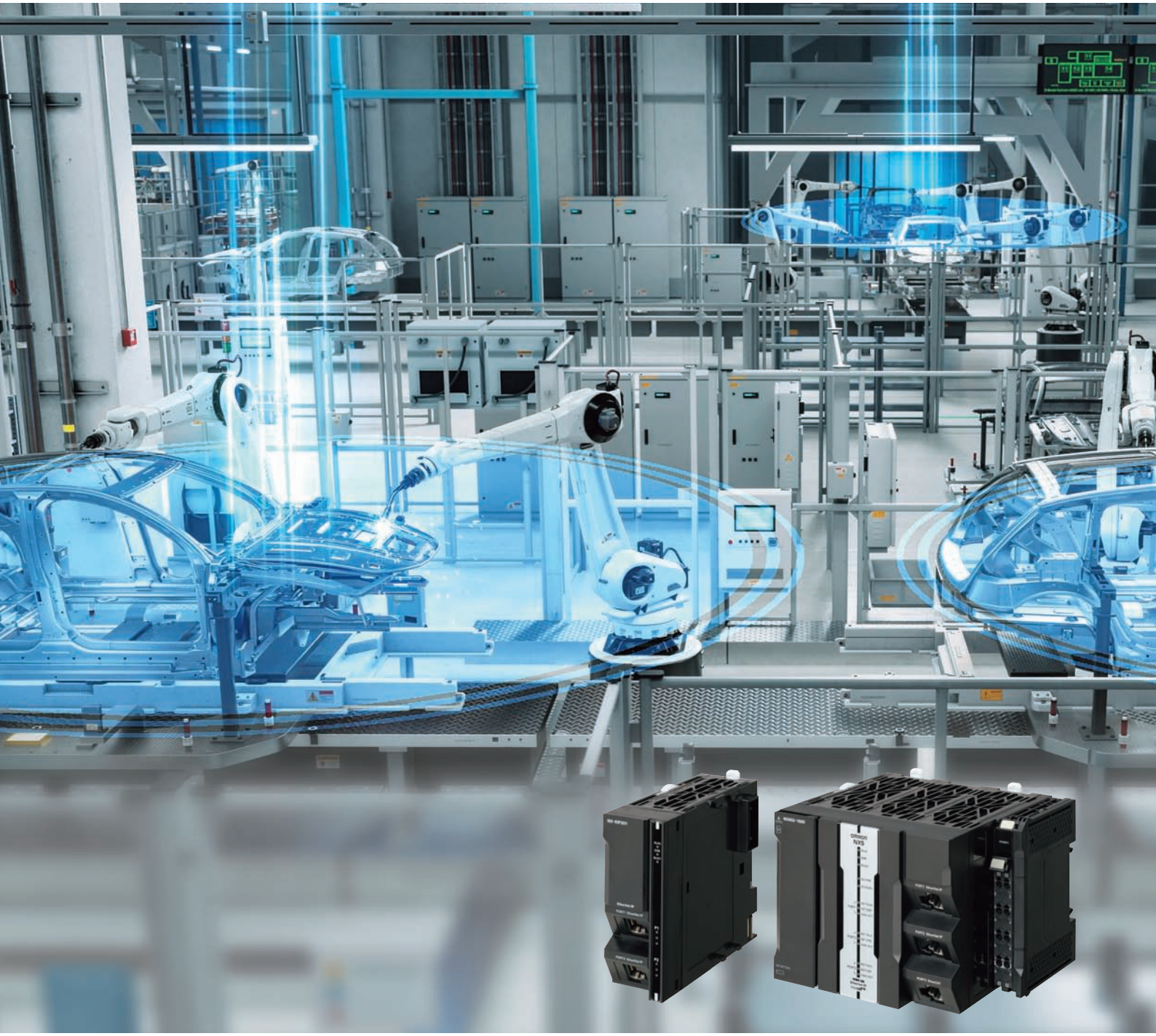
Automation Controller
NX502
EtherNet/IP™Unit
NX-EIP201

