# 1. Product Description

Nexto Series is a powerful and complete Programmable Logic Controller (PLC) with unique and innovative features. Due to its flexibility, smart design, enhanced diagnostics capabilities and modular architecture, Nexto is suitable for control systems ranging from medium to high-end large applications. Finally, its compact size, high density of points per module and superior performance, allow Nexto Series to be applied in small automation systems with high performance requirements, such as manufacturing applications and industrial machines.

The Series has a wide variety of CPUs, I/O and communication modules with features to fit requirements in different kinds of applications. The options available cover from standard automation systems, high-availability applications where redundancy is a major requirement, distributed applications to functional safety systems.

The NX5110 and NX5210 modules are devices of slave head type for PROFIBUS-DP networks, allowing the user to use all I/O modules of Nexto Series. Finally, Nexto Series has some innovative features for diagnostics and maintenance, such as Electronic Tag on Display, Easy Plug System and One Touch Diag.


Its main features are:

- PROFIBUS-DP protocol for communication of I/O data
- High communication speed (baud rate up to 12 Mbits/s)
- Compatible with any PROFIBUS-DP master equipment, following the standard EN 50170
- PROFIBUS-DP network addressing in the front
- Ability to use up to 22 I/O modules in a single rack
- Redundancy support (using two heads NX5210)
- Support hot swap (only NX5210)
- Support hot swap I/O modules
- Auto-parameterization and configuration of the I/O modules via PROFIBUS-DP master(class 1)
- Automatic baud rate detection
- Expansion I/O modules without the need to disable the network (hot expansion)
- Ethernet interface for firmware update
- Local advanced diagnostic service
- Diagnostics and states of local operation via LEDs and display
- One Touch Diag
- Free of moving parts (fans, coolers, etc.)

# 2. Ordering Information

## 2.1. Included Items

The product package contains the following items:

- NX5110 or NX5210 module
- 6-terminal block with fixing

## 2.2. Product Code

The following codes shall be used for product purchase:

| Code | Description |
|---|---|
| **NX5110** | PROFIBUS-DP Head |
| **NX5210** | PROFIBUS-DP Redundant Head |

Table 1: Module Names

# 3. Related Products

The following products must be acquired separately whenever necessary:

| Code | Description |
|---|---|
| **NX9010** | 8-Slot Backplane Rack (No Hot Swap) |
| **NX9000** | 8-Slot Backplane Rack |
| **NX9001** | 12-Slot Backplane Rack |
| **NX9002** | 16-Slot Backplane Rack |
| **NX9003** | 24-Slot Backplane Rack |
| **NX3004** | CPU, 1 Ethernet port, 1 serial channel, remote rack expansion support and power supply integrated |
| **NX3005** | CPU, 1 Ethernet port, 1 serial channel, remote rack expansion support, power supply integrated and user web pages support |
| **NX3010** | High-speed CPU, 1 Ethernet port, 2 serial channels, memory card interface and remote rack expansion support |
| **NX3020** | High-speed CPU, 2 Ethernet ports, 2 serial channels, memory card interface and remote rack expansion support |
| **NX3030** | High-speed CPU, 2 Ethernet ports, 2 serial channels, memory card interface, remote rack expansion and redundancy support |
| **NX9404** | 6-terminal connector with fixing |
| **AL-2601** | PROFIBUS Connector |
| **AL-2602** | PROFIBUS Terminator Connector |
| **AL-2605** | Terminator with Power Supply Diagnostic |
| **AL-2303** | PROFIBUS cable |
| **AL-2431** | FOCUS/ PROFIBUS Optical Repeater |
| **AL-2432** | FOCUS/ PROFIBUS Optical Repeater with Two Ports |
| **AL-2433** | PROFISwitch – Coupler for Redundant Profibus Network |
| **NX5001** | PROFIBUS-DP Master Module |
| **PO4053** | PROFIBUS-DP Master Interface |
| **AL3406** | PROFIBUS-DP Master Interface |
| **MT8500** | MasterTool IEC XE |

Table 2: Related Products

**Notes:**

**AL-2601:** The connector for PROFIBUS-DP network is a connector type DB9 with standardized pinout according to EN 50170 and without termination. It is suitable for connection to PROFIBUS-DP devices mounted on intermediate positions in the PROFIBUS-DP network, i.e. physically not mounted at the ends of the network. This connector has input and output connection of the cable network, enabling disconnection be done without disrupting the continuity of the physical network.

**AL-2602:** PROFIBUS-DP terminator connector is a connector type DB9 with standardized pinout according to EN 50170 and termination. It is suitable for connection to PROFIBUS-DP devices mounted on the ends of the physical network (beginning and end).

**AL-2605:** The terminator with diagnosis of font is used in the extremes of redundant networks, where is needed to make the exchange of devices without losing the endings.

**AL-2303:** Cable for data communication on PROFIBUS-DP network.

**AL-2431 and AL-2432:** Optical repeaters for interconnection between any PROFIBUS-DP equipment through optical fiber. The module AL-2432 has redundancy of optical transmission by adding increased availability to the system.

