

## 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

<b>Nominal size</b>	<b>DN 15 to 80</b>
<b>Pressure rating</b>	<b>PN 25</b>
<b>Temperatures</b>	<b>-10 to +350 °C</b>



**Fig. 1:** Type 3531-IP

**Fig. 2:** Type 3531-PP

**Fig. 3:** Type 3531-E1

**Fig. 4:** Electric actuator for Type 3531-E3

#### Special features

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

- Electropneumatic actuator for Type 3531-IP
- Pneumatic actuators for Type 3531-PP
- Electric actuators for Type 3531-E1 or Type 3531-E3

#### Valve body

- Material: Spheroidal graphite iron, cast steel or stainless steel for PN 25
- Nominal sizes DN 15 to 80

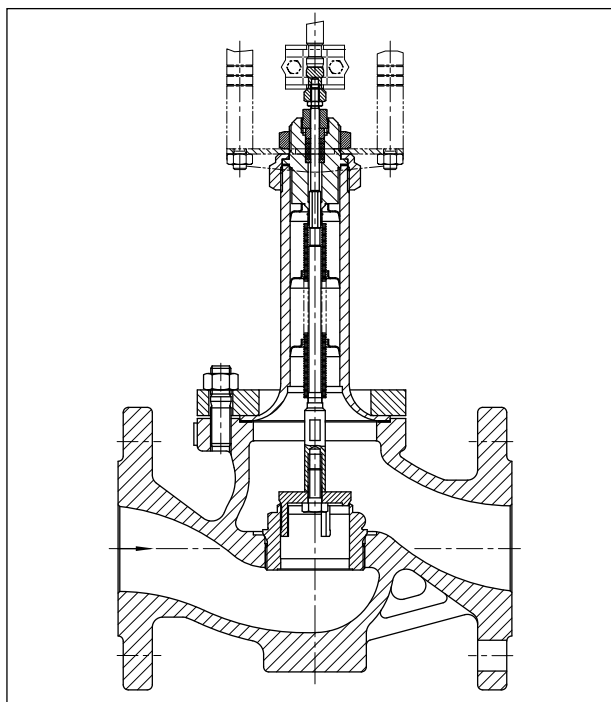
#### Other special features

- 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** (Fig. 1) · With Type 3372 Pneumatic Actuator, with Type 3725 Positioner · Tight-closing function for completely venting or filling the actuator with air · 4 to 20 mA set point · Max. 6 bar supply air · Fail-safe position actuator stem extends or retracts · Optionally with Type 4744-2 Limit Switch
- **Type 3531-PP Pneumatic Globe Valve for Heat Transfer Oil** (Fig. 2) · With Type 3371 Pneumatic Actuator · 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) · Nominal size DN 15 to 50 with Type 5827-N3 Electric Actuator for 230 V/50 Hz or 24 V/50 Hz · Optionally with limit contacts, resistance transmitters, positioner
- **Type 3531-E3 Electric Globe Valve for Heat Transfer Oil** (Fig. 4) · With Type 3374 Electric Actuator for 230 V/50 Hz, 230 V/60 Hz or 24 V/50 Hz or 24 V/60 Hz · Optionally with fail-safe action (typetested), limit contacts, resistance transmitters, positioner