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



sysmac
always in control

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

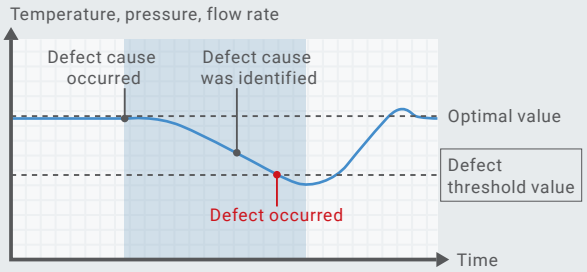
Speed is essential in all processes at manufacturing sites to cope with large demand fluctuations.
The NX502 Automation Controller, new product in the NJ/NX Series,
and NX-EIP201 EtherNet/IP Unit integrate control, information, and safety, helping speed up all processes from commissioning through to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

Speed up production improvement

Utilize data to boost yield

Problem

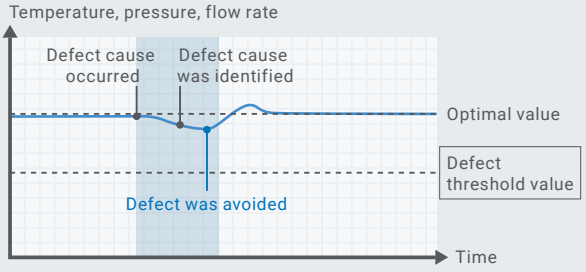
To increase yield, it is necessary to analyze data (e.g., temperature, pressure, and flow rate) accurately for finding optimal processing conditions and to feed the analysis results back to machines in real time.
Since accurate analysis requires fast and accurate collection of high-resolution data in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



It takes time to transfer data and feed back analysis results, resulting in low yield.

NX5

With approximately four times the data transfer capability of the previous model [*1], 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.



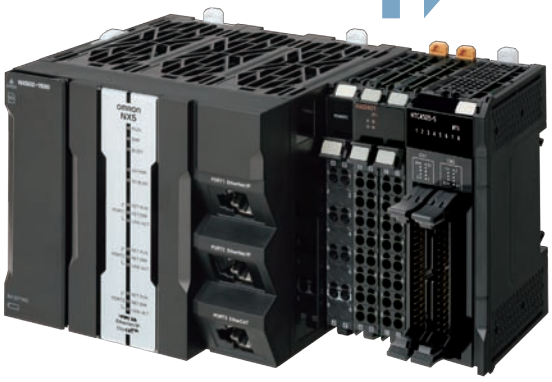
Real-time feedback increases yield.

*1. NJ5 Machine Automation Controller

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 µs

NX-HTC Advanced Temperature Control Unit

Temperature control with 0.01°C resolution

Speed up production improvement

Reduce equipment cycle time while improving quality

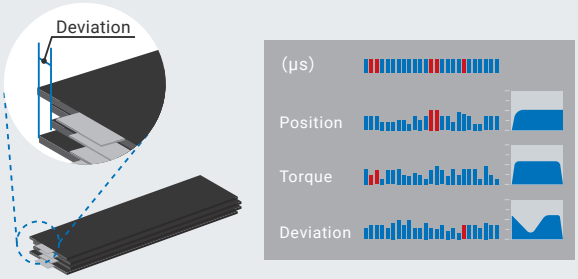
Problem

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

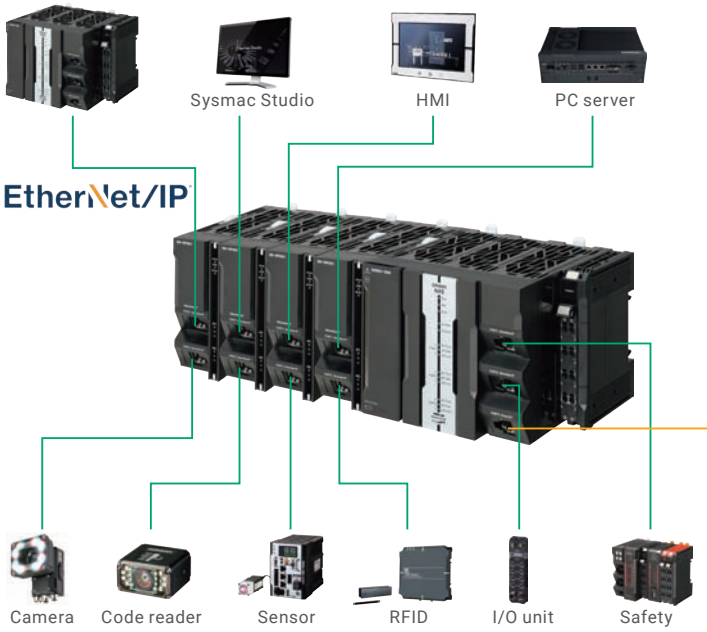
NX5 can update command values to send to servomotors and stepper motors as fast as every 250 µs, enabling smooth cam motion, and high-precision interpolation and phase adjustment between axes.
In addition, NX5 can collect data from all EtherCAT® I/O synchronously with less than 1 µs jitter.
Up to four 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.

