OMRON

Machine Automation Controller

CJ-series

DeviceNet Units

Operation Manual for NJ-series CPU Unit

CJ1W-DRM21

DeviceNet Units

W497-E1-03

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Introduction

Thank you for purchasing a CJ-series CJ1W-DRM21 DeviceNet Unit.
This manual contains information that is necessary to use the CJ-series CJ1W-DRM21 DeviceNet Unit for an NJ-series CPU 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.

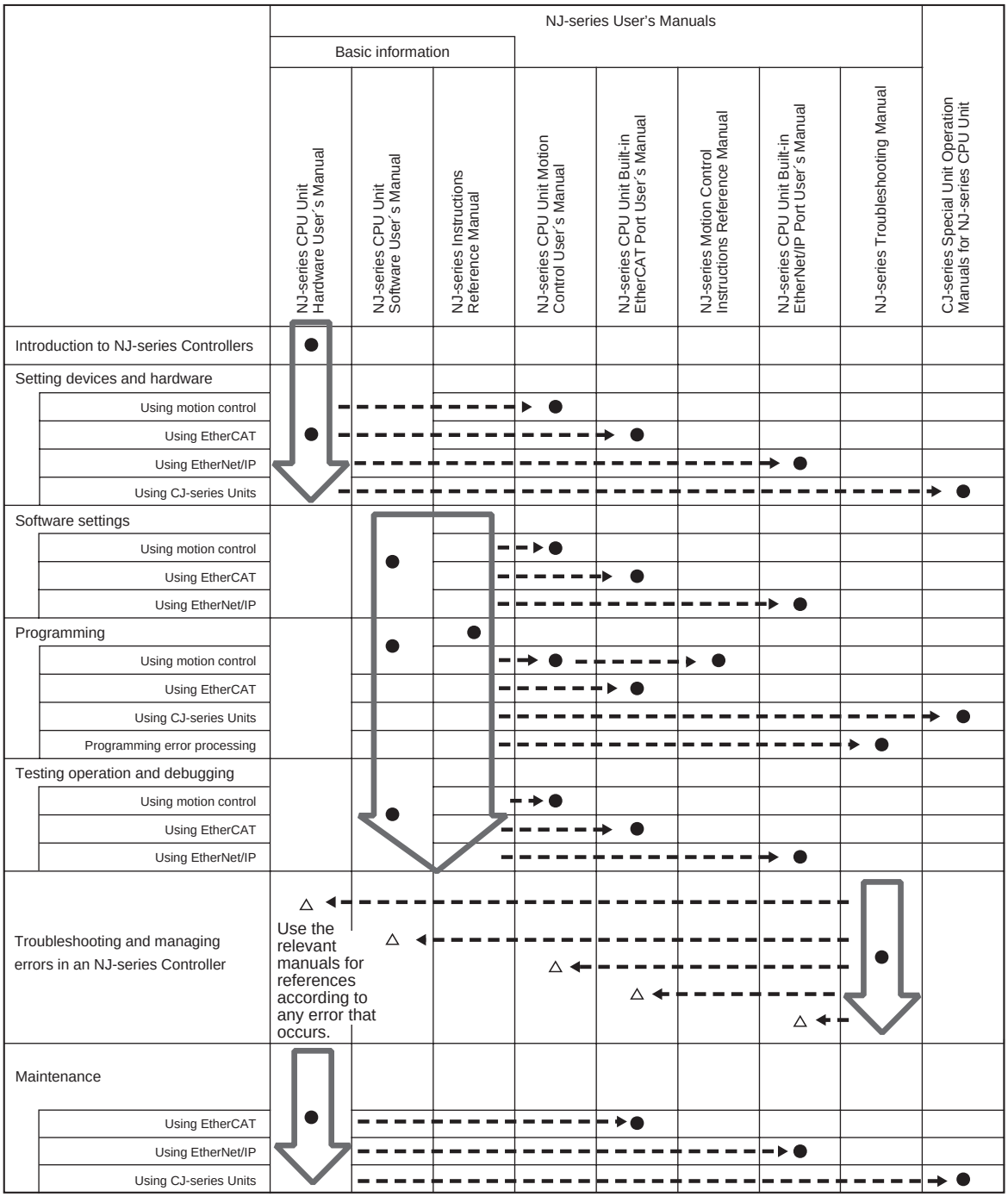
Applicable Products

This manual covers the following products.

CJ-series CJ1W-DRM21 DeviceNet Unit

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 DeviceNet Units Operation Manual for NJ-series CPU Unit (Cat. No. W497) (This Manual)

Section	Description
Section 1 Features and System Configuration	This section provides an introduction to the DeviceNet Units and their features. It also describes the operating procedure and the specifications of the DeviceNet Units.
Section 2 Nomenclature and Installation	This section describes the nomenclature, functionality and installation of the DeviceNet Unit.
Section 3 Data Exchange with the CPU Unit	This section describes the data exchange between the CPU Unit and DeviceNet Unit and the definitions of the device variables for CJ-series Unit.
Section 4 Remote I/O Master Communications	This section describes the remote I/O communications performed as a DeviceNet master by the DeviceNet Unit.
Section 5 Remote I/O Slave Communications	This section describes the remote I/O communications performed as a DeviceNet slave by the DeviceNet Unit.
Section 6 Message Communications	This section describes the message communications of the DeviceNet Unit.
Section 7 Other Functions	This section describes other functionality provided by the DeviceNet Unit.
Section 8 Communications Timing	This section describes the communications timing of the DeviceNet Unit and the performances of the remote I/O communications and message communications.
Section 9 Troubleshooting and Maintenance	This section describes the troubleshooting procedure, event logs and maintenance procedure for the DeviceNet Unit.
Appendices	---

DeviceNet Operation Manual (Cat. No. W267)

Section	Description
Section 1 Introduction	This section provides an overview of the DeviceNet network, including features, functionality, and types of connected devices such as Masters and Slaves.
Section 2 Network Configuraion and Wiring	This section describes the DeviceNet network configuration, the wiring method, and details on the connected devices such as connectors.
Section 3 Communications Power Supply Methods	This section describes the communications power supply methos.
Appendices	This section provides a list of related products, describes dimensions of the connected devices, and gives a list of corrent consumption of Masters and Slaves.

DRT2 Series DeviceNet Slaves Operation Manual (Cat. No. W404)

Section	Description
Section 1 Smart Slaves and Features	This section provide a functional overview and descrives the types of Slaves.
Section 2 Example System Startup	This section provides the operating procedures for DeviceNet by using examples.
Section 3 Common Slave Specifications	This section provides specifications and indicator displays that are common to all Slaves. It also describes the allocation of remote I/O memory for Smsty Salves.
Section 4 Function of All Slaves, General-purpose Slaves, and Environment-resistive Slaves	This section provides an overview funcionality provided by DRT2 Sries Slaves and the operating procedure.
Section 5 General-purpose Slaves	This section describes the specificaions and the components, terminal arrangement, basic procedures for wiring, and settings for General-purpose Slaves.
Section 6 Environment-resistive Slaves	This section describes the specifications, terminal arrangements, basic procedures for wiring and settings for Environment-resistive Slaves (conforming to IP67).
Section 7 Analog Slaves	This section describes the specifications, terminal arrangements, wiring methods and settings for Analog Slaves.
Section 8 Communications Timing	This section provides information on the response time and the transmission delay time when the remote I/O communications or message commucnaitions are performred.
Section 9 Troubleshooting and Maintenance	This section describes the troublushooting and mentainance procedures to take corrective actions for errors and conduct a routine inspection.
Appendix	This section provides an overview of explicit messages, a list of commands, and informaion on how to use setting files (EDS files) that are required in the multi-vendor environments. It also gives a list of the device profiles of Slaves and a list of Slaves and connected devices.

GT1 Series DeviceNet Multiple I/O Terminal Operation Manual (Cat. No. 348)

Section	Description
Section 1 Multiple I/O Terminal	This section describes the features, system configuration, types of Units and functons provided by the Multiple I/O Terminals.
Section 2 Hardeare Setup and Operationa Check	This section describes the operating procedures for the Multiple I/O Terminals by using examples.
Section 3 Sample Programs	This section provides sample programs to use the Special I/O Units of the Multiple I/O Terminals.
Section 4 Basic I/O Unit Specifications	This section describes the specifications of the each Basic I/O Unit, terminal arrangements, wiring methods.
Section 5 Special I/O Unit Specifications	This section describes the specifications, terminal arrangements, wiring methods of the each Special I/O Unit.
Section 6 Communications Timing	This section describes the response time and transmission delay time of the remote I/O commucnaitions functions.
Section 7 Troublushooting and Maintenance	This section describes the troublushooting and mentainance procedures to take corrective actions for errors and conduct a routine inspection.
Appendices	This section provides the device profiles of Slaves that are required in the multi-vendor environments and gives a list of products including Multiple I/O Terminals and connected devices.

CVM1/CV-series and C200HX/HG/HE/HS DeviceNet Master Units Operation Manual (Cat. No. W379)

Section	Description
Section 1 Features and System Configuration	This section describes the features of the DeviceNet and the operating procedure for the DeviceNet Master Unit.
Section 2 Master Unit Components and Installation	This section describes the component names, functionality and installation of the DeviceNet Master Units.
Section 3 Remote I/O commucanitons	This section describes the remote I/O master function provided by the DeviceNet Master Unit.
Section 4 Message Communications	This section describes the message commucniations performed by the DeviceNet Master Unit.
Section 5 Software Switches and Status Area	This section describes the details on the software switches used to control the DeviceNet Unit and the status area.
Section 6 Communications Timing	This section describes the communication timing of the DeviceNet Master Unit and the performances of the remote I/O communciations and message communications.
Section 7 Troubleshooting and Maintenance	This section describes the troublushooting and mentainance procedures to take corrective actions for errors and conduct a routine inspection.
Appendix	This section describes the details on the commands for the message communciations and the completion codes of the message communications.

CS/CJ Series DeviceNet Unit Operation Manual (Cat. No. W380)

Section	Description
Section 1 Features and System Configuration	This section provides an overview of the DeviceNet Units and their features. It also describes the operating procedure and the specifications of the DeviceNet Units.
Section 2 Nomeclature and Installation	This section describes the nomenclature, functionality and installation of the DeviceNet Unit.
Section 3 Allocated CIO and DM Words	This section describes the data exchange between the CPU Unit and DeviceNet Unit and the definitions of the CIO and DM words allocated to the DeviceNet Unit.
Section 4 Remote I/O Master Communications	This section describes the remote I/O communications performed as a DeviceNet master by the DeviceNet Unit.
Section 5 Remote I/O Slave Communications	This section describes the remote I/O communications performed as a DeviceNet slave by the DeviceNet Unit.
Section 6 Message Communications	This section describes the message communications of the DeviceNet Unit.
Section 7 Other Functions	This section describes other functionality provided by the DeviceNet Unit.
Section 8 Communciations Timing	This section describes the communications timing of the DeviceNet Unit and the performances of the remote I/O communications and message communications.
Section 9 Troublueshooting and Maintenance	This section describes the troubleshooting procedure, event logs and maintenance procedure for the DeviceNet Unit.
Appendix	---

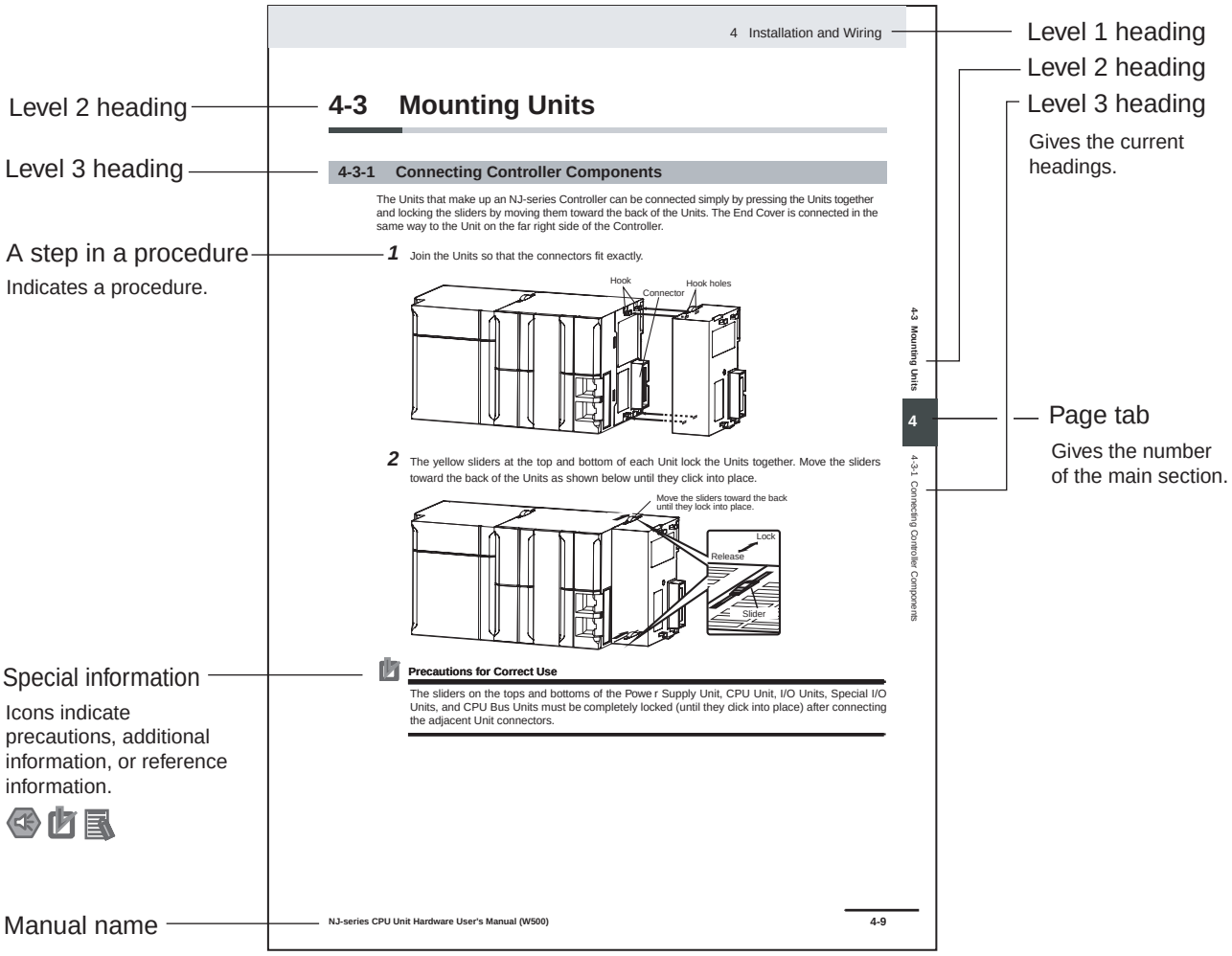
CX-Integrator Ver.2. □ Operation Manual (Cat. No. W464)

Section	Description
Section 1 Overview	This section provides an overview of the CX-Integrator and describes the CX-Integrator menus and connecitions.
Section 2 Basic Operations	This section describes the basic operations used for the CX-Integrator.
Section 3 Trouting 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 unithe to DeviceNet networks including registeing slaves in the master, I/O allocations, and devide 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	This section describes 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.

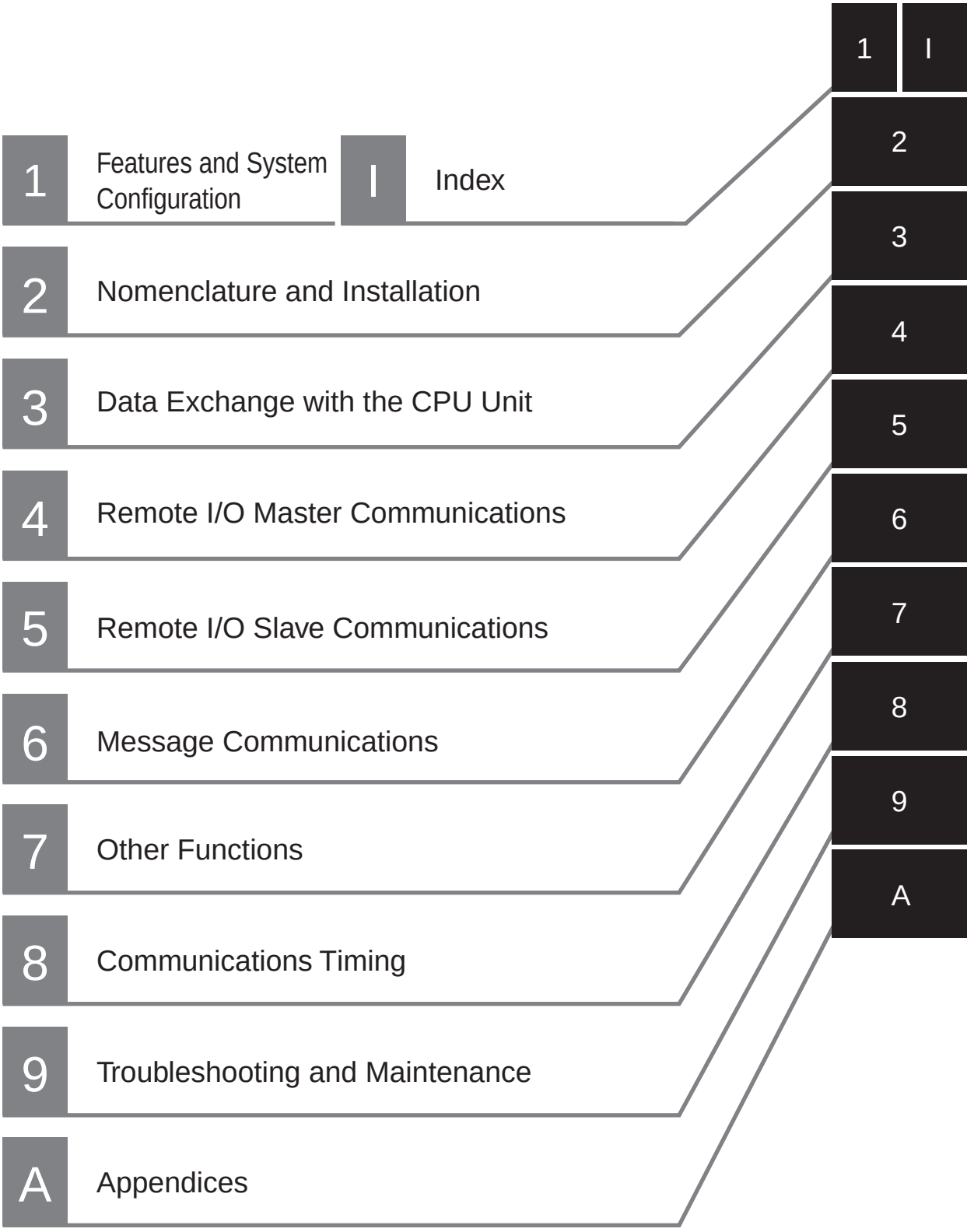
Note References are provided to more detailed or related information.

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.

Sections in this Manual



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Read and Understand this Manual

Please read and understand this manual before using the products. 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 DeviceNet 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 labels that are on the top of the Units when they are shipped before you turn ON the power supply. If the labels 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 electric 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. Write the user program to use the received data only if there is no error. 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 the DeviceNet Units

- Enable the scan list to before operating the system.
- When adding a new node to the network, make sure that the baud rate is the same as other nodes.
- Use specified communications cables.
- Do not extend connection distances 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:

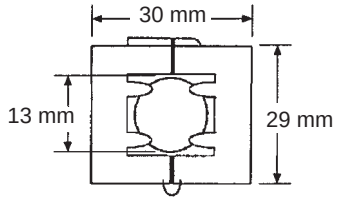
- The NJ-series Controller must be installed within a control panel.
- You must use reinforced insulation or double insulation for the DC power supplies connected to DC Power Supply Units and I/O Units.
- NJ-series Controllers that comply with EC Directives also conform to the Common Emission Standard (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.

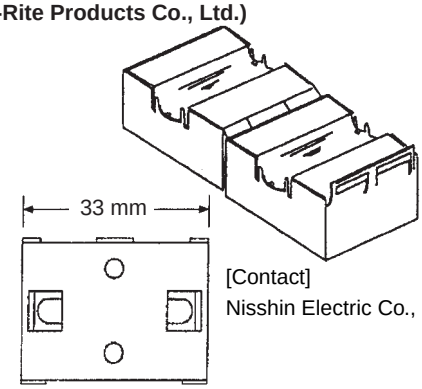
The following examples show means of reducing noise.

1 Noise from the communications cable can be reduced by installing a ferrite core on the communications cable within 10 cm of the DeviceNet Unit.

Ferrite Core (Data Line Filter): 0443-164151 (manufactured by Fair-Rite Products Co., Ltd.)

Impedance specifications
25 MHZ: 156 Ω
100 MHZ: 250 Ω





[Contact]
Nisshin Electric Co., Ltd.

2 Wire the control panel with as thick and short electric lines as possible and ground to 100 Ω min.

3 Keep DeviceNet communications cables as short as possible and ground to 100 Ω min.

Conformance to Shipbuilding Standards

The NJ-series Controllers comply with the following shipbuilding standards. Applicability to the shipbuilding standards is based on certain usage conditions. It may not be possible to use the product in some locations. Contact your OMRON representative before attempting to use a Controller on a ship.

Usage Conditions for NK and LR Shipbuilding Standards

- The NJ-series Controller must be installed within a control panel.
- Gaps in the door to the control panel must be completely filled or covered with gaskets or other material.
- The following noise filter must be connected to the power supply line.

Noise Filter

Manufacturer	Model
Cosel Co., Ltd.	TAH-06-683

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 Beckhoff Automation GmbH, Germany.
- The SD logo is a trademark of SD-3C, LLC.

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Unit Versions

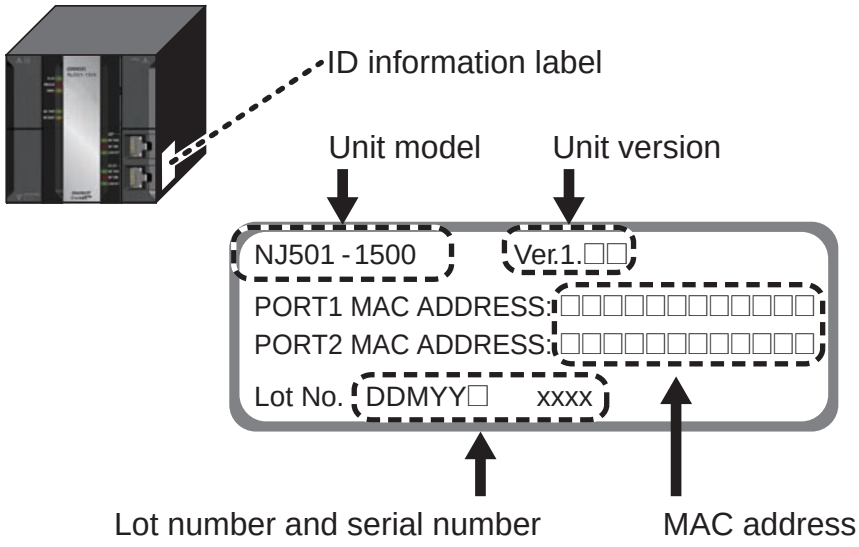
Unit Versions

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 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.

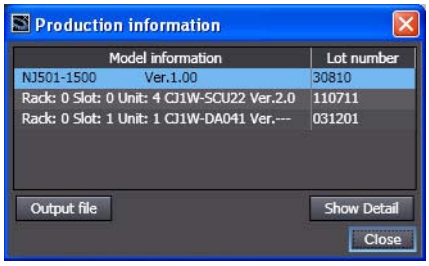
● CPU Unit and CJ-series Units

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.

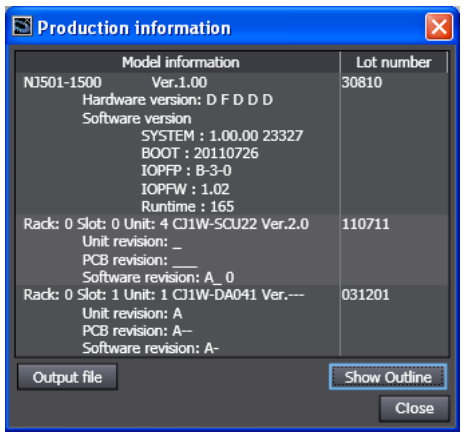
The Unit Editor is displayed for the Controller Configurations and Setup layer.

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

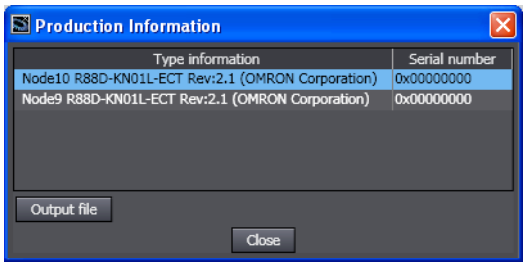
● EtherCAT Slaves

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.

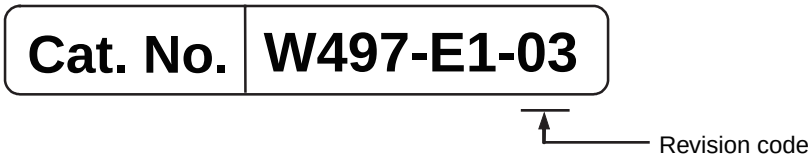
Related Manuals

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 DeviceNet Units Operation Manual for NJ-series CPU Unit (This document)	W497	CJ1W-DRM21	Learning about the functions and operating procedures when the CJ-series DeviceNet Unit is used in an NJ-series system configuration.	The functions and operating procedures when the CJ-series DeviceNet Unit is used in an NJ-series system configuration are described.
DeviceNet Operation Manual	W267	---	Learning about the communications specifications and wiring methods common among the DeviceNet communications networks.	The communications specifications and wiring methods common among the DeviceNet communications networks are described. Please read this manual and familiarize yourself with the functions and characteristics of the DeviceNet before use.
DRT2 Series DeviceNet Slaves Operation Manual	W404	DRT2-ID/OD/MD32SL(H)(-1) DRT2-MD16S DRT2 Series	Learning about the DRT2 Series DeviceNet Slaves.	The types of DRT2 DeviceNet Slaves, the functions, specifications, and operating procedures are described in details.
GT1 Series DeviceNet Multiple I/O Terminal Operation Manual	W348	DRT1-COM GT1 Series	Learning about the Multiple I/O Terminal, which is a type of DeviceNet Slave.	The types of Multiple I/O Terminal, which are kinds of DeviceNet Slaves, are provided. Also, their functions, specifications, and operating procedures are described in details.
CVM1/CV-series and C200HX/HG/HE/HS DeviceNet Master Units Operation Manual	W379	C200HW-DRM21-V1 CVM1-DRM21-V1	Learning about C200H and CVM1/CV DeviceNet Master Units.	The specifications of C200H and CVM1/CV DeviceNet Master Units, their functions and operating procedures are described.
CS/CJ Series DeviceNet Unit Operation Manual	W380	CS1W-DRM21(-V1) CJ1W-DRM21	Learning about the functions and operating procedure for CS/CJ Series DeviceNet Units.	The functions and operating procedures when the CS/CJ Series DeviceNet Unit is used in CS/CJ series system configuration are described.
CX-Integrator Ver.2. □ Operation Manual	W464	---	Learning about the CX-Integrator that is used to set up the DeviceNet networks and to make settings.	The operating procedures for 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	July 2011	Original production
02	March 2012	Corrected errors.
03	August 2012	Made changes accompanying release of unit version 1.03 of the CPU Unit.

1

Features and System Configuration

This section provides an overview of the DeviceNet network, and includes features, specifications, and system configurations.

1-1 DeviceNet Unit Features 1-2

1-2 Specifications 1-7

1-2-1 DeviceNet Unit 1-7

1-3 Overview of CX-Integrator 1-13

1-4 Basic Operating Procedures 1-14

1-4-1 Network Installation Procedure 1-14

1-4-2 DeviceNet Unit Startup Procedure 1-15

1-4-3 Message Communications Only (Neither Master nor Slave Function Used) 1-21

1-5 List of Usage Methods by Purpose 1-22

1-1 DeviceNet Unit Features

The following are features of the CJ-series DeviceNet Units (CJ1W-DRM21).

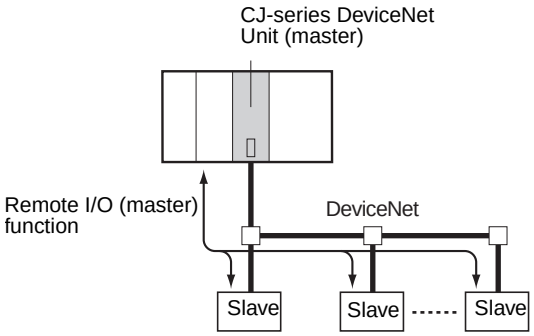
● Multi-vendor Network

You can connect DeviceNet devices made by other companies (masters or slaves) to DeviceNet because it conforms to open field network specifications. You can use a combination of valves, sensors, and other DeviceNet products to adapt the network to various field-level applications. You can use a combination of valves, sensors, and other DeviceNet products to adapt the network to various field-level applications.

● Simultaneous Remote I/O Communications and Messaging Services

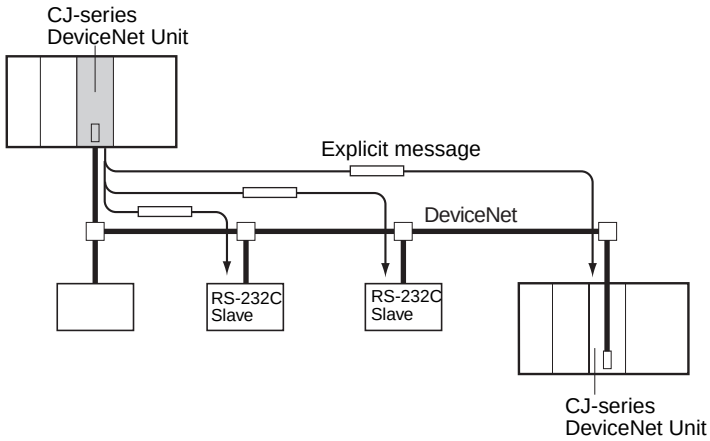
Remote I/O communications that constantly transfer I/O between a DeviceNet Unit and slaves as well as message communications where the DeviceNet Unit sends and receives data as needed can both be executed simultaneously. When a DeviceNet network is constructed, this feature ensures the network will be able to handle applications that require the free flow back and forth of bit data and message data.

Remote I/O Communications



Note Refer to *Section 4 Remote I/O Master Communications* for details on remote I/O communications.

Explicit Message Communications



Note Refer to *6-2 Sending Explicit Messages* and *6-3 Receiving Explicit Messages* for details on remote I/O communications.

● User-set Allocations without the CX-Integrator

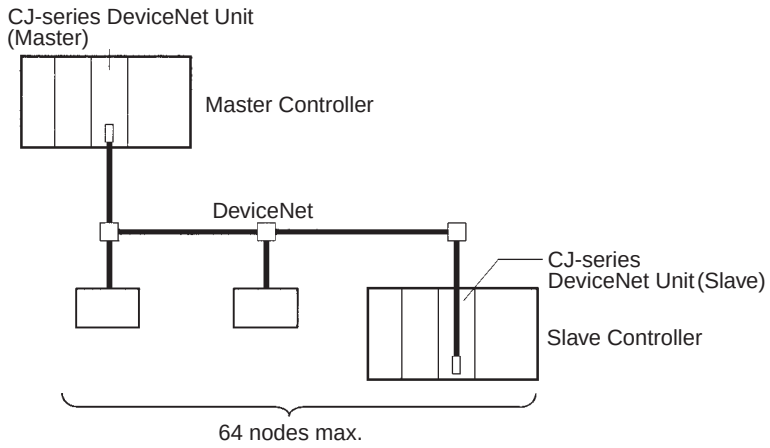
With CJ-series DeviceNet Units, you can allocate remote I/O communications in any area without the CX-Integrator simply by using device variables for CJ-series Unit.

If you use the CX-Integrator, you can change the node address order for more flexible I/O allocations. This feature enables the proper area allocation for any application and simplifies programming, which helps you make effective use of the CPU Unit Area on the memory used for CJ-series Unit.

Note Refer to *4-4 User-set Allocations* for details.

● Slave Functions

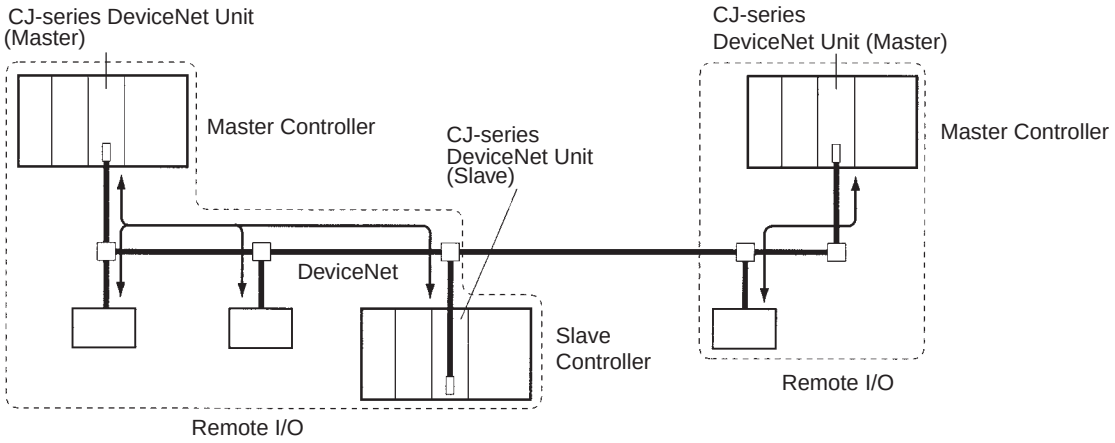
You can use CJ-series DeviceNet Units as both masters and slaves, and you can execute master and slave communications either separately or simultaneously. A Unit that is used as a slave supports fixed and user-set allocations.



Note Refer to *Remote I/O Slave Communications* for details.

● Multiple Controllers in a Single Network

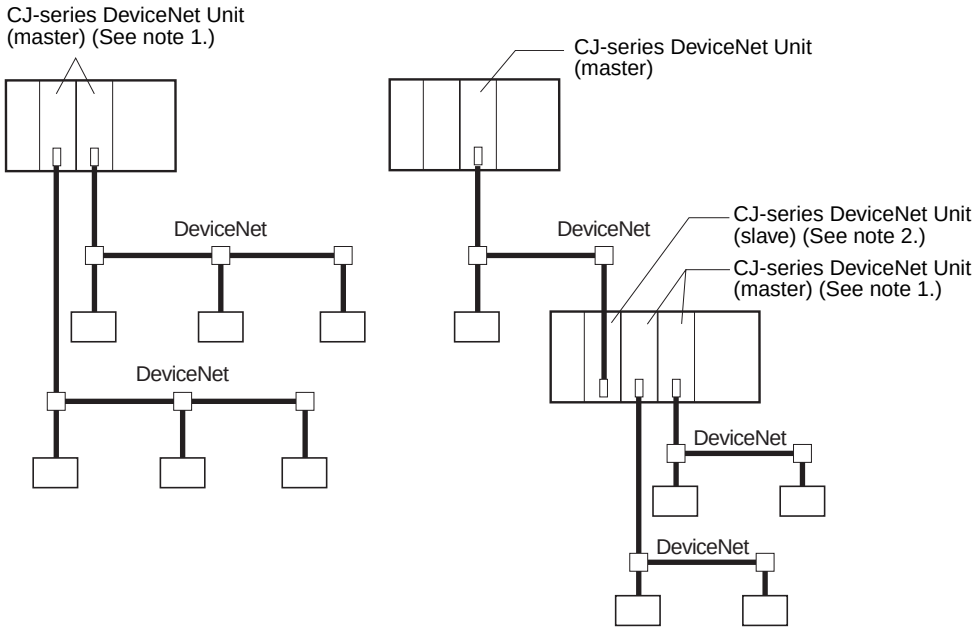
You can connect multiple DeviceNet Units in a single network for message communications between CPU Units as well as for remote I/O communications between Controllers and slaves in multiple groups. This feature allows a DeviceNet to be used as a common bus that can integrate all types of control with less wiring.



Note Refer to *4-1 Master Remote I/O Communications* for details.

Multiple DeviceNet Units on a Single Controller

You can mount up to 16 CJ-series DeviceNet Units to a single Contoller. This feature enables greater DeviceNet remote I/O control capacity and ensures that DeviceNet can easily handle line expansion as well as other applications.



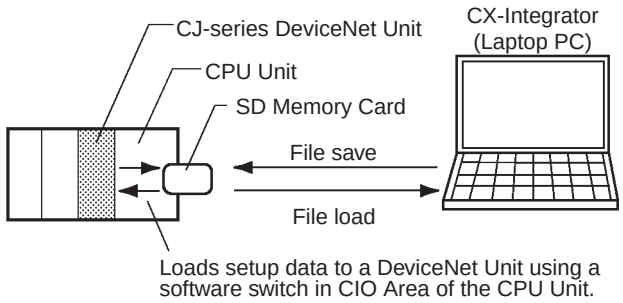
Note **1** You can mount multiple Units without the CX-Integrator.

2 You can mount DeviceNet Units as slaves with those as masters.

Note Refer to *4-1 Master Remote I/O Communications* for details.

DeviceNet Unit Setup Files (SD Memory Card Backup)

You can write setup data (e.g., scan lists) of a DeviceNet Unit as a file to the SD Memory Card mounted in a CPU Unit. This feature greatly simplifies DeviceNet Unit replacement. You can also save a DeviceNet Unit device parameter file (same as setup data file) that is prepared offline with the use of the CX-Integrator on a SD Memory Card, and download the setup data from the SD Memory Card to a DeviceNet Unit.



Note Refer to *7-1 SD Memory Card Backup Functions* for details.

Various Connection Methods

Normal multi-drop, T-branch multi-drop (with up to three branches), and daisy-chain line connections are available. You can combine these methods to construct a flexible system that suits the floor layout.

Maximum Network Length of 500 m

A network can connect up to 63 Slaves and can handle remote I/O communications of up to 2,000 byes (16,000 points without the CX-Integrator) per DeviceNet Unit. A maximum network length of 500 m is possible with a baud rate of 125 kbit/s using thick cable.

High-speed Communications

High-speed communications are possible at up to 500 kbit/s for a trunk line length of 100 m.

Compatibility with Slow Slaves

You can set the communications cycle time without the CX-Integrator. Therefore, you can use slaves with slow response times.

A Wide Variety of Slaves

You can use a wide variety of I/O devices, like Remote I/O Terminals, Environment-resistant Terminals, Remote Adapters, Sensor Terminals, Temperature Input Terminals, CQM1 I/O Link Units, Analog I/O Terminals, C200H I/O Link Units, RS-232C Units, Multiple I/O Terminals, Temperature Adjusters, Inverters, and Intelligent Flags as slaves.

1-2 Specifications

1-2-1 DeviceNet Unit

● General Specifications

General specifications of the CJ-series DeviceNet Unit conform to those of the NJ-series CPU Units.

● Functional and Performance Specifications

Item				Specification
DeviceNet Unit model				CJ1W-DRM21
Applicable Controller				NJ Series
Unit classification				CPU Bus Unit
Applicable unit numbers				0 to F
Mounting position				CPU Rack or Expansion Rack
No. of Masters that you can mount	Fixed allocations			3 Units max. (You must allocate unique words with the use of device variables for CJ-series Unit (for software switch).)
	User-set allocations		By CX-Integrator	16 Units max. (You must allocate unique words with the use of CX-Integrator.)
			By device variables for CJ-series Unit	16 Units max. (You must allocate unique words with the use of device variables for CJ-series Unit (user setup tables).)
No. of Slaves that you can mount	Fixed allocations			3 Units max. (You must allocate unique words with the use of device variables for CJ-series Unit (Software Switches).)
	User-set allocations		By CX-Integrator	16 Units max. (You must allocate unique words with the use of CX-Integrator.)
			By device variables for CJ-series Unit	16 Units max. (You must allocate unique words with the use of device variables for CJ-series Unit (user setup tables).)
No. of Units that you can connect per network				64 Units max.
Words allocated in the memory used for CJ-series Unit	DeviceNet remote I/O communications	When used as a Master	Fixed allocations	Fixed words in the CJ-series DeviceNet Area in the CIO Area (one of three settings).
			User-set allocations	Any I/O memory (Set with the use of the device variables for CJ-series Unit or CX-Integrator.)
		When used as a Slave	Fixed allocations	Fixed words in the CJ-series DeviceNet Area in the CIO Area (one of three settings).
			User-set allocations	Any I/O memory (Set with device variables for CJ-series Unit or CX-Integrator.)
	I/O port (without power OFF retention) (Access via the device variables for CJ-series Unit)			25 words/Unit
				CPU Unit to DeviceNet Unit: 9 words for the software switches, etc., 6 words for the status area, 8 words for the registered slaves and normal slaves tables
	I/O port (with power OFF retention) (Access via the device variables for CJ-series Unit)			100 words/Unit
				Scan List User Setup Table, Slave User-set Allocations Setup Table, Master I/O Allocations Reference Table, Slave I/O Allocations Reference Table, Detailed Slave Status Table, etc. CPU Unit to DeviceNet Unit: Table for communications cycle time settings
	Other I/O memory (Using the user-defined variable for R/W to the allocation area)			Set the allocation size table for all slaves in any area when remote I/O communications is set to user-set allocations according to the setting in the device variables for CJ-series Unit.
Supported connections (communications)				• Remote I/O communications (master and slave): Master/slave connection (poll, bit-strobe, COS, cyclic) • Explicit message communications: Explicit connection All conform to DeviceNet communications standards.

<table>
<tr><th colspan="3">Item</th><th colspan="7">Specifications</th></tr>
<tr><td rowspan="8">Remote I/O master communications</td><td rowspan="8">Slave allocation method (Using the user-defined variable for R/W to each allocation area)</td><td rowspan="3">Fixed allocations</td><td colspan="7">Select one of the following fixed allocations areas with the use of the device variables for CJ-series Unit (Fixed Allocations Area Switches 1, 2, and 3).</td></tr>
<tr><td rowspan="3">Allocated words (CIO Area)</td><td>I/O</td><td>Size</td><td>Fixed Allocation Area Setting 1</td><td>Fixed Allocation Area Setting 2</td><td>Fixed Allocation Area Setting 3</td></tr>
<tr><td>Output (OUT) area</td><td>64 words</td><td>3200 to 3263</td><td>3400 to 3463</td><td>3600 to 3663</td></tr>
<tr><td>Input (IN) area</td><td>64 words</td><td>3300 to 3363</td><td>3500 to 3563</td><td>3700 to 3763</td></tr>
<tr><td colspan="6">Select one of the above areas with the use of the software switches. All are fixed at 1 word per node address. The default setting is Fixed Allocation Area Setting 1.</td></tr>
<tr><td rowspan="5">User-set allocations</td><td rowspan="3">By CX-Integrator</td><td colspan="6">Set the areas for the OUT 1/2 and IN 1/2 blocks, the first words, and the allocation sizes for all slaves with the use of the CX-integrator. You can set the blocks for nodes in any order.</td></tr>
<tr><td>Allocated words</td><td colspan="5">The input and output areas can be the following sizes that start from any word in any of the following areas: CIO Area, WR Area, HR Area, DM Area, or EM Area in the memory used for CJ-series Unit.</td></tr>
<tr><td>Output (OUT) area</td><td colspan="4">500 words max. × 2 blocks</td></tr>
<tr><td>Input (IN) area</td><td colspan="4">500 words max. × 2 blocks</td></tr>
<tr><td rowspan="3">By device variables for CJ-series Unit</td><td colspan="6">Set the areas and the first words for the OUT 1 and IN 1 blocks in the device variables for CJ-series Unit (Scan List Setup Table).
Set the allocation size for each slave with the use of the device variables for CJ-series Unit (Allocation Size Setup Table) in any area. Allocations must be in the order of node addresses.</td></tr>
<tr><td>Allocated words</td><td colspan="5">The input and output areas can be the following sizes that start from any word in any of the following areas: CIO Area, WR Area, HR Area, DM Area, or EM Area in the memory used for CJ-series Unit.</td></tr>
<tr><td>Output (OUT) area</td><td colspan="4">500 words max. × 1 block</td></tr>
<tr><td></td><td></td><td>Input (IN) area</td><td colspan="4">500 words max. × 1 block</td></tr>
</table>

Item				Specifications
Remote I/O master	Max. No. of Slaves connected per DeviceNet Unit	Fixed allocations		63 nodes
		User-set allocations	By CX-Integrator	
			By device variable for CJ-series Unit	
	Max. No. of I/O points per DeviceNet Unit	Fixed allocations		2,048 pts (64 input words, 64 output words)
		User-set allocations	By CX-Integrator	16,000 pts (500 input words x 1 block, 500 output words x 1 block)
			By device variable for CJ-series Unit	32,000 pts (500 input words x 2 blocks, 500 output words x 2 blocks)
	Max. No. of I/O per Slave controllable by a DeviceNet Unit	Fixed allocations		2,048 pts (64 input words, 64 output words)
		User-set allocations	By CX-Integrator	3,200 pts (100 input words, 100 output words)
			By device variable for CJ-series Unit	3,200 pts (100 input words, 100 output words)

<table>
<tr><th colspan="3">Item</th><th colspan="7">Specifications</th></tr>
<tr><td rowspan="11">Remote I/O Slave</td><td rowspan="10">Allocation method (Using the user-defined variable for R/W to the allocation area)</td><td rowspan="4">Fixed allo-cations</td><td colspan="7">Select one of the following fixed allocation areas with the use of the device variable for CJ-series Unit (Slave Fixed Allocated Area Switches 1, 2, and 3).</td></tr>
<tr><td rowspan="3">Allocated words (CIO Area)</td><td>I/O</td><td>Size</td><td>Fixed Alloca-tion Area Setting 1</td><td>Fixed Alloca-tion Area Setting 2</td><td>Fixed Alloca-tion Area Setting 3</td></tr>
<tr><td>Output (OUT) area to the slave from the master</td><td>1 word</td><td>3370</td><td>3570</td><td>3770</td></tr>
<tr><td>Input (IN) area to the master from the slave</td><td>1 word</td><td>3270</td><td>3470</td><td>3670</td></tr>
<tr><td colspan="7">Select one of the preceding areas with the use of the software switches. All are fixed at 1 word per node address. The default setting is Fixed Allocation Area Setting 1.</td></tr>
<tr><td rowspan="6">User-set allocations</td><td rowspan="3">By CX-Integrator</td><td colspan="6">Set the areas for the OUT 1 and IN 1/2 blocks (total of 3 blocks), the first words, and the slave allocation sizes with the use of the CX-Integrator.</td></tr>
<tr><td rowspan="3">Allocated words</td><td colspan="5">The input and output areas can be the following sizes that start from any word in any of the following areas: CIO Area, WR Area, HR Area, DM Area, or EM Area.</td></tr>
<tr><td colspan="4">Output (OUT) area from this slave</td><td>100 words x 1</td></tr>
<tr><td colspan="4">Input (IN) area to this slave</td><td>100 words x 2</td></tr>
<tr><td rowspan="3">By device variable for CJ-series Unit</td><td colspan="6">Set the areas, the first words, and slave allocation size for the OUT 1 and IN 1 blocks (total of 2 blocks) with the use of the device variables for CJ-series Unit (Slave User-set Allocations Setup Table).</td></tr>
<tr><td rowspan="3">Allocated words</td><td colspan="5">The input and output areas can be the following sizes that start from any word in any of the following areas: CIO Area, WR Area, HR Area, DM Area, or EM Area memory used for CJ-series Unit.</td></tr>
<tr><td colspan="4">Output (OUT) area from this slave</td><td>100 words x 1</td></tr>
<tr><td colspan="4">Input (IN) area to this slave</td><td>100 words x 1</td></tr>
<tr><td rowspan="3">Max. No. of I/O points per DeviceNet Unit slave</td><td colspan="2">Fixed allocations</td><td colspan="6">32 points (1 input word, 1 output word)</td></tr>
<tr><td rowspan="2">User-set allocations</td><td>By CX-Integrator</td><td colspan="6">4,800 pts (100 input words x 2, 100 output words x 1)</td></tr>
<tr><td>By device variables for CJ-series Unit</td><td colspan="6">3,200 pts (100 input words, 100 output words)</td></tr>
<tr><td colspan="3">Default settings</td><td colspan="7">• Scan list: Disabled
• Master communications: Supported
• Slave communications: Disabled
• Remote I/O communications: Start
• Master fixed allocations: Fixed Allocation Area Setting 1
• Slave fixed allocations: Fixed Allocation Area Setting 1</td></tr>
</table>

Item			Specifications	
Data stored in non-volatile memory (EEPROM) in the DeviceNet Unit			Saves the following data settings (same as the Backup file on the SD Memory Card). • Master scan list • Slave scan list • Message monitoring timer list (monitoring time for explicit message responses) • Communications cycle time settings • Master/Slave enabled	
Applicable connections			The DeviceNet Unit automatically selects the applicable connection. The user can also specify poll, bit-strobe, COS (change of state) or cyclic for the applicable connection of each slave with the use of the CX-Integrator. You can set up to two types of connections for each Slave (although COS and cyclic cannot be specified simultaneously).	
Communications cycle time			Uses values by default are calculated by the following equations. Example: 16 Input Slaves (16 points each), 16 Output Slaves (16 points each), and a baud rate of 500 Kbit/s: 9.3 ms The user can set a value within a range from 2 to 500 ms. However, the calculated value is enabled when the calculated value from the conditions equation is greater than the setting. **Note** Uses default values calculated in the way that even missing nodes are cosidered 1 input word 1 output word when the scan list is disabled.	
Message communications	Max. No. of nodes for message communications per DeviceNet Unit		Send explicit messages	63 nodes
	Execution instructions		Any commands	SendCmd instruction
	Inter–network communications	Same type of network	Allows transmission across the same type of networks between DeviceNet networks when multiple Units are mounted (can cross up to three levels).	
		Different type of network	Allows transmission across different types of networks between DeviceNet and other networks (e.g., Controller Link and Ethernet/IP) (can cross up to three levels).	
Other functions	SD Memory Card Backup function		Allows DeviceNet Unit setup data (scan list, communications cycle time settings, etc.) to be backed up as a file to a SD Memory Card in the CPU Unit. You can also read (i.e., restore) the setup data from the SD Memory Card to the DeviceNet Unit. Data setup file can be restored into a DeviceNet Unit simply by carrying the SD Memory Card to the site if the device parameter file prepared from the CX-Integrator is saved to SD Memory Card from a personal computer.	
	Error history in the DeviceNet Unit		Supported (You can access the history with the CX-Integrator).	
	Communications cycle time setting		Supported (in the device variable for CJ-series Unit or from the CX-Integrator).	
	Message monitoring timer		Sets the response monitoring time (explicit connection opening interval) in the DeviceNet Unit for explicit message communications. You can make settings separately for all targeted devices with the use of the CX-Integrator.	
	COS/cyclic heartbeat timer setting		Sets the minimum SEND interval in COS or cyclic connections for all targeted devices. The setting is made using the CX-Integrator.	
	Device data check function		Performs a comparison check on the following device data when slave data registered in the scan list is compared with actual slave data. You can use the CX-Integrator to set this function for all targeted Slaves. Vendor, device type and product code	
CX-Integrator connection method			Built-in EtherNet/IP port on CPU Unit or peripheral (USB) port	
Setting section			Rotary switches: Unit No. (hexadecimal x 1), node address (decimal x 2) Front panel DIP switch: Baud rate, stop or continue communications when an error occurs	

Item	Specifications
Display section	Two indicators (2 colors): Display Unit and network status (Module Status and Network Status). Two 7-segment indicators: Displays the DeviceNet Unit node address, error code, and node address where an error occurred. 2 dot indicators: Display whether the registration scan list is enabled or not.
Front connector	One communications connector (communications data: CAN H and CAN L, communications power supply: V+, V–, shielded) Use the XW4B-05C1-H1-D connector provided to connect the communications cable. **Note** Use the XW4B-05C4-T-D connector sold separately for multi-drop connections.
Communications power supply voltage	11 to 25 VDC (supplied from the communications connector)
Current consumption	Communications power supply: 18 mA at 24 VDC, (supplied from the communications connector) Internal circuit power supply: 290 mA max. at 5 VDC (supplied from the Power Supply Unit)
External dimensions	31 x 90 x 65 mm (W x H x D)
Weight	118 g (connector provided included)
Standard accessories	One XW4B-05C1-H1-D connector to connect to a node from a T-branch Tap.

1-3 Overview of CX-Integrator

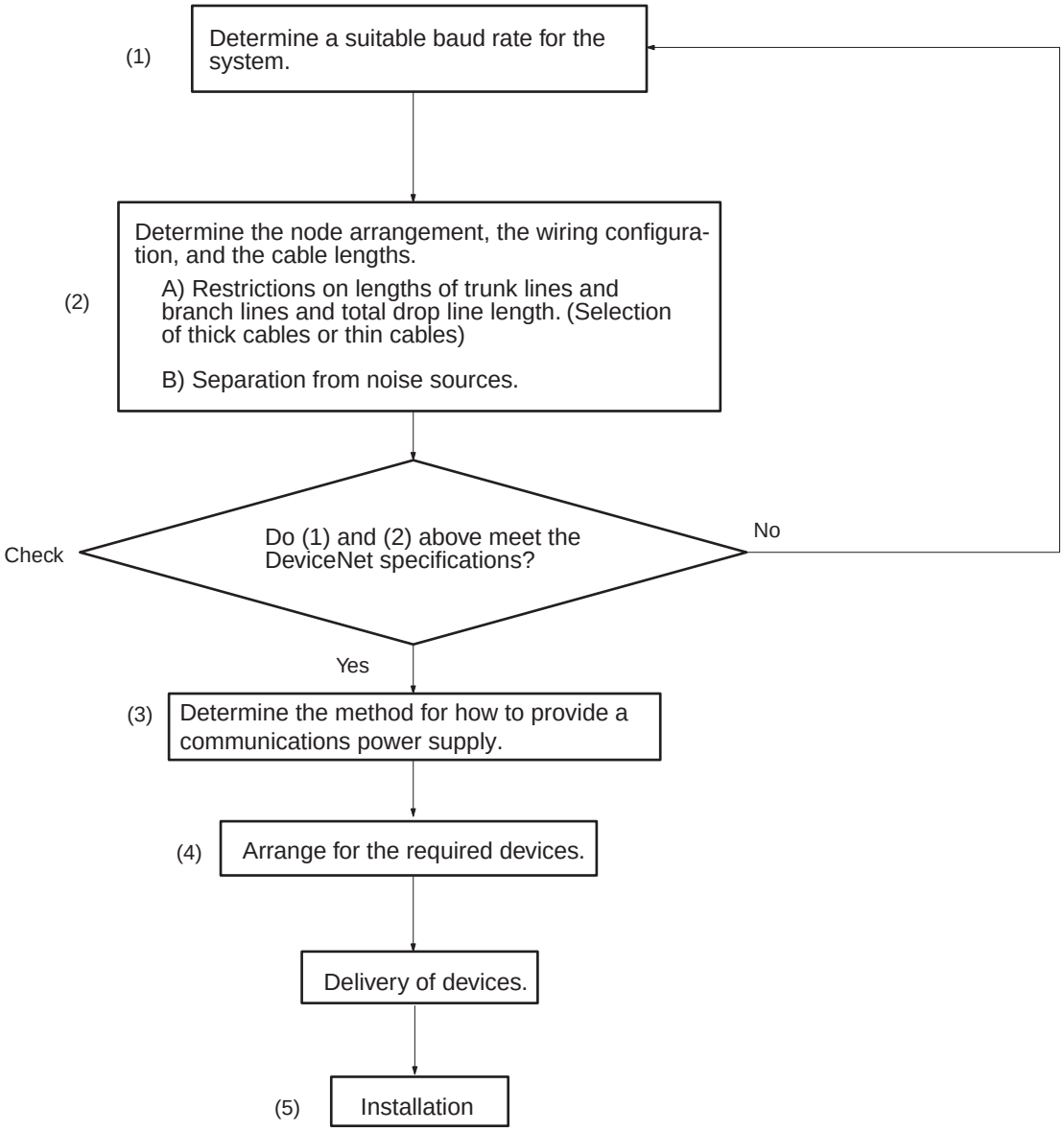
You can set allocations for remote I/O communications in any order of node addresses with the CX-Integrator. Users can also set remote I/O communications connections.

For details, refer to *the CX-Integrator Ver.2.□ OPERATION MANUAL* (Cat. No. W464).

1-4 Basic Operating Procedures

1-4-1 Network Installation Procedure

For details on the network installation procedure, refer to the *DeviceNet OPERATION MANUAL* (Cat. No. W267). Only a general description is given here.



1-4-2 DeviceNet Unit Startup Procedure

The basic operating procedures for DeviceNet Unit are described here.

Use Sysmac Studio to create programs and to set the Unit.

Use the CX-Integrator to set the network configuration.

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

For details on operations of CX-Integrator, refer to *CX-Integrator Ver.2.□ OPERATION MANUAL* (Cat. No. W464).

Programming and software settings	Step 1: Create POU and global variables Create unit configuration	· Create and register global variables and each POU. Register variables including variables for accessing the slave area and for message communications data. · Create algorithm of each POU and register local variables of each POU. · Register the Unit in the Unit Configuration on the CPU/Expansion Racks screen in Configuration and Setup. At this time, set both the device name and the unit number of the unit to be registered. · Allocate device variables for CJ-series Unit to I/O port. Allocate on the I/O Map View window. You can use one of the following three methods to allocate. 1. Select and allocate existing variables. 2. Input a new variable name. 3. Automatically create with "Device variable creation".
	Step 2: Create Initialization Data of the Unit	· Create the Unit settings by using the [Edit Special Unit Settings]. (When the program is transferred, items set here will be reflected in the device variable for CJ-series Unit.)
Hardware setting and Rack assembly	Step 3: Set up the DeviceNet Unit Unit number [UNIT No.] Node address [NODE ADR] Operation settings for baud rate/ communication errors [DIP switch]	· Set the hardware switch on the front panel. Set the same unit number as in the Unit Configuration settings.
	Step 4: Set up Slaves Node address, baud rate, etc.	· Initial settings for slaves Set by referring to the Manual for Slaves.
	Step 5: Mount and wire to the Rack Wire the slaves	
	Step 6: Turn ON the power to the Controller.	· Reflect the settings for the switches on the front panel of the Unit, in the Unit. Switch ON the power in the sequence: Communications power → slave power → Controller power, or switch all three ON at the same time.
Program transfer and operation	Step 7: Transfer the user programs	· Transfer user programs, Unit Configuration and Setup, and variable information.
	Step 8: Set up a network configuration	· Set when you use a unit as a master or a slave.
	Step 9: Main operation	

Precautions for Correct Use

A slave may not go online if the communications power supply is turned ON after the slave is turned ON.

Additional Information

- The communications power supply and slave power supply, the slave power supply and Controller power supply, or all three of these power supplies may be turned ON simultaneously.
- When Step 6 is performed, an I/O Setting Check Error occurs when there is a Unit Configuration in the CPU Unit which does not match the actual Unit Configuration. In this case, reset the Controller after Step 7 to cancel the error.

Allocation of User-defined Variables to the Memory Used for CJ-series Unit

With this Unit, the slave areas of the following functions are allocated to the Memory used for CJ-series Unit.

- Fixed allocations and user-set allocations (Master)
- Fixed allocations and user-set allocations (Slave)

The user program accesses the slave via the user-defined variable that specifies the AT specification for the area where the slave is allocated. With this Unit, the device variable for CJ-series Unit, or a user-defined variable that specifies the AT specification of the allocation area for the slave as setup using the CX-Integrator software application, needs to be created. User-defined variables are created using Sysmac Studio.

Have the necessary user-defined variables created before creating a program.

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

Precautions for Correct Use

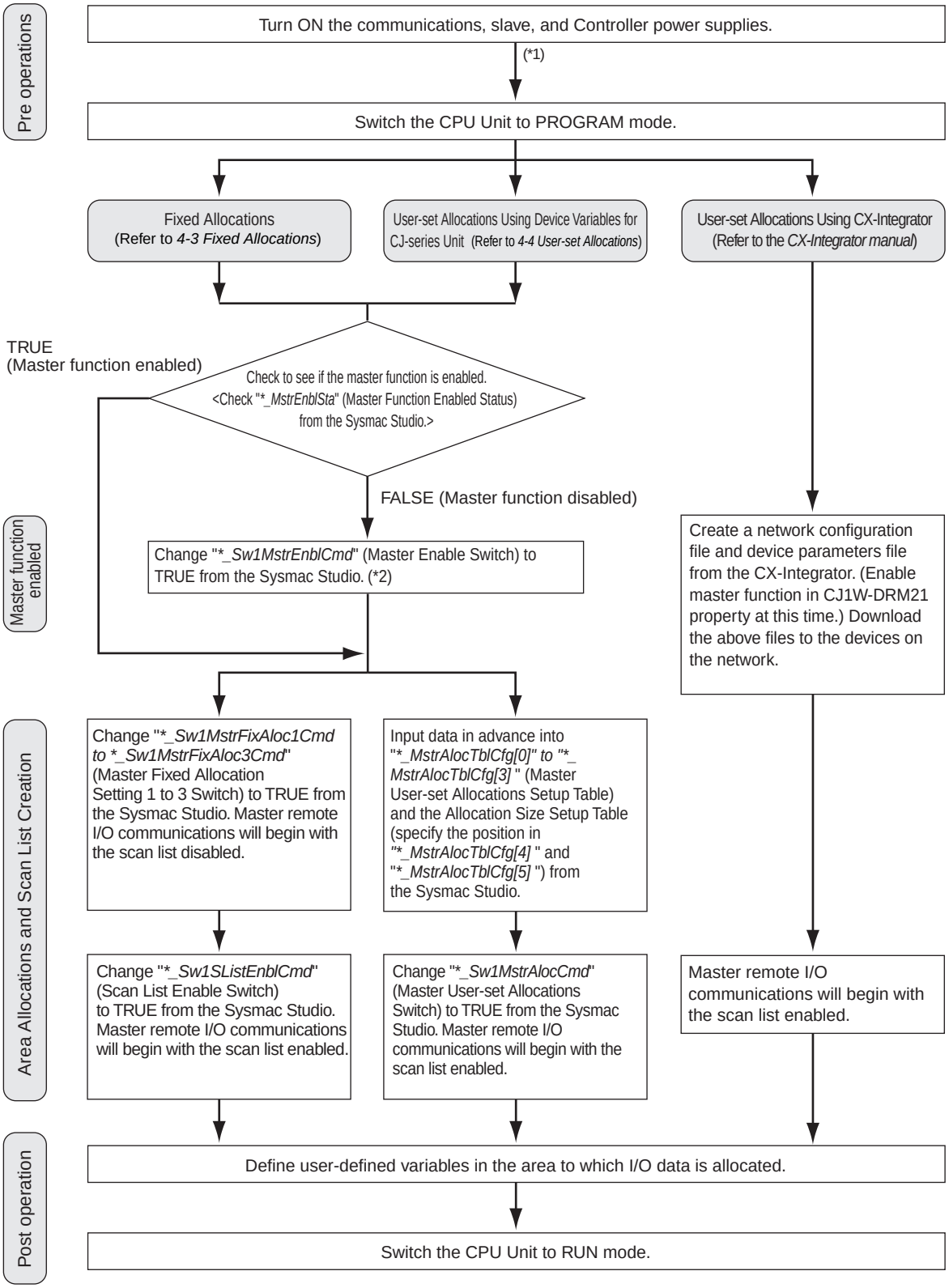
The user is responsible for management of the memory used for CJ-series Unit. Please take great care to avoid overlapping of reference areas between user-defined variables.

Network Configuration Settings

● Using the Master Function

To use this unit as a master function, the **_Sw1MstrEnblCmd* (Master Enable Switch) must be changed to TRUE from Sysmac Studio.

Note Enable master communications through CJW-DRM21 properties if you use CX-Integrator.



*1 Turn ON the communications power supply before turning ON the slave power supplies or the slaves may not go online.

*2 Execute this only when master communications are turned OFF. (If the Master Enable Switch is turned ON when master communications are enabled, a Unit error will occur and a C2 error will be displayed on the 7-segment indicator on the front panel.)

Precautions for Safe Use

Make sure the scan list is enabled when you use the master function.

This will allow you to check whether slaves are online or not from the CPU Unit so that you will be able to determine whether or not the DeviceNet communicates properly.

Additional Information

You can turn OFF (disconnected) remote I/O communications with a specified slave by changing *_*CnctCmd* (Disconnect/Connect Switches) to TRUE when a slave is replaced or is registered in the scan list prior to connection. These switches, however, are changed to FALSE when the power supply is turned OFF, however, so a bit must be turned back to TRUE from the user program when the power turns ON for it to be valid again.

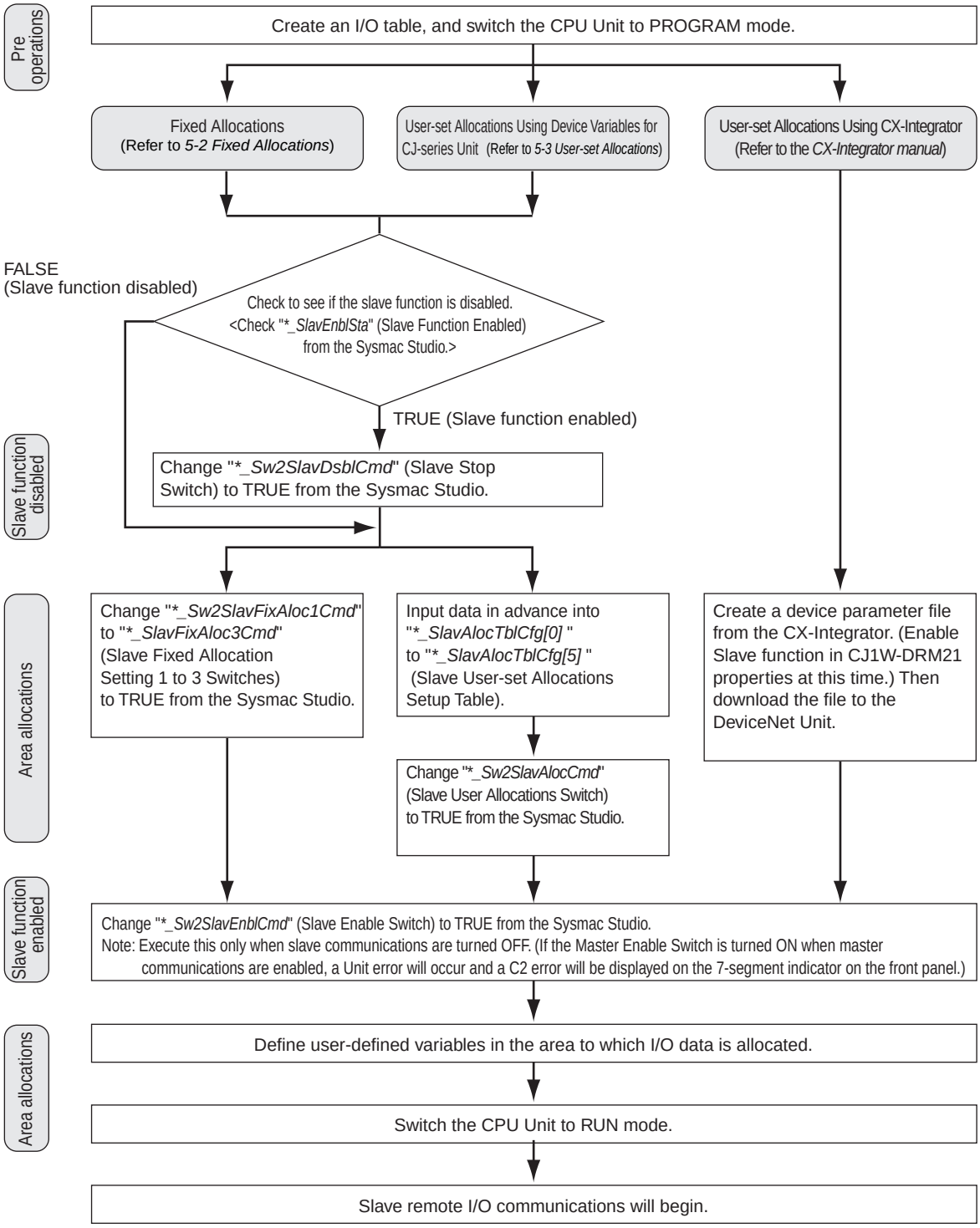
● Using the Slave Function

To use the slave function, the *_*Sw2SlavEnblCmd* (Slave Enable Switch) must be changed to TRUE from Sysmac Studio.

With fixed allocations or allocations set in the device variables for CJ-series Unit, slave communications must be disabled prior to area allocation and must be enabled following the area allocation.

The order of the procedure is thus Slave Stop Switch (if slave communications are enabled), area allocation, and Slave Enable Switch.

Note Enable slave communications through CJ1W-DRM21 properties if you use a CX-Integrator.



Precautions for Correct Use

Slave communications must be disabled prior to area allocation when you use fixed allocations or allocations set in the device variable for CJ-series Unit, and the settings must be read to the Unit when slave communications are enabled.
Allocations will not be valid if slave communications are enabled during area allocation.

1-4-3 Message Communications Only (Neither Master nor Slave Function Used)

The DeviceNet Unit does not have to be registered in the scan list if it is only used for message communications. You can execute message communications (send and receive) with both master and slave communications disabled.

