

# NX-ERA

Programmable Controllers Series





**TAKE CONTROL  
OVER YOUR  
BUSINESS**

# THE UNIQUE SOLUTION FOR YOUR APPLICATIONS

*With high performance and wide range of offerings, controllers can be applied to any automation and control system*

NX-ERA PLC Series is an advanced automation system able to control in a distributed and redundant way, complex industrial processes, high performance machines and production lines.

The Series presents resources for all stages of your application life cycle with its integrated programming and configuration environment based on IEC 61131-3 standard, speeding up development and reducing engineering and commissioning costs.

Its architecture allows easy integration with traditional supervision systems, not to mention its high availability capability with redundancy of CPUs, power supplies, supervision and control networks and field buses.

NX-ERA Series equipment advanced diagnostics and hot swapping, minimize or eliminate downtime for maintenance and ensure continuous production process.

The series also features high reliability modules and specific editors for application development with functional safety requirements and a unique solution designed to meet the specific demands of Industry 4.0.



**Modular  
architecture to  
give flexibility to  
your application**

#### **HIGH PERFORMANCE**

Multitasking and preemptive, the operating system of NX-ERA Series CPUs allow sophisticated applications and total control of the RISC 32-bit PowerPC processor. Combining high performance and lower power consumption, there is no need for moving parts contributing to a higher MTBF (Mean Time Between Failures).

The processor can perform more than 145,000 Boolean instructions or even 200 PID loops per millisecond, complex arithmetics and advanced control features that are essential for the complete automation of machines and industrial process.

#### **HIGH CONNECTIVITY**

NX-ERA Series supports hardware and software to OPC DA, traditional networks and field bus protocols (MODBUS RTU, MODBUS TCP, MODBUS RTU/TCP, PROFIBUS-DP, PROFINET\*, IEC 60870-5-104 Server, DNP3, EtherNet/IP, EtherCAT Master, OPC DA, OPC UA and MQTT) through its integrated CPU communication interface ports. Yet, in cases of necessity, users can develop their own protocols, allowing total integration with any industrial device.

\* Under development.



### AVAILABILITY

For applications that cannot be stopped, like O&G, Sugar and Ethanol, Waste, Steel, among others, NX-ERA Series has redundant CPUs and modules hot swapping, minimizing downtime for maintenance. The I/O module expansion feature without stopping the system enhances the Series potential.

### NETWORK VARIABLES

Smart and versatile, the Series CPUs have attributes that enable the creation of network variables. This feature enables the user to create, modify and share specific variables among several controllers connected to the network, which reduces the systems engineering time.

### FRIENDLY TO THE ENVIRONMENT

All NX-ERA Series modules come with protection on the components and electronic boards (conformal coating), seeking superior service life even in harsh environments. It also does not use lead in the manufacturing process, which makes it compatible with the European ROHS directive. Eco friendly, NX-ERA Series has large retain memory, no internal batteries and real-time clock (RTC) with long endurance. These features were made possible by the BFO (Battery Free Operation) technology, which consists in using hardware, and software algorithms that eliminate the need for internal information retention by using batteries, thereby reducing the environmental impact in disposing of these elements.

### SCALAR ARCHITECTURE

Based on deterministic Ethernet, the internal bus can be expanded to multiple remote backplane racks without performance loss. One CPU is able to control up to 320 I/O on a single backplane; local backplane can be connected up to 24 remote backplanes.

