

# Valve Series V2001

## Globe Valve for Heat Transfer Oil Type 3531 with Pneumatic or Electric Actuator



DIN version

### Application

Control valves designed 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 3531 Globe Valve for Heat Transfer Oil can be equipped with either a pneumatic or electric actuator:

- Electropneumatic actuator with integrated i/p positioner for Type 3531-IP
- Pneumatic actuators for Type 3531-PP
- Electric actuators for Type 3531-E1 or Type 3531-E3

Valve body materials

- Spheroidal graphite iron, cast steel or stainless steel for PN 16 and PN 25
- Nominal sizes DN 15 to DN 80
- Stem sealing with metal bellows and packing
- Valve plug with metal sealing.

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

### Versions

with Type 3531 Globe Valve for Heat Transfer Oil

**Type 3531-IP Electropneumatic Globe Valve for Heat Transfer Oil** (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. 6 bar supply air, fail-safe position valve CLOSED or OPEN, optionally with Type 4744-2 Limit Switch

**Type 3531-PP Pneumatic Globe Valve for Heat Transfer Oil** with Type 3371 Pneumatic Actuator, bench range 2.1 to 3.3 bar for version with fail-safe position valve CLOSED or 0.4 to 1.4 bar for version with fail-safe position valve OPEN, optionally with Type 4744-2 Limit Switch (Fig. 2)

**Type 3531-E1 Electric Globe Valve for Heat Transfer Oil** Nominal sizes DN 15 to 50 with Type 5824-30 Electric Actuator, power supply 230 V/50 Hz or 60 Hz, 110 V/60 Hz and 24 V/50 Hz, optionally with limit switches, potentiometer, positioner (Fig. 3)

**Type 3531-E3 Electric Globe Valve for Heat Transfer Oil** with Type 3374 Electric Actuator (Fig. 4) 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

**Type 3531** · Temperature range down to -70 °C on request

**Explosion-protected version** with electric actuators on request

**Type 3531 according to ANSI standards** · See T 8132 EN



Fig. 1 · Type 3531-IP



Fig. 2 · Type 3531-PP



Fig. 3 · Type 3531-E1



Fig. 4 · Electric Actuator for Type 3531-E3

### Principle of operation

The process medium flows through the valve in the direction indicated by the arrow (Figs. 5 and 6) in the flow-to-open direction. The valve plug position determines the cross-sectional area between the seat and plug. The plug stem is connected to the actuator stem by the stem connector and sealed by a metal bellows.

### 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)

The valve closes when the supply air fails.

#### Actuator stem retracts (FE)

The valve opens when the supply air fails.

### Associated documentation

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

- EB 8111/2 EN Globe Valve Type 3531
- EB 8313 EN Actuator for Type 3531-IP
- EB 5824 EN Electric Actuator for Type 3531-E1
- EB 8331-1 EN Electric Actuator for Type 3531-E3