1-5 List of Usage Methods by Purpose

Situation			Action	Section
Design	Allocating any words for remote I/O	Not in order of node addresses	Set with the use of the CX-Integrator. **Note** Allocations with the use of CX-Integrator: Any node address order and two blocks from OUT 1, IN 1, OUT 2 and IN 2. Allocation is much easier with the use of a wizard.	*4-4-1 Settings through CX-Integrator*
		In order of node addresses	Set with the use of the device variables for CJ-series Unit. (Master user-set Allocations Setup Table and Allocation Size Setup Table) **Note** Allocations with the use of device variables for CJ-series Unit: Fixed node address order and one block from OUT 1 and IN 1.	*4-4-2 Settings through Device Variables for CJ-series Unit (Master User-set Allocations Setup Table)*
	Using the Unit as a slave		Set with the use of the device variables for CJ-series Unit.	*5-1 Slave Remote I/O Communications*
	Performing message communications between controllers to which DeviceNet Units are mounted		Execute communications instructions from the user program.	*Section 6 Message Communications*
	Mounting multiple DeviceNet Units using master communications to a single controller		3 Units max. with fixed allocations 16 Units max. with user-set allocations	*4-1 Master Remote I/O Communications*
	Mounting multiple DeviceNet Units using slave communications to a single controller		3 Units max. with fixed allocations 16 Units max. with user-set allocations	*5-1 Slave Remote I/O Communications*
	Connecting multiple controllers (master communications) in a network		Supported by user-set allocations with the use of device variables for CJ-series Unit or user-set allocations with the use of the CX-Integrator.	*5-1 Slave Remote I/O Communications*
	Connecting a single Master controller and multiple Slave controllers in a network		Set multiple Controller to Slave mode from the device variables for CJ-series Unit or the CX-Integrator. **Note** Up to 64 Units may be on a network. (Example: 1 Master Controller and 63 Slave Controllers)	*5-1 Slave Remote I/O Communications*
	Sending DeviceNet explicit messages		Set the command code to 2801.	*6-2 Sending Explicit Messages*
	Setting the node address for a DeviceNet Unit		Set the rotary switches on the front of the DeviceNet Unit.	*Node Address Switches* on page 2-6
	Setting the baud rate for the DeviceNet Unit		Set the DIP switch on the front of the DeviceNet Unit.	*DIP Switch* on page 2-6
	Stopping remote I/O communications for communications errors		Set the DIP switch on the front of the DeviceNet Unit.	*DIP Switch* on page 2-6
	Storing OUT data in slave I/O memory for communications errors		Set the DIP switch on the front of the DeviceNet Unit.	*DIP Switch* on page 2-6

Situation		Action	Section
Operation	Stopping remote I/O communications with all Slaves	Stop communications with the use of the CX-Integrator or *_*Sw1IOCommStopCmd* (Remote I/O Communications Stop Switch).	*3-2-1 Software Switches 1*
	Using a scan list in remote I/O communications (fixed allocations)	Change *_*Sw1SListEnblCmd* (Scan List Enable Switch) to TRUE.	*3-2-1 Software Switches 1*
	Enabling a scan list in remote I/O communications (user-set allocations by device variables for CJ-series Unit)	Set the allocation areas with the use of the device variables for CJ-series Unit, and change *_*Sw1MstrAlocCmd* (Master User-set Allocations Switch) to TRUE.	*3-2-1 Software Switches 1*
	Changing the communications system configuration	Change *_*Sw1SListClrCmd* (Scan List Clear Switch) to TRUE, and change *_*Sw1SListEnblCmd* (Scan List Enable Switch) to TRUE after you change the communications system.	*4-2 Scan List*
	Checking master I/O allocations status (fixed allocations, user-set allocations by device variables for CJ-series Unit, user-set allocations with the CX-Integrator)	Monitor the Master Status 2 status codes in *_Mstr2Sta* from Sysmac Studio.	*3-2-8 Master Status 2*
	Checking to see if all slaves are registered in the scan list	Check *_RegSlavTblSta* (Registered Slave Table).	*3-2-11 Registered Slave Table*
	Checking to see if all slaves are performing remote I/O communications properly	Check *_NormSlavTblSta* (Normal Slave Table).	*3-2-12 Normal Slave Table*
	Checking to see if there is an error history in the DeviceNet Unit	Check the error history (registration yes/no) from Sysmac Studio.	*3-2-6 Unit Status 2*, *9-2 Error Log Functions*
	Monitoring the error history in the DeviceNet Unit	Execute the device monitor function from the CX-Integrator (Error History Tab).	*CS/CJ/CP/NSJ Series CX-Integrator Ver.2.□ OPERATION MANUAL (W464)*
	Monitoring status of the DeviceNet Unit	Execute the device monitor function from the CX-Integrator (Status and Unit Status Tabs).	
	Checking the current communications cycle time	Execute the device monitor function from the CX-Integrator (Current Communications Cycle Time Tab).	
	Adjusting the communications cycle time	Execute the device parameter edit function from the CX-Integrator (Communications Cycle Time Tab).	
	Saving all parameters, like scan list data, for masters and slaves on the network	Save the network configuration from the CX-Integrator.	
	Replacing a DeviceNet Unit	1. Insert a SD Memory Card in the CPU Unit and change the Unit Setup File Backup Switch in the device variables for CJ-series Unit to TRUE. 2. Replace the DeviceNet Unit. 3. Change *Sw2FileRestoreCmd* (Unit Setup File Restore Switch) to TRUE. 4. Change *_Sw1SListEnblCmd* (Scan List Enable Switch) in the device variables for CJ-series Unit to TRUE. 5. Make sure the slave is connected, and then change *_Sw1SListEnblCmd* (Scan List Clear Switch) in the device variables for CJ-series Unit to TRUE.	*7-1 SD Memory Card Backup Functions*, *9-5-3 Replacing Faulty Units*

2

Nomenclature and Installation

This section describes the nomenclature and installation of the DeviceNet Unit.

2-1 Nomenclature and Functions 2-2
2-1-1 Nomenclature and Functions 2-2
2-1-2 Switch Settings 2-5
2-2 Installing the DeviceNet Unit 2-9
2-2-1 System Configuration Precautions 2-9
2-2-2 Mounting 2-9
2-2-3 Handling Precautions 2-10
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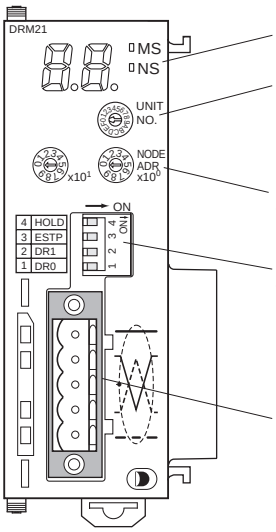
2-1 Nomenclature and Functions

2-1-1 Nomenclature and Functions

CJ1W-DRM21



Indicators

Unit No. switch

This switch sets the unit number of the DeviceNet Unit as a one-digit hexadecimal value.

Node address switches

These switches set the node address as a two-digit decimal value.

DIP switch

The pins have the following functions:
Pins 1 and 2: Baud rate
Pin 3: Continue/Stop communications for error (when used as a Master)
Pin 4: Hold/clear I/O for communications error (when used as a Slave)

Communications connector

Connect the Network communications cable to this connector. The communications power for this Unit is also supplied through this connector.
A parallel connector with screws (XW4B-O5C1-H1-D) is provided for node connection.

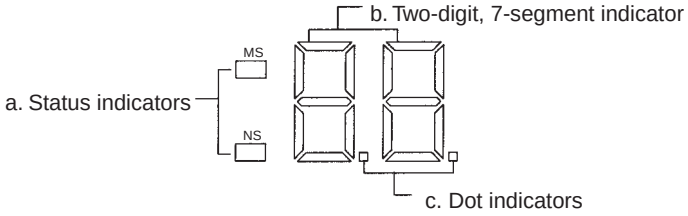
Indicators

The DeviceNet Units are equipped with the following indicators that indicate the operating status of the node itself and the overall network.

a. Two status indicators (two-color: Green or red indicators)

b. A two-digit, 7-segment indicator

c. Two dot indicators



● Status Indicators: MS and NS

The MS (Module Status) indicator indicates the status of the node itself and the NS (Network Status) indicator indicates the status of the network.

The MS and NS indicators can be green or red and they can be OFF, ON, or flashing (alternating 0.5-s ON and 0.5-s OFF). The following table shows the meaning of these indicator conditions.

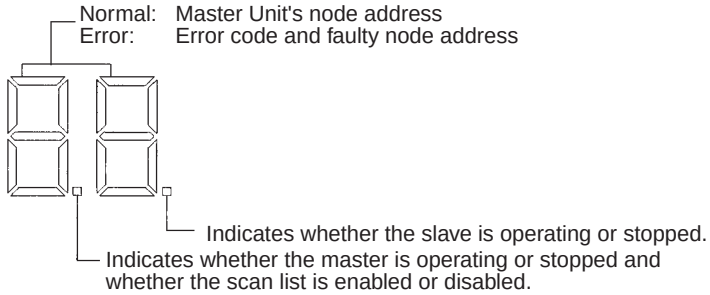
Indicator	Color	Status	Meaning (likely errors)
MS	Green	Lit	Normal operating status Communications are being performed normally.
	Red	Lit	A non-recoverable, major fault has occurred. (Watchdog timer error, memory error, or system error.) Replace the DeviceNet Unit.
		Flashing	A recoverable, partial or minor fault has occurred. (Configuration Error, Switch Setting Error, CPU Unit initialization error, CPU Unit interface error, or Routing Table Error.) Correct the error and reset the Unit.
	---	Not lit	Power isn't being supplied or the Unit is being reset.
NS	Green	Lit	The Unit is Online with the network and remote I/O communications have been established with a slave registered in the scan list or message communications have been established.
		Flashing	The Unit is Online with the network, but neither remote I/O communications nor message communications have been established. Either the scan list is being read, or both remote I/O communications and message communications are disabled.
	Red	Lit	A major fault in communications has occurred. Network communications are not possible. (Node address duplicated or Bus Off error)
		Flashing	A partial or minor fault in communications has occurred. (Communications Error, Structure Error, or Verification Error)
	---	Not lit	The Unit is not Online with the network. (There is no network power supply, the Unit is being reset, a partial or minor fault or a sending error has occurred.)

Note The indicators flash at a 0.5-s interval.

● Seven-Segment Indicator

In addition to the MS and NS indicators, DeviceNet Units have a 2-digit, 7-segment indicator that normally indicates the master node address. When an error occurs, the indicator will alternately show between the error code and the node address of the faulty slave.

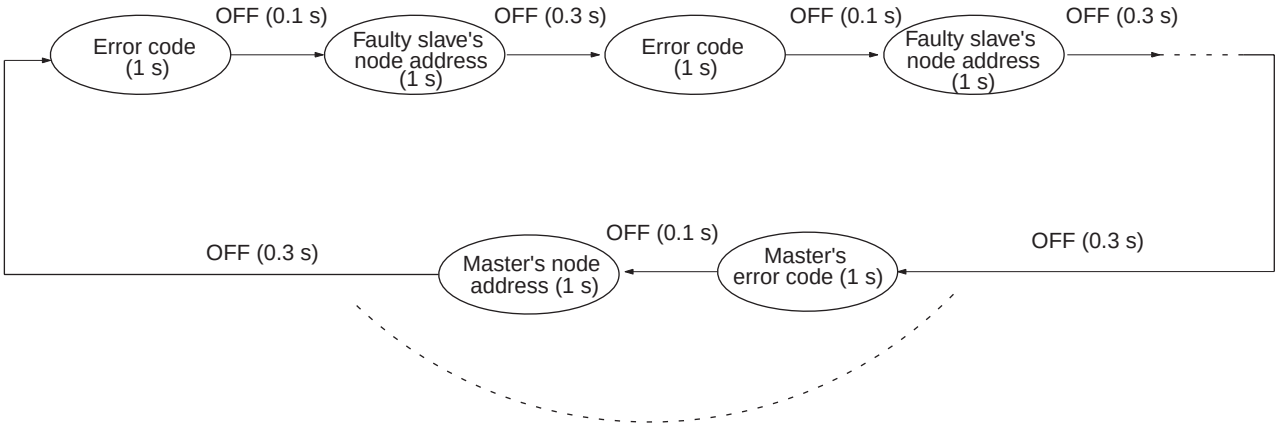
There are dot indicators at the lower-right corner of each digit. The left dot indicator shows whether or not the master is operating and whether the scan list is enabled or disabled. The right dot indicator shows whether or not the slave is operating.



Seven-segment Digits

Status		Display	
Remote I/O communications active and normal		Displays the master's node address (00 to 63)	Lit
From power ON to completion of node address check (master function disabled, slave function disabled, or both disabled)			Flashing
Remote I/O communications started			Flashing (until communications actually start)
From completion of the node address check until the start of remote I/O communications			Flashing
Error	Watchdog timer error	Not lit	
	Memory error or Controller error	Error code only	Lit
	Other errors	Alternately displays the error code and error node address (see diagram below)	
Scan list	Reading	"- -"	Flashing
	Registered		

The following diagram shows the alternating error code/ node address display.



If there is an error at the DeviceNet Unit.

- The master's error code and master's node address will be displayed if an error has occurred at the master.
- There is no priority for showing error codes. All error codes that occur at that time are shown in sequence.
- For the error codes displayed on the seven-segment display, refer to *9-1 Troubleshooting with the DeviceNet Unit Indicators*.

Dot Indicators

The following table shows the functions of the dot indicators.

Indicator	Content	Display
Left dot	Scan list enabled/disabled, master function disabled	ON: Master function disabled Flashing: Scan list disabled OFF: Scan list enabled
Right dot	Slave function disabled	ON: Slave function disabled OFF: Slave operating

2-1-2 Switch Settings

Unit No. Switch

CJ1W-DRM21

Use the Unit No. Switch to set the unit number for units as a CPU Special Unit. Set a unique unit number for each CPU set Special Unit installed in the CPU Rack and Expansion Rack with the unit numbers in the unit configuration. Turn OFF the Controller before changing the unit number setting.

Setting method: One-digit hexadecimal

Setting range: 0 to F

Note The unit number is set to 0 at the factory.

You can set any unit number from 0 to F as long as it has not been set on another CPU Bus Unit connected to the same CPU Unit.

Precautions for Safe Use

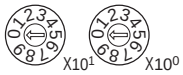
- Use a small flat-blade screwdriver to turn the rotary switches; be careful not to damage the switch.
- Always turn OFF the Controller before changing the unit number setting.

Additional Information

If the unit number is the same as one set on another CPU Bus Unit connected to the same CPU Unit, a major fault level controller error "Duplicate Unit Number" will occur and it will not be possible to start up the DeviceNet network. After correcting the unit number setting, cycle the power to the Controller.

Node Address Switches

CJ1W-DRM21



Use these switches to set the node address of the Unit.

Setting method: Two-digit decimal

Setting range: 0 to 63

Note The node address is set to 63 at the factory.

You can set any node address from 0 through 63 as long as it has not been set on another slave node.

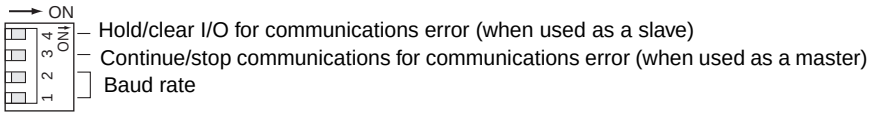
Additional Information

If the node address is the same as one set on another node, a node address duplication error will occur and it will not be possible to start up network communications.

DIP Switch

The DIP switch on the front of the DeviceNet Unit is used to set the baud rate, whether communications will be continued or stopped when a communications error occurs, and whether to hold or clear the remote outputs when a communications error occurs in the slave function.

CJ1W-DRM21



The settings of the DIP switch pins are shown in the following table. All pins are set to OFF at the factory.

Pin	Function	Setting
1	Baud rate	See the next table.
2		
3	Continue/stop remote I/O communications for communication errors (when used as a master)	OFF: Continue communications ON: Stop communications
4	Hold/clear remote outputs for communications error (when used as a slave)	OFF: Clear remote outputs ON: Hold remote outputs

Baud Rate

Pins 1 and 2 are used to set the baud rate as shown in the following table.

Pin 1	Pin 2	Baud rate
OFF	OFF	125 kbit/s
ON	OFF	250 kbit/s
OFF	ON	500 kbit/s
ON	ON	Not allowed.

Precautions for Safe Use

Always turn OFF the Controller before changing the unit number setting.

Precautions for Correct Use

Set the same baud rate on all of the nodes (Master and Slaves) in the Network. Any slaves with baud rates different from the master's rate will not be able to participate in communications and may cause a communications error between nodes that have been set properly.

Continue/Stop Remote I/O Communications

If "stop remote I/O communication upon communication error" is set (turned ON) by DIP switch 3, remote I/O communication will stop (*) when any of the following error occurs and will remain stopped after the error is reset (message and slave communications will not stop).

- *_*Mstr1IOErr* (Remote I/O Communication Error)
- *_*SendTimeoutErr* (Send Timeout Error)
- *_*NetPwrErr* (Network Power Error)

To resume communications, change *_ *Sw1IOCommStartCmd* (Remote I/O Communications Start Switch) of software switch 1 to TRUE. Refer to *3-2 Device Variables for CJ-series Unit (Software Switches, Statuses)* for details.

Note The 7-segment indicator will show "A0" when remote I/O communications stop.

If pin 3 is OFF, remote I/O communications will stop if a send timeout or network power error occurs, but will restart automatically when the cause of the error is cleared.

Hold/Clear Remote Outputs

When the DeviceNet Unit is used as a slave, pin 4 is used to set whether to hold or clear remote outputs when a communications error occurs.

Note If the DeviceNet Unit is used as a slave, the 7-segment indicator will show "L9" when remote I/O communications stop.

Communications Connectors

Color stickers that match communications cable colors are attached to the communications connectors. Match the colors when connecting communications cables to the connectors. These colors are given in the following table

Color	Signal
Black	Power line, negative voltage (V–)
Blue	Communications line, low (CAN L)
---	Shield
White	Communications line, high (CAN H)
Red	Power line, positive voltage (V+)

For details on communications specifications and wiring, refer to the *DeviceNet OPERATION MANUAL* (Cat. No. W267).

Precautions for Safe Use

Before connecting communications cables, turn OFF the Controller power supply, all slave power supplies, and the communications power supply.

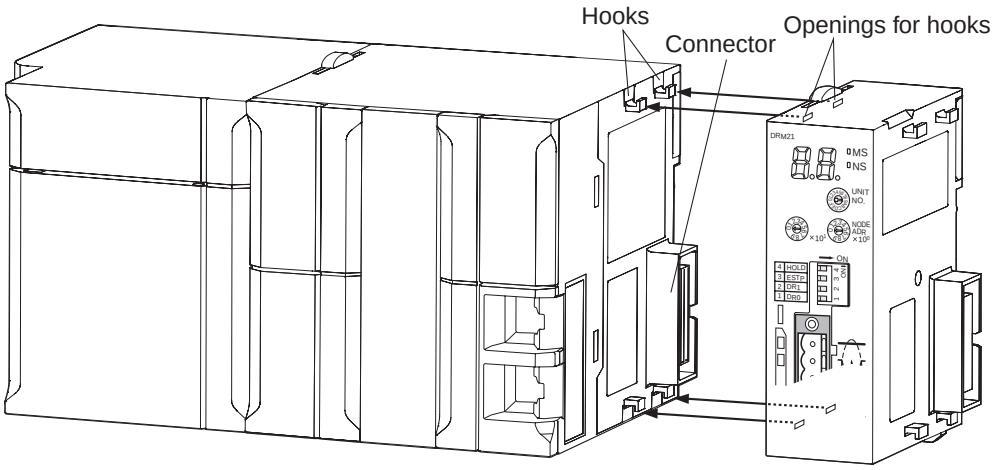
2-2 Installing the DeviceNet Unit

2-2-1 System Configuration Precautions

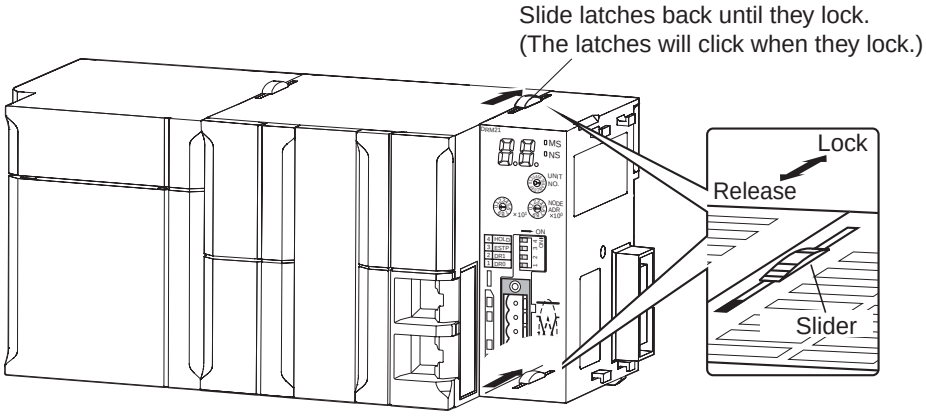
You can mount up to 16 Units on the CPU Rack or an Expansion Rack per CPU (but no more than 10 Units on one Rack).

2-2-2 Mounting

1 Carefully align the connectors to mount the DeviceNet Unit.



2 Move the yellow sliders on the top and bottom of the Unit until they click into position, to lock.



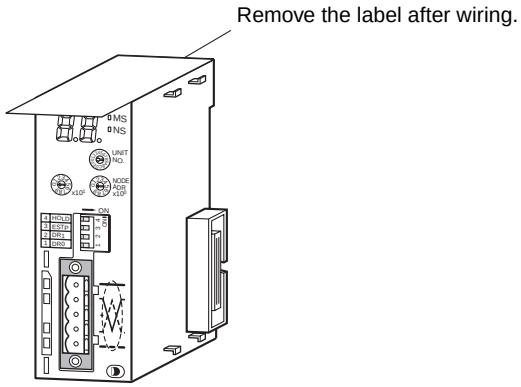
Precautions for Safe Use

If the sliders are not securely locked, the DeviceNet Unit functions may not operate sufficiently.

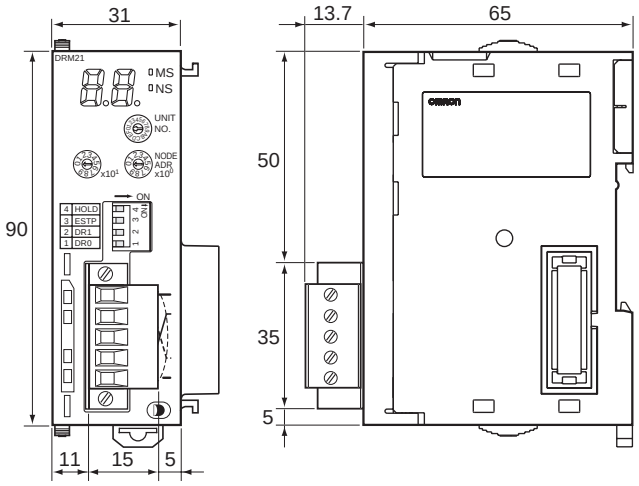
To dismount the Unit, move the sliders to the "Release" direction.

2-2-3 Handling Precautions

- Always turn OFF the Controller before you mount or dismount a Unit or connect or disconnect cables.
- Provide separate conduits or ducts for the I/O lines to prevent noise from high-tension lines or power lines.
- Prevent wire clippings, cutting chips or other materials from getting inside the Unit. They could cause scorching, failure, and malfunction. Pay particular attention to this during installation and take measures such as covering with a cover.
- If the Unit was shipped from the factory with the dust protection label on top of the unit, be sure to remove that label before switching ON the power. The label prevents heat dissipation and could cause a malfunction.



2-2-4 External Dimensions



3

Data Exchange with the CPU Unit

This section describes the words allocated to the DeviceNet Unit in the CIO Area and DM Area. These words both enable controlling the DeviceNet Unit and accessing Unit and network status.

3-1 Data Exchange with the CPU Unit 3-2
3-1-1 Data Flow 3-2
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3-1 Data Exchange with the CPU Unit

Data exchange between this Unit and the CPU Units uses the I/O port and memory for CJ-series Unit allocated to the DeviceNet Unit.

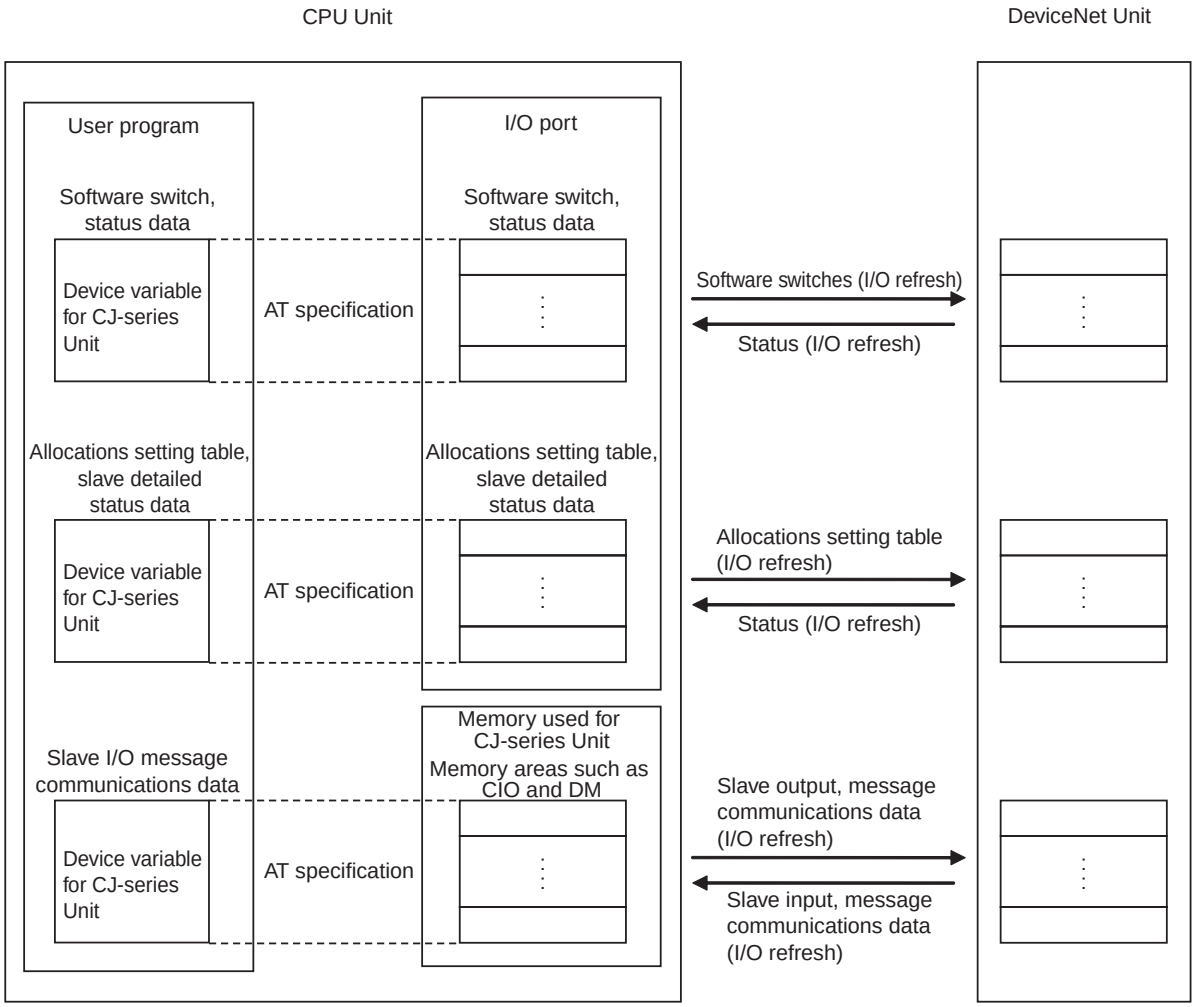
3-1-1 Data Flow

The CPU Units and CJ-series DeviceNet Units exchange data as shown in the table and chart below.

Data exchange type

Access methods from the user program	AT specification destination	Data exchange timing	Unit data type
Device variable for CJ-series Unit	I/O port	During I/O refresh	Software switch
			Status
			Allocations setting table
			Slave detailed status
User-defined variable	Memory used for CJ-series Unit	During I/O refresh	Slave I/O Data
		At I/O refresh after instruction execution	Message send/receive data for communications instructions
System-defined variable	None	During I/O refresh	Unit Restart Flag, Communications Port Enabled Flags, etc.

Note The allocations setting table and slave detailed status data are retained in the CPU unit by the battery even during power interruptions.


CPU Unit
DeviceNet Unit
User program
I/O port
Software switch, status data
Software switch, status data
Device variable for CJ-series Unit
AT specification
Software switches (I/O refresh)
Status (I/O refresh)
Allocations setting table, slave detailed status data
Allocations setting table, slave detailed status data
Device variable for CJ-series Unit
AT specification
Allocations setting table (I/O refresh)
Status (I/O refresh)
Memory used for CJ-series Unit
Memory areas such as CIO and DM
Slave I/O message communications data
Device variable for CJ-series Unit
AT specification
Slave output, message communications data (I/O refresh)
Slave input, message communications data (I/O refresh)

Device Variable for CJ-series Unit

Device variables for CJ-series Units are variables for which AT is specified for the I/O port explained below. The user program uses device variables for CJ-series Unit to access the Configuration Unit such as DeviceNet Unit.

For allocation of the device variables for CJ-series Unit to the I/O port, refer to *How to Create Device Variables for CJ-series Unit* (P. 3-5).

● I/O Port

An "I/O port" is a logical interface for data exchange by a CPU Unit with a DeviceNet Unit or other Configuration Unit.

An I/O port has a unique pre-defined name for each unit model and function.

An I/O port is automatically created by preparing the Unit Configuration with Sysmac Studio.

For details on the I/O ports defined for DeviceNet Unit, refer to *3-2 Device Variables for CJ-series Unit (Software Switches, Statuses)* and *3-3 Device Variables for CJ-series Unit (Allocations Setting Table, Slave Detailed Status)*.

DeviceNet Unit has two types of I/O ports; one is for the following software switch/status data, and the other is for allocations setting table/slave detailed status data.

● Software switches / Status data

Software switches (execution instructions of each function from the CPU Unit to the DeviceNet Unit), DeviceNet Unit statuses and error data are allocated.

● Allocations Setting Table, Slave Detailed Status Data

Allocations Setup Tables that the user can freely set and individual slave statuses by node address are allocated.

User-defined Variable

Slaves are allocated to the memory used for CJ-series Unit when you use the functions shown below.

- Master remote I/O communications (fixed/user-set allocation)
- Slave remote I/O communications (fixed/user-set allocation)

To use this area from the user program, you need to create a user-defined variable of AT specification.

3-1-2 Accessing From the User Program

From the user program, various types of information are exchanged using AT specified device variables for CJ-series Unit that are allocated to the I/O ports, and AT specified user-defined variables that are allocated to slave allocation areas.

From the user program, the following is used to exchange various types of information:

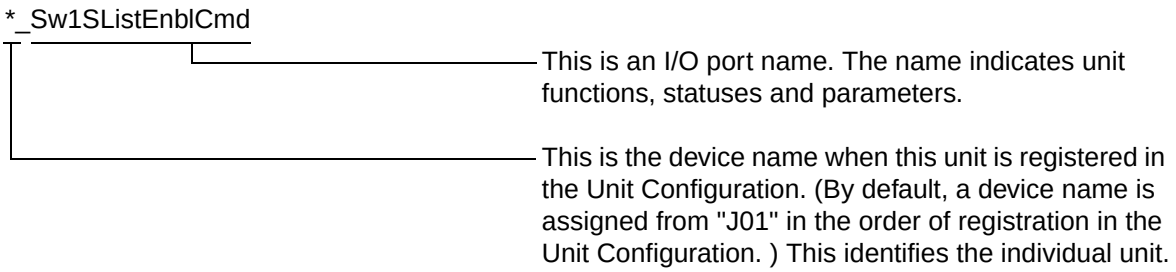
Data type		I/O port, memory used for CJ-series Unit		Access method
Setting/status	Software switches/status data	Operation Data		Device variables for CJ-series Unit
	Allocations setting table, slave detailed status			
Slave area	Fixed allocation 1 to 3	Fixed allocation 1	OUT: CIO 3200 to CIO 3263 words IN: CIO 3300 to CIO 3363 words	User-defined variable
		Fixed allocation 2	OUT: CIO 3400 to CIO 3463 words IN: CIO 3500 to CIO 3563 words	
		Fixed allocation 3	OUT: CIO 3600 to CIO 3663 words IN: CIO 3700 to CIO 3763 words	
	User-set allocation (By master user-set allocation)	Any area of CIO, DM, WR, HR and EM		
	User-set allocation (By CX-Integrator)	Same as above		

How to Create Device Variables for CJ-series Unit

Use I/O Map in Sysmac Studio to allocate device variables for CJ-series Unit to an I/O port. Specify variable names using one of the methods shown below.

1. Select and allocate existing variables.
2. Input a new variable name.
3. Automatically create with "Create Device Variable".

The following shows the structure of a variable name created automatically with method 3.



For details on device variables for CJ-series Unit, refer to the following:

3-2 Device Variables for CJ-series Unit (Software Switches, Statuses)

3-3 Device Variables for CJ-series Unit (Allocations Setting Table, Slave Detailed Status)

In the explanations from here on, the device name automatically created is used as the device variable name for CJ-series Unit, for example **_Sw1SListEnblCmd*.

For details on the memory for CJ-series Unit, refer to *NJ-series CPU Unit Software User's Manual* (Cat. No. W501).

How to Create User-defined Variables

In this unit, slaves are allocated to the memory used for CJ-series Unit when you use the functions shown below.

- Fixed allocations and user-set allocations (Master)
- Fixed allocations and user-set allocations (Slave)

Use the Sysmac Studio to register user-defined variables to the variable table. Use user-defined variables to specify the AT specification of the memory used for CJ-series Unit to which the slave is allocated.

Generally, array variables are created.

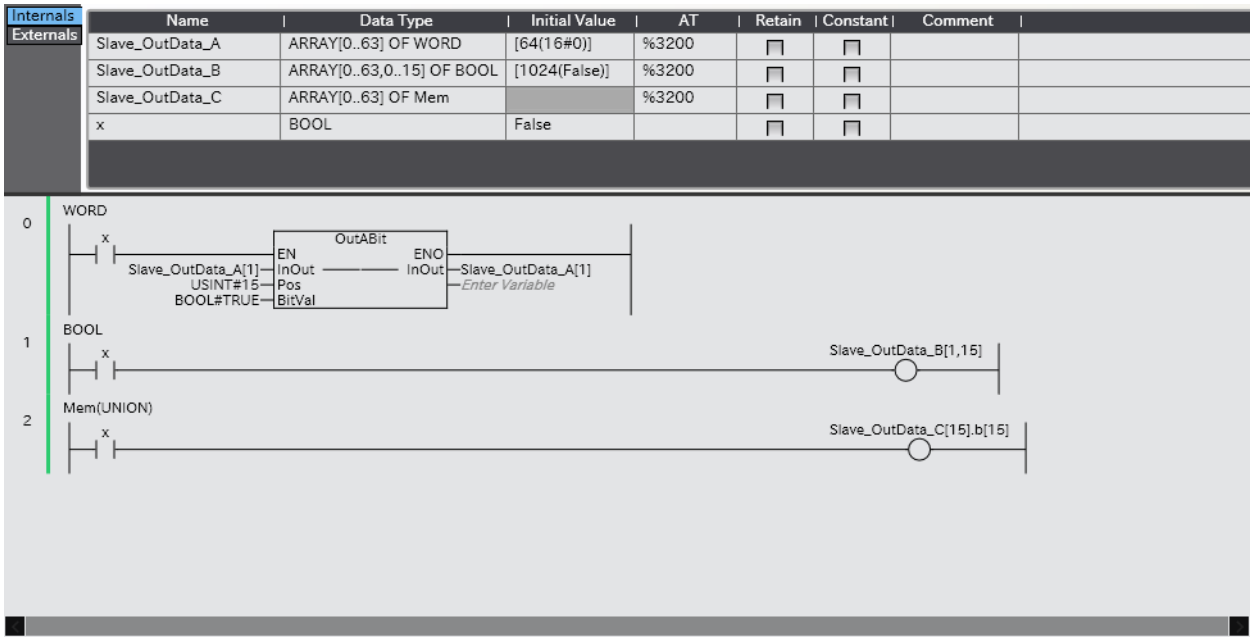
Below is an example of allocation to user-defined variables.

- Used with Master Fixed Allocation 1
- Used slaves: 16 I/O points; 64 slaves

In this case, I/O data of each slave is allocated as follows:

Words allocated	I/O data
CIO 3200	OUT slave I/O data (node address 0)
CIO 3201	OUT slave I/O data (node address 1)
⋮	⋮
CIO 3263	OUT slave I/O data (node address 63)

Allocate the I/O data to the user-defined variables as shown in the example below.



This example uses the following three data types.

- Slave1_OutData_A (WORD type)
- Slave1_OutData_B (BOOL type)
- Slave1_OutData_C (union)

Use one of these data types or multiple data types to create user-defined variables according to the user program.

When the user program accesses the slave only with WORD type, use the WORD-type user-defined variables *Slave1_OutData_A* defined in the example.

The user-defined variables and I/O data of each slave are allocated as follows:

I/O Data	User-defined variable name	Address
OUT slave I/O data (node address 0)	Slave1_OutData_A[0]	3200
:		
OUT slave I/O data (node address 63)	Slave1_OutData_A[63]	3263

The user program accesses the slave with WORD-type variables.

When the user program accesses the slave only with BOOL type, use the BOOL-type user-defined variables *Slave1_OutData_B* defined in the example.

The user-defined variables and I/O data of each slave are allocated as follows:

I/O Data	User-defined variable name	Address
OUT slave I/O data (node address 0) Bit 0	Slave1_OutData_B[0,0]	3200.00
OUT slave I/O data (node address 0) Bit 1	Slave1_OutData_B[0,1]	3200.01
:		
OUT slave I/O data (node address 63) Bit 15	Slave1_OutData_B[63,15]	3263.15

The user program accesses the slave with BOOL-type variables.

When the user program accesses the slave with both WORD type and BOOL type, use the union-type user-defined variables *Slave1_OutData_C* defined in the example.

The user-defined variables and I/O data of each slave are allocated as follows:

I/O Data	User-defined variable name	Address
OUT slave I/O data (node address 0)	WORD type Slave1_OutData_C[0].w BOOL type Slave1_OutData_C[0].b[0] to Slave1_OutData_C[0].b[15]	3200 3200.00 3200.15
:		
OUT slave I/O data (node address 63)	WORD type Slave1_OutData_C[63].w BOOL type Slave1_OutData_C[63].b[0] to Slave1_OutData_C[63].b[15]	3263 3263.00 3263.15

The user program accesses the slave with WORD-type or BOOL-type variables.

When you use the union, prepare the union data type Mem that you can access with WORD and BOOL as shown below.

Additional Information

For details on memory used for CJ-series Unit, variable allocation, and user-defined variable registration, refer to the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504).

3-2 Device Variables for CJ-series Unit (Software Switches, Statuses)

When you operate and reference software switches and statuses, use the following device variables for CJ-series Unit allocated to the I/O port of this Unit.

Name of device variable for CJ-series Unit	Type	R/W	Area
*_Sw1Cmd	WORD	RW	Software Switches 1
*_Sw2Cmd	WORD	RW	Software Switches 2
*_MstrCOSSendCmd	LWORD	RW	Master COS Send Switch
*_CnctCmd	LWORD	RW	Disconnect/Connect Switches
*_Unit1Sta	WORD	R	Unit Status 1
*_Unit2Sta	WORD	R	Unit Status 2
*_Mstr1Sta	WORD	R	Master Status 1
*_Mstr2Sta	WORD	R	Master Status 2
*_Slav1Sta	WORD	R	Slave Status 1
*_Slav2Sta	WORD	R	Slave Status 2
*_RegSlavTblSta	LWORD	R	Registered Slave Table
*_NormSlavTblSta	LWORD	R	Normal Slave Table
*_CMstrSta	WORD	R	C200H Master Replacement Master Status 1

The function of each device variable for CJ-series Unit is explained below.

Described with variables names automatically created on the I/O Map View window.

3-2-1 Software Switches 1

Use one of the following device variables for CJ-series Unit is used to operate Software Switches 1 from the user program:

- WORD-type device variable for CJ-series Unit holding all switch functions contained in Software Switches 1
- BOOL-type device variable for CJ-series Unit separating functions per each switch contained in Software Switches 1

All switches execute some functions when the user changes them to TRUE. They change to FALSE automatically after the functions are executed.

Once a function is set by changing a switch to TRUE (except for the switches listed below), it is saved regardless of whether the power is turned OFF and ON again.

- **_Sw1IOCommStartCmd* (Remote I/O Communications Start Switch)
- **_Sw1IOCommStopCmd* (Remote I/O Communications Stop Switch)

Note No functions other than the master and slave communications are disabled by stopping master or slave communications.

If multiple switches are changed to TRUE simultaneously, the requests will generate errors and Unit operation will remain unchanged.

The device variables for CJ-series Unit corresponding to the following words will change to TRUE if a request made by a software switch ends in an error.

- **_Unit2Sta* (Unit Status 2)
- **_Mstr1Sta* (Master Status 1)

WORD-type device variables for CJ-series Unit holding all switch functions contained in Software Switches 1 are shown below.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Sw1Cmd	WORD	RW	Software Switches 1	Bits have the following functions: Bit 00: Scan List Enable Switch Bit 01: Scan List Clear Switch Bit 02: Remote I/O Communications Start Switch Bit 03: Remote I/O Communications Start Switch Bit 04: Remote I/O Communications Stop Switch Bit 05: Reserved by system Bit 06: Master Enable Switch Bit 07: Master Disable Switch Bit 08: Master Fixed Allocation Setting 1 Switch Bit 09: Master Fixed Allocation Setting 2 Switch Bit 10: Master Fixed Allocation Setting 3 Switch Bit 11: Master User-set Allocations Switch Bit 12: Temporary Setting Switch for Communications Cycle Time Bit 13: Communications Cycle Time Setting Switch Bit 14: Communications Cycle Time Reference Table Clear Switch Bit 15: Reserved by system Default: 16#0000

BOOL-type device variables for CJ-series Unit separating functions per each switch contained in Software Switches 1 are shown below.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Sw1SListEnblCmd	BOOL	RW	Scan List Enable Switch	<Operation specifications> FALSE→TRUE: Enables the scan list with fixed allocations. **Note** The allocated words are the ones set for use when the scan list is disabled. The following allocated words are the default settings when the scan list is disabled. • OUT area: CIO 3200 to CIO 3263 (1 word/1 node address (fixed)) • IN area: CIO 3300 to CIO 3363 (1 word/1 node address (fixed)) FALSE: Returns to FALSE when the scan list is registered and the Unit starts operating with the scan list enabled. Default: FALSE <Operation conditions> • CPU Unit is operating in PROGRAM mode. • Master function is enabled. • Scan list status is disabled.
*_Sw1SListClrCmd	BOOL	RW	Scan List Clear Switch	<Operation specifications> FALSE→TRUE: Clears and disables the scan list. This switch clears the scan list and operates the Unit using fixed allocations with the scan list disabled regardless of whether operating using fixed allocations, user-set allocations with device variables for CJ-series Unit, or user-set allocations by CX-Integrator. The fixed allocations area used the last time the scan list was disabled will be used. FALSE: Returns to FALSE when the scan list data is cleared and the Unit starts operating with the scan list disabled. Default: FALSE <Operation conditions> • CPU Unit is operating in PROGRAM mode. • Master function is enabled. • Scan list status is enabled.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Sw1IOCommStartCmd	BOOL	RW	Remote I/O Communications Start Switch	<Operation specifications> FALSE→TRUE: Starts remote I/O communications. **Note 1** The switch is ignored if remote I/O communications are already running. **2** This switch resumes remote I/O communications if they are stopped by a communications error. **3** Communications with a slave will fail even if remote I/O communications are started when *_*CnctCmd* (Disconnect/Connect Switches) is TRUE (Disconnect). FALSE: Returns to FALSE at the start of remote I/O communications. **Note** This switch will stop remote I/O communications if DIP switch pin 3 on the front panel (remote I/O communications stop/continue with a communications error) is ON (stop) and there is an ongoing communications or send error. Default: FALSE <Operation conditions> • Master function is enabled.
*_Sw1IOCommStopCmd	BOOL	RW	Remote I/O Communications Stop Switch	<Operation specifications> FALSE→TRUE: Stops remote I/O communications. Once remote I/O communications have been stopped, they will remain stopped until the Unit restarts or the remote I/O communications restart (i.e., until the Remote I/O Communications Start Switch is changed to TRUE). **Note 1** The switch is ignored if remote I/O communications are already stopped. **2** Message communications will remain enabled even if remote I/O communications are stopped. FALSE: Returns to FALSE when remote I/O communications stop. Default: FALSE <Operation conditions> • Master function is enabled.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Sw1MstrEnblCmd	BOOL	RW	Master Enable Switch	<Operation specifications> FALSE→TRUE: Enables master communications. (The Unit automatically restarts.) Once enabled, the Unit will function as a Master until *_*Sw1MstrDsblCmd* (Master Stop Switch) is changed to TRUE, regardless of whether the power is turned OFF and back ON again. **Note 1** Master communications are enabled by default. **2** If this bit is changed to TRUE with master communications enabled, a Unit status error will occur due to a software switch operation error and a C2 error will be displayed on the front 7-segment indicator. The 7-segment indicator will go out automatically after 30 seconds. FALSE: Returns to FALSE at the start of master communications. Default: FALSE <Operation conditions> • CPU Unit is operating in PROGRAM mode. • Master function is stopped.
*_Sw1MstrDsblCmd	BOOL	RW	Master Disable Switch	<Operation specifications> FALSE→TRUE: Stops master communications. (The Unit automatically restarts.) Set this switch to TRUE if the Unit will be used only for slave communications. FALSE: Returns to FALSE after master communications stop. Default: FALSE <Operation conditions> • CPU Unit is operating in PROGRAM mode. • Master function is enabled.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Sw1MstrFixAloc1Cmd	BOOL	RW	Master Fixed Allocation Setting 1 Switch	<Operation specifications> FALSE→TRUE: Sets the I/O allocation area for when the scan list is disabled to the following words. (Same as default. The Unit automatically restarts after the setting.) • OUT area: CIO 3200 to CIO 3263 (1 word/1 node address (fixed)) • IN area: CIO 3300 to CIO 3363 (1 word/1 node address (fixed)) **Note** The I/O words used with the scan list disabled are also used with the scan list enabled. Use *_*Sw1SListEnblCmd* (Scan List Enable Switch). FALSE: Returns to FALSE after the fixed allocations areas are set. Default: FALSE <Operation conditions> • CPU Unit is operating in PROGRAM mode. • Master function is enabled. • Scan list status is disabled.
*_Sw1MstrFixAloc2Cmd	BOOL	RW	Master Fixed Allocation Setting 2 Switch	Functions the same as *_*Sw1MstrFixAloc1Cmd* (Master Fixed Allocation Setting 1 Switch). Sets the I/O allocation area to the following words. (The Unit automatically restarts.) • OUT area: CIO 3400 to CIO 3463 (1 word/1 node address (fixed)) • IN area: CIO 3500 to CIO 3563 (1 word/1 node address (fixed))
*_Sw1MstrFixAloc3Cmd	BOOL	RW	Master Fixed Allocation Setting 3 Switch	Functions the same as *_*Sw1MstrFixAloc1Cmd* (Master Fixed Allocation Setting 1 Switch). Sets the I/O allocation area to the following words. (The Unit automatically restarts.) • OUT area: CIO 3600 to CIO 3663 (1 word/1 node address (fixed)) • IN area: CIO 3700 to CIO 3763 (1 word/1 node address (fixed))

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Sw1MstrAlocCmd	BOOL	RW	Master User-set Allocations Switch	<Operation specifications> FALSE→TRUE: Reads setting data from *_*MstrAlocTblCfg[0]* to *_*MstrAlocTblCfg[5]* (Master User-set Allocations Setup Table) and registers the scan list. (The Unit automatically restarts.) Once registered, the Unit will operate with master user-set allocations until the scan list is cleared, regardless of whether the power is turned OFF and back ON again. FALSE: Returns to FALSE when the scan list is registered and the Unit starts operating with the scan list enabled. **Note** If there is a setting information error, an error code will be stored in *_*MstrAlocTblCfgSta* (Setting Results of Master User-set Allocations Setup) and *_*Mstr1SListRegErr* (Scan List Register/Clear Failed) will change to TRUE. Default: FALSE <Operation conditions> • CPU Unit is operating in PROGRAM mode. • Master function is enabled.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Sw1CycleTmTmpSet	BOOL	RW	Temporary Setting Switch for Communications Cycle Time	<Operation specifications> FALSE→TRUE: Reads setting data from *_*CommCycleTmCfg* (Communications Cycle Time Setting) and temporarily changes the communications cycle time. Use this to temporarily extend the communications cycle time to place priority on message communications. **Note** You can change the cycle time in any CPU Unit operating mode. FALSE: Returns to FALSE after the communications cycle time is changed. *_*CycleTmRefTblSta[0]* to *_*CycleTmRefTblSta[3]* (Communications Cycle Time Reference Table) will be cleared before the switch returns to FALSE if the change was successfully completed. *_CycleTmRefTblSta[0] to *_CycleTmRefTblSta[3] (*Communications Cycle Time Reference Table*) will be cleared before the switch returns to FALSE if the change was successfully completed. **Note** *_*Mstr1CycleTmSetErr* (Communications Cycle Time Setting Failed) will change to TRUE if there is a setting error, and the Communications Cycle Time Reference Table will not be cleared. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Sw1CycleTmSetCmd	BOOL	RW	Communications Cycle Time Setting Switch	<Operation specifications> FALSE→TRUE: Reads setting data from *_*CommCycleTmCfg* (Communications Cycle Time Setting) to change the communications cycle time and to store the communications cycle time in non-volatile memory in the Unit. The setting will therefore be valid again when the power is turned OFF and back ON, or when the Unit is restarted. FALSE: Returns to FALSE after the communications cycle time is changed. *_*CycleTmRefTblSta[0]* to *_*CycleTmRefTblSta[3]* (Communications Cycle Time Reference Table) will be cleared before the switch returns to FALSE if the change was successfully completed. **Note** *_*Mstr1CycleTmSetErr* (Communications Cycle Time Setting Failed) will change to TRUE if there is a setting error. In this case, *_*CycleTmRefTblSta[0]* to *_*CycleTmRefTblSta[3]* (Communications Cycle Time Reference Table) will not be cleared. Default: FALSE <Operation conditions> • CPU Unit is operating in PROGRAM mode.
*_Sw1CycleTmClrCmd	BOOL	RW	Communications Cycle Time Reference Table Clear Switch	<Operation specifications> FALSE→TRUE: Clears data from *_*CycleTmRefTblSta[0]* to *_*CycleTmRefTblSta[3]* (Communications Cycle Time Reference Table). The data that is cleared will be updated with new data. FALSE: Returns to FALSE after the data from *_*CycleTmRefTblSta[0]* to *_*CycleTmRefTblSta[3]* (Communications Cycle Time Reference Table) is cleared. Default: FALSE

3-2-2 Software Switches 2 (n + 1CH)

Use one of the following device variables for CJ-series Unit to operate Software Switches 2 from the user program:

- WORD-type device variable for CJ-series Unit holding all switch functions contained in Software Switches 2
- BOOL-type device variable for CJ-series Unit separating functions per each switch contained in Software Switches 2

All switches are set to TRUE by the user. The Unit automatically changes them to FALSE after the function is executed.

Once a function is set by changing the status to TRUE (except for the switches listed below), it is saved regardless of whether the power is turned OFF and back ON again.

- *_*Sw2SlavCOSSendCmd* (Slave COS Send Switch)
- *_*Sw2FileRestoreCmd* (Unit Setup File Restore Switch)
- *_*Sw2FileBkupCmd* (Unit Setup File Backup Switch)

If multiple switches are changed to TRUE simultaneously, all requests will generate errors but they will not alter Unit operation.

The error bits corresponding to the following words will change to TRUE if a request made by a software switch ends in an error.

- *_*Slav1Sta* (Slave Status 1)

WORD-type device variables for CJ-series Unit holding all switch functions contained in Software Switches 2 are shown below.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Sw2Cmd	WORD	RW	Software Switches 2	Bits 0 to 05: Reserved by system Bit 06: Slave Enable Switch Bit 07: Slave Stop Switch Bit 08: Slave Fixed Allocation Setting 1 Switch Bit 09: Slave Fixed Allocation Setting 2 Switch Bit 10: Slave Fixed Allocation Setting 3 Switch Bit 11: Slave User Allocations Switch Bit 12: Slave COS Send Switch Bit 13: Reserved by system Bit 14: Unit Setup File Restore Switch Bit 15: Unit Setup File Backup Switch Default: 16#0000

BOOL-type device variables for CJ-series Unit separating functions per each switch contained in Software Switches 2 are shown below.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Sw2SlavEnblCmd	BOOL	RW	Slave Enable Switch	<Operation specifications> FALSE→TRUE: Enables slave communications. (The Unit automatically restarts.) To use fixed allocations, set this switch to TRUE after setting *_*Sw2SlavFixAloc1Cmd* to *_*Sw2SlavFixAloc3Cmd* (Slave Fixed Allocation Setting Switch) to TRUE. To use user-set allocations, set this switch to TRUE after setting *_*Sw2SlavAlocCmd* (Slave User Allocations Switch) to TRUE. Once enabled, the Unit will function as a slave until *_ *Sw2SlavDsblCmd* (Slave Stop Switch) is changed to TRUE regardless of whether the power is turned OFF and back ON again. **Note 1** Slave communications are disabled by default. **2** If this bit is changed to TRUE with slave communications enabled, a Unit status error will occur due to a software switch operation error and a C2 error will be displayed on the front 7-segment indicator. The 7-segment indicator will go out automatically after 30 seconds. FALSE: Returns to FALSE at the start of slave communications. Default: FALSE <Operation conditions> • CPU Unit is operating in PROGRAM mode. • Slave function is stopped.
*_Sw2SlavDsblCmd	BOOL	RW	Slave Stop Switch	<Operation specifications> FALSE→TRUE: Stops slave communications. (The Unit automatically restarts.) Set this switch to TRUE if the Unit will be used only for master communications. FALSE: Returns to FALSE after slave communications stop. Default: FALSE <Operation conditions> • CPU Unit is operating in PROGRAM mode. • Slave function is enabled.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Sw2SlavFixAloc1Cmd	BOOL	RW	Slave Fixed Allocation Setting 1 Switch	<Operation specifications> FALSE→TRUE: Sets the Slave Fixed Allocation Area to the following words. • OUT 1 area (input to the CPU Unit): CIO 3370 (1 word allocated) • IN 1 area (output from the CPU Unit): CIO 3270 (1 word allocated) • OUT 2 area: Not used • IN 2 area: Not used **Note 1** Disable slave communications before this switch is changed to TRUE. After this switch is changed to TRUE, change **_Sw2SlavEnblCmd* (Slave Enable Switch) to TRUE to enable Fixed Allocation. **2** This is the default setting for the Unit. **3** The words allocated by this switch are used as the I/O area for the slave. (Use **_Sw2SlavEnblCmd* (Slave Enable Switch).) FALSE: Returns to FALSE after fixed allocations are set. Default: FALSE <Operation conditions> • CPU Unit is operating in PROGRAM mode. • Slave function is stopped.
*_Sw2SlavFixAloc2Cmd	BOOL	RW	Slave Fixed Allocation Setting 2 Switch	Functions the same as **_Sw2SlavFixAloc1Cmd_DRM2* (Slave Fixed Allocation Setting 1 Switch). Sets the Slave Fixed Allocation Area to the following words. • OUT 1 area (input to the CPU Unit): CIO 3570 (1 word allocated) • IN 1 area (output from the CPU Unit): CIO 3470 (1 word allocated) • OUT 2 area: Not used • IN 2 area: Not used
*_Sw2SlavFixAloc3Cmd	BOOL	RW	Slave Fixed Allocation Setting 3 Switch	Functions the same as **_Sw2SlavFixAloc1Cmd_DRM2* (Slave Fixed Allocation Setting 1 Switch). Sets the Slave Fixed Allocation Area to the following words. • OUT 1 area (input to the CPU Unit): CIO 3770 (1 word allocated) • IN 1 area (output from the CPU Unit): CIO 3670 (1 word allocated) • OUT 2 area: Not used • IN 2 area: Not used

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Sw2SlavAlocCmd	BOOL	RW	Slave User Allocations Switch	<Operation specifications> FALSE→TRUE: Reads setting data from *_*SlavAlocTblCfg[0]* to *_*SlavAlocTblCfg[5]* (Slave User-set Allocations Setup Table) and registers slave user-set allocations. Once registered, the Unit will operate with slave user-set allocations until slave communications are disabled (Slave Stop Switch is changed to TRUE), regardless of whether the power is turned OFF and back ON again. **Note** Disable slave communications before this switch is changed to TRUE. After the switch is changed to TRUE, change *_*Sw2SlavEnblCmd* (Slave Enable Switch) to TRUE to enable User-set Allocations. FALSE: Returns to FALSE at the start of operation for slave user-set allocations after they are registered. **Note** *_*Slav1FunSetErr* (Slave Function Enable/Disable Failed) in Unit Status 2 will change to TRUE if there is a setting error. Default: FALSE <Operation conditions> • CPU Unit is operating in PROGRAM mode. • Slave function is stopped.
*_Sw2SlavCOSSendCmd	BOOL	RW	Slave COS Send Switch	<Operation specifications> FALSE→TRUE: Sends COS input data to the master. FALSE: Returns to FALSE after transmission is completed regardless of whether it was completed normally or in error. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Sw2FileRestoreCmd	BOOL	RW	Unit Setup File Restore Switch	<Operation specifications> FALSE→TRUE: Reads Unit settings (for details on the scan list, communications cycle time settings, etc., refer to *7-1 SD Memory Card Backup Functions* on page 7-2.) from the file within the SD Memory Card of the CPU Unit and downloads the data as Unit settings. (The Unit automatically restarts.) **Note** After the file data is downloaded, the Unit automatically restarts with the new data. FALSE: Returns to FALSE when the Unit restarts if the data is read properly. **Note** *_*FileRWErr* (File Read/Write Error) will change to TRUE if there is a setup data error or a file read error. Default: FALSE <Operation conditions> • CPU Unit is operating in PROGRAM mode.
*_Sw2FileBkupCmd	BOOL	RW	Unit Setup File Backup Switch	<Operation specifications> FALSE→TRUE: Writes Unit settings (for details on the scan list, communications cycle time settings, etc., refer to *7-1 SD Memory Card Backup Functions* on page 7-2.) as a file within the SD Memory Card of the CPU Unit. **Note** Files can only be backed up with the scan list enabled. You cannot make a back-up with the scan list disabled. FALSE: Returns to FALSE after the data is written to a file. **Note** *_*FileRWErr* (File Read/Write Error) in Unit Status 2 will change to TRUE if data failed to write to a file. Default: FALSE <Operation conditions> • Scan list status is enabled.*

* When the Master function is enabled, the Unit Setup File cannot be backed up unless the scan list is enabled.

3-2-3 Master COS Send Switches

Use one of the following device variables for CJ-series Unit is used to operate Master COS Send Switches.

- **_MstrCOSSendCmd*
  LWORD-type device variable for CJ-series Unit that is capable of operating switches for all slaves (node addresses 0 to 63).
- **_MstrCOSSendNdCmd[0 to 63]*
  BOOL-type device variable for CJ-series Unit that is capable of operating switches for any slave of node addresses 0 to 63.

Bits 00 to 63 of **_MstrCOSSendCmd* (Master COS Send Switch) and array elements of *MstrCOSSendNdCmd[0 to 63]* correspond to slaves at node addresses 0 to 63.

If a bit or device variable for CJ-series Unit is changed to TRUE, then COS output data will be sent to the corresponding slave.

You can simultaneously change multiple Master COS Switches to TRUE for multiple slaves. Once COS data are sent to slaves, the corresponding switches will be changed back to FALSE.

If a send error occurs, the bit corresponding to **_Nd0Sta* to **_Nd63Sta* (Slave Detailed Status) will change to TRUE.

The following device variable for CJ-series Unit is used when you execute functions for multiple slaves at the same time.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_MstrCOSSendCmd	LWORD	RW	Master COS Send Switch	Executes the operation of Master COS Send Switches for multiple slaves at the same time. Bits 0 to 63 correspond to the Master COS Send Switches for slaves at node addresses 0 to 63. Data range: 16#0000000000000000 to FFFFFFFFFFFFFFFF Default: 16#0000000000000000

The following device variable for CJ-series Unit is used when you execute an individual function for each slave.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_MstrCOSSendNdCmd[0 to 63]	BOOL	RW	Master COS Send Switch for Node Address 0-63 Slave	<Operation specifications> FALSE→TRUE: Sends COS output data to the corresponding slave. FALSE: Returns to FALSE when COS is sent. Default: FALSE

3-2-4 Disconnect/Connect Switches

Use one of the following device variables for CJ-series Unit is used to operate Disconnect/Connect Switches from the user program.

- *_CnctCmd*
  LWORD-type device variable for CJ-series Unit that is capable of operating switches for all slaves (node addresses 0 to 63).
- *_CnctNdCmd[0 to 63]*
  BOOL-type device variable for CJ-series Unit that is capable of operating switches for any slave of node addresses 0 to 63.

Bits 00 to 63 of *_CnctCmd* (Disconnect/Connect Switches) and array elements of *_CnctNdCmd[0 to 63]* correspond to slaves at node addresses 0 to 63.

If a bit or device variable for CJ-series Unit is changed to TRUE, then the remote I/O communications to the slave will be temporarily stopped (i.e., it is disconnected from the network). A communications error will occur for any slave that is disconnected if the corresponding switch is changed to TRUE during communications.

Disconnect/Connect Switches are used primarily to replace slaves or to reserve a place for a slave that will be added (when a Unit is registered in the scan list but not yet connected). A communications error and verification error for the slave that is disconnected will not be generated at the master as long as the corresponding switch is TRUE.

Remote I/O communications will restart (reconnect) with the corresponding slave if a user returns the Disconnect/Connect Switches to FALSE.

More than one of these switches may be changed to ON for multiple slaves at the same time. If the switch for a slave that is not using remote I/O communications is set to TRUE, it will be ignored.

A Unit that is disconnected can still perform message communications.

Changing this switch to TRUE does not effect the communications cycle time (except that it increases blank time in the communications cycle).

Note All Disconnect/Connect Switches and device variable for CJ-series Unit are cleared and returned to FALSE when the power is turned OFF. If required, write a user program to turn them back to TRUE when the power is turned ON.

The following device variable for CJ-series Unit is used when you execute the functions for multiple slaves at the same time.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_CnctCmd	LWORD	RW	Disconnect/Connect Switches	Executes the operation of Disconnect/Connect Switches for multiple slaves at the same time. Bits 0 to 63 correspond to the Disconnect/Connect Switches for slaves at node addresses 0 to 63. Default: 16#0000000000000000

The following device variable for CJ-series Unit is used when you execute an individual function for each slave.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_CnctNdCmd[0 to 63]	BOOL	RW	Discon-nect/Con-nect Switches for Node Address 0-63 Slave	<Operation specifications> TRUE: Stops remote I/O communications with the corresponding slave. FALSE: Starts remote I/O communications with the corresponding slave. Default: FALSE

3-2-5 Unit Status 1

The following device variable for CJ-series Unit is used to reference all information of Unit Status 1.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Unit1Sta	WORD	R	Unit Status 1	Bit 00: Unit Error Bit 01: Master Function Error Bit 02: Reserved by system Bit 03: Slave Function Error Bit 04: Unit Memory Error Bit 05: Bus Off Error Bit 06: Node Address Duplicated Error Bit 07: Network Power Error Bit 08: Send Timeout Error Bit 09: Reserved by system Bit 10: Reserved by system Bit 11: Reserved by system Bit 12: Routing Table Error Bit 13: Invalid Message Timer List Error Bit 14: Reserved by system Bit 15: Reserved by system Default: 16#0000

The following device variables for CJ-series Unit are used to reference individual information.

Name of device variables for CJ-series Unit	Type	R/W	Area	Function
*_UnitErr	BOOL	R	Unit Error	<Operation specifications> TRUE: Displays DeviceNet Unit operating errors. *_*UnitErr* (Unit Error) changes to TRUE if any bit from 01 to 15 in *_*Unit1Sta* (Unit Status 1) is TRUE (OR information of bits 01 to 15). Usage example: When you write the program for remote I/O communications, use this bit as an N.C. input condition to control slave I/O processing. FALSE: Indicates that the error did not occur. Or, changes to FALSE when the error is cleared. Default: FALSE
*_MstrFunErr	BOOL	R	Master Function Error	<Operation specifications> TRUE: Indicates that at least one master error occurred. Refer to *_*Mstr1Sta* (Master Status 1). The master errors are as follows: • *_*Mstr1VefyErr* (Verification Error) • *_*Mstr1StruErr* (Structure Error) • *_*Mstr1IOErr* (Remote I/O Communication Error) • *_*Mstr1SListErr* (Invalid Scan List Data Error) • *_*Mstr1IORefErr* (Master I/O Refresh Error) FALSE: Indicates that none of above errors occured. Or, changes to FALSE when all of above errors are cleared. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_SlavFunErr	BOOL	R	Slave Function Error	<Operation specifications> TRUE: Indicates that at least one slave error occurred. Refer to *_*Slav1Sta* (Slave Status 1). The slave errors are as follows: • *_*Slav1IO1Err* (Remote I/O Communications Error with slave communications enabled, for OUT 1/IN 1) • *_*Slav1IO2Err* (Remote I/O Communications Error with slave communications enabled, for OUT 2/IN 2) • *_*Slav1FunDatErr* (Invalid Setup Data) • *_*Slav1IORefErr* (Slave I/O Refresh Error) FALSE: Indicates that none of the above errors occured. Or, changes to FALSE when all of above errors are cleared. Default: FALSE
*_MemErr	BOOL	R	Unit Memory Error	<Operation specifications> TRUE: Indicates an error in internal memory where the error history is stored. (The error occurs when the Unit starts up or when the error history is written.) FALSE: Indicates that the error did not occur. Once this error occurs, the bit will remain TRUE and will not return to FALSE (Normal). Default: FALSE
*_BusoffErr	BOOL	R	Bus Off Error	<Operation specifications> TRUE: Indicates that a Bus OFF error (communications were stopped by multiple data errors) occurred. When a Bus OFF occurs, the Unit goes offline and all communications stop (remote I/O communications are stopped, slave operation is stopped, and message communications are disabled). FALSE: Indicates that the error did not occur. Once this error occurred, the bit will remain TRUE and will not return to FALSE (Normal). Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_NdAdrDupErr	BOOL	R	Node Address Duplicated Error	<Operation specifications> TRUE: Indicates a duplicate node address check error when the Unit starts up. The Unit goes offline and all communications stop. (Remote I/O communications stop, slave operation stop, and message communications are disabled). FALSE: Indicates that the error did not occur. Once this error occurs, the bit will remain TRUE and will not return to FALSE (Normal). Default: FALSE
*_NetPwrErr	BOOL	R	Network Power Error	<Operation specifications> TRUE: Indicates that there is no power from the network power supply. **Note** Remote I/O communications stop if DIP switch pin 3 (remote I/O communications stop/continue with a communications error) on the front panel is ON (stop). FALSE: Indicates that the error did not occur. Or, changes to FALSE when the network power supply restarts. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_SendTimeoutErr	BOOL	R	Send Time-out Error	<Operation specifications> TRUE: Indicates that a send timeout occurred due to one of the following factors: • No slaves present. • Mismatched baud rate settings. **Note** Remote I/O communications stop if DIP switch pin 3 (remote I/O communications stop/continue with a communications error) on the front panel is ON (stop). FALSE: Returns to FALSE at the start of communications even with just one slave. Default: FALSE
*_RTblErr	BOOL	R	Routing Table Error	<Operation specifications> TRUE: Incorrect data in the routing tables set in the CPU Unit. FALSE: Indicates that the error did not occur. This error will not occur if a routing table is not set. Default: FALSE
*_MsgListErr	BOOL	R	Invalid Message Timer List Error	<Operation specifications> TRUE: Indicates that the data in the message monitoring timer list is not correct. FALSE: Indicates that the data in the message monitoring timer list is correct. Changes to FALSE if CX-Integrator registers a message monitoring timer list when the error occurs. Default: FALSE

3-2-6 Unit Status 2

The following device variables for CJ-series Unit is used to reference all information of Unit Status 2.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Unit2Sta	WORD	R	Unit Status 2	Bit 00: Online Status Bit 01: Remote I/O Communications Status Bit 02: Reserved by system Bit 03: Master Function Enabled Status Bit 04: Scan List Disabled Status Bit 05: Reserved by system Bit 06: Automatic Slave Connection Status Bit 07: Slave Function Enabled Status Bit 08: File Read/Write Error Bit 09: Reserved by system Bit 10: Reserved by system Bit 11: Reserved by system Bit 12: Reserved by system Bit 13: Reserved by system Bit 14: Reserved by system Bit 15: Error History Registered Flag Default: 16#0000

The following device variables for CJ-series Unit are used to reference individual information.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_OnlineSta	BOOL	R	Online Status	<Operation specifications> TRUE: Indicates that the Unit is online. **Note** When the Send Command instruction (SendCmd) is executed from the user program, use *_Port_isAvailable* (Communications Port Enabled Flag) in the CPU Unit and this flag as an AND input condition. FALSE: Indicates that the Unit is offline. A Unit will go offline under the following conditions: • Operation is stopped by the hardware/software check at startup. • An error occurred in the duplicate node address check (Refer to *_*NdAdrDupErr* (Node Address Duplicated Error)). • A Bus OFF error occurred (Refer to *_*BusoffErr* (Bus Off Error)). Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_IOCommSta	BOOL	R	Remote I/O Communications Status	<Operation specifications> TRUE: Indicates that remote I/O communications are being performed for the master function. **Note** This variable only indicates the start of remote I/O communications, and does not indicate whether data was actually exchanged with slaves. Actual data exchange between one or more slaves is monitored from *_*Mstr1IOCommSta_DRM* (I/O Data Communications Status). Therefore use the I/O Data Communications Status rather than this bit as the input condition in I/O processing for slaves from the program. FALSE: Indicates remote I/O communications stopped. Normally, the Unit will perform remote I/O communications automatically. **Note** This bit only indicates the start of remote I/O communications, and does not indicate whether data was actually exchanged with slaves. Actual data exchange between one or more slaves is monitored from *_*Mstr1IOCommSta* (I/O Data Communications Status). Therefore use the I/O Data Communications Status rather than this bit as the input condition in I/O processing for slaves from the program. Default: FALSE
*_MstrEnblSta	BOOL	R	Master Function Enabled Status	<Operation specifications> TRUE: Indicates that master communications are enabled (Unit is operating as a master). FALSE: Indicates that master communications are disabled. Default: FALSE
*_SListDsblSta	BOOL	R	Scan List Disabled Status	<Operation specifications> TRUE: Indicates that the Unit is operating with the scan list disabled. FALSE: Indicates that the Unit is operating with the scan list enabled. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_SlavConnTypSta	BOOL	R	Automatic Slave Connection	<Operation specifications> TRUE: Indicates that the connection type was automatically set in the slave scan list. This device variable for CJ-series Unit is valid only with slave communications enabled. FALSE: Indicates that the connection type was set from CX-Integrator in the slave scan list. **Note** The type of connection in slave communications cannot be specified without CX-Integrator. If it is not set from CX-Integrator, it will be set automatically. Default: FALSE
*_SlavEnblSta	BOOL	R	Slave Function Enabled	<Operation specifications> TRUE: Indicates that slave communications are enabled. FALSE: Indicates that slave communications are disabled. Default: FALSE
*_FileRWErr	BOOL	R	File Read/Write Error	<Operation specifications> TRUE: Indicates that an error occurred when user setup data is read from a SD Memory Card in the CPU Unit or when data is written as a file to a SD Memory Card. FALSE: Indicates that the error did not occur. Changes to FALSE when the Unit has successfully completed the operation. Default: FALSE
*_ErrHistorySta	BOOL	R	Error History Registered Flag	<Operation specifications> TRUE: Indicates that an error history was registered. Changes to TRUE at the first error history registration for the Unit. FALSE: Indicates that no errors are registered in the error history. Changes to FALSE when the Unit receives an error history clear request. Default: FALSE

3-2-7 Master Status 1

The following device variable for CJ-series Unit is used to reference all information of Master Status 1.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Mstr1Sta	WORD	R	Master Status 1	Bit 00: Verification Error Bit 01: Structure Error Bit 02: Remote I/O Communications Error Bit 03: Reserved by system Bit 04: Invalid Scan List Data Error Bit 05: Master I/O Refresh Error Bit 06: Reserved by system Bit 07: Reserved by system Bit 08: Master Function Enable/Disable Failed Bit 09: Master User-set Allocations User Setting Failed Bit 10: Master Fixed Allocation Area Setting Failed Bit 11: Scan List Register/Clear Failed Bit 12: Communications Cycle Time Setting Failed Bit 13: Reserved by system Bit 14: Reserved by system Bit 15: I/O Data Communications Status Default: 16#0000

The following device variables for CJ-series Unit are used to reference individual information.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Mstr1VefyErr	BOOL	R	Verification Error	<Operation specifications> TRUE: Indicates that the slave information registered in the scan list is different from the actual slave information. It occurs with the scan list enabled. FALSE: Indicates that a verification error did not occur. Or, changes to FALSE when a verification error is cleared. Default: FALSE
*_Mstr1StruErr	BOOL	R	Structure Error	<Operation specifications> TRUE: Indicates that I/O allocations cannot be made with the scan list disabled. FALSE: Indicates that a structure error did not occur. Or, changes to FALSE when a structure error is cleared. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Mstr1IOErr	BOOL	R	Remote I/O Communications Error	<Operation specifications> TRUE: Indicates that a remote I/O communications timeout occurred during remote I/O communications with slaves. **Note** Remote I/O communications stop if DIP switch pin 3 (remote I/O communications stop/continue with a communications error) on the front panel is ON (stop). This error occurs with the scan list enabled or disabled. FALSE: Indicates that a remote I/O communications error did not occur. Or, changes to FALSE when a remote I/O communications error is cleared. Default: FALSE
*_Mstr1SListErr	BOOL	R	Invalid Scan List Data Error	<Operation specifications> TRUE: Indicates that there is incorrect data in the scan list (mismatched checksum). Remote I/O communications in the Unit will stop. (Slave operations and message communications will continue.) FALSE: Indicates that the scan list data is correct. Changes to FALSE when an incorrect scan list data error occurs and then the correct scan list is registered. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Mstr1IORefErr	BOOL	R	Master I/O Refresh Error	<Operation specifications> TRUE: Indicates that the I/O memory in the CPU Unit that is to be refreshed is not present during I/O refreshing for the master. FALSE: Indicates that no master I/O refresh errors occurred. Default: FALSE
*_Mstr1FunSetErr	BOOL	R	Master Function Enable/Disable Failed	<Operation specifications> TRUE: Indicates that an error occurred in the following operations: • *_*Sw1MstrEnblCmd* (Master Enable Switch) • *_*Sw1MstrDsblCmd* (Master Stop Switch) Once this bit changes to TRUE, it will remain TRUE until the operation is successfully completed. FALSE: Indicates that the error did not occur. The bit changes to FALSE when the operation is successfully completed. Default: FALSE
*_Mstr1AlocErr	BOOL	R	Master User-set Allocations User Setting Failed	<Operation specifications> TRUE: Indicates that an error occurred in the following operations: • *_*Sw1MstrAlocCmd* (Master User-set Allocations Switch) Once this bit changes to TRUE, it will remain TRUE until the operation is successfully completed. Details on the master user-set allocation results are output to *MstrAlocTblCfgSta* (Setting Results of Master User-set Allocations Setup). FALSE: Indicates that the error did not occur. The bit changes to FALSE when the operation is successfully completed. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Mstr1FixAlocErr	BOOL	R	Master Fixed Allocation Area Setting Failed	<Operation specifications> TRUE: Indicates that an error occurred in one of the following operations: • *_*Sw1MstrFixAloc1Cmd* (Master Fixed Allocation Setting 1 Switch) • *_*Sw1MstrFixAloc2Cmd* (Master Fixed Allocation Setting 2 Switch) • *_*Sw1MstrFixAloc3Cmd* (Master Fixed Allocation Setting 3 Switch) Once this bit changes to TRUE, it will remain TRUE until the operation is successfully completed. FALSE: Indicates that the error did not occur. The bit changes to FALSE when the operation is successfully completed. Default: FALSE
*_Mstr1SListRegErr	BOOL	R	Scan List Register/ Clear Failed	<Operation specifications> TRUE: Indicates that an error occurred in one of the following operations: • *_*Sw1SListEnblCmd* (Scan List Enable Switch) • *_*Sw1SListClrCmd* (Scan List Clear Switch) Once this bit changes to TRUE, it will remain TRUE until the operation is successfully completed. FALSE: Indicates that the error did not occur. The bit changes to FALSE when the operation is successfully completed. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Mstr1CycleTmSetErr	BOOL	R	Communications Cycle Time Setting Failed	<Operation specifications> TRUE: Indicates that an error occurred when setting *_*Sw1CycleTmTmpSet* (Temporary Setting Switch for Communications Cycle Time) or *_*Sw1CycleTmSetCmd* (Communications Cycle Time Setting Switch). Once this bit changes to TRUE, it will remain TRUE until the operation is successfully completed with the device variable for CJ-series Unit. FALSE: Indicates that the error did not occur. The bit changes to FALSE when the operation is successfully completed. Default: FALSE
*_Mstr1IOCommSta	BOOL	R	I/O Data Communications Status	<Operation specifications> TRUE: Indicates that at least one slave is performing remote I/O communications. Usage example: When writing the user program for master remote I/O communications, use this bit as an N.O. input condition to control slave I/O processing. FALSE: Indicates that remote I/O communications are not conducted with any slaves. Default: FALSE

3-2-8 Master Status 2

The following device variables for CJ-series Unit indicate the status of master I/O allocations.

