OMRON

Machine Automation Controller

NX-series

CPU Unit
User's Manual

FINS Function

NX701-1720
NX701-1620
NX102-12□□
NX102-11□□
NX102-10□□
NX102-90□□

SYSMAC
always in control

W596-E1-01

NOTE

(1) All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form, or by any means, mechanical, electronic, photocopying, recording, or otherwise, without the prior written permission of OMRON.

(2) No patent liability is assumed with respect to the use of the information contained herein. Moreover, because OMRON is constantly striving to improve its high-quality products, the information contained in this manual is subject to change without notice.

(3) Every precaution has been taken in the preparation of this manual. Nevertheless, OMRON assumes no responsibility for errors or omissions.
Neither is any liability assumed for damages resulting from the use of the information contained in this publication.

Trademarks

- Sysmac and SYSMAC are trademarks or registered trademarks of OMRON Corporation in Japan and other countries for OMRON factory automation products.
- Microsoft, Windows, Windows Vista, Excel, and Visual Basic are either registered trademarks or trademarks of Microsoft Corporation in the United States and other countries.
- EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.
- ODVA, CIP, CompoNet, DeviceNet, and EtherNet/IP are trademarks of ODVA.
- The SD and SDHC logos are trademarks of SD-3C, LLC.

Other company names and product names in this document are the trademarks or registered trademarks of their respective companies.

Copyrights

- Microsoft product screen shots reprinted with permission from Microsoft Corporation.
- This product incorporates certain third party software. The license and copyright information associated with this software is available at http://www.fa.omron.co.jp/nj_info_e/.

Introduction

Thank you for purchasing an NX-series CPU Unit.
This manual contains information that is necessary to use the NX-series CPU Unit. Please read this manual and make sure you understand the functionality and performance of the NX-series CPU Unit before you attempt to use it in a control system.
Keep this manual in a safe place where it will be available for reference during operation.

Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

- Personnel in charge of introducing FA systems.
- Personnel in charge of designing FA systems.
- Personnel in charge of installing and maintaining FA systems.
- Personnel in charge of managing FA systems and facilities.

For programming, this manual is intended for personnel who understand the programming language specifications in international standard IEC 61131-3 or Japanese standard JIS B 3503.

Applicable Products

This manual covers the following products.

NX-series CPU Unit

- NX701-1720
- NX701-1620
- NX102-12□□
- NX102-11□□
- NX102-10□□
- NX102-90□□

Part of the specifications and restrictions for the CPU Units are given in other manuals. Refer to *Relevant Manuals* on page 2 and *Related Manuals* on page 19.

Relevant Manuals

The following table provides the relevant manuals for the NX-series CPU Units. Read all of the manuals that are relevant to your system configuration and application before you use the NX-series CPU Unit.

Most operations are performed from the Sysmac Studio Automation Software. For details about the Sysmac Studio, refer to *Sysmac Studio Version 1 Operation Manual (Cat. No. W504)*.

Purpose of use	Manual											
	Basic information											
	NX-series CPU Unit Hardware User's Manual	NX-series NX102 CPU Unit Hardware User's Manual	NJ/NX-series CPU Unit Software User's Manual	NJ/NX-series Instructions Reference Manual	NJ/NX-series CPU Unit Motion Control User's Manual	NJ/NX-series Motion Control Instructions Reference Manual	NJ/NX-series CPU Unit Built-in EtherCAT Port User's Manual	NJ/NX-series CPU Unit Built-in EtherNet/IP Port User's Manual	NJ/NX-series CPU Unit OPC UA User's Manual	NX-series CPU Unit FINS Function User's Manual	NJ/NX-series Database Connection CPU Units User's Manual	NJ/NX-series Troubleshooting Manual
Introduction to NX701 Controller	○											
Introduction to NX102 Controller		○										
Setting devices and hardware	○	○										
Using motion control					○							
Using EtherCAT							○					
Using EtherNet/IP								○				
Software settings			○									
Using motion control					○							
Using EtherCAT							○					
Using EtherNet/IP								○				
Using OPC UA									○			
Using FINS										○		
Using the database connection service											○	
Writing the user program			○	○								
Using motion control					○	○						
Using EtherCAT							○					
Using EtherNet/IP								○				
Using OPC UA									○			
Using FINS										○		
Using the database connection service											○	
Programming error processing												○

Purpose of use	Manual											
	Basic information											
	NX-series CPU Unit Hardware User's Manual	NX-series NX102 CPU Unit Hardware User's Manual	NJ/NX-series CPU Unit Software User's Manual	NJ/NX-series Instructions Reference Manual	NJ/NX-series CPU Unit Motion Control User's Manual	NJ/NX-series Motion Control Instructions Reference Manual	NJ/NX-series CPU Unit Built-in EtherCAT Port User's Manual	NJ/NX-series CPU Unit Built-in EtherNet/IP Port User's Manual	NJ/NX-series CPU Unit OPC UA User's Manual	NX-series CPU Unit FINS Function User's Manual	NJ/NX-series Database Connection CPU Units User's Manual	NJ/NX-series Troubleshooting Manual
Testing operation and debugging												
Using motion control					○							
Using EtherCAT							○					
Using EtherNet/IP			○					○				
Using OPC UA									○			
Using FINS										○		
Using the database connection service											○	
Learning about error management functions and corrections of problems *1									△	△	△	○
Maintenance	○	○										
Using motion control					○							
Using EtherCAT							○					
Using EtherNet/IP								○				

*1. Refer to *NJ/NX-series Troubleshooting Manual (Cat. No. W503)* for the error management concepts and an overview of the error items. However, refer to the manuals that are indicated with triangles(△) for details on errors corresponding to the products with the manuals that are indicated with triangles(△).

Terms and Conditions Agreement

Warranty, Limitations of Liability

Warranties

- **Exclusive Warranty**

  Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.

- **Limitations**

  OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE.

  Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right.

- **Buyer Remedy**

  Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty.

  See http://www.omron.com/global/ or contact your Omron representative for published information.

Limitation on Liability; Etc

OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY

WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY.

Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.

Application Considerations

Suitability of Use

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Programmable Products

Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.

Disclaimers

Performance Data

Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.

Change in Specifications

Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may

be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

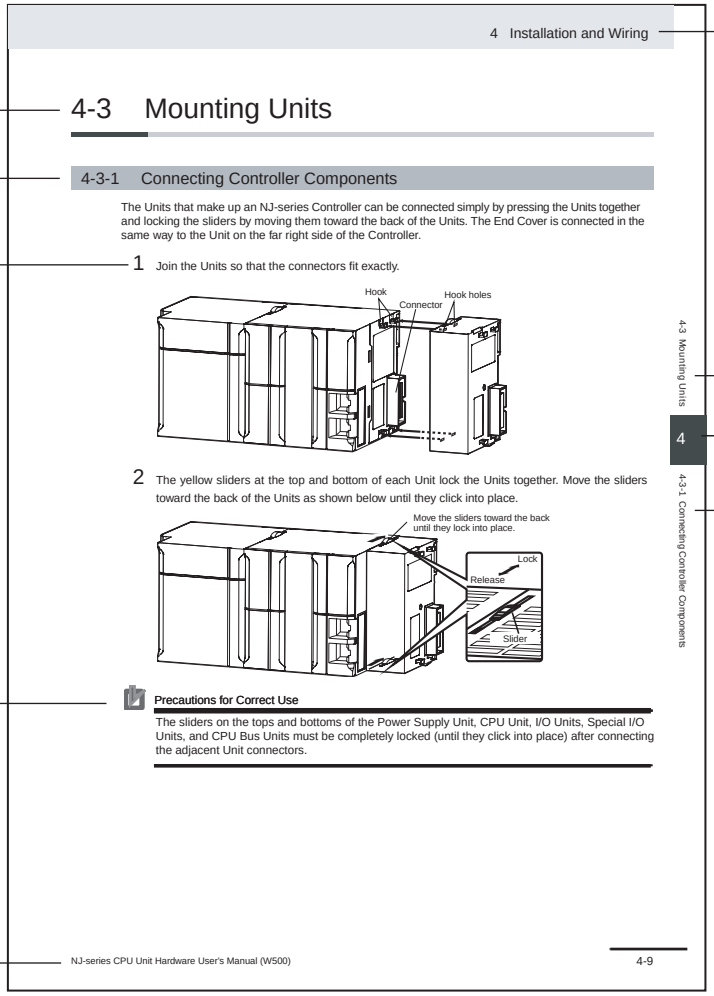
Errors and Omissions

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.

Manual Structure

Page Structure

The following page structure is used in this manual.



This illustration is provided only as a sample. It may not literally appear in this manual.

Special Information

Special information in this manual is classified as follows:

 **Precautions for Safe Use**

Precautions on what to do and what not to do to ensure safe usage of the product.

 **Precautions for Correct Use**

Precautions on what to do and what not to do to ensure proper operation and performance.

 **Additional Information**

Additional information to read as required.
This information is provided to increase understanding or make operation easier.

