

T 8131 EN

Series V2001 Valves · Type 3531 Globe Valve for Heat Transfer Oil with electropneumatic, pneumatic or electric actuator

DIN version



Application

Control valves for heat transfer applications using organic media according to DIN 4754

Nominal size	DN 15 to 80
Pressure rating	PN 25
Temperature range	-10 to +350 °C

The Type 3531 Globe Valve for Heat Transfer Oil can be equipped with either pneumatic or electric actuators:

- 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

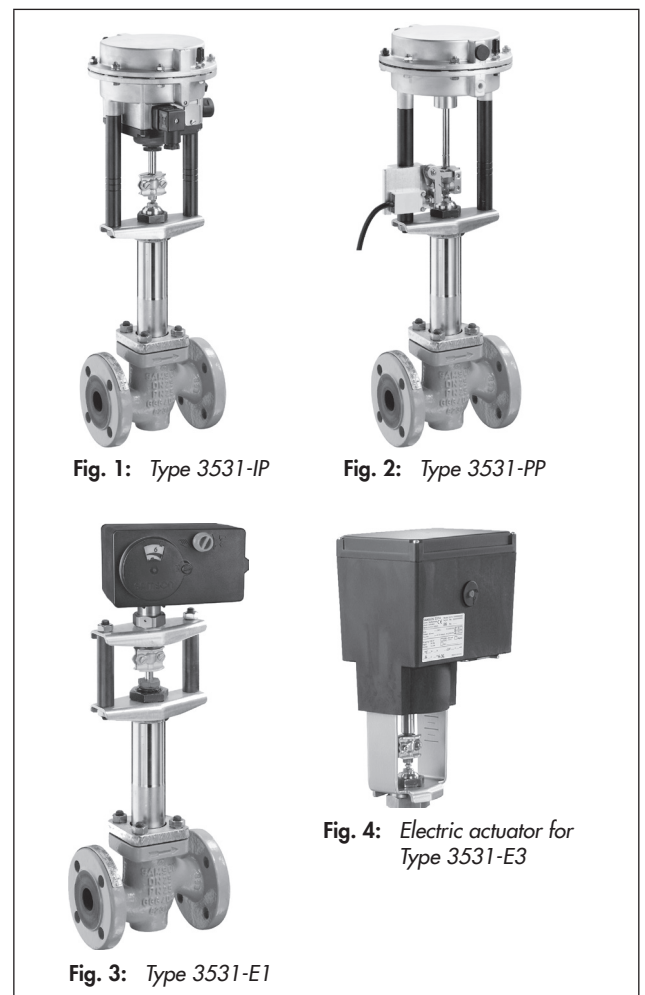
Valve body materials

- Spheroidal graphite iron, cast steel or stainless steel for PN 25
- Nominal sizes DN 15 to 80
- Stem sealed by metal bellows and additional packing
- Metal-seated valve plug

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

Versions

- **Type 3531-IP Electropneumatic Globe Valve for Heat Transfer Oil** with Type 3372 Electropneumatic Actuator (Fig. 1) · Plug connector, tight-closing function for completely venting or filling the actuator with air, 4 to 20 mA reference variable, max. 6 bar supply air, fail-close or fail-open, optionally with Type 4744-2 Limit Switch
- **Type 3531-PP Pneumatic Globe Valve for Heat Transfer Oil** with Type 3371 Pneumatic Actuator (Fig. 2), bench range 2.1 to 3.3 bar for fail-close version or 0.4 to 1.4 bar for fail-open version, optionally with Type 4744-2 Limit Switch
- **Type 3531-E1 Electric Globe Valve for Heat Transfer Oil** (Fig. 3) in DN 15 to 50 with Type 5827-N3 Electric Actuator, supply voltage 230 V/50 Hz or 24 V/50 Hz, optionally with limit contacts, resistance transmitter, positioner



- **Type 3531-E3 Electric Globe Valve for Heat Transfer Oil** with Type 3374 Electric Actuator (Fig. 4), supply voltage 230 V/50 Hz or 230 V/60 Hz, 24 V/50 Hz or 24 V/60 Hz, optionally with fail-safe action (typetested), limit contacts, resistance transmitters, positioner

