USER MANUAL

Z-KEY-P, R-KEY-LT-P, Z-KEY-2ETH-P

PROFINET IO / MODBUS RTU-TCP GATEWAYS

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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.
Seneca is not responsible for failures, breakages and accidents caused by ignorance or failure to apply the stated requirements.
Seneca is not responsible for any unauthorized modifications.
Seneca reserves the right to modify the device, for any commercial or construction requirement, without the obligation to promptly update the reference manuals.
No liability for the contents of this document can be accepted.
Use the concepts, examples and other content at your own risk.
There may be errors and inaccuracies in this document that could damage your system, so proceed with caution, the author(s) will not take responsibility for it.
Technical specifications are subject to change without notice.

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ORIGINAL INSTRUCTIONS

Product information	commerciale@seneca.it

Document revisions

DATE	REVISION	NOTES	AUTHOR
16/12/2022	0	First revision for new dual core CPU Aligned with firmware 117 revision	MM
26/04/2023	1	New operating modes introduced with firmware 204 revision	MM
27/04/2023	2	Various fixes	MM
21/07/2023	3	Corrected reporting on Chapter 8: MODBUS DIAGNOSTICS	AZ

TABLE OF CONTENTS

1. PRELIMINARY WARNINGS

⚠ ATTENTION!

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

⚠ ATTENTION!

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.
SENECA, its subsidiaries, affiliates, group companies, suppliers and distributors do not guarantee that the functions fully meet the customer's expectations or that the device, firmware and software should have no errors or operate continuously.

1.1. DESCRIPTION

The Z-KEY-P, R-KEY-LT-P, Z-KEY-2ETH-P products allow to convert data coming from the Modbus serial bus or Modbus TCP-IP Ethernet into the Profinet IO bus or vice versa.

1.2. PROFINET IO PROTOCOL

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

MEMORY	
Memory size	In Gateway Master and Gateway Slave modes: 512 bytes max in reading and 512 bytes max in writing (20 slots max)

1.3. PROFINET GATEWAY DEVICES

PRODUCT	*ETHERNET PORTS No.*	*PORTS No. RS232/RS485 (CONFIGURABLE)*	*RS485 PORTS No.*	*ISOLATED SERIAL PORTS*
Z-KEY-P	1	1	1	Yes, both ports
R-KEY-LT-P	1	1	NO	NO
Z-KEY-2ETH-P	2	1	1	Yes, both ports

2. ETHERNET PORT

The factory configuration of the Ethernet port is:

STATIC IP: 192.168.90.101
SUBNET MASK: 255.255.255.0
GATEWAY: 192.168.90.1

Multiple devices must not be inserted on the same network with the same static IP.

⚠ ATTENTION!

DO NOT CONNECT 2 OR MORE FACTORY-CONFIGURED DEVICES ON THE SAME NETWORK, OR THE DEVICE WILL NOT WORK
(CONFLICT OF IP ADDRESSES 192.168.90.101)

3. FIRMWARE UPDATE

In order to improve, add or optimize the functions of the product, Seneca releases firmware updates on the device section on the www.seneca.it website

The firmware update is made using the appropriate command on the Easy Setup2 software or the webserver.

⚠ ATTENTION!

UPDATING THE FIRMWARE FROM A 1xx TO A 2xx REVISION WILL LOSE THE CONFIGURATION. ON THE SENECA WEBSITE THERE IS AN EXCEL TEMPLATE THAT IMPORTS A CONFIGURATION OF THE TAGS CARRIED OUT WITH A 1xx FIRMWARE AND CONVERTS IT IN THE NEW MODE "GATEWAY PROFINET IO MODBUS MASTER" OF THE 2xx FIRMWARE REVISIONS
FOR MORE INFO REFER TO THE TEMPLATE ITSELF

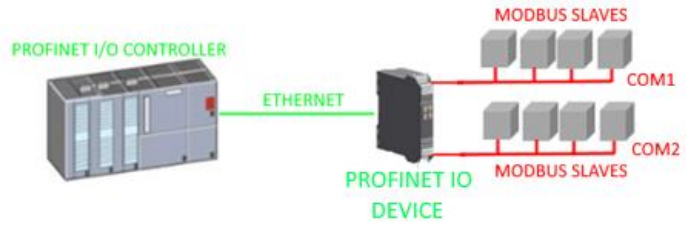
⚠ ATTENTION!
NOT TO DAMAGE THE DEVICE DO NOT REMOVE THE POWER SUPPLY DURING THE FIRMWARE UPDATE OPERATION.

4. OPERATING MODE

The Gateway allows you to operate in 3 different modes:
PROFINET IO DEVICE / MODBUS MASTER GATEWAY
PROFINET IO DEVICE / MODBUS SLAVE GATEWAY
GATEWAY WITH PORT#1 AND PORT#2 MASTER TAG.

4.1. PROFINET IO DEVICE / MODBUS MASTER GATEWAY

This operating mode is the most used and allows you to connect a Profinet IO PLC controller with Modbus RTU/ASCII Slave I/O devices

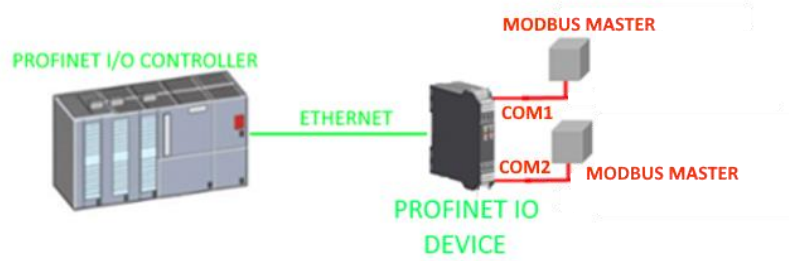


The Gateway, in the serial part, works as a Modbus master device and in the Ethernet part as a Profinet IO Device.
Modbus requests (read or write commands) are configured in the device and a GSDML file is automatically generated.
Once this file is imported into the PLC development software (e.g. TIA PORTAL) all configured IO will be accessible without any other configuration.

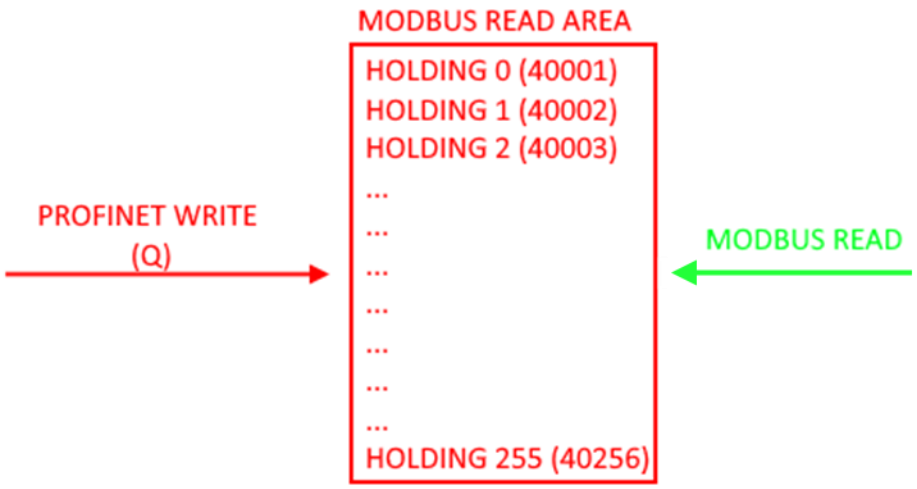
In addition to serial devices it is also possible to connect up to 3 Modbus TCP-IP servers.

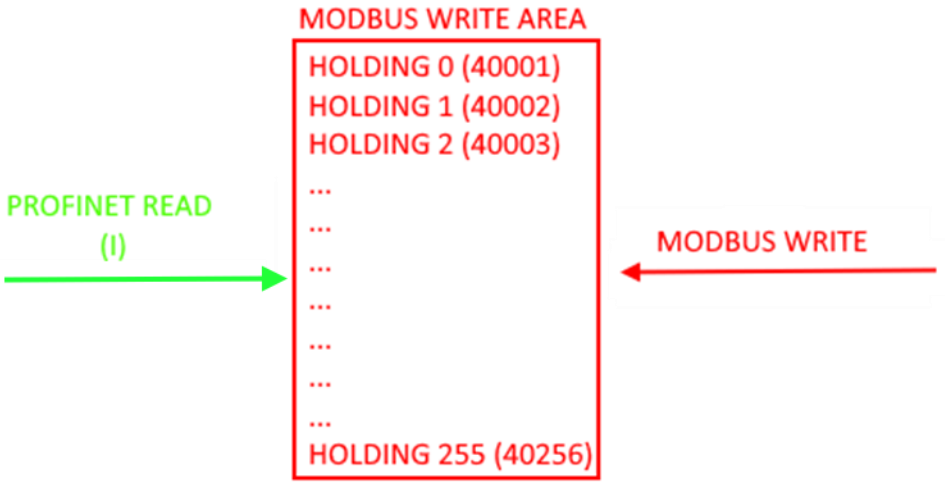
4.2. PROFINET IO DEVICE / MODBUS SLAVE GATEWAY

This operating mode allows you to connect a Profinet IO PLC controller with a maximum of 1 or 2 devices (based on the number of serial ports available in the gateway) of the Modbus RTU/ASCII Master type (typically of the PLCs).



The gateway provides two different areas of 512 bytes for reading and 512 bytes for writing.
Bytes are available from Modbus Holding Register 0 to Holding Register 255 inclusive.
The “Modbus Read Area” is only readable by Modbus and only writable by Profinet.
The "Modbus Write Area" is only writable by Modbus and only readable by Profinet.



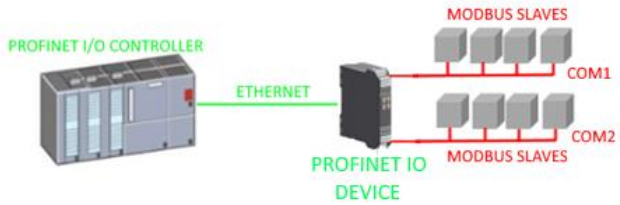


⚠ ATTENTION!

THE GATEWAY CREATES TWO DIFFERENT MODBUS AREAS, ONE FOR READING AND ONE FOR WRITING.
FOR EXAMPLE IF YOU WRITE BYTES FROM MODBUS THESE WILL END UP IN THE WRITING AREA AND THEN THEY WILL NOT BE READABLE BY THE MODBUS ITSELF

4.3. GATEWAY WITH PORT#1 AND PORT#2 MASTER TAG

This operating mode ***is not recommended for use by the customer***, it has been maintained for backward compatibility with previous versions of the gateway and allows you to connect a Profinet IO PLC controller with Modbus RTU/ASCII Slave I/O devices



The Gateway, in the serial part, works as a Modbus master device and in the Ethernet part as a Profinet IO Device.
Differently from the *GATEWAY PROFINET IO DEVICE / MODBUS MASTER* mode, here the Modbus commands are not defined, only the variables (TAGs), subsequently the firmware internally performs an optimization by creating Modbus request commands.
Also in this mode it is possible to define, in addition to the serial devices, up to 3 Modbus TCP-IP servers.

5. *STEP-BY-STEP DEVICE CONFIGURATION EXAMPLE USING EASY SETUP 2 AND TIA PORTAL*

The easiest method to configure the gateway is through the Easy Setup2 software.
For more information, refer to the help in the software.

5.1. "PROFINET IO - MODBUS MASTER GATEWAY" CONFIGURATION

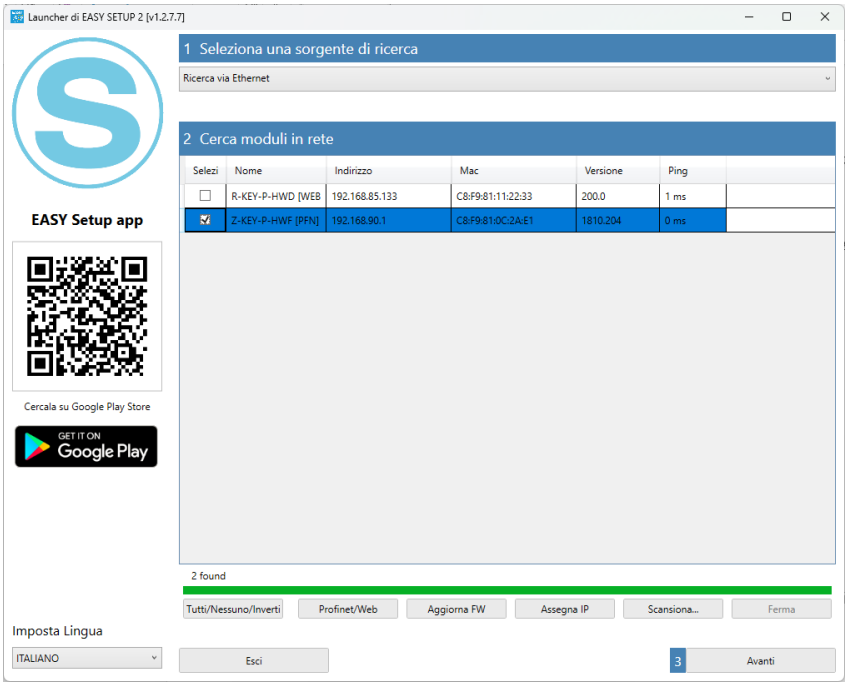
You want to connect a Siemens™ PLC to two Seneca Modbus RTU slave devices:
Z-10-D-IN (SLAVE STATION ADDRESS 1)

Z-10-D-OUT (SLAVE STATION ADDRESS 2).

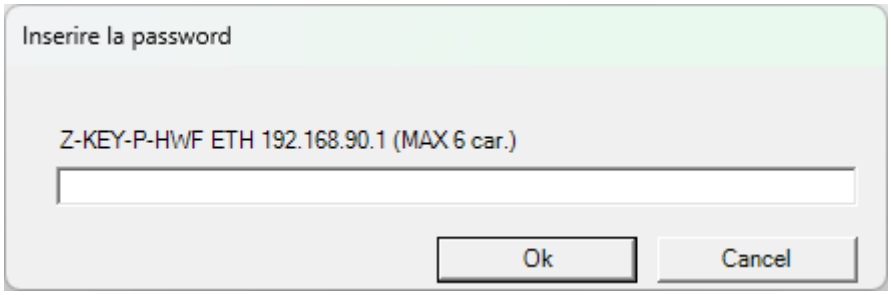
In the example we will use the Z-KEY-P product (the steps are exactly the same for the other R-KEY-LT-P and Z-KEY-2ETH devices).

The 10 digital inputs of the Z-10-D-IN are from coil address 1 to coil address 10 of station address #1
The 10 digital outputs of the Z-10-D-OUT are from coil address 1 to coil 10 of Station Address #2

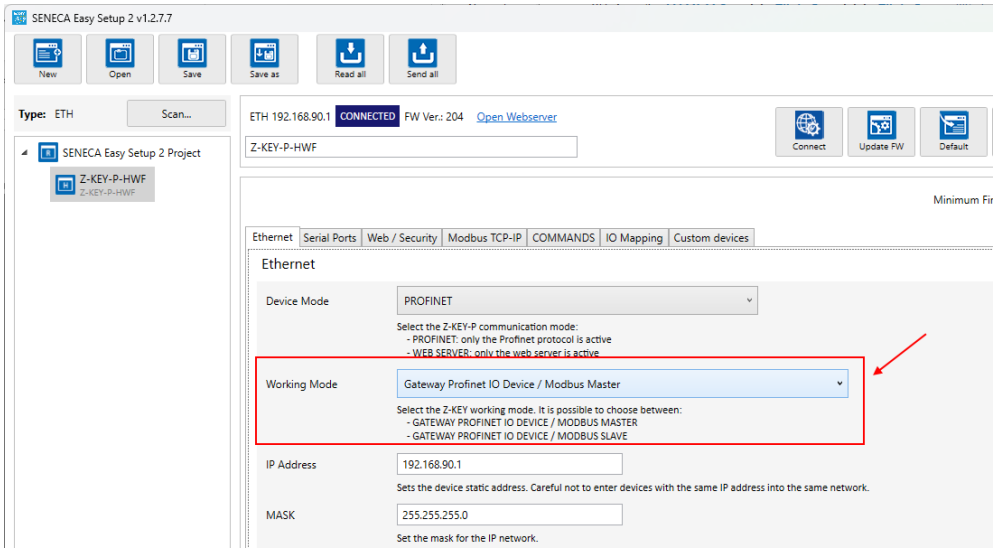
First we disconnect the PLC from the Ethernet network.
Now we use the Easy Setup 2 software selecting the Z-KEY-P product (with SCAN or in manual entry):



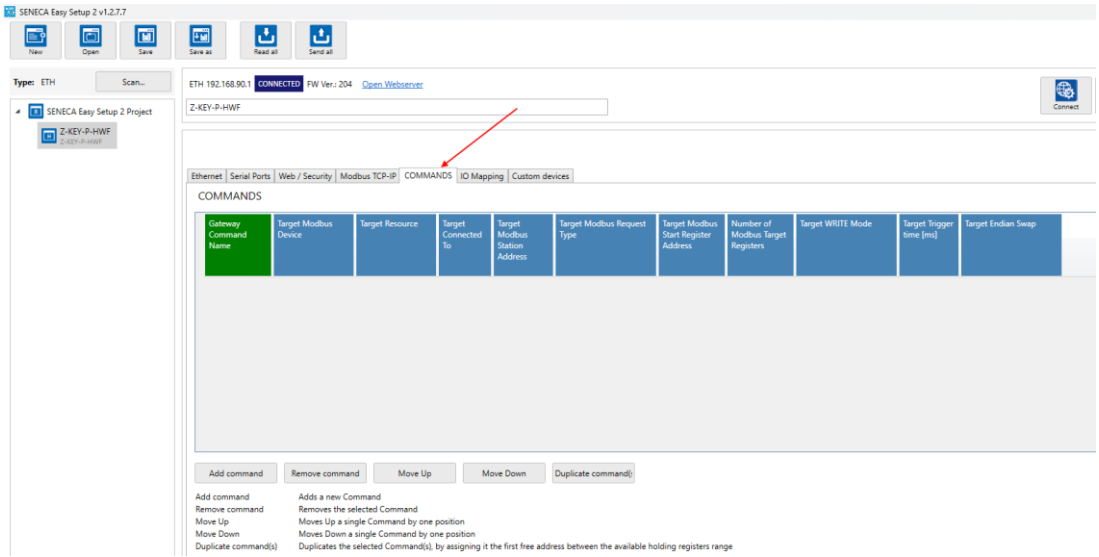
At this point the device access password is requested (default: admin):



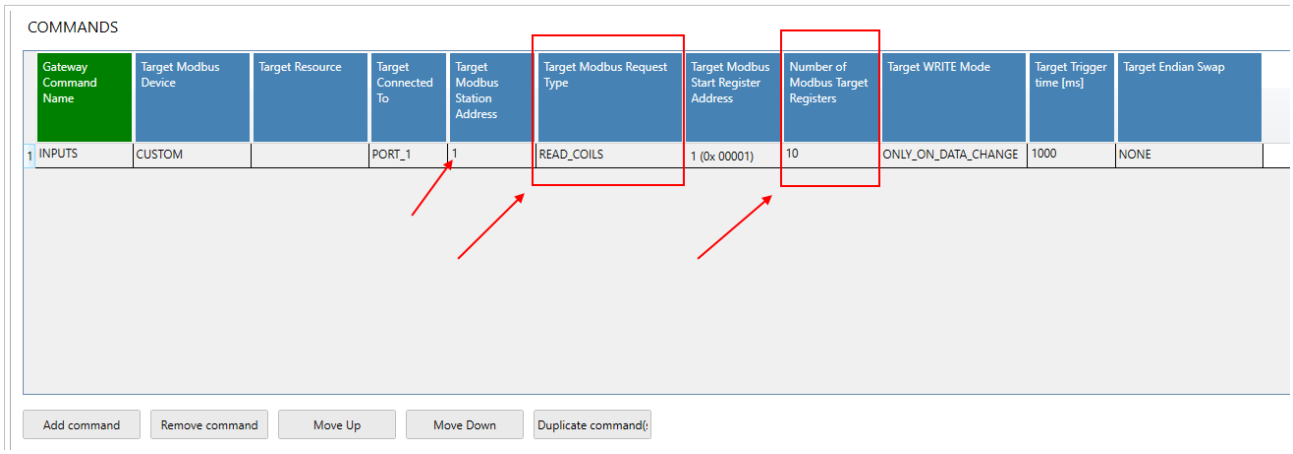
Once the password has been entered, select the Profinet IO Device / Modbus Master mode Gateway:



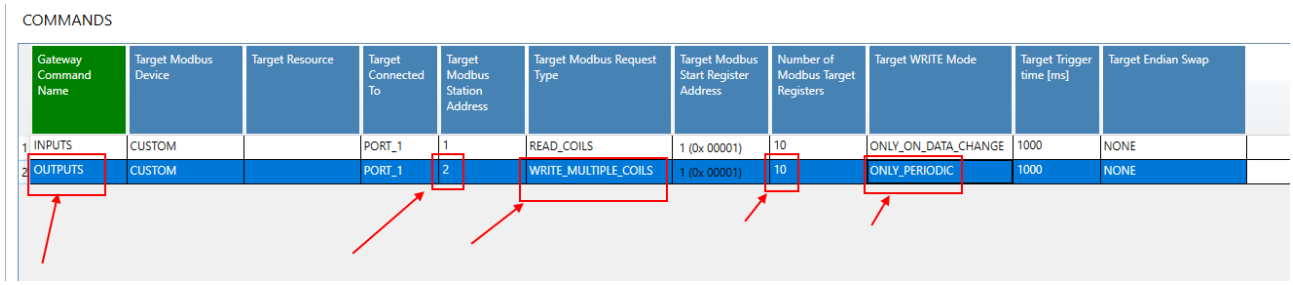
Now let's add the Modbus commands to acquire the inputs and write the outputs, select the COMMANDS section:



We add the reading of 10 coil registers relating to the 10 digital inputs of Z-10-D-IN:

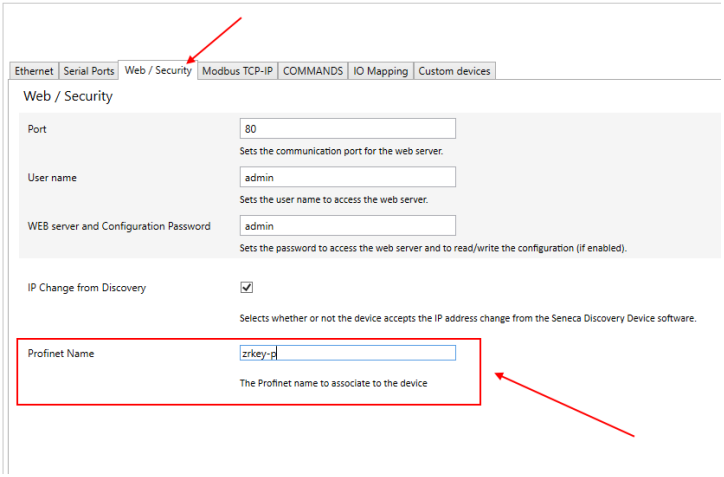


Now let's add the writing of 10 coil registers related to the 10 digital outputs of Z-10-D-OUT:

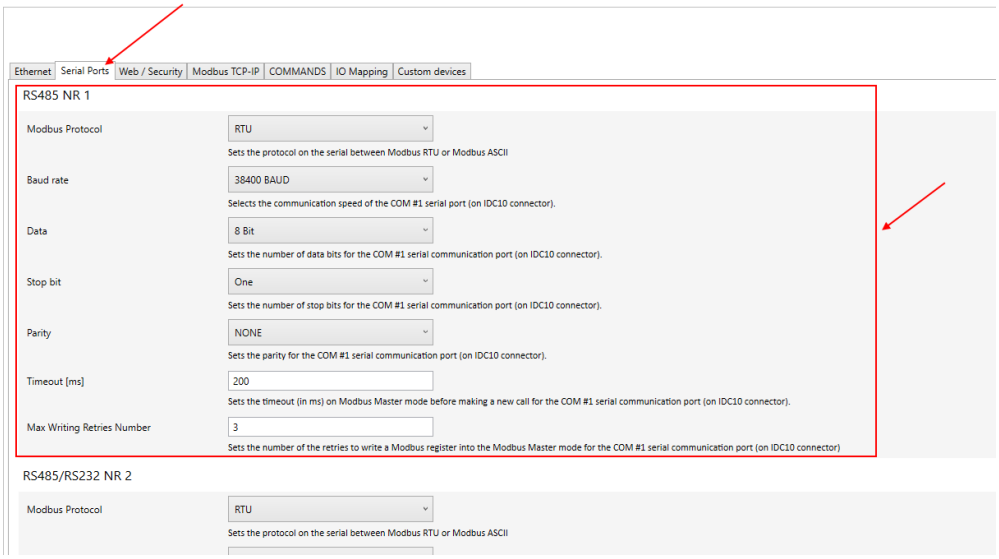


We set the writings in "Only Periodic" so they will always be performed every 1000 ms.

