

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

Nominal size	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 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 cm² 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 cm² (NPS ½ to 4, 15 mm travel) or Type 3371 Pneumatic Actuator, 350 cm² (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 5827-N3 Electric Actuator for 230 V/50 Hz or 24 V/50 Hz, optionally with limit contacts, resistance transmitter, positioner



Fig. 1: Type 3323-IP



Fig. 2: Type 3323-PP



Fig. 3: Type 3323-IP with Type 3725 Positioner, 120 cm²



Fig. 4: Type 3323-IP with limit switch



Fig. 5: Type 3323-E1



Fig. 6: Type 3323-E3

- **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).

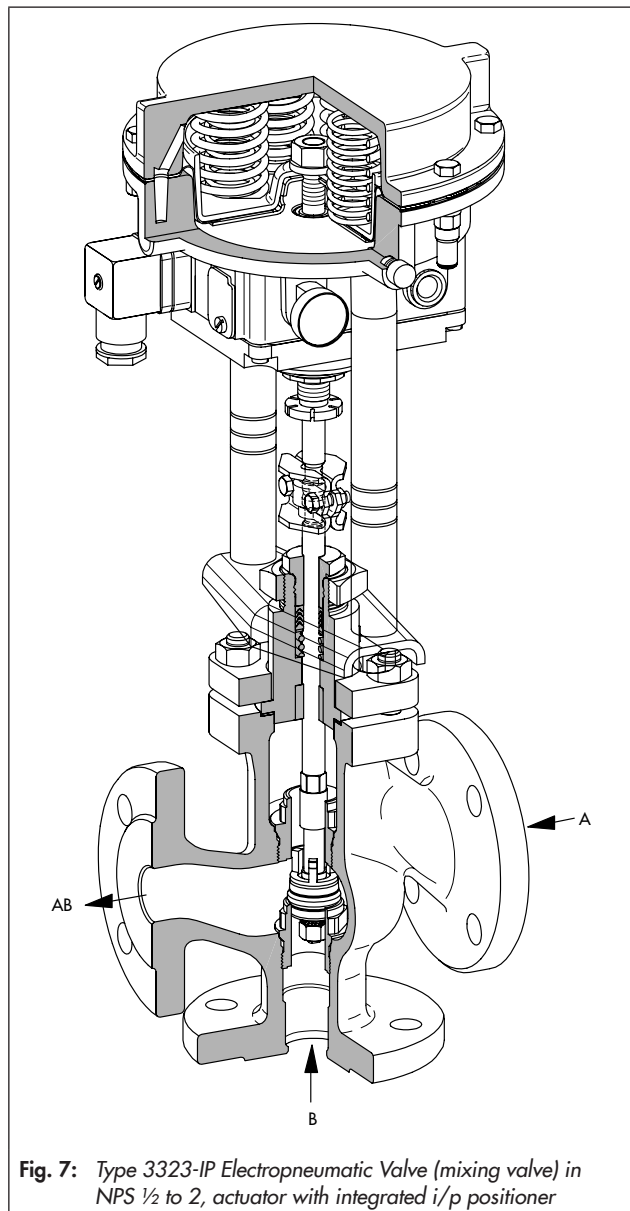


Fig. 7: Type 3323-IP Electropneumatic Valve (mixing valve) in NPS 1/2 to 2, actuator with integrated i/p positioner

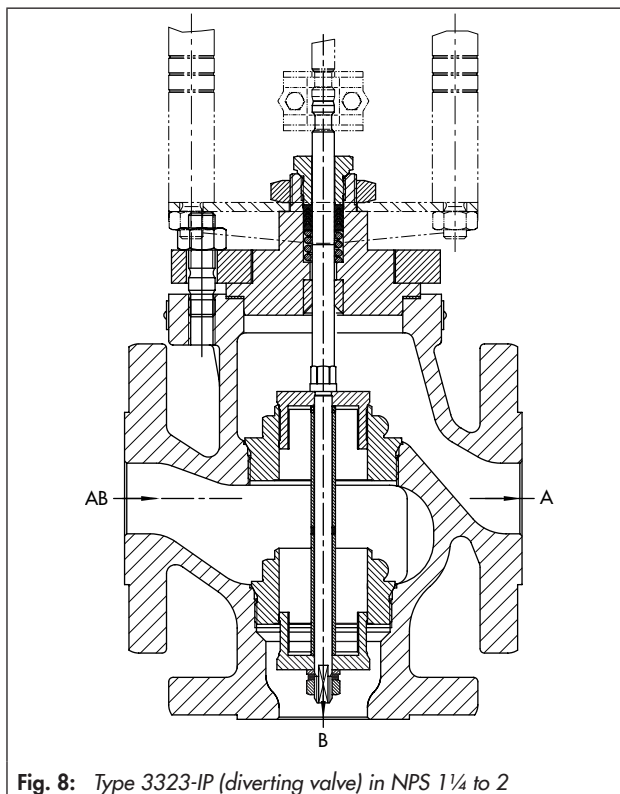


Fig. 8: Type 3323-IP (diverting valve) in NPS 1 1/4 to 2

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 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**

