Asset Management User Manual for Nexto Series

MU214603 Rev. C

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Contents

1. Introduction

The HART protocol was proposed due to a necessity of accessing a greater diversity of data from field devices. Originally these devices used a reading of 4 to 20 mA electrical current, where only a single information was transmitted. Using this same physical medium, the protocol was developed allowing for access of several different pieces of information from the same device. Making these readings available on other fieldbus networks it is possible to have integrated access to information of the whole industrial plant.

The practices of asset management provided a new technological step in the quality of integration of several instruments managed through the fieldbus networks, with which the devices information is transmitted, allowing for critical analysis and decision making. In the existent architectures, the master can access the instruments for acquisition of a set of variables used for control and commissioning, something that was not available remotely or that can be delivered in a centralized manner to an application executed in a Host PC.

Considering the presented case, Altus has developed modules capable of delivering the required information without interference in the control process, as it is the case with asset management accessing data from the HART network. The PROFIBUS remote head PO5064 and the redundant PROFIBUS remote head PO5065 have the PROFIBUS-DPV1 extension. Due to this characteristic they can be used paired with the modules PO1114 HART and PO2134 HART to implement a HART over PROFIBUS, which allows for connecting with an application for asset management (as the softwares that implement the FDT standard) with the HART devices. One of the architectures presented in this manual describes how to mount and configure the equipment that composes the HART over PROFIBUS network. The other architecture presented in this manual used the modules NX6014 HART and NX6134 HART connected directly to a local bus, enabling the HART devices to directly communicate with the asset management system through the HART communication network. This approach can be simpler in terms of infrastructure because it avoids the need for an interface module and a separate PROFIBUS network.

The architecture of the solution is composed of the following elements:

- The asset management application (or other open/proprietary standard) is executed in a computer (Host PC).
- A local bus with a CPU and a PROFIBUS network composed by the NX5001 Master (besides a Class II Master AL-2434) and the remote heads PO5064/PO5065.
- A local bus composed of Nexto CPU and the modules NX6014 and NX6134.

In the architecture solution with PROFIBUS, the PO5064/PO5065 devices send the information to the HART analog input and output modules PO1114 and PO2134, respectively, which process this information and establish the communication with the HART devices. The architecture works with open communication standards, which allows for easy interfacing with other devices that use the same standards, e.g., a device connected directly to the PROFIBUS network that requires some configuration that is available only at the level of the PROFIBUS-DPV1 extension. In the architecture solution with connection directly to the local bus, the HART analog input and output modules NX6014 and NX6134, respectively, which process this information and establish the communication with the HART devices, communicating directly to the Nexto controller, without the necessity of an external interface.

1.1. Documents Related to this Manual

For further technical details, configuration, installation and programming, the table below should be consulted.

The table below is only a guide of some relevant documents that can be useful during the use, maintenance, and programming of this product.

Code	Description	Language
MU299609	MasterTool IEC XE User Manual	English
MU299048	Manual de Utilização MasterTool IEC XE	Portuguese
CE108100	Architex Technical Characteristics	English
CT108100	Características Técnicas do Architex	Portuguese
CE109511	PO5064 Technical Characteristics	English
CT109511	Características Técnicas do PO5064	Portuguese
CE109321	PO1114 Technical Characteristics	English
CT109321	Características Técnicas do PO1114	Portuguese
CE109416	PO2134 Technical Characteristics	English
CT109416	Características Técnicas do PO2134	Portuguese
CE114315	NX6014 Technical Characteristics	English
CT114315	Características Técnicas do NX6014	Portuguese

Code	Description	Language
CE114408	NX6134 Technical Characteristics	English
CT114408	Características Técnicas do NX6134	Portuguese
CE108100	Manual de Utilização Rede HART sobre PROFIBUS	Portuguese
MU214600	Nexto Series User Manual	English
MU214000	Manual de Utilização Série Nexto	Portuguese
MU209700	Ponto Series User Manual	English
MU209000	Manual de Utilização da Série Ponto	Portuguese

Table 1: Related Documents

1.2. Visual Inspection

Before resuming the installation process, it is advised to carefully visually inspect the equipment, verifying the existence of transport damage. Verify if all parts requested are in perfect shape. In case of damages, inform the transport company or Altus distributor closest to you.

CAUTION

Before taking the modules off the case, it is important to discharge any possible static energy accumulated in the body. For that, touch (with bare hands) on any metallic grounded surface before handling the modules. Such procedure guaranties that the module static energy limits are not exceeded.

It's important to register each received equipment serial number, as well as software revisions, in case they exist. This information is necessary, in case the Altus Technical Support is contacted.

1.3. Technical Support

For Altus Technical Support contact in São Leopoldo, RS, call +55 51 3589-9500. For further information regarding the Altus Technical Support existent on other places, see https://www.altus.com.br/en/ or send an email to altus@altus.com.br.

If the equipment is already installed, you must have the following information at the moment of support requesting:

- The model from the used equipments and the installed system configuration
- The product serial number
- The equipment revision and the executive software version, written on the tag fixed on the product's side
- CPU operation mode information, acquired through MasterTool IEC XE
- The application software content, acquired through MasterTool IEC XE
- Used programmer version

1.4. Warning Messages Used in this Manual

In this manual, the warning messages will be presented in the following formats and meanings:

DANGER

Reports potential hazard that, if not detected, may be harmful to people, materials, environment and production.

CAUTION

Reports configuration, application or installation details that must be taken into consideration to avoid any instance that may cause system failure and consequent impact.

ATTENTION

Identifies configuration, application and installation details aimed at achieving maximum operational performance of the system.

2. List of Modules Used in the Architecture

CPU

- NX3030: Central Processing Unit for the Nexto Series

PROFIBUS Master

- NX5001: PROFIBUS Network Interface

Fieldbus Network Heads

- PO5064: PROFIBUS-DPV1 Remote Head

Input Modules

- PO1114: 8 AI HART Module
- NX6014: 8 AI HART Module

Output Modules

- PO2134: 4 AO HART Module
- NX6134: 4 AO HART Module

Fontes

- NX8000: 24Vdc Power Supply

Bases

- PO6001: Sprint Style Base for Analog I/O
- PO6500: Base for Remote Head MODBUS, PROFIBUS
- NX9000: 8-slot Backplane Rack
- NX9100: Left/Right Side Rack Ends

Cables and Connectors

- AL-2303: PROFIBUS Cable
- AL-2602: PROFIBUS Terminator Connector
- NX9102: Backplane Rack Connector Cover

Gateway

- AL-2434: DPV1 Scanner for Asset Management

HART Instruments

- Atta ATT10-PH: Temperature Transmitter
- Atta APT10: Pressure Transmitter
- Atta AVP10: Valve Positioner

Softwares

- MT8500: Application for programming, configuration, diagnostic and commissioning of Altus PLCs.
- ArchiteX: Application for asset management, based on FDT/DTM standard, for communication with field devices.

3. Architecture

- **Mounting Rail**
  The Ponto and Nexto series are mounted on TS35 DIN standard rails. The attaching on the rails is made by fitting. The rails must be grounded to the panel.

- **UCP**
  The CPU, Central Processing Unit, is responsible for the execution of the control functions, operating the basic cycle of reading input points, running the user application, updating the outputs and communicating with the supervisory system, between other functions.

- **Power Supply**
  The Power Supply Module supplies energy to the modules installed in the bus. Each bus must have its own Power Supply Module. The current requirements of the application are shown in the configuration tool.

- **Local Bus**
  Local bus is understood to mean the place where are installed the CPU and the fieldbus interface for the remote buses.
  In this document the local bus is always of the Nexto Series. A Nexto local bus may be composed of multiple backplane racks connected to each other by expansion modules and controlled by a single CPU. However, for the architectures proposed in this manual, the bus expansion will be disregarded. .
  The HART modules NX6014 and NX6134 do not offer support to bus expansion, so they must be used exclusively in the local bus where the CPU is installed.

- **Remote Bus or Remote**
  It is the set formed by a unit of fieldbus head and I/O modules. These modules are connected together through a fieldbus network to the fieldbus interface in the local bus.
  The maximum number of I/O modules that can be connected to a PROFIBUS DP remote head is 20. This number is determined by the type of parameterization adopted in the protocol.
  In a fieldbus network, the number of remote heads is defined by the adopted communication standard.
  For PROFIBUS-DP networks there are 127 addresses available. In this case, in a configuration that has a local bus (master), we can expect a network that allows for 124 remote heads or PROFIBUS DP remote buses.

- **Bases**
  The bases are modular elements that gather buses. They are plugged into TS35 rails and act as interconnection agents for power, bus and I/O signals for all modules. The bases have terminals - spring style - for field wiring interconnection, and optionally fuses for protection. The base selection depends upon the kind of module to be used. Please refer to the Technical Characteristics of each module to define available bases options.

- **Fieldbus Interfaces**
  Fieldbus interfaces are fieldbus master nodes and allow access to remote modules or other equipments based on PROFIBUS-DP, MODBUS and others. The fieldbus interfaces are plugged into local buses.

- **Fieldbus Heads**
  The fieldbus heads connect the Ponto Series I/O modules to different field networks. They can communicate with CPUs from different vendors, supporting PROFIBUS DPV1 protocol. The fieldbus heads have integrated power supply that feeds the modules connected to them.

- **I/O Modules**
  They are responsible for conditioning the field signals, making them compatible with the logical bus. The Ponto Series provides a great number of I/O modules both analog and digital. For some of the modules, an external 24 Vdc power supply is required. The details about this type of installation is available in the Technical Characteristics of each specific module.

- **Fieldbus Network**
  It is the communication and data exchange medium between the master device and the remote head. It uses standardized configuration both in regard to the physical medium (like cables and connectors) and to the communication protocol. The master and slave devices of both Nexto and Pontos Series meet these requirements allowing their connectivity with similar systems from other vendors. For additional information, it is recommend referring to the User Manual of the module, network interface or remote head being used.

- **Termination**
  It couples the impedance for a local or remote bus. The termination is a connector that should be placed at the last bus base. This element comes along with the CPU base and the field network head.

- **Cables and Connectors**
  For connecting the remote head with the local bus, or even with a CPU from another vendor, the user must employ fieldbus network cables with standard characteristics.

3.1. HART over PROFIBUS System Architecture

3.1.1. HART Protocol

The HART protocol is known as an industry standard for communication with smart field devices using 4-20mA signals. The protocol allows encoding of the digital signal into the 4-20mA signals, through the same wires.

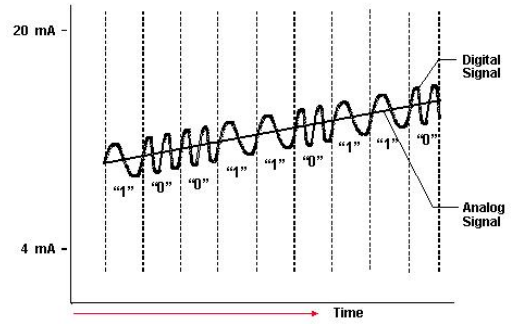


Figure 1: Simultaneous analog signal and digital signal

3.1.2. PROFIBUS DPV1

The PROFIBUS DPV1 extension contains improvements towards automation processes, particularly for acyclic data communication for parameterization, operation, visualization and control of field devices interruption, as well as cyclic communication from the user.

The acyclic data transmission is executed in parallel to the cyclic communication, but with a lower priority. This allows access to online stations, by using engineering tools. The Class I master has the token and executes the cyclic data exchange with each slave, then passes the token to the Class II master. This master establishes an acyclic communication with any slave, exchanges data and returns the token to the Class I master. Class I masters also have the capacity to exchange data in acyclic communication with the slaves.

The asset management system have been developed and are capable of using basically two technologies for describing the assets:

In the automation systems, the modules that connect to the instruments to be controlled are located in buses near the controller industrial plant. These buses, also known as remote heads, communicate with the controlled system through fieldbus network protocols that allow for high transferring rate and make it possible for other components to acquire information of several remote heads present in the network. Additionally, they allow for remote programming and configuration of the automation system.

For asset management practical applications, it is necessary to install an asset management software in a computer. But it is also necessary for these computers to be able to access and communicate with the instruments to be managed. That can be made through direct connection to the instruments, through a fieldbus network or through the usage of gateways for linking different network areas.

A system architecture is proposed in order to facilitate connection between the computer and the managed instruments. The PO5064 DPV1 remote head and the analog modules PO1114 and PO2134 work as “HART Master”. The input and output modules, PO1114 and PO2134, respectively, can be used to communicate with the HART instruments by HART connections of 4-20 mA current. The possibility of communication with HART instruments is made possible by the implemented DPV1 extension of the PROFIBUS protocol in the PO5064 remote head, where the HART messages are encapsulated. The conversion of protocols (PROFIBUS to HART) is partially executed by the remote head and partially by the analog modules.

The PROFIBUS messages format transport HART frames (HART-over-PROFIBUS) in a nearly seamless form, so that the remote head can redirect the frame to the analog modules and those then apply to the HART instruments.

The computer where the asset management application is executed can be identified as a “HART Client”. The operation of the asset management system is based on DTMs. The reason for this is not due to any limitation of hardware or software, but merely a matter of configuration of the asset management systems themselves.

In terms of configuration it is important to understand that the asset management systems must be appropriately configured to obtain the information of the devices associated to them. To do so it is necessary for them to have the system information that will be used to get access to the data available in the instruments. As an example, the asset management application must encapsulate the HART frame to be sent to the instruments: if there is a gateway, the application will be using HART over PROFIBUS over Ethernet; if there are no gateways (the connection is directly to the PROFIBUS network), the application will be using HART over PROFIBUS.

4. Projects and Configuration

This chapter presents instructions about creating a project using the MasterTool IEC XE application, with the objective of configuring two architectures, one using the Nexto PLC as PROFIBUS Master and the remote PROFIBUS Head of the Ponto Series and the second architecture using Nexto Series modules connected directly to the local bus.

4.1. MasterTool Configuration for Nexto with PROFIBUS Master and Ponto Series Slaves

The first step is to create a project using MasterTool IEC XE, selecting the "Standard MasterTool Project" model. Choose a name and a directory to save the project and click OK.

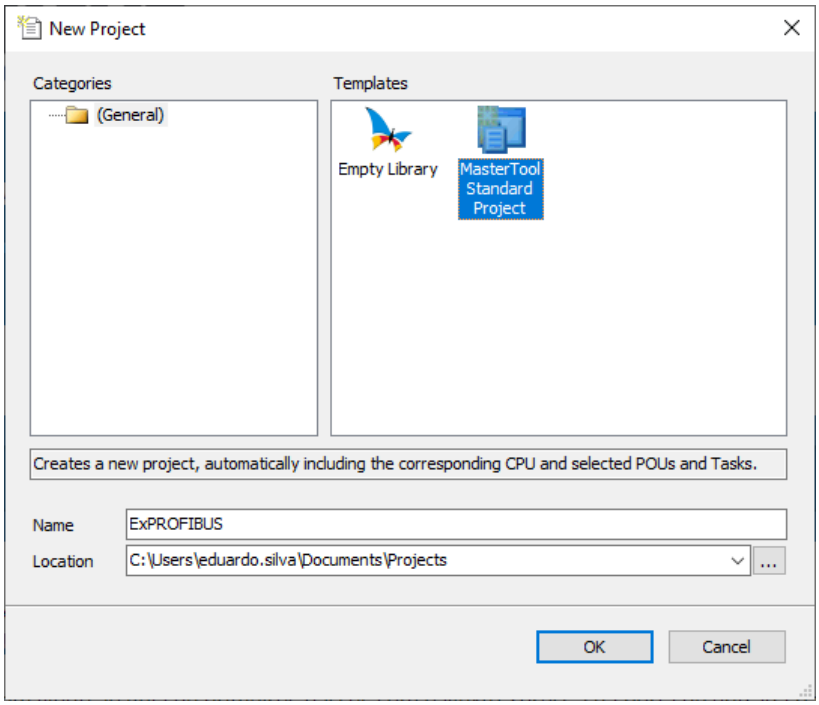


Figure 2: Creating MasterTool project

After clicking OK a new window will open where you can select the CPU model, the backplane rack and the power supply to be used in the project and then click "Next". In this example we will use an NX3030 CPU, NX9000 backplane rack and NX8000 power supply.

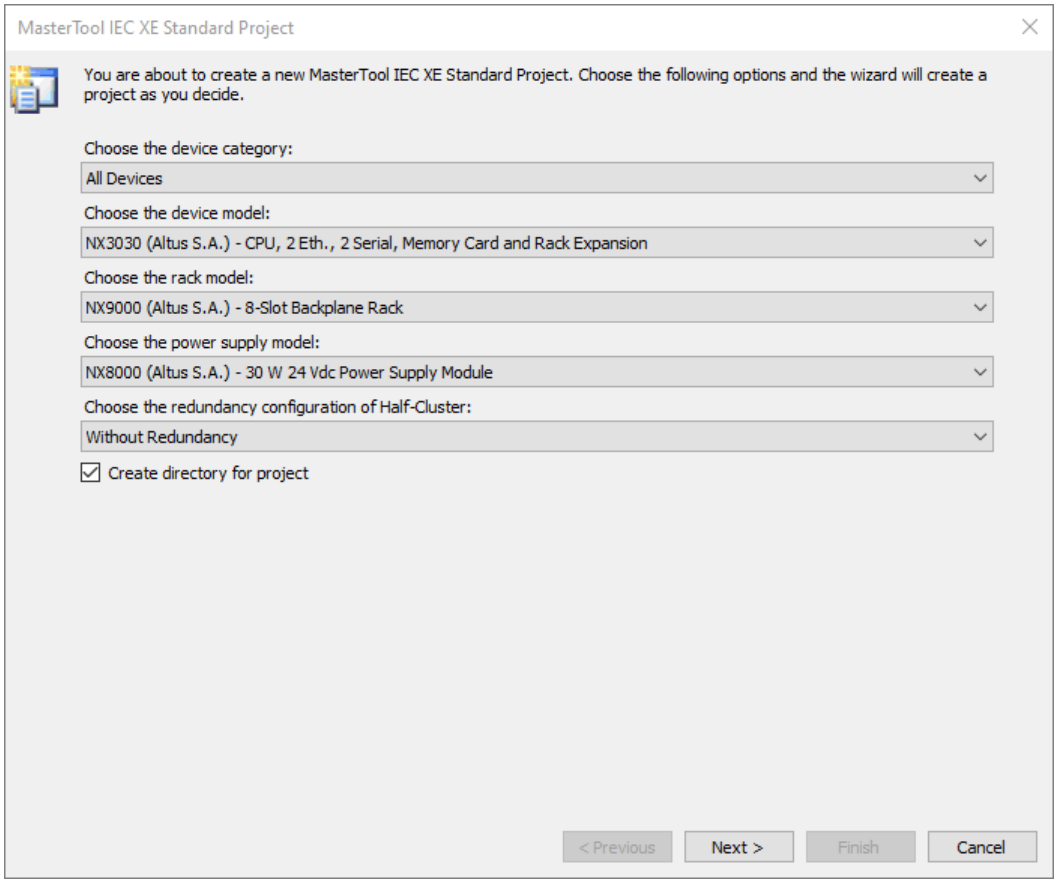


Figure 3: Hardware Selection

In the next page you will choose the quantity of PROFIBUS networks to be used. In this example we will create only one PROFIBUS network.

