

Z-PC Line

Z-10-D-IN

RS485 Modbus Module 10 Digital Inputs

Installation Manual



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General Specifications

- 10 digital inputs with self-powered 16V DC shared negative pole.
- Removable terminals with section of 2.5 mm²
- Input protection by 600W/ms TVS transient current suppressers..
- 8 inputs with 16 bit contactor with 100 Hz max. frequency.
- 2 inputs with 32 bit contactor with 10 kHz max. frequency.
- Frequency measurement for 10 kHz inputs.
- Period, frequency and TON, TOFF measurement for 100 Hz inputs.
- Possibility to set total counters for forward or backward counting.
- Overflow indication for each total counter.
- Possibility of ON-LINE configuration.
- RS485 serial communication with Modbus-Rtu protocol, maximum 64 nodes.
- 150V_{ac} 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	8 + 2
Maximum Counters frequency	10 kHz only for 9 e 10 inputs
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)
Minimum Pulse width	4 ms for 1 ..8 inputs, and 50 μs for 9 ..10 inputs
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%

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 (-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, 3,5 pitch Rear IDC10 connector for DIN 46277 rail

DIMENSIONS / BOX	
Dimension	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 2.5A shall be installed in the field.

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 four 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-DINAL2-1,75 accessory.

Rear Connector (IDC10)

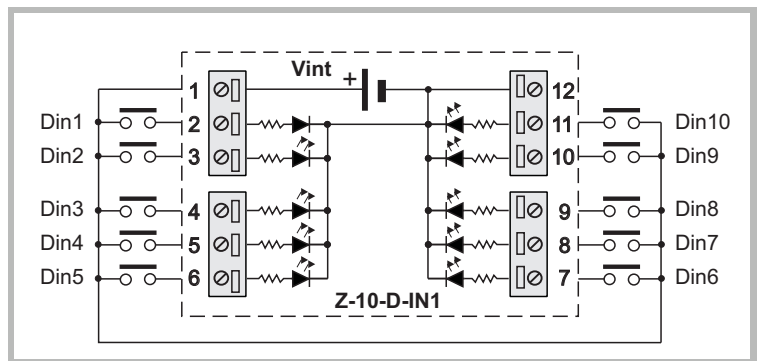
In the figure the meaning of the IDC10 connector pins is showed, in the case the user decides to provide the signals directly through it.

Z-PC-DINAL2-1,75 Accessory Use

In case of Z-PC-DINAL2-1,75 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).

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). The current that flows through a closed input is approx. 3 mA.



Inputs #1.. #8: 0..100 Hz Input #9 and #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 length of the cables which connect the two bus terminators modules (see Scheme 1).
-Drop Length: maximum length of a drop line 2 m(see Scheme 1).

Scheme 1

Bus lenght	Drop lenght
1200 m	2 m

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
00xxxxxxx	9600	xx000001xx	# 1
01xxxxxxx	19200	xx000010xx	# 2
10xxxxxxx	38400
11xxxxxxx	57600	xx111111xx	# 63

POSITION	BAUD RATE	POSITION	ADDRESS
xx000000	From EEprom	xx000000	From EEprom

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

Digital Inputs

MODBUS REGISTERS

Registers	Name	Description
40002	OVERFLOW, 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 1: 40002.5 Input 2: 40002.6 Input 3: 40002.7 Input 4: 40002.8 Input 5: 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
40011	TOTAL 9 Parte bassa	Lower part of the total counter with 32 bit (signed) for input 9
40012	TOTAL 9 Parte alta	Upper part of the total counter with 32 bit (signed) for input 9. Overflow is signalled on bit 40015.8
40013	TOTAL 10 Parte bassa	Lower part of the total counter with 32 bit (signed) for input 10
40014	TOTAL 10 Parte alta	Upper part of the total counter with 32 bit (signed) for input 10. Overflow is signalled on bit 40015.9
40015	OVERFLOW	Overflow of the total counters is available in the following bits: input 1: 40015.0 input 5: 40015.4 input 9: 40015.8 input 2: 40015.1 input 6: 40015.5 input 10: 40015.9 input 3: 40015.2 input 7: 40015.6 input 4: 40015.3 input 8: 40015.7 NOTE: The overflow bit MUST BE reset by the master.

Inputs status

Registers	Name	Description
10001	INPUT 1	Active status input 1. See 40002.0
10002	INPUT 2	Active status input 2. See 40002.0
10003	INPUT 3	Active status input 3. See 40002.0
10004	INPUT 4	Active status input 4. See 40002.0
10005	INPUT 5	Active status input 5. See 40002.0
10006	INPUT 6	Active status input 6. See 40002.0
10007	INPUT 7	Active status input 7. See 40002.0
10008	INPUT 8	Active status input 8. See 40002.0
10009	INPUT 9	Active status input 9. See 40002.0
10010	INPUT 10	Active status input 10. See 40002.0

Coil registers

Registers

Registers	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.
00022	OFFTOTAL 6	Overflow input 6 totalizer.
00023	OFFTOTAL 7	Overflow input 7 totalizer.
00024	OFFTOTAL 8	Overflow input 8 totalizer.
00025	OFFTOTAL 9	Overflow input 9 totalizer.
00026	OFFTOTAL 10	Overflow input 10 totalizer.

LEDS Signallings

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

