1. Product Description

The Nexto XF is a powerful Programmable Logic Controller (PLC), belonging to the family of controllers and I/O modules of the Nexto Series. The Nexto XF provides high-speed processing power in a compact design with embedded I/O, easily expandable with external I/O modules. There are several options available, allowing you to choose the best solution regardless of the complexity of the application.

This product portfolio targets small, medium and distributed control systems, offering models with a range of options of embedded I/O points that includes digital and analog inputs and outputs concentrated in a single controller. For additional I/O needs, the system can be easily expanded through expansion modules coupled to the high-speed bus (refer to Related Products section). Additionally, the number of I/O points can be further increased through remote (distributed) I/O devices communicating via protocols such as CANopen, EtherNet/IP, PROFINET, EtherCAT, and MODBUS.

The Nexto XF can be used in applications such as infrastructure, marine, building and factory automation (food, textile, packaging, general machinery), water and wastewater treatment and numerous OEM solutions. Integrated solutions of firewall and VPN add security to ensure data integrity and reduce risks associated to cybersecurity threats. Additionally, the controller is an ideal solution to complement large applications along with the Nexto Series portfolio, extending the range of applications using the same technology and engineering environment. This is a significant advantage for OEMs and system integrators with a wide range of applications needs and sizes.

Key features include:

- Compact and modern design
- DIN rail mounting
- High-speed bus I/O expansion
- High-performance 64-bit Dual-Core ARM processor
- Two 10/100 Mbps Ethernet interfaces with protocols such as OPC UA, EtherNet/IP, PROFINET, EtherCAT, MODBUS, RSTP and MQTT (complete list in this document)
- Web service (Webvisu)
- Docker Engine
- Firewall and VPN
- CAN interface (CANopen and J1939)
- RS-485 interface (MODBUS RTU, Master/Slave)
- High I/O density (up to 44 embedded I/O points in the controller)
- Opto-isolated digital inputs
- Encoder inputs (quadrature)
- Opto-isolated transistor digital outputs
- PTO outputs
- Dedicated analog voltage and current inputs
- Analog voltage or current outputs
- Memory card (microSD)
- USB host port (V2.0)
- LEDs for I/O status indication and diagnostics
- Real-time clock (RTC)
- Retentive memory
- Compliance with international standard (IEC 61131-3)
- Fanless cooling (no moving parts)
- Battery-free
- Conformal coating

2. Ordering Information

2.1. Included Items

The product packaging includes the following items:

- PLC module with embedded I/O XF3xx
- 40-pin connector
- 20-pin connector (except for XF300 and XF300-B)
- 3-pin connector
- 2 x 4-pin connectors
- Nexto XF bus terminator
- CPU embedded I/O cable cover

2.2. Product Code

The following code should be used to purchase the product:

Code	Description
XF300-B	High-speed compact PLC with 16 digital inputs, 16 transistor digital outputs, 2 Ethernet ports, 1 RS-485 port, 1 CAN port, USB Host, and microSD card. Support for basic protocols only.
XF300	High-speed compact PLC with 16 digital inputs, 16 transistor digital outputs, 2 Ethernet ports, 1 RS-485 port, 1 CAN port, USB Host, and microSD card.
XF315	High-speed compact CLP with 16 digital inputs, 16 transistor digital outputs, 6 current analog inputs, 4 voltage analog inputs, 2 Ethernet ports, 1 RS-485 port, 1 CAN port, USB Host, and microSD card.
XF325	High-speed compact PLC with 16 digital inputs, 16 transistor digital outputs, 6 current analog inputs, 4 voltage analog inputs, 2 analog outputs (V/I), 2 Ethernet ports, 1 RS-485 port, 1 CAN port, USB Host, and microSD card.
XF325-W	High-speed compact PLC with 16 digital inputs, 16 transistor digital outputs, 6 current analog inputs, 4 voltage analog inputs, 2 analog outputs (V/I), 2 Ethernet ports, 1 RS-485 port, 1 CAN port, USB Host, microSD card and user web page support.

Table 1: Nexto XF Controller Models

3. Related Products

The following products must be purchased separately when necessary:

Code	Description
MT9000	Mastertool X
AL-2600	RS-485 network branch and terminator
AL-2306	RS-485 cable for MODBUS or CAN network
NX9101	32 GB microSD memory card with miniSD and SD adapters
FBS-USB-232M9	Universal USB-Serial converter cable / 2m
XP900	TP-Link nano Wireless 150 Mbps USB Adapter TL-WN725N (only available in Brazil)
AMJG0808	Simple cable RJ45-RJ45 2 m
XF101	24Vdc 16 DI module
XF201	24Vdc 16 DO transistor module
XF600	8 AI voltage/current module
XF610	8 AI thermocouple module
XF620	6 AI RTD module
XF700	4 AO voltage/current module
XF900	Nexto XF bus terminator
XF901	CPU embedded I/O cable cover
XF902	I/O module cable cover

Table 2: Related Products

Notes:

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

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

FBS-USB-232M9: Cable for use as a USB-Serial converter on the USB interface of XF controllers.

AMJG0808: Cable for programming the CPUs.

