# SENECA Z-4AI 4-Channel Analog Input Module Instruction Manual



Contents



## SENECA Z-4AI 4-Channel Analog Input Module


## 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.

DOCUMENTATION
Z-4AI

SENECA s.r.l.; Via Austria, 26 – 35127 – PADOVA – ITALY; Tel. +39.049.8705359 – Fax +39.049.8706287

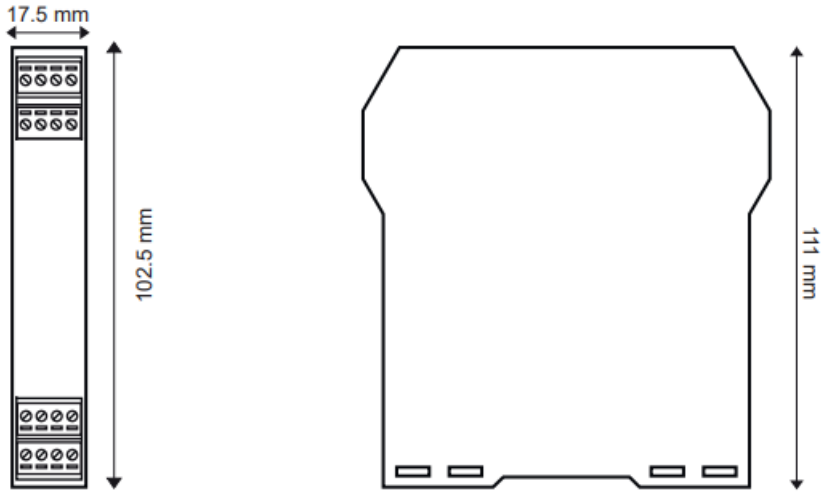
## CONTACT INFORMATION

**Technical support:** support@seneca.it

**Product information:** sales@seneca.it

content of this document corresponds to the described products and technologies.
Stated data may be modified or supplemented for technical and/or sales purposes.

## MODULE LAYOUT

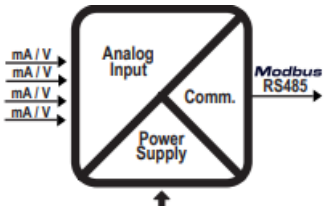



Dimensions LxHxD: 17.5 x 102.5 x 111 mm; Weight: 110 g; Enclosure: PA6, black

## SIGNALS VIA LED ON FRONT PANEL

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

## TECHNICAL SPECIFICATIONS

| | |
|---|---|
| **CERTIFICATIONS** | https://www.seneca.it/products/z-4ai/doc/CE_declaration |
| **INSULATION** |  <br>**WARNING**<br>**the maximum working voltage between any terminal and ground must be less than 50Vac / 75Vdc**<br>– |
| **ENVIRONMENTAL CONDITIONS** | *Temperature:* -10 ÷ + 65°C<br>*Humidity:* 30% ÷ 90% non condensing.<br>*Altitude:* Up to 2000 m above sea level<br>*Storage temperature:* -20 ÷ + 85°<br>*Protection rating:* IP20. |
| **ASSEMBLY** | IEC EN60715, 35mm DIN rail 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 ÷ 40Vdc; 19 ÷ 28Vac 50 ÷ 60Hz Absorption: Typical: 0.5W @ 24Vdc, Max: 3 .5W |

| INPUTS | |
|---|---|
| *Voltage input:* | Bipolar with F.S. programmable at +2Vdc and +10Vdc Input impedance >100kOhm |
| *Current input:* | Bipolar with F.S. Programmable at +20mA with 50Ohm internal shunt selectable via DI P-switch. Available power supply: 90 + 90mA at 13Vdc. |
| *Number of channels:* | 4 |
| *Input resolution:* | 15 bit + sign. |
| *Input protection:* | ± 30Vdc or 25mA |
| *Voltage and current precision:* | Starting: 0.1 % of full scale Linearity: 0.03% of scale. Zero: 0.05% of scale.<br>TC: 100 ppm, EMI: <1 % |
| *Sampling time* | 120ms/channel or 60ms/channel |
| *Measurement update times* | – 250ms for 4 channels with ADC speed 1 sample every 60ms<br>– 500ms for 4 channels with ADC speed 1 sample every 120ms |
| *Filter* | configurable from 0 to 6 |

## CONFIGURATION OF FACTORY SETTINGS

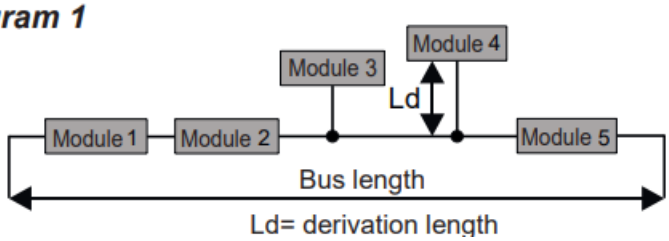
| | | | |
|---|---|---|---|
| All DIP-switches in | OFF | |  |
| Communication parameters of ModBUS protocol: | 38400 8, N, 1 Address 1 | | |
| Communication parameters of micro USB front port | 2400 8, N, 1 Address 1 | | |
| Channel input from 1 to 4 | VOLTAGE ± 10 Vdc | | |
| Numerical representation of the input measurement: | ± 10000 mV | | |
| 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 The following table shows cable length data:
3. 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).
4. Derivation length: maximum length of a derivation 2 m (see Diagram 1).

| Bus length | Derivation length |
|---|---|
| 1200 m | 2 m |

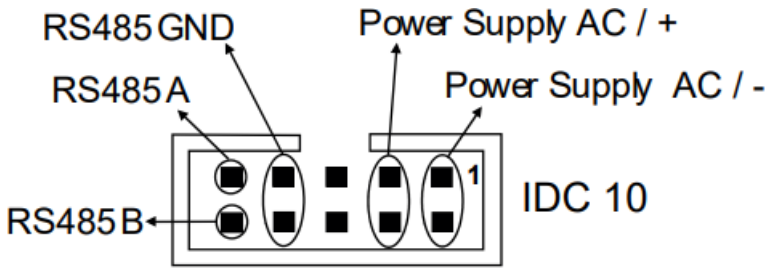
***Diagram 1***




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

## IDC10 CONNECTOR

Power supply and Modbus interface are available using the Seneca DIN rail bus, via the IDC10 rear connector, or the Z-PC-DINAL2-17.5 accessory.




