MITSUBISHI ELECTRIC

Programmable Controller

MELSEC iQ-R series

MELSEC iQ-R DeviceNet Master/Slave Module User's Manual (Application)

-RJ71DN91

SAFETY PRECAUTIONS

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.

The precautions given in this manual are concerned with this product only. For the safety precautions of the programmable controller system, refer to the MELSEC iQ-R Module Configuration Manual.

In this manual, the safety precautions are classified into two levels: "⚠ WARNING" and "⚠ CAUTION".

⚠ **WARNING**	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ **CAUTION**	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "⚠ CAUTION" may lead to serious consequences.

Observe the precautions of both levels because they are important for personal and system safety.

Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Design Precautions]

⚠WARNING

- Configure safety circuits external to the programmable controller to ensure that the entire system operates safely even when a fault occurs in the external power supply or the programmable controller. Failure to do so may result in an accident due to an incorrect output or malfunction.
  (1) Emergency stop circuits, protection circuits, and protective interlock circuits for conflicting operations (such as forward/reverse rotations or upper/lower limit positioning) must be configured external to the programmable controller.
  (2) When the programmable controller detects an abnormal condition, it stops the operation and all outputs are:
    - Turned off if the overcurrent or overvoltage protection of the power supply module is activated.
    - Held or turned off according to the parameter setting if the self-diagnostic function of the CPU module detects an error such as a watchdog timer error.
  (3) All outputs may be turned on if an error occurs in a part, such as an I/O control part, where the CPU module cannot detect any error. To ensure safety operation in such a case, provide a safety mechanism or a fail-safe circuit external to the programmable controller. For a fail-safe circuit example, refer to "General Safety Requirements" in the MELSEC iQ-R Module Configuration Manual.
  (4) Outputs may remain on or off due to a failure of a component such as a relay and transistor in an output circuit. Configure an external circuit for monitoring output signals that could cause a serious accident.
- In an output circuit, when a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.
- Configure a circuit so that the programmable controller is turned on first and then the external power supply. If the external power supply is turned on first, an accident may occur due to an incorrect output or malfunction.
- For the operating status of each node after a communication failure, refer to manuals relevant to the network. Incorrect output or malfunction due to a communication failure may result in an accident.
- When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.

[Design Precautions]

⚠WARNING

- Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.
- Do not write any data to the "system area" and "write-protect area" of the buffer memory in the module. Also, do not use any "use prohibited" signals as an output signal from the CPU module to each module. Doing so may cause malfunction of the programmable controller system. For the "system area", "write-protect area", and the "use prohibited" signals, refer to the user's manual for the module used.
- If a communication cable is disconnected, the network may be unstable, resulting in a communication failure of multiple nodes. Configure an interlock circuit in the program to ensure that the entire system will always operate safely even if communications fail. Incorrect output or malfunction due to a communication failure may result in an accident.
- To maintain the safety of the programmable controller system against unauthorized access from external devices via the network, take appropriate measures. To maintain the safety against unauthorized access via the Internet, take measures such as installing a firewall.
- If a communication failure occurs on a DeviceNet network, faulty nodes will behave as (1) and (2) below. Configure an interlock circuit in the program using the communication status information of slave nodes and provide a safety mechanism external to the slave node to ensure that the entire system will operate safely.
  (1) The master node (RJ71DN91) holds input data which had been received from slave nodes before the communication failure occurred.
  (2) Whether output signals of a slave node are turned off or held is determined by the specifications of slave nodes or the parameter settings of the master node. When the RJ71DN91 is used as a slave node, it holds input data that had been received from the master node before the communication failure occurred.

[Design Precautions]

⚠CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm or more between them. Failure to do so may result in malfunction due to noise.
- During control of an inductive load such as a lamp, heater, or solenoid valve, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on. Therefore, use a module that has a sufficient current rating.
- After the CPU module is powered on or is reset, the time taken to enter the RUN status varies depending on the system configuration, parameter settings, and/or program size. Design circuits so that the entire system will always operate safely, regardless of the time.
- Do not power off the programmable controller or reset the CPU module while the settings are being written. Doing so will make the data in the flash ROM and SD memory card undefined. The values need to be set in the buffer memory and written to the flash ROM and SD memory card again. Doing so also may cause malfunction or failure of the module.
- When changing the operating status of the CPU module from external devices (such as the remote RUN/STOP functions), select "Do Not Open by Program" for "Opening Method" of "Module Parameter". If "Open by Program" is selected, an execution of the remote STOP function causes the communication line to close. Consequently, the CPU module cannot reopen the line, and external devices cannot execute the remote RUN function.

[Installation Precautions]

⚠WARNING

- Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may result in electric shock or cause the module to fail or malfunction.

[Installation Precautions]

⚠CAUTION

- Use the programmable controller in an environment that meets the general specifications in the Safety Guidelines included with the base unit. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
- To mount a module, place the concave part(s) located at the bottom onto the guide(s) of the base unit, and push in the module until the hook(s) located at the top snaps into place. Incorrect interconnection may cause malfunction, failure, or drop of the module.
- To mount a module with no module fixing hook, place the concave part(s) located at the bottom onto the guide(s) of the base unit, push in the module, and fix it with screw(s). Incorrect interconnection may cause malfunction, failure, or drop of the module.
- When using the programmable controller in an environment of frequent vibrations, fix the module with a screw.
- Tighten the screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- When using an extension cable, connect it to the extension cable connector of the base unit securely. Check the connection for looseness. Poor contact may cause malfunction.
- When using an SD memory card, fully insert it into the SD memory card slot. Check that it is inserted completely. Poor contact may cause malfunction.
- Securely insert an extended SRAM cassette or a battery-less option cassette into the cassette connector of the CPU module. After insertion, close the cassette cover and check that the cassette is inserted completely. Poor contact may cause malfunction. Poor contact may cause malfunction.
- Do not directly touch any conductive parts and electronic components of the module, SD memory card, extended SRAM cassette, battery-less option cassette, or connector. Doing so can cause malfunction or failure of the module.

[Wiring Precautions]

⚠WARNING

- Shut off the external power supply (all phases) used in the system before installation and wiring. Failure to do so may result in electric shock or cause the module to fail or malfunction.
- After installation and wiring, attach a blank cover module (RG60) to each empty slot and an included extension connector protective cover to the unused extension cable connector before powering on the system for operation. Failure to do so may result in electric shock.

[Wiring Precautions]

⚠CAUTION

- Individually ground the FG and LG terminals of the programmable controller with a ground resistance of 100 ohms or less. Failure to do so may result in electric shock or malfunction.
- For terminal block wiring, use solderless terminals with an insulation sleeve. Do not connect more than two solderless terminals to a terminal.
- Use applicable solderless terminals and tighten them within the specified torque range. If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- Check the rated voltage and signal layout before wiring to the module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause fire or failure.
- Connectors for external devices must be crimped or pressed with the tool specified by the manufacturer, or must be correctly soldered. Incomplete connections may cause short circuit, fire, or malfunction.
- Securely connect the connector to the module. Poor contact may cause malfunction.
- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm or more between them. Failure to do so may result in malfunction due to noise.
- When an overcurrent caused by a failure of an external device or a module flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.
- Place the cables in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact. Do not clamp the extension cables with the jacket stripped. Doing so may change the characteristics of the cables, resulting in malfunction.
- When disconnecting the cable from the module, do not pull the cable by the cable part. For the cable with connector, hold the connector part of the cable. For the cable connected to the terminal block, loosen the terminal screw. Pulling the cable connected to the module may result in malfunction or damage to the module or cable.
- Check the interface type and correctly connect the cable. Incorrect wiring (connecting the cable to an incorrect interface) may cause failure of the module and external device.
- Tighten the terminal screws or connector screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, fire, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, fire, or malfunction.
- Tighten the terminal block mounting screws, terminal screws, or module fixing screws within the specified torque range. Undertightening the terminal block mounting screws or terminal screws can cause short circuit, fire, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, fire, or malfunction. Undertightening the module fixing screws can cause drop of the screw. Overtightening can damage the screw and/or module, resulting in drop.
- Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction.
- A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring. Do not remove the film during wiring. Remove it for heat dissipation before system operation.

[Wiring Precautions]

⚠CAUTION

- Programmable controllers must be installed in control panels. Connect the main power supply to the power supply module in the control panel through a relay terminal block. Wiring and replacement of a power supply module must be performed by qualified maintenance personnel with knowledge of protection against electric shock. For wiring, refer to the MELSEC iQ-R Module Configuration Manual.
- For Ethernet cables to be used in the system, select the ones that meet the specifications in the user's manual for the module used. If not, normal data transmission is not guaranteed.

[Startup and Maintenance Precautions]

⚠WARNING

- Do not touch any terminal while power is on. Doing so will cause electric shock or malfunction.
- Correctly connect the battery connector. Do not charge, disassemble, heat, short-circuit, solder, or throw the battery into the fire. Also, do not expose it to liquid or strong shock. Doing so will cause the battery to produce heat, explode, ignite, or leak, resulting in injury and fire.
- Shut off the external power supply (all phases) used in the system before cleaning the module or retightening the terminal screws, connector screws, or module fixing screws. Failure to do so may result in electric shock.

[Startup and Maintenance Precautions]

⚠CAUTION

- When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
- Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.
- Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire.
- Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) more than 25cm away in all directions from the programmable controller. Failure to do so may cause malfunction.
- Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may cause the module to fail or malfunction.
- Tighten the screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- After the first use of the product, do not perform each of the following operations more than 50 times (IEC 61131-2/JIS B 3502 compliant):
  - Mounting/removing the module to/from the base unit
  - Inserting/removing the extended SRAM cassette or battery-less option cassette to/from the CPU module
  - Mounting/removing the terminal block to/from the module

  Exceeding the limit may cause malfunction.
- After the first use of the product, do not insert/remove the SD memory card to/from the CPU module more than 500 times. Exceeding the limit may cause malfunction.
- Do not touch the metal terminals on the back side of the SD memory card. Doing so may cause malfunction or failure of the module.
- Do not touch the integrated circuits on the circuit board of an extended SRAM cassette or a battery-less option cassette.
- Do not drop or apply shock to the battery to be installed in the module. Doing so may damage the battery, causing the battery fluid to leak inside the battery. If the battery is dropped or any shock is applied to it, dispose of it without using.

[Startup and Maintenance Precautions]

⚠CAUTION

- Startup and maintenance of a control panel must be performed by qualified maintenance personnel with knowledge of protection against electric shock. Lock the control panel so that only qualified maintenance personnel can operate it.
- Before handling the module, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Failure to do so may cause the module to fail or malfunction.

[Operating Precautions]

⚠CAUTION

- When changing data and operating status, and modifying program of the running programmable controller from an external device such as a personal computer connected to an intelligent function module, read relevant manuals carefully and ensure the safety before operation. Incorrect change or modification may cause system malfunction, damage to the machines, or accidents.
- Do not power off the programmable controller or reset the CPU module while the setting values in the buffer memory are being written to the flash ROM in the module. Doing so will make the data in the flash ROM undefined. The values need to be set in the buffer memory and written to the flash ROM again. Doing so can cause malfunction or failure of the module.

[Disposal Precautions]

⚠CAUTION

- When disposing of this product, treat it as industrial waste.
- When disposing of batteries, separate them from other wastes according to the local regulations. For details on battery regulations in EU member states, refer to the MELSEC iQ-R Module Configuration Manual.

[Transportation Precautions]

⚠CAUTION

- When transporting lithium batteries, follow the transportation regulations. For details on the regulated models, refer to the MELSEC iQ-R Module Configuration Manual.
- The halogens (such as fluorine, chlorine, bromine, and iodine), which are contained in a fumigant used for disinfection and pest control of wood packaging materials, may cause failure of the product. Prevent the entry of fumigant residues into the product or consider other methods (such as heat treatment) instead of fumigation. The disinfection and pest control measures must be applied to unprocessed raw wood.

CONDITIONS OF USE FOR THE PRODUCT

(1) Mitsubishi programmable controller ("the PRODUCT") shall be used in conditions;
i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
("Prohibited Application")
Prohibited Applications include, but not limited to, the use of the PRODUCT in;
- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above restrictions, Mitsubishi may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the Mitsubishi representative in your region.

INTRODUCTION

Thank you for purchasing the Mitsubishi Electric MELSEC iQ-R series programmable controllers.
This manual describes the functions, parameter settings, programming, and troubleshooting of the relevant product listed below.
Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the MELSEC iQ-R series programmable controller to handle the product correctly.
When applying the program examples provided in this manual to an actual system, ensure the applicability and confirm that it will not cause system control problems.
Please make sure that the end users read this manual.

Relevant product

RJ71DN91

Point

DeviceNet means DeviceNet® in this manual.

CONTENTS

RELEVANT MANUALS

Manual name [manual number]	Description	Available form
MELSEC iQ-R DeviceNet Master/Slave Module User's Manual (Application) [SH-081767ENG] (this manual)	Functions, parameter settings, programming, troubleshooting, I/O signals, and buffer memory of the DeviceNet master/slave module	Print book e-Manual PDF
MELSEC iQ-R DeviceNet Master/Slave Module User's Manual (Startup) [SH-081765ENG]	Specifications, procedures before operation, system configuration, wiring, and communication examples of the DeviceNet master/slave module	Print book e-Manual PDF
MELSEC iQ-R Programming Manual (Module Dedicated Instructions) [SH-081976ENG]	Dedicated instructions for the intelligent function modules	e-Manual PDF

Point

e-Manual refers to the Mitsubishi Electric FA electronic book manuals that can be browsed using a dedicated tool.

e-Manual has the following features:

- Required information can be cross-searched in multiple manuals.
- Other manuals can be accessed from the links in the manual.
- The hardware specifications of each part can be found from the product figures.
- Pages that users often browse can be bookmarked.
- Sample programs can be copied to an engineering tool.

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
Buffer memory	A memory in an intelligent function module, where data (such as setting values and monitoring values) are stored. When using the CPU module, the memory is indicated for storing data (such as setting values and monitored values) of the Ethernet function and data used for data communication of the multiple CPU function.
Connection type	Communication methods that are used for I/O communications between the master node and slave nodes. When the RJ71DN91 is used as a master node, one of the following connection types, which are defined by the DeviceNet specification, can be selected for each slave node. • Polling • Bit strobe • Change of state • Cyclic When the RJ71DN91 is used as a slave node, I/O communications are performed in polling.
C Controller module	A generic term for the MELSEC iQ-R series C Controller modules
CPU module	A generic term for the MELSEC iQ-R series CPU modules
Device	A device (X, Y, M, D, or others) in a CPU module
Engineering tool	Another term for the software package for the MELSEC programmable controllers
Flash ROM	Internal memory of the RJ71DN91, in which parameters can be saved. Parameters that are saved in the flash ROM are read automatically to the buffer memory when the system is powered off and on or the CPU module is reset. (When module parameters are not set with GX Works3 or "Basic parameter setting" of the module parameter is set to "Program")
Global label	A label that is valid for all the program data when multiple program data are created in the project. There are two types of global label: a module specific label (module label), which is generated automatically by GX Works3, and an optional label, which can be created for any specified device.
Intelligent function module	A module that has functions other than input and output, such as an A/D converter module and D/A converter module
Label	A label that represents a device in a given character string
Master node	A device that communicates I/O data with slave nodes set in the parameters for master function
Module label	A label that represents one of memory areas (I/O signals and buffer memory areas) specific to each module in a given character string. GX Works3 automatically generates this label, which can be used as a global label.
Parameter for master function	A parameter for setting information, such as a connection type and the number of I/O points, to perform I/O communications with each slave node when the RJ71DN91 is used as a master node
Parameter for slave function	Parameters that change the number of I/O points of a slave node when the RJ71DN91 is used as a slave node
Process CPU	A generic term for the R08PCPU, R16PCPU, R32PCPU, R120PCPU
Process CPU (process mode)	A Process CPU operating in process mode. Process control function blocks and the online module change function can be used.
RAS	The abbreviation for Reliability, Availability, and Serviceability. This term refers to the overall usability of automated equipment.
Reserved node	This node is not actually connected, but counted as a connected node.
RnCPU	A generic term for the R00CPU, R01CPU, R02CPU, R04CPU, R08CPU, R16CPU, R32CPU, and R120CPU.
RnENCPU	A generic term for the R04ENCPU, R08ENCPU, R16ENCPU, R32ENCPU, R120ENCPU
Safety CPU	A generic term for the R08SFCPU, R16SFCPU, R32SFCPU, and R120SFCPU. This module is used with a safety function module as a pair, and performs both standard control and safety control.
Slave node	A device that communicates I/O data with the master node

Instruction symbols

Unless otherwise specified, this manual uses the following generic symbols for some instructions.

Classification	Instruction symbol	Generic symbol
Data consistency dedicated instruction	G.DNTMRD	DNTMRD
	G.DNTMWR	DNTMWR
	G.DNTSRD	DNTSRD
	G.DNTSWR	DNTSWR

1 FUNCTIONS

1.1 Master Function (I/O Communication)

This function communicates the I/O data with each slave node (63 at maximum) using the buffer memory of the RJ71DN91. Input 512 bytes (256 bytes at maximum per node) and output 512 bytes (256 bytes at maximum per node) can be communicated.

Setting for I/O communication with each slave node

- Set the connection type and number of I/O points for the I/O communication with each slave node with the engineering tool.
- The master function parameter can be set with a program as well. (☞ Page 95 Setting the Parameter with a Program)

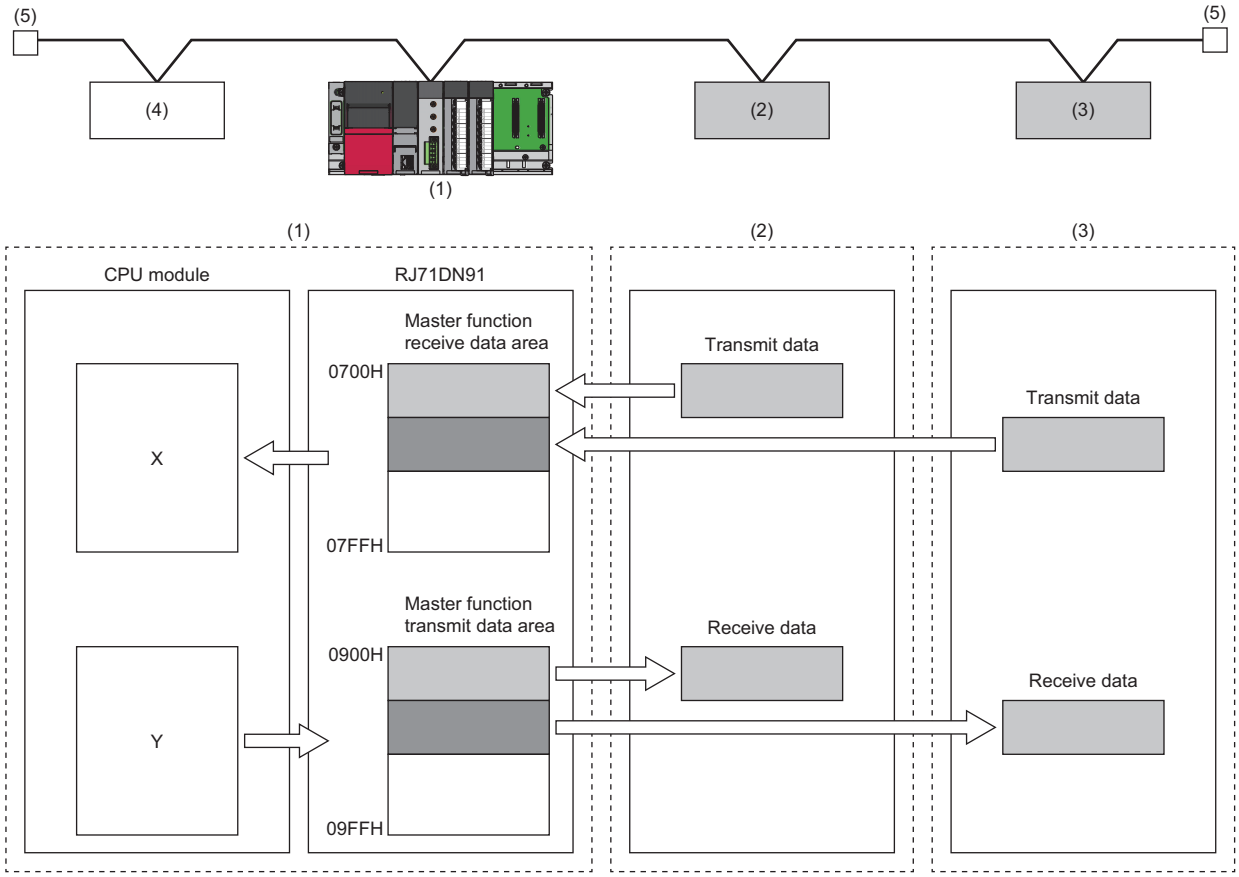
Reading/writing I/O data

- The I/O data is stored in the following buffer memory.

Buffer memory address	Item	Description	Reference
Un\G1792 to Un\G2047	Master function receive data	The data received from each slave node is stored.	☞ Page 86 Master function receive data (Un\G1792 to Un\G2047)
Un\G2304 to Un\G2559	Master function transmit data	Data to be transmitted to each slave node is set.	☞ Page 86 Master function transmit data (Un\G2304 to Un\G2559)

Flow of I/O data

The following figure shows the I/O communication between the RJ71DN91 (master node) and two slave nodes as an example.

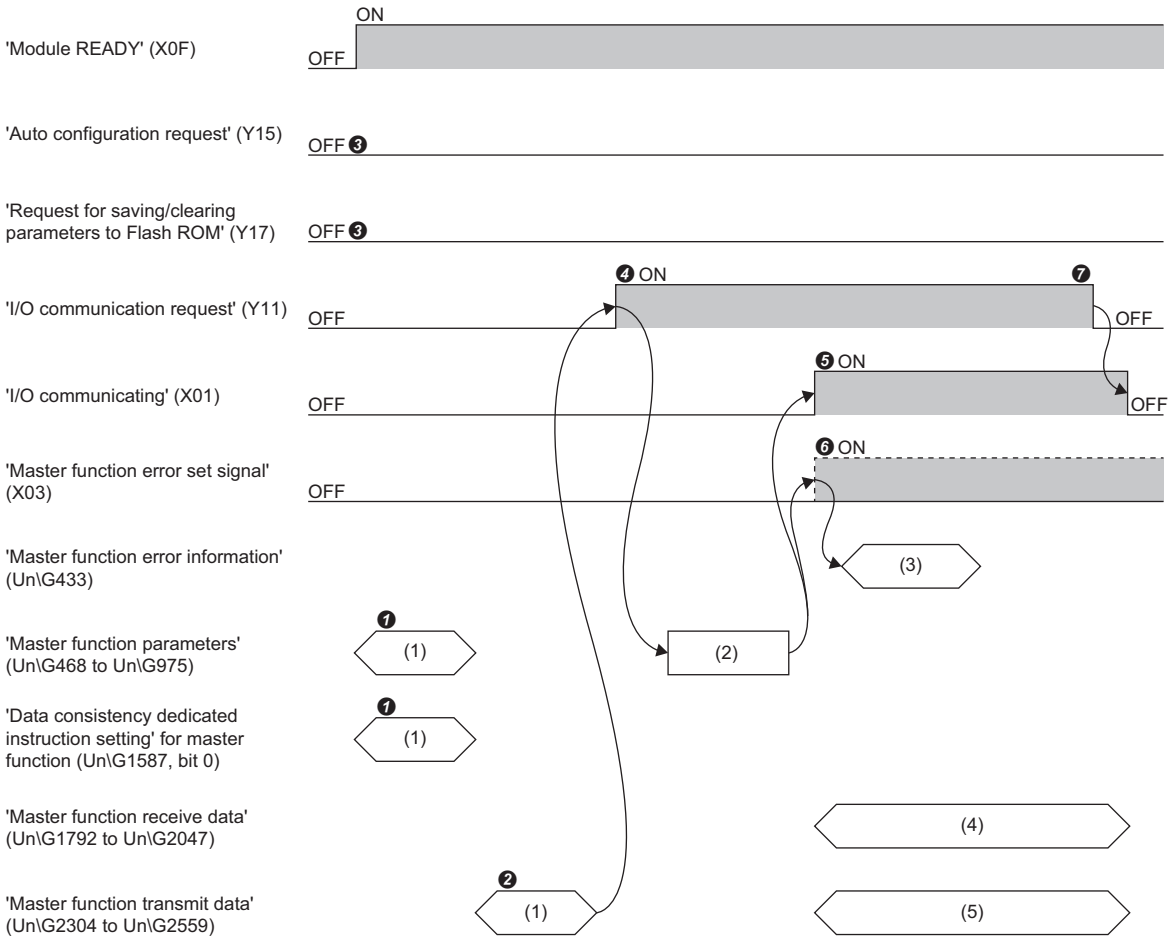


(1) Master node
(2) Slave node 1
(3) Slave node 2
(4) Network power supply equipment
(5) Terminating resistor

Flow of operation

This section describes the flow of operation of the I/O communication with each slave node.

