



Automation Controller  
NX502  
EtherNet/IP™ Unit  
NX-EIP201



# Integrated control, information, and safety brings a new level of speed to manufacturing sites

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- Safety Light Curtains • Safety Laser Scanners • Programmable Safety Systems
- Safety Mats and Edges • Safety Door Switches • Emergency Stop Devices
- Safety Switches & Operator Controls • Safety Monitoring/Force-guided Relays

**Control Components**

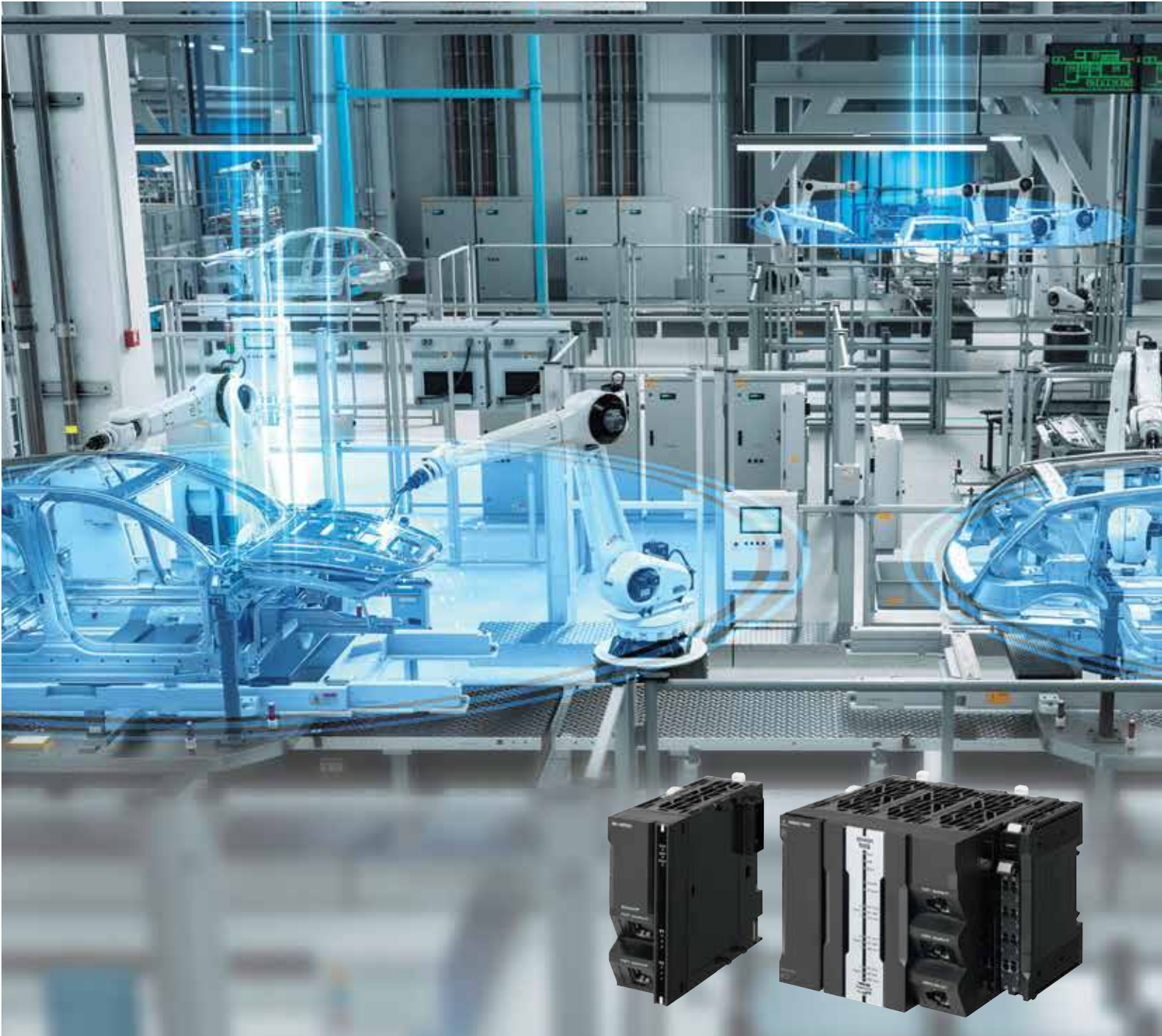
- Power Supplies • Timers • Counters • Programmable Relays
- Digital Panel Meters • Monitoring Products