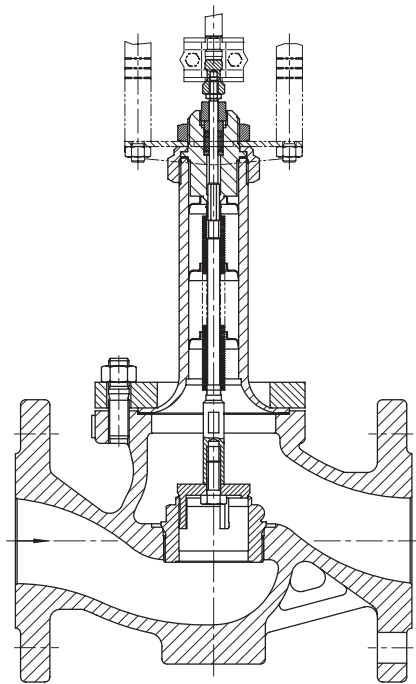


Fig. 5 · Type 3531-IP Globe Valve for Heat Transfer Oil in DN 15 to 50

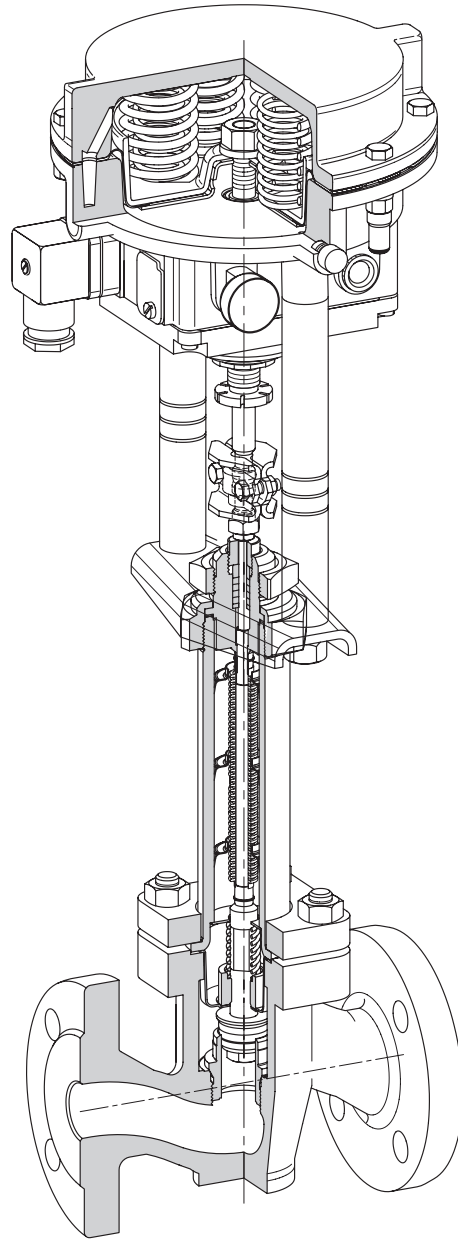


Fig. 6 · Type 3531-IP Globe Valve for Heat Transfer Oil, actuator with integrated i/p positioner

# 1. Type 3531 Globe 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		Equal percentage		
Rangeability		50 : 1		
Temperature range		-10 ... 350 °C · Extended temperature range down to -70 °C on request		
Leakage class according to DIN EN 1349		Metal sealing: Class IV For Type 3531-E1 Control Valves: Class I (0.05 % of the K <sub>VS</sub> coefficient)		

**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 (0.7043)	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 to 50: 1.4104 · DN 65 and 80: 1.4006		
	Plug	1.4305		
Bellows seal		1.4541 · 1.4301		
Packing		PTFE		
Body gasket		Metal graphite		

**Table 1.3 · Nominal sizes, K<sub>VS</sub> coefficients, seat diameters and travels**

Nominal size	DN	15		20		25		32	40	50	65	80
K <sub>VS</sub> coefficient		1.6	4	2.5	6.3	4	10	16	25	35	50	80
Seat diameter	mm	9.5	19	14	22	19	24	32	32	40	65	
Rated travel	mm	15										

**Table 1.4 · K<sub>VS</sub> coefficients and associated nominal sizes**

K <sub>VS</sub>	1.6	2.5	4	6.3	10	16	25	35	50	80
DN										
15	•		•							
20		•		•						
25			•		•					
32						•				
40							•			
50								•		
65									•	
80										•

## 2. Pneumatic actuators

Table 2.1 · Technical data

Actuator		Electropneumatic actuator for Type 3531-IP	Pneumatic actuator for Type 3531-PP
Actuator area		120 cm <sup>2</sup>	120 cm <sup>2</sup>
Fail-safe position		Valve CLOSED or valve OPEN	
Reference variable/ bench range for fail-safe position	CLOSED	4 to 20 mA · Minimum current 3.6 mA Load impedance < 6 V (300 Ω/20 mA) Direction of action >>, fixed	2.1 to 3.3 bar
	OPEN		0.4 to 1.4 bar
Characteristic		Linear, deviation from terminal-based conformity ≤ 2 %	-
Hysteresis		≤ 1 %	
Variable position		≤ 7 %	
Transit time for rated travel	p <sub>perm</sub> =4 bar	Approx. 3 s	
Air consumption in steady-state condition		≤ 160 l <sub>n</sub> /h at p <sub>perm</sub> = 4 bar ≤ 200 l <sub>n</sub> /h at p <sub>perm</sub> = 6 bar	-
Degree of protection		IP 54 <sup>2)</sup>	-
Permissible 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

Fail-safe position		Valve CLOSED		Valve OPEN	
Bench range	bar	1.4 to 2.3	2.1 to 3.3	1.4 to 2.3	0.4 to 1.4
Min./max. supply pressure	bar	2.8 to 4.0	3.7 to 6.0	3.7 to 4.0	3.5 to 6.0
K <sub>V5</sub> coefficients		Δp when p <sub>2</sub> = 0 bar			
1.6 · 10		16	-	16	-
16 to 35		10	-	10	-
50 · 80		3.5	5.0	3.5	5.0

### 3. Electric actuators

Table 3.1 · Technical data

Actuator	for	Type 3531-E1	Type 3531-E3	
Thrust		0.7 kN	2.5 kN Type 3374-11	2.0 kN Type 3374-21/31 <sup>1)</sup>
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	10.5 VA
	With positioner	–	9.5 VA	12.5 VA
Manual override		•	•	
Degree of protection		IP 54 when installed upright	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		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 <sup>2)</sup>	Digital	
Input signal		0(4) to 20 mA · 0(2) to 10 V		
Output signal		0(2) to 10 V		