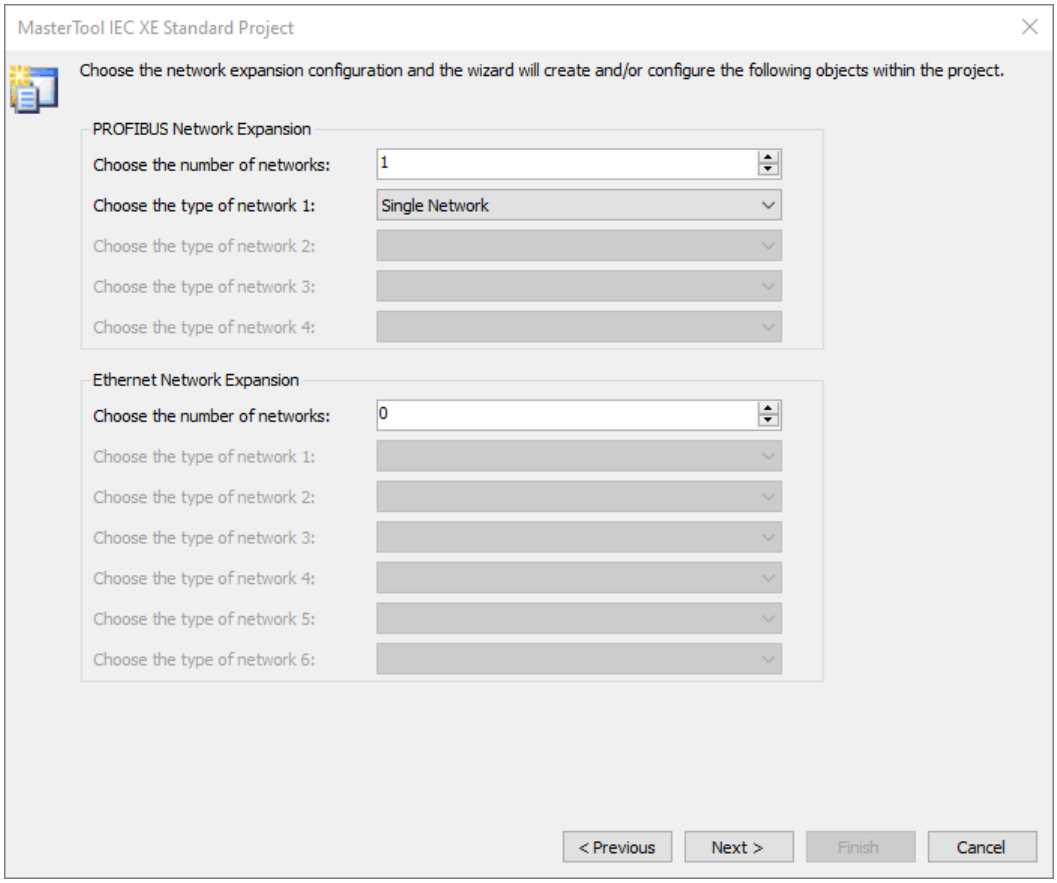


Figure 4: PROFIBUS networks configuration selection

Finishing all the project configuration, the project window will open. On the left side of the window there will be a device tree and inside it an item representing the module NX5001. Right-click the device and select the option *Add Device*.

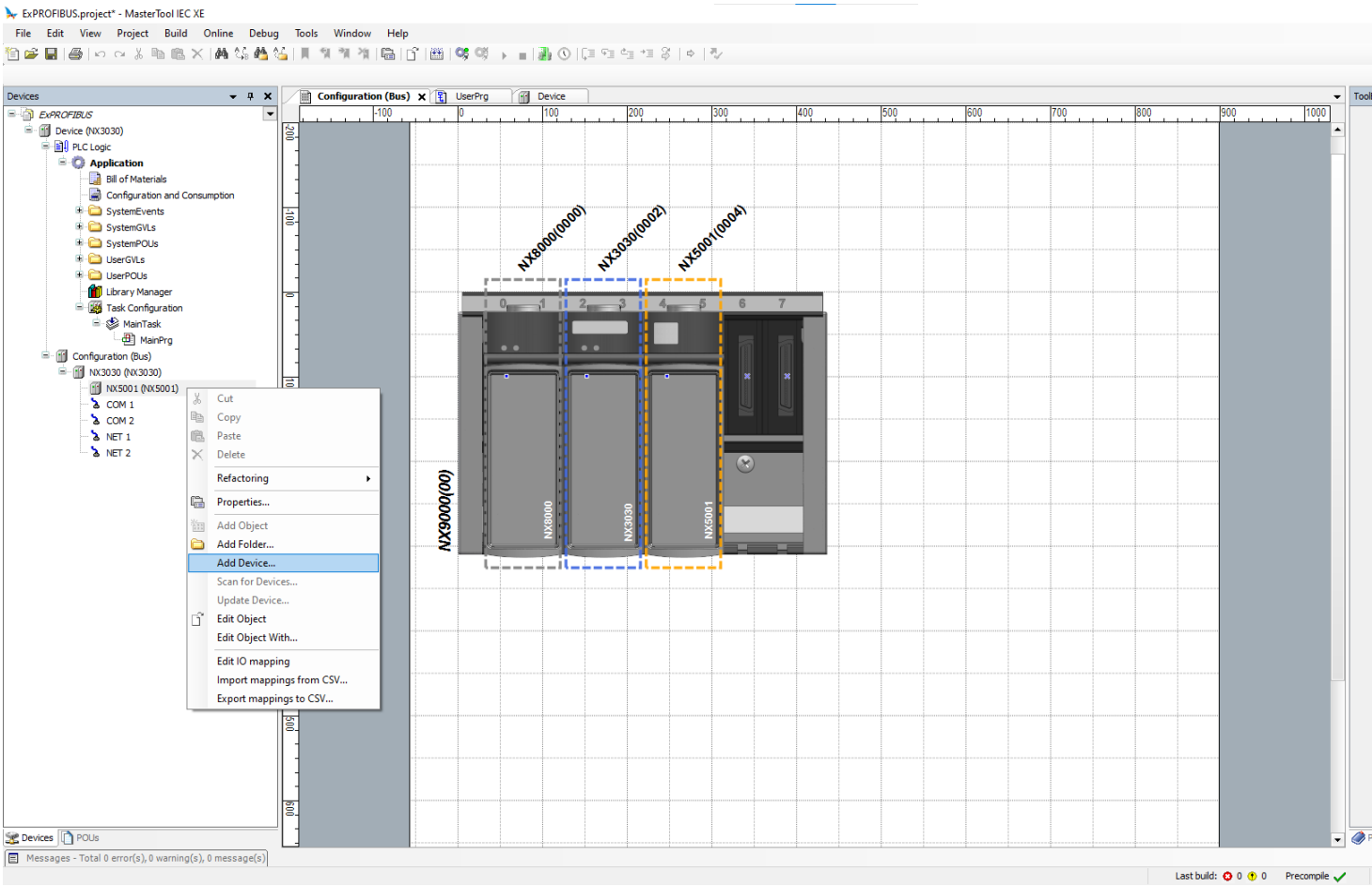


Figure 5: Adding device to the project

Add the PROFIBUS head used in the architecture to the project. In this example we are using the PO5064 head.

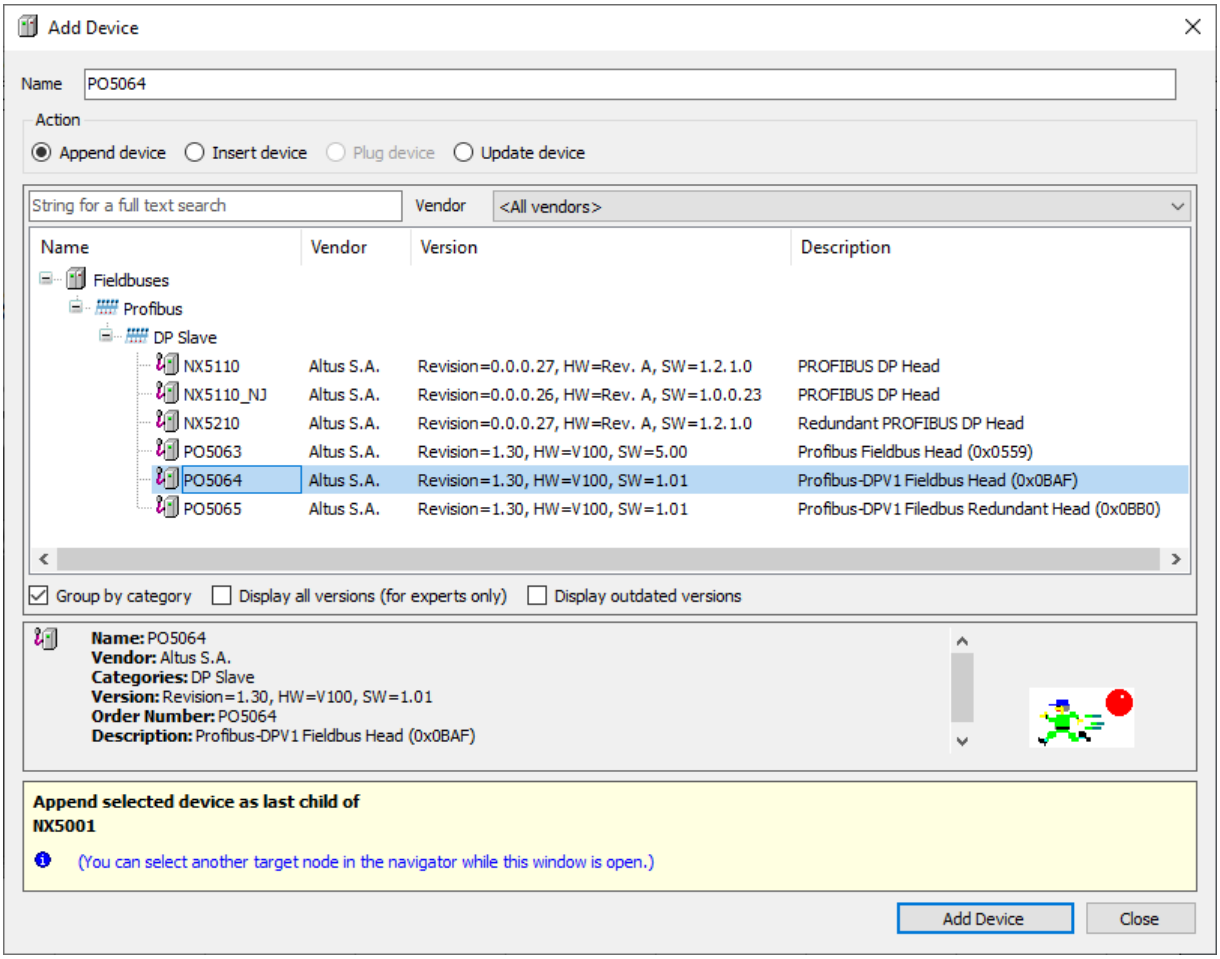


Figure 6: Adding PO5064 PROFIBUS Head

To add the modules that are installed with this PROFIBUS head you should right-click the PO5064 head in the devices tree. Select the option Add Device, which will open a window containing the modules available for this slave device. For this example we are adding two modules, one PO1114 and one PO2134.

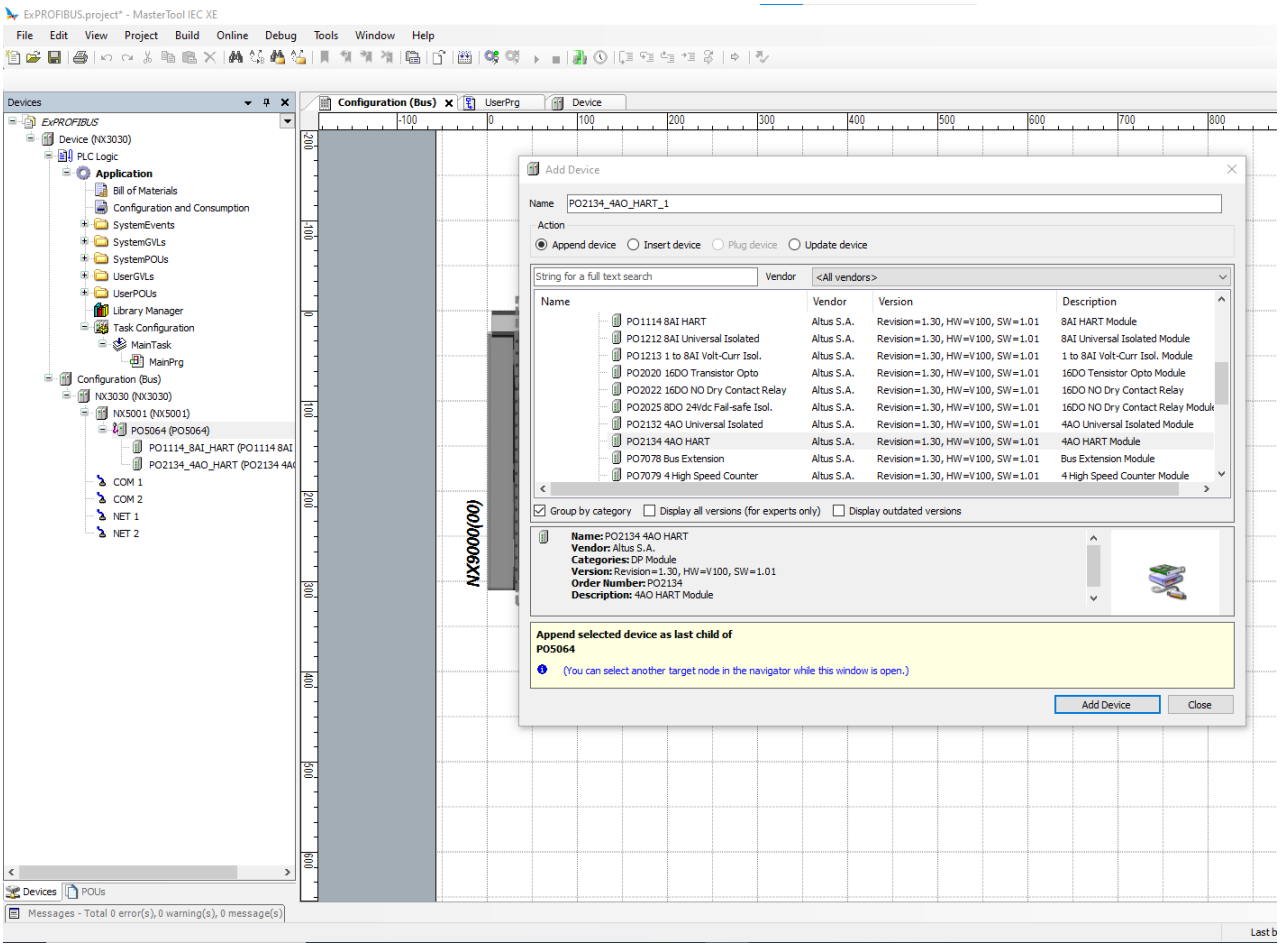


Figure 7: Adding modules PO1114 and PO2134

The hardware configuration is finished. To declare the inputs and outputs for the modules as variables in the program you can access the I/O Mappings page by double-clicking the module in the devices tree.

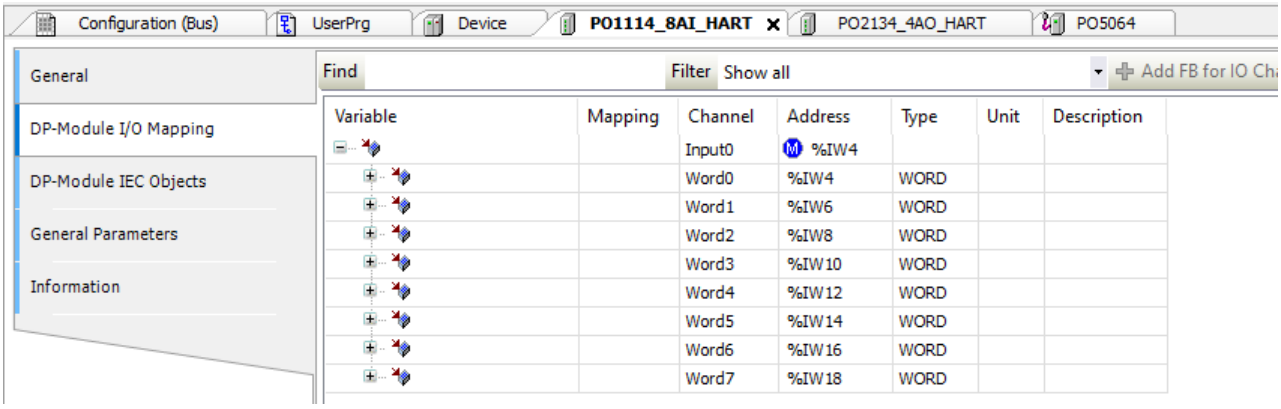


Figure 8: I/O Mappings of module PO1114

4.2. MasterTool Configuration for Nexto with Modules NX6014 and NX6134 on Local Bus

The first step is to create a project using MasterTool IEC XE, selecting the “Standard MasterTool Project” model. Choose a name and a directory to save the project and click OK.

