

# NX-series EtherNet/IP™ Unit

# NX-EIP201

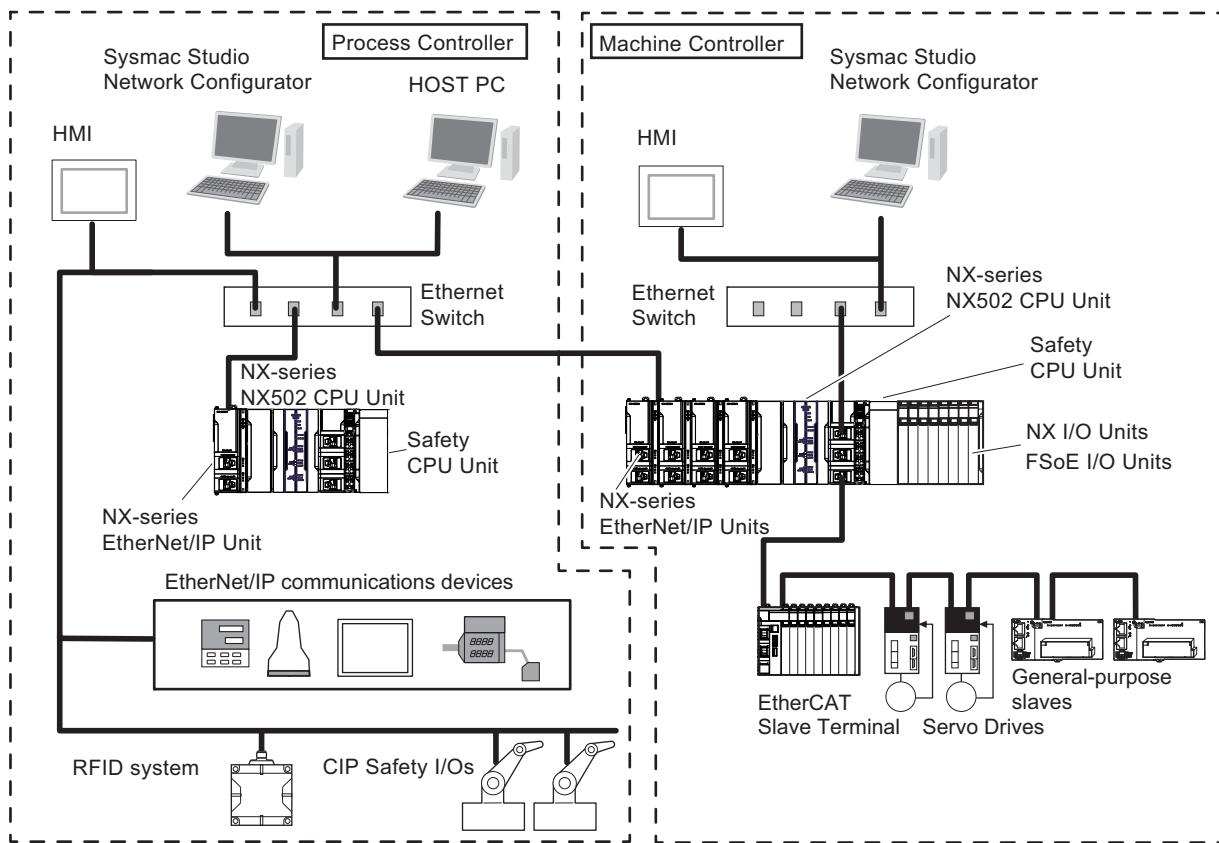
**Collects large amounts of data  
at high speeds and increases scalability  
of safety**



## Features

- High-speed, high-capacity communications (allowed bandwidth per unit: 40,000 pps, baud rate: 1 Gbps)
- Connectable to NX5 via X bus for high-speed, high-capacity data transfer
- Expandable to eight EtherNet/IP networks (four NX-EIP201 EtherNet/IP Units per NX5)
- CIP communications service: Tag data links and message communications
- Used in conjunction with NX-SL5 Safety Control Unit for safety communications via CIP Safety
- Network ports to connect HMI and Sysmac Studio

## System Configuration



The following table shows the description, NX502 CPU Unit connection method, and quantity for each configuration element in the figure above.

