

# Ziegler

Redefine Innovative Metering

# Technical Datasheet

ZOT PROI | PROV | PROHz

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PROGRAMMABLE ELECTRICAL SIGNAL CONVERTERS

# ZOT PROI | PROV | PROHz

## PROGRAMMABLE ELECTRICAL SIGNAL CONVERTERS

ZOT PRO is a series of programmable signal converters used to measure and convert AC electrical signal to DC Voltage or Current analog output for process control application

### Product Features

- **Measuring Input:**
  - ZOT PROHz : Sine wave or distorted wave form of nominal input voltage with fundamental wave
  - ZOT PROI | PROV : AC Voltage/ Current input signal , sine wave or distorted wave form
- **Analog Output (Single or dual) :** Isolated analog output which can be set onsite to either voltage or current output
- **Accuracy :** Output signal accuracy Class 0.2 as per International Standard IEC/EN 60 688
- **Programmable Input /Output :** The converter 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)
- **Display Module (Optional) :** Optional 7 segment LCD display with backlit & keypad for displaying measured parameters & onsite configuration of input/output
- **RS485 Communication (Optional) :** Optional RS485 communication is available for reading measured parameters & onsite configuration of input/output

Symbol	For PROV/ PROI	For PROHz
X	Input AC Voltage / AC Current	Input Frequency
X0	Start value of input	Start value of input
X1	Elbow value of input	Elbow value of input
X2	End value of input	End value of input
Y	Output DC Voltage / DC Current	Output DC Voltage / DC Current
Y0	Start value of output DC Voltage / DC Current	Start value of output DC Voltage / DC Current
Y1	Elbow value of output DC Voltage / DC Current	Elbow value of output DC Voltage / DC Current
Y2	End value of output DC Voltage / DC Current	End value of output DC Voltage / DC Current
R <sub>N</sub>	Rated value of output burden	Rated value of output burden
FN or UN	Nominal Frequency	Nominal Voltage



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### Technical Specifications

<b>Measuring Input X</b>	
<b>Voltage signal converter ZOT PROV</b>	
Nominal input Voltage $U_N$ (AC RMS) (PT Secondary range) PT Primary range	$57V \leq U_N \leq 500 V$ 57V to 400 kV
Nominal Frequency $F_N$	45....66 Hz
Nominal input Voltage burden	< 0.6 VA at $U_N$
Overload Capacity:	1.2 * $U_N$ continuously, 2 * $U_N$ for 1 second, repeated 10 times at 10 minute intervals. (Maximum 300V with power supply powered from measuring input).
No need of external potentiometer. User can set full scale output for desired input with the help of programmable PT secondary.	
<b>Current signal converter ZOT PROI</b>	
Nominal input Current $I_N$ (AC RMS) (CT Secondary range) CT Primary range	$1 A \leq I_N \leq 5 A$ 1 A to 9999A
Nominal Frequency $F_N$	45....66 Hz
Nominal input Current burden	< 0.2 VA 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 time at 1 hour interval(max 250 A).
No need of external potentiometer. User can set full scale output for desired input with the help of programmable CT secondary.	
<b>Frequency converter ZOT PROHz</b>	
Measuring Ranges	45Hz to 55Hz, 48Hz to 52Hz, 55Hz to 65Hz, 45Hz to 65Hz (min span 4Hz)
Nominal input Voltage( $U_N$ )	$57V \leq U_N \leq 500 V$
Nominal input Voltage burden	< 0.6 VA max
Overload Capacity	1.2 * $U_N$ continuously, 2 * $U_N$ for 1 second, repeated 10 times at 10 minute intervals (maximum 300V with power supply powered from measuring input)
<b>Measuring Output Y (Single or Optional Dual)</b>	
Output type	Load independent DC Voltage or DC Current (Onsite selectable through DIP switches & programming)
Load independent DC output (Y)	0...20mA / 4...20mA OR 0...10V
Output burden with DC current output signal	$0 \leq R \leq 15V/Y2$
Output burden with DC voltage output signal	$Y2/(2 mA) \leq R \leq \infty$
Current limit under overload $R=0$	$\leq 1.25 * Y2$ with current output $\leq 100 mA$ with voltage output
Voltage limit under $R=\infty$	$< 1.25 * Y2$ with voltage output $\leq 30 V$ with current output
Residual Ripple in Output signal	$\leq 1\%$ pk-pk
Response Time	< 400 ms