Information of *MstrIOAlocSta* (Master I/O Allocation Status) can be referenced from *_*Mstr2Sta* (Master Status 2).

● Master I/O Allocation Status Codes and Allocation Statuses

Code	Details
16#00	Unit starting up
16#01	Fixed allocation status 1 (with the scan list disabled)
16#02	Fixed allocation status 2 (with the scan list disabled)
16#03	Fixed allocation status 3 (with the scan list disabled)
16#11	Fixed allocation status 1
16#12	Fixed allocation status 2
16#13	Fixed allocation status 3
16#20	User-set allocations set with device variable for CJ-series Unit
16#30	User-set allocations set by CX-Integrator
16#80	Master function disabled

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_ Mstr2Sta	WORD	R	Master Status 2	Bits 00 to 07: Reserved by system Bits 08 to 15: Master I/O Allocation Status Default: 16#0000

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_ MstrIOAlocSta	BYTE	R	Master I/O Allocation Status	Master I/O Allocation Status Data range: 16#00 to 03, 16#11 to 13, 16#20, 16#30, 16#80 Default: 16#00

3-2-9 Slave Status 1

The following device variable for CJ-series Unit is used to reference all information of Slave Status 1.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Slav1Sta	WORD	R	Slave Status 1	Bit 00: Reserved by system Bit 01: Reserved by system Bit 02: Remote I/O Communications Error with slave communications enabled, for OUT 1/IN 1 Bit 03: Remote I/O Communications Error with slave communications enabled, for OUT 2/IN 2 Bit 04: Invalid Setup Data Bit 05: Slave Function I/O Refresh Error Bit 06: Reserved by system Bit 07: Reserved by system Bit 08: Slave Function Enable/Disable Failed Bit 09: Slave User-set Allocations User Setting Failed Bit 10: Slave Fixed Allocation Area Setting Failed Bit 11: Slave COS Send Failed Bit 12: Connection 2 Established Bit 13: Connection 1 Established Bit 14: Remote I/O Communications for OUT 2/IN 2 Bit 15: Remote I/O Communications for OUT 1/IN 1 Default: 16#0000

The following device variables for CJ-series Unit are used to reference individual information.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Slav1IO1Err	BOOL	R	Remote I/O Communications Error for OUT 1/IN 1	<Operation specifications> TRUE: Indicates that a communications error occurred in the OUT 1/IN 1 slave I/O connection. FALSE: Indicates that a remote I/O communications error with slave communications enabled, for OUT 1/IN 1 did not occur. Or changes to FALSE when a remote I/O communications error with slave communications enabled, for OUT 1/IN 1 is cleared. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Slav1IO2Err	BOOL	R	Remote I/O Communications Error for OUT 2/IN 2	<Operation specifications> TRUE: Indicates that a communications error occurred in the OUT 2/IN 2 Slave I/O connection. FALSE: Indicates that a remote I/O communications error with slave communications enabled, for OUT 2/IN 2 did not occur. Or changes to FALSE when a remote I/O communications error with slave communications enabled, for OUT 2/IN 2 is cleared. Default: FALSE
*_Slav1FunDatErr	BOOL	R	Invalid Setup Data	<Operation specifications> TRUE: Indicates that there is incorrect data in slave settings (mismatched checksum). The Unit stops slave communications. (Remote I/O communications and message communications continue.) FALSE: Indicates that a Unit is operating with the correct slave setting data or without slave communications being set. Changes to FALSE when the slave is properly set after a slave setup data error occurs. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Slav1IORefErr	BOOL	R	Slave I/O Refresh Error	<Operation specifications> TRUE: Indicates that the I/O memory in the CPU Unit that is to be refreshed is not present during I/O refreshing for the slave function. It occurs in several situations, such as when an I/O area is allocated in an EM bank that is not present. FALSE: Indicates that a slave I/O refresh error did not occur. Default: FALSE
*_Slav1FunSetErr	BOOL	R	Slave Function Enable/Disable Failed	<Operation specifications> TRUE: Indicates that an error occurred in one of the following operations: • *_*Sw2SlavEnblCmd* (Slave Enable Switch) • *_*Sw2SlavDsblCmd* (Slave Stop Switch) Once this bit changes to TRUE, it will remain TRUE until the operation is successfully completed. FALSE: Indicates that the error did not occur. The bit changes to FALSE when the operation is successfully completed. Default: FALSE
*_Slav1AlocErr	BOOL	R	Slave User-set Allocations User Setting Failed	<Operation specifications> TRUE: Indicates that an error occurred in the following operations: • *_*Sw2SlavAlocCmd* (Slave User Allocations Switch) Once this bit changes to TRUE, it will remain TRUE until the operation is successfully completed. FALSE: Indicates that the error did not occur. The bit changes to FALSE when the operation is successfully completed. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Slav1FixAlocErr	BOOL	R	Slave Fixed Allocation Area Setting Failed	<Operation specifications> TRUE: Indicates that an error occurred in one of the following operations: • *_*Sw2SlavFixAloc1Cmd* (Slave Fixed Allocation Setting 1 Switch) • *_*Sw2SlavFixAloc2Cmd* (Slave Fixed Allocation Setting 2 Switch) • *_*Sw2SlavFixAloc3Cmd* (Slave Fixed Allocation Setting 3 Switch) Once this bit changes to TRUE, it will remain TRUE until the operation is successfully completed. FALSE: Indicates that the error did not occur. The bit changes to FALSE when the operation is successfully completed. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Slav1COSSendErr	BOOL	R	COS Send Failed	<Operation specifications> TRUE: Indicates that an attempt was made to send COS to a master using *_*Sw2SlavCOSSendCmd* (Slave COS Send Switch), but the transmission failed. The following may cause the failure of COS signal transmission: • A COS connection was not established with a master. • Bus OFF error occurred. • A network power error occurred. • A send timeout occurred. Once this bit changes to TRUE, it will remain TRUE until the operation is successfully completed. FALSE: Indicates that the error did not occur. The bit changes to FALSE when COS is successfully sent. Default: FALSE
*_Slav1Conn2EstbSta	BOOL	R	Connection 2 Established	<Operation specifications> TRUE: Indicates that an I/O connection is established for OUT 2/IN 2. This bit changes to TRUE even if valid I/O data is not exchanged. FALSE: Indicates that an I/O connection is not established for OUT 2/IN 2. Default: FALSE
*_Slav1Conn1EstbSta	BOOL	R	Connection 1 Established	<Operation specifications> TRUE: Indicates that an I/O connection is established for OUT 1/IN 1. This bit changes to TRUE even if valid I/O data is not exchanged. FALSE: Indicates that an I/O connection is not established for OUT 1/IN 1. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Slav1IO2CommSta	BOOL	R	Remote I/O Communications for OUT 2/IN 2	<Operation specifications> TRUE: Indicates that an I/O connection is established for OUT 2/IN 2 and the slave is conducting normal remote I/O communications with the master. FALSE: Indicates that an I/O connection is not established for OUT 2/IN 2 and the slave is not conducting normal remote I/O communications with the master. Usage example: When writing the user program for slave remote I/O communications, use this bit as an N.O. input condition to control I/O processing with the master. Default: FALSE
*_Slav1IO1CommSta	BOOL	R	Remote I/O Communications for OUT 1/IN 1	<Operation specifications> TRUE: Indicates that an I/O connection is established for OUT 1/IN 1 and the slave is conducting normal remote I/O communications with the master. FALSE: Indicates that an I/O connection is not established for OUT 1/IN 1 and the slave is not conducting normal remote I/O communications with the master. Usage example: When writing the user program for slave remote I/O communications, use this bit as an N.O. input condition to control I/O processing with the master. Default: FALSE

3-2-10 Slave Status 2

*_*Slav2Sta* (Slave Status 2) is used to reference 2 types of information: Master Node Address and Slave I/O Allocation Status.

Use *_*MstrNdAdrSta* (Node Address of The Remote Master for Slave Communications) and *_*SlavIOAlocSta* (Slave I/O Allocation Status) to reference individual information.

● *_*MstrNdAdrSta* (Node Address of The Remote Master for Slave Communications)

This indicates the node address of the remote master for slave communications.

This information is valid when *_*Slav1IO2CommSta* (Remote I/O Communications for OUT 2/IN 2) and *_*Slav1IO1CommSta* (Remote I/O Communications for OUT 1/IN 1) are TRUE in Slave Status 1.

● *_*SlavIOAlocSta* (Slave I/O Allocation Status)

This indicates the I/O allocation status of the slave.

Code	Details
16#00	Unit starting up
16#01	Fixed allocation status 1
16#02	Fixed allocation status 2
16#03	Fixed allocation status 3
16#20	User-set allocations with set device variable for CJ-series Unit
16#30	User-set allocations set by CX-Integrator
16#80	Slave function disabled

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Slav2Sta	WORD	R	Slave Status 2	Bits 00 to 07: Master Node Address Bits 08 to 15: Slave I/O Allocation Status Default: 16#0000
*_MstrNdAdrSta	USINT	R	Node Address of The Remote Master for Slave Communications	This indicates the node address of the remote master for slave communications. Data range: 0 to 63 Default: 0
*_SlavIOAlocSta	BYTE	R	Slave I/O Allocation Status	This indicates the I/O allocation status of the slave. Data range: 16#00 to 03, 16#20, 16#30, 16#80 Default: 16#00

3-2-11 Registered Slave Table

This table indicates the slaves that are registered in the master scan list.

Bits 00 to 63 of LWORD-type device variable for CJ-series Unit *_*RegSlavTblSta* correspond to slaves at node addresses 0 to 63.

This table is updated when the Unit starts up and when a scan list is registered.

Use the following device variables for CJ-series Unit to reference all information of the Registered Slave Table.

Name of device variables for CJ-series Unit	Type	R/W	Area	Function
*_RegSlavTblSta	LWORD	R	Registered Slave Table	You can reference information concerning all slaves in the Registered Slave Table. Bits 00 to 63 correspond to information for slaves at node addresses 0 to 63. Data range: 16#0000000000000000 to FFFFFFFFFFFFFFFF Default: 16#0000000000000000

The following device variable for CJ-series Unit is used to reference individual slave information.

Name of device variables for CJ-series Unit	Type	R/W	Area	Function
*_RegSlavTblNdSta[0 to 63]	BOOL	R	Registered Slave Table Corre-sponding to Node Addresses 0 to 63	<Operation specifications> TRUE: • With the scan list disabled: Indicates slaves to which a connection is established at least once. When you register the scan list, slaves in which the bit is TRUE in this table are registered. • With the scan list enabled: Indicates that a slave is registered in the scan list. FALSE: Indicates that a slave is not registered in the scan list. Default: FALSE

3-2-12 Normal Slave Table

This table indicates the slaves that are communicating normally with the master. Bits 00 to 63 of LWORD-type device variable for CJ-series Unit *_*NormSlavTblSta* correspond to slaves at node addresses 0 to 63.

For all set I/O connections, the bits corresponding to slaves that successfully established connection will be TRUE.

If connection is not yet established due to a network error, etc., the applicable slave bit turns FALSE.

These are not flags to show the remote I/O communications status.

This table is updated continuously.

However, in the case of a communications power supply error, Send Timeout Error or remote I/O communications stopped (including remote I/O communications stopped due to a communications error), all bits turn FALSE.

The following device variable for CJ-series Unit is used to reference all information of the Normal Slave Table.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_NormSlavTblSta	LWORD	R	Normal Slave Table	You can reference information concerning all slaves in the Normal Slave Table. Bits 00 to 63 correspond to information for slaves at node addresses 0 to 63. Data range: 16#0000000000000000 to FFFFFFFFFFFFFFFF Default: 16#0000000000000000

The following device variable for CJ-series Unit is used to reference individual slave information.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_NormSlavTblNdSta[0 to 63]	BOOL	R	Normal Slave Table Corresponding to Node Addresses 0 to 63 Slave	TRUE: Indicates normal connection. FALSE: Indicates that not all connections are made. Default: FALSE

3-2-13 C200H Master Replacement Master Status 1

To simplify changes to user programs for a C200H DeviceNet Master Unit (C200HW-DRM21-V1), C200H Master Replacement Master Status 1, which has the same bit configuration as Master Status Area 1, is provided for this Unit.

The following device variable for CJ-series Unit is used to execute all functions of C200H Master Replacement Master Status 1.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_CMstrSta	WORD	R	C200H Master Replacement Master Status 1	Bit 00: Unit Memory Error Bit 01: Node Address Duplicated/Bus Off Error Bit 02: Reserved by system Bit 03: Configuration Error Bit 04: Structure Error Bit 05: Send Error Bit 06: Communication Error Bit 07: Verification Error Bit 08: I/O Data Communications Not Running Status Bit 09: Reserved by system Bit 10: Reserved by system Bit 11: Reserved by system Bit 12: Message Communications Permitted Bit 13: Invalid Scan List Data Flag Bit 14: Master Error Bit 15: I/O Data Communications Default: 16#0000

The following device variables for CJ-series Unit are used to execute individual functions.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_CMstrMemErr	BOOL	R	Unit Memory Error	This is the same as *_*MemErr* (Unit Memory Error). Default: FALSE
*_CMstrNdDupErr	BOOL	R	Node Address Duplicated/Bus Off Error	This bit changes to TRUE if any of the following device variables for CJ-series Unit is TRUE: • *_*NdAdrDupErr* (Node Address Duplicated Error) • *_*BusoffErr* (Bus Off Error) Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_CMstrCfgErr	BOOL	R	Configuration Error	This bit changes to TRUE if any of the following device variables for CJ-series Unit is TRUE: • *_*RTblErr* (Routing Table Error) • *_*MsgListErr* (Invalid Message Timer List Error) • *_*Mstr1SListErr* (Invalid Scan List Data Error) • *_*Mstr1IORefErr* (Master I/O Refresh Error) Default: FALSE
*_CMstrStruErr	BOOL	R	Structure Error	This is the same as *_*Mstr1StruErr* (Structure Error). Default: FALSE
*_CMstrSendErr	BOOL	R	Send Error	This bit changes to TRUE if any of the following device variables for CJ-series Unit is TRUE: • *_*NetPwrErr* (Network Power Error) • *_*SendTimeoutErr* (Send Timeout Error) Default: FALSE
*_CMstrIOErr	BOOL	R	Communication Error	This is the same as *_*Mstr1IOErr* (Remote I/O Communication Error). Default: FALSE
*_CMstrVefyErr	BOOL	R	Verification Error	This is the same as *_*Mstr1VefyErr* (Verification Error). Default: FALSE
*_CMstrIOStopSta	BOOL	R	I/O Data Communications Not Running Status	This operates in the reverse way of *_*IOCommSta* (Remote I/O Communications Status). Default: FALSE
*_CMstrMsgEnblSta	BOOL	R	Message Communications Permitted	This is the same as *_*OnlineSta* (Online Status). **Note** When you execute the Send Command instruction (SendCmd) from a program, use *_Port.isAvailable* (Network Communications Enabled Flag) in the CPU Unit and this flag as an AND input condition. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_CMstrSListDsblSta	BOOL	R	Invalid Scan List Data Flag	This is the same as *_*SListDsblSta* (Scan List Disable Status). Default: FALSE
*_CMstrErr	BOOL	R	Master Error	This bit changes to TRUE if bits 0, 1, or 3 to 7 of *_*CMstrSta* (C200H Master Replacement Master Status 1) is TRUE. Default: FALSE
*_MstrIOCommSta	BOOL	R	Remote I/O Data Communications Flag	This is the same as *_*Mstr1IOCommSta* (I/O Data Communications Status). Default: FALSE

3-3 Device Variables for CJ-series Unit (Allocations Setting Table, Slave Detailed Status)

The following device variables for CJ-series Unit are used to set Allocations Setting Tables, reference setup statuses and reference detailed statuses of slaves.

*_CommCycleTmCfg	UINT	RW	Communications Cycle Time Setting
*_MstrAlocTblCfg[0 to 5]	UINT	RW	Master User-set Allocations Setup Table
*_MstrAlocTblCfgSta	WORD	R	Setting Results of Master User-set Allocations Setup
*_SlavAlocTblCfg[0 to 5]	UINT	RW	Slave User-set Allocations Setup Table
*_ SlavAlocTblCfgSta	WORD	R	Setting Results of Slave User-set Allocations Setup
*_CycleTmRefTblSta[0 to 3]	UINT	R	Communications Cycle Time Reference Table
*_MstrAlocRefTblSta[0 to 11]	UINT	R	Master User-set Allocations Reference Table
*_SlavAlocRefTblSta[0 to 11]	UINT	R	Slave User-set Allocations Reference Table
*_Nd0Sta to *_Nd63Sta	BYTE	R	Detailed Slave Status Table for Node Addresses 0 to 63

You can use one of the following methods to set the Communications Cycle Time Setting, Master User-set Allocations Setup Table, Slave User-Set Allocations Setup Table.

1. Use Special Unit Setup Editing screen of Sysmac Studio.

2. Use a user program.

If it is necessary to change the System Setting while the user program is being executed, use the user program to change the System Setting.

3-3-1 Communications Cycle Time Setting

This sets the communications cycle time for the master using *_*CommCycleTmCfg*.

You can update the standard communications cycle time with *_*Sw1CycleTmTmpSet* (Temporary Setting Switch for Communications Cycle Time) and *_*Sw1CycleTmSetCmd* (Communications Cycle Time Setting Switch). For details on these switches, refer to *3-2-1 Software Switches 1* of *3-2 Device Variables for CJ-series Unit (Software Switches, Statuses)*.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_CommCycleTmCfg	UINT	RW	Communi-cations Cycle Time Setting	Sets the communications cycle time in milliseconds. If this bit is set to FALSE, the optimum time calculated by the Unit will be used. If a value higher than 500 ms is set, the Unit will operate at 500 ms. If the setting cannot be correctly made for some reason, *_*Mstr1CycleTmSetErr* (Communications Cycle Time Setting Failed) in Master Status 1 is changed to TRUE, and *_*Sw1CycleTmTmpSet* (Temporary Setting Switch for Communications Cycle Time) and *_*Sw1CycleTmSetCmd* return to FALSE. Data range: 0 to 500 Default: 0

Additional Information

The Unit calculates the optimum communications cycle time and stores it internally. If a value smaller than that is set, then the value calculated by the Unit will be used.

3-3-2 Master User-set Allocations Setup Table

Use device variables for CJ-series Unit to specify the I/O words for Master User-set Allocations. You can only set OUT block 1 and IN block 1 with this table.

Additional Information

OUT blocks 1 and 2 and IN block 1 and 2 can be set from CX-Integrator.

You can update I/O allocations in the master by setting this table and changing *_*Sw1MstrAlocCmd* (Master User-set Allocations Switch) to TRUE. The Unit restarts automatically and starts operating with the scan list enabled.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_MstrAlocTblCfg[0]	UINT	RW	OUT block 1 area	Specifies the OUT 1 block area. Data range: 0 to 20 Default: 0
*_MstrAlocTblCfg[1]	UINT	RW	First word in OUT block 1	Specifies the first word for the OUT 1 block. Data range: 0 to 32767 Default: 0
*_MstrAlocTblCfg[2]	UINT	RW	IN block 1 area	Specifies the IN 1 block area. Data range: 0 to 20 Default: 0
*_MstrAlocTblCfg[3]	UINT	RW	First word in IN block 1	Specifies the first word for the IN 1 block. Data range: 0 to 32767 Default: 0
*_MstrAlocTblCfg[4]	UINT	RW	Allocation size setup table area	Specifies the area for the allocation size setup table. Data range: 0 to 20 Default: 0
*_MstrAlocTblCfg[5]	UINT	RW	First word in the allocation size setup table 1*.	Specifies the first word in the allocation size setup table (l). Data range: 0 to 32767 Default: 0
*_MstrAlocTblCfgSta	WORD	R	Setting Results of Master User-set Allocations Setup	Stores the Setting Results of Master User-set Allocations Setup. Data range: 16#0000 to FFFF Default: 16#0000

* For details on the first word in the allocation size setup table l, refer to *Allocation Size Setup Table* (page 3-55).

● Areas and Word Ranges

Code	Area name in memory for CJ-series Unit	Word range
0	---	The block is not allocated.
1	CIO Area (CIO)	0 to 6143
3	Data Memory (DM)	0 to 32767
4	Work Area (WR)	0 to 511
5	Holding Area (HR)	0 to 511
8 to 20	Expansion Data Memory (EM) Bank 0 to bank C (13 banks)	0 to 32767 (E0_00000 to E0_32767, ···, EC_00000 to EC_32767) for all banks

Note You cannot use Holding Area H512 and its subsequent holding areas, or EM Area Bank D and its subsequent banks.

● Master User Allocations Table Setting Results

Code	Description	Details
16#0000	Completed normally	---
16#1101	No area	• Incorrect area setting. • The allocated size in the allocation size setup table is 0.
16#1103	Address range specification error	The first word is outside the setting range.
16#110C	Parameter error	• The OUT or IN size in the allocation size setup table exceeds 200 bytes. • Both the OUT and IN blocks are set for no allocations. • No slaves are allocated.
16#1104	Address range overflow	• The block or the allocation size setup table exceeds the valid word range. • The block is larger than 1,000 bytes.
16#2201	Wrong operating mode	The CPU Unit is not in PROGRAM mode.
16#2211	Unit busy	Service cannot be executed because the Unit is busy.
16#2606	Cannot execute service	The Unit master communications are not disabled.

Precautions for Correct Use

Make sure the CPU Unit is in PROGRAM mode and the master function is enabled before you set these values.

Allocation Size Setup Table

Set the following allocation size setup tables in the memory used for CJ-series Units of the CPU Unit to use the Master User-set Allocations Setup Table.

The number of bytes set in the allocation size setup table are allocated in word units in order of node addresses for OUT block 1 and then IN block 1. Set the sizes within a range from 0 to 200 bytes (100 words).

To set the tables shown below from the user program, allocate user-defined variables in the following areas.

For details on allocating user-defined variables, refer to *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504).

Word	Bit 15 to Bit 08	Bit 07 to Bit 00
I	Node address 0 OUT size (bytes)	Node address 0 IN size (bytes)
I+1	Node address 1 OUT size (bytes)	Node address 1 IN size (bytes)
	⋮	
I+63	Node address 63 OUT size (bytes)	Node address 63 IN size (bytes)

Additional Information

The areas and first word in the memory used for CJ-series Unit used for setting up the allocation size setup table are set by using the following device variable for CJ-series Unit.

Allocation Size Setup Table Area **_MstrAlocTblCfg[4]*

First Word In The Allocation Size Setup Table 1 **_MstrAlocTblCfg[5]*

Setting Example

The following example shows the allocation when the size (bytes) for OUT block 1 and IN block 1 is set in the allocation size setup table using the specified values.

Node address 0: OUT size: 1 byte, IN size: 5 bytes
Node address 1: OUT size: 4 byte, IN size: 3 bytes
Node address 2: OUT size: 1 byte, IN size: 2 bytes

Allocation size setup table

I	1	5
I+1	4	3
I+2	1	2
	:	:

OUT block 1

	15	00
→ s	Not usable	00
s+1	01	01
s+2	01	01
s+3	Not usable	02
	:	:

IN block 1

	15	00
k	00	00
k+1	00	00
k+2	Not usable	00
k+3	01	01
k+4	Not usable	01
k+5	02	02
	:	:

I: First word in allocation size setup table
s: First word in OUT block 1
k: First word in IN block 1

Note 1 The numbers in the OUT 1 and IN 1 blocks represent node addresses.

2 Bytes are allocated in the blocks in word units in the order of node addresses. If the allocated size is 1 byte, the rightmost byte is used, but the leftmost byte cannot be used.

3-3-3 Slave User-set Allocations Setup Table

The I/O areas in the Memory for CJ-series Units specified here for the slave OUT 1 area and slave IN 1 area are used if the slave function is enabled with *_*Sw2SlavAlocCmd* (Slave User Allocations Switch).

You can update I/O allocations for the slaves by setting this table and changing *_*Sw2SlavAlocCmd* (Slave User Allocations Switch) to TRUE. The Unit restarts automatically and starts operating with the scan list enabled.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_SlavAlocTblCfg[0]	UINT	RW	Slave OUT 1 area	Specifies the OUT 1 area. Data range: 0 to 20 Default: 0
*_SlavAlocTblCfg[1]	UINT	RW	First word in Slave OUT 1 area	Specifies the first word in the OUT 1 area. Data range: 0 to 32767 Default: 0
*_SlavAlocTblCfg[2]	UINT	RW	OUT 1 area size	Specifies the size of the OUT 1 area. Unit is in bytes. The OUT 1 area is not allocated when the value is 0. Possible range of variables: 0 to 200 Default: 0
*_SlavAlocTblCfg[3]	UINT	RW	Slave IN 1 area	Specifies the IN 1 area. Data range: 0 to 20 Default: 0
*_SlavAlocTblCfg[4]	UINT	RW	First word in Slave IN 1 area	Specifies the first word in the IN 1 area. Data range: 0 to 32767 Default: 0
*_SlavAlocTblCfg[5]	UINT	RW	IN 1 area size	Specifies the size of the IN 1 Area. Unit is in bytes. The IN 1 Area is not allocated when the value is 0. Data range: 0 to 200 Default: 0
*_SlavAlocTblCfgSta	WORD	R	Setting Results of Slave User-set Allocations Setup	Stores the Setting Results of Slave User-set Allocations Setup. Data range: 16#0000 to FFFF Default: 16#0000

● Areas and Word Ranges

Code	Area name in memory for CJ-series Unit	Word range
0	---	The area is not used.
1	CIO Area (CIO)	0 to 6143
3	Data Memory (DM)	0 to 32767
4	Work Area (WR)	0 to 511
5	Holding Area (HR)	0 to 511
8 to 20	Expansion Data Memory (EM) Bank 0 to bank C (13 banks)	0 to 32767 (E0_00000 to E0_32767, ..., EC_00000 to EC_32767) for all banks

Note You cannot use Holding Area H512 and its subsequent holding areas, or EM Area Bank D and its subsequent banks.

● Slave User-set Allocations Setup Table Setting Results

Code	Description	Details
16#0000	Completed normally	---
16#1101	No area	Incorrect area setting.
16#1103	Address range specification error	The first word is outside the setting range.
16#110C	Parameter error	• The OUT 1 or IN 1 area size exceeds 200 bytes. • The OUT 1 and IN 1 area sizes are 0. • Neither the OUT 1 area nor IN 1 area is set for allocation.
16#1104	Address range overflow	The allocated area exceeds the valid word range.
16#2201	Wrong operating mode	The CPU Unit is not in PROGRAM mode.
16#2211	Unit busy	Service cannot be executed because the Unit is busy.
16#2606	Cannot execute service	The Unit slave communications are not disabled.

Precautions for Safe Use

Make sure the CPU Unit is in PROGRAM mode and the Unit has stopped slave communications before you set these values.

3-3-4 Communications Cycle Time Reference Table

You can use this table to store the present, maximum and minimum communications cycle times in milliseconds.

All the values in this table are cleared from the Unit and the maximum and minimum values are updated with new values of when **_Sw1CycleTmClrCmd* (Communications Cycle Time Reference Table Clear Switch) is changed to TRUE.

In the case of automatic setting (default), the communications cycle time setting value is set to 0.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_CycleTmRefTblSta[0]	UINT	R	Communications cycle time setting value	Indicates the the set value of communications cycle time. Data range: 0 to 500 Default: 0
*_CycleTmRefTblSta[1]	UINT	R	Communications cycle time present value	Indicates the present value of communications cycle time. Data range: 0 to 65535 Default: 0
*_CycleTmRefTblSta[2]	UINT	R	Communications cycle time maximum value	Indicates the maximum value of communications cycle time. Data range: 0 to 65535 Default: 0
*_CycleTmRefTblSta[3]	UINT	R	Communications cycle time minimum value	Indicates the minimum value of communications cycle time. Data range: 0 to 65535 Default: 0

3-3-5 Master User-set Allocations Reference Table

You can access the settings (area and size) for a maximum of four blocks (OUT block 1, OUT block 2, IN block 1, and IN block 2) in the Master User-set Allocations Reference Table.

The OUT 1 and IN 1 block settings can be referenced if CX-Integrator is not being used.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_MstrAlocRefTblSta[0]	UINT	R	OUT block 1 area	Stores the OUT 1 area. Data range: 0 to 20 Default: 0
*_MstrAlocRefTblSta[1]	UINT	R	First word in OUT block 1	Stores the first word for OUT 1 area. Data range: 0 to 32767 Default: 0
*_MstrAlocRefTblSta[2]	UINT	R	No. of bytes in OUT block 1	Stores the size of OUT 1 area. The OUT 1 block is not allocated if the value is 0. Data range: 0 to 1000 Default: 0
*_MstrAlocRefTblSta[3]	UINT	R	IN block 1 area	Stores the IN 1 area. Data range: 0 to 20 Default: 0

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_MstrAlocRefTblSta[4]	UINT	R	First word in IN block 1	Stores the first word for IN 1 area. Data range: 0 to 32767 Default: 0
*_MstrAlocRefTblSta[5]	UINT	R	No. of bytes in IN block 1	Stores the size of IN 1 area. The OUT 1 block is not allocated if the value is 0. Data range: 0 to 1000 Default: 0
*_MstrAlocRefTblSta[6]	UINT	R	OUT block 2 area	Stores the OUT 2 area. Data range: 0 to 20 Default: 0
*_MstrAlocRefTblSta[7]	UINT	R	First word in OUT block 2	Stores the first word for OUT 2 area. Data range: 0 to 32767 Default: 0
*_MstrAlocRefTblSta[8]	UINT	R	No. of bytes in OUT block 2	Stores the size of OUT 2 area. The OUT 1 block is not allocated if the value is 00 hex. Data range: 0 to 1000 Default: 0
*_MstrAlocRefTblSta[9]	UINT	R	IN block 2 area	Stores the IN 2 area. Data range: 0 to 20 Default: 0
*_MstrAlocRefTblSta[10]	UINT	R	First word in IN block 2	Stores the first word for IN 2 area. Data range: 0 to 32767 Default: 0
*_MstrAlocRefTblSta[11]	UINT	R	No. of bytes in IN block 2	Stores the size of IN 2 area. The OUT 1 block is not allocated if the value is 0. Data range: 0 to 1000 Default: 0

● Areas and Word Ranges

Code	Area name in memory for CJ-series Units	Word range
0	---	The block is not used.
1	CIO Area (CIO)	0 to 6143
3	Data Memory (DM)	0 to 32767
4	Work Area (WR)	0 to 511
5	Holding Relay (HR)	0 to 511
8 to 20	Expansion Data Memory (EM) Bank 0 to bank C (13 banks)	0 to 32767 (E0_00000 to E0_32767, ..., EC_00000 to EC_32767) for all banks

Note You cannot use Holding Area H512 and its subsequent holding areas, or EM Area Bank D and its subsequent banks.

3-3-6 Slave User-set Allocations Reference Table

You can access the slave block settings in the Slave User-set Allocations Reference Table. You can use a maximum of two OUT and two IN areas (OUT 1, IN 1, OUT 2, and IN 2 areas) for slave communications and you can access their area and size in the table.

The OUT 1 and IN 1 areas and their sizes can be referenced if CX-Integrator is not being used.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_SlavAlocRefTblSta[0]	UINT	R	Slave OUT 1 area	Stores the OUT 1 area. Data range: 0 to 20 Default: 0
*_SlavAlocRefTblSta[1]	UINT	R	First word in Slave OUT 1 area	Stores the first word for OUT 1 area. Data range: 0 to 32767 Default: 0
*_SlavAlocRefTblSta[2]	UINT	R	Slave OUT 1 area size	Stores the size of OUT 1 area. The OUT 1 block is not allocated if the value is 0. Data range: 0 to 200 Default: 0
*_SlavAlocRefTblSta[3]	UINT	R	Slave IN 1 area	Stores the IN 1 area. Data range: 0 to 20 Default: 0
*_SlavAlocRefTblSta[4]	UINT	R	First word in Slave IN 1 area	Stores the first word for IN 1 area. Data range: 0 to 32767 Default: 0
*_SlavAlocRefTblSta[5]	UINT	R	Slave IN 1 area size	Stores the first word for IN 1 area. The OUT 1 block is not allocated if the value is 0. Data range: 0 to 200 Default: 0
*_SlavAlocRefTblSta[6]	UINT	R	Slave OUT 2 area	Stores the OUT 2 area. Data range: 0 to 20 Default: 0
*_SlavAlocRefTblSta[7]	UINT	R	First word in Slave OUT 2 area	Stores the first word for OUT 2 area. Data range: 0 to 32767 Default: 0
*_SlavAlocRefTblSta[8]	UINT	R	Slave OUT 2 area size	Stores the size of OUT 2 area. The OUT 1 block is not allocated if the value is 0. Data range: 0 to 200 Default: 0
*_SlavAlocRefTblSta[9]	UINT	R	Slave IN 2 area	Stores the IN 2 area. Data range: 0 to 20 Default: 0
*_SlavAlocRefTblSta[10]	UINT	R	First word in Slave IN 2 area	Stores the first word for IN 2 area. Data range: 0 to 32767 Default: 0

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_SlavAlocRefTblSta[11]	UINT	R	Slave IN 2 area size	Stores the first word for IN 2 area. The OUT 1 block is not allocated if the value is 0. Data range: 0 to 200 Default: 0

● Areas and Word Ranges

Code	Area name in Memory for CJ-series Units	Word range
0	---	The block is not used.
1	CIO Area (CIO)	0 to 6143
3	Data Memory (DM)	0 to 32767
4	Work Area (WR)	0 to 511
5	Holding Relay (HR)	0 to 511
8 to 20	Expansion Data Memory (EM) Bank 0 to bank C (13 banks)	0 to 32767 (E0_00000 to E0_32767, ..., EC_00000 to EC_32767) for all banks

Note You cannot use Holding Area H512 and its subsequent holding areas, or EM Area Bank D and its subsequent banks.

3-3-7 Slave Detailed Status

Various types of statuses of each slave controlled by the master communication are provided.

The following device variables for CJ-series Unit are used to reference all information of the device variables for CJ-series Unit detailed slave status table.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Nd0Sta to *_Nd63Sta	BYTE	R	Detailed Slave Status Table for Node Addresses 0 to 63	Each bit of *_*Nd0Sta* to *_*Nd63Sta* indicates the following statuses for slaves at node addresses 0 to 63. Bit 00: Slave Error for node addresses 0 to 63 Bit 01: Slave Verification Error Flag at node addresses 0 to 63 Bit 02: Slave Configuration Error for node addresses 0 to 63 Bit 03: Slave Remote I/O Communications Error for node addresses 0 to 63 Bit 04: Reserved by system Bit 05: Master COS Send Error for node addresses 0 to 63 Bit 06: Scan List Registration Flag for node addresses 0 to 63 Bit 07: Remote I/O Communications Flag for node addresses 0 to 63 Data range: 16#00 to FF Default: 16#00

The following device variables for CJ-series Unit are used to reference individual information.

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Nd0Err to *_Nd63Err	BOOL	R	Slave Error for node addresses 0 to 63	<Operation specifications> TRUE: Indicates that a remote I/O communications error occurred with the corresponding slave. More specifically, this bit changes to TRUE when at least one of the following errors occurs: • *_*Mstr1VefyErr* (Verification Error) • *_*Mstr1StruErr* (Structure Error) • *_*Mstr1IOErr* (Remote I/O Communication Error) FALSE: Indicates that none of the above errors occured. Changes to FALSE when the error is clear. Default: FALSE
*_Nd0VefyErr to *_Nd63VefyErr	BOOL	R	Slave Verification Error for node addresses 0 to 63	<Operation specifications> TRUE: Indicates that the data for the slave registered in the scan list is different from the actual Slave. FALSE: Indicates that a verification error did not occur. Changes to FALSE when a verification error is cleared. Default: FALSE <Operation conditions> It occurs with the scan list enabled.
*_Nd0CfgErr to *_Nd63CfgErr	BOOL	R	Slave Configuration Error for node addresses 0 to 63	<Operation specifications> TRUE: Indicates that I/O allocations cannot be made with the scan list disabled. FALSE: Indicates that a structure error did not occur. Changes to FALSE when a structure error is cleared. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Nd0IOErr to *_Nd63IOErr	BOOL	R	Slave Remote I/O Communications Error for node addresses 0 to 63	<Operation specifications> TRUE: Indicates that an error occurred in remote I/O communications with the corresponding slave. This bit changes to TRUE if a timeout occurs in at least one connection with multiple connections set. FALSE: Indicates that a remote I/O communications error did not occur. Or, changes to FALSE when a remote I/O communications error is cleared. Default: FALSE
*_Nd0COSSendErr to *_Nd63COSSendErr	BOOL	R	Master COS Send Error for node addresses 0 to 63	<Operation specifications> TRUE: Indicates that COS sent to a slave destination failed. Use *_*MstrCOSSendCmd* (Master COS Send Switch) to send COS. The following may cause the failure of COS signal transmission: • Remote I/O communications stopped. • A COS connection was not established. • Bus OFF is occurring or has occurred. • A network power error is occurring or has occurred. • A send timeout is occurring or has occurred. Once this bit changes to TRUE, it will remain TRUE until the operation is successfully completed. FALSE: Indicates that the error did not occur. The bit changes to FALSE when the operation is successfully completed. Default: FALSE
*_Nd0SListRegSta to *_Nd63SListRegSta	BOOL	R	Scan List Registration Flag for node addresses 0 to 63	<Operation specifications> TRUE: Indicates that the corresponding slave is registered in the scan list. FALSE: Indicates that the Unit is operating with the scan list disabled or the slave is not registered in the scan list. Default: FALSE

Name of device variable for CJ-series Unit	Type	R/W	Area	Function
*_Nd0IOCommSta to *_Nd63IOCommSta	BOOL	R	Remote I/O Communications Flag at node addresses 0 to 63	<Operation specifications> TRUE: Indicates that normal remote I/O communications were conducted with the corresponding slaves at all set connections. This bit changes to FALSE if a timeout occurs in at least one connection with multiple connections set. FALSE: Indicates that remote I/O communications failed (no slave present, no scan list registered, verification error, structure error) or that a communications error is occurring. Default: FALSE

4

Remote I/O Master Communications

This section describes the remote I/O communications performed as a DeviceNet master by the DeviceNet Unit.

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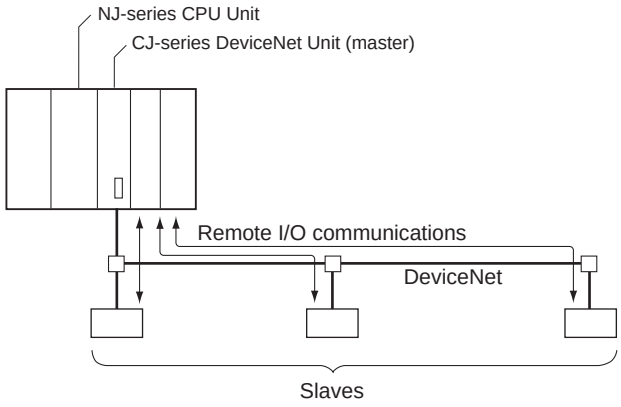
4-1 Master Remote I/O Communications

Remote I/O communications are used to automatically transfer data between slaves and the CPU Unit without any special programming in the CPU Unit under which the Master Unit is mounted.

● Master Communications



Note A CJ-series DeviceNet Unit can function as either a master or slave in remote I/O communications and it can even function as both a master and a slave at the same time. Change **_Sw1MstrEnblCmd* (Master Enable Switch) to TRUE to set the CJ-series DeviceNet Unit to function as a master. Once master communications are enabled, the Unit will continue to perform master communications regardless of whether the power is turned OFF and back ON again.
Change **_Sw1MstrDsblCmd* (Master Disable Switch) to TRUE to stop master communications. Master communications are the focus of this section.
In the following descriptions, a CJ-series DeviceNet Unit set to function as a master is referred to as a "Master Unit" and a CJ-series DeviceNet Unit set to function as a slave is referred to as a "Slave Unit".

4-1-1 Allocations

All slaves are allocated in the I/O memory area in the NJ-series CPU Unit to which the Master Unit is mounted. They are allocated using one of the following methods:

1) Fixed allocations

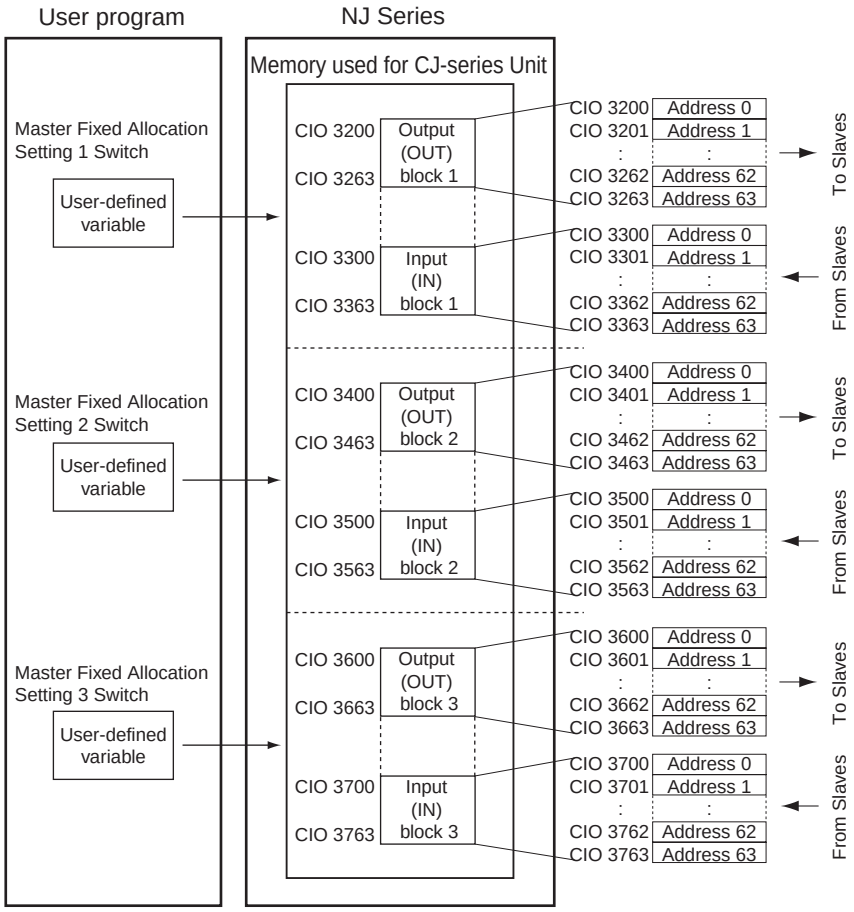
2) User-set allocations

Note With either fixed or user-set allocations, to access the area where each slave is allocated from the user program, a user-defined variable that specifies the AT specification of that area needs to be defined.

Fixed Allocations

You can use *_Sw1MstrFixAloc1Cmd to *_Sw1MstrFixAloc3Cmd (Master Fixed Allocation Setting 1 to 3 Switch) to specify where a slave is allocated in the following fixed allocation areas 1 to 3. The output (OUT) block and the input (IN) block are allocated to a certain area as shown below in the order of node address.

To access the allocated area from the user program, a user-defined variable that specifies the AT specification of that area needs to be defined.



Specify using master fixed allocation setting switches 1-3.

Words are allocated to slaves that start from address 0 in the output (OUT) and input (IN) blocks. Each address is allocated at least one byte (rightmost).

- More than one word is allocated for each slave (according to its node address) with more than16 I/O points.
- The rightmost byte of the word is allocated to each slave that has 8 I/O points or less.

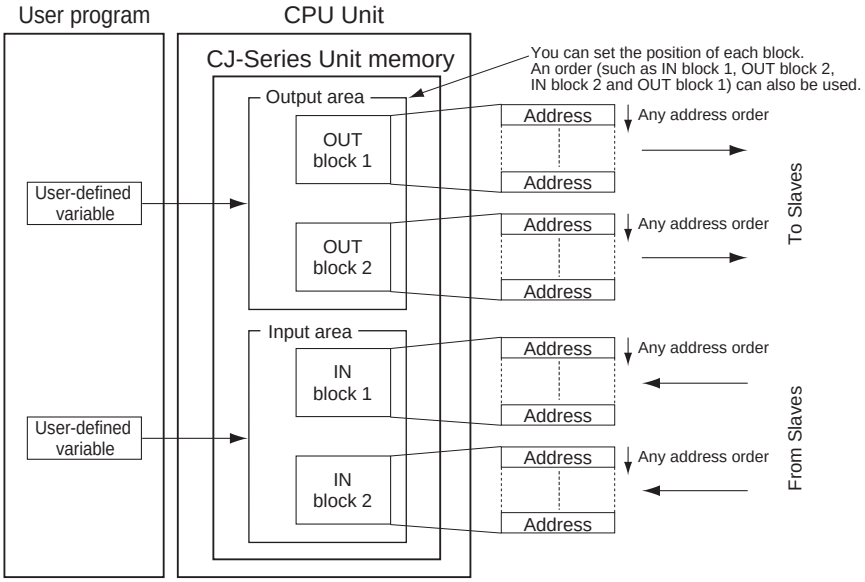
User-set Allocations

The following methods are used for user-set allocations:

- Using the CX-Integrator
- Using the device variable for CJ-series Unit (Master User-set Allocations Setup Table)

With CX-Integrator

When using the CX-Integrator, you can allocate four blocks to each slave: Output (OUT) blocks 1 and 2 and input blocks 1 and 2. Each block is a maximum of 500 words. To access the allocated area from the user program, a user-defined variable that specifies the AT specification of that area needs to be defined.



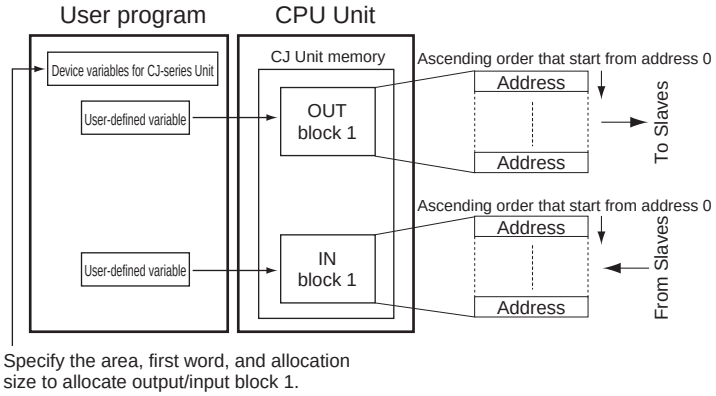
You can use any order for block allocations and for slave allocations within each block. Each address is allocated at least one byte (rightmost).

- More than one word is allocated for each slave with more than16 I/O points (using it's node address).
- The leftmost or rightmost byte of the word is allocated to each slave that has 8 I/O points or less.

Using "*_MstrAlocTblCfg[0 to 5]" (Master User-set Allocations Setup Table)

In **_MstrAlocTblCfg[0 to 5]* (Master User-set Allocations Setup Table), set the areas and first words for the output block (OUT 1) and the input block (IN 1) and set the area and first word for the Allocation Size Setup Table. You can allocate each slave two blocks, OUT 1 and IN 1, according to the settings in this device variable for CJ-series Unit. The OUT and IN blocks will be allocated in order of slave node addresses. Each block is a maximum of 500 words.

To access the allocated area from the user program, a user-defined variable that specifies the AT specification of that area needs to be defined.



Each address is allocated at least one byte (rightmost).

- More than one word is allocated for each slave with more than16 I/O points (according to its node address).
- The rightmost byte of the word is allocated to each slave that has 8 I/O points or less.

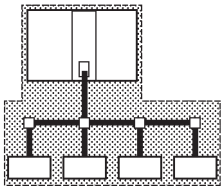
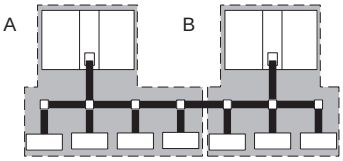
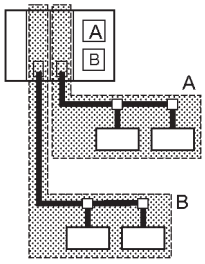
4-1-2 Remote I/O Master Specifications

Item	Specifications						
Slave allocation methods	Fixed allocations	Select one of the following fixed allocations areas with the use of **_Sw1MstrFixAloc1Cmd* to **_Sw1MstrFixAloc3Cmd* (Master Fixed Allocation Setting 1 to 3 Switch).					
		Allocated words (CIO Area)	I/O	Size	Fixed Allocation Area Setting 1	Fixed Allocation Area Setting 2	Fixed Allocation Area Setting 3
			Output (OUT) area	64 words	3200 to 3263	3400 to 3463	3600 to 3663
			Input (IN) area	64 words	3300 to 3363	3500 to 3563	3700 to 3763
			Note Select one of the above areas with the use of the device variable for CJ-series Unit. All are fixed at 1 word per node address. The default setting is Fixed Allocation Area Setting 1.				
	User-set allocations	By CX-Integrator	Set the areas for the OUT 1/2 and IN 1/2 blocks, the first words, and the allocation sizes for all slaves with the use of the CX-Integrator. You can set blocks for nodes in any order.				
			Allocated words	The input and output areas can be the following sizes that start from any word in any of the following areas: CIO Area, WR Area, HR Area, DM, Area, or EM Area.			
				Output (OUT) area	500 words max. × 2 blocks		
				Input (IN) area	500 words max. × 2 blocks		
		By device variable for CJ-series Unit	Set the areas and the first words for the OUT 1 and IN 1 blocks in the device variable for CJ-series Unit. Set the allocation size for each slave with the use of the allocation size Setup Table (in the memory used for CJ-series Unit). Allocations must be in the order of node addresses.				
			Allocated words	The input and output areas can be the following sizes that start from any word in any of the following areas: CIO Area, WR Area, HR Area, DM Area, or EM Area in the memory used for CJ-series Unit.			
				Output (OUT) area	500 words max. × 1 block	Allocation by the node address order	
				Input (IN) area	500 words max. × 1 block		
No. of Masters that you can mount	Fixed allocations		3 Units max. (Unique words must be allocated with the use of **_Sw1MstrFixAloc1Cmd* to **_Sw1MstrFixAloc3Cmd* (Master Fixed Allocation Setting 1 to 3 Switch).)				
	User-set allocations	By device variable for CJ-series Unit	16 Units max. (Unique words must be allocated with the use of the user Setup Table (Device variable for CJ-series Unit).)				
		By CX-Integrator	16 Units max. (Unique words must be allocated with the use of the CX-Integrator.)				
Max. No. of Slaves connected per DeviceNet Unit	Fixed allocations		63 nodes				
	User-set allocations	By device variable for CJ-series Unit					
		By CX-Integrator					

Item	Specifications		
Max. No. of I/O points per DeviceNet Unit	Fixed allocations		2,048 pts (64 input words, 64 output words)
	User-set allocations	By device variable for CJ-series Unit	16,000 pts (500 input words x 1 block, 500 output words x 1 block)
		By CX-Integrator	32,000 pts (500 input words x 2 blocks, 500 output words x 2 blocks)
Max. No. of I/O per Slave controllable by a DeviceNet Unit	Fixed allocations		1,024 pts (32 input words, 32 output words)
	User-set allocations	By device variable for CJ-series Unit	3,200 pts (100 input words, 100 output words)
		By CX-Integrator	3,200 pts (100 input words, 100 output words)

4-1-3 Precautions on the Number of Master Units

You can construct the following system configurations based on various numbers of Master Units when DeviceNet Units are used.

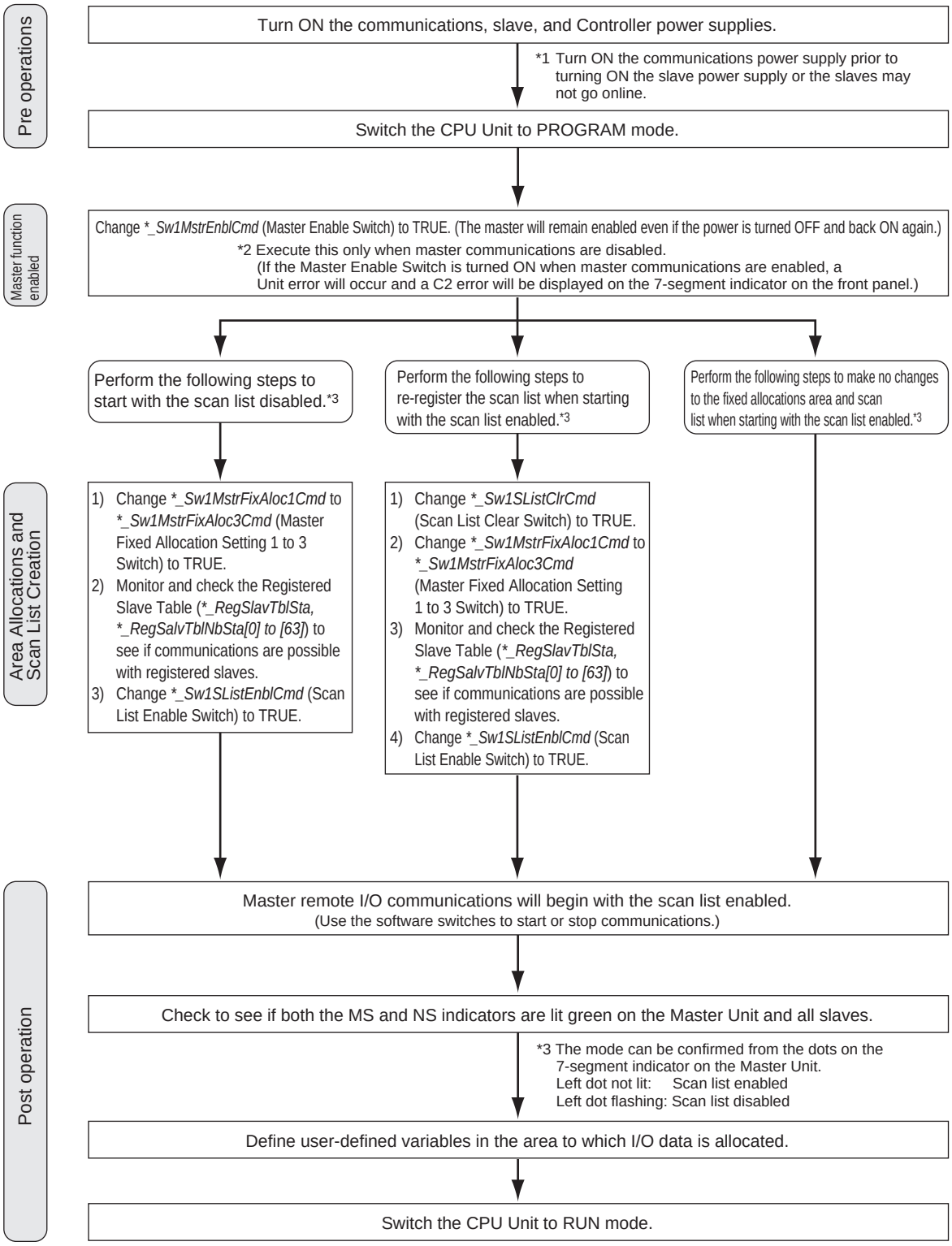
Pattern			One Master Unit connected on a single network	Multiple Master Units connected on a single network	Multiple Master Units connected to a single CPU Unit
Configuration				Yes 	
Remote I/O communications					
	Fixed allocations		❍	×	❍ (You can use up to 3 Master Units.)
	User-set allocations	By CX-Integrator	❍	❍ (See note.)	❍
		By device variable for CJ-series Unit	❍	❍ (See note.)	❍

Pattern	One Master Unit connected on a single network	Multiple Master Units connected on a single network	Multiple Master Units connected to a single CPU Unit
Precautions	Same as previous networks.	• The communications cycle time is longer. **Note** The communications cycle time for the network in the figure above is TA+TB if sections A and B above are separate networks with a communications cycle time of TA and TB. • Multiple Master Units cannot share a single Slave Unit. • Bus Off errors (communications stopped by multiple transmissions) may occur if multiple Master Units with disabled scan lists are present on a single network.	• Make sure that each word allocated in the system is allocated to only one Master Unit.

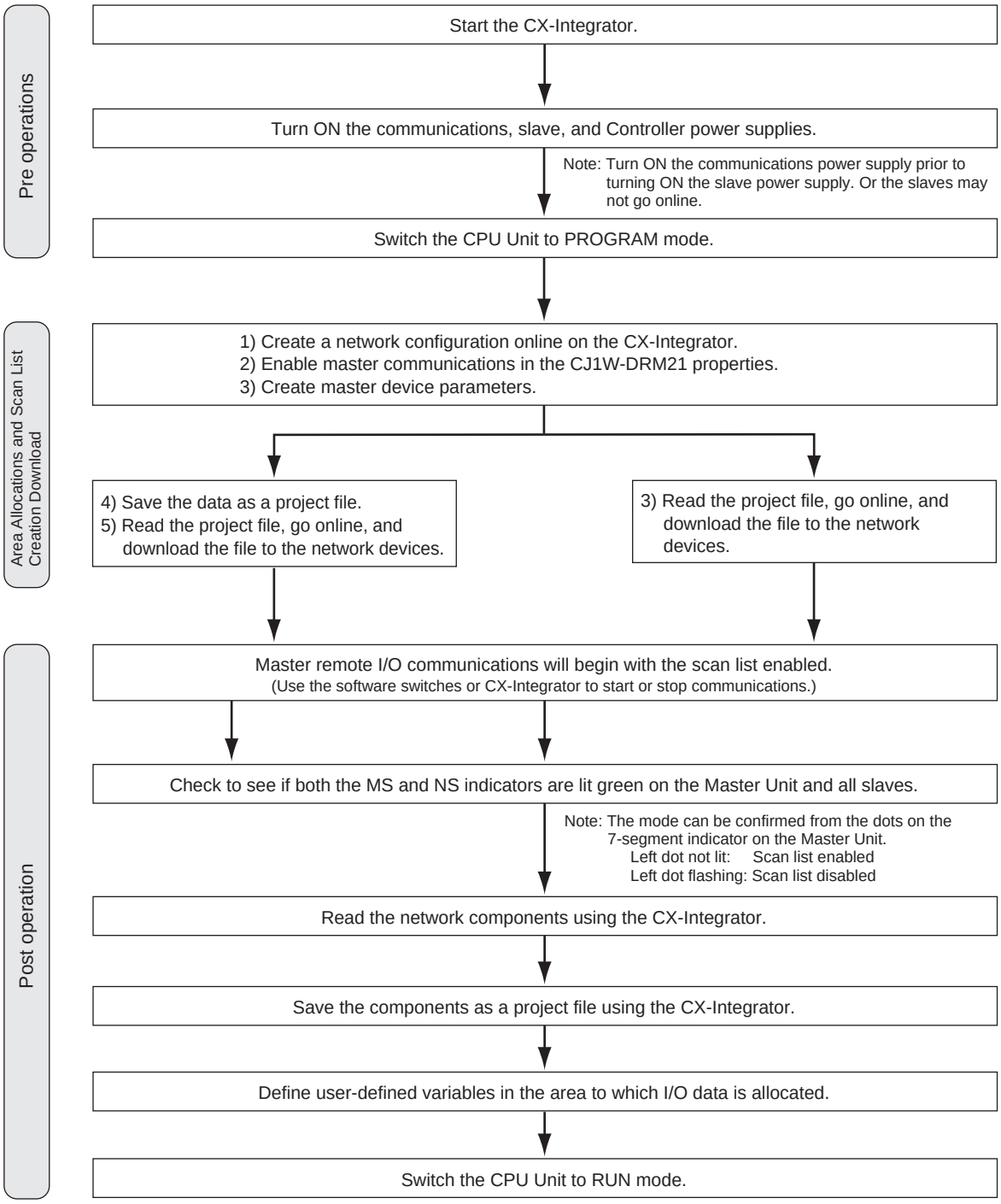
Note You can connect only one Master Unit to a network if you specify a COS or cyclic connection with the use of CX-Integrator. Remote I/O communication errors may occur. In such a case, therefore, change the system setup so that only one Master Unit is connected to a network.

4-1-4 Procedure for Using Remote I/O Master

● Fixed Allocations for Remote I/O



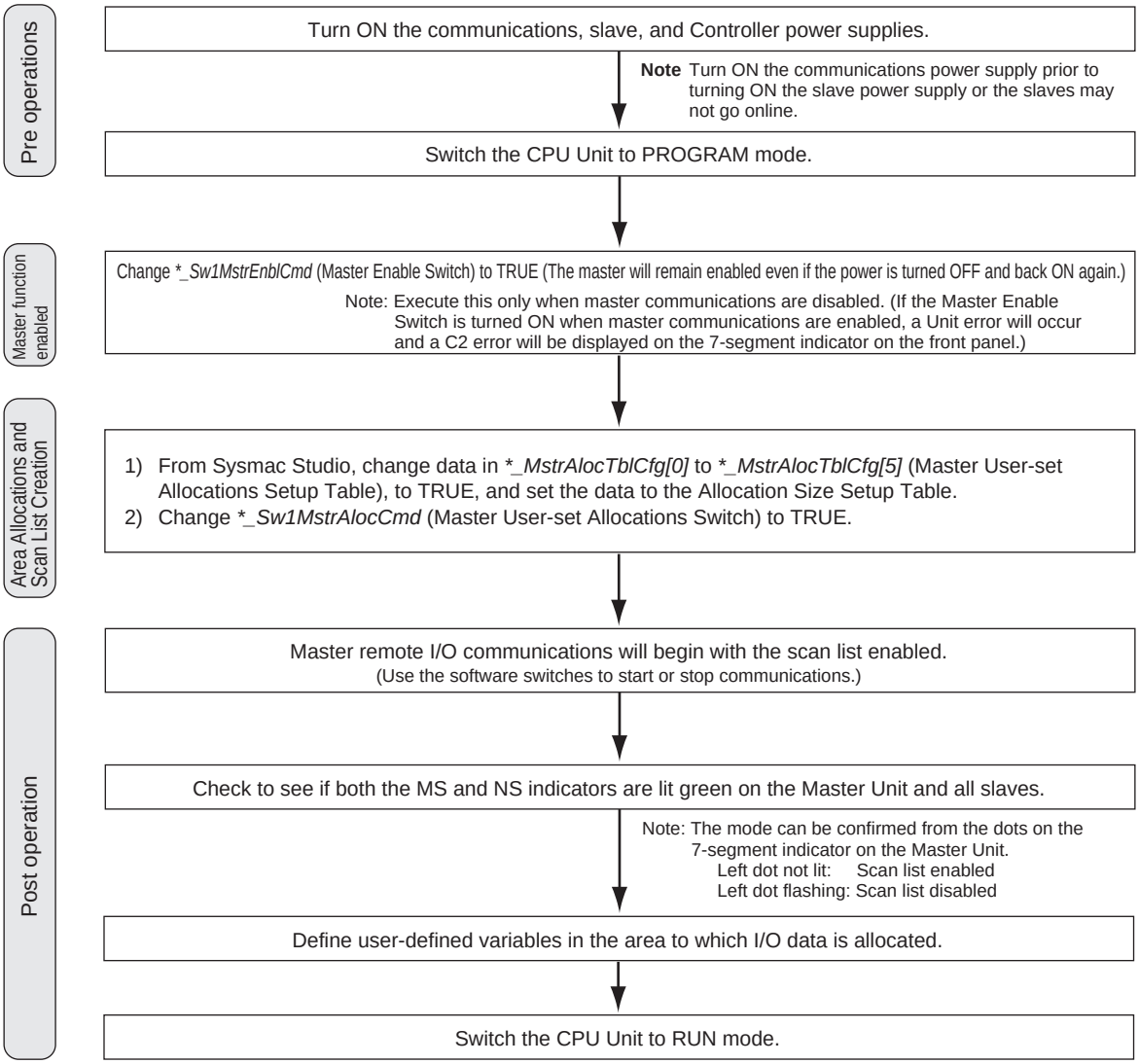
● User-set Remote I/O Allocations Using the CX-Integrator



Additional Information

You can stop remote I/O communications with a specified slave to effectively disconnect the slave from the network by changing *_*CnctCmd* (Disconnect/Connect Switches) to TRUE. You can do this when a slave is replaced or to register a slave in the scan list in preparations to connect it to the network at a later time. The Disconnect/Connect Switches, however, are cleared when the power supply is turned OFF, so the bit must be changed back to TRUE from the user program after the power turns ON in order for it to remain effective.

● User-set Remote I/O Allocations Using Device Variable for CJ-series Unit



4-2 Scan List

4-2-1 Scan List

A scan list is used to register the slaves with which the Master Unit communicates in DeviceNet remote I/O communications. It is the basis on which the Master Unit communicates with slaves.

The Master Unit does not contain a scan list by default. DeviceNet Unit, however, has a default setting that allows it to communicate with all slaves even with the scan list disabled, but this operating mode should not be used for normal operation. Always create a scan list prior to operating the Unit.

