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FANUC

PROFINET NETWORK START

WITH TIA PORTAL

Revision: C

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1 Introduction

1.1Objective

This document shows the steps to follow to start a profinet network with CP1604 card using the TIA Portal software on R-30iA, R-30iB and R-30iB plus robot controllers.

Revision B of the document also adds:

- the definition of a profinet device network with a dual-channel Molex profinet card,
- updating the firmware of the cards,
- the procedures to follow in the event of a card replacement,
- the definition of a profisafe communication.

1.2Prerequisites

The TIA portal software must be installed and a software update is required to be able to use all features like the ability to configure security exchanges.

To do this, in the TIA main screen, in the Start screen, click on Installed Software then check for updates (circled in yellow below).

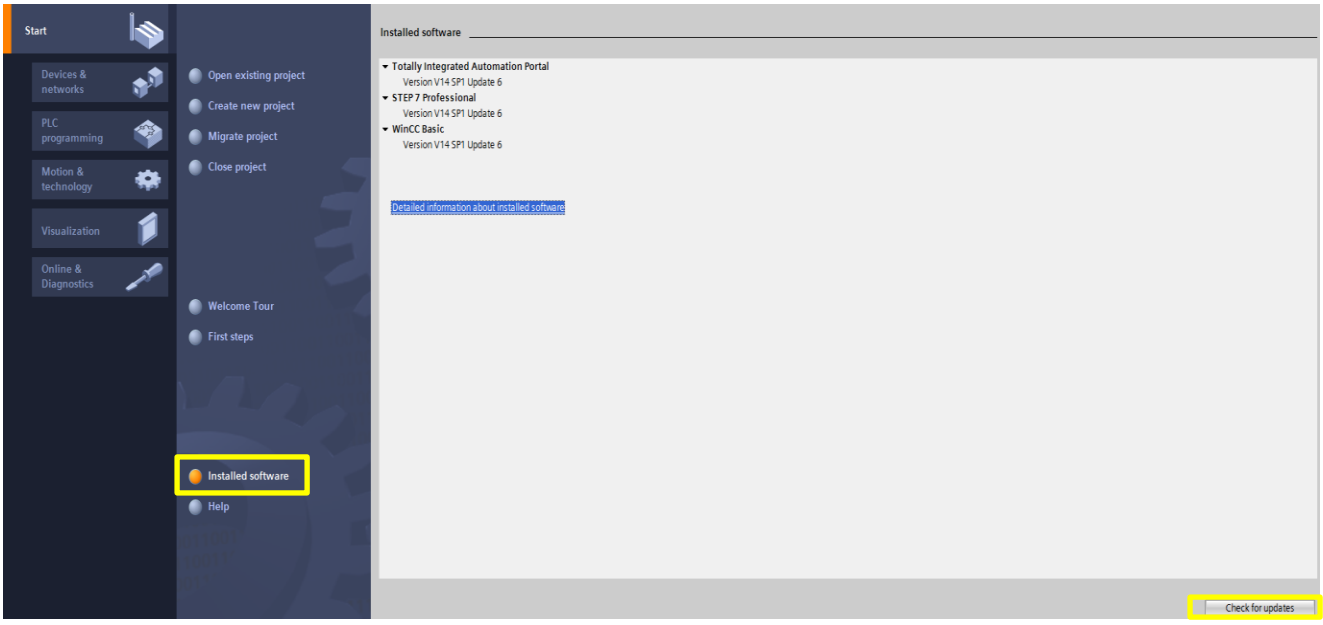


Figure 1 – TIA: Software Update

In the window that appears, once the software has checked for possible updates, download them and then install.

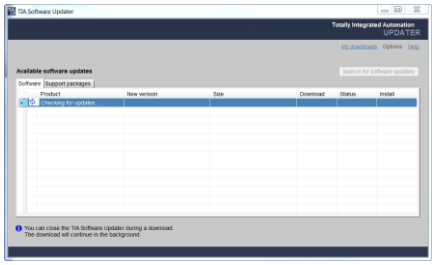


Figure 2 – TIA: Software update window

1.3Card and controller firmware correspondence

In order for the network configuration to work properly, it is necessary to ensure that the correct firmware is loaded into the map and that the correct GSDML is used in the TIA project.

1.3.1Firmware & GSDML for CP1604 card

1.3.1.1 Firmware & GSDML for R-30iA

- Software version: V7.70p23 or higher
- CP1604 Firmware: V2.5
- Firmware file: fw16xx-2.5.2.0.38.fwl
- GSDML: GSDML-V2.25-Fanuc-J930-20120113.xml.

Please note that in the context of the R-30iA controller, there is no robot option allowing you to have the firmware of load it into the robot. It must therefore be copied onto an external medium and then loaded into the robot via the diary of the Profinet Setup menu in Controlled Start.

1.3.1.2 Firmware & GSDML for R-30iB

Two combinations exist depending on the robot software version.

First possibility:

- Software version: V8.10p03 or higher
- CP1604 Firmware: V2.5
- Firmware file: fw16xx-2.**5**.2.2.1.fwl
- GSDML: GSDML-V2.25-Fanuc-A05B2600J930-20120627.xml

Second possibility:

- Software version: V8.20p07 or higher or V8.30p02 or higher
- CP1604 Firmware: V2.6
- Firmware file: fw16xx-2.**6**.0.3.9.fwl
- GSDML: GSDML-V2.3-Fanuc-A05B2600J930V820**D**4-20131203.xml (device only) or GSDML-V2.3-Fanuc-A05B2600J930V820**M**4-20131203.xml (migration := Device + Controller Profinet)

1.3.1.3 Firmware & GSDML for R-30iB plus

- Software version: V9.10p05 or higher
- CP1604 Firmware: V2.7
- Firmware file: fw16xx-2.**7**.2(.0.1).fwl
- GSDML: **No more standard fanuc gsdml!**

1.3.2Firmware & GSDML for Molex card

1.3.2.1 Firmware & GSDML for R30iB

- Software version: V8.30pXX
- Molex Firmware: V1.3.1.0
- Firmware file: ef2.bin
- GSDML: GSDML-V2.3-Fanuc-A05B2600R834V830-20140601

1.3.2.2 Firmware & GSDML for R30iB plus

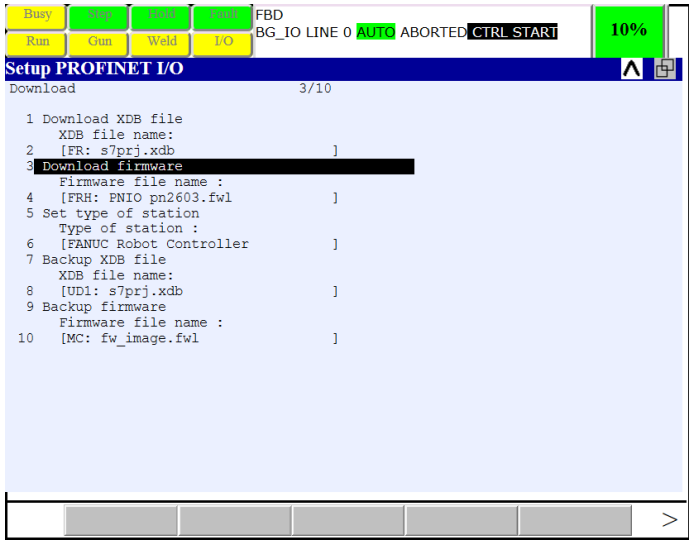
- Software version: V9.10pXX
- Molex Firmware: V1.3.3.2
- Firmware file: ef2 (1.3.3.2)(1.1.18.3).bin
- GSDML: GSDML-V2.33-Fanuc-A05B2600R834V910-20180517

1.3.3Profinet Card Firmware Update Procedure

1.3.3.1 CP1604 Firmware Update

First restart the robot in controlled start. Once the robot is in controlled start do

MENU-> 0. Next -> 0. Next -> 2. Profinet Setup. You arrive at the screen below.



F igure 3 – R30iB: Prof inet Setup screen

There are two cases.

- Case 1: Option J744 is loaded into the robot.
- Case 2: Option J744 is not loaded in the robot.

If you find yourself in case number 2, you will need to obtain external support (PCMCIA or USB) and then copy the appropriate firmware file (see part 1.3) to the root of this medium. Then, you need change the default path listed below firmware file name. If you are working with a PCMCIA, you need to enter MC:\firmware_file_name.fwl. With a USB key, you need to put UD1:\firmware_file_name.fwl file_firmware.fwl.

We now repeat the procedure whether we are in case 1 or 2.

Go to Download Firmware and press ENTER. The system will inform you that it will take 7 minutes.

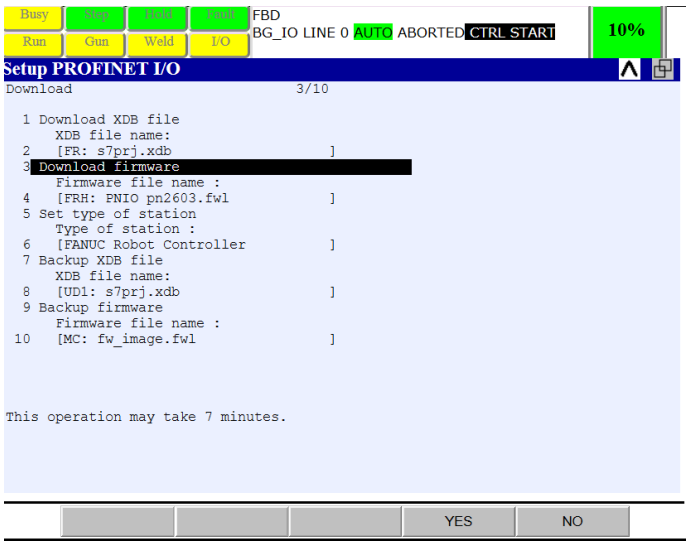


Figure 4 – R30iB: CP1604 firmware download

Press F4 YES and the loading will start.

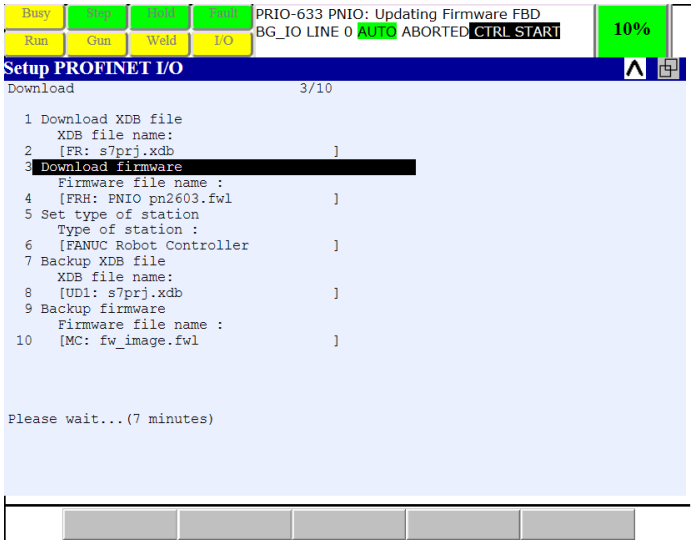


Figure 5 – R30iB: CP1604 Firmware being downloaded

Restart the robot in cold start using the FCTN key.

The update procedure is complete.

1.3.3.2 Molex Firmware Update

First restart the robot in controlled start. Once the robot is in controlled start, click MENU -> 0. Next -> 0. Next -> 1. Profinet (M) Setup. You arrive at the screen below.

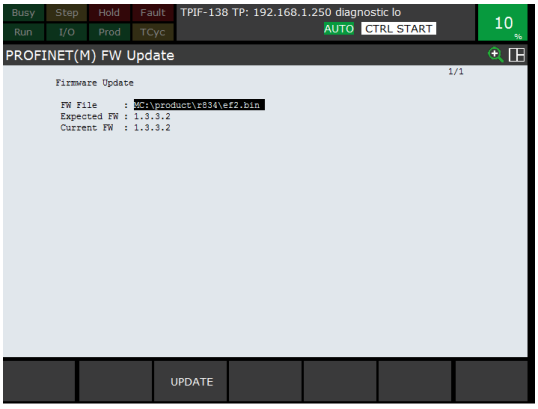


Figure 6 – R30iB plus: Molex card firmware update screen

The system indicates the firmware version that must be installed to operate properly. If the version expected is different from the version currently on the card, the firmware needs to be updated.

To do this, insert a media (PCMCIA or USB key) with the firmware file included on this media then change the access name in FW File. For example, if the firmware file is in the root, enter UD1:\ef2.bin for it. firmware R30ib or UT1:\ef2 (1.3.3.2)(1.1.18.3).bin.

Finally, to complete the procedure you must press F2 Update to update the firmware.

Restart the robot in cold start using the FCTN key.

The update procedure is complete.

2 Definition of a profinet controller network with Siemens CP1604 card

2.1Prerequisites

Before you can follow the next steps, you must first create a project in TIA Portal. To do this, in the home screen, just click on in the start menu on Create New Project. Give a name to the project then make sure to select the most up-to-date version (In the example below: V14 SP).

Finally press Create.

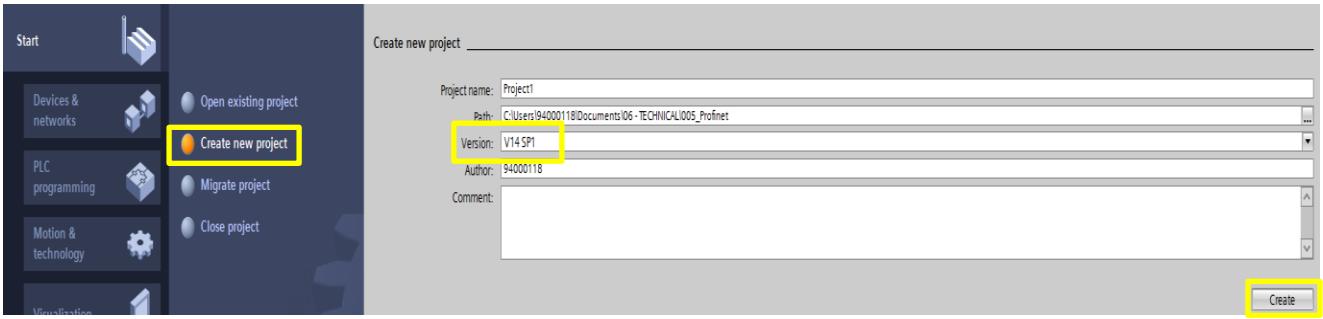


Figure 7 – TIA: Creation of a project

Once the project is generated, tap Project view to switch to the screen below.

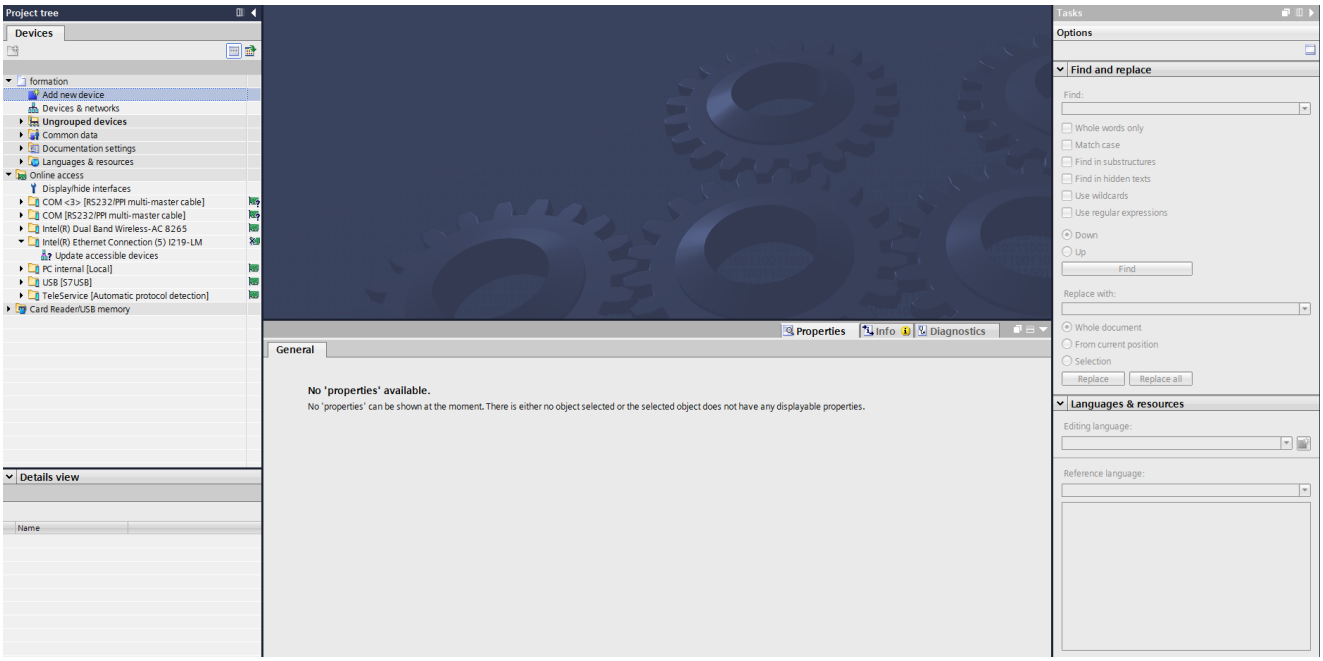


Figure 8 – TIA: project view

2.2Step 1: Inserting a PC Station

The first step is to add a PC Station to the project. For representation, the PC Station is the robot controller.

To add a PC station, do “Add new device”.

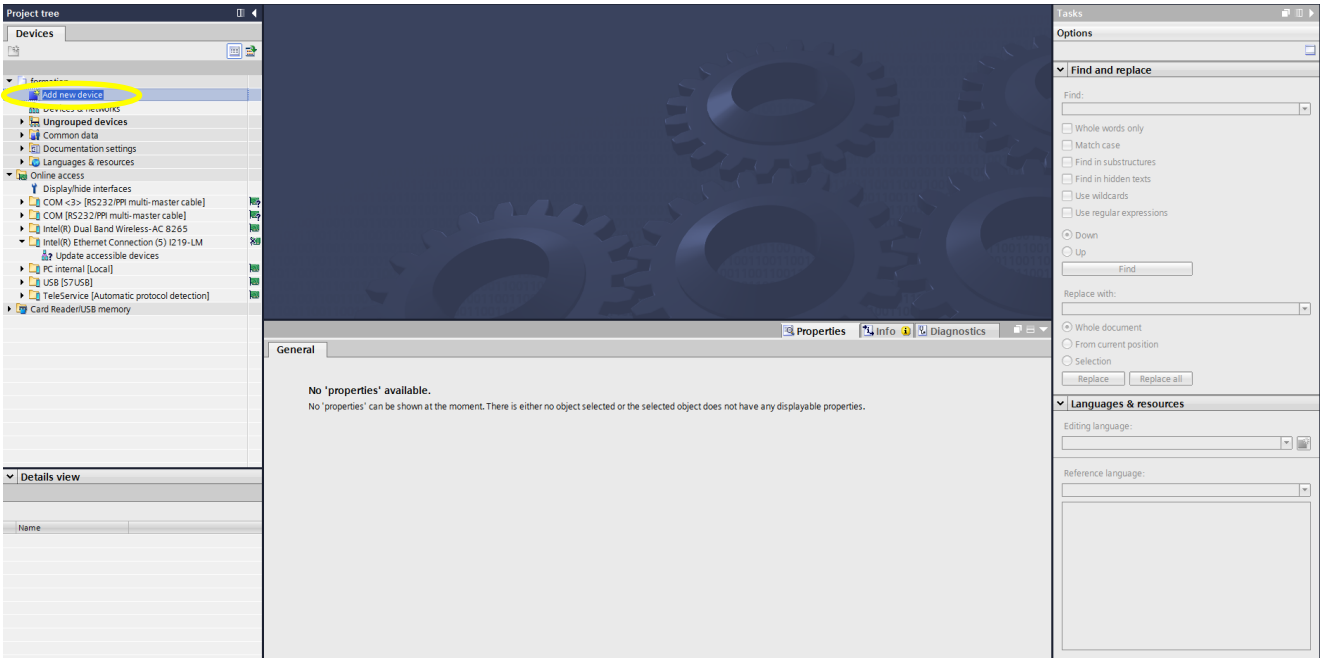


Figure 9 – TIA: Add a new module

The window below appears. In the proposed tree structure, go to PC Systems - PC General - PC Station. Make OK.

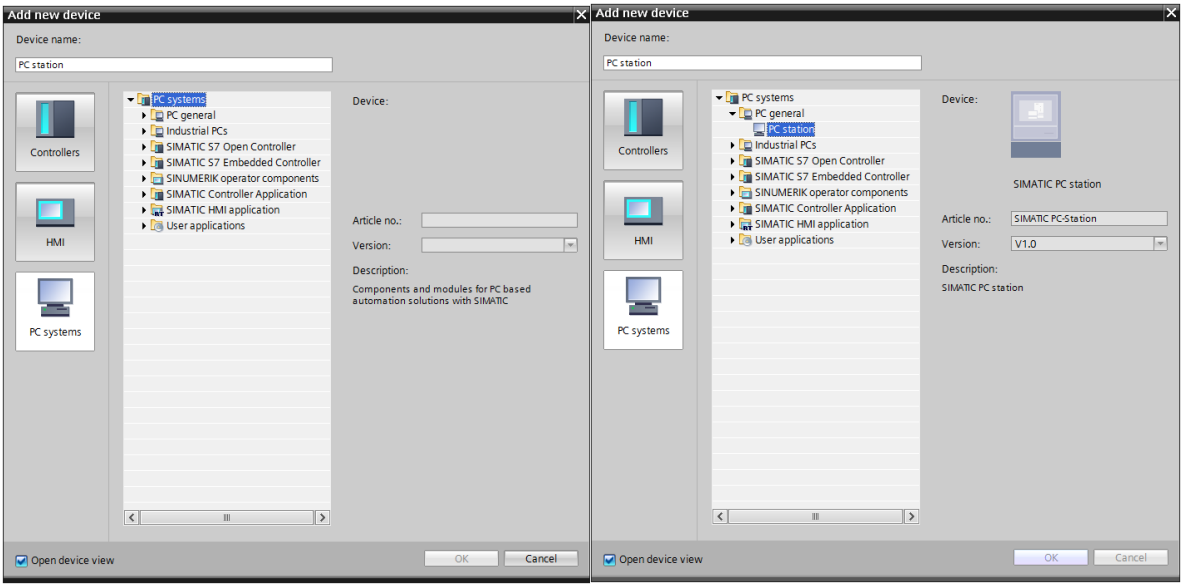
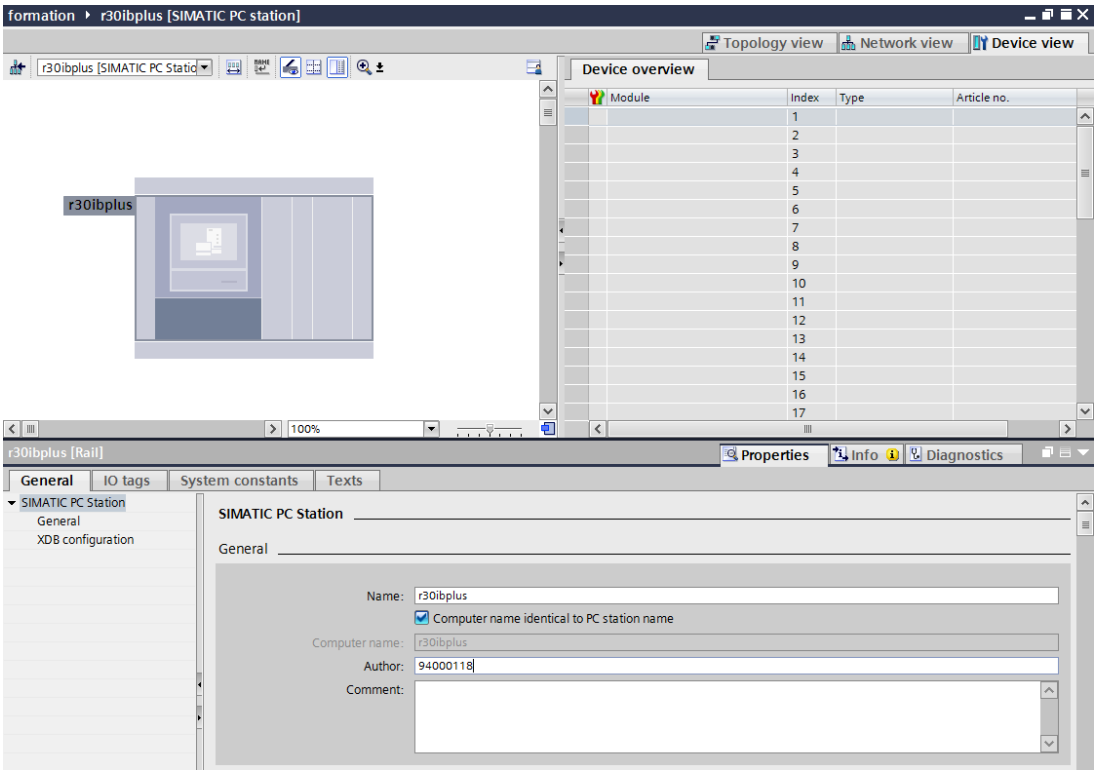


Figure 10 – TIA: Adding a PC Station

The PC station is created, it remains to give it a name. Let's call it by the type of controllers currently used (eg: r30ibplus).



F igure 11 – TIA: PC Stat ion

2.3Step 2: Adding a CP1604 card

To communicate in profinet, we physically have a CP1604 card which must be installed in the wide mini slot of the robot controller.

Therefore, the configuration in TIA must be the same as the one we have physically. If the pc station is the controller, so you need to add a CP1604 card to the controller.

When opening the PC station, the window on the right shows us the modules that we can add (otherwise, select the pc station and click on device view).

You have to go to Communication modules-PROFINET/Ethernet -CP1604-Select the correct reference of card.