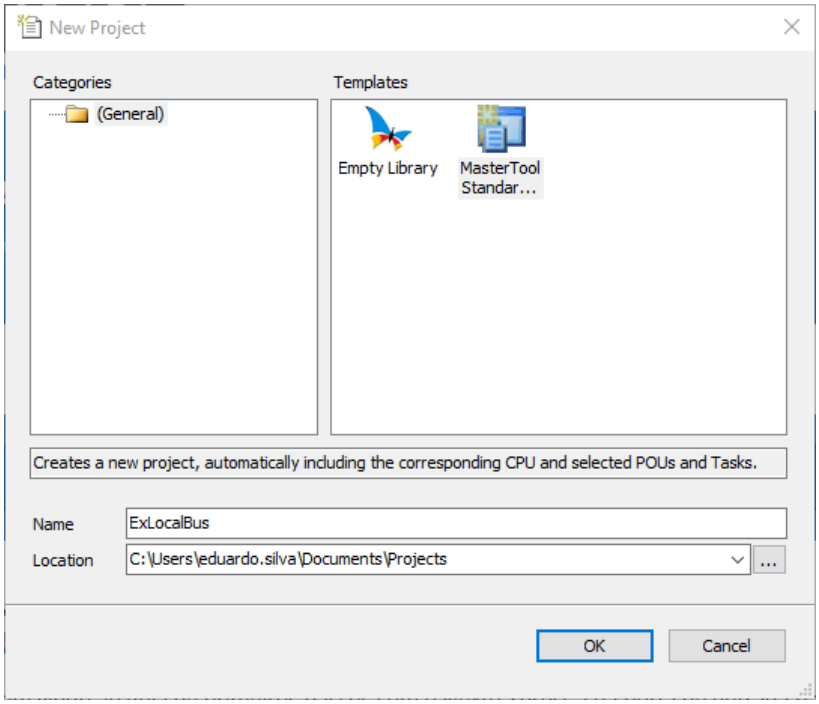


Figure 9: Creating MasterTool project

After clicking OK a new window will open where you can select the CPU model, the backplane rack and the power supply to be used in the project and then click “Next”. In this example we will use an NX3030 CPU, NX9000 backplane rack and NX8000 power supply.

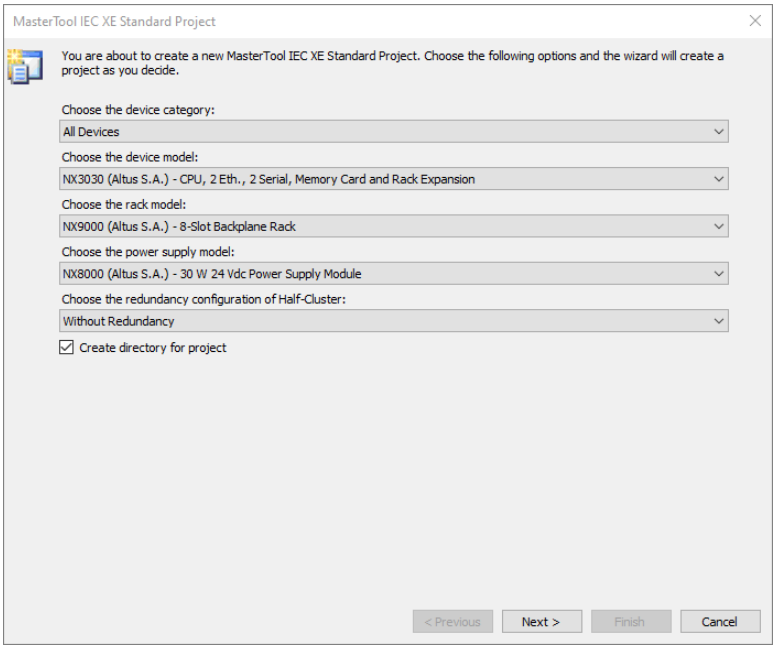


Figure 10: Hardware Selection

Finishing all the project configuration, the project window will open. On the right side of the window it is possible to access the Product Library and on the Analog I/O tab we can find the NX6014 and NX6134 modules to add to the project.

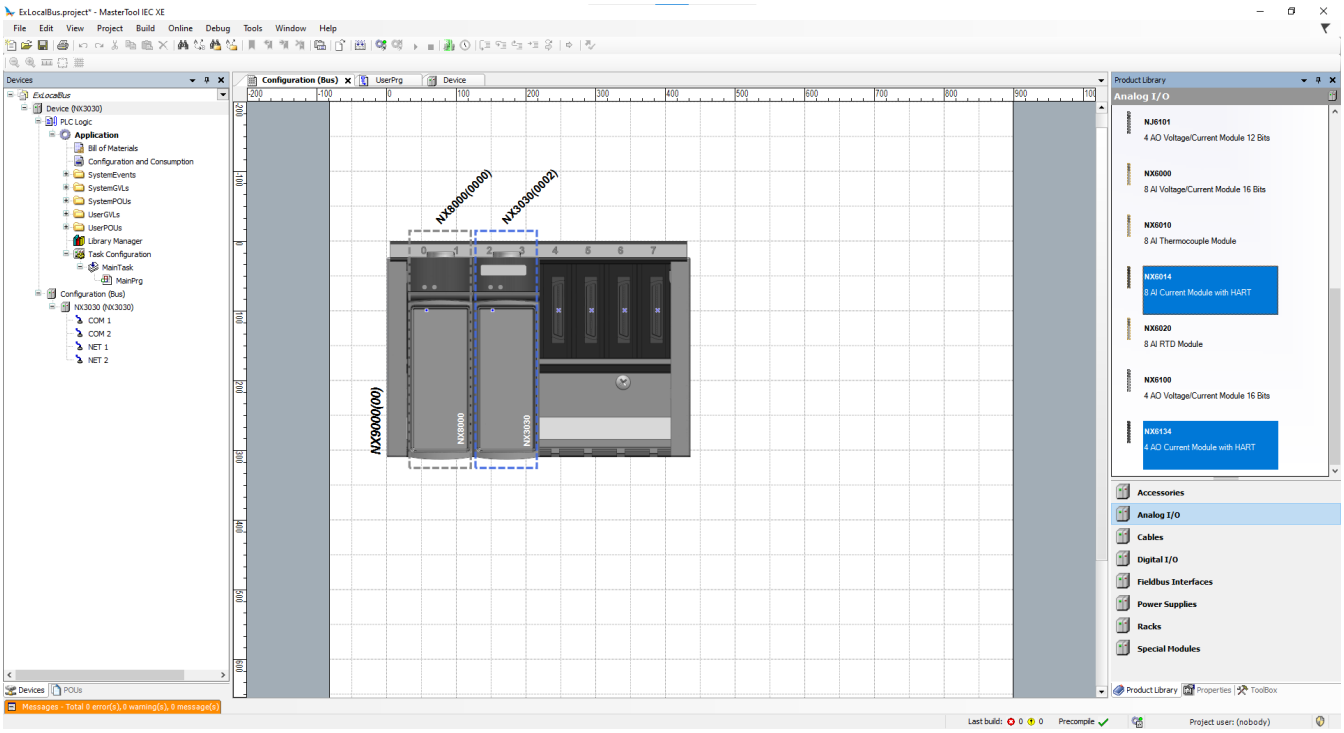


Figure 11: Selecting analog modules NX6014 and NX6134

To add the modules to the local bus of the controller, you must click the required device in the Analog I/O tab and drag them to the hardware user interface area in the project. For this example we will add one NX6014 and one NX6134.

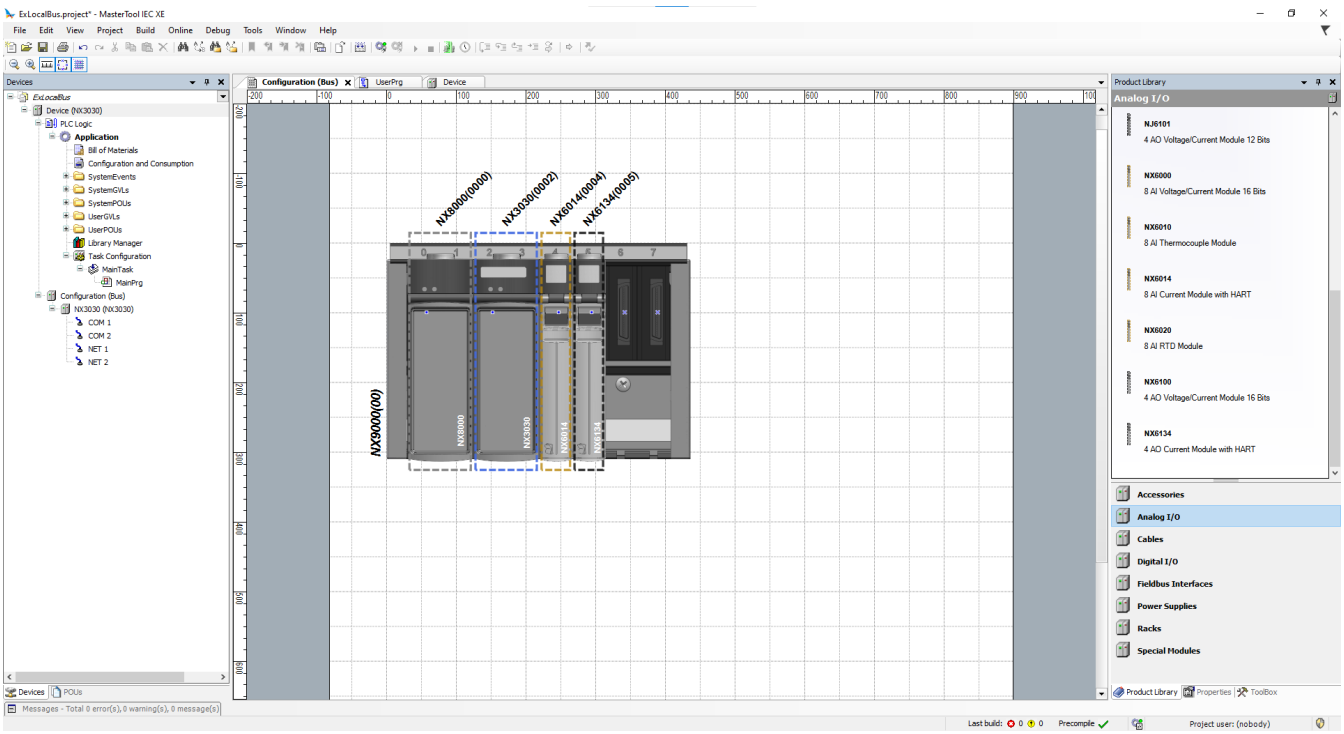


Figure 12: Adding analog modules NX6014 and NX6134

With this the hardware configuration is finished. To declare the inputs and outputs for the modules as variables in the program you can access the I/O Mappings page by right-clicking the NX3030 controller in the devices tree and accessing the

option *Edit IO mapping*.

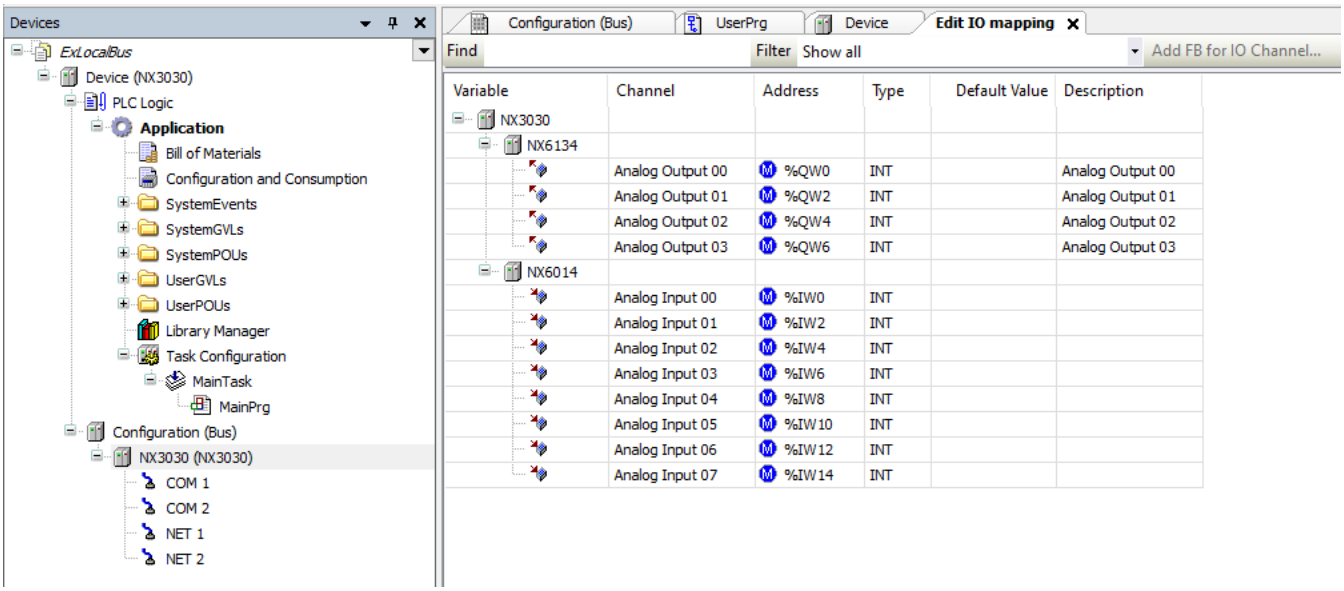


Figure 13: I/O Mappings of the local bus

5. Electrical and Mechanical Installation

This chapter outlines the procedures for the physical installation of components from the Nexto Series, Ponto Series, and HART instruments, as well as the care that should be taken with other installations within the panel where the CPU is being installed.

5.1. Mechanical Assembly of Nexto Series Modules

First the side covers assembly must be checked. If they are placed, they must be removed as shown on figure below.

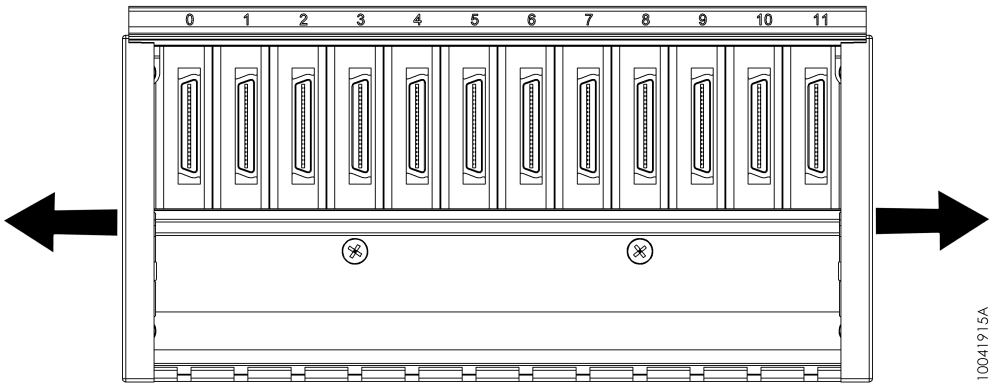


Figure 14: Side Racks Ends

Before inserting the backplane rack in the panel, the screws type 1 (Figure 15) must be partially inserted.

The rack must be aligned with the screws type 1 and placed in the panel until it touches its back. Figure 15 indicates how this procedure must be executed.

P.S.: Some figures used in this section do not show the backplane rack printed circuit board to simplify the process understanding.

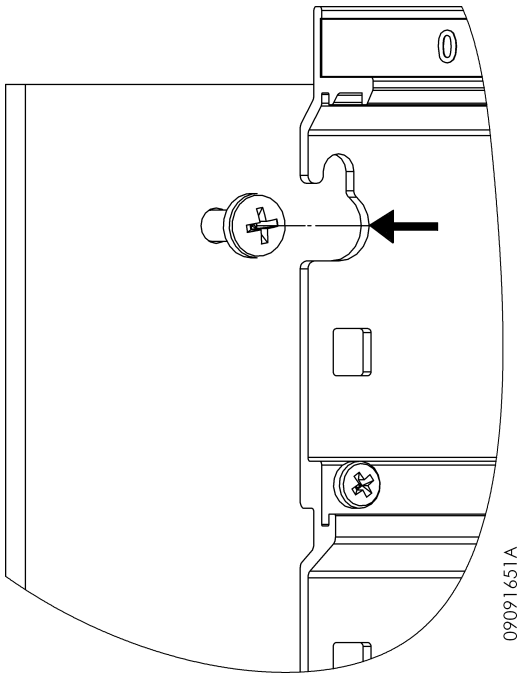


Figure 15: Backplane Rack Fixation – Alignment

After that, the rack must be pulled down in order to fit the screws type 1 in the keyway, as presented on figure below.

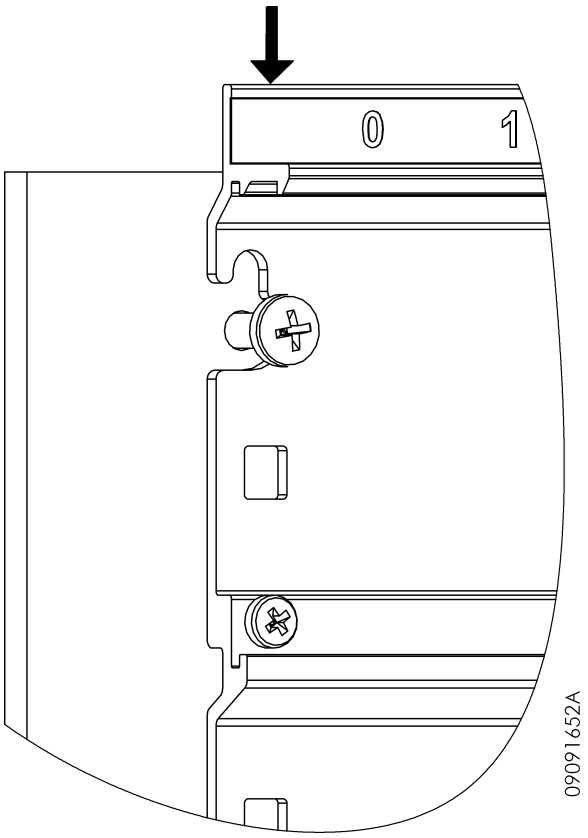


Figure 16: Backplane Rack Fixation – Screws Fitting

After the rack insertion is complete, all fixation screws must be assembled. The side rack ends can be placed back. At last the side rack ends must be placed back as shown in the figure below.