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- Limit Switches • Pushbutton Switches • Electromechanical Relays
- Solid State Relays

**Software**

- Programming & Configuration • Runtime





# Integrated control, information, and safety brings a new level of speed to manufacturing sites

Speed is essential in all processes at manufacturing sites to cope with large demand fluctuations.  
The NX502 Automation Controller, new product in the NJ/NX Series, and NX-EIP201 EtherNet/IP Unit integrate control, information, and safety, helping speed up all processes from commissioning through to operation and maintenance.



## Speed up production improvement

- Utilize data to boost yield ..... P4
- Reduce equipment cycle time while improving quality ..... P5



## Speed up production line modification to accommodate demand changes

- Increase equipment availability through integrated safety ..... P6



## Speed up problem-solving in machines and production lines

- Achieve both rapid commissioning and stable operation ..... P7

## Features

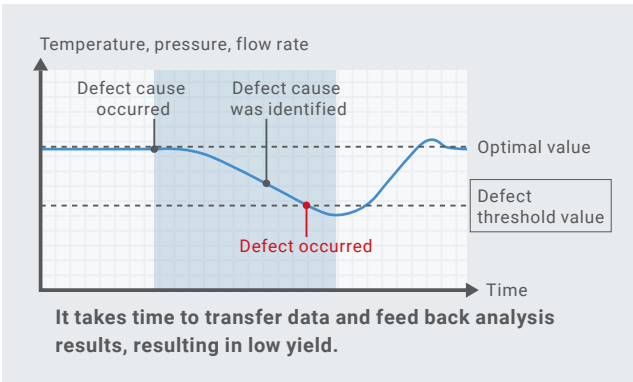


- NX5 integrates control, information, and safety ..... P8
- Sysmac Studio improves productivity throughout machine lifecycle ..... P10
- Ordering Information ..... P11

Utilize data to boost yield

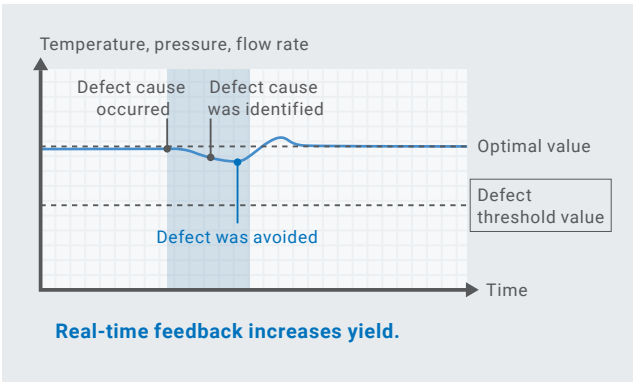
Problem

To increase yield, it is necessary to analyze data (e.g., temperature, pressure, and flow rate) accurately for finding optimal processing conditions and to feed the analysis results back to machines in real time. Since accurate analysis requires fast and accurate collection of high-resolution data in chronological order, the amount of data is so large that the data transfer to databases becomes a bottleneck.



NX5

With approximately four times the data transfer capability of the previous model <sup>\*1</sup>, NX5 can transfer all of the increasing amount of high-resolution production data to a database at high speeds. NX5 also reflects results of database analysis in processing conditions in real time, contributing to defect prevention and yield improvement.



