1. Product Description

Nexto Series programmable controllers are the ultimate solution for industrial automation and system control. With high technology embedded, the products of the family are able to control, in a distributed and redundant way, complex industrial systems, machines, high performance production lines and the most advanced processes of Industry 4.0. Modern and high-speed, the Nexto series uses cutting-edge technology to provide reliability and connectivity, helping to increase the productivity of different businesses.

Compact, robust and with high availability, the series products have excellent processing performance and rack expansion possibilities. Its architecture allows easy integration with supervision, control and field networks, in addition to PLC redundancy. The series equipment also offers advanced diagnostics and hot swapping, minimizing or eliminating maintenance downtime and ensuring a continuous production process.

Its main features are:

- 384 Kbytes of %I and 384 Kbytes of %Q
- Large memory capacity for user application and user data
- 8 Mbytes of retentive or persistent memory
- 64-bit high-speed processing
- Floating point unit
- 1 serial port
- 6 front panel Ethernet Interfaces (1000/100/10 Mbps)
- 2 Ethernet SFP Interfaces (1000 Mbps, optical or cooper) for redundancy synchronization
- microSD Card Interface
- Advanced Diagnostic Services
- System Message Log
- OPC DA/UA, PROFINET, EtherCAT, MODBUS TCP, SNMP and EtherNet/IP protocols
- Clock synchronization via SNTP
- Web Server Resources
- Redundancy mode for high availability applications
- One Touch Diag
- Compliance with international standard IEC 61131-3
- Real Time Clock (RTC)
- Compact and modern design
- Free of moving parts (fans, active coolers, etc.)

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2. Ordering Information

2.1. Included Items

The product package contains the following items:

- NX3035 module

2.2. Product Code

The following code should be used to purchase the product:

Code	Description
NX3035	High-speed CPU, 6 Ethernet ports, 2 SFP ports, 1 serial channel, memory card interface, remote rack expansion and redundancy support

Table 1: Product Code

3. Related Products

The following products must be purchased separately when necessary:

Code	Description
MT8500	MasterTool IEC XE
AL-2600	RS-485 network branch and terminator
AL-2306	RS-485 cable for MODBUS or CAN network
AL-2319	RJ45-RJ45 Cable
AL-1763	CMDB9-Terminal Block Cable
NX9101	32 GB microSD memory card with miniSD and SD adapters
NX9202	RJ45-RJ45 2 m Cable
NX9205	RJ45-RJ45 5 m Cable
NX9210	RJ45-RJ45 10 m Cable
NX9000	8-Slot Backplane Rack
NX9001	12-Slot Backplane Rack
NX9002	16-Slot Backplane Rack
NX9003	24-Slot Backplane Rack
NX8000	30 W 24 Vdc Power Supply Module
NX9500	Gigabit SFP multimode fiber transceiver (550m)
NX9501	Gigabit SFP single-mode fiber transceiver (10Km)

Table 2: Related Products

Notes:

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

AL-2600: This module is used for branch and termination of RS-422/485 networks. For each network node, an AL-2600 is required. The AL-2600 that is at the ends of network must be configured with termination, except when there is a device with active internal termination, the rest must be configured without termination.

AL-2306: Two shielded twisted pairs cable without connectors, used for networks based on RS-485 or CAN.

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AL-2319: Two RJ45 connectors for programming the CPUs of the Nexto Series and Ethernet point-to-point with another device with Ethernet interface communication.

AL-1763: Cable with one DB9 male connector and terminal block for communication between CPUs of the Nexto Series and products with RS-485/RS-422 standard terminal block.

NX9202/NX9205/NX9210: Cables used for Ethernet communication and to interconnect the bus expansion modules.

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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.

VPN: Nexto products have an embedded VPN service, which creates a private tunnel that connects directly to the CPU. This functionality, available on some models of the family, allows accessing a control network remotely and completely securely..

FTP: Supporting FTP-type connections, the series equipment is able to exchange data with a server that uses this same technology model. This functionality allows the files generated by the controller, such as logs collected through a datalogger function, to be accessed remotely.

Linux: Another innovative feature of the series is its embedded Linux platform. The feature makes possible the virtualization of software developed for operating systems with Unix technology. The feature gives more versatility and speed to the operation of the system, as it allows the processing of multiple data within the CPU itself.