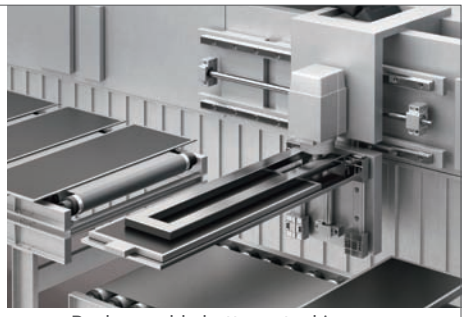
Complete data collection required for high-precision processing without deviation



Collection of all necessary data

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

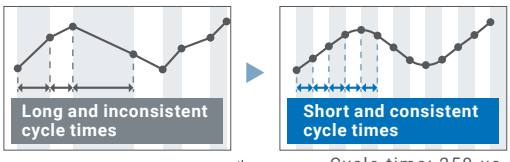




Rechargeable battery stacking process

Smooth cam motion and high-precision phase adjustment

Controls 32 axes with cycle time of 250 µs



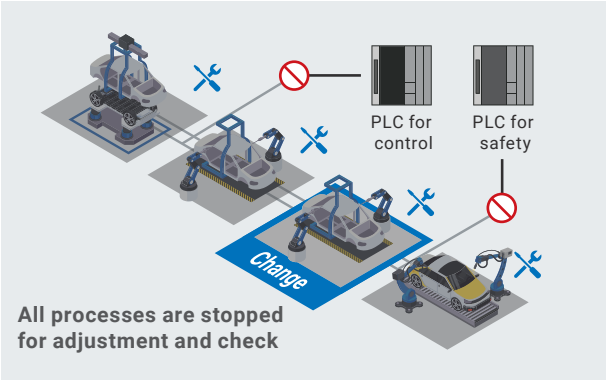
Cycle time: 250 µs

Speed up production line modification to accommodate demand changes

Increase equipment availability through integrated safety

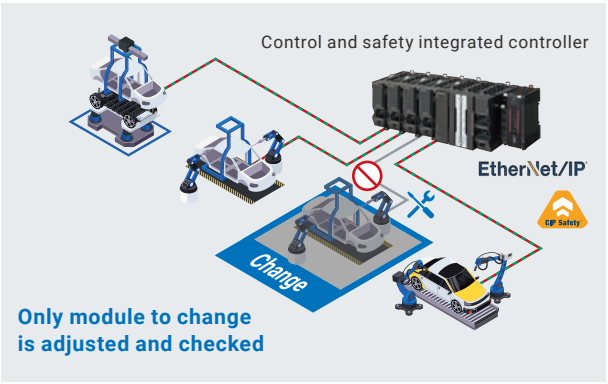
Problem

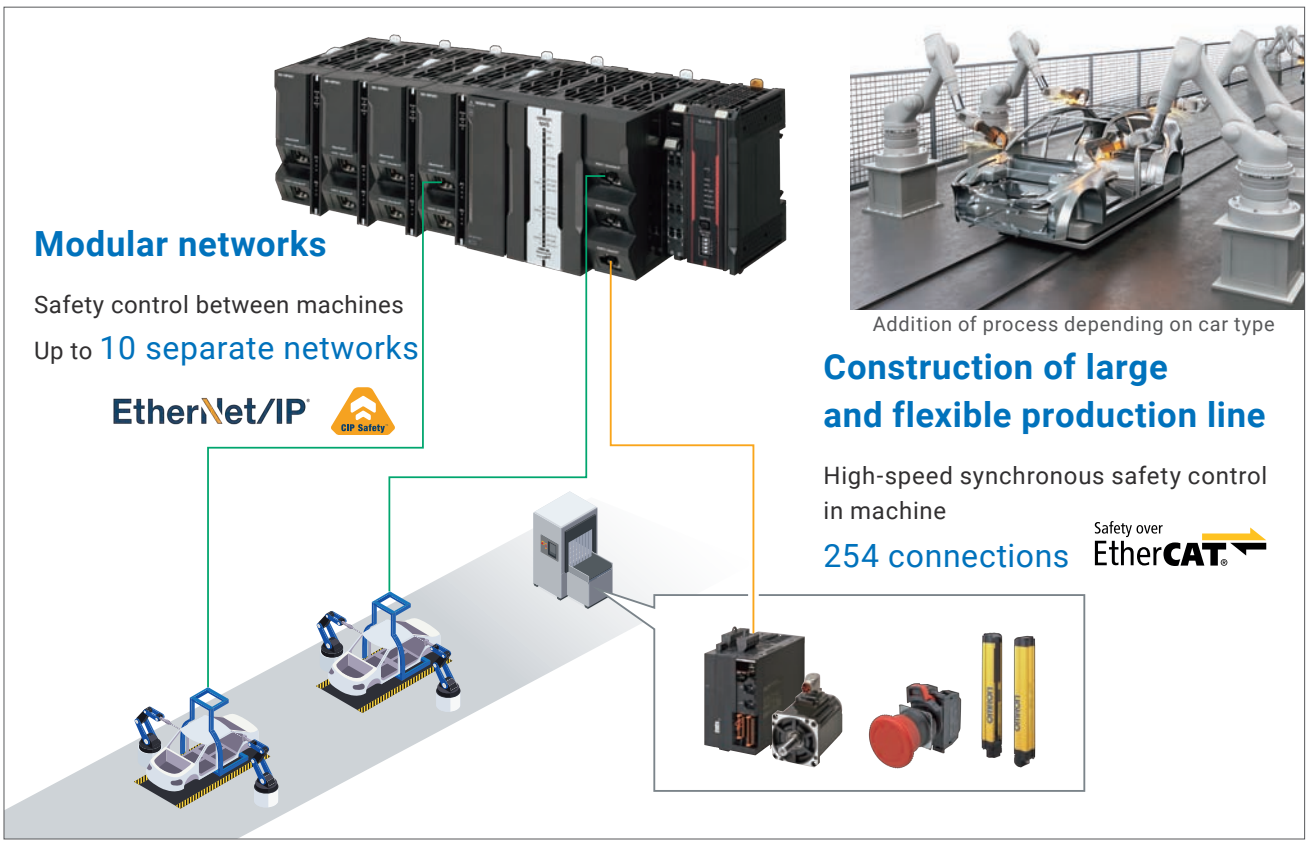
Amid technological innovation such as EV and digital devices, manufacturers need to cope with rapid demand changes by building flexible equipment.
