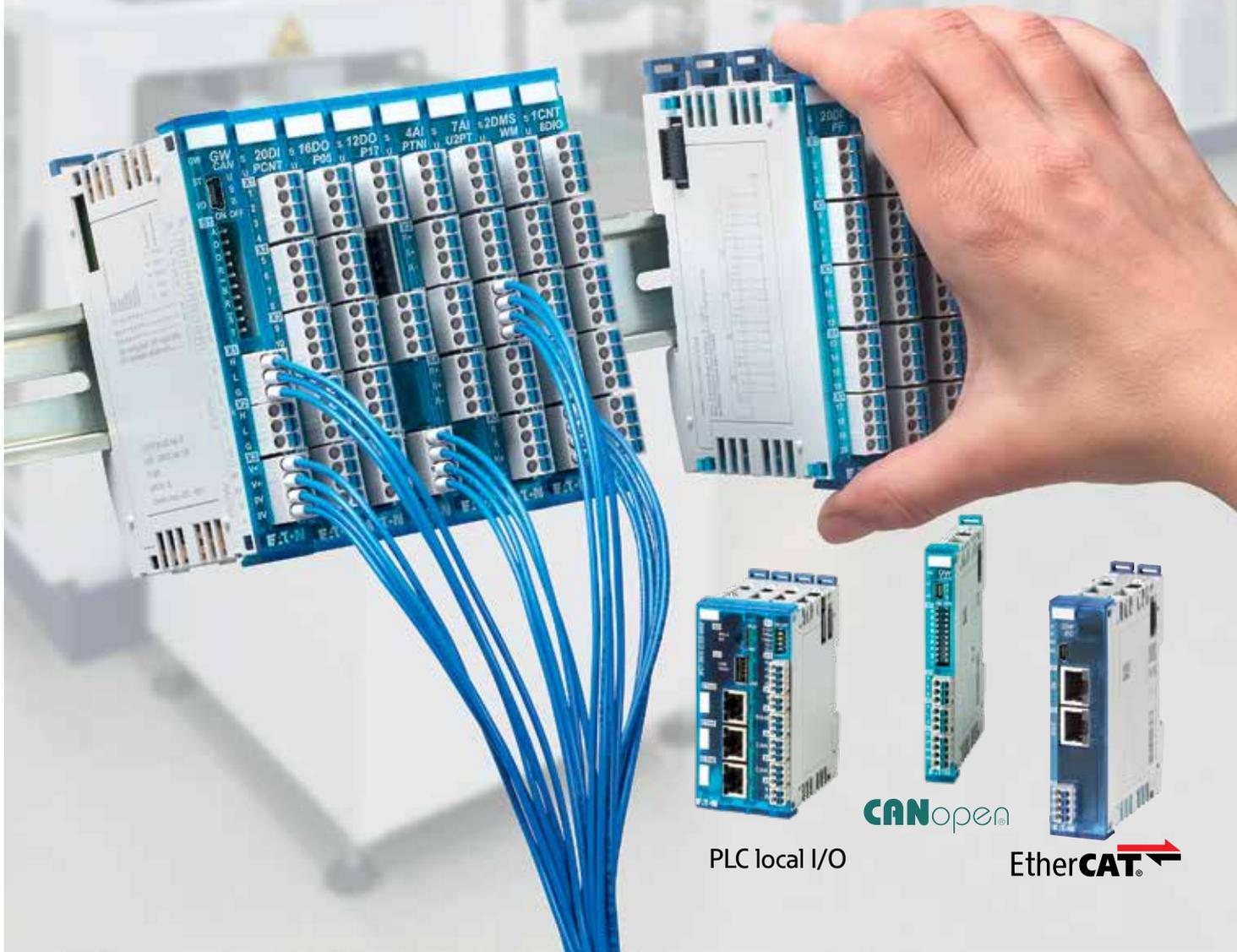


# Big Efficiency in a Small Package



PLC local I/O

CANopen

EtherCAT

**EATON**

*Powering Business Worldwide*

# One for all and all for one

## XN300 – The slice card modular I/O system for the machine building industry

XN300, our ultra-compact, slice card modular I/O system with pluggable, high-density connections, can be combined with Eaton's HMI/PLC products to create system solutions tailored to the needs of your application. The wide range of available functions and models reduces equipment costs and facilitates optimum system solutions while keeping the footprint to a minimum.

