SENECA

Z-PC Line

EN

Z-10-D-IN

RS485 Modbus Module
10 Digital Inputs

Installation Manual

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SENECA s.r.l.
Via Austria, 26 – 35127 – PADOVA – ITALY
Tel. +39.049.8705355 - 8705359 - Fax +39.049.8706287
For manuals and configuration software: see www.seneca.it

CSQ IQNet ISO 9001:2008

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General Specifications

- 10 digital inputs with self-powered 16V⎓ shared negative pole.
- Removable terminals with section of 2.5 mm^2
- Input protection by 600W/ms TVS transient current suppressors..
- 8 inputs with 16 bit totalizer with 100 Hz Max. frequency.
- 2 inputs with 32 bit totalizer with 10 kHz Max. frequency.
- Frequency measurement for 10 kHz inputs.
- Period, frequency and TON, TOFF measurement for 100 Hz inputs.
- Possibility to set the totalizers for forward or backward counting.
- Overflow indication for each totalizer.
- Possibility of ON-LINE configuration.
- RS485 serial communication with Modbus-Rtu protocol, maximum 64 nodes.
- 1500V~ 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.
- All the totalizers are saved in non-volatile memory (Fe-RAM).

Technical Specifications

Inputs

Type input	Reed, Contact, Proximity PNP, NPN (with external resistor) etc.
Number of Channels	8 + 2
Maximum Totalizer frequency	10 kHz only for 9 e 10 inputs
U_L (state OFF)	0 – 10 V⎓, I < 2 mA
U_H (stato ON)	12 – 30 V⎓, I > 3 mA
Absorbed Current	3 mA (for each input)
• Minima durata Impulso	4 ms per ingressi (1 – 8) e 50 µs per (9 – 10)
Measurement error and resolution	Frequency: 2% of the value for inputs 9 e 10, ± 2 Hz for inputs 1 – 8. Period, Ton, Toff,: Resolution 1 ms error = 2%

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Power Supply

Voltage	10 – 40 V⎓; 19 - 28 V∿ 50 – 60 Hz
Consumption	Typical: 1.5 W, Max: 2.5 W

Environmental Conditions

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 degree	IP20

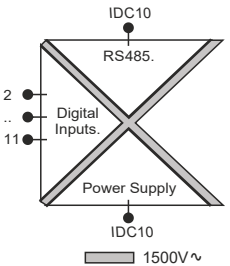
Connections

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

Dimensions / Box

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

Isolation 1500 V∿



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).

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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.

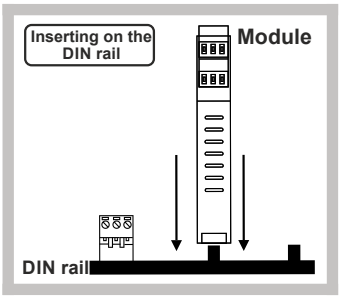
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Installation Rules

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

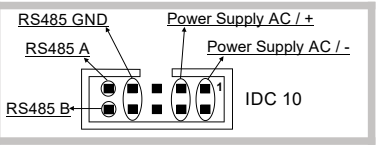
As it is illustrated in the next figure:
1) Insert the rear IDC10 connector on a DIN rail free slot (there's only one way to insert the module because of polarized connector).
2) Tighten the two locks placed at the sides of the rear IDC10 connector to fix the module.



Electrical Connections

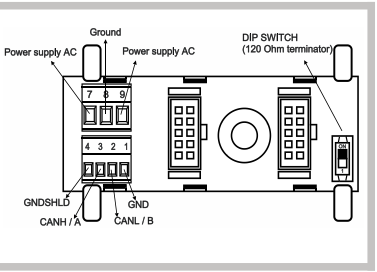
Power supply and MODBUS interface

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.



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.



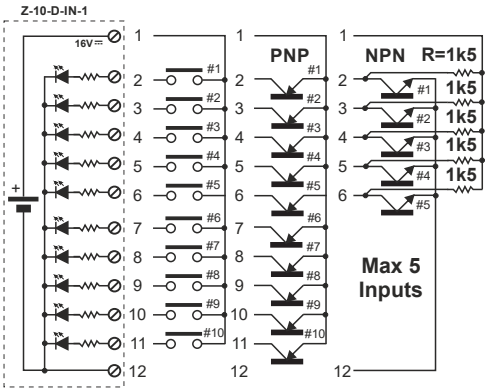
Z-PC-DINAL2-17,5 Accessory Use

In case of Z-PC-DINAL2-17.5 accessory use, the signals may be provided by terminal blocks. The figure shows the meaning 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).

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Digital Inputs

REED, PROXIMITY, PNP, NPN, and contact-type sensors can be connected to the input
terminals. The power supply for these sensors can be taken directly from Terminal 1 (+16V). All the inputs are connected in shared connection to Terminal 12 (GND).



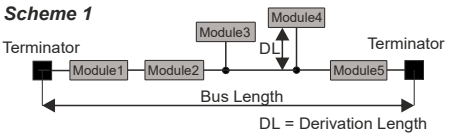
Inputs #1 – #8: 0 – 100 Hz **inputs #9 e #10: 0 – 10kHz**

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).
- Derivation Length: Derivation line Maximum length as a function of the Baud Rate (see Scheme 1).