4. Product Features

4.1. General Features

	XF300-B	XF300	XF315	XF325	XF325-W
Digital inputs	16 (9 fast)				
Digital outputs	16 (8 fast)				
Max. number of high-speed counters	3				
Max. number of external interruptions	9				
Max. number of PTO outputs	3				
Max. number of VFO/PWM outputs	8				
Analog voltage inputs	-		4	4	4
Analog current inputs	-		6	6	6
Analog V/I outputs	-		-	2	2
Ethernet TCP / IP interface	2				
Ethernet interface redundancy support	Yes				
RS-485 serial interface	1				
CAN interface	1				
USB Host port	1				
Max number of I/O expansion modules supported	10				
User web pages (Webvisu)	No				Yes, 2048 tags
Docker engine	No	Yes			
I/O Channels	128	512			
Communication Tags	512	2048			4096
Mapped points	20480				
Communication Protocols	See table Protocols				
FTP	Yes				
Firewall	Yes				
VPN	Yes				
Programming languages	Structured Text (ST) Ladder Diagram (LD) Sequential Function Chart (SFC) Function Block Diagram (FBD) Continuous Function Chart (CFC)				
Online changes	Yes				
Maximum number of tasks	16				
Watchdog	Yes				
Status and diagnosis	LEDs, web page and internal CPU memory				
Real-time clock (RTC)	Yes 1 ms resolution, max. variation of 3 seconds per day, retention time of 14 days.				
Isolation					
Protective earth ⏚ to all	1000 Vac / 1 minute (1414 Vdc / 1 minute)				
Logic/USB to all	1000 Vac / 1 minute (1414 Vdc / 1 minute)				
Power supply to all	1000 Vac / 1 minute (1414 Vdc / 1 minute)				
NET1 to all	1000 Vac / 1 minute (1414 Vdc / 1 minute)				
NET2 to all	1000 Vac / 1 minute (1414 Vdc / 1 minute)				

CAN to all	1000 Vac / 1 minute (1414 Vdc / 1 minute)
RS-485 to all	1000 Vac / 1 minute (1414 Vdc / 1 minute)
Analog I/O to all	1000 Vac / 1 minute (1414 Vdc / 1 minute)
Digital inputs to all	1000 Vac / 1 minute (1414 Vdc / 1 minute)
Digital inputs group I0x to I1x	1000 Vac / 1 minute (1414 Vdc / 1 minute)
Digital outputs to all	1000 Vac / 1 minute (1414 Vdc / 1 minute)
Maximum power dissipation	10 W
Maximum wire size	0.5 mm^2 (20 AWG) with ferrule 1.5 mm^2 (16 AWG) without ferrule
Minimum wire temperature rating	75 °C
Wire material	Copper only
IP level	IP 20
Conformal coating	Yes
Operating temperature	-20 to 60 °C
Storage temperature	-40 to 70 °C
Operating and storage relative humidity	10% to 95%, non-condensing
Vibration resistance (IEC 60068-2-6, sinus)	3.5 mm from 5 to 8.4 Hz 1 G from 8.4 to 500 Hz 10 sweeps each axis, 1 octave per minute
Shock resistance (IEC 60068-2-27, half-sine)	15 G for 11 ms, 6 shocks in each of 3 axis
Product dimensions (W x H x D)	112.2 x 122.8 x 123.0 mm (102.8 x 122.8 x 110.8 mm without I/O termination and without cable cover)
Package dimensions (W x H x D)	128 x 138 x 138 mm
Weight	513.5 g
Weight with package	675.1 g

Table 3: General Features

Notes:

I/O Channels: Maximum number of individual input and output channels used by the application, listed in *I/O Mapping* tab of each device editor window. A channel may contain multiple I/O points (especially for digital I/O), so the count of channels is less than the number of I/O points. The number of I/O Channels used by the application is informed by Mastertool on *Messages* window within the category *Software Metrics*.

Communication Tags: Maximum number of variables explicitly designated for data exchange between the controller and external systems using OPC UA, OPC DA and CODESYS Protocol - ARTI, configured on *Communication Manager* or *Symbol Configuration*. The number of *Communication Tags* used by the application is informed by Mastertool on *Messages* window within the category *Software Metrics*.

Webvisu Tags: Maximum number of application variables used in web visualization dashboard. The number of *Webvisu Tags* used is informed by Mastertool on *Messages* window within the category *Software Metrics*.

Mapped points: Maximum number of communication points mapped specifically on protocols MODBUS, IEC 104, DNP3 and IEC 61850 (if supported). Each mapping can contain one or more mapped points, depending on the data size. This varies depending on whether simple variables or ARRAY-type variables are used. Each simple variable, as well as each index of an ARRAY, is counted as a mapped point, even if it occupies more than one address in the driver. For example, a simple DWORD-type variable mapped in the MODBUS protocol will be counted as a single point, even though it occupies two consecutive addresses/registers in the driver.

Isolation: The term *Logic* refers to the processing circuit that is electrically isolated from the interfaces, with the exception of the USB interface.

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

Number of I/O modules: The maximum number of I/O modules supported by the CPU depends on the power consumed on the bus. Use Mastertool to configure the number of modules and scale the power consumption on the bus.

