

Z-PC Line

Z-8AI

8 ANALOG INPUT voltage-current with Modbus RS485

Installation Manual

- Contents:**
- General specifications
 - Technical features
 - Modbus connections
 - Installation
 - Electrical connections
 - DIP-switches settings
 - Modbus registers and LEDs signalling
 - Factory settings and advanced settings.



SENECA s.r.l.
Via Germania, 34 - 35127 - Z.I. CAMIN - PADOVA - ITALY
Tel. +39.049.8705355 - 8705359 - Fax +39.049.8706287
For manuals and configuration software, see www.seneca.it

This document is property of SENECA srl. Duplication and reproduction are forbidden, if not authorized. Contents of the present documentation refers to products and technologies described in it. All technical data contained in the document may be modified without prior notice. Content of this documentation is subject to periodical revision.

GENERAL SPECIFICATIONS

- Voltage or current inputs with programmable range: ± 2 Vdc, ± 10 Vdc e ± 20 mA with 16 bits resolution.
- **NEW** module auxiliary power supply can be supplied to all 8 current loop at the same time.
- **NEW** Modbus address and Baud rate can be set through DIP-switches
- Current input with internal shunt can be imposed through DIP-switch.
- Current input impedance ~ 50 Ω .
- 1500 Vdc output isolation compared with other low voltage circuits.
- Easy connections for power supply and serial communication by seneca bus that can be mounted on standard DIN 46277 rail.
- Removable terminals with section of 2.5 mm².
- RS485 serial communication with Modbus-Rtu protocol, maximum 64 nodes.
- Module insertion or extraction from seneca bus without interruptions for communication and power supply.
- Connection distance up to 1200 m.
- RS232 communication with jack 3,5 mm connector on frontal.

TECHNICAL FEATURES

Inputs	
Voltage inputs	Bipolar with programmable FS at ± 2.5 Vdc, and ± 10 Vdc input impedance: >100 k Ω
Current inputs	Bipolar with programmable FS at ± 20 mA. The 50 Ω internal shunt are selected from DIP-switches. Available power supply of 90 + 90 mA at 13 V.
Number of input channel	8
Protection inputs	± 30 Vdc or 25 mA
Inputs resolution	15 bit + 1 bit sign
Voltage and current accuracy	Initial: 0.1% of full scale. Linearity: 0.03% of range. Zero: 0.05% of range. TC: 100 ppm; EMI: 1 %
Sampling time	10 / 20 / 40 / 120 ms/channel

Power supply	
Voltage	10 ..40 Vdc 19 ..28 Vdc @ 50 ..60 Hz
Consumption	Typical: 1.5 W, Maximum: 3.5 W
Environmental condition	
Temperature	-10 ..+65°C (UL: -10 ..55°C)
Humidity	30 ..90% a 40°C not condensing
Storage Temperature	-20 ..+85°C
Degree protection	IP20

Connections	
Connections	Removable 3-way screw terminals, 5,08 pitch Rear IDC10 connector for DIN 46277 rail Frontal jack 3.5 mm

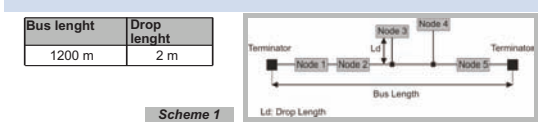
Box / Dimensions	
Dimensions	L: 100 mm; H: 112 mm; W: 17,5 mm
Box	PBT, Black

Isolations 1500 V		Standards	
The module complies with the following standards:			
	EN61000-6-4/2002 (electromagnetic emission, industrial environment).		EN61000-6-2/2006 (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".		

ADDITIONAL NOTES:
Use in environment with 2 or less pollution degree.
Power Supply must be Class 2.
When supplied by an Isolated Limited Voltage/Limited Current power supply a fuse rated max 2.5A shall be installed in the field.

MODBUS CONNECTIONS RULES

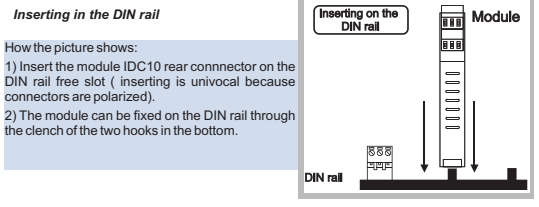
- 1) Connect the module into the DIN rail (max 120)
- 2) Use a cable with a suitable length to connect the remote modules. In the following table there are data relative to:
- Maximum length of the Modbus bus: It defines the connection length between two modules that have bus terminator dip switch on. (see scheme 1).
- Drop length: Maximum length of branch (see scheme 1).



For the maximum performances it's recommended to use a specific shielded cable, as an example BELDEN 9841.

INSTALLATION RULES

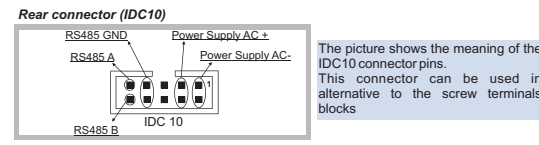
The module is designed to be installed, in vertical position, on DIN 46277 rail. For the best module performance and duration, avoid to place cables raceways and other objects that could obstruct ventilation slits. Never install the modules near heat sources. The module installation is advised in the bottom of the control panel.



