## CIP- P - Transducers of active / reactive power


- True RMS measurement
- Onsite configurable as active or reactive power
- Accuracy class 0.5 (IEC/EN 60688)
- Wide Auxiliary power supply which can be accept any between 60 - 300V AC/DC or 24V AC/DC
- Output response time < 700ms standard
- Fast and easy installation on DIN RAIL or onto a wall
- Fully onsite programmable input voltage range and input current range
- Seven segment LCD Display

### Optional

- Single or dual output type
- Onsite selectable output type (DC current/ DC voltage)
- RS485 (MODBUS) Communication

## Application

The CIP-P transducer is used to measure and convert active or reactive power in to a singple-phase or three-phase AC system with balanced or unbalanced load into a proportional load independent DC current or voltage output signal.

## Product Features

**Measuring Input**

AC voltage/current input signal, sine wave or distorted wave form.

**Analog Output (Single or dual)**

Isolated analog output which can be set to voltage or current output onsite.

**Accuracy**

Ouput signal accuracy class 0.5 as per International Standard IEC/EN60688.

**Programmable Input/Output**

Onsite transducer can be programmed using front key and display or through RS485.

**LED Indication**

LED Indication for power in and output type. (Current red LED, voltage green LED).

**Display Module (Optional)**

Optional 7 segment LCD display with backlit and keypad. For displaying measured parameters and onsite configuration of input/output.

**RS485 Communication (Optional)**

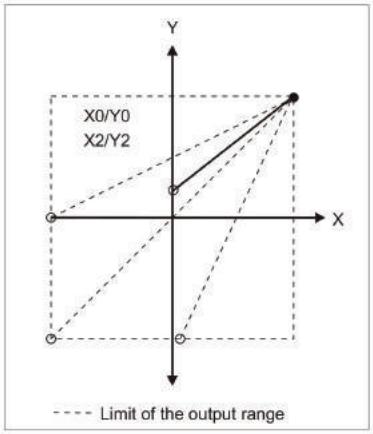
Optional RS485 communication is available. For reading measured parameters and onsite configuration of input/output.

**Symbols and their meaning**

| | | |
|---|---|---|
| X | Input | Reactive / Active Power |
| X0 | Start value of input | |
| X1 | Elbow value of input | |
| X2 | End value of input | |
| Y | Output DC Voltage / DC Current | |
| Y0 | Start value of output DC Voltage / DC Current | |
| Y1 | Elbow value of output DC Voltage / DC Current | |
| Y2 | End value of output DC Voltage / DC Current | |
| RN | Rated value of output burden | |
| FN | Nominal frequency | |

