INSTALLATION MANUAL
Z-4AI
Module with 4 voltage-current ANALOGUE INPUTS with Modbus protocol on RS485

E

CE

17.5 mm

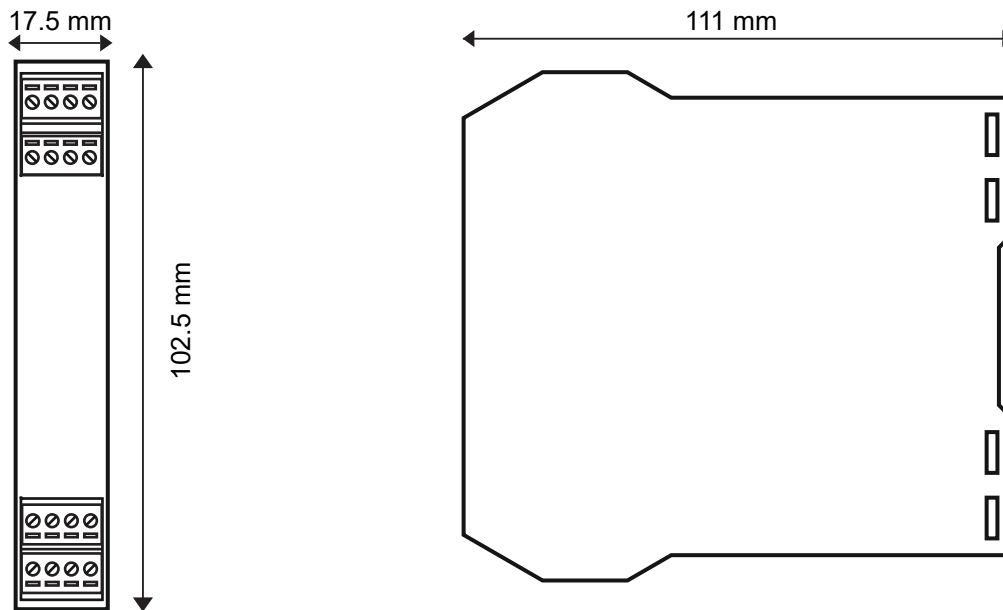111 mm

102.5 mm

Dimensions LxHxD 17.5 x 102.5 x 111 mm; **Weight:** 110 g; **Enclosure:** PA6, black

SIGNALS VIA LED ON FRONT PANEL

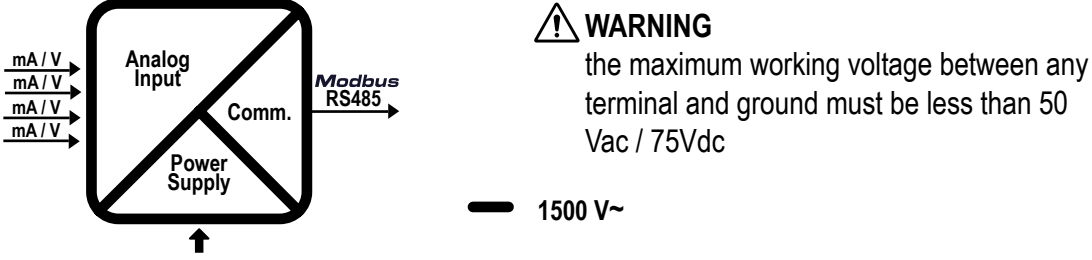| LED	STATUS	LED meaning
PWR Green	ON	The device is powered correctly
FAIL yellow	Flashing	Anomaly or fault
RX Red	Flashing	Receipt of packet completed
RX Red	ON	Anomaly / Check connection
TX Red	Flashing	Transmission of packet completed

PRELIMINARY WARNINGS

The word **WARNING** preceded by the symbol ⚠ indicates conditions or actions that put the user's safety at risk. The word **ATTENTION** 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 module or devices 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 any operation. The module must only be used by qualified electricians. Specific documentation is available at www.seneca.it/products/z-4ai
	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 recycling). The symbol on the product or its packaging shows the product must be surrendered to a collection centre authorized to recycle electrical and electronic waste.

