

## Series V2001 Valves

# Type 3323 Three-way Valve with pneumatic or electric actuator

SAMSON

ANSI version

### Application

Mixing and diverting valve designed for use in industrial plants

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



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

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

Valve body materials

- Cast iron for Class 150
- Cast steel for Class 150 and 300
- Stainless steel for Class 300 (up to NPS 2) as well as 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 3321-IP Electropneumatic Mixing/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 for completely venting or filling the actuator with air, reference variable 4 to 20 mA, max. 90 psi (6 bar) supply air, fail-safe position actuator stem extends or retracts, optionally with Type 4744-2 Limit Switch (Fig. 4) and Type 3730 Positioner
- **Type 3323-PP Pneumatic Mixing/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 position actuator stem extends or retracts, optionally with Type 4744-2 Limit Switch
- **Type 3323-E1 Electric Mixing/Diverting Valve** (Fig. 5) 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 Mixing/Diverting 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 3323-IP



Fig. 2: Type 3323-PP



Fig. 3: Type 3323-IP with Type 3725 Positioner, 120 cm<sup>2</sup>



Fig. 4: Type 3323-IP with limit switch



Fig. 5: Type 3323-E1



Fig. 6: Type 3323-E3

- Explosion-protected version with electric actuators
- Type 3323 according to DIN standards · ▶ T 8113

