# INSTALLATION MANUAL

# Z-5DI-2DO

**Module: 5 digital inputs, 2 relay outputs, modbus communication on RS485/USB**




ISO 9001:2008

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Manuals and configuration software are available at website:
www.seneca.it/products/z-5di-2do

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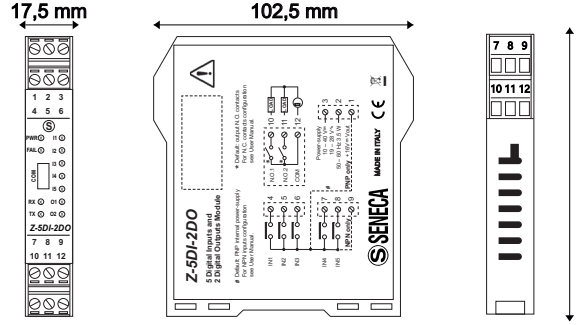


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## GENERAL SPECIFICATIONS

- 5 opto-insulated digital inputs with a common contact. Internal or external, NPN or PNO selectable by software.
- Insulation of the 1500 Vac inputs complying with respect to the remaining low voltage circuits.
- 2 SPST relay outputs with common contact, capacity of 2 $A_{AC1}$ 250 Vac.
- 3 kVac insulation between the outputs and the remaining low voltage circuits.
- Inputs with 32 bit totalizers.
- Measure of the period, frequency, TON, TOFF.
- Possibility to set the totalizers for counting forward or backward
- All the totalizers are saved in a non-volatile memory (Fe-RAM).
- RS485 serial communication with Modbus-Rtu protocol, 64 nodes maximum (without repeater). Configurable also via dip-switch.
- Communication times shorter than 10 ms (@ 38400 Baud).
- Connection distance up to 1200 m.
- Removable connectors section 2.5 mm
- Easy wiring of power supply and serial connection by means of a bus which can be housed in the IEC EN 60715 guide.
- Module can be fitted on and removed from bus without interrupting communication or power supply to the system.

## MODULE LAYOUT




| | |
|---|---|
| **Dimension (L×H×W)** | 17,5 x 102,5 x 111 mm |
| **Weight** | 140 g. |
| **Case** | Material PA6, Black color. |


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## LEDS SIGNALS

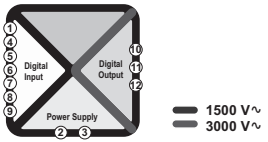
| LED | State | Meaning of the LEDS |
|---|---|---|
| PWR (Green) | On<br>Blinking | Power supply present<br>The device in powered off |
| FAIL (Yellow) | Blinking<br>On | Settings error<br>Faul/Failure |
| RX (Red) | Blinking<br>On | Data from RS485 received<br>Check the connection. |
| TX (Red) | Blinking<br>On | Data to RS485 received<br>Check the connection |

## TECHNICAL SPECIFICATION

**STANDARDS**

**EN61000-6-4** Electromagnetic emission, industrial environment
**EN61000-6-2** Electromagnetic immunity, industrial environment
**EN61010-1** Safety

**INSULATION**




**ENVIRONMENTAL COND.**

| | |
|---|---|
| *Temperature* | -20 – +70°C |
| *Humidity* | 30% – 90% not condensing |
| *Altitude* | Up to 2000 m a.s.l. |
| *Storage temperature* | -20 – + 85°C |
| *Protection degree* | IP20 |

**MOUNTING** IEC EN 60715 Rail

**CONNECTIONS**

Removable 3-way screw terminals, 5,08 mm pitch
Rear IDC10 connector for CEI EN60715 rail
Micro USB frontal panel connector.
**Note: The USB socket ISN'T insulated from the inputs.**


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## TECHNICAL SPECIFICATIONS

**POWER SUPPLY**

| | |
|---|---|
| *Voltage* | 10 – 40 V⎓ o 19 – 28 V∿ a 50 – 60 Hz |
| *Power Absorbed* | Max: 3,5 W |

**INPUTS**

| | |
|---|---|
| Input type | Reed, Contact, Proximity PNP, NPN. |
| Number of Channels | 5 configurable to PNP or NPN |
| Transition Level | OFF < 6 V, On > 9 V (max 24 V ⎓) |
| Maximun Frequency | 5 Khz |
| Current consumption | 3,5 mA @ 10 V ⎓; 10 mA @ 24 V ⎓ |
| Voltage for input power supply | 16 V ± 10% |

**OUTPUTS**

| | |
|---|---|
| Outputs | SPST relay outputs with common contacts, capacity 2 $A_{AC1}$ 250 Vac. |
| Number of Channels | 2 |
| Operate/release time delay | 5/2 ms |

## PRELIMINARY WARNINGS



**Before performing any operation is mandatory to read the full contents of this manual.** The module may only be used by qualified and skilled technicians in the field of electric installation. Specific documentation is available for download at website: www.seneca.it/products/z-8ntc.