They design software, hardware, and networks in a modular manner in order to efficiently change or add production lines and processes, especially large production 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.



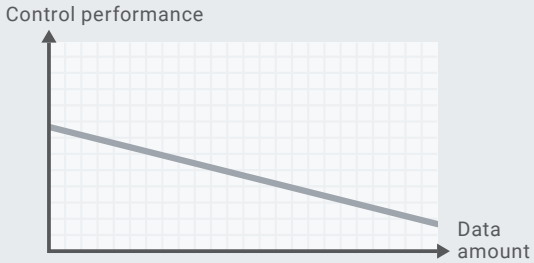


Speed up problem-solving in machines and production lines

Achieve both rapid commissioning and stable operation

Problem

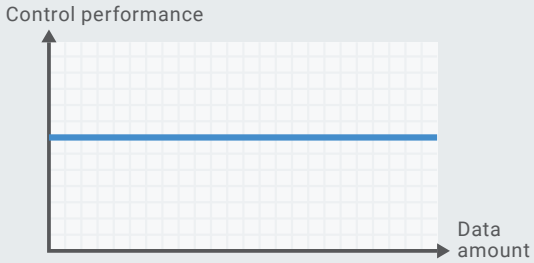
Reduction in time required to set up and reliably operate a new machine is always a challenge. It is time- consuming to solve problems that are hard to be reproduced.
Defects and line stoppages during mass production need to be addressed quickly to improve overall equipment effectiveness (OEE).



