

NX1 Machine Automation Controller

Continue to pursue productivity



The solution in your hand

Improve productivity, improve your business

The manufacturing industry is under pressure to keep boosting productivity without compromising on quality. Global production and flexible production are required to satisfy diverse consumer needs.

In addition, manufacturers need to control quality and safety to provide the same level of quality and meet rising quality and safety standards.

In order to fulfill these requirements, it is crucial to utilize information, take safety measures, control quality, and at the same time improve production efficiency.

Common issues

Compromise between production efficiency and information utilization/safety measures/quality control



Production cycle time is increased due to traceability data processing

Full traceability is required to meet high-level quality standards. As it takes a long time to process all traceability data, the production cycle time increases.



Safety measures make setup and troubleshooting difficult

Separate safety control for machines and lines and separate controllers for machine control and safety are required. Line and machine design is time-consuming, and safety measures have to be redesigned when the layout is changed.



Production lead time is increased due to additional inspections and tight quality control

Adding inspections to maintain quality increases production lead time. When special machines with built-in PC that collect and process data at high speeds are used for inspections, maintenance becomes difficult. Instead, acceptance sampling is conducted offline.

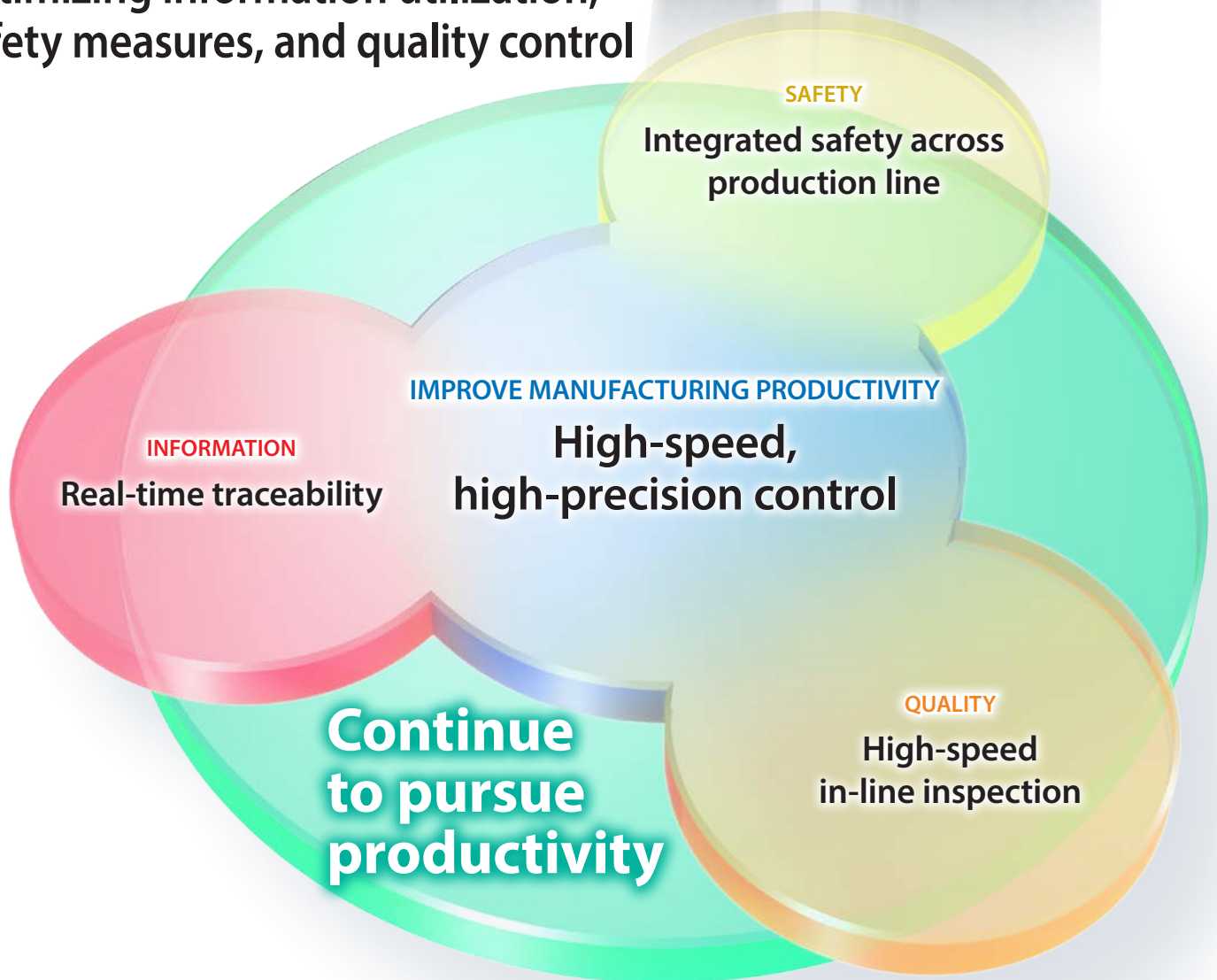


NX1

The Next Standard

NX1

Improves production efficiency while optimizing information utilization, safety measures, and quality control



SAFETY

Integrated safety across production line

IMPROVE MANUFACTURING PRODUCTIVITY

High-speed, high-precision control

INFORMATION

Real-time traceability

QUALITY

High-speed in-line inspection

Continue to pursue productivity

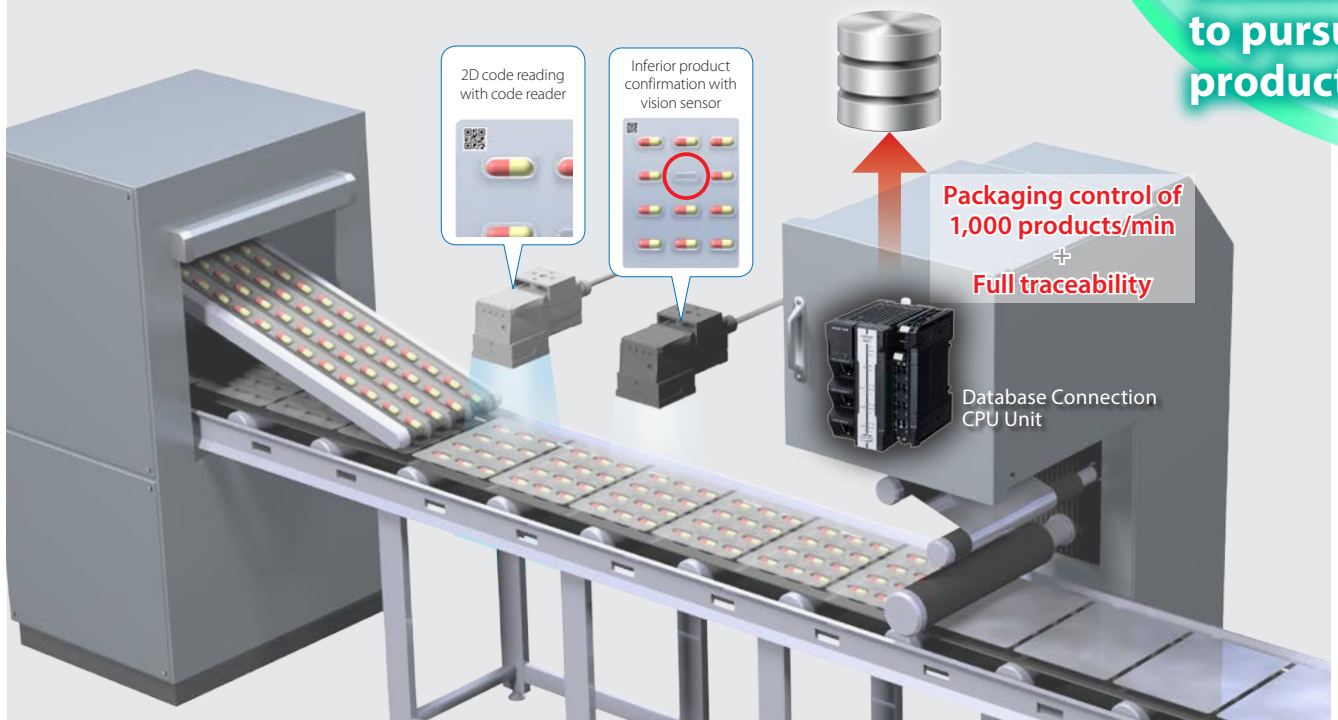
Produce faster without compromising on quality

The NX1 can utilize information, take safety measures, and control quality while at the same time improving production efficiency through high-speed, high-precision control. This contributes to continuous improvement in productivity.