 **Version Information**

Information on differences in specifications and functionality for Controller with different unit versions and for different versions of the Sysmac Studio is given.

Precaution on Terminology

In this manual, "download" refers to transferring data from the Sysmac Studio to the physical Controller and "upload" refers to transferring data from the physical Controller to the Sysmac Studio.
For the Sysmac Studio, "synchronization" is used to both "upload" and "download" data. Here, "synchronize" means to automatically compare the data for the Sysmac Studio on the computer with the data in the physical Controller and transfer the data in the direction that is specified by the user.

CONTENTS

Safety Precautions

Refer to the following manuals for safety precautions.

- *NX-series CPU Unit Hardware User's Manual (Cat. No. W535)*
- *NX-series NX102 CPU Unit Hardware User's Manual (Cat. No. W593)*

Precautions for Safe Use

Refer to the following manuals for precautions for safe use.

- *NX-series CPU Unit Hardware User's Manual (Cat. No. W535)*
- *NX-series NX102 CPU Unit Hardware User's Manual (Cat. No. W593)*

Precautions for Correct Use

Refer to the following manuals for precautions for correct use.

- *NX-series CPU Unit Hardware User's Manual (Cat. No. W535)*
- *NX-series NX102 CPU Unit Hardware User's Manual (Cat. No. W593)*

Regulations and Standards

Refer to the following manuals for regulations and standards.

- *NX-series CPU Unit Hardware User's Manual (Cat. No. W535)*
- *NX-series NX102 CPU Unit Hardware User's Manual (Cat. No. W593)*

Versions

Hardware revisions and unit versions are used to manage the hardware and software in NX-series Units and EtherCAT slaves. The hardware revision or unit version is updated each time there is a change in hardware or software specifications. Even when two Units or EtherCAT slaves have the same model number, they will have functional or performance differences if they have different hardware revisions or unit versions.

Checking Versions

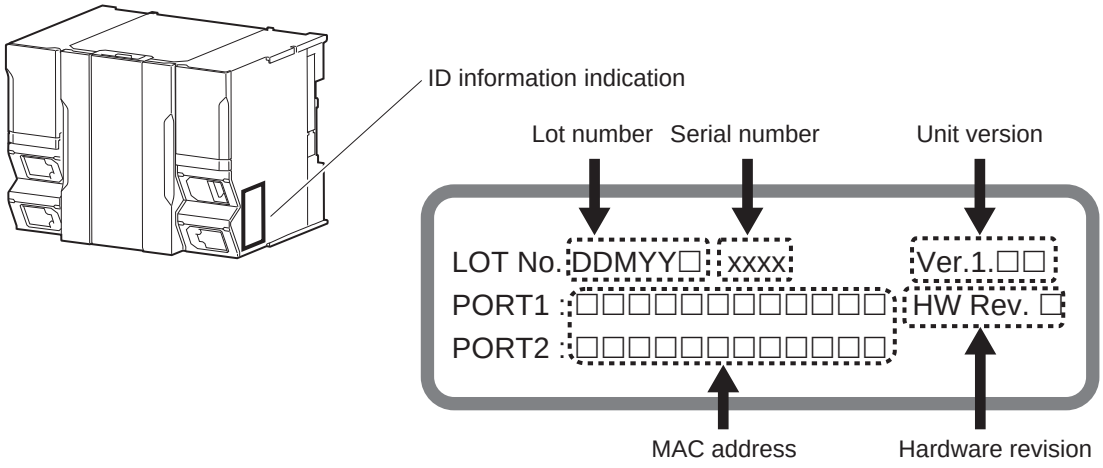
You can check versions on the ID information indications or with the Sysmac Studio.

Checking Unit Versions on ID Information Indications

The unit version is given on the ID information indication on the side of the product.

- **For NX701**

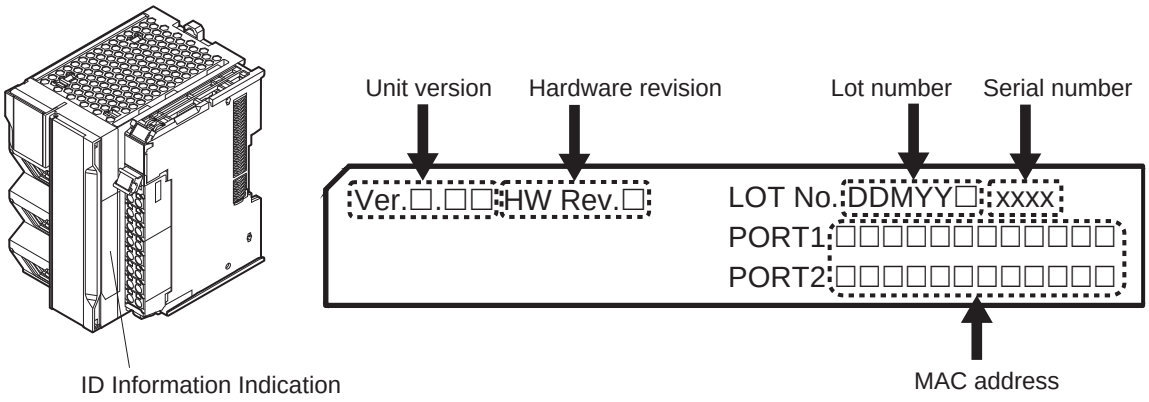
The ID information on an NX-series NX701-□□□□ CPU Unit is shown below.



Note The hardware revision is not displayed for the Unit whose hardware revision is blank.

● For NX102

The ID information on an NX-series NX102-□□□□ CPU Unit is shown below.



Note The hardware revision is not displayed for the Unit whose hardware revision is blank.

Checking Unit Versions with the Sysmac Studio

You can use the Sysmac Studio to check unit versions. The procedure is different for Units and for EtherCAT slaves.

● Checking the Unit Version of an NX-series CPU Unit

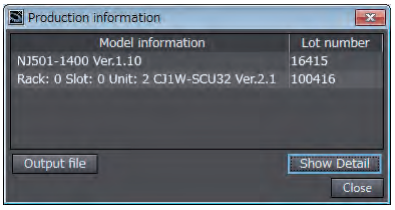
You can use the Production Information while the Sysmac Studio is online to check the unit version of a Unit. You can do this for the following Units.

Model	Unit for which unit version can be checked
NX701-□□□□	CPU Unit
NX102-□□□□	CPU Unit and NX Unit on CPU Rack
NX1P2-□□□□	CPU Unit, NX Unit on CPU Rack, and Option Boards

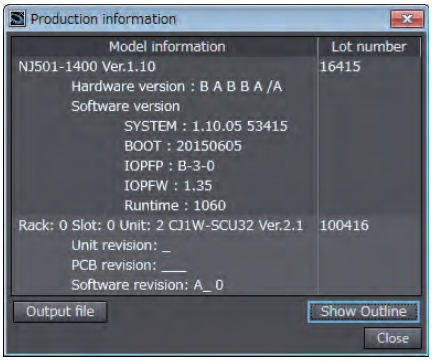
1 Right-click **CPU Rack** under **Configurations and Setup** - **CPU/Expansion Racks** in the Multi-view Explorer and select **Production Information**.
The Production Information Dialog Box is displayed.

● Changing Information Displayed in Production Information Dialog Box

1 Click the **Show Detail** or **Show Outline** Button at the lower right of the Production Information Dialog Box.
The view will change between the production information details and outline.



Outline View



Detail View

The information that is displayed is different for the Outline View and Detail View. The Detail View displays the unit version, hardware revision, and various versions. The Outline View displays only the unit version.

Note The hardware revision is separated by "/" and displayed on the right of the hardware version. The hardware revision is not displayed for the Unit that the hardware revision is in blank.

● Checking the Unit Version of an EtherCAT Slave

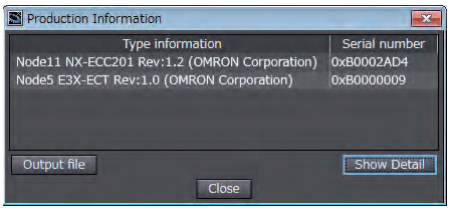
You can use the Production Information while the Sysmac Studio is online to check the unit version of an EtherCAT slave.
Use the following procedure to check the unit version.

1 Double-click **EtherCAT** under **Configurations and Setup** in the Multiview Explorer. Or, right-click **EtherCAT** under **Configurations and Setup** and select **Edit** from the menu.
The EtherCAT Tab Page is displayed for the Controller Configurations and Setup Layer.

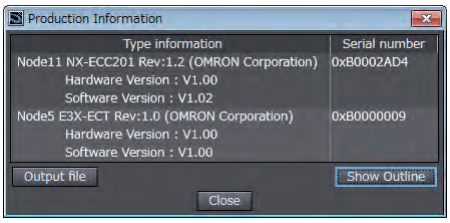
2 Right-click the master on the EtherCAT Tab Page and select **Display Production Information**.
The Production Information Dialog Box is displayed.
The unit version is displayed after "Rev."

