SENECA

Z-PC Line

EN

Z-204-1
TRUE RMS AC/DC VOLTAGE ISOLATOR CONVERTER with Modbus RS485 protocol.

Installation Manual

Contents:

CE

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For manuals and configuration software, please see: www.seneca.it

CSQ IQNet ISO 9001:2008

The Z204-1 module measures the value of alternate and/or direct voltage applied to the input sockets, converting it into a normalized current or voltage signal to the output terminals, proportional to the RMS (Root Mean Square) value of input.

GENERAL SPECIFICATIONS

- Voltage input up to 1200 V (DC scale) or up to 850 V (AC scale), with pre-calibrated scales selectable by DIP-Switches and through Easy Setup software.
- The device parameters can be set via the configuration software (Easy Setup, Z-NET).
- Selectable current (0 – 20 mA / 4 – 20 mA) or voltage (0 – 10 V⎓) analog output. The output value is proportional to the TRMS value of the input voltage.
- High accuracy: 0.5% Input, 0.1% outputs.
- Galvanic isolation between the high voltage input and the other terminals: 4000V.
- Isolation between the output terminals and the power supply terminals: 1500V.
- Frontal panel LEDs indicating: Power On / Failure, 485 Rx and Tx.

TECHNICAL FEATURES

Inputs	
Voltage DC input 0 – 1200 V⎓	Input impedance: 4 MΩ and Accuracy: 0.5%. (please see SW1 table for the measurement range selection).
Voltage AC input 0 – 850 V∿	Input impedance: 4 MΩ, Frequency: 30Hz – 60Hz and Accuracy: 0.5%.
Pass-band	30 – 400Hz (-3dB)
Outputs	
Current output	Range: 0 – 20 mA /4 – 20 mA Software configurable. Maximum load resistance: 500 Ω. Accuracy: 0.1%.
Voltage output	Range: 0 – 10V⎓ Software configurable. Minimum load resistance : 1 kΩ. Accuracy: 0.1%.
Overvoltage category	CAT IV up to 300V⎓∿; CAT III up to 600V⎓∿, CAT II up to 1000V⎓∿, for voltage up to 1200V⎓ you will have to install an external overvoltage protection at 4kV to the device.
Thermal drift	100 ppm / K
Response time	For a step variation: 1 s from 10 to 90 %.

The safety of any system incorporating the device object of this manual is the responsibility of the assembler of the system.

Caution: The manual must be consulted in all cases where this symbol is marked	**Caution:** This symbol indicates the **possibility of electric shock.**

Power supply

Voltage	10 – 40 V⎓; 19 - 28 V∿ 50 – 60 Hz
Consumption	1 W

Environmental condition

Temperature	-20 – +65°C
Humidity	30 – 90% at 40°C not condensing
Storage Temperature	-20 – +85°C
Degree protection	IP20

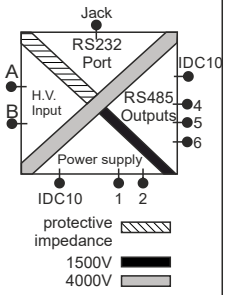
Connections

Connections	Removable 3-way screw terminals, 5,08 pitch
	Standard 4mm sockets
	Frontal jack 3.5 mm for module configuration.
	Rear IDC10 connector for DIN 46277 rail

Dimensions / Box

Dimensions	L: 100 mm; H: 112 mm; W: 35 mm
Box	PA6, Black color

Isolations 1500 V



Standards

The module complies with the following standards:

CE

EN61000-6-4 (electromagnetic emission, industrial environment).

EN61000-6-2 (electromagnetic immunity, industrial environment)

EN61010-1 (safety).

One maximum 2.5A fuse must be installed near the module.

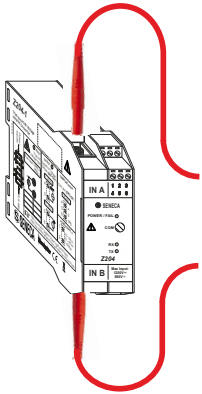
For voltage from 1000V⎓ to 1200V⎓ you will have to install an external overvoltage protection at 4kV to the device.

ADDITIONAL NOTES :
Use in environment with 2 or less pollution degree.

ELECTRICAL CONNECTIONS

WARNING!

BEFORE MAKING ANY CONNECTION TO THE DEVICE: BE SURE THAT ALL DANGEROUS HIGH VOLTAGE CIRCUITS HAVE BEEN DISCONNECTED.
FOR HIGH VOLTAGE CONNECTIONS USE ONLY THE BANANA PLUGS SUPPLIED WITH THE DEVICE.



