# USER MANUAL

## Z-5DI2-DO

**5 DIGITAL INPUT/COUNTERS AND 2 DIGITAL RELAYS OUTPUT WITH USB / RS485 PORT AND MODBUS RTU PROTOCOL**


CE

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**ORIGINAL INSTRUCTIONS**

## Introduction

Contents of the present documentation refer to products and technologies described in it.
All technical data contained in the document may be modified without prior notice.
Content of this documentation is subject to periodical revision.
To use the product safely and effectively, read carefully the following instructions before use.
The product must be used only for the use for which it was designed and built: any other use must be considered with full responsibility of the user.
The installation, programming and set-up is allowed only to authorized operators, physically and intellectually suitable.
Set up shall be performed only after a correct installation and the user shall perform every operation described in the installation manual carefully.
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Technical features subject to change without notice.

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## Document revisions

| DATE | REVISION | NOTES |
|---|---|---|
| 11/05/2018 | 1.0.0.0 | First Release |
| 14/12/2018 | 1.0.0.1 | Fix Connection Images<br>Minor Fix |
| | | |
| | | |
| | | |

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# 1. DEVICE DESCRIPTION AND INTENDED USE

**WARNING!**

**This User Manual extend the information from the Installation Manual about the device configuration. Use the Installation Manual for more info.**

**WARNING!**

**Under any circumstances, SENECA s.r.l. or its suppliers shall not be responsible for loss of recording data/incomes or for consequential or incidental damage due to neglect or reckless mishandling of the device, even though SENECA is well aware of these possible damages.**
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## 1.1. Description

The Z-5DI-2DO module acquires 5 single-ended digital signals, then converts them to a digital format (IN 1-5 state). Nr 2 Relays Output are also available and can be written from Modbus RTU Protol.
The supported communication protocol is Modbus RTU.
The following counters are available:
5 counters at 32 bits in non-volatile memory (Fe-RAM memory for infinite writing)
5 Frequency/Ton/Toff/Period
A RS485 port with a standard Modus RTU protocol is also available.

## 1.2. Features

- NR 5 opto-insulation digital inputs with a common contact. Internal or external, NPN (sink) or PNP (source) selectable by software.
- Insulation of the 1500 Vac inputs complying with respect to the remaining low voltage circuits.
- NR 2 SPST relay outputs with common contact, capacity of 2 AAC1 250 Vac.
- 3 kVac insulation between the outputs and the remaining low voltage circuits.
- Inputs with 32 bit totalizers, max frequency 5 KHz.
- Measure of the period, frequency, TON, TOFF. Max frequency 5KHz.
- Possibility to set the totalizers for counting forward or backward
- All the totalizers are saved in a non-volatile memory (Fe-RAM).

- RS485 and USB serial communication with Modbus-Rtu protocol, RS485 with 64 nodes maximum (without repeater). Configurable also via dip-switch.
- Communication times shorter than 10 ms (@ 38400 Baud).
- Connection distance up to 1200 m.
- Facilitated wiring of power supply and serial connection by means of a bus which can be housed in the DIN guide.
- Module can be fitted on and removed from bus without interrupting communication or power supply to the system.
- Input Counters IN1-IN5 can be filtered
- Free Easy Setup software for configuration
- Baud rate for Modbus RTU: from 2400 baud up to 115200 baud
- Quick installation on DIN 46277 rail

Refer to the installation manual for more information.

## 1.3. Technical specifications

| GENERAL SPECIFICATIONS | |
|---|---|
| **Power supply** | 10 ..40 VDC<br>19 ..28 VAC a 50 ..60 Hz |
| **Consumption max** | 3.5 W |

| BOX | |
|---|---|
| **Dimensions** | L: 100 mm; H: 112 mm; W: 17.5 mm |
| **Box, protection degree** | Black, PA6, IP20 |

| CONNECTIONS | |
|---|---|
| **Connections** | Removable 3-way screw terminals, 5.8 mm pitch |
| | Rear IDC10 connector for DIN 46277 rail |