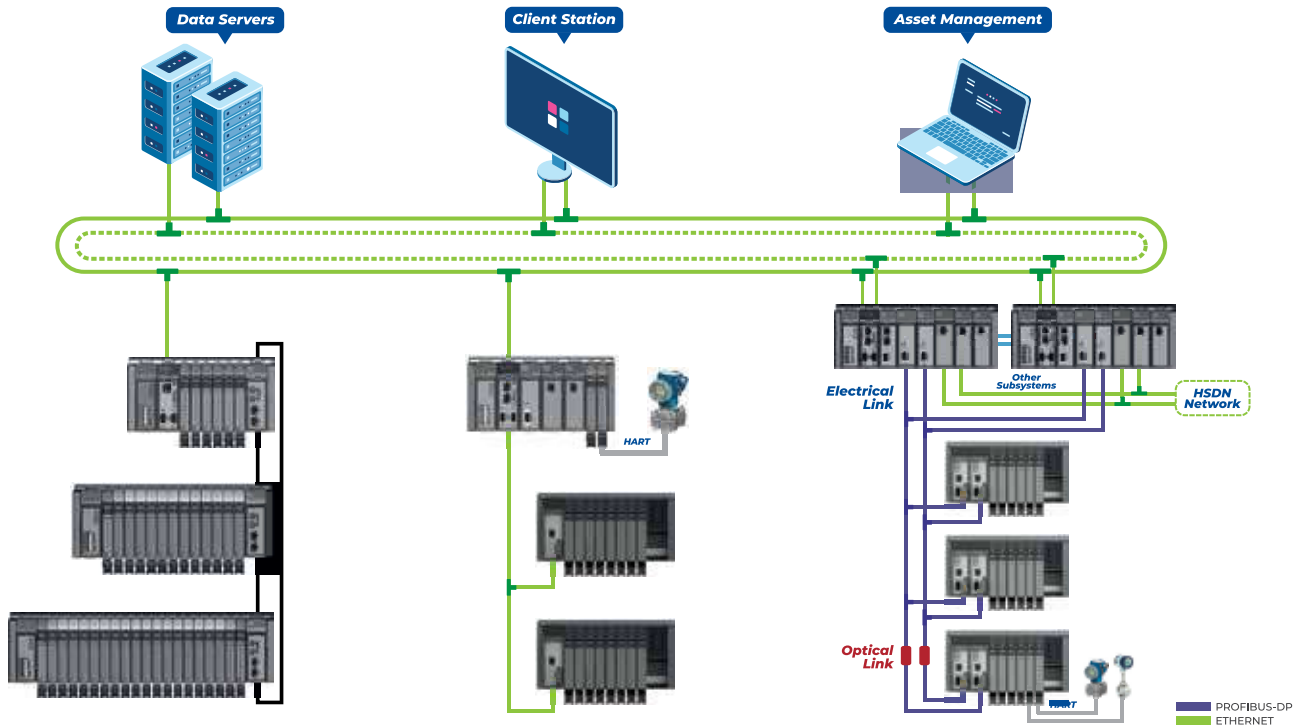
#### *Series is fully compatible with web services, such as:*

- Environment Design for Process Supervision WebPage (WebServer)
- Web pages server for visualization of diagnostics and product updates
- User visualization web pages for real-time application data monitoring and control
- SNTP for time synchronization and SNMP for Ethernet network management

### INTERNATIONAL CERTIFICATIONS

The high quality of NX-ERA Series is accredited by renowned technological institutes. In addition to being designed to meet the requirements established by European directives (CE), the Series products also bear important international certificates.

NX-ERA Series equipment are classified as NRAQ, granted by Under-writers Laboratories, according to the safety standards UL 61010-1 and UL 61010-2-201. It also holds the Type Approval certification, granted by DNV-GL Group, for marine applications, and the EAC certification, classes TROO04 and TR020, requirement for commercialization in countries such as Russia, Belarus and Kazakhstan.



## Bus expansion rack

High performance and advanced features for systems with a large number of I/Os

## Distributed systems

More reach to your control network, ideal for building automation, refrigeration and sanitation

## High availability

CPU redundancy and hot swap modules, perfect for non-stop applications

### ENHANCED DIAGNOSTICS

The diagnostics button, located in each module, has the One Touch Diag (OTD) feature, which displays advanced system information, such as a short circuit in the outputs, IP address and alphanumeric tags, among others, assisting in commissioning activities and avoiding technical documents handling at the time of maintenance. In conjunction with the Electronic Tag on Display (ETD) functionality, it allows the I/O module visualization of tags on the CPU graphical display.