Starting the I/O communication with 'I/O communication request' (Y11)



(1) MOV/TO instruction
(2) Parameter check
(3) MOV/FROM instruction
(4) MOV/FROM instruction, DNTMRD, or M+RJ71DN91_MasterRead
(5) MOV/TO instruction, DNTMWR, or M+RJ71DN91_MasterWrite

❶ Set the following items.
- Set the parameter in 'Master function parameters' (Un\G468 to Un\G975).
- Set whether to enable or disable the data consistency dedicated instruction with 'Data consistency dedicated instruction setting' (Un\G1587.0) for the master function.

❷ Set the default value of ON/OFF information to each slave node in 'Master function transmit data' (Un\G2304 to Un\G2559).

❸ Turn off 'Auto configuration request' (Y15) and 'Request for saving/clearing parameters to Flash ROM' (Y17).

❹ When 'I/O communication request' (Y11) is turned on, the parameter is checked.

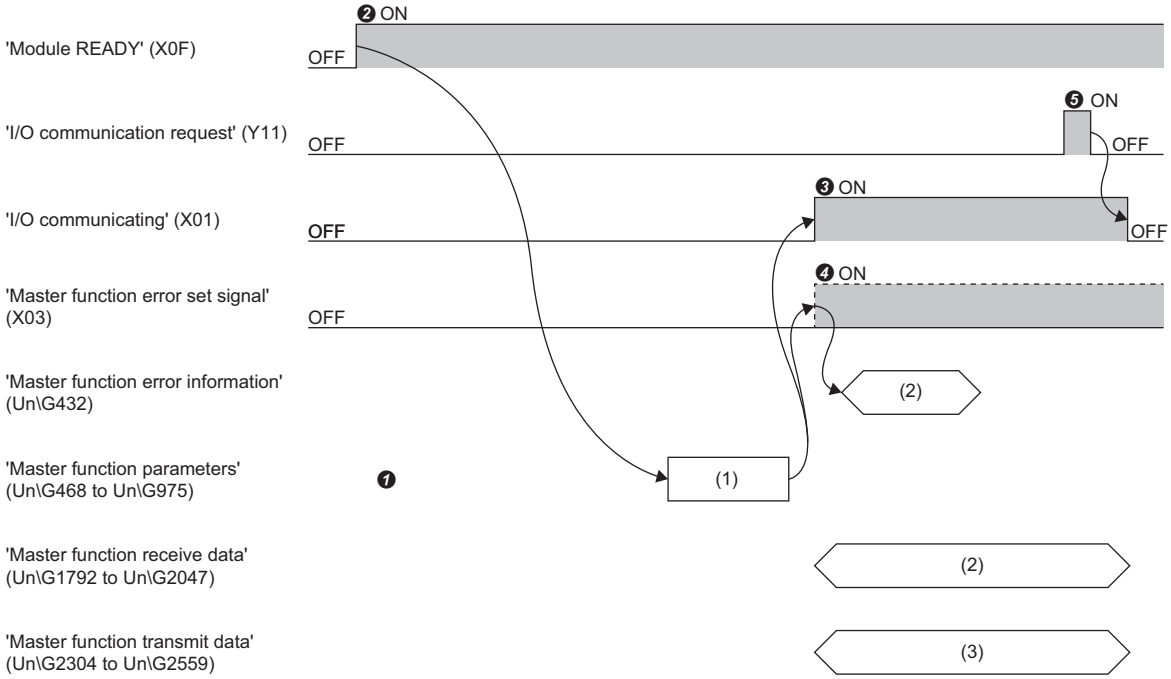
❺ When the parameter check normally completes, the I/O communication with each slave node starts and 'I/O communicating' (X01) turns on.
- The input status from each slave node is stored in 'Master function receive data (Un\G1792 to Un\G2047).
- Set the ON/OFF information to each slave node in 'Master function transmit data' (Un\G2304 to Un\G2559).

❻ When the parameter check abnormally completes, an error occurs and 'Master function error set signal' (X03) turns on. 'I/O communicating' (X01) does not turn on at this time. Check the error code with the module diagnostics, 'Master function error information' (Un\G433), or 'Master function communication error information' (Un\G1152), and correct the error.

❼ When 'I/O communication request' (Y11) is turned off, the I/O communication with each slave node stops and 'I/O communicating' (X01) turns off.

Starting the I/O communication automatically at power-on

For auto communications, set 'Auto communication start setting' (Un\G1585) to "Start".



(1) Parameter check
(2) MOV/FROM instruction
(3) MOV/TO instruction

❶ Set the following parameters in advance.
- 'Master function parameters' (Un\G468 to Un\G975)
- 'Auto communication start setting' (Un\G1585)

❷ When the power is turned on, 'Module READY' (X0F) turns on and the parameter is checked.

❸ When the parameter check normally completes, the I/O communication with each slave node starts and 'I/O communicating' (X01) turns on.
- The input status from each slave node is stored in 'Master function receive data (Un\G1792 to Un\G2047).
- Set the ON/OFF information to each slave node in 'Master function transmit data' (Un\G2304 to Un\G2559).

❹ When the parameter check abnormally completes, an error occurs and 'Master function error set signal' (X03) turns on. 'I/O communicating' (X01) does not turn on at this time. Check the error code with the module diagnostics, 'Master function error information' (Un\G433), or 'Master function communication error information' (Un\G1152), and correct the error.

❺ When 'I/O communication signal request' (Y11) turns on and off, the I/O communication with each slave node stops and 'I/O communicating' (X01) turns off.

Overview of each connection type

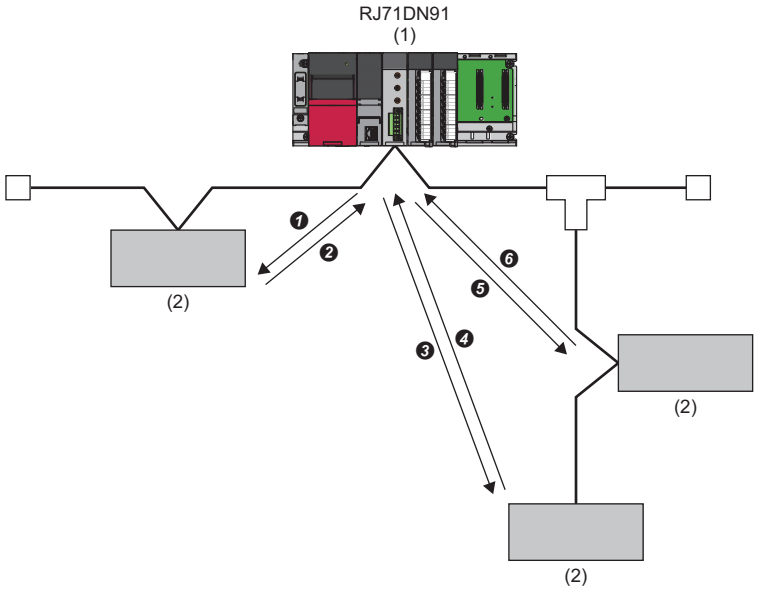
One of the following connection types, which are defined by the DeviceNet specification, can be selected for each slave node.

- Polling
- Bit strobe
- Change of state
- Cyclic

For the connection type available for the slave node, refer to the manual of each slave node.

Polling

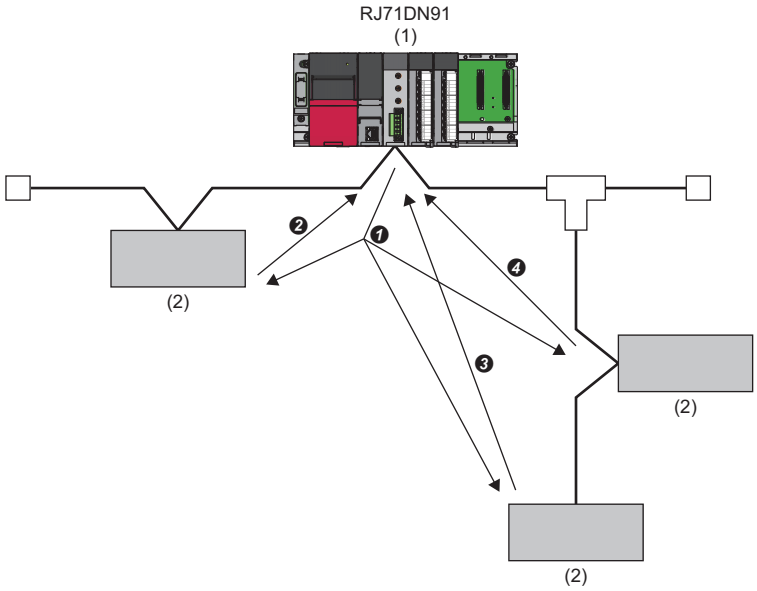
The polling is the communication method that repeats the following communication from ❶ to ❻ to each slave node.



(1) Master node
(2) Slave node
❶ The master node transmits the data.
❷ The slave node transmits the data using ❶ as a trigger.
❸ The master node transmits the data.
❹ The slave node transmits the data using ❸ as a trigger.
❺ The master node transmits the data.
❻ The slave node transmits the data using ❺ as a trigger.

Bit strobe

The bit strobe is the communication method that repeats the following communication from ❶ to ❹ to each slave node.

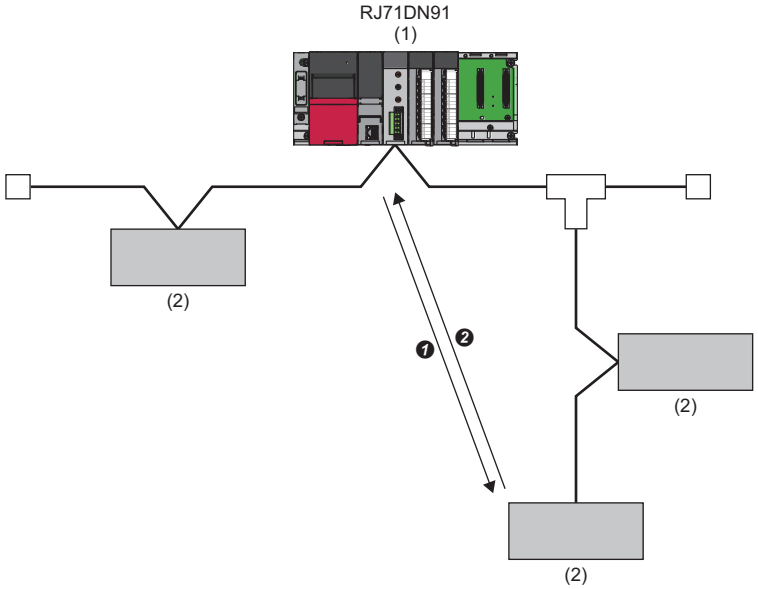


(1) Master node
(2) Slave node
❶ Messages are transmitted to each slave node simultaneously.
❷ The slave node transmits the data using ❶ as a trigger.
❸ The slave node transmits the data using ❶ as a trigger.
❹ The slave node transmits the data using ❶ as a trigger.

Change of state

The change of state is the communication method that performs the following communication, ❶ and ❷, along with the change of the I/O data.

When the I/O data is not changed, the data is not transmitted.

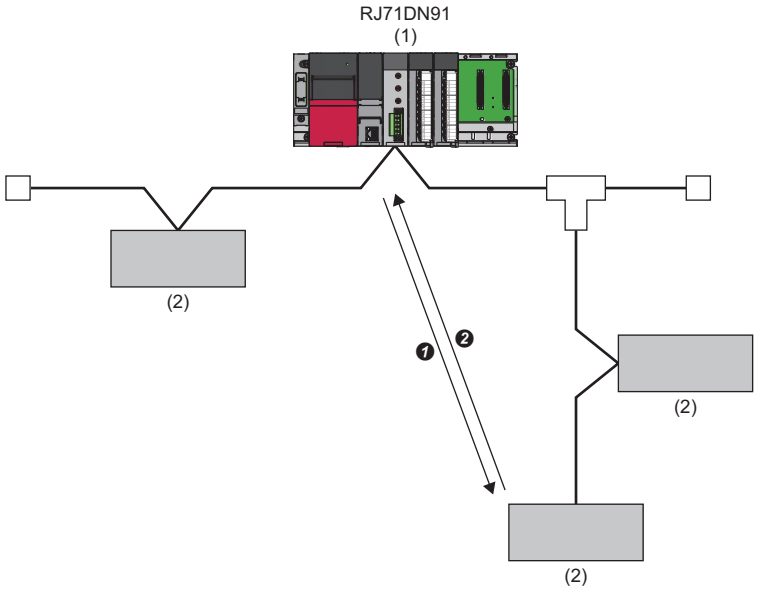


(1) Master node
(2) Slave node
❶ When the output data of the master node is changed, the data is transmitted to the slave node.
❷ When the input data of the slave node is changed, the data is transmitted to the master node.

The concept of the communication cycle is not applied to the change of state.

Cyclic

The cyclic is the communication method that repeats the following communication, ❶ and ❷, regularly to each slave node.



(1) Master node
(2) Slave node
❶ The master node transmits the data in it to the slave node.
❷ The slave node transmits the data in it to the master node.

The transmit cycle of the cyclic can be specified by each slave node.

Set the transmit cycle with the following parameter.

- Transmit cycle from the master node: Production inhibit rate
- Transmit cycle from the slave node: Expected packet rate

The concept of the communication cycle is not applied to the cyclic.

1.2 Master Function (Message Communication)

This function reads/writes the attribute data of the slave node, acquires communication error information, and requests a reset message using the buffer memory of the RJ71DN91.

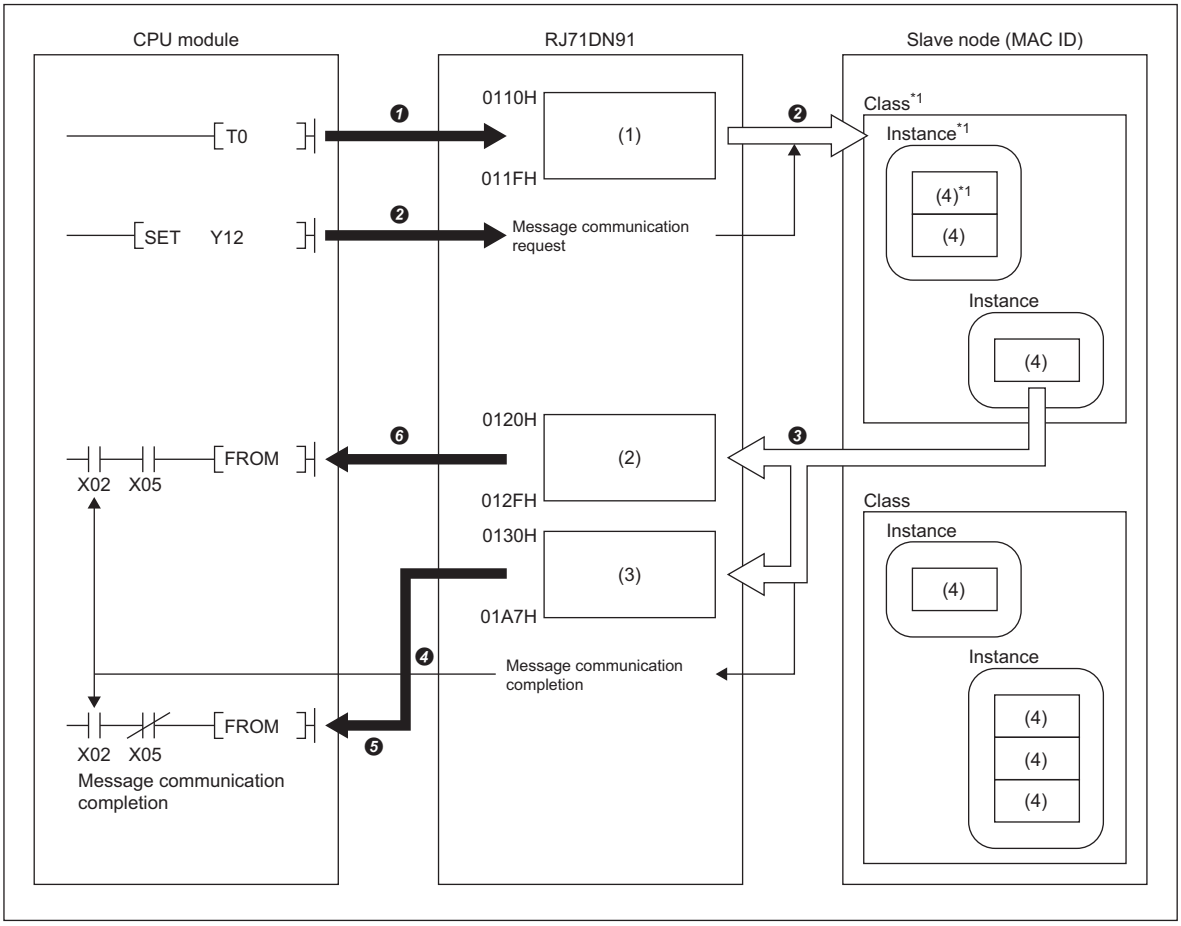
For details on other message communications, refer to DeviceNet common service in THE CIP NETWORKS LIBRARY Volume 3 DeviceNet Adaptation of CIP Edition 1.14.

The message data of 240 bytes can be communicated at once.

For the execution timing, refer to the following.

☞ Page 65 For message communication (X02), (X05), (Y12)

Reading attribute data

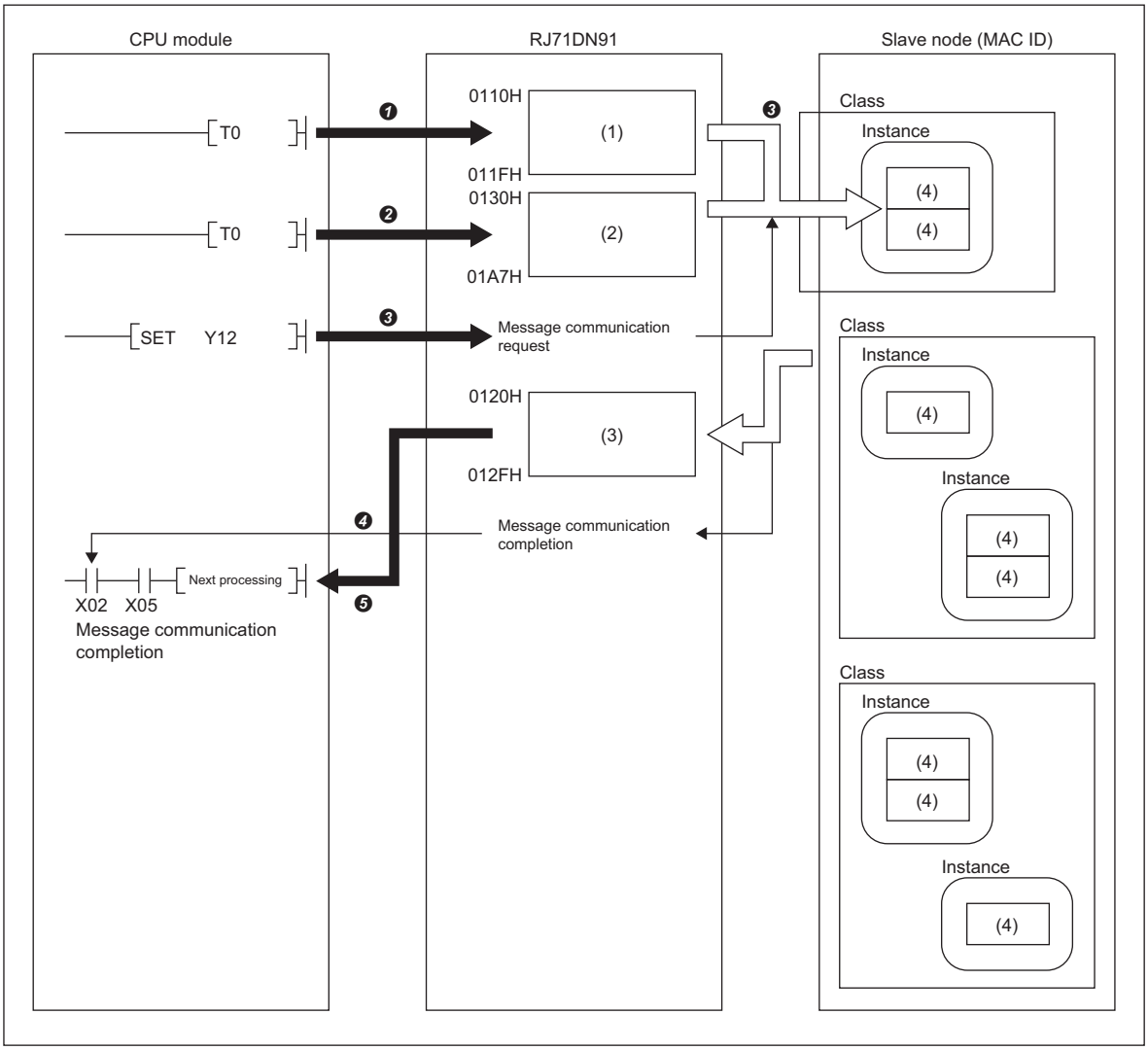


(1) Message communication command
(2) Message communication result
(3) Message communication data
(4) Attribute

❶ Set the command data in 'Message communication command' (Un\G272 to Un\G287) (0110H to 011FH).
❷ When 'Message communication request' (Y12) is turned on, the master node reads the attribute data from the slave node set with the command data.
❸ The attribute data of the slave node is stored in 'Message communication data' (Un\G304 to Un\G423) (0130H to 01A7H).
❹ When the read processing completes, the processing result is stored in 'Message communication result' (Un\G288 to Un\G303) (0120H to 012FH) and 'Message communication completion' (X02) turns on.
❺ The attribute data of the slave node stored in 'Message communication data' (Un\G304 to Un\G423) (0130H to 01A7H) is written to the CPU module.
❻ When the read processing completes with an error, 'Message communication error signal' (X05) turns on. The content of 'Message communication result' (Un\G288 to Un\G303) (0120H to 012FH) is read, and the cause of the error is checked.