● Scan List Contents

The contents of the scan list is listed in the following table. When a Master Unit goes online, it compares each of these items with the slaves that are actually connected to the network. The items that are compared, however, will depend on the allocation method that is used.

Item	Description	Fixed allocations	User-set allocations using device variables for CJ-series Unit	User-set allocations from the CX-Integrator
Node address	Node address for every Slave	Compared		Compared
Allocated IN/OUT sizes and allocation	Settings of the number of bytes allocated to every slave in a data area of the Master Unit	Compared		Compared
Vendor	Unique manufacturer ID	Not compared		Set from CX-Integrator
Device type	Unique product type value	Not compared		Set from CX-Integrator
Product code	Unique product model value	Not compared		Set from CX-Integrator
Connection type	Applicable DeviceNet protocol (See *A-2 DeviceNet Connections* for details.)	Automatically set		Automatically set or set from CX-Integrator
Connection path	Type of slave I/O data (See *A-2 DeviceNet Connections* for details.)	Cannot be set		Set from CX-Integrator

● Creating the Scan List

The way that a scan list is prepared varies with the allocation method as shown below.

Allocations	Fixed allocations	User-set allocations using device variable for CJ-series Unit	User-set allocations from the CX-Integrator
How to create scan list	With the CPU Unit in PROGRAM mode: 1. Change the one of the Fixed Allocated Switches (1 to 3) to TRUE. 2. Change the Scan List Enable Switch to TRUE.	With the CPU Unit in PROGRAM mode. 1. Change the Master User-set Allocations Setup Switch to TRUE.	Create a list from the CX-Integrator. (Acquire a list of online devices, use it to create a scan list, and then register the scan list in the Master Unit.)

Precautions for Safe Use

- Be sure to create a scan list before you start actual system operation.
- It is still possible to communicate with Units (with the scan list disabled) if a scan list is not created when fixed allocations areas 1 to 3 are used. This may result in faulty operation because the Master Unit will communicate with slaves even if they do not start up due to errors, such as equipment failure if there is no scan list.

4-2-2 Scan List Enabled and Scan List Disabled

The scan list must be made. The scan list modes are described here.

● Scan List Enabled (Used for Actual Operation)

Remote I/O communications are performed according to the registered scan list and only with slaves that are on the list. A Verification Error occurs (*_*Mstr1VefyErr* changes to TRUE) if a slave registered on the scan list is not present on the network, if a slave did not start up when remote I/O communications started, or if the number of I/O points did not match the number registered.

● Scan List Disabled (Used when Changing System Configuration)

You can perform remote I/O communications with fixed allocations instead of a scan list in order to change a system configuration. Do not operate without a scan list during actual system operation. Use this mode only to replace a Master Unit or to change system configuration (change a connected slave or a node address).

Note 1 To disable the scan list, change **_Sw1SListClrCmd* (Scan List Clear Switch) to TRUE during remote I/O communications with the scan list enabled (with fixed allocations, user-set allocations using device variable for CJ-series Unit, or user-set allocations using the CX-Integrator). In all these cases, remote I/O communications are executed using the fixed allocations area that was last used when the list was disabled.

2 Slaves that are connected to the network while communications are in progress are also targeted for communications. Errors cannot be confirmed, however, even if there are slaves present that did start up due to errors because there is no scan list available to check communications against. The communications cycle time will also be significantly longer than the calculated value.

Precautions for Correct Use

The scan list is automatically enabled when user-set allocations are set using the device variables for CJ-series Unit or the CX-Integrator. If the list is subsequently cleared using *_Sw1SListClrCmd* (Scan List Clear Switch), fixed allocations (1 to 3) will be used for remote I/O communications when the scan list is disabled. Make sure the system has stopped before you disable the scan list with a Master Unit that is set for user-set allocations. Particularly when multiple Master Units are connected to a single network, communications will not be performed successfully if even one Master Unit on the network is operating with the scan list disabled. Once the list is disabled, the user-set allocations data registered in the Master Unit is lost.

4-2-3 Backing Up the Scan List

A scan list must be created to switch the DeviceNet Unit to operation with the scan list disabled or to replace a DeviceNet Unit. It is important to back up the list with the use of one of the following methods:

● Fixed Allocations or User-set Allocations in Device Variable for CJ-series Unit

Save the scan list as a backup file on SD Memory Card in the CPU Unit by changing *_Sw2FileBkupCmd* (Unit Setup File Backup Switch) to TRUE.

● User-set Allocations from the CX-Integrator

Save the scan list as a backup file on SD Memory Card or save it either as a device parameter file or project file by using the CX-Integrator.

In the preceding cases, change *_Sw2FileRestoreCmd* (Unit Setup File Restore Switch) to TRUE to input setup data including the scan list backed up on the SD Memory Card into a DeviceNet Unit.

4-3 Fixed Allocations

4-3-1 Allocated Words

If fixed allocation is used, allocated words are in the following I/O (CIO) area in the memory used for CJ-series Unit. You can select an area of words from one of three fixed allocation areas. Use *_*Sw1MstrFixAloc1Cmd* to *_*Sw1MstrFixAloc3Cmd* (Master Fixed Allocation Setting 1 to 3 Switch) to select the allocation area.

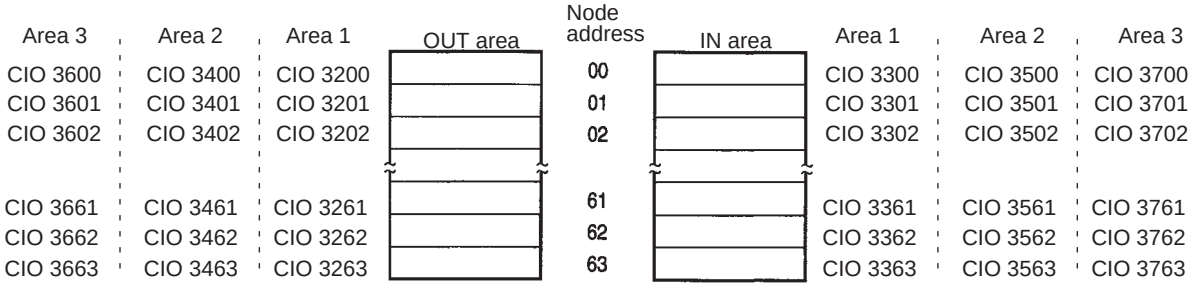
Each area is comprised of an OUT area that is used to write output data to slaves and an IN area that is used for input from slaves in remote I/O communications.

To access a slave allocated to the fixed allocations areas 1 to 3 from the user program, user-defined variables that specify the AT specification of the memory used for CJ-series Unit to which the slave is allocated need to be defined.

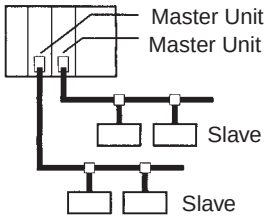
Area	OUT area (word)	IN area (word)	Selection method
Fixed allocation area 1	CIO 3200 to CIO 3263	CIO 3300 to CIO 3363	Change *_*Sw1MstrFixAloc1Cmd* (Master Fixed Allocation Setting 1 Switch) to TRUE.
Fixed allocation area 2	CIO 3400 to CIO 3463	CIO 3500 to CIO 3563	Change *_*Sw1MstrFixAloc2Cmd* (Master Fixed Allocation Setting 2 Switch) to TRUE.
Fixed allocation area 3	CIO 3600 to CIO 3663	CIO 3700 to CIO 3763	Change *_*Sw1MstrFixAloc2Cmd* (Master Fixed Allocation Setting 3 Switch) to TRUE.

You can include a maximum of 3 DeviceNet Units as masters in a single CPU Unit because the three allocation areas above on the memory used for CJ-series Unit are set individually for fixed allocations. The default setting is fixed allocations area 1.

Each OUT/IN area is allocated to a slave according to its node address as shown below. Allocated words are determined by the node address in fixed allocations as shown.



Note You can include more than one Master Unit in a single CPU Unit with fixed allocations, as shown below (3 Units max.).



4-3-2 Allocation Procedures

● Step 1: Place the CPU Unit in PROGRAM mode.

● Step 2: Change the Master Enable Switch to TRUE

If the master communications have been disabled (if *_*MstrEnblSta* (Master Function Enabled Status) is set to FALSE), change *_*Sw1MstrEnblCmd* (Master Enable Switch) to TRUE to enable master communications. Once Master communications have been enabled by changing this switch to TRUE, it will not change even if the power is turned OFF and back ON again.

Note If the master communications are enabled (if *_*MstrEnblSta* (Master Function Enabled Status) is TRUE), skip this step and go onto the next step. (If the Master Enable Switch is changed to TRUE (when master communications are enabled), a Unit error will occur and a C2 error will be displayed on the 7-segment indicator on the front panel.)

● Step 3: Change the Scan List Clear Switch to TRUE

If the Unit is in the Scan List Enable mode (if *_*SListDsblSta* (Scan List Disable Status) is set to FALSE), change *_*Sw1SListClrCmd* (Scan List Clear Switch) to TRUE to change to the Scan List Disabled mode.

Note If the Unit is already in the Scan List Disabled mode (if *_*SListDsblSta* (Scan List Disable Status) is TRUE), skip this step and go onto the next step. (If the Scan List Clear Switch is changed to TRUE (when the Unit is in the Scan List Disabled mode), a Unit error will occur and a C2 error will be displayed on the 7-segment indicator on the front panel.)

● Step 4: Select Fixed Allocations Area 1 to 3

Change *_*Sw1MstrFixAloc1Cmd* to *_*Sw1MstrFixAloc3Cmd* (Master Fixed Allocation Setting 1 to 3 Switch) to TRUE to select the fixed allocations area from 1 to 3.

One word will be allocated per node address in order of node addresses for the output (OUT) block and one word for the input (IN) block in the CIO Area in the memory used for CJ-series Unit.

Name of device variables for CJ-series Unit	Name	Fixed allocations area number	Allocated OUT area	Allocated IN area
*_Sw1MstrFixAloc1Cmd	Master Fixed Allocation Setting 1 Switch	Fixed allocations area 1	CIO 3200 to CIO 3263	CIO 3300 to CIO 3363
*_Sw1MstrFixAloc2Cmd	Master Fixed Allocation Setting 2 Switch	Fixed allocations area 2	CIO 3400 to CIO 3463	CIO 3500 to CIO 3563
*_Sw1MstrFixAloc3Cmd	Master Fixed Allocation Setting 3 Switch	Fixed allocations area 3	CIO 3600 to CIO 3663	CIO 3700 to CIO 3763

● Step 5: Change the Scan List Enable Switch to TRUE

Remote I/O communications will start with the scan list disabled after you select a fixed allocations area. Check to see if communication is proceeding normally with each slave, and then change *_*Sw1SListEnblCmd* (Scan List Enable Switch) to TRUE to communicate with the scan list enabled.

Step 6: Define the User-defined Variable

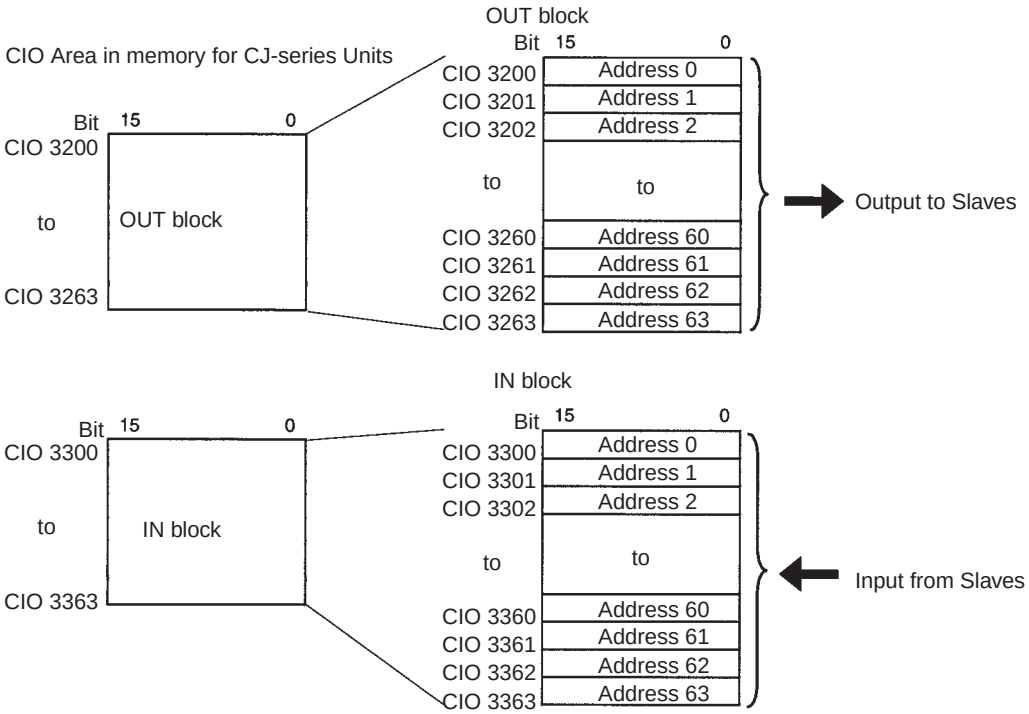
Define a user-defined variable for the area to which each slave is allocated. By using the user-defined variable, the user program can access the allocation area of the slave.

Below is an example of a user-defined variable in which fixed allocations area 1 is selected.

Name	Data Type	Initial Value	AT
DRM01_Out	ARRAY[0..63] OF WORD	[64(16#0)]	%3200
DRM01_In	ARRAY[0..63] OF WORD	[64(16#0)]	%3200

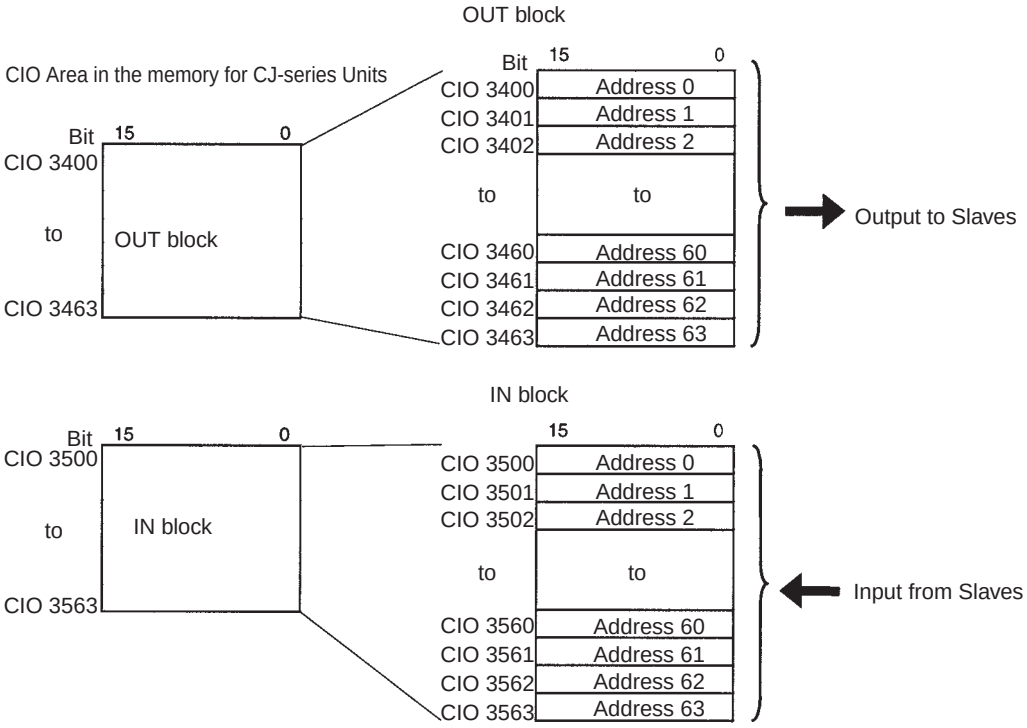
Fixed Allocations Area 1

OUT blocks are allocated to slaves from CIO 3200 to CIO 3263 and IN blocks are allocated to slaves from CIO 3300 to CIO 3363 in the memory used for CJ-series Unit. To access the output (OUT) block and the input (IN) block from the user program, allocate a user-defined variable to the applicable area.



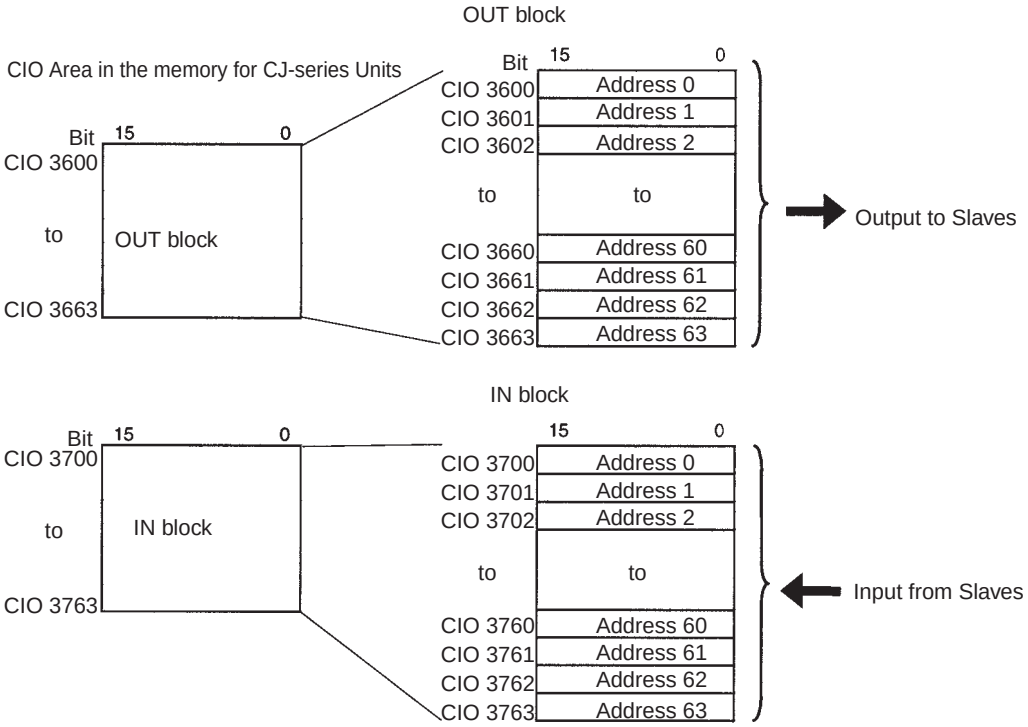
Fixed Allocations Area 2

OUT blocks are allocated to slaves from CIO 3400 to CIO 3463 and IN blocks are allocated to slaves from CIO 3500 to CIO 3563 in the memory used for CJ-series Unit. To access the output (OUT) block and the input (IN) block from the user program, allocate a user-defined variable to the applicable area.



Fixed Allocations Area 3

OUT blocks are allocated to slaves from CIO 3600 to CIO 3663 and IN blocks are allocated to slaves from CIO 3700 to CIO 3763 in the memory used for CJ-series Unit. To access the output (OUT) block and the input (IN) block from the user program, allocate a user-defined variable to the applicable area.



The Slave allocation order is fixed in the output (OUT) and IN blocks that start from address 0. Each address is allocated at least one byte (rightmost).

- More than one word is allocated for each slave (according to it's node address) with more than16 I/O points.
- The rightmost byte of the word is allocated to each slave that has 8 I/O points or less.

4-3-3 Changing System Components

The scan list must be cleared in the following situations:

- Adding a slave
- Disconnecting a slave
- Changing a node address

Set the CPU Unit to PROGRAM Mode. Change *_*Sw1SListClrCmd* (Scan List Clear Switch) to TRUE to clear the scan list. (Remote I/O communications will be performed with the scan list disabled using fixed allocations in the fixed allocations area that was used the last time the list was disabled.)

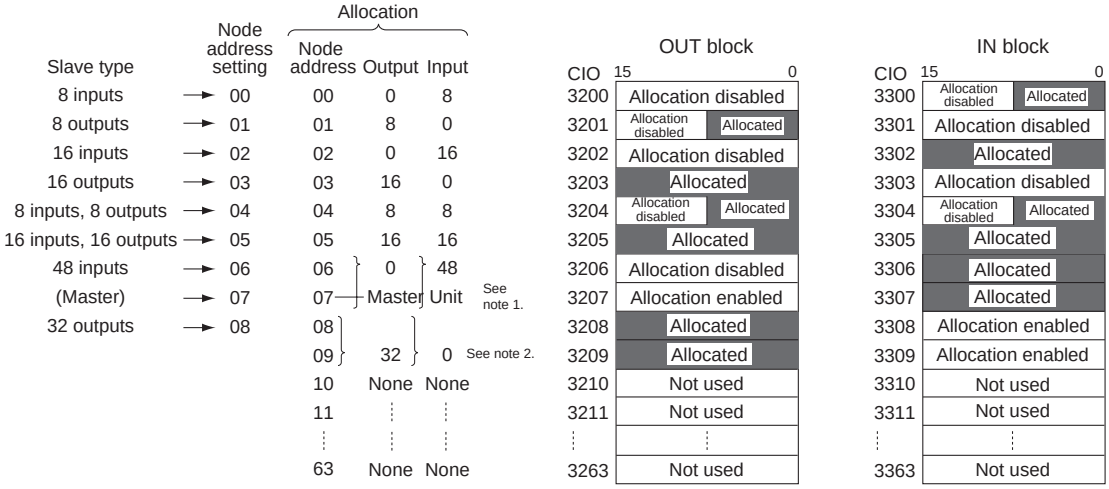
Make sure that communications with all slaves are operating properly after the scan list is cleared and the system component is changed, and then change *_*Sw1SListEnblCmd* (Scan List Enable Switch) to TRUE again to register all slaves currently online in the scan list. Remote I/O communications will continue during this time with the scan list enabled.

4-3-4 Fixed Allocations Example

This example shows the allocations that are used when Fixed Allocations 1 are used for the following slaves.

Node address	Outputs	Inputs	Product
0	0 pts	8 pts	8-pt Transistor Input Terminal (DRT1-ID08)
1	8 pts	0 pts	8-pt Transistor Output Terminal (DRT1-OD08)
2	0 pts	16 pts	16-pt Transistor Input Terminal (DRT1-ID16)
3	16 pts	0 pts	16-pt Transistor Output Terminal (DRT1-OD16)
4	8 pts	8 pts	8-pt Input and 8-pt Output Environment-resistant Terminal (DRT1-MD16C)
5	16 pts	16 pts	CQM I/O Link Terminal (CQM1-DRT21)
6	0 pts	48 pts	C200 I/O Link Unit (C200HW-DRM21) with 48 input pts (3 words)
7			
8	32 pts		Analog Output Terminal with 2 output pts (DRT2-DA02)
9		0 pts	

● Resulting Slave Allocation



Note 1 The Master Unit does not require any word allocation and so it can use any available address.

2 You can allocate blocks for which allocation is enabled to Slaves as long as the blocks do not overlap.

3 To use the I/O data allocated to the address above using Sysmac Studio, you need to register user-defined variables.

● Change the Scan List Enable Switch to TRUE

Change **_Sw1SListEnblCmd* (Scan List Enable Switch) to TRUE. This will create a scan list based on data for slaves that are actually online and will start remote I/O communications with the scan list enabled.

4-4 User-set Allocations

With a CJ-series DeviceNet Unit, you can allocate remote I/O communication slaves in any area of a memory used for CJ-series Unit (CIO, WR, HR, DM, or EM) with the use of one of the following methods:

- Setting through CX-Integrator
- Setting through device variables for CJ-series Unit (Master User-set Allocations Setup Table)

To access a given allocation area from the user program, a user-defined variable that specifies the AT specification of that allocation area needs to be defined.

● User-set Allocations Methods

Method		Set through CX-Integrator	Set through Device Variables for CJ-series Unit (Master User-set Allocations Setup Table)
Allocation areas in memory used for CJ-series Unit*		CIO: 0000 to 6143 WR: W000 to W511 HR: HR000 to HR511 DM: D00000 to D32767 EM: E _00000 to E _32767 (=0 to C)	
No. of allocated blocks		4 blocks: OUT 1, IN 1, OUT 2 and IN 2 You can create OUT 1, IN 1, OUT 2, and IN 2 anywhere in the above areas.	2 blocks: OUT 1 and IN 1 You can create OUT 1 and IN 1 anywhere in the above areas.
Block allocation order		Any order	
Node address order		Any order **Note 1** Node addresses do not have to correspond between blocks. **2** One node address cannot be allocated to different blocks.	Allocations must be in order of node addresses (0 to 63 in ascending order) **Note 1** Not all nodes need to be allocated, reducing the number of words required. **2** Node addresses do not have to correspond between blocks.
Start bit for allocations		Allocations can start from bit 00 or bit 08. Allocations that start from bit 08 are in 1-byte units only.	All allocations start from bit 00 (Cannot start from bit 08. All allocations are in 1 word units.)
Allocation size	Per block	500 words max.	
	Total size	2,000 words max. for a total of 4 blocks	1,000 words max. for a total of 2 blocks
Slave allocation limits	Slaves with more than 8 points	The leftmost byte (bits 07 to 15) cannot be used.	
	Slaves with 8 points	Allocated to the leftmost or rightmost bytes (not allocated a word)	
	Slaves with 16 points	Allocated one word	
	Slaves with more than 16 points	Allocated multiple words (with an odd number of bytes, only the rightmost byte is allocated in the last word)	

* You cannot use Holding Area H512 and its subsequent holding areas, or EM Area Bank D and its subsequent banks.

Precautions for Correct Use

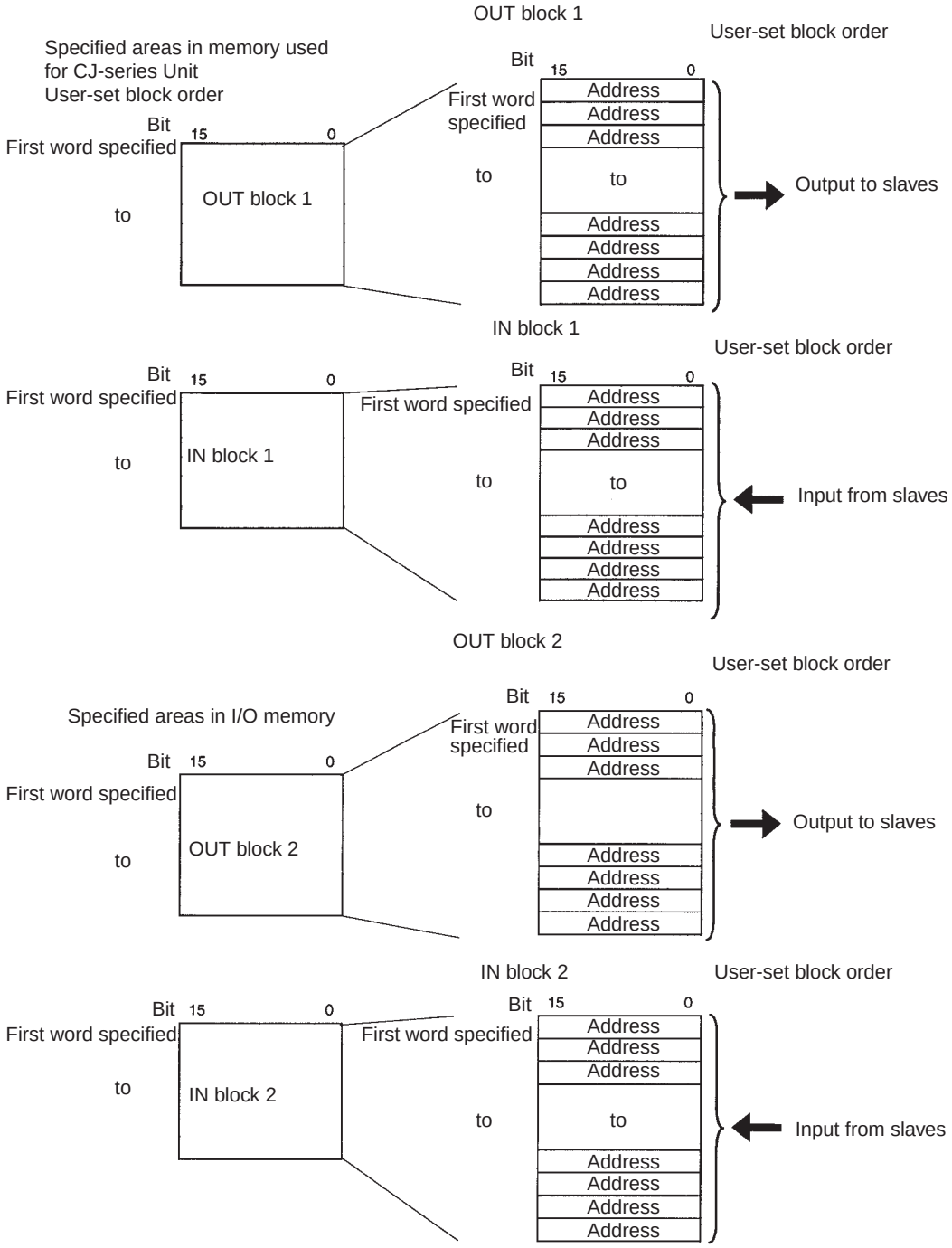
Functions will vary as shown below depending on whether allocations are set with the use of CX-Integrator or through device variable for CJ-series Unit (Master User-set Allocations Setup Table.)

- You can determine the order of node addresses when the CX-Integrator is used. Words are always allocated to slaves in order of ascending node addresses when allocations are set with device variable for CJ-series Unit. However, even when you use device variable for CJ-series Unit, nodes do not have to be allocated words, reducing the number of words required.
- There are four blocks (OUT1 and 2 and IN1 and 2) available when setting is made with the CX-Integrator, but you can only allocate two blocks (OUT1 and IN1) with device variables for CJ-series Unit.
- The first bit for node allocations can be either bit 00 or bit 08 when setting allocations with CX-Integrator (allocations for slaves with two bytes or more cannot start at bit 08), while it is always bit 00 with device variable for CJ-series Unit.

4-4-1 Settings through CX-Integrator

You can allocate slaves in any order for the following blocks: OUT block 1, OUT block 2, IN block 1, and IN block 2.

To access the area where the slave is allocated from the user program, a user-defined variable that specifies the AT specification of that area needs to be defined.



You can set the block allocation order, block allocation areas, and order of node addresses in each block. Each address is allocated at least one byte (rightmost or leftmost byte).

- More than one word is allocated for each slave (according to it's node address) with more than 16 I/O points.
- The leftmost or rightmost byte of the word is allocated to each slave that has 8 I/O points or less.

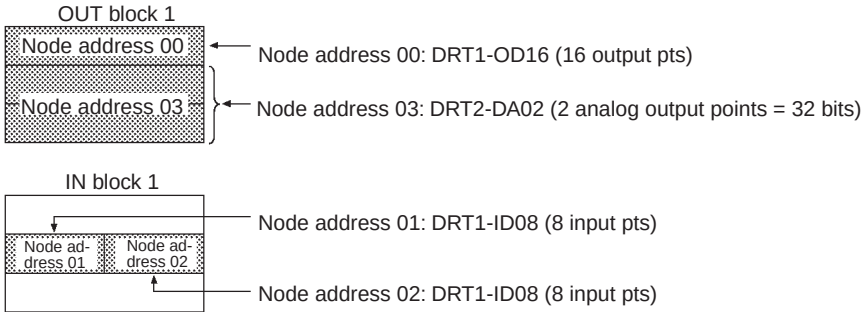
Allocation Procedures

Step 1

Set the area, start word, and words allocated for each block with the use of the CX-Integrator.

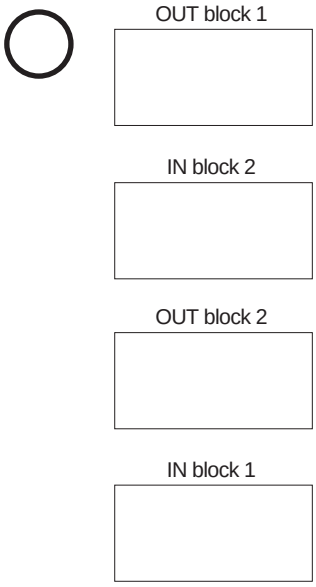
Step 2

Allocate words to all node addresses in each block as shown below with the use of the CX-Integrator.



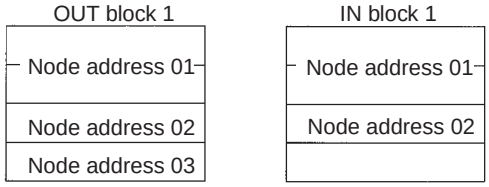
- Each address is allocated at least one byte (rightmost or leftmost byte).

Note a) You can set the order of all blocks as you desire.



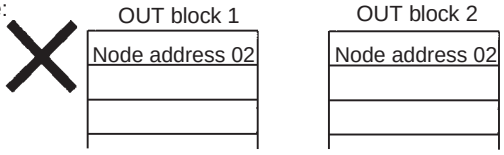
b) Node addresses do not have to correspond between an output block and input block.

Example: This is not necessary.

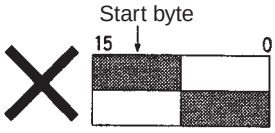


c) The same node address cannot be allocated more than once.

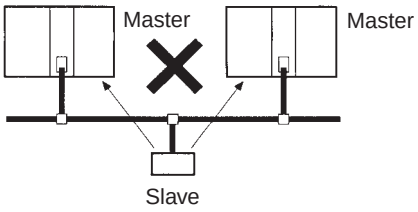
Example:



d) The start bit for node addresses can be bit 00 or bit 08. If it is bit 08 however, 2 or more bytes cannot be allocated as shown below.



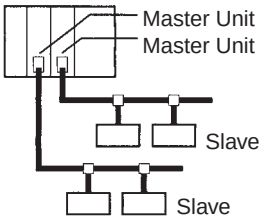
e) Multiple masters cannot share the same slave.



You can determine whether there are duplicate node addresses in the I/O allocations (scan lists) that were created simply by conducting a master parameter file duplicate check from the CX-Integrator.

f) Be sure to use user-set allocations and operate with the scan list enabled if multiple masters are connected to a single network. A Bus OFF errors will occur if multiple fixed allocations masters operating with the scan list disabled are present on a single network.

g) You can include multiple Master Units in a single CPU Unit as shown below using user-set allocations (16 Units max.).



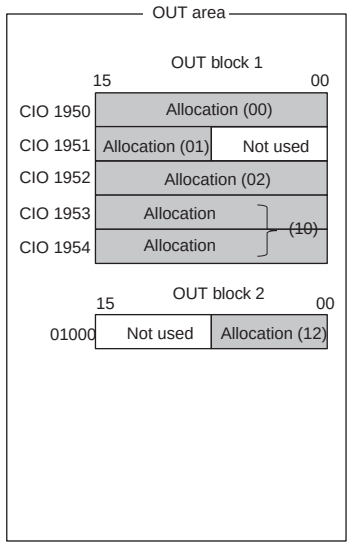
Step 3: Define User-defined Variable

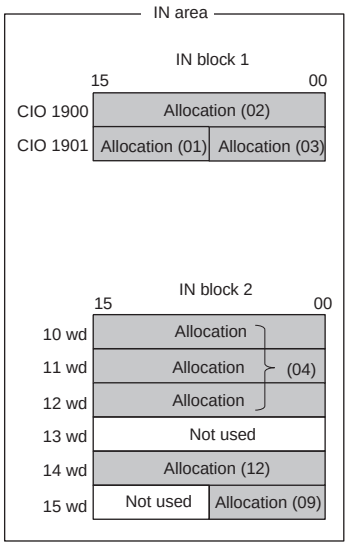
To access the area where the slave is allocated from the user program, a user-defined variable that specifies the AT specification of that area needs to be defined.

Example of User-set Allocations Using the CX-Integrator

Slave types	Node address setting	Node address	Output	Input
16 output pts	00	00	16 pts	0 pts
Combination of 8 input and output pts	01	01	8 pts	8 pts
Combination of 16 input and output pts	02	02	16 pts	16 pts
8 input pts	03	03	0 pts	8 pts
32 output pts	10	10	32 pts	0 pts
48 input pts	04	04	0 pts	48 pts
8 input pts	09	09	0 pts	8 pts
Combination of 8 output and 16 input pts	12	12	8 pts	16 pts

Allocation status





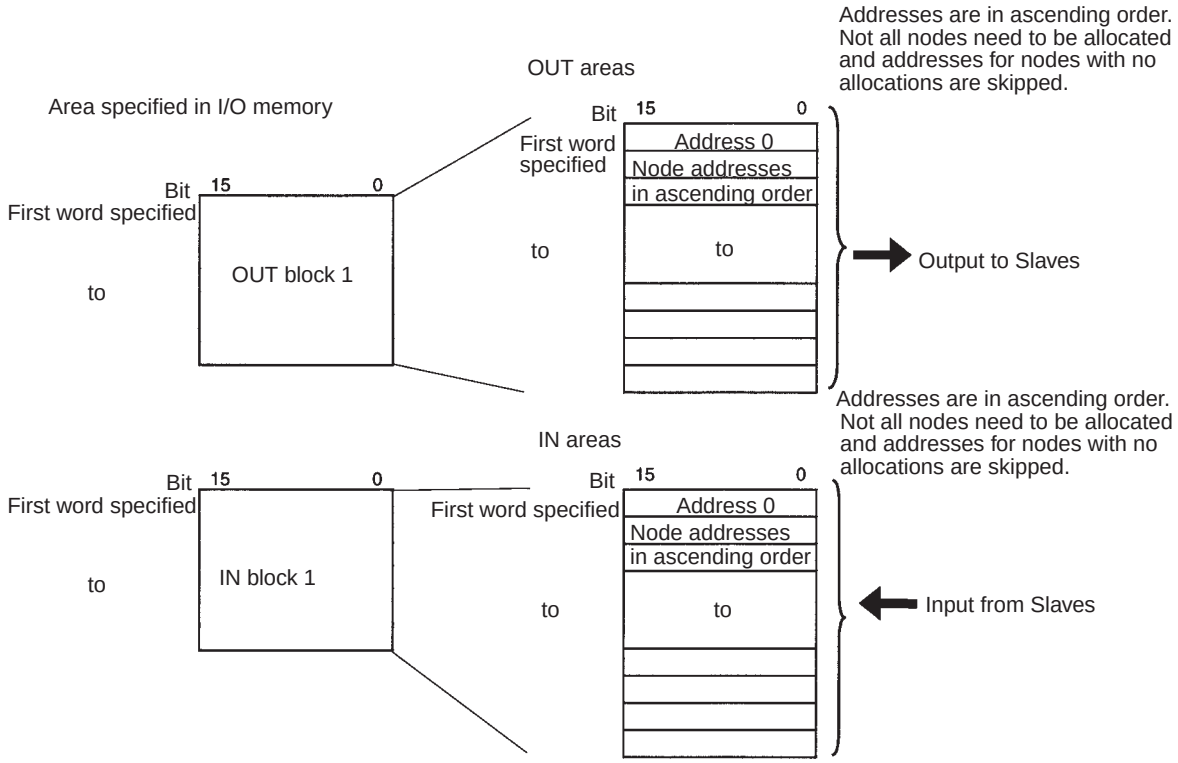
CX-Integrator Setting Methods

Refer to *CX-Integrator Ver.2.□ OPERATION MANUAL* (Cat. No. W464).

4-4-2 Settings through Device Variables for CJ-series Unit (Master User-set Allocations Setup Table)

All slaves are allocated words in order of node addresses in two blocks: OUT block 1 and IN block 1.

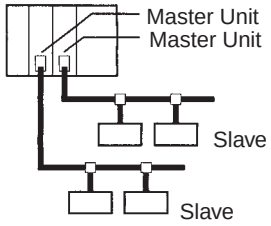
In the block area, the first word is set with **_MstrAlocTblCfg[0 to 3]*. In addition, an Allocation Size Setup Table is created in the area and word location is specified through **_MstrAlocTblCfg[4 and 5]*, and you can define the size for each block. To access the area where the slave is allocated from the user program, a user-defined variable that specifies the AT specification of that area needs to be defined.



You can set the block allocation order and block allocation areas. Node addresses in each block are allocated words in ascending order from 0 to 63. Node addresses that are not allocated are skipped (not allocated words). Each address is allocated at least one word (rightmost byte, 1 word, or multiple words).

- More than one word is allocated for each slave (according to it's node address) with more than16 I/O points.
- The rightmost byte of the word is allocated to each slave that has 8 I/O points or less.

Note You can include multiple Master Units in a single CPU Unit as shown below with the use of user-set allocations (16 Units max.).



Allocation Procedures

Step 1: Set the CPU Unit to PROGRAM Mode.

Step 2: Set the Master Enable Switch to TRUE.

Make sure that master communications was disabled by checking to see if *_MstrEnblSta* (Master Function Enabled Status) is FALSE, and then set to TRUE the *_Sw1MstrEnblCmd* (Master Enable Switch) to enable master communications. Once you have turned this switch from OFF to ON, which will enable the master, the system operates over the master whether the power supply is turned OFF or ON.

Note Do not change the Master Enable Switch to TRUE unless master communications are stopped. (If the Master Enable Switch is change to TRUE when master communications are enabled, a Unit error will occur and a "C5" error will be displayed on the 7-segment indicator on the front panel.)

Step 3: Set the Master User-set Allocations Setup Table

This table specifies the area and first word for each block and the area and first word for the Allocation Size Setup Table.

- Master User-set Allocations Setup Table

Name of device variables for CJ-series Unit	Type	Name	Range
*_MstrAlocTblCfg[0]	UINT	OUT block 1 area	0 to 20
*_MstrAlocTblCfg[1]	UINT	First word in OUT block 1	0 to 32767
*_MstrAlocTblCfg[2]	UINT	IN block 1 area	0 to 20
*_MstrAlocTblCfg[3]	UINT	First word in IN block 1	0 to 32767
*_MstrAlocTblCfg[4]	UINT	Allocation size setup table area	0 to 20
*_MstrAlocTblCfg[5]	UINT	First word in allocation size setup table 1	0 to 32767
*_MstrAlocTblCfgSta	WORD	Setting Results of Master User-set Allocations Setup	16#0000 to FFFF

- Areas and Word Ranges for OUT Block 1, IN Block 1, and the Allocation Size Setup Table

Code	Area name in memory used for CJ-series Unit	Word range
0	---	The block is not used.
1	CIO Area (CIO)	0 to 6143
3	Data Memory (DM)	0 to 32767
4	Work (WR)	0 to 511
5	HR (HR)	0 to 511
8 to 20	Expansion Data Memory (EM) Bank 0 to bank C (13 banks)	0 to 32767 (E0_00000 to E0_32767, ... , EC_00000 to EC_32767) for all banks

Note You cannot use Holding Area H512 and its subsequent holding areas, or EM Area Bank D and its subsequent banks.

Step 4: Set the Allocation Size Setup Table

Specify the area and first word l in this table at words *_MstrAlocTblCfg[4]* (Allocation size setup table area) and *_MstrAlocTblCfg[5]* (First word in the allocation size setup table 1).

Allocate user-defined variables to the areas on the allocation size setup table.

After allocating user-defined variables to the areas, IN and OUT sizes for all nodes are set here as shown in the table below. The setting range for each node is 0 to 200 bytes (0 to 100 words), although actual size depends on the allocated slaves. The maximum size per block is 500 words. If the size set here is larger than 1 byte, the start bit for all slaves is bit 00 and size is allocated in ascending node address order that start from the beginning of the OUT 1 and IN 1 areas in word units. If the size is set at 0 bytes for a node address, it is skipped the words are allocated to the next address.

- Allocation Size Setup Table

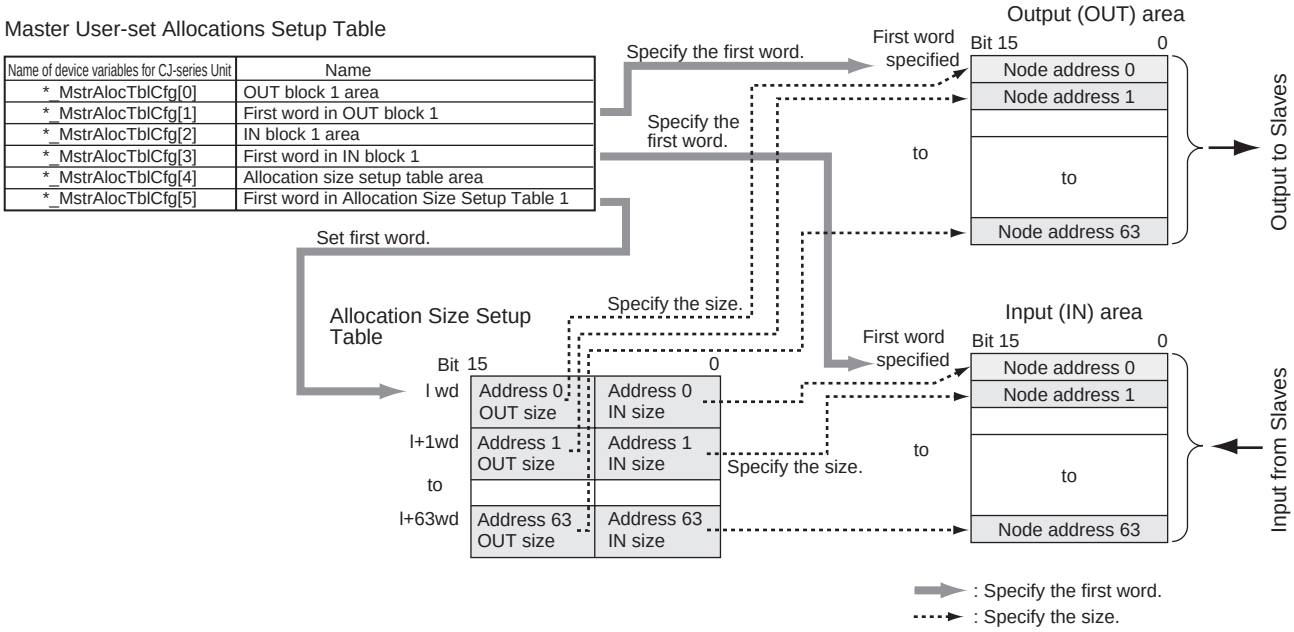
  l is the start address for the Allocation Size Setup Table specified with *_MstrAlocTblCfg[4]* (Allocation Size Setup Table Area) and *_MstrAlocTblCfg[5]* (First Word in Allocation Size Setup Table 1).

Bit	15 to 08	07 to 00
l+0	Node address 0 OUT size (bytes)	Node address 0 IN size (bytes)
l+1	Node address 1 OUT size (bytes)	Node address 1 IN size (bytes)
to	to	
l+62	Node address 62 OUT size (bytes)	Node address 62 IN size (bytes)
l+63	Node address 63 OUT size (bytes)	Node address 63 IN size (bytes)

Step 5: Set the Master User-set Allocations Setup Switch to TRUE.

Change *_Sw1MstrAlocCmd* (Master User-set Allocations Switch) to TRUE. The DeviceNet Unit performs the following two steps simultaneously to start remote I/O communications with the scan list enabled: reading allocation result for the above slaves from the NJ-series CPU Unit, and creating a scan list based on actual connection information of slaves.

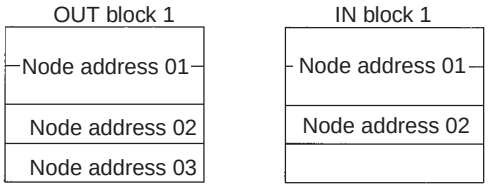
Note The Master User-set Allocations Switch not only reads slave allocation data, but it also enables the scan list.



Note **1** You can use any order for the OUT 1 and IN 1 blocks.

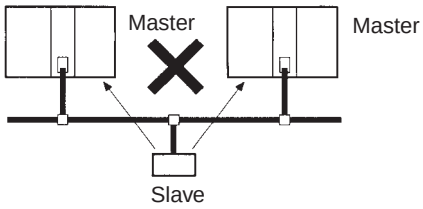
2 Node addresses do not have to correspond between output block 1 and input block 1.

Example: This is not necessary.



3 The start bit for node addresses must always be bit 00, and never bit 08.

4 Multiple masters cannot share the same slave.



5 Be sure to use user-set allocations and operate the Master Unit with the scan list enabled if multiple masters are connected to a single network. Communications will not be possible if there is more than one master with the scan list disabled connected to a network.

Step 6: Define the User-defined Variable

Define a user-defined variable that specifies the AT specification for the area to which each slave is allocated. By using the user-defined variable, the user program can access the allocation area of the slave.

Changing System Components

In the following situations, the table must be reset, the **_Sw1MstrAlocCmd* (Master User-set Allocations Switch) changed to TRUE, and the scan list recreated:

- Adding a slave
- Removing a slave
- Changing a node address
- Changing a node allocation

There is no need to clear the scan list.

Example Settings for User-set Allocations through Device Variables for CJ-series Unit

This example uses the following settings for unit number 0.

- OUT block 1 area and first word: WR (4), 50CH (50)
- IN block 1 area and first word: WR (4), 100CH (100)
- Allocation Size Setup Table area and first word: DM (3), 00100 (100)

This example shows user-set allocations for the following slaves.

Node address	Outputs	Inputs	Product
0	16 pts	0 pts	16-pt Transistor Output Terminal (DRT1-OD16)
1	8 pts	8 pts	8-pt input and 8-pt Output Environment-resistant Terminal (DRT1-MD16C)
2	16 pts	16 pts	CQM I/O Link Terminal (CQM1-DRT21)
3	0 pts	8 pts	8-pt Transistor Input Terminal (DRT1-ID08)
4	None		---
5	160 pts	160 pts	CJ-series DeviceNet Unit (CJ1W-DRM21) (Slave Unit)

● Master User-set Allocations Setup Table

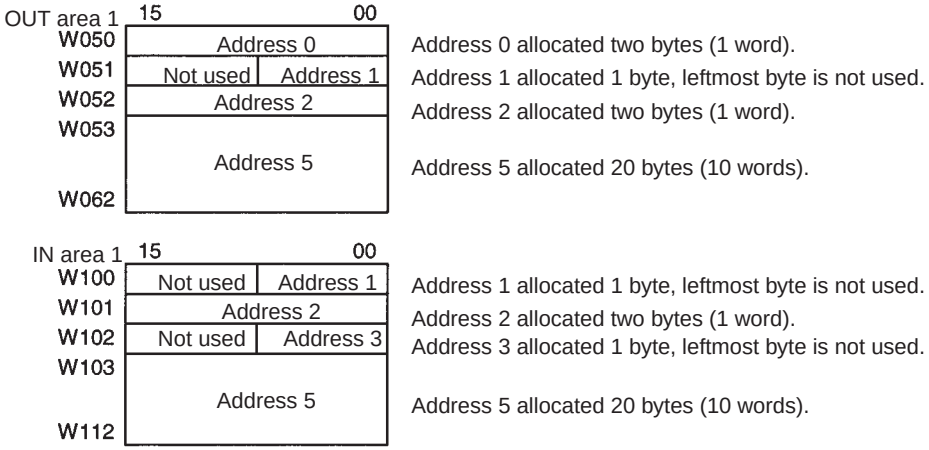
Name of device variables for CJ-series Unit	Name	Setting (function)
*_MstrAlocTblCfg[0]	OUT block 1 area	4 (WR)
*_MstrAlocTblCfg[1]	First word in OUT block 1	50 (50 words)
*_MstrAlocTblCfg[2]	IN block 1 area	4 (WR)
*_MstrAlocTblCfg[3]	First word in IN block 1	100 (100 words)
*_MstrAlocTblCfg[4]	Allocation size setup table area	3 (DM)
*_MstrAlocTblCfg[5]	First word in Allocation Size Setup Table 1	100 (100 words)

● Allocation Size Setup Table

Address	User-defined variable name (USINT type)	Setting	Number of slave bytes
Bits 00 to 07 for D00100	Slave0_InSizeTab	0	0
Bits 08 to 15 for D00100	Slave0_OutSizeTab	2	2
Bits 00 to 07 for D00101	Slave1_InSizeTab	1	1
Bits 08 to 15 for D00102	Slave1_OutSizeTab	1	1
Bits 00 to 07 for D00103	Slave2_InSizeTab	2	2
Bits 08 to 15 for D00103	Slave2_OutSizeTab	2	2
Bits 00 to 07 for D00104	Slave3_InSizeTab	1	1
Bits 08 to 15 for D00104	Slave3_OutSizeTab	0	0
Bits 00 to 07 for D00105	Slave4_InSizeTab	0	0
Bits 08 to 15 for D00105	Slave4_OutSizeTab	0	0
Bits 00 to 07 for D00106	Slave5_InSizeTab	20	20
Bits 08 to 15 for D00106	Slave5_OutSizeTab	20	20

● Resulting Slave Allocations

Slaves are allocated as follows. Before a user program can access the following areas, a user-defined variable that specifies the AT specification of that allocation area must to be defined.



● Changing the Master User-set Allocations Switch to TRUE

Change *_*Sw1MstrAlocCmd* (Master User-set Allocations Switch) to TRUE. The Master User-set Allocations Switch will read the allocation results data for the above slaves and create a scan list based on data for slaves that are actually online prior to starting remote I/O communications with the scan list enabled.

4-5 Starting and Stopping Remote I/O Communications

4-5-1 Starting Remote I/O Communications

Remote I/O communications start automatically after the Unit is restarted or the Controller is reset, including when the power is turned ON.

The *_Mstr1IOCommSta* (I/O Data Communications Status) is changed to TRUE when remote I/O communications is started with at least one slave.

4-5-2 Stopping Remote I/O Communications

Remote I/O communications stop under the following user-controlled conditions. Message communications can still be performed when the remote I/O communications stop.

Stop Communications with All Slaves

When *_Sw1IOCommStopCmd* (Remote I/O Communications Stop Switch) is changed to TRUE.

Stop Communications with a Specified Slave

When associated device variables for CJ-series Unit *_CnctNdCmd[0]* to *_CnctNdCmd[63]* (Disconnect/Connect Switches for Node Address 0-63 Slave) are changed to TRUE (Disconnected when changed to TRUE).

Note The communications cycle time is not shorter even though a slave was disconnected from remote I/O communications by setting the Disconnect/Connect Switch to TRUE. (Blank time in the communications cycle will only be increased.)

4-5-3 Restarting Remote I/O Communications

Remote I/O communications restart under the following conditions.

Restart Communications with All Slaves

Remote I/O communications restart when *_Sw1IOCommStartCmd* (Remote I/O Communications Start Switch) is changed to TRUE. (Only communications with slaves with the Disconnect/Connect Switch changed to FALSE will be restarted.)

Restart Communications with Specified Slave

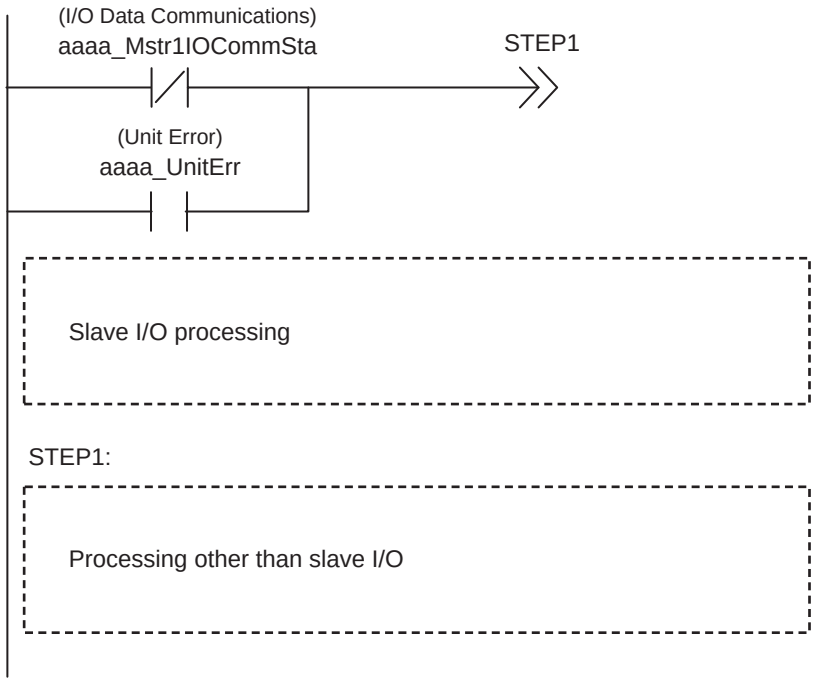
When associated device variables for CJ-series Unit *_CnctNdCmd[0]* to *_CnctNdCmd[63]* (Disconnect/Connect Switches for Node Address 0-63 Slave) are changed to FALSE. (Connected when changed to FALSE.)

4-6 Example of User Program for Remote I/O Communications

When user program are written for remote I/O communications, make sure it performs I/O processing with a slave under the following conditions:

- *_Mstr1IOCommSta* (I/O Data Communications Status) is changed to TRUE.
- *_UnitErr* (Unit Error) is changed to FALSE.

Example: There is no jump and slave I/O is processed when the JMP(004) instruction input condition is FALSE in the following instructions. There is a jump and slave I/O is not processed when the JMP(004) instruction input condition is TRUE.



Precautions for Correct Use

Even if there is a communications error with the slave, the slave input data is saved in the allocated area.

To prevent operating errors, make a user program so that no slave I/O processing will occur when *_UnitErr* (Unit Error) is TRUE.

4-7 Errors that May Occur in Remote I/O Communications

The following errors may occur during remote I/O communications.

Condition	Error		Details	Results	Indicators	7-segment indicator
Error occurs in fixed allocations with the scan list disabled	*_*Mstr1StruErr* (Structure Error) is TRUE	Duplicate I/O area	The same I/O word is allocated to two or more slaves. (This occurs whenever a slave that is allocated multiple words has one of the words allocated to the node address of another Slave.)	Reconnect with the error slave and continue remote I/O communications.	MS: Not related NS: Flashes red	d0
		I/O area range exceeded	A slave is allocated an area outside the fixed allocations area. (This occurs whenever slaves are allocated multiple words and a slave is allocated a word beyond node address 63 in the fixed allocations area.)			d1
		Unsupported Slave	The I/O size of a slave exceeds 200 bytes (100 words). (This occurs if either the IN or the OUT size exceeds 200 bytes.)			d2
Error occurs in either fixed or user-set allocations with the scan list enabled	*_*Mstr1VefyErr* (Verification Error) is TRUE	No slaves present	A Slave registered in the scan list is not present.			d5
		I/O size mismatched	The I/O size registered in the scan list does not match the I/O size of the slave. **Note** I/O size is compared in 8-point (1-byte) units. If I/O size is registered at 8 points for example, then an error I/O size mismatch will not occur with a Slave with just one input point connected.			d6
		Incorrect vendor	The vendor registered in the scan list does not match the slave vendor.			d6
		Incorrect device type	The device type registered in the scan list does not match the slave device type.			d6
		Incorrect product code	The product code registered in the scan list does not match the slave product code.			d6
		Incorrect connection bus	The connection bus registered in the scan list is set incorrectly.			d6
		Unsupported connection	The slave does not support the connection registered in the scan list.			d6

Condition	Error	Details	Results	Indicators	7-segment indicator
Fixed or user-set allocations	I/O communications error	A timeout occurred during remote I/O communications. (The Slave response timed out 6 times in a row or an error occurred 3 times in a row.)	Reconnect with the error Slave and continue remote I/O communications.*	MS: Not related NS: Flashes red	d9
	Network power error	The network is not supplying communications power.		MS: Not related NS: Goes out	E0
	Send timeout	A communications request was not successfully completed due to the following reasons: • There are no devices on the network. • Baud settings do not match for every node. • CAN controller error			E2
	Duplicated node address	The master node address is the same address as another node.	All communications stop (remote I/O communications stop, slave operation stops, and message communications are disabled).	MS: Not related NS: Flashes red	F0
	Bus OFF detected	Bus OFF error was detected.			F1
	Master scan list logic error	The master scan list data is incorrect.	Remote I/O communications stop (Slave operation stops, but message communications are enabled).	MS: Flashes red NS: Not related	E8

* Remote I/O communications will stop (7-segment indicator: A0) if DIP switch pin 3 on the front panel is turned ON to specify stopping remote I/O communications for I/O communications errors.

5

Remote I/O Slave Communications

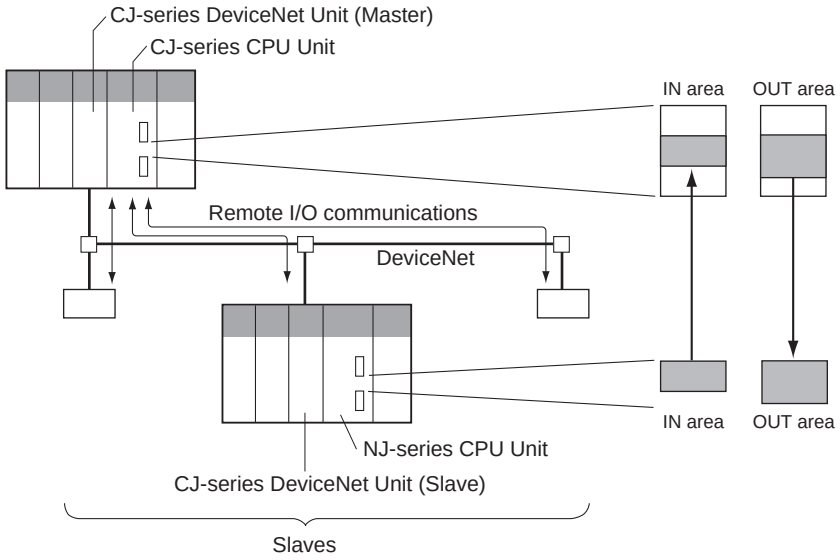
This section describes the remote I/O communications performed as a DeviceNet slave by the DeviceNet Unit.

5-1 Slave Remote I/O Communications 5-2
5-1-1 Allocation Methods 5-2
5-1-2 Remote I/O and Slave Communications Specifications 5-3
5-1-3 Procedures for Using Remote I/O Slave Communications 5-4
5-2 Fixed Allocations 5-7
5-2-1 Allocated Words 5-7
5-3 User-set Allocations 5-9
5-3-1 Setting through CX-Integrator 5-9
5-3-2 Settings through Device Variables for CJ-series Unit (Slave User-set Allocations Setup Table) 5-12

5-1 Slave Remote I/O Communications

A CJ-series DeviceNet Unit can function as a Slave Unit in remote I/O communications and a single CJ-series DeviceNet Unit can function as both a Master Unit and a Slave Unit. This section describes Slave communications.

● Slave Communications



- In the following descriptions, the areas used to transfer data from the master to the slaves are called OUT areas and the areas used to transfer data from the slaves to the master are called the IN areas.
- In the following descriptions, a CJ-series DeviceNet Unit set to function as a master is referred to as a "Master Unit" and a CJ-series DeviceNet Unit set to function as a slave is referred to as a "Slave Unit".

5-1-1 Allocation Methods

The specified areas in the memory used for CJ-series Unit of the NJ-series CPU Unit in which a Slave Unit is installed, are allocated to the Master Unit as DeviceNet slave. They are allocated using one of the following methods:

1) Fixed allocations

2) User-set allocations

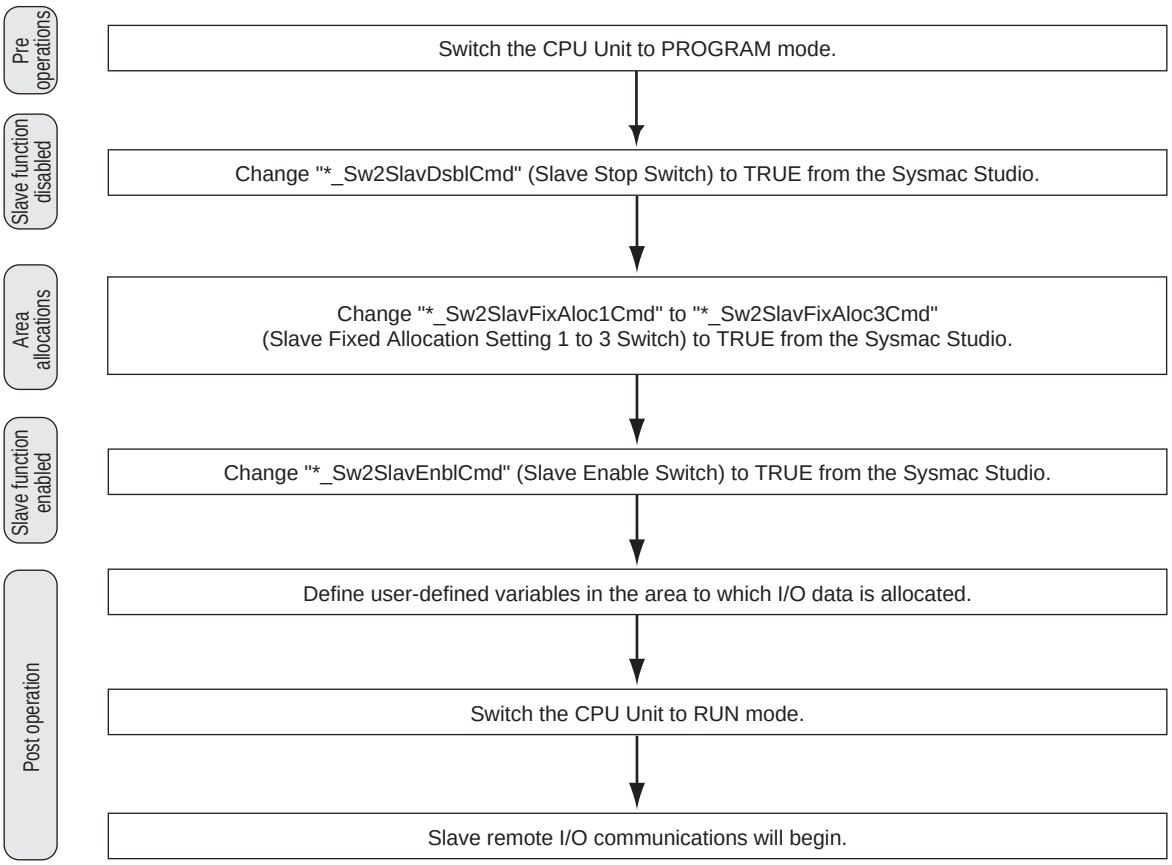
To access the OUT/IN Areas that was specified with the above method from the user program, a user-defined variable that specifies the AT specification of that area needs to be defined.