Configuration element	Description	NX502 CPU Unit connection method	Qty
NX502 CPU Unit	A CPU Unit to which the NX-series EtherNet/IP Unit is connected. This Unit performs machine control and process control of the system.	---	One Unit for machine control, and one Unit for overall process control
NX-series EtherNet/IP Unit	One of X Bus Units which performs EtherNet/IP communications.	X Bus *1	Up to four Units per an NX502 CPU Unit
NX I/O Unit	An interface Unit to connect an NX-series CPU Unit to control devices such as sensors and actuators. This Unit can also be connected to an NX-series Communications Coupler Unit.	NX bus of CPU Unit and Slave Terminal	Zero to multiple Units (depends on application)
Safety CPU Unit	A CPU Unit which controls the safety circuit of manufacturing equipment. This Unit controls both of the safety control within equipment by FSoE and the line safety control by CIP Safety.	NX bus of CPU Unit	One Unit per an NX502 CPU Unit
FSoE I/O Unit	This Unit inputs safety input signals and outputs safety output signals in combination with a Safety CPU Unit.	NX bus of CPU Unit and Slave Terminal	Zero to multiple Units (depends on application)
Servo Drive	A control device for an electric motor assembled in a control equipment. It is controlled by the Motion Control Function Module within the CPU Unit.	Built-in EtherCAT port	Zero to multiple Units (depends on application)
EtherCAT general-purpose slave	A general-purpose slave connected to the EtherCAT.	Built-in EtherCAT port	Zero to multiple Units (depends on application)
Ethernet switch	An Ethernet switch connects devices on the network by packet switching and transfers the received data to the target device.	EtherNet/IP port on CPU Unit and NX-series EtherNet/IP Unit	Zero to multiple Units (depends on application)
HMI	An HMI performs operation input to the manufacturing equipment and displays status of the manufacturing equipment.	EtherNet/IP port on CPU Unit and NX-series EtherNet/IP Unit	Zero to multiple Units (depends on application)
Sysmac Studio Network Configurator	Support Software for NX502 CPU Unit.	EtherNet/IP port on CPU Unit and NX-series EtherNet/IP Unit	One to multiple Units (depends on application)
HOST PC	This computer performs EtherNet/IP communications.	EtherNet/IP port on CPU Unit and NX-series EtherNet/IP Unit	One to multiple Units (depends on application)
RFID system	This system uses electromagnetic fields and radio waves to exchange product identification information. Communications is performed with a Modbus/TCP client.	EtherNet/IP port on CPU Unit and NX-series EtherNet/IP Unit	Zero to multiple Units (depends on application)
CIP Safety I/O	A connection interface for sensors and actuators of safety I/O devices. CIP Safety on EtherNet/IP compatible.	EtherNet/IP port on NX-series EtherNet/IP Unit	Zero to multiple Units (depends on application)

\*1. You can connect the NX series EtherNet/IP Unit on the left side of the NX502 CPU Unit.

## Ordering Information

### Applicable standards

Refer to the OMRON website ([www.ia.omron.com](http://www.ia.omron.com)) or ask your OMRON representative for the most recent applicable standards for each model.

### 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

### Industrial Switching Hubs

Product name	Functions	No. of ports	Accessories	Current consumption (A)	Model
Industrial Switching Hubs 	Packet priority control (QoS): EtherNet/IP control data priority Ethernet standard: IEEE 802.3 10Base-T, 100Base-TX Auto-negotiation: Supported Broadcast Storm Detection Function: Supported	5	Power supply connector	0.07	W4S1-05D

### Recommended Network Devices

The following table shows the devices recommended for use with the EtherNet/IP.

