

1. Product Description

NX Line is a powerful and complete series of Programmable Logic Controllers (PLCs) with exclusive and innovative features, targeted for covering control systems requirements from medium to large applications or high performance industrial machines.

The backplane racks are the basic elements where NX Line modules are connected. The power supply and communication links are provided by these devices. Also, they are easy to install and maintain.

NX Line offers four different backplane rack sizes: 8, 12, 16 and 24-slot backplane rack and one 2-slot base. NX9020 (2-slot base for panel assembly) is a choice for applications which don't require I/O modules. NX9010 (8-slot backplane rack without hot swap) is the perfect choice in machinery applications. The NX9000 (8-slot backplane rack) is the perfect choice in applications with few or, even, no local I/O points. If higher I/O point density is required, or there's the need of more modules, the user can select larger backplane racks, like NX9001 (12-slot backplane rack), NX9002 (16-slot backplane rack) or NX9003 (24-slot backplane rack).



Its main features are:

- Available sizes for 2, 8, 12, 16 or 24 slots
- Easy module insertion and removal
- Rugged and lightweight design
- High-speed backplane bus
- Automatic addressing
- Compact size

2. Ordering Information

2.1. Included Items

The product package contains the following items:

- One NX9000, NX9001, NX9002, NX9003, NX9010 backplane rack or one base NX9020.

2.2. Product Code

The following code should be used to purchase the product:

Code	Description
NX9020	2-Slot base for panel assembly
NX9010	8-Slot Backplane Rack (No Hot Swap)
NX9010-C	8-Slot Backplane Rack (No Hot Swap) with Conformal Coating
NX9000	8-Slot Backplane Rack
NX9001	12-Slot Backplane Rack
NX9002	16-Slot Backplane Rack
NX9003	24-Slot Backplane Rack

Table 1: Backplane Models

3. Related Products

The following products must be purchased separately when necessary:

Code	Description
NX9100	Left/Right Side Rack Ends
NX9102	Rack Connector Cover

Table 2: Related Products

Notes:

NX9100: NX9100 is a pair of side rack ends designed for protecting the rack ends. NX9100 must be purchased separately.

NX9102: NX9102 was designed to protect unused backplane connectors against dust, moisture and ESD (Electric Static Discharge). It's highly recommended the use of backplane connector covers in all unused backplane connectors. NX9102 must be purchased separately.

4. Innovative Features

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



iF Product Design Award 2012: Nexto Line 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

	NX9020	NX9010	NX9000	NX9001	NX9002	NX9003
IP level	IP 20					
Operation temperature	0 to 60 °C					
Storage temperature	-25 to 75 °C					
Relative humidity	5 to 96 %, non condensing					
Conformal coating	✗	Optional	✓	✓	✓	✓
Isolation						
Logic to protective earth 500 Vac / 1 minute	✗	✓	✓	✓	✓	✓
Module dimensions (W x H x D) mm	55.1 x 119.00 x 18.60	163.70 x 119.00 x 18.60	163.70 x 119.00 x 18.60	236.10 x 119.00 x 18.60	308.50 x 119.00 x 18.60	453.30 x 119.00 x 18.60
Package dimensions (W x H x D) mm	110.00 x 140.00 x 30.00	230.00 x 184.00 x 35.00	230.00 x 184.00 x 35.00	304.00 x 184.00 x 35.00	377.00 x 184.00 x 35.00	520.00 x 184.00 x 35.00
Weight	0.05 kg	0.22 kg	0.27 kg	0.50 kg	0.60 kg	0.82 kg
Weight With Package	0.06 kg	0.35 kg	0.40 kg	0.65 kg	0.76 kg	1.15 kg
Current consumption	-	-	0.065 A	0.085 A	0.130 A	0.170 A
Products support						
NX3003	✓	✓	✓	✓	✓	✓
NX3004	✓	✓	✓	✓	✓	✓
NX3005	✓	✓	✓	✓	✓	✓
NX3008	✓	✓	✓	✓	✓	✓
NX3010	✗	✗	✓	✓	✓	✓
NX3020	✗	✗	✓	✓	✓	✓
NX3030	✗	✗	✓	✓	✓	✓
NX3035	✗	✗	✓	✓	✓	✓
NX5100	✗	✓	✓	✓	✓	✓
NX5101	✓	✓	✓	✓	✓	✓
NX5110	✗	✓	✓	✓	✓	✓
NX5210	✗	✗	✓	✓	✓	✓
CPU redundancy support	✗	✗	✓	✓	✓	✓
Hot swap support	✗	✗	✓	✓	✓	✓

Table 3: General Features

Notes:

IP level: The IP level was defined considering that the backplane rack is fully inserted with NX Line modules.