Collecting more data reduces control performance, limiting collected data.

NX5

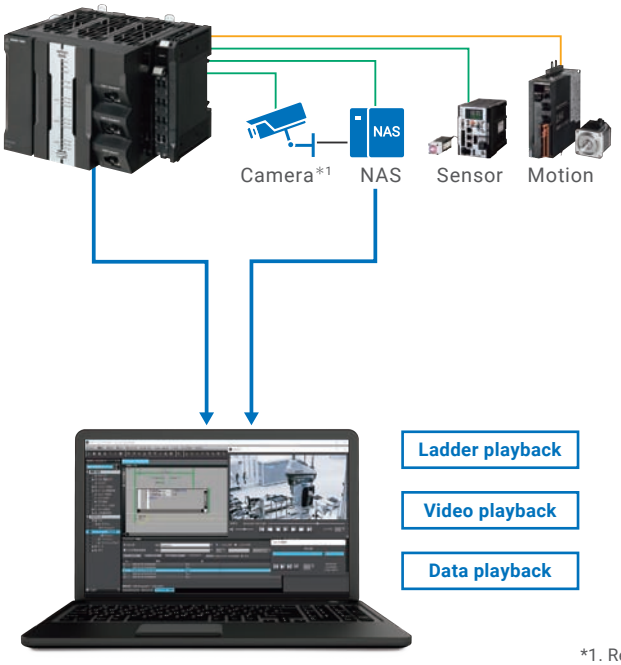
NX5 comes with the Automation Playback function as standard, collecting and playing back control behavior data to allow you to quickly identify problems that are hard to be reproduced.
You can reliably use NX5 during mass production because data collection does not affect the control period.
Causes of 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.

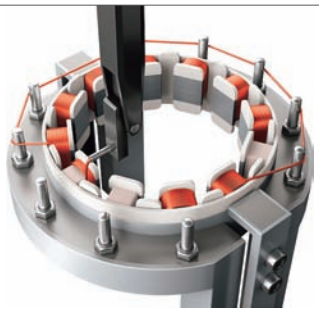


Collecting more data does not affect control performance, allowing control behavior data to be easily collected.

Stable operation

Control-first architecture and multi-core MPU





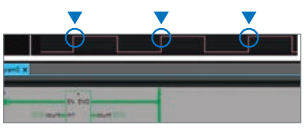
Motor winding process

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

*1. Recording time and quality depend on the specifications of the network camera.

NX5 integrates control, information, and safety

Information

SQL

MQTT

EtherNet/IP

OPC UA

Safety

CIP Safety

Safety over EtherCAT®

NX-EIP201

NX502

NX-SL5

Control

EtherCAT®

Control

Control for fast-cycle, high-precision processing

- Controls 32 axes with cycle time of 250 μs
- Used motion control servo axes : 256, 128, 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 10 separate networks for network modularization