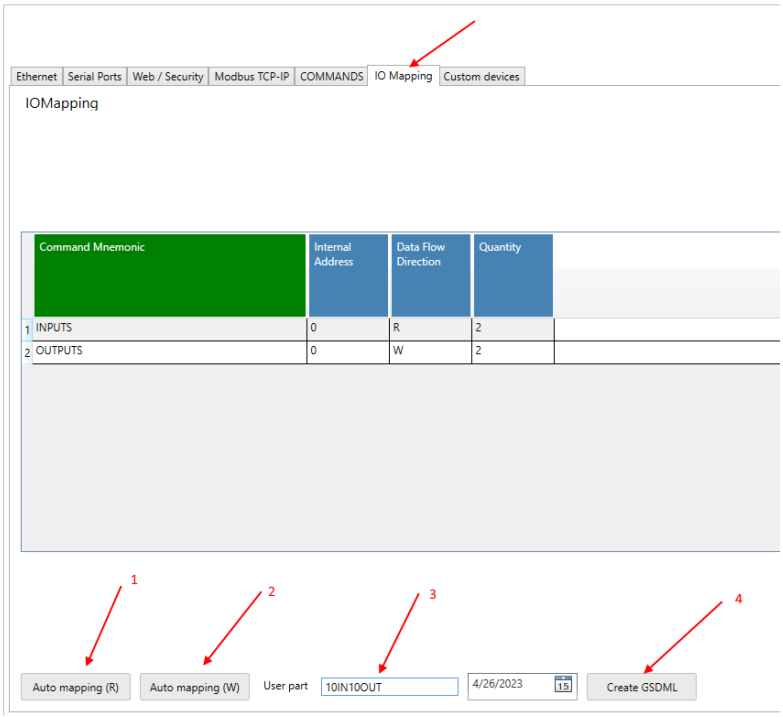
Enter the profinet name of the device:



Let's verify that serial port 1 is configured correctly for slave devices:



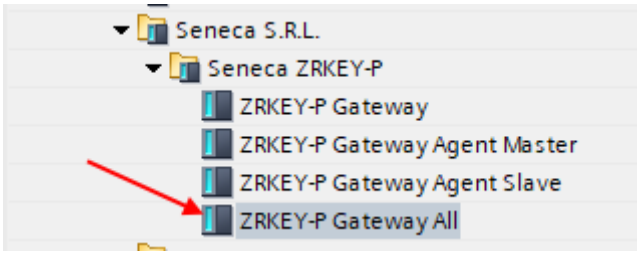
At this point we export the GSDML file from the "IO Mapping" section:



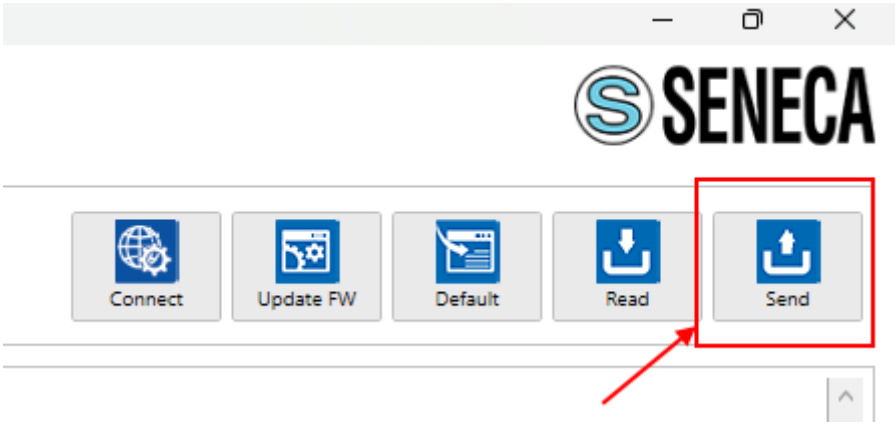
1 We press the button to calculate the offsets of the readings
2 We press the button to calculate the write offsets
3 We enter a name to recognize the GSDML file
4 We export the GSDML file

⚠ ATTENTION!

IT IS ALSO POSSIBLE TO DOWNLOAD A GSDML FILE (Gateway All) FROM THE WWW.SENECA.IT WEBSITE (IN THE SECTION RELATED TO PROFINET GATEWAYS) AND COMPOSE YOUR OWN CONFIGURATION FROM TIA PORTAL WITHOUT HAVING TO IMPORT THE FILE EACH TIME.

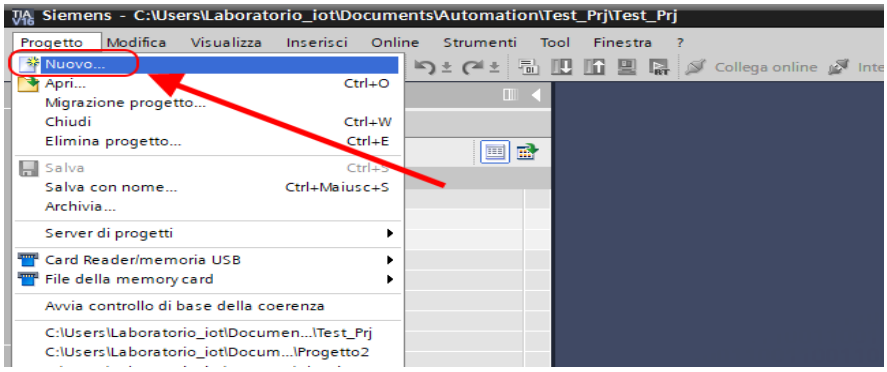


Now let's send the configuration to the device with the "send" button:

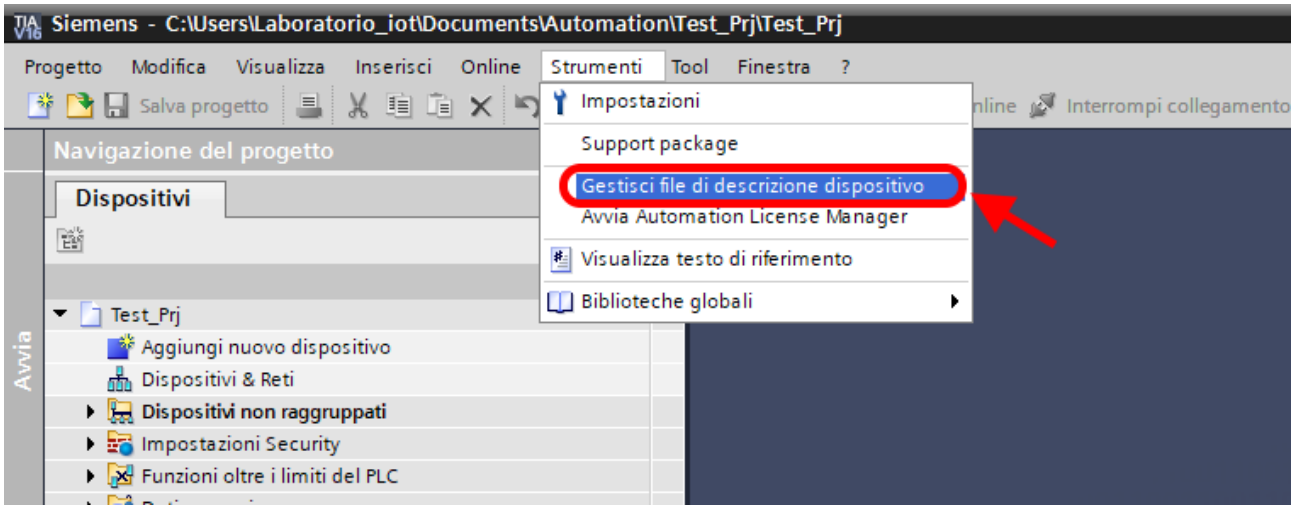


We can now move on to configuring the PLC via Tia Portal™:

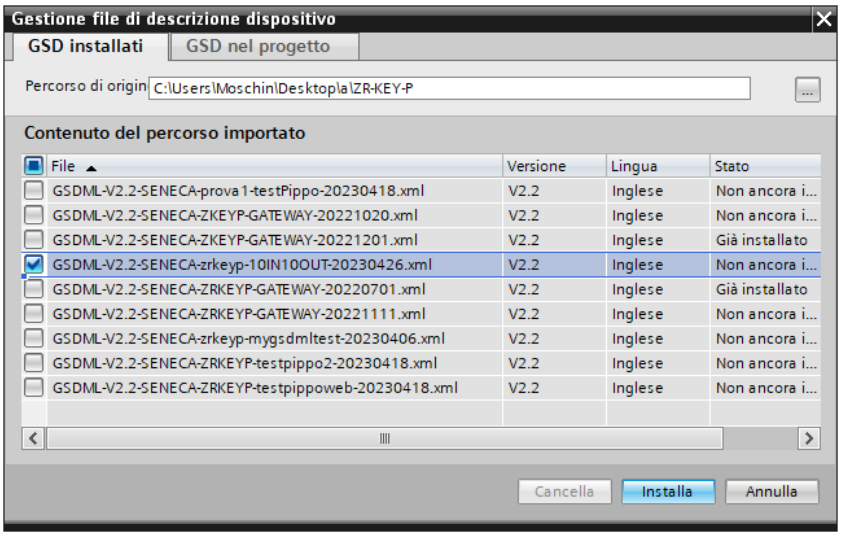
Creating a new project:



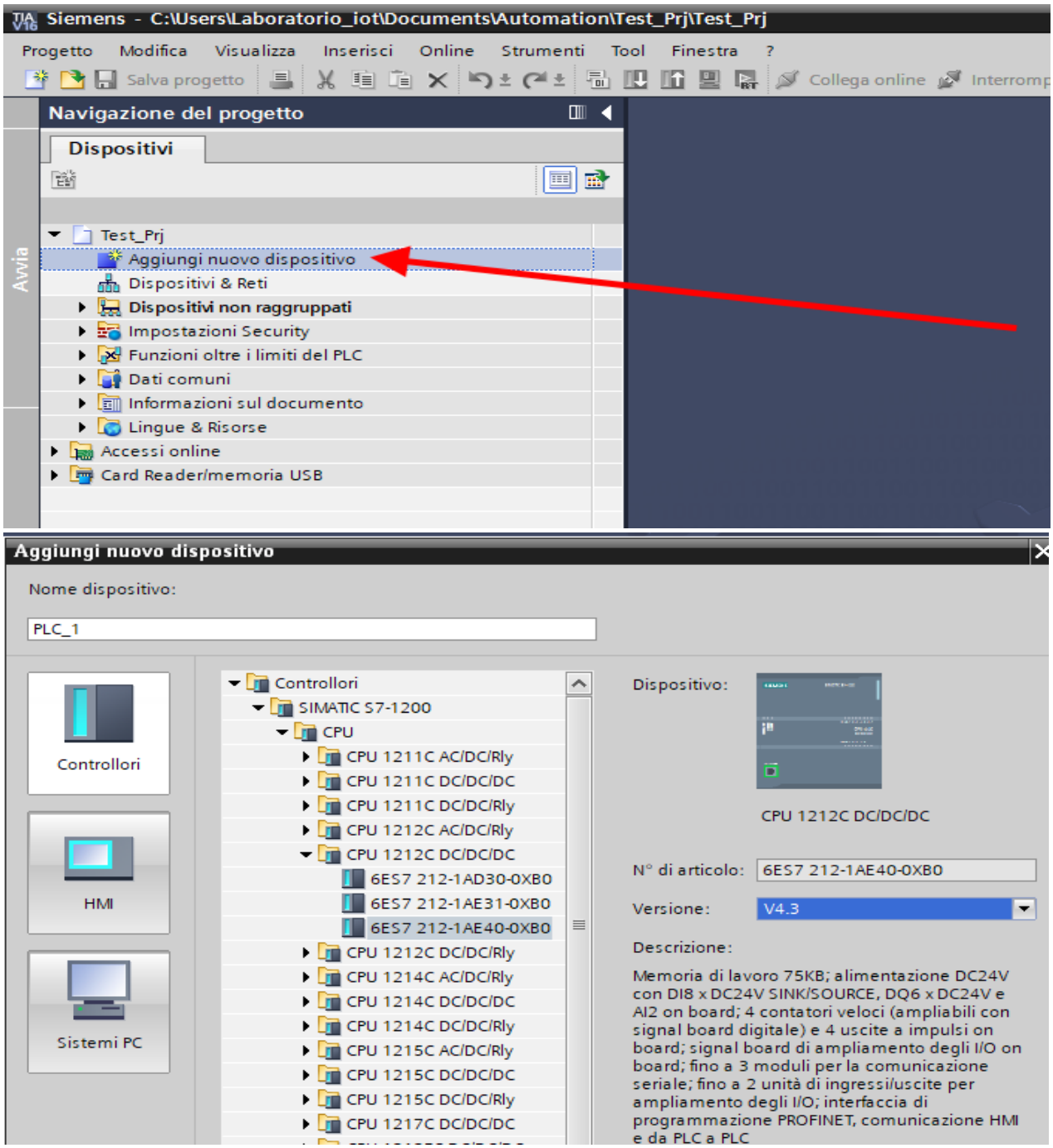
Install the GSD file of the Seneca product:



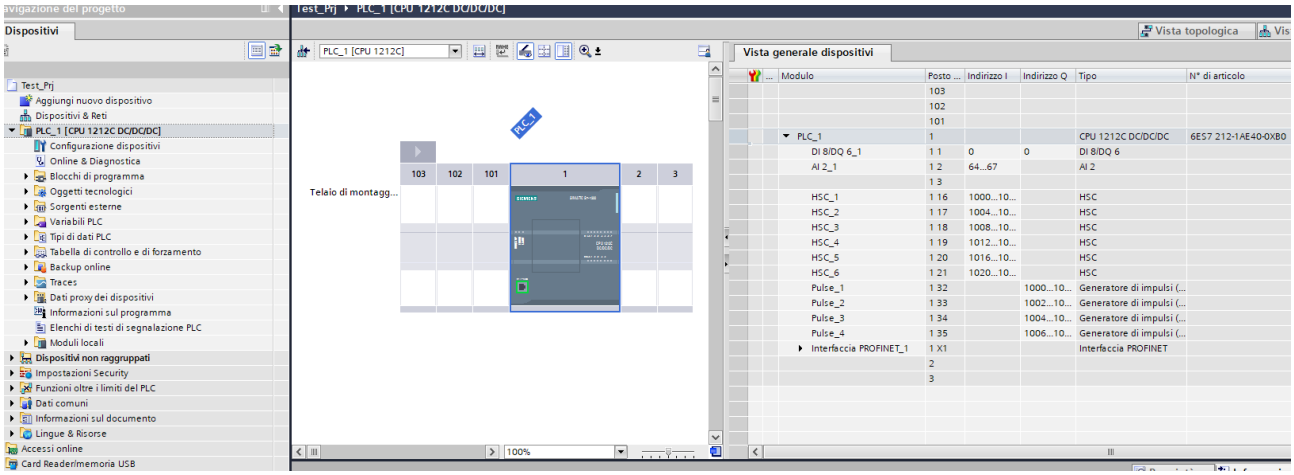
Point to the directory where we previously saved the GSDML file and press INSTALL.



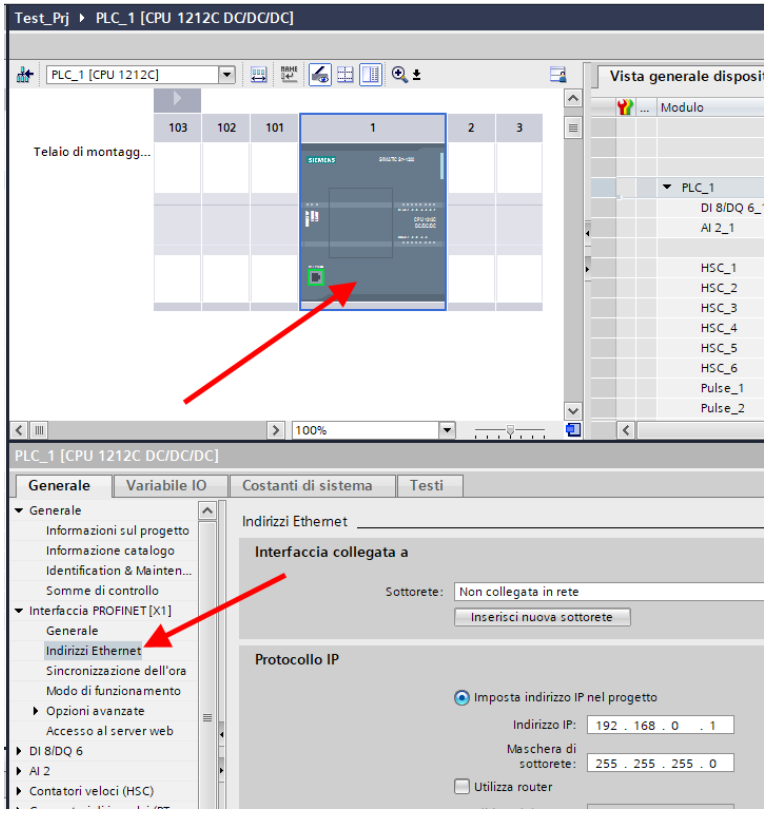
Now insert the Siemens PLC (in our example a SIEMATIC S7 1200), click on "Add new device ...":



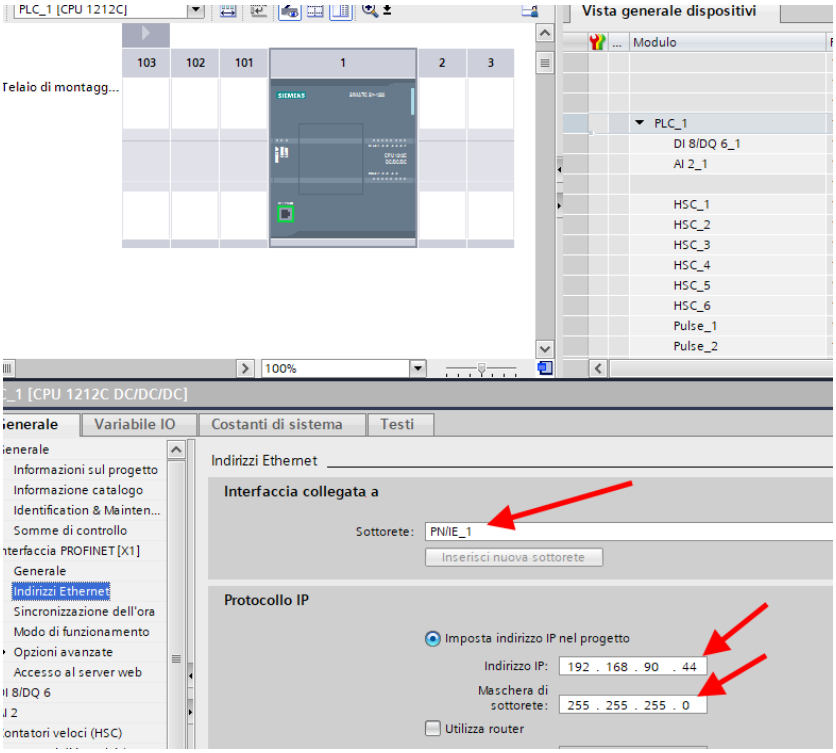
Confirm and the PLC will be added to the rack:



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

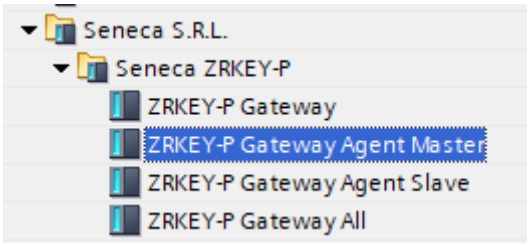


Set the IP you want for the PLC (in this case 192.168.90.44) and the PLC subnet:

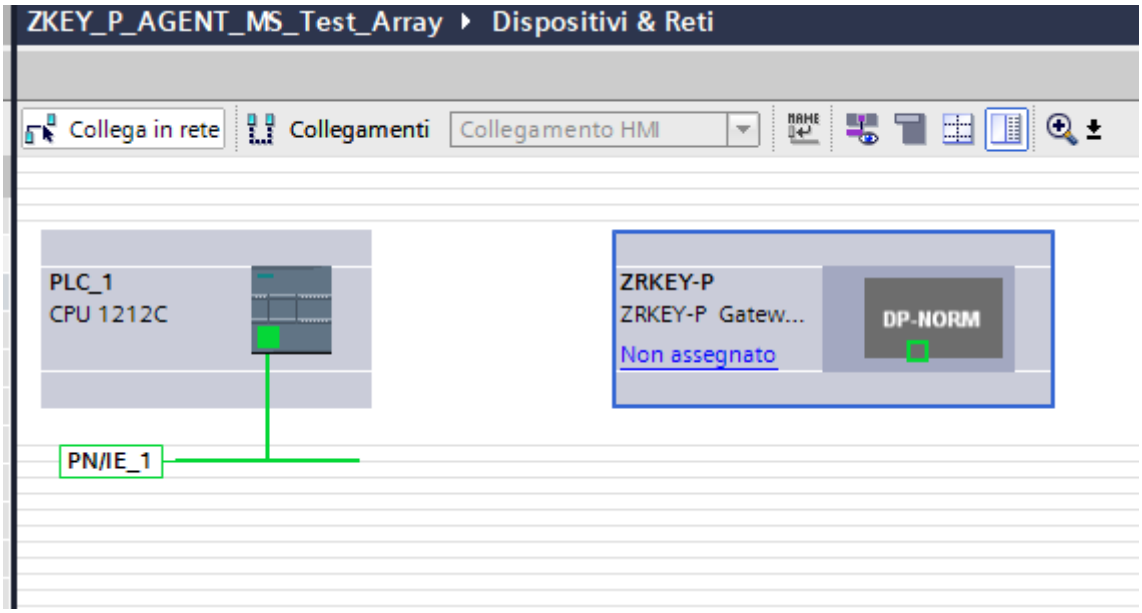


Move on to “devices and network” view:

On the right select "Hardware Catalogue" and then under "Additional Field Equipment" -> PROFINET IO -> GATEWAY -> Seneca SRL - ZR-KEY-P Gateway-> ZRKEY-P Gateway Agent Master

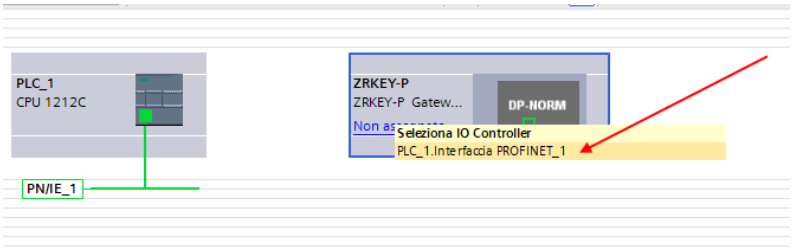


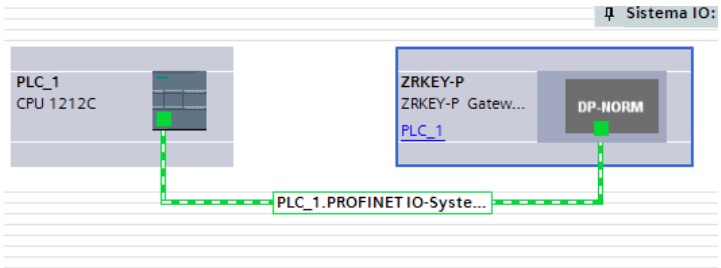
Drag the device to the network view:



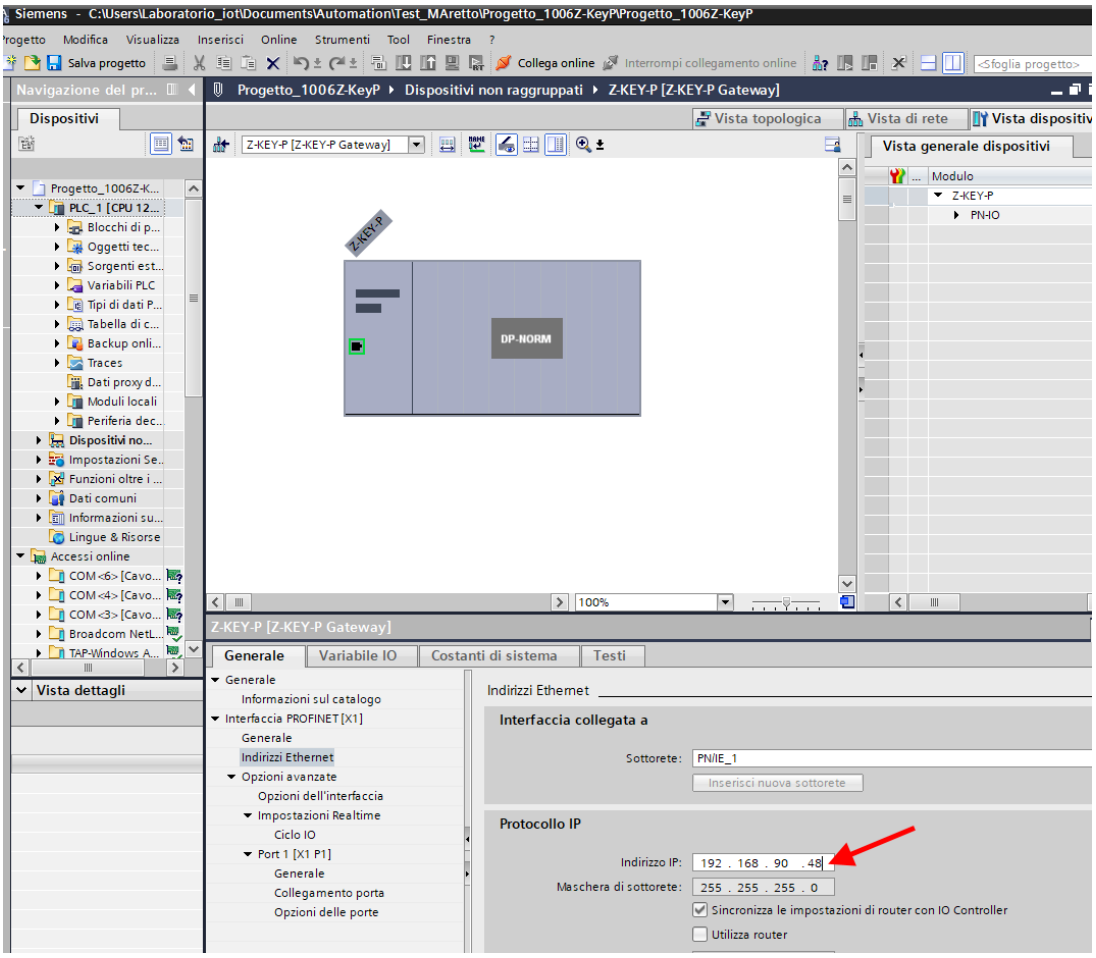
Now associate it with the PLC:

Click with the left mouse button on "Not assigned" and then select the PLC:

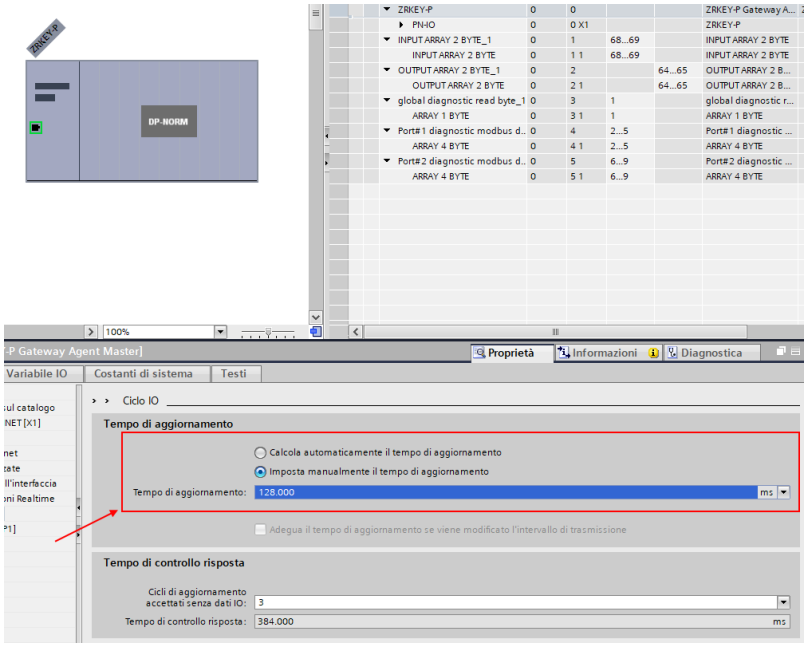




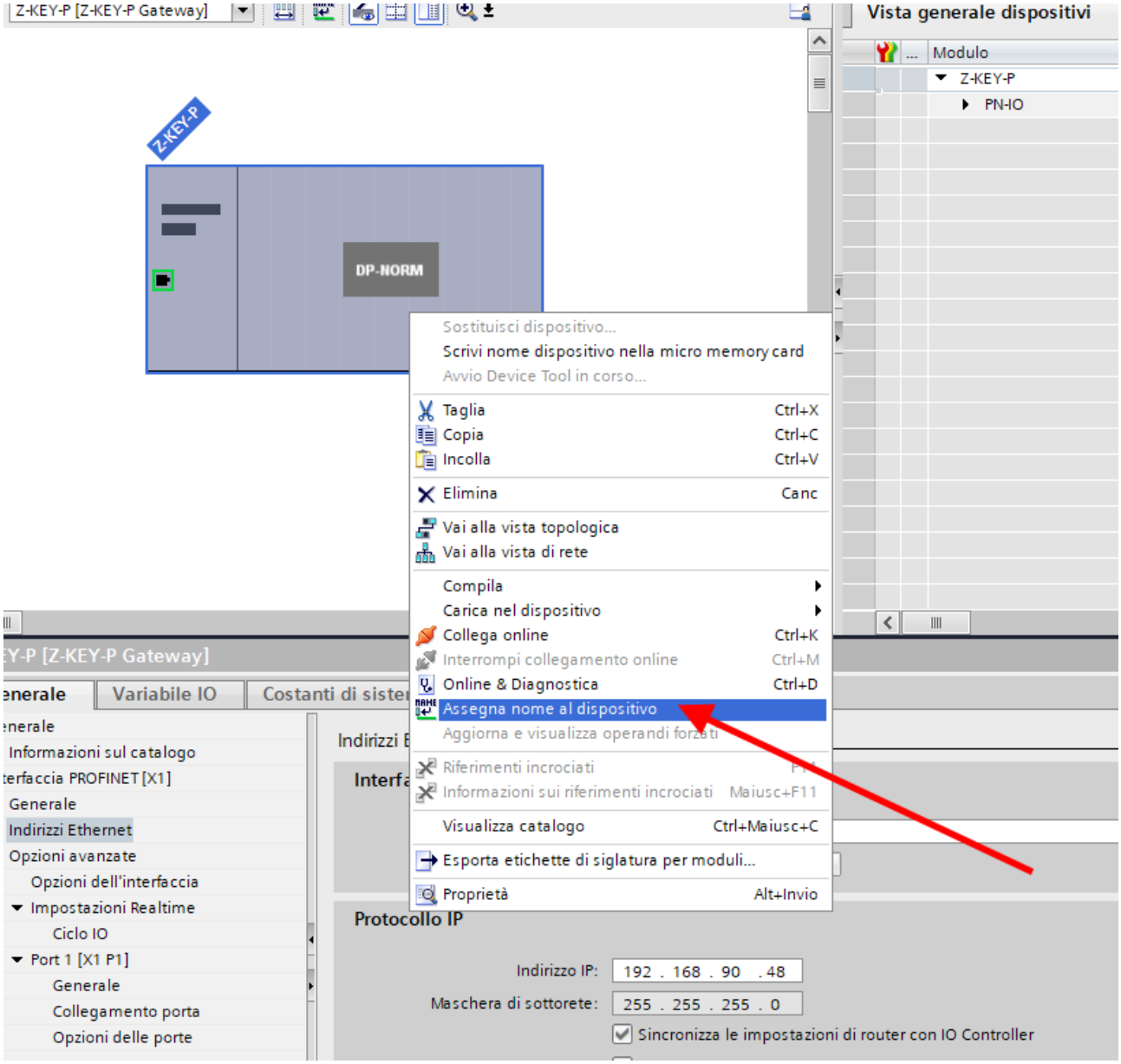
Click twice on the Seneca device and configure the IP address here too (for example 192.168.90.48) and the timing:



Depending on the project it is necessary to set the cycle time (typically 128 ms):

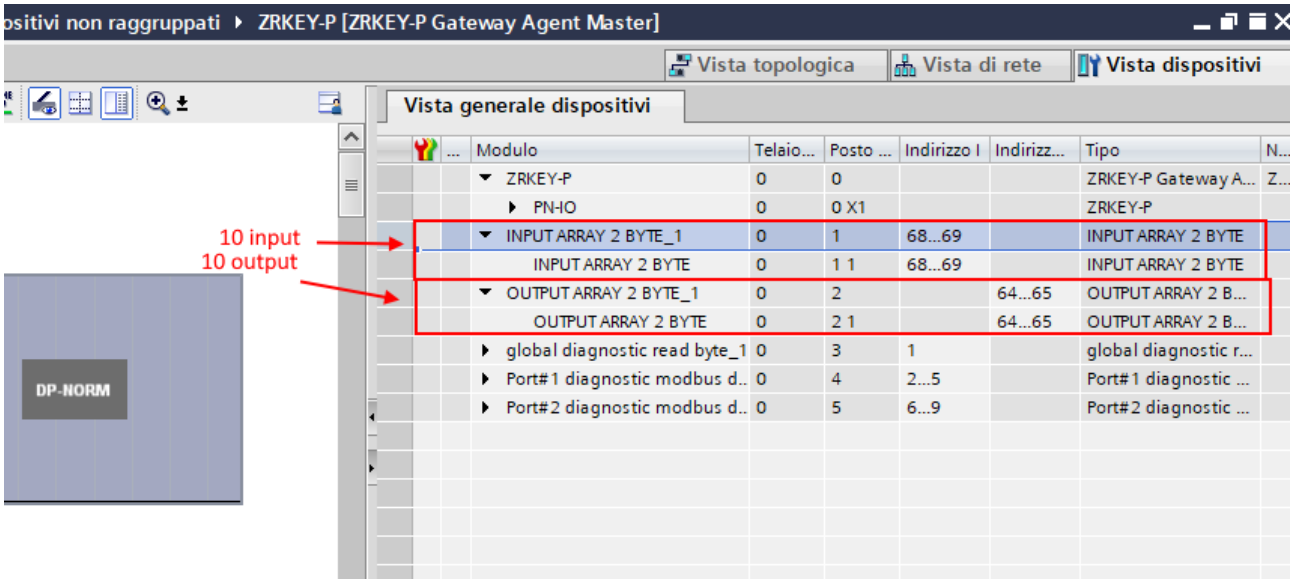


In Profinet the devices are identified by their name, so right click on the Seneca device and select "Assign device name"



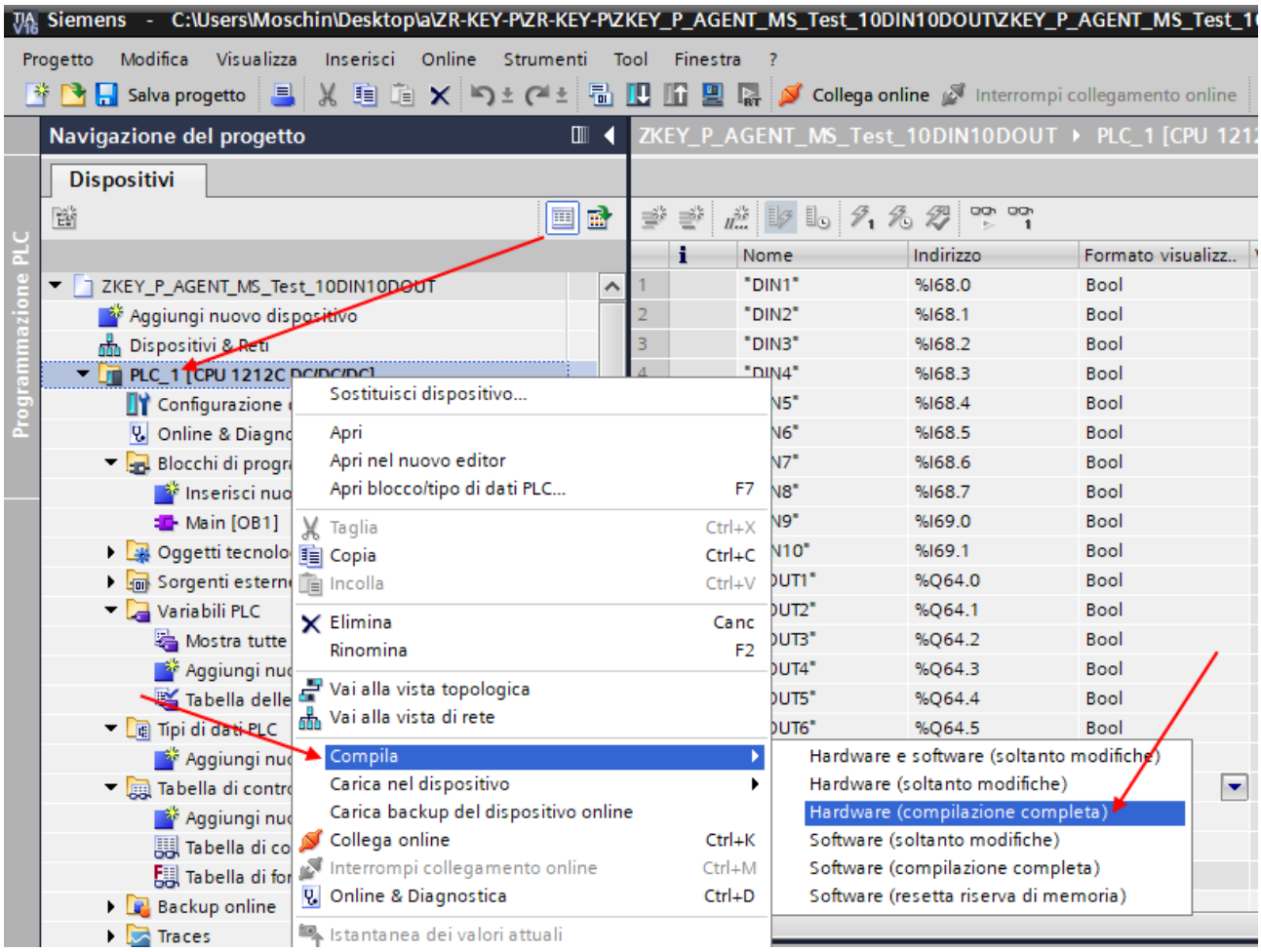
Scan the network with "Update list" and set (if necessary) the device name with "Assign name".

The IO configuration has already been prepared having imported the GSDML project (otherwise if you have imported the generic GSDML file "Gateway All" you must drag the correct number of read/write bytes):

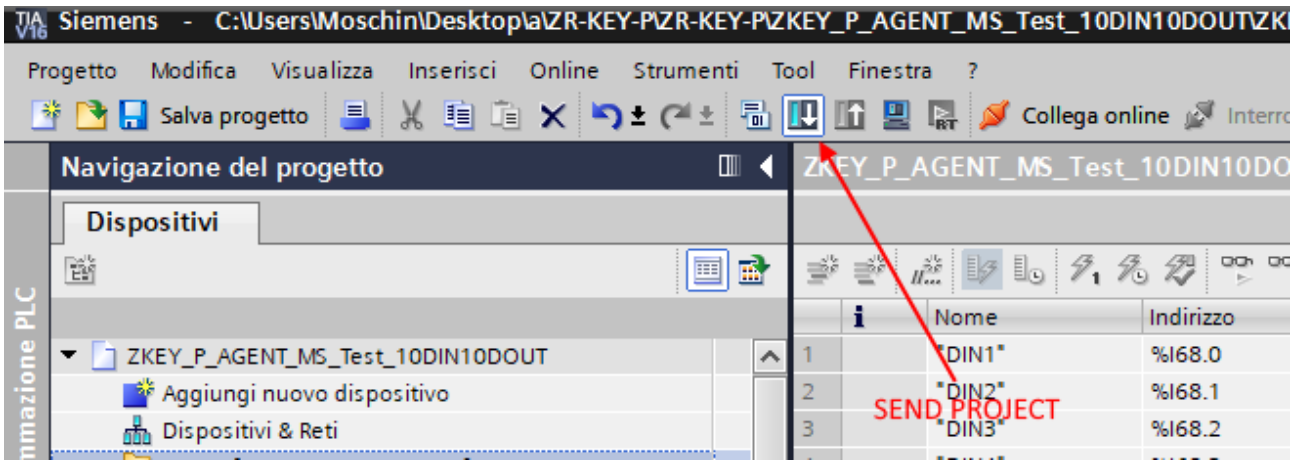


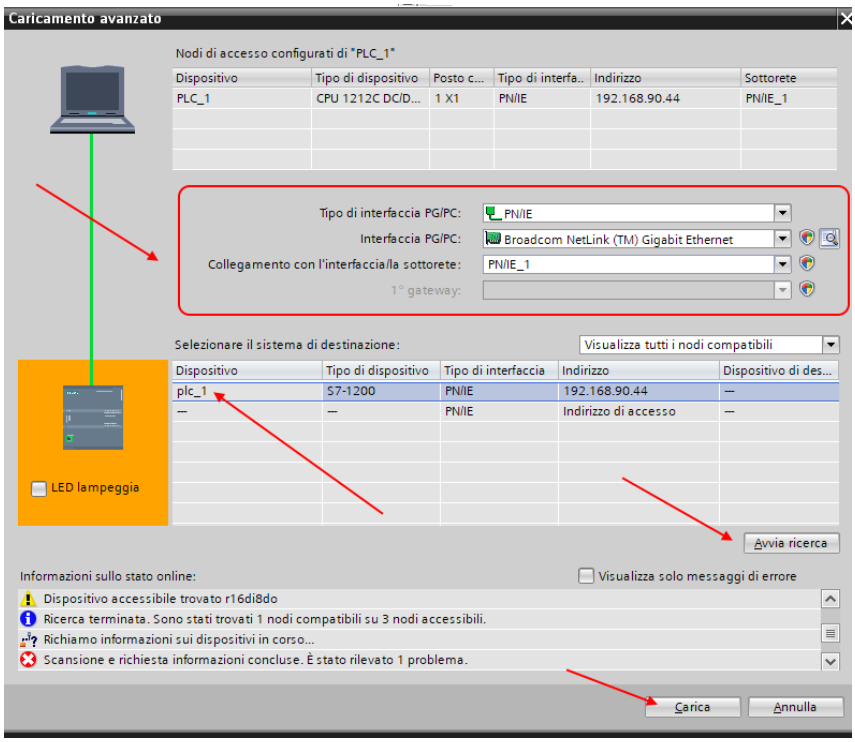
In particular, the 10 inputs are available at addresses I68 and I69 while the outputs are located at addresses Q64 and Q65.