STANDARDS	**EN61000-6-4** Electromagnetic emissions, industrial environment. **EN61000-6-2** Electromagnetic immunity, industrial environment. **EN61010-1** Safety
INSULATION	
ENVIRONMEN-TAL CONDITIONS	*Temperature*: -10 – + 65°C (-10 - +55 °C UL) *Humidity*: 30%– 90% non condensing. *Altitude:* up to 2000 m above sea level *Storage temperature:* -20 + 85° *Protection degree:* IP20.
ASSEMBLY	35 mm DIN rail IEC EN60715 in vertical position.
CONNECTIONS	3-way removable screw terminals, pitch 5 mm Rear connector IDC10 for DIN bar 46277 front micro USB
POWER SUPPLY	Voltage: 10 – 40 Vdc; 19 – 28 Vac 50 – 60 Hz Absorption: Typical: 0,5 W @ 24Vdc, Max: 3.5 W

INPUTS	
Voltage input:	Bipolar with F.S. programmable at +2 Vdc and +10 Vdc Input impedance >100 kOhm
Current input:	Bipolar with F.S. Programmable at +20 mA with 50 Ohm internal shunt selectable via DIP-switch. Available power supply: 90 + 90 mA at 13 Vdc.
Number of chan-nels:	4
Input resolution:	15 bit + sign.
Input protection:	± 30 Vdc or 25 mA
Precision voltage and current:	Starting: 0.1 of full scale Linearity : 0.03% of scale. Zero: 0.05% of scale. TC: 100 ppm, EMI: <1 %
Sampling time	120 ms/channel 0 60 ms/channel
Filter	configurable from 0 to 6

CONFIGURATION OF FACTORY SETTINGS

All DIP-switches in	OFF position ▪
Communication parameters of ModBUS protocol:	38400 8, N, 1 Address 1
Communication parameters of micro USB front port	2400 8, N, 1 Address 1
Channel input from 1 to 4	VOLTAGE ± 10 Vdc
Numerical representation of the input measurement:	± 10000 mV
Sampling time:	120 ms

ModBUS CONNECTION RULES

1) Install the modules in the DIN rail (120 max)
2) Connect the remote modules using cables of an appropriate length. The following table shows cable length data:
- Bus length: maximum length of the Modbus network according to the Baud Rate. This is the length of the cables that connect the two farthest modules (see Diagram 1).
- Derivation length: maximum length of a derivation 2 m (see Diagram 1).

Diagram 1

Bus length	Derivation length
1200 m	2 m

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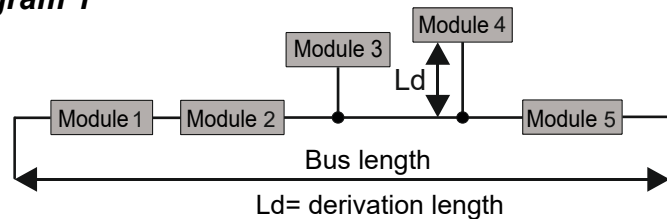
For maximum performance, it is recommended to use special shielded cables, such as BELDEN 9841.

INSTALLATION REGULATIONS

The module has been designed for vertical installation on a DIN 46277 rail. For optimal operation and long life, adequate ventilation must be provided. Avoid positioning ducting 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.

Insertion in the DIN rail
As shown in figure:
1. Insert the IDC10 rear connector of the module on a free slot of the DIN rail
    (the insertion is univocal since the connectors are polarized).
2. To secure the module to the DIN rail, tighten the two hooks on the side of the IDC10 rear connector.
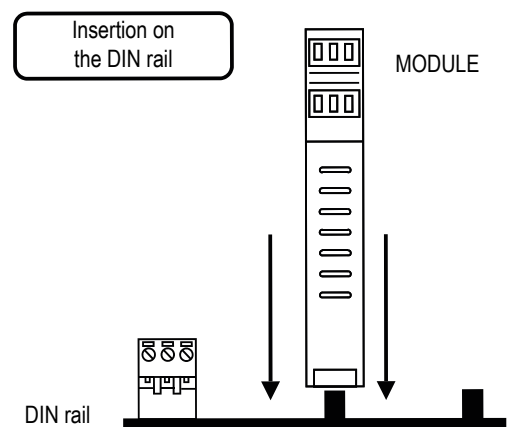
The module is designed to arrange data according to the modes defined by the MODBUS protocol. It has a micro USB connector on the front panel and can be configured using applications and/or software programs. The USB communication has priority over the RS485 communication.

