OMRON

Machine Automation Controller

CJ-series

CompoNet Master Units

Operation Manual for NJ-series CPU Unit

CJ1W-CRM21

CompoNet Master Units

W493-E1-02

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Introduction

Thank you for purchasing a CompoNet Unit.
This manual contains information that is necessary to use the CJ-series CompoNet Unit. Please read this manual and make sure you understand the functionality and performance of the NJ-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 B3503.

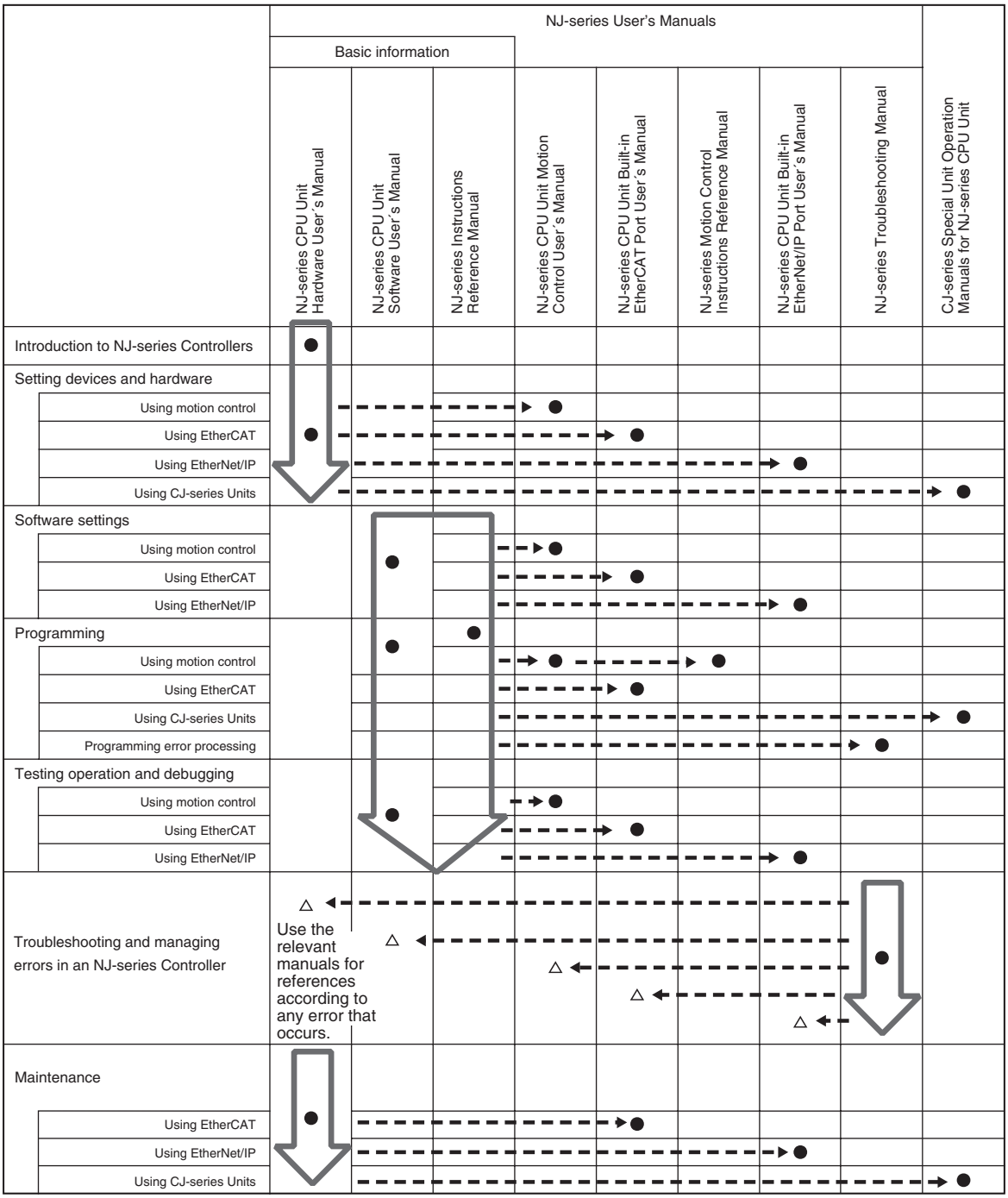
Applicable Products

This manual covers the following products.

- CJ-series CompoNet Unit
  - CJ1W-CRM21

Relevant Manuals

There are three manuals that provide basic information on the NJ-series CPU Units: the *NJ-series CPU Unit Hardware User's Manual*, the *NJ-series CPU Unit Software User's Manual*, and the *NJ-series Instructions Reference Manual*.
Most operations are performed from the Sysmac Studio Automation Software. Refer to the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504) for information on the Sysmac Studio.
Other manuals are necessary for specific system configurations and applications.
Read all of the manuals that are relevant to your system configuration and application to make the most of the NJ-series CPU Unit.



Manual Configuration

NJ-series CPU Unit Hardware User's Manual (Cat. No. W500)

Section	Description
Section 1 Introduction	This section provides an introduction to the NJ-series Controllers and their features, and gives the NJ-series Controller specifications.
Section 2 System Configuration	This section describes the system configuration used for NJ-series Controllers.
Section 3 Configuration Units	This section describes the parts and functions of the configuration devices in the NJ-series Controller configuration, including the CPU Unit and Configuration Units.
Section 4 Installation and Wiring	This section describes where and how to install the CPU Unit and Configuration Units and how to wire them.
Section 5 Troubleshooting	This section describes the event codes, error confirmation methods, and corrections for errors that can occur.
Section 6 Inspection and Maintenance	This section describes the contents of periodic inspections, the service life of the Battery and Power Supply Units, and replacement methods for the Battery and Power Supply Units.
Appendices	The appendices provide the specifications of the Basic I/O Units, Unit dimensions, load short-circuit protection detection, line disconnection detection, and measures for EMC Directives.

NJ-series CPU Unit Software User's Manual (Cat. No. W501)

Section	Description
Section 1 Introduction	This section provides an introduction to the NJ-series Controllers and their features, and gives the NJ-series Controller specifications.
Section 2 CPU Unit Operation	This section provides information that is necessary to use the CPU Unit, including how the CPU Unit works and the operations that it performs depending on the status of the CPU Unit.
Section 3 I/O Ports, Slave Configuration, and Unit Configuration	This section describes how to use I/O ports, how to create the slave configuration and unit configuration and how to assign functions.
Section 4 Controller Setup	This section describes the initial settings of the function modules.
Section 5 Designing Tasks	This section describes the task system and types of tasks.
Section 6 Programming	This section describes programming, including the programming languages and the variables and instructions that are used in programming.
Section 7 Checking Operation and Actual Operation	This section describes the items and procedures for checking the operation of an NJ-series Controller, including offline debugging procedures.
Section 8 CPU Unit Functions	This section describes the functionality provided by the CPU Unit.
Section 9 Communications Setup	This section describes how to go online with the CPU Unit and how to connect to other devices.
Section 10 Example of Actual Application Procedures	This section describes the procedures that are used to actually operate an NJ-series Controller.
Section 11 Troubleshooting	This section describes the event codes, error confirmation methods, and corrections for errors that can occur.
Appendices	The appendices provide the CPU Unit specifications, task execution times, specifications of individual system-defined variables, data attribute lists, CJ-series Unit memory information, CJ-series Unit memory allocation methods, and version information.

Sysmac Studio Version 1 Operation Manual (Cat. No. W504)

Section	Description
Section 1 Introduction	This section provides an overview and lists the specifications of the Sysmac Studio and describes its features and components.
Section 2 Installation and Uninstallation	This section describes how to install and uninstall the Sysmac Studio.
Section 3 System Design	This section describes the basic concepts for designing an NJ-series System with the Sysmac Studio and the basic operating procedures.
Section 4 Programming	This section describes how to create programs with the Sysmac Studio.
Section 5 Online Connections to a Controller	This section describes how to go online with a Controller.
Section 6 Debugging	This section describes how to debug the programs online on the Controller or debug it offline with the Simulator.
Section 7 Other Functions	This section describes other functions that are supported by the Sysmac Studio, including security functions and troubleshooting functions.
Section 8 Reusing Programming	This section describes how to reuse the programs that you create with the Sysmac Studio.
Section 9 Support Software Provided with the Sysmac Studio	This section describes the Support Software that is provided with the Sysmac Studio.
Section 10 Troubleshooting	This section describes the error messages that are displayed when you check a program on the Sysmac Studio and how to correct those errors.
Appendices	The appendices describe the following: Driver Installation for Direct USB Cable Connection Specifying One of Multiple Ethernet Interface Cards Online Help Simulation Instructions

CJ-series CompoNet Master Unit Operation Manual for NJ-series CPU Unit (Cat. No. W493) (This Manual)

Section	Description
Section 1 Introduction	This section provides an overview, the specifications, and the operating procedures of a CompoNet Network.
Section 2 CompoNet Master Unit	This section gives the part names and dimensions of the CompoNet Master Unit, and it describes the functions of the CompoNet Master Unit.
Section 3 Wiring Configurations	This section provides the wiring specifications for a CompoNet Network.
Section 4 Installation and Wiring	This section describes how to install a CompoNet Master Unit, connect the cables, process and mount the connectors, and wire the CompoNet Network power supply.
Section 5 Remote I/O Communications	This section describes how to exchange data between the CPU Unit and CompoNet Slave Unit and it describes the performance of remote I/O communications on CompoNet Networks.
Section 6 Message Communications	This section describes message communications for the CompoNet Master Unit.
Section 7 Troubleshooting	This section describes how to troubleshoot errors in the CompoNet Master Unit. It describes the error history and event log.
Appendices	The appendices describe the differences between using a CompoNet Master Unit with an NJ-series CPU Unit and using it with a CJ-series CPU Unit.

CompoNet Slave Units and Repeater Unit Operation Manual (Cat. No. W457)

Section	Description
Section 1 Features and Slave Units	This section describes the features of the CompoNet Slave Units and it lists the models that are available.
Section 2 Wiring Configurations	This section describes the features and wiring formations of a CompoNet Network, and it describes the types of communications cables and wiring.
Section 3 Installation and Wiring	This section describes how to install the CompoNet Slave Units, connect the cables, process and mount the connectors, and wire the CompoNet Network power supply.
Section 4 Basic Specifications of Slave Units	This section provides the specifications that are common to all CompoNet Slave Units.
Section 5 Digital I/O Slave Units	This section provides the specifications of the Digital I/O Slave Units.
Section 6 Analog I/O Slave Units	This section provides the specifications of the Analog I/O Slave Units.
Section 7 Temperature Input Units	This section provides the specifications of the Temperature Input Units.
Section 8 Expansion Units	This section provides the specifications of the Expansion Units.
Section 9 Bit Slave Units	This section provides the specifications of the Bit Slave Units.
Section 10 Repeater Unit	This section provides the specifications of the Repeater Unit.
Section 11 Smart Functions	This section describes the smart functions of CompoNet Slave Units.
Section 12 Troubleshooting and Maintenance	This section describes how to troubleshoot errors in CompoNet Slave Units and it describes device maintenance.
Appendices	The appendices provide information on message communications, current consumption, connection precautions, and other information.

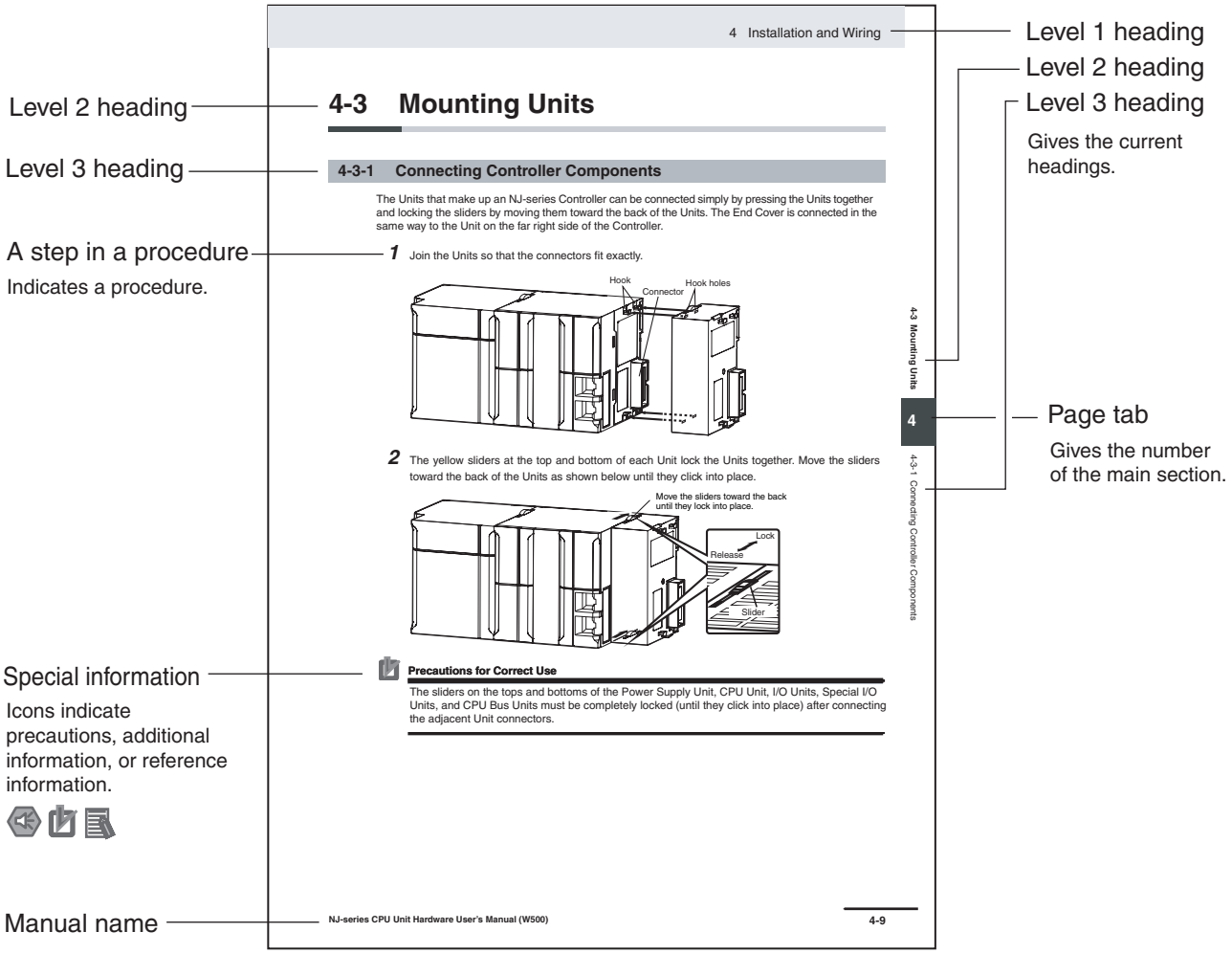
CX-Integrator Ver.2. □ Operation Manual (Cat. No. W464)

Section	Description
Section 1 Overview	This section provides an overview of the CX-Integrator and describes the CX-Integrator menus and connections.
Section 2 Basic Operations	This section describes the basic operations used for the CX-Integrator.
Section 3 Routing Tables	This section describes how to set the routing tables. For NJ-series, routing table is created by using Sysmac Studio instead of CX-Integrator.
Section 4 Data Links for Controller Link and SYSMAC LINK	This section describes how to set data links for Controller Link and SYSMAC LINK networks.
Section 5 Ethernet	This section describes the operations specific to Ethernet.
Section 6 DeviceNet	This section describes the settings and operations unique to DeviceNet networks including registering slaves in the master, I/O allocations, and device monitoring.
Section 7 CompoNet	This section describes the basic usage of CompoNet networks and how to set CompoNet parameters.
Section 8 CompoWay/F	This section describes the settings and operations specific to the CompoWay/F system.
Section 9 NT Link	This section describes the settings and operations specific to the NT Link system.
Section 10 Network Testing	This section describes the operations of the network test tool.
Appendices	The appendices describe the CPS files for Ethernet, Controller Link, CompoWay/F and NT Link Networks, and EDS files for DeviceNet Networks.

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.

Note References are provided to more detailed or related information.

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.

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1 Introduction

2 CompoNet Master Unit

3 Wiring Configurations

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Read and Understand this Manual

Please read and understand this manual before using the product. Please consult your OMRON representative if you have any questions or comments.

Warranty and Limitations of Liability

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS 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 OR REPAIR.

Application Considerations

SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this manual.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

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 model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

PERFORMANCE DATA

Performance data given in this manual 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 users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

ERRORS AND OMISSIONS

The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

Safety Precautions

Definition of Precautionary Information

The following notation is used in this manual to provide precautions required to ensure safe usage of a CJ-series CompoNet Master Unit. The safety precautions that are provided are extremely important to safety. Always read and heed the information provided in all safety precautions.
The following notation is used.

WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Additionally, there may be severe property damage.
Caution	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

Precautions for Safe Use
Indicates precautions on what to do and what not to do to ensure safe usage of the product.

Precautions for Correct Use
Indicates precautions on what to do and what not to do to ensure proper operation and performance.

Symbols

The circle and slash symbol indicates operations that you must not do.
The specific operation is shown in the circle and explained in text.
This example indicates prohibiting disassembly.

The triangle symbol indicates precautions (including warnings).
The specific operation is shown in the triangle and explained in text.
This example indicates a precaution for electric shock.

The triangle symbol indicates precautions (including warnings).
The specific operation is shown in the triangle and explained in text.
This example indicates a general precaution.

The filled circle symbol indicates operations that you must do.
The specific operation is shown in the circle and explained in text.
This example shows a general precaution for something that you must do.

⚠ WARNING

During Power Supply

Do not touch any of the terminals or terminal blocks while the power is being supplied. Doing so may result in electric shock.

Do not attempt to take any Unit apart. In particular, high-voltage parts are present in the Power Supply Unit while power is supplied or immediately after power is turned OFF. Touching any of these parts may result in electric shock. There are sharp parts inside the Unit that may cause injury.

Fail-safe Measures

Provide safety measures in external circuits to ensure safety in the system if an abnormality occurs due to malfunction of the CPU Unit, other Units, or slaves or due to other external factors affecting operation. Not doing so may result in serious accidents due to incorrect operation.

Emergency stop circuits, interlock circuits, limit circuits, and similar safety measures must be provided in external control circuits.

The Controller outputs may remain ON or OFF due to deposition or burning of the output relays or destruction of the output transistors. As a countermeasure for such problems, external safety measures must be provided to ensure safe operation of the system.

The CPU Unit will turn OFF all outputs from Basic Output Units in the following cases. The remote I/O slaves will operate according to the settings in the slaves.

- If an error occurs in the power supply
- If the power supply connection becomes faulty
- If a CPU watchdog timer error or CPU reset occurs
- If a major fault level Controller error occurs
- While the CPU Unit is on standby until RUN mode is entered after the power is turned ON

External safety measures must be provided to ensure safe operation of the system in such cases.

If external power supplies for slaves or other devices are overloaded or short-circuited, the voltage will drop, outputs will turn OFF, and the system may be unable to read inputs. Provide external safety measures in controls with monitoring of external power supply voltage as required so that the system operates safely in such a case.

⚠ WARNING

Fail-safe Measures

Unintended outputs may occur when an error occurs in variable memory or in memory used for CJ-series Units. As a countermeasure for such problems, external safety measures must be provided to ensure safe operation of the system.

Provide measures in the communications system and user program to ensure safety in the overall system even if errors or malfunctions occur in data link communications or remote I/O communications.

If there is interference in remote I/O communications or if a major fault level error occurs, output status will depend on the products that are used.
Confirm the operation that will occur when there is interference in communications or a major fault level error, and implement safety measures.
Correctly set all of the EtherCAT slaves.

The NJ-series Controller continues normal operation for a certain period of time when a momentary power interruption occurs. This means that the NJ-series Controller may receive incorrect signals from external devices that are also affected by the power interruption. Accordingly, take suitable actions, such as external fail-safe measures and interlock conditions, to monitor the power supply voltage of the external device as required.

You must take fail-safe measures to ensure safety in the event of incorrect, missing, or abnormal signals caused by broken signal lines, momentary power interruptions, or other causes. Not doing so may result in serious accidents due to incorrect operation.

Voltage and Current Inputs

Make sure that the voltages and currents that are input to the Units and slaves are within the specified ranges.
Inputting voltages or currents that are outside of the specified ranges may cause accidents or fire.

Downloading

Always confirm safety at the destination before you transfer a user program, configuration data, setup data, device variables, or values in memory used for CJ-series Units from the Sysmac Studio. The devices or machines may perform unexpected operation regardless of the operating mode of the CPU Unit.

⚠ Caution

Application

Do not touch any Unit when power is being supplied or immediately after the power supply is turned OFF. Doing so may result in burn injury.

Wiring

Be sure that all terminal screws and cable connector screws are tightened to the torque specified in the relevant manuals. The loose screws may result in fire or malfunction.

Online Editing

Execute online editing only after confirming that no adverse effects will be caused by deviations in the timing of I/O. If you perform online editing, the task execution time may exceed the task period, I/O may not be refreshed with external devices, input signals may not be read, and output timing may change.

Precautions for Safe Use

Disassembly and Dropping

- Do not attempt to disassemble, repair, or modify any Units. Doing so may result in malfunction or fire.
- Do not drop any Unit or subject it to abnormal vibration or shock. Doing so may result in Unit malfunction or burning.

Mounting

- The sliders on the tops and bottoms of the Power Supply Unit, CPU Unit, I/O Units, and other Units must be completely locked (until they click into place) after connecting the adjacent Unit connectors.

Installation

- Always connect to a ground of 100 Ω or less when installing the Units. A ground of 100 Ω or less must be installed when shorting the GR and LG terminals on the Power Supply Unit.

Wiring

- Follow the instructions in this manual to correctly perform wiring.
  Double-check all wiring and switch settings before turning ON the power supply.
- Use crimp terminals for wiring.
  Do not connect bare stranded wires directly to terminals.
- Do not pull on the cables or bend the cables beyond their natural limit.
  Do not place heavy objects on top of the cables or other wiring lines. Doing so may break the cables.
- Mount terminal blocks and connectors only after checking the mounting location carefully.
  Be sure that the terminal blocks, expansion cables, and other items with locking devices are properly locked into place.
- Always remove any dustproof sheets that are on the top of the Units when they are shipped before you turn ON the power supply. If the sheets are not removed, heat will accumulate and malfunctions may occur.
- Before you connect a computer to the CPU Unit, disconnect the power supply plug of the computer from the AC outlet. Also, if the computer has an FG terminal, make the connections so that the FG terminal has the same electrical potential as the GR terminal on the Power Supply Unit. A difference in electrical potential between the computer and Controller may cause failure or malfunction.
- If the external power supply to an Output Unit or slave has polarity, connect it with the correct polarity. If the polarity is reversed, current may flow in the reverse direction and damage the connected devices regardless of the operation of the Controller.

Power Supply Design

- Do not exceed the rated supply capacity of the Power Supply Units in the NJ-series Controller. The rated supply capacities are given in the *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500).
  If the capacity is exceeded, operation may stop, malfunctions may occur, or data may not be backed up normally for power interruptions.
  Use NJ-series Power Supply Units for both the NJ-series CPU Rack and Expansion Racks.
  Operation is not possible if a CJ-series Power Supply Unit is used with an NJ-series CPU Unit or an NJ-series Power Supply Unit is used with a CJ-series CPU Unit.
- Do not apply voltages or connect loads to the Output Units or slaves in excess of the maximum ratings.

- Surge current occurs when the power supply is turned ON. When selecting fuses or breakers for external circuits, consider the above precaution and allow sufficient margin in shut-off performance. Refer to the relevant manuals for surge current specifications. Refer to the *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500) for surge current specifications.
- If the full dielectric strength voltage is applied or turned OFF using the switch on the tester, the generated impulse voltage may damage the Power Supply Unit. Use the adjustment on the tester to gradually increase and decrease the voltage.
- Apply the voltage between the Power Supply Unit's L1 or L2 terminal and the GR terminal when testing insulation and dielectric strength.
- Do not supply AC power from an inverter or other device with a square-wave output. Internal temperature rise may result in smoking or burning. Always input a sinusoidal wave with the frequency that is given in the *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500).
- Install external breakers and take other safety measures against short-circuiting in external wiring.

Turning ON the Power Supply

- It takes up to approximately 10 to 20 s to enter RUN mode after the power is turned ON. During that time, outputs will be OFF or will be the values specified in the Unit or slave settings, and external communications cannot be performed. Use the RUN output on the Power Supply Unit, for example, to implement fail-safe circuits so that external devices do not operate incorrectly.
- Configure the external circuits so that the power supply to the control system turns ON only after the power supply to the Controller has turned ON. If the power supply to the Controller is turned ON after the control power supply, temporary errors may result in incorrect control system signals because the output terminals on Output Units may momentarily turn ON when power supply is turned ON to the Controller.
- If you transfer data from a backup file on an SD Memory Card to the Controller when the power supply is turned ON, properly select the data groups to transfer. If the data for an unintended data group is transferred to the Controller, it may cause the equipment to operate unpredictably.

Actual Operation

- Check the user program, data, and parameter settings for proper execution before you use them for actual operation.

Turning OFF the Power Supply

- Never turn OFF the power supply to the Controller when the BUSY indicator is flashing. While the BUSY indicator is lit, the user program and settings in the CPU Unit are being backed up in the built-in non-volatile memory. This data will not be backed up correctly if the power supply is turned OFF. Also, a major fault level Controller error will occur the next time you start operation, and operation will stop.
- Do not turn OFF the power supply or remove the SD Memory Card while SD Memory Card access is in progress (i.e., while the SD BUSY indicator flashes). Data may become corrupted, and the Controller will not operate correctly if it uses corrupted data. To remove the SD Memory Card from the CPU Unit while the power supply is ON, press the SD Memory Card power supply switch and wait for the SD BUSY indicator to turn OFF before you remove the SD Memory Card.
- Do not disconnect the cable or turn OFF the power supply to the Controller when downloading data or the user program from Support Software.
- Always turn OFF the power supply to the Controller before you attempt any of the following.
  - Mounting or removing I/O Units or the CPU Unit
  - Assembling the Units
  - Setting DIP switches or rotary switches
  - Connecting cables or wiring the system
  - Connecting or disconnecting the connectors

The Power Supply Unit may continue to supply power to the rest of the Controller for a few seconds after the power supply turns OFF. The PWR indicator is lit during this time. Confirm that the PWR indicator is not lit before you perform any of the above.

Operation

- Confirm that no adverse effect will occur in the system before you attempt any of the following.
  - Changing the operating mode of the CPU Unit (including changing the setting of the Operating Mode at Startup)
  - Changing the user program or settings
  - Changing set values or present values
  - Forced refreshing
- Always sufficiently check the safety at the connected devices before you change the settings of an EtherCAT slave or Special Unit.
- If two different function modules are used together, such as when you use CJ-series Basic Output Units and EtherCAT slave outputs, take suitable measures in the user program and external controls to ensure that safety is maintained in the controlled system if one of the function modules stops. The relevant outputs will stop if a partial fault level error occurs in one of the function modules.
- Always confirm safety at the connected equipment before you reset Controller errors with an event level of partial fault or higher for the EtherCAT Master Function Module.
  When the error is reset, all slaves that were in any state other than Operational state due to a Controller error with an event level of partial fault or higher (in which outputs are disabled) will go to Operational state and the outputs will be enabled.
  Before you reset all errors, confirm that no Controller errors with an event level of partial fault have occurred for the EtherCAT Master Function Module.
- Always confirm safety at the connected equipment before you reset Controller errors for a CJ-series Special Unit. When a Controller error is reset, the Unit where the Controller error with an event level of observation or higher will be restarted.
  Before you reset all errors, confirm that no Controller errors with an event level of observation or higher have occurred for the CJ-series Special Unit. Observation level events do not appear on the Controller Error Tab Page, so it is possible that you may restart the CJ-series Special Unit without intending to do so.
  You can check the status of the *_CJB_UnitErrSta[0,0]* to *_CJB_UnitErrSta[3,9]* error status variables on a Watch Tab Page to see if an observation level Controller error has occurred.

Battery Backup

- The user program and initial values for the variables are stored in non-volatile memory in the CPU Unit. The present values of variables with the Retain attribute and the values of the Holding, DM, and EM Areas in the memory used for CJ-series Units are backed up by a Battery. If the Battery is not connected or the Battery is exhausted, the CPU Unit detects a Battery-backup Memory Check Error. If that error is detected, variables with a Retain attribute are set to their initial values and the Holding, DM, and EM Areas in memory used for CJ-series Units are cleared to all zeros. Perform thorough verifications and provide sufficient measures to ensure that the devices perform safe operation for the initial values of the variables with Retain attributes and the resulting operation.

Debugging

- Forced refreshing ignores the results of user program execution and refreshes I/O with the specified values. If forced refreshing is used for inputs for which I/O refreshing is not supported, the inputs will first take the specified values, but they will then be overwritten by the user program. This operation differs from the force-set/reset functionality of the CJ-series PLCs.
- You cannot upload or download information for forced refreshing with the Sysmac Studio.
  After downloading data that contains forced refreshing, change to RUN mode and then use the Sysmac Studio to perform the operation for forced refreshing.
  Depending on the difference in the forced status, the control system may operate unexpectedly.

- Do not specify the same address for the AT specification for more than one variable.
  Doing so would allow the same entity to be accessed with different variable names, which would make the user program more difficult to understand and possibly cause programming mistakes.

General Communications

- When you use data link communications, check the error information that is given in *_ErrSta* (Controller Error Status) to make sure that no error has occurred in the source device. Create a user program that uses reception data only when there is no error in the source device. If there is an error in the source device, the data for the data link may contain incorrect values.
- Unexpected operation may result if inappropriate data link tables are set. Even if appropriate data link tables have been set, confirm that the controlled system will not be adversely affected before you transfer the data link tables. The data links start automatically after the data link tables are transferred.
- All CPU Bus Units are restarted when routing tables are transferred from Support Software to the CPU Unit. Confirm that the system will not be adversely affected by restarting before you transfer the routing tables.
- Tag data links will stop between related nodes while tag data link parameters are transferred during Controller operation. Confirm that the system will not be adversely affected before you transfer the tag data link parameters.

EtherNet/IP Communications

- All related EtherNet/IP nodes are reset when you transfer settings for the built-in EtherNet/IP port (including IP addresses and tag data links settings). Confirm that the system will not be adversely affected by resetting nodes before you transfer the settings.
- If EtherNet/IP tag data links (cyclic communications) are used with a repeating hub, the communications load on the network will increase. This will increase collisions and may prevent stable communications. Do not use repeating hubs on networks where tag data links are used. Use an Ethernet switch instead.

EtherCAT Communications

- Make sure that the communications distance, number of nodes connected, and method of connection for EtherCAT are within specifications.
  Do not connect EtherCAT communications to EtherNet/IP, a standard in-house LAN, or other networks. An overload may cause the network to fail or malfunction.
- Malfunctions or unexpected operation may occur for some combinations of EtherCAT revisions of the master and slaves. If you disable the revision check in the network settings, use the Sysmac Studio to check the slave revision settings in the master and the actual slave revisions, and then make sure that functionality is compatible in the slave manuals or other references. You can check the actual slave revisions from the Sysmac Studio or on slave nameplates.
- After you transfer the user program, the CPU Unit is restarted and communications with the EtherCAT slaves are cut off. During that period, the slave outputs behave according to the slave settings.
  The time that communications are cut off depends on the EtherCAT network configuration.
  If the EtherCAT network configuration contains only OMRON EtherCAT slaves, communications are cut off for a maximum of 45 seconds.
  Before you transfer the user program, confirm that the system will not be adversely affected.
- If the Fail-soft Operation parameter is set to stop operation, process data communications will stop for all slaves when an EtherCAT communications error is detected in a slave. For this reason, if Servo Drives are connected, the Servos for all axes will be turned OFF. Make sure that the Fail-soft Operation parameter setting results in safe operation when a device error occurs.
- EtherCAT communications are not always established immediately after the power supply is turned ON. Use the system-defined variables in the user program to confirm that communications are established before attempting control operations.

- If frames sent to EtherCAT slaves are lost due to noise or other causes, slave I/O data is not communicated, and the intended operation is sometimes not achieved. If noise countermeasures are required, use the *_EC_InDataInvalid* (Input Data Disable) system-defined variable as an interlock condition in the user program.
  Refer to the *NJ-series CPU Unit Built-in EtherCAT Port User's Manual* (Cat. No. W505) for details.
  The slave outputs behave according to the slave settings. Refer to the manuals for the slaves for details.
- When an EtherCAT slave is disconnected, communications will stop and control of the outputs will be lost not only for the disconnected slave, but for all slaves connected after it. Confirm that the system will not be adversely affected before you disconnect a slave.
- If you disconnect the cable from an EtherCAT slave to disconnect it from the network, any current communications frames may be lost. If frames are lost, slave I/O data is not communicated, and the intended operation is sometimes not achieved. Perform the following processing for a slave that needs to be replaced.
  Program the *_EC_InDataInvalid* (Input Data Disable) system-defined variable as an interlock condition.
  Set the Impermissible Number of Continuous Timeouts setting in the EtherCAT master to at least 2.
  Refer to the *NJ-series CPU Unit Built-in EtherCAT Port User's Manual* (Cat. No. W505) for details.

Motion Control

- Confirm the axis number carefully before you perform an MC Test Run.
- The motor is stopped if communications are interrupted between the Sysmac Studio and the CPU Unit during an MC Test Run. Connect the communications cable between the computer and CPU Unit securely and confirm that the system will not be adversely affected before you perform an MC Test Run.
- Always execute the Save Cam Table instruction if you change any of the cam data from the user program in the CPU Unit or from the Sysmac Studio. If the cam data is not saved, the previous condition will be restored when the power is turned ON again, possibly causing unexpected machine operation.
- The positive drive prohibit input (POT), negative drive prohibit input (NOT), and home proximity input (DEC) of the Servo Drive are used by the MC Function Module as the positive limit input, negative limit input, and home proximity input. Make sure that the signal widths for all of these input signals are longer than the control period of the MC Function Module. If the input signal widths are shorter than the control period, the MC Function Module may not be able to detect the input signals, resulting in incorrect operation.

Battery Replacement

- The Battery may leak, rupture, heat, or ignite. Never short-circuit, charge, disassemble, heat, or incinerate the Battery or subject it to strong shock.
- Dispose of any Battery that has been dropped on the floor or otherwise subjected to excessive shock. Batteries that have been subjected to shock may leak if they are used.
- UL standards require that only an experienced engineer replace the Battery. Make sure that an experienced engineer is in charge of Battery replacement.
- Apply power for at least five minutes before changing the Battery. Install a new Battery within five minutes (at 25°C) of turning OFF the power supply. If power is not supplied for at least 5 minutes, the saved data may be lost.

Unit Replacement

- We recommend replacing the Battery with the power turned OFF to prevent the CPU Unit's sensitive internal components from being damaged by static electricity and to prevent malfunctions. The Battery can be replaced without turning OFF the power supply. To do so, always touch a grounded piece of metal to discharge static electricity from your body before you start the procedure.
  After you replace the Battery, connect the Sysmac Studio and clear the Low Battery Voltage error.

- Make sure that the required data, including the user program, configurations, settings, variables, and memory used for CJ-series Units, is transferred to a CPU Unit that was replaced and to externally connected devices before restarting operation.
  Be sure to include the routing tables, network parameters, and other CPU Bus Unit data, which are stored in the CPU Unit.

Disposal

- Dispose of the product and Batteries according to local ordinances as they apply.

- The following information must be displayed for all products that contain primary lithium batteries with a perchlorate content of 6 ppb or higher when shipped to or transported through the State of California, USA.
  Perchlorate Material - special handling may apply.
  See www.dtsc.ca.gov/hazardouswaste/perchlorate.
- The CPU Unit contains a primary lithium battery with a perchlorate content of 6 ppb or higher. Place the above information on the individual boxes and shipping boxes when shipping finished products that contain a CPU Unit to the State of California, USA.

Using CompoNet Units

- Always set the same communications mode number on the rotary switch on the front of the CompoNet Master Unit and for the communications mode number setting when you register the Unit on the Sysmac Studio (MODE□ in the Unit Name). If the numbers are not the same, the CompoNet Master Unit will operate with the communications mode number that is set on the rotary switch on the front panel, but the I/O ports that are assigned for slave I/O data will be created according to the communications mode number that is registered on the Sysmac Studio. If this happens, data will be accessed for a different Slave Unit or a different item when you try to access I/O data for the Slave Unit. Set the communications mode number carefully.
- When Flat Cable I (unsheathed) or Flat Cable II (sheathed) cables are used for more than one CompoNet system, do not bundle the cables from two different CompoNet systems together. Always separate the cables from each other by at least 5 mm to prevent unstable operation of the systems due to interference.
- Always configure the control circuits so that they turn ON power to the I/O Slave Units before they turn ON power to the Controller with the Master Unit. If the power to the Controller is turned ON first, normal operation will temporarily not be possible.
- Use only the specified communications cables.
- Do not extend the connection distances of the communications cables beyond the ranges given in the specifications.

Precautions for Correct Use

Storage, Mounting, and Wiring

- Do not operate or store the Controller in the following locations. Operation may stop or malfunctions may occur.
  - Locations subject to direct sunlight
  - Locations subject to temperatures or humidity outside the range specified in the specifications
  - Locations subject to condensation as the result of severe changes in temperature
  - Locations subject to corrosive or flammable gases
  - Locations subject to dust (especially iron dust) or salts
  - Locations subject to exposure to water, oil, or chemicals
  - Locations subject to shock or vibration
- Take appropriate and sufficient countermeasures when installing the Controller in the following locations.
  - Locations subject to strong, high-frequency noise
  - Locations subject to static electricity or other forms of noise
  - Locations subject to strong electromagnetic fields
  - Locations subject to possible exposure to radioactivity
  - Locations close to power lines
- Before touching a Unit, be sure to first touch a grounded metallic object in order to discharge any static build-up.
- Install the Controller away from sources of heat and ensure proper ventilation. Not doing so may result in malfunction, in operation stopping, or in burning.
- An I/O bus check error will occur and the Controller will stop if an I/O Connecting Cable's connector is disconnected from the Rack. Be sure that the connectors are secure.
- Do not allow foreign matter to enter the openings in the Unit. Doing so may result in Unit burning, electric shock, or failure.
- Do not allow wire clippings, shavings, or other foreign material to enter any Unit. Otherwise, Unit burning, failure, or malfunction may occur. Cover the Units or take other suitable countermeasures, especially during wiring work.
- For EtherCAT and EtherNet/IP, use the connection methods and cables that are specified in the *NJ-series CPU Unit Built-in EtherCAT Port User's Manual* (Cat. No. W505) and the *NJ-series CPU Unit Built-in EtherNet/IP Port User's Manual* (Cat. No. W506). Otherwise, communications may be faulty.
- Use the rated power supply voltage for the Power Supply Units. Take appropriate measures to ensure that the specified power with the rated voltage and frequency is supplied in places where the power supply is unstable.
- Make sure that the current capacity of the wire is sufficient. Otherwise, excessive heat may be generated. When cross-wiring terminals, the total current for all the terminals will flow in the wire. When wiring cross-overs, make sure that the current capacity of each of the wires is not exceeded.
- Do not touch the terminals on the Power Supply Unit immediately after turning OFF the power supply. Residual voltage may cause electrical shock.
- If you use reed switches for the input contacts for AC Input Units, use switches with a current capacity of 1 A or greater.
  If the capacity of the reed switches is too low, surge current may fuse the contacts.

Error Processing

- In applications that use the results of instructions that read the error status, consider the affect on the system when errors are detected and program error processing accordingly. For example, even the detection of a minor error, such as Battery replacement during operation, can affect the system depending on how the user program is written.
- If you change the event level of a Controller error, the output status when the error occurs may also change. Confirm safety before you change an event level.

Restoring and Automatically Transferring Data

- When you edit the restore command file or the automatic transfer command file, do not change anything in the file except for the “yes” and “no” specifications for the selectable data groups. If you change anything else in the file, the Controller may perform unexpected operation when you restore or automatically transfer the data.

Unit Replacement

- If you replace a CPU Bus Unit or Special I/O Unit, refer to operation manual for the Unit for information on the data required for individual Units and redo the necessary settings.
- The absolute encoder home offset is backed up with a Battery in the CPU Unit.
  When you change the combination of the CPU Unit and Servomotor, e.g., when you add or replace a Servomotor, define home again.
  To restore the information without changing the CPU Unit-Servomotor combination, remove the absolute encoder home offset from the data to restore.

Task Settings

- If a Task Period Exceeded error occurs, shorten the programs to fit in the task period or increase the setting of the task period.

Motion Control

- Use the system-defined variable in the user program to confirm that EtherCAT communications are established before you attempt to execute motion control instructions. Motion control instructions are not executed normally if EtherCAT communications are not established.
- Use the system-defined variables to monitor for errors in communications with the slaves that are controlled by the motion control function module. Motion control instructions are not executed normally if an error occur in slave communications.
- Before you start an MC Test Run, make sure that the operation parameters are set correctly.
- Do not download motion control settings during an MC Test Run.

EtherCAT Communications

- Do not disconnect the EtherCAT slave cables during operation. The outputs will become unstable.
- Set the Servo Drives to stop operation if an error occurs in EtherCAT communications between the Controller and a Servo Drive.
- Make sure that all of the slaves to be restored are participating in the network before you reset a Network Configuration Verification Error, Process Data Communications Error, or Link OFF Error in the EtherCAT Master Function Module. If any slave is not participating when any of these errors is reset, the EtherCAT Master Function Module may access slave with a different node address than the specified node address or the error may not be reset correctly.

Battery Replacement

- Be sure to install a replacement Battery within two years of the production date shown on the Battery label.
- Turn ON the power after replacing the Battery for a CPU Unit that has been unused for a long time. Leaving the CPU Unit unused again without turning ON the power even once after the Battery is replaced may result in a shorter Battery life.
- When you replace the Battery, use the CJ1W-BAT01 Battery Set.

SD Memory Cards

- Insert the SD Memory Card all the way.
- Do not turn OFF the power supply to the Controller during SD Memory Card access. The files may be corrupted.
  If there is a corrupted file in the SD Memory Card, the file is automatically deleted by the restoration function when the power supply is turned ON.

Regulations and Standards

Conformance to EC Directives

Applicable Directives

- EMC Directives
- Low Voltage Directive

Concepts

- EMC Directive

  OMRON devices that comply with EC Directives also conform to the related EMC standards so that they can be more easily built into other devices or the overall machine. The actual products have been checked for conformity to EMC standards.*
  Whether the products conform to the standards in the system used by the customer, however, must be checked by the customer. EMC-related performance of the OMRON devices that comply with EC Directives will vary depending on the configuration, wiring, and other conditions of the equipment or control panel on which the OMRON devices are installed. The customer must, therefore, perform the final check to confirm that devices and the overall machine conform to EMC standards.

  * Applicable EMC (Electromagnetic Compatibility) standards are as follows:
  EMS (Electromagnetic Susceptibility): EN 61131-2 and EN 61000-6-2
  EMI (Electromagnetic Interference): EN 61131-2 and EN 61000-6-4 (Radiated emission: 10-m regulations)

- Low Voltage Directive

  Always ensure that devices operating at voltages of 50 to 1,000 VAC and 75 to 1,500 VDC meet the required safety standards. The applicable directive is EN 61131-2.

- Conformance to EC Directives

  The NJ-series Controllers comply with EC Directives. To ensure that the machine or device in which the NJ-series Controller is used complies with EC Directives, the Controller must be installed as follows:

  - The NJ-series Controller must be installed within a control panel.
  - You must use reinforced insulation or double insulation for the DC power supplies connected to DC Power Supply Units and I/O Units.
  - NJ-series Controllers that comply with EC Directives also conform to the Common Emission Standard (EN 61000-6-4). Radiated emission characteristics (10-m regulations) may vary depending on the configuration of the control panel used, other devices connected to the control panel, wiring, and other conditions.
    You must therefore confirm that the overall machine or equipment complies with EC Directives.

Conditions for Use Under Shipping Standards

Installation Location

- Do not use the CompoNet Master Unit on the bridge or decks.
- Use the CompoNet Master Unit in a location with limited vibration. (Do not use it in locations with a lot of vibration, such as the engine room.)

Conditions for Use Under Shipping Standards

- The Master Unit must be installed in a control panel.
- The following DC Power Supply must be used to supply power for communications.

DC Power Supply

Manufacturer	Model
OMRON	S82J Series

The DC Power Supply must provide the following specifications.

Item	Specification
Output voltage	24 VDC
Output current	The capacity of the Power Supply must be equal to or greater than the total of the current consumptions of the following Units: All Slaves, Repeater Units, and SmartSlice Units

Trademarks

- Sysmac and SYSMAC are trademarks or registered trademarks of OMRON Corporation in Japan and other countries for OMRON factory automation products.
- Windows, Windows 98, Windows XP, Windows Vista, and Windows 7 are registered trademarks of Microsoft Corporation in the USA and other countries.
- EtherCAT® is registered trademark and patented technology, licensed by Bechhoff Automation GmbH, Germany.
- The SD logo is a trademark of SD-3C, LLC.

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

Unit Versions

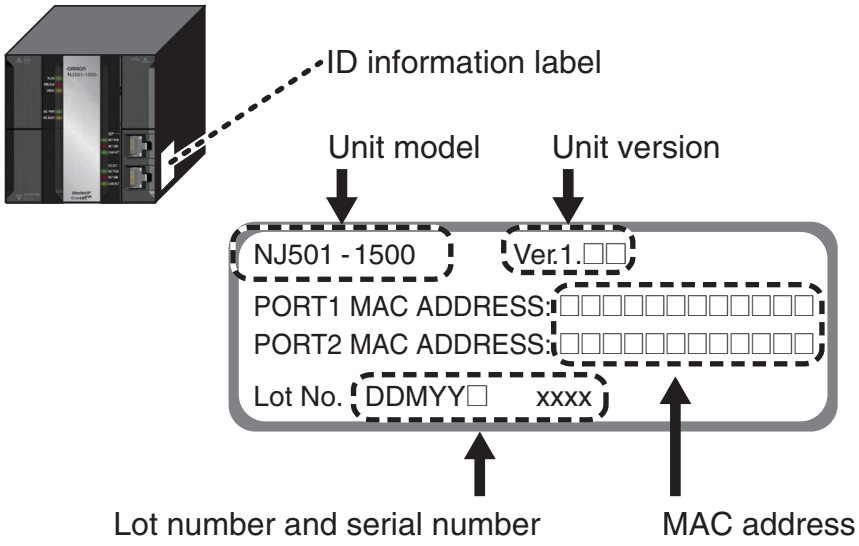
Unit Versions

A “unit version” has been introduced to manage CPU Units in the NJ Series according to differences in functionality accompanying Unit upgrades.

Notation of Unit Versions on Products

The unit version is given on the ID information label of the products for which unit versions are managed, as shown below.

Example for NJ-series NJ501-□□□□ CPU Unit:



The following information is provided on the ID information label.

Item	Description
Unit model	Gives the model of the Unit.
Unit version	Gives the unit version of the Unit.
Lot number and serial number	Gives the lot number and serial number of the Unit. DDMYY: Lot number, □: For use by OMRON, xxxx: Serial number “M” gives the month (1 to 9: January to September, X: October, Y: November, Z: December)
MAC address	Gives the MAC address of the built-in port on the CPU Unit.

Confirming Unit Versions with Sysmac Studio

You can use the Unit Production Information on the Sysmac Studio to check the unit version of the CPU Unit, CJ-series Special I/O Units, CJ-series CPU Bus Units, and EtherCAT slaves. The unit versions of CJ-series Basic I/O Units cannot be checked from the Sysmac Studio.

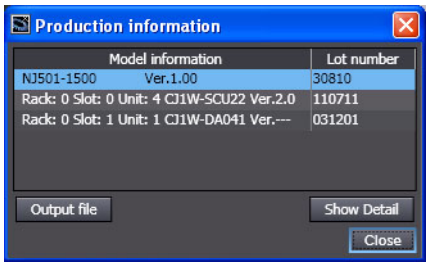
- **CPU Unit and CJ-series Units**

1 Double-click **CPU/Expansion Racks** under **Configurations and Setup** in the Multiview Explorer. Or, right-click **CPU/Expansion Racks** under **Configurations and Setup** and select ***Edit*** from the menu.

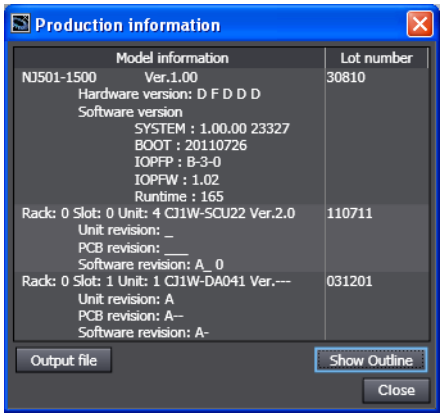
The Unit Editor is displayed for the Controller Configurations and Setup layer.

2 Right-click any open space in the Unit Editor and select ***Production Information***.

The Production Information Dialog Box is displayed.



Simple Display



Detailed Display

In this example, “Ver.1.00” is displayed next to the unit model.

The following items are displayed.

CPU Unit	CJ-series Units
Unit model	Unit model
Unit version	Unit version
Lot number	Lot number
	Rack number, slot number, and unit number

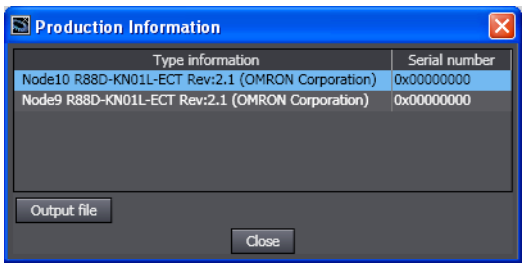
● EtherCAT Slaves

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 Configuration Tab Page is displayed for the Controller Configurations and Setup layer.

2 Right-click the master in the EtherCAT Configurations Editing Pane and select **Display Production Information**.

The Production Information Dialog Box is displayed.



The following items are displayed.
Node address
Type information*
Serial number

* If the model number cannot be determined (such as when there is no ESI file), the vendor ID, product code, and revision number are displayed.

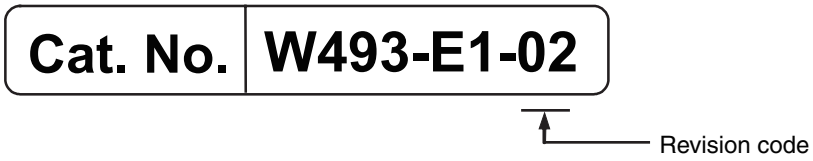
Related Manuals

The following manuals are related to the NJ-series Controllers. Use these manuals for reference.

Manual name	Cat. No.	Model numbers	Application	Description
NJ-series CPU Unit Hardware User's Manual	W500	NJ501-□□□□ NJ301-□□□□	Learning the basic specifications of the NJ-series CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided.	An introduction to the entire NJ-series 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 Use this manual together with the *NJ-series CPU Unit Software User's Manual* (Cat. No. W501).
NJ-series CPU Unit Software User's Manual	W501	NJ501-□□□□ NJ301-□□□□	Learning how to program and set up an NJ-series CPU Unit. Mainly software information is provided.	The following information is provided on a Controller built with an NJ501 CPU Unit. • CPU Unit operation • CPU Unit features • Initial settings • Programming based on IEC 61131-3 language specifications Use this manual together with the *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500).
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.
CJ-series CompoNet Master Unit Operation Manual for NJ-series CPU Unit (this manual)	W493	CJ1W-CRM21	Learning the functions and operating procedures of a CJ-series CompoNet Master Unit when it is used in an NJ-series Controller	The functions and operating procedures of a CJ-series CompoNet Master Unit when it is used in an NJ-series Controller are described.
CompoNet Slave Units and Repeater Unit Operation Manual	W457	CRT1 Series	Learning about CompoNet Slave Units	The models, functions, specifications, operating procedures, and other details are described.
CS/CJ-series CompoNet Master Units Operation Manual	W456	CS1W-CRM21 CJ1W-CRM21	Learning the functions and operating procedures of a CS/CJ-series CompoNet Master Unit	The functions and operating procedures of a CS/CJ-series CompoNet Master Unit when it is used in an CS/CJ-series PLC are described.
CX-Integrator Version 2.□ Operation Manual	W464	---	Learning about the CX-Integrator Support Software, which is used to set up and commission a CompoNet Network	The operating procedures of the CX-Integrator are described.

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	Date	Revised content
01	May 2012	Original production
02	August 2012	Made changes accompanying release of unit version 1.03 of the CPU Unit.

1

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1-1 CompoNet Networks

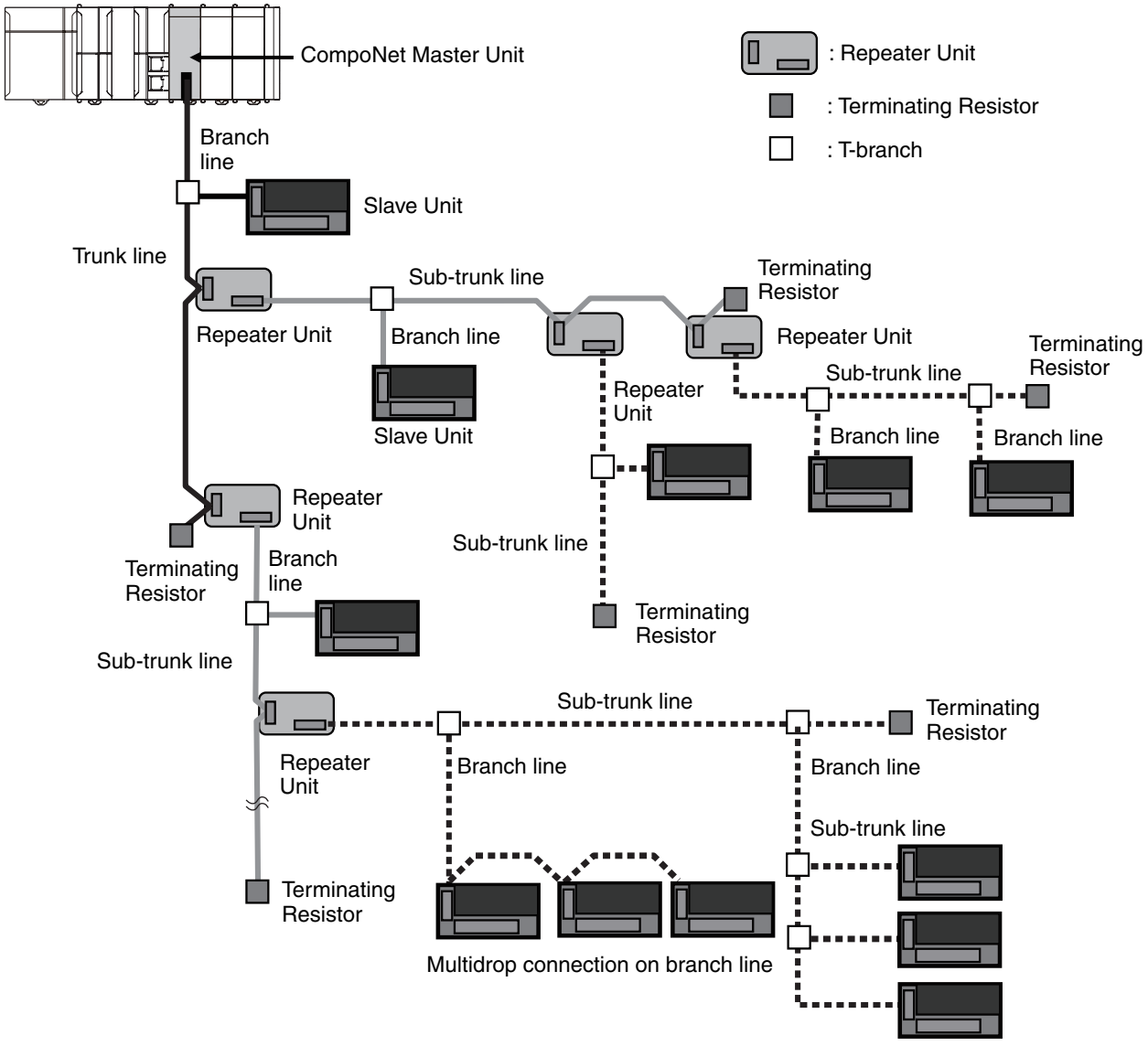
1-1-1 Features

CompoNet Networks feature easy operation and installation in a component-level network that connects Controllers and onsite I/O. The CPU Unit and CompoNet Slave Units cyclically exchange I/O information through the CompoNet Master Unit, refreshing I/O in sync with the task periods of the CPU Unit. Message communications can also be used from host computers or the Master Unit on the Controller to read and write data for CompoNet Slave Units.

1-1-2 Overall System Configuration and Elements

A CompoNet Network is a remote I/O system that consists of the following elements.

System Configuration Example



Communications Cables

CompoNet Networks use Round Cable I, Round Cable II, Flat Cable I (DCA4-4F10 Standard Flat Cable), and Flat Cable II (DCA5-4F10 Sheathed Flat Cable) for Communications Cables.

Master Unit

The Master Unit manages the CompoNet Network and transfers I/O data between the CPU Unit and the Slave Units.

There is only one Master Unit per network. The Master Unit must be connected to the end of the trunk line.

Slave Units

Some Slave Units receive output data from the Master Unit across the CompoNet Network and output it. Other Slave Units send data that has been input across the network to the Master Unit. There are two types of Slave Unit according to the I/O capacity of the Slave Unit.

- Word Slave Units: A Word Slave Unit is allocated 16 bits (i.e., 16 I/O points) in the I/O memory of the CPU Unit.
- Bit Slave Units: A Bit Slave Unit is allocated 2 bits (i.e., 2 I/O points) in the I/O memory of the CPU Unit.

Repeater Unit

Using Repeater Units enables expanding network connections as follows:

- Extending the Communications Cable
- Increasing the number of nodes (Units)
- Creating long-distance T-branches from the trunk line and sub-trunk lines (See note.)
- Converting between different types of cable (Round Cable I, Round Cable II, Flat Cable I, and Flat Cable II)

A sub-trunk line downstream from a Repeater Unit can be connected with the same communications specifications (i.e., distances and number of Slave Units) as the trunk line.

Up to 64 Repeater Units can be connected per network (i.e., per Master Unit). When Repeater Units are connected in series from the Master Unit, up to two layers can be created.

Note The physical layer is not connected across a Repeater Unit. The connection is thus different from a branch connection, which branches the same physical layer.

Terminating Resistors

With a CompoNet Network, the Master Unit is located at one end of the trunk line and a Terminating Resistor is connected to the other end of the trunk line.

If Repeater Units are used, each Repeater Unit is treated like a Master Unit, i.e., Terminating Resistor is connected to the most remote end of the sub-trunk line downstream from the Repeater Unit.

Note A Terminating Resistor reduces signal bouncing to stabilize communications and must always be connected to the most remote end of the network lines below the Master Unit and each Repeater Unit. Always connect a Terminating Resistor to ensure the quality of the transmission path.

Trunk Lines and Branch Lines

The trunk lines and branch lines in a CompoNet Network are defined as follows:

- Trunk line: The transmission path between the Master Unit and the Terminating Resistor.
- Sub-trunk line: The transmission path between the Repeater Unit and the Terminating Resistor (when a Repeater Unit is used).
- Branch line: The transmission path created using a T-branch from the trunk line or sub-trunk line.

- Sub-branch line: The transmission path created using a T-branch from a branch line. (T-branching is not possible from sub-branch lines.)

Note Due to differences in functionality, the same type of cable must be used between the trunk line and a branch line, a sub-trunk line and a branch line, and a branch line and a sub-branch line. Different types of cable can be used between the trunk line and a sub-trunk line.

Branches

There are two ways to create branch lines.

(1) T-branch Connections

- T-branch connections using Flat Connectors (when Flat Cable I or Flat Cable II is used)
- T-branch connections using commercially available relay terminals (when Round Cable I or Round Cable II is used)

(2) Multidrop Connections

- Multidrop connections using Flat Connectors and Multidrop Connectors (when Flat Cable I is used) (See note.)
- Multidrop connections using Open Type Connectors (when Round Cable I or Round Cable II is used)

Note You cannot use multidrop connections with Multidrop Connectors if you use Flat Cable II.

Communications Power Supply

This is the power supply for communications and internal operations for each Unit.

A commercially available 24-VDC power supply is used for communications and internal operations in each Unit.

One communications power supply can be connected for a trunk line or a sub-trunk line. Communications power is supplied to the trunk line from the Master Unit and to a sub-trunk line from the Repeater Unit.

One power supply cannot be used to supply communications power to more than one line (i.e., to the trunk line and sub-trunk line or to two sub-trunk lines).

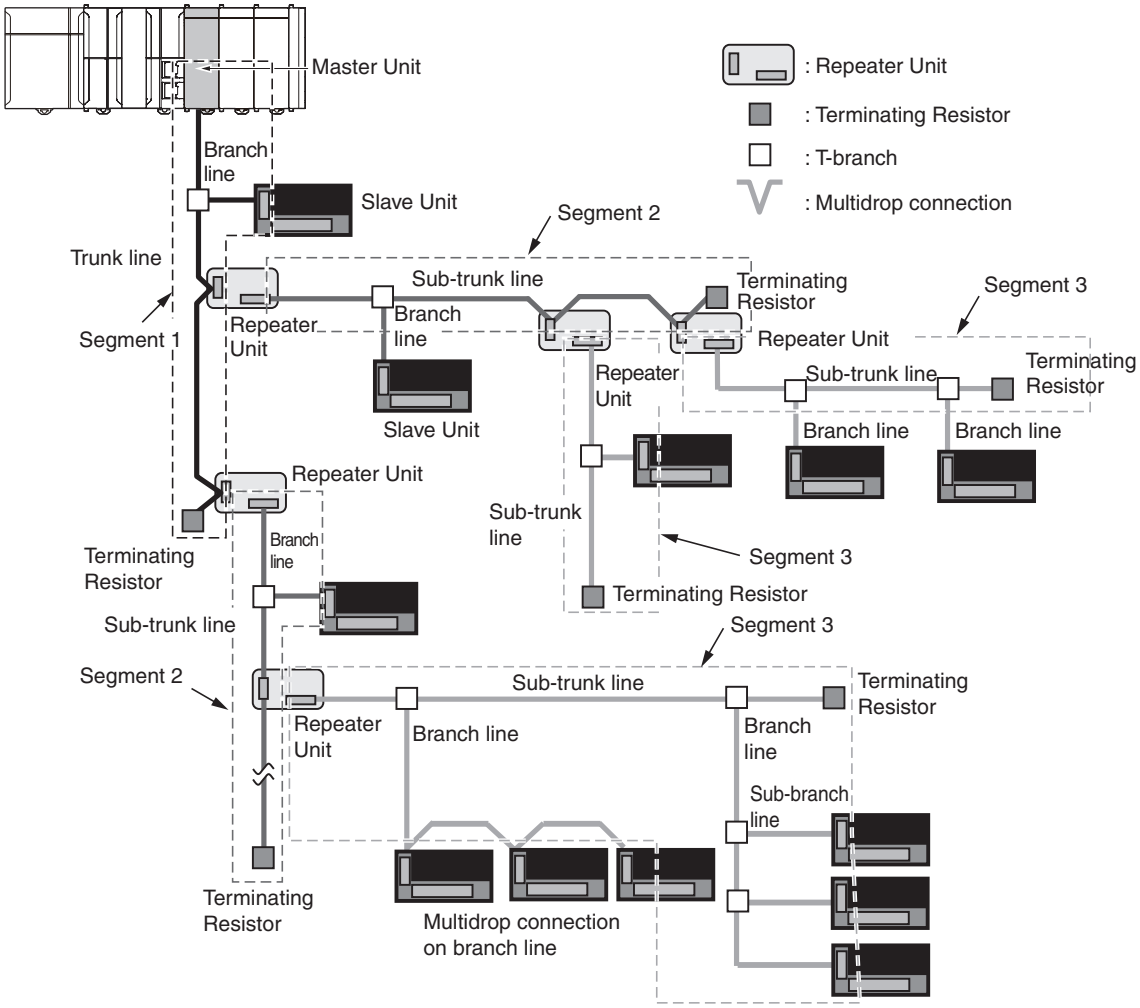
I/O Power Supply

A commercially available 24-VDC power supply is used to power the I/O operations of the external I/O device connected to a Unit. It is connected to the I/O power supply terminal of the Unit.

1-1-3 Segments

Segment Layers

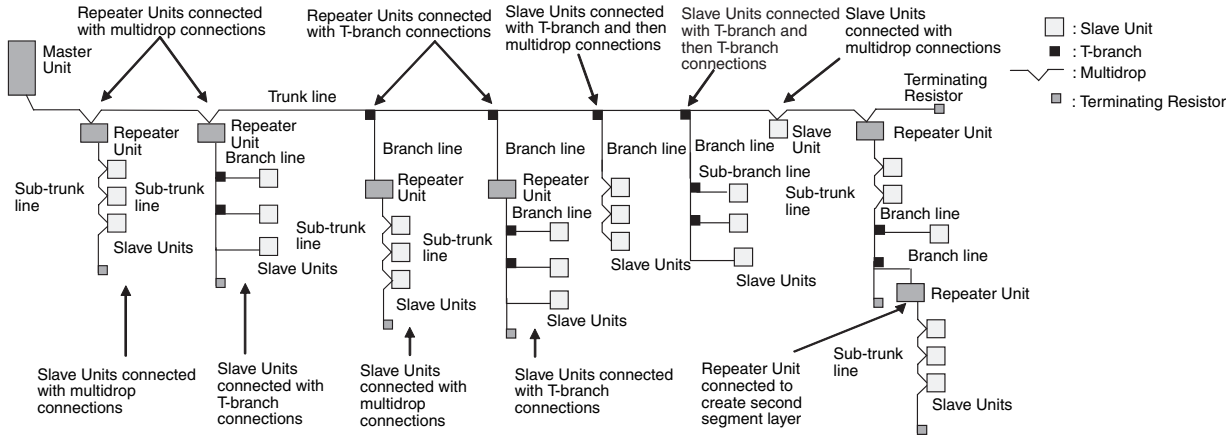
When Repeater Units are used, the CompoNet Network is divided into segments by the Repeater Units. Each segment is connected to the same network, but is isolated electrically. Three layers of these isolated segments can be configured, called segments 1, 2, and 3, counted in order from the Master Unit. Therefore, up to two extra segment layers can be created using Repeater Units. Accordingly, you can expand the length of one trunk line and one branch line to up to 1,500 m (500 m × 3, 93.75 kbps). Including Repeater Units connected using multidrop connections, a maximum of 64 Repeater Units can be connected in a single network (i.e., to a single Master Unit).



Number of Units Per Segment

A maximum of 32 Slave Units and Repeater Units can be connected in one segment.

1-1-4 System Configuration Patterns



1-1-5 Features of CompoNet Networks

● Programless Communications

With the use of only Round Cable I (2-conductor), Round Cable II (4-conductor), Flat Cable I (unsheathed), and Flat Cable II (sheathed) cables, cyclic data exchange (remote I/O communications) can be achieved between a Master Unit mounted in a Controller and multiple Slave Units.

● High-speed Multi-point Processing

Remote I/O communications for up to 2,560 I/O points can be achieved at approximately 1,000 points per millisecond (at 4 Mbps*1). This enables configuring CompoNet Network systems to replace systems previously configured with Basic I/O Units.

*1 There are restrictions when you branch lines or use Flat Cable II. For details, refer to *1-2-2 Branch Line and Multidrop Support for Cable Types and Baud Rates*.

● Easy Introduction

Remote I/O communications can be started merely by connecting the Master Unit and Slave Units with communications cables, setting the switches on the Master Unit, and turning ON the power to the Slave Units and the Controller.

● Repeater Units for Greater Flexibility

Repeater Units can be used in a network to enable the following network expansions.

- Extending the cable length
- Increasing the number of nodes
- Branching from the trunk line
- Changing the type of cable

Repeater Units can be used to extend up to two segment layers (called sub-trunk lines) from the trunk line. Up to 64 Repeater Units can be connected per Master Unit and up to 32 Repeater Units can be connected to the trunk line.

Note Communications power is supplied to a sub-trunk line from the Repeater Unit.

Bit-level Distribution

Slave Units with industry-standard e-CON connectors, clamping terminal blocks, or small connectors can be used to distribute I/O at the bit level. This enables distributed control in distributed devices, such as sensors and other devices located over a wide area on conveyors or in warehouses. Bit Slave Units are available in two types: IP20 and IP54.

Five Communications Modes According to Number of Nodes, I/O Points, and Allocated Memory

There are five communications modes that can be used according to number of Slave Units, the number of I/O points, and the location of allocated memory.

This enables efficient application of memory according to the size of the system.

Data Exchange with Message Communications

Message communications can be used from the CX-Integrator running on a host computer or from the CPU Unit to access Slave Units and Repeater Units on the CompoNet Network. This enables easily improving network and system maintenance.

Easy Maintenance with Complete System Monitoring Functions

The CompoNet Network is constantly monitored to enable confirming system safety by quickly isolating errors and checking communications status.

- CX-Integrator
  The CX-Integrator provides the following network functionality.
  - Uploading the network configuration
  - Editing and transferring software setting tables
  - Editing and transferring registration tables
  - Setting Input Data Zero Clear Mode for when communications error occur
  - Setting I/O Communications Manual Startup Mode
  - Monitoring Master Unit status
  - Monitoring the Master Unit error history
  - Monitoring Slave Unit network participation status
  - Setting and transferring Slave Unit parameters
  - Monitoring Slave Unit information
  - Managing files
  - Managing hardware (EDS files)
- Smart Slave Unit Functions
  Most of the Slave Units provide Smart Functions that can record various added-value information in addition to the ON/OFF signals (I/O data). This enables preventive system maintenance (including operation time monitoring and contact operation counter monitoring) and aids in faster system introduction (including communications power voltage monitoring and I/O power status monitoring). Settings are possible from either the CX-Integrator or through message communications.
- Master Unit Detection of Network Participation, Errors, and Status
  When a Slave Unit joins the network, a BOOL I/O port that corresponds to the node address will change to TRUE. The I/O port is called the WORD/BIT IN Connect Flag. If a Slave Unit that has been participating in the network leaves the network, a BOOL I/O port that corresponds to the node address will change to TRUE. The I/O port is called the WORD/BIT IN Communication Error Flag.
  Network status, such as communications errors and redundant Slave Unit node address, and Slave Unit diagnostic results are detected by the Master Unit and displayed on the seven-segment display on the front panel and reflected in the Status Flags.

- Registration Tables
  Tables of the Slave Unit that should be participating at each node (i.e., the node address and corresponding Slave Unit model number) can be registered from the CX-Integrator to verify the Slave Units actually participating in the network and prevent unregistered Slave Units from participating in the network. A monitoring time for registered Slave Unit participation after power is turned ON can also be set.
  Remote I/O communications can be stopped until all registered Slave Units are participating and remote I/O communications can be started as soon as all registered Slave Units are participating (called Registered Slave Unit Participation Standby Mode).
- Stopping Communications at Communications Errors
  A DIP switch on the front of the Master Unit can be set to stop remote I/O communications when a communications error has occurred in any of the Slave Units.
- I/O Communications Manual Startup Mode
  I/O Communications Manual Startup Mode can be set from the CX-Integrator so that remote I/O communications are not started when the power is turned ON. Remote I/O communications will not start until **_IOCycleStartCmd* (Remote I/O Communications Start Switch) changes to TRUE.
- Communications Error Input Data Zero Clear Mode
  Input Data Zero Clear Mode can be set from the CX-Integrator for communications error. If a communications error occurs for a Slave Unit in this mode, all input data for that Slave Unit will be cleared to zeros. This can be used to suppress triggering operations when communications errors have occurred in systems where ON input data signals are used as triggers for operation.
- Communications Status on Master Unit Seven-segment Display
  The seven-segment display on the front of the Master Unit can be used to check communications status.
  The baud rate is normally displayed, but if an error occurs, the error code is displayed in hexadecimal and the error node address is displayed in decimal.

● Automatic Baud Rate Detection

The Slave Units will automatically detect and use the baud rate set on the DIP switch on the Master Unit. Setting the baud rate is not necessary for any of the Slave Units.