Be careful to select the correct card reference that is present in the controller.

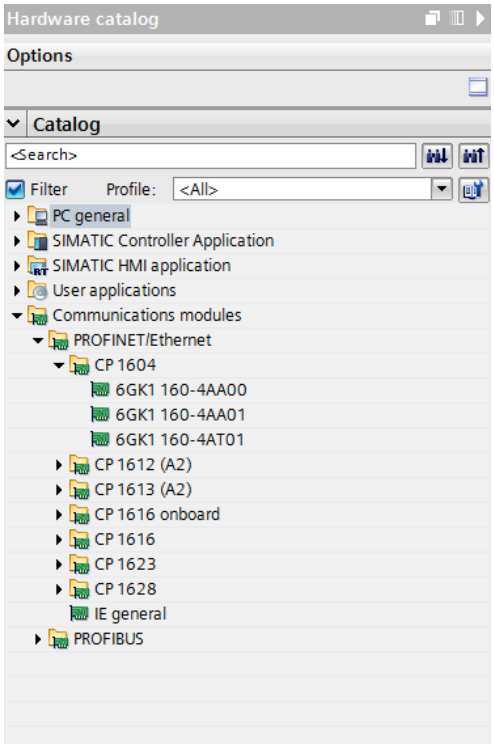
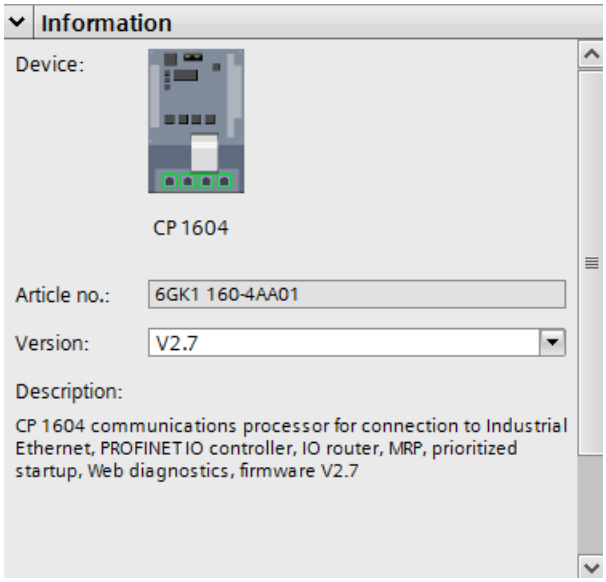


Figure 12 – TIA: Selecting the CP1604 card

When the correct card reference is selected, in the information window **you have to choose the version of correct firmware**. (Reminder: R30iA - V2.5 / R30iB - V2.5 or V2.6 depending on the software version / R30iB plus - V2.7).



F igure 13 – TIA: Firmware selection

Of course, you must first have updated the firmware of the card that is in the robot controller. Both Firmware versions must match otherwise communication will not work.

=

To be able to add the card, once the correct firmware is chosen, simply drag and drop the card into the pc station. The screen should look similar to the one below.

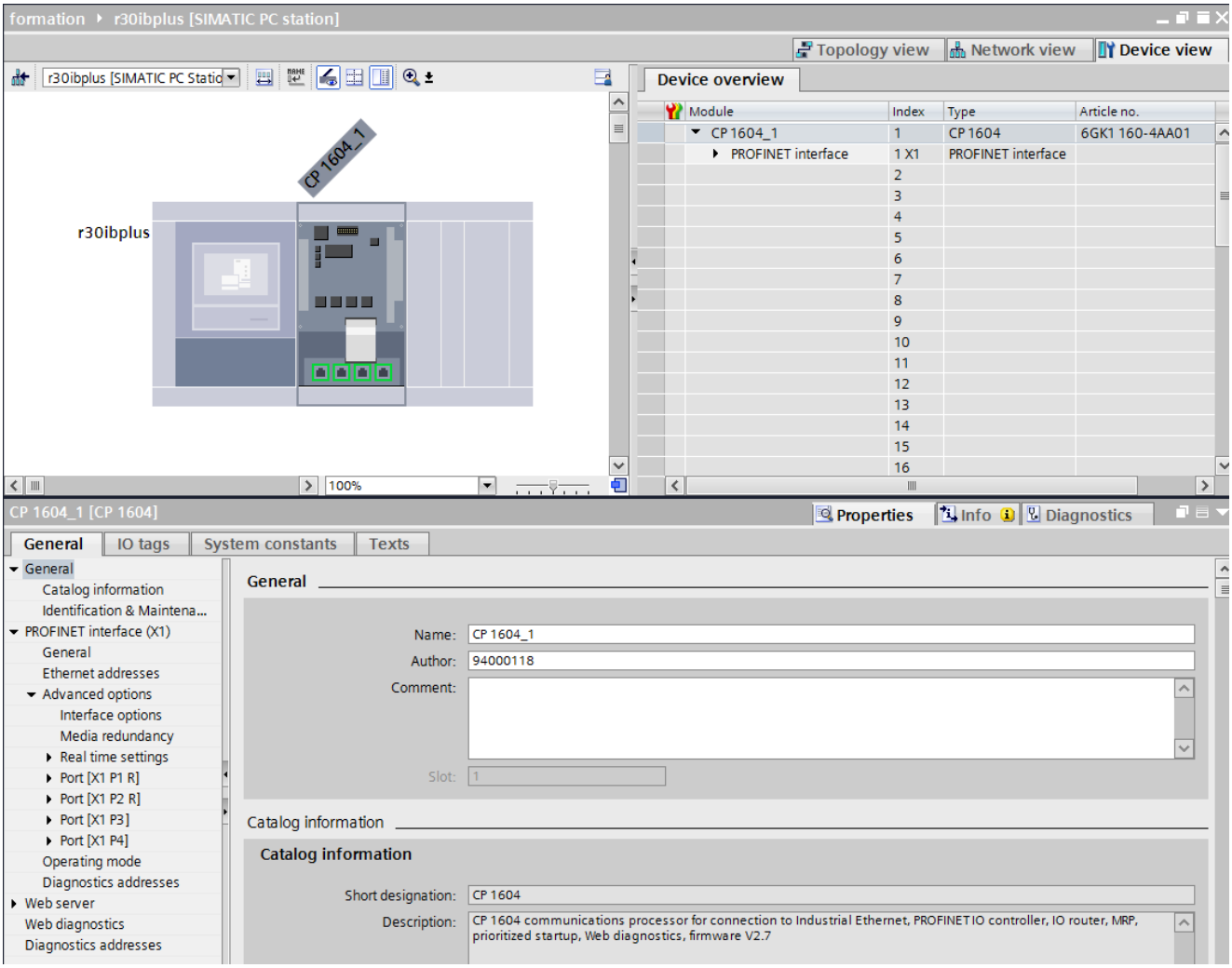


Figure 14 – TIA: CP1604 added

2.4Step 3: Configuring the CP1604

2.4.1Step 3.1: Name the map

Go to the general field and then name the card. In the example it is called CP1604.

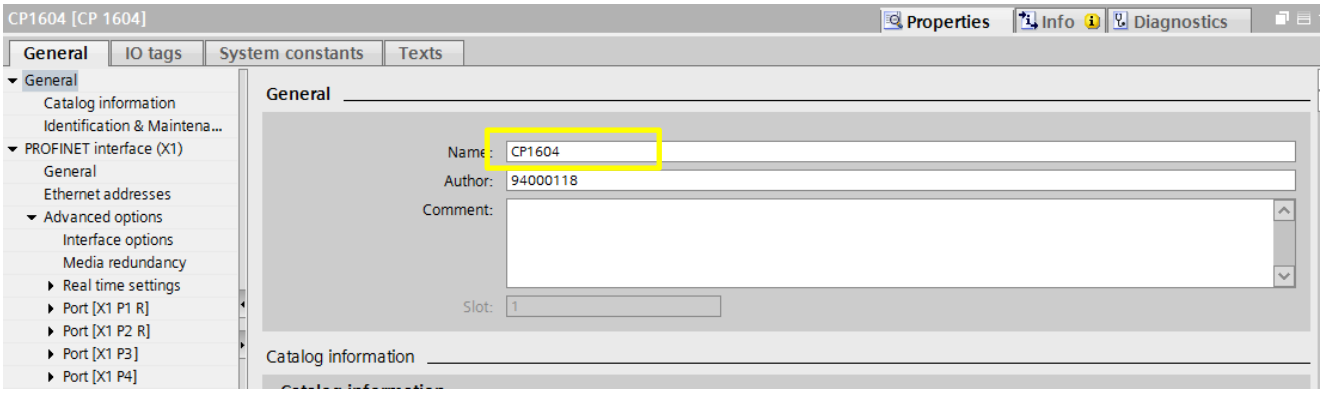


Figure 15 – TIA: Naming the CP1604 card

2.4.2Step 3.2: Give a name to the profinet network

Go to Profinet Interface - General.

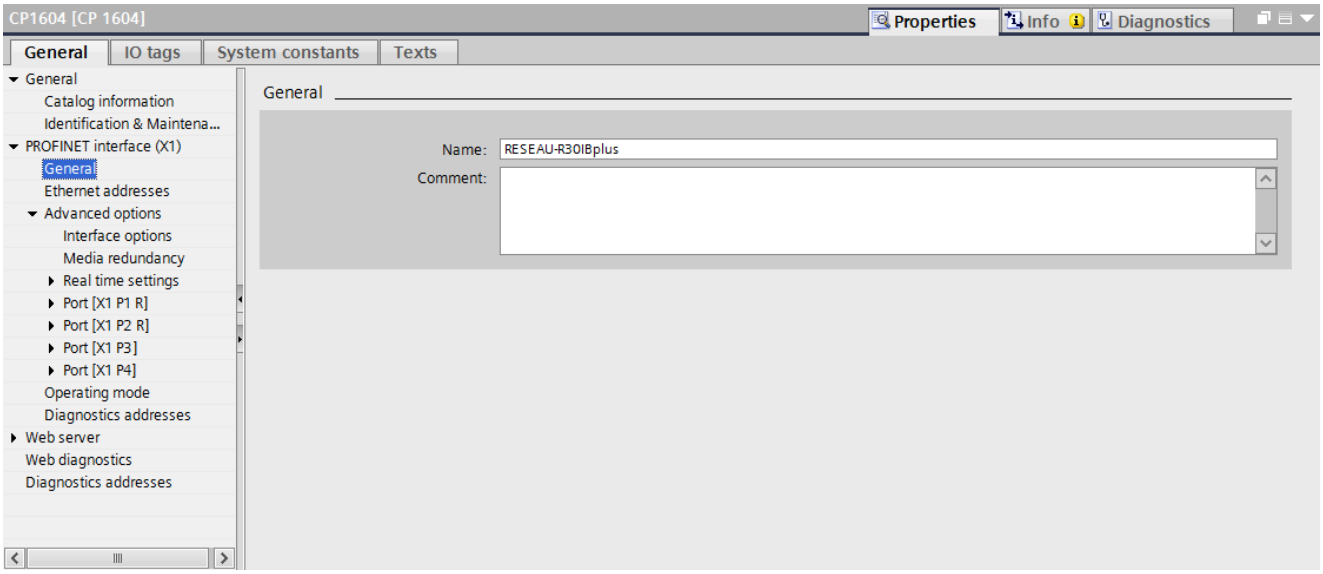


Figure 16 – TIA: Name of the prof inet network

2.4.3Step 3.3: Configure the IP address and name of the profinet module

Go to Ethernet addresses, then do:

1. Add new subnet
2. Enter an IP address

Leave the Generate PROFINET device name automatically box checked. The generated name is NomPCStation.NomCP1604. In our example, NomPCStation = r30ibplus / NomCP1604 = CP1604, i.e. module name profinet = r30ibplus.cp1604.

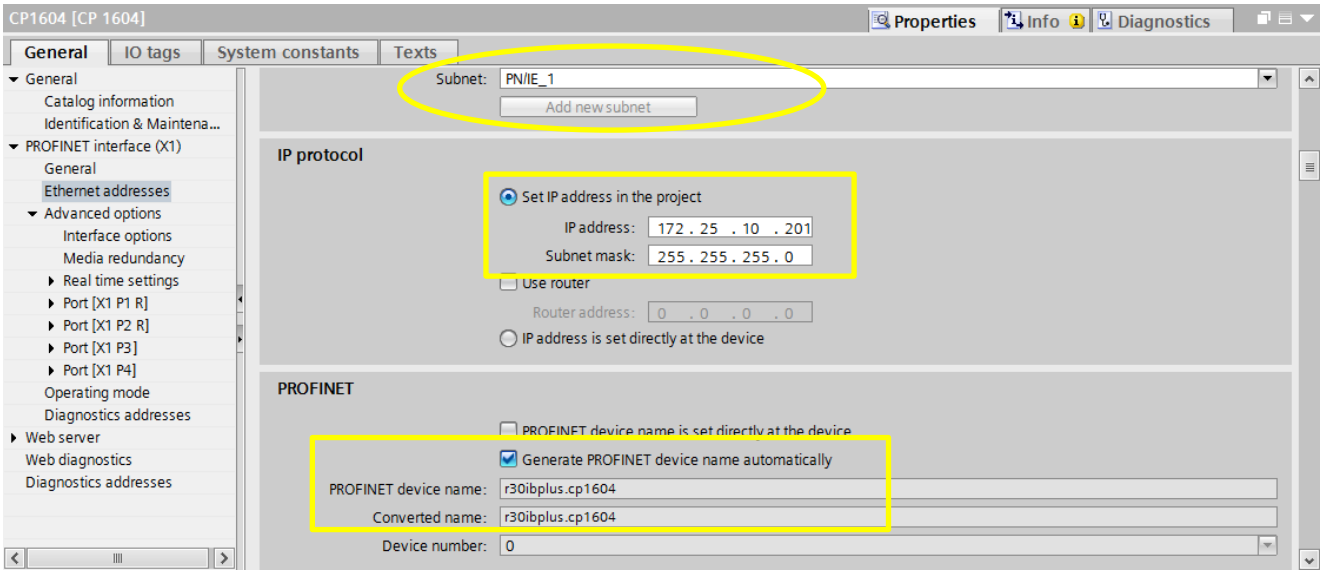


Figure 17 – TIA: Network configuration of the CP1604 card

2.5Step 4: Adding profinet devices

This step must be repeated as many times as there are profinet devices to add to the controller's profinet network robot.

2.5.1Step 4.1: Adding the profinet device

Click on network view, the view below appears.

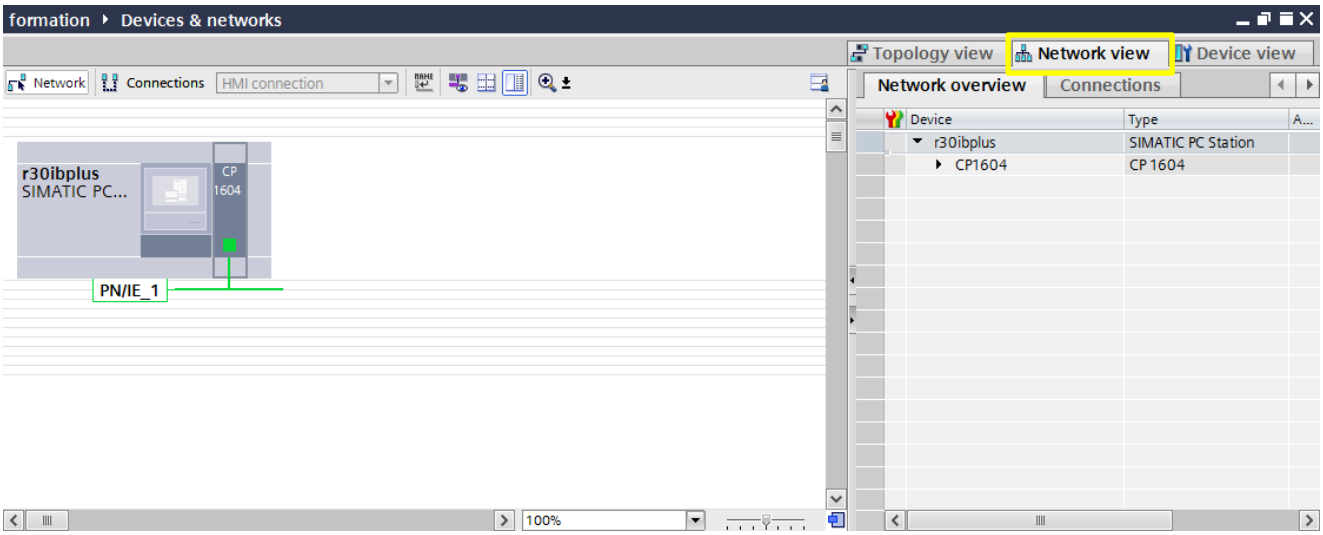
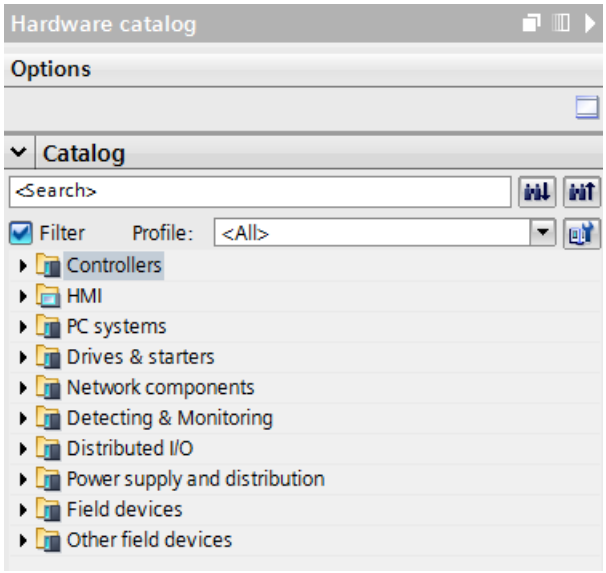


Figure 18 – TIA: Network visualization

At this point, the robot controller is alone on its network. The goal is to add the communication modules with which the robot will communicate.

When switching to network view, the right screen shows us the available hardware catalog. So we need to go and get the modules in this catalog then drag and drop them into the network to be able to add them module to the robot network.



F igure 19 – TIA: Hardware catalog

Please note that it is first necessary to load the gsdml of this/these module(s) by doing Options -Manage general station description files.

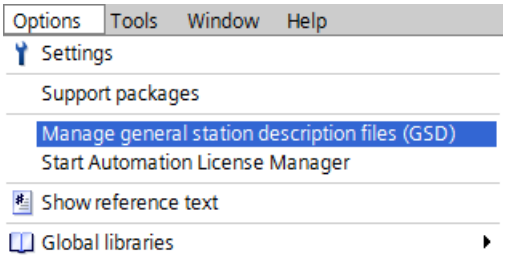


Figure 20 – TIA: Loading a gsdml

After adding the module by dragging and dropping, it appears in the network view.

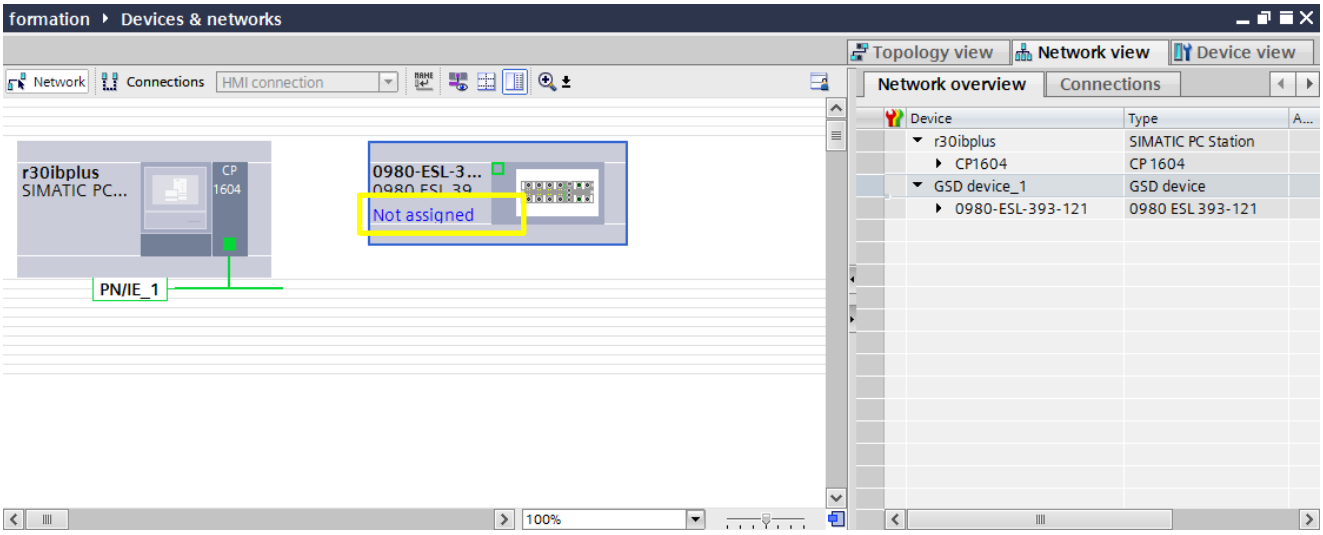


Figure 21 – TIA: Network visualization with additional module

2.5.2Step 4.2: Assigning the profinet controller to the device.

For the module to connect to the robot network, you must left-click on the not assigned (in yellow above). above) and select the network to which it should be connected. In our example, r30ibplus.cp1604.NETWORK-R30IBplus

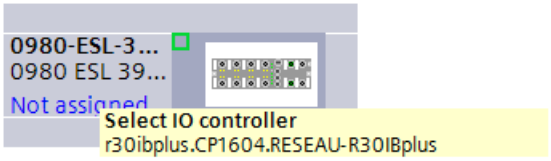


Figure 22 – TIA: Assignment of the module to the network to the controller

Once the network is selected, the connection is made automatically in the network view.

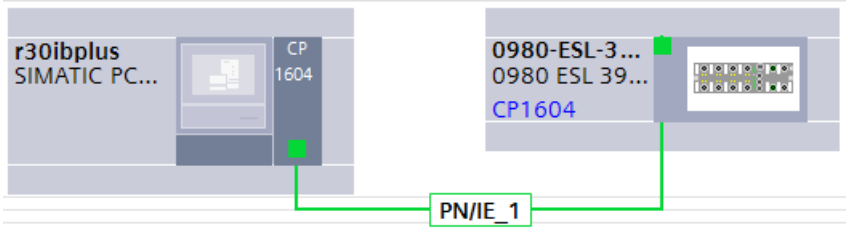


Figure 23 – TIA: connecting the module to the network

2.5.3Step 4.3: Configure the module IP address and profinet module name

Click on the profinet module of the device (click at the image level).

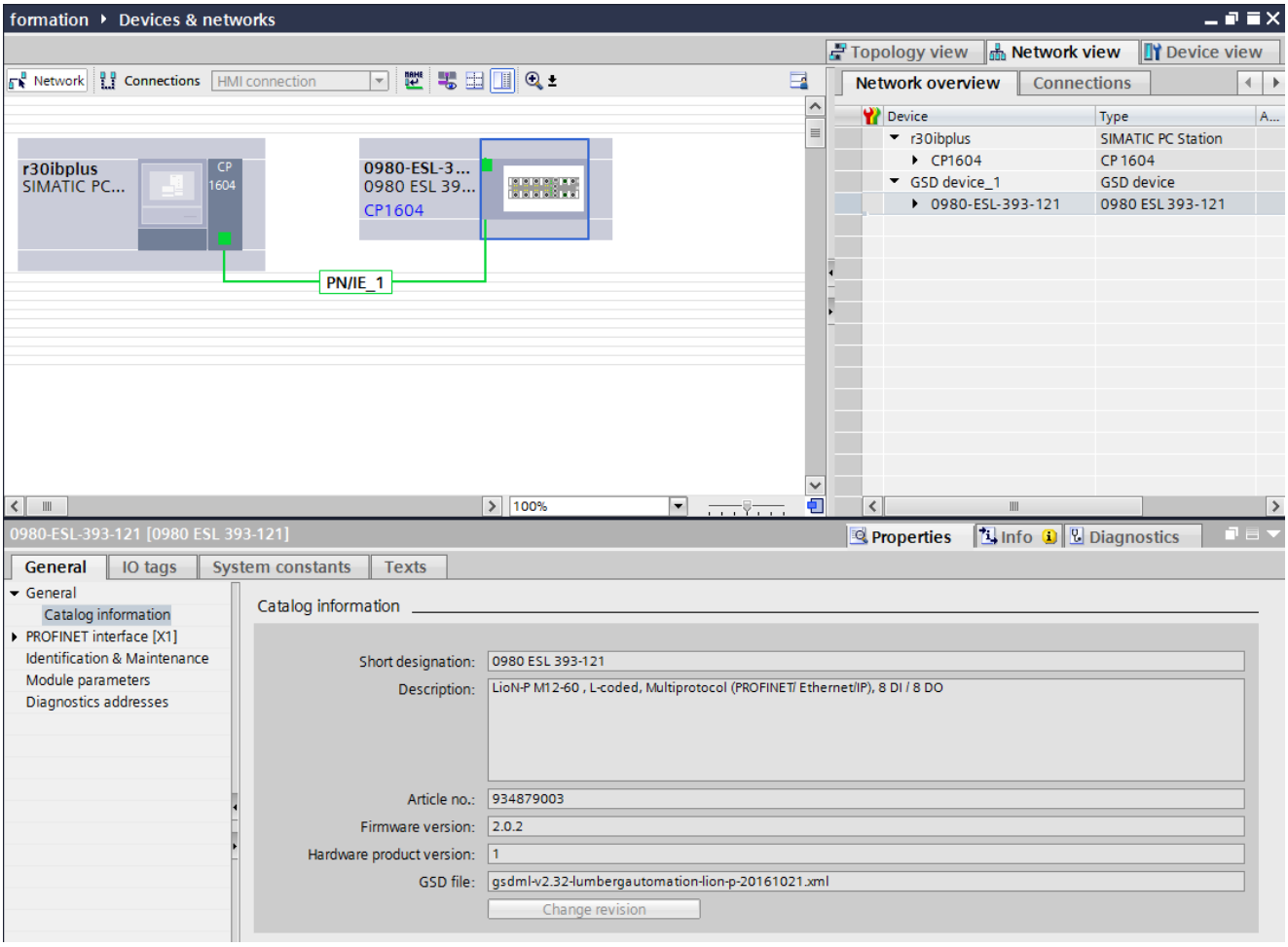


Figure 24 – TIA: Device prof inet module

Go to Profinet Interface-Ethernet Addresses. Enter an IP address and then a name for the profinet module.

