SENECA

Z-PC Series

CANopen

Modbus

ZC-8AI

EN

CANopen I/O Module
4 Couples isolated (1,5KV) double
Voltage/Current Inputs

Installation manual

General Specifications

HW	✓ 8 analog inputs (4 isolation zones) ✓ Inputs: 0 -20.5mA; 0 - 10.5V ✓ 6 isolation zones, 1500 V_{AC} isolation amongst every zone ✓ Protection against ESD discharge up to 4 kV. ✓ Simplified power supply and serial bus wiring by means of the bus housed in the DIN rail. ✓ Power for up to 8 sensors, up to 22mA @ 16.5V each. ✓ Adjustable resolution: 14 or 15 bit ✓ Minimum refresh time: 20ms
SW	✓ Adjustable rejection 50 or 60 Hz ✓ Variable input filtering ✓ Led Indications: Power Supply, CAN communication, MODBUS-RTU communication, Inputs fault.
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 SUPPLY	
Voltage	10 – 40 V DC o 19 – 28 V AC (50 – 60Hz)
Consumption	Max 5.0W (all sensors powered)
ANALOG INPUTS	
Input Type	Monopolar input: current o voltage
Full Scale	0 - 20.5mA; 0 - 10.5V
Voltage input error 14bits	0.046% f.s. + 1.7mV
Voltage input error 15bits	0.039% f.s. + 1.3mV
Current input error 14bits	0.046% f.s. + 3.4 uA
Current input error 15bits	0.039% f.s. + 2.4uA

| CONVERSION / PRECISION SPECIFICATIONS	
ADC	15 bits
Thermal drift	< 100 ppm/°C
Sampling frequency	Settable from 11 to 48 Hz
Interference rejection	Settable either at 50 or 60 Hz
ENVIRONMENTAL CONDITIONS	
Operational Temperature	-10 – +65 °C
Storage Temperature	-20 – +85 °C
Humidity	30 – 90 % non-condensing
Altitude	Up to 2000m a.s.l.
CONNECTIONS	
Removable terminals	Removable 4-way screw terminals, 3.5mm pitch.
IDC10 Rear Connector	CAN Interface and Power Supply (for DIN rail).
Stereophonic frontal jack	3,5 mm for RS232 connection (COM)
DIMENSIONS / BOX	
Dimensions and Weight	100 x 112 x 17,5 mm; 140 g
Box	PBT, black
ISOLATIONS / STANDARS	
Standards C E	EN61000-6-4/2007 (electromagnetic emission, industrial environment) EN61000-6-2/2005 (electromagnetic immunity, industrial environment) EN61010-1/2001 (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".*

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.

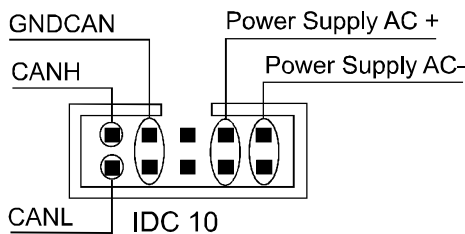Inserting on the DIN rail — Module — DIN Rail
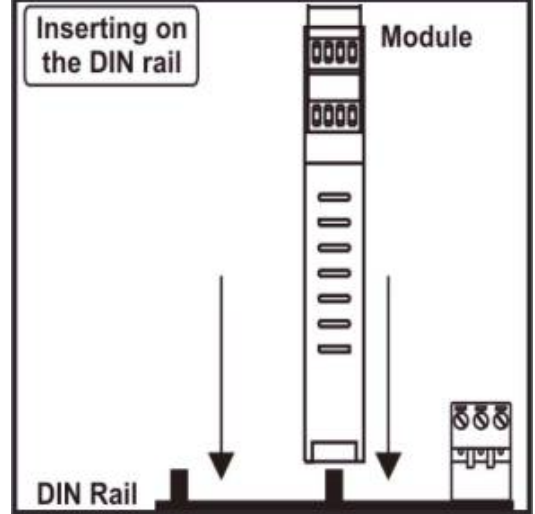
Electrical Connections