**Fig. 5:** Type 3531-IP Globe Valve for Heat Transfer Oil in DN 15 to 50/NPS ½ to 2

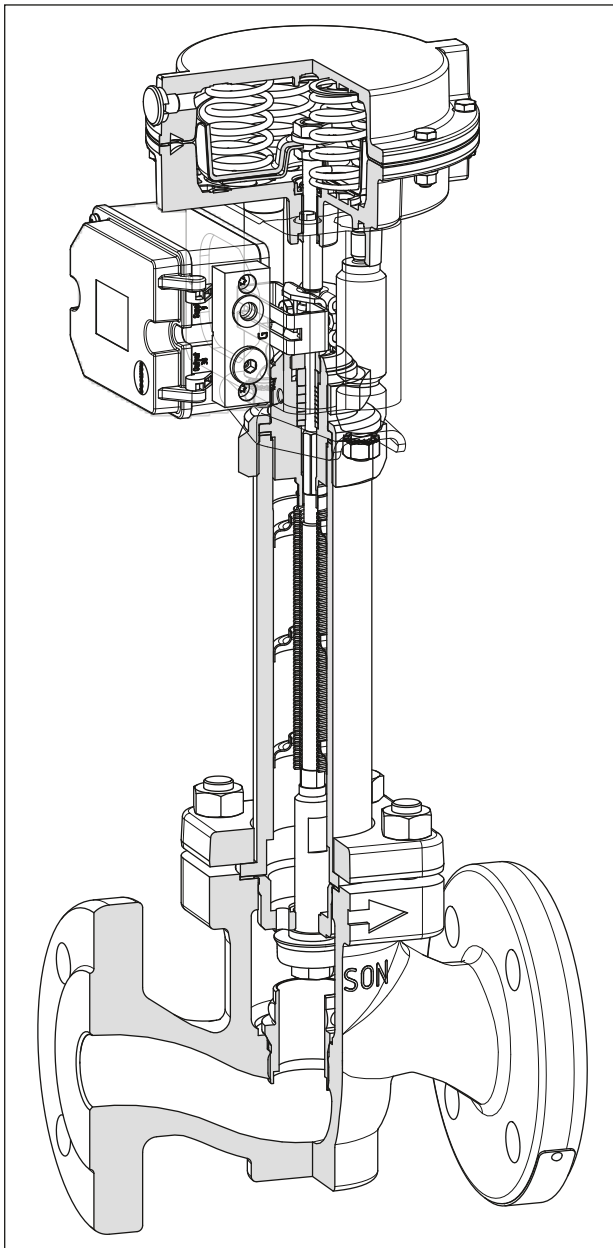
## Further versions

- **Type 3531** · Temperature range down to -70 °C · On request
- **Explosion-protected version** with electric actuators · On request
- **ANSI version of Type 3531** · 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 (see Fig. 5 and Fig. 6). The plug is moved by changing the control signal applied to the actuator. The valve plug position determines the cross-sectional area between the seat and plug.

The plug stem is connected to the actuator stem by a stem connector. The plug stem is sealed by a metal bellows and an additional packing.



**Fig. 6:** Type 3531-IP Globe Valve for Heat Transfer Oil · Actuator with Type 3725 Positioner

### Fail-safe positions

When the valve is combined with a pneumatic actuator with integrated springs or an electric actuator with fail-safe action, 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):**  
When the signal pressure is reduced or the air supply fails, the springs move the actuator stem downward. The valve closes upon fail-safe action.
- **Actuator stem retracts (fail-open):**  
When the signal pressure is reduced or the air supply fails, the springs move the actuator stem upward. The valve opens upon fail-safe action.

### Associated documentation

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

- ▶ EB 8131/8132 Type 3531 Globe Valve for Heat Transfer Oil
- ▶ EB 8313-3 Pneumatic actuator for Type 3531-IP
- ▶ EB 5827-1 Electric actuator (three-step version) for Type 3531-E1
- ▶ EB 5827-2 Electric actuator (with positioner) for Type 3531-E1
- ▶ EB 8331-3 Electric actuator (three-step version) for Type 3531-E3
- ▶ EB 8331-4 Electric actuator (with positioner) for Type 3531-E3

**Table 1: Technical data for Type 3531 · DIN version**

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	DIN EN 1092-1 form B1, Ra 3.2 to 12.5 µm · DIN EN 1092-1, groove form D		
Pressure rating	PN	25		
Seat-plug seal		Metal seal		
Characteristic		Equal percentage		
Rangeability		50:1		
Conformity		CE		
Temperature range		-10 to +350 °C · Extended temperature range down to -70 °C on request		
Leakage class according to DIN EN 60534-4		Metal seal: Class IV Type 3531-E1: Class I (0.05 % of $K_{VS}$ coefficient)		

**Table 2: Materials for Type 3531 · DIN version**

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	DN 15 to 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		

**Flow coefficients and seat diameters****Table 3: Overview of Type 3531**

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

**Table 4:  $C_V$  and  $K_{VS}$  coefficients with 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										•	

## Pneumatic actuators with Type 3531

**Table 5:** Technical data for pneumatic actuators

Valve/actuator		Type 3531-IP with Type 3372 Actuator	Type 3531-PP with Type 3371 Actuator
Actuator area		120 cm <sup>2</sup>	120 cm <sup>2</sup>
Fail-safe action		Actuator stem extends (FA) or actuator stem retracts (FE)	
Set point		4 to 20 mA	-
Set point/bench range with fail-safe action	Stem extends (FA)	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
	Stem retracts (FE)		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		≤160 I <sub>n</sub> /h when p <sub>perm</sub> = 4 bar ≤200 I <sub>n</sub> /h when p <sub>perm</sub> = 6 bar	-
Degree of protection		IP66 with Type 3725	-
Permissible ambient temperature		-30 to +70 °C	-35 to +90 °C
Additional electrical equipment		1 or 2 changeover contacts (IP65, Ex d, 3 m cable) Nominal voltage/current: 250 V/5 A or 250 V/0.4 A	