Real-time traceability

The NX1 provides high-speed control while utilizing information. For example, the NX1 used for a packaging machine with the capability of handling 1,000 products per minute can collect all traceability data in synchronization with the production cycle while performing motion control.



Integrated safety across production line



The NX1 is the first in the world* to integrate two different open networks: EtherNet/IP™ for scalable safety control in production lines and EtherCAT® for fast safety control in machines. Furthermore, it integrates safety control into machine control in lines that require fast cycle times.

This integration allows you to standardize machines and build flexible lines.

* Based on Omron investigation in March 2018.

SAFETY

**IMPROVE
MANUFACTURING
PRODUCTIVITY**

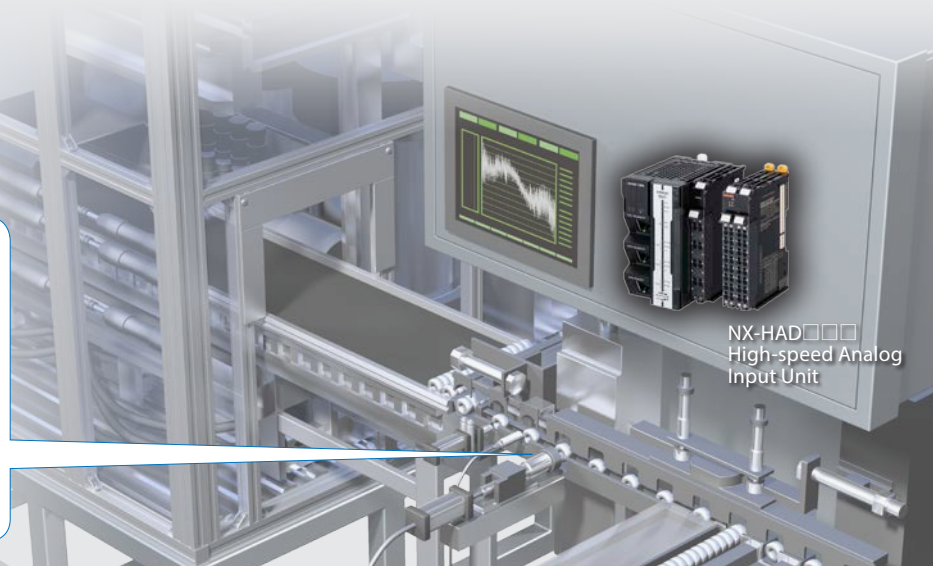
QUALITY

High-speed in-line inspection

Although special inspection machines with built-in PC are widely used for high-speed inspections, they require special maintenance skills.

Therefore, acceptance sampling is often carried out offline to prevent line stoppages. The NX1 can be used in conjunction with the High-speed Analog Input Unit to collect measurement data within a fixed cycle time of 5 μs. This standard controller eliminates the need for special machines with PC and can be maintained by on-site engineers. In-line inspections of all products can also be conducted easily.

High-speed in-line inspection of all products with standard inspection machine



Seamless Integration: Production Line & IT systems

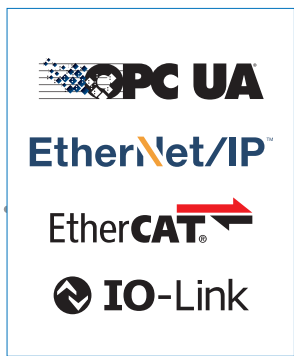
The NX1 Controller integrates inputs, logic, outputs, safety, and robotics, offering a wide variety of applications that leverage information to boost productivity and measures for quality and safety.

