

# Z-D-IN

## 5 DIGITAL INPUTS MODULE / RS485

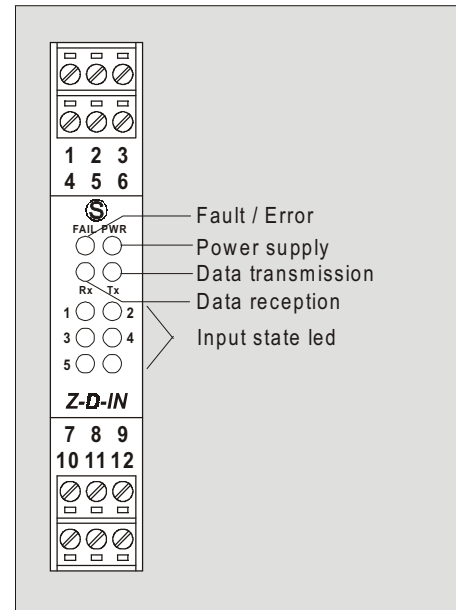
Used for interfacing 5 digital signals for contact with all of the control systems which are able to communicate with the transmission protocol MODBUS RTU through the RS485 serial interface.

The system comprises 5 opto-isolated digital inputs with negative in common and self-powered at 24 Vcc and are protected by fast transient TVS of 600 W/ms suppressors.

A 16 bit counter is present for each input, the maximum input frequency is 100 Hz and it is possible to set one input as a fast counter with a maximum frequency of 10kHz. Furthermore, it is possible to insert an anti-rebound filter which is settable from 5 to 250 ms.

The wiring of the power supply and serial bus is facilitated by the use of a support bus that can be lodged within the DIN guide. Such a system also allows for hot swapping, that is, the insertion and extraction of the module from the bus without the interruption of the communication nor the power supply to the remaining part of the system.

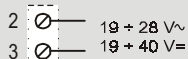
Frontal signalling LEDs for: presence of power supply, anomaly, state of the 5 inputs, reception/transmission of data.



### TECHNICAL DATA

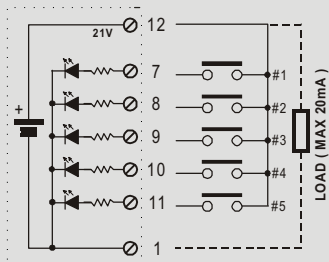
- Power supply : 19 - 40 Vcc / 19 - 28 Vca - 50/60 Hz, power consumption max. 2,5W
- Input galvanised separation / the remaining circuits are at low voltage : 1500 Vac
- Interface : serial RS485 2 wire with settable velocity : 4800, 9600, 19200, 38400, 57600 baud
- Communication protocol : MODBUS RTU
- Communication time : < 10 ms (@ 38400 baud)
- Connection distance : up to 1200 m
- Inputs : 5 opto-isolated type inputs for REED, PROXIMITY PNP, NPN, clean contact, etc..
- Input protections : by means of transient TVS suppressors of 600 W/ms
- *For further information make reference to page 2.*

**POWER SUPPLY**

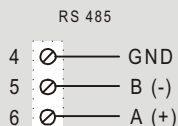


Power voltage must be in a range from 19 to 40 Vdc (indifferent polarity), from 19 to 28 Vac. **Upper limits must be exceeded, if it happen there could be damage for module.** It is necessary to protect power source from possible module's failure by fuse correctly dimensioned.

**INPUTS**



**SERIAL INTERFACE**



**BUS SUPPORT DIN TYPE**

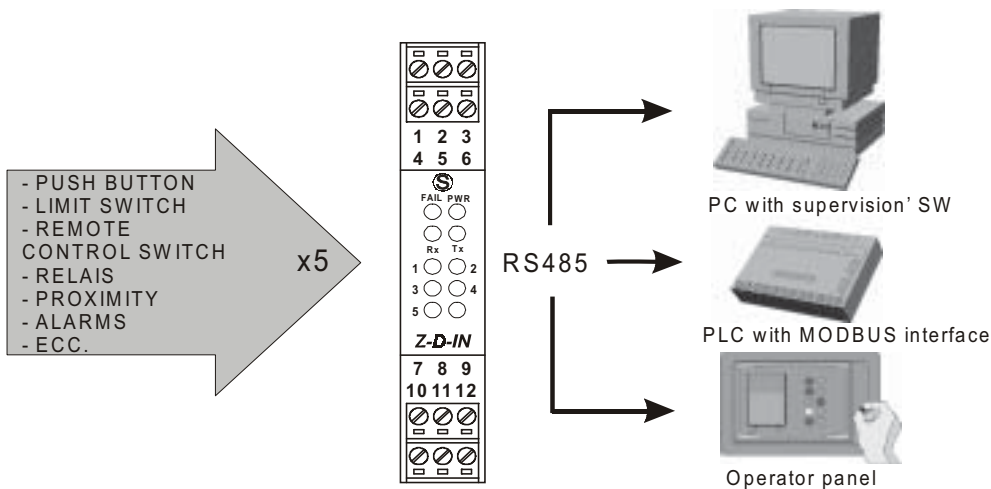
The connection, for serial interface and feed of the module, is also situated on the connector on the instrument bottom.

This connector allows the connectin by bus through the support that must be installed in the DIN guide.

**PROGRAMMING**

All of the settings of the module, such as the type of input, setting of the digital filters, velocity of the serial interface, address of the module, etc. can be configured by means of the appropriate Z-PROG software.

**EXAMPLES**



# Z-PC Line

## Z-D-IN

### Modbus Module 5 Digital Inputs

# Installation Manual

- Contents:**
- General Specifications
  - Technical Specifications
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  - Digital inputs
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## General Specifications

- 5 digital inputs with self-powered 16 VDC shared negative pole.
- Removable terminals with section of 2,5 mm<sup>2</sup>
- 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.
- 1500V<sub>ac</sub> 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 <sub>i</sub> (state OFF)	0 ..10 V <sub>dc</sub> , I < 2 mA
U <sub>i</sub> (state ON)	12 ..30 V <sub>dc</sub> , I > 3 mA
Absorbed Current	3 mA (for each input)

POWER SUPPLY	
Voltage	10 ..40 V <sub>dc</sub> 19 ..28 V <sub>ac</sub> 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 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	
Dimensioni	L: 100 mm; H: 112 mm; W: 17,5 mm
Contenitore	PBT, colore nero

ISOLATIONS	STANDARDS
1500 V <sub>ac</sub> a tre punti: 	<b>The module complies with the following standards:</b>  <b>EN61000-6-4/2002-10</b> (electromagnetic emission, industrial environment). <b>EN61000-6-2/2006-10</b> (electromagnetic immunity, industrial environment). <b>EN61010-1/2001</b> (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 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 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**

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.

**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 (see Scheme 1) as a function of the Baud Rate.

Bus lenght	Drop lenght
1200 m	2 m

**Scheme 1**

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
00xxxxxxx	9600	xx00001xx	# 1	xxxxxxx0	Disable
01xxxxxxx	19200	xx000010xx	# 2	xxxxxxx1	Enable
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 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 On	Error settings. Fault/Failure.
RX	Blinking On	Received data from RS485. Verify the connection.
TX	Blinking On	Received data from RS485. Verify the connection.

## Factory settings

**All DIP-switch OFF:**

- Modbus Protocol / - Communication parameters: 38400 8,N,1 Aadr. 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](http://www.seneca.it)).  
For more information about a list of all register and their function consult the USER manual.

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