CPU redundancy support: The backplanes support half-cluster redundancy, where a redundant CPU and a Redundancy Link Module must be placed side-by-side. These modules must be placed in the slots 2 and 4, occupying the slot numbers 2, 3, 4 and 5 (all modules with redundant features need 2 slots per module).

Conformal coating: The conformal coating protects the electronics inside the product from moisture, dust and other harsh elements in electronic circuits. On NX9010, conformal coating is optional, ordering code NX9010-C.

ATTENTION

When using the backplane NX9010, I/O data depends on the bus modules continuity to travel between the CPU and I/O modules, that is, the lack of any module on the bus will cause to all other modules physically on the right to get also diagnosed as missing.

5.2. Standards and Certifications

Standards and Certifications NX9000 / NX9001 / NX9002 / NX9003 / NX9010 / NX9020	
IEC	61131-2: Industrial-process measurement and control - Programmable controllers - Part 2: Equipment requirements and tests
	DNV Type Approval – DNV-CG-0339 (TAA000013D) (Excepto NX9020)
CE	2014/30/EU (EMC) 2014/35/EU (LVD) 2011/65/EU and 2015/863/EU (ROHS)
UK CA	S.I. 2016 No. 1091 (EMC) S.I. 2016 No. 1101 (Safety) S.I. 2012 No. 3032 (ROHS)
	UL/cUL Listed – UL 61010-1 UL 61010-2-201 (file E473496)
EAC	TR 004/2011 (LVD) CU TR 020/2011 (EMC)

Table 4: Standards and Certifications

6. Compatibility with Other Products

The following table provides information regarding the compatibility of the module and programming tool Mastertool.

Products	Mastertool
NX9001, NX9002 and NX9003	1.00 or higher
NX9000	2.01 or higher
NX9010	2.02 or higher
NX9020	3.12 or higher

Table 5: Compatibility with Other Products

ATTENTION

The Backplane Rack NX9010 is compatible with, besides the previous table, only I/O modules, except for the NX2020.

7. Physical Dimensions

7.1. 2-Slot Base for panel assembly (NX9020)

Dimensions in mm.

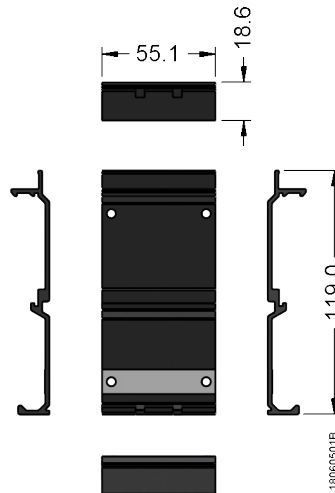


Figure 1: 2-Slot base for panel assembly

7.2. 8-Slot Backplane Rack Without Hot Swap (NX9010)

Dimensions in mm.

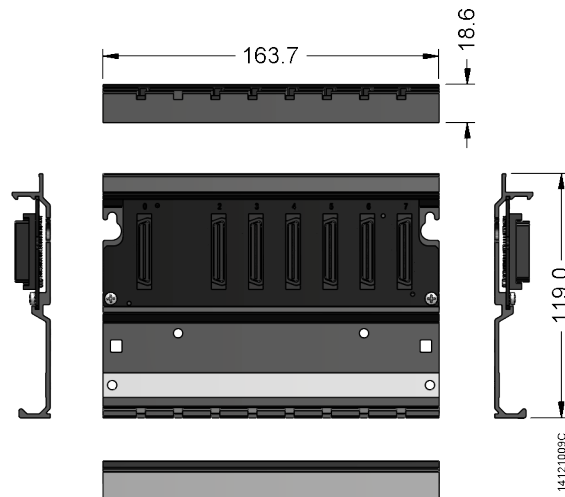


Figure 2: 8-Slot Backplane Rack (Without Hot Swap)

7.3. 8-Slot Backplane Rack (NX9000)

Dimensions in mm.