1-2 CompoNet Network Specifications

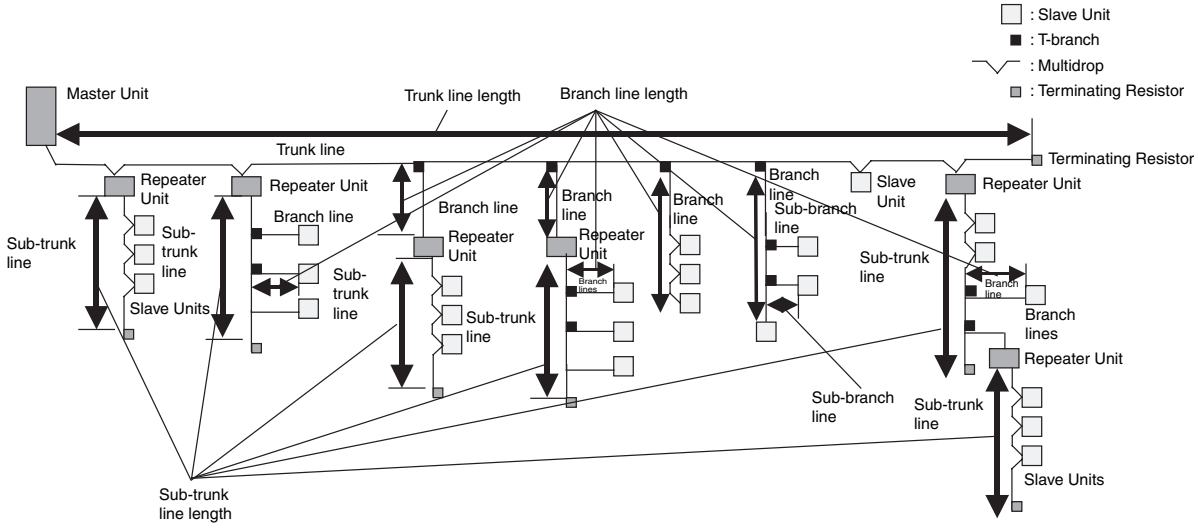
Item	Specifications
Communications method	CompoNet protocol
Types of communications	Remote I/O communications (programless, constant sharing of data with Slave Units) and message communications (explicit message communications)
Baud rate	4 Mbps (*1), 3 Mbps, 1.5 Mbps, 93.75 kbps *1 A baud rate of 4 Mbps is not supported for branch lines and thus cannot be used for Slave Units with Cables.
Modulation	Base-band
Coding	Manchester code
Error control	Manchester code rules, CRC
Communications media	The following cables can be used. • Round Cable I (VCTF 2-conductor cable, JIS C3306) • Round Cable II (VCTF 4-conductor cable, JIS C3306) • Flat Cable I (DCA4-4F10 Standard Flat Cable) • Flat Cable II (DCA5-4F10 Sheathed Flat Cable) **Note** Round Cable I, Round Cable II, Flat Cable I, and Flat Cable II cables are all treated as different types of cables. When two or more types of cables are used in a single network, a Repeater Unit must be used to separate any two different types of cables between the trunk line and a sub-trunk line.
Communications distance and wiring	Refer to *1-2-1 Cable Types, Maximum Distances, and Number of Slave Units*.
Connectable Master Units	CompoNet Master Units
Connectable Slave Units	CompoNet Slave Units
Maximum I/O capacity	Word Slave Units: 1,024 inputs and 1,024 outputs (2,048 I/O points total) Bit Slave Units: 256 inputs and 256 outputs (512 I/O points total)
Maximum number of nodes	Word Slave Units: 64 input nodes and 64 output nodes Bit Slave Units: 128 input nodes and 128 output nodes
Bits allocated per node address	Word Slave Units: 16 bits Bit Slave Units: 2 bits
Maximum number of nodes per segment	32 nodes including Repeater Units
Applicable node addresses	Word Slave Units: IN0 to IN63 and OUT0 to OUT63 Bit Slave Units: BIT IN0 to BIT IN127 and BIT OUT0 to OUT127 Repeater Units: 0 to 63
Repeater Unit application conditions	Up to 64 Repeater Units can be connected per network (i.e., per Master Unit). Up to 32 Repeater Units can be connected per segment. Repeater Units can be used to create up to two extra segment layers from the Master Unit.
Signal lines	Two lines: BDH (communications data high) and BDL (communications data low)
Power lines	Two lines: BS+ and BS- (power for communications and internal Slave Unit circuits) • Power is supplied from the Master Unit and Repeater Units.
Communications power supply voltage	24 VDC ±10%

Item	Specifications
Connection forms	Round Cable II, Flat Cable I, or Flat Cable II cables at a baud rate of 93.75 kbps: No restrictions Other cables or other baud rates: Trunk line and branch lines
	Connections for Slave Units and Repeater Units: T-branch or multidrop connections
Remote I/O communications	Automatic startup when power is turned ON*1 or manual startup using **_IOCycleStartCmd* (Remote I/O Communications Start Switch) in I/O Communications Manual Start Mode *1 This includes when the power is turned ON to the Controller, the Controller is reset, or the Slave Unit communications power is turned ON. The following are exceptions. • In Registered Slave Unit Participation Standby Mode, communications are not started until all registered Slave Units are participating in the network. • In Communications Error Communications Stop Mode, communications stop when a communications error occurs.
I/O Communications Manual Startup Mode	I/O Communications Manual Startup Mode can be set from the CX-Integrator so that remote I/O communications are not started when the power is turned ON. Remote I/O communications will not start until **_IOCycleStartCmd* (Remote I/O Communications Start Switch) changes to TRUE.
Communications Error Communications Stop Mode	All remote I/O communications are stopped if a communications error occurs in any Slave Unit. **Note** Communications will not stop for verification errors for registration tables or duplicated address settings.
Communications Error Input Data Zero Clear Mode	All input data will be cleared to zeros in any Slave Unit in which a communications error occurs.
Duplicated Slave Unit address check	If the same address is set for two different Slave Units or the same memory is allocated to two different nodes, the Slave Unit that joins communications last will cause a duplicated address error and will leave the network. At this time, **_SlavDupErr* (Slave Unit Duplicated Address Error Flag) will change to TRUE. **Note** This error will also occur if a Slave Unit leaves the network and then a different type of Slave Unit joins the network.

Item		Specifications
Registration Table		The Slave Unit that can participate for each node address is registered in a table so that only the registered Slave Units can participate. If the participating network Slave Units do not agree with the table, **_RegTblErr* (Registration Table Verification Error Flag) will change to TRUE. The Registration Table is created automatically or manually edited from the CX-Integrator.
Slave Unit status	Without Registration Table	Connect Flag and Communication Error Flag for each Slave Unit • Connect Flag: Changes to TRUE and remains TRUE if the Slave Unit joins the network even one time after system power is turned ON. • Communication Error Flag: Changes to TRUE if the Slave Unit cannot communicate with the Master Unit for any reason after the Slave Unit has joined the network (i.e., when the Connect Flag is TRUE). (This Flag changes to FALSE when the error is reset.) **_SlavDupErr* (Slave Unit Duplicated Address Error Flag) and **_SlavAllAlmSta* (Representative Alarm Status Flag)
	With Registration Table	• Connect Flag and Communication Error Flag for each node address for which a Slave Unit is registered in the Registration Table • **_RegTblErr* (Registration Table Verification Error Flag) • **_SlavAllCnctSta* (All Registered Slave Units Participating Flag) **Note** The Registered Slave Unit Participation Monitoring Time can be set (verification error check timing). Registered Slave Unit Participation Standby Mode can be set. (Remote I/O communications will not start until all registered Slave Units are participating.)

1-2-1 Cable Types, Maximum Distances, and Number of Slave Units

This section provides specifications on the maximum cable length and the maximum number of connectable Slave Units for each type of cable. The cables and Units must be used within the specifications.



Baud Rate of 4 Mbps (No branching allowed. *1)

Item	Round Cable I or II	Flat Cable I
Length per trunk line or sub-trunk line	30 m	30 m
Branch line length	Lines cannot be branched from the trunk line. (Only multidrop connections are possible from the trunk line or sub-trunk lines.)	
Total branch line length		
Restrictions on branch line locations		
Number of connected Slave Units (including Repeater Units)	32	32

*1 There are restrictions when you branch lines or use Flat Cable II. For details, refer to *1-2-2 Branch Line and Multidrop Support for Cable Types and Baud Rates*.

Baud Rate of 3 Mbps

Item	Round Cable I or II	Flat Cable I or II
Length per trunk line or sub-trunk line	30 m	30 m
Branch line length	0.5 m	0.5 m
Total branch line length	8 m	8 m
Restrictions on branch line locations	3 branches / m	3 branches / m
Number of Units per branch (See note.)	1	1
Maximum sub-branch line length	Not supported	Not supported
Total sub-branch line length	Not supported	Not supported
Number of connected Slave Units (including Repeater Units)	32	32

Note This is the maximum number of Slave Units and Repeater Units combined that can be connected to a branch line by using multidrop connections and/or T-branching. T-branching creates a sub-branch.

Baud Rate of 1.5 Mbps

Item	Round Cable I		Round Cable II, Flat Cable I, or Flat Cable II
	Without branch lines	With branch lines	
Length per trunk line or sub-trunk line	100 m	30 m	30 m
Branch line length	Not supported (*2)	2.5 m	2.5 m
Total branch line length	Not supported (*2)	25 m	25 m
Restrictions on branch line locations	---	3 branches / m	3 branches / m
Number of Units per branch (See note.)		3	3
Maximum sub-branch line length		Not supported	0.1 m (*3)
Total sub-branch line length		Not supported	2 m (*3)
Number of connected Slave Units (including Repeater Units)	32	32	32

Note This is the maximum number of Slave Units and Repeater Units combined that can be connected to a branch line by using multidrop connections and/or T-branching. T-branching creates a sub-branch.

*2 The trunk line does not support branching. The trunk line and sub-trunk lines support only multidrop connections.

*3 Branch lines support branching to sub-branch lines.

Baud Rate of 93.75 kbps

Item	Round Cable I	Round Cable II, Flat Cable I, or Flat Cable II
Length per trunk line or sub-trunk line	500 m	Unrestricted wiring is enabled for a total length of 200 m.
Branch line length	6 m	
Total branch line length	120 m	
Restrictions on branch line locations	3 branches / m	
Number of Units per branch (See note.)	1	
Maximum sub-branch line length	---	
Total sub-branch line length	---	
Number of connected Slave Units (including Repeater Units)	32	32

Note This is the maximum number of Slave Units and Repeater Units combined that can be connected to a branch line by using multidrop connections and/or T-branching. T-branching creates a sub-branch.

1-2-2 Branch Line and Multidrop Support for Cable Types and Baud Rates

Support for Branch Lines

Support for branch lines from the trunk line or sub-trunk lines and support for sub-branch lines from branch lines is listed in the following tables.

- Baud Rate of 4 Mbps (No Branch Lines)

Cable	Branch lines	Sub-branch lines
Round Cable I	Not supported	Not supported
Round Cable II, Flat Cable I, or Flat Cable II	Not supported	Not supported

Note Branch lines are not supported for a baud rate of 4 Mbps and therefore Slave Units with Prewired Cables cannot be used. The network must consist of Slave Units without Cables, and multidrop connections must be used. (DCN4-MD4 Multidrop Connectors must be used for Flat Cable I.)

- Baud Rate of 3 Mbps

Cable	Branch lines	Sub-branch lines
Round Cable I	Supported	Not supported
Round Cable II, Flat Cable I, or Flat Cable II	Supported	Not supported

- Baud Rate of 1.5 Mbps

Cable		Branch lines	Sub-branch lines
Round Cable I	100 m max.	Not supported	Not supported
	30 m max.	Supported	
Round Cable II, Flat Cable I, or Flat Cable II		Supported	Supported

- Baud Rate of 93.75 kbps

Cable	Branch lines	Sub-branch lines
Round Cable I	Supported	Not supported
Round Cable II, Flat Cable I, or Flat Cable II	Supported (no restrictions)	

Support for Multidrop Connections

- All Baud Rates
  You cannot use multidrop connections if you use Flat Cable II because there are no Multidrop Connectors for Flat Cable II.

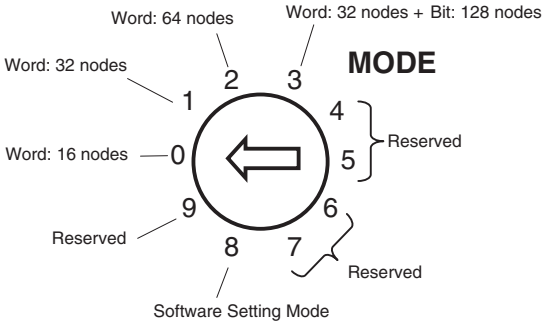
1-2-3 Allocating I/O Ports and CPU Unit Memory Area to Slave Units According to Communications Mode Numbers

Slave Unit I/O information and status information are assigned to the I/O ports and specified bits in the memory for CJ-series Units in the CPU Unit to which the Master Unit is mounted. Assignments are determined by the communications mode number. The node address for each Slave Unit determines the bits that are used by that Slave Unit. The relationship between communications mode numbers, the number of connected nodes, and the number of points that can be controlled is described next.

Number of Connected Nodes and Control Points Per Master Unit

Use the rotary switch on the front of the Master Unit to select the communications mode number.

Also, when the CompoNet Master Unit is registered in the Unit Configuration on the Sysmac Studio, the Unit Name is selected for the communications mode to use. The same communications number must be set on the rotary switch on the front panel and in the Unit Name of the CompoNet Master Unit when it is registered in the Unit Configuration.



Communications mode number	Mode name	Connectable node addresses	Control points	Allocations	Number of unit numbers used by each Master Unit
0	Mode 0	Word Slave Units: IN0 to IN7 and OUT0 to OUT7	128 inputs and 128 outputs (Word Slave Units)	I/O ports	2
1	Mode 1	Word Slave Units: IN0 to IN15 and OUT0 to OUT15	256 inputs and 256 outputs (Word Slave Units)		4
2	Mode 2	Word Slave Units: IN0 to IN31 and OUT0 to OUT31	512 inputs and 512 outputs (Word Slave Units)		8
3	Mode 3	Word Slave Units: IN0 to IN15 and OUT0 to OUT15 Bit Slave Units: IN0 to IN63 and OUT0 to OUT63	256 inputs and 256 outputs (Word Slave Units) 128 inputs and 128 outputs (Bit Slave Units)		8
4	Reserved	---	---	---	---
5	Reserved	---	---	---	---
6	Reserved	---	---	---	---
7	Reserved	---	---	---	---
8	Software Setting Mode	Can be set within the following ranges: Word Slave Units: IN0 to IN63 and OUT0 to OUT63 Bit Slave Units: IN0 to IN127 and OUT0 to OUT127	Can be set within the following ranges: Word Slave Units: 1,024 inputs and 1,024 outputs Bit Slave Units: 256 inputs and 256 outputs	Words and bits can be allocated anywhere in the CIO, DM, WR, or HR Area. **Note** The Status and Setting are assigned to I/O ports.	1
9	Reserved	---	---	---	---

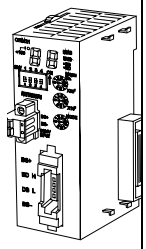
Note 1 In a CompoNet Network, Word Slave Units have 16 bits per node address. Bit Slave Units have two bits allocated per node address.

2 Do not use the reserved communications mode numbers (4 to 7 and 9). A communications mode setting error (H4 at the 7-segment LED indicator) will occur if any of these mode numbers is set.

1-3 Devices in a CompoNet Network

1-3-1 Master Unit

CompoNet Master Unit

Name	Model	Unit classification	Maximum number per CPU Unit		Communications Cables (Yes: Can be used. No: Cannot be used.)			
					Round Cable I	Round Cable II	Flat Cable I	Flat Cable II
CJ-series Master Unit 	CJ1W-CRM21	CJ-series Special I/O Unit	Communications mode No.		Yes*1	Yes*1	Yes*2	Yes*3
			8 (1 unit number used)	40				
			0 (2 unit numbers used)	40				
			1 (4 unit numbers used)	24				
			2 or 3 (8 unit numbers used)	12				

*1 A DCN4-TB4 Open Type Connector is required to connect a Round Cable I or Round Cable II cable to the Unit.

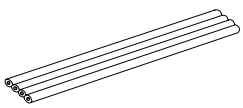
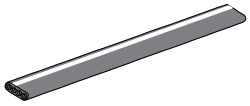
*2 A DCN4-TR4 Flat Connector Socket is required to connect a Flat Cable I cable.

*3 A DCN5-TR4 Flat Connector Socket is required to connect a Flat Cable II cable.

1-3-2 Peripheral Devices

Communications Cables

The following table shows the Communications Cables that can be used in a CompoNet Network.

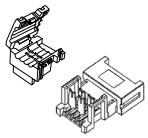
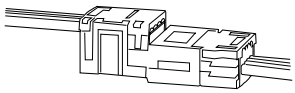
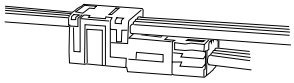
Name	Model	Specifications	Remarks
Round Cable I Round Cable II	---	JIS C 3306 Nominal cross-sectional area: 0.75 mm^2, Finished conductor diameter: 2.3 mm	Cannot be used with Slave Units with Prewired Cables.
Flat Cable I 	DCA4-4F10	Standard 4-conductor flat cable (UL2555) Length: 100 m Conductor diameters: 0.75 $mm^2 \times 2$, 0.5 $mm^2 \times 2$	Approximately 50 cm of cable comes connected to IP20 Bit Slave Units with e-CON Connectors.
Flat Cable II 	DCA5-4F10	Sheathed 4-conductor flat cable Length: 100 m Conductor diameters: 0.75 $mm^2 \times 2$, 0.5 $mm^2 \times 2$	Approximately 50 cm of cable comes connected to IP54 Bit Slave Units.

Flat Connectors

In a CompoNet Network, the connectors described below can be connected to the Communications Cable to enable extending the cable length, branching cables, and wiring to Slave Units.

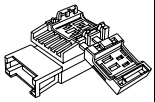
● Flat Connector Socket

- Flat Cable I

Name	Model	Appearance	Application	Communications Cables (Yes: Can be used. No: Cannot be used.)			
				Round Cable I	Round Cable II	Flat Cable I	Flat Cable II
Flat Connector Socket	DCN4-TR4		Use this Connector in a set with a DCN4-BR4 Flat Connector Plug for the following applications. • Extending the trunk line or a sub-trunk line  • T-branching a branch line from the trunk line or a sub-trunk line • T-branching a sub-branch line from a branch line 	No	Yes (See note.)	Yes	No

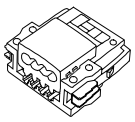
Note The only case when the Socket is used with a Round Cable II is to connect the Cable to a Terminating Resistor.

- Flat Cable II

Name	Model	Appearance	Application	Communications Cables (Yes: Can be used. No: Cannot be used.)			
				Round Cable I	Round Cable II	Flat Cable I	Flat Cable II
Flat Connector Socket	DCN5-TR4		Use this Connector in a set with a DCN5-BR4 Flat Connector Plug for the following applications. • Extending the trunk line or a sub-trunk line • T-branching a branch line from the trunk line or a sub-trunk line • T-branching a sub-branch line from a branch line **Note** Use the Connector to connect IP54 Bit Slave Units.	No	No	No	Yes

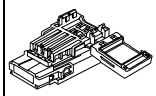
● Flat Connector Plug

- Flat Cable I

Name	Model	Appearance	Application	Communications Cables (Yes: Can be used. No: Cannot be used.)			
				Round Cable I	Round Cable II	Flat Cable I	Flat Cable II
Flat Connector Plug	DCN4-BR4		a. Use the Connector in a set with a DCN4-TR4 Flat Connector Socket for the following applications. • Extending the trunk line or a sub-trunk line • T-branching a branch line from the trunk line or a sub-trunk line • T-branching a sub-branch line from a branch line b. Use this Connector independently for the following applications. • Connecting Communications Cable to a Master Unit, Word Slave Unit, or Repeater Unit • Connecting Communications Cable to a Multi-wiring Connector	No	No	Yes	No

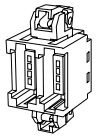
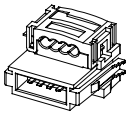
Note Although this product is called a Flat Connector Plug, it can be used as a connector to connect a Master Unit, Slave Unit, or Repeater Unit.

- Flat Cable II

Name	Model	Appearance	Application	Communications Cables (Yes: Can be used. No: Cannot be used.)			
				Round Cable I	Round Cable II	Flat Cable I	Flat Cable II
Flat Connector Plug	DCN5-BR4		a. Use this Connector in a set with a DCN5-TR4 Flat Connector Socket for the following applications. • Extending the trunk line or a sub-trunk line • T-branching a branch line from the trunk line or a sub-trunk line • T-branching a sub-branch line from a branch line b. Use this Connector independently for the following applications. • Connecting Communications Cable to a Master Unit, Word Slave Unit, or Repeater Unit • Connecting Communications Cable to connectors for wiring **Note** Use for connecting IP54 Bit Slave Units.	No	No	No	Yes

Note Although this product is called a Flat Connector Plug, it can be used as a connector to connect a Master Unit, Slave Unit, or Repeater Unit.

● Multi-wiring Connector

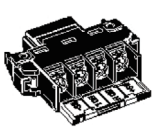
Name	Model	Appearance	Application	Communications Cables (Yes: Can be used. No: Cannot be used.)			
				Round Cable I	Round Cable II	Flat Cable I	Flat Cable II
Multi-wiring Connector	DCN4-MD4		This Connector connects two Flat Connector Plugs to two ports. Use Multi-wiring Connectors for multidrop wiring of Master Units, Slave Units, or Repeater Units to trunk lines, sub-trunk lines, or branch lines. **Note** When the baud rate is 4 Mbps (mainly when Flat Cable is used), use this Connector to connect to Word Slave Units only.	No	No	Yes	No
Flat Multi-wiring Connector Plug	DCN4-MR4		This Plug is used for multidrop connections of Bit Slave Units with Small Connectors (CRT1B-□D0□JS(-1)).	No	No	Yes	No

Special Tools

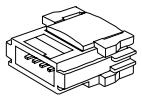
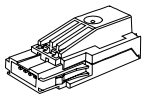
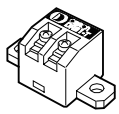
Name	Model	Appearance	Application	Communications Cables (Yes: Can be used. No: Cannot be used.)			
				Round Cable I	Round Cable II	Flat Cable I	Flat Cable II
Special Tool (Pliers)	DWT-A01		A pressure welding tool for a DCN4-TR4 Flat Connector Socket and a DCN4-BR4 Flat Connector Plug or DCN4-MR4 Flat Multi-wiring Connector Plug.	No	Yes (See note.)	Yes	No
Special Tool (Pliers)	DWT-A02		A pressure welding tool for DCN5-TR4 Flat Connector Socket and a DCN5-BR4 Flat Connector Plug.	No	No	No	Yes

Note The only case when the Special Tool is used with a Round Cable II cable is to connect the Cable to a Terminating Resistor.

Open Type Connector

Name	Model	Appearance	Application	Communications Cables (Yes: Can be used. No: Cannot be used.)			
				Round Cable I	Round Cable II	Flat Cable I	Flat Cable II
Open Type Connector	DCN4-TB4		Converts the communications connector on a Unit to a screw terminal block to enable connecting a Round Cable I or II cable to a Slave Unit or Repeater Unit.	Yes	Yes	No	No

Terminating Resistors

Name	Model	Appearance	Application	Communications Cables (Yes: Can be used. No: Cannot be used.)			
				Round Cable I	Round Cable II	Flat Cable I	Flat Cable II
Terminating Resistor	DCN4-TM4		Connector-type Terminating Resistor for a Round Cable II or Flat Cable I cable. Connect this Terminating Resistor to a Flat Connector Socket (DCN4-TR4) on the end of the trunk or sub-trunk line.	No	Yes	Yes	No
	DCN5-TM4		Connector-type Terminating Resistor for a Flat Cable II cable. Connect this Terminating Resistor to a Flat Connector Socket (DCN5-TR4) on the end of the trunk or sub-trunk line.	No	No	No	Yes
	DRS1-T		Terminal block-type Terminating Resistor for a Round Cable I cable. Connect this Terminating Resistor to the end of the trunk or sub-trunk line.	Yes	No	No	No

1-3-3 Selecting Peripheral Devices Used According to Connection Configuration

● Flat Cable I, Round Cable I, or Round Cable II

Connection configuration			Peripheral Devices used
Connecting the Master Unit		Connecting the trunk line to the Master Unit	Flat Connector Plug (DCN4-BR4) only, or Open Type Connector (to connect Units to the Cable) (DCN4-TB4)
Connecting Slave Units or Repeater Units		Connecting branch lines or sub-branch lines to Slave Units or Repeater Units	Flat Connector Plug (DCN4-BR4) only, or Open Type Connector (to connect Units to the Cable) (DCN4-TB4)
Branching	T-branching	T-branching from a trunk or sub-trunk line	Flat Connector Socket (DCN4-TR4) with Flat Connector Plug (DCN4-BR4) as a set, or commercially available terminal blocks
		T-branching a sub-branch line from a branch line	
	Multidrop branching	Multidrop branching of the trunk line or a sub-trunk line	Open Type Connector (to connect Units to the Cable) (DCN4-TB4), or Multidrop Connector (DCN4-MD4)
		Multidrop branching of a branch line or sub-branch line	
		Multidrop branching of the trunk line or a sub-trunk line to connect a Bit Slave Unit with a Small Connector	Open Type Connector (to connect Units to the Cable) (HCN-TB4LMZG+ from Honda Tsushin Kogyo Co., Ltd.), or Flat Multidrop Connector (DCN4-MR4)
		Multidrop branching of the branch line or a sub-branch line to connect a Bit Slave Unit with a Small Connector	

Connection configuration		Peripheral Devices used
Extending the line length	Extending the trunk line or a sub-trunk line	Flat Connector Socket (DCN4-TR4) with Flat Connector Plug (DCN4-BR4) as a set
	Extending a branch line	
Terminating Resistor	Installing Terminating Resistors on trunk lines or sub-trunk lines	Terminating Resistor (DCN4-TM4 or DRS1-T)

● Flat Cable II

Connection configuration			Peripheral Devices used
Connecting the Master Unit		Connecting the trunk line to the Master Unit	Flat Connector Plug (DCN5-BR4) only, or Open Type Connector (to connect Units to the Cable) (DCN4-TB4)
Connecting Slave Units or Repeater Units		Connecting branch lines or sub-branch lines to Slave Units or Repeater Units	Flat Connector Plug (DCN5-BR4) only, or Open Type Connector (to connect Units to the Cable) (DCN4-TB4)
Branching	T-branching	T-branching from a trunk or sub-trunk line	Flat Connector Socket (DCN5-TR4) with Flat Connector Plug (DCN5-BR4) as a set
		T-branching a sub-branch line from a branch line	
Extending lines		Extending the trunk line or a sub-trunk line	Flat Connector Socket (DCN5-TR4) with Flat Connector Plug (DCN5-BR4) as a set
		Extending a branch line	
Terminating Resistor		Installing Terminating Resistors on trunk lines or sub-trunk lines	Terminating Resistor (DCN5-TM4)

1-4 Overview of Design Flow

Perform the following steps to design the system.

1. Determine the number of I/O points. ... Refer to *1-2 CompoNet Network Specifications* and *1-3 Devices in a CompoNet Network*.

   Determine the number of I/O points in the entire system.

▼

2. Match up the I/O points with specific Slave Units.

   Determine the specific Slave Unit for each input and output.

▼

3. Determine the number of nodes.

   Determine how many nodes are to be connected.

▼

4. Determine the layout. ... Refer to *SECTION 3 Wiring Configurations.*

   - Determine the wiring form (trunk line-branch lines or unrestricted branching).
   - Determine the wiring distances.
   - Determine the method for providing communications and I/O power supplies to the Slave Units (with minimal wiring).
   - Determine the type of cable to be used.

▼

5. Temporarily determine the communications mode number and the baud rate. ... Refer to *5-5 Remote I/O Communications Performance*.

   Note There are restrictions when you branch lines or use Flat Cable II. For details, refer to *1-2-2 Branch Line and Multidrop Support for Cable Types and Baud Rates*.

▼

6. Determine the communications cycle.

   The communications cycle is determined from the communications mode number and the baud rate.

   (With communications mode 8, it also depends on the type and number of Slave Units.)

   Determine whether the required I/O response time can be achieved at that baud rate.

▼

7. Consider using more than one Master Unit.

   If the desired distance and communications cycle cannot both be achieved even after rechecking the communications mode number, the baud rate, and the use of Repeater Units, then use more than one Master Unit.

1-5 Overview of Operating Procedure

Follow the steps below to install and use a CompoNet Network.

1. Install and wire the system. ... *SECTION 4 Installation and Wiring*

   Wire the network, the communications power supply, and the I/O power supply.

▼

2. Select the communications mode number on the front of the Master Unit. ... *SECTION 2 Master Units*

   Set the communications mode number to 0, 1, 2, 3, or 8.

▼

3. Make the following settings on the DIP switch on the front of the Master Unit.

   SW1 (DR0) and SW2 (DR1): Set the baud rate.

   SW3 (ESTP): Set whether communications are to stop when an error occurs.

   SW4 (REGS): Enable or disable the Registration Table.

▼

4. Set the unit number on the front of the Master Unit.

   Set a number from 0 to 95.

▼

5. Set the Slave Unit node addresses.

   Set a node addresses from 0 to 63 for Word Slave Units and from 0 to 127 for Bit Slave Units.

▼

6. Create the Unit Configuration offline on the Sysmac Studio. ... *NJ-series CPU Unit Software User's Manual* (Cat. No. W501)

   - Register the CompoNet Master Unit in the Unit Configuration in **CPU/Expansion Racks** under **Configurations and Setup**. When you register the Unit, select one of the following according to the communications mode number that is set on the rotary switch on the front panel (0 to 3 or 8): *CJ1W-CRM21(MODE0) to CJ1W-CRM21(MODE3)*, or *CJ1W-CRM21(MODE8)*.
   - Set the name of the CompoNet Master Unit as the device name.
   - Set the unit number to the same number as the value that is set on the rotary switches on the front panel.

▼

7. Create the device variables for the CJ-series Unit in the I/O Map settings on the Sysmac Studio. ... *NJ-series CPU Unit Software User's Manual* (Cat. No. W501)

   When you create the Unit Configuration in the I/O Map on the Sysmac Studio, the I/O ports are automatically created. The device variables for the CJ-series Unit are assigned to the I/O ports that you will use.

   Any of the following three allocation methods can be used.

   - Select and allocate existing variables.
   - Input a new variable name.
   - Automatically create with "Device variable creation".

▼

8. Create the user program on the Sysmac Studio using the device variables for the CJ-series Unit. ... *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504)

▼

9. Connect the computer with the Sysmac Studio or CX-Integrator to the USB port or built-in EtherNet/IP port on the CPU Unit of the Controller where the Master Unit is mounted.

... *CX-Integrator Version 2.□ Operation Manual* (Cat. No. W464)

▼

10. Turn ON the power supply to the Controller.

▼

11. Download the project from the Sysmac Studio to the CPU Unit.

... *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504)

▼

12. Using the CX-Integrator, edit and download the Master Unit device parameters.

    1. Go online with the CPU Unit of the Controller to which the Master Unit is mounted.
    2. In the Online Connection Information Window, right-click the Master Unit under the connected PLC, and then select Connect.
    3. Right-click the Master Unit under the connected PLC, and select Transfer [Network to Computer].
    4. Double-click the Master Unit in the Network Configuration Window, and then edit and download the device parameters.

▼

13. Reset the Controller or cycle the power supply to the Controller.

▼

14. Remote I/O communications will start when all registered Slave Units are participating.

▼

15. Using the CX-Integrator, monitor the participation status of the Slave Units.

    1. While online, upload the network configuration.
    2. Right-click the Master Unit in the Network Configuration Window and select Monitor to monitor the participation status on the Status/Unit Status Tab Page.

1-6 Design and Operating Procedure Examples

1-6-1 Design

● I/O Capacity

Establish the I/O correspondences for each Slave Unit. Determine how many Word and Bit Slave Units are to be connected, and calculate the current consumption for the communications power supply.

- Units Used

I/O capacity	Slave Unit type	Model (specifications)	Number of Units	Current consumption (See notes 1 and 3.)
16 inputs	Word Slave Units	CRT1-ID16 (16 DC inputs, NPN)	1	85 mA
16 inputs and 8 outputs		CRT1-ID16 (16 DC inputs, NPN) + XWT-OD08 (8 transistor outputs, NPN)	1 of each	85 mA + 5 mA = 90 mA
16 outputs		CRT1-OD16 (16 transistor outputs, NPN)	1	85 mA
2 inputs × 2	Bit Slave Units	CRT1B-ID02S (2 DC inputs, sensor connector type, NPN)	2	80 mA + I/O current consumption 76 mA (Sensor example: 35 mA × 2 + input current 3 mA × 2) (See note 2.) **Note** The total for two Units is 160 mA + 152 mA.
2 outputs		CRT1B-OD02S (2 transistor outputs, sensor connector type, NPN)	1	75 mA + I/O current consumption 160 mA (actuator) Example: 80 mA × 2 (See note 2.)
			Total	495 mA + 312 mA for I/O = 807 mA

Note 1 Refer to the *CRT1-series CompoNet Slave Units and Repeater Unit Operation Manual* (Cat. No. W456) for the current consumption of the Slave Units.

2 When Bit Slave Units are used, the current consumption of the Bit Slave Units and the external I/O, such as sensors and actuators, is supplied from the communications power supply that is connected to the Master Unit through the Flat Cable. Therefore, the current consumption of the following external I/O must be added to the total power consumption.
Sensor current consumption × 2, actuator current consumption × 2

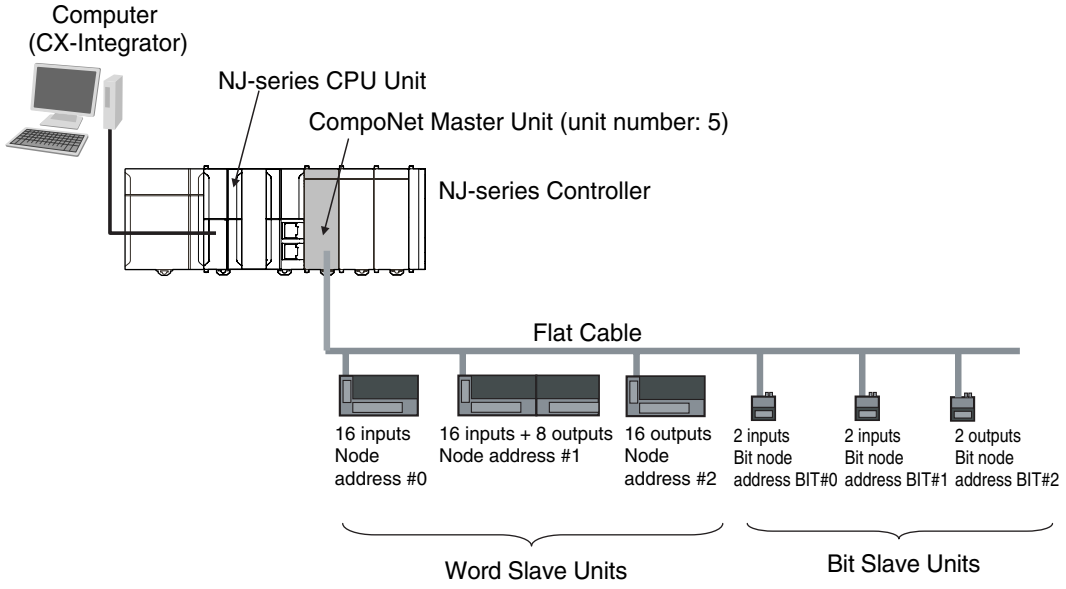
3 Here, to allow for the voltage drop, the current consumption for 14 VDC is used in the calculation for the maximum current consumption.

Word Slave Units × 3 nodes, Bit Slave Units × 3 nodes
At the same time, provide a 24-VDC power supply with an output current of at least 0.9 A for the communications power supply.

- Required Peripheral Devices

Specifications	Model	Quantity	Remarks
Flat Connector Socket	DCN4-TR4	7	Order in units of ten.
Flat Connector Plug	DCN4-BR4	10	Order in units of ten.
Terminating Resistor	DCN4-TM4	1	Order in units of ten.
Flat Cable I	DCA4-4F10	1	Order in increments of 100 m.
Special Tool (Pliers)	DWT-A01	1	---

● System Configuration



● Layout

- Wiring form: Branching from trunk line to branch lines, with no sub-branch lines.
- Wiring distance: 30 m or less.
- Communications Power Supply to Slave Units: Supplied to all collectively.

Cable type			Round Cable I					Round Cable II, Flat Cable I, or Flat Cable II			
Baud rate			4 Mbps	3 Mbps	1.5 Mbps		93.75 kbps	4 Mbps	3 Mbps	1.5 Mbps	93.75 kbps
Wiring form	No branch lines		All can be used.					(*1)	All can be used.		
	With branch lines	Without sub-branch lines (branch line extension)	Not supported.	Supported (0.5 m).	Not supported.	Supported (2.5 m).	Supported (6 m).	Not supported.	Supported (0.5 m).	Supported (2.5 m).	Supported (unrestricted branching).
		With sub-branch lines	Not supported.					Not supported.		Supported (2.5 m).	Supported (unrestricted branching).
Maximum length for trunk lines and sub-trunk lines			30 m		100 m	30 m	500 m	30 m			200 m total per segment (unrestricted branching).

*1 You cannot use Flat Cable II because there are no Multidrop Connectors for Flat Cable II, so multidrop connections are not possible.

Additional Information

- Wiring Form
  - When there is a branch, Round Cable I, Round Cable II, Flat Cable I and Flat Cable II cables cannot be used at a baud rate of 4 Mbps. This means you cannot use a Slave Unit with a pre-attached cable at 4 Mbps. When a Round Cable I cable is used at a baud rate of 1.5 Mbps, the trunk line and the sub-trunk line must be no longer than 30 m.
  - When a branch line has a sub-branch line, Round Cable II, Flat Cable I, or Flat Cable II cables must be used either at a baud rate of 1.5 Mbps or 93.75 kbps.
- Maximum Length for Trunk Lines and Sub-trunk Lines
  - When the lines are 30 m or less: Any combination of cable types and baud rates is supported except for Flat Cable II.
  - When a distance longer than 30 m is required:
    - Round Cable I: The baud rate must be 1.5 Mbps, with no branching. (The cable length can be up to 100 m.)
    - Round Cable II, Flat Cable I, or Flat Cable II: The baud rate must be 93.75 kbps. (The cable length can be up to 200 m when unrestricted branching is used.)

Types of Cables

Flat Cable I is used in this example, because IP20 Bit Slave Units with e-CON connectors are used and the communications power supply is provided collectively through the communications cables.

<table>
<tr><th colspan="3" rowspan="2">Item</th><th colspan="4">Cable type</th></tr>
<tr><th>Round Cable I</th><th>Round Cable II</th><th>Flat Cable I</th><th>Flat Cable II</th></tr>
<tr><td colspan="3">Application</td><td colspan="4">Wiring the Slave Units between the Master Unit and a Repeater Unit and wiring the Slave Units downstream from a Repeater Unit</td></tr>
<tr><td colspan="3"></td><td>• To wire with commercially available cable.
• To supply communications power separately.
• When Bit Slave Units with Prewired Flat Cables are not used.</td><td>• To wire with commercially available cable
• To supply the communications power collectively via the communications cable.
• When Bit Slave Units with Prewired Flat Cables are not used.</td><td>• To use the communications cable and the communications power to supply power to all Slave Units.
• When an IP20 Bit Slave Unit with an e-CON connector is used.</td><td>• To use the communications cable and the communications power to supply power to all Slave Units.
• When an IP54 Bit Slave Unit is used.
• To use in an environment conforming to IP54 (splash-proof and drip-proof.)</td></tr>
<tr><td rowspan="4">Applicable Slave Units</td><td colspan="2">Word Slave Units</td><td colspan="4">Supported</td></tr>
<tr><td rowspan="3">Bit Slave Units</td><td>IP20 Bit Slave Units with e-CON Connectors</td><td colspan="2" rowspan="2">Not supported
Note Round Cables cannot be used with Bit Slave Units with Prewired Flat Cables. This is because Flat Cables are pre-connected to those Bit Slave Units.</td><td>Supported</td><td>Not supported</td></tr>
<tr><td>IP54 Bit Slave Unit</td><td>Not supported</td><td>Supported</td></tr>
<tr><td>IP20 Bit Slave Units with Small Connectors</td><td colspan="4">Supported</td></tr>
<tr><td colspan="3">Communications power supply</td><td>Wired separately from the communications cable.</td><td colspan="3">Supplied via communications cable. (Power is supplied from the Master Unit and Repeater Units.)</td></tr>
<tr><td colspan="3">Condition to use different types of cables together</td><td colspan="4">When a Repeater Unit is used, two different types of cables can be used (two of Round Cable I, Round Cable II, Flat Cable I, and Flat Cable II): one for the upstream port and the other for the downstream port.
In other cases, all cables on the trunk line, a sub-trunk line, a branch line, or a sub-branch line must be the same type.</td></tr>
<tr><td colspan="3">Master Unit position</td><td>Only at the end of trunk line</td><td colspan="3">At baud rate of 93.75 kbps: Anywhere in the network
At other baud rates: Only at the end of trunk line</td></tr>
<tr><td colspan="3">Branch lines</td><td>At 4 Mbps: Not supported
At other baud rates: Supported</td><td colspan="3">At 93.75 kbps: Unrestricted wiring
At 4 Mbps: Not supported
At other baud rates: Supported</td></tr>
<tr><td rowspan="2">Multi-wiring on branch lines</td><td colspan="2">Multidrop connections on branch lines</td><td>At 1.5 Mbps: Supported (up to 3 connectors per branch line)</td><td colspan="2">At 93.75 kbps: Unrestricted wiring
At 1.5 Mbps: Supported (up to 3 connectors per branch line)</td><td>Not supported</td></tr>
<tr><td colspan="2">Sub-branch lines</td><td>Not supported</td><td colspan="3">At 93.75 kbps: Unrestricted wiring
At 1.5 Mbps: supported (up to 3 connectors per branch line)</td></tr>
</table>

Item		Cable type			
		Round Cable I	Round Cable II	Flat Cable I	Flat Cable II
Communications distance	4 Mbps	Length of the trunk line or a sub-trunk line: 30 m max.			Not supported
	3 Mbps	Length of the trunk line or a sub-trunk line: 30 m max.			
	1.5 Mbps	Length of the trunk line or a sub-trunk line: 100 m max. when there is no branching, 30 m max. when there is branching	Length of the trunk line or a sub-trunk line: 30 m max.		
	93.75 kbps	Length of the trunk line or a sub-trunk line: 500 m max.	Total wiring length per segment: 200 m max.		

Unit Number

- Unit number 5 is used.

Communications Mode Number and Baud Rate

- Communications mode number: 3 (Mode 3 is selected because Word Slave Units and Bit Slave Units are used. Memory can be allocated with I/O ports, so no software settings are required from the CX-Integrator.)
- Baud rate: 3 Mbps (Branch lines are used, but not sub-branch lines. Also, this baud rate can be used with a maximum trunk line length of 30 m.)

Communications Cycle Time

The communications cycle time is 2.5 ms, at a baud rate of 3 Mbps in communications mode 3. Base calculations on a communications cycle time of 2.5 ms. (For details on I/O response times, refer to *5-5 Remote I/O Communications Performance*.)

Slave Unit type and maximum number of nodes	Baud rate Communications mode No.	Communications cycle time (with message communications)			
		4 Mbps	3 Mbps	1.5 Mbps	93.75 kbps
Word Slave Units, max. 8 nodes input and 8 nodes output	0	0.9 ms	0.9 ms	1.5 ms	19.8 ms
Word Slave Units, max. 16 nodes input and 16 nodes output	1	1.0 ms	1.2 ms	2.3 ms	30.2 ms
Word Slave Units, max. 32 nodes input and 32 nodes output	2	1.3 ms	1.7 ms	4.0 ms	51.3 ms
Word Slave Units, max. 16 nodes input and 16 nodes output; Bit Slave Units, max. 64 nodes input and 64 nodes output	3	2.0 ms	2.5 ms	5.9 ms	72.1 ms
Word Slave Units, max. 64 nodes input and 64 nodes output; Bit Slave Units, max. 128 nodes input and 128 nodes output	8	0.79 ms + added time for number of and types of Slave Units	0.85 ms + added time for number of and types of Slave Units	1.94 ms + added time for number of and types of Slave Units	24.81 ms + added time for number of and types of Slave Units

Additional Information

When less than the maximum number of nodes is used, the communications cycle time is progressively shortened as the communications mode number becomes smaller and as the baud rate is increased.

Registration Tables

Registration tables are used.

- Registered Slave Unit Participation Standby Mode

Communications Error Communications Stop Mode

- These are enabled.

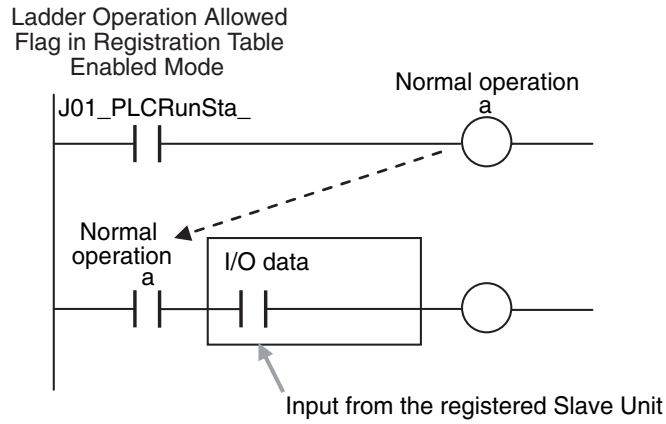
Variable Specifications

Use the Sysmac Studio to define the following device variables for the CJ-series Unit.

Node address	Model	Name	Description	Data type of variable	Device variable*1	Remarks
#0	CRT1-ID16	Word Slave Unit IN00	WORD IN Data00	WORD	J01_InDat00	
			WORD IN Connect Flag00	BOOL	J01_InCnctNdSta00	
			WORD IN Communication Error Flag00	BOOL	J01_InErrNdSta00	
#1	CRT1-ID16	Word Slave Unit IN01	WORD IN Data01	WORD	J01_InDat01	
			WORD IN Connect Flag01	BOOL	J01_InCnctNdSta01	
			WORD IN Communication Error Flag01	BOOL	J01_InErrNdSta01	
#1	XMT-OD08	Word Slave Unit OUT01	WORD OUT Data01	WORD	J01_OutDat01	The lower 8 bits are used for the output data.
#2	CRT1-OD16	Word Slave Unit OUT02	WORD OUT Data02	WORD	J01_OutDat02	
			WORD OUT Connect Flag02	BOOL	J01_OutCnctNdSta02	
			WORD OUT Communication Error Flag02	BOOL	J01_OutErrNdSta02	
BIT#0	CRT1B-ID02S	Bit Slave Unit BIT IN00	BitIN Data00 Bit00 BitIN Data00 Bit01	BOOL	J01_BitInDat00_00, J01_BitInDat00_01	
			BIT IN Connect Flag00	BOOL	J01_BitInCnctNdSta00	
			BIT IN Communication Error Flag00	BOOL	J01_BitInErrNdSta00	
BIT#1	CRT1B-ID02S	Bit Slave Unit BIT IN01	BitIN Data01 Bit00 BitIN Data01 Bit01	BOOL	J01_BitInDat01_00, J01_BitInDat01_01	
			BIT IN Connect Flag01	BOOL	J01_BitInCnctNdSta01	
			BIT IN Communication Error Flag01	BOOL	J01_BitInErrNdSta01	
BIT#2	CRT1B-OD02S	Bit Slave Unit BIT OUT02	BitOUT Data02 Bit00 BitOUT Data02 Bit01	BOOL	J01_BitOutDat02_00, J01_BitOutDat02_01	
			BIT OUT Connect Flag02	BOOL	J01_BitOutCnctNdSta02	
			BIT OUT Communication Error Flag02	BOOL	J01_BitOutErrNdSta02	
	---	Status	Ladder Operation Allowed Flag in Registration Table Enabled Mode	BOOL	PLCRunSta	

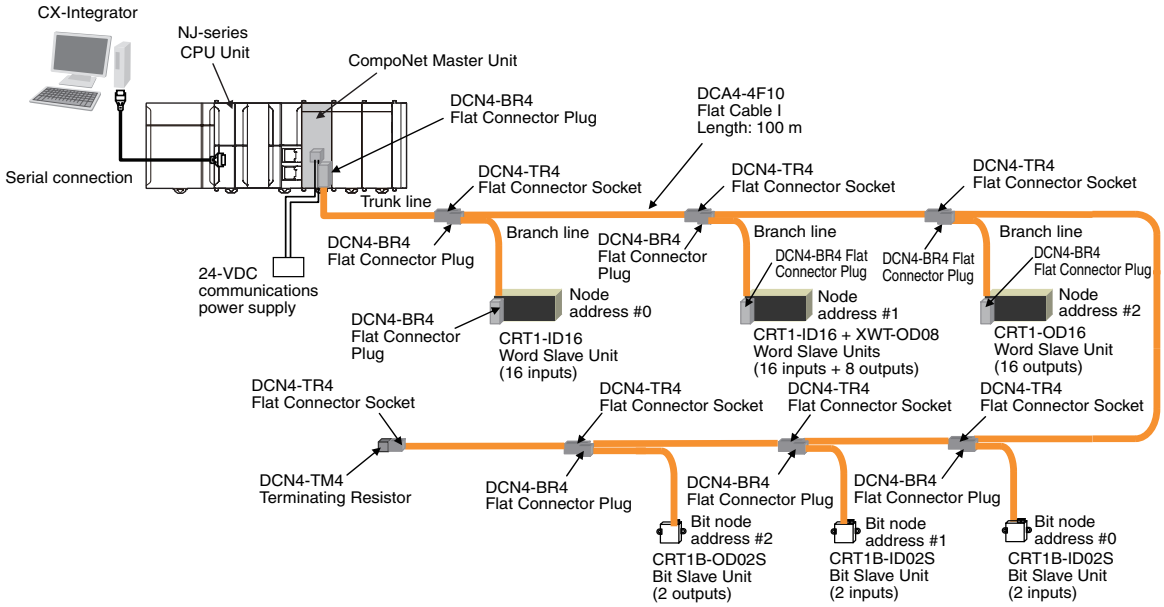
*1 These devices names are for when a device name of J01 is registered for the CompoNet Master Unit in the Unit Configuration.

● Programming Example

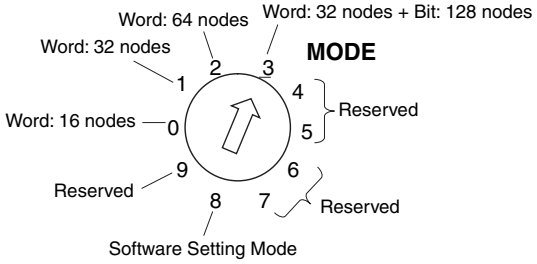


1-6-2 Operating Procedure

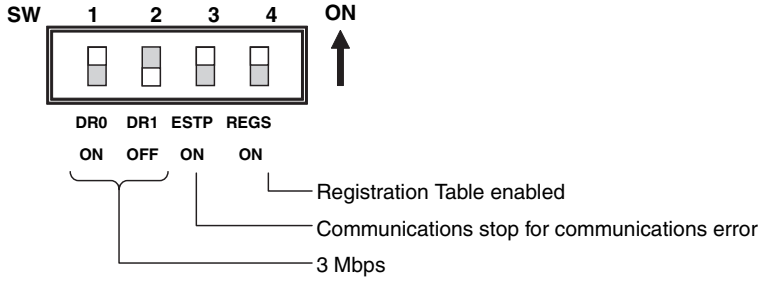
1 Perform the installation and wiring.



2 Set the communications mode number on the front of the Master Unit (example: 3).



3 Set the DIP switch on the front of the Master Unit as follows:



- Baud Rate Setting

SW1	SW2	Setting
DR0	DR1	
OFF	OFF	4 Mbps (default)
ON	OFF	3 Mbps
OFF	ON	1.5 Mbps
ON	ON	93.75 kbps

- Communications Error Communications Stop Mode (Stopping All Remote I/O Communications when a Communications Error Occurs in One Slave Unit) and Registration Table Enable Setting

SW	Name	ON	OFF
3	ESTP (Communications Error Communications Stop Mode)	Communications stop when a communications error occurs.	Communications do not stop when a communications error occurs.
4	REGS (Registration Table Enable Setting)	Registration Table enabled.	Registration Table disabled.

4 Set the unit number on the front of the Master Unit.

(The unit number is set to 5 in this example.)

5 Set the Slave Unit node addresses.

Model	Node address
CRT1-ID16	Node address #0
CRT1-ID16 + XWT-OD08	Node address #1
CRT1-OD16	Node address #2
CRT1B-ID02S	Bit node address #0
CRT1B-ID02S	Bit node address #1
CRT1B-OD02S	Bit node address #2

6 Start the Sysmac Studio and create the Unit Configuration offline.

(1) When you register the CompoNet Master Unit in the Unit Configuration in CPU/Expansion Racks under Configurations and Setup, select *CJ1W-CRM21(MODE3)*, which corresponds to communications mode number 3 that was set in step 3.

(2) Set the unit number of the registered CJ1W-CRM21(MODE3) to 5, which is the value that was set in step 4.

(3) Set the device name to J01. (The device name will be J01 for the first CompoNet Master Unit that is registered in the Unit Configuration.)

7 Create the device variables for the CJ-series Unit.

Right-click CJ1W-*CRM21(MODE3)*, which was registered in the I/O Map of the Sysmac Studio in step 6, above, and select ***Create Device Variable*** from the menu. Device variables for the CJ-series Unit are automatically allocated to the I/O ports of the CompoNet Master Unit and registered in the specified variable table.

8 Create the user program on the Sysmac Studio using the device variables for the CJ-series Unit.

9 Connect the computer with the Sysmac Studio or CX-Integrator to the USB port or built-in EtherNet/IP port on the CPU Unit.

10 Turn ON the power supply to the Controller.

Additional Information

If the Unit Configuration that is saved in the CPU Unit is not the same as the actual Unit configuration, an I/O Setting Check Error will occur. This error is cleared when the Controller is reset in step 11, below.

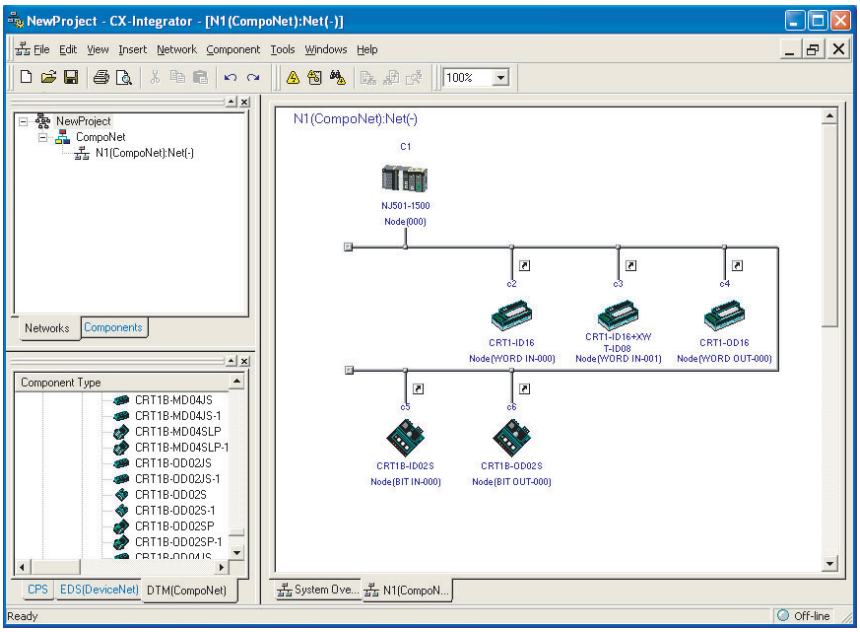
11 Download the project from the Sysmac Studio to the CPU Unit.

12 Connect the CX-Integrator online and edit and download the Master Unit device parameters.

(1) Go online with the CPU Unit of the Controller to which the Master Unit is mounted.

(2) In the Online Connection Information Window, right-click the Master Unit under the connected PLC, and then select Connect.

(3) Right-click the Master Unit under the connected PLC, and select Transfer [Network to Computer].



(4) Double-click the Master Unit in the Network Configuration Window. Then, on General Master Unit Tab Page in the Edit Device Parameter Dialog Box, select the Slave Units to be registered and create a Registration Table.

(5) Open the Detailed Settings Dialog Box and enable the Registered Slave Unit Participation Standby Mode.

(6) Click the Download Button to download the Master Unit device parameters.

13 Reset the Controller or cycle the power supply to the Controller.

14 Remote I/O communications will start when all registered Slave Units have started participating.

● MS and NS Indicators

- Normal Operation

LED	Status	Contents	
MS	Lit green	Master Unit normal	Power is being supplied and the Master Unit hardware and settings are normal.
NS	Lit green	Remote I/O communications normal	Power is being supplied, remote I/O communications have started, there are no communications errors at any Slave Unit or Repeater Unit, there are no Registration Table errors, and there are no node address duplication errors for Slave Units or Repeater Units.

- Error Operation

LED	Status	Contents	
MS	Flashing red	Non-fatal error	Communications mode number or unit number setting error
	Lit red	Fatal error	Hardware error
NS	Flashing green	I/O communications stopped	Remote I/O communications have not started or have stopped (for a reason other than a communications error).
	Flashing red	Communications error	A communications error has occurred for one or more Slave Units or Repeater Units. A verification error (non-existent or unregistered Slave Unit) has occurred for one or more Slave Units. Communications have stopped due to a communications error. An illegal configuration error (number of Repeater Units) has occurred. An address duplication error has occurred at one or more Slave Units or Repeater Units.
	Lit red	Address duplication error	An error has occurred in the communications circuit.

Seven-segment Display

- Normal Operation

Indication	Status	Displayed text	Seven-segment display	Meaning
_0 to _3 lit	Remote I/O communications are starting.	_0		4 Mbps
		_1		3 Mbps
		_2		1.5 Mbps
		_3		93.75 kbps

- Error Operation

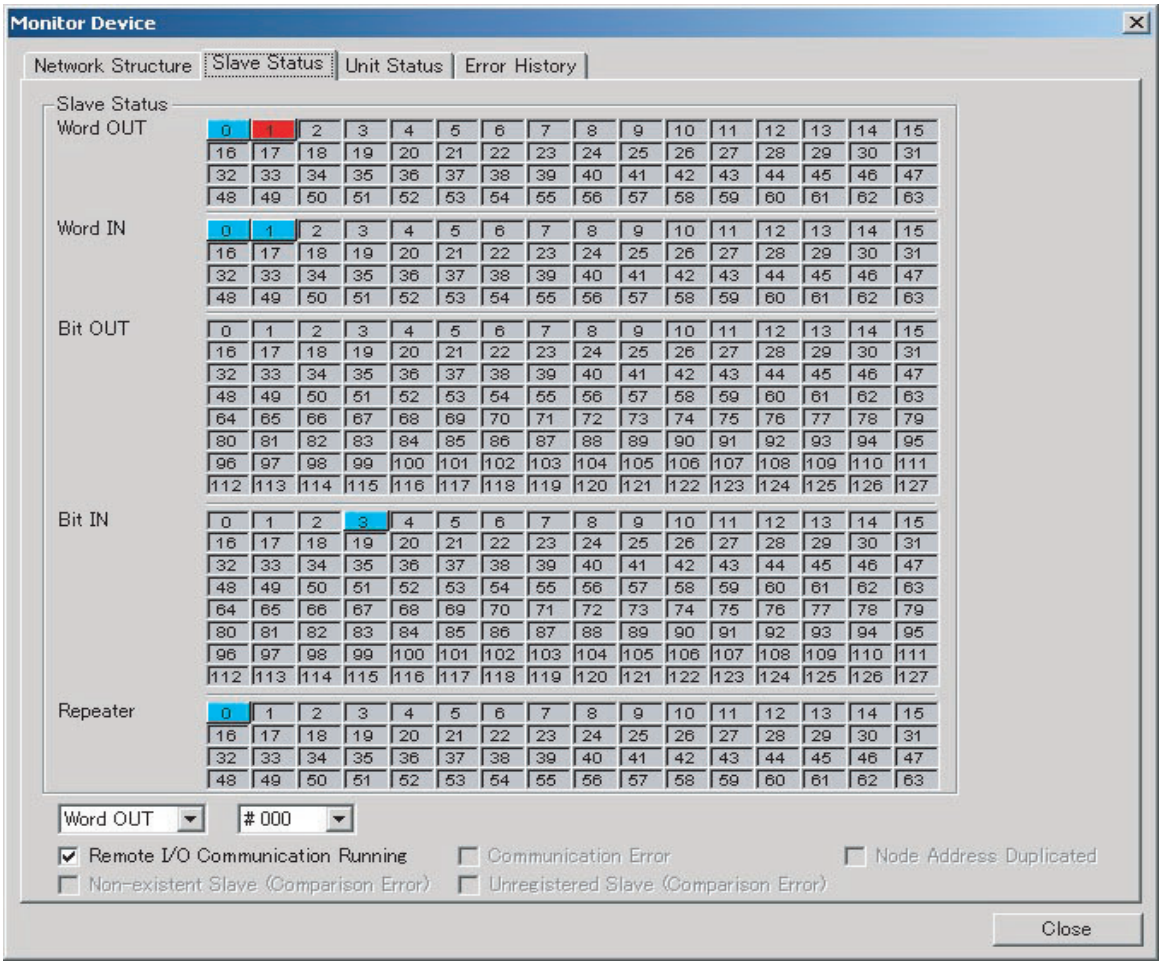
Indication	Status	Seven-segment display				Meaning
_0 to _3 flashing	Remote I/O communications are not starting.	_0				4 Mbps
		_1				3 Mbps
		_2				1.5 Mbps
		_3				93.75 kbps
d9 - i/o/bi/bo/r - Node address	A communications error has occurred.	d9		i		Input
				o		Output
				bi		Bit input
				bo		Bit output
				r		Repeater Unit
d0 - i/o/bi/bo/r - Node address	The same address is being used by two different Units. Or, a communications error has occurred.	d0		Same as above.		
d5 - i/o/bi/bo/r - Node address	A non-existent Slave Unit verification error has occurred.	d5		Same as above.		
d6 - i/o/bi/bo/r - Node address	An unregistered Slave Unit verification error has occurred.	d6		Same as above.		
A0	Communications have stopped due to a communications error.	A0		---		
E4	Software set data is illegal.	E4		---		
E8	Registered Table data is illegal.	E8		---		

15 Using the CX-Integrator, monitor the participation status of Slave Units.

(1) While online, upload the network configuration.

(2) Right-click the Master Unit in the Network Configuration Window, and select Monitor.

(3) Monitor Slave Unit participation status on the Slave Status Tab Page.



A list of node addresses will be displayed showing the participation status for each node: participating (blue), disconnected (red), or not participating (gray).

(4) Monitor the status of all Master Unit communications on the Unit Status Tab Page.

2

CompoNet Master Unit

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2-1-1 Specifications 2-2
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2-1 CompoNet Master Unit Specifications

2-1-1 Specifications

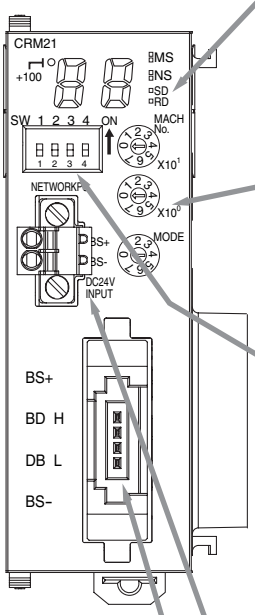
General Specifications

The general specifications of the CompoNet Master Unit conform to those of the NJ-series CPU Units.

Functional and Performance Specifications

Item	Specification
Model	CJ1W-CRM21
Applicable Controllers	NJ Series
Unit classification	CJ-series Special I/O Unit
Current consumption (supplied by Power Supply Unit)	400 mA max. at 5 VDC
Weight	130g max. (Master Unit only)
Communications power supply connector	When a Round Cable II, Flat Cable I, or Flat Cable II cable is used, 1 communications power supply connector must be provided for Slave Units or Repeater Units on the trunk line. **Note** The Master Unit does not require a communications power supply.
Allowable current capacity for a communications power supply connector	5 A max (UL rating: 4A) If your devices must conform to the UL Standard, the allowable current capacity is 4 A max.
Maximum number of mountable Master Units	One word number assigned: 40 Units Two word numbers assigned: 40 Units Four word numbers assigned: 24 Units Eight word numbers assigned: 12 Units
Mounting location	According to NJ-series Special I/O Unit specifications.
Communications power ON/OFF monitoring	The ON/OFF status of the communications power supply can be detected at the communications power supply connector.
Data stored in Master Unit (built-in EEPROM)	1) The following device parameters: • Registration Table • Registration Table Check Type • Registered Slave Unit Participation Monitoring Time, Registered Slave Unit Participation Standby Mode, and Event Disable Setting • Software Settings Table • I/O Communications Start Mode • Communications Error Input Data Zero Clear Mode • Network settings 2) Part of error history (depends on type of error; mainly serious error related to communications stopping)

2-1-2 Component Names and Functions



Display Section
Shows the Master Unit status and Slave Unit communications status.
· Indicators
Four LED indicators:
MS (green/red), NS (green/red), SD (yellow), and RD (yellow)
· Seven-segment Display
Displays the communications status, error code, etc.
(two digits plus a dot that indicates "+100")

Rotary Switches
· MACH No.
Special I/O Unit unit number setting
Two decimal rotary switches (setting range: 0 to 95)
· MODE
Communications mode number of the Master Unit
One decimal rotary switch (setting range: 0 to 3 or 8)

DIP Switch
Used to set the baud rate, communications error, communications stop mode, and Registration Table (4-pin switch).

SW1 DR0	SW2 DR1	Baud rate setting
OFF	OFF	4 Mbps (default) Note: Branch lines are not supported and therefore Slave Units with Prewired Cables cannot be used.
ON	OFF	3 Mbps
OFF	ON	1.5 Mbps
ON	ON	93.75 kbps

SW	Name	ON	OFF
3	ESTP (Communications Error Communications Stop Mode)	Communications stop when a communications error occurs.	Communications do not stop when a communica-tions error occurs.
4	REGS (Registration Table Enable Setting)	Registration Table enabled.	Registration Table disabled.

Communications Power Supply Connector
Connect this connector to a 24-VDC power supply when using Round Cable II, Flat Cable I, or Flat Cable II cable.
Doing so will supply communications power to the Slave Units and Repeater Units on the trunk line from the communications connector through the Round Cable II, Flat Cable I, and Flat Cable II cable.
Note: Do not connect anything to this connector when using Round Cable I cable.

Communications Connector
Connect the communications cable to this connector.
BS+, BS- (communications power) and BDH, BDL (communications data)
BS+ and BS- are used only when using Round Cable II, Flat Cable I, or Flat Cable II cable to output the communications power supply connected to the communications power supply connector.
Note: Open Type Connector (to connect Units to the Cable) can be used to connect to a terminal block.

2-1-3 Display Section

Communications Indicators

The following LED indicators are provided for communications.

MS (Module Status): Shows the status of the node itself. (Two colors: green and red)

NS (Network Status): Shows the status of communications. (Two colors: green and red)

SD (Send Data): Shows Master Unit transmission status. (One color: yellow)

RD (Receive Data): Shows Master Unit reception status. (One color: yellow)

Indicator	Status	Status definition	Meaning
MS	Lit green	Normal	The Unit is operating normally.
	Lit red	Fatal error	Unit hardware error, such as a watchdog timer error (WDT)
	Flashing red	Non-fatal error	Communications mode number or unit number setting error
	Not lit	Power OFF/Preparing	Power OFF, resetting, or initializing
NS	Lit green	Online, with remote I/O communications in progress	Power is being supplied, remote I/O communications have started, there are no communications errors at any Slave Unit or Repeater Unit, there are no Registration Table errors, and there are no node address duplication errors for Slave Units or Repeater Units.
	Flashing green	Online, with no remote I/O communications in progress	Remote I/O communications have not started or have stopped (for a reason other than a communications error).
	Lit red	Fatal communications error	An error has occurred in the communications circuit.
	Flashing red	Non-fatal communications error	A communications error has occurred at one or more Slave Units or Repeater Units. A verification error (non-existent or unregistered Slave Unit) has occurred at one or more Slave Units. Communications have stopped due to a communications error. An illegal configuration error (number of Repeater Units) has occurred. An address duplication error has occurred at one or more Slave Units or Repeater Units.
	Not lit	Power OFF/Preparing	Power OFF, resetting, or initializing
SD	Lit yellow	Normal transmission	Frames are being sent normally from the Master Unit.
	Not lit	No transmission	The Master Unit is not sending data.
RD	Lit yellow	Normal reception	Frames are being sent normally from a Slave Unit.
	Not lit	No reception	The Master Unit is not receiving data.

The indicator flashing intervals are approximately 0.5 s lit and 0.5 s not lit.

Seven-segment Display

- The seven-segment display shows the baud rate during normal transmission.
  It lights while remote I/O communications are in progress and flashes while they are stopped.
- When a communications error occurs, the following information is displayed in order: Error code (2 digits hexadecimal) - Type of Slave Unit at error node - Node address (2 digits decimal).
- When an error other than a communications error occurs, the error code (2 digits hexadecimal) is displayed.

Status		Display contents	Display	Actual display		Contents
Normal	Remote I/O communications in progress	Baud rate display lit.	_0		Lit	4 Mbps
			_1		Lit	3 Mbps
			_2		Lit	1.5 Mbps
			_3		Lit	93.75 kbps
	Remote I/O communications stopped	Baud rate display flashing.	_0		Flashing	4 Mbps
			_1		Flashing	3 Mbps
			_2		Flashing	1.5 Mbps
			_3		Flashing	93.75 kbps

<table>
<tr><th colspan="2">Status</th><th>Display contents</th><th colspan="2">Display</th><th colspan="2">Actual display</th><th colspan="3">Contents</th></tr>
<tr><td rowspan="11">Error</td><td>Initialization error</td><td>Error code</td><td colspan="7">The error code is displayed in hexadecimal (lit).</td></tr>
<tr><td rowspan="10">Communications error</td><td rowspan="10">The error code, Slave Unit type, and applicable node address are alternately displayed.</td><td colspan="7">The error code (2 digits hexadecimal), Slave Unit type, and applicable node address (1-bit dot notation for the 100 position for 3-digit decimal) are alternately displayed (i.e., the cause of the error).
Note The error codes are different for inputs and outputs.</td></tr>
<tr><td colspan="2" rowspan="2">Example</td><td colspan="2">Error code</td><td colspan="3">Slave Unit type</td></tr>
<tr><td>Dis-play</td><td>Actual display</td><td>Dis-play</td><td>Actual display</td><td>Meaning</td></tr>
<tr><td colspan="2" rowspan="5">A communications error occurred.</td><td rowspan="5">d9</td><td rowspan="5"> </td><td>i</td><td> </td><td>IN</td></tr>
<tr><td>o</td><td> </td><td>OUT</td></tr>
<tr><td>bi</td><td> </td><td>Bit input</td></tr>
<tr><td>bo</td><td> </td><td>Bit out-put</td></tr>
<tr><td>r</td><td> </td><td>Repeater Unit</td></tr>
<tr><td colspan="2">A node address duplication error occurred.</td><td>d0</td><td> </td><td colspan="3">Same as above.</td></tr>
<tr><td colspan="2">A non-existent Slave Unit verification error occurred.</td><td>d5</td><td> </td><td colspan="3">Same as above.</td></tr>
<tr><td colspan="2">An unregistered Slave Unit verification error occurred.</td><td>d6</td><td> </td><td colspan="3">Same as above.</td></tr>
<tr><td rowspan="5">Error during operation
Note An error during operation is an error other than a communications error that occurs during Unit operation.</td><td rowspan="5">Error code</td><td colspan="7">The error code is displayed in 2-digit hexadecimal (lit).</td></tr>
<tr><td colspan="2" rowspan="2">Example</td><td colspan="2">Error code</td><td colspan="3">---</td></tr>
<tr><td>Dis-play</td><td>Actual display</td></tr>
<tr><td colspan="2">Communications have stopped due to a communications error.</td><td>A0</td><td> </td><td colspan="3">---</td></tr>
<tr><td colspan="2">Software set data is illegal.</td><td>E4</td><td> </td><td colspan="3">---</td></tr>
<tr><td colspan="2">Registered Table data is illegal.</td><td>E8</td><td> </td><td colspan="3">---</td></tr>
</table>

2-1-4 Switch Settings

Unit Number Switches (MACH No.)

Use these switches to set the Special I/O Unit unit number (two decimal rotary switches (0 to 95)). The setting is read when the power supply is turned ON to the Controller.

Communications mode number	Setting range
0	00 to 94
1	00 to 92
2	00 to 88
3	00 to 88
8	00 to 95

Additional Information

If you set the same unit number on another Special I/O Unit that is connected to the same CPU Unit, a Duplicate Unit Number major fault level Controller error will occur and the CompoNet Master Unit will not start. If this happens, correct the setting of the unit number and cycle the power supply to the Controller.

Communications Mode Number Switch (MODE)

Use this switch to set the communications mode number of the Master Unit (one decimal rotary switch (0 to 3 or 8)). The setting is read when the power supply is turned ON to the Controller.