Battery Free Operation: Nexto Series does not require any kind of battery for memory maintenance and real time clock operation. This feature is extremely important because it reduces the system maintenance needs and allows the use in remote locations where maintenance can be difficult to be performed. Besides, this feature is environmentally friendly.

Easy Plug System: Nexto Series has an exclusive method to plug and unplug I/O terminal blocks. The terminal blocks can be easily removed with a single movement and with no special tools. In order to plug the terminal block back to the module, the frontal cover assists the installation procedure, fitting the terminal block to the module.

Multiple Block Storage: Several kinds of memories are available to the user in Nexto Series CPUs, offering the best option for any user needs. These memories are divided in volatile memories and non-volatile memories. For volatile memories, Nexto Series CPUs offer addressable input (%I), addressable output (%Q), addressable memory (%M), data memory and redundant data memory. For applications that require non-volatile functionality, Nexto Series CPUs bring retain addressable memory (%Q), retain data memory, persistent addressable memory (%Q), persistent data memory, program memory, source code memory, CPU file system (doc, PDF, data) and memory card interface.

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.

OFD – On Board Full Documentation: Nexto Series CPUs are capable of storing the complete project documentation in its own memory. This feature can be very convenient for backup purposes and maintenance, since the complete information is stored in a single and reliable place.

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.

High-speed CPU: All Nexto Series CPUs were designed to provide an outstanding performance to the user, allowing the coverage of a large range of applications requirements.

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5. Product Features

5.1. General Features

	NX3035
Backplane rack occupation	4 sequential slots
Power supply integrated	No
Ethernet TCP/IP local interface	6
Serial Interface	1
CAN Interface	No
USB Port Host	No
Memory Card Interface	Yes
Real time clock (RTC)	Yes Resolution of 1 ms and maximum variance of 2 s per day.
Watchdog	Yes
Status and diagnostic Indication	Graphic display LEDs System Web Page CPU internal memory
Programming languages	Structured Text (ST) Ladder Diagram (LD) Sequential Function Chart (SFC) Function Block Diagram (FBD) Continuous Function Chart (CFC)
Tasks	Cyclic (periodic) Event (software interrupt) External (hardware interrupt) Freewheeling (continuous) Status (software interrupt)
Online changes	Yes
Maximum number of tasks	32
Maximum number of expansion bus	24
Bus expansion redundancy support	Yes
Maximum number of I/O modules on the CPU local bus	128
Maximum number of additional Ethernet TCP/IP interface modules (NX5000)	6
Ethernet TCP/IP interface redundancy support	Yes
Maximum number of PROFIBUS-DP networks (using master modules PROFIBUS-DP)	4
PROFIBUS-DP network redundancy support	Yes
Redundancy support (half-clusters)	Yes
Hot Swap support	Yes

Event oriented data reporting (SOE)
    Protocol
    Maximum Event Queue Size
	No
	-
	-

Web pages development (available through the HTTP protocol)	No

	NX3035
One Touch Diag (OTD)	Yes
Electronic Tag on Display (ETD)	Yes

Table 3: General Features

Notes:

Real Time Clock (RTC): The retention time, time that the real time clock will continue to update the date and time after a CPU power down, is 15 days for operation at 25 °C. At the maximum product temperature, the retention time is reduced to 10 days.

Maximum number of I/O modules on bus: The maximum number of I/O modules refers to the sum of all modules on the local bus and expansions. Additional I/O modules can be installed in remote I/O systems (PROFIBUS, MODBUS, PROFINET, Ethernet/IP, etc).

5.2. Memory

	NX3035
Addressable input variables memory (%I)	384 Kbytes
Addressable output variables memory (%Q)	384 Kbytes
Direct representation variable memory (%M)	256 Kbytes
Symbolic variable memory	20 Mbytes
Persistent or Retain symbolic variables memory	8 Mbytes
Full Redundant Data Memory	2603 Kbytes
Direct representation input variable memory (%I)	320 Kbytes
Direct representation output variable memory (%Q)	320 Kbytes
Direct representation variable memory (%M)	256 Kbytes
Symbolic variable memory	1707 Kbytes
Program memory	64 Mbytes
Source code memory (backup)	256 Mbytes
User files memory	2 Gbytes