● Changing Information Displayed in Production Information Dialog Box

1 Click the **Show Detail** or **Show Outline** Button at the lower right of the Production Information Dialog Box.
The view will change between the production information details and outline.



Outline View



Detail View

Unit Versions of CPU Units and Sysmac Studio Versions

The functions that are supported depend on the unit version of the NX-series CPU Unit. The version of Sysmac Studio that supports the functions that were added for an upgrade is also required to use those functions.
Refer to the *NJ/NX-series CPU Unit Software User's Manual (Cat. No. W501)* for the relationship between the unit versions of the CPU Units and the Sysmac Studio versions and for the functions that are supported by each unit version.

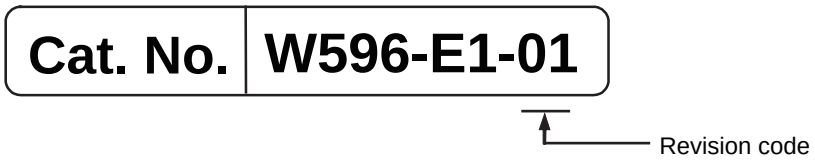
Related Manuals

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

Manual name	Cat. No.	Model	Application	Contents
NX-series CPU Unit Hardware User's Manual	W535	NX701-□□□□	Learning the basic specifications of the NX701 CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided.	An introduction to the entire NX701 system is provided along with the following information on the CPU Unit. • Features and system configuration • Introduction • Part names and functions • General specifications • Installation and wiring • Maintenance and inspection
NX-series NX102 CPU Unit Hardware User's Manual	W593	NX102-□□□□	Learning the basic specifications of the NX102 CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided.	An introduction to the entire NX102 system is provided along with the following information on the CPU Unit. • Features and system configuration • Introduction • Part names and functions • General specifications • Installation and wiring • Maintenance and Inspection
NJ/NX-series CPU Unit Software User's Manual	W501	NX701-□□□□ 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/NX-series CPU Unit. • CPU Unit operation • CPU Unit features • Initial settings • Programming based on IEC 61131-3 language specifications
NX-series CPU Unit FINS Function User's Manual	W596	NX701-□□20 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-□□□□ 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.
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.
CS/CJ-series Ethernet unit Application Construction User's Manual	W421	CS1W-ETN21 CJ1W-ETN21	Using an Ethernet unit	This manual describes the mail send function, mail receive function, socket service function, clock information automatic adjustment function, FTP server function, and host application creation of FINS communications.
CS/CJ/CP/NSJ-series Communications Commands Reference Manual	W342	CS1G/H-CPU□□ CS1D-CPU□□□ CS1W-SC□□□-V1 CJ1G/H-CPU□□□ CJ1M-CPU□□ CJ2H-CPU6□ CJ2M-CPU□□ CJ1W-SCU□□-V1 CP1H-□□□□□ CP1L-M/L□□□ CP1E-□□□D□	Learning the detailed communication commands for the CS/CJ/CP-series CPU Unit and NSJ-series.	This manual describes the C mode commands and FINS commands for the CPU unit in detail.

Revision History

A manual revision code appears as a suffix to the catalog number on the front and back covers of the manual.



Revision code	Revision date	Revised content
01	April 2018	Original production

Sections in this Manual

1

FINS

This section describes an overview, a system configuration, and types of FINS.

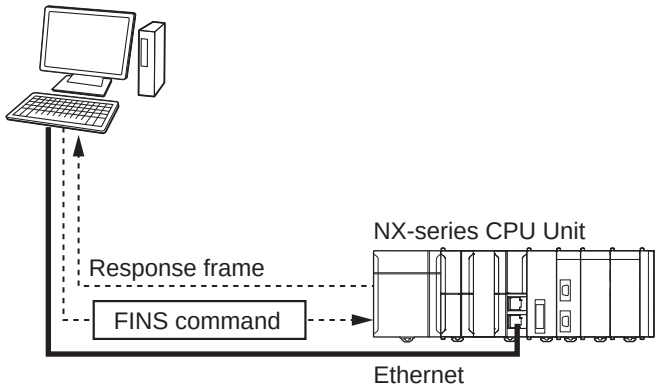
1-1 Overview of FINS

FINS is a command system for the message service that can be used commonly in OMRON network. The FINS command system allows to read sent and received data, status etc. between a host computer and an NX-series CPU Unit, and between an NX-series CPU Unit and an OMRON CPU Unit.
FINS provides server and client functions.

For details about the FINS frame format, refer to the *SYSMAC CS/CJ/CP/NSJ-series Communications Commands Reference Manual (Cat. No. W342)*.

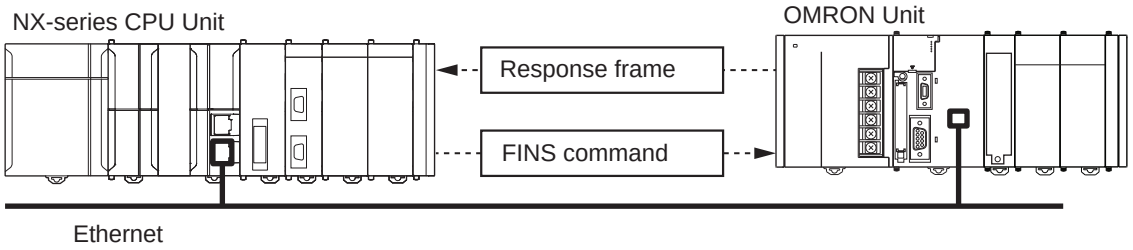
1-1-1 Server Function of FINS

This function allows to receive FIN commands from external devices such as host computers or OMRON CPU Units and then to execute requested services.



1-1-2 Client Function of FINS

This function allows NX102 CPU Units to send and receive data to/from OMRON Units which is provided with Server Function of FINS.



1-2 Applicable CPU Units

FINS commands can be sent/received from/by the following CPU Units.

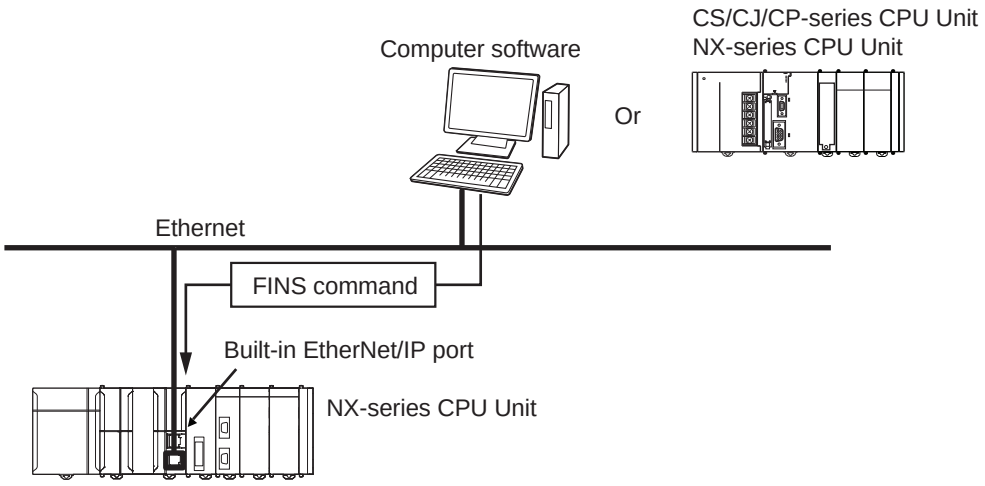
Unit name	Model	Server function	Client function	Unit version of CPU Unit
NX7 Database Connection CPU Unit	NX701-□□20 *1*2	Available	Not available	Version 1.16 or higher
NX102 CPU Unit	NX102-□□□□ *2	Available	Available	
NX1P2 CPU Unit	NX1P2-□□□□	Not available	Not available	

*1. NX701-□□00 does not support the Server Function of FINS and the Client Function of FINS.

*2. Only port 2 of the built-in EtherNet/IP ports supports FINS commands.

1-3 System Configuration

System configuration is available on conditions that it must issue FIN commands received from external computers and OMRON CPU Units and receive FINS commands through the built-in EtherNet/IP port of the NX-series CPU Unit.



1-4 Relationship Between FINS Types and Units

The following shows the relationship between applicable FINS types and unit.

Item		Units	
		NX701-□□20	NX102-□□□□
FINS/UDP	**Usable or not**	Yes	
	Port number	9600 *1	
FINS/TCP	**Usable or not**	Yes	
	Maximum number of connections	16 *2	
	Port number	9600 *1	
FINS communication service on Ethernet	**Number of nodes**	254	
	Message length	Max. 2,012 bytes	

*1. This can be changed.

*2. This is total number of server and client connections.

1-5 Memory Used for CJ-series Units

The following describes how to set the memory used for the CJ-series Units and the area types of the compatible memory used for CJ-series Units.