4.2. Standards and Certifications

Standards and Certifications	
IEC	61131-2: Industrial-process measurement and control - Programmable controllers - Part 2: Equipment requirements and tests 61131-3: Programmable controllers - Part 3: Programming languages
	DNV Type Approval – DNV-CG-0339 (TAA000013D)
	2014/30/EU (EMC) 2011/65/EU and 2015/863/EU (ROHS)
	S.I. 2016 No. 1091 (EMC) S.I. 2012 No. 3032 (ROHS)
	Ordinary and Hazardous Locations (C1D2): cULus LISTED Certification process in progress

Table 4: Standards and Certifications

4.3. Memory

	XF300-B	XF300	XF315	XF325	XF325-W
Addressable input variables memory (%I)	64 KB				
Addressable output variables memory (%Q)	64 KB				
Direct representation variable memory (%M)	32 KB				
Symbolic variable memory	10 MB				32 MB
Program memory	32 MB				
Total memory **Program memory +** **Source code memory (backup) +** **Webvisu files memory**	256 MB				
Retain/persistent memory	128 KB				
User files memory **Memory of the CPU +** **Docker Memory**	2.5GB				

Table 5: Memory

4.4. Performance

Instruction	Language	Variable Type	Time (μs)
1000 Contacts	LD	BOOL	2.1
1000 Divisions	LD, ST	INT	9.2
		REAL	17.0
1000 Multiplications	LD, ST	INT	6.4
		REAL	8.2
1000 Sums	LD, ST	INT	4.4
		REAL	8.2

Table 6: Instruction Times

4.5. Protocols

The following table describes the limits of types and quantities (number of instances) of each protocol. Please note that there are other operational limits related to communication capabilities (maximum number of *I/O Channels*, *Communication Tags* and *Mapped Points*), which are informed on **??** table.

	Interface	XF300-B	XF300 | XF315 | XF325 | XF325-W
EtherCAT Master **PROFINET Controller** **EtherNet/IP Scanner**	NET 1 / NET 2	✗	Up to 1 instance
EtherNet/IP Adapter	NET 1 / NET 2	Up to 1 instance	Up to 2 instances
PROFINET Device	-	✗	✗
CANopen Master **SAE J1939**	CAN	Up to 1 instance	Up to 1 instance
CAN low level	CAN	✓	✓
CANopen Slave	-	✗	✗
Open Protocol	COM 1 / USB	✓	✓
Symbolic MODBUS RTU Master **Symbolic MODBUS RTU Slave**	COM 1	Up to 1 instance	Up to 1 instance
Symbolic MODBUS TCP Client **Symbolic MODBUS TCP Server** **Symbolic MODBUS RTU over TCP Client** **Symbolic MODBUS RTU over TCP Server**	NET 1 / NET 2	Up to 8 instances	Up to 8 instances
IEC 60870-5-104 Client	-	✗	✗
IEC 60870-5-104 Server	-	✗	✗
DNP3 Client	-	✗	✗
DNP3 Server	-	✗	✗
OPC DA Server	NET 1 / NET 2 / USB	✓	✓
OPC UA Server	NET 1 / NET 2 / USB	✓	✓
SNMP Agent	NET 1 / NET 2 / USB	✓	✓
MQTT Client	NET 1 / NET 2 / USB	✓	✓
Sparkplug B	NET 1 / NET 2 / USB	✓	✓
SNTP Client (clock synchronism)	NET 1 / NET 2 / USB	✓	✓
OpenVPN Client	NET 1 / NET 2 / USB	✓	✓
OpenVPN Server	NET 1 / NET 2 / USB	✓	✓
FTP Server	NET 1 / NET 2 / USB	✓	✓
RSTP	NET 1 / NET 2	✓	✓
MRP	NET 1 / NET 2	✗	✓

Table 7: Protocols

Notes:

USB: The use of a Serial Converter, Wi-Fi Adapter or 3G/4G Modem is necessary.

4.6. RS-485 Interface

	RS-485
Connector	4-pin terminal block (D+, D-, GND and shield)
Physical interface	RS-485 bus
RS-485 max. transceivers	32
Termination	Yes (through mechanical switch)
Baud rate	2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
Isolation	
Logic to serial port	1000 Vac / 1 minute
Serial port to protection earth ⏚	1000 Vac / 1 minute

Table 8: RS-485 Serial Interface Features

Note:
RS-485 maximum transceivers: It is the maximum number of RS-485 interfaces that can be used on the same bus.

4.7. CAN Interface

	CAN
Connector	4-pin terminal block (H, L, GND and shield)
Physical interface	CAN bus
Supported standards	CAN 2.0A 2.0B (11-bit and 29-bit identifiers)
Max. number of nodes	64
Termination	Yes (through mechanical switch)
Baud rate	10, 20, 50, 100, 125, 250, 500, 800, 1000 kbit/s
Isolation	
Logic to CAN	1000 Vac / 1 minute
CAN to protection earth ⏚	1000 Vac / 1 minute

Table 9: CAN Interface Features

4.8. Memory Card Interface

The memory card can be used for different data to be stored such as user logs, project documentation and source files.

	Memory Card
Maximum Capacity	32 Gbytes
Minimum Capacity	2 Gbytes
Type	MicroSD
File System	FAT32
Remove card safely	Yes (via button and web page)

Table 10: 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 PLC Web Page.

4.9. USB Interface

	USB
Connector	USB Type-A (female)
Physical interface	USB V2.0
Baud rate	1.5 Mbps (Low-Speed), 12 Mbps (Full-Speed) and 480 Mbps (High-Speed)
Maximum current	500 mA
Supported devices	Mass storage USB RS-232 Serial Converter USB 3G/4G Modem USB Wi-Fi Adapter USB Ethernet Adapter
Isolation **Logic to USB** **USB to protection earth** ⏚	 Not isolated 1000 Vac / 1 minute

Table 11: USB Interface Features

Attention:

The CPU supports the use of only one USB device at a time. Devices such as USB hubs are not supported.

