

# SINEAX P530 / Q531

## Transducer for Active or Reactive Power

Carrying housing P13/70 resp. P18/105



### Application

The transducer **SINEAX P530/Q531** (Fig. 1) converts to active or reactive power of a single-phase AC or three-phase system with balanced or unbalanced loads.

The output signal is proportional to the measured value of the active or reactive power and is either a **load-independent** DC current or a **load-independent** DC voltage.

The transducer fulfils all the important requirements and regulations concerning electromagnetic compatibility **EMC** and **Safety** (IEC 1010 resp. EN 61 010). It was developed and is manufactured and tested in strict accordance with the **quality assurance standard** ISO 9001.

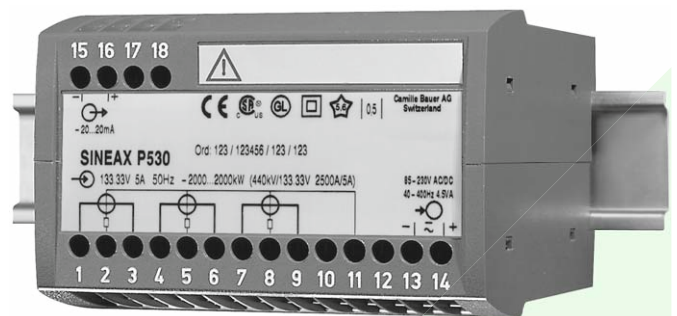


Fig. 1. Transducer SINEAX P530 in housing P18/105 clipped onto a top-hat rail.

### Features / Benefits

- **Measuring inputs: Sine wave forms of nominal input currents and nominal input voltages**

Measured variables	Nominal input current	Nominal input voltage
Active or reactive power	1 to 6 A	100 to 690 V

- **Measuring output: Unipolar, bipolar or live zero output variables**
- **Measuring principle / TDM system**
- **DC-, AC-power pack with wide power supply tolerance / Universal**
- **Standard as marine version per Lloyd's Register of Shipping**

### Technical data

#### General

Measured quantity: Active or reactive power, unipolar or bipolar (in 4 quadrants)

Measuring principle: Pulse duration modulation (Time-Division-Multiplikation, TDM)

#### Measuring input

Nominal frequency  $f_N$ : 50 or 60 Hz, sine

Nominal input voltage  $U_N$ : 100 ... 690 V  
(85 ... 230 V with power supply from voltage measuring input)

Nominal input current  $I_N$ : 1 to 6 A

Calibration factor c: 0.75 to 1.3 with active power  
0.5 to 1.0 with reactive power

Admissible measuring range and values (calibration factor c):

Acc. to table 2, feature 6

Own consumption:  $\leq I^2 \cdot 0.01 \Omega$  per current path  
 $U^2 / 400 \text{ k}\Omega$  per voltage path

Overload capacity:

Measured quantities $I_N, U_N$	Number of applications	Duration of one application	Interval between two successive applications
$1.2 \times I_N$	—	continuous	—
$20 \times I_N$	10	1 s	100 s
$1.2 \times U_N^1$	—	continuous	—
$2 \times U_N^1$	10	1 s	10 s

<sup>1</sup> But max. 264 V with power supply from voltage measuring input

#### Measuring output

Load independent

DC current: 0 ... 1.0 to 0 ... 20 mA  
resp. live-zero 0.2 ... 1 to 4 ... 20 mA  
 $\pm 1.0$  to  $\pm 20 \text{ mA}$

Burden voltage:  $\pm 15 \text{ V}$

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Load independent DC voltage:	0 ... 1 to 0 ... 10 V resp. live-zero 0.2 ... 1 to 2 ... 10 V $\pm 1$ V to $\pm 10$ V
Load capacity:	4 mA
Voltage limit under $R_{\text{ext}} = \infty$ :	$\leq 40$ V
Current limit under overload:	Approx. $1.3 \times I_{\text{AN}}$ at current output Approx. 30 mA at voltage output
Residual ripple in output current:	$< 1\%$ p.p.
Response time:	$< 300$ ms

### Accuracy (acc. to EN 60 688)

Reference value:	Output end value
Basic accuracy:	Class 0.5

### Reference conditions:

Ambient temperature	15 ... 30 °C
Input current	$I_N \cdot c$
Input voltage	$U_N$
Power factor	$\cos\phi = 0.8 \dots 1.0 \dots 0.8$ with active power $\cos\phi = 0.8 \dots 1.0 \dots 0.8$ with reactive power
Frequency	50 or 60 Hz
Wave form	Sine, distortion factor $< 1\%$
Power supply	At nominal range
Output burden	Current: $0.5 \cdot R_{\text{ext}}$ max. Voltage: $2 \cdot R_{\text{ext}}$ min.

