INSTALLATION MANUAL

Z204-1

True RMS AC / DC converter with Modbus protocol on RS485

EN



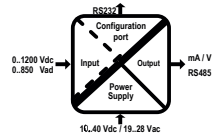
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For manuals in French, German, English and configuration software, visit the www.seneca.it/products/204-1 website

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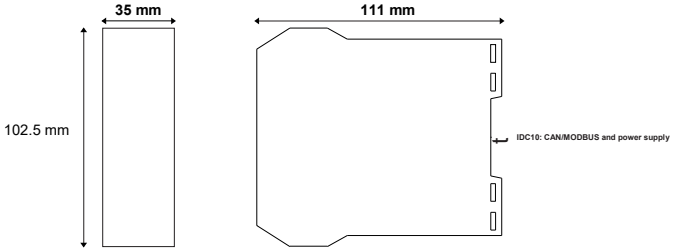
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TECHNICAL SPECIFICATIONS

STANDARDS	**EN61000-6-4** electromagnetic emissions, industrial environment **EN61000-6-2**. Electromagnetic immunity, industrial environment. **EN61010-1** (safety) Install a fuse with a maximum capacity of 2.5 A near the module For voltages over 1000 V⎓, install a 4kV overvoltage protection device
INSULATION	 N.B: use in environments with pollution degree 2 or lower.
ENVIRONMENTAL CONDITIONS	Temperature: -20 – + 65°C Humidity/Altitude: 30 -90% non condensing, up to 2000 m above sea level. Storage temperature: -20 – + 85°C Protection rating: IP20
CONNECTIONS	Removable 4-way screw terminals, 3.5 mm pitch for cable up to 2.5 mm2, rear IDC10, for 35 mm DIN bar IEC EN60715 3.5 mm front jack for configuration 4 mm standard bushes
POWER SUPPLY	Voltage 10..40 V⎓ or 19..28 V~ 50 – 60 Hz Typical absorption 1 W
INPUTS	Voltage: 0/850 V~ Input impedance 4 MΩ (precision: 0.5%). Frequency 30 - 60 Hz, Voltage: 0/1200 V⎓, Input impedance 4 MΩ (precision: 0.5%). Pass-band: 30-400 Hz (-3 dB). **N.B.:** the instrument below 3% of the selected full scale does not give the correct measurement
OVERVOLTAGE	Category V: up to 300 Vac/dc: Category III: up to 600 Vac/dc; Category II: up to 1000 Vac/dc; For voltages up to 1200 V⎓ provide an overvoltage limiter external to the 4 kV device.
OUTPUTS	Current: 0/4..20 mA, max resistance 500 Ω (precision: 0.1%) Continuous voltage: 0-10 V selectable via the software. Minimum load resistance: 1 kΩ. (precision: 0.1%) Temperature drift: 100 ppm/K Response time for a stepped variation: 1 s from 10 to 90%
CONFIGURABILITY	Baud rate and MODBUS Address via DIP-switch or via software.
Dimensions (LxHxD)	35 x 102.5 x 111 mm (terminals included).
Case	PA6 material, black.

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MODULE LAYOUT



Dimensions: 35 x 102.5 x 111mm, **Weight:**: 170 g, **Container** PA6, black

PRELIMINARY WARNINGS

The word **WARNING** preceded by the ⚠ symbol indicates conditions or actions that put the user's safety at risk. The word **CAUTION** preceded by the ⚠ symbol indicates conditions or actions that might damage the instrument or the connected equipment.

The warranty shall become null and void in the event of improper use or tampering with the device or accessories supplied by the manufacturer as necessary for its correct operation, and if the instructions contained in this manual are not followed.



WARNING: The full content of this manual must be read before operation. The module must only be used by qualified electricians.
Specific documentation is available from www.seneca.it/prodotti/ Z204-1.



The module must be repaired and damaged parts replaced by the Manufacturer. The product is sensitive to electrostatic discharges. Take appropriate measures during any operation.



Important: Obstructing ventilation slots with any object is prohibited.
Installing the module next to devices that generate heat is prohibited.



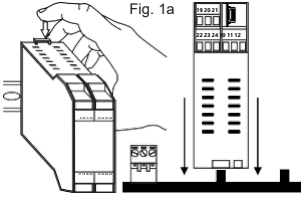
Electrical and electronic waste disposal (applicable in the European Union and other countries with selective waste collection). The symbol on the product or its packaging shows that the product must be disposed of at a collection centre authorised to recycle electrical and electronic waste.