4.9.1. List of Supported Devices

4.9.1.1. RS-232 Converter

Controller	Manufacturer
FT232	FTDI
PL2303	Prolific

Table 12: Supported USB to RS-232 converters

4.9.1.2. 3G/4G Modem

Model	Manufacturer	Type	Remarks
E303	Huawei	Bridge	-
E3272	Huawei	Bridge	-
E3276	Huawei	Bridge	-
E8372	Huawei	Router	-

Table 13: Supported USB modems

4.9.1.3. Ethernet Adapters

Adapter	Manufacturer
USB 3.0 to Gigabit SuperSpeed Ethernet Adapter UE300	TP-LINK
USB31000S USB 3.0 to Gigabit Ethernet Adapter	STAR TECH

Table 14: Supported USB to Ethernet adapters

4.9.1.4. Wi-Fi Adapters

Chipset	Manufacturer	Example of comercial products
RTL8188EU	Realtek	TP-LINK model TL-WN725N LM Technologies model LM007

Table 15: Supported chipsets for USB Wi-Fi adapters

4.10. Ethernet Interface

	Ethernet
Interfaces	NET1 and NET2
Connector	Shielded female RJ45
Auto crossover	Yes
Maximum cable length	100 m
Cable type	UTP or ScTP, category 5
Baud rate	10/100 Mbps
Physical layer	10/100 BASE-TX
Data link layer	LLC
Network layer	IP
Transport layer	TCP (Transmission Control Protocol) UDP (User Datagram Protocol)
Operation mode	Single / NIC Teaming / Switch
Diagnostics	LED (Link/Activity)
Isolation **Ethernet interface to logic** **Ethernet interface to ethernet interface** **Ethernet interface to protection earth** ⏚	 1000 Vac / 1 minute 1000 Vac / 1 minute 1000 Vac / 1 minute

Table 16: Ethernet Interface Features

4.11. Power Supply

	Power supply
Nominal input voltage	24 Vdc
Input voltage	18 to 30 Vdc
Maximum input current	1.4 A at 18 Vdc
Maximum in-rush current	15 A for 1 ms
Maximum interruption time	10 ms at 18 Vdc
Number of I/O modules supported by integrated power supply	10
Maximum Current on XF Bus	2.2 A
Input protections	Polarity reversal Overvoltage Short-circuit (fuse) Overload and short-circuit on the I/O module bus
Isolation **Input to logic** **Input to protective earth** ⏚	 1000 Vac / 1 minute 1000 Vac / 1 minute

Table 17: Power Supply Features

4.12. Digital Inputs

	Digital inputs
Number of inputs	7
Type of inputs	Opto-isolated, sink/source
Connector identification	I00 to I06
Input voltage	24 Vdc 15 to 30 Vdc for logic level 1 0 to 5 Vdc for logic level 0
Input impedance	4.95 kΩ
Max. input current	6.2 mA at 30 Vdc
Input status indication	Yes
Update time	2 ms
Input filter	Disabled or configurable by software from 2 ms to 255 ms
Isolation **Input to logic** **Input to protective earth** ⏚	 1000 Vac / 1 minute 1000 Vac / 1 minute

Table 18: Digital Inputs Features

Note:

Input Filter: The filter sampling is performed in the MainTask, so it is recommended to use values that are multiples of the task interval.

4.13. Fast Digital Inputs

	Fast digital inputs
Number of fast inputs	9
Type of fast inputs	Opto-isolated sink/source
Maximum number of fast counters	3 (Increment/Decrement, A-pulse, B-direction, and Z-zero)
Maximum number of encoders	3 (Quadrature A, B, and Z)
Max. number of external interrupts	9 (Rise, Fall or Both)
Connector identification	I07 to I15
Input voltage	24 Vdc 15 to 30 Vdc for logic level 1 0 to 5 Vdc for logic level 0
Input impedance	3.9 kΩ
Max. input current	7.3 mA at 30 Vdc
Configuration mode	**Modes for 1 input:** Standard digital input External interrupt **Modes for 3 inputs:** Counter 0: Quadrature or Up/Down (I07, I08, and I09) Counter 1: Quadrature or Up/Down (I10, I11, and I12) Counter 2: Quadrature or Up/Down (I13, I14, and I15)

	Fast digital inputs
Direction control for counting	Only through hardware
Edge detection for counting input	Rising edge, active at logic level 1 – default (support alternative settings)
Data format	32-bit signed integers
Operation limit	From -2,147,483,648 to 2,147,483,647
Max. input frequency	250 kHz
Min. pulse width @24Vdc	2 μs
Isolation **Input to logic** **Input to protective earth** ⏚	 1000 Vac / 1 minute 1000 Vac / 1 minute

Table 19: Fast Digital Inputs Features

4.14. Digital Outputs

	Digital outputs
Number of outputs	8
Type of outputs	Transistor switch, opto-isolated, source
Connector identification	Q00 to Q07
Max. current	1.5 A per output (single - unprotected) 6 A total
Leakage current	35 μA
Output resistance	100 mΩ
External power supply	19.2 to 30 Vdc
Switching time	3 μs - off-to-on transition 50 μs - on-to-off transition (400 Ω load at 24Vdc)
Max. switching frequency	250 Hz
Configurable parameters	Yes
Output status indication	Yes (LED)
Output protections	Yes (against voltage surges)
Isolation **Output to logic** **Output to protective earth** ⏚	 1000 Vac / 1 minute 1000 Vac / 1 minute

Table 20: Digital Outputs Features

Notes:
Switching time: The time required to turn off an output depends on the applied load.

CAUTION

The outputs are not protect for overcurrent or short circuit events.