*1 In DeviceNet, the area where is read and written by communications is specified with the number, such as the class ID, instance ID, and attribute ID.
For details, refer to the manual for each slave node.

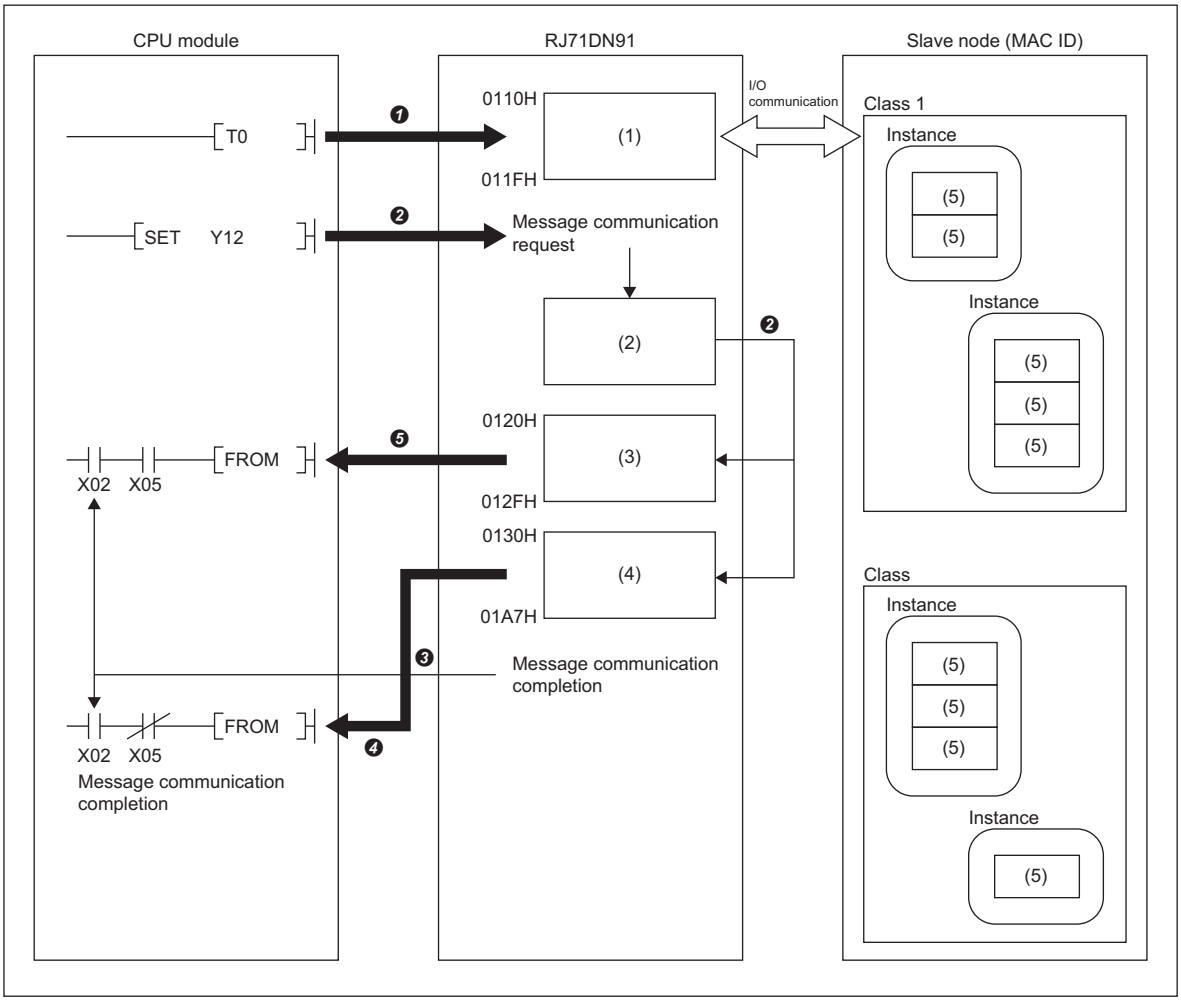
Writing attribute data



(1) Message communication command
(2) Message communication data
(3) Message communication result
(4) Attribute

❶ Set the command data in 'Message communication command' (Un\G272 to Un\G287) (110H to 11FH).
❷ Set the attribute data in 'Message communication data' (Un\G304 to Un\G423) (130H to 1A7H).
❸ When 'Message communication request' (Y12) is turned on, the master node writes the attribute data to the slave node set with the command data.
❹ When the write processing completes, the processing result is stored in 'Message communication result' (Un\G288 to Un\G303) (120H to 12FH) and 'Message communication completion' (X02) turns on.
❺ When the write processing completes with an error, 'Message communication error signal' (X05) turns on. The content of 'Message communication result' (Un\G288 to Un\G303) (120H to 12FH) is read, and the cause of the error is checked.

Acquiring communication error information



(1) Message communication command
(2) Slave information storage area: Stores the status of each slave node during the I/O communication.
(3) Message communication result
(4) Message communication data
(5) Attribute

❶ Set the command data in 'Message communication command' (Un\G272 to Un\G287) (110H to 11FH).

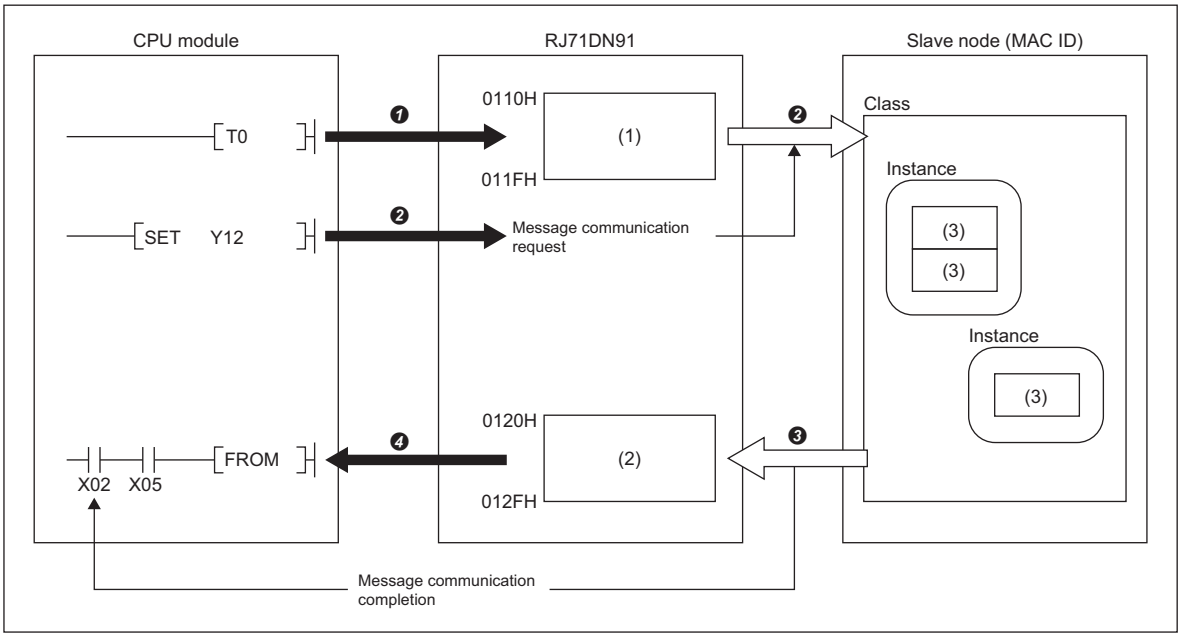
❷ When 'Message communication request' (Y12) is turned on, the communication error information of the corresponding slave node stored in the RJ71DN91 is stored in 'Message communication data' (Un\G304 to Un\G423) (130H to 1A7H).

❸ When the read processing completes, the processing result is stored in 'Message communication result' (Un\G288 to Un\G303) (120H to 12FH) and 'Message communication completion' (X02) turns on.

❹ The communication error information of the slave node stored in 'Message communication data' (Un\G304 to Un\G423) (130H to 1A7H) is written to the CPU module.

❺ When the read processing completes with an error, 'Message communication error signal' (X05) turns on. The content of 'Message communication result' (Un\G288 to Un\G303) (120H to 12FH) is read, and the cause of the error is checked.

Reset



(1) Message communication command
(2) Message communication result
(3) Attribute

❶ Set the command data in 'Message communication command' (Un\G272 to Un\G287) (0110H to 011FH).

❷ When 'Message communication request' (Y12) is turned on, the master node transmits a reset message to the slave node set with the command data.

❸ When the message communication processing completes, the processing result is stored in 'Message communication result' (Un\G288 to Un\G303) (0120H to 012FH) and 'Message communication completion' (X02) turns on.

❹ When the message communication processing completes with an error, 'Message communication error signal' (X05) turns on. The content of 'Message communication result' (Un\G288 to Un\G303) (0120H to 012FH) is read, and the cause of the error is checked.

1.3 Slave Function (I/O Communication)

This function enables the communications of I/O data between the master node and the slave nodes using the buffer memory of the RJ71DN91.
Input 128 bytes and output 128 bytes can be communicated.
The connection type is polling.

Setting for I/O communication with the master node

- Set the number of I/O points for the I/O communication with the master node with the engineering tool. This setting is unnecessary when the value is not changed from the default value (number of I/O points: 8 bytes for each).
- The slave function parameter can be set with a program as well. (☞ Page 95 Setting the Parameter with a Program)

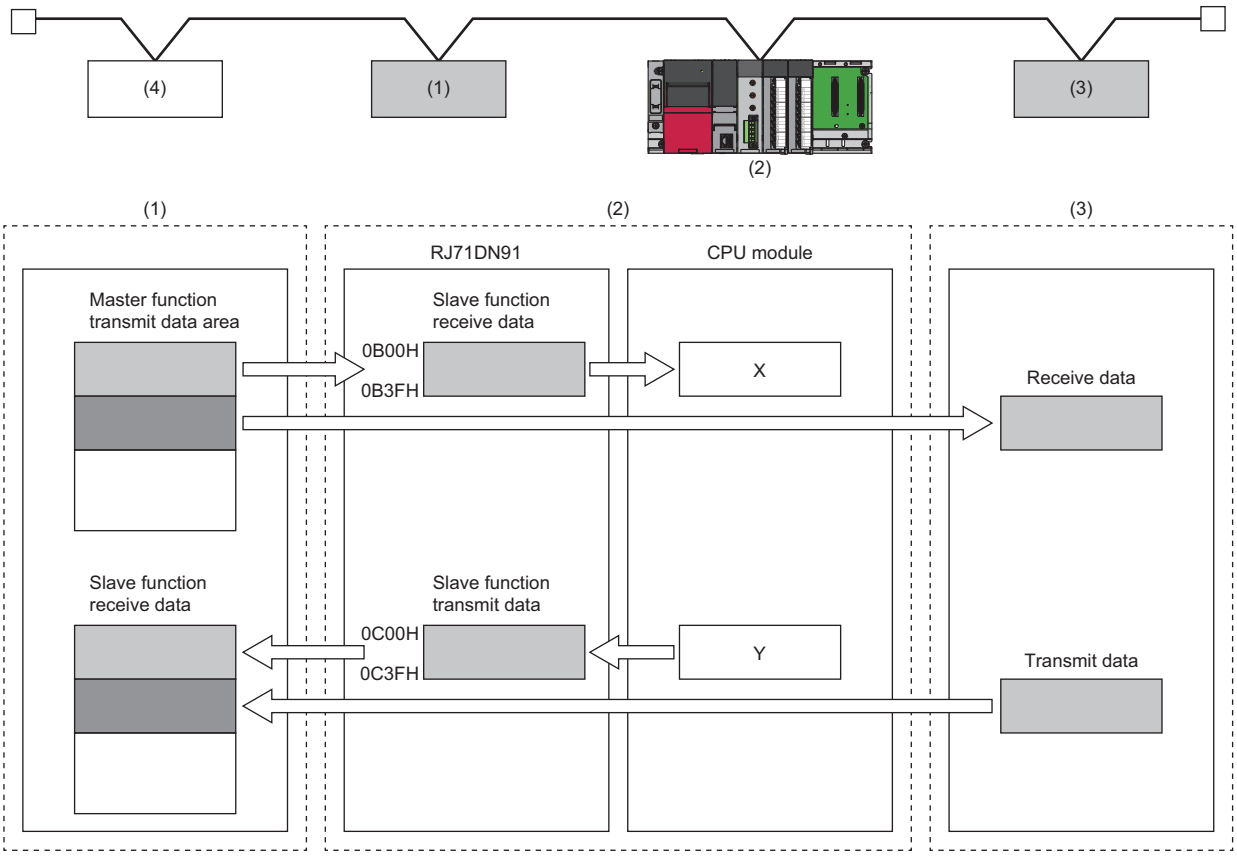
Reading/writing I/O data

- The I/O data is stored in the following buffer memory.

Buffer memory address	Item	Description	Reference
Un\G2816 to Un\G2879	Slave function receive data	The data received from the master node is stored.	☞ Page 89 Slave function receive data (Un\G2816 to Un\G2879)
Un\G3072 to Un\G3135	Slave function transmit data	The data transmitted to the master node is set.	☞ Page 89 Slave function transmit data (Un\G3072 to Un\G3135)

Flow of I/O data

The following figure shows the I/O communication between the RJ71DN91 (slave node) and the master node as an example.

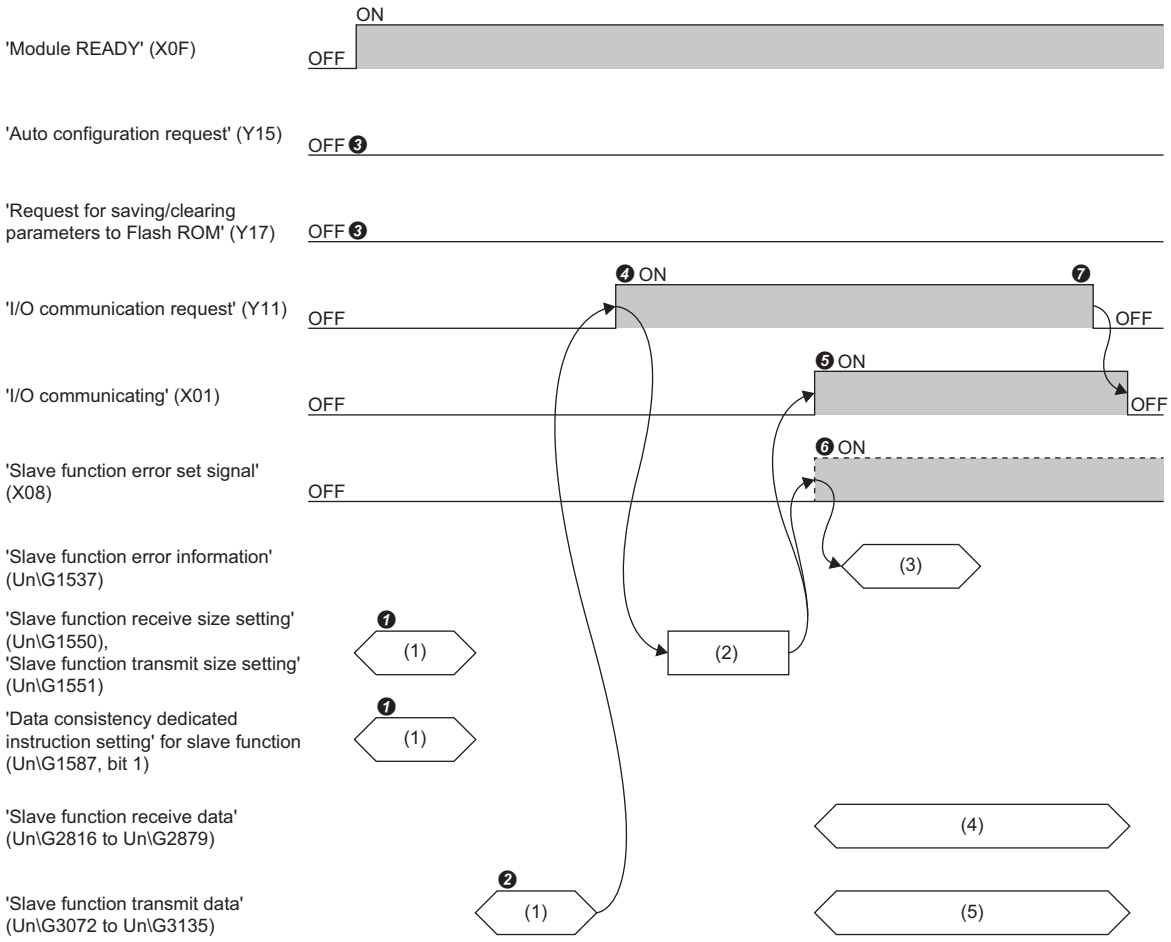


(1) Master node
(2) Slave node 1 (RJ71DN91)
(3) Slave node 2
(4) Network power supply equipment

Flow of operation

This section describes the flow of the operation of the I/O communication with the master node.

Starting the I/O communication with 'I/O communication request' (Y11)



(1) MOV/TO instruction
(2) Parameter check
(3) MOV/FROM instruction
(4) MOV/FROM instruction, DNTSRD, or M+RJ71DN91_SlaveRead
(5) MOV/TO instruction, DNTSWR, or M+RJ71DN91_SlaveWrite

❶ Set the following items.
- Set the parameter in 'Slave function receive size setting' (Un\G1550) and 'Slave function transmit size setting' (Un\G1551).
- Set whether to enable or disable the data consistency dedicated instruction with 'Data consistency dedicated instruction setting' (Un\G1587.1) for the slave function.

❷ Set the default value of the ON/OFF information that is to be transmitted to the master node to 'Slave function transmit data' (Un\G3072 to Un\G3135)

❸ Turn off 'Auto configuration request' (Y15) and 'Request for saving/clearing parameters to Flash ROM' (Y17).

❹ When 'I/O communication request' (Y11) is turned on, the parameter is checked.

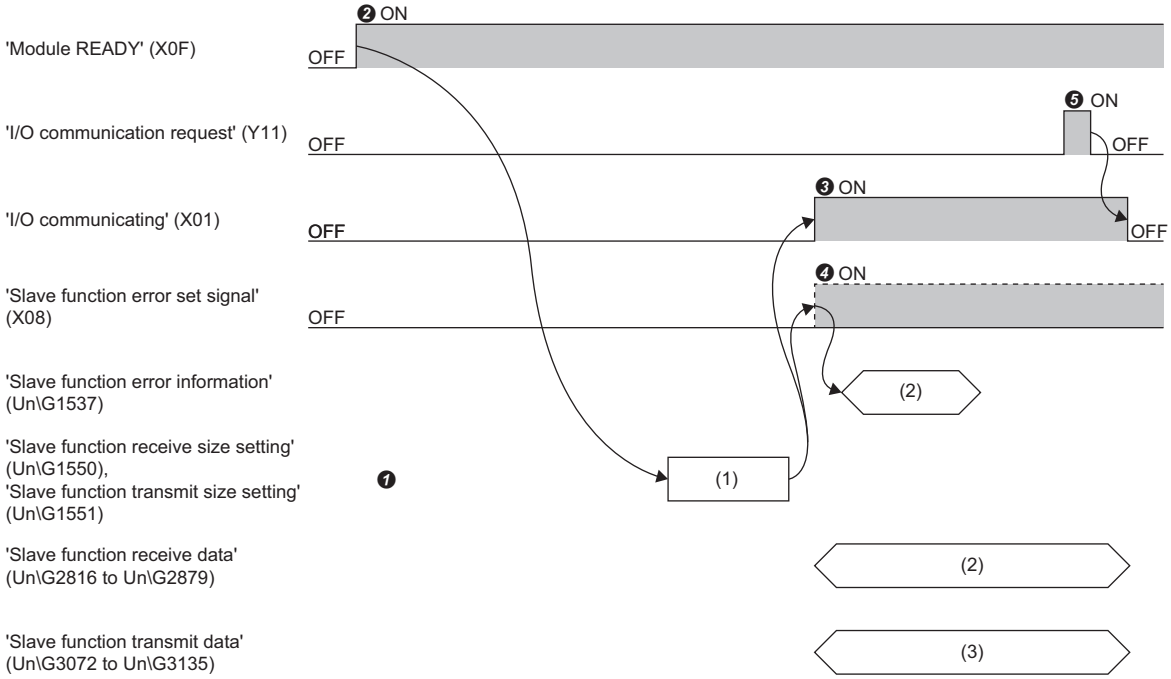
❺ When the parameter check normally completes, the I/O communication with the master node starts and 'I/O communicating' (X01) turns on. However, the node is at connection establishment waiting status until the I/O communication request is transmitted from the master function.
- The transmit data from the master node is stored in 'Slave function receive data' (Un\G2816 to Un\G2879).
- Set the ON/OFF information that is to be transmitted to the master node to 'Slave function transmit data' (Un\G3072 to Un\G3135).

❻ When the parameter check abnormally completes, an error occurs and 'Slave function error set signal' (X08) turns on. 'I/O communicating' (X01) does not turn on at this time. Check the error code with the module diagnostics, 'Slave function error information' (Un\G1537), or 'Slave function communication error information' (Un\G1153), and correct the error.

❼ When 'I/O communication request' (Y11) is turned off, the I/O communication with the master node stops and 'I/O communicating' (X01) turns off.

Starting the I/O communication automatically at power-on

For auto communications, set 'Auto communication start setting' (Un\G1585) to "Start".



(1) Parameter check
(2) MOV/FROM instruction
(3) MOV/TO instruction

❶ Set the following parameters in advance.
- Set the parameter in 'Slave function receive size setting' (Un\G1550) and 'Slave function transmit size setting' (Un\G1551).
- 'Auto communication start setting' (Un\G1585)

❷ When the power is turned on, 'Module READY' (X0F) turns on and the parameter is checked.

❸ When the parameter check normally completes, the I/O communication with the master node starts and 'I/O communicating' (X01) turns on. However, the node is at connection establishment waiting status until the I/O communication request is transmitted from the master function.
- The transmit data from the master node is stored in 'Slave function receive data' (Un\G2816 to Un\G2879).
- Set the ON/OFF information that is to be transmitted to the master node to 'Slave function transmit data' (Un\G3072 to Un\G3135).

❹ When the parameter check abnormally completes, an error occurs and 'Slave function error set signal' (X08) turns on. 'I/O communicating' (X01) does not turn on at this time. Check the error code with the module diagnostics, 'Slave function error information' (Un\G1537), or 'Slave function communication error information' (Un\G1153), and correct the error.

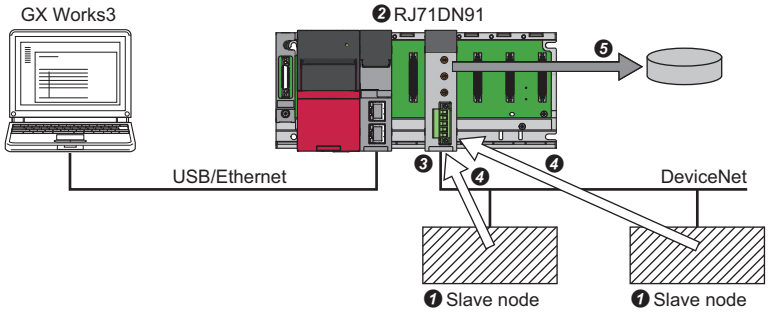
❺ When 'I/O communication signal request' (Y11) turns on and off, the I/O communication with the master node stops and 'I/O communicating' (X01) turns off.