### DATA STORAGE

The Multiple Block Storage (MBS) is a feature that brings different memories for program storage, commented source code, operands, retain data, log events and mass memory. This last one, made with miniSD card is used for user files, data application storage (data logging) and project documentation through the Onboard Full Documentation (OFD) feature, which speeds up the resolution of problems and ensures safety and reliability of the project information

### PRACTICAL AND MODERN

Easy Plug System (EPS) is a practical and safe terminal block insertion and extraction mechanism for input and output modules that exempts the use of auxiliary tools.

NX-ERA Series offers a wide range of I/O, communication interfaces and special modules. Its compact and modular design optimizes the space in control cabinets through the Double Hardware Width (DHW). This feature allows a combination of 18 or 36 mm wide modules.



## | AVAILABLE MODELS

	CODE	COMMUNICATION PORTS	PROTOCOLS	BUS EXPANSION	INTEGRATED POWER SUPPLY	MEMORY CARD	REDUNDANCY
CPUs	NX3010	2x Serial (RS-232 and RS-485/422) 1x Ethernet TCP/IP	Standard protocols*	up to 8	No	Yes	No
	NX3020	2x Serial (RS-232 and RS-485/422) 2x Ethernet TCP/IP	IEC 60870-5-104 Server, EtherCAT Master and standard protocols*	up to 24	No	Yes	No
	NX3030	2x Serial (RS-232 and RS-485/422) 2x Ethernet TCP/IP	IEC 60870-5-104 Server, EtherCAT Master and standard protocols*	up to 24	No	Yes	Yes
COMMUNICATION	NX5000	10/100 Mbps Ethernet TCP/IP Module					
	NX5001	PROFIBUS-DP Master					
	NX5100	MODBUS TCP Head					
	NX5101	MODBUS TCP Head, 14 ED 24 Vdc, 10 SD Transistor w/ no hot swap					
	NX5110	PROFIBUS-DP Head					
	NX5210	Redundant PROFIBUS-DP Head					
INPUT	NX1001	24 Vdc 16 DI Module					
	NX6000	8 AI Voltage/Current Module					
	NX6010	8 AI Thermocouple Module					
	NX6014	8 AI Functional Module with HART					
	NX6020	8 AI RTD Module					
OUTPUT	NX2001	24 Vdc 16 DO Transistor Module					
	NX2020	16 DO Relay Module					
	NX6100	4 AO Voltage/Current Module - 16 bits					
MIXED I/O	NX1005	24 Vdc 8 DO Transistor / 8 DI Mixed Module					
POWER SUPPLY	NX8000	30 W 24 Vdc Power Supply Module					
RACKS	NX9000	8-Slot Backplane Rack					
	NX9001	12-Slot Backplane Rack					
	NX9002	16-Slot Backplane Rack					
	NX9003	24-Slot Backplane Rack					
SPECIAL	NX4000	Bus Expansion Module					
	NX4010	Redundancy Link Module					
ACCESSORIES	NX9100	Left/Right Side Rack Ends					
	NX9101	8 Gb Memory Card, MicroSD with MiniSD Adapter					
	NX9102	Rack Connector Cover					
	NX9202	RJ45-RJ45 (2 m) Cable					
	NX9205	RJ45-RJ45 (5 m) Cable					
	NX9210	RJ45-RJ45 (10 m) Cable					
	NX9401	6 Position Connector					
	NX9402	10 Position Connector					
	NX9403	20 Position Connector					
	NX9404	6 Position Connector with mounting					
	NX9405	12 Position Connector with mounting					
	NX9406	18 Position Connector with mounting					

\* Standard protocols: MODBUS RTU, MODBUS TCP, MODBUS RTU/TCP, SNTP, SNMP, EtherNet/IP, OPC UA, OPC DA and MQTT.



