SENECA

Z-PC series

CANopen Modbus

EN

# ZC-SG

CANopen I/O Module:
Strain Gauge Converter

## Installation Manual

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## General Specifications

| | |
|---|---|
| HW | ✓ Sampling frequency settable from 12,53 Hz to 151,71 Hz.<br>✓ 1500 $V_{AC}$ isolation amongst imputs, power supply and CAN interface.<br>✓ Protection against ESD discharge up to 4 kV.<br>✓ Adjustable rejection at 50 and 60Hz.<br>✓ Strain gauge directly powered by the instrument.<br>✓ Ratiometric measurement.<br>✓ Simplified power supply and serial bus wiring by means of the bus housed in the DIN rail.<br>✓ 1 to 64mV/V sensitivity, settable by software for real/integer values |
| SW | ✓ Load cell calibration with known weight<br>✓ Load cell calibration is not necessary if the load cell sensibility is known.<br>✓ Configurable digital I/O.<br>✓ Stable weight indication via digital output / Modbus register / PDO<br>✓ Remote writing of the tare in volatile and/or non volatile memory through digital input / CAN commands..<br>✓ Led Indications: Power Supply, CAN communication, MODBUS-RTU communication, Inputs fault.<br>✓ Alarm generated when programmable threshold is exceeded.<br>✓ Measurement stabilization through a programmable number of samples, +-30000 points hysteresis activable. |
| Comm | ✓ CAN Interface with CANopen protocol: up to 1 Mbps speed.<br>✓ CANopen Baud rate and Node ID configurability by DIP-switches or software.<br>✓ Node guarding or heartbeat<br>✓ RS232 Serial Communication with MODBUS-RTU protocol<br>✓ Complete configurability through specific software downloadable in the website www.seneca.it |

## 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.<br>Linearity: 0,01% of the full-scale value.<br>Thermal Drift: 25 ppm/°C |



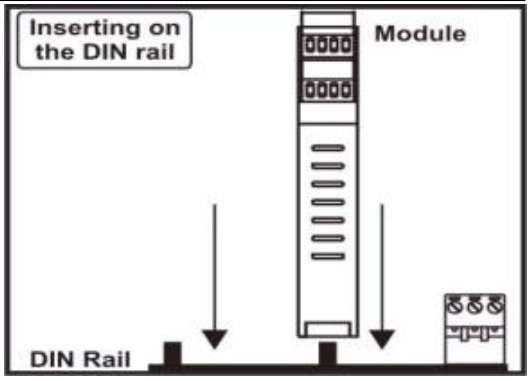
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| STRAIN GAUGE CHARATERISTICS | |
|---|---|
| Power supply voltage | 5 V DC |
| Minimum Impedance | 87 Ω equivalent, eventually derived by a parallel of load cells (for ex. Four 350 Ω cells) |
| Sensitivity | From ± 1mV/V to ± 64 mV/V |
| Terminals | 4 or 6 |
| **DIGITAL INPUT OR OUTPUT** | |
| Digital input opto-isolated | Max voltage: 30V |
| Digital output opto-isolated | Max current: 50 mA<br>Max voltage: 30 V |
| **CONVERSION / PRECISION SPECIFICATIONS** | |
| ADC | 24 Bit |
| Thermal drift | 25 ppm/°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 °C |
| Storage Temperature | -20 – +85 °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 / STANDARS** | |
| Standards<br>CE | EN61000-6-4/2007 (electromagnetic emission, industrial environment)<br>EN61000-6-2/2005 (electromagnetic immunity, industrial environment)<br>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".* |



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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:***

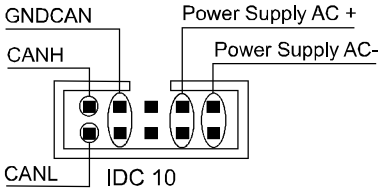
1) Insert the rear IDC10 connector on a DIN rail free slot (the inserting is univocal since the connectors are polarized).
2) Tighten the two locks placed at the sides of the rear connector to fix the module.