\*1. NJ5 Machine Automation Controller

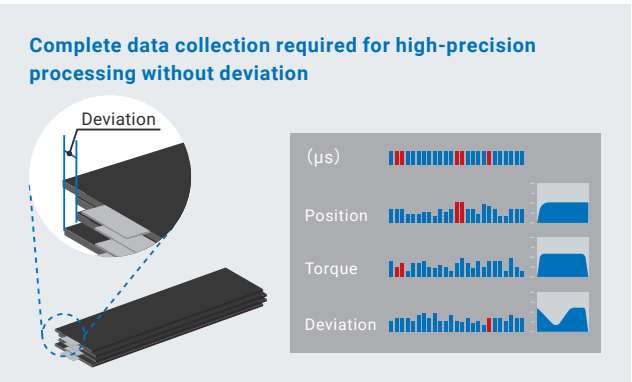
Reduce equipment cycle time while improving quality

Problem

As processing is becoming more and more precise, high-frequency collection of diverse data is required in order to improve product quality early on while maintaining fast equipment cycle times. Another challenge is insufficient communication bandwidth when the increasing amount of data is transferred to a PC or other system.



NX5

NX5 can update command values to send to servomotors and stepper motors as fast as every 250  $\mu$ s, enabling smooth cam motion, and high-precision interpolation and phase adjustment between axes. In addition, NX5 can collect data from all EtherCAT<sup>®</sup> I/O synchronously with less than 1  $\mu$ s jitter. Up to four EtherNet/IP units, whose maximum allowed communications bandwidth per unit is 40,000 pps, can be mounted to NX5, coping with high-capacity communications. Fast cycle times can be maintained, and product quality can be improved early.



**Real-time link between database server and control**

High-speed database communications




Polycrystalline ingot manufacturing

**Chronological collection of high-resolution data with fast cycle times**

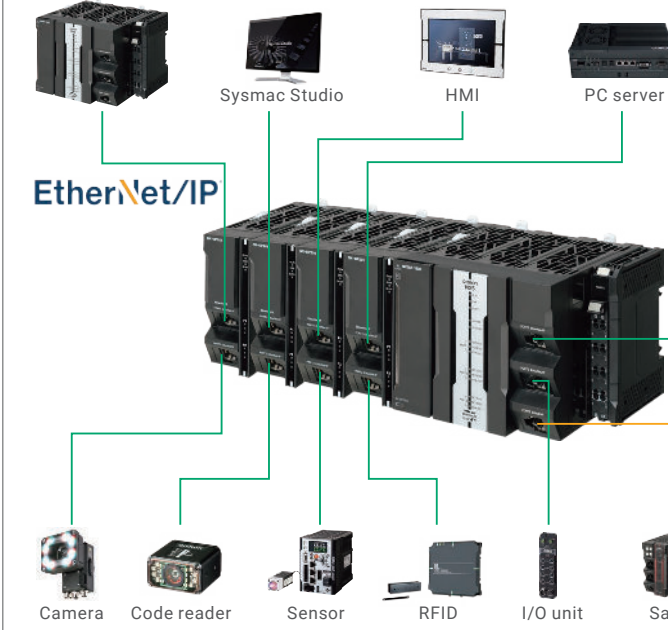
NX-HAD High-speed Analog Input Unit  
Sampling as fast as every 5  $\mu$ s

NX-HTC Advanced Temperature Control Unit  
Temperature control with 0.01 $^{\circ}$ C resolution



**Collection of all necessary data**

10 x 1 Gbps ports for high-speed, high-capacity communications



EtherNet/IP

Sysmac Studio

HMI

PC server

Camera

Code reader

Sensor

RFID

I/O unit

Safety

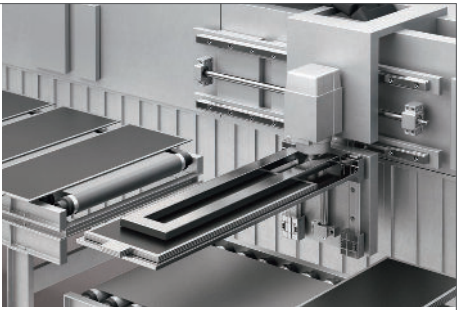
**Smooth cam motion and high-precision phase adjustment**