Information

Secure direct connection to database



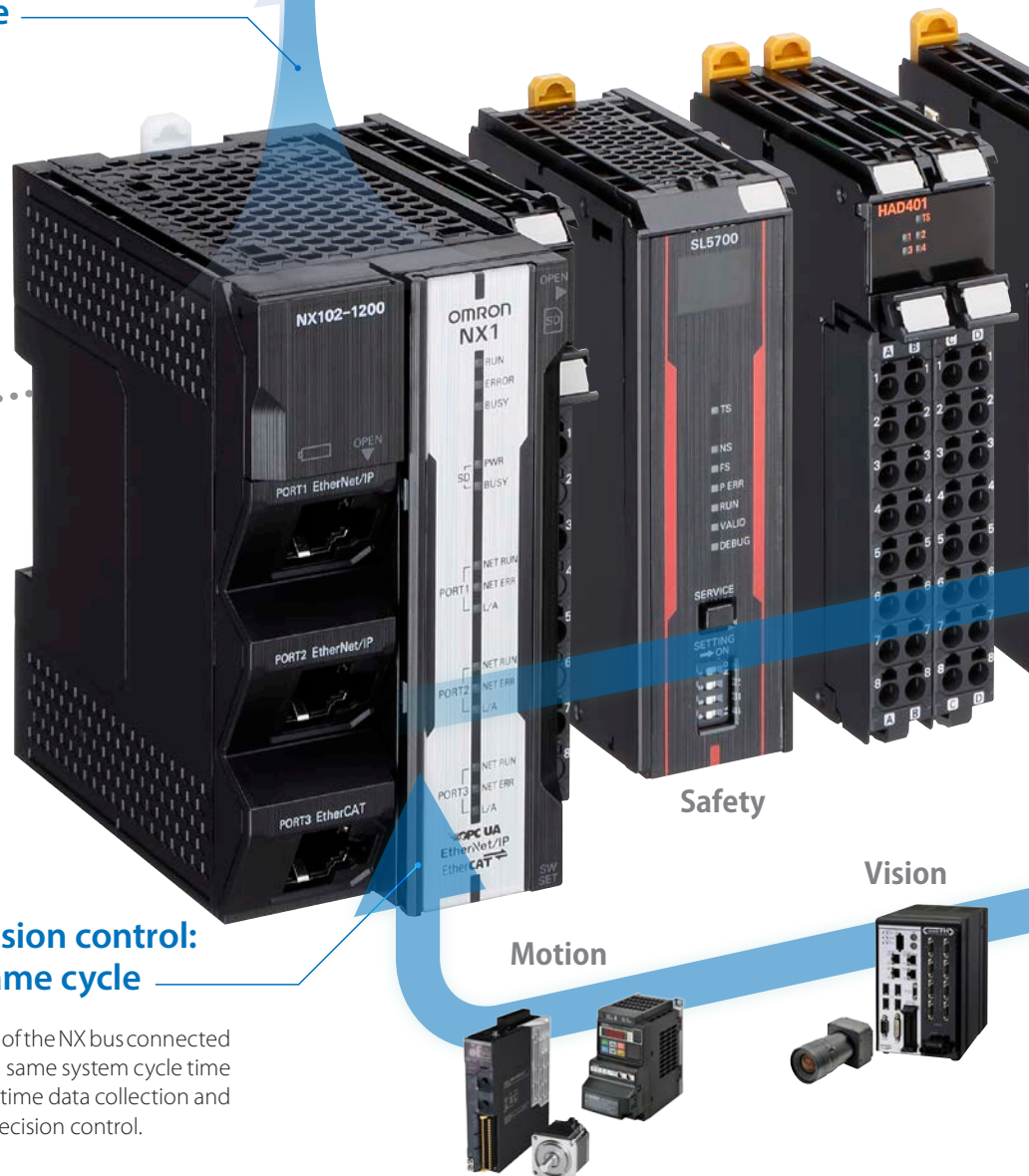
Networks



Production Line


High-speed, high-precision control: Synchronized within same cycle

The NX1 provides synchronized control of the NX bus connected I/O and motion control network within same system cycle time and jitter below 1 μs. This enables real-time data collection and analysis as well as high-speed, high-precision control.




