SENECA

Z-PC Line

EN

Z-3AO

3 analog outputs module with RS485 serial interface MODBUS RTU protocol

Installation Manual

Contenuti:

- General specifications
- Technical specifications
- Modbus connection rules
- Installation rules
- Electrical connections
- DIP-switches settings
- Analog outputs
- Frontal panel LEDs signallings
- Default conditions
- Module layout
- Decommissioning and disposal



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CSQ IQNet ISO 9001:2008

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Before executing any operation it's mandatory to read all the content of this user Manual. Only electrical-skilled technicians can use the module described in this user Manual.

Only the Manufacturer is authorized to repair the module or to replace damaged components.

No warranty is guaranteed in connection with faults resulting from improper use, from modifications or repairs carried out by Manufacturer-unauthorised personnel on the module, or if the content of this user Manual is not followed.

GENERAL SPECIFICATIONS

- 3 current or voltage analog outputs with 12 bit resolution.
- Start/end scale voltage programmable between: -10 – +10 V, 0 – +10 V or +2 – +10 V.
- Start/end scale current programmable between 0 – 20 mA o 4 – 20 mA
- 1500V insulation between: analog outputs and remaining low voltage circuits.
- Outputs protection via 400W/ms TVS transient current suppressors; PTC load protection.
- Negative common connection.
- Removable terminals with section of 2.5 mm^2.
- Fast response time (step 10-90%): < 50 ms.
- Power supply and serial connection wiring facilitated by means of a bus that can be housed in the DIN guide.
- RS485 serial communication with Modbus-Rtu protocol, maximum 64 nodes.
- RS232 serial connection on frontal panel with Modbus protocol for serial communications and also for programming.
- Insertion and extraction from bus without interruption of communication or of system power supply.
- Communication times below 10 ms (@ 38400 Baud).
- Connection distance up to 1200 m.
- DIP-Switch settings for Module address and Baud rate.

TECHNICAL SPECIFICATIONS

Outputs	
Voltage output	-10 – 10 V, 0 – 10 V, 2 – 10 V. Output impedance > 600 Ω
Current output	0 – 20 mA, 4 – 20 mA. Output impedance < 600 Ω
Number of output channels	3
Voltage output resolution	12 bit (5 mV)
Current output resolution	12 bit (5 µA)
Voltage output accuracy	Calibration Max: 0.2% of E.E.S., typical: 0.1% of E.E.S. Linearity: 0.05% of Electical End Scale (E.E.S.) Thermal stability: 0.01%/°C of E.E.S.
Current output accuracy	Calibration Max: 0.2% of E.E.S., typical: 0.1% of E.E.S. Linearity: 0.05% of Electical End Scale (E.E.S.) Thermal stability: 0.01%/°C of E.E.S.

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Power supply

Supply voltage	10 – 40 Vdc;19 – 28 Vac 50 – 60 Hz
Power consumption	Typical: 1,5 W @ 24Vdc, Max: 3.2 W

Environmental Conditions

Temperature	-20 – +65°C (-10 – +55 °C UL)
Humidity	30 – 90% a 40°C not condensing
Altitude	Up to 2000 m. a.s.l.
Storage temperature	-20 – +85°C
Protection degree	IP20

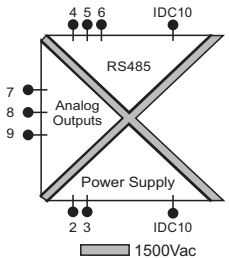
Connections

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

Dimensions / Box

Dimension	Width W = 100 mm, Height H = 112mm, Depth D = 17.5mm
Box	PBT, Black

Isolation 1500 Vac



Standards

The module complies with the following standards:

EN61000-6-4 (electromagnetic emission, industrial environment).

EN61000-6-2 (electromagnetic immunity, industrial environment).

EN61010-1 (safety).

ADDITIONAL NOTES :
Use in Pollution Degree 2 Environment .
Power Supply must be Class 2.
A max 2.5 A rated fuse shall be installed near the module.

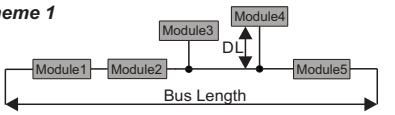
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Modbus connection rules

1) Install the modules on the DIN rail (max 120).
2) Connect the remote modules using cables of proper length. The following table show the cables length
- Bus Length: Modbus network maximum length as a function of the Baud rate. This is the lenght of the cables which connect the two bus terminators modules (see Scheme 1).
- Derivation Length: Derivation line Maximum length as a function of the Baud Rate .

