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**

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:	≤ I^2 · 0,01 Ω per current path U^2 / 400 kΩ 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 × I_N	---	dauernd	---
20 × I_N	10	1 s	100 s
1.2 × U_N [1]	---	dauernd	---
2 × U_N [1]	10	1 s	10 s

[1] 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 ± 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} = ∞:	≤ 40 V
Current limit under overload:	Approx. 1.3 × I_{AN} at current output Approx. 30 mA at voltage output
Residual ripple in output current:	< 2% 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	$\cos\varphi$ = 0.8 … 1.0 … 0.8 with active power $\sin\varphi$ = 0.8 … 1.0 … 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 · R_{ext} max. Voltage: 2 · 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 (gagainst 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:	≤ 4.0 mm² single wire or 2 × 2.5 mm² fine wire

Environmental conditions

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

Ambient tests

EN 60 068-2-6:	Vibration
Acceleration:	± 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
EN 60 068-2-27:	Shock
Acceleration:	3 × 50 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

武汉海瑞特自动化工程有限公司
H.R.T Automation Engineering
http://www.herrett.com.cn
Tel:027-87630899 Fax:027-87632899

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			*SCODE	no-go	5 3 0 –
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- or 4-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					. . . . . 4 . .
3. Nominal input frequency					
1) 50 Hz					. . . . . 1 .
2) 60 Hz					. . . . . 2 .
4. Nominal input voltage (measuring input)					
1) 100 … 115 V	[V]				 1
2) 200 … 230 V	[V]				 2
3) 380 … 440 V	[V]		A		 3
4) 600 … 690 V	[V]		A		 4
9) Non-standard U_N	[V]				 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 [V]: > 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

武汉海瑞特自动化工程有限公司
H.R.T Automation Engineering
http://www.herrett.com.cn
Tel:027-87630899 Fax:027-87632899

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 · U_N · I_N With single-phase AC reactive power ≥ 0.5 to 1.0 · U_N · I_N With 3-phase system active power ≥ 0.75 to 1.3 · $\sqrt{3}$ · U_N · I_N With 3-phase system reactive power ≥ 0.5 to 1.0 · $\sqrt{3}$ · U_N · 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 > 1.00 to < 20	[mA]				. . . 9 . . .
A) Output final value 10 V					. . . A . . .
Z) Non-standard 1.00 to < 10	[V]				. . . Z . . .
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!

武汉海瑞特自动化工程有限公司
H.R.T Automation Engineering
http://www.herrett.com.cn
Tel:027-87630899 Fax:027-87632899

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

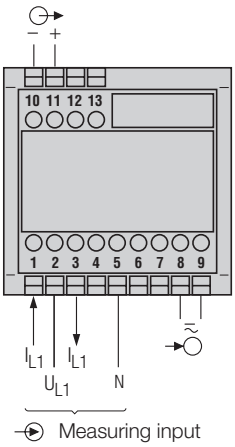


Fig. 2. Power supply connected to terminals 8 and 9.

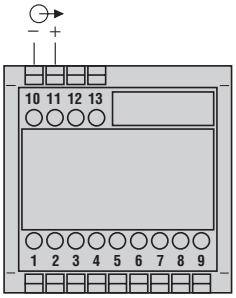


Fig. 3. Power supply internal from measuring input, without separated power supply.

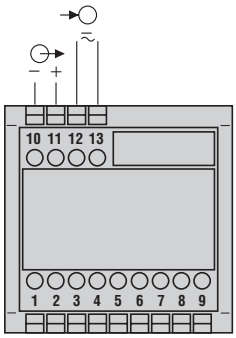


Fig. 4. Power supply connected to the low tension terminal side 12 and 13.

Terminal allocation housing P18/105

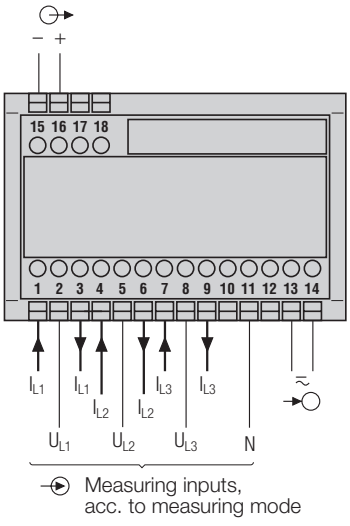


Fig. 5. Power supply connected to terminals 13 and 14.