**AL-2433:** The AL-2433 adapter enables the interconnection between non-redundant PROFIBUS-DP slave devices in a redundant PROFIBUS-DP network with AL-3406, PO4053 or NX5001 masters.

**NX5001:** PROFIBUS-DP Master – Nexto Series.

**PO4053:** PROFIBUS-DP Master – Ponto Series.

**AL3406:** PROFIBUS-DP Master – AL Series.

**MT8500:** MasterTool IEC XE is available in four different versions: LITE, BASIC, PROFESSIONAL and ADVANCED. For more information, please consult the MasterTool IEC XE User Manual - MU299609.

# 4. Innovative Features

Nexto Series brings to the user many innovations regarding utilization, supervision and system maintenance. These features were developed focusing a new concept in industrial automation.

**One Touch Diag:** One Touch Diag is an exclusive feature that Nexto Series brings to PLCs. With this new concept, the user can check diagnostic information of any module present in the system directly on CPU's graphic display with one single press in the diagnostic switch of the respective module. OTD is a powerful diagnostic tool that can be used offline (without supervisor or programmer), reducing maintenance and commissioning times.

**ETD – Electronic Tag on Display:** Another exclusive feature that Nexto Series brings to PLCs is the Electronic Tag on Display. This new functionality brings the process of checking the tag names of any I/O pin or module used in the system directly to the CPU's graphic display. Along with this information, the user can check the description, as well. This feature is extremely useful during maintenance and troubleshooting procedures.

**DHW – Double Hardware Width:** Nexto Series modules were designed to save space in user cabinets or machines. For this reason, Nexto Series delivers two different module widths: Double Width (two backplane rack slots are required) and Single Width (only one backplane rack slot is required). This concept allows the use of compact I/O modules with a high-density of I/O points along with complex modules, like CPUs, fieldbus masters and power supply modules.

**iF Product Design Award 2012:** Nexto Series was the winner of iF Product Design Award 2012 in industry + skilled trades group. This award is recognized internationally as a seal of quality and excellence, considered the Oscars of the design in Europe..

# 5. Product Features

## 5.1. General Features

| | NX5110 | NX5210 |
|---|---|---|
| **Module Type** | PROFIBUS-DP Fieldbus Head | PROFIBUS-DP Fieldbus Redundant Head |
| **Communication Protocol** | PROFIBUS-DP, standard EN50170 | |
| **Sync/Freeze Support** | Yes | |
| **Backplane Rack Occupation** | 2 Sequential Positions | |
| **Maximum Number of Modules** | 22 | 20 |
| **Input Capacity** | 240 input bytes | 238 data bytes + 2 bytes regarding the head status |
| **Output Capacity** | 240 data bytes | 238 data bytes + 2 bytes of User Commands |
| **PROFIBUS-DP Baud Rate** | Automatic Baud rate detection from 9.6 to 12000 kbits/s | |
| **Ethernet Port Baud Rate** | 10/100 Mbps | |
| **Status and Diagnostics Indication** | Display, web page and LEDs | |
| **Network Redundancy Support** | No | Yes |
| **Hot Swap Support** | No | Yes |
| **I/O Hot Swap Support** | Yes | |
| **GSD File** | ALT_0EDD.GSD<br>ALNJ0EDD.GSD | ALT_0EDE.GSD |
| **One Touch Diag (OTD)** | Yes | |
| **Electronic Tag on Display (ETD)** | Yes | |
| **Standards and Certifications** | Standard PROFIBUS Europea EN 50170<br>IEC 61131-2:2003, chapter 8 and 11<br>CE – 2011/65/EU (RoHS), 2014/35/EU (LVD) and 2014/30/EU (EMC)<br>UL Listed - UL61010-1 (file E473496)<br>DNV Type Approval – DNV-CG-0339 (TAA000013D)<br>EAC - CU TR 004/2011 (LVD) and CU TR 020/2011 (EMC) | |
| **Isolation**<br>**PROFIBUS Interface to Logic**<br>**PROFIBUS Interface to Earth Protection** ⏚<br>**Logic to Earth Protection** ⏚ | <br>1000 Vac / 1 minute<br>1000 Vac / 1 minute<br>1250 Vac / 1 minute | |
| **Input Voltage** | 19.2 to 30 Vdc | |
| **Max Input Current (in-rush)** | 30 A | |
| **Max Input Current** | 1.4 A | |
| **Max Current Provided to the Bus** | 3 A | |
| **Dissipation** | 5 W | |
| **IP Level** | IP 20 | |
| **Operating Temperature** | 0 to 60 °C | |

| | NX5110 | NX5210 |
|---|---|---|
| **Storage Temperature** | -25 to 75 °C | |
| **Operation and Storage Relative Humidity** | 5 to 96 %, non-condensing | |
| **Conformal Coating** | Yes | |
| **Module dimensions (W x H x D)** | 36.00 x 114.63 x 115.30 mm | |
| **Package dimensions (W x H x D)** | 44.00 x 122.00 x 147.00 mm | |
| **Weight** | 200 g | |
| **Weight with Package** | 250 g | |

Table 3: General Features

**Notes:**

**Maximum Number of Modules:** The maximum number of modules is related to greater backplane rack available in Series Nexto, with 24 positions, two positions are occupied by the NX5110 module, allowing the use of a maximum of 22 modules in this frame. There are still other limits that are to be taken into consideration, such as the consumption of each I/O module and also the number of bytes of input and output that each module has. In this way, this limit may be reduced in the light of these other requirements.