Bus lenght	Derivation lenght
1200 m	2 m

Scheme 1



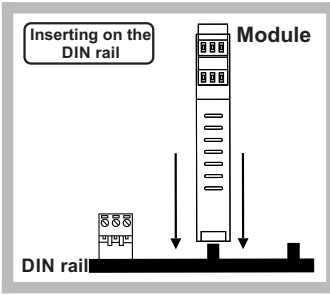
For the best performances, the use of special shielded cables is recommended (BELDEN 9841 cable for example)

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 next figure:
1) Insert the rear IDC10 connector on a DIN rail free slot (there's only one way to insert the module because of polarized connector).
2) Tighten the two locks placed at the sides of the rear IDC10 connector to fix the module.

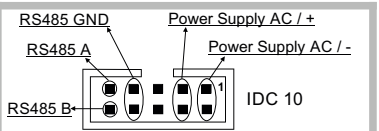


Electrical Connections

Power supply and MODBUS interface

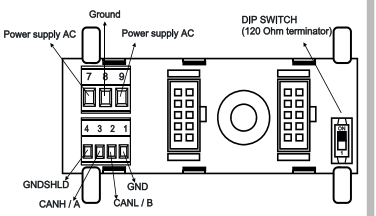
Power Supply and Modbus interface are available by using the bus for the Seneca DIN rail, by the rear IDC10 connector or by Z-PC-DINAL2-17,5 accessory.

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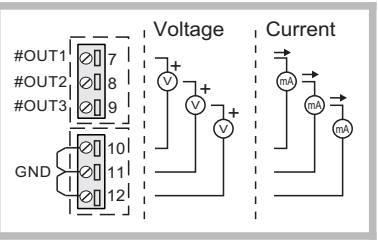
Rear Connector (IDC10)

In the figure the meaning of the IDC10 connector pins is showed, if the user decides to provide the signals directly through it.



Z-PC-DINAL2-17,5 Accessory Use

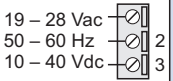
If Z-PC-DINAL2-17.5 accessory is used, the signals may be provided by terminal blocks. The figure shows the meaning and position of terminals and the DIP-switch (present on each DIN rail supports listed on Accessories) for network termination (not used in case of Modbus network).
GNDSHLD: Shield to protect the signals of the connecting cables against interference (recommended).



Analog outputs

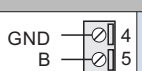
The screw terminals 10, 11 and 12 are internally connected between themselves.
The outputs available to the screw terminals 7, 8 and 9 can be set for current or voltage via DIP-switches.

Power supply



Terminals 2 and 3 can be used to power supply the module as an alternative to the Z-PC-DINx bus connection. The supply voltage must be from 10 to 40 Vdc or from 19 to 28 Vac. **The upper limits must not be exceeded to avoid serious damage to the module.** If the power supply source is not protected against overload, a safety fuse appropriately sized (Max = 2.5 A) must be installed near the module.

MODBUS RS485



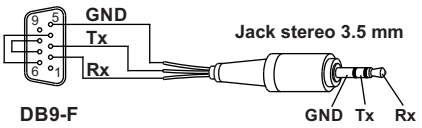
Connection for RS485 communication using the Modbus master system as an alternative to the Z-PC-DINx bus.
Note: the indication of the RS485 connection polarity is not standardised and in some masters may be inverted.

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MODBUS RS232

The module is designed to exchange data according to the protocol MODBUS.
The RS232 communication has priority over the RS485 communication.
This RS232 serial port can be used for communication but also to program the module.
The RS232 serial port uses the following communication parameters: **2400,8,N,1**
The RS232 COM port behaves exactly like that of the RS485 bus except for the communication parameters. When using the RS232 bus will be idle, it will automatically reactivate a few seconds after the last message on the COM port.
EASY SETUP is the configuration software for this module.

RS232 SERIAL PORT
The module is equipped with a female Jack connector that allows the connection to the RS232 communication bus.
The connection cable DB9 with a 3.5 mm stereo Jack, can be assembled as indicated in the following figure or it can be bought as an accessory:(cod.PM001601).