# ZOT PROI | PROV | PROHz

## PROGRAMMABLE ELECTRICAL SIGNAL CONVERTERS

<b>Auxiliary Power Supply</b>	
AC/DC Auxiliary Supply	60V... 300 VAC-DC $\pm$ 5% or 24... 60 VAC-DC $\pm$ 10%
AC Auxiliary supply frequency range	40 to 65 Hz
Auxiliary supply consumption	
60V...300 VAC-DC	$\leq$ 8VA for Single output $\leq$ 10VA for Dual output
24V...60 VAC-DC	$\leq$ 5 VA for Single output $\leq$ 6 VA for Dual output
<b>Accuracy (Acc. To IEC / EN 60688)</b>	
Reference Value	Output end Value Y2 (Voltage or Current)
Basic Accuracy	0.2 * C
<b>Reference Conditions for Accuracy</b>	
Ambient temperature	23°C +/- 1°C
Pre-conditioning	30 min acc. to IEC / EN 60 688
Input Variable	Rated Voltage / Rated Current
Input waveform	Sinusoidal, Form Factor 1.1107
Input signal frequency	50 or 60Hz
Auxiliary supply voltage	At nominal range
Output Load	Rn = 7.5 V / Y2 $\pm$ 1%      With DC current output signal; Rn = Y2 / 1 mA $\pm$ 1%      With DC voltage output signal
Miscellaneous	Acc. to IEC / EN 60 688
<b>Additional Error</b>	
Temperature influence	$\pm$ 0.2% /10°C
<b>Influence of Variations</b>	
As per IEC / EN 60688 standard	< 30min
Output stability	
<b>Safety</b>	
Protection Class	II (Protection Isolated, EN 61010)
Protection	IP 40, housing according to EN 60529 IP 20 ,terminal according to EN 60529
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
<b>Installation Data</b>	
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

## PROGRAMMABLE ELECTRICAL SIGNAL CONVERTERS

Connection Terminal	
Connection Element	Conventional Screw type terminal with indirect wire pressure
Permissible cross section of the connection lead	≤ 4.0 mm <sup>2</sup> single wire or 2 x 2.5 mm <sup>2</sup> fine wire
Environmental	
Nominal range of use	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	
<b>EN 60068-2-6</b>	<b>Vibration</b>
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
<b>EN 60068-2-7</b>	<b>Shock</b>
Acceleration	3 x 50 g 3 shocks in each direction
EN 60 068-2-1/-2/-3	Cold, Dry, Damp heat
IEC 61000-4-2/-3/-4/-5/-6	Electromagnetic compatibility.
EN 55 011	

**Accuracy :** Factor C (The highest value applies if calculated C is less than 1, then C=1 applies)

Linear characteristics:

$$C = \frac{1 - \frac{Y_0}{Y_2}}{1 - \frac{X_0}{X_2}} \text{ or } C=1$$

Bent characteristics:

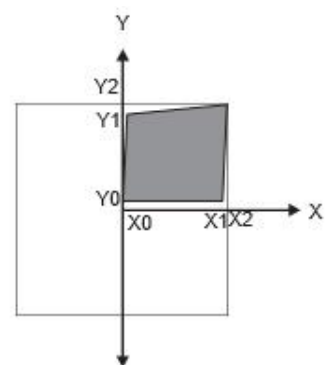
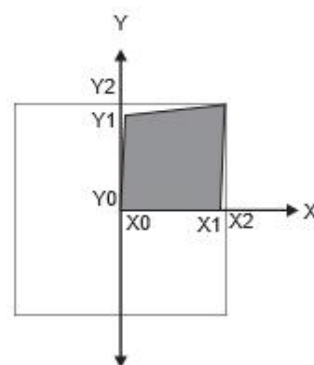
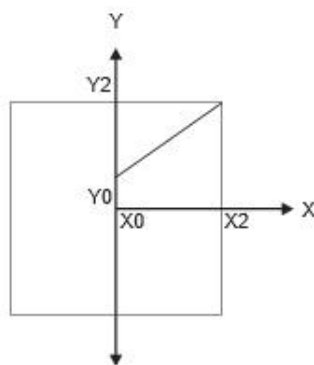
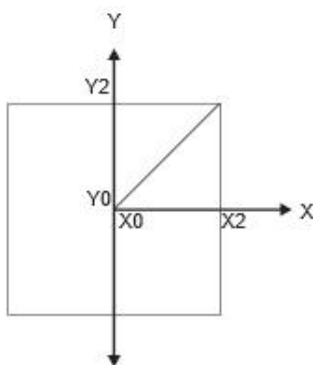
For  $X_0 \leq X \leq X_1$

