# USER MANUAL

## R-32DIDO-P

## R-32DIDO

### MULTIPROTOCOL INDUSTRIAL ETHERNET I/O MODULE

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**ORIGINAL INSTRUCTIONS**

# Introduction

The content of this documentation refers to products and technologies described in it.
All technical data contained in the document may be changed without notice.
The content of this documentation is subject to periodic review.
To use the product safely and effectively, read the following instructions carefully before use.
The product must be used only for the use for which it was designed and manufactured: any other use is under the full responsibility of the user.
Installation, programming and set-up are allowed only to authorized, physically and intellectually suitable operators.
Set-up must be performed only after correct installation and the user must follow all the operations described in the installation manual carefully.
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# 1. INTRODUCTION

**ATTENTION!**

**This user manual extends the information from the installation manual to the configuration of the device. Use the installation manual for more information.**

**In any case, SENECA s.r.l. or its suppliers will not be responsible for the loss of data/revenue or consequential or incidental damages due to negligence or bad/improper management of the device, even if SENECA is well aware of these possible damages.**
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## 1.1. DESCRIPTION

The R series is based on devices equipped with two Ethernet switch ports that allow a chain connection to the next Ethernet device (daisy chain), so expensive industrial Ethernet switches are not required and wiring is simplified.
The hardware present in the devices allows the internal switch to work even if the device is faulty or not powered for up to 4 days (LAN function with bypass in case of failure).
Another important function is the possibility of copying inputs on remote outputs of R series products without the aid of a master device (peer 2 peer function) (only for R-32DIDO version).

| Model | Description | Communication protocols |
|---|---|---|
| R-32DIDO | Remote Ethernet I/O with 2 Ethernet ports and<br>32 digital Inputs/outputs<br>32 counters (32 bit, Max frequency 50 Hz) | Modbus TCP-IP<br>Modbus RTU<br>Seneca P2P I/O Mirror with broadcast (UDP based) |
| R-32DIDO-P | Remote Ethernet I/O with 2 Ethernet ports and<br>32 digital Inputs/outputs | Profinet IO |

## 1.2. COMMUNICATION PORT SPECIFICATIONS

| ETHERNET COMMUNICATION PORTS | |
|---|---|
| **Number** | 2 |
| **Type** | 100 Mbits |
| **Configuration** | Switch |

| RS485 COMMUNICATION PORTS (ONLY R-32DIDO MODEL) | |
|---|---|
| **Number** | 1 |
| **Baudrate** | From 1200 to 115200 bit/s configurable |
| **Parity, Data bit, Stop bit** | Configurable |
| **Protocol** | Can be configured between<br>Modbus RTU Slave or<br>Modbus TCP-IP to Modbus RTU passtrough |

| USB COMMUNICATION PORT (ONLY R-32DIDO MODEL) | |
|---|---|
| **Number** | 1 |
| **Communication parameters** | 115200 bit/s, 8 bits, No parity, 1 stop bit, station address 1 |
| **Protocol** | Modbus RTU Slave |

| R-32DIDO COMMUNICATION PROTOCOLS SUPPORTED | |
|---|---|
| **Modbus RTU** | From RS485 and USB port |
| **Modbus TCP-IP** | From Ethernet 1 and 2 |
| **Seneca IO Mirror** | From Ethernet 1 and 2 |

| R-32DIDO-P COMMUNICATION PROTOCOLS SUPPORTED | |
|---|---|
| **Profinet IO** | From Ethernet 1 and 2 |

# 2. CONNECTION OF THE DEVICES TO A NETWORK (ONLY R-32DIDO MODEL)

## 2.1. CONNECTION OF THE DEVICE TO A NETWORK

The factory configuration of the IP address is:

***Static address: 192.168.90.101***

Therefore, multiple devices must not be inserted on the same network with the same static IP.
If you want to connect multiple devices on the same network, you need to change the IP address configuration using the Easy Setup 2 software.

***DO NOT CONNECT 2 OR MORE FACTORY-CONFIGURED DEVICES ON THE SAME NETWORK, OR THE ETHERNET INTERFACE WILL NOT WORK (192.168.90.101 IP ADDRESS CONFLICT)***

If the addressing mode with DHCP is activated and an IP address is not received within 1 minute, the device will set an IP address with a fixed error:

169.254.x.y

Where x.y are the last two values of the MAC ADDRESS.
This way it is possible to install more I/O of the R series and then configure the IP with the Easy Setup 2 software even on networks without a DHCP server.

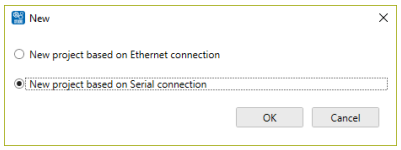
## 2.2. USING EASY SETUP 2 TO CONFIGURE DEVICES

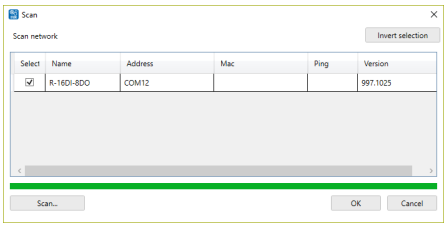
The Easy Setup 2 software allows:

- Configuring R series devices via the USB port
- Searching and configuring Seneca R-series devices on an Ethernet network

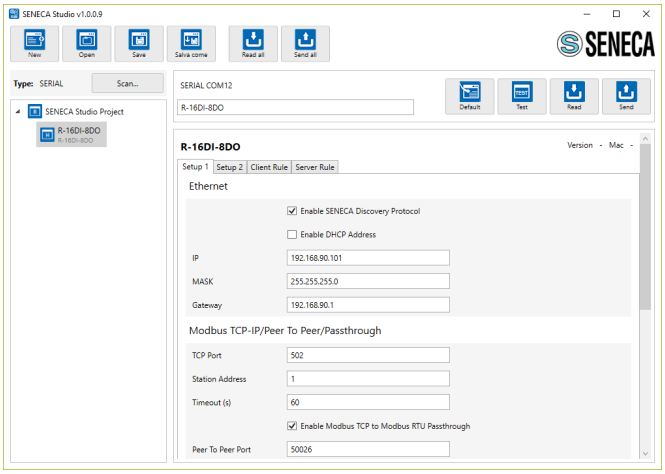
In the case of a first installation we recommend following these steps:

1) Install the Easy Setup 2 software
2) Power and connect the device to the PC via the USB port






3) Configure the device with the IP address and the desired configuration




4) Install the device

If many devices are installed using the USB port:

1) Power and connect the device to the PC via the USB port
2) Configure the automatic address via DHCP from the search window
3) Install all the devices in the network
4) If there is no DHCP server in the network, after 1 minute the devices will set a fail IP address (see chapter 2.1)
5) Wait for all the device STS LEDs to be on steady.
6) At this point, using Easy Setup 2, create a new Ethernet project and find all the devices with the "search" button, then reconfigure the devices with the most appropriate work addresses.

In case of many devices using the Ethernet port:

1) Power and connect the first device to the PC via the Ethernet port
2) Perform the search
3) Change the address of the device with IP 192.168.90.101 from the search window
4) Connect the second device in Daisy Chain, search and return to step 2) until all devices are configured

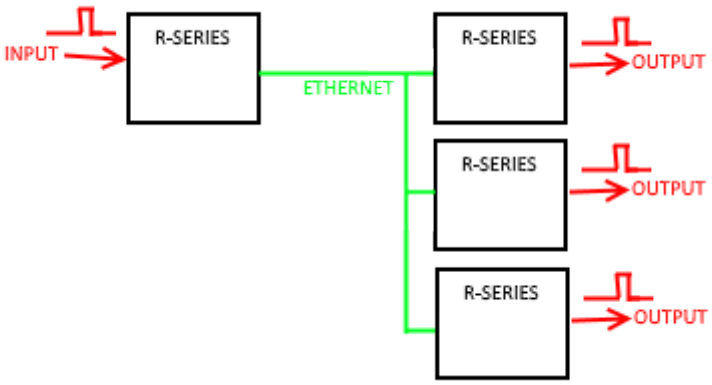
The search software included in Easy Setup 2 works at Ethernet Layer 2 level (through the Seneca Discovery protocol) and it is therefore not necessary to have an Ethernet configuration compatible with the device you are looking for to change its IP. For the general configuration of the device it is necessary to have compatible configuration.

## 3. I/O COPY USING THE PEER TO PEER FUNCTION WITHOUT WIRING (ONLY R-32DIDO MODEL)

The "R" series devices can be used to copy and update in real time an input channel on a remote output channel without the aid of a master controller.

For example, a digital input can be copied to a remote digital output device:


Note that no controller is required because the communication is managed directly by the R series devices.
It is possible to make a more sophisticated connection, for example it is possible to copy the inputs to different R-series remote devices (from Device 1 Input 1 to Device 2 Output1, Device 1 Input 2 to Device 3 Output 1 etc ...)
It is also possible to copy an input to an output of multiple remote devices:

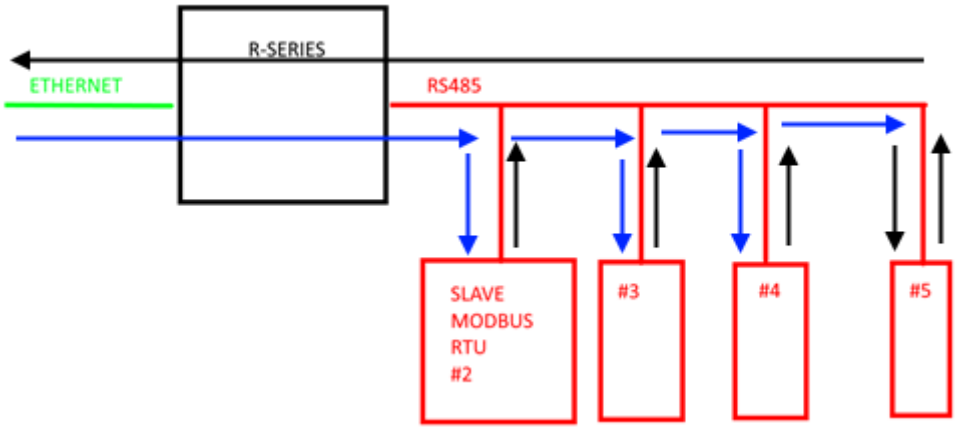



Each R-series device can send and receive a maximum of 32 inputs.

For further information, see chapter 5.2.4.

# 4. MODBUS PASSTHROUGH (ONLY R-32DIDO MODEL)

Thanks to the Modbus Passthrough function it is possible to extend the amount of I/O available in the device via the RS485 port and the Modbus RTU slave protocol, for example by using the Seneca Z-PC series products.
In this mode the RS485 port stops working as Modbus RTU slave and the device becomes a Modbus TCP-IP gateway to Modbus RTU serial:




Each Modbus TCP-IP request with station address other than that of the R series device is converted into a serial packet on the RS485 and, in the case of a reply, it is turned over to TCP-IP.
Therefore, it is no longer necessary to purchase gateways to extend the I/O number or to connect already available Modbus RTU I/O.

# 5. WEBSERVER (ONLY R-32DIDO MODEL)

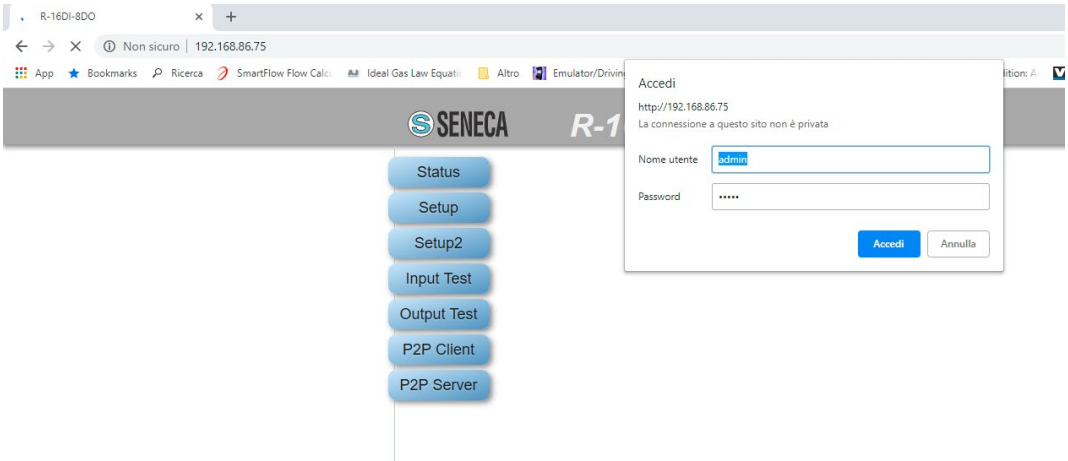
## 5.1. ACCESS TO THE WEB SERVER

Access to the web server takes place using a web browser and entering the IP address of the device.
To find out the IP address of the device, use the "search" function of the “Easy Setup 2" software (see chapter 10).

On first access the user name and password will be requested.
The default values are:

User Name: admin
Password: admin

**AFTER THE FIRST ACCESS CHANGE USER NAME AND PASSWORD IN ORDER TO PREVENT ACCESS TO THE DEVICE TO UNAUTHORIZED PEOPLE.**




**IF THE PARAMETERS TO ACCESS THE WEB SERVER HAVE BEEN LOST, IT IS NECESSARY TO RESET THE FACTORY-SET CONFIGURATION (SEE CHAPTER 7)**

## 5.2. DEVICE CONFIGURATION

To configure the device, access the web server and select the section you are interested in.
After a modification to the configuration has been made, the changes must be confirmed with the "***APPLY***" button and the device will restart autonomously.
The ***Reboot*** button reboots the device (not necessary in the event of a configuration change).
The ***Default*** button returns all the page parameters to the default settings.

### 5.2.1. SETUP SECTION

***DHCP (ETH) (default: Disabled)***
Sets the DHCP client to get an IP address automatically.

***IP ADDRESS STATIC (ETH)* (default: 192.168.90.101*)**
Sets the device static address. Careful not to enter devices with the same IP address into the same network.

***IP MASK STATIC (ETH) (default: 255.255.255.0)***
Sets the mask for the IP network.

***GATEWAY ADDRESS STATIC (ETH) (default: 192.168.90.1)***
Sets the gateway address.

***PROTECT CONFIGURATION (default: Disabled)***
Allows you to enable or disable password protection for reading and writing the configuration (including the IP address) using the Easy Setup 2 software or Seneca Discovery Tool. The password is the same one that allows accessing the web server.