Controls 32 axes with cycle time of 250  $\mu$ s

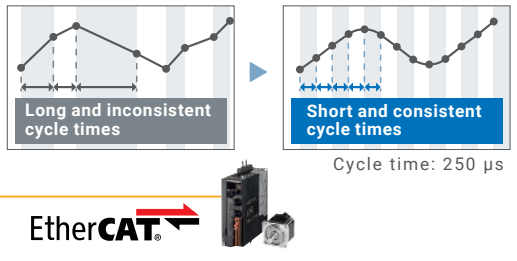
Long and inconsistent cycle times

Short and consistent cycle times

Cycle time: 250  $\mu$ s



Rechargeable battery stacking process



EtherCAT



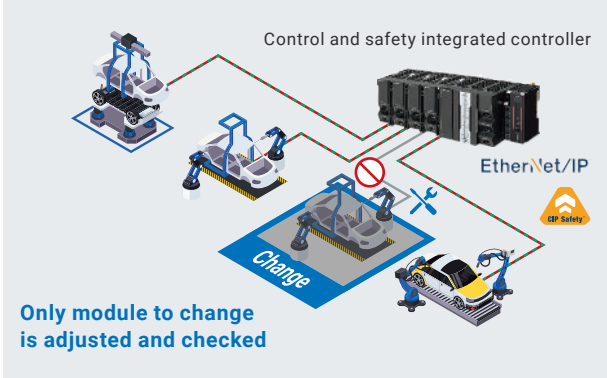
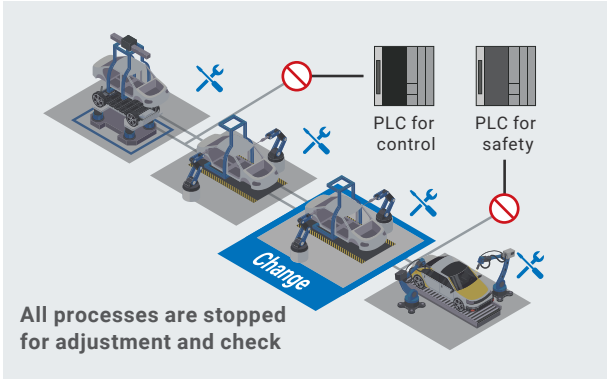
Increase equipment availability through integrated safety

Problem

Amid technological innovation such as EV and digital devices, manufacturers need to cope with rapid demand changes by building flexible equipment. They design software, hardware, and networks in a modular manner in order to efficiently change or add production lines and processes, especially large production lines. However, network power supply for all processes must be turned off for change or addition because safety communications are configured within the same network segment. This affects a wide area, thereby prolonging lead time.

NX5

NX5 enables you to modularize network configurations including safety as well as software and hardware. Since a process to change is localized, you can adjust and check only the process without stopping the entire line. In addition, up to 8 separate networks and 254 safety connections allow a large production line to be flexibly built. These benefits significantly reduce lead time for line changes.