Communications mode No.	Name	Connectable node addresses	Control points	Allocations	Number of unit numbers used per Master Unit
0	Communications mode No. 0	Word Slave Units: IN0 to IN7 and OUT0 to OUT7	Word Slave Units: 128 inputs and 128 outputs	I/O ports	2
1	Communications mode No. 1	Word Slave Units: IN0 to IN15 and OUT0 to OUT15	Word Slave Units: 256 inputs and 256 outputs		4
2	Communications mode No. 2	Word Slave Units: IN0 to IN31 and OUT0 to OUT31	Word Slave Units: 512 inputs and 512 outputs		8
3	Communications mode No. 3	Word Slave Units: IN0 to IN15 and OUT0 to OUT15 Bit Slave Units: IN0 to IN63 and OUT0 to OUT63	Word Slave Units: 256 inputs and 256 outputs Bit Slave Units: 128 inputs and 128 outputs		8
4	Reserved	---	---	---	---
5	Reserved	---	---	---	---
6	Reserved	---	---	---	---
7	Reserved	---	---	---	---
8	Software Setting Mode	Can be set within the following ranges: Word Slave Units: IN0 to IN63 and OUT0 to OUT63 Bit Slave Units: IN0 to IN127 and OUT0 to OUT127	Can be set within the following ranges: Word Slave Units: 1,024 inputs and 1,024 outputs Bit Slave Units: 256 inputs and 256 outputs	Words and bits can be allocated anywhere in the CIO, DM, WR, or HR Area. **Note** The Status and Setting are assigned to I/O ports.	1
9	Reserved	---	---	---	---

Note **1** In a CompoNet Network, Word Slave Units have 16 bits per node address.

2 Do not set the reserved communications mode numbers (4 to 7 and 9). A communications mode setting error (H4 at the 7-segment LED indicator) will occur if any of these modes is set.

Also, when the CompoNet Master Unit is registered in the Unit Configuration on the Sysmac Studio, one of the following unit names is selected and registered according to the communications mode.

CJ1W-CRM21 (MODE0), CJ1W-CRM21 (MODE1), CJ1W-CRM21 (MODE2), CJ1W-CRM21 (MODE3), or CJ1W-CRM21 (MODE8)

The device variables for the CJ-series Unit are created according to the communications mode number of the unit name. The same communications number must be set on the rotary switch on the front panel and in the Unit Name of the CompoNet Master Unit when it is registered in the Unit Configuration.

Precautions for Safe Use

Always set the same communications mode number on the rotary switch on the front of the CompoNet Master Unit and for the communications mode number setting when you register the Unit on the Sysmac Studio (MODE□ in the Unit Name). If these mode numbers are not the same, the communications mode that is set on the rotary switch on the front of the CompoNet Master Unit is used for operation. However, the device variables are automatically created according to the unit name that is set on the Sysmac Studio. Therefore, the intended data is not accessed when you try to access I/O data for the Slave Unit. Set the communications mode number carefully.

DIP Switch

The settings on the DIP switch are read when the power supply is turned ON to the Controller.

● Baud Rate Setting

SW1	SW2	Baud rate setting
DR0	DR1	
OFF	OFF	4 Mbps (default)
ON	OFF	3 Mbps
OFF	ON	1.5 Mbps
ON	ON	93.75 kbps

Slave Units automatically detect the baud rate set on SW1 (DR0) and SW2 (DR2). It is not necessary to set the baud rate separately for any of the Slave Units.

● Communications Error Communications Stop Mode Setting

SW	Name	ON	OFF
3	ESTP (Communications Error Communications Stop Mode)	Communications stop when a communications error occurs.	Communications do not stop when a communications error occurs.

If you turn ON SW3 (ESTP), all remote I/O communications will stop if a communications error occurs for any Slave Unit. (*_*CommStopSta* (Communications Error Communications Stop Flag) in *_*UnitSta* (Status) will change to TRUE.) If you turn OFF SW3, remote I/O communications will continue even if a communications error occurs for any of the Slave Units.

● Registration Table Enable Setting

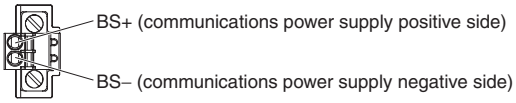
SW	Name	ON	OFF
4	REGS (Registration Table Enable Setting)	Registration Table enabled.	Registration Table disabled.

If you turn ON SW4 (REGS), the Registration Table that was edited or downloaded from the CX-Integrator will be enabled when the power supply is turned ON. Only the registered Slave Units will join the network and the registered Slave Units are compared to the actual Slave Units. If they do not agree, *_*RegTblErr* (Registration Table Verification Error Flag) in *_*UnitSta* (Status) will change to TRUE.

2-1-5 Terminal Arrangement

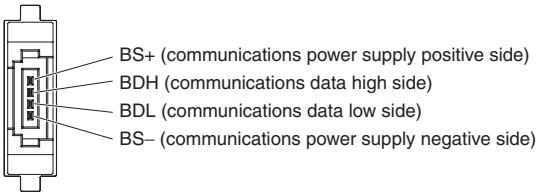
Communications Power Supply Connector

This connector supplies communications power to Slave Units and Repeater Units connected to the trunk line.



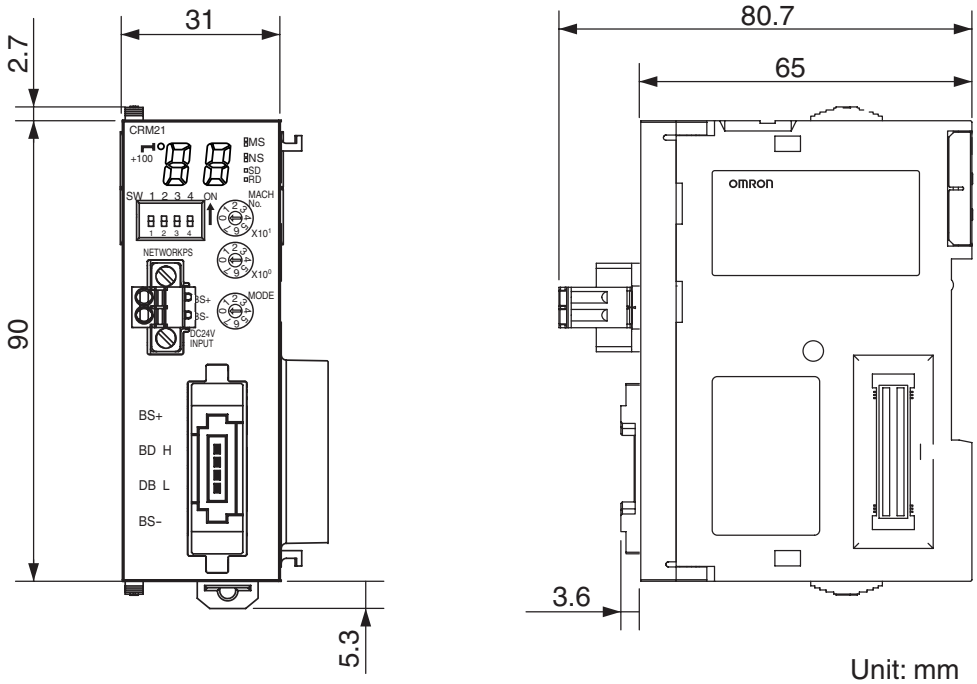
Note This connector does not supply power to the Master Unit.

Communications Connector



Note BS+ and BS- output the communications power supply connected to the communications power supply connector. (This is the communications power for Slave Units and Repeater Units connected to the trunk line.)
This connector does not supply power to the Master Unit.

2-1-6 Dimensions



Unit: mm

3

Wiring Configurations

3-1 Wiring Formations 3-2

3-2 CompoNet Network Wiring 3-4

3-2-1 Round Cable I 3-4
3-2-2 Round Cable II 3-6
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3-2-4 Cable Types 3-8
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3-2-6 Node Connection Methods 3-13
3-2-7 Branching a Communications Cable 3-14
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3-1 Wiring Formations

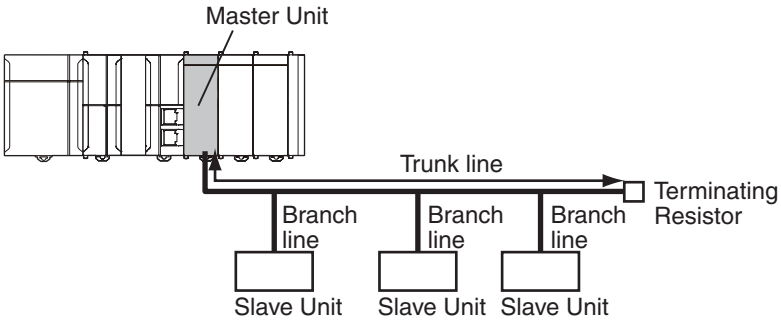
A CompoNet network can take two wiring formations: Trunk line-Branch line and Unrestricted Wiring.

There are restrictions on the number of branches and the number of Units that can be connected.

Trunk Line-Branch Line Formation

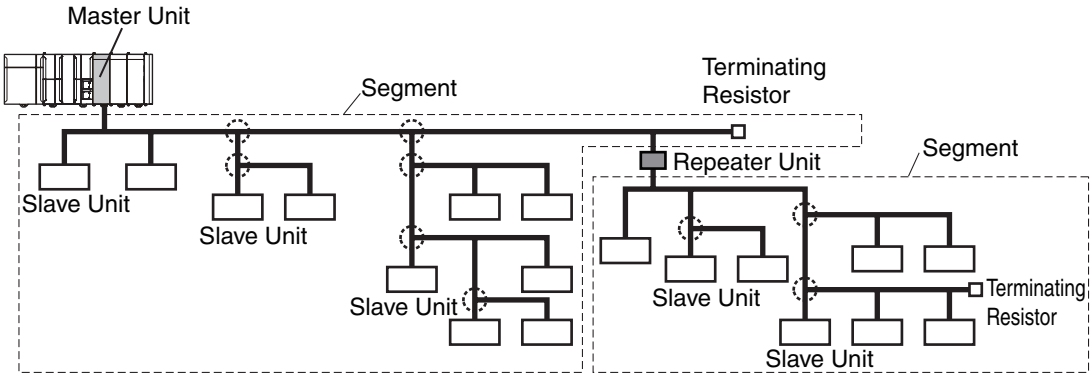
With this wiring formation, the trunk line is differentiated from branch lines.

There are restrictions on the number of branches and the number of Units that can be connected.



Unrestricted Wiring Formation

With this wiring formation, there is no differentiation between the trunk line and branch lines. There are no wiring restrictions as long as the total cable length for any one segment does not exceed 200 m. There is also no limit on the number of branches.



The formation is determined automatically by the type of cable used and the required baud rate.

Cable type	Baud rate			
	4 Mbps	3 Mbps	1.5 Mbps	93.75 kbps
Round Cable I	Trunk-Branch*1	Trunk-Branch	Trunk-Branch	Trunk-Branch
Round Cable II, Flat Cable I, or Flat Cable II	Trunk-Branch*1	Trunk-Branch	Trunk-Branch	Unrestricted

*1 Lines cannot be branched from the trunk line if the baud rate is 4 Mbps. Only multidrop connections can be used for branching from the trunk line.

The following table shows the conditions and restrictions for each formation.

Item	Wiring formation	
	Trunk-Branch formation	Unrestricted wiring formation
Master Unit location	At an end of a network	Anywhere in a network (not necessarily at an end)
Maximum number of Slave Units connectable to any one branch line	1 or 3 depending on the cable type and the baud rate	No restrictions
Terminating Resistor location	On the opposite ends of the trunk line and all sub-trunk lines from the Master Unit and each Repeater Unit	On the farthest ends from the Master Unit and each Repeater Unit

3-2 CompoNet Network Wiring

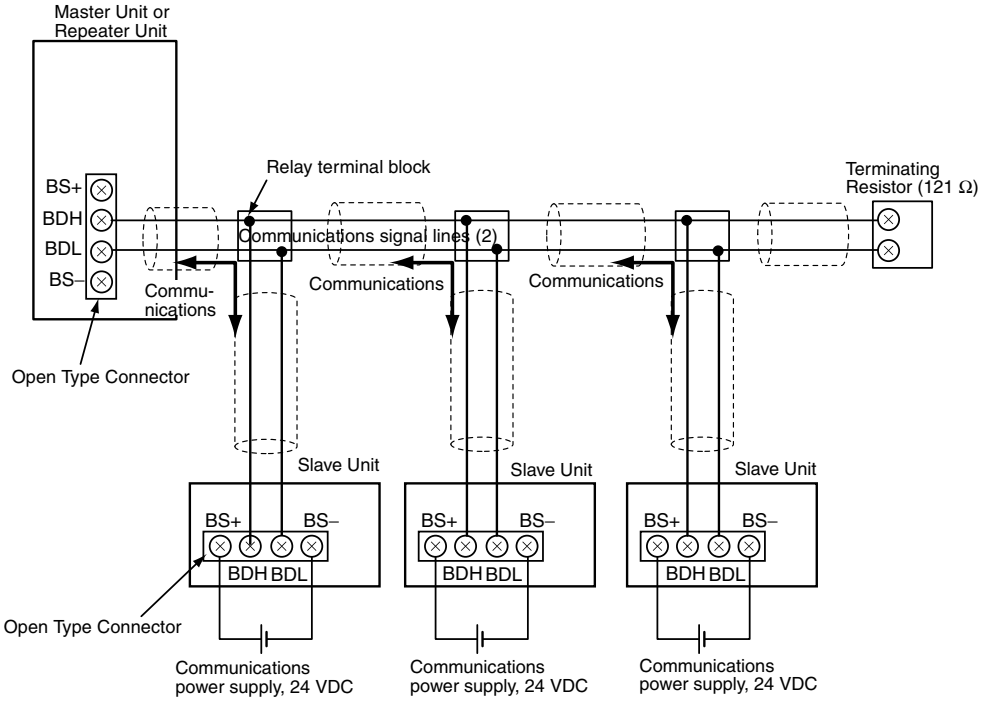
A CompoNet Network requires wiring of following lines.

- Two communications signal lines: BDH (communications data high) and BDL (communications data low)
- Two communications power supply lines (for both communications power and Slave Unit internal circuit power)
  Terminals are BS+ (positive terminal of communications power supply) and BS− (negative terminal of communications power supply).

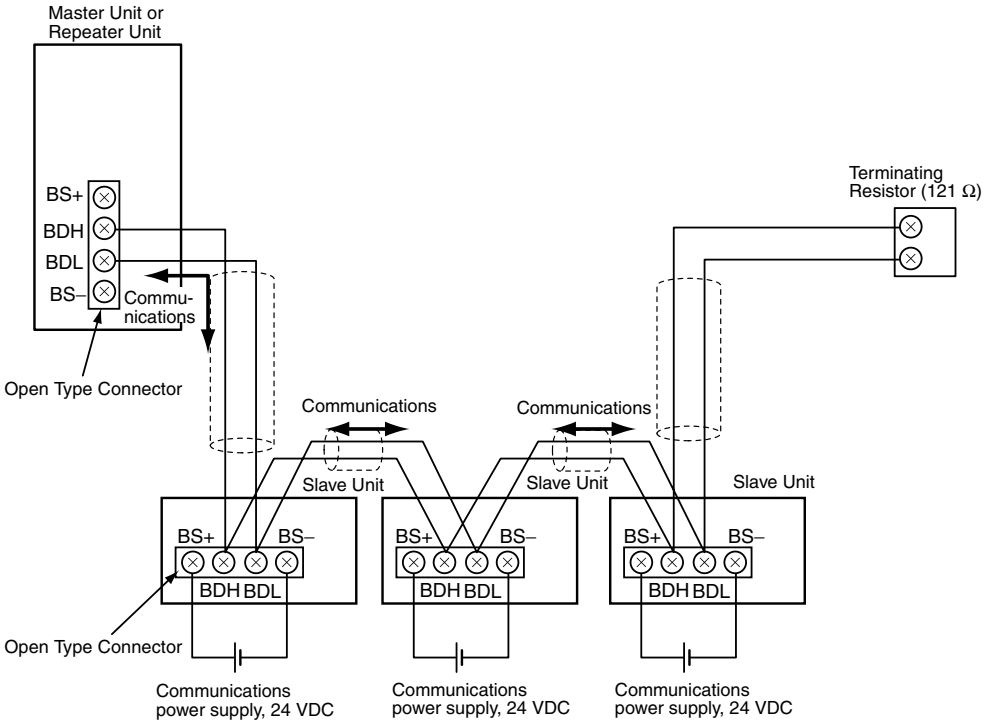
The wiring method depends on the cable type.

3-2-1 Round Cable I

- The two communications signal lines are connected in parallel between the Master Unit or a Repeater Unit and multiple Slave Units.
- A DCN4-TB4 Open Type Connector is used to connect the communications cable between the Master Unit or a Repeater Unit and a Slave Unit.
- The two communications power supply lines are connected to each Slave Unit. The supply lines must be different lines from the communications lines. The communications power supply lines supply 24-VDC communications power.
- The Master Unit and the connected Repeater Units are not supplied with power.
- A DRS1-T Terminating Resistor must be connected at the end of the network.

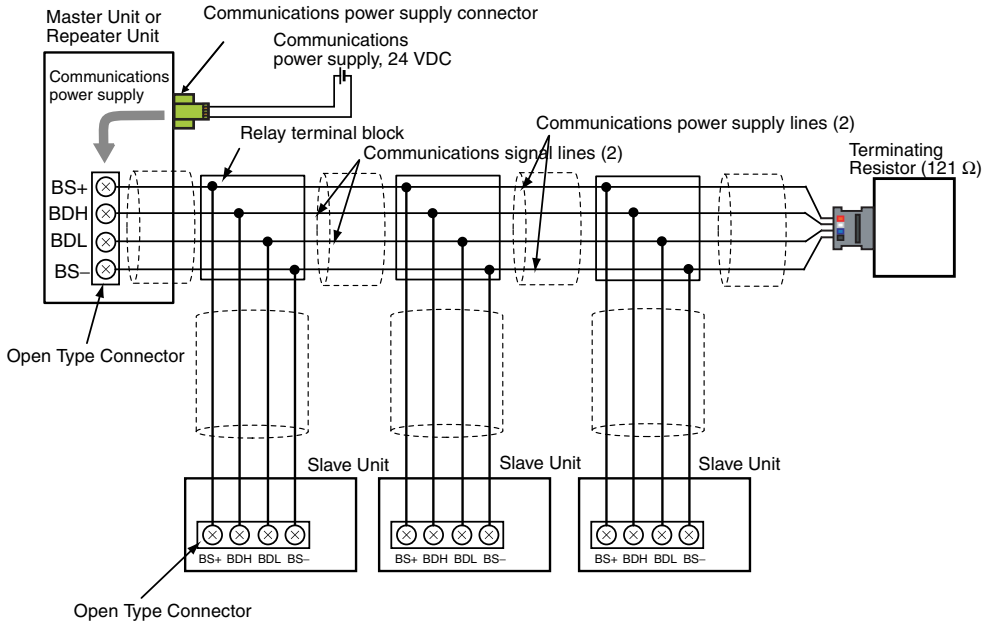


Multidrop connections can also be used to connect the Slave Units in parallel.

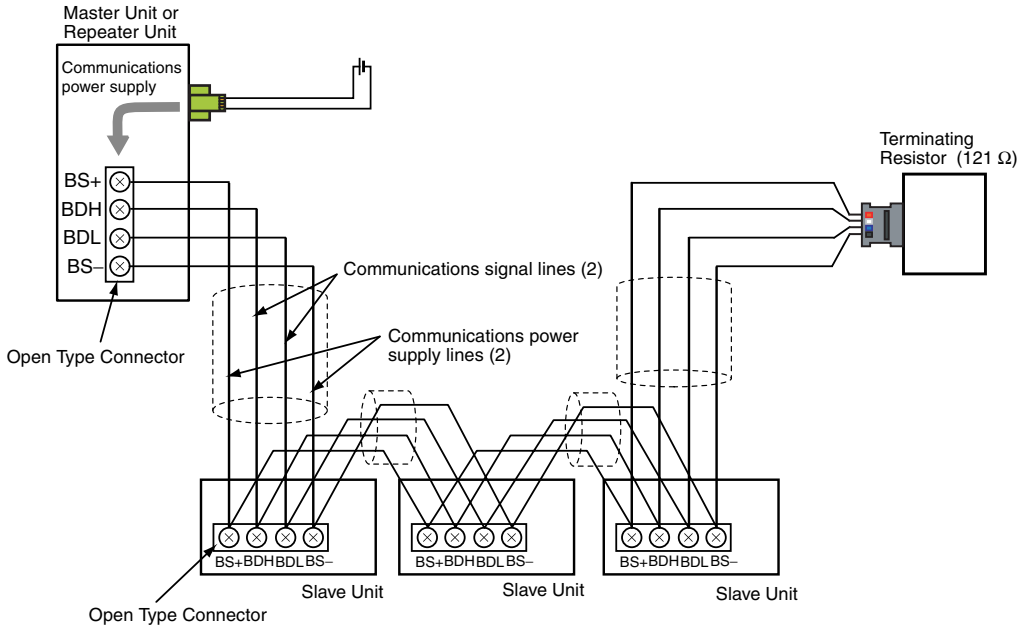


3-2-2 Round Cable II

- The two communications signal lines and the two communications power supply lines are connected in parallel between the Master Unit or Repeater Unit and multiple Slave Units.
- A DCN4-TB4 Open Type Connector is used to connect the communications cable between the Master Unit or a Repeater Unit and a Slave Unit.
- Connect the communications power supply (24 VDC) to the communications power supply connector for the Master Unit or Repeater Unit.
- A DCN4-TR4 Flat Connector Socket and a DCN4-TM4 Terminating Resistor must be connected at the end of the network.

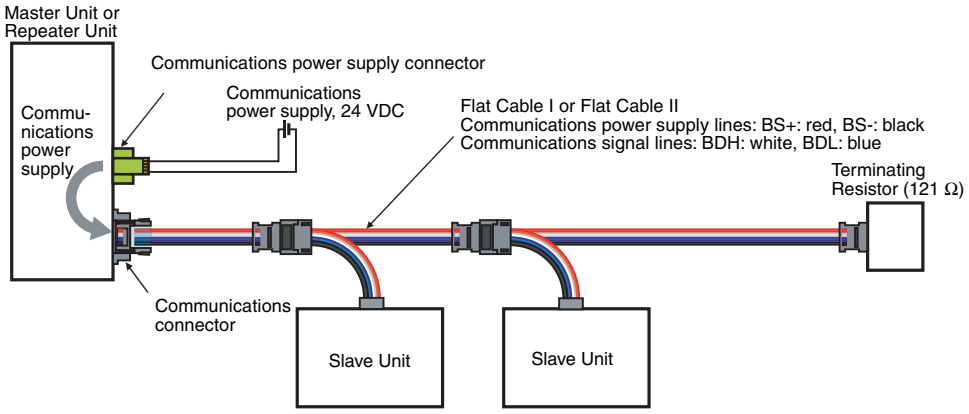


Multidrop connections can also be used to connect the Slave Units in parallel.

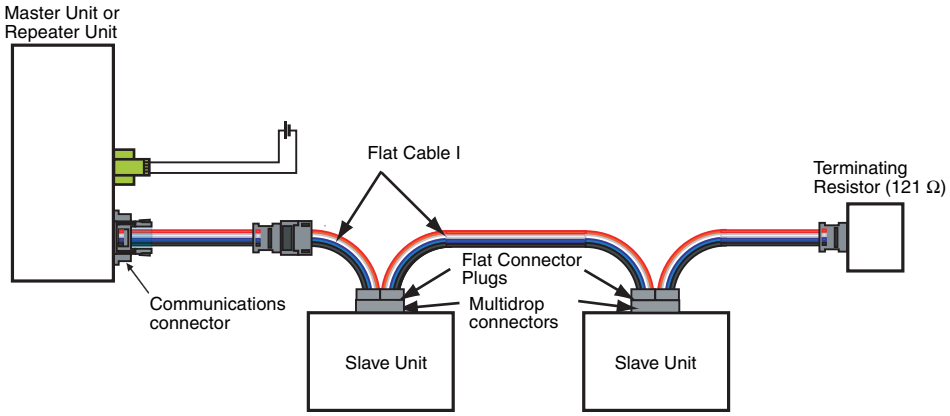


3-2-3 Flat Cable I or Flat Cable II

- The two communications signal lines and the two communications power supply lines are connected to the Master Unit, Repeater Units, and Slave Units using Flat Cable.
- Connect the communications power supply (24 VDC) to the communications power supply connector for the Master Unit or Repeater Unit.
- Always connect a DCN4-TR4 or DCN5-TR4 Flat Connector Socket to the end of the network and then connect a DCN4-TM4 or DCN5-TM4 Terminating Resistor to the Socket.



Slave Units can also be connected in parallel by using multidrop connections. A DCN4-MD4 Multidrop Connector is required for this.



There are restrictions when you branch lines or use Flat Cable II. For details, refer to *1-2-2 Branch Line and Multidrop Support for Cable Types and Baud Rates*.

3-2-4 Cable Types

Cable Types

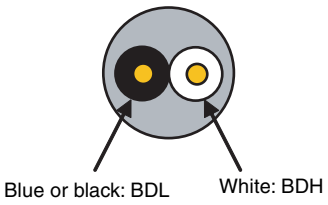
The four types of cable listed in the following table can be used as the communications cable for a CompoNet Network.

Do not use any other cables.

Cable type	Main application		Communications power	Conductors			
				BDH (signal high)	BDL (signal low)	BS+ (communications power supply positive side)	BS- (communications power supply negative side)
Round Cable I (VCTF 2-conductor cable)	• Wiring for the Master Unit and Repeater Units • Wiring for Slave Units downstream from each Repeater Unit	• When using commercially available cable is desirable. • To provide communications power separately. • When Bit Slave Units are not being used.	Provided separately.	White	Black or Blue	None	None
Round Cable II (VCTF 4-conductor cable)		• When using a commercially available cable is desirable. • To supply communications power collectively to all Slave Units with the communications cable.	Included	White	Green or Blue	Red	Black
Flat Cable I (Standard)		• To supply communications power to all Slave Units with the communications cable. • To use Bit Slave Units.	Included	White	Blue	Red	Black
Flat Cable II (Sheathed)		• To supply communications power to all Slave Units with the communications cable. • To use Bit Slave Units. • Applications in environments that required IP54 compliance (drip-proof, splash-proof).	Included	White	Blue	Red	Black

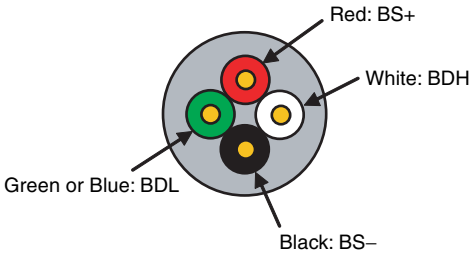
Round Cable I

Use a commercially available VCTF cable with two 0.75-mm^2 conductors (JIS C3306) that meets CompoNet specifications. Ask the cable manufacturer for products applicable to CompoNet.

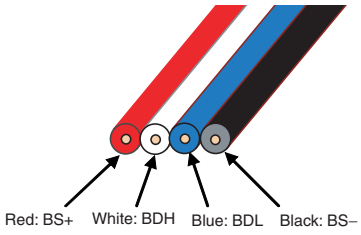


Round Cable II

Use a commercially available VCTF cable with four 0.75-mm^2 conductors (JIS C3306) that meets CompoNet specifications. Ask the cable manufacturer for products applicable to CompoNet.



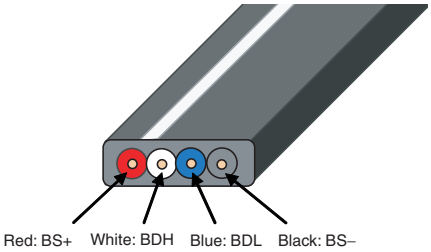
DCA4-4F10 Flat Cable I



Conductor No.	Insulation color	Application	Nominal cross-section	Allowable current (A)
1	Red	BS+ (communications power supply positive side)	0.75 mm^2	5 max.
2	White	BDH (signal high)	0.5 mm^2	---
3	Blue	BDL (signal low)	0.5 mm^2	---
4	Black	BS– (communications power supply negative side)	0.75 mm^2	5 max.

Models other than the DCA4-4F10 can also be used as long as they conform to CompoNet specifications. Ask the cable manufacturer for applicable products.

● DCA5-4F10 Flat Cable II



Conductor No.	Insulation color	Application	Nominal cross-section	Allowable current (A)
1	Red	BS+ (communications power supply positive side)	0.75 mm^2	5 max.
2	White	BDH (signal high)	0.5 mm^2	---
3	Blue	BDL (signal low)	0.5 mm^2	---
4	Black	BS– (communications power supply negative side)	0.75 mm^2	5 max.

Models other than the DCA5-4F10 can also be used as long as they conform to CompoNet specifications. Ask the cable manufacturer for applicable products.

Additional Information

For additional information on applicable cables to CompoNet and their manufacturers, refer to the ODVA home page.

Precautions for Correct Use

The characteristics of each conductor in a Flat Cable I or Flat Cable II cable have been adjusted to the specific application of the conductor as listed in the table. Check the insulator colors, and use them only for the specified application.

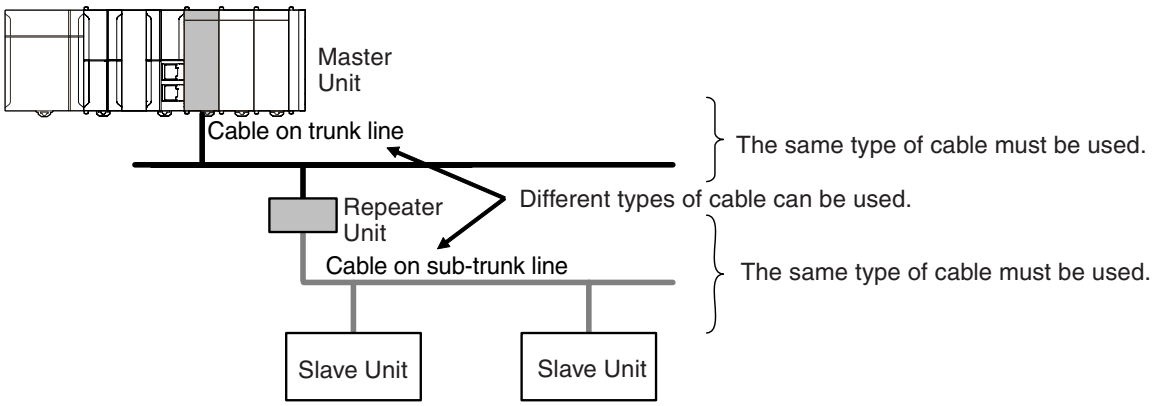
Selecting Cable Types

Refer to *Types of Cables* on page 1-28 in *1-6-1 Design*, and select applicable cables.

Using Different Cable Types

All cables downstream from the Master Unit must be the same type. That means the same type of cable must be used for the trunk line and their branch lines; for sub-trunk lines and their branch lines; and branch lines and their sub-branch lines.

If a Repeater Unit is used, however, cables can be different upstream and downstream from the Repeater Unit, i.e., for the trunk line and sub-trunk lines, and for a sub-trunk line and another sub-trunk line. Refer to the following illustration.



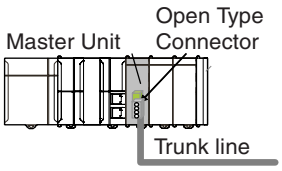
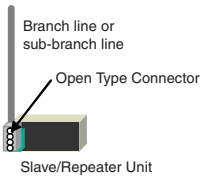
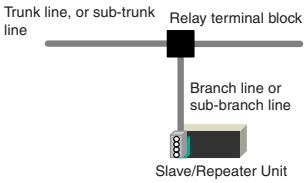
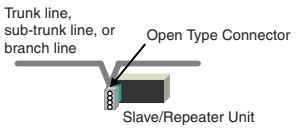
Note Round Cable I, Round Cable II, Flat Cable I and Flat Cable II cables are all treated as different types of cables.

Cable Separation between Multiple CompoNet Network

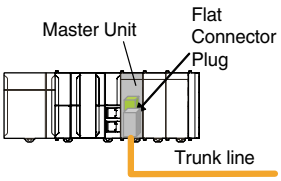
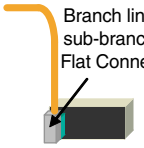
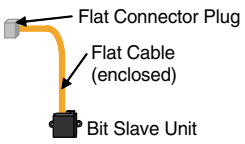
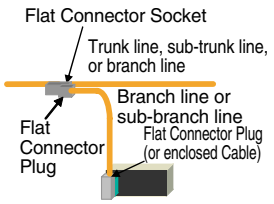
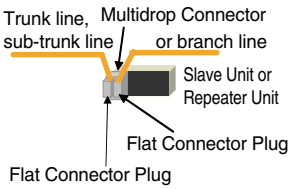
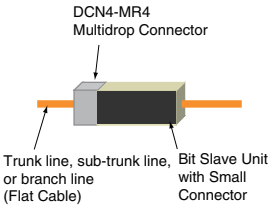
When more than one CompoNet network uses Flat Cable I or II cables, electrical interference may disturb stable system operation. To prevent interference, do not bundle Flat Cables from different CompoNet networks. Instead, separate the Cables for one network by at least 5 mm from cables for other networks.

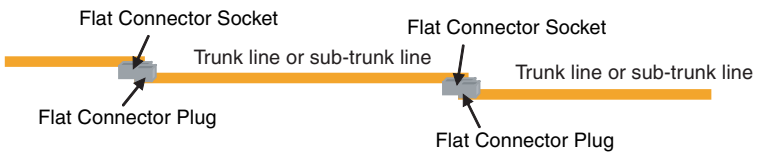
3-2-5 Connection Methods

Round Cable I or Round Cable II

Master Unit connections	Slave Unit/Repeater Unit connections	Cable branches	
		T-branch connections	Multidrop connections
Open Type Connector 	Open Type Connector  **Note** Application is not possible for Bit Slave Units with Prewired Flat Cables.	Relay terminal block (commercially available product) 	Open Type Connector 

Flat Cable I or Flat Cable II

Master Unit connection	Slave Unit/Repeater Unit connections	Cable branches	
		T-branch connections	Multidrop connections
Flat Connector Plug 	Flat Connector Plug • Word Slave Unit, Bit Slave Unit with communications connector, or Repeater Unit  Word Slave Unit, Bit Slave Unit with communications connector, or Repeater Unit • Bit Slave Unit with Prewired Flat Cable  **Note** Some Bit Slave Units come with Flat Cables as a standard feature.	Flat Connector Socket + Flat Connector Plug  Word Slave Unit, Bit Slave Unit with communications connector, or Repeater Unit	Multidrop Connector  • Bit Slave Unit with Small Connector  **Note** You cannot use multidrop connections with Multidrop Connectors if you use Sheathed Flat Cable II.

Extending the cable
Flat Connector Socket + Flat Connector Plug 

3-2-6 Node Connection Methods

Nodes are connected to the CompoNet Network using the methods described in this section.

Master Unit Connections

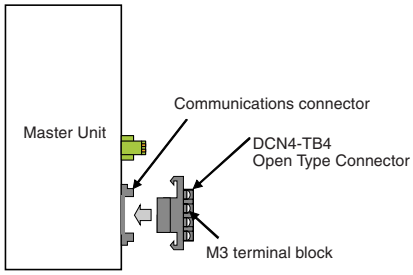
Except in unrestricted wiring formations, the Master Unit must always be connected on one end of the trunk line.

The Master Unit has a communications connector to which a communications cable is connected.

● Round Cable I or Round Cable II (Using Open Type Connector)

The following Open Type Connector is used to connect a Round Cable I or Round Cable II cable to the Master Unit. The Open Type Connector is used to convert the communications connector on the Master Unit to a terminal block. The Open Type Connector takes M3 crimp terminals.

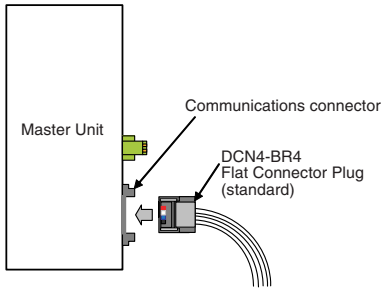
- Round Cable I or Round Cable II
  A DCN4-TB4 Open Type Connector is used.



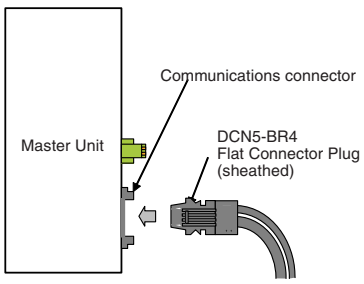
● Flat Cable I or Flat Cable II (Using Flat Connector Plug)

The following Flat Connector Plugs are used to connect Flat Cable I or Flat Cable II cable to the Master Unit.

- Flat Cable I
  A DCN4-BR4 Flat Connector Plug is used.



- Flat Cable II
  A DCN5-BR4 Flat Connector Plug is used.



3-2-7 Branching a Communications Cable

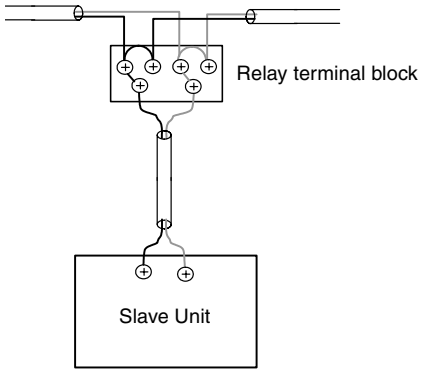
There are two ways to branch the trunk line, sub-trunk lines, and branch lines: T-branching and multi-drop connections.

T-branching

- **Round Cable I or Round Cable II (with a Commercially Available Relay Terminal Block)**

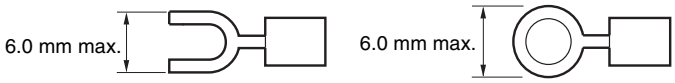
  Use a commercially available relay terminal block, and connect the cable wires to the block.

  Example for Round Cable I



Precautions for Correct Use

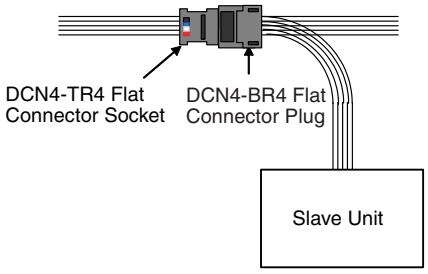
Attach an M3 crimp terminal to the cable wire before you connect the wire to a terminal block.

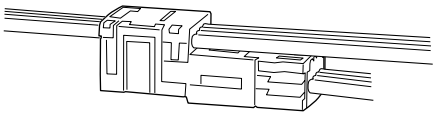


- **Flat Cable I or Flat Cable II (with a Flat Connector Socket and a Flat Connector Plug)**

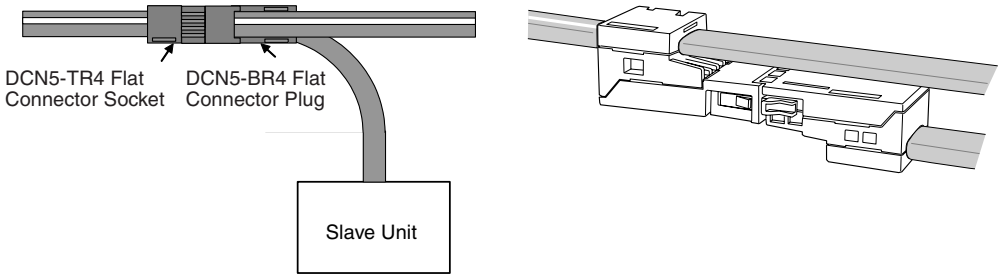
  Use a Flat Connector Socket and a Flat Connector Plug.

  - Example for Flat Cable I
    Attach a DCN4-BR4 Flat Connector Plug to a DCN4-TR4 Flat Connector Socket.





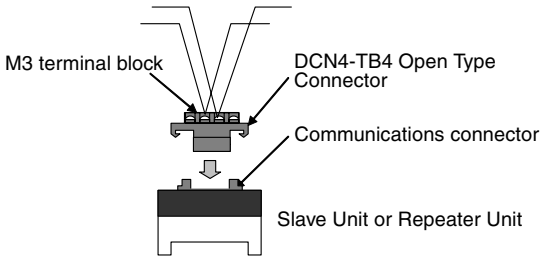
- Example for Flat Cable II
  Attach a DCN5-BR4 Flat Connector Plug to a DCN5-TR4 Flat Connector Socket.



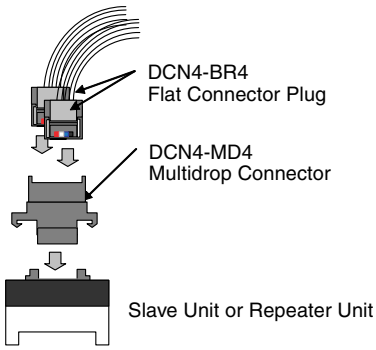
Note The same type of cable must be used for both the trunk line and the branch line.

Multidrop Connections

● Round Cable I or Round Cable II (with an Open Type Connector)



● Flat Cable I (with a Multidrop Connector)

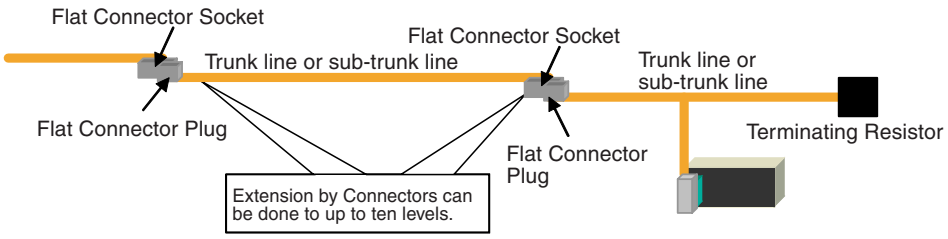


● Flat Cable II

Multidrop connections are not supported.

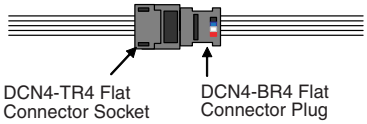
3-2-8 Extending the Cable Length

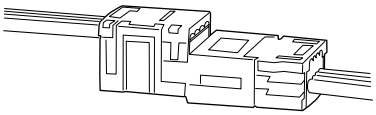
Flat Connectors can be used to extend the cables for the trunk line, sub-trunk lines, branch lines, and sub-branch lines to up to ten levels. The maximum distance that the cables can be extended is restricted by the maximum trunk line length. Refer to *1-2-1 Cable Types, Maximum Distances, and Number of Slave Units*.



● Flat Cable I

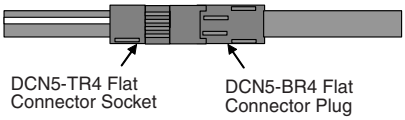
A DCN4-TR4 Flat Connector Socket with a cable stopper and a DCN4-BR4 Flat Connector Plug are used.

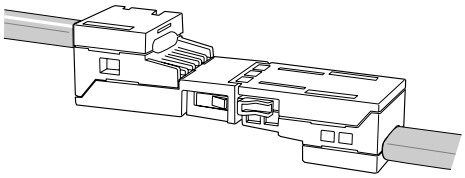




● Flat Cable II

Attach a DCN5-BR4 Flat Connector Plug to a DCN5-TR4 Flat Connector Socket in which a stopper is provided.



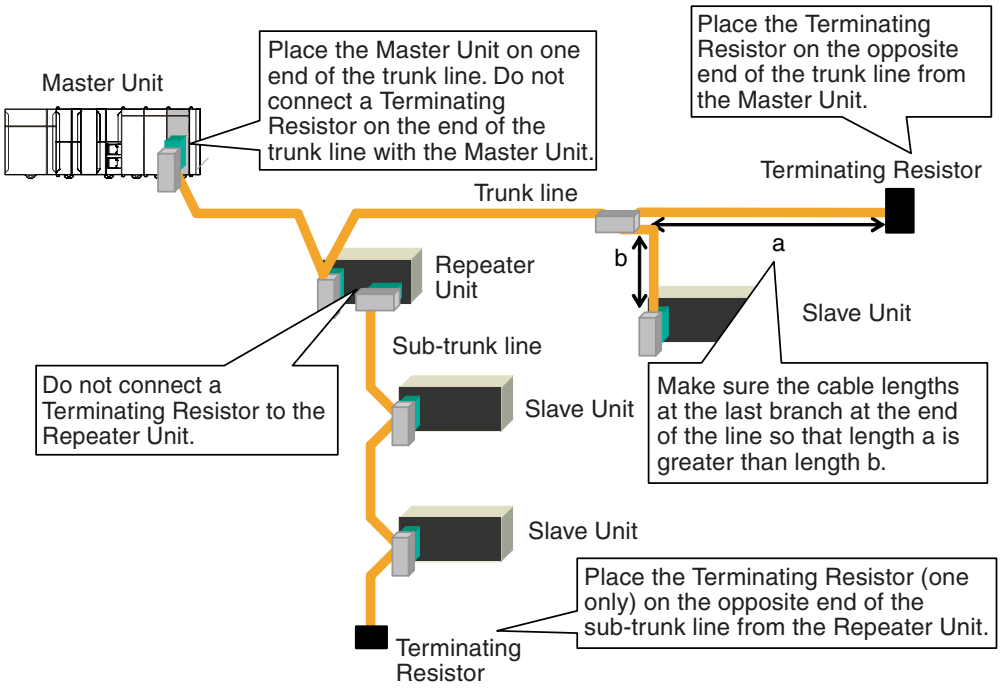


3-2-9 Connection Locations for Terminating Resistors

Terminating Resistors must always be connected to the trunk line and each sub-trunk line on the opposite end from the Master Unit or Repeater Unit.

Note Do not connect a Terminating Resistor on the end of the Network with the Master Unit.

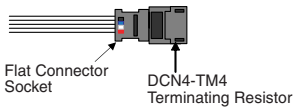
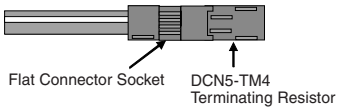
When the trunk line or sub-trunk line is branched, the Terminating Resistor is connected to the end of the branch line farthest from the Master Unit or Repeater Unit.



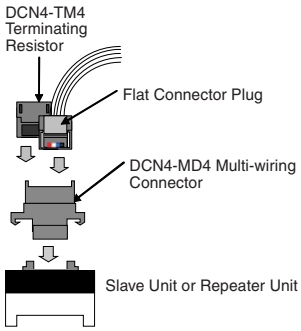
Connecting Terminating Resistors

There are three methods that can be used to connect Terminating Resistor.

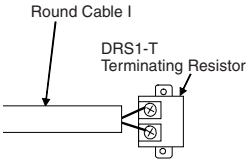
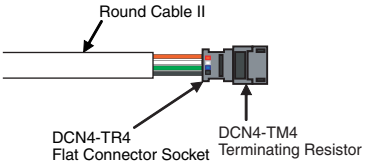
Method 1: Connect a Flat Connector Socket to the trunk line or sub-trunk line and then connect a Terminating Resistor to the Connector.

Flat Cable I	Flat Cable II
	

Method 2: Connect a Multi-wiring Connector to the communications connector for the upstream port on the Slave Unit or Repeater Unit and then connect the trunk line or sub-trunk line cable and a Terminating Resistor to the Multi-wiring Connector.

Flat Cable I


Method 3: Connect a Terminating Resistor to the trunk line or sub-trunk line cable.

Round Cable I	Round Cable II
	

Models and Characteristics of Terminating Resistors

There are two types of Terminating Resistor: the Connector-type and the Terminal Block-type.

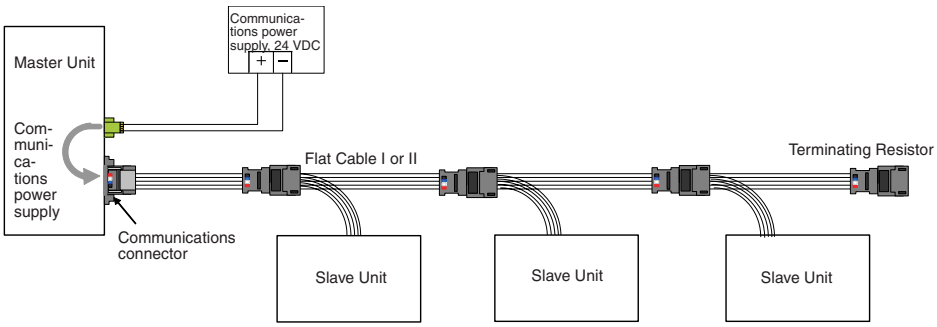
Type of Terminating Resistor	Connector-type		Terminal Block-type
Name	Terminating Resistor		
Model	DCN4-TM4	DCN5-TM4	DRS1-T
Resistance	121 Ω	121 Ω	121 Ω
Rated power	1/4 W	1/4 W	1/4 W
Accuracy	1% max.	1% max.	---
Power handling capacity	0.01 μF	0.01 μF	---
Applicable cable	Round Cable II or Flat Cable I	Flat Cable II	Round Cable I

3-2-10 Connection Locations for Communications Power Supply

Connect the communications power supply as shown in the following diagrams.

● Round Cable II, Flat Cable I, or Flat Cable II

Example for Flat Cable I or II

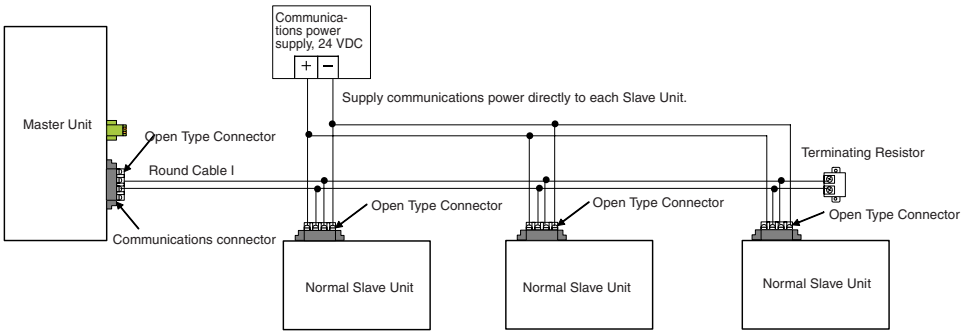


The communications power supply (BS+ and BS-) is connected to the communications power supply connector on the Master Unit. Doing so will supply communications power to the Slave Units on the trunk line from the Round Cable II, Flat Cable I, or Flat Cable II.

Note **1** Connect the communications power supply at only one location for the trunk line and each sub-trunk line.

2 Connect the communications power supply to the downstream port communications power supply connector on the Repeater Unit to supply power to a sub-trunk line.

● Round Cable I



The communications power supply (BS+ and BS-) is connected separately to each Slave Unit and Repeater Unit (see note). Power does not need to be supplied to the Master Unit.

Note The communications power to the Repeater Unit must be supplied to the BS+ and BS- terminals on the upstream port (port 1).

Refer to *4-4 Power Supply Wiring* for details on wiring the communications power supply.

4

Installation and Wiring

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4-1-2 Installation Locations According to Degree of Protection 4-2
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4-1 Installation

4-1-1 Tools Required for Installation and Wiring

The following tools are required to install, wire, and set the Units.

- Phillips screwdrivers: M3 and M4: To install and wire I/O for the Master Unit, Slave Units, and Repeater Units.
- Precision screwdriver: To set rotary switches and DIP switches.

4-1-2 Installation Locations According to Degree of Protection

The degree of protection of the CompoNet Network Units depends on the model of the Unit. The degree of protection for each Unit is given in the following table. Select suitable installation locations accordingly.

Master Units

Name	Model	Degree of protection	Applicable peripheral devices
Master Units	CJ1W-CRM21	---	Flat Cable I Peripheral Devices, Flat Cable II Peripheral Devices, Round Cable I, and Round Cable II

Flat Cable I Peripheral Devices

Name	Model	Degree of protection	Remarks
Flat Cable I	DCA4-4F10	---	Flat Cable I (standard, 100 m)
Flat Connector Socket	DCN4-TR4	IP40	Required when using Flat Cable I
Flat Connector Plug	DCN4-BR4	IP40	Required when using Flat Cable I
Terminating Resistor	DCN4-TM4	IP40	Required when using Flat Cable I

Flat Cable II Peripheral Devices

Name	Model	Degree of protection	Remarks
Flat Cable II	DCA5-4F10	---	Flat Cable II (sheathed, 100 m)
Flat Connector Socket	DCN5-TR4	IP54	Required when using Flat Cable II
Flat Connector Plug	DCN5-BR4	IP54	Required when using Flat Cable II
Terminating Resistor	DCN5-TM4	IP54	Required when using Flat Cable II

4-1-3 Installing the Master Unit

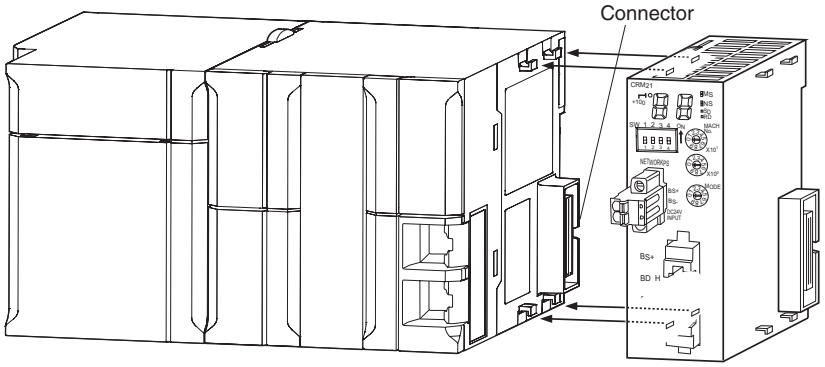
The Master Unit is connected to the CPU Unit. It is connected to the CPU Unit in the same way as other Units.

System Configuration Precautions

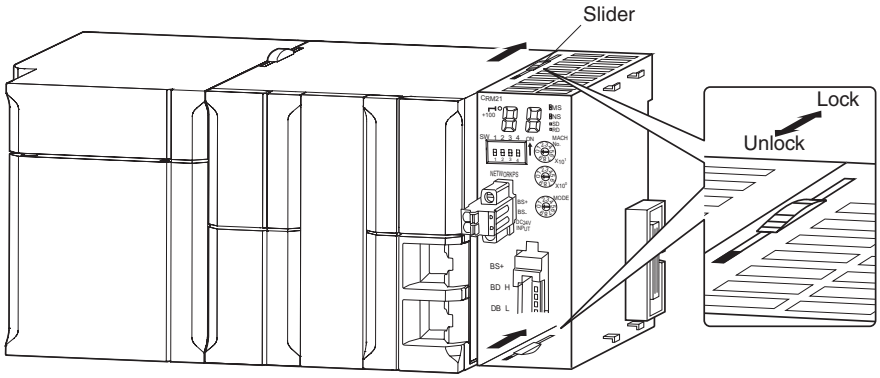
You can connect the Master Unit to the CPU Rack or an Expansion Rack as long as there are no more than 10 Units on one Rack. You can connect up to 40 Master Units per CPU Unit.

Installing the Master Unit

1 Align the connectors and connect the Master Unit.



2 Slide the yellow sliders at the top and bottom of the Unit until they click into place and lock the Unit.



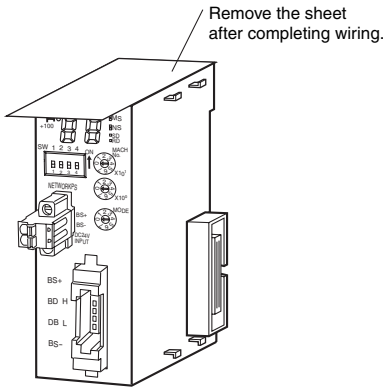
Precautions for Safe Use

If the sliders are not locked completely, the Master Unit may not function properly.

To remove the Unit, unlock the sliders and remove the Unit.

Unit Handling Precautions

- Always turn OFF the power supply to the Controller before you mount or dismount a Unit or connect or disconnect cables.
- To prevent noise from affecting the system, place all wires connected to the Unit ports in ducts, and use separate ducts from those used for high-voltage and high-power lines.
- If the Unit was shipped from the factory with the dust protection sheet on top of the Unit, be sure to remove that sheet before you turn ON the power supply to the Controller. The sheet prevents heat dissipation and could cause malfunctions.
- If you do not use a communications port, always leave the port's dust cover attached.



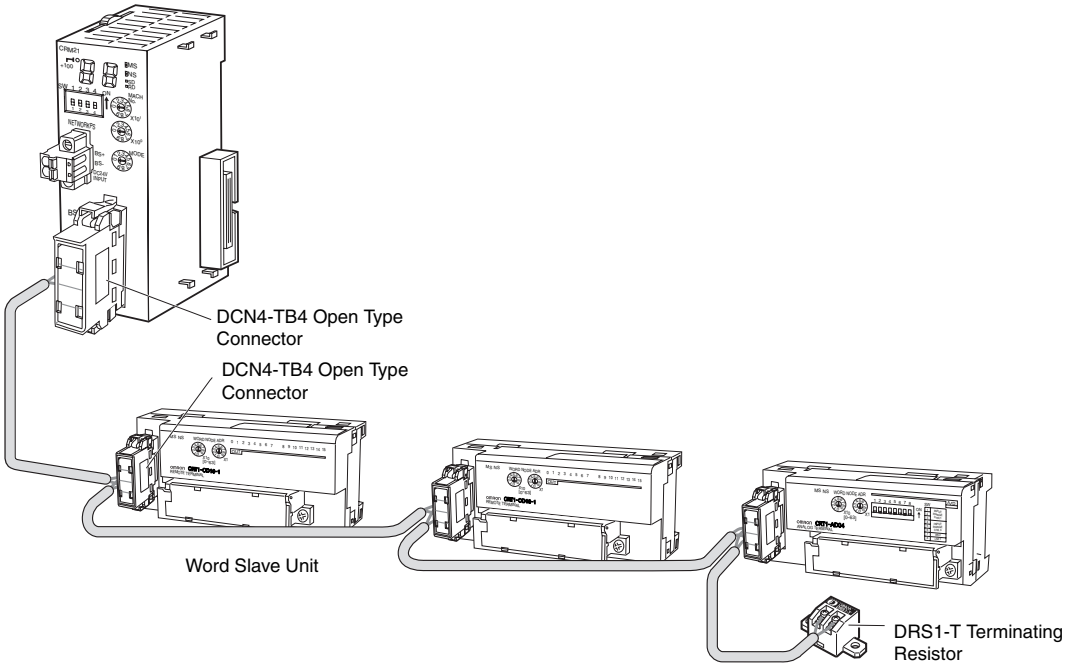
4-2 Connecting Cables

4-2-1 Overview

This section provides an outline of connecting a CompoNet Network using Round Cable I and Flat Cable I cables.

Refer to *SECTION 3 Wiring Configurations* for information on the configuration. Refer to *4-4 Power Supply Wiring* for information on supplying communications power.

Round Cable I

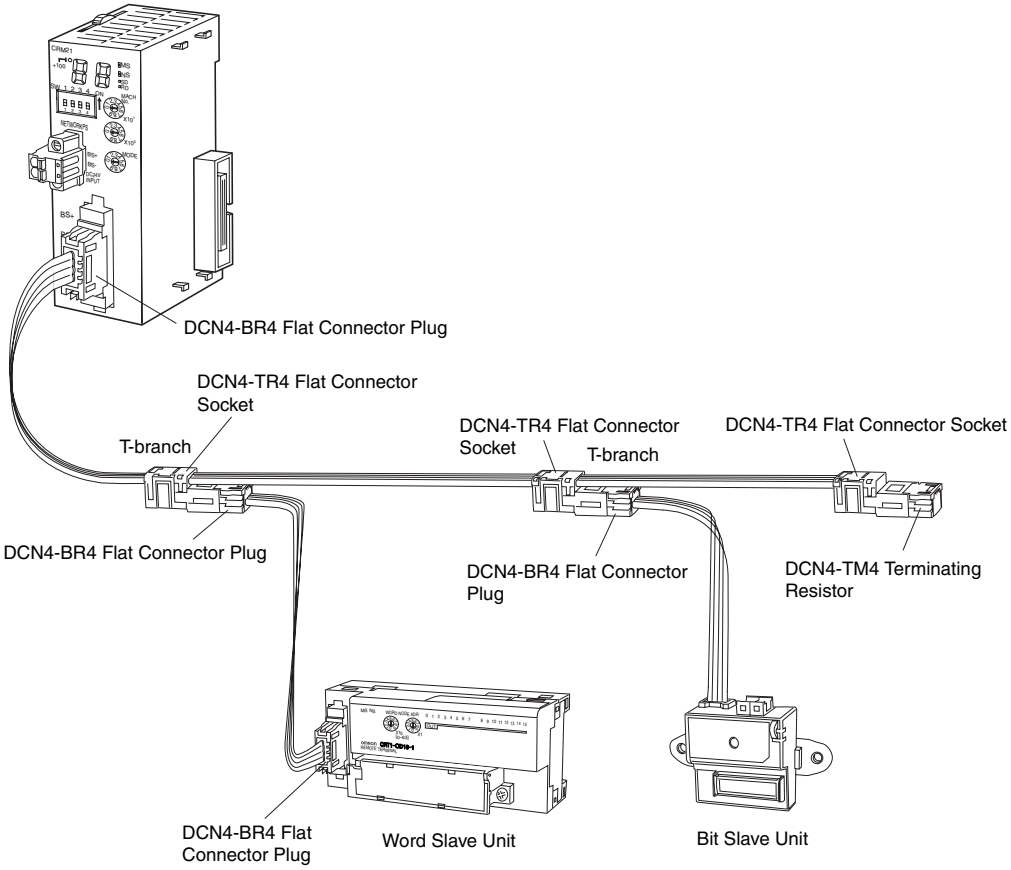


Note T-branching is also possible with a commercially available terminal block.

Flat Cable I

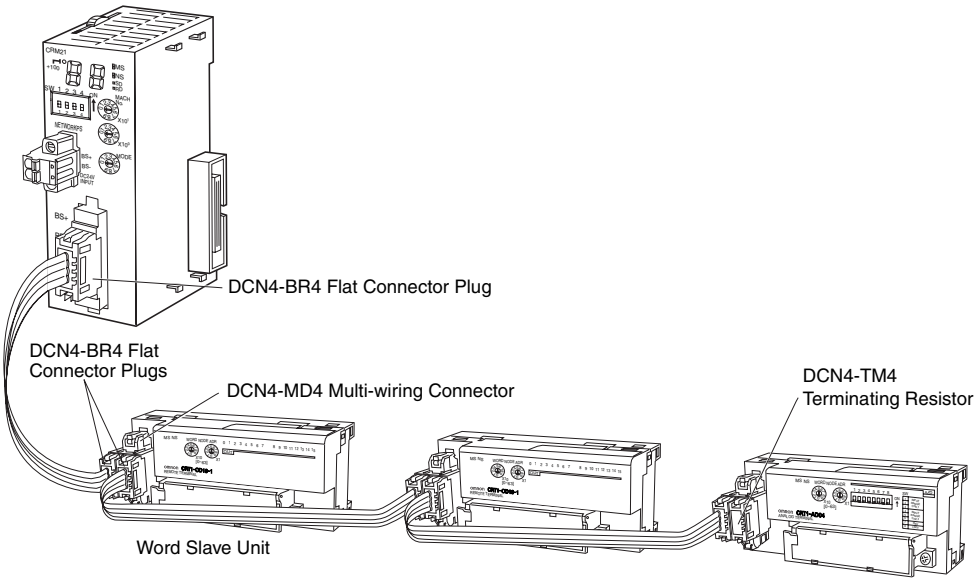
● T-branching

Note T-branches and multidrop connections can be used together.



● Multidrop Connections

Note T-branches and multidrop connections can be used together.

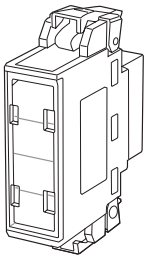


4-2-2 Connecting to Units

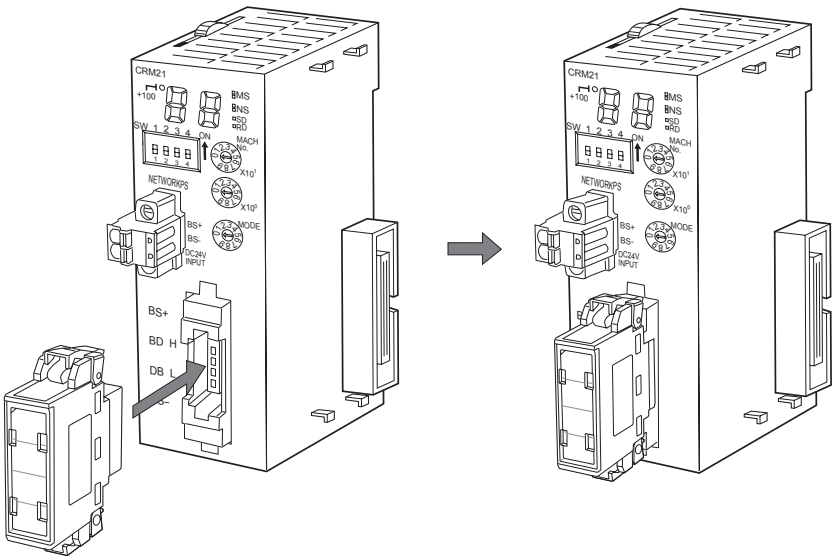
Connecting the Trunk Line to the Master Unit

● Round Cable I or II

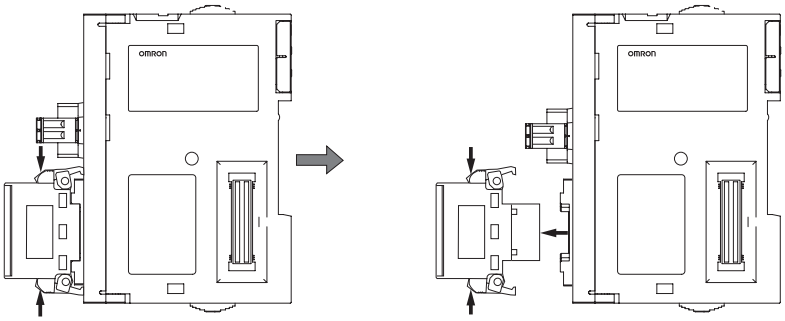
A DCN4-TB4 Open Type Connector is used.



Orient the Open Type Connector so that surface with the open terminals is facing to the left and press in the Open Type Connector until it clicks into place.

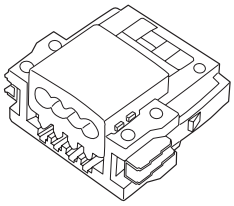


Note To remove an inserted Connector, hold the latches on both sides, and pull out the Connector.

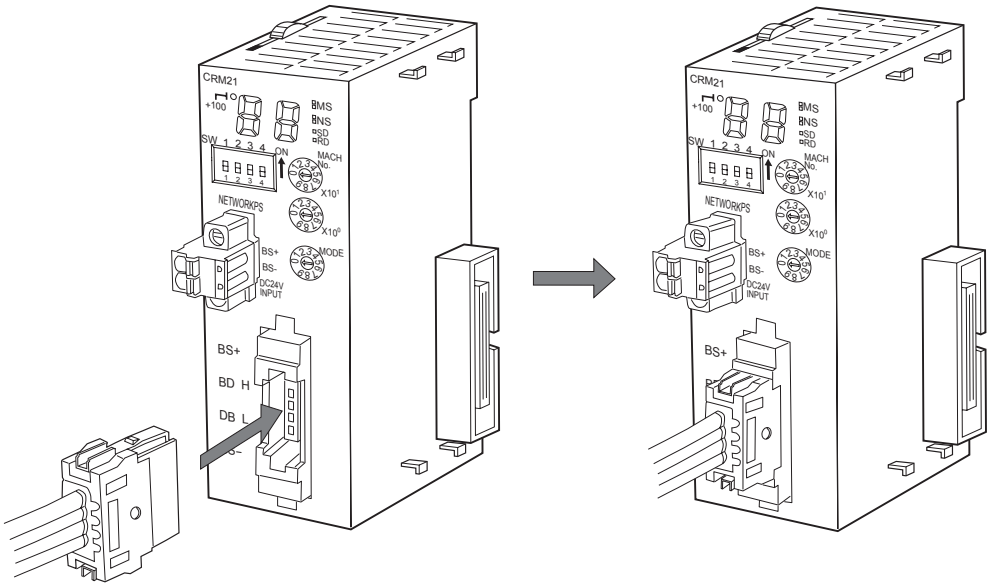


● Flat Cable I

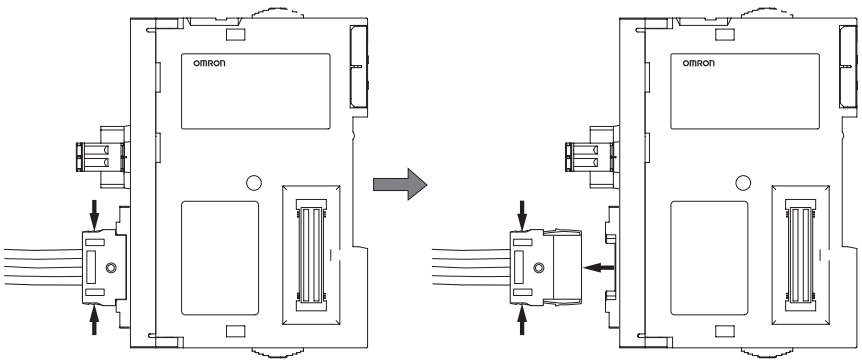
A DCN4-BR4 Flat Connector Plug is connected to the communications connector on the Master Unit. Refer to *4-3 Preparing and Mounting Flat Connectors*.



Orient the Connector so that the line colors are indicated (red, white, blue, and black) is facing to the left and press in the Connector until it clicks into place.

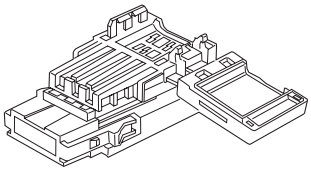


Note To remove an inserted Connector, hold the latches on both sides, and pull out the Connector.

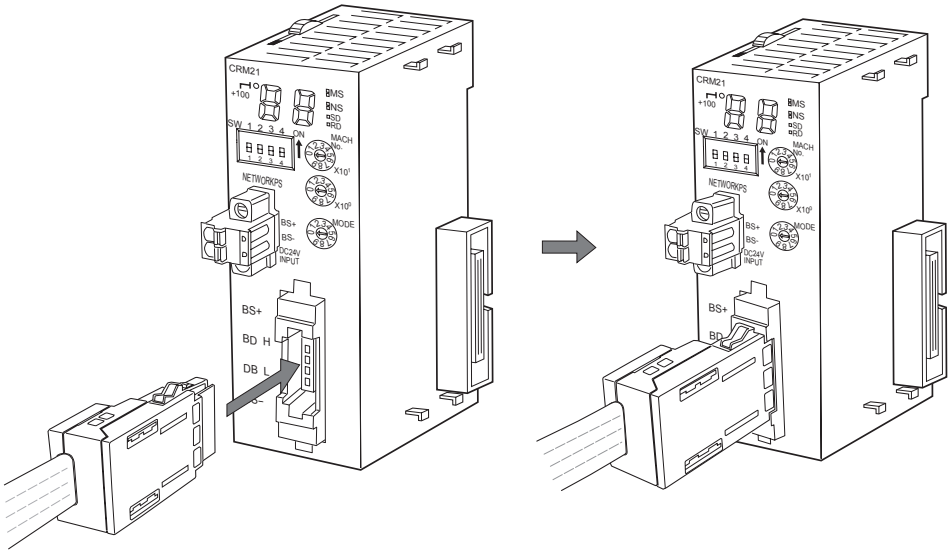


Flat Cable II

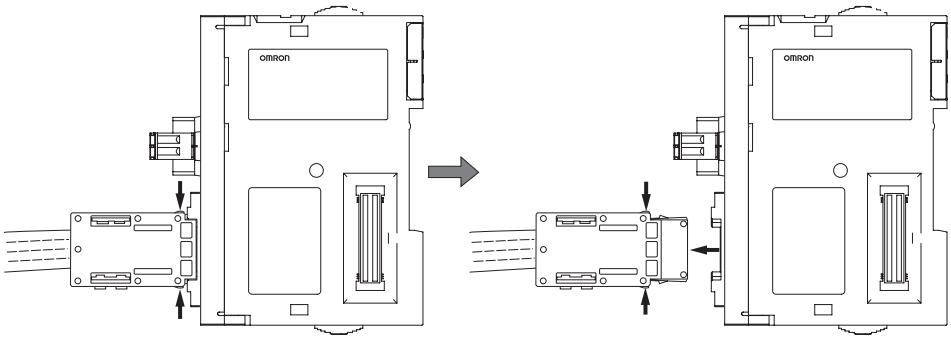
A DCN5-BR4 Flat Connector Plug is connected to the communications connector on the Master Unit. Refer to *4-3 Preparing and Mounting Flat Connectors*.



Orient the Connector so that the white line on the cable is facing to the left and press in the Connector until it clicks into place.



Note To remove an inserted Connector, hold the latches on both sides, and pull out the Connector.