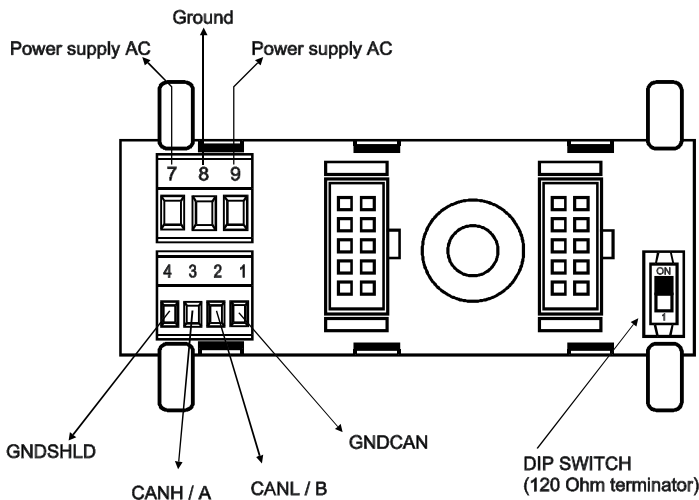### POWER SUPPLY AND CAN INTERFACE

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)

GNDCAN — CANH — Power Supply AC + — Power Supply AC- — CANL — IDC 10

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

Power supply AC — Ground — Power supply AC — GNDSHLD — CANH / A — CANL / B — GNDCAN — DIP SWITCH (120 Ohm terminator)

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).

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
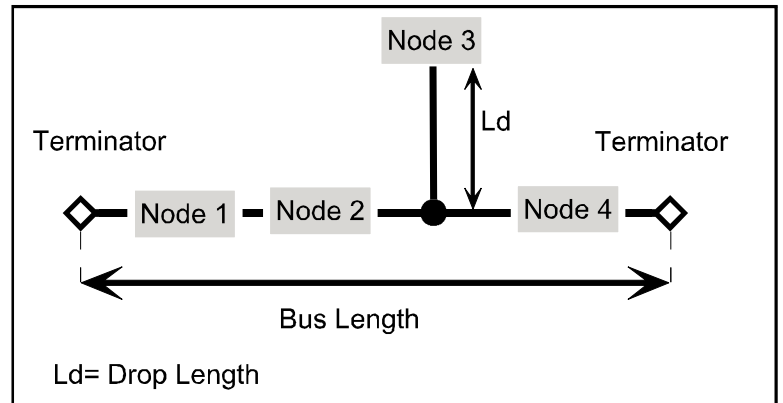
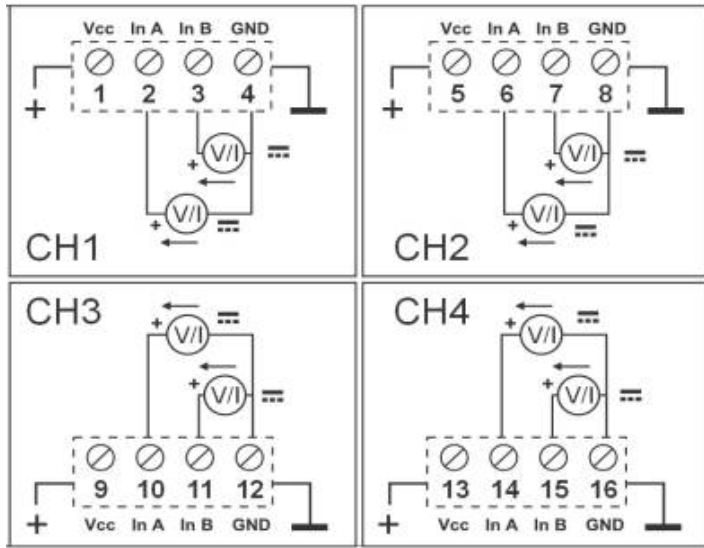For the best performances, the use of special shielded cables is recommended (**BELDEN 9841** cable for example).
3) Terminate the two ends of the CANbus network by setting to ON the DIP-switch present on the DIN rail connection supports (see *Accessories*) where the two ends are inserted.
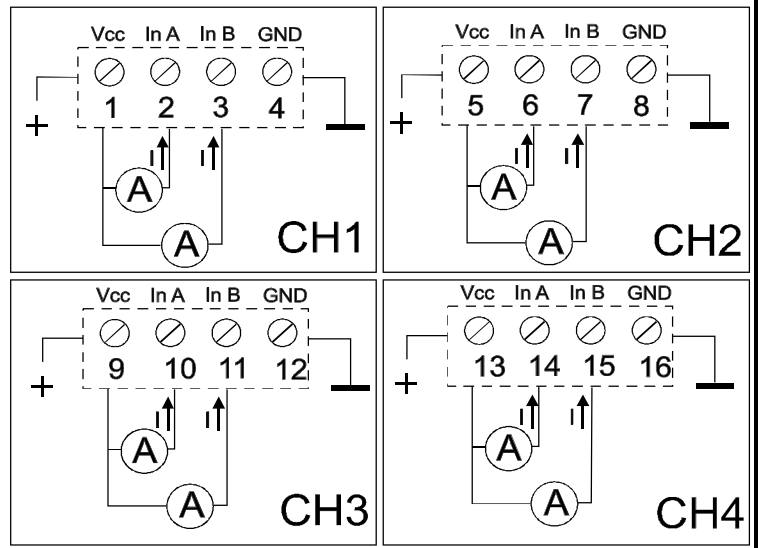
RS232 SERIAL PORT
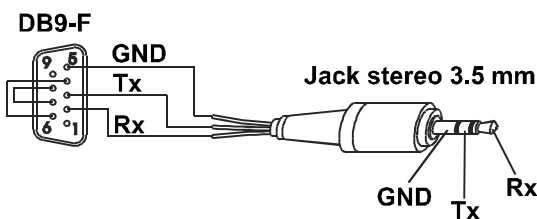
The connection cable DB9 with a 3.5 mm stereophonic jack, can be assembled as indicated in the following figure, or can be bought as an accessory (see *Accessories*).

