

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.

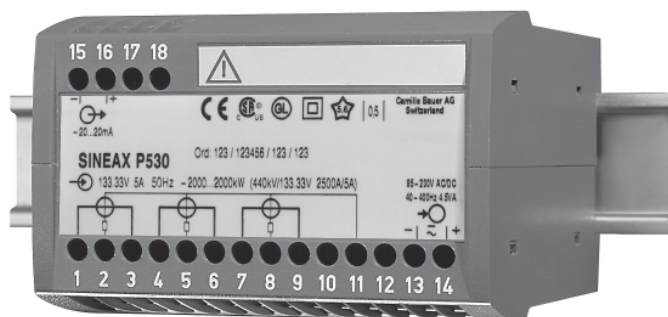


Fig. 1. Transducer SINEAX P530 in housing P18/105 clipped onto a top-hat rail.

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

¹ 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 ... 1.0 to 0 ... 20 mA
resp. live-zero 0.2 ... 1 to 4 ... 20 mA
 ± 1.0 to ± 20 mA

Burden voltage:

± 15 V

Load independent DC voltage:

0 ... 1 to 0 ... 10 V
resp. live-zero 0.2 ... 1 to 2 ... 10 V
 ± 1 V to ± 10 V

Load capacity:

4 mA

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

≤ 40 V

Current limit under overload:

Approx. $1.3 \times I_{AN}$ at current output
Approx. 30 mA at voltage output

Residual ripple in output current:

< 1% p.p.

Response time:

< 300 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: ≥ 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: $\leq 75\%$
 Altitude: 2000 m max.
 Indoor use statement

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

SINEAX P530/Q531

Transducer for active or reactive power

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	↑	↑	↑	↑
Transducer for active power			5	3	0	
Transducer for reactive power			5	3	1	
1. Mechanical design						
4) Housing type P for rail mounting					4	
2. Measuring mode / Application						
1) 3-wire 3-phase balanced load, housing P18/105					1	
2) 3-wire 3-phase unbalanced load, housing P18/105					2	
3) 4-wire 3-phase unbalanced load, housing P18/105					3	
4) Single-phase AC, housing P13/70	E				4	
Line 1: Type 530 (active power) available also for 4-wire 3-phase balanced load						
3. Nominal input frequency						
1) 50 Hz					1	
2) 60 Hz					2	
4. Nominal input voltage (measuring input)						
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	E				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 3: Single-phase AC max. 400 V Line 4: Not possible with single-phase AC 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	
5. Nominal input current (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			
6. Measuring range W or Var			
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 ≥ 0.75 to $1.3 \cdot U_N \cdot I_N$ With single-phase AC reactive power ≥ 0.5 to $1.0 \cdot U_N \cdot I_N$ With 3-phase system active power ≥ 0.75 to $1.3 \cdot \sqrt{3} \cdot U_N \cdot I_N$ With 3-phase system reactive power ≥ 0.5 to $1.0 \cdot \sqrt{3} \cdot U_N \cdot I_N$			
7. Output signal, start value			
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			
8. Output signal, final value			
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			
9. Power supply			
1) 85 ... 230 V DC, AC		 1
2) 24 ... 60 V DC, AC		 2
4) From measuring input (≥ 85 to 230 V AC)		A 4
5) Connected to the low tension side 24 V AC / 24 ... 60 V DC		 5
10. Additional lettering on type label			
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!

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Continuation "Table 2: Specification and ordering information"

Order Code	-														
Features, Selection											*SCODE	no-go			
11. Test records															
0) Without test records												0			
D) Test records in German												D			
E) Test records in English												E			

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

Electrical connections

Terminal allocation housing P13/70

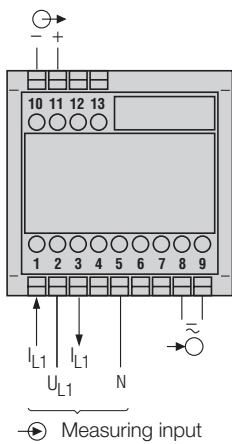


Fig. 2. Power supply connected to terminals 8 and 9.

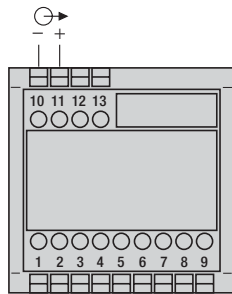


Fig. 3. Power supply internal from measuring input, without separated power supply.

