INSTALLATION MANUAL

Z-4TC

4 THERMOCOUPLE INPUT module with Modbus protocol on RS485

EN

CE

SENECA

ISO 9001:2015

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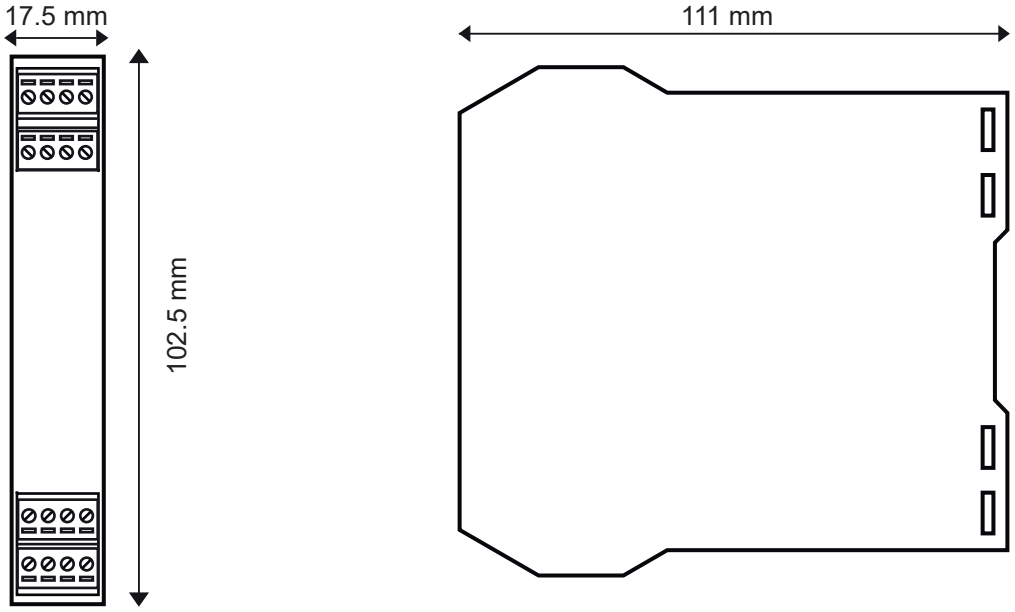
For manuals in other languages and the configuration software, visit www.seneca.it/products/z-4tc

MODULE LAYOUT



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

SIGNALS VIA LED ON FRONT PANEL

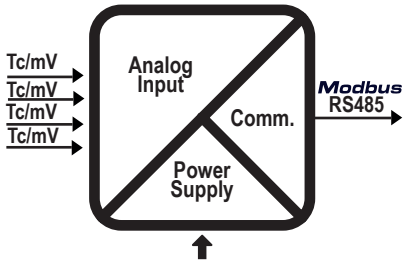
LED	STATUS	LED meaning
PWR Green	ON	The device is powered correctly
FAIL yellow	Flashing	Wrong setup
FAIL yellow	ON	Anomaly or fault
RX Red	Flashing	Receipt of packet completed
RX Red	ON	Anomaly / Check connection
TX Red	Flashing	Transmission of packet completed

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 via QR-CODE shown on page 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.
	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.

TECHNICAL SPECIFICATIONS

STANDARDS	**EN61000-6-4** Electromagnetic emissions, industrial environment. **EN61000-6-2** Electromagnetic immunity, industrial environment. **EN61010-1** Safety
INSULATION	 **WARNING** the maximum working voltage between any terminal and ground must be less than 50 Vac / 75Vdc **1500 V~**
ENVIRONMENTAL CONDITIONS	*Temperature*: -25 ÷ + 65°C *Humidity*: 30% ÷ 90% non condensing. *Altitude:* up to 2000 m above sea level *Storage temperature:* -30 ÷ + 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: 1 W
INPUTS	
Voltage input:	Bipolar with F.S. ± 150 mV, with 16 bit resolution. Input impedance >10 MOhm DMRR: > 60 dB (50 Hz); > 54 dB (60 Hz)
Thermocouple input:	TC type: J,K,R,S,T,B,E,N Automatic detection of interrupted TC: test current:<200 nA Input impedance: > 10 Ohm DMRR: > 60dB (50Hz); > 54dB (60Hz). Compensation error of the cold junction: <2°C (between 0 and 50°C).
Number of channels:	4
Input resolution:	15 bit + sign. Resolution = 5µV for voltage; Resolution = 0.1°C for Tc J and K.
Input protection:	± 30 Vdc
Precision:	Calibration: 0.1% of full scale, Temperature drift: < 50 ppm/°K EMI:<1% o.s.
Sampling time	Configurable between: 120 ms or 60 ms.

