SENECA

Z-PC Line

EN

Z-D-IN

Modbus Module
5 Digital Inputs

Installation Manual

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General Specifications

- 5 digital inputs with self-powered 16 VDC shared negative pole.
- Removable terminals with section of 2.5 mm²
- Input protection by 600 W/ms TVS transient current suppressers.
- 5 inputs with 16 bit contactor with 100 Hz max. frequency, with settable filter.
- Possibility to set the input n° 5 for fast totalizer with 32bit, max frequency 10 KHz.
- Possibility of ON-LINE configuration.
- RS485 serial communication with Modbus-Rtu protocol, maximum 32 nodes.
- 1500Vac input insulation with respect to remaining low voltage circuits.
- Power supply and serial connection wiring facilitated by means of a bus that can be housed in the DIN guide.
- Insertion and extraction of bus without interruption of communication or system power supply.
- Communication times below 10 ms (@ 38400 Baud).
- Connection distance up to 1200 m.
- DIP-Switch settings for Modbus speed and address, and for RS485 line termination.

Technical Specifications

INPUTS

Type input	Reed, Contact, Proximity PNP, NPN (with external resistor) etc...
Number of Channels	5 (4+1)
Maximum Counters frequency	10 KHz only for 5 if setted
U_L (state OFF)	0 ..10 V_{DC} , I < 2 mA
U_H (state ON)	12 ..30 V_{DC}, I > 3 mA
Absorbed Current	3 mA (for each input)

POWER SUPPLY

Voltage	10 ..40 V_{DC}
	19 ..28 V_{AC} a 50 ..60 Hz
Consumption	Typical: 1.5 W, Max: 2.5 W

ENVIRONMENTAL CONDITION

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

CONNECTIONS

Connections	Removable 3-way crew terminals, 3,5 pitch
	Rear IDC10 connector for DIN 46277 rail

DIMENSIONS / BOX

Dimensioni	L: 100 mm; H: 112 mm; W: 17,5 mm
Contenitore	PBT, colore nero

ISOLATIONS

1500 V_{AC} a tre punti:

= : Isolations 1500 V
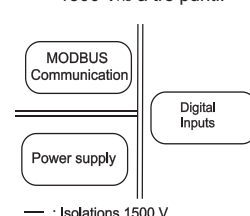
STANDARDS
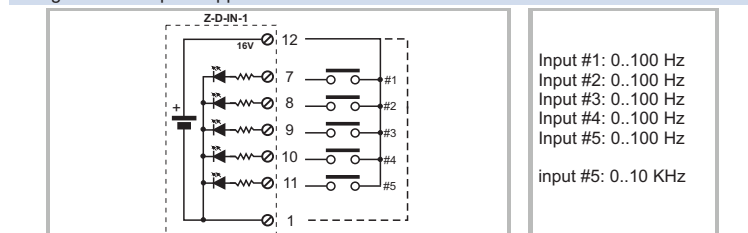
The module complies with the following standards:

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".

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 (the inserting is univocal since the connectors are polarized).

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-DINAL1-17.5 accessory.

Rear Connector (IDC10)

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

Z-PC-DINAL2-17.5 Accessory Use

In case of Z-PC-DINAL2-17.5 accessory use, the signals may be provided by terminal blocks. The figure shows the meaning of the terminals and the position of 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 connection cables (recommended).

POWER SUPPLY

Terminals 2 and 3 can be used to provide the module with power supply as an alternative to connection using the Z-PC-DINx bus. **The upper limits mus 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 max. permissible value of 0.5 A must be installed in the power supply line.

INPUTS

REED, PROXIMITY PNP, NPN, and contact-type sensor can be connected to the input terminals. The power supply for these sensors can be taken directly from terminal 12 (+16 V). All the inputs are connected in shared connection to terminal 1 GND. The current that flows through a closed input is approx. 3 mA.
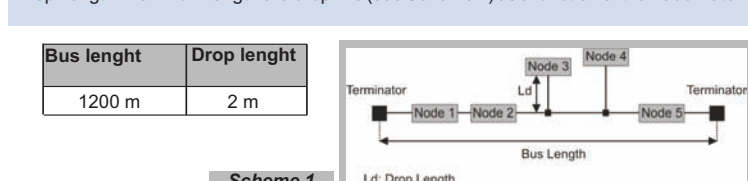

Input #1: 0..100 Hz
Input #2: 0..100 Hz
Input #3: 0..100 Hz
Input #4: 0..100 Hz
Input #5: 0..100 Hz

input #5: 0..10 KHz

MODBUS RS485

GND — 4
B(-) — 5
A(+) — 6

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

Modbus connection rules

1) Install the modules on the DIN rail (max 120).
2) Connect the remote modules using cables of proper length. On the table the following data about the cables length are provided:
-Bus Length: Modbus network maximum length as a function of the Baud Rate. It is the lenght of the cables which connect the two bus terminators modules (see Scheme 1).
-Drop Length: maximum length of a drop line (see Scheme 1) as a function of the Baud Rate.