**IF THE CONFIGURATION PROTECTION IS ENABLED IT WILL BE IMPOSSIBLE TO READ/WRITE THE CONFIGURATION OF THE DEVICE WITHOUT KNOWING THE PASSWORD.**
**IN THE EVENT OF LOSING THE PASSWORD IT WILL BE POSSIBLE TO RETURN THE DEVICE TO THE FACTORY CONFIGURATION (SEE CHAPTER 7)**

***MODBUS SERVER PORT (ETH) (default: 502)***
Sets the communication port for the Modbus TCP-IP server.

***MODBUS SERVER STATION ADDRESS (ETH) (default: 1)***
Active only if Modbus Passthrough is also active, it sets the station address of the modbus TCP-IP server.

**THE MODBUS SERVER WILL ANSWER ANY STATION ADDRESS ONLY IF THE MODBUS PASSTHROUGH MODE IS DISABLED.**

***MODBUS PASSTHROUGH (ETH) (default: disabled)***
Sets the conversion mode from Modbus TCP-IP to Modbus RTU serial (see chapter 4).

***MODBUS TCP-IP CONNECTION TIMEOUT [sec] (ETH) (default: 60)***
Sets the TCP-IP connection timeout for the Modbus TCP-IP server and Passthrough modes.

***P2P SERVER PORT (default: 50026)***
Sets the communication port for the P2P server.

***WEB SERVER USER NAME (default: admin)***
Sets the user name to access the web server.

***CONFIGURATION/WEB SERVER PASSWORD (default: admin)***
Sets the password to access the web server and to read/write the configuration (if enabled).

***WEB SERVER PORT (default: 80)***
Sets the communication port for the web server.

***BAUDRATE MODBUS RTU (SER) (default: 38400 baud)***
Sets the baud rate for the RS485 communication port.

***DATA MODBUS RTU (SER) (default: 8 bit)***
Sets the number of bits for the RS485 communication port.

***PARITY MODBUS RTU (SER) (default: None)***
Sets the parity for the RS485 communication port.

***STOP BIT MODBUS RTU (SER) (default: 1 bit)***
Sets the number of stop bits for the RS485 communication port.

***MODBUS PASSTHROUGH SERIAL TIMEOUT (default: 100ms)***
Active only if passthrough mode is activated, sets the maximum waiting time before sending a new packet from TCP-IP to the serial port. It must be set according to the longest response time of all the devices present on the RS485 serial port.

**THE USB PORT CONFIGURATION PARAMETERS CANNOT BE MODIFIED AND ARE BAUDRATE: 115200**
**DATA: 8 BIT**
**PARITY: NONE**
**STOP BIT: 1**
**MODBUS RTU PROTOCOL**

### 5.2.2. DIGITAL I/O SETUP SECTION

This section allows the configuration of the digital I/Os present in the device.

***DIGITAL I/O MODE (default Input)***

Selects whether the selected input will work as an input or output.

***DIGITAL INPUT NORMALLY HIGH/LOW (default Normally Low)***

If selected as digital input, it configures whether the input is normally high or low.

***DIGITAL OUTPUT NORMALLY STATE (default Normally Open)***

If selected as digital output, it configures whether the output is normally open or closed.

***DIGITAL OUTPUT WATCHDOG (default Disabled)***

If selected as digital output, it sets the output watchdog mode.
If “Disabled”, it disables the watchdog function for the selected output.
If "Enabled on Modbus Communication" the output goes into "Watchdog state" if there has been no generic Modbus communication within the set time.
If "Enabled on Modbus Digital Output Writing" the output goes into "Watchdog state" if there has been no writing of the output within the set time.

***DIGITAL OUTPUT WATCHDOG STATE (default Open)***

Sets the value that the digital output must adopt if the watchdog has been triggered.

***DIGITAL OUTPUT WATCHDOG TIMEOUT [s] (default 100s)***

Represents the watchdog time of the digital output in seconds.

### 5.2.3. SETUP COUNTERS SECTION

***COUNTERS FILTER [ms] (default 0)***

Sets the value in [ms] for filtering all the counters connected to the inputs.

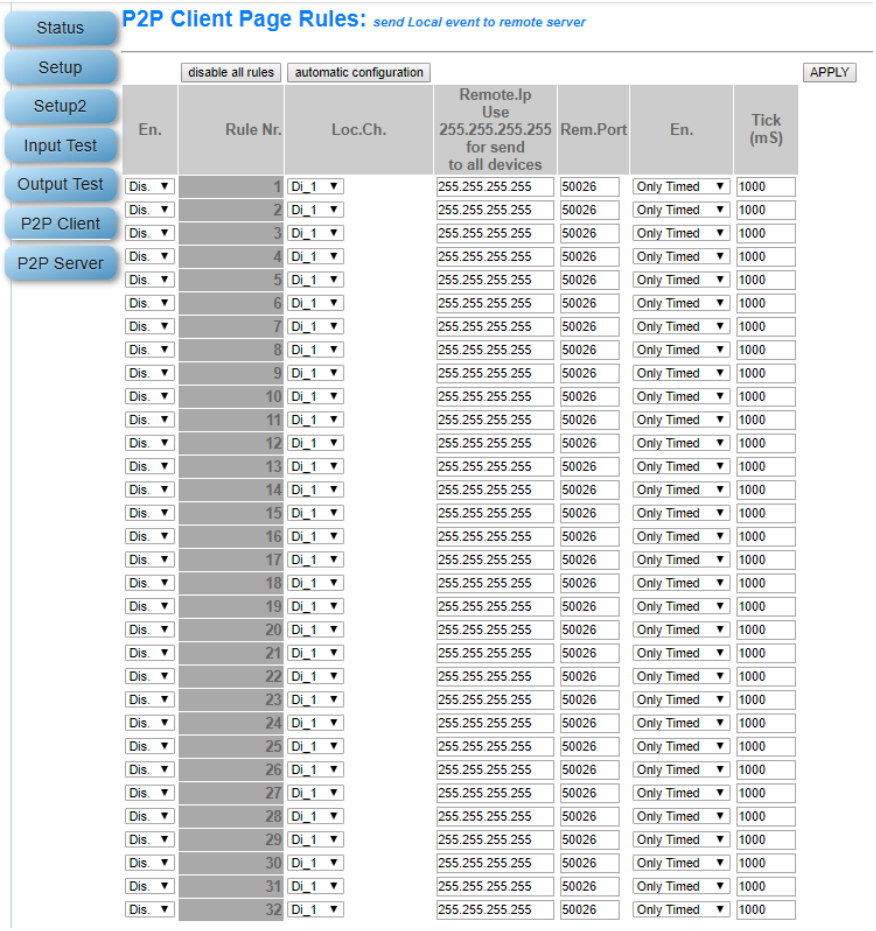
### 5.2.4. P2P CONFIGURATION

In the P2P Client section it is possible to define which local events to send to one or more remote devices. This way it is possible to send the status of the inputs to the remote outputs and obtain the input-output replication without wiring. It is also possible to send the same input to several outputs simultaneously.

In the P2P Server section it is instead possible to define which inputs must be copied to the outputs.

The "***Disable all rules***" button places all the rules in a disabled status (default).
The "***APPLY***" button allows you to confirm and then save the set rules in the non-volatile memory.

### 5.2.4.1. P2P CLIENT SECTION




The "***Automatic configuration***" button allows you to prepare the rules for sending all the inputs available in the device in use.

***En.***

Selects whether the copy rule is active or not.

***Loc. Ch.***

Selects the status of which channel should be sent to the remote device(s).

***Remote IP***

Selects the IP address of the remote device to which the status of that input channel is to be sent.

If the channel has to be sent simultaneously to all the devices (broadcast), enter the broadcast address (255.255.255.255) as the IP address.

***Remote Port***

Selects the communication port for sending the status of the inputs. It must coincide with the ***P2P SERVER PORT*** parameter of the remote device.

***En***

Selects operation in "Only Timed" or "Timed+Event" mode.
In "Only Timed" mode, the status of the inputs is sent on each "tick [ms]" and then refreshed continuously (cyclic sending).
In the “Timed+Event” mode, the status of the inputs is sent to a digital event (change of status).

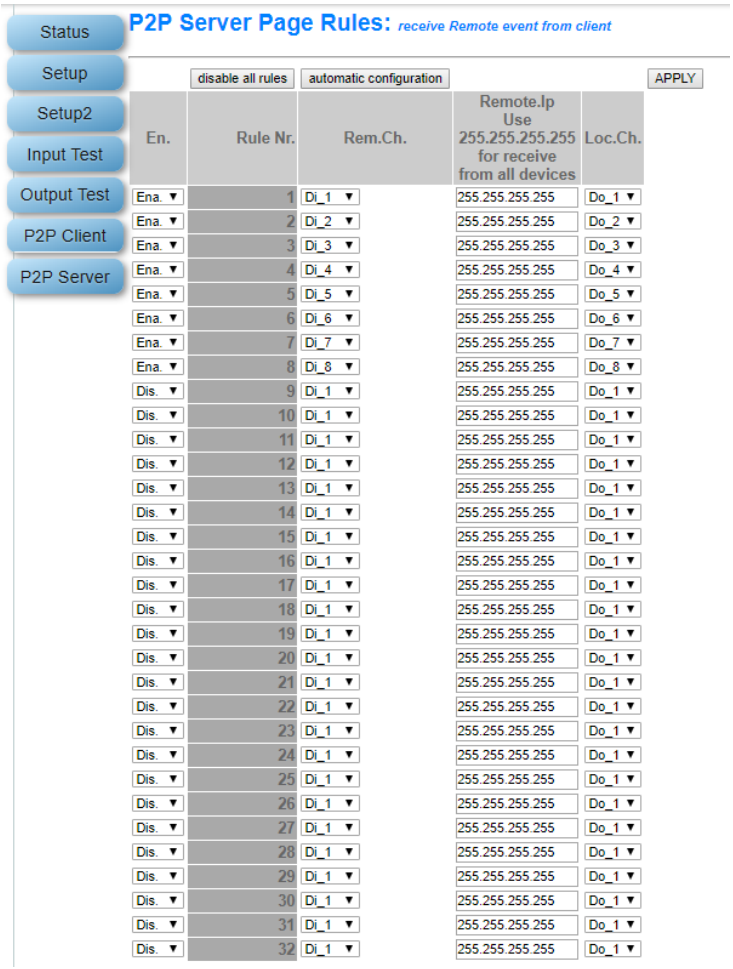
***Tick [ms]***

Sets the cyclical sending time of the input status.

**IN CASE OF ENABLED WATCHDOG OF DIGITAL OUTPUTS THE RULE'S TICK TIME MUST BE LOWER THAN THE WATCHDOG TIMEOUT SET**

***IT IS ALSO POSSIBLE TO COPY SOME I/O OF THE SAME DEVICE (FOR EXAMPLE, COPY THE I01 INPUT TO D01) BY ENTERING THE IP OF THE DEVICE AS REMOTE IP***

### 5.2.4.2. P2P SERVER SECTION




| En. | Rule Nr. | Rem.Ch. | Remote.Ip Use 255.255.255.255 for receive from all devices | Loc.Ch. |
|---|---|---|---|---|
| Ena. | 1 | Di_1 | 255.255.255.255 | Do_1 |
| Ena. | 2 | Di_2 | 255.255.255.255 | Do_2 |
| Ena. | 3 | Di_3 | 255.255.255.255 | Do_3 |
| Ena. | 4 | Di_4 | 255.255.255.255 | Do_4 |
| Ena. | 5 | Di_5 | 255.255.255.255 | Do_5 |
| Ena. | 6 | Di_6 | 255.255.255.255 | Do_6 |
| Ena. | 7 | Di_7 | 255.255.255.255 | Do_7 |
| Ena. | 8 | Di_8 | 255.255.255.255 | Do_8 |
| Dis. | 9 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 10 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 11 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 12 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 13 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 14 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 15 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 16 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 17 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 18 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 19 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 20 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 21 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 22 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 23 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 24 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 25 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 26 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 27 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 28 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 29 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 30 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 31 | Di_1 | 255.255.255.255 | Do_1 |
| Dis. | 32 | Di_1 | 255.255.255.255 | Do_1 |

The "***Automatic configuration***" button allows you to prepare the rules to receive all the inputs on the outputs of the device in use.

***En.***

Selects whether the copy rule is active or not.

***Rem. Ch.***

Selects the status of which remote channel should be received by the local device.

***Remote IP***

Selects the IP address of the remote device from which to receive the input status.

If the channel must be received simultaneously by all the devices (broadcast), enter the broadcast address (255.255.255.255) as the IP address.

***Loc. Ch.***

Selects the copy destination of the remote input value.

***IT IS ALSO POSSIBLE TO COPY SOME I/O OF THE SAME DEVICE (FOR EXAMPLE, COPY THE I01 INPUT TO D01) BY ENTERING THE IP OF THE DEVICE AS REMOTE IP. HOWEVER, THE ETHERNET PORT MUST BE CORRECTLY CONNECTED.***

### 5.2.4.3. P2P CONFIGURATION EXAMPLE

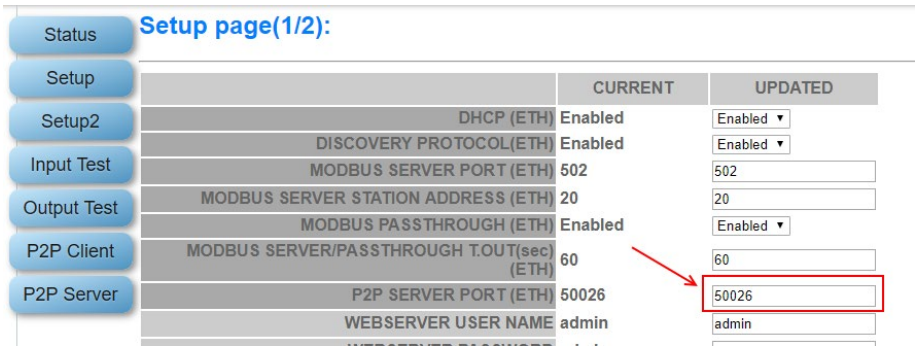
In the following example we have No.2 devices and we want to copy the status of digital input 1 of the first to the digital output of the second.
The IP address of Device 1 is 192.168.1.10
The IP address of Device 2 is 192.168.1.11

Let's move to device 1 with IP address 192.168.1.10 and select the sending of digital input 1 to the remote address 192.168.1.11 of device 2 this way:

DEVICE 1

| En. | Rule Nr. | Loc.Ch. | Remote.Ip Use 255.255.255.255 for send to all devices | Rem.Port | En. | Tick (mS) |
|---|---|---|---|---|---|---|
| Ena. | 1 | Di_1 | 192.168.1.11 | 50026 | Timed+Event | 1000 |

Now let's move on to device 2 and first configure the P2P server communication port on 50026:




And we now configure the P2P server, the channel to be received from 192.168.1.10 is Di_1 and must be copied to Do_1:

DEVICE 2

| En. | Rule Nr. | Rem.Ch. | Remote.Ip Use 255.255.255.255 for receive from all devices | Loc.Ch. |
|---|---|---|---|---|
| Ena. | 1 | Di_1 | 192.168.1.10 | Do_1 |

With this configuration, each time digital input 1 of device 1 (192.168.1.10) changes status, a packet will be sent to device 2 (192.168.1.11) which will copy it to digital output 1.
After 1 second, the same packet will be sent cyclically.