Now the devices are configured, all that remains is to compile and send the configuration to the PLC.
To compile we select the complete hardware compilation:

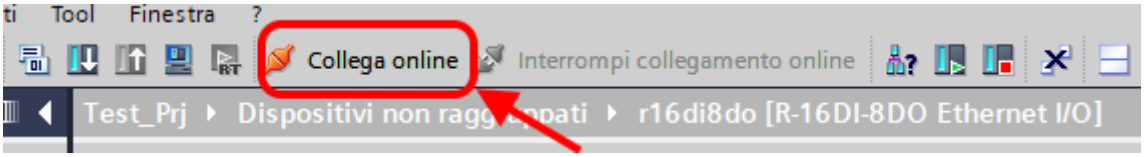


Then press icon to send the project to the PLC:

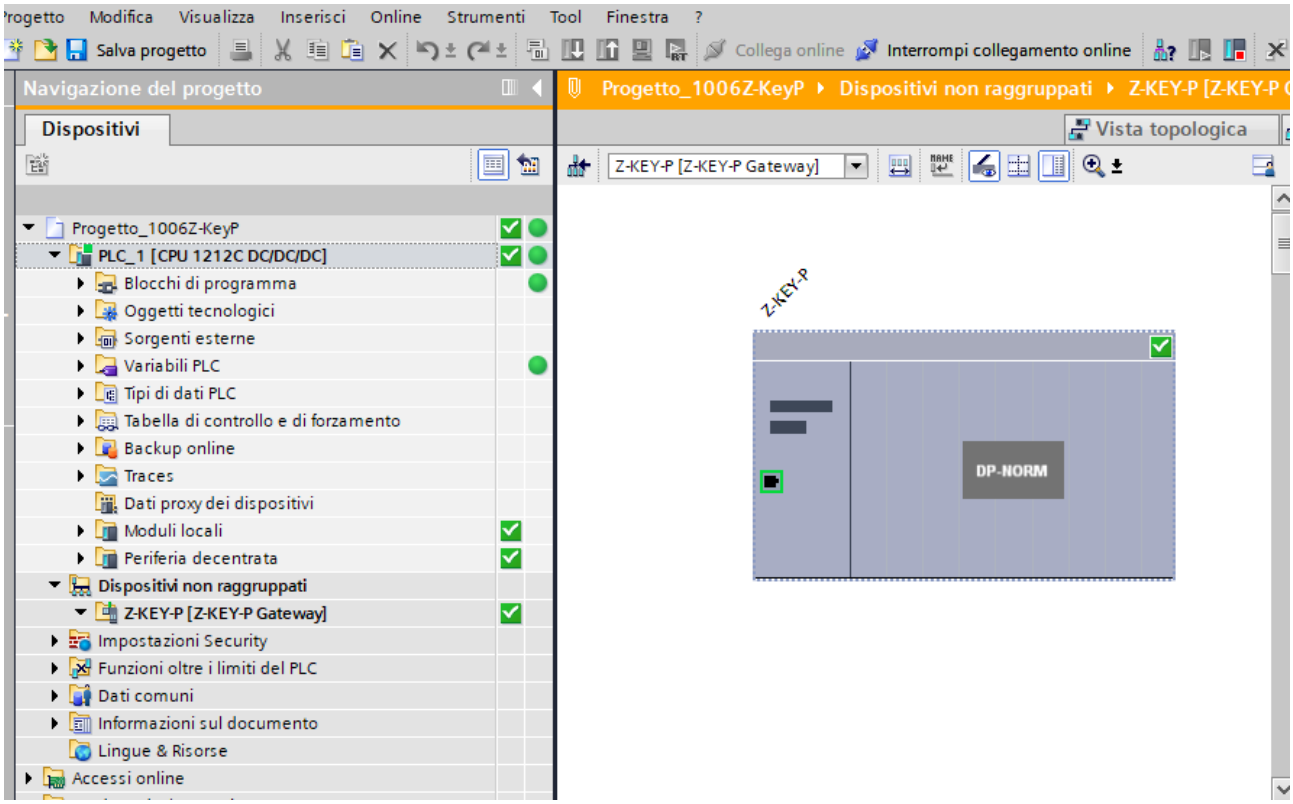




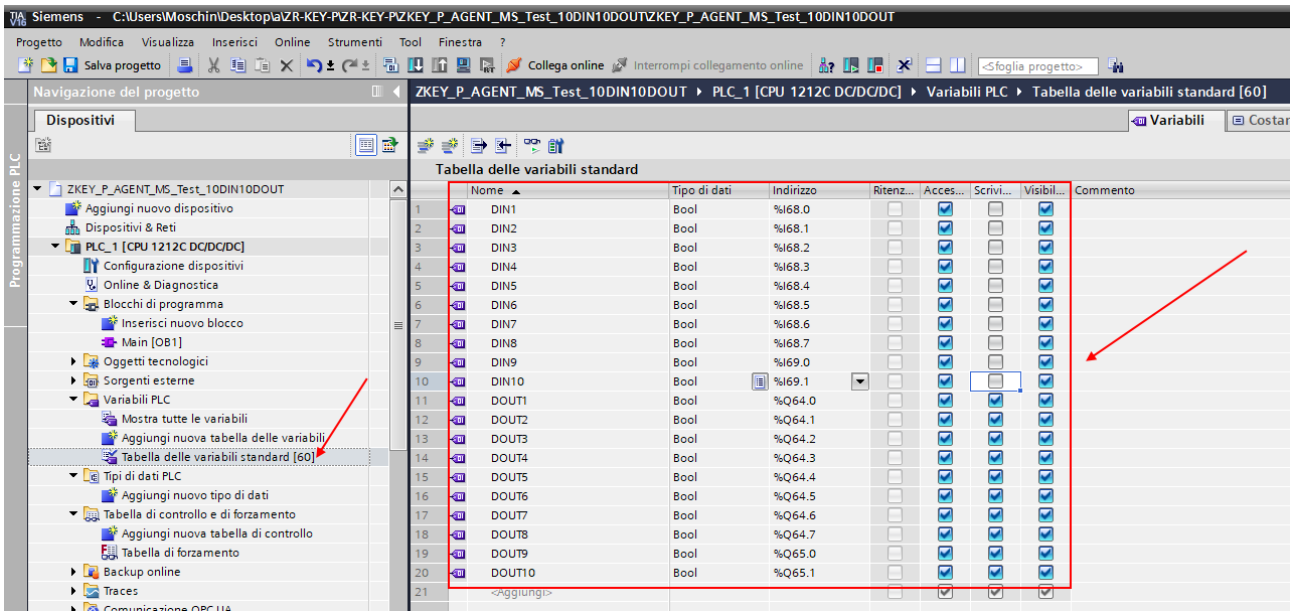
Let's go online to check if there are any errors:



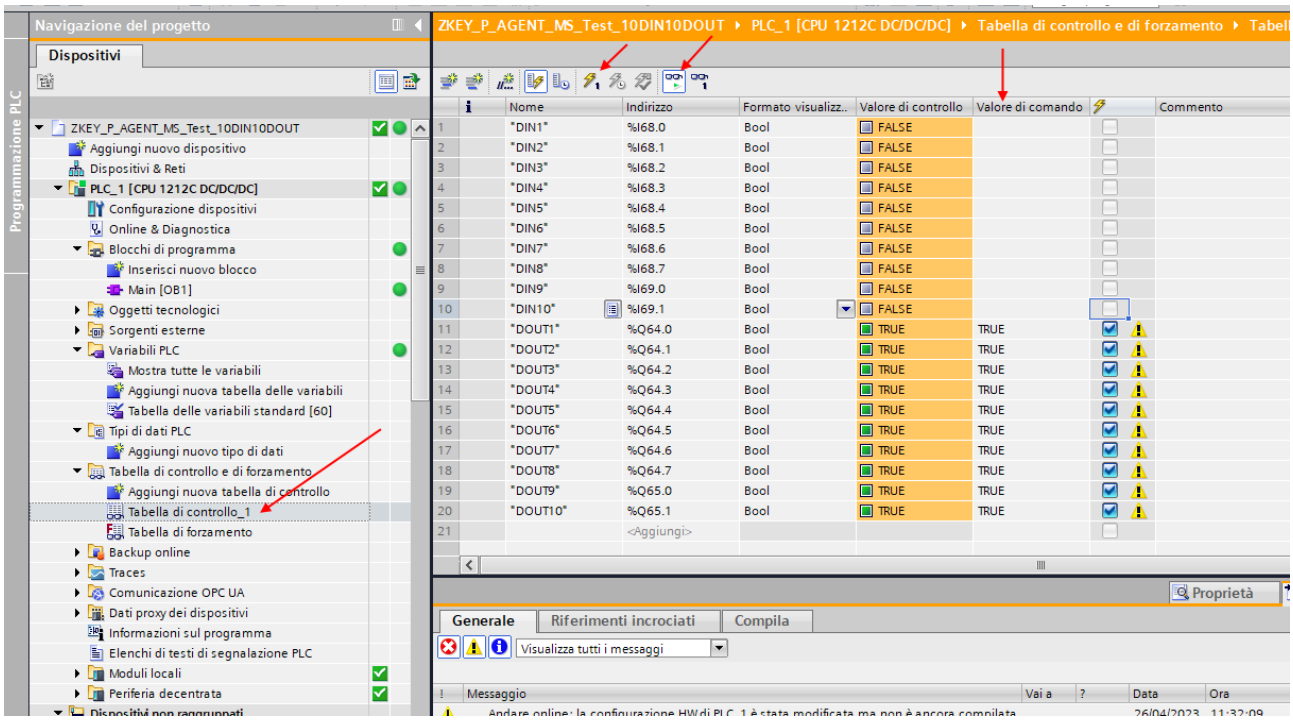
If everything is correct you will get a green icon next to the Seneca device:



It is also possible to read and write the IO (for debugging purposes) directly from the TIA portal.
Then define the variables for the PLC referring to the above addresses:



And then define a control table:



Here it is now possible to read inputs and force write outputs.

5.2. "PROFINET IO - MODBUS SLAVE GATEWAY" CONFIGURATION

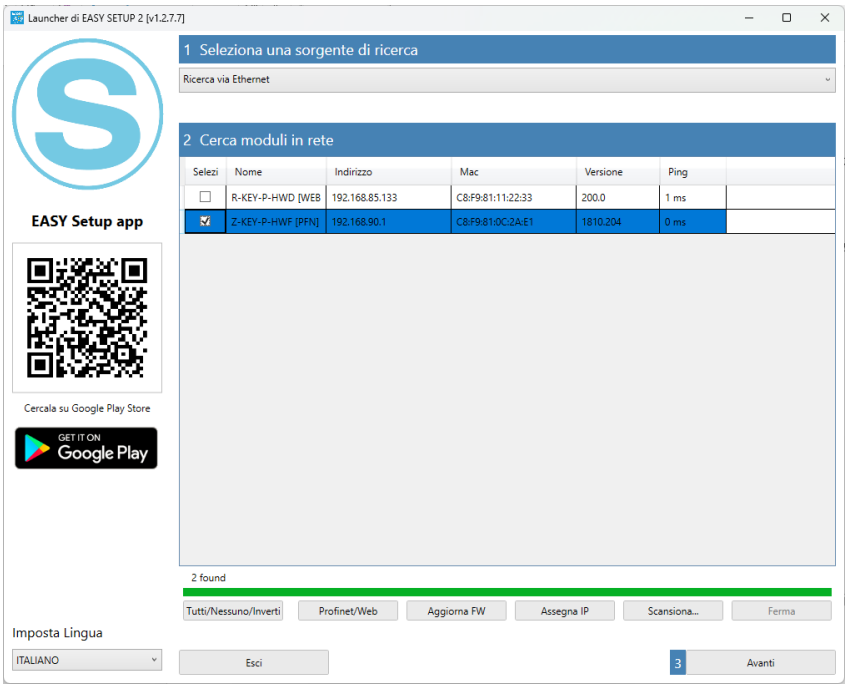
You want to connect a Siemens™ PLC to another PLC connected to serial port 1. The serial PLC supports the Modbus Master protocol.

In the example we will use the Z-KEY-P product (the steps are exactly the same for the other R-KEY-LT-P and Z-KEY-2ETH devices).

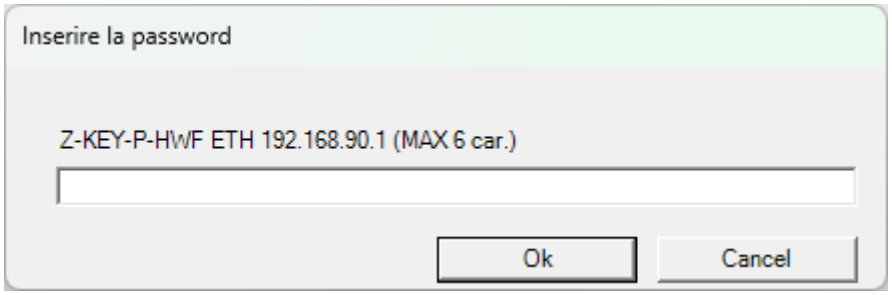
Suppose you want to exchange 10 bytes from the serial PLC to the Siemens PLC and 5 bytes from the Siemens PLC to the serial PLC.

First we disconnect the PLC from the Ethernet network.

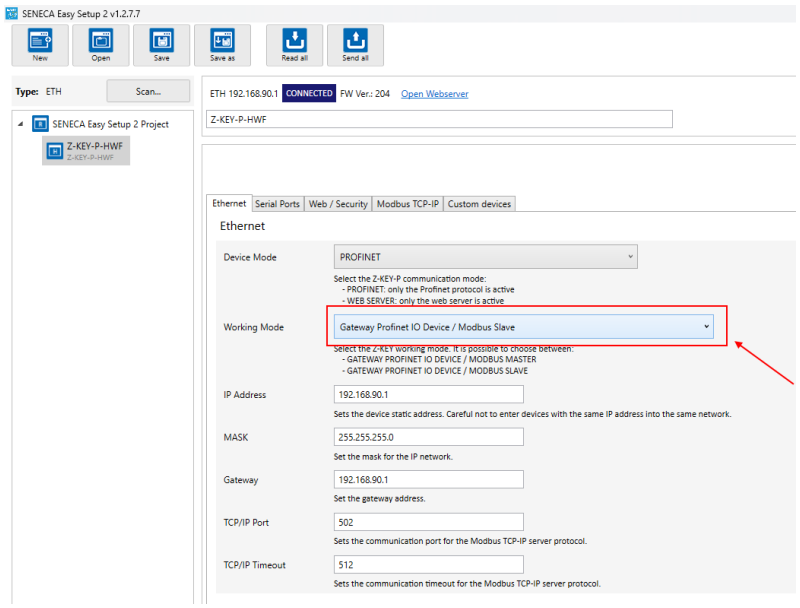
Now we use the Easy Setup 2 software selecting the Z-KEY-P product (with SCAN or in manual entry):



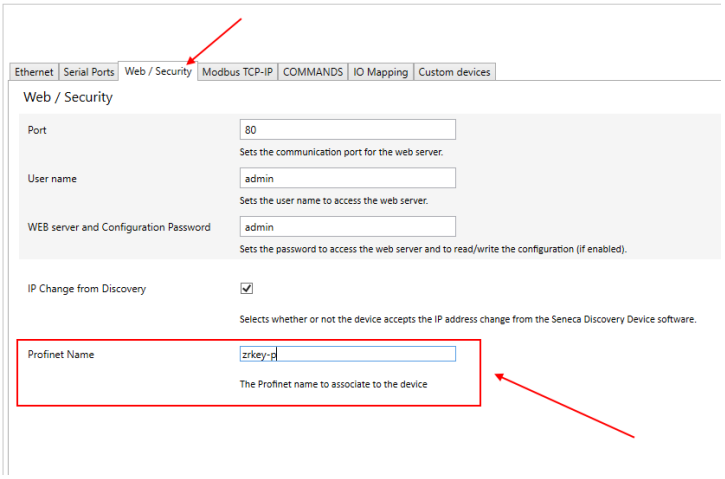
At this point the device access password is requested (default: admin):



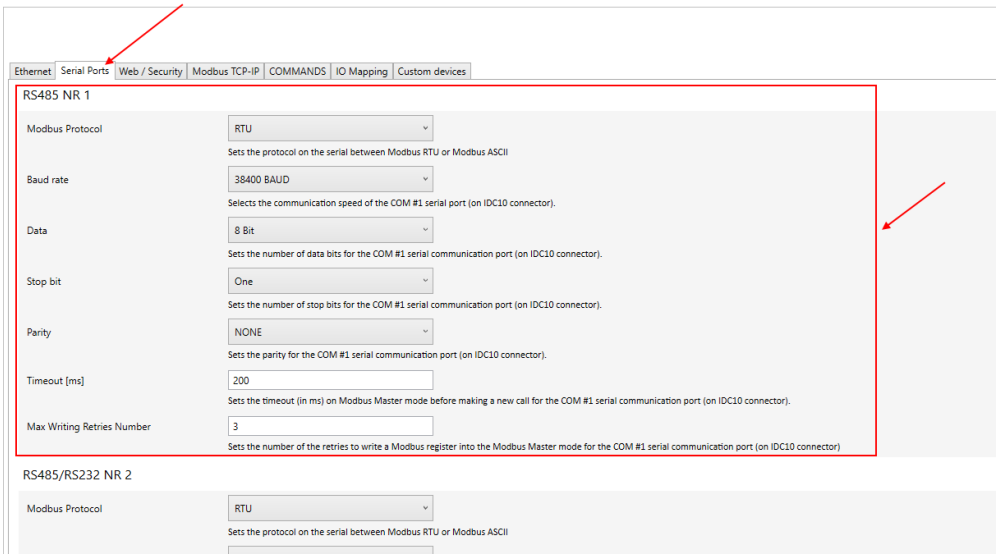
Once the password has been entered, select the Profinet IO Device / Master slave Gateway mode:



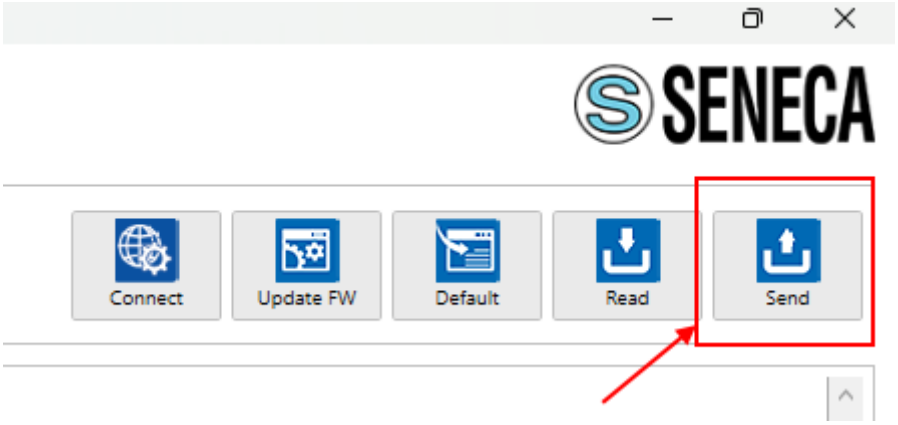
Enter the profinet name of the device:



Check that serial port 1 is configured correctly for the serial PLC:

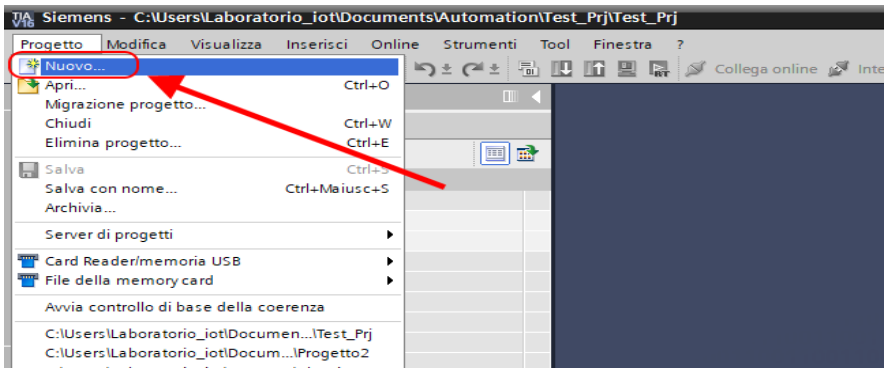


Now let's send the configuration to the device with the "send" button:

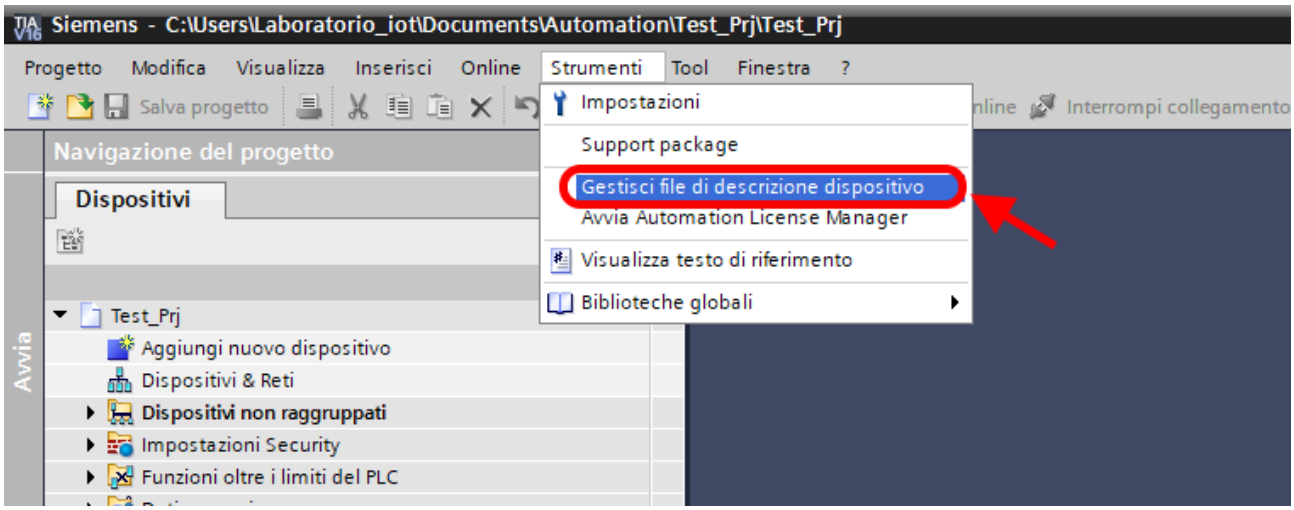


We can now move on to configuring the PLC via Tia Portal™:

Creating a new project:

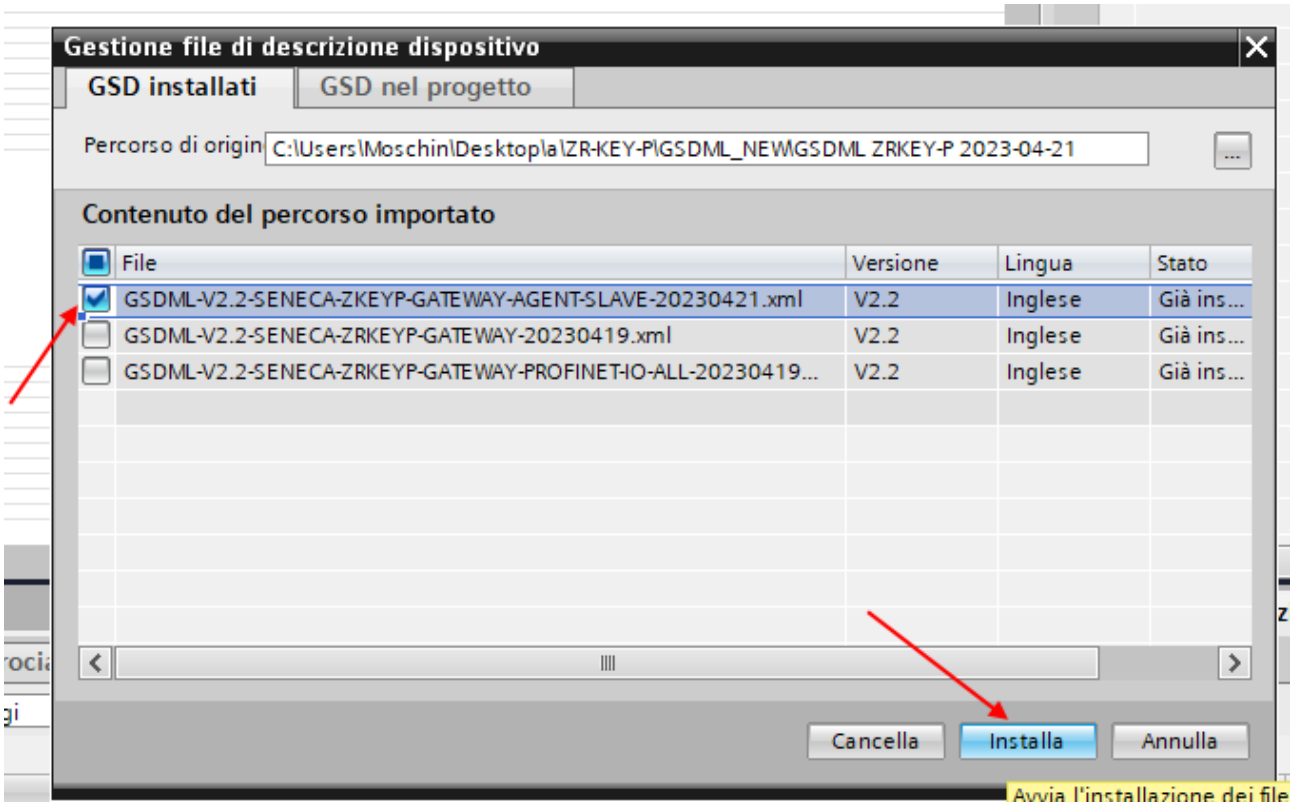


Install the GSD file of the Seneca product:

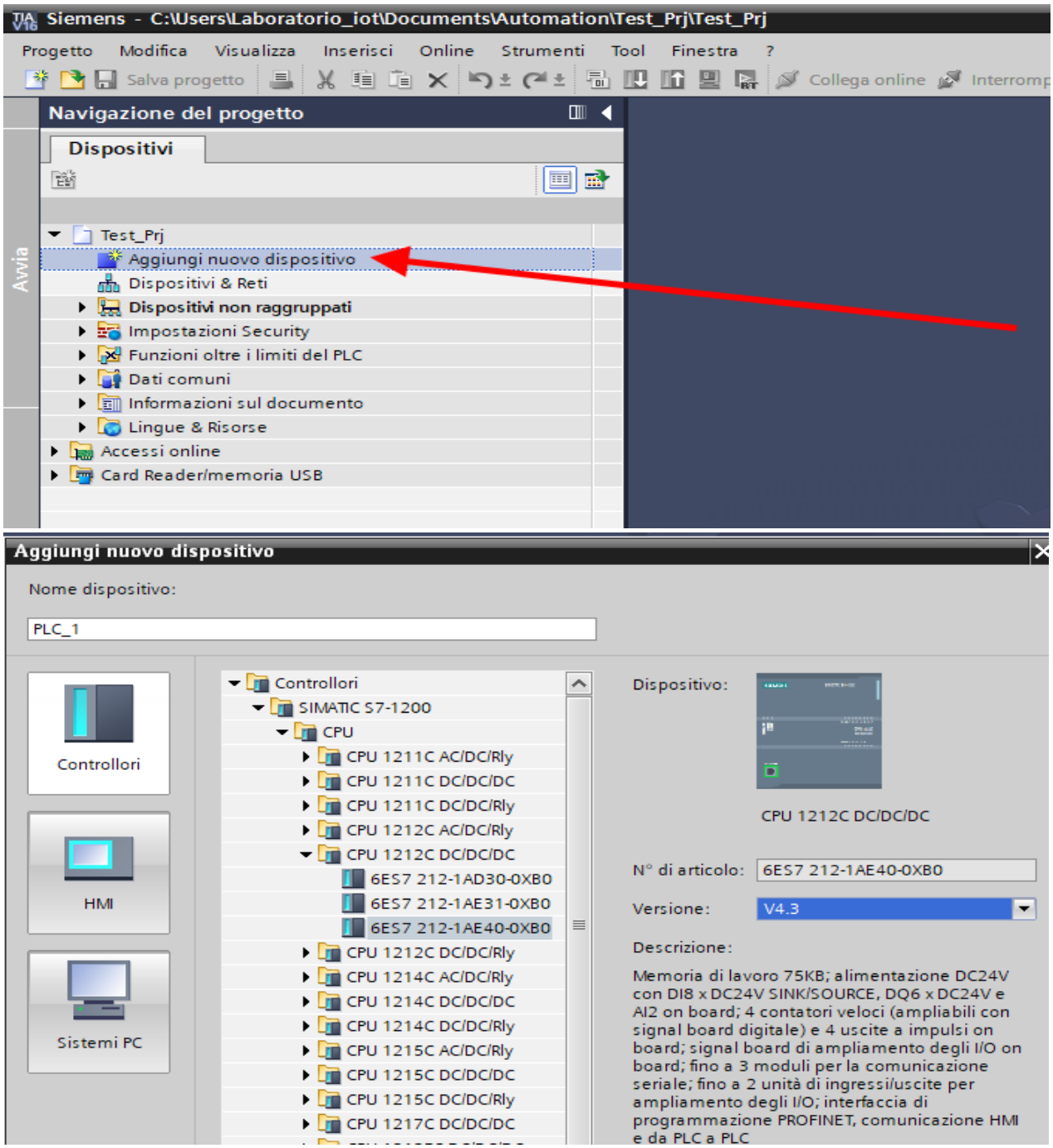


For the Modbus Slave mode, the GSDML file is generic and can be downloaded from the www.seneca.it website in the gateway section of the key-p series.

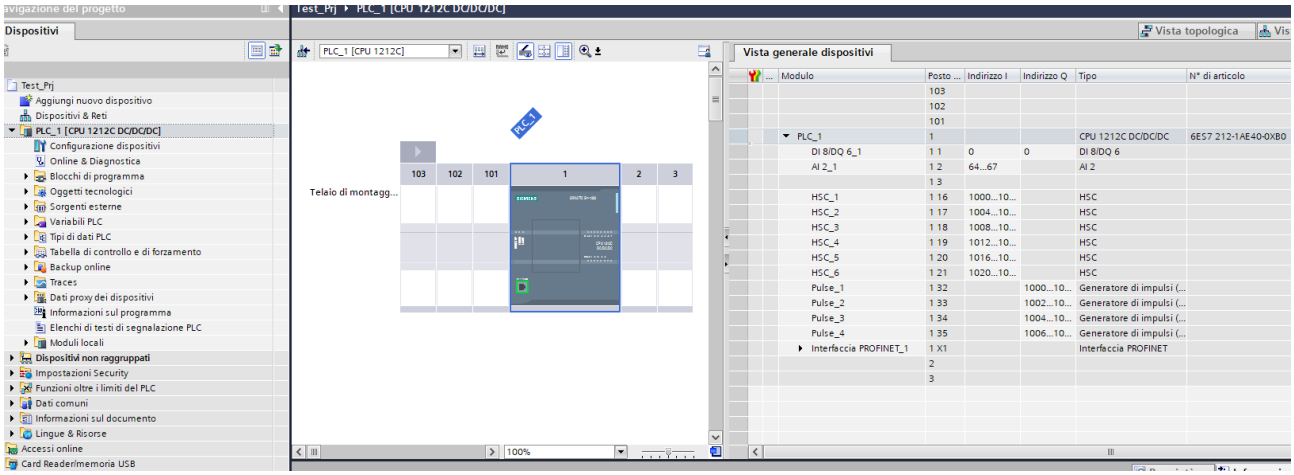
Point to the directory where you saved the GSDML file and press INSTALL.



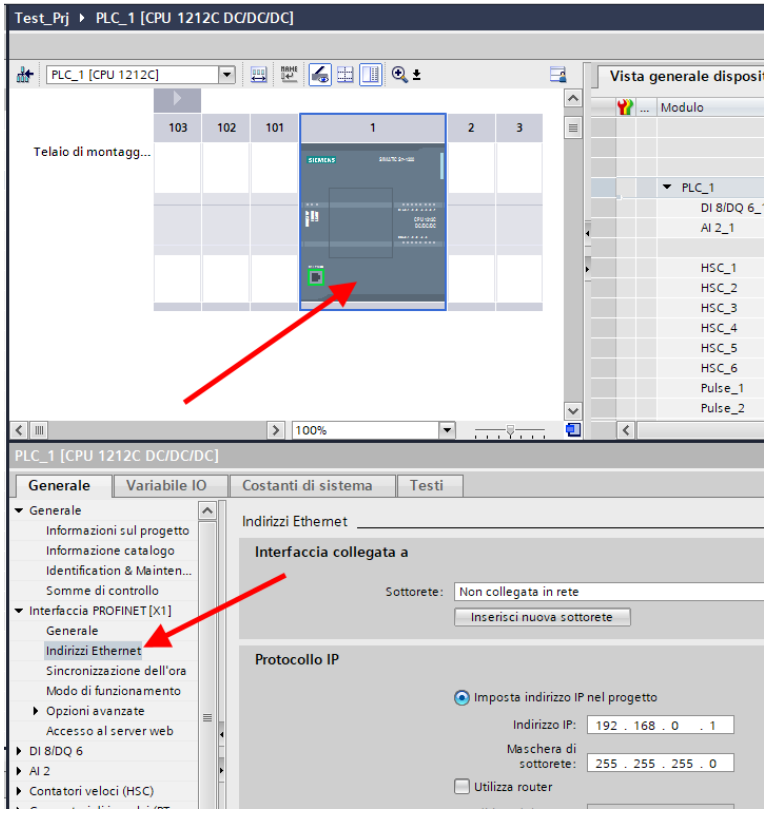
Now insert the Siemens PLC (in our example a SIEMATIC S7 1200), click on "Add new device ...":



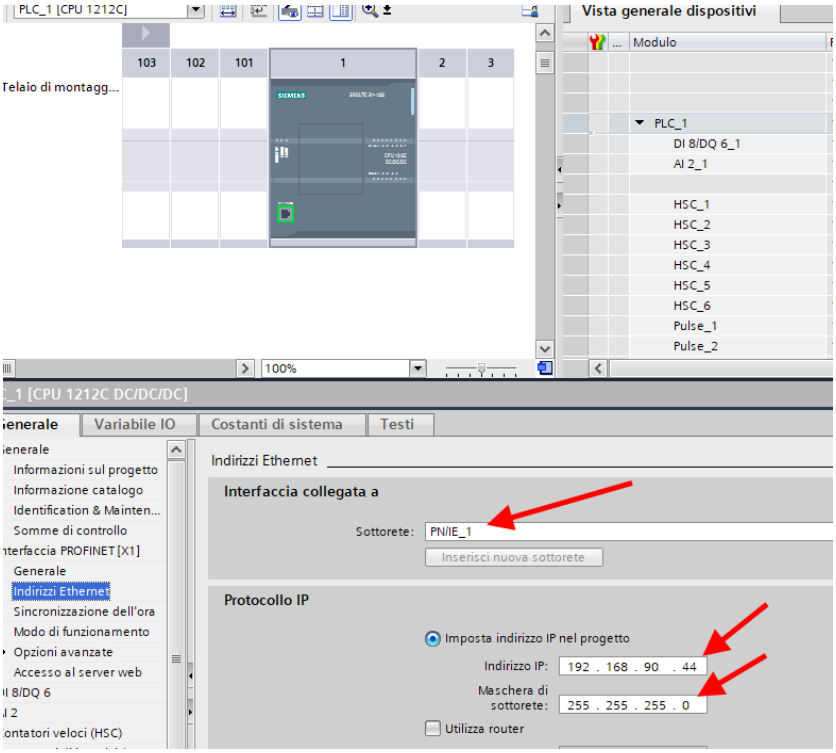
Confirm and the PLC will be added to the rack:



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

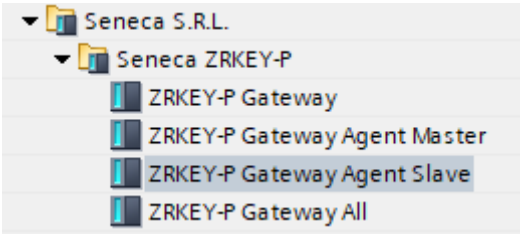


Set the IP you want for the PLC (in this case 192.168.90.44) and the PLC subnet:

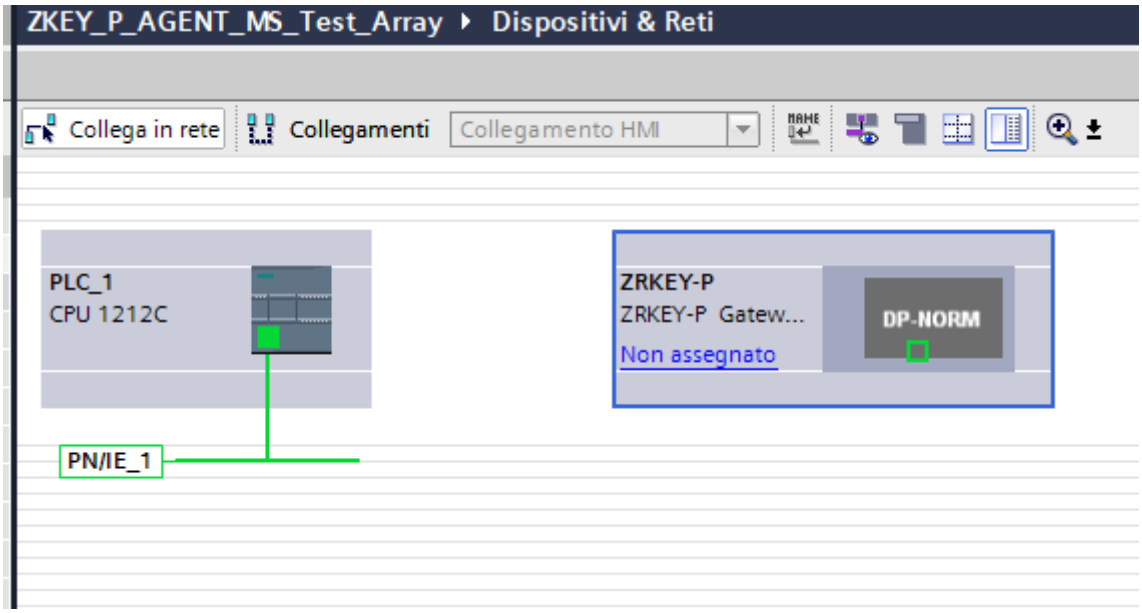


Move on to “devices and network” view:

On the right select "Hardware Catalogue" and then under "Additional Field Equipment" -> PROFINET IO -> GATEWAY -> Seneca SRL -> ZR-KEY-P Gateway -> ZRKEY-P Gateway Agent Slave

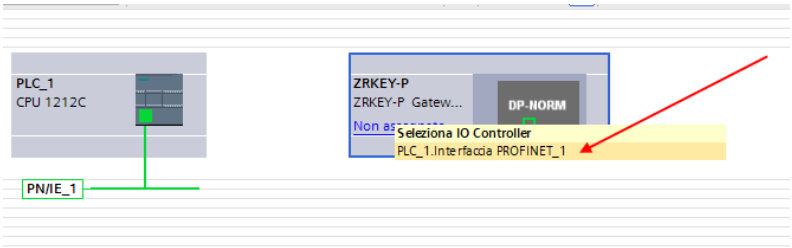


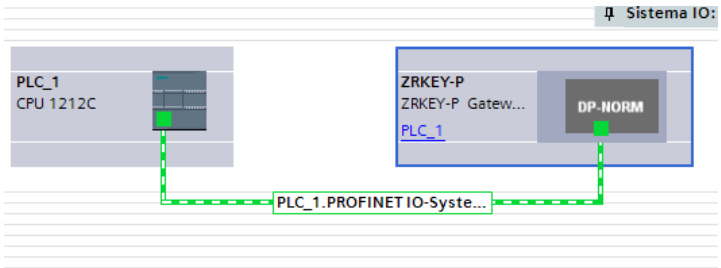
Drag the device to the network view:



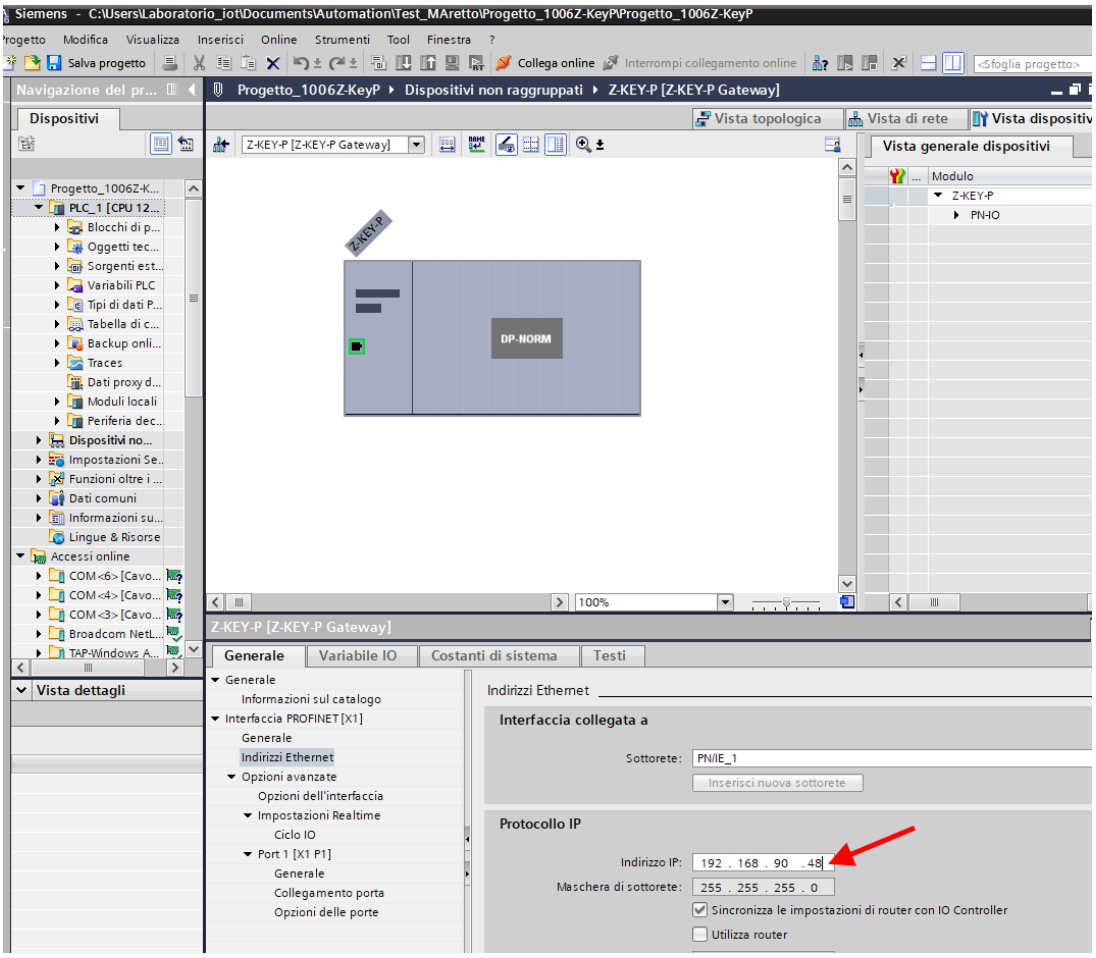
Now associate it with the PLC:

Click with the left mouse button on "Not assigned" and then select the PLC:

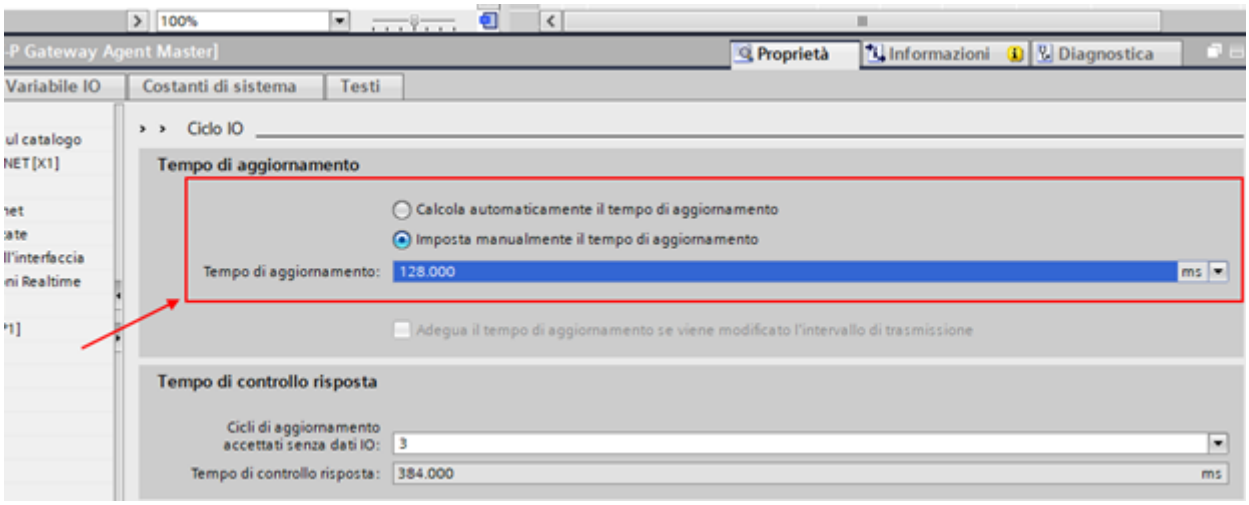




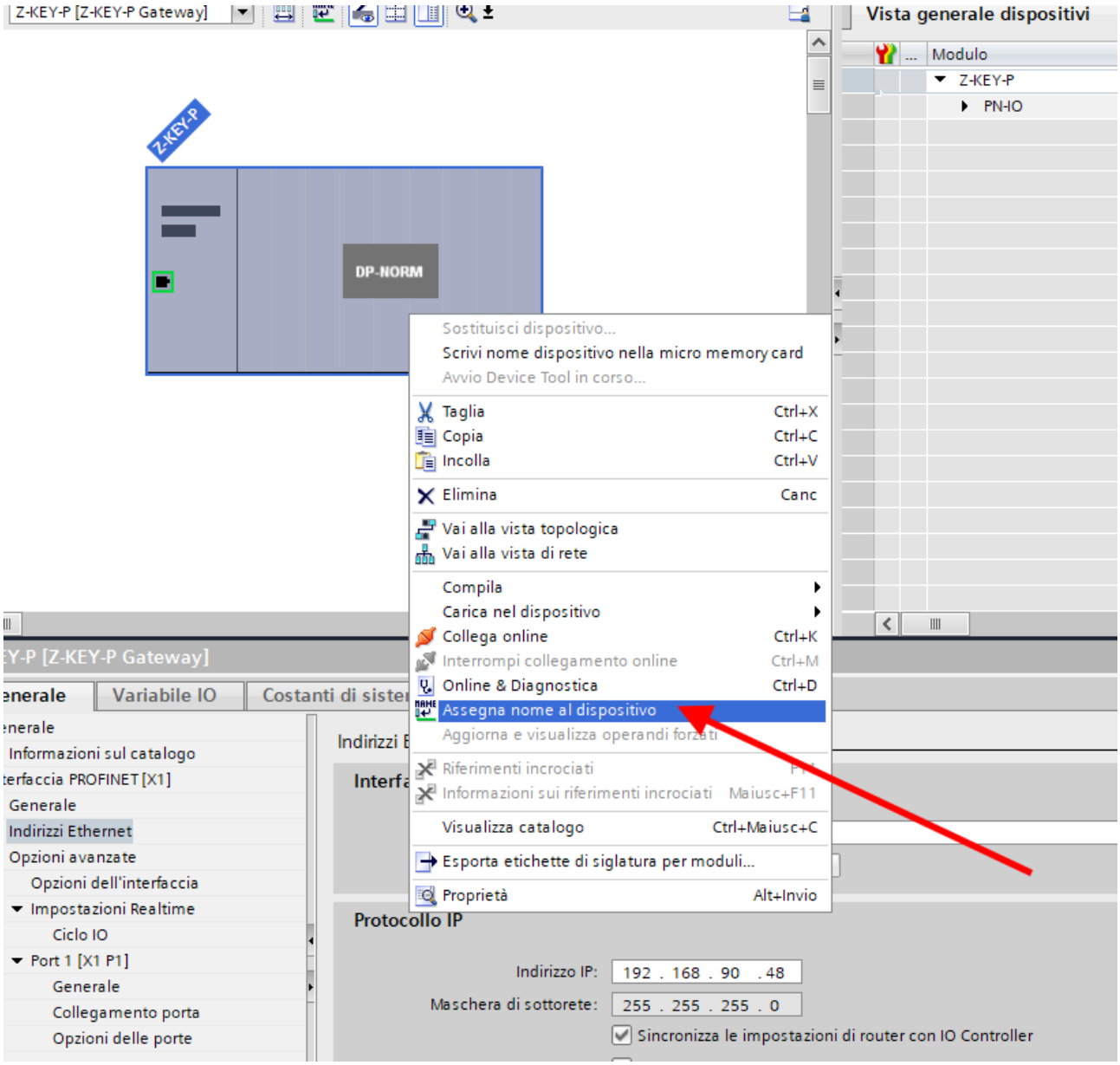
Click twice on the Seneca device and configure the IP address here too (for example 192.168.90.48) and the timing:



Depending on the project it is necessary to set the cycle time (typically 128 ms):



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

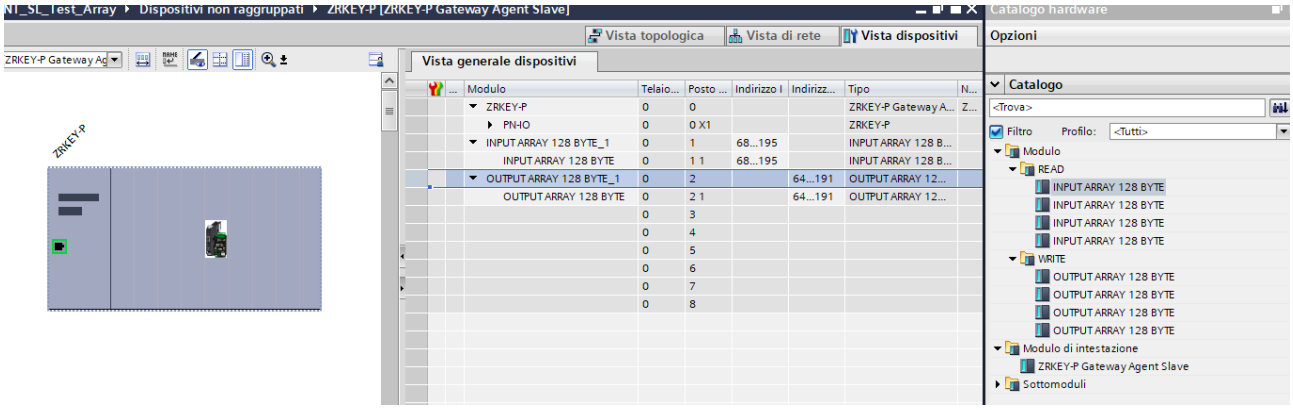


Scan the network with "Update list" and set (if necessary) the device name with "Assign name".

You said that you want to get the following map:

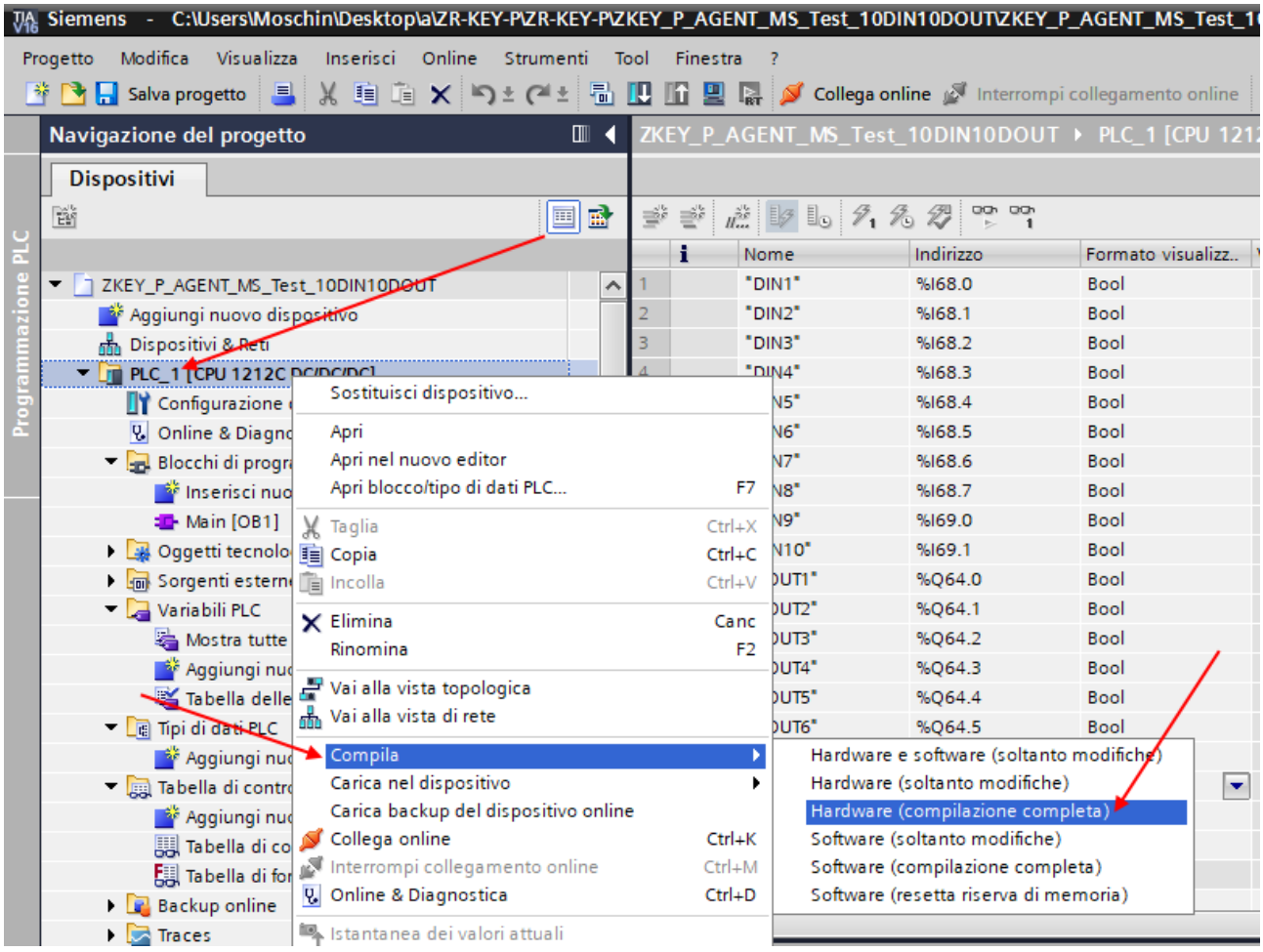
SERIAL PLC -> Writes 10 Byte on Modbus -> SIEMENS PLC Reads 10 Byte from Profinet
SIEMENS PLC -> Writes 5 Bytes on Profinet -> SERIAL PLC Reads 5 Bytes from Modbus

The IO configuration must therefore be prepared:

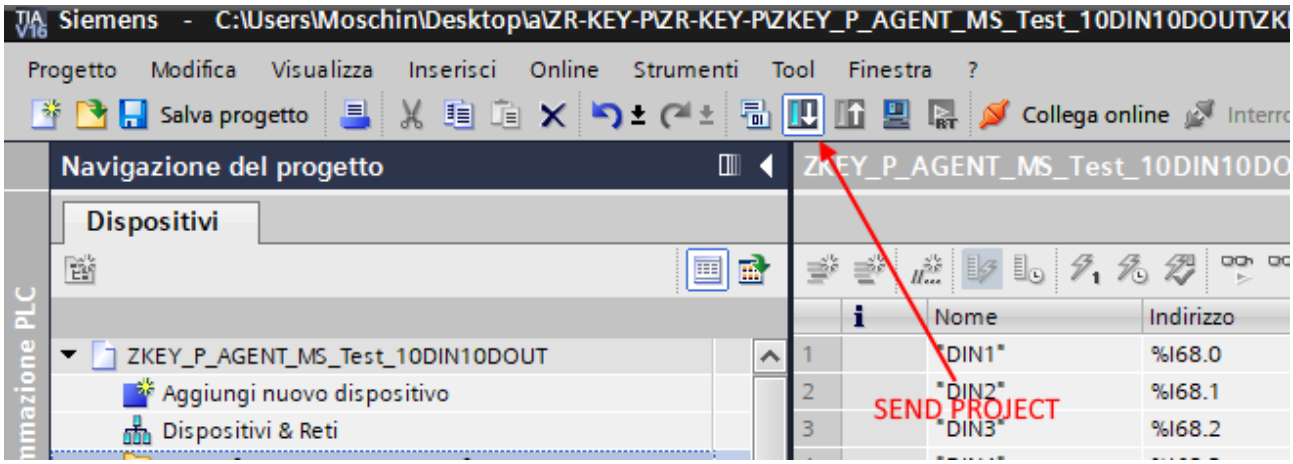


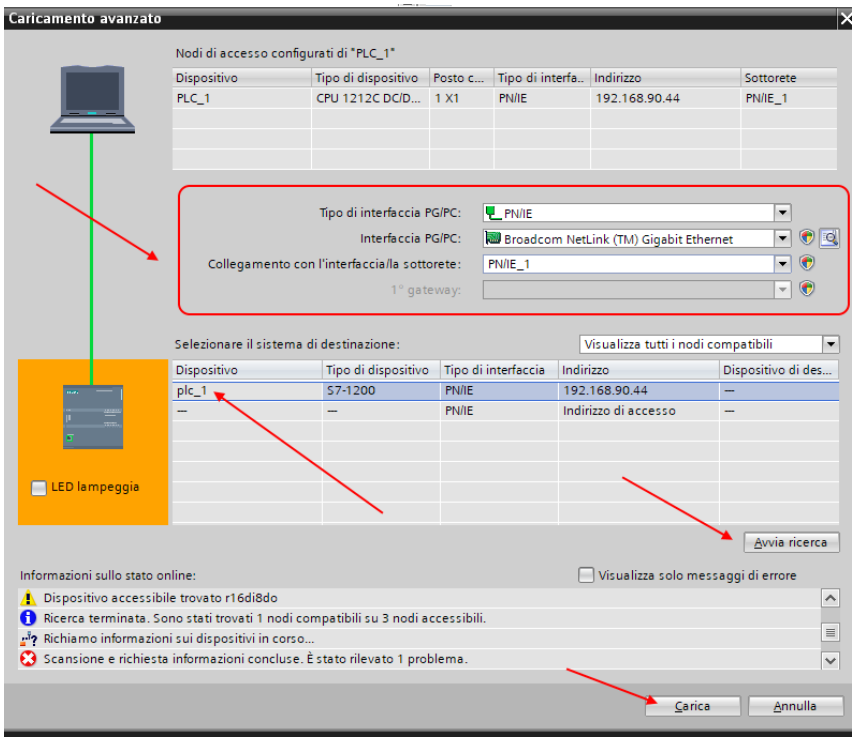
Move one 128-byte array for inputs and another 128-byte array for outputs.
You will only need 10 bytes for writing and 5 bytes for reading.

Now the devices are configured, all that remains is to compile and send the configuration to the PLC.
To compile we select the complete hardware compilation:

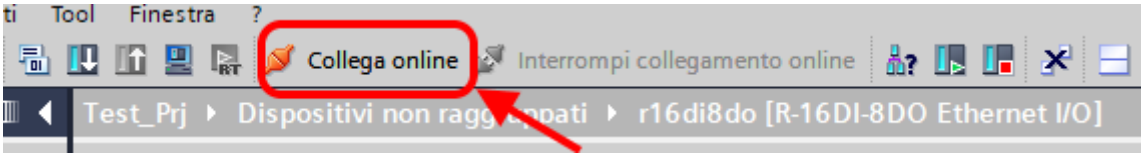


Then press icon to send the project to the PLC:

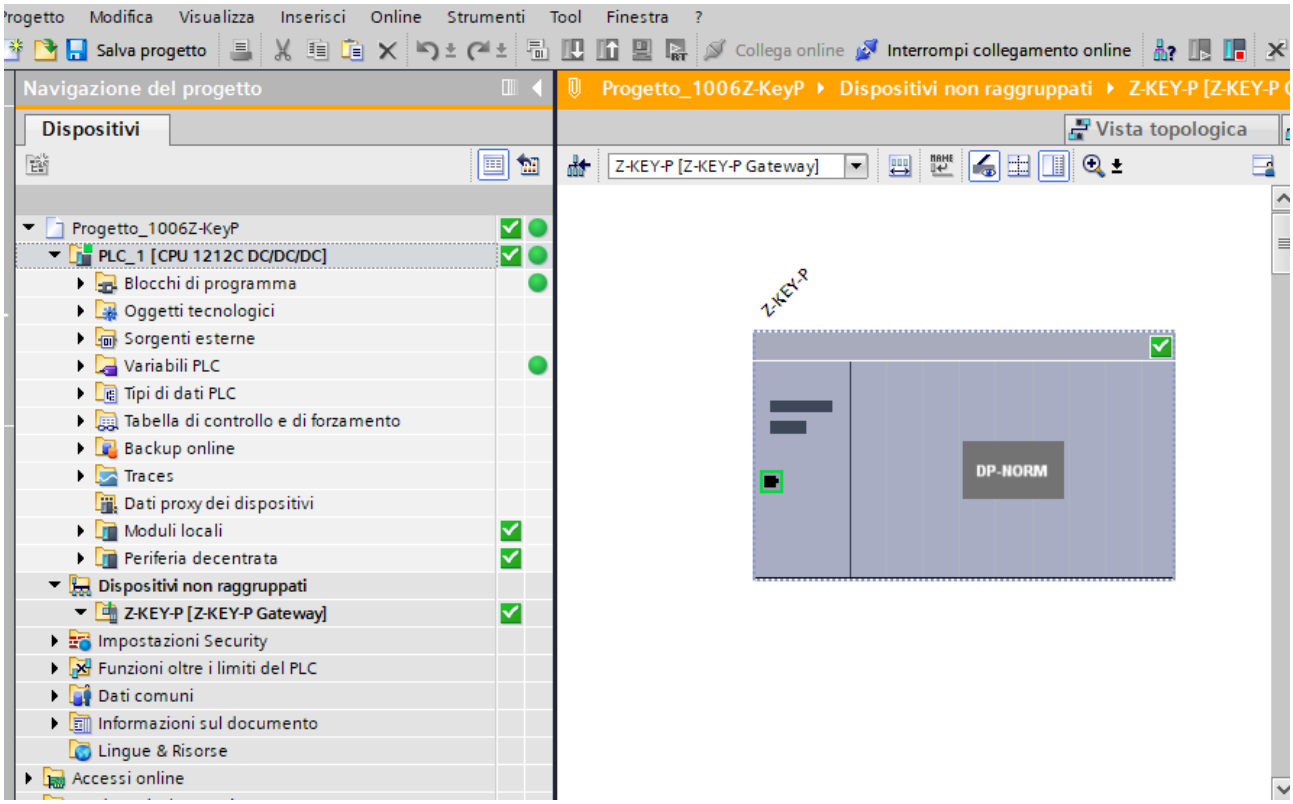




Let's go online to check if there are any errors:



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

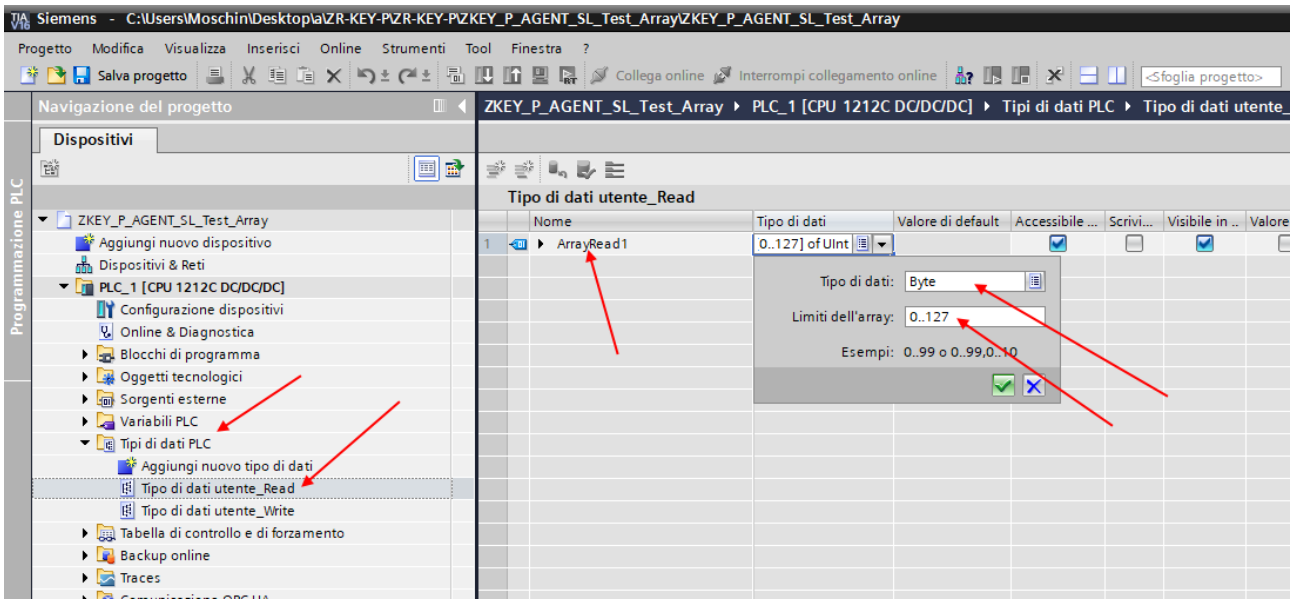


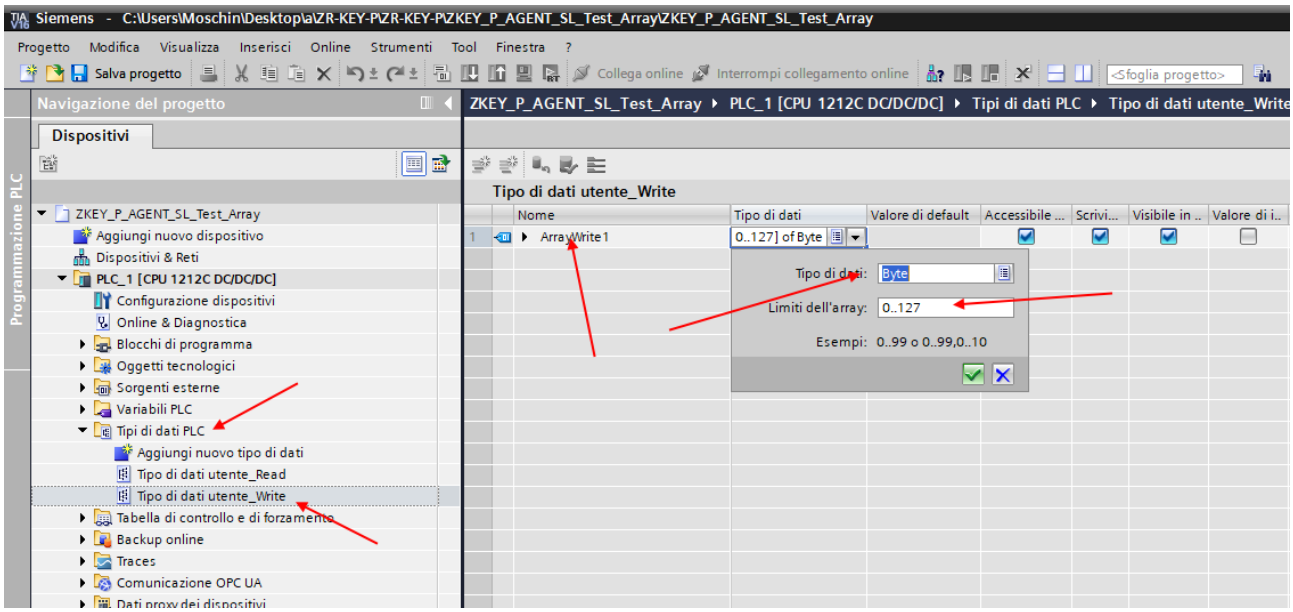
It is also possible to read and write the IO (for debugging purposes) directly from the TIA portal.