### Modular networks

Safety control between machines  
Up to 8 separate networks

EtherNet/IP

Addition of process depending on car type

### Construction of large and flexible production line

High-speed synchronous safety control in machine  
254 connections

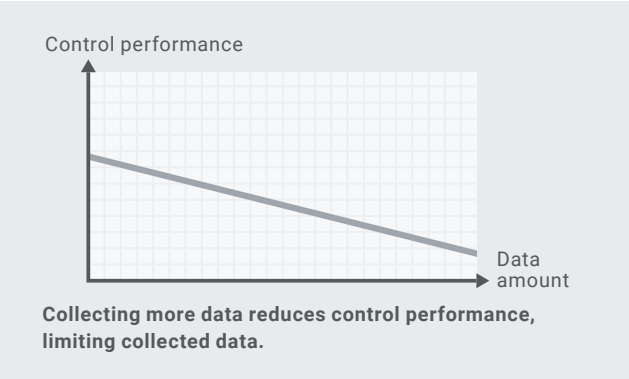
Safety over EtherCAT

Available soon

Achieve both rapid commissioning and stable operation

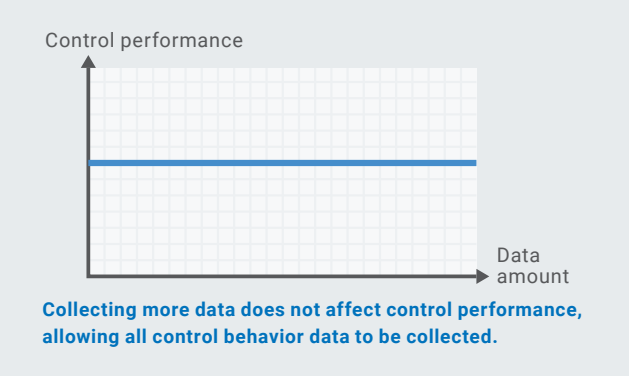
Problem

Reduction in time required to set up and reliably operate a new machine is always a challenge. It is time-consuming to solve problems that are hard to be reproduced. Defects and line stoppages during mass production need to be addressed quickly to improve overall equipment effectiveness (OEE).



NX5

NX5 comes with the Automation Playback function as standard, collecting and playing back all control behavior data to allow you to quickly identify problems that are hard to be reproduced. You can reliably use NX5 during mass production because data collection does not affect the control period. Causes of problems can be quickly analyzed from huge amounts of playback data. This shortens the time required for finding the causes, contributing to increase in machine availability.



### Stable operation

Control-first architecture and multi-core MPU

Motor winding process

### Collection of data required for cause identification

Easy reproduction using variable data and recording data

Playback data search  
Jump to and reproduce time when variable value changed

Output causal search  
Visualize cause of outputting variable

# NX5 integrates control, information, and safety

Information

SQL  
MQTT

Safety



EtherNet/IP

OPC UA



Control

EtherCAT



Control

## Control for fast-cycle, high-precision processing

- Controls 32 axes with cycle time of 250  $\mu$ s
- Used motion control servo axes : 64, 32, 16 axes
- Program capacity : 80 MB
- Memory capacity for variables : 260 MB\*1

Information

## Various networks for diverse information utilization

SQL functionality

- Reliable, rapid, and easy direct access to databases and utilization of production data

MQTT support

- Direct connection to cloud for easy, fast, and secure data collection

OPC UA functionality

- Secure connection to IT systems such as MES and ERP

Expanded EtherNet/IP

- 10 x 1 Gbps ports for high-speed, high-capacity communications (when connecting four NX-EIP201 units)

Safety

## 2 different open networks ideal for safety control of production lines and machines

Fail Safe over EtherCAT (FSoE)

- High speed and high reliability with redundancy, suitable for safety control in machine
- 254 connections for large and flexible production line

Common Industrial Protocol Safety (CIP Safety)

- High scalability, suitable for safety control across production line
- Up to 8 separate networks for network modularization

