SENECA

Z-PC series

CANopen Modbus

ZC-8TC

EN

CANopen I/O Module:
4 Isolated (1.5KV) double
Thermocouple or Voltage Inputs

Installation Manual

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General Specifications

HW	✓ Three selectable acquisition speed (two at 14 bits, one at 15 bits) ✓ High acquisition speed. ✓ 1500 V_{AC} isolation amongst imputs, power supply and CAN interface. ✓ Protection against ESD discharge up to 4 kV. ✓ Adjustable rejection at 50 and 60Hz. ✓ Measurement of thermocouples: J, K, E ,N ,S ,R, B, T. ✓ Simplified power supply and serial bus wiring by means of the bus housed in the DIN rail. ✓ Measurement in temperature or mV. ✓ Channels independentely active.
SW	✓ Measurement of the inputs available in the following formats: floating-point representation, fixed dot at 16 bits, in tenths degrees with sign for temperature, tenths of mV for voltage. ✓ Cold junction compensation. ✓ Eight levels adjustable filter to stabilize reading. ✓ Led Indications: Power Supply, CAN communication, MODBUS-RTU communication, Inputs fault. ✓ Programmable vallue in case of fault or freezing of last reading.
Comm	✓ CAN Interface with CANopen protocol: up to 1 Mbps speed. ✓ CANopen Baud rate and Node ID configurability by DIP-switches or software. ✓ Node guarding or heartbeat ✓ RS232 Serial Communication with MODBUS-RTU protocol ✓ Complete configurability through specific software downloadable in the website www.seneca.it

Technical specifications

POWER SUPPY	
Voltage	10 – 40 V DC or 19 – 28 V AC (50 – 60Hz)
Consumption	Max 0,6W
INPUTS	
Input type	Thermocouples types: J, K, E, N, S, R, B, T
Tables	EN60584-1 (ITS-90)
Temperature range	Dependent on the thermocouple type (see ***Thermcouples range***)
Span mV	From -10,1mV to +81,4 mV
Input impedance	10 MΩ
Test current	< 50 nA.

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CMRR (1)	> 155 dB (tested port towards all the other ones at GND).
DMRR (1) (2)	> 60 dB.
Total Error	ADC 14 bit and 50 Hz Rejection : ± (0,040% + 13µV). ADC 15 bit and 50 Hz Rejection : ± (0,035% + 10µV). ADC 14 bit and 60 Hz Rejection : ± (0,045% + 16µV). ADC 14 bit and 60 Hz Rejection : ± (0,045% + 16µV).
CONVERSION / PRECIOSION SPECIFICATIONS	
ADC	15 Bits
Thermal drift	< 100 ppm/°C
Cold junction error	< 1°C
Disturbance Rejection	Selectable either at 50 or at 60 Hz
ENVIRONMENTAL CONDITIONS	
Operational Temperature	-10 – +65 °C; parameters saving in EEPROM is guaranteed in the range: 0 – 50 °C
Storage Temperature	-20 – +85 °C
Humidity	30 – 90 % non-condensing
Altitude	Up to 2000m asl
CONNECTIONS	
Removable Terminals	4-way screw terminals (max 1.5 mm^2, 3.5 mm pitch)
IDC10 Rear connector	CAN interface and Power Supply (for DIN rail)
Stereophonic frontal jack	3,5 mm: RS232 (COM)
DIMENSIONS / BOX	
Dimensions and weight	100 x 112 x 17,5 mm; 140 g
Box	PBT, black
ISOLATIONS / STANDARDS	
Normative CE	EN 61000-6-4/2007 (electromagnetic emission, industrial environment) EN 64000-6-2/2005 (electromagnetic immunity, industrial environment) EN 61010-1/2001 (safety). *All circuits must be isolated from the other circuits under dangerous voltage with double isolation. The power supply transformer must comply with EN60742: "Isolated transformers and safety transformers".*