**Table 6:** Materials for pneumatic actuators

Actuator		Type 3372	Type 3371
Actuator area		120 cm <sup>2</sup>	120 cm <sup>2</sup>
Actuator housing		GD-ALSi12	GD-ALSi12
Diaphragm		NBR	NBR
Actuator stem		1.4305	1.4305
Positioner housing		Type 3725: Polyphthalamide (PPA)	Polyamide
Yoke	Stem	9SMn28K zinc-plated, matt black finish	-
	Crossbeam	1.4301	-

**Table 7:** Permissible differential pressures for metal-seated plug

Fail-safe action Bench range	Actuator stem extends		Actuator stem retracts	
	1.4 to 2.3 bar	2.1 to 3.3 bar	1.4 to 2.3 bar	0.4 to 1.4 bar
Min./max. supply pressure	2.8 to 4.0 bar	3.7 to 6.0 bar	3.7 to 4.0 bar	3.5 to 6.0 bar
K <sub>V5</sub> coefficients	Δp when p <sub>2</sub> = 0 bar		Δp when p <sub>2</sub> = 0 bar	
1.6 to 10	16	-	16	-
16, 25 to 35	10	-	10	-
50 to 80	3.5	5	3.5	5

## Electric actuators with Type 3531

**Table 8:** Technical data for electric actuators

Control valve		Type 3531-E1	Type 3531-E3	
Type ... Actuator		5827-N3	3374-11	3374-21/31 <sup>1)</sup>
Thrust		0.7 kN	2.5 kN	2.0 kN
Transit time for rated travel		90 s	120 s · Other transit times on request	
Supply voltage	230 V/50 Hz	•	•	
	230 V/60 Hz	• <sup>2)</sup>	•	
	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		IP54 when installed upright	IP54 · IP65 with cable gland	
	Mounting position	Suspended mounting not permitted (▶ EB 5827-1, ▶ EB 5827-2, ▶ EB 8331-3 and ▶ EB 8331-4)		
Permissible ambient temperature		0 to 50 °C	5 to 60 °C	
Additional electrical equipment				
Limit contacts		2	2	
Resistance transmitter (not for version with positioner)		1 0 to 1000 Ω	2 0 to 1000 Ω	
Positioner		Digital <sup>3)</sup>	Digital	
Input signal		0/4 to 20 mA · 0/2 to 10 V		
Output signal		0/2 to 10 V		

<sup>1)</sup> Actuators with fail-safe action: Type 3374-21 with stem extends, Type 3374-31 with stem retracts

<sup>2)</sup> Special version

<sup>3)</sup> 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 9:** Permissible differential pressures for metal-seated plug

Control valve		Type 3531-E1	Type 3531-E3
Type ... Actuator		5827-N3	3374-11
Thrust		0.7 kN	2.5 kN
$K_{VS}$ coefficients		$\Delta p$ when $p_2 = 0$ bar	$\Delta p$ when $p_2 = 0$ bar
1.6 to 10		10	16
16, 25 to 35		3.5	12
50 to 80		–	4

## Dimensions

**Table 10:** Dimensions for Type 3531 Valve · DIN version

Valve	DN	15	20	25	32	40	50	65	80
Height H <sup>1)</sup>	mm	270	270	270	280	280	280	390	390
Length L	mm	130	150	160	180	200	230	290	310
Height H2	mm	70	80	85	100	105	120	130	140

<sup>1)</sup> Plug in the closed position

**Table 11:** Type 3531-IP Electropneumatic Control Valve

Valve	DN	15	20	25	32	40	50	65	80
H1	mm	402	402	402	412	412	412	522	522
H3 (minimum distance)	mm	110	110	110	110	110	110	110	110

**Table 12:** Type 3531-PP Pneumatic Control Valve

Valve	DN	15	20	25	32	40	50	65	80
H1	mm	471	471	471	481	481	481	586	586
H3 (minimum distance)	mm	110	110	110	110	110	110	110	110