# Electrical Connections

## POWER SUPPLY AND CAN INTERFACE

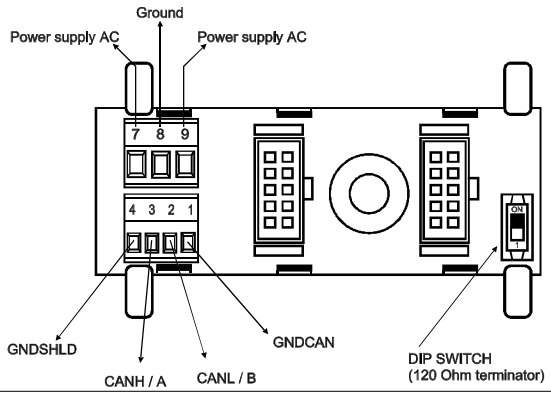
Power Supply and CAN interface are available by using the bus for the Seneca DIN rail, by the rear IDC10 connector or by Z-PC-DINAL2-17.5 / Z-PC-DINAL1-35 accessory (see *Accessories).*

### *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.

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



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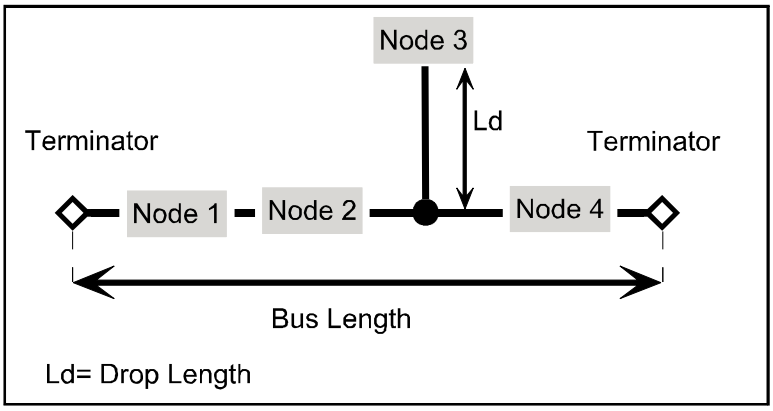
## *CAN bus Connection Rules*

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 |

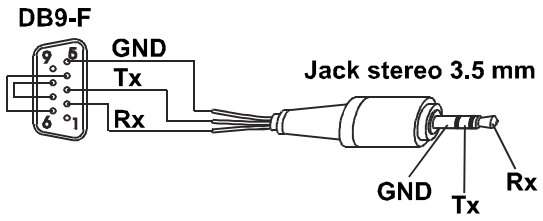
**Scheme**




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

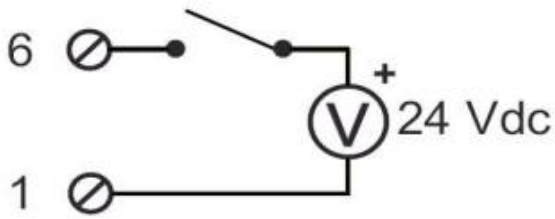



The connection cable DB9 with a 3.5 mm stereophonic jack, can be assembled as indicated in the following figure, or can be bought as an accessory (see *Accessories*).

