POWER TRANSDUCERS FOR SINGLE-PHASE AND THREE-PHASE NETWORK
P11P, P13P, P13B

APPLICATION

The P11P transducer is destined for the conversion of active or reactive A.C. power into a D.C. current or D.C. voltage standard signal. The input, output and supply circuits are galvanically isolated (transformer separation). The conversion frequency range enables the correct measurement of power when currents and voltages are distorted (up to 25th harmonic). The pulse feeder ensures the operation in a wide range of values and frequency of the supply voltage. The measurement is realized through the analogue multiplier function with the pulse modulation (TDM). These transducers are destined to operate in industrial conditions and can be mounted in optional position.

Transducer housings are made of a self-extinguishing plastic and are adapted to be fixed on a 35 mm DIN rail (EN 60715).

P11P - transducer destined for active power measurement in a single-phase network.

P13P - transducer destined for active power measurement in a symmetrically loaded 3-phase 3-wire network.

P13B - transducer destined for reactive power measurement in a symmetrically loaded 3-phase 3-wire network.

TRANSUDER SET

The transducer set includes:
- P11P or P13P or P13B transducer 1 pc
- service manual 1 pc
- guarantee card 1 pc

INSTALLATION

The P11P or P13P or P13B transducer is designed to be installed on a 35 mm DIN rail acc. EN 60715. On the external side of the transducer there are screw or self-locking terminal strips enabling the connection of 2.5 mm² external leads (supply and output) up to 1.5 mm² leads (input).

![Fig.1 Overall dimensions and fixing way of the transducer](image-url)
DIAGRAMS OF EXTERNAL CONNECTIONS

The P11P or P134P or P13B transducer has two sockets of terminal strips and two connectors are included, a screw plug or a self-locking plug, depending on the chosen type by the user in the order code.

Measurement of active power in a single-phase network by a P11P transducer.

Measurement of active power in a 3-phase 3-wire network by a P13P transducer (Symmetrically loaded)

Measurement of reactive power in a 3-phase 3-wire network by a P13B transducer (Symmetrically loaded)
TECHNICAL DATA

Basic parameters:
- input current 1 A (X/1 A), 5 A (X/5 A)
- input voltage 10...23 V, 100 V, 230 V, 400 V, 500 V, 690 V, X/100 V
- output signals 5 mA, 20 mA, 4...20 mA, 10 V
- accuracy class 0.5
- output load resistance:
  - for 5 mA current output 0...2000 Ω
  - for 20 mA current output 0...500 Ω
  - for 10 V voltage output ≥ 500 Ω
- circuit consumption:
  - voltage measurement ≤ 0.6 VA
  - current measurement ≤ 0.3 VA
  - supply ≤ 6 VA
- preheating time of the transducer 15 min.
- set-up time of the output signal (0/90%) ≤ 0.5 s
- insulation test voltage 3.25 kV
- limitation of output current 28 mA ± 10%

Nominal reference and operating conditions:
- ambient temperature -20...+55°C
- supply voltage 18...40 V or 85...253 V a.c./d.c.
- frequency of the supply voltage 40...400 Hz
- frequency of the input current (voltage) 45...65...1250 Hz
- input voltage 0...0.01...1.2 Un
- power factor (cosφ) -1...0...1
- input current 0...0.01...1.2 ln
- peak factor of the measured current ≤ 3
- peak factor of the measured voltage ≤ 2
- storage temperature -25...+85°C
- relative humidity (condensation inadmissible) 0...45...75%
- external magnetic field 0...40...400 A/m
- working position optional.

Additional Errors caused by the influence of:
- frequency of the input quantity < 0.05 × acc. class/100 Hz
- ambient temperature < 0.5 × acc. class/10°C
- external magnetic field < 0.1 × acc. class/100 A/m.