Table 4: Memory

5.3. Protocols

	NX3035	Interface
Open Protocol	Yes	COM1
MODBUS RTU Master	Yes	COM1
MODBUS RTU Slave	Yes	COM1
MODBUS TCP Client	Yes	NET1 / NET2 / NET3 / NET4 / NET5 / NET6
MODBUS TCP Server	Yes	NET1 / NET2 / NET3 / NET4 / NET5 / NET6
MODBUS RTU over TCP Client	Yes	NET1 / NET2 / NET3 / NET4 / NET5 / NET6
MODBUS RTU over TCP Server	Yes	NET1 / NET2 / NET3 / NET4 / NET5 / NET6
CANopen Master	No	-
CANopen Slave	No	-
CAN low level	No	-
SAE J-1939	No	-
OPC DA Server	Yes	NET1 / NET2 / NET3 / NET4 / NET5 / NET6

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	NX3035	Interface
OPC UA Server	Yes	NET1 / NET2 / NET3 / NET4 / NET5 / NET6
EtherCAT Master	Yes	NET2 / NET3 / NET4 / NET5 / NET6
SNMP Agent	Yes	NET1 / NET2 / NET3 / NET4 / NET5 / NET6
SOE (Event-oriented data)	No	NET1 / NET2 / NET3 / NET4 / NET5 / NET6
IEC 60870-5-104 Server	No	-
EtherNet/IP Scanner	Yes	NET1 / NET2 / NET3 / NET4 / NET5 / NET6
EtherNet/IP Adapter	Yes	NET1 / NET2 / NET3 / NET4 / NET5 / NET6
MQTT Client	Yes	NET1 / NET2 / NET3 / NET4 / NET5 / NET6
SNTP Client (for clock synchronism)	Yes	NET1 / NET2 / NET3 / NET4 / NET5 / NET6
PROFINET Controller	Yes	NET1 / NET2 / NET3 / NET4 / NET5 / NET6
PROFINET Device	No	-

Table 5: Protocols

5.4. Serial Interface

5.4.1. COM 1

	COM 1
Connector	Shielded female DB9
Physical interface	RS-485
Communication direction	half duplex
RS-485 max. transceivers	32
Termination	Yes (optional through parameter)
Baud rate	200, 300, 600, 1200, 1800, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
Isolation **Logic to Serial Port**	1000 Vac / 1 minute
Serial Port to protection eartho ⏚	1000 Vac / 1 minute

Table 6: COM 1 Serial Interface Features

Note:
Physical interface: The list of cables can be found in the section Related Products.
RS-485 maximum transceivers: It is the maximum number of RS-485 interfaces that can be used on the same bus.

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5.5. Ethernet Interfaces

5.5.1. NET 1 ... NET 6

	NET 1 / NET 2 / NET 3 / NET 4 / NET 5 / NET 6
Connector	Shielded female RJ45
Auto crossover	Yes
Maximum cable length	100 m
Cable type	UTP or ScTP, category 5
Baud rate	10/100/1000 Mbps
Physical layer	10BASE-TE/100BASE-TX/1000BASE-T
Data link layer	LLC (Logical Link Control)
Network layer	IP (Internet Protocol)
Transport layer	TCP (Transmission Control Protocol) UDP (User Datagram Protocol)
Diagnostics	LED - green 1000 Mbps (link/activity) LED – yellow 100 Mbps (link/activity) LEDs – green and yellow 10 Mbps (link/activity)
Isolation **Ethernet interface to logic and earth**	1500 Vac / 1 minute
Ethernet interface to Ethernet interface	1500 Vac / 1 minute

Table 7: NET 1 to NET 6 Interface Features

The NET 1 Interface is the interface used for programming using the MasterTool IEC XE tool.

5.6. Memory Card Interface

	Memory Card
Maximum Capacity	32 Gbytes
Minimum Capacity	2 Gbytes
Type	MicroSD
File System	FAT32
Remove card safely	Yes, through a specific menu for this function.

Table 8: Memory Card Interface Features

Notes:

Maximum Capacity: The memory card capacity must be less than or equal to this limit for correct operation on Nexto CPU, otherwise the Nexto CPU may not detect the memory card or even present problems during data transfer.