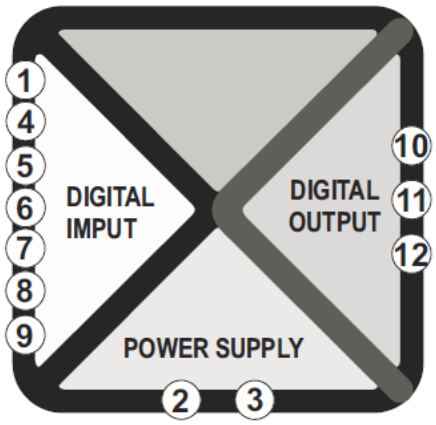
| USB COMMUNICATION PORT | |
|---|---|
| **Number** | 1 |
| **Protocol** | Modbus RTU Slave |
| **Serial / Protocol Parameters** | Fixed: 38400 baud, 8 bit data, parity None, 1 stop bit,<br>Modbus Station Address 1 |
| **Drivers** | Virtual com port for Windows ™, Linux, MAC OS, Windows CE |

| RS485 COMMUNICATION PORT | |
|---|---|
| **Number** | 1 |
| **Protocol** | Modbus RTU Slave |
| **Serial / Protocol Parameters** | Baud Rate 2400..115200 configurable, 8 bit data, parity OFF/EVEN/ODD, 1 or 2 stop bit, Modbus Station address configurable |

| ENVIRONMENTAL CONDITIONS | |
|---|---|
| **Temperature** | -20°C ÷ +65°C |
| **Humidity** | 30 ÷ 90% no condensing |
| **Storage temperature** | -30°C ÷ +85°C |
| **Altitude** | Up to 2000 m a.s.l. |

| REFERENCE STANDARDS | |
|---|---|
| **EN 61000-6-4** | Emission, industrial environmental |
| **EN 61000-6-2** | Immunity, industrial environmental |
| **EN 61010-1** | Safety |

## ISOLATIONS




1500 V~
3000 V~

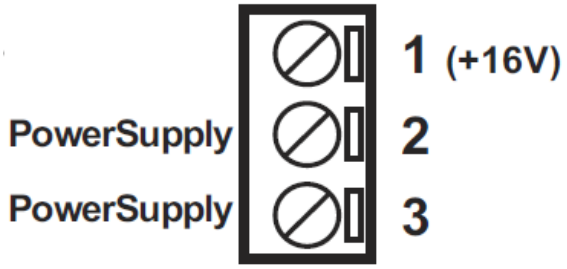
Refer to the installation manual for more information.

# 2. CONNECTION

## 2.1. POWER SUPPLY

Connect power supply to 2-3 with the following ranges:

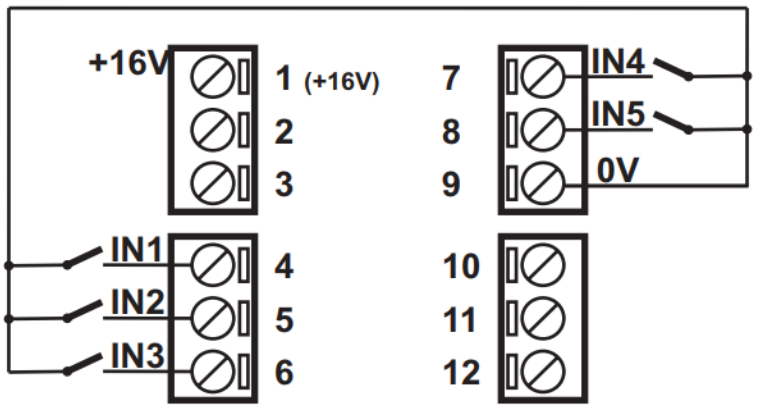
10 ..40 for VDC
19 ..28 for VAC at 50 ..60 Hz



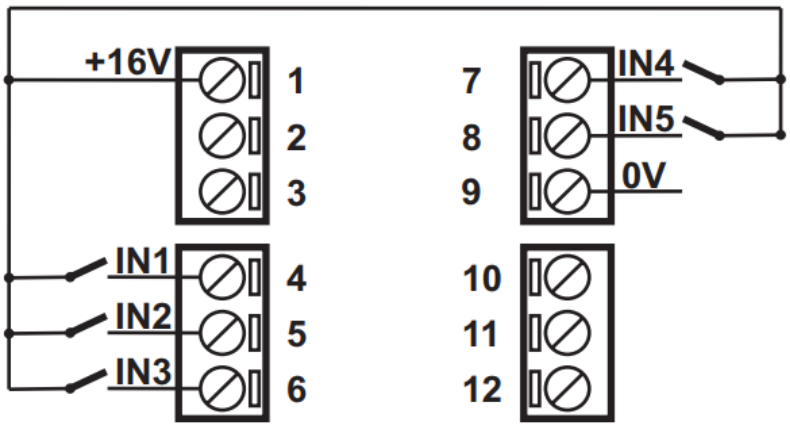

## 2.2. DIGITAL INPUTS

The inputs can be configured in NPN (sink) or PNP (source) mode:

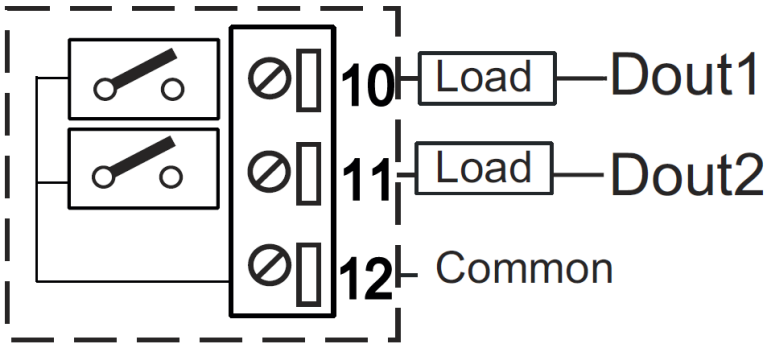
### 2.2.1. NPN (Sink) Inputs connection



### 2.2.2. PNP (Source) Inputs connection




## 2.3. DIGITAL OUTPUTS

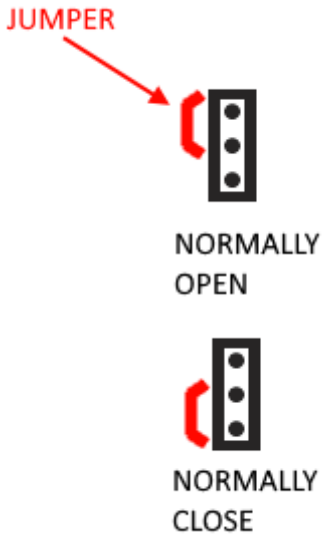


# 3. OUTPUTS CONFIGURATION

## 3.1. Configure Outputs in N.O. or N.C.

For configure the outputs in Normally Open or Normally Close mode use the J1, J2 jampers:

J1 controls the Output1 and J2 the Output2, for obtain a N.O. / N.C. configuration the jamper must be connected in this way:



# 4. DIP SWITCH CONFIGURATION (SW1)

The dip switches can be used for configure the Baud Rate and the Modbus Station Address.
DIP 1 and 2 are used for the RS485 port baud rate
DIP 3 to 8 are used for the RS485 port modbus station address
DIP 9 is not used
DIP 10 is used for insert a R-C terminal in the RS485 port

## 4.1. Loading configuration for RS485 port from flash

If ALL Dip Switch 1…8 are OFF, the device use the Flash configuration (you must use the Easy Setup Software for configure the Modbus parameters)

| *Load RS485 port Configuration* | *DIP1* | *DIP2* | *DIP3* | *DIP4* | *DIP5* | *DIP6* | *DIP7* | *DIP8* |
|---|---|---|---|---|---|---|---|---|
| FROM FLASH | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF |

**WARNING!**

**Dip switches configuration are active only after a reboot!**

**WARNING!**

**The Dip Switch setting will overwrite the Flash setting so, if you need to use the flash configuration you MUST set ALL dip switches to "OFF".**

## 4.2. Setting the RS485 Port Baud rate

Dip Switch 1 and 2 are used for setting the Baud Rate

| *Baud Rate* | *DIP1* | *DIP2* |
|---|---|---|
| 9600 | OFF | OFF |
| 19200 | OFF | ON |
| 38400 | ON | OFF |
| 57600 | ON | ON |

**WARNING!**

**The Parity bit and the Stop bits can not be configured with the dip switches configuration but only from the Easy Setup software. By setting the dip switches the parity is always set to "None" and the Stop Bits to 1: (8,N,1).**

## 4.3. Setting the RS485 Port Modbus Station Address

Dip Switch 3 to 8 are used for configure the RS485 Port Station Address using the binary convention:

| *Modbus Station Address* | *DIP3* | *DIP4* | *DIP5* | *DIP6* | *DIP7* | *DIP8* |
|---|---|---|---|---|---|---|
| 1 | OFF | OFF | OFF | OFF | OFF | ON |
| 2 | OFF | OFF | OFF | OFF | ON | OFF |
| 3 | OFF | OFF | OFF | OFF | ON | ON |
| 4 | OFF | OFF | OFF | ON | OFF | OFF |
| 5 | OFF | OFF | OFF | ON | OFF | ON |
| 6 | OFF | OFF | OFF | ON | ON | OFF |
| 7 | OFF | OFF | OFF | ON | ON | ON |
| 8 | OFF | OFF | ON | OFF | OFF | OFF |
| 9 | OFF | OFF | ON | OFF | OFF | ON |
| 10 | OFF | OFF | ON | OFF | ON | OFF |
| 11 | OFF | OFF | ON | OFF | ON | ON |
| 12 | OFF | OFF | ON | ON | OFF | OFF |
| 13 | OFF | OFF | ON | ON | OFF | ON |
| 14 | OFF | OFF | ON | ON | ON | OFF |
| 15 | OFF | OFF | ON | ON | ON | ON |
| … | … | … | … | … | … | … |
| 63 | ON | ON | ON | ON | ON | ON |