1) Actuators with fail-safe position: Type 3374-21 actuator stem extends; Type 3374-31 actuator stem retracts

2) 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 pressures

Table 3.2.1 · Plug with metal sealing, all pressures in bar

Actuator	for	Type 3531-E1	Type 3531-E3
Thrust		0.7 kN	2.5 kN
	K <sub>V</sub> S coefficients	Δp when p <sub>2</sub> = 0 bar	
	1.6 to 10	10	16
	16 to 35	3.5	12
	50 · 80	–	4

#### 4. Dimensions in mm and weights in kg · Type 3531 Globe Valve

Nominal size	DN	15	20	25	32	40	50	65	80
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**Table 4.1 · Type 3531-IP Electropneumatic Valve · Dimensions for fail-safe position valve OPEN or valve CLOSED**

L (Installation length)	mm	130	150	160	180	200	230	290	310
Installation height									
H1 (Valve CLOSED)	mm		471			481		586	
H1 (Valve OPEN)	mm		556			566		671	
H2	mm		40			72		98	
H3 (Valve CLOSED)	mm		110			110		110	
H3 (Valve OPEN)	mm		210			210		210	
Weight									
Weight	kg	7.7	8.7	10	14.7	15.3	18.2	25.7	34.5

**Table 4.2 · Type 3531-PP Pneumatic Valve · Dimensions valid for both fail-safe positions**

L (Installation length)	mm	130	150	160	180	200	230	290	310
Installation height									
H1 (Valve CLSD or OPEN)	mm		471			481		586	
H2	mm		40			72		98	
H3 (minimum distance)	mm		110			110		110	
Weight									
Weight	kg	7.3	8.3	9.6	14.3	14.9	17.8	25.3	31.1