$$C = \frac{Y_1 - Y_0}{X_1 - X_0} \cdot \frac{X_2}{Y_2} \text{ or } C=1$$

For  $X_1 \leq X \leq X_2$

$$C = \frac{1 - \frac{Y_1}{Y_2}}{1 - \frac{X_1}{X_2}} \text{ or } C=1$$

### Output Characteristics :



X0 = Start value of input

Y0 = Start value of output X1

X1 = Elbow value of input

Y1 = Elbow value of output X2

X2 = End value of input

Y2 = End value of output

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

# ZOT PROI | PROV | PROHz

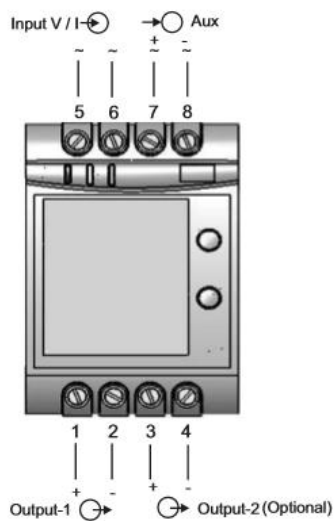
## PROGRAMMABLE ELECTRICAL SIGNAL CONVERTERS

### LED Indication

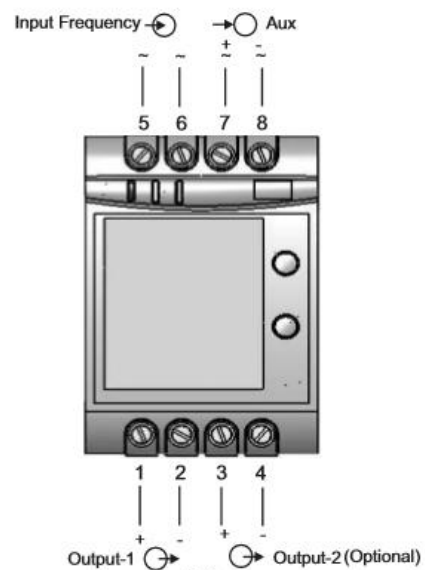
ON LED	Aux.supply healthy condition	Green LED continuous ON
O/P1 LED	Output1 voltage selection	Green LED continuous ON
	Output1 Current selection	Red LED continuous ON
O/P2 LED	Output2 voltage selection	Green LED continuous ON
	Output2 Current selection	Red LED continuous ON

### Connection Diagram and Installation

Connection	Terminal details	
Measuring input	~	5
	~	6
Auxilliary Power supply	~, +	7
	~, -	8
Measuring output - 1	+	1
	-	2
Measuring output - 2	+	3
	-	4