**Input Capacity:** Each PROFIBUS-DP remote's ability to convey the master module the limit of 240 bytes of input, thus it is necessary to consult the user Manual of the Nexto PROFIBUS-DP Head-MU214608 the number of bytes of each module entry consumes. For example, the HSC NX1001 module (module NX1001 counter mode enabled) has 16 bytes of input.

**Output Capacity:** Each PROFIBUS-DP remote has the ability to receive the master module the limit of 240 bytes of output, thus it is necessary to consult the user Manual of the Nexto PROFIBUS-DP Head -MU214608 the number of bytes of each module output consumes. For example, the HSC NX1001 module (module NX1001 counter modes enabled) has 11 bytes of output.

**Baud rate:** The baud rate is detected in the following communication speeds: 9.6 kbits/s, 19.2 Kbit/s, 93.75 Kbit/s, 187.5 Kbit/s, 500 Kbit/s, 1500, 3000 Kbit/s Kbit/s Kbit/s 6000 and 12000 Kbit/s.

**Isolation:** In order to identify the different circuits and component sets that have isolation on the product, the term logic is the name given the internal interfaces as memories, and interfaces with the rack.

**Max Current Provided to the Bus:** The modules NX5110 and NX5210 have an integrated power supply that can provide to the bus 3 A of current to power the I/O modules.

**Conformal Coating:** The coating of electronic circuitry protects the internal parts of the product against humidity, dust and other harsh elements to electronic circuits.

**ATTENTION**

NX5110 and NX5210 modules don't have network terminations, therefore external terminator modules are necessary.

## 5.2. Power Supply

| | NX5110 | NX5210 |
|---|---|---|
| **Nominal Input Voltage** | 24 Vdc | |
| **Maximum Output Power** | 15 W | |
| **Maximum Output Current** | 3 A | |
| **Input Voltage** | 19.2 to 30 Vdc | |
| **Maximum Input Current (in-rush)** | 30 A | |
| **Maximum Input Current** | 1.4 A | |
| **Maximum input voltage interruption** | 10 ms | |
| **Isolation** | | |
| **Input to Output** | 1000 Vac / 1 minute | |
| **Input to Earth Protection** ⏚ | 1500 Vac / 1 minute | |
| **Input to Functional Earth** ⏚ | 1500 Vac / 1 minute | |
| **Wire Gauge** | 0.5 mm² | |
| **Reverse polarity protection** | Yes | |
| **Internal Resettable fuse** | Yes | |
| **Short circuit protection on the output** | Yes | |
| **Overcurrent Protection** | Yes | |

Table 4: Power Supply features

## 5.3. Diagnostics LEDs

PROFIBUS Heads NX5110 and NX5210 have an LED for diagnostics indication (LED DG) and an LED for watchdog event indication (LED WD).

## 5.4. I/O Capacity

### 5.4.1. NX5110

A remote PROFIBUS-DP, with the NX5110 module, has its limited capacity by the following values:

- total number of modules in the same backplane rack: 22
- maximum number of bytes to be transmitted over the network: 240 input bytes and 240 output bytes

### 5.4.2. NX5210

A remote PROFIBUS-DP, with the NX5210 module, has its limited capacity by the following values:

- total number of modules in the same backplane rack: 20
- maximum number of bytes to be transmitted over the network: 238 input bytes + 2 redundancy control bytes and 238 output bytes + 2 redundancy control bytes

### 5.4.3. I/O Modules

The maximum number of points depends on the type of points used. For example, the threshold for digital is 640 points (20 modules). But for analog the limit points are 96 points (12 modules). The maximum number of a mixed configuration is limited by the maximum number of total bytes, depending on the model of the PROFIBUS-DP head used. The density, in bytes, of the I/O modules can be seen below:

- 16 points digital modules: 2 bytes
- Digital module NX1001 in HSC mode: 16 input bytes and 11 output bytes

- Digital Module NX1005 in HSC mode: 15 input bytes and 12 output bytes
- 8 points Analog Modules: 16 bytes

For further details see the User Manual of Nexto PROFIBUS-DP Head (MU214608)

**ATTENTION**

It is not allowed use Nexto and Nexto Jet modules on the same rack. The Nexto Jet modules are not available to be used together with the PROFIBUS-DP redundant head, or in other words, the NX5210 interfaces not support the Nexto Jet modules.

