

Valve Series V2001



Three-way valve V2001 with Pneumatic or Electric Actuator

ANSI version

Application

Mixing and flow-diverting valve designed for use in industrial plants

Valve size NPS ½ to 2
Pressure rating ANSI Class 150 and 300
Temperature range 14 to 430 °F (-10 to 220 °C)



V2001 Three-way Valves can be equipped with either pneumatic or electric actuators:

- Electropneumatic actuator with integrated i/p positioner for V2001-IP or
- Pneumatic actuator for V2001-P or V2001-PA
- Electric actuator for V2001-E1 or V2001-E3

Valve body materials

- Cast iron for ANSI Class 150 or
- Carbon steel for ANSI Class 150 and 300
- Valve plug with metal sealing
- Mixing valves in NPS ½ to 1 can also be used for flow-diverting service.

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

Versions

with Type 3323 Three-way Valve

Electropneumatic Mixing/Diverting Valve V2001-IP (Fig. 1) with Type 3372 Electropneumatic Actuator, plug connector, tight-closing function for completely venting or filling the actuator with air, reference variable 4 to 20 mA, max. 60 psi (4 bar) supply air, fail-safe position for actuator stem extends or retracts, optionally with Type 4744-2 Limit Switch

Pneumatic Mixing/Diverting Valve V2001-P (Fig. 2) with Type 3372 Pneumatic Actuator, bench range 30 to 48 psi (2.1 to 3.3 bar) for version with fail-safe position actuator stem extends or 6 to 20 psi (0.4 to 1.4 bar) for version with fail-safe position actuator stem retracts, optionally with Type 4744-2 Limit Switch

Pneumatic Mixing/Diverting Valve V2001-PA with Type 2780-2 Pneumatic Actuator (Fig. 3) for the direct attachment of a positioner, e.g. Type 3760 (see T 8385 EN)

Electric Mixing/Diverting Valve V2001-E1 (Fig. 4) with Type 5824-30 Electric Actuator 230 V/50 Hz or 24 V/50 Hz, optionally with positioners, limit switches and potentiometers.

Electric Mixing/Diverting Valve V2001-E3 (Fig. 5) with Type 3374 Electric Actuator for 230 or 24 V/50 Hz or 110 V/60 Hz optionally with fail-safe action (typetested), positioners, limit switches and potentiometers.

Explosion-protected version with electric actuators on request **V2001 acc. to DIN standards** · See Data Sheet T 8113 EN



Fig. 1 · V2001-IP



Fig. 2 · V2001-P



Fig. 3 · Actuator for V2001-PA with positioner



Fig. 4 · V2001-E1



Fig. 5 · Actuator for V2001-E3

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. 6).

Fail-safe position for pneumatic actuators

Depending on the arrangement of the compression springs in the electropneumatic or pneumatic actuator, the control valve has two fail-safe positions that become effective upon air supply failure:

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

The valve and actuator are not assembled together upon delivery. Instructions on how to mount the valve on the actuator can be found in the mounting and operating instructions delivered with the product:

EB 8113/4 EN	V2001 Three-way Valve
EB 8313 EN	Actuator for mixing/diverting valves V2001-IP and V2001-PP
EB 5840 EN	Type 2780-2 Actuator for V2001-PA
EB 5824 EN	Electric actuator for V2001-E1
EB 8331-1 EN	Electric actuator for V2001-E3