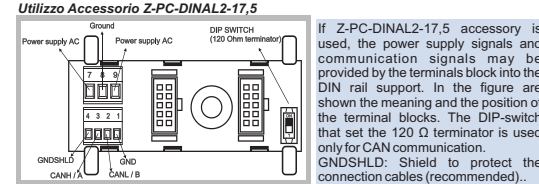
ELECTRICAL CONNECTIONS

Power supply and Modbus interface

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

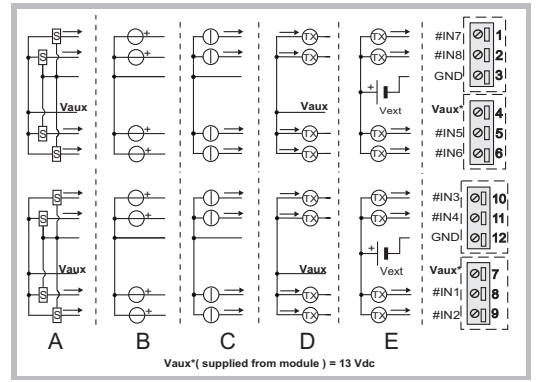


The picture shows the meaning of the IDC10 connector pins. This connector can be used in alternative to the screw terminals blocks



If Z-PC-DINAL2-17.5 accessory is used, the power supply signals and communication signals may be provided by the terminals block into the DIN rail support. In the figure are shown the meaning and the position of the terminal blocks. The DIP-switch that set the 120 Ω terminator is used only for CAN communication. GNDSHLD: Shield to protect the connection cables (recommended)..

Input



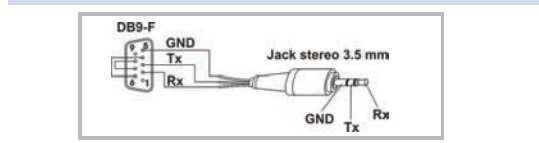
- A) Voltage input with sensor's power supply from MODULE (13 Vdc)
- B) Voltage input with sensor's power supply NOT from MODULE
- C) Current input with sensor's power supply NOT from MODULE
- D) Current input with sensor's power supply from MODULE (13 Vdc)
- E) Current input with external power supply for sensors.

RS232

RS232 port can be used to communicate and also to program the module. Z-NET or EASY Z-PC are the Seneca configuration softwares. RS232 communication use the following communication parameters:

2400,8,N,1

RS232 and RS485 port use the same Modbus protocol. When RS232 communication is established, the serial RS485 bus network will be not enable. The RS485 port will return automatically active some seconds after the last data packed received from RS232 port. The 3,5 mm DB9 jack stereo connector for RS232 communication can either be assembled as indicated in the following figure or purchased as an accessory (cod. PM001601).



DIP-SWITCHES SETTING

The DIP-switches positions defines the Modbus communication parameter: Address and Baud rate. In the following table the Baud rate and address value are listed as a function of the DIP-switches position:

DIP-switches table

POSITION	BAUD RATE	POSITION	ADDRESS	POSITION	TERMINATOR
00xxxxxxx	9600	xx000001xx	# 1	xxxxxxx0x	Disable
01xxxxxxx	19200	xx000010xx	# 2	xxxxxxx1x	Enable
10xxxxxxx	38400		
11xxxxxxx	57600	xx111111xx	# 63		

POSITION	BAUD RATE	POSITION	ADDRESS
xx000000	From EEprom	xx000000	From EEprom

Note: When DIP-Switches from 3 to 8 are in OFF, communication settings are retrieved from EEprom
Nota 2: The termination of RS485 communication must be enabled only to the ends of the communication line.

DIP-switches for inputs setting

CHANNEL	VOLTAGE	CURRENT	CHANNEL	VOLTAGE	CURRENT
CH1	00000000	10000000	CH5	00000000	00001000
CH2	00000000	01000000	CH6	00000000	00000100
CH3	00000000	00100000	CH7	00000000	00000010
CH4	00000000	00010000	CH8	00000000	00000001

The dip switch selection must be compatible with the Modbus register setting. The description of Modbus registers are available on USER MANUAL.



MODBUS REGISTER AND LED SIGNALLINGS

Holding register

Register	Name	Description
40003	NCH 1	Measured value of input channel .
40004	NCH 2	See before.
40005	NCH 3	See before.
40006	NCH 4	See before.
40007	NCH 5	See before.
40008	NCH 6	See before.
40009	NCH 7	See before.
40010	NCH 8	See before.

LEDs signalling

LED	STATE	Meaning of LEDs
PWR	On	Power supply presence.
FAIL	Blinking	Error settings .
RX	Blinking	Received data.
	On	Verify the connection.
TX	Blinking	Transmitted data.

FACTORY SETTING AND ADVANCED SETTING

Factory settings

Tutti i DIP-switch in OFF:

- Parametri di comunicazione: 38400 8,N,1 Addr. 1
- Ingresso canale 1 : VOLTAGE ± 10 V
- Ingresso canale 2 : VOLTAGE ± 10 V
- Ingresso canale 3 : VOLTAGE ± 10 V
- Ingresso canale 4 : VOLTAGE ± 10 V
- Ingresso canale 5 : VOLTAGE ± 10 V
- Ingresso canale 6 : VOLTAGE ± 10 V
- Ingresso canale 7 : VOLTAGE ± 10 V
- Ingresso canale 8 : VOLTAGE ± 10 V
- Numeric representation of measure : ± 10000 mV
- Sampling time: 10 ms

Advanced settings

- Input channels are settable in current or voltage.
- Possibility to set the scale of measure with value IS (start scale) and FS (full scale) : ± 10000 mV or 0 ..20000 μ A.
- Possibility to set the representation of the measure with an IST (start technical scale) and FST (full technical scale) value : ± 32000
- Possibility to enable or disable every single channel.

Variations of standard parameters are possible by using configuration softwares Z-NET and EASY-Z-PC (www.seneca.it). For more information about a list of all register and their function consult the USER manual