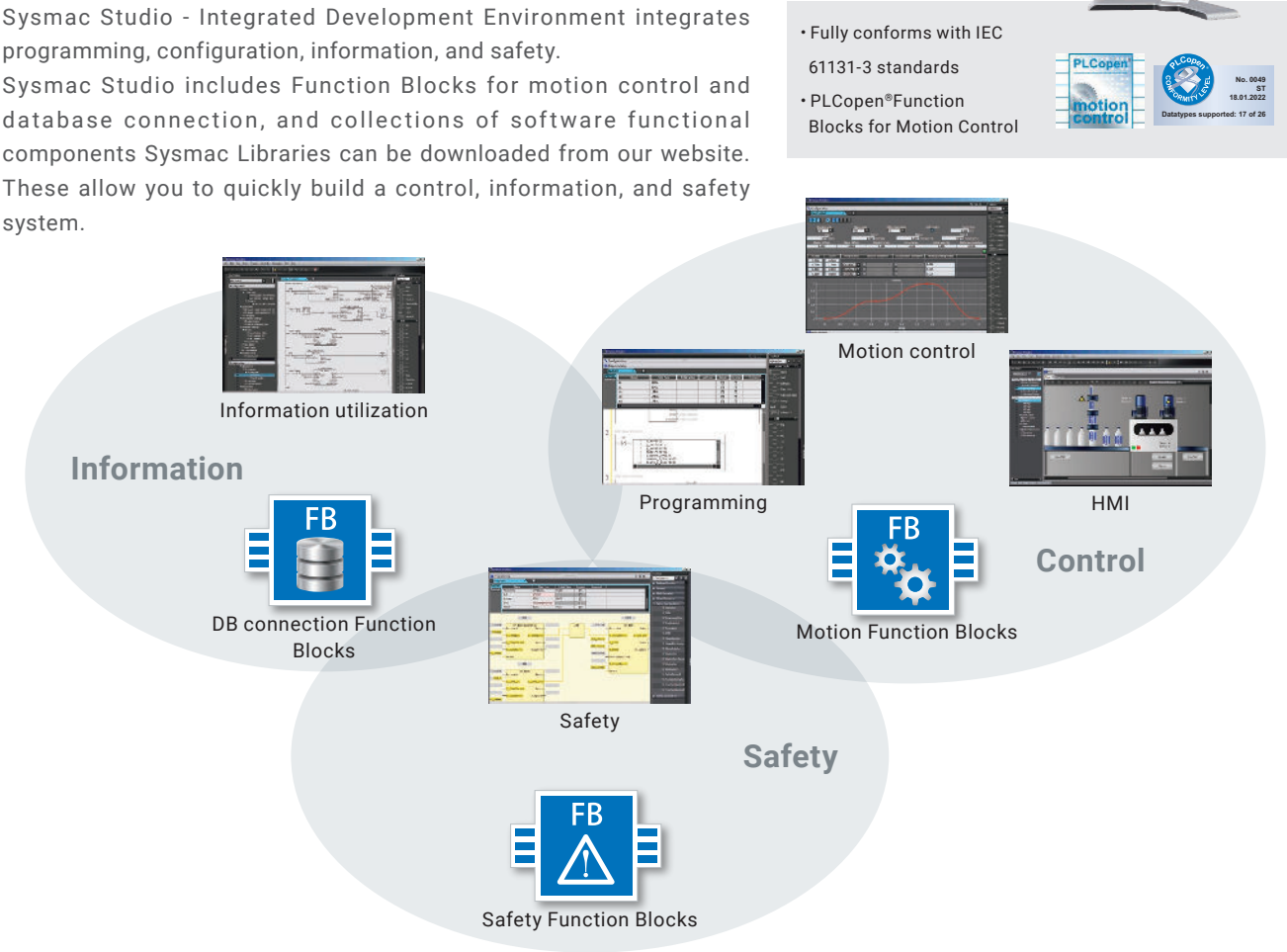
\*1. Total value of retain attribute memory and no retain attribute memory



# Sysmac Studio improves productivity throughout machine lifecycle

## Development environment integrating control, information, and safety

Sysmac Studio - Integrated Development Environment integrates programming, configuration, information, and safety. Sysmac Studio includes Function Blocks for motion control and database connection, and collections of software functional components Sysmac Libraries can be downloaded from our website. These allow you to quickly build a control, information, and safety system.

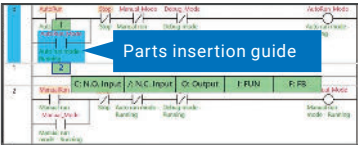


## New functions help reduce development lead time

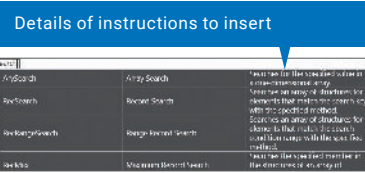
Available soon

### Intuitive usability

The guide shows where to insert or change a rung or connecting line, allowing users to create programs using their keyboard only.

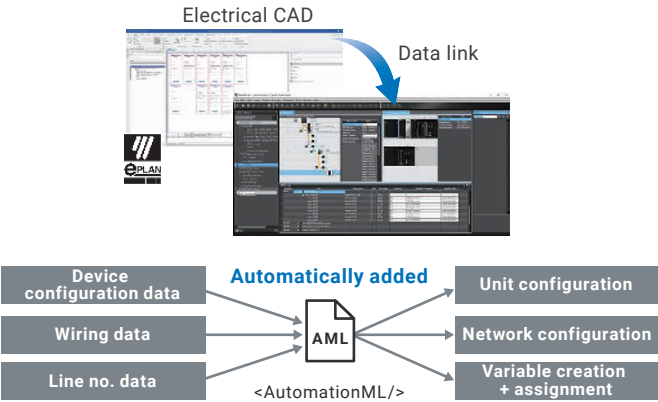


Users can easily enter instructions using the search editor, without referring to manuals.