## Output characteristics:

Example of setting with Linear Characteristics




X0 = Start value of input
Y0 = Start value of output
X1 = Elbow value of input

Y1 = Elbow value of output
X2 = End value of input
Y2 = End value of output

**Note:** End value(Y2) of output cannot be changed onsite.

## Technical Specifications

| | |
|---|---|
| **Measured Parameter** | |
| Network Type Supported by Power transducer: | Single Phase / 3 phase 3 wire Unbalanced / 3 phase 4 wire Unbalanced<br>3 phase 3 wire balanced / 3 phase 4 wire balanced |
| **Nominal voltage Input $U_N$** | |
| Nominal input Voltage (AC RMS) (PT Secondary range) | 100 V ≤ UN ≤ 500 VL-L |
| PT Primary range | 100V to 692.8 KVL-L |
| Nominal Frequency $F_N$ | 25 Hz to 65 Hz (Optional - 400Hz) |
| Nominal input Voltage burden | < 0.6 VA per phase at $U_N$ |
| Overload Capacity | 1.2 * $U_N$ continuously,<br>2 * $U_N$ for 1 second, repeated 10 times at 10 minute intervals<br>(Un maximum 300V with power supply powered from measuring input). |
| **Nominal current Input $I_N$** | |
| Nominal input Current (AC RMS) (CT Secondary range) | 1 A ≤ $I_N$ ≤ 5 A |
| CT Primary range | 1 A to 9999 A |
| Nominal Frequency $F_N$ | 25 Hz to 65 Hz (Optional - 400Hz) |
| Nominal input Current burden | < 0.2 VA per phase at $I_N$ |
| Overload Capacity | 1.2 * $I_N$ continuously,<br>10 * $I_N$ for 3 second, repeated 5 times at 5 minute intervals.<br>50 * $I_N$ for 1 second, repeated 1 times at 1 hour interval (Max 250 A). |
| **Allowed measuring range end values X2 (calibration factor Xc)** | |
| With single phase AC active/ reactive power | $0.30 \leq (X2/\text{Rated power}) \geq 1.3 \cdot U_N/\sqrt{3} \cdot I_N$ |
| With 3-phase AC active/ reactive power | $0.30 \leq (X2/\text{Rated power}) \geq 1.3 \cdot \sqrt{3} \cdot U_N \cdot I_N$<br>(For single phase rated power = $U_N/\sqrt{3} \cdot I_N$)<br>(For three phase rated power = $\sqrt{3} \cdot U_N \cdot I_N$) |
| **Phase Angle & Power Factor measuring Range:** | |
| Minimum span 20° to Maximum Span 360° | |
| **Measuring output / (Single or optional Dual)** | |
| Output type Y2 | Load independent DC voltage or DC current (onsite selectable through DIP switches) |
| Load independient DC output | Unipolar 0...20mA / 4...20mA or 0...10V<br>Bipolar -20mA...0...+20mA/ or -10V...0...+10V |
| Output burden with DC current output signal | $0V \leq R \leq 15V/Y2$ |
| Output burden with DC voltage output signal | $Y2/(2mA) \leq R \leq \infty$ |
| Current limit under overload R=0 | ≤ 1.25*Y2 with current output<br>≤ 100mA with voltage output |
| Voltage limit under R=∞ | < 1.25*Y2 with voltage output<br>≤ 30V with current output |
| Residual Ripple in output signal | ≤ 1% pk-pk |
| Response time | < 7500ms |
| **Auxiliary supply (according to IEC/EN 60688)** | |
| Reference value | Output end value Y2 (voltage or current) |
| Basic accuracy | class 0.5 |
| Basic Accuracy for Phase Angle & Power Factor transducer | 0.5*C |
| Factor C (The highest value applies if calculated C is less than 1,then C=1 applies) | |
| Linear characteristics: $C = \frac{1-(Y0/Y2)}{1-(X0/X2)}$ or C= 1 | For $X0 \leq X \leq X1$ Bent characteristics: $C = \frac{(Y1-Y0)}{(X1-X0)} \cdot \frac{X2}{Y2}$ or C=1 |
| | For $X1 \leq X \leq X2$ $C = \frac{1-(Y1/Y2)}{1-(X1/X2)}$ or C=1 |
| **Reference conditions for Accuracy** | |
| Ambient temperature | 23°C +/- 1°C |
| Pre-conditioning | 30min according to IEC EN 60688 |
| Imput variable | voltage rated/ current rated |
| Input waveform | Sinusoidal, form factor 1.1107 |
| Input signal frequency | 50 or 60Hz |
| Active/reactive factor | cos = 1 resp. sin = 1 |
| For Phase Angle & Power Factor Transducer | Reference Value For Phase angle = 90° resp. For power factor = 0.5 |
| Auxiliary supply voltage | at nominal range |
| Output load | Rn = 7.5V / Y2 ± 1%, with DC current output signal<br>Rn = Y2 / 1mA ± 1%, with DC voltage output signal |
| Miscellaneous | according to IEC EN 60688 |



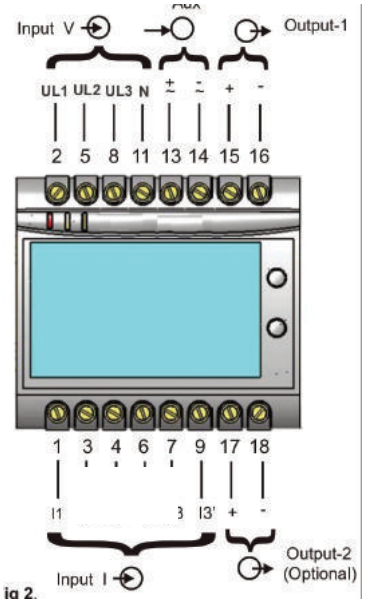
Celsa Messgerate España S.L.
www.celsamessgerate-spain.com
info@celsaspain.com / +34 96 130 93 78

| | |
|---|---|
| **Additional error** | |
| Temperature Influence | ± 0.2%/10°C |
| **Influence of Variations** | |
| As per IEC EN 60688 Standard Output Stability | < 30min |
| **Safety** | |
| Protection Class | II (Protection Isolated, EN 61010) |
| Protection | IP 40, housing according to EN 60 529<br>IP 20 ,terminal according to EN 60 529 |
| Pollution degree | 2 |
| Installation | Category III |
| Insulation Voltage | 1min. ( EN 61010-1)<br>7700V DC, Input versus outer surface<br>5200V DC, Input versus all other circuits<br>5200V DC, Auxiliary supply versus outer surface and output<br>690V DC, Output versus output versus each other versus outer surface. |
| **Installation data** | |
| Mechanical Housing | Lexan 940 (polycarbonate) Flammability Class V-0 acc. To UL 94, self extinguishing, non dripping, free of halogen |
| Mounting position | Rail mounting / wall mounting |
| Weight | Approx. 0.4kg |
| **Connection terminal** | |
| Connection Element | Conventional Screw type terminal with indirect wire pressure |
| Permissible cross section of the connection lead | ≤ 4.0 mm² single wire or 2 x 2.5 mm² fine wire |
| **Environmental** | |
| Operating temperature | 0°C...23°C...45°C(usage Group II) |
| Storage temperature | -40 °C to 70 °C |
| Relative humidity of annual mean | ≤ 75% |
| Altitude | 2000m max |
| **Ambient tests** | |
| Vibration | EN 60 068-2-6 |
| Acceleration | ± 2 g |
| Frequency range | 10....150...10Hz, |
| Rate of frequency sweep | 1 octave/minute |
| Number of cycles | 10, in each of the three axes |
| Shock | EN 60 068-2-7 |
| Acceleration | 3 x 50g 3 shocks in each direction |
| Cold, Dry, Damp heat | EN 60 068-2-1/-2/-3 |
| Electromagnetic compatibility | IEC 1000-4-2/-3/-4/-5/-6 - EN 55 011 |