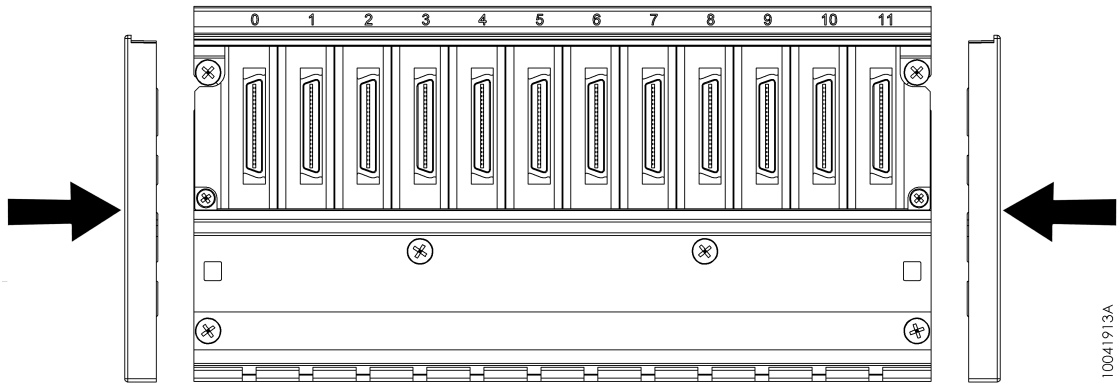


Figure 17: Backplane Rack Fixation – Side Rack Ends

5.1.1. Removing

To remove the rack, it is necessary to execute the inverse process described in the assembling instructions.

5.1.2. Inserting the Modules

The following example shows a Nexto Series generic module, this procedure must be followed for any Nexto Series module.

First the module lower part, which is used as a guide for the correct insertion, must be fit in the backplane rack, and then the guide pins are correctly placed in the right rack keyways for a specified position. Modules that use only one position in the rack has only one guide pin. The figure below shows how the module lower part must be positioned in relation to the rack for the correct insertion.

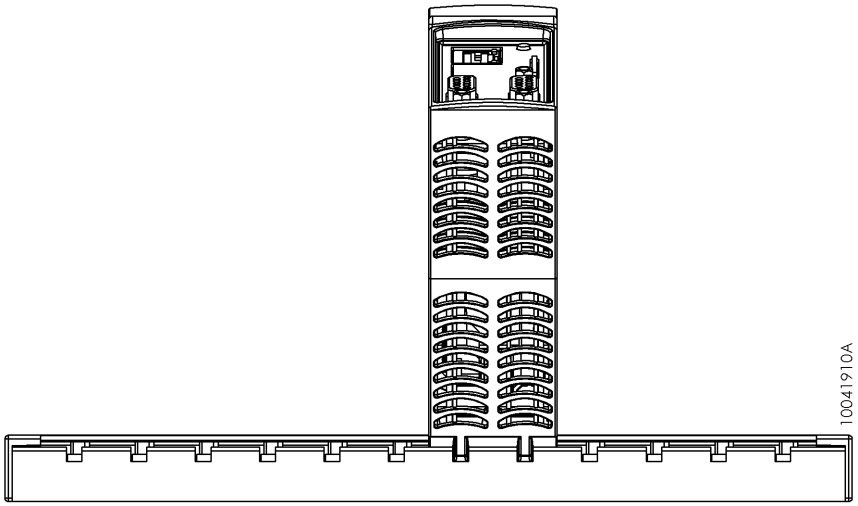


Figure 18: NX3010 e Backplane Rack

After fitting the module lower part as described above, a rotation movement must be executed in order to fit the fixation lock in the rack upper part, as shown on figure below.

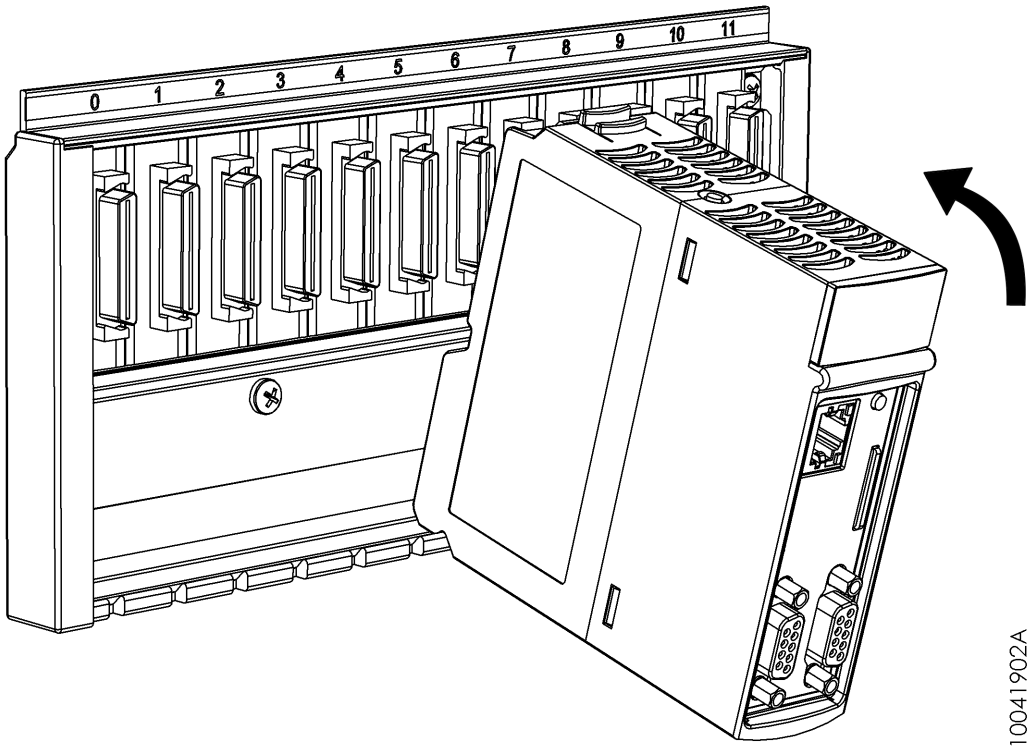


Figure 19: Movement for Mounting in the Backplane Rack

If the user follows the described procedures correctly, the module will have been perfectly connected to the bus, as presented on figure below.

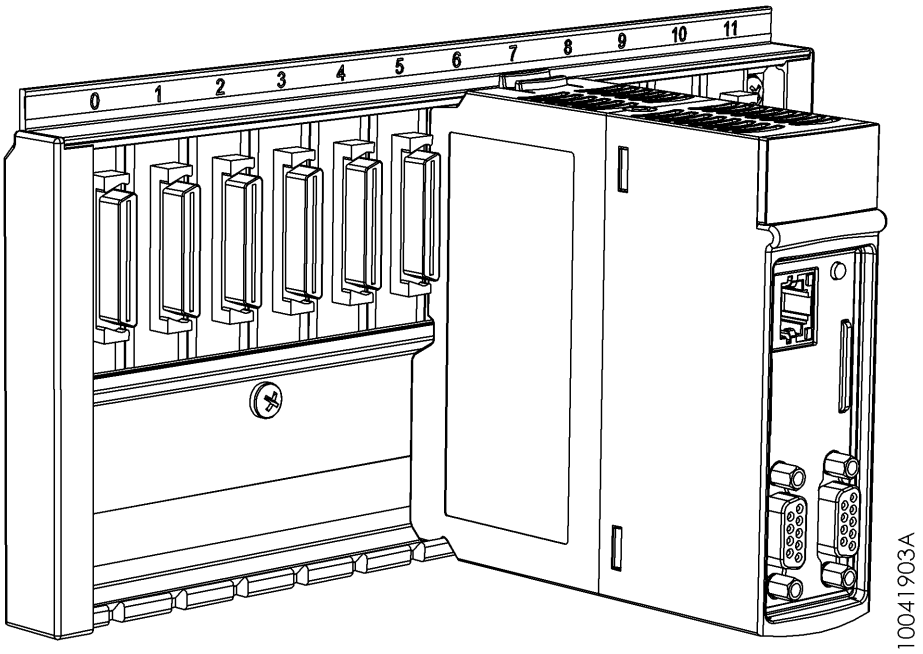


Figure 20: Module Correctly Placed in the Backplane Rack

The module must not be connected to the rack any other way. Wrong insertion of the module may cause irreversible damage to it. The figure below shows how to NOT connect the Nexto modules to the rack.

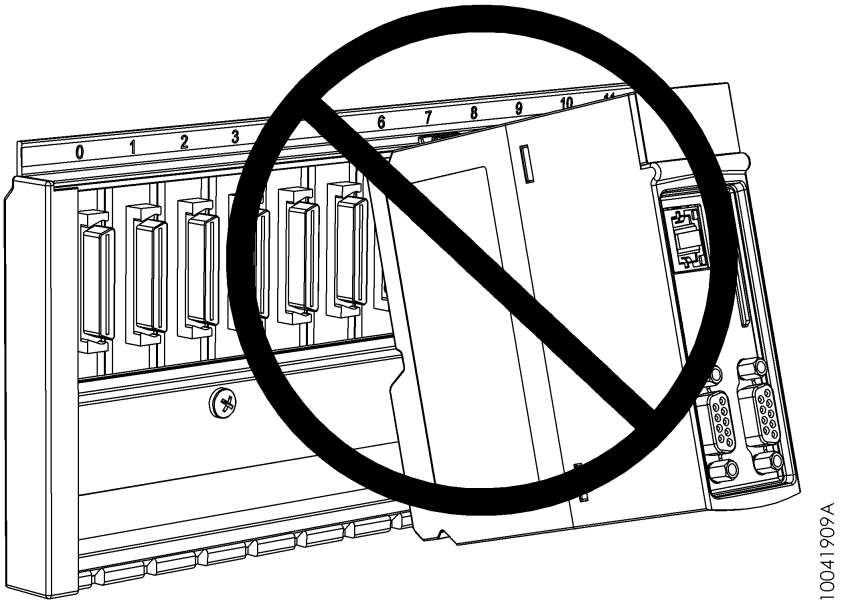


Figure 21: Incorrect Movement for Inserting

5.1.3. Removing the Modules

The following example shows a Nexto Series generic module, this procedure must be followed for any Nexto Series module.

First the fixation lock must be pressed (1), in order to unlock the module from the bus, then it must be rotate as shown on figure below(2).

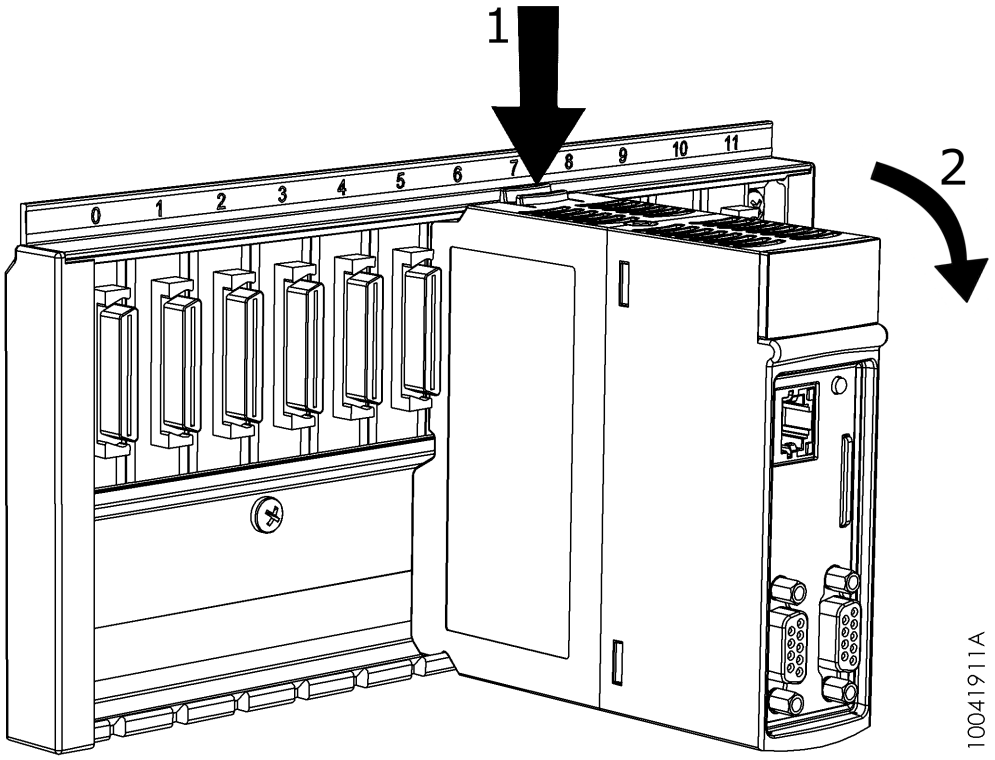


Figure 22: Disconnecting from Backplane Rack

If the user follows the described procedures correctly, the module will have been perfectly disconnected from the bus and it can be taken off as presented on figure below.

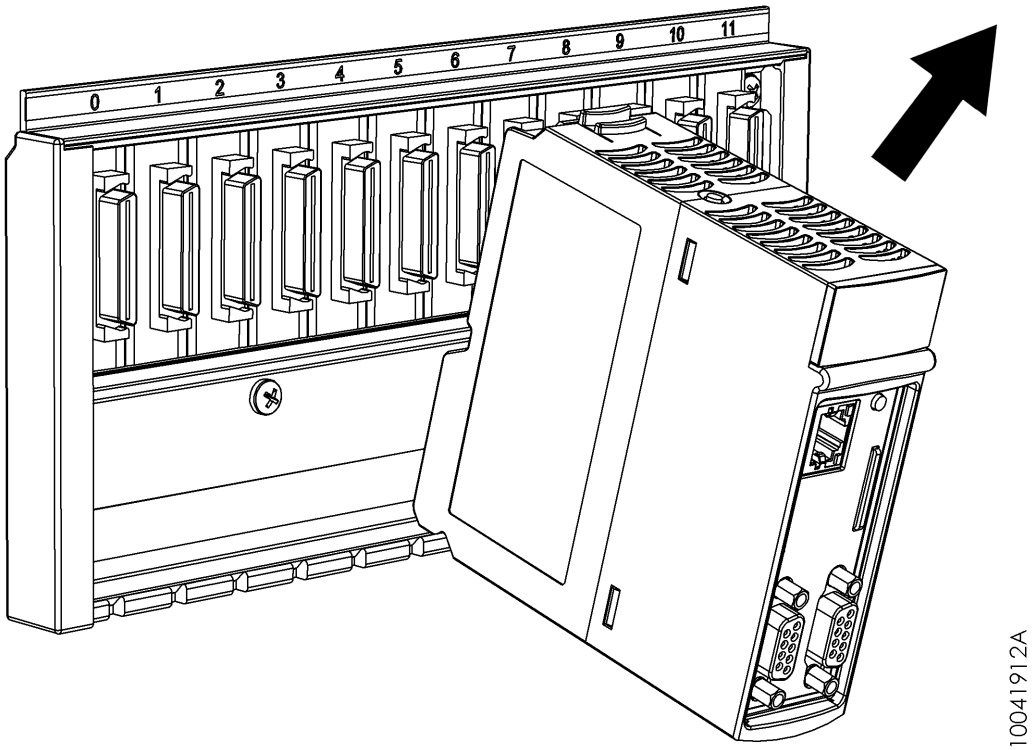


Figure 23: Removing Module from Backplane Rack

5.2. Mechanical Assembly of Ponto Series Modules

5.2.1. Mounting on Rails

The rails must be metallic and corrosion resistant. The rails must be grounded for EMI protection purposes. They should comply with the DIN EN 50032 norm, specially for the dimensions and also have good quality.

Be sure to securely fix the rails through screws so they can resist to mechanical vibrations.

5.2.2. Mounting of Bases and Gateway

Once the rails are installed, proceed to install the bases according to the following steps and always respecting the project definitions:

1. Put the base in contact with the assembly panel superficies as shown on Figure 24;
2. Slide the base in direction to the rails until touching it;
3. Rotate the base towards the rail until the lock plugs in (see Figure 24);
4. For the remaining bases, retract the sliding connector, and follow the steps 1, 2 nd 3, until the base securely plugs to the rail;
5. Double check if the hook located on the base left side is hooked to the left base;
6. Finally connect the bus sliding the connector totally to the left towards the next base;
7. For the gateway installation, similar steps to those in steps 1, 2, 3 should be followed.