## 4.4. Setting the RS485 TERMINATOR

The dip switch 10 insert the R-C Terminator:

| *Terminator* | *DIP9* | *DIP10* |
|---|---|---|
| OFF | Not Used | OFF |
| ON | Not Used | ON |

# 5. USB PORT

The USB port use the following fixed configuration:

Protocol: Modbus RTU Slave
Modbus Station Address: 1
Baud rate: 38400 baud
Data Bit: 8
Parity: None
Stop Bits: 1

**WARNING!**

**The USB Port configuration is fixed and is not affected by dip switches or flash configuration**

**WARNING!**

**When the USB port is connected the RS485 Port is deactivated.**
**When the USB Port is disconnected the RS485 Port is activated.**
**So is not possible to use the RS485 Port simultaneously with the USB Port**

## 5.1. USB Virtual COM Port Drivers

The Windows Drivers is included in the Easy Setup, drivers for others operating systems the drivers can be downloaded from:

http://www.ftdichip.com/Drivers/VCP.htm

# 6. MODBUS RTU PROTOCOL

The Modbus protocol supported by the Z-5DI-2DO by RS485 and USB ports is:

- Modbus RTU Slave

For more information about these protocols, please refer to the Modbus specification website:

http://www.modbus.org/specs.php.

## 6.1. Modbus RTU function code supported

The following Modbus RTU functions are supported:

- Read Holding Register (function code 3) Max 28 Registers
- Write Single Register (function code 6)
- Write Multiple registers (function code 16) Max 10 Registers
- Read Coil Registers (function code 1) Max 7 Registers
- Write Single Coil (function code 5)
- Read Inputs (function code 2) Max 7 Registers

**WARNING!**

**All 32 bit values are stored into 2 consecutive registers**

**WARNING!**

**You can Read a Maximum of 28 Modbus Registers with the Read Holding Register function (function code 3)**

**WARNING!**

**You can Write a Maximum of 10 Modbus Registers with the Write Multiple Register function (function code 16)**

# 7. MODBUS REGISTERS TABLE

In the following table this abbreviations are used:

| |
|---|
| MS = Most significant |
| LS = Less significant |
| MSW = Most significant Word (16 bits) |
| LSW = Less significant Word (16 bits) |
| R = Read only register |
| RW = Read and writeable register |
| RW* = Read and writeable register, the value can be stored in flash by using the store flash command |
| Unsigned 16 bits = Unsigned 16 bits register (from 0 to 65535) |
| Signed 16 bits = 16 bits register with sign (from -32768 to +32767) |
| Float 32 bits = Floating point single precision 32 bits (IEEE 754) register |
| 0x = Hexadecimal Value |

## 7.1. Bit Position Convention in the Holding Registers:

One Holding Register is composed by 16 bits with the following convention:

| BIT 15 | BIT 14 | BIT 13 | BIT 12 | BIT 11 | BIT 10 | BIT 9 | BIT 8 | BIT 7 | BIT 6 | BIT 5 | BIT 4 | BIT 3 | BIT 2 | BIT 1 | BIT 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

For example, if the register value in decimal is
12300
the 12300 value in hexadecimal is:
0x300C
the 0x300C hexadecimal in binary value is:
0011 0000 0000 1100
So, using the Bit convention we obtain:

| BIT 15 | BIT 14 | BIT 13 | BIT 12 | BIT 11 | BIT 10 | BIT 9 | BIT 8 | BIT 7 | BIT 6 | BIT 5 | BIT 4 | BIT 3 | BIT 2 | BIT 1 | BIT 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |

## 7.2. Modbus Holding Registers Addresses (function code 3):

| Register Name | Comment | Register Type | R/W | Default value or Start Value | Modbus Address | Register Offset |
|---|---|---|---|---|---|---|
| **Machine ID** | Module ID code | Unsigned 16 bits | R | - | 40001 | 0 |
| **Firmware Revision** | Firmware Revision Code | Unsigned 16 bits | R | - | 40002 | 1 |
| **AUX 4** | Registro parametri per Command | Unsigned 16 bits | R/W | - | 40003 | 2 |
| **AUX 3** | Registro parametri per Command | Unsigned 16 bits | R/W | - | 40004 | 3 |
| **AUX 2** | Registro parametri per Command | Unsigned 16 bits | R/W | - | 40005 | 4 |
| **AUX 1** | Registro parametri per Command | Unsigned 16 bits | R/W | - | 40006 | 5 |
| **Command** | This register is used for sending commands to the device.<br>The following commands are supported:<br><br>49600<br>Store configuration in Flash<br><br>49568<br>Reset the Module<br><br>49601<br>Load Default parameters<br><br>After the command is executed the register | Unsigned 16 bits | R/W | 0 | 40007 | 6 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | will return to 0 value | | | | | |
| **Fail Config** | Bit 0 = 0 Outputs Fail Control Disabled<br>Bit 0 = 1 Outputs Fail Control Enabled<br><br>Bit 1 = Output1 value in fail ( 0 = not excited, 1 = excited)<br><br>Bit 2 = Output2 value in fail ( 0 = not excited, 1 = excited)<br><br>Bit 3 .. Bit 15 Not used | Unsigned 16 bits | R/W* | 0 | 40008 | 7 |
| **Fail Delay [seconds]** | Number of seconds after that, if there is not Modbus communication, the outputs go in fail mode.<br>From 1 to 250 seconds | Unsigned 16 bits | R/W* | 30 | 40009 | 8 |
| **Serial/Din Config** | Bit 0..Bit 5 Not used<br><br>Bit 6 = 0 Parity Disabled<br>Bit 6 = 1 Parity Enabled<br><br>Bit 7 = 0 Parity Odd<br>Bit 7 = 1 Parity Even<br><br>Bit 8 = 0 1 Stop Bit<br>Bit 8 = 1 2 Stop Bit<br><br>Bit 9…Bit 14 Not Used<br><br>Bit 15 = 0 Din in PNP (Source) mode<br>Bit 15 = 1 Din in NPN (Sink) mode | Unsigned 16 bits | R/W* | 0 | 40010 | 9 |
| **Modbus Station Address** | Modbus RTU station address | Unsigned 16 bits | RW* | 1 | 40011 | 10 |
| **Baud Rate** | RS485 Port Baud | Unsigned | RW* | 3 | 40012 | 11 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | rate<br><br>0 = 4800 baud<br>1 = 9600 baud<br>2 = 19200 baud<br>3 = 38400 baud<br>4 = 57600 baud<br>5 = 115200 baud<br>6 = 2400 baud | 16 bits | | | | |
| **Counters/Measures Filter [ms*10]** | Filter to be used for Counters / Period / Frequency / TON / TOFF<br><br>cutoff frequency [Hz] =10000/Filter Value<br><br>For example:<br>200 means:<br><br>Freq cut= 10000/200 = 50 Hz<br><br>Values from 0 (filter Disabled) to 250 | Unsigned 16 bits | RW* | 0 | 40013 | 12 |
| **Up/Down Counter** | Bit 0 = 0 Counter 1 in upcounter mode<br>Bit 0 = 1 Counter 1 in downcounter mode<br><br>Bit 1 = 0 Counter 2 in upcounter mode<br>Bit 1 = 1 Counter 2 in downcounter mode<br><br>Bit 2 = 0 Counter 3 in upcounter mode<br>Bit 2 = 1 Counter 3 in downcounter mode<br><br>Bit 3 = 0 Counter 4 in upcounter mode<br>Bit 3 = 1 Counter 4 in downcounter mode<br><br>Bit 4 = 0 Counter 5 in upcounter mode<br>Bit 4 = 1 Counter 5 in | Unsigned 16 bits | RW* | 0 | 40014 | 13 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | downcounter mode | | | | | |