How to connect High voltage plugs

The picture on the left shows the insertion points of the two 4mm banana plugs supplied with the instrument.

Polarity of High voltage connections

No matter what the polarity when you measure a Direct Current.

INSTALLATION RULES

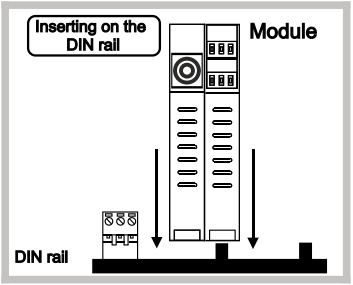
The module is designed to be installed, in vertical position, on DIN 46277 rail. For the best module performance and long life, avoid to place cables raceways and other objects that could obstruct ventilation slits. Never install the modules near heat sources.
We suggest to install the module in the bottom of the control panel.

Inserting in the DIN rail

How the picture shows:

1) Insert the IDC10 connector in the rear of the module on the DIN rail free slot (inserting is univocal because connectors are polarized).

2) The module can be fixed on the DIN rail by pressing the two hooks located on the rear of the module.



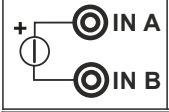
Power supply and Modbus interface

The power supply electrical connections are available to terminals or by using the Seneca DIN rail bus. The MODBUS RS485 connections are available by using the Seneca DIN rail bus after setting SW3 DIP-switch to ON position or by the screw terminals 4, 5 e 6 after setting SW3 DIP-switch to OFF position.

Power supply

The supply voltage must be between 10 to 40 V⎓ (Any polarity), or between 19 e 28 V~. **These upper limits must not be exceeded to avoid serious. damage to the module.**
It's necessary to protect the power supply source against any failure of the module using appropriately sized fuse.

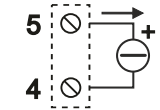
Voltage True RMS input



Max 1200 Vdc | Max 850 Vac

REFERRED TO EARTH

Current output

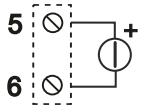


SW3= OFF

4 – 20 mA

You can change the output settings through software.

Voltage output



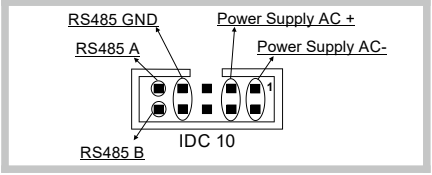
SW3= OFF

0 – 10 V⎓

You can change the output settings through software.

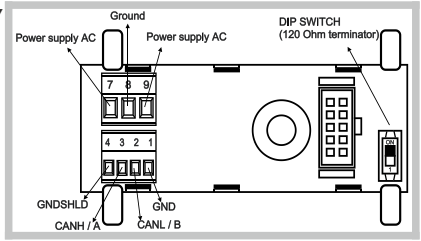
Rear connector (IDC10)

The picture shows the meaning of the IDC10 connector pins.
This connector can be used as alternative to the screw terminals blocks.



Use of the Z-PC-DINAL1-35 accessory

If Z-PC-DINAL1-35 accessory is used, then the power supply signals and communication signals may be provided by the terminals block into the DIN rail support. The figure show the meaning and the position of the terminal blocks. The DIP-switch that set the 120 Ω terminator is used only for CAN communication.
GNDSHLD: Shield to protect the connection cables (recommended).

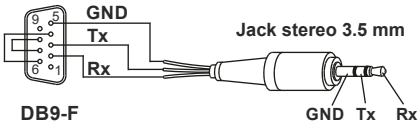


RS485	COM. PORT SW3=ON
4 A (+) 5 B (-) 6 GND	Connection for RS485 communication with the Modbus Master system as an alternative to Z-PC-DINx bus. Note: the indication of RS485 connection polarity is not standard, it may be inverted on some masters.

RS232

WARNING:
Disconnect the high voltage inputs before using RS232 serial port.

RS232 port can be used only to program the module. Z-NET or EASY Z-PC are the Seneca configuration softwares. RS232 serial communication port use the following communication parameters**: 2400,8,N,**1.
When RS232 communication is established, the serial RS485 bus network will be not enable. The RS485 port will return automatically active some seconds after the last data packed received from RS232 port.
The 3,5 mm DB9 jack stereo connector for RS232 communication can be assembled as indicated in the following figure or purchased as an accessory (cod. PM001601).



DIP-SWITCHES SETTING

CAUTION!