1-5-1 Setting for the Memory Used for CJ-series Units

For The NX701-□□20 and NX102 CPU Unit, the memory used for CJ-series Units can be set using the Multiview Explorer of the Sysmac Studio.
Select **Configurations and Setup**-**Controller Setup**, and then use **Memory Settings** to set the area type and each address range of the memory used for CJ-series Units.

For details, refer to *Sysmac Studio Version 1 Operation Manual (Cat. No. W504)*.

1-5-2 Compatible Memory for CJ-series Units

NX701-□□20 and NX102 CPU Units are compatible with the following area types of the memory used for CJ-series Units.

- CIO Area
- Work Area
- Holding Area
- Data Memory Area
- Expansion Memory Area

For details about the specifications of memory for the CJ Units, refer to *NJ/NX-series CPU Unit Software User's Manual (Cat. No. W501)*.

2

Server Function

This section describes a function that issues FINS commands supported by the NX-series CPU Unit and, reads and writes the memory used for CJ-series Units.

2-1 Overview of Server Function

The NX-series CPU Unit receives FINS commands issued from external devices such as host computers or CS/CJ/CP-series CPU Units on the Ethernet network and then can execute the requested service.

2-2 FINS Commands Supported by NX-series CPU Units

This section describes FINS commands supported by the NX-series CPU Unit, restrictions, and execution conditions.

For details about each FINS command, refer to *SYSMAC CS/CJ/CP/NSJ-series Communications Commands Reference Manual (Cat. No. W342)*.

FINS Commands Supported by NX-series CPU Units and Restrictions

The following describes FINS commands supported by the NX-series CPU Units and restrictions when they are used.

Command code (Hex)		Command name	Restrictions
MR	SR		
01	01	MEMORY AREA READ	Only areas that exist in the memory of CJ-series Units are accessible.
01	02	MEMORY AREA WRITE	
01	03	MEMORY AREA FILL	
01	04	MULTIPLE MEMORY AREA READ	
01	05	MEMORY AREA TRANSFER	
05	01	CPU UNIT DATA READ	Only the following values can be read. *1 • CPU Unit model • CPU Unit version
06	01	CPU UNIT STATUS READ	Only the following values can be read. *4 *4 *4 • Operation status • Operating mode
07	01	CLOCK READ	None
07	02	CLOCK WRITE	

*1. Fixed values are returned for the following values.
- DIP switch information: Fixed at 0
- Program area size: Fixed at 14 hex.
- Timer/counter size: Fixed at 08 hex.
- Memory card type: SD Memory Card fixed at 04 hex. (regardless of the presence status)
- SD memory card size: SD Memory Card fixed at FFFF hex. when a memory card is inserted. Fixed at 00 hex. when a memory card is not inserted
- Remote I/O information: Fixed at 0

*2. Two pieces of information shown below are processed as error information of the NX-series.
- Fatal error information: A value of 0000 hex. is returned when the major fault level is normal. A value of 0001 hex. is returned when the major fault level is abnormal.
- Non-fatal error information: A value of 0000 hex. is returned when the partial fault level or minor fault level is normal. A value of 0001 hex. is returned when the partial fault level or minor fault level is abnormal.

*3. All below values are returned fixed at 0.
"CPU status", "Battery presence", "Built-in flash memory access status", "Message presence", "Failure code"

*4. Sixteen ASCII code 20Hex (space) characters of below value are returned and can not be used.
"Error message"

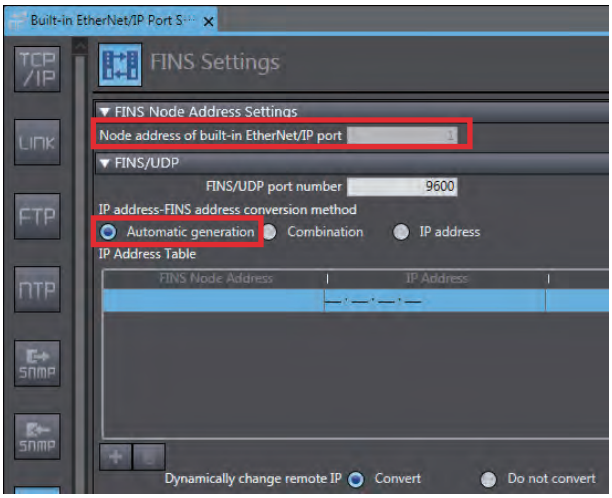
2-3 Setting of FINS Node Address of Built-in EtherNet/IP Port

This FINS node address is necessary to identify a node in the FINS communication.
The following describes how to determine the FINS node address of the built-in EtherNet/IP port and how to set the FINS node address from the Sysmac Studio.

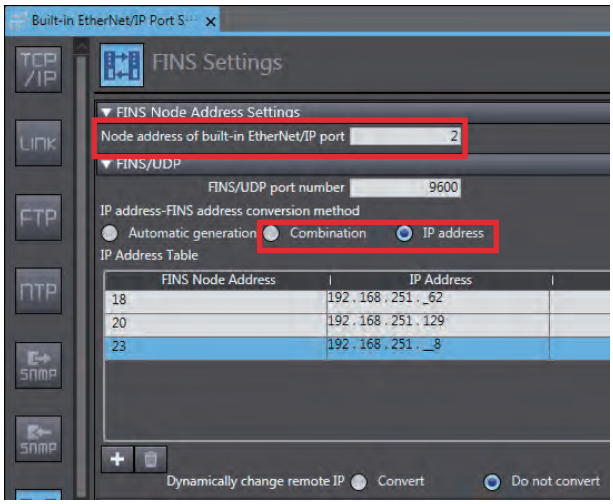
IP address ⇔ FINS node address conversion method *1	FINS node address determination method	Setting method from Sysmac Studio
Automatic generation method	The least significant digits of the IP address becomes the FINS node address automatically.	**Controller Setup** - **Built-in EtherNet/IP Port Settings** - **TCP/IP Settings** - **IP Address Settings**
Combined method	Set the FINS node address itself.	**Controller Setup** - **Built-in EtherNet/IP Port Settings** - **FINS Settings** - **FINS Node Address Settings**
IP address table method		

*1. This may vary depending on the setting of **IP address ⇔ FINS address conversion method** for FINS/UDP. To make the setting, select **Configurations and Setup** - **Controller Setup** - **Built-in EtherNet/IP Port Settings** - **FINS Settings** - **FINS/UDP** - **IP Address ⇔ FINS Address Conversion Method** from the Multi-view Explorer of the Sysmac Studio.

When the automatic generation method is selected, the least significant digit of the IP address is set as the FINS node address.



When the combined method or IP address table method is selected, the value specified for the FINS node address setting is the FINS node address.


Built-in EtherNet/IP Port S
TCP /IP
LINK
FTP
NTP
SNMP
SNMP
FINS Settings
FINS Node Address Settings
Node address of built-in EtherNet/IP port
2
FINS/UDP
FINS/UDP port number
9600
IP address-FINS address conversion method
Automatic generation
Combination
IP address
IP Address Table
FINS Node Address
IP Address
18
192.168.251.62
20
192.168.251.129
23
192.168.251.8
Dynamically change remote IP
Convert
Do not convert

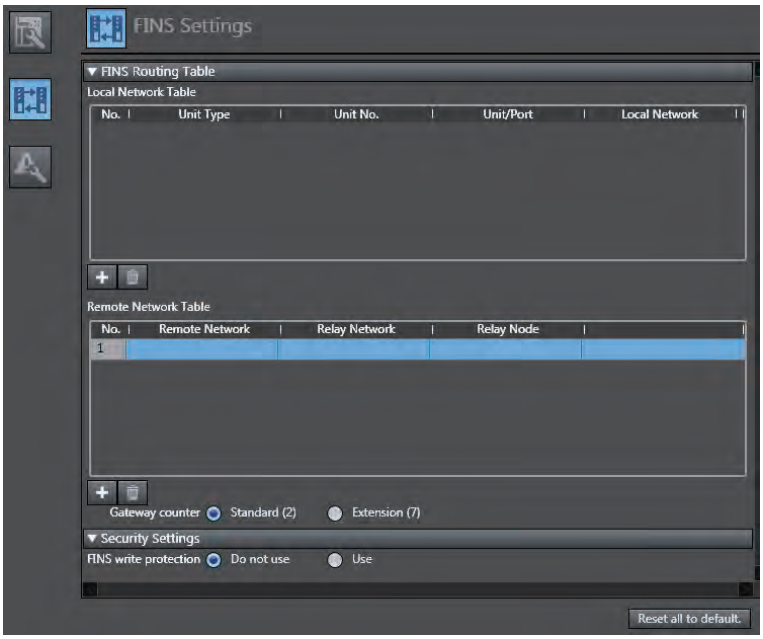
2-4 FINS Routing Table Setting

The routing table is a table that is used to find the communication path of the FINS message when the FINS communication service is in use.
The routing table consists of two types of tables: local network table and relay network table.

Here are the cases, where the setting of FINS routing table is required.