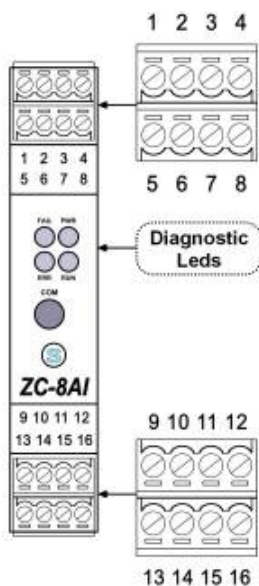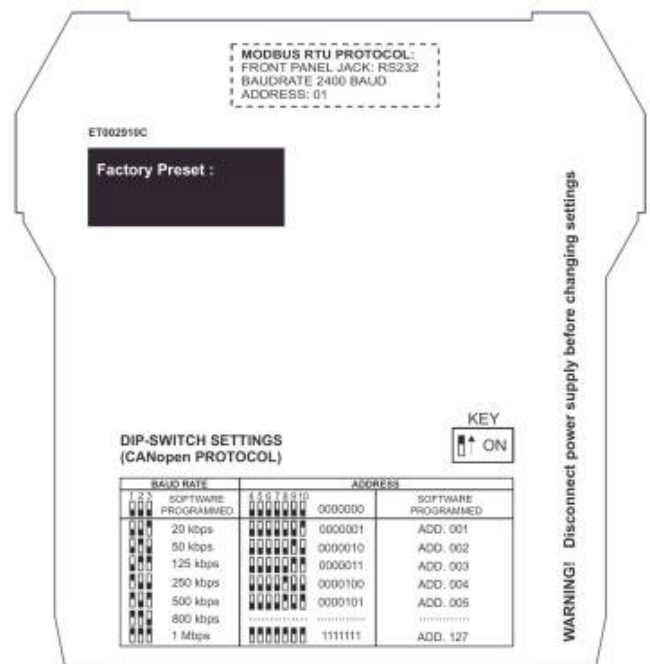| ANALOG INPUT OR 3 WIRE INPUT SENSOR	2 WIRE INPUT SENSOR

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*

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	Operational	The Device is in the OPERATIONAL state.

FAIL AND PWR: GENERAL SYSTEM DIAGNOSTICS

Led PWR (Green)	Description
On	Power supply Presence

Led FAIL (Yellow)	Significato
Off	• No error.
On	• Fault: <u>Power supply not sufficient</u>, faulty channel, faulty sensor, internal communication error (can be de-activated via software).
Blinking	• Data reception from frontal jack.

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

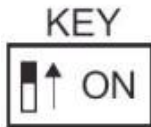With all the DIP-switches in OFF position, the module is programmed as follows:
- **CAN** communication : **Baud Rate: 20 kbps, Address: 127**
- Analog type input : **0 - 10 V**
- **ModBUS** communication from **frontal jack** : **2400, 8, N, 1 ADDR = 1**

DIP-switches 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