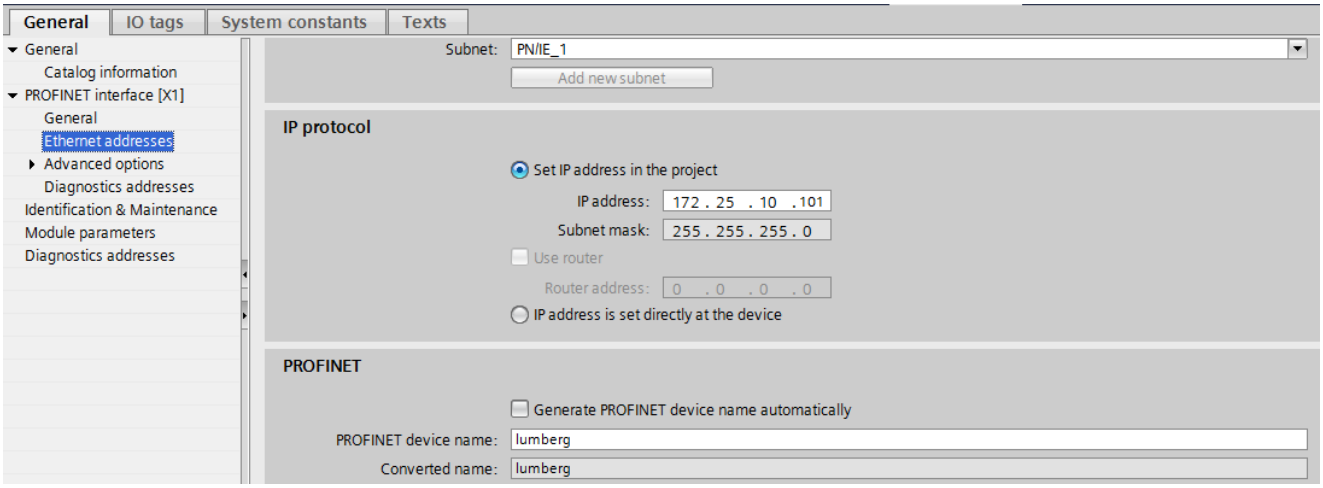


Figure 25 – TIA: Module network configuration

2.5.4Step 4.3: Configuring I/O Exchange

Still keeping the module being added selected, click on device view.

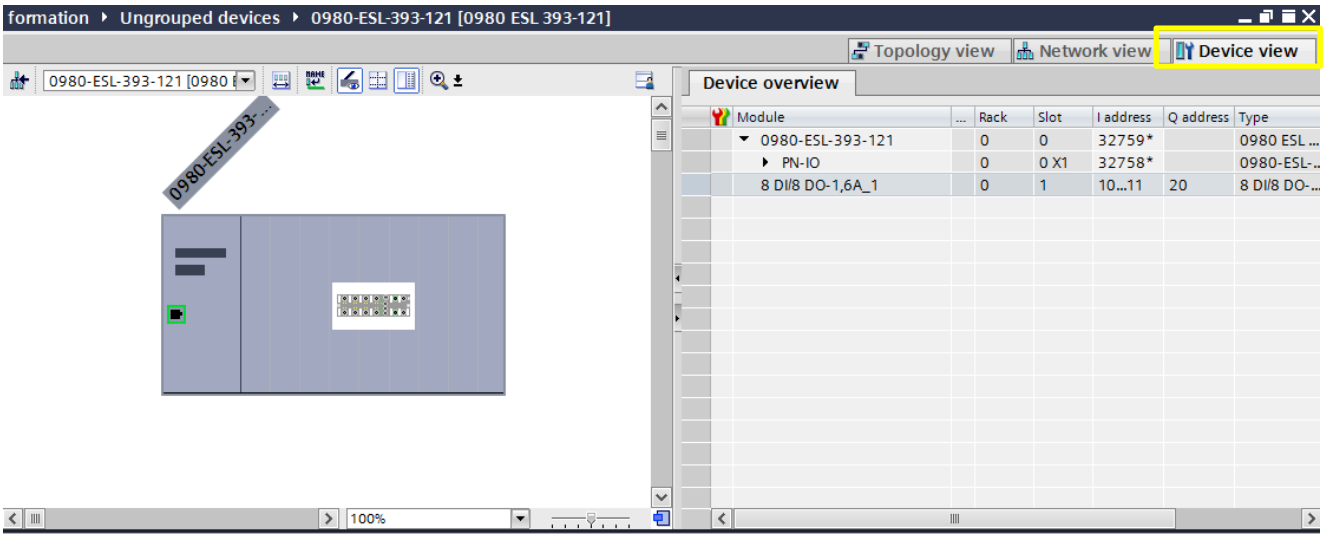


Figure 26 – TIA: module view

In the right screen "Hardware catalog" you must select the desired exchange configurations available.
nible for the module and then drag and drop it to the device overview screen.

Next, you need to configure the exchange range between the profinet controller and the profinet device.

This is done in the I Address and Q Address columns. Allowable values are between 0 and 32765.

The numbers entered in I Address and Q Address will determine the value of the start point to be entered.
in the robot's I/O configuration. The start points are calculated using the following formulas:

= × 8 + 1

= × 8 + 1

In our example we have configured I address and Q address to 10 and 20 respectively. We must therefore enter the robot configuration for the outputs Rack: 99 Slot: 1 Start Point: 20x8+1 = 161. For the inputs, you must enter Rack: 99 Slot: 1 Start Point: 10x8+1 = 81.

2.6Step 5: Compiling the project

In the network view, right-click on the PC station corresponding to our controller
robot then do Compile - Hardware and software (only change).

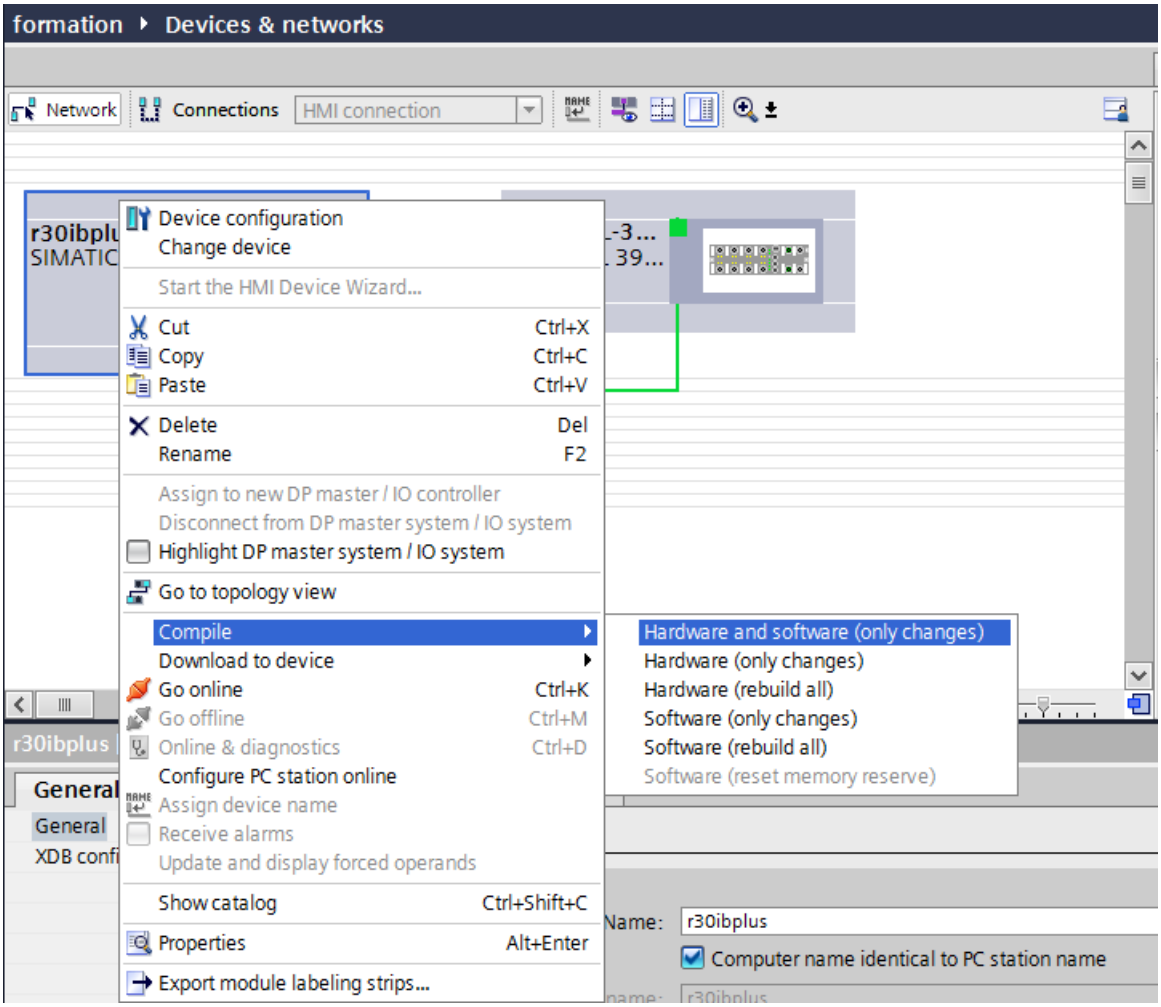
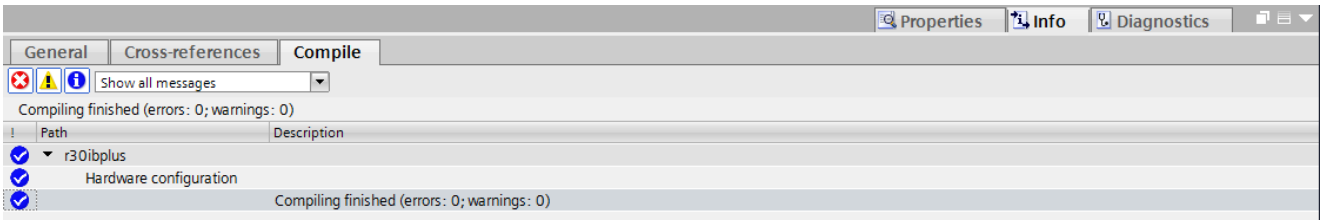


Figure 27 – TIA: Project compilation

In the info screen, the compilation should go through without errors. The configuration is therefore ready to be loaded into the CP1604 of the robot controller.



F igure 28 – TIA: Compi lat ion diagnosis

2.7Step 6: Assigning IP addresses and names of profinet modules

The project is now compiled and ready to be loaded. But to do this, you must first name the different modules on the network and assign them the correct IP address according to the project configuration (part 2.4.3 and 2.5.3).

In the “Project tree”, go under your network card then click on “update accessible devices” to scan the network and find all profinet modules that are online.

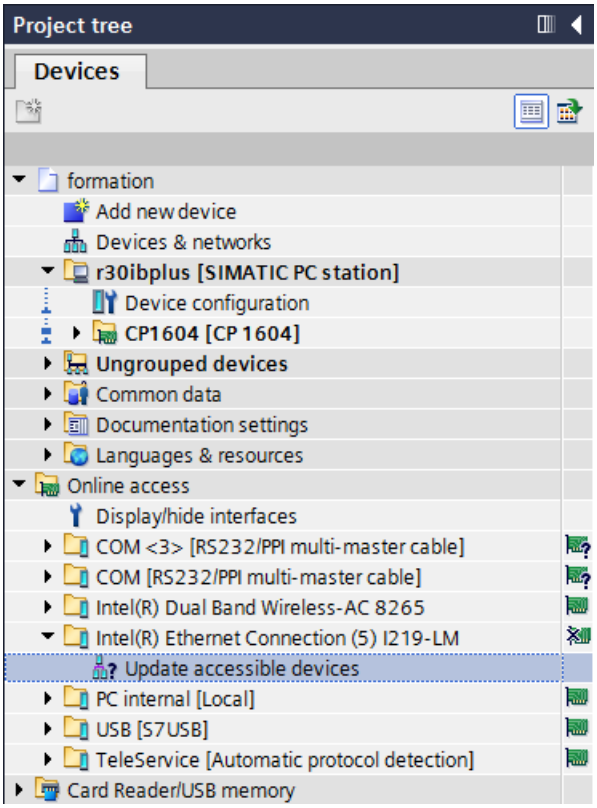


Figure 29 – TIA: Scanning the prof inet network

In the info tab, we can see that TIA has successfully launched a network scan.

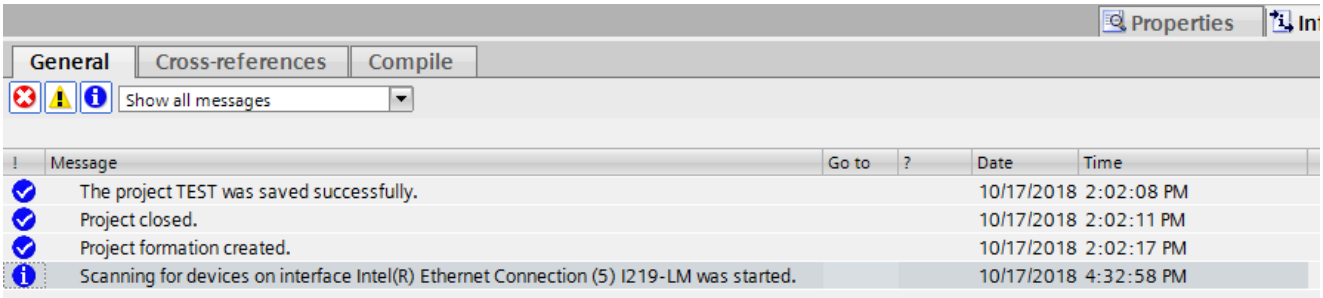


Figure 30 – TIA: Scan in progress

Once the scan is complete, the items present on the network appear.

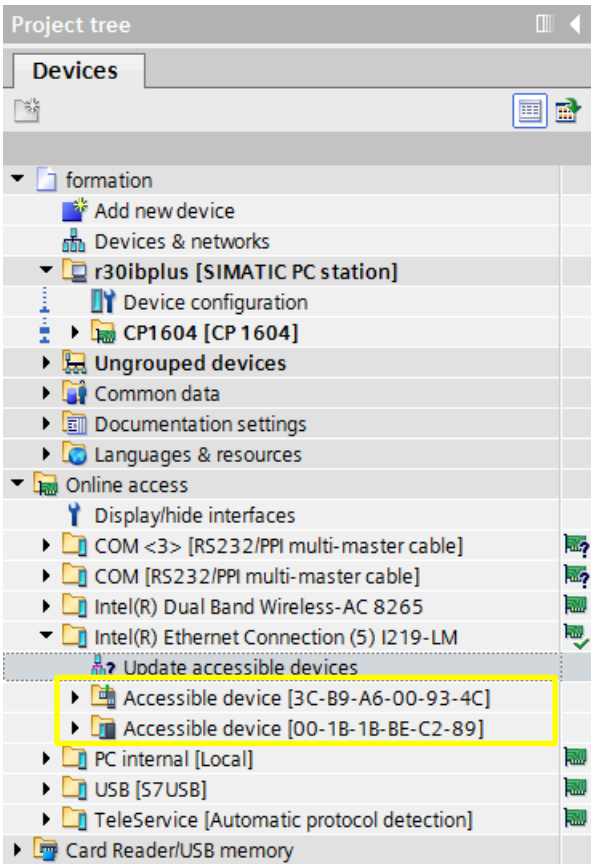
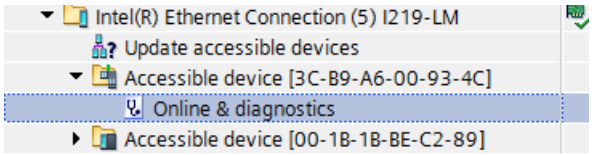


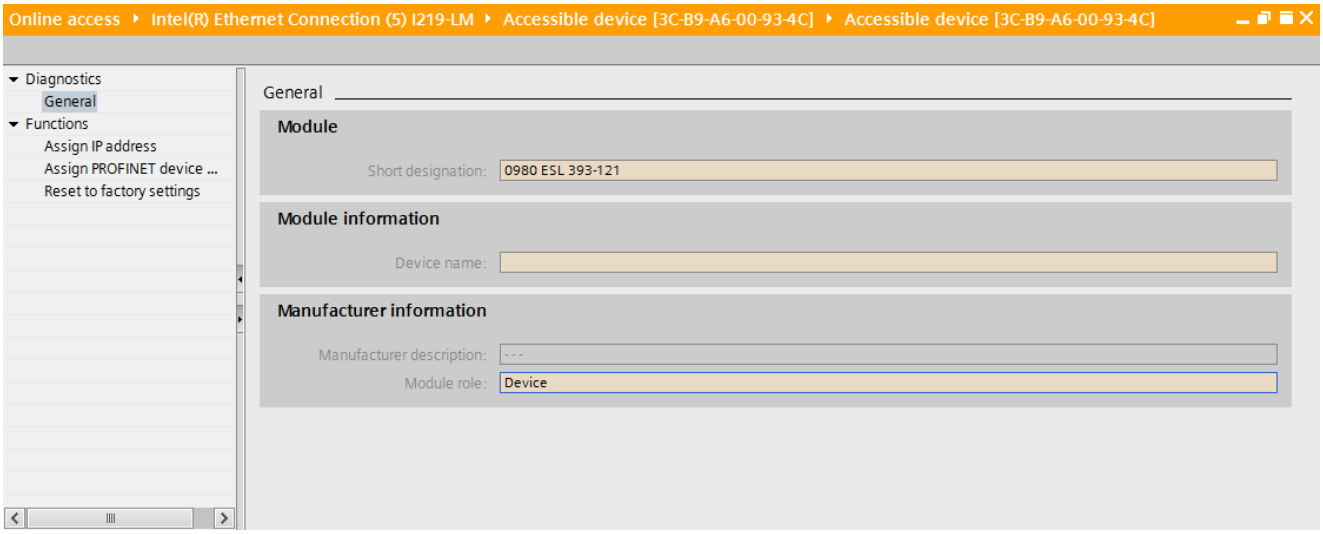
Figure 31 – TIA: List of modules accessible online

You need to unfold the module menus then double-click on Online & diagnostics



F igure 32 – TIA: Online and diagnostic modules

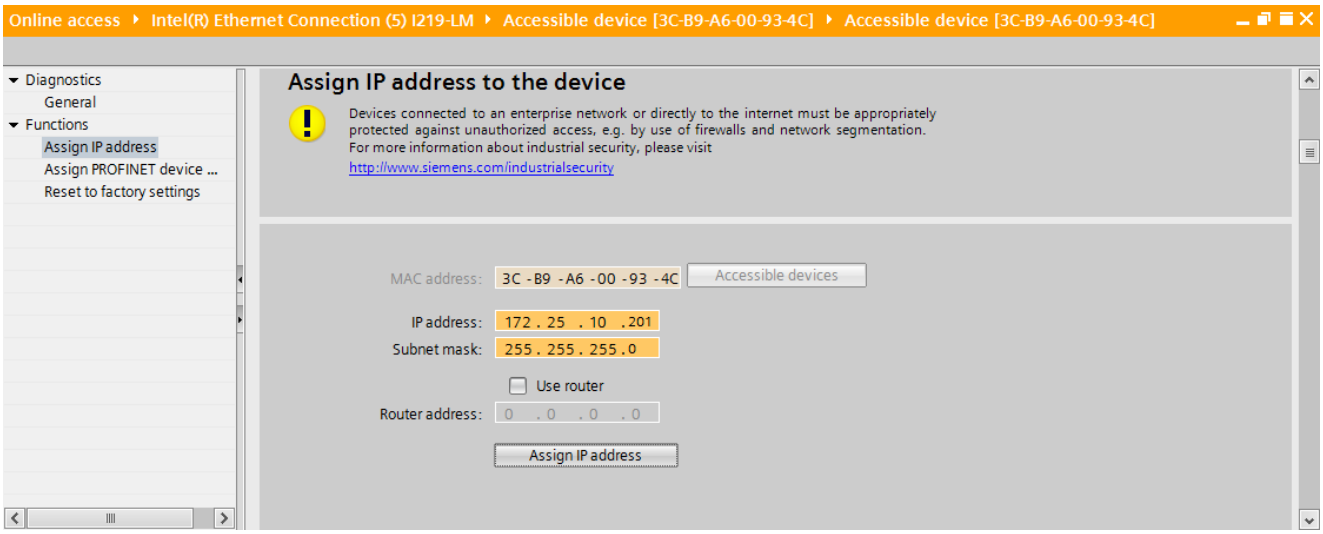
The following screen appears. You must then assign the IP address and the profinet name according to the names given in marked in parts 2.4.3 and 2.5.3. This step is crucial, because if the names differ the communication will not not work properly.



F igure 33 – TIA: Module diagnostics screen

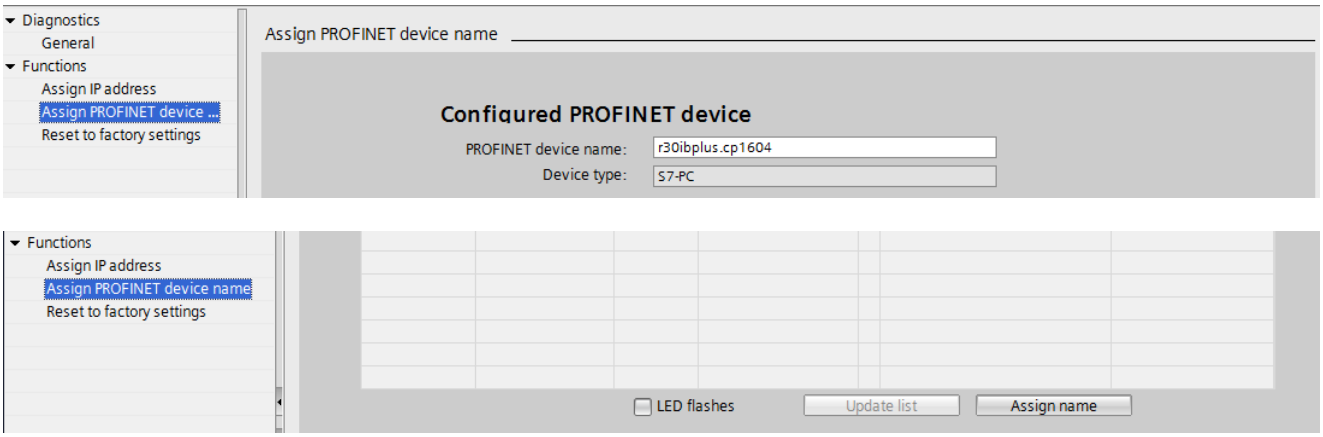
In Assign IP Address, enter the IP address and then the subnet mask. Then press the Assign IP button

Address.



F igure 34 – TIA: IP address assignment of an online module

In Assign profinet device name, enter the name then press Assign name.



F igure 35 – TIA: Assigning the name of the prof inet of an online module

2.8Step 7: Loading the configuration into the CP1604 card

Right click on the pc station in network view then do download to device -Hardware configuration.

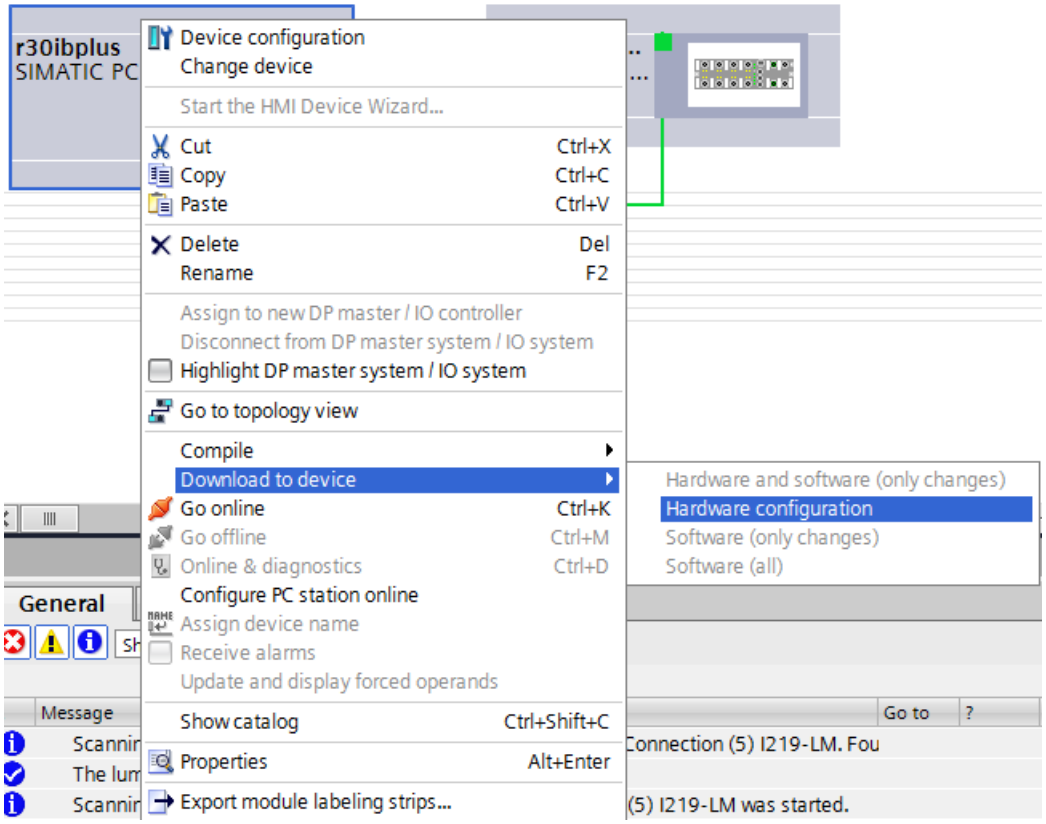


Figure 36 – TIA: Loading the prof inet configuration

When loading for the first time a help screen appears (below), select in connection to interface/subnet: PN/IE_1 then click on Start search.