**Table 13:** Type 3531-E1 Electric Control Valve

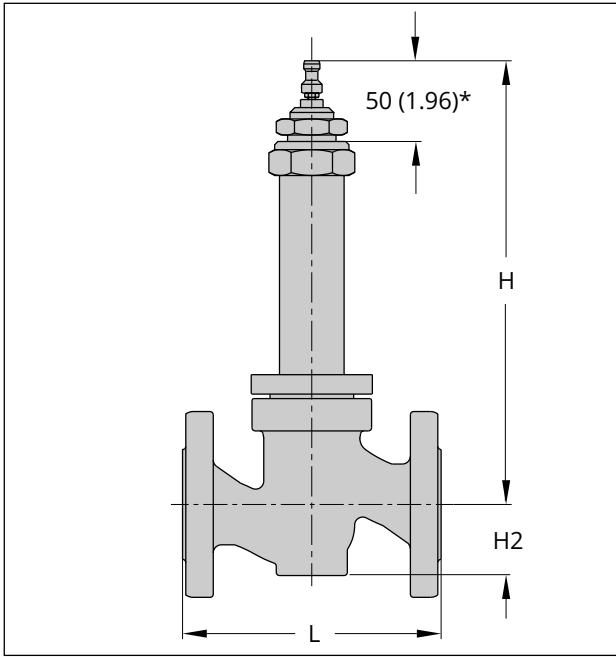
Valve	DN	15	20	25	32	40	50	65	80
H1 (Type 5827 Actuator)	mm	432	432	432	442	442	442	-	-
H3 (minimum distance)	mm	110	110	110	110	110	110	-	-

**Table 14:** Type 3531-E3 Electric Control Valve

Valve	DN	15	20	25	32	40	50	65	80
H1	mm	529	529	529	539	539	539	644	644
H3 <sup>1)</sup> (minimum distance)	mm	110	110	110	110	110	110	110	110

<sup>1)</sup> Cover screws are mounted from the top.

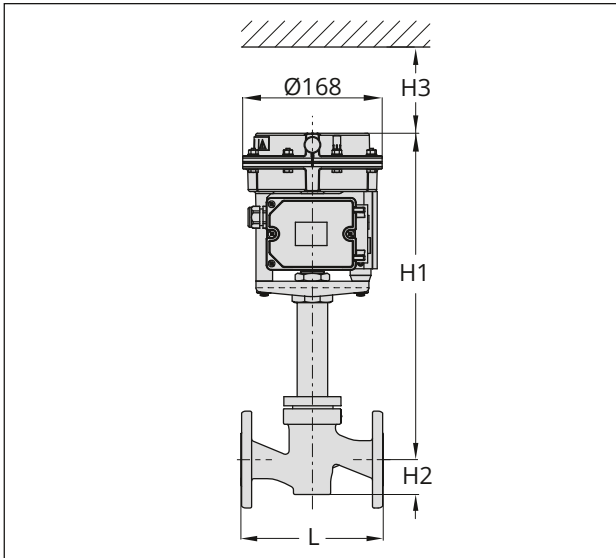
### Dimensional drawing of valve



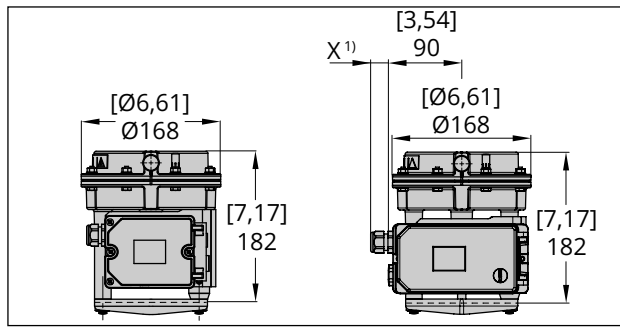
**Fig. 7:** Dimensional drawing of Type 3531

\* Dimension applies to plug stem pushed into the valve body

### Dimensional drawings for electropneumatic control valves



**Fig. 8:** Type 3531-IP Electropneumatic Control Valve with Type 3725 Positioner



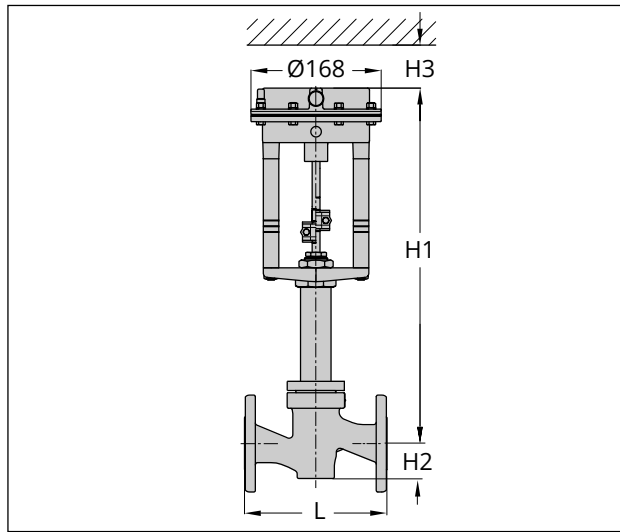
**Fig. 9:** Specifications in mm [inches]