ASSEMBLY STANDARDS

The module has been designed for vertical installation on an IEC EN 60715 omega guide. For optimal operation and long life, adequate ventilation must be provided. Avoid positioning channels or other objects that obstruct the ventilation slots. Avoid mounting modules over equipment generating heat. Installation in the bottom part of the switchboard is recommended.

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INSTALLATION ON AND REMOVAL FROM THE IEC EN 60715 RAIL

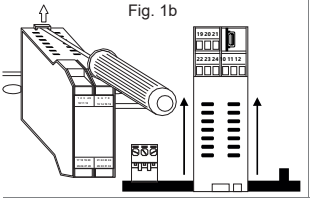


Insertion onto the OMEGA IEC EN 60715 rail:

1) Move the two hooks on the back of the module outward as illustrated in Fig. 1b.

2) Insert the rear IDC10 connector of the module into a free slot of the OMEGA rail accessory as shown in Fig. 1a. (insertion is univocal as connectors are polarised).

3) To secure the module to the OMEGA guide, tighten the two hooks on the side of the IDC10 rear connector as illustrated in Fig. 1a.



Removal from the OMEGA IEC EN 60715 rail:

As shown in figure 1b:

1) With the help of a screwdriver, pull the two hooks on the side of the module outwards.

2) Slowly extract the module from the rail.

USE OF THE Z-PC-DINAL ACCESSORY

⚠ **CAUTION**

Do not turn the module upside down and **do not force the insertion** of the IDC10 connector on the Z-PC-DIN bus. The module's rear IDC10 connector must be plugged into a free slot on the Z-PC-DIN bus.

The illustration shows the meanings of the various IDC10 connector pins if signals are to be sent via them directly.

Fig. 1 c and **Fig. 1 d** show the power connection and RS485 port on the IDC10.

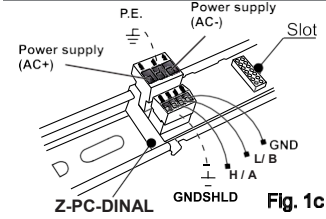


Fig. 1c

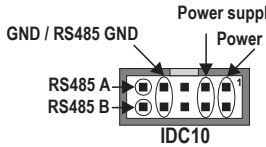


Fig. 1d

SUPPLY AND MODBUS INTERFACE

Supply and MODBUS interface are available via the Seneca BUS.

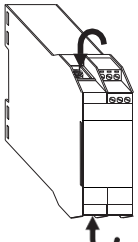
Access to the Seneca BUS is available via the IDC10 connector, or via the Z-PC-DINAL-35 accessory.

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ELECTRICAL CONNECTIONS

⚠ **WARNING**

BEFORE CARRYING OUT ANY INSTRUMENT CONNECTIONS, MAKE SURE THAT YOU DISCONNECT ALL THE CIRCUITS SUBJECT TO A DANGEROUS VOLTAGE. TO CONNECT THE HIGH VOLTAGE INPUT USE ONLY THE PLUGS SUPPLIED WITH THE INSTRUMENT



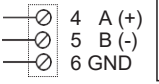
Insertion of high voltage plugs

The figure at the side shows the insertion points of the two 4mm banana plugs supplied with the instrument.

Polarity of the high voltage connection

In the case of DC measurement, the polarity is indifferent.

Rs485 PORT COM Sw3 = ON



Connection for RS485 communication using the MODBUS master system as an alternative to the Z-PC-DINx bus.
N.B. the indication of the RS485 connection polarity is not standardised and in some devices may be inverted.

RS232

⚠ **WARNING**

Use the RS232 serial port only after disconnecting the high voltage input.

This communication port can only be used to program the module. Z-NET or Easy Setup are our configuration software. The RS 232 serial port uses the following communication parameters: **2400,8,N,1.**

During the use of the RS232 port, the bus will be inactive; it will reactivate automatically a few seconds after the last message exchanged on the COM port. The DB9 connection cable 3.5 mm stereo jack can be assembled as shown in the figure below or purchased as an accessory (code PM001601).



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DIP - SWITCH SETTINGS

⚠ **WARNING**

BEFORE YOU ATTEMPT USING THE DIP-SWITCHES, MAKE SURE THAT YOU HAVE DISCONNECTED ALL DANGEROUS VOLTAGE CIRCUITS.

The range of the instrument is established by the SW1 DIP-switch settings (DIP 7 and 8); the table below shows the useful combinations for the pre-set ranges.