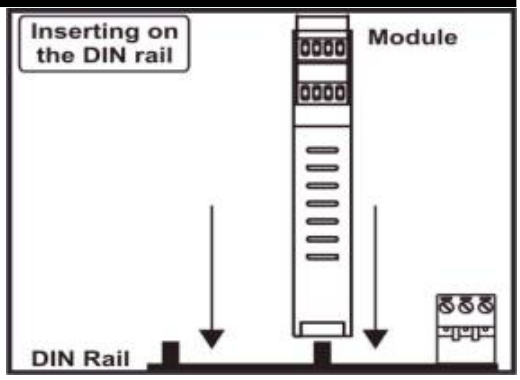
(1) Values are valid at rejection frequency selected with the filter ON
(2) For disturbance values such as the input signal peak does not exceed the limit of acceptability

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Thermocouples range

TYPE TC	Allowed Range	Linearization error	TYPE TC	Allowed Range	Linearization error
J	-210 – 1200°C	0,05 °C	S	-50 – 1768 °C	0,02 °C
K	-200 – 1372 °C	0,05 °C	R	-50 – 1768 °C	0,02 °C
E	-200 – 1000 °C	0,02 °C	B	250 – 1820 °C	0,03 °C
N	-200 – 1300°C	0,04 °C	T	-200 – 400 °C	0,04 °C

Installation Rules



The module is designed to be installed in vertical position on a DIN 46277 rail. In order to ensure optimum performance and the longest working life, the module(s) must be supplied adequate ventilation and no raceways or other objects that obstruct the ventilation slots. Never install modules above sources of heat; we recommend installation in the lower part of the control panel.

Inserting on the DIN rail as it is illustrated in the figure:

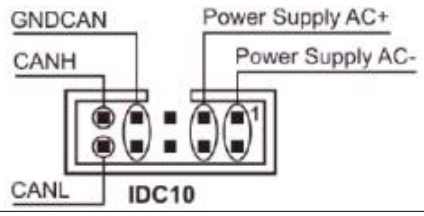
1) Insert the rear IDC10 connector on a DIN rail free slot (the inserting is univocal since the connectors are polarized).
2) Tighten the two locks placed at the sides of the rear connector to fix the module.

Electrical Connections

POWER SUPPLY AND CAN INTERFACE

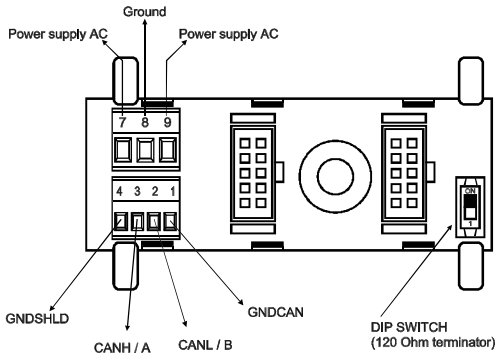
Power Supply and CAN interface are available by using the bus for the Seneca DIN rail, by the rear IDC10 connector or by Z-PC-DINAL2-17.5 / Z-PC-DINAL1-35 accessory (see *Accessories).*

Rear Connector (IDC10)



In the figure the meaning of the IDC10 connector pins is showed, in the case the user decides to provide the signals directly through it.

Z-PC-DINAL2-17.5 / Z-PC-DINAL1-35 Accessories Use



In case of Z-PC-DINAL2-17.5 / Z-PC-DINAL1-35 accessory use, the signals may be provided by terminal blocks. The figure shows the meaning of the terminals and the position of the DIP-switch (present on each DIN rail supports listed on *Accessories*) for CAN network termination.
GNDSHLD: Shield to protect the connection cables (always recommended)