1.4 Auto Configuration Function

The auto configuration function detects the slave node on the network and automatically creates the slave node information of the parameter for master function. By saving the slave node information to the RJ71DN91, the same slave node information can be used even after the CPU module is reset and the system is powered off and on.

Procedure of auto configuration

This section describes the flow of creating the slave node information and storing it to the module by the auto configuration.



❶ The slave node in which the I/O communication is set is connected to the network as the detection target of the auto configuration. For the I/O communication setting of the slave node, refer to the manual for the slave node to be connected.
❷ Set the operation mode of the RJ71DN91 to the master function or the master function + slave function, and turn off and on the CPU module.
❸ To execute the auto configuration, 'I/O communication request' (Y11) is turned off and the I/O communication is stopped. For the stop of the I/O communication, refer to the following.
☞ Page 68 I/O communicating (X01), I/O communication request (Y11)
❹ Set the operation setting of the auto configuration. The auto configuration is executed, and the slave node information is created.
For the operation setting of the auto configuration, refer to the following.
☞ Page 85 Auto configuration operation setting (Un\G1008)
For the execution of the auto configuration, refer to the following.
☞ Page 66 For auto configuration (X14), (X15), (Y15)
❺ The created slave node information is saved to the flash ROM of the RJ71DN91. For how to store in the flash ROM, refer to the following.
☞ Page 70 For flash ROM (X06), (X07), (Y17)

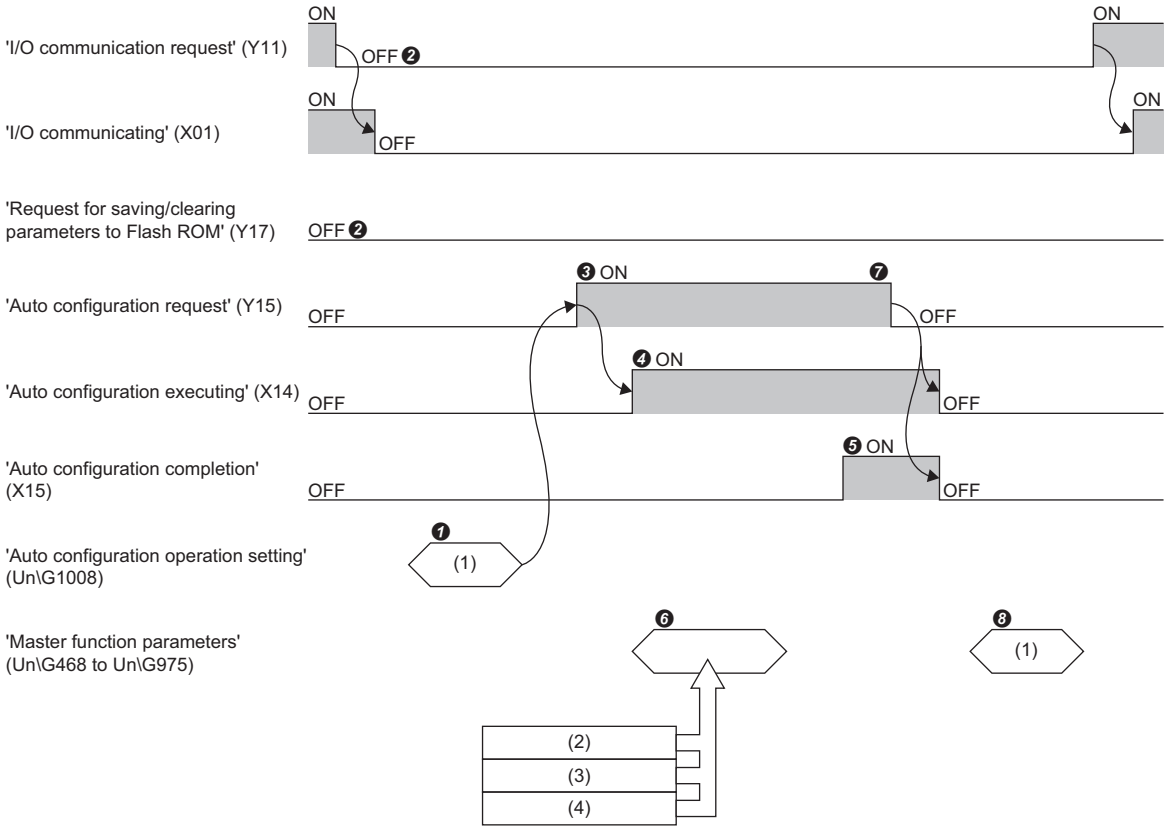
For the program example of when the auto configuration is used, refer to the following.
☞ Page 95 Setting the Parameter with a Program

Point

The processing of the auto configuration takes approximately 60 minutes at maximum.

Flow of the auto configuration operation

This section describes the flow of the operation when the auto configuration is used for setting parameters.



(1) MOV/TO instruction
(2) Slave node (node address 1)
(3) Slave node (node address 2)
(4) Slave node (node address 3)

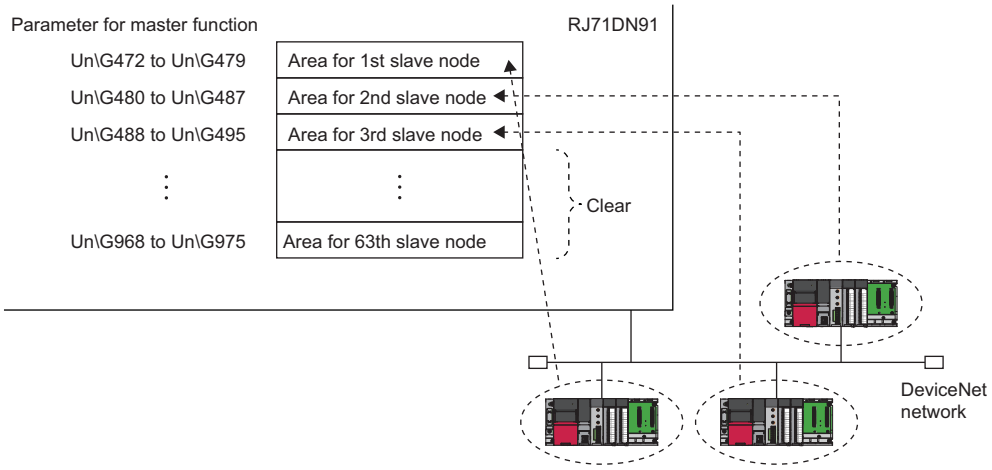
❶ Set the type and maximum detection node address to 'Auto configuration operation setting' (Un\G1008). Set "0004H" when the type of the auto configuration is the all configuration and the maximum detection node address is 4.
❷ Turn off 'I/O communication request' (Y11) and 'Request for saving/clearing parameters to Flash ROM' (Y17).
❸ Turn on 'Auto configuration request' (Y15).
❹ The auto configuration starts and 'Auto configuration executing' (X14) turns on. The auto configuration takes approximately 60 seconds at maximum to complete.
❺ When the auto configuration completes, 'Auto configuration completion' (X15) turns on.
❻ The parameter detail in each slave node is read and stored in 'Master function parameters' (Un\G468 to Un\G975). The setting of the detected slave nodes is stored in order of the node address.
❼ When 'Auto configuration request' (Y15) is turned off, 'Auto configuration executing' (X14) and 'Auto configuration completion' (X15) turn off.
❽ Check 'Master function parameters' (Un\G468 to Un\G975). Check that the setting details, such as the node address, connection type, and number of I/O points, are correct. Correct the item if it is incorrect.

Operation type

There are two types of configuration: The all configuration that detects all slave nodes on the network and the add configuration that detects the slave node added to the network.
This section describes the operation type of the all configuration and the add configuration.

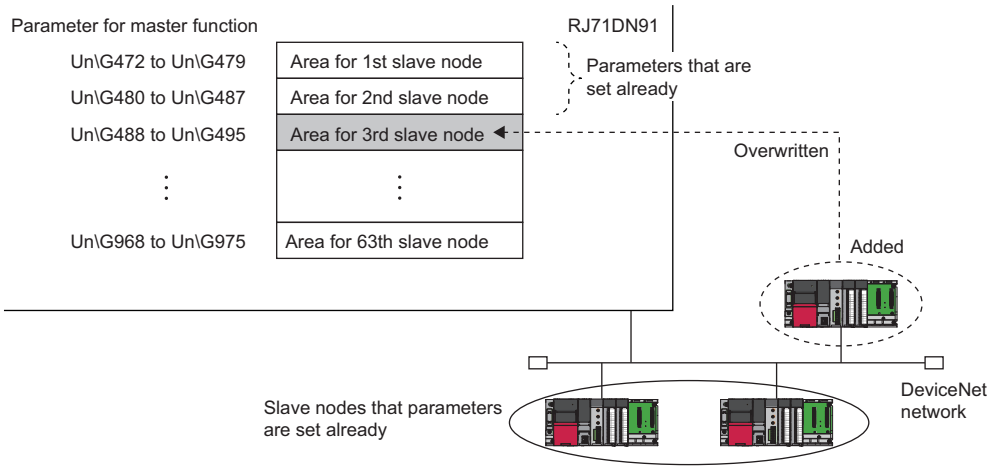
All configuration

This type of configuration detects all slave nodes on the network, and overwrites every area of 'Master function parameters' (Un\G468 to Un\G975) from 1st to 63rd.
If few slave nodes are detected, the areas of later than the number of detected node is cleared.



Add configuration

This type of configuration detects slave nodes in which the parameter is already set or not on the network, and writes the parameter to the areas following the last slave node in which the parameter is set.
The parameters are written according to the number of detected slave nodes.
When the slave node in which the parameter is already set uses the area of 63rd node, the add configuration cannot be performed.
When the parameter of the detected node address is already set, the parameter is not added.
When the slave node in which the parameter is already set does not exist, the parameter is deleted.



Setting details

This section describes the values that are automatically detected and set by the auto configuration function.
When changing the value, use the TO instruction from the program.

Item	Description
Node address of the slave node	Lower byte • Node address of the 1st slave node (MAC ID) 0 to 63 Upper byte • 01H: Node supporting UCMM and using either of message group 3, 2, or 1 • 03H: Node supporting UCMM and using the message group 1 • 04H: Node not supporting UCMM When setting the reserved node, use the program or the engineering tool.
Message group of the slave node	
Connection type of the slave node	Select the connection type for the I/O communication. • 0001H: Polling • 0002H: Bit strobe • 0004H: Change of state • 0008H: Cyclic
Number of byte module of the slave node	Lower byte: Number of input byte module Upper byte: Number of output byte module The bit module is calculated as 8 points equaling to 1 byte module. When the data size is 0 to 255 bytes, this number is set as the number of byte modules.
Number of word module of the slave node	Lower byte: Number of input word module Upper byte: Number of output word module When the data size is 256 bytes, this number is set as the number of word modules.
Number of double word module of the slave node	Lower byte: Number of input double word module Upper byte: Number of output double word module As the double word module is the setting of the master function, the setting value is fixed to "0".
Expected packet rate of the slave node	Set the expected packet rate for the slave node. Setting value = 0000H: 200ms (default value)
Watchdog timeout action of the slave node	Set the action taken when a watchdog timeout occurs in the slave node. Setting value = 0000H (default value)
Production inhibit time of the slave node	Set the production inhibit time. Setting value = 0000H: 10ms (default value)

2 PARAMETER SETTINGS

This chapter describes the parameter setting necessary for the RJ71DN91.

2.1 Setting Parameters

1. Add the RJ71DN91 to the engineering tool.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Right-click ⇨ [Add New Module]

2. "Basic Setting", "Applied Setting", and "Refresh Setting" are included in the module parameter. Select the settings from the tree in the following window and configure them.

[Navigation window]⇨[Parameter]⇨[Module Information]⇨[RJ71DN91]

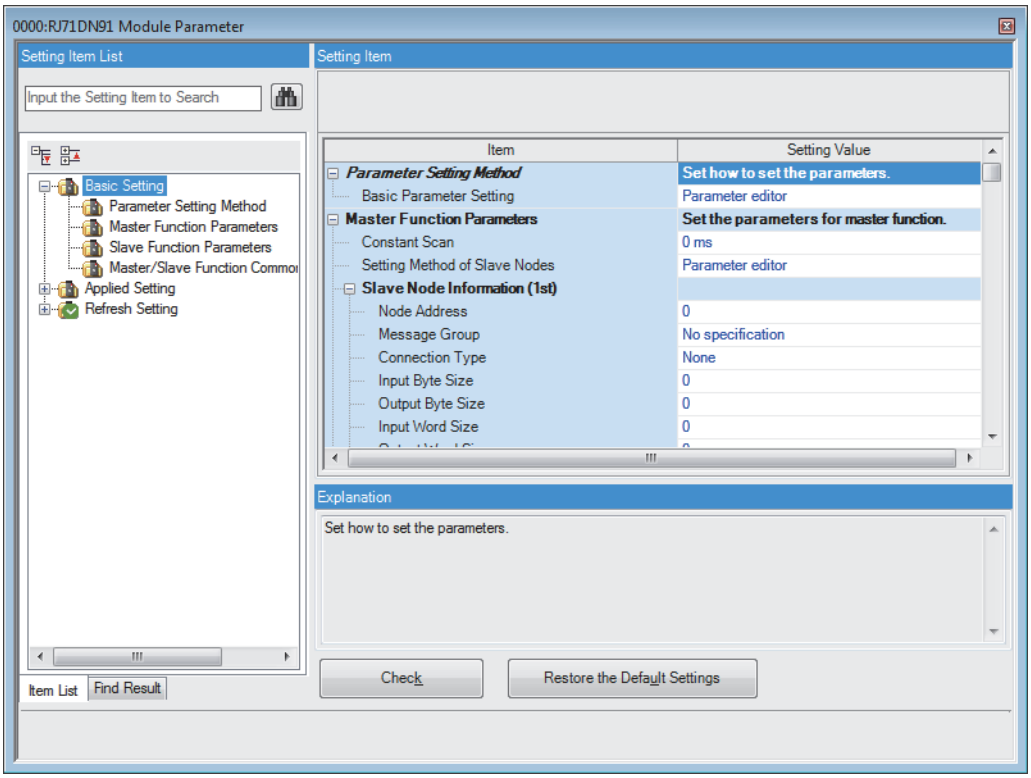
3. Write the settings to the CPU module using the engineering tool.

[Online] ⇨ [Write to PLC]

4. The settings are reflected by resetting the CPU module or powering off and on the system.

2.2 Basic Settings

Set the parameter setting method of the RJ71DN91, the parameters for master function and slave function.



Whether the parameter of the basic setting can be set or not depends on the setting of the master function and slave function. The following table lists the parameter availability of each function.

○: Can be set, ×: Cannot be set

Item			Availability		
			Master function	Slave function	Master function/ slave function
Parameter Setting Method	Basic parameter setting		○	○	○
Master Function Parameters	Constant Scan		○	×	○
	Setting method of slave nodes		○	×	○
	Slave Node Information (□th)	Node Address	○	×	○
		Message Group	○	×	○
		Connection Type	○	×	○
		Input Byte Size	○	×	○
		Output Byte Size	○	×	○
		Input Word Size	○	×	○
		Output Word Size	○	×	○
		Input Dword Size	○	×	○
		Output Dword Size	○	×	○
		Expected Packet Rate	○	×	○
		Watch Dog Time out	○	×	○
		Production Inhibit Time	○	×	○
Slave Function Parameters	Slave Receive Size		×	○	○
	Slave Transmit Size		×	○	○
Master/Slave Function Common Parameters	Auto Communication Start Setting		○	○	○
	Data consistency setting		○	○	○
	Operation setting when bus off error occurs		○	○	○

Parameter Setting Method

Select the parameter setting method.

Item	Description	Setting range
Basic parameter setting	Select whether to set the basic setting in engineering tool or in program.	• Parameter editor • Program (Default: Parameter editor)

Master Function Parameters

Set the master function parameters.

Item		Description	Setting range
Constant Scan		Set the link scan time. (ms) Set a larger value than "Maximum link scan time". If "Current link scan time" is longer than the set link scan time, the module operates according to "Current link scan time".	0 to 65535 (Default: 0)
Setting method of slave nodes		Select whether to set the slave node information in engineering tool or with information stored in the module.	• Parameter editor • Information saved in unit (Default: Parameter editor)
Slave Node Information (□th)*1	Node Address	Set the node address (MAC ID) of the slave node on □.	0 to 63 (Default: 0)
	Message Group	Set the message group.	• (No specification) • Node that supports UCMM, and uses either message group 3, 2 or 1 • Node that supports UCMM, and uses message group 1 • Node that does not support UCMM. (Supports group 2 server only) • Reserved node (Default: (No specification))
	Connection Type	Select the connection type for the I/O communication.	• None • Polling • Bit strobe • Change of state • Cyclic (Default: None)
	Input Byte Size*2	Set the number of input byte modules. The bit module is calculated as 8 points equaling to 1 byte module.	0 to 255 (Default: 0)
	Output Byte Size*2	Set the number of output byte modules. The bit module is calculated as 8 points equaling to 1 byte module.	0 to 255 (Default: 0)
	Input Word Size*2	Set the number of input word modules.	0 to 128 (Default: 0)
	Output Word Size*2	Set the number of output word modules.	0 to 128 (Default: 0)
	Input Dword Size*2	Set the number of input double-word modules.	0 to 64 (Default: 0)
	Output Dword Size*2	Set the number of output double-word modules.	0 to 64 (Default: 0)
	Expected Packet Rate	Set the expected packet rate for the slave node. When the setting value is 0 (default): 200ms When the setting value is other than 0: The setting value -1 is the expected packet rate (ms)	0 to 65535 (Default: 0)
	Watch Dog Time out	Set the action taken when a watchdog timeout occurs in the slave node. (Default) Same as the following timeout. TIMEOUT The connection times out. The communication is manually stopped, and is not recovered until manually restarted. AUTO DELETE The connection is automatically deleted. The communication is stopped temporarily, and automatically restarted. The output is cleared once. AUTO RESET Communication continues while holding the connection.	• Default • Timeout • Auto delete • Auto reset (Default: Default)
	Production Inhibit Time	Set the production inhibit time. The setting value varies depending on the connection type. When the setting value is 0 (default value): 10ms When the setting value is other than 0: The setting value -1 is the minimum transmitting interval (ms).	0 to 65535 (Default: 0)

*1 Set the number of I/O points for a single slave node within 256 bytes in total.

*2 For the sorting order of the modules stored in the buffer memory, refer to the following.

☞ Page 86 Master function transmit/receive data area

Slave Function Parameters

Set the slave function parameter.

Item	Description	Setting range
Slave Receive Size	Set the I/O receive data size as the slave function. (Byte)	0 to 128 (Default: 8)
Slave Transmit Size	Set the I/O transmit data size as the slave function. (Byte)	0 to 128 (Default: 8)

Master/Slave Function Common Parameters

Set the parameter common in the master/slave function.

Item	Description	Setting range
Auto Communication Start Setting	Set whether to start the I/O communication automatically when the CPU module is powered off and on, or auto configuration is completed.	• Start • No Start (Default: Start)
Data consistency setting	Sets whether to enable or disable the data consistency with the data consistency dedicated instruction or refresh. "Only master function instruction is enabled", "Only slave function instruction is enabled", or "Master function and Slave function instruction are enabled" is set. In this case, the data consistency can be maintained by using the data consistency dedicated instruction when reading/writing the I/O data from/to the buffer memory of the RJ71DN91. When "Refresh is enabled" is set, the data consistency can be maintained when the receive/transmit data in the buffer memory of the RJ71DN91 is refreshed with to the CPU device.	• Disable • Only master function instruction is enabled • Only slave function instruction is enabled • Master function and Slave function instruction are enabled • Refresh is enabled (Default: Disable)
Operation setting when bus off error occurs	Set whether to reset the communication chip automatically to restart the communication when a bus off error occurs.	• No reset • Reset (Default: No reset)

Details on the expected packet rate and the production inhibit time

The following table lists the details on the expected packet rate and the production inhibit time.

Connection Type	EXPECTED PACKET RATE	PRODUCTION INHIBIT TIME
Polling	(1) The communication watchdog timer value for the slave is set. When the communication between the master and slave is cut out for the specified period (the setting time × 4), the slave node will carry out the action specified with WATCHDOG TIMEOUT ACTION.	(1) Minimum transmission cycle of slave = Set the minimum time in which the slave can prepare the transmit data. The master transmits the polling request to the slave in this time or longer.*1
	(2) When the expected packet rate setting value ≠ 1, accordingly, the expected packet rate ≠ 0ms, then, the expected packet rate ≥ the production inhibit time must be observed.	
	(3) When 1 is set, accordingly the expected packet rate is 0ms, the watchdog timer monitor function is invalid.	(3) When 1 is set, accordingly the production inhibit time is 0ms, the master transmits the polling request to the slave at the scan interval of the module.

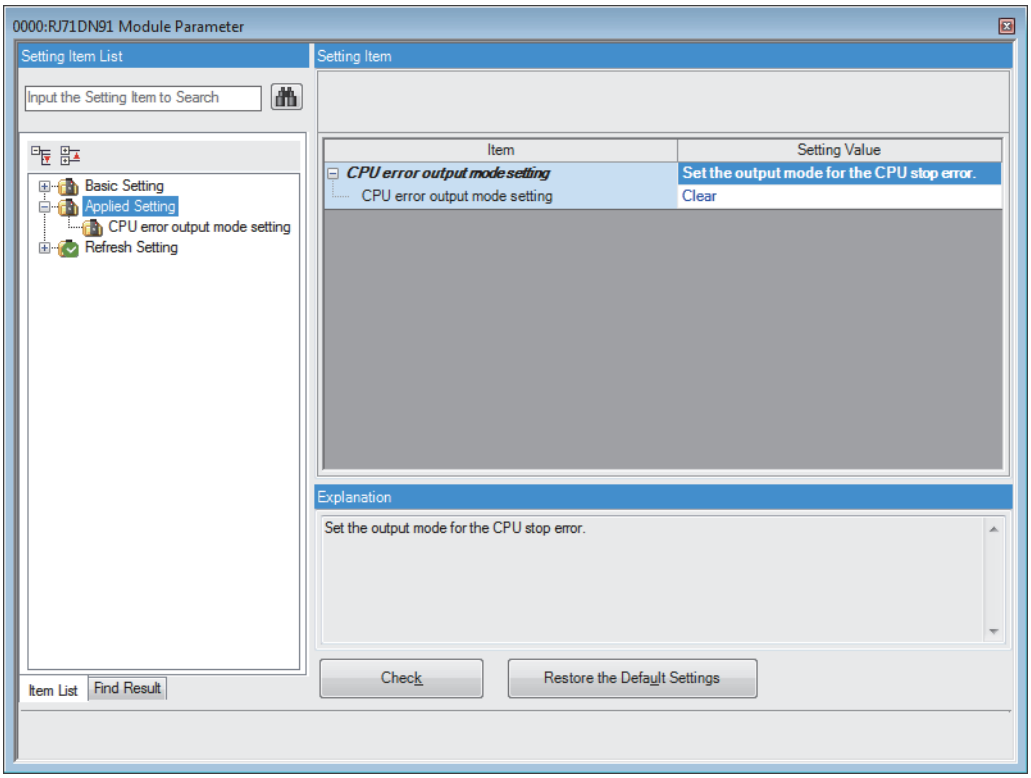
Connection Type	EXPECTED PACKET RATE	PRODUCTION INHIBIT TIME
Bit strobe[*2]	(1) The communication watchdog timer value for the slave is set. When the communication between the master and slave is cut out for the specified period (the setting time × 4), the slave node will carry out the action specified with WATCHDOG TIMEOUT ACTION.	(1) Minimum transmission cycle of slave = Set the minimum time in which the slave can prepare the transmit data. The master transmits the bit strobe request to the slave in this time or longer.[*1]
	(2) When the expected packet rate setting value ≠ 1, accordingly, the expected packet rate ≠ 0ms, then, the expected packet rate ≥ the production inhibit time must be observed.	
	(3) When 1 is set, accordingly the expected packet rate is 0ms, the watchdog timer monitor function is invalid.	(3) When 1 is set, accordingly the production inhibit time is 0ms, the master transmits the bit strobe request to the slave at the scan interval of the module.
Change of state	(1) The communication watchdog timer value for the slave is set. When the communication between the master and slave is cut out for the specified period (the setting time × 4), the slave node will carry out the action specified with WATCHDOG TIMEOUT ACTION.	(1) Set the minimum time in which the slave can receive the data. The master transmits the output data to the slave in this interval. (It transmits the data to the slave even at the timing of the output data conversion.)[*1]
	(2) When the expected packet rate setting value ≠ 1, accordingly, the expected packet rate ≠ 0ms, then, the expected packet rate ≥ the production inhibit time must be observed.	
	(3) When 1 is set, accordingly the expected packet rate is 0ms, the watchdog timer monitor function is invalid.	(3) When 1 is set, accordingly the production inhibit time is 0ms, the master transmits the data to the slave only at the timing of the output data conversion.
Cyclic	(1) Specify the cycle to transmit the data from the slave to the master.	(1) Specify the cycle to transmit the data from the master to the slave.[*1]
	(2) When the expected packet rate setting value ≠ 1, accordingly, the expected packet rate ≠ 0ms, then, the expected packet rate ≥ the production inhibit time must be observed.	
	(3) Setting 1, accordingly the expected packet rate is 0ms, is not available.	(3) Setting 1, accordingly the production inhibit rate is 0ms, is not available.