**Table 4.3 · Type 3531-E1 Electric Valve**

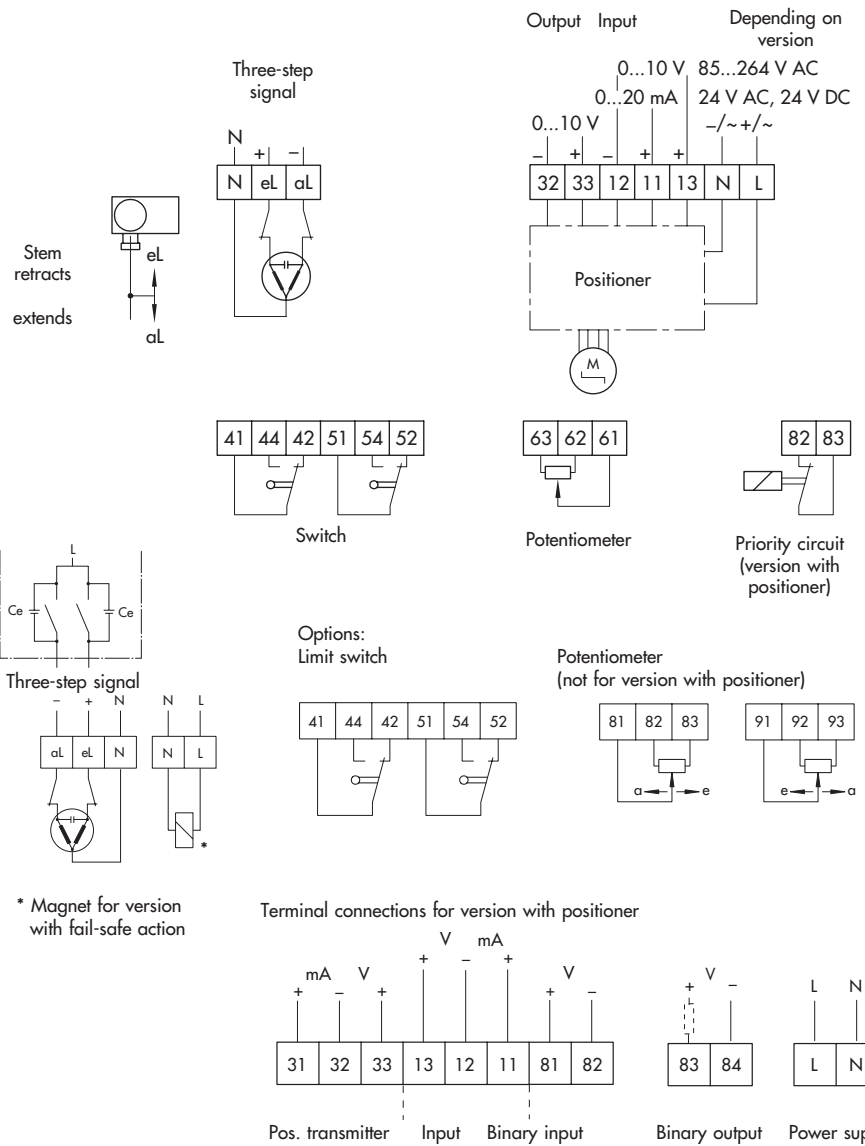
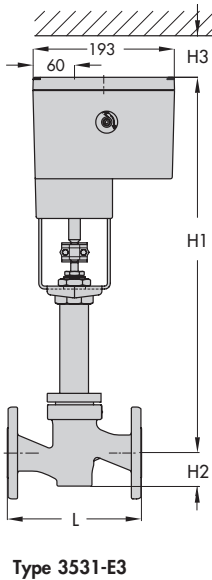
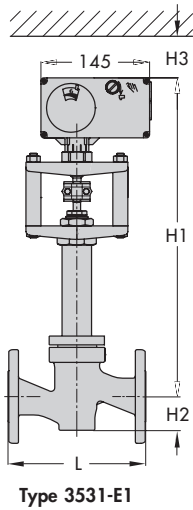
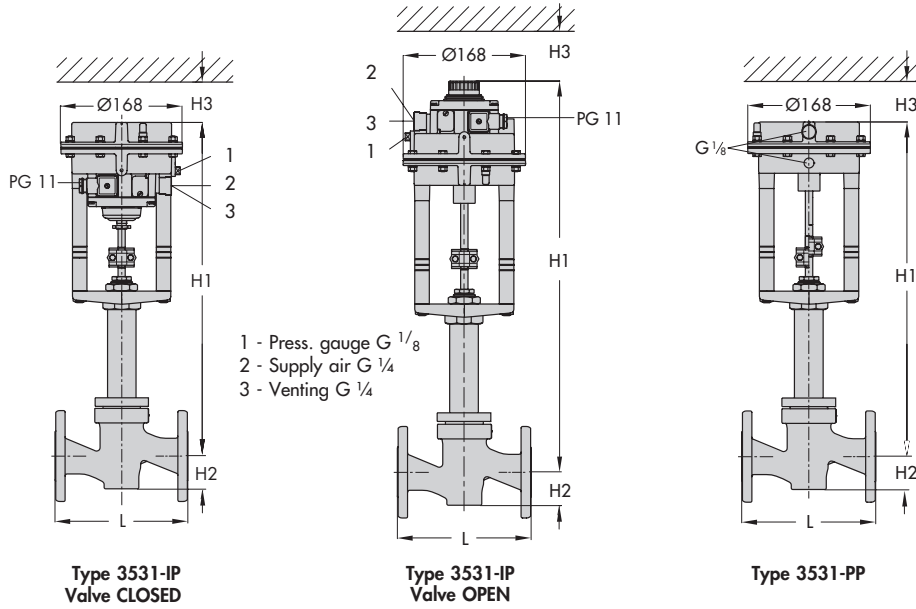
L (Installation length)	mm	130	150	160	180	200	230	–	
Installation height									
H1	mm		429			439		–	
H2	mm		40			72		–	
H3 (minimum distance)	mm		110			110		–	
Weight									
Weight	kg	5.8	6.8	8.1	12.8	13.4	16.3	–	

**Table 4.4 · Type 3531-E3 Electric Valve**

L (Installation length)	mm	130	150	160	180	200	230	290	310
Installation height									
H1	mm		529			539		644	
H2	mm		40			72		98	
H3 <sup>1)</sup> (minimum distance)	mm		110			110		110	
Weight									
Weight	kg	9.5	10.5	11.8	16.5	17.1	20.0	27.5	36.3

<sup>1)</sup> Note: Cover screws are inserted from the top.

**Dimensional diagrams and terminal connections**



## 5. Ordering text

When ordering, please indicate the following details:

### Type 3531 Globe 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 3531-IP**: Electropneumatic actuator

with integrated positioner 4 to 20 mA

optionally

Intrinsically safe  $\text{Ex}$  II 2 G EEx ia IIC T6 acc. to ATEX

Accessories

Limit switch 1 or 2

for **Type 3531-PP**: Pneumatic actuator

Fail-safe position Valve CLOSED or  
valve OPEN

Bench range Valve CLOSED 2.1 to 3.3 bar  
Valve OPEN 0.4 to 1.4 bar

Accessories

Limit switch 1 or 2

for **Type 3531-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  $\Omega$   
Positioner input 0(4) to 20 mA or  
0(2) to 10 V

for **Type 3531-E3**: Electric actuator

Fail-safe position Valve CLOSED or  
valve OPEN

Nom. thrust with fail-safe action 2 kN  
w/o fail-safe action 2.5 kN

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  $\Omega$   
Digital positioner  
Input and output 0(4) to 20 mA or  
0(2) to 10 V

Specifications subject to change without notice.

