Ziegler

Redefine Innovative Metering

ZIEGLER PRO-P

Power / Phase Angle / Power Factor Transducer

Application

The **Ziegler PRO-P** transducer is used to measure and convert active, reactive, apparent power, Phase angle & Power Factor of a Single-phase or Three-phase AC system with balanced or unbalanced load into a proportional **load independent DC current or voltage output** signal.

Salient Features

- True RMS measurement.
- Fully **onsite programmable** input voltage range & input current range
- On Site Configurable as Active / Reactive / Apparent Transducer / Phase Angle / Power Factor .
- **Onsite selectable output type**(DC current / DC voltage).
- **Single or Dual output**.
- Accuracy **Class 0.2 (IEC / EN 60688)** for Power .
- Accuracy **Class 0.5 (IEC / EN 60688)** for Phase Angle / Power Factor**.**
- Seven Segment **LCD Display**.
- **Rs485(Modbus)** Communication.
- Wide Auxiliary power supply. Accepts any input between 60V-300V AC/DC.
- Output Response Time < 750 ms standard.
- Fast and easy installation on DIN RAIL or onto a wall

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
Output signal accuracy **class 0.2** as per International **IEC / EN 60688** Standard.

Programmable Input/Output
The Transducer can be programmed onsite using front key & display or through programming port (COM) or through RS 485.

LED Indication
LED indication for power on and output type.
(Current output : Red LED, Voltage output : Green LED).

Fig. 1 Ziegler PRO-P

Display Module(Optional)
Optional 7 segment LCD display with backlit & keypad. For displaying measured parameter & onsite configuration of Input/output.

RS485 Communication(Optional)
Optional RS485 communication is available. For reading measured parameter & onsite configuration of input/output.

Symbols and their meaning:

X	Input
	Apparent /Active/Reactive
	Power Factor / Phase Angle
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
R_N	Rated value of output burden

Technical Specifications

Measured Parameter
Active Power / Reactive Power / Apparent Power / Power Factor /Phase Angle.

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

Network Type Supported by Power Factor & Phase Angle Single Phase / (U12 I1) 3 Phase Balanced load
(U13 I1) 3 Phase Balanced load / (U23 I1) 3 Phase Balanced load
3 phase 3 wire balanced / 3 Phase 4 wire Balanced load

Nominal Voltage Input(U_N)

Nominal input Voltage (AC RMS) (PT Secondary range)	100 V ⩽ U_N ⩽ 500 VL-L
PT Primary range	100V to 692 KVL-L
Nominal Frequency F_N	25 Hz to 60 Hz
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 60 Hz
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(M ax 250 A).

Allowed measuring range end values X2 (calibration factor Xc)

With single phase AC active/reactive/apparent power 0.30 ⩽ (X2/Rated Power) ⩽ 1.3 • $U_N/\sqrt{3}$ • I_N
With 3-phase AC active/reactive/apparent power 0.30 ⩽ (X2/Rated Power) ⩽ 1.3 • $\sqrt{3}$ • U_N • I_N
(For single phase Rated Power=$U_N/\sqrt{3}$ • I_N)
(For Three phase Rated Power=$\sqrt{3}$ • U_N • I_N)

Phase Angle & Power Factor measuring Range
Minimum span 20° to Maximum Span 360°

Measuring Output Y(Single or Optional Dual)

Output type	Load independent DC Voltage , DC Current On site 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	0 ⩽ R ⩽ 15V/Y2
Output burden with DC voltage output Signal	Y2/(2 mA) ⩽ R ⩽ ∞

Current limit under overload R=0	⩽ 1.25 * Y2 with current output ⩽ 100 mA with voltage output
Voltage limit under R=∞	< 1.25 * Y2 with voltage output ⩽ 30 V with current output
Residual Ripple in Output signal	⩽ 1% pk-pk
Response Time	< 750 ms

Auxiliary Power Supply

AC/DC Auxiliary Supply	60V… 300 VAC-DC ± 5%
AC Auxiliary supply frequency range	45 to 65 Hz
Auxiliary supply consumption	⩽ 8 VA for one output ⩽ 10 VA for two outputs

Accuracy (Acc. to IEC / EN 60688)

Reference Value	Output end Value Y2 (Voltage or Current)
Basic Accuracy for power transducer	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:

$$C=\frac{1-\frac{Y0}{Y2}}{1-\frac{X0}{X2}} \text{ or } C=1$$

Bent characteristics:

For $X0 \leq X \leq X1$ $\quad C=\frac{Y1-Y0}{X1-X0}\cdot\frac{X2}{Y2}$ or $C=1$

For $X1 \leq X < X2$ $\quad C=\frac{1-\frac{Y1}{Y2}}{1-\frac{X1}{X2}}$ or $C=1$

Reference conditions for Accuracy
For Power Transducer:

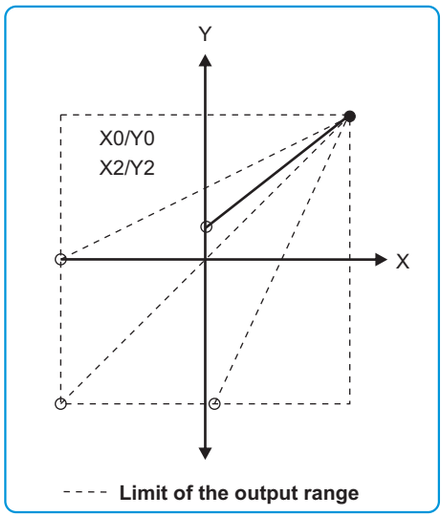
Ambient temperature	23°C +/- 1°C
Pre-conditioning	30 min acc. to IEC / EN 60688
Input Variable	Voltage Rated / Current Rated
Input waveform	Sinusoidal, Form Factor 1.1107
Input signal frequency	50....60Hz
Active / Reactive factor	Cos Φ=1 resp. Sin Φ = 1

For Phase Angle & Power Factor Transducer:

Reference Value	For Phase angle = 90° resp. For power factor = 0.5
Auxiliary supply voltage	Rated Value ±1%
Auxiliary supply frequency	Rated Value ±1%
Output Load	Rn = 7.5 V / Y2 ± 1% With DC current output signal Rn = Y2 / 1 mA ± 1% With DC voltage output signal
Miscellaneous	Acc. to IEC / EN 60688

Output Characteristics

Example of setting with Linear Characteristics **:**

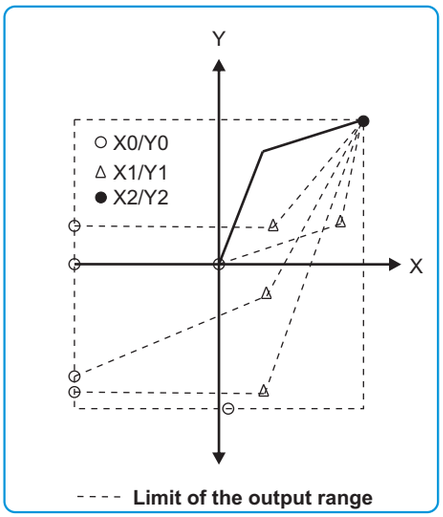


X0 = Start value of input
Y0 = Start value of output
X1 = Elbow value of input

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.

Example of setting with bent Characteristics **:**



Additional Error
Temperature influence ± 0.2%/10°C

Influence of Variations
As per IEC / EN 60688 standard.
Output stability < 30 min

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	50Hz,1min. (EN 61010-1) 5500V, Input versus outer surface 3700V, Input versus all other circuits 3700V, Auxiliary supply versus outer surface and output 490V, 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

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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

EN 60 068-2-6	Vibration
Acceleration	± 2 g
Frequency range Rate of frequency sweep	10....150...10Hz, 1 octave/minute
Number of cycles	10, in each of the three axes
EN 60 068-2-7	Shock
Acceleration	3 x 50g 3 shocks in each direction
EN 60 068-2-1/-2/-3	Cold, Dry, Damp heat
IEC 1000-4-2/-3/-4/-5/-6 EN 55 011	Electromagnetic compatibility.