4.15. Fast Digital Outputs

	Fast digital outputs	
Number of outputs	8	
Output type	Transistor switch, opto-isolated, source	
Connector identification	Q08 to Q15	
Max. number of PTO outputs	3	
Max. number of VFO/PWM outputs	8 (if not using PTO) 7 (when using 1 PTO) 6 (when using 2 PTOs) 5 (when using 3 PTOs)	
Maximum current	3 to 500 Hz: 1.5A per output (6.0 A total) 500 Hz to 250 kHz: 0.5 A per output	
Pulse generation minimum frequency	3 Hz from 60 mA	
Pulse generation maximum frequency	250 kHz from 60 mA	
Minimum pulse width at 24 Vdc	Minimum load	Positive pulse
	400 Ω	240 ns
Switching Time	0.2 μs - off-to-on transition 0.8 μs - on-to-off transition (400 Ω load at 24Vdc)	
Output status indication	Yes (LED)	
Protections	Voltage surge (TVS)	
Operating voltage	19.2 to 30 Vdc	
Output impedance	200 mΩ	
Output modes	Standard output VFO/PWM PTO (only Q08, Q09, and Q14)	
Software managed functions	PTO	VFO/PWM
	Writing the number of pulses to be generated; Writing the number of acceleration and deceleration pulses; Start/end outputs operation; Fast outputs diagnostics; Fast outputs monitoring state.	Writing the frequency value to be generated (3 Hz to 250 kHz, +/-1%); Writing of outputs duty cycle (1% to 100%); Start/end of outputs operations; Fast outputs diagnostics.
Isolation **Output to logic** **Output to protective earth** ⏚	 1000 Vac / 1 minute 1000 Vac / 1 minute	

Table 21: Fast Digital Outputs Features

4.16. Analog Inputs

	Analog inputs
Number of inputs	10 (with 6 current and 4 voltage)
Type of input	Dedicated as voltage or current, single-ended, configured individually
Data format	16 bits in two's complement, left-justified
Converter resolution	12 bits monotonicity guaranteed, no missing codes
Conversion time	400 μs (all channels enabled)
Channel status indication	Yes (LED)
Protections	Yes, protection against surge voltage and polarity inversion
Isolation **Channel to logic** **Channel to protective earth** ⏚	 1000 Vac / 1 minute 1000 Vac / 1 minute

Table 22: Analog Inputs Features

	Voltage input		
Input range	Range	Engineering Scale	Resolution
	0 to 10 Vdc	0 to 30,000	2.52 mV
Precision	±0.3 % of full scale @ 25 °C ± 0.010 % of full scale / °C		
Over scale	3 % of full scale		
Maximum input voltage	14 Vdc		
Input impedance	21 kΩ		
Configurable parameters	Filters		
Low pass filter time constant	100 ms, 1 s, 10 s or disabled		

Table 23: Voltage Analog Inputs Features

	Current input		
Input ranges	Range	Engineering Scale	Resolution
	0 to 20 mA	0 to 30,000	5.03 μA
	4 to 20 mA	0 to 30,000	5.03 μA
Precision	±0.3 % of full scale at 25 °C ± 0.015 % of full scale / °C		
Over scale	3 % of full scale		
Maximum input current	30 mA		
Input impedance	119 Ω		
Configurable parameters	Filters, open loop value		
Low pass filter time constant	100 ms, 1 s, 10 s or disabled		

Table 24: Current Input Mode Features

4.17. Analog Outputs

	Analog outputs
Number of outputs	2
Output type	Voltage or current output, individually configured
Data format	16 bits in two's complement, left-justified
Converter resolution	12 bits monotonicity guaranteed, no missing codes
Update time	400 μs (all outputs enabled)
Channel status indication	Yes (LED)
Protections	Yes, protection against surge voltage and polarity inversion
Isolation	
Channel to logic	1000 Vac / 1 minute
Channel to protective earth ⏚	1000 Vac / 1 minute

Table 25: Analog Outputs Features

	Voltage output mode		
Output ranges	Range	Engineering Scale	Resolution
	0 to 10 V	0 to 30,000	2.52 mV
Precision	±0.3 % of full scale at 25 °C ± 0.010 % of full scale / °C		
Stabilization time	4 ms		
Overscale	3% of full scale		
Load impedance	$>$ 1 kΩ		
Configurable parameters	Signal type per output (voltage or current)		

Table 26: Voltage Output Mode Features

	Current output mode		
Output ranges	Range	Engineering Scale	Resolution
	0 to 20 mA	0 to 30,000	5.03 μA
	4 to 20 mA	0 to 30,000	5.03 μA
Precision	±0.3 % of full scale at 25 °C ± 0.015 % of full scale / °C		
Stabilization time	4 ms		
Overscale	3% of full scale		
Load impedance	$<$ 600 Ω		
Configurable parameters	Signal type per output (voltage or current)		

Table 27: Current Output Mode Features

Notes:

Output ranges: When configured as 4 to 20 mA, the output can be set to values below 4 mA by assigning negative values to the output variable (-7,500 for 0 mA).