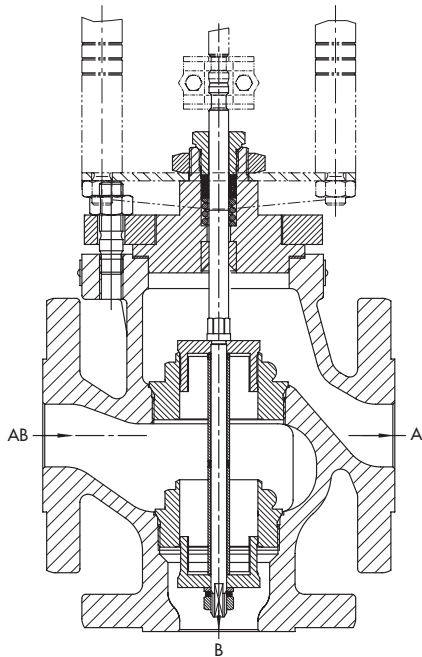


Fig. 6 · V2001-IP Valve in NPS 1/2 to 2, with a flow-diverting valve

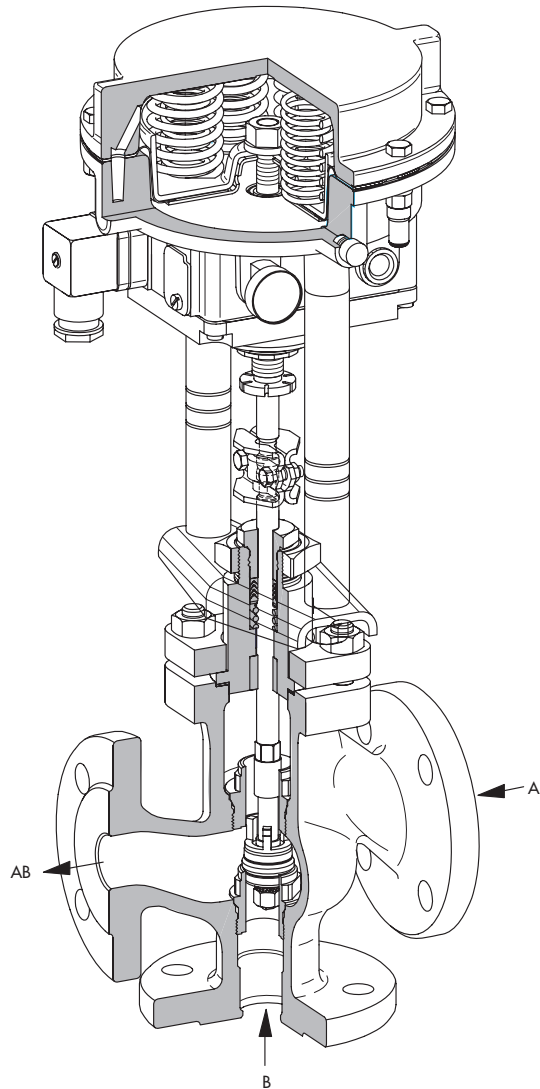


Fig. 7 · V2001-IP Electropneumatic Control Valve in NPS 1/2 to 2, with a mixing valve, actuator with integrated i/p positioner

1. V2001 Three-way Valve

Table 1.1 · Technical data

Valve size	NPS	½ · ¾ · 1 · 1½ · 2	
Material		Cast iron · A126 B	Carbon steel · A 216 WCC
Connection	Flanges	Raised face · R _a 3.2 to 12.5 μm	
Pressure rating		Class 150	Class 150 and 300
Seat/plug sealing		Metal sealing	
Characteristic		Linear	
Rangeability		30 : 1 up to NPS 1 · 50 : 1 for NPS 1½ or larger	
Temperature range		14 to 430 °F (-10 to 220 °C)	
Leakage rate acc. to DIN EN 1349		Metal sealing: I (0.05 % of C _v)	

Table 1.2 · Materials · Material number according to DIN EN

Valve size	NPS	½ · ¾ · 1 · 1½ · 2	
Valve body		Cast iron · A 126 B	Carbon steel · A 216 WCC
Valve bonnet		A 105	
Seat and plug	Seat	Up to NPS 1: 1.4305 · NPS 1½ or larger: 1.4104	
	Plug	1.4305	
Guide bushing		1.4104	
Packing		PTFE	
Body gasket		Graphite on metal core	