LED Indication

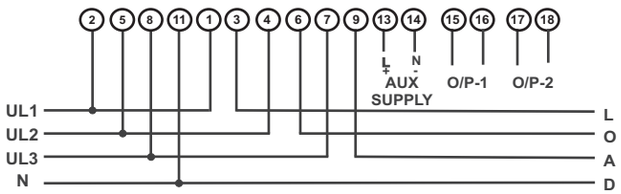
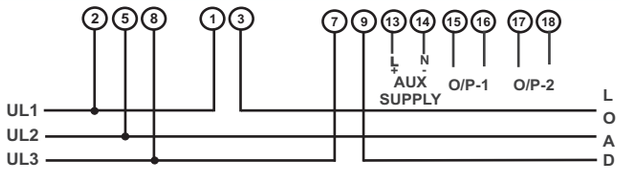
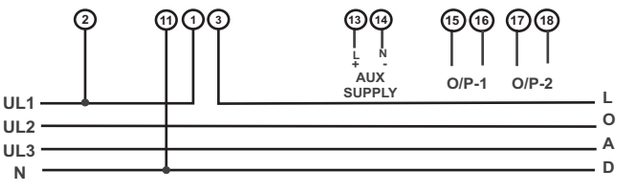
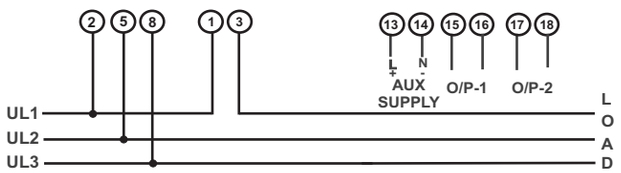
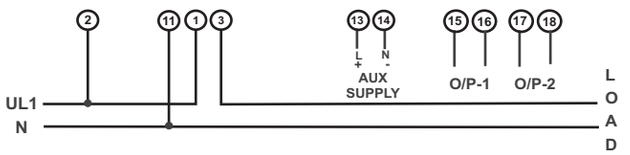
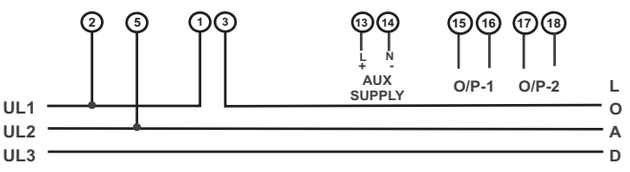
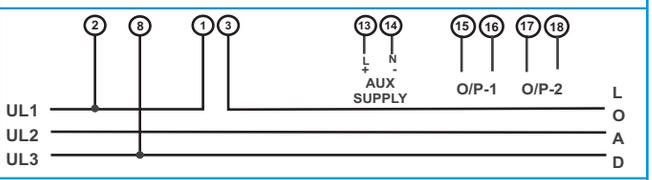
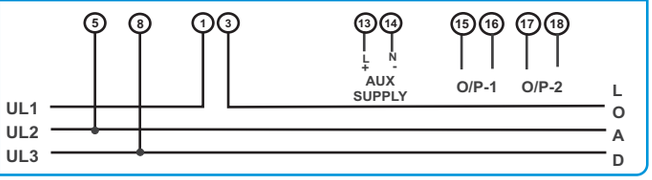
ON LED	Aux.supply healthy condition	Green LED continuous ON
O/P1 LED	Output1 voltage selection	Green LED continuous ON
	Output1 current selection	Red LED continuous ON
O/P2 LED	Output2 voltage selection	Green LED continuous ON
	Output2 current selection	Red LED continuous ON

Electrical Connections

Connection	Terminal details	
Measuring Voltage Input	UL1 UL2 UL3 N	2 5 8 11
Auxilliary Power supply	~ , + ~ , -	13 14
Measuring output - 1	+ -	15 16

Connection	Terminal details	
Measuring Current Input	I1 I1′ I2 I2′ I3 I3′	1 3 4 6 7 9
Measuring output - 2	+ -	17 18

Electrical Networks

3 Phase 4 Wire Unbalanced Load	
3 Phase 3 Wire Unbalanced Load	
3 Phase 4 Wire Balanced Load	
3 Phase 3 Wire Balanced Load	
1 Phase 2 Wire	
U12 I1 3 Phase Balanced Load	
U13 I1 3 Phase Balanced Load	
U23 I1 3 Phase Balanced Load	

Terminal Details

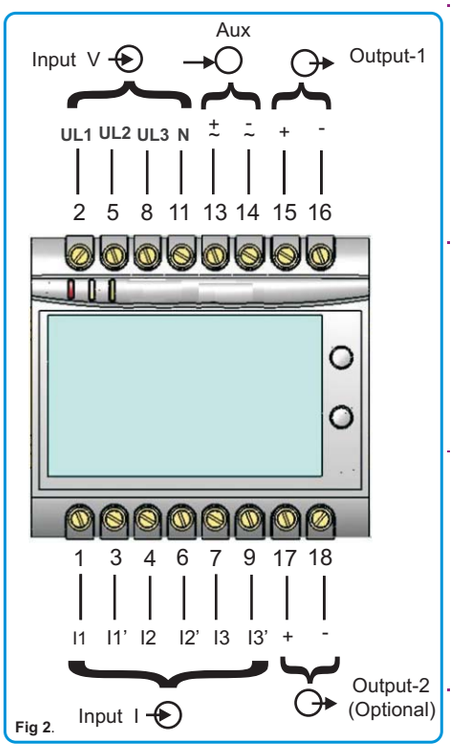


Fig 2.