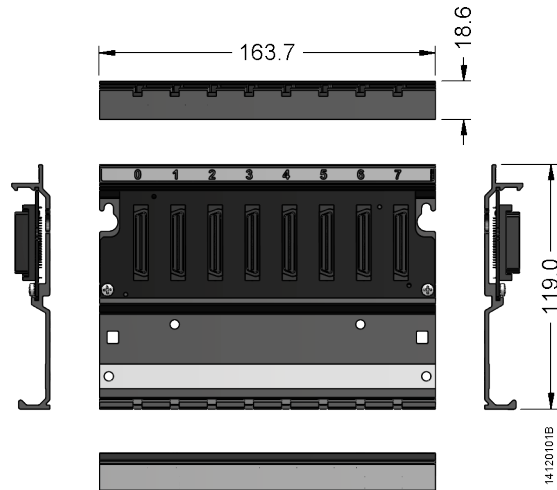


Figure 3: 8-Slot Backplane Rack

7.4. 12-Slot Backplane Rack (NX9001)

Dimensions in mm.

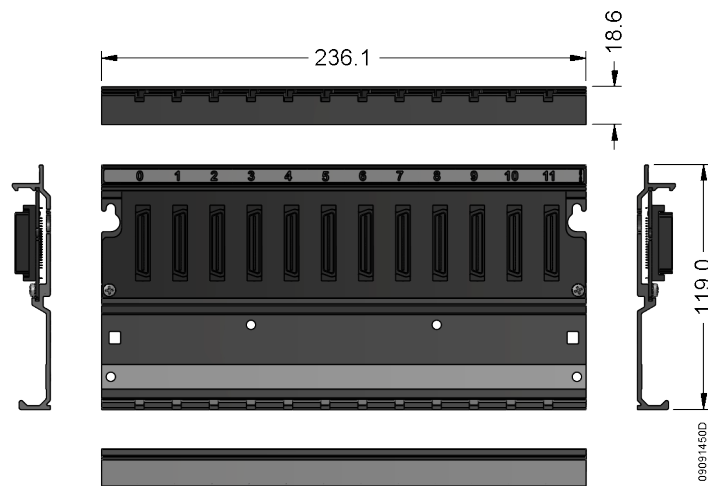


Figure 4: 12-Slot Backplane Rack

7.5. 16-Slot Backplane Rack (NX9002)

Dimensions in mm.

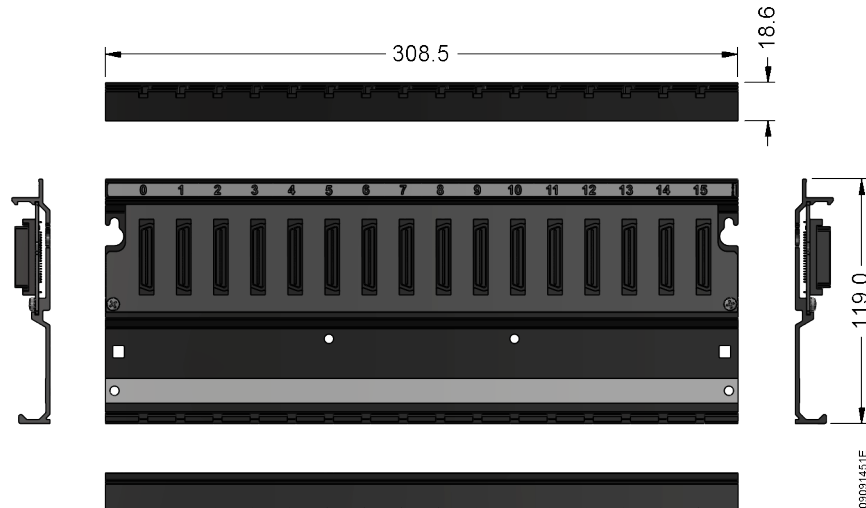


Figure 5: 16-Slot Backplane Rack

7.6. 24-Slot Backplane Rack (NX9003)

Dimensions in mm.