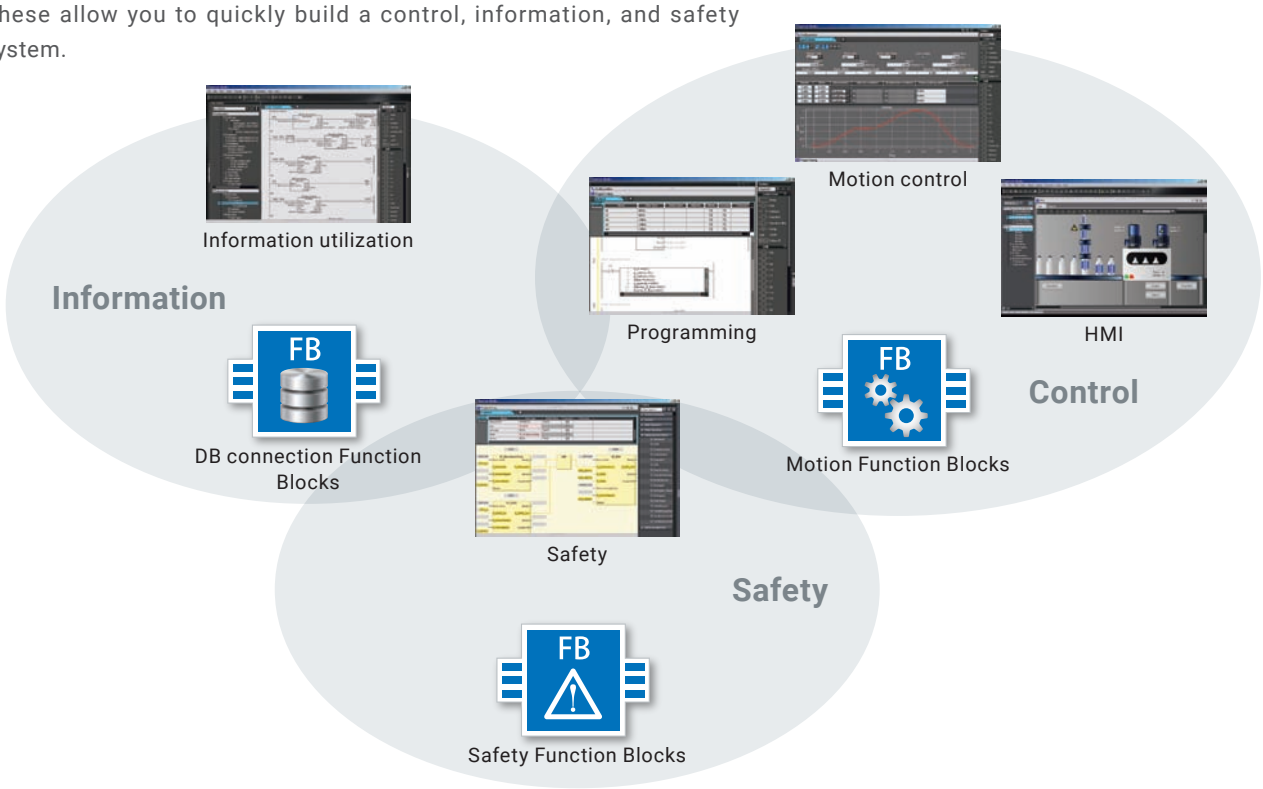
*1. Total value of retain attribute memory and no retain attribute memory

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.

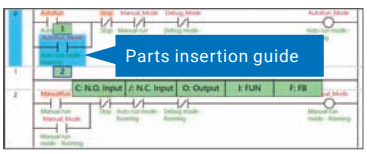
- Fully conforms with IEC 61131-3 standards
- PLCopen®Function Blocks for Motion Control



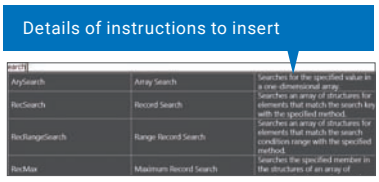
New functions help reduce development lead time

Intuitive usability

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

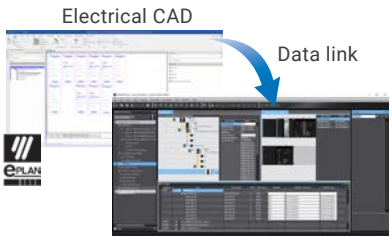


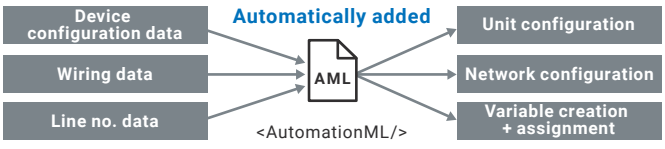
Users can easily enter instructions using the search editor, without referring to manuals.



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)	256 axes	256 axes	NX502-1700
			128 axes	128 axes	NX502-1600
			64 axes	64 axes	NX502-1500
			32 axes	32 axes	NX502-1400
			16 axes	16 axes	NX502-1300

EtherNet/IP Unit

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

Automation Software Sysmac Studio

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.

For details, refer to your local OMRON website and *Sysmac Studio Catalog* (Cat. No. P138).

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/

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

Note: Do not use this document to operate the Unit.

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