Edition October 2012

Data Sheet

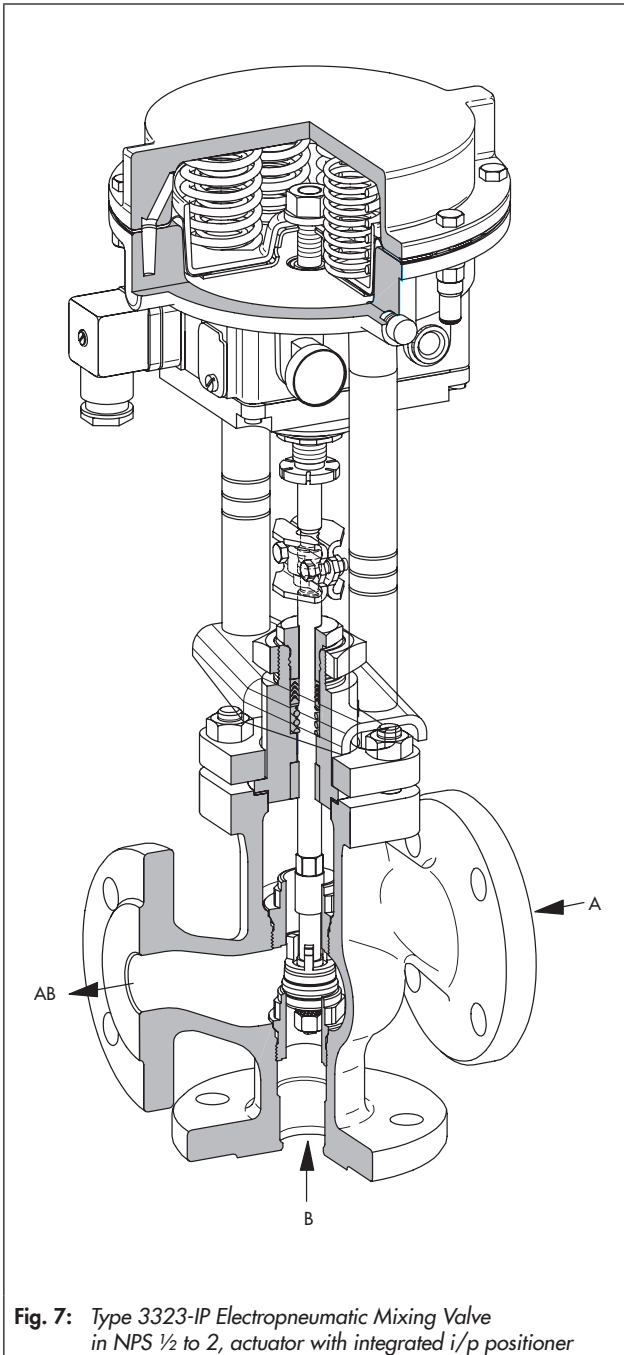
T 8114 EN

## Principle of operation

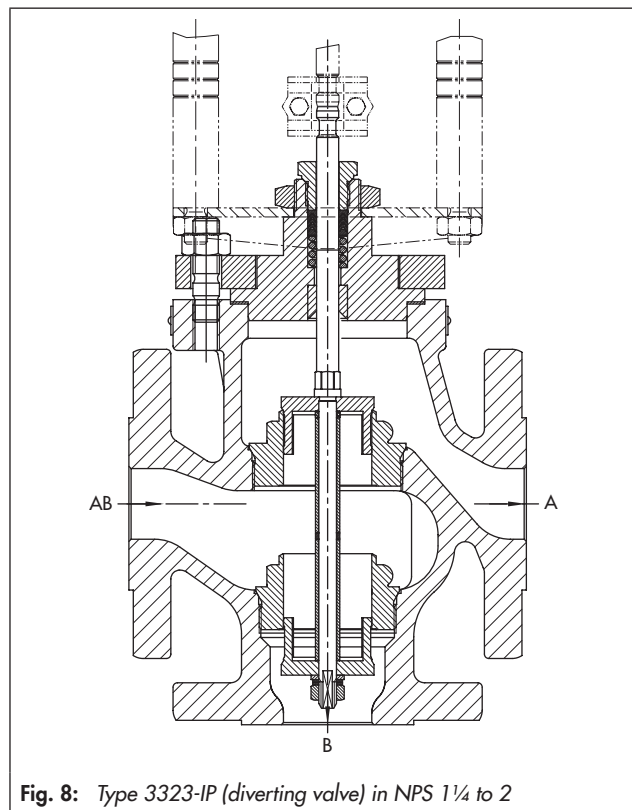
Depending on the version, the three-way valve can be used for either mixing or flow-diverting service.

In mixing valves, the process media to be mixed enter at valve ports A and B. The combined media exit the valve at port AB (Fig. 7). The flow rate from valve port A or B to the common port AB depends on the cross-sectional area of flow between the seats and plugs.

In flow-diverting valves, in contrast, the process medium enters at the valve port AB and the partial flows exit at valve ports A and B (Fig. 8).



**Fig. 7:** Type 3323-IP Electropneumatic 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 (FA)**  
In mixing valves, port B is closed when the supply air fails. In diverting valves, port A is closed.
- **Actuator stem retracts (FE)**  
In mixing valves, port A is closed when the supply air fails. In diverting valves, port B is closed.

## 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 8113 Type 3323 Three-way Valve
- ▶ EB 8313-1 Actuator for Type 3323-IP
- ▶ EB 5824 Actuator for Type 3323-E1
- ▶ EB 8331-1 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	½ · ¾ · 1 · 1½ · 2 · 2½ · 3 · 4	
Material		A 126 B	A 216 WCC · A 351 CF8M
Connection	Flanges	Flat face (FF)	Raised face · Ra = 3.2 to 6.3 µm
Nominal pressure		Class 150	Class 150 to 300
Seat/plug sealing		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 · (-10 to +300 °C)	
Leakage class according to ANSI/FCI 70-2		Metal seal: I (0.05 % of C <sub>v</sub> )	

**Table 1.2: Materials**

Valve size	NPS	½ · ¾ · 1 · 1½ · 2 · 2½ · 3 · 4		
Valve body		A 126 B	Cast steel · A 216 WCC	Stainless steel · A 351 CF8M
Valve bonnet		Up to NPS 2: A 105 NPS 2½ and larger: A 216 WCC		Up to NPS 2: A 182 F316 NPS 2½ and larger: CF8M
Valve flange <sup>1)</sup>		A 105		
Seat and plug	Seat	Up to NPS 1: 1.4305 NPS 1½ to 2: 1.4104 NPS 2½ and larger: 1.4006		Up to NPS 2: 1.4305/1.4104 NPS 2½ and larger: 1.4404
	Plug	Up to NPS 2: 1.4305 NPS 2½ and larger: 1.4404		
Guide bushing		1.4104		
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-piece (see valve bonnet for material)

**Table 2: Nominal sizes, C<sub>v</sub>, K<sub>vS</sub> coefficients and seat diameters****Table 2.1: Type 3323 as mixing valve**