Table 1.3 · Valve sizes, flow coefficients and seat diameters

Valve size	NPS	½	¾	1	1½	2
	DN	15	20	25	40	50
Flow rate	C _v	5	7.5	9.4	23	37
	K _{vS}	4	6.3	8	20	32
Seat Ø	in	0.945"			1.57"	
	mm	24			40	
Rated travel		0.59" · 15 mm				

Table 1.4 · Flow coefficients and associated valves sizes

C _v		5	7.5	9.4	23	37
K _{vS}		4	6.3	8	20	32
NPS	DN					
½	15	•				
¾	20		•			
1	25			•		
1½	40				•	
2	50					•

2. Pneumatic actuators

Table 2.1 · Technical data

Actuator		Electropneumatic actuator for V2001-IP	Pneumatic actuator for V2001-P	Pneumatic actuator for V2001-PA ¹⁾
Actuator area		120 cm ²	120 cm ²	120 cm ²
Fail-safe position		Actuator stem extends or retracts		
Reference variable/ bench range for fail-safe position	Stem extend Stem retracts	4 ... 20 mA · Minimum current 3.6 mA Load impedance < 6 V (300 Ω/20 mA) Direction of operation >>, fixed	Bench range: 20 to 34 psi (1.4 to 2.3 bar)	
Characteristic		Linear, deviation from terminal-based conformity ≤ 2 %	-	Linear, deviation from terminal-based conformity ≤ 1.5 %
Hysteresis		≤ 1 %		≤ 0.5 %
Variable position		≤ 7 %		-
Transit time for rated travel p _{perm} = 60 psi (4 bar)		Approx. 3 s		2 s
Air consumption in steady-state condition		≤ 160 l _n /h at p _{perm} = 60 psi (4 bar)	-	≤ 100 l _n /h signal pressure 9 psi (0.6 bar)
Degree of protection		IP 54 ²⁾	-	IP 54 ²⁾
Permissible ambient temperature		-22 to 160 °F (-30 to +70 °C)	-31 to 194 °F (-35 to +90 °C)	-4 to 160 °F (-20 to +70 °C)
Accessories		1 or 2 limit switches with selector switch (IP 65, Ex d, supply lead 3 m) nominal voltage/current: 250 V~/5 A~ or 250 V-/0.4 A-		Inductive limit switch

1) Data apply in conjunction with Type 3760 Positioner, see Data Sheet T 8385 EN

2) IP 65 as special version with filter check valve (order no. 1790-7408)

Table 2.2 · Materials · Material number according to DIN EN

Actuator case		GD-Al Si 12		
Diaphragm		NBR		
Actuator stem		1.4305		
Positioner housing		POM-GF	-	Polyamide
Yoke	Stem	9SMn28K galvanized, mat black finish		
	Bracket	1.4301		

Table 2.3 · Permissible differential pressures for plug with metal sealing, all pressures in psi and (bar)

Fail-safe position		Actuator stem extends		Actuator stem retracts	
Bench range	psi (bar)	20 to 34 (1.4 to 2.3)		20 to 34 (1.4 to 2.3)	
Min./max. supply pressure	psi (bar)	55 to 60 (3.5 to 4.0)		55 to 60 (3.5 to 4.0)	
C _v	K _{vs}	Δp when p ₂ = 0 psi (bar)			
5 to 9.4	4 to 8	230 (16)	-	230 (16)	-
23 · 37	20 · 32	-	145 (10)	-	145 (10)

3. Electric actuators

Table 3.1 · Technical data

Actuator	for	V2001-E1	V2001-E3
Nominal thrust		0.7 kN	2.5 kN Type 3374-11
Transit time for rated travel		90 s	120 s · Other transit times on request
Power supply	230, 24 V/50 Hz		
	100 V/60 Hz	–	
Power consumption	Motor	3 VA	7.5 VA
	With positioner	–	9.5 VA
Manual override			
Degree of protection		IP 54 when vertically mounted	IP 54 · IP 65 with cable gland
	Mounting position	Suspended mounting position not permitted (see EB 5824 EN and EB 8331-1 EN)	
Permissible ambient temperature		32 to 122 °F (0 to 50 °C)	41 to 140 °F (5 to 60 °C)
Additional electrical equipment			
Limit switch		2	2
Potentiometer (not for version with positioner)		1 0 to 1000 Ω	2 0 to 1000 Ω
Positioner		Analog	Digital
Control signal		4(0) to 20 mA · 0(2) to 10 V	

