra = 3.2 to 6.3 $\mu\text{m}$	Raised face (RF) Ra = 3.2 to 6.3 $\mu\text{m}$
Pressure rating		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
Seat-plug seal		Metal seal	
Characteristic		Linear	
Rangeability		30:1 up to NPS 1 · 50:1 for NPS 1½ and larger	
Medium 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 $C_V$ coefficient)	
Conformity		CE · UK · EAC	

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

**Table 1.2: Materials**

Valve size	NPS	$\frac{1}{2} \cdot \frac{3}{4} \cdot 1 \cdot 1\frac{1}{2} \cdot 2 \cdot 2\frac{1}{2} \cdot 3 \cdot 4$	
Valve body		A216 WCC	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 and plug	Seat	NPS ½ to 1: A582 430F <sup>2)</sup> NPS 1½ to 2: A582 430F NPS 2½ and larger: A276 410 T	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 410 T	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 1.4305

**Table 2: Valve sizes,  $C_V$  and  $K_{VS}$  coefficients, seat diameters****Table 2.1: Type 3323 as mixing valve**

Valve size	NPS	$\frac{1}{2}$	$\frac{3}{4}$	1	1½	2	2½	3	4	
	DN	15	20	25	40	50	65	80	100	
Flow coefficient	$C_V$	5	7.5	9.4	23	37	70	95	190	
	$K_{VS}$	4	6.3	8	20	32	60	80	160	
Seat Ø	in	0.945			1.57		2.5	2.95	3.94	
	mm	24			40		63	75	100	
Rated travel		0.59" · 15 mm							1.2" · 30 mm	

**Table 2.2: Type 3323 as diverting valve**

Valve size	NPS	$\frac{1}{2}$	$\frac{3}{4}$	1	1½	2	2½	3	4	
	DN	15	20	25	40	50	65	80	100	
Flow coefficient	$C_V$	–	–	–	23	37	70/47	95/70	190/120	
	$K_{VS}$	–	–	–	20	32	60/40	80/60	160/100	
Seat Ø	in	–	–	–	1.57	1.57	2.5/1.9	2.95/2.5	3.94/3.15	
	mm	–	–	–	40	40	6¾8	75/63	100/80	
Rated travel		0.59" · 15 mm							1.2" · 30 mm	

**Table 3: Pneumatic actuators****Table 3.1: Technical data**

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>	120 cm <sup>2</sup>	350 cm <sup>2</sup>
Attachment to Type 3323		NPS ½ to 2 (DN 15 to 50)	NPS 2½ to 4 (DN 65 to 100)	NPS ½ to 2 (DN 15 to 50)	NPS 2½ to 4 (DN 65 to 100)
Fail-safe position		Actuator stem extends (FA) or actuator stem retracts (FE)			
Reference variable		4 to 20 mA		-	
Bench range/ rated travel	Stem extends (FA)	20 to 35 psi/15 mm (1.4 to 2.3 bar)	32 to 55 psi/30 mm (2.2 to 3.8 bar)	20 to 35 psi/15 mm (1.4 to 2.3 bar)	32 to 55 psi/30 mm (2.2 to 3.8 bar)
	Stem retracts (FE)	20 to 35 psi/15 mm (1.4 to 2.3 bar)	22 to 39 psi/30 mm (1.5 to 2.7 bar)	20 to 35 psi/15 mm (1.4 to 2.3 bar)	22 to 39 psi/30 mm (1.5 to 2.7 bar)
Characteristic		Linear, deviation from terminal-based linearity ≤ 2 %		-	
Hysteresis		≤ 1 %		-	
Variable position		≤ 7 %		-	
Degree of protection		IP 54 with integrated positioner (for 120 cm <sup>2</sup> only) IP 66 with Type 3725		-	
Permissible ambient temperature		Standard:	-4 to +176 °F (-20 to +80 °C)	-31 to +194 °F (-35 to +90 °C)	
		With metal cable gland:	-22 to +176 °F (-30 to +80 °C)		

**Table 3.2: 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 3.3: 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 in psi and bar Travel (in parentheses)	psi	20 to 35	32 to 55 (30 mm) 30 to 39 (15 mm)	20 to 35	22 to 39 (30 mm) 22 to 39 (15 mm)
	bar	1.4 to 2.3	2.2 to 3.8 (30 mm) 2.1 to 2.7 (15 mm)	1.4 to 2.3	1.5 to 2.7 (30 mm) 1.5 to 2.1 (15 mm)
C <sub>v</sub>	K <sub>vs</sub>	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)