## Electrical Connections

| Connection | Terminal details | |
|---|---|---|
| Measuring Voltage input | UL1<br>UL2<br>UL3<br>N | 2<br>5<br>8<br>11 |
| Auxiliary power supply | ~, +<br>~, - | 13<br>14 |
| Measuring output - 1 | +<br>- | 15<br>16 |
| Measuring Current input | I1<br>I1'<br>I2<br>I2'<br>I3<br>I3' | 1<br>3<br>4<br>6<br>7<br>9 |
| Measuring output - 2 | +<br>- | 17<br>18 |

## Terminal details

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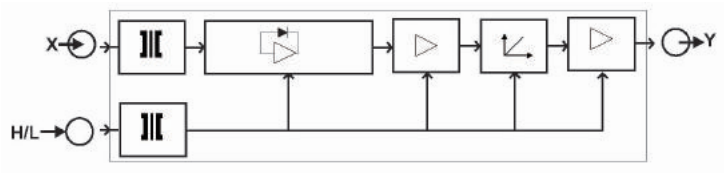
## LED Indication

| | | |
|---|---|---|
| ON LED | Aux. supply healthy condition | Green LED continuous ON |
| O/P1 LED | Output1 voltage selection | Green LED continuous ON |
| | Output1 current selection | Red LED continuous ON |
| O/P2 LED | Output2 voltage selection | Green LED continuous ON |
| | Output2 current selection | Red LED continuous ON |

## Electrical networks




## Programming

Can be done in two ways:

1. Programming via front LCD and two keys
2. Programming via optional RS485 (MODBUS) communication port (Device address,Password,communication parameter,Output Type and simulation mode can be programmed).

**Configuration CIP Transducer**

To configure CIP Transducers Input/Output one of the two programming methods to be adapted along with mechanical switch setting (DIP switch setting on PCB)

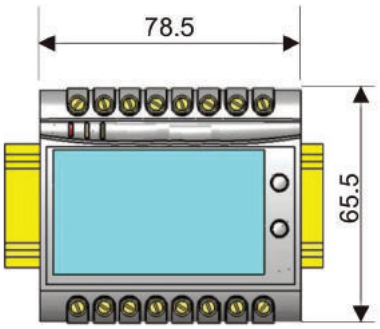
**DIP Switch Setting for Output**

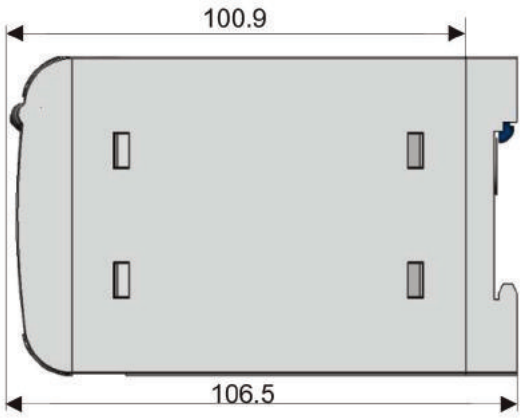
Type of output (current to voltage signal) has to be set by DIP swicth.For programming of DIP switch the user needs to open the transducer housing and set the DIP switch located on PCB to the desired output type voltage or current output range changing is not possible with DIP switch setting.

The four pole DIP switch is located on the PCB on the CIP Transducers

| DIP Swicth Setting | Type of output signal |
|---|---|
|   | load-independent current |
|   | load-independent voltage |

## Dimensions




| Type | Description | | Output 1 or 2 outputs (to indicate) | Auxiliary supply (to indicate) |
|---|---|---|---|---|
| **Active power** | CIP-P/1w<br>CIP-P/1d<br>CIP-P/2<br>CIP-P/1<br>CIP-P/3 | 1-Phase<br>3-Phases 3 wire balanced<br>3-Phases 3 wire unbalanced<br>3-Phases 4 wire balanced<br>3-Phases 4 wire unbalanced | 0 - 20 mA<br>4 - 20 mA<br>0 - 10V | 60 - 300V AC/DC<br>24 - 60V AC/DC |
| **Reactive power** | CIP-P/1w<br>CIP-P/1d<br>CIP-P/2<br>CIP-P/1<br>CIP-P/3 | 1-Phase<br>3-Phases 3 wire balanced<br>3-Phases 3 wire unbalanced<br>3-Phases 4 wire balanced<br>3-Phases 4 wire unbalanced | 0 - 20 mA<br>4 - 20 mA<br>0 - 10V | 60 - 300V AC/DC<br>24 - 60V AC/DC |



Celsa Messgerate España S.L.
www.celsamessgerate-spain.com
info@celsaspain.com / +34 96 130 93 78