- When the FINS routing table is already set at one or more nodes in the same network and the FINS message communications are performed, the local network table setting is required.
  For details, refer to *A-1 Difference Between CS/CJ-series and NX-series in FINS Routing* on page A - 2.
- When the FINS command is issued over the level of the FINS network, the relay network table setting is required.

To set the FINS routing table, select **Configurations and Setup** - **Controller Setup** - **Operation Settings** - **FINS Settings** from the Multiview Explorer of the Sysmac Studio.



2-5 FINS Write Protection Function

When data is written into the CPU Unit using the FINS command, this data writing can be disabled so that the data is not written into the memory of the CPU Unit.
This function is called the FINS write protection function.
The models that support the FINS write protection function are NX701-□□20 and NX102-□□□□.
To set whether to use the write protection function select **Configurations and Setup** - **Controller Setup** - **Operation Settings** - **FINS Settings** - **Security Settings** from the Multiview Explorer of the Sysmac Studio.
Even when the FINS write protection function is enabled, the data reading from the CPU Unit is still possible.

For details, refer to *Sysmac Studio Version 1 Operation Manual (Cat. No. W504)*.

2-6 FINS Command Execution Condition

The following describes the FINS command execution conditions.

Command code (Hex)		Command name	Execution condition		
MR	SR		RUN mode	PROGRAM mode	Write protection in process
01	01	MEMORY AREA READ	Supported	Supported	Supported
01	02	MEMORY AREA WRITE			Not supported
01	03	MEMORY AREA FILL			Not supported
01	04	MULTIPLE MEMORY AREA READ			Supported
01	05	MEMORY AREA TRANSFER			Not supported
05	01	CPU UNIT DATA READ			Supported
06	01	CPU UNIT STATUS READ			Supported
07	01	CLOCK READ			Supported
07	02	CLOCK WRITE			Not supported

3

Client Function

This section describes the instructions that issue the FINS command from the NX102 CPU Unit for OMRON Unit provided with the FINS server function and then send and receive data.

Overview of Client Function

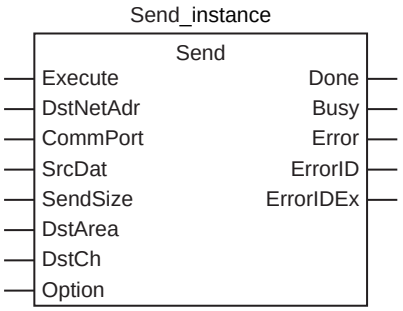
FINS communication instructions is a set of instructions, which allows to control data send/receive, mode change etc. as required, for various types of units such as CPU Units and CPU Special Units on the network or CPU Rack.
These instructions are executed over multiple cycles and perform the communication non-synchronized with the cycle.

FINS Communications Instructions

Instructions	Name	Page
Send	Send to Network	page 3 - 4
Rcv	Receive from Network	page 3 - 8
SendCmd	Send Command	page 3 - 14

Send

Sends data to a node on the network.

Instruction	Name	FB/ FUN	Graphic expression	ST expression
Send	Send to Network	FB		Send_instance(Execute, DstNetAdr, CommPort, SrcDat, SendSize, DstArea, DstCh, Option, Done, Busy, Error, ErrorID, ErrorIDEx);

Variable

	Name	Input/ output	Contents	Valid range	Unit	Initial value
DstNetAdr	Network address at send destination	Input	Specifies the network address and node address at send destination	---	---	---
CommPort	Designation of port at send destination		Specifies the serial port at send destination	_NONE	---	_NONE
SrcDat[] array	First element of array at send destination		Beginning of data (array) to be sent	16#0000 to 16#FFFF	---	*1
SendSize	Number of send words		Specifies the number of words in the send data	0 to Max. data length *2	Word	1
DstArea	Area at send destination		Specifies the area type at send destination	_CIO _WR _HR _TIMER _COUNTER _DM _EM0 ⋮ _EM18	---	_DM
DstCh	CH at send destination		Specifies the first ch at send destination	0 to 32,767	ch	0
Option	Response		Specifies response monitoring and resending	---	---	---

*1. If you omit an input parameter, the default value is not applied. A building error will occur.

*2. This may vary depending on the network type.

	Boolean	Bit strings				Integers								Real numbers		Times, durations, dates, and text strings				
	BOOL	BYTE	WORD	DWORD	LWORD	USINT	UINT	UDINT	ULINT	SINT	INT	DINT	LINT	REAL	LREAL	TIME	DATE	TOD	DT	STRING
DstNetAdr	Refer to *Function* on page 3 - 5 for details on the structure _sDNET_ADR.																			
CommPort	For enumeration_ePORT enumerator, refer to *Function* on page 3 - 5.																			
SrcDat[] array			OK																	
SendSize							OK													
DstArea	For enumeration_eAREA enumerator, refer to *Function* on page 3 - 5.																			
DstCh							OK													
Option	Refer to *Function* on page 3 - 5 for details on the structure _sRESPONSE.																			

Function

When *Execute* changes from FALSE to TRUE, *SrcDat[]* is written to the area at the send destination specified by *DstNetAdr*, *CommPort*, *DstArea*, and *DstCh*.

The data type of *DstNetAdr* is structure_sDNET_ADR. The specifications are shown below.

Variable	Name	Contents	Data type	Valid range	Unit	Initial value
DstNetAdr	Network address at send destination	Network address at send destination	_sDNET_ADR	---	---	---
NetNo	Network address	Network address	USINT	0 to 127	---	0
NodeNo	Node address	Node address	USINT	Depends on the data type		
UnitNo	Unit address	Unit address	BYTE	Depends on the data type		16#00

The data type of *CommPort* is enumeration_ePORT.
The meaning of the enumerator of enumeration_ePORT is as follows.

Enumerator	Meaning
_NONE	The send destination is not a serial port (host link mode).

The data type of *DstArea* is enumeration_eAREA.
The meaning of the enumerator of enumeration_eAREA is as follows.

Enumerator	Meaning
_CIO	Core I/O Area, Work Area, etc.
_WR	Work Area
_HR	Holding Area
_TIMER	Timer Area
_COUNTER	Counter Area
_DM	Data Memory Area
_EM0	0 bank area of Expansion Memory Area
⋮	⋮

Enumerator	Meaning
_EM18	24 bank area of Expansion Memory Area

The data type of *Option* is structure_sRESPONSE. The specifications are shown below.

Variable	Name	Contents	Data type	Valid range	Unit	Initial value
Option	Response	Response monitoring and retry specifications	_sRES-PONSE	---	---	---
isNonResp	No response	TRUE: Response is not required. FALSE: Response is required.	BOOL	Depends on the data type	---	FALSE
TimeOut	Timeout Time	Timeout time 0: 2.0 s	UINT		0.1 s	20 (2.0 s)
Retry	Retry count	Retry count	USINT	0 to 15	Count	0

If no response is returned within the timeout time *Option.TimeOut* when the value of the Response Not Necessary Flag *Option.isNonResp* is FALSE, the command is retried until the response is returned. The retry count is specified by *Option.Retry*.
The timeout time is *Option.TimeOut* x 0.1 s. However, when the value of *Option.TimeOut* is 0, the timeout time becomes 2.0 s. The initial value of *Option.TimeOut* is also 2.0 s.

Related System-defined Variables

Name	Meaning	Data type	Description
_Port_numUsingPort	Number of Used Ports	USINT	This is the number of ports that are currently used.
_Port_isAvailable	Network Communications Instruction Enabled Flag	BOOL	TRUE: A port is available. FALSE: A port is not available.

Precautions for Correct Use

- This instruction can be executed only when there is an available port. Therefore, use the system-defined variable *_Port_isAvailable* (Network Communications Instruction Enabled Flag) in an N.O. execution condition for the instruction.
- The command is not sent if the value of *SendSize* is *0*. When the instruction is executed, the value of *Done* changes to TRUE.
- During execution of this instruction, set *Option.Retry* to a value other than *0* by considering the case when the send message or response is lost due to noise that occurs during communication. If no response is returned within *Option.TimeOut*, it is recommended to retry the process.
- When this instruction is written in the ST program, make sure that the instruction is executed for each task period during execution of this instruction. If this instruction is not executed every task period, the normal process may not be performed.
- This instruction cannot be used on the event task. An error occurs during compiling.
- An error occurs in the following cases. *Error* will change to TRUE.
  a) A member of *DstNetAdr* is outside of its range.

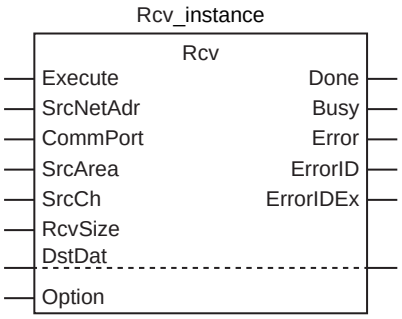
b) *SendSize*, *DstArea*, or *DstCh* is outside of its range.
c) A member of *Option* is outside of its range.
d) The value of *SendSize* exceeds the size of *SrcDat[]*.
e) The value of *_Port_isAvailable* is FALSE.
f) Communications fail.