#### Switching Hub

Manufacturer	Model number
Phoenix Contact USA	Consult the manufacturer.
Contec USA, Inc.	Consult the manufacturer.
Cisco Systems, Inc	Consult the manufacturer.

#### Twisted-pair Cables

Applicable EtherNet/IP communications cables and connectors vary depending on the used baud rate.

For 100Base-TX and 10Base-T, use an STP (shielded twisted-pair) cable of category 5 or higher.

You can use either straight or cross cable.

For 1000Base-T, use an STP (shielded twisted-pair) cable (double shielding with aluminum tape and braiding) of category 5e or higher. You can use either straight or cross cable.

Cabling materials used for EtherNet/IP communication cables are shown in the table below.

"100Base-TX" in the "Product" column of the table below indicates that either 100Base-TX or 10Base-T can be used.

#### Cables / Connectors

Product		Appearance	Recommended manufacturer	Model
For 1000BASE-T and 100BASE-TX	Size and conductor pairs: AWG24 x 4P	Cables	----	Kuramo Electric Co., Ltd.
		RJ45 Connectors	----	Panduit Corporation
For 100BASE-TX	Size and conductor pairs: AWG22 x 2P	Cables	----	Kuramo Electric Co., Ltd.
			----	JMACS Japan Co., Ltd.
		RJ45 Assembly Connector		OMRON
				XS6G-T421-1 *1

\*1. We recommend that you use cables and connectors in above combinations.

## General Specifications

Item	Specification
<b>Enclosure</b>	Mounted in a panel
<b>Grounding method</b>	Ground to less than 100 $\Omega$ .
<b>Dimensions: Height × Depth × Width</b>	100 × 120 × 39 (mm)
<b>Weight</b>	310 g max.
<b>Power consumption</b>	8.1 W max.
<b>Operating environment</b>	<p><b>Ambient operating temperature</b> 0 to 55°C</p> <p><b>Ambient operating humidity</b> 10% to 95% (with no icing or condensation)</p> <p><b>Atmosphere</b> Must be free from corrosive gases.</p> <p><b>Ambient storage temperature</b> -25 to 70°C (with no icing or condensation)</p> <p><b>Altitude</b> 2,000 m max.</p> <p><b>Pollution degree</b> 2 or less: Meets IEC 61010-2-201.</p> <p><b>Noise immunity</b> 2 kV on power supply line (Conforms to IEC 61000-4-4.)</p> <p><b>Overvoltage category</b> Category II: Meets IEC 61010-2-201.</p> <p><b>EMC immunity level</b> Zone B</p> <p><b>Vibration resistance</b> Conforms to IEC 60068-2-6. 5 to 8.4 Hz with 3.5-mm amplitude, 8.4 to 150 Hz, acceleration of 9.8 m/s<sup>2</sup> 100 min each in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total) Gravity acceleration is assumed to be G=9.8 m/s<sup>2</sup>.</p> <p><b>Shock resistance</b> Conforms to IEC 60068-2-27, 147 m/s<sup>2</sup>, 3 times in X, Y, and Z directions. Gravity acceleration is assumed to be G=9.8 m/s<sup>2</sup>.</p> <p><b>Mounting method</b> Mount to DIN Track</p> <p><b>Mounting direction</b> One direction (upright)</p>
<b>Applicable standards *1</b>	EU Directives, cULus, RCM, UKCA, KC

\*1. Refer to the OMRON website (<http://www.ia.omron.com/>) or consult your OMRON representative for the most recent applicable standards for each model.