Further versions

- **Type 3531** · Temperature range down to $-70\text{ }^{\circ}\text{C}$ · On request
- **Explosion-protected version** with electric actuators · On request
- **Type 3531 according to ANSI standards** · See Data Sheet
▶ T 8132

Principle of operation

The process medium flows through the valve in the direction indicated by the arrow in the flow-to-open direction (Fig. 5, Fig. 6). 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 electro-pneumatic, pneumatic or electric actuator, the control valve has two different fail-safe positions that become effective when the supply air or control signal fails:

- **Actuator stem extends (fail-close):** The valve closes when the supply air fails.
- **Actuator stem retracts (fail-open):** The valve opens when the supply air fails.

Associated documentation

Instructions on how to mount the valve on the actuator can be found in the mounting and operating instructions delivered with the product:

- ▶ EB 8111 Type 3531 Globe Valve
- ▶ EB 8313-1 Actuator for Type 3531-IP
- ▶ EB 8313-3
- ▶ EB 5827-1 Electric actuator for Type 3531-E1
- ▶ EB 8331-3 Electric actuator for Type 3531-E3

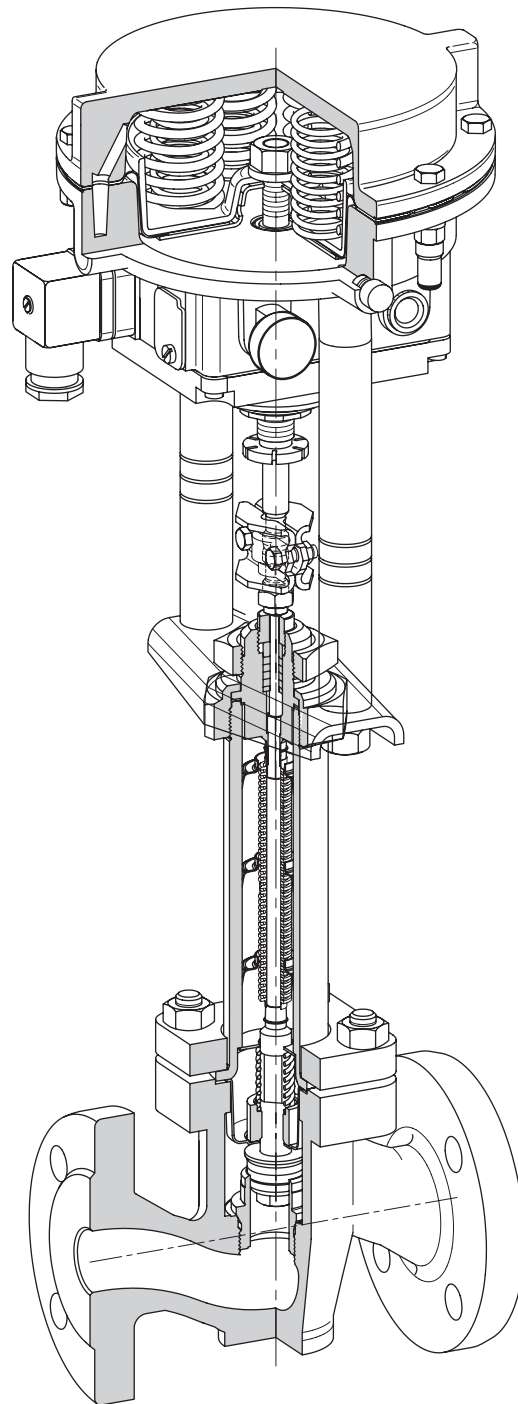
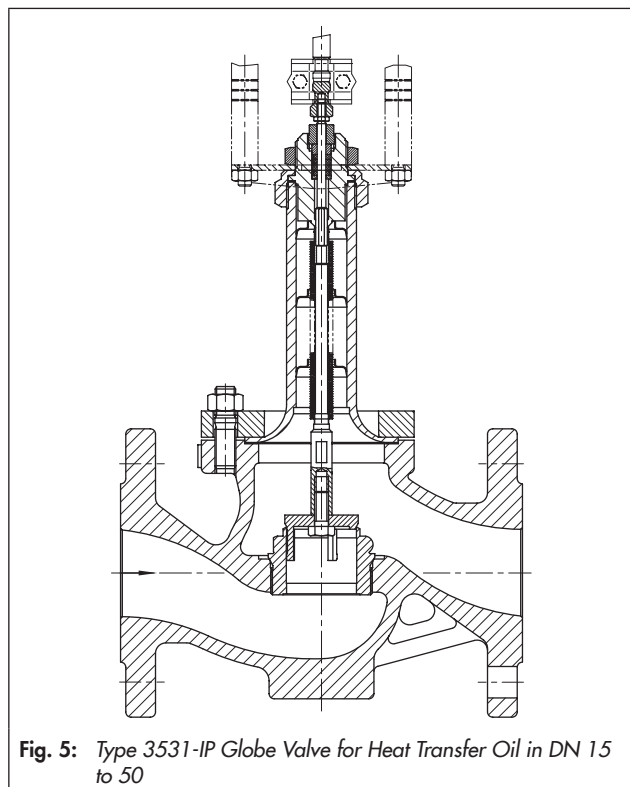


