

Valve Series V2001

SAMSON

Three-way Valve for Heat Transfer Oil Type 3535 with Pneumatic or Electric Actuator

DIN version

Application

Mixing or flow-diverting valves for heat transfer systems using organic heat transfer media in accordance with DIN 4754

Nominal size DN 15 to DN 80
Nominal pressure PN 16 and PN 25
Temperature range -10 to 350 °C



Type 3535 Three-way Valves for Heat Transfer Oil (as mixing or flow-diverting valves) can be equipped with either pneumatic or electric actuators:

- Electropneumatic actuator with integrated i/p positioner for Type 3535-IP or
- Pneumatic actuators for Type 3535-PP
- Electric actuators for Type 3535-E1 or Type 3535-E3

Valve body materials

- Spheroidal graphite iron, cast steel or stainless steel for PN 16 and PN 25
- Nominal sizes DN 15 to 80
- Stem sealing with metal bellows and packing
- Valve plug with metal sealing
- Mixing valves in DN 15 to 25 sizes can also be used for flow-diverting service.

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

Versions

with Type 3535 Three-way Valve for Heat Transfer Oil

Type 3535-IP Electropneumatic Mixing/Diverting Valve for Heat Transfer Oil (Fig. 1)

i/p positioner integrated into Type 3372 Pneumatic Actuator, plug connector, tight-closing function for completely venting or filling the actuator with air, reference variable 4 to 20 mA, max. 4 bar supply air, fail-safe position actuator stem extends or retracts, optionally with Type 4744-2 Limit Switch

Type 3535-PP Pneumatic Mixing/Diverting Valve for Heat Transfer Oil (Fig. 2)

with Type 3371 Pneumatic Actuator, bench range 1.4 to 2.3 bar, optionally with Type 4744-2 Limit Switch

Type 3535-E1 Electric Mixing/Diverting Valve for Heat Transfer Oil (Fig. 3)

Type 5824-30 Actuator for power supply 230 V/50 Hz or 60 Hz, 120 V/60 Hz and 24 V/50 Hz, optionally with limit switches, potentiometer, positioner

Type 3535-E3 Electric Mixing/Diverting Valve for Heat Transfer Oil (Fig. 4)

Type 3374 Actuator for power supply 230 V/50 Hz or 60 Hz, 120 V/60 Hz and 24 V/50 Hz or 60 Hz, optionally with fail-safe action (typetested), limit switches, potentiometer, positioner



Fig. 1 · Type 3535-IP



Fig. 2 · Type 3535-PP



Fig. 3 · Type 3535-E1



Fig. 4 · Type 3535-E3

Type 3535 · Temperature range down to -70 °C on request
Explosion-protected version with electric actuators on request
Type 3535 according to ANSI standards · See T 8136 EN

Edition July 2010

Data Sheet

T 8135 EN

Principle of operation

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

In mixing valves, the media to be mixed enter at valve ports A and B. The combined media exit the valve at port AB (Fig. 6). The flow rate from valve port A or B to the common port AB depends on the cross-sectional area between the seats and plugs. Mixing valves in nominal sizes DN 15 to 25 are also suitable for flow-diverting service.

In flow-diverting valves, in contrast, the medium enters at valve port AB and the partial flows exit at valve ports A and B (Fig. 5). The plug stem is sealed by a metal bellows and an additional packing.

Fail-safe position with pneumatic actuators

Depending on how the springs are arranged in the electropneumatic or pneumatic actuator, 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

Refer to the Mounting and Operating Instructions delivered with the product:

EB 8135/6 EN	Type 3535 Three-way Valve
EB 8313 EN	Pneumatic actuator for mixing/diverting valves Type 3535-IP
EB 5824 EN	Electric Actuator for Type 3535-E1
EB 8331-1 EN	Electric Actuator for Type 3535-E3

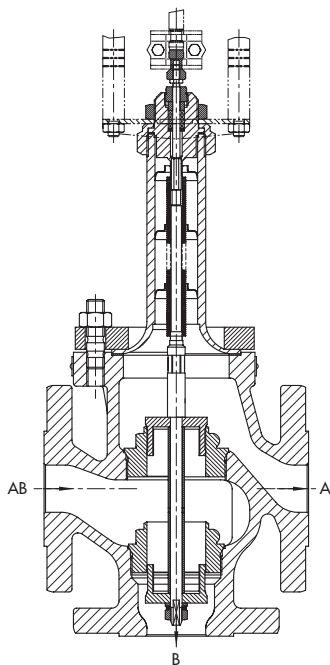


Fig. 5 · Type 3535 Three-way Valve for Heat Transfer Oil plug arrangement for diverting service