Bus lenght	Drop lenght
1200 m	2 m

Scheme 1   Ld: Drop Length

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

DIP-switch 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 SWITCH STATUS

POSITION	BAUD RATE	POSITION	ADDRESS	POSITION	TERMINATOR
00xxxxxxxx	9600	xx000001xx # 1		xxxxxxxxx0	Disable
01xxxxxxxx	19200	xx000010xx # 2		xxxxxxxxx1	Enable
10xxxxxxxx	38400	.....	.....		
11xxxxxxxx	57600	xx111111xx # 63			

POSITION	BAUD RATE	POSITION	ADDRESS
xx000000	From EEprom	xx000000	From EEprom

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

Digital Inputs

MODBUS REGISTER

Holding register

Register	Name	Description
40002	OVERFLOW, INPUT	Input 1: 40002.0 Input 2: 40002.1 Input 3: 40002.2 Input 4: 40002.3 Input 5: 40002.4 The bits from 40002.8 a 40002.12 indicate overflow of the respective totalizers. NOTE: The overflow bits MUST be reset from master.
40003	TOTAL 1	16 bit totalizer of input 1 . The overflow is signalled on bit 40002.8
40004	TOTAL 2	16 bit totalizer of input 1 . The overflow is signalled on bit 40002.9

40005	TOTAL 3	16 bit totalizer of input 1 . The overflow is signalled on bit 40002.10
40006	TOTAL 4	16 bit totalizer of input 1 . The overflow is signalled on bit 40002.11
40007	TOTAL 5	16 bit totalizer of input 1 . The overflow is signalled on bit 40002.12

Input status

Register	Name	Description
10001	INPUT 1	Active status input 1. See 40009.0
10002	INPUT 2	Active status input 2. See 40009.0
10003	INPUT 3	Active status input 3. See 40009.0
10004	INPUT 4	Active status input 4. See 40009.0
10005	INPUT 5	Active status input 5. See 40009.0

Coil registers

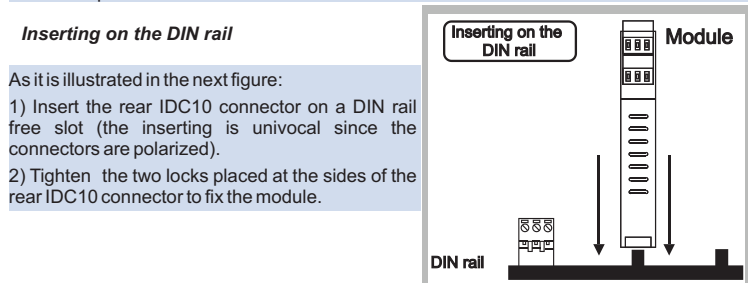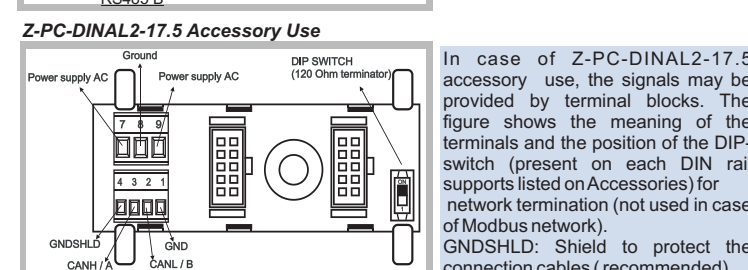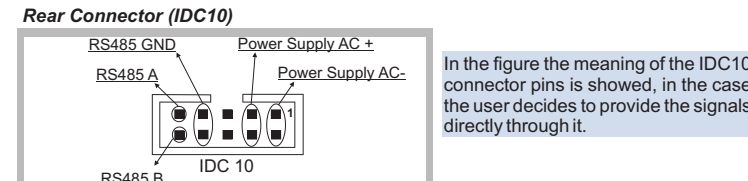| Register	Name	Description
00017	OFFTOTAL 1	Overflow input 1 totalizer.
00018	OFFTOTAL 2	Overflow input 2 totalizer.
00019	OFFTOTAL 3	Overflow input 3 totalizer.
00020	OFFTOTAL 4	Overflow input 4 totalizer.
00021	OFFTOTAL 5	Overflow input 5 totalizer.

LEDS Signallings

LED	STATE	Meaning of LEDS
PWR	On	Power supply presence.
FAIL	Blinking	Error settings.
	On	Fault/Failure.
RX	Blinking	Recived data from RS485.
	On	Verify the connection.
TX	Blinking	Recived data from RS485.
	On	Verify the connection.

Factory settings

All DIP-switch OFF:

- Modbus Protocol / - Communication parameters: 38400 8,N,1 Addr. 1
- Inversion input status : DISABLE
- Digital filter : 3 ms
- Totalizators : UP counter
- 10 KHz Channel : DISABLE
- Modbus latency time : 5 ms

Variation of standard parameters are possible by using configuration software 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.