Fig. 6: Type 3531-IP Globe Valve for Heat Transfer Oil, actuator with integrated electropneumatic positioner

Table 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-GJS-400-18-LT	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		
Pressure rating	PN	25		
Seat-plug seal		Metal seal		
Characteristic		Equal percentage		
Rangeability		50:1		
Temperature range		-10 to +350 °C · Extended temperature range lower than -70 °C on request		
Leakage class according to IEC 60534-4		Metal seal: Class IV Type 3531-E1: Class I (0.05 % of K_{VS} coefficient)		
Conformity		CE · EAC		

Table 1.2: Materials · (previous material designation written in parentheses)

Nominal size	DN	15 · 20 · 25 · 32 · 40 · 50 · 65 · 80		
Valve body		Spheroidal graphite iron · EN-GJS-400-18-LT	Cast steel · 1.0619	Stainless steel · 1.4408
Valve bonnet		1.0460		1.4408
Seat and plug	Seat	Up to DN 50: 1.4401/1.4404 DN 65 and larger: 1.4006		1.4401/1.4404
	Plug	Up to DN 50: 1.4305 DN 65 and larger: 1.4104		
Bellows seal		1.4571		
Packing		PTFE		
Body gasket		Graphite on metal core		

Table 1.3: Nominal sizes, K_{VS} coefficients, seat diameters and travel

Nominal size	DN	15		20		25		32	40	50	65	80
		K_{VS}	1.6	4	2.5	6.3	4	10	16	25	35	50
Seat Ø	mm	9.5	19	14	22	19	24	32	40	40	65	
Rated travel	mm	15										

Table 1.4: K_{VS} coefficients and associated nominal sizes

K_{VS}	1.6	2.5	4	6.3	10	16	25	35	50	80
DN										
15	•		•							
20		•		•						
25			•		•					
32						•				
40							•			
50								•		
65									•	
80										•

Table 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 ²	120 cm ²
Fail-safe position	Fail-close or fail-open	
Reference variable/bench range with fail-safe action	CLOSED	4 to 20 mA · Minimum current 3.6 mA Load impedance <6 V (300 Ω/20 mA) Operating direction increasing/increasing >>, fixed
	OPEN	
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	≤160 l _n /h at $p_{perm} = 4 \text{ bar}$ ≤200 l _n /h at $p_{perm} = 6 \text{ bar}$	-
Degree of protection	IP 54	-
Permissible ambient temperature	-30 to +70 °C	-35 to +90 °C
Additional electrical equipment	1 or 2 changeover contacts (IP 65, Ex d, 3 m cable) Nominal voltage/current: 250 V~/5 A~ or 250 V~/0.4 A~	

Table 2.2: Materials

Actuator housing	GD-Al Si 12		
Diaphragm	NBR		
Actuator stem	1.4305		
Positioner housing	POM-GF	-	Polyamide
Yoke	Stem	9SMn28K zinc-plated, matt black finish	
	Crossbeam	1.4301	