Input overload:
Voltage:
- short duration 2:Un
- long-lasting 1.2:Un
Current:
- short duration 10:In
- long-lasting 1.2:In

Ensured protection degree:
- by the housing IP50
- from the terminal side IP20

Dimensions 45 x 100 x 120 mm

Weight 210 g

Compliance to standards:
- service security, requirements and tests EN 61010-1
- insulation ensured by the housing EN 61010-1
- installation category III
- pollution level 2
- maximal working voltage in relation to earth 600 V

Electromagnetic compatibility:
- immunity EN 61000-6-2
- emission EN 61000-6-4

ORDERING CODES

Ordering codes of P11P, P13P and P13B transducers

Table 1

<table>
<thead>
<tr>
<th>POWER TRANSDUCER - P1</th>
<th>XX</th>
<th>XX</th>
<th>XX</th>
<th>X</th>
<th>X</th>
<th>X</th>
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</thead>
</table>

Kind of transducer:
measurement of 1-phase active or reactive power ........................................ 1P
measurement of active power in 3-phase 3-wire systems, symmetric load .................. 3P
measurement of reactive power in 3-phase 3-wire systems, symmetric load .................. 3B

Input current:
write down the range code (from A1 to Z1 and B5 to Z5) from the table 2:
1 A ........................................... A1
20 000/1 A ..................................... Z1
5 A ........................................... B5
20 000/5 A ..................................... Z5
on order* ................................... 99

Input voltage:
write down the range code (from A to V) from the table 2:
100/3 V ........................................ A
400 000/100 V ................................ W
on order* ................................... X

Output range:
0...5 mA, R load = 0...2000 Ω .................................................. 1
0...20 mA, R load = 0...500 Ω .................................................. 2
4...20 mA, R load = 0...500 Ω .................................................. 3
0...10 V, R load ≥ 500 Ω .................................................. 4
-5...0...5 mA, R load = 0...2000 Ω ........................................ 5
-20...0...20 mA, R load = 0...500 Ω ........................................ 6
-10...0...10 V, R load ≥ 500 Ω ........................................ 7
on order* ................................... 9

Supply:
85...253 V d.c. or a.c. (40...400 Hz) ........................................ 1
18...40 V d.c. or a.c. (40...400 Hz) ........................................ 2
on order* ................................... 9

Kind of terminals:
permanent fastening screws ........................................................... 1
socket - screw plug ........................................................... 2
socket - self-locking plug ........................................................... 3

Version:
standard ........................................................... 00
custom-made* ........................................................... XX

Acceptance test:
without a quality inspection certificate ........................................... 0
with a quality inspection certificate ........................................... 1
acc user’s agreement* ........................................................... X

* Custom-made version, one must agree with the producer
** The producer will settle the ordering code number

Coding example:
The P11P-A1-C1-1-1-00-0 code means:
the version of a transducer for measurement of active power in a single-phase system, input: In = 1 A, Un = 230 V, nominal power: 200 W, permanent fastening screw terminals, standard version, without a quality inspection certificate.

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<table>
<thead>
<tr>
<th>In code</th>
<th>Power unit</th>
</tr>
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<tbody>
<tr>
<td>Z1-Z5</td>
<td>MW; Mvar</td>
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<tr>
<td>X1-X5</td>
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</tr>
<tr>
<td>U1-U5</td>
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<tr>
<td>M1-M5</td>
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<td>B5 B1</td>
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<table>
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<tr>
<th>In code</th>
<th>Power unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>KW; kvar</td>
</tr>
</tbody>
</table>

