SENECA

Z-PC Line

EN

Z-3AO

Modbus module with three 12 bit ANALOG OUTPUTS.

Installation Manual

Contents:

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

GENERAL SPECIFICATIONS

- 3 settable analog outputs in voltage or current with 12 bit resolution.
- Bipolar voltage outputs with settable full scale and start scale at -10 ..10 V, 0 ..10 V or 2 ..10 V.
- Current outputs with settable full scale and start scale at 0 ..20 mA or 4 ..20 mA.
- 1500 Vac output isolation compared with other low voltage circuits.
- Outputs protected with 400 W/ms transient current suppressors; user load protection by PTC.
- Connection with shared negative pole.
- Removable terminals with section of 2.5 mm^2.
- Analogue output response time: 400 ms (10-90%): typical < 50 ms.
- Easy connections for power supply and serial communications from seneca bus installable to the standards DIN 46277 rail.
- RS485 serial communication with Modbus-Rtu protocol, maximum 64 nodes.
- Communication and also programming from frontal Jack 3,5 mm connector with RS232 Modbus protocol.
- Module insertion or extraction from seneca bus without interruptions for communication and power supply.
- Communication time below 10 ms (@ 38400 Baud).
- Connection distance up to 1200 m.
- Set the Modbus address and the Baud rate with DIP-Switch.

TECHNICAL SPECIFICATIONS

Outputs

Voltage output	-10 ..10 V, 0 ..10 V, 2 ..10 V. pilotable impedance > 600 Ω
Current output	0 ..20 A, 4 ..20 A. pilotable impedance < 600 Ω
Number channels	3
Voltage output resolution	12 bit (5 mV)
Current output resolution	12 bit (5 µA)
Voltage output errors	Calibration: 0.2% del F.S. max, 0.1% typical Linearity: 0.05% del F.S. Thermal stability: 0.01%/°C del F.S.
Current voltage errors	Calibration: 0.2% del F.S. max, 0.1% Typical Linearity: 0.05% del F.S. Thermal stability: 0.01%/°C del F.S.

Power supply

Voltage	10 ..40 V_{DC} 19 ..28 V_{AC} @ 50 ..60 Hz
Consumption	Typical: 1,5 W, Maximum: 3,2 W

Environmental condition

Temperature	-10 ..+65°C (-10 ..+55°C UL)
Humidity	30 ..90% a 40°C non condensing
Altitude	Up to 2000 m a.s.l.
Storage Temperature	-20 ..+85°C
Protection	IP20

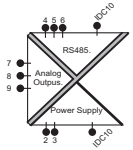
Connections

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

Box / Dimensions

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

Isolations 1500 V



Standards

The module complies with the following standards:

EN61000-6-4/2002-10 (electromagnetic emission, industrial environment).

EN61000-6-2/2006-10 (electromagnetic immunity, industrial environment)

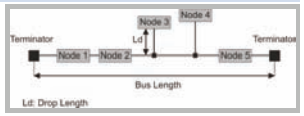
EN61010-1/2001 (safety). All circuits must be isolated from the other circuits under dangerous voltage with double isolation. The power supply transformer must comply with EN60742: "Isolated transformers and safety transformers".

ADDITIONAL NOTES :
Use in Pollution Degree 2 Environment .
Power Supply must be Class 2.
When supplied by an Isolated Limited Voltage/Limited Current power supply a fuse rated max 2.5 A shall be installed in the field.

MODBUS CONNECTIONS RULES

1) Connect the module into the DIN rail (max 120)
2) Use a suitable lenght cable to connect the remote modules. In the table below the relative data to the lenght of the bus and lenght of the cable are reported.
-Bus lenght: Maximum lenght of the Modbus network. The bus lenght is determined from the lenght of network that has the two modules who has been switched on the bus terminator. (see scheme 1).
-Drop lenght: Maximum lenght of branch (see scheme 1).

Bus lenght	Drop lenght
1200 m	2 m



Scheme 1

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

INSTALLATION RULES

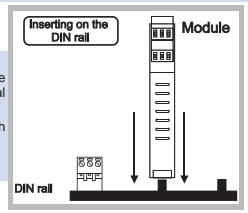
The module is designed to be installed, in vertical position, on DIN 46277 rail. For the best performance and long life cycle the cables raceways and other objects in the control panel must be placed not to obstruct the slits of the module that must be ventilated.
Never install the modules near heat sources. It's adviced the installation of the module in the lower part of the control panel.

Inserting in the DIN rail

As it is illustrated in the next figure:

1) Insert the module IDC10 rear connnector on the DIN rail free slot (the inserting is unequivocal because the connectors are polarized).

2) The module can be fixed on the DIN rail through the clench of the two hooks in the lower part of it.