Table 2.3: Permissible differential pressures

Fail-safe position		Fail-close		Fail-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_{VS} coefficients		Δp when $p_2 = 0 \text{ bar}$			
1.6 to 10		16	-	16	-
16 to 35		10	-	10	-
50 and 80		3.5	5.0	3.5	5.0

Table 3: *Electric actuators***Table 3.1:** *Technical data*

Actuator	for	Type 3531-E1	Type 3531-E3	
Positioning force		0.7 kN	2.5 kN (Type 3374-11)	2.0 kN (Type 3374-21/31) ¹⁾
Transit time for rated travel		90 s	120 s · Other transit times on request	
Supply voltage	230 V/50 Hz	•	•	
	230 V/60 Hz	Special version	•	
	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 orientation		Suspended mounting not permitted (see ► EB 5827-1 and ► EB 8331-3)		
Permissible ambient temperature		0 to 50 °C	5 to 60 °C	
Additional electrical equipment				
Limit switch	Limit contacts	2	2	
Resistance transmitters (not for version with positioner)		1 0 to 1000 Ω	2 0 to 1000 Ω	
Positioner		Digital ²⁾	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 action: Type 3374-21 with stem extends, Type 3374-31 with stem retracts

²⁾ Power supply for version with positioner: 24 V DC, 24 V/50 and 60 Hz as well as 85 to 264 V/50 and 60 Hz

Table 3.2: *Permissible differential pressures for metal-seated plug · All pressures in bar*

Actuator	for	Type 3531-E1	Type 3531-E3
Positioning force		0.7 kN	2.5 kN
K_{VS} coefficients		Δp when $p_2 = 0$ bar	
1.6 to 10		10	16
16 to 35		3.5	12
50 and 80		–	4

Table 4: Dimensions in mm and weights in kg · Type 3531 Globe Valve

The weights specified apply to a specific standard device configuration. Weights of other device configurations may differ depending on the version (material, trim or number of actuator springs etc.).

Table 4.1: Type 3531-IP Electropneumatic Control Valve · Dimensions for fail-open or fail-close version

Nominal size	DN	15	20	25	32	40	50	65	80	
L (face-to-face dimension)	mm	130	150	160	180	200	230	290	310	
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	kg	7.7	8.7	10	14.7	15.3	18.2	25.7	34.5	

Table 4.2: Type 3531-PP Pneumatic Control Valve · Dimensions apply to both fail-safe positions

Nominal size	DN	15	20	25	32	40	50	65	80	
L (face-to-face dimension)	mm	130	150	160	180	200	230	290	310	
Height										
H1 (fail-close or fail-open)	mm	471			481			586		
H2	mm	40			72			98		
H3 (minimum distance)	mm	110			110			110		
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 Control Valve

Nominal size	DN	15	20	25	32	40	50	65	80	
L (face-to-face dimension)	mm	130	150	160	180	200	230	–		
Height										
H1	for Type 5827 Actuator mm	432			442			–		
H2	mm	40			72					
H3 (minimum distance)	mm	110			110					
Weight	kg	5.8	6.8	8.1	12.8	13.4	16.3			

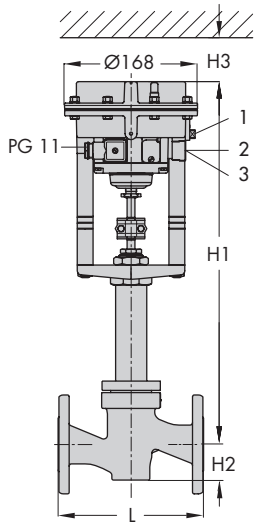
Table 4.4: Type 3531-E3 Electric Control Valve

Nominal size	DN	15	20	25	32	40	50	65	80	
L (face-to-face dimension)	mm	130	150	160	180	200	230	290	310	
Height										
H1	mm	529			539			644		
H2	mm	40			72			98		
H3 ¹⁾ (minimum distance)	mm	110			110			110		
Weight	kg	9.5	10.5	11.8	16.5	17.1	20	27.5	36.3	

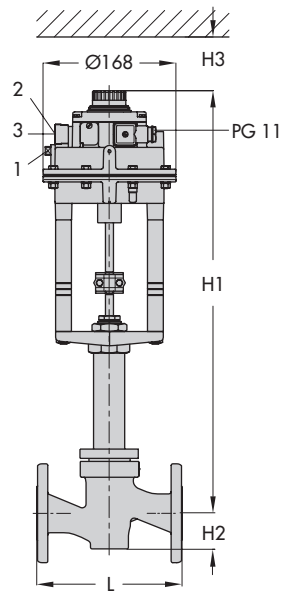
¹⁾ Cover screws are mounted from the top.

