

# SINEAX P530/Q531

## Transducer for active or reactive power

Carrying rail 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.

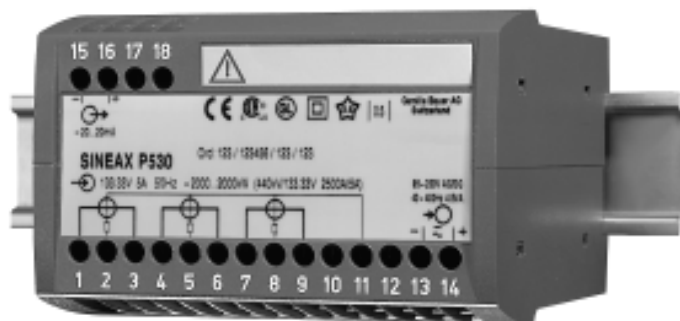


Fig. 1. Transducer SINEAX P530 in housing **P18/105** clipped onto a top-hat rail.

### 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**

Own consumption:

$$\leq I^2 \cdot 0,01 \Omega \text{ per current path}$$

$$U^2 / 400 \text{ k}\Omega \text{ per voltage path}$$

Overload capacity:

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

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

### 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 $\rightarrow$

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

#### Measuring output $\rightarrow$

Load independent DC current:

$$0 \dots 1.0 \text{ to } 0 \dots 20 \text{ mA}$$

$$\text{resp. live-zero } 0.2 \dots 1 \text{ to } 4 \dots 20 \text{ mA}$$

$$\pm 1.0 \text{ to } \pm 20 \text{ mA}$$

Burden voltage:

$$\pm 15 \text{ V}$$

Load independent DC voltage:

$$0 \dots 1 \text{ to } 0 \dots 10 \text{ V}$$

$$\text{resp. live-zero } 0.2 \dots 1 \text{ to } 2 \dots 10 \text{ V}$$

$$\pm 1 \text{ V to } \pm 10 \text{ V}$$

Load capacity:

$$4 \text{ mA}$$

Voltage limit under  $R_{\text{ext}} = \infty$ :

$$\leq 40 \text{ V}$$

Current limit under overload:

$$\text{Approx. } 1.3 \times I_{\text{AN}} \text{ at current output}$$

$$\text{Approx. } 30 \text{ mA at voltage output}$$

Residual ripple in output current:

$$< 2\% \text{ p.p.}$$

Response time:

$$< 300 \text{ ms}$$

# SINEAX P530/Q531

## Transducer for active or reactive power

### 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  
 $\sin\phi = 0.8 \dots 1.0 \dots 0.8$  with reactive power  
 Frequency: 50 or 60 Hz  
 Wave form: Sine, distortion factor < 1%  
 Power supply: At nominal range  
 Output burden: Current:  $0.5 \cdot R_{ext}$  max.  
 Voltage:  $2 \cdot R_{ext}$  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 (gagaint 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 ... + 33% AC ± 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 **P13/70** resp. **P18/105**  
 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:  $\leq 4.0 \text{ mm}^2$  single wire or  $2 \times 2.5 \text{ mm}^2$  fine wire

### Environmental conditions

Operating temperature: – 10 to + 55 °C  
 Storage temperature: – 40 to + 70 °C  
 Relative humidity of annual mean:  $\leq 75\%$

### Ambient tests

EN 60 068-2-6: Vibration  
 Acceleration:  $\pm 2 \text{ g}$   
 Frequency range: 10 ... 150 ... 10 Hz, rate of frequency sweep: 1 octave/minute  
 Number of cycles: 10, in each of the three axes  
 EN 60 068-2-27: Shock  
 Acceleration:  $3 \times 50 \text{ g}$   
 3 shocks each in 6 directions  
 EN 60 068-2-1/-2/-3: Cold, dry heat, damp heat  
 IEC 1000-4-2/-3/-4/-5/-6  
 EN 55 011: Electromagnetic compatibility

## Germanischer Lloyd

Type approval certificate: No. 12 260-98 HH

Ambient category: C

Vibration: 0.7 g

**Table 2: Specification and ordering information**

Order Code						
Features, Selection	*SCODE	no-go	5	3	0	
<b>Transducer for active power</b>						
<b>Transducer for reactive power</b>			5	3	1	
<b>1. Mechanical design</b>						
4) Housing type P for rail mounting						4
<b>2. Measuring mode / Application</b>						
1) 3- or 4-wire 3-phase <b>balanced</b> load, housing P18/105						1
2) 3-wire 3-phase <b>unbalanced</b> load, housing P18/105						2
3) 4-wire 3-phase <b>unbalanced</b> load, housing P18/105						3
4) Single-phase AC, housing P13/70						4
<b>3. Nominal input frequency</b>						
1) 50 Hz						1
2) 60 Hz						2
<b>4. Nominal input voltage (measuring input)</b>						
1) 100 ... 115 V [M]						1
2) 200 ... 230 V [M]						2
3) 380 ... 440 V [M]	A					3
4) 600 ... 690 V [M]	A					4
9) Non-standard $U_N$ [M]						9
Lines 1 to 9: Without PT: Specify effective nominal voltage With PT: Specify primary/secondary voltage in V, e.g. 16000/100  Line 9: Non-standard [M]: > 115.00 to < 600 with 3-phase system, ≥ 57.73 to ≤ 400 with single-phase AC; with power supply from measuring input max. 230 V  Input voltage $U_N$ : – line-to-line voltage with 3-phase system – line-to-neutral voltage with single-phase AC						

Continuation of Table 2 see on next page!