| **Inputs Value / Output Fail** | Bit 0 = 0 input 1 Low<br>Bit 0 = 1 input 1 High<br><br>Bit 1 = 0 input 2 Low<br>Bit 1 = 1 input 2 High<br><br>Bit 2 = 0 input 3 Low<br>Bit 2 = 1 input 3 High<br><br>Bit 3 = 0 input 4 Low<br>Bit 3 = 1 input 4 High<br><br>Bit 4 = 0 input 5 Low<br>Bit 4 = 1 input 5 High<br><br>Bit 5..6 Not Used<br><br>Bit 7 = 0 Outputs Status OK<br><br>Bit 7 = 0 Outputs Status FAIL | Unsigned 16 bits | R | 0 | 40015 | 14 |
| **Outputs Value** | Bit 0 = 0 Output Relay 1 not excited<br><br>Bit 0 = 1 Output Relay 1 excited<br><br>Bit 1 = 0 Output Relay 2 not excited<br><br>Bit 1 = 1 Output Relay 2 excited | Unsigned 16 bits | R/W | 0 | 40016 | 15 |
| **Counter 1 Value** | Input 1 Counter Value | Unsigned 32 bits | R/W (Backupped in FeRAM memory) | 0 | 40101 MSW<br>40102 LSW | 100 MSW<br>101 LSW |
| **Counter 2 Value** | Input 2 Counter Value | Unsigned 32 bits | R/W (Backupped in FeRAM memory) | 0 | 40103 MSW<br>40104 LSW | 102 MSW<br>103 LSW |
| **Counter 3 Value** | Input 3 Counter Value | Unsigned 32 bits | R/W (Backupped in FeRAM memory) | 0 | 40105 MSW<br>40106 LSW | 104 MSW<br>105 LSW |
| **Counter 4 Value** | Input 4 Counter | Unsigned | R/W | 0 | 40107 | 106 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Value | 32 bits | (Backupped in FeRAM memory) | | MSW 40108 LSW | MSW 107 LSW |
| **Counter 5 Value** | Input 5 Counter Value | Unsigned 32 bits | R/W (Backupped in FeRAM memory) | 0 | 40109 MSW 40110 LSW | 108 MSW 109 LSW |
| **Period 1** | Input 1 Period [*100 us] (for example 10 = 1ms) | Unsigned 16 bits | R | 0 | 40121 | 120 |
| **Period 2** | Input 2 Period [*100 us] (for example 10 = 1ms) | Unsigned 16 bits | R | 0 | 40122 | 121 |
| **Period 3** | Input 3 Period [*100 us] (for example 10 = 1ms) | Unsigned 16 bits | R | 0 | 40123 | 122 |
| **Period 4** | Input 4 Period [*100 us] (for example 10 = 1ms) | Unsigned 16 bits | R | 0 | 40124 | 123 |
| **Period 5** | Input 5 Period [*100 us] (for example 10 = 1ms) | Unsigned 16 bits | R | 0 | 40125 | 124 |
| **Frequency 1** | Input 1 Frequency [Hz] | Unsigned 16 bits | R | 0 | 40131 | 130 |
| **Frequency 2** | Input 2 Frequency [Hz] | Unsigned 16 bits | R | 0 | 40132 | 131 |
| **Frequency 3** | Input 3 Frequency [Hz] | Unsigned 16 bits | R | 0 | 40133 | 132 |
| **Frequency 4** | Input 4 Frequency [Hz] | Unsigned 16 bits | R | 0 | 40134 | 133 |
| **Frequency 5** | Input 5 Frequency [Hz] | Unsigned 16 bits | R | 0 | 40135 | 134 |
| **T high 1** | Input 1 Ton [*100 us] (for example 10 = 1ms) | Unsigned 16 bits | R | 0 | 40141 | 140 |
| **T high 2** | Input 2 Ton [*100 us] (for example 10 = 1ms) | Unsigned 16 bits | R | 0 | 40142 | 141 |
| **T high 3** | Input 3 Ton [*100 us] (for example 10 = | Unsigned 16 bits | R | 0 | 40143 | 142 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 1ms) | | | | | |
| **T high 4** | Input 4 Ton [*100 us] (for example 10 = 1ms) | Unsigned 16 bits | R | 0 | 40144 | 143 |
| **T high 5** | Input 5 Ton [*100 us] (for example 10 = 1ms) | Unsigned 16 bits | R | 0 | 40145 | 144 |
| **T low 1** | Input 1 Toff [*100 us] (for example 10 = 1ms) | Unsigned 16 bits | R | 0 | 40151 | 150 |
| **T low 2** | Input 2 Toff [*100 us] (for example 10 = 1ms) | Unsigned 16 bits | R | 0 | 40152 | 151 |
| **T low 3** | Input 3 Toff [*100 us] (for example 10 = 1ms) | Unsigned 16 bits | R | 0 | 40153 | 152 |
| **T low 4** | Input 4 Toff [*100 us] (for example 10 = 1ms) | Unsigned 16 bits | R | 0 | 40154 | 153 |
| **T low 5** | Input 5 Toff [*100 us] (for example 10 = 1ms) | Unsigned 16 bits | R | 0 | 40155 | 154 |