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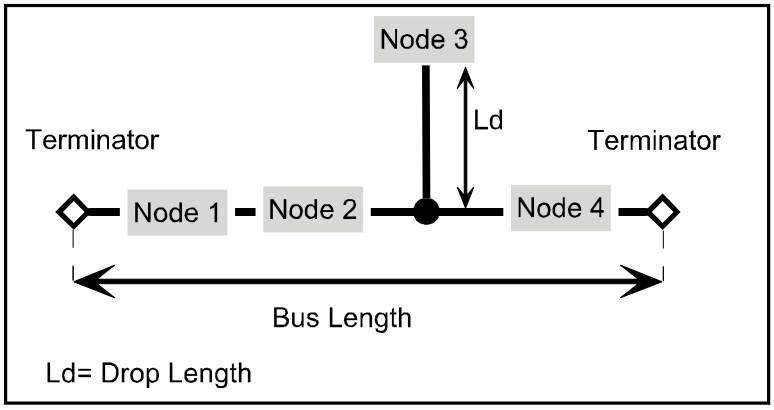
CAN bus Connection Rules

1) Install the modules on the DIN rail (max 120).
2) Connect the remote modules using cables of proper length. On the table the following data about the cables length are provided:

– *Bus Length*: CAN network maximum length as a function of the Baud rate. It is the lenght of the cables which connects the two bus terminators modules (see *Scheme*).
– *Drop Length*: maximum length of a drop line (see *Scheme*) as a function of the Baud Rate.

Baud rate	Bus Length	Drop length
20 kbps	2500 m	150 m
50 kbps	1000 m	60 m
125 kbps	500 m	5 m
250 kbps	250 m	5 m
500 kbps	100 m	5 m
800 kbps	50 m	3 m
1000 kbps	25 m	0,3 m

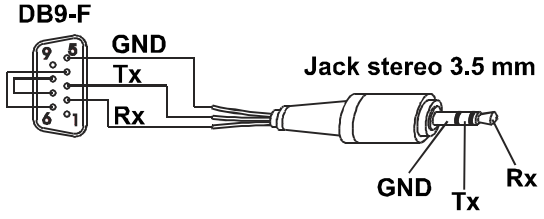
Scheme



For the best performances, the use of special shielded cables is recommended (***BELDEN 9841*** cable for example).

3) Terminate the two ends of the CANbus network by setting to ON the DIP-switch present on the DIN rail connection supports (see *Accessories*) where the two ends are inserted.

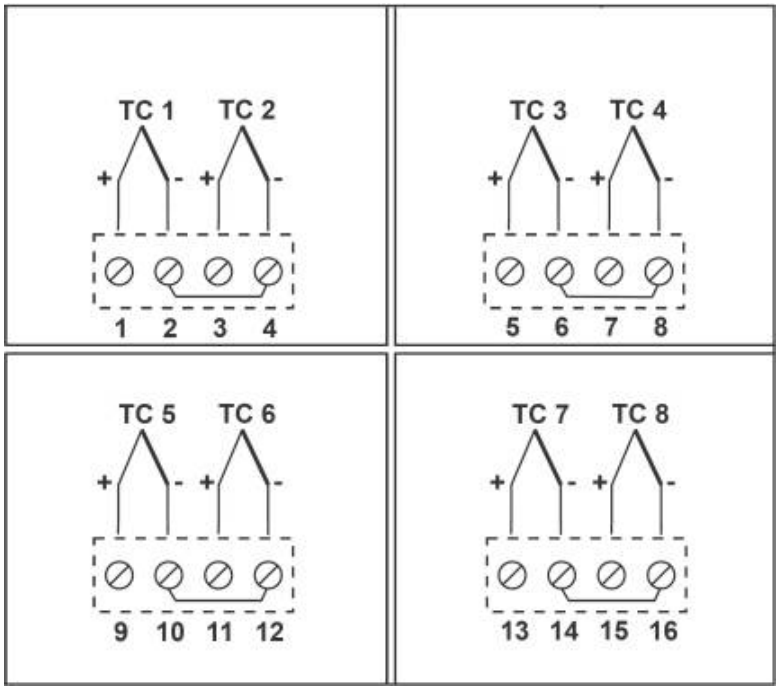
RS232 SERIAL PORT



The connection cable DB9 with a 3.5 mm stereophonic jack, can be assembled as indicated in the following figure, or can be bought as an accessory (see *Accessories*).