*1 When the production inhibit time in setting is shorter than the link scan time of the module, the master transmits the data to the slave at the scan interval of the module.

*2 The setting value of the production inhibit time must be same in all bit strobe connection.

2.3 Applied Setting

Set the applied setting of the RJ71DN91.



The applied setting can be set both in the master function and in the slave function.

CPU error output mode setting

Set the output mode upon CPU error.

Item	Description	Setting range
CPU error output mode setting	Whether to clear or hold the output to the module when a stop error occurs in the CPU module can be set.	• Clear • Hold (Default: Clear)

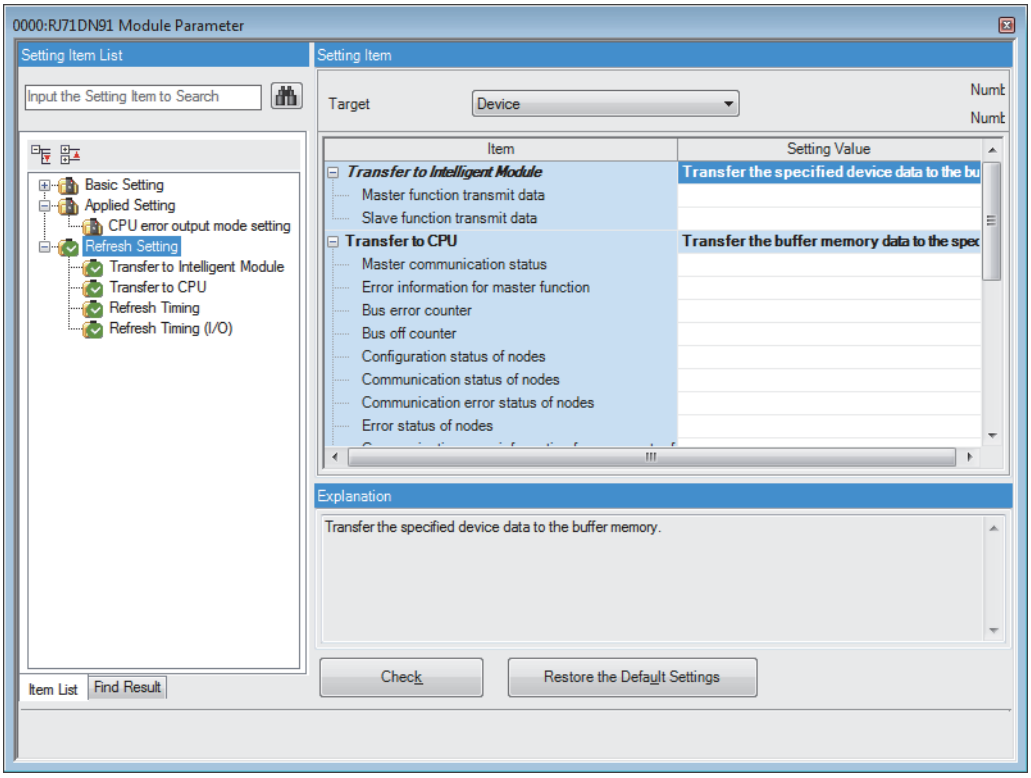
2.4 Refresh Settings

Set the buffer memory of the RJ71DN91 to refresh.

This refresh setting eliminates the need for reading and writing with a program.

1. Start the module parameter.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71DN91] ⇨ [Refresh Setting]



2. Click "Target", and set the refresh target.

• When "Target" is "Module Label"

When the validity of "Master function transmit data" is set, the validity of the refresh is also set.

• When "Target" is "Refresh Data Register (RD)"

Set the start device in "Start Device Name", then the transfer destination of all items is automatically set.

• When "Target" is "Device"

Double-click the item to set, and input the refresh target device.

3. Click "Refresh Timing", and set the timing of refresh.

Set "Refresh Timing" to "At the Execution Time of END Instruction" or "At the Execution Time of Specified Program".

When "At the Execution Time of Specified Program" is set, double-click "Refresh Group [n](n: 1-64)", and set 1 to 64.

Point

When the refresh is enabled, the value of the refresh target becomes valid at the refresh time set in the engineering tool. In this case, the buffer memory is overwritten with the value of the refresh target. When changing the value of the buffer memory targeted to refresh, create the program so that the module label and device value of the refresh target change.

Precautions

When the refresh target for "Master function transmit data", "Master function receive data", "Slave function transmit data", or "Slave function receive data" is set, use the following CPU modules. Failure to do so, the parameter error (error code: 2200H) occurs.

• The RnCPU with firmware version "28" or later

• The RnENCPU with firmware version "17" or later

2.5 Refresh Processing Time

The refresh processing time [μs] composed the scan time of the CPU module. For the scan time, refer to the following.

MELSEC iQ-R CPU Module User's Manual (Application)

The refresh processing time [μs] spent on the refresh setting is as follows.

- Refresh processing time [μs] = Refresh read (refresh by transferring data to CPU) time + Refresh write (refresh by transferring data to the intelligent function module) time

The refresh read time and refresh write time vary depending on the setting of the refresh target.

When the refresh target is the module label or refresh data register (RD)

The following table lists the refresh read time and refresh write time when the CPU module is used.

Classification	Refresh processing time
Refresh read time	63.37μs
Refresh write time	13.46μs

When the refresh target is the specified device

The refresh read time and refresh write time are calculated based on the number of items in which the refresh setting is set and the number of transfers (word). For the calculation method, refer to the following.

MELSEC iQ-R CPU Module User's Manual (Application)

3 DEDICATED INSTRUCTION

The dedicated instructions simplify the programming to use the function of the intelligent function module.
For details on the dedicated instructions, refer to the following.
MELSEC iQ-R Programming Manual (Module Dedicated Instructions)

3.1 Dedicated Instruction List

Dedicated instruction list

The following table lists the dedicated instructions that can be used with the RJ71DN91.

Dedicated instruction	Function overview
G.DNTMRD	Reads the data from the master function receive data area of the specified module maintaining data consistency.
G.DNTMWR	Writes the data to the master function transmit data area of the specified module maintaining data consistency.
G.DNTSRD	Reads the data from the slave function receive data area of the specified module maintaining data consistency.
G.DNTSWR	Writes the data to the slave function transmit data area of the specified module maintaining data consistency.

3.2 Precautions for Dedicated Instructions

Before executing the dedicated instruction

Always check the following points before executing the data consistency dedicated instruction.

■Enabling the dedicated instructions

Set the data consistency setting according to the setting of the mode switch as follows. (☞ Page 38 Master/Slave Function Common Parameters)

Mode switch setting		Data consistency setting
0 to 2	Master function	Only master function instruction is enabled
3 to 5	Slave function	Only slave function instruction is enabled
6 to 8	Master function + slave function	Select one of the following settings. • Only master function instruction is enabled • Only slave function instruction is enabled • Master function and Slave function instruction are enabled

When the data consistency setting does not match the mode switch setting, an error occurs, and either of 'Master function error set signal' (X03) or 'Slave function error set signal' (X08) turns on, or both of them turn on.
In this case, the data consistency function is disabled. Set the parameters correctly.

Point

When the data consistency settings which are different from the settings above are set, the data consistency dedicated instruction is not executed. In addition, an error does not occur.

■Access to the transmit/receive data areas of the buffer memory without using the dedicated instruction

When using the data consistency dedicated instruction, do not access the transmit/receive data areas of the buffer memory with the following methods. Otherwise, data inconsistency may occur.

- Refresh
- MOV instruction
- FROM/TO instruction

The target transmit/receive data areas of the buffer memory are as follows.

- 'Master function receive data' (Un\G1792 to Un\G2047)
- 'Master function transmit data' (Un\G2304 to Un\G2559)
- 'Slave function receive data' (Un\G2816 to Un\G2879)
- 'Slave function transmit data' (Un\G3072 to Un\G3135)

Transmission delay time when the dedicated instruction is used

When the data consistency dedicated instruction is used, the transmission delay time will become longer. (☞ Page 94 Transmission delay time)

Execution timing of the dedicated instruction

After enabling the data consistency setting, execute the data consistency dedicated instruction once in one sequence scan.

Operation when the dedicated instruction is unexecuted

If the dedicated instruction is not executed in three sequence scans after the data consistency setting is enabled, an error occurs.

- When the master function is used, 'Master function error set signal' (X03) turns on and the error code is stored in 'Master function error information' (Un\G433).
- When the slave function is used, 'Slave function error set signal' (X08) turns on and the error code is stored in 'Slave function error information' (Un\G1537).

In this case, the transmit/receive data in the buffer memory is forcibly updated.

- When the DNTMRD or DNTSRD dedicated instruction is not executed in three sequence scans, the latest receive data is stored in 'Master function receive data' (Un\G1792 to Un\G2047) or 'Slave function receive data' (Un\G2816 to Un\G2879).
- When the DNTMWR or DNTSWR dedicated instruction is not executed in three sequence scans, the data stored in 'Master function transmit data' (Un\G2304 to Un\G2559) or 'Slave function transmit data' (Un\G3072 to Un\G3135) is transmitted to the destination node.

4 TROUBLESHOOTING

This chapter describes troubleshooting of the RJ71DN91.

4.1 Checking with LEDs

This section describes troubleshooting using the LEDs. If an error has occurred in the RJ71DN91, identify the error cause using the engineering tool. (☞ Page 48 Checking the Module Status)
Error status can be determined by status of the RUN LED and the ERR LED.

RUN LED	ERR LED	Error status*1	Description
Off	—	Major error	• The power of the module is off. • An error such as hardware failure or memory failure. The module stops operating.
On	Flashing	Moderate error	An error, such as parameter error, which affect module operation. The module stops operating.
On	On	Minor error	An error such as communication failure. The module continues operating.

*1 When multiple errors occur, the error status is displayed in the order of major, moderate, and minor.

When the RUN LED turns off

When the RUN LED turns off after powering on the RJ71DN91, check the following.

Check item	Action
Is the RJ71DN91 mounted correctly?	If not, mount RJ71DN91 on the base unit correctly.
Is the CPU module reset or turned off while accessing the file?	Reset or turn off and on the CPU module to restart RJ71DN91. Then, write the parameter again.

If the above action does not solve the problem, perform the hardware test to check for hardware failure. (☞ Page 50 Hardware test)

When the ERR LED turns on or is flashing

When the ERR LED turns on or is flashing, check the following.

Check item	Action
Does any error occur in the module diagnostics?	Take the actions displayed on the window.

If the above action does not solve the problem, perform the hardware test to check for hardware failure. (☞ Page 50 Hardware test)

When the MS LED turns off

When the MS LED turns off, check the following.

Check item	Action
Is the power of the module on?	Turn on the module.

When the NS LED turns off

When the NS LED turns off, check the following.

Check item	Action
Is the power supply for network being initialized?	If the NS LED remains off even after a few seconds, check if the power supply for network is on.

When the NS LED is flashing in red

When the NS LED is flashing in red, check the following.

Check item	Action
Does any error occur in the communication with the slave node?	An I/O communication error occurs on communications with one or more slave nodes. Check the error code with the following buffer memory, and take proper action. • 'Master function error information' (Un\G433), 'Master function communication error information' (Un\G1152), or 'Other slave communication error information' (Un\G1154 to Un\G1217) • 'Slave function error information' (Un\G1537) or 'Slave function communication error information' (Un\G1153)

When the NS LED turns on in red

When the NS LED turns on in red, check the following.

Check item	Action
• Are there the same node addresses on the network? • Is every communication speed on the entire network same? • Is the terminating resistor connected to both ends of the trunk line?	Check the items on the left and error codes. If the items are normal, check the status of the network, such as the noise and installation, comprehensively.

When the NS LED is flashing in green

When the NS LED is flashing in green, check the following.

Check item	Action
Is the I/O communication performed?	Turn on 'I/O communication request' (Y11).

When the MS LED is flashing in green

When the MS LED is flashing in green, check the following.

Check item	Action
Is the parameter correct?	A parameter error occurs. Check the following and take proper action. • Is the mode switch set to 0 to C? • Is the node address set to 0 to 63? • 'Master function error information' (Un\G433), 'Master function communication error information' (Un\G1152), or 'Other slave communication error information' (Un\G1154 to Un\G1217) • 'Slave function error information' (Un\G1537) or 'Slave function communication error information' (Un\G1153)

When the MS LED turns on in red

When the MS LED turns on in red, check the following.

Check item	Action
What is the mode switch set to?	A hardware failure occurs. • When the mode switch is 0 to 8 or A to C, check the error code. • When the mode switch is 9, the hardware test is completed with an error. Check 'Hardware test result area' (Un\G1583) of the buffer memory.

When the MS LED is flashing in red

When the MS LED is flashing in red, check the following.

Check item	Action
Is everything proper excluding the hardware and parameters?	A module failure occurs. (Hardware failures and parameter errors are excluded.) Check the error code.

4.2 Checking the Module Status

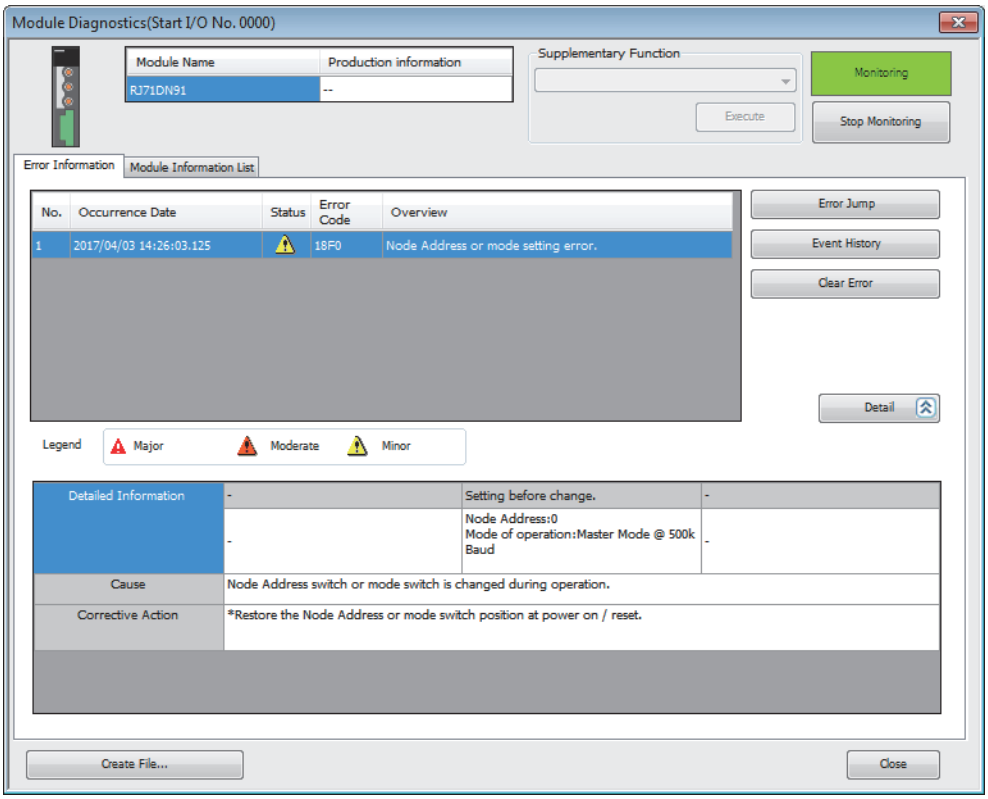
Module diagnostics

The following functions can be used in the "Module Diagnostics" window of the RJ71DN91.

Functions	Usage
Error Information	Displays the details of the errors currently occurring.
Module Information List	Displays various status information of the RJ71DN91.

Error Information

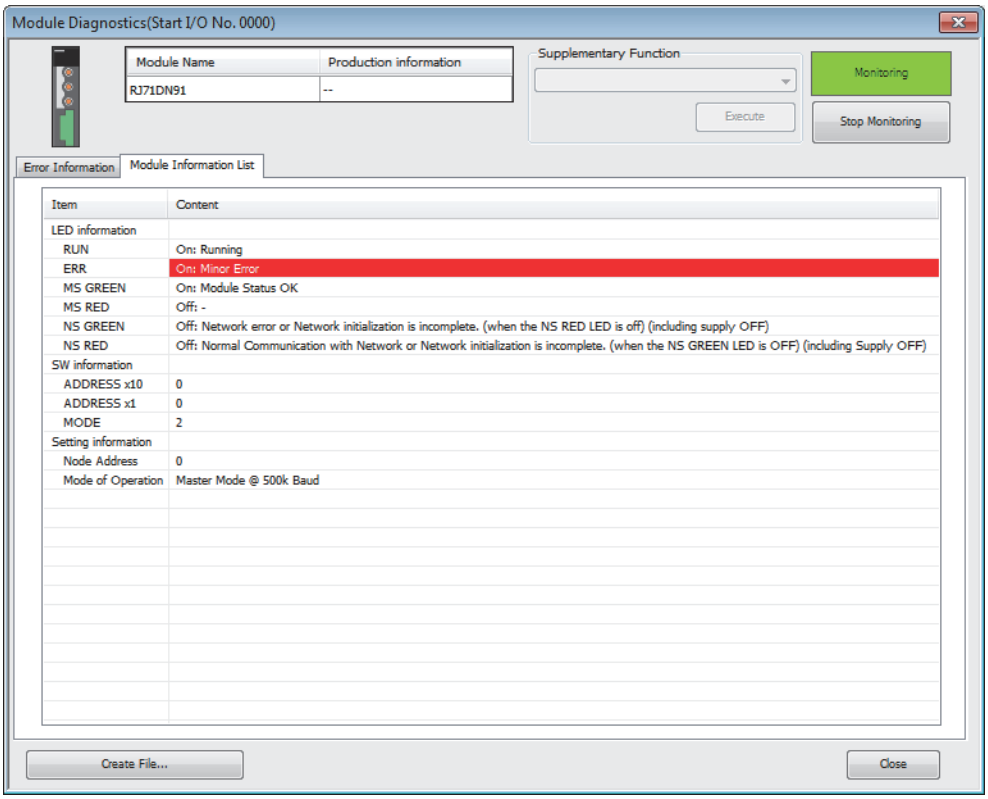
Check the details of the error currently occurring and action to remove the error.



Item	Description
Status	Major: An error such as hardware failure or memory failure. The module stops operating.
	Moderate: An error, such as parameter error, which affect module operation. The module stops operating.
	Minor: An error such as communication failure. The module continues operating.
Error Code	Displays error codes for module diagnostics to check errors which have occurred on the own node. (☞ Page 57 Error code for module diagnostics (own node error))
[Error Jump] button	The RJ71DN91 does not support the error jump function.
[Event History] button	Clicking the button displays the event code to check the history of errors that have occurred on the other nodes while the master function was being used by the own node, errors detected on each module, and operations that have been executed. (☞ Page 60 Event code (other node error))
[Clear Error] button	For the minor errors (the module does not stop operating), the following operations are executed. • The ERR LED is turned off. • The display in "Error Status" in the "System Monitor" window is deleted. • The display in the [Error Information] tab in the "Module Diagnostics" window is deleted. However, when the mode switch setting is hardware test or communication test, the above operations are not executed.
Detailed Information	Displays detailed information about each error (maximum of 3 pieces).
Cause	Displays the detailed error causes.
Corrective Action	Displays the actions to eliminate the error causes.

Module Information List

Switch to the [Module Information List] tab to check various status information of the RJ71DN91.



Item		Description
LED information		Displays the status of the RJ71DN91 LED.
SW information	ADDRESS ×10	Displays the setting status of the node address setting switch.
	ADDRESS ×1	
	MODE	Displays the setting status of the mode switch.
Setting Information	Node Address	Displays the set node address.
	Mode of Operation	Displays the set mode.

Hardware test

Checks if the module operates normally.

The ROM check, RAM check, and self-loopback test is performed.

Procedure

1. Wire the power for network, and turn it on.
2. Set the mode switch to 9.
3. Reset or power off and on the CPU module to start the test.

Point

Do not perform a hardware test while connected to the slave node. While connected to the slave node, the hardware test is not performed correctly.

Checking the status and result of hardware test

■Status of the hardware test

Check the status of the hardware test with the LED indication of the module.

Test status	LED indication
Test in progress	The MS LED is flashing in green/red alternately. (Including when the mode backs to the online mode after the completion of the auto configuration or saving data to flash ROM.)
Completed successfully	The MS LED turns on in green.
Completed with an error	The MS LED turns on in red and the ERR LED turns on.

■Checking the result

Check the result of the hardware test with 'Hardware test result area' (Un\G1583) of the buffer memory.

Error code for hardware test	Description	Action
0000H	Normal completion	—
60AAH	RAM error	The hardware failure may have occurred. Please consult your local Mitsubishi representative.
62AAH	CAN controller check error	The hardware failure may have occurred. Please consult your local Mitsubishi representative.
63AAH	Network power supply error	Wire the power correctly and supply the power to the network. If the error occurs again even after taking the above action, the possible cause is a hardware failure. Please consult your local Mitsubishi representative.
70AAH	Microcomputer error	The hardware failure may have occurred. Please consult your local Mitsubishi representative.
71AAH		
72AAH		
73AAH		
74AAH		

4.3 Checking the Network Status

Communication test

Performs the transmit test and receive test with the RJ71DN91 connected to another DeviceNet device using a DeviceNet cable.