### Safety

Protection class:	II (protection isolated, EN 61 010)
Protection:	IP 40, housing (test wire, EN 60 529) IP 20, terminals (test finger, EN 60 529)
Pollution degree:	2
Installation category:	III
Rated insulation voltage (against earth):	400 V, inputs 230 V, power supply 40 V, output
Test voltage:	50 Hz, 1 min. acc. to EN 61 010-1 5550 V, inputs versus all other circuits as well as outer surface 3250 V, input circuits versus each other 3700 V, power supply versus output as well as outer surface 490 V, output versus outer surface

### Power supply →○

DC-, AC-power pack (DC or 40 ... 400 Hz)

Table 1: Rated voltages and permissible variations

Rated voltage	Tolerance
85 ... 230 V DC, AC	DC $- 15 \dots + 33\%$ AC $\pm 15\%$
24 ... 60 V DC, AC	

Power consumption: Approx. 2.5 W resp. 4.5 VA

### Options

Power supply from voltage measuring input:  $\geq 85$  to 230 V AC  
(Nominal input voltage range = internal power supply range)

Connected to the low tension: 24 V AC or 24 ... 60 V DC

### Installation data

Mechanical design:	Housing <b>P13/70</b> resp. <b>P18/105</b>
Material of housing:	Lexan 940 (polycarbonate) flammability Class V-0 acc. to UL 94, self-extinguishing, non-dripping, free of halogen
Mounting:	For rail mounting
Mounting position:	Any
Weight:	Housing P13/70 approx. 0.3 kg Housing P18/105 approx. 0.7 kg

### Connecting terminals

Connection element:	Screw-type terminals with indirect wire pressure
Permissible cross section of the connection leads:	$\leq 4.0$ mm <sup>2</sup> single wire or 2 x 2.5 mm <sup>2</sup> fine wire

### Environmental conditions

Operating temperature:	$- 10$ to $+ 55$ °C
Storage temperature:	$- 40$ to $+ 70$ °C
Relative humidity of annual mean:	$\leq 75\%$
Altitude:	2000 m max.
Indoor use statement!	

### Ambient tests

EN 60 068-2-6:	Vibration
Acceleration:	$\pm 2$ g
Frequency range:	10 ... 150 ... 10 Hz, rate of frequency sweep: 1 octave/minute
Number of cycles:	10, in each of the three axes

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EN 60 068-2-27:	Shock	<b>Germanischer Lloyd</b>	
Acceleration:	3 x 50 g 3 shocks each in 6 directions	Type approval certificate:	No. 12 260-98 HH
EN 60 068-2-1/-2/-3:	Cold, dry heat, damp heat	Ambient category:	C
IEC 1000-4-2/-3/-4/-5/-6		Vibration:	0.7 g
EN 55 011:	Electromagnetic compatibility		

**Table 2: Specification and ordering information**

Description	*Blocking code	No-go with blocking code	Article No./ Feature
<b>Order Code xxx - xxxx xxxx xx</b>			
<b>Features, Selection</b>			
<b>SINEAX P530, Transducer for active power</b>			530 –
<b>SINEAX Q531, Transducer for reactive power</b>			531 –
<b>1. Mechanical design</b>			
Housing type P for rail mounting			4
<b>2. Measuring mode / Application</b>			
3-wire 3-phase <b>balanced</b> load, housing P18/105			1
Type 530 (active power) available also for 4-wire 3-phase <b>balanced</b> load			
3-wire 3-phase <b>unbalanced</b> load, housing P18/105			2
4-wire 3-phase <b>unbalanced</b> load, housing P18/105			3
Single-phase AC, housing P13/70	E		4
<b>3. Nominal input frequency</b>			
50 Hz			1
60 Hz			2
<b>4. Nominal input voltage</b> (measuring input)			
100 ... 115 V [V]			1
200 ... 230 V [V]			2
380 ... 440 V [V]			
Single-phase AC max. 400 V	A		3
600 ... 690 V [V]			
Not possible with single-phase AC	A	E	4
Non-standard $U_N$			
Non-standard [V]: $\geq 115.00$ to $< 600$ with 3-phase system, $\geq 57.73$ to $\leq 400$ with single-phase AC;			9
With power supply from measuring input max. 230 V [V]			
Lines 1 to 9: Without PT: Specify effective nominal voltage With PT: Specify primary/secondary voltage in V, e.g. 16000/100			
Input voltage $U_N$ : – line-to-line voltage with 3-phase system – line-to-neutral voltage with single-phase AC			
<b>5. Nominal input current</b> (measuring input)			
1 A [A]			1
5 A [A]			2
Non-standard $I_N$ [A] $> 1$ to $\leq 6$ A [A]			9
With CT: Specify primary/secondary current in A			