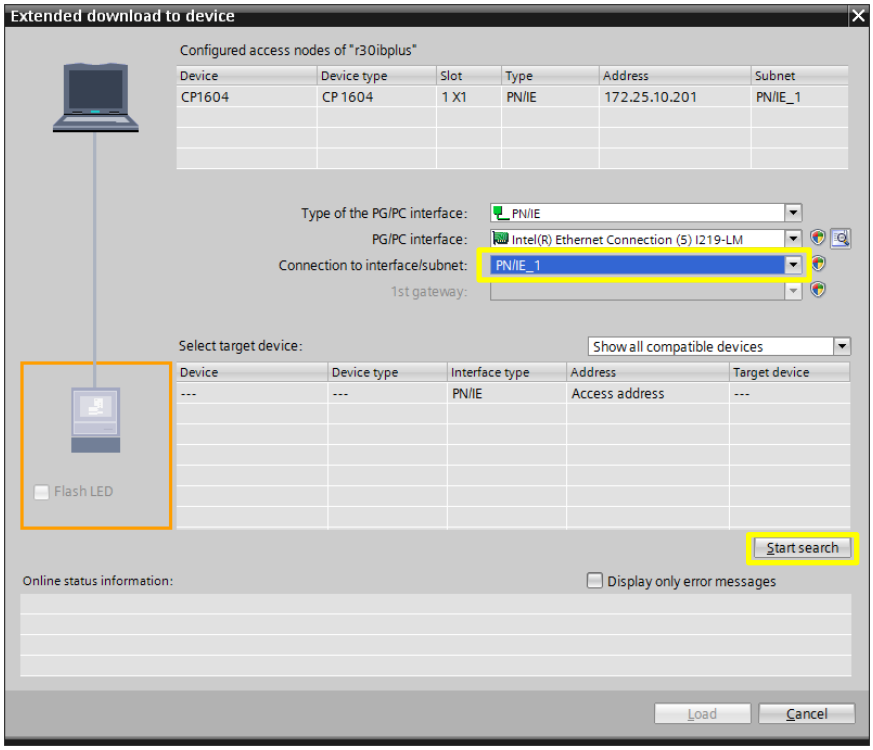


Figure 37 – TIA: Loading assistance screen 1

Once the network scan is complete, select the appropriate module and click Load.

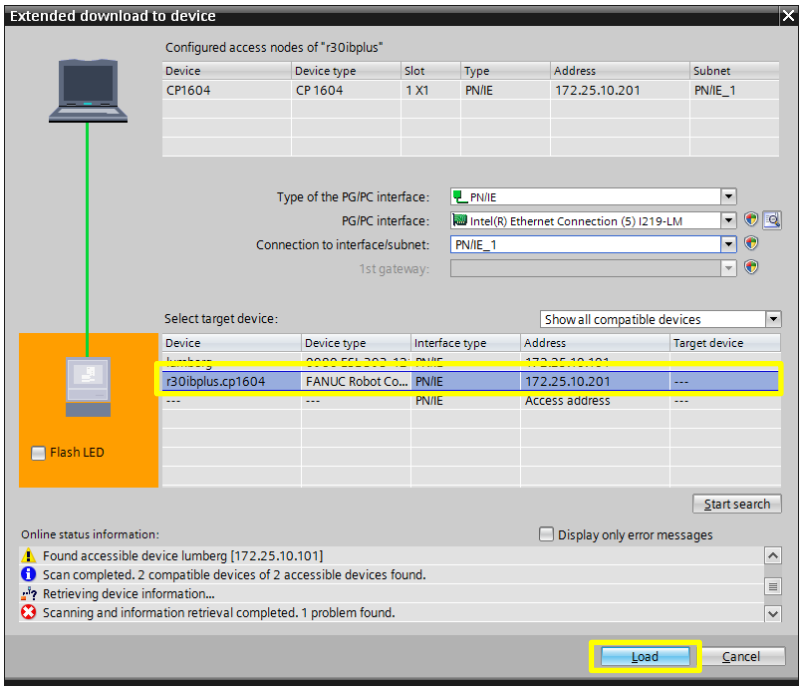


Figure 38 – TIA: Loading area screen 2

On the next screen do Load again. The loading begins and at the end of it in the info screen it should indicate that the configuration was loaded into the card without any problems.

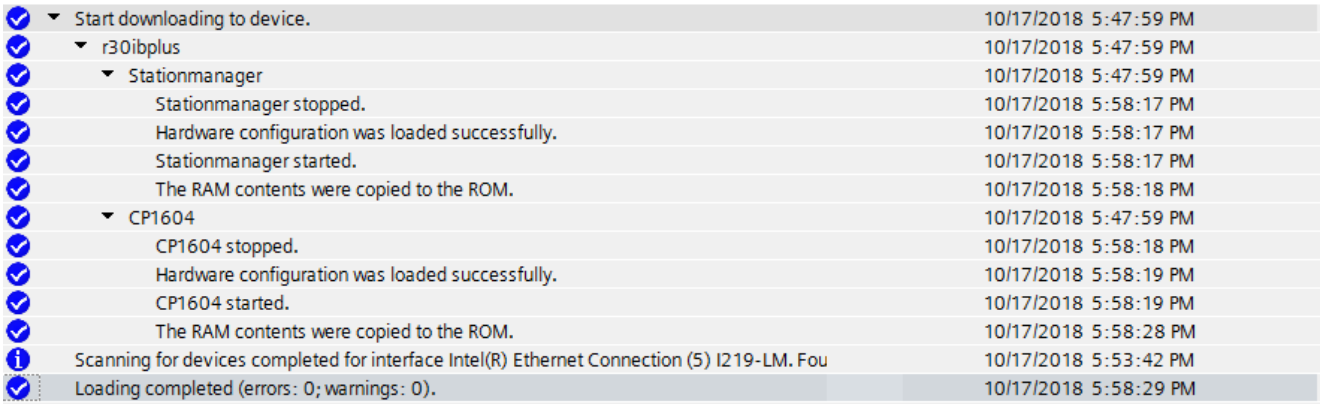
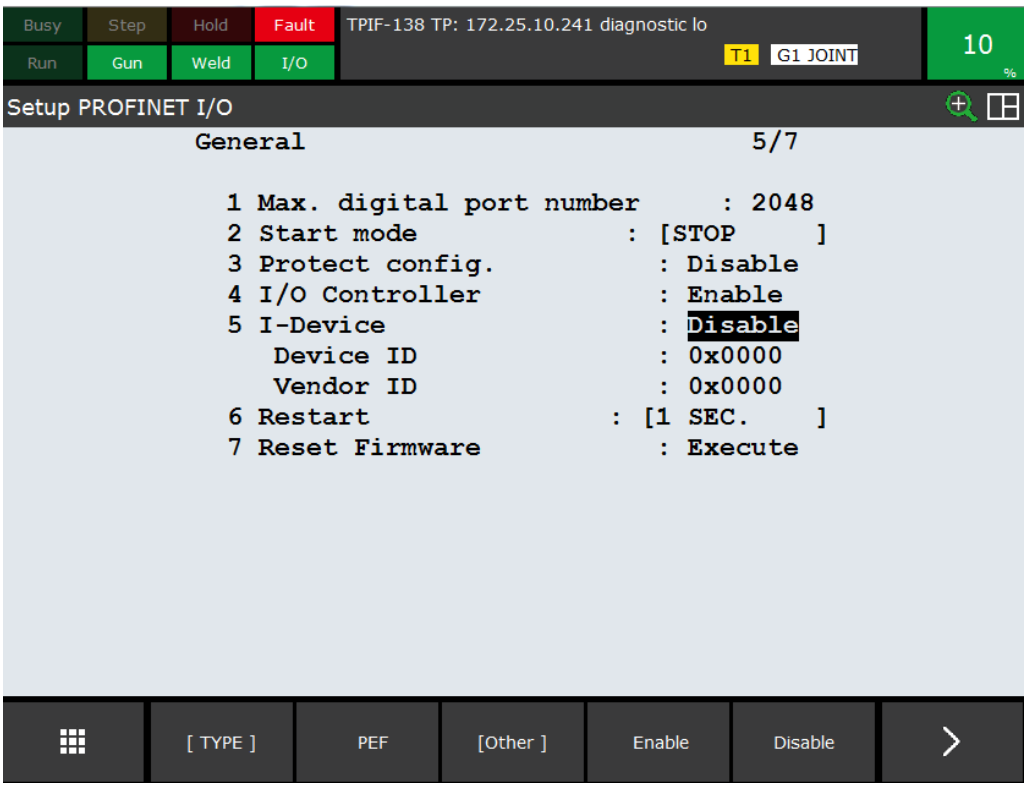


Figure 39 – TIA: Load monitoring

2.9Step 8: Reading the profinet controller configuration from the card by the robot.

Go to the robot's Profinet screen (MENU - Setup - Profinet), then set the I Device to disable.



F igure 40 – R30iBplus: Conf igurat ion of the Prof inet I/O controller

Change the start mode to Run for R30ibplus or Read-in for R30iA/R30iB.

The robot controller then reads the configuration found in the card and the profinet parameters on the controller side robot are updated. A boot is required to be able to function. Below are the different warning that appear (R30iBplus).

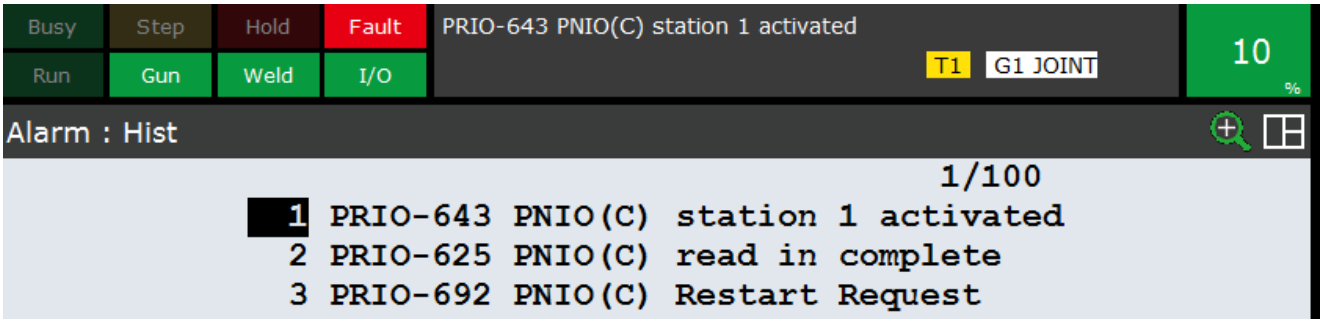
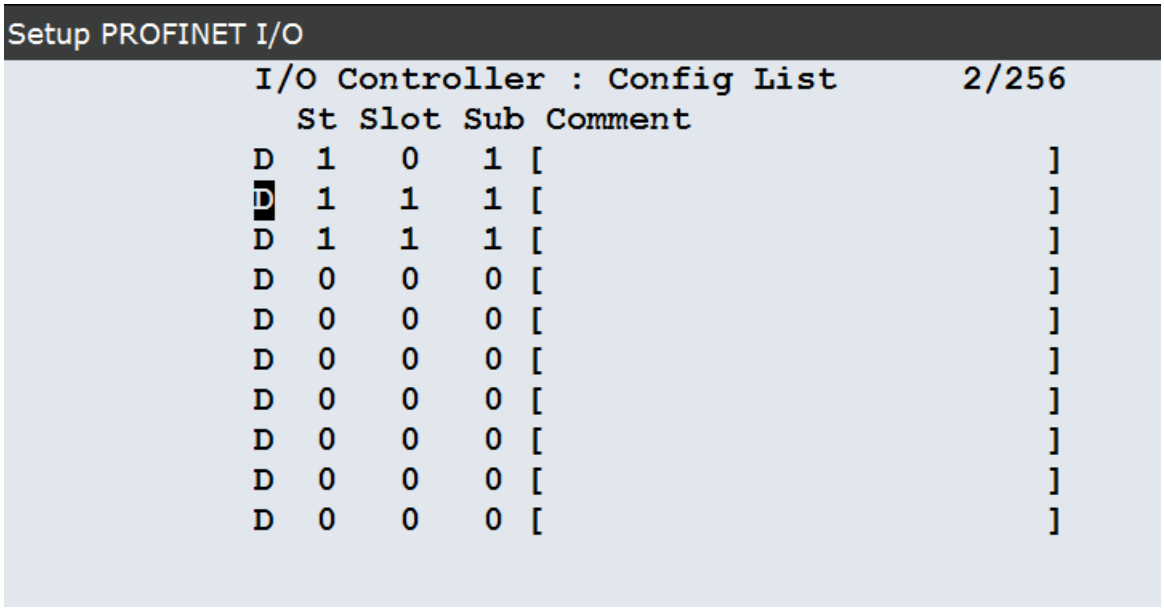


Figure 41 – R30iBplus: robot warning when reading the configuration

On reboot, warnings should inform the user that all modules in the config I/O Controller are enabled.

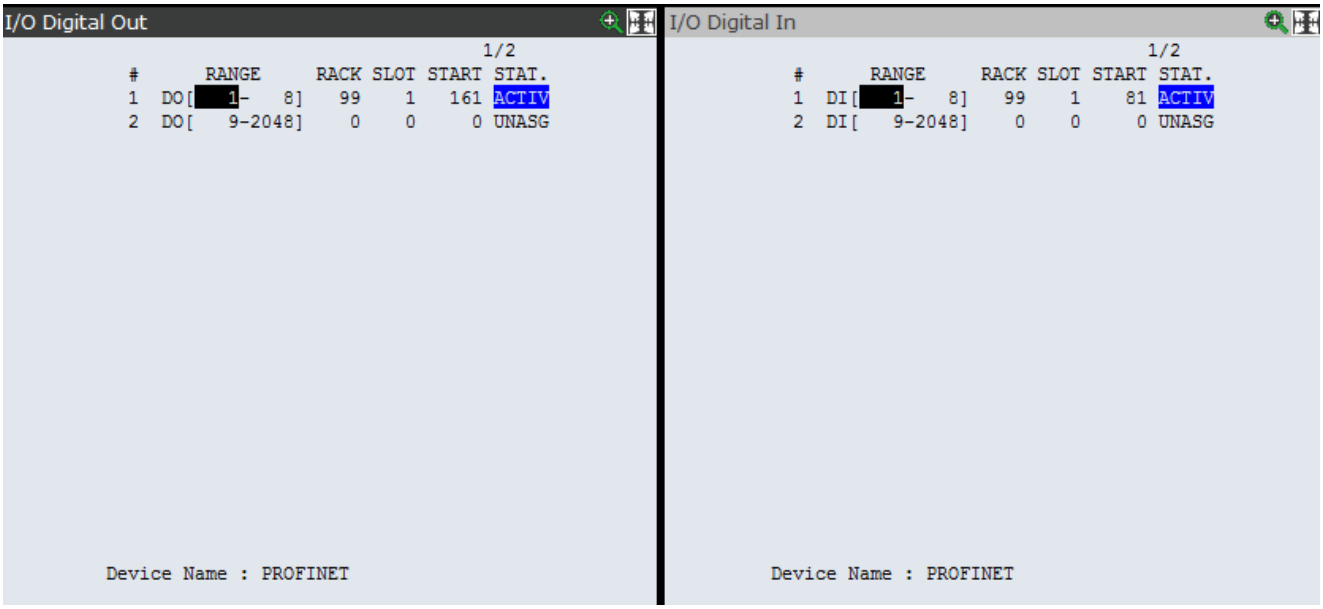
It is possible to go and check the configuration of the modules added to the I/O Controller profinet network by going in MENU - Profinet - F3. [OTHER] - Config.



F igure 42 – R30iBplus: Config I/O Control

2.10Step 9: Assigning I/O

In order to complete the configuration, it is necessary to declare the appropriate input/output configuration to communicate in function of the I Address and Q Address entered in part 2.5.4. To calculate the start point, refer to the part 2.5.4. In Profinet Controller, rack and slot are fixed and are equal to 99 and 1.



F igure 43 – R30iBplus: I/O Assignment

2.11Summary

To define a profinet controller network, the steps to follow are:

1. Insert a PC station
2. Insert a CP1604 card into the PC station
    a. Select the correct firmware based on the physical card firmware
3. Configure the CP1604 card
    a. Enter a network name
    b. Create a new subnet
    c. Assign an IP address
    d. Assign a name to the profinet module
4. Insert the communication modules
    a. Connect the module to the PC station's profinet network
    b. Assign an IP address
    c. Assign a name to the profinet module
    d. Configure I/O addressing
5. Compile the project
6. Scan the modules online
7. Assign an IP address and name to each online module in accordance with the names provided in points 3.c, 3.d, 4.b and 4.c.
8. Load the configuration into the CP1604 card
9. Read the CP1604 card configuration with the robot
10. Restart the controller
11. I/O Declaration

3 Defining a Profinet Device network with Siemens CP1604 card

The major difference in profinet between the R30iA, R30iB and R30iBplus bays is in the configuration. ration of the I-device part.

In V2.5 and V2.6 (R30iA & R30iB) the configuration of a profinet exchange as a device is done entirely in the robot and must match the definition made in TIA portal via the controller's gsdml.

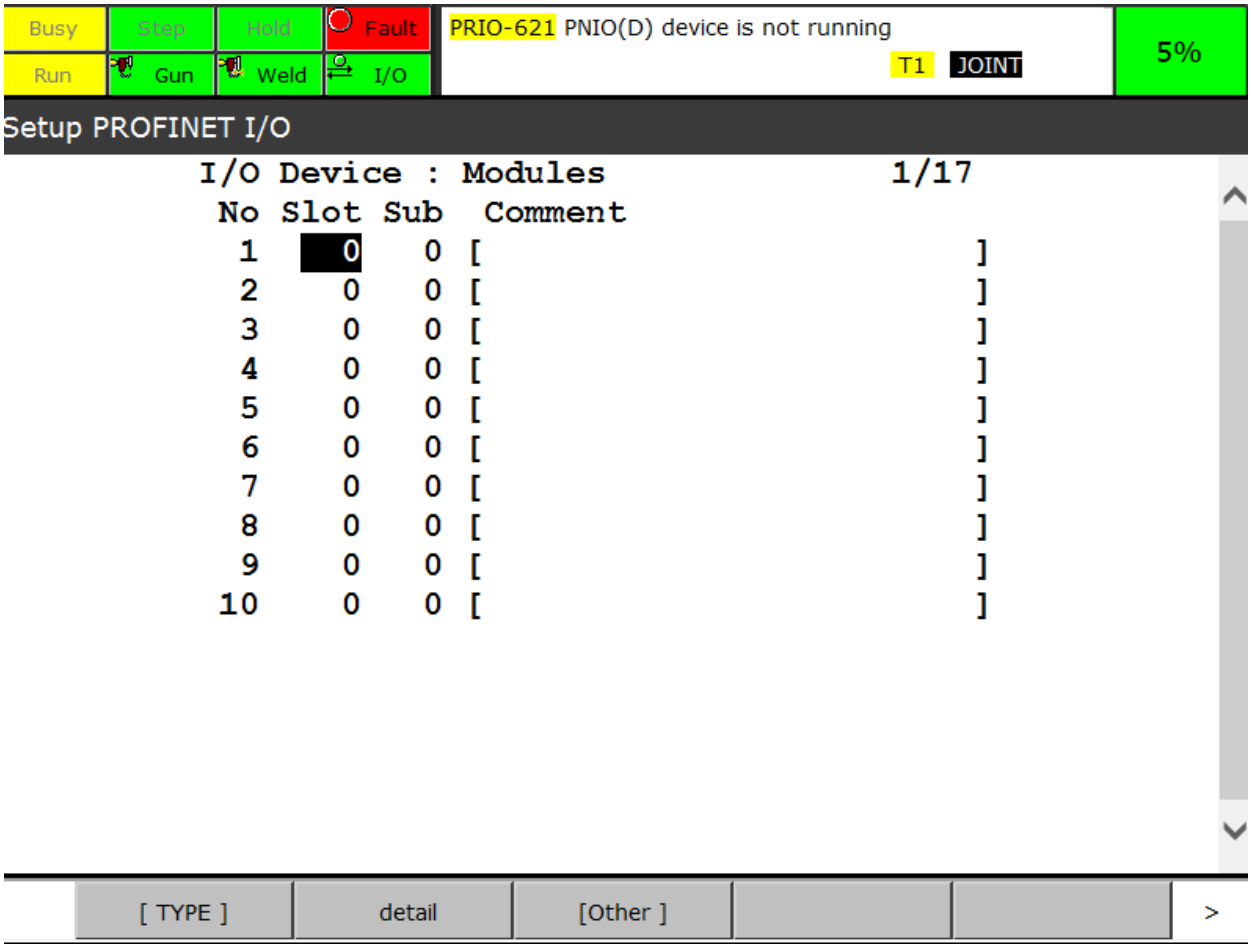
On the contrary, in V2.7 (R30iBplus), all the configuration of I/O exchanges via profinet in I-device is done by TIA portal. There is no longer a standard gsdml for the R30iBplus controller.

3.1Definition of a profinet network device firmware V2.5 & V2.6

The procedure will be carried out using an example using an R30iA bay as a Device.

3.1.1Step 1: Configuring the profinet device

To be able to configure the profinet exchange ranges, you must go to MENU - SETUPE - Profinet - F3 [OTHER] - I/O Device - Module. We arrive at the screen below.

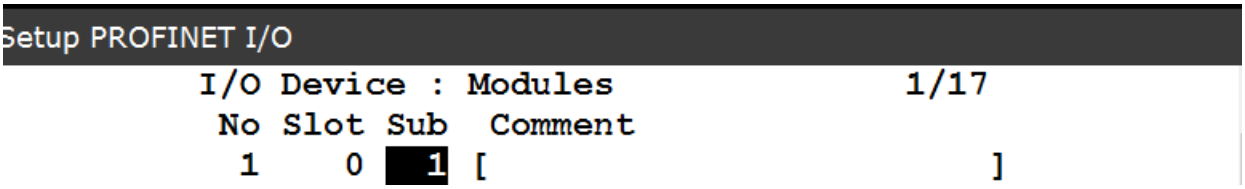


F igure 44 – R30iA/R30iB: I/O Device screen

First, you need to declare the CP1604 card on the first line. In our case we use the CP1604 in device only, the values to enter are:

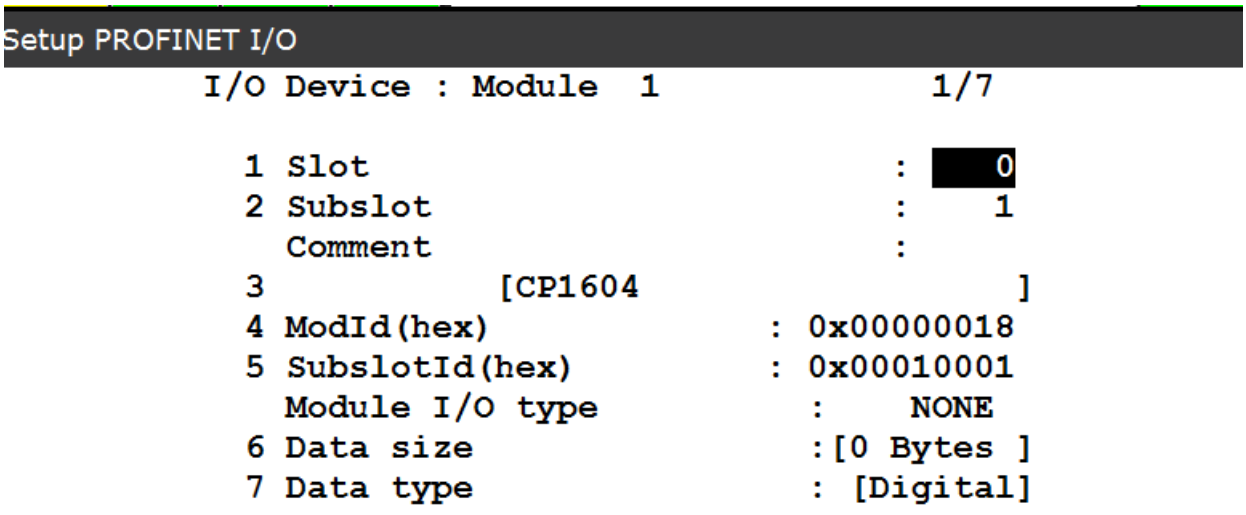
- Slot: 0
- Subslot: 1
- Module Ident Number: 24
- Submodule Ident Number: 65537

First enter on line number 1, subslot at 1. The action should lead to a screen like below.



F igure 45 – R30iA/R30 iB: Declaration sub lot CP1604

Press F2 detail to arrive at the screen below then go to the ModId (hex) line and enter 23 then on the line SubSlotId (hex) enter 65537. You can optionally enter a comment.