5. Installation

5.1. Product Identification

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

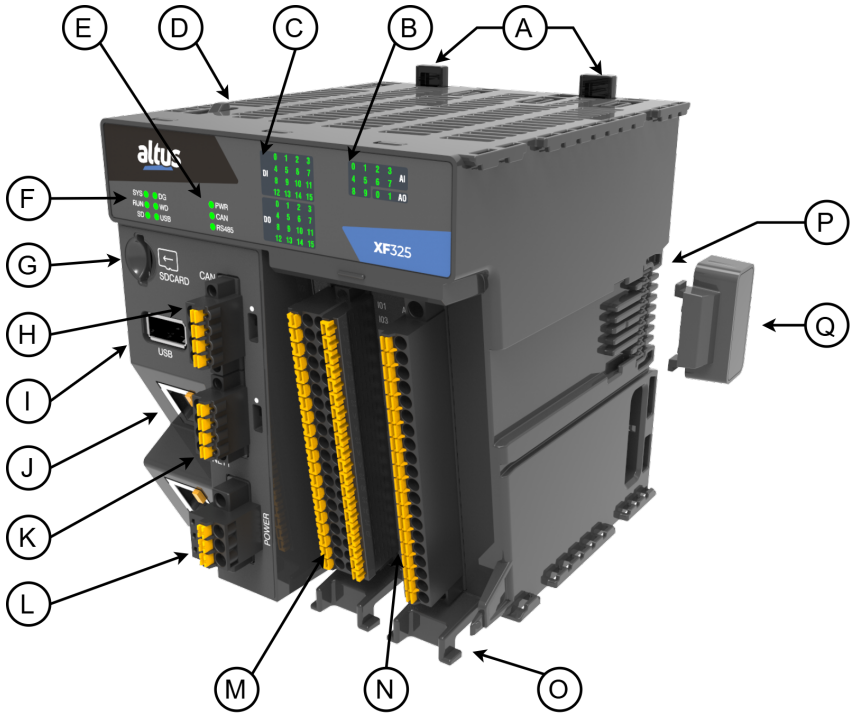

Figure 1: XF325

Ⓐ DIN rail mounting latch.
Ⓑ Status LEDs for embedded analog I/O.
Ⓒ Status LEDs for embedded digital I/O.
Ⓓ Button.
Ⓔ Status LEDs for PSU, CAN interfaces, and RS-485.
Ⓕ Status LEDs for CPU.
Ⓖ Micro SD card slot.
Ⓗ 4-terminal connector for CAN interface and termination switch.
Ⓘ USB device port.
Ⓙ RJ45 Ethernet connectors.
Ⓚ 4-terminal connector for RS-485 interface and termination switch.
Ⓛ 3-terminal connector for power input.
Ⓜ 40-terminal connector for embedded digital I/O.
Ⓝ 20-terminal connector for embedded analog I/O (not available for the XF300 and XF300-B).
Ⓞ Support for holding the I/O cable.
Ⓟ I/O Expansion Module Connection.
Ⓠ I/O termination.
Ⓡ CPU embedded I/O cable cover (not shown in this view).

5.2. Electrical Installation

Danger

When performing any installation in an electrical panel, ensure that the power supply is TURNED OFF.

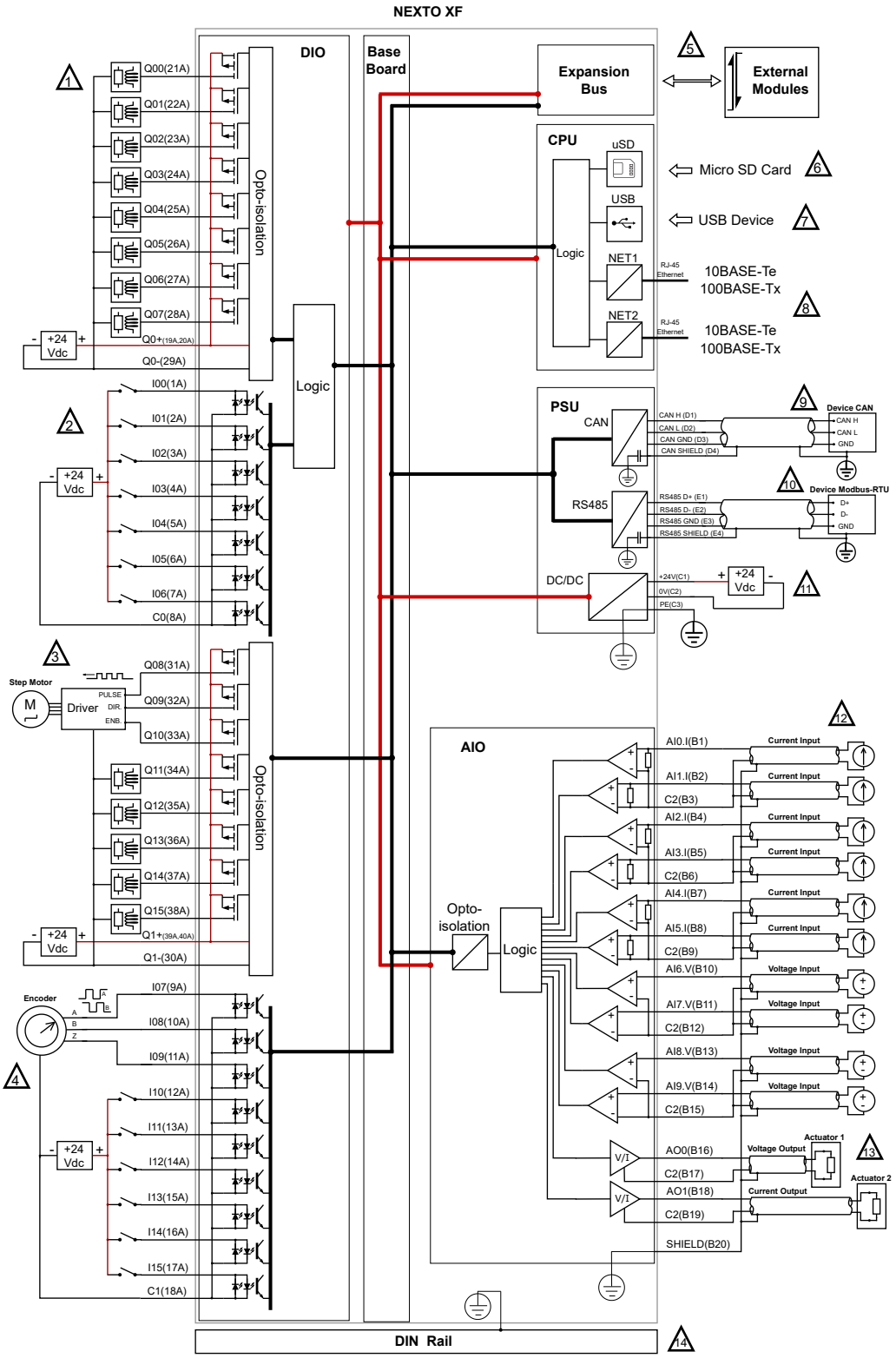

Figure 2: XF3xx electrical wiring diagram

Diagram notes:

1. Typical connection of the isolated digital outputs Q00 to Q07 (source type). Independent external 24Vdc power supply connected to terminals Q0+ and Q0-.

2. Typical connection of the isolated digital inputs I00 to I06 (sink type). Independent external 24Vdc power supply connected to the common terminal C0 and switch contacts.

3. Typical connection of the isolated fast digital outputs Q08 to Q15 for stepper motor control and discrete load activation. Independent external 24Vdc power supply connected to terminals Q1+ and Q1-.

4. Typical connection of the isolated fast digital inputs I07 to I15, with a 3-signal encoder (A, B, and Z) and discrete switches. Independent external 24Vdc power supply connected to the common terminal C1 and switch contacts.

5. I/O Expansion Modules bus connection to external modules or termination cover.

6. Micro SD card slot.

7. USB device port. Refer to the technical specifications table for the USB port to obtain the list of supported devices.

8. Use the Ethernet cables specified in the Related Products section. Connector shielding connected directly to internal ground.

9. Typical CAN serial interface connection. Cable shielding internally coupled to ground via capacitor; the cable shielding must be connected to ground externally at only one end.

10. Typical RS-485 serial interface connection. Cable shielding internally coupled to ground via capacitor; the cable shielding must be connected to ground externally at only one end.

11. Connection of the system power supply, nominally 24 VDC. The system grounding point if the DIN rail is not grounded.

12. Typical connection for analog voltage and current inputs. The cable shield grounding occurs at a single point on the connector. Cable shield connection should occur at only one end. This note does not apply to XF300 and XF300-B.

13. Typical connection for configurable voltage and current analog outputs. The cable shield grounding occurs at a single point on the connector. Cable shield connection should occur at only one end. This note does not apply to XF315, XF300 and XF300-B.

14. The grounding is performed through direct contact of the product with a standard DIN rail, which must be metallic and connected through a proper external grounding, see note 11.

Protective earth terminal.

For 24Vdc power supplies, for power inputs and I/O signals, use only isolated power supplies that provide safe extra-low voltage (SELV/PELV) with LPS or Class 2 or Energy Limited, in accordance with IEC 61131-2, IEC 61010-2-201 or equivalent.

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.

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.

5.3. Connector Pinouts

The following tables show the descriptions of each terminal on the connectors:

Terminal number	Description	Signal
1	24 Vdc power input	+24V
2	0 Vdc power input	0V
3	Protective earth	PE

Table 28: Power Input Connector

Terminal number	Description	Signal
1	CAN high differential signal	H
2	CAN low differential signal	L
3	Common of the CAN interface	GND
4	Cable shield connection	Shield

Table 29: CAN Interface Connector

Terminal number	Description	Signal
1	RS-485 data+ differential signal	D+
2	RS-485 Data- differential signal	D-
3	Common of the RS-485 interface	GND
4	Cable shield connection	Shield

Table 30: RS-485 Interface Connector

Terminal number	Description	Signal
1	Standard digital input 0	I00
2	Standard digital input 1	I01
3	Standard digital input 2	I02
4	Standard digital input 3	I03
5	Standard digital input 4	I04
6	Standard digital input 5	I05
7	Standard digital input 6	I06
8	Common for standard digital inputs	C0
9	Fast digital input 7	I07
10	Fast digital input 8	I08
11	Fast digital input 9	I09
12	Fast digital input 10	I10
13	Fast digital input 11	I11
14	Fast digital input 12	I12
15	Fast digital input 13	I13
16	Fast digital input 14	I14
17	Fast digital input 15	I15
18	Common for fast digital inputs	C1
19 and 20	Power supply for standard digital outputs	Q0+
21	Standard digital output 0	Q00
22	Standard digital output 1	Q01
23	Standard digital output 2	Q02
24	Standard digital output 3	Q03
25	Standard digital output 4	Q04
26	Standard digital output 5	Q05
27	Standard digital output 6	Q06
28	Standard digital output 7	Q07
29	Common for standard digital outputs	Q0-
30	Common for fast digital outputs	Q1-
31	Fast digital output 8	Q08
32	Fast digital output 9	Q09
33	Fast digital output 10	Q010
34	Fast digital output 11	Q011
35	Fast digital output 12	Q012
36	Fast digital output 13	Q013
37	Fast digital output 14	Q014
38	Fast digital output 15	Q015
39 and 40	Power supply for fast digital outputs	Q1+

Table 31: Digital I/O Connector

Terminal number	Description	Signal
1	Current analog input 0	AI0.I
2	Current analog input 1	AI1.I
3	Common of the analog interface	C2
4	Current analog input 2	AI2.I
5	Current analog input 3	AI3.I
6	Common of the analog interface	C2
7	Current analog input 4	AI4.I
8	Current analog input 5	AI5.I
9	Common of the analog interface	C2
10	Voltage analog input 6	AI6.V
11	Voltage analog input 7	AI7.V
12	Common of the analog interface	C2
13	Voltage analog input 8	AI8.V
14	Voltage analog input 9	AI9.V
15	Common of the analog interface	C2
16	Analog output 0	AO0
17	Common of the analog interface	C2
18	Analog output 1	AO1
19	Common of the analog interface	C2
20	Cable shield connection	Shield

Table 32: Analog I/O Connector

Note: Pin 1 of the connectors is located in the first position from left to right when viewed from the front of the connector.