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<b>Order Code xxx - xxxx xxxx xx</b>			
<b>Features, Selection</b>			
<b>SINEAX P530, Transducer for active power</b>			530 –
<b>SINEAX Q531, Transducer for reactive power</b>			531 –
<b>6. Measuring range W or Var</b>			
Measuring range bipolar [W] or [Var] <input type="text"/>			1
Measuring range unipolar [W] or [Var] <input type="text"/>	B		2
Specify measuring range in W or Var, e.g. 500 at measuring range bipolar – 500 ... + 500 1000 at measuring range unipolar 0 ... 1000  Admissible measuring range end values (calibration factor c) With single-phase AC active power $\geq 0.75$ to $1.3 \cdot U_N \cdot I_N$ With single-phase AC reactive power $\geq 0.5$ to $1.0 \cdot U_N \cdot I_N$ With 3-phase system active power $\geq 0.75$ to $1.3 \cdot \sqrt{3} \cdot U_N \cdot I_N$ With 3-phase system reactive power $\geq 0.5$ to $1.0 \cdot \sqrt{3} \cdot U_N \cdot I_N$			
<b>7. Output signal, start value</b>			
Output bipolar, start value – 100% final value Not possible with unipolar measuring range		B	1
Output unipolar, start value 0			2
Output live-zero, start value 20% final value			3
<b>8. Output signal, final value</b>			
Output final value 20 mA			1
Output final value 10 mA			2
Output final value 5 mA			3
Output final value 2.5 mA			4
Output final value 1 mA			5
Non-standard (> 1.00 to < 20) [mA] <input type="text"/>			9
Output final value 10 V			A
Non-standard (1.00 to < 10) [V] <input type="text"/>			Z
<b>9. Power supply</b>			
85 ... 230 V DC, AC			1
24 ... 60 V DC, AC			2
From measuring input ( $\geq 85$ to 230 V AC)		A	4
Connected to the low tension side 24 V AC / 24 ... 60 V DC			5
<b>10. Additional lettering on type label</b>			
Without additional lettering on type label			0
With additional lettering on type label 1 line with max. 40 letters, e.g. measuring location			9
<b>11. Test records</b>			
Without test records			0
Test records in German			D
Test records in English			E

\*Lines with letter(s) under "no-go" cannot be combined with preceding lines having the same letter under "SCODE".

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### Electrical connections

#### Terminal allocation housing P13/70

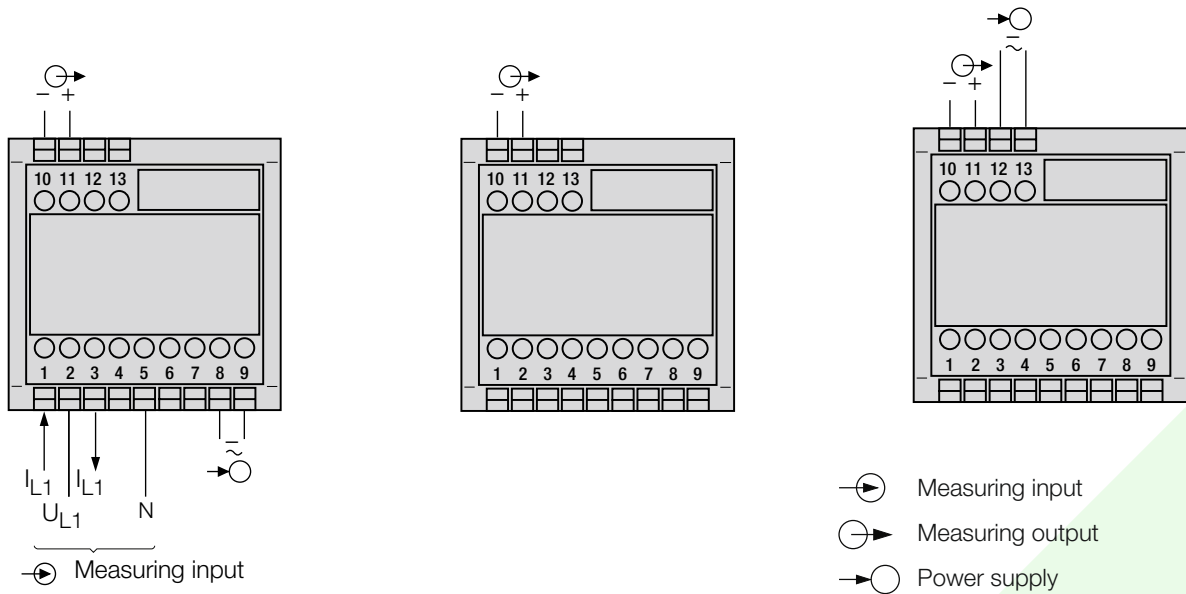


Fig. 2. Power supply connected to terminals 8 and 9.