## Performance Specifications

Item		NX-EIP201	
<b>Number of ports</b>		2	
<b>Physical layer</b>		10BASE-T, 100BASE-TX, or 1000BASE-T	
<b>Frame length</b>		1,514 bytes max.	
<b>Media access method</b>		CSMA/CD	
<b>Modulation</b>		Baseband	
<b>Topology</b>		Star	
<b>Baud rate</b>		1 Gbps (1000BASE-T) max.	
<b>Transmission media</b>		STP (shielded, twisted-pair) cable of Ethernet category 5, 5e or higher	
<b>Maximum transmission distance between Ethernet switch and node</b>		100 m	
<b>Maximum number of cascade connections</b>		There are no restrictions if an Ethernet switch is used.	
<b>LLDP</b>		Supported.	
<b>BOOTP client</b>		Supported.	
<b>DNS client</b>		Supported.	
<b>SNMP agent, traps</b>		Supported.	
<b>EtherNet/IP port</b>	<b>Maximum number of connections</b>	256 per port 512 total	
	<b>Packet interval *1, *2</b>	Can be set for each connection. 1.0 to 10,000 ms in 1-ms increments	
	<b>Allowed communications bandwidth per Unit</b>	40,000 pps *3, *4 (including heartbeat)	
	<b>Maximum number of tag sets</b>	256 per port 512 total	
	<b>Tag types</b>	Network variables CIO, Work, Holding, DM, or EM Areas can be used.	
	<b>Number of tags per connection (i.e., per tag set)</b>	64 (63 tags if Controller status is included in the tag set.)	
	<b>Maximum number of tags</b>	1,024 per port 2,048 total	
	<b>Maximum link data size per node (total size for all tags)</b>	369,664 bytes per port (total of 739,328 bytes with two ports)	
	<b>Maximum data size per connection</b>	1,444 bytes	
	<b>Maximum number of registrable tag sets</b>	256 per port 512 total (1 connection = 1 tag set)	
	<b>Maximum tag set size</b>	1,444 bytes (Two bytes are used if Controller status is included in the tag set.)	
	<b>Multicast packet filter *5</b>	Supported.	
	<b>Class 3 (number of connections)</b>	128 per port 256 total (clients plus server)	
	<b>UCMM (non-connection type)</b>	<b>Maximum number of clients that can communicate at one time</b>	32 per port 64 total
		<b>Maximum number of servers that can communicate at one time</b>	32 per port 64 total
	<b>CIP Safety routing *6</b>	<b>Maximum number of routable CIP Safety connections</b>	84 total (originator: 80, target: 4)
		<b>Maximum routable safety data length per connection</b>	32 bytes
	<b>SNMP</b>	<b>Agents</b>	SNMPv1, SNMPv2C
		<b>MIB</b>	MIB-II
<b>EtherNet/IP conformance test</b>		Conforms to CT18.	
<b>Ethernet interface</b>		10BASE-T, 100BASE-TX, or 1000BASE-T Auto negotiation	

\*1. Data will be refreshed at the set interval, regardless of the number of nodes.

\*2. The approximate I/O response time of the tag data link is determined by the relationship between the packet interval and the number of connections.

\*3. "pps" means packets per second, i.e., the number of communications packets that can be sent or received in one second.

If the packet interval (RPI) is 0.5 ms, then this will be 30,000 pps.

\*4. When the Unit is performing tag data link communications where the allowable communications bandwidth per Unit is close to or greater than 30,000 pps, the following functions may not be used properly. In that case, use the built-in EtherNet/IP port on the CPU Unit or an EtherNet/IP port of a different NX-series EtherNet/IP Unit.

- Connecting the Sysmac Studio online from the EtherNet/IP port of the NX-series EtherNet/IP Unit
- Connecting the Network Configurator online from the EtherNet/IP port of the NX-series EtherNet/IP Unit
- Connecting the NA-series Programmable Terminal online from the EtherNet/IP port of the NX-series EtherNet/IP Unit
- Port forward via the NX-series EtherNet/IP Unit
- CIP message communications
- SNMP function

These functions of the NX-series EtherNet/IP Unit can be used via X Bus from the built-in EtherNet/IP port on the CPU Unit or an EtherNet/IP port of a different NX-series EtherNet/IP Unit.

\*5. As the EtherNet/IP port implements the IGMP client, unnecessary multi-cast packets can be filtered by using an Ethernet switch that supports IGMP Snooping.