## 7.3. Modbus Coil Registers Addresses (function code 1):

| Register Name | Comment | Register Type | R/W | Default value or Start Value | Modbus Address | Register Offset |
|---|---|---|---|---|---|---|
| **Input 1** | Input 1 Value | Bit | R | 0 | 1 | 0 |
| **Input 2** | Input 2 Value | Bit | R | 0 | 2 | 1 |
| **Input 3** | Input 3 Value | Bit | R | 0 | 3 | 2 |
| **Input 4** | Input 4 Value | Bit | R | 0 | 4 | 3 |
| **Input 5** | Input 5 Value | Bit | R | 0 | 5 | 4 |
| **Output 1** | Output 1 Value | Bit | R/W | 0 | 6 | 5 |
| **Output 2** | Output 2 Value | Bit | R/W | 0 | 7 | 6 |

## 7.4. Modbus Input Registers (read only) Addresses (function code 2):

| Register Name | Comment | Register Type | R/W | Default value or Start Value | Modbus Address | Register Offset |
|---|---|---|---|---|---|---|
| **Input 1** | Input 1 Value | Bit | R | 0 | 10001 | 0 |
| **Input 2** | Input 2 Value | Bit | R | 0 | 10002 | 1 |
| **Input 3** | Input 3 Value | Bit | R | 0 | 10003 | 2 |
| **Input 4** | Input 4 Value | Bit | R | 0 | 10004 | 3 |
| **Input 5** | Input 5 Value | Bit | R | 0 | 10005 | 4 |
| **Output 1** | Output 1 Value | Bit | R | 0 | 10006 | 5 |
| **Output 2** | Output 2 Value | Bit | R | 0 | 10007 | 6 |

# 8. FULL CONFIGURATION WITH EASY SETUP

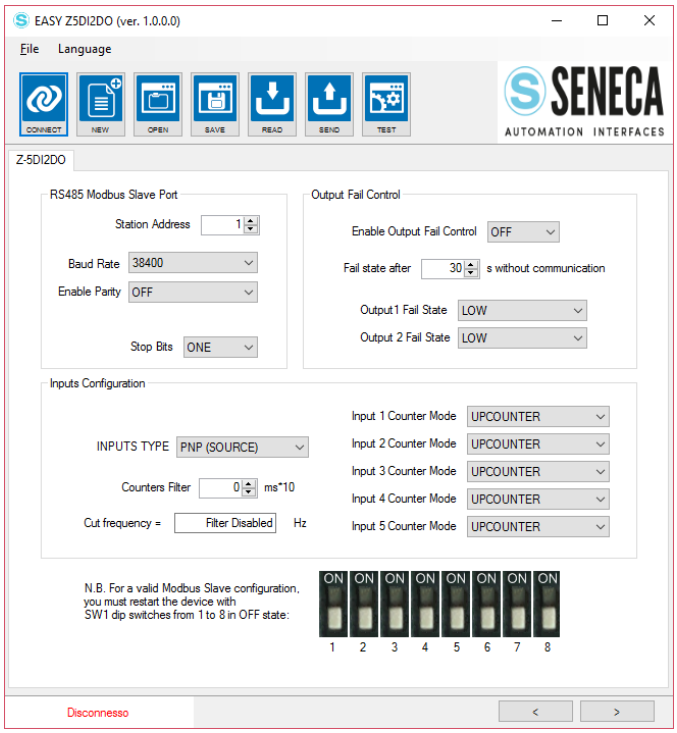
For configure all the device parameters you must use the RS485 Port and the Easy Z-5DI-2DO software included in the Easy Setup Suite.
You can download the Easy Setup software for free from:

www.seneca.it

## 8.1. Easy Setup Menu


***Connect***: Use the connect icon for connect the PC to the Device.
***New:*** Load the default parameters in the actual project
***Open:*** Open a stored project
***Save:*** Save the actual project
***Read:*** Read the actual configuration from the device (if the dip switches are not ALL OFF the configuration is read from dip switches)
***Send:*** Send the project configuration (if the dip switches are NOT ALL OFF the device use the dip switch configuration and NOT the sent configuration)
***Test:*** Start a Registers read, open the Datalogger or send command to the device

## 8.2. Creating a Project Configuration




**WARNING!**

**You must set all dip switches to OFF before sending the configuration to the device or the actual configuration will be overwritten from the dip switches configuration!**

The parameters that can be configured are:

### *RS485 MODBUS SLAVE PORT*

***Station Address:*** Select The Modbus RTU station address for the RS485 Port
***Baud Rate:*** Select the Baud rate from 2400 to 115200 baud for the RS485 Port
***Enable Parity:*** Select between Enable or Disable if Enable you must select ODD or Even Parity for the RS485 Port.
***Stop Bits:*** Select 1 or 2 stop bits.