#### 5.2.4.4. P2P EXECUTION TIME

The switching time depends on the client device model and the server device model in addition to the congestion of the ethernet network.
For example, for the R-16DI8DO model, the switching time of the remote digital output as a response to an incoming event into another R-16DI8DO is about 20 ms (daisy chain connection of 2 devices, 1 set rule).
As regards the analogue models, the refresh time of the digital inputs/outputs and analogue inputs typical of the device must also be considered.

## 5.3. FW/CONFIGURATION UPDATE SECTION

The "***Configure***" section allows you to save or open a complete configuration of the device.
The "***Firmware***" section allows you to update the device firmware in order to obtain new functions.

**NOT TO DAMAGE THE DEVICE DO NOT REMOVE THE POWER SUPPLY DURING THE FIRMWARE UPDATE OPERATION.**

## 6. USB CONNECTION (R-32DIDO MODEL ONLY)

The front USB port allows a simple connection using the Modbus RTU slave protocol, the communication parameters for the USB port cannot be modified:

Baud rate: 115200
Address of the Modbus RTU station: 1
Data Bit: 8
Stop bit: 1

Drivers for Windows PC can be downloaded from the device's web page.
The drivers are anyway present in the installation of the "Easy Setup 2" software.

## 7. RESETTING THE DEVICE TO FACTORY CONFIGURATION

It is possible to reset the device to the factory configuration using the following procedure:

1) Remove the device back cover
2) With the device off, set dip switch SW3 dip 1 and 2 to ON
3) Power up the device and wait 10 seconds
4) Turn off the device
5) With the device off, set dip switch SW3 dip 1 and 2 to OFF
6) Power up the device
7) The device has now been reset to the factory configuration

# 8. SUPPORTED MODBUS COMMUNICATION PROTOCOLS (MODEL R-32DIDO ONLY)

The Modbus communication protocols supported are:

- Modbus RTU Slave (from the RS485 and USB ports)
- Modbus TCP-IP Server (from Ethernet ports) 8 clients max

For more information on these protocols, see the website:
http://www.modbus.org/specs.php.

## 8.1. SUPPORTED MODBUS FUNCTION CODES

The following Modbus functions are supported:

- Read Holding Register (function 3)
- Read Coil Status (function 1)
- Write Coil (function 5)
- Write Single Register (function 6)
- Write Multiple Registers (function 16)
- Read/Write Multiple Registers (function 23) (from firmware version 1035)

**All 32-bit values are contained in 2 consecutive registers**

**Any registers with RW* (in flash memory) can be written up to 10000 times**
**The PLC/Master Modbus programmer must not exceed this limit**

# 9. MODBUS REGISTER TABLE (R-32DIDO MODEL ONLY)

The following abbreviations are used in the register tables:

| |
|---|
| MS = More significant |
| LS = Less significant |
| MSW = 16 most significant bits |
| LSW = 16 least significant bits |
| RO = Register in read-only |
| RW = Read/write register |
| RW * = Register in reading and writing contained in flash memory, writable a maximum of 10000 times. |
| Unsigned 16 bit = unsigned integer register, can take values from 0 to 65535 |
| Signed 16 bit = signed integer register can take values from -32768 to +32767 |
| Float 32 bits = Single-precision floating point register with 32 bits (IEEE 754) https://en.wikipedia.org/wiki/IEEE_754 |
| BIT = Boolean registry, can be 0 (false) or 1 (true) |

## 9.1. R-32DIDO: MODBUS 4X HOLDING REGISTERS TABLE (FUNCTION CODE 3)

| ADDRESS (4x) | OFFSET (4x) | REGISTER | CHANNEL | DESCRIPTION | W/R | TYPE |
|---|---|---|---|---|---|---|
| **40001** | 0 | MACHINE-ID | - | Device identification | RO | UNSIGNED 16 BIT |
| **40002** | 1 | FW REVISION (Maior/Minor) | - | Fw Revision | RO | UNSIGNED 16 BIT |
| **40003** | 2 | FW REVISION (Fix/Build) | - | Fw Revision | RO | UNSIGNED 16 BIT |
| **40004** | 3 | FW CODE | - | Fw Code | RO | UNSIGNED 16 BIT |
| **40005** | 4 | RESERVED | - | - | RO | UNSIGNED 16 BIT |
| **40006** | 5 | RESERVED | - | - | RO | UNSIGNED 16 BIT |
| **40007** | 6 | BOARD-ID | - | Hw Revision | RO | UNSIGNED 16 BIT |
| **40008** | 7 | BOOT REVISION (Maior/Minor) | - | Bootloader Revision | RO | UNSIGNED 16 BIT |
| **40009** | 8 | BOOT REVISION (Fix/Build) | - | Bootloader Revision | RO | UNSIGNED 16 BIT |
| **40010** | 9 | RESERVED | - | - | RO | UNSIGNED 16 BIT |
| **40011** | 10 | RESERVED | - | - | RO | UNSIGNED 16 BIT |
| **40012** | 11 | RESERVED | - | - | RO | UNSIGNED 16 BIT |

| ADDRESS (4x) | OFFSET (4x) | REGISTER | CHANNEL | DESCRIPTION | W/R | TYPE |
|---|---|---|---|---|---|---|
| **40013** | 12 | COMMAND_AUX _3H | - | Aux Command Register | RW | UNSIGNED 16 BIT |
| **40014** | 13 | COMMAND_AUX _3L | - | Aux Command Register | RW | UNSIGNED 16 BIT |
| **40015** | 14 | COMMAND_AUX 2 | - | Aux Command Register | RW | UNSIGNED 16 BIT |
| **40016** | 15 | COMMAND_AUX 1 | - | Aux Command Register | RW | UNSIGNED 16 BIT |
| **40017** | 16 | COMMAND | - | Aux Command Register | RW | UNSIGNED 16 BIT |
| **40018** | 17 | STATUS | - | Device Status | RW | UNSIGNED 16 BIT |
| **40019** | 18 | RESERVED | - | - | RW | UNSIGNED 16 BIT |
| **40020** | 19 | RESERVED | - | - | RW | UNSIGNED 16 BIT |
| **40021** | 20 | DIGITAL I/O | 16..1 | Digital IO Value [Channel 16…1] | RW | UNSIGNED 16 BIT |
| **40022** | 21 | DIGITAL I/O | 32..17 | Digital IO Value [Channel 32…17] | RW | UNSIGNED 16 BIT |

| ADDRESS (4x) | OFFEST (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| **40101** | 100 | COUNTER MSW DIN | 1 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40102** | 101 | COUNTER LSW DIN | | | RW | |
| **40103** | 102 | COUNTER MSW DIN | 2 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40104** | 103 | COUNTER LSW DIN | | | RW | |
| **40105** | 104 | COUNTER MSW DIN | 3 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40106** | 105 | COUNTER LSW DIN | | | RW | |
| **40107** | 106 | COUNTER MSW DIN | 4 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40108** | 107 | COUNTER LSW DIN | | | RW | |
| **40109** | 108 | COUNTER MSW DIN | 5 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40110** | 109 | COUNTER LSW DIN | | | RW | |
| **40111** | 110 | COUNTER MSW DIN | 6 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40112** | 111 | COUNTER LSW DIN | | | RW | |
| **40113** | 112 | COUNTER MSW DIN | 7 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40114** | 113 | COUNTER LSW DIN | | | RW | |
| **40115** | 114 | COUNTER MSW | 8 | CHANNEL COUNTER | RW | UNSIGNED 32 |

| ADDRESS (4x) | OFFEST (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| | | DIN | | VALUE | | BIT |
| **40116** | 115 | COUNTER LSW DIN | | | RW | |
| **40117** | 116 | COUNTER MSW DIN | 9 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40118** | 117 | COUNTER LSW DIN | | | RW | |
| **40119** | 118 | COUNTER MSW DIN | 10 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40120** | 119 | COUNTER LSW DIN | | | RW | |
| **40121** | 120 | COUNTER MSW DIN | 11 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40122** | 121 | COUNTER LSW DIN | | | RW | |
| **40123** | 122 | COUNTER MSW DIN | 12 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40124** | 123 | COUNTER LSW DIN | | | RW | |
| **40125** | 124 | COUNTER MSW DIN | 13 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40126** | 125 | COUNTER LSW DIN | | | RW | |
| **40127** | 126 | COUNTER MSW DIN | 14 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40128** | 127 | COUNTER LSW DIN | | | RW | |
| **40129** | 128 | COUNTER MSW DIN | 15 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40130** | 129 | COUNTER LSW DIN | | | RW | |
| **40131** | 130 | COUNTER MSW DIN | 16 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40132** | 131 | COUNTER LSW DIN | | | RW | |
| **40133** | 132 | COUNTER MSW DIN | 17 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40134** | 133 | COUNTER LSW DIN | | | RW | |
| **40135** | 134 | COUNTER MSW DIN | 18 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40136** | 135 | COUNTER LSW DIN | | | RW | |
| **40137** | 136 | COUNTER MSW DIN | 19 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40138** | 137 | COUNTER LSW DIN | | | RW | |
| **40139** | 138 | COUNTER MSW DIN | 20 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40140** | 139 | COUNTER LSW DIN | | | RW | |
| **40141** | 140 | COUNTER MSW DIN | 21 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40142** | 141 | COUNTER LSW DIN | | | RW | |
| **40143** | 142 | COUNTER MSW DIN | 22 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40144** | 143 | COUNTER LSW DIN | | | RW | |

| ADDRESS (4x) | OFFEST (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| **40145** | 144 | COUNTER MSW DIN | 23 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40146** | 145 | COUNTER LSW DIN | | | RW | |
| **40147** | 146 | COUNTER MSW DIN | 24 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40148** | 147 | COUNTER LSW DIN | | | RW | |
| **40149** | 148 | COUNTER MSW DIN | 25 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40150** | 149 | COUNTER LSW DIN | | | RW | |
| **40151** | 150 | COUNTER MSW DIN | 26 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40152** | 151 | COUNTER LSW DIN | | | RW | |
| **40153** | 152 | COUNTER MSW DIN | 27 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40154** | 153 | COUNTER LSW DIN | | | RW | |
| **40155** | 154 | COUNTER MSW DIN | 28 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40156** | 155 | COUNTER LSW DIN | | | RW | |
| **40157** | 156 | COUNTER MSW DIN | 29 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40158** | 157 | COUNTER LSW DIN | | | RW | |
| **40159** | 158 | COUNTER MSW DIN | 30 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40160** | 159 | COUNTER LSW DIN | | | RW | |
| **40161** | 160 | COUNTER MSW DIN | 31 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40162** | 161 | COUNTER LSW DIN | | | RW | |
| **40163** | 162 | COUNTER MSW DIN | 32 | CHANNEL COUNTER VALUE | RW | UNSIGNED 32 BIT |
| **40164** | 163 | COUNTER LSW DIN | | | RW | |
| **40165** | 164 | PERIOD | 1 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40166** | 165 | | | | RW | |
| **40167** | 166 | PERIOD | 2 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40168** | 167 | | | | RW | |
| **40169** | 168 | PERIOD | 3 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40170** | 169 | | | | RW | |
| **40171** | 170 | PERIOD | 4 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40172** | 171 | | | | RW | |
| **40173** | 172 | PERIOD | 5 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40174** | 173 | | | | RW | |
| **40175** | 174 | PERIOD | 6 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40176** | 175 | | | | RW | |
| **40177** | 176 | PERIOD | 7 | PERIOD [ms] | RW | FLOAT 32 BIT |

| ADDRESS (4x) | OFFEST (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| **40178** | 177 | | | | RW | |
| **40179** | 178 | PERIOD | 8 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40180** | 179 | | | | RW | |
| **40181** | 180 | PERIOD | 9 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40182** | 181 | | | | RW | |
| **40183** | 182 | PERIOD | 10 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40184** | 183 | | | | RW | |
| **40185** | 184 | PERIOD | 11 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40186** | 185 | | | | RW | |
| **40187** | 186 | PERIOD | 12 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40188** | 187 | | | | RW | |
| **40189** | 188 | PERIOD | 13 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40190** | 189 | | | | RW | |
| **40191** | 190 | PERIOD | 14 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40192** | 191 | | | | RW | |
| **40193** | 192 | PERIOD | 15 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40194** | 193 | | | | RW | |
| **40195** | 194 | PERIOD | 16 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40196** | 195 | | | | RW | |
| **40197** | 196 | PERIOD | 17 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40198** | 197 | | | | RW | |
| **40199** | 198 | PERIOD | 18 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40200** | 199 | | | | RW | |
| **40201** | 200 | PERIOD | 19 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40202** | 201 | | | | RW | |
| **40203** | 202 | PERIOD | 20 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40204** | 203 | | | | RW | |
| **40205** | 204 | PERIOD | 21 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40206** | 205 | | | | RW | |
| **40207** | 206 | PERIOD | 22 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40208** | 207 | | | | RW | |
| **40209** | 208 | PERIOD | 23 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40210** | 209 | | | | RW | |
| **40211** | 210 | PERIOD | 24 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40212** | 211 | | | | RW | |
| **40213** | 212 | PERIOD | 25 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40214** | 213 | | | | RW | |
| **40215** | 214 | PERIOD | 26 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40216** | 215 | | | | RW | |
| **40217** | 216 | PERIOD | 27 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40218** | 217 | | | | RW | |