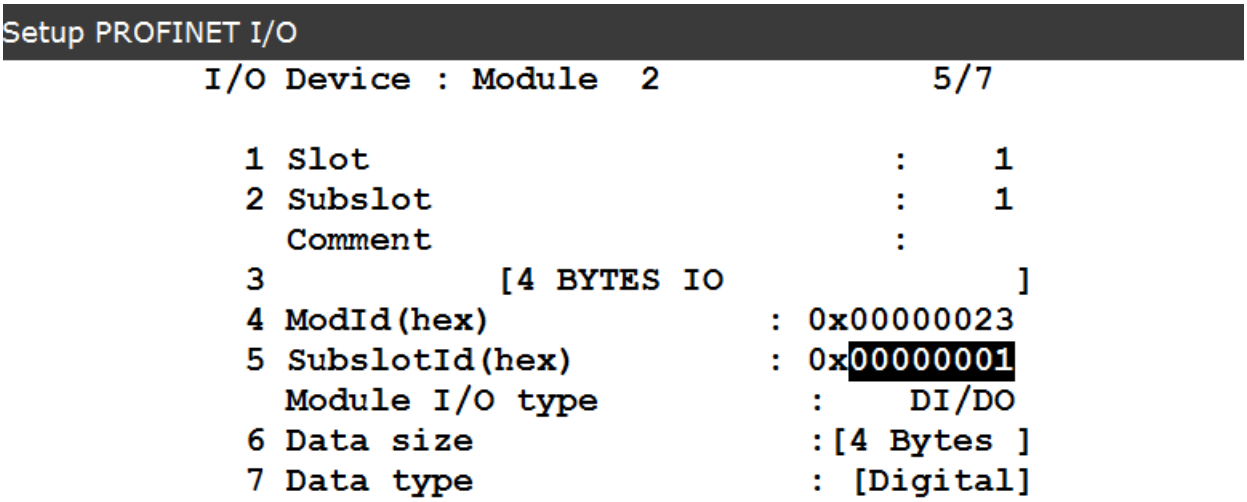
F igure 46 – R30iA/R30iB: Declaration C1604

Press F4 next to go to the next module, and enter:

- Slot: 1
- Sub: 1

For the example, we exchange 4 bytes of inputs/outputs with the automaton. We must enter the following values:

- Module Ident Number: 35
- Submodule Ident Number : 1

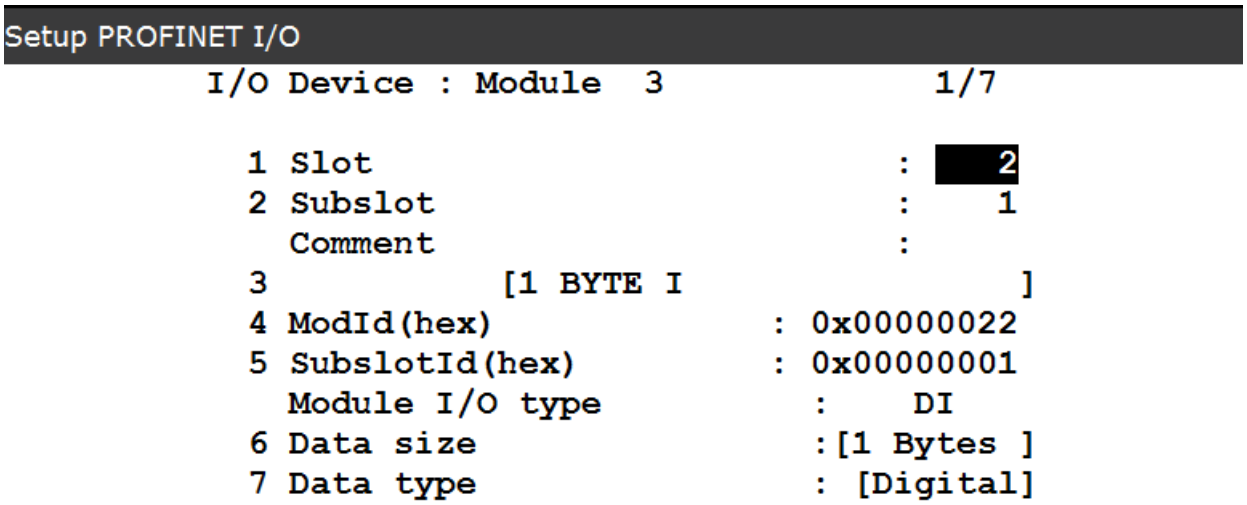


F igure 47 – R30iA/R30iB: Declaration Module dev ice byte I/O

Finally in the third module we declare it in slot 2 sub 1 and then write the following values cor-

corresponding to an exchange of 1 byte of DO coming from the automaton:

- Module Ident Number: 34
- Submodule Ident Number : 1



F igure 48 – R30iA/R30iB: Module declaration

At the end of the declaration of all the modules, it is necessary to restart the robot controller so that the modifications take effect.

Generally speaking, to know the values to enter in the ModId(hex) and Subslo- parameters, tId(hex) please refer to Appendix 4.1 for R30iA and 4.2 for R30iB.

Please note that the module configuration entered in the device menu must correspond to the modules of the gsdml used under TIA .

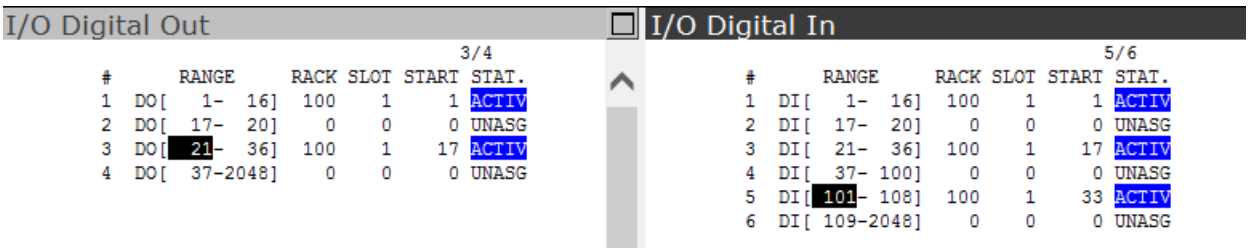
Switch the start mode of the general profinet screen to read-in then restart the controller.

3.1.2Step 2: Configuring I/O

It remains to configure the input/output ranges which will communicate with the PLC.

In the case of the profinet device the rack is 100 and the slot remains at 1. The start point also starts at 1 and corresponds to the first bit of the frame defined in the Profinet - I/O Device - Modules menu.

Below is an example of a working configuration.



F igure 49 – R30iA/R30iB: Prof inet dev ice I/O test

3.1.3Configuring communication with a PLC

At this point we have configured the robot to receive inputs/outputs via the profinet network. The work side robot is finished.

The following is about defining a profinet controller network using the exchange configuration made in step 3.1.1 and 3.1.2.

Normally the following described below must be carried out by an automation engineer and is not our responsibility.

To simulate an automaton, we use the R30iB plus controller which was defined in part 2.

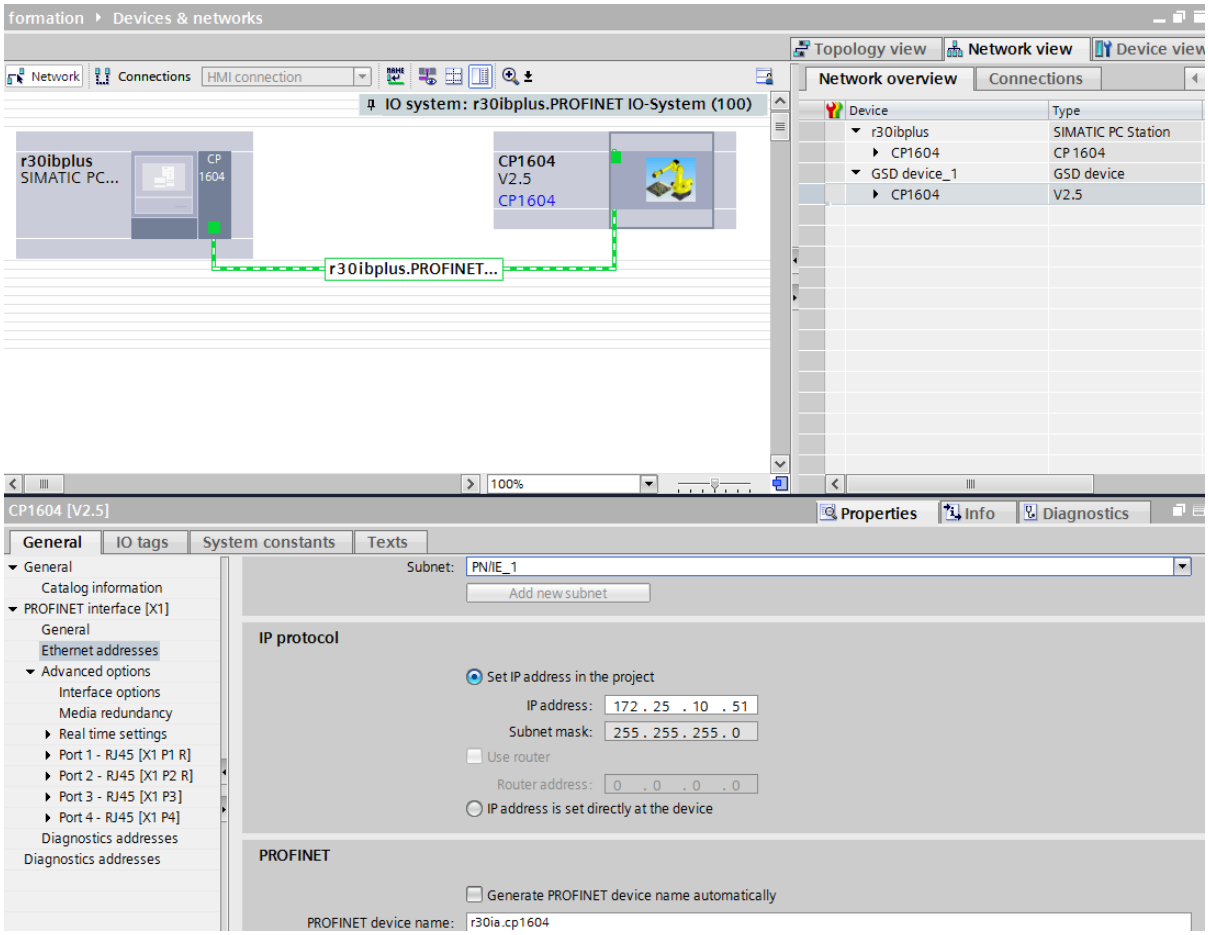
Once an automaton has been added to the project, you must follow the steps in part 2.5 for adding the R30iA or R30iB controller as a device module.

The fanuc gsdmls can be found in the hardware catalog at the following location:

Other Field Devices - Profinet I/O - I/O - FANUC - FANUC Robot Controller.

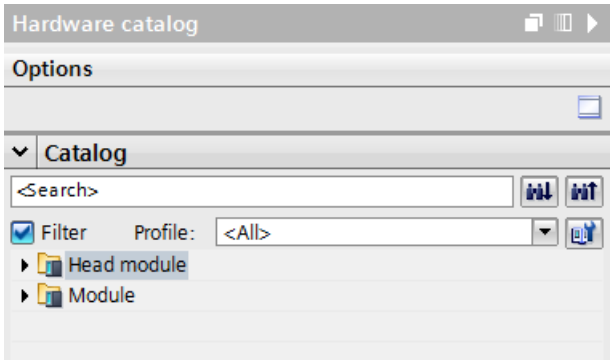
Select the correct gsdml according to the controller type and software version type (see Correspondence dance firmware card and controller / page 2)

Once the module has been added and then connected to the network with an IP address and a name entered, you must define the exchange range on which we wish to communicate with the profinet controller.



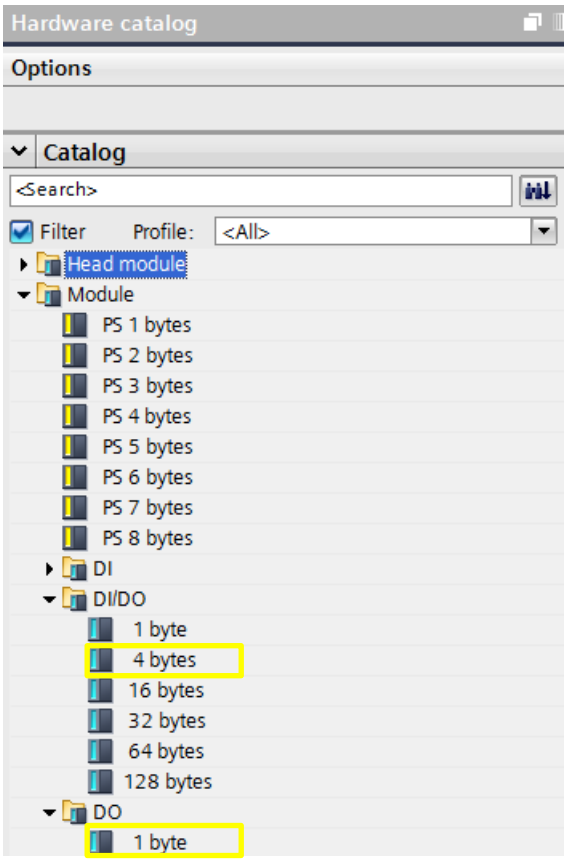
F igure 50 – TIA: professional configuration of the R30iA/R30iB module

To define the exchange range, select the R30iA/R30iB module in the Network View then click on Device view. The “Hardware catalog” screen should appear as follows on the right.



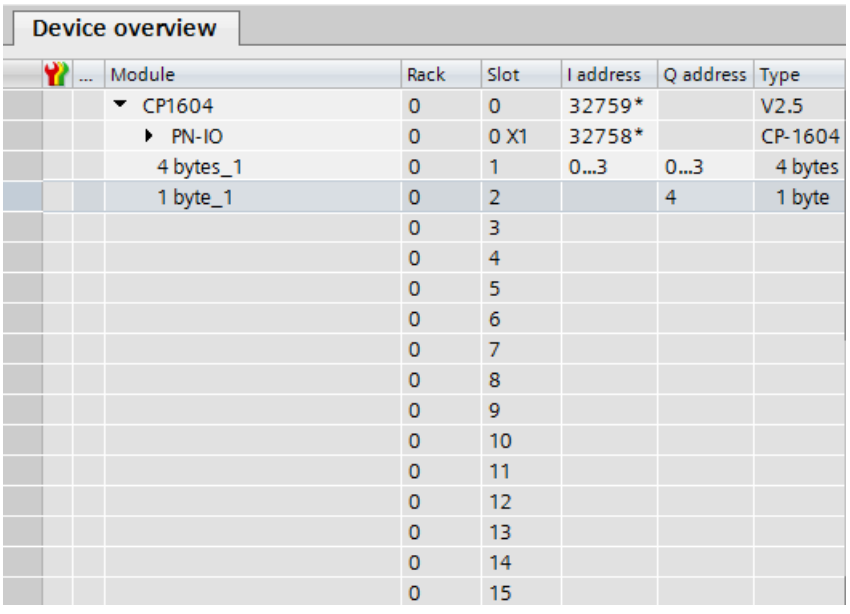
F igure 51 – TIA: R30iA/R30iB equipment catalog

In the example the automaton will communicate 4 input/output bytes and 1 output byte.



F igure 52 – gsdml R30iA I/O Conf igurat ion

Drag and drop 4 DI/DO bytes and 1 DO byte into the device overview, to arrive at the screen below.



...	Module	Rack	Slot	I address	Q address	Type
	CP1604	0	0	32759*		V2.5
	PN-IO	0	0 X1	32758*		CP-1604
	4 bytes_1	0	1	0...3	0...3	4 bytes
	1 byte_1	0	2		4	1 byte
		0	3			
		0	4			
		0	5			
		0	6			
		0	7			
		0	8			
		0	9			
		0	10			
		0	11			
		0	12			
		0	13			
		0	14			
		0	15			

F igure 53 – TIA: I/O Conf igurat ion

Now, compile the project so that it can be loaded into the automaton. At this point, the automaton knows that it is going to communicate with an R30iA controller 4 bytes of DI/DO + 1 byte of DO. The robot being ready to receive these frames as they were defined in the previous steps, communication should now be done correctly-ment (the error PNIO(D) device is not running should no longer appear).

3.2Definition of a profinet network device firmware V2.7

With firmware 2.7 (:=R30iBplus), it no longer has standard gsdml and there is no more configuration to do in the robot controller. In practice this means that the user no longer has to go to the Profinet - I/O Device menu -Module to define 1 by 1 the communication ranges with the profinet controller. The entire con- I/O device profinet figuration is done via TIA.

3.2.1Step 1: Create the basic configuration

This step 1 is to follow the following steps step by step:

1. Step 1: Inserting a PC Station / page 8
2. Step 2: Adding a CP1604 card / page 9
   - **Please note, at this stage, carefully choose the card firmware in V2.7**
3. Step 3: Configuring the CP1604 / page 11

3.2.2Step 2: Configuration of the CP1604 as an I/O device

Select the CP1604 and go to the operating mode menu then check the I/O Device box.

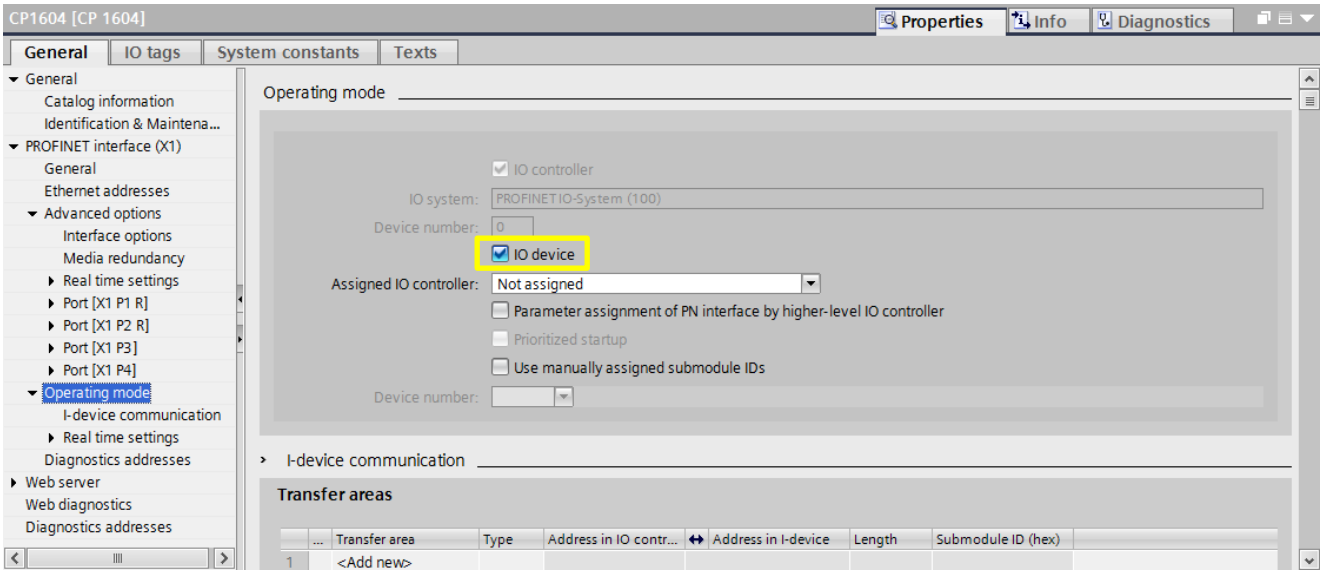
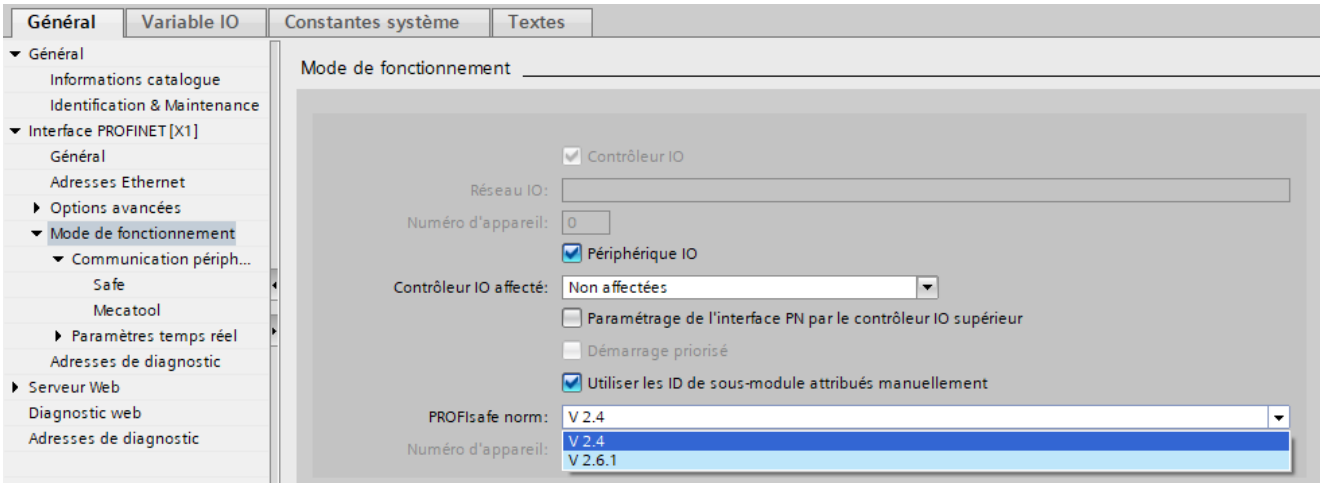


Figure 54 – TIA: IO dev ice 1 mode declaration

If there is a need to configure a security exchange range, the "use manually" box must also be checked. assigned submodule IDs ». Otherwise, it can remain unchecked.

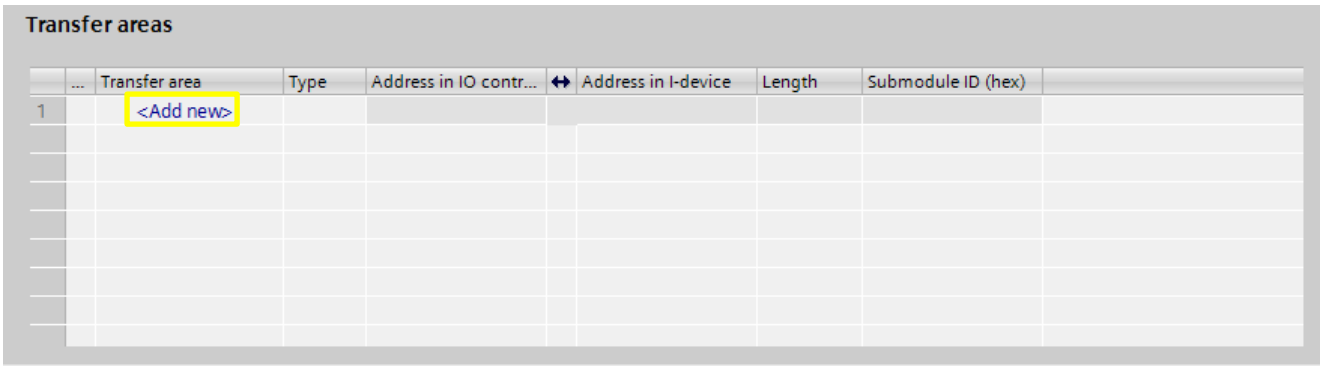
Please note that with more recent versions of TIA portal, a Profisafe norm field appears in addition (this documentation was produced with TIA portal V14). It is mandatory to choose the Profisafe V2.4 standard for to be able to work with a CP1604 firmware V2.7 on FANUC robot.



F igure 55 – TIA: Prof i safe standard

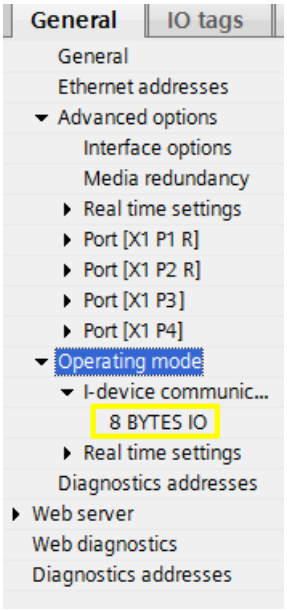
3.2.3Step 3: Declaration of input-output exchanges

In the example, we will define an exchange range of 8 I/O bytes + 1 output byte. To do this, we You need to go to the transfer areas section and enter the desired ranges. Just double-click on Add-new to make an input/output declaration.