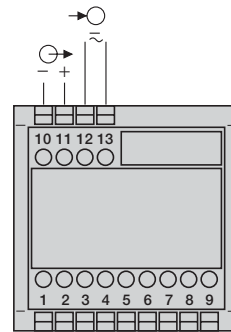
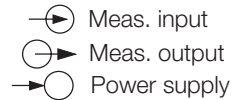


Fig. 4. Power supply connected to the low tension terminal side 12 and 13.



Terminal allocation housing P18/105

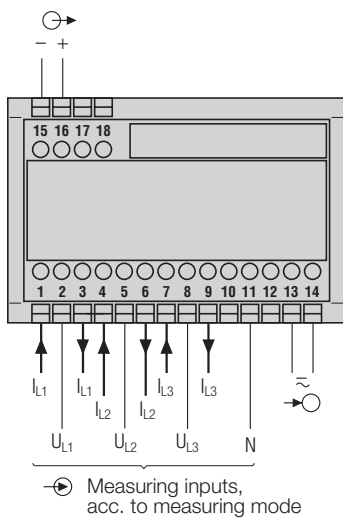


Fig. 5. Power supply connected to terminals 13 and 14.

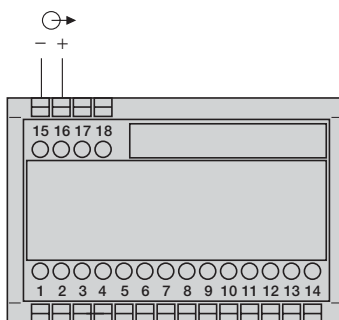


Fig. 6. Power supply internal from measuring input, without separated power supply.

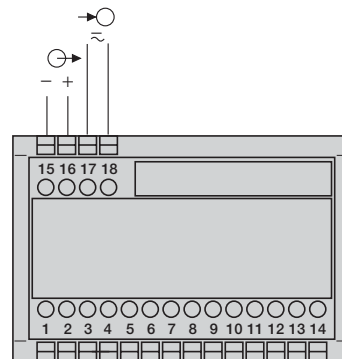


Fig. 7. Power supply connected to the low tension terminal side 17 and 18.

SINEAX P530/Q531

Transducer for active or reactive power

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

SINEAX P530/Q531 Transducer for active or reactive power

Dimensional drawings

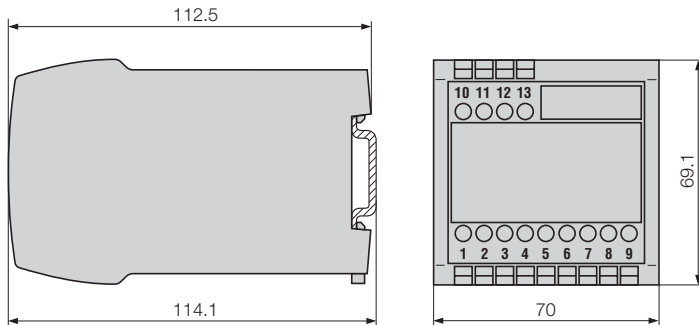


Fig. 8. SINEAX P530/Q531 in housing **P13/70** clipped onto a top-hat rail (35 × 15 mm or 35 × 7.5 mm, acc. to EN 50 022).

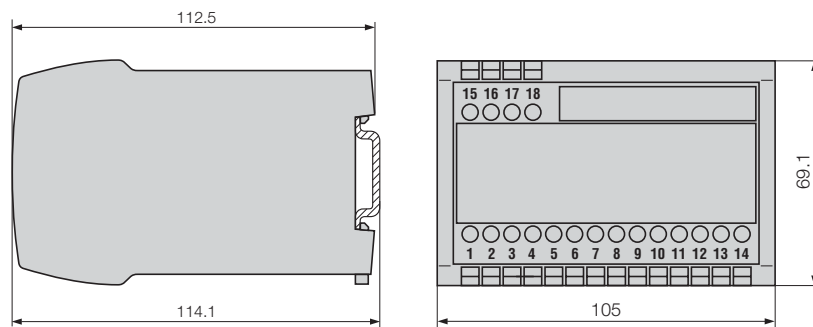


Fig. 9. SINEAX P530/Q531 in housing **P18/105** clipped onto a top-hat rail (35 × 15 mm or 35 × 7.5 mm, acc. to EN 50 022).

Standard accessories

- 1 Operating Instructions

SINEAX P530/Q531

Transducer for active or reactive power

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