The USB serial port uses the following communication parameters: **2400,8,N,1**The USB communication port responds exactly like the RS485 port with the exception of the communication parameters. During the use of the USB port, the bus will be inactive; it will reactivate automatically a few seconds after the last message exchanged on the USB port. EASY SETUP is the software to use for the configuration. For more information, visit www.seneca.it/products/z-4ai

Android APP configuration

CU-A-MICROO TG

CU-A-MICROB

PC software configuration

CU-A-MICROB

PC
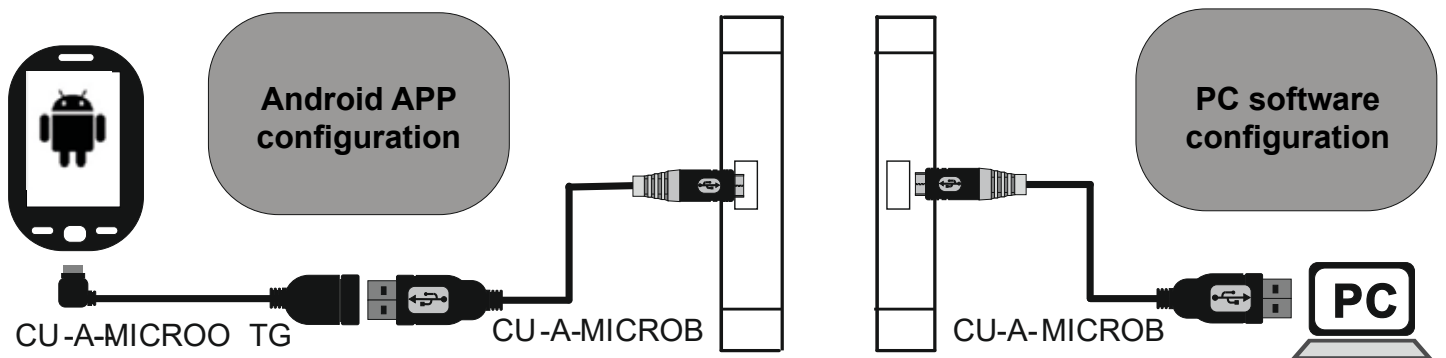
Check that the device in question is included in the list of products supported by the Easy Setup APP in the store.

SETTING THE DIP-SWITCHES

The position of the DIP-switches defines the Modbus communication parameters of the module: Address and Baud Rate The following table shows the Baud Rate and Address values according to the DIP-switch setting:

DIP-Switch status					
SW1 POSITION 1 2 3 4 5 6 7 8	BAUD RATE	SW1 POSITION 3 4 5 6 7 8	ADDRESS	POSITION 10	TERMINATOR
▯▮ - - - - - - -	9600	▮▮▮▮▮▯	#1	▯	Disabled
▯▮ - - - - - - -	19200	▮▮▮▮▯▮	#2	▮	Enabled
▮▯ - - - - - - -	38400	· · · · · · · · ·	#...		
▮▮ - - - - - - -	57600	▯▯▯▯▯▯	#63		
- - ▮▮▮▮▮▮	From EEPROM	▮▮▮▮▮▮	From EEPROM		

Note: When DIP switches 1 to 8 are OFF, the communication settings are taken from programming (EEPROM).
Note 2: The R S 485 line must be terminated only at the ends of the communication line.

| SW2 ANALOGUE INPUTS				
1	2	3	4	CHANNEL
▮	▮	▮	▮	CURRENT INPUT
				VOLTAGE INPUT

LEGEND	
▮	ON
▯	OFF

The settings of the dip-switches must be compatible with the settings on the registers. The description of the registers is available in the USER MANUAL.

| Modbus registers: Holding registers		
Register	Name	Description
40017	IN CH1	Channel measurement value with scale± 10000 normalised.
40018	IN CH2	Channel measurement value with scale± 10000 normalised.
40019	IN CH3	Channel measurement value with scale± 10000 normalised.
40020	IN CH4	Channel measurement value with scale± 10000 normalised.

ELECTRICAL CONNECTIONS

Power supply and Modbus interface are available using the Seneca DIN rail bus, via the IDC10 rear connector, or the Z-PC-DINAL-17.5 accessory.

RS485 GND
RS485 A
RS485 B
Power Supply AC / +
Power Supply AC / -
IDC 10
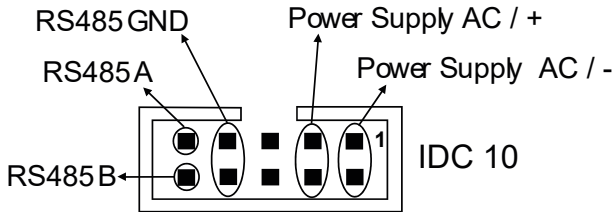
Back connector (IDC 10)
The illustration shows the meanings of the various IDC10 connector pins if signals are to be sent via them directly.