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

DIP Switch		
⬆	ON	↑
⬇	OFF	↓

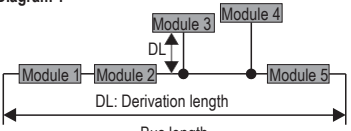
DIP-Switch SW1 - INPUT SCALES (maximum limit values)

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~

MODBUS CONNECTION RULES

1) Install the modules in the omega rail (120 max)
2) Connect the remote modules using cables of an appropriate length.
3) The following table shows cable length data:
- Bus length: maximum length of the Modbus network in function of the Baud Rate.
It is the length of the cables that connect the two modules on which the bus terminal has been inserted by means of a DIPSwitch (see Diagram 1).
- Derivation length: maximum length of a derivation (see Diagram 1).

Diagram 1



• MODBUS Diagram 1

BUS length	Derivation length	Baudrate
1200 m	2 m	115kbps

For maximum performance, it is recommended to use special shielded cables, such as BELDEN 9841.

PROGRAMMING VIA MODBUS INTERFACE

The module can be programmed/configured via the MODBUS interface. For details on communication, refer to the User Manual.
For the variation of the parameters, the communication software is available in the download area of the www.seneca.it website: Z-NET and EASY-SETUP.

With all DIP-switches in the OFF position (the communication parameters are taken from the memory).

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To obtain the best resolution, select through the SW1 Dip-Switch group the input scale (among the four in the previous table) whose full scale is closer to and higher than the value to be measured.
After selecting the measurement range, it is necessary to configure via software the desired start and full scale within the selected range and then the current or voltage values that you want to retransmit as the measurement start and full scale.
For example: if the value to be measured is 680 V ~, then set Dip-switches SW1-1 =
0 and SW1-2 = 1 (this corresponds to the 0-850 V ~ measuring range).
Using the Easy Setup software we can configure the voltage output 0 V for the start of the scale and 10V for the full scale so we will read 8V at 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						↑	Fixed address 01
	↑	19200 Baud					↑		Fixed address 02
↑		38400 Baud					↑	↑	Fixed address 03
↑	↑	57600 Baud				↑			Fixed address 04
			X	X	X	X	X	X	Fixed address, represented as binary
			↑	↑	↑	↑	↑	↑	Fixed address 63

(*) Note: if DIP-switches from 1 to 8 are OFF, the communication parameters are loaded from EEprom.

Sw3 - MEASUREMENT AVAILABLE ON TERMINALS 4 5 6

1	Measurement available on terminals 4 5 6
	Analogue output: retransmitted current or voltage
↑	RS485 serial port

LED SIGNALS ON THE FRONT PANEL

LED	Status	LED meaning
PWR	On	Power supply on
	Flashing	Internal error or out of scale
RX	On	Check the connection
	Flashing	Receipt of packet completed
TX	Flashing	Transmission of packet completed

BASE MODBUS REGISTERS (Holding register)

Address	Name	Description
40047	**VRMS (MSW)**	Input voltage value (floating point, most significant bits)
40048	**VRMS(LSW)**	Input voltage value (floating point, least significant bits)

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SUPPLY AND MODBUS INTERFACE

Electrical power connections are available from both terminals and using the Seneca DIN guide bus. Connections relative to the MODBUS RS485 interface are instead available using the DIN rail bus or, after configuring the SW3 DIP-switch to ON, through terminals 4, 5 and 6.

POWER SUPPLY



The power voltage must be between 10 and 40 V⎓ (any polarity), or between 19 and 28 V~. **The upper limits must not be exceeded in order to avoid serious risk to the module**. The power supply source must be protected from any module malfunctions using appropriately-sized safety fuses.

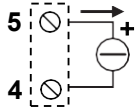
TRUE RMS VOLTAGE INPUT



Max 1200 Vdc | Max 850 Vac

⚠ **WARNING REFERRED TO GROUND**

Current output

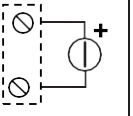


SW3= OFF

4– 20 mA

The output settings can be modified by the software.

Voltage output



SW3= OFF

0 – 10 V⎓

The output settings can be modified by the software.

FACTORY SETTINGS

Default conditions for module configuration parameters:

Full scale	1000 V⎓
Analogue output	Current 4 - 20 mA
Communication parameters	38400 8, N, 1 Addr. 1

To change the input scale, set Dip-Switches SW1 as shown in the relevant table and load the configuration via the configuration software (EasySetup or Z-NET =

ACCESSORIES

Code	Description
Z-PC-DINAL1-35	DIN rail support with power supply terminals P = 35 mm
Z-PC-DIN1-35	DIN 1-slot support for rear connector P = 35mm
CS-JACK-DB9F	PC-Z204-1 serial cable

CONTACT INFORMATION:

Technical support	supporto@seneca.it	Product information	commerciale@seneca.it

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