Dimensions

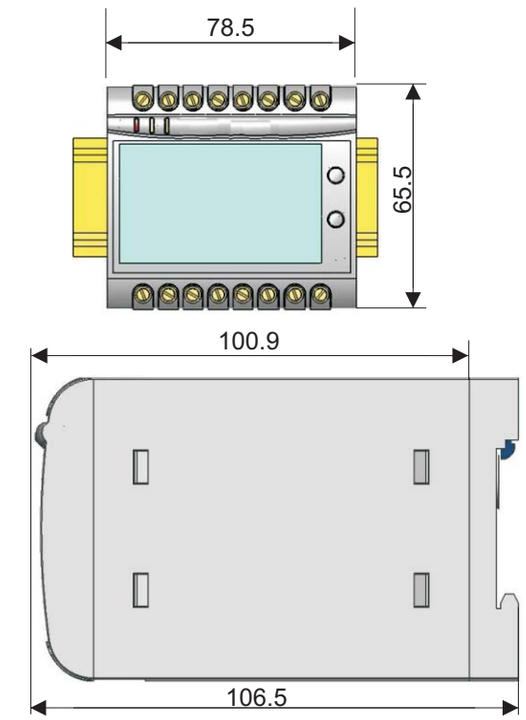


Fig 3. (All dimensions are in mm.)

Programming (Figs.4 and 5)

Programming of transducer can be done in three ways

1) Programming Via Front LCD & two keys.

2) Programming Via optional RS485(MODBUS) communication port.
(Device address,PT Ratio,CT Ratio,Transducer type,Password, communication parameter,Output Type & simulation mode can be programmed).

3) Programming Via Programming port available at front of ZIEGLER PRO Transducers using optional PRKAB601 Adapter.

Programming Via Programming port (COM)

A PC with RS 232 C interface along with the programming cable PRKAB601 and the configuration software are required to program the transducer.

The connections between
"PC PRKAB601 ZIEGLER CON Transducer.
The power supply must be applied to transducer before it can

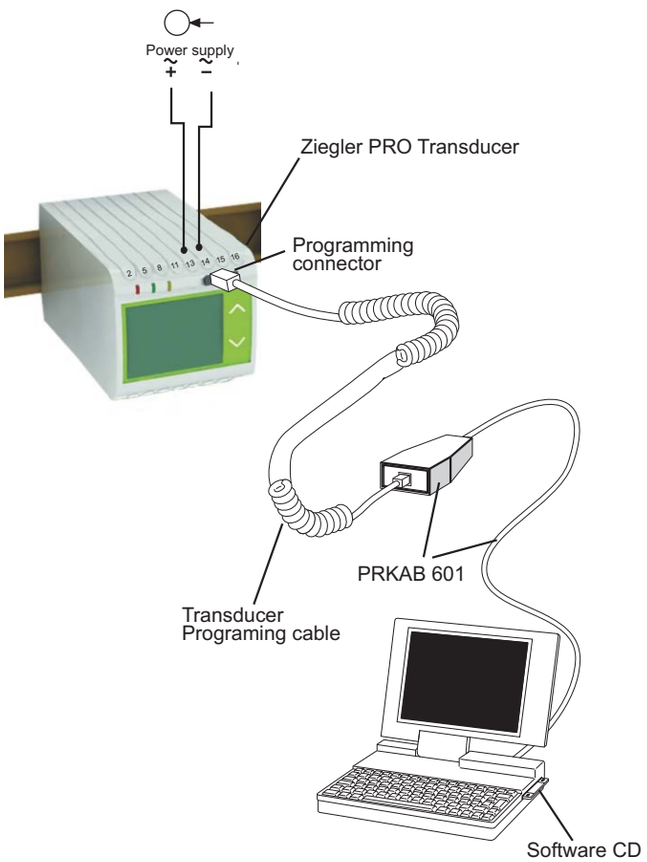


Fig. 4

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The Configuration software is supplied on a CD.
The programming cable PRKAB601 adjusts the signal level and provides the electrical insulation between the PC and ZIEGLER PRO Transducers.

