INSTALLATION MANUAL

Z-3AO

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

SENECA

QUALITY MANAGEMENT SYSTEM
ISO 9001:2015

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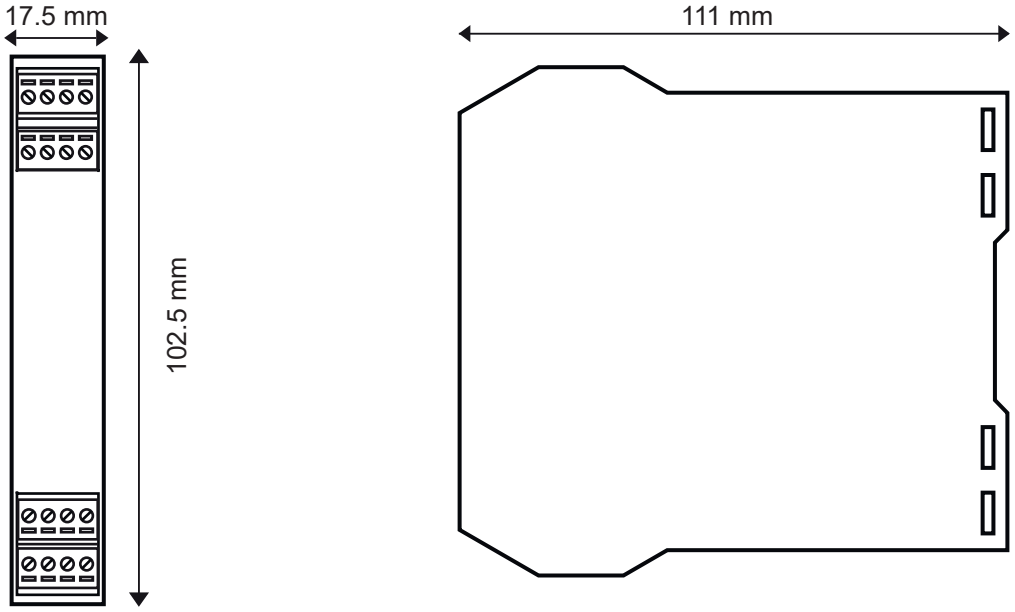
CONTACT INFORMATION

Technical support	support@seneca.it	Product information	sales@seneca.it

MODULE LAYOUT

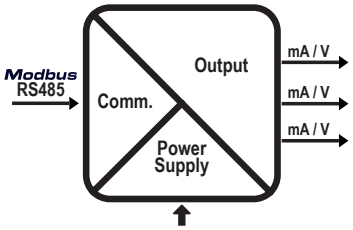


Dimensions LxHxD 17.5 x 102.5 x 111 mm; **Weight:** 110 g; **Enclosure:** PA6, black

SIGNALS VIA LED ON FRONT PANEL

LED	STATUS	LED meaning
PWR Green	ON	The device is powered correctly
FAIL yellow	Flashing	Wrong setup
FAIL yellow	ON	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	CE UKCA  c UL us LISTED 3LUT
INSULATION	 **WARNING** the maximum working voltage between any terminal and ground must be less than 50 Vac / 75Vdc — **1500 Vac**
ENVIRONMENTAL CONDITIONS	*Temperature*: -20 – + 65°C (-10 - +60 °C UL) *Humidity*: 30%– 90% non condensing. *Altitude:* up to 2000 m above sea level *Storage temperature:* -20 + 85° *Protection degree:* IP20.
ASSEMBLY	35 mm DIN rail IEC EN60715 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 – 40 Vdc; 19 – 28 Vac 50 – 60 Hz Absorption: Typical: 1,5 W @ 24Vdc, Max: 3.2 W
OUTPUTS	*Voltage outputs*: -10 - 10 V, 0 - 10 V, 2 - 10 V. Pilotable impedance > 600 Ohm *Current outputs*: 0 – 20 m, 4 – 20 mA. Pilotable impedance < 600 Ohm *Number of channels:* 3 *Voltage output resolution:* 12 bit (5 mV) *Current output resolution:* 12 bit (5 µA) *Voltage output errors:* Calibration: 0.2% of F.S. MAX, 0.1% typical Linearity : 0.05% of F.S. Thermal stability: 0.01%/°C of F.S. *Voltage output errors:* Calibration: 0.2% of F.S. MAX, 0.1% typical Linearity : 0.05% of F.S. Thermal stability: 0.01%/°C of F.S. *Response time:* 50 ms