5-1-2 Remote I/O and Slave Communications Specifications

<table>
<tr><th>Item</th><th colspan="7">Specifications</th></tr>
<tr><td rowspan="11">Allocation method</td><td rowspan="4">Fixed allocations</td><td colspan="7">Select one of the following fixed allocations areas 1, 2, and 3 using *_Sw2SlavFixAloc1Cmd to *_Sw2SlavFixAloc3Cmd (Slave Fixed Allocation Setting 1 Switch to Slave Fixed Allocation Setting 3 Switch).</td></tr>
<tr><td rowspan="3">Allocated words (CIO Area)</td><td>I/O</td><td>Size</td><td>Fixed Allocation Area Setting 1</td><td>Fixed Allocation Area Setting 2</td><td>Fixed Allocation Area Setting 3</td></tr>
<tr><td>Output (OUT) area to the slave from the master</td><td>1 word</td><td>3370</td><td>3570</td><td>3770</td></tr>
<tr><td>Input (IN) area to the master from the slave</td><td>1 word</td><td>3270</td><td>3470</td><td>3670</td></tr>
<tr><td colspan="7">Note Select one of the preceding areas with the use of the device variables for CJ-series Unit. All are fixed at 1 word per node address. The default setting is Fixed Allocations Area Setting 1.</td></tr>
<tr><td rowspan="7">User-set allocations</td><td rowspan="3">By CX-Integrator</td><td colspan="6">Set the areas for the OUT 1 and IN 1/2 blocks, the first words, and the slave allocation sizes with the use of the CX-Integrator.</td></tr>
<tr><td>Allocated words</td><td colspan="4">The input and output areas can be the following sizes that start from any word in any of the following areas: CIO Area, WR Area, HR Area, DM Area, or EM Area in the memory used for CJ-series Unit.</td></tr>
<tr><td colspan="3">Output (OUT) area from this master</td><td>100 words</td></tr>
<tr><td colspan="3">Input (IN) area to this master</td><td>100 words</td></tr>
<tr><td rowspan="3">By device variables for CJ-series Unit</td><td colspan="6">Set the areas, the first words, and slave allocation size for the OUT 1 and IN 1 blocks (total of 2 blocks) with the use of the Slave User Allocation Setup Table in the device variables for CJ-series Unit.</td></tr>
<tr><td>Allocated words</td><td colspan="4">The input and output areas can be the following sizes that start from any word in any of the following areas: CIO Area, WR Area, HR Area, DM Area, or EM Area in the memory used for CJ-series Unit.</td></tr>
<tr><td colspan="3">Output (OUT) area from this master</td><td>100 words</td></tr>
<tr><td colspan="3">Input (IN) area to this master</td><td>100 words</td></tr>
<tr><td rowspan="3">Max. No. of I/O points per DeviceNet Unit slave</td><td colspan="2">Fixed allocations</td><td colspan="5">32 points (1 input word, 1 output word)</td></tr>
<tr><td rowspan="2">User-set allocations</td><td>By device variables for CJ-series Unit</td><td colspan="5">3,200 pts (100 input words, 100 output words)</td></tr>
<tr><td>By CX-Integrator</td><td colspan="5">4,800 pts (100 input words x 2, 100 output words x 1)</td></tr>
</table>

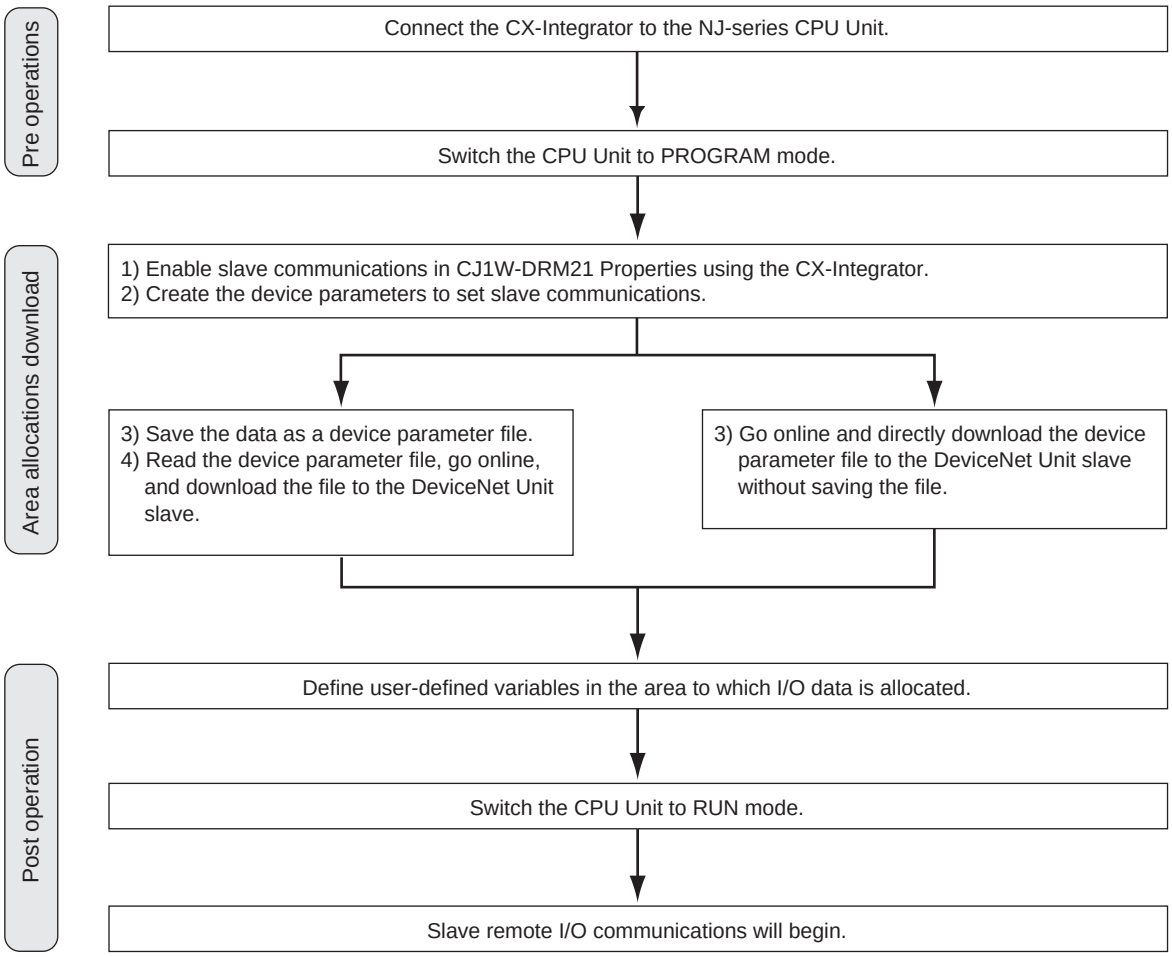
5-1-3 Procedures for Using Remote I/O Slave Communications

● Fixed Allocations for Remote I/O



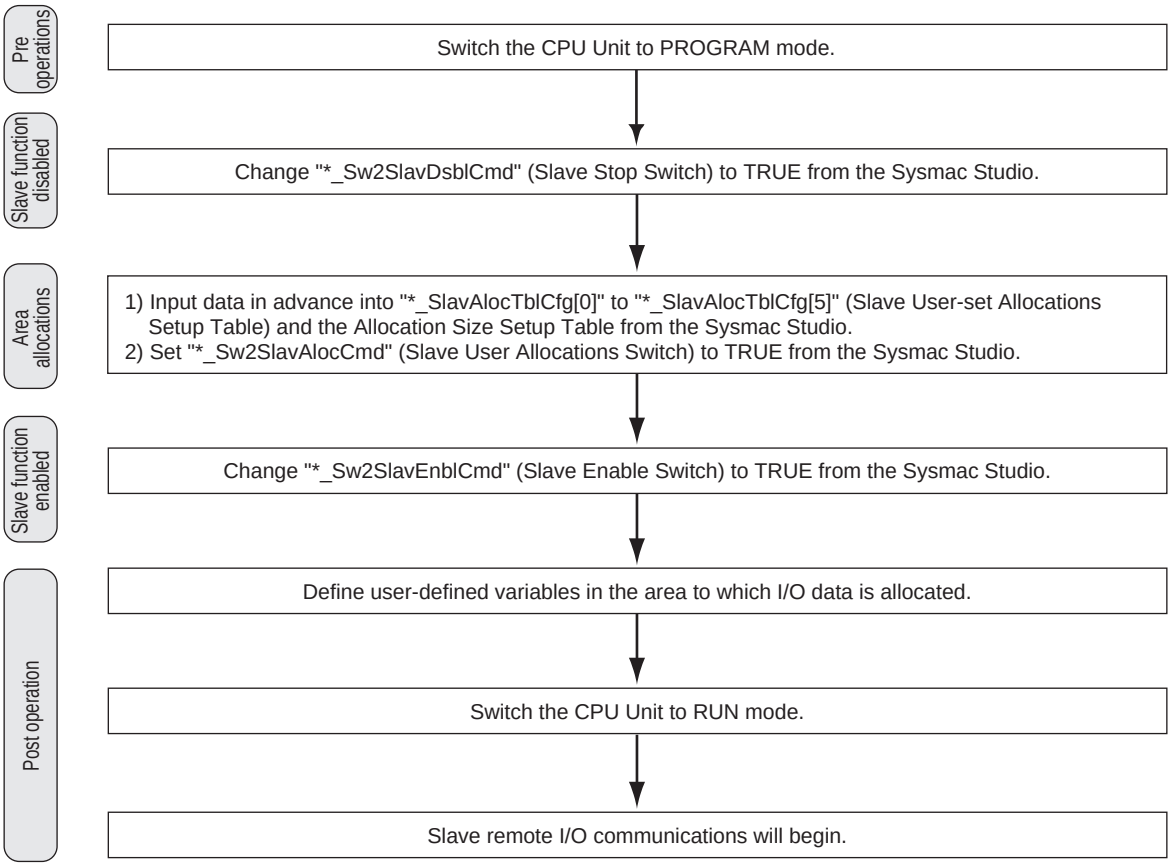
Note Slave communications must be disabled prior to area allocation and must be enabled after area allocation. The order of the procedure is 1) stop slave communications, allocate areas, and then enable slave communications. The allocated areas will not be valid if the procedure is done in any other order.

● User-set Remote I/O Allocations Using the CX-Integrator



Note Enable slave communications in CJ1W-DRM21 Properties if the CX-Integrator is used.

● User-set Remote I/O Allocations Using Device Variables for CJ-series Unit



Note Slave communications must be disabled prior to area allocation and must be enabled after area allocation. The order of the procedure is 1) stop slave communications, allocate areas, and then enable slave communications. The allocated areas will not be valid if the procedure is done in any other order.

Precautions for Correct Use

In fixed allocation or user-set allocations through the device variables for CJ-series Unit, area allocations must be set with slave communications disabled and will be transferred to Units when slave communications are enabled.
Allocations will not be valid if slave communications are enabled during area allocation.

5-2 Fixed Allocations

5-2-1 Allocated Words

If fixed allocation is used, allocated words are in the following I/O (CIO) area in the memory used for CJ-series Unit. You can select words from one of three fixed allocations areas. Use *_Sw2SlavFixAloc1Cmd* to *_Sw2SlavFixAloc3Cmd* (Slave Fixed Allocation Setting 1 to 3 Switch) to select the allocation area.

Each area is comprised of an OUT area that is used to write data to the master IN area and an IN area that is used for inputs from the master OUT area in remote I/O communications.

To access the following areas from the user program, user-defined variables that specify the AT specification of these areas need to be defined.

Area	OUT area (master to slave)	IN area (slave to master)	Selection method
Fixed allocation area 1	CIO 3370	CIO 3270	Change *_Sw2SlavFixAloc1Cmd* (Slave Fixed Allocation Setting 1 Switch) to TRUE.
Fixed allocation area 2	CIO 3570	CIO 3470	Change *_Sw2SlavFixAloc2Cmd* (Slave Fixed Allocation Setting 2 Switch) to TRUE.
Fixed allocation area 3	CIO 3770	CIO 3670	Change *_Sw2SlavFixAloc3Cmd* (Slave Fixed Allocation Setting 3 Switch) to TRUE.

You can include a maximum of 3 CJ-series DeviceNet Units as slaves in a single NJ-series CPU Unit because the three allocation areas above are set individually for fixed allocations. The default setting is fixed allocation area 1.

Allocation Procedures

- **Step 1: Set the CPU Unit to PROGRAM Mode.**

- **Step 2: Stop Slave Communications**

  If the Unit already functions as a Slave Unit, change *_Sw2SlavDsblCmd* (Slave Stop Switch) to TRUE to stop slave communications. This step is not necessary if slave communications are stopped.

- **Step 3: Select a Fixed Allocation Area**

  Change *_Sw2SlavFixAloc1Cmd* to *_ Sw2SlavFixAloc3Cmd* (Slave Fixed Allocation Setting 1 to 3 Switch) to TRUE to select a fixed allocations area between 1 and 3.

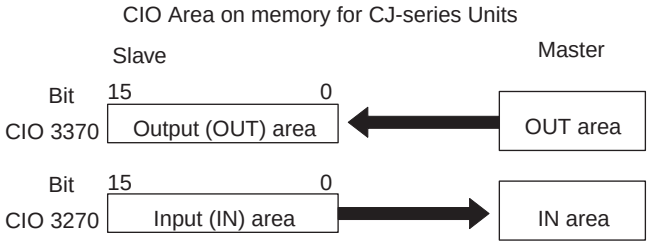
  One word is allocated for the output (OUT) area from the Slave Unit to the CPU Unit and another word is allocated for the input (IN) area from the CPU Unit to the Slave Unit in the memory used for CJ-series Unit, as shown below.

Name of device variables for CJ-series Unit	Name	Fixed allocation area	Allocated output (OUT) area (master to slave)	Allocated input (IN) area (slave to master)
*_Sw2SlavFixAloc1Cmd	Slave Fixed Allocation Setting 1 Switch	Fixed allocation area 1	CIO 3370	CIO 3270
*_Sw2SlavFixAloc2Cmd	Slave Fixed Allocation Setting 2 Switch	Fixed allocation area 2	CIO 3570	CIO 3470
*_Sw2SlavFixAloc3Cmd	Slave Fixed Allocation Setting 3 Switch	Fixed allocation area 3	CIO 3770	CIO 3670

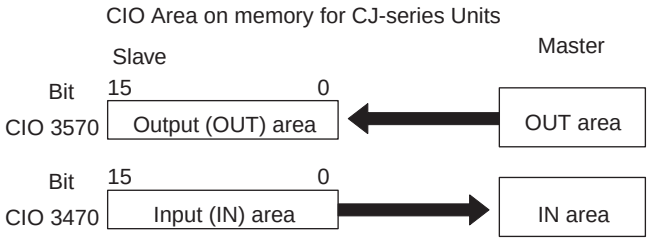
Step 4: Change the Slave Enable Switch to TRUE

Change *_*Sw2SlavEnblCmd* (Slave Enable Switch) to TRUE. This will allocated the fixed allocation areas as slave areas and the DeviceNet Unit will start slave remote I/O communications. Slave communications will run automatically after that whenever the power is turned ON.

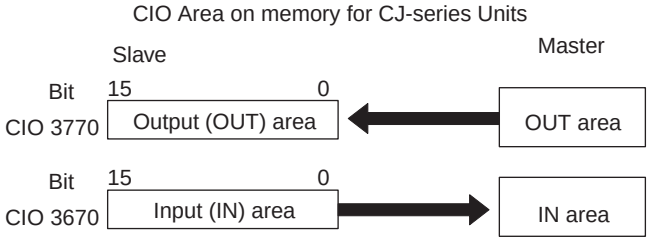
Fixed Allocations Area Setting 1



Fixed Allocations Area Setting 2



Fixed Allocations Area Setting 3



Step 5: Define User-defined Variables

Define a user-defined variable for the area to which each slave is allocated. By using the user-defined variable, the user program can access the allocation area of the slave.

5-3 User-set Allocations

With a CJ-series DeviceNet Unit, you can allocate remote I/O communication slaves in any area of a memory used for CJ-series Unit (CIO, WR, HR, DM, or EM) using one of the following methods:

- Setting through CX-Integrator
- Setting through the device variables for CJ-series Unit (Slave User-set Allocations Setup Table)

● User-set Allocations Methods

Method		Set through CX-Integrator	Set through the device variables for CJ-series Unit (Slave User Allocations Setup Table)
Areas in memory used for CJ-series Unit available for allocations*		CIO: CIO 0000 to CIO 6143 WR: W000 to W511 HR: H000 to H511 DM: D00000 to D32767 EM: (E€_00000 to E€_32767: € = 0 to C)	
No. of allocation blocks		3 blocks: OUT 1, IN 1 and IN 2	2 blocks: OUT 1 and IN 1
Allocation size	Per block	100 words max.	
	Total size	300 words max. for a total of 3 blocks	200 words max. for a total of 2 blocks
Connection type		Automatic or user specified	Automatic (connection specified by the master)

* You cannot use Holding Area H512 and its subsequent holding areas, or EM Area Bank D and its subsequent banks.

Precautions for Correct Use

Functions will vary as shown below depending on whether allocations are set through the device variables for CJ-series Unit (Slave User Allocations Setup Table) or through the CX-Integrator.

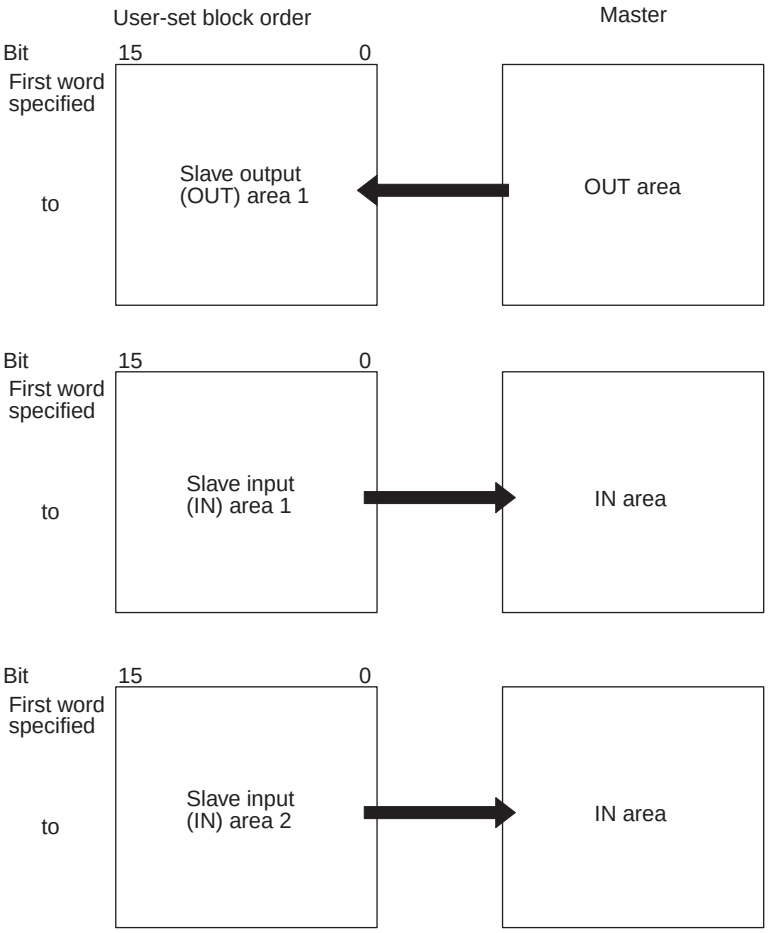
You can only allocate two blocks (OUT 1 and IN 1) when settings are made with the device variables for CJ-series Unit, but there are three blocks (OUT 1 and IN 1/2) available with the CX-Integrator.

5-3-1 Setting through CX-Integrator

You can allocate a maximum of three blocks at any location in I/O memory for the output (OUT) area block 1, input (IN) area block 1, and input (IN) area block 2.

To access a slave allocated to the memory used for CJ-series Unit from the user program, user-defined variables that specify the AT specification of the memory used for CJ-series Unit to which the slave is allocated must be defined.

Specified areas in memory used for CJ-series Unit



You can set the block allocation order and block allocation areas as required. Refer to *CX-Integrator Ver.2.□ OPERATION MANUAL* (Cat. No. W464).

Connection Types

You can specify the type of connection if the CX-Integrator is used for settings. The number of applicable allocation areas varies with the type of connection used.

- You can use a maximum of three areas (OUT 1, IN 1, and IN 2) if you specify multiple connections.
- You can use two allocation areas (OUT 1 and IN 1) if you specify the automatic connection setting or a single connection.

Connection Types and Allocated I/O Areas

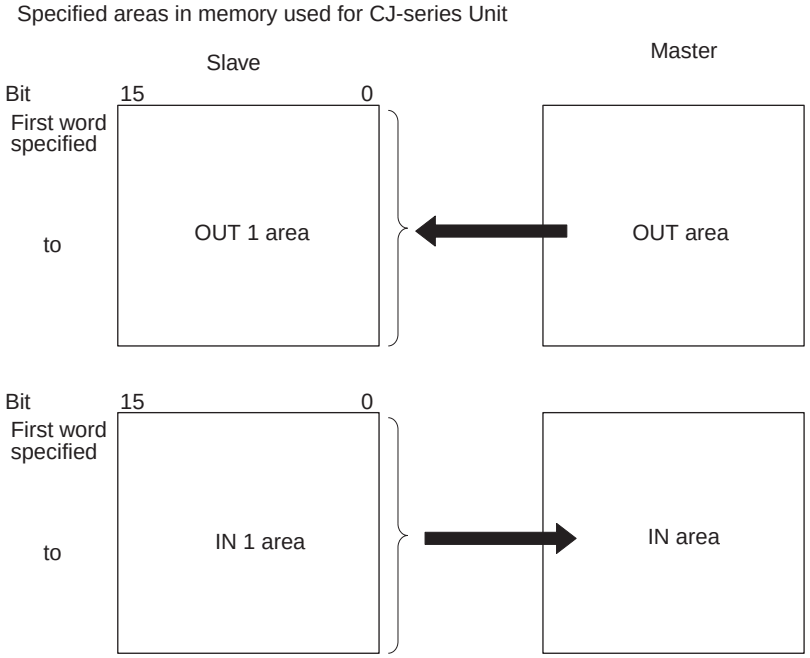
The following table shows the relationship between various connection combinations and the allocated areas that are applicable with those connections.

Specified connection type	OUT 1 area	IN 1 area	IN 2 area
Poll	Poll OUT data	Poll IN data	Not used
Bit-strobe	Not used	Bit-strobe IN data	Not used
COS	COS OUT data	COS IN data	Not used
Cyclic	Cyclic OUT data	Cyclic IN data	Not used
Poll+bit-strobe	Poll OUT data	Poll IN data	Bit-strobe IN data
Poll+COS (See note.)	Poll/COS OUT data	Poll IN data	COS IN data
Poll+cyclic (See note.)	Poll/cyclic OUT data	Poll IN data	Cyclic IN data
COS+bit-strobe	COS OUT data	COS IN data	Bit-strobe IN data
Cyclic+bit-strobe	Cyclic OUT data	Cyclic IN data	Bit-strobe IN data

Note With poll + COS connections, the OUT data is the same for poll and COS. Set the same OUT areas for poll and COS connections when you specify the areas with the CX-Integrator.
With poll + cyclic connections as well, the OUT data is the same for poll and cyclic. Set the same OUT areas for poll and cyclic when you specify the areas with the CX-Integrator.

5-3-2 Settings through Device Variables for CJ-series Unit (Slave User-set Allocations Setup Table)

You can allocate words for the OUT 1 area (master to Slave Unit) and IN 1 area (Slave Unit to master) from any specified location for the memory used for CJ-series Unit specified in the settings in the device variables for CJ-series Unit. To access a slave allocated to the memory used for CJ-series Unit from the user program, user-defined variables that specify the AT specification of the memory used for CJ-series Unit to which the slave is allocated must be defined.



Connection Types

The type of connection cannot be specified when the device variables for CJ-series Unit is used for settings. The master specifies a poll, bit-strobe, COS, or cyclic connection.

Allocation Procedures

Step 1: Set the CPU Unit to PROGRAM Mode.

Step 2: Stop Slave Communications

If the Unit already functions as a slave, change **_Sw2SlavDsblCmd* (Slave Stop Switch) to TRUE to stop slave communications. This step is not necessary if slave communications are stopped.

Step 3: Set the Slave User-set Allocations Table

This table is used to specify the areas, first words, and sizes for OUT block 1 and IN block 1 to the device variables for CJ-series Unit below.

- **Slave User-set Allocations Setup Table**

Name of device variables for CJ-series Unit	Type	Name	Range
*_SlavAlocTblCfg[0]	UINT	Slave OUT 1 area	0 to 20
*_SlavAlocTblCfg[1]	UINT	First word in slave OUT 1 area	0 to 32767
*_SlavAlocTblCfg[2]	UINT	OUT 1 area size	0 to 200
*_SlavAlocTblCfg[3]	UINT	Slave IN 1 area	0 to 20

Name of device variables for CJ-series Unit	Type	Name	Range
*_SlavAlocTblCfg[4]	UINT	First word in slave IN 1 area	0 to 32767
*_SlavAlocTblCfg[5]	UINT	IN 1 area size	0 to 200
*_SlavAlocTblCfgSta	WORD	Setting Results of Slave User-set Allocations Setup	16#0000 to FFFF

- **Areas and Word Ranges for the OUT 1/IN 1 Areas**

Code	Area name in memory for CJ-series Unit	Word range
0	---	The block is not used.
1	CIO Area (CIO)	0 to 6143
3	DM Area (DM)	0 to 32767
4	Word Area (WR)	0 to 511
5	Holding Area (HR)	0 to 511
8 to 20	Expansion Data Memory (EM) Bank 0 to C (13 banks)	0 to 32767 (E0_00000 to E0_32767, ... , EC_00000 to EC_32767) for all banks

Note You cannot use Holding Area H512 and its subsequent holding areas, or EM Area Bank D and its subsequent banks.

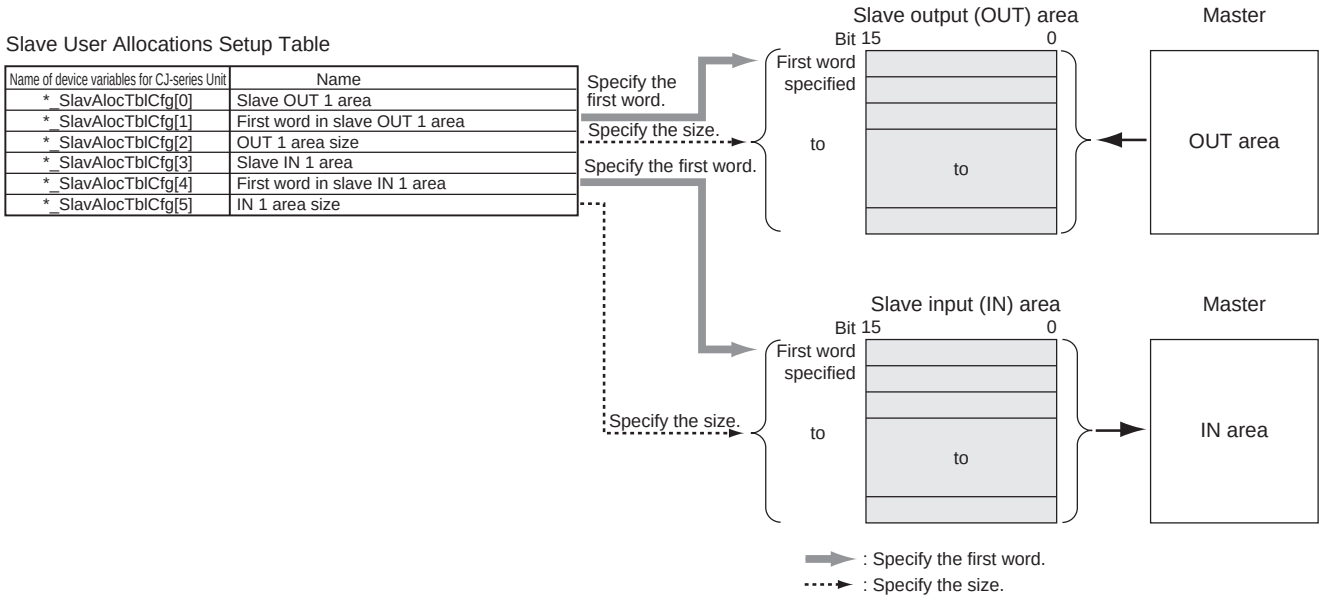
Step 4: Change the Slave User-set Allocations Switch to TRUE

Change *_*Sw2SlavAlocCmd* (Slave User Allocations Switch) to TRUE.

Step 5: Change the Slave Enable Switch to TRUE

Change *_*Sw2SlavEnblCmd* (Slave Enable Switch) to TRUE. This will allocate the above areas as slave areas and the DeviceNet Unit will start slave remote I/O communications.

Note Once slave communications are enabled by changing the Slave Enable Switch to TRUE, the Unit will continue to perform slave communications even after the power is turned OFF and back ON again.



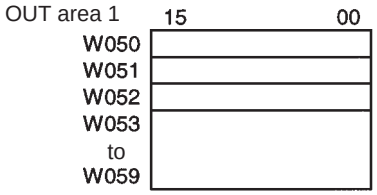
Example Settings for User-set Allocations through Device Variable for CJ-series Unit

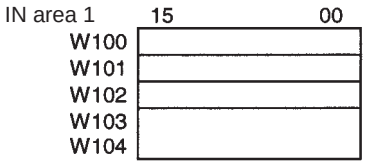
This example uses the following settings for unit number 0.

- OUT block 1 area and first word: WR (4), 50 (50CH (50)), 20-byte size = 10 words (20)
- IN block 1 area and first word: WR (4), 100 (100CH (100)), 10-byte size = 5 words (10)
- **Slave User-set Allocations Setup Table**

Name of device variables for CJ-series Unit	Name	Value (meaning)
*_SlavAlocTblCfg[0]	Slave OUT 1 area	4 (Work Area)
*_SlavAlocTblCfg[1]	First word in slave OUT 1 area	50 (W050)
*_SlavAlocTblCfg[2]	OUT 1 area size	20 (10 words)
*_SlavAlocTblCfg[3]	Slave IN 1 area	4 (Work Area)
*_SlavAlocTblCfg[4]	First word in slave IN 1 area	100 (W100)
*_SlavAlocTblCfg[5]	IN 1 area size	105 (5 words)

- **Slave areas**





Step 1: Change the Slave User-set Allocations Switch to TRUE

Make sure that slave communications have stopped prior when you perform this operation. Change *_*Sw2SlavAlocCmd* (Slave User Allocations Switch) to TRUE.

Step 2: Change the Slave Enable Switch to TRUE

Change *_*Sw2SlavEnblCmd* (Slave Enable Switch) to TRUE. This will allocate the above areas as slave areas and the DeviceNet Unit will start slave remote I/O communications.

6

Message Communications

This section describes explicit message communications sent from the user program in the CPU Unit.

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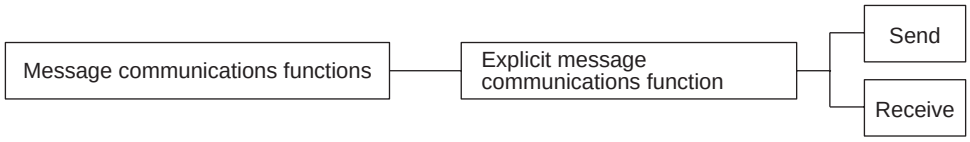
6-1 Overview

Message communications enable messages to be set between nodes on a DeviceNet network when required by system conditions. It is possible for messages to be sent between a PLC and a DeviceNet master or slave made by another company. You can use them to send/receive data; read time data, error logs, and other data; or control operation, e.g., refreshing with user-specified values.

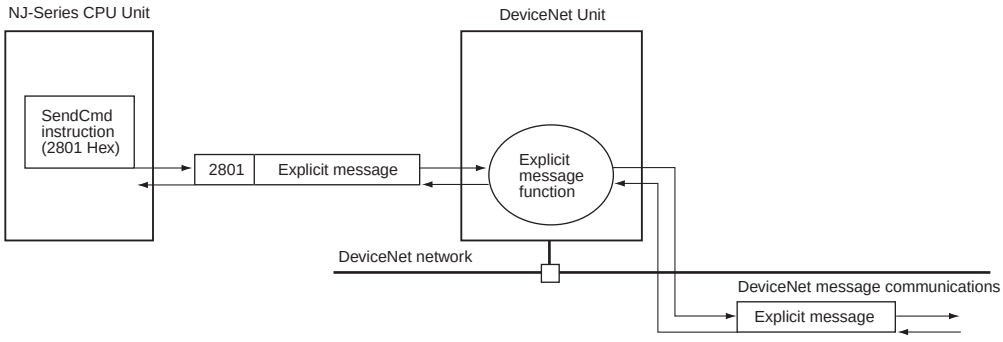
There is one type of messages: Explicit messages.

6-1-1 Outline of Message Communications

	Explicit message communications
Overview	General-purpose message communications that uses DeviceNet protocol
Remote devices	• DeviceNet masters and slaves from other companies • C200H-series DeviceNet Units, CVM1/CV-series DeviceNet Units, and CS/CJ-series DeviceNet Units
Features	• Message communications with DeviceNet devices from other companies can be performed. • Explicit messages from OMRON PLCs (with C200H-series DeviceNet Units and CVM1/CV-series DeviceNet Units) can be received. Explicit messages can be sent to OMRON PLCs (with C200H I/O Link Units).



● Overall Structure



Additional Information

If only the message communications function is being used and the remote I/O communications function is not being used, message communications are possible even if the master function is disabled. In this case, it is not necessary to register a scan list.

6-1-2 Explicit Message Communications

You can send service requests to DeviceNet masters and slaves made by other manufacturers and OMRON slaves (C200H I/O Link Units, CS-series DeviceNet Units, etc.) with the use of explicit messages defined for DeviceNet.

Service requests to read/write CPU Unit status and I/O memory can also be received from PLCs with C200H-series DeviceNet Units (C200HW-DRM21-V1), PLCs with CVM1/CV-series DeviceNet Units (CVM1-DRM21-V1), PLCs with CS/CJ-series DeviceNet Units, and DeviceNet masters made by other manufacturers using explicit messages.

Additional Information

A specific command (2801) is used to send explicit messages.

Item	Sending	Receiving
Network communications instruction	You can use the SendCmd instruction using command code 2801 hex to send explicit messages to DeviceNet Units.*	Automatically responds to explicit messages from other devices.
Remote devices and supported functions	• DeviceNet masters and slaves made by other manufacturers. Supported services determine supported functions.	• DeviceNet masters made by other manufacturers • PLCs with CS/CJ-series DeviceNet Units. • PLCs with C200H-series DeviceNet Master Units. • PLCs with CVM1/CV-series DeviceNet Master Units. • All listed devices support status read/write and I/O memory read/write for the local CPU Unit.

* A specific command (2801) is used to send explicit messages.

Additional Information

This CJ-series DeviceNet Unit (CJ1W-DRM21) contains a PLC Object so that the I/O memory of the CPU Unit of this DeviceNet Unit can be read/written from other devices. The C200H I/O Link Unit (C200HW-DRT21) and CS-series DeviceNet Unit (CS1W-DRM21(-V1)) also contain a PLC Object so that you can read/write the I/O memory of the CPU Unit of the C200H I/O Link Unit from other devices. The C200HW-DRM21-V1 and CVM1-DRM21-V1 DeviceNet Master Units, however, do not have PLC Objects, the I/O memory of the CPU Unit for these Units cannot be read or written from other devices.

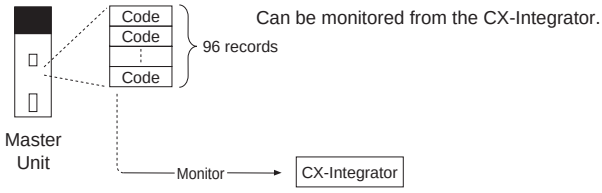
6-1-3 Message Communications Specifications

Supported CPU Unit functions		Specification
Unit model number		CJ1W-DRM21
Max. No. of communications nodes per Unit	Explicit messages	63
Communications instructions	Explicit DeviceNet messages	SendCmd instruction
		Sends explicit messages to DeviceNet masters/slaves made by other manufacturers, PLCs with C200H I/O Link Units, or PLCs with CS/CJ-series DeviceNet Units mounted to them.
Sources: destinations		1:1 (Broadcasting is not supported)
Data length (excluding command code)		SendCmd instruction: 542 bytes max.
Response monitoring time		Default setting: 2 s User setting: 0.1 to 6553.5 s
Retries		0 to 15
Message monitor timer function (explicit message communications)		You can set the response monitoring time for DeviceNet Units during explicit message communications (the interval the explicit connection is open) from the CX-Integrator for each device. (The settings for all devices can be stored in the DeviceNet Unit. This is called the Message Monitoring Timer List.)

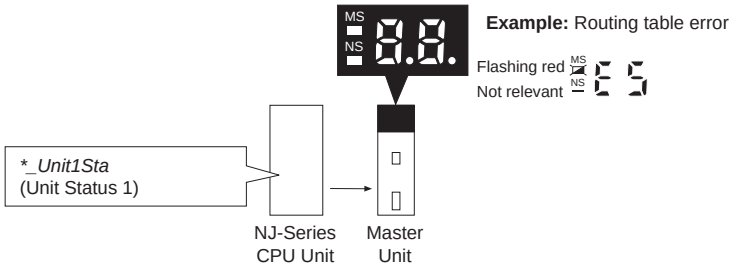
6-1-4 Message Communications Error Indications

There are two ways to obtain information on communications errors that occur in message communications: 1) Using the error history in the DeviceNet Unit and 2) Using DeviceNet Unit displays, indicators, and Master Status Areas.

1 Each time a communications error occurs, an error code is placed in an error record in the error history kept in the RAM of the DeviceNet Unit. Up to 96 records can be stored in the error history. The time and date the record occurred is also recorded.



2 You can use the MS and NS indicators and the 7-segment indicator on the front panel of the DeviceNet Unit together with the **_Unit1Sta* (Unit Status 1) in the CPU Unit to obtain information on a communications error that has occurred. This information can be used as the basis for troubleshooting.



6-1-5 Message Monitoring Timer

A message monitoring timer monitors responses for the DeviceNet Unit. A timer can be set for each device that will be communicated with (each message destination).

You can set the timers with the CX-Integrator. The default setting is 2 seconds (2,000 ms). The setting range is 500 to 30,000 ms.

If the response from the remote communications device (message destination) is slow, the timer setting must be increased. The next message cannot be sent to the same communications device during the response waiting time, so the setting should not be set too high.

The DeviceNet Unit uses this timer to monitor message timeouts. The CPU Unit performs the monitoring based on the response monitoring time for SendCmd instruction. There will be no effect, therefore, if either the message monitoring timer or the response monitoring time for SendCmd instruction setting only is increased or decreased. Both must be increased or decreased for there to be an effect.

Set the response monitoring time for the SendCmd instruction the same as or longer than the message monitoring timer, i.e., Response monitoring time for the SendCmd instruction ≥ Message monitoring timer.

If a lot of timeouts occur, maintain this relationship but lengthen the time for both.

6-1-6 Message Communications Errors

The following table shows the main errors that occur when messages are sent or received. Refer to *Section 9 Troubleshooting and Maintenance* for countermeasures and errors recorded in error history that are not shown by the indicators.

Error	Indicators			Unit status 1	Error history code (Hex)
	MS	NS	7-segment indicator*		
Network power error	No change	Not lit	E0	*_*NetPwrErr* is 1.	0341
Send timeout			E2	*_*SendTimeoutErr* is 1.	0342
Routing table error	Flashing red	No change	HC	*_*RTblErr* is 1.	021A
Node address duplicated	No change	Lit red	F0	*_*NdAdrDupErr* is 1.	0211
Bus Off detected			F1	*_*BusoffErr* is 1.	0340
CPU Unit service monitoring error	Flashing red	Not lit	HE	—	0002
Other CPU error			H7		0006
Local node not part of network; cannot send	No change	No change	No change	—	0101
No. of retries limit exceeded; cannot send					0103
Remote device busy; cannot send					0109
Header error; cannot send					0112
Reception buffer full; message destroyed					0117
Illegal message received; received message destroyed					0118
Local node busy; cannot send					0119

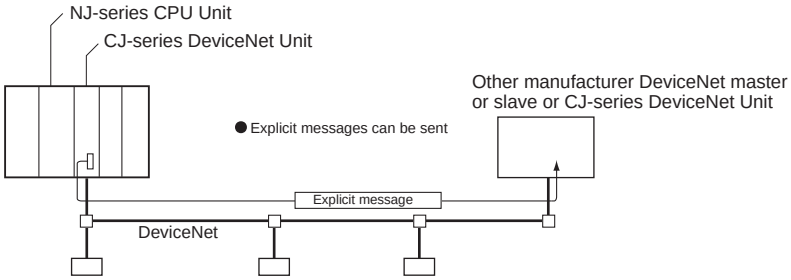
* The 7-segment indicator alternately displays the error and the master node address where the error occurred.

6-2 Sending Explicit Messages

CJ-series DeviceNet Units can send explicit messages. Explicit messages can be sent to the following destinations.

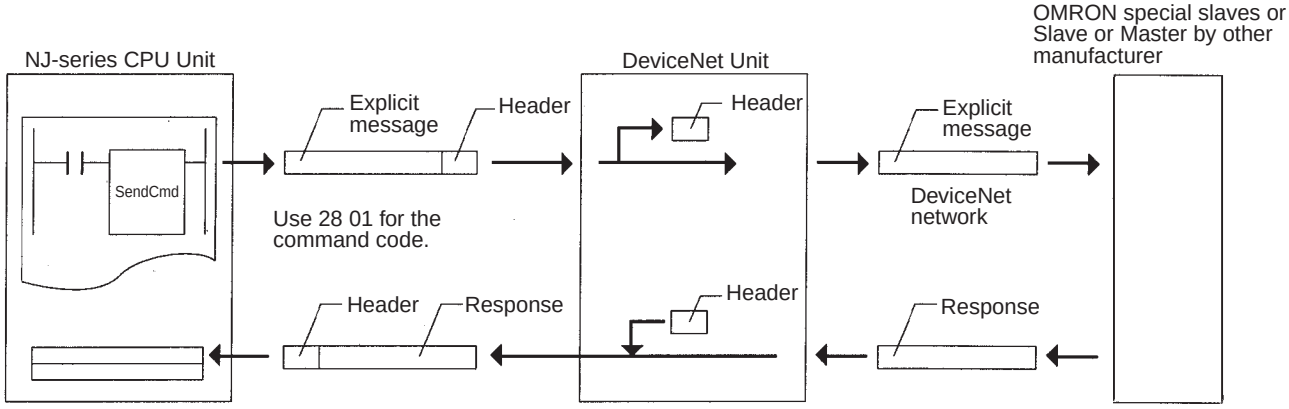
- DeviceNet masters or slaves made by other manufacturers
- CS/CJ-series DeviceNet Unit

Example

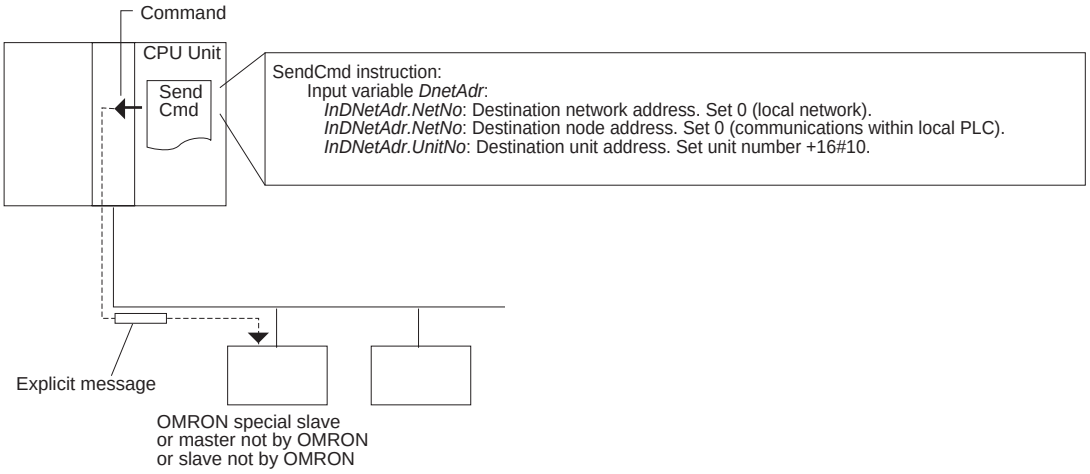


6-2-1 Sending Explicit Messages

The command code 28 01 can be used to send explicit DeviceNet messages to OMRON special slaves and DeviceNet masters/slaves made by other manufacturers.



The local DeviceNet Unit is specified as the destination in the communications instruction in the PLC's user program (not the OMRON Special Slave or DeviceNet device made by another manufacturer), and the node address of the actual destination (i.e., the DeviceNet Slave or Master made by another manufacturer) is specified in the command data for the explicit message send command.



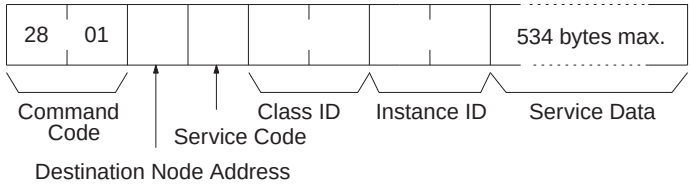
Precautions for Correct Use

Depending on the network status, the destination slave may not always accept an explicit message. Always perform retry processing when sending explicit messages.

EXPLICIT MESSAGE SEND (28 01)

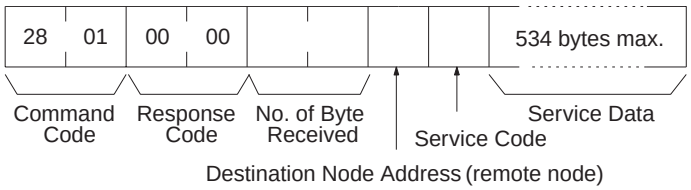
EXPLICIT MESSAGE SEND will send an explicit DeviceNet message to the specified class and receive a response.

● Command Block



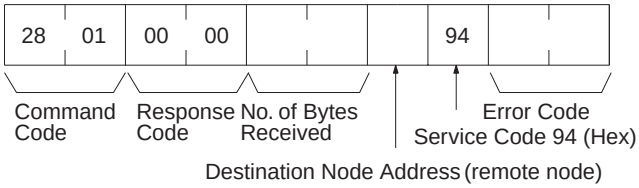
Response Block

Normal Response

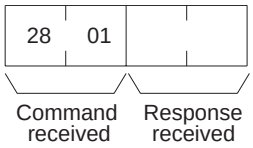


Error Responses

The following response is returned if an error occurs for the explicit message.



The following response is returned if the explicit message cannot be sent or times out.



Parameters

Destination Node Address (command): The node address of the destination of the explicit message. The node address of the local Master Unit is specified as the input variables *DstNetAdr* (Destination network address) in the SendCmd instruction when the Explicit Message Send command is sent, but the node address of the actual destination is specified here.

Service Code (command, response): A service code defined for DeviceNet. In a normal response, bit 15 of the service code specified in the command will be TRUE and returned. In an error response, 94 Hex will always be returned.

Class ID (command): The class ID of the destination of the explicit message.

Instance ID (command): The instance ID of the destination of the explicit message.

Service Data (command, response): In command, the data defined by the service codes are specified. In response, the receive data defined by the service codes are returned.

No. of Bytes Received (response): The number of bytes received from the destination node address (remote node).

Destination Node Address (remote node) (response): The node address of the remote device to which the explicit message was sent is returned.

Error Code (response): An error code defined by DeviceNet.

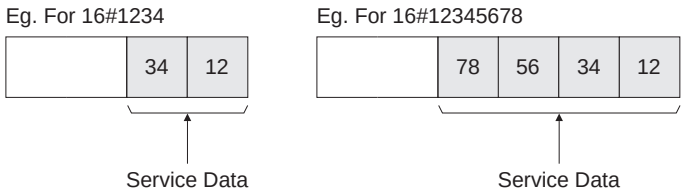
Explanation

- This command sends a DeviceNet-defined explicit message to a DeviceNet Slave manufactured by another company and receives a response.
- When the Explicit Message Send command is sent, specify the DeviceNet Master Unit of the local node address as the destination of the input variable *DstNetAdr* (Destination network address) in the SendCmd instruction, and specify the node address of the actual destination by the "Destination Node Address" in the Explicit Message Send command.
  Be sure to specify the Master Unit of the local node address as the input variables *DstNetAdr* (Destination network address) in the SendCmd instruction. If the Master Unit of any other node address is specified, an error will occur.
- If the DeviceNet Master receives an explicit message, it will automatically return a response.

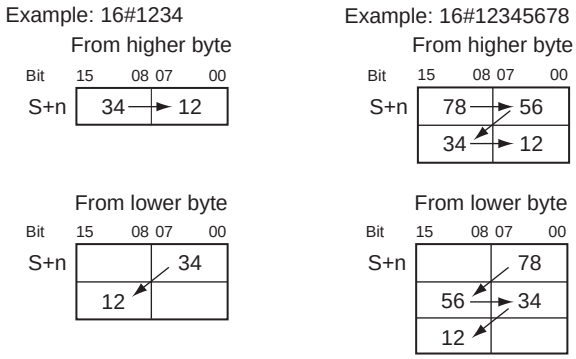
● Service Data

Word (2-byte) data and double-word (4-byte) data in the Service Data (such as channel data and error clear codes) shall conform to the command format of specifying the lower byte (L) first, followed by the higher byte (H). Example) To specify word data 16#1234, specify 16#34 first, and then 16#12. To specify double-word data 16#12345678, specify 16#78, 16#56, 16#34, and 16#12, in this order.

Command Format Example



Accordingly, set data in the SendCmd instruction as follows.



Similarly when word (2-byte) data or double-word (4-byte) data in the Service Data is returned, the response format is to return the lower byte (L) first, followed by the higher byte (H).

Additional Information

- Since data in the Service Data is stored in the little endien order when used in the response format, these word (2-byte) data and double-word (4-byte) data must be converted using the AryBTo instruction. Refer to the *NJ-series Instructions Reference Manual* (Cat. No. W502.)
- Contact the ODVA to obtain copies of the DeviceNet specification.
  ODVA's URL: http://www.odva.org/

6-2-2 Sending Explicit Messages Using SendCmd Instruction

The SendCmd (send command) instruction can be used in the CPU Unit user program of the CJ-series DeviceNet Unit to send explicit messages.

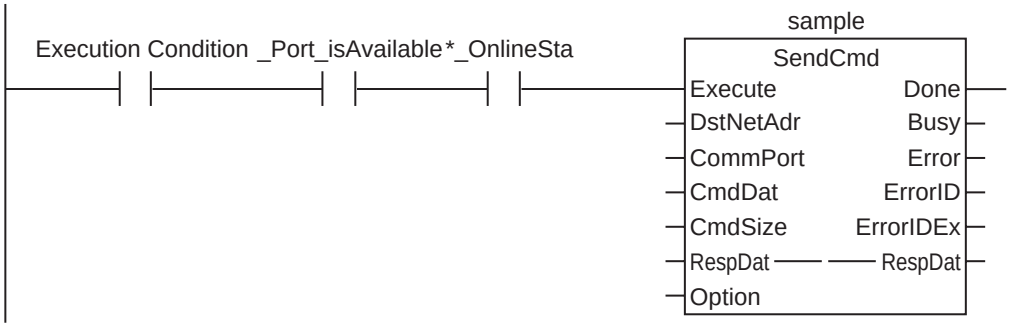
The explicit message command data that contains the command code 2801 hex at its beginning is sent.

The explicit message response is received after the command code 2801 hex and the end code.

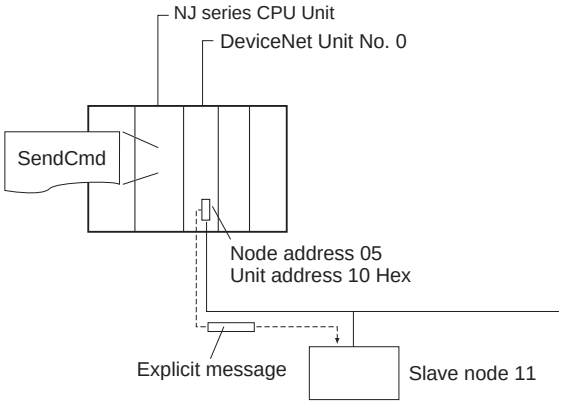
In a program that issues explicit messages, the following execution conditions are generally used based on the AND gate:

1) Network Enabled Flag on the CPU Unit side

2) *_*OnlineSta* (Online Flag) or *_*CMstrMsgEnblSta* (Message Communications Permitted Flag) on the DeviceNet Unit side

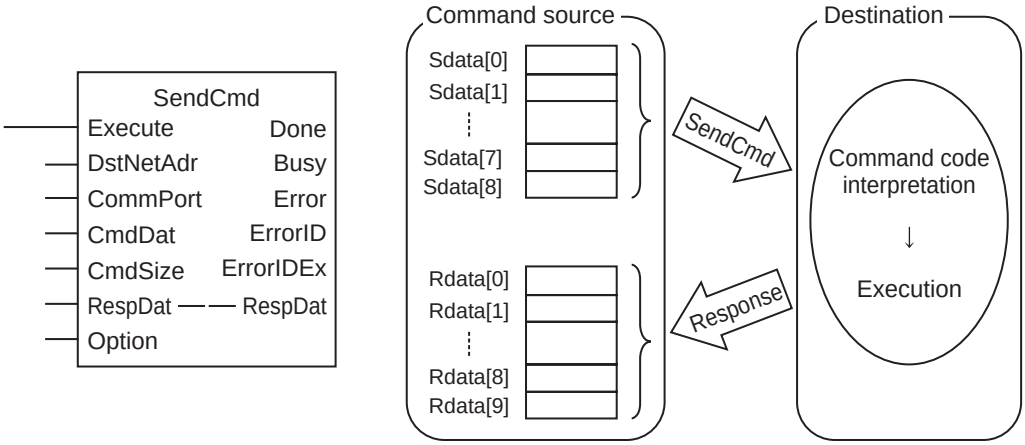


● Example: Sending Explicit Messages Using SendCmd Instruction



Operation

Here, an example of reading the vendor code (OMRON vendor code: 002F hex) from the DeviceNet slave (unit address: 16#10).



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/unit address.		Network address: 0 Node address: 0 Unit address: 16#10
CommPort	The destination port is specified.		NONE (Default)
CmdDat	Sdata[0]	Command code	16#28
	Sdata[1]		16#01
	Sdata[2]	Slave node address (11)	16#0B
	Sdata[3]	ServiceCode	16#0E
	Sdata[4]	ClassID	16#00
	Sdata[5]		16#01
	Sdata[6]	InstanceID	16#00
	Sdata[7]		16#01
	Sdata[8]	AttributeID	16#01
CmdSize		The number of bytes corresponding to the command data to be sent is specified.	9
RespDat	Rdata[0]	Command code	16#28
	Rdata[1]		16#01
	Rdata[2]	End code	16#00
	Rdata[3]		16#00
	Rdata[4]	Number of bytes received	16#00
	Rdata[5]		16#04
	Rdata[6]	Slave node address (11)	16#0B
	Rdata[7]	ServiceCode (when completed normally)	16#8E
	Rdata[8]	Vendor code	16#2F
	Rdata[9]		16#00
Option	Response monitoring, and number of resends, are specified.		ResponseTime = 20 Retry = 2

Additional Information

You can send explicit messages to OMRON slaves and DeviceNet devices made by other manufacturers by setting the command code to 28 01.
In this case, set the response monitoring time to at least the value set for the message monitoring timer (default: 2s). If it is set to 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-DRM21 in slot 0 of the CPU Rack.
Device name of this unit		"DeviceNet"
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	---	Communications Port Enabled Flags	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)

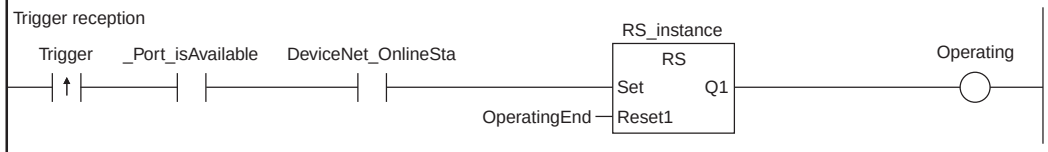
Name	Data type	Default	Details
Trigger	BOOL	False	Execution conditions
OperatingEnd	BOOL	False	Process completed
Operating	BOOL	False	Processing
InDNetAdr	_sDNET_ADR	(NetNo := 0, NodeNo := 0, UnitNo := 16#0)	Destination network address
InOption	_sRESPONSE	(isNonResp := False, TimeOut := 0, Retry := 0)	Response monitoring and retry setting
Sdata	ARRAY[0..8] OF BYTE	[9(16#0)]	Send data
Rdata	ARRAY[0..9] OF BYTE	[10(16#0)]	Receive data
RS_instance	RS	---	---
SendCmd_instance	SendCmd	---	---

Device variables for CJ-series Unit (Create on the I/O Map View window after the unit configuration is created)

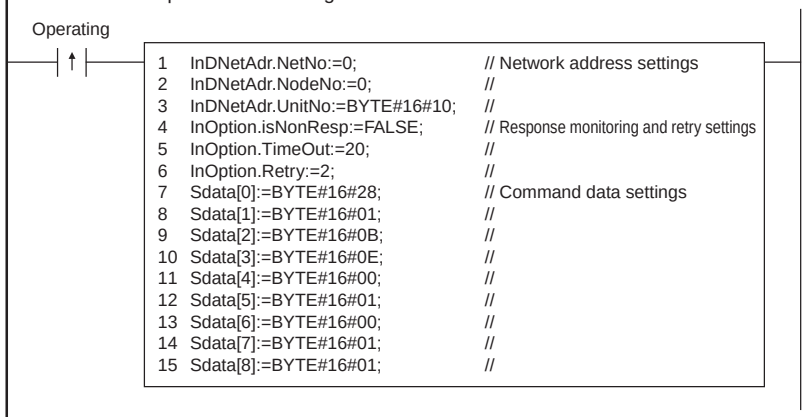
Name	Data type	Default	Allocated address (AT)	Comments	Details
DeviceNet_OnlineSta	BOOL	---	IOBus://rack#0/slot#0/Unit2Sta/OnlineSta	Online Status	TRUE when the Unit is online.

Determining the SendCmd instruction execution completion

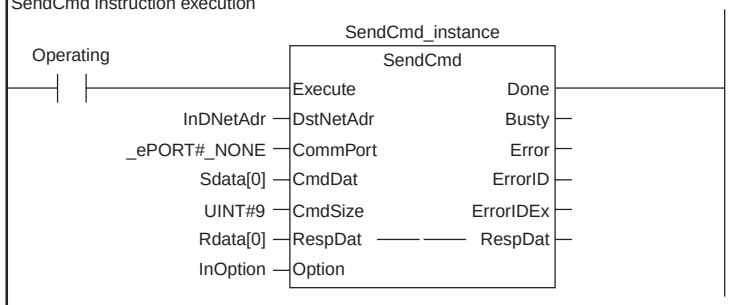
Trigger reception



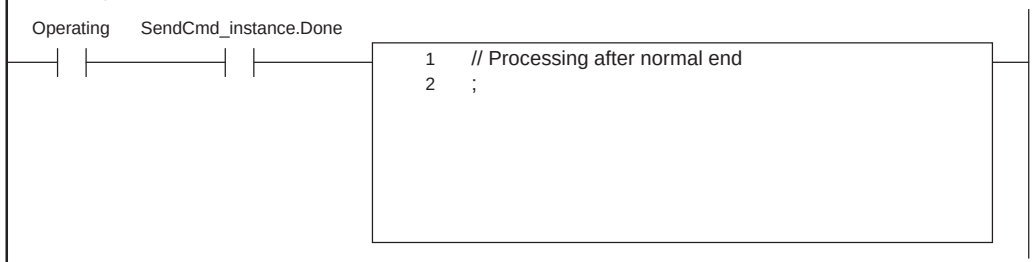
Communications parameters settings



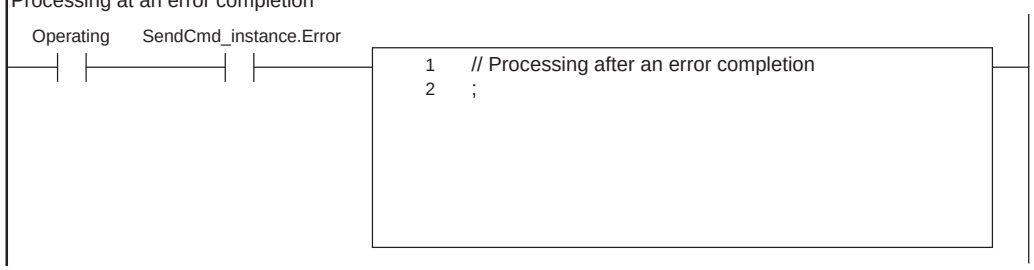
SendCmd instruction execution



Processing at normal end



Processing at an error completion



Precautions for Correct Use

The message service function does not guarantee that a given message will reach the remote node. Messages may be lost during communication due to noise, etc. When the message service function is used, normally the node that issues an instruction performs resend to avoid the above condition. With the SendCmd instruction, the resend process is performed automatically when the number of resends is specified. For the number of resends, be sure to specify a value other than 0.

6-3 Receiving Explicit Messages

CJ-series DeviceNet Unit contains a PLC Object. The Unit will receive messages addressed to the PLC Object, process service requests addressed to the CPU Unit, and return responses.

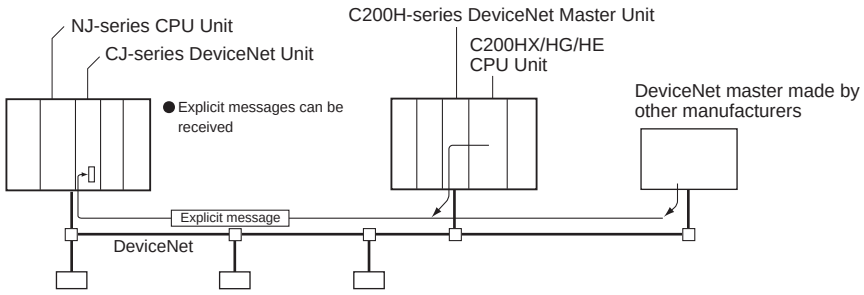
The following services are provided by the PLC Object.

- CPU Unit status read/write
- CPU Unit I/O memory read/write

The explicit messages can be received from the following sources:

- DeviceNet masters made by other manufacturers
- PLCs with C200H-series DeviceNet Master Units (C200HW-DRM21-V1)
- PLCs with CVM1/CV-series DeviceNet Master Units (CVM1-DRM21-V1)
- NJ-series PLCs with CJ-series DeviceNet Units
- CS/CJ-series PLCs with CS/CJ-series DeviceNet Units

● Example



Note Status and the I/O memory read/write operations cannot be performed for PLCs with a C200H-series or CVM1/CV-series DeviceNet Master Units. The CPU Unit of a CS/CJ-series DeviceNet Unit can also send an explicit message to read/write I/O memory of PLCs with C200H I/O Link Units.

6-3-1 List of PLC Object Services

PLC Objects provide the following services.

● Status Read/Write for CPU Units

Services	Service code	Class ID	Instance ID	Request service data	Contents
CPU Unit Information Read	0E Hex	2F Hex	00 Hex	Attribute ID = 64 Hex	Reads the operating mode of the CPU Unit.
				Attribute ID = 65 Hex	Reads if there is a Controller error the CPU Unit.
				Attribute ID = 66 Hex	Reads CPU Unit model.
CPU Unit Write	10 Hex			Attribute ID = 64 Hex, Attribute Value	Changes the operating mode of the CPU Unit.
				Attribute ID = 65 Hex Attribute Value	Clears errors.
CPU Unit Status Read	40 Hex			None	Reads the detailed status of the CPU Unit. Operation status: Stop, run Operating modes: PROGRAM, RUN

● I/O Memory Read/Write for CPU Units

Service	Service code	Class ID	Instance ID	Request service data	Contents
Byte Data Read	1C Hex	2F Hex	Specifies area (01 Hex to 14 Hex)	Address, No. of read bytes	Reads the specified node data in byte units. The word data is read in order, from high to low bytes. Read data: 200 bytes max.
Word Data Read	1D Hex			Address, No. of read words	Reads the specified node data in word units. The word data is read in order, from low to high bytes. Read data: 100 words max.
Byte Data Write	1E Hex			Address, word data	Writes the specified node data in byte units. The word data is specified in order, from high to low bytes. Write data: 200 bytes max.
Word Data Write	1F Hex			Address word data	Writes the specified node data in word units. The word data is specified in order, from low to high bytes. Write data: 100 words max.

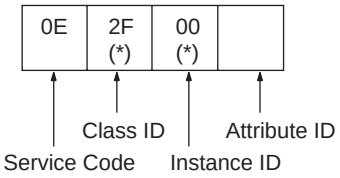
The commands and responses for the explicit messages that can be sent and received are described on the following pages.

In the following command and response formats, all boxes represents 1 byte.

Information Read for CPU Units (Service Code: 0E Hex)

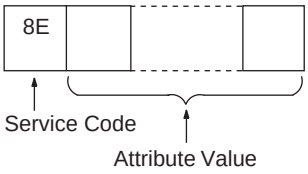
Reads CPU Unit information, including Operating Mode, Controller Errors, and the CPU Unit model.

Command Block



Note A body format of either 8 bits or 16 bits is possible.

Response Block



Parameters

Service Code (command, response): 0E Hex is specified for commands. For responses, the highest bit be ON and 8E Hex will be returned.

Class ID (command): Always 2F Hex.

Instance ID (command): Always 00 Hex.

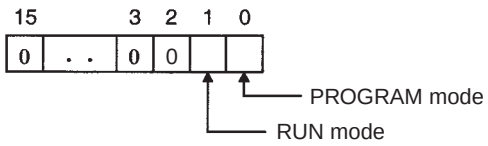
Attribute ID (command): The read information is specified by the attribute ID. The attribute IDs are listed in the following table.

Attribute ID (Hex)	Contents	Attribute value size
64	CPU Unit operating mode	1 word (2 bytes)
65	CPU Unit controller errors	1 word (2 bytes)
66	CPU Unit model	22 bytes

- CPU Operating Mode (when Attribute ID = 64 Hex)
  Reads the CPU Unit operating mode.
- CPU Unit Errors (when Attribute ID = 65 Hex)
  Reads if there are any major fault controller errors in the CPU Unit.
- CPU Unit Model (when Attribute ID = 66 Hex)
  Reads the CPU Unit model.

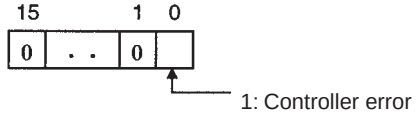
Read Data (response): The specified information is returned in order.

- CPU Unit operating mode (attribute ID = 64 Hex).
  The CPU Unit operating mode is returned in 1-word (2-byte) hexadecimal format, as follows:
  0001 hex: "Program" Mode, 0002 hex: "RUN" Mode

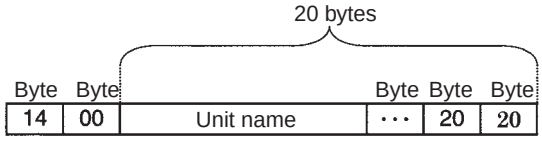


Note The codes for the above modes are 1-word (2-byte) data and are returned in low byte first. For example, for PROGRAM mode, the code is returned as 01 Hex followed by 00 Hex.

- CPU Unit Errors (when Attribute ID = 65 Hex)
  The CPU Unit controller error data is returned in 1-byte (2-digit) hexadecimal format.
  01 hex: Controller Error, 00 hex: No Controller Error.



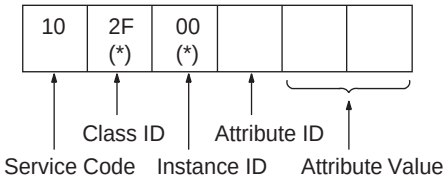
- CPU Unit Model (when Attribute ID = 66 Hex)
  The CPU Unit model is returned in ASCII.
  Size: 2 bytes (Always 1400 Hex) + Model: 20 bytes (fixed). Unused area is filled with 20 Hex (spaces) and returned.



CPU Unit Write (Service Code: 10 Hex)

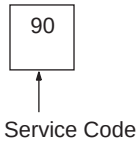
This PLC Object service writes CPU Unit information, including the operating mode and clearing errors.

Command Block



Note A body format of either 8 bits or 16 bits is possible.

Response Block



Parameters

Service Code (command, response): 10 Hex is specified for commands. For responses, the highest bit will turn ON and 90E Hex will be returned.

Class ID (command): Always 2F Hex.

Instance ID (command): Always 00 Hex.

Attribute ID (command): Information to write is specified by the attribute ID. The attribute IDs are listed in the following table.

Attribute ID (Hex)	Contents	Attribute value size
64	CPU Unit operating mode	1 word (2 bytes)
65	CPU Unit errors	1 word (2 bytes)

- CPU Operating Mode (Attribute ID = 64 Hex)
  Changes the CPU Unit operating mode.
  The Attribute Values are as follows:
  0001 hex: "Program" Mode, 0002 hex or 0004 hex : "Run" Mode

Note The specified code for the above operating modes are 1-word (2-byte) data, and are specified with the low byte first. For example, for PROGRAM mode, the code is specified as 01 Hex followed by 00 Hex. Accordingly, the low to high bytes for the above codes are set as high to low bytes in I/O memory, when setting the input variable *CmdDat* of the SendCmd instruction as data.

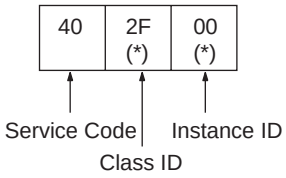
Additional Information

NJ-series CPU Units do not support the "CPU Unit Error Reset" command. For details on the error reset, refer to the *NJ-series Troubleshooting Manual* (Cat. No. W503).

CPU Unit Status Read (Service Code: 40 Hex)

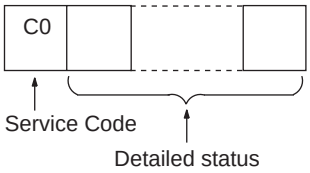
This PLC Object service reads detailed status (operation status, operating mode) from the CPU Unit.

● Command Block



Note A body format of either 8 bits or 16 bits is possible.

● Response Block



● Parameters

Service Code (command, response): 40 Hex is specified for commands. For responses, the highest bit will turn ON and C0 Hex will be returned.

Class ID (command): Always 2F Hex.

Instance ID (command): Always 00 Hex.

Read Data (response): The read data is given in the following table. The data is returned after the service code in the order shown in the table (high to low).

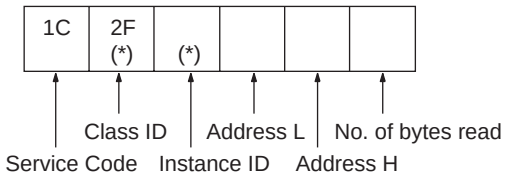
Operation Status
RUN mode
00 Hex
00 Hex
00 Hex
00 Hex
00 Hex
00 Hex
00 Hex
00 Hex
ASCII with 20 hex (space) in 16 bytes

- **Operation status:** Returns the operation status of the CPU Unit in 1-byte (2-digit) hexadecimal. 00 Hex: "Stop" Mode, 01 Hex: "Run" Mode
- **Operating mode:** Returns the operating mode of the CPU Unit in 1-byte (2-digit) hexadecimal. 00 Hex: "Program" Mode, 04 Hex: "Run" Mode

Byte Data Read (Service Code: 1C Hex)

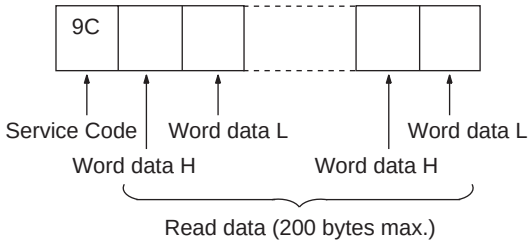
Byte Data Read reads any I/O memory area data in the memory used for CJ-series Unit in a CPU Unit with a CJ-series DeviceNet Unit mounted. The read word data is in byte units. The response block is returned from high to low bytes.

Command Block



* A body format of either 8 bits or 16 bits is possible.

Response Block



Parameters

Service Code (command, response): 1C Hex is specified for commands. For responses, the highest bit will turn ON and 9C Hex will be returned.

Class ID (command): Always 2F Hex.

Instance ID (command): The type of area in the memory used for CJ-series Unit that will read the data is specified as shown in the following table.

Instance ID (Hex)	CPU Unit memory area for read	Word range
01	CIO	CIO 0000 to CIO 6143
03	DM	D00000 to D32767
04	WR	W000 to W511
05	HR	H000 to H511
08 to 14	EM, banks 0 to C	En_00000 to En_32767 (n: 0 to C)

Address L, Address H (command): The address of the first word from which to read the data is specified in hexadecimal as shown below.
Address L: The lower 2 digits when the first word address is given in 4-digit hexadecimal.
Address H: The higher 2 digits when the first word address is given in 4-digit hexadecimal.

No. of Read Bytes (command): The number of bytes of read data is specified in 1-byte (2-digit) hexadecimal. The range is 01 to C8 Hex (1 to 200 decimal).

No. of Bytes Received (response): The number of bytes received from the destination node address (remote node) is returned in hexadecimal.

Destination Node Address (response): The node address of the CJ-series DeviceNet Unit that returned the response is returned in hexadecimal.

Read Data (response): The specified area, word, and byte data is returned in order from word H (high byte: bits 8 to 15) to word L (low byte: bits 0 to 7). If an odd number is specified for the number of read bytes, the last 1 byte of data will be read to the high word.

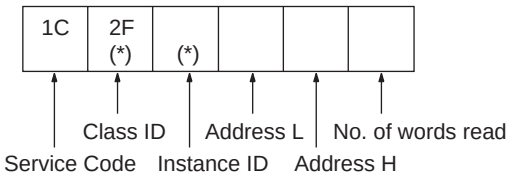
Important Points

The actual address L, address H, and number of read bytes that can be specified depends on the model of the CPU Unit of the CJ-series DeviceNet Unit and the type of memory area. Do not exceed the boundary of the data areas for the CPU Unit you are using.

Word Data Read (Service Code: 1D Hex)

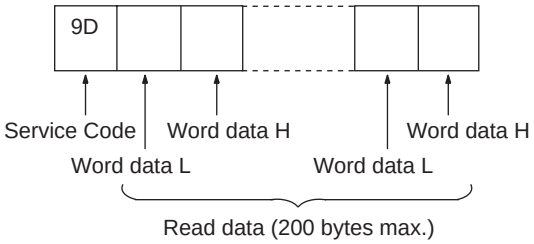
Word Data Read reads any I/O memory area data in the memory used for CJ-series Unit in a CPU Unit with a CJ-series DeviceNet Unit mounted. The read word data is in word units. The response block is returned from low to high bytes.

● Command Block



* A body format of either 8 bits or 16 bits is possible.