CONFIGURATION OF FACTORY SETTINGS

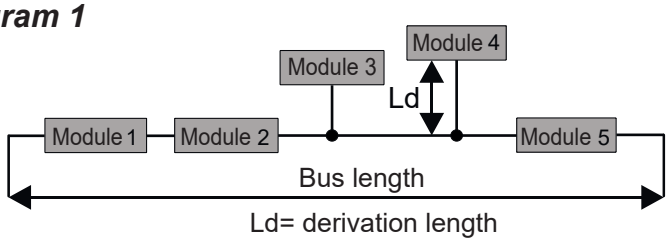
All DIP-switches in	OFF position
Communication parameters of ModBUS protocol:	38400 8, N, 1 Address 1
Communication parameters of micro USB front port:	2400 8, N, 1 Address 1
Input type of the 4 inputs:	Thermocouple J
Sampling time:	120 ms

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).

Bus length	Derivation length
1200 m	2 m

Diagram 1



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

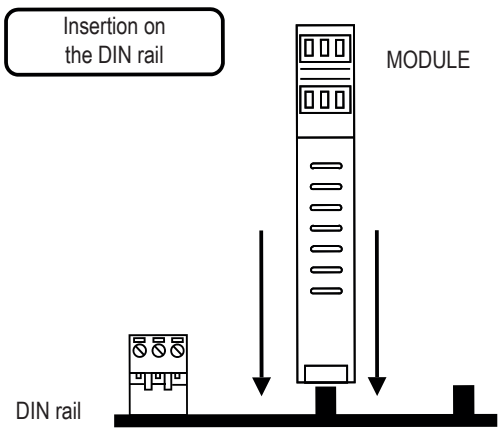
INSTALLATION REGULATIONS

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

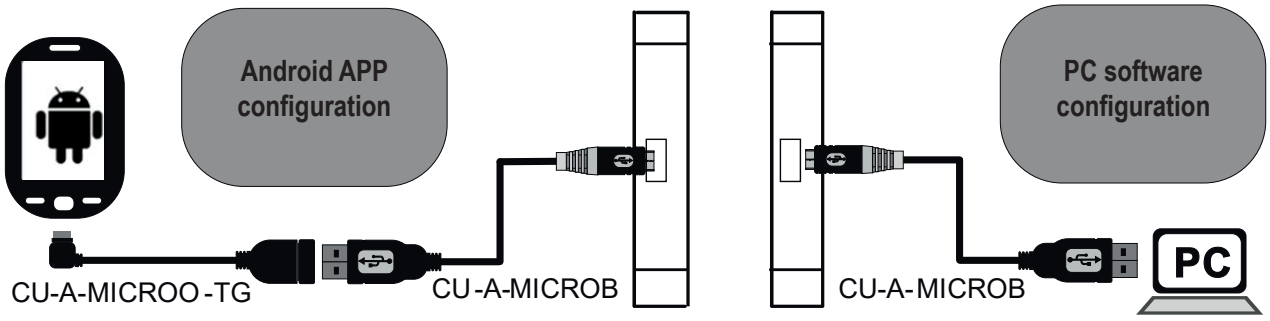
As shown in figure:

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.



USB PORT

The module is designed to exchange 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 serial port uses the following communication parameters: **2400,8,N,1.**
The USB communication port responds exactly like the serial ports, with the exception of the communication parameters. For more information, visit the site shown on page 1.



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	**BAUD RATE**	**SW1 POSITION**	**ADDRESS**	**POSITION**	**TERMINATOR**
1 2 3 4 5 6 7 8		3 4 5 6 7 8		**10**	
- - - - - - - -	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.

Modbus registers: Holding registers		
Register	**Name**	**Description**
40013	IN CH1	Channel measurement value, depending on the type of input selected 1bit = 5µV or 0.1°C.
40014	IN CH2	Channel measurement value, depending on the type of input selected 1bit = 5µV or 0.1°C.
40015	IN CH3	Channel measurement value, depending on the type of input selected 1bit = 5µV or 0.1°C.
40016	IN CH4	Channel measurement value, depending on the type of input selected 1bit = 5µV or 0.1°C.