## 5.5. Integrated Power Supply Capacity

NX5110 and NX5220 heads have integrated power supply with a maximum current capacity of 3 amps. This feature allows feed I/O modules without the need for additional modules on bus. However, you should consult the consumption of each I/O module in their respective technical specifications (CEs) to the proper system configuration.

In the redundant head NX5210, the fact of existing source redundancy does not increase the ability of bus modules.

## 5.6. System Settings

### 5.6.1. Architecture A: Simple PROFIBUS-DP Network

The PROFIBUS-DP network configuration allows simple connection between a master and slave devices through a single network. The following figure illustrates this connection by using Nexto Series PROFIBUS-DP Master NX5001, however, this same link can be applied with other PROFIBUS-DP master.

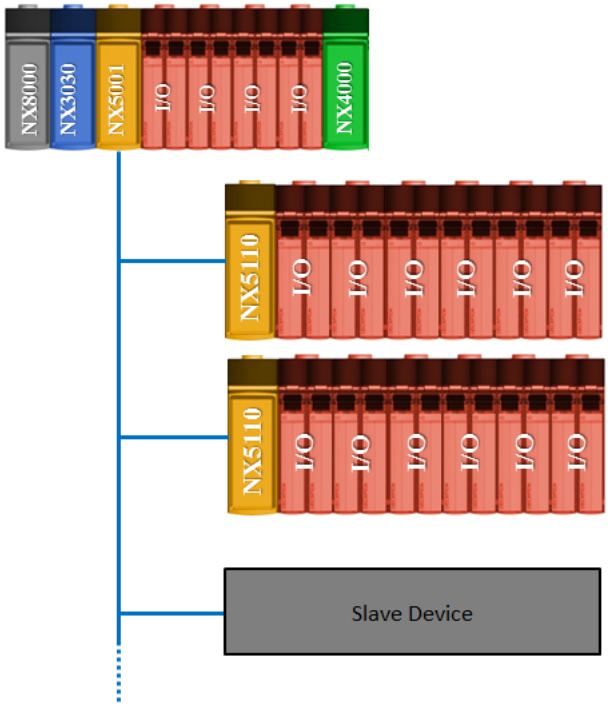


Figure 1: Simple PROFIBUS-DP Architecture

### 5.6.2. Architecture B: Redundant PROFIBUS-DP Network

The redundant PROFIBUS-DP network configuration allows maintaining the redundant system operating even occurring a failure in a redundant slave's head, interruption in data transmission or line failure in one of the Master Interfaces. This type of configuration consists of a CPU connected to two PROFIBUS-DP Master Interfaces (NX5001). These interfaces make up networks A and B, each with their heads NX5210. In the example below the bus consists of a CPU NX3030 and two Nexto PROFIBUS-DP NX5001 Masters.

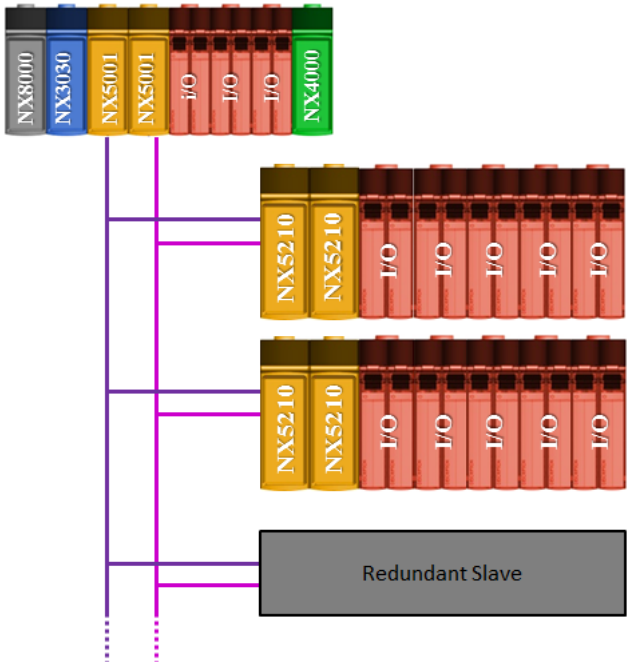


Figure 2: Redundant PROFIBUS-DP Architecture

### 5.6.3. Architecture C: Redundant PROFIBUS-DP Network with Master's Redundancy

This architecture keeps the operation of the system even in a failure of a redundant slave's head, a disruption of data transmission lines, in one of the Interfaces or in one of the masters. This type of configuration consists of two Master's PLCs, each connected to two Master PROFIBUS-DP Interfaces. In the example presented each CPU is composed of a NX3030 and two Nexto PROFIBUS-DP NX5001 Masters.