Only the Manufacturer is authorized to repair the module or to replace damaged parts. The product is susceptible to electrostatic discharge, take appropriate countermeasures during any operation.



No warranty is granted in connection with faults resulting from improper use, from modifications or repairs carried out by Manufacturer-unauthorized personnel on the device, or if the content of this user Manual is not followed.



**It is forbidden to place anything that could obstruct the ventilation slits.**
**It is forbidden to install the module near heat sources.**



Severe operating conditions: -Powersupply > 30 V⎓, Powersupply > 26 V∿ and the module power the input sensor. **Separate the module at least 5 mm** away from the other devices installed side by side if the module operate with:
- The operating temperature > 40°C and one of the severe operating condition exists.
- The operating temperature > 35°C and two of the severe operating conditions exist.



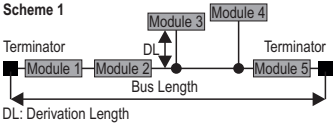
Disposal of electrical & electronic equipment (applicable throughout the EU and other countries with separate collection programs). The symbol found on this product or on its packaging, indicates that this product it must be handed over to an authorised collection point for **the recycling of electrical and electronic equipments.**


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## MODBUS CONNECTION STANDARDS

1) Install the modules on the IEC EN 60715 rail.
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).

**Scheme 1**




DL: Derivation Length

**• MODBUS Scheme 1**

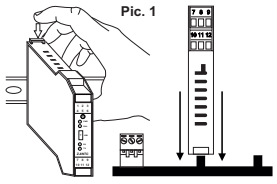
| Bus length | Derivation Length | Baudrate |
|---|---|---|
| 1200 m | 2 m | 115kbps |

In order to obtain maximum performances it's recommended to use a specific shielded cable, as an example BELDEN 9841.

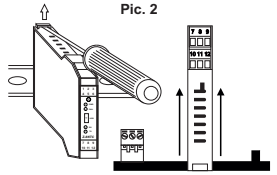
## INSTALLATION RULES

In order to ensure optimum performance and a longest working life, the module(s) must be provided with adequate ventilation and no raceways or other objects that obstruct the ventilation slots.
Never install the modules near heat sources.
We recommend installation in the lower part of the control panel.

## INSTALLATION ON AND REMOVAL FROM IEC EN 60715 RAIL




**Insertion on the IEC EN 60715 rail:**
1) Move the two hooks on the back of the module outwards as illustrated in **Pic.2**.
2) Insert the module rear IDC10 connector into a free slot of DIN rail accessory as you can see in **Pic.1**.
(the insertion is one way only because the connectors are polarized).
3) To secure the module to the IEC EN 60715 rail, tighten the two hooks on the side of the IDC10 rear connector as shown in **Pic.1**.

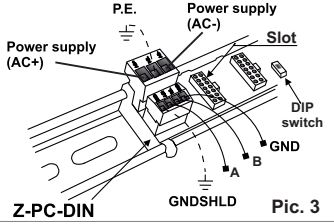



**Removal from IEC EN 60715 rail:**
As shown in **Pic.2**:
1) Move outwards the two hooks on the side of the module, with the help of a screwdriver.
2) Extract the module from the IEC EN 60715 rail.

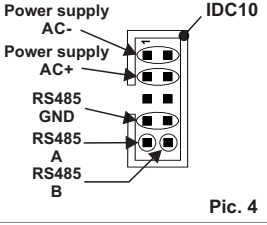

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## USE OF Z-PC-DINAL ACCESSORY

**Don't turn upside down** the module and **don't force the insertion** of the IDC10 connector into the Z-PC-DIN bus. The IDC10 connector located on the rear of the module will be inserted on a free slot of Z-PC-DIN accessory. In the figure you can see the meaning of the various pins of the rear IDC10 connector if you want to provide the signals directly through this connector. The pictures **Pic.3** and **Pic.4** show how to connect powersupply and RS485 COM1 port to the rear IDC10 connector.



Pic. 3



Pic. 4

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 signal inside the connection cables from electromagnetic disturbances (recommended).