4-2-3 Branching a Communications Cable

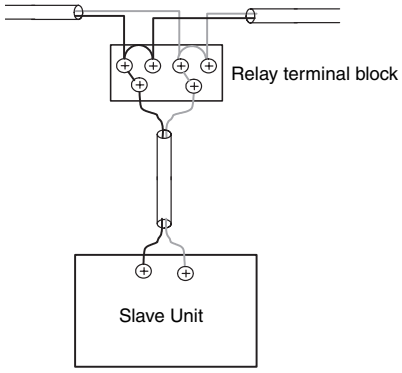
There are two ways to branch the trunk line, sub-trunk lines, and branch lines: T-branches and multi-drop connections.

T-branching

● Round Cable I or II

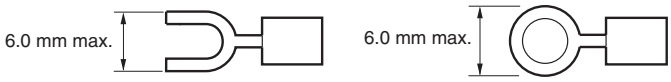
Use a commercially available relay terminal block, and connect the cable wires to the block.

Example for Round Cable I



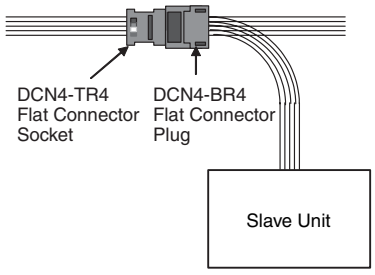
Precautions for Correct Use

Attach an M3 crimp terminal to the cable wire before you connect the wire to a Terminal Block.



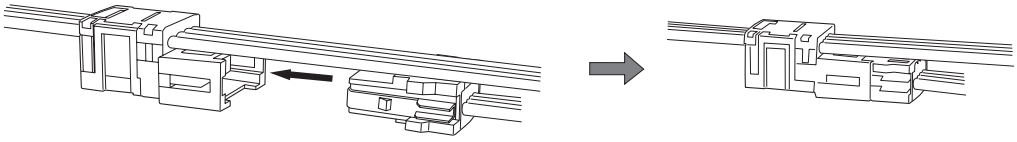
● Flat Cable I

Attach a DCN4-BR4 Flat Connector Plug to a DCN4-TR4 Flat Connector Socket which has already been mounted to the communications cable.



- Mounting Procedure

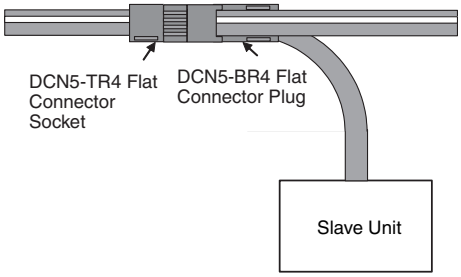
Hold the Flat Connector Plug with the side with the line colors (red, white, black, and blue) facing down, and push the Connector Plug inward until it clicks into place.



Note To remove a Connector Plug which has been attached, hold the latches on both sides of the Connector, and pull out the Connector Plug.

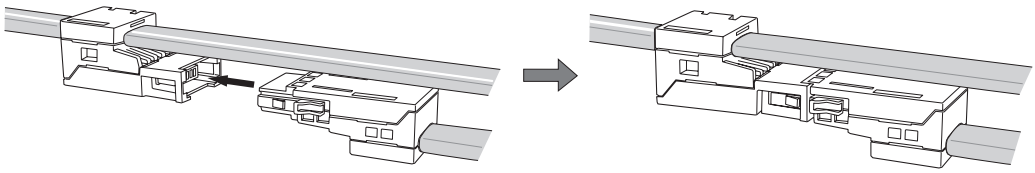
● Flat Cable II

Attach a DCN5-BR4 Flat Connector Plug to a DCN5-TR4 Flat Connector Socket which has already been mounted to the communications cable.



- Mounting Procedure

Hold the Connector Plug with the side with white line facing down, and push the Connector Plug inward until it clicks into place.



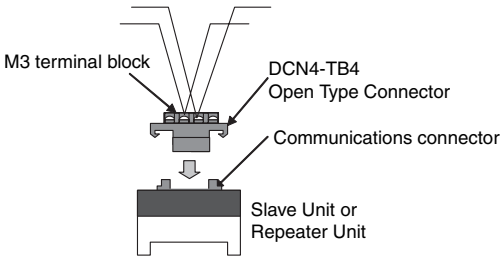
Note To remove a Connector Plug which has been attached, hold the latches on both sides of the Connector, and pull out the Connector Plug.

Multidrop Connections

● Round Cable I or II

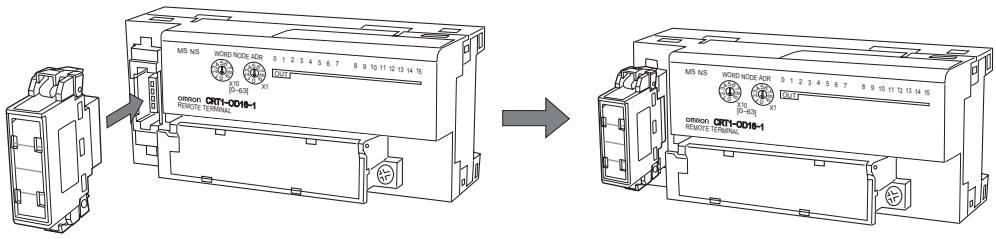
A DCN4-TB4 Open Type Connector is attached to the communications connector of a Slave Unit or a Repeater Unit to convert the communications connector to an M3 screw terminal block. Then the cable wires are connected to the Connector.

Example for Round Cable I



- Mounting Procedure

(1) To mount a DCN4-TB4 Open Type Connector on the communications connector of the Unit, orient the Open Type Connector so that the surface with the open terminals is facing to the left, and press in the Connector until it clicks into place.



Note To remove the inserted Connector, hold the latches on both sides, and pull out the Connector.

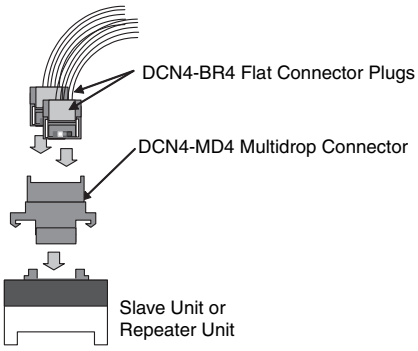
(2) Open the terminal cover of the Open Type Connector. Connect the cable wires to the BDH terminal (communications data high) and the BDL terminal (communications data low). If a Round Cable II cable is being used, connect the other wires to the BS+ terminal (positive terminal of communications power supply) and the BS− terminal (negative terminal of communications power supply).

Precautions for Correct Use

Attach an M3 crimp terminal to the cable wire before you connect the wire to a terminal block.

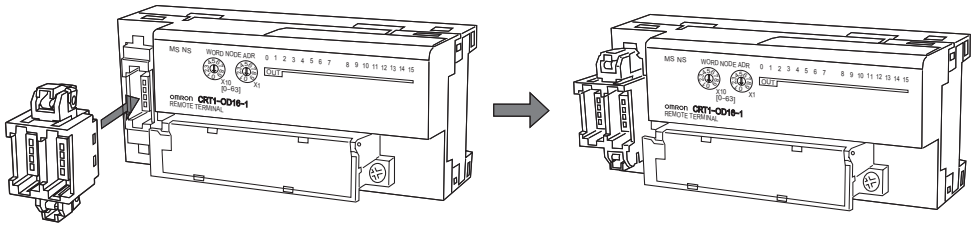
● Flat Cable I

A DCN4-MD4 Multidrop Connector is attached to the communications connector of a Slave Unit or a Repeater Unit. Two DCN4-BR4 Flat Connector Plugs are mounted separately on two communications cables. The two Plugs are connected to the Multidrop Connector to make a branch.

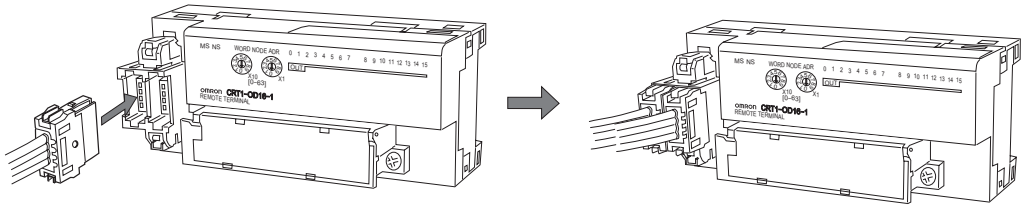


- Mounting Procedure

(1) Hold the Multidrop Connector so that the side with the number is facing to the left, and press the Connector to the communications connector of a Slave or a Repeater Unit until it clicks into place.



(2) Hold the Flat Connector Plug so that the side with the line colors (red, white, black and blue) is facing to the left, and press in the Plug until it clicks into place. Repeat the same to have two Plugs connected to the Unit.



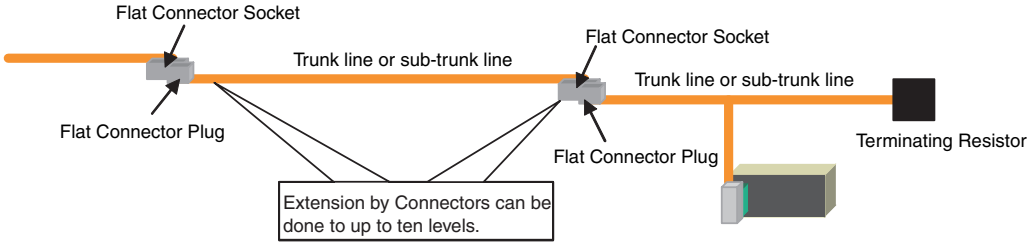
Note To remove the inserted Connector, hold the latches on both sides, and pull out the Connector.

● Flat Cable II

Multidrop connections are not supported.

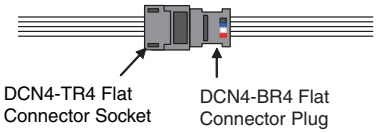
4-2-4 Extending a Communications Cable

Flat Connectors can be used to extend cables for the trunk line, sub-trunk lines, branch lines, and sub-branch lines to maximum ten levels. The maximum trunk line length is the upper limit of extension of each type of cable. Refer to *1-2-1 Cable Types, Maximum Distances, and Number of Slave Units*.



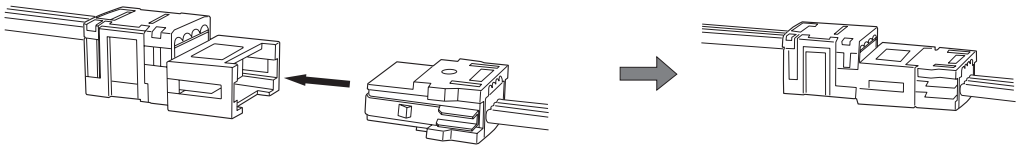
● Flat Cable I

Attach a DCN4-BR4 Flat Connector Plug to a DCN4-TR4 Flat Connector Socket which has already been mounted to the communications cable.



- Mounting Procedure

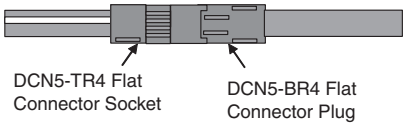
Hold the Flat Connector Plug with the side with the line colors (red, white, black, and blue) facing down, and push the Flat Connector Plug inward until it clicks into place.



Note To remove a Connector Plug which has been attached, hold the latches on both sides of the Connector, and pull out the Connector Plug.

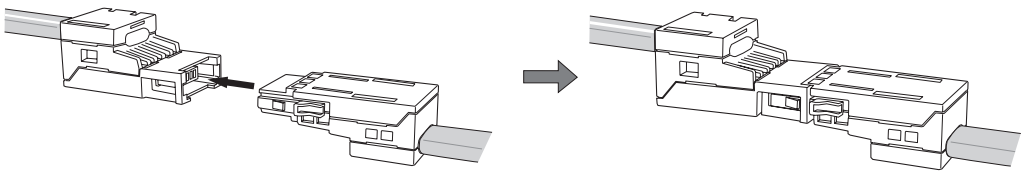
● Flat Cable II

Attach a DCN5-BR4 Flat Connector Plug to a DCN5-TR4 Flat Connector Socket which has already been mounted to the communications cable.



- Mounting Procedure

Hold the Flat Connector Plug with the side with the white line facing down, and push the Flat Connector Plug inward until it clicks into place.



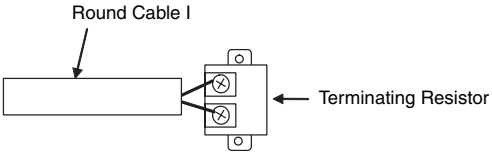
Note To remove a Connector Plug which has been attached, hold the latches on both sides of the Connector, and pull out the Connector Plug.

4-2-5 Connecting Terminating Resistors

A Terminating Resistor must always be connected to the trunk line and each sub-trunk line on its opposite end from the Master Unit or a Repeater Unit.

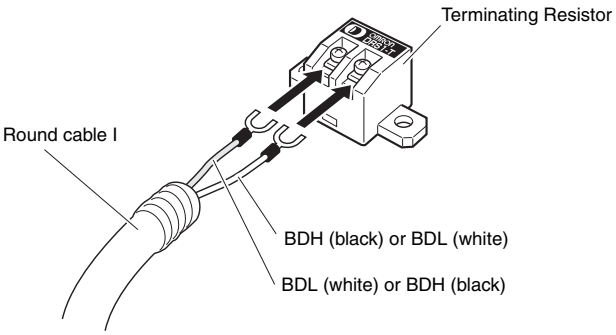
● Round Cable I

The cable wires are connected to a DRS1-T Terminating Resistor.



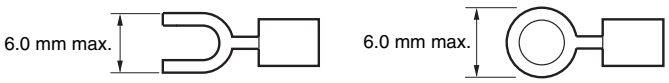
- Connecting Procedure

Connect the cable wires to the Terminating Resistor, and tighten the screws. The Terminating Resistor has no polarity. Either wire can be connected to either terminal regardless of their colors.



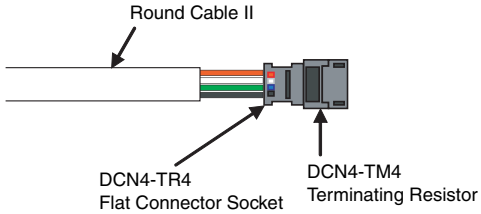
Precautions for Correct Use

Attach an M3 crimp terminal to the cable wire before you connect the wire to a Terminating Resistor.



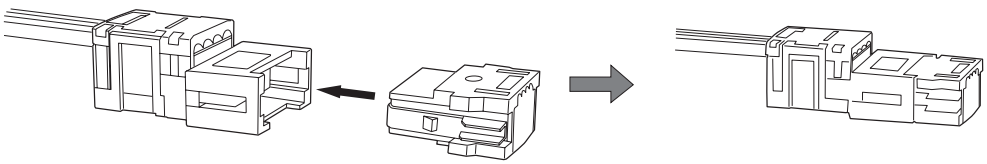
● Round Cable II

A DCN4-TR4 Flat Connector Socket is mounted on the Round Cable II cable. Then a DCN4-TM4 Terminating Resistor is attached to the Socket.



- Mounting Procedure

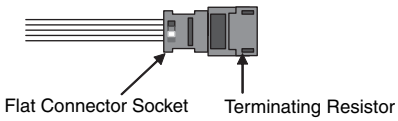
Press the Terminating Resistor into the Socket until it clicks into place.



Note To remove a Terminating Resistor Plug which has been attached, hold the latches on both sides of the Resistor, and pull it out.

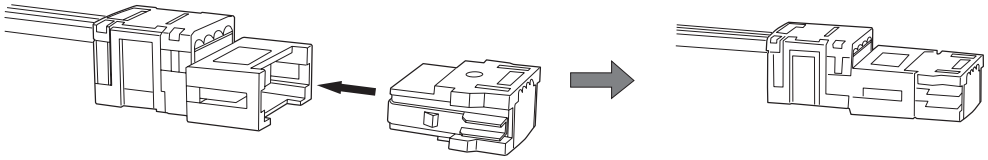
● Flat Cable I

A DCN4-TR4 Flat Connector Socket is mounted at the end of the communications cable. Then a DCN4-TM4 Terminating Resistor is attached to the Socket.



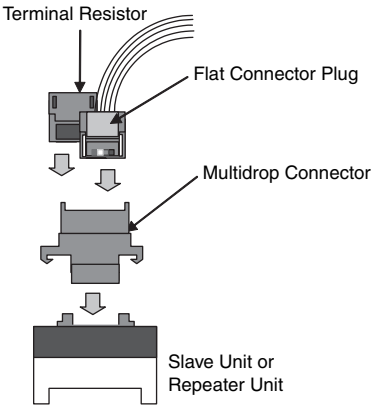
- Mounting Procedure

Press the Terminating Resistor into the Socket until it clicks into place.



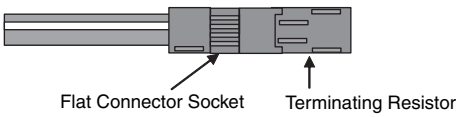
Note To remove a Terminating Resistor which has been attached, hold the latches on both sides of the Resistor, and pull it out.

When a Slave Unit or a Repeater Unit has a multidrop connection, the Terminating Resistor can be directly attached to the Multidrop Connector that is mounted on the Unit. This is only applicable with Flat Cable I cables.



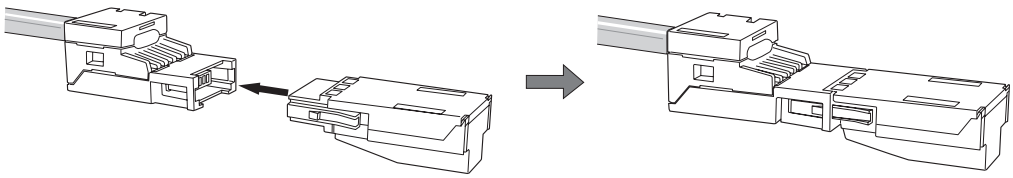
Flat Cable II

A DCN5-TR4 Flat Connector Socket is mounted on the communications cable. Then a DCN5-TM4 Terminating Resistor is attached to the Socket.



- Mounting Procedure

Press the Terminating Resistor into the Socket until it clicks into place.



Note To remove a Terminating Resistor which has been attached, hold the latches on both sides of the Resistor, and pull it out.

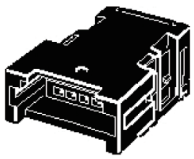
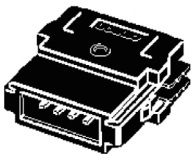
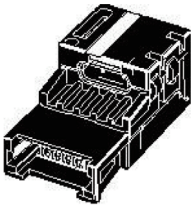
4-3 Preparing and Mounting Flat Connectors

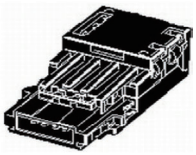
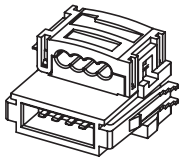
When you connect a Terminating Resistor to a Round Cable II cable, connect a Flat Cable I or II cable to the Unit, or when you branch or extend the line, you must prepare a Flat Connector and mount it on the cable.

Precautions for Correct Use

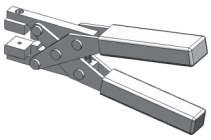
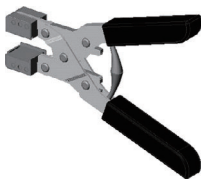
- Flat Connectors are not reworkable. Once they are connected they cannot be removed and connected again.
- Hold the Flat Connector body to plug in or pull out the connector.
- After connecting the Flat Connector, pull it lightly to confirm the connection is secured.

Applicable Peripheral Devices

Name	Appearance	Model	Application
Flat Connector Socket		DCN4-TR4	Used as a set with the DCN4-BR4 Flat Connector Plug in the following applications: • Extending the trunk line or sub-trunk lines. • T-branching branch lines from the trunk line or sub-trunk lines. • T-branching sub-branch lines from a branch line.
			Used independently when connecting a DCN4-TM4 Terminating Resistor to the end of the trunk line or a sub-trunk line.
Flat Connector Plug		DCN4-BR4	Used as a set with the DCN4-TR4 Flat Connector Socket in the following applications: • Extending the trunk line or sub-trunk lines. • T-branching branch lines from the trunk line or sub-trunk lines. • T-branching sub-branch lines from a branch line.
			Used independently in the following applications: • Connecting Communications Cable to a Unit. • Connecting Communications Cable to a DCN4-MD4 Multidrop Connector (when a multidrop connection is used).
Flat Connector Socket		DCN5-TR4	Used as a set with the DCN5-BR4 Flat Connector Plug in the following applications: • Extending the trunk line or sub-trunk lines. • T-branching branch lines from the trunk line or sub-trunk lines. • T-branching sub-branch lines from a branch line.
			Used independently when connecting a DCN5-TM4 Terminating Resistor to the end of the trunk line or a sub-trunk line.

Name	Appearance	Model	Application
Flat Connector Plug		DCN5-BR4	Used as a set with the DCN5-TR4 Flat Connector Socket in the following applications: • Extending the trunk line or sub-trunk lines. • T-branching branch lines from the trunk line or sub-trunk lines. • T-branching sub-branch lines from a branch line. Used independently to connect Communications Cable to a Unit.
Flat Multi-wiring Connector Plug		DCN4-MR4	Used independently for the following applications: • Making a multidrop connection from the communications cable to a Unit. * This Connector can be used with the following Units. Bit Slave Units with Small Connectors (CRT1B-□D0□JS(-1))

Tools Required

Name	Appearance	Model	Application
Special Tool (Pliers)		DWT-A01	A pressure welding tool for a DCN4-TR4 Flat Connector Socket and a DCN4-BR4 Flat Connector Plug or DCN4-MR4 Flat Multi-wiring Connector.
Special Tool (Pliers)		DWT-A02	A pressure welding tool for a DCN5-TR4 Flat Connector Socket or a DCN5-BR4 Flat Connector Plug.

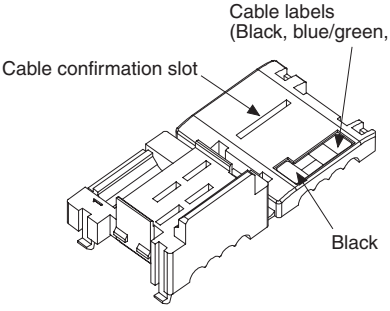
4-3-1 Round Cable II

A Flat Connector must be mounted on a Round Cable II cable only when a Terminating Resistor is attached to it.

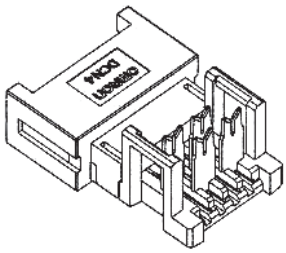
Preparing and Mounting DCN4-TR4 Flat Connector Sockets

- Component Names

Cover



Housing

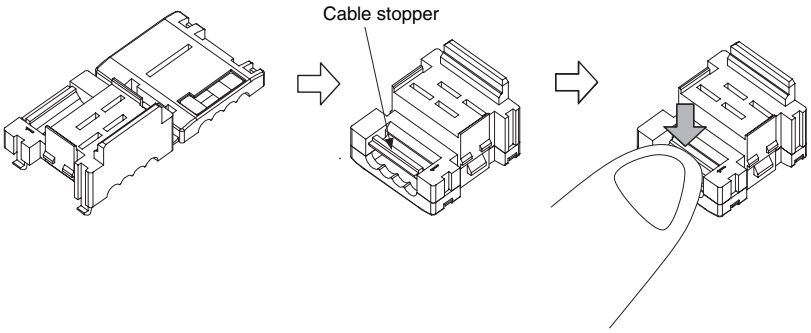


1 Preparing the Cable

At the tip of cable, make a cut line perpendicular to the cable length on the sheath, and strip the sheath.

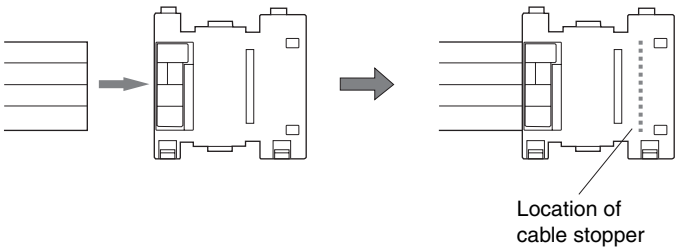
2 Setting the Cable Stopper

Set the cable stopper. Close the cover. Secure the hooks. Press down on the cable stopper until it clicks into place.



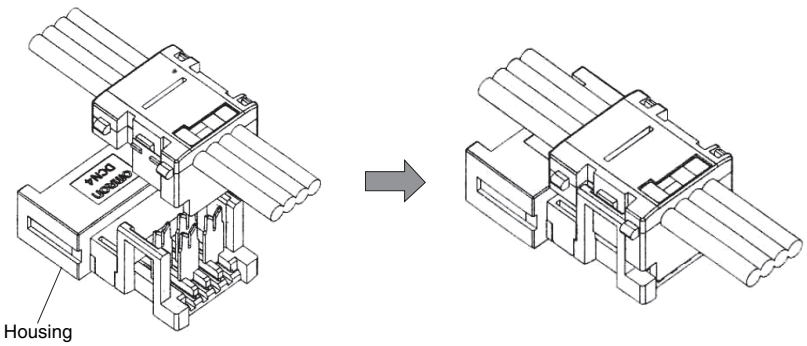
3 Connecting the Cable

Confirm that the cable colors match the cable labels and then insert the unsheathed cable tip all the way into the cable stopper in the cover.



4 Attaching the Housing

Confirm the colors again, and temporarily secure the housing to the cover.



Note Once it is attached, the housing cannot be removed from the cover. If you attempt to separate the housing and the cover forcefully, you may damage the connector.

5 Pressure-welding the Connector

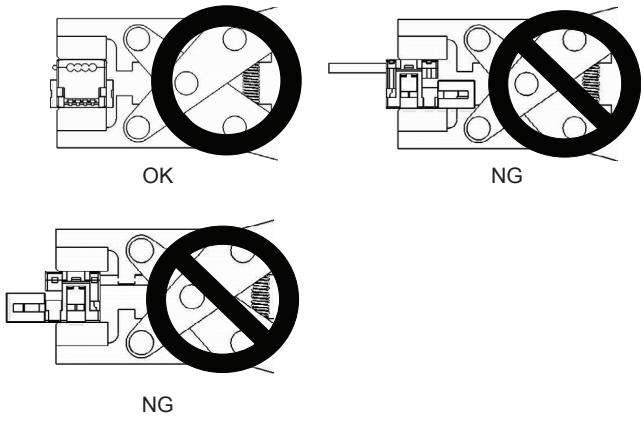
Use the DWT-A01 Pliers to pressure-weld the connector.

(1) Align the center (see arrows) of the connector cover with the center of the pressure-welding block on the DWT-A01 Pliers.

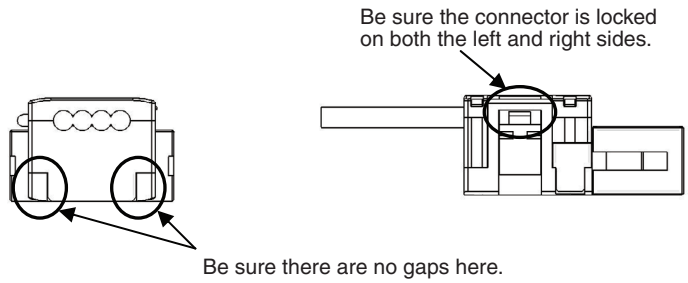
(2) Squeeze firmly on the Pliers until the lock on the connector clicks into place.

Precautions for Correct Use

- Do not pressure-weld the connector cover at the edges.
- Do not pressure-weld the connector cover at the back of the pressure-welding block.
- Set the connector in the correct orientation.



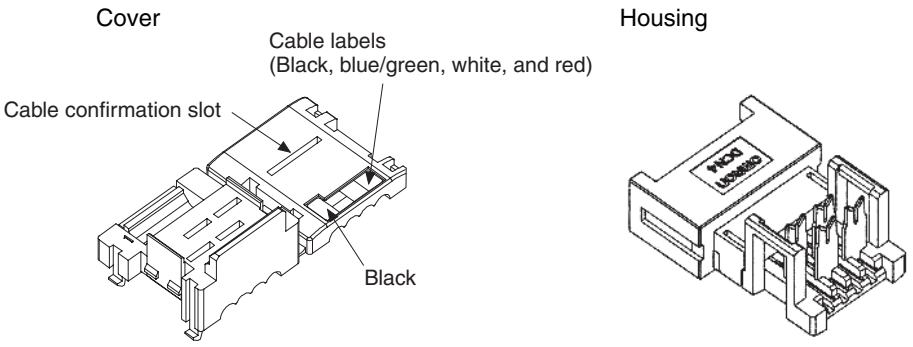
(3) After attaching the cable, confirm that it is properly pressure-welded.



4-3-2 Flat Cable I

Preparing and Mounting DCN4-TR4 Flat Connector Sockets

- Component Names

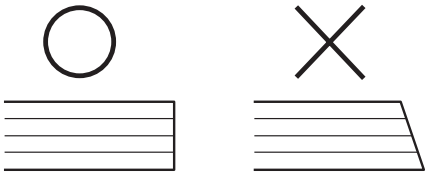


1 Cutting the Cable

This step is required only for extending the cable or connecting a Terminating Resistor.

Cut the cable perpendicular to its length.

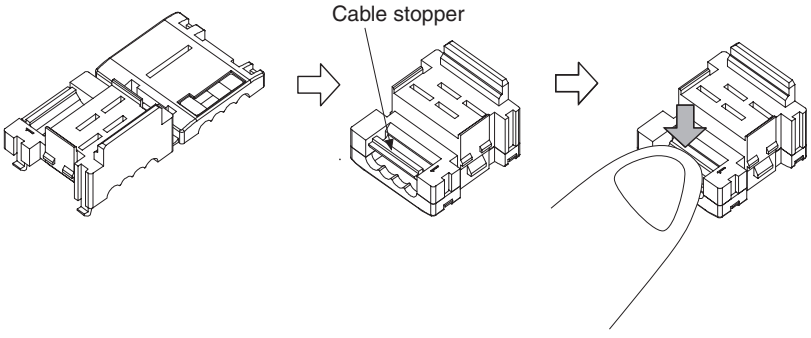
To prevent short-circuits, use a sharp cutting tool such as nipper. Confirm there is no remaining wire coming out.



2 Setting the Cable Stopper

This step is required only for extending the cable or connecting a Terminating Resistor.

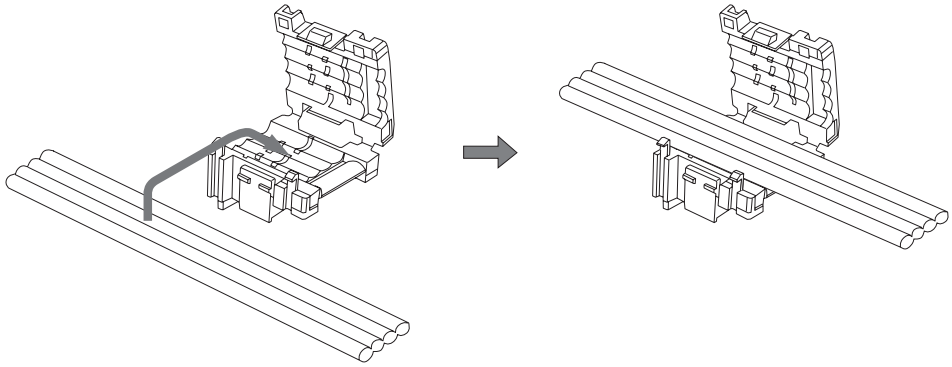
For these purposes, the cable can end in the connector. Set the cable stopper in advance. Close the cover. Secure the hooks. Press down on the cable stopper until it clicks into place.



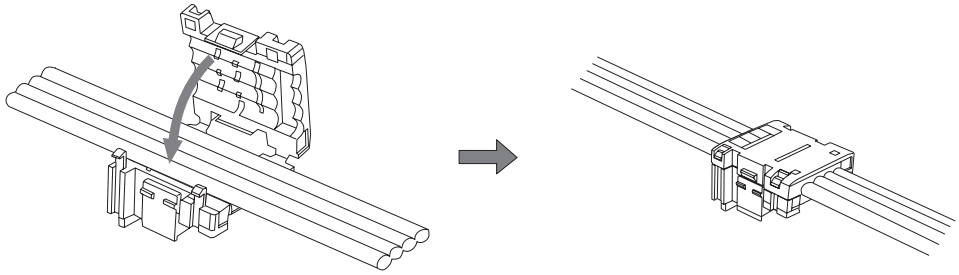
3 Mounting the Cable

- T-branching

(1) Confirm that the cable colors match the cable labels, and then place the cable in the cover.

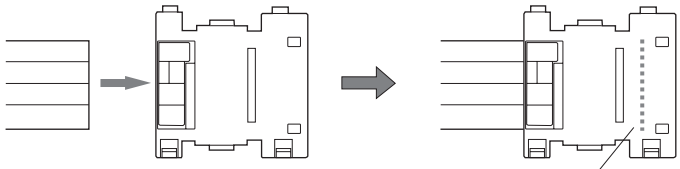


(2) Close the cover to sandwich the cable and secure the hook.



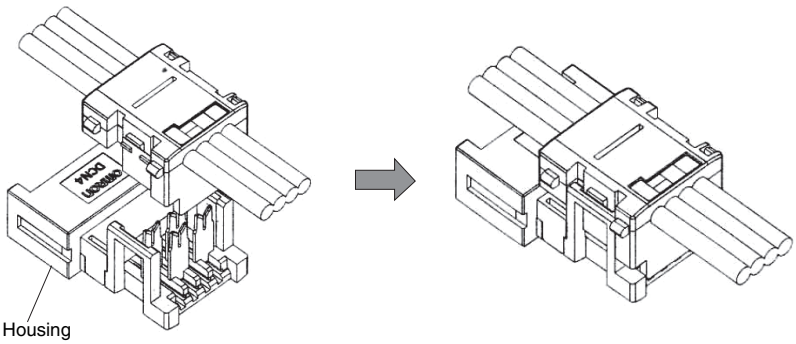
- Extending or Connecting a Terminating Resistor

  Insert the cable tip all the way into the cable stopper in the cover.



4 Attaching the Housing

Confirm the colors again, and temporarily secure the housing to the cover.

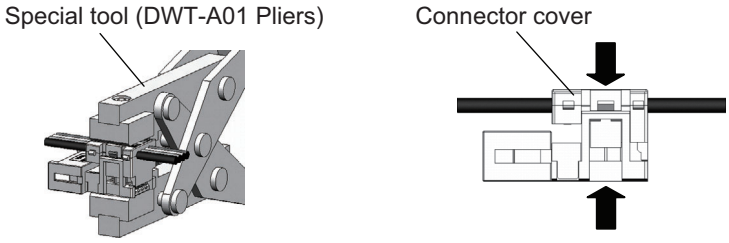


Note Once it is attached, the housing cannot be removed from the cover. If you attempt to separate the housing and the cover forcefully, you may damage the connector.

5 Pressure-welding the Connector

Use the DWT-A01 Pliers to pressure-weld the connector.

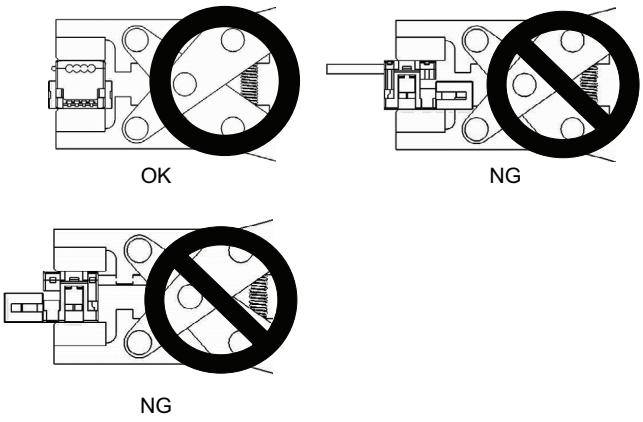
(1) Align the center (see arrows) of the connector cover with the center of the pressure-welding block on the DWT-A01 Pliers.



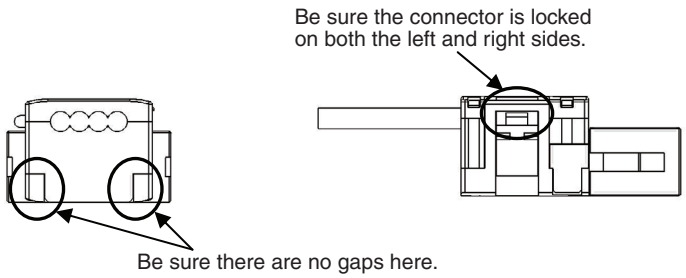
(2) Squeeze firmly on the Pliers until the lock on the connector clicks into place.

Precautions for Correct Use

- Do not pressure-weld the connector cover at the edges.
- Do not pressure-weld the connector cover at the back of the pressure-welding block.
- Set the connector in the correct orientation.

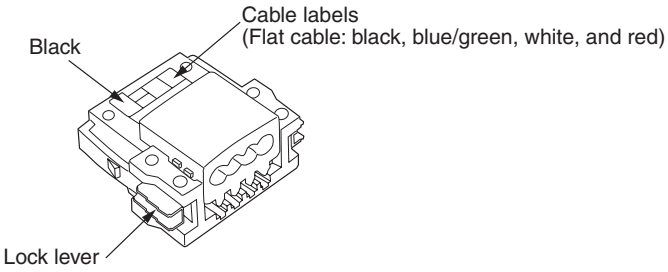


(3) After attaching the cable, confirm that it is properly pressure-welded.



Preparing and Mounting DCN4-BR4 Flat Connector Plugs

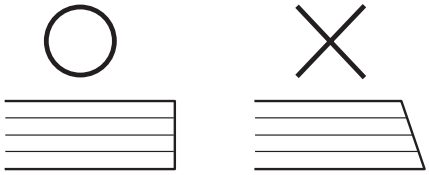
- Component Names



1 Cutting the Cable

Cut the cable perpendicular to the length.

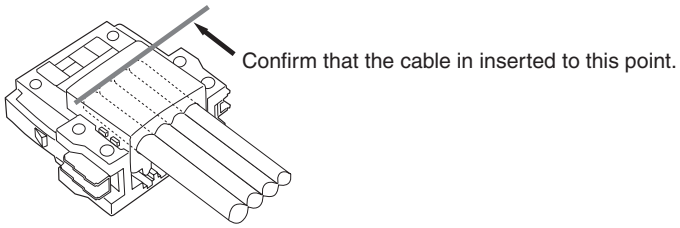
To prevent short-circuits, use a sharp cutting tool such as nipper. Confirm there is no remaining wire coming out.



2 Attaching the Cable

Confirm that the cable colors match the cable labels and insert the cable into the connector.

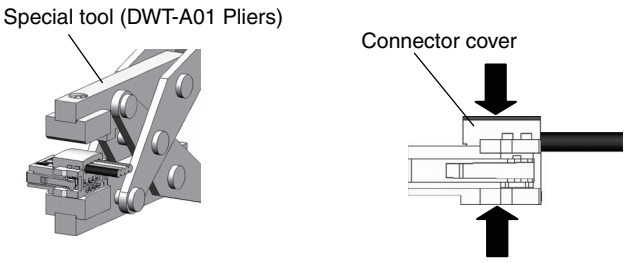
Confirm that the cable is inserted all the way to the back. (The cover is semi-transparent.)



3 Pressure-welding the Connector

The connector is pressure-welded using the DWT-A01 Pliers.

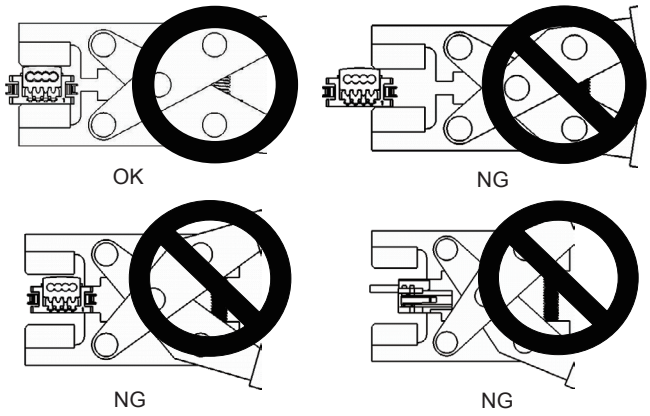
(1) Align the center (see arrow) of the connector cover with the center of the pressure-welding block on the Pliers and set the cover in the Pliers.



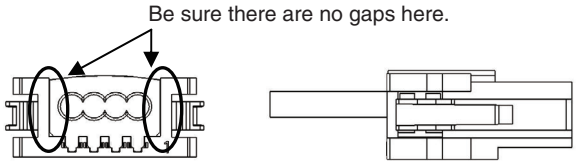
(2) Squeeze firmly on the Pliers until the lock on the connector clicks into place.

Precautions for Correct Use

- Do not pressure-weld the connector cover at the edges.
- Do not pressure-weld the connector cover at the back of the pressure-welding block.
- Set the connector in the correct orientation.



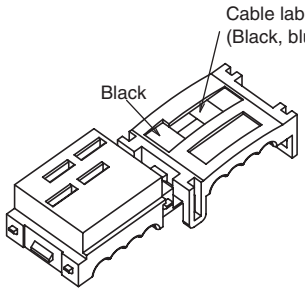
(3) After attaching the cable, confirm that it is properly pressure-welded.



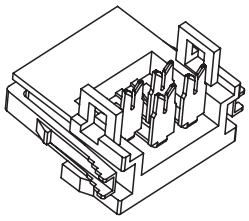
Preparing and Mounting DCN4-MR4 Flat Multi-wiring Connector Plugs

- Component Names

Cover



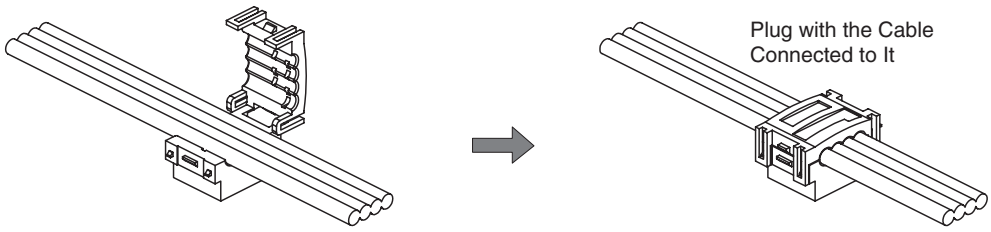
Housing



1 Attaching the Cable

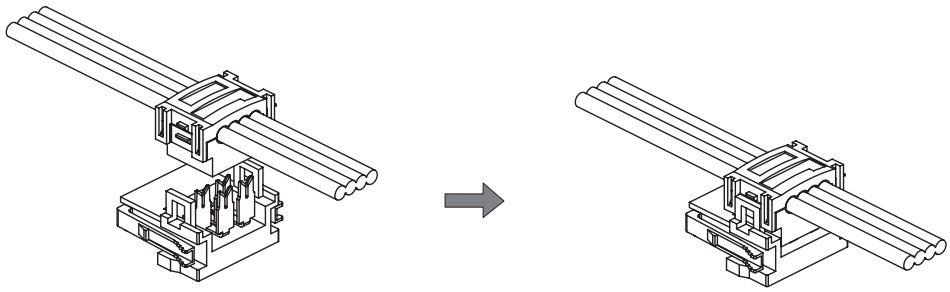
(1) Confirm that the cable colors match the cable labels and then place the Cable on the Plug.

(2) Close the cover to sandwich the cable and secure the hooks.



2 Attaching the Housing

(1) Confirm the colors again, and temporarily secure the housing to the cover.

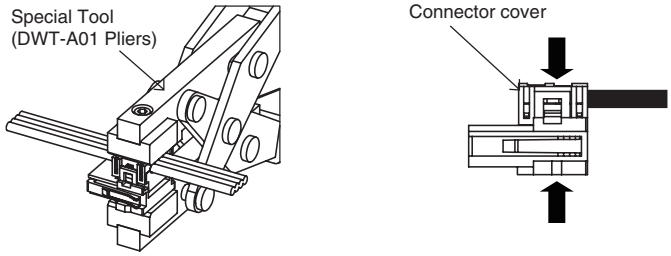


3 Pressure-welding the Connector

Use the DWT-A01 Pliers to pressure-weld the connector.

(1) Align the center (see arrows) of the connector cover with the center of the pressure-welding block on the DWT-A01 Pliers.

(2) Squeeze firmly on the Pliers until the lock on the connector clicks into place.

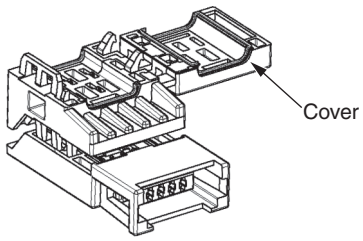


Note After pressure-welding the Cable, confirm that the Cable is properly pressure-welded. The lock on the housing must be completely engaged with the cover.

4-3-3 Flat Cable II

Preparing and Mounting DCN5-TR4 Flat Connector Sockets

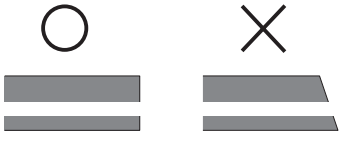
- Component Names



1 Cutting the Cable

This step is required only for extending the cable or connecting a Terminating Resistor.

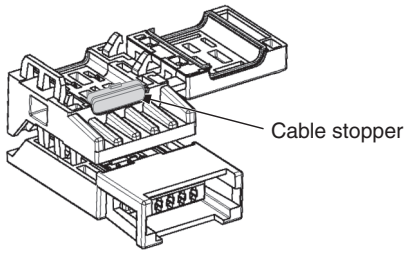
At the tip of cable, cut the cable perpendicular to the cable length. To prevent short-circuits, use a sharp cutting tool such as nipper. Confirm there is no remaining wire coming out.



2 Setting the Cable Stopper

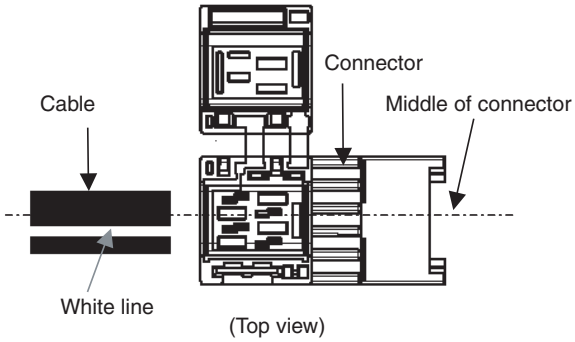
This step is required only for extending the cable or connecting a Terminating Resistor.

For these purposes, the cable can end in the connector. Place the cable stopper in advance. Put the cable in the cover. Position the cable so that the cable tip touches the stopper.

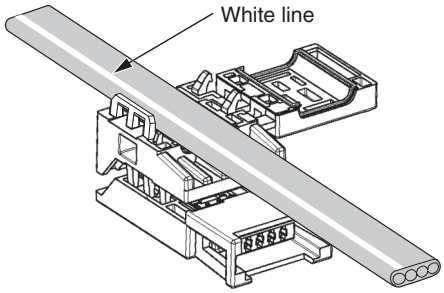


3 Attaching the Cable

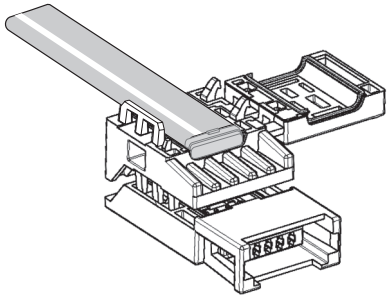
(1) Hold the cable with the white line facing up and near the cover opening.



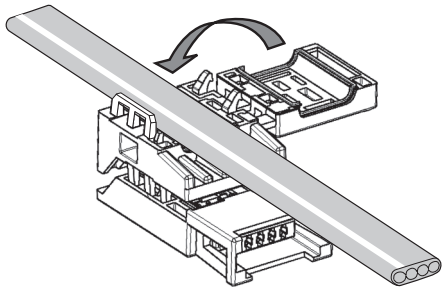
T-branch Connections



Extending the Cable or Connecting a Terminating Resistor



(2) Hold the cable to prevent dislocation and close the cover.

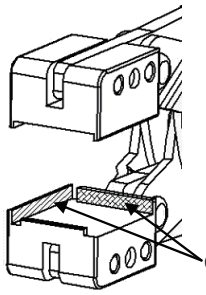


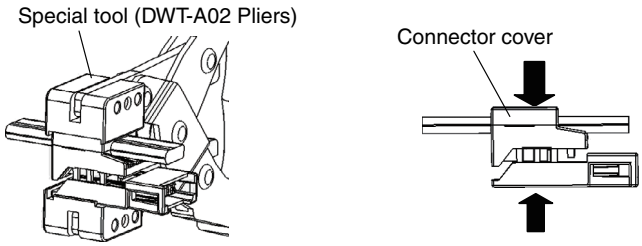
Note For extension or to connect a Terminating Resistor, make sure the cable tip is inserted to the cable stopper and will not come out.

4 Pressure-welding the Connector

The connector is pressure-welded using the DWT-A02 Pliers.

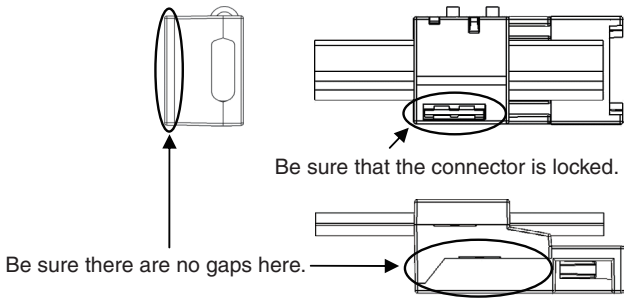
(1) Align the center (see arrows) of the connector cover with the center of the pressure-welding block on the DWT-A02 Pliers.





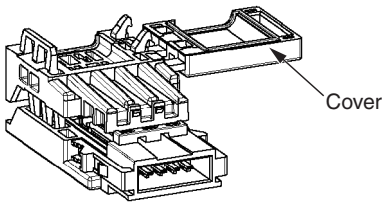
(2) Squeeze firmly on the Pliers until the lock on the connector clicks into place.

(3) After attaching the cable, confirm that it is properly pressure-welded.



Preparing and Mounting DCN5-BR4 Flat Connector Plugs

- Component Names



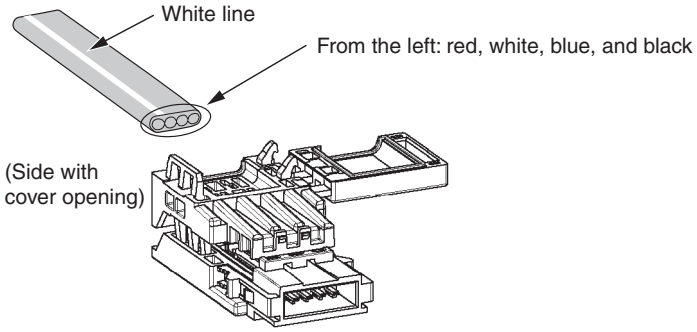
1 Cutting the Cable

Cut the cable perpendicular to the length.

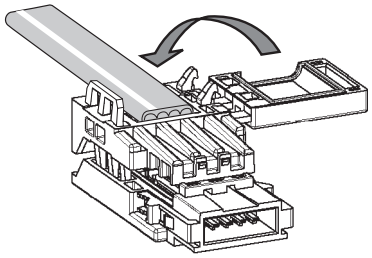
To prevent short-circuits, use a sharp cutting tool such as nipper. Confirm there is no remaining wire coming out.

2 Attaching the Cable

(1) Hold the cable with the white line facing up and near the cover opening



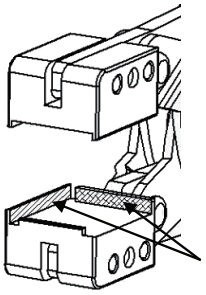
(2) Hold the cable so that it does not move and close the cover.



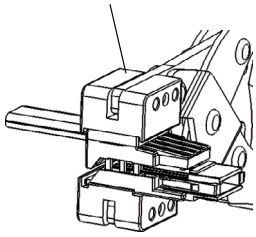
3 Pressure-welding the connector

The connector is pressure-welded using the DWT-A02 Pliers.

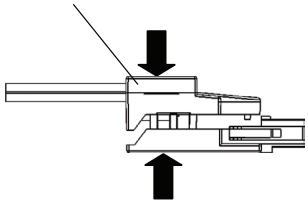
(1) Align the center (see arrows) of the connector cover with the center of the pressure-welding block on the DWT-A02 Pliers.



Connector position reference surfaces



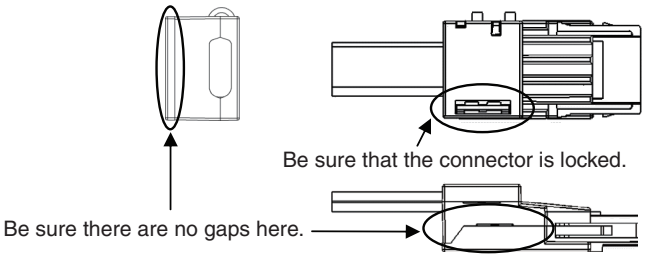
Special tool (DWT-A02 Pliers)



Connector cover

(2) Squeeze firmly on the Pliers until the lock on the connector clicks into place.

(3) After attaching the cable, confirm that it is properly pressure-welded.



Be sure that the connector is locked.

Be sure there are no gaps here.

4-4 Power Supply Wiring

The following power supplies are required to operate the CompoNet Network.

- Communications power supply: Used for communications with individual Units and for internal circuit operations of Units.
- I/O power supply: Used for I/O operations for Units with external I/O.

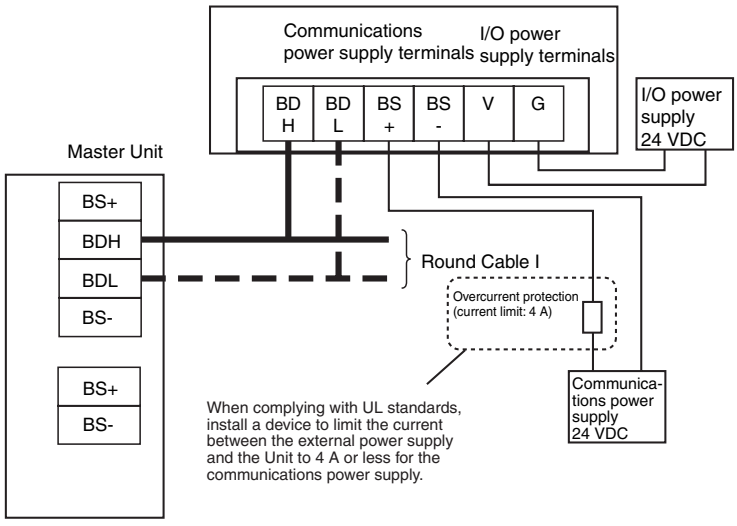
The method for supplying communications power and I/O power depends on the types of cable and Slave Unit that are used. The differences are shown in the following table.

Power supply	Cable type	Communications power supply method	I/O power supply method
Multi-power supply	Round Cable I	Supplied to Units individually.	Supplied to individual Units separately from the communications power supply.
	Round Cable II, Flat Cable I, or Flat Cable II	Supplied through the Communications Cable by supplying power to the Master Unit.	
Network power supply	Round Cable I	Not supported	
	Round Cable II, Flat Cable I, or Flat Cable II	The communications power supply and the I/O power supply are provided together through Communications Cable.	

Multi-power Supply

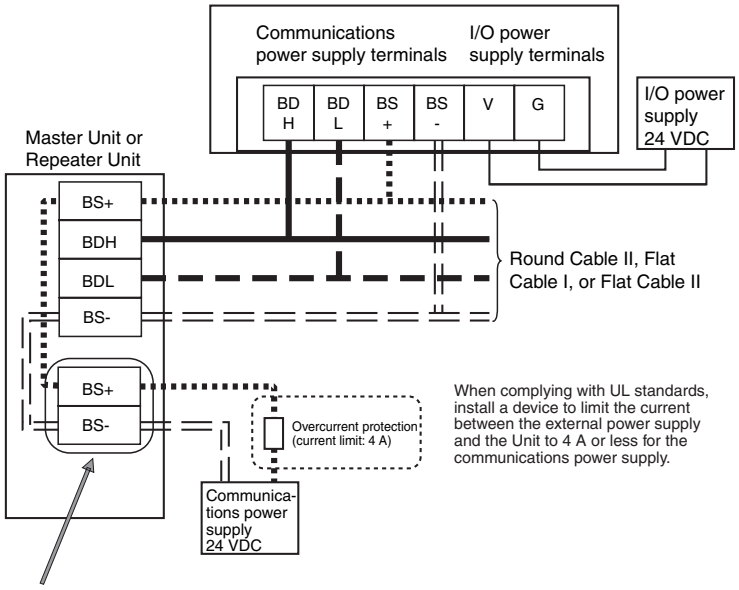
● Round Cable I

- Communications Power
  Power is supplied individually to the power terminals on the communications connectors of each Unit. Power is also supplied individually to the power terminals on the PORT1 connectors of each Repeater Unit.
- I/O Power
  Power is supplied separately from the communications power to the I/O power supply terminals on each Unit. To prevent noise generation, the power must be supplied separately from the communications power supply.



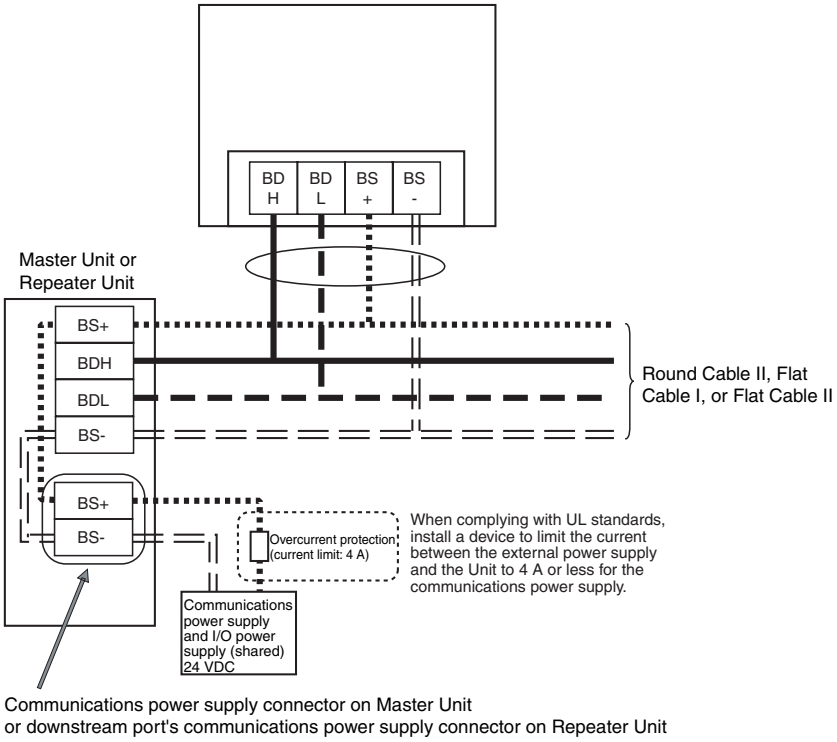
● Round Cable II, Flat Cable I, or Flat Cable II

- Communications Power
  Power is supplied through the communications power supply connector on the Master Unit. Power is also supplied through the downstream port of the communications power supply connector on each Repeater Unit.
- I/O Power
  Power is supplied separately from the communications power to the I/O power supply terminals on each Unit.



Network Power Supply

The communications power and the I/O power are supplied together. That is there is no need to supply power to Units separately. The power is supplied commonly through the communications power supply connector on the Master Unit or through the downstream port of communications power supply connector on the Repeater Unit. Bit Slave Units have Flat Cables attached.



4-4-1 Connecting the Communications Power Supply

The communications power supply must meet the following specifications. Commercially available power supply units can be used. An OMRON S82-series Power Supply Unit is recommended to supply communications power to a CompoNet network.

Item	Specification
Output voltage	24 VDC ±10%
Output ripple	600 mVp-p
Output current	Use a power supply that has a capacity equivalent or exceeding the following total current consumption: • The current consumption of all of Word Slave Units and Repeater Units, and • The current consumption of all of Bit Slave Units and the external I/O devices
Insulation	Between outputs and AC power, and between outputs and enclosure grounding

With the Slave Units with a network power supply, the external I/O devices are also supplied power through the communications power supply connected to the Master Unit or a Repeater Unit via Flat Cables. Therefore, the output current of communications power supply must include the current consumption and the actual load current of the external I/O devices the calculation.

The following is a calculation example of the current consumption for a Bit Slave Unit's communications power supply.

(1) Input Units

Current consumption of the communications power supply

= Current consumption of a Bit Slave for communications

+ (Input current of a Bit Slave x Number of used channels)

+ (Current consumption of a sensor x Number of used sensors)

(2) Output Units

Current consumption of the communications power supply

= Current consumption of a Bit Slave for communications

+ (Actual load current of an actuator x Number of actuators)

(3) I/O Units

Current consumption of the communications power supply

= Current consumption of a Bit Slave for communications

+ (Input current of a Bit Slave x Number of used channels)

+ (Current consumption of a sensor x Number of used sensors)

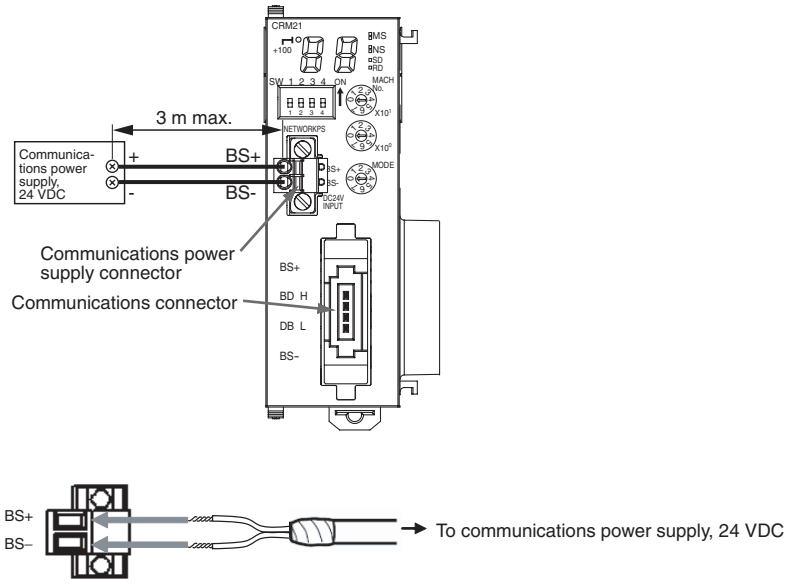
+ (Actual load current of an actuator x Number of actuators)

Use a power source with sufficient capacity, allowing for inrush current at startup.

4-4-2 Connecting the Communications Power Supply

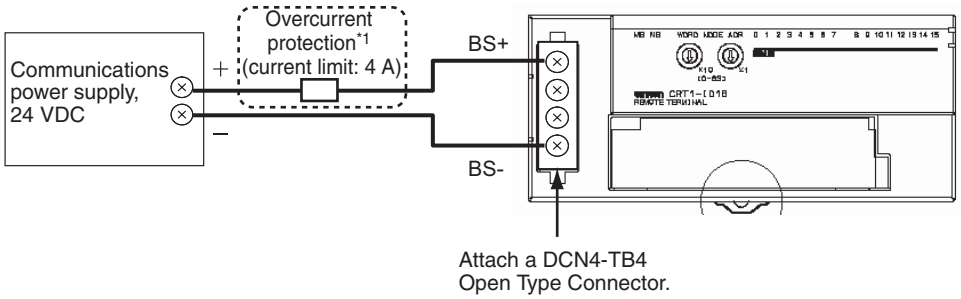
Round Cable II, Flat Cable I, or Flat Cable II

● Master Unit Connections



Round Cable I

● Slave Unit Connections



*1 When complying with UL standards, install a device to limit the current between the external power supply and the Unit to 4 A or less for the communications power supply.

4-4-3 Current Consumption of a Slave Unit or a Repeater Unit

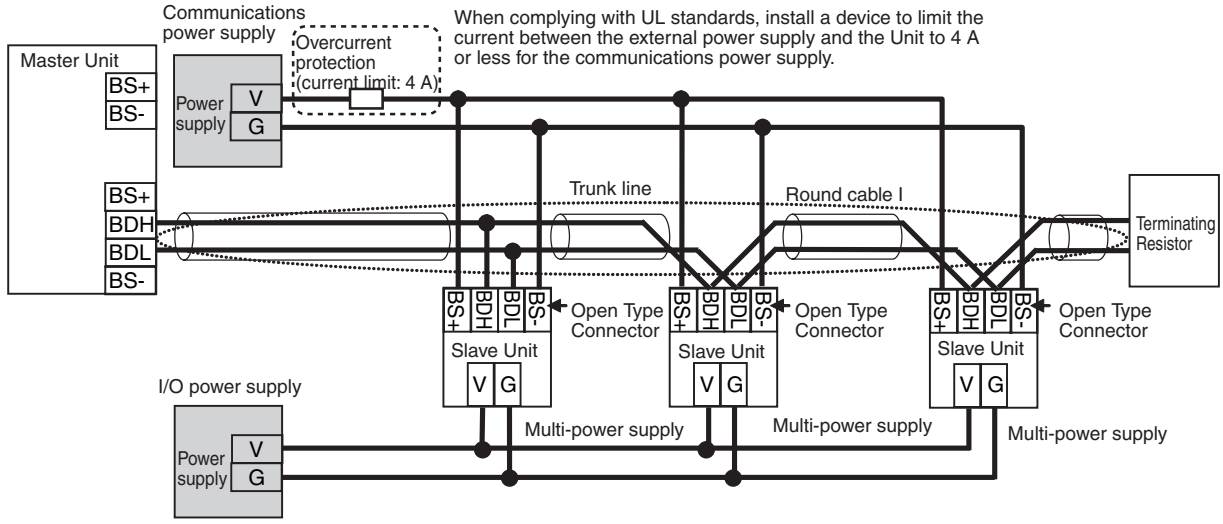
Refer to the *CRT1-series CompoNet Slave Units and Repeater Unit Operation Manual* (Cat. No. W457-E1).

4-4-4 Communications Power Supply Wiring Example

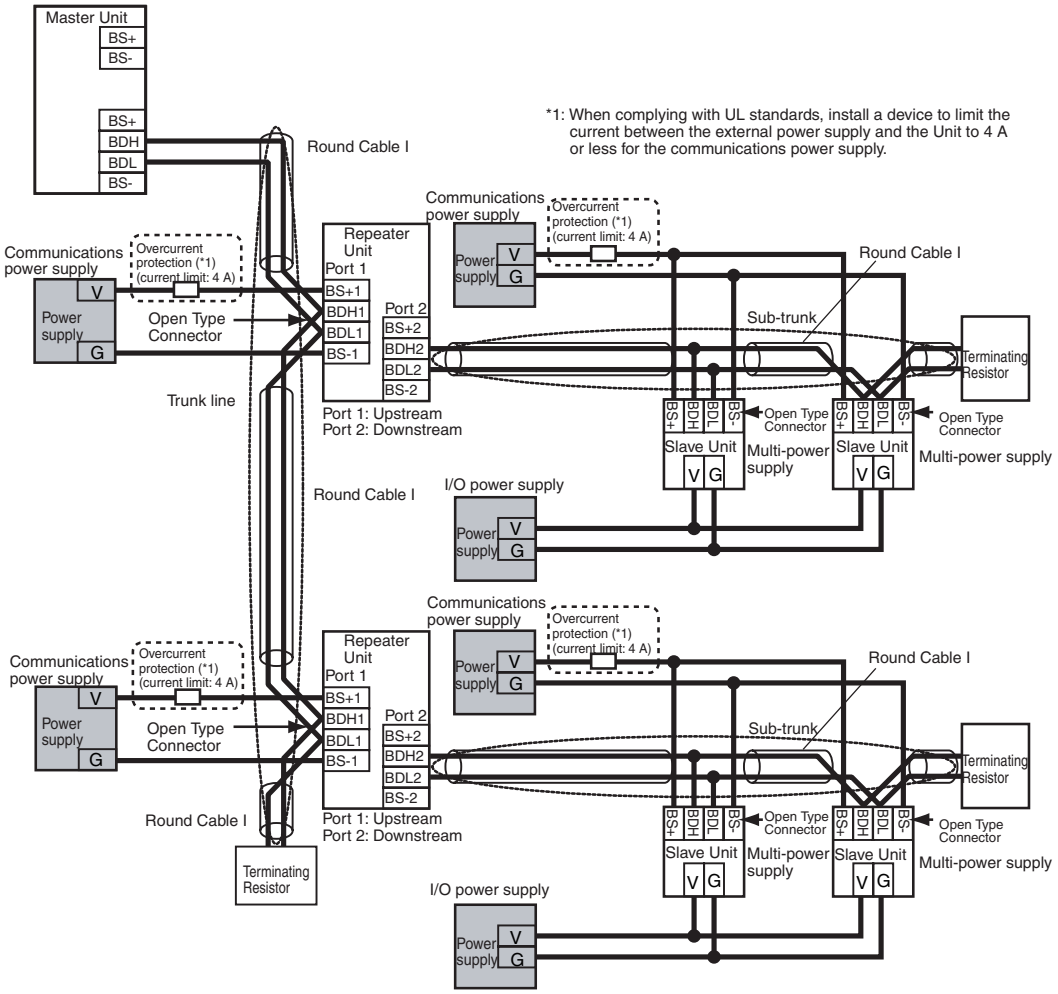
Round Cable I

When Round Cable I cables are used, the communications power cannot be supplied through the communications cables. The power must be supplied to each Slave and Repeater Unit through other cables. Furthermore, the I/O power must be supplied separately to the Slave Units which need I/O power, i.e., Slave Units with a multi-power supply. There is no need, however, to provide an external communications power supply to the Master Unit.

● Without Repeater Units



● With Repeater Units



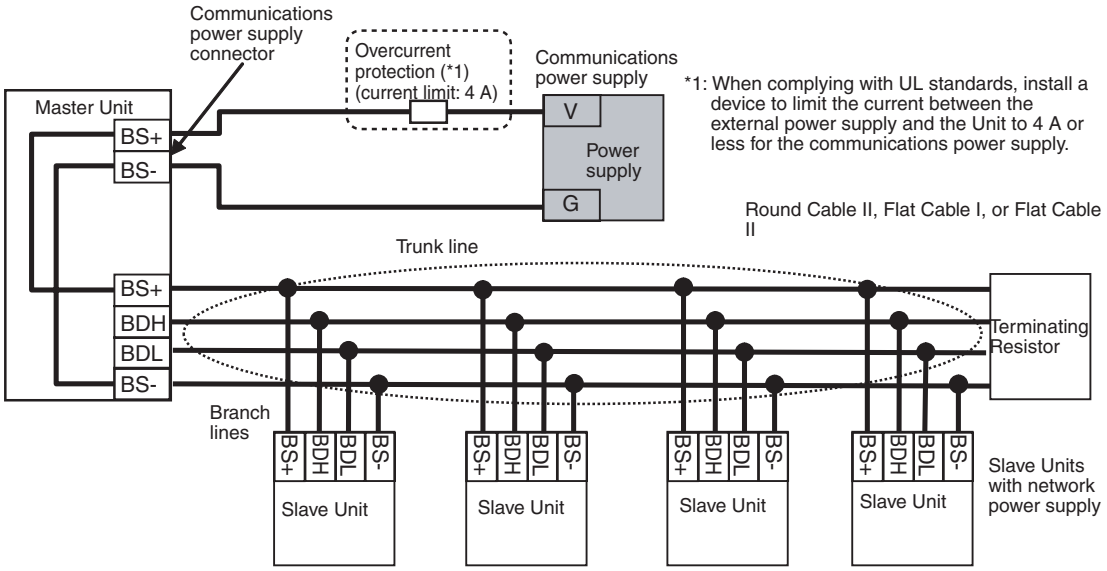
Precautions for Correct Use

The I/O power supply to multi-power supply Slave Units may be a source of noise depending on the connected devices. Even when supplying the communications power supply together to all Slave Units, use a separate I/O power supply so that noise does not affect the network.