The XN300 I/O system can either be used as a local I/O directly with our XC300 PLC, or as a remote I/O in CAN or EtherCAT networks.

All this is combined with a sleek design and a convenient installation concept that makes handling easier and allows users to pre-assemble their I/O stations and the components they will be connecting. Moreover, the plug-in terminal system and the way in which signals are clearly identified make commissioning easier and round off the system's characteristics, making it the perfect solution for the needs of machine building industry.

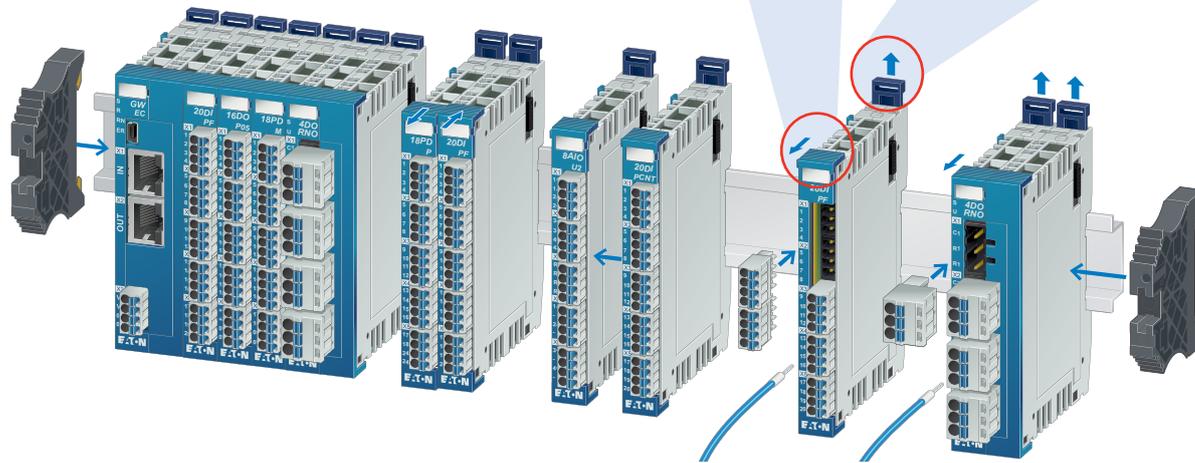
## Designed for your needs

Time is money! The XN300 system offers unrivaled time savings, thanks to the plug-in connections and the division of the installation process into two steps (block assembly and busbar assembly): As such, the installation can be efficiently broken down into individual, pre-assembled steps.

The function block can be quickly assembled and mounted as a whole on a mounting rail – without any tools! Just push the cables into the push-in connector or plug in the connectors and you are ready to go to get the system up and running.

Module catch mechanism

DIN rail mounting



### Tool-free installation

The modern assembly system and the connectors with push-in technology simplify installation and save time during commissioning.



### Versatile functions

The modular system design with up to 32 modules and different functions offers maximum flexibility for your application solution.



### Application-oriented functions

The application-oriented functional design of the modules minimizes the number of devices required, which saves both money and space.



### Compact design

The XN300 system with push-in technology offers a status display and high channel density (up to 20 channels), at front surface area of only 12.5 x 102 mm and a height of just 72 mm.