Nominal 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 µm	Raised face (RF) Ra = 3.2 to 6.3 µm
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 ¹⁾ · (–10 to +300 °C)	
Leakage class according to ANSI/FCI 70-2		Metal seal: I (0.05 % of C _V coefficient)	
Conformity		CE	

¹⁾ Version for lower temperatures on request

Table 1.2: Materials

Nominal 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 ¹⁾		A105	
Seat and plug	Seat	NPS ½ to 1: A582 430F ²⁾ NPS 1½ to 2: A582 430F NPS 2½ and larger: A276 410 T	NPS ½ to 1: A582 430F ²⁾ 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	

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

²⁾ Top seat 1.4305

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

Nominal size	NPS	½	¾	1	1½	2	2½	3	4
	DN	15	20	25	40	50	65	80	100
Flow coefficients	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

Nominal size	NPS	½	¾	1	1½	2	2½	3	4
	DN	15	20	25	40	50	65	80	100
Flow coefficients	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 ²	350 cm ²	120 cm ²	350 cm ²
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 ² 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 ²	350 cm ²	120 cm ²	350 cm ²
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
Crossbeam	1.4301	–	1.4301	–
Mounting bracket for Type 3725	Aluminum		–	

Table 3.3: *Permissible differential pressures for metal-seated plug*

Fail-safe position		Actuator stem extends		Actuator stem retracts	
Actuator area		120 cm ²	350 cm ²	120 cm ²	350 cm ²
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 _v	K _{vs}	Δp when p ₂ = 0 psi (bar)		Δp when p ₂ = 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	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}	Δp when $p_2 = 0$ psi (bar)			
5 to 9.4	4.0 to 8		145 (10)	72 (5) 260 (18) ¹⁾	360 (25)
20 to 37	16 to 32		43 (3)	17 (1.2) 87 (6) ¹⁾	145 (10)
70	60		–	– 29 (2) ¹⁾	80 (5.5)
94	80		–	–	46 (3.2)
190	160		–	–	27 (1.9)
Actuator data		See Data Sheet	► T 5827	► T 8331	

¹⁾ 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 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

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 6.1: Dimensions of Type 3323 Three-way Valve

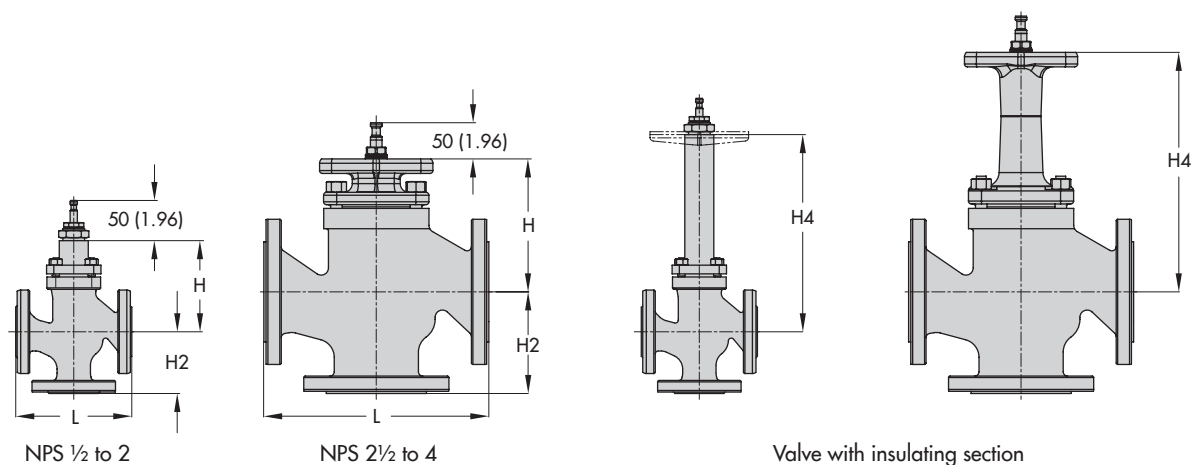
Nominal size	NPS	½	¾	1	1½	2	2½	3	4
	DN	15	20	25	40	50	65	80	100
H	in	4.84			4.96		7.17		8.11
	mm	123			126		182		206
Class 150									
Face-to-face dimension L	in	7.25	7.25	7.25	8.75	10.0	10.87	11.73	13.86
	mm	184	184	184	222	254	276	298	352
H2	in	3.62	3.62	3.62	4.37	5	5.43	5.87	6.93
	mm	92	92	92	111	127	138	149	176
Class 300									
Face-to-face di- mension 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
With insulating section									
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