Minimum Capacity: The memory card capacity must be greater than or equal to this limit for correct operation on Nexto CPU, otherwise the Nexto CPU may not detect the memory card or even present problems during data transfer.

File System: It is recommended to format the memory card using the Nexto CPU, otherwise it may result in performance loss in the memory card interface.

5.7. Environmental Characteristics

	NX3035
Current consumption on the power supply rail	2000 mA
Dissipation	10 W
Operating temperature	0 to 60 °C
Storage temperature	-25 to 75 °C
Relative humidity	5% to 96%, non-condensing
Conformal coating	Yes
IP Level	IP 20
Module dimensions (W x H x D)	72.20 x 114.63 x 115.30 mm
Package dimensions (W x H x D)	90.00 x 122.00 x 147.00 mm
Weight	490 g
Weight with package	620 g

Table 9: Environmental Characteristics

Notes:

Conformal coating of electronic circuits: The covering of electronic circuits protects internal parts of the product against moisture, dust and other harsh elements to electronic circuits.

5.8. Performance

Instruction	Language	Variable Type	Time (μs)
1000 Contacts	LD	BOOL	2.30
1000 Divisions	ST	INT	2.30
		REAL	2.30
	LD	INT	2.30
		REAL	1.05
1000 Multiplications	ST	INT	4.00
		REAL	2.30
	LD	INT	4.00
		REAL	2.30
1000 Sums	ST	INT	2.30
		REAL	2.30
	LD	INT	2.30
		REAL	2.30
1000 PID	ST	REAL	< 200

Table 10: Instruction Times

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6. CPU Redundancy

NX3035 supports CPU Redundancy. Redundant CPUs are installed in different racks (half-clusters). One of these CPUs is the active CPU and executes the application. The other is the standby CPU, that is ready to switch to active in case of failure of the currently active CPU. This means that critical processes are not affected by hardware failures in the control system. The result is increased productivity and minimized downtime.

Communication between the CPUs is done at the end of each cycle, through two high-speed redundancy links.

More information about configuration and use of CPU redundancy features can be found in NX3035 CPU User Manual - MU214619.

6.1. Half-Cluster Redundancy

This redundancy option uses two racks with a CPU with a redundancy link. In this case, each rack is called a "half-cluster". Each half-cluster can also have one or more fieldbus master modules which are responsible for communicating with all remote I/O. When an error occurs with the active half-cluster, the stand-by half-cluster takes over and its fieldbus master module becomes its active master. This application is easy to configure and does not require the user to carry out special programming or parameterization. The figure below illustrates an example of a rack with a half-cluster redundant topology:
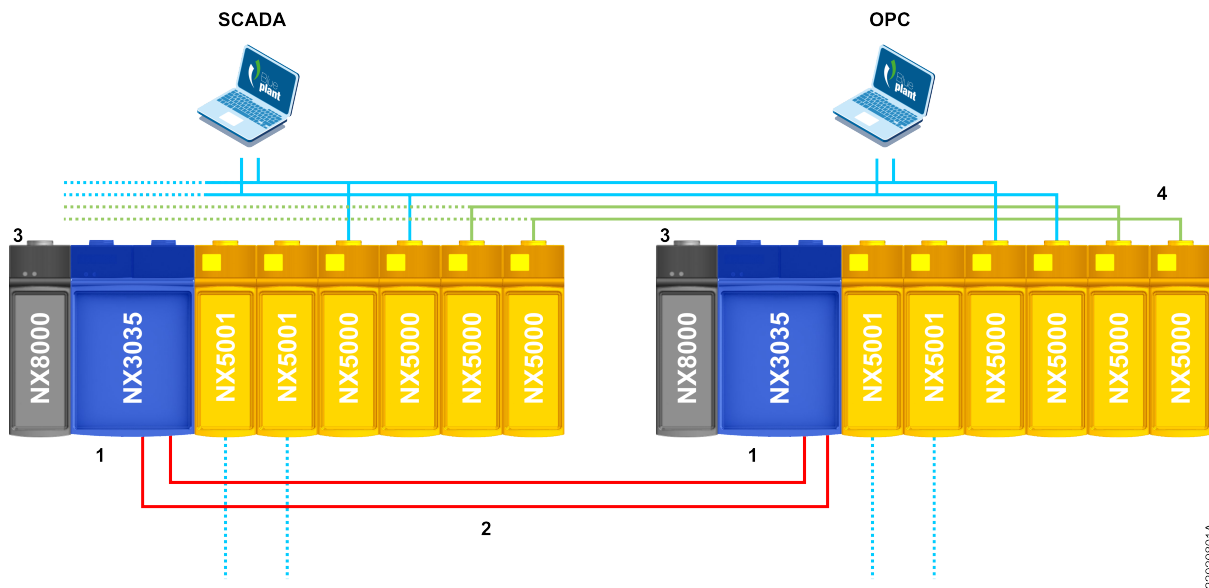