● Response Block



● Parameters

Service Code (command, response): 1D Hex is specified for commands. For responses, the highest bit will turn ON and 9D Hex will be returned.

Class ID (command): Always 2F Hex.

Instance ID (command): The type of area in the memory used for CJ-series Unit that will read the data is specified as shown in the following table.

Instance ID (Hex)	CPU Unit memory area for read	Word range
01	CIO	CIO 0000 to CIO 6143
03	DM	D00000 to D32767
04	WR	W000 to W511
05	HR	H000 to H511
08 to 14	EM, banks 0 to C	En_00000 to En_32767 (n: 0 to C)

Address L, Address H (command): The address of the first word to read the data from is specified in hexadecimal as shown below.
Address L: The lower 2 digits when the first word address is given in 4-digit hexadecimal.
Address H: The higher 2 digits when the first word address is given in 4-digit hexadecimal.

No. of Read Words (command): The number of words of read data is specified in 1-byte (2-digit) hexadecimal. The range is 01 to 64 Hex (1 to 100 decimal).

Read Data (response): The specified area, word, and byte data is returned in order from word L (low byte: bits 0 to 7) to word H (high byte: bits 8 to 15).

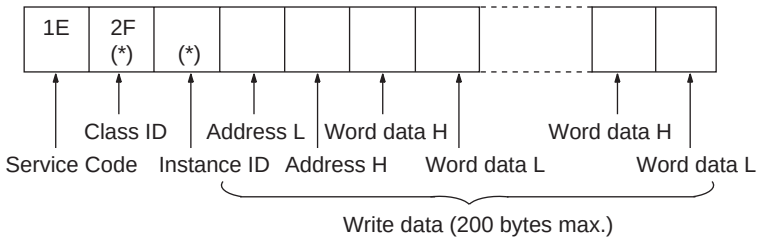
● Important Points

The actual address L, address H, and number of write data bytes that can be specified depends on the CPU Unit of the CJ-series DeviceNet Unit and the Memory Area. Do not exceed the boundary of the data areas for the CPU Unit you are using.

Byte Data Write (Service Code: 1E Hex)

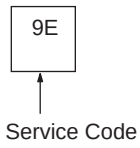
Byte Data Write writes data to any I/O memory area in the memory used for CJ-series Unit in a CPU Unit with a CJ-series DeviceNet Unit mounted. The write word data is in byte units. The command block is specified from high to low bytes, as shown in the following diagram.

● Command Block



* A body format of either 8 bits or 16 bits is possible.

● Response Block



● Parameters

Service Code (command, response): 1E Hex is specified for commands. For responses, the highest bit will turn ON and 9E Hex will be returned.

Class ID (command): Always 2F Hex.

Instance ID (command): The type of area in the memory used for CJ-series Unit to which the data will be written is specified as shown in the following table.

Instance ID (Hex)	CPU Unit memory area for write	Word range
01	CIO	CIO 0000 to CIO 6143
03	DM	D00000 to D32767
04	WR	W000 to W511
05	HR	H000 to H511
08 to 14	EM, banks 0 to C	En_00000 to En_32767 (n: 0 to C)

Note You cannot use Holding Area H512 and its subsequent holding areas, or EM Area Bank D and its subsequent banks.

Address L, Address H (command): The address of the first word to which the data will be written is specified in hexadecimal as shown below.
Address L: The lower 2 digits when the first word address is displayed in 4-digit hexadecimal.
Address H: The higher 2 digits when the first word address is displayed in 4-digit hexadecimal.

Write Data (command): The specified area and write data is returned in order from word H (higher byte: bits 8 to 15) to word L (lower byte: bits 0 to 7). If an odd number is specified, the last 1 byte of data will be written to word H.

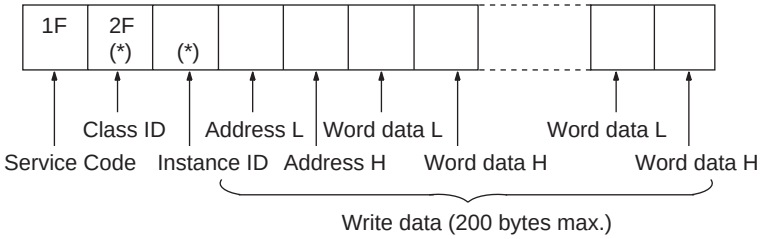
● Important Points

The actual address L, address H, and number of write data words that can be specified depends on the type of CPU Unit with CJ-series DeviceNet Unit mounted and the type of memory area. Do not exceed the boundary of the data areas for the CPU Unit you are using.

Word Data Write (Service Code: 1F Hex)

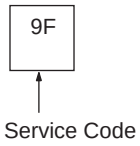
Word Data Write writes data to any I/O memory area in the memory used for CJ-series Unit in a CPU Unit with a CJ-series DeviceNet Unit mounted. The write word data is in word units. The response block is returned from low to high bytes.

● Command Block



Note A body format of either 8 bits or 16 bits is possible.

● Response Block



● Parameters

Service Code (command, response): 1F Hex is specified for commands. For responses, the highest bit will turn ON and 9F Hex will be returned.

Class ID (command): Always 2F Hex.

Instance ID (command): The type of area in the memory used for CJ-series Unit to which the data will be written is specified as shown in the following table.

Instance ID (Hex)	CPU Unit memory area for write	Word range
01	CIO	CIO 0000 to CIO 6143
03	DM	D00000 to D32767
04	WR	W000 to W511
05	HR	H000 to H511
08 to 14	EM, banks 0 to C	En_00000 to En_32767 (n: 0 to C)

Address L, Address H (command): The address of the first word to which the data is written is specified in hexadecimal as shown below.
Address L: The lower 2 digits when the first word address is displayed in 4-digit hexadecimal.
Address H: The higher 2 digits when the first word address is displayed in 4-digit hexadecimal.

Write Data (command): The specified area and write data is returned in order from word L (lower byte: bits 0 to 7) to word H (higher byte: bits 8 to 15).

● Important Points

The actual address L, address H, and number of write words that can be specified depends on the mode of CPU Unit for the CJ-series DeviceNet Unit and the type of memory areas. Do not exceed the boundary of the data areas for the CPU Unit you are using.

7

Other Functions

This section describes connecting to Sysmac Studio via the DeviceNet and the SD Memory Card backup function.

7-1 SD Memory Card Backup Functions 7-2

7-1-1 Outline of Functions 7-3

7-1-2 File Names 7-4

7-1 SD Memory Card Backup Functions

The DeviceNet Unit stores the following setup data in the internal non-volatile memory.

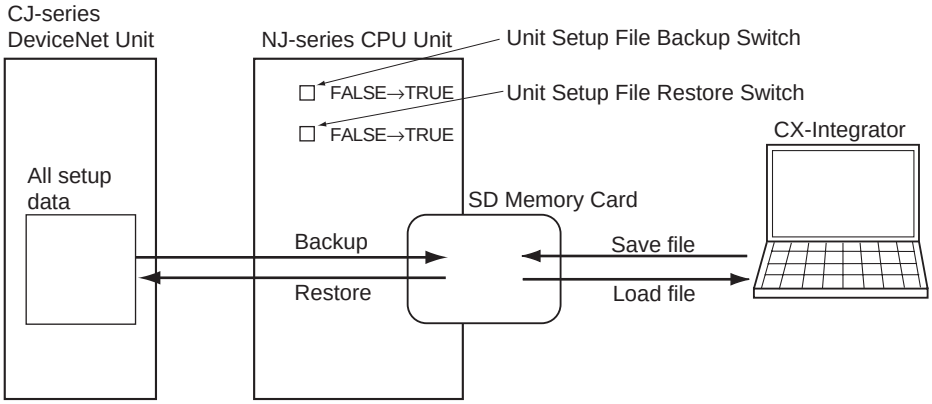
- Master scan lists
- Slave scan lists
- Message monitoring timer lists
- Communications cycle time settings
- Master/Slave functions enabled/disabled settings

Note Backup is possible only when scan lists are enabled.

With the CJ-series DeviceNet Unit, all this setup data can be backed up to and restored from an SD Memory Card mounted to the CPU Unit.

If all setup data for a DeviceNet Unit that starts normally is saved on an SD Memory Card that data can be read and used when replacing DeviceNet Units, making the replacement process smooth.

Device parameter files (.dvf files) created using the CX-Integrator can be saved from the computer to the SD Memory Card and can be restored to the DeviceNet Unit mounted to the CPU Unit. This means that setup data created using the CX-Integrator (scan lists and other parameters) can be downloaded to DeviceNet Units simply by taking the SD Memory Card to site.

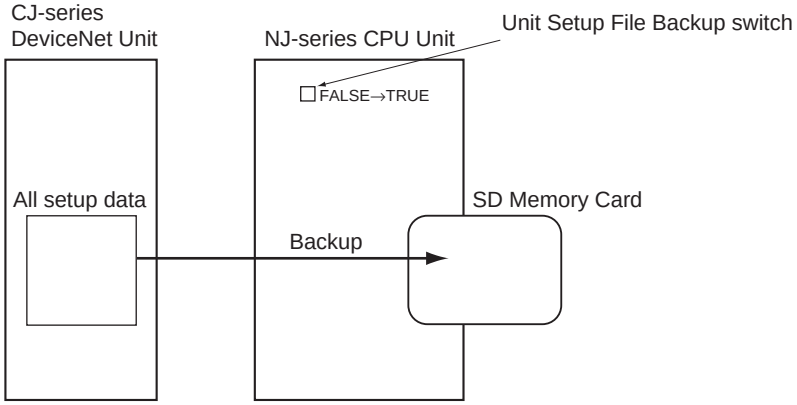


7-1-1 Outline of Functions

Backing Up Unit Setup Files

Saves all internal Unit setup data to the SD Memory Card mounted to the CPU Unit.

Method: By changing the software switch *_*Sw2FileBkupCmd* (Unit Setup File Backup Switch) to TRUE, save the internal Unit setup data on an SD Memory Card as unit setup files.

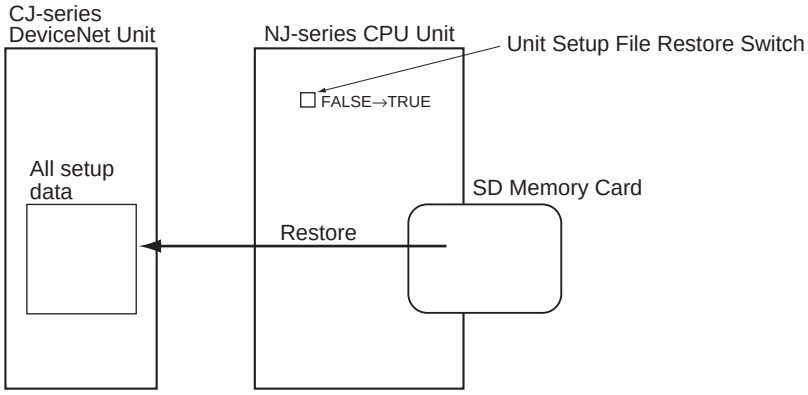


Restoring Unit Setup Files (Restore and Set in the Unit)

Restore the data saved on a CPU Unit's SD Memory Card into the Unit.

Method: By changing the software switch *_*Sw2FileRestoreCmd* (Unit Setup File Restore Switch) to TRUE, restore the Unit setup data on an SD Memory Card and make it effective as Unit settings.

After the file data is restored, the Unit automatically restarts with the new settings.

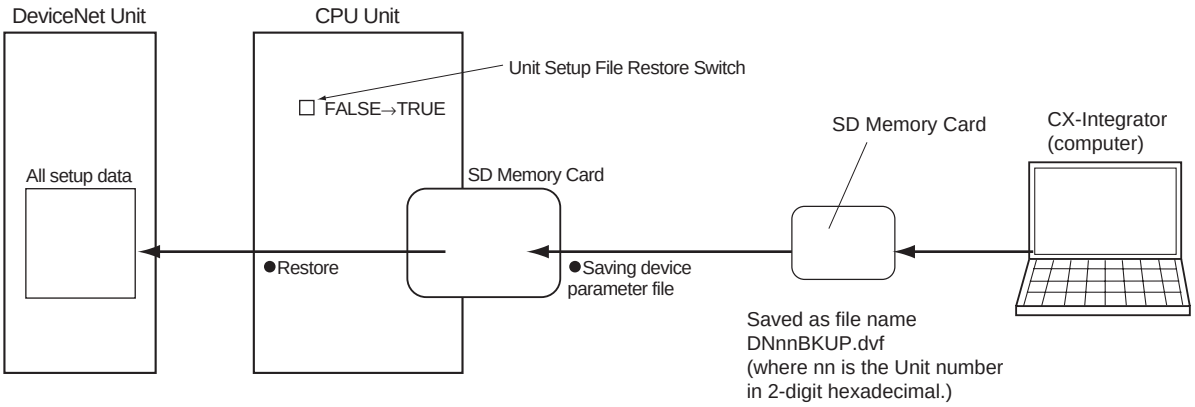


Note *_*FileRWErr* (File Read/Write Error) in Unit Status 2 will change to TRUE if there is a setup data error or a file read error.

Saving Files from CX-Integrator to SD Memory Card

You can restore the data setup file into a DeviceNet Unit by saving a device parameter file (extension .dvf) for this DeviceNet Unit created with CX-Integrator to an SD Memory Card with the file name DNnn-BKUP.dvf (nn: unit number (2-digit hexadecimal), mounting it in the CPU Unit, and changing the software switch *_*Sw2FileRestoreCmd* (Unit Setup File Restore Switch) to TRUE.

Note The file name when saving setup data to the SD Memory Card must be DNnnBKUP.dvf (where nn is the Unit number in 2-digit hexadecimal). For example, for unit number 00, the file name must be DN00BKUP.dvf. If the file is saved under another name, the data cannot be restored from the SD Memory Card to the DeviceNet Unit.



7-1-2 File Names

The following files are created on the SD Memory Card.

Directory (fixed): Route and directory.

File name (fixed): DNnnBKUP.dvf (nn: Unit number in 2-digit hexadecimal).

(Ex.: File name is N00BKUP.dvf when Unit No. is 00.)

Additional Information

The above file is data compatible with device parameter files for the Master (this Unit) created with CX-Integrator.

8

Communications Timing

This section describes the time required for remote I/O communications and message communications.

8-1 Remote I/O Communications Characteristics 8-2

8-1-1 Communications Cycle Time 8-2

8-1-2 Calculating Guidelines for I/O Response Times 8-5

8-1-3 More than One Master in Network 8-7

8-1-4 System Startup Time 8-8

8-2 Message Communications 8-10

8-2-1 Message Communications Time 8-10

8-2-2 Calculating the Maximum Message Response Time 8-11

8-1 Remote I/O Communications Characteristics

This section describes the characteristics of remote I/O communications when the DeviceNet Unit is used as a master in combination with OMRON DeviceNet slaves. Use this section for reference when planning operations that require precise I/O timing.

The equations provided here are valid under the following conditions:

- The DeviceNet Unit is operating with the scan list enabled.
- All of the required Slaves are participating in communications.
- No errors are being indicated at the DeviceNet Unit
- Messages aren't being produced in the Network (from another company's configurator, for example).

Additional Information

The values provided by these equations may not be accurate if another company's DeviceNet Master or Slave is being used in the Network.

8-1-1 Communications Cycle Time

This section explains the communications cycle time and communications time per slave required for calculating processing time by the DeviceNet Unit.

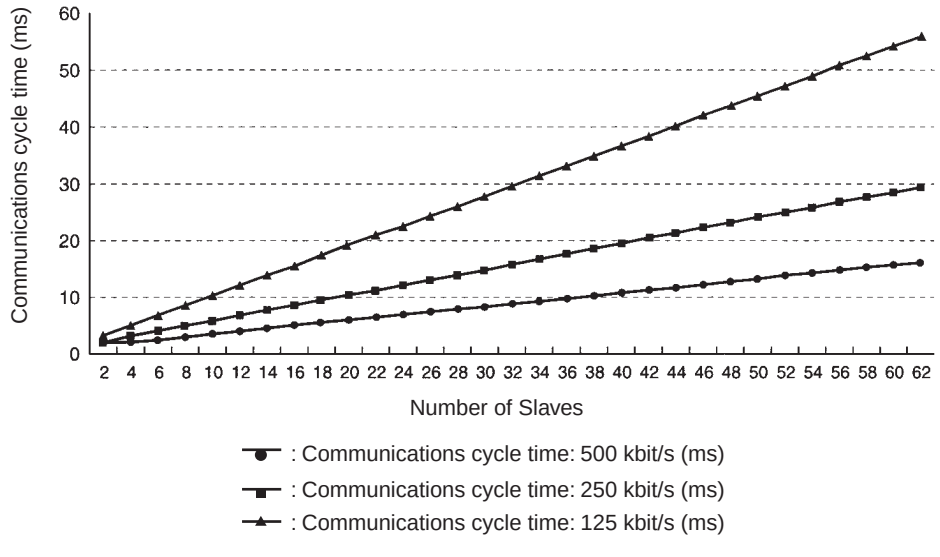
Communications Cycle Time

The communications cycle time is the time from the completion of a Slave's remote I/O communications processing until remote I/O communications with the same Slave are processed again. The communications cycle time is used to calculate the maximum I/O response time.

The communications cycle time depends on the number of Masters in the Network and on whether or not message communications are being performed. The following explanation is for a network with one Master. For networks with two or more Masters, refer to *8-1-3 More than One Master in Network*.

● Communications Cycle Time Graph

The following graph shows communications cycle time for the number of slaves when there are both 16-point output and 16-point input slaves.
Inputs: Bit strobe, Outputs: Poll connection



● Communications Cycle Time Calculation

Use the equations shown below to calculate the communications cycle time (T_{RM}) for a network with one Master. Note that if the result of this calculation is less than 2 ms, the actual communications cycle time will be 2 ms.

T_{RM} = Σ (Communications time per Slave)
+ High-density Unit processing time
+ Explicit message communications time
+ COS/Cyclic connection time (ms)
+ 0.01 × N + 1.0 [ms]

Communications Time per Slave:

This is the communications time required for a single Slave.
"Σ (Communications time per Slave)" represents the total of the "Communications time per Slave" for all the Slaves in the network.

High-density Unit Processing Time:

3.5 ms
This is added if there are any Slaves in the network that use at least 8 bytes for input, output, or both.

Explicit Message Communications Time:

$(0.11 \times T_B) \times n$ [ms]
The explicit message communications time is added as a delay time when explicit communications (sending or receiving) are performed.
n= Number of explicit messages (both sending and receiving) that occur simultaneously within one CPU Unit task period of CPU Unit
T_B = The baud rate factor
(500 kbit/s: T_B = 2; 250 kbit/s: T_B = 4; 125 kbit/s: T_B = 8)

COS/Cyclic Connection Time:

$\{(0.05+0.008 \times S) \times T_B\} \times n$ (ms)

The COS/cyclic connection time is added as a delay time when COS/cyclic communications are performed.
S: Total number of inputs and outputs in the COS/cyclic connection (bytes)
T_B: The baud rate factor
(500 kbit/s: T_B = 2; 250 kbit/s: T_B = 4; 125 kbit/s: T_B = 8)
n: Number of nodes occurring simultaneously within 1 communications cycle time in the COS/Cyclic connection
N: Number of Slaves

Communications Time/Slave

The communications time per Slave is the communications time required for a single Slave.

The following equations show the communications time/Slave (T_{RT}) for each kind of Slave Unit.

The communications time for each slave is not related to the type of connection (protocol) used by the slave.

● Output Slaves with Less Than 8 Bytes of Output

$T_{RT} = 0.016 \times T_B \times S_{OUT1} + 0.11 \times T_B + 0.07$ [ms]
S_{OUT1} : The number of Output Slave output words
T_B : The baud rate factor
(500 kbit/s: T_B = 2; 250 kbit/s: T_B = 4; 125 kbit/s: T_B = 8)

Input Slaves with Less Than 8 Bytes of Input

$T_{RT} = 0.016 \times T_B \times S_{IN1} + 0.06 \times T_B + 0.05$ [ms]

S_{IN1} : The number of Input Slave input words

T_B : The baud rate factor

(500 kbit/s: $T_B = 2$; 250 kbit/s: $T_B = 4$; 125 kbit/s: $T_B = 8$)

Mixed I/O Slaves with Less Than 8 Bytes of Input or Output

$T_{RT} = 0.016 \times T_B \times (S_{OUT2} + S_{IN2}) + 0.11 \times T_B + 0.07$ [ms]

S_{OUT2} : The number of Mixed I/O Slave output words

S_{IN2} : The number of Mixed I/O Slave input words

T_B : The baud rate factor

(500 kbit/s: $T_B = 2$; 250 kbit/s: $T_B = 4$; 125 kbit/s: $T_B = 8$)

Slaves with More Than 8 Bytes of Input or Out put

$T_{RT} = T_{OH} + T_{BYTE-IN} \times B_{IN} + T_{BYTE-OUT} \times B_{OUT}$ [ms]

T_{OH} : Protocol overhead

$T_{BYTE-IN}$: The input byte transmission time

B_{IN} : The number of input words

$T_{BYTE-OUT}$: The output byte transmission time

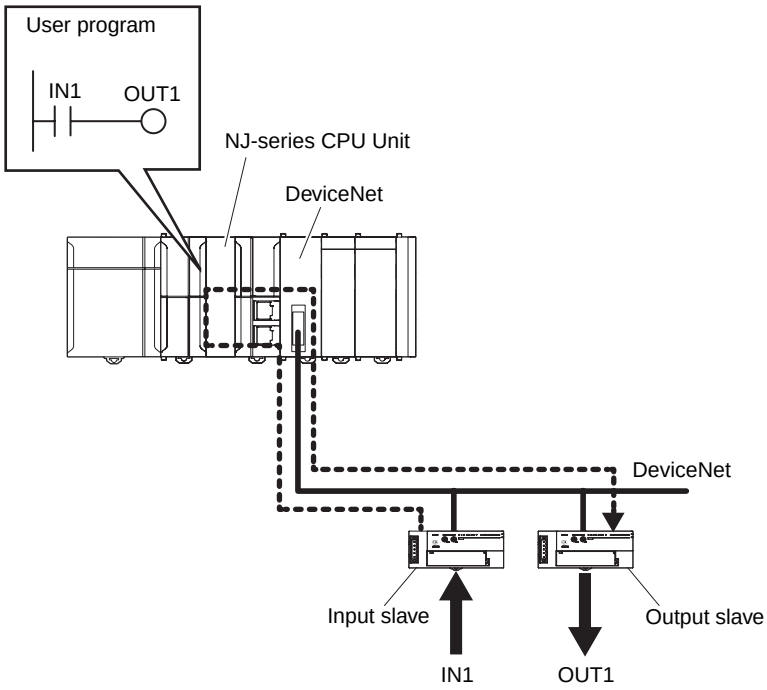
B_{OUT} : The number of output words

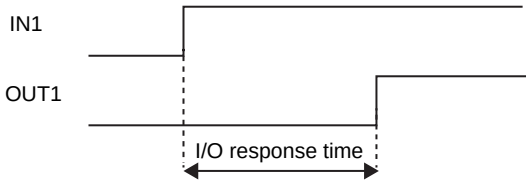
Baud rate	T_{OH}	$T_{BYTE-IN}$	$T_{BYTE-OUT}$
500 kbit/s	0.306 ms	0.040 ms	0.036 ms
250 kbit/s	0.542 ms	0.073 ms	0.069 ms
125 kbit/s	1.014 ms	0.139 ms	0.135 ms

For Input Slaves take B_{OUT} to be 0, and for Output Slaves take B_{IN} to be 0.

8-1-2 Calculating Guidelines for I/O Response Times

This section describes the formulas to use to calculate the minimum and maximum I/O response times for the following configuration. Refer to *8-1-1 Communications Cycle Time* for the communications cycle time and the communications time per slave, which are used in the formulas.





Precautions for Safe Use

Actual I/O response times depend on the number of CJ-series Units that you use, the size of I/O data that is refreshed for other CPU Bus Units, and other factors. The values that are calculated with these formulas are guidelines only. You must always check performance under actual conditions with the actual hardware and make sure that suitable I/O response times are achieved.

Formula for the Maximum I/O Response Time

You can calculate the maximum I/O response time T_{MAX} (ms) with the following formula.

$$T_{MAX} = T_{IN} + T_{RM} \times 2 + N_{RMMAX} \times T_{RM} + T_{RT\text{-}OUT} + T_{OUT}$$

T_{IN}: Input slave ON or OFF delay (ms)

T_{RM}: Communications cycle time (ms)

N_{RMMAX}: Number of communications cycles of the DeviceNet Unit that waits for data to return from the CPU Unit

$T_{RT\text{-}OUT}$: Communications time per slave for output slaves (ms)

T_{OUT}: Output slave ON or OFF delay (ms)

N_{RMMAX} is the smallest value that meets the following condition.

$N_{RMMAX} \times T_{RM} > T_{RFNJ}$

$T_{RFNJ} = T_{INNJMAX}$ + Task period $\times$ (3 + y) + $T_{OUTNJMAX}$

y = ((Number of CPU Bus Units + 1) $\times$ 1 ms) $\div$ Task period

Note Truncate the decimal portion of y and use the resulting integer in the formula.

$T_{INNJMAX}$: Input processing time in CPU Unit (ms)

$T_{OUTNJMAX}$: Output processing time in CPU Unit (ms)

Task period: The period of the task in which I/O refreshing is assigned for the DeviceNet Unit (ms)

Number of CPU Bus Units: The number of CPU Bus Units that are connected in the Controller

$T_{INNJMAX}$ = 0.5 + 0.0005 $\times$ Total size of all master input data in bytes

$T_{OUTNJMAX}$ = 0.2 + 0.0006 $\times$ Total size of all master output data in bytes

However, if the DeviceNet Unit is on an Expansion Rack, use the following formulas to calculate $T_{INNJMAX}$ and $T_{OUTNJMAX}$.

$T_{INNJMAX}$ = 0.5 + 0.00075 $\times$ Total size of all master input data in bytes

$T_{OUTNJMAX}$ = 0.2 + 0.0009 $\times$ Total size of all master output data in bytes

Formula for the Minimum I/O Response Time

You can calculate the minimum I/O response time T_{MIN} (ms) with the following formula.

$T_{MIN} = T_{IN} + T_{RT\text{-}IN} + T_{RT\text{-}OUT} + T_{RFNJ} + T_{OUT}$

T_{IN}: Input slave ON or OFF delay (ms)

$T_{RT\text{-}IN}$: Communications time per slave for input slaves (ms)

$T_{RT\text{-}OUT}$: Communications time per slave for output slaves (ms)

T_{OUT}: Output slave ON or OFF delay (ms)

$T_{RFNJ} = T_{INNJMIN}$ + Task period + $T_{OUTNJMIN}$

$T_{INNJMIN}$: Input processing time in CPU Unit (ms)

$T_{OUTNJMIN}$: Output processing time in CPU Unit (ms)

Task period: The period of the task in which I/O refreshing is assigned for the DeviceNet Unit (ms)

$T_{INNJMIN}$ = 0.4 + 0.0004 $\times$ Data size per slave for input slaves in bytes

$T_{OUTNJMIN}$ = 0.1 + 0.0005 $\times$ Data size per slave for output slaves in bytes

However, if the DeviceNet Unit is on an Expansion Rack, use the following formulas to calculate $T_{INNJMIN}$ and $T_{OUTNJMIN}$.

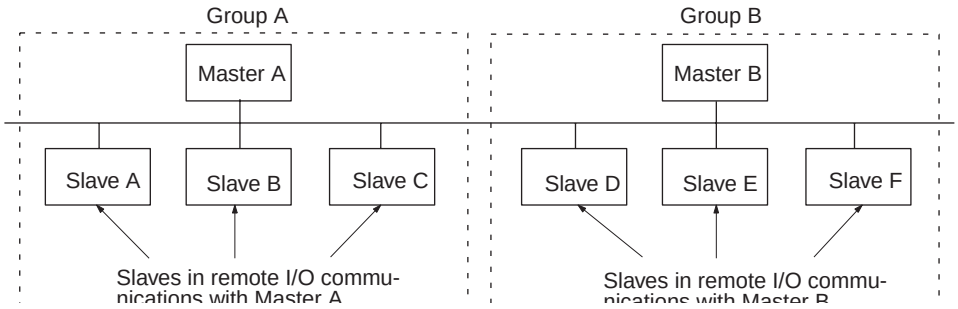
$T_{INNJMIN}$ = 0.4 + 0.0006 $\times$ Data size per slave for input slaves in bytes

$T_{OUTNJMIN}$ = 0.1 + 0.00075 $\times$ Data size per slave for output slaves in bytes

8-1-3 More than One Master in Network

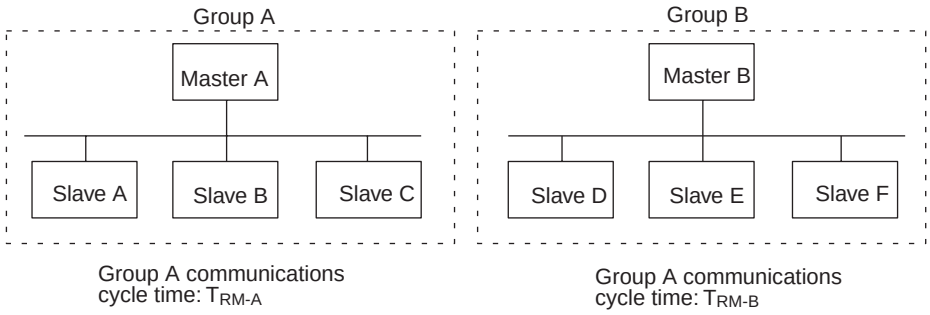
The following equation shows the remote I/O communications cycle time (T_{RM}) when there is more than one master in the network. An example for two masters is used.

First, the network is divided into two groups: Master A and the slaves in remote I/O communications with it and master B and the slaves in remote I/O communications with it.



Although in the above diagram the Slaves are separated into two groups for convenience, the actual physical positions in the Network are irrelevant.

Next, we can refer to *Communications Cycle Time* on page 8-2 and calculate the communications cycle time for each group as if they were separate Networks.



In Networks with two Masters, the communications cycle time for the entire Network will be the sum of the communications cycle times for the groups.

$$T_{RM} = T_{RM-A} + T_{RM-B}$$

Although this example shows only two Masters in the Network, the total communications cycle time for any Network can be calculated by dividing it into groups and adding the communications cycle times of all groups.

8-1-4 System Startup Time

Master Function

This section describes the system startup time (estimated) for a network operating with the scan list enabled. The system startup time is the delay from when the controller is reset or restarted including turning ON the DeviceNet Unit (master) until remote I/O communications begin. Here, we assume that the scan list is enabled and that remote I/O communications are set to start automatically at startup.

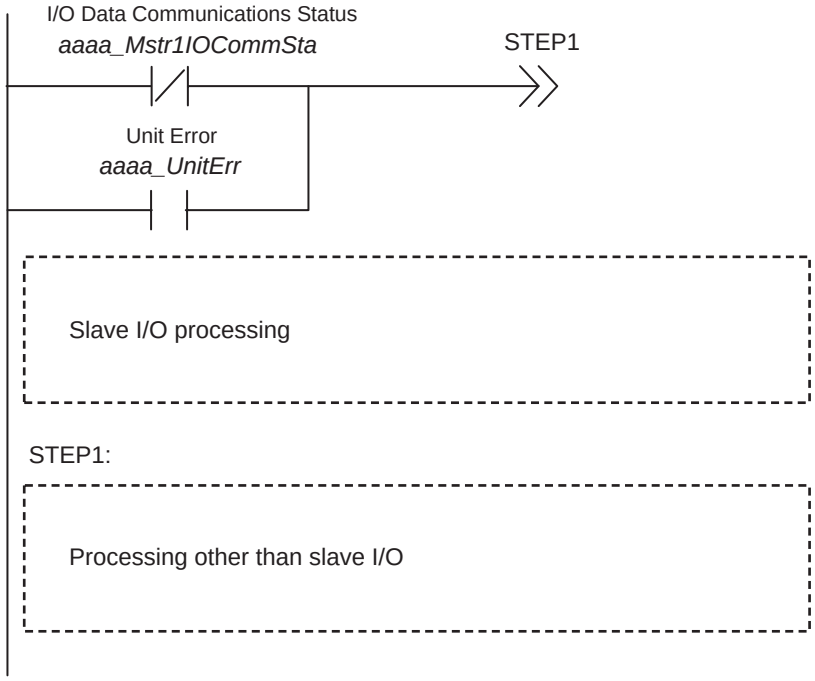
The following table shows the system startup times for 2 cases. In the first case, the DeviceNet Unit starts up just after all of the Slaves' power supplies are turned ON. In the second case, the DeviceNet Unit is restarted while communications are in progress.

Case	Slave's indicator status	System start-up time (estimated)
The Master is started just after Slave startup.	The NS indicator is OFF or flashing green.	13 seconds
Just the Master is restarted.	The NS indicator is flashing red while the Master is OFF.	15 seconds
Just the Slaves are restarted.	---	9 seconds

Program Example

As shown in the preceding table, it takes time for DeviceNet communications to start up. This programming uses flags in the Master status area to prevents the Slaves' I/O processing from being performed until remote I/O communications start up.

This programming is for a DeviceNet Unit with a unit number of 00.



Additional Information

Refer to *3-2 Device Variables for CJ-series Unit (Software Switches, Statuses)* for details on the Master Status Area.

Slave Function

It takes approximately 12 seconds from the time that the Controller is reset or restarted, including when the power is turned ON to the DeviceNet Unit (slave), until remote I/O communications with the master begin.

8-2 Message Communications

8-2-1 Message Communications Time

The message communications time is the time required from the time a Master Unit starts to send a message over the Network to another node until the Master Unit completes sending the message.

The following equation can be used to compute the approximate message communications time.

Message communications time =

Communications cycle time x ((No. of message bytes + 15) ÷ 6 + 1)

No. of message bytes: No. of data bytes following the command code (16#2801)

The communications cycle time depends on whether or not remote I/O communications are being used.

Message Communications Only (No Remote I/O Communications)

The following equation can be used to compute the message communications time when remote I/O communications are not being used.

Communications cycle time =

2 (see note) + 0.11 × T_B + 0.6 [ms]

T_B : The baud rate factor
(500 kbit/s: T_B = 2; 250 kbit/s: T_B = 4; 125 kbit/s: T_B = 8)

Note The communications cycle time will be 2 ms even if remote I/O communications are not being used.

Remote I/O and Message Communications

Performing message communications in addition to remote I/O communications will increase the message communications time.

Communications cycle time=

Communications cycle time for remote I/O communications only
+ 0.11 × T_B + 0.6 [ms]

T_B : The baud rate factor
(500 kbit/s: T_B = 2; 250 kbit/s: T_B = 4; 125 kbit/s: T_B = 8)
(Varies depending on the baud rate.)

Precautions for Correct Use

The above equations can be used to find the approximate message communications time, but this is a typical time, not the maximum time. The message communications time will vary depending on the frequency of message communications, the load on the remote node, the communications cycle time, and other factors. For any one Master Unit, the message communications time can be greatly increased due to heavy loads and the user program must be written to allow for this.

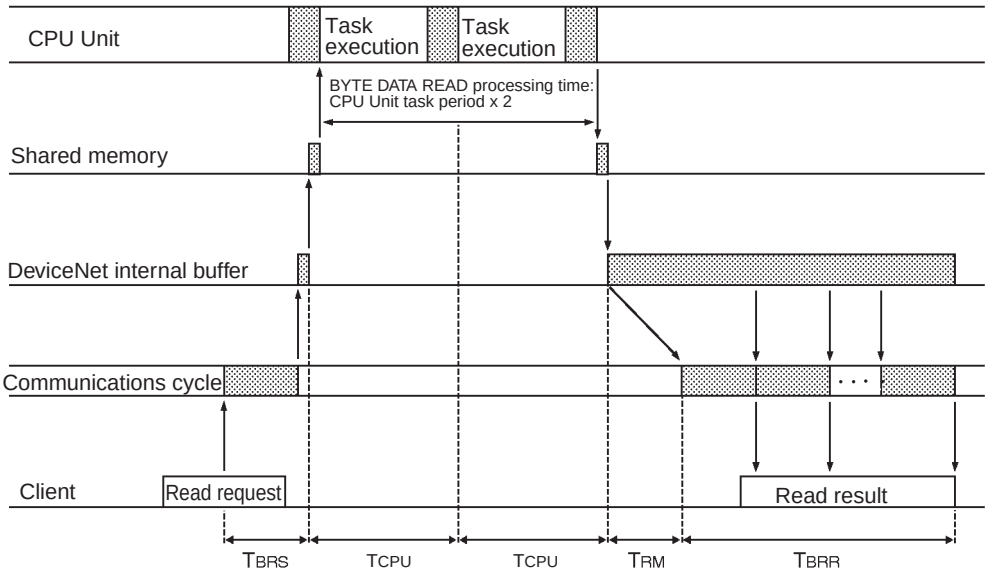
8-2-2 Calculating the Maximum Message Response Time

The message response time is the time required from the time a DeviceNet Unit starts to receive an I/O memory read request message (BYTE DATA READ explicit message) until the DeviceNet Unit completes sending the response message to the client.

The message response times described below are based on the following conditions:

- Only one DeviceNet Unit is mounted.
- The I/O memory read request is returned from CPU Unit in 2 CPU Unit task periods.
- Baud rate: 500 Kbit/s
- Communications cycle time: 3 ms (no remote I/O communications)
- CPU Unit task period: 10 ms
- DeviceNet Unit's refresh time on the CPU Unit: 2 ms

● Request from One Client (BYTE DATA READ)



Shown below is the response time required to return data for 100 words.

- BYTE DATA READ request sending time: T_{BRS}
  DeviceNet header (4 bytes) + Parameters (3 bytes) = 7 bytes (no fragment)
  Therefore, T_{BRS} = 1 communications cycle time (T_{RM}) = 3 ms
- CPU Unit's processing time: T_{CPU} x 2
  T_{CPU} x 2 = CPU Unit task period x 2 = 10 x 2 = 20 ms
- BYTE DATA READ response receiving time: T_{BRR}
  DeviceNet header (3 bytes) + Number of words to be read x 2 = 203 bytes
  Therefore, T_{BRR} = 1 + 203 bytes/6 communications cycle time = 35 communications cycle time
- DeviceNet Unit refresh time: T_{RF} = 2 ms

The message response time will be as follows:

= T_{RM} + T_{CPU} x 2 + T_{RM} x 35 + T_{RF} x 2 =3+20+105+4
= 132 ms

Shown below is the response time required to return data for 100 words to 8 clients.

- BYTE DATA READ request sending time: T_{BRS}
  DeviceNet header (4 bytes) + Parameters (3 bytes) = 7 bytes (no fragment)
  Therefore, T_{BRS} = 1 communications cycle time (T_{RM}) = 3 ms

- CPU Unit's processing time: T_{CPU} x 6 + T_{CPU} x 2 = T_{CPU} x 8
  The following time is required to process data with other clients before the CPU Unit starts processing.
  7 other clients/2 = Approximately cycle time x 3
  If one processing requires two CPU Unit task periods, the time will be as follows:
  CPU Unit task period x 3 x 2 = CPU Unit task period x 6
  CPU Unit's processing time: T_{CPU} x 2 = CPU Unit task period x 2
  Total time will be as follows: CPU Unit task period x 8
- BYTE DATA READ response receiving time: T_{BRR}
  DeviceNet header (3 bytes) + Number of words to be read x 2 = 203 bytes
  Therefore, T_{BRR} = 1 + 203 bytes/6 communications cycle time = 35 communications cycle time
- DeviceNet Unit refresh time: T_{RF} = 2 ms

The message response time will be as follows:

= T_{RM} + T_{CPU} x 8 + T_{RM} x 35 + T_{RF} x 2 x 8 =3+80+105+32
= 220 ms

Precautions for Correct Use

The above equations can be used to find the approximate message response time, but this is the typical time, not the maximum time. The message response time will vary depending on the frequency of message communications, the load on the remote node, the communications cycle time, and other factors. For any one DeviceNet Unit, the message communications time can be greatly increased due to heavy loads and the user program must be written to allow for this.

9

Troubleshooting and Maintenance

This section describes error processing, periodic maintenance operations, and troubleshooting procedures needed to keep the DeviceNet network operating properly. We recommend reading through the error processing procedures before operation so that operating errors can be identified and corrected more quickly.

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9-1 Troubleshooting with the DeviceNet Unit Indicators

9-1-1 Determining Operating Status from the Indicators

Indicator status			Network/Unit status	Comments
MS	NS	7-segment		
OFF	OFF	OFF	Initializing with CPU Unit	Initialization processing with the CPU Unit is in progress. Restart the DeviceNet Unit if this status continues for an extended period of time. Replace the CPU Unit and/or DeviceNet Unit if the problem is not corrected by restarting.
ON (green)	OFF	Master's node address (flashing)	Checking for node address duplication	The node address duplication check is performed after initialization.
ON (green)	Flashing (green)	Master's node address (flashing)	Waiting for remote I/O communications	The Unit will have this status until remote I/O communications are performed with the master or slave function. (When both functions are operating, the Unit will have this status until remote I/O communications are performed with either function.)
		Master's node address	Waiting for message communications connection	The Unit will have this status when both the master and slave functions are disabled and the Unit is waiting for a connection by message communications.
ON (green)	ON (green)	Master's node address	Remote I/O or message communications in progress.	This is the normal display when the master and/or slave is active.
ON (green)	ON (green)	- - (flashing)	Scan list operation in progress.	The scan list is being saved in flash memory or the scan list is being cleared.

9-1-2 Troubleshooting Errors Occurring in the DeviceNet Unit

Indicators			Error category	Error	Likely cause	DeviceNet Unit response	Error log (Hex)	
MS	NS	7-segment *1						
-	-	A0	Master function	Remote I/O communications stopped by a communications error	Pin 3 on the master's DIP switch is set to stop communications in the event of a communications error and communications have been stopped due to a remote I/O communications error, network power supply error, or transmission timeout.	• Remote I/O communications as a master will stop. Remote I/O communications as a slave and message communications will continue. • Records the error in the error log.	0346	
-	-	C0	Software settings errors	CPU Unit status error	The software switch operation couldn't be performed because the CPU Unit wasn't in PROGRAM mode.	• The only response is the error code displayed on the 7-segment indicator. • The error display will be cleared the next time that a software switch operation is completed normally.	-	
-	-	C2		Unit status error	The software switch operation failed because the Unit could not perform the requested process in its current status. *2		-	
-	-	C4		Structure error	The software switch operation failed because a structure error occurred.		-	

*1 The 7-segment indicator will alternate between the Unit's node address and the code given in the tables in this section.

*2 The most common causes of Unit status errors during settings switch operations are listed below:

- The master was stopped and a software switch operation relating to the master function was performed. (This does not include the master enable switch operation.)
- The scan list was enabled and a software switch operation was performed that can only be performed while the scan list is disabled. (Scan list enable and fixed allocation setting operations)
- The scan list was disabled and a software switch operation was performed that can only be performed while the scan list is enabled. (Clear scan list and Backup Unit settings file operations)
- The slave was stopped and a software switch operation relating to the slave function was performed. (This does not include the slave enable switch operation.)

Status of C200H Master Replacement Master Status 1 *_*CMstrSta*_*CMstrSta*	Status of device variables for CJ-series Units	Correction
*_*CMstrErr* (Master Error) and *_*CMstrIOErr* (Communication Error) are TRUE or *_*CMstrErr* (Master Error) and *_*CMstrSendErr* (1Send Error) are TRUE.	*_*Mstr1IOErr* (Remote I/O Communication Error), *_*UnitErr* (Unit Error) and *_*MstrFunErr* (Master Function Error) are TRUE, or *_*NetPwrErr* (Network Power Error) and *_*UnitErr* (Unit Error), or *_*SendTimeoutErr* (Send Timeout Error) and *_*UnitErr* (Unit Error) are TRUE.	Perform error processing according to the cause: • Remote I/O communications error (See error d9.) • Network power supply error (See error E0.) • Transmission timeout error (See error E2.) Correct the cause of the error and then restart remote I/O communications using the software switch *_*Sw1IOCommStartCmd* (the Remote I/O Communications Start Switch.)
-	-	Switch the CPU Unit to PROGRAM mode and try the operation again.
-	-	The C2 display will automatically go out after 30 seconds or will go out if the new software switch operation is successful.
-	-	Correct the structure error's cause (see errors d0 to d2), then register to the scan list again after checking there is no error.

Indicators			Error category	Error	Likely cause	DeviceNet Unit response	Error log (Hex)	
MS	NS	7-segment *1						
-	-	C5	Software settings errors	Incorrect setting	There was an error in the parameters specified in the user settings and the requested settings could not be made.	• The only response is the error code displayed on the 7-segment indicator. • The error display will be cleared the next time that a software switch operation is completed normally.	-	
-	-	C6		Multiple switches ON	Two or more software switches were changed to TRUE simultaneously or a second software switch was changed to TRUE before a prior operation was completed.		-	
-	Red (flashing)	d0	Master function	Structure error *2 (I/O area duplication)	The slave's I/O areas overlap. (Occurred with the scan list disabled.) **Note** Errors will occur in the slaves that join afterwards.	The master will periodically attempt to reconnect with the slave with the structure error.	0343	
-	Red (flashing)	d1		Structure error *2 (I/O area range exceeded)	The slave's I/O area isn't within the allowed range. (Occurs with the scan list disabled.)		0343	

*1 The 7-segment indicator will alternate between the Unit's node address and the code given in the tables in this section.

*2 When a (master function) structure error or verification error occurs, only the most recent error is displayed for each slave. If the Unit is set to stop the remote I/O communications for a communications error, two errors can be displayed: The slave's communications error and its most recent error.

Status of C200H Master Replacement Master Status 1 *_*CMstrSta*_*CMstrSta*	Status of device variables for CJ-series Units	Correction
-	-	Check the parameters in the user settings and try the operation again.
-	-	Execute software switch operations one at a time.
*_*CMstrErr* (Master Error) and *_*CMstrStruErr* (Structure Error) are TRUE.	*_*Mstr1StruErr* (Structure Error), *_*UnitErr* (Unit Error) and *_*MstrFunErr* (Master Function Error) are TRUE.	Set the slaves' node addresses again.
*_*CMstrErr* (Master Error) and *_*CMstrStruErr* (Structure Error) are TRUE.	*_*Mstr1StruErr* (Structure Error), *_*UnitErr* (Unit Error) and *_*MstrFunErr* (Master Function Error) are TRUE.	Set the slaves' node addresses again or use user-set allocations.

Indicators			Error category	Error	Likely cause	DeviceNet Unit response	Error log (Hex)	
MS	NS	7-segment *1						
-	Red (flashing)	d2		Structure error *2 (Unsupported slave)	The size of the slave's input and/or output area exceeded 200 bytes. (Occurs with the scan list disabled.)	The master will periodically attempt to reconnect with the slave with the structure error.	0343	
-	Red (flashing)	d5		Verification error *2 (Non-existent slave)	A slave registered in the scan list doesn't exist or the local node's (master's) node address is registered in the scan list. (Occurs with the scan list enabled.)	• If a slave is involved, the master will periodically attempt to reconnect. • If the master is involved, it will not send an OPEN frame to itself.	0344	

*1 The 7-segment indicator will alternate between the Unit's node address and the code given in the tables in this section.

*2 When a (master function) structure error or verification error occurs, only the most recent error is displayed for each slave. If the Unit is set to stop the remote I/O communications for a communications error, two errors can be displayed: The slave's communications error and its most recent error.

Status of C200H Master Replacement Master Status 1 *_*CMstrSta*_*CMstrSta*	Status of device variables for CJ-series Units	Correction
*_*CMstrErr* (Master Error) and *_*CMstrStruErr* (Structure Error) are TRUE.	*_*Mstr1StruErr* (Structure Error), *_*UnitErr* (Unit Error) and *_*MstrFunErr* (Master Function Error) are TRUE.	Use slaves with input and output areas of 200 bytes max.
*_*CMstrErr* (Master Error) and *_*CMstrVefyErr* (Verification Error) are TRUE.	*_*Mstr1VefyErr* (Verification Error), *_*UnitErr* (Unit Error) and *_*MstrFunErr* (Master Function Error) are TRUE.	Check the following: • Matching master and slave baud rates • Proper cable lengths (trunk and branch lines) • Broken or loose cables • Installation of terminators only at both ends of the trunk line • Excessive noise

Indicators			Error category	Error	Likely cause	DeviceNet Unit response	Error log (Hex)	
MS	NS	7-segment *1						
-	Red (flashing)	d6	Master function	Verification error *2 (Illegal vendor)	The CX-Integrator is set to check the vendor and the slave's vendor does not match the registered scan list. (Occurs with the scan list enabled.)	The master will periodically attempt to reconnect with the slave with the verification error.	0344	
-	Red (flashing)	d6		Verification error *2 (Illegal connection path)	The connection path was set with the CX-Integrator and there is a mistake in the connection path setting in the scan list. (Occurs with the scan list enabled.)	The master will periodically attempt to reconnect with the slave with the verification error.	0344	
-	Red (flashing)	d6		Verification error *2 (I/O size mismatch)	The slave's I/O data size does not match the registered scan list. (Occurs with the scan list enabled.)	The master will periodically attempt to reconnect with the slave with the verification error.	0344	
-	Red (flashing)	d6	Master function	Verification error *2 (Illegal device)	The CX-Integrator is set to check the device type and the slave's device type does not match the registered scan list. (Occurs with the scan list enabled.)	Records the error in the error log. The master will periodically attempt to reconnect with the slave with the verification error.	0344	
-	Red (flashing)	d6		Verification error *2 (Illegal product code)	The CX-Integrator is set to check the product code and the slave's product code does not match the registered scan list. (Occurs with the scan list enabled.)	Records the error in the error log. The master will periodically attempt to reconnect with the slave with the verification error.	0344	
-	Red (flashing)	d6	Master function	Verification error *2 (Unsupported connection)	The device does not support the I/O service specified in the scan list. (Occurs with the scan list enabled.)	Records the error in the error log. The master will periodically attempt to reconnect with the slave with the verification error.	0344	
-	Red (flashing)	d9		Remote I/O communications error	A timeout occurred during remote I/O communications using the master function. (The response from the slave timed out 6 consecutive times.)	Records the error in the error log. The master will periodically attempt to reconnect with the slave with the error, but remote I/O communications will stop if the master is set to stop communications.	0345	

*1 The 7-segment indicator will alternate between the Unit's node address and the code given in the tables in this section.

*2 When a (master function) structure error or verification error occurs, only the most recent error is displayed for each slave. If the Unit is set to stop the remote I/O communications for a communications error, two errors can be displayed: The slave's communications error and its most recent error.

Status of C200H Master Replacement Master Status 1 *_*CMstrSta*_*CMstrSta*	Status of device variables for CJ-series Units	Correction
*_*CMstrErr* (Master Error) and *_*CMstrVefyErr* (Verification Error) are TRUE.	*_*Mstr1VefyErr* (Verification Error), *_*UnitErr* (Unit Error) and *_*MstrFunErr* (Master Function Error) are TRUE.	Inspect the slave and then create the scan list again.
*_*CMstrErr* (Master Error) and *_*CMstrVefyErr* (Verification Error) are TRUE.	*_*Mstr1VefyErr* (Verification Error), *_*UnitErr* (Unit Error) and *_*MstrFunErr* (Master Function Error) are TRUE.	Inspect the slave and then create the scan list again.
*_*CMstrErr* (Master Error) and *_*CMstrVefyErr* (Verification Error) are TRUE.	*_*Mstr1VefyErr* (Verification Error), *_*UnitErr* (Unit Error) and *_*MstrFunErr* (Master Function Error) are TRUE.	Inspect the slave and then create the scan list again.
*_*CMstrErr* (Master Error) and *_*CMstrVefyErr* (Verification Error) are TRUE.	*_*Mstr1VefyErr* (Verification Error), *_*UnitErr* (Unit Error) and *_*MstrFunErr* (Master Function Error) are TRUE.	Inspect the slave and then create the scan list again.
*_*CMstrErr* (Master Error) and *_*CMstrVefyErr* (Verification Error) are TRUE.	*_*Mstr1VefyErr* (Verification Error), *_*UnitErr* (Unit Error) and *_*MstrFunErr* (Master Function Error) are TRUE.	Inspect the slave and then create the scan list again.
*_*CMstrErr* (Master Error) and *_*CMstrVefyErr* (Verification Error) are TRUE.	*_*Mstr1VefyErr* (Verification Error), *_*UnitErr* (Unit Error) and *_*MstrFunErr* (Master Function Error) are TRUE.	Inspect the slave and then create the scan list again.
*_*CMstrErr* (Master Error) and *_*CMstrIOErr* (Communications Error) are TRUE.	*_*Mstr1IOErr* (Remote I/O Communications Error), *_*UnitErr* (Unit Error) and *_*MstrFunErr* (Master Function Error) are TRUE.	Check the following: • Matching master and slave baud rates • Proper cable lengths (trunk and branch lines) • Broken or loose cables • Installation of terminators only at both ends of the trunk line • Excessive noise

Indicators			Error category	Error	Likely cause	DeviceNet Unit response	Error log (Hex)	
MS	NS	7-segment *1						
-	OFF or Red (flashing) *2	E0	Network	Network power supply error	The communications power supply is not being supplied properly from the network.	Records the error in the error log. As long as power is not being supplied remote I/O communications will remain stopped and errors will be returned in response to requests for message transmissions. The indicator status, scanning, and message processing will return to normal when the network power supply is restored, although scanning will not resume if the DeviceNet Unit is set to stop remote I/O communications when a communications error occurs.	0341	

*1 The 7-segment indicator will alternate between the Unit's node address and the code given in the tables in this section.

*2 The NS indicator will flash red if the error occurs during remote I/O communications, otherwise the indicator will be OFF.

Status of C200H Master Replacement Master Status 1 **_CMstrSta*_CMstrSta*	Status of device variables for CJ-series Units	Correction
*_*CMstrErr* (Master Error) and *_*CMstrSendErr* (Send Error) are TRUE.	*_*NetPwrErr* (Network Power Error) and *_*UnitErr* (Unit Error) are TRUE.	Check the network power supply and the wiring of the network cables.

Indicators			Error category	Error	Likely cause	DeviceNet Unit response	Error log (Hex)	
MS	NS	7-segment *1						
-	OFF or Red (flashing) *2	E2	Network	Transmission time-out error	A transmission request was not completed normally for one of the following reasons: • There is not even one device such as a slave in the network. • The communications speed settings are not the same in all of the nodes. • CAN controller error	As long as transmission timeout is in effect, remote I/O communications will remain stopped and errors will be returned in response to requests for message transmissions. The indicator status, scanning, and message processing will return to normal when the transmission timeout returns to normal, although scanning will not resume if the DeviceNet Unit is set to stop remote I/O communications when a communications error occurs.	0342	
Red (flashing)	-	E6	Memory access	Message monitoring timer list logic error	There is an error in the contents of the message monitoring timer list stored in non-volatile memory.	Records the error in the error log. Operation will continue using the default message monitoring timer values.	021A	
Red (flashing)	-	E7		Slave scan list logic error	There is an error in the contents of the slave scan list stored in non-volatile memory.	• Records the error in the error log. • The slave remote I/O communications will be stopped. • Message processing and the exchange of data with the CPU Unit will continue. Normal operation will resume when the slave scan list is written normally. (Start the slave remote I/O communications.)	021A	

*1 The 7-segment indicator will alternate between the Unit's node address and the code given in the tables in this section.

*2 The NS indicator will flash red if the error occurs during remote I/O communications, otherwise the indicator will be OFF.

Status of C200H Master Replacement Master Status 1 *_*CMstrSta*_*CMstrSta*	Status of device variables for CJ-series Units	Correction
*_*CMstrErr* (Master Error) and *_*CMstrSendErr* (Send Error) are TRUE.	*_*SendTimeoutErr* (Send Timeout Error) and *_*UnitErr* (Unit Error) are TRUE.	Check the following: • Matching master and slave baud rates • Proper cable lengths (trunk and branch lines) • Broken or loose cables • Installation of terminators only at both ends of the trunk line • Excessive noise
*_*CMstrErr* (Master Error) and *_*CMstrCfgErr* (Configuration Error) are TRUE.	*_*UnitErr* (Unit Error) and *_*MsgListErr* (Invalid Message Timer List Error) are TRUE.	Use the CX-Integrator to register the message monitoring timer list again.
-	*_*UnitErr* (Unit Error), *_*SlavFunErr* (Slave Function Error) and *_*MemErr* (Unit Memory Error) are TRUE.	Disable the slave, reset the allocations, and then enable the slave again or use the CX-Integrator to reset the slave scan list.

Indicators			Error category	Error	Likely cause	DeviceNet Unit response	Error log (Hex)	
MS	NS	7-segment *1						
Red (flashing)	-	E8	Memory access	Master scan list logic error	There is an error in the contents of the master scan list stored in non-volatile memory.	• Records the error in the error log. • The master remote I/O communications will be stopped. • Data exchange, slave operation, and message communications with the CPU Unit will continue. Normal operation will resume when the master scan list is written normally. (Start the master remote I/O communications.)	021A	

*1 The 7-segment indicator will alternate between the Unit's node address and the code given in the tables in this section.

Status of C200H Master Replacement Master Status 1 **_CMstrSta*_CMstrSta*	Status of device variables for CJ-series Units	Correction
**_CMstrErr* (Master Error) and **_CMstrCfgErr* (Configuration Error) are TRUE.	**_UnitErr* (Unit Error), **_MstrFunErr* (Master Function Error) and **_Mstr1SListErr* (Invalid Scan List Data Error) are TRUE.	Clear the scan list and register the scan list again or use the CX-Integrator to reset the master scan list.

Indicators			Error category	Error	Likely cause	DeviceNet Unit response	Error log (Hex)	
MS	NS	7-segment *1						
Red (flashing)	-	E9	Memory access	Memory access error	An error occurred in the Unit's non-volatile memory itself. This error will occur in the following cases. Error1: An error occurs reading the identity information during initialization. Error2: All error log records cannot be used during initialization or registering an error log record. Error3: An error occurs while reading or writing the error log. Error4: An error occurs while reading or writing the master function enabling data or the master scan list. Error5: An error occurs while reading or writing the slave function enabling data or the slave scan list. Error6: An error occurs while reading or writing the message monitoring timer. Error7: An error occurs while reading or writing the communications cycle time set value. Error8: An error occurs while reading the identity information during Identity object server processing. **Note** This error does occur for checksum errors while reading data.	Registers an error record with error code 0602 in the RAM error log area. For Error 1: Normal operation continues. For Error 2 or 3: Remaining writes to EEPROM are all ignored. Other than that, normal operation continues. (Error records continue to be written to RAM.) For Error 4: The master remote I/O communications are stopped. Other operations continue. For Error 5: The slave scanning is stopped and other operations continue. For Error 6: The default values are used for the message monitoring timer and operation continues. For Error 7: The communications cycle time is set automatically and operation continues. For Error 8: Operation continues.	0602	

*1 The 7-segment indicator will alternate between the Unit's node address and the code given in the tables in this section.

Status of C200H Master Replacement Master Status 1 **_CMstrSta*_CMstrSta*	Status of device variables for CJ-series Units	Correction
**_CMstrErr* (Master Error) and **_CMstrMemErr* (Unit Memory Error) are TRUE.	**_UnitErr* (Unit Error) and **_MemErr* (Unit Memory Error) are TRUE.	Replace the Unit if the error recurs.

Indicators			Error category	Error	Likely cause	DeviceNet Unit response	Error log (Hex)	
MS	NS	7-segment *1						
-	Red (lit)	F0	Network	Node address duplication	The master's node address is duplicated on another node.	• The Unit will go offline and communications will be disabled. Error responses will be returned to all communications requests. • The exchange of data with the CPU Unit will continue.	0211	
-	Red (lit)	F1		Bus Off detected	A Bus Off condition was detected.	• The Unit will go offline and communications will be disabled. Error responses will be returned to all communications requests. • The exchange of data with the CPU Unit will continue.	0340	
Red (flashing)	OFF	H1	CPU Unit exchange	Unit number duplication	The unit number is duplicated on another Unit.	Stops operation.	-	
Red (flashing)	OFF	H2		CPU Unit faulty (H2)	-	Stops operation.	-	
Red (lit)	OFF	H3		DeviceNet Unit faulty	-	Stops operation.	-	
Red (flashing)	OFF	H4		Node address setting error	The node address set on the rotary switches is out-of-range (64 or higher.)	Stops operation.	-	
Red (flashing)	OFF	H5		Communications speed setting error	The communications speed is set incorrectly.	Stops operation.	-	
Red (flashing)	OFF	H6		CPU Unit faulty (H6)	-	• Records the error in the error log. (The time information is set to all zeroes.) • Stops operation.	000F	
Red (flashing)	OFF	H7		I/O table not registered	The CPU Unit's I/O table is not registered.	• Records the error in the error log. • Stops operation.	0006	

*1 The 7-segment indicator will alternate between the Unit's node address and the code given in the tables in this section.

Status of C200H Master Replacement Master Status 1 *_*CMstrSta*_*CMstrSta*	Status of device variables for CJ-series Units	Correction
*_*CMstrErr* (Master Error) and *_*CMstrNdDupErr* (Node Address Duplicated/Bus Off Error) are TRUE.	*_*UnitErr* (Unit Error) and *_*NdAdrDupErr* (Node Address Duplicated) are TRUE.	Check the node addresses set on other nodes in the network. Correct the settings to eliminate the duplication and restart the DeviceNet Units.
*_*CMstrErr* (Master Error) and *_*CMstrNdDupErr* (Node Address Duplicated/Bus Off Error) are TRUE.	*_*UnitErr* (Unit Error) and *_*BusoffErr* (Bus Off Error) are TRUE.	Check the following: • Matching master and slave baud rates • Proper cable lengths (trunk and branch lines) • Broken or loose cables • Installation of terminators only at both ends of the trunk line • Excessive noise
-	-	Set the unit numbers correctly and restart the DeviceNet Units.
-	-	Replace the CPU Unit if the error recurs when the Controller is restarted.
-	-	Replace the DeviceNet Unit if the same error recurs when the Unit is mounted to another CPU Unit.
-	-	Set the node address correctly and restart the DeviceNet Units.
-	-	Set the communications speed correctly and restart the DeviceNet Units.
-	-	Replace the CPU Unit if the error recurs when the Controller is restarted.
-	-	Create the Unit Configuration in which the Unit is registered to.

Indicators			Error category	Error	Likely cause	DeviceNet Unit response	Error log (Hex)	
MS	NS	7-segment *1						
Red (flashing)	-	HA	CPU Unit exchange	CPU Unit memory faulty	A parity error occurred while reading the routing table.	• Records the error in the error log and continues processing • The routing table is treated as missing.	0012	
Red (flashing)	-	Hb		CPU Unit faulty (Hb)	A timeout occurred while reading the routing table.	• Continues processing but data exchange with the CPU Unit is stopped. • The routing table is treated as missing. • Records the error in the error log.	0011	
Red (flashing)	-	HC		Routing table logic error	There is an error in the contents of the routing table.	• Records the error in the error log. • The routing table is treated as missing and processing continues.	021A	
Red (flashing)	-	Hd		I/O refresh error	• The I/O areas set in the master scan list or slave scan list do not exist in the CPU Unit. • This error can occur when the Unit is mounted to a different CPU Unit with a different number of EM banks or EM that has been converted to file memory. **Note** This error may occur during remote I/O communications, too.	Stops remote I/O communications for the function (master or slave) using the non-existent area. **Note** There is a possibility that this error will occur again. If it does occur again, restart remote I/O communications to return the system to normal operation.	0347	

*1 The 7-segment indicator will alternate between the Unit's node address and the code given in the tables in this section.

Status of C200H Master Replacement Master Status 1 **_CMstrSta*_CMstrSta*	Status of device variables for CJ-series Units	Correction
**_CMstrErr* (Master Error) and **_CMstrCfgErr* (Configuration Error) are TRUE.	**_RTblErr* (Routing Table Error) and **_UnitErr* (Unit Error) are TRUE.	Register the routing table in the CPU Unit again and restart the Controller. Replace the CPU Unit if the error recurs.
**_CMstrErr* (Master Error) and **_CMstrCfgErr* (Configuration Error) are TRUE.	**_RTblErr* (Routing Table Error) and **_UnitErr* (Unit Error) are TRUE.	Register the routing table in the CPU Unit again and restart the Controller. Replace the CPU Unit if the error recurs.
**_CMstrErr* (Master Error) and **_CMstrCfgErr* (Configuration Error) are TRUE.	**_RTblErr* (Routing Table Error) and **_UnitErr* (Unit Error) are TRUE.	Set the routing table in the CPU Unit correctly and restart the DeviceNet Units.
**_CMstrErr* (Master Error) and **_CMstrCfgErr* (Configuration Error) are TRUE.	**_UnitErr* (Unit Error), **_MstrFunErr* (Master Function Error) and **_Mstr1IORefErr* (Master I/O Refresh Error) are TRUE, or **_UnitErr* (Unit Error), **_SlavFunErr* (Slave Function Flag) and **_Slav1IORefErr* (Slave I/O Refresh Error) are TRUE.	Check the master scan list and slave scan list and reset with a correct allocation.

Indicators			Error category	Error	Likely cause	DeviceNet Unit response	Error log (Hex)	
MS	NS	7-segment *1						
Red (flashing)	-	HE	CPU Unit exchange	CPU Unit service monitoring error	Servicing from the CPU Unit is not performed at fixed intervals. Servicing is normally monitored performed at 11 s.	• Records the error in the error log. • Stops master and slave remote I/O communications. Performs the following processing if it receives commands that must be passed along to the CPU Unit: • Returns an error response (0302 Hex) to commands requiring a response. • Discards other frames and stores an error record (010B Hex) in the error log. **Note** Remote I/O communications will not restart automatically for this error. First confirm that the error has been eliminated and then perform the procedure to start remote I/O communications.	0002	
Red (flashing)	-	HF		CPU Unit watchdog timer error	An error occurred in the CPU Unit. *2	• Records the error in the error log. • Stops master and slave remote I/O communications. Performs the following processing if it receives commands that must be passed along to the CPU Unit: • Returns an error response (0302 Hex) to commands requiring a response. • Discards other frames and stores an error record (010B Hex) in the error log.	0001	

*1 The 7-segment indicator will alternate between the Unit's node address and the code given in the tables in this section.

*2 The CPU Unit's watchdog timer error can occur during initialization.

Status of C200H Master Replacement Master Status 1 *_CMstrSta*_CMstrSta	Status of device variables for CJ-series Units	Correction
There is no status notification because communications with the CPU Unit are disabled.	There is no status notification because communications with the CPU Unit are disabled.	Inspect the CPU Unit's operating environment.
There is no status notification because communications with the CPU Unit are disabled.	There is no status notification because communications with the CPU Unit are disabled.	Replace the CPU Unit.

Indicators			Error category	Error	Likely cause	DeviceNet Unit response	Error log (Hex)	
MS	NS	7-segment *1						
-	Red (flashing)	L9	Slave function	Remote I/O communications error	A timeout occurred during remote I/O communications using the slave function.	If slave has outputs, the status of those outputs is determined by the hold/clear outputs setting for communications errors.	0345	
Red (lit)	OFF	OFF	Unit	Special Unit error	-	• Records the error in the error log. • Stops the Unit.	0601	
-	-	-	CPU Unit	CPU Unit major fault	-	Output data is set to 0. (With the master, these are output bits. With the slave, these are input bits to the other master.)	-	

*1 The 7-segment indicator will alternate between the Unit's node address and the code given in the tables in this section.

Status of C200H Master Replacement Master Status 1 *_CMstrSta*_CMstrSta	Status of device variables for CJ-series Units	Correction
-	*_Slav1IO1Err (Remote I/O Communications Error for OUT1/IN1) or *_Slav1IO2Err (Remote I/O Communications Error for OUT2/IN2) is TRUE and *_UnitErr (Unit Error) and *_SlavFunErr (Slave Function Flag) are TRUE.	Check the following: • Master Operation is normal • Matching master and slave baud rates • Proper cable lengths (trunk and branch lines) • Broken or loose cables • Installation of terminators only at both ends of the trunk line • Excessive noise
-	-	Restart Controller. Replace the DeviceNet Unit if the error recurs.
-	-	-

9-2 Error Log Functions

Errors detected by the DeviceNet Unit are stored in the error log along with the date and time of their occurrence. You can monitor the error log by using the CX-Integrator.
Refer to the *CX-Integrator Operation Manual* (Cat. No. W464) for error log monitoring operations.

9-2-1 Error Log Table

● Error Log Table

Each time an error occurs, one error record is recorded in the DeviceNet Unit's RAM error log table. You can record a maximum of 96 records with Unit Ver. 1.1 or later, and a maximum of 64 records with versions before Ver.1.1. If another error occurs when the table is full, the oldest record will be erased to make room for the new error record.

The error log table records the following information.

- Error code (Refer to *9-2-2 Error Codes and Detail Codes*)
- Detail code (Refer to *9-2-2 Error Codes and Detail Codes*)
- Time of occurrence (The CPU Unit's time is used for the time stamp.)

● Error Log Storage Area

When an error is detected, information on the error and the time stamp are stored in the Unit's internal RAM as an error log record. Serious errors are recorded in EEPROM as well as RAM*. The error log records in EEPROM are retained even when Controller is turned OFF or the Unit is restarted. The error log records in EEPROM are copied to RAM when the DeviceNet Unit is turned ON.

When the error log is read from the CX-Integrator, only the error log records in RAM are read. When the error log is cleared from the CX-Integrator, the error log records in RAM and EEPROM are erased.

* Refer to *9-2-2 Error Codes and Detail Codes* for a table listing the error codes.

● Reading and Clearing the Error Log

When you use the CX-Integrator, you can monitor the error log with the master error history read operation. With the CX-Integrator, the error log can only be monitored and cannot be saved.

Additional Information

The CPU Unit's time information is used for the time stamps in the DeviceNet Unit's error log records. If the time information cannot be read from the CPU Unit, the time stamp will contain all zeroes.

Moreover, if the battery is replaced in an NJ-series controller, the time of the CPU Unit's built-in clock must be set again the next time that power is turned ON. If the built-in clock time is not set, the correct time information will not be recorded. If this error log is read from the CPU Unit, the time information will not be consistent.