5.4. Physical Dimensions

Dimensions in mm.

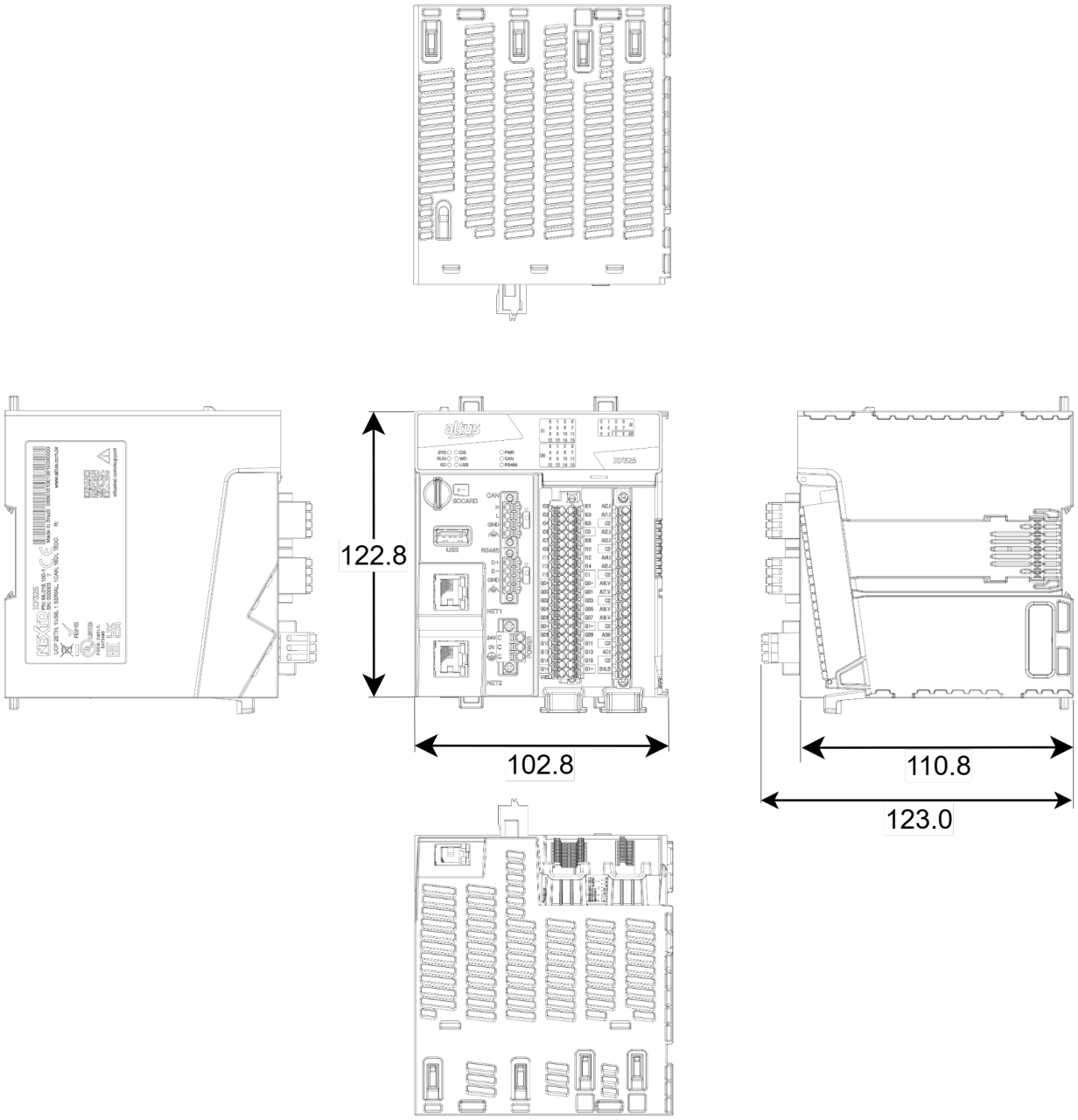

Figure 3: XF3xx Physical Dimensions

6. 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
CE118100	Nexto XF Technical Characteristics	English
CT118100	Características Técnicas Nexto XF	Portuguese
MU214000	Manual de Utilização Série Nexto	Portuguese
MU214600	Nexto Series User Manual	English
MU214622	LibSparkPlug User Manual	English
MU218600	Nexto XF User Manual	English
MU218000	Manual de Utilização Nexto XF	Portuguese
MU299611	Mastertool X User Manual	English
MU299049	Manual de Utilização Mastertool X	Portuguese
MP399609	IEC 61131 Programming Manual	English
MP399048	Manual de Programação IEC 61131	Portuguese
MU214606	MQTT User Manual	English
MU214609	OPC UA Server for Altus Controllers User Manual	English
MU214610	PID - Advanced Control Functions User Manual	English
MU214621	Nexto Series PROFINET Manual	English
NAP169	RSTP in Nexto CPUs	English

Table 33: Related Documents