Product Description

Nexto Series is a powerful and complete Programmable Logic Controller (PLC) Series 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 and I/O modules with features to fit requirements in different kinds of applications. The NX3810 is the Nexto CPU model to address functional safety requirements.

Functional safety is the process of using non-standard equipment that has a safe response of the outputs in relation to the inputs. In systems where physical integrity, property or environment are at risk, a superior safety level is necessary to ensure a proper process operation in every aspect. These safety requirements are not only valid for process applications, but also for factory automation. Normally used in systems that need a fast response to light barriers and emergency buttons, as industrial machines and process control, the logic used must provide the best performance as possible without compromising the system integrity. With that concept in mind, NX3810 CPU was developed with the highest technology in industrial automation, representing the state of the art in functional safety engineering.

NX3810 CPU is based in the following standards: IEC 61508, IEC 62061 and EN ISO 13849. The module can be used in certified applications and is capable of achieving SIL 3 and PLe Cat. 4.

Its main features are:

- PROFIsafe Master communication
- Can be added to existing PROFIBUS networks
- Up to 1 kbyte of input PROFIsafe/exchange variable image and 1 kbyte of output PROFIsafe/exchange variable image
- Up to 1.5 Mbytes of user code
- High speed 32 bits processing
- Double channel architecture
- No requirement for external protection devices
- Enhanced diagnostic services
- System messages log
- IEC 61508 certified
- IEC 62061 certified
- ISO 13849-1 certified
- One Touch Diag
- Electronic Tag on Display

Ordering Information

Included Items

The product package contains the following items:

- NX3810 module
- Installation guide

Product Code

The following code should be used to purchase the product:

Code	Description
NX3810	Safety CPU Module

Table 1: Product Code

Related Products

The following products must be purchased separately when necessary:

Code	Description
MT8800	MasterTool Safety
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
NX5001	PROFIBUS-DP Master Module
NX8000	30 W 24 Vdc Power Supply Module
NX9000	8-Slot Backplane Rack
NX9001	12-Slot Backplane Rack
NX9002	16-Slot Backplane Rack
NX9003	24-Slot Backplane Rack

Table 2: Related Products

Compatibility with Other Products

Nexto Safety CPU acts as a co-processor of the Nexto CPU. It receives the data from fail-safe inputs process and delivers the expected data to the fail-safe outputs.

Aimed to ensure the safety on applications using Nexto Safety modules, the following table provides a list of compatible tools and modules with its respective product revision and/or software version.

	Software version	Product revision
MT8800	1.00 or higher	AA or higher
MT8500	3.03 or higher	AY or higher
NX5110	1.1.2.3 or higher	AK or higher

Table 3: Compatibility with Other Products

Minimum backplane rack for using this product

The following table shows the minimum backplane rack configuration needed to use this product:

Code	Description
NX9000	8-Slot Backplane Rack
NX3004	CPU, 1 Ethernet port, 1 serial channel, remote rack expansion support and power supply integrated
NX5001	PROFIBUS-DP Master Module

Table 4: Minimum backplane rack for using this product

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.

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.

Product Features

General Features

	NX3810
Backplane rack occupation	2 sequential slots
Programming Language	Function Block Diagram (FBD)
Safety function blocks available	PLC Open Safety POUs
Supported safety protocols	PROFIsafe V2
Task types	Cyclical (periodic)
Hot swap support	Yes
Cycle time	10 ms to 100 ms
Watchdog	Yes
Safe state	Interruption of communication (no PROFIsafe messages are sent)
Status and diagnostics indication	Graphic display, LEDs
One Touch Diag (OTD)	Yes
Electronic Tag on Display (ETD)	Yes
PROFIsafe Address	1
Isolation **Logic to protective earth** ⏚	 1500 Vac / 1 minute
Current consumption from backplane rack power supply	300 mA
IP Level	IP 20
Operation temperature	0 to 60 °C
Storage temperature	-25 to 70 °C
Operation and storage relative humidity	5% to 96%, non-condensing
Conformal coating	Yes
Classification <SRSREQ190> **IEC 61508** **IEC 62061** **ISO 13849**	 SIL 3 SIL 3 PLe Cat. 4
Proof Test Interval (PTI)	20 years <SRSREQ16>
Failure probability **Low demand (PFD_{avg})** **High demand (PFH)**	 $< 5X10^{-5}$ (5% of PFD_{avg} max. for SIL 3) <SRSREQ13> $< 5X10^{-9}$ (5% of PFH max. for SIL 3) <SRSREQ14>
MTTFd (Mean Time to Failure dangerous)	High (>30 years) <SRSREQ15>
DC_{avg}	Higher than 99% <SRSREQ11>
Standards <SRSREQ1018> <SRSREQ2> **- (Incl. Climatic and Mechanical req.)**	IEC 61131-2:2017 IEC 61131-6:2012 IEC 61508:2010 IEC 62061:2005 EN ISO 13849-1:2012 IEC 61784-3-3:2010
EMC Compliance <SRSREQ6>	IEC 61131-2:2017 Zone B IEC 61131-6:2012 General EMC Environment IEC61326-3-1:2017 IEC61000-6-4:2006+AMD1:2010 CE –2014/35/EU (LVD) and 2014/30/EU (EMC)