Dimension diagrams for electropneumatic control valves

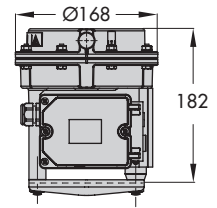
- 1 Pressure gauge G 1/8
- 2 Supply air G 1/4
- 3 Vent plug G 1/4



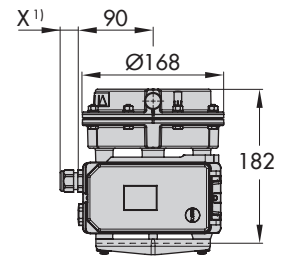
Type 3531-IP, fail-close



Type 3531-IP, fail-open



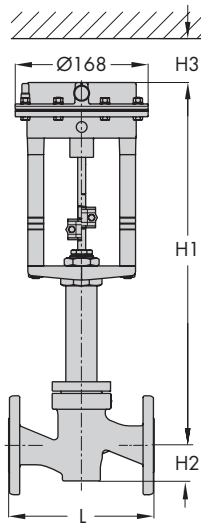
Type 3372 with Type 3725 Positioner



Type 3372 with Series 3730 Positioner

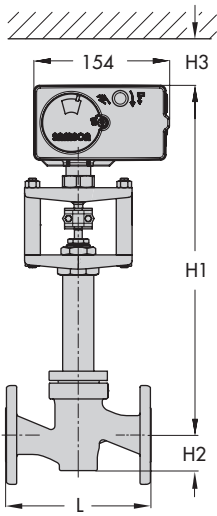
1) The dimension X depends on the cable gland used.