\*6. CIP Safety communications and tag data links cannot be used together in one NX-series EtherNet/IP Unit

## Function Specifications

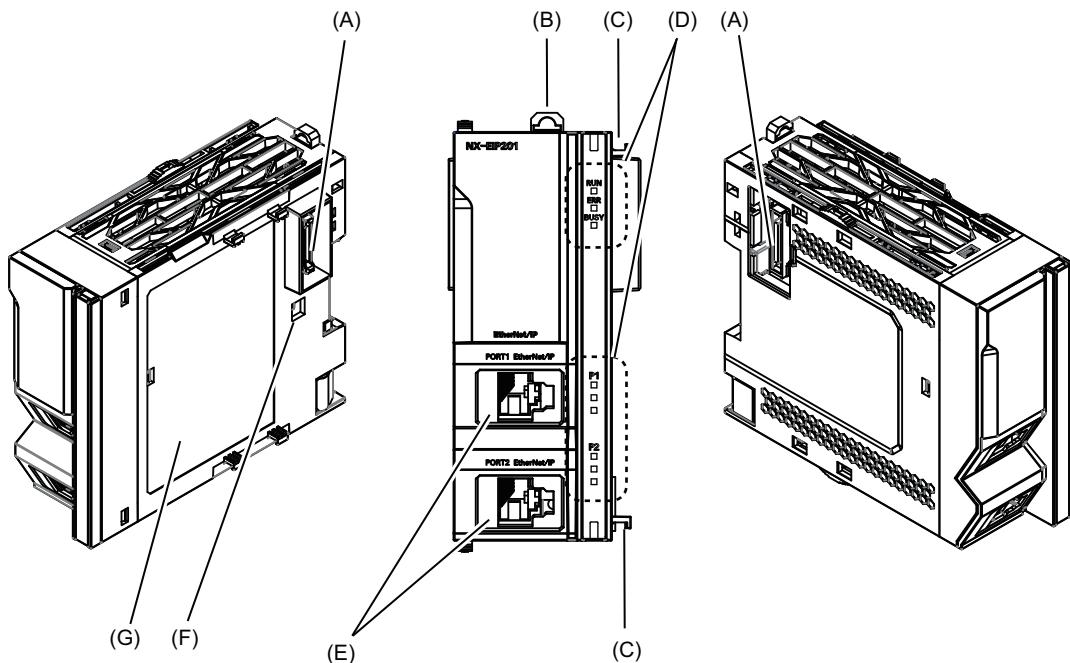
Item				NX-EIP201
Communications	EtherNet/IP port	Communications protocol		TCP/IP or UDP/IP
		CIP communications services	Tag data links	Programless cyclic data exchange is performed with the devices on the EtherNet/IP network.
			Message Communications	CIP commands are sent to or received from the devices on the EtherNet/IP network.
System management	Event logs	TCP/IP application		EtherNet/IP port internal status information is provided to network management software that uses an SNMP manager.
		Function		Events are recorded in the logs.
		Maximum number of events	System event log	1,024
			Access event log	512
			User-defined event log	None

## Version Information

NX-EIP201	Sysmac Studio	Network Configurator *1
Ver.1.0	Ver.1.54 or higher	Ver.3.74 or higher

\*1. This software is used to configure tag data links.

## Part Names and Functions



Symbol	Name	Function
(A)	X Bus connectors	These connectors are used to connect another Unit.
(B)	DIN Track mounting hook	This hook is used to mount the Unit to a DIN Track.
(C)	Unit hookup guides	These guides are used to connect two Units.
(D)	Operation status indicators	The indicators show the current operating status of the Unit.
(E)	EtherNet/IP ports	The communications ports for EtherNet/IP connection. There are two ports.
(F)	DIP switch	This switch is for configuring internal settings of the Unit, but not used normally. Always keep all pins from SW1 to SW4 in OFF state.
(G)	Unit specifications	The specifications of the Unit are given here.