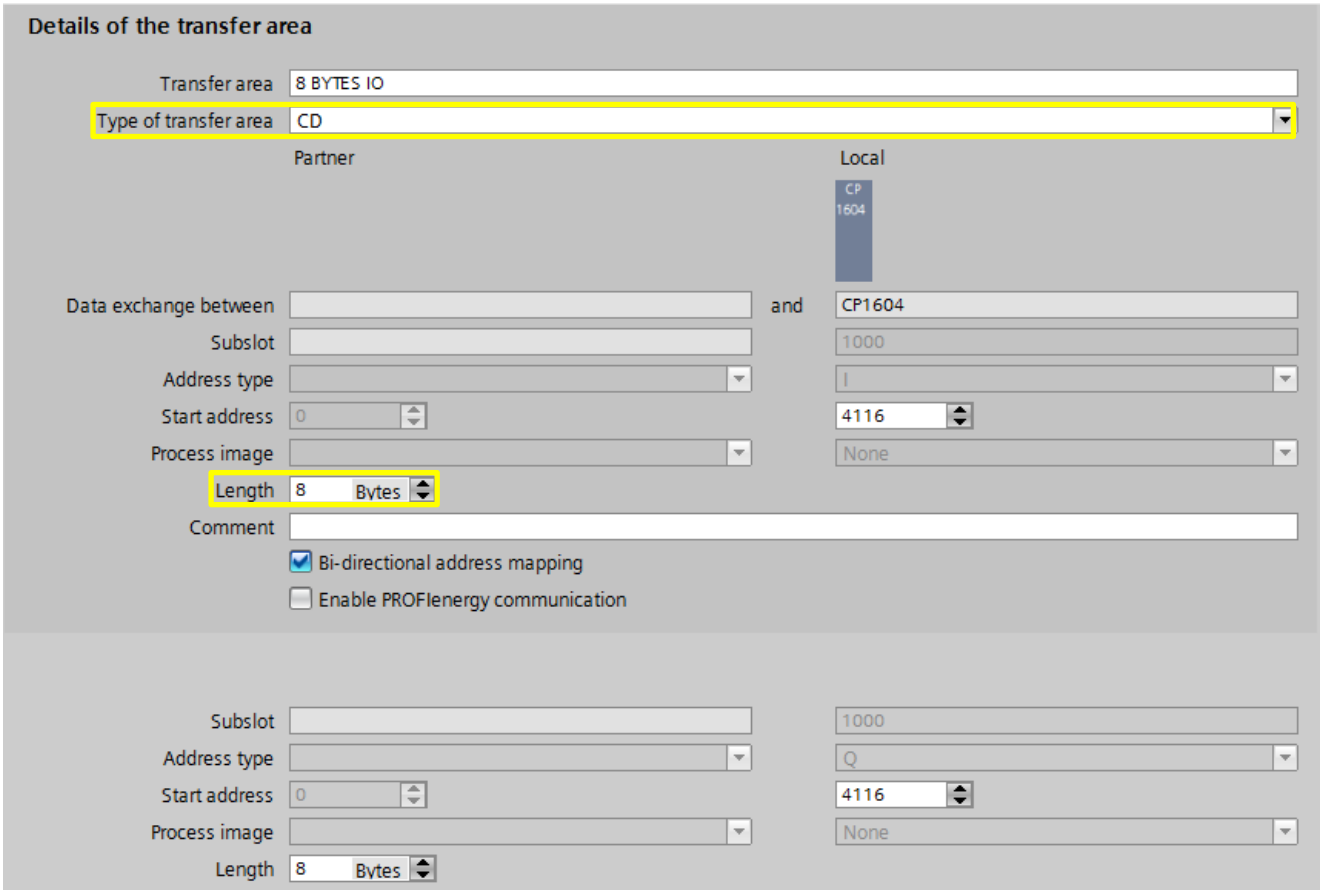
F igure 56 – TIA: Communication range declaration

You have to give a name to the transfer zone and then enter. From now on, a submenu has appeared in I-device communication in the CP1604 card setting menu. This corresponds to the transfer zone newly created.



F igure 57 – TIA: Communication range 4

Click on this transfer area to enter the configuration menu. You should arrive at a screen similar to the one below.



F igure 58 – TIA: Conf igurat ion of communicat ion range 1

In this menu, we indicate the type and size of the exchanges (see elements circled in yellow above).

If the information exchange is done in both directions, the bi-directional address mapping box must be checked.

The types of transfer that can be used with a robot controller are the following two:

- CD: standard exchange
- F-PS: security exchange

In the case of using a security exchange, it is mandatory to enter in SubModule ID (hex) the value 0x1008.

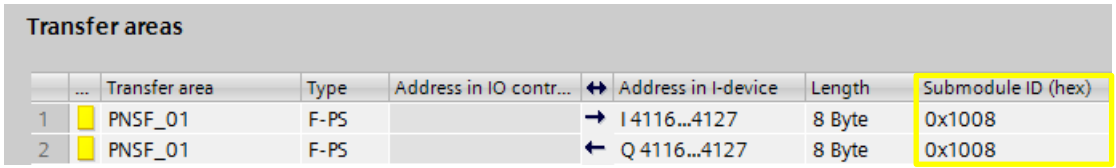
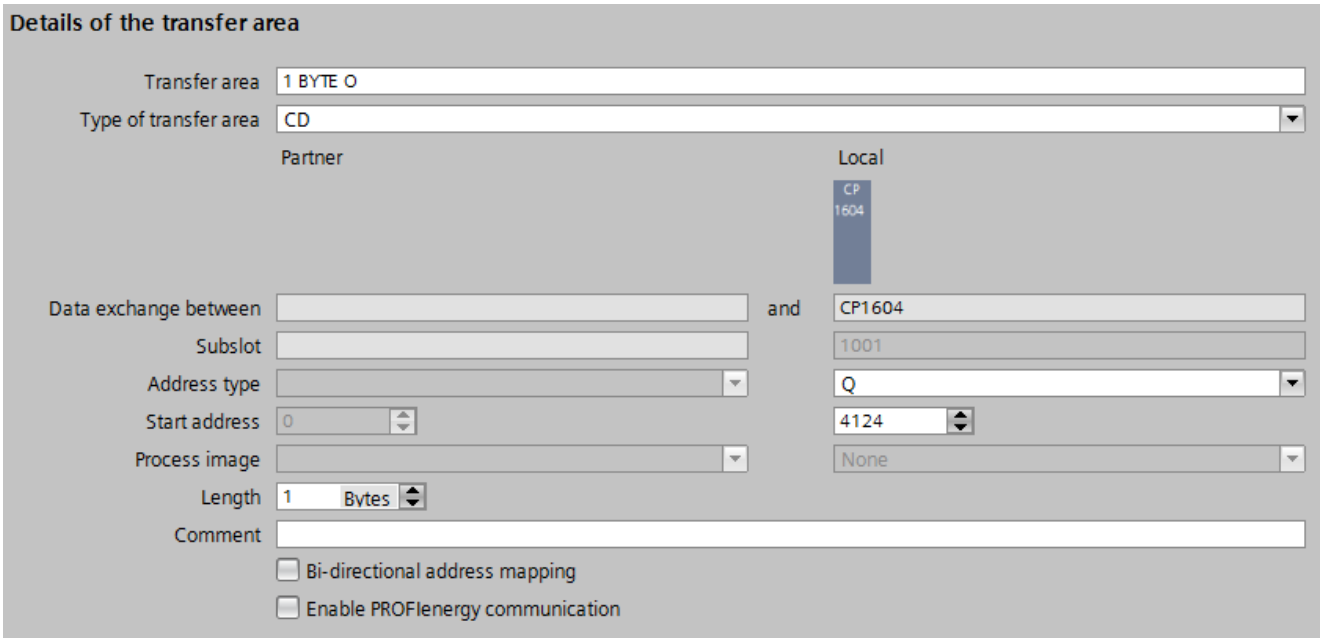


Figure 59 – TIA: Security Exchange Declaration

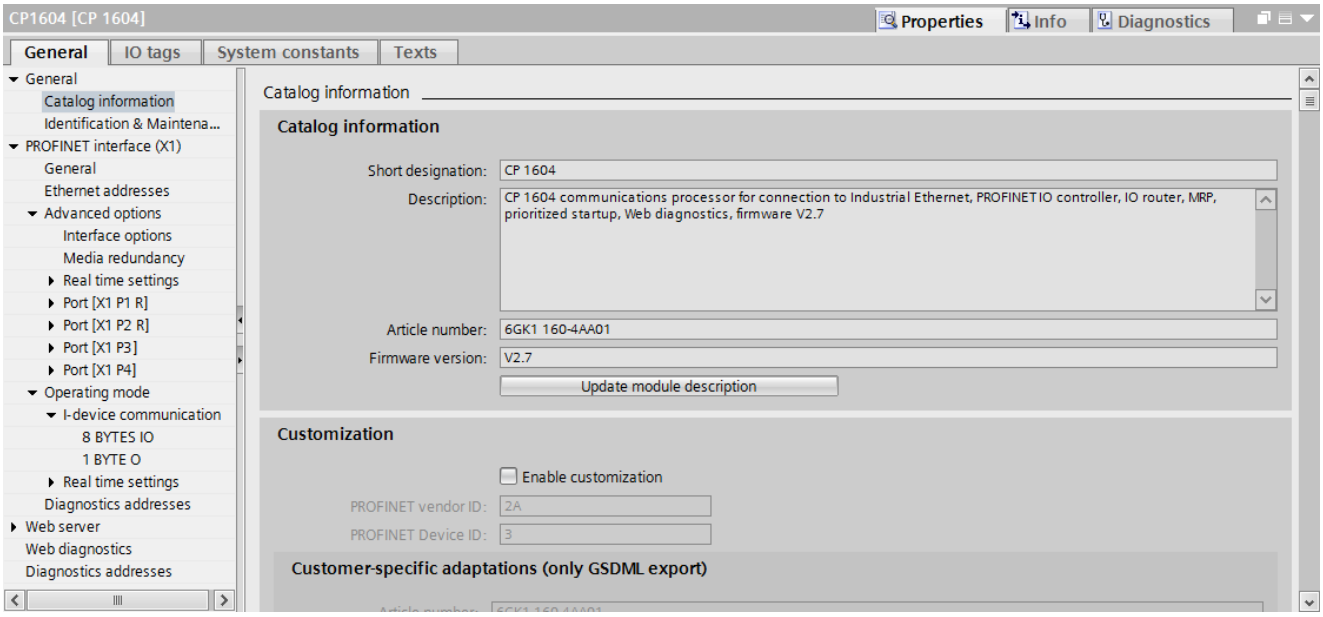
Below is a view of the configuration of the second exchange range.



F igure 60 – TIA: TIA: Conf igurat ion of communicat ion range 2

3.2.4Step 4: Global configuration of the I-Device function

Go to the Catalog information menu, you should see the screen below.



F igure 61 – TIA: Catalog information screen

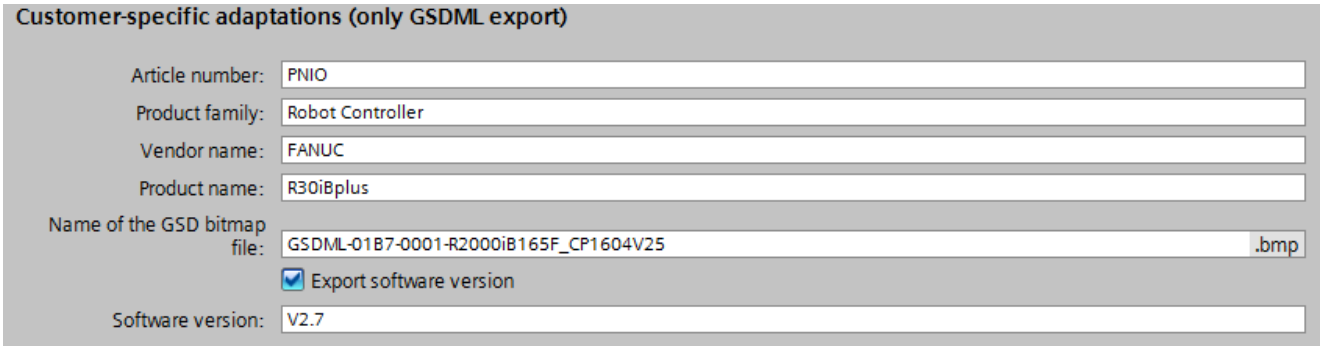
You must check the Enable customization box and enter the following values:

- Profinet Vendor ID: 1B7
- Profinet Device ID: E



F igure 62 – TIA:: Global configuration of the I-Dev ice function

Also fill in the fields of the customer specific adaptations useful for the description of the gsdml which will be created.



F igure 63 – TIA: Personalization of gsdml

For the gsd bitmap which will serve as the image which will be present on the robot module during an import into a other project, the bitmap file must be in the same folder as the gsdml. This bitmap gsd can be found on the network in the profinet folder of the R30iBplus controller.

3.2.5Step 5: Compiling and loading the project into the CP1604 board

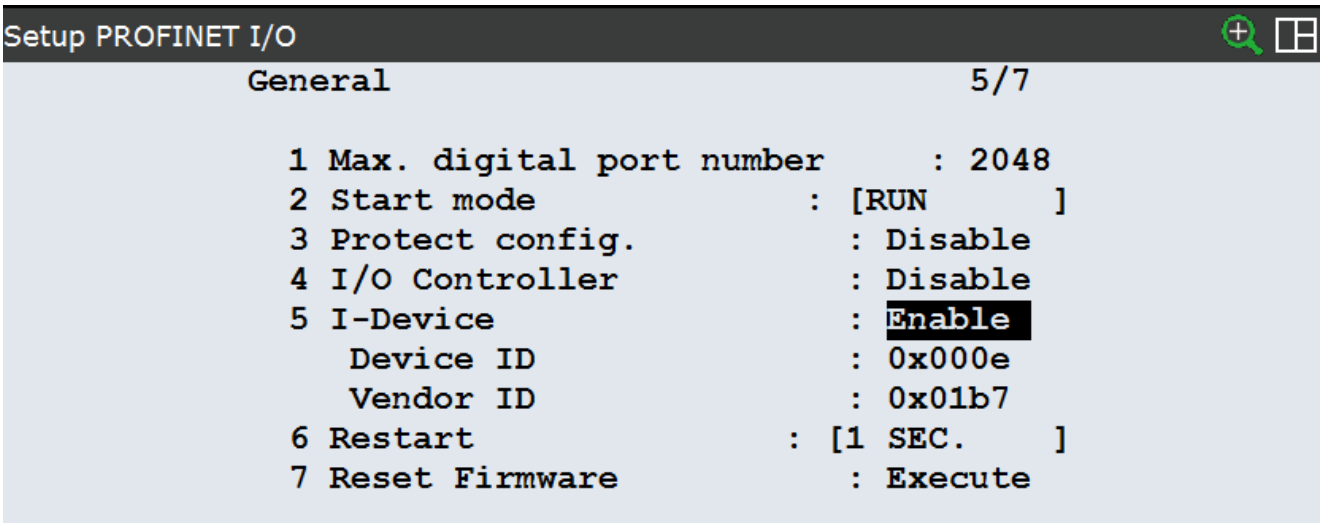
This part 5 comes down to following the following steps step by step:

1. Step 5: Compiling the project / page 17
2. Step 6: Assigning IP addresses and names of profinet modules / page 19
3. Step 7: Loading the configuration into the CP1604 card / page 22

3.2.6Step 6: Reading the profinet i-device configuration of the card by the robot

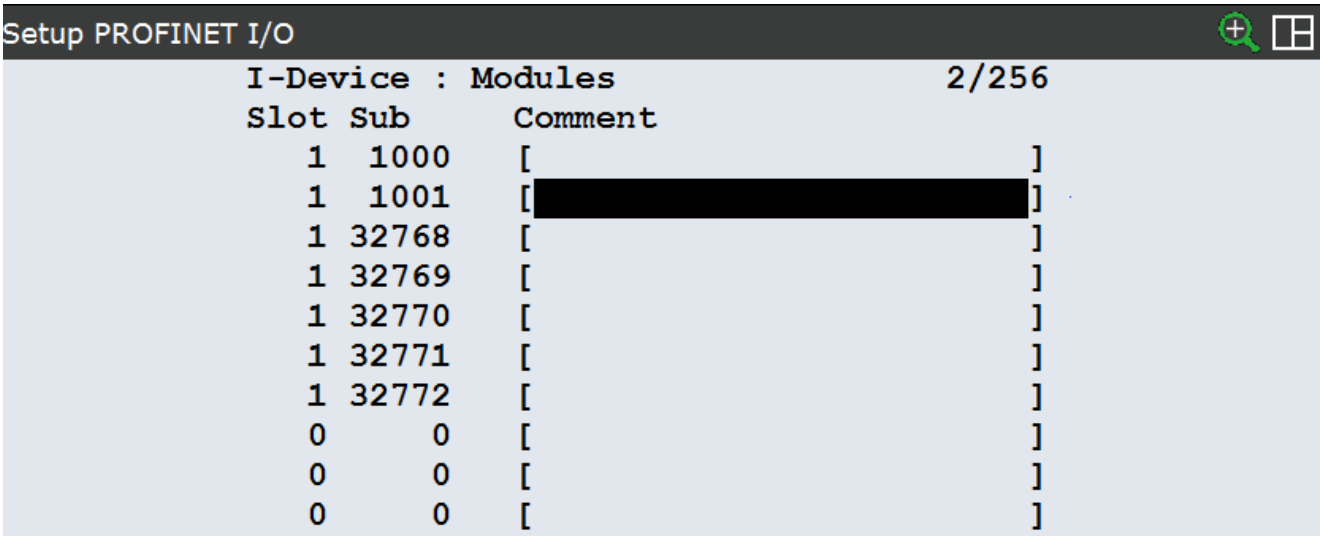
In the profinet menu, once the project is loaded into the card, change the start mode to RUN then restart the controller (the PRIO-692 PNIO(D) Restart Request message should appear.

After reboot, the profinet screen should have changed in terms of Device ID and Vendor ID values and should-wind have the values below.



F igure 64 – R30iBplus: Conf igurat ion of the Prof inet I/O i-dev ice

By doing F3 [OTHER] - I-Device - Transfer area it is possible to see the different modules that have been configured.



F igure 65 – R30iBplus: Visual i sat ion of the prof inet i -device modules

3.2.7Step 7: Configuring I/O

See Step 2: Configuring I/O / page 32.

3.2.8Configuring communication with a PLC

At this point we have configured the robot to receive inputs/outputs via the profinet network. The work side robot is finished.

The following is about defining a profinet controller network using the exchange configuration made in step 3.2.1 and 3.2.7.

Normally the following described below must be carried out by an automation engineer and is not our responsibility.

In firmware V2.7 there are two solutions to configure communication with an automaton.

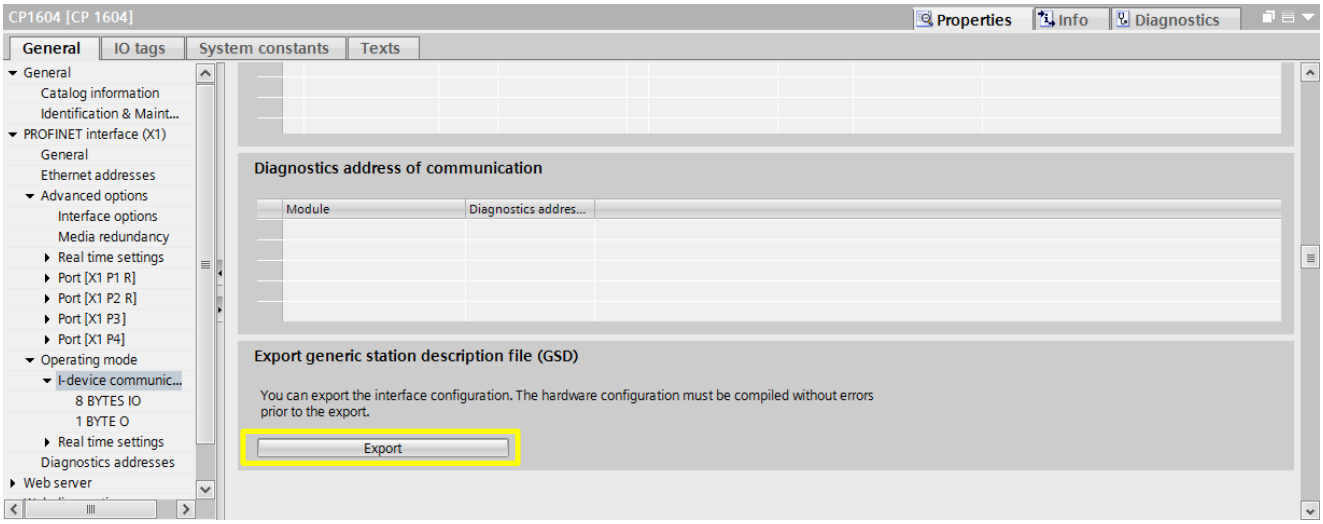
Solution 1: Generate a gsdml from the I/O configuration elaborated in the previous parts then do a new project with an automaton in which the same gsdml will be imported.

Solution 2: Insert an automaton in the same project as the previous steps.

3.2.8.1 Description of solution 1, with generation of gsdml

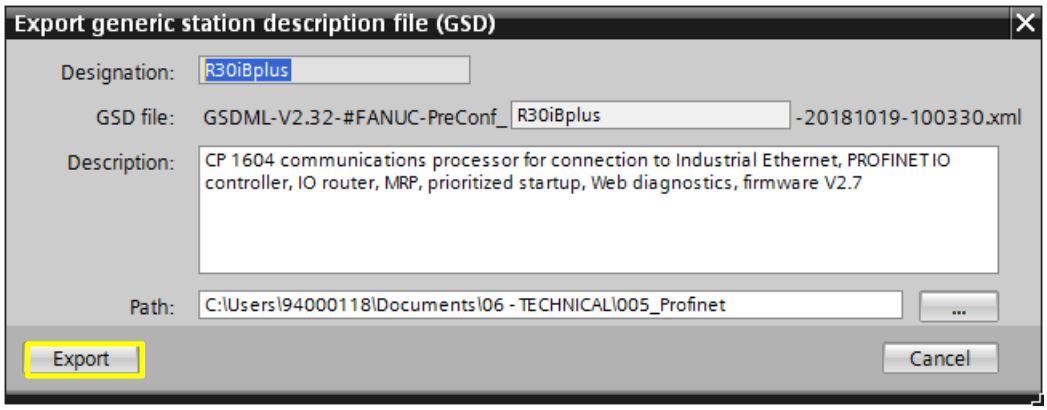
First, it is necessary to generate the gsdml corresponding to the I/O configuration loaded in the robot.

To do this, simply go to the I-Device communication menu and then press the Export button in the Export generic station description file (GSD) window.



F igure 66 – TIA: Exporting gsdml

The screen below appears, then simply export.



F igure 67 – TIA: Exporting gsdmml

The software informs the user that the file generation was successful in the info screen.

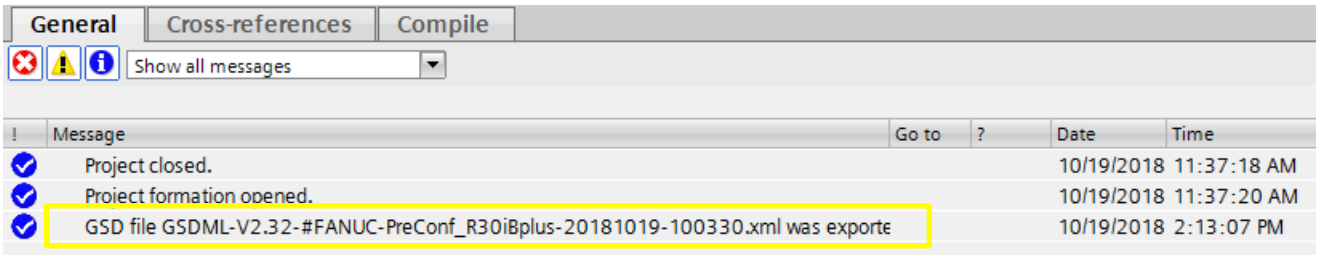


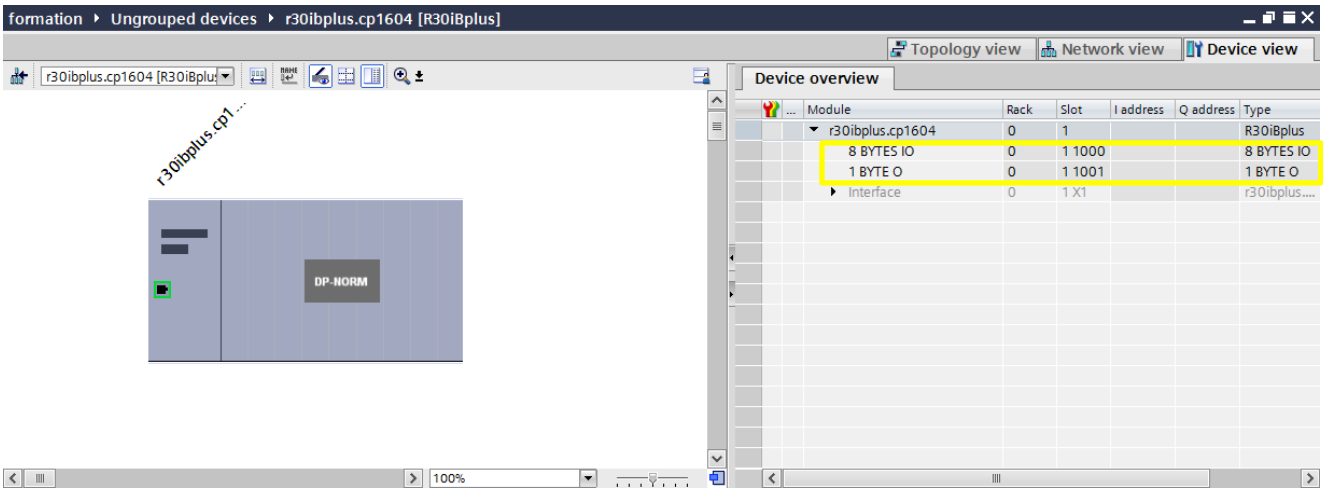
Figure 68 – TIA: Successful gsdml generation

Once the file is generated, you now need to create a project in which you need to insert a profinet controller then imported the gsdml. Then, you must follow the explanations in point 3.1.3 Communication configuration with an automaton.

The imported gsdmls are located under the following path in the hardware catalog.

Other field device - Profinet I/O - PLCs & CPs

The main difference with the gsdml R30iA or R30iB is that the I/O frame exchanged with the PLC is no longer configurable (see Figure 52 – gsdml R30iA I/O Configuration). This is fixed and corresponds to the configuration set in TIA (see below).



F igure 69 – TIA: I/O configuration gsdml R30iBplus

The last step is to compile the project and then load it into the PLC. The communication must establish without error (the error PNIO(D) device is not running should no longer appear).

3.2.8.2 Description solution 2, without generation of gsdml

In this solution, it is sufficient to add the PLC in the R30iBplus profinet I/O configuration project.

Once the PLC is configured, select the pc station r30ibplus and then attach it to the plc network. To do this, click on not assigned then choose the PLC network (below PLC.CP1604.PLC-NETWORK).

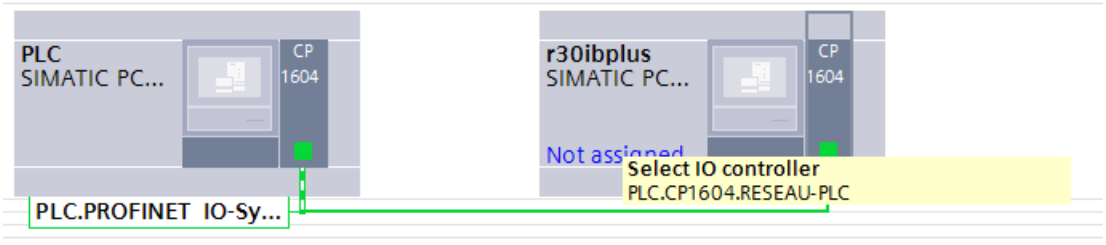


Figure 70 – TIA: R30iBplus connection to the prof inet controller network

Finally, compile the PLC part (right click on PLC then Compile - Hardware and Software (only changes)) and load into the corresponding card. The devices are ready to communicate with each other.