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>	5	7.5	9.4	23	37	70	95	190	
	K <sub>vS</sub>	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	½	¾	1	1½	2	2½	3	4	
	DN	15	20	25	40	50	65	80	100	
Flow rate	C <sub>v</sub>	–	–	–	23	37	70/47	95/70	190/120	
	K <sub>vS</sub>	–	–	–	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	63/48	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>
Mounting on 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 action		Actuator stem extends or retracts			
Reference variable		4 to 20 mA		–	
Bench range/ rated travel	Stem extends	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	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 conformity ≤ 2 %		–	
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 to 80 °C)		–31 to 194 °F (–35 to 90 °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 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 3.3: Permissible differential pressures for metal-seated plug**

Fail-safe action		Actuator stem extends		Actuator stem retracts	
Actuator size		120 cm <sup>2</sup>	350 cm <sup>2</sup>	120 cm <sup>2</sup>	350 cm <sup>2</sup>
Bench range and (travel) in mm	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*

Three-way valve		Type	Type 3323-E1	Type 3323-E3	
Actuator		Type	5824-30	3374-21/-31	3374-10/-11
Thrust			0.7 kN	1.25 kN	2.5 kN
$C_v$	$K_{vs}$		$\Delta p$ when $p_2 = 0$ psi (bar)		
5 to 9.4	4.0 to 8		145 (10)	260 (18)	360 (25)
20 to 37	16 to 32		50 (3.5)	90 (6)	145 (10)
70	60		–	30 (2)	80 (5.5)
94	80		–	–	46 (3.2)
190	160		–	–	45 (3.1)
Actuator data		Refer to data sheet	▶ T 5824	▶ T 8331	

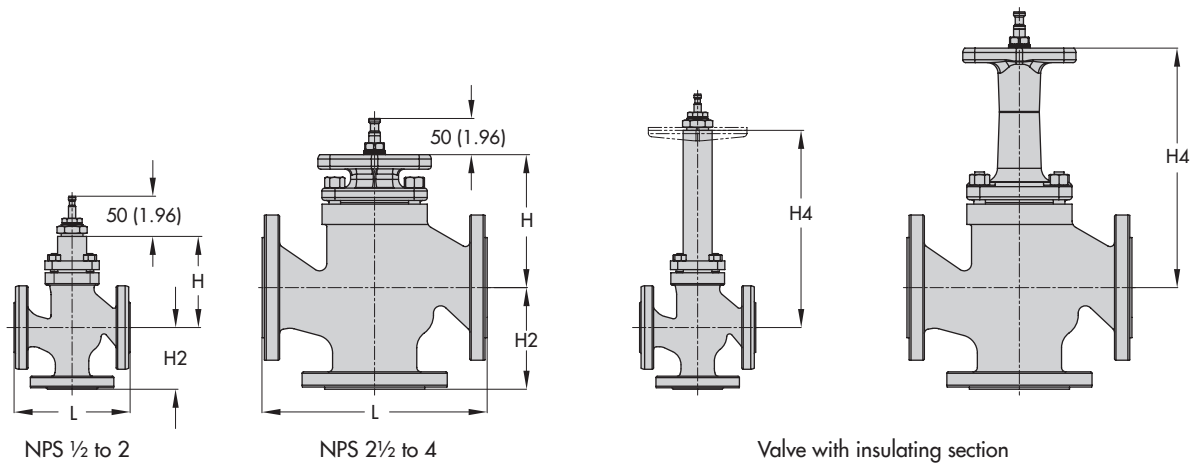
**Table 5:** *Type of attachment and required adapter*

Type 3323 Valve		NPS ½ to 2	NPS 2½ to 4
Type 3372 Actuator with plug connector	IP	Attachment with crossbeam (form B)	–
Type 3372 Actuator with Type 3725 Positioner	IP	Attachment with crossbeam (form B)	Attachment without crossbeam (form C)
Type 5824-30 Actuator	E1	With adapter (1400-7414)	–
Type 3374-11/-21/-31 Actuator	E3	Attachment with crossbeam (form B)	With adapter (1400-9515)
Type 3374-10 Actuator	E3	–	With adapter (1400-9515)
Type 3371 Actuator	PP	Attachment with crossbeam (form B)	Attachment without crossbeam (form C)