## Functional Comparison of EtherNet/IP Ports on NJ/NX-series CPU Units and Other Series

Item	Built-in EtherNet/IP port on NX701 CPU Unit	Built-in EtherNet/IP port on NX502 CPU Unit	Built-in EtherNet/IP port on NX102 CPU Unit	Built-in EtherNet/IP port on NX1P2 CPU Unit	Built-in EtherNet/IP port on NJ-series CPU Unit	NX-series EtherNet/IP Unit	CJ-series Ethernet Unit	EtherNet/IP Unit (built-in port on CJ2 CPU Unit)		
	Unit version 1.0	Unit version 2.0	Unit version 2.1							
Tag data link communications service	OK	OK	OK	OK	OK	OK	---	OK	OK	OK
CIP message communications service	OK	OK	OK	OK	OK	OK	---	OK	OK	OK
IP routing	OK	OK	OK	---	---	OK	---	---	---	---
Socket service	OK	OK	OK	OK	OK	---	OK	---	---	---
FTP server	OK	OK	OK	OK	OK	---	OK	---	OK	OK
FTP client	OK	OK	OK	OK	OK	---	---	---	---	---
Mail send/receive	---	---	---	---	---	---	OK	---	---	---
Web functions	---	---	---	---	---	---	OK	---	---	---
Automatic adjustment of PLC/Controller's internal clock	OK	OK	OK	OK	OK	---	OK	---	OK	OK
Error history	OK *1	OK *1	OK	OK	OK	OK				
Response to PING command	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
SNMP/SNMP trap	OK	OK	OK	OK	OK	OK	---	---	OK	OK
CIDR function for IP addresses	OK	OK	OK	OK	OK	OK	---	---	OK	OK
DHCP client	---	OK	---	---	---	---	---	---	---	---
Online connection via EtherNet/IP using CX-One	---	---	---	---	---	---	OK	---	OK	OK
Online connection via EtherNet/IP using Network Configurator	OK	OK	OK	OK	OK	OK	---	OK	OK	OK
Mounting in an NJ-series CPU Unit	---	---	---	---	---	---	---	---	---	OK *2
Connection settings using the Sysmac Studio	OK	OK	OK	OK	OK	OK	---	---	---	OK

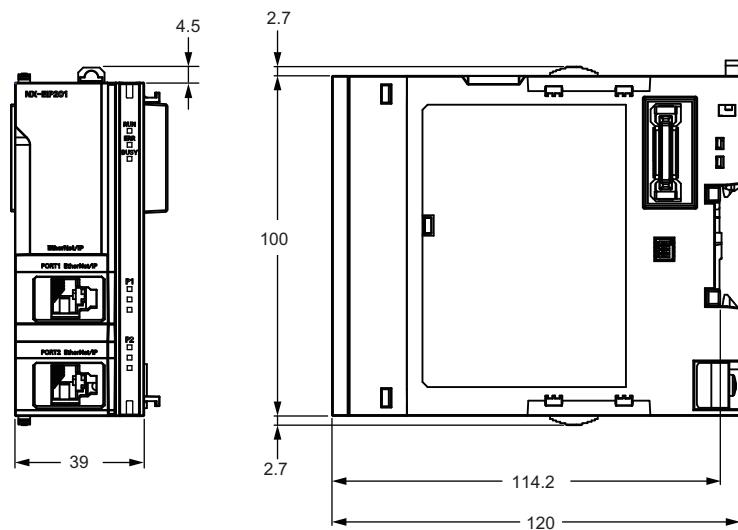
\*1. This is equivalent to the event log in the EtherNet/IP of an NJ-series Controller.

\*2. You cannot use the following functions if you connect to the CPU Unit through an EtherNet/IP Unit.

- Placing the Sysmac Studio online with the CPU Unit (However, you can place the Network Configurator online)
- Using the Troubleshooter of an NS-series PT

## Dimensions

### NX-EIP201



For dimensions after attaching the communications cables, refer to *NX-series EtherNet/IP™ Unit User's Manual* (W627).

## Related Manuals

The following manuals are related. Use these manuals for reference.