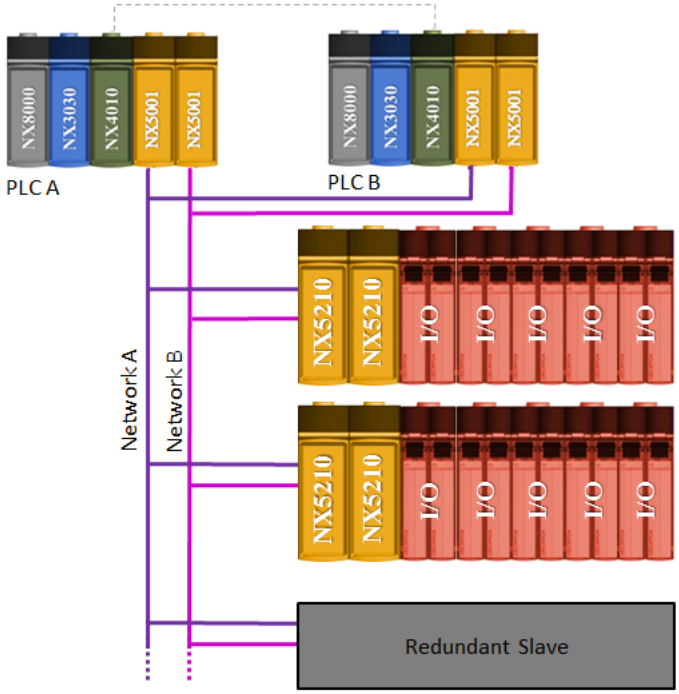


Figure 3: Redundant PROFIBUS-DP Architecture with Half-Cluster Redundancy

## 5.7. Software Features

The Nexto Series brings to the user the MasterTool IEC XE, a powerful tool that provides a complete interface for programming of all modules of Nexto Series. This means that there is no need for other software to perform the configuration of the PROFIBUS-DP Slave. All configurations are done in the same software used for programming the Nexto Series CPUs.

Another important point is that all the parameterization of PROFIBUS-DP Slave is sent to the NX5001 module through the Nexto Series CPU, not needing special cables to the module's configuration.

## 5.8. Compatibility with Other Products

### 5.8.1. NX5110

The following table provides information concerning the compatibility between the NX5110 module with the programming tool IEC MasterTool XE and other Nexto Series Modules.

| NX5110 | | | Compatible Software Version | |
|---|---|---|---|---|
| **Version** | **Revision** | **Features** | **NX5001** | **MasterTool IEC XE** |
| 1.0.0.0 | AA | - | 1.2.0.0 or higher | 2.01 or higher |
| 1.1.0.0 or higher | AB | Nexto Jet modules support NJ1001, NJ2001, NJ6000, NJ6020 e NJ6100 | | 2.03 or higher |

Table 5: Compatibility with Other Products NX5110

#### 5.8.2. NX5210

The following table provides information concerning the compatibility between the NX5210 module with the programming tool IEC MasterTool XE and other Nexto Series Modules.

| NX5210 | | | Compatible Software Version | |
|---|---|---|---|---|
| **Version** | **Revision** | **Features** | **NX5001** | **MasterTool IEC XE** |
| 1.0.0.0 | AA | - | 1.2.0.0 or higher | 2.01 or higher |

Table 6: Compatibility with Other Products NX5210

## 5.9. Redundancy Capacity

NX5210 head has the ability to be linked to other NX5210, share the same I/O modules, forming a redundant System which provides greater reliability to the fieldbus network. The redundant system implemented is the Altus redundancy System, based on the European standard of PROFIBUS-DP Redundancy.

## 5.10. Altus Redundancy System Implementation

The redundancy system consists basically of two fieldbus network heads NX5210 connected via backplane rack of Nexto Series I/O modules. These heads are each connected in a Master PROFIBUS-DP interface. One of these heads, called Active is responsible for reading and writing in input and output modules. The other head, called Standby, has the function of monitoring. When the Active Head, presents some problem, the Standby head takes over the control of Nexto Series backplane rack, without any damage to the application being executed.

The redundancy system has the following features (according to PROFIBUS-DP Redundancy Standard):

- NX5210 modules can be connected individually on PROFIBUS-DP networks. In this case, the modules must have the same network address
- The redundancy system can be implemented by masters who do not possess the characteristics of redundancy. For this it is necessary that the application on CPU to implement redundancy algorithm described in the Nexto Head PROFIBUS-DP User Manual
- The redundancy system can be implemented with a master that suits the way of implementation of the NX5210 module (NX5001 PROFIBUS-DP Master for example)
- Redundancy informations are controlled by a virtual module and accessed by master in the same way as an ordinary I/O module
- The Standby Head is identified in the display
- An expansion can be made of nodes/modules without disabling the PROFIBUS-DP network (Hot-expansibility) through the redundancy system
- Owns a security state that sustains the parameterizable time outputs if the redundancy system has no communication with the Master
- Allows hot swap of any of the NX5210 heads without affecting the application. This operation is possible provided that the two heads are in Active or Standby status, respectively
- Through master's commands it is possible to request the return of Active/standby state (switchover) to redundant system

## 5.11. Physical Dimensions

Dimensions in mm.