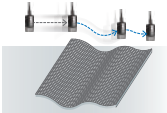
tems

Information Utilization Application

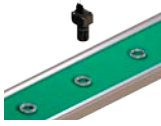
| Application | NX1 functionality + product |
|--|---|
| All traceability data storage  | NX1 Database Connection CPU Unit Code reader RFID |
| Direct connection of machine to MES/SCADA Data utilization to prevent manipulation | NX1 OPC UA server (standard functionality) |
| Linkage between image and data | FH Vision System |



Production Efficiency Improvement Application

| Application | NX1 + product |
|---|---|
| Predictive maintenance | NX-ILM400 IO-Link Master Unit IO-Link sensor |
| Automatically optimized temperature control | NX-TC Temperature Control Unit E5 Digital Temperature Controller |
| Position and load control for servo press | 1S Servo System  |
| Weighing control | NX-RS Load Cell Input Unit |
| Tracer control | ZW-7000/5000 Confocal Fiber Displacement Sensor  |

Quality Control Application

| | |
|----------------------------|---|
| Rotator inspection | NX-HAD High-speed Analog Input Unit |
| Welding quality inspection | |
| Appearance inspection | FH Vision System  |

Safety Measures Application

| | |
|--------------------------------------|--|
| High-speed safety control in machine | NX-SL5 Safety CPU Unit |
| Safety control in line | |
| Intrusion detection | F3SG-R Safety Light Curtain  |

NX1 brings advanced control in miniaturized

Three industrial Ethernet ports and a power supply are housed in a compact design with a width of 66 mm. The NX1 provides key functionality to integrate control and information for advanced manufacturing applications. The new controller contributes to the pursuit of productivity improvements.

Actual size

Information
Two built-in ports
OPC UA functionality
Modbus/TCP, FINS
Enhanced security

Production Line
Motion control of 4/6/8/12 axes*
Up to 64 slaves

Embedded Power Supply
DC power supply without battery backup

NX bus
Up to 32 local NX I/O units

EtherNet/IP™
OPC UA

EtherCAT®



* Including single axis position control axes

High-speed, high-precision control

Synchronized control of I/O and motion within 1 ms cycle time

Jitter : 1 μ s

Memory capacity for variables : 33.5 MB*¹

Secure host connection

OPC UA is an IEC communication protocol which is listed as a recommendation for Industrie 4.0 and PackML. The NX1 comes equipped with an OPC UA server interface and provides a secure connection to IT systems such as MES and ERP.



Enhanced Ethernet functionality

Connectivity to existing devices (e.g., Modbus/TCP*², FINS communications, and connection to other vendor PLC*³) and EtherNet/IP™ performance (increased to 12,000 pps*⁴) are improved. Packet Filter enhances security, and visualization of EtherCAT® slave errors makes troubleshooting easier.

Multicore microprocessor for control and data handling

The multicore microprocessor enables information utilization including communications and traceability without compromising control performance.

*1. The total number of bytes of retained and non-retained variables.

*2. Clients instructions are supported.

*3. SLMP commands are included in the Sysmac Library.

*4. The total pps of two ports.

One software to get things done..