	NX3810
RoHS directive	RoHS 2002/95/EC
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	100 g
Weight with package	150 g

Table 5: NX3810 - General Features

Notes:

Safe state: In case of an internal failure or a backplane power failure, NX3810 will interrupt the PROFIsafe communication, resulting in PROFIsafe watchdog. <SRSREQ4>

Isolation: The Logic term refers to the internal interfaces such as processors, memories and backplane rack interfaces.

Proof Test Interval (PTI): Period of time which the module must be replaced so the PFD limits of SIL-3 is not exceeded.

Diagnostic Coverage (DC): Defines internal tests effectiveness considering all possible failure modes.

Conformal Coating: Conformal coating protects the electronic components inside the product from moisture, dust and other harsh elements to electronic circuits.

Installation and commissioning

Architecture

Nexto Safety Series is capable of addressing many different applications ranging from small high-speed machinery automation to large complex process automation. For this reason, the system is very flexible and modular, enabling many different configurations without compromising cost and performance.

The safety architecture is divided in the following main components:

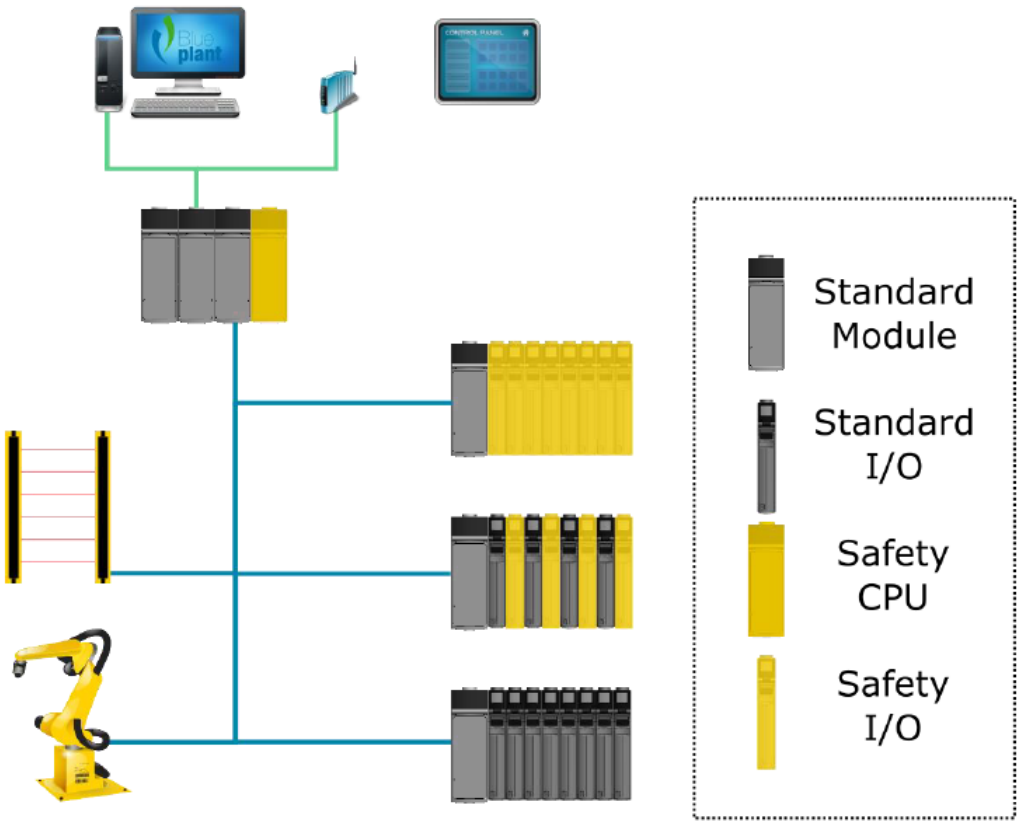

Figure 1: Architecture

Mechanical and Electrical Assembly

The mechanical and electrical mounting and the connector insertion and removing for I/O modules are described at Nexto Series User Manual – MU214600.

Physical Dimensions

Nexto User Manual – MU214600 should be consulted for general measurement of installation panel.
Dimensions in mm.