9-2-2 Error Codes and Detail Codes

Error code (Hex)	Error	Detail code		Record stored in EEPROM
		First byte	Second byte	
0001	CPU Unit watchdog timer error	00 Hex	00 Hex	Yes
0002	CPU Unit service monitoring error (Servicing from the CPU Unit is not performed at fixed intervals.)	Monitoring time (ms)		Yes
0006	Other CPU error	Bit 14 ON: Duplicate unit number setting Bit 11 ON: Unit not in registered Unit Configuration in the CPU Unit Other bits: Reserved by system		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 04 Hex: CPU Bus Unit system settings error 05 Hex: Special Unit CIO or DM allocation	Yes

Error code (Hex)	Error	Detail code		Record stored in EEPROM
		First byte	Second byte	
0101	Transmission failed because the local node is not participating in the network.	Explicit message communications command: Bit 15: OFF Bits 14 to 8: 0 Bit 7: ON Bits 6 to 0: Node address of command source Explicit message communications response: Bit 15: ON Bits 14 to 8: 0 Bit 7: ON Bits 6 to 0: Node address of command source		No
0105	Transmission failed because of a node address setting error.			
0106	Transmission failed because of a node address duplication error.			
0107	Transmission failed because the other node is not participating in the network.			
0108	Transmission failed because there is no Unit with the specified unit number.			
0109	Transmission failed because the other node is busy.			
010B	Transmission failed because of a CPU Unit error. Frame discarded due to one of the following: • A cyclic service monitoring timeout occurred. • A CPU Unit watchdog timer error occurred. • Another CPU Unit error occurred.			
010D	Transmission failed because the destination address is not registered in the routing table.			
010E	Transmission failed because the routing table has not been registered.			
010F	Transmission failed because of a routing table error.			
0110	Transmission failed because of too many repetitions.			
0111	Transmission failed because the command exceeded the max. command length.			
0112	Transmission failed because of a header error.			
0117	Packet discarded because the internal reception buffer is full.			
0118	Illegal packet discarded.			
0120	Unexpected routing error			
0123	Packet discarded because the internal transmission buffer is full.			
0124	Routing failed because maximum frame length was exceeded.			
0125	Packet discarded because of response timeout.			
021A	Setting table logic error	00 Hex	03 Hex: Routing table 0A Hex: Master scan list 0B Hex: Slave scan list 0C Hex: Message monitoring timer list 0D Hex: Scan time	Yes
0211	Node address duplication (cause)	00 Hex	Local node address	No
0300	Packet discarded because of parameter error.	Same as the code (such as 0101 Hex) in the discarded explicit message packet.		No
0340	Bus Off detected	00 Hex	00 Hex	No
0341	Network power supply error	00 Hex	00 Hex	No
0342	Transmission timeout	00 Hex	00 Hex	No

Error code (Hex)	Error	Detail code		Record stored in EEPROM
		First byte	Second byte	
0343	Structure error	01 Hex: I/O area duplication 02 Hex: I/O area range exceeded 03 Hex: Unsupported slave	Slave's node address	No
0344	Verification error	01 Hex: Non-existent slave 02 Hex: Illegal vendor 03 Hex: Illegal device type 04 Hex: Illegal product code 05 Hex: Unsupported connection 06 Hex: I/O size mismatch 07 Hex: Illegal connection path	Slave's node address	No
0345	Remote I/O communications error	01 Hex: Master 02 Hex: Slave	Master: Slave's node address Slave: Master's node address	No
0346	Remote I/O communications stopped because of a remote I/O communications error.	01 Hex: Remote I/O communications error 02 Hex: Network power supply error 03 Hex: Transmission timeout	Remote I/O comm. error: Slave's node address Power supply error: Local (master's) node address Transmission timeout: Local (master's) node address	No
0347	I/O refreshing error	01 Hex: Master 02 Hex: Slave	00 Hex	No
0348	Message discarded because a new request was received.	Same as the code (such as 0101 Hex) in the discarded explicit message packet.		No
0601	Special Unit error	Uncertain contents		Yes
0602	Special Unit memory error	01 Hex: Read error 02 Hex: Write error	06 Hex: Error log 09 Hex: Identity data 0A Hex: Master scan list 0B Hex: Slave scan list 0C Hex: Message monitoring timer list 0D Hex: Communications cycle time setting	Yes*

* The error information is not written to EEPROM when a memory error occurs in the error log area (EEPROM).

9-3 Troubleshooting

9-3-1 CPU Unit's ERR/ALM Indicator Lit or Flashing

Error	Probable cause

An I/O setting check error occurred.	• Make sure that the Unit is mounted properly.
	• The CPU Bus Unit model registered in the Unit Configuration in the CPU Unit does not match the actual Unit Configuration. Compare using "Synchronize" operation and use one of the following procedures.
	  • Correct the Unit number setting
	  • Correct the project Unit Configuration and transfer to the CPU Unit

Special Unit access is denied.	• Make sure that the Unit is mounted properly. • Restart the Unit. If operation is not restored even after the Unit is restarted, replace the Unit.
An I/O Bus check error occurred.	• Make sure that the Unit is mounted properly. • Restart the Unit. If operation is not restored even after the Unit is restarted, replace the Unit.

Note Refer to the *NJ-Series CPU Unit Hardware User's Manual* (Cat. No. W500) and *NJ-Series CPU Unit Software User's Manual* (Cat. No. W501) for more details on these errors.

9-3-2 Remote I/O Communications Disabled

Error	Probable cause
All of the DeviceNet Unit's indicators are OFF.	• Check whether power is being supplied to the NJ-series Controller. • Check whether the DeviceNet Unit is mounted in the Backplane correctly. • When a watchdog timer (WDT) error has occurred in the CPU Unit, follow the procedures described in the CPU Unit's manual to correct the problem. • All of a CJ1W-DRM21 Unit's indicators will be OFF when a CPU Bus Unit error has occurred. • Restart the Unit. If operation is not restored even after the Unit is restarted, replace the Unit.

The DeviceNet Unit's MS indicator is ON and green, but the NS indicator remains OFF. (The green NS indicator normally goes ON about 2 seconds after the green MS indicator goes ON.)	• If the DeviceNet Unit's 7-segment indicator is displaying an error code, refer to the tables in *9-1 Troubleshooting with the DeviceNet Unit Indicators*.
	• Make sure that the master's unit number setting is correct.
	• Make sure that the unit number is not duplicated on another Special Unit.
	• Use the Synchronize function to compare the Unit Configurations.
	• Use one of the following procedures according to the comparison results.
	  • Correct the Unit number setting
	  • Correct the project Unit Configuration and transfer to the CPU Unit
	• Restart the Unit. If operation is not restored even after the Unit is restarted, replace the Unit.

Error	Probable cause
The DeviceNet Unit's MS indicator is ON and green, but the NS indicator continues to flash green. (The green NS indicator normally goes ON about 2 seconds after the green MS indicator goes ON.)	• If the DeviceNet Unit's 7-segment indicator is displaying an error code, refer to the tables in *9-1 Troubleshooting with the DeviceNet Unit Indicators*. • Restart the Unit. If operation is not restored even after the Unit is restarted, replace the Unit.
The DeviceNet Unit's MS and NS indicators are ON and green, but the 7-segment indicator continues to flash the master's node address. (If the slave is connected correctly, the local node address normally goes ON within 8 seconds after the green NS indicator goes ON.)	• Check that the Master Unit's baud rate matches the baud rates set on all of the slaves. If they don't match, set all of the baud rates to the same value. • Make sure that there are121-Ω terminators connected at both ends of the trunk line. Connect 121-Ω terminators if the wrong resistance is being used. • Check whether all of the slaves' settings are correct. • Check whether the communications cables are wired correctly. • Check whether the power supply cables and power supply are wired and set correctly. • Check for broken wires in the communications and power supply cables attached to the connectors. • Check whether the slaves are operating properly. When an OMRON DeviceNet slave is being used, refer to the *DeviceNet Slaves Operation Manual* (Cat. No. W347). When another company's DeviceNet slave is being used, refer to that slave's user's manual.

9-3-3 I/O Link Problems

Error	Probable cause
The I/O isn't simultaneous.	Observe the following precautions when writing application programs: • Node unit data simultaneity is ensured between the NJ-series CPU Unit and Master Unit. • In OMRON DeviceNet slaves, the data simultaneity of words are ensured. • If another manufacturer's DeviceNet slave is being used, refer to that slave's user's manual for details.

9-3-4 Communications Error Operation Settings

Error	Probable cause
Communications are stopped even though there is no communications error.	When pin 3 on the DIP switch is ON, communications will be stopped if a communications error, transmission timeout, or network power supply error occurs. While communications are stopped, the 7-segment indicators will alternately display error code A0 and the error code of the communications error that caused the stoppage. In the case of a network power supply error or a transmission timeout, the error code will disappear and the indicator will show just the communications stoppage code (A0) after the correction.
After stopping is performed because of the communications stop setting for when a communications error occurs, stopping is not released even after a "stop release" operation.	• When communications can't be restarted with slaves that were communicating normally before the stoppage, stop the communications again. Check that the slave has started up and perform the "clear communications error stoppage" operation. • It may be necessary to perform the operation twice if the network contains another company's slave that take a long time to join the network.

9-3-5 Scan List Problems

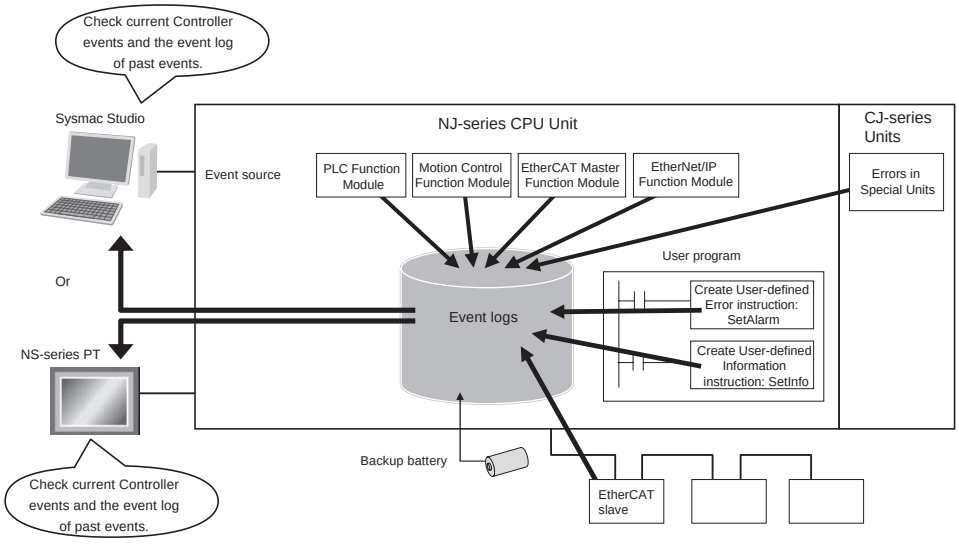
Error	Probable cause
A scan list couldn't be created by the "create scan list" operation. A scan list couldn't be cleared by the "clear scan list" operation.	Neither the scan list clear nor create scan list operations can be performed until *_Mstr1IOCommSta* (I/O Data Communications) changes to TRUE in the Master Status Area after the power is turned ON and the I/O Data Communications Status will change to TRUE again after the scan list clear operation is executed. Make sure that the I/O Data Communications Status changes to TRUE before attempting to execute the create scan list or scan list clear operations.
The "create scan list" or "clear scan list" operation was executed, but the master's 7-segment indicators still display "- -". (The "- -" display usually lasts for 1 second after the "create scan list" operation or 0.1 seconds after the "clear scan list" operation.)	Restart the DeviceNet Unit, execute the clear scan list operation, and then the create scan list operation if necessary. Replace the DeviceNet Unit if this doesn't correct the problem.

9-4 Event Logs

9-4-1 Overview of the Event Logs

You 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.

9-4-2 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	Meaning
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	
04880000 hex	Unit Memory Error	An error occurred when writing to internal memory where the error history is saved.	• There is a source of noise nearby. • Non-volatile memory failure			S	U		page 9-42
04890000 hex	Network Power Error	Network power is not being supplied.	• Communications power is not being supplied normally from the network.			S			page 9-42
148D0000 hex	Invalid Scan List Data	There is an error in the contents of the slave scan list or master scan list stored in non-volatile memory.	• The power was interrupted during writing the scan list to the non-volatile memory.			S			page 9-43
148E0000 hex	Invalid Setup Data	There is illegal data in the settings for the slave function.	• The power was interrupted while the system was writing the parameters. • Non-volatile memory life			S			page 9-43
24480000 hex	Node Address Duplicated Error	An error was discovered during the node address duplication check when starting the DeviceNet Unit.	• The node address of the DeviceNet Unit is also set for another node.			S			page 9-44
34BC0000 hex	Routing Table Error	There is illegal data in the routing tables set in the CPU Unit.	• The local DeviceNet Unit is not in the routing tables. • The routing table format is incorrect. • Reading the routing tables timed out.			S	U		page 9-44

Event code	Event name	Meaning	Assumed cause	Level					Reference
				Maj	Prt	Min	Obs	Info	
34BD 0000 hex	Verification Error	The slave information registered in the scan list does not agree with the actual slave information.	• A slave that is in the scan list does not exist. • The node address of the local Unit, which is the master, is registered in the scan list. • If the system is set to check the vendor in the detailed verification settings, the vendor of the slave does not match the registration in the scan list. • If the connection path is set in the detailed verification settings, then setting the connection path that is set in the scan list failed. • The size of the slave I/O data does not match the registration in the scan list. • If the device type is set in the detailed verification settings, then setting the device type that is set in the scan list failed. • If the product code is set in the detailed verification settings, then setting the product code that is set in the scan list failed. • The device does not support the I/O service specified in the scan list.			S			page 9-45
34BE 0000 hex	Structure Error	The scan list is disabled and an error occurred that prevented making I/O allocations.	• The I/O words allocated to slave overlap. • The I/O words allocated to the slave exceed the valid range. • The I/O size of the slave exceeds 200 bytes for outputs or 200 bytes for inputs.			S			page 9-46
34BF 0000 hex	Master I/O Refresh Error	The I/O memory in the destination CPU Unit for I/O refreshing could not be found when refreshing the master function data in the CPU Unit.	• I/O words are allocated in an EM bank that does not exist.			S			page 9-46
34C0 0000 hex	Master User-set Allocations User Setting Failed	An error occurred in the following operation for user allocation of the master.	• The master function is not enabled. • There is a mistake in the user allocations in the master. • CPU Unit is not in PROGRAM mode. • More than one software switch changed to TRUE at the same time. Or, another software switch changed to TRUE before processing was completed for a previous software switch.			S			page 9-47
34C1 0000 hex	Communications Cycle Time Setting Failed	An error occurred in one of the following operations when setting the communications cycle time.	• There is an error in the set information. • CPU Unit is not in PROGRAM mode.			S			page 9-47

Event code	Event name	Meaning	Assumed cause	Level					Reference
				Maj	Prt	Min	Obs	Info	
34C20000 hex	Slave I/O Refresh Error	The I/O memory in the destination CPU Unit for I/O refreshing could not be found when refreshing the slave function data in the CPU Unit.	• I/O words are allocated in an EM bank that does not exist.			S			page 9-48
34C30000 hex	Slave User Allocation Area Setting Failed	An error occurred in the following operation for user allocation of the slave.	• The slave function is not disabled. • There is a mistake in the user allocations to a slave. • CPU Unit is not in PROGRAM mode. • More than one software switch changed to TRUE at the same time. Or, another software switch changed to TRUE before processing was completed for a previous software switch.			S			page 9-48
64AC0000 hex	Send Timeout Error	A send timeout occurred.	• There is no slave or other device on the network. • The same baud rate is not set for all nodes. • Communications cable lengths (trunk line and branch lines) are unsuitable. • A communications cable is disconnected or loose. • The terminating resistance is somewhere other than the ends of the trunk line. • Noise • There is an error in the CAN controller.			S			page 9-49
74600000 hex	Master Function Enable/Disable Failed	An operating error occurred when enabling or disabling the master function.	• An attempt was made to enable the master function when it was already enabled. • An attempt was made to disable the master function when it was already disabled. • CPU Unit is not in PROGRAM mode. • More than one software switch changed to TRUE at the same time. Or, another software switch changed to TRUE before processing was completed for a previous software switch.			S			page 9-50
74610000 hex	Master Fixed Allocation Area Setting Failed	An error occurred in one of the following operations for fixed allocation of the master.	• The master function is not enabled. • The scan list is not disabled. • CPU Unit is not in PROGRAM mode. • More than one software switch changed to TRUE at the same time. Or, another software switch changed to TRUE before processing was completed for a previous software switch.			S			page 9-51

Event code	Event name	Meaning	Assumed cause	Level					Reference
				Maj	Prt	Min	Obs	Info	

74620000 hex	Scan List Register/Clear Failed	An operating error occurred when registering or clearing the scan list by performing one of the following operations.	• CPU Unit is not in PROGRAM mode.
			• Request processing is not possible in this status or the request was made when the operation was already in progress. The following are the main causes of Unit status errors.
			  • A software switch operation for the master function was executed when the master function was disabled.
			  • A switch that can be used only when the scan list is disabled was used when the scan list was enabled.
			  • A switch that can be used only when the scan list is enables was used when the scan list was disabled.
			  • A software switch operation for the slave function was executed when the slave function was disabled.
			• A configuration error has occurred.
			• There is an error in the parameters specified in the user settings, and the requested setting could not be made.
			• More than one software switch changed to TRUE at the same time. Or, another software switch changed to TRUE before processing was completed for a previous software switch.
						S			page 9-52

74630000 hex	Slave Function Enable/Disable Failed	An error occurred in one of the following operations in the slave function.	• An attempt was made to enable the slave function when it was already enabled. • An attempt was made to disable the slave function when it was already disabled. • CPU Unit is not in PROGRAM mode. • More than one software switch changed to TRUE at the same time. Or, another software switch changed to TRUE before processing was completed for a previous software switch.			S			page 9-53
74640000 hex	Slave Fixed Allocation Area Setting Failed	An error occurred in one of the following operations for fixed allocation of the slave.	• The slave function is not disabled. • CPU Unit is not in PROGRAM mode. • More than one software switch changed to TRUE at the same time. Or, another software switch changed to TRUE before processing was completed for a previous software switch.			S			page 9-54

Event code	Event name	Meaning	Assumed cause	Level					Reference
				Maj	Prt	Min	Obs	Info	
84740000 hex	Bus Off Detected	A Bus Off error occurred (i.e., communications stopped because there were too many communications errors).	• The master and slave have different baud rates. • Communications cable lengths (trunk line and branch lines) are unsuitable. • A communications cable is disconnected or loose. • The terminating resistance is somewhere other than the ends of the trunk line. • Noise			S			page 9-55
84750000 hex	Remote I/O Communications Error	A timeout occurred in remote I/O communications.	• The master and slaves have different baud rates. • Communications cable lengths (trunk line and branch lines) are unsuitable. • A communications cable is disconnected or loose. • The terminating resistance is somewhere other than the ends of the trunk line. • Noise			S	U		page 9-56
84760000 hex	Remote I/O Communications Error (during Slave Operation)	An error occurred in remote I/O communications.	• The master is not in operation. • The master and slaves have different baud rates. • Communications cable lengths (trunk line and branch lines) are unsuitable. • A communications cable is disconnected or loose. • The terminating resistance is somewhere other than the ends of the trunk line. • Noise			S			page 9-57
84770000 hex	Slave COS Send Failed	An attempt was made to send COS data to the master using the Slave COS Send Switch (software switch 2, device variable *_Sw2SlavCOSSendCmd*), but the send failed.	• A COS connection to the master is not open. • A Bus Off state occurred. • A network power error occurred. • A send timeout occurred.			S			page 9-58
048A0000 hex	File Read/Write Error	An error occurred when user setup data was read from an SD Memory Card in the CPU Unit or when data was written as a file to an SD Memory Card.	• The available capacity on the SD Memory Card was insufficient to write a file. • Write-protection is set on the SD Memory Card when you write to a file. • Noise • The SD Memory Card is damaged. • The CPU Unit has failed.			U	S		page 9-58
148C0000 hex	Invalid Message Timer List Error	The data in the message monitoring timer list is not correct.	• The power supply was interrupted while writing the message-monitoring timer list to the non-volatile memory.			U	S		page 9-59

9-4-3 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.

<table>
<tr><td>Event name</td><td colspan="3">Gives the name of the error.</td><td>Event code</td><td colspan="2">Gives the code of the error.</td></tr>
<tr><td>Meaning</td><td colspan="6">Gives a short description of the error.</td></tr>
<tr><td>Source</td><td colspan="2">Gives the source of the error.</td><td>Source details</td><td>Gives details on the source of the error.</td><td>Detection timing</td><td>Tells when the error is detected.</td></tr>
<tr><td>Error attributes</td><td>Level</td><td>Tells the level of influence on control.*1</td><td>Recovery</td><td>Gives the recovery method.*2</td><td>Log category</td><td>Tells which log the error is saved in.*3</td></tr>
<tr><td>Effects</td><td>User program</td><td>Tells what will happen to execution of the user program.*4</td><td>Operation</td><td colspan="3">Provides special information on the operation that results from the error (event).</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="6">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.</td></tr>
<tr><td rowspan="2">Cause and correction</td><td colspan="2">Assumed cause</td><td colspan="2">Correction</td><td colspan="2">Prevention</td></tr>
<tr><td colspan="6">Lists the possible causes, corrections, and preventive measures for the error.</td></tr>
<tr><td>Attached information</td><td colspan="6">This is the attached information that is displayed by the Sysmac Studio or an NS-series PT.</td></tr>
<tr><td>Precautions/ Remarks</td><td colspan="6">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.</td></tr>
</table>

*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	Unit Memory Error			Event code	04880000 hex	
Meaning	An error occurred when writing to internal memory where the error history is saved.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At power ON, Controller reset, or error history save
Error attributes	Level	Minor fault	Recovery	Cycle the power supply.	Log category	System
Effects	User program	Continues.	Operation	Non-volatile memory cannot be written.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	There is a source of noise nearby.		Implement noise countermeasures.		Use the Controller away from sources of noise.	
	Non-volatile memory failure		If the above cause does not apply, replace the Unit.		None	
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	Network Power Error			Event code	04890000 hex	
Meaning	Network power is not being supplied.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	Continuously
Error attributes	Level	Minor fault	Recovery	Cycle the power supply.	Log category	System
Effects	User program	Continues.	Operation	The DeviceNet Unit will stop remote I/O communications and return errors for message send requests whenever there is a network power supply error. When the network power supply returns to normal status, the error display will stop, the scan will be started, and message processing will return to normal. The scan will not start again after recovery to normal operation, however, if remote I/O communications are set to stop when a communications error occurs.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	Communications power is not being supplied normally from the network.		Check the network power supply and network cable connections and correct any errors.		Check to see if the network power supply and network cables are correctly wired.	
Attached information	None					
Precautions/ Remarks	None					

Event name	Invalid Scan List Data			Event code	148D0000 hex	
Meaning	There is an error in the contents of the slave scan list or master scan list stored in non-volatile memory.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At power ON or Controller reset
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	The DeviceNet Unit will stop remote I/O communications for the master or slaves. Data exchange processing with the CPU Unit and message processing will continue. Normal operation will be recovered if writing is performed normally.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The power was interrupted during writing the scan list to the non-volatile memory.		If there is an error in the slave scan list, disable the slave function, reset the allocations, and then enable the slave function. Or, reset the slave scan list with the CX-Integrator. If there is an error in the master scan list, clear the scan list, and then register the scan list again. Or, reset the master scan list with the CX-Integrator.		Do not turn OFF the power supply while the system is writing the settings.	
Attached information	None					
Precautions/ Remarks	None					

Event name	Invalid Setup Data			Event code	148E0000 hex	
Meaning	There is illegal data in the settings for the slave function.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At power ON or Controller reset
Error attributes	Level	Minor fault	Recovery	Automatic recovery, cycle power supply, or reset controller	Log category	System
Effects	User program	Continues.	Operation	The DeviceNet Unit will stop the slave function. Remote I/O communications and message communications will continue.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The power was interrupted while the system was writing the parameters.		Write the parameters again.		Do not turn OFF the power supply while the system is writing the parameters.	
	Non-volatile memory life		Replace the Unit.		None	
Attached information	None					
Precautions/ Remarks	None					

Event name	Node Address Duplicated Error		Event code	24480000 hex		
Meaning	An error was discovered during the node address duplication check when starting the DeviceNet Unit.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	When trying to establish a link
Error attributes	Level	Minor fault	Recovery	Cycle the power supply.	Log category	System
Effects	User program	Continues.	Operation	The DeviceNet Unit is offline. Communications will not operate. Error responses are returned to all communications requests. Data refreshing with the CPU Unit will continue. Communications are not performed if two DeviceNet Units have the same node address.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The node address of the DeviceNet Unit is also set for another node.		Correct the node address of the DeviceNet Unit so that it is not set for any other node.		Set node addresses so that each one is used only once.	
Attached information	None					
Precautions/ Remarks	None					

Event name	Routing Table Error		Event code	34BC0000 hex		
Meaning	There is illegal data in the routing tables set in the CPU Unit.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At power ON or Controller reset
Error attributes	Level	Minor fault	Recovery	Cycle the power supply or reset the Controller.	Log category	System
Effects	User program	Continues.	Operation	Processing will continue without using routing tables.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The local DeviceNet Unit is not in the routing tables.		Correct the routing tables so that the local DeviceNet Unit is included in them.		Make sure that the local DeviceNet Unit is in the routing tables.	
	The routing table format is incorrect.		Correct the routing tables so that the proper format is used.		Make sure that the routing tables are set correctly.	
	Reading the routing tables timed out.		Check the status of the CPU Unit, and then perform the required corrective actions.		None	
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 “Cycle power supply or reset Controller.”					

<table>
<tr><td>Event name</td><td colspan="3">Verification Error</td><td>Event code</td><td colspan="2">34BD0000 hex</td></tr>
<tr><td>Meaning</td><td colspan="6">The slave information registered in the scan list does not agree with the actual slave information.</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>When trying to establish an ID connection</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">The DeviceNet Unit periodically performs reconnection processing for slaves.</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="11">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">A slave that is in the scan list does not exist.
• The master and slaves have different communications settings.
• Communications cable lengths (trunk line and branch lines) are unsuitable.
• A communications cable is disconnected or loose.
• The terminating resistance is somewhere other than the ends of the trunk line.
• Noise</td><td colspan="2">• Correct the settings so that the master and slaves use the same baud rate.
• Adjust the communications cables of the trunk and branch lines to suitable lengths.
• Connect the communications cable securely. If the communications cable is broken, replace it.
• Connect terminating resistance only to the ends of the trunk line.
• Implement noise countermeasures.</td><td colspan="2">• Set the master and slaves to the same baud rate.
• Install suitable lengths of communications cables for the trunk and branch lines.
• Connect the communications cable securely. Check to see if the communications cable is broken.
• Connect terminating resistance only to the ends of the trunk line.
• Implement noise countermeasures.</td></tr>
<tr><td colspan="2">The node address of the local Unit, which is the master, is registered in the scan list.</td><td colspan="2">Do not register the node address of the local Unit in the scan list.</td><td colspan="2">Do not register the node address of the local Unit in the scan list.</td></tr>
<tr><td colspan="2">If the system is set to check the vendor in the detailed verification settings, the vendor of the slave does not match the registration in the scan list.</td><td colspan="2" rowspan="6">Correct the scan list if the slave is correct. If the slave is incorrect, replace it with the correct slave.</td><td colspan="2" rowspan="6">Make sure that the information in the scan list matches the information of the slaves that are actually connected.</td></tr>
<tr><td colspan="2">If the connection path is set in the detailed verification settings, then setting the connection path that is set in the scan list failed.</td></tr>
<tr><td colspan="2">The size of the slave I/O data does not match the registration in the scan list.</td></tr>
<tr><td colspan="2">If the device type is set in the detailed verification settings, then setting the device type that is set in the scan list failed.</td></tr>
<tr><td colspan="2">If the product code is set in the detailed verification settings, then setting the product code that is set in the scan list failed.</td></tr>
<tr><td colspan="2">The device does not support the I/O service specified in the scan list.</td></tr>
<tr><td>Attached information</td><td colspan="6">None</td></tr>
<tr><td>Precautions/ Remarks</td><td colspan="6">None</td></tr>
</table>

Event name	Structure Error		Event code	34BE0000 hex		
Meaning	The scan list is disabled and an error occurred that prevented making I/O allocations.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	When trying to establish an ID connection
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	The Unit will continue processing the connection again with the slave that has the error, and remote I/O will also continue.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The I/O words allocated to slave overlap.		Correct the node addresses of the slaves so that I/O area words do not overlap.		Set the node addresses of the slaves so that I/O area words do not overlap.	
	The I/O words allocated to the slave exceed the valid range.		Correct the node addresses of the slaves so that the I/O area words do not exceed the valid range.		Set the node addresses of the slaves so that the I/O area words do not exceed the valid range. Or, use the slaves with user allocations.	
	The I/O size of the slave exceeds 200 bytes for outputs or 200 bytes for inputs.		Use a slave with 200 output bytes or less and 200 input bytes or less.		Use a slave with 200 output bytes or less and 200 input bytes or less.	
Attached information	None					
Precautions/ Remarks	None					

Event name	Master I/O Refresh Error		Event code	34BF0000 hex		
Meaning	The I/O memory in the destination CPU Unit for I/O refreshing could not be found when refreshing the master function data in the CPU Unit.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At power ON or Controller reset
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Remote I/O communications stop.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	I/O words are allocated in an EM bank that does not exist.		Correct the I/O allocations so that only I/O words that exist in the I/O memory of a CPU Unit are allocated.		Allocate only I/O words that exist in the I/O memory of a CPU Unit.	
Attached information	None					
Precautions/ Remarks	None					

Event name	Master User-set Allocations User Setting Failed		Event code	34C00000 hex		
Meaning	An error occurred in the following operation for user allocation of the master. • Master User Allocation Setting Switch (device variable *_Sw1MstrAlocCmd*)					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At user operation
Error attributes	Level	Minor fault	Recovery	Error reset	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	
	The master function is not enabled.		Enable the master function.		Enable the master function.	
	There is a mistake in the user allocations in the master.		Correct the master user allocation settings.		Correct the master user allocation settings.	
	CPU Unit is not in PROGRAM mode.		Change the CPU Unit to PROGRAM mode.		Change the CPU Unit to PROGRAM mode when setting user allocations in the master.	
	More than one software switch changed to TRUE at the same time. Or, another software switch changed to TRUE before processing was completed for a previous software switch.		Execute the software switch operations one at a time.		Execute the software switch operations one at a time.	
Attached information	None					
Precautions/ Remarks	None					

Event name	Communications Cycle Time Setting Failed		Event code	34C10000 hex		
Meaning	An error occurred in one of the following operations when setting the communications cycle time. • Communications Cycle Time Temporary Setting Switch (device variable *_Sw1CycleTmTmpSet*) • Communications Cycle Time Setting Switch (device variable *_Sw1CycleTmSetCmd*)					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At user operation
Error attributes	Level	Minor fault	Recovery	Error reset	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	
	There is an error in the set information.		Correct the set information.		Correct the set information.	
	CPU Unit is not in PROGRAM mode.		Change the CPU Unit to PROGRAM mode.		Change the CPU Unit to PROGRAM mode before setting the communications cycle time.	
Attached information	None					
Precautions/ Remarks	None					

Event name	Slave I/O Refresh Error			Event code	34C20000 hex	
Meaning	The I/O memory in the destination CPU Unit for I/O refreshing could not be found when refreshing the slave function data in the CPU Unit.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At power ON or Controller reset
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Remote I/O for the slave function		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	I/O words are allocated in an EM bank that does not exist.		Correct the I/O allocations so that only I/O words that exist in the I/O memory of a CPU Unit are allocated.		Allocate only I/O words that exist in the I/O memory of a CPU Unit.	
Attached information	None					
Precautions/ Remarks	None					

Event name	Slave User Allocation Area Setting Failed			Event code	34C30000 hex	
Meaning	An error occurred in the following operation for user allocation of the slave. • Slave user allocation setting switch (device variable *_*Sw2SlavAlocCmd*)					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At user operation
Error attributes	Level	Minor fault	Recovery	Error reset	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	
	The slave function is not disabled.		Disable the slave function.		Disable the slave function to set slave user allocations.	
	There is a mistake in the user allocations to a slave.		Use the correct settings.		Check the settings.	
	CPU Unit is not in PROGRAM mode.		Change the CPU Unit to PROGRAM mode.		Change the CPU Unit to PROGRAM mode before setting user allocations for the slaves.	
	More than one software switch changed to TRUE at the same time. Or, another software switch changed to TRUE before processing was completed for a previous software switch.		Execute the software switch operations one at a time.		Execute the software switch operations one at a time.	
Attached information	None					
Precautions/ Remarks	None					

Event name	Send Timeout Error			Event code	64AC0000 hex	
Meaning	A send timeout occurred.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	When trying to establish a link or during DeviceNet communications
Error attributes	Level	Minor fault	Recovery	Automatic recovery	Log category	System
Effects	User program	Continues.	Operation	The DeviceNet Unit will stop remote I/O communications and return errors for message send requests wherever there is a transmission timeout. When the system returns to normal status from the transmission timeout, the error display will stop, remote I/O communications will start, and message processing will return to normal. Remote I/O communications will not start again after recovery to normal operation, however, if remote I/O communications are set to stop when a communications error occurs.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	There is no slave or other device on the network.		Add at least one device to the network.		Connect at least one device to the network.	
	The same baud rate is not set for all nodes.		Correct the settings so that all nodes use the same baud rate.		Set all nodes to the same baud rate.	
	Communications cable lengths (trunk line and branch lines) are unsuitable.		Adjust the communications cables to suitable lengths.		Make sure that the communications cable lengths are suitable.	
	A communications cable is disconnected or loose.		Connect the communications cable securely. If the communications cable is broken, replace it.		Connect the communications cable securely. Check the communications cable to see if it is operating properly.	
	The terminating resistance is somewhere other than the ends 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		Implement noise countermeasures.		Implement noise countermeasures.	
	There is an error in the CAN controller.		Replace the DeviceNet Unit.		None	
Attached information	None					
Precautions/ Remarks	None					

<table>
<tr><td>Event name</td><td colspan="3">Master Function Enable/Disable Failed</td><td>Event code</td><td colspan="2">74600000 hex</td></tr>
<tr><td>Meaning</td><td colspan="6">An operating error occurred when enabling or disabling the master function.
• Master Function Enable Switch (device variable *_Sw1MstrEnblCmd)
• Master Function Disable Switch (device variable *_Sw1MstrDsblCmd)</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>At user operation</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">Not affected.</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="5">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">An attempt was made to enable the master function when it was already enabled.</td><td colspan="2">Disable the master function before you enable it.</td><td colspan="2">Disable the master function before you enable it.</td></tr>
<tr><td colspan="2">An attempt was made to disable the master function when it was already disabled.</td><td colspan="2">Enable the master function before you disable it.</td><td colspan="2">Enable the master function before you disable it.</td></tr>
<tr><td colspan="2">CPU Unit is not in PROGRAM mode.</td><td colspan="2">Change the CPU Unit to PROGRAM mode.</td><td colspan="2">Change the CPU Unit to PROGRAM before you enable or disable the master function.</td></tr>
<tr><td colspan="2">More than one software switch changed to TRUE at the same time. Or, another software switch changed to TRUE before processing was completed for a previous software switch.</td><td colspan="2">Execute the software switch operations one at a time.</td><td colspan="2">Execute the software switch operations one at a time.</td></tr>
<tr><td>Attached information</td><td colspan="6">None</td></tr>
<tr><td>Precautions/ Remarks</td><td colspan="6">None</td></tr>
</table>

<table>
<tr><td>Event name</td><td colspan="3">Master Fixed Allocation Area Setting Failed</td><td>Event code</td><td colspan="2">74610000 hex</td></tr>
<tr><td>Meaning</td><td colspan="6">An error occurred in one of the following operations for fixed allocation of the master.
• Fixed Allocation Area Setting 1 Switch (device variable *_Sw1MstrFixAloc1Cmd)
• Fixed Allocation Area Setting 2 Switch (device variable *_Sw1MstrFixAloc2Cmd)
• Fixed Allocation Area Setting 3 Switch (device variable *_Sw1MstrFixAloc3Cmd)</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>At user operation</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">Not affected.</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="5">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">The master function is not enabled.</td><td colspan="2">Enable the master function.</td><td colspan="2">Enable the master function.</td></tr>
<tr><td colspan="2">The scan list is not disabled.</td><td colspan="2">Disable the scan list.</td><td colspan="2">Disable the scan list.</td></tr>
<tr><td colspan="2">CPU Unit is not in PROGRAM mode.</td><td colspan="2">Change the CPU Unit to PROGRAM mode.</td><td colspan="2">Change the CPU Unit to PROGRAM mode.</td></tr>
<tr><td colspan="2">More than one software switch changed to TRUE at the same time. Or, another software switch changed to TRUE before processing was completed for a previous software switch.</td><td colspan="2">Execute the software switch operations one at a time.</td><td colspan="2">Execute the software switch operations one at a time.</td></tr>
<tr><td>Attached information</td><td colspan="6">None</td></tr>
<tr><td>Precautions/ Remarks</td><td colspan="6">None</td></tr>
</table>

<table>
<tr><td>Event name</td><td colspan="2">Scan List Register/Clear Failed</td><td>Event code</td><td colspan="2">74620000 hex</td></tr>
<tr><td>Meaning</td><td colspan="5">An operating error occurred when registering or clearing the scan list by performing one of the following operations.
• Scan List Enable Switch (device variable *_Sw1SListEnblCmd)
• Scan List Clear Switch (device variable *_Sw1SListClrCmd)</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>At user operation</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">Not affected.</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="8">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">CPU Unit is not in PROGRAM mode.</td><td colspan="2">Change the CPU Unit to PROGRAM mode before executing a software switch operation.</td><td colspan="2">Change the CPU Unit to PROGRAM mode before executing a software switch operation.</td></tr>
<tr><td colspan="2">Request processing is not possible in this status or the request was made when the operation was already in progress. The following are the main causes of Unit status errors.
• A software switch operation for the master function was executed when the master function was disabled.
• A switch that can be used only when the scan list is disabled was used when the scan list was enabled.
• A switch that can be used only when the scan list is enables was used when the scan list was disabled.
• A software switch operation for the slave function was executed when the slave function was disabled.</td><td colspan="2">Change to a status that supports software switch operations.</td><td colspan="2">Use the software switches only when the current status permits them.</td></tr>
<tr><td colspan="2">A configuration error has occurred.</td><td colspan="2">Remove the cause of the configuration error, check that the error does not occur, and then register the scan list again.</td><td colspan="2">Make sure that the configuration is correct.</td></tr>
<tr><td colspan="2">There is an error in the parameters specified in the user settings, and the requested setting could not be made.</td><td colspan="2">Correct the parameter settings in the user settings and execute the software switch operation again.</td><td colspan="2">Set the correct parameter settings in the user settings and execute the software switch operation again.</td></tr>
<tr><td colspan="2">More than one software switch changed to TRUE at the same time. Or, another software switch changed to TRUE before processing was completed for a previous software switch.</td><td colspan="2">Execute the software switch operations one at a time.</td><td colspan="2">Execute the software switch operations one at a time.</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td colspan="6"></td></tr>
<tr><td>Attached information</td><td colspan="5">None</td></tr>
<tr><td>Precautions/ Remarks</td><td colspan="5">None</td></tr>
</table>

Event name	Slave Function Enable/Disable Failed			Event code	74630000 hex	
Meaning	An error occurred in one of the following operations in the slave function. • Slave Function Enable Switch (device variable *_*Sw2SlavEnblCmd*) • Slave Function Disable Switch (device variable *_*Sw2SlavDsblCmd*)					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At user operation
Error attributes	Level	Minor fault	Recovery	Error reset	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 attempt was made to enable the slave function when it was already enabled.		Disable the slave function before you enable it.		Disable the slave function before you enable it.	
	An attempt was made to disable the slave function when it was already disabled.		Enable the slave function before you disable it.		Enable the slave function before you disable it.	
	CPU Unit is not in PROGRAM mode.		Change the CPU Unit to PROGRAM mode.		Change the CPU Unit to PROGRAM mode.	
	More than one software switch changed to TRUE at the same time. Or, another software switch changed to TRUE before processing was completed for a previous software switch.		Execute the software switch operations one at a time.		Execute the software switch operations one at a time.	
Attached information	None					
Precautions/ Remarks	None					

Event name	Slave Fixed Allocation Area Setting Failed			Event code	74640000 hex	
Meaning	An error occurred in one of the following operations for fixed allocation of the slave. • Slave Fixed Allocation Area Setting 1 Switch (device variable *_*Sw2SlavFixAloc1Cmd*) • Slave Fixed Allocation Area Setting 2 Switch (device variable *_*Sw2SlavFixAloc2Cmd*) • Slave Fixed Allocation Area Setting 3 Switch (device variable *_*Sw2SlavFixAloc3Cmd*)					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At user operation
Error attributes	Level	Minor fault	Recovery	Error reset	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	
	The slave function is not disabled.		Disable the slave function.		Disable the slave function.	
	CPU Unit is not in PROGRAM mode.		Change the CPU Unit to PROGRAM mode.		Change the CPU Unit to PROGRAM mode.	
	More than one software switch changed to TRUE at the same time. Or, another software switch changed to TRUE before processing was completed for a previous software switch.		Execute the software switch operations one at a time.		Execute the software switch operations one at a time.	
Attached information	None					
Precautions/ Remarks	None					

Event name	Bus Off Detected			Event code	84740000 hex	
Meaning	A Bus Off error occurred (i.e., communications stopped because there were too many communications errors).					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	When the I/O connection is established or DeviceNet communications are performed
Error attributes	Level	Minor fault	Recovery	Cycle the power supply or reset the Controller.	Log category	System
Effects	User program	Continues.	Operation	The DeviceNet Unit is offline. Communications will not operate. Error responses are returned to all communications requests. Data refreshing with the CPU Unit continues.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The master and slave have different baud rates.		Correct the settings so that the master and slaves use the same baud rate.		Set the master and slaves to the same baud rate.	
	Communications cable lengths (trunk line and branch lines) are unsuitable.		Refer to the communications specifications and adjust all of the communications cables to suitable lengths.		Refer to the communications specifications and adjust all of the communications cables to suitable lengths.	
	A communications cable is disconnected or loose.		Connect the communications cable securely. If the communications cable is broken, replace it.		Connect the communications cable securely. Check the communications cable to see if it is operating properly.	
	The terminating resistance is somewhere other than the ends 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		Implement noise countermeasures.		Implement noise countermeasures.	
Attached information	None					
Precautions/ Remarks	None					

Event name	Remote I/O Communications Error			Event code	84750000 hex	
Meaning	A timeout occurred in remote I/O communications.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	During DeviceNet communications
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	The DeviceNet Unit periodically performs reconnection processing for slaves that have a remote I/O communications error. Remote I/O communications will stop, however, when a communications error occurs and remote I/O communications are set to stop.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The master and slaves have different baud rates.		Correct the settings so that the master and slaves use the same baud rate.		Set the master and slaves to the same baud rate.	
	Communications 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 communications cable is disconnected or loose.		Connect the communications cable securely. If the communications cable is broken, replace it.		Connect the communications cable securely. Check to see if the communications cable is operating properly.	
	The terminating resistance is somewhere other than the ends 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		Implement noise countermeasures.		Implement noise countermeasures.	
Attached information	None					
Precautions/ Remarks	You can change the event level to the observation level. If you change the level to the observation level, recovery procedures are not required.					

Event name	Remote I/O Communications Error (during Slave Operation)			Event code	84760000 hex	
Meaning	An error occurred in remote I/O communications.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	During DeviceNet communications
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Outputs will be retained or cleared according to the settings if there are output words.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The master is not in operation.		Check to see if the master is operating normally. If it is not, investigate the cause, and then perform corrective actions.		Check to make sure the master is operating normally.	
	The master and slaves have different baud rates.		Correct the settings so that the master and slaves use the same baud rate.		Set the master and slaves to the same baud rate.	
	Communications cable lengths (trunk line and branch lines) are unsuitable.		Refer to the communications specifications and adjust all of the communications cables to suitable lengths.		Refer to the communications specifications and adjust all of the cables to suitable lengths.	
	A communications cable is disconnected or loose.		Connect the communications cable securely. If the communications cable is broken, replace it.		Connect the communications cable securely. Check to see if the communications cable is operating properly.	
	The terminating resistance is somewhere other than the ends 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		Implement noise countermeasures.		Implement noise countermeasures.	
Attached information	None					
Precautions/ Remarks	None					

Event name	Slave COS Send Failed			Event code	84770000 hex	
Meaning	An attempt was made to send COS data to the master using the Slave COS Send Switch (software switch 2, device variable **_Sw2SlavCOSSendCmd*), but the send failed.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	During DeviceNet communications
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	COS transmissions are not possible.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	A COS connection to the master is not open.		Open a COS connection to the master.		When you perform COS communications, open a COS connection between the master and slave.	
	A Bus Off state occurred.		Remove the cause of the Bus Off error.		Take measures to prevent the errors from occurring again.	
	A network power error occurred.		Remove the cause of the power supply error.			
	A send timeout occurred.		Remove the cause of the send timeout.			
Attached information	None					
Precautions/ Remarks	None					

Event name	File Read/Write Error			Event code	048A0000 hex	
Meaning	An error occurred when user setup data was read from an SD Memory Card in the CPU Unit or when data was written as a file to an SD Memory Card.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	When SD Memory Card backup is executed
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	
	The available capacity on the SD Memory Card was insufficient to write a file.		Replace the SD Memory Card for one with sufficient available capacity. Or, delete unnecessary files from the SD Memory Card.		Use an SD Memory Card with sufficient available capacity when you save files to it.	
	Write-protection is set on the SD Memory Card when you write to a file.		Remove write-protection from the SD Memory Card.		Disable write-protection on the SD Memory Card before you save the file to the SD Memory Card.	
	Noise		Implement noise countermeasures.		Implement noise countermeasures.	
	The SD Memory Card is damaged.		Replace the SD Memory Card.		None	
	The CPU Unit has failed.		Replace the CPU Unit.		None	
Attached information	None					
Precautions/ Remarks	You can change the event level to the minor fault level. If you change the level to the minor fault level, the *Recovery* column above will be changed to “Error reset.”					

Event name	Invalid Message Timer List Error			Event code	148C 0000 hex	
Meaning	The data in the message monitoring timer list is not correct.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At power ON or Controller reset
Error attributes	Level	Observation	Recovery	---	Log category	System
Effects	User program	Continues.	Operation	The message monitoring timer will operate with the default value.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The power supply was interrupted while writing the message-monitoring timer list to the non-volatile memory.		Register the message-monitoring timer list again.		Do not turn OFF the power supply while the system is writing the settings.	
Attached information	None					
Precautions/ Remarks	You can change the event level to the minor fault level. If you change the level to the minor fault level, the *Recovery* column above will be changed to “Error reset.”					

9-5 Maintenance and Replacement

This section describes the routine cleaning and inspection recommended as regular maintenance as well as the Unit replacement procedure.

9-5-1 Cleaning

Clean the DeviceNet Units regularly as described below in order to keep the network in its optimal operating condition.

- Wipe the Unit daily with a dry, soft cloth.
- When a spot can't be removed with a dry cloth, dampen the cloth with a neutral cleanser (2% solution), wring out the cloth, and wipe the Unit.
- A smudge may remain on the Unit from gum, vinyl, or tape that was left on for a long time. Remove the smudge when cleaning.

Precautions for Correct Use

Never use volatile solvents such as paint thinner, benzene, or chemical wipes. These substances could damage the surface of the Unit.

9-5-2 Inspection

Be sure to inspect the system periodically to keep it in its optimal operating condition. In general, inspect the system once every 6 to 12 months, but inspect more frequently if the system is used with high temperature or humidity or under dirty/dusty conditions.

Inspection Equipment

Prepare the following equipment before inspecting the system.

● Required Equipment

Have a standard and Phillips-head screwdriver, multimeter, alcohol, and a clean cloth.

● Equipment Required Occasionally

Depending on the system conditions, a synchroscope, oscilloscope, thermometer, or hygrometer (to measure humidity) might be needed.

Inspection Procedure

Check the items in the following table and correct any items that are below standard.

Item		Standard	Equipment
Environmental conditions	Ambient and cabinet temperature	0°C to 55°C	Thermometer
	Ambient and cabinet humidity	10% to 90% (with no condensation or icing)	Hygrometer
	Dust/dirt accumulation	None	Check visually

Item		Standard	Equipment
Installation	Are the Units installed securely?	No looseness	Phillips head screwdriver
	Are the communications connectors fully inserted?	No looseness	Phillips head screwdriver
	Are the external wiring screws tight?	No looseness	Phillips head screwdriver
	Are the connecting cables undamaged?	No damage	Check visually

9-5-3 Replacing Faulty Units

Replace a DeviceNet Unit with an error as soon as possible. Refer to the *DRT2 Series DeviceNet Slaves Operation Manual* (Cat. No. W404) or the *DeviceNet MULTIPLE I/O TERMINAL Operation Manual* (Cat. No. W348) for details on replacing slaves. We recommend having spare Units available to restore network operation as quickly as possible.

Precautions

Observe the following precautions when replacing a faulty Unit.

- After replacement make sure that there are no errors with the new Unit.
- When a Unit is being returned for repair, attach a sheet of paper detailing the problem and return the Unit to your OMRON dealer.
- If there is a faulty contact, try wiping the contact with a clean, lint-free cloth dampened with alcohol.

Precautions for Safe Use

To prevent electric shock when replacing a Unit, be sure to stop communications in the network and turn OFF the power supplies to all of the nodes (master and slaves) before removing the faulty Unit.

Settings after Replacing DeviceNet Units

When the master communication is used, the scan list (project file) must be registered again.

All of the settings data stored in the DeviceNet Unit can be saved to the CPU Unit's SD Memory Card*1 and later read from the SD Memory Card*2. It will be much easier to replace the Unit if you save all of the settings data when the Unit is operating normally.

*1 Change *_*Sw2FileBkupCmd* (Unit Setup File Backup Switch) to TRUE.

*2 Change *_*Sw2FileRestoreCmd* (Unit Setup File Restore Switch) to TRUE.

The backup file is saved to the CPU Unit's SD Memory Card with the filename DNnnBKUP.dvf. (The number "nn" is the unit number in 2-digit hexadecimal.)

● Fixed Remote I/O Allocations

Turn ON power to all slaves and then select one of the fixed allocations areas (1, 2, or 3) and change *_*Sw1SListEnblCmd* (Scan List Enable Switch) of software switch 1 to TRUE. The scan list will be registered.

For details on allocation procedures, refer to *4-3-2 Allocation Procedures*.

● User-set Remote I/O Allocations

Use one of the following procedures.

Using the Settings Data Stored in the NJ-series CPU Unit's SD Memory Card

Use the following procedure to write all of the settings data from the SD Memory Card to the DeviceNet Unit.

1. Turn ON the Controller power supply.
2. Switch the CPU Unit to PROGRAM mode.
3. Change *_*Sw2FileRestoreCmd* (Unit Setup File Restore Switch) of software switch 2 to TRUE.

Using a Stored Project File

Write the settings to the Master Unit from a project file saved on a disk.

1. Turn ON the power to the DeviceNet Unit.
2. Place the CX-Integrator online and read the project file that was previously saved.
3. Use the Device Parameters Edit operation to specify the Master Unit that has been replaced, and to write the settings from the project file to the device.

Writing a Network Configuration

Read out the network configuration from the actual configuration and write this to the Master Unit again.

1. Turn ON the power to the Master Unit and slaves.
2. Place the CX-Integrator online and read the Network Configuration.
3. Specify the Master, and use the Device Parameters Edit operation to register slaves and to allocate I/O.
4. Write the settings to the devices.

Precautions for Correct Use

- When user-set remote I/O allocations are used, always save the project file to restore operation quickly if the Master Unit needs to be replaced.
- When the CPU Unit is replaced, be sure that all data in the DM Area, HR Area, and other memory areas is transferred to the new CPU Unit before starting operation.

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A-1 Differences in Available Functions Depending on the CPU Unit (NJ or CJ Series)

Some of the specifications when a DeviceNet Unit is connected to a CJ-series CPU Unit are different from the specifications when the DeviceNet 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 DeviceNet Unit is connected to a CJ-series CPU Unit and when the DeviceNet Unit is connected to an NJ-series CPU Unit.

Unsupported Functions

The following function cannot be used when the DeviceNet Unit is connected to an NJ-series CPU Unit.

- DeviceNet Configurator connection (Use the CX-Integrator instead.)

Functions with Different Names

The names of the following functions are different between when a DeviceNet Unit is connected to a CJ-series CPU Unit and when the DeviceNet Unit is connected to an NJ-series CPU Unit. The corresponding names are listed in the following table.

Item	DeviceNet Unit connected to a CJ-series CPU Unit	DeviceNet 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 *

* 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 from User Program

When this Unit is operated with an NJ-series device, a user program accesses various functions provided by the DeviceNet Unit through device variables for CJ-series Unit that specifies AT specification for the memory used for CJ-series Unit.

The device variables for CJ-series Unit in the NJ-series CPU Unit's memory for CJ series Unit that correspond to the addresses and bit positions in the CJ-series CPU Unit's I/O memory are listed below.

First word in Special I/O Unit CIO Area: n = CIO 1,500 + Unit number × 25 (Unit number: 0 to 15)

First word in Special I/O Unit DM Area: m = D30,000 + Unit number × 100 (Unit number: 0 to 15)

CPU Bus Unit Words Allocated in CIO Area

- **CIO n (Software Switch 1)**

  The device variable for CJ-series Unit that corresponds to all bits of a word starting with CIO n is as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**Description**
CIO n	0 to 15	*_Sw1Cmd	Software Switches 1 (The functions of bits 0 to 15 of CIO n correspond to those of bits 0 to 15 of this CJ-series Unit device variable.)

The device variables for CJ-series Units that correspond to bits 0 to 15 of a word starting with CIO n are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**Description**
CIO n	0	*_Sw1SListEnblCmd	Scan List Enable Switch
	1	*_Sw1SListClrCmd	Scan List Clear Switch
	2	*_Sw1IOCommStartCmd	Remote I/O Communications Start Switch
	3	Undefined	Undefined
	4	*_Sw1IOCommStopCmd	Remote I/O Communications Stop Switch
	5	---	Reserved by system
	6	*_Sw1MstrEnblCmd	Master Enable Switch
	7	*_Sw1MstrDsblCmd	Master Disable Switch
	8	*_Sw1MstrFixAloc1Cmd	Master Fixed Allocation Setting 1 Switch
	9	*_Sw1MstrFixAloc2Cmd	Master Fixed Allocation Setting 2 Switch
	10	*_Sw1MstrFixAloc3Cmd	Master Fixed Allocation Setting 3 Switch
	11	*_Sw1MstrAlocCmd	Master User-set Allocations Switch
	12	*_Sw1CycleTmTmpSet	Temporary Setting Switch for Communications Cycle Time
	13	*_Sw1CycleTmSetCmd	Communications Cycle Time Setting Switch
	14	*_Sw1CycleTmClrCmd	Communications Cycle Time Reference Table Clear Switch
	15	---	Reserved by system

● CIO n+1 (Software Switch 2)

The device variable for CJ-series Unit that corresponds to all bits of a word starting with CIO n+1 is as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+1	0 to 15	*_Sw2Cmd	Software Switches 2 (The functions of bits 1 to 0 of CIO n+1 correspond to those of bits 0 to 15 of this CJ-series Unit device variable.)

The device variables for CJ-series Units that correspond to bits 0 to 15 of a word starting with CIO n+1 are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+1	0 to 5	---	Reserved by system
	6	*_Sw2SlavEnblCmd	Slave Enable Switch
	7	*_Sw2SlavDsblCmd	Slave Stop Switch
	8	*_Sw2SlavFixAloc1Cmd	Slave Fixed Allocation Setting 1 Switch
	9	*_Sw2SlavFixAloc2Cmd	Slave Fixed Allocation Setting 2 Switch
	10	*_Sw2SlavFixAloc3Cmd	Slave Fixed Allocation Setting 3 Switch
	11	*_Sw2SlavAlocCmd	Slave User Allocations Switch
	12	*_Sw2SlavCOSSendCmd	Slave COS Send Switch
	13	---	Reserved by system
	14	*_Sw2FileRestoreCmd	Unit Setup File Restore Switch
	15	*_Sw2FileBkupCmd	Unit Setup File Backup Switch

● CIO n+2 to n+5 (Master COS Send Switch)

The device variable for CJ-series Unit that corresponds to all bits of 4 words from CIO n+2 to n+5 is as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+2 to n+5	0 to 15 for each word	*_MstrCOSSendCmd	Master COS Send Switch Bits 0 to 15 in each word correspond to the bits of this CJ-series Unit device variable as follows: • Bits 0 to 15 of CIO n+2 correspond to bits 0 to 15 of this CJ-series Unit device variable. • Bits 0 to 15 of CIO n+3 correspond to bits 16 to 31 of this CJ-series Unit device variable. • Bits 0 to 15 of CIO n+4 correspond to bits 32 to 47 of this CJ-series Unit device variable. • Bits 0 to 15 of CIO n+5 correspond to bits 48 to 63 of this CJ-series Unit device variable.

The device variables for CJ-series Units that correspond to bits 0 to 15 of 4 words from CIO n+2 to n+5 are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+2	0	*_MstrCOSSendNdCmd[0]	Master COS Send Switch for Node Address 0 Slave
	1	*_MstrCOSSendNdCmd[1]	Master COS Send Switch for Node Address 1 Slave
	2	*_MstrCOSSendNdCmd[2]	Master COS Send Switch for Node Address 2 Slave
	3	*_MstrCOSSendNdCmd[3]	Master COS Send Switch for Node Address 3 Slave
	4	*_MstrCOSSendNdCmd[4]	Master COS Send Switch for Node Address 4 Slave
	5	*_MstrCOSSendNdCmd[5]	Master COS Send Switch for Node Address 5 Slave
	6	*_MstrCOSSendNdCmd[6]	Master COS Send Switch for Node Address 6 Slave
	7	*_MstrCOSSendNdCmd[7]	Master COS Send Switch for Node Address 7 Slave
	8	*_MstrCOSSendNdCmd[8]	Master COS Send Switch for Node Address 8 Slave
	9	*_MstrCOSSendNdCmd[9]	Master COS Send Switch for Node Address 9 Slave
	10	*_MstrCOSSendNdCmd[10]	Master COS Send Switch for Node Address 10 Slave
	11	*_MstrCOSSendNdCmd[11]	Master COS Send Switch for Node Address 11 Slave
	12	*_MstrCOSSendNdCmd[12]	Master COS Send Switch for Node Address 12 Slave
	13	*_MstrCOSSendNdCmd[13]	Master COS Send Switch for Node Address 13 Slave
	14	*_MstrCOSSendNdCmd[14]	Master COS Send Switch for Node Address 14 Slave
	15	*_MstrCOSSendNdCmd[15]	Master COS Send Switch for Node Address 15 Slave

The device variables for CJ-series Units that correspond to bits 0 to 15 of 4 words from CIO n+2 to n+5 are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+3	0	*_MstrCOSSendNdCmd[16]	Master COS Send Switch for Node Address 16 Slave
	1	*_MstrCOSSendNdCmd[17]	Master COS Send Switch for Node Address 17 Slave
	2	*_MstrCOSSendNdCmd[18]	Master COS Send Switch for Node Address 18 Slave
	3	*_MstrCOSSendNdCmd[19]	Master COS Send Switch for Node Address 19 Slave
	4	*_MstrCOSSendNdCmd[20]	Master COS Send Switch for Node Address 20 Slave
	5	*_MstrCOSSendNdCmd[21]	Master COS Send Switch for Node Address 21 Slave
	6	*_MstrCOSSendNdCmd[22]	Master COS Send Switch for Node Address 22 Slave
	7	*_MstrCOSSendNdCmd[23]	Master COS Send Switch for Node Address 23 Slave
	8	*_MstrCOSSendNdCmd[24]	Master COS Send Switch for Node Address 24 Slave
	9	*_MstrCOSSendNdCmd[25]	Master COS Send Switch for Node Address 25 Slave
	10	*_MstrCOSSendNdCmd[26]	Master COS Send Switch for Node Address 26 Slave
	11	*_MstrCOSSendNdCmd[27]	Master COS Send Switch for Node Address 27 Slave
	12	*_MstrCOSSendNdCmd[28]	Master COS Send Switch for Node Address 28 Slave
	13	*_MstrCOSSendNdCmd[29]	Master COS Send Switch for Node Address 29 Slave
	14	*_MstrCOSSendNdCmd[30]	Master COS Send Switch for Node Address 30 Slave
	15	*_MstrCOSSendNdCmd[31]	Master COS Send Switch for Node Address 31 Slave

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+4	0	*_MstrCOSSendNdCmd[32]	Master COS Send Switch for Node Address 32 Slave
	1	*_MstrCOSSendNdCmd[33]	Master COS Send Switch for Node Address 33 Slave
	2	*_MstrCOSSendNdCmd[34]	Master COS Send Switch for Node Address 34 Slave
	3	*_MstrCOSSendNdCmd[35]	Master COS Send Switch for Node Address 35 Slave
	4	*_MstrCOSSendNdCmd[36]	Master COS Send Switch for Node Address 36 Slave
	5	*_MstrCOSSendNdCmd[37]	Master COS Send Switch for Node Address 37 Slave
	6	*_MstrCOSSendNdCmd[38]	Master COS Send Switch for Node Address 38 Slave
	7	*_MstrCOSSendNdCmd[39]	Master COS Send Switch for Node Address 39 Slave
	8	*_MstrCOSSendNdCmd[40]	Master COS Send Switch for Node Address 40 Slave
	9	*_MstrCOSSendNdCmd[41]	Master COS Send Switch for Node Address 41 Slave
	10	*_MstrCOSSendNdCmd[42]	Master COS Send Switch for Node Address 42 Slave
	11	*_MstrCOSSendNdCmd[43]	Master COS Send Switch for Node Address 43 Slave
	12	*_MstrCOSSendNdCmd[44]	Master COS Send Switch for Node Address 44 Slave
	13	*_MstrCOSSendNdCmd[45]	Master COS Send Switch for Node Address 45 Slave
	14	*_MstrCOSSendNdCmd[46]	Master COS Send Switch for Node Address 46 Slave
	15	*_MstrCOSSendNdCmd[47]	Master COS Send Switch for Node Address 47 Slave

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+5	0	*_MstrCOSSendNdCmd[48]	Master COS Send Switch for Node Address 48 Slave
	1	*_MstrCOSSendNdCmd[49]	Master COS Send Switch for Node Address 49 Slave
	2	*_MstrCOSSendNdCmd[50]	Master COS Send Switch for Node Address 50 Slave
	3	*_MstrCOSSendNdCmd[51]	Master COS Send Switch for Node Address 51 Slave
	4	*_MstrCOSSendNdCmd[52]	Master COS Send Switch for Node Address 52 Slave
	5	*_MstrCOSSendNdCmd[53]	Master COS Send Switch for Node Address 53 Slave
	6	*_MstrCOSSendNdCmd[54]	Master COS Send Switch for Node Address 54 Slave
	7	*_MstrCOSSendNdCmd[55]	Master COS Send Switch for Node Address 55 Slave
	8	*_MstrCOSSendNdCmd[56]	Master COS Send Switch for Node Address 56 Slave
	9	*_MstrCOSSendNdCmd[57]	Master COS Send Switch for Node Address 57 Slave
	10	*_MstrCOSSendNdCmd[58]	Master COS Send Switch for Node Address 58 Slave
	11	*_MstrCOSSendNdCmd[59]	Master COS Send Switch for Node Address 59 Slave
	12	*_MstrCOSSendNdCmd[60]	Master COS Send Switch for Node Address 60 Slave
	13	*_MstrCOSSendNdCmd[61]	Master COS Send Switch for Node Address 61 Slave
	14	*_MstrCOSSendNdCmd[62]	Master COS Send Switch for Node Address 62 Slave
	15	*_MstrCOSSendNdCmd[63]	Master COS Send Switch for Node Address 63 Slave

● CIO n+6 to n+9 (Disconnect/Connect Switch)

The device variable for CJ-series Unit that corresponds to all bits of 4 words from CIO n+6 to n+9 is as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+6 to n+9	0 to 15 for each word	*_CnctCmd	Disconnect/Connect Switches Bits 0 to 15 in each word correspond to the bits of this CJ-series Unit device variable as follows: • Bits 0 to 15 of CIO n+6 correspond to bits 0 to 15 of this CJ-series Unit device variable. • Bits 0 to 15 of CIO n+7 correspond to bits 16 to 31 of this CJ-series Unit device variable. • Bits 0 to 15 of CIO n+8 correspond to bits 32 to 47 of this CJ-series Unit device variable. • Bits 0 to 15 of CIO n+9 correspond to bits 48 to 63 of this CJ-series Unit device variable.

The device variables for CJ-series Units that correspond to bits 0 to 15 of 4 words from CIO n+6 to n+9 are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+6	0	*_CnctNdCmd[0]	Disconnect/Connect Switch for Node Address 0 Slave
	1	*_CnctNdCmd[1]	Disconnect/Connect Switch for Node Address 1 Slave
	2	*_CnctNdCmd[2]	Disconnect/Connect Switch for Node Address 2 Slave
	3	*_CnctNdCmd[3]	Disconnect/Connect Switch for Node Address 3 Slave
	4	*_CnctNdCmd[4]	Disconnect/Connect Switch for Node Address 4 Slave
	5	*_CnctNdCmd[5]	Disconnect/Connect Switch for Node Address 5 Slave
	6	*_CnctNdCmd[6]	Disconnect/Connect Switch for Node Address 6 Slave
	7	*_CnctNdCmd[7]	Disconnect/Connect Switch for Node Address 7 Slave
	8	*_CnctNdCmd[8]	Disconnect/Connect Switch for Node Address 8 Slave
	9	*_CnctNdCmd[9]	Disconnect/Connect Switch for Node Address 9 Slave
	10	*_CnctNdCmd[10]	Disconnect/Connect Switch for Node Address 10 Slave
	11	*_CnctNdCmd[11]	Disconnect/Connect Switch for Node Address 11 Slave
	12	*_CnctNdCmd[12]	Disconnect/Connect Switch for Node Address 12 Slave
	13	*_CnctNdCmd[13]	Disconnect/Connect Switch for Node Address 13 Slave
	14	*_CnctNdCmd[14]	Disconnect/Connect Switch for Node Address 14 Slave
	15	*_CnctNdCmd[15]	Disconnect/Connect Switch for Node Address 15 Slave

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+7	0	*_CnctNdCmd[16]	Disconnect/Connect Switch for Node Address 16 Slave
	1	*_CnctNdCmd[17]	Disconnect/Connect Switch for Node Address 17 Slave
	2	*_CnctNdCmd[18]	Disconnect/Connect Switch for Node Address 18 Slave
	3	*_CnctNdCmd[19]	Disconnect/Connect Switch for Node Address 19 Slave
	4	*_CnctNdCmd[20]	Disconnect/Connect Switch for Node Address 20 Slave
	5	*_CnctNdCmd[21]	Disconnect/Connect Switch for Node Address 21 Slave
	6	*_CnctNdCmd[22]	Disconnect/Connect Switch for Node Address 22 Slave
	7	*_CnctNdCmd[23]	Disconnect/Connect Switch for Node Address 23 Slave
	8	*_CnctNdCmd[24]	Disconnect/Connect Switch for Node Address 24 Slave
	9	*_CnctNdCmd[25]	Disconnect/Connect Switch for Node Address 25 Slave
	10	*_CnctNdCmd[26]	Disconnect/Connect Switch for Node Address 26 Slave
	11	*_CnctNdCmd[27]	Disconnect/Connect Switch for Node Address 27 Slave
	12	*_CnctNdCmd[28]	Disconnect/Connect Switch for Node Address 28 Slave
	13	*_CnctNdCmd[29]	Disconnect/Connect Switch for Node Address 29 Slave
	14	*_CnctNdCmd[30]	Disconnect/Connect Switch for Node Address 30 Slave
	15	*_CnctNdCmd[31]	Disconnect/Connect Switch for Node Address 31 Slave

The device variables for CJ-series Units that correspond to bits 0 to 15 of 4 words from CIO n+6 to n+9 are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+8	0	*_CnctNdCmd[32]	Disconnect/Connect Switch for Node Address 32 Slave
	1	*_CnctNdCmd[33]	Disconnect/Connect Switch for Node Address 33 Slave
	2	*_CnctNdCmd[34]	Disconnect/Connect Switch for Node Address 34 Slave
	3	*_CnctNdCmd[35]	Disconnect/Connect Switch for Node Address 35 Slave
	4	*_CnctNdCmd[36]	Disconnect/Connect Switch for Node Address 36 Slave
	5	*_CnctNdCmd[37]	Disconnect/Connect Switch for Node Address 37 Slave
	6	*_CnctNdCmd[38]	Disconnect/Connect Switch for Node Address 38 Slave
	7	*_CnctNdCmd[39]	Disconnect/Connect Switch for Node Address 39 Slave
	8	*_CnctNdCmd[40]	Disconnect/Connect Switch for Node Address 40 Slave
	9	*_CnctNdCmd[41]	Disconnect/Connect Switch for Node Address 41 Slave
	10	*_CnctNdCmd[42]	Disconnect/Connect Switch for Node Address 42 Slave
	11	*_CnctNdCmd[43]	Disconnect/Connect Switch for Node Address 43 Slave
	12	*_CnctNdCmd[44]	Disconnect/Connect Switch for Node Address 44 Slave
	13	*_CnctNdCmd[45]	Disconnect/Connect Switch for Node Address 45 Slave
	14	*_CnctNdCmd[46]	Disconnect/Connect Switch for Node Address 46 Slave
	15	*_CnctNdCmd[47]	Disconnect/Connect Switch for Node Address 47 Slave

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+9	0	*_CnctNdCmd[48]	Disconnect/Connect Switch for Node Address 48 Slave
	1	*_CnctNdCmd[49]	Disconnect/Connect Switch for Node Address 49 Slave
	2	*_CnctNdCmd[50]	Disconnect/Connect Switch for Node Address 50 Slave
	3	*_CnctNdCmd[51]	Disconnect/Connect Switch for Node Address 51 Slave
	4	*_CnctNdCmd[52]	Disconnect/Connect Switch for Node Address 52 Slave
	5	*_CnctNdCmd[53]	Disconnect/Connect Switch for Node Address 53 Slave
	6	*_CnctNdCmd[54]	Disconnect/Connect Switch for Node Address 54 Slave
	7	*_CnctNdCmd[55]	Disconnect/Connect Switch for Node Address 55 Slave
	8	*_CnctNdCmd[56]	Disconnect/Connect Switch for Node Address 56 Slave
	9	*_CnctNdCmd[57]	Disconnect/Connect Switch for Node Address 57 Slave
	10	*_CnctNdCmd[58]	Disconnect/Connect Switch for Node Address 58 Slave
	11	*_CnctNdCmd[59]	Disconnect/Connect Switch for Node Address 59 Slave
	12	*_CnctNdCmd[60]	Disconnect/Connect Switch for Node Address 60 Slave
	13	*_CnctNdCmd[61]	Disconnect/Connect Switch for Node Address 61 Slave
	14	*_CnctNdCmd[62]	Disconnect/Connect Switch for Node Address 62 Slave
	15	*_CnctNdCmd[63]	Disconnect/Connect Switch for Node Address 63 Slave

● CIO n+10 (Unit Status 1)

The device variables for CJ-series Unit that corresponds to all bits of a word starting with CIO n+10 is as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+10	0 to 15	*_Unit1Sta	Unit Status 1 (The functions of bits 0 to 15 of CIO n+10 correspond to those of bits 0 to 15 of this CJ-series Unit device variable.)