Set the different node address from the own node to the communication target.

Procedure

1. Connect the terminating resistors to both ends of the DeviceNet cable.
2. Connect RJ71DN91 and other DeviceNet device with the DeviceNet cable.
3. Match the communication speed to other DeviceNet device and set the mode switch to A to C. (A: 125kbaud, B: 250kbaud, C: 500kbaud)
4. Turn on the power for network and the power of other DeviceNet device.
5. Reset or power off and on the CPU module to start the test.

Checking the status and result of communication test

■Status of the communication test

Check the status of the communication test with the LED indication of the module.

Test status	LED indication
Test in progress	The MS LED is flashing in green/red alternately. (Including when the mode backs to the online mode after the completion of the auto configuration or saving data to flash ROM.)
Completed successfully	The MS LED turns on in green.
Completed with an error	The MS LED turns off and the ERR LED turns on.

■Checking the result

Check the result with 'Hardware test result area' (Un\G1583) of the buffer memory.

Check the result of the communication test with 'Hardware test result area' (Un\G1583) of the buffer memory.

Error code for communication test	Description	Action
01H	The same node address as the own node is on the network.	Set different node addresses to every node on the network.
02H	A bus off occurs.	• Set the same value to the communication speed of every node on the network. • Check the status of the network comprehensively: if the terminating resistor comes off, if the distance and wiring of the communication cable is correct, and others.
03H	The power is not supplied to the network.	Check if the power is correctly wired and supplied to the network.
04H	An error has occurred at transmit data.	• Connect other nodes on the network. • Set the same value to the communication speed of every node on the network. • Check the status of the network comprehensively: if the terminating resistor comes off, if the distance and wiring of the communication cable is correct, and others.
05H	An error has occurred at receiving data.	
06H	The test normally completes.	—

4.4 Re-setting Parameters at Module Replacement

When the parameter is saved to the flash ROM of the RJ71DN91, the content of the flash ROM is deleted by the replacement of the RJ71DN91. Therefore, the parameter needs to be re-set.
This section describes the procedure to take over the parameter setting in the RJ71DN91 after the replacement.

1. By using M+RJ71DN91_ReadParam of the module function block, save the parameter, which is set in the buffer memory of the RJ71DN91 before being replaced, in the internal device of the CPU module.

MELSEC iQ-R DeviceNet Master/Slave Module Function Block Reference

2. Replace RJ71DN91.

MELSEC iQ-R Module Configuration Manual

3. By using M+RJ71DN91_WriteParam of the module function block, write the parameter in the buffer memory of the RJ71DN91 after being replaced.

MELSEC iQ-R DeviceNet Master/Slave Module Function Block Reference

4. Turn on 'Request for saving/clearing parameters to Flash ROM' (Y17) to save the parameter of the buffer memory in the flash ROM.

Point

Before replacing the RJ71DN91, take one of the following actions to prevent the saved parameter from being deleted.

- Set the internal device of the target of saving to the latch setting.
- Save the saved data in the SD memory card. (At writing: SP.FWRITE instruction, at reading: SP.FREAD instruction)
- Record the saved data.

4.5 Troubleshooting by Symptom

This section describes troubleshooting method by symptom. If an error has occurred in the RJ71DN91, identify the error cause using the engineering tool. (☞ Page 48 Checking the Module Status)

Unable to communicate with any slave node (master function)

When the communication cannot be performed with any slave node, check the following items.

Check item	Action
Is the communication cable connected to the connector of the RJ71DN91 firmly?	Connect the communication cable to the connector of the RJ71DN91 firmly.
Is the same communication speed set to every node?	Set the same communication speed to every node.
Is the terminating resistor connected?	Connect the terminating resistor.
Is the parameter written?	Create a correct parameter and write it.
Does the created parameter match the hardware structure of the actual slave node?	Create a correct parameter and write it.
Is 'I/O communication request' (Y11) on?*1	Turn on 'I/O communication request' (Y11).
Is not the circuit load high because of the multi-master configuration?	Set or change a constant scan for all the master nodes and decrease the frequency of communications for stable communications.
Is not the circuit load high because of I/O communications or message communications?	Decrease the frequency of I/O communications or message communications for stable communications.
Is any communication error code stored in 'Master function communication error information' (Un\G1152)?	Take action according to the communication error code.

*1 This item is for when the parameter setting method is "Program" and the auto communication setting is off.

If the above action does not solve the problem, perform the hardware test to check for hardware failure. (☞ Page 50 Checking the Module Status)

Unable to communicate with a specific slave node (master function)

When the communication cannot be performed with a specific slave node, check the following items.

Check item	Action
Is the power of the slave node on?	Turn on the power of the slave node.
Is the communication cable connected firmly to the slave node?	Connect the communication cable to the slave node firmly.
Is the communication speed setting same as other nodes?	Set the same communication speed as other nodes.
Is that slave node set among the parameter?	Check the parameter and set the information of corresponding slave node with one of the following methods if it is not set. • Set the information using the module parameter of the engineering tool. • Set the information with the program. • Set the information using the auto configuration function.
Are the node address of the parameter and the actual node address same?	Check the following parameter and set the correct value. • When using the engineering tool: [Basic Setting] ⇨ [Master Function Parameters] ⇨ [Slave Node Information] ⇨ [Node Address] • When not using the engineering tool: Lower byte of "Node Address" of the slave node information in buffer memory 'Master function parameters' (Un\G468)
Is the reserved node setting set?	Check the following parameter and set the correct value. • When using the engineering tool: [Basic Setting] ⇨ [Master Function Parameters] ⇨ [Slave Node Information] ⇨ [Message Group] • When not using the engineering tool: Upper byte of "Node Address" of the slave node information in buffer memory 'Master function parameters' (Un\G468)
Does the specified connection type match the specification of the slave node?	Check the following parameter and set the correct value. • When using the engineering tool: [Basic Setting] ⇨ [Master Function Parameters] ⇨ [Slave Node Information] ⇨ [Connection Type] • When not using the engineering tool: "Connection Type" of the slave node information in buffer memory 'Master function parameters' (Un\G468)
Do the existence of UCMM and the message group match the specifications of the slave node?	Check the following parameter and set the correct value. • When using the engineering tool: [Basic Setting] ⇨ [Master Function Parameters] ⇨ [Slave Node Information] ⇨ [Message Group] • When not using the engineering tool: Upper byte of "Node Address" of the slave node information in buffer memory 'Master function parameters' (Un\G468)

Check item	Action
Does the setting value of the watchdog timeout match the specifications of the slave node?	Check the following parameter and set the correct value. • When using the engineering tool: [Basic Setting] ⇨ [Master Function Parameters] ⇨ [Slave Node Information] ⇨ [Watch Dog Time out] • When not using the engineering tool: "Watch Dog Time out" of the slave node information in buffer memory 'Master function parameters' (Un\G468)
Does the I/O structure of the parameter and the actual structure of the slave node match?	Check the following parameter and set the correct value. • When using the engineering tool: [Basic Setting] ⇨ [Master Function Parameters] ⇨ [Slave Node Information] ⇨ [Input Byte Size], [Output Byte Size], [Input Word Size], [Output Word Size], [Input Dword Size], [Output Dword Size] • When not using the engineering tool: "Number of byte modules", "Number of word modules", "Number of double word module" of the slave node information in buffer memory 'Master function parameters' (Un\G468)
Is the production inhibit time too short?	Check the following parameter and set the correct value. • When using the engineering tool: [Basic Setting] ⇨ [Master Function Parameters] ⇨ [Slave Node Information] ⇨ [Production Inhibit Time] • When not using the engineering tool: "Production Inhibit Time" of the slave node information in buffer memory 'Master function parameters' (Un\G468)
Is the production inhibit time too long?	Check the following parameter and set the correct value. • When using the engineering tool: [Basic Setting] ⇨ [Master Function Parameters] ⇨ [Slave Node Information] ⇨ [Production Inhibit Time] • When not using the engineering tool: "Production Inhibit Time" of the slave node information in buffer memory 'Master function parameters' (Un\G468)
Is the parameter written?	Create a correct parameter and write it.
Is not the circuit load high because of the multi-master configuration?	Set or change a constant scan for all the master nodes and decrease the frequency of communications for stable communications.
Is not the circuit load high because of I/O communications or message communications?	Decrease the frequency of I/O communications or message communications for stable communications.
Is any communication error code stored in 'Other slave communication error information' (Un\G1154 to Un\G1217)?	Take action according to the communication error code.
Can master function error information be read by reading communication error information with the master function (message communication)?	Take action according to the read communication error information (the communication error code and the general DeviceNet error code).

If the above action does not solve the problem, perform the hardware test to check for hardware failure. (☞ Page 50 Checking the Module Status)

Unable to communicate with the master node (slave function)

When the communication cannot be performed with the master node, check the following items.

Check item	Action
Is the communication cable connected to the connector of the RJ71DN91 firmly?	Connect the communication cable to the connector of the RJ71DN91 firmly.
Is the same communication speed set to every node?	Set the same communication speed to every node.
Is the terminating resistor connected?	Connect the terminating resistor.
Does the number of I/O points of the slave function match the parameter setting of the master node?	Match the number of I/O transmit/receive points with the master node.
Is the parameter setting of the master node the polling and the UCMM support (group 3)?	Set the parameter setting of the master node to the polling and the UCMM support (group 3).
Is 'I/O communication request' (Y11) on?*1	Turn on 'I/O communication request' (Y11).
Is not the circuit load high because of the multi-master configuration?	Set or change a constant scan for all the master nodes and decrease the frequency of communications for stable communications.
Is not the circuit load high because of I/O communications or message communications?	Decrease the frequency of I/O communications or message communications for stable communications.
Is any communication error code stored in 'Slave function communication error information' (Un\G1153)?	Take action according to the communication error code.

*1 This item is for when the parameter setting method is "Program" and the auto communication setting is off.

If the above action does not solve the problem, perform the hardware test to check for hardware failure. (☞ Page 50 Checking the Module Status)

Other troubleshooting

For other troubleshooting, check the following items.

Situation	Check item	Action
The auto configuration is not executed.	Is the following output signal on? • 'I/O communication request' (Y11) • 'Request for saving/clearing parameters to Flash ROM' (Y17)	Turn off the output signal on the left column, and turn off and on 'Auto configuration request' (Y15) again.
	Is 'Auto communication start setting' (Un\G1585) set to "Start"? ('I/O communicating' (X01) is on)	• Set 'Auto communication start setting' (Un\G1585) to "No Start". • When 'I/O communication signal request' (Y11) is turned on and off, the I/O communication stops and 'I/O communicating' (X01) turns off.
The target parameter cannot be acquired with the auto configuration.	• Is the power of the slave node on? • Is the power of the network on? • Is the wiring correct?	Check if the power of slave node and network power are on, and the wiring is correct.
	When the target slave node is the RJ71DN91, is 'Auto communication start setting' (Un\G1585) set to "Start", or is 'I/O communication request' (Y11) on?	When the auto communication start setting is not set to the target slave node (RJ71DN91), turn off and on 'I/O communication request' (Y11).
	Is the slave node to assign set in order of node address?	The setting of the slave node detected by the auto configuration is stored in order of node address. Set the correct value to the corresponding item of 'Master function parameters' (Un\G468 to Un\G975).
	Is the connection type, number of I/O points correct?	Check the available connection type and number of I/O points referring to the manual for each slave node. Set the correct value to the corresponding item of 'Master function parameters' (Un\G468 to Un\G975).
Parameter save/clear to flash ROM does not start.	Is the following output signal on? • 'I/O communication request' (Y11) • 'Auto configuration request' (Y15)	Turn off the output signal on the left column, and turn off and on 'Request for saving/clearing parameters to Flash ROM' (Y17) again.
	• Is 'Auto communication start setting' (Un\G1585) set to "Start"? ('I/O communicating' (X01) is on)	• Set 'Auto communication start setting' (Un\G1585) to "No Start". • When 'I/O communication signal request' (Y11) is turned on and off, the I/O communication stops and 'I/O communicating' (X01) turns off.
The parameter is not saved in the Flash ROM.	Is the parameter save area correct?	After checking 'Parameter save/clear selection bit' (Un\G1584), turn off and on 'Request for saving/clearing parameters to Flash ROM' (Y17) again.
After the power-on, the I/O communication automatically starts.	Is 'Auto communication start setting' (Un\G1585) set to "Start"? ('I/O communicating' (X01) is on)	• Set 'Auto communication start setting' (Un\G1585) to "No Start". • When 'I/O communication signal request' (Y11) turns on and off, the I/O communication stops and 'I/O communicating' (X01) turns off.
At the execution of the data consistency dedicated instruction, the data is not transferred to the specified device/buffer memory.	Does the I/O communication start?	• Start the I/O communication. (Turn on 'I/O communication request' (Y11))
	Is the mode correct?	• Set the mode switch setting correctly.
	Is the data consistency dedicated instruction supporting the mode used?	• Use the data consistency dedicated instruction supporting the mode.
	Is the data consistency dedicated instruction validity setting error (20FEH, 21FEH) for the master function or slave function stored in 'Master function error information' (Un\G433) or 'Slave function error information' (Un\G1537)?	• Set the data consistency setting so that it supports the master/slave, and turn on 'I/O communication request' (Y11) again.
At the execution of the data consistency dedicated instruction, the data is transferred or not transferred to the specified device/buffer memory.	Is the same data consistency dedicated instruction executed many times for a single sequence scan?	• Execute the one data consistency dedicated instruction once in a single sequence scan.
At the execution of the data consistency dedicated instruction, the data is transferred to the unexpected device/buffer memory.	Are device/buffer memory set in the argument of the data consistency dedicated instruction correct?	• Set the correct device/buffer memory in the argument of the data consistency dedicated instruction.
An error occurs in the CPU at the execution of the data consistency dedicated instruction.	Is the name of the data consistency dedicated instruction correct?	• Execute the data consistency dedicated instruction with its correct name.
	Is the argument of the data consistency dedicated instruction correct?	• Set the correct value to the argument of the data consistency dedicated instruction.

Situation	Check item	Action
When the data consistency dedicated instruction is used, the transmission delay time is abnormally long.	Is data consistency dedicated instruction executed?	• Execute the data consistency dedicated instruction at every scan.
Data consistency cannot be maintained even though the data consistency dedicated instruction is used.	Is the data refreshed with methods other than the data consistency dedicated instruction?	• Do not refresh the data with methods other than the data consistency dedicated instruction.

If the above action does not solve the problem, perform the hardware test to check for hardware failure. (☞ Page 50 Checking the Module Status)

4.6 List of Error Codes

The error codes for troubleshooting are divided into the following three types.

- Error code for module diagnostics: This type of error code is displayed in the "Module Diagnostics" window. These codes are issued for errors which occur on the own node (while the master function or slave function is used). (☞ Page 57 Error code for module diagnostics (own node error))
- Event code: This type of error code is displayed in the "Event History" window. These codes are issued for errors which occur on other nodes while the master function is used by the own node. (☞ Page 60 Event code (other node error))
- Communication error code: This type of error code is stored in the buffer memory. (☞ Page 57 Error code for module diagnostics (own node error), ☞ Page 60 Event code (other node error))

In addition, there are the following four types of error code for each application.

- Error code for hardware test (☞ Page 50 Checking the status and result of hardware test)
- Error code for communication test (☞ Page 51 Checking the status and result of communication test)
- Execution error code for message communication (☞ Page 77 Message communication result (Un\G288 to Un\G303))
- General DeviceNet error code (📖 DeviceNet Master-Slave Module User's Manual)

Error code for module diagnostics (own node error)

The error codes for module diagnostics are issued for errors which occur on the own node (while the master function or slave function is used).

The error codes can be checked in the [Error Information] tab in the "Module Diagnostics" window of the RJ71DN91. (☞ Page 48 Error Information)

Point

Communication error codes are stored in the following buffer memory area.

☞ Page 81 Master function error information (Un\G433)

☞ Page 88 Slave function error information (Un\G1537)

Error code	Communication error code	Error details and causes	Action	Detection mode	
				Master function	Slave function
1080H	—	The number of writes to the flash ROM has exceeded 100000.	Replace the module.	○	○
18F0H	F0FFH	The setting of the node address setting switch or the mode setting switch is changed during operation.	Restore the setting of the node address setting switch and the mode setting switch.	○	○
2221H	—	The setting value is out of the range.	• Check the parameter setting. • Match the module set by the project of the engineering tool to the version of the mounted module. • If the error occurs again even after taking the above, the possible cause is the data memory in the CPU module, the memory card, or a hardware failure of the intelligent function module. Please consult your local Mitsubishi representative.	○	○
3002H	02FEH	Both the number of input points and the number of output points of the slave node set by the parameter are 0.	Set the number of input and output points according to specifications for slave node in "Slave Node Information" of "Master Function Parameters" under "Basic Setting".	○	×
3003H	03FEH	The node address of the slave node set by the parameter is out of range.	Set "Node Address" to 0 to 63 in "Slave Node Information" of "Master Function Parameters" under "Basic Setting".	○	×
3004H	04FEH	The message group of the slave node set by the parameter is out of range.	Set "Message Group" properly in "Slave Node Information" of "Master Function Parameters" under "Basic Setting".	○	×
3005H	05FEH	The connection type of the slave node set by the parameter is out of range.	Set "Connection Type" properly in "Slave Node Information" of "Master Function Parameters" under "Basic Setting".	○	×

Error code	Communication error code	Error details and causes	Action	Detection mode	
				Master function	Slave function
3006H	06FEH	The slave node whose node address is the same as the node address of the own node is set in the parameter.	• Set "Node Address" in "Slave Node Information" of "Master Function Parameters" under "Basic Setting" so that a node address does not overlap with the own node. • Change the node address of the own node by the node address setting switch so that the node address does not overlap with the node address of the slave node set in the parameter.	○	×
3007H	07FEH	Any slave node is not set in the parameter.	Set "Slave Node Information" to one or more slave nodes in "Master Function Parameters" under "Basic Setting".	○	×
3008H	08FEH	The total input data size of all slave node set in the parameter is too large.	Set the input data size in "Slave Node Information" of "Master Function Parameters" under "Basic Setting" so that the total input data size of all slave nodes is 512 bytes or less.	○	×
3009H	09FEH	The total output data size of all slave node set by the parameter is too large.	Set the output data size in "Slave Node Information" of "Master Function Parameters" under "Basic Setting" so that the total output data size of all slave nodes is 512 bytes or less.	○	×
300AH	0AFEH	The value of the watchdog timeout action of the slave node set by the parameter is incorrect.	Set "Watchdog Timeout Action" properly in "Slave Node Information" of "Master Function Parameters" under "Basic Setting".	○	×
300BH	0BFEH	The value of the expected packet rate of the slave node set by the parameter is smaller than the production inhibit time.	Set "Expected Packet Rate" to a value more than "Production Inhibit Time" in "Slave Node Information" of "Master Function Parameters" under "Basic Setting".	○	×
300CH	0CFEH 0DFEH 0EFEH	The Flash ROM checksum error has occurred.	• Save the parameter in the flash ROM again. • Do not reset or turn off the CPU module while saving the parameter.	○	○
300FH	0FFEH	The Flash ROM all clear error has occurred.	• Clear all parameters again. • Do not reset or turn off the CPU module while deleting all parameters.	○	○
3010H	10FEH	The total of the input data size per slave node set with the parameter exceeds 256 bytes.	Set the input data size in "Slave Node Information" of "Master Function Parameters" under "Basic Setting" so that the total input data size per slave node is 256 bytes or less.	○	×
3011H	11FEH	The total of the output data size per slave node set with the parameter exceeds 256 bytes.	Set the output data size in "Slave Node Information" of "Master Function Parameters" under "Basic Setting" so that the total output data size per slave node is 256 bytes or less.	○	×
3013H	13FEH	The connection type of the slave node set with the parameter is set to the cyclic and the value of the expected packet rate is set to 0ms (setting value 1).	• Set "Expected Packet Rate" to a value more than 1ms in "Slave Node Information" of "Master Function Parameters" under "Basic Setting". • Set "Connection Type" to a value other than "Cyclic" in "Slave Node Information" of "Master Function Parameters" under "Basic Setting".	○	×
3015H	15FEH	The connection type of the slave node set with the parameter is set to the cyclic and the value of the production inhibit time is set to 0ms (setting value 1).	• Set "Production Inhibit Time" to a value more than 1ms in "Slave Node Information" of "Master Function Parameters" under "Basic Setting". • Set "Connection Type" to a value other than "Cyclic" in "Slave Node Information" of "Master Function Parameters" under "Basic Setting".	○	×
3016H	16FEH	All slave nodes set with the parameter are the reserved node.	• Set "Message Group" to one or more slave nodes (other than reserved node) in "Slave Node Information" of "Master Function Parameters" under "Basic Setting". • Set "Slave Node Information" according to connected slave nodes in "Master Function Parameters" under "Basic Setting".	○	×
302EH	24FEH	When the master function is used, the I/O communication starts with the data consistency setting of the slave function enabled.	Set the data consistency setting of the slave function to Disable in "Data Consistency Setting" of "Master/Slave Function Common Parameters" under "Basic Setting".	○	×

Error code	Communication error code	Error details and causes	Action	Detection mode	
				Master function	Slave function
302FH	25FEH	When the slave function is used, the I/O communication starts with the data consistency setting of the master function enabled.	Set the data consistency setting of the master function to Disable in "Data Consistency Setting" of "Master/Slave Function Common Parameters" under "Basic Setting".	×	○
3030H	—	The data consistency setting for refresh and the data consistency dedicated instruction setting for the master function or slave function were enabled simultaneously.	Set "Data Consistency Setting" properly in "Master/Slave Function Common Parameters" under "Basic Setting".	○	○
3036H	36FFH	The value of the node address (MAC ID) of the own node is out of range. The value of the mode switch is out of range.	• Set the node address of the own node to 0 to 63 by the node address setting switch. • Set the mode switch within 0 to C.	○	○
303BH	3BnnH	Two or more same node addresses (MAC ID) are detected among the parameters.	• Set "Node Address" in "Slave Node Information" of "Master Function Parameters" under "Basic Setting" so that a node address does not overlap with all other nodes. • Set "Node Address" in "Slave Node Information" of "Master Function Parameters" under "Basic Setting" so that a node address does not overlap with the node address of the own node.	○	×
3084H	80FEH	The receiving byte of the slave function set with the parameter is out of range.	Set "Slave Function Input Size" to 0 to 128 in "Slave Function Parameters" under "Basic Setting".	×	○
3085H	81FEH	The transmit byte of the slave function set with the parameter is out of range.	Set "Slave Function Output Size" to 0 to 128 in "Slave Function Parameters" under "Basic Setting".	×	○
3086H	82FEH	The number of the transmit bytes and the number of the receiving bytes of the slave function set with the parameter are both set to 0.	Set "Slave Function Input Size" or "Slave Function Output Size" to 1 byte or more in "Slave Function Parameters" under "Basic Setting".	×	○
30A0H	A0FEH	When both the master function and slave function are used, the number of their I/O points are set to 0.	Take one of the following actions in "Basic Setting". • Set one or more nodes in "Slave Node Information" of "Master Function Parameters" • Set "Slave Function Input Size" or "Slave Function Output Size" to 1 byte or more in "Slave Function Parameters".	○	○
3220H	—	The parameter that is not supported is written.	• Check the parameter setting. • Match the module set by the project of the engineering tool to the version of the mounted module.	○	○
3C00H	—	A hardware failure has been detected.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the error occurs again even after taking the above, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	○	○
3C01H					
3C02H					
3C03H					
3C0FH					
3C10H					
3C11H					

Event code (other node error)

There are three types of event codes: system, error, and operation.
The error codes can be checked with the [Event History] button in the [Error Information] tab in the "Module Diagnostics" window of the RJ71DN91. (☞ Page 48 Error Information)

System

Event code	Overview	Cause
00400	Master function I/O communication status change	The I/O communication status of the master function has changed.
00402	Auto configuration	The auto configuration function has been executed.
00403	Parameter saving to flash ROM	Parameters have been saved in the flash ROM.
00404	Master function error reset	The master function error has been reset.
00405	Slave function error reset	The slave function error has been reset.
00406	Down node detection inhibit setting	The down node detection inhibit setting has been changed.
00408	Own node reset execution	The CAN chip of the own node has been reset.
00C16	Network power abnormality	The power is not supplied to the network.
00C17	Network configuration abnormality	Other modules cannot be found on the network.
00C18	Parameter clearing in flash ROM	Parameters have been deleted from the flash ROM.
00C19	Bus off error occurrence	A bus off error has occurred.