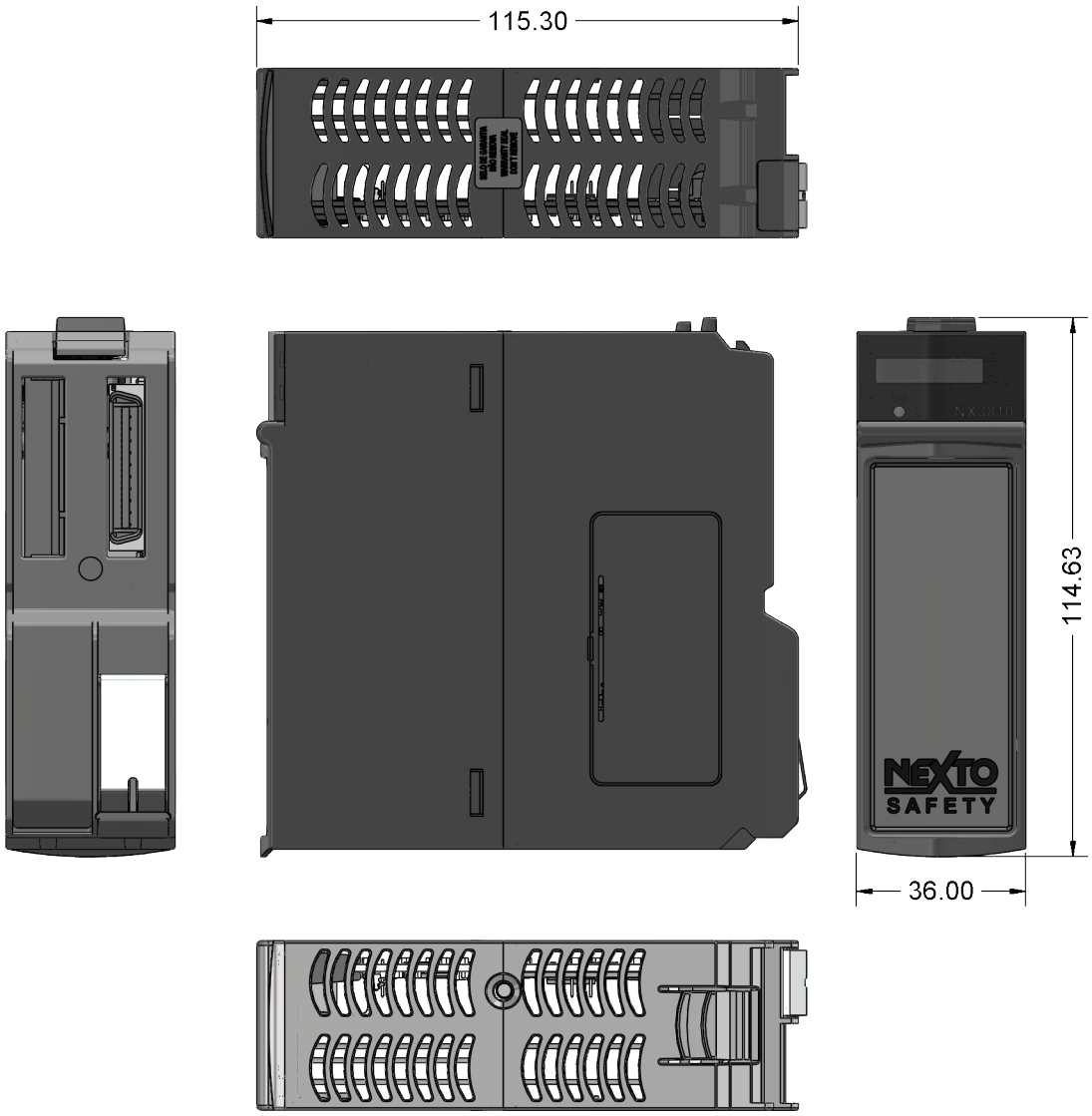

Figure 2: NX3810 - Physical Dimensions

Configuration

The information related to module configuration can be found on Nexto Safety User Manual - MU214602.

Maintenance

The maintenance and diagnostic information can be found on Nexto Safety User Manual - MU214602.

Manuals

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

Code	Description	Language
MU214602	Nexto Safety User Manual	English
CE114699	Nexto Safety CPU – Technical Characteristic	English
CT114699	Nexto UCP de Segurança – Características Técnicas	Portuguese
CS114699	Nexto UCP de Seguridad – Especificaciones y Configuraciones	Spanish
CE114305	Safety 24 Vdc 8 DI Module – Technical Characteristic	English
CT114305	Módulo 24 Vdc 8 ED de Segurança – Características Técnicas	Portuguese
CS114305	Módulo 24 Vdc 8 ED de Seguridad – Especificaciones y Configuraciones	Spanish
CE114404	Safety 24 Vdc 4 DO Transistor Module – Technical Characteristic	English
CT114404	Módulo 24 Vdc 4 SD Transistor de Segurança – Características Técnicas	Portuguese
CS114404	Módulo 24 Vdc 4 SD Transistor de Seguridad – Especificaciones y Configuraciones	Spanish
MU214605	Nexto Series CPUs User Manual	English
MU214100	Manual de Utilização UCPs Série Nexto	Portuguese

Table 6: Safety Related documents