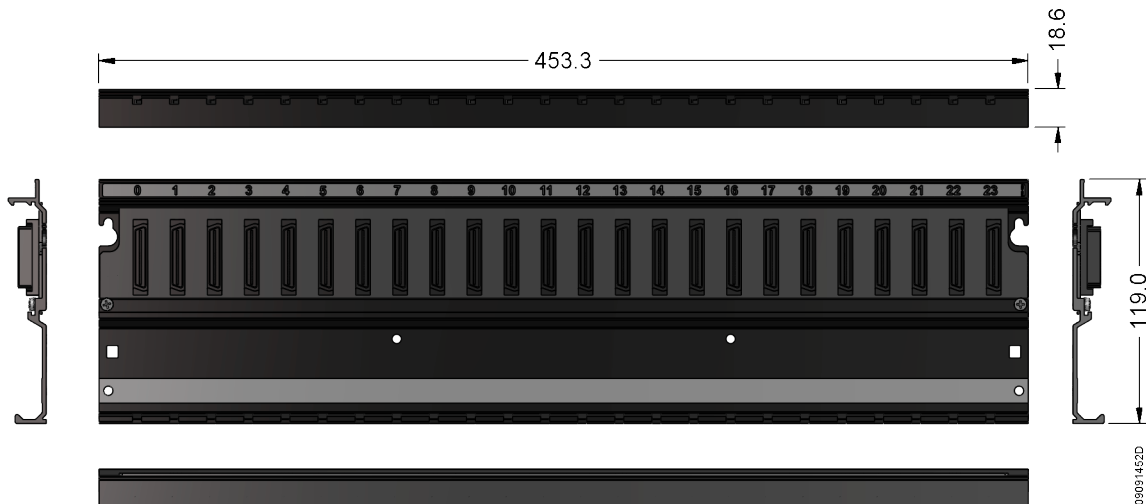


Figure 6: 24-Slot Backplane Rack

7.7. Assembled module depth in the backplane rack

NX Line module and rack cluster depth can be calculated by summing 2.49 mm to the module depth. In the example shown on figure below, a module 115.30 mm deep was used. Considering the rack, the resulting cluster depth is 117.79 mm.

Dimensions in mm.

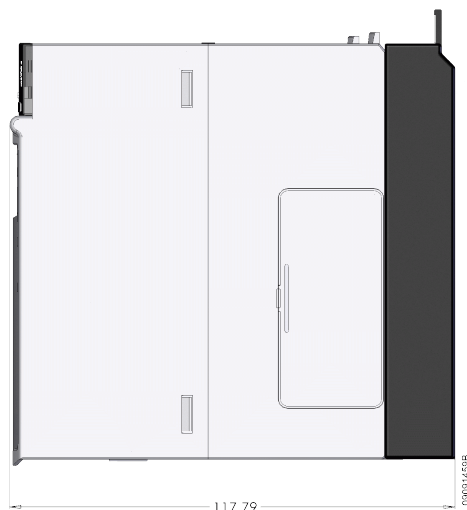


Figure 7: Assembled module depth in the backplane rack

7.8. Spacing between modules and other equipment in the panel

The PLC requires some free space around itself. This is necessary to allow the correct device handling. Besides, such space must be respected to allow the air flow through the PLC, in the convection form, in order to keep the equipment temperature.

Figure 8 and Table 6 indicate the necessary spacing for the NX Line modules.