Errors

The event codes are issued for errors which occur on other nodes while the master function is used by the own node.
The node address (MAC ID) of the node where an error has occurred is stored in nn of the communication error code.

Point

Communication error codes are stored in the following buffer memory area.
☞ Page 81 Master function error information (Un\G433)

Event code	Communication error code	Overview	Cause
00C00	01nnH	Network abnormality	After the communication started, network trouble has been detected. This event occurs due to the following cause. • The cable is not connected correctly.
00C01	1EnnH	Slave node abnormality	The slave node did not respond. [Example] • The MAC ID and communication speed do not match. • The slave node went down. • The terminating resistor came off.
00C02	20nnH	Slave node error response	The slave node has responded to an unspecified error. The error cause can be acquired by the communication error information read.
00C03	23nnH	Slave node error response	The slave node has responded to the error at connection establishment. The error cause can be acquired by the communication error information read.
00C04	24nnH	Input data size abnormality	The input data size of the parameter in the slave node set with the parameter and the input data size of the actual slave node are different.
00C05	25nnH	Output data size abnormality	The output data size of the parameter in the slave node set with the parameter and the output data size of the actual slave node are different.
—	26nnH	Improper data receive	The response data of a function which is not supported by the RJ71DN91 has been received.
—	27nnH	Slave node error response	The connection is already in the specified mode.
00C06	28nnH	Improper data receive	An incorrect data has been transmitted from the slave node at connection establishment. [Example] • The terminating resistor came off.
00C07	29nnH	Slave node error response	The connection with the slave node which has been already connected was going to be established. [Example] • The connection with the slave node has been disconnected because an error has occurred. • Stable communications cannot be performed because the circuit load is high.

Event code	Communication error code	Overview	Cause
—	2AnnH	Polling response data length abnormality	The polling response data length differs from the data length read from the slave node at connection establishment.
00C08	2BnnH	Polling response divide receive abnormality	For divide receive of the polling response, the first divided data has been received twice. [Example] • The terminating resistor came off.
00C09	2CnnH	Polling response divided data number abnormality	For divide receive of the polling response, the number of the received divided data is different from the expected one. [Example] • The terminating resistor came off.
00C10	2DnnH	Polling response divided data receive abnormality	For divide receive of the polling response, the intermediate data or final data has been received before the first divided data has been received. [Example] • The terminating resistor came off.
00C11	3BnnH	Node address duplication abnormality	Two or more same node addresses (MAC ID) are detected among the parameters.
00C12	47nnH	Connection type abnormality	An improper connection type has been specified by the slave node at connection establishment. The error cause can be acquired by the communication error information read.
—	61nnH	Number of transmit byte abnormality	The transmit byte of the slave function is out of range.
00C13	80nnH	Polling connection timeout	The polling connection of the slave function became timeout. [Example] • The terminating resistor came off. • The master node is abnormal.
00C14	81nnH	Connection Allocate abnormality	The connection other than the explicit message or polling. [Example] • The connection type of the master node is set to other than the polling.
00C15	82nnH	Number of receive byte abnormality	The number of receive byte of the polling exceeds the maximum number of receive points. [Example] • The number of I/O points setting of the master node exceeds the maximum number of the RJ71DN91.
—	83nnH	Polling fragmented sequence abnormality	An error has occurred in a polling fragmented sequence.
00C20	20FEH	Data consistency setting abnormality	Although the data consistency setting of the master function is enabled, DNTMRD or M+RJ71DN91_MasterRead is not executed in three sequence scans.
00C21	21FEH	Data consistency setting abnormality	Although the data consistency setting of the master function is enabled, DNTMWR or M+RJ71DN91_MasterWrite is not executed in three sequence scans.
00C22	22FEH	Data consistency setting abnormality	Although the data consistency setting of the slave function is enabled, DNTSRD or M+RJ71DN91_SlaveRead is not executed in three sequence scans.
00C23	23FEH	Data consistency setting abnormality	Although the data consistency setting of the slave function is enabled, DNTSWR or M+RJ71DN91_SlaveWrite is not executed in three sequence scans successively.

Operation

Event code	Overview	Cause
24000	I/O communication start request	I/O communication start has been instructed by I/O communication request.
24001	I/O communication stop request	I/O communication stop has been instructed by I/O communication request.
24002	Master function error reset request	Master function error reset request has been.
24003	Auto configuration request	Auto configuration request has been transmitted.
24004	Parameter save request to Flash ROM	Parameter saving to flash ROM has been requested.
24005	Slave function error reset request	Slave function error reset request has been transmitted.
24008	Own node reset request receive	A reset request of the own node has been received from other nodes.
24009	Other node reset request	A reset has been requested to other nodes.
2A000	Parameter clearing in flash ROM request	Parameter clearing in flash ROM has been requested.

4.7 List of Parameter Numbers

This section lists the parameter numbers.

Item	Parameter No.
Basic Settings	7200H
Applied Setting	7101H
Refresh Settings	7400H

APPENDICES

Appendix 1 Module Label

The I/O signals and buffer memory of RJ71DN91 can be set using the module label.

Structure of the module label

The module label name is defined with the following structure.

"Instance name"_"Module number"."Label name"

"Instance name"_"Module number"."Label name"_D

Ex.

RDN91_1.bSts_Watchdog_Timer_Error

■Instance name

The following is the instance name of the RJ71DN91.

Model	Instance name
RJ71DN91	RDN91

■Module number

A sequential number starting with "1" for identifying a module from the one with the same instance name.

■Label name

A label name unique to the module.

■_D

This symbol indicates that the module label is for direct access. The label without "_D" is for refresh. The following are the differences between refresh and direct access.

Type	Description	Access timing
Refresh	The values read/written from/to the module labels are reflected to the module at refresh. The execution time of the program can be shortened.	At refresh
Direct access	The values read/written from/to the module labels are reflected to the module immediately. Although the execution time of the program is longer than the one at the refresh, the responsiveness is improved.	At reading/writing from/to the module label

A

Appendix 2 I/O Signals

This section describes the I/O signals for the CPU module. The I/O signal assignment of when the start I/O number of the RJ71DN91 is "0" is listed below.

List of I/O signals

The following table lists I/O signals. The device X is an input signal from the RJ71DN91 to the CPU module. The device Y is an output signal from the CPU module to the RJ71DN91.

Input signals

○: Available, ×: Not available

Device No.	Signal name	As master function	As slave function
X00	Watchdog timer error	○	○
X01	I/O communicating	○	○
X02	Message communication completion	○	×
X03	Master function error set signal	○	×
X04	Slave down signal	○	×
X05	Message communication error signal	○	×
X06	Parameter saving/clearing to Flash ROM	○	○
X07	Parameter save/clear completion to Flash ROM	○	○
X08	Slave function error set signal	×	○
X09	Use prohibited	×	×
X0A	Hardware testing	At hardware test (use prohibited at other than hardware test)	
X0B	Hardware test completion	At hardware test (use prohibited at other than hardware test)	
X0C	Hardware test error detection	At hardware test (use prohibited at other than hardware test)	
X0D to X0E	Use prohibited	×	×
X0F	Module READY	○	○
X10 to X13	Use prohibited	×	×
X14	Auto configuration executing	○	×
X15	Auto configuration completion	○	×
X16 to X1F	Use prohibited	×	×

Output signals

○: Available, ×: Not available

Device No.	Signal name	As master function	As slave function
Y00 to Y10	Use prohibited	×	×
Y11	I/O communication request	○	○
Y12	Message communication request	○	×
Y13	Master function error reset request	○	×
Y14	Use prohibited	×	×
Y15	Auto configuration request	○	×
Y16	Use prohibited	×	×
Y17	Request for saving/clearing parameters to Flash ROM	○	○
Y18	Slave function error reset request	×	○
Y19 to Y1F	Use prohibited	×	×

Point

Do not use (turn on) any "use prohibited" signals as an I/O signal to the CPU module. Doing so may cause malfunction of the programmable controller system.

Details of master I/O signals

For message communication (X02), (X05), (Y12)

Use 'Message communication completion' (X02), 'Message communication error signal' (X05), 'Message communication request' (Y12) for message communication.

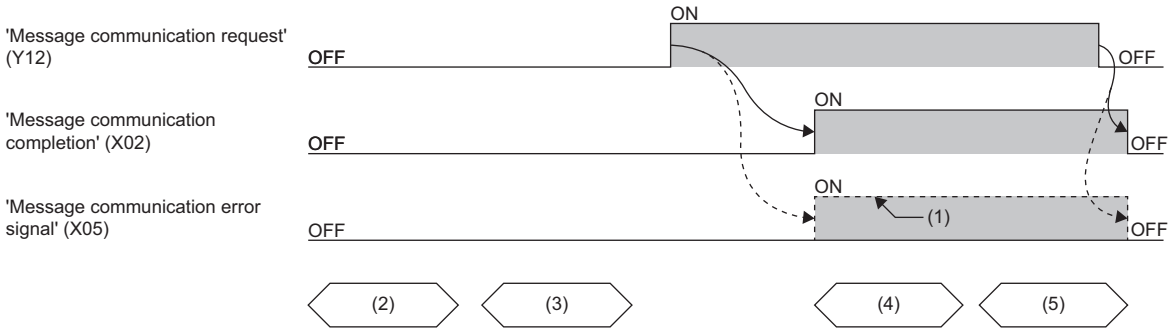
Execute when 'Master function communication status' (Un\G432) is "OPERATE (C0H)" or "STOP (40H)".

Point

For the message communication, set the parameter for master function.

When the parameter for master function is not set, make the message connection using the message group 1.

- When the command data is set to 'Message communication command' (Un\G272 to Un\G287), and 'Message communication request' (Y12) is turned on, the message communication starts. (Set the interval of turning on 'Message communication request' (Y12) to 100ms or longer.)
- When the message communication completes, the processing result is stored in 'Message communication result' (Un\G288 to Un\G303) and 'Message communication completion' (X02) turns on. When completed with an error, 'Message communication error signal' (X05) turns on.
- When 'Message communication request' (Y12) is turned off, 'Message communication completion' (X02) and 'Message communication error signal' (X05) turn off.

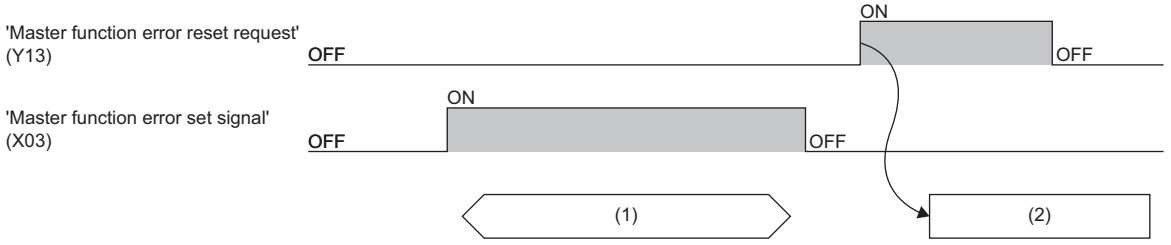


(1) When completed with an error
(2) Message communication command (MOV/TO instruction)
(3) Message communication data (MOV/TO instruction): Only when transmitting data
(4) Message communication result (MOV/FROM instruction)
(5) Message communication data (MOV/FROM instruction): Only when receiving data

For master function error (X03), (Y13)

'Master function error set signal' (X03) and 'Master function error reset request' (Y13) are used for the notification of an error while executing the master function and the reset of the error code.

- If an error occurs in the master function, the error information is stored in 'Master function error information' (Un\G433), 'Master function communication error information' (Un\G1152), or 'Other slave communication error information' (Un\G1154 to Un\G1217) and 'Master function error set signal' (X03) turns on. When the error cause is eliminated, 'Master function error set signal' (X03) turns off. (However, it does not turn off while the I/O communication is stopped.)
- If 'Master function error reset request' (Y13) is turned on after eliminating the error cause, the error code of 'Master function error information' (Un\G433) is cleared.



(1) 'Master function error information' (Un\G433)
(2) Error code clear

A

Slave down signal (X04)

This signal indicates whether there is any slave node (down node) in which the I/O communication is stopped.

- Off: All nodes normally perform communications.
- On: A communication error occurs on a node.

When the communications with the down node is recovered, 'Slave down signal' (X04) turns off.

Point

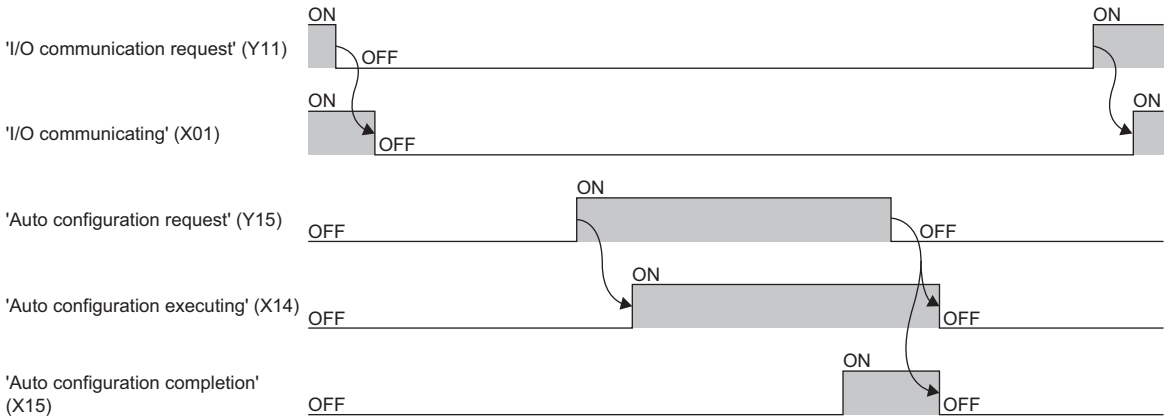
- The I/O communication status of the slave node can be checked in 'Communication status of nodes' (Un\G444 to Un\G447).
- The reserved node is recognized as the down node. When not detecting the down node as the reserved node, turn on the corresponding bit of 'Down node detection prohibit setting' (Un\G460 to Un\G463).

For auto configuration (X14), (X15), (Y15)

Use 'Auto configuration executing' (X14), 'Auto configuration completion' (X15), and 'Auto configuration request' (Y15) when executing the auto configuration.

Execute when 'I/O communicating' (X01) is off.

- When 'Auto configuration request' (Y15) is turned on, the auto configuration starts and 'Auto configuration executing' (X14) turns on. The auto configuration takes approximately 60 seconds at maximum to complete.
- When the auto configuration completes, the parameter is stored in 'Master function parameters' (Un\G468 to Un\G975) and 'Auto configuration completion' (X15) turns on.
- When 'Auto configuration request' (Y15) is turned off, 'Auto configuration executing' (X14) and 'Auto configuration completion' (X15) turn off.



Point

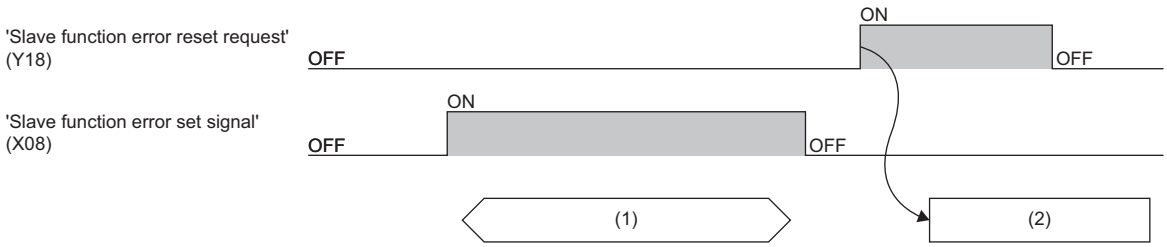
Even though 'Auto configuration request' (Y15) is turned on while 'I/O communication request' (Y11) or 'Request for saving/clearing parameters to Flash ROM' (Y17) is on, 'Auto configuration completion' (X15) does not turn on. After the output signal turns off, turn off and on 'Auto configuration request' (Y15) again.

Details of slave I/O signals

For slave function error (X08), (Y18)

'Slave function error set signal' (X08) and 'Slave function error reset request' (Y18) are used for the notification of an error while executing the slave function and the reset of the error code.

- When an error occurs in the slave function, the error information is stored in 'Slave function error information' (Un\G1537) or 'Slave function communication error information' (Un\G1153) and 'Slave function error set signal' (X08) turns on. When the error cause is eliminated, 'Slave function error set signal' (X08) turns off. (However, it does not turn off while the I/O communication is stopped.)
- If 'Slave function error reset request' (Y18) is turned on after eliminating the error cause, the error code of 'Slave function error information' (Un\G1537) is cleared.



(1) 'Slave function error information (Un\G1537)
(2) Error code clear

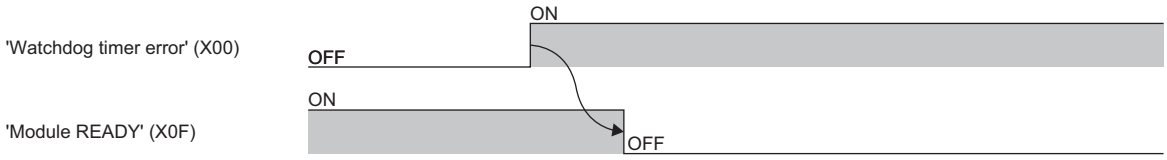
A

Details of I/O signal common in the master function and the slave function

Watchdog timer error (X00)

This signal turns on when a hardware failure occurs on the RJ71DN91.

- Off: Module normal
- On: Module failure



I/O communicating (X01), I/O communication request (Y11)

Use this signal when starting the I/O communication with each slave node.

Execute while 'Module READY' (X0F) is on.

■When starting the I/O communication by 'I/O communication request' (Y11)

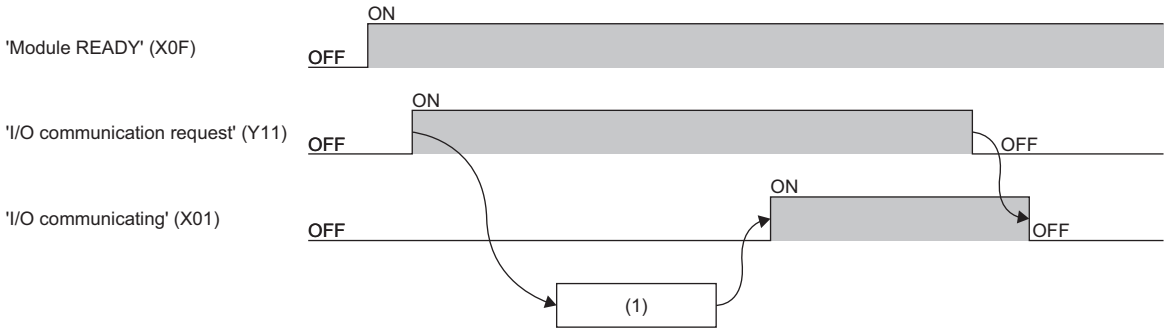
- When 'I/O communication request' (Y11) is turned on, the parameter is checked.
- When the parameter check normally completes, the I/O communication with each slave node starts and 'I/O communicating' (X01) turns on.
- When the parameter check abnormally completes, the ERR LED turns on and 'Master function error set signal' (X03) or 'Slave function error set signal' (X08) turns on. 'I/O communicating' (X01) does not turn on at this time. For details on 'Master function error set signal' (X03) and 'Slave function error set signal' (X08), refer to the following.

☞ Page 65 For master function error (X03), (Y13)

☞ Page 67 For slave function error (X08), (Y18)

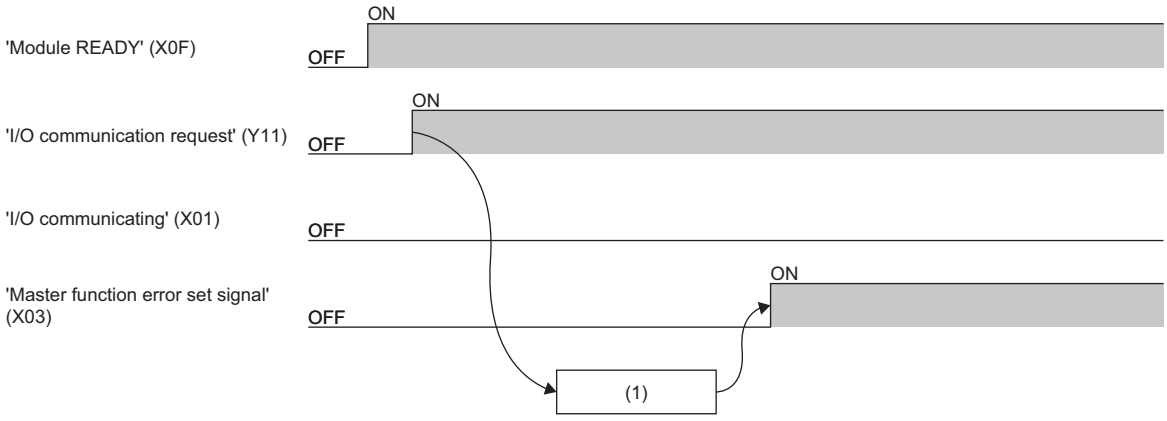
- When 'I/O communication request' (Y11) is turned off, the I/O communication with each slave node stops and 'I/O communicating' (X01) turns off.

When parameter check normally completes



(1) Parameter check

When parameter check abnormally completes



(1) Parameter check

Point

- Even though 'I/O communication request' (Y11) is turned on while 'Auto configuration request' (Y15) or 'Request for saving/clearing parameters to Flash ROM' (Y17) is on, 'I/O communicating' (X01) does not turn on. After the output signal turns off, turn off and on 'I/O communication request' (Y11) again.
- To stop the I/O communication, set 'I/O communication request' (Y11) and reset it after 200ms or longer.

■When starting the I/O communication automatically at power-on

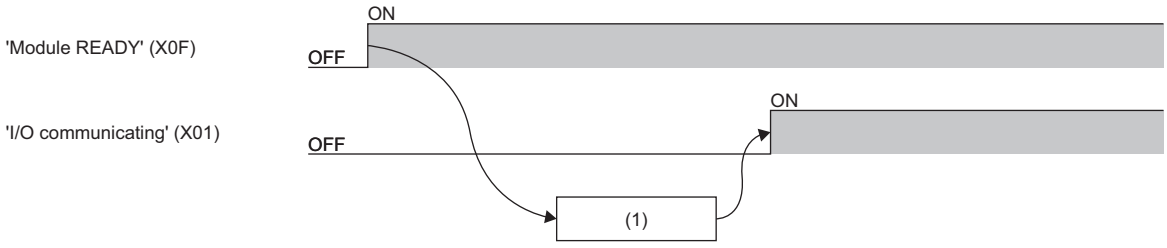
For auto communication, set 'Auto communication start setting' (Un\G1585) to "Start".