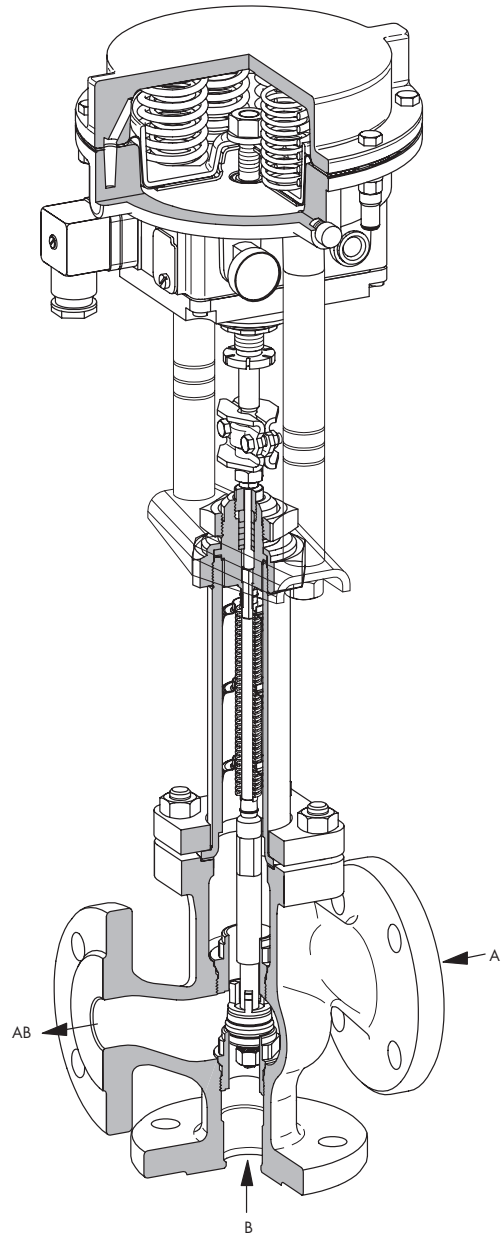


Fig. 6 · Type 3535-IP Mixing Valve for Heat Transfer Oil, pneumatic actuator with integrated i/p positioner

1. Type 3535 Three-way Valve for Heat Transfer Oil

Table 1.1 · Technical data

Nominal size	DN	15 · 20 · 25 · 32 · 40 · 50 · 65 · 80		
Material		Spheroidal graphite iron · EN-JS1024	Cast steel · 1.0619	Stainless steel · 1.4408
Connection	Flanges	EN 1092-1 Form B1, Ra 3.2 to 12.5 µm · EN 1092-1, groove Form D		
Nominal pressure	PN	16 · 25		
Seat/plug sealing		Metal sealing		
Characteristic		Linear		
Rangeability		30 : 1 up to DN 25 · 50 : 1 DN 32 or larger		
Temperature range		-10 ... 350 °C · Extended temperature range down to -70 °C on request		
Leakage class acc. to DIN EN 1349		Metal sealing: I (0.05 % of K _{vs})		

Table 1.2 · Materials · Material number according to DIN EN

Nominal size	DN	15 · 20 · 25 · 32 · 40 · 50 · 65 · 80		
Valve body		Spheroidal graphite iron · EN-JS1024	Cast steel · 1.0619	Stainless steel · 1.4408
Valve bonnet		Cast steel S235JR (St 37)		1.4408
Seat and plug	Seat	Up to DN 25: 1.4305 · DN 32 or larger: 1.4104		
	Plug	1.4305		
Bellows seal		1.4541 · 1.4301		
Packing		PTFE		
Body gasket		Graphite on metal core		

Table 1.3 · Nominal sizes, K_{vs} coefficients and seat diameters

Nominal sizes	DN	15	20	25	32	40	50	65	80
K _{vs}		4	6.3	8	16	20	32	50	80
Seat diameter	mm	24			40			65	
Rated travel	mm	15							