**Table 4:** Electric actuators · Permissible differential pressures for metal-seated plug

Three-way valve		Type	3323-E1	3323-E3	
Actuator		Type	5824-30/5827-N3	3374-21/-31	3374-10/-11
Thrust		Retracts	0.7 kN	0.5 kN	2.5 kN
		Extends	0.7 kN	2.0 kN	2.5 kN
$C_v$		$K_{vs}$	$\Delta p$ when $p_2 = 0$ psi (bar)		
5...9.4		4.0 to 8	145 (10)	260 (18) <sup>1)</sup>	360 (25)
20 to 37		16 to 32	50 (3.5)	87 (6) <sup>1)</sup>	145 (10)
70		60	–	29 (2) <sup>1)</sup>	80 (5.5)
94		80	–	–	46 (3.2)
190		160	–	–	45 (3.1)
Actuator data		See Data Sheet	▶ T 5824/▶ 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)

**Table 5:** Type of attachment and required adapter

Type 3323 Valve			NPS ½ to 2	NPS 2½ to 4
Type 3372 Actuator with connector	Version:	IP	Mounting with crossbeam (form B)	–
Type 3372 Actuator with Type 3725 Positioner		IP	Mounting with crossbeam (form B)	Mounting without crossbeam (form C)
Type 5824-30 or Type 5827-N3 Actuator		E1	With adapter (1400-7414) and spacer (0340-3031)	–
Type 3374-11/-21/-31 Actuator		E3	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)

**Table 6:** Dimensions and weights

**Table 6.1:** Dimensions of Type 3323 Three-way Valve

Valve size	NPS	½	¾	1	1½	2	2½	3	4	
	DN	15	20	25	40	50	65	80	100	
H	in	4.84			4.96			7.17		8.11
	mm	123			126			182		206
<b>Class 150</b>										
Face-to-face dimension L	in	7.25	7.25	7.25	8.75	10.0	10.87	11.73	13.86	
	mm	184	184	184	222	254	276	298	352	
H2	in	3.62	3.62	3.62	4.37	5	5.43	5.87	6.93	
	mm	92	92	92	111	127	138	149	176	
<b>Class 300</b>										
Face-to-face dimension L	in	7.50	7.62	7.75	9.25	10.50	11.5	12.5	14.5	
	mm	190	194	197	235	267	292	318	368	
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>										
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	

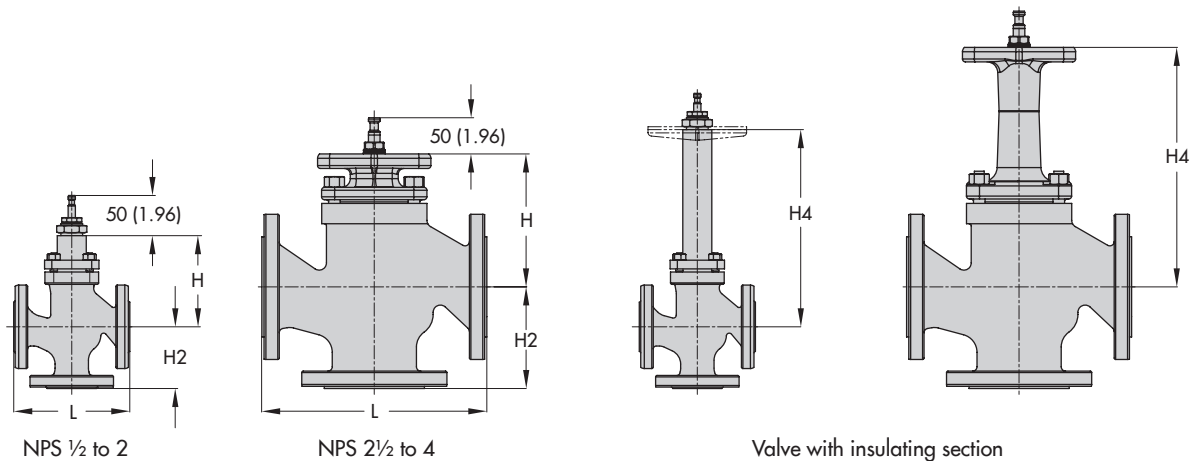
**Table 6.2:** Weights for Type 3323 Three-way Valve

Valve size	NPS	½	¾	1	1½	2	2½	3	4
	DN	15	20	25	40	50	65	80	100
<b>With standard bonnet</b>									
Weight	Approx. lbs	11.0	13.2	15.4	26.5	33.1	68.3	81.6	108.0
	kg (approx.)	5	6	7	12	15	31	37	49
<b>With insulating section</b>									
Weight	Approx. lbs	17.6	19.8	22.0	39.7	46.3	88.2	99.2	150.0
	kg (approx.)	8	9	10	18	21	40	45	68

**Table 6.3:** Weights of Type 3371, Type 3372, Type 5824, Type 5827 and Type 3374 Actuators

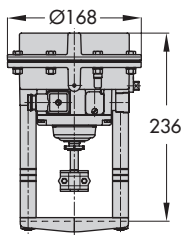
Actuator type	Pneumatic		Electropneumatic			Electric		
Type	3371/120	3371/350	3372/120	3372/120	3372/350	E1/5824 E1/5827	E3/3374	
Positioner	-		Integrated	Type 3725		Optional, integrated		
Weight	lbs	8.8	28.7	13.2	15.4	35.2	2.8	8.8
	kg	4	13	6	7	16	1.25	4