BEFORE CHANGING THE DIP-SWITCHES CONFIGURATION: BE SURE THAT ALL DANGEROUS HIGH VOLTAGE CIRCUITS HAVE BEEN DISCONNECTED.

The device input range depends from the DIP-switches SW1 positions;
The table below shows the pre-calibrated input scales selectable by DIP-Switches..

In the following tables the symbol ● corresponds to the DIP-switch = 1 (ON).
no indication corresponds to the DIP-switch = 0 (OFF).

DIP Switch		
●	ON	↑
	OFF	↓

DIP-Switch SW1 - INPUT SCALE (maximum limit values)

7	8	DC SCALE	AC SCALE
		0 – 150 V⎓	0 – 100 V∿
●		0 – 500 V⎓	0 – 350 V∿
	●	0 – 850 V⎓	0 – 600 V∿
●	●	0 – 1200 V⎓	0 – 850 V∿

In order to obtain the best resolution, select through the SW1 Dip-Switches group, the input scale (between the four scales in the previous table) whose fullscale is closer and higher than the value to measure.
After selecting the range of measure you must to configure, through software, start and fullscale desired within the range selected and then the current or voltage values that you want re-transmit as start and fullscale of measurement.
For example:if the value that you want to measure is 680 V ~, then set the Dip-Switches: SW1-1 = 0 and SW1-2 = 1 (that correspond to the measurement range 0-850 V⎓).
Through Easy Setup software we can configure: Voltage output, START = 0V, Fullscale = 10V and then we can read 8V to the output.

DIP-Switch SW2 - COMMUNICATION PARAMETERS									
1	2	BAUD RATE	3	4	5	6	7	8	COMMUNICATION ADDRESS
		From software							Communication parameters from EEPROM (*)
		9600 Baud						●	Address #01
	●	19200 Baud					●		Address #02
●		38400 Baud					●	●	Address #03
●	●	57600 Baud				●			Address #04
			X	X	X	X	X	X	Fixed Address, as from binary representation
			●	●	●	●	●	●	Address #63

(*) Note: when DIP-switches from 1 to 8 are in OFF position, comunication settings are recovered from EEprom.

SW3 - MEASUREMENT TO THE TERMINALS 4, 5, 6	
1	Measurement available to the terminals 4, 5 and 6
	Analog output: Voltage or Current retransmitted
●	Serial Port RS485

MODBUS REGISTER

Holding register

Address	Name	Description
40047	**V RMS**	Input voltage RMS value (floating point, most significant bits)
40048	**V RMS (LSB)**	Input voltage RMS value (floating point, less significant bits)

LED SIGNALLINGS

LED	STATE	*Meaning of LEDs*
PWR/FAIL	On Blinking	Power supply presence. Internal error or out of range.
RX	Blinking On	Received data. Data are being received through RS485 port.
TX	Blinking	Trasmitted data.

PURCHASE ORDER CODE

Order code	Description
Z204-1	AC/DC TRUE RMS HIGH VOLTAGE CONVERTER
PM001601	SERIAL CABLE PC- Z204-1

FACTORY SETTING

Default condition for the configuration parameters of the module:

Full Scale	1000 V⎓
Analog Output	Current 4 – 20 mA
Comunication parameters:	38400 8,N,1 Addr. 1

To change the input scale set the Dip-Switch SW1, as shown in the previous table and configure the Z204-1 module using the software (Easy, Z-NET).

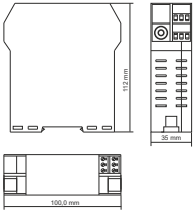
MAINTENANCE

CAUTION!

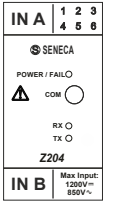
BEFORE PERFORMING ANY MAINTENANCE OPERATION:BE SURE THAT ALL DANGEROUS HIGH VOLTAGE CIRCUITS HAVE BEEN DISCONNECTED.

MODULE LAYOUT

MODULE DIMENSIONS



FRONTAL PANEL



Variations of standard parameters are possible by using configuration softwares: Z-NET or EASY-Z-PC available at: www.seneca.it site. For more information about a list of all register and their function please see the USER manual.

The safety of any system incorporating the module object of this manual is responsability of the assembler of the system.

DECOMMISSIONING AND DISPOSAL

Disposal of Electrical & Electronic Equipment (Applicable throughout the European Union and other European countries with separate collections programs). This symbol, found on your producr or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical & electronic equipment. By ensuring this product is didposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product. The recycling of materials will help to conserve natural resources. For more detailed information about the recycling of the product, please contact your local city office, waste disposal service of the retail store where you purchased this product.