# SINEAX P530/Q531

## Transducer for active or reactive power

Continuation "Table 2: Specification and ordering information"

Order Code												
Features, Selection	*SCODE	no-go	↑ ↑ ↑ ↑ ↑ ↑									
<b>5. Nominal input current</b> (measuring input)												
1) 1 A	[A]		1 . . . . .									
2) 5 A	[A]		2 . . . . .									
9) Non-standard $I_N$ [A] > 1 to ≤ 6 A	[A]		9 . . . . .									
With CT: Specify primary/secondary current in A												
<b>6. Measuring range W or Var</b>												
1) Measuring range bipolar	[W] or [Var]		. 1 . . . . .									
2) Measuring range unipolar	[W] or [Var]	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>												
1) Output bipolar, start value - 100% final value		B	. . 1 . . . . .									
2) Output unipolar, start value 0			. . 2 . . . . .									
3) Output live-zero, start value 20% final value			. . 3 . . . . .									
Line 1: Bipolar output not possible with unipolar measuring range												
<b>8. Output signal, final value</b>												
1) Output final value 20 mA			. . . 1 . . . . .									
2) Output final value 10 mA			. . . 2 . . . . .									
3) Output final value 5 mA			. . . 3 . . . . .									
4) Output final value 2.5 mA			. . . 4 . . . . .									
5) Output final value 1 mA			. . . 5 . . . . .									
9) Non-standard	[mA]		. . . 9 . . . . .									
> 1.00 to < 20												
A) Output final value 10 V			. . . A . . . . .									
Z) Non-standard	[V]		. . . Z . . . . .									
1.00 to < 10												
<b>9. Power supply</b>												
1) 85 ... 230 V DC, AC			. . . . 1 . . . .									
2) 24 ... 60 V DC, AC			. . . . 2 . . . .									
4) From measuring input ( $\geq 85$ to 230 V AC)		A	. . . . 4 . . . .									
5) Connected to the low tension side 24 V AC / 24 ... 60 V DC			. . . . 5 . . . .									
<b>10. Additional lettering on type label</b>												
0) Without additional lettering on type label			. . . . . 0 . . .									
9) With additional lettering on type label			. . . . . 9 . . .									
Line 9: 1 line with max. 40 letters, e.g. measuring location												

Continuation of Table 2 see on next page!



# SINEAX P530/Q531

## Transducer for active or reactive power

Measuring inputs	
Measuring mode/ Application	Terminal allocation
Single phase AC network	
3-wire 3-phase network balanced load	
3-wire 3-phase network unbalanced load	
4-wire 3-phase network balanced load	
4-wire 3-phase network unbalanced load	<p><i>3 single-pole insulated voltage transformer in the high-voltage system</i></p>

## Dimensional drawings

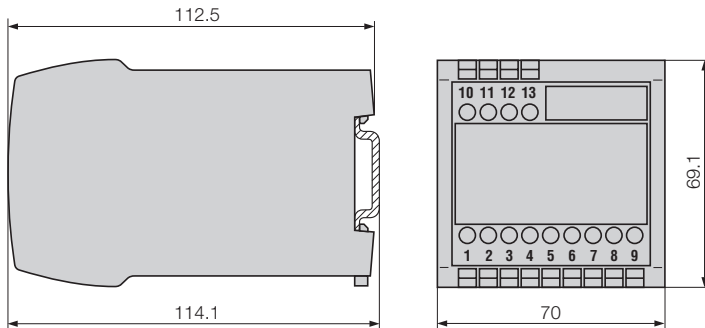


Fig. 8. SINEAX P530/Q531 in housing **P13/70** clipped onto a top-hat rail (35 × 15 mm or 35 × 7.5 mm, acc. to EN 50 022).

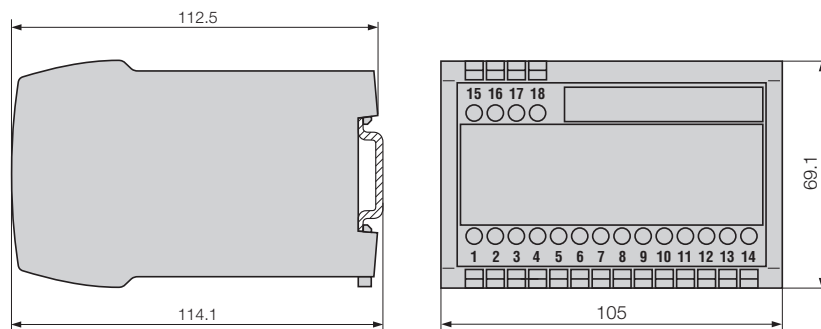


Fig. 9. SINEAX P530/Q531 in housing **P18/105** clipped onto a top-hat rail (35 × 15 mm or 35 × 7.5 mm, acc. to EN 50 022).

## Standard accessories

- 1 Operating Instructions

# SINEAX P530/Q531

## Transducer for active or reactive power

---

---

Printed in Switzerland • Subject to change without notice • Edition 04.01 • Data sheet No. P530/Q531 Le

**MOD-TRONIC**  
INSTRUMENTS LIMITED

48 Haggert Ave N  
Brampton, ON L6X 1Y3  
Tel: 905 457-6322  
Fax: 905 457-4716  
Toll Free: 800 794-5883