Fig. 3. Power supply internal from measuring input, without separated power supply.

Fig. 4. Power supply connected to the low tension terminal side 12 and 13.

#### Terminal allocation housing P18/105

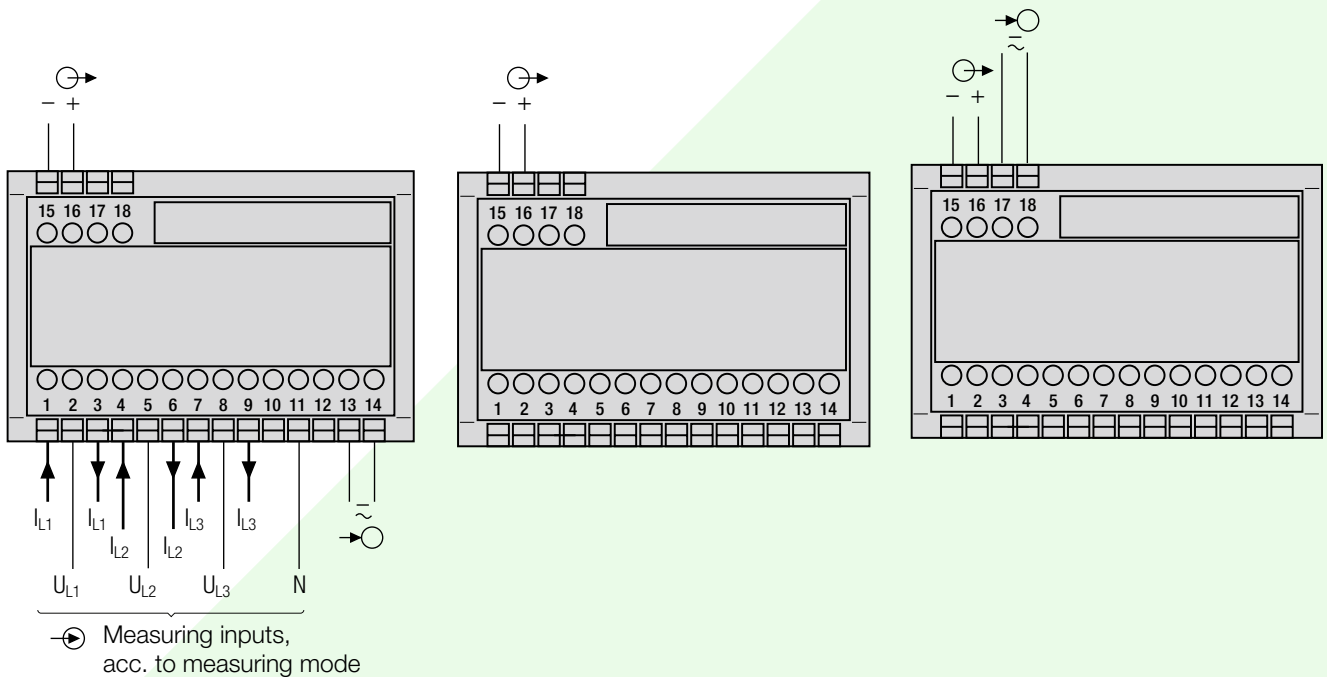


Fig. 5. Power supply connected to terminals 13 and 14.

Fig. 6. Power supply internal from measuring input, without separated power supply.

Fig. 7. Power supply connected to the low tension terminal side 17 and 18.