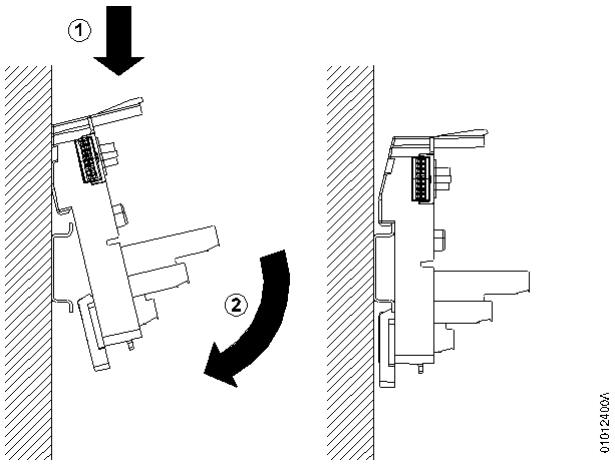


Figure 24: Mounting the base on the rail

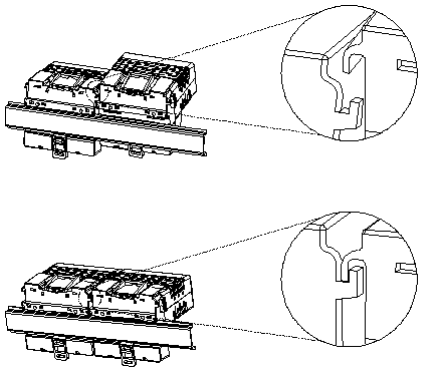


Figure 25: Fixation hooks on the left side of the bases

5.2.3. Dismounting of Bases and Gateway

The process for dismounting a base is:

1. Remove the module connected to the base and the two adjacent modules;
2. Release the connector of the bus existent in the base and in the adjacent base;
3. With a screwdriver, release the lock that holds the base to the rail, turning the base to the outside direction of the rail (6a) and sliding the base, removing it from the rail (6b), as shown in the Figure 26;

For dismounting the Gateway the step 3 can be repeated.

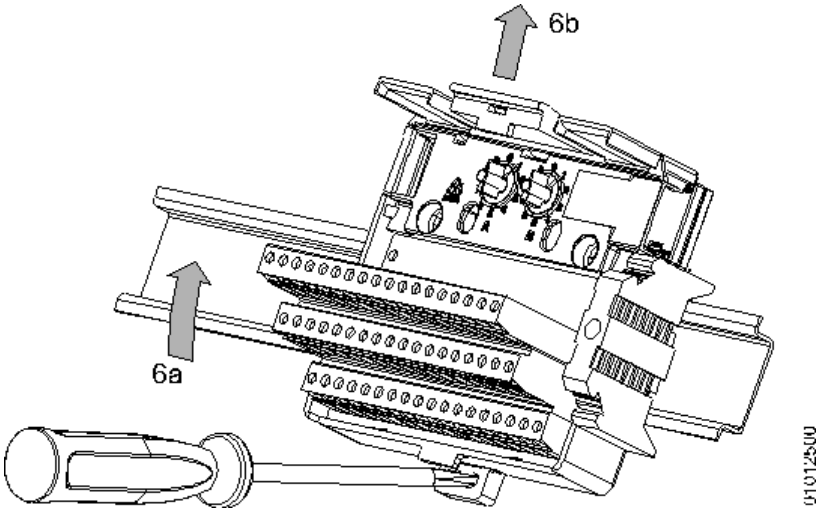


Figure 26: Removing Pontos Series bases

5.2.4. Adjusting the Mechanical Switches

The mechanical switches, located in the bases, have the function of stopping the insertion of a type of module different from the ones configured in the project.

The switches must be adjusted accordingly with the code for the module to be mounted, by turning them clockwise. The switch must have the same code defined by the last two digits of the module name. This code can be found in the window existent in the upper-right corner of each module (see Figure 27), e.g., the PO2022 module must have its base adjusted by the user with the code 22.

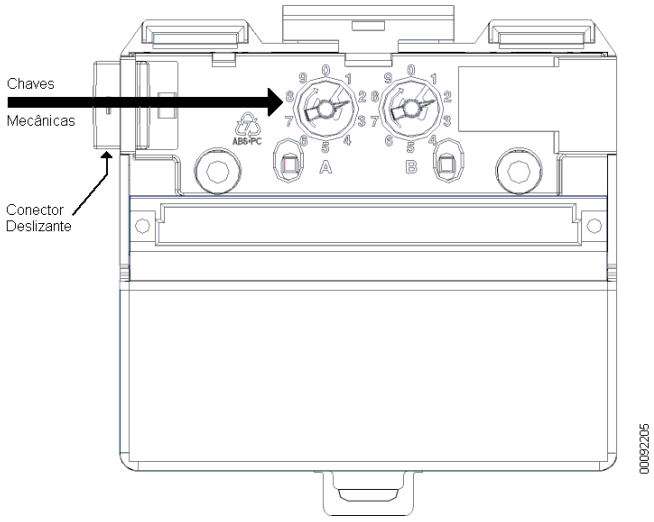


Figure 27: Mechanical Switches and Sliding Connector

5.2.5. Mounting of Termination

The last base of the last segment must have a termination, otherwise the system will not work properly. The termination comes along with the head or CPU base.

ATTENTION

The termination is polarized. The labeled side must be installed upside.

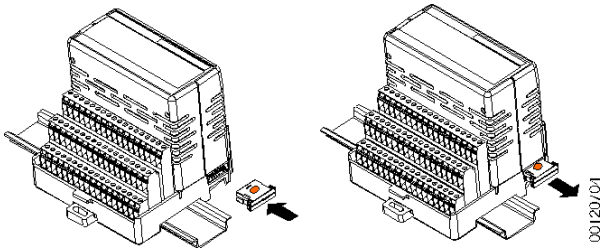


Figure 28: Bus Termination for Ponto Series

5.2.6. Inserting the Modules

Only plug the modules in after all the bus sliding connectors are plugged. For further details on the mechanical installation of the modules, refer to the Ponto Series manual.

ATENÇÃO

There is a mechanical interference that blocks the module connection when the bus is unplugged or the base switch is incorrect. In the first bus base the sliding connector also must be located outside.

1. Push the module towards its base, aligning the connector to the base guides;
2. Once the module is securely plugged into the base, push the base upper lock towards the module (see Figure 30).
3. Double check if the module is also plugged in its connector side.

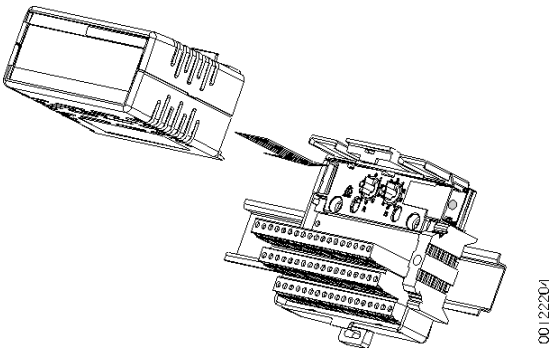


Figure 29: Inserting Module

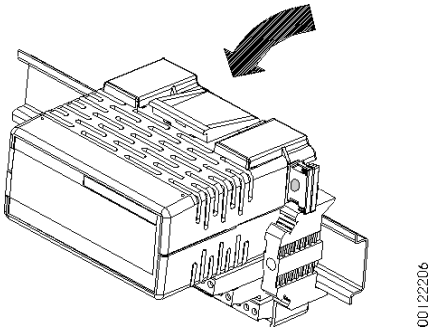


Figure 30: Module Fixation

ATTENTION

Firmly push the module in the connector area until it completely touches the base and the connector is inserted to the end.

5.3. Electrical Installation of Nexto NX5001

DANGER

When performing any installation of an electrical panel, make sure that its power source is TURNED OFF.

The backplane rack installation can be seen on the figure below.

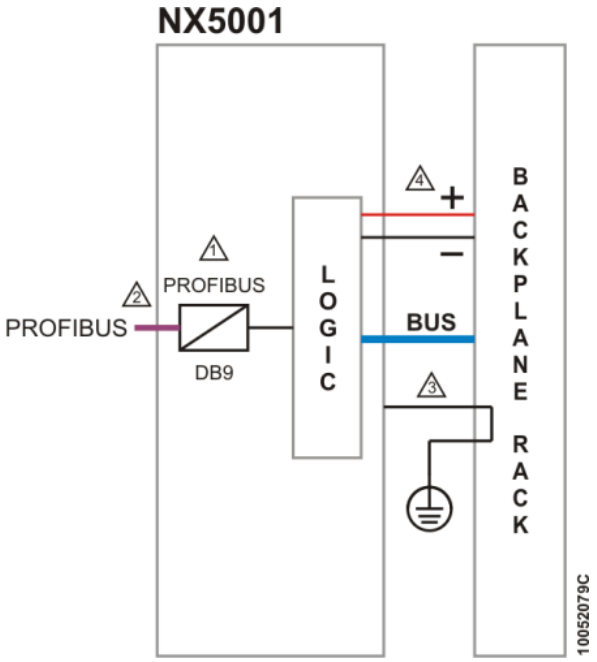


Figure 31: Electrical Diagram of PROFIBUS-DP Master NX5001

Diagram Notes:

1. Standard interface for connection to PROFIBUS networks. Pin 1 of DB9 connector is connected to the protection ground of the Nexto Series rack.
   Use the supplied AL-2303 cable for PROFIBUS network and one of the following connectors:
   - AL-2601 is a connector for PROFIBUS network without internal termination. It can be used to connect any PROFIBUS equipment in a position in which the termination is not required.
   - AL-2602 is a connector for PROFIBUS network with internal termination. It must be used in equipment located at the ends of the PROFIBUS network. Altus also offers a second option for networks where reliability and availability are the main requirements. For these cases, module AL-2605 should be used in each end of the network and all PROFIBUS modules should use unterminated connectors (AL-2601). More information about AL-2605 module can be found in the document CE104705. It is mandatory the use of two PROFIBUS network terminations. Each termination should be placed at each end of the network.
2.
3. Module is grounded through the rack of Nexto Series.
4. The NX5001 module is powered by the power supply connected to the same Nexto series rack not requiring external power source.

5.4. Electrical Installation of PROFIBUS Head PO5064

ATTENTION

ESD (Electro Static Discharge) sensitive device. Always touch a grounded metal object before handling the device.

The diagram shows 24 Vdc power supply wiring and PROFIBUS cable with PO5064/PO5065 module installed on PO6500 base. PO5064 PROFIBUS Head and PO5065 Redundant PROFIBUS Head User Manual must be consulted for further details.

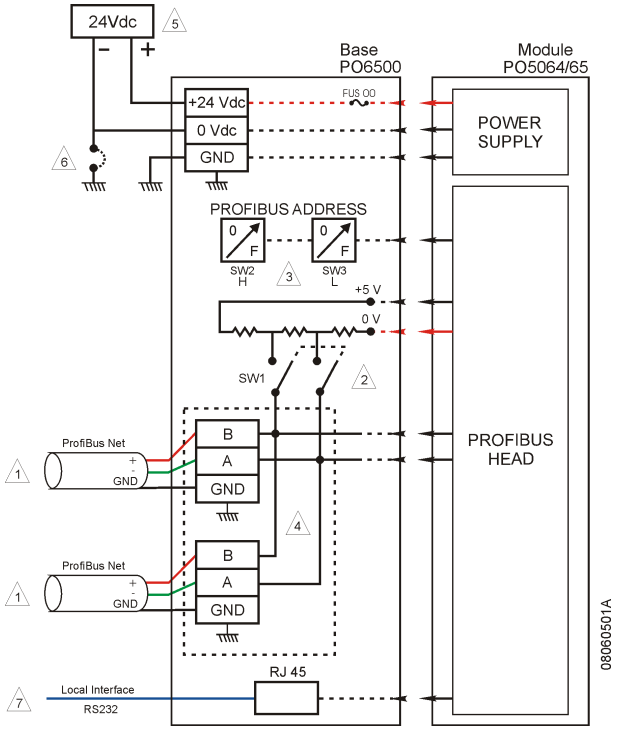


Figure 32: Electrical Diagram of PROFIBUS-DP Remote Head PO5064

Diagram Notes:

1. PROFIBUS fieldbus cables are directly connected to the terminal base identified by A and B and ground shielding.
2. If the head is the last element in a PROFIBUS fieldbus, SW1 key must be commuted to ON. Thus the terminal resistors demanded by field bus are added.
3. Two hexadecimal keys program the PO5064/65 PROFIBUS address. SW2 is the most significant digit.
4. PO6500 base has terminals for direct link of PROFIBUS cable and incorporates the impedance compensation circuit. Thus is not necessary to use special connectors like AL-2601 and AL-2602.
5. The power source of 24 Vdc is connected to terminals “+24 Vdc”, “0 Vdc” and grounding “G”.
6. The common point of the power source of modules (0 Vdc) must be turned on ground from electrical panel. This joining is not mandatory, but is recommended to minimize electric noise in an automation system.
7. RJ45-RS232C standard interface for connection of a local HMI.

5.5. PROFIBUS Network Installation

5.5.1. General Information

The PROFIBUS network should be installed in accordance to the EN 50170 Norm. The cable and the connectors used in the installation are provided by Altus:

- AL-2601: PROFIBUS Connector
- AL-2602: PROFIBUS Terminator Connector
- AL-2303: PROFIBUS Cable

Refer to the PROFIBUS Network manual for details about installation.

ATTENTION

Addressing errors on slave devices are difficult to identify. The PROFIBUS network cannot detect errors when two slaves have the same address and are separated by a few meters of network cable. It is recommended to thoroughly verify the addressing switches of each device before activating the network.

5.5.2. Parameterization

The remote head and modules parameterization is executed remotely with the configuration application for the PROFIBUS-DP or PROFIBUS-DPV1 master.

In the case of the Nexto PROFIBUS Master and the Ponto PROFIBUS Heads manufactured by Altus the configuration is made through the MasterTool IEC XE application. The remote head parameters are transmitted through the PROFIBUS-DP network, without the need for additional configuration.

The remote head parameters are described in their own User Manual and are related to the operation mode aspects like these:

- Modules hot-swapping
- Forcing I/O points values
- Safe state

The modules parameterization is described in their own Technical Characteristics documentation. For additional information about the modules parameterization, refer to the PROFIBUS Head PO5064 and Redundant PROFIBUS Head PO5065 User Manuals.

5.5.3. GSD File

All of the options of parameterization of the head and modules are defined in a standard PROFIBUS file named GSD. The GSD files of the Ponto Series PROFIBUS heads and of the PROFIBUS-DP Master NX5001 are already contained in the MasterTool IEC XE application. The GSD file for operation of the PO5064 PROFIBUS DPV1 head is the ALT_0BAF.GSD.

5.6. Installation of HART Devices

5.6.1. Analog Input Module PO1114 HART

ATTENTION

ESD (Electro Static Discharge) sensitive device. Always touch a grounded metallic object before handling the device.

PO1114 module installation must be done on a PO6001 base.

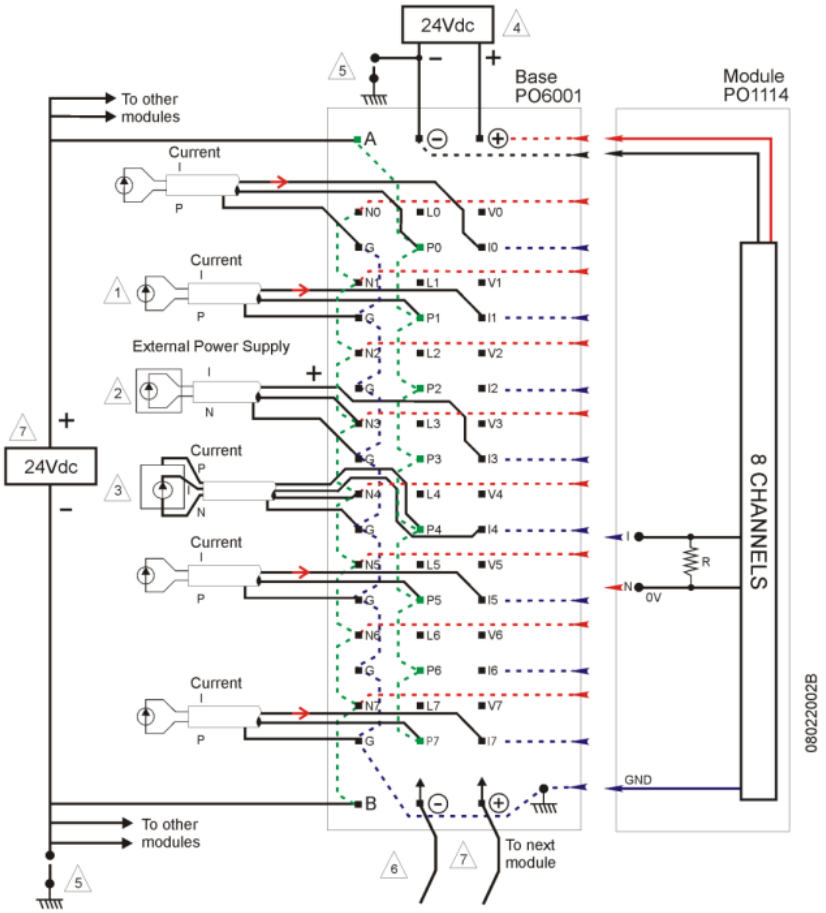


Figure 33: Electrical Diagram of Ponto Module PO1114

Diagram Notes:

1. This is the required connection for 2-wire current sensors – the sensor is powered by terminal P. The 24 Vdc power supply comes from terminal P. Current signal will be considered as positive when it comes in terminal I.
2. When using current sensors that require external power (four wires): the input signal is connected to terminal I and returns to sensor through terminal N.
3. Sensors that require 24 Vdc power supply can use the 24 Vdc voltage available in all P terminals. This is connected to the field power supply (7).
4. Electrical installation is done by feeding the module base with a 24 Vdc power supply. This connection is done via terminals marked by (+) and (-). This connection is mandatory, because it is the only way to supply power to the module.
5. The common point for the power supply (4) and the sensor (7) may be connected to the panel ground. This connection is not mandatory, but it is recommended in order to reduce electrical noise in automation systems.
6. The next module may be fed through the points (+) and (-) on this module base. The maximum number of module bases that may be connected in this way is 10. No other device can be connected to these terminal strips.
7. This power supply may provide 24 Vdc to feed the sensors. We recommend the use of a power supply different from the one indicated in the item (4), because, in case of a field short-circuit fail, the system will not fail and is capable to assist maintenance procedures through diagnostics messages.

5.6.2. Analog Output Module PO2134 HART

ATTENTION

This device is sensible to electrostatic discharge (ESD). Always touch a grounded metallic surface before handling this device.

PO2134 module installation must be done on a PO6001 base. The internal circuit is plotted in doted lines.