### Engineering chain integration

Electrical CAD design data can be loaded and automatically added to configurations and variable names. Only different information from the existing project can be imported.



## Ordering Information

### NX-series NX502 CPU Unit

| Product name   |   | Specifications   |  |                                  |                                | Model      |
|----------------|---|------------------|--|----------------------------------|--------------------------------|------------|
|                |   | Program capacity | Memory capacity for variables                            | Maximum number of used real axes | Used motion control servo axes |            |
| NX502 CPU Unit |  | 80 MB            | 4 MB (Retain attributes) / 256 MB (No Retain attributes) | 64 axes                          | 64 axes                        | NX502-1500 |
|                |   |                  |  | 32 axes                          | 32 axes                        | NX502-1400 |
|                |   |                  |  | 16 axes                          | 16 axes                        | NX502-1300 |

### EtherNet/IP Unit

| Product name     | Specifications                         | Units per CPU Unit | Power consumption | Model     |
|------------------|--|--------------------|-------------------|-----------|
|                  | Communications                         |                    |                   |           |
| EtherNet/IP Unit | Tag data links, Message Communications | 4 max.             | 8.1 W max.        | NX-EIP201 |

### Automation Software Sysmac Studio

Please purchase a DVD and required number of licenses the first time you purchase the Sysmac Studio. DVDs and licenses are available individually. Each model of licenses does not include any DVD.

| Product name                            | Specifications  | Number of licenses | Media                      | Model            |
|---|---|--------------------|----------------------------|------------------|
| Sysmac Studio Standard Edition Ver.1.□□ | The Sysmac Studio is the software that provides an integrated environment for setting, programming, debugging and maintenance of machine automation controllers including the NJ/NX-series CPU Units, NY-series Industrial PC, EtherCAT Slave, and the HMI. Sysmac Studio runs on the following OS.<br>Windows 10 (32-bit/64-bit version) *1/Windows 11 (64-bit version)<br>The Sysmac Studio Standard Edition DVD includes Support Software to set up EtherNet/IP Units, DeviceNet slaves, Serial Communications Units, and Support Software for creating screens on HMIs (CXDesigner).<br>For details, refer to your local OMRON website. | — (Media only)     | Sysmac Studio (32-bit) DVD | SYSMAC-SE200D    |
|   |   | — (Media only)     | Sysmac Studio (64-bit) DVD | SYSMAC-SE200D-64 |
|   |   | 1 license *2       | —                          | SYSMAC-SE201L    |

\*1. Use Sysmac Studio on Windows 10 version 1803 or higher OS on the computer.

\*2. Multi licenses are available for the Sysmac Studio (3, 10, 30, or 50 licenses).

### Collection of software functional components Sysmac Library

Please download the Sysmac Library from the following URL and add it to the Sysmac Studio.  
[http://www.ia.omron.com/sysmac\\_library/](http://www.ia.omron.com/sysmac_library/)

#### Typical Models

| Product name                         | Features  | Model        |
|--------------------------------------|---|--------------|
| MQTT Communications Library          | The MQTT communication library is a collection of software functional objects for exchanging Pub / Sub type messages through the MQTT server (MQTT broker).   | SYSMAC-XR020 |
| High-speed Analog Inspection Library | The High-speed Analog Inspection Library records analog input values acquired by the High-speed Analog Input Units in chronological order.  | SYSMAC-XR016 |
| Temperature Control Library          | The Temperature Control Library is used to perform a high-level temperature control.  | SYSMAC-XR007 |
| Safety System Monitor Library        | The Safety System Monitor Library is used to monitor the safety system information. You can use this library to manage the information of the running safety system.                                | SYSMAC-XR015 |
| SLMP Communications Library          | The SLMP Communications Library is a collection of functional objects that uses the SLMP communications protocol for the Sequencer made by Mitsubishi Electric to carry out communications control. | SYSMAC-XR017 |

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