Table 1.4 · K_{vs} coefficients and associated nominal sizes

K _{vs}	4	6.3	8	16	20	32	50	80
DN								
15	•							
20		•						
25			•					
32				•				
40					•			
50						•		
65							•	
80								•

2. Pneumatic actuators

Table 2.1 · Technical data

Actuator		Electropneumatic actuator for Type 3535-IP	Pneumatic actuator for Type 3535-PP
Actuator area		120 cm ²	120 cm ²
Fail-safe position		Actuator stem extends or retracts	
Reference variable/ bench range for fail-safe position	Stem extends	4 to 20 mA · Minimum current 3.6 mA Load impedance < 6 V (300 Ω/20 mA) Direction of operation >>, fixed	Bench range: 1.4 to 2.3 bar
	Stem retracts		Bench range: 1.4 to 2.3 bar
Characteristic		Linear, deviation from terminal-based conformity ≤ 2 %	
Hysteresis		≤ 1 %	
Variable position		≤ 7 %	
Transit time for rated travel		$p_{perm} = 4 \text{ bar}$	Approx. 3 s
Air consumption in steady-state condition		≤ 160 l _n /h at $p_{perm} = 4 \text{ bar}$	–
Degree of protection		IP 54 ²⁾	–
Perm. ambient temperature		–30 to +70 °C	–35 to +90 °C
Accessories		1 or 2 limit switches with changeover contact (IP 65, Ex d, 3 m lead) nominal voltage/current: 250 V~/5 A~ or 250 V~/0.4 A-	

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	Rods	9SMn28K galvanized, matt black finish		
	Crossbeam	1.4301		

Table 2.3 · Permissible differential pressures for plug with metal sealing, all pressures in bar

Fail-safe position		Actuator stem extends			Actuator stem retracts		
Bench range	bar	1.4 to 2.3			1.4 to 2.3		
Min./max. supply pressure	bar	3.7 to 4.0			3.7 to 4.0		
K _{vS}		Δp when p ₂ = 0 bar					
1.6 to 8		16	–	–	16	–	–
16 to 32		–	10	–	–	10	–
50 · 80		–	–	3.5	–	–	3.5

3. Electric actuators

Table 3.1 · Technical data

Actuator	for	Type 3535-E1	Type 3535-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 V/50 Hz	•	•
	230 V/60 Hz	Special version	•
	120 V/60 Hz	•	•
	24 V/50 Hz	•	•
	24 V/60 Hz	–	•
Power consumption	Motor	3 VA	7.5 VA
	With positioner	–	9.5 VA
Manual override		•	•
Degree of protection		IP 54 when mounted upright	IP 54 · IP 65 with cable gland
	Mounting position	Suspended mounting position not permitted (see EB 5824 EN and EB 8331-1 EN)	
Perm. ambient temperature		0 to 50 °C	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		Digital ¹⁾	Digital
Input signal		0(4) to 20 mA · 0(2) to 10 V	
Output signal		0(2) to 10 V	

¹⁾ Power supply for version with positioner: 24 V DC, 24 V/50 Hz and 60 Hz as well as 85 to 264 V/50 Hz and 60 Hz

Table 3.2 · Permissible differential pressure for plug with metal sealing, all pressures in bar

Actuator	for	Type 3535-E1	Type 3535-E3
Nominal thrust		0.7 kN	2.5 kN
	K_{VS}	Δp when $p_2 = 0$ bar	
	1.6 to 8	10	16
	16 to 32	3.5	12
	50 · 80	–	4

4. Dimensions in mm and weights in kg · Type 3535 Three-way Valve for Heat Transfer Oil

Nominal size	DN	15	20	25	32	40	50	65	80
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Table 4.1 · Type 3535-IP Electropneumatic Control Valve · Dimensions for fail-safe position actuator stem extends or retracts

L (installation length)	mm	130	150	160	180	200	230	290	310
Installation height									
H1 (stem extends)	mm	471			481			586	
H1 (stem retracts)	mm	556			566			671	
H2	mm	70	80	85	100	105	120	130	140
H3 (stem extends)	mm	110			110			110	
H3 (stem retracts)	mm	210			210			210	
Weight									
Weight	kg	8.7	9.2	10.2	16.7	17.2	19.7	30.7	35.7

Table 4.2 · Type 3535-PP Pneumatic Control Valve · Dimensions valid for both fail-safe positions