for ZOT PROI | PROV

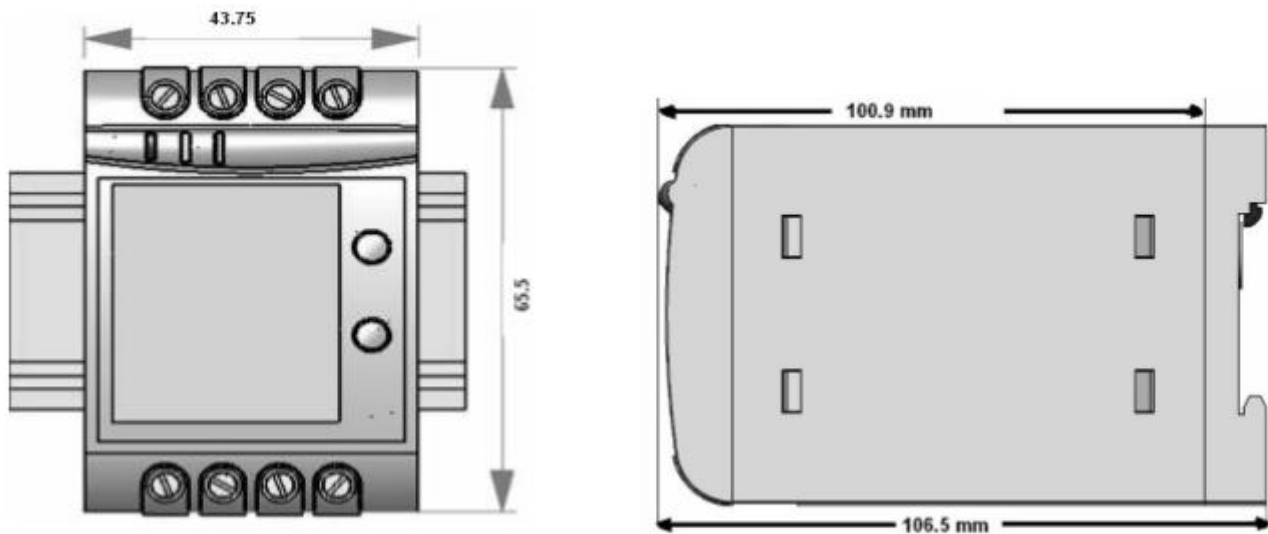


for ZOT PROHz

# ZOT PROI | PROV | PROHz

## PROGRAMMABLE ELECTRICAL SIGNAL CONVERTERS

### Dimensions



### Programming

Programming of converter 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, Password, communication parameter, Output Type & simulation mode can be programmed)
- 3) Programming Via Programming port available at the front of converters using optional Adapter

**Programming Via Programming port (COM):** A PC with RS232C interface along with the programming cable and the configuration software are required to Program the converter.

The connections between

PC ↔ Comm. cable ↔ ZOT PRO converter

The power supply must be applied to converter before it can be programmed, the Configuration software is supplied on a CD

The programming cable adjusts the signal level and provides the electrical insulation between the PC and ZOT PRO converters

**Configuring converter :** To configure ZOT PRO converter 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. For programming of DIP switch the user needs to open the converter 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.

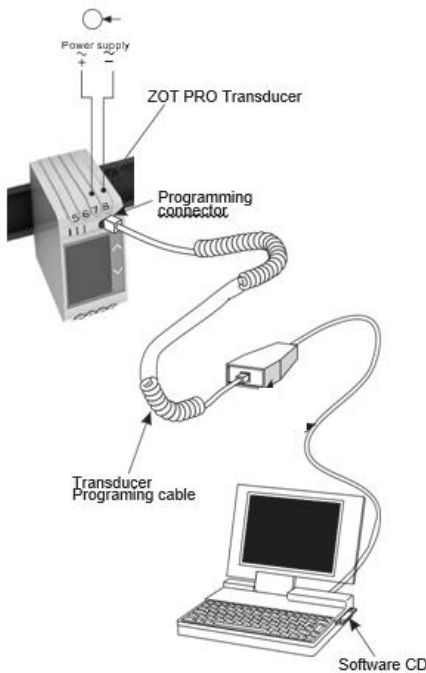
Refer table aside for DIP switch setting.

The four pole DIP switch is located on the PCB in the ZOT PRO converter

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

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## PROGRAMMABLE ELECTRICAL SIGNAL CONVERTERS



### Ordering Information

Converter ZOT PROI   PROV	(✓)	Converter ZOT PROHz	(✓)
<b>Input Signal</b>		<b>Input Signal</b>	
Voltage (Range: 57V to 500V)		Frequency	
Current (Range: 1A to 5A)		45.... 65Hz	
<b>Note</b> : Input Ranges are onsite programmable.		<b>Note</b> : Input frequency can be programmed onsite from 45Hz to 65 Hz but minimum span is 4Hz	
<b>Frequency of Input</b> (50 Hz / 60 Hz)		<b>Auxiliary Supply</b>	
<b>Auxiliary Supply</b>		High Aux (60V... 300VAC-DC)	
High Aux (60V..300VAC-DC)		Low Aux (24V... 60VAC-DC)	
Low Aux (24V..60VAC-DC)		<b>Output 1 (Standard Ranges)</b>	
<b>Output 1 (Standard Ranges)</b>		Current = 0...20 mA	
Current = 0...20 mA		<b>Output 2 (Standard Ranges)</b>	
<b>Output 2 (Standard Ranges)</b>		Voltage = 0..10V	
Voltage = 0..10V		<b>With Display</b>	
<b>With Display</b>		<b>Without RS- 485</b>	
<b>Without RS-485</b>		<b>Without Comm. cable</b>	
<b>Without Comm. cable</b>			



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