## High reliability for functional safety applications

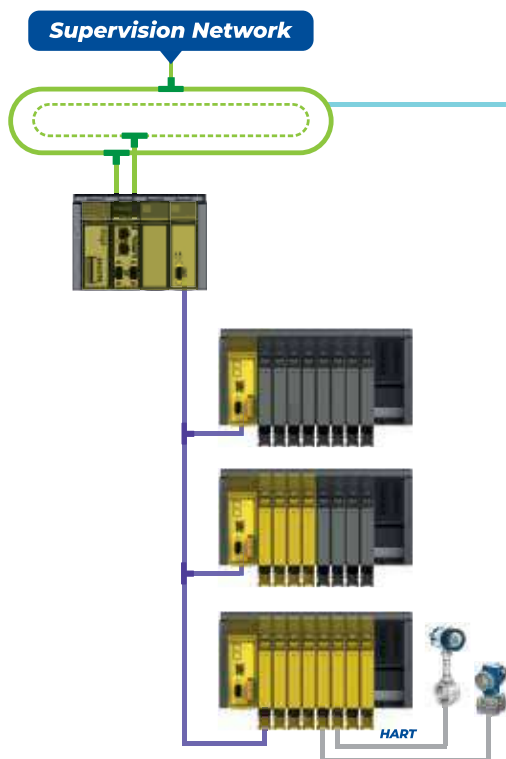
*NX-ERA PLCs feature an exclusive solution of modules to be used in functional safety industrial applications. Created to minimize the likelihood of dangerous failures in product design and manufacturing, NX-ERA Safety meets the specifications of international standards for fault analysis and treatment.*

### INTERNATIONAL STANDARDS

There are different standards related to product development for applications with functional safety requirements. The main one is IEC 61508, that states the requirements and procedures necessary to the development of this type of products. The standard defines that, for systematic failures rate reduction, well structured procedures must be followed during the product's conception, execution, verification and validation.

The standard defines functional safety levels (SIL, SIL2, SIL3 and SIL4) and each level is related to a maximum value of bearable dangerous failures, where SIL1 has the highest and SIL4 the lowest failure rate admitted. What defines the necessary SIL rating for each application is the level of risk to human and physical integrity. All products of NX-ERA Safety Solution allow up to SIL3 rating.





## Security architecture

Automation system for functional safety with PLC Safety and PROFI-safe control.



### INDUSTRIAL MACHINES

Another highly used standard is ISO 13849-1, especially in regards to large machine functional safety. Just like IEC 61508, ISO 13849-1 states tolerable dangerous failures rates as well as the requirements of two consecutive failures. The Series products meet Category 4 performance level, called Cat 4. 4 PLe.

### INTEROPERABILITY AND PROTECTION

NX-ERA Safety Solution products allow the use of conventional and safety equipment on the same backplanes and communication networks. This feature enables the implementation of a simpler project with backplanes, power supply, network interface and integrated programming tools, besides ensuring data exchange between the Safety and the conventional CPU in a safe way. The data integrity is guaranteed by the use of a secure protocol, which is PROFI-safe protocol in the products in scope.

### DIGITAL I/O

NX2800 safety digital output module features PN outputs, allowing the controlling of the output status to be made either on the positive or negative part of the load connection. This process ensures the output shutdown even in case of failure detection in one of the triggering circuits or failures in the internal logic of the product.

The NX1800 digital input module offers many different specific diagnostics to avoid erroneous textures in case of mesh failures. The module counts on two output signal groups that feed the input values through safety switches and are responsible for continuous testing of the digital inputs. They can still work with several contact combinations, such as simple antivalent, double equivalent and antivalent.

The solution also features the NX6800, an eight current safety analog input module with HART protocol support.