L (installation length)	mm	130	150	160	180	200	230	290	310
Installation height									
H1	mm	471			481			586	
H2	mm	70	80	85	100	105	120	130	140
H3 (minimum distance)	mm	110			110			110	
Weight									
Weight		8.3	8.8	9.8	16.3	16.8	19.3	30.3	35.3

Table 4.3 · Type 3535-E1 Electric Control Valve

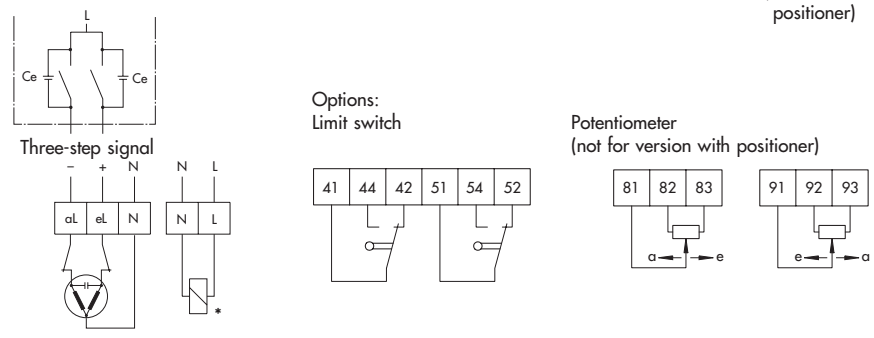
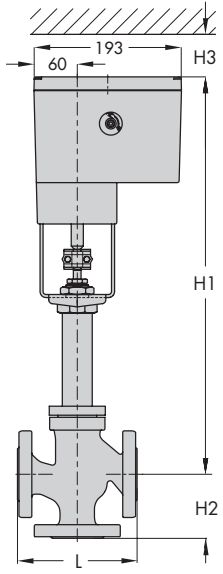
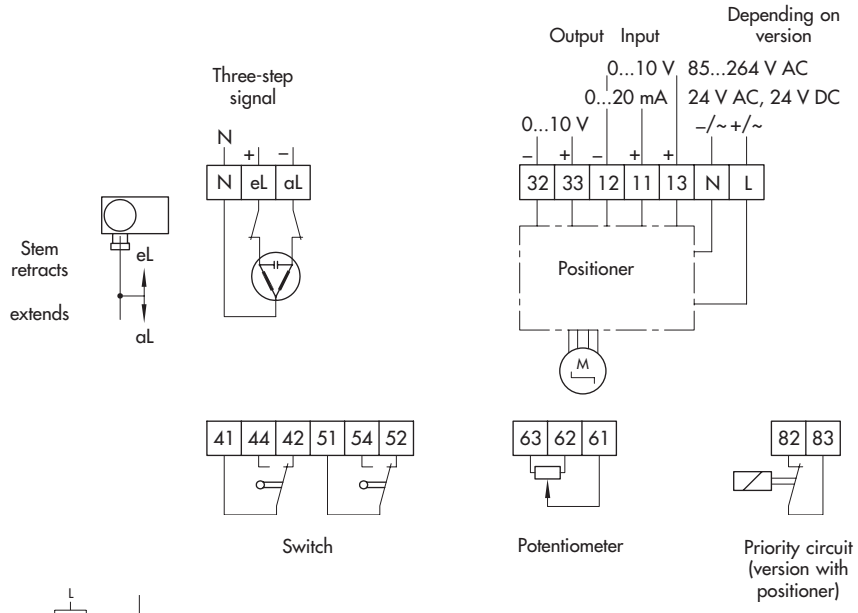
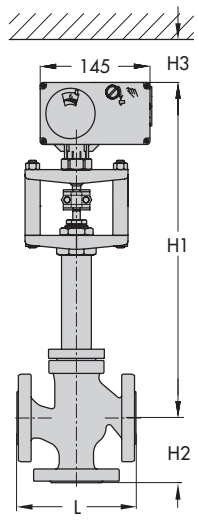
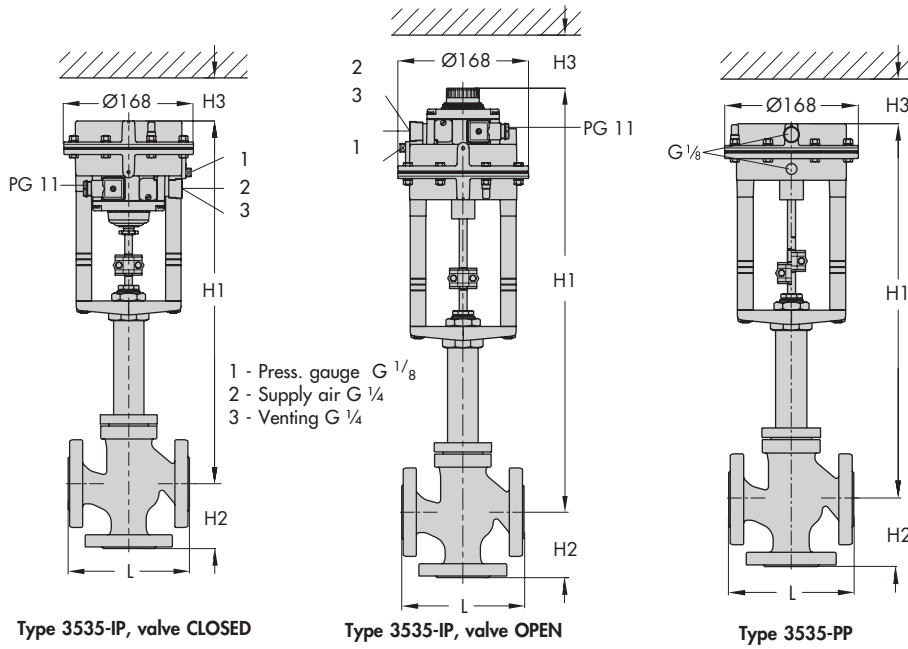
L (installation length)	mm	130	150	160	180	200	230	–	
Installation height									
H1	mm	429			439			–	
H2	mm	70	80	85	100	105	120		
H3 (minimum distance)	mm	110			110				
Weight									
Weight	kg	6.8	7.3	8.3	14.8	15.3	17.8		