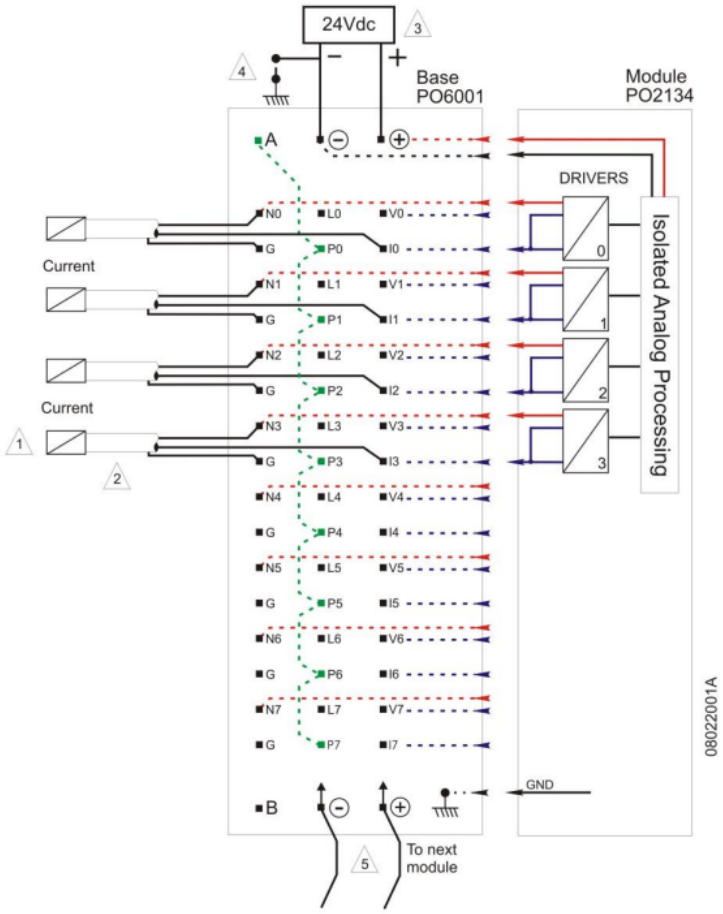


Figure 34: Electrical Diagram of Ponto Module PO2134

Diagram Notes:

1. IO, I1, I2, I3 are the four current analog output.
2. All signals must be connected through shielded cables with the shield grounded to the G terminal block. Both ends should not be grounded simultaneously.
3. Electrical installation is done by feeding the module base with a 24 Vdc power supply. This connection is done via terminals marked by (+) and (-). This connection is mandatory, because it is the only way to supply power to the module.
4. The common point for the power supply (3) may be connected to the panel ground. This connection is not mandatory, but it is recommended in order to reduce electric noise in automation systems.
5. The next module may be fed through the points (+) and (-) on this module base. The maximum number of module bases that may be connected in this way is 10. No other device can be connected to these terminal strips.

5.6.3. Analog Input Module NX6014 HART

ATTENTION

The device is sensitive to static electricity (ESD). Always touch in a metallic grounded object before handling it.

The Figure 35 shows an example using two inputs: input I0 and input I2. Each entry has a different connection, as explained below.

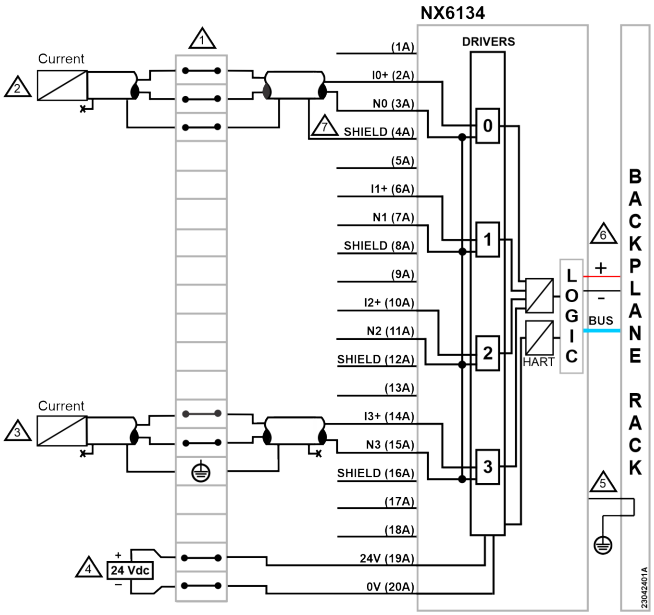


Figure 35: Electrical Diagram of Nexto Module NX6014

Diagram Notes:

The diagram above has the representation a set of terminal blocks where each symbol represents a different kind of terminal block: ⏤ represents a standard feed-through terminal block, ⏚ represents a grounding terminal block and ⏤ represents a feed-through terminal block with connection to other terminal block.

2 Input I0 is connected to a current output module, usually a transducer. This type of transducer, unlike the example above, uses the same pins for power supply and current output. In this case, only a 4 to 20 mA scale is possible.

3 Input I2 is connected to a current output module, usually a transducer. This type of transducer has different pins for power supply and current output.

4 There is a shield pin for each pair of analog inputs.

5 The NX6014 is connected to protective ground ⏚ through the backplane rack.

6 The module power supply is derived from the connection to the backplane rack, not requiring external connections.

⏚ Protective ground terminal.

5.6.4. Analog Output Module NX6134 HART

ATTENTION

The device is sensitive to static electricity (ESD). Always touch in a metallic grounded object before handling it.

The Figure 36 below shows an example using two outputs. All in current mode.

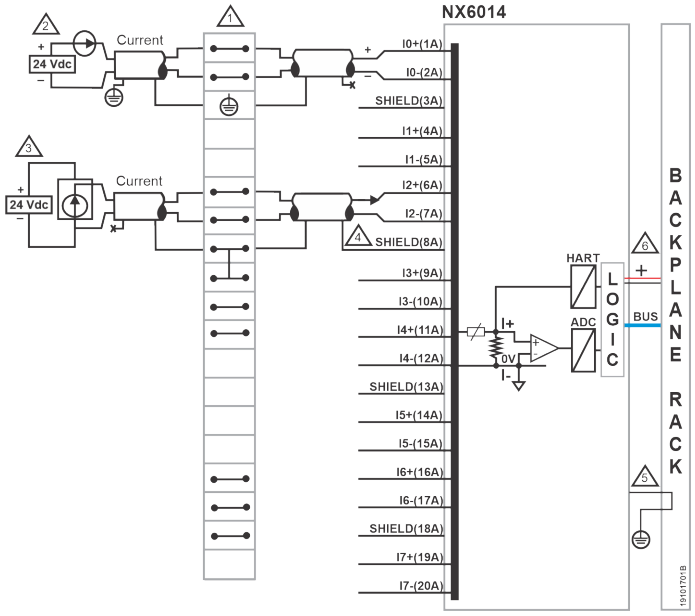
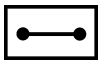
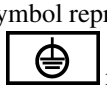


Figure 36: Electrical Diagram of Nexto Module NX6134

Diagram Notes:

1. The diagram above has the representation a set of terminal blocks where each symbol represents a different kind of terminal block:  represents a standard connection terminal block and  represents a grounding terminal block.
2. The current output mode uses the I and N pins. The shielded cable of output 00 is connected to the shield pin.
3. The current output mode uses the I and N pins. The shielded cable of output 03 is connected to the ground terminal block.
4. The external power supply is connected to pins 19A and 20A.
5. The module is connected to protective ground ⏚ through the backplane rack.
6. The module's power supply is derived from the connection to the rack and requires no external connections.

⏚ Protective ground terminal.

5.6.5. Smart Temperature Transmitter

To access the electrical terminals you must remove the ATT10 back cover. To do so, loose the screw that locks the cover and turn it clockwise.

The conduits through which the equipment's power supply cables pass must be mounted in such a way that avoids the possibility of water entering the electrical terminals. The conduits screw-threads must be sealed according to the norms required for the area. Any unused electrical connection must be sealed with adequate plug and seal.

The Figure 37 shows the power supply terminals (PWR BUS), the input connection terminals (1 to 4), the grounding terminals (one internal and one external), and the communication terminals. To supply power for the equipment it is recommended the use of certified PROFIBUS PA cables of type AWG18 with shield (capacitance < 30 pF).

The connection of the HART instrument to the PO1114 module can be done by using two wires as presented in the Diagram Notes of the electrical installation of PO1114. To make the connection of the NX6014 module you can use the information presented in the Diagram Notes for electrical installation of NX6014. The wires connected to "+" and "-" upper terminals of the HART instrument must be connected to the P and I terminals of the base. The correct base to use is the PO6001 and there is no need for any electrical load between the HART instrument and the power supply. The power supply and communication of the HART instrument is provided through the wires connected to the electrical terminals P and I.

For additional information about the HART instrument, please refer to the user manual of the specific device containing instructions, operations and maintenance details for the equipment.

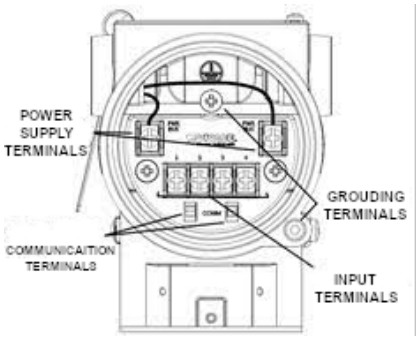


Figure 37: ATT10-PH Terminals

5.6.6. Smart Pressure Transmitter

To access the electrical terminals you must remove the APT10 back cover. To do so, loose the screw that locks the cover and turn it clockwise.

The conduits through which the equipment's power supply cables pass must be mounted in such a way that avoids the possibility of water entering the electrical terminals. The conduits screw-threads must be sealed according to the norms required for the area. Any unused electrical connection must be sealed with adequate plug and seal.

The Figure 38 shows the power supply terminals (PWR BUS 9 to 32 Vcc without polarity), the grounding terminals (one internal and one external), and the communication terminals for COMM PROFIBUS PA with configuration tool. To supply power for the equipment it is recommended the use of certified PROFIBUS PA cables of type AWG18 with shield (capacitance < 30 pF).

The connection of the HART instrument to the PO1114 module can be done by using two wires as presented in the Diagram Notes of the electrical installation of PO1114. To make the connection of the NX6014 module you can use the information presented in the Diagram Notes for electrical installation of NX6014. The wires connected to "+" and "-" upper terminals of the HART instrument must be connected to the P and I terminals of the base. The correct base to use is the PO6001 and there is no need for any electrical load between the HART instrument and the power supply. The power supply and communication of the HART instrument is provided through the wires connected to the electrical terminals P and I.

For additional information about the HART instrument, please refer to the user manual of the specific device containing instructions, operations and maintenance details for the equipment.

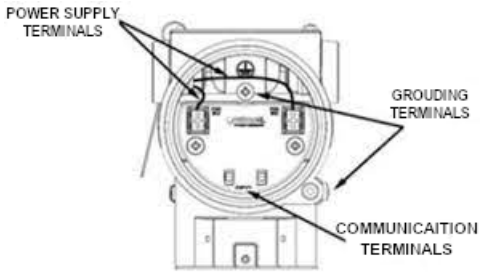


Figure 38: APT10 Terminals

5.6.7. Smart Valve Positioner

To access the electrical terminals you must remove the AVP10 blind cover (without screen). To do so, loose the screw that locks the cover and turn it clockwise.

The conduits through which the equipment's power supply cables pass must be mounted in such a way that avoids the possibility of water entering the electrical terminals. The conduits screw-threads must be sealed according to the norms required for the area. Any unused electrical connection must be sealed with adequate plug and seal.

The Figure 39 shows the power supply terminals, the grounding terminals (one internal and one external), and the communication terminals, 4-20 mA current return and tests of AVP10, standard HART version. The figure shows the terminals for the HART model with digital inputs and outputs (complete).

The Test and Communication Terminals allow to, respectively, measure the 4-20 mA current loop without opening it and communicate with the positioner. For measuring, connect the "-" and "+" terminals to a multimeter, using mA scale, between the "-" e "+" terminal of TEST.

The connection of the HART instrument to the PO2134 module can be done by using two wires as presented in the Diagram Notes of the electrical installation of PO2134. To make the connection of the NX6134 module you can use the information presented in the Diagram Notes for electrical installation of NX6134. The wires connected to "+" and "-" upper terminals of the HART instrument must be connected to the I and N terminals of the base. The correct base to use is the PO6001. The power supply and communication of the HART instrument is provided through the wires connected to the electrical terminals I and N.

For additional information about the HART instrument, please refer to the user manual of the specific device containing instructions, operations and maintenance details for the equipment.

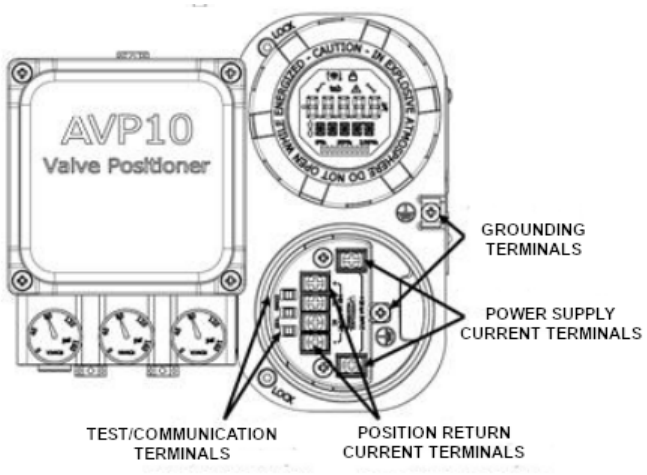


Figure 39: AVP10 Terminals

6. ArchiteX

This chapter shows how to use ArchiteX, the application developed by Altus for asset management, that can be used for maintenance, calibration and diagnostic of devices existent in architectures built and configured in the previous chapters.

Figure 40: ArchiteX Splash Page

6.1. Home Page

When ArchiteX is executed for the first time, a window is shown for inserting the application license.

Once the license is inserted, the user will be prompted with a question to update the DTMs catalog. If the catalog is not updated at this point, it will remain empty until the user executes the update catalog routine through the application menu. Whenever a new DTM library from Altus or other Vendors is installed in a computer, the catalog must be updated. Every DTM that will be used in projects must be installed in every computer where the ArchiteX clients will be executed.

The starting window of the application allows the user to create a new project or to open an existent one. It is also possible to update the license from there.

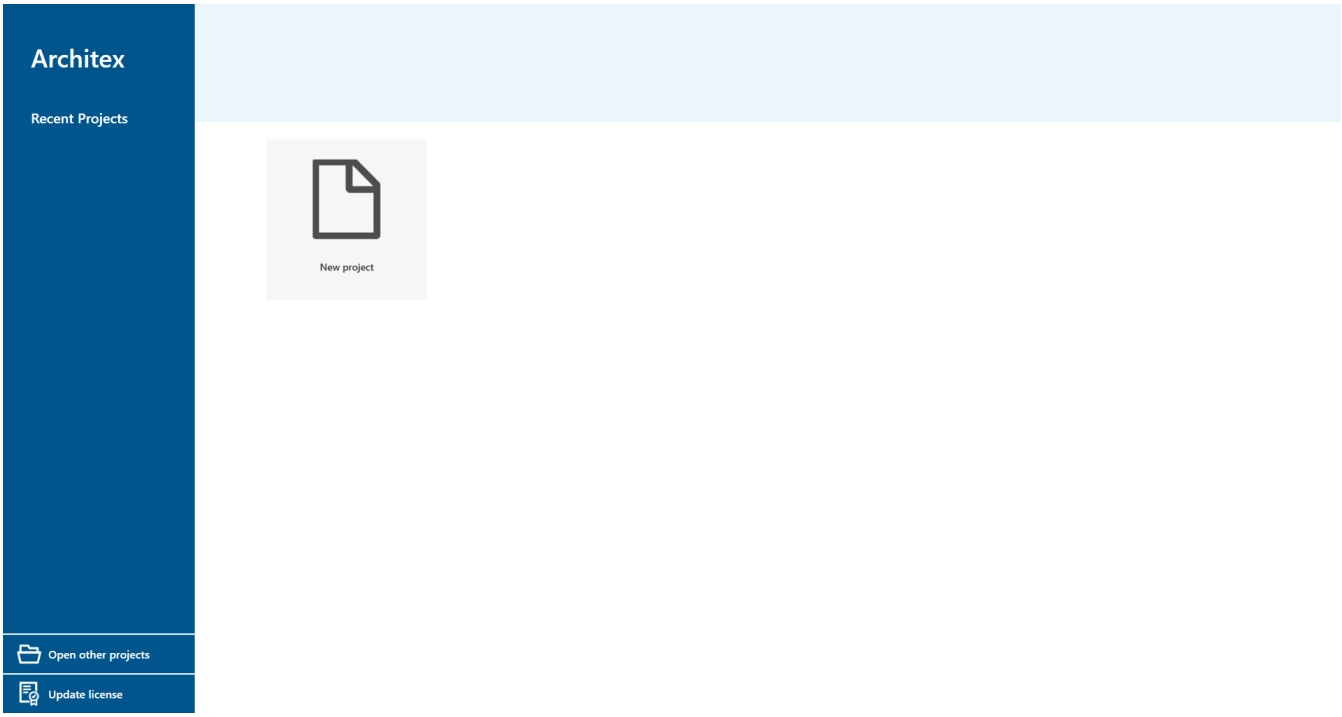


Figure 41: ArchiteX Starting Page

6.2. Application Menus

The application features are divided in multiple menus that can be accessed at the top of the user interface through tabs. The function of each menu will be described in this chapter.

6.2.1. Project

In the Project menu it is possible to create a new project, open an existent one and save the current project. In this tab it is also possible to alternate between the two saving modes:

- Local Connection: with this saving mode the project is saved in the Architex Projects folder within the user's documents folder;
- Server Connection: with this saving mode the project is saved in the database of a server.

When connected to a server, the option to synchronize the project also becomes available in this menu. This allows changes made to the project by another client, which have been saved on the server, to be imported into the open project. Before saving the project, the system always checks if it is synchronized with the project on the server. If it is not, synchronization is performed, importing all changes made by other clients on the project that were saved on the server.