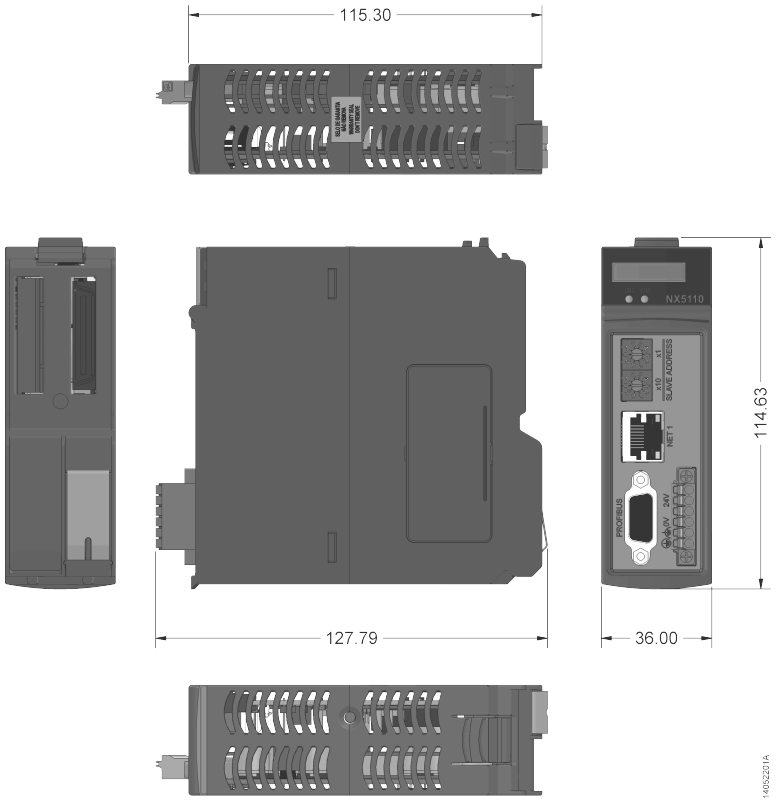


Figure 4: NX5x10 Physical Dimensions

# 6. Installation

For the correct installation of this product, it is necessary to use a rack (backplane rack) and it must be carried out according to the mechanical and electrical installation instructions that follow.

## 6.1. Product Identification

This product has some parts that must be observed before installation and use. The following figure identifies each of these parts.

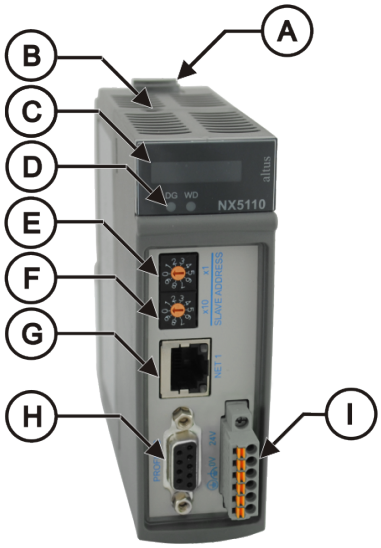


Figure 5: NX5110/NX5210

Ⓐ Fixing lock.
Ⓑ Diagnostic switch.
Ⓒ Status and diagnostic display.
Ⓓ Diagnostic and watchdog LEDs.
Ⓔ Slave address switch, least significant digit.
Ⓕ Slave address switch, most significant digit.
Ⓖ RJ45 connector for Ethernet communication.
Ⓗ Female DB9 connector for PROFIBUS fieldbus.
Ⓘ Connector for power supply.

The product has in its mechanics a label that identifies it and in it are presented some symbols whose meaning is described below:

⚠ Attention! Before using the equipment and installing, read the documentation.

⎓ Direct Current.