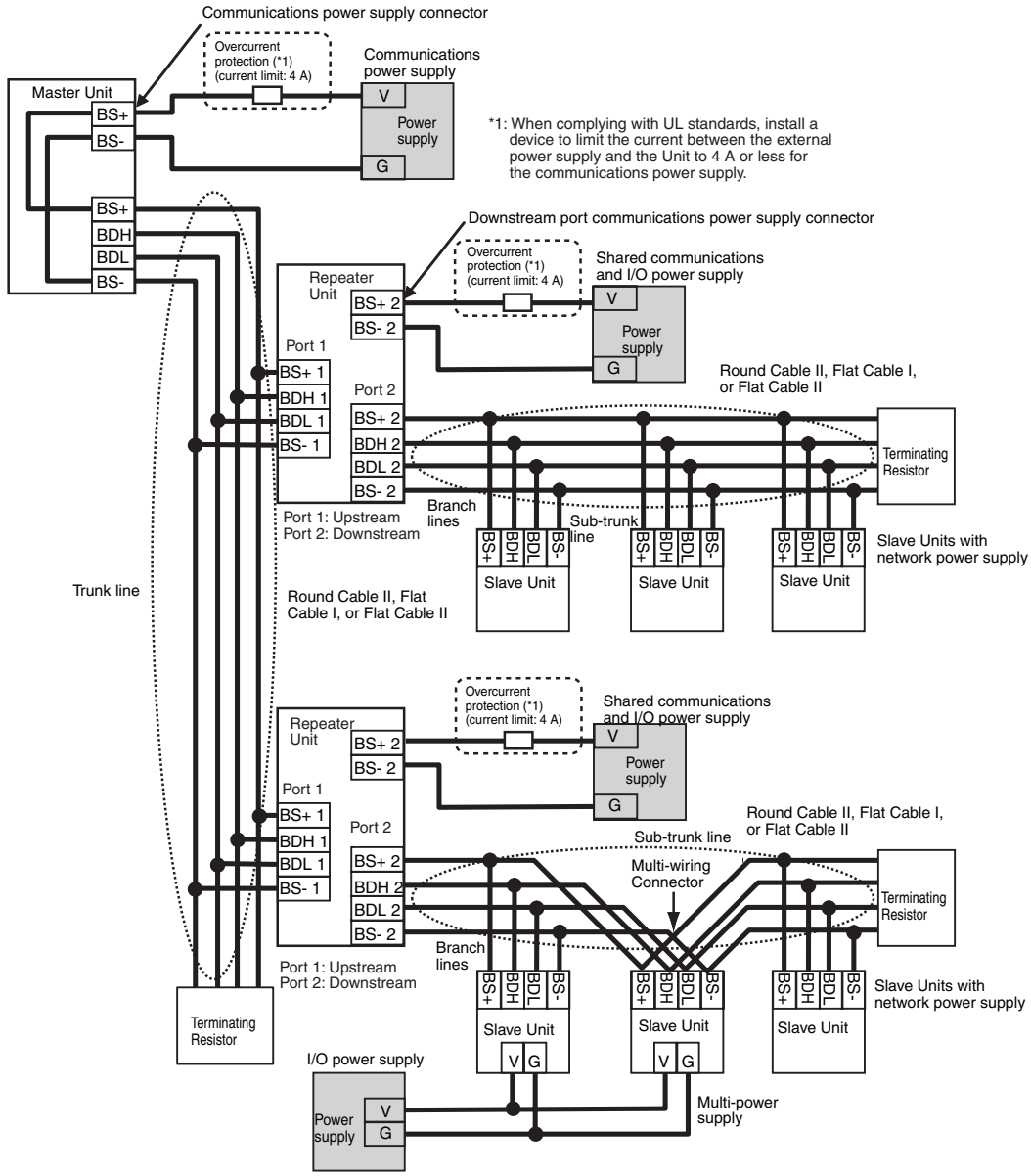
Round Cable II, Flat Cable I, or Flat Cable II

The communications power to Slave Units is supplied through a Round Cable II, Flat Cable I or Flat Cable II cable. Therefore there is no need to provide a communications power supply for Slave Units separately. The communications power supply can be shared by all Slave Units within the same trunk line or sub-trunk line. The I/O power must be supplied separately to the Slave Units which need I/O power, i.e., Slave Units with a multi-power supply.

● Without Repeater Units



● With Repeater Units



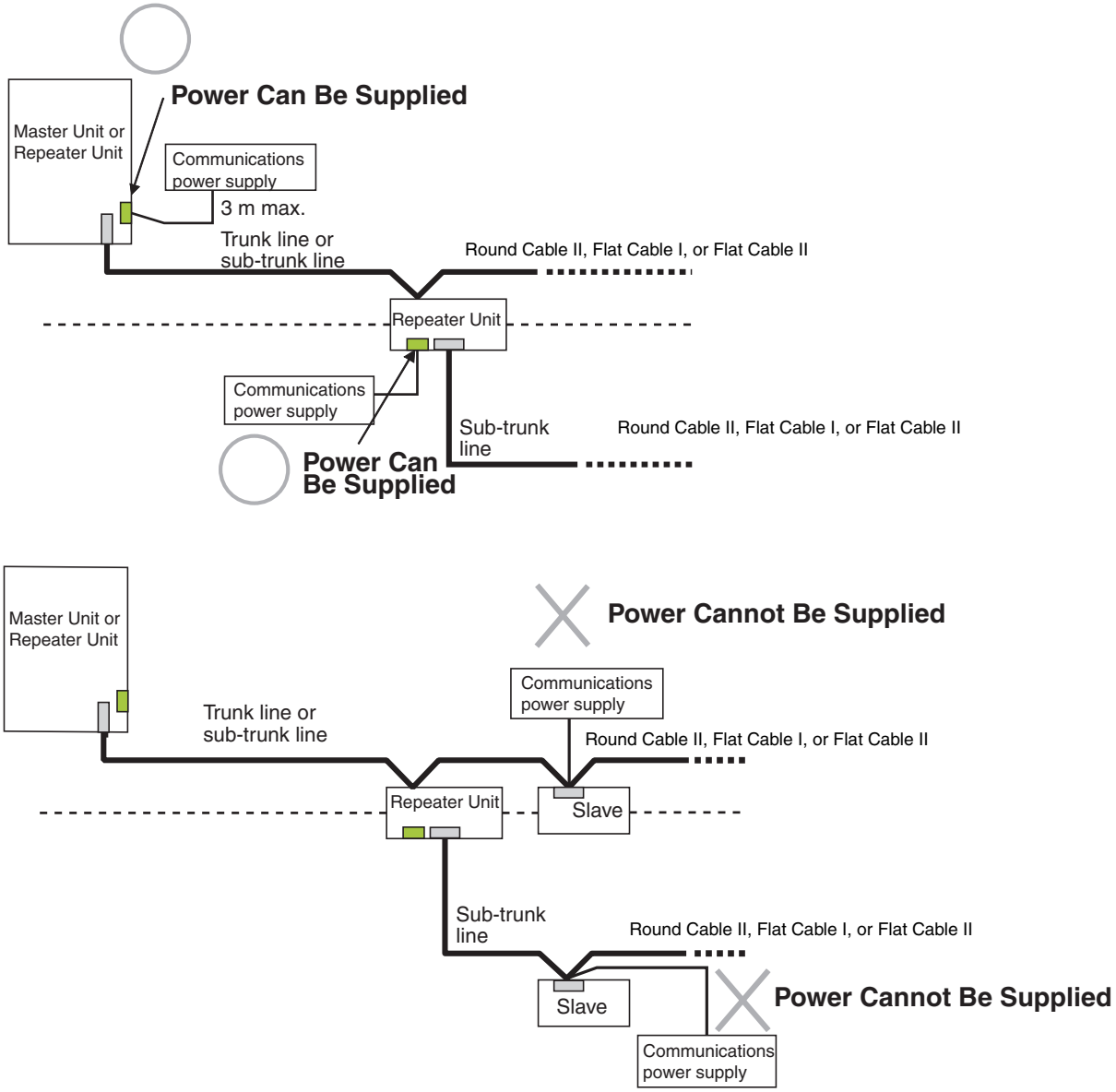
Precautions for Correct Use

- Do not supply communications power from more than one location for the trunk line or for any one sub-trunk line. The quality of communications may decrease and normal communications may not be possible.
- Do not supply communications power from a single power supply to the trunk line and a sub-trunk line or to two sub-trunk lines. Also do not use a single communications power supply for two or more CompoNet networks. The quality of communications may decrease and normal communications may not be possible.
- The I/O power supply to multi-power supply Slave Units may be a source of noise depending on the connected devices. Even when supplying the communications power supply together to all Slave Units, use a separate I/O power supply so that noise does not affect the network.

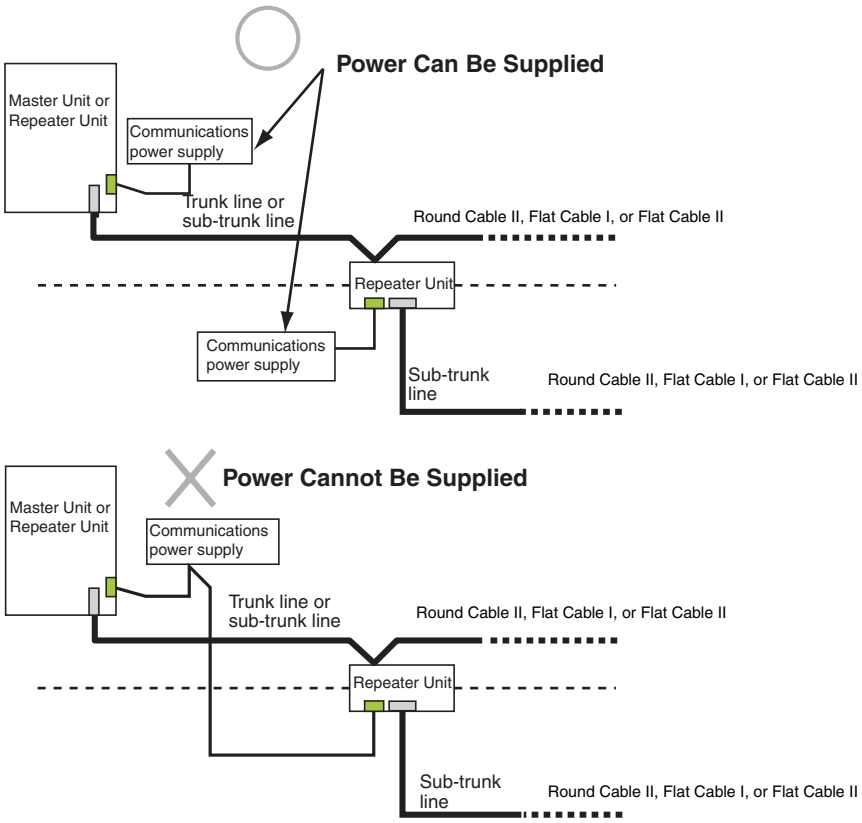
Restrictions

The following restrictions apply when supplying communications power through a Round Cable II, Flat Cable I, or Flat Cable II cable.

- The communications power supply can be connected at only one location for the trunk line and one location each for the sub-trunk lines.
- Communications power to the trunk line can be supplied only through the communications power supply connector on the Master Unit. Communications power to a sub-trunk line can be supplied only through the downstream port of communications power supply connector on the Repeater Unit. Communications power cannot be supplied at any other locations.



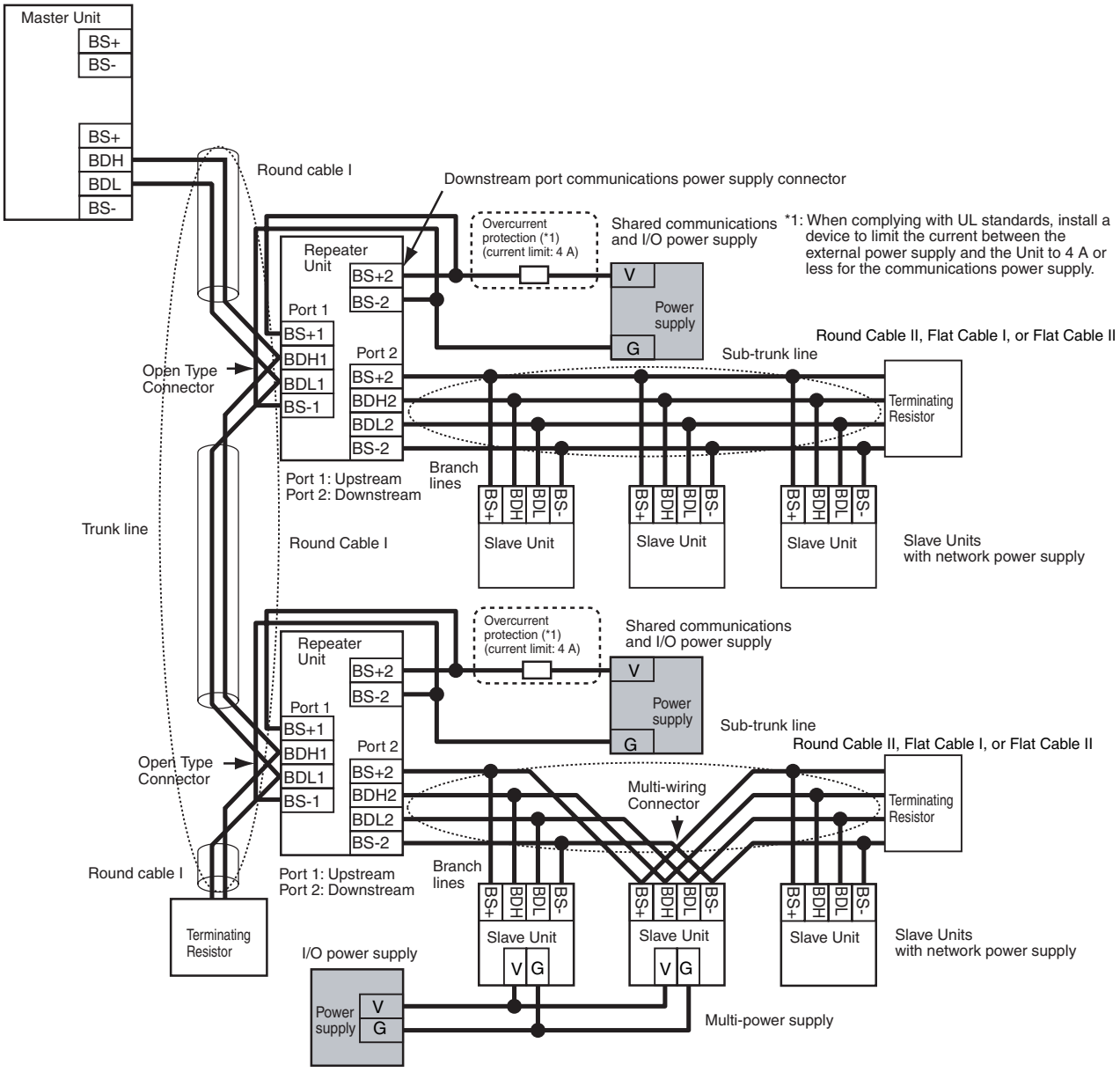
- Use separate power supplies each for the Master Unit trunk line and for the upstream and downstream trunk lines from a Repeater Unit.



Otherwise, transmission may deteriorate and communications errors may occur.

Using Round Cable I with Round Cable II, Flat Cable I, or Flat Cable II

In a CompoNet network, Round Cable I cables can be installed under the same Master Unit as Round Cables II, Flat Cable I, or Flat Cable II cables as long as they are separated by a Repeater Unit.



Precautions for Correct Use

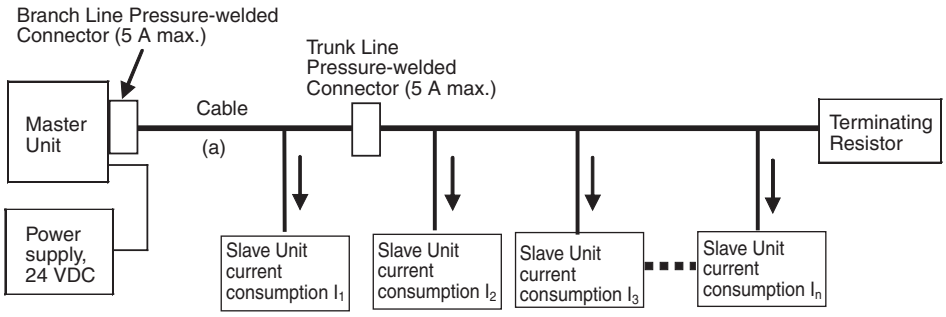
The I/O power supply to multi-power supply Slave Units may be a source of noise depending on the connected devices. Even when supplying the communications power supply together to all Slave Units, use a separate I/O power supply so that noise does not affect the network.

4-4-5 Precaution in Supplying Power to Slave Units

When supplying communications power and I/O power, the allowable currents of cables and connections, the voltage drop, and the capacity and location of power supplies must be considered.

Allowable Current Restrictions

Do not allow the total current consumption of all Slave Units to exceed the allowable current of the communications cables and connectors. If the allowable current is exceeded, heating or burning may occur.



● Allowable Currents for Cables

Select the communications cable so that the total current consumption of all Slave Units does not exceed the allowable current of the cable.

Cable allowable current ≥ $I_1 + I_2 + I_3 + \cdots I_n$
(For the allowable cable current for “a” in the above diagram)

● Allowable Currents for Connectors

There are limits to the allowable current for the communications power supply connectors on the Master Unit and Repeater Units, Flat Connector Sockets, and Flat Connector Plugs. Do not allow the current flow where these connectors are used to exceed the allowable current.

Name	Model	Allowable current	Remarks
Communications power supply connectors on CJ-Master Units	CJ1W-CRM21	5 A (UL rating: 4A)	Round Cable I, Round Cable II, Flat Cable I, or Flat Cable II
Communications power supply connector on Repeater Unit	CRS1-RPT01		
Flat Connector Socket	DCN4-TR4		
	DCN5-TR4		
Flat Connector Plug	DCN4-BR4		
	DCN5-BR4		
Multi-wiring Connector	DCN4-MD4		
Flat Multi-wiring Connector Plug	DCN4-MR4		Flat Cable I

Voltage Drop

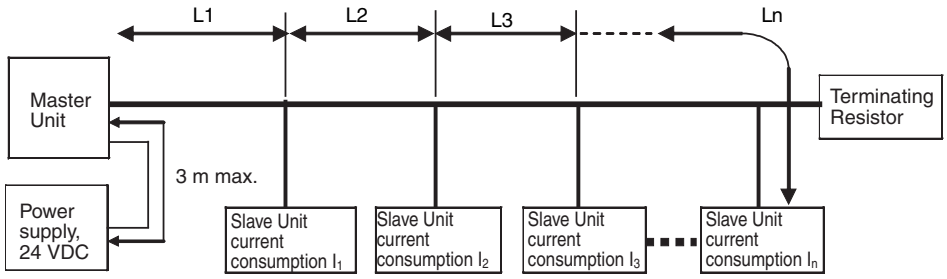
Cable Voltage Drop

The voltage drop must be considered so that the power supply voltage at the Slave Unit that is the farthest from the power supply will still be within the allowable power supply range.

The voltage drop is expressed by the following formula.

Voltage drop (V) = Current (A) × Cable conductor resistance (Ω/m) × Cable length (m) × 2

If the voltage drop is too large and power cannot be supplied to the farthest Slave Unit within the allowable range, add a Repeater Unit and supply power from the Repeater Unit.



- Calculation Example

The allowable power supply voltage range for Slave Units is 14 to 26.4 VDC. If a 24-VDC power supply is used, the allowable voltage drop is 10 V.

The relationship between the cable and the length that can be extended is expressed by the following formula:

$$10\ (V) \geq \{(I_1 + I_2 + I_3 + \ldots + I_n) \times R_1 \times L_1 \times 2\} + \{(I_2 + I_3 + \ldots + I_n) \times R_2 \times L_2 \times 2\} + \{(I_3 + \ldots + I_n) \times R_3 \times L_3 \times 2\} + \ldots + \{I_n \times R_n \times L_n \times 2\}$$

To provide leeway when selecting the cable, use the following approximation.

$$10(V) \geq \{(I_1 + I_2 + I_3 + \ldots + I_n) \times R \times L \times 2\}$$

R = Cable conductor resistance = 0.025 Ω/m for Flat Cable

The extended length of the cable is thus expressed by the following formula:

$$L\ (m) \leq 200 \div (I_1 + I_2 + I_3 + \ldots + I_n)$$ … For Flat Cable

4-4-6 Precautions on Locating the I/O Power Supply

When building a system, the supply methods for communications power and I/O power must be considered. Not only hardware, such as selecting the power supplies and cables based on allowable currents and voltage drop, be considered, but also system operation for power supply errors, costs, and other software issues must be considered when studying power supply methods.

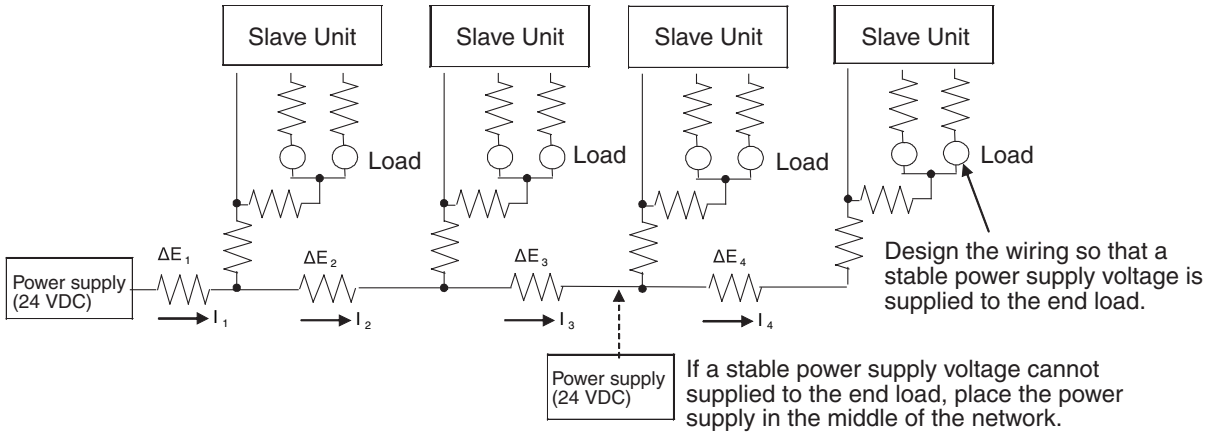
Supplying I/O Power from One Source

When supplying I/O power to the entire system from one source, the power consumed by each devices and the loads must be considered. Select the cables so that the power supply voltage for the last Slave Unit and load will be within the allowable range.

Also, give proper consideration to the power supply capacity and be sure the total line current is within the allowable current range of the cable.

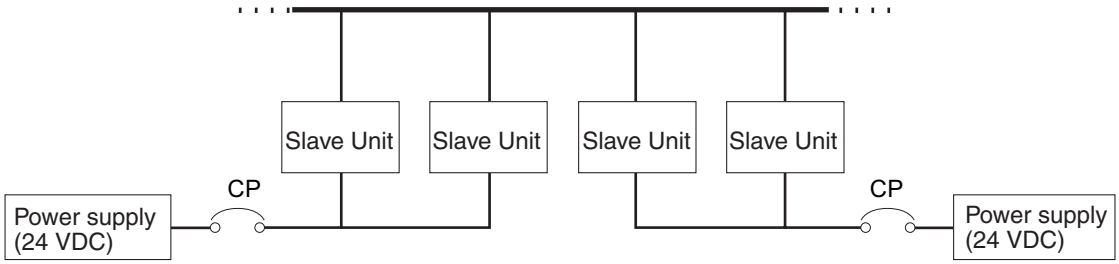
The following measures can be considered to keep the voltage drop within the allowable range when supplying power from one power supply.

- Increase the thickness of the cables.
- Increase the output voltage of the power supply.
- Shorting the wiring.
- Locate the power supply in the middle of the network.



Supplying I/O Power from Multiple Sources

Supplying I/O power from multiple power supplies instead of from one power supply enables reducing the line current, reducing the voltage drop, and decreasing the size of the cable. Using multiple power supplies should also be considered to increase system safety when power supply errors occur.



4-4-7 Other Precautions

Power Supply Errors

The location of power supplies and the grouping of Slave Units should be considered based on whether the overall system is to be stopped when a power supply error occurs.

If it is necessary to prevent the overall system from stopping to ensure system safety, consider placing power supplies in more than one location and consider the way Slave Units should be grouped when supplying power.

Cost Considerations

Also consider the power supply methods from the point of view of the total cost, including the following items:

Capacity and number of power supplies

Cable thickness (allowable current) and length (voltage drop)

System safety

Wiring work.

5

Remote I/O Communications

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5-1 Exchanging Data with the CPU Unit

Communications for sharing data can be continuously performed between the CPU Unit and the CompoNet Master Unit, and between the CompoNet Master Unit and Slave Units. This is called remote I/O communications. After wiring is completed, communications are started just by turning ON the communications power supply to the Slave Units and Controller or resetting the Controller to share data between the I/O ports or memory used for CJ-series Units in the CPU Unit and the Slave Units.

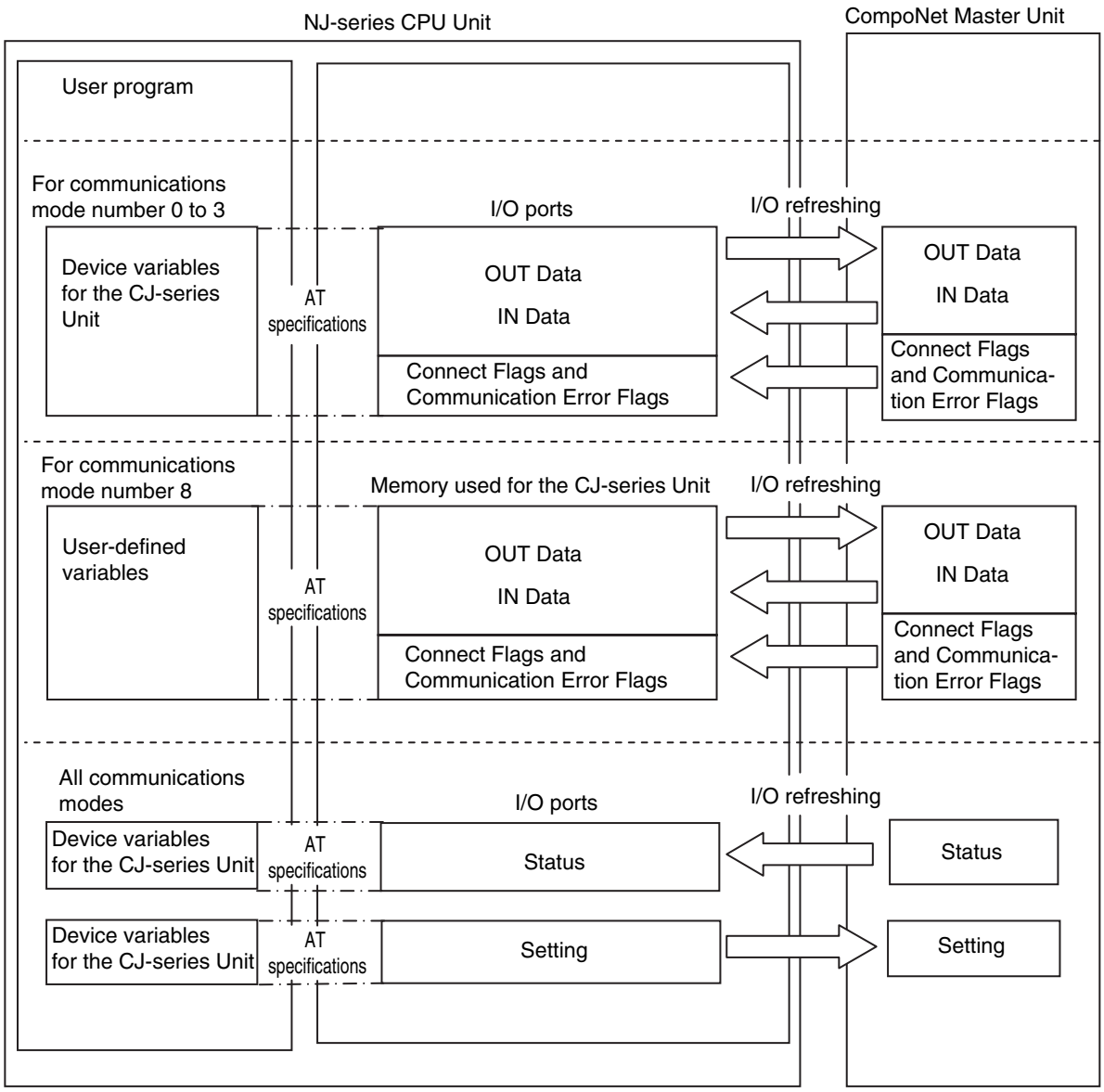
I/O ports that are allocated to the CompoNet Master Unit are used to exchange data between the CompoNet Master Unit and the CPU Unit. (Refer to *5-3 Device Variables for the CJ-series Unit* for details on I/O ports.)

5-1-1 Exchanging Data between the CPU Unit and the CompoNet Master Unit

The following table and figure show how data is exchanged between the CPU Unit and the CompoNet Master Unit.

Types of Data Exchange

Communications mode number	Access method from user program	AT specification destination	Timing of data exchange	Types of Unit data
0 to 3	Device variables for the CJ-series Unit	I/O ports	During I/O refreshing	OUT Data, IN Data, Connect Flags, Communication Error Flags, and status information (Status and Setting)
8	User-defined variables	Memory used for the CJ-series Unit	During I/O refreshing	OUT Data, IN Data, Connect Flags, and Communication Error Flags
	Device variables for the CJ-series Unit	I/O ports	During I/O refreshing	Status information (Status and Setting)


NJ-series CPU Unit
CompoNet Master Unit
User program
For communications mode number 0 to 3
I/O ports
I/O refreshing
Device variables for the CJ-series Unit
AT specifications
OUT Data
IN Data
Connect Flags and Communication Error Flags
OUT Data
IN Data
Connect Flags and Communica-tion Error Flags
For communications mode number 8
Memory used for the CJ-series Unit
I/O refreshing
User-defined variables
AT specifications
OUT Data
IN Data
Connect Flags and Communication Error Flags
OUT Data
IN Data
Connect Flags and Communica-tion Error Flags
All communications modes
I/O ports
I/O refreshing
Device variables for the CJ-series Unit
AT specifications
Status
Status
Device variables for the CJ-series Unit
AT specifications
Setting
Setting

Device Variables for the CJ-series Unit

Device variables for the CJ-series Unit are variables with AT specifications to the I/O ports that are described below. Device variables for CJ-series Units are used in the user program to access the CompoNet Master Unit and other Configuration Units. Refer to *Access with Device Variables for the CJ-series Unit* in *5-1-2 Access Methods from User Program* for information on the allocation of device variables for the CJ-series Unit.

● I/O Ports

An I/O port is a logical interface that is used by the CPU Unit to exchange data with the CompoNet Master Unit and other Configuration Units. I/O ports have unique predefined names for specific functions. I/O ports are automatically created when you create the Unit Configuration with the Sysmac Studio. For details on the I/O ports that are defined for a CompoNet Master Unit, refer to *5-3 Device Variables for the CJ-series Unit*.

If you set communications mode number 0 to 3, I/O ports are assigned to the CompoNet Master Unit for I/O data, Connect Flags, and Communication Error Flags. I/O ports are assigned to status information regardless of what communications mode number is set. Refer to *5-4-3 I/O Port Allocations for Each Communications Mode Numbers* for details on information provided on the Slave Units and for the settings of unit numbers for the Slave Units according to the communications mode.

● Slave Unit I/O Data, Connect Flags, and Communication Error Flags (Communications Mode Number 0 to 3)

I/O data, Connect Flags, and Communication Error Flags for Slave Units are stored in I/O ports that are allocated to the CompoNet Master Unit. The area for OUT Data is for outputs and the area for IN Data, Connect Flags, and Communication Error Flags is for inputs. This data is continuously exchanged between the CPU Unit and the CompoNet Master Unit.

● Status Information (Status and Setting) (All Communications Modes)

The status Information consists of the Status and the Setting. The Status and Setting are stored in I/O ports that are allocated to the CompoNet Master Unit. The Setting area is for outputs and the Status area is for inputs. This data is continuously exchanged between the CPU Unit and the CompoNet Master Unit.

User-defined Variables (Communications Mode Number 8)

If you set communications mode number 8, you can use the CX-Integrator to assign user-defined variables for the I/O data, Connect Flags, or Communication Error Flags of the Slave Units in any memory locations so that you can access this data from the user program. Refer to *Access with User-defined Variables (Communications Mode Number 8)* in *5-1-2 Access Methods from User Program* for information on assigning user-defined variables.

5-1-2 Access Methods from User Program

Use variables to access the I/O ports from the user program.

Differences in Access Methods for Each Type of Data

The following table shows how different types of data are exchanged between the CPU Unit and the CompoNet Master Unit depending on the communications mode.

Communications mode number	Type of data	Access method
0 to 3	OUT Data, IN Data, Connect Flags, and Communication Error Flags	Device variables for the CJ-series Unit
	Status information (Status and Setting)	
8	OUT Data, IN Data, Connect Flags, and Communication Error Flags	User-defined variables
	Status information (Status and Setting)	Device variables for the CJ-series Unit

Access with Device Variables for the CJ-series Unit

Use the I/O Map in the Sysmac Studio to assign device variables for the CJ-series Unit to I/O ports. Use one of the following methods to assign the variables.

(1) Select an existing variable to assign it.

(2) Enter a new variable.

(3) Automatically create the variables with the *Create Device Variable* menu command.

The format of the variable names that are created automatically with method 3 is described below.

Device Variables for the CJ-series Unit

*_ SlavAllCommErr

This is the I/O port name. This name indicates the function, status, or parameter of the Unit.

This is the device name that was used when the CompoNet Master Unit was registered in the Unit Configuration.
(The default names are J01, J02, J03, etc. They are assigned in the order that the Units are registered in the Unit Configuration.)
The device names are used to identify individual Units.

(Refer to *5-3 Device Variables for the CJ-series Unit* for details on device variables for the CJ-series Unit.)

Hereafter, the automatically created names of the device variables for the CJ-series Unit, such as *_ *SlavAllCnctSta*, are used.

Access with User-defined Variables (Communications Mode Number 8)

If you set communications mode number 8 (Software Setting Mode), user-defined variables are required to access the I/O data, Connect Flags, and Communication Error Flags of the CompoNet Master Unit. The following two operations are performed.

(1) Use the CX-Integrator to make the software settings. Set the first addresses to allocate in the memory used for CJ-series Units and set the number of nodes for allocation.

(2) Use the Sysmac Studio to create the user-defined variables. Create the user-defined variables with AT specifications to the memory used for the CJ-series Unit that was specified above with the CX-Integrator, and register them in a variable table.

Examples of assigning memory to user-defined variables are given below.

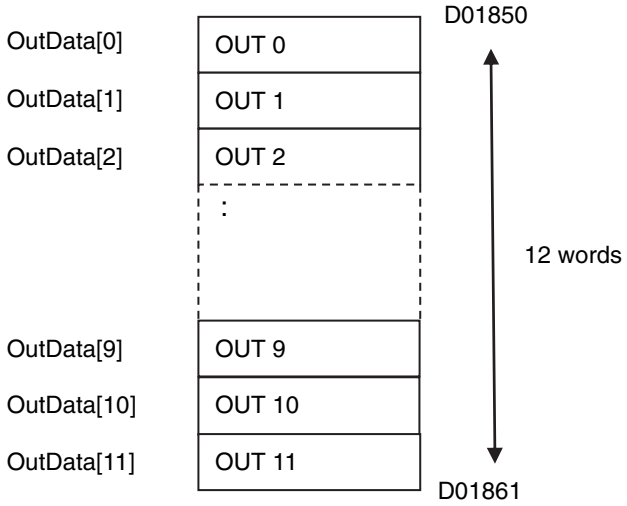
Example 1: In this example, the data for 12 nodes (nodes 0 to 11) for the WORD OUT areas of Word Slave Units are assigned to the OutData*1 array variable.

The first address is set to D1850 in the software settings.

Word address	Bit 15 Bit 0
+0	[WORD OUT0]
+1	[WORD OUT1]
+2	[WORD OUT2]
:	:
+11	[WORD OUT11]
:	Not allocated.
+63	Not allocated.

Set the number of nodes to 12.

*1 You can use any name for the array variable. The data type of the array is WORD because each WORD OUT Data is one word. The number of elements in the array is 12, so the array variable is WORD OutData[12]. Use the Sysmac Studio to allocate addresses starting from D01850 to this array.



Refer to the *NJ-series CPU Unit Software User's Manual* (Cat. No. W501) for details on memory for CJ-series Units, to the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504) for how to assign variables and register user-defined variables, and to the *CX-Integrator Version 2.□ Operation Manual* (Cat. No. W464) for the procedure to make the software settings from the CX-Integrator.

5-1-3 I/O Ports for the CompoNet Master Unit

With an NJ-series CPU Unit, I/O ports are defined in advance for the following data of the CompoNet Master Unit.

(1) I/O data (except for communications mode number 8)

(2) Connect Flags and Communication Error Flags (except for communications mode number 8)

(3) Status information

The device variables for CJ-series Units for CompoNet are described below for each type of data.

I/O Data (Communications Mode Number 0 to 3)

If the communications mode number is set to 0 to 3, the I/O data of the Slave Units is assigned to the following I/O ports.

Type of data	Slave Unit		Data name	I/O port (nn = Node address, mm = Bit node address*1)
I/O data	Word Slave Units	Word Output Slave Units	WORD OUT Data	OutDatnn (WORD data) OutDatnn_00 to OutDatnn_15 (BOOL data)
		Word Input Slave Units	WORD IN Data	InDatnn (WORD data) InDatnn_00 to InDatnn_15 (BOOL data)
	Bit Slave Units	Bit Output Slave Units	BitOUT Data	BitOutDatmm_00 and BitOutDatmm_01
		Bit Input Slave Units	BitIN Data	BitInDatmm_00 and BitOutDatmm_01

*1 This is a two-digit number. (Specify 00 for a node address of 0.)

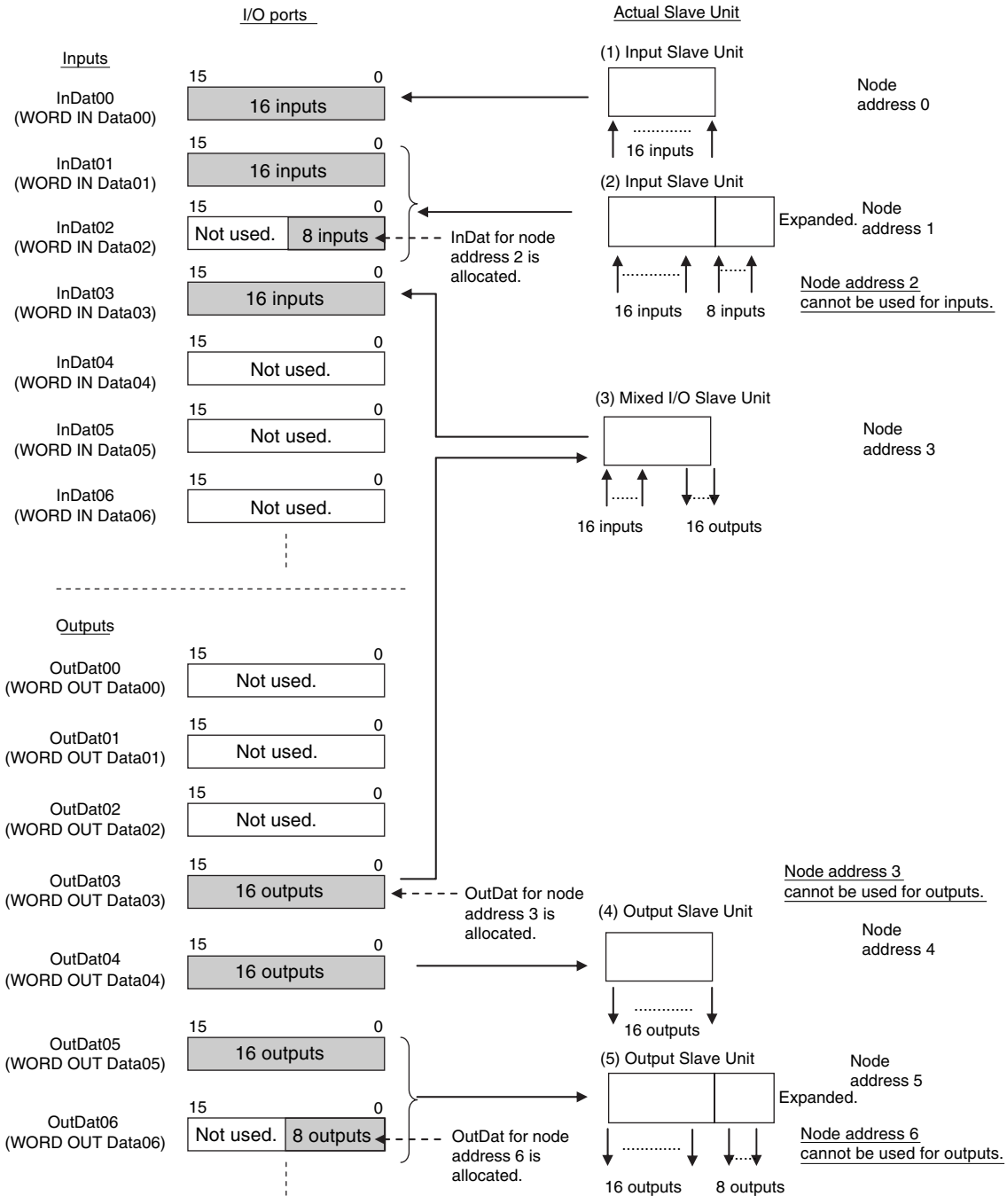
Note If you set the communications mode number to 8, use the CX-Integrator to assign user-specified memory locations in the memory used for the CJ-series Unit.

Word Slave Units

The following assignments are made when the node address of the Word Slave Unit is set to nn (00 to 15).

- Sixteen inputs are assigned to the following I/O ports: InDatnn_00 to InDatnn_15. The next 16 inputs are assigned to the following I/O ports: InDatnn+1_00 to InDatnn+1_15.
- Sixteen outputs are assigned to the following I/O ports: OutDatnn_00 to OutDatnn_15. The next 16 outputs are assigned to the following I/O ports: OutDatnn+1_00 to OutDatnn+1_15.

Example:



1. Sixteen-point Input Slave Unit with Node Address 0:
   The 16 inputs are assigned to InDat00_00 to InDat00_15 (bits 00 to 15) of InDat00 (WORD IN Data00).
2. Twenty-four-point Input Slave Unit with Node Address 1:
   The first 16 inputs are assigned to InDat01_00 to InDat01_15 (bits 00 to 15) of InDat01 (WORD IN Data01).
   The expanded 8 inputs are assigned to InDat02_00 to InDat02_07 (bits 00 to 07) of InDat02 (WORD IN Data02).
   InDat02_08 to InDat02_15 (bits 08 to 15) in InDat02 (WORD IN Data02) are not used.
   Node address 2 cannot be used for inputs.

Note If the Slave Unit with node address N+1 does not have inputs, a Node Duplicated Address Error will not occur for node addresses N and N+1. If the Slave Unit with node address N+1 has inputs, a Node Duplicated Address Error will occur. Therefore, node address 2 cannot be used for inputs in this example.

3. Thirty-two-point Mixed I/O Slave Unit with Node Address 3:
   The 16 inputs are assigned to InDat03_00 to InDat03_15 (bits 00 to 15) of InDat03 (WORD IN Data03).
   The 16 outputs are assigned to OutDat03_00 to OutDat03_15 (bits 00 to 15) of OutDat03 (WORD OUT Data03).
4. Sixteen-point Output Slave Unit with Node Address 4:
   The 16 outputs are assigned to OutDat04_00 to OutDat04_15 (bits 00 to 15) of OutDat04 (WORD OUT Data04).
5. Twenty-four-point Output Slave Unit with Node Address 5:
   The first 16 outputs are assigned to OutDat05_00 to OutDat05_15 (bits 00 to 15) of OutDat05 (WORD OUT Data05).
   The expanded 8 outputs are assigned to OutDat06_00 to OutDat06_07 (bits 00 to 07) of OutDat06 (WORD OUT Data06). OutDat06_08 to OutDat06_15 (bits 08 to 15) in OutDat06 (WORD OUT Data06) are not used. Node address 6 cannot be used for outputs.

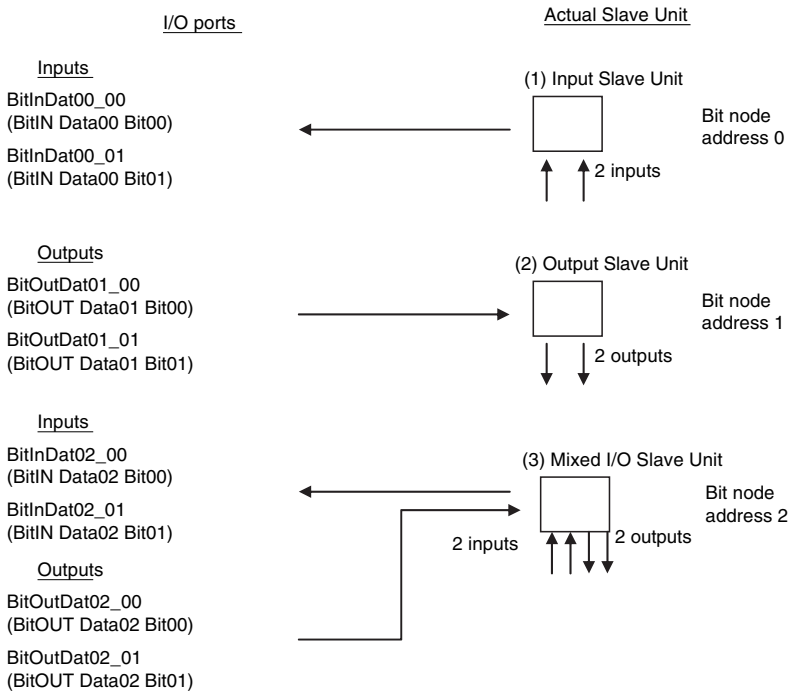
Note If the Slave Unit with node address N+1 does not have outputs, a Node Duplicated Address Error will not occur for node addresses N and N+1. If the Slave Unit with node address N+1 has outputs, a Node Duplicated Address Error will occur. Therefore, node address 6 cannot be used for outputs in this example.

Bit Slave Units

The following assignments are made when the node address of the Bit Slave Unit is set to mm (00 to 63).

- Two inputs are assigned to the following I/O ports: BitInDatmm_00 and BitInDatmm_01.
- Two outputs are assigned to the following I/O ports: BitOutDatmm_00 and BitOutDatmm_01.

Example:



1. Two-point Input Slave Unit with Bit Node Address 0:
   The two inputs are assigned to BitInDat00_00 (BitIN Data00 Bit00) and BitInDat00_01 (BitIN Data00 Bit01).
2. Two-point Output Slave Unit with Bit Node Address 1:
   The two outputs are assigned to BitOutDat01_00 (BitOUT Data01 Bit00) and BitOutDat01_01 (BitOUT Data01 Bit01).
3. Thirty-two-point Mixed I/O Slave Unit with Node Address 2:
   The two inputs are assigned to BitInDat02_00 (BitIN Data02 Bit00) and BitInDat02_01 (BitIN Data02 Bit01). The two outputs are assigned to BitOutDat02_00 (BitOUT Data02 Bit00) and BitOutDat02_01 (BitOUT Data02 Bit01).

Connect Flags and Communication Error Flags (Communications Mode Number 0 to 3)

These flags indicate if the Slave Units are normally participating in the network. They are assigned to I/O ports as shown in the following table.

Type of data	Slave Unit of Connect Flags and Communication Error Flags	Data name	I/O port (nn = Node address, mm = Bit node address*1)
Connect Flags	Word Output Slave Units	WORD OUT Connect Flag	OutCnctNdStann
	Word Input Slave Units	WORD IN Connect Flag	InCnctNdStann
	Bit Output Slave Units	BIT OUT Connect Flag	BitOutCnctNdStamm
	Bit Input Slave Units	BIT IN Connect Flag	BitInCnctNdStamm
Communication Error Flag	Word Output Slave Units	WORD OUT Communication Error Flag	OutErrNdStann
	Word Input Slave Units	WORD IN Communication Error Flag	InErrNdStann
	Bit Output Slave Units	BIT OUT Communication Error Flag	BitInErrNdStamm
	Bit Input Slave Units	BIT IN Communication Error Flag	BitOutErrNdStamm

*1 This is a two-digit number. (Specify 00 for a node address of 0.)

Status Information (Status and Setting) (All Communications Modes)

There are the following two types of status information.

- Status
  This information is sent from the CompoNet Master Unit to the CPU Unit. It shows the overall status of the CompoNet network and the status of the CompoNet Master Unit.
- Setting
  This information is sent from the CPU Unit to the CompoNet Master Unit. The only setting that is available is *_*IOCycleStartCmd* (Remote I/O Communications Start Switch)

The status information is assigned to I/O ports as shown in the following table.

Type of data	Data name		I/O ports
Status	Status		UnitSta
		Communications Error Flag	SlavCommErr
		Registration Table Verification Error Flag	RegTblErr
		Communications Error Communications Stop Flag	CommStopSta
		Slave Unit Duplicated Address Error Flag	SlavDupErr
		Repeater Unit Communications Error Flag	RepeaterCommErr
		Repeater Unit Node Slave Unit Duplicated Address Error Flag	RepeaterDupAdrErr
		All Registered Slave Units Participating Flag	SlavAllCnctSta
		Remote I/O Communications Started Flag	IOCycleStartSta
		Ladder Operation Allowed Flag in Registration Table Enabled Mode	PLCRunSta
		Registration Table Mode Flag	RegTblSta
		Representative Warning Status Flag	SlavAllWarnSta
		Representative Alarm Status Flag	SlavAllAlmSta
Settings	Setting		UnitCmd
		Remote I/O Communications Start Switch	IOCycleStartCmd

5-2 Network Status

5-2-1 Conditions for Starting and Stopping Remote I/O Communications

- If the communications power supply to the Slave Units is turned ON, remote I/O communications will start when the power supply is turned ON to the Controller or when the Controller is reset. In Registered Slave Unit Participation Standby Mode, communications will not start until all registered Slave Units are participating in the network. (Refer to *Registered Slave Unit Participation Standby Mode* on page 5-18 for information on the Registered Slave Unit Participation Standby Mode.)
- I/O Communications Manual Startup Mode can be set from the CX-Integrator so that remote I/O communications do not start when the power supply is turned ON. Remote I/O communications will not start until **_IOCycleStartCmd* (Remote I/O Communications Start Switch) changes to TRUE.
- In Communications Error Communications Stop Mode, all remote I/O communications will stop if a communications error occurs in any Slave Unit. At this time, **_CommStopSta* (Communications Error Communications Stop Flag) in **_UnitSta* (Status) will change to TRUE. To use Communications Error Communications Stop Mode, turn ON the ESTP (Communications Error Communications Stop Mode setting) pin on the DIP switch on the front of the CompoNet Master Unit.

Note All communications will stop if a Verification Error occurs when the Registration Table is enabled or if a Slave Unit Duplicated Address Error occurs.

5-2-2 Communications Errors

A communications error occurs when a Slave Unit cannot return a normal response to a communications request from the Master Unit.

The following are the main causes of communications errors:

- There is a malfunction at the Slave Unit itself.
- The communications cable to the Slave Unit is disconnected.
- The communications power supply is OFF.
- The Slave Unit cannot receive correct data because of noise.

When a communication error occurs at a Slave Unit, the NS indicator on the front of the Master Unit will light and the seven-segment display will show d9. At the same time, the representative communications flag **_SlavComErr* (Communication Error Flag) in **_UnitSta* (Status) will change to TRUE.

Remote I/O Communications Operation When a Communications Error Occurs

If a communications error occurs for a Slave Unit when the ESTP (Communications Error Communications Stop Mode setting) pin on the DIP switch on the front of the Master Unit is set to ON, all remote I/O and message communications will stop. At this time, (**_CommStopSta* (Communications Error Communications Stop Flag) in **_UnitSta* (Status) will change to TRUE.) If the pin is set to OFF, remote I/O communications will continue. When the cause of the communications error is removed, the Slave Unit is automatically restored to the network. It is not necessary to restart the Master Unit or cycle the power supply.

Communications Error Input Data Zero Clear Mode

Communications Error Input Data Zero Clear Mode can be set from the CX-Integrator for communications errors. If a communications error occurs for a Slave Unit in this mode, all IN Data for that Slave Unit is cleared to zeros. If Communications Error Input Data Zero Clear Mode is not set, then the IN Data is held for the Slave Unit when a communications error occurs. This can be used, for example, to suppress triggering operations when communications errors have occurred in systems where the TRUE status of IN Data signals are used as triggers for operation.

5-2-3 Confirming Normal Slave Unit Operation

Connect Flags and Communication Error Flags

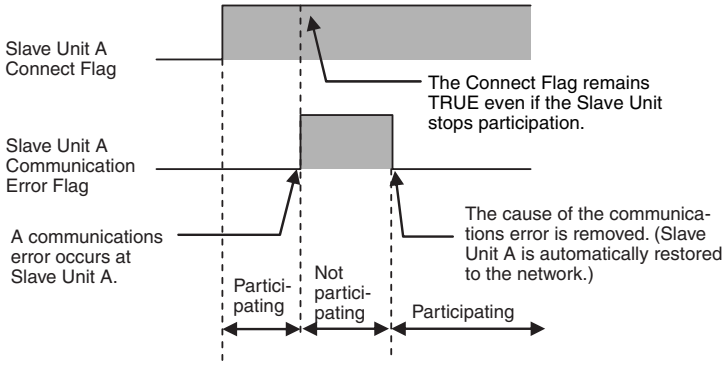
Connect Flags and Communication Error Flags in the I/O ports are used to indicate whether Slave Units are participating normally in the network. The Connect Flags and Communication Error Flags indicate nodes that have participated in the network at least once and nodes for which errors have occurred after participation. In Registration Table Enable Mode, only the registered Slave Units can participate. (Slave Units that are not registered cannot participate.)

● Connect Flags

A Connect Flag will remain TRUE if the corresponding Slave Unit has participated in the network at least once after the system has started (i.e., after the power supply is turned ON). (The Connect Flag for a Slave Unit will remain TRUE even if a communications error causes the Slave Unit to leave the network.)

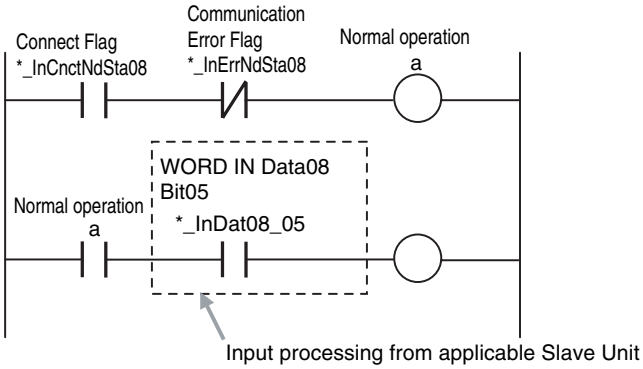
● Communication Error Flags

A Communication Error Flag changes to TRUE if the corresponding Slave Unit cannot communicate with the Master Unit for any reason after the Slave Unit has joined the network. (The Connect Flag will remain TRUE in this case.) (The Communication Error Flag changes to FALSE when the error is reset.) If you use Communications Error Communications Stop Mode, all remote I/O communications will stop if a communications error occurs in any of the Slave Units. (To use Communications Error Communications Stop Mode, turn ON the ESTP (Communications Error Communications Stop Mode setting) pin on the DIP switch on the front of the Master Unit.)



Therefore, in the user program, the applicable Slave Unit is judged to have stopped participating when both the Connect Flag and the Communication Error Flag are TRUE. Similarly, the applicable Slave Unit is judged to be operating normally when the Connect Flag is TRUE and the Communication Error Flag is FALSE.

Example: This example shows how to combine the Connect Flag and Communication Error Flag as the condition for using the input value in bit 05 of the Word Input Slave Unit with node address 08 only when the Slave Unit is operating normally.



● Applicable Connect Flags and Communication Error Flags

The operation of the Connect Flags and Communication Error Flags depends on the status of SW4 (REGS) on the DIP switch on the front of the Master Unit.

SW4 (REGS) of DIP switch on front of Master Unit	Object of Connect or Communication Error Flag
OFF (Registration Table Disabled)	All Slave Units
ON (Registration Table enabled)	Registered Slave Units only. Connect Flags and Communication Error Flags for unregistered Slave Units do not operate.

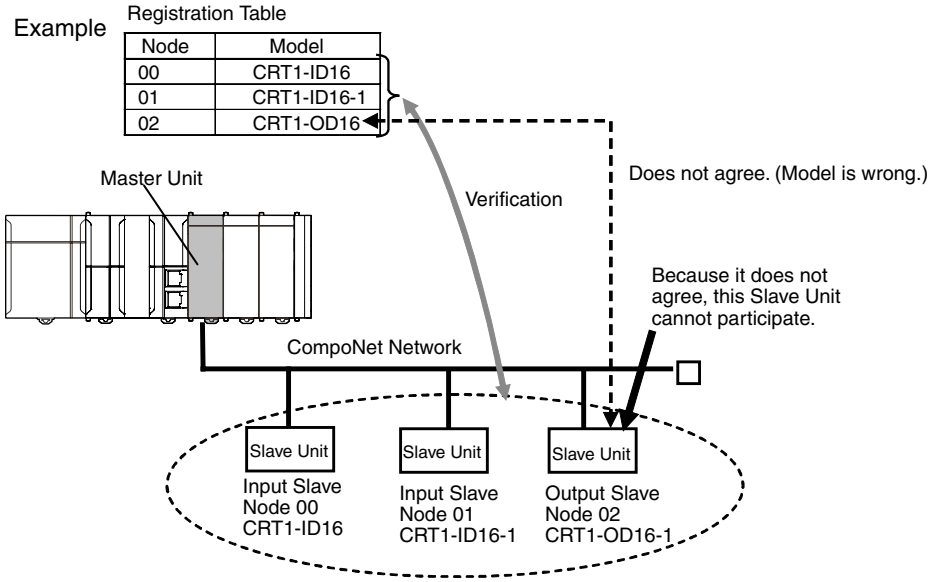
● Assignments of Connect Flags and Communication Error Flags

For each node address, a Connect Flag and a Communication Error Flag are assigned to I/O ports. The I/O ports to which the Connect Flags and Communication Error Flags are assigned depend on whether the node address is for a Word or Bit Slave Unit and whether it is for Input or Output Unit. For a Mixed I/O Slave Unit, the Flags are assigned only to the I/O ports for an Input Slave Unit.

Registration Tables

Overview

Registration Tables are used to register Slave Units that are intended to participate at particular node addresses (along with the models corresponding to the node addresses) to enable verifying that they actually are participating. At the same time, they prevent unregistered Slave Units and Slave Units of the wrong models or with the wrong node addresses from participating in the network.



The Registration Table is enabled only in Registration Table Enable Mode (i.e., when SW4 (REGS) is set to ON on the Master Unit when the power supply is turned ON and the Registration Table data is normal). It can be used with any communications mode number.

If verification shows that the network Slave Units do not agree with the table, *_*RegTblErr* (Registration Table Verification Error Flag) in *_*UnitSta* (Status) will change to TRUE. However, remote I/O communications will still start if the Registered Slave Unit Participation Standby Mode is disabled. If the Registered Slave Unit Participation Standby Mode is enabled, remote I/O communications will not start.

Operation

The operation for each case is as follows:

- If all registered Slave Units are participating within the Registered Slave Unit Participation Monitoring Time after the power supply is turned ON or after *_*IOCycleStartCmd* (Remote I/O Communications Start Switch) changes to TRUE in the I/O Communications Manual Startup Mode, *_*SlavAllCnctSta* (All Registered Slave Units Participating Flag) in *_*UnitSta* (Status) will change to TRUE. (The default monitoring time is 10 s for any baud rate other than 93.75 kbps, and 30 s for 93.75 kbps.*1)
  - If no unregistered Slave Units are participating, *_*RegTblErr* (Registration Table Verification Error Flag) will change to FALSE.
  - If an unregistered Slave Unit is participating, a Verification Error (Unregistered Slave Participating) will occur and *_*RegTblErr* (Registration Table Verification Error Flag) will change to TRUE. At the same time, the NS indicator on the front of the Master Unit will flash red and the seven-segment display will show *d6*.
  - If all registered Slave Units are not participating within the Registered Slave Unit Participation Monitoring Time after the power supply is turned ON or after *_*IOCycleStartCmd* (Remote I/O Communications Start Switch) changes to TRUE in the I/O Communications Manual Startup Mode, a Verification Error (Slave Missing) will occur and *_*RegTblErr* (Registration Table Verification Error Flag) will change to TRUE. (The default monitoring time is 10 s for any baud

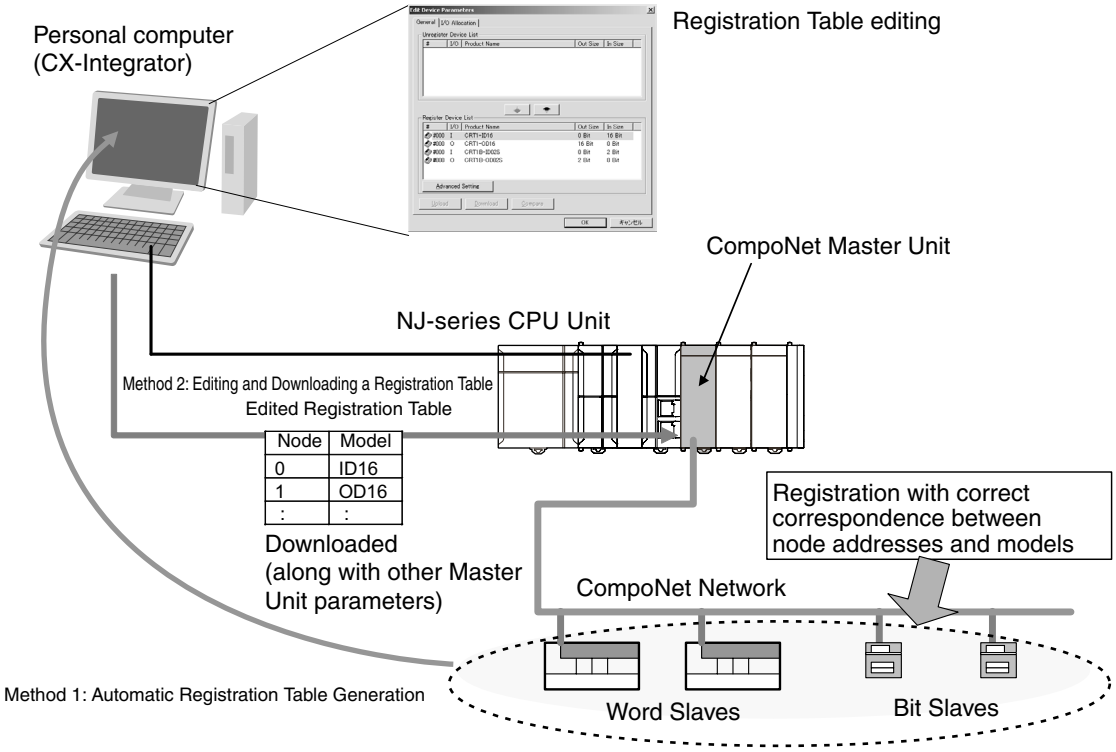
rate other than 93.75 kbps, and 30 s for 93.75 kbps.*1) At the same time, the NS indicator on the front of the Master Unit will flash red and the seven-segment display will show *d5*. However, if the applicable Slave Unit subsequently starts participating, **_RegTblErr* (Registration Table Verification Error Flag) will change to FALSE and the error display will be cleared.

*1 The Registered Slave Unit Participation Monitoring Time is disabled when the Registered Slave Unit Participation Standby Mode is enabled.

Note Remote I/O communications will not operate if SW4 (REGS) is set to ON on the Master Unit when the power supply is turned ON and the Registration Table data is not valid. The MS indicator on the front of the Master Unit will flash red, and the seven-segment display will show *E8*.

● Creating Registration Tables

Registration Tables are created either by automatic generation from the CX-Integrator or by editing and transferring them.



The Registration Table is then enabled by turning ON the power supply with SW4 (REGS) on the Master Unit set to ON. (The Registration Table is read when the power supply is turned ON.) **_RegTblSta* (Registration Table Mode Flag) in **_UnitSta* (Status) will change to TRUE (Registration Table Enable Mode).

(1) Editing and Transferring the Registration Tables

Edit the Registration Table in the Master Parameter Editing Window of the CX-Integrator. The table shows the correspondence between the node addresses and the Slave Unit models. Download the Table to the CompoNet Master Unit.

Additional Information

Registration Tables that are either generated automatically from the CX-Integrator or edited and downloaded are stored in EEPROM in the CompoNet Master Unit. Therefore, the Registration Table data in the CompoNet Master Unit is saved even if the power supply to the Controller is turned OFF or if the Master Unit is mounted to another Controller.

● Registered Slave Unit Participation Monitoring Time

The Registered Slave Unit Participation Monitoring Time is the time from when the power supply to the Controller is turned ON, from when **_IOCycleStartCmd* (Remote I/O Communications Start Switch) is changed to TRUE in the I/O Communications Manual Startup Mode, or from when the Controller is reset, until the participation of all registered Slave Units has been detected.

The Registered Slave Unit Participation Monitoring Time can be set to a time other than the default (10 s for any baud rate other than 93.75 kbps, and 30 s for 93.75 kbps).

Using the CX-Integrator, set the Registered Slave Unit Participation Monitoring Time (1 to 600 s; default: 10 s at baud rate of other than 93.75 kbps and 30 s at baud rate of 93.75 kbps) under **Detailed Settings** in the Master General Tab Page, and then download the parameters to the CompoNet Master Unit. This setting is disabled when the Registered Slave Unit Participation Standby Mode is enabled.

● Registered Slave Unit Participation Standby Mode

Registered Slave Unit Participation Standby Mode can be used not to start remote I/O communications until all registered Slave Units are participating in the network (i.e., until **_SlavAllCnctSta* (All Registered Slaves Participating Flag) changes to TRUE). Using this mode will make it faster for all Slave Units to participate in the network.
Remote I/O communications will not start, however, unless all registered Slave Units are participating.
When this mode is used, Registered Slave Unit Participation Monitoring Time setting (including the default value of 10 s) is disabled.
On the CX-Integrator, go to the Detailed Settings on the Master General Tab Page, and enable the Registered Slave Unit Participation Standby Mode. Download the parameters to the CompoNet Master Unit to enable the setting.
The Registered Slave Unit Participation Standby Mode is enabled only when Registration Table Enable Mode (i.e., when SW4 (REGS) is set to ON on the Master Unit when the power supply to the Controller is turned ON or the Controller is reset and the Registration Table data is normal). It can be used with any communications mode number.

Slave Unit Duplicated Address Error

In any of the following cases, a Slave Unit duplicated address error will occur and **_SlavDupErr* (Slave Unit Duplicated Address Error Flag) in **_UnitSta* (Status) will change to TRUE for the Slave Unit that joined the network last.

The NS indicator on the front of the Master Unit will flash red and the seven-segment display will show *d0*. Remote I/O communications will not stop.

- There is already a Slave Unit for which the same node address is set. (For example, both Slave Units are set for node address N.)

Note An address duplication error will occur if the same node address is set for two Slave Units in the same allocation area. This applies only if both are Input Slave Units or both are Output Slave Units.

- Different node addresses are set, but the same I/O ports are used by two different nodes.
  (For example, a Slave Unit set for node address 0 has 24 inputs and a Slave Unit set for node address 1 has 16 inputs. In this case, both Slave Units will be set to use the IN1 Area, which is not allowed.)

Note As long as the I/O ports are not duplicated between the nodes, the IN Area and OUT Area for the same node address can be assigned to Slave Units that are set for different node addresses.
(For example, a Slave Unit set for node address 1 can be allocated 16 outputs in the Output 1 Area, while an Expansion Slave Unit set for node address 0 can be allocated 16 inputs in the Input 1 Area.)

- A Slave Unit was removed and then a Slave Unit of a different model started participating at the same node address.

Illegal Configuration Error

If the permitted number of Repeater Unit segments is exceeded, the NS indicator on the front of the Master Unit will flash red and the seven-segment display will show *E5*.

5-3 Device Variables for the CJ-series Unit

Device variables for the CJ-series Unit are used with AT specifications to I/O ports to access the I/O data in the CompoNet Master Unit. This section describes the functions of the individual device variables for the CJ-series Unit. The names of the variables that are automatically created on the I/O Map are used in this section.

5-3-1 Assigning Device Variables for the CJ-series Unit

With an NJ-series CPU Unit, I/O ports are defined in advance for the following data of the CompoNet Master Unit.

Device variables for the CJ-series Unit are assigned to the I/O ports to enable using them.

(1) I/O data (except for communications mode number 8)

(2) Connect Flags and Communication Error Flags (except for communications mode number 8)

(3) Status information: Status

(4) Status information: Setting

The device variables for CJ-series Units for CompoNet are described below for each type of data. For the relationship between the device variables for the CJ-series Unit and the parameter addresses for the CompoNet Master Unit, refer to *A-1-2 Differences in Accessing Data from User Program*.

In the *Communications mode number* column in the following tables, variable applicability for individual communications modes are indicated with *OK* and *NA*.