## | AVAILABLE MODELS

	CODE	DESCRIPTION
SAFETY MODULES (SIL3)	NX3810	Functional Safety Module CPU
	NX1800	24 Vdc 8 DI Functional Safety
	NX2800	24 Vdc 4 DO Functional Safety Transistor
	NX6800	8 AI Functional Safety Current Module with HART



*In addition to being a rugged equipment designed to meet the requirements of large applications, NX-ERA Series offers a combination of input and output modules without hot swap, ideal for distributed systems and medium-to-small-size applications. Compact, delivering high performance, the equipment retains essential features of the Series and can be used with its flagship products.*

### **HIGH PERFORMANCE CPU**

With its integrated power supply and I/O points, the NX-ERA CPUs, part of NX-ERA solution, are ideal for building automation processes such as access management, lighting and thermal comfort environment, textile applications in confined areas, water cooling, reservoir and pump control room, and other architectures for most areas of the industry. With a 4 ms response time per cycle, the unit stands out as the best performing solution for the machine market. The CPU also has PID variable reading and processing to control positioning,

speed, temperature, humidity and other aspects verified in cooling and atmospheric control systems.

Integrated to MasterTool IEC XE and using all NX-ERA Series CPUs, fieldbus masters and backplanes, the solution allows any application to be expanded with the use of NX-ERA Series I/O modules, protecting the investment done on the automation system and offering technology updates and future improvements.

## I/O MODULES

The solution is composed by a group of smart input and output modules with features that allow its use in a variety of applications. The digital I/O offering turn Nexto Jet into an extremely versatile solution, as well as reliable and compact. Available on 16 points per module configuration, with 18 mm width each, the source-type digital outputs and sink/source inputs are optically isolated, perfect for operation at 24 Vdc.

On the other hand, the analog modules can be found in different versions, like input and output (I/O) for voltage and current, temperature reading with RTD sensors (Resistance Temperature Detectors) and thermocouples. No hot swapping available.



## WEBSERVER SUPPORT

To give the user more flexibility and agility in the development of small and medium size applications, NX-ERA Series counts on WebServer, a system that allows the creation of supervision and monitoring screens without the use of SCADA software. Available on the NX3005 CPU and XP340 compact PLC, the tool is embedded in the programmable controller memory and can be accessed through the web browser of any device (computer, tablet or smartphone) connected to the network. In addition to allowing the user to control the system remotely, the feature represents considerable savings for the project, as it does not require the use of dedicated supervision equipment and software.

## AVAILABLE MODELS

\* Protocolos padrão: MODBUS RTU, MODBUS TCP, MODBUS RTU/TCP, SNTIP, SNMP, EtherNet/IP, OPC UA, OPC DA and MQTT.

	CODE	COMMUNICATION PORTS	PROTOCOLS	INTEGRATED I/O	MAXIMUM I/O PER BUS	BUS EXPANSION	INTEGRATED PWER SUPPLY	WEBSERVER
CPUs	NX3003	1x Serial (RS-485) 1x Ethernet TCP/IP	Standard protocols*	14 DI and 10 DO 24 Vdc	184	No	Yes	No
	NX3004	1x Serial (RS-485/422) 1x Ethernet TCP/IP	Standard protocols*	No	512	up to 1	Yes	No
	NX3005	1x Serial (RS-485/422) 1x Ethernet TCP/IP	IEC 60870-5-104 Server and standard protocols*	No	1024	up to 4	Yes	Yes
INPUT	NJ1001	24 Vdc 16 DI Module						
	NJ6000	8 AI Voltage/Current Module - 16 bits						
	NJ6001	6 AI Voltage/Current Module - 12 bits						
	NJ6010	8 AI Thermocouple Module						
	NJ6011	4 AI Thermocouple Module						
	NJ6020	8 AI RTD Module						
OUTPUT	NJ2001	24 Vdc 16 DO Transistor Module						
	NJ6100	4 AO Voltage/Current Module - 16 bits						
	NJ6101	4 AO Voltage/Current Module - 12 bits						
MIXED I/O	NJ1005	8 DO 24 Vdc Transistor and 8 DI 24 Vdc Mixed Module						
	NJ6005	4 AO and 6 AI Voltage/Current - 12 bits						
RACKS	NX9020	2-Slot Panel						
	NX9010	8-Slot Backplane Rack (no hot swap)						