## 6.2. Electrical Installation

**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.

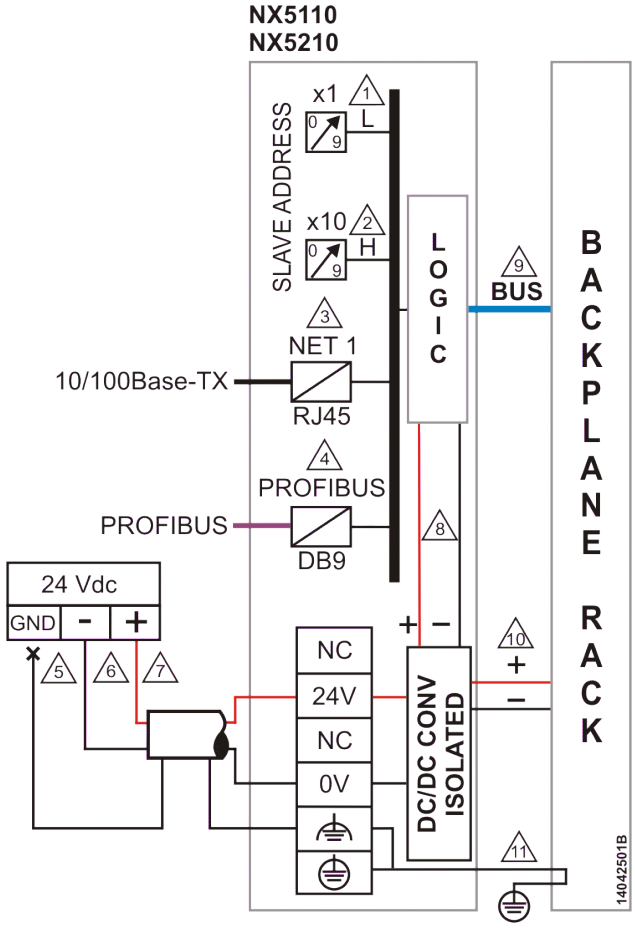


Figure 6: Electrical Diagram

**Diagram Notes:**

**1, 2** - The address of the PROFIBUS-DP Slave is set by key x1 and x10 so that the unit is set in the key x1 and the ten is set in the key x10. As an example, the rack with address 15 must have 5 in x1 and 1 in x10.

**3** - Standard Ethernet interface 10/100Base-TX to access the Diagnostics and Firmware update through Web page.

**4** - Use the cable AL-2303 for PROFIBUS-DP fieldbus network and one of the following connectors:

- AL-2601 is a connector for PROFIBUS-DP fieldbus network without internal termination. It can be used to connect any PROFIBUS-DP equipment in a position in which the termination is not required.
- AL-2602 is a connector for PROFIBUS-DP fieldbus network with internal termination. It should be used on PROFIBUS-DP equipment located at the ends of the fieldbus network.
  Altus also offers a second option for requirements where reliability and availability are key requirements. For these cases a connector AL-2605 should be used at each end of the field network and all modules PROFIBUS-DP without internal termination connectors should be used with AL-2601. More information about the AL-2605 module can be found in document CE104705.

The use of two network PROFIBUS-DP terminations is obligatory. Each termination should be positioned at each end of the fieldbus.

**5** - The grounding from the external power source is connected to the terminal ⏚. Use cables from 0.5 to 1.0 mm².

**6** - The power supply is connected to terminal 0 V. Use 0.5 mm² cables. For further information on the connector's usage, please refer to the Nexto Series User Manual- MU214600.

**7** - The power supply is connected to terminal 24 V. Use 0.5 mm² cables. For further information on the connector's usage, please refer to the Nexto Series User Manual- MU214600.

**8** - The power supply feeds the internal circuit directly.

**9** - Local data bus.

**10** - The module feeds the other modules of the Nexto Series through rack connection.

**11** - The grounding of the module is done via the Nexto Series rack.

## 6.3. Mechanical and Electrical Assembly

The mechanical assembly of this module is described in Nexto Series User Manual - MU214600. The NX5110 module must be installed at the slot 0. The NX5210 module must be placed side by side at the slot 0 and 2. The modules must be added at the device tree below a PROFIBUS-DP Master.

**ATTENTION**

Products with broken warranty seal are not covered in warranty.

**CAUTION**

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

**DANGER**

Nexto Series can operate with voltage up to 250 Vac. Special care must be taken during the installation, which should only be done by qualified technical personnel. Do not touch on the wiring field when in operation.

## 6.4. Protection Circuit

For further information, consult the *"Lightining Protection"* section of the Nexto Series User Manual - MU214600.

**ATTENTION**

Atmospheric discharges (thunders) may cause damages to the product although its protections. Additional protections should be used if the product's power comes from a power supply located outside the panel where it is installed because it could be vulnerable to this kind of discharges. If the field wiring of the output points is susceptible to this kind of discharge, surge suppressors should be used.

## 6.5. Parametrization

The parameterization of the head and the connected modules is made by the PROFIBUS-DP master. The parameters of the head are transmitted via the PROFIBUS-DP network, without the need for additional configuration.

The parameters of the head are described in its Manual.

The parameterization of the modules is described in the CEs.

## 6.6. GSD File

All head's configurable options and the modules are defined in a file named PROFIBUS-DP GSD standard. This file follows the programmer MasterTool IEC XE.

To use the head with other master manufacturers the files can be obtained at www.altus.com.br or with the support of Altus.

# 7. Maintenance

Altus recommends that all modules' connections be checked and that all dust or any kind of dirt located at the module's enclosure be removed at least every 6 months.

The NX5110 and NX5210 modules offer four important features to assist the user during maintenance: One Touch Diag, Diagnostics and Status Indicators and Diagnostics mapped in internal memory.

## 7.1. One Touch Diag

One Touch Diag is an important feature that allows the user the option of checking diagnostics related to a given module directly on the Head's graphic display.

One Touch Diag is a user-friendly feature. To check the diagnosis of a given module, a short press (less than 1 second) on the diagnosis button is enough. After one press the Head will show the module diagnostics.

More information about One Touch Diag can be found at Nexto Series User Manual – MU214600.