5-3-2 I/O Data

Word Slave Units

nn = Node address

RW: Read/write, R: Read-only

Device variables for the CJ-series Unit	Communications mode number					Data type	R/W	Name	Description
	0	1	2	3	8				
*_OutDat00 to *_OutDatnn	OK (n = 07)	OK (n=15)	OK (n=31)	OK (n=15)	NA	WORD	RW	WORD OUT Data00 to nn	WORD OUT Data for node address 00 to nn
*_OutDat00_00						BOOL	RW	WORD OUT Data00 Bit00	Bit 00 of WORD OUT Data for node address 00
to						to			
*_OutDat00_15						BOOL	RW	WORD OUT Data00 Bit15	Bit 15 of WORD OUT Data for node address 00
to									
*_OutDatnn_00						BOOL	RW	WORD OUT Datann Bit00	Bit 00 of WORD OUT Data for node address nn
to						to			
*_OutDatnn_15						BOOL	RW	WORD OUT Datann Bit15	Bit 15 of WORD OUT Data for node address nn
*_InDat00 to *_InDatnn	OK (n=07)	OK (n=15)	OK (n=31)	OK (n=15)	NA	WORD	R	WORD IN Data00 to nn	WORD IN Data for node address 00 to nn
*_InDat00_00						BOOL	R	WORD IN Data00 Bit00	Bit 00 of WORD IN Data for node address 00
to						to			
*_InDat00_15						BOOL	R	WORD IN Data00 Bit15	Bit 15 of WORD IN Data for node address 00
to									
*_InDatnn_00						BOOL	R	WORD IN Datann Bit00	Bit 00 of WORD IN Data for node address nn
to						to			
*_InDatnn_15						BOOL	R	WORD IN Datann Bit15	Bit 15 of WORD IN Data for node address nn

Bit Slave Units

mm = Bit node address

RW: Read/write, R: Read-only

Device variables for the CJ-series Unit	Communications mode number					Data type	R/W	Name	Description
	0	1	2	3	8				
*_BitOutDat00_00, *_BitOutDat00_01	NA	NA	NA	OK (m=63)	NA	BOOL	RW	BitOUT Data00 Bit00, Bit01	Bits 00 and 01 of BitOUT Data for bit node address 00
to									
*_BitOutDatmm_00 to *_BitOutDatmm_01						BOOL	RW	BitOUT Datamm Bit00, Bit01	Bits 00 and 01 of BitOUT Data for bit node address mm
*_BitInDat00_00 to *_BitInDat00_01	NA	NA	NA	OK (m=63)	NA	BOOL	R	BitIN Data00 Bit00, Bit01	Bits 00 and 01 of BitIN Data for bit node address 00
to									
*_BitInDatmm _00 to *_BitInDatmm _01						BOOL	R	BitIN Datamm Bit00, Bit01	Bits 00 and 01 of BitIN Data for bit node address mm

5-3-3 Connect Flags and Communication Error Flags

Connect Flags for Word Output Slave Units

Device variables for the CJ-series Unit	Communications mode number					Data type	R/W	Name	Description
	0	1	2	3	8				
*_OutCnctNdSta 00_07	OK	OK	OK	OK	NA	BYTE	R	WORD OUT Connect Flag00_07	Bits 0 to 7: Node addresses 00 to 07
*_OutCnctNdSta 00						BOOL	R	WORD OUT Connect Flag00	Connect Flags for node addresses 00 to 07
to								to	
*_OutCnctNdSta 07								WORD OUT Connect Flag07	
*_OutCnctNdSta 08_15	NA	OK	OK	OK	NA	BYTE	R	WORD OUT Connect Flag08_15	Bits 0 to 7: Node addresses 08 to 15
*_OutCnctNdSta 08						BOOL	R	WORD OUT Connect Flag08	Connect Flags for node addresses 08 to 15
to								to	
*_OutCnctNdSta 15								WORD OUT Connect Flag15	

Device variables for the CJ-series Unit	Communications mode number					Data type	R/W	Name	Description
	0	1	2	3	8				
*_OutCnctNdSta16_23	NA	NA	OK	NA	NA	BYTE	R	WORD OUT Connect Flag16_23	Bits 0 to 7: Node addresses 16 to 23
*_OutCnctNdSta16						BOOL	R	WORD OUT Connect Flag16	Connect Flags for node addresses 16 to 23
to								to	
*_OutCnctNdSta23								WORD OUT Connect Flag23	
*_OutCnctNdSta24_31	NA	NA	OK	NA	NA	BYTE	R	WORD OUT Connect Flag24_31	Bits 0 to 7: Node addresses 24 to 31
*_OutCnctNdSta24						BOOL	R	WORD OUT Connect Flag24	Connect Flags for node addresses 24 to 31
to								to	
*_OutCnctNdSta31								WORD OUT Connect Flag31	

Connect Flags for Word Input Slave Units

Device variables for the CJ-series Unit	Communications mode number					Data type	R/W	Name	Description
	0	1	2	3	8				
*_InCnctNdSta00_07	OK	OK	OK	OK	NA	BYTE	R	WORD IN Connect Flag00_07	Bits 0 to 7: Node addresses 00 to 07
*_InCnctNdSta00						BOOL	R	WORD IN Connect Flag00	Connect Flags for node addresses 00 to 07
to								to	
*_InCnctNdSta07								WORD IN Connect Flag07	
*_InCnctNdSta08_15	NA	OK	OK	OK	NA	BYTE	R	WORD IN Connect Flag08_15	Bits 0 to 7: Node addresses 08 to 15
*_InCnctNdSta08						BOOL	R	WORD IN Connect Flag08	Connect Flags for node addresses 08 to 15
to								to	
*_InCnctNdSta15								WORD IN Connect Flag15	

Device variables for the CJ-series Unit	Communications mode number					Data type	R/W	Name	Description
	0	1	2	3	8				
*_InCnctNdSta16_23	NA	NA	OK	NA	NA	BYTE	R	WORD IN Connect Flag16_23	Bits 0 to 7: Node addresses 16 to 23
*_InCnctNdSta16						BOOL	R	WORD IN Connect Flag16	Connect Flags for node addresses 16 to 23
to								to	
*_InCnctNdSta23								WORD IN Connect Flag23	
*_InCnctNdSta24_31	NA	NA	OK	NA	NA	BYTE	R	WORD IN Connect Flag24_31	Bits 0 to 7: Node addresses 24 to 31
*_InCnctNdSta24						BOOL	R	WORD IN Connect Flag24	Connect Flags for node addresses 24 to 31
to								to	
*_InCnctNdSta31								WORD IN Connect Flag31	

Communication Error Flags for Word Output Slave Units

Device variables for the CJ-series Unit	Communications mode number					Data type	R/W	Name	Description
	0	1	2	3	8				
*_OutErrNdSta00_07	OK	OK	OK	OK	NA	BYTE	R	WORD OUT Communication Error Flag00_07	Bits 0 to 7: Node addresses 00 to 07
*_OutErrNdSta00						BOOL	R	WORD OUT Communication Error Flag00	WORD OUT Communication Error Flags for node addresses 00 to 07
to								to	
*_OutErrNdSta07								WORD OUT Communication Error Flag07	
*_OutErrNdSta08_15	NA	OK	OK	OK	NA	BYTE	R	WORD OUT Communication Error Flag08_15	Bits 0 to 7: Node addresses 08 to 15
*_OutErrNdSta08						BOOL	R	WORD OUT Communication Error Flag08	WORD OUT Communication Error Flags for node addresses 08 to 15
to								to	
*_OutErrNdSta15								WORD OUT Communication Error Flag15	

Device variables for the CJ-series Unit	Communications mode number					Data type	R/W	Name	Description
	0	1	2	3	8				
*_OutErrNdSta16_23	NA	NA	OK	NA	NA	BYTE	R	WORD OUT Communication Error Flag16_23	Bits 0 to 7: Node addresses 16 to 23
*_OutErrNdSta16						BOOL	R	WORD OUT Communication Error Flag16	WORD OUT Communication Error Flags for node addresses 16 to 23
to								to	
*_OutErrNdSta23								WORD OUT Communication Error Flag23	
*_OutErrNdSta24_31	NA	NA	OK	NA	NA	BYTE	R	WORD OUT Communication Error Flag24_31	Bits 0 to 7: Node addresses 24 to 31
*_OutErrNdSta24						BOOL	R	WORD OUT Communication Error Flag24	WORD OUT Communication Error Flags for node addresses 24 to 31
to								to	
*_OutErrNdSta31								WORD OUT Communication Error Flag31	

Communication Error Flags for Word Input Slave Units

Device variables for the CJ-series Unit	Communications mode number					Data type	R/W	Name	Description
	0	1	2	3	8				
*_InErrNdSta00_07	OK	OK	OK	OK	NA	BYTE	R	WORD IN Communication Error Flag00_07	Bits 0 to 7: Node addresses 00 to 07
*_InErrNdSta00						BOOL	R	WORD IN Communication Error Flag00	WORD IN Communication Error Flags for node addresses 00 to 07
to								to	
*_InErrNdSta07								WORD IN Communication Error Flag07	
*_InErrNdSta08_15	NA	OK	OK	OK	NA	BYTE	R	WORD IN Communication Error Flag08_15	Bits 0 to 7: Node addresses 08 to 15
*_InErrNdSta08						BOOL	R	WORD IN Communication Error Flag08	WORD IN Communication Error Flags for node addresses 08 to 15
to								to	
*_InErrNdSta15								WORD IN Communication Error Flag15	

Device variables for the CJ-series Unit	Communications mode number					Data type	R/W	Name	Description
	0	1	2	3	8				
*_InErrNdSta16_23	NA	NA	OK	NA	NA	BYTE	R	WORD IN Communication Error Flag16_23	Bits 0 to 7: Node addresses 16 to 23
*_InErrNdSta16						BOOL	R	WORD IN Communication Error Flag16	WORD IN Communication Error Flags for node addresses 16 to 23
to								to	
*_InErrNdSta23								WORD IN Communication Error Flag23	
*_InErrNdSta24_31	NA	NA	OK	NA	NA	BYTE	R	WORD IN Communication Error Flag24_31	Bits 0 to 7: Node addresses 24 to 31
*_InErrNdSta24						BOOL	R	WORD IN Communication Error Flag24	WORD IN Communication Error Flags for node addresses 24 to 31
to								to	
*_InErrNdSta31								WORD IN Communication Error Flag31	

Connect Flags for Bit Output Slaves (Communications Mode Number 3)

These variables can be used only with the communications mode number is set to 3.

Device variables for the CJ-series Unit	Data type	R/W	Name	Description
*_BitOutCnctNdSta00_07	BYTE	R	BIT OUT Connect Flag00_07	Bits 0 to 7: Bit node addresses 00 to 07
*_BitOutCnctNdSta00	BOOL	R	BIT OUT Connect Flag00	BIT OUT Connect Flags for bit node addresses 00 to 07
to			to	
*_BitOutCnctNdSta07			BIT OUT Connect Flag07	
*_BitOutCnctNdSta08_15	BYTE	R	BIT OUT Connect Flag08_15	Bits 0 to 7: Bit node addresses 08 to 15
*_BitOutCnctNdSta08	BOOL	R	BIT OUT Connect Flag08	BIT OUT Connect Flags for bit node addresses 08 to 15
to			to	
*_BitOutCnctNdSta15			BIT OUT Connect Flag15	
*_BitOutCnctNdSta16_23	BYTE	R	BIT OUT Connect Flag16_23	Bits 0 to 7: Bit node addresses 16 to 23
*_BitOutCnctNdSta16	BOOL	R	BIT OUT Connect Flag16	BIT OUT Connect Flags for bit node addresses 16 to 23
to			to	
*_BitOutCnctNdSta23			BIT OUT Connect Flag23	
*_BitOutCnctNdSta24_31	BYTE	R	BIT OUT Connect Flag24_31	Bits 0 to 7: Bit node addresses 24 to 31
*_BitOutCnctNdSta24	BOOL	R	BIT OUT Connect Flag24	BIT OUT Connect Flags for bit node addresses 24 to 31
to			to	
*_BitOutCnctNdSta31			BIT OUT Connect Flag31	

Device variables for the CJ-series Unit	Data type	R/W	Name	Description
*_BitOutCnctNdSta32_39	BYTE	R	BIT OUT Connect Flag32_39	Bits 0 to 7: Bit node addresses 32 to 39
*_BitOutCnctNdSta32	BOOL	R	BIT OUT Connect Flag32	BIT OUT Connect Flags for bit node addresses 32 to 39
to			to	
*_BitOutCnctNdSta39			BIT OUT Connect Flag39	
*_BitOutCnctNdSta40_47	BYTE	R	BIT OUT Connect Flag40_47	Bits 0 to 7: Bit node addresses 40 to 47
*_BitOutCnctNdSta40	BOOL	R	BIT OUT Connect Flag40	BIT OUT Connect Flags for bit node addresses 40 to 47
to			to	
*_BitOutCnctNdSta47			BIT OUT Connect Flag47	
*_BitOutCnctNdSta48_55	BYTE	R	BIT OUT Connect Flag48_55	Bits 0 to 7: Bit node addresses 48 to 55
*_BitOutCnctNdSta48	BOOL	R	BIT OUT Connect Flag48	BIT OUT Connect Flags for bit node addresses 48 to 55
to			to	
*_BitOutCnctNdSta55			BIT OUT Connect Flag55	
*_BitOutCnctNdSta56_63	BYTE	R	BIT OUT Connect Flag56_63	Bits 0 to 7: Bit node addresses 56 to 63
*_BitOutCnctNdSta56	BOOL	R	BIT OUT Connect Flag56	BIT OUT Connect Flags for bit node addresses 56 to 63
to			to	
*_BitOutCnctNdSta63			BIT OUT Connect Flag63	

Connect Flags for Bit Input Slaves (Communications Mode Number 3)

These variables can be used only with the communications mode number is set to 3.

Device variables for the CJ-series Unit	Data type	R/W	Name	Description
*_BitInCnctNdSta00_07	BYTE	R	BIT IN Connect Flag00_07	Bits 0 to 7: Bit node addresses 00 to 07
*_BitInCnctNdSta00	BOOL	R	BIT IN Connect Flag00	BIT IN Connect Flags for bit node addresses 00 to 07
to			to	
*_BitInCnctNdSta07			BIT IN Connect Flag07	
*_BitInCnctNdSta08_15	BYTE	R	BIT IN Connect Flag08_15	Bits 0 to 7: Bit node addresses 08 to 15
*_BitInCnctNdSta08	BOOL	R	BIT IN Connect Flag08	BIT IN Connect Flags for bit node addresses 08 to 15
to			to	
*_BitInCnctNdSta15			BIT IN Connect Flag15	
*_BitInCnctNdSta16_23	BYTE	R	BIT IN Connect Flag16_23	Bits 0 to 7: Bit node addresses 16 to 23
*_BitInCnctNdSta16	BOOL	R	BIT IN Connect Flag16	BIT IN Connect Flags for bit node addresses 16 to 23
to			to	
*_BitInCnctNdSta23			BIT IN Connect Flag23	
*_BitInCnctNdSta24_31	BYTE	R	BIT IN Connect Flag24_31	Bits 0 to 7: Bit node addresses 24 to 31
*_BitInCnctNdSta24	BOOL	R	BIT IN Connect Flag24	BIT IN Connect Flags for bit node addresses 24 to 31
to			to	
*_BitInCnctNdSta31			BIT IN Connect Flag31	
*_BitInCnctNdSta32_39	BYTE	R	BIT IN Connect Flag32_39	Bits 0 to 7: Bit node addresses 32 to 39
*_BitInCnctNdSta32	BOOL	R	BIT IN Connect Flag32	BIT IN Connect Flags for bit node addresses 32 to 39
to			to	
*_BitInCnctNdSta39			BIT IN Connect Flag39	
*_BitInCnctNdSta40_47	BYTE	R	BIT IN Connect Flag40_47	Bits 0 to 7: Bit node addresses 40 to 47
*_BitInCnctNdSta40	BOOL	R	BIT IN Connect Flag40	BIT IN Connect Flags for bit node addresses 40 to 47
to			to	
*_BitInCnctNdSta47			BIT IN Connect Flag47	

Device variables for the CJ-series Unit	Data type	R/W	Name	Description
*_BitInCnctNdSta48_55	BYTE	R	BIT IN Connect Flag48_55	Bits 0 to 7: Bit node addresses 48 to 55
*_BitInCnctNdSta48	BOOL	R	BIT IN Connect Flag48	BIT IN Connect Flags for bit node addresses 48 to 55
to			to	
*_BitInCnctNdSta55			BIT IN Connect Flag55	
*_BitInCnctNdSta56_63	BYTE	R	BIT IN Connect Flag56_63	Bits 0 to 7: Bit node addresses 56 to 63
*_BitInCnctNdSta56	BOOL	R	BIT IN Connect Flag56	BIT IN Connect Flags for bit node addresses 56 to 63
to			to	
*_BitInCnctNdSta63			BIT IN Connect Flag63	

Communication Error Flags for Bit Output Slaves (Communications Mode Number 3)

These variables can be used only with the communications mode number is set to 3.

Device variables for the CJ-series Unit	Data type	R/W	Name	Description
*_BitOutErrNdSta00_07	BYTE	R	BIT OUT Communication Error Flag00_07	Bits 0 to 7: Bit node addresses 00 to 07
*_BitOutErrNdSta00	BOOL	R	BIT OUT Communication Error Flag00	BIT OUT Connect Flags for bit node addresses 00 to 07
to			to	
*_BitOutErrNdSta07			BIT OUT Communication Error Flag07	
*_BitOutErrNdSta08_15	BYTE	R	BIT OUT Communication Error Flag08_15	Bits 0 to 7: Bit node addresses 08 to 15
*_BitOutErrNdSta08	BOOL	R	BIT OUT Communication Error Flag08	BIT OUT Connect Flags for bit node addresses 08 to 15
to			to	
*_BitOutErrNdSta15			BIT OUT Communication Error Flag15	
*_BitOutErrNdSta16_23	BYTE	R	BIT OUT Communication Error Flag16_23	Bits 0 to 7: Bit node addresses 16 to 23
*_BitOutErrNdSta16	BOOL	R	BIT OUT Communication Error Flag16	BIT OUT Connect Flags for bit node addresses 16 to 23
to			to	
*_BitOutErrNdSta23			BIT OUT Communication Error Flag23	
*_BitOutErrNdSta24_31	BYTE	R	BIT OUT Communication Error Flag24_31	Bits 0 to 7: Bit node addresses 24 to 31
*_BitOutErrNdSta24	BOOL	R	BIT OUT Communication Error Flag24	BIT OUT Connect Flags for bit node addresses 24 to 31
to			to	
*_BitOutErrNdSta31			BIT OUT Communication Error Flag31	
*_BitOutErrNdSta32_39	BYTE	R	BIT OUT Communication Error Flag32_39	Bits 0 to 7: Bit node addresses 32 to 39
*_BitOutErrNdSta32	BOOL	R	BIT OUT Communication Error Flag32	BIT OUT Connect Flags for bit node addresses 32 to 39
to			to	
*_BitOutErrNdSta39			BIT OUT Communication Error Flag39	
*_BitOutErrNdSta40_47	BYTE	R	BIT OUT Communication Error Flag40_47	Bits 0 to 7: Bit node addresses 40 to 47
*_BitOutErrNdSta40	BOOL	R	BIT OUT Communication Error Flag40	BIT OUT Connect Flags for bit node addresses 40 to 47
to			to	
*_BitOutErrNdSta47			BIT OUT Communication Error Flag47	
*_BitOutErrNdSta48_55	BYTE	R	BIT OUT Communication Error Flag48_55	Bits 0 to 7: Bit node addresses 48 to 55
*_BitOutErrNdSta48	BOOL	R	BIT OUT Communication Error Flag48	BIT OUT Connect Flags for bit node addresses 48 to 55
to			to	
*_BitOutErrNdSta55			BIT OUT Communication Error Flag55	
*_BitOutErrNdSta56_63	BYTE	R	BIT OUT Communication Error Flag56_63	Bits 0 to 7: Bit node addresses 56 to 63
*_BitOutErrNdSta56	BOOL	R	BIT OUT Communication Error Flag56	BIT OUT Connect Flags for bit node addresses 56 to 63
to			to	
*_BitOutErrNdSta63			BIT OUT Communication Error Flag63	

Communication Error Flags for Bit Input Slaves (Communications Mode Number 3)

These variables can be used only with the communications mode number is set to 3.

Device variables for the CJ-series Unit	Data type	R/W	Name	Description
*_BitInErrNdSta00_07	BYTE	R	BIT IN Communication Error Flag00_07	Bits 0 to 7: Bit node addresses 00 to 07
*_BitInErrNdSta00	BOOL	R	BIT IN Communication Error Flag00	BIT IN Connect Flags for bit node addresses 00 to 07
to			to	
*_BitInErrNdSta07			BIT IN Communication Error Flag07	
*_BitInErrNdSta08_15	BYTE	R	BIT IN Communication Error Flag08_15	Bits 0 to 7: Bit node addresses 08 to 15
*_BitInErrNdSta08	BOOL	R	BIT IN Communication Error Flag08	BIT IN Connect Flags for bit node addresses 08 to 15
to			to	
*_BitInErrNdSta15			BIT IN Communication Error Flag15	
*_BitInErrNdSta16_23	BYTE	R	BIT IN Communication Error Flag16_23	Bits 0 to 7: Bit node addresses 16 to 23
*_BitInErrNdSta16	BOOL	R	BIT IN Communication Error Flag16	BIT IN Connect Flags for bit node addresses 16 to 23
to			to	
*_BitInErrNdSta23			BIT IN Communication Error Flag23	
*_BitInErrNdSta24_31	BYTE	R	BIT IN Communication Error Flag24_31	Bits 0 to 7: Bit node addresses 24 to 31
*_BitInErrNdSta24	BOOL	R	BIT IN Communication Error Flag24	BIT IN Connect Flags for bit node addresses 24 to 31
to			to	
*_BitInErrNdSta31			BIT IN Communication Error Flag31	
*_BitInErrNdSta32_39	BYTE	R	BIT IN Communication Error Flag32_39	Bits 0 to 7: Bit node addresses 32 to 39
*_BitInErrNdSta32	BOOL	R	BIT IN Communication Error Flag32	BIT IN Connect Flags for bit node addresses 32 to 39
to			to	
*_BitInErrNdSta39			BIT IN Communication Error Flag39	
*_BitInErrNdSta40_47	BYTE	R	BIT IN Communication Error Flag40_47	Bits 0 to 7: Bit node addresses 40 to 47
*_BitInErrNdSta40	BOOL	R	BIT IN Communication Error Flag40	BIT IN Connect Flags for bit node addresses 40 to 47
to			to	
*_BitInErrNdSta47			BIT IN Communication Error Flag47	
*_BitInErrNdSta48_55	BYTE	R	BIT IN Communication Error Flag48_55	Bits 0 to 7: Bit node addresses 48 to 55
*_BitInErrNdSta48	BOOL	R	BIT IN Communication Error Flag48	BIT IN Connect Flags for bit node addresses 48 to 55
to			to	
*_BitInErrNdSta55			BIT IN Communication Error Flag55	
*_BitInErrNdSta56_63	BYTE	R	BIT IN Communication Error Flag56_63	Bits 0 to 7: Bit node addresses 56 to 63
*_BitInErrNdSta56	BOOL	R	BIT IN Communication Error Flag56	BIT IN Connect Flags for bit node addresses 56 to 63
to			to	
*_BitInErrNdSta63			BIT IN Communication Error Flag63	

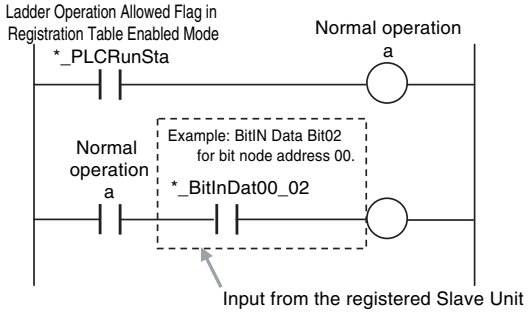
5-3-4 Status Information: Status (All Communications Modes)

Device variables for the CJ-series Unit	Data type	R/W	Name	Description
*_ UnitSta	WORD	R	Status	The overall status of the network and the status of the Master Unit are stored here. The meanings of individual bits are given below. There is a BOOL variable for each bit. Refer to the remainder of this table. 00: Communications Error Flag 01: Registration Table Verification Error Flag 02: Communications Error Communications Stop Flag 03: Slave Unit Duplicated Address Error Flag 04: Repeater Unit Communications Error Flag 05: Repeater Unit Node Slave Unit Duplicated Address Error Flag 06: All Registered Slave Units Participating Flag 07: Remote I/O Communications Started Flag 08: Ladder Operation Allowed Flag in Registration Table Enabled Mode 09: Reserved. 10: Registration Table Mode Flag 11: Reserved. 12: Representative Warning Status Flag 13: Representative Alarm Status Flag 14-15: Reserved.

Device variables for the CJ-series Unit	Data type	R/W	Name	Description
*_SlavCommErr	BOOL	R	Communications Error Flag	FALSE: Normal TRUE: Error This flag changes to TRUE if a communications error occurs in even one of the applicable Slave Units.*1 *1 All Slave Units are applicable if the power supply was turned ON to the Controller or the Controller was reset with SW4 (REGS) set to OFF on the Master Unit. Only the registered Slave Units are applicable if the power supply was turned ON to the Controller or the Controller was reset with SW4 (REGS) set to ON on the Master Unit.
*_RegTblErr	BOOL	R	Registration Table Verification Error Flag	This flag is enabled only when Registration Table Enable Mode (i.e., when SW4 (REGS) was set to ON on the Master Unit when the power supply to the Controller was turned ON or the Controller was reset). FALSE: Normal TRUE: Verification error This flag is TRUE if there is a disagreement between the Slave Units (i.e., combination of node addresses and models) in the Registration Table and the Slave Units which actually are participating when the power supply to the Controller is turned ON or the Controller is reset. **Note** Remote I/O communications will start even if this flag is TRUE.
*_CommStopSta	BOOL	R	Communications Error Communications Stop Flag	FALSE: Operation is normal or SW3 (ESTP) on the Master Unit is set to OFF (Communications Error Communications Stop Mode disabled). TRUE: Error (when SW3 (ESTP) on the Master Unit is set to ON (Communications Error Communications Stop Mode enabled) and remote I/O communications stopped due to a communications error). After this flag changes to TRUE, it will remain TRUE until the power supply is cycled or the Controller is restarted. **Note** The status of all Repeater Units and Slave Units affect this variable.
*_SlavDupErr	BOOL	R	Slave Unit Duplicated Address Error Flag	FALSE: Normal TRUE: Error (The same node address is set for two Slave Units, two Slave Units use the same memory area even though they are set to different node addresses, or a Slave Unit left the network and then a Slave Unit with the same node address but with a different number or type of inputs or outputs joined the network.) **Note** Remote I/O communications will start even if this flag is TRUE.

Device variables for the CJ-series Unit	Data type	R/W	Name	Description
*_RepeaterCommErr	BOOL	R	Repeater Unit Communications Error Flag	FALSE: Normal TRUE: Error **Note** Remote I/O communications will start even if this flag is TRUE.
*_RepeaterDupAdrErr	BOOL	R	Repeater Unit Node Slave Unit Duplicated Address Error Flag	FALSE: Normal TRUE: Error **Note** Remote I/O communications will start even if this flag is TRUE.
*_SlavAllCnctSta	BOOL	R	All Registered Slave Units Participating Flag	This flag is enabled only when Registration Table Enable Mode (i.e., when SW4 (REGS) was set to ON on the Master Unit when the power supply to the Controller was turned ON or the Controller was reset). FALSE: There is a Slave Unit that is not participating in the network. (Not all of the Slave Units in the Registration Table are participating.) TRUE: All of the Slave Units in the Registration Table are participating in the network. The Connect Flags for all of the Slave Units are used to determine when the Slave Units are participating. **Note 1** This flag will be TRUE when all Slave Units in the Registration Table are participating in the network, even if an unregistered Slave Unit is also participating. **2** When the Registered Slave Unit Participation Standby Mode is enabled, remote I/O communications will stop while this flag is FALSE. Remote I/O communications will start when this flag changes to TRUE.
*_IOCycleStartSta	BOOL	R	Remote I/O Communications Started Flag	FALSE: Remote I/O communications are stopped. TRUE: Remote I/O communications are operating.
*_PLCRunSta	BOOL	R	Ladder Operation Allowed Flag in Registration Table Enabled Mode	FALSE: User program operations are not possible. (The user program cannot use Slave Unit I/O data in Registration Table Enable Mode.) TRUE: User program operations are possible. (The user program can use Slave Unit I/O data in Registration Table Enable Mode.) **Note** Flag status is determined by a logical AND of the value of *SlavCommErr* (FALSE = no communications error) in **_UnitSta* (Status), the value of *SlavAllCnctSta* (All Registered Slave Units Participating Flag), and the value of **_IOCycleStartSta* (Remote I/O Communications Start Switch).
*_RegTblSta	BOOL	R	Registration Table Mode Flag	FALSE: Registration Table Disable Mode. (SW4 (REGS) on the Master Unit was set to OFF when the power supply to the Controller was turned ON or the Controller was reset, or the Registration Table data is not correct.) TRUE: Registration Table Enable Mode. (SW4 (REGS) on the Master Unit was set to ON when the power supply to the Controller was turned ON or the Controller was reset and the Registration Table data is correct.)
*_SlavAllWarnSta	BOOL	R	Representative Warning Status Flag	The value of this variable is a logical OR of the Warning Status Flags for all Slave Units.
*_SlavAllAlmSta	BOOL	R	Representative Alarm Status Flag	The value of this variable is a logical OR of the Alarm Status Flags for all Slave Units.

Example: In this example, operation is considered normal when all registered Slave Units are participating, there are no communications errors at any registered Slave Units, and remote I/O communications are operating.



5-3-5 Status Information: Setting (All Communications Modes)

Device variables for the CJ-series Unit	Data type	R/W	Name	Description
*_ UnitCmd	WORD	RW	Setting	The meanings of individual bits are given below. There is a BOOL variable for each bit. Refer to the remainder of this table. 00: Remote I/O Communications Start Switch 01 to 15: Reserved.
*_IOCycleStartCmd	BOOL	RW	Remote I/O Communications Start Switch	FALSE: No processing (default) FALSE to TRUE: Remote I/O communications are started when this variable changes from FALSE to TRUE. This variable is automatically changed to FALSE by the system after the system detects that the switch has changed to TRUE. **Note 1** This variable is enabled only in I/O Communications Manual Start Mode. This mode can be selected with the CX-Integrator. **2** When the I/O Communications Manual Start Mode is disabled or when the remote I/O communications have already been in operation, a command to start the remote I/O communications is invalid even if the system detects that the variable was changed to TRUE.

5-4 Slave Unit Allocations

This section describes how I/O in the CPU Unit where the CompoNet Master Unit is mounted is allocated to the Slave Units.

5-4-1 Overview

Slave Unit I/O data, Connect Flags, and Communication Error Flags are assigned to I/O ports in the CPU Unit where the CompoNet Master Unit is mounted. The number of nodes and the types of Slave Units to which I/O ports can be allocated and the I/O ports that are allocated depend on the communications mode number. The number of I/O that is used by each Slave Unit is determined by the point size of the Slave Unit.

From the user program, you access the Slave Units through device variables for the CJ-series Unit. Device variables for the CJ-series Unit are given AT specifications to the I/O ports that are allocated to Slave Unit I/O.

If the communications unit number is set to 8, you can make software settings from the CX-Integrator to assign the I/O data, Connect Flags, and Communication Error Flags for the Slave Units to the desired locations in the memory used for CJ-series Units. (You can also change the number of nodes with software settings from the CX-Integrator.) If the communications mode number is set to 8, you must create user-defined variables on the Sysmac Studio to access the I/O data of the Slave Units from the user program. The user-defined variables are given AT specifications to the memory used for CJ-series Units that was specified in the software settings from the CX-Integrator.

5-4-2 Types of CompoNet Network Node Addresses

There are the following three types of node address for a CompoNet Network.

- Node addresses
- Bit node addresses
- Repeater node addresses

Node address type	Node name		Node address name	Address range	Applicable Slave Units	Abbreviation on Unit	Unit color
Node addresses	Word Slave Units	Contact Input Unit	WORD IN	00 to 63	Input Slave Units with 4, 8, or 16 points per node address	WORD NODE ADR	Orange
		Contact Output Unit	WORD OUT	00 to 63	Output Slave Units with 4, 8, or 16 points per node address	WORD NODE ADR	Yellow
		Contact I/O Unit	WORD IN/ OUT	00 to 63	I/O Slave Units with 4, 8, or 16 points per node address	WORD NODE ADR	Orange + yellow
Bit node addresses	Bit Slave Units	Contact Input Unit	BIT IN	00 to 127	Input Slave Units with 2 points per node address	BIT NODE ADR	Orange
		Contact Output Unit	BIT OUT	00 to 127	Output Slave Units with 2 points per node address	BIT NODE ADR	Yellow
		Contact I/O Unit	BIT IN/OUT	00 to 127	I/O Slave Units with 2 points per node address	BIT NODE ADR	Orange + yellow
Repeater node addresses	Repeater Unit		Repeater node	00 to 63	Repeater Unit	RPT NODE ADR	Green

Note The destination addresses that are used to send message to the Slave Units are given in the following table.

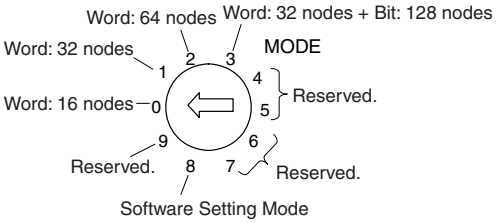
Slave Unit	Assigned address	Destination address for messages
I/O Slave Units	Input and output node addresses	Input node address
Slave Units with more than 16 points	Node address for the nearest integer that is larger than the total number of points divided by 16	The node address that is set on the rotary switches on the front panel (i.e., the lower node address)
Other Slave Units	The node address that is set on the rotary switches on the front panel	The node address that is set on the rotary switches on the front panel

5-4-3 I/O Port Allocations for Each Communications Mode Numbers

The communications mode number is set on the rotary switch on the front of the CompoNet Master Unit and when the CompoNet Master Unit is registered on the Sysmac Studio. You must always set the same communications mode number on the rotary switch on the front panel and in the Sysmac Studio.

Setting on Rotary Switches on CompoNet Master Unit Front Panel

Set the communications mode number according to the number of Slave Units to connect (the number of Word Slave Units and Bit Slave Units) and the number of points to control. Set the rotary switches on the front panel of the CompoNet Master Unit to between 0 and 3 or to 8.



Setting in CPU/Expansion Racks under Configurations and Setup of the Sysmac Studio

While offline, select the communications mode number when you register the CompoNet Master Unit in **CPU/Expansion Racks** under **Configurations and Setup**.
The names of the CompoNet Master Unit that are registered on the Sysmac Studio are defined in advance according to the communications mode, as shown below. Select and register the name of the CompoNet Master Unit that corresponds to the communications mode number that you will use.

- CJ1W-CRM21(MODE0)
- CJ1W-CRM21(MODE1)
- CJ1W-CRM21(MODE2)
- CJ1W-CRM21(MODE3)
- CJ1W-CRM21(MODE8)

Select the name with the communications mode number that you will use.

Precautions for Safe Use

Always set the same communications mode number on the rotary switch on the front of the CompoNet Master Unit and for the communications mode number setting when you register the Unit on the Sysmac Studio (MODE□ in the Unit Name). If the numbers are not the same, the CompoNet Master Unit will operate with the communications mode number that is set on the rotary switch on the front panel, but the I/O ports that are assigned for slave I/O data will be created according to the communications mode number that is registered on the Sysmac Studio. If this happens, data will be accessed for a different Slave Unit or a different item when you try to access I/O data for the Slave Unit. Set the communications mode number carefully.

Allowable Slave Unit Node Addresses and Control Points per Master Unit, and Slave Unit I/O Data Allocations and Sizes for Each Communications Mode

Communications mode	Mode name	Allowable Slave Unit node addresses per Master Unit	Control points per Master Unit	Unit numbers per Master Unit	Slave Unit I/O data allocations and access method (variables) from user program	Words allocated to I/O Port				
						Output Area	Input Area	Status	Setting	Connect Flags and Communications Error Flags
0	Communications mode 0	Word Slave Units: 8 input and 8 output node addresses	Word Slave Units: 128 inputs and 128 outputs	2	I/O ports (device variables for the CJ-series Unit with AT specifications to I/O ports)	Word Slave Units: 8 words	Word Slave Units: 8 words	1 word	1 word	Word Slave Units: 2 words
1	Communications mode 1	Word Slave Units: 16 input and 16 output node addresses	Word Slave Units: 256 inputs and 256 outputs	4		Word Slave Units: 16 words	Word Slave Units: 16 words	1 word	1 word	Word Slave Units: 4 words
2	Communications mode 2	Word Slave Units: 32 input and 32 output node addresses	Word Slave Units: 512 inputs and 512 outputs	8		Word Slave Units: 32 words	Word Slave Units: 32 words	1 word	1 word	Word Slave Units: 8 words
3	Communications mode 3	Word Slave Units: 16 input and 16 output node addresses Bit Slave Units: 64 input and 64 output node addresses	Word Slave Units: 256 inputs and 256 outputs Bit Slave Units: 128 inputs and 128 outputs	8		Word Slave Units: 16 words + Bit Slave Units: 8 words	Word Slave Units: 16 words + Bit Slave Units: 8 words	1 word	1 word	Word Slave Units: 4 words + Bit Slave Units: 16 words
8	Software Setting Mode	Word Slave Units: 64 input and 64 output node addresses Bit Slave Units: 128 input and 128 output node addresses	Word Slave Units: 1,024 inputs and 1,024 outputs Bit Slave Units: 256 inputs and 256 outputs	1	The first address can be set for Word Slave Unit outputs, Word Slave Unit inputs, Bit Slave Unit outputs, and Bit Slave Unit inputs. (According to software settings made from the CX-Integrator. User-defined variables with AT specifications to CIO, WR, HR, or DM Areas in memory used for CJ-series Units.)	Word Slave Units: 64 words + Bit Slave Units: 16 words max. (Software setting from the CX-Integrator.)	Word Slave Units: 64 words + Bit Slave Units: 16 words max. (Software setting from the CX-Integrator.)	1 word **Note** Two words for the Status and Setting are allocated to I/O ports.	1 word	Word Slave Units: 16 words +Bit Slave Units: 32 words

I/O Port Allocation Pattern for each Communications Mode

<table>
<tr><th>Communications mode number</th><th>Pattern</th></tr>
<tr><td>0</td><td>
<table>
<tr><th>Device variables for the CJ-series Unit</th><th colspan="2">Slave Unit I/O data</th></tr>
<tr><td>*_OutDat00 to *_OutDat07
((*_OutDat00_00 to *_OutDat00_15) to (*_OutDat07_00 to *_OutDat07_15))</td><td colspan="2">WORD OUT Data (8 words): Word Slave Unit outputs 00 to 07</td></tr>
<tr><td>*_InDat00 to *_InDat07
(*_InDat00_00 to *_InDat00_15 to *_InDat07_00 to *_InDat07_15)</td><td colspan="2">WORD IN Data (8 words): Word Slave Unit inputs 00 to 07</td></tr>
<tr><td>*_UnitSta</td><td colspan="2">Status (1 word)</td></tr>
<tr><td>*_UnitCmd</td><td colspan="2">Setting (1 word)</td></tr>
<tr><td>*_OutCnctNdSta00_07
(*_OutCnctNdSta00 to 07)</td><td>WORD OUT Connect Flags (BYTE): Word Slave outputs 00 to 07</td><td rowspan="2">(1 word)</td></tr>
<tr><td>*_InCnctNdSta00_07
(*_InCnctNdSta00 to 07)</td><td>WORD IN Connect Flags (BYTE): Word Slave Unit inputs 00 to 07</td></tr>
<tr><td>*_OutErrNdSta00_07
(*_OutErrNdSta00 to 07)</td><td>WORD OUT Communication Error Flags (BYTE): Word Slave outputs 00 to 07</td><td rowspan="2">(1 word)</td></tr>
<tr><td>*_InErrNdSta00_07
(*_InErrNdSta00 to 07)</td><td>WORD IN Communication Error Flags (BYTE): Word Slave Unit inputs 00 to 07</td></tr>
</table>
</td></tr>
<tr><td>1</td><td>
<table>
<tr><th>Device variables for the CJ-series Unit</th><th colspan="2">Slave Unit I/O data</th></tr>
<tr><td>*_OutDat00 to *_OutDat15
((*_OutDat00_00 to *_OutDat00_15) to (*_OutDat15_00 to *_OutDat15_15))</td><td colspan="2">WORD OUT Data (16 words): Word Slave Unit outputs 00 to 15</td></tr>
<tr><td>*_InDat00 to *_InDat15
((*_InDat00_00 to *_InDat00_15) to (*_InDat15_00 to *_InDat15_15))</td><td colspan="2">WORD IN Data (16 words): Word Slave Unit inputs 00 to 15</td></tr>
<tr><td>*_UnitSta</td><td colspan="2">Status (1 word)</td></tr>
<tr><td>*_UnitCmd</td><td colspan="2">Setting (1 word)</td></tr>
<tr><td>*_OutCnctNdSta00_07
(*_OutCnctNdSta00 to 07)</td><td>WORD OUT Connect Flags:
Word Slave Unit outputs 00 to 07 (BYTE)</td><td rowspan="2">(1 word)</td></tr>
<tr><td>*_OutCnctNdSta08_15
(*_OutCnctNdSta08 to 15)</td><td>Word Slave Unit outputs 08 to 15 (BYTE)</td></tr>
<tr><td>*_InCnctNdSta00_07
(*_InCnctNdSta00 to 07)</td><td>WORD IN Connect Flags:
Word Slave Unit inputs 00 to 07 (BYTE)</td><td rowspan="2">(1 word)</td></tr>
<tr><td>*_InCnctNdSta08_15
(*_InCnctNdSta08 to 15)</td><td>Word Slave Unit inputs 08 to 15 (BYTE)</td></tr>
<tr><td>*_OutErrNdSta00_07
(*_OutErrNdSta00 to 07)</td><td>WORD OUT Communication Error Flags:
Word Slave Unit outputs 00 to 07 (BYTE)</td><td rowspan="2">(1 word)</td></tr>
<tr><td>*_OutErrNdSta08_15
(*_OutErrNdSta08 to 15)</td><td>Word Slave Unit outputs 08 to 15 (BYTE)</td></tr>
<tr><td>*_InErrNdSta00_07
(*_InErrNdSta00 to 07)</td><td>WORD IN Communication Error Flags:
Word Slave Unit inputs 00 to 07 (BYTE)</td><td rowspan="2">(1 word)</td></tr>
<tr><td>*_InErrNdSta08_15
(*_InErrNdSta08 to 15)</td><td>Word Slave Unit inputs 08 to 15 (BYTE)</td></tr>
</table>
</td></tr>
</table>

Communications mode number	Pattern
2	

Device variables for the CJ-series Unit	Slave Unit I/O data	
*_OutDat00 to *_OutDat31 ((*_OutDat00_00 to *_OutDat00_15) to (*_OutDat31_00 to *_OutDat31_15))	WORD OUT Data (32 words): Word Slave Unit outputs 00 to 31	
*_InDat00 to *_InDat31 ((*_InDat00_00 to *_InDat00_15) to (*_InDat31_00 to *_InDat31_15))	WORD IN Data (32 words): Word Slave Unit inputs 00 to 31	
*_UnitSta	Status (1 word)	
*_UnitCmd	Setting (1 word)	
*_OutCnctNdSta00_07 (*_OutCnctNdSta00 to 07)	WORD OUT Connect Flags: Word Slave Unit outputs 00 to 07 (BYTE)	(1 word)
*_OutCnctNdSta08_15 (*_OutCnctNdSta08 to 15)	Word Slave Unit outputs 08 to 15 (BYTE)	
*_OutCnctNdSta16_23 (*_OutCnctNdSta16 to 23)	Word Slave Unit outputs 16 to 23 (BYTE)	(1 word)
*_OutCnctNdSta24_31 (*_OutCnctNdSta24 to 31)	Word Slave Unit outputs 24 to 31 (BYTE)	
*_InCnctNdSta00_07 (*_InCnctNdSta00 to 07)	WORD IN Connect Flags: Word Slave Unit inputs 00 to 07 (BYTE)	(1 word)
*_InCnctNdSta08_15 (*_InCnctNdSta08 to 15)	Word Slave Unit inputs 08 to 15 (BYTE)	
*_InCnctNdSta16_23 (*_InCnctNdSta16 to 23)	Word Slave Unit inputs 16 to 23 (BYTE)	(1 word)
*_InCnctNdSta24_31 (*_InCnctNdSta24 to 31)	Word Slave Unit inputs 24 to 31 (BYTE)	
*_OutErrNdSta00_07 (*_OutErrNdSta00 to 07)	WORD OUT Communication Error Flags: Word Slave Unit outputs 00 to 07 (BYTE)	(1 word)
*_OutErrNdSta08_15 (*_OutErrNdSta08 to 15)	Word Slave Unit outputs 08 to 15 (BYTE)	
*_OutErrNdSta16_23 (*_OutErrNdSta16 to 23)	Word Slave Unit outputs 16 to 23 (BYTE)	(1 word)
*_OutErrNdSta24_31 (*_OutErrNdSta24 to 31)	Word Slave Unit outputs 24 to 31 (BYTE)	
*_InErrNdSta00_07 (*_InErrNdSta00 to 07)	WORD IN Communication Error Flags: Word Slave Unit inputs 00 to 07 (BYTE)	(1 word)
*_InErrNdSta08_15 (*_InErrNdSta08 to 15)	Word Slave Unit inputs 08 to 15 (BYTE)	
*_InErrNdSta16_23 (*_InErrNdSta16 to 23)	Word Slave Unit inputs 16 to 23 (BYTE)	(1 word)
*_InErrNdSta24_31 (*_InErrNdSta24 to 31)	Word Slave Unit inputs 24 to 31 (BYTE)	

Communications mode number	Pattern
3	

Device variables for the CJ-series Unit	Slave Unit I/O data	
*_OutDat00 to *_OutDat15 ((*_OutDat00_00 to *_OutDat00_15) to (*_OutDat15_00 to *_OutDat15_15))	WORD OUT Data (16 words): Word Slave Unit outputs 00 to 15	
*_InDat00 to *_InDat15 ((*_InDat00_00 to *_InDat00_15) to (*_InDat15_00 to *_InDat15_15))	WORD IN Data (16 words): Word Slave Unit inputs 00 to 15	
*_BitOutDat00_00 to *_BitOutDat63_01	BitOUT Data (8 words): Bit Slave Unit outputs 00 to 63	
*_BitInDat00_00 to *_BitInDat63_01	BitIN Data (8 words): Bit Slave Unit inputs 00 to 63	
*_UnitSta	Status (1 word)	
*_UnitCmd	Settings (1 word)	
*_OutCnctNdSta00_07 (*_OutCnctNdSta00 to 07)	WORD OUT Connect Flags: Word Slave Unit outputs 00 to 07 (BYTE)	(1 word)
*_OutCnctNdSta08_15 (*_OutCnctNdSta08 to 15)	Word Slave Unit outputs 08 to 15 (BYTE)	
*_InCnctNdSta00_07 (*_InCnctNdSta00 to 07)	WORD IN Connect Flags: Word Slave Unit inputs 00 to 07 (BYTE)	(1 word)
*_InCnctNdSta08_15 (*_InCnctNdSta08 to 15)	Word Slave Unit inputs 08 to 15 (BYTE)	
*_OutErrNdSta00_07 (*_OutErrNdSta00 to 07)	WORD OUT Communication Error Flags: Word Slave Unit outputs 00 to 07 (BYTE)	(1 word)
*_OutErrNdSta08_15 (*_OutErrNdSta08 to 15)	Word Slave Unit outputs 08 to 15 (BYTE)	
*_InErrNdSta00_07 (*_InErrNdSta00 to 07)	WORD IN Communication Error Flags: Word Slave Unit inputs 00 to 07 (BYTE)	(1 word)
*_InErrNdSta08_15 (*_InErrNdSta08 to 15)	Word Slave Unit inputs 08 to 15 (BYTE)	
*_BitOutCnctNdSta00_07 (*_BitOutCnctNdSta00 to 07)	BIT OUT Connect Flags: Bit Slave Unit outputs 00 to 07 (BYTE)	(1 word)
*_BitOutCnctNdSta08_15 (*_BitOutCnctNdSta08 to 15)	Bit Slave Unit outputs 08 to 15 (BYTE)	
*_BitOutCnctNdSta16_23 (*_BitOutCnctNdSta16 to 23)	Bit Slave Unit outputs 16 to 23 (BYTE)	(1 word)
*_BitOutCnctNdSta24_31 (*_BitOutCnctNdSta24 to 31)	Bit Slave Unit outputs 24 to 31 (BYTE)	
*_BitOutCnctNdSta32_39 (*_BitOutCnctNdSta32 to 39)	Bit Slave Unit outputs 32 to 39 (BYTE)	(1 word)
*_BitOutCnctNdSta40_47 (*_BitOutCnctNdSta40 to 47)	Bit Slave Unit outputs 40 to 47 (BYTE)	
*_BitOutCnctNdSta48_55 (*_BitOutCnctNdSta48 to 55)	Bit Slave Unit outputs 48 to 55 (BYTE)	(1 word)
*_BitOutCnctNdSta56_63 (*_BitOutCnctNdSta56 to 63)	Bit Slave Unit outputs 56 to 63 (BYTE)	
*_BitInCnctNdSta00_07 (*_BitInCnctNdSta00 to 07)	BIT IN Connect Flags: Bit Slave Unit inputs 00 to 07 (BYTE)	(1 word)
*_BitInCnctNdSta08_15 (*_BitInCnctNdSta08 to 15)	Bit Slave Unit inputs 08 to 15 (BYTE)	
*_BitInCnctNdSta16_23 (*_BitInCnctNdSta16 to 23)	Bit Slave Unit inputs 16 to 23 (BYTE)	(1 word)
*_BitInCnctNdSta24_31 (*_BitInCnctNdSta24 to 31)	Bit Slave Unit inputs 24 to 31 (BYTE)	

<table>
<tr><th>Communications mode number</th><th>Pattern</th></tr>
<tr><td>3</td><td>
<table>
<tr><th>Device variables for the CJ-series Unit</th><th colspan="2">Slave Unit I/O data</th></tr>
<tr><td>*_BitInCnctNdSta32_39
(*_BitInCnctNdSta32 to 39)</td><td>Bit Slave Unit inputs 32 to 39 (BYTE)</td><td>(1 word)</td></tr>
<tr><td>*_BitInCnctNdSta40_47
(*_BitInCnctNdSta40 to 47)</td><td>Bit Slave Unit inputs 40 to 47 (BYTE)</td><td></td></tr>
<tr><td>*_BitInCnctNdSta48_55
(*_BitInCnctNdSta48 to 55)</td><td>Bit Slave Unit inputs 48 to 55 (BYTE)</td><td>(1 word)</td></tr>
<tr><td>*_BitInCnctNdSta56_63
(*_BitInCnctNdSta56 to 63)</td><td>Bit Slave Unit inputs 56 to 63 (BYTE)</td><td></td></tr>
</table>
</td></tr>
<tr><td>8</td><td>
With this mode, I/O ports are not used and the I/O data for Slave Units is assigned to the memory used for CJ-series Units. The area and first address for each of the following is set in the software settings from the CX-Integrator: WORD OUT Data for Word Slave Units, WORD IN Data for Word Slave Units, BitOUT Data for Bit Slave Units, BitIN Data for Bit Slave Units, and status (status, settings, participation, and disconnection). The size of memory that is allocated for each is set in the software setting from the CX-Integrator. AT specifications for user-defined variables must be made for the memory locations that are set in the software settings.

Note The allocations for the Slave Units are fixed and are in order from node address 0. Even if some of the node addresses are not used, the allocations cannot be changed. If the number of nodes that is set from the CX-Integrator is n, node address 0 to node address n−1 are allocated.

<table>
<tr><td>+0 words
to
+63 words max.</td><td>WORD OUT Data (64 words max.):
Word Slave Unit outputs 00 to 63</td></tr>
<tr><td>+0 words
to
+63 words max.</td><td>WORD IN Data (64 words max.):
Word Slave Unit inputs 00 to 63</td></tr>
<tr><td>+0 words
to
+15 words max.</td><td>BitOUT Data (16 words max.):
Bit Slave Unit outputs 00 to 127</td></tr>
<tr><td>+0 words
to
+15 words max.</td><td>BitIN Data (16 words max.):
Bit Slave Unit inputs 00 to 127</td></tr>
<tr><td>+0 words
to
+15 words</td><td>Connect Flags and Communication Error Flags (16 words)</td></tr>
<tr><td>+0 words
to
+31 words</td><td>Bit Slave Unit Connect Flags and Communication Error Flags (32 words)</td></tr>
</table>

The following are assigned to I/O ports.

<table>
<tr><td>*_UnitSta</td><td>Status (1 word)</td></tr>
<tr><td>*_UnitCmd</td><td>Settings (1 word)</td></tr>
</table>
</td></tr>
</table>

5-4-4 Details on Allocation of I/O Ports to Slave Unit I/O Data

I/O ports are provided for each node address for CompoNet Network I/O data for Word Slave Unit outputs, Word Slave Unit inputs, Bit Slave Unit outputs, and Bit Slave Unit inputs.

Each node is allocated I/O ports according to the point size of the Slave Unit starting from the node address of the Slave Unit.

Note Each node is not necessarily allocated only one I/O port. For a Word Slave Unit that has more than 16 points (e.g., 24 points), more than one I/O port (e.g., 2 I/O ports) would be allocated. A Bit Slave Unit with four points would be allocated two I/O ports.

Allocations for Word Slave Unit Data

A Word Slave Unit uses 16 points (or 1 word) for each WORD I/O port (WORD OUT or WORD IN Data) that is allocated.

There are input and output ports for each node address, each of which has a size of 16 points.

Each Slave Unit with less than 16 points is allocated the I/O port for one node address (i.e., only the I/O port for the node address of the Slave Unit).*1

*1 A Slave Unit with eight points would be allocated the I/O port for one word. The lower byte of the word is allocated and the upper byte is not used.

Each Slave Unit with more than 16 points and less than 32 points is allocated the I/O ports for two node addresses (i.e., the I/O port for the node address of the Slave Unit and the next I/O port).

Note As long as the I/O ports are not duplicated between the nodes, the WORD IN Data and WORD OUT Data of the I/O ports for the same node address can be assigned to different nodes. (Example: It is acceptable to allocate the I/O port OUT1 data to the 16 outputs of a Slave Unit with node address 1 and to also allocate the I/O port IN1 data to the 16 expansion inputs of a Slave Unit with node address 0.)

● Allocations for WORD OUT Data

Node address	I/O ports		Bit 15	Bit 0
	Name	Data type		
00	OutDat00	WORD	WORD OUT Data00	
	OUTDat00_00 to OUTDat00_15	BOOL		
01	OutDat01	WORD	WORD OUT Data01	
	OUTDat01_00 to OUTDat01_15	BOOL		
02	OutDat02	WORD	WORD OUT Data02	
	OUTDat02_00 to OUTDat02_15	BOOL		
:	:		:	
30	OutDat30	WORD	WORD OUT Data30	
	OUTDat30_00 to OUTDat30_15	BOOL		
31	OutDat31	WORD	WORD OUT Data31	
	OUTDat31_00 to OUTDat31_15	BOOL		

● Allocations for WORD IN Data

Node address	I/O ports		Bit 15	Bit 0
	Name	Data type		
00	InDat00	WORD	WORD IN Data00	
	InDat00_00 to InDat00_15	BOOL		
01	InDat01	WORD	WORD IN Data01	
	InDat01_00 to InDat01_15	BOOL		
02	InDat02	WORD	WORD IN Data02	
	InDat02_00 to InDat02_15	BOOL		
:	:		:	

Node address	I/O ports		Bit 15	Bit 0
	Name	Data type		
30	InDat30	WORD	WORD IN Data30	
	InDat30_00 to InDat30_15	BOOL		
31	InDat31	WORD	WORD IN Data31	
	InDat31_00 to InDat31_15	BOOL		

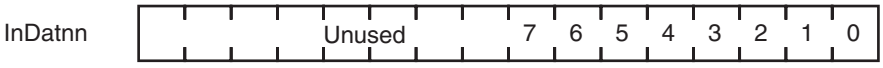
The following are some examples.

- If the Slave Unit with node address 02 has 16 inputs and 16 outputs, it is allocated the InDat02 and OutDat02 I/O ports.
- If the Slave Unit with node address 03 has 32 inputs, it is allocated the InDat03 and InDat04 I/O ports.
  In this case, node address 04 cannot be used for inputs.

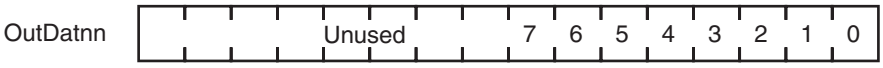
● Data Allocation Patterns for Word Slave Units

The allocation patterns for Word Slave Units are shown below. (n = node addresses)

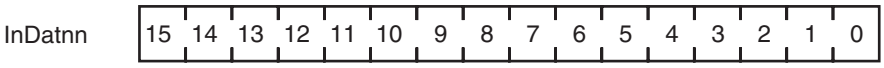
Eight-point Input Slave Unit



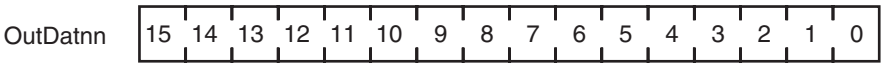
Eight-point Output Slave Unit



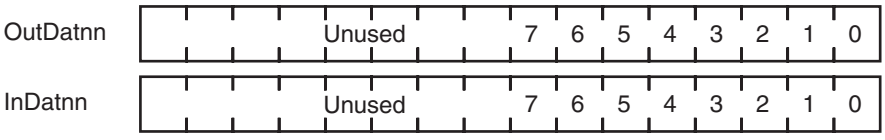
Sixteen-point Input Slave Unit



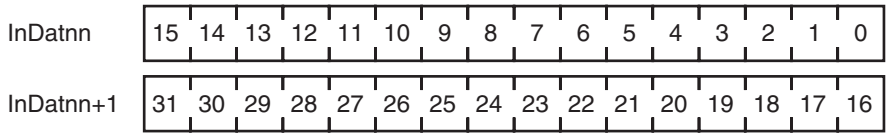
Sixteen-point Output Slave Unit



Sixteen-point Mixed Slave Unit



Thirty-two-point Input Slave Unit



Thirty-two-point Output Slave Unit

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
OutDatnn																
OutDatnn+1	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16

Thirty-two-point Mixed Slave Unit

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
OutDatnn																
InDatnn																

● Analog Input Slave Units

Data to be allocated to the Communications Unit is selected by using one of the following methods, and it is transferred using remote I/O communications.

Default Settings

With the default settings for an Analog Input Unit, only the analog input values are set as the I/O data. Four words of data (or 8 bytes) are allocated to the WORD IN Data I/O port (InDat) as shown below.

	15 8 7 0
InDatnn	Analog input value for Input 0
InDatnn+1	Analog input value for Input 1
InDatnn+2	Analog input value for Input 2
InDatnn+3	Analog input value for Input 3

CX-Integrator

The CX-Integrator can be used to assign the analog data in a preset combination with data such as Status Flags. To make the settings with the CX-Integrator, combinations can be selected from a pull-down list.

Example: Analog Data + Top/Valley Detection Timing Flag (Shot Status)

	15 8 7 0	
InDatnn	Analog Data for Input 0	
InDatnn+1	Analog Data for Input 1	
InDatnn+2	Analog Data for Input 2	
InDatnn+3	Analog Data for Input 3	
InDatnn+4	Top Detection Timing Flag	Valley Detection Timing Flag

Procedure to Select Analog Data Using the CX-Integrator

(1) Start the CX-Integrator.

(2) In the Network Configuration Window, double-click the icon for the Analog Input Slave Unit. Alternatively, right-click the icon and select *Parameters* – *Edit* from the pop-up menu. The Configuration Window will be displayed.

Analog Output Slave Units

An Analog Output Slave Unit has one type of OUT Data. The data is assigned by default, so no setting is required. Two words (4 bytes) of OUT Data are allocated to the WORD OUT Data I/O port (OutDatnn). The data is allocated as the two's complements.

	15 8	7 0
OutDatnn	Analog output value for Output 0	
OutDatnn+1	Analog output value for Output 1	

Data Assignment for Word Slave Unit + Expansion Unit

When an Expansion Unit is used, the IN and OUT data of the Expansion Unit is included in the allocation size of the Unit.

The allocation patterns for Word Slave Units with Expansion Unit data are shown below. (n = node addresses)

Sixteen-point Input Slave Unit + Sixteen-point Expansion Input Unit

The I/O ports for two node addresses are allocated: the I/O port for the node address of the Slave Unit (InDatnn) and the I/O port for the next node address (InDatnn+1).

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
InDatnn																
InDatnn+1	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16

Sixteen-point Input Slave Unit + Eight-point Input Expansion Unit

The I/O ports for two node addresses are allocated: the I/O port for the node address of the Slave Unit (InDatnn) and the I/O port for the next node address (InDatnn+1).

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
InDatnn																
InDatnn+1	Unused								23	22	21	20	19	18	17	16

Sixteen-point Input Slave Unit + Sixteen-point Expansion Output Unit

The I/O ports for two node addresses are allocated: the WORD IN Data I/O port (InDatnn) and the WORD OUT Data I/O port (OutDatnn).

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
OutDatnn																
InDatnn																

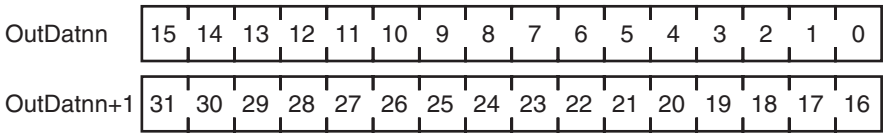
Sixteen-point Input Slave Unit + Eight-point Expansion Output Unit

The I/O ports for two node addresses are allocated: the WORD IN Data I/O port (InDatnn) and the WORD OUT Data I/O port (OutDatnn).

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
OutDatnn	Unused								7	6	5	4	3	2	1	0
InDatnn																

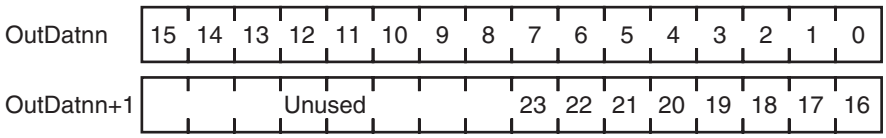
Sixteen-point Output Slave Unit + Sixteen-point Expansion Output Unit

The I/O ports for two node addresses are allocated: the I/O port for the node address of the Slave Unit (OutDatnn) and the I/O port for the next node address (OutDatnn+1).



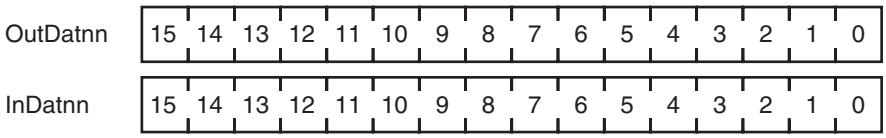
Sixteen-point Output Slave Unit + Eight-point Expansion Output Unit

The I/O ports for two node addresses are allocated: the I/O port for the node address of the Slave Unit (OutDatnn) and the I/O port for the next node address (OutDatnn+1).



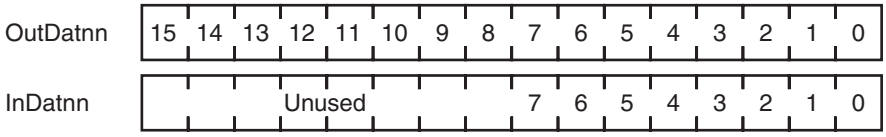
Sixteen-point Output Slave Unit + Sixteen-point Expansion Input Unit

The I/O ports for two node addresses are allocated: the WORD OUT Data I/O port (OutDatnn) and the WORD IN Data I/O port (InDatnn).



Sixteen-point Output Slave Unit + Eight-point Expansion Input Unit

The I/O ports for two node addresses are allocated: the WORD OUT Data I/O port (OutDatnn) and the WORD IN Data I/O port (InDatnn).



I/O Expansion for Word Slave Units

The number of I/O points for Word Slave Units in a CompoNet Network can be increased by using Expansion Units. The following table shows the Slave Unit and Expansion Unit models that can be used.

Basic Unit	Expansion Unit	Inputs	Outputs
CRT1-ID16/ID16-1	None	16	0
	XWT-ID08/ID08-1	24	0
	XWT-OD08/OD08-1	16	8
	XWT-ID16/ID16-1	32	0
	XWT-OD16/OD16-1	16	16
CRT1-OD16/OD16-1 CRT1-ROS16/ROF16	None	0	16
	XWT-ID08/ID08-1	8	16
	XWT-OD08/OD08-1	0	24
	XWT-ID16/ID16-1	16	16
	XWT-OD16/OD16-1	0	32

Additional Information

For Mixed I/O Slave Units,*1 the node address of the Slave Unit is the node address for the IN Data. Therefore, the Connect Flag and Communication Error Flag for the IN Data (InCnctNdStann and InErrNdStann) are used.

*1 A Word Slave that is a combination of a Basic Unit and Expansion Unit and provides both inputs and outputs, or a CRT1B-MD Bit Slave which provides both inputs and outputs.

Allocations for Bit Slave Unit Data

A Bit Slave Unit uses 1 point (or 1 bit) for each BOOL I/O port (BitOUT or BitIN Data) that is allocated.

There are input and output ports for each bit node address, each of which has a size of 2 points.

Each Slave Unit with 2 points is allocated the I/O ports for one node address (i.e., only the I/O ports for the bit node address of the Slave Unit). Each Slave Unit with 4 points is allocated the I/O ports for two bit node addresses (i.e., the I/O port for the bit node address of the Slave Unit and the next I/O port).

Example:

- Input Unit with Two Points
  The BitIN Data I/O ports (BitInDat00_00 and BitInDat00_01) are used.
- Output Unit with Four Points
  The BitOUT Data I/O ports (BitOutDat00_00, BitOutDat00_01, BitOutDat01_00, and BitOutDat01_01) are used.
- I/O Unit with Two Points
  The BitIN Data I/O ports (BitInDat00_00 and BitInDat00_01) and BitOUT Data I/O ports (BitOutDat00_00 and BitOutDat00_01) are used.

The allocation patterns for Bit Slave Units are shown below. (mm = Bit node address)

Input Unit with Two Points

BitInDatmm_00 and BitInDatmm_01

Input Unit with Four Points

BitInDatmm_00 and BitInDatmm_01, BitInDatmm+1_00 and BitInDatmm+1_00

Output Unit with Two Points

BitOutDatmm_00 and BitOutDatmm_01

Output Unit with Four Points

BitOutDatmm_00 and BitOutDatmm_01, BitOutDatmm+1_00 and BitOutDatmm+1_01

I/O Unit with Two Points

BitInDatmm_00 and BitOutDatmm_00

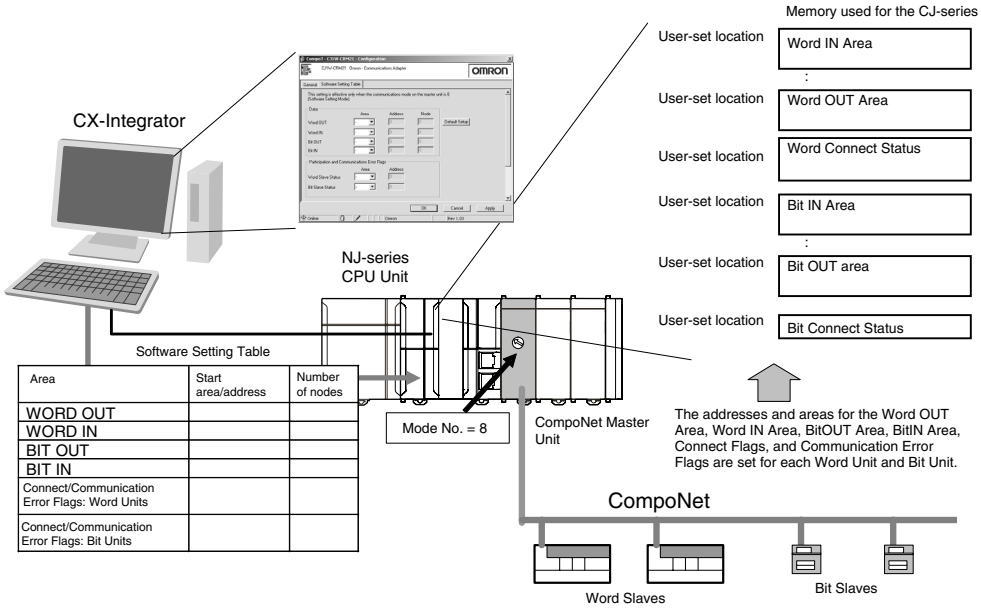
I/O Unit with Four Points

BitInDatmm_00 and BitInDatmm_01, BitOutDatmm_00 and BitOutDatmm_01

5-4-5 Slave Unit Allocations for Communications Mode Number 8

When using communications mode 8, I/O ports are not used. I/O data for the CompoNet Master Unit is assigned in software settings directly to any locations in the memory used for CJ-series Units (any addresses in the CIO, WR, HR, or DM Area).

The software settings are made from the CX-Integrator. Slave Unit allocations are made for WORD IN, WORD OUT, BitIN, BitOUT, Connect Flags, and Communication Error Flags for each Word or Bit Slave Unit. To access the memory locations that were specified in the software settings from the user program, you use user-defined variables with AT specifications to the memory used for CJ-series Units.



For the allocations of Slave Unit I/O data in communications mode number 8, refer to *Memory Allocations for Communications Mode Number 8*, below.

Refer to the *SYSMAC CS/CJ/CP/NSJ Series CX-Integrator Version 2.3 Operation Manual* (Cat. No. W464) for the editing procedures for software setting tables.

Memory Allocations for Communications Mode Number 8

Memory is allocated as shown below to the WORD OUT Data, WORD IN Data, BitOUT Data, BitIN Data, Connect Flags, and Communication Error Flags according to the software settings.

Word Slave Unit Output Area (OUT)

The first address is specified.

Word address	Bit 15 Bit 0
+0	[WORD OUT0]
+1	[WORD OUT1]
+2	[WORD OUT2]
:	:
+N-1	[WORD OUT(N-1)]
:	Not allocated.
+63	Not allocated.

The number of nodes, N, is specified.

Word Slave Unit Input Area (IN)

The first address is specified.

Word address	Bit 15 Bit 0
+0	[WORD IN0]
+1	[WORD IN1]
+2	[WORD IN2]
:	:
+N-1	[WORD IN(N-1)]
:	Not allocated.
+63	Not allocated.

The number of nodes, N, is specified.

Bit Slave Output Area (BIT OUT)

The first address is specified.

Word address \ Bit	15 14	13 12	11 10	9 8	7 6	5 4	3 2	1 0
+0	[BIT IN 7]	[BIT IN 6]	[BIT IN 5]	[BIT IN 4]	[BIT IN 3]	[BIT IN 2]	[BIT IN 1]	[BIT IN 0]
+1	[BIT IN 15]	[BIT IN 14]	[BIT IN 13]	[BIT IN 12]	[BIT IN 11]	[BIT IN 10]	[BIT IN 9]	[BIT IN 8]
+2	[BIT IN 23]	[BIT IN 22]	[BIT IN 21]	[BIT IN 20]	[BIT IN 19]	[BIT IN 18]	[BIT IN 17]	[BIT IN 16]
+3	[BIT IN 31]	[BIT IN 30]	[BIT IN 29]	[BIT IN 28]	[BIT IN 27]	[BIT IN 26]	[BIT IN 25]	[BIT IN 24]
+4	[BIT IN 39]	[BIT IN 38]	[BIT IN 37]	[BIT IN 36]	[BIT IN 35]	[BIT IN 34]	[BIT IN 33]	[BIT IN 32]
+5	[BIT IN 47]	[BIT IN 46]	[BIT IN 45]	[BIT IN 44]	[BIT IN 43]	[BIT IN 42]	[BIT IN 41]	[BIT IN 40]
+6	[BIT IN 55]	[BIT IN 54]	[BIT IN 53]	[BIT IN 52]	[BIT IN 51]	[BIT IN 50]	[BIT IN 49]	[BIT IN 48]
+7	[BIT IN 63]	[BIT IN 62]	[BIT IN 61]	[BIT IN 60]	[BIT IN 59]	[BIT IN 58]	[BIT IN 57]	[BIT IN 56]
+8	[BIT IN 71]	[BIT IN 70]	[BIT IN 69]	[BIT IN 68]	[BIT IN 67]	[BIT IN 66]	[BIT IN 65]	[BIT IN 64]
+9	[BIT IN 79]	[BIT IN 78]	[BIT IN 77]	[BIT IN 76]	[BIT IN 75]	[BIT IN 74]	[BIT IN 73]	[BIT IN 72]
+10	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	[BIT IN 81]	[BIT IN 80]
+11	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.
+12	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.
+13	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.
+14	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.
+15	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.

Example: When 82 is specified as the number of nodes N

Bit Slave Input Area (BIT IN)

The first address is specified.

Word address \ Bit	15 14	13 12	11 10	9 8	7 6	5 4	3 2	1 0
+0	[BIT OUT 7]	[BIT OUT 6]	[BIT OUT 5]	[BIT OUT 4]	[BIT OUT 3]	[BIT OUT 2]	[BIT OUT 1]	[BIT OUT 0]
+1	[BIT OUT 15]	[BIT OUT 14]	[BIT OUT 13]	[BIT OUT 12]	[BIT OUT 11]	[BIT OUT 10]	[BIT OUT 9]	[BIT OUT 8]
+2	[BIT OUT 23]	[BIT OUT 22]	[BIT OUT 21]	[BIT OUT 20]	[BIT OUT 19]	[BIT OUT 18]	[BIT OUT 17]	[BIT OUT 16]
+3	[BIT OUT 31]	[BIT OUT 30]	[BIT OUT 29]	[BIT OUT 28]	[BIT OUT 27]	[BIT OUT 26]	[BIT OUT 25]	[BIT OUT 24]
+4	[BIT OUT 39]	[BIT OUT 38]	[BIT OUT 37]	[BIT OUT 36]	[BIT OUT 35]	[BIT OUT 34]	[BIT OUT 33]	[BIT OUT 32]
+5	[BIT OUT 47]	[BIT OUT 46]	[BIT OUT 45]	[BIT OUT 44]	[BIT OUT 43]	[BIT OUT 42]	[BIT OUT 41]	[BIT OUT 40]
+6	[BIT OUT 55]	[BIT OUT 54]	[BIT OUT 53]	[BIT OUT 52]	[BIT OUT 51]	[BIT OUT 50]	[BIT OUT 49]	[BIT OUT 48]
+7	[BIT OUT 63]	[BIT OUT 62]	[BIT OUT 61]	[BIT OUT 60]	[BIT OUT 59]	[BIT OUT 58]	[BIT OUT 57]	[BIT OUT 56]
+8	[BIT OUT 71]	[BIT OUT 70]	[BIT OUT 69]	[BIT OUT 68]	[BIT OUT 67]	[BIT OUT 66]	[BIT OUT 65]	[BIT OUT 64]
+9	[BIT OUT 79]	[BIT OUT 78]	[BIT OUT 77]	[BIT OUT 76]	[BIT OUT 75]	[BIT OUT 74]	[BIT OUT 73]	[BIT OUT 72]
+10	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	[BIT OUT 81]	[BIT OUT 80]
+11	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.
+12	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.
+13	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.
+14	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.
+15	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.	Not allocated.

Example: When 82 is specified as the number of nodes N

Word Slave Connect Flags and Communication Error Flags (Status)

The first address is specified.

Word address	Bit 15	Bit 0
+0	Communication Error Flags: OUT0 to OUT7	Connect Flags: OUT0 to OUT7
+1	Communication Error Flags: IN0 to IN7	Connect Flags: IN0 to IN7
:	:	:
+14	Communication Error Flags: OUT56 to OUT63	Connect Flags: OUT56 to OUT63
+15	Communication Error Flags: IN56 to IN63	Connect Flags: IN56 to IN63

The number of nodes N is specified.

Bit Slave Connect Flags and Communication Error Flags (Bit Status)

The first address is specified.

Word address	Bit 15	Bit 0
+0	Communication Error Flags: BIT OUT0 to BIT OUT7	Connect Flags: BIT OUT0 to BIT OUT7
+1	Communication Error Flags: BIT IN0 to BIT IN7	Connect Flags: BIT IN0 to BIT IN7
:	:	:
+30	Communication Error Flags: BIT OUT 120 to BIT OUT 127	Connect Flags: BIT OUT 120 to BIT OUT 127
+31	Communication Error Flags: BIT IN 120 to BIT IN 127	Connect Flags: BIT IN 120 to BIT IN 127

The number of nodes N is specified.

