CIP- P - Transducers of active / reactive power

- True RMS measurement
- Onsite configurable as active or reactive power
- Accuracy class 0.2 (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 2.0 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)

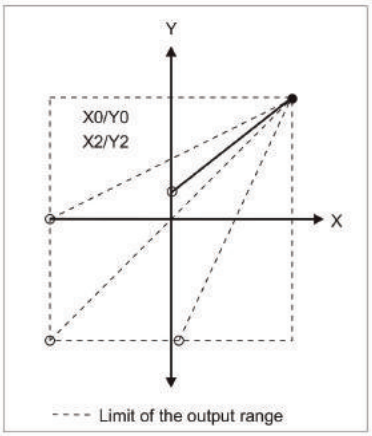
Optional RS485 communication is available. For reading measured parameters and onsite configuration of input/output.

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 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, 2 * U_N for 1 second, repeated 10 times at 10 minute intervals (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, 10 * I_N for 3 second, repeated 5 times at 5 minute intervals. 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 ≤ (X2/ Rated power) ≥ 1.3 • U_N/ √3 • I_N
With 3-phase AC active/ reactive power	0.30 ≤ (X2/ Rated power) ≥ 1.3 • √3 • U_N • I_N (For single phase rated power = U_N/ √3 • I_N) (For three phase rated power = √3 • U_N • 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 independent DC output	Unipolar 0...20mA / 4...20mA or 0...10V Bipolar -20mA...0...+20mA/ or -10V...0...+10V
Output burden with DC current output signal	0V ≤ R ≤ 15V/Y2
Output burden with DC voltage output signal	Y2/(2mA) ≤ R ≤ ∞
Current limit under overload R=0	≤ 1.25*Y2 with current output ≤ 100mA with voltage output
Voltage limit under R=∞	< 1.25*Y2 with voltage output ≤ 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 0.2*C
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 ≤ X ≤ X1: C = $\frac{(Y1-Y0)}{(X1-X0)} \cdot \frac{X2}{Y2}$ or C=1 For X1 ≤ X ≤ 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 Rn = Y2 / 1mA ± 1%, with DC voltage output signal
Miscellaneous	according to IEC EN 60688

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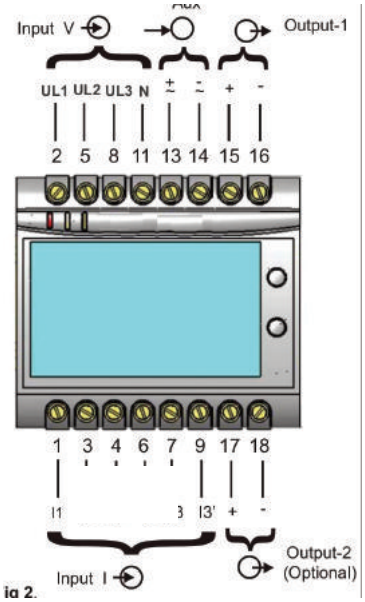
Additional error	
Temperature Influence	± 0.2%/10°C
Influence of Variations	
As per IEC EN 60688 Standard Output Stability	< 30min
Safety	
Protection Class	II (Protection Isolated, EN 61010)
Protection	IP 40, housing according to EN 60 529 IP 20 ,terminal according to EN 60 529
Pollution degree	2
Installation	Category III
Insulation Voltage	1min. (EN 61010-1) 7700V DC, Input versus outer surface 5200V DC, Input versus all other circuits 5200V DC, Auxiliary supply versus outer surface and output 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 UL2 UL3 N	2 5 8 11
Auxiliary power supply	~, + ~, -	13 14
Measuring output - 1	+ -	15 16
Measuring Current input	I1 I1' I2 I2' I3 I3'	1 3 4 6 7 9
Measuring output - 2	+ -	17 18

Terminal details



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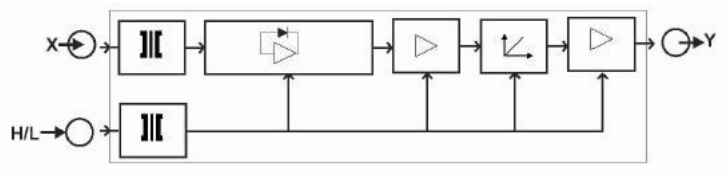
LED Indication

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)

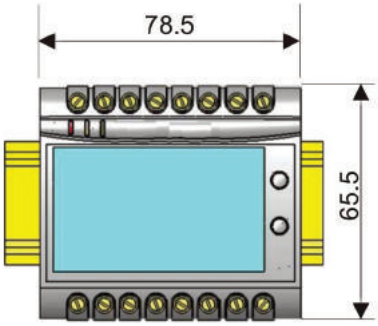
DIP Switch Setting for Output

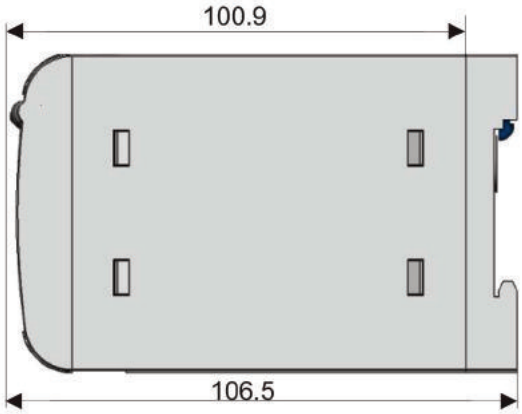
Type of output (current to voltage signal) has to be set by DIP swicth.For programming of DIP switch the user needs to open the transducer housing and set the DIP switch located on PCB to the desired output type voltage or current output range changing is not possible with DIP switch setting.

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 CIP-P/1d CIP-P/2 CIP-P/1 CIP-P/3	1-Phase 3-Phases 3 wire balanced 3-Phases 3 wire unbalanced 3-Phases 4 wire balanced 3-Phases 4 wire unbalanced	0 - 20 mA 4 - 20 mA 0 - 10V	60 - 300V AC/DC 24 - 60V AC/DC
Reactive power	CIP-P/1w CIP-P/1d CIP-P/2 CIP-P/1 CIP-P/3	1-Phase 3-Phases 3 wire balanced 3-Phases 3 wire unbalanced 3-Phases 4 wire balanced 3-Phases 4 wire unbalanced	0 - 20 mA 4 - 20 mA 0 - 10V	60 - 300V AC/DC 24 - 60V AC/DC

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