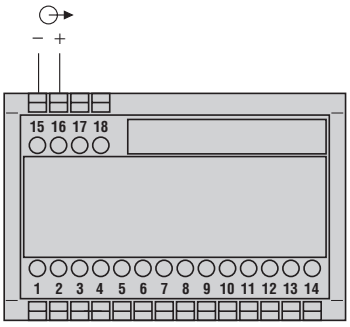


Fig. 6. Power supply internal from measuring input, without separated power supply.

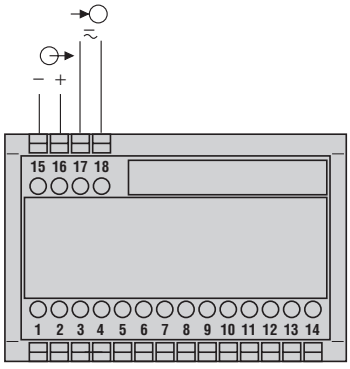
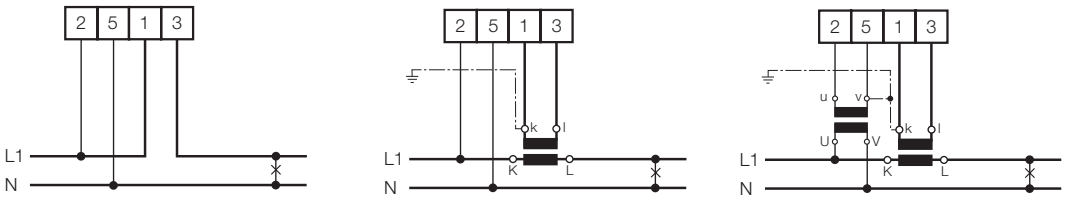
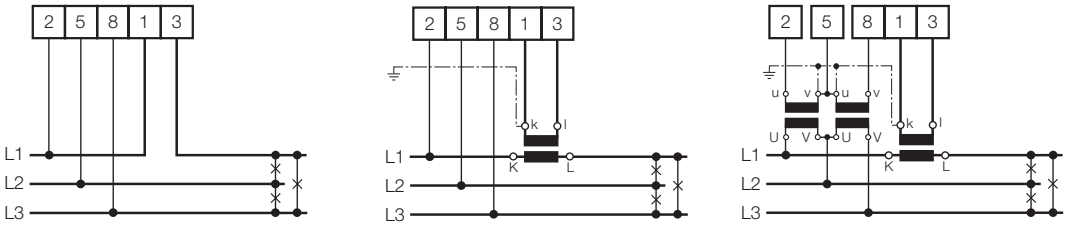
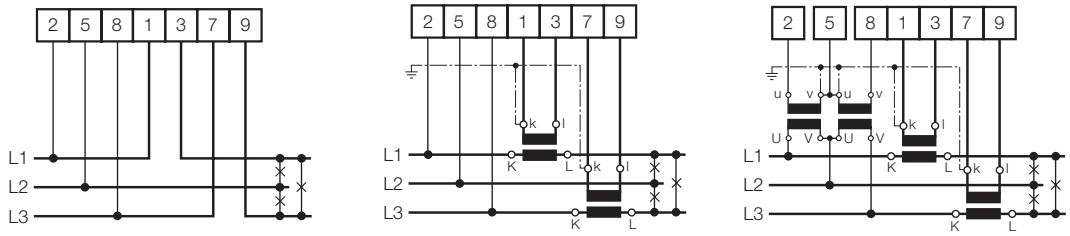
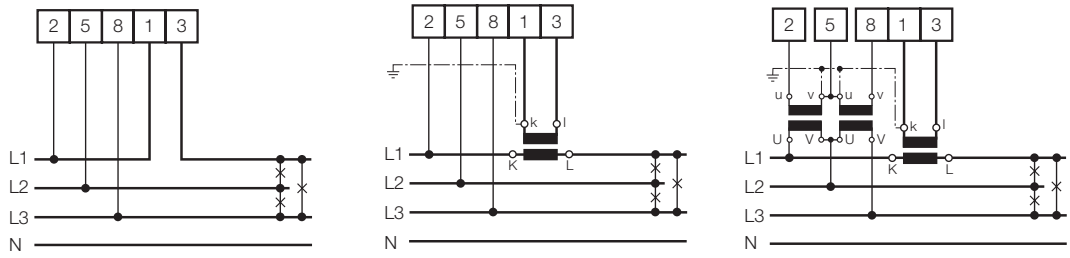
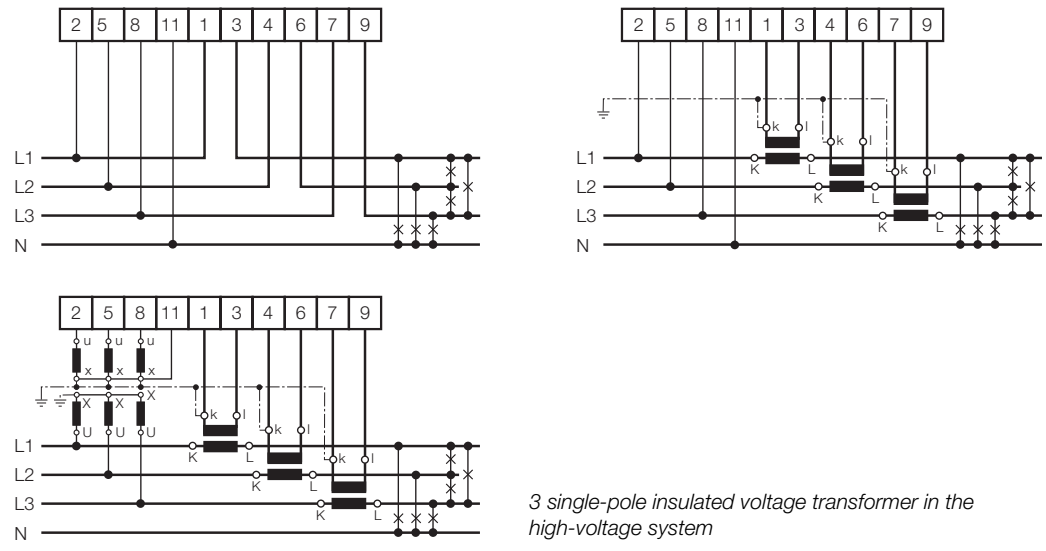