3.3Summary

To define a profinet controller network, the steps to follow are:

Firmware 2.5 & 2.6

1. Go to the menu Profinet - I/O Device - Module
2. On the first line define CP1604
3. On the following lines define the exchange ranges with the automaton
4. Put the robot in read-in
5. I/O Declaration

Firmware 2.7

1. Insert a PC station
2. Insert a CP1604 card into the PC station
    a. Select firmware 2.7
3. Configure the CP1604 card
    a. Enter a network name
    b. Create a new subnet
    c. Assign an IP address
    d. Assign a name to the profinet module
4. Configure communication ranges
    a. Declare the I-Device function
    b. Declare the transfer zones
    c. Declare the vendor ID and device ID
5. Compile the project
6. Load the configuration into the CP1604 card
7. Read the CP1604 card configuration with the robot
8. Restart the controller
9. I/O Declaration

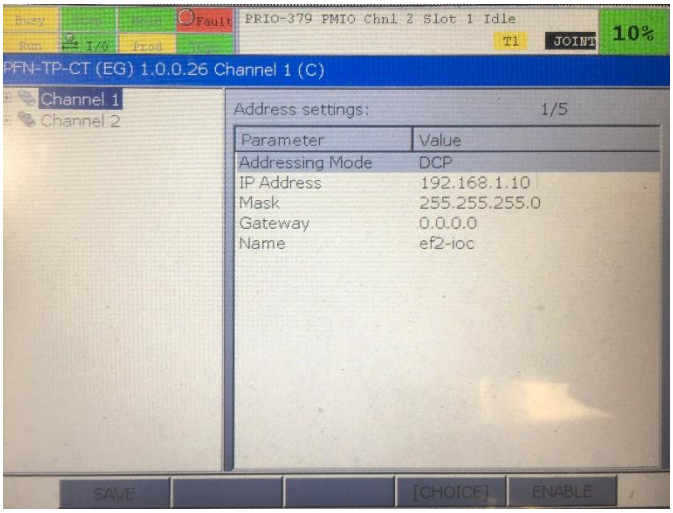
4 Defining a Profinet Device network with Molex card

Whether in firmware V1.3.1.0 (r30ib) or firmware V1.3.3.2 (r30ibplus), the procedure to operate in device is the same.

Please note that a molex card has dedicated ports. The first two ports at the top (channel 2) are used only for device communication and the two bottom ports (channel 1) are used only for controller communication.

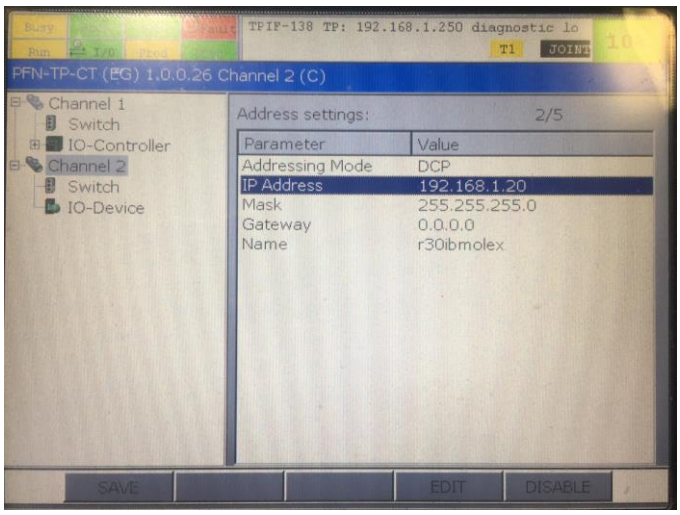
4.1Step 1: Define the name and IP address

Go to Menu -> 5. I/O - Profinet (M). The screen below appears.



F igure 71 – R30iB: Prof inet screen (M)

Select channel 2 then the IP address and do F4 Edit.



F igure 72 – R30iB: Channel 2 IP address

Enter the appropriate IP address corresponding to the configuration on the TIA side then press F1 APPLY.

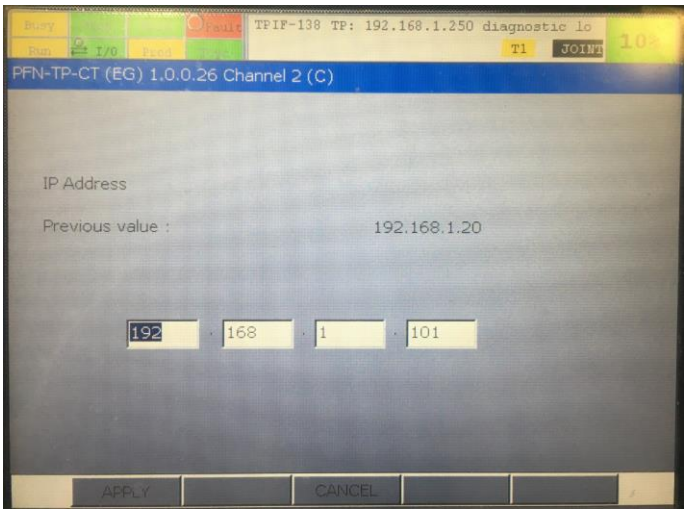


Figure 73 – R30iB: Channel 2 IP address configuration

Then go to the molex card name and do F4 Edit again. Give a name corresponding to the configuration on the TIA side. Validate with F1 APPLY.

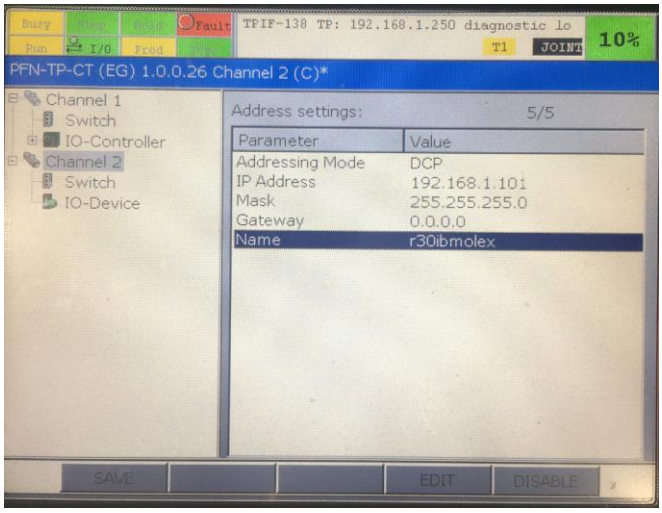


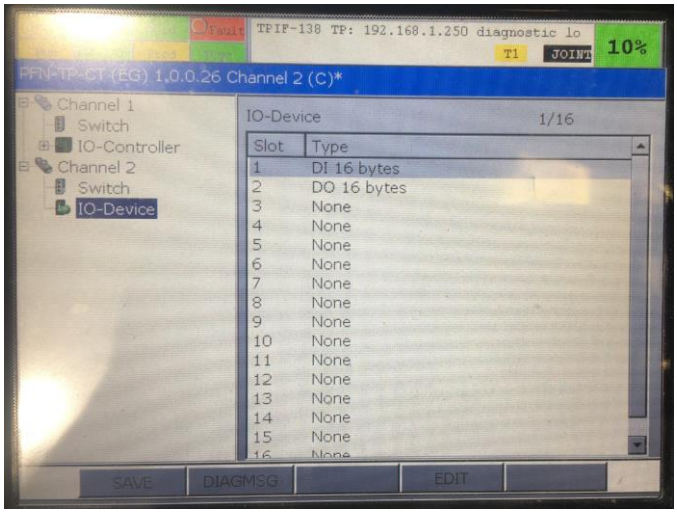
Figure 74 – R30iB: Prof inet module name configuration

At the end of these steps, press F1 Save then restart the controller.

4.2Step 2: Configuring the profinet device

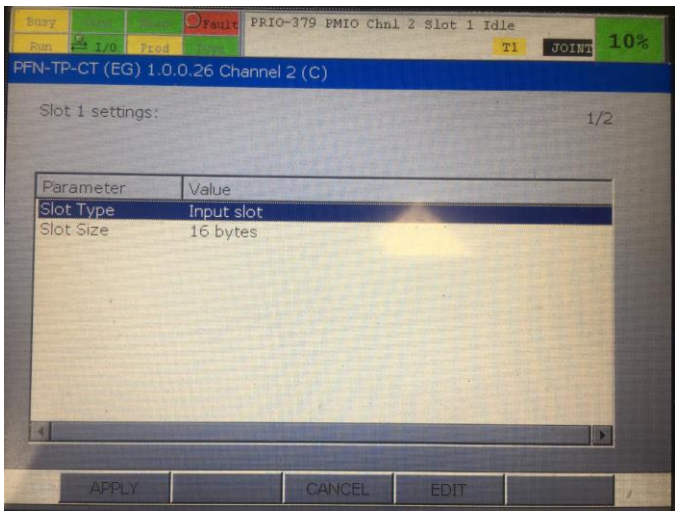
Go to Menu -> 5. I/O -> Profinet (M). Go to channel 2 then right arrow to make appear the channel tree 2.

Go to IO-Device, then in the slots, enter the exchanges that will take place with the automaton. The configuration Default ration is 16 bytes of input and 16 bytes of output.



F igure 75 – R30iB: I/O frame configuration

To configure trades, select the corresponding slot and then press F4 Edit. The screen below appears.



F igure 76 – R30iB: Slot configuration

Declare your slot type by F4 Edit (type := Input, Output, Input/Output, Safety).

In a second step, configure the size of the exchange also by F4 Edit (size := 1 byte, 2 bytes, 4 bytes, 8 bytes, 16 bytes, 32 bytes, 64 bytes, 128 bytes).

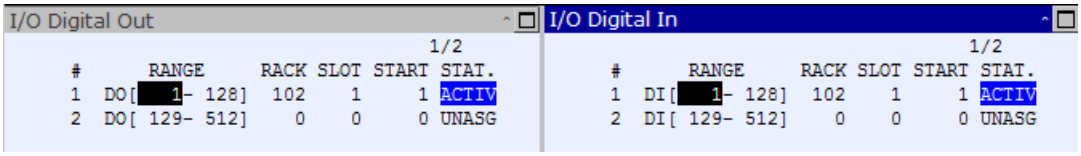
Please note, if you wish to declare exchanges on a profisafe security frame, this frame must be necessarily found on the first slots.

Validate each step with F1 APPLY. At the end of these configurations, press F1 SAVE then restart the controller robot.

4.3Step 3: Configuring I/O

Now you need to configure the input/output exchange ranges with the PLC.

In molex card, the rack device is 102, the slot and the start point remains at 1. Below is an example of configuration functional.



F igure 77 – R30iB: Molex dev ice I/O configuration

4.4Configuring communication with a PLC

At this point we have configured the robot to receive inputs/outputs via the profinet network. The work side robot is finished.

The following concerns the definition of a profinet controller network using the exchange configuration made in the steps 4.1 to 4.3.

Normally the following described below must be carried out by an automation engineer and is not our responsibility.

In the following, the configuration is done with a Siemens S7-1500 PLC.

First, you need to install the GSDML corresponding to the type of controller with which the PLC will communicate (see part 1.3.2).

Once the GSDML is imported, you must add the automaton to the project then the GSDML of the robot in the network view by drag and drop.

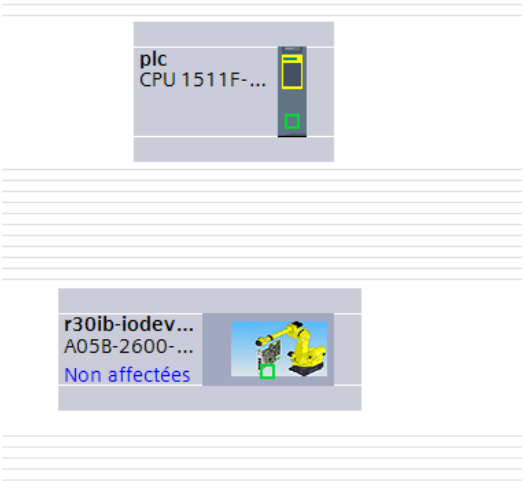


Figure 78 – TIA: PLC network view / gsdml molex fanuc

The molex gsdml is located in Other field devices -> PROFINET I/O -> I/O -> FANUC -> R-30iB EF2 (for R30iB) or R-30iB plus EF2.

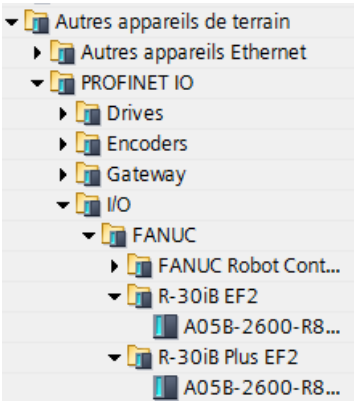
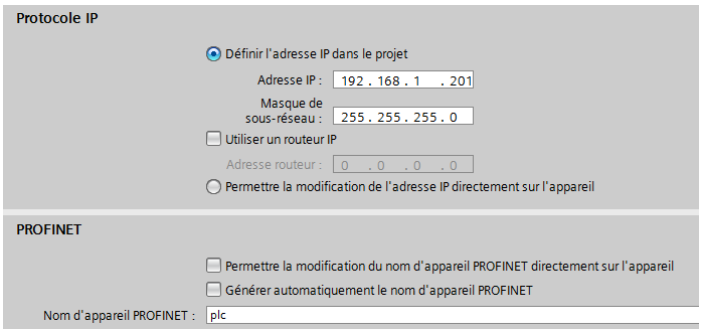


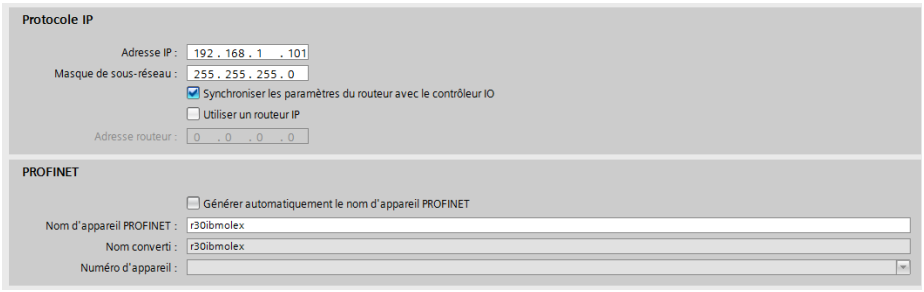
Figure 79 – TIA: Path to gsdml molex fanuc

Assign an IP address and a name to the PLC in the properties tab then PROFINET interface.



F igure 80 – TIA: Conf igurat ion of the automaton

Then assign an IP address and name to the molex card's gsdml -**Be careful, you have to put the same one name and IP address as that entered in step 4.1.**



F igure 81 – TIA: Gsdml Conf igurat ion

Connect the robot's gsdml to the PLC.

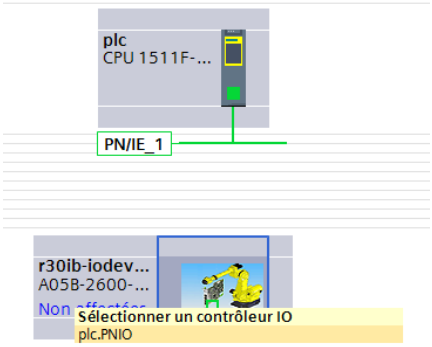
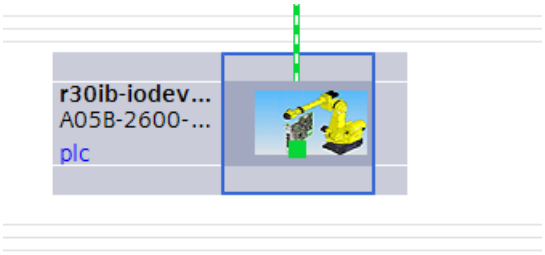


Figure 82 – TIA: Configuration of the PMIO PLC/robot network

Click on the middle of the robot's GSDML then go to device view.



F igure 83 – TIA: Gsdml molex fanuc

On the right of the TIA screen, the catalog appears with the module possibilities to add. Now you need to add the modules corresponding to the exchanged frames. In our example, we have configured in slot 1 16 bytes of inputs and in slot 2 16 bytes of outputs. On the PLC side, it is therefore necessary to configure in slot 1 16 bytes of outputs and in slot 2 16 bytes of inputs.

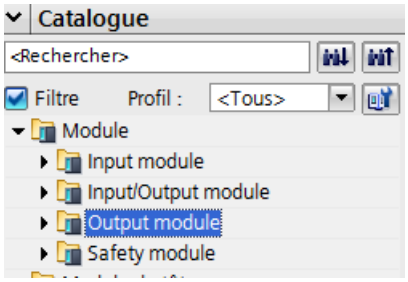


Figure 84 – TIA: gsdml molex module

Drag and drop modules into device overview.

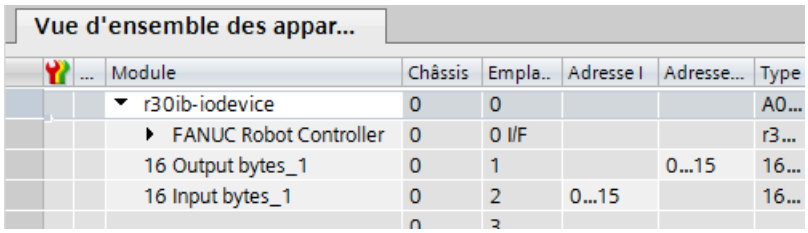
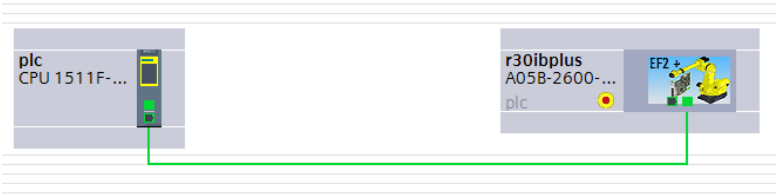


Figure 85 – TIA: Configuration of exchange frames on the PLC side

Finally, you should go to the topology view tab to connect the PLC port to the port of the molex card.**Please note that it is important that this topological view matches the configuration exactly hardware installed. Otherwise, communication will not work** .

In the example below, port 1 of the PLC is connected to port 2 of channel 2 of the molex card.



F igure 86 – TIA: Topological view

Now compile the project and load it into the PLC. The PLC configuration is complete.

.

5 Definition of a Profinet Controller / Device network

The purpose of this part is to explain the implementation of a profinet controller and device network on the same robot. Consider the schematic diagram below.

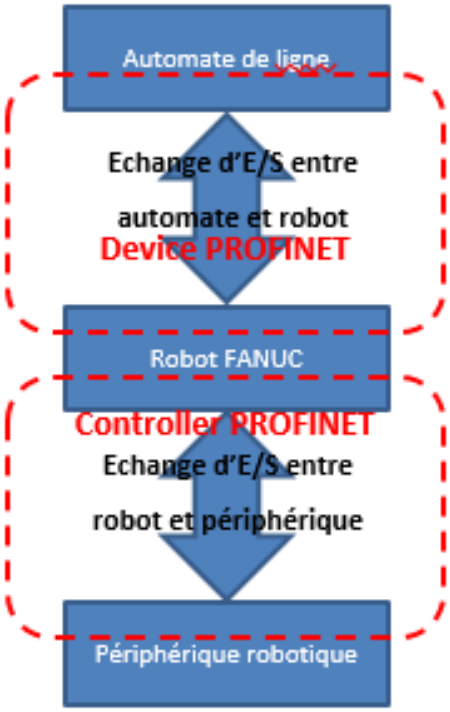


Figure 87 – Controller / Dev ice exchange principle

There are notable differences between firmware 2.5/2.6 and 2.7. In summary, configuring such a network is much simpler in R30iBplus (firmware 2.7).

5.1Definition of a profinet controller & device firmware 2.5/2.6

First of all, you must first start by creating a TIA project with a PC station containing a card CP1604 in firmware V2.5 or V2.6. Then add the different communication modules that are dedicated to exchange information with the robot. In summary, follow the procedure in part 2. Defining a network profinet controller up to Step 7: Loading the configuration into the CP1604 card.

In a second step, configure the different communication modules corresponding to the frame exchange with the PLC, or follow Step 1: Configuration of the profinet device.**Attention, you must take the card code CP1604 (migration)**, either :

- V2.5: ModId: 22 / SubSlotId: 65537
- V2.6: ModId: 26 / SubSlotId: 65537

At this point, the configuration at the robot level is complete (don't forget to switch to READ-IN then to OPERATION and restart to finalize). The TIA project should look like the view below (number of module ready).

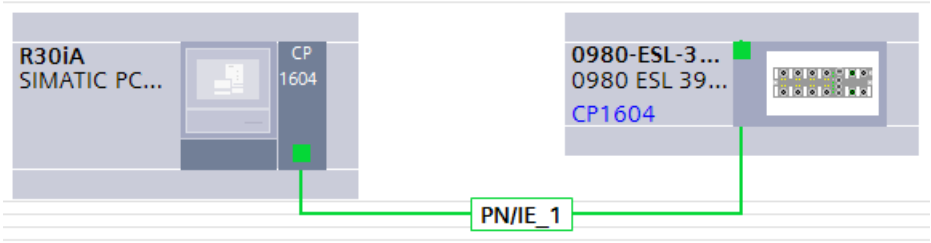


Figure 88 – TIA; Project view Controller / Dev ice R30iA/R30iB

Normally, the rest of the procedure is not within the FANUC robotics scope. It is the responsibility of a automation engineer.

In the same project, we must add an automaton corresponding to the line automaton in Figure 87.

Define a second subnet in the PLC menu in the ethernet addresses menu.

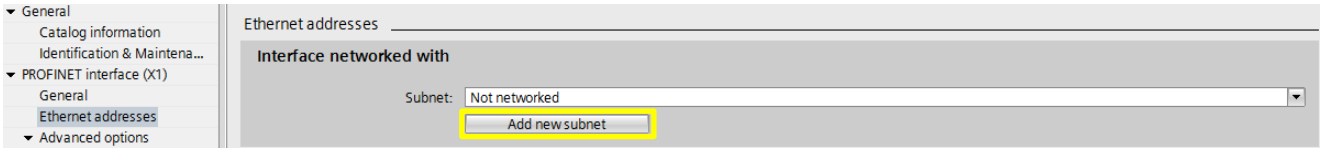


Figure 89 – TIA: Adding a new subnet

Then add the gsdml R30iA or R30iB but in migration mode (migration :=device+controller).

Assign this gsdml to the PLC network and then set it to the same IP address and name as the part R30iA/R30iB controllers (both items below must have the same IP address and name).

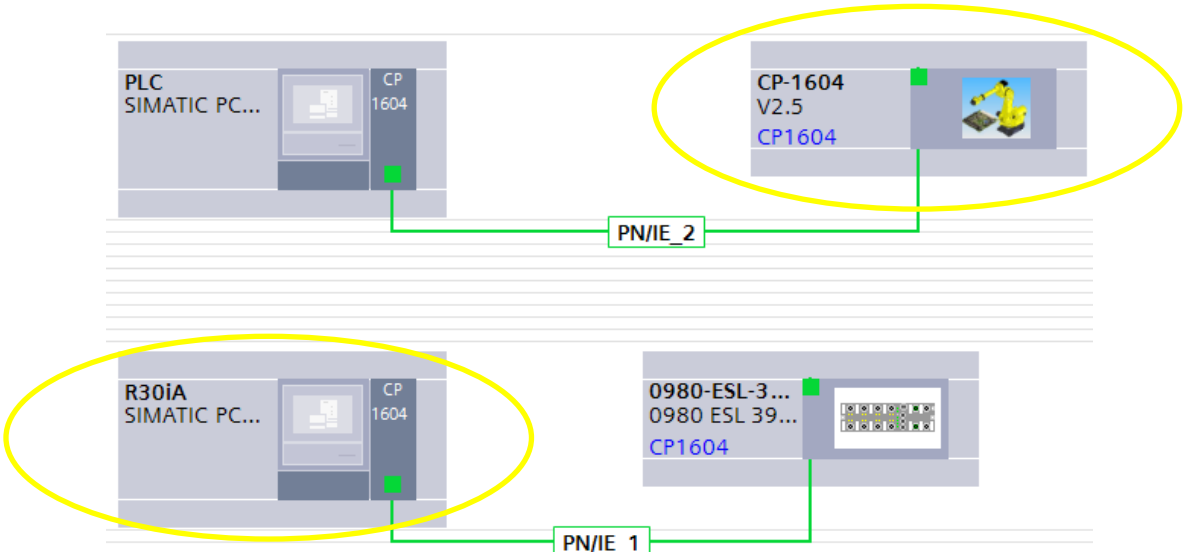


Figure 90 – TIA: Network view controller / dev ice

Insert the exchange frames between the PLC and the R30iA/R30iB (see Figure 52). Compile the PLC project then load it into the corresponding hardware. The controller/device configuration is complete.

5.2Definition of a profinet controller & device firmware V2.7

In firmware V2.5 and V2.6 it is necessary to separate the device and controller communication part into two distinct parts under TIA as in the robot.

Under TIA, two different subnets are needed as seen in the previous part. In the robot, it is necessary to confi- manually set the device frame in the profinet menu then load the controller part from TIA to configure the controller part.

In V2.7, the entire procedure is done under TIA.

It's necessary :

1. Follow the steps**1 to 4** from part 2 Defining a profinet controller network
2. Follow the steps**2 to 4** from part 3.2 Definition of a profinet network device firmware V2.7
3. Follow step Description solution 2, without generating the gsdml

Compile the pc station r30iBplus then load the configuration into the card.