Ground
Power Supply AC
Power Supply AC
DIP SWITCH
7 8 9
4 3 2 1
GNDSHLDG
ND
CANL / A
CANL / B
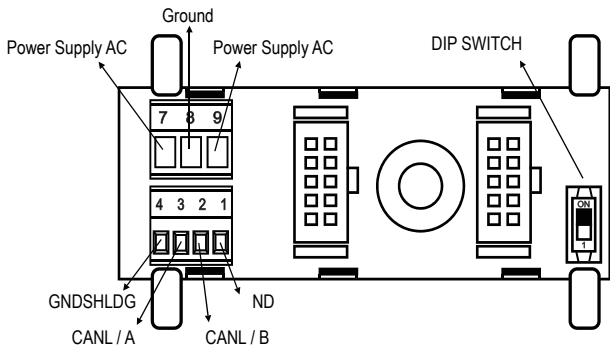
Z-PC-DINAL2-17.5 accessory use
If the Z-PC-DINAL2-17.5 accessory is used, signals can be sent via terminal boards. The illustration shows the meaning of the various terminals and DIP-switch position (found in all supports for the DIN rail listed in Accessories) for the termination of the CAN network (not used for the Modbus network).
GNDSHLD:
Connection cable signal protection shield (recommended).

− Vac/Vdc 2
+ Vac/Vdc 3
1
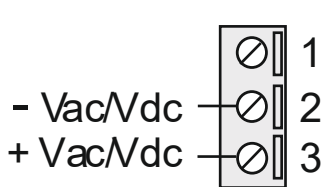
Power supply
Terminals 2 and 3 can be used to provide the module with power supply as an alternative to the connection using the Z-PC-DINx bus. **The upper limits must not be exceeded as this can seriously damage the module**. If the power supply source is not protected against overload, a safety fuse with a 2.5 max permissible value must be installed in the power supply line. A.
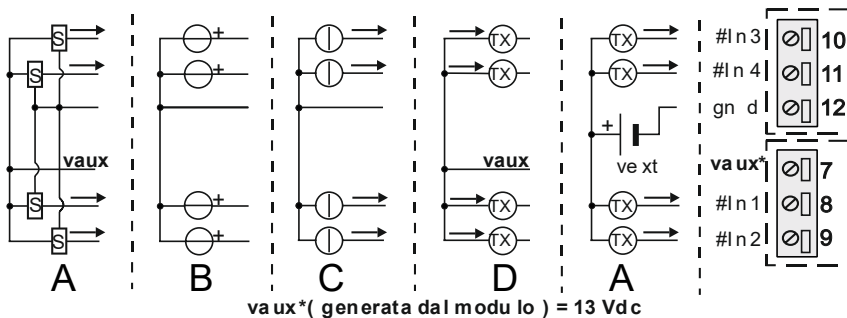
GND 4
B 5
A 6
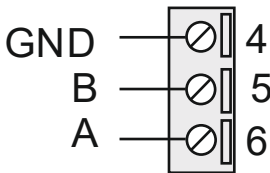
ModBus RS485
Connection for RS485 communication using the MODBUS master system as an alternative to the Z-PC-DINx bus.
N.B. The indication of the RS485 connection polarity is not standardised and in some devices may be inverted.

INPUTS

A B C D A

vaux
vaux
ve xt
vaux*

#In 3 10
#In 4 11
gn d 12

vaux* 7
#In 1 8
#In 2 9

va ux *(generata dal modulo) = 13 Vdc

A) Voltage input with sensor supply from the MODULE (13 Vdc)

B) Voltage input with sensor supply NOT coming from the MODULE

C) Current input with sensor supply NOT coming from the MODULE

D) Current input with sensor supply from the MODULE (13 Vdc)

E) Current input with sensor EXTERNAL power supply

⚠ ATTENTION

The upper power supply limits must not be exceeded, as this might cause serious damage to the module. Switch the module off before connecting inputs and outputs.

To meet the electromagnetic immunity requirements:

- use shielded signal cables;
- connect the shield to a preferential instrumentation earth system;
- separate shielded cables from other cables used for power installations (inverters, motors, induction ovens, etc...).
- install a fuse with a MAX capacity of 2.5 A near the module.
- make sure that the power supply voltage to the module does not exceed: 40 Vdc or 28 Vac, otherwise the module will be damaged.

ACCESSORIES

CODE	DESCRIPTION
CU-A-MICROB	USM - micro USB 1 metre communication cable
CU-A-MICRO-OTG	Mobile phone adapter cable
Z-PC-DINAL2-17.5	Quick fit support for DIN rail - HEAD + 2 SLOT P = 17.5 mm
Z-PC-DIN2-17.5	Quick fit support for DIN rail - 2 SLOT P = 17.5 mm
Z-PC-DIN8-17.5	Quick fit support for DIN rail - 8 SLOT P = 17.5 mm

CONTACT INFORMATION

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