### *OUTPUT FAIL CONTROL*

***Enable Output Fail control:*** Select between OFF or ON. If ON the Master must periodically request or write a device register or the outputs will pass to the “output fail state”.

***Fail state after:*** Number of seconds of communication silence after the outputs will enter in the "Outputs Fail State"
***Output 1/2 fail state:*** Select the output fail state for relay 1 and 2.

For example if the configuration is:

-Output fail control set to "ON"
-Fail state after set to 30 seconds
-Output Fail State 1 = Output Fail State 2 = HIGH

If the Master is not functional, after 30 seconds without a Modbus request to the device the Relays 1 and 2 will switch to "excited" and the yellow led "Fail" will go on . The first communication to the device will cause the exit from the "Outputs Fail State" and the "Fail" led will go off, the outputs are loaded with the previous value.

### *INPUTS CONFIGURATIONS*

***Inputs Type:*** Select between NPN (Sink) or PNP (Source). See chapter 2.2 for more info.
***Counter Filter:*** Select the filter to be applied to all the 5 Counters. Insert the value in steps of 10ms.

The Filter is a low pass filter with cut frequency that can be calculated with this formula:

$$Fcut\ [Hz] = \frac{10000}{Counter\ Filter}$$

So, for example, Counter Filter = 50 then Fcut = 200 Hz.

If Counter Filter = 0 the Filter is disabled.

***Input Counter Mode:*** Select between UPCOUNTER or DOWNCOUNTER.

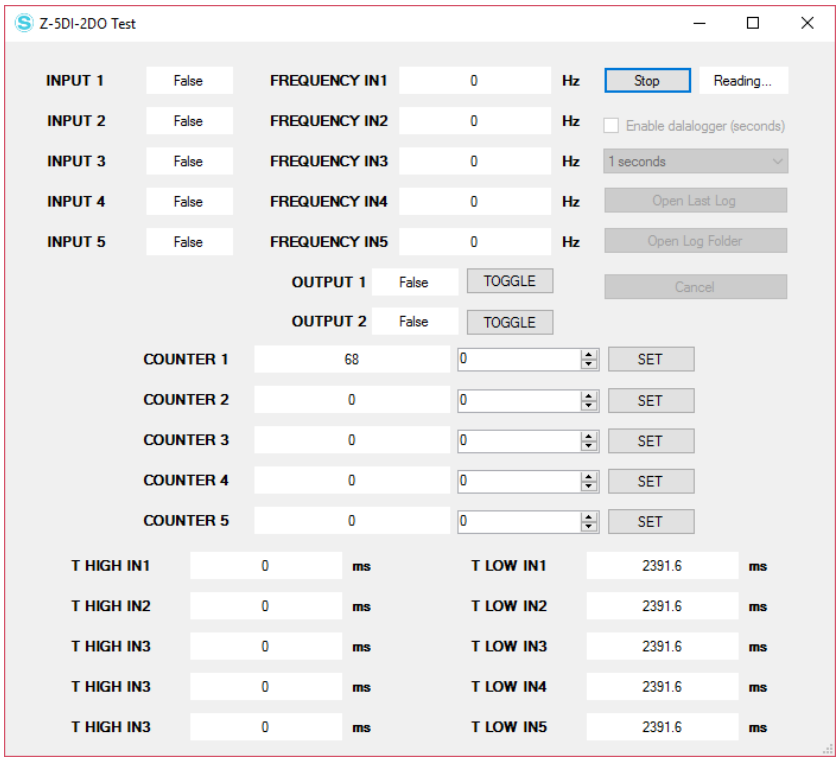
**WARNING!**

**If the counter is set in "Upcounter" when reach the 4294967295 (that means $2^{32} - 1$) a pulse to the counter will bring the value to 0**

**If the counter is set in "Downcounter" and the value is 0 then a pulse will bring the value to 4294967295 (that means $2^{32} - 1$)**

## 8.3. Testing the Device

When the configuration is sent to the device you can test the actual configuration by using the  icon:




The test configuration will acquire the measure from the Modbus registers, you can also command the outputs and set counters to a value.

### 8.3.1. The datalogger

The datalogger can be used for acquire data that can be used with an external software (for example Microsoft Excel ™). It is possible to set how much time to acquire the samples (minimum 1 second).
The datalogger will create a file in a standard .csv format that can be open also with Microsoft Excel ™.