### Universal use and integrated communications

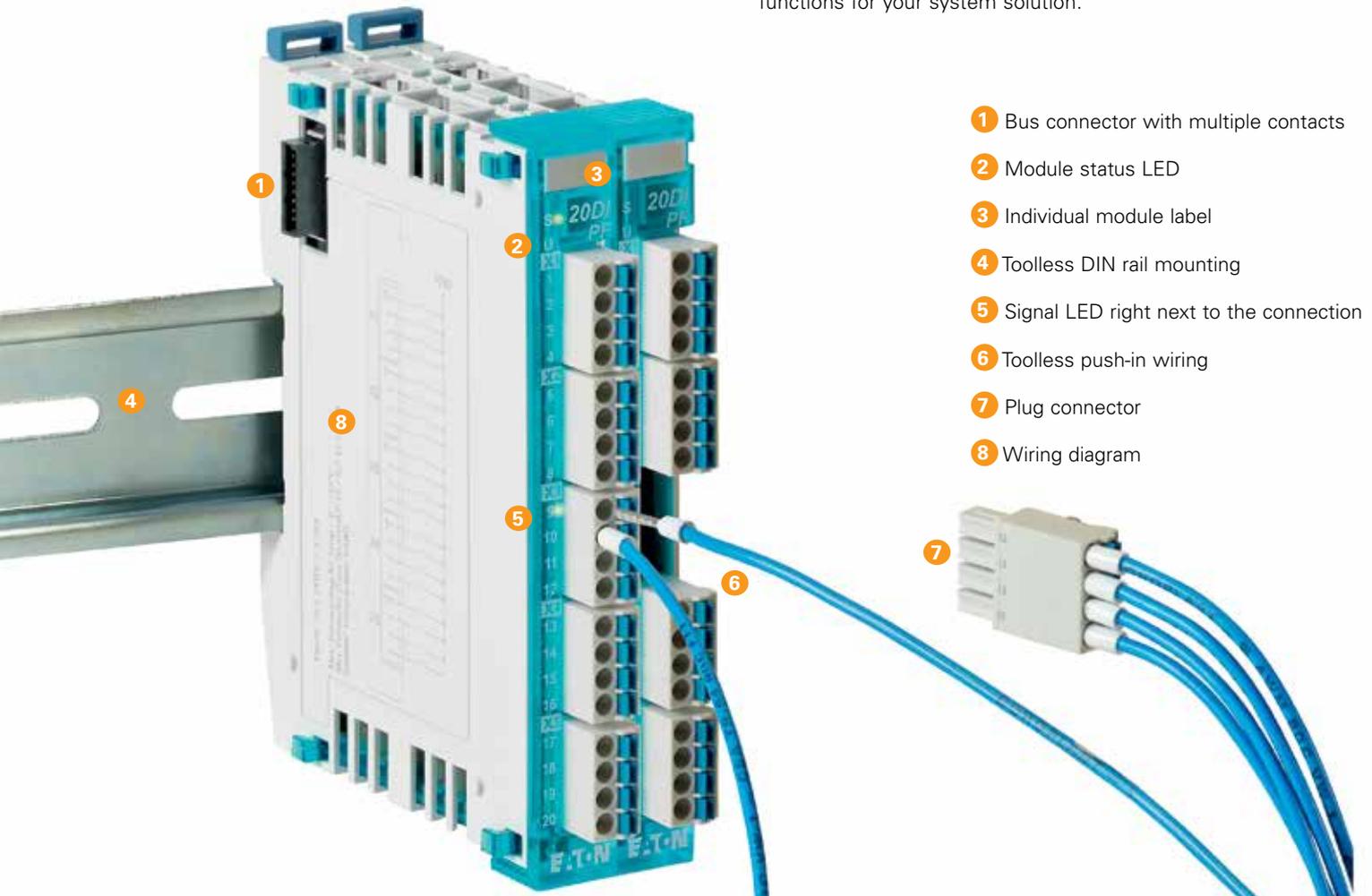
Thanks to the XC300 PLC and the various gateway options, the XN300 I/O system is suitable for universal use as a local or remote I/O in CAN and EtherCAT networks.

# A solution-oriented system based on push-in wiring

The optimized functionality of the devices reduces the number of required slices and enables the implementation of additional application functions. This means, for instance, that the digital outputs can be powered and protected in groups, as well as switched off centrally.

The digital inputs offer additional counter functions, while the analog input modules can be used to provide reference voltages for potentiometers or for temperature measurement with variable cold junction compensation, etc.

The XN300 allows you to put together the right combination of functions for your system solution.



- 1 Bus connector with multiple contacts
- 2 Module status LED
- 3 Individual module label
- 4 Toolless DIN rail mounting
- 5 Signal LED right next to the connection
- 6 Toolless push-in wiring
- 7 Plug connector
- 8 Wiring diagram

## Convenient and easy to wire

A plug-in connection system makes it possible to quickly connect and replace modules, which in turn makes it much easier to commission and service machines. Each module can accommodate up to 20 channels, which are distributed among up to five plug connectors as required for the application at hand.

Accessories include keying pins designed to ensure that plugs will not be mixed up.