Sample Programming

Refer to *Sample Programming* on page 3 - 11 of the Rcv instruction.

Rcv

Requests a node on the network to send and receives data.

Instruction	Name	FB/ FUN	Graphic expression	ST expression
Rcv	Receive from Network	FB		Rcv_instance(Execute, SrcNetAdr, CommPort, SrcArea, SrcCh, RcvSize, DstDat, Option, Done, Busy, Error, ErrorID, ErrorIDEx);

Variable

	Name	Input/ output	Contents	Valid range	Unit	Initial value
SrcNetAdr	Network address at source	Input	Specifies the network address and node address at send source	---	---	---
CommPort	Designation of port at receive destination		Selects the serial port at receive destination	_NONE	---	_NONE
SrcArea	Data source area		Specifies the area type at send source	_CIO _WR _HR _TIMER _COUNTER _DM _EM0 ⋮ _EM18	---	_DM
SrcCh	Data source CH		Specifies the first ch at send source	0 to 32,767	ch	0
RcvSize	Number of receive words		Specifies the number of words in the receive data.	0 to Max. data length *1	Word	1
Option	Response		Specifies response monitoring and resending	---	---	---
DstDat[] array	First element of receive array	Input/ output	Beginning of data (array) to be received	16#0000 to 16#FFFF	---	*2

*1. This may vary depending on the network type.

*2. If you omit an input parameter, the default value is not applied. A building error will occur.

	Boolean	Bit strings				Integers								Real numbers		Times, durations, dates and text strings				
	BOOL	BYTE	WORD	DWORD	LWORD	USINT	UINT	UDINT	ULINT	SINT	INT	DINT	LINT	REAL	LREAL	TIME	DATE	TOD	DT	STRING
SrcNetAdr	Refer to *Function* on page 3 - 9 for details on the structure _sDNET_ADR.																			
CommPort	For enumeration_ePORT enumerator, refer to *Function* on page 3 - 9.																			
SrcArea	For enumeration_eAREA enumerator, refer to *Function* on page 3 - 9.																			
SrcCh							OK													
RcvSize							OK													
Option	Refer to *Function* on page 3 - 9 for details on the structure _sRESPONSE.																			
DstDat[] array			OK																	

Function

When *Execute* changes from FALSE to TRUE, *SrcNetAdr* and *CommPort* are requested to send the data specified by *SrcArea* and *SrcCh*.
The received data is stored in *DstDat[]*.

The data type of *SrcNetAdr* is structure_sDNET_ADR. The specifications are shown below.

Variable	Name	Contents	Data type	Valid range	Unit	Initial value
SrcNetAdr	Network address at source	Specifies the network address and node address at send source	_sDNET_ADR	---	---	---
NetNo	Network address	Network address	USINT	0 to 127	---	0
NodeNo	Node address	Node address	USINT	Depends on data type.		
UnitNo	Unit address	Unit address	BYTE	Depends on data type.		16#00

The data type of *CommPort* is enumeration_ePORT.
The meaning of the enumerator of enumeration_ePORT is as follows.

Enumerator	Meaning
_NONE	The send destination is not a serial port (host link mode).

The data type of *SrcArea* is enumeration_eAREA.
The meaning of the enumerator of enumeration_eAREA is as follows.

Enumerator	Meaning
_CIO	Core I/O Area, Work Area, etc.
_WR	Work Area
_HR	Holding Area
_TIMER	Timer Area
_COUNTER	Counter Area
_DM	Data Memory Area
_EM0	0 bank area of Expansion Memory Area

Enumerator	Meaning
⋮	⋮
_EM18	24 bank area of Expansion Memory Area

The data type of *Option* is structure_sRESPONSE. The specifications are shown below.

Variable	Name	Contents	Data type	Valid range	Unit	Initial value
Option	Response	Response monitoring and retry specifications	_sRES-PONSE	---	---	---
isNonResp	No response	TRUE: Response is not required. FALSE: Response is required.	BOOL	Depends on data type.	---	FALSE
TimeOut	Timeout Time	Timeout time 0: 2.0 s	UINT		0.1 s	20 (2.0 s)
Retry	Retry count	Retry count	USINT	0 to 15	Count	0

If no response is returned within the timeout time *Option.TimeOut* when the value of the Response Not Necessary Flag *Option.isNonResp* is FALSE, the command is retried until the response is returned. The retry count is specified by *Option.Retry*.
The timeout time is *Option.TimeOut* x 0.1 s. However, when the value of *Option.TimeOut* is 0, the timeout time becomes 2.0 s. The initial value of *Option.TimeOut* is also 2.0 s.

Related System-defined Variables

Name	Meaning	Data type	Description
_Port_numUsingPort	Number of Used Ports	USINT	This is the number of ports that are currently used.
_Port_isAvailable	Network Communications Instruction Enabled Flag	BOOL	TRUE: A port is available. FALSE: A port is not available.

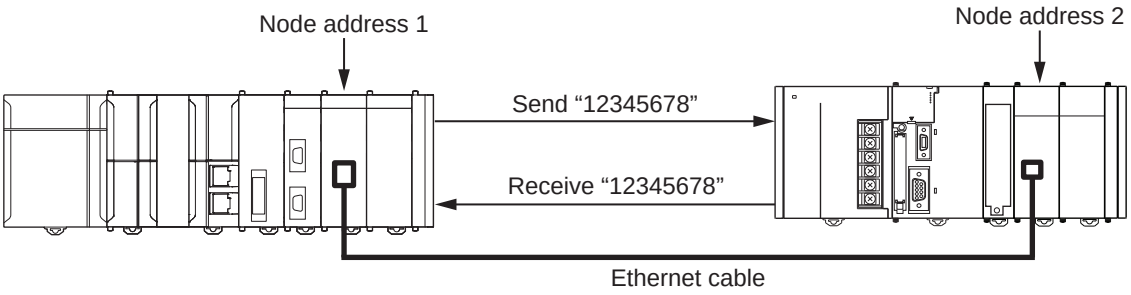
Precautions for Correct Use

- This instruction can be executed only when there is an available port. Therefore, use the system-defined variable *_Port_isAvailable* (Network Communications Instruction Enabled Flag) in an N.O. execution condition for the instruction.
- The command is not sent if the value of *RcvSize* is *0*. When the instruction is executed, the value of *Done* changes to TRUE.
- During execution of this instruction, set *Option.Retry* to a value other than *0* by considering the case when the send message or response is lost due to noise that occurs during communication. If no response is returned within *Option.TimeOut*, it is recommended to retry the process.
- When this instruction is written in the ST program, make sure that the instruction is executed for each task period during execution of this instruction. If this instruction is not executed every task period, the normal process may not be performed.
- This instruction cannot be used on the event task. An error occurs during compiling.
- An error occurs in the following cases. *Error* will change to TRUE.

a) A member of *SrcNetAdr* is outside of its range.
b) Broadcasting (SrcNetAdr.NodeNo.=255) is set.
c) Any of *SrcArea*, *SrcCh*, and *RcvSize* is outside of its range.
d) The value of *RcvSize* exceeds the size of *DstDat[]*.
e) The data type that is not supported is specified for *DstDat[]*.
f) A member of *Option* is outside of its range.
g) *Option.isNonResp* is TRUE and this instruction is executed.
h) The value of *_Port_isAvailable* is FALSE.
i) Communications fail.

Sample Programming

A 2CH data write command is sent to DM100 of network No. 0, node No. 2, and Unit No. 0. Then, the 2CH data read command is sent from DM100.



ST

Internal variable	Name	Data type	Initial value	Comment
	Trigger	BOOL	FALSE	Execution condition
	DoFinsTrigger	BOOL	FALSE	Processing
	SendExecute	BOOL	FALSE	Send instruction execution flag
	RcvExecute	BOOL	FALSE	Rcv instruction execution flag
	State	SINT	0	Sample programming status
	InDNetAdr	_sDNET_ADR	NetNo:=0, NodeNo:=0, UnitNo:=16#0	Network address at send destination
	InOption	_sRESPONSE	isNonResp:=FALSE, TimeOut:=0, Retry:=0	Response
	SrcDat	ARRAY [0..1] OF WORD	[2(16#0)]	Send data
	DstDat	ARRAY [0..1] OF WORD	[2(16#0)]	Receive data
	SendInstance	Send		Send instance
	RcvInstance	Rcv		Rcv instance