## 7.2. Status and diagnostic Indicators

The modules NX5110 and NX5210 have graphical display containing status and information of interest to the user, such as: operating mode of the interface with network redundancy enabled, IP address of the Ethernet interface, Sync mode indication and/or Freeze. Additionally, it also provides Diagnostics related to interface and PROFIBUS-DP network LED DG. A second LED is used to indicate the occurrence of watchdog (WD LED).

### 7.2.1. DG (Diagnostic)

| Green | Red | Description | Causes | Priority |
|---|---|---|---|---|
| ON | OFF | Cyclic data are exchanged with the master. | Communication with PROFIBUS-DP master has been established. | 5 (Low) |
| Blink 2x | OFF | Modules in the bus with diagnostics. | Some module, including the Head, has an active diagnostic. | 4 |
| Blink 4x | OFF | No configuration. | - PROFIBUS-DP master still hasn't sent the parameterization and configuration | 3 |
| OFF | PBlink 1x | Configuration Error or Hardware Error. | Configuration/Parameterization Error. See the diagnostics structure. | 2 |
| OFF | ON | No activity in the PROFIBUS network. | - Defective PROFIBUS-DP network cable.<br>- Disconnected PROFIBUS-DP network cable.<br>- Error in PROFIBUS-DP termination | 1 |
| OFF | OFF | Hardware Error in the Head. | - Fatal hardware fault.<br>- Memory error in PROFIBUS-DP coprocessor. | 0 (High) |

Table 7: DG LED Diagnostics

#### 7.2.2. WD (WatchDog)

| Green | Red | Description | Causes | Priority |
|---|---|---|---|---|
| OFF | OFF | No watchdog indication | Normal operation | 3 (Low) |
| OFF | Blink 1x | Software watchdog | Software watchdog | 2 |
| OFF | ON | Hardware watchdog | Damaged Module | 1 (High) |

Table 8: WD LED Diagnostics

**Notes:**

**Software Watchdog:** To remove the watchdog application, the device must be reset. This watchdog happens when the PROFIBUS-DP execution time is larger than the watchdog configured time.

**Hardware Watchdog:** In order to reset any watchdog indication, as in the WD LED or in the tDetailed.Reset.bWatchdogReset variable, the module must be disconnected from the power supply.

## 7.3. Graphical Display

The NX5110 and NX5210 Nexto Series modules have a graphical display used to show the status and diagnostic system, including the additional module-specific Diagnostics that supports this feature. More information about how to use the graphical display can be found in the User Manual of Nexto PROFIBUS-DP Head MU214608.

## 7.4. Diagnostics via Variables

All diagnoses of the modules NX5110 and NX5210 can be accessed through variables that can be manipulated by the user or application even forwarded to a supervisory using a communication channel. There are two different ways to access the user application Diagnostics: using the AT in symbolic variables or variables of direct representation. Altus recommends the use of symbolic variables. More information on how to access the Diagnostics through variables can be found in your User Manual for the PROFIBUS-DP Head Nexto MU214608.

# 8. Manuals

For further technical details, configuration, installation and programming of Nexto Series 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 |
|---|---|---|
| **CE114000** | Nexto Series – Technical Characteristics | English |
| **CT114000** | Série Nexto – Características Técnicas | Portuguese |
| **CS114000** | Serie Nexto – Características Técnicas | Spanish |
| **MU214600** | Nexto Series User Manual | English |
| **MU214000** | Manual de Utilização Série Nexto | Portuguese |
| **MU214608** | Nexto PROFIBUS-DP Head Utilization Manual | English |
| **MU214108** | Manual de Utilização da Cabeça PROFIBUS-DP Nexto | Portuguese |
| **MU214601** | NX5001 PROFIBUS DP Master User Manual | English |
| **MU214001** | Manual de Utilização Mestre PROFIBUS-DP NX5001 | Portuguese |
| **MU299609** | MasterTool IEC XE User Manual | English |
| **MU299048** | Manual de Utilização MasterTool IEC XE | Portuguese |
| **MU299026** | Manual de Utilização da Rede PROFIBUS | Portuguese |
| **MU204631** | Manual de Utilização do Repetidor Ótico/FOCUS PROFIBUS | Portuguese |

Table 9: Related documents

# 9. Adherence to PROFIBUS-DP Redundancy Standard

The Altus Redundancy System is based on PROFIBUS-DP Slave Redundancy Standard (reference below).

The Altus Redundancy system respects the most significant items of the standard cited below:

- 2 PROFIBUS-DP connections
- 2 interfaces communicating PROFIBUS-DP independents
- 1 redundancy channel for communication. A single redundant system implementation for all types of network topology
- Fast system recovery from failure occurrence

The points of the standard that are not met are the following:

- The addresses of the slaves are determined using rotating switches. There is no differentiation between Primary and Standby slave addresses
- No acyclic communication between the Master and its slaves, with the exception of diagnostic communication

For more information about the PROFIBUS-DP Redundancy Standard, see Guideline Order No. 2.212 - Specification Slave Redundancy, Version 1.0, January 2000.