CONFIGURATION OF FACTORY SETTINGS

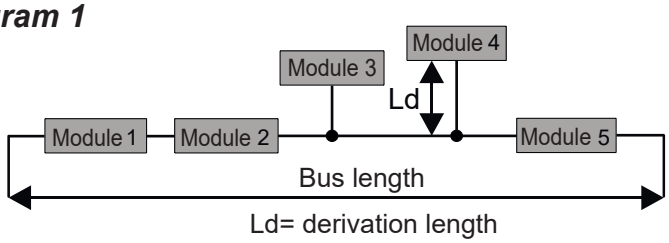
All DIP-switches in	OFF position
Communication parameters of ModBUS protocol:	38400 8, N, 1 Address 1
Channel 1 output:	CURRENT 4 - 20 mA
Channel 2 output:	CURRENT 4 - 20 mA
Channel 3 output:	CURRENT 4 - 20 mA
Time Out:	DISABLED

ModBUS CONNECTION RULES

1) Install the modules in the DIN rail (120 max)
2) Connect the remote modules using cables of an appropriate length. The following table shows cable length data:
- 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).
- 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.

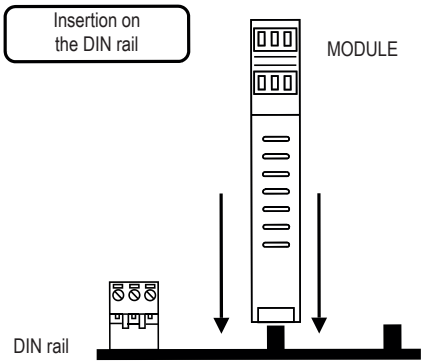
INSTALLATION REGULATIONS

The module has been designed for vertical installation on a DIN 46277 rail. For optimal operation and long life, adequate ventilation must be provided. Avoid positioning ducting or other objects that obstruct the ventilation slots. Avoid mounting modules over equipment generating heat. Installation in the bottom part of the switchboard is recommended.

Insertion in the DIN rail

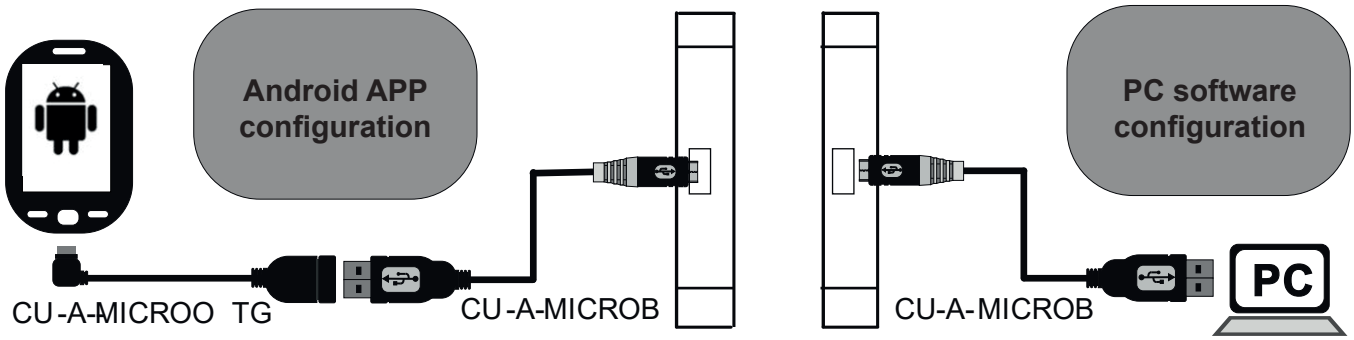
As shown in figure:

1. Insert the IDC10 rear connector of the module on a free slot of the DIN rail
   (the insertion is univocal since the connectors are polarized).
2. To secure the module to the DIN rail, tighten the two hooks on the side of the IDC10 rear connector.



USB PORT

The module is designed to arrange data according to the modes defined by the MODBUS protocol. It has a micro USB connector on the front panel and can be configured using applications and/or software programs. The USB communication has priority over the RS485 communication.
The USB serial port uses the following communication parameters: **2400,8,N,1**The USB communication port responds exactly like the RS485 port with the exception of the communication parameters. During the use of the USB port, the bus will be inactive; it will reactivate automatically a few seconds after the last message exchanged on the USB port. EASY SETUP is the software to use for the configuration. For more information,
visit www.seneca.it/products/z-3ao



Check that the device in question is included in the list of products supported by the Easy Setup APP in the store.

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 Baud Rate and Address values according to the DIP-switch setting:

Stato dei DIP-Switch			
SW2 POSIZIONE	**BAUD RATE**	**SW2 POSIZIONE**	**ADDRESS**
1 2 3 4 5 6 7 8		3 4 5 6 7 8	
- - - - - - - -	9600		#1
- - - - - - - -	19200		#2
- - - - - - - -	38400	. . . . .	#...
- - - - - - - -	57600		#63
- -	From EEPROM		From EEPROM

Note: When DIP switches 3 to 8 are OFF, the communication settings are taken from programming (EEPROM).

RS485 line terminator			
1	ON		**SW3 TERMINATOR**
0	OFF		

The R S 485 line must be terminated only at the ends of the communication line.