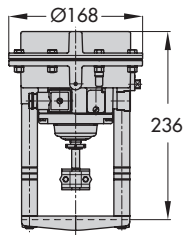
**Table 6:** Dimensions of Type 3323 Three-way Valve

Valve size	NPS	½	¾	1	1½	2	2½	3	4
	DN	15	20	25	40	50	65	80	100
<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
H4	in	14.53	14.53	14.53	14.72	14.72	15.83	27.64	15.83
	mm	369	369	369	374	374	402	702	402

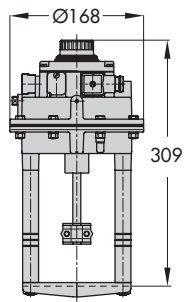
**Dimensional drawings for Type 3323 Valve**



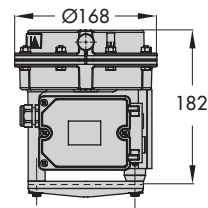
Dimensional drawings for actuators



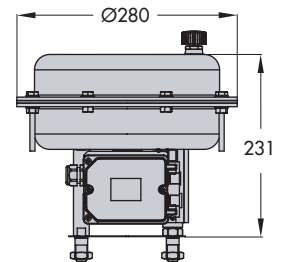
Type 3372/120 cm<sup>2</sup>  
integrated, stem extends



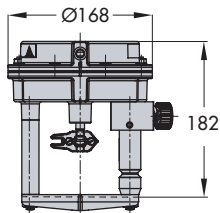
Type 3372/120 cm<sup>2</sup>  
integrated, stem retracts



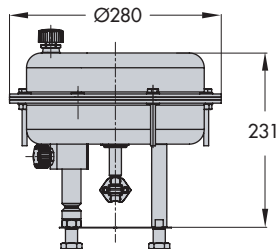
Type 3372/120 cm<sup>2</sup>  
with Type 3725  
stem extends or retracts



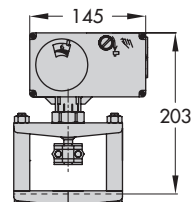
Type 3372/350 cm<sup>2</sup>  
with Type 3725  
stem extends or retracts



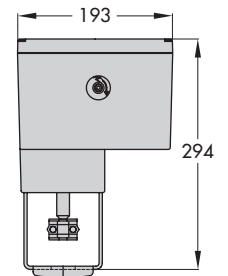
Type 3371/120 cm<sup>2</sup>



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



Actuator E1  
Type 5824/5825



Actuator E3  
Type 3374

## Ordering text

The following specifications are required on ordering:

### Type 3323 Three-way Valve

Version	Mixing or diverting valve
Valve size	NPS ...
Pressure rating	Class ...
Flow coefficient	$C_v$ ...
Body material	Cast iron, cast steel or stainless steel
Seat/plug seal	Metal seal

### Actuators

for **Type 3323-IP:** Type 3372 Electropneumatic Actuator

Integrated positioner	4 to 20 mA
Positioner	Type 3725 or Type 3730-x
Optional	Intrinsically safe Ex ia
Additional equipment	1 or 2 limit switches

for **Type 3323-PP:** 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 **Type 3323-E1:** Type 5824-30 Electric Actuator

Power supply	<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>- Two limit contacts</li><li>- Resistance transmitter 0 to 1000 <math>\Omega</math></li><li>- Positioner input 0/4 to 20 mA or 0/2 to 10 V</li></ul>

for **Type 3323-E3:** Type 3374 Electric Actuator

Thrust (without fail-safe action)	1.25 kN, 2.5 kN
Power supply	<ul style="list-style-type: none"><li>- 230 V/50 Hz</li><li>- 24 V/50 Hz</li><li>- 110 V/60 Hz</li></ul>
Additional equipment	<ul style="list-style-type: none"><li>- Two limit contacts</li><li>- Resistance transmitter 0 to 1000 <math>\Omega</math></li><li>- Digital positioner input and output 0/4 to 20 mA or 0/2 to 10 V</li></ul>

Specifications subject to change without notice