Configuring ZIEGLER PRO Transducer
To configure ZIEGLER PRO Transducer Input / Output one of the three programming methods can be adapted along with mechanical switch setting (DIP switch setting on PCB).

DIP Switch Setting for OUTPUT
Type of output (current or voltage signal) has to be set by DIP switch (see Fig.5).

For programming of DIP switch the user needs to open the transducer housing & 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.

Refer below Fig. 5 for DIP switch setting.

The four pole DIP switch is located on the PCB in the ZIEGLER PRO Transducer

DIP Switch Setting	Type of Output Signal
	load-independent current
	load-independent voltage

Fig. 5

Ordering Information

Standard Version

Dual Output : **P - 4WUB - F - O1A1 - O2V1 - D - Z - Z**

Single Output : **P - 4WUB - F - O1A1 - D - Z - Z**

Sr.No.	Transducer parameter	Ordering Code
1	Input Signal	
	Active Power	P
	***Network supported :** 3 phase 4 wire unbalanced load	4WUB
2	Frequency of Input (50 Hz / 60 Hz)	F
3	**Output 1 (Standard Ranges)**	
	Current = -20.....0.....20 mA	O1A1
4	**Output 2 (Standard Ranges)**	
	Voltage = -10.....0.....10 V	O2V1
5	**With Display**	D
6	**Without RS-485**	Z
7	**Without PRKAB 601**	Z

Note: End value of output can not be changed onsite.
* Transducer type and network supported are onsite programmable.

Ordering Information

Optional Versions

Sr.No.	Transducer parameter		Ordering Code
1	Input Signal		
	Active Power		P
	Reactive Power		Q
	Apparent Power		S
	*Network supported	Single phase	1P2W
		3 phase 3 wire unbalanced load	3WUB
		3 phase 4 wire unbalanced load	4WUB
		3 phase 4 wire balanced load	4WB
		3 phase 3 wire balanced load	3WB
	Power factor/		PF
	Phase angle		PA
	*Network supported	Single phase/	1P2W
		3 phase 4 wire balanced load	4WB
		3 phase 3 wire balanced load	3WB
		(U12I1) 3 phase balanced load	3WB - U12
		(U13I1) 3 phase balanced load	3WB - U13
		(U23I1) 3 phase balanced load	3WB - U23

2	Frequency of Input (50 Hz / 60 Hz)	F
3	**Output 1**	
	**Current = -20.....20 mA	O1A1
	Current = 0.....20 mA	O1A2
	Current = 4.....20 mA	O1A3
	**Voltage = -10....10 V	O1V1
	Voltage = 0....10 V	O1V2
	Optional factory set ranges	
	Current = 0.....10 mA	O1A4
	Current = 0.....5 mA	O1A5
	Current = 0.....2.5 mA	O1A6
	Current = 0.....1 mA	O1A7
	Voltage = 0.....5 V	O1V3
	Voltage = 0.....2.5 V	O1V4
	Voltage = 0.....1 V	O1V5
4	**Output 2**	
	Without output 2	O200
	**Current = -20.....20 mA	O2A1
	Current = 0.....20 mA	O2A2
	Current = 4.....20 mA	O2A3
	**Voltage = -10.....10 V	O2V1
	Voltage = 0.....10 V	O2V2
	Optional factory set ranges	
	Current = 0.....10 mA	O2A4
	Current = 0.....5 mA	O2A5
	Current = 0.....2.5 mA	O2A6
	Current = 0.....1 mA	O2A7
	Voltage = 0.....5 V	O2V3
	Voltage = 0.....2.5 V	O2V4
	Voltage = 0.....1 V	O2V5
5	LCD display module	
	With Display	D
	Without Display	Z
6	RS-485 module	
	With RS-485	R
	Without RS-485	Z
7	PRKAB 601module	
	With PRKAB 601	PR
	Without PRKAB 601	Z

Optional Version Example:

Q - 3WB - F - O1A2 - O1V2 - O2V2- O2A2 - D - R-PR

Reactive Power transducer, 3 phase 3 wire balanced network ,50/60 Hz nominal input signal,
Output1 = 0…20mA or 0…10V , Output2= 0…10V or 0…20mA,
With LCD display module , with RS-485 & with PRKAB 601 cable.

Note: End value of output can not be changed onsite.

* Transducer type and network supported are onsite programmable.

**For apparent power, -20...0....20mA or ,-10....0....10V is not applicable.

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Ziegler
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