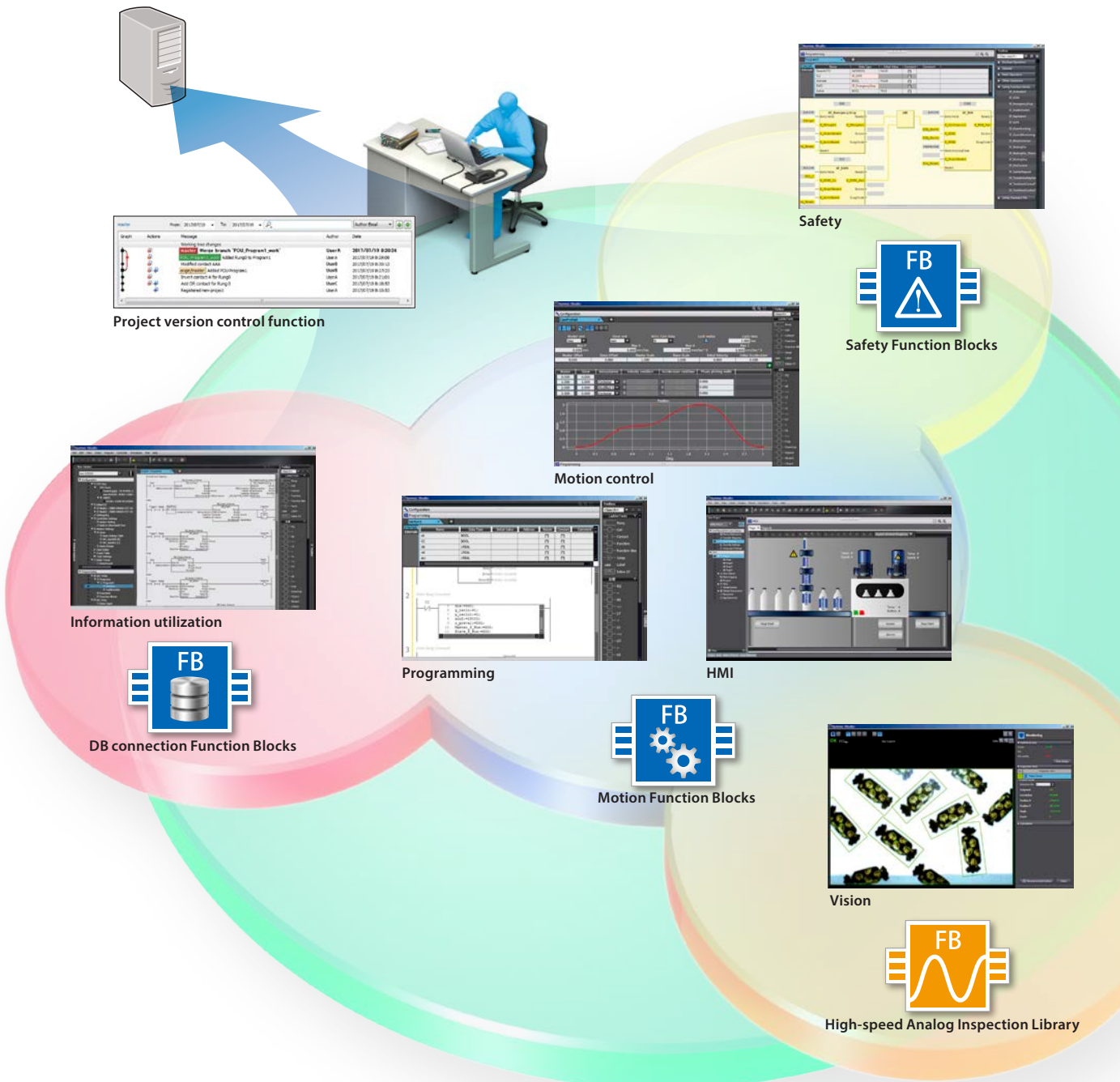
Sysmac Studio – Integrated Development Environment integrates programming, configuration, information, and safety. The project version control system in the Sysmac Studio Team Development Option ensures smooth development across the team. The Sysmac Studio includes Function Blocks for motion control and database connection, and collections of software functional components Sysmac Libraries can be downloaded from our website. These allow you to minimize time to build systems that boost productivity.



Sysmac Studio

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







Ordering Information

International Standards

The standards are abbreviated as follows: U: UL, U1: UL(Class I Division 2 Products for Hazardous Locations), C: CSA, UC: cULus, UC1: cULus(Class I Division 2 Products for Hazardous Locations), CU: cUL, N: NK, L: Lloyd, CE: EU Directives, RCM: Regulatory Compliance Mark, KC: KC Registration, and EAC: EAC mark. Contact your OMRON representative for further details and applicable conditions for these standards.

NX-Series NX102 CPU Units

| Product Name | Specifications | | | | | Model | Standards |
|---|------------------|--|----------------------------------|-----------------------------------|------------|------------|-----------------------|
| | Program capacity | Memory capacity for variables | Maximum number of used real axes | | | | |
| | | | Motion control axes | Single-axis position control axes | | | |
| NX102 CPU Unit  | 5 MB | 1.5 MB (Retained during power interruption)/ 32 MB (Not retained during power interruption) | 12 | 8 | 4 | NX102-1200 | UC1, CE, RCM, KC, EAC |
| | | | 8 | 4 | 4 | NX102-1100 | |
| | | | 6 | 2 | 4 | NX102-1000 | |
| 4 | | | 0 | 4 | NX102-9000 | | |
| NX102 Database Connection CPU Unit  | | | 12 | 8 | 4 | NX102-1220 | |
| | | | 8 | 4 | 4 | NX102-1120 | |
| | 6 | 2 | 4 | NX102-1020 | | | |
| | | | 4 | 0 | 4 | NX102-9020 | |

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. Windows 7 (32-bit/64-bit version)/ Windows 8 (32-bit/64-bit version)/ Windows 8.1 (32-bit/64-bit version)/ Windows 10 (32-bit/64-bit version) 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). For details, refer to your local OMRON website. | --- | DVD | SYSMAC-SE200D |
| | | 1 license ^{*1} | --- | SYSMAC-SE201L |


*1. Multi licenses are available for the Sysmac Studio (3, 10, 30, or 50 licenses). Note. For Sysmac Studio Team Development Option, refer to your local OMRON website.