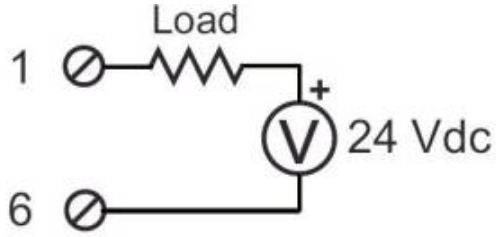
## DIGITAL INPUT/OUTPUT

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**





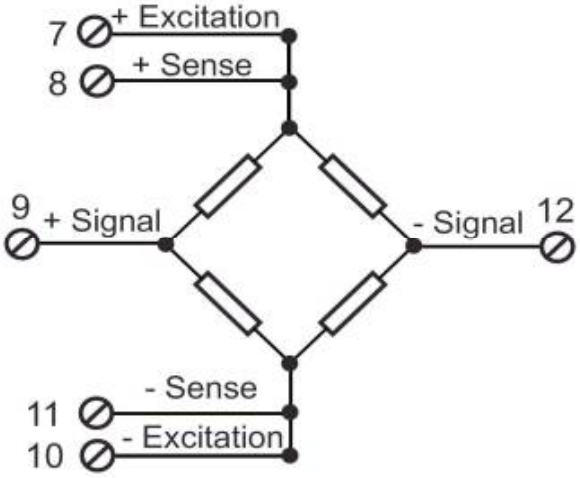

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## ANALOG INPUT

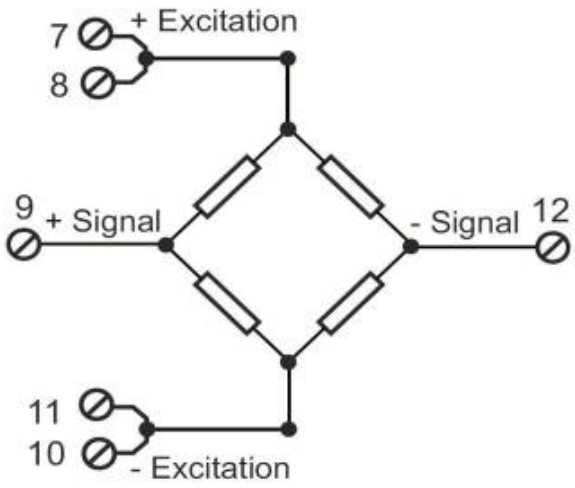
The figure below shows the connections to be made for connection to a strain gauge. The terminals have the following meaning:

| | |
|---|---|
| 7) Strain gauge positive power supply<br>8) Strain gauge positive power supply reading<br>9) Strain gauge positive reading | 10) Strain gauge negative power supply<br>11) Strain gauge negative power supply reading<br>12) Strain gauge negative reading |

**6 wires measurement**




**4 wires measurement**

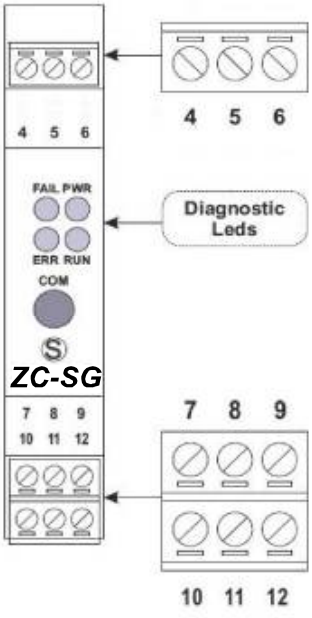
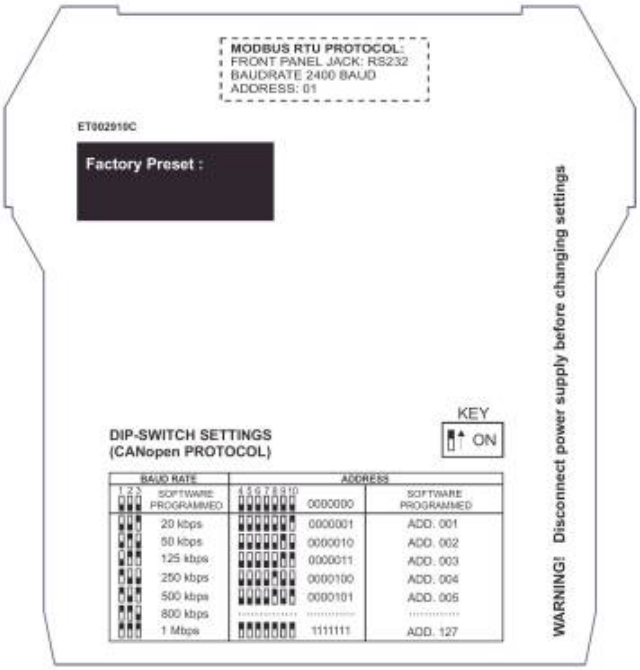



Note : Running outside the bridges between 7-8 and 11-10 terminals.

# *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*** |
|---|---|
|  |  |





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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 | 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 RUN (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 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.

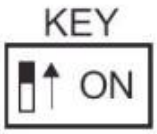
### *Factory preset*

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

- **CAN** communication : **Baud Rate: 20 kbps, Address: 127**
- **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 |
| | 20 kbps | | 0000001 | ADD. 001 |
| | 50 kbps | | 0000010 | ADD. 002 |
| | 125 kbps | | 0000011 | ADD. 003 |
| | 250 kbps | | 0000100 | ADD. 004 |
| | 500 kbps | | 0000101 | ADD. 005 |
| | 800 kbps | ..... | ..... | ..... |
| | 1 Mbps | | 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.



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