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)

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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

POSITION 1 2 3 4 5 6 7 8 9 10	BAUD RATE	POSITION 1 2 3 4 5 6 7 8 9 10	ADDRESS	POSITION 1 2 3 4 5 6 7 8 9 10	TERMINA-TOR
■■ x x x x x x x x	9600	x x ■ ■ ■ ■ ■ ■ x x	# 1	x x x x x x x x ■	Disabled
■□ x x x x x x x x	19200	x x ■ ■ ■ ■ ■ □ x x	# 2	x x x x x x x x □	Enabled
□■ x x x x x x x x	38400	x x . . . . . x x	# . . .		
□□ x x x x x x x x	57600	x x □ □ □ □ □ □ x x	# 63		
x x ■ ■ ■ ■ ■ ■ x x	From EEPRO	x x ■ ■ ■ ■ ■ ■ x x	From EEPROM		

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

Digital Inputs

MODBUS Registrers: Holding registers

Register	Name	Description
40002	**INPUT**	Input status is available in the following bits: input 1: 40002.0 input 2: 40002.1 input 3: 40002.2 input 4: 40002.3 input 5: 40002.4 input 6: 40002.5 input 7: 40002.6 input 8: 40002.7 input 9: 40002.8 input 10: 40002.9
40003	**TOTAL 1**	16 bit totalizer of input 1. The overflow is signalled on bit 40015.0
40004	**TOTAL 2**	16 bit totalizer of input 2. The overflow is signalled on bit 40015.1
40005	**TOTAL 3**	16 bit totalizer of input 3. The overflow is signalled on bit 40015.2
40006	**TOTAL 4**	16 bit totalizer of input 4. The overflow is signalled on bit 40015.3
40007	**TOTAL 5**	16 bit totalizer of input 5. The overflow is signalled on bit 40015.4
40008	**TOTAL 6**	16 bit totalizer of input 6. The overflow is signalled on bit 40015.5
40009	**TOTAL 7**	16 bit totalizer of input 7. The overflow is signalled on bit 40015.6
40010	**TOTAL 8**	16 bit totalizer of input 8. The overflow is signalled on bit 40015.7

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Register	Name	Description
40011	**TOTAL 9 Less significant part**	Lower part of the totalizer with 32 bit (Unsigned) for input 9.
40012	**TOTAL 9 Most signifcant part**	Upper part of the totalizer with 32 bit (Unsigned) for input 9. Overflow is signalled on bit 40015.8
40013	**TOTAL 10 Less significant part**	Lower part of the totalizer with 32 bit (Unsigned) for input 10.
40014	**TOTAL10 Most signifcant part**	Upper part of the totalizer with 32 bit (Unsigned) for input 10. Overflow is segnalled on bit 40015.9
40015	**OVERFLOW**	Overflow of the totalizer is available in the following bits: input 1: 40015.0 input 6: 40015.5 input 2: 40015.1 input 7: 40015.6 input 3: 40015.2 input 8: 40015.7 input 4: 40015.3 input 9: 40015.8 input 5: 40015.4 input 10: 40015.9 NOTE: The overflow bit MUST BE reset by the master.

MODBUS Registrers: Input status

Register	Name	Description
10001	**INPUT 1**	Active status input 1. See: 40002.0
10002	**INPUT 2**	Active status input 2. See: 40002.1
10003	**INPUT 3**	Active status input 3. See:40002.2
10004	**INPUT 4**	Active status input 4. See: 40002.3
10005	**INPUT 5**	Active status input 5. See: 40002.4
10006	**INPUT 6**	Active status input 6. See: 40002.5
10007	**INPUT 7**	Active status input 7. See: 40002.6
10008	**INPUT 8**	Active status input 8. See: 40002.7
10009	**INPUT 9**	Active status input 9. See:40002.8
10010	**INPUT 10**	Active status input 10. See:40002.9

MODBUS Registrers: Coil registers

Register	Name	Description
00017	**OFTOTAL 1**	Overflow input 1 totalizer.
00018	**OFTOTAL 2**	Overflow input 2 totalizer.
00019	**OFTOTAL 3**	Overflow input 3 totalizer.
00020	**OFTOTAL 4**	Overflow input 4 totalizer.
00021	**OFTOTAL 5**	Overflow input 5 totalizer.
00022	**OFTOTAL 6**	Overflow input 6 totalizer.
00023	**OFTOTAL 7**	Overflow input 7 totalizer.
00024	**OFTOTAL 8**	Overflow input 8 totalizer.
00025	**OFTOTAL 9**	Overflow input 9 totalizer.
00026	**OFTOTAL 10**	Overflow input 10 totalizer.

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Frontal panel LEDs Signallings

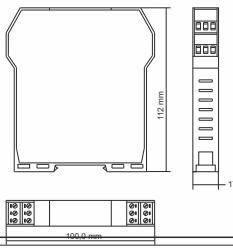
LED	STATUS	*Meanings of LED*
PWR Green	On	Power supply presence.
FAIL Yellow	Blinking	error settings.
FAIL Yellow	On	Malfunction or fault.
RX Red	Blinking	Receiving data from RS485.
RX Red	On	Verifying the connection.
TX Red	Blinking	Sending data to RS485.
TX Red	On	Verifying the connection.

Default Conditions

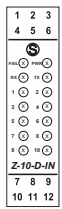
Module factory settings parameters:	
All DIP-Switch position:	OFF
Communication parameters Modbus Protocol:	38400 8,N,1 Addr. 1
Reverse input status:	DISABLED
Digital filter:	3 ms
Totalizers:	UP Counter
Modbus latency time:	5 ms

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 register and their function refer to the USER manual.

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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