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/

| Product name | Specifications | Model |
|--------------------------------------|--|--------------|
| SLMP Communications Library | The SLMP Communications Library is used to control communications with Mitsubishi sequencers using the SLMP communications protocol. | SYSMAC-XR017 |
| High-Speed Analog Inspection Library | The High-speed Analog Inspection Library records analog input values acquired by the High-speed Analog Input Units in time. | SYSMAC-XR016 |

High-speed Analog Input Unit

| Product name | Specifications | | | | | Model |
|---|------------------|--|-----------------|-----------------------|---------------------|-----------|
| | Number of points | Input range | Conversion time | Trigger input section | | |
| | | | | Number of points | Internal I/O common | |
| High-speed Analog Input Unit  | 4 points | -10 to +10 V 1 to 5 V -5 to +5 V 0 to 20 mA 0 to 10 V 4 to 20 mA 0 to 5 V | 5 μs/4 Ch | 4 points | NPN | NX-HAD401 |
| | | | | | PNP | NX-HAD402 |

Safety CPU Unit

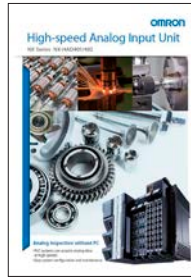
| Product name | Specifications | | | | Model |
|--|-------------------------------------|------------------|----------------------------------|-----------------------|-----------|
| | Maximum number of safety I/O points | Program capacity | Number of safety I/O connections | I/O refreshing method | |
| Safety CPU Unit  | 1024 points | 2048 KB | 128 | Free-Run refreshing | NX-SL5500 |
| | 2032 points | 4096 KB | 254 | | NX-SL5700 |

Related catalogs



Machine Automation Controller NX1 Datasheet

Cat. No. P130



High-speed Analog Input Unit NX-HAD401/402 Catalog

Cat. No. P128



Safety Network Controller NX-series Catalog

Cat. No. F104

- Sysmac is a trademark or registered trademark of OMRON Corporation in Japan and other countries for OMRON factory automation products.
- Windows is either a registered trademark or trademark of Microsoft Corporation in the United States and/or other countries.
- EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.
- EtherNet/IP™, CIP Safety™, and DeviceNet™ are trademarks of ODVA.
- OPC UA is a trademark of OPC Foundation.
- Other company names and product names in this document are the trademarks or registered trademarks of their respective companies.
- Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.
- The product photographs and figures that are used in this catalog may vary somewhat from the actual products.
- Some images are used under license from Shutterstock.com.

OMRON Corporation Industrial Automation Company
Kyoto, JAPAN

Contact: www.ia.omron.com

Regional Headquarters

OMRON EUROPE B.V.
Wegalaan 67-69, 2132 JD Hoofddorp
The Netherlands
Tel: (31)2356-81-300/Fax: (31)2356-81-388

OMRON ASIA PACIFIC PTE. LTD.
No. 438A Alexandra Road # 05-05/08 (Lobby 2),
Alexandra Technopark,
Singapore 119967
Tel: (65) 6835-3011/Fax: (65) 6835-2711

OMRON ELECTRONICS LLC
2895 Greenspoint Parkway, Suite 200
Hoffman Estates, IL 60169 U.S.A.
Tel: (1) 847-843-7900/Fax: (1) 847-843-7787

OMRON (CHINA) CO., LTD.
Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Tel: (86) 21-5037-2222/Fax: (86) 21-5037-2200

Authorized Distributor:

© OMRON Corporation 2018 All Rights Reserved.
In the interest of product improvement,
specifications are subject to change without notice.

CSM_3_1_0618
Cat. No. P129-E1-03

Printed in Japan
0618(0418)