Table 4.4 · Type 3535-E3 Electric Control Valve

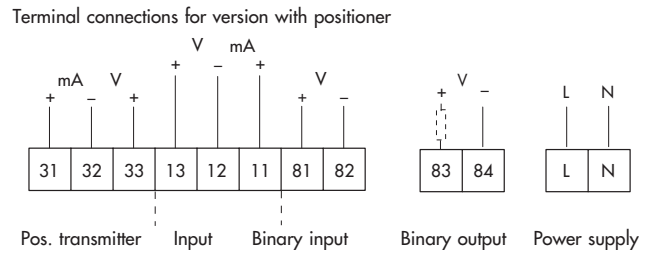
L (installation length)	mm	130	150	160	180	200	230	290	310
Installation height									
H1	mm	529			539			644	
H2	mm	70	80	85	100	105	120	130	140
H3 ¹⁾ (minimum distance)	mm	110			110			110	
Weight									
Weight	kg	10.5	11	12	18.5	19	21.5	32.5	37.5

¹⁾ Note: Cover screws are inserted from the top

Dimensional diagrams and terminal connections



* Magnet for version with fail-safe action



5. Ordering text

When ordering, please indicate the following details:

Type 3535 Three-way Valve for Heat Transfer Oil

	Mixing or flow-diverting valve
Nominal size and flow rate	DN Kvs
Nominal pressure	PN
Body material	Spheroidal graphite iron, cast steel or stainless steel
Seat/plug sealing	Metal sealing

Actuators

for **Type 3535-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 switch 1 or 2

for **Type 3535-PP**: Pneumatic actuator

Fail-safe position: Actuator stem extends or
retracts

Bench range 1.4 to 2.3 bar

Accessories

Limit switch 1 or 2

for **Type 3535-E1**: Electric actuator

Power supply

Three-step signal 230 V/50 Hz,
230 V/60 Hz,
120 V/60 Hz,
24 V/50 Hz

Version with positioner 24 V DC,
24 V/50 Hz, 60 Hz
85 to 264 V/50 Hz and 60 Hz

Accessories

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

for **Type 3535-E3**: Electric actuator

Nominal thrust 2.5 kN
(only without fail-safe action)

Power supply 230 V/50 Hz,
230 V/60 Hz,
120 V/60 Hz
24 V/50 Hz
24 V/60 Hz

Accessories

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

Specifications subject to change without notice.