Fig. 7. Power supply connected to the low tension terminal side 17 and 18.

SINEAX P530/Q531
Transducer for active or reactive power

武汉海瑞特自动化工程有限公司
H.R.T Automation Engineering
http://www.herrett.com.cn
Tel:027-87630899 Fax:027-87632899

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**	 *3 single-pole insulated voltage transformer in the high-voltage system*

Dimensional drawings

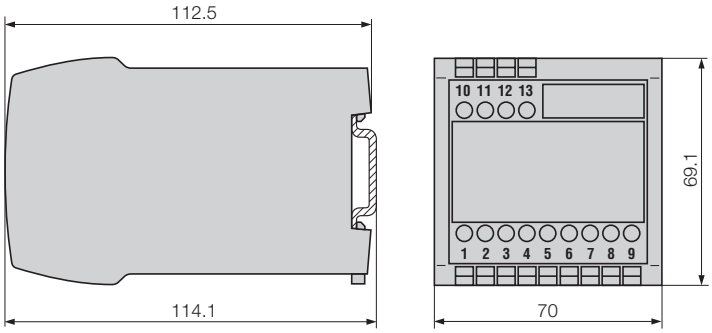


*Fig. 8. SINEAX P530/Q531 in housing **P13/70** clipped onto a top-hat rail (35 × 15 mm or 35 × 7.5 mm, acc. to EN 50 022).*

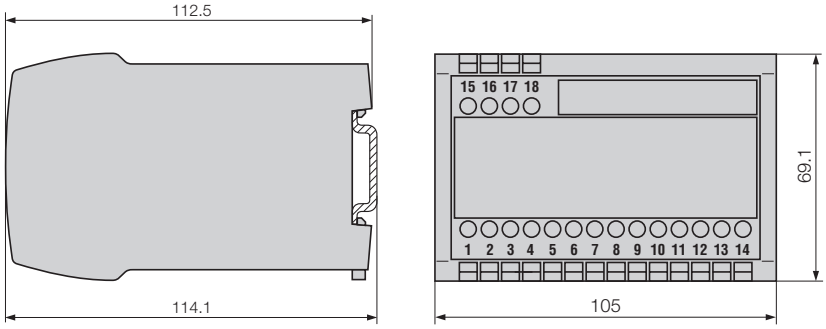


*Fig. 9. SINEAX P530/Q531 in housing **P18/105** clipped onto a top-hat rail (35 × 15 mm or 35 × 7.5 mm, acc. to EN 50 022).*

Standard accessories

1 Operating Instructions

SINEAX P530/Q531
Transducer for active or reactive power