Change the start mode to RUN and then restart the controller.

Compile the automaton and then load the project into it.

The R30iBplus is ready to operate as a controller/device.

6 Establishment of security communication

This chapter deals with Profisafe communication between a Profinet_Profisafe PLC controller and a device Profinet_Profisafe robot. This robot must have the Profinet_Profisafe option loaded in its software configuration for safety communication to work.

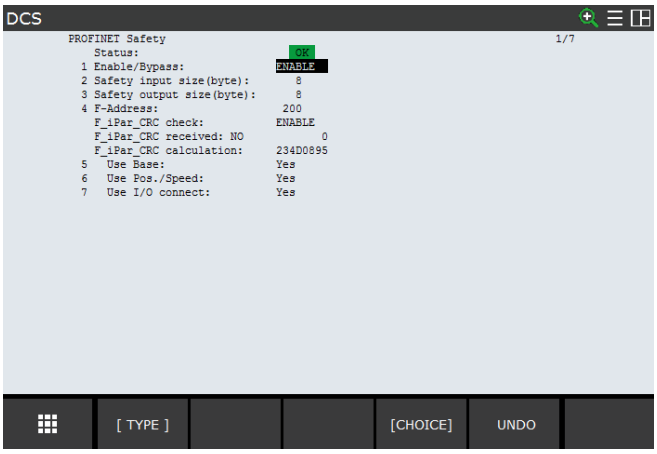
First, you must follow the steps described in 3.1 or 3.2 or 4 depending on the type of equipment in in use. The only difference is that a profisafe frame is defined in the exchanges between automaton and robot.

Once the safety frame is loaded into the robot configuration the SRVO-419 PROFIsafe comm message error 1,1 should appear. This will disappear by following the steps below.

6.1CP1604 Safety Communication Firmware 2.5 & 2.6 (R-30iA & R-30iB)

6.2CP1604 Safety Communication Firmware 2.7 (R-30iB plus)

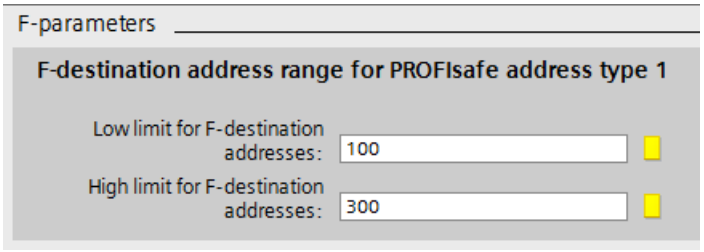
First, you need to go to the DCS Profinet Safety screen. To do this, MENU -> 0. Next -> 6. System -> 8. DCS -> Profinet Safety then ENTER. You arrive at the screen below.



F igure 91 – R30iBplus: Prof inet safety screen R -30iB plus

Then, note the F-Address and the F_iPar_CRC. Optionally, if your security exchanges are different from 8 I/O bytes, change this configuration.

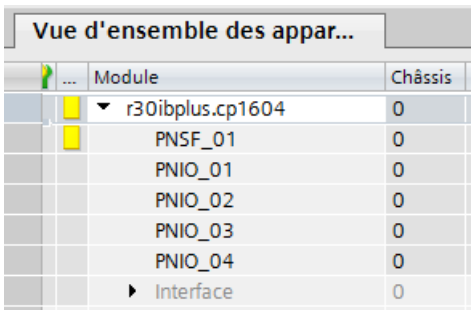
Now, under TIA, click on the automaton and then go to properties -> Fail-safe -> F-parameters. The screen below below is displayed.



F igure 92 –TIA: Def ini t ion of F-Address

Make sure the robot's F-address is within the range of the screen below. If it is not, change these values.

Now click on the robot gsdml and then on device view. All configured frames are displayed then. Select the security frame (in our example PNSF_01) which is recognizable by the rectangle yellow in front of the frame name then go to properties -> PROFIsafe.



F igure 93 – TIA: Prof i safe / Prof inet frames view

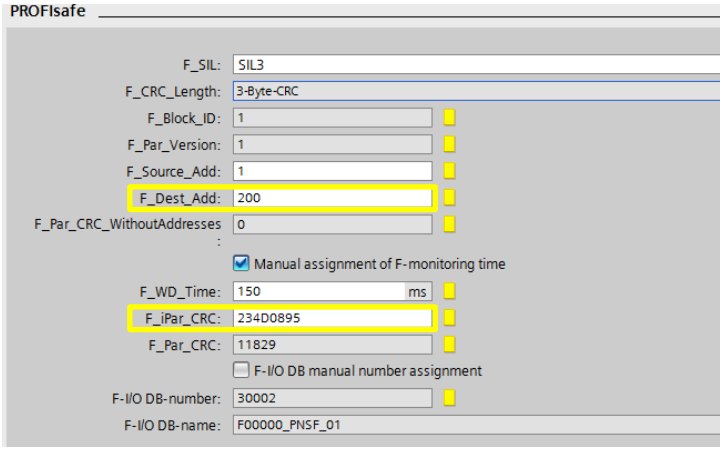


Figure 94 – TIA: Definition of professional isafe address and signature exchange parameters

In the screen above, enter the robot's F-address and F_iPar_CRC in the F_Dest_Add and F_iPar_CRC field (circled in yellow).

Compile the project once and then load it into the automaton.

Please note that the following is given only as an example to be able to operate the communication. security. The reintegration equation must be adapted to the project to take into account the other safety elements that can interact with the robot.

In the project browser window, go to the PLC then Program block and finally Main_Safety_RTG1.

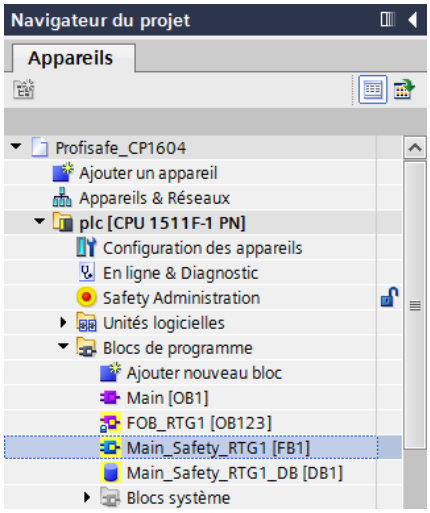
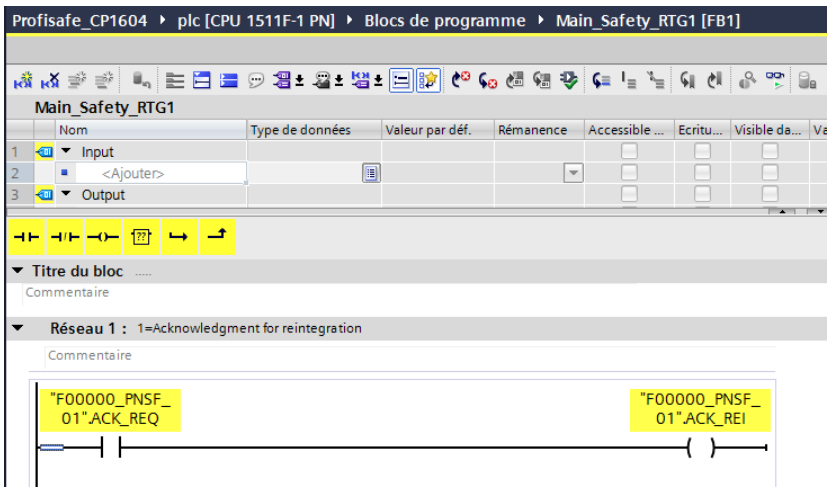


Figure 95 – TIA: Main safety

Double click to enter the window shown below and create the network.



F igure 96 – TIA: Reintegration equation

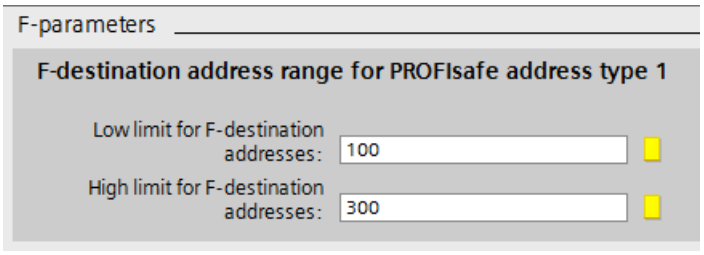
Compile again and then load the program into the PLC. Once the PLC is restarted, the fault profisafe comm error 1,1 should disappear. Check that the communication works by doing MENU -> 0. Next -> 4. Status -> Profinet.

6.3Molex Safety Communication (R-30iB & R-30iB plus)

First, you need to go to the DCS Profinet Safety screen. To do this, MENU -> 0. Next -> 6. System -> 8. DCS -> Profinet Safety then ENTER. You arrive at the screen below.

Next, note the F-Address. Optionally, if your security exchanges are different than 8 I/O bytes, change manage this configuration (the case in our example).

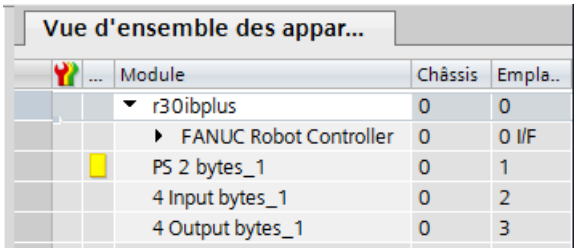
Now, under TIA, click on the automaton and then go to properties -> Fail-safe -> F-parameters. The screen below below is displayed.



F igure 97 –TIA: F-Address def ini t ions

Make sure the robot's F-address is within the range of the screen below. If it is not, change these values.

Now click on the robot gsdml and then on device view. All configured frames are displayed then. Select the security frame (in our example PS 2 bytes_1) which is recognizable by the rec-yellow tangle in front of the frame name then go to properties -> PROFIsafe.



F igure 98 – TIA: Prof i safe / Prof inet frames view

In the screen above, enter the F-address in the F_Dest_Add field (circled in yellow).

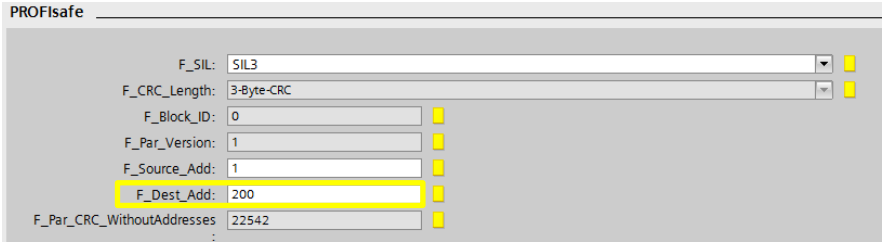


Figure 99 – TIA: Definition of address exchange parameters

Compile the project once and then load it into the automaton.

Please note that the following is given only as an example to be able to operate the communication. security. The reintegration equation must be adapted to the project to take into account the other safety elements that can interact with the robot.

In the project browser window, go to the PLC then Program block and finally Main_Safety_RTG1.

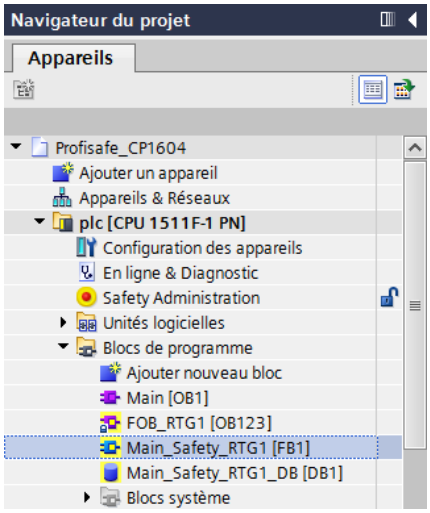
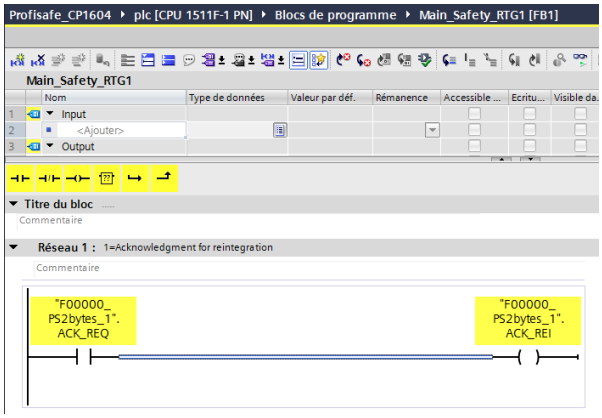


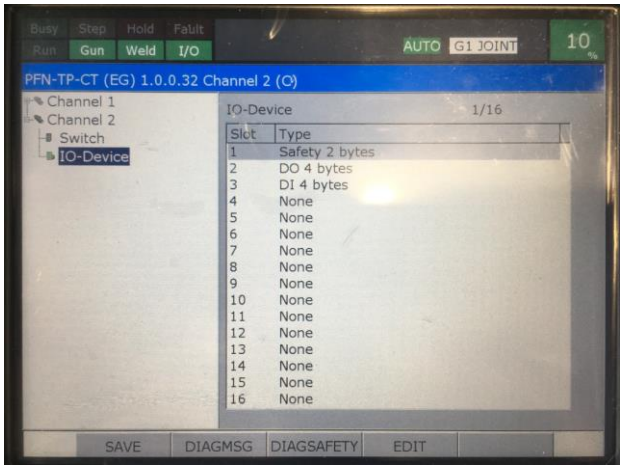
Figure 100 – TIA: Main safety

Double click to enter the window shown below and create the network.



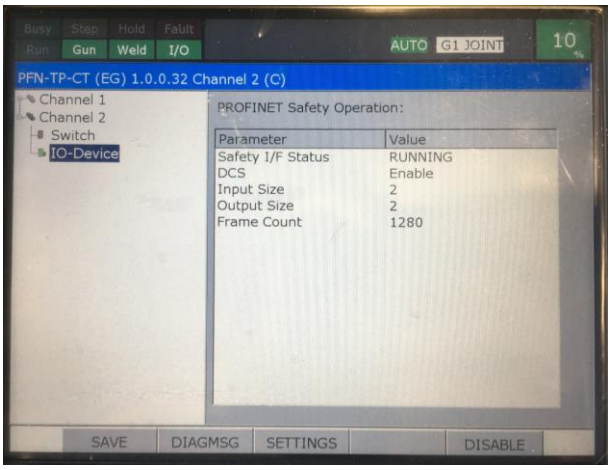
F igure 101 – TIA: Reintegration equation

Compile again and then load the program into the PLC. Once the PLC is restarted, the fault profisafe comm error 1,1 should disappear. Check that the communication works by doing MENU -> 5. I/O -> Profinet (M) -> Channel 2 -> I/O device.



F igure 102 – R30iBplus: Prof inet Molex IO -Dev ice

Do F3. DIAGSAFETY.



F igure 103 – R30iBplus: Prof inet Molex DIAGSAFETY

The safety communication status must be running and the frame count must be changing.

7 Maintenance procedure

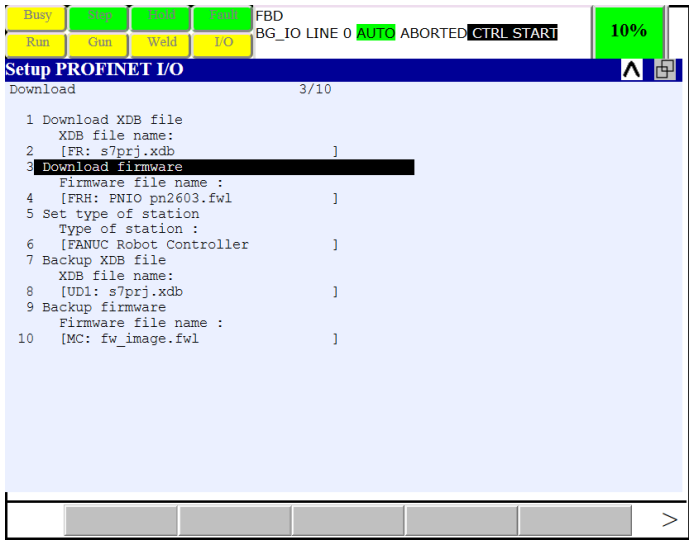
In case of exchange of a CP1604 or Molex card due to hardware failure. Follow the procedure below: below.

7.1Maintenance Procedure CP1604

First, obtain external media (PCMCIA or USB).

Start a controlled start.

Go to MENU -> 0. Next -> 0. Next -> 2. Profinet Setup.



F igure 104 – R30iB: Prof inet Setup screen

Go to the backup xdb file line and change the backup path if necessary if it does not match the media that you are going to use.

UD1 : := USB

MC: := PCMCIA

Leave the default name S7PRJ.xdb then press enter on line 7. Backup XDB file.

Once the xdb file backup is complete, turn off the robot.

Replace the CP1604 card.

Turn on the robot in controlled start then perform the firmware update procedure (see 1.3.3.1).

Then, still in controlled start, return to the Profinet Setup screen and go to line 1. Download xdb file (it may be necessary to change the path). Press enter and then load the configuration of the map.

When loading is complete, start in cold start by the FCTN key, the Profinet / Profisafe must recover.

7.2Molex Maintenance Procedure

Make a backup of all of the above robot. Reminder Procedure:

- MENU -> 7. FILE -> 1.FILE
- F5. UTIL -> SET DEVICE -> Select the appropriate media you are working with.
- It may be convenient to make this backup in a separate folder. do F5. UTIL -> 4. MAKE DIR to create a new folder.
- Press F4. Backup -> 8. All Of Above.

The backup is done.

At the end of the backup, turn off the robot and then replace the molex card.

Restart in controlled start.

Perform the firmware update procedure (see 1.3.3.2).

Then do MENU -> F5. FILE then go to the backup folder.

Look for the file called PMCFG.ZIP and load it into the robot using F3. LOAD.

Start in cold start using the FCTN key, Profinet / Profisafe communication should be reestablished.

8 Appendix

8.1Definition of Profinet Device R30iA I/O modules

INTERFACE MODULE						
			Module Ident Num-ber		Submodule Ident Num-ber	
slot	subslot	Kind	hex	dec	hex	dec
0	1	CP1616 Migration	0x00000015	21	0x00010001	65537
		CP1604 Migration	0x00000016	22	0x00010001	65537
		CP1616	0x00000017	23	0x00010001	65537
		CP1604	0x00000018	24	0x00010001	65537

Table 1 – Assignment CP1604 R30iA Dev ice

STANDARD I/O						
			Module Ident Number		Submodule Ident Num-ber	
slot	subslot	Kind	hex	dec	hex	dec
x	1	1 byte DI/DO	0x00000020	32	0x0001	1
x	1	1 byte DI	0x00000021	33	0x0001	1
x	1	1 byte DO	0x00000022	34	0x0001	1
x	1	4 byte DI/DO	0x00000023	35	0x0001	1
x	1	4 byte DI	0x00000024	36	0x0001	1
x	1	4 byte DO	0x00000025	37	0x0001	1
x	1	16 byte DI/DO	0x00000026	38	0x0001	1
x	1	16 byte DI	0x00000027	39	0x0001	1
x	1	16 byte DO	0x00000028	40	0x0001	1
x	1	64 byte DI/DO	0x00000029	41	0x0001	1
x	1	64 byte DI	0x00000030	42	0x0001	1
x	1	64 byte DO	0x00000031	43	0x0001	1
x	1	32 byte DI/DO	0x00000035	53	0x0001	1
x	1	32 byte DI	0x00000036	54	0x0001	1
x	1	32 byte DO	0x00000037	55	0x0001	1
x	1	128 byte DI/DO	0x00000120	288	0x0001	1
x	1	128 byte DI	0x00000121	289	0x0001	1
x	1	128 byte DO	0x00000122	290	0x0001	1

Table 2 – I/O Assignment Prof inet Dev ice R30iA

SAF0E I/O						
			Module Ident Number		Submodule Ident Number	
slot	sub-slot	Kind	hex	dec	hex	dec
1	1	1 byte IO	0x00001001	4097	0x0001	1
1	1	2 byte IO	0x00001002	4098	0x0001	1
1	1	3 byte IO	0x00001003	4099	0x0001	1
1	1	4 byte IO	0x00001004	4100	0x0001	1
1	1	5 byte IO	0x00001005	4101	0x0001	1
1	1	6 byte IO	0x00001006	4102	0x0001	1
1	1	7 byte IO	0x00001007	4103	0x0001	1
1	1	8 byte IO	0x00001008	4104	0x0001	1

Table 3 – Professional I/O Assignment R -30iA

8.2Definition of Profinet Device R30iB V2.5 I/O modules

INTERFACE MODULE						
			Module Ident Number		Submodule Ident Number	
slot	sub-slot	Kind	hex	dec	hex	dec
0	1	CP1616 Migration V2.5	0x00000015	21	0x00010001	65537
		CP1604 Migration V2.5	0x00000016	22	0x00010001	65537
		CP1616 V2.5	0x00000017	23	0x00010001	65537
		CP1604 V2.5	0x00000018	24	0x00010001	65537

Table 4 – Assignment CP1604 R30iB dev iceV2.5

STANDARD I/O						
			Module Ident Number		Submodule Ident Number	
slot	sub-slot	Kind	hex	dec	hex	dec
x	1	1 byte DI/DO	0x00000020	32	0x0001	1
x	1	1 byte DI	0x00000021	33	0x0001	1
x	1	1 byte DO	0x00000022	34	0x0001	1
x	1	4 byte DI/DO	0x00000023	35	0x0001	1
x	1	4 byte DI	0x00000024	36	0x0001	1
x	1	4 byte DO	0x00000025	37	0x0001	1
x	1	16 byte DI/DO	0x00000026	38	0x0001	1
x	1	16 byte DI	0x00000027	39	0x0001	1
x	1	16 byte DO	0x00000028	40	0x0001	1
x	1	64 byte DI/DO	0x00000029	41	0x0001	1
x	1	64 byte DI	0x00000030	42	0x0001	1
x	1	64 byte DO	0x00000031	43	0x0001	1
x	1	32 byte DI/DO	0x00000035	53	0x0001	1
x	1	32 byte DI	0x00000036	54	0x0001	1
x	1	32 byte DO	0x00000037	55	0x0001	1
x	1	128 byte DI/DO	0x00000120	288	0x0001	1
x	1	128 byte DI	0x00000121	289	0x0001	1
x	1	128 byte DO	0x00000122	290	0x0001	1

Table 5 – Prof inet dev ice R30iB V2.5 I/O ass ignat ion

SAFE I/O						
			Module Ident Number		Submodule Ident Number	
slot	subslot	Kind	hex	dec	hex	dec
1	1	1 byte IO	0x00001001	4097	0x0001	1
1	1	2 byte IO	0x00001002	4098	0x0001	1
1	1	3 byte IO	0x00001003	4099	0x0001	1
1	1	4 byte IO	0x00001004	4100	0x0001	1
1	1	5 byte IO	0x00001005	4101	0x0001	1
1	1	6 byte IO	0x00001006	4102	0x0001	1
1	1	7 byte IO	0x00001007	4103	0x0001	1
1	1	8 byte IO	0x00001008	4104	0x0001	1

Table 6 – Professional I/O Assignment R30iB V2.5

8.3Definition of Profinet Device R30iB V2.6 I/O modules

INTERFACE MODULE						
			Module Ident Number		Submodule Ident Number	
slot	sub-slot	Kind	hex	dec	hex	dec
1	1	CP1616 Migration V2.6	0x00000019	25	0x00010001	65537
		CP1604 Migration V2.6	0x0000001A	26	0x00010001	65537
		CP1616 V2.6	0x0000001B	27	0x00010001	65537
		CP1604 V2.6	0x0000001C	28	0x00010001	65537

Table 7 – Assignment CP1604 R30iB dev ice V2.6

STANDARD I/O						
			Module Ident Number		Submodule Ident Number	
slot	sub-slot	Kind	hex	dec	hex	dec
x	1	1 byte DI/DO	0x00000020	32	0x0001	1
x	1	1 byte DI	0x00000021	33	0x0001	1
x	1	1 byte DO	0x00000022	34	0x0001	1
x	1	4 byte DI/DO	0x00000023	35	0x0001	1
x	1	4 byte DI	0x00000024	36	0x0001	1
x	1	4 byte DO	0x00000025	37	0x0001	1
x	1	16 byte DI/DO	0x00000026	38	0x0001	1
x	1	16 byte DI	0x00000027	39	0x0001	1
x	1	16 byte DO	0x00000028	40	0x0001	1
x	1	64 byte DI/DO	0x00000029	41	0x0001	1
x	1	64 byte DI	0x00000030	42	0x0001	1
x	1	64 byte DO	0x00000031	43	0x0001	1
x	1	32 byte DI/DO	0x00000035	53	0x0001	1
x	1	32 byte DI	0x00000036	54	0x0001	1
x	1	32 byte DO	0x00000037	55	0x0001	1
x	1	128 byte DI/DO	0x00000120	288	0x0001	1
x	1	128 byte DI	0x00000121	289	0x0001	1
x	1	128 byte DO	0x00000122	290	0x0001	1

Table 8 – Prof inet dev ice R30iB V2.6 I/O ass ignat ion

SAFE I/O						
			Module Ident Number		Submodule Ident Number	
slot	subslot	Kind	hex	dec	hex	dec
2	1	1 byte IO	0x00001001	4097	0x0001	1
2	1	2 byte IO	0x00001002	4098	0x0001	1
2	1	3 byte IO	0x00001003	4099	0x0001	1
2	1	4 byte IO	0x00001004	4100	0x0001	1
2	1	5 byte IO	0x00001005	4101	0x0001	1
2	1	6 byte IO	0x00001006	4102	0x0001	1
2	1	7 byte IO	0x00001007	4103	0x0001	1
2	1	8 byte IO	0x00001008	4104	0x0001	1

Table 9 – Professional I/O Assignment R30iB V2.6