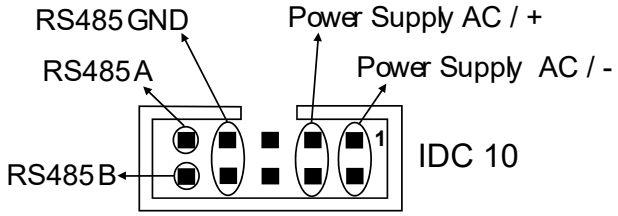
SETTING THE DIP-SWITCHES

The parameters of each of the 4 inputs can be set using the Z-NET and EASY-Z-PC configuration software. It is possible to get a voltage signal or a thermocouple signal. The following table indicates the start and full scale values for each type of thermocouple and for the voltage.

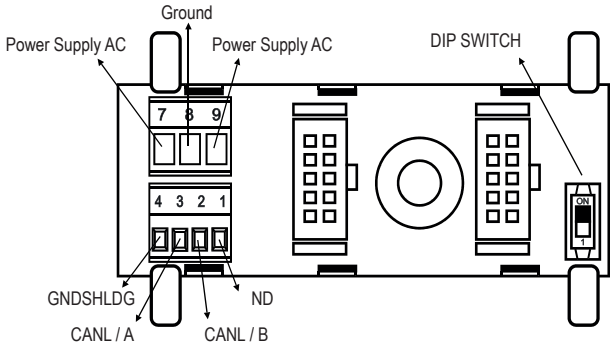
TC Type	Range	Linearisation error	TC Type	Range	Linearisation error
J	-210°C / 1200°C	0.05°C	**S**	-50°C / 1768°C	0.02°C
K	-200°C / 1372°C	0.05°C	**R**	-50°C / 1768°C	0.02°C
E	-200°C / 1000°C	0.02°C	**B**	250°C / 1820°C	0.03°C
N	-210°C / 1300°C	0.04°C	**T**	-200°C / 400°C	0.04°C
Input range for voltage					-150 mV / 150 mV

ELECTRICAL CONNECTIONS

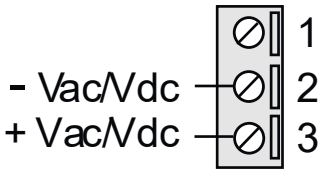
Power supply and Modbus interface are available using the Seneca DIN rail bus, via the IDC10 rear connector, or the Z-PC-DINAL-17.5 accessory.



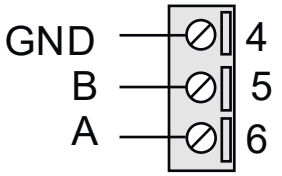
Back connector (IDC 10)
The illustration shows the meanings of the various IDC10 connector pins if signals are to be sent via them directly.



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).

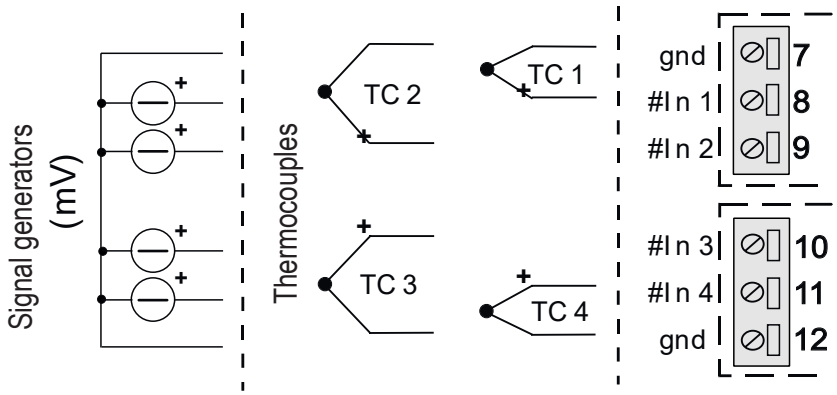


Power supply
Terminals 2 and 3 can be used to provide the module with power supply as an alternative to the connection using the Z-PC-DINx bus. **The upper limits must not be exceeded as this can seriously damage the module**. If the power supply source is not protected against overload, a safety fuse with a 2.5 max permissible value must be installed in the power supply line. A.



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



The ground that is available at terminals 7 and 12 is internally connected to all 4 analogue inputs

Note: To avoid measurement errors caused by external interference, the unused thermocouple input channels should be short-circuited.

⚠ 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.

ADVANCED SETTINGS

- Adjustable filter for each channel
- Acquisition speed 60/120 ms per channel
- Adjustable offset for each channel

CONTACT INFORMATION

Technical support	support@seneca.it	Product information	sales@seneca.it