5-5 Remote I/O Communications Performance

This section describes the performance of remote I/O communications in a CompoNet Network.

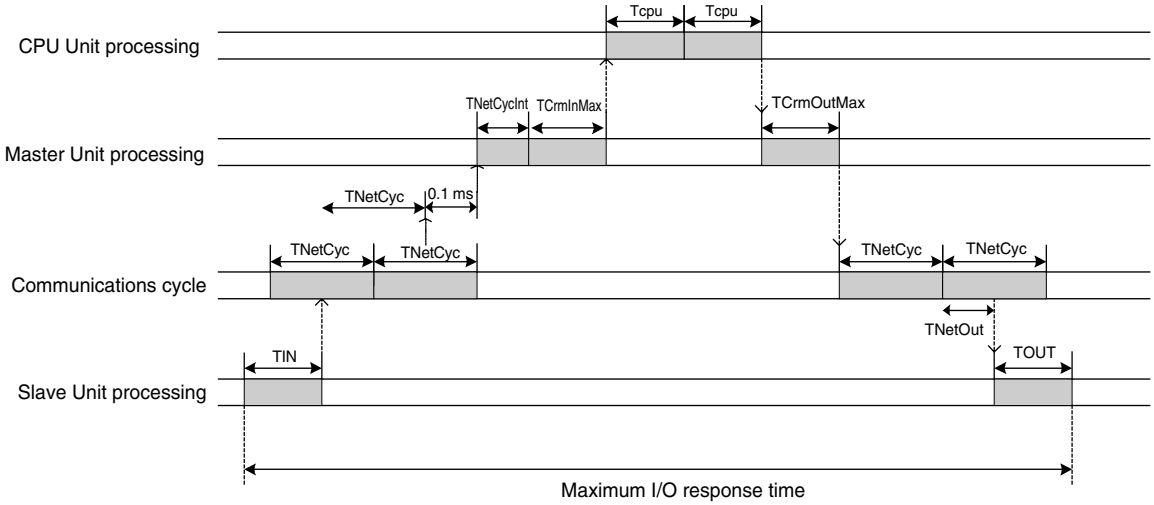
5-5-1 I/O Response Time

This section describes the minimum and maximum I/O response times in a CompoNet Network.

The I/O response time is the time that is required for an input signal from an Input Slave Unit to be processed by the CPU Unit where the Master Unit is mounted until it is output to an Output Slave Unit.

Maximum I/O Response Time

- **Word Slave Units**



Formula for the Maximum I/O Response Time for a Word Slave Unit

TIN + TNetCyc × 2 + 0.1 ms + TNetCycInt + TCrmInMax + Tcpu × 2 + TCrmOutMax + TNetOut + TOUT

TIN:	Input Slave Unit input delay time
TNetCyc:	Communications cycle time
TNetCycInt:	Interrupt processing time
TCrmInMax:	Maximum input processing time at Master Unit
Tcpu:	Task period of CPU Unit
TCrmOutMax:	Maximum output processing time at Master Unit
TNetOut:	Time allotted for output frames in communications cycle time
TOUT:	Output Slave Unit output delay time

- TIN: Input Slave Unit input delay time
  For details on delay times for individual Slave Units, refer to the input specifications for individual Slave Units in the *CompoNet Slave Unit Operation Manual* (Cat. No. W457).

- TNetCyc: Communications Cycle Time

Baud rate / Communications mode	Maximum I/O	4.0 Mbps	3.0 Mbps	1.5 Mbps	93.75 kbps
Communications mode 0	128 word inputs, 128 word outputs	0.9 ms (0.7 ms)	0.9 ms (0.7 ms)	1.5 ms (1.1 ms)	19.8 ms (12.5 ms)
Communications mode 1	256 word inputs, 256 word outputs	1.0 ms (0.8 ms)	1.2 ms (1.0 ms)	2.3 ms (1.9 ms)	30.2 ms (22.8 ms)
Communications mode 2	512 word inputs, 512 word outputs	1.3 ms (1.0 ms)	1.7 ms (1.5 ms)	4.0 ms (3.5 ms)	51.3 ms (44.0 ms)
Communications mode 3	256 word inputs, 256 word outputs + 128 bit inputs, 128 bit outputs	2.0 ms (1.8 ms)	2.5 ms (2.3 ms)	5.9 ms (5.5 ms)	72.1 ms (65.7 ms)
Communications mode 8	1,024 word inputs, 1,024 word outputs + 256 bit inputs, 256 bit outputs **Note** The number of connectable nodes is 128 for Word Slave Units (64 input and 64 output) and 256 for Bit Slave Units (128 bit input and 128 bit output).	0.79 ms + G (*1) (0.64 ms + G) (*1)	0.85 ms + G (*1) (0.64 ms + G) (*1)	1.94 ms + G (*1) (1.52 ms + G) (*1)	24.81 ms + G (*1) (17.74 ms + G) (*1)

The figures in parentheses are when message communications are not used.

*1 Communications Mode 8
G = (Number of Word Output Slave Units × additional time per Word Output Slave Unit)
+ (Number of Word Input Slave Units × additional time per Word Input Slave Unit)
+ (Number of Bit Output Slave Units × additional time per Bit Output Slave Unit)
+ (Number of Bit Input Slave Units × additional time per Bit Input Slave Unit)

Additional Time Per Unit by Slave Unit Type

Baud rate / Slave Unit type	4.0 Mbps	3.0 Mbps	1.5 Mbps	93.75 kbps
Word Output Unit	5.31 μs	5.78 μs	11.02 μs	171.48 μs
Word Input Unit	15.55 μs	22.42 μs	53.44 μs	667.58 μs
Bit Output Unit	0.66 μs	0.74 μs	1.33 μs	21.60 μs
Bit Input Unit	14.49 μs	19.18 μs	45.08 μs	529.18 μs

G Calculation Example

Conditions

Baud rate	Word outputs	Word inputs	Bit outputs	Bit inputs
4.0 Mbps	16 Units	32 Units	64 Units	32 Units

G = (16 × 5.31 μs) + (32 × 15.55 μs) + (64 × 0.66 μs) + (32 × 14.49 μs) ≅ 1.088 ms

- 0.1 ms: Interval for inputting input data

- TNetCycInt: Interrupt processing time

Baud rate / Communications mode	4.0 Mbps	3.0 Mbps	1.5 Mbps	93.75 kbps
Communications mode 0	0.40 ms	0.45 ms	0.60 ms	6.90 ms
Communications mode 1	0.42 ms	0.48 ms	0.68 ms	6.98 ms
Communications mode 2	0.48 ms	0.53 ms	0.82 ms	7.11 ms
Communications mode 3	0.63 ms	0.69 ms	0.98 ms	7.28 ms
Communications mode 8	0.37 ms + H (*1)	0.43 ms + H (*1)	0.73 ms + H (*1)	7.03 ms + H (*1)

*1 Communications Mode 8
H = (Number of Word Output Slave Units × 0.313 μs) + (Number of Word Input Slave Units × 3.125 μs) + (Number of Bit Output Slave Units × 0.078 μs) + (Number of Bit Input Slave Units × 3.125 μs)

H Calculation Example

Conditions

Baud rate	Word outputs	Word inputs	Bit outputs	Bit inputs
---	32 nodes	64 nodes	48 nodes	16 nodes

H = (32 × 0.313 μs) + (64 × 3.125 μs) + (48 × 0.078 μs) + (16 × 3.125 μs) ≅ 0.264 ms

- TCrmInMax: Maximum input processing time at Master Unit

Baud rate / Communications mode	4.0 Mbps	3.0 Mbps	1.5 Mbps	93.75 kbps
Communications mode 0	0.3 ms	0.28 ms	0.26 ms	0.22 ms
Communications mode 1	0.31 ms	0.29 ms	0.27 ms	0.27 ms
Communications mode 2	0.35 ms	0.33 ms	0.37 ms	0.37 ms
Communications mode 3	0.34 ms	0.34 ms	0.38 ms	0.38 ms
Communications mode 8	0.29 ms + I (*1)	0.29 ms + I (*1)	0.33 ms + I (*1)	0.35 ms + I (*1)

*1 Communications Mode 8
I = (Number of Word Input Slave Units × 0.625 μs) + [(Number of Word Output Slave Units or Word Input Slave Units, whichever is greater) + (Number of Bit Output Slave Units or Bit Input Slave Units, whichever is greater) × 0.5 μs]

I Calculation Example

Conditions

Baud rate	Word outputs	Word inputs	Bit outputs	Bit inputs
---	48 nodes	32 nodes	64 nodes	128 nodes

I = (32 × 0.625 μs) + {(48 + 128) × 0.5 μs} = 0.108 ms

- Tcpu: Task period of CPU Unit

- TCrmOutMax: Maximum output processing time at Master Unit

Communications mode 0	Communications mode 1	Communications mode 2	Communications mode 3	Communications mode 8
0.086 ms	0.090 ms	0.098 ms	0.094 ms	0.082 ms + J (*1)

*1 Communications Mode 8
J = (Number of Word Output Slave Units × 0.5 μs) + (Number of Bit Output Slave Units × 0.0625 μs)

J Calculation Example

Conditions

Baud rate	Word outputs	Word inputs	Bit outputs	Bit inputs
---	16 nodes	48 nodes	8 nodes	8 nodes

J = (16 × 0.5 μs) + (8 × 0.0625 μs) ≅ 0.009 ms

- TNetOut: Time allotted for output frames in communications cycle time

Baud rate / Communications mode	Maximum I/O	4.0 Mbps	3.0 Mbps	1.5 Mbps	93.75 kbps
Communications mode 0	128 word inputs, 128 word outputs	0.046 ms	0.060 ms	0.121 ms	1.936 ms
Communications mode 1	256 word inputs, 256 word outputs	0.078 ms	0.103 ms	0.206 ms	3.305 ms
Communications mode 2	512 word inputs, 512 word outputs	0.142 ms	0.188 ms	0.377 ms	6.048 ms
Communications mode 3	256 word inputs, 256 word outputs + 128 bit inputs, 128 bit outputs	0.110 ms	0.146 ms	0.291 ms	4.674 ms
Communications mode 8	1,024 word inputs, 1,024 word outputs + 256 bit inputs, 256 bit outputs **Note** The number of connectable nodes is 128 for Word Slave Units (64 input and 64 output) and 256 for Bit Slave Units (128 bit input and 128 bit output).	0.013 ms + K (*1)	0.018 ms + K (*1)	0.035 ms + K (*1)	0.567 ms + K (*1)

*1 Communications Mode 8
K = (Number of Word Output Slave Units connected x additional time per Word Output Slave Unit) + [(Number of Bit Output Slave Units +7) ÷ 8] × additional time per 8 Bit Output Slave Units)

Additional time per Word Output Slave Unit and Additional time per 8 Bit Output Slave Units

Slave Unit type \ Baud rate	4.0 Mbps	3.0 Mbps	1.5 Mbps	93.75 kbps
Word Output	4.0 μs	5.312 μs	10.656 μs	171.104 μs
Bit Output	4.0 μs	5.312 μs	10.656 μs	171.104 μs

K Calculation Example

Conditions

Baud rate	Word outputs	Word inputs	Bit outputs	Bit inputs
3.0 Mbps	7 Units	8 Units	9 Units	10 Units

$K = (7 \times 5.312\ \mu s) + (2 \times 5.312\ \mu s) \cong 0.048$ ms

- TOUT: Output Slave Unit output delay time
  For details on delay times for individual Slave Units, refer to the output specifications for individual Slave Units in the *CompoNet Slave Unit Operation Manual* (Cat. No. W457).

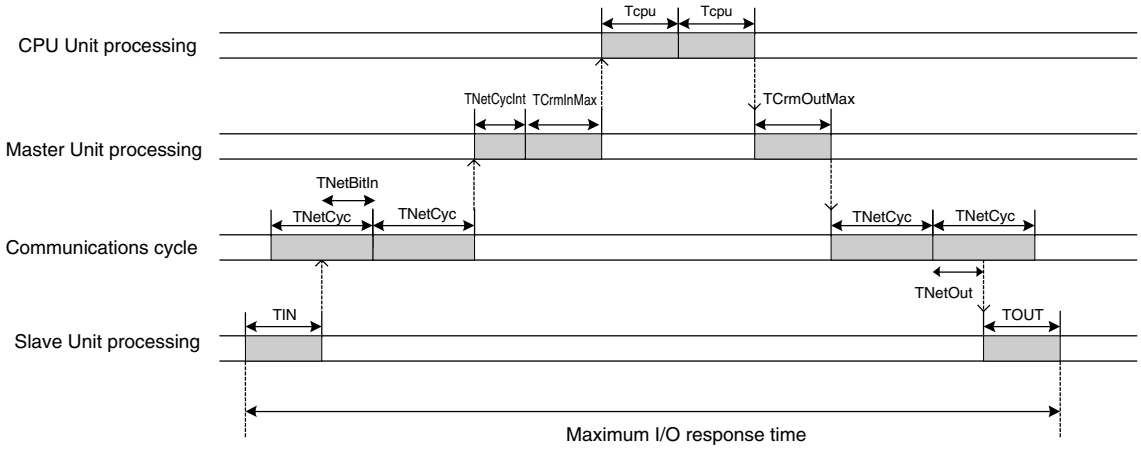
Reference Example

The following table shows the calculation results for the maximum I/O response time for Word Slave Units with the maximum number of nodes and a CPU Unit task period of 1 ms.

Communications mode	Number of nodes connected	Word Slave Unit max. I/O response time (ms)			
		4 Mbps	3 Mbps	1.5 Mbps	93.75 kbps
Communications mode 0	16 word nodes (8 input, 8 output)	7.7	7.8	9.2	53.8
Communications mode 1	32 word nodes (16 input, 16 output)	8.0	8.5	10.9	76.1
Communications mode 2	64 word nodes (32 input, 32 output)	8.8	9.6	14.8	121.3
Communications mode 3	32 word nodes (16 input, 16 output) 128 bit nodes (64 bit input, 64 bit output)	10.3	11.4	18.6	161.7
Communications mode 8	128 word nodes (64 input, 64 output) 256 bit nodes (128 bit input, 128 bit output)	16.7	19.3	35.8	374.9

(With message communications)

● Bit Slave Units



Formula for the Maximum I/O Response Time for a Bit Slave Unit

TIN + TNetCyc × 2 + TNetBitIn + TNetCycInt + TCrmInMax + Tcpu × 2 + TCrmOutMax + TNetOut + TOUT

TIN:	Input Slave Unit input delay time
TNetCyc:	Communications cycle time
TNetBitIn:	Time allotted for bit input frames in communications cycle time
TNetCycInt:	Interrupt processing time
TCrmInMax:	Maximum input processing time at Master Unit
Tcpu:	Task period of CPU Unit
TCrmOutMax:	Maximum output processing time at Master Unit
TNetOut:	Time allotted for output frames in communications cycle time
TOUT:	Output Slave Unit output delay time

- TIN: Input Slave Unit input delay time
  For details on input delay times for individual Slave Units, refer to the input specifications for individual Slave Units in the *CompoNet Slave Unit Operation Manual* (Cat. No. W457).

- TNetBitIn: Time allotted for bit Input frames in communications cycle time

Baud rate / Communications mode	Maximum I/O	4.0 Mbps	3.0 Mbps	1.5 Mbps	93.75 kbps
Communications mode 3	256 word inputs, 256 word outputs + 128 bit inputs, 128 bit outputs	0.809 ms	1.075 ms	2.322 ms	32.959 ms
Communications mode 8	1,024 word inputs, 1,024 word outputs + 256 bit inputs, 256 bit outputs	0.013 ms × (Number of Bit Input Slave Units)	0.018 ms × (Number of Bit Input Slave Units)	0.038 ms × (Number of Bit Input Slave Units)	0.530 ms × (Number of Bit Input Slave Units)

- TCrmInMax: Maximum input processing time at Master Unit

Baud rate / Communications mode	4.0 Mbps	3.0 Mbps	1.5 Mbps	93.75 kbps
Communications mode 3	0.35 ms	0.35 ms	0.39 ms	0.39 ms
Communications mode 8	0.25 ms + M (*1)	0.27 ms + M (*1)	0.33 ms + M (*1)	0.35 ms + M (*1)

*1 Communications Mode 8
M = (Number of Word Input Slave Units x 0.625 μs) + [{(Number of Bit Input Slave Units × 7) ÷ 8} × 0.375 μs] + [(Number of Word Output Slave Units or Word Input Slave Units, whichever is greater + Number of Bit Output Slave Units and Bit Input Slave Units, whichever is greater) × 0.5 μs]

M Calculation Example

Conditions

Baud rate	Word outputs	Word inputs	Bit outputs	Bit inputs
---	8 nodes	16 nodes	16 nodes	8 nodes

M = (16 × 0.625 μs) + (1 × 0.375 μs) + {(16 + 16) × 0.5 μs} ≅ 0.027 ms

Reference Example

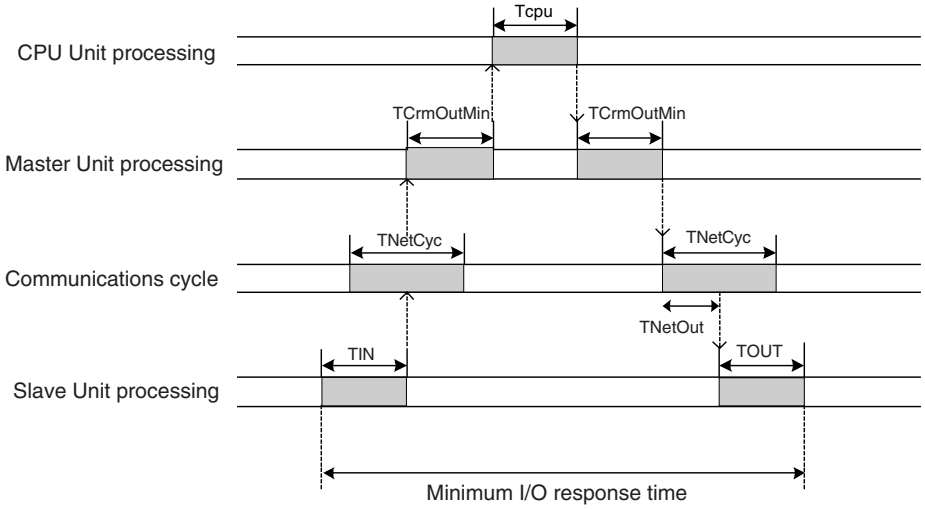
The following table shows the calculation results for the maximum I/O response time for Bit Slave Units with the maximum number of nodes and a CPU Unit task period of 1 ms.

Communications mode	Number of nodes connected	Bit Slave Unit max. I/O response time (ms)			
		4 Mbps	3 Mbps	1.5 Mbps	93.75 kbps
Communications mode 3	32 word nodes (16 input, 16 output) 128 bit nodes (64 bit input, 64 bit output)	11.0	12.4	20.9	194.6
Communications mode 8	128 word nodes (64 input, 64 output) 256 bit nodes (128 bit input, 128 bit output)	18.2	21.5	40.6	442.6

(With message communications)

Minimum I/O Response Time

● Word Slave Units



Formula for Word Slave Minimum I/O Response Time

TIN + TCrmInMin + Tcpu + TCrmOutMin + TNetOut + TOUT

TIN:	Input Slave Unit input delay time
TCrmInMin:	Minimum input processing time at Master Unit
Tcpu:	Task period of CPU Unit
TCrmOutMin:	Minimum output processing time at Master Unit
TNetOut:	Time allotted for output frames in communications cycle time
TOUT:	Output Slave Unit output delay time

- TCrmOutMin: Minimum output processing time at Master Unit

Communications mode 0	Communications mode 1	Communications mode 2	Communications mode 3	Communications mode 8
0.05 ms	0.055 ms	0.06 ms	0.06 ms	0.045 ms + N (*1)

*1 Communications Mode 8
N = (Number of Word Output Slave Units × 0.5 μs) + (Number of Bit Output Slave Units × 0.0625 μs)

N Calculation Example

Conditions

Baud rate	Word outputs	Word inputs	Bit outputs	Bit inputs
---	48 nodes	32 nodes	16 nodes	8 nodes

N = (48 × 0.5 μs) + (16 × 0.0625 μs) = 0.025 ms

- TCrmInMin: Minimum input processing time at Master Unit

Communications mode 0	Communications mode 1	Communications mode 2	Communications mode 3	Communications mode 8
0.023 ms	0.025 ms	0.029 ms	0.025 ms	0.021 ms + 0 (*1)

*1 Communications Mode 8
O = (Number of Word Input Slave Units × 0.25 μs)

O Calculation Example

Conditions

Baud rate	Word outputs	Word inputs	Bit outputs	Bit inputs
---	8 nodes	16 nodes	32 nodes	48 nodes

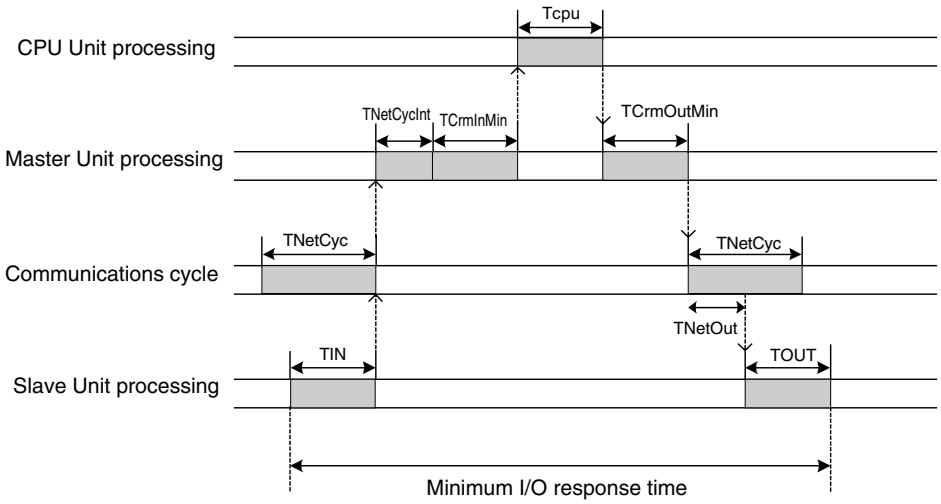
O = 16 × 0.25 μs = 0.004 ms

Reference Example

The following table shows the calculation results for the minimum I/O response time for a Word Slave Unit with the maximum number of nodes and a CPU Unit task period of 1 ms.

Communications mode	Number of nodes connected	Word Slave Unit min. I/O response time (ms)			
		4 Mbps	3 Mbps	1.5 Mbps	93.75 kbps
Communications mode 0	16 word nodes (8 input, 8 output)	4.2	4.2	4.2	6.0
Communications mode 1	32 word nodes (16 input, 16 output)	4.2	4.2	4.3	7.4
Communications mode 2	64 word nodes (32 input, 32 output)	4.3	4.3	4.7	10.2
Communications mode 3	32 word nodes (16 input, 16 output) 128 bit nodes (64 bit input, 64 bit output)	4.2	4.3	4.4	8.8
Communications mode 8	128 word nodes (64 input, 64 output) 256 bit nodes (128 bit input, 128 bit output)	4.5	4.6	5.0	18.4

● Bit Slave Units



Formula for the Minimum I/O Response Time for a Bit Slave Unit

TIN + TNetCycInt + TCrmInMin + Tcpu + TCrmOutMin + TNetOut + TOUT

TIN:	Input Slave Unit input delay time
TNetCycInt:	Interrupt processing time
TCrmInMin:	Minimum input processing time at Master Unit
Tcpu:	Task period of CPU Unit
TCrmOutMin:	Minimum output processing time at Master Unit
TNetOut:	Time allotted for output frames in communications cycle time
TOUT:	Output Slave Unit output delay time

- TCrmInMin: Minimum input processing time at Master Unit

Communications mode 3	Communications mode 8
0.093 ms	0.46 ms + P (*1)

*1 Communications Mode 8
P = (Number of Word Input Slave Units × 0.25 μs) + [{(Number of Bit Input Slave Units × 7) ÷ 8} × 0.375 μs] + [(Number of Word Output Slave Units or Word Input Slave Units, whichever is greater + Number of Bit Output Slave Units and Bit Input Slave Units, whichever is greater) × 0.5 μs]

P Calculation Example

Conditions

Baud rate	Word outputs	Word inputs	Bit outputs	Bit inputs
---	63 nodes	64 nodes	128 nodes	127 nodes

P= (64 × 0.25 μs) + (16 × 0.375 μs) + ((64 + 128) × 0.5 μs) = 0.118 ms

Reference Example

The following table shows the calculation results for the minimum I/O response time for Bit Slave Units with the maximum number of nodes and a CPU Unit task period of 1 ms.

Communications mode	Number of nodes connected	Bit Slave Unit min. I/O response time (ms)			
		4 Mbps	3 Mbps	1.5 Mbps	93.75 kbps
Communications mode 3	32 word nodes (16 input, 16 output) 128 bit nodes (64 bit input, 64 bit output)	4.9	5.0	5.5	16.2
Communications mode 8	128 word nodes (64 input, 64 output) 256 bit nodes (128 bit input, 128 bit output)	5.7	5.9	6.6	26.3

6

Message Communications

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6-1-2 Explicit Message Communications 6-2
6-1-3 Message Communications Specifications 6-2
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6-1 Message Communications

You can use message communications to send and receive data or to control operation between nodes on a CompoNet Network, i.e., between the CPU Unit and the Master Unit or between the Controller and the CompoNet Slave Units. Message communications are used to read and write special data, such as time data or error history data, and to control operation, e.g., force-setting/resetting. Message communications are performed whenever required, i.e., when the conditions that are set for their execution are satisfied. With the CompoNet Master Unit, message communications are performed with explicit messages.

6-1-1 Overview of Message Communications

	Explicit message communications
Overview	General-purpose message communications are performed by using the CompoNet Network protocol.
Remote devices	CompoNet Slave Units
Features	• Explicit messages can be received from OMRON Controllers and they can be sent to CompoNet Slave Units.

6-1-2 Explicit Message Communications

Explicit messages that are defined by the CompoNet Network are used to send requests for services to CompoNet Slave Units.

6-1-3 Message Communications Specifications

Applicable CPU Unit functionality		NJ Series
Unit model number		CJ1W-CRM21
Maximum number of nodes per Master Unit for message communications	Explicit messages	448
Instructions for executing message communications	CompoNet explicit messages	SendCmd instruction (Sends explicit messages to CompoNet Slave Units.)
Ratio of command transmission sources to transmission destinations		1:1 communications (1:N broadcasting is not supported.)
Communications data length (not including command code)		SendCmd instruction: 542 bytes max.
Response monitoring time		Default setting: 2 s User setting: 0.1 to 6,553.5 s
Number of retries		0 to 15
Message monitoring timer (explicit message communications)		The setting is saved in the CompoNet Master Unit.

6-1-4 Message Monitoring Timer

The message monitoring timer measures the monitoring time for responses made by the CompoNet Master Unit. It is enabled for explicit message communications. The default setting is for 2 s (2,000 ms). Any time from 1 to 65,535 ms can be set.

A longer time must be set if responses from the communications target device (the message transmission destination) are slow. If the set time is too long, however, subsequent messages cannot be sent to the same communications device while waiting for a response to a previous message.

The CompoNet Master Unit monitors message timeouts using this timer. Likewise, monitoring is performed by the CPU Unit according to the response monitoring time for the DELIVER COMMAND (SendCmd) instructions. It is therefore not effective to lengthen (or shorten) only the message monitoring timer or only the response monitoring time for SendCmd.

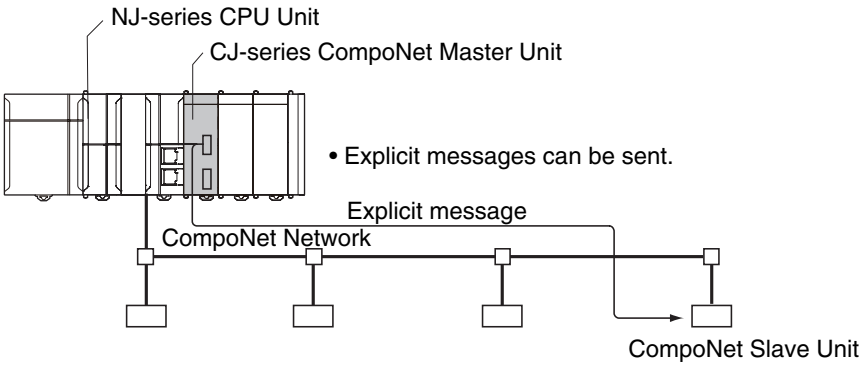
Set the response monitoring time for SendCmd to a value equal to or greater than the time set for the message monitoring timer.

If too many timeouts are occurring, then lengthen the times for both while maintaining the time settings relative to each other.

6-2 Sending Explicit Messages

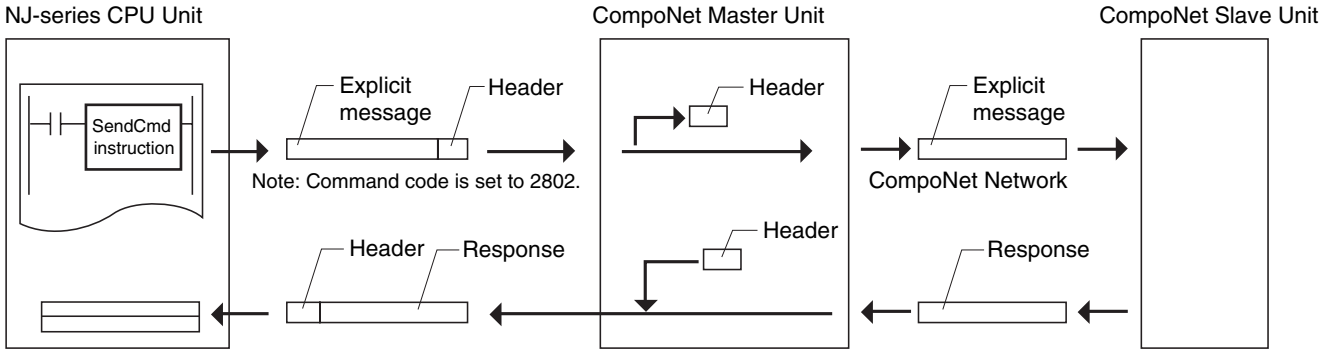
You can use a CJ-series CompoNet Master Unit to send explicit messages with a header attached. Explicit messages can be sent to CompoNet Slave Units.

Example:

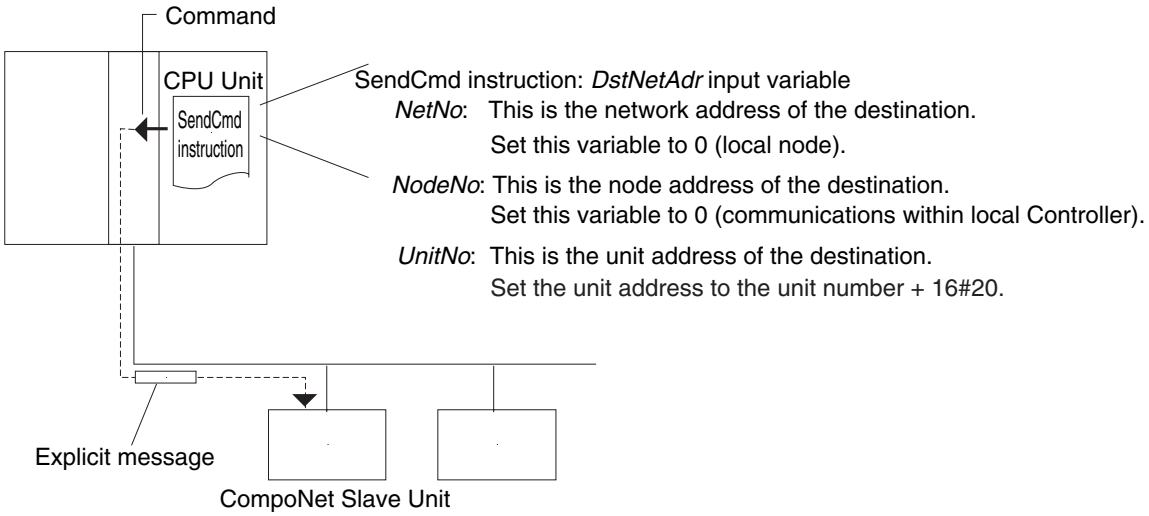


6-2-1 Sending Explicit Messages

To send an explicit message to a CompoNet Slave Unit, use a command (2802) as shown below to send it to the CompoNet Master Unit.



When you send an explicit message, specify the Master Unit at the local node as the destination of the command rather than the actual destination (the CompoNet Slave Unit). The actual destination node address is specified in the command data in the SEND EXPLICIT MESSAGE command.

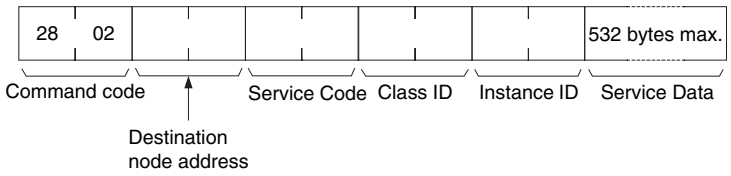


Depending on the type of Slave Unit at the destination, a message may not be received. Be sure to set retry processing.

SEND EXPLICIT MESSAGE: 28 02

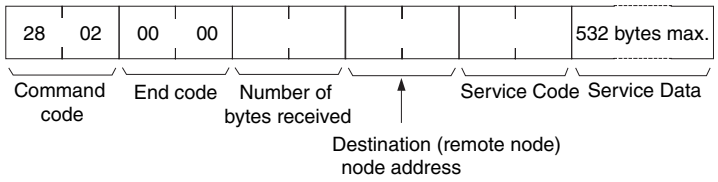
SEND EXPLICIT MESSAGE sends a CompoNet explicit message to the specified class, and receives a response.

● Command Format

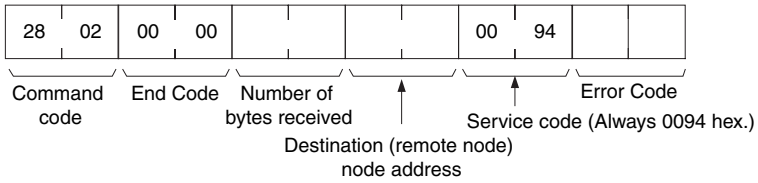


● Response Format

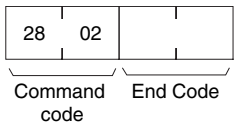
- Normal Response to Explicit Message



- Error Response to Explicit Message



- Explicit Message Transmission Send Failure or Timeout



Parameter Details

Destination Node Address (Command)

This parameter specifies the node address of destination Slave Unit for an explicit message.

Word Input Slave Unit*1	Word Output Slave Unit	Mixed Word Slave Unit	Bit Input Slave Unit*1	Bit Output Slave Unit	Mixed Bit Slave Unit	Repeater Unit
10xx hex	20xx hex	30xx hex	40xx hex	50xx hex	60xx hex	70xx hex

"xx" represents the node address of the Slave Unit in hexadecimal.

*1 Even if you send 10xx hex to a Mixed Word Slave Unit, the response will contain 30xx hex to indicate that the Unit is a Mixed Word Slave Unit. Even if you send 40xx hex to a Mixed Bit Slave Unit, the response will contain 60xx hex.

Service Code (Command, Response)

For a command, this parameter specifies the service code defined by the CompoNet Network.

For details, refer to the following table.

In an error response, the most-significant bit of the service code that was specified in the command is changed to TRUE in the response, and 0094 hex is returned to indicate an error.

Service Code List

Service	Read	Write	Reset	Save
Command	0E hex	10 hex	05 hex	16 hex
Normal Response	8E hex	90 hex	85 hex	96 hex

Class ID (Command)

Specifies the destination class ID for the explicit message.

Instance ID (Command)

Specifies the destination instance ID for the explicit message.

Service Data (Command, Response)

For a command, this parameter specifies the data defined by the service code.

The reception data defined by the service code is returned in the response.

End Code (Response)

The end code indicates the result of executing the command.

For details, refer to the following table of end codes.

End Codes

End code	Description
0000 hex	The command was completed normally.
0101 hex	The network for the local node is not operating.
0201 hex	The network for the remote node is not operating.
0204 hex	The message cannot be sent because the remote node is busy.
0205 hex	Monitoring time expired with no response from the remote node.
1001 hex	The maximum permissible command length was exceeded.
1002 hex	The command length is less than the minimum command length.

End code	Description
1004 hex	The command format is not suitable.
1005 hex	There is a header error. (The destination address setting is illegal.)
110B hex	The response exceeded the maximum response length.
2211 hex	The Unit is busy. (The memory required for internal transmission processing cannot be reserved.)
2609 hex	The required settings have not been made.

Number of Bytes Received (Response)

The number of bytes of data received from the destination (remote node) node address onwards is returned.

Destination (Remote Node) Node Address (Response)

The remote node address of the response source is returned.

Error Code (Response)

An error code that is defined by the CompoNet Network is returned.

For details, refer to the following table of error codes.

Error Codes

Error code	Description
0x02FF hex	A required resource was not available.
0x08FF hex	A requested service is not supported.
0x09FF hex	Attribute data is illegal.
0x0BFF hex	The specified object was already in the requested state.
0x0CFF hex	The requested service cannot be executed for the specified object.
0x0EFF hex	An unchangeable attribute was specified.
0x10FF hex	The requested service cannot be executed for the specified device.
0x11FF hex	The response data is too long to be processed.
0x13FF hex	There is insufficient data provided for processing.
0x14FF hex	The attribute is undefined.
0x15FF hex	Invalid data is included.
0x16FF hex	The object is not implemented.
0x19FF hex	The save operation failed.
0x1F□□ hex	A header error occurred. (Detailed error information is stored in □□.)
0x20FF hex	There is an error in the parameters.
0x28FF hex	A class, instance, or attribute that is not implemented was specified for the member ID of the requested service.

● Description

- SEND EXPLICIT MESSAGE command sends an explicit message defined by CompoNet to a Slave Unit by another manufacturer and receives a response.
- For the SEND EXPLICIT MESSAGE command, specify the CompoNet Master Unit at the local node as the destination in the control code in the SendCmd instruction, and specify the node address of the actual destination for the destination node address in the SEND EXPLICIT MESSAGE command. Always specify the Master Unit at the local node in the control code of the SendCmd instruction. If the Master Unit at any other node is specified, an error will occur.

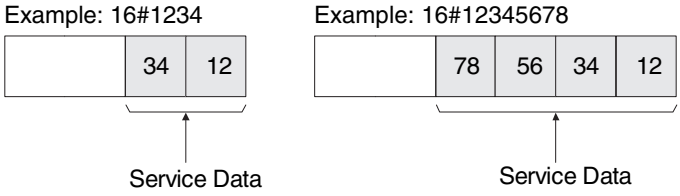
- When a CompoNet Master Unit receives an explicit message, it automatically returns a response to the message.

Service Data

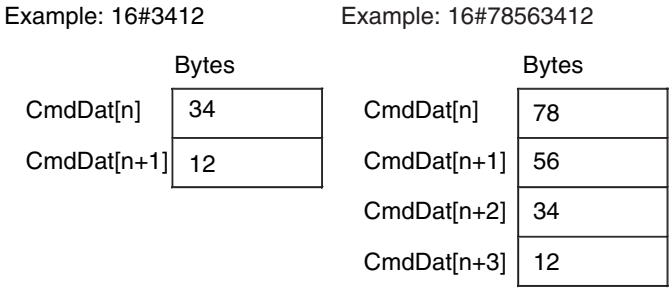
- For the command format, specify the lower bytes (L) first followed by the higher bytes (H) for the word (2-byte) data and double-word (4-byte) data in the service data (such as word data and error clear codes).

Example: To specify the word data 1234 hex, specify 34 hex first, and then 12 hex. To specify the double-word data 12345678 hex, specify 78 hex first, then 56 hex and 34 hex, and finally 12 hex. Therefore, set the data as follows in the command format:

Command Format



Also, data in the *CmdDat* input variable that inputs the command code is handled in bytes, so set the command code as follows:



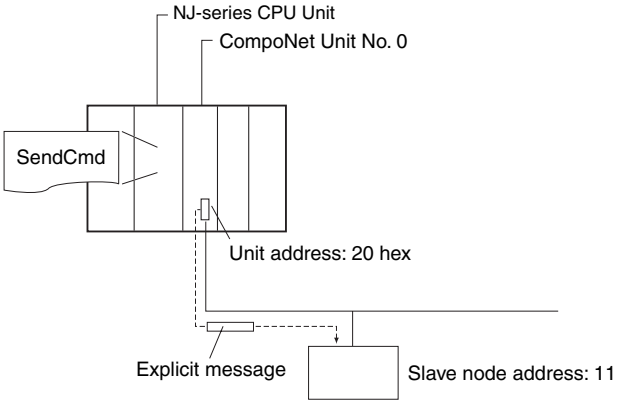
- The service data in the response format is also returned with lower bytes (L) first followed by the higher bytes (H) for word (2-byte) data and double-word (4-byte) data.

Additional Information

- Refer to CompoNet specifications for detailed information on the parameters of explicit messages.
- Contact the ODVA to obtain copies of the CompoNet specifications.
  ODVA's URL: http://www.odva.org/

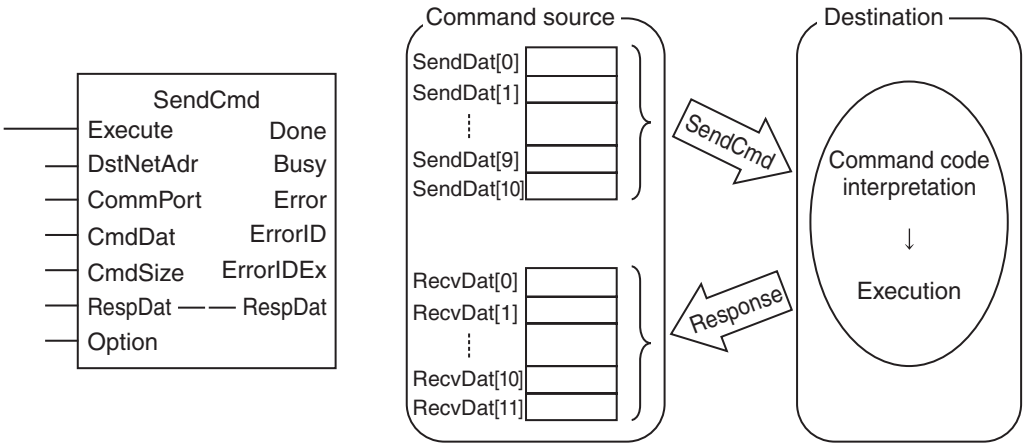
6-2-2 Sending Explicit Messages Using SendCmd Instruction

● Example: Sending Explicit Messages Using SendCmd Instruction



● Operation

In the following example, the READ CONTROLLER INFORMATION command (2802) is used to read the vendor code of a Slave Unit from the Master Unit with unit address 16#20. (The vendor code for OMRON is 002F hex.)



Input variable	Function		Example details
Execute	The operation SendCmd is executed when TRUE is set.		---
DstNetAdr	The destination network address is specified with the use of the network address, node address and unit address.		Network address: 0 Node address: 0 Unit address: 16#20
CommPort	The destination port is specified.		NONE (Default)
CmdDat	SendDat[0]	Command code	16#28
	SendDat[1]		16#02
	SendDat[2]	Slave node address (11)	16#10
	SendDat[3]		16#0B
	SendDat[4]	Service code	16#00
	SendDat[5]		16#0E
	SendDat[6]	Class ID	16#00
	SendDat[7]		16#01
	SendDat[8]	Instance ID	16#00
	SendDat[9]		16#01
	SendDat[10]	Attribute ID	16#01
CmdSize	The number of bytes corresponding to the command data to be sent is specified.		10
RespDat	RecvDat[0]	Command code	16#28
	RecvDat[1]		16#02
	RecvDat[2]	End code	16#00
	RecvDat[3]		16#00
	RecvDat[4]	Number of bytes received	16#00
	RecvDat[5]		16#04
	RecvDat[6]	Slave node address (11)	16#10
	RecvDat[7]		16#0B
	RecvDat[8]	Service code (when completed normally)	16#00
	RecvDat[9]		16#8E
	RecvDat[10]	Vendor code	16#2F
	RecvDat[11]		16#00
Option	Response monitoring and the number of resends are specified.		Response Time = 20 Retry = 2

Additional Information

If the remote node is an OMRON Special Slave Unit or a CompoNet device from another manufacturer, set the response monitoring time to at least the value that is set for the message monitoring timer (default: 2 s). If the setting is less than the value, communications may be busy even if the next command is executed after the first one times out.

Unit Settings

Name	Setting target	Settings
Unit Configuration	**CPU/Expansion Racks** under **Controller Configurations and Setup** of Sysmac Studio	Mount CJ1W-CRM21 in slot 0 of the CPU Rack.
Device name of this unit		CompoNet
Unit number	Unit No. Switch and Unit Configuration and Setup (**CPU/Expansion Racks** under **Controller Configurations and Setup** of Sysmac Studio)	Unit number 0
Special Unit Setup	System setup data	Not required

Program Example

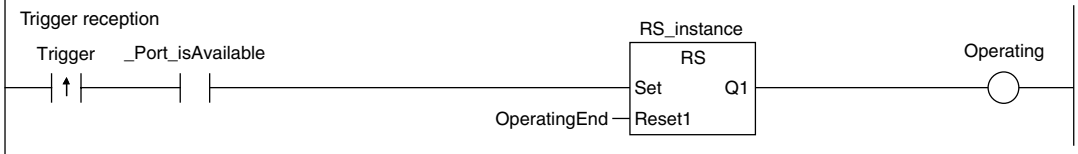
System-defined variable

Name	Data type	Default	Comments	Details
_Port_isAvailable	BOOL	---	Network Communications Instruction Enabled Flag	TRUE when there are internal logical ports available, FALSE when there is no internal logical port available.

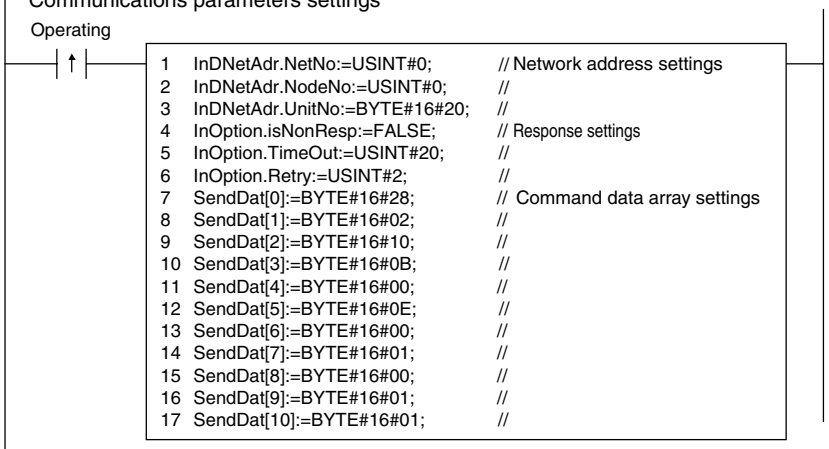
User-defined variables (Define before or when creating a program)

Name	Data type	Default	Details
Trigger	BOOL	False	Execution conditions
OperatingEnd	BOOL	False	Process completed
Operating	BOOL	False	Processing
InDNetAdr	_sDNET_ADR	(NetNo := 0, NodeNo := 0, UnitNo := 16#0)	Destination network address
InOption	_sRESPONSE	(isNonResp := False, TimeOut := 0, Retry := 0)	Response monitoring and retry setting
SendDat	ARRAY[0..10] OF BYTE		Send data
RecvDat	ARRAY[0..11] OF BYTE		Receive data
RS_instance	RS	---	---
SendCmd_instance	SendCmd	---	---

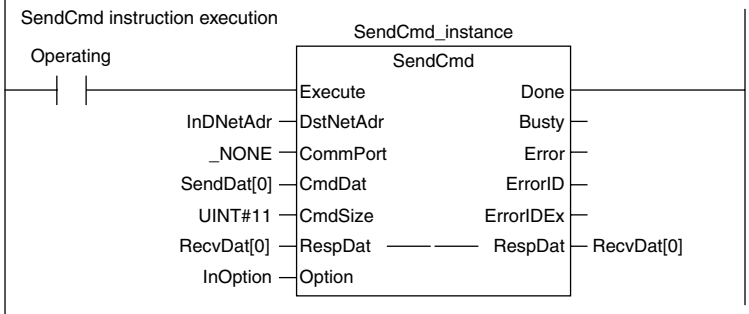
Determining the SendCmd instruction execution completion



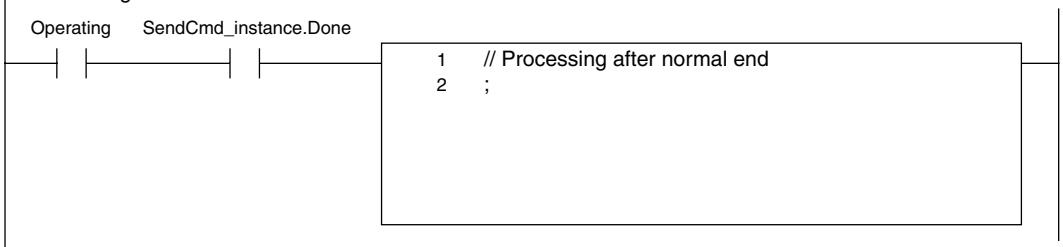
Communications parameters settings



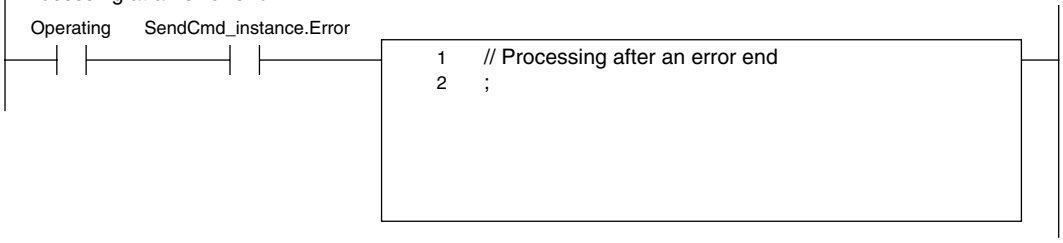
SendCmd instruction execution



Processing at normal end



Processing at an error end



7

Troubleshooting

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7-1 Handling Errors

This section describes how to handle CompoNet Network errors that may occur.

7-1-1 CompoNet Master Unit Errors

This section describes the meanings of the LED indicators and seven-segment display when errors occur at a CompoNet Master Unit, and it provides countermeasures for handling the errors.

Meanings of CompoNet Master Unit Indicators and Procedure for Handling Errors

CompoNet Master Units are designed to follow the same basic procedures as CJ-series Special I/O Units for handling errors.

When an error occurs at a Special I/O Unit, the general location of the error is shown by the status of the indicators.

With CompoNet Master Units, in addition to these indicators, a seven-segment display shows the location and content of errors.

7-1-2 Troubleshooting Sequence When an Error Occurs

1. Determine the general location of the error.
   Check the pattern in which the indicators are lit to determine whether the error occurred in the CPU Unit or in the network.

↓

2. Determine the details.
   Check the seven-segment display and the status area of the CompoNet Master Unit to determine the location and content of the error.

↓

3. Determine the cause of the error.
   Check the probable cause of error and the onsite conditions, and determine and clear the cause of the error.

↓

4. Take countermeasures.
   Check the system status in the *Unit operation after error detection* column, check the required operations in the *Countermeasures* column, and restore system operation to normal.

The CompoNet Master Unit error detection function, operations following error detection, and countermeasures are described on the following pages.

Initialization Errors

MS indicator	NS indicator	7-segment display	Item	Error history (hex)	Probable cause of error	Unit operation after error detection	Countermeasures
◎ Red	●	H1	Unit number setting error	---	One of the following errors occurred in the unit number setting for the Master Unit. • An illegal unit number was set. • A unit number already being used for another Unit was set.	The Master Unit stops operating and goes into standby mode.	Correct the unit number, and then restart the Master Unit. Either of the following methods can be used to restart the Master Unit: 1) Cycle the power supply to the Controller. 2) Change the Special I/O Unit Restart Flag to TRUE. 3) Execute the ResetUnit instruction. 4) Restart the Master Unit from the Unit Configuration in the Sysmac Studio.
◎ Red	●	H2	The CPU Unit is defective.	---	---		Restart the Master Unit. If the same error occurs again, replace the Master Unit.
○ Red	●	H3	Hardware test error (Unit interface test)	---	An error was detected during the Master Unit interface check.		If the same error occurs even when the Unit is mounted to another CPU Unit, replace the Master Unit.
●	○ Red	H3	Hardware test error (Communications ASIC test)	---	An error was detected during the Master Unit communications ASIC check.		
○ Red	○ Red	H3	Hardware test error (RAM test)	---	An error was detected during the Master Unit RAM check.		
◎ Red	●	H4	Communications mode setting error	---	An illegal rotary switch setting was detected for the communications mode (i.e., the switch is set to 4, 5, 6, 7, or 9).		Correct the communications mode setting, and then restart the Master Unit.
◎ Red	●	H6	The CPU Unit is defective.	000F	---	After the error is recorded in the error history, the Master Unit stops operating and goes into standby mode.	Restart the Master Unit. If the same error occurs again, replace the Master Unit.
◎ Red	●	H7	Not registered in Unit Configuration	0006	The Master Unit is not registered in the Unit Configuration in the CPU Unit.		Create the Unit Configuration.
◎ Red	---	HA	Insufficient CPU Unit memory	0012	An error response was detected when reading the routing tables from the CPU Unit.	After the error is recorded in the error history, operation continues without the routing tables.	Restart the Master Unit. If the same error occurs again, replace the Master Unit.
◎ Red	---	Hb	Event timeout	0011	A timeout was detected for a system setting read request to the CPU Unit.	After the error is recorded in the error history, operation continues while the interface with the CPU Unit is stopped.	
◎ Red	---	HC	Setting table error	021A	A logical error (such as an out-of-range error) occurred in routing tables read from the CPU Unit at initialization, or a sum error or an error other than a timeout was returned.	After the error is recorded in the error history, operation continues without the routing table.	Correct or delete the routing table.

Indicators
○: Lit
◎: Flashing
●: Not lit
---: Not applicable

Exception Processing

MS indicator	NS indicator	7-segment display	Item	Error history (hex)	Probable cause of error	Unit operation after error detection	Countermeasures
○ Red	●	Not lit	Unit-related error	0601	Special I/O Unit error	After the error is registered in the error history, watchdog timer refreshing is stopped and the Master Unit completely stops.	The Master Unit may have been subjected to noise interference. Eliminate the source of noise and cycle the power supply to the Controller.
○ Red	●	Not lit	Unit watchdog timer error	---	There was a watchdog timer timeout for the Unit.	The Master Unit completely stops.	

Indicators
○: Lit
◎: Flashing
●: Not lit
---: Not applicable

Errors in CPU Unit Monitoring

If an error occurs in CPU Unit to which the Master Unit is mounted, check the pattern in which the indicators are lit on the CPU Unit against those given in the following table.

MS indicator	NS indicator	7-segment display	Item	Error history (hex)	Probable cause of error	Unit operation after error detection	Countermeasures
◎ Red	---	H9	I/O bus check Error	000E	An error occurred in the bus for exchanging data with the CPU Unit.	• Cyclic operations are stopped. • The communications cycle is stopped.	Restart the Controller by cycling the power supply to it.
◎ Red	---	HF	CPU Unit watchdog timer error	0001	An error occurred at the CPU Unit, and CPU Unit operations stopped.	The error is registered in the error history. System operation continues, but the communications cycle is stopped.	Clear the error in the CPU Unit, and then restart the Master Unit.
●	●	Not lit	Power failure	---	The CPU Unit power supply is OFF.	System operation is completely stopped by a hardware reset.	Clear the cause of the failure and turn ON the power again.
◎ Red	---	HE	CPU Unit monitoring error	0002	Service from the CPU Unit is irregular. The monitoring time is acquired at initialization. Normally monitoring is for 11 s.	The error is registered in the error history. (It is registered only once even though the error continues.) • The I/O cycle is stopped. • Cyclic operations are stopped. • The final data is provided to an output Slave Unit. There is a possibility of recovery from this error, restoring normal operations.	Check the CPU Unit operating environment.

Indicators
○: Lit
◎: Flashing
●: Not lit
---: Not applicable

Errors in Remote I/O Communications

The following indicator patterns show that an error related to the CompoNet Network has occurred.

Errors can basically be identified by the NS indicator flashing red and the seven-segment display showing d*.

MS indicator	NS indicator	7-segment display	Item	Error history (hex)	Probable cause of error	Unit operation after error detection	Countermeasures
---	◎ Red	d9 ↓ yy ↓ zzz	Communications error	0374	A system disconnection was detected.	System operations continue. Each detected disconnection is registered in the error history. Participation of the disconnected Slave Unit is awaited. When there is no longer any cause of an error, normal operation is restored. (The NS indicator lights green.)	Either of the following may be the cause of the error. 1) Communications had to be continually retried for the applicable Slave Unit due to noise, until the specified number of retries was exceeded. 2) Responses to communications from the Master Unit are not possible because of a malfunction, line disconnection, or communications power supply interruption at the Slave Unit itself. Inspect the Slave Unit where the disconnection was detected, and remove the cause of the error. There is no need to restart the Master Unit.
---	◎ Red	d0 ↓ yy ↓ zzz	Address duplication error	0376	An address duplication error was detected for a Slave Unit attempting to participate. Or, a communications error was detected for a Slave Unit.	The duplication error is registered in the error history. All system operations continue.	A Slave Unit or Repeater Unit in the same network is set for the same node. Use the following procedure: 1) Turn OFF the power to the Master Unit and the Slave Unit. 2) Change the duplicate node number to a new value. 3) Turn the power back ON to the Master Unit and the Slave Unit. If the error is still not cleared, it can be a communications error. Check for noise entering the network, disconnected cables, loose connectors, and loose signal lines, and check the network installation to see if all specifications are met.
---	◎ Red	E5	Illegal configuration error	0378	It was detected that the Slave Units and Repeater Units requesting to participate in the network exceeded the permitted number of Repeater Unit segments (two).	Subsequent Slave Unit participation is prohibited from the point where it is detected that the permitted number of Repeater Unit segments has been exceeded in the participation processing. Other system operations continue. The error is registered in the error history. After normal status is restored, the Unit recovers by being restarted.	The maximum number of Repeater Unit segments is registered to two in the Master Unit and cannot be changed. This error thus indicates that there are three or more Repeater Unit segments. Correct the wiring and restart the Master Unit.
---	◎ Red	d5 ↓ yy ↓ zzz	Verification error (Slave missing)	0370	It was detected that a Slave Unit registered in the Registration Table is not participating within a fixed time after power is turned ON to the Master Unit. The monitoring time is set using the CX-Integrator.	The error is registered in the error history. System operations all continue, and remote I/O operations start. Participation of the Slave Unit where the error occurred continues to be monitored. When Slave Unit participation is completed, normal status is restored. (The NS indicator lights green.)	If the error is not cleared, check the Slave Unit that is not participating.
---	◎ Red	d6 ↓ yy ↓ zzz	Verification error (Unregistered Slave Participating)	0372	Participation of an unregistered Slave Unit was detected.	The error is registered in the error history. All other system operations continue, without the participation of the unregistered Slave Unit. Recovery is attained by restoring normal status and restarting the Unit.	Check and correct the status of the unregistered Slave Unit, and then restart the Master Unit.
---	◎ Red	A0	Communications have stopped due to a communications error.	0375	A communications error was detected while communications were set to be stopped when a communications error occurred.	The error is registered in the error history. System operations continue. Remote I/O communications with the Slave Units stop, and communications with the CPU Unit continue. There is no automatic recovery even after the cause of the error is removed. The Unit must be restarted to recover.	Check and eliminate the cause of the error, and then restart the Master Unit.

Indicators
◯: Lit
◎: Flashing

●: Not lit
---: Not applicable

yy: Indicates the Slave Unit type, as shown below.

yy	Actual display	Slave Unit type
i		Word Input Slave Unit (including Mixed I/O Slave Unit)
o		Word Output Slave Unit
bi		Bit Input Slave Unit
bo		Bit Output Slave Unit
r		Repeater Unit

zzz: Node address where the error occurred (2 digits decimal) (Note: The 100s digit is displayed with a dot.)

Errors in Memory Access Processing

The following indicator patterns show that an error has occurred in the CPU Unit where the Master Unit is mounted.

MS indicator	NS indicator	7-segment display	Item	Error history (hex)	Probable cause of error	Unit operation after error detection	Countermeasures
◎ Red	---	E4	Software setting table logic error	021A	1) The communications mode is set to the Software Setting Mode (mode 8) even though a Software Setting Table has not been made. (By default, there is no Software Setting Table.) 2) The Software Setting Table is corrupted.	The error is registered in the error history. Data and message exchanges with the CPU Unit are executed without starting remote I/O communications.	1) Restart the Master Unit in Mode 8. 2) Using the CX-Integrator, reset the Software Setting Table.
◎ Red	---	E6	Network parameters logic error	021A	The Network Parameters Table is corrupted.		Using the CX-Integrator, reset the network parameters.
◎ Red	---	E7	Slave Unit parameters logic error	021A	The Slave Unit Parameters Table is corrupted.		Using the CX-Integrator, reset the Slave Unit parameters.
◎ Red	---	E8	Registration Table logic error	021A	1) The registration settings (REGS) are enabled even though the Registration Table is disabled. 2) The Registration Table is corrupted.		Using the CX-Integrator, reset the Registration Table.
◎ Red	---	E9	Memory access error	0602	One of the following errors occurred when the non-volatile memory in the Unit was accessed: 1) None of the 64 records could be used during initialization or when registering an error in the error history. 2) An error history reading or writing error 3) A network parameters reading or writing failure during initialization 4) An identity information reading failure during initialization 5) A Registration Table information reading or writing failure during initialization 6) A Software Setting Table information reading or writing failure during initialization	For 1) and 2), access to EEPROM stops after the error history is registered in RAM. All other normal operations continue. (Registering the error history to RAM continues.) For 3), 5), and 6) (reading), other operations continue without starting the communications cycle. For 3), 5), and 6) (writing), further accessing of EEPROM is stopped. Aside from these, normal operations continue. For 4), normal operations are executed.	Restart the Master Unit. If the same error occurs again, replace the Master Unit.

Indicators
○: Lit
◎: Flashing
●: Not lit
---: Not applicable

7-2 Error History Function

The error history registers errors detected by the CompoNet Master Unit, along with the clock times at which they occur. You can monitor the error history from the CX-Integrator.
For the procedures to monitor the error history, refer to the *CX-Integrator Version 2.□ Operation Manual* (Cat. No. W464).

Error History Table

● Error History Table

Each time an error occurs, one record (up to a maximum of 64 records) is registered in the Error History Table in the CompoNet Master Unit's internal RAM. Once the maximum number of records (64) has been registered in the Error History Table, the oldest record is deleted in order with each new record that is registered.

The following information is stored in the Error History Table.

- Error codes
- Detail codes
- The clock times at which errors occurred (using the CPU Unit's time data)

● Error History Save Area

When an error is detected, the contents of the error and the time at which it occurred are registered as an error history in the Unit's internal RAM. Serious errors are registered not only in RAM but also in EEPROM. The error history registered in EEPROM is saved during a power interruption or when the Unit is restarted. When the CompoNet Master Unit is started, the error history in EEPROM is copied to RAM. When you read the error history from the CX-Integrator, you are reading the error history that is stored in RAM. When you clear the error history, it is cleared both from the RAM and from EEPROM.

Precautions for Correct Use

The CPU Unit's time information is read and used by the CompoNet Master Unit. If this time information cannot be read from the CPU Unit, all time information in the error history will show 0.
In addition, for an NJ-series CPU Unit, the time setting for the CPU Unit's built-in clock must be reset when the power supply is turned ON after replacing the battery. If the time is not reset, correct time information will not be registered. When the error history is read, the time information will be unreliable.

Error Code and Detailed Information Tables

Error code (hex)	Error contents	Detailed information		EEPROM
		First byte	Second byte	
0001	CPU Unit watchdog timer error	00 hex	00 hex	Yes
0002	CPU Unit service monitoring error (Service from the CPU Unit is irregular.)	Monitoring time (ms)		Yes
0006	Other CPU Unit errors	Bit 14: Unit number duplication Bit 11: No applicable Unit in Unit Configuration All other bits are reserved.		Yes
000F	CPU Unit initialization error	00 hex	00 hex	Yes
0011	Event timeout	MRC	SRC	Yes
0012	CPU Unit memory error	01 hex: Read error 02 hex: Write error	03 hex: Routing Table	Yes
0101	Transmission is not possible because local node is not participating in the network.			No
0103	Transmission is not possible because of too many resends.	Command Bit 15: OFF Bits 14 to 8: SNA Bits 7 to 0: SA1		No
0106	Transmission is not possible because of an address duplication error.			No
0107	Transmission is not possible because remote node is not participating in the network.	Response Bit 15: ON Bits 14 to 8: DNA Bits 7 to 0: DA1		No
0108	Transmission is not possible because there is no Unit corresponding to the unit number.			No
0109	Transmission is not possible because the remote node is busy.			No
010B	Transmission is not possible because of a CPU Unit error.			No
010D	Transmission is not possible because no destination address is set in the routing tables.			No
010E	Transmission is not possible because the routing tables are not registered.			No
010F	Transmission is not possible because of a routing table error.	Command Bit 15: OFF Bits 14 to 8: SNA Bits 7 to 0: SA1		No
0110	Transmission is not possible because of too many relays.			No
0111	Transmission is not possible because the command exceeds the maximum command length.	Response Bit 15: ON Bits 14 to 8: DNA Bits 7 to 0: DA1		No
0112	Transmission is not possible because of a header error.			No
0117	Packet was discarded because the internal reception buffer was full.			No
0118	Illegal packet discarded			No
0120	Unexpected routing error			No
0122	Packet was discarded because it could not be serviced in the current mode.			No
0123	Packet was discarded because the internal buffer was full.			No
0124	Routing is not possible because the maximum frame length was exceeded.			No

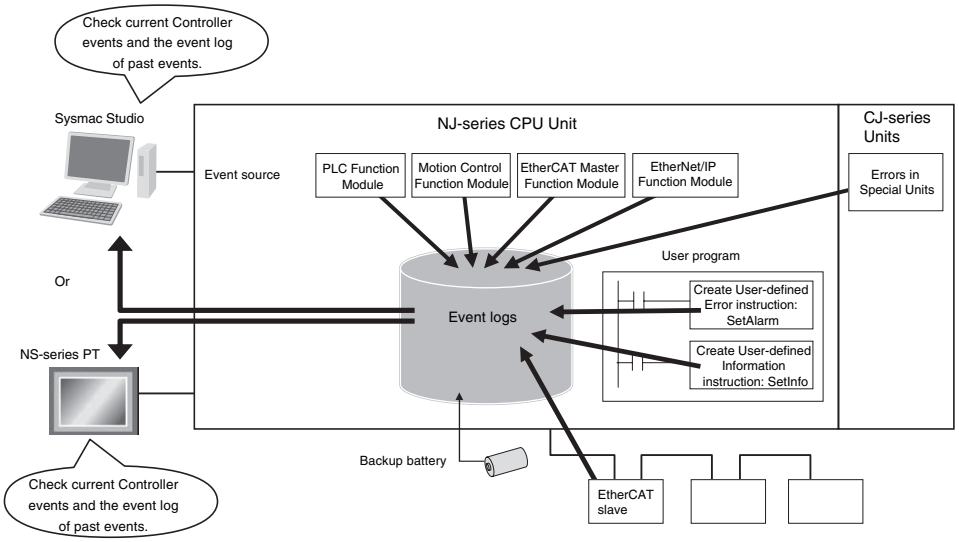
Error code (hex)	Error contents	Detailed information		EEPROM
		First byte	Second byte	
0125	Packet was discarded because of a response timeout.			No
0300	Packet was discarded because of a parameter error.			No
021A	Logic error in setting table	00 hex	01 hex: Network parameters 02 hex: Software Setting Table 03 hex: Routing Table 04 hex: System Setup 0A hex: Registration Table	Yes
0347	I/O refresh error	00 hex	00 hex	No
0370	Verification error (Slave missing)	00	00	No
0372	Verification error (Unregistered Slave participating)	10 hex: Word Input Slave Unit, Word Mixed I/O Slave Unit 20 hex: Word Output Slave Unit 40 hex: Bit Input Slave Unit, Bit Mixed I/O Slave Unit 50 hex: Bit Output Slave Unit	Node address (hex)	No
0374	Communications error	10 hex: Word Input Slave Unit, Word Mixed I/O Slave Unit 20 hex: Word Output Slave Unit 40 hex: Bit Input Slave Unit, Bit Mixed I/O Slave Unit 50 hex: Bit Output Slave Unit 70 hex: Repeater Unit	Node address (hex)	No
0375	Communications have stopped due to a communications error. [Cause] A communications error occurred while communications were set to be stopped for communications errors.	10 hex: Word Input Slave Unit, Word Mixed I/O Slave Unit 20 hex: Word Output Slave Unit 40 hex: Bit Input Slave Unit, Bit Mixed I/O Slave Unit 50 hex: Bit Output Slave Unit	Node address (hex)	Yes
0376	Address duplication error	10 hex: Word Input Slave Unit, Word Mixed I/O Slave Unit 20 hex: Word Output Slave Unit 40 hex: Bit Input Slave Unit, Bit Mixed I/O Slave Unit 50 hex: Bit Output Slave Unit 70 hex: Repeater Unit	Node address (hex)	No
0378	Invalid Repeater Unit/configuration error	10 hex: Word Input Slave Unit, Word Mixed I/O Slave Unit 20 hex: Word Output Slave Unit 40 hex: Bit Input Slave Unit, Bit Mixed I/O Slave Unit 50 hex: Bit Output Slave Unit 70 hex: Repeater Unit	Node address (hex)	No
0601	Illegal interrupt	00	00	Yes
0602	Special Unit memory error	01 hex: Read error 02 hex: Write error	01 hex: Network parameters 02 hex: Software Setting Table 04 hex: Slave Unit parameters 06 hex: Error history 09 hex: Identity information 0A hex: Registration Table	Yes (Error history only: No)

7-3 Event Logs

7-3-1 Overview of the Event Logs

You can use the same methods to manage all of the events that occur on the NJ-series Controller. (The events include errors and information.) You can use the Sysmac Studio or an NS-series PT to confirm current Controller events and the logs of events that have occurred. These logs are called event logs. Controller errors that occur for this Unit are also reported as events in the NJ-series CPU Unit.

Refer to the *NJ-series CPU Unit Software User's Manual* (Cat. No. W501) for details on the event logs in an *NJ-series CPU Unit.* Refer to the *NJ-series Troubleshooting Manual* (Cat. No. W503) for details on Controller errors, confirmation methods, and corrections.



To use an NS-series PT to check events, connect the PT to the built-in EtherNet/IP port on the CPU Unit.

7-3-2 Error Table

The errors that may occur for this Unit are listed below.

The following abbreviations and symbols are used in the event level column.

Abbreviation	Name
Maj	Major fault level
Prt	Partial fault level
Min	Minor fault level
Obs	Observation
Info	Information

Symbol	Meaning
S	Event levels that are defined by the system.
U	Event levels that can be changed by the user.*

* This symbol appears only for events for which the user can change the event level.

A version in parentheses in the *Event code* column is the unit version of the CPU Unit when the event was added.

Refer to the *NJ-series Troubleshooting Manual* (Cat. No. W503) for all of the event codes that may occur in an NJ-series Controller.

Event code	Event name	Meaning	Assumed cause	Level					Reference
				Maj	Prt	Min	Obs	Info	
349C 0000 hex	Registration Table Verification Error	An inconsistency was found when verifying the slave registration table.	• There is at least one entry in the slave registration table where the node address and Slave Unit model are inconsistent.			S			page 7-14
349D 0000 hex	Slave Unit Duplicated Address Error	The same address is used by more than one Slave Unit or the same word has been allocated to more than one Slave Unit.	• The same node address is set for more than one Slave Unit. • There are no duplicated node addresses set for the Slave Units, but allocated words overlap. • A Slave Unit was disconnected from the network, and then another Slave Unit with the same node address but a different I/O capacity joined the network.			S			page 7-14
349E 0000 hex	Repeater Unit Node Duplicated Address Error	The node address of the Repeater Unit is also set for another node.	• The node address of the Repeater Unit is also used for anther node.			S			page 7-15

Event code	Event name	Meaning	Assumed cause	Level					Reference
				Maj	Prt	Min	Obs	Info	
8460 0000 hex	Communications Error	A Slave Unit was disconnected from the network.	• Cable lengths (trunk line and branch lines) are unsuitable. • A cable is disconnected or loose. • A terminating resistance is not connected. Or, the terminating resistance is somewhere other than the end of the trunk line. • Noise • The Slave Unit does not respond to communications from the Master Unit because the Slave Unit is faulty, the line is disconnected, or the communications power supply is interrupted.			S	U		page 7-16
8461 0000 hex	Repeater Unit Communications Error	An error occurred in Repeater Unit communications.	• Cable lengths (trunk line and branch lines) are unsuitable. • A cable is disconnected or loose. • A terminating resistance is not connected. Or, the terminating resistance is somewhere other than the end of the trunk line. • Noise • The Repeater Unit does not respond to communications from the Master Unit because the Repeater Unit is faulty, the line is disconnected, or the communications power is interrupted.			S	U		page 7-17
6498 0000 hex	Representative Warning	A warning has occurred in at least one Slave Unit.	• A warning has occurred in at least one Slave Unit.				S		page 7-18
6499 0000 hex	Representative Alarm	An alarm has occurred in at least one Slave Unit.	• An alarm has occurred in at least one Slave Unit.				S		page 7-18

7-3-3 Error Descriptions

This section describes the information that is given for individual errors.