DIP-Switches settings

The DIP-switches position defines the module Modbus 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:

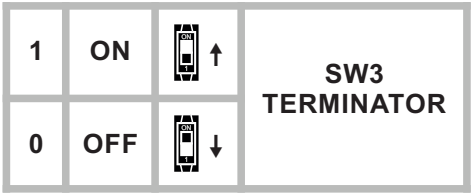
DIP-Switches status

SW1 POSITION 1 2 3 4 5 6 7 8	BAUD RATE	SW1 POSITION 1 2 3 4 5 6 7 8	ADRESS	SW3 POSITION	TERMINA -TOR
▯▯ x x x x x x	9600	x x ▯ ▯ ▯ ▯ ▯ ▯	# 1	▯	Disabled
▯▯ x x x x x x	19200	x x ▯ ▯ ▯ ▯ ▯ ▯	# 2	▯	Enabled
▯▯ x x x x x x	38400	x x	# . .	▯↑	ON
▯▯ x x x x x x	57600	x x ▯ ▯ ▯ ▯ ▯ ▯	# 63		
x x ▯ ▯ ▯ ▯ ▯ ▯	From EEPROM	x x ▯ ▯ ▯ ▯ ▯ ▯	From EEPROM	▯↓	OFF

Note: when switches from 3 to 8 are in OFF, comunication settings are retrieved from EEPROM

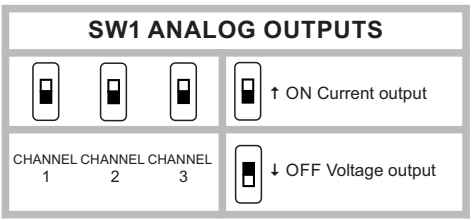
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RS485 line terminator



The RS485 line termination must be carried out only at the ends of the communication line.

Selection of the outputs type



On the side of the module there are three switches, which allow you to choose independently for each channel the output type.
This output (voltage or current) is automatically recognized by the module.
It is recommended to set DIP-switch when module is switched off.

Analog outputs

MODBUS registers: Holding registers

Register	Name	Description
40005	**OUT CH1**	Analog output's value: the allowed values are: from 0 to 10000 current output: 0 – 20 mA, 4 – 20 mA or else from -10000 to 10000 voltage output: 0 – 10V, 2 – .10V, -10 – +10V in relation to the state of the flags register EPRFLG. The value stored in the EEPROM it will be used as the default power-up and default timeout, only if the safety function is enabled (please see USER MANUAL).
40006	**OUT CH2**	As above.
40007	**OUT CH3**	As above.

Advanced configurations

- Facility to set SS (start scale) and ES (end scale) of the desired output.
- Facility to set a security timer that after a programmed time sets the outputs in a predefined security status.
- Facility to set the security status of the outputs, this will be activated when a communication failure happens for a period equal to the setted time in safety timer.

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Frontal panel LEDs signallings

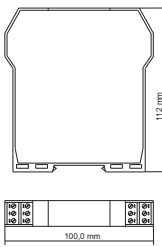
LED	STATUS	Meanings of LED
PWR Green	On	Power supply presence.
FAIL Yellow	Blinking	error settings.
FAIL Yellow	On	Malfunction or fault.
RX Red	Blinking	Receiving data from RS485.
RX Red	On	Verifying the connection.
TX Red	Blinking	Sending data to RS485.
TX Red	On	Verifying the connection.

Default Conditions

Module factory settings parameters:	
All DIP-Switches position:	OFF
Communication parameters Modbus Protocol:	38400 8,N,1 Addr. 1
Output channel 1:	CURRENT 4 - 20 mA
Output channel 2:	CURRENT 4 - 20 mA
Output channel 3:	CURRENT 4 - 20 mA
Time out :	DISABLED

Module Layout

MODULE DIMENSIONS



FRONT PANEL



Variation of standard parameters are possible by using configuration software (see: www.seneca.it).
For more information about a list of all registers and their functions refer to the USER MAUNAL.

Decommissioning and Disposal



Disposal of Electrical & Electronic Equipment (Applicable throughout the European Union and other European countries with separate collections programs). This symbol, found on your producr 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 & 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 the product, please contact your local city office, waste disposal service of the retail store where you purchased this product.

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