Dimension diagrams for pneumatic control valves

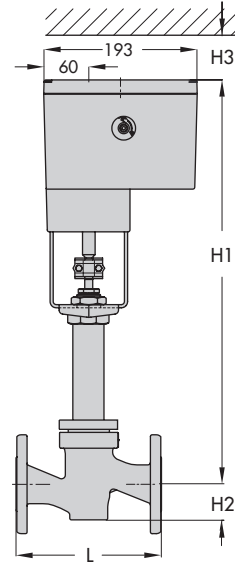


Type 3531-PP

Dimension diagrams for electric control valves

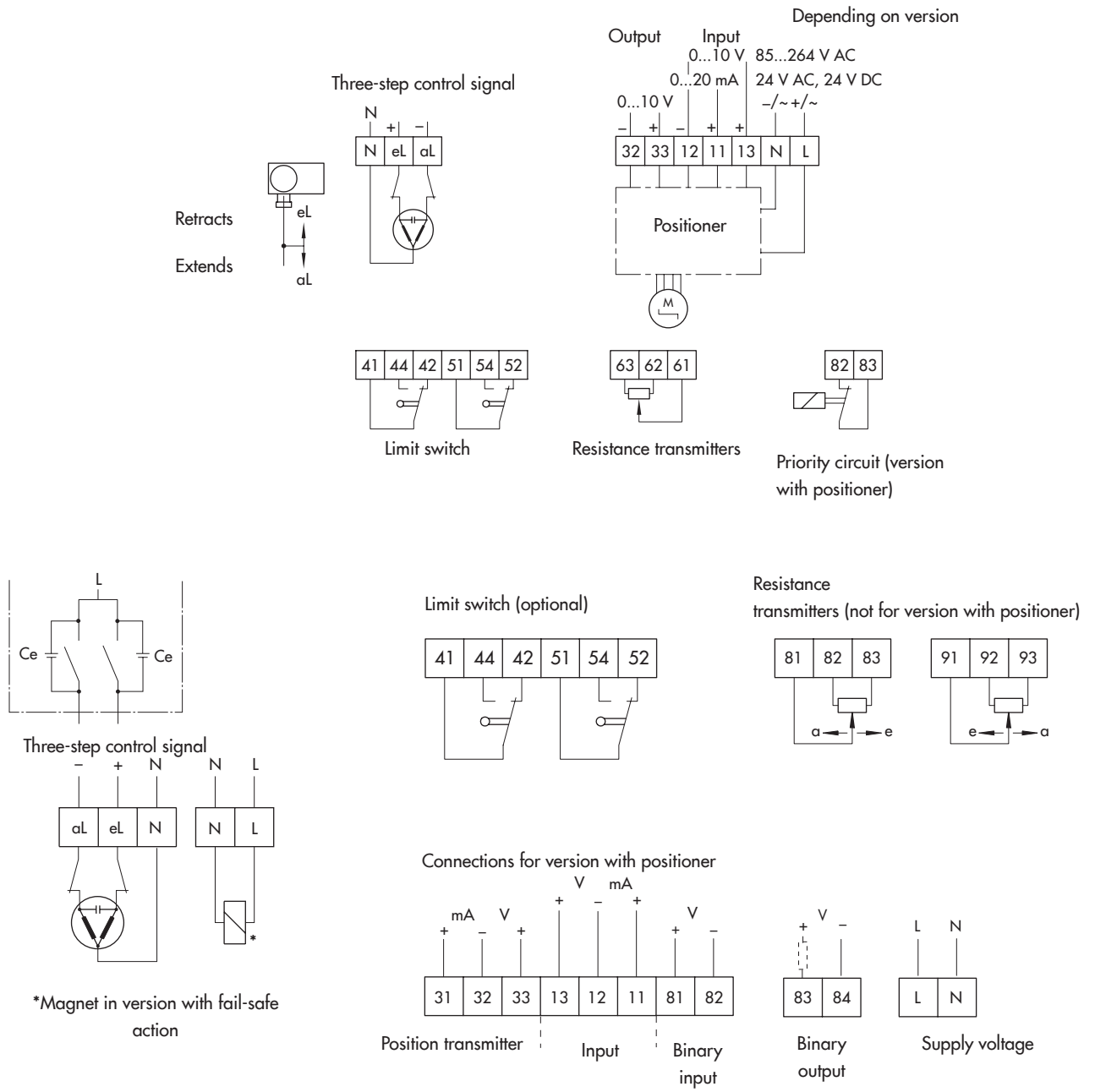


Type 3531-E1
Valve with Type 5827 Electric Actuator



Type 3531-E3

Wiring plans



Ordering text

The following specifications are required on ordering:

Type 3531 Globe Valve

Nominal size	DN ...
Flow coefficients	K_{VS} ...
Pressure rating	PN ...
Body material	Spheroidal graphite iron, cast steel or stainless steel
Seat-plug seal	Metal seal

Actuators

For **Type 3531-IP**: Electropneumatic actuator with integrated positioner, 4 to 20 mA or with Type 3725/Series 3730 Positioner

Optional Intrinsically safe $\text{Ex II 2G Ex ia IIC T6}$
according to ATEX

Additional equipment Limit switch 1 or 2

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

Fail-safe position Fail-close or fail-open

Bench range Fail-close: 2.1 to 3.3 bar
Fail-open: 0.4 to 1.4 bar

Additional equipment Limit switch 1 or 2

For **Type 3531-E1**: Type 5827 Electric Actuator

Supply voltage

Version with three-
step signal – 230 V/50 Hz
 – 24 V/50 Hz

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

Additional equipment – Limit switch 2
 – Resistance transmitter 0 to
 1000 Ω
 – Positioner
 input
 0/4 to 20 mA or 0/2 to 10 V

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

Fail-safe position Fail-close or fail-open

Positioning force With fail-safe action: 2 kN
Without fail-safe action: 2.5 kN

Supply voltage – 230 V/50 Hz
 – 230 V/60 Hz
 – 24 V/50 Hz
 – 24 V/60 Hz

Additional equipment – Limit switch 2
 – Resistance transmitter 0 to
 1000 Ω
 – Digital positioner with input and
 output 0/4 to 20 mA or 0/2 to
 10 V