| ADDRESS (4x) | OFFEST (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| **40219** | 218 | PERIOD | 28 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40220** | 219 | | | | RW | |
| **40221** | 220 | PERIOD | 29 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40222** | 221 | | | | RW | |
| **40223** | 222 | PERIOD | 30 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40224** | 223 | | | | RW | |
| **40225** | 224 | PERIOD | 31 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40226** | 225 | | | | RW | |
| **40227** | 226 | PERIOD | 32 | PERIOD [ms] | RW | FLOAT 32 BIT |
| **40228** | 227 | | | | RW | |
| **40229** | 228 | FREQUENCY | 1 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40230** | 229 | | | | RW | |
| **40231** | 230 | FREQUENCY | 2 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40232** | 231 | | | | RW | |
| **40233** | 232 | FREQUENCY | 3 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40234** | 233 | | | | RW | |
| **40235** | 234 | FREQUENCY | 4 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40236** | 235 | | | | RW | |
| **40237** | 236 | FREQUENCY | 5 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40238** | 237 | | | | RW | |
| **40239** | 238 | FREQUENCY | 6 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40240** | 239 | | | | RW | |
| **40241** | 240 | FREQUENCY | 7 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40242** | 241 | | | | RW | |
| **40243** | 242 | FREQUENCY | 8 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40244** | 243 | | | | RW | |
| **40245** | 244 | FREQUENCY | 9 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40246** | 245 | | | | RW | |
| **40247** | 246 | FREQUENCY | 10 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40248** | 247 | | | | RW | |
| **40249** | 248 | FREQUENCY | 11 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40250** | 249 | | | | RW | |
| **40251** | 250 | FREQUENCY | 12 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40252** | 251 | | | | RW | |
| **40253** | 252 | FREQUENCY | 13 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40254** | 253 | | | | RW | |
| **40255** | 254 | FREQUENCY | 14 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40256** | 255 | | | | RW | |
| **40257** | 256 | FREQUENCY | 15 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40258** | 257 | | | | RW | |
| **40259** | 258 | FREQUENCY | 16 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |

| ADDRESS (4x) | OFFEST (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| **40260** | 259 | | | | RW | |
| **40261** | 260 | FREQUENCY | 17 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40262** | 261 | | | | RW | |
| **40263** | 262 | FREQUENCY | 18 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40264** | 263 | | | | RW | |
| **40265** | 264 | FREQUENCY | 19 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40266** | 265 | | | | RW | |
| **40267** | 266 | FREQUENCY | 20 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40268** | 267 | | | | RW | |
| **40269** | 268 | FREQUENCY | 21 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40270** | 269 | | | | RW | |
| **40271** | 270 | FREQUENCY | 22 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40272** | 271 | | | | RW | |
| **40273** | 272 | FREQUENCY | 23 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40274** | 273 | | | | RW | |
| **40275** | 274 | FREQUENCY | 24 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40276** | 275 | | | | RW | |
| **40277** | 276 | FREQUENCY | 25 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40278** | 277 | | | | RW | |
| **40279** | 278 | FREQUENCY | 26 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40280** | 279 | | | | RW | |
| **40281** | 280 | FREQUENCY | 27 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40282** | 281 | | | | RW | |
| **40283** | 282 | FREQUENCY | 28 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40284** | 283 | | | | RW | |
| **40285** | 284 | FREQUENCY | 29 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40286** | 285 | | | | RW | |
| **40287** | 286 | FREQUENCY | 30 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40288** | 287 | | | | RW | |
| **40289** | 288 | FREQUENCY | 31 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40290** | 289 | | | | RW | |
| **40291** | 290 | FREQUENCY | 32 | FREQUENCY [Hz] | RW | FLOAT 32 BIT |
| **40292** | 291 | | | | RW | |

## 9.2. R-32DIDO: TABLE OF MODBUS REGISTERS 0x COIL STATUS (FUNCTION CODE 1)

| ADDRESS (0x) | ADDRESS (0x) OFFSET | REGISTER | CHANNEL | DESCRIPTION | W/R | TYPE |
|---|---|---|---|---|---|---|
| **1** | 0 | DIGITAL INPUT | 1 | *DIGITAL INPUT* | RO | BIT |
| **2** | 1 | DIGITAL INPUT | 2 | DIGITAL INPUT | RO | BIT |
| **3** | 2 | DIGITAL INPUT | 3 | DIGITAL INPUT | RO | BIT |
| **4** | 3 | DIGITAL INPUT | 4 | DIGITAL INPUT | RO | BIT |
| **5** | 4 | DIGITAL INPUT | 5 | DIGITAL INPUT | RO | BIT |
| **6** | 5 | DIGITAL INPUT | 6 | DIGITAL INPUT | RO | BIT |
| **7** | 6 | DIGITAL INPUT | 7 | DIGITAL INPUT | RO | BIT |
| **8** | 7 | DIGITAL INPUT | 8 | DIGITAL INPUT | RO | BIT |
| **9** | 8 | DIGITAL INPUT | 9 | DIGITAL INPUT | RO | BIT |
| **10** | 9 | DIGITAL INPUT | 10 | DIGITAL INPUT | RO | BIT |
| **11** | 10 | DIGITAL INPUT | 11 | DIGITAL INPUT | RO | BIT |
| **12** | 11 | DIGITAL INPUT | 12 | DIGITAL INPUT | RO | BIT |
| **13** | 12 | DIGITAL INPUT | 13 | DIGITAL INPUT | RO | BIT |
| **14** | 13 | DIGITAL INPUT | 14 | DIGITAL INPUT | RO | BIT |
| **15** | 14 | DIGITAL INPUT | 15 | DIGITAL INPUT | RO | BIT |
| **16** | 15 | DIGITAL INPUT | 16 | DIGITAL INPUT | RO | BIT |
| **17** | 16 | DIGITAL INPUT | 17 | DIGITAL INPUT | RO | BIT |
| **18** | 17 | DIGITAL INPUT | 18 | DIGITAL INPUT | RO | BIT |
| **19** | 18 | DIGITAL INPUT | 19 | DIGITAL INPUT | RO | BIT |
| **20** | 19 | DIGITAL INPUT | 20 | DIGITAL INPUT | RO | BIT |
| **21** | 20 | DIGITAL INPUT | 21 | DIGITAL INPUT | RO | BIT |
| **22** | 21 | DIGITAL INPUT | 22 | DIGITAL INPUT | RO | BIT |
| **23** | 22 | DIGITAL | 23 | DIGITAL | RO | BIT |

| ADDRESS (0x) | ADDRESS (0x) OFFSET | REGISTER | CHANNEL | DESCRIPTION | W/R | TYPE |
|---|---|---|---|---|---|---|
| | | INPUT | | INPUT | | |
| **24** | 23 | DIGITAL INPUT | 24 | DIGITAL INPUT | RO | BIT |
| **25** | 24 | DIGITAL INPUT | 25 | DIGITAL INPUT | RO | BIT |
| **26** | 25 | DIGITAL INPUT | 26 | DIGITAL INPUT | RO | BIT |
| **27** | 26 | DIGITAL INPUT | 27 | DIGITAL INPUT | RO | BIT |
| **28** | 27 | DIGITAL INPUT | 28 | DIGITAL INPUT | RO | BIT |
| **29** | 28 | DIGITAL INPUT | 29 | DIGITAL INPUT | RO | BIT |
| **30** | 29 | DIGITAL INPUT | 30 | DIGITAL INPUT | RO | BIT |
| **31** | 30 | DIGITAL INPUT | 31 | DIGITAL INPUT | RO | BIT |
| **32** | 31 | DIGITAL INPUT | 32 | DIGITAL INPUT | RO | BIT |
| **33** | 32 | DIGITAL OUT | 1 | DIGITAL OUT | RW | BIT |
| **34** | 33 | DIGITAL OUT | 2 | DIGITAL OUT | RW | BIT |
| **35** | 34 | DIGITAL OUT | 3 | DIGITAL OUT | RW | BIT |
| **36** | 35 | DIGITAL OUT | 4 | DIGITAL OUT | RW | BIT |
| **37** | 36 | DIGITAL OUT | 5 | DIGITAL OUT | RW | BIT |
| **38** | 37 | DIGITAL OUT | 6 | DIGITAL OUT | RW | BIT |
| **39** | 38 | DIGITAL OUT | 7 | DIGITAL OUT | RW | BIT |
| **40** | 39 | DIGITAL OUT | 8 | DIGITAL OUT | RW | BIT |
| **41** | 40 | DIGITAL OUT | 9 | DIGITAL OUT | RW | BIT |
| **42** | 41 | DIGITAL OUT | 10 | DIGITAL OUT | RW | BIT |
| **43** | 42 | DIGITAL OUT | 11 | DIGITAL OUT | RW | BIT |
| **44** | 43 | DIGITAL OUT | 12 | DIGITAL OUT | RW | BIT |
| **45** | 44 | DIGITAL OUT | 13 | DIGITAL OUT | RW | BIT |
| **46** | 45 | DIGITAL OUT | 14 | DIGITAL OUT | RW | BIT |
| **47** | 46 | DIGITAL OUT | 15 | DIGITAL OUT | RW | BIT |
| **48** | 47 | DIGITAL OUT | 16 | DIGITAL OUT | RW | BIT |
| **49** | 48 | DIGITAL OUT | 17 | DIGITAL OUT | RW | BIT |
| **50** | 49 | DIGITAL OUT | 18 | DIGITAL OUT | RW | BIT |
| **51** | 50 | DIGITAL OUT | 19 | DIGITAL OUT | RW | BIT |
| **52** | 51 | DIGITAL OUT | 20 | DIGITAL OUT | RW | BIT |
| **53** | 52 | DIGITAL OUT | 21 | DIGITAL OUT | RW | BIT |
| **54** | 53 | DIGITAL OUT | 22 | DIGITAL OUT | RW | BIT |
| **55** | 54 | DIGITAL OUT | 23 | DIGITAL OUT | RW | BIT |
| **56** | 55 | DIGITAL OUT | 24 | DIGITAL OUT | RW | BIT |
| **57** | 56 | DIGITAL OUT | 25 | DIGITAL OUT | RW | BIT |

| ADDRESS (0x) | ADDRESS (0x) OFFSET | REGISTER | CHANNEL | DESCRIPTION | W/R | TYPE |
|---|---|---|---|---|---|---|
| **58** | 57 | DIGITAL OUT | 26 | DIGITAL OUT | RW | BIT |
| **59** | 58 | DIGITAL OUT | 27 | DIGITAL OUT | RW | BIT |
| **60** | 59 | DIGITAL OUT | 28 | DIGITAL OUT | RW | BIT |
| **61** | 60 | DIGITAL OUT | 29 | DIGITAL OUT | RW | BIT |
| **62** | 61 | DIGITAL OUT | 30 | DIGITAL OUT | RW | BIT |
| **63** | 62 | DIGITAL OUT | 31 | DIGITAL OUT | RW | BIT |
| **64** | 63 | DIGITAL OUT | 32 | DIGITAL OUT | RW | BIT |

## 9.3. R-32DIDO: TABLE OF MODBUS REGISTERS 1x INPUT STATUS (FUNCTION CODE 2)

| ADDRESS (0x) | ADDRESS (0x) OFFSET | REGISTER | CHANNEL | DESCRIPTION | W/R | TYPE |
|---|---|---|---|---|---|---|
| **10001** | 0 | DIGITAL INPUT | 1 | DIGITAL INPUT | RO | BIT |
| **10002** | 1 | DIGITAL INPUT | 2 | DIGITAL INPUT | RO | BIT |
| **10003** | 2 | DIGITAL INPUT | 3 | DIGITAL INPUT | RO | BIT |
| **10004** | 3 | DIGITAL INPUT | 4 | DIGITAL INPUT | RO | BIT |
| **10005** | 4 | DIGITAL INPUT | 5 | DIGITAL INPUT | RO | BIT |
| **10006** | 5 | DIGITAL INPUT | 6 | DIGITAL INPUT | RO | BIT |
| **10007** | 6 | DIGITAL INPUT | 7 | DIGITAL INPUT | RO | BIT |
| **10008** | 7 | DIGITAL INPUT | 8 | DIGITAL INPUT | RO | BIT |
| **10009** | 8 | DIGITAL INPUT | 9 | DIGITAL INPUT | RO | BIT |
| **10010** | 9 | DIGITAL INPUT | 10 | DIGITAL INPUT | RO | BIT |
| **10011** | 10 | DIGITAL INPUT | 11 | DIGITAL INPUT | RO | BIT |
| **10012** | 11 | DIGITAL INPUT | 12 | DIGITAL INPUT | RO | BIT |
| **10013** | 12 | DIGITAL INPUT | 13 | DIGITAL INPUT | RO | BIT |
| **10014** | 13 | DIGITAL INPUT | 14 | DIGITAL INPUT | RO | BIT |
| **10015** | 14 | DIGITAL INPUT | 15 | DIGITAL INPUT | RO | BIT |
| **10016** | 15 | DIGITAL INPUT | 16 | DIGITAL INPUT | RO | BIT |
| **10017** | 16 | DIGITAL INPUT | 17 | DIGITAL INPUT | RO | BIT |
| **10018** | 17 | DIGITAL | 18 | DIGITAL | RO | BIT |

| ADDRESS (0x) | ADDRESS (0x) OFFSET | REGISTER | CHANNEL | DESCRIPTION | W/R | TYPE |
|---|---|---|---|---|---|---|
| | | INPUT | | INPUT | | |
| **10019** | 18 | DIGITAL INPUT | 19 | DIGITAL INPUT | RO | BIT |
| **10020** | 19 | DIGITAL INPUT | 20 | DIGITAL INPUT | RO | BIT |
| **10021** | 20 | DIGITAL INPUT | 21 | DIGITAL INPUT | RO | BIT |
| **10022** | 21 | DIGITAL INPUT | 22 | DIGITAL INPUT | RO | BIT |
| **10023** | 22 | DIGITAL INPUT | 23 | DIGITAL INPUT | RO | BIT |
| **10024** | 23 | DIGITAL INPUT | 24 | DIGITAL INPUT | RO | BIT |
| **10025** | 24 | DIGITAL INPUT | 25 | DIGITAL INPUT | RO | BIT |
| **10026** | 25 | DIGITAL INPUT | 26 | DIGITAL INPUT | RO | BIT |
| **10027** | 26 | DIGITAL INPUT | 27 | DIGITAL INPUT | RO | BIT |
| **10028** | 27 | DIGITAL INPUT | 28 | DIGITAL INPUT | RO | BIT |
| **10029** | 28 | DIGITAL INPUT | 29 | DIGITAL INPUT | RO | BIT |
| **10030** | 29 | DIGITAL INPUT | 30 | DIGITAL INPUT | RO | BIT |
| **10031** | 30 | DIGITAL INPUT | 31 | DIGITAL INPUT | RO | BIT |
| **10032** | 31 | DIGITAL INPUT | 32 | DIGITAL INPUT | RO | BIT |
| **10033** | 32 | DIGITAL OUT | 1 | DIGITAL OUT | RO | BIT |
| **10034** | 33 | DIGITAL OUT | 2 | DIGITAL OUT | RO | BIT |
| **10035** | 34 | DIGITAL OUT | 3 | DIGITAL OUT | RO | BIT |
| **10036** | 35 | DIGITAL OUT | 4 | DIGITAL OUT | RO | BIT |
| **10037** | 36 | DIGITAL OUT | 5 | DIGITAL OUT | RO | BIT |
| **10038** | 37 | DIGITAL OUT | 6 | DIGITAL OUT | RO | BIT |
| **10039** | 38 | DIGITAL OUT | 7 | DIGITAL OUT | RO | BIT |
| **10040** | 39 | DIGITAL OUT | 8 | DIGITAL OUT | RO | BIT |
| **10041** | 40 | DIGITAL OUT | 9 | DIGITAL OUT | RO | BIT |
| **10042** | 41 | DIGITAL OUT | 10 | DIGITAL OUT | RO | BIT |
| **10043** | 42 | DIGITAL OUT | 11 | DIGITAL OUT | RO | BIT |
| **10044** | 43 | DIGITAL OUT | 12 | DIGITAL OUT | RO | BIT |
| **10045** | 44 | DIGITAL OUT | 13 | DIGITAL OUT | RO | BIT |
| **10046** | 45 | DIGITAL OUT | 14 | DIGITAL OUT | RO | BIT |
| **10047** | 46 | DIGITAL OUT | 15 | DIGITAL OUT | RO | BIT |
| **10048** | 47 | DIGITAL OUT | 16 | DIGITAL OUT | RO | BIT |