Table 3.2 · Permissible differential pressures for plug with metal sealing, all pressures in psi and (bar)

Actuator	for	V2001-E1	V2001-E3
Nominal thrust		0.7 kN	2.5 kN
C_v	K_{vs}	Δp when $p_2 = 0$ psi (bar)	
5 to 9.4	4 to 8	145 (10)	360 (25)
23 to 37	20 to 32	50 (3.5)	145 (10)

4. Dimensions and weights · V2001 Three-way Valve

Valve size	NPS	½	¾	1	1½	2
	DN	15	20	25	40	50
Class 150						
Installation length L	in	7.25	7.25	7.25	8.75	10.0
	mm	184	184	184	222	254
H2	in	3.62	3.62	3.62	4.37	5
	mm	92	92	92	111	127
Class 300						
Installation length L	in	7.50	7.62	7.75	9.25	10.50
	mm	191	194	197	235	267
H2	in	3.76	3.82	3.88	4.63	5.26
	mm	95	97	98.5	117.5	133.5

Table 4.1 · V2001-IP Electropneumatic Control Valve · Dimensions for fail-safe position: actuator stem extends or retracts

H1 (stem extends)	in	11.69				11.85
	mm	297				301
H1 (stem retracts)	in	15.04				15.19
	mm	382				386
H3 (stem extends)	in	4.33				4.33
	mm	110				110
H3 (stem retracts)	in	8.26				8.26
	mm	210				210
Weight ¹⁾	lb	18.8	19.8	22	35.7	41.2
	kg	8.5	9	10	16.2	18.7

Table 4.2 · V2001-P Pneumatic Control Valve · Dimensions valid for both fail-safe positions

H1	in	11.69				11.85
	mm	297				301
H3 (minimum distance)	in	4.33				4.33
	mm	110				110
Weight ¹⁾	lb	17.9	19	21.2	34.8	40.3
	kg	8.1	8.6	9.6	15.8	18.3

Table 4.3 · V2001-PA Pneumatic Control Valve · Dimensions valid for both fail-safe positions

H1	in	13.78				13.94
	mm	350				354
H3 (minimum distance)	in	4.33				4.33
	mm	110				110
Weight ¹⁾	lb	20.1	21.2	21.8	37	42.5
	kg	9.1	9.6	9.9	16.8	19.3

Table 4.4 · V2001-E1 Electric Control Valve

H1	in	10.04				10.19
	mm	255				259
H3 (minimum distance)	in	4.33				4.33
	mm	110				110
Weight ¹⁾	lb	14.6	15.7	17.9	31.5	37
	kg	6.6	7.1	8.1	14.3	16.8