| Un code | A | B | C | D | E | G | H | I | K | L | M | N | P | R | S | T | U | V | W |
| 1       | 50| 100| 200| 400| 500| 600| 800| 1  | 5  | 10 | 15 | 25 | 30 | 50 | 60 | 100| 150| 300| 600|
| 5; 5/x  | 250| 500| 1 | 2 | 2.5| 3 | 4 | 5 | 25 | 50 | 80 | 120| 150| 250| 300| 500| 800| 1,5| 3  |
| 10/x    | 500| 1  | 2 | 4 | 5  | 6 | 8 | 10| 50 | 100| 150| 250| 300| 500| 600| 1  | 1.5| 3  | 6  |
| 15/x    | 800| 1.5| 3 | 6 | 7.5| 10| 12| 15| 75 | 150| 250| 300| 500| 750| 1  | 1.5| 2  | 3  | 5  | 10 |
| 20/x    | 1  | 2  | 4 | 7.5| 10| 12| 15| 20| 100| 200| 300| 500| 600| 1  | 1.2| 2  | 3  | 7.5| 12 |
| 30/x    | 1.5| 3  | 6 | 12| 15 | 20| 25| 30| 150| 300| 500| 750| 1  | 1.5| 2  | 3  | 5  | 10 | 20 |
| 50/x    | 2.5| 5  | 10| 20| 25 | 30| 40| 50| 250| 500| 800| 1.2| 1.5| 2  | 3  | 5  | 8  | 15| 30 |
| 75/x    | 4  | 7.5| 15| 30| 30 | 50| 60| 80| 300| 750| 1  | 1.5| 2  | 3  | 5  | 7.5| 12 | 25| 50 |
| 100/x   | 5  | 10 | 20 | 40| 50 | 60| 80| 100| 500| 1  | 1.5| 2  | 3  | 5  | 6  | 10| 15 | 30| 60 |
| 150/x   | 8  | 15 | 30 | 60| 75 | 100| 120| 150| 750| 1.5| 2  | 3  | 5  | 7.5| 10 | 15| 25 | 50| 100|
| 200/x   | 10 | 20 | 40 | 80| 100| 120| 150| 200| 1  | 2  | 3  | 5  | 6  | 10| 12 | 20 | 30 | 75 | 120|
| 300/x   | 15 | 30 | 60 | 120| 150| 200| 250| 300| 1.5| 3  | 5  | 7.5| 10 | 15| 20 | 30 | 50 | 100| 200|
| 400/x   | 20 | 40 | 80 | 150| 200| 250| 300| 400| 2  | 4  | 6  | 10| 12 | 20 | 25 | 40 | 75 | 150| 250|
| 600/x   | 30 | 60 | 120| 200| 300| 400| 500| 600| 3  | 6  | 10 | 12 | 20 | 25 | 40 | 60 | 100| 200| 400|
| 800/x   | 40 | 80 | 150| 300| 400| 500| 600| 800| 4  | 8  | 12 | 20 | 25 | 40 | 50 | 80 | 150| 300| 500|
| 1000/x  | 50 | 100| 200| 400| 500| 600| 800| 1  | 5  | 10 | 15| 25 | 30 | 50 | 60 | 100| 150| 300| 600|
| 1200/x  | 60 | 120| 250| 400| 800| 800| 800| 1  | 1.2| 6  | 12 | 20 | 30 | 40 | 60 | 80 | 120| 200| 400|
| 1500/x  | 80 | 150| 300| 600| 750| 1  | 1.2| 1.5| 7.5| 15 | 25 | 30 | 50 | 75 | 100| 150| 250| 500| 1000|
| 2000/x  | 100| 200| 400| 800| 1  | 1.2| 1.5| 2  | 10 | 20 | 30| 50 | 60 | 100| 120| 200| 300| 500| 750|
| 3000/x  | 150| 300| 600| 1  | 1.2| 1.5| 2  | 2.5| 3  | 15 | 30 | 50 | 75 | 100| 150| 200| 300| 500| 1000|
| 4000/x  | 200| 400| 800| 1  | 1.2| 1.5| 2  | 2.5| 3  | 4  | 20 | 40 | 60 | 100| 120| 200| 250| 400| 750|
| 6000/x  | 300| 600| 1  | 1.2| 2  | 3  | 4  | 5  | 6  | 30 | 60 | 100| 150| 200| 300| 400| 600| 1000|
| 10000/x | 500| 1  | 2  | 4  | 5  | 6  | 8  | 10 | 50 | 100| 150| 200| 300| 400| 600| 1000| 1200| 4000| 40000|