| ADDRESS (0x) | ADDRESS (0x) OFFSET | REGISTER | CHANNEL | DESCRIPTION | W/R | TYPE |
|---|---|---|---|---|---|---|
| **10049** | 48 | DIGITAL OUT | 17 | DIGITAL OUT | RO | BIT |
| **10050** | 49 | DIGITAL OUT | 18 | DIGITAL OUT | RO | BIT |
| **10051** | 50 | DIGITAL OUT | 19 | DIGITAL OUT | RO | BIT |
| **10052** | 51 | DIGITAL OUT | 20 | DIGITAL OUT | RO | BIT |
| **10053** | 52 | DIGITAL OUT | 21 | DIGITAL OUT | RO | BIT |
| **10054** | 53 | DIGITAL OUT | 22 | DIGITAL OUT | RO | BIT |
| **10055** | 54 | DIGITAL OUT | 23 | DIGITAL OUT | RO | BIT |
| **10056** | 55 | DIGITAL OUT | 24 | DIGITAL OUT | RO | BIT |
| **10057** | 56 | DIGITAL OUT | 25 | DIGITAL OUT | RO | BIT |
| **10058** | 57 | DIGITAL OUT | 26 | DIGITAL OUT | RO | BIT |
| **10059** | 58 | DIGITAL OUT | 27 | DIGITAL OUT | RO | BIT |
| **10060** | 59 | DIGITAL OUT | 28 | DIGITAL OUT | RO | BIT |
| **10061** | 60 | DIGITAL OUT | 29 | DIGITAL OUT | RO | BIT |
| **10062** | 61 | DIGITAL OUT | 30 | DIGITAL OUT | RO | BIT |
| **10063** | 62 | DIGITAL OUT | 31 | DIGITAL OUT | RO | BIT |
| **10064** | 63 | DIGITAL OUT | 32 | DIGITAL OUT | RO | BIT |

## 10. SEARCH AND MODIFICATION OF THE DEVICE IP WITH SENECA DISCOVERY TOOL

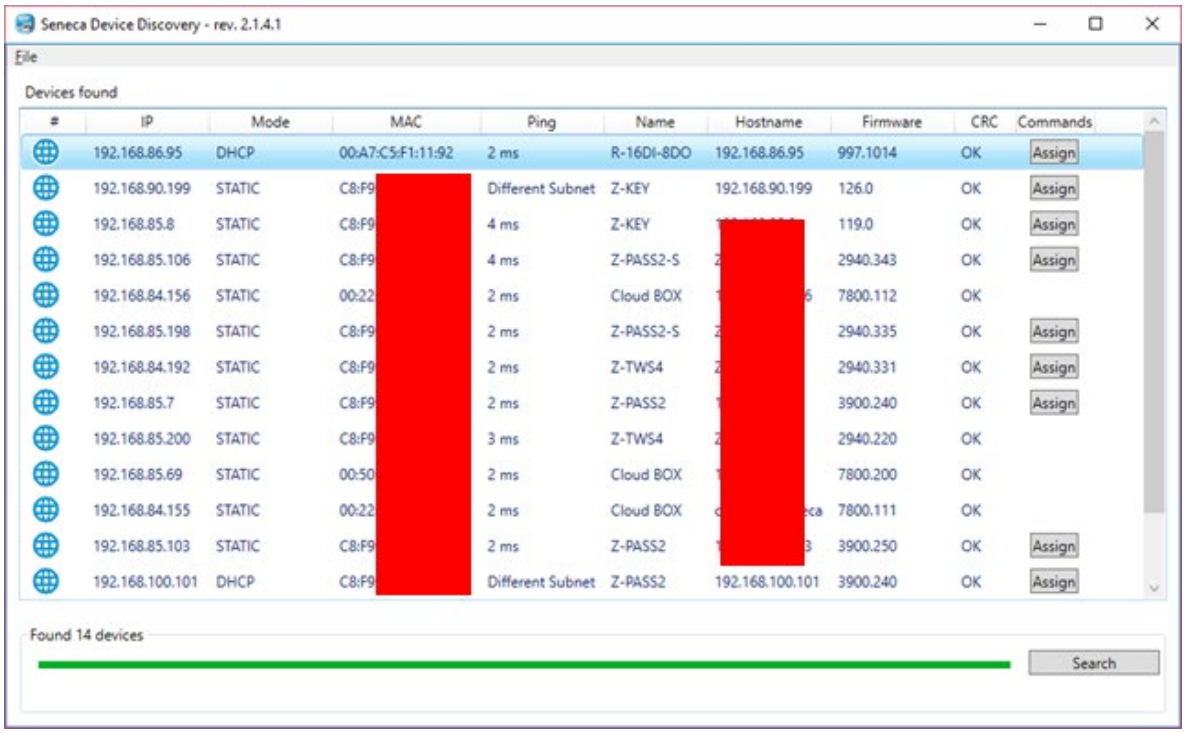
The search and modification of a device can be performed directly in the Easy Setup 2 software.
If Seneca devices that are not part of the R series are also used, it is more convenient to set the addresses with a single software.

When in the R series device the STS LED is on steady, it is possible to obtain the IP address which has been set using the "Seneca Discovery" tool too.

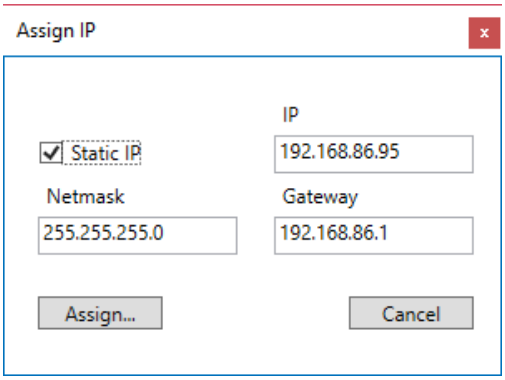
The software can be downloaded from:

https://www.seneca.it/en/linee-di-prodotto/software/easy/sdd

Pressing the "search" button starts the search for all Seneca devices present in the network even if with IP addresses not compatible with the current PC configuration:




It is now possible to change the address by pressing the "Assign" button:




The software works at layer 2 level and it is therefore not necessary to have an Ethernet configuration compatible with the device you are looking for.

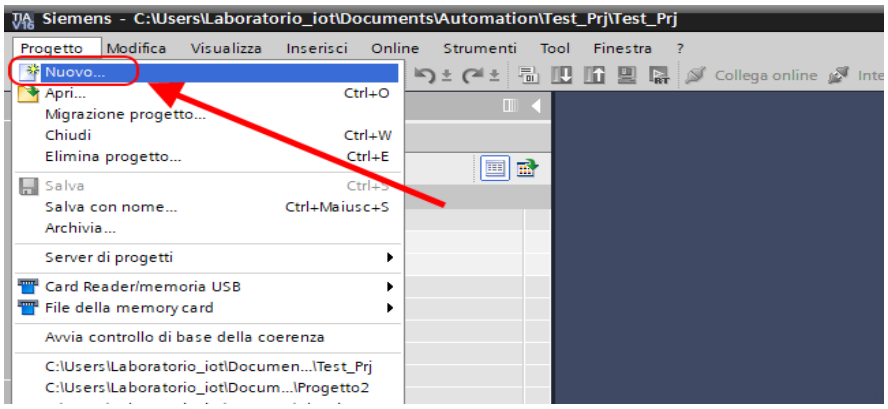
# 11. PROFINET IO (R-32DIDO-P MODEL ONLY)

Type of protocol: Class A Device, Cyclic Real-time (RT) and Acyclic Data

The device has been tested using the following PLCs:
SIEMENS S7 1200 and 1500 (Tia Portal 16)
CODESYS Runtime 3.5 (Codesys 3.5)

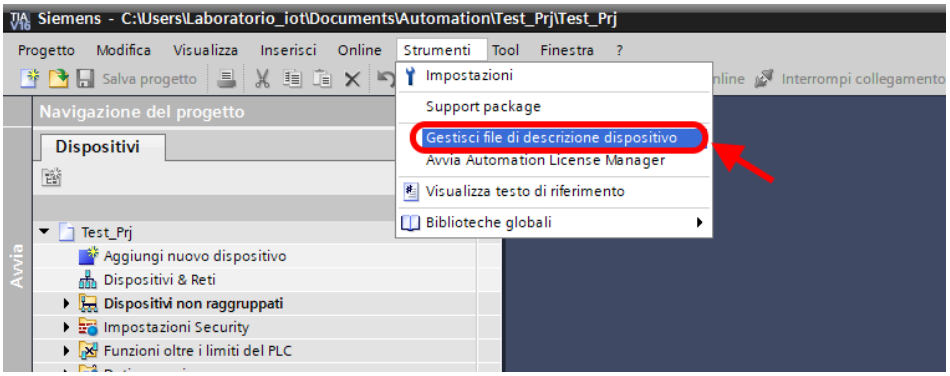
## 11.1. STEP BY STEP CREATION OF A PROJECT WITH SIEMENS PLC (TIA PORTAL 16)

Creating a new project:

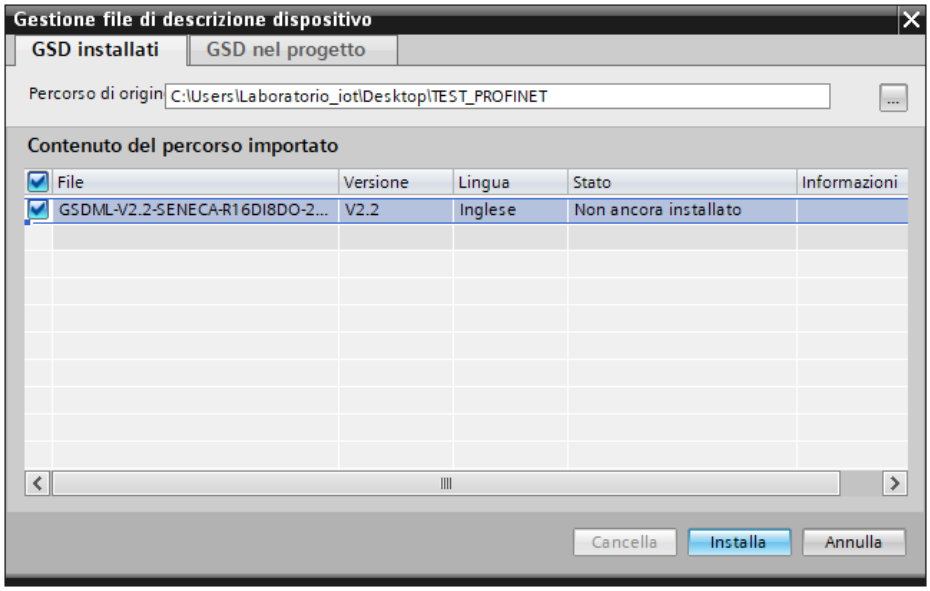



### 11.1.1. INSTALLING THE GSD FILE

Install the GSD file of the Seneca product:



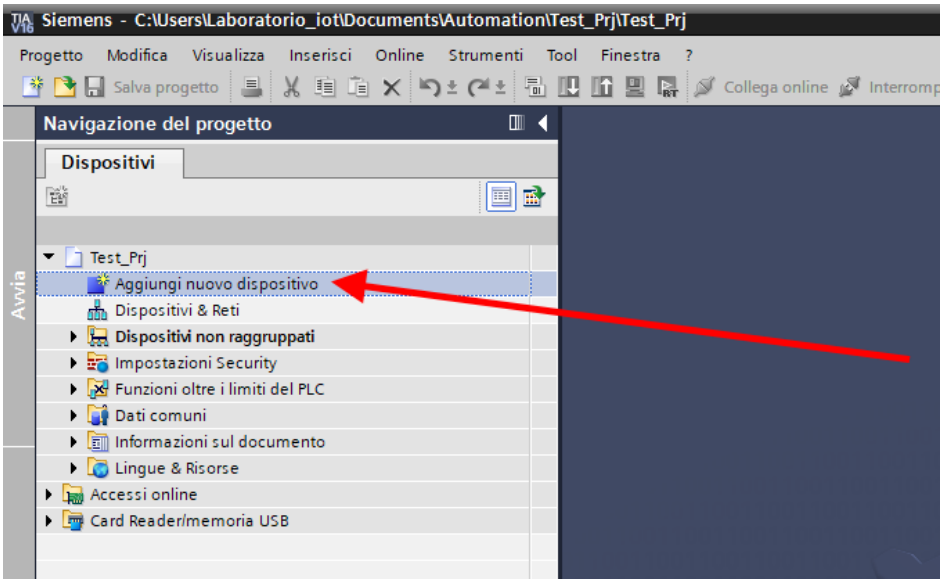

Point to the directory where the file is and press OK, then the list of GSD files in the folder will appear:

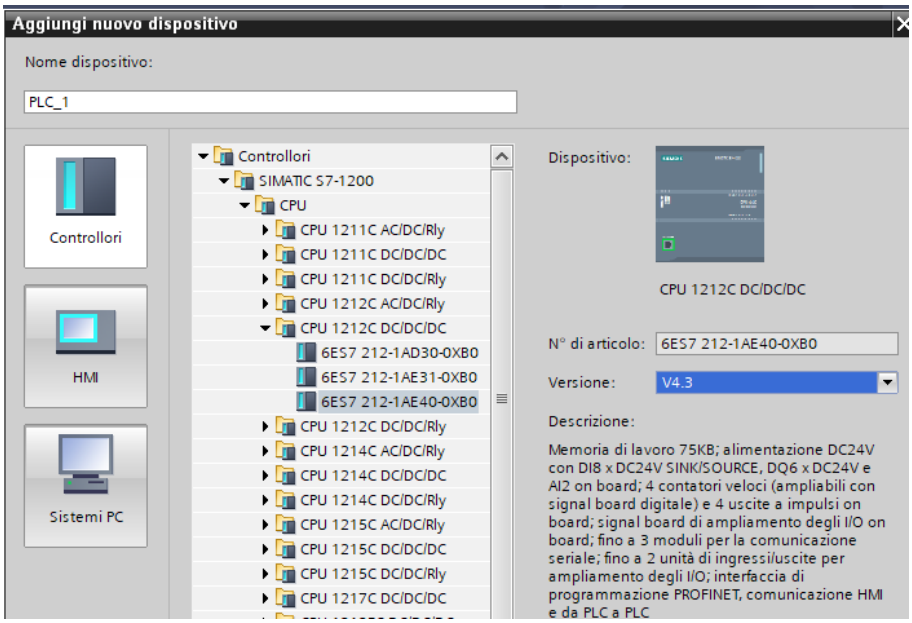



Click on "install".