Figure 1: Half-Cluster Redundancy

Chart Notes:

1. At the core of a two half-cluster redundant system, there is a pair of redundant CPUs.
2. Links between two half-clusters have two channels. These 2 links use 1 Gbps SFP modules, allowing for the option of either fiber optic or twisted pair connections. Thus, any failures in a single channel will not affect the system.
3. The configuration of both half-clusters must be identical.
4. This example presents network modules with Ethernet-based protocols. There are two network modules for each purpose: a control network and a supervision network for SCADA.

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7. Physical Dimensions

Dimensions in mm.
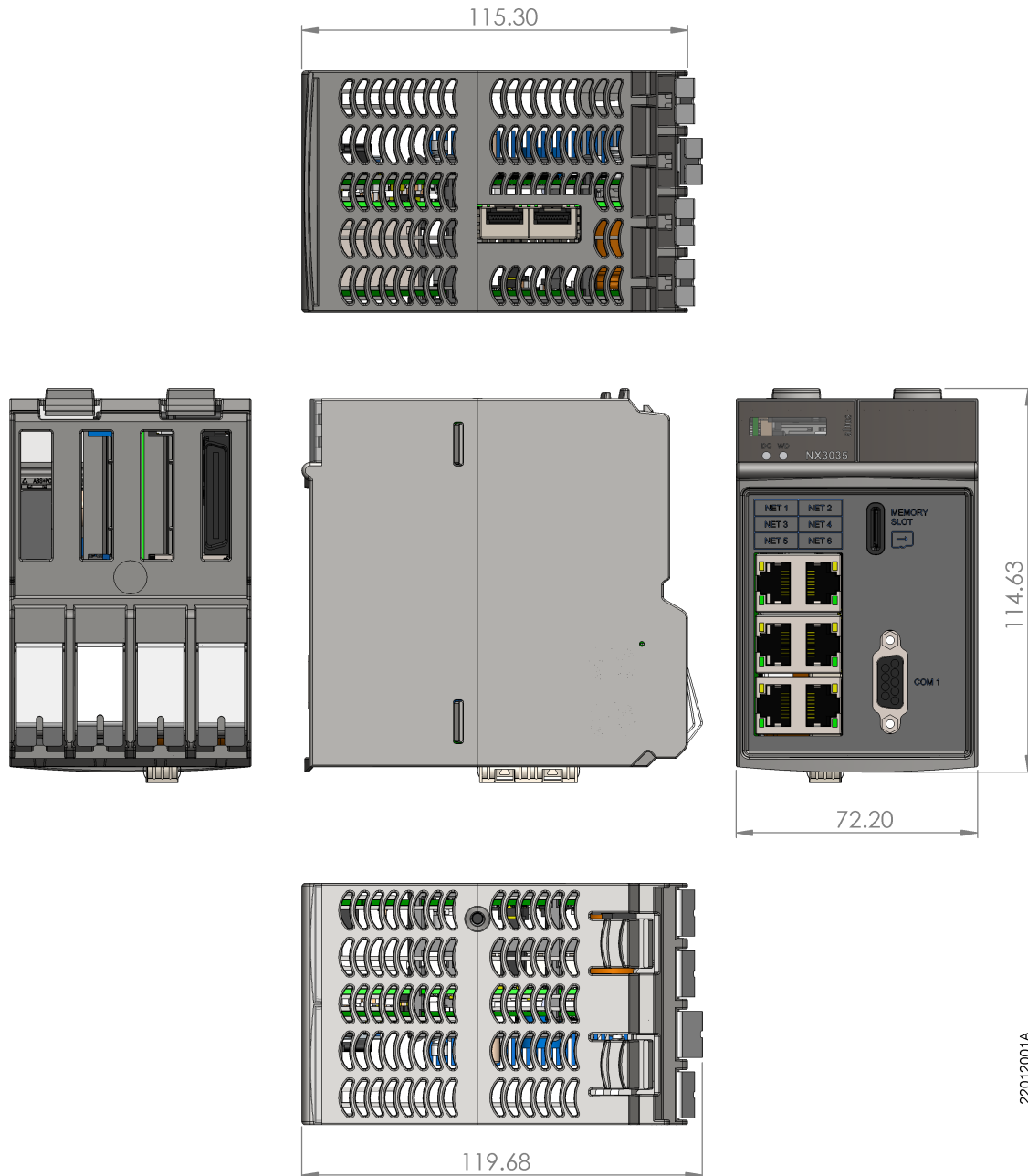
Figure 2: Physical Dimensions