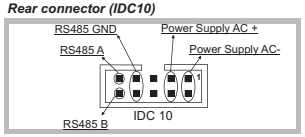


ELECTRICAL CONNECTIONS

Power supply and Modbus interface

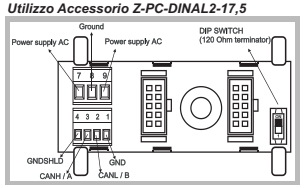
From IDC10 (rear connector of the module) or Z-PC-DINAL2-17,5 (optional) are avaiable power supply and Modbus interface. In the next page are shown the use specifications of IDC10 and Z-PC-DINAL2-17,5.

Rear connector (IDC10)



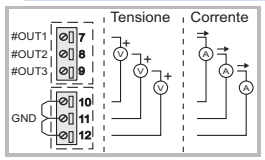
In the figure the meaning of the IDC10 connector pins is showed.
This connector can be used in alternative to the screw terminals blocks

Utilizzo Accessorio Z-PC-DINAL2-17,5



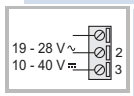
If Z-PC-DINAL2-17,5 accessory is used, the power supply signals and communication signals may be provided by the terminals block into the DIN rail support. In the figure are shown the meaning and the position of the terminal blocks. The DIP-switch that set the 120 Ω terminator is used only for CAN communication.
GNDSHLD: Shield to protect the connection cables (recommended).

Analog outputs



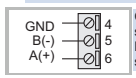
10,11 and 12 screw terminals are internally connected between them. To 7,8 and 9 screw terminals are available the analog outputs, they can be set from DIP-switches.

Power supply



Screw terminal 2 and 3 are the alternative to seneca DIN rail bus to provide the power supply at the module .**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 maximum permissible value of **2.5 A** must be installed in the power supply line.

RS485



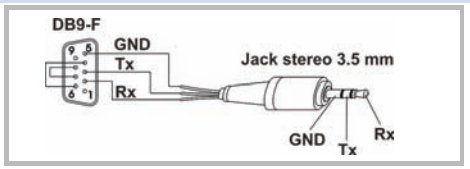
Connection for RS485 communication using the Modbus master system as an alternative to the Z-PC-DINx bus.
Note: the indication of the RS485 connection polarity is not standardised and in some masters may be inverted.

RS232

The RS232 port can be used to communicate and also to program the module.
Z-NET or EASY Z-PC are the Seneca configurations softwares. The RS232 communication use the following parameter of communications:

2400,8,N,1

RS232 and RS485 port use the same Modbus protocol. When RS232 communication is active, the serial RS485 bus network will be stopped. The RS485 will return automatically active a few seconds after the last data packed recived from RS232.
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:

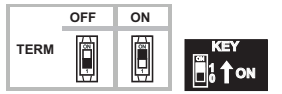
DIP-switches table

POSITION	BAUD RATE	POSITION	ADDRESS	POSITION	TERMINATOR
00xxxxxx	9600	xx000001	# 1	none	see TERM
01xxxxxx	19200	xx000010	# 2	none	see TERM
10xxxxxx	38400	.....	.....		
11xxxxxx	57600	xx111111	# 63		

POSITION	BAUD RATE	POSITION	ADDRESS
xx000000	From EEprom	xx000000	From EEprom

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

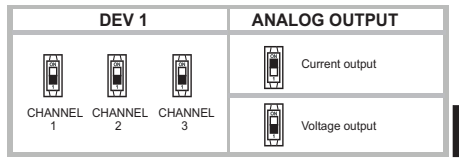
RS485 line termination



The RS485 line must be terminated only at the ends of the communication network line.

Output setting from DIP-switches

In a side of the module there are three DIP-switches that let to choose, for each channel, the voltage or current output. The output choice (if voltage or current) is automatically recognized by the module.
Recommended to set the DIP-switches when the module is off.



MODBUS BASIC REGISTER AND LED SIGNALLINGS

Holding register

Registers	Name	Description
40005	**OUT CH 1**	Analogue output value: the acceptable values are from 0 to 10000 for current output in 0..20 mA, 4..20 mA or -10000 to -10000 with corresponding voltage output in 0..10 V or or 2..10 V depending on the status of the EPRFLG register flags.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 CH 2**	As above
40007	**OUT CH 3**	As above

LEDs signallings

LED	STATE	*Meaning of LEDs*
PWR	On	Power supply presence.
FAIL	Blinking	Error settings.
	On	Fault/failure.
RX	Blinking	Recived data.
	On	Error connection.
TX	Blinking	Recived data.

FACTORY SETTING AND ADVANCED SETTING

Factory settings

All DIP-switch in OFF position:

- Modbus protocol: - Communication parameters: 38400 8,N,1 Addr. 1
- Output channel 1 : VOLTAGE ± 10 V
- Output channel 2 : VOLTAGE ± 10 V
- Output channel 3 : VOLTAGE ± 10 V
- Time out : DISABLE

Advanced settings

- Set the outputs SS (Start scale) and the FS (full scale).
- Set a safety timer to regulate the time that the outputs will be set in the safety state.
- Set the outputs safety state that will be enabled in case of lost communication for a time equal to setted safety timer.

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