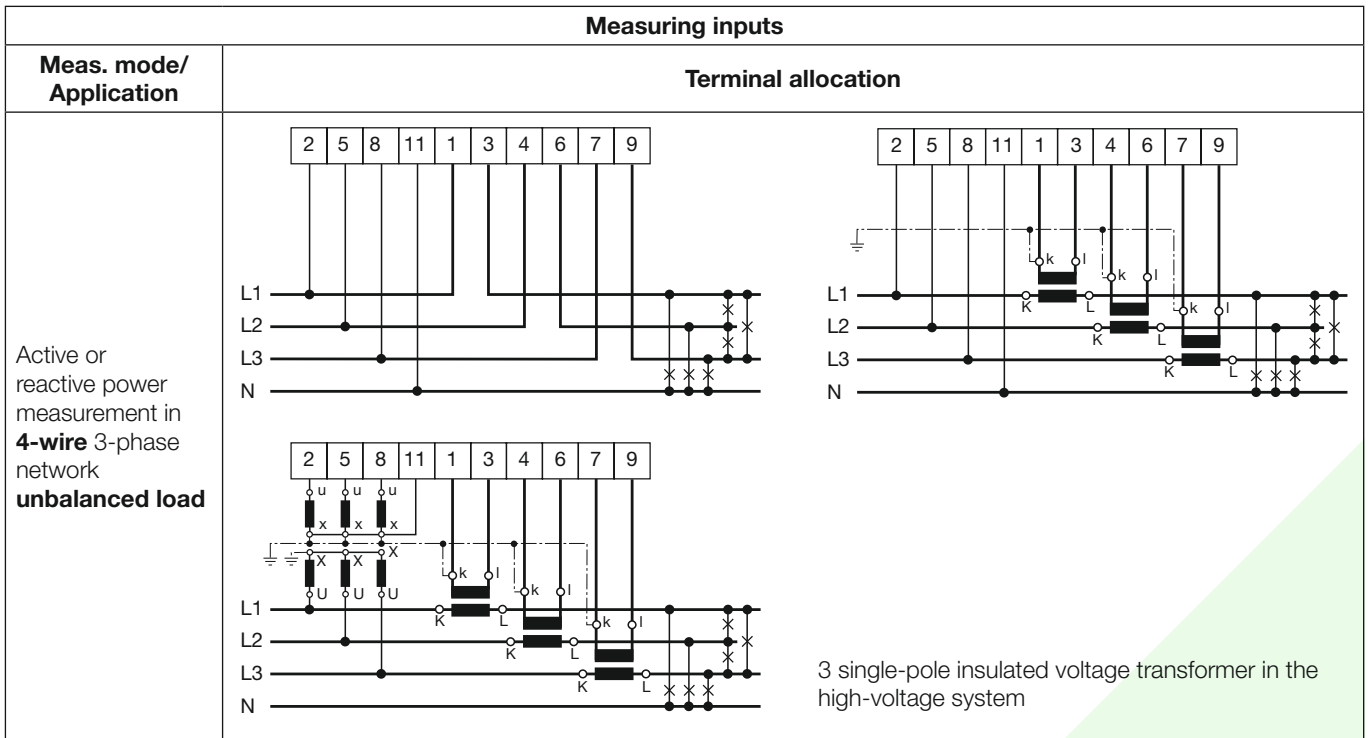
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## Transducer for Active or Reactive Power

Measuring inputs	
Meas. mode/ Application	Terminal allocation
Active or reactive power measurement in <b>single-phase</b> AC network	
Active or reactive power measurement in <b>3-wire</b> 3-phase network <b>balanced load</b>	
Active or reactive power measurement in <b>3-wire</b> 3-phase network <b>unbalanced load</b>	
Active power measurement in <b>4-wire</b> 3-phase network <b>balanced load</b>	

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### Dimensional drawings

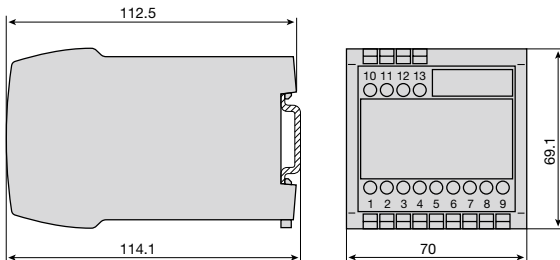


Fig. 8. SINEAX P530/Q531 in housing **P13/70** clipped onto a top-hat rail (35 x 15 mm or 35 x 7.5 mm, acc. to EN 50 022).

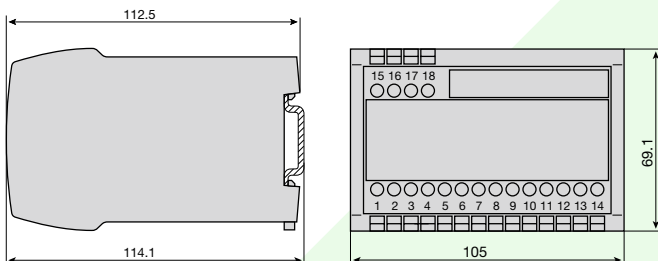


Fig. 9. SINEAX P530/Q531 in housing **P18/105** clipped onto a top-hat rail (35 x 15 mm or 35 x 7.5 mm, acc. to EN 50 022).

### Standard accessories

1 Operating Instructions in three languages: German, French and English

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