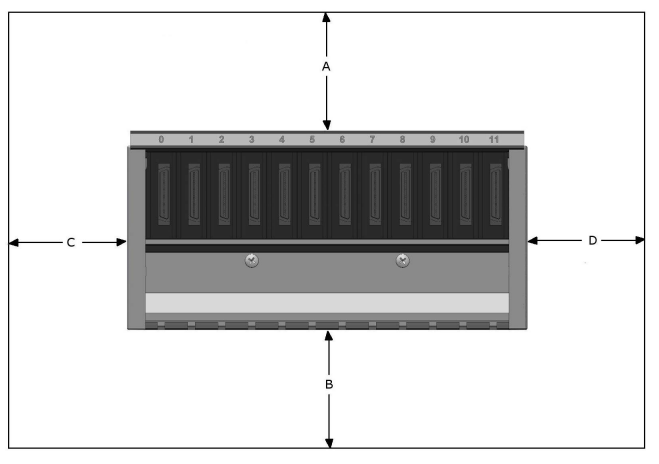


Figure 8: Free space around the PLC

Dimension A	Dimension B	Dimension C	Dimension D
10 cm	10 cm	4 cm	4 cm

Table 6: Free space dimension around the PLC

Note:

Dimension C and D: It's recommended to use a space at least 4cm wide to allow the side rack ends to fit. If necessary, this width can be decreased.

8. Installation

8.1. Module Installation

NX Line has a variety of modules where some require two slots and others only one slot. The number of slots used per each module can be found at module's specific technical documentation.

ATTENTION

For more information about the recommended position for each type of module (power supply, CPU, bus expansion, I/O modules), refer to the respective documentation for each product.

8.2. Electrical Installation

Information and guidelines on proper electrical installation can be found in the user documentation for the products connected to the backplane.

8.3. Mechanical Assembly

The figures below show the hole positions used to mount the NX Line backplanes in a panel.

8.3.1. Backplane Rack Fixation

8.3.1.1. Drilling

8.3.1.1.1. NX9020

Dimensions in mm.

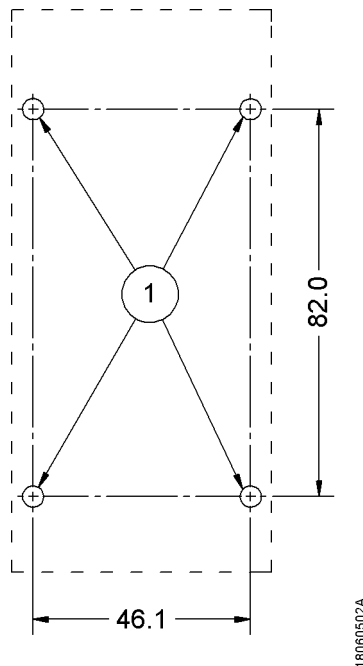


Figure 9: Drilling NX9020

8.3.1.1.2. NX9000, NX9001, NX9002, NX9003, NX9010

The backplane rack fixation must be made through six M4 screws as shown on figure below.

Dimensions in mm.