**Dimensional drawings of Type 3323 Three-way Valve**

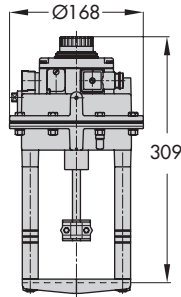


## Dimensional drawings for actuators

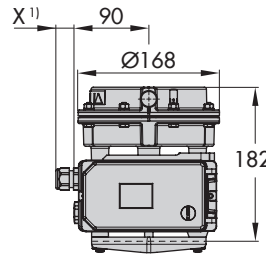
### Actuators for electropneumatic control valves



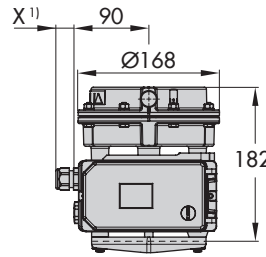
Type 3372/120 cm<sup>2</sup>  
Integrated, stem extends



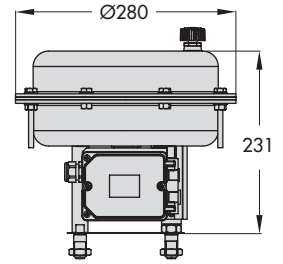
Type 3372/120 cm<sup>2</sup>  
Integrated, stem retracts



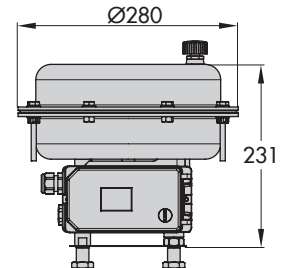
Type 3372/120 cm<sup>2</sup> with  
Type 3725 Positioner, stem  
extends/retracts



Type 3372/120 cm<sup>2</sup> with  
Series 3730 Positioner, stem  
extends/retracts

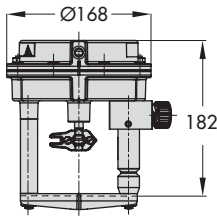


Type 3372/350 cm<sup>2</sup> with  
Type 3725 Positioner, stem  
extends/retracts

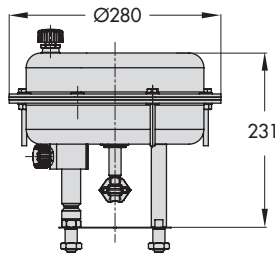


Type 3372/350 cm<sup>2</sup> with  
Series 3730 Positioner, stem  
extends/retracts

### Actuators for pneumatic control valves

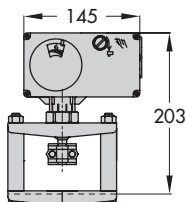


Type 3371/120 cm<sup>2</sup>

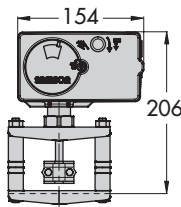


Type 3371/350 cm<sup>2</sup>

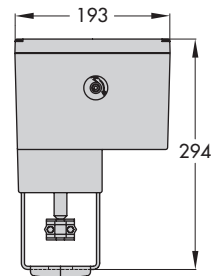
### Actuators for electric control valves



Actuator E1  
Type 5824



Actuator E1  
Type 5827



Actuator E3  
Type 3374

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

## Ordering text

The following specifications are required on ordering:

Valve	
<b>Type 3323 Three-way Valve</b>	
Version as	Mixing valve or diverting valve
Valve size	NPS ...
Pressure rating	Class ...
Flow coefficient	$C_v$ ...
Body material	Cast iron, spheroidal graphite iron, cast steel, or stainless steel
Seat-plug seal	Metal seal
<b>Actuators</b>	
for <b>Type 3323-IP</b> : Type 3372 Electropneumatic Actuator	
With integrated positioner	4 to 20 mA
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 position	Actuator stem extends or retracts
Bench range	20 to 23 psi (1.4 to 2.3 bar)
Additional equipment	1 or 2 limit switches
For <b>Type 3323-E1</b> : Type 5824-30 or Type 5827-N3 Electric Actuator or	
Supply voltage	<ul style="list-style-type: none"><li>- 230 V/50 Hz</li><li>- 24 V/50 Hz</li></ul>
Additional equipment	<ul style="list-style-type: none"><li>- 2 limit contacts</li><li>- Resistance transmitter 0 to 1000 <math>\Omega</math></li><li>- 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></li></ul>
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	<ul style="list-style-type: none"><li>- 230 V/50 Hz</li><li>- 230 V/60 Hz</li><li>- 24 V/50 Hz</li><li>- 24 V/60 Hz</li></ul>
Additional equipment	<ul style="list-style-type: none"><li>- 2 limit contacts</li><li>- Resistance transmitter 0 to 1000 <math>\Omega</math></li><li>- Digital positioner with input and output 0/4 to 20 mA or 0/2 to 10 V</li></ul>