8. 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	Nexto Series – Technical Characteristics	English
CT114000	Série Nexto – Características Técnicas	Portuguese
CE114108	NX3035 Technical Characteristics	English
CT114108	Características Técnicas NX3035	Portuguese
CE114200	NX8000 Power Supply Module Technical Characteristics	English
CT114200	Características Técnicas Fonte de Alimentação NX8000	Portuguese
CE114700	Nexto Series Backplane Racks Technical Characteristic	English
CT114700	Características Técnicas dos Bastidores da Série Nexto	Portuguese
CE114810	Nexto Series Accessories for Backplane Rack Technical Characteristics	English
CT114810	Características Técnicas Acessórios para Bastidor Série Nexto	Portuguese
CE114902	Nexto Series PROFIBUS-DP Master Technical Characteristics	English
CT114902	Características Técnicas do Mestre PROFIBUS-DP da Série Nexto	Portuguese
CE114903	Nexto Series Ethernet Module Technical Characteristics	English
CT114903	Características Técnicas Módulo Ethernet Série Nexto	Portuguese
CE114908	NX5110 and NX5210 PROFIBUS-DP Heads Technical Characteristics	English
CT114908	Características Técnicas Interfaces Cabeça PROFIBUSDP NX5110 e NX5210	Portuguese
CE157204	NX9500 / NX9501 Technical Characteristics	English
CT157204	Características Técnicas NX9500 / NX9501	Portuguese
MU214600	Nexto Series User Manual	English
MU214000	Manual de Utilização Série Nexto	Portuguese
MU214619	NX3035 CPU User Manual	English
MU214107	Manual de Utilização UCP NX3035	Portuguese
MU299609	MasterTool IEC XE User Manual	English
MU299048	Manual de Utilização MasterTool IEC XE	Portuguese
MP399609	MasterTool IEC XE Programming Manual	English
MP399048	Manual de Programação MasterTool IEC XE	Portuguese
MU214601	NX5001 PROFIBUS DP Master User Manual	English
MU214001	Manual de Utilização Mestre PROFIBUS-DP NX5001	Portuguese
MU214608	Nexto PROFIBUS-DP Head Utilization Manual	English
MU214108	Manual de Utilização da Cabeça PROFIBUS-DP Nexto	Portuguese
MU219000	Ponto Series Utilization Manual	English
MU209000	Manual de Utilização da Série Ponto	Portuguese
MU209508	Manual de Utilização Cabeça PROFIBUS PO5063V1 e Cabeça Redundante PROFIBUS PO5063V5	Portuguese
MU219511	PO5064 PROFIBUS Head and PO5065 Redundant PROFIBUS Head Utilization Manual	English
MU209511	Manual de Utilização Cabeça PROFIBUS PO5064 e Cabeça Redundante PROFIBUS PO5065	Portuguese
MU209020	Manual de Utilização Rede HART sobre PROFIBUS	Portuguese
MU214603	Nexto Series HART Manual	English

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Code	Description	Language
MU214609	OPC UA Server for Altus Controllers User Manual	English
MU214610	Advanced Control Functions User Manual	English
NAP151	Utilização do Tunneller OPC	Portuguese
NAP169	RSTP in Nexto CPUs	English

Table 11: Documentos Relacionados

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