The push-in terminals have the following conductor cross-sections:

### Connection specifications (standard)

- |  |           |
|--|-----------|
| • Rigid [mm <sup>2</sup> ]                             | 0,2–1,50  |
| • Flexible with uninsulated ferrule [mm <sup>2</sup> ] | 0,25–1,50 |
| • Flexible with insulated ferrule [mm <sup>2</sup> ]   | 0,25–0,75 |
| • AWG  | 24–16     |
| • Stripping length [mm]                                | 10        |

## Neat and easy to keep track of

A clear functional layout makes it possible to easily keep track of things despite the modules' high channel density:

- Mechanical latches can be easily accessed – even after a module is installed
- Labels for individual identification
- Individually programmable user LEDs can be used as slot-specific indicators
- Each module has a status LED that shows its communication status
- The signal state for each wire is shown right next to where the wire is connected
- Different signal colors make it easy to identify functions (green = input, yellow = output, red = fault)

# XN300 - The system for your automation solution

Small automation solutions are primarily used to control process and production steps of low complexity, or to perform partial functions when implementing modular machine designs. These process steps typically include the preparation, processing, transport, sorting and packaging of materials. The XN300 I/O system can not only detect and transmit analog and digital signals, but can also supply new data from the PLC to the output elements.

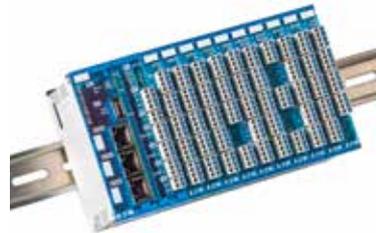
The special challenges for I/O systems in such applications usually include the following:

- Limitations in the scope of functions offered by I/O products
- Limited installation space due to the compact design
- The required level of machine productivity (output)
- The development, material and installation costs
- The expenditures for maintenance and system care



## A compact and powerful system

In combination with our compact XN300 I/O system, the XC300 makes for a powerful modular PLC that forms the basis of modern automation solutions. Thanks to its large number of interfaces, this XSOFT-CODESYS 3-programmable PLC can be used as a universal and flexible data node for a wide range of applications.



Whether used as a local I/O for our XC300 PLC or as a remote solution – the XN300 enables the quick and effective implementation of application solutions.

## How future-proof is my application solution?

Ensuring the sustainability and re-usability of a solution and the associated know-how places additional requirements on the flexibility of I/O systems that go beyond the scope of the application itself. If you are planning to expand the machine in different stages, modifications over its life cycle are to be expected, and questions such as whether all sensors and actuators can be connected and networked thus need to be considered at an early stage.

The system controls and visualization, including the programming system, pose additional challenges for the flexibility of the overall solution and the supplier's product range.



## Various standards are supported CAN networking and third-party integration

The XN300 system supports the CAN and EtherCAT open communication standards for use as a remote I/O. CAN networking makes the XN300 ideal for small automation solutions with local visualization via an HMI/PLC as well as for larger systems. Up to 32 XN300 I/O slices can be operated via one XN300 CAN gateway, while their data are transmitted by means of 24 send and receive PDOs. Such networks can be quickly and easily configured using our CODESYS-programmable XV100, XV300 or XC300 PLCs. Any previous system experience and program developments can be applied across the board to create tailor-made application solutions at short notice.

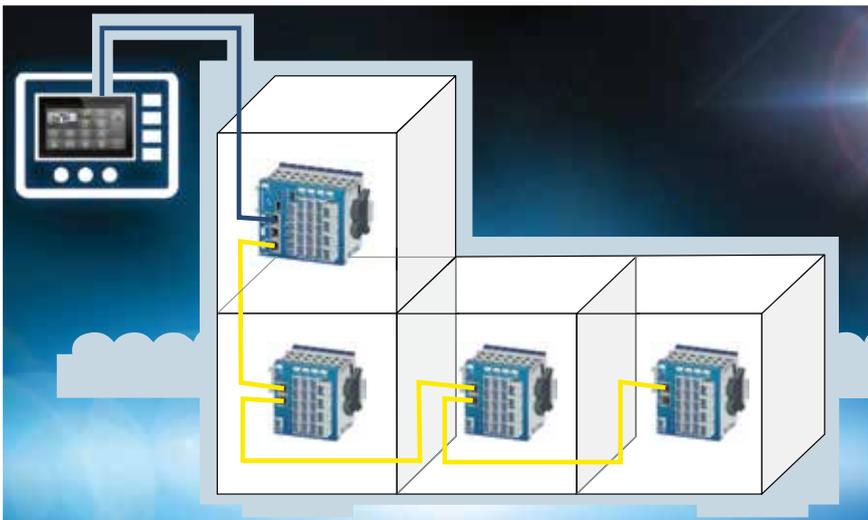
If used in conjunction with a CAN network, the XN300 I/O block can be used with any type of controller. In addition, this communication interface also makes it possible to integrate components from other manufacturers into Eaton automation solutions.