Important:
Registers written in Modbus cannot be read by Modbus but only by Profinet
Registers read by Modbus cannot be written by Modbus but only by Profinet

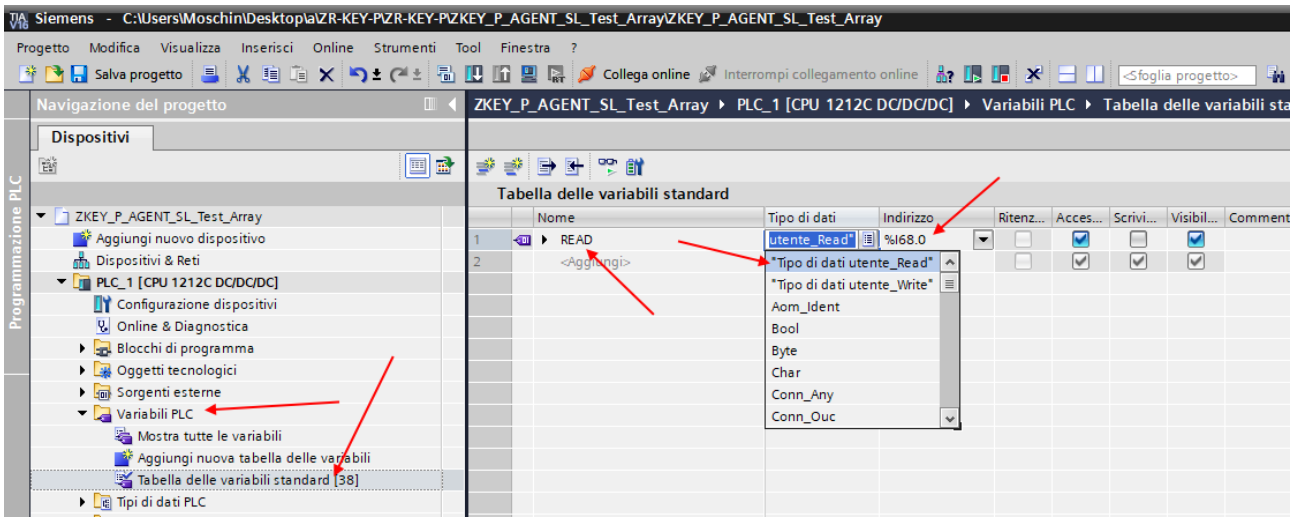
Then define the variables for the PLC.
It is convenient to define data types to manage arrays:

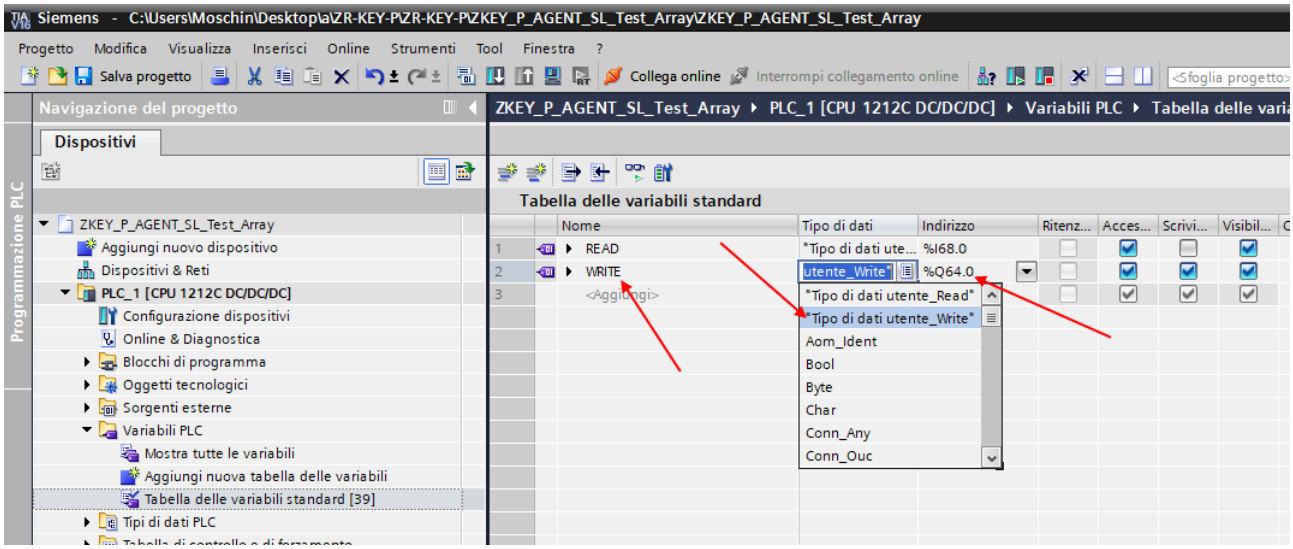
Create two data types, one for read and one for write, each of 128 bytes



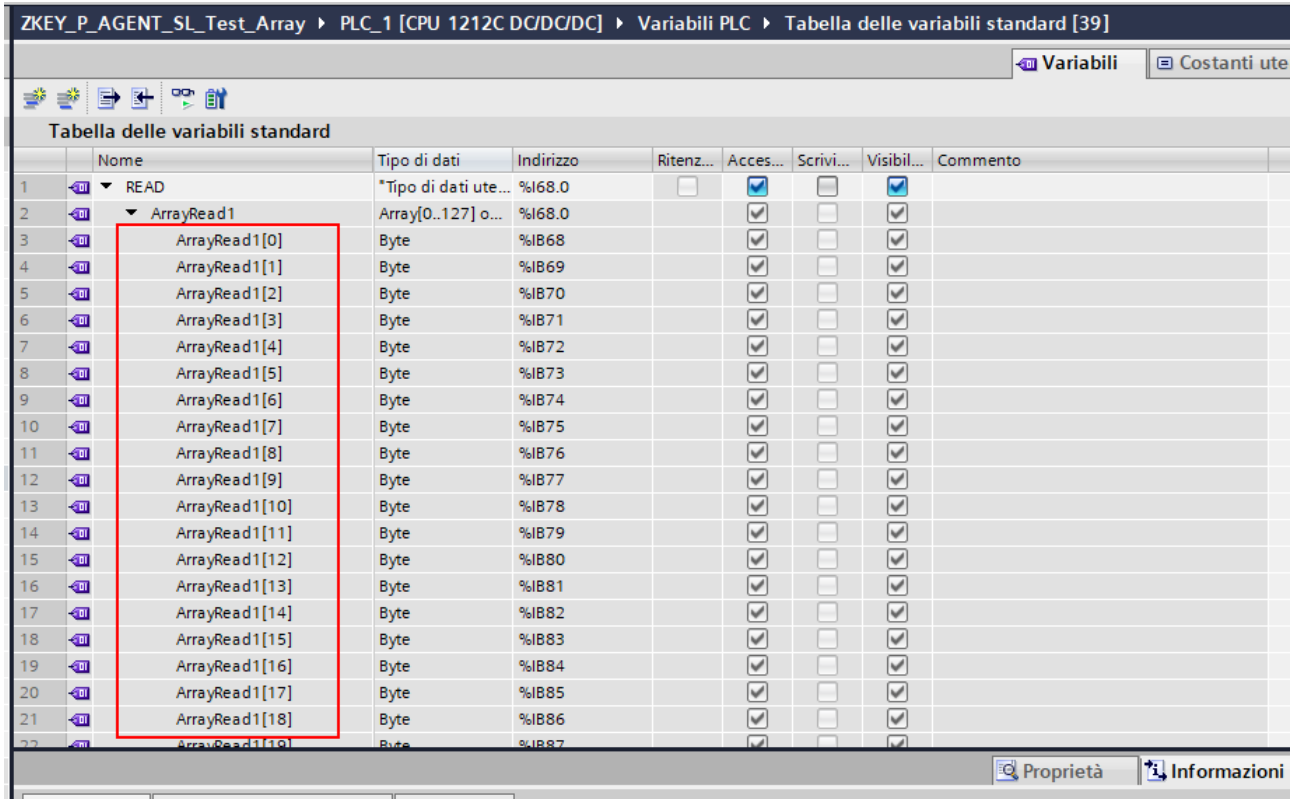


Now define the PLC variables using the newly created ones as data type:

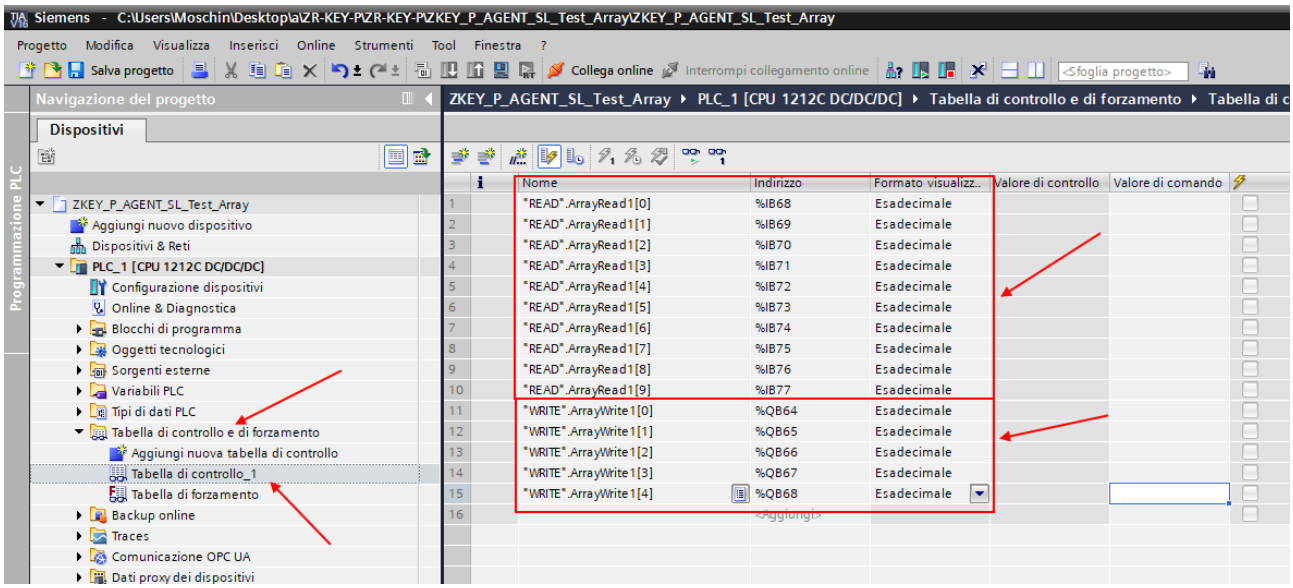




This way you created the arrays (albeit beyond our needs):
For example the array of reads:



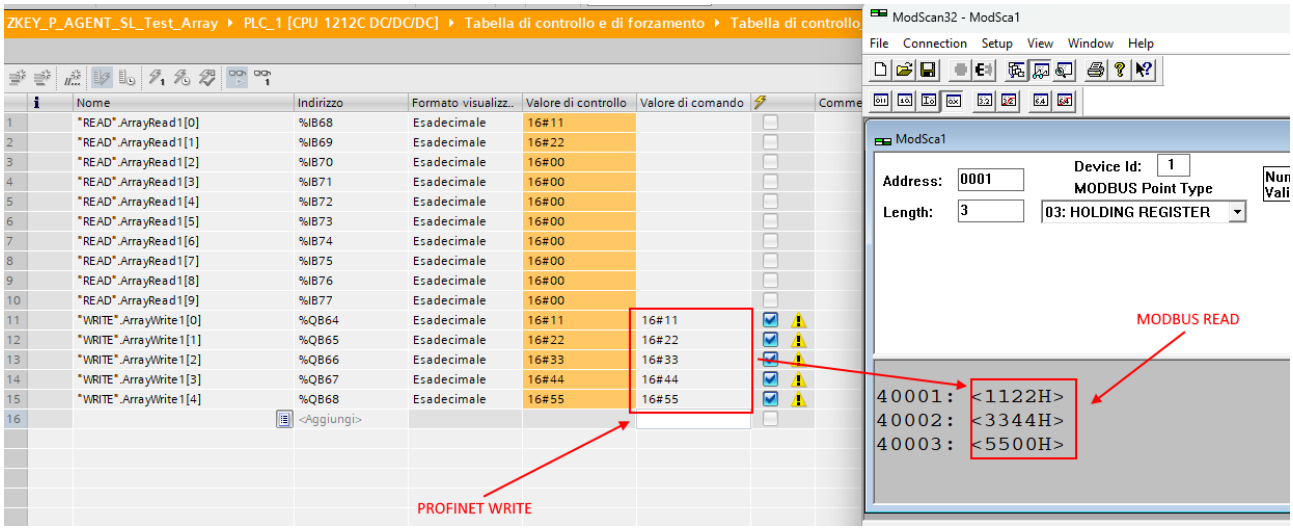
And then define a control table using the following notation:



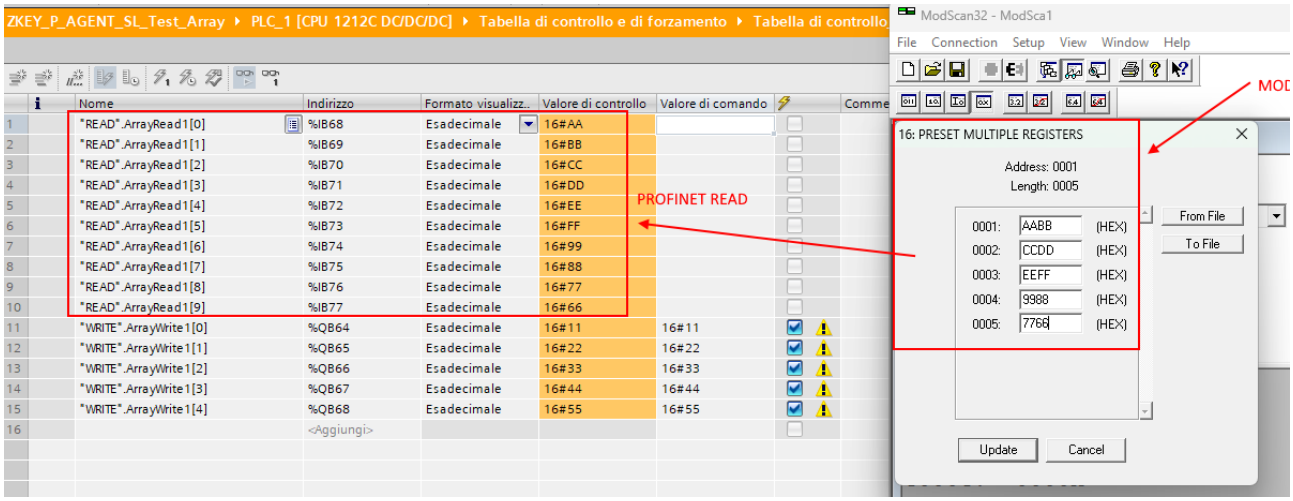
The 5 bytes of Profinet writing are the 5 bytes of reading from modbus (3 Modbus Bytes = 6 bytes).
The 10 bytes of Profinet readings are the 10 bytes of modbus writing (5 Modbus registers = 10 bytes).

Here it is now possible to read inputs and force write outputs.

Profinet writes in the “Write” arrays are read by Modbus like this:



Writes from modbus are read by profinet like this:



6. WEBSERVER MODE AND PROFINET MODE

The device is normally in Profinet mode; in Profinet mode the device can be configured only through the Easy Setup 2 software.

In order to access the internal webserver it is necessary to put the device in Webserver mode using the Easy Setup2 or Seneca Device Discovery software, it is also possible to change the operating mode by pressing the button following the procedure:

6.1. MANUAL PROCEDURE FOR SWITCHING FROM PROFINET MODE TO WEBSERVER MODE AND VICE VERSA

To force webserver mode:

1) Turn on the device
2) Keep the PS1 button pressed until all LEDs turn off
3) Release the button
4) The device restarts and the LEDs
   On Z-KEY-P: PWR and SD/COM
   On Z-KEY-2ETH-P: PWR and COM
   On R-KEY-LT-P: PWR and COM
   flash slowly to show webserver mode

To force Profinet mode:

1) Turn on the device
2) Keep the PS1 button pressed until all LEDs turn off
3) Release the button
4) The device restarts and the LEDs
   On Z-KEY-P: PWR and SD/COM
   On Z-KEY-2ETH-P: PWR and COM
   On R-KEY-LT-P: PWR and COM

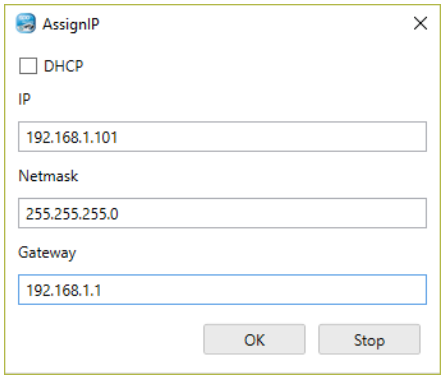
end flashing slowly to show Profinet mode.

6.2. STEP BY STEP GUIDE FOR THE FIRST ACCESS TO THE WEBSERVER

STEP 1: POWER THE DEVICE AND CONNECT THE ETHERNET PORT, PUT THE DEVICE IN WEBSERVER MODE (SEE CHAPTER 6)

SENECA DISCOVERY DEVICE SOFTWARE STEP 2

Launch SCAN, select the device and press the “Assign IP” button, set a configuration compatible with your PC, for instance:



Confirm with OK. Now the device can be reached via Ethernet from your PC.

STEP 5 ACCESS TO THE CONFIGURATION WEBSERVER

ENTER your access credentials:
user: admin
password: admin

⚠ ATTENTION!
THE WEB BROWSERS WHICH HAVE BEEN TESTED FOR COMPATIBILITY WITH THE DEVICE WEBSERVER ARE:
MOZILLA FIREFOX AND GOOGLE CHROME.
THEREFORE, THE OPERATION WITH OTHER BROWSERS IS NOT GUARANTEED

6.3. WEBSERVER DEVICE CONFIGURATION

For further information on the access to the webserver of a new device, please refer to chapter 6.2.

⚠ ATTENTION!
THE WEB BROWSERS WHICH HAVE BEEN TESTED FOR COMPATIBILITY WITH THE DEVICE WEBSERVER ARE:
MOZILLA FIREFOX AND GOOGLE CHROME.
THEREFORE, THE OPERATION WITH OTHER BROWSERS IS NOT GUARANTEED

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

⚠ ATTENTION!
IF THE PARAMETERS TO ACCESS THE WEBSERVER HAVE BEEN LOST, TO ACCESS IT, IT IS NECESSARY TO GO THROUGH THE PROCEDURE TO RESET THE FACTORY-SET CONFIGURATION

6.4. WEBSERVER SECTIONS

The Webserver is divided into pages (sections) representing the various gateway functions:

Status
It is the section that displays the values of the configured tags in real time.

Setup
It is the section that allows the device basic configuration.

Setup Modbus Commands / Tags
It is the section that allows you to add/modify the Modbus commands or the tags (i.e. the variables) of the Modbus devices connected to the gateway.

I/O Mapping
In PROFINET IO / MODBUS MASTER GATEWAY mode only this is the section that allows you to export the current configuration in the GSDML file and to remap the bytes relating to the data coming from the Modbus protocol.

Firmware Update
This is the section that allows you to update the device firmware.