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INPUTS



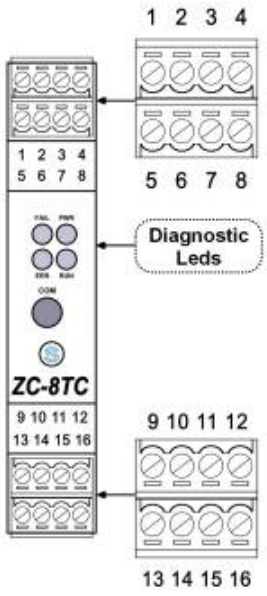
The module accepts, at input, the following type of thermocouples: J, K, E, N, S, R, B, T. For the elctrical connections, we advice you to use screened cables.
The pairs of channels belonging to the same group of terminals have the GND terminal internally connected and are not isolated each other. Instead a 1.5 KV isolation is presente amongst the input channels elonging to different groups of terminals.
The terminals connections can be seen in the picture on the left.

Significant Components Position

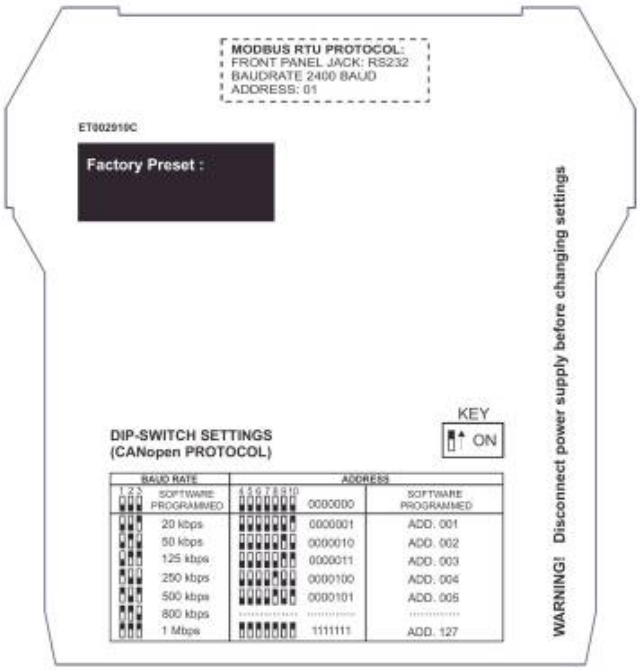
TERMINALS/LEDS/CONNECTOR/DIP-SWITCH

The terminals numbering, the leds position on the frontal panel and the DIP-switch on the rear side are illustrated below.

Front panel



Rear side



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Leds Signallings

LEDS *ERR* AND *RUN:* CANOPEN COMMUNICATION STATE

The meaning of leds ***ERR*** and ***RUN*** is described below; refer to the *User Manual* for details about the possible state and the flashing modes of the two leds.

Led ERR (Red) meaning

N°	*Led ERR (Red)*	*STATE*	*DESCRIPTION*
1	Off	No error	The Device is in working condition.
2	Single flash	Warning, limit reached	At least one of the error counters of the CAN controller has reached or exceeded the warning level (too many error frames).
3	Double flash	Error control Event	A guard event (NMT-Slave or NMT-Master)
4	Triple flash	Sync error	The SYNC message has not been received within the configured communication cycle period time out.
5	ON	Bus off	The CAN controller is bus off.

Led RUN (Green) Meaning

N°	*Led RUN (Green)*	*STATE*	*DESCRIPTION*
1	Single flash	Stop	The Device is in STOPPED state.
2	Blinking	Pre-Operational	The Device is in the PRE-OPERATIONAL state.
3	On	Bus off	The Device is in the OPERATIONAL state.

FAIL AND PWR: GENERAL SYSTEM DIAGNOSTICS

Led PWR (Green)	*Description*
On	Power supply Presence
Led FAIL (Yellow)	***Description***
Off	• No error.
On	• Fault: Power supply not sufficient, faulty channel, faulty sensor, internal communication error (can be de-activated via software).
Blinking	• Data reception from frontal jack.