# Automation with EtherCAT®

Industrial Ethernet (IE) is the use of Ethernet in industrial applications with protocols that support determinism and real-time capability. Such devices use the standard Ethernet interface, methods and services (IEEE 802.3) and supplement functions to meet the special requirements of industrial communication. EtherCAT® (Ethernet Control Automation Technology) is a real-time ETHERNET system for industrial automation, which is characterized by high performance and easy handling. The complex ETHERNET Star topology is defined by a simple line or tree structure and the use of 'switches' can be omitted. The function in the IEC standard IEC 61158 open EtherCAT protocol is suitable for 'hard' as well as 'soft' real-time requirements in Automation technology.

Powerful device description files define the functional characteristics of the devices. They simplify development and commissioning and enable universal application under any controller with EtherCAT master function.

The XN-312-GW-EC gateway identifies the connected XN300 I/O modules, creates a local process image from it and exchanges the data with the controller after the configuration check. Due to the line structure of the EtherCAT topology, this is done automatically without the need for settings such as IP Address or baud rate at the Gateway. The EtherCAT protocol is implemented by the participants continuously forwarded from one participants to the next and thus offers a high transmission speed and data transmission rate.



## EtherCAT®

All characteristics of EtherCAT® fit perfectly the use of the technology in performant, small and medium-sized application solutions for the serial machine construction.

For communication to the control level the XC300 offers other free configurable Ethernet interfaces and thus supports the separation of field and control level.

## Advantages of EtherCAT® in your automation solution



### Future-proof system through Platform concept

Automation solutions based on a flexible product range XC300, XV300, XN300 and the standard programming tool XSOFT-CODESYS 3 from one source - a guarantee for fast implementation of new projects.



### Simple system maintenance

XV300, XC300 and XN300 with EtherCAT and CAN network connection simplify the 3rd party integration and enable a step-by-step modernization of the machine.



### Reduction of development times

System configuration and parameterization of the XN300 modules based on device description files (EtherCAT Slave Information (ESI) file).



### Flexible in use

Hardly any restriction in the transmitted data volume and the number of connectable devices.



### Simple commissioning

Error-proof mounting, since no configuration settings on the device are need to be done.



### Improvement of machine productivity

The EtherCAT performance characteristics in determinism and real-time capability lead to shortened task cycle times and a higher machine productivity.



### Low product and infrastructure costs

Application-oriented XN300 device functions, standard Ethernet wiring and the omission of "switches" are easy on the budget.

# The XN300 system at a glance



EtherCAT Gateway



CAN Gateway



## Gateway modules

The EtherCAT and CAN gateways are part of the basic XN300 portfolio and support all latest Eaton I/O components for the system. The XN300 backplane is used to transmit data between the gateway and the various I/O modules.

- Direct connection to the components in the XN system
- Minimal width with easy-to-use push-in connection technology
- Clear separation between diagnostic, configuration, and connection functions
- LED indicators for system diagnostics
- The address and baud rate can be set with DIP switches; a bus termination resistor can be connected (CAN)

## Digital modules

XN-322 digital modules provide the following advantages as input/output and relay modules:

- Compact connection space
- LEDs with different colors in order to show the various possible states
- State signals directly at the point of connection
- LED indicators for system diagnostics



## Analog modules

XN-322 analog modules are available as input/output modules and multifunction modules.

- A wide variety of configuration options
- Modules with mixed functions
- Temperature measurement using thermocouples or resistance sensors (Pt, Ni, KTY)

## Technology Modules

The following XN-322 specialty modules are an integral part of the XN300 portfolio:

- Weigh module
- RS422/TTL-Counter module
- Motor driver modules

# Softwaretool XN300-Assist

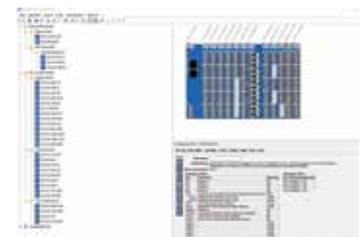
The XN300-Assist offers you maximum operating convenience when planning your system. The online and offline functions of this practical software tool are helpful features for commissioning and installing the devices.