Database Update
It is the section that allows you to update the database of Modbus Seneca devices.

Serial Traffic Monitor
It allows to analyse the ModBUS frames of the serials.

6.4.1. "STATUS" SECTION

Depending on the selected operating mode, it displays:

PROFINET IO DEVICE / MODBUS MASTER GATEWAY
In the status section it is possible to view the mapping of the bytes associated with the registers coming from Modbus in real time.

PROFINET IO DEVICE / MODBUS SLAVE GATEWAY
In the status section it is possible to view the mapping of the bytes associated with the registers coming from Modbus in real time.

6.4.2. "SETUP" SECTION

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

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

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

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

WORKING MODE
Sets the operating mode:

TCP-IP PORT (default: 502)
Sets the communication port for the Modbus TCP-IP client protocol.

TCP-IP TIMEOUT [ms] (default 512 ms)
Sets the waiting time for a request to be considered in timeout.

PORT #1 MODBUS PROTOCOL (default RTU)
Sets the protocol on the serial between Modbus RTU or Modbus ASCII

PORT #2 MODBUS PROTOCOL (default RTU)
Sets the protocol on the serial between Modbus RTU or Modbus ASCII

PORT #1 BAUDRATE (default: 38400 baud)
Selects the communication speed of the COM #1 serial port

PORT #1 DATA BITS (default: 38400 baud)
Selects the communication speed of the COM #1 serial port

PORT #1 PARITY (default: None)
Sets the parity for the COM #1 serial communication port.

PORT #1 STOP BIT (default: 1)
Sets the number of stop bits for the COM #1 serial communication port.

PORT #1 TIMEOUT [ms]
Sets the wait time before defining fail.

PORT #1 WRITING RETRIES (default: 3)
Selects the number of writing attempts to be made on a serial slave before returning an error.

PORT #1 MAX READ NUM
Sets the maximum number of simultaneous serial reading ModBUS registers, the firmware will use this value to optimize the ModBUS readings.

PORT #1 MAX WRITE NUM
Sets the maximum number of simultaneous writing ModBUS registers of the serial, the firmware will use this value to optimize the ModBUS writings.

PORT #2 BAUDRATE (default: 38400 baud) (only for Z-KEY-P and Z-KEY-2ETH-P)
Selects the communication speed of the COM #2 serial port

PORT #2 DATA BITS (default: 38400 baud) (only for Z-KEY-P and Z-KEY-2ETH-P)
Selects the communication speed of the COM #2 serial port

PORT #2 PARITY (default: None) (only for Z-KEY-P and Z-KEY-2ETH-P)
Sets the parity for the COM #2 serial communication port.

PORT #2 STOP BIT (default: 1) (only for Z-KEY-P and Z-KEY-2ETH-P)
Sets the number of stop bits for the COM #2 serial communication port.

PORT# 2 TIMEOUT [ms] (only for Z-KEY-P and Z-KEY-2ETH-P)
Sets the wait time before defining fail.

PORT #2 WRITING RETRIES (default: 3) (only for Z-KEY-P and Z-KEY-2ETH-P)

Selects the number of writing attempts to be made on a serial slave before returning an error.

PORT #2 MAX READ NUM (only for Z-KEY-P and Z-KEY-2ETH-P)
Sets the maximum number of simultaneous reading ModBUS registers of the remote TCP-IP Modbus server, the firmware will use this value to optimize the ModBUS readings.

PORT #2 MAX WRITE NUM (only for Z-KEY-P and Z-KEY-2ETH-P)
Sets the maximum number of simultaneous writing ModBUS registers of the serial, the firmware will use this value to optimize the ModBUS writings.

WEB SERVER AUTHENTICATION USER NAME (default: admin)
Sets the username to access the webserver.

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

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

IP CHANGE FROM DISCOVERY (default: Enabled)
Selects whether or not the device accepts the IP address change from the Seneca Discovery Device software.

PORT #1 AFTER FAIL DELAY [s]
Sets the number of quarantine seconds after a tag has been declared in fail (i.e. these tags are no longer considered) before being interrogated again.

PORT #2 AFTER FAIL DELAY [s] (only for Z-KEY-P and Z-KEY-2ETH-P)
Sets the number of quarantine seconds after a tag has been declared in fail (i.e. these tags are no longer considered) before being interrogated again.

PROFINET DEVICE NAME
Sets the name of the Profinet peripheral

MODBUS TCP-IP CLIENT
Enables or not the TCP-IP client Modbus

MODBUS TCP-IP SERVER#1…3 PORT
Sets the port for the max 3 remote TCP-IP Modbus servers

MODBUS TCP-IP SERVER#1…3 ADDRESS
Sets the IP address for the max 3 remote TCP-IP Modbus servers

MODBUS TCP-IP CLIENT TIMEOUT [ms]
Sets the timeout for remote TCP-IP Modbus servers

MODBUS TCP-IP CLIENT WRITING ATTEMPTS
Selects the number of writing attempts to be made on a remote TCP-IP Modbus server before returning an error and activating the quarantine.

MODBUS TCP-IP CLIENT MAX READ NUM
Sets the maximum number of simultaneous reading ModBUS registers of the remote TCP-IP Modbus server, the firmware will use this value to optimize the ModBUS readings.

MODBUS TCP-IP CLIENT MAX WRITE NUM
Sets the maximum number of simultaneous writing ModBUS registers of the remote TCP-IP Modbus server, the firmware will use this value to optimize the ModBUS writings.

SERVER AFTER FAIL DELAY
Sets the number of quarantine seconds after a tag has been declared in fail (i.e. these tags are no longer considered) before being interrogated again.

In addition, a configuration can be exported / imported via the webserver.

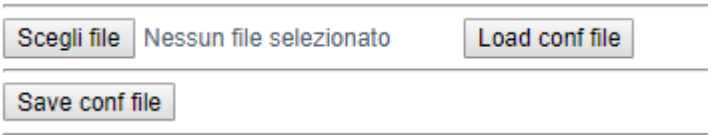
6.4.3. SAVING A CONFIGURATION ON A FILE

A configuration that includes:

CONFIGURATION
TAGS/COMMANDS

It can be saved to a file this way:

Go to the Setup section and select the file to save, press the "Save config" button



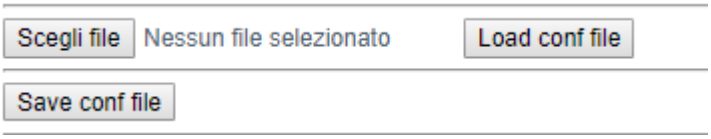
6.4.4. IMPORTING A CONFIGURATION FROM A FILE

A configuration that includes:

CONFIGURATION
TAGS/COMMANDS

It can be imported from a file this way:

Go to the Setup section and select the file to load, press the "Load config" button



6.4.5. "COMMANDS/TAGS" SECTION (ONLY FOR PROFINET IO / MODBUS MASTER GATEWAY MODE)

In this section you can add, edit or delete a tag.

Using the ADD button you can add a new command.
Using the MODIFY button it is possible to modify an existing command.
Using the DEL button it is possible to delete an existing command.

MNEMONIC NAME
It is the identifying name of the command

TARGET MODBUS DEVICE
It represents the Seneca Modbus device selected from those available in the database.
In the case of a non-Seneca device, select CUSTOM.

TARGET RESOURCE
It represents the Seneca device variable you want to add.

TARGET CONNECTED TO
It selects the serial to be used for Modbus serial communication for the specified TAG.

TARGET MODBUS STATION ADDRESS
It selects the station address to use for the command.

TARGET MODBUS START REGISTER
It represents the starting Modbus address of the command (in the case of a Seneca device it is filled in automatically).

TARGET MODBUS REQUEST TYPE
It represents the type of Modbus command to use (Holding Register, Coil etc.).
In the case of a Seneca device it is filled in automatically.

TARGET MODBUS TRIGGER
If the command is about writing, it allows you to select the writing technique on the Modbus side: Periodic, or Data change or both.
Periodic: writing is carried out continuously with the set time interval
Data Change: writing occurs only if the command registers change their values.
Periodic or data Change: combines the two previous modes.

TARGET MODBUS WRITE PERIODIC TIME [ms]

It represents the time interval of the periodic reading.

ENDIAN SWAP
Allows you to swap a register read by Modbus, i.e.:
NONE: no swap
BYTE: shifts the high byte with low byte (for example Modbus reading 0xAABB will be converted to 0xBBAA)
WORD: In the case of a data type greater than a Modbus register (e.g. single precision Floating Point registers) it allows you to set which word (register) to use as the most significant part, for example:
Register 1 = 0xAABB
Register 2 = 0xCCDD
will become a single value 0xAABBCCDD if the parameter is NONE, otherwise 0xCCDDAABB if this parameter is active
BYTE AND WORD: as in the previous case but there will also be a byte swap, for example:
Register 1 = 0xAABB
Register 2 = 0xCCDD
Will become 0xDDCCBBAA

6.4.6. "I/O MAPPING" SECTION

It allows exporting the GSDML file created (in the case of IO / Modbus Master Gateway mode) and to move the contents of the bytes of the read and write buffers.

6.4.7. "FIRMWARE UPDATE" SECTION

In order to improve, add, optimize the functions of the product, Seneca releases firmware updates on the device section on the www.seneca.it website

⚠ ATTENTION!
NOT TO DAMAGE THE DEVICE DO NOT REMOVE THE POWER SUPPLY DURING THE FIRMWARE UPDATE OPERATION.

6.4.8. "DATABASE UPDATE" SECTION

Seneca releases new Database files of its updated ModBUS devices on the Z-KEY-P device section of the www.seneca.it website.
To update the database, select the file and press the "Update Database" button.
The device is already updated at the factory with the most recent database at the time of production

6.4.9. "SERIAL TRAFFIC MONITOR"

Allows you to view the serial packets that are in transit.

7. SUPPORTED MODBUS COMMUNICATION PROTOCOLS

The Modbus communication protocols supported are:

- Modbus RTU/ASCII master (from #1 and #2 serial ports)
- Modbus RTU/ASCII slave (from #1 and #2 serial ports)
- Modbus TCP-IP Client (from the Ethernet port) up to 3 remote TCP-IP Modbus Servers

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

7.1. SUPPORTED MODBUS FUNCTION CODES

The following Modbus functions are supported:

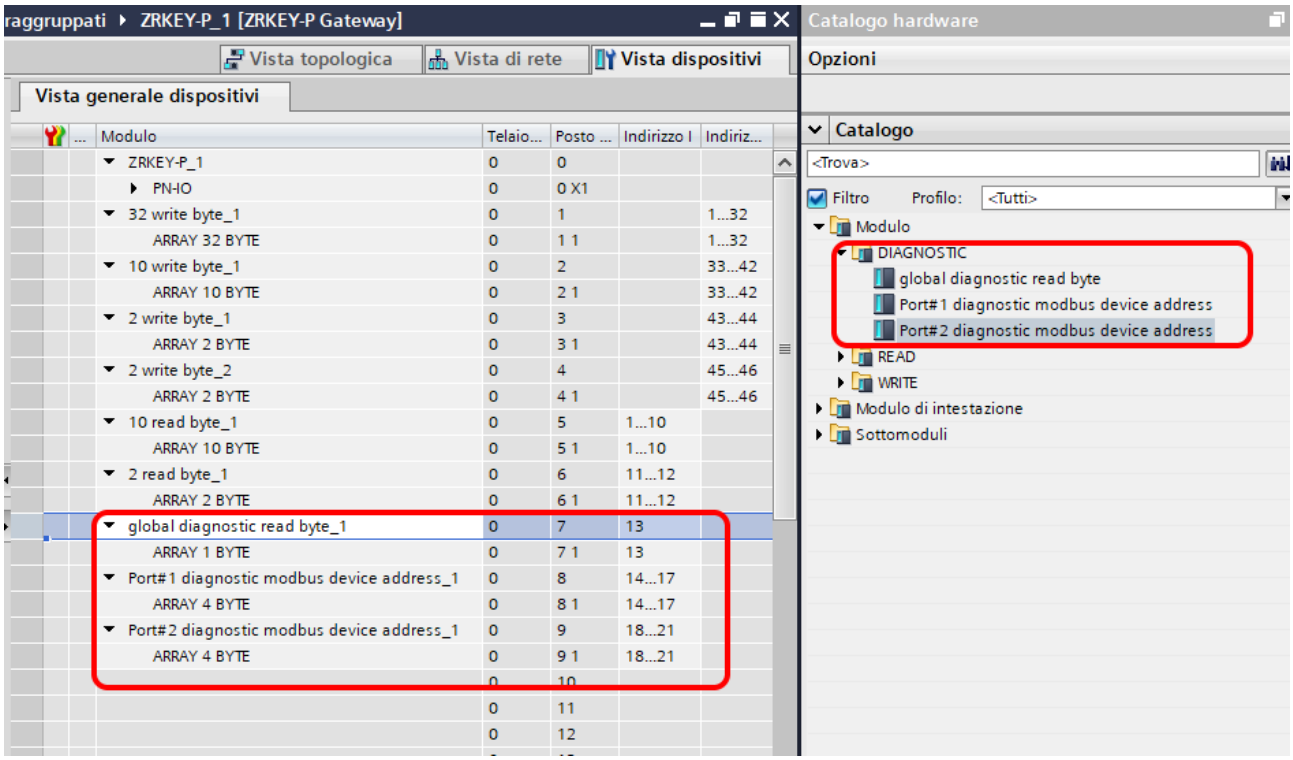
- Read Coils (function 1)
- Read Discrete Inputs (function 2)
- Read Holding Registers (function 3)
- Read Input Registers (function 4)
- Write Single Coil (function 5)
- Write Single Register (function 6)
- Write multiple Coils (function 15)
- Write Multiple Registers (function 16)

⚠ ATTENTION!
All 32-bit variables are contained in 2 consecutive Modbus registers
All 64-bit variables are contained in 4 consecutive Modbus registers

8. MODBUS DIAGNOSTICS (ONLY PROFINET IO / MODBUS MASTER GATEWAY MODE)

Diagnostics management takes the timeout or exceptions to the Modbus requests into account.
3 slots are made available for diagnostics:

GLOBAL DIAGNOSTIC READ BYTE
PORT#1 DIAGNOSTIC MODBUS DEVICE ADDRESS
PORT#2 DIAGNOSTIC MODBUS DEVICE ADDRESS



In the GLOBAL DIAGNOSTIC READ BYTE slot in particular, the bits have the following meaning:
If the Bit is 0 -> No Error
If the Bit is 1 -> At least one device is in fail

BIT 0 -> GENERIC SERIAL 1 FAIL
BIT 1 -> GENERIC SERIAL 2 FAIL
BIT 2 -> MODBUS TCP-IP SERVER 1 FAIL
BIT 3 -> MODBUS TCP-IP SERVER 2 FAIL
BIT 4 -> MODBUS TCP-IP SERVER 3 FAIL

The other 2 slots indicate which station address on the serial ports is failing.
It is possible to detect the fail of up to 4 slave devices per port according to the following coding:

BYTE0 -> LOWER FAIL STATION ADDRESS
…
BYTE3 -> STATION ADDRESS IN HIGHEST FAIL

For example, if devices with station address: 1, 8, 15, 24 are connected to serial port #1 and station 15 and 24 are in error, the slot "PORT#1 DIAGNOSTIC MODBUS DEVICE ADDRESS" will be in error:
BYTE0 -> 15
BYTE1 -> 24
BYTE 2 -> 0
BYTE 3 -> 0

9. RESETTING THE DEVICE TO ITS FACTORY CONFIGURATION

The factory configuration removes all configured commands and resets all parameters to default.

To reset the device to the factory configuration it is necessary to follow the procedure below:

Z-KEY-P / Z-KEY-2ETH-P:

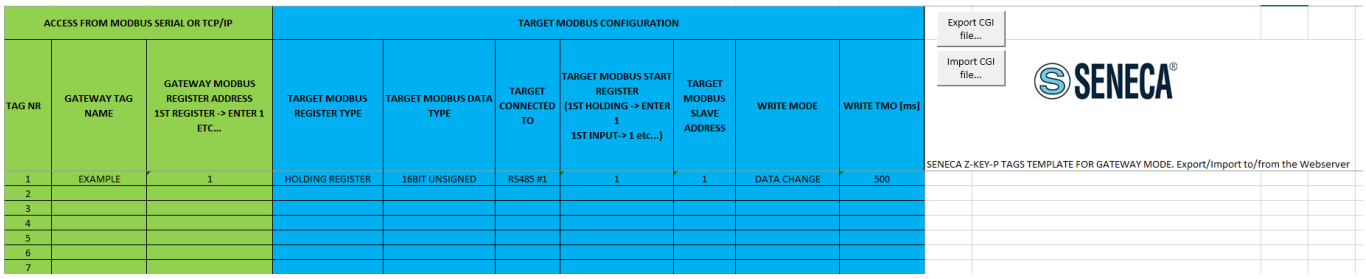
1) Remove power from the device
2) Turn dip switches 1 and 2 to ON
3) Power up the device and wait at least 10 seconds
4) Remove power from the device
5) Turn dip switches 1 and 2 to OFF
6) At the next restart the device will have loaded the factory configuration

R-KEY-LT-P:

1) Remove power from the device
2) Turn 2 SW2 dip switches to ON
3) Power up the device and wait at least 10 seconds
4) Remove power from the device
5) Turn 2 SW2 dip switches to OFF.
6) At the next restart the device will have loaded the factory configuration

10. EXCEL TEMPLATE

Excel templates are available on the Seneca website (www.seneca.it Profinet series Gateway section).



	ACCESS FROM MODBUS SERIAL OR TCP/IP			TARGET MODBUS CONFIGURATION						
	TAG NR	GATEWAY TAG NAME	GATEWAY MODBUS REGISTER ADDRESS 1ST REGISTER -> ENTER 1 ETC...	TARGET MODBUS REGISTER TYPE	TARGET MODBUS DATA TYPE	TARGET CONNECTED TO	TARGET MODBUS START REGISTER (1ST HOLDING -> ENTER 1 1ST INPUT-> 1 etc...)	TARGET MODBUS SLAVE ADDRESS	WRITE MODE	WRITE TMO [ms]
1	EXAMPLE	1	HOLDING REGISTER	16BIT UNSIGNED	RS485 #1	1	1	DATA CHANGE	500	
2										
3										
4										
5										
6										
7										

Export CGI file...
Import CGI file...
SENECA
SENECA Z-KEY-P TAGS TEMPLATE FOR GATEWAY MODE. Export/Import to/from the Webserver

11. MODBUS TCP-IP SERVER AND MODBUS PASS-THROUGH

Querying the gateways via port 502 at the slave address 254, they respond with the values of the commands in real-time, otherwise, querying them via port 502 at the slave address from 1 to 253, they convert the Modbus TCP-IP requests to Modbus RTU (Pass-Through mode).
Address 255 is reserved for configuring the device with the Easy Setup2 software.

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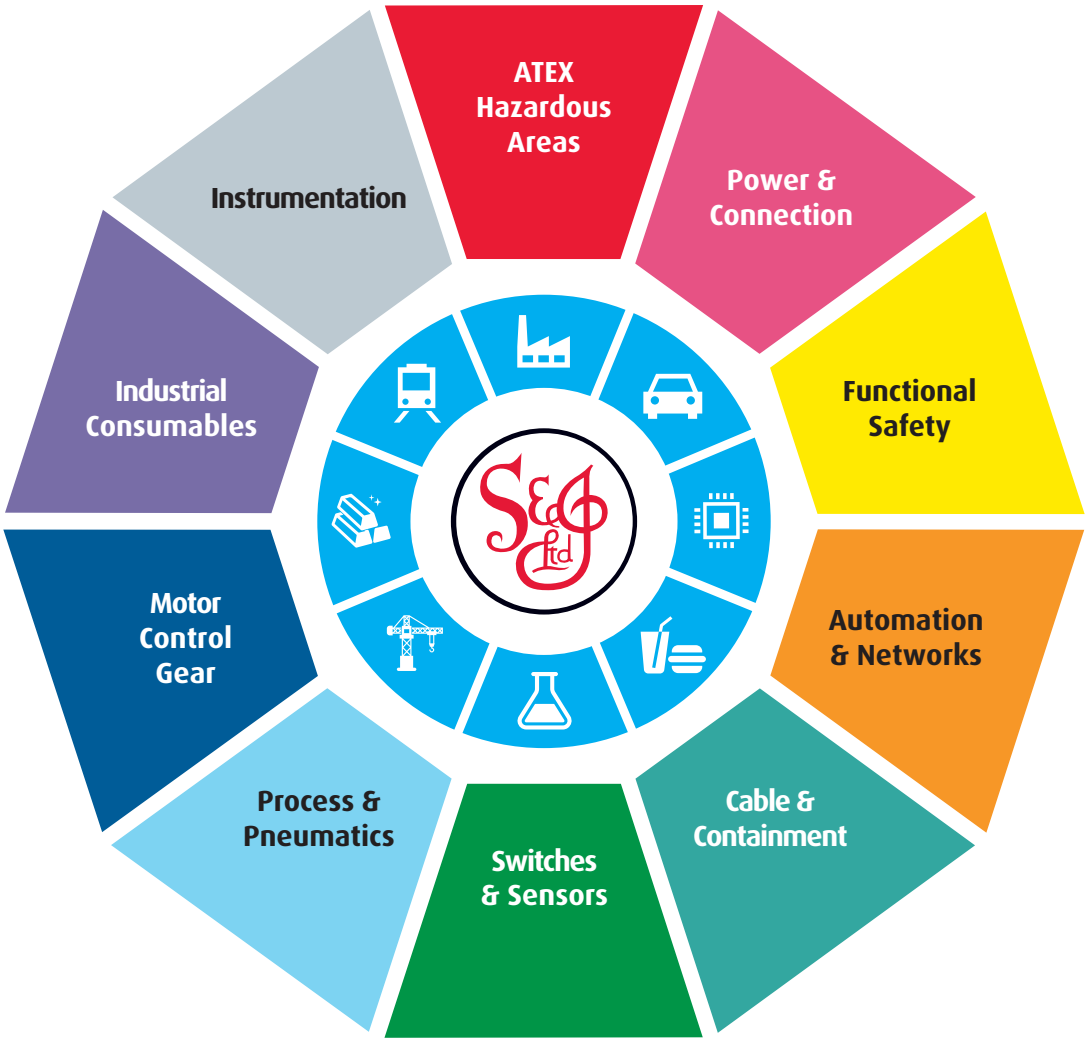

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