Nominal size	NPS	1/2	3/4	1	1 1/2	2	2 1/2	3	4
	DN	15	20	25	40	50	65	80	100
With standard bonnet									
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
With insulating section									
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

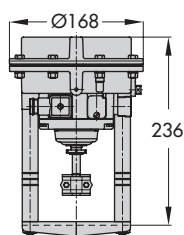
Table 6.3: Weights of Type 3371, Type 3372, Type 5827 and Type 3374 Actuators

Actuator type		Pneumatic		Electropneumatic			Electric	
Type		3371/120	3371/350	3372/120	3372/120	3372/350	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

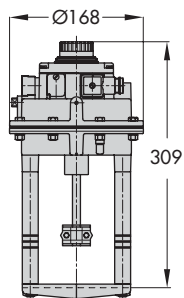
Dimensional drawings of Type 3323 Three-way Valve

Dimensional drawings for actuators

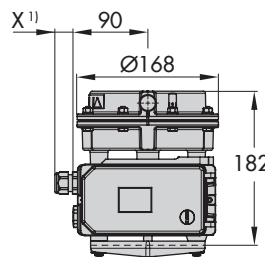
Actuators for electropneumatic control valves



Type 3372/120 cm²
Integrated, stem extends

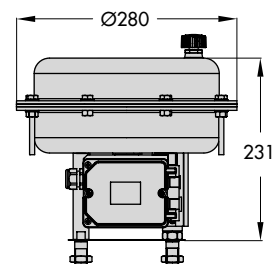


Type 3372/120 cm²
Integrated, stem retracts

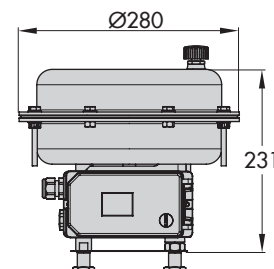


Type 3372/120 cm² with
Type 3725 Positioner, stem
extends/retracts

Type 3372/120 cm² with
Series 3730 Positioner, stem
extends/retracts

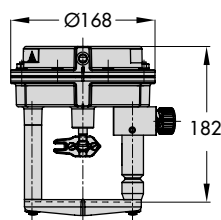


Type 3372/350 cm² with
Type 3725 Positioner, stem
extends/retracts

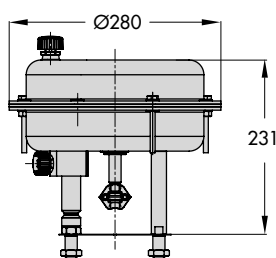


Type 3372/350 cm² with
Series 3730 Positioner, stem
extends/retracts

Actuators for pneumatic control valves

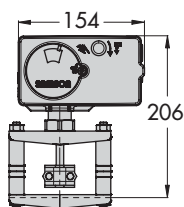


Type 3371/120 cm²

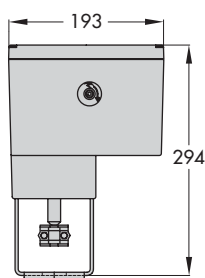


Type 3371/350 cm²

Actuators for electric control valves



Actuator E1
Type 5827



Actuator E3
Type 3374

¹) The dimension X depends on the cable gland used.

Ordering text

The following specifications are required on ordering:

Valve	
Type 3323 Three-way Valve	
Version as	Mixing valve or diverting valve
Nominal size	NPS ...
Pressure rating	Class ...
Flow coefficients	C_v ...
Body material	Cast iron, spheroidal graphite iron, cast steel, or stainless steel
Seat-plug seal	Metal seal
Actuators	
for Type 3323-IP: 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 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 5827-N3 Electric Actuator	
Supply voltage	– 230 V/50 Hz – 24 V/50 Hz
Additional equipment	– Two 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 Type 3323-E3: Type 3374 Electric Actuator	
Fail-safe action	With fail-safe action: Actuator stem extends or retracts
Thrust - Without fail-safe action - With fail-safe action	1.25 kN; 2.5 kN 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	– Two 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