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Programming

The module can be programmed both through CAN interface or RS232 interface (via ModBUS-RTU). Refer to the *User Manual* for details about the communication.

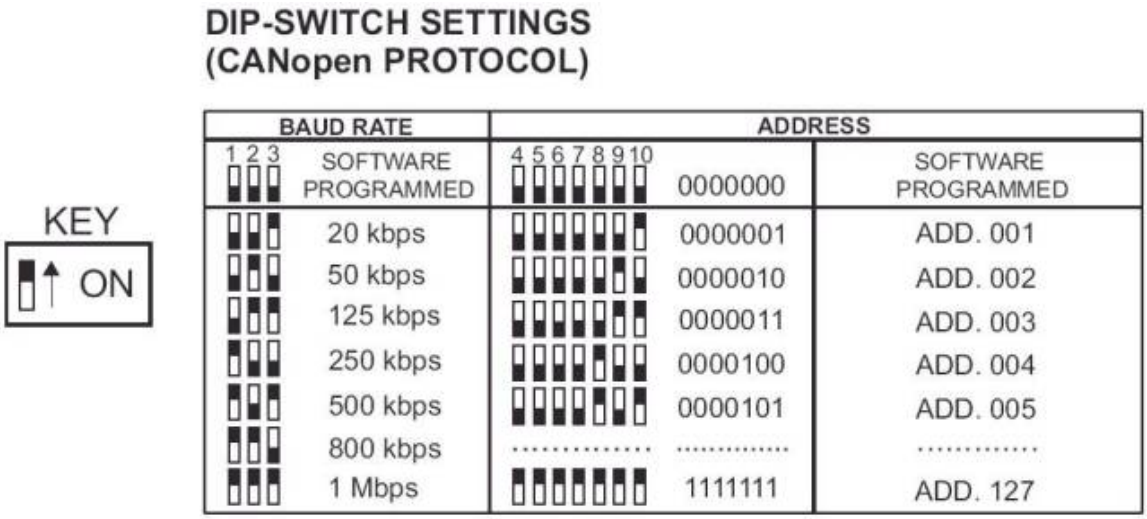
Factory preset

With all the DIP-switches in OFF position, the module is programmed as follows:

- **CAN** communication : **Baud Rate: 20 kbps, Address: 127**
- Type input : **TC J**
- **ModBUS** communication from **frontal jack** : **2400, 8, N, 1 ADDR = 1**

DIP-switch settings

The DIP-switches position defines the module CAN communication parameters: Address and Baud Rate. In the following figure the Baud Rate and Address values are listed as a function of the DIP-switches position:



We underline that on all the DIN rail supports listed on *Accessories* a DIP-switch is present and if it is set to ON position the CAN network termination is inserted.

Accessories

SUPPORTS FOR MOUNTING ON DIN RAIL GUIDE/ SERIAL CABLE

Code	Description
Z-PC-DINAL2-17.5	Bus Support: Terminal blocks + 2 slots to connect Z-PC line modules.
Z-PC-DINAL1-35	Bus Support: Terminal blocks + 1 slot to connect Z-PC line modules.
Z-PC-DIN2-17.5	Bus Support: 2 slots to connect Z-PC line modules.
Z-PC-DIN1-35	Bus Support: 1 slot to connect Z-PC line modules.
Z-PC-DIN8-17.5	Bus Support: 8 slots to connect Z-PC line modules.
Z-PC-DIN4-35	Bus Support: 4 slots to connect Z-PC line modules.
PM001601	Serial Cable: from 2,5 mm stereo Jack to DB9F

Disposal of Electrical & Electronic Equipment (Applicable throughout the European Union and other European countries with separate collection programs). This symbol, found on your product 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 and electronic equipment. By ensuring this product is disposed 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 this product, please contact your local city office, waste disposal service or the retail store where you purchased this product.

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