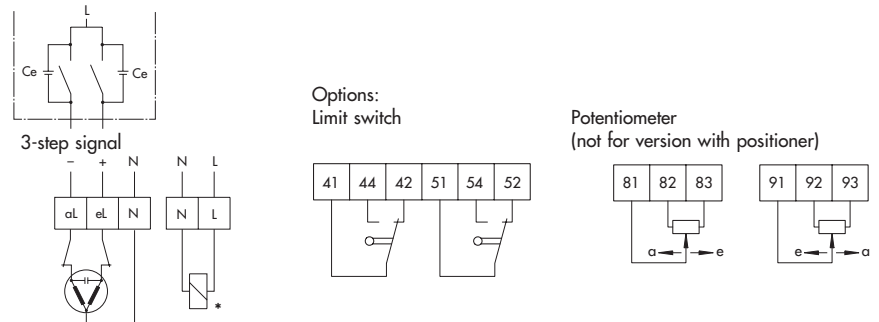
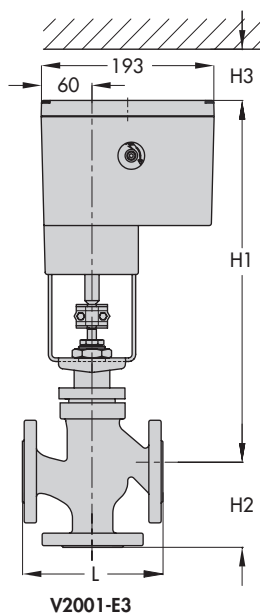
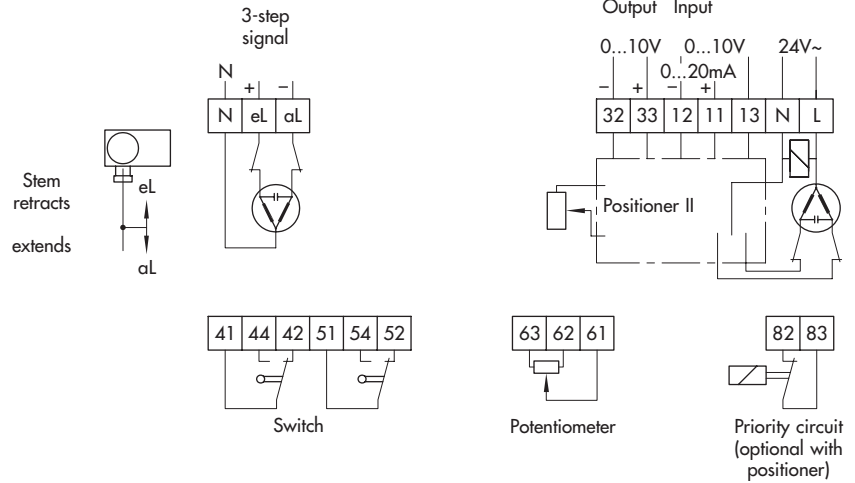
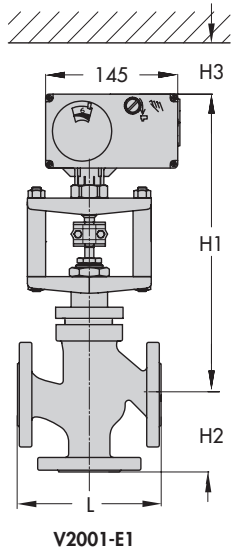
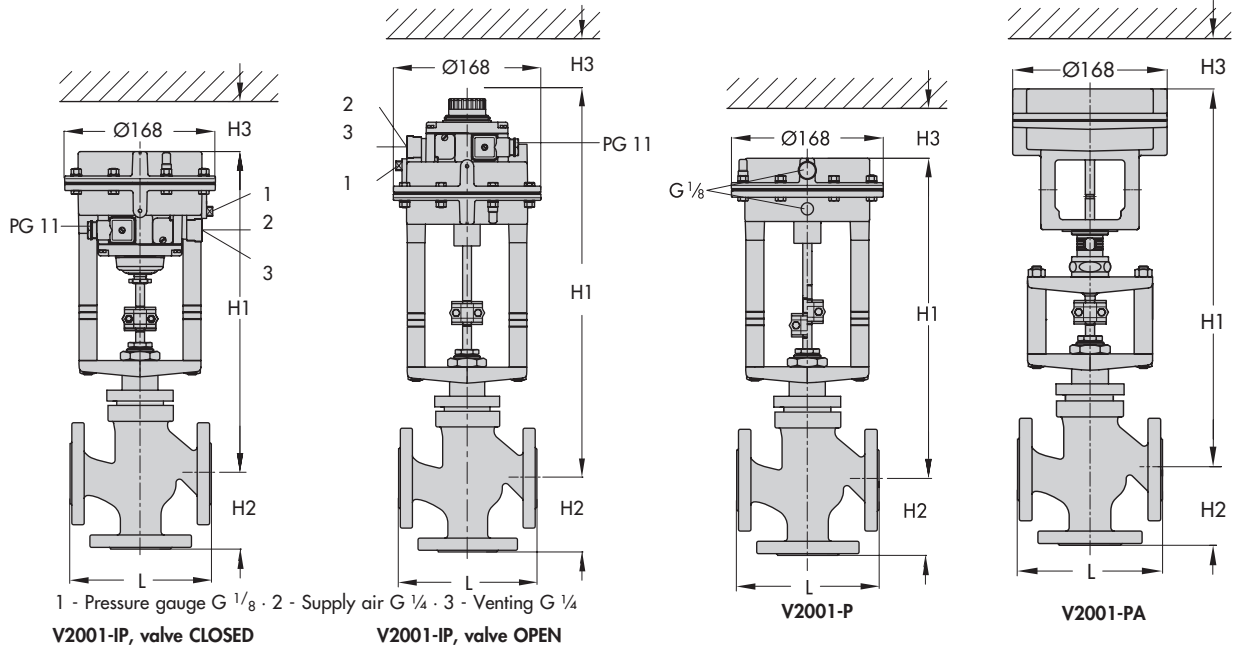
Table 4.5 · V2001-E3 Electric Control Valve