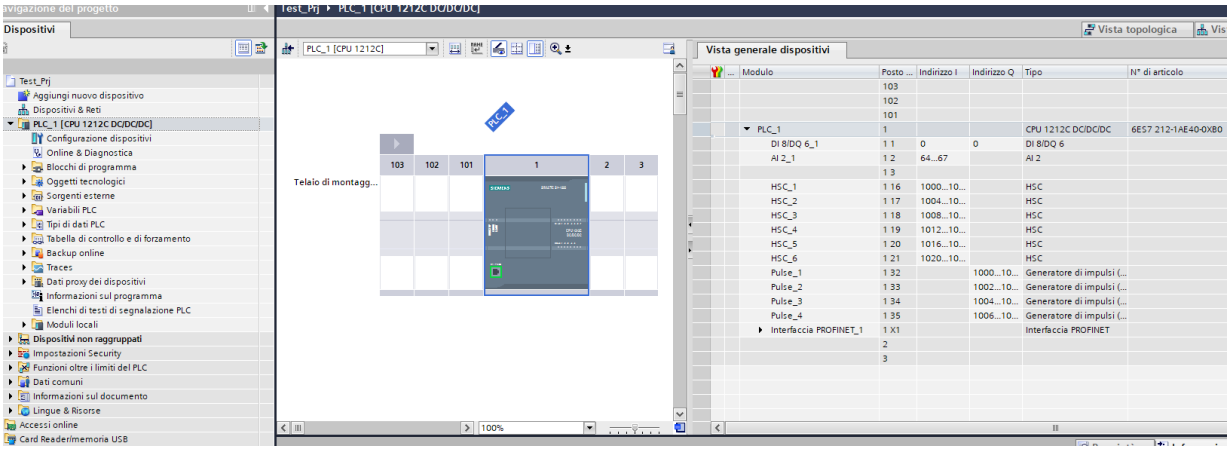
### 11.1.2. INSERTION OF THE SIEMENS PLC IN THE PROJECT

Now insert the Siemens PLC (in our example a SIEMATIC S7 1200), click on "Add new device ...":

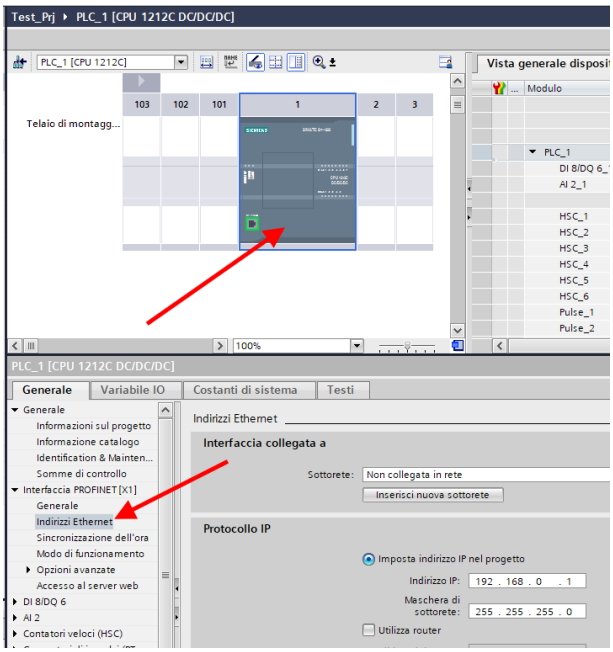




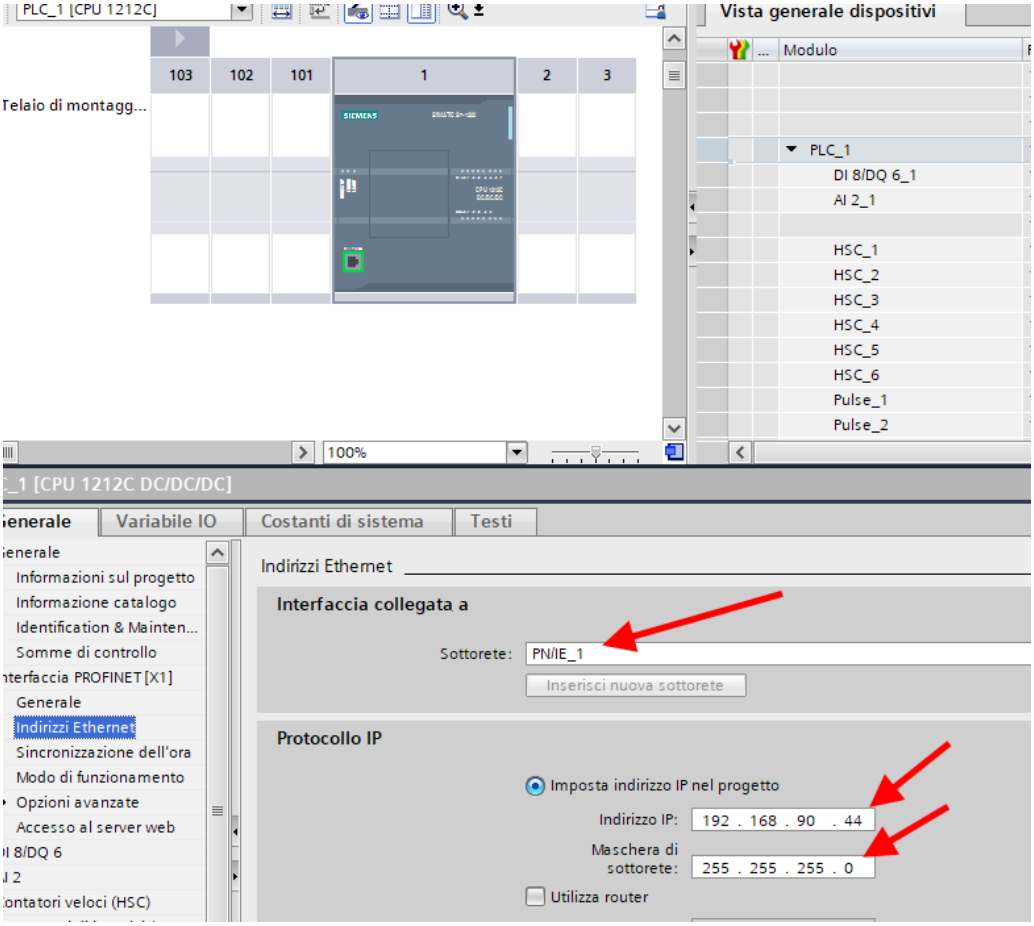

Confirm and the PLC will be added to the rack:



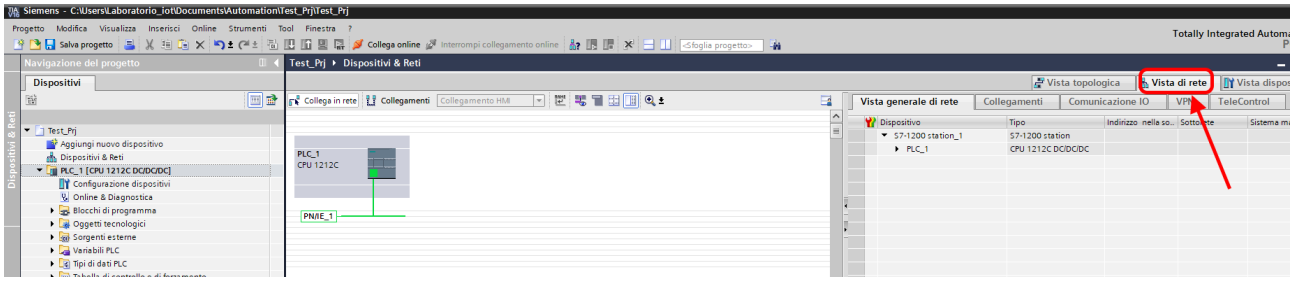

Now click on the PLC and select Profinet interface -> Ethernet addresses




Set the IP you want (in this case 192.168.90.44) and the PLC subnet:

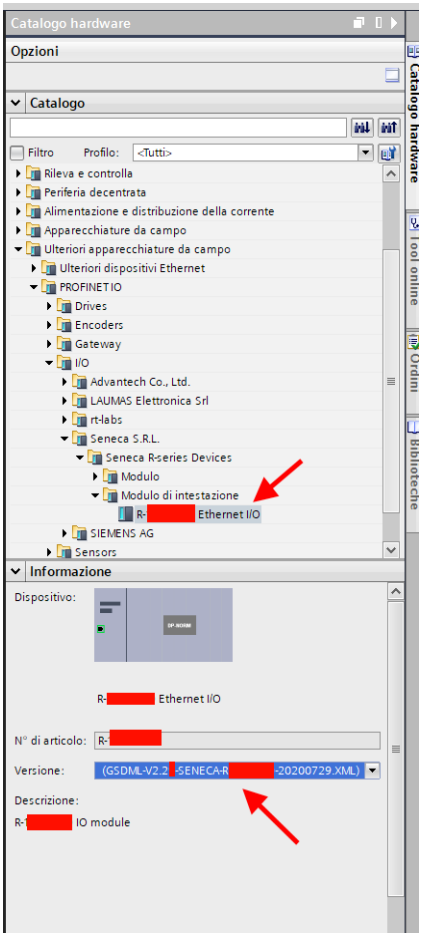


Move on to the network view:

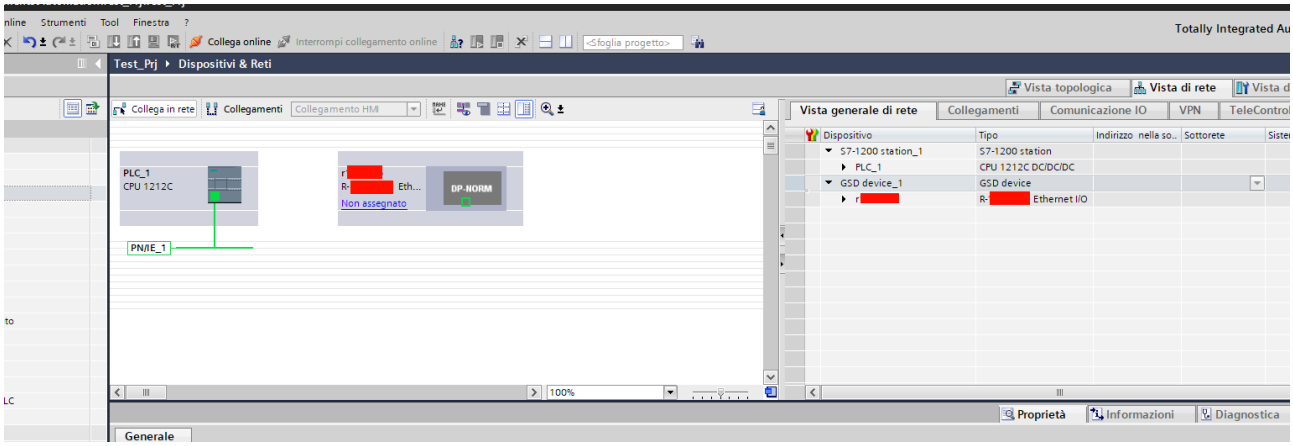



## 11.1.3. INSERTION OF THE PROFINET SENECA IO

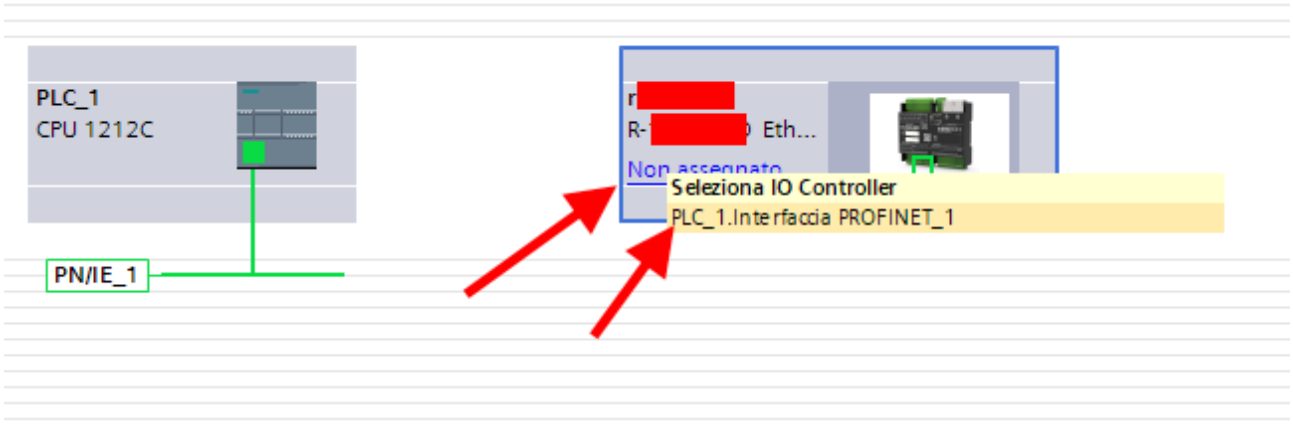
On the right, select "Hardware Catalogue" and then under "Additional Field Device" -> PROFINET IO -> I/O -> Seneca R-Series-> Header module (in the example an R-16DI-8DO device is shown):