# XPRESS

## YOUR GATEWAY TO **INDUSTRY 4.0**

**Connect your business  
to the IoT universe**



*Ideal for building automation, such as lighting and climate control, process supervision, conveyors and access control.*



*Precision variable control in sanitation market applications such as remote control stations, pumping stations and reservoir level control.*



*Speed and economy to control labelers, blowers, washers, injectors, baggers, grinders, presses and other machines.*

### **VERSATILITY**

The solution offers four models that differ in number of points and features available: XP300, XP315, XP325 and XP340. With up to 43 I/O points per product, Xpress devices still have 04 fast inputs and 04 outputs, LEDs for status indication and diagnostics, DIN rail mounting, pull-out connectors and expandability via CAN port or the I/O points themselves.

### **CONFORMAL COATING**

To ensure the integrity of PLCs even in harsh environments, Xpress printed circuit boards undergo a conformal coating process, in which a thin layer of non-conductive material is applied to protect them from corrosion, extreme temperatures, salt spray, humidity, among others.



### SMALL IN SIZE, HUGE IN PERFORMANCE

With compact design (212,5 x 90,1 x 32,2 mm) and 24 Vdc power supply, the Xpress solution is ideal for embedded control of machines and small size applications. Its ARM 32 Bit processor, combined with Real Time Clock (RTC), high density of multiple purpose (tension, current and RTD) digital and analog I/O, give the solution an elevated processing capability, accuracy and agility on data acquisition.

### QUICK AND MULTIPROTOCOL COMMUNICATION

Designed to meet the demands of highly connected environments, the solution supports a wide variety of communication protocols, which enables you to interact with different types of smart devices. In addition to Ethernet based protocols, such as MODBUS TCP, EtherNet/IP, OPC DA, OPC UA and MQTT, Xpress products also count on RS 485, CAN and USB Serial communication interfaces.

*Digital outputs supporting 1.5 A per dot {maximum 12 A}, 12-bit resolution analog I/O, and ali-channel update in less than 1 ms, one of the fastest on the market.*

*Possibility to connect to smart devices such as media converters, barcode readers, wireless modems and data storage devices via USB interface. \**

*In addition, the XP340 model offers WebServer support, a system that allows the creation of supervision and monitoring screens. More details about this feature can be found on page 9.*

*\* Contact our sales team for more information.*

## AVAILABLE MODELS

	CODE	DIGITAL INPUTS	DIGITAL OUTPUTS	V/I ANALOG INPUTS	RTD ANALOG INPUTS	V/I ANALOG OUTPUTS	CANOPEN MASTER PROTOCOL	WEBSERVER
CPUs	XP300	16	16	-	-	-	Yes	No
	XP315	16	16	5	2	-	Yes	No
	XP325	16	16	5	2	4	Yes	No
	XP340	16	16	5	2	4	Yes	Yes



# MASTERTOOL



MasterTool IEC XE



**One tool for all stages of your project lifecycle**



## **A COMPLETE TOOL**

NX-ERA Series has a complete tool for programming, debugging, configuration and simulation of user applications: the MasterTool IEC XE. The software is based on the CODESYS technology platform, known worldwide, with resources for all stages of the life cycle of an automation and process control project, ensuring efficiency throughout the development, commissioning and maintenance.