H1	in	16.38				16.54
	mm	416				420
H3 ²⁾ (minimum distance)	in	4.33				4.33
	mm	110				110
Weight ¹⁾	lb	22.7	23.8	26	39.7	45.2
	kg	10.3	10.8	11.8	18	20.5

¹⁾ The indicated weight increases by approx. 15 % for versions in Class 300

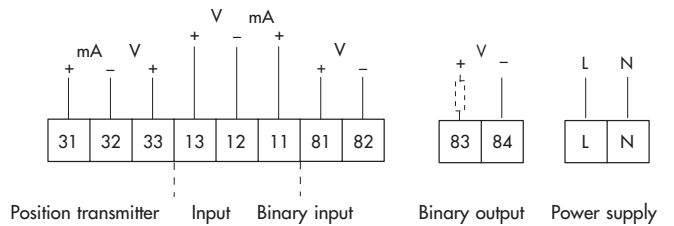
²⁾ Note: Cover screws are inserted from the top

Dimensional diagrams and terminal connections



* Magnet for version with fail-safe action

Terminal connections for version with positioner



5. Ordering text

When ordering, please indicate the following details:

V2001 Three-way Valve

	Mixing valve or flow-diverting valve
Valve size and flow rate	NPS ... Cv ...
Pressure rating	Class ...
Body material	Cast iron or carbon steel
Seat/plug sealing	Metal sealing

Actuators

for **V2001-IP**: Electropneumatic actuator
with integrated positioner

4 to 20 mA

optionally

Intrinsically safe Ex II 2 G EEx ia IIC T6 acc. to ATEX

Accessories

Limit switches 1 or 2

for **V2001-P**: Pneumatic actuator

Fail-safe action: Actuator stem extends or
retracts

Bench range 20 to 34 psi
(1.4 to 2.3 bar)

Accessories

Limit switches 1 or 2

for **V2001-PA**: Pneumatic actuator for direct attachment of a
positioner, e.g. Type 3760 (see Fig. 3)

Fail-safe action: Actuator stem extends or
retracts

Bench range 20 to 34 psi
(1.4 to 2.3 bar)

for **V2001-E1**: Electric actuator

Power supply 230 V/50 Hz or
24 V/50 Hz

Accessories

Limit switches 2
Potentiometer 0 to 1000 Ω
Positioner input 4(0) to 20 mA or
0(2) to 10 V

for **V2001-E3**: Electric actuator

Nominal thrust (w/o fail-safe action) 2.5 kN
Power supply 230 V/50 Hz
24 V/50 Hz
110 V/60 Hz

Accessories

Limit switches 2
Potentiometer 0 to 1000 Ω
Digital positioner
Input and output 4(0) to 20 mA or
0(2) to 10 V

Specifications subject to change without notice.