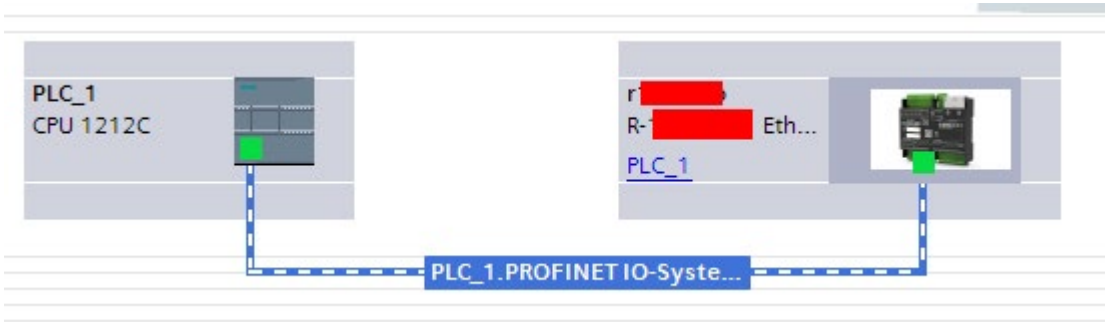


Drag the device to the network view:

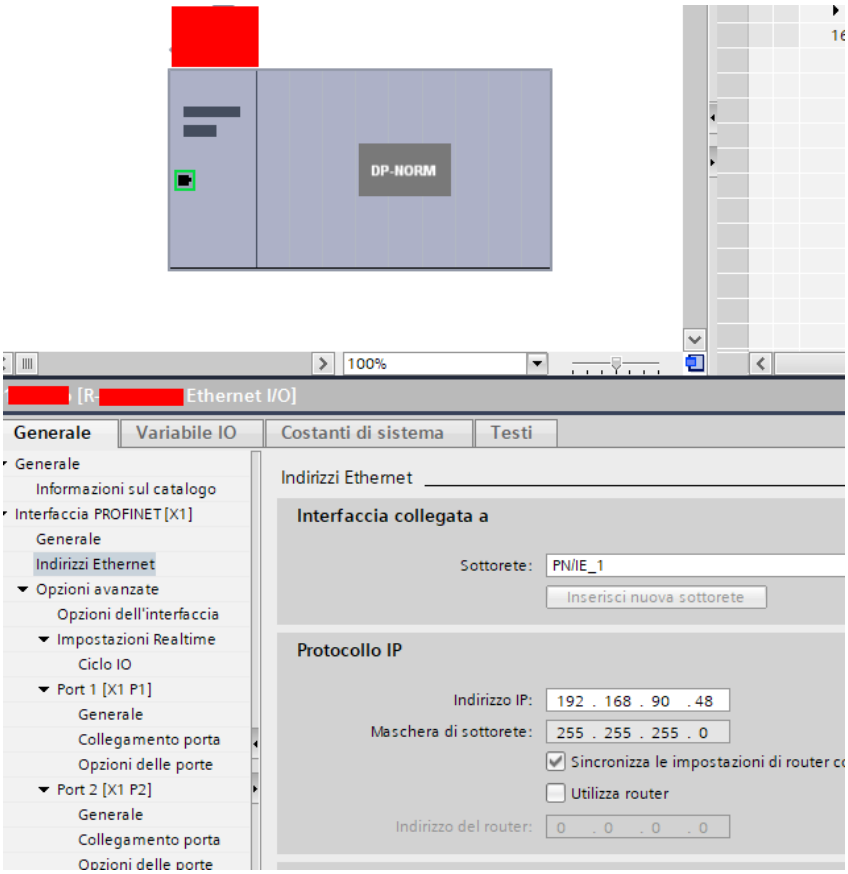



Now associate it to the PLC by clicking with the left mouse on "Not assigned" and then select the PLC:

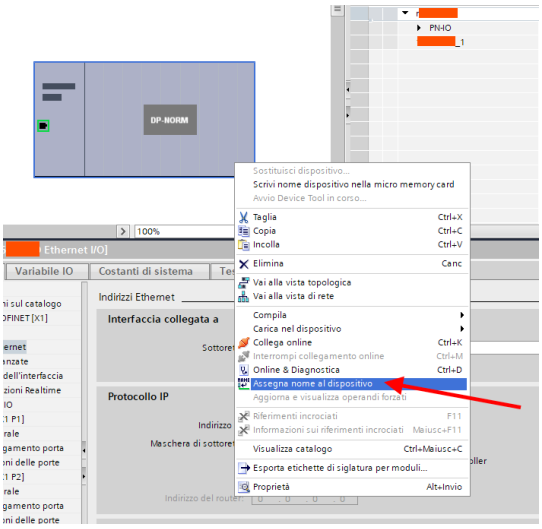



Click twice on the Seneca device and configure the IP address here too (for example 192.168.90.48):



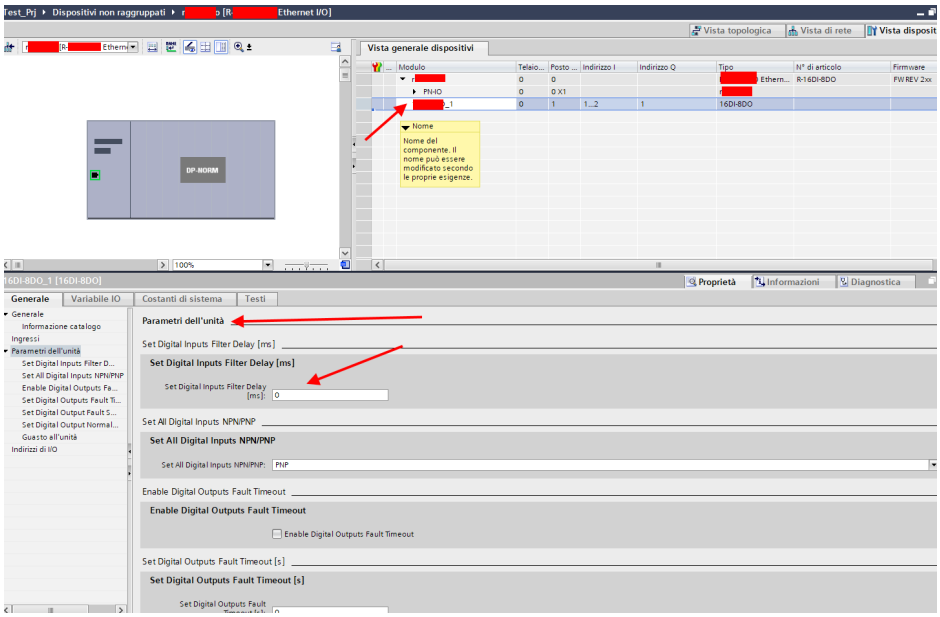

In Profinet the devices are identified by their name, so right click on the Seneca device and select "Assign device name"




Scan the network with "Update list" and set (if necessary) the device name with "Assign name".

### 11.1.4. CONFIGURATION OF THE PARAMETERS OF THE SENECA IO

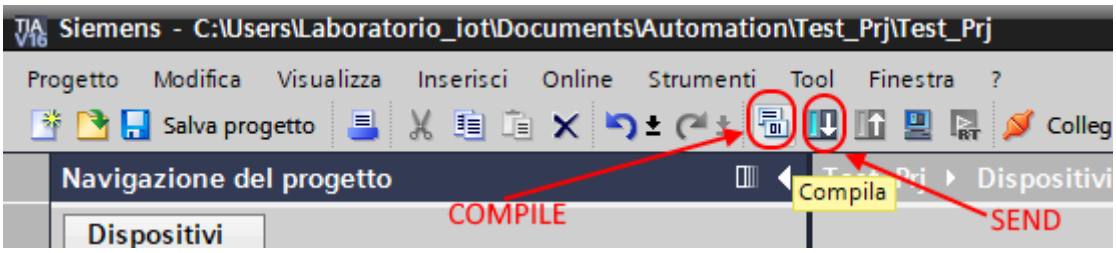
It is also possible to directly configure the device IO without any external software.
To configure the device, click on the IO so that the "Unit parameters" appear:



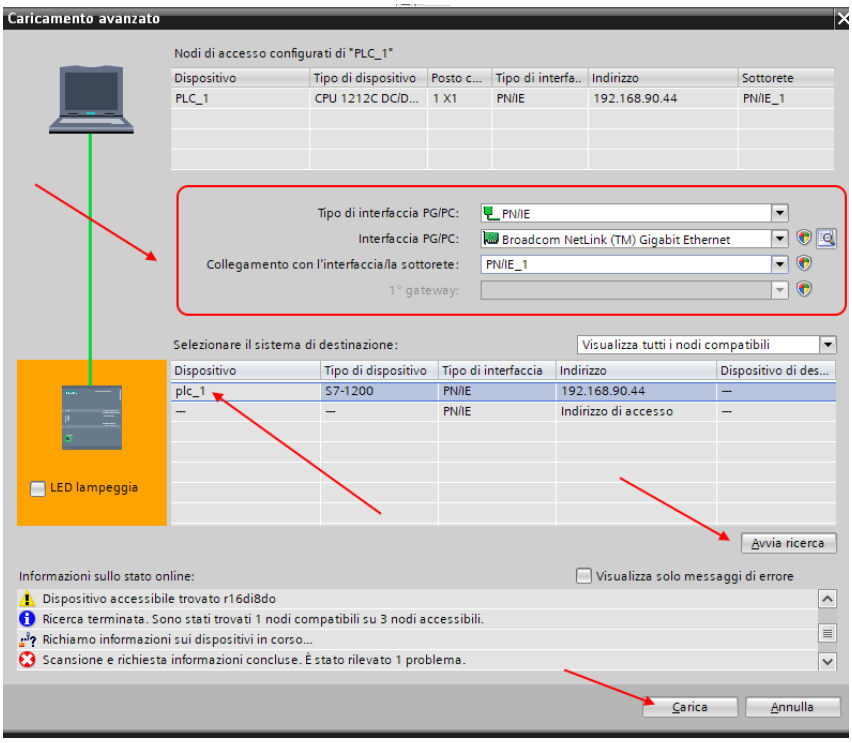

At the next start, the PLC will send the desired configuration to the device.

### 11.1.5. COMPILATION AND SENDING OF THE PROJECT TO THE SIEMENS PLC

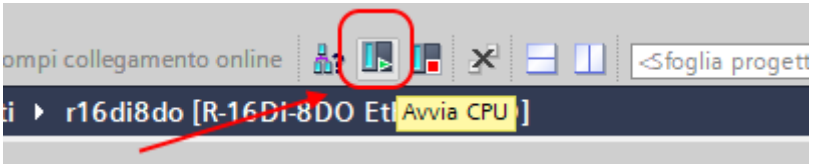
Now that the devices are configured, all that remains is to compile and send the configuration to the PLC.
The first icon compiles while the second sends the project:



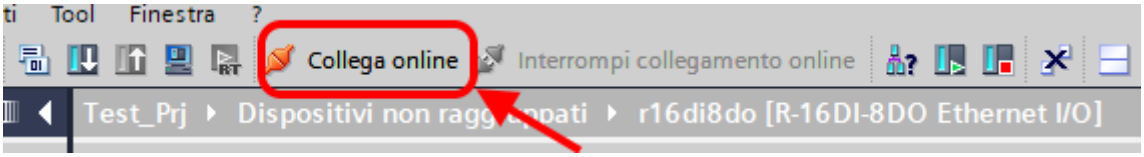

Before sending the project to the PLC, you are asked to select the ethernet interface and start the search, in order to select the PLC and press "Load".



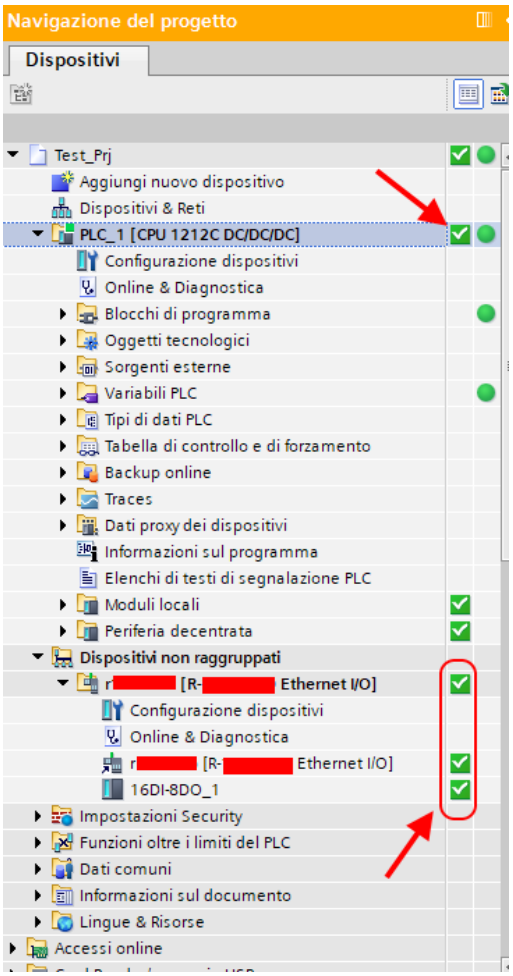

Once the project has been sent, RUN the PLC:




And go ON-Line so as to check if there are any errors:

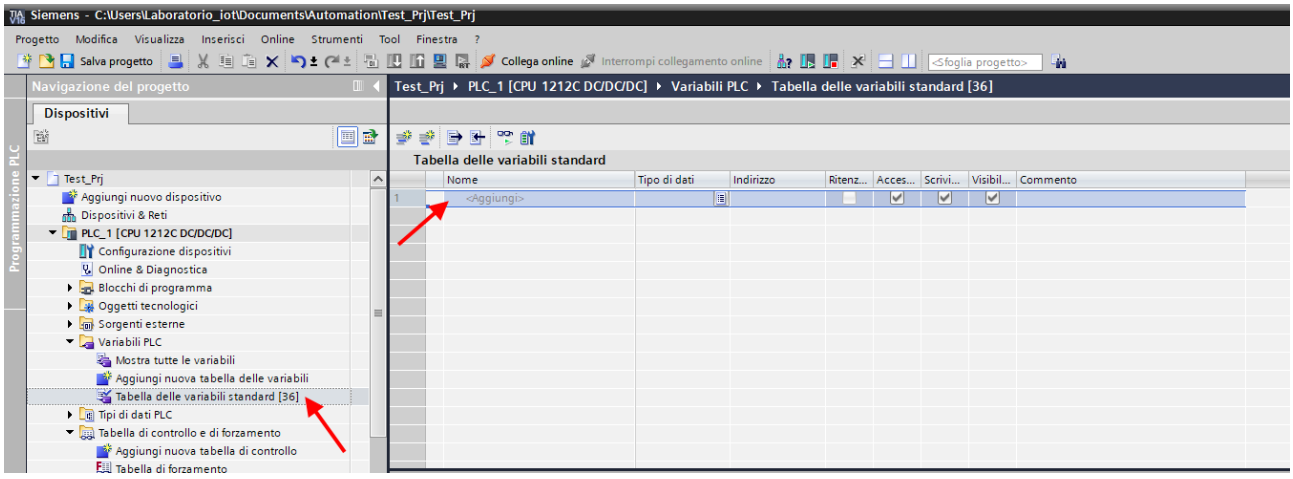



If everything is correct you will get a green icon next to the Seneca device:




## 11.1.6. READING AND WRITING OF THE SENECA IO FROM TIA PORTAL

It is also possible to read and write the Seneca IO (for debugging purposes) directly from the TIA portal. Define the PLC tags directly in the "standard tag table":



Now let's add the variables related to the IO, the addresses are shown here:


So:

Bytes I1 to I4 contain the inputs (bit 0 is IO1, bit 1 is IO2 etc ...)