Controller Error Descriptions

The items that are used to describe individual errors (events) are described in the following copy of an error table.

Event name	Gives the name of the error.			Event code	Gives the code of the error.	
Meaning	Gives a short description of the error.					
Source	Gives the source of the error.		Source details	Gives details on the source of the error.	Detection timing	Tells when the error is detected.
Error attributes	Level	Tells the level of influence on control.*1	Recovery	Gives the recovery method.*2	Log category	Tells which log the error is saved in.*3
Effects	User program	Tells what will happen to execution of the user program.*4	Operation	Provides special information on the operation that results from the error (event).		
System-defined variables	Variable		Data type		Name	
	Lists the variable names, data types, and meanings for system-defined variables that provide direct error notification, that are directly affected by the error, or that contain settings that cause the error.					
Cause and correction	Assumed cause		Correction		Prevention	
	Lists the possible causes, corrections, and preventive measures for the error.					
Attached information	This is the attached information that is displayed by the Sysmac Studio or an NS-series PT.					
Precautions/ Remarks	Provides precautions, restrictions, and supplemental information. If the user can set the event level, the event levels that can be set, the recovery method, operational information, and other information are also provided.					

*1 One of the following:
Major fault: Major fault level
Partial fault: Partial fault level
Minor fault: Minor fault level
Observation
Information

*2 One of the following:
Automatic recovery: Normal status is restored automatically when the cause of the error is removed.
Error reset: Normal status is restored when the error is reset after the cause of the error is removed.
Cycle the power supply: Normal status is restored when the power supply to the Controller is turned OFF and then back ON after the cause of the error is removed.
Controller reset: Normal status is restored when the Controller is reset after the cause of the error is removed.
Depends on cause: The recovery method depends on the cause of the error.

*3 One of the following:
System: System event log
Access: Access event log

*4 One of the following:
Continues: Execution of the user program will continue.
Stops: Execution of the user program stops.
Starts: Execution of the user program starts.

Error Descriptions

Event name	Registration Table Verification Error			Event code	349C 0000 hex	
Meaning	An inconsistency was found when verifying the slave registration table.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At power ON
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Even if this error occurs, remote I/O communications start for the Master Unit. Remote I/O communications are not possible for the Slave Unit. If a Slave Unit is missing, monitoring for Slave Unit participation will continue. When the Slave Unit joins the network, normal status is recovered. If there is an unregistered Slave Unit in the network, normal status is recovered by correcting the registration table and cycling the power supply.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	There is at least one entry in the slave registration table where the node address and Slave Unit model are inconsistent.		Correct the registration table so that all node addresses and Slave Unit models are consistent. If verification of the registration table is not required, disable verification of the registration table.		Create the registration table so that all node addresses and Slave Unit models are consistent.	
Attached information	None					
Precautions/ Remarks	If pin 4 (REGS) on the DIP switch on the Master Unit is ON when the power is turned ON or the Controller is reset, the registration table is enabled.					

Event name	Slave Unit Duplicated Address Error			Event code	349D 0000 hex	
Meaning	The same address is used by more than one Slave Unit or the same word has been allocated to more than one Slave Unit.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	During CompoNet communications
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Even if this error occurs, remote I/O communications start for the Master Unit. However, communications are not possible for the Slave Units with duplicated addresses.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The same node address is set for more than one Slave Unit.		Turn OFF the power supply to the Master Unit and Slave Units, and then change the settings so that there are no duplicated node addresses or overlapping word allocations.		Do not use the same address for more than one Slave Unit and make sure that allocated words do not overlap.	
	There are no duplicated node addresses set for the Slave Units, but allocated words overlap.					
	A Slave Unit was disconnected from the network, and then another Slave Unit with the same node address but a different I/O capacity joined the network.					
Attached information	None					
Precautions/ Remarks	None					

Event name	Repeater Unit Node Duplicated Address Error		Event code	349E0000 hex		
Meaning	The node address of the Repeater Unit is also set for another node.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	During CompoNet communications
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Even if this error occurs, remote I/O communications start for the Master Unit. However, communications are not possible for any Slave Units that are beyond the Repeater Unit.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The node address of the Repeater Unit is also used for anther node.		Turn OFF the power supply for the Master Unit, Slave Units, and Repeater Units, check the other node addresses and change the settings so that the node address of the Repeater Unit is not used for other nodes.		Set the node addresses so that the node address of the Repeater Unit is not also used for other nodes.	
Attached information	None					
Precautions/ Remarks	None					

<table>
<tr><td>Event name</td><td colspan="3">Communications Error</td><td>Event code</td><td colspan="2">84600000 hex</td></tr>
<tr><td>Meaning</td><td colspan="6">A Slave Unit was disconnected from the network.</td></tr>
<tr><td>Source</td><td colspan="2">PLC Function Module</td><td>Source details</td><td>CJ-series Unit</td><td>Detection timing</td><td>During CompoNet communications</td></tr>
<tr><td>Error attributes</td><td>Level</td><td>Minor fault</td><td>Recovery</td><td>Error reset</td><td>Log category</td><td>System</td></tr>
<tr><td>Effects</td><td>User program</td><td>Continues.</td><td>Operation</td><td colspan="3">Communications are not possible for a disconnected Slave Unit. The Master Unit waits for the disconnected Slave Unit to join the network. When the cause of the error is removed, the disconnected Slave Unit returns to normal operation.</td></tr>
<tr><td rowspan="2">System-defined variables</td><td colspan="2">Variable</td><td colspan="2">Data type</td><td colspan="2">Name</td></tr>
<tr><td colspan="2">None</td><td colspan="2">---</td><td colspan="2">---</td></tr>
<tr><td rowspan="6">Cause and correction</td><td colspan="2">Assumed cause</td><td colspan="2">Correction</td><td colspan="2">Prevention</td></tr>
<tr><td colspan="2">Cable lengths (trunk line and branch lines) are unsuitable.</td><td colspan="2">Refer to the communications specifications and adjust all of the cables to suitable lengths.</td><td colspan="2">Refer to the communications specifications and adjust all of the cables to suitable lengths.</td></tr>
<tr><td colspan="2">A cable is disconnected or loose.</td><td colspan="2">Connect the cable securely. If the cable is broken, replace it.</td><td colspan="2">Connect the cable securely. Check the cable to see if it is operating properly.</td></tr>
<tr><td colspan="2">A terminating resistance is not connected. Or, the terminating resistance is somewhere other than the end of the trunk line.</td><td colspan="2">Connect terminating resistance only to the ends of the trunk line.</td><td colspan="2">Connect terminating resistance only to the ends of the trunk line.</td></tr>
<tr><td colspan="2">Noise</td><td colspan="2">Take actions to prevent noise.</td><td colspan="2">Take actions to prevent noise.</td></tr>
<tr><td colspan="2">The Slave Unit does not respond to communications from the Master Unit because the Slave Unit is faulty, the line is disconnected, or the communications power supply is interrupted.</td><td colspan="2">Investigate the disconnected Slave Unit and remove the cause of the problem.</td><td colspan="2">Make sure that the Slave Units are not faulty, lines are not disconnected, and the communications power is not interrupted.</td></tr>
<tr><td>Attached information</td><td colspan="6">None</td></tr>
<tr><td>Precautions/ Remarks</td><td colspan="6">This error occurs when there is a communications error in at least one of the target Slave Units. The target Slave Units are determined as follows:
• All Slave Units if pin 4 (REGS) on the DIP switch is set to OFF on the Master Unit when the power supply is turned ON or the Controller is reset.
• Only registered Slave Units if pin 4 (REGS) on the DIP switch is set to ON when the power supply is turned ON or the Controller is reset.
• You can change the event level to the observation level. If you change the level to the observation level, the Recovery column above will be changed to “Error reset.”</td></tr>
</table>

Event name	Repeater Unit Communications Error			Event code	8461 0000 hex	
Meaning	An error occurred in Repeater Unit communications.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	During CompoNet communications
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Even if this error occurs, remote I/O communications start for the Master Unit. However, communications are not possible for any Slave Units that are beyond the Repeater Unit. The Master Unit waits for the disconnected Repeater Unit to join the network. When the cause of the error is removed, the disconnected Repeater Unit and all Slave Units that are beyond it return to normal operation.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	Cable lengths (trunk line and branch lines) are unsuitable.		Refer to the communications specifications and adjust all of the cables to suitable lengths.		Refer to the communications specifications and adjust all of the cables to suitable lengths.	
	A cable is disconnected or loose.		Connect the cable securely. If the cable is broken, replace it.		Connect the cable securely. Check the cable to see if it is operating properly.	
	A terminating resistance is not connected. Or, the terminating resistance is somewhere other than the end of the trunk line.		Connect terminating resistance only to the ends of the trunk line.		Connect terminating resistance only to the ends of the trunk line.	
	Noise		Take actions to prevent noise.		Take actions to prevent noise.	
	The Repeater Unit does not respond to communications from the Master Unit because the Repeater Unit is faulty, the line is disconnected, or the communications power is interrupted.		Check the disconnected Repeater Unit and remove the cause of the problem.		Make sure that the Repeater Unit is not faulty, lines are not disconnected, and the communications power is not interrupted.	
Attached information	None					
Precautions/ Remarks	You can change the event level to the observation level. If you change the level to the observation level, the *Recovery* column above will be changed to “Error reset.”					

Event name	Representative Warning			Event code	64980000 hex	
Meaning	A warning has occurred in at least one Slave Unit.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	During CompoNet communications
Error attributes	Level	Observation	Recovery	---	Log category	System
Effects	User program	Continues.	Operation	Not affected.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	A warning has occurred in at least one Slave Unit.		Check the Slave Unit where the warning occurred, remove the cause of the warning, and reset the warning.		None	
Attached information	None					
Precautions/ Remarks	None					

Event name	Representative Alarm			Event code	64990000 hex	
Meaning	An alarm has occurred in at least one Slave Unit.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	During CompoNet communications
Error attributes	Level	Observation	Recovery	---	Log category	System
Effects	User program	Continues.	Operation	Not affected.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	An alarm has occurred in at least one Slave Unit.		Check the Slave Unit where the alarm occurred, remove the cause of the alarm, and reset the alarm.		None	
Attached information	None					
Precautions/ Remarks	None					

App

Appendices

A-1 Differences in Available Functions Depending on the CPU Unit (NJ or CJ Series) A-2
A-1-1 Functional Differences A-2
A-1-2 Differences in Accessing Data from User Program A-2
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A-2-1 Recommended CompoNet Cables A-26

A-1 Differences in Available Functions Depending on the CPU Unit (NJ or CJ Series)

Some of the specifications when a CompoNet Master Unit is connected to a CJ-series CPU Unit are different from the specifications when the CompoNet Master Unit is connected to an NJ-series CPU Unit. A list of these differences is provided below.

A-1-1 Functional Differences

There are differences in function support, function names, and specifications between when a CompoNet Master Unit is connected to a CJ-series CPU Unit and when the CompoNet Master Unit is connected to an NJ-series CPU Unit.

Functions with Different Names

The names of the following functions are different between when a CompoNet Master Unit is connected to a CJ-series CPU Unit and when the CompoNet Master Unit is connected to an NJ-series CPU Unit. The corresponding names are listed in the following table.

Item	CompoNet Master Unit connected to a CJ-series CPU Unit	CompoNet Master Unit connected to an NJ-series CPU Unit
Backup functions	Simple backup function	SD Memory Card backup function
	Backup with PLC backup tool	Sysmac Studio Controller backup function*1

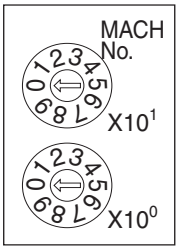
*1 An NJ-series CPU Unit with unit version 1.03 or later and Sysmac Studio version 1.04 or higher are required.

A-1-2 Differences in Accessing Data from User Program

When the CompoNet Master Unit is used with an NJ-series CPU Unit, the device variables for the CJ-series Unit are used as the basic means to access the CompoNet Master Unit from the user program. The following tables give the I/O memory addresses in a CJ-series CPU Unit and the corresponding device variables for CJ-series Units in the NJ-series CPU Unit. (The I/O memory of the CJ-series CPU Unit is the same as the memory used for CJ-series Units.)

Words Allocated to Special I/O Units in CIO Area

n (first word) = CIO 2000 + (10 × Unit number)



The words that are allocated to the CompoNet Master Unit in the CIO and DM Areas depend on the unit number that is set on the unit number switches on the front panel of the Unit.

Additional Information

If you set the same unit number on another Special I/O Unit that is connected to the same CPU Unit, a Duplicate Unit Number major fault level Controller error will occur and the CompoNet Master Unit will not start. If this happens, correct the setting of the unit number and cycle the power supply to the Controller.

Communications Mode Number 0

● CIO n to CIO n+7 (WORD OUT Data)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n to CIO n+7 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n	0 to 15	*_ OUTDat00	WORD OUT Data00
	0	*_ OUTDat00_00	WORD OUT Data00 Bit00
	1	*_ OUTDat00_01	WORD OUT Data00 Bit01
	2	*_ OUTDat00_02	WORD OUT Data00 Bit02
	3	*_ OUTDat00_03	WORD OUT Data00 Bit03
	4	*_ OUTDat00_04	WORD OUT Data00 Bit04
	5	*_ OUTDat00_05	WORD OUT Data00 Bit05
	6	*_ OUTDat00_06	WORD OUT Data00 Bit06
	7	*_ OUTDat00_07	WORD OUT Data00 Bit07
	8	*_ OUTDat00_08	WORD OUT Data00 Bit08
	9	*_ OUTDat00_09	WORD OUT Data00 Bit09
	10	*_ OUTDat00_10	WORD OUT Data00 Bit10
	11	*_ OUTDat00_11	WORD OUT Data00 Bit11
	12	*_ OUTDat00_12	WORD OUT Data00 Bit12
	13	*_ OUTDat00_13	WORD OUT Data00 Bit13
	14	*_ OUTDat00_14	WORD OUT Data00 Bit14
	15	*_ OUTDat00_15	WORD OUT Data00 Bit15
CIO n+1	0 to 15	*_ OUTDat01	WORD OUT Data01
	0	*_ OUTDat01_00	WORD OUT Data01 Bit00
	1	*_ OUTDat01_01	WORD OUT Data01 Bit01
	2	*_ OUTDat01_02	WORD OUT Data01 Bit02
	3	*_ OUTDat01_03	WORD OUT Data01 Bit03
	4	*_ OUTDat01_04	WORD OUT Data01 Bit04
	5	*_ OUTDat01_05	WORD OUT Data01 Bit05
	6	*_ OUTDat01_06	WORD OUT Data01 Bit06
	7	*_ OUTDat01_07	WORD OUT Data01 Bit07
	8	*_ OUTDat01_08	WORD OUT Data01 Bit08
	9	*_ OUTDat01_09	WORD OUT Data01 Bit09
	10	*_ OUTDat01_10	WORD OUT Data01 Bit10
	11	*_ OUTDat01_11	WORD OUT Data01 Bit11
	12	*_ OUTDat01_12	WORD OUT Data01 Bit12
	13	*_ OUTDat01_13	WORD OUT Data01 Bit13
	14	*_ OUTDat01_14	WORD OUT Data01 Bit14
	15	*_ OUTDat01_15	WORD OUT Data01 Bit15
:		:	:

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+7	0 to 15	*_ OUTDat07	WORD OUT Data07
	0	*_ OUTDat07_00	WORD OUT Data07 Bit00
	1	*_ OUTDat07_01	WORD OUT Data07 Bit01
	2	*_ OUTDat07_02	WORD OUT Data07 Bit02
	3	*_ OUTDat07_03	WORD OUT Data07 Bit03
	4	*_ OUTDat07_04	WORD OUT Data07 Bit04
	5	*_ OUTDat07_05	WORD OUT Data07 Bit05
	6	*_ OUTDat07_06	WORD OUT Data07 Bit06
	7	*_ OUTDat07_07	WORD OUT Data07 Bit07
	8	*_ OUTDat07_08	WORD OUT Data07 Bit08
	9	*_ OUTDat07_09	WORD OUT Data07 Bit09
	10	*_ OUTDat07_10	WORD OUT Data07 Bit10
	11	*_ OUTDat07_11	WORD OUT Data07 Bit11
	12	*_ OUTDat07_12	WORD OUT Data07 Bit12
	13	*_ OUTDat07_13	WORD OUT Data07 Bit13
	14	*_ OUTDat07_14	WORD OUT Data07 Bit14
	15	*_ OUTDat07_15	WORD OUT Data07 Bit15

● CIO n+8 to CIO n+15 (WORD IN Data)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+8 to CIO n+15 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+8	0 to 15	*_ InDat00	WORD IN Data00
	0	*_ InDat00_00	WORD IN Data00 Bit00
	1	*_ InDat00_01	WORD IN Data00 Bit01
	2	*_ InDat00_02	WORD IN Data00 Bit02
	3	*_ InDat00_03	WORD IN Data00 Bit03
	4	*_ InDat00_04	WORD IN Data00 Bit04
	5	*_ InDat00_05	WORD IN Data00 Bit05
	6	*_ InDat00_06	WORD IN Data00 Bit06
	7	*_ InDat00_07	WORD IN Data00 Bit07
	8	*_ InDat00_08	WORD IN Data00 Bit08
	9	*_ InDat00_09	WORD IN Data00 Bit09
	10	*_ InDat00_10	WORD IN Data00 Bit10
	11	*_ InDat00_11	WORD IN Data00 Bit11
	12	*_ InDat00_12	WORD IN Data00 Bit12
	13	*_ InDat00_13	WORD IN Data00 Bit13
	14	*_ InDat00_14	WORD IN Data00 Bit14
	15	*_ InDat00_15	WORD IN Data00 Bit15

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+9	0 to 15	*_ InDat01	WORD IN Data01
	0	*_ InDat01_00	WORD IN Data01 Bit00
	1	*_ InDat01_01	WORD IN Data01 Bit01
	2	*_ InDat01_02	WORD IN Data01 Bit02
	3	*_ InDat01_03	WORD IN Data01 Bit03
	4	*_ InDat01_04	WORD IN Data01 Bit04
	5	*_ InDat01_05	WORD IN Data01 Bit05
	6	*_ InDat01_06	WORD IN Data01 Bit06
	7	*_ InDat01_07	WORD IN Data01 Bit07
	8	*_ InDat01_08	WORD IN Data01 Bit08
	9	*_ InDat01_09	WORD IN Data01 Bit09
	10	*_ InDat01_10	WORD IN Data01 Bit10
	11	*_ InDat01_11	WORD IN Data01 Bit11
	12	*_ InDat01_12	WORD IN Data01 Bit12
	13	*_ InDat01_13	WORD IN Data01 Bit13
	14	*_ InDat01_14	WORD IN Data01 Bit14
	15	*_ InDat01_15	WORD IN Data01 Bit15
:		:	:
CIO n+15	0 to 15	*_ InDat07	WORD IN Data07
	0	*_ InDat07_00	WORD IN Data07 Bit00
	1	*_ InDat07_01	WORD IN Data07 Bit01
	2	*_ InDat07_02	WORD IN Data07 Bit02
	3	*_ InDat07_03	WORD IN Data07 Bit03
	4	*_ InDat07_04	WORD IN Data07 Bit04
	5	*_ InDat07_05	WORD IN Data07 Bit05
	6	*_ InDat07_06	WORD IN Data07 Bit06
	7	*_ InDat07_07	WORD IN Data07 Bit07
	8	*_ InDat07_08	WORD IN Data07 Bit08
	9	*_ InDat07_09	WORD IN Data07 Bit09
	10	*_ InDat07_10	WORD IN Data07 Bit10
	11	*_ InDat07_11	WORD IN Data07 Bit11
	12	*_ InDat07_12	WORD IN Data07 Bit12
	13	*_ InDat07_13	WORD IN Data07 Bit13
	14	*_ InDat07_14	WORD IN Data07 Bit14
	15	*_ InDat07_15	WORD IN Data07 Bit15

● CIO n+16 (Status)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+16 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+16	0 to 15	*_UnitSta	Status
	0	*_SlavCommErr	Communications Error Flag
	1	*_RegTblErr	Registration Table Verification Error Flag
	2	*_CommStopSta	Communications Error Communications Stop Flag
	3	*_SlavDupErr	Slave Unit Duplicated Address Error Flag
	4	*_RepeaterCommErr	Repeater Unit Communications Error Flag
	5	*_RepeaterDupAdrErr	Repeater Unit Node Slave Unit Duplicated Address Error Flag
	6	*_SlavAllCnctSta	All Registered Slave Units Participating Flag
	7	*_IOCycleStartSta	Remote I/O Communications Started Flag
	8	*_PLCRunSta	Ladder Operation Allowed Flag in Registration Table Enabled Mode
	9	---	Reserved
	10	*_RegTblSta	Registration Table Mode Flag
	11	---	Reserved
	12	*_SlavAllWarnSta	Representative Warning Status Flag
	13	*_SlavAllAlmSta	Representative Alarm Status Flag
	14	---	Reserved
	15	---	Reserved

● CIO n+17 (Setting)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+17 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+17	0 to 15	*_UnitCmd	Setting
	0	*_IOCycleStartCmd	Remote I/O Communications Start Switch
	1 to 15	---	Reserved

● CIO n+18 to CIO n+19 (WORD OUT Connect Flags/Communication Error Flags) and (WORD IN Connect Flags/Communication Error Flags)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+18 and CIO n+19 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+18	0 to 7	*_OutCnctNdSta00_07	WORD OUT Connect Flag(00 to 07)
	0	*_OutCnctNdSta00	WORD OUT Connect Flag00
	:	:	:
	7	*_OutCnctNdSta07	WORD OUT Connect Flag07
	8 to 15	*_OutErrNdSta00_07	WORD OUT Communication Error Flag(00 to 07)
	8	*_OutErrNdSta00	WORD OUT Communication Error Flag00
	:	:	:
	15	*_OutErrNdSta07	WORD OUT Communication Error Flag07

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+19	0 to 7	*_InCnctNdSta00_07	WORD IN Connect Flag(00 to 07)
	0	*_InCnctNdSta00	WORD IN Connect Flag00
	:	:	:
	7	*_InCnctNdSta07	WORD IN Connect Flag07
	8 to 15	*_InErrNdSta00_07	WORD IN Communication Error Flag(00 to 07)
	8	*_InErrNdSta00	WORD IN Communication Error Flag00
	:	:	:
	15	*_InErrNdSta07	WORD IN Communication Error Flag07

Communications Mode Number 1

● CIO n to CIO n+15 (WORD OUT Data)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n to CIO n+15 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n	0 to 15	*_ OUTDat00	WORD OUT Data00
	0	*_ OUTDat00_00	WORD OUT Data00 Bit00
	1	*_ OUTDat00_01	WORD OUT Data00 Bit01
	2	*_ OUTDat00_02	WORD OUT Data00 Bit02
	3	*_ OUTDat00_03	WORD OUT Data00 Bit03
	4	*_ OUTDat00_04	WORD OUT Data00 Bit04
	5	*_ OUTDat00_05	WORD OUT Data00 Bit05
	6	*_ OUTDat00_06	WORD OUT Data00 Bit06
	7	*_ OUTDat00_07	WORD OUT Data00 Bit07
	8	*_ OUTDat00_08	WORD OUT Data00 Bit08
	9	*_ OUTDat00_09	WORD OUT Data00 Bit09
	10	*_ OUTDat00_10	WORD OUT Data00 Bit10
	11	*_ OUTDat00_11	WORD OUT Data00 Bit11
	12	*_ OUTDat00_12	WORD OUT Data00 Bit12
	13	*_ OUTDat00_13	WORD OUT Data00 Bit13
	14	*_ OUTDat00_14	WORD OUT Data00 Bit14
	15	*_ OUTDat00_15	WORD OUT Data00 Bit15
CIO n+1	0 to 15	*_ OUTDat01	WORD OUT Data01
	0	*_ OUTDat01_00	WORD OUT Data01 Bit00
	1	*_ OUTDat01_01	WORD OUT Data01 Bit01
	2	*_ OUTDat01_02	WORD OUT Data01 Bit02
	3	*_ OUTDat01_03	WORD OUT Data01 Bit03
	4	*_ OUTDat01_04	WORD OUT Data01 Bit04
	5	*_ OUTDat01_05	WORD OUT Data01 Bit05
	6	*_ OUTDat01_06	WORD OUT Data01 Bit06
	7	*_ OUTDat01_07	WORD OUT Data01 Bit07
	8	*_ OUTDat01_08	WORD OUT Data01 Bit08
	9	*_ OUTDat01_09	WORD OUT Data01 Bit09
	10	*_ OUTDat01_10	WORD OUT Data01 Bit10
	11	*_ OUTDat01_11	WORD OUT Data01 Bit11
	12	*_ OUTDat01_12	WORD OUT Data01 Bit12
	13	*_ OUTDat01_13	WORD OUT Data01 Bit13
	14	*_ OUTDat01_14	WORD OUT Data01 Bit14
	15	*_ OUTDat01_15	WORD OUT Data01 Bit15
:		:	:

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+15	0 to 15	*_ OUTDat15	WORD OUT Data15
	0	*_ OUTDat15_00	WORD OUT Data15 Bit00
	1	*_ OUTDat15_01	WORD OUT Data15 Bit01
	2	*_ OUTDat15_02	WORD OUT Data15 Bit02
	3	*_ OUTDat15_03	WORD OUT Data15 Bit03
	4	*_ OUTDat15_04	WORD OUT Data15 Bit04
	5	*_ OUTDat15_05	WORD OUT Data15 Bit05
	6	*_ OUTDat15_06	WORD OUT Data15 Bit06
	7	*_ OUTDat15_07	WORD OUT Data15 Bit07
	8	*_ OUTDat15_08	WORD OUT Data15 Bit08
	9	*_ OUTDat15_09	WORD OUT Data15 Bit09
	10	*_ OUTDat15_10	WORD OUT Data15 Bit10
	11	*_ OUTDat15_11	WORD OUT Data15 Bit11
	12	*_ OUTDat15_12	WORD OUT Data15 Bit12
	13	*_ OUTDat15_13	WORD OUT Data15 Bit13
	14	*_ OUTDat15_14	WORD OUT Data15 Bit14
	15	*_ OUTDat15_15	WORD OUT Data15 Bit15

● CIO n+16 to CIO n+31 (WORD IN Data)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+16 to CIO n+31 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+16	0 to 15	*_ InDat00	WORD IN Data00
	0	*_ InDat00_00	WORD IN Data00 Bit00
	1	*_ InDat00_01	WORD IN Data00 Bit01
	2	*_ InDat00_02	WORD IN Data00 Bit02
	3	*_ InDat00_03	WORD IN Data00 Bit03
	4	*_ InDat00_04	WORD IN Data00 Bit04
	5	*_ InDat00_05	WORD IN Data00 Bit05
	6	*_ InDat00_06	WORD IN Data00 Bit06
	7	*_ InDat00_07	WORD IN Data00 Bit07
	8	*_ InDat00_08	WORD IN Data00 Bit08
	9	*_ InDat00_09	WORD IN Data00 Bit09
	10	*_ InDat00_10	WORD IN Data00 Bit10
	11	*_ InDat00_11	WORD IN Data00 Bit11
	12	*_ InDat00_12	WORD IN Data00 Bit12
	13	*_ InDat00_13	WORD IN Data00 Bit13
	14	*_ InDat00_14	WORD IN Data00 Bit14
	15	*_ InDat00_15	WORD IN Data00 Bit15

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	**Bit number**	**Variable**	**Name**
CIO n+17	0 to 15	*_ InDat01	WORD IN Data01
	0	*_ InDat01_00	WORD IN Data01 Bit00
	1	*_ InDat01_01	WORD IN Data01 Bit01
	2	*_ InDat01_02	WORD IN Data01 Bit02
	3	*_ InDat01_03	WORD IN Data01 Bit03
	4	*_ InDat01_04	WORD IN Data01 Bit04
	5	*_ InDat01_05	WORD IN Data01 Bit05
	6	*_ InDat01_06	WORD IN Data01 Bit06
	7	*_ InDat01_07	WORD IN Data01 Bit07
	8	*_ InDat01_08	WORD IN Data01 Bit08
	9	*_ InDat01_09	WORD IN Data01 Bit09
	10	*_ InDat01_10	WORD IN Data01 Bit10
	11	*_ InDat01_11	WORD IN Data01 Bit11
	12	*_ InDat01_12	WORD IN Data01 Bit12
	13	*_ InDat01_13	WORD IN Data01 Bit13
	14	*_ InDat01_14	WORD IN Data01 Bit14
	15	*_ InDat01_15	WORD IN Data01 Bit15
:		:	:
CIO n+31	0 to 15	*_ InDat15	WORD IN Data15
	0	*_ InDat15_00	WORD IN Data15 Bit00
	1	*_ InDat15_01	WORD IN Data15 Bit01
	2	*_ InDat15_02	WORD IN Data15 Bit02
	3	*_ InDat15_03	WORD IN Data15 Bit03
	4	*_ InDat15_04	WORD IN Data15 Bit04
	5	*_ InDat15_05	WORD IN Data15 Bit05
	6	*_ InDat15_06	WORD IN Data15 Bit06
	7	*_ InDat15_07	WORD IN Data15 Bit07
	8	*_ InDat15_08	WORD IN Data15 Bit08
	9	*_ InDat15_09	WORD IN Data15 Bit09
	10	*_ InDat15_10	WORD IN Data15 Bit10
	11	*_ InDat15_11	WORD IN Data15 Bit11
	12	*_ InDat15_12	WORD IN Data15 Bit12
	13	*_ InDat15_13	WORD IN Data15 Bit13
	14	*_ InDat15_14	WORD IN Data15 Bit14
	15	*_ InDat15_15	WORD IN Data15 Bit15

CIO n+32 (Status)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+32 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+32	0 to 15	*_UnitSta	Status
	0	*_SlavCommErr	Communications Error Flag
	1	*_RegTblErr	Registration Table Verification Error Flag
	2	*_CommStopSta	Communications Error Communications Stop Flag
	3	*_SlavDupErr	Slave Unit Duplicated Address Error Flag
	4	*_RepeaterCommErr	Repeater Unit Communications Error Flag
	5	*_RepeaterDupAdrErr	Repeater Unit Node Slave Unit Duplicated Address Error Flag
	6	*_SlavAllCnctSta	All Registered Slave Units Participating Flag
	7	*_IOCycleStartSta	Remote I/O Communications Started Flag
	8	*_PLCRunSta	Ladder Operation Allowed Flag in Registration Table Enabled Mode
	9	---	Reserved
	10	*_RegTblSta	Registration Table Mode Flag
	11	---	Reserved
	12	*_SlavAllWarnSta	Representative Warning Status Flag
	13	*_SlavAllAlmSta	Representative Alarm Status Flag
	14	---	Reserved
	15	---	Reserved

CIO n+33 (Setting)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+33 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+33	0 to 15	*_UnitCmd	Setting
	0	*_IOCycleStartCmd	Remote I/O Communications Start Switch
	1 to 15	---	Reserved

CIO n+34 to CIO n+37 (WORD OUT Connect Flags/Communication Error Flags) and (WORD IN Connect Flags/Communication Error Flags)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+34 to CIO n+37 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+34	0 to 7	*_OutCnctNdSta00_07	WORD OUT Connect Flag(00 to 07)
	0	*_OutCnctNdSta00	WORD OUT Connect Flag00
	:	:	:
	7	*_OutCnctNdSta07	WORD OUT Connect Flag07
	8 to 15	*_OutErrNdSta00_07	WORD OUT Communication Error Flag(00 to 07)
	8	*_OutErrNdSta00	WORD OUT Communication Error Flag00
	:	:	:
	15	*_OutErrNdSta07	WORD OUT Communication Error Flag07

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+35	0 to 7	*_InCnctNdSta00_07	WORD IN Connect Flag(00 to 07)
	0	*_InCnctNdSta00	WORD IN Connect Flag00
	:	:	:
	7	*_InCnctNdSta07	WORD IN Connect Flag07
	8 to 15	*_InErrNdSta00_07	WORD IN Communication Error Flag(00 to 07)
	8	*_InErrNdSta00	WORD IN Communication Error Flag00
	:	:	:
	15	*_InErrNdSta07	WORD IN Communication Error Flag07
CIO n+36	0 to 7	*_OutCnctNdSta08_15	WORD OUT Connect Flag(08 to 15)
	0	*_OutCnctNdSta08	WORD OUT Connect Flag08
	:	:	:
	7	*_OutCnctNdSta15	WORD OUT Connect Flag15
	8 to 15	*_OutErrNdSta08_15	WORD OUT Communication Error Flag(08 to 15)
	8	*_OutErrNdSta08	WORD OUT Communication Error Flag08
	:	:	:
	15	*_OutErrNdSta15	WORD OUT Communication Error Flag15
CIO n+37	0 to 7	*_InCnctNdSta08_15	WORD IN Connect Flag(08 to 15)
	0	*_InCnctNdSta08	WORD IN Connect Flag08
	:	:	:
	7	*_InCnctNdSta15	WORD IN Connect Flag15
	8 to 15	*_InErrNdSta08_15	WORD IN Communication Error Flag(08 to 15)
	8	*_InErrNdSta08	WORD IN Communication Error Flag08
	:	:	:
	15	*_InErrNdSta15	WORD IN Communication Error Flag15

Communications Mode Number 2

● CIO n to CIO n+31 (WORD OUT Data)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n to CIO n+31 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n	0 to 15	*_ OUTDat00	WORD OUT Data00
	0	*_ OUTDat00_00	WORD OUT Data00 Bit00
	1	*_ OUTDat00_01	WORD OUT Data00 Bit01
	2	*_ OUTDat00_02	WORD OUT Data00 Bit02
	3	*_ OUTDat00_03	WORD OUT Data00 Bit03
	4	*_ OUTDat00_04	WORD OUT Data00 Bit04
	5	*_ OUTDat00_05	WORD OUT Data00 Bit05
	6	*_ OUTDat00_06	WORD OUT Data00 Bit06
	7	*_ OUTDat00_07	WORD OUT Data00 Bit07
	8	*_ OUTDat00_08	WORD OUT Data00 Bit08
	9	*_ OUTDat00_09	WORD OUT Data00 Bit09
	10	*_ OUTDat00_10	WORD OUT Data00 Bit10
	11	*_ OUTDat00_11	WORD OUT Data00 Bit11
	12	*_ OUTDat00_12	WORD OUT Data00 Bit12
	13	*_ OUTDat00_13	WORD OUT Data00 Bit13
	14	*_ OUTDat00_14	WORD OUT Data00 Bit14
	15	*_ OUTDat00_15	WORD OUT Data00 Bit15

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+1	0 to 15	*_ OUTDat01	WORD OUT Data01
	0	*_ OUTDat01_00	WORD OUT Data01 Bit00
	1	*_ OUTDat01_01	WORD OUT Data01 Bit01
	2	*_ OUTDat01_02	WORD OUT Data01 Bit02
	3	*_ OUTDat01_03	WORD OUT Data01 Bit03
	4	*_ OUTDat01_04	WORD OUT Data01 Bit04
	5	*_ OUTDat01_05	WORD OUT Data01 Bit05
	6	*_ OUTDat01_06	WORD OUT Data01 Bit06
	7	*_ OUTDat01_07	WORD OUT Data01 Bit07
	8	*_ OUTDat01_08	WORD OUT Data01 Bit08
	9	*_ OUTDat01_09	WORD OUT Data01 Bit09
	10	*_ OUTDat01_10	WORD OUT Data01 Bit10
	11	*_ OUTDat01_11	WORD OUT Data01 Bit11
	12	*_ OUTDat01_12	WORD OUT Data01 Bit12
	13	*_ OUTDat01_13	WORD OUT Data01 Bit13
	14	*_ OUTDat01_14	WORD OUT Data01 Bit14
	15	*_ OUTDat01_15	WORD OUT Data01 Bit15
:		:	:
CIO n+31	0 to 15	*_ OUTDat31	WORD OUT Data31
	0	*_ OUTDat31_00	WORD OUT Data31 Bit00
	1	*_ OUTDat31_01	WORD OUT Data31 Bit01
	2	*_ OUTDat31_02	WORD OUT Data31 Bit02
	3	*_ OUTDat31_03	WORD OUT Data31 Bit03
	4	*_ OUTDat31_04	WORD OUT Data31 Bit04
	5	*_ OUTDat31_05	WORD OUT Data31 Bit05
	6	*_ OUTDat31_06	WORD OUT Data31 Bit06
	7	*_ OUTDat31_07	WORD OUT Data31 Bit07
	8	*_ OUTDat31_08	WORD OUT Data31 Bit08
	9	*_ OUTDat31_09	WORD OUT Data31 Bit09
	10	*_ OUTDat31_10	WORD OUT Data31 Bit10
	11	*_ OUTDat31_11	WORD OUT Data31 Bit11
	12	*_ OUTDat31_12	WORD OUT Data31 Bit12
	13	*_ OUTDat31_13	WORD OUT Data31 Bit13
	14	*_ OUTDat31_14	WORD OUT Data31 Bit14
	15	*_ OUTDat31_15	WORD OUT Data31 Bit15

● CIO n+32 to CIO n+63 (WORD IN Data)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+32 to CIO n+63 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+32	0 to 15	*_ InDat00	WORD IN Data00
	0	*_ InDat00_00	WORD IN Data00 Bit00
	1	*_ InDat00_01	WORD IN Data00 Bit01
	2	*_ InDat00_02	WORD IN Data00 Bit02
	3	*_ InDat00_03	WORD IN Data00 Bit03
	4	*_ InDat00_04	WORD IN Data00 Bit04
	5	*_ InDat00_05	WORD IN Data00 Bit05
	6	*_ InDat00_06	WORD IN Data00 Bit06
	7	*_ InDat00_07	WORD IN Data00 Bit07
	8	*_ InDat00_08	WORD IN Data00 Bit08
	9	*_ InDat00_09	WORD IN Data00 Bit09
	10	*_ InDat00_10	WORD IN Data00 Bit10
	11	*_ InDat00_11	WORD IN Data00 Bit11
	12	*_ InDat00_12	WORD IN Data00 Bit12
	13	*_ InDat00_13	WORD IN Data00 Bit13
	14	*_ InDat00_14	WORD IN Data00 Bit14
	15	*_ InDat00_15	WORD IN Data00 Bit15
CIO n+33	0 to 15	*_ InDat01	WORD IN Data01
	0	*_ InDat01_00	WORD IN Data01 Bit00
	1	*_ InDat01_01	WORD IN Data01 Bit01
	2	*_ InDat01_02	WORD IN Data01 Bit02
	3	*_ InDat01_03	WORD IN Data01 Bit03
	4	*_ InDat01_04	WORD IN Data01 Bit04
	5	*_ InDat01_05	WORD IN Data01 Bit05
	6	*_ InDat01_06	WORD IN Data01 Bit06
	7	*_ InDat01_07	WORD IN Data01 Bit07
	8	*_ InDat01_08	WORD IN Data01 Bit08
	9	*_ InDat01_09	WORD IN Data01 Bit09
	10	*_ InDat01_10	WORD IN Data01 Bit10
	11	*_ InDat01_11	WORD IN Data01 Bit11
	12	*_ InDat01_12	WORD IN Data01 Bit12
	13	*_ InDat01_13	WORD IN Data01 Bit13
	14	*_ InDat01_14	WORD IN Data01 Bit14
	15	*_ InDat01_15	WORD IN Data01 Bit15
:		:	:
CIO n+63	0 to 15	*_ InDat31	WORD IN Data31
	0	*_ InDat31_00	WORD IN Data31 Bit00
	1	*_ InDat31_01	WORD IN Data31 Bit01
	2	*_ InDat31_02	WORD IN Data31 Bit02
	3	*_ InDat31_03	WORD IN Data31 Bit03
	4	*_ InDat31_04	WORD IN Data31 Bit04
	5	*_ InDat31_05	WORD IN Data31 Bit05
	6	*_ InDat31_06	WORD IN Data31 Bit06
	7	*_ InDat31_07	WORD IN Data31 Bit07
	8	*_ InDat31_08	WORD IN Data31 Bit08
	9	*_ InDat31_09	WORD IN Data31 Bit09
	10	*_ InDat31_10	WORD IN Data31 Bit10
	11	*_ InDat31_11	WORD IN Data31 Bit11
	12	*_ InDat31_12	WORD IN Data31 Bit12
	13	*_ InDat31_13	WORD IN Data31 Bit13
	14	*_ InDat31_14	WORD IN Data31 Bit14
	15	*_ InDat31_15	WORD IN Data31 Bit15

CIO n+64 (Status)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+64 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+64	0 to 15	*_UnitSta	Status
	0	*_SlavCommErr	Communications Error Flag
	1	*_RegTblErr	Registration Table Verification Error Flag
	2	*_CommStopSta	Communications Error Communications Stop Flag
	3	*_SlavDupErr	Slave Unit Duplicated Address Error Flag
	4	*_RepeaterCommErr	Repeater Unit Communications Error Flag
	5	*_RepeaterDupAdrErr	Repeater Unit Node Slave Unit Duplicated Address Error Flag
	6	*_SlavAllCnctSta	All Registered Slave Units Participating Flag
	7	*_IOCycleStartSta	Remote I/O Communications Started Flag
	8	*_PLCRunSta	Ladder Operation Allowed Flag in Registration Table Enabled Mode
	9	---	Reserved
	10	*_RegTblSta	Registration Table Mode Flag
	11	---	Reserved
	12	*_SlavAllWarnSta	Representative Warning Status Flag
	13	*_SlavAllAlmSta	Representative Alarm Status Flag
	14	---	Reserved
	15	---	Reserved

CIO n+65 (Setting)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+65 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+65	0 to 15	*_UnitCmd	Setting
	0	*_IOCycleStartCmd	Remote I/O Communications Start Switch
	1 to 15	---	Reserved

CIO n+66 to CIO n+73 (WORD OUT Connect Flags/Communication Error Flags) and (WORD IN Connect Flags/Communication Error Flags)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+66 to CIO n+73 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+66	0 to 7	*_OutCnctNdSta00_07	WORD OUT Connect Flag(00 to 07)
	0	*_OutCnctNdSta00	WORD OUT Connect Flag00
	:	:	:
	7	*_OutCnctNdSta07	WORD OUT Connect Flag07
	8 to 15	*_OutErrNdSta00_07	WORD OUT Communication Error Flag(00 to 07)
	8	*_OutErrNdSta00	WORD OUT Communication Error Flag00
	:	:	:
	15	*_OutErrNdSta07	WORD OUT Communication Error Flag07

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+67	0 to 7	*_InCnctNdSta00_07	WORD IN Connect Flag(00 to 07)
	0	*_InCnctNdSta00	WORD IN Connect Flag00
	:	:	:
	7	*_InCnctNdSta07	WORD IN Connect Flag07
	8 to 15	*_InErrNdSta00_07	WORD IN Communication Error Flag(00 to 07)
	8	*_InErrNdSta00	WORD IN Communication Error Flag00
	:	:	:
	15	*_InErrNdSta07	WORD IN Communication Error Flag07
CIO n+68	0 to 7	*_OutCnctNdSta08_15	WORD OUT Connect Flag(08 to 15)
	0	*_OutCnctNdSta08	WORD OUT Connect Flag08
	:	:	:
	7	*_OutCnctNdSta15	WORD OUT Connect Flag15
	8 to 15	*_OutErrNdSta08_15	WORD OUT Communication Error Flag(08 to 15)
	8	*_OutErrNdSta08	WORD OUT Communication Error Flag08
	:	:	:
	15	*_OutErrNdSta15	WORD OUT Communication Error Flag15
CIO n+69	0 to 7	*_InCnctNdSta08_15	WORD IN Connect Flag(08 to 15)
	0	*_InCnctNdSta08	WORD IN Connect Flag08
	:	:	:
	7	*_InCnctNdSta15	WORD IN Connect Flag15
	8 to 15	*_InErrNdSta08_15	WORD IN Communication Error Flag(08 to 15)
	8	*_InErrNdSta08	WORD IN Communication Error Flag08
	:	:	:
	15	*_InErrNdSta15	WORD IN Communication Error Flag15
CIO n+70	0 to 7	*_OutCnctNdSta16_23	WORD OUT Connect Flag(16 to 23)
	0	*_OutCnctNdSta16	WORD OUT Connect Flag16
	:	:	:
	7	*_OutCnctNdSta23	WORD OUT Connect Flag23
	8 to 15	*_OutErrNdSta16_23	WORD OUT Communication Error Flag(16 to 23)
	8	*_OutErrNdSta16	WORD OUT Communication Error Flag16
	:	:	:
	15	*_OutErrNdSta23	WORD OUT Communication Error Flag23
CIO n+71	0 to 7	*_InCnctNdSta16_23	WORD IN Connect Flag(16 to 23)
	0	*_InCnctNdSta16	WORD IN Connect Flag16
	:	:	:
	7	*_InCnctNdSta23	WORD IN Connect Flag23
	8 to 15	*_InErrNdSta16_23	WORD IN Communication Error Flag(16 to 23)
	8	*_InErrNdSta16	WORD IN Communication Error Flag16
	:	:	:
	15	*_InErrNdSta23	WORD IN Communication Error Flag23
CIO n+72	0 to 7	*_OutCnctNdSta24_31	WORD OUT Connect Flag(24 to 31)
	0	*_OutCnctNdSta24	WORD OUT Connect Flag24
	:	:	:
	7	*_OutCnctNdSta31	WORD OUT Connect Flag31
	8 to 15	*_OutErrNdSta24_31	WORD OUT Communication Error Flag(24 to 31)
	8	*_OutErrNdSta24	WORD OUT Communication Error Flag24
	:	:	:
	15	*_OutErrNdSta31	WORD OUT Communication Error Flag31
CIO n+73	0 to 7	*_InCnctNdSta24_31	WORD IN Connect Flag(24 to 31)
	0	*_InCnctNdSta24	WORD IN Connect Flag24
	:	:	:
	7	*_InCnctNdSta31	WORD IN Connect Flag31
	8 to 15	*_InErrNdSta24_31	WORD IN Communication Error Flag(24 to 31)
	8	*_InErrNdSta24	WORD IN Communication Error Flag24
	:	:	:
	15	*_InErrNdSta31	WORD IN Communication Error Flag31

Communications Mode Number 3

● CIO n to CIO n+15 (WORD OUT Data)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n to CIO n+15 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n	0 to 15	*_ OUTDat00	WORD OUT Data00
	0	*_ OUTDat00_00	WORD OUT Data00 Bit00
	1	*_ OUTDat00_01	WORD OUT Data00 Bit01
	2	*_ OUTDat00_02	WORD OUT Data00 Bit02
	3	*_ OUTDat00_03	WORD OUT Data00 Bit03
	4	*_ OUTDat00_04	WORD OUT Data00 Bit04
	5	*_ OUTDat00_05	WORD OUT Data00 Bit05
	6	*_ OUTDat00_06	WORD OUT Data00 Bit06
	7	*_ OUTDat00_07	WORD OUT Data00 Bit07
	8	*_ OUTDat00_08	WORD OUT Data00 Bit08
	9	*_ OUTDat00_09	WORD OUT Data00 Bit09
	10	*_ OUTDat00_10	WORD OUT Data00 Bit10
	11	*_ OUTDat00_11	WORD OUT Data00 Bit11
	12	*_ OUTDat00_12	WORD OUT Data00 Bit12
	13	*_ OUTDat00_13	WORD OUT Data00 Bit13
	14	*_ OUTDat00_14	WORD OUT Data00 Bit14
	15	*_ OUTDat00_15	WORD OUT Data00 Bit15
CIO n+1	0 to 15	*_ OUTDat01	WORD OUT Data01
	0	*_ OUTDat01_00	WORD OUT Data01 Bit00
	1	*_ OUTDat01_01	WORD OUT Data01 Bit01
	2	*_ OUTDat01_02	WORD OUT Data01 Bit02
	3	*_ OUTDat01_03	WORD OUT Data01 Bit03
	4	*_ OUTDat01_04	WORD OUT Data01 Bit04
	5	*_ OUTDat01_05	WORD OUT Data01 Bit05
	6	*_ OUTDat01_06	WORD OUT Data01 Bit06
	7	*_ OUTDat01_07	WORD OUT Data01 Bit07
	8	*_ OUTDat01_08	WORD OUT Data01 Bit08
	9	*_ OUTDat01_09	WORD OUT Data01 Bit09
	10	*_ OUTDat01_10	WORD OUT Data01 Bit10
	11	*_ OUTDat01_11	WORD OUT Data01 Bit11
	12	*_ OUTDat01_12	WORD OUT Data01 Bit12
	13	*_ OUTDat01_13	WORD OUT Data01 Bit13
	14	*_ OUTDat01_14	WORD OUT Data01 Bit14
	15	*_ OUTDat01_15	WORD OUT Data01 Bit15
:		:	:

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+15	0 to 15	*_ OUTDat15	WORD OUT Data15
	0	*_ OUTDat15_00	WORD OUT Data15 Bit00
	1	*_ OUTDat15_01	WORD OUT Data15 Bit01
	2	*_ OUTDat15_02	WORD OUT Data15 Bit02
	3	*_ OUTDat15_03	WORD OUT Data15 Bit03
	4	*_ OUTDat15_04	WORD OUT Data15 Bit04
	5	*_ OUTDat15_05	WORD OUT Data15 Bit05
	6	*_ OUTDat15_06	WORD OUT Data15 Bit06
	7	*_ OUTDat15_07	WORD OUT Data15 Bit07
	8	*_ OUTDat15_08	WORD OUT Data15 Bit08
	9	*_ OUTDat15_09	WORD OUT Data15 Bit09
	10	*_ OUTDat15_10	WORD OUT Data15 Bit10
	11	*_ OUTDat15_11	WORD OUT Data15 Bit11
	12	*_ OUTDat15_12	WORD OUT Data15 Bit12
	13	*_ OUTDat15_13	WORD OUT Data15 Bit13
	14	*_ OUTDat15_14	WORD OUT Data15 Bit14
	15	*_ OUTDat15_15	WORD OUT Data15 Bit15

● CIO n+16 to CIO n+31 (WORD IN Data)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+16 to CIO n+31 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+16	0 to 15	*_ InDat00	WORD IN Data00
	0	*_ InDat00_00	WORD IN Data00 Bit00
	1	*_ InDat00_01	WORD IN Data00 Bit01
	2	*_ InDat00_02	WORD IN Data00 Bit02
	3	*_ InDat00_03	WORD IN Data00 Bit03
	4	*_ InDat00_04	WORD IN Data00 Bit04
	5	*_ InDat00_05	WORD IN Data00 Bit05
	6	*_ InDat00_06	WORD IN Data00 Bit06
	7	*_ InDat00_07	WORD IN Data00 Bit07
	8	*_ InDat00_08	WORD IN Data00 Bit08
	9	*_ InDat00_09	WORD IN Data00 Bit09
	10	*_ InDat00_10	WORD IN Data00 Bit10
	11	*_ InDat00_11	WORD IN Data00 Bit11
	12	*_ InDat00_12	WORD IN Data00 Bit12
	13	*_ InDat00_13	WORD IN Data00 Bit13
	14	*_ InDat00_14	WORD IN Data00 Bit14
	15	*_ InDat00_15	WORD IN Data00 Bit15
CIO n+17	0 to 15	*_ InDat01	WORD IN Data01
	0	*_ InDat01_00	WORD IN Data01 Bit00
	1	*_ InDat01_01	WORD IN Data01 Bit01
	2	*_ InDat01_02	WORD IN Data01 Bit02
	3	*_ InDat01_03	WORD IN Data01 Bit03
	4	*_ InDat01_04	WORD IN Data01 Bit04
	5	*_ InDat01_05	WORD IN Data01 Bit05
	6	*_ InDat01_06	WORD IN Data01 Bit06
	7	*_ InDat01_07	WORD IN Data01 Bit07
	8	*_ InDat01_08	WORD IN Data01 Bit08
	9	*_ InDat01_09	WORD IN Data01 Bit09
	10	*_ InDat01_10	WORD IN Data01 Bit10

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+17	11	*_ InDat01_11	WORD IN Data01 Bit11
	12	*_ InDat01_12	WORD IN Data01 Bit12
	13	*_ InDat01_13	WORD IN Data01 Bit13
	14	*_ InDat01_14	WORD IN Data01 Bit14
	15	*_ InDat01_15	WORD IN Data01 Bit15
:		:	:
CIO n+31	0 to 15	*_ InDat15	WORD IN Data15
	0	*_ InDat15_00	WORD IN Data15 Bit00
	1	*_ InDat15_01	WORD IN Data15 Bit01
	2	*_ InDat15_02	WORD IN Data15 Bit02
	3	*_ InDat15_03	WORD IN Data15 Bit03
	4	*_ InDat15_04	WORD IN Data15 Bit04
	5	*_ InDat15_05	WORD IN Data15 Bit05
	6	*_ InDat15_06	WORD IN Data15 Bit06
	7	*_ InDat15_07	WORD IN Data15 Bit07
	8	*_ InDat15_08	WORD IN Data15 Bit08
	9	*_ InDat15_09	WORD IN Data15 Bit09
	10	*_ InDat15_10	WORD IN Data15 Bit10
	11	*_ InDat15_11	WORD IN Data15 Bit11
	12	*_ InDat15_12	WORD IN Data15 Bit12
	13	*_ InDat15_13	WORD IN Data15 Bit13
	14	*_ InDat15_14	WORD IN Data15 Bit14
	15	*_ InDat15_15	WORD IN Data15 Bit15

● CIO n+32 to CIO n+39 (BitOUT Data)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+32 to CIO n+39 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+32	0	BitOutDat00_00	BitOUT Data00 Bit00
	1	BitOutDat00_01	BitOUT Data00 Bit01
	2	BitOutDat01_00	BitOUT Data01 Bit00
	3	BitOutDat01_01	BitOUT Data01 Bit01
	4	BitOutDat02_00	BitOUT Data02 Bit00
	5	BitOutDat02_01	BitOUT Data02 Bit01
	6	BitOutDat03_00	BitOUT Data03 Bit00
	7	BitOutDat03_01	BitOUT Data03 Bit01
	8	BitOutDat04_00	BitOUT Data04 Bit00
	9	BitOutDat04_01	BitOUT Data04 Bit01
	10	BitOutDat05_00	BitOUT Data05 Bit00
	11	BitOutDat05_01	BitOUT Data05 Bit01
	12	BitOutDat06_00	BitOUT Data06 Bit00
	13	BitOutDat06_01	BitOUT Data06 Bit01
	14	BitOutDat07_00	BitOUT Data07 Bit00
	15	BitOutDat07_01	BitOUT Data07 Bit01
CIO n+33	0	BitOutDat08_00	BitOUT Data08 Bit00
	:		
	15	BitOutDat15_00	BitOUT Data15 Bit00
:		:	:
CIO n+39	0	BitOutDat56_00	BitOUT Data56 Bit00
	:		
	15	BitOutDat63_00	BitOUT Data63 Bit00

CIO n+40 to CIO n+47 (BitIN Data)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+40 to CIO n+47 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+40	0	BitInDat00_00	BitIN Data00 Bit00
	1	BitInDat00_01	BitIN Data00 Bit01
	2	BitInDat01_00	BitIN Data01 Bit00
	3	BitInDat01_01	BitIN Data01 Bit01
	4	BitInDat02_00	BitIN Data02 Bit00
	5	BitInDat02_01	BitIN Data02 Bit01
	6	BitInDat03_00	BitIN Data03 Bit00
	7	BitInDat03_01	BitIN Data03 Bit01
	8	BitInDat04_00	BitIN Data04 Bit00
	9	BitInDat04_01	BitIN Data04 Bit01
	10	BitInDat05_00	BitIN Data05 Bit00
	11	BitInDat05_01	BitIN Data05 Bit01
	12	BitInDat06_00	BitIN Data06 Bit00
	13	BitInDat06_01	BitIN Data06 Bit01
	14	BitInDat07_00	BitIN Data07 Bit00
	15	BitInDat07_01	BitIN Data07 Bit01
CIO n+41	0	BitInDat08_00	BitIN Data08 Bit00
	1	BitInDat08_01	BitIN Data08 Bit01
	:		
	14	BitInDat15_00	BitIN Data15 Bit00
	15	BitInDat15_01	BitIN Data15 Bit01
:		:	:
CIO n+47	0	BitInDat56_00	BitIN Data56 Bit00
	1	BitInDat56_01	BitIN Data56 Bit01
	:	:	:
	14	BitInDat63_00	BitIN Data63 Bit00
	15	BitInDat63_01	BitIN Data63 Bit01

CIO n+48 (Status)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+48 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+48	0 to 15	*_UnitSta	Status
	0	*_SlavCommErr	Communications Error Flag
	1	*_RegTblErr	Registration Table Verification Error Flag
	2	*_CommStopSta	Communications Error Communications Stop Flag
	3	*_SlavDupErr	Slave Unit Duplicated Address Error Flag
	4	*_RepeaterCommErr	Repeater Unit Communications Error Flag
	5	*_RepeaterDupAdrErr	Repeater Unit Node Slave Unit Duplicated Address Error Flag
	6	*_SlavAllCnctSta	All Registered Slave Units Participating Flag
	7	*_IOCycleStartSta	Remote I/O Communications Started Flag
	8	*_PLCRunSta	Ladder Operation Allowed Flag in Registration Table Enabled Mode
	9	---	Reserved
	10	*_RegTblSta	Registration Table Mode Flag
	11	---	Reserved
	12	*_SlavAllWarnSta	Representative Warning Status Flag
	13	*_SlavAllAlmSta	Representative Alarm Status Flag
	14	---	Reserved
	15	---	Reserved

CIO n+49 (Setting)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+49 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+49	0 to 15	*_UnitCmd	Setting
	0	*_IOCycleStartCmd	Remote I/O Communications Start Switch
	1 to 15	---	Reserved

CIO n+50 to CIO n+53 (WORD OUT Connect Flags/Communication Error Flags) and (WORD IN Connect Flags/Communication Error Flags)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+50 to CIO n+53 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+50	0 to 7	*_OutCnctNdSta00_07	WORD OUT Connect Flag(00 to 07)
	0	*_OutCnctNdSta00	WORD OUT Connect Flag00
	:	:	:
	7	*_OutCnctNdSta07	WORD OUT Connect Flag07
	8 to 15	*_OutErrNdSta00_07	WORD OUT Communication Error Flag(00 to 07)
	8	*_OutErrNdSta00	WORD OUT Communication Error Flag00
	:	:	:
	15	*_OutErrNdSta07	WORD OUT Communication Error Flag07
CIO n+51	0 to 7	*_InCnctNdSta00_07	WORD IN Connect Flag(00 to 07)
	0	*_InCnctNdSta00	WORD IN Connect Flag00
	:	:	:
	7	*_InCnctNdSta07	WORD IN Connect Flag07
	8 to 15	*_InErrNdSta00_07	WORD IN Communication Error Flag(00 to 07)
	8	*_InErrNdSta00	WORD IN Communication Error Flag00
	:	:	:
	15	*_InErrNdSta07	WORD IN Communication Error Flag07
CIO n+52	0 to 7	*_OutCnctNdSta08_15	WORD OUT Connect Flag(08 to 15)
	0	*_OutCnctNdSta08	WORD OUT Connect Flag08
	:	:	:
	7	*_OutCnctNdSta15	WORD OUT Connect Flag15
	8 to 15	*_OutErrNdSta08_15	WORD OUT Communication Error Flag(08 to 15)
	8	*_OutErrNdSta08	WORD OUT Communication Error Flag08
	:	:	:
	15	*_OutErrNdSta15	WORD OUT Communication Error Flag15
CIO n+53	0 to 7	*_InCnctNdSta08_15	WORD IN Connect Flag(08 to 15)
	0	*_InCnctNdSta08	WORD IN Connect Flag00
	:	:	:
	7	*_InCnctNdSta15	WORD IN Connect Flag15
	8 to 15	*_InErrNdSta08_15	WORD IN Communication Error Flag(08 to 15)
	8	*_InErrNdSta08	WORD IN Communication Error Flag08
	:	:	:
	15	*_InErrNdSta15	WORD IN Communication Error Flag15

● CIO n+54 to CIO n+69 (BIT OUT Connect Flags/Communication Error Flags) and (BIT IN Connect Flags/Communication Error Flags)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+54 to CIO n+69 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+54	0 to 7	*_BitOutCnctNdSta00_07	BIT OUT Connect Flag(00 to 07)
	0	*_BitOutCnctNdSta00	BIT OUT Connect Flag00
	:	:	:
	7	*_BitOutCnctNdSta07	BIT OUT Connect Flag07
	8 to 15	*_BitOutErrNdSta00_07	BIT OUT Communication Error Flag(00 to 07)
	8	*_BitOutErrNdSta00	BIT OUT Communication Error Flag00
	:	:	:
	15	*_BitOutErrNdSta07	BIT OUT Communication Error Flag07
CIO n+55	0 to 7	*_BitInCnctNdSta00_07	BIT IN Connect Flag(00 to 07)
	0	*_BitInCnctNdSta00	BIT IN Connect Flag00
	:	:	:
	7	*_BitInCnctNdSta07	BIT IN Connect Flag07
	8 to 15	*_BitInErrNdSta00_07	BIT IN Communication Error Flag(00 to 07)
	8	*_BitInErrNdSta00	BIT IN Communication Error Flag00
	:	:	:
	15	*_BitInErrNdSta07	BIT IN Communication Error Flag07
CIO n+56	0 to 7	*_BitOutCnctNdSta08_15	BIT OUT Connect Flag(08 to 15)
	0	*_BitOutCnctNdSta08	BIT OUT Connect Flag08
	:	:	:
	7	*_BitOutCnctNdSta15	BIT OUT Connect Flag15
	8 to 15	*_BitOutErrNdSta08_15	BIT OUT Communication Error Flag(08 to 15)
	8	*_BitOutErrNdSta08	BIT OUT Communication Error Flag08
	:	:	:
	15	*_BitOutErrNdSta15	BIT OUT Communication Error Flag15
CIO n+57	0 to 7	*_BitInCnctNdSta08_15	BIT IN Connect Flag(08 to 15)
	0	*_BitInCnctNdSta08	BIT IN Connect Flag08
	:	:	:
	7	*_BitInCnctNdSta15	BIT IN Connect Flag15
	8 to 15	*_BitInErrNdSta08_15	BIT IN Communication Error Flag(08 to 15)
	8	*_BitInErrNdSta08	BIT IN Communication Error Flag08
	:	:	:
	15	*_BitInErrNdSta15	BIT IN Communication Error Flag15
CIO n+58	0 to 7	*_BitOutCnctNdSta16_23	BIT OUT Connect Flag(16 to 23)
	0	*_BitOutCnctNdSta16	BIT OUT Connect Flag16
	:	:	:
	7	*_BitOutCnctNdSta23	BIT OUT Connect Flag23
	8 to 15	*_BitOutErrNdSta16_23	BIT OUT Communication Error Flag(16 to 23)
	8	*_BitOutErrNdSta16	BIT OUT Communication Error Flag16
	:	:	:
	15	*_BitOutErrNdSta23	BIT OUT Communication Error Flag23
CIO n+59	0 to 7	*_BitInCnctNdSta16_23	BIT IN Connect Flag(16 to 23)
	0	*_BitInCnctNdSta16	BIT IN Connect Flag16
	:	:	:
	7	*_BitInCnctNdSta23	BIT IN Connect Flag23
	8 to 15	*_BitInErrNdSta16_23	BIT IN Communication Error Flag(16 to 23)
	8	*_BitInErrNdSta16	BIT IN Communication Error Flag16
	:	:	:
	15	*_BitInErrNdSta23	BIT IN Communication Error Flag23

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+60	0 to 7	*_BitOutCnctNdSta24_31	BIT OUT Connect Flag(24 to 31)
	0	*_BitOutCnctNdSta24	BIT OUT Connect Flag24
	:	:	:
	7	*_BitOutCnctNdSta31	BIT OUT Connect Flag31
	8 to 15	*_BitOutErrNdSta24_31	BIT OUT Communication Error Flag(24 to 31)
	8	*_BitOutErrNdSta24	BIT OUT Communication Error Flag24
	:	:	:
	15	*_BitOutErrNdSta31	BIT OUT Communication Error Flag31
CIO n+61	0 to 7	*_BitInCnctNdSta24_31	BIT IN Connect Flag(24 to 31)
	0	*_BitInCnctNdSta24	BIT IN Connect Flag24
	:	:	:
	7	*_BitInCnctNdSta31	BIT IN Connect Flag31
	8 to 15	*_BitInErrNdSta24_31	BIT IN Communication Error Flag(24 to 31)
	8	*_BitInErrNdSta24	BIT IN Communication Error Flag24
	:	:	:
	15	*_BitInErrNdSta31	BIT IN Communication Error Flag31
CIO n+62	0 to 7	*_BitOutCnctNdSta32_39	BIT OUT Connect Flag(32 to 39)
	0	*_BitOutCnctNdSta32	BIT OUT Connect Flag32
	:	:	:
	7	*_BitOutCnctNdSta39	BIT OUT Connect Flag39
	8 to 15	*_BitOutErrNdSta32_39	BIT OUT Communication Error Flag(32 to 39)
	8	*_BitOutErrNdSta32	BIT OUT Communication Error Flag32
	:	:	:
	15	*_BitOutErrNdSta39	BIT OUT Communication Error Flag39
CIO n+63	0 to 7	*_BitInCnctNdSta32_39	BIT IN Connect Flag(32 to 39)
	0	*_BitInCnctNdSta32	BIT IN Connect Flag32
	:	:	:
	7	*_BitInCnctNdSta39	BIT IN Connect Flag39
	8 to 15	*_BitInErrNdSta32_39	BIT IN Communication Error Flag(32 to 39)
	8	*_BitInErrNdSta32	BIT IN Communication Error Flag32
	:	:	:
	15	*_BitInErrNdSta39	BIT IN Communication Error Flag39
CIO n+64	0 to 7	*_BitOutCnctNdSta40_47	BIT OUT Connect Flag(40 to 47)
	0	*_BitOutCnctNdSta40	BIT OUT Connect Flag40
	:	:	:
	7	*_BitOutCnctNdSta47	BIT OUT Connect Flag47
	8 to 15	*_BitOutErrNdSta40_47	BIT OUT Communication Error Flag(40 to 47)
	8	*_BitOutErrNdSta40	BIT OUT Communication Error Flag40
	:	:	:
	15	*_BitOutErrNdSta47	BIT OUT Communication Error Flag47
CIO n+65	0 to 7	*_BitInCnctNdSta40_47	BIT IN Connect Flag(40 to 47)
	0	*_BitInCnctNdSta40	BIT IN Connect Flag40
	:	:	:
	7	*_BitInCnctNdSta47	BIT IN Connect Flag47
	8 to 15	*_BitInErrNdSta40_47	BIT IN Communication Error Flag(40 to 47)
	8	*_BitInErrNdSta40	BIT IN Communication Error Flag40
	:	:	:
	15	*_BitInErrNdSta47	BIT IN Communication Error Flag47
CIO n+66	0 to 7	*_BitOutCnctNdSta48_55	BIT OUT Connect Flag(48 to 55)
	0	*_BitOutCnctNdSta48	BIT OUT Connect Flag48
	:	:	:
	7	*_BitOutCnctNdSta55	BIT OUT Connect Flag55
	8 to 15	*_BitOutErrNdSta48_55	BIT OUT Communication Error Flag(48 to 55)
	8	*_BitOutErrNdSta48	BIT OUT Communication Error Flag48
	:	:	:
	15	*_BitOutErrNdSta55	BIT OUT Communication Error Flag55

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+67	0 to 7	*_BitInCnctNdSta48_55	BIT IN Connect Flag(48 to 55)
	0	*_BitInCnctNdSta48	BIT IN Connect Flag48
	:	:	:
	7	*_BitInCnctNdSta55	BIT IN Connect Flag55
	8 to 15	*_BitInErrNdSta48_55	BIT IN Communication Error Flag(48 to 55)
	8	*_BitInErrNdSta48	BIT IN Communication Error Flag48
	:	:	:
	15	*_BitInErrNdSta55	BIT IN Communication Error Flag55
CIO n+68	0 to 7	*_BitOutCnctNdSta56_63	BIT OUT Connect Flag(56 to 63)
	0	*_BitOutCnctNdSta56	BIT OUT Connect Flag56
	:	:	:
	7	*_BitOutCnctNdSta63	BIT OUT Connect Flag63
	8 to 15	*_BitOutErrNdSta56_63	BIT OUT Communication Error Flag(56 to 63)
	8	*_BitOutErrNdSta56	BIT OUT Communication Error Flag56
	:	:	:
	15	*_BitOutErrNdSta63	BIT OUT Communication Error Flag63
CIO n+69	0 to 7	*_BitInCnctNdSta56_63	BIT IN Connect Flag(56 to 63)
	0	*_BitInCnctNdSta56	BIT IN Connect Flag56
	:	:	:
	7	*_BitInCnctNdSta63	BIT IN Connect Flag63
	8 to 15	*_BitInErrNdSta56_63	BIT IN Communication Error Flag(56 to 63)
	8	*_BitInErrNdSta56	BIT IN Communication Error Flag56
	:	:	:
	15	*_BitInErrNdSta63	BIT IN Communication Error Flag63

Communications Mode Number 8

● CIO n (Status)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n	0 to 15	*_UnitSta	Status
	0	*_SlavCommErr	Communications Error Flag
	1	*_RegTblErr	Registration Table Verification Error Flag
	2	*_CommStopSta	Communications Error Communications Stop Flag
	3	*_SlavDupErr	Slave Unit Duplicated Address Error Flag
	4	*_RepeaterCommErr	Repeater Unit Communications Error Flag
	5	*_RepeaterDupAdrErr	Repeater Unit Node Slave Unit Duplicated Address Error Flag
	6	*_SlavAllCnctSta	All Registered Slave Units Participating Flag
	7	*_IOCycleStartSta	Remote I/O Communications Started Flag
	8	*_PLCRunSta	Ladder Operation Allowed Flag in Registration Table Enabled Mode
	9	---	Reserved
	10	*_RegTblSta	Registration Table Mode Flag
	11	---	Reserved
	12	*_SlavAllWarnSta	Representative Warning Status Flag
	13	*_SlavAllAlmSta	Representative Alarm Status Flag
	14	---	Reserved
	15	---	Reserved

CIO n+1 (Setting)

The device variables for CJ-series Units that correspond to bits 00 to 15 in CIO n+1 are listed in the following table.

CJ-series I/O memory address		Device variable for CJ-series Unit in the NJ-series CPU Unit	
Word address	Bit number	Variable	Name
CIO n+1	0 to 15	*_UnitCmd	Setting
	0	*_IOCycleStartCmd	Remote I/O Communications Start Switch
	1 to 15	---	Reserved

A-2 Recommended CompoNet Cables

A-2-1 Recommended CompoNet Cables

Model	Specification	Supplier
TCN-F1	Flat Cable I	SWCC Showa Cable Systems Co., Ltd.
TCN-F2	Flat Cable II	
TCN-R1	Round Cable I	
FCN-R1	Round Cable I	Fuji Electric Wire Co., Ltd.
FCN-R2	Round Cable II	
KOMP-FI	Flat Cable I	Kuramo Electric Co., Ltd.
KOMP-FII	Flat Cable II	
KOMP-RI	Round Cable I	
KOMP-RII	Round Cable II	
UNICOMPO FCI-T	Flat Cable I	Nichigoh Communication Electric Wire Co., Ltd.
UNICOMPO FCII-T	Flat Cable II	
UNICOMPO RCI-T	Round Cable I	
UNICOMPO RCII-T	Round Cable II	
CNS-I	Round Cable I (Rigid)	Daidensha Co., Ltd.
CNS-II	Round Cable II (Rigid)	
CNM-I	Round Cable I (Flexible)	
CNM-II	Round Cable II (Flexible)	
KCNF (Daiko Denkosha Corp.)	Flat Cable I	Kanetsu Co., Ltd.
KCNF-J (Taiyo Cabletec Corporation)	Flat Cable II	
MRC-4 (Hanshin Electric Wire & Cable Co., Ltd.)	Round Cable II (Oil-resistant and Flexible)	
VCTF0.75-2C (Onamba Co., Ltd.)	Round Cable I	
VCTF0.75-4C (Onamba Co., Ltd.)	Round Cable II	
VCTF0.75-2C (Kawai Cable)	Round Cable I	
VCTF0.75-4C (Kawai Cable)	Round Cable II	

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