External variable	Name	Data type	Comment
	_Port_isAvailable	BOOL	Network Communications Instruction Enabled Flag

```
IF ( (Trigger=TRUE) AND (DoFinsTrigger=FALSE) AND (_Port_isAvailable=TRUE) ) THEN
    State:= 1;
    DoFinsTrigger:=TRUE;

    SendExecute := FALSE; // Send execution status
    RcvExecute := FALSE; // Rcv execution status
    InDNetAdr.NetNo :=USINT#0; // Set network address.
    InDNetAdr.NodeNo :=USINT#2;
    InDNetAdr.UnitNo :=BYTE#16#0;
    InOption.isNonResp :=FALSE; // Set
    InOption.TimeOut :=UINT#20;
    InOption.Retry :=USINT#2;
    SrcDat[0] :=WORD#16#1234; // Set command array.
    SrcDat[1] :=WORD#16#5678;
END_IF;

IF (DoFinsTrigger=TRUE) THEN
    SendInstance( Execute := SendExecute,
        DstNetAdr := InDNetAdr,
        CommPort := _NONE,
        SrcDat := SrcDat[0],
        SendSize := 2,
        DstArea := _DM,
        DstCh := 100,
        Option := InOption);

    RcvInstance ( Execute := RcvExecute,
        SrcNetAdr := InDNetAdr,
        CommPort := _NONE,
        SrcArea := _DM,
        SrcCh := 100,
        RcvSize := 2,
        DstDat := DstDat[0],
        Option := InOption);

    CASE State OF
        1: // Execute Send.
            SendExecute := TRUE;
            IF (SendInstance.Done=TRUE) THEN
                State := 2;
            ELSIF (SendInstance.Error=TRUE) THEN
                State := 99;
            END_IF;
```

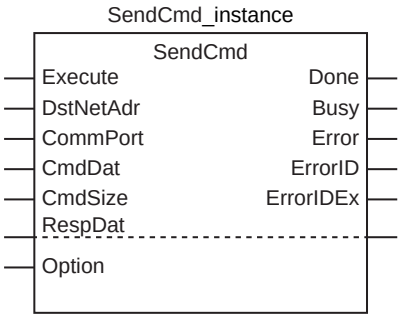
```
        2: // Execute Rcv.
            RcvExecute := TRUE;
            IF (RcvInstance.Done=TRUE) THEN
                State := 3;
            ELSIF (RcvInstance.Error=TRUE) THEN
                State := 99;
            END_IF;

        3: // Normal processing
            Trigger := FALSE;
            DoFinsTrigger:=FALSE;

        99: // Abnormal processing
            Trigger := FALSE;
            DoFinsTrigger:=FALSE;
    END_CASE;
END_IF;
```

SendCmd

Issues a desired command and receives a response.

Instruction	Name	FB/ FUN	Graphic expression	ST expression
SendCmd	Send Command	FB		SendCmd_instance(Execute, DstNetAdr, CommPort, CmdDat, CmdSize, RespDat, Option, Done, Busy, Error, ErrorID, ErrorIDEx);

Variables

	Meaning	I/O	Description	Valid range	Unit	Default
DstNetAdr	Destination network address	Input	Destination network address	---	---	---
CommPort	Destination serial port		Destination serial port	_NONE		_NONE
CmdDat[] (array)	Command array		Command to send	Depends on data type.		*1
CmdSize	Command data size		Command data size	0 to max. data length *2	Bytes	2
Option	Response		Response monitoring and retry specifications	---	---	---
RespDat[] (array)	Response storage array	In-out	Array to store response	Depends on data type.	---	---

*1. If you omit an input parameter, the default value is not applied. A building error will occur.

*2. This may vary depending on the network type.

	Boolean	Bit strings				Integers								Real numbers		Times, durations, dates, and text strings				
	BOOL	BYTE	WORD	DWORD	LWORD	USINT	UINT	UDINT	ULINT	SINT	INT	DINT	LINT	REAL	LREAL	TIME	DATE	TOD	DT	STRING
DstNetAdr	Refer to *Function* on page 3 - 15 for details on the structure _sDNET_ADR.																			
CommPort	For enumeration_ePORT enumerator, refer to *Function* on page 3 - 15.																			
CmdDat[] (array)		OK																		
CmdSize							OK													
Option	Refer to *Function* on page 3 - 15 for details on the structure _sRESPONSE.																			
RespDat[] (array)		OK																		

Function

The SendCmd instruction sends the contents of command array CmdDat[] to the destination specified with destination network address *DstNetAdr* and destination serial port *CommPort*.
The command data size *CmdSize* specifies how many elements of CmdDat[] contain the command.
The response that is returned is stored in response storage array RespDat[].

The data type of *DstNetAdr* is structure _sDNET_ADR. The specifications are as follows:

Name	Meaning	Description	Data type	Valid range	Unit	Default
DstNetAdr	Destination network address	Destination network address	_sDNET_ADR	---	---	---
NetNo	Network address	Network address	USINT	0 to 127	---	0
NodeNo	Node address	Node address	USINT	Depends on data type.		
UnitNo	Unit address	Unit address	BYTE	Depends on data type.		16#00

The data type of *CommPort* is enumerated type _ePORT.
The meanings of the enumerators of enumerated type _ePORT are as follows:

Enumerators	Meaning
_NONE	The destination is not a serial port in Host Link Mode.

The data type of *Option* is structure _sRESPONSE. The specifications are as follows:

Name	Meaning	Description	Data type	Valid range	Unit	Default
Option	Response	Response monitoring and retry specifications	_sRESPONSE	---	---	---
isNonResp	No response	TRUE: Response is not required. FALSE: Response is required.	BOOL	Depends on data type.	---	FALSE
TimeOut	Timeout time	Timeout time 0: 2.0 s	UINT		0.1 s	20 (2.0 s)
Retry	Retry count	Retry count	USINT	0 to 15	Times	0

If no response is returned within the timeout time *Option.TimeOut* when the value of the Response Not Necessary Flag *Option.isNonResp* is FALSE, the command is retried until the response is returned.
The retry count is specified by *Option.Retry*.
The timeout time is *Option.TimeOut* multiplied by 0.1 s. However, if the value of *Option.TimeOut* is 0, the timeout time is 2.0 s. The default value of *Option.TimeOut* is 2.0 s.

Related System-defined Variables

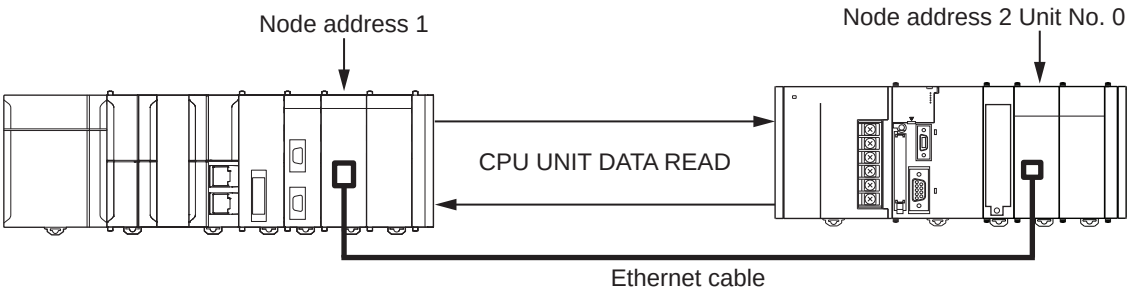
Name	Meaning	Data type	Description
_Port_numUsingPort	Number of Used Ports	USINT	This is the number of ports that are currently used.
_Port_isAvailable	Network Communications Instruction Enabled Flag	BOOL	TRUE: A port is available. FALSE: A port is not available.

Precautions for Correct Use

- This instruction can be executed only when there is an available port. Therefore, use the system-defined variable *_Port_isAvailable* (Network Communications Instruction Enabled Flag) in an N.O. execution condition for the instruction.
- The command is not sent if the value of *CmdSize* is *0*. When the instruction is executed, the value of *Done* changes to TRUE.
- During execution of this instruction, set *Option.Retry* to a value other than *0* by considering the case when the send message or response is lost due to noise that occurs during communication. If no response is returned within *Option.TimeOut*, it is recommended to retry the process.
- When this instruction is written in the ST program, make sure that the instruction is executed for each task period during execution of this instruction. If this instruction is not executed every task period, the normal process may not be performed.
- This instruction cannot be used on the event task. An error occurs during compiling.
- An error occurs in the following cases. *Error* will change to TRUE.
  a) A member of *DstNetAdr* is outside of its range.
  b) *CmdSize* is outside of its range.
  c) The value of *CmdSize* exceeds the size of *CmdDat[]*.
  d) A member of *Option* is outside of its range.
  e) The response size exceeds the size of *RespDat[]*.
  f) The value of *_Port_isAvailable* is FALSE.
  g) Communications fail.

Sample Programming

In this sample, the SendCmd instruction sends CPU UNIT DATA READ command from the network No. 0, node No. 2, Unit No. 0 and receives the data.