Communication with the remote server can be configured in the Server Options menu. Section 6.5 describes these configurations.

6.2.2. Asset Management

This menu contains the main commands for usage of the asset management features. It is possible to choose the type of visualization, either a network topology of the devices in the hierarchy they are connected, or a of TAGs that shows the devices as a table allow for search of devices by TAG.

It is also possible to access in this tab the DTMs catalog that, once updated, shows all the DTMs installed in the user's computer, being them either the ones that were installed packed with the application or third-party DTMs installed by the user.

Configuration related to the asset management context can also be accessed in this menu. The options are opened in a side-docked menu, and consists, currently, only of the choice of topology items size: small, medium or large.

6.2.3. View

The View menu provides access to windows that are not directly related to the asset management usage context. As an example, the messages log can be accessed from this menu, showing to the user pieces of information reported by different parts of the application that can help in understanding operation problems.

In the mesage log screen, there is a text field and a severity filter that allow filtering of the log entries. The last 200 messages the fit the filter are shown in the list, but the complete log history can be accessed by saving the log in a text file, with the *Save log* button.

6.2.4. Topology, Operation and Functions

The Topology, Operation and Functions menus provide the commands for handling and interacting with the network topology and the devices present in the project. These tabs are explained with more details in section 6.4.

6.2.5. Help

The Help menu offers auxiliary commands for the user, which include updating the software license, online help (that leads you to the documentation present in Altus' website) and offline help (that opens this document).

6.3. Building a Topology

To be able to operate the devices it is necessary to first build the topology that will be used and that was assembled in the previous chapters. This process is detailed here and consists basically of adding the required DTMs for communication, configuring their parameters for connection and executing a network scan.

6.3.1. Adding DTMs From the Catalog

To add the required DTMs to the topology you must open the catalog in the Asset Management tab. If the catalog is not up-to-date, it is possible to use the update button that is available above the catalog.

For the first architecture the required DTM is the CommDTM PROFIBUS DP-V1, which represents the AL-2434 gateway. For the second architecture it is required to select the root element of the topology again and add the Nexto communication DTM.

The Figure 42 shows the DTMs catalog containing the communication DTMs required to start building the topology.

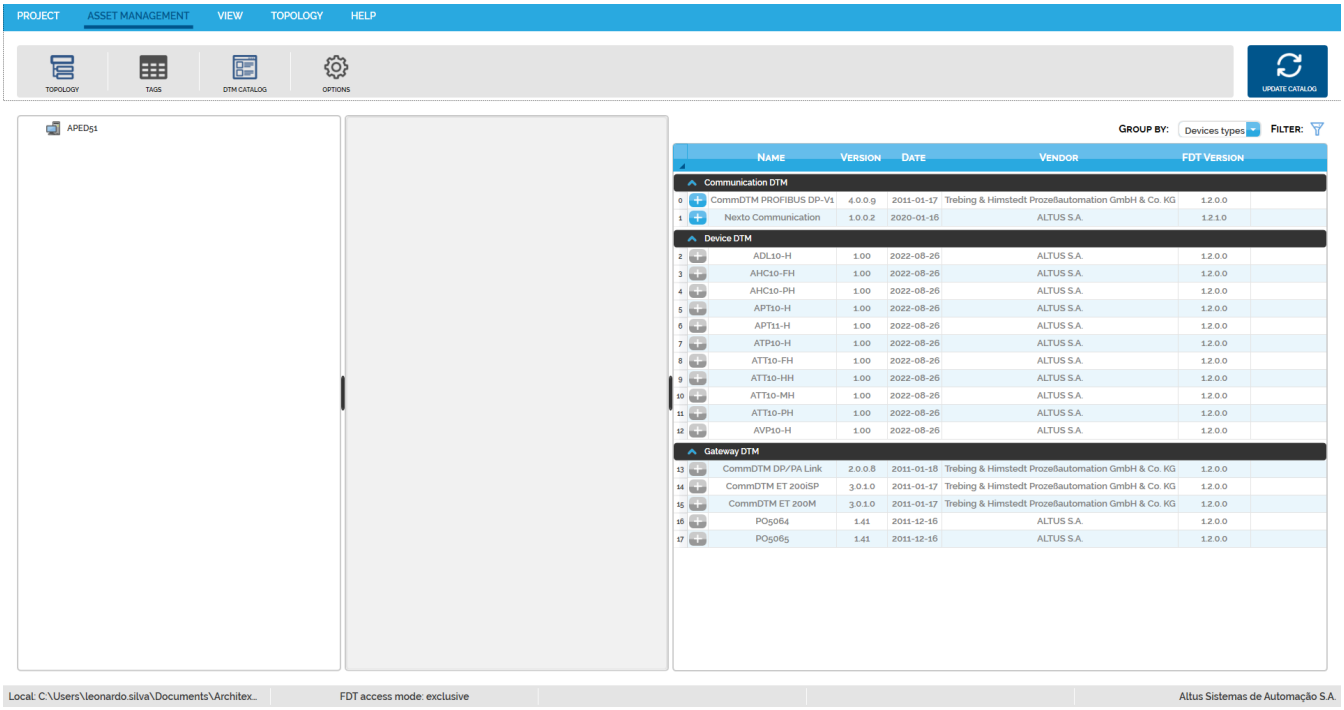


Figure 42: DTMs Catalog

6.3.2. Configuring AL-2434

To configure the DTM for AL-2434 for connection you should select and execute the function CONFIGURATION in the Functions tab. This will open an user interface at the center of the application.

Clicking the *Search* button will search the network for corresponding devices, making the addresses found available for selection. Between the devices found, the desired device should be selected. The parameters of the “Bus parameter” area must be configured accordingly to allow communication with the PROFIBUS network. The “Address” parameter must be an address that is not being used by another device (master or salve) in the network. The remaining parameters must be equivalent to what was configured for the PROFIBUS Class I Master (in the Altus products, this refers to the configuration of the NX5001 module). For example, in the architecture shown in this manual, the “Address” parameter must be configured with value 2, and the “Baud rate” with value 12 MBits/s. The values can change for different architectures.

Clicking OK will save the configuration and the device is ready to be connected.

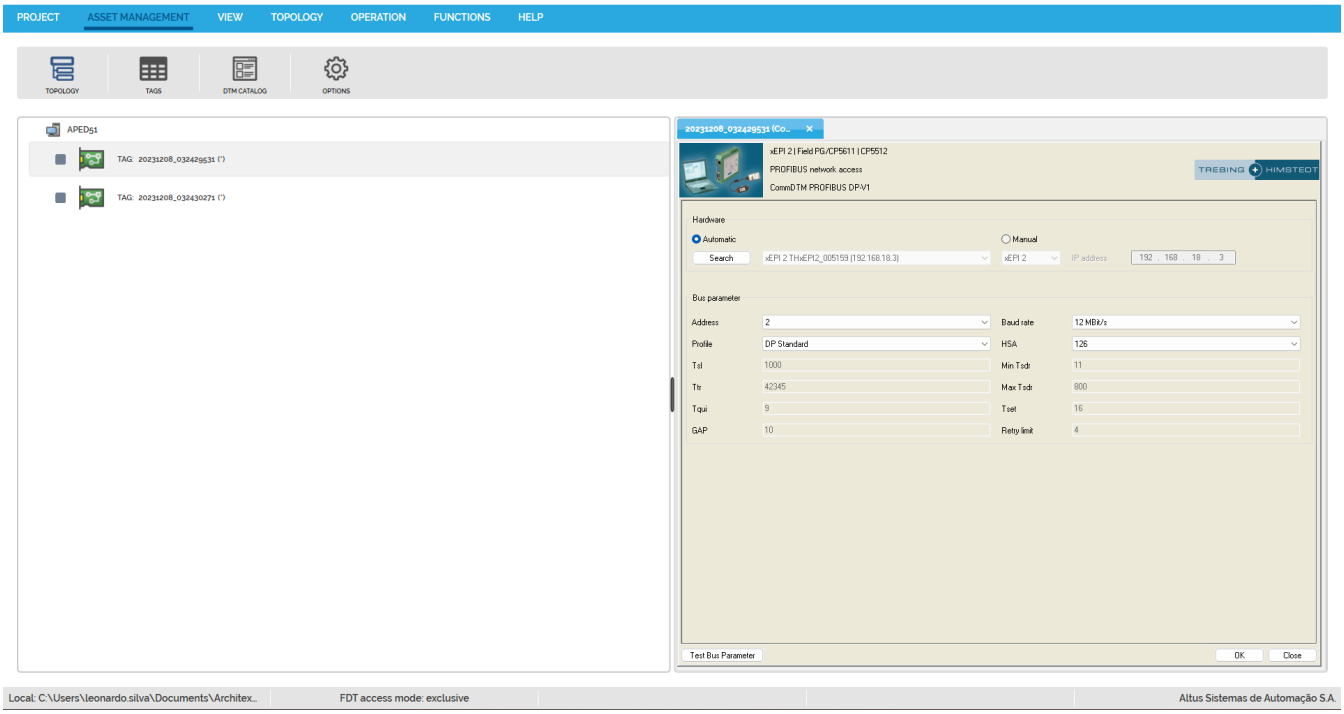


Figure 43: Configuration of the DTM for AL-2434

6.3.3. Configuring Nexto

To configure the Nexto DTM for connection you must select it and then execute the function OFFLINE PARAMETERS in the Functions tab. This will open an user interface in the center of the application.

The “IP Address” field must be configured with the IP the device you intend to connect occupies in the network and “Port” with the port it uses for communication. Clicking *OK* will save the configuration and the device is ready for connection.

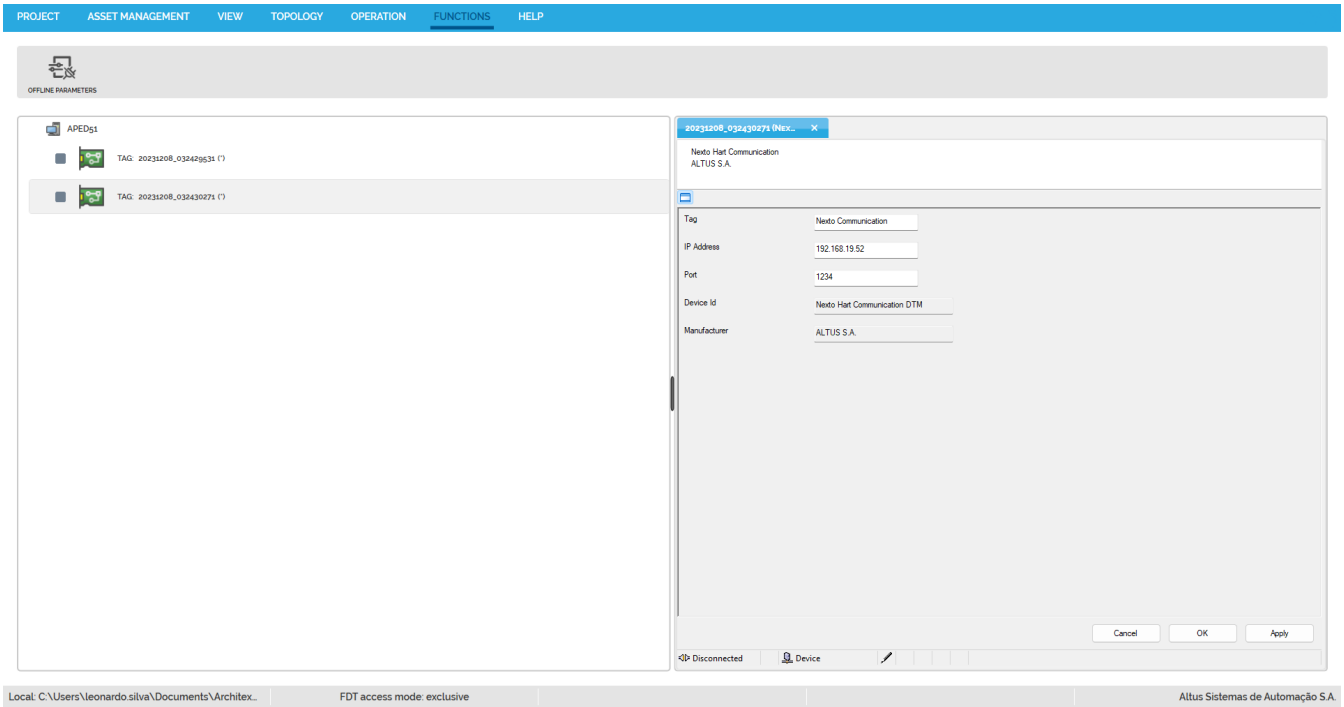


Figure 44: Configuration of the Nexto DTM

6.3.4. Executing a Network Scan

With the communication DTMs configured it is possible to execute a network scan to automatically add devices connected to them.

For the first architecture, selecting the DTM for AL-2434 and executing the command SCAN in the Topology tab will connect the device and start the scanning process. In the status region on the lower part of the window you can observe the progress of the operation and how many channels have already been scanned. In the case of the AL-2434 there is only one channel. It is also possible to see in the topology the DTM status icon is no longer gray, but a shade of orange which indicates that it is busy executing an operation.

When the operation finishes, a window is shown containing the results of the scan for each channel where a response was received, which can be seen in the Figure 45. Since the AL-2434 has only one channel, there should be only one tab, showing as result the PO5064 DTM. Clicking "Apply all selections" will add the DTM to the topology as a child of the AL-2434.

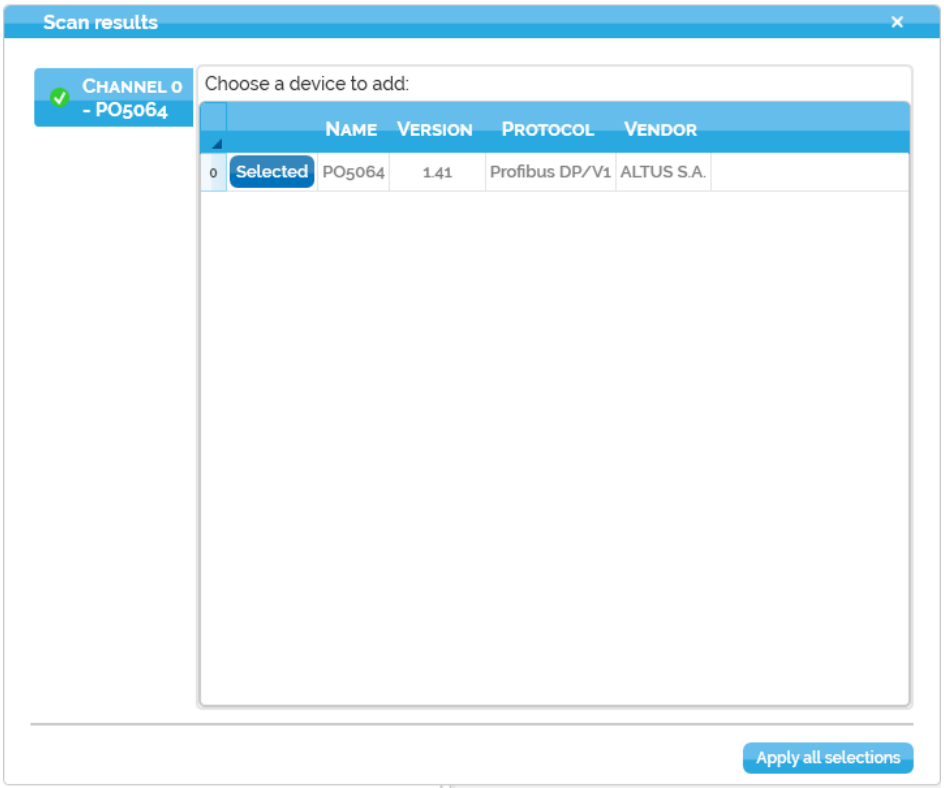


Figure 45: Scan Results for AL-2434

To continue building the topology you can select the PO5064 DTM in the topology an execute the scan operation again. The PO5064 has many channels, so it is possible to cancel the operation midway once the progress bar starts if you know that the channels where you have devices connected have already been scanned.

When the operation finishes the results window will be shown as in the previous case, but there will be more result tabs as shown in the Figure 46. It is important to validate the results of each channel because there are cases where more than one DTM is fully compatible with the device, and in this case they will be shown and the user should select the correct one. In the cases where the application cannot identify in the DTMs catalog a DTM compatible with the device, the whole list of DTMs in the catalog will be shown, but it is possible to not select any DTM in which case nothing will be added for that channel. Clicking *Apply all selections* will make all the DTMs currently selected in the results window to be added as children of the PO5064 in the identified channel.

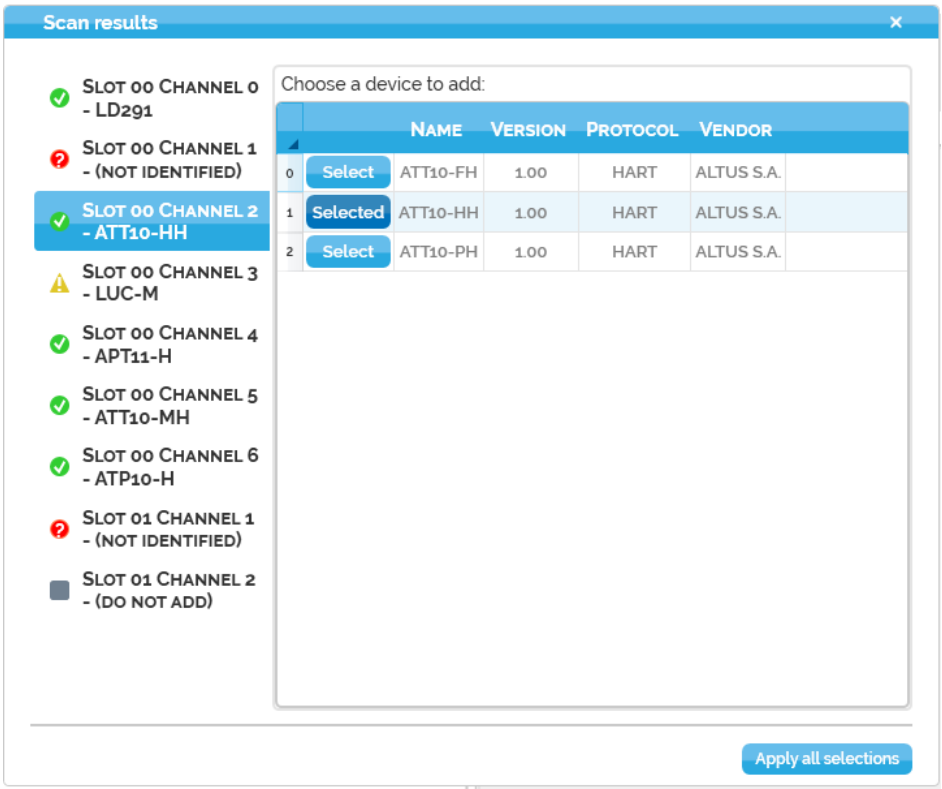


Figure 46: Scan Results for PO5064

For the second architecture we must execute the same process by starting from the Nexto DTM, but the devices will appear in the scan results window for the Nexto directly because there are no gateway DTMs in this architecture.