**Rear Connector (IDC 10)**
The meaning of the various pins on the IDC10 connector is shown in the figure if you wish to supply signals directly via it.

## 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 values of the Baud Rate and the Address according to the setting of the DIP-switches:

| 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 | | |

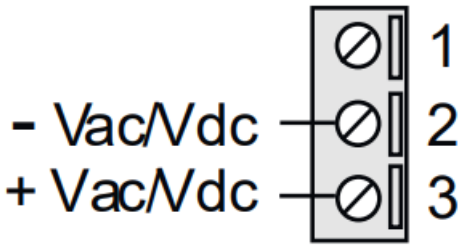
**Note:** When DIP switches 3 to 8 are OFF, the communication settings are taken from programming (EEPROM).
**Note 2:** The RS485 line must be terminated only at the ends of the communication line.
The settings of the dip-switches must be compatible with the settings on the registers.
The description of the registers is available in the USER MANUAL.

**ANALOGUE INPUT SETTING VIA DIP-SWITCH:**
DIP-Switch SW2 defines the type of input for each individual channel. Channels 1 to 4 can be set in current or voltage.
For the settings, refer to the SW2 table on the side.

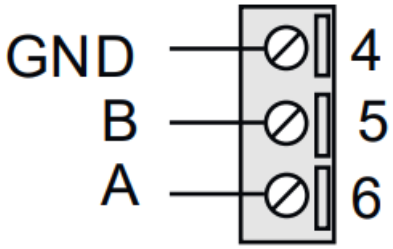
| SW2 ANALOGUE INPUTS | | |
|---|---|---|
| | ON | CURRENT INPUT |
| | OFF | VOLTAGE INPUT |

## ELECTRICAL CONNECTIONS

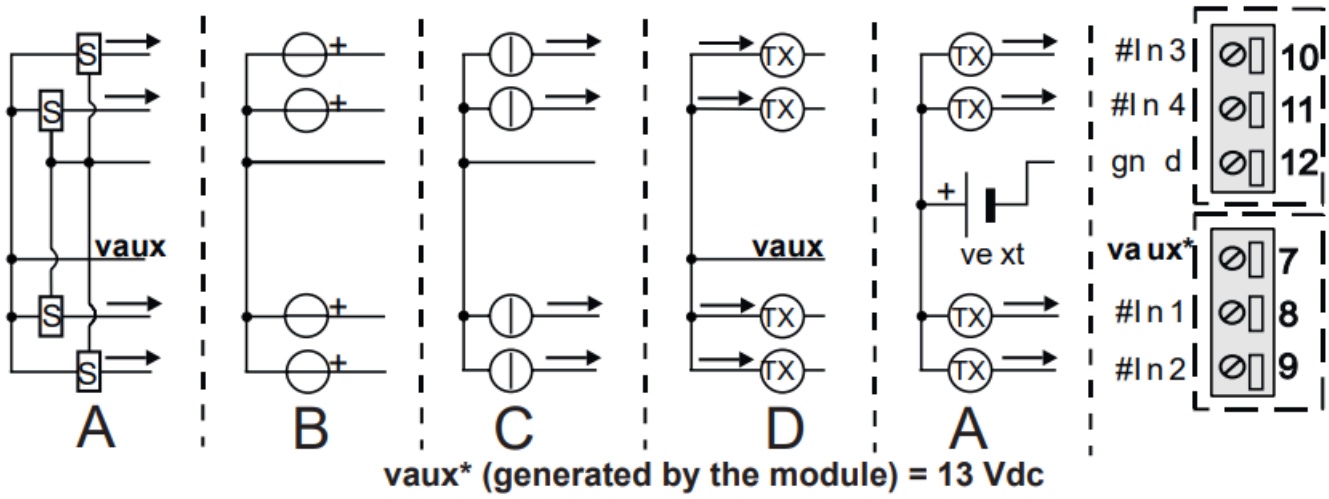
**Power supply**
The upper limits must not be exceeded as this can seriously damage the module. If the power supply source is not protected against overload, a safety fuse with a 2.5A max permissible value must be installed in the power supply line.




**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**




- A) Voltage input with sensor supply from the MODULE (13 Vdc)
- B) Voltage input with sensor supply NOT coming from the MODULE
- C) Current input with sensor supply NOT coming from the MODULE
- D) Current input with sensor supply from the MODULE (13 Vdc)
- E) Current input with EXTERNAL sensor supply

**ATTENTION**
The upper power supply limits must not be exceeded, as this might cause serious damage to the module. Switch the mod-ule 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…).
- make sure that the module is not supplied with a supply voltage higher than that indicated in the technical specifications in order not to damage it.

## Documents / Resources

| | |
|---|---|
|  | SENECA Z-4AI 4-Channel Analog Input Module [pdf] Instruction Manual<br>Z-4AI, 4-Channel Analog Input Module, Analog Input Module, 4-Channel Input Module, Input Module, Module |

## References

- seneca.it/products/z-4ai/doc/CE_declaration