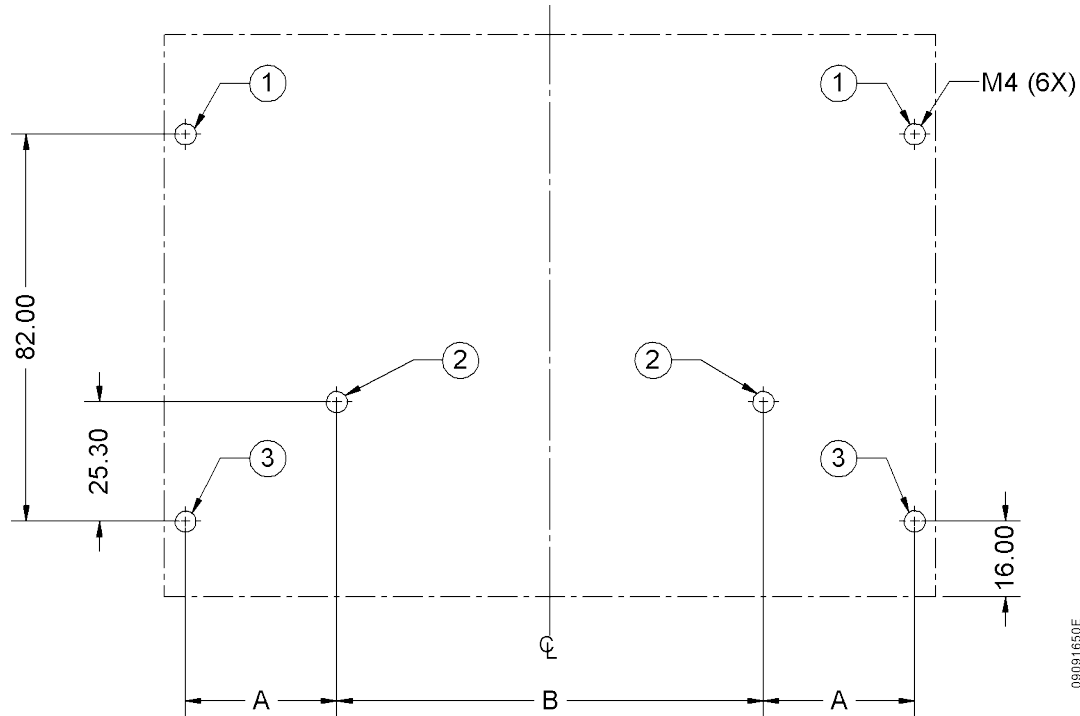


Figure 10: Drilling for Rack Fixation

The table below must be consulted to find the respective dimension for A and B according the backplane model.

Code	Dimension A	Dimension B
NX9000	32.1 mm	90.5 mm
NX9001	68.3 mm	90.5 mm
NX9002	104.5 mm	90.5 mm
NX9003	140.7 mm	162.9 mm
NX9010	32.1 mm	90.5 mm

Table 7: Backplanes Drilling Dimensions

NX Line backplane rack has 6 holes for fixation. DIN 7985 M4 cross recessed pan head screws must be used in all holes. These screws can be fixed straight in the panel or using nuts, when the panel width is too thin to create a thread. At using nuts, it's recommended the use of self-locking nuts to avoid it become loose.

Figure 10 identifies three types of hole: 1, 2 and 3. It's extremely important to respect the following fixation rules for the correct assembly of the backplane racks:

- It's recommended to use M4 washers in the screws type 1. These screws must be, mandatorily, used
- It's not possible to use washers in screws type 2. Therefore, the use of self-locking nuts or thread locking materials is recommended. The screws for the holes type 2 are not needed, unless in cases where the assembly robustness must be increased. It's important to stress that these screws are placed under the modules assembled in the rack, so they must be removed when the screws need to be retighten
- It's mandatory the use of toothed washers in the screws type 3 to guarantee the lowest electric resistance possible between the screw and the panel, which must be grounded. The toothed washer must be type M4

8.3.1.2. Assembly

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

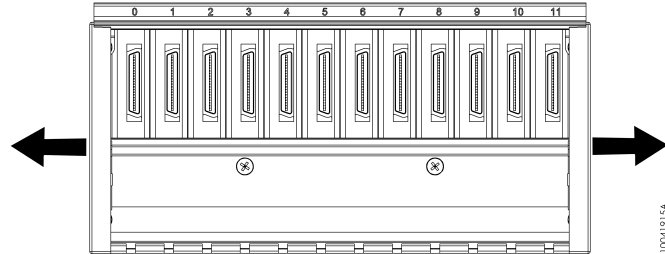


Figure 11: Rack side covers

Before inserting the backplane rack in the panel, the screws type 1 (Figure 10) 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 12 indicates how this procedure must be executed.

Ps: Some figures used in this subtitle don't show the backplane rack printed circuit board to simplify the process understanding.

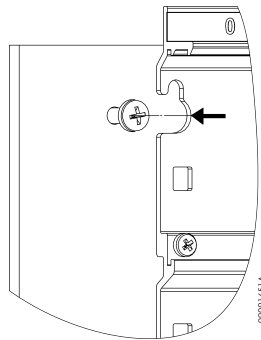


Figure 12: Rack fixation - Alignment

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

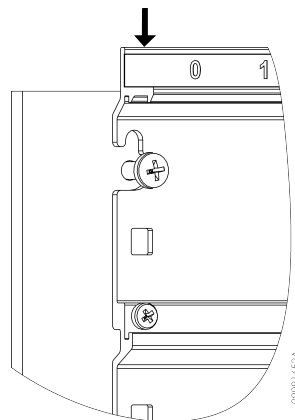


Figure 13: Rack fixation – Keyway fitting

After the rack insertion is complete, all fixation screws must be assembled.