## ELECTRICAL CONNECTIONS

**• POWER SUPPLY**

19 – 28V∿ 50 – 60 Hz
10 – 40V⎓ 0.6 W Max




Connect the IDC10 rear connector to provide power supply to module.
The supply voltage must be between:
10 and 40V⎓ (any polarity), or between 19 and 28 V∿.
**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 of max. 2.5 A must be installed in the power supply line near the device.

**• RS485**



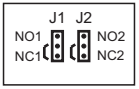

Connection for RS485 communication with the Modbus master system through Z-PC-DINAL2-17.5 accessory.
Note: the indication of the RS485 connection polarity is not standardised and in some masters may be inverted


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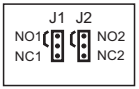
## ELECTRICAL CONNECTION

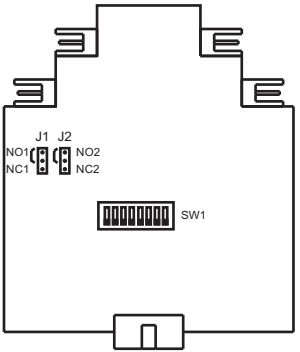
Sensors REED, PROXIMITY PNP, NPN, contact, can be connected to the input terminals. The power supply to these sensors can be obtained directly from the Z-D-IO Module (factory configuration),or it can be externally supplied.

NORMALLY CLOSE

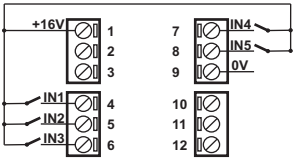


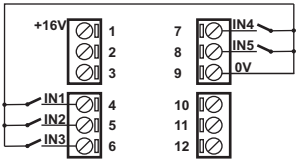

NORMALLY OPEN



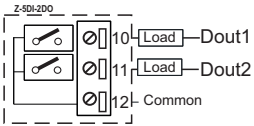




## INTERNAL POWER SUPPLY, PNP CONNECTION, NPN CONNECTION




## DIGITAL OUTPUT




The relay outputs can be configured to use the NO contact (factory configuration), or the NC contact. To modify the output configuration it is necessary move the J1 and J2 jumper.

## MODBUS REGISTERS

Detailed information about the list of MODBUS registers and their functions can be found within the **USER MANUAL**.

## CONFIGURATIONS

The **EASY SETUP** configuration software, allows the parameter setting.
This software is available for free on the Internet site: www.seneca.com.
Some parameters can also be set using **DIP-switches.**


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## CONFIGURATIONS

**• DIP-SWITCHES**

**Before setting the DIP switches, in order to avoid damage to the module, you must disconnect the power supply.** The DIP-switches position defines the Modbus Address and Baud Rate communication parameters. In the following table the Baud Rate and Address values are listed as a function of the DIP-switches position:

| SW1 | BAUD RATE | SW1 | ADDRESS | SW1 | TERMINATOR |
|---|---|---|---|---|---|
| 1 2 | | 3 4 5 6 7 8 | | 9 10 | |
| ⬇⬇ | 9600 | ⬇⬇⬇⬇⬇⬆ | # 1 | x ⬇ | DISABLED |
| ⬇⬆ | 19200 | ⬇⬇⬇⬇⬆⬇ | # 2 | x ⬆ | ENABLED |
| ⬆⬇ | 38400 | . . . . . | #. . | ⬆ | ON |
| ⬆⬆ | 57600 | ⬆⬆⬆⬆⬆⬆ | # 63 | ⬇ | OFF |
| ⬇⬇ | FROM EEPROM | ⬇⬇⬇⬇⬇⬇ | FROM EEPROM | X | Not Used |

**Note**: If switches from 1 to 8 are in OFF position, communication settings are retrieved from EEPROM.
**2nd Note:** The termination of the RS485 line must be carried out only at the ends of the communication line.

## FACTORY SETTINGS

**• DEFAULT CONDITION FOR THE CONFIGURATION PARAMETERS OF THE MODULE:**

**All DIP-switches at OFF position ⬇**

| | |
|---|---|
| RS485 MODBUS protocol comunication parameters: | 38400 8,N,1 Addr. 1 |

For any variation of the parameters are available in the download area of the website: www.seneca.it Z-NET and EASY-Z-PC communication software.
For more information about the list of registers and their functions, see the USER manual.

## CONTACTS

| | |
|---|---|
| Technical support | support@seneca.it |
| Product Informations | sales@seneca.it |


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