Manual name	Cat. No.	Model numbers	Application	Description
NX-series EtherNet/IP™ Unit User's Manual	W627	NX-EIP201	Learning how to use the NX-series EtherNet/IP Unit.	Information on the NX-series EtherNet/IP Unit is provided. Information is provided on the basic setup, tag data links, and other features.
NX-series NX502 CPU Unit Hardware User's Manual	W629	NX502-□□□□	Learning the basic specifications of the NX502 CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided.	An introduction to the entire NX502 system is provided along with the following information on the CPU Unit. <ul style="list-style-type: none"> <li>• Features and system configuration</li> <li>• Introduction</li> <li>• Part names and functions</li> <li>• General specifications</li> <li>• Installation and wiring</li> <li>• Maintenance and inspection</li> </ul>
NJ/NX-series CPU Unit Software User's Manual	W501	NX701-□□□□ NX502-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	Learning how to program and set up an NJ/NX-series CPU Unit. Mainly software information is provided.	The following information is provided on a Controller built with an NJ/NXseries CPU Unit. <ul style="list-style-type: none"> <li>• CPU Unit operation</li> <li>• CPU Unit features</li> <li>• Initial settings</li> <li>• Programming based on IEC 61131-3 language specifications</li> </ul>
NJ/NX-series Instructions Reference Manual	W502	NX701-□□□□ NX502-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	Learning detailed specifications on the basic instructions of an NJ/NX-series CPU Unit.	The instructions in the instruction set (IEC 61131-3 specifications) are described.
NJ/NX-series CPU Unit Motion Control User's Manual	W507	NX701-□□□□ NX502-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	Learning about motion control settings and programming concepts.	The settings and operation of the CPU Unit and programming concepts for motion control are described.
NJ/NX-series Motion Control Instructions Reference Manual	W508	NX701-□□□□ NX502-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	Learning about the specifications of the motion control instructions.	The motion control instructions are described.
NJ/NX-series CPU Unit Built-in EtherCAT® Port User's Manual	W505	NX701-□□□□ NX502-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	Using the built-in EtherCAT port on an NJ/NX-series CPU Unit.	Information on the built-in EtherCAT port is provided. This manual provides an introduction and provides information on the configuration, features, and setup.
NJ/NX-series CPU Unit Built-in EtherNet/IP™ Port User's Manual	W506	NX701-□□□□ NX502-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	Using the built-in EtherNet/IP port on an NJ/NX-series CPU Unit.	Information on the built-in EtherNet/IP port is provided. Information is provided on the basic setup, tag data links, and other features.
NJ/NX-series CPU Unit OPC UA User's Manual	W588	NX701-□□□□ NX502-□□□□ NX102-□□□□ NJ501-1□00	Using the OPC UA.	Describes the OPC UA.
NX-series CPU Unit FINS Function User's Manual	W596	NX701-□□20 NX502-□□□□ NX102-□□□□	Using the FINS function of an NX-series CPU Unit.	Describes the FINS function of an NX-series CPU Unit.
NJ/NX-series Troubleshooting Manual	W503	NX701-□□□□ NX502-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	Learning about the errors that may be detected in an NJ/NX-series Controller.	Concepts on managing errors that may be detected in an NJ/NX-series Controller and information on individual errors are described.

Manual name	Cat. No.	Model numbers	Application	Description
Sysmac Studio Version 1 Operation Manual	W504	SYSMAC-SE2□□□	Learning about the operating procedures and functions of the Sysmac Studio.	Describes the operating procedures of the Sysmac Studio.
NXR-series IO-Link Master Unit for EtherNet/IP™ User's Manual	W619	NXR-ILM08C-EIT	Learning how to use an NXR-series IO-Link Master Unit for EtherNet/IP.	The hardware, setup methods, and functions of the NXR-series IO-Link Master Unit for EtherNet/IP are described.

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## MEMO

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## Errors and Omissions.

Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

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

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**Kyoto, JAPAN**

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