## **EASY COMMISSIONING**

The software also offers vast capability of monitoring and forcing of digital and analog variables. The tool also features real-time data viewing and applications source code, as well as online editing download application. The trace functions allow the user to monitor internal variables directly into the controller in a graphical and practical way. This feature allows easy data viewing and application debugging without supervisory systems or other external programs.

**ADVANCED FEATURES**

Through this software, NX-ERA Series enables the development of advanced functions, such as variables process handling, mathematical functions, PID control blocks and timers. The Series is also able to reuse these functions in different applications through a sophisticated library function block system, optimizing productivity and minimizing development costs.

**INTEGRATED CONFIGURATION**

NX-ERA Series integrates field bus configuration and standard communication protocols, such as PROFIBUS-DP and MODBUS to the programming tool. This feature allows users to define all configuration parameters in only one place, without using other software tools, speeding up development and reducing engineering costs. Besides, it is also possible to import and export configuration and other applications information, enabling its use in other projects.

**DOCUMENTATION AND SECURITY OF APPLICATIONS**

In order to achieve full control and maximum security over the system, MasterTool IEC XE allows full source-code storage, comments, tags and application project descriptions, in addition to different access levels to controllers and information through user login, user groups, passwords and specific access rights.

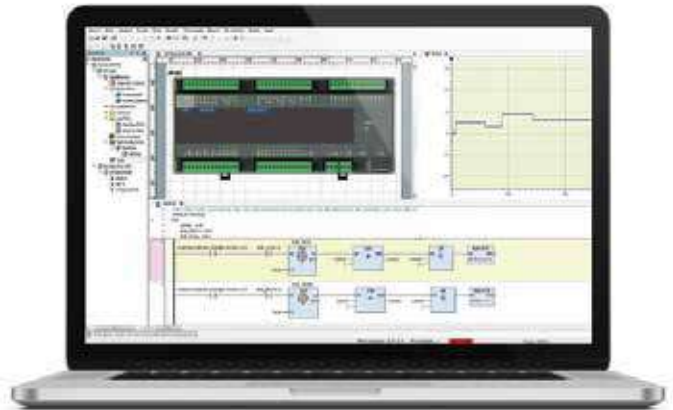
**SIMULATION**

MasterTool IEC XE offers a simulation tool that enables users to evaluate and test various project to its operation. It works in online mode (real-time) and offline with no need of connection with the controller. In addition, error anticipation during planning and specification steps reduces risks of failures in engineering projects. The tool also enables possible modifications to be tested previously without interfering in the real system, avoiding accidents, damage to properties and the environment, not to mention loss of production or efficiency.

**MASTERTOOL | AVAILABLE MODELS**

	CODE	DESCRIPTION
SOFTWARE	MT8500/LITE	MasterTool IEC XE LITE
	MT8500/BASIC	MasterTool IEC XE Basic
	MT8500/PRO	MasterTool IEC XE Professional
	MT8500/ADV	MasterTool IEC XE Advanced
SAFETY	MT8800/LITE	MasterTool Safety Lite
	MT8800/PRO	MasterTool Safety Professional

**Intuitive programming environment for advanced application development**



**CUSTOMIZABLE ENVIRONMENT**

Free for Xpress PLCs, NX3003, and applications up to 320 I/O points, MasterTool IEC XE software comes with a modern and customizable interface due to available docking resources. Those resources allow the user to configure bars, tools and menu structure, providing a different development experience. Object-oriented, the programming is graphical and friendly, with advanced editing capabilities, integrating software application, field buses and other processes into a single interface.

**PROGRAMMING LANGUAGE**

The software allows the use of different programming languages defined in the IEC 61131-3 standard — both graphic and textual — in the same project. Among the graphics languages, the following can be highlighted: FBD (Function Block Diagram), CFC (Continuous Function Chart), SFC (Sequential Function Chart) and traditional LD (Ladder Diagram). The textual are divided in ST (Structured Text) and IL (Instruction List). The tool also makes it possible to convert the application between the graphic languages and reuse them in other versions of the software.



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