SW1 ANALOGUE OUTPUTS				
				Current output ON
Channel 1	Channel 2	Channel 3		Voltage output OFF

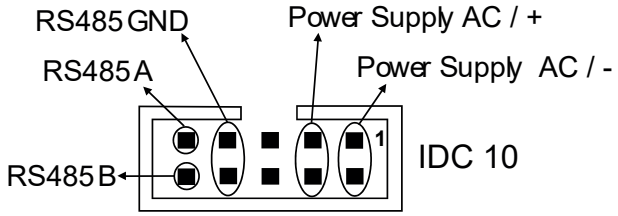
On one side of the module there are three selector switches, which allow you to independently choose the voltage or current output for each channel. This output (either voltage or current) is automatically recognized by the module.

It is advisable to set the DIP-switches with the module off.

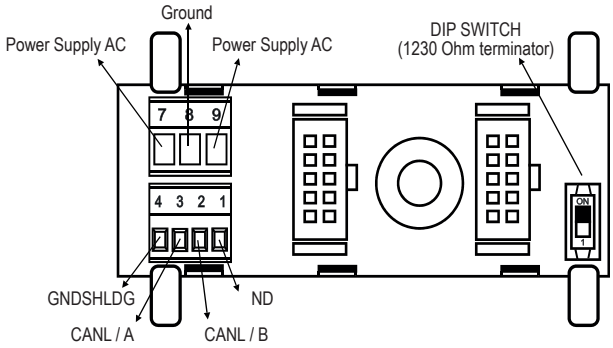
ANALOGUE OUTPUTS		
Modbus registers: Holding registers		
Register	**Name**	**Description**
40005	OUT CH1	Value of the analogue output: the accepted values are: from 0 to 10000 current output 0 - 20 mA, 4 - 20 mA or from -10000 to 10000 voltage output 0 – 10V, 2 – .10V, -10 – 10V depending on the status of the flags of the EPRFLG register. The value memorised in EEPROM will be used as a default value when the unit is switched on and at the end of the timeout if the safety function is enabled (see USER MANUAL).
40006	OUT CH2	As above
40007	OUT CH3	As above

ELECTRICAL CONNECTIONS

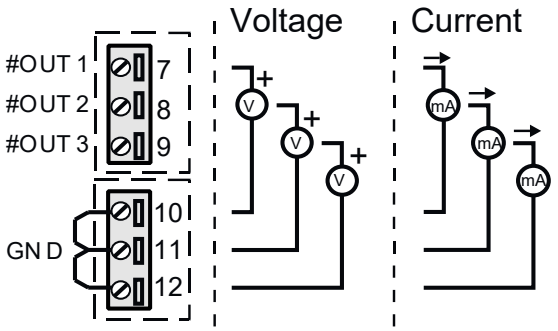
Power supply and Modbus interface are available using the Seneca DIN rail bus, via the IDC10 rear connector, or the Z-PC-DINAL-17.5 accessory.



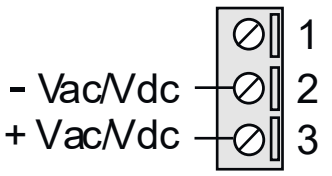
Back connector (IDC 10)
The illustration shows the meanings of the various IDC10 connector pins if signals are to be sent via them directly.



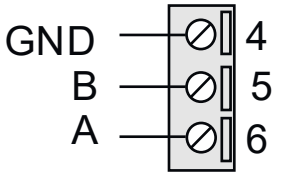
Z-PC-DINAL2-17.5 accessory use
If the Z-PC-DINAL2-17.5 accessory is used, signals can be sent via terminal boards. The illustration shows the meaning of the various terminals and DIP-switch position (found in all supports for the DIN rail listed in Accessories) for the termination of the CAN network (not used for the Modbus network).
GNDSHLD:
Connection cable signal protection shield (recommended).



Analogue outputs
Terminals 10, 11 and 12 are connected internally. The outputs are available to terminals 7, 8 and 9 and can be set as current or voltage via DIP-switches.



Power supply
Terminals 2 and 3 can be used to provide the module with power supply as an alternative to the connection using the Z-PC-DINx bus. **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 2.5 max permissible value must be installed in the power supply line. A.



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.

⚠ ATTENTION

The upper power supply limits must not be exceeded, as this might cause serious damage to the module. Switch the module 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 power supply voltage to the module does not exceed: 40 Vdc or 28 Vac, otherwise the module will be damaged.

ADVANCED SETTINGS

- Possibility to set IS (the scale start) and FS (the full scale) of the desired output.
- Possibility to set a safety timer which, after a programmed time, brings the outputs to a predefined safety status.
- Possibility to set the security status of the outputs, this will be activated in the event of a communication failure for a time equal to that set in the safety timer.