ST

Internal Variables	Name	Data type	Initial value	Comment
	Trigger	BOOL	FALSE	Execution condition
	DoFinsTrigger	BOOL	FALSE	Processing
	SendCmdExecute	BOOL	FALSE	SendCmd instruction execution flag
	State	SINT	0	Sample programming status
	InDNetAdr	_sDNET_ADR	NetNo:=0, NodeNo:=0, UnitNo:=16#0	Network address at send destination
	InOption	_sRESPONSE	isNonResp:=FALSE, TimeOut:=0, Retry:=0	Response
	CmdDat	ARRAY[0..1] OF BYTE	[2(16#0)]	Send data
	RespDat	ARRAY[0..1023] OF BYTE	[1024(16#0)]	Receive data
	SendCmdInstance	SendCmd		SendCmd instance

External variable	Name	Data type	Comment
	_Port_isAvailable	BOOL	Network Communications Instruction Enabled Flag

```
IF ( (Trigger=TRUE) AND (DoFinsTrigger=FALSE) AND (_Port_isAvailable=TRUE) ) THEN
    State:= 1;
    DoFinsTrigger:=TRUE;

    SendCmdExecute := FALSE; // Send execution status
    InDNetAdr.NetNo :=USINT#0; // Set network address.
    InDNetAdr.NodeNo :=USINT#2;
    InDNetAdr.UnitNo :=BYTE#16#0;
    InOption.isNonResp :=FALSE; // Set response.
    InOption.TimeOut :=UINT#20;
    InOption.Retry :=USINT#2;
```

```
    CmdDat[0] :=BYTE#16#05; // Set command array.
    CmdDat[1] :=BYTE#16#01;
END_IF;

IF (DoFinsTrigger=TRUE) THEN
    SendCmdInstance( Execute :=SendCmdExecute,
        DstNetAdr:=InDNetAdr,
        CommPort :=_NONE,
        CmdDat := CmdDat [0],
        CmdSize :=UINT#2,
        RespDat := RespDat [0],
        Option :=InOption);

    CASE State OF
        1: // Execute SendCmd.
            SendCmdExecute := TRUE;
            IF (SendCmdInstance.Done=TRUE) THEN
                State := 2;
            ELSIF (SendCmdInstance.Error=TRUE) THEN
                State := 99;
            END_IF;

        2: // Normal processing
            Trigger := FALSE;
            DoFinsTrigger:=FALSE;

        99: // Abnormal processing
            Trigger := FALSE;
            DoFinsTrigger:=FALSE;
    END_CASE;
END_IF;
```

4

Troubleshooting

This section describes the errors that may occur during communications with CPU Units.

4-1 Troubleshooting

Refer to the *End Codes* in *5-1 Command Lists* of *SYSMAC CS/CJ/CP/NSJ-series Communications Commands Reference Manual (Cat. No. W342)* for details about the errors that may occur during communications with CPU Units.
Refer to the manual of each relevant unit for details about the errors that may occur during communications with other OMRON Units.

A

Appendices

A-1 Difference Between CS/CJ-series and NX-series in FINS Routing

The FINS routing specification settings in the NX-series CPU Units differ from those in the CS/CJ-series CPU Units by the following points:

- Communication when *0* is specified for the destination network address
- Operation of the routing table during Clear All Memory operation.

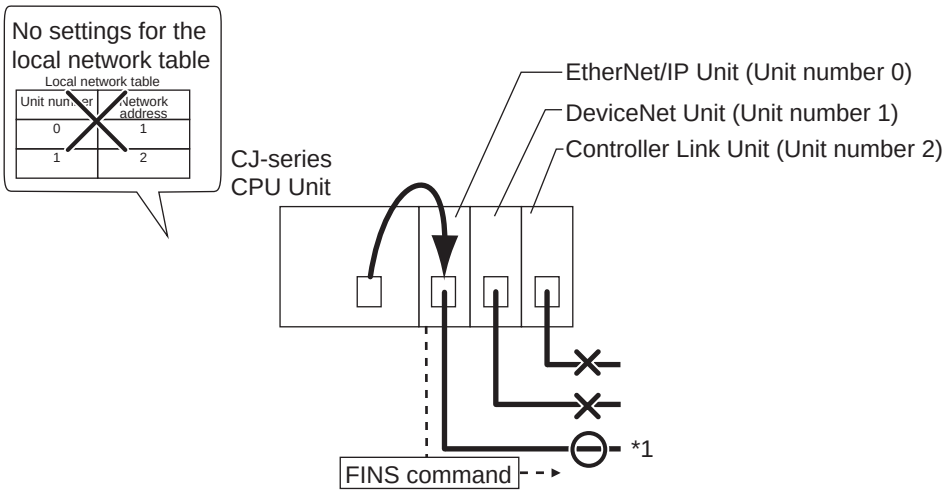
A-1-1 Communication When *0* Is Specified for the Destination Network Address

The communication may vary depending on the CPU Unit as described below.

CPU Unit	Operation
NX-series	Routing of the network of the built-in EtherNet/IP port.
CS/CJ-series	Routing of the network of the Communications Unit that has the smallest unit number among the installed CS/CJ-series Special Units.

Additional Information

For the CS/CJ-series CPU Units, the FINS command is issued to the network of the FINS network Communications Unit that has the smallest unit number.



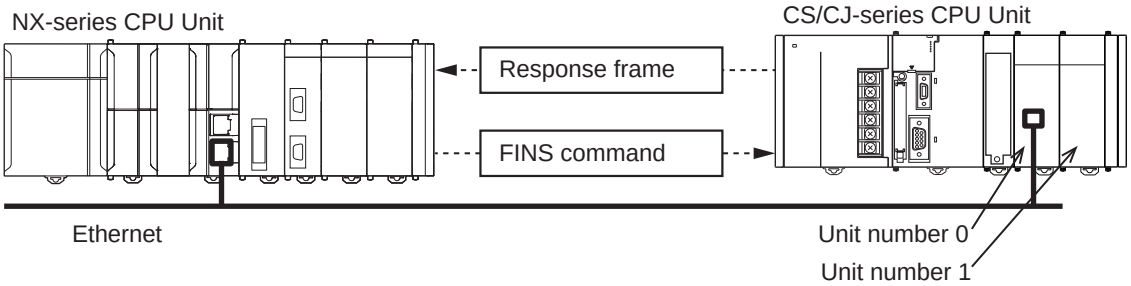
*1. When the FINS command specified with network address 0 and node address n is issued to a CPU Unit with no local network table specified, the FINS command is issued to the FINS network of the lowest unit number.

When the opposite unit is the CS/CJ-series CPU Unit and *0* is specified for the destination network address, the communication may or may not be possible as described below.

Communication is possible when network number *0* is specified

- When only one FINS network Communications Unit is connected to the opposite CS/CJ-series CPU Unit.
- When multiple FINS network Communications Units are connected to the opposite CS/CJ-series CPU Units, and the FINS network Communications Unit is connected to the CS/CJ-series CPU Unit that has the smallest unit number.

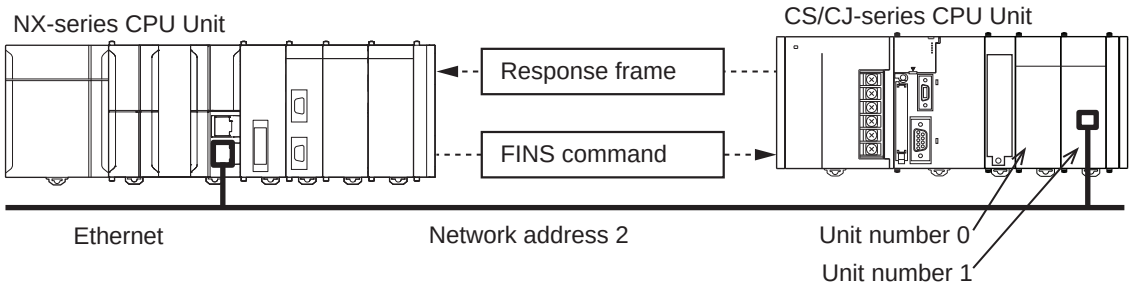
In this case, the routing table setting is not required for the NX-series CPU Unit.



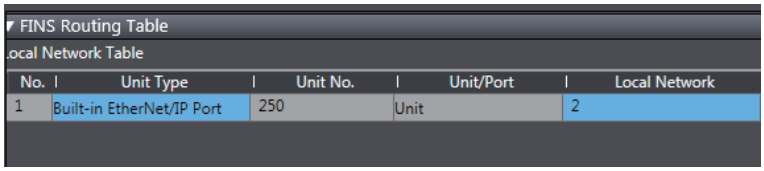
Communication is not possible when network number *0* is specified

- When multiple FINS network Communications Units are connected to the opposite CS/CJ-series CPU Units, and the FINS network Communication Unit is connected to a CS/CJ-series CPU Unit other than the unit that has the smallest unit number.

In this case, routing table setting is required for both the NX-series CPU Unit and the CS/CJ-series CPU Unit.



The example below shows the routing table setting for the NX-series CPU Unit.



The example below shows the routing table setting for the CS/CJ-series CPU Unit.

[Local network table]

No.	Local network table	Unit number
1	1	0
2	2	1
3		

A-1-2 Operation of Routing Table during Clear All Memory operation

During Clear All Memory operation of the NX-series CPU Units, the routing table is cleared together with the local network table and relay network table.

I

Index

Index

P

R

S

V

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 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 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 (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:

Cat. No. W596-E1-01 0418