Online functions:

- Reading and setting of signal state and parameter

Offline functions:

- System configuration and plausibility check
- Generation of purchase orders
- Creation of files for device specification (EDS-file)



Download XN300 Assist:  
<http://applications.eaton.eu/sdlc>

# XN300 general overview



Specification	Part-No.:	Article-No.
<b>Gateway/Interface</b>		
Gateway to bus system EtherCAT	<b>XN-312-GW-EC</b>	178785
Gateway to bus system CANopen	<b>XN-312-GW-CAN</b>	178782
<b>Digital input</b>		
8 inputs, P, 24VDC, 5.0ms	<b>XN-322-8DI-PD</b>	183172
16 inputs, P, 24VDC, 5.0ms	<b>XN-322-16DI-PD</b>	183173
20 inputs, P, 24VDC, 5.0ms	<b>XN-322-20DI-PD</b>	178786
20 inputs, P, 24VDC, 0.5ms	<b>XN-322-20DI-PF</b>	178768
20 inputs, P, 24VDC, 2/4 CNT, 25kHz	<b>XN-322-20DI-PCNT</b>	178767
20 inputs, N, 24VDC, 5.0ms	<b>XN-322-20DI-ND</b>	183174
<b>Digital output</b>		
4 outputs, relay, N/O	<b>XN-322-4DO-RNO</b>	178779
8 outputs, P, 24VDC, 0.5A, sp	<b>XN-322-8DO-P05</b>	183175
12 outputs, P, 24VDC, 1.7A, sp	<b>XN-322-12DO-P17</b>	178788
16 outputs, P, 24VDC, 0.5A, sp	<b>XN-322-16DO-P05</b>	178787
<b>Digital input / output</b>		
4 inputs, 4 outputs, P, 24VDC	<b>XN-322-8DIO-PD05</b>	183178
8 inputs, 8 outputs, P, 24VDC	<b>XN-322-16DIO-PD05</b>	183179
8 inputs, 8 outputs, P, 24VDC, CNT	<b>XN-322-16DIO-PC05</b>	183180
<b>Analog input</b>		
4 inputs, PT/NI/KTY/R, 2/3 cable	<b>XN-322-4AI-PTNI</b>	178772
6 inputs, +/-10V, 1 PT/KTY, Uref	<b>XN-322-7AI-U2PT</b>	178789
8 inputs, 0/4-20mA	<b>XN-322-8AI-I</b>	179288
8 inputs, thermocouple, 2 KTY	<b>XN-322-10AI-TEKT</b>	178792
<b>Analog output</b>		
8 outputs, +/-10V	<b>XN-322-8AO-U2</b>	178790
<b>Analog input / output</b>		
2 inputs, 2 outputs, +/-10V, Uref	<b>XN-322-4AIO-U2</b>	183181
4 inputs, 4 outputs, +/-10V, Uref	<b>XN-322-8AIO-U2</b>	178791
2 inputs, 2 outputs, 0/4-20mA	<b>XN-322-4AIO-I</b>	183182
4 inputs, 4 outputs, 0/4-20mA	<b>XN-322-8AIO-I</b>	178771
<b>Technology modules</b>		
Weigh module, 2DMS, 24Bit	<b>XN-322-2DMS-WM</b>	178793
DC motor driver, 12-30V, brushed, 3.5A	<b>XN-322-1DCD-B35</b>	178794
Counter, 1 CNT, 125kHz, 16Bit, 4 DO, 4 DI	<b>XN-322-1CNT-8DIO</b>	178795
Serial, 2 SSI, RS422, 32Bit	<b>XN-322-2SSI</b>	178773
<b>Power supply modules</b>		
Power supply, 4 x 24VDC/2A, sp	<b>XN-322-4PS-20</b>	178796
<b>Passive field potential distributors</b>		
Power Distribution, 18 channels, GND	<b>XN-322-18PD-M</b>	178769
Power Distribution, 18 channels, VCC	<b>XN-322-18PD-P</b>	178770

Eaton's mission is to improve the quality of life and the environment through the use of power management technologies and services. We provide sustainable solutions that help our customers effectively manage electrical, hydraulic, and mechanical power – more safely, more efficiently, and more reliably. Eaton's 2019 revenues were \$21.4 billion, and we sell products to customers in more than 175 countries. We have approximately 95,000 employees. For more information, visit [Eaton.com](https://www.eaton.com).