

**Z-PC series**

**CANopen**

**Modbus**

**EN**

## **ZC-SG**

CANopen I/O Module:  
Strain Gauge Converter

## ***Installation Manual***

### Contents:

### Pag

– General Specifications	2
– Technical Specifications	2
– Installation Rules	4
– Electrical Connections	4
– Significant Components Position.	6
– Led Signallings	7
– Programming	8
– DIP-switch settings	8
– Accessories	8



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## General Specifications

HW	<ul style="list-style-type: none"> <li>✓ Sampling frequency settable from 12,53 Hz to 151,71 Hz.</li> <li>✓ 1500 V<sub>AC</sub> isolation amongst inputs, power supply and CAN interface.</li> <li>✓ Protection against ESD discharge up to 4 kV.</li> <li>✓ Adjustable rejection at 50 and 60Hz.</li> <li>✓ Strain gauge directly powered by the instrument.</li> <li>✓ Ratiometric measurement.</li> <li>✓ Simplified power supply and serial bus wiring by means of the bus housed in the DIN rail.</li> <li>✓ 1 to 64mV/V sensitivity, settable by software for real/integer values</li> </ul>
SW	<ul style="list-style-type: none"> <li>✓ Load cell calibration with known weight</li> <li>✓ Load cell calibration is not necessary if the load cell sensibility is known.</li> <li>✓ Configurable digital I/O.</li> <li>✓ Stable weight indication via digital output / Modbus register / PDO</li> <li>✓ Remote writing of the tare in volatile and/or non volatile memory through digital input / CAN commands..</li> <li>✓ Led Indications: Power Supply, CAN communication, MODBUS-RTU communication, Inputs fault.</li> <li>✓ Alarm generated when programmable threshold is exceeded.</li> <li>✓ Measurement stabilization through a programmable number of samples, +-30000 points hysteresis activable.</li> </ul>
Comm	<ul style="list-style-type: none"> <li>✓ CAN Interface with CANopen protocol: up to 1 Mbps speed.</li> <li>✓ CANopen Baud rate and Node ID configurability by DIP-switches or software.</li> <li>✓ Node guarding or heartbeat</li> <li>✓ RS232 Serial Communication with MODBUS-RTU protocol</li> <li>✓ Complete configurability through specific software downloadable in the website <a href="http://www.seneca.it">www.seneca.it</a></li> </ul>

## Technical Specifications

POWER SUPPLY	
Voltage	10 – 40 V DC or 19 – 28 V AC (50 – 60Hz)
Consumption	2.0W Max
ANALOG INPUT	
Input type	6-wires or 4-wires differential measurement input.
Full Scale	± 5 mV – ± 320 mV
Error	Calibration: 0,01% of the full-scale value. Linearity: 0,01% of the full-scale value. Thermal Drift: 25 ppm/°C

## STRAIN GAUGE CHARACTERISTICS

Power supply voltage	5 V DC
Minimum Impedance	87 $\Omega$ equivalent, eventually derived by a parallel of load cells (for ex. Four 350 $\Omega$ cells)
Sensitivity	From $\pm 1\text{mV/V}$ to $\pm 64\text{ mV/V}$
Terminals	4 or 6

## DIGITAL INPUT OR OUTPUT

Digital input opto-isolated	Max voltage: 30V
Digital output opto-isolated	Max current: 50 mA Max voltage: 30 V

## CONVERSION / PRECISION SPECIFICATIONS

ADC	24 Bit
Thermal drift	25 ppm/ $^{\circ}\text{C}$
Sampling frequency	Settable from 12,53 to 151,71 Hz
Interference rejection	Settable both at 50 and 60 Hz

## ENVIRONMENTAL CONDITIONS

Operational Temperature	-10 – +65 $^{\circ}\text{C}$
Storage Temperature	-20 – +85 $^{\circ}\text{C}$
Humidity	30 – 90 % non-condensing
Altitude	Up to 2000m a.s.l.

## CONNECTIONS

Removable terminals	Removable 3-way screw terminals, 5.08mm 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 / STANDARDS

Standards	EN61000-6-4/2007 (electromagnetic emission, industrial environment) EN61000-6-2/2005 (electromagnetic immunity, industrial environment) EN61010-1/2001 (safety). <i>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".</i>
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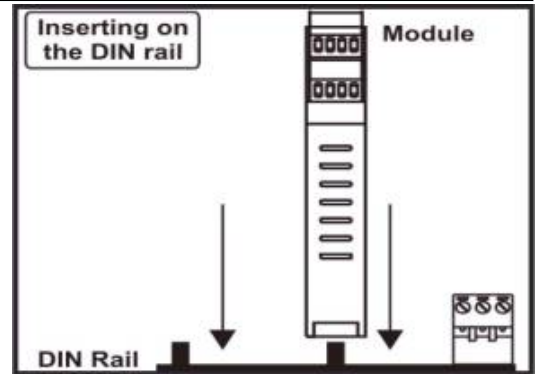


## Installation Rules

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.