The device variables for CJ-series Units that correspond to bits 0 to 15 of a word starting with CIO n+10 are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	Bit	Variable name	CJ-series function name
CIO n+10	0	*_UnitErr	Unit Error
	1	*_MstrFunErr	Master Function Error
	2	---	Reserved for by system
	3	*_SlavFunErr	Slave Function Error
	4	*_MemErr	Unit Memory Error
	5	*_BusoffErr	Bus Off Error
	6	*_NdAdrDupErr	Node Address Duplicated Error
	7	*_NetPwrErr	Network Power Error
	8	*_SendTimeoutErr	Send Timeout Error
	9 to 11	---	Reserved by system
	12	*_RTblErr	Routing Table Error
	13	*_MsgListErr	Invalid Message Timer List Error
	14, 15	---	Reserved by system

● CIO n+11 (Unit Status 2)

The device variables for CJ-series Unit that corresponds to all bits of a word starting with CIO n+11 is as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	Bit	Variable name	CJ-series function name
CIO n+11	0 to 15	*_Unit2Sta	Unit Status 2 (The functions of bits 0 to 15 of CIO n+11 correspond to those of bits 0 to 15 of this CJ-series Unit device variable.)

The device variables for CJ-series Units that correspond to bits 0 to 15 of a word starting with CIO n+11 are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	Bit	Variable name	CJ-series function name
CIO n+11	0	*_OnlineSta	Online Status
	1	*_IOCommSta	Remote I/O Communications Status
	2	---	Reserved by system
	3	*_MstrEnblSta	Master Function Enabled Status
	4	*_SListDsblSta	Master Function Enabled Status
	5	---	Reserved by system
	6	*_SlavConnTypSta	Automatic Slave Connection
	7	*_SlavEnblSta	Slave Function Enabled
	8	*_FileRWErr	File Read/Write Error
	9 to 14	---	Reserved by system
	15	*_ErrHistorySta	Error History Registered Flag

● CIO n+12 (Master Status 1)

The device variable for CJ-series Unit that corresponds to all bits of a word starting with CIO n+12 is as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+12	0 to 15	*_Mstr1Sta	Master Status 1 (The functions of bits 0 to 15 of CIO n+12 correspond to those of bits 0 to 15 of this CJ-series Unit device variable.)

The device variables for CJ-series Units that correspond to bits 0 to 15 of a word starting with CIO n+12 are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+12	0	*_Mstr1VefyErr	Verification Error
	1	*_Mstr1StruErr	Structure Error
	2	*_Mstr1IOErr	Remote I/O Communications Error
	3	---	Reserved by system
	4	*_Mstr1SListErr	Invalid Scan List Data Error
	5	*_Mstr1IORefErr	Master I/O Refresh Error
	6, 7	---	Reserved by system
	8	*_Mstr1FunSetErr	Master Function Enable/Disable Failed
	9	*_Mstr1AlocErr	Master User-set Allocations User Setting Failed
	10	*_Mstr1FixAlocErr	Master Fixed Allocation Area Setting Failed
	11	*_Mstr1SListRegErr	Scan List Register/Clear Failed
	12	*_Mstr1CycleTmSetErr	Communications Cycle Time Setting Failed
	13, 14	---	Reserved by system
	15	*_Mstr1IOCommSta	I/O Data Communications Status

● CIO n+13 (Master Status 2)

The device variable for CJ-series Unit that corresponds to all bits of a word starting with CIO n+13 is as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+13	0 to 15	*_Mstr2Sta	Master Status 2 (The functions of bits 0 to 15 of CIO n+13 correspond to those of bits 0 to 15 of this CJ-series Unit device variable.)

The device variables for CJ-series Units that correspond to bits 0 to 15 of a word starting with CIO n+13 are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+13	0 to 7	---	Reserved by system
	8 to 15	*_MstrIOAlocSta	Master I/O Allocation Status

● CIO n+14 (Slave Status 1)

The device variable for CJ-series Unit that corresponds to all bits of a word starting with CIO n+14 is as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+14	0 to 15	*_Slav1Sta	Slave Status 1 (The functions of bits 0 to 15 of CIO n+14 correspond to those of bits 0 to 15 of this CJ-series Unit device variable.)

The device variable for CJ-series Units that correspond to bits 0 to 15 of a word starting with CIO n+14 are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+14	0, 1		Reserved by system
	2	*_Slav1IO1Err	Remote I/O Communications Error with slave communications enabled, for OUT 1/IN 1
	3	*_Slav1IO2Err	Remote I/O Communications Error with slave communications enabled, for OUT 2/IN 2
	4	*_Slav1FunDatErr	Invalid Setup Data
	5	*_Slav1IORefErr	Slave I/O Refresh Error
	6, 7		Reserved by system
	8	*_Slav1FunSetErr	Slave Function Enable/Disable Failed
	9	*_Slav1AlocErr	Slave User-set Allocations Area Setting Failed
	10	*_Slav1FixAlocErr	Slave Fixed Allocation Area Setting Failed
	11	*_Slav1COSSendErr	COS Send Failed
	12	*_Slav1Conn2EstbSta	Connection 2 Established
	13	*_Slav1Conn1EstbSta	Connection 1 Established
	14	*_Slav1IO2CommSta	Remote I/O Communications for OUT 2/IN 2
	15	*_Slav1IO1CommSta	Remote I/O Communications for OUT 1/IN 1

● CIO n+15 (Slave Status 2)

The device variable for CJ-series Unit that corresponds to all bits of a word starting with CIO n+15 is as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+15	0 to 15	*_Slav2Sta	Slave Status 2 (The functions of bits 0 to 15 of CIO n+15 correspond to those of bits 0 to 15 of this CJ-series Unit device variable.)

The device variable for CJ-series Units that correspond to bits 0 to 15 of a word starting with CIO n+15 are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+15	0 to 7	*_MstrNdAdrSta	Node Address of The Remote Master for Slave Communications
	8 to 15	*_SlavIOAlocSta	Slave I/O Allocation Status

● CIO n+16 to n+19 (Registered Slave Table)

The device variable for CJ-series Unit that corresponds to all bits of 4 words from CIO n+16 to n+19 is as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+16 to n+19	0 to 15 for each word	*_RegSlavTblSta	Registered Slave Table Bits 0 to 15 in each word correspond to the bits of this CJ-series Unit device variable as follows: • Bits 0 to 15 of CIO n+16 correspond to bits 0 to 15 of this CJ-series Unit device variable. • Bits 0 to 15 of CIO n+17 correspond to bits 16 to 31 of this CJ-series Unit device variable. • Bits 0 to 15 of CIO n+18 correspond to bits 32 to 47 of this CJ-series Unit device variable. • Bits 0 to 15 of CIO n+19 correspond to bits 48 to 63 of this CJ-series Unit device variable.

The device variable for CJ-series Units that correspond to bits 0 to 15 of 4 words from CIO n+16 to n+19 are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+16	0	*_RegSlavTblNdSta[0]	Registered Slave Table Corresponding to Node Address 0 Slave
	1	*_RegSlavTblNdSta[1]	Registered Slave Table Corresponding to Node Address 1 Slave
	2	*_RegSlavTblNdSta[2]	Registered Slave Table Corresponding to Node Address 2 Slave
	3	*_RegSlavTblNdSta[3]	Registered Slave Table Corresponding to Node Address 3 Slave
	4	*_RegSlavTblNdSta[4]	Registered Slave Table Corresponding to Node Address 4 Slave
	5	*_RegSlavTblNdSta[5]	Registered Slave Table Corresponding to Node Address 5 Slave
	6	*_RegSlavTblNdSta[6]	Registered Slave Table Corresponding to Node Address 6 Slave
	7	*_RegSlavTblNdSta[7]	Registered Slave Table Corresponding to Node Address 7 Slave
	8	*_RegSlavTblNdSta[8]	Registered Slave Table Corresponding to Node Address 8 Slave
	9	*_RegSlavTblNdSta[9]	Registered Slave Table Corresponding to Node Address 9 Slave
	10	*_RegSlavTblNdSta[10]	Registered Slave Table Corresponding to Node Address 10 Slave
	11	*_RegSlavTblNdSta[11]	Registered Slave Table Corresponding to Node Address 11 Slave
	12	*_RegSlavTblNdSta[12]	Registered Slave Table Corresponding to Node Address 12 Slave
	13	*_RegSlavTblNdSta[13]	Registered Slave Table Corresponding to Node Address 13 Slave
	14	*_RegSlavTblNdSta[14]	Registered Slave Table Corresponding to Node Address 14 Slave
	15	*_RegSlavTblNdSta[15]	Registered Slave Table Corresponding to Node Address 15 Slave

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+17	0	*_RegSlavTblNdSta[16]	Registered Slave Table Corresponding to Node Address 16 Slave
	1	*_RegSlavTblNdSta[17]	Registered Slave Table Corresponding to Node Address 17 Slave
	2	*_RegSlavTblNdSta[18]	Registered Slave Table Corresponding to Node Address 18 Slave
	3	*_RegSlavTblNdSta[19]	Registered Slave Table Corresponding to Node Address 19 Slave
	4	*_RegSlavTblNdSta[20]	Registered Slave Table Corresponding to Node Address 20 Slave
	5	*_RegSlavTblNdSta[21]	Registered Slave Table Corresponding to Node Address 21 Slave
	6	*_RegSlavTblNdSta[22]	Registered Slave Table Corresponding to Node Address 22 Slave
	7	*_RegSlavTblNdSta[23]	Registered Slave Table Corresponding to Node Address 23 Slave
	8	*_RegSlavTblNdSta[24]	Registered Slave Table Corresponding to Node Address 24 Slave
	9	*_RegSlavTblNdSta[25]	Registered Slave Table Corresponding to Node Address 25 Slave
	10	*_RegSlavTblNdSta[26]	Registered Slave Table Corresponding to Node Address 26 Slave
	11	*_RegSlavTblNdSta[27]	Registered Slave Table Corresponding to Node Address 27 Slave
	12	*_RegSlavTblNdSta[28]	Registered Slave Table Corresponding to Node Address 28 Slave
	13	*_RegSlavTblNdSta[29]	Registered Slave Table Corresponding to Node Address 29 Slave
	14	*_RegSlavTblNdSta[30]	Registered Slave Table Corresponding to Node Address 30 Slave
	15	*_RegSlavTblNdSta[31]	Registered Slave Table Corresponding to Node Address 31 Slave

The device variable for CJ-series Units that correspond to bits 0 to 15 of 4 words from CIO n+16 to n+19 are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+18	0	*_RegSlavTblNdSta[32]	Registered Slave Table Corresponding to Node Address 32 Slave
	1	*_RegSlavTblNdSta[33]	Registered Slave Table Corresponding to Node Address 33 Slave
	2	*_RegSlavTblNdSta[34]	Registered Slave Table Corresponding to Node Address 34 Slave
	3	*_RegSlavTblNdSta[35]	Registered Slave Table Corresponding to Node Address 35 Slave
	4	*_RegSlavTblNdSta[36]	Registered Slave Table Corresponding to Node Address 36 Slave
	5	*_RegSlavTblNdSta[37]	Registered Slave Table Corresponding to Node Address 37 Slave
	6	*_RegSlavTblNdSta[38]	Registered Slave Table Corresponding to Node Address 38 Slave
	7	*_RegSlavTblNdSta[39]	Registered Slave Table Corresponding to Node Address 39 Slave
	8	*_RegSlavTblNdSta[40]	Registered Slave Table Corresponding to Node Address 40 Slave
	9	*_RegSlavTblNdSta[41]	Registered Slave Table Corresponding to Node Address 41 Slave
	10	*_RegSlavTblNdSta[42]	Registered Slave Table Corresponding to Node Address 42 Slave
	11	*_RegSlavTblNdSta[43]	Registered Slave Table Corresponding to Node Address 43 Slave
	12	*_RegSlavTblNdSta[44]	Registered Slave Table Corresponding to Node Address 44 Slave
	13	*_RegSlavTblNdSta[45]	Registered Slave Table Corresponding to Node Address 45 Slave
	14	*_RegSlavTblNdSta[46]	Registered Slave Table Corresponding to Node Address 46 Slave
	15	*_RegSlavTblNdSta[47]	Registered Slave Table Corresponding to Node Address 47 Slave

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+19	0	*_RegSlavTblNdSta[48]	Registered Slave Table Corresponding to Node Address 48 Slave
	1	*_RegSlavTblNdSta[49]	Registered Slave Table Corresponding to Node Address 49 Slave
	2	*_RegSlavTblNdSta[50]	Registered Slave Table Corresponding to Node Address 50 Slave
	3	*_RegSlavTblNdSta[51]	Registered Slave Table Corresponding to Node Address 51 Slave
	4	*_RegSlavTblNdSta[52]	Registered Slave Table Corresponding to Node Address 52 Slave
	5	*_RegSlavTblNdSta[53]	Registered Slave Table Corresponding to Node Address 53 Slave
	6	*_RegSlavTblNdSta[54]	Registered Slave Table Corresponding to Node Address 54 Slave
	7	*_RegSlavTblNdSta[55]	Registered Slave Table Corresponding to Node Address 55 Slave
	8	*_RegSlavTblNdSta[56]	Registered Slave Table Corresponding to Node Address 56 Slave
	9	*_RegSlavTblNdSta[57]	Registered Slave Table Corresponding to Node Address 57 Slave
	10	*_RegSlavTblNdSta[58]	Registered Slave Table Corresponding to Node Address 58 Slave
	11	*_RegSlavTblNdSta[59]	Registered Slave Table Corresponding to Node Address 59 Slave
	12	*_RegSlavTblNdSta[60]	Registered Slave Table Corresponding to Node Address 60 Slave
	13	*_RegSlavTblNdSta[61]	Registered Slave Table Corresponding to Node Address 61 Slave
	14	*_RegSlavTblNdSta[62]	Registered Slave Table Corresponding to Node Address 62 Slave
	15	*_RegSlavTblNdSta[63]	Registered Slave Table Corresponding to Node Address 63 Slave

● CIO n+20 to n+23 (Normal Slave Table)

The device variable for CJ-series Unit that corresponds to all bits of 4 words from CIO n+20 to n+23 is as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+20 to n+23	0 to 15 for each word	*_NormSlavTblSta	Normal Slave Table Bits 0 to 15 in each word correspond to the bits of this CJ-series Unit device variable as follows: • Bits 0 to 15 of CIO n+20 correspond to bits 0 to 15 of this CJ-series Unit device variable. • Bits 0 to 15 of CIO n+21 correspond to bits 16 to 31 of this CJ-series Unit device variable. • Bits 0 to 15 of CIO n+22 correspond to bits 32 to 47 of this CJ-series Unit device variable. • Bits 0 to 15 of CIO n+23 correspond to bits 48 to 63 of this CJ-series Unit device variable.

The device variable for CJ-series Units that correspond to bits 0 to 15 of 4 words from CIO n+20 to n+23 are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+20	0	*_NormSlavTblNdSta[0]	Normal Slave Table Corresponding to Node Address 0 Slave
	1	*_NormSlavTblNdSta[1]	Normal Slave Table Corresponding to Node Address 1 Slave
	2	*_NormSlavTblNdSta[2]	Normal Slave Table Corresponding to Node Address 2 Slave
	3	*_NormSlavTblNdSta[3]	Normal Slave Table Corresponding to Node Address 3 Slave
	4	*_NormSlavTblNdSta[4]	Normal Slave Table Corresponding to Node Address 4 Slave
	5	*_NormSlavTblNdSta[5]	Normal Slave Table Corresponding to Node Address 5 Slave
	6	*_NormSlavTblNdSta[6]	Normal Slave Table Corresponding to Node Address 6 Slave
	7	*_NormSlavTblNdSta[7]	Normal Slave Table Corresponding to Node Address 7 Slave
	8	*_NormSlavTblNdSta[8]	Normal Slave Table Corresponding to Node Address 8 Slave
	9	*_NormSlavTblNdSta[9]	Normal Slave Table Corresponding to Node Address 9 Slave
	10	*_NormSlavTblNdSta[10]	Normal Slave Table Corresponding to Node Address 10 Slave
	11	*_NormSlavTblNdSta[11]	Normal Slave Table Corresponding to Node Address 11 Slave
	12	*_NormSlavTblNdSta[12]	Normal Slave Table Corresponding to Node Address 12 Slave
	13	*_NormSlavTblNdSta[13]	Normal Slave Table Corresponding to Node Address 13 Slave
	14	*_NormSlavTblNdSta[14]	Normal Slave Table Corresponding to Node Address 14 Slave
	15	*_NormSlavTblNdSta[15]	Normal Slave Table Corresponding to Node Address 15 Slave

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+21	0	*_NormSlavTblNdSta[16]	Normal Slave Table Corresponding to Node Address 16 Slave
	1	*_NormSlavTblNdSta[17]	Normal Slave Table Corresponding to Node Address 17 Slave
	2	*_NormSlavTblNdSta[18]	Normal Slave Table Corresponding to Node Address 18 Slave
	3	*_NormSlavTblNdSta[19]	Normal Slave Table Corresponding to Node Address 19 Slave
	4	*_NormSlavTblNdSta[20]	Normal Slave Table Corresponding to Node Address 20 Slave
	5	*_NormSlavTblNdSta[21]	Normal Slave Table Corresponding to Node Address 21 Slave
	6	*_NormSlavTblNdSta[22]	Normal Slave Table Corresponding to Node Address 22 Slave
	7	*_NormSlavTblNdSta[23]	Normal Slave Table Corresponding to Node Address 23 Slave
	8	*_NormSlavTblNdSta[24]	Normal Slave Table Corresponding to Node Address 24 Slave
	9	*_NormSlavTblNdSta[25]	Normal Slave Table Corresponding to Node Address 25 Slave
	10	*_NormSlavTblNdSta[26]	Normal Slave Table Corresponding to Node Address 26 Slave
	11	*_NormSlavTblNdSta[27]	Normal Slave Table Corresponding to Node Address 27 Slave
	12	*_NormSlavTblNdSta[28]	Normal Slave Table Corresponding to Node Address 28 Slave
	13	*_NormSlavTblNdSta[29]	Normal Slave Table Corresponding to Node Address 29 Slave
	14	*_NormSlavTblNdSta[30]	Normal Slave Table Corresponding to Node Address 30 Slave
	15	*_NormSlavTblNdSta[31]	Normal Slave Table Corresponding to Node Address 31 Slave

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
CIO n+22	0	*_NormSlavTblNdSta[32]	Normal Slave Table Corresponding to Node Address 32 Slave
	1	*_NormSlavTblNdSta[33]	Normal Slave Table Corresponding to Node Address 33 Slave
	2	*_NormSlavTblNdSta[34]	Normal Slave Table Corresponding to Node Address 34 Slave
	3	*_NormSlavTblNdSta[35]	Normal Slave Table Corresponding to Node Address 35 Slave
	4	*_NormSlavTblNdSta[36]	Normal Slave Table Corresponding to Node Address 36 Slave
	5	*_NormSlavTblNdSta[37]	Normal Slave Table Corresponding to Node Address 37 Slave
	6	*_NormSlavTblNdSta[38]	Normal Slave Table Corresponding to Node Address 38 Slave
	7	*_NormSlavTblNdSta[39]	Normal Slave Table Corresponding to Node Address 39 Slave
	8	*_NormSlavTblNdSta[40]	Normal Slave Table Corresponding to Node Address 40 Slave
	9	*_NormSlavTblNdSta[41]	Normal Slave Table Corresponding to Node Address 41 Slave
	10	*_NormSlavTblNdSta[42]	Normal Slave Table Corresponding to Node Address 42 Slave
	11	*_NormSlavTblNdSta[43]	Normal Slave Table Corresponding to Node Address 43 Slave
	12	*_NormSlavTblNdSta[44]	Normal Slave Table Corresponding to Node Address 44 Slave
	13	*_NormSlavTblNdSta[45]	Normal Slave Table Corresponding to Node Address 45 Slave
	14	*_NormSlavTblNdSta[46]	Normal Slave Table Corresponding to Node Address 46 Slave
	15	*_NormSlavTblNdSta[47]	Normal Slave Table Corresponding to Node Address 47 Slave

The device variable for CJ-series Units that correspond to bits 0 to 15 of 4 words from CIO n+20 to n+23 are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	Bit	Variable name	CJ-series function name
CIO n+23	0	*_NormSlavTblNdSta[48]	Normal Slave Table Corresponding to Node Address 48 Slave
	1	*_NormSlavTblNdSta[49]	Normal Slave Table Corresponding to Node Address 49 Slave
	2	*_NormSlavTblNdSta[50]	Normal Slave Table Corresponding to Node Address 50 Slave
	3	*_NormSlavTblNdSta[51]	Normal Slave Table Corresponding to Node Address 51 Slave
	4	*_NormSlavTblNdSta[52]	Normal Slave Table Corresponding to Node Address 52 Slave
	5	*_NormSlavTblNdSta[53]	Normal Slave Table Corresponding to Node Address 53 Slave
	6	*_NormSlavTblNdSta[54]	Normal Slave Table Corresponding to Node Address 54 Slave
	7	*_NormSlavTblNdSta[55]	Normal Slave Table Corresponding to Node Address 55 Slave
	8	*_NormSlavTblNdSta[56]	Normal Slave Table Corresponding to Node Address 56 Slave
	9	*_NormSlavTblNdSta[57]	Normal Slave Table Corresponding to Node Address 57 Slave
	10	*_NormSlavTblNdSta[58]	Normal Slave Table Corresponding to Node Address 58 Slave
	11	*_NormSlavTblNdSta[59]	Normal Slave Table Corresponding to Node Address 59 Slave
	12	*_NormSlavTblNdSta[60]	Normal Slave Table Corresponding to Node Address 60 Slave
	13	*_NormSlavTblNdSta[61]	Normal Slave Table Corresponding to Node Address 61 Slave
	14	*_NormSlavTblNdSta[62]	Normal Slave Table Corresponding to Node Address 62 Slave
	15	*_NormSlavTblNdSta[63]	Normal Slave Table Corresponding to Node Address 63 Slave

● CIO n+24 (C200H Master Replacement Master Status 1)

The device variable for CJ-series Unit that corresponds to all bits of a word starting with CIO n+24 is as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	Bit	Variable name	CJ-series function name
CIO n+24	0 to 15	*_CMstrSta	C200H Master Replacement Master Status 1 (The functions of bits 0 to 15 of CIO n+24 correspond to those of bits 0 to 15 of this CJ-series Unit device variable.)

The device variables for CJ-series Units that correspond to bits 0 to 15 of a word starting with CIO n+24 are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	Bit	Variable name	CJ-series function name
CIO n+24	0	*_CMstrMemErr	Unit Memory Error
	1	*_CMstrNdDupErr	Node Address Duplicated/ Bus Off Error
	2		Reserved by system
	3	*_CMstrCfgErr	Configuration Error
	4	*_CMstrStruErr	Structure Error
	5	*_CMstrSendErr	Send Error
	6	*_CMstrIOErr	Communication Error
	7	*_CMstrVefyErr	Verification Error
	8	*_CMstrIOStopSta	I/O Data Communications Not Running Status
	9 to 11		Reserved by system
	12	*_CMstrMsgEnblSta	Message Communications Permitted
	13	*_CMstrSListDsblSta	Invalid Scan List Data Flag
	14	*_CMstrErr	Error is occurring or Remote I/O Communications is stopped due to error (Master Error)
	15	*_CMstrIOCommSta	Remote I/O Communications Flag

CPU Bus Unit Words Allocated in DM Area

● D m (Communications Cycle Time Setup Table)

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	Bit	Variable name	CJ-series function name
D m	0 to 15	*_CommCycleTmCfg	Communications Cycle Time Setting

● D m+1 to m+7 (Master User-set Allocations Setup Table)

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	Bit	Variable name	CJ-series function name
D m+1	0 to 7	*_MstrAlocTblCfg[0]	OUT Block 1 Area
D m+2	0 to 15	*_MstrAlocTblCfg[1]	First word in OUT Block 1
D m+3	0 to 7	*_MstrAlocTblCfg[2]	IN Block 1 Area
D m+4	0 to 15	*_MstrAlocTblCfg[3]	First word in IN Block 1
D m+5	0 to 7	*_MstrAlocTblCfg[4]	Allocation size setup table area
D m+6	0 to 15	*_MstrAlocTblCfg[5]	First word in the Allocation Size Setup Table 1
D m+7	0 to 15	*_MstrAlocTblCfgSta	Setting Results of Master User-set Allocations Setup

● D m+8 to m+14 (Slave User-set Allocations Setup Table)

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	Bit	Variable name	CJ-series function name
D m+8	0 to 7	*_SlavAlocTblCfg[0]	Slave OUT 1 Area
D m+9	0 to 15	*_SlavAlocTblCfg[1]	First word in Slave OUT 1 Area
D m+10	0 to 7	*_SlavAlocTblCfg[2]	OUT 1 Area Size
D m+11	0 to 15	*_SlavAlocTblCfg[3]	Slave IN 1 Area
D m+12	0 to 7	*_SlavAlocTblCfg[4]	First word in Slave IN 1 Area
D m+13	0 to 15	*_SlavAlocTblCfg[5]	IN 1 Area Size
D m+14	0 to 15	*_SlavAlocTblCfgSta	Setting Results of Slave User-set Allocations Setup

● D m+15 to m+18 (Communication Cycle Time Reference Table)

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	Bit	Variable name	CJ-series function name
D m+15	0 to 15	*_CycleTmRefTblSta[0]	Communications cycle time setting value
D m+16	0 to 15	*_CycleTmRefTblSta[1]	Communications cycle time present value
D m+17	0 to 15	*_CycleTmRefTblSta[2]	Communications cycle time maximum value
D m+18	0 to 15	*_CycleTmRefTblSta[3]	Communications cycle time minimum value

● D m+19 to m+30 (Master User-set Allocations Reference Table)

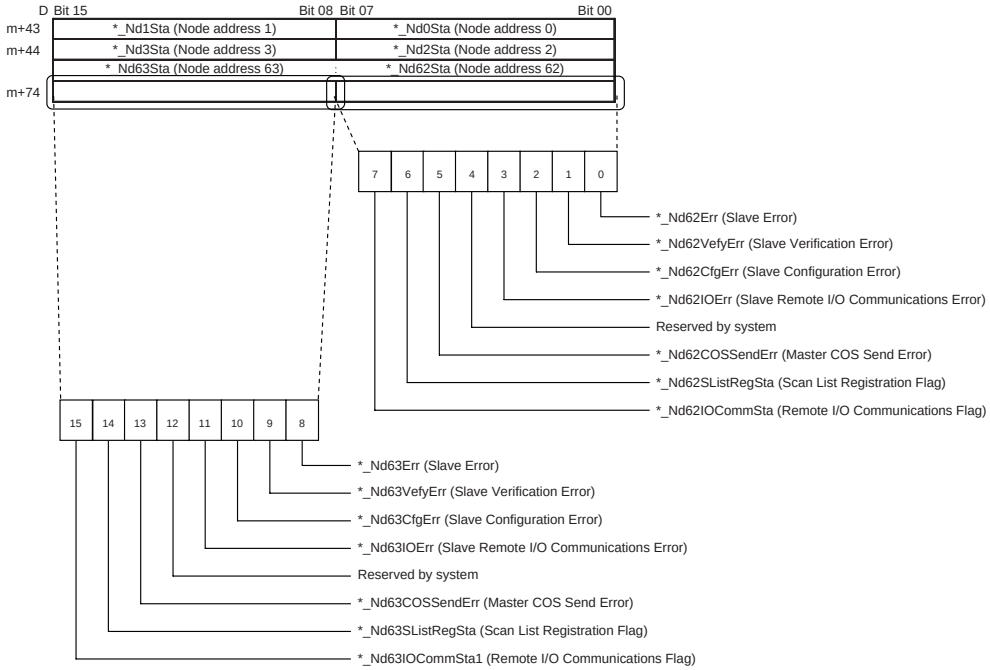
CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	Bit	Variable name	CJ-series function name
D m+19	0 to 7	*_MstrAlocRefTblSta[0]	OUT block 1 area
D m+20	0 to 15	*_MstrAlocRefTblSta[1]	First word in OUT block 1
D m+21	0 to 15	*_MstrAlocRefTblSta[2]	No. of bytes in OUT block 1
D m+22	0 to 7	*_MstrAlocRefTblSta[3]	IN block 1 area
D m+23	0 to 15	*_MstrAlocRefTblSta[4]	First word in IN block 1
D m+24	0 to 15	*_MstrAlocRefTblSta[5]	No. of bytes in IN block 1
D m+25	0 to 7	*_MstrAlocRefTblSta[6]	OUT block 2 area
D m+26	0 to 15	*_MstrAlocRefTblSta[7]	First word in OUT block 2
D m+27	0 to 15	*_MstrAlocRefTblSta[8]	No. of bytes in OUT block 2
D m+28	0 to 7	*_MstrAlocRefTblSta[9]	IN block 2 area
D m+29	0 to 15	*_MstrAlocRefTblSta[10]	First word in IN block 2
D m+30	0 to 15	*_MstrAlocRefTblSta[11]	No. of bytes in IN block 2

● D m+31 to m+42 (Slave User-set Allocations Reference Table)

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	Bit	Variable name	CJ-series function name
D m+31	0 to 7	*_SlavAlocRefTblSta[0]	Slave OUT 1 area
D m+32	0 to 15	*_SlavAlocRefTblSta[1]	First word in Slave OUT 1 area
D m+33	0 to 15	*_SlavAlocRefTblSta[2]	Slave OUT 1 area size
D m+34	0 to 7	*_SlavAlocRefTblSta[3]	Slave IN 1 area
D m+35	0 to 15	*_SlavAlocRefTblSta[4]	First word in Slave IN 1 area

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
D m+36	0 to 15	*_SlavAlocRefTblSta[5]	Slave IN 1 area size
D m+37	0 to 7	*_SlavAlocRefTblSta[6]	Slave OUT 2 area
D m+38	0 to 15	*_SlavAlocRefTblSta[7]	First word in Slave OUT 2 area
D m+39	0 to 15	*_SlavAlocRefTblSta[8]	Slave OUT 2 area size
D m+40	0 to 7	*_SlavAlocRefTblSta[9]	Slave IN 2 area
D m+41	0 to 15	*_SlavAlocRefTblSta[10]	First word in Slave IN 2 area
D m+42	0 to 15	*_SlavAlocRefTblSta[11]	Slave IN 2 area size

● D m+43 to m+74 (Slave Detailed Status)



The device variables for CJ-series Units that correspond to bits 0 to 7 or 8 to 15 of each word are as follows:

The functions of bits 0 to 7 and 8 to 15 of each word correspond to the functions of bits 0 to 7 on the device variables for CJ-series Unit:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
D m+43	0 to 7	*_Nd0Sta	Detailed Slave Status Table for Node Address 0
	8 to 15	*_Nd1Sta	Detailed Slave Status Table for Node Address 1
D m+44	0 to 7	*_Nd2Sta	Detailed Slave Status Table for Node Address 2
	8 to 15	*_Nd3Sta	Detailed Slave Status Table for Node Address 3
D m+45	0 to 7	*_Nd4Sta	Detailed Slave Status Table for Node Address 4
	8 to 15	*_Nd5Sta	Detailed Slave Status Table for Node Address 5
D m+46	0 to 7	*_Nd6Sta	Detailed Slave Status Table for Node Address 6
	8 to 15	*_Nd7Sta	Detailed Slave Status Table for Node Address 7
D m+47	0 to 7	*_Nd8Sta	Detailed Slave Status Table for Node Address 8
	8 to 15	*_Nd9Sta	Detailed Slave Status Table for Node Address 9

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
D m+48	0 to 7	*_Nd10Sta	Detailed Slave Status Table for Node Address 10
	8 to 15	*_Nd11Sta	Detailed Slave Status Table for Node Address 11
D m+49	0 to 7	*_Nd12Sta	Detailed Slave Status Table for Node Address 12
	8 to 15	*_Nd13Sta	Detailed Slave Status Table for Node Address 13
D m+50	0 to 7	*_Nd14Sta	Detailed Slave Status Table for Node Address 14
	8 to 15	*_Nd15Sta	Detailed Slave Status Table for Node Address 15
D m+51	0 to 7	*_Nd16Sta	Detailed Slave Status Table for Node Address 16
	8 to 15	*_Nd17Sta	Detailed Slave Status Table for Node Address 17
D m+52	0 to 7	*_Nd18Sta	Detailed Slave Status Table for Node Address 18
	8 to 15	*_Nd19Sta	Detailed Slave Status Table for Node Address 19
D m+53	0 to 7	*_Nd20Sta	Detailed Slave Status Table for Node Address 20
	8 to 15	*_Nd21Sta	Detailed Slave Status Table for Node Address 21
D m+54	0 to 7	*_Nd22Sta	Detailed Slave Status Table for Node Address 22
	8 to 15	*_Nd23Sta	Detailed Slave Status Table for Node Address 23
D m+55	0 to 7	*_Nd24Sta	Detailed Slave Status Table for Node Address 24
	8 to 15	*_Nd25Sta	Detailed Slave Status Table for Node Address 25
D m+56	0 to 7	*_Nd26Sta	Detailed Slave Status Table for Node Address 26
	8 to 15	*_Nd27Sta	Detailed Slave Status Table for Node Address 27
D m+57	0 to 7	*_Nd28Sta	Detailed Slave Status Table for Node Address 28
	8 to 15	*_Nd29Sta	Detailed Slave Status Table for Node Address 29
D m+58	0 to 7	*_Nd30Sta	Detailed Slave Status Table for Node Address 30
	8 to 15	*_Nd31Sta	Detailed Slave Status Table for Node Address 31
D m+59	0 to 7	*_Nd32Sta	Detailed Slave Status Table for Node Address 32
	8 to 15	*_Nd33Sta	Detailed Slave Status Table for Node Address 33
D m+60	0 to 7	*_Nd34Sta	Detailed Slave Status Table for Node Address 34
	8 to 15	*_Nd35Sta	Detailed Slave Status Table for Node Address 35

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
D m+61	0 to 7	*_Nd36Sta	Detailed Slave Status Table for Node Address 36
	8 to 15	*_Nd37Sta	Detailed Slave Status Table for Node Address 37
D m+62	0 to 7	*_Nd38Sta	Detailed Slave Status Table for Node Address 38
	8 to 15	*_Nd39Sta	Detailed Slave Status Table for Node Address 39
D m+63	0 to 7	*_Nd40Sta	Detailed Slave Status Table for Node Address 40
	8 to 15	*_Nd41Sta	Detailed Slave Status Table for Node Address 41
D m+64	0 to 7	*_Nd42Sta	Detailed Slave Status Table for Node Address 42
	8 to 15	*_Nd43Sta	Detailed Slave Status Table for Node Address 43

The device variables for CJ-series Units that correspond to bits 0 to 7 and 8 to 15 of each word are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
D m+65	0 to 7	*_Nd44Sta	Detailed Slave Status Table for Node Address 44
	8 to 15	*_Nd45Sta	Detailed Slave Status Table for Node Address 45
D m+66	0 to 7	*_Nd46Sta	Detailed Slave Status Table for Node Address 46
	8 to 15	*_Nd47Sta	Detailed Slave Status Table for Node Address 47
D m+67	0 to 7	*_Nd48Sta	Detailed Slave Status Table for Node Address 48
	8 to 15	*_Nd49Sta	Detailed Slave Status Table for Node Address 49
D m+68	0 to 7	*_Nd50Sta	Detailed Slave Status Table for Node Address 50
	8 to 15	*_Nd51Sta	Detailed Slave Status Table for Node Address 51
D m+69	0 to 7	*_Nd52Sta	Detailed Slave Status Table for Node Address 52
	8 to 15	*_Nd53Sta	Detailed Slave Status Table for Node Address 53
D m+70	0 to 7	*_Nd54Sta	Detailed Slave Status Table for Node Address 54
	8 to 15	*_Nd55Sta	Detailed Slave Status Table for Node Address 55
D m+71	0 to 7	*_Nd56Sta	Detailed Slave Status Table for Node Address 56
	8 to 15	*_Nd57Sta	Detailed Slave Status Table for Node Address 57

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
D m+72	0 to 7	*_Nd58Sta	Detailed Slave Status Table for Node Address 58
	8 to 15	*_Nd59Sta	Detailed Slave Status Table for Node Address 59
D m+73	0 to 7	*_Nd60Sta	Detailed Slave Status Table for Node Address 60
	8 to 15	*_Nd61Sta	Detailed Slave Status Table for Node Address 61
D m+74	0 to 7	*_Nd62Sta	Detailed Slave Status Table for Node Address 62
	8 to 15	*_Nd63Sta	Detailed Slave Status Table for Node Address 63

The device variables for CJ-series Units that correspond to bits 0 to 15 of each word are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
D m+43, m+44 to m+74	0 of each word	*_Nd0Err, *_Nd2Err, to *_Nd62Err	Slave Error for node address 0, 2 to 62
	1 of each word	*_Nd0VefyErr, *_Nd2VefyErr, to *_Nd62VefyErr	Slave Verification Error for node address 0, 2 to 62
	2 of each word	*_Nd0CfgErr, *_Nd2CfgErr, to *_Nd62CfgErr	Slave Configuration Error for node address 0, 2 to 62
	3 of each word	*_Nd0IOErr, *_Nd2IOErr, to *_Nd62IOErr	Slave Remote I/O Communications Error for node address 0, 2 to 62
	4 of each word		Reserved by system
	5 of each word	*_Nd0COSSendErr, *_Nd2COSSendErr, to *_Nd62COSSendErr	Master COS Send Error for node address 0, 2 to 62
	6 of each word	*_Nd0SListRegSta, *_Nd2SListRegSta, to *_Nd62SListRegSta	Scan List Registration Flag for node address 0, 2 to 62
	7 of each word	*_Nd0IOCommSta, *_Nd2IOCommSta, to *_Nd62IOCommSta	Remote I/O Communications Flag at node address 0, 2 to 62

The device variables for CJ-series Units that correspond to bits 0 to 15 of each word are as follows:

CJ-series I/O memory address		NJ-series device variables for CJ-series Unit	
Word address	**Bit**	**Variable name**	**CJ-series function name**
D m+43, m+44 to m+74	8 of each word	*_Nd1Err, *_Nd3Err, to *_Nd63Err	Slave Error for node address 1, 3 to 63
	9 of each word	*_Nd1VefyErr, *_Nd3VefyErr to *_Nd63VefyErr	Slave Verification Error for node address 1, 3 to 63
	10 of each word	*_Nd1CfgErr, *_Nd3CfgErr, to *_Nd63CfgErr	Slave Configuration Error for node address 1, 3 to 63
	11 of each word	*_Nd1IOErr, *_Nd3IOErr, to *_Nd63IOErr	Slave Remote I/O Communications Error for node address 1, 3 to 63
	12 of each word		Reserved by system
	13 of each word	*_Nd1COSSendErr, *_Nd3COSSendErr, to *_Nd63COSSendErr	Master COS Send Error for node address 1, 3 to 63
	14 of each word	*_Nd1SListRegSta, *_Nd3SListRegSta, to *_Nd63SListRegSta	Scan List Registration Flag for node address 1, 3 to 63
	15 of each word	*_Nd1IOCommSta, *_Nd3IOCommSta, to *_Nd63IOCommSta	Remote I/O Communications Flag at node address 1, 3 to 63

A-2 DeviceNet Connections

DeviceNet has several different protocols for remote I/O communications between Master and Slave devices. Connections are units used to manage those protocols.

There are four kinds of DeviceNet remote I/O communications protocols (connections): Poll, bit–strobe, COS (change of state), and cyclic. CJ-series DeviceNet Units support all four types.

The connection used by the DeviceNet Unit is automatically selected if the CX-Integrator is not used. If you use the CX-Integrator, you can automatically select the connection by the DeviceNet Unit, or you can specify the connections for each slave. You can set up to two connections. COS and cyclic connections cannot be specified at the same time.

Note If you use COS and cyclic connections, do not connect multiple Master Units on one network.

The characteristics of each connection are outlined in the following table.

Connection	Characteristics	
Poll	Used for basic I/O.	
Bit-strobe	Used for input of 8 bytes or less. Sends broadcasting requests from master and receives input from slaves.	
COS (Change of State)	Communications occur at regular cycles (heartbeat timer) and the connection is determined by the master or slave sending the data. You can send data only when required, which reduces the network communications load. You can use this connection to send data to the master or slave if the master or slave data changes. COS connections are given priority over poll and bit-strobe connections, which may result in a longer communications cycle time due to the higher frequency of COS connections used to send data or large amounts of data sent with the use of COS. Therefore, COS connections are effective when changes to data are infrequent (approximately 100 ms min.), or to give higher priority to small amounts of data. For DeviceNet Units, you can decide the transmission timing in the user program. The following points apply for CJ-series DeviceNet Units: If the master *_*MstrCOSSendCmd* (Master COS Send Switch) is changed to TRUE, remote I/O communications output data can be sent every time from the master using COS to the slaves that support COS. If *_*Sw2SlavCOSSendCmd* (Slave COS Send Switch) is set to TRUE, you can send remote I/O communications output data every time from the slave using COS to the master (input data from the perspective of the master). Even if the software switch is not changed to TRUE, you can perform the COS communications using regular cycles (heartbeat timer) simultaneously. **Note** This CJ-series DeviceNet Unit supports COS.	**Note** COS and cyclic connections cannot be used at the same time.
Cyclic	Communications timing is determined by regular cycles (heartbeat timer). Masters and slaves send output or input data in regular cycles. Cyclic connections are have higher priority than poll or bit-strobe connections, which may result in a longer communications cycle time due to large amounts of data sent with the use of cyclic connections. Therefore, cyclic connections are effective when changes to data are infrequent, or the amount of data to be sent is small.	

Connections Using Allocations

Allocation method		Contents
With CX-Integrator	User-set allocations from the CX-Integrator	The user can select the connection to be used for each node address with the CX-Integrator e.g., poll could be used for data and COS could be used for status. You can specify automatic selection or user selection. You can use two connections simultaneously for one slave (but you cannot use COS and cyclic simultaneously.)
Without CX-Integrator	Fixed allocation (scan list disabled or enabled)	Only 1 connection, automatically selected by the DeviceNet Unit. (Either a polling or bit-strobe connection is used.)
	User-set allocations using device variables for CJ-series Unit	Only 1 connection, automatically selected by the DeviceNet Unit based on the I/O area set in the Master User-set Allocations Setup Table.

Setting Connection Type

The settings for remote I/O communications connections differ depending on the allocation method, as outlined below.

● Fixed Allocations or User-set Allocations Using Device Variable for CJ-series Unit

The Master CJ-series DeviceNet Unit automatically selects either poll or bit-strobe, whichever makes the communications cycle time shortest.

● User-set Allocations Using the CX-Integrator

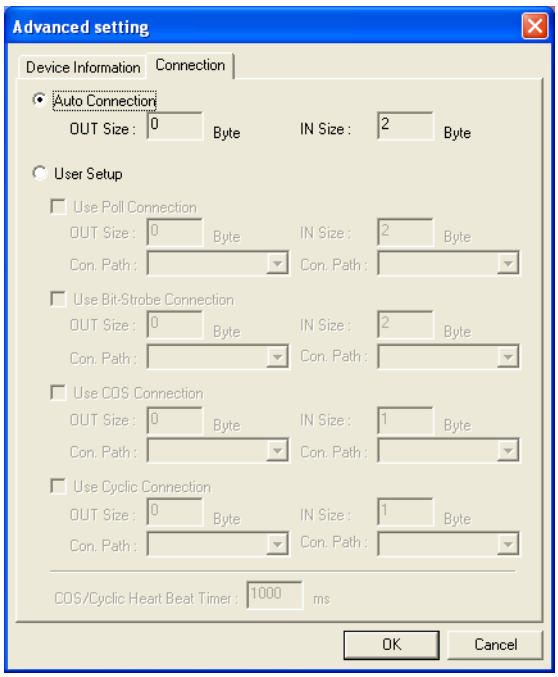
The Master CJ-series DeviceNet Unit can make an automatic selection, the same as above, or the user can select up to two connections for a Slave. The setting method is outlined below.

1 Select the Master Node in the Network Configuration Window in the CX-Integrator.

2 Select Device – Parameters – Edit – All Masters and select the corresponding Slave. Click the Detailed Settings Button.

3 On the Connection Tab Page shown below, select a check box.

- Automatic selection
- User selection
  Select up to two connections from poll, bit–strobe, COS and cyclic. COS and cyclic connections cannot be used at the same time.



Precautions for Correct Use

Output data using poll connections and output data using COS or cyclic connections are transmitted using the same frame. Therefore set the same output size (bytes) when you combine poll and COS or poll and cyclic.

Additional Information

The COS/cyclic heartbeat timer is the smallest transmission interval for COS or cyclic connections. You can set it for each corresponding slave.

For details on using the CX-Integrator, refer to the *CP CS/CJ/CP/NSJ CX-Integrator Ver.2.□ Operation Manual* (Cat. No. W464).

Connection Path

Connection path are parameters that specify the type of I/O data in the slaves. Depending on the type of slave, the internal I/O data type may be able to be selected. For the relationships between the selected applicable connections and the applicable connections per I/O area words (block), refer to the *"A-2 DeviceNet Connections"*.

The connection path settings will differ depending on the allocation method, as outlined below.

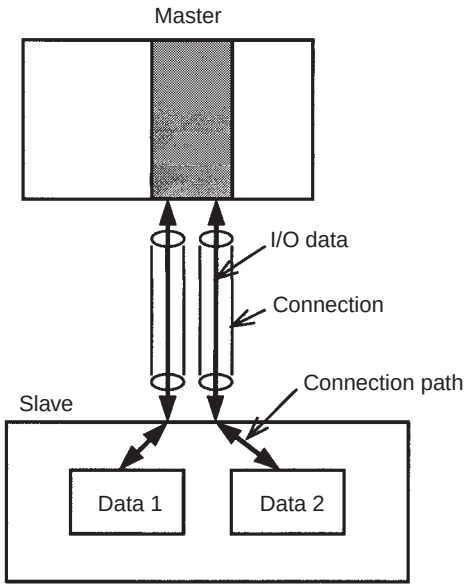
Fixed Allocations or User-set Allocations Using Device Variable for CJ-series Unit

Connection path settings cannot be made.

User-set Allocations Using the CX-Integrator

The CX-Integrator can be used to set the type of I/O data in the slave, using the connection path. The user can use this method to specify the I/O data type within the slave with which they would like perform master and remote I/O communications.

The connection path is saved by the CX-Integrator to the CJ-series DeviceNet Unit scan list and when the remote I/O communications are started, the connection path is set to the slave via the DeviceNet network.



● Master COS Send Switch

COS transmission is possible only for User-set allocations using the CX-Integrator.

When required, you can output the remote I/O output data from the master to a specified slave.

In this case, sending output data at the communications cycle timing to the specified slave by other connections selected automatically or by the user (only when using the CX-Integrator) is performed.

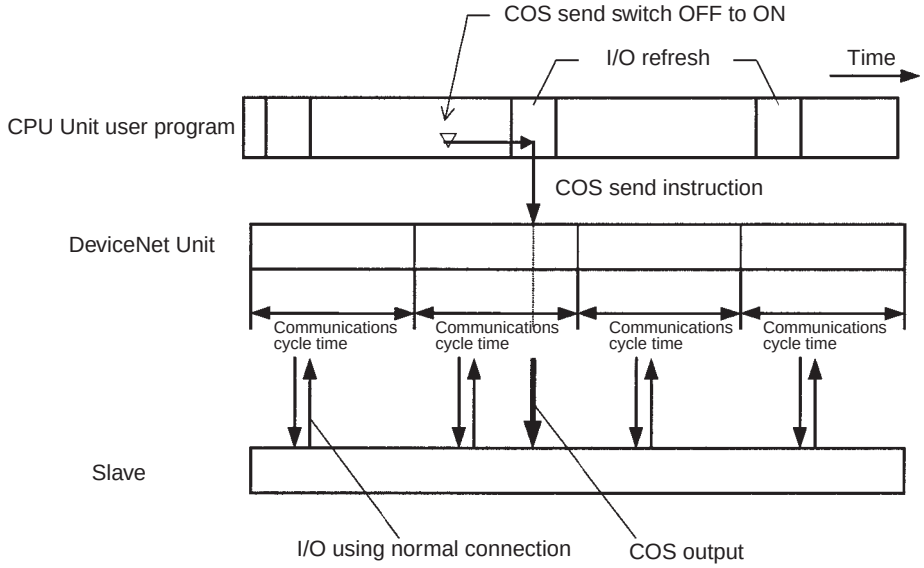
In this case, the communications timing is not dependant on the communications cycle time but it is dependant on the CPU Unit cycle time.

Note When a master or slave sending data with COS communications must handle large quantities of data or when data is sent frequently using COS communications, the communications cycle time may actually be longer than when using poll communications. This can have a large impact on the performance of remote I/O communications and delay responses. Therefore, give ample consideration to the system performance when using COS.

DeviceNet Units use the Master COS Send Switch in the allocated CIO Area words to execute COS transmissions from the master to slaves. The procedure is outlined below.

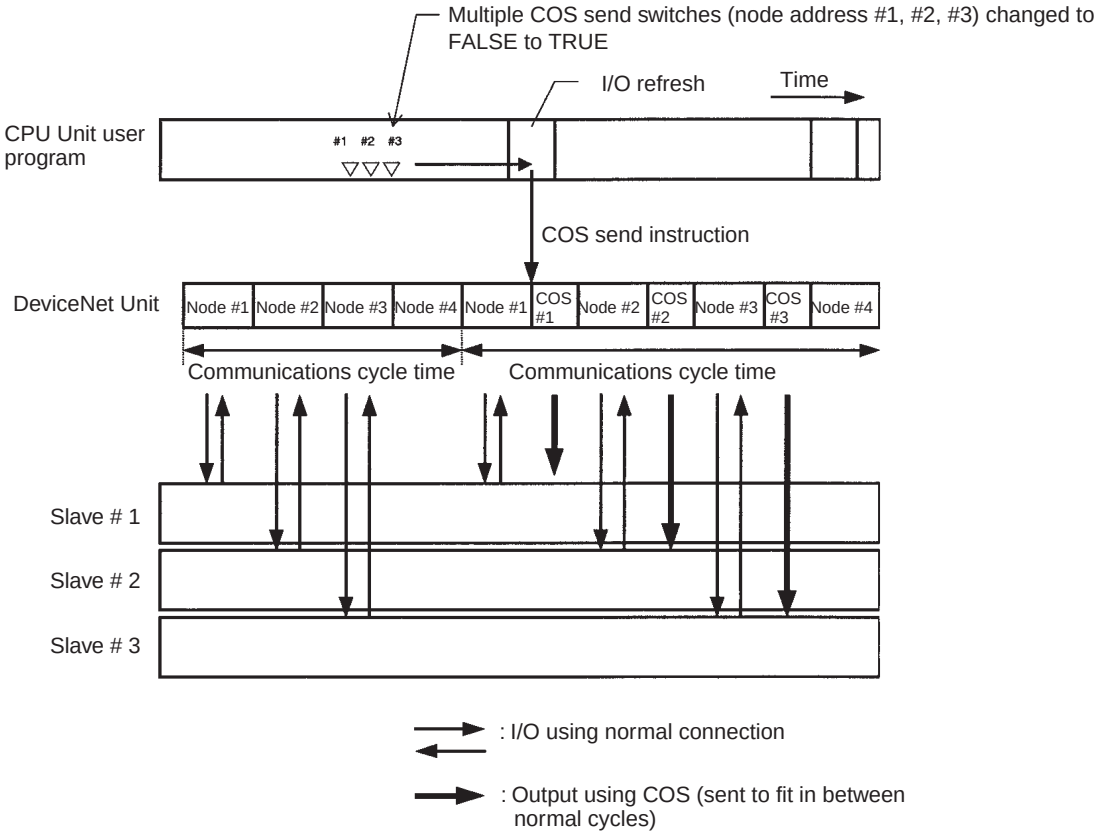
Step 1
Before executing COS transmission, the connection for the destination slave must be set to COS in the master scan list, using the CX-Integrator.

Step 2
If the bits associated with the node address of *_MstrCOSSendCmd* (Master COS Send Switch) or the array variables associated with the node address, *_MstrCOSSendNdCmd[0]* to *_MstrCOSSendNdCmd[63]* are changed to TRUE, sending OUT data is triggered independently of the communication cycle.



You can change multiple bits to TRUE simultaneously and you can send output data to multiple node addresses simultaneously.

The following diagram shows the transmission timing. After the COS send instruction is sent to the DeviceNet (at the I/O refresh timing for the CPU Unit), the COS transmission is executed to each slave immediately after the refresh (remote I/O communications), which is performed with each slave during the communications cycle. Therefore, when there are a lot of destination slaves, the COS send timing may be delayed in order of the node addresses.

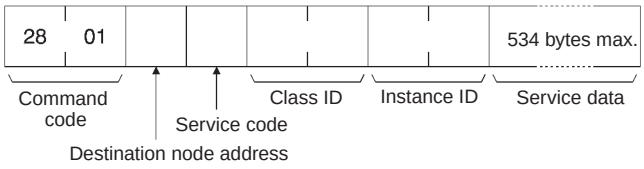


A-3 DeviceNet Explicit Message Send Command for Other Manufacturer Nodes

A-3-1 Explicit Message Send (2801)

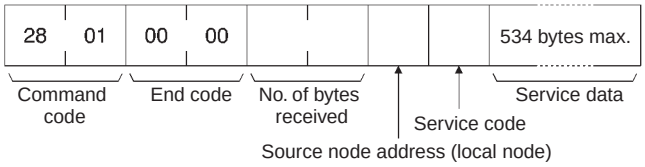
Sends a DeviceNet explicit message to a specified object and receives a response.

● Command Block

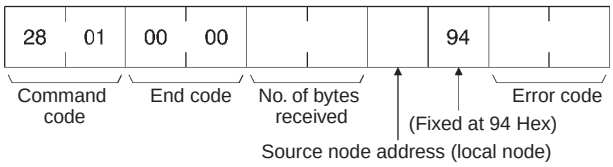


● Response Block

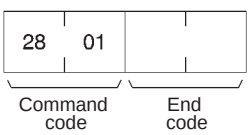
- When a normal response is returned for the executed explicit message:



- When an error response is returned for the executed explicit message:



- When the explicit message execution failed or timed out:



Parameter Details

[Destination Node Address] (Command)

Specifies the node address of the explicit message destination.
The node address of the local Master Unit is specified as the input variables *DstNetAdr* (Destination network address) in the SendCmd instruction when the Explicit Message Send command is sent, but the node address of the actual destination is specified here.

[Service Code] (Command, response)
For commands, the service code defined by the DeviceNet is specified.
For normal responses, the value for which bit 15 of the service code specified in the command turns ON is returned. For error responses, 94 hex, which indicates an error, is returned.

[Class ID] (Command)
Specifies the class ID for the explicit message destination.

[Instance ID] (Command)
Specifies the instance ID for the explicit message destination.

[Service Data] (Command, response)
For commands, specifies the data defined by the service code.
For responses, returns the data defined by the service code.

[No. of Bytes Received] (Response)
Returns the number of bytes received after Source (local node) Node Address.

[Source (local node) Node Address] (Response)
Returns the local node DeviceNet node address that was the source of the explicit message.

[Error Code] (Response)
Returns the error code defined by the DeviceNet.

Explanation

- The Explicit Message Send command sends a DeviceNet-defined explicit message to an OMRON Special I/O Slave Unit or a DeviceNet Slave manufactured by another company and receives a response.
- The input variables *DstNetAdr* (Destination network address) in the SendCmd instruction specifies the local node DeviceNet Master Unit when the Explicit Message Send command is sent. The actual destination node is specified with the use of the Destination Node Address in the Explicit Message Send command.

Additional Information

- Refer to DeviceNet Specifications for explicit message parameter details.
- For information on explicit messages for OMRON slave, refer to the *DRT2 Series DeviceNet Slaves Operation Manual* (Cat. No. W404).
- Contact the ODVA to obtain copies of the DeviceNet specification.
  ODVA's URL: http://www.odva.org/

A-4 Multi-vendor Applications

This appendix provides precautions and reference material needed when you use DeviceNet (Compo-Bus/D) Units as DeviceNet components in a multi-vendor environment.

● Connecting another Company's DeviceNet Slaves to an OMRON Master

For connecting another Company's DeviceNet Slaves to an OMRON Master, consult the document attached to another Company's DeviceNet slave.

If a Slave has an EDS file, you can install it in the CX-Integrator to enable handling it just like an OMRON DeviceNet Slave.

In particular, be sure to determine the number of words in the OMRON Master Unit that another Company's DeviceNet Slave requires for input and output.

With Connection Object instance 2 (Polled I/O Connection) of another company's DeviceNet slave, you can find the number of I/O words allocated in the OMRON Master from the "Produced Connection Size" and "Consumed Connection Size" as shown below. You can allocate up to 100 words to inputs and another 100 words to outputs.

Produced Connection Size

This is the amount of memory (usually in bytes) allocated as input.

Consumed Connection Size

This is the amount of memory (usually in bytes) allocated as output.

If the connection size is an even number of bytes, the number of allocated words is: (bytes ÷ 2).

If the connection size is an odd number of bytes, the number of allocated words is: [(bytes +1) ÷ 2)].

If the connections size is zero (0), no words are allocated.

For Connection Object instance 3 (Bit Strobed I/O Connection) of the DeviceNet Slave, you can find the number of input words allocated in the OMRON Master from the "Produced Connection Size" as shown below.

Produced Connection Size

This is the amount of memory (usually in bytes) allocated as input.

If the connection size is an even number of bytes, the number of allocated words is: (bytes ÷ 2).

If the connection size is an odd number of bytes, the number of allocated words is: [(bytes +1) ÷ 2)].

● Connecting to another Company's Configurator

When another company's configurator (a tool that makes environment settings on DeviceNet Masters and Slaves) is connected, it will be able to read settings from OMRON Masters and Slaves but not change them.

When another company's configurator is used, we recommend you create an OMRON DeviceNet Slave EDS file (a file that contains each Slave's parameters and operating information). Refer to the OMRON DeviceNet Slave device profile as well as the Configurator's manual for details on creating an EDS file.

Master Unit Device Profile

General data	Compatible DeviceNet Specifications	Volume I - Release 2.0 Volume II - Release 2.0	
	Vendor name	OMRON Corporation	Vendor ID = 47
	Device profile name	Communication Adapter	Profile number = 12
	Manufacturer revision	1.1	
Physical conformance data	Network current consumption	24 VDC, 30 mA max.	
	Connector type	Open plug	
	Physical insulation	Yes	
	Supported indicators	Module, Network	
	MAC ID setting	Rotary switch	
	Default MAC ID	63	
	Baud rate setting	DIP switch	
	Supported baud rates	125 kbit/s, 250 kbit/s, and 500 kbit/s	
Communications data	Predefined Master/Slave connection set	Group 2 client Group 2 only client Group 2 server	
	Dynamic connection support (UCMM)	Yes	
	Explicit message fragmentation support	Yes	

Object Mounting

● Identity Object (01 Hex)

Object class	Attribute	Not supported
	Service	Not supported

Item		ID content	Get (read)	Set (write)	Value
Object instance	Attribute	1 Vendor	Yes	No	47
		2 Product type	Yes	No	12
		3 Product code	Yes	No	CJ1W-DRT21: 05
		4 Revision	Yes	No	1.1
		5 Status (bits supported)	Yes	No	---
		6 Serial number	Yes	No	Unique for each Unit
		7 Product name	Yes	No	CJ1W-DRM21
		8 State	No	No	---
	Service	DeviceNet Service			Parameter option
		05 Reset			None
		0E Get Attribute Single			None

Message Router Object (02 Hex)

Object class	Attribute	Not supported
	Service	Not supported
Object instance	Attribute	Not supported
	Service	Not supported
Vendor specification addition		No

DeviceNet Object (03 Hex)

Item		ID content	Get (read)	Set (write)	Value
Object class	Attribute	1 Revision	Yes	No	2
	Service	DeviceNet service	Parameter option		
		0E Get_Attribute_Single	No		

Item		ID content	Get (read)	Set (write)	Value
Object instance	Attribute	1 MAC ID	Yes	No	---
		2 Baud rate	Yes	No	---
		3 BOI	Yes	No	0
		4 Bus–off counter	Yes	No	0
		5 Allocation information	Yes	No	---
		6 MAC ID switch changed	No	No	---
		7 Baud rate switch changed	No	No	---
		8 MAC ID switch value	No	No	---
		9 Baud rate switch value	No	No	---
	Service	DeviceNet service	Parameter option		
		0E Get_Attribute_Single	No		
		4B Allocate_Master/ Slave_Connection Set	No		
		4C Release_Master/ Slave_Connection Set	No		

Connection Object (05 Hex)

Object class	Attribute	Not supported
	Service	Not supported
	Max. number of instances	203

Object instance 1	**Section**	**Information**			**Max. No. of instances**
	Instance type	Explicit Message			1
	Production trigger	Cyclic			---
	Transport type	Server			
	Transport class	3			
	Attribute	**ID content**	**Get (read)**	**Set (write)**	**Value**
		1 State	Yes	No	---
		2 Instance_type	Yes	No	0
		3 Transport_class_trigger	Yes	No	83 hex
		4 Produced_connection_ID	Yes	No	---
		5 Consumed_connection_ID	Yes	No	---
		6 Initial_comm_characteristics	Yes	No	21 hex
		7 Produced_connection_size	Yes	No	553
		8 Consumed_connection_size	Yes	No	Format 16-16: 557 Format 8-8: 555 Format 16-8, 8-16: 556
		9 Expected_packed_rate	Yes	Yes	---
		12 Watchdog_timeout_action	Yes	Yes	1 or 3
		13 Produced_connection_path_length	Yes	No	0
		14 Produced_connection_path	Yes	No	empty
		15 Consumed_connection_path_length	Yes	No	0
		16 Consumed_connection_path	Yes	No	empty
		17 Production_inhibit_time	Yes	Yes	---
	Service	DeviceNet service	Parameter option		
		05 Reset	No		
		0E Get_Attribute_Single	No		
		10 Set_Attribute_Single	No		

Object instance 2	Section	Information			Max. No. of instances
	Instance type	Polled I/O			1
	Production trigger	Cyclic			---
	Transport type	Server			
	Transport class	2			
	Attribute	**ID content**	**Get (read)**	**Set (write)**	**Value**
		1 State	Yes	No	---
		2 Instance_type	Yes	No	1
		3 Transport_class_trigger	Yes	No	82 hex
		4 Produced_connection_ID	Yes	No	---
		5 Consumed_connection_ID	Yes	No	---
		6 Initial_comm_characteristics	Yes	No	1
		7 Produced_connection_size	Yes	No	*1
		8 Consumed_connection_size	Yes	No	*2
		9 Expected_packed_rate	Yes	Yes	---
		12 Watchdog_timeout_action	Yes	No	0
		13 Produced_connection_path_length	Yes	No	4
		14 Produced_connection_path	Yes	No	20 94 24 01 hex
		15 Consumed_connection_path_length	Yes	No	4
		16 Consumed_connection_path	Yes	No	20 94 24 01 hex
		17 Production_inhi_bit_time	Yes	Yes	---
	Service	DeviceNet service	Parameter option		
		05 Reset	No		
		0E Get_Attribute_Single	No		
		10 Set_Attribute_Single	No		

*1 Number of input bytes used by Slave.

*2 Number of output bytes used by Slave.

Object instance 3	**Section**	**Information**			**Max. No. of instances**
	Instance type	Bit Strobed I/O			1
	Production trigger	Cyclic			---
	Transport type	Server			
	Transport class	2			
	Attribute	**ID content**	**Get (read)**	**Set (write)**	**Value**
		1 State	Yes	No	---
		2 Instance_type	Yes	No	1
		3 Transport_class_trigger	Yes	No	82 hex
		4 Produced_connection_ID	Yes	No	---
		5 Consumed_connection_ID	Yes	No	---
		6 Initial_comm_characteristics	Yes	No	2
		7 Produced_connection_size	Yes	No	*
		8 Consumed_connection_size	Yes	No	8
		9 Expected_packed_rate	Yes	Yes	---
		12 Watchdog_timeout_action	Yes	No	0
		13 Produced_connection_path_length	Yes	No	0
		14 Produced_connection_path	Yes	No	empty
		15 Consumed_connection_path_length	Yes	No	4
		16 Consumed_connection_path	Yes	No	20 94 24 01 hex
		17 Production_inhibit_time	Yes	Yes	---
	Service	DeviceNet service	Parameter option		
		05 Reset	No		
		0E Get_Attribute_Single	No		
		10 Set_Attribute_Single	No		

* Number of input bytes used by Slave.

Object instance 4	Section	Information			Max. No. of instances
	Instance type	COS/cyclic I/O			1
	Production trigger	Cyclic			---
	Transport type	Client			
	Transport class	0 (no ACK)/2 (with ACK)			
	Attribute	**ID content**	**Get (read)**	**Set (write)**	**Value**
		1 State	Yes	No	---
		2 Instance_type	Yes	No	*
		3 Transport_class_trigger	Yes	No	02 hex (with Cyclic ACK) 12 hex (with COS ACK) 00 hex (no Cyclic ACK) 10 hex (no COS ACK)
		4 Produced_connection_ID	Yes	No	---
		5 Consumed_connection_ID	Yes	No	FFFF hex (no ACK)
		6 Initial_comm_characteristics	Yes	No	01 hex (with ACK) 0F hex (no ACK)
		7 Produced_connection_size	Yes	No	*
		8 Consumed_connection_size	Yes	No	---
		9 Expected_packed_rate	Yes	Yes	---
		12 Watchdog_timeout_action	Yes	No	0
		13 Produced_connection_path_length	Yes	No	4
		14 Produced_connection_path	Yes	No	20 94 24 01 hex
		15 Consumed_connection_path_length	Yes	No	0 (no ACK) 4 (with ACK)
		16 Consumed_connection_path	Yes	No	empty (no ACK) 20 2B 24 01 (with ACK)
		17 Production_inhibit_time	Yes	Yes	---
	Service	DeviceNet service	Parameter option		
		05 Reset	No		
		0E Get_Attribute_Single	No		
		10 Set_Attribute_Single	No		

* Number of input bytes used by Slave.

Object instance 5 and above	Section	Information			Max. No. of instances
	Instance type	Explicit Message/ I/O Message			199
	Production trigger	Cyclic			---
	Transport type	Server			
	Transport class	0/2/3			
	Attribute	**ID content**	**Get (read)**	**Set (write)**	**Value**
		1 State	Yes	No	---
		2 Instance_type	Yes	No	*1
		3 Transport_class_trigger	Yes	No	*2
		4 Produced_connection_ID	Yes	No	---
		5 Consumed_connection_ID	Yes	No	---
		6 Initial_comm_characteristics	Yes	No	---
		7 Produced_connection_size	Yes	No	---
		8 Consumed_connection_size	Yes	No	---
		9 Expected_packed_rate	Yes	Yes	---
		12 Watchdog_timeout_action	Yes	No	---
		13 Produced_connection_path_length	Yes	No	---
		14 Produced_connection_path	Yes	No	---
		15 Consumed_connection_path_length	Yes	No	---
		16 Consumed_connection_path	Yes	No	---
		17 Production_inhi_bit_time	Yes	Yes	---
	Service	DeviceNet service	Parameter option		
		05 Reset	No		
		0E Get_Attribute_Single	No		
		10 Set_Attribute_Single	No		

*1 The following table shows the instance type by communications type.

Communications type	Instance type
Explicit Message	0
I/O	1

*2 The following table shows the transport class trigger by connection type.

Format	Transport_class_trigger
Poll client	22 hex
COS (M) client	12 hex (with ACK)/10 hex (no ACK)
COS (M) server	92 hex (with ACK)/90 hex (no ACK)
Cyclic (M) client	02 hex (with ACK)/00 hex (no ACK)
Cyclic (M) server	82 hex (with ACK)/80 hex (no ACK)

Format	Transport_class_trigger
Bit-strobe client	22 hex
Explicit client	23 hex
Explicit server	83 hex

● PLC Object (2F Hex)

Object class	Attribute	Not supported
	Service	Not supported

		DeviceNet service	Parameter option
Object instance 1 (CIO area)	Service	1C Block String Read	Logical Area Address Length
		1D Block StringN Read	Logical Area Address Length
		1E Block String Write	Logical Area Address
		1F Block StringN Write	Logical Area Address
Object instance 3 (DM area)	Service	1C Block String Read	Logical Area Address Length
		1D Block StringN Read	Logical Area Address Length
		1E Block String Write	Logical Area Address
		1F Block StringN Write	Logical Area Address
Object instance 4 (WR area)	Service	1C Block String Read	Logical Area Address Length
		1D Block StringN Read	Logical Area Address Length
		1E Block String Write	Logical Area Address
		1F Block StringN Write	Logical Area Address
Object instance 5 (HR area)	Service	1C Block String Read	Logical Area Address Length
		1D Block StringN Read	Logical Area Address Length
		1E Block String Write	Logical Area Address
		1F Block StringN Write	Logical Area Address
Object instance 6 (AR area)	Service	1C Block String Read	Logical Area Address Length
		1D Block StringN Read	Logical Area Address Length
		1E Block String Write	Logical Area Address
		1F Block StringN Write	Logical Area Address
Object instance 7 (TIM/ CNT area)	Service	1C Block String Read	Logical Area Address Length
		1D Block StringN Read	Logical Area Address Length
		1E Block String Write	Logical Area Address
		1F Block StringN Write	Logical Area Address
Object instance 8-20 (EM0 to EMC area)	Service	1C Block String Read	Logical Area Address Length
		1D Block StringN Read	Logical Area Address Length
		1E Block String Write	Logical Area Address
		1F Block StringN Write	Logical Area Address

Note The refresh area types are shown in the following table.

PLC area	Refresh area type	Refresh address
CIO	1	CIO 0000 to CIO 6143
DM	3	D00000 to D32767
WR	4	W000 to W511
HE	5	H000 to H511
EM (bank 0)	8	E0_00000 to E0_32767
EM (bank 1)	9	E1_00000 to E1_32767
EM (bank 2)	A	E2_00000 to E2_32767
EM (bank 3)	B	E3_00000 to E3_32767
EM (bank 4)	C	E4_00000 to E4_32767
EM (bank 5)	D	E5_00000 to E5_32767
EM (bank 6)	E	E6_00000 to E6_32767
EM (bank 7)	F	E7_00000 to E7_32767
EM (bank 8)	10	E8_00000 to E8_32767
EM (bank 9)	11	E9_00000 to E9_32767
EM (bank 10)	12	EA_00000 to EA_32767
EM (bank 11)	13	EB_00000 to EB_32767
EM (bank 12)	14	EC_00000 to EC_32767

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