Left: Type 3372/120 cm<sup>2</sup> with Type 3725 Positioner

Right: Type 3372/120 cm<sup>2</sup> with Series 3730 Positioner

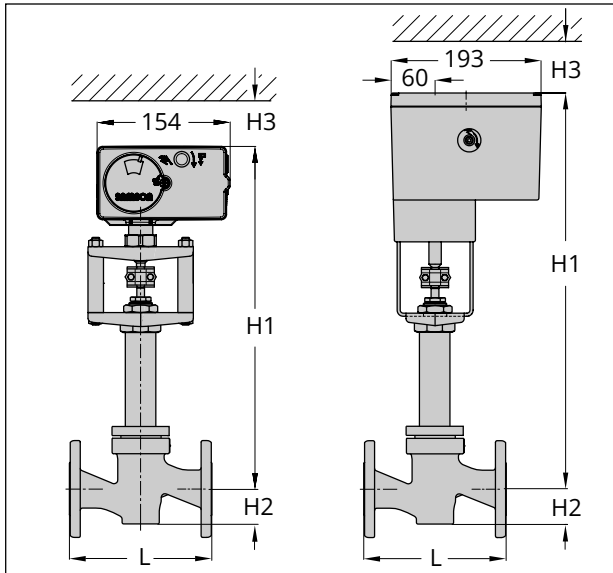
¹) The dimension X depends on the cable gland used.

### Dimensional drawing for pneumatic control valve



**Fig. 10:** Type 3531-PP Pneumatic Control Valve

## Dimensional drawings · Actuators for electric control valves



**Fig. 11:** Left: Type 3531-E1 Electric Control Valve (Type 5827 Actuator)

Right: Type 3531-E3 Electric Control Valve (Type 3374 Actuator)

## Weights

**Table 15:** Weights<sup>1)</sup> for Type 3531 Valve

Nominal size	DN	15	20	25	32	40	50	65	80
Type 3531-IP Control Valve	kg	7.7	8.7	10	14.7	15.3	18.2	25.7	34.5
Type 3531-PP Control Valve	kg	7.3	8.3	9.6	14.3	14.9	17.8	25.3	31.1
Type 3531-E1 Control Valve	kg	5.8	6.8	8.1	12.8	13.4	16.3	-	-
Type 3531-E3 Control Valve	kg	9.5	10.5	11.8	16.5	17.1	20	27.5	36.3

<sup>1)</sup> The weights specified apply to a specific standard device configuration. Weights of other valve configurations may differ depending on the version (material, trim etc.).

## Ordering text

The following specifications are required on ordering:

Valve	
<b>Type 3531</b> Globe Valve for Heat Transfer	
Oil	
Nominal size	DN ...
Pressure rating	PN ...
Flow coefficients	$K_{vs}$ ...
Body material	See Table 2
Seat-plug seal	Metal seal
Actuators	
for <b>Type 3531-IP</b> : Type 3372 Electropneumatic Actuator	
With positioner	Type 3725/Series 3730
Optional	Intrinsically safe Ex ia
Additional equipment	1 or 2 limit switches
for <b>Type 3531-PP</b> : Type 3371 Pneumatic Actuator	
Fail-safe action	Actuator stem extends (FA) or stem retracts (FE)
Bench range	FA: 2.1 to 3.3 bar FE: 0.4 to 1.4 bar
Additional equipment	1 or 2 limit switches
for <b>Type 3531-E1</b> : Type 5827-N3 Electric Actuator	
Supply voltage	Three-step version
	- 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	- 2 limit contacts - Resistance transmitter 0 to 1000 $\Omega$ - Digital positioner - Input: 0/4 to 20 mA or 0/2 to 10 V
for <b>Type 3531-E3</b> : Type 3374 Electric Actuator	
Fail-safe action	Actuator stem extends (FA) or stem retracts (FE)
Thrust	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	- 2 limit contacts - Resistance transmitter 0 to 1000 $\Omega$ - Digital positioner with input and output: 0/4 to 20 mA or 0/2 to 10 V