To finish the process, the rack side covers must be inserted as presented on figure below.

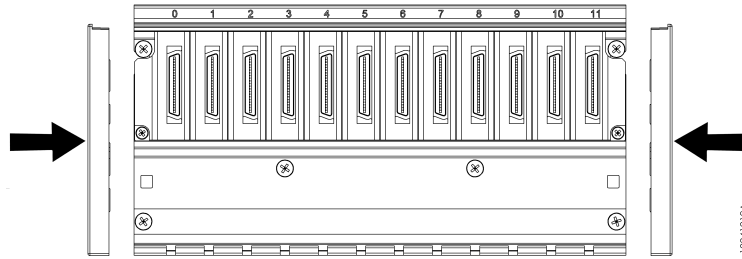


Figure 14: Rack fixation – Side covers

8.3.1.3. Removal

To remove the rack, it's necessary to execute the inverse process described on the Assembly subtitle.

8.3.2. Rack Connector Cover

The connector cover must be used on the not used rack positions for protection against undesirable contacts and dust.

8.3.2.1. Rack Connector Cover Insertion

The connector cover must be placed on the connector starting by the lower part and finishing by the upper part, pressing it until it's completely fit, as presented on Figure 15.

On Figure 16 the connector cover is presented completely placed.

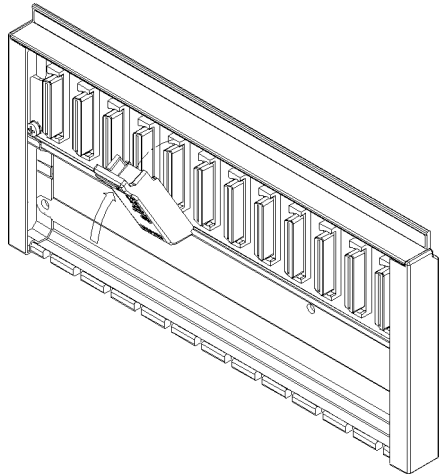


Figure 15: Rack Connector Cover Insertion

8.3.2.2. Rack Connector Cover Removal

To remove the connector cover one must just pull it by its upper rim, as shown on Figure 16.

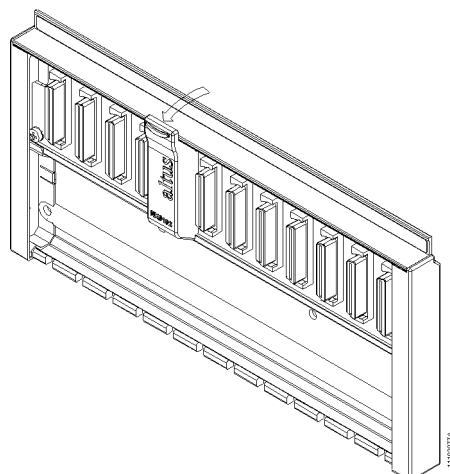


Figure 16: Rack Connector Cover Removal

8.3.3. Horizontal/ Vertical Assembly

The NX Line allows the PLC utilization in the horizontal position. It's not allowed the assembly in the vertical position in the rack.

9. Manuals

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
CE114000	Technical Characteristics of the NX and NJ Lines	English
CT114000	Características Técnicas das Linhas NX e NJ	Portuguese
MU299611	Mastertool X User Manual	English
MU299049	Manual de Utilização Mastertool X	Portuguese
MU299609	MasterTool IEC XE User Manual	English
MU299048	Manual de Utilização MasterTool IEC XE	Portuguese
MP399609	IEC 61131 Programming Manual	English
MP399048	Manual de Programação IEC 61131	Portuguese
MU214608	Nexto NX NX5110, NX5210 User Manual	English
MU214108	Manual de Utilização Nexto NX NX5110, NX5210	Portuguese

Table 8: Related Documents