Bytes Q1 to Q4 contain the outputs (bit 0 is IO1, bit 1 is IO2 etc ...), obviously only the outputs are writable.

Below is the default mapping of available IOs:

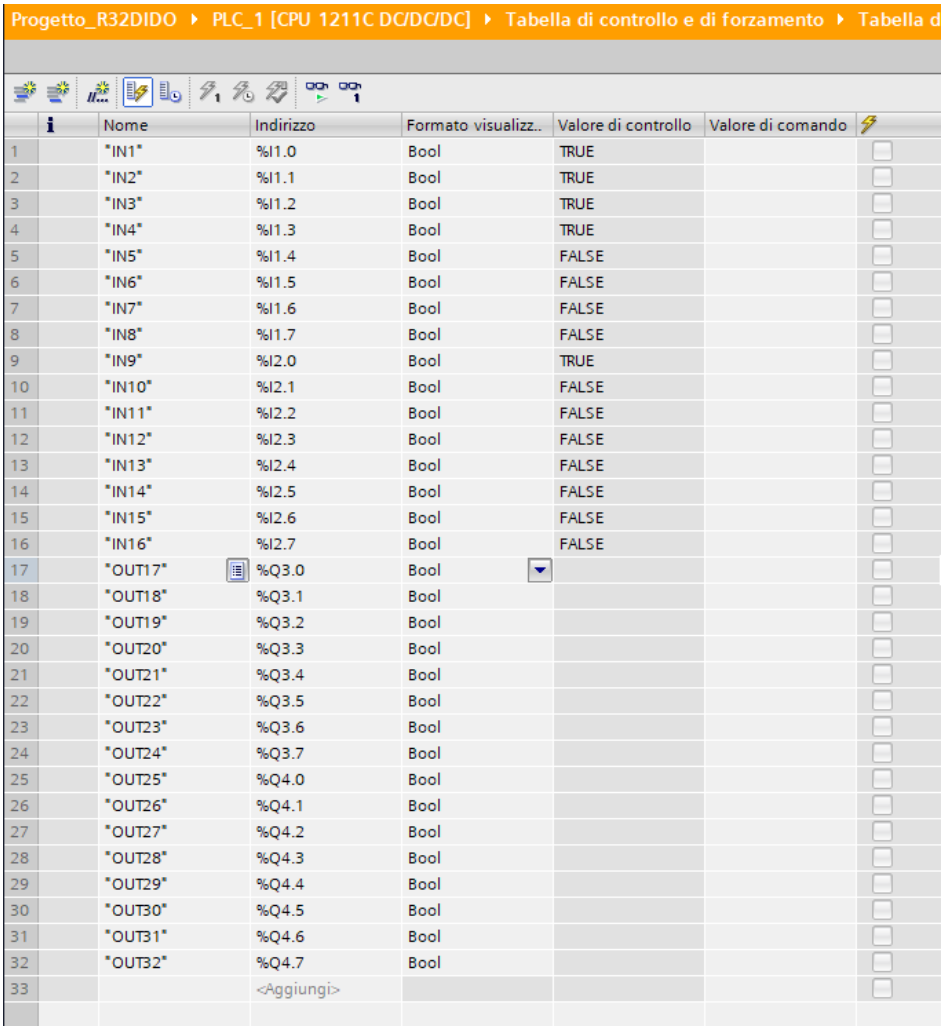
| *INPUT/OUTPUT* | *DEFAULT ADDRESS IO CONFIGURED AS AN INPUT* | *DEFAULT ADDRESS IO CONFIGURED AS AN OUTPUT* |
|---|---|---|
| IO1 | I1.0 | Q1.0 |
| IO2 | I1.1 | Q1.1 |
| IO3 | I1.2 | Q1.2 |
| IO4 | I1.3 | Q1.3 |
| IO5 | I1.4 | Q1.4 |
| IO6 | I1.5 | Q1.5 |
| IO7 | I1.6 | Q1.6 |
| IO8 | I1.7 | Q1.7 |
| IO9 | I2.0 | Q2.0 |
| IO10 | I2.1 | Q2.1 |
| IO11 | I2.2 | Q2.2 |
| IO12 | I2.3 | Q2.3 |
| IO13 | I2.4 | Q2.4 |
| IO14 | I2.5 | Q2.5 |
| IO15 | I2.6 | Q2.6 |
| IO16 | I2.7 | Q2.7 |
| IO17 | I3.0 | Q3.0 |
| IO18 | I3.1 | Q3.1 |
| IO19 | I3.2 | Q3.2 |
| IO20 | I3.3 | Q3.3 |
| IO21 | I3.4 | Q3.4 |
| IO22 | I3.5 | Q3.5 |
| IO23 | I3.6 | Q3.6 |
| IO24 | I3.7 | Q3.7 |
| IO25 | I4.0 | Q4.0 |
| IO26 | I4.1 | Q4.1 |
| IO27 | I4.2 | Q4.2 |
| IO28 | I4.3 | Q4.3 |
| IO29 | I4.4 | Q4.4 |
| IO30 | I4.5 | Q4.5 |
| IO31 | I4.6 | Q4.6 |
| IO32 | I4.7 | Q4.7 |

So if, for example, I need 16 inputs and 16 outputs, I can use the Booleans from I1.0 to I2.7 for the inputs (which will therefore be found in the IO1 ... IO16) and the Booleans from Q3.0 to Q4.7 for the outputs (which will then be found in the IO17 ... IO32).

**ATTENTION!**

**An IO configured as an input cannot be controlled as an output.**
**An IO configured as an output cannot be read as an input.**

Always following our example (16 inputs and 16 outputs) we define the 16 inputs and 16 outputs in the standard variables table:

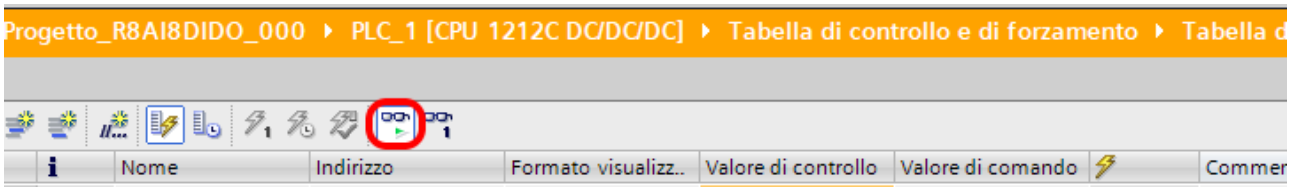


Progetto_R32DIDO ▸ PLC_1 [CPU 1211C DC/DC/DC] ▸ Tabella di controllo e di forzamento ▸ Tabella d

| | Nome | Indirizzo | Formato visualizz.. | Valore di controllo | Valore di comando |
|---|---|---|---|---|---|
| 1 | "IN1" | %I1.0 | Bool | TRUE | |
| 2 | "IN2" | %I1.1 | Bool | TRUE | |
| 3 | "IN3" | %I1.2 | Bool | TRUE | |
| 4 | "IN4" | %I1.3 | Bool | TRUE | |
| 5 | "IN5" | %I1.4 | Bool | FALSE | |
| 6 | "IN6" | %I1.5 | Bool | FALSE | |
| 7 | "IN7" | %I1.6 | Bool | FALSE | |
| 8 | "IN8" | %I1.7 | Bool | FALSE | |
| 9 | "IN9" | %I2.0 | Bool | TRUE | |
| 10 | "IN10" | %I2.1 | Bool | FALSE | |
| 11 | "IN11" | %I2.2 | Bool | FALSE | |
| 12 | "IN12" | %I2.3 | Bool | FALSE | |
| 13 | "IN13" | %I2.4 | Bool | FALSE | |
| 14 | "IN14" | %I2.5 | Bool | FALSE | |
| 15 | "IN15" | %I2.6 | Bool | FALSE | |
| 16 | "IN16" | %I2.7 | Bool | FALSE | |
| 17 | "OUT17" | %Q3.0 | Bool | | |
| 18 | "OUT18" | %Q3.1 | Bool | | |
| 19 | "OUT19" | %Q3.2 | Bool | | |
| 20 | "OUT20" | %Q3.3 | Bool | | |
| 21 | "OUT21" | %Q3.4 | Bool | | |
| 22 | "OUT22" | %Q3.5 | Bool | | |
| 23 | "OUT23" | %Q3.6 | Bool | | |
| 24 | "OUT24" | %Q3.7 | Bool | | |
| 25 | "OUT25" | %Q4.0 | Bool | | |
| 26 | "OUT26" | %Q4.1 | Bool | | |
| 27 | "OUT27" | %Q4.2 | Bool | | |
| 28 | "OUT28" | %Q4.3 | Bool | | |
| 29 | "OUT29" | %Q4.4 | Bool | | |
| 30 | "OUT30" | %Q4.5 | Bool | | |
| 31 | "OUT31" | %Q4.6 | Bool | | |
| 32 | "OUT32" | %Q4.7 | Bool | | |
| 33 | | <Aggiungi> | | | |

Now compile, send the project and go online with the PLC.

Once online, press the glasses icon to update the status of the variables.




Under the "Control value" column you can read the I/O value in real time.

To control the outputs, it is necessary to enter "TRUE" or "FALSE" in the "Command value" column and then press the icon with the lightning bolt to order the writing. Note the status of the LED relating to the commanded output.

In the "Control value" column, the status of the outputs is also read in real time.

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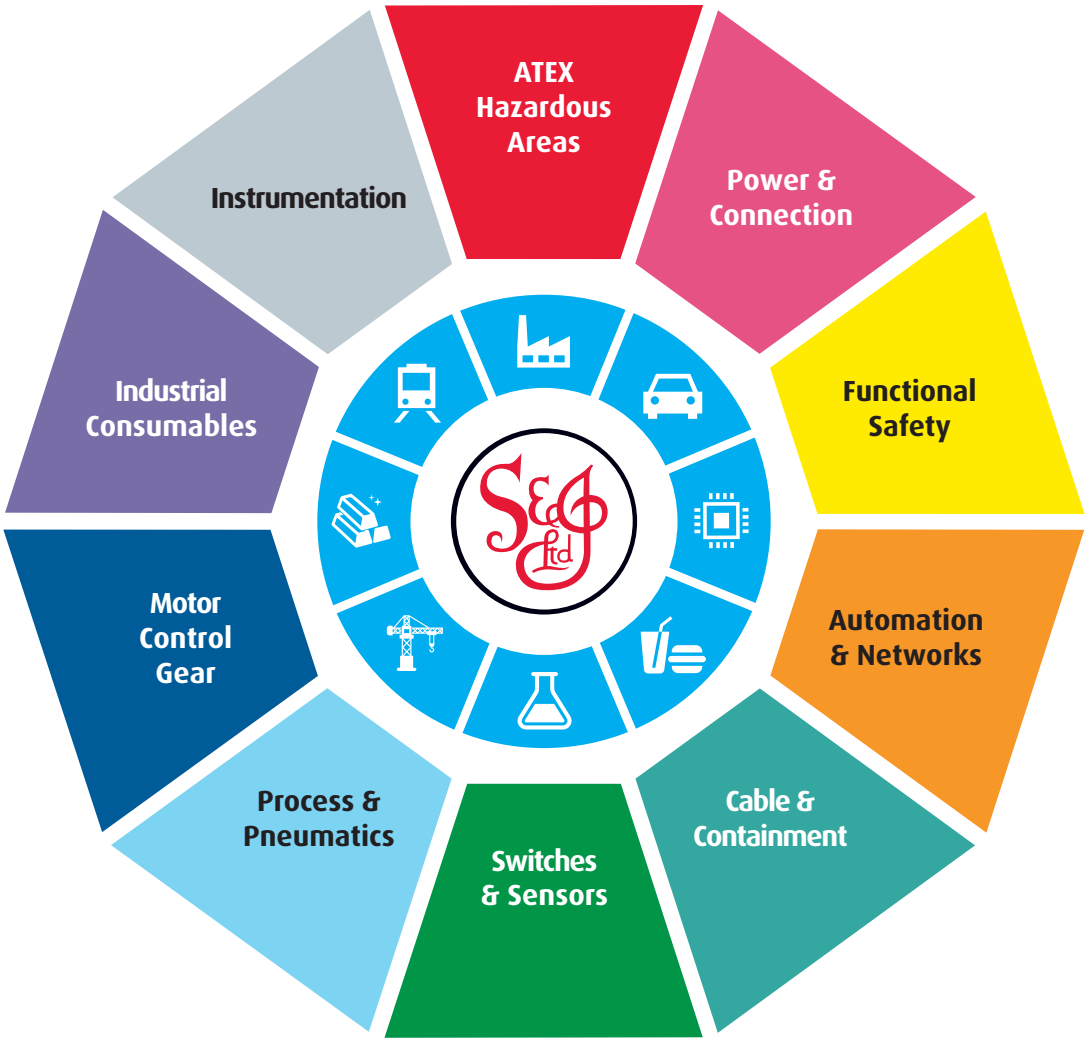


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