After executing the steps, it is possible to start operating the DTMs, which will be discussed in the next section.

6.4. Using the DTMs

After building the network topology with the DTMs as described in section 6.3, it is possible to execute the desired asset management operations such as: configuration, editing TAGs, download/upload.

This chapter will describe how to access and execute these operations.

6.4.1. Topology Operations

This menu presents the commands capable of modifying the network topology, they are commands that may cause changes to more than one DTM at a time.

Besides the *Scan*, previously discussed, the other topology operations are: *Delete*, *Edit Tag*, *Import* and *Export*.

The *Delete* function excludes the currently selected device and all its children devices from the network topology. To remove a device from the topology, it must be disconnected and its user interfaces should not be opened in the central area of the application.

The *Edit Tag* function allows the user to change the name that represents the DTM on the network topology. This tag is related only to the project, not having any relation to the tag defined internally in the device, which can be accessed and edited in DTM user interfaces, which may be different for each DTM.

The *Export* function can be used to create an .xml file containing all the devices in the topology in a standardized format. This file uses a format that is standard FDT xml and can be imported in other ArchiteX projects (as well as other FDT standard based applications that have the importing function available). While trying to export, if no device is selected in the network topology, the whole topology will be exported. If a device is selected, only the selected device and its children will be exported. A DTM can only be exported if it is disconnected.

The *Import* function can be used to load a .xml file containing a topology as long as the file is using the standard FDT xml format. While importing, if no device is selected, the topology will be added in the root item of the network topology. If a device is selected, the topology from the file will be added as a child of the selected device.

The imported topology must be compatible with the selected device for the importing process to work correctly. If the selected device contains more than one communication channel, the user will be prompted to selected the channel where to insert the child device.

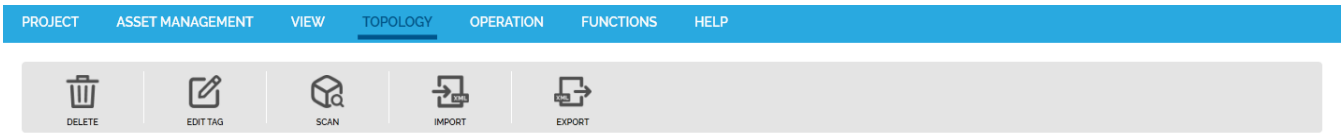


Figure 47: Topology Operations

6.4.2. DTM Operations

DTM operations are application commands that are executed directly by a single selected DTM. The DTM operations are: Connect, Disconnect, Upload and Download.

The commands for connecting and disconnecting give access to starting and stopping online operations by using the DTMs to connect to the physical devices. For a DTM to read and write information to the device it represents, it must first be connected. When a DTM tries to establish connection all its parent devices will automatically try to connect first. While a DTM is connected, the functions available to use may change allowing for different actions to be performed. Similar to the connection process, the moment a parent DTM is disconnected all its children devices will also be disconnected.

The upload and download commands allow for exchange of information between the physical device and the information saved in the project of the ArchiteX application. The upload will read parameters from the physical devices and save them to the project. The download will load parameters saved in the project and send them to the physical device represented by the DTM. The device must be connected to be able to execute these operations. Some DTMs allow these operations to be cancelled midway.

Figure 48: DTM Operations

6.4.3. DTM Functions

The DTM functions are commands executed by the DTM itself. Each DTM provides a group of function as defined by the vendors of each device, in which case it is important to highlight that the content of these tabs depends on the currently selected DTM. The vast majority of the functions opens a graphical interface, which will be added to the DTM user interfaces area at the center of the application. Some functions will provide DTM documentation through the opening of a PDF or another type of file. In a few cases these functions may also allow configuration by opening a webpage.

The default functions are defined by the FDT/DTM Specification and the DTMs may provide some of these or none of them. Some of these functions include: Offline Parameters, Online Parameters, Diagnostic, Simulation and Observe.

The Figure 49 shows an example of functions that may be available in the Functions tab.

Figure 49: DTM Functions

The Figure 50 shows an user interface of the Offline Parameters function of a DTM placed in the central area of the application. The DTM functions are the main way of interacting with the devices of the architecture.

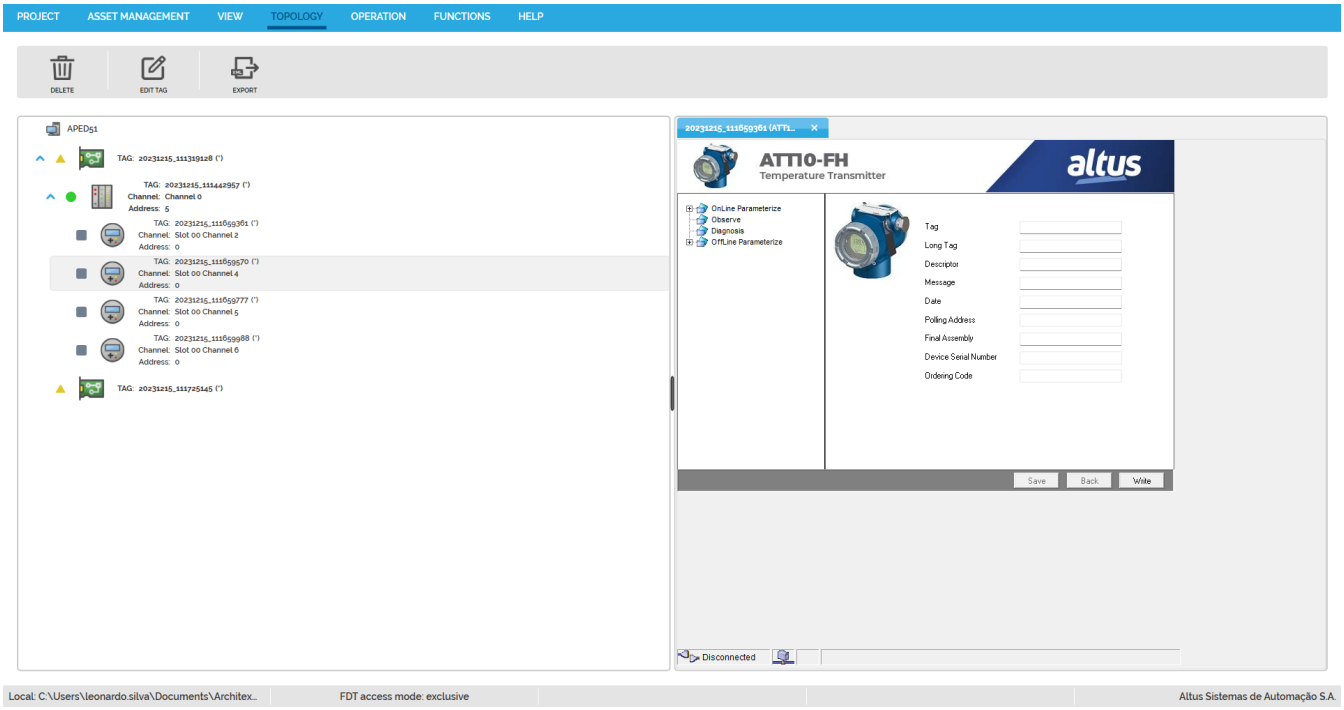


Figure 50: Offline Parameters function of a DTM

The additional functions do not follow a standard and are customized by each DTM vendor. They are presented in a context menu opened with the *Additional Functions* button on the Functions tab.

The Figure 51 shows an example of the functions that may be present in the Additional Functions.

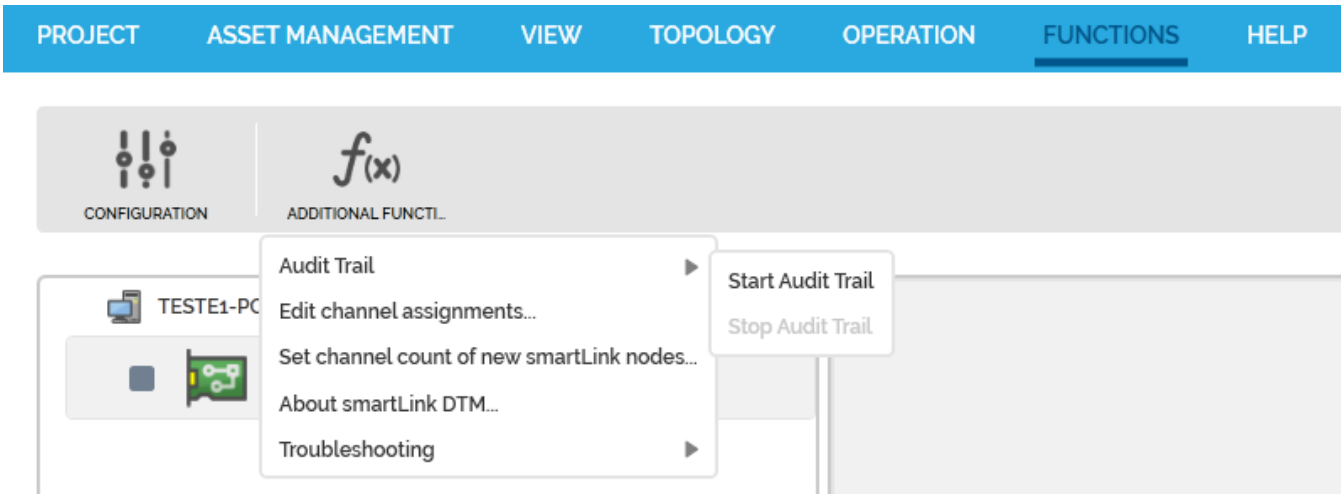


Figure 51: Additional Functions

6.5. Server Options

Saving projects on a server is a way to allow access to these projects from different machines. To indicate to ArchiteX which server to access, you can configure this connection through the Server Options menu. The settings include the IP

address, TCP port, and database username and password, as shown in Figure 52. The *Validate connection* button tests the entered settings and shows an icon next to the button indicating whether the connection to the server could be established. The *Save and connect* button saves the settings, whether valid or not, and then attempts to connect to the server.

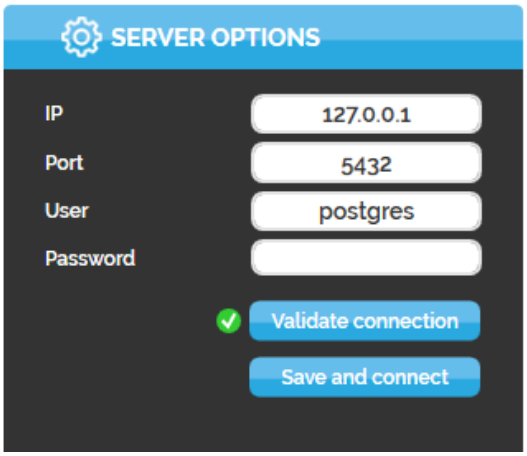


Figure 52: Server Options Parameters

By default, these settings point to a server on the local machine, created during the installation of ArchiteX. However, they can be directed to other machines with ArchiteX installed or with any machine with a PostgreSQL database configured, as described in Section 6.5.1.

ATTENTION

Make sure that the DTMs present in the projects are installed on all clients that access them, and that their catalogs are updated.

6.5.1. Server Configuration

For using the Server Connection mode, the ArchiteX installer sets up the PostgreSQL database on the machine, creating a local server. This feature can be used for pre-configuring a machine that will serve as a remote server. Alternatively, a server can be set up with just the installation of PostgreSQL and the necessary configurations.

For client machines to access this remote server, it is necessary to:

1. Authorize the client machines addresses in the remote server's file:
   `C:\Program Files (x86)\PostgreSQL\10\data\pg_hba.conf`;
2. Set up inbound and outbound firewall rules for connections on the port used by PostgreSQL (5432 by default);
3. Reinitialize the postgresql-10 windows service.

The default user and password combination is:

- User: postgres
- Password: Architex5432

It is recommended that the password is changed upon installation. To change the username and password, use pgAdmin 4 (PostgreSQL database management tool). Its documentation is available at https://www.pgadmin.org/.

ATTENTION

Check your company's network and cybersecurity policies to configure the server accordingly.

6.6. Making Backups

Backups can be used as a safety copy, or for transferring projects between different computers. In Architex projects, this can be achieved in different ways, depending on the particular reasons why a backup is needed.

6.6.1. Backup a project as a file

Use this option when an offline transfer to a different computer or an offline backup to an external drive is required.

1. Open the project you would like to backup;
2. If you are currently in Server Connection, in the Project menu, change to Local Connection;
3. Save the project;
4. Access the Architex Projects folder within the user's documents folder;
5. Copy the folder containing the project to another location on the computer or external drive where you wish to store it;
6. If you need to use the project in another computer, copy the project folder to the Architex Projects folder of the new computer;
7. Keep in mind that the project should always be contained in a folder with the same name of the .projarch file;

6.6.2. Backup a project to a server

Use this option when you want to backup an specific project to a remote server (this server may be different from the server you usually work on).

1. Set the server configuration (Section 6.5);
2. Open the project you would like to backup;
3. In the Project menu, change the Server Configurations to connect to the backup server;
4. Save the project;
5. Keep in mind that at this point, there will be two independent instances of the project: the original one and the one on the backup server, and changes made to one will not automatically reflect on the other.

6.6.3. Backup every project in a server

Use this option when you need a complete backup of all the projects available in a remote server. For this purpose, you can use pgAdmin (PostgreSQL database management tool) to create a backup of the complete database:

1. Access the machine that is running the server you would like to backup;
2. Open pgAdmin 4, which is installed along with PostgreSQL;
    - The first time it is run, you will need to set a password and specify the PostgreSQL Binary Path in the preferences as `C:\Program Files (x86)\PostgreSQL\10\bin`.
3. Right-click on the altus_architex_dbv2 database and select Backup;
4. Choose a name for the file;
5. Click Backup.

When you want to restore this database:

1. Access the machine where you would like to restore the backup;
2. Open pgAdmin 4;
3. Right-click on Databases and create a new database with the name altus_architex_dbv2;
4. Right-click on the new database and select Restore;
5. Choose the backup file;
6. Click Restore.

For additional details and options, refer to the tool's documentation at https://www.pgadmin.org/.

7. Appendix A

7.1. MasterTool IEC XE Installation

To install MasterTool IEC XE, you must execute the installer of version 3.52 or newer. Select the language preference. You can choose to create a shortcut in the Desktop and then proceed with the installation process.

Additional information regarding MasterTool IEC XE can be obtained in the user manual.

7.2. DTM Libraries Installation

To be able to build the network topology using the asset management software based on the FDT standard, it is first necessary to install the DTM for each equipment that is part of the network. The DTMs for Altus devices are already packed by default with the ArchiteX application. To install third-party DTMs you should execute the installer of the HART DTM libraries that can be found in the website of each specific manufacturer.

8. Appendix B

8.1. AL-2434 Configuration

The AL-2434 has an IP address pre-configured, so it is necessary to verify in the Technical Characteristics CE104634 the address configuration details for access through the browser.

For verification of the current parameters of the gateway, simply input the IP address in the browser.

In the Settings tab we can check the AL-2434 parameters. The values of the parameters can also be made in this tab, updating the configuration for one that matches your local network IP addresses values. The Figure 53 shows the page where the network configuration can be updated.

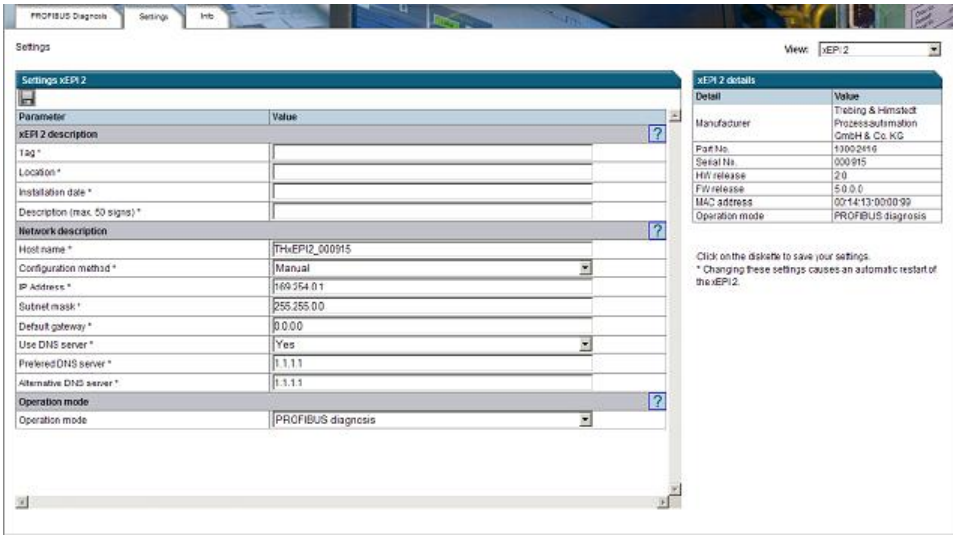


Figure 53: Configuration of AL-2434