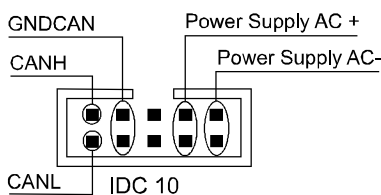


## Electrical Connections

### POWER SUPPLY AND CAN INTERFACE

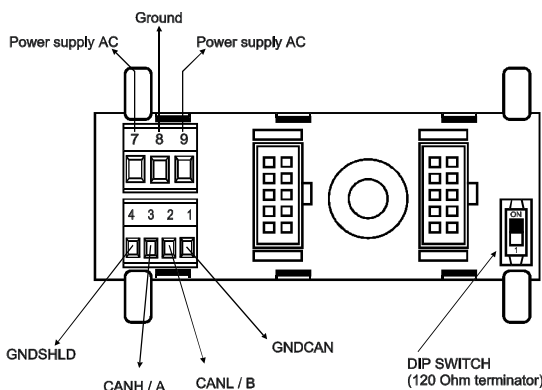
Power Supply and CAN interface are available by using the bus for the Seneca DIN rail, by the rear IDC10 connector or by Z-PC-DINAL2-17.5 / Z-PC-DINAL1-35 accessory (see *Accessories*).

#### 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.

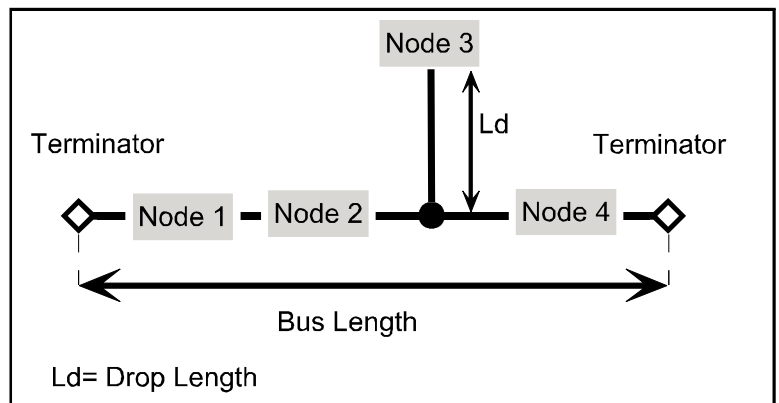
**GND SHLD:** Shield to protect the connection cables (always recommended).

## 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 length 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

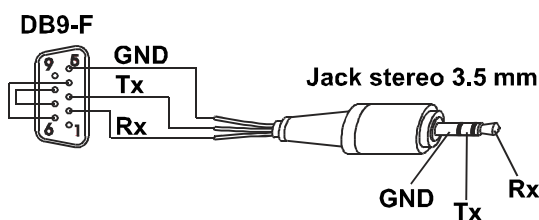
**Scheme**



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

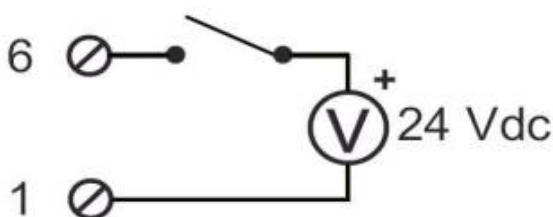


The connection cable DB9 with a 3.5 mm stereophonic jack, can be assembled as indicated in the following figure, or can be bought as an accessory (see *Accessories*).

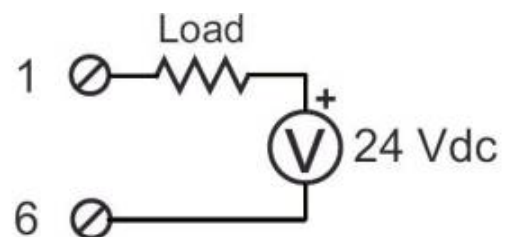
## DIGITAL INPUT/OUTPUT

The module can be set to provide either a digital input or digital output. The connections in the two cases are as follows:

**Digital input**



**Digital output**





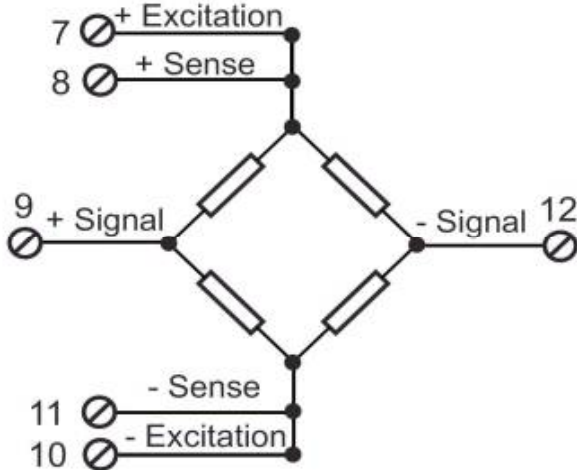
## ANALOG INPUT

The figure below shows the connections to be made for connection to a strain gauge. The terminals have the following meaning:

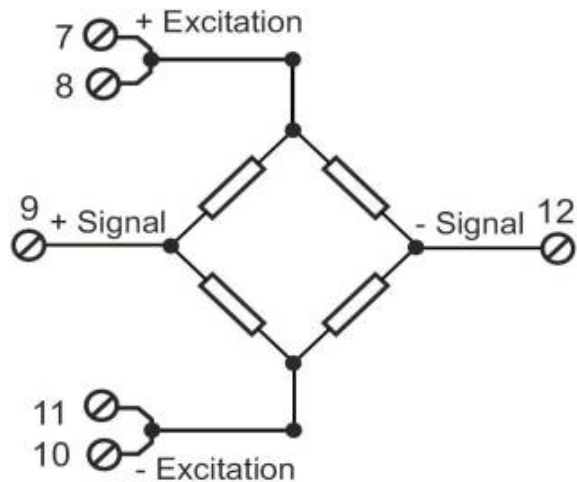
- 7) Strain gauge positive power supply
- 8) Strain gauge positive power supply reading
- 9) Strain gauge positive reading

- 10) Strain gauge negative power supply
- 11) Strain gauge negative power supply reading
- 12) Strain gauge negative reading

### 6 wires measurement



### 4 wires measurement



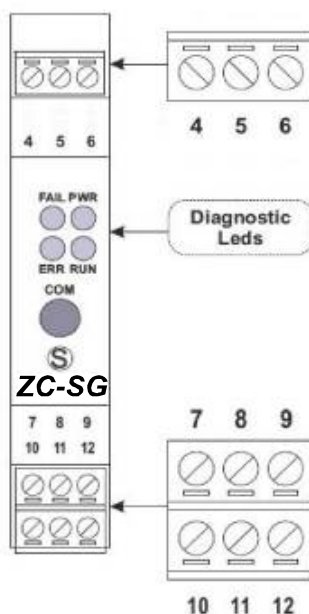
Note : Running outside the bridges between 7-8 and 11-10 terminals.

## Significant Components Position

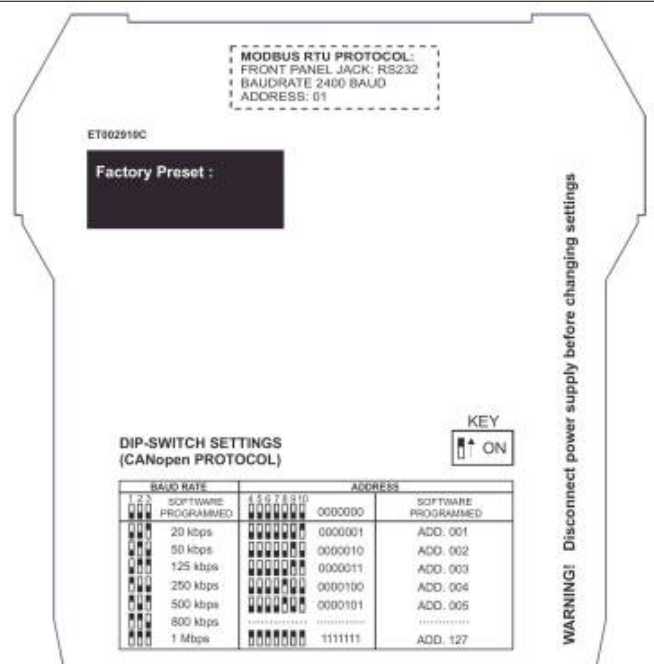
### TERMINALS/LEDS/CONNECTOR/DIP-SWITCH

The terminals numbering, the leds position on the frontal panel, the rear IDC10 connector for DIN rail 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 <i>ERR</i> (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	Guard event
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 <i>RUN</i> (Green)	STATE	DESCRIPTION
1	Single flash	Stop	The Device is in STOP 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 <i>PWR</i> (Green)	Description
On	Power supply Presence
Led <i>FAIL</i> (Yellow)	Description
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:

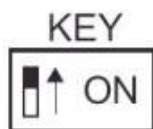
- **CAN** communication : **Baud Rate: 20 kbps, Address: 127**
- **Sensitivity** : **± 2 mV / V**
- **ModBUS** communication from **frontal jack** : **2400, 8, N, 1 ADDR = 1**

## 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:

**DIP-SWITCH SETTINGS  
(CANopen PROTOCOL)**

BAUD RATE			ADDRESS									
1	2	3	SOFTWARE PROGRAMMED	4	5	6	7	8	9	10	0000000	SOFTWARE PROGRAMMED
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 kbps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0000001	ADD. 001
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 kbps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0000010	ADD. 002
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	125 kbps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0000011	ADD. 003
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	250 kbps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0000100	ADD. 004
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	500 kbps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0000101	ADD. 005
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	800 kbps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....	.....
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 Mbps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1111111	ADD. 127



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.