- When the power is turned on, 'Module READY' (X0F) turns on and the parameter is checked.
- When the parameter check normally completes, the I/O communication with each slave node starts and 'I/O communicating' (X01) turns on.
- When the parameter check abnormally completes, the ERR LED turns on and 'Master function error set signal' (X03) turns on. 'I/O communicating' (X01) does not turn on at this time. For details on 'Master function error set signal' (X03), refer to the following.

☞ Page 65 For master function error (X03), (Y13)

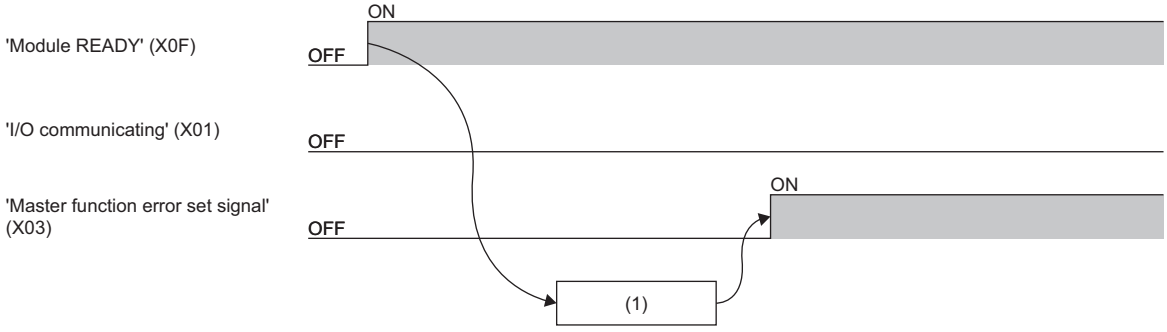
- When 'I/O communication signal request' (Y11) is turned on and off, the I/O communication with each slave node stops and 'I/O communicating' (X01) turns off.

When parameter check normally completes



(1) Parameter check

When parameter check abnormally completes



(1) Parameter check

For flash ROM (X06), (X07), (Y17)

Use 'Parameter saving/clearing to Flash ROM' (X06), 'Parameter save/clear completion to Flash ROM' (X07), and 'Request for saving/clearing parameters to Flash ROM' (Y17) for saving the parameter of the buffer memory to the flash ROM of the RJ71DN91 or clearing parameters saved in the flash ROM.

These areas are set whether to save the parameter of the buffer memory to the flash ROM or clear the parameter saved in the flash ROM by 'Parameter save/clear selection bit' (Un\G1584). (☞ Page 91 Parameter save/Clear selection area)

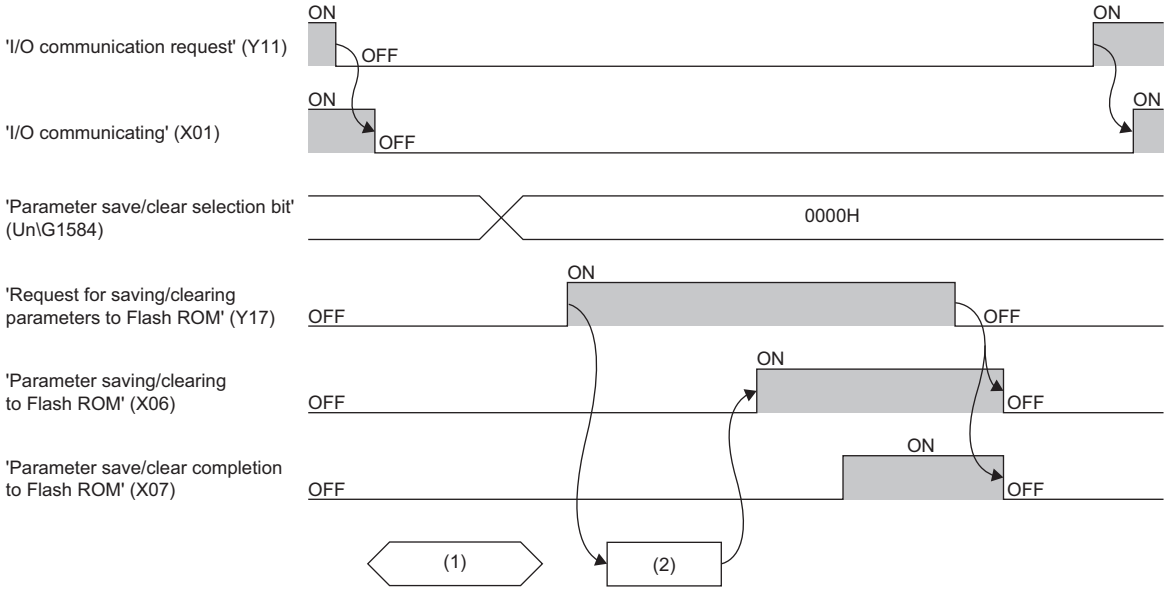
■When saving the parameter of the buffer memory to the flash ROM

- Execute when 'I/O communicating' (X01) is off.
- Set saving parameters (0000H) to 'Parameter save/clear selection bit' (Un\G1584).
- When 'Request for saving/clearing parameters to Flash ROM' (Y17) is turned on, the parameter is checked.
- When the parameter check normally completes, the parameter saving to the flash ROM starts and 'Parameter saving/clearing to Flash ROM' (X06) turns ON.
- When the parameter check abnormally completes, the ERR LED turns on and 'Master function error set signal' (X03) or 'Slave function error set signal' (X08) turns on. For details, refer to the following.

☞ Page 65 For master function error (X03), (Y13)
☞ Page 67 For slave function error (X08), (Y18)

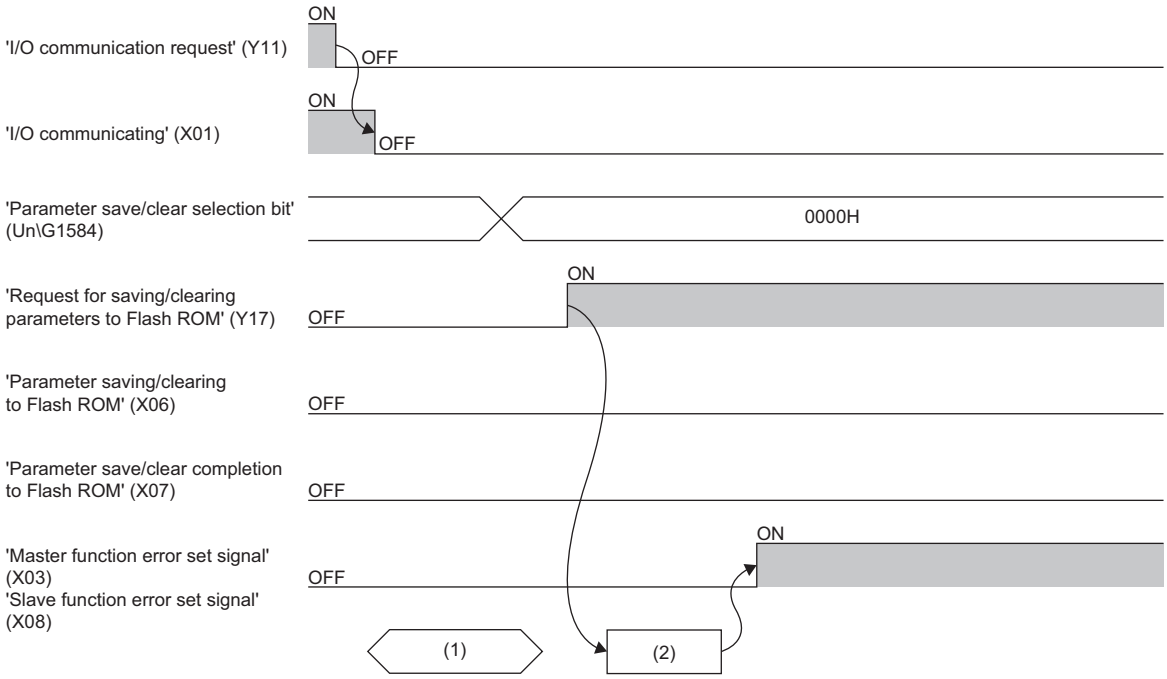
- When the parameter saving to the flash ROM completes, 'Parameter save/clear completion to Flash ROM' (X07) turns on.
- When 'Request for saving/clearing parameters to Flash ROM' (Y17) is turned off, 'Parameter saving/clearing to Flash ROM' (X06) and 'Parameter save/clear completion to Flash ROM' (X07) also turn off.

When parameter check normally completes



(1) Parameter (MOV/TO instruction)
(2) Parameter check

When parameter check abnormally completes



(1) Parameter (MOV/TO instruction)
(2) Parameter check

Point

- Even though 'Request for saving/clearing parameters to Flash ROM' (Y17) is turned on while 'I/O communicating' (X01) is on, 'Parameter save/clear completion to Flash ROM' (X07) does not turn on. Turn off 'I/O communication request' (Y11) and turn off and on 'Request for saving/clearing parameters to Flash ROM' (Y17) again after 'I/O communicating' (X01) turns off.
- Even though 'Request for saving/clearing parameters to Flash ROM' (Y17) is turned on while 'I/O communication request' (Y11) or 'Auto configuration request' (Y15) is on, 'Parameter save/clear completion to Flash ROM' (X07) does not turn on. Turn off the output signal, and turn off and on 'Request for saving/clearing parameters to Flash ROM' (Y17) again.
- The parameter cannot be saved in the flash ROM in which a parameter error occurs. However, when either of the master function or slave function is not used in master + slave function mode, all the parameters of the unused function can be set to zero and saved.
- The number of writes to the flash ROM is limited. Therefore, execute 'Request for saving/clearing parameters to Flash ROM' (Y17) only when creating a new parameter and changing the parameter.

'Module READY' (X0F)

This signal indicates whether the RJ71DN91 can operate or not.

This signal turns on when the RJ71DN91 becomes to be able to operate.

When 'Watchdog timer error' (X00) turns on, 'Module Ready' (X0F) turns off.

Details of I/O signal other than the master function and the slave function

For hardware test (X0A), (X0B), (X0C)

'Hardware testing' (X0A), 'Hardware test completion' (X0B), and 'Hardware test error detection' (X0C) indicate the status of the hardware test.

For the hardware test, refer to the following.

☞ Page 50 Hardware test

- Set the mode switch to 9, and turn on the power. Then, the hardware test starts, and 'Hardware testing' (X0A) turns on.
- When the hardware test completed successfully, 'Hardware test completion' (X0B) turns on.
- When an error occurs in the hardware test, 'Hardware test error detection' (X0C) turns on. At this time, 'Hardware test completion' (X0B) does not turn on.

Appendix 3 Buffer Memory

The buffer memory is used to exchange data between the RJ71DN91 and the CPU module. Buffer memory values are defaulted when the CPU module is reset or the system is powered off and on.

List of buffer memory addresses

Address (decimal)	Address (hexadecimal)	Name	Description	As master function	As slave function	Read, write
0 to 271	0000H to 010FH	System area				
272 to 287	0110H to 011FH	Message communication command	Sets the message communication command.	○	×	Write
288 to 303	0120H to 012FH	Message communication result	Stores the processing results of the message communication.	○	×	Read
304 to 423	0130H to 01A7H	Message communication data	Stores the transmit/receive data of the message communication.	○	×	Read, write
424 to 431	01A8H to 01AFH	System area				
432	01B0H	Master function communication status	Stores the communication status of the master function.	○	×	Read
433	01B1H	Master function error information	Stores the communication error code occurred in the master function.	○	×	Read
434	01B2H	Bus error counter	Stores the number of CAN chip (DeviceNet communication chip) illegal frame counts exceeding 96 times.	○	×	Read
435	01B3H	Bus off counter	Stores the number of the RJ71DN91 transitions to the bus off status.	○	×	Read
436 to 439	01B4H to 01B7H	Configuration status of nodes	Stores the parameter setting status of the slave node.	○	×	Read
440 to 443	01B8H to 01BBH	System area	—	×	×	—
444 to 447	01BCH to 01BFH	Communication status of nodes	Stores the I/O communication status of the slave node.	○	×	Read
448 to 451	01C0H to 01C3H	Communication error status of nodes	Stores the I/O communication error status of the slave node.	○	×	Read
452 to 455	01C4H to 01C7H	Error status of nodes	Stores the communication trouble status of the slave node.	○	×	Read
456 to 459	01C8H to 01CBH	System area	—	×	×	—
460 to 463	01CCH to 01CFH	Down node detection prohibit setting	Sets whether to detect the down node.	○	×	Read, write
464 to 467	01D0H to 01D3H	System area	—	×	×	—
468 to 975	01D4H to 03CFH	Master function parameters[*1]	Sets the master function parameters.	○	×	Read, write
976 to 1007	03D0H to 03EFH	System area				
1008	03F0H	Auto configuration operation setting	Sets the operation of the auto configuration.	○	×	Read, write
1009 to 1151	03F1H to 047FH	System area				
1152	0480H	Master function communication error information	Stores the communication error code occurred in the own node. It is valid only when the own node uses the master function.	○	×	Read
1153	0481H	Slave function communication error information	Stores the communication error code occurred in the own node. It is valid only when the own node uses the slave function.	×	○	Read
1154 to 1217	0482H to 04C1H	Other slave communication error information	Stores the communication error code occurred in each slave node. It is valid only when the own node uses the master function.	○	×	Read
1218 to 1279	04C2H to 04FFH	System area				

A

Address (decimal)	Address (hexadecimal)	Name	Description	As master function	As slave function	Read, write
1280 to 1531	0500H to 05FBH	Master function I/O address	Stores the start addresses and sizes (in increments of words) of the master function receive data (address: 0700H to 07FFH) and master function transmit data (address: 0900H to 09FFH) used by each slave node.	○	×	Read
1532	05FCH	Current link scan time	Stores the current link scan time. (Unit: ms)	○	×	Read
1533	05FDH	Minimum link scan time	Stores the minimum link scan time after power-on. (Unit: ms)	○	×	Read
1534	05FEH	Maximum link scan time	Stores the maximum link scan time after power-on. (Unit: ms)	○	×	Read
1535	05FFH	System area				
1536	0600H	Slave function communication status	Stores the I/O communication status of the slave function.	×	○	Read
1537	0601H	Slave function error information	Stores the communication error code occurred in the slave function.	×	○	Read
1538 to 1549	0602H to 060DH	System area				
1550	060EH	Slave function receive size setting*1	Sets the I/O data receive size of the slave function.	×	○	Read, write
1551	060FH	Slave function transmit size setting*1	Sets the I/O data transmit size of the slave function.	×	○	Read, write
1552 to 1567	0610H to 061FH	System area				
1568 to 1572	0620H to 0624H	Model display	Stores "RJ71DN91" in the ASCII code.	○	○	Read
1573	0625H	Node address	Stores the current operating node address.	○	○	Read
1574	0626H	Mode switch number	Stores the current operating mode switch number.	○	○	Read
1575 to 1581	0627H to 062DH	System area				
1582	062EH	Hardware test item display	Stores the current executing test item number at the hardware test and communication test.	At hardware test		Read
1583	062FH	Hardware test result area	Stores the results of the hardware test and communication test.	At hardware test		Read
1584	0630H	Parameter save/clear selection bit	Selects whether to save or clear the parameter with 'Request for saving/clearing parameters to Flash ROM' (Y17).	○	○	Read, write
1585	0631H	Auto communication start setting*1	Sets whether to start the I/O communication automatically with the parameter saved in the flash ROM when the CPU module is reset or powered off and on.	○	○	Read, write
1586	0632H	Operation setting for bus off error area	Sets whether to reset the CAN chip (communication chip) of the RJ71DN91 to restart the communication when a bus off error occurs. The communication can be restarted even when a value is changed after a bus off error occurs.	○	○	Read, write
1587	0633H	Data consistency setting	Sets whether to enable or disable the data consistency for refresh or the data consistency dedicated instruction.	○	○	Read, write
1588	0634H	Data consistency setting status	Stores the enabled/disabled state of data consistency for refresh or the data consistency dedicated instruction.	○	○	Read
1589 to 1791	0635H to 06FFH	System area				
1792 to 2047	0700H to 07FFH	Master function receive data	Stores the data received from each slave node.	○	×	Read
2048 to 2303	0800H to 08FFH	System area				
2304 to 2559	0900H to 09FFH	Master function transmit data	Sets the data to be transmitted to each slave node.	○	×	Write
2560 to 2815	0A00H to 0AFFH	System area				
2816 to 2879	0B00H to 0B3FH	Slave function receive data	Stores the data received from the master node.	×	○	Read
2880 to 3071	0B40H to 0BFFH	System area				
3072 to 3135	0C00H to 0C3FH	Slave function transmit data	Sets the data to be transmitted to the master node.	×	○	Write

Address (decimal)	Address (hexadecimal)	Name	Description	As master function	As slave function	Read, write
3136 to 32767	0C40H to 7FFFH	System area				

*1 This buffer memory address can be saved to the flash ROM.
The parameters of the buffer memory areas are cleared when the CPU module is reset or powered off and on unless they are saved to the flash ROM.

Point

Do not write data to "System area". Doing so may cause malfunction of the programmable controller system.

A

Details of buffer memory addresses

The following shows the buffer memory addresses of the RJ71DN91.

Master function message communication area

This area is used for the message communication of the master function.

For the execution timing, refer to the following.

☞ Page 65 Details of master I/O signals

■Message communication command (Un\G272 to Un\G287)

Set the message communication command.

• Reading the attribute data of the slave node

Buffer memory address	Item	Description
Un\G272	Command number	0101H = Reading attribute (Get Attribute)
Un\G273	Node address of slave node (Slave MAC ID), class ID	Lower byte: Node address of slave node (MAC ID) Upper byte: Object class ID
Un\G274	Instance ID	Object instance ID
Un\G275	Attribute ID	Lower byte: Object attribute ID Upper byte: Always set 0.

• Writing the attribute data to the slave node

Buffer memory address	Item	Description
Un\G272	Command number	0102H = Getting attribute (Set Attribute)
Un\G273	Node address of slave node (Slave MAC ID), class ID	Lower byte: Node address of slave node (MAC ID) Upper byte: Object class ID
Un\G274	Instance ID	Object instance ID
Un\G275	Attribute ID, data length	Lower byte: Object attribute ID Upper byte: Byte length of the attribute data to be written 1 to 240 (1H to F0H)

• Reading the communication error information of the slave node

Buffer memory address	Item	Description
Un\G272	Command number	0001H = Communication error information read
Un\G273	Node address of slave node (Slave MAC ID)	Lower byte: Node address of slave node (MAC ID) Upper byte: Always set 0.

• Reset

Buffer memory address	Item	Description
Un\G272	Command number	0201H = Reset
Un\G273	Node address of slave node (Slave MAC ID), class ID	Lower byte: Node address of slave node (MAC ID) Upper byte: Object class ID
Un\G274	Instance ID	Object instance ID

• Performing other message communications

Buffer memory address	Item	Description
Un\G272	Command number	FE**H (For details on **, refer to DeviceNet common service in THE CIP NETWORKS LIBRARY Volume 3 DeviceNet Adaptation of CIP Edition 1.14.)
Un\G273	Node address of slave node (Slave MAC ID), class ID	Lower byte: Node address of slave node (MAC ID) Upper byte: Object class ID
Un\G274	Instance ID	Object instance ID
Un\G275	Attribute ID, data length	Lower byte: Object attribute ID Upper byte: Always set 0.

■Message communication result (Un\G288 to Un\G303)

The processing result of the message communication is stored.

• Reading the attribute data of the slave node

Buffer memory address	Item	Description
Un\G288	Command number	0101H = Reading attribute (Get Attribute)
Un\G289	Execution error code for message communication	At normal completion: 0000H At error completion: Execution error code for message communication
Un\G290	Node address of slave node (Slave MAC ID), class ID	Lower byte: Node address of slave node (MAC ID) Upper byte: Object class ID
Un\G291	Instance ID	Object instance ID
Un\G292	Attribute ID, data length	Lower byte: Object attribute ID Upper byte: Byte length of the read attribute data 1 to 240 (1H to F0H)

• Writing the attribute data to the slave node

Buffer memory address	Item	Description
Un\G288	Command number	0102H = Getting attribute (Set Attribute)
Un\G289	Execution error code for message communication	At normal completion: 0000H At error completion: Execution error code for message communication
Un\G290	Node address of slave node (Slave MAC ID), class ID	Lower byte: Node address of slave node (MAC ID) Upper byte: Object class ID
Un\G291	Instance ID	Object instance ID
Un\G292	Attribute ID	Lower byte: Object attribute ID Upper byte: Byte length of the attribute data (1 to 240)

• Reading the communication error information of the slave node

Buffer memory address	Item	Description
Un\G288	Command number	0001H = Communication error information read
Un\G289	Execution error code for message communication	At normal completion: 0000H At error completion: Execution error code for message communication

• Reset

Buffer memory address	Item	Description
Un\G288	Command number	0201H = Reset
Un\G289	Execution error code for message communication	At normal completion: 0000H At error completion: Execution error code for message communication
Un\G290	Node address of slave node (Slave MAC ID), class ID	Lower byte: Node address of slave node (MAC ID) Upper byte: Object class ID
Un\G291	Instance ID	Object instance ID

• Performing other message communications

Buffer memory address	Item	Description
Un\G288	Command number	For FE**H□**, refer to DeviceNet common service.
Un\G289	Execution error code for message communication	At normal completion: 0000H At error completion: Execution error code for message communication
Un\G290	Node address of slave node (Slave MAC ID), class ID	Lower byte: Node address of slave node (MAC ID) Upper byte: Object class ID
Un\G291	Instance ID	Object instance ID
Un\G292	Attribute ID, data length	Lower byte: Object attribute ID Upper byte: Byte length of the read attribute data 1 to 240 (1H to F0H)

The following table lists the message communication execution error codes stored at the error completion.

• Message communication execution error codes (only when the master function is used)

Error code (decimal)	Error detection	Description	Remedy
2	Slave node	The object could not use the resources required for executing the requested service.	• Referring to the slave manual, check the conditions for the slave to notify this error, and remedy accordingly.
8	Slave node	The requested service was not mounted or was not defined for this object class or instance.	• Check that the specified MAC ID, class ID, instance ID, and attribute ID are correct. • Referring to the slave manual, check the conditions for the slave to notify this error, and remedy accordingly.
9	Slave node	Invalid attribute data was detected.	• Check that the specified MAC ID, class ID, instance ID, and attribute ID are correct. • Referring to the slave manual, check the conditions for the slave to notify this error, and remedy accordingly.
11	Slave node	The object has already been in the mode or state requested by the service.	• Check that the specified MAC ID, class ID, instance ID, and attribute ID are correct. • Check the current status using Get Attribute. • Referring to the slave manual, check the conditions for the slave to notify this error, and remedy accordingly.
12	Slave node	The object cannot execute the requested service in the current mode or state.	• Check that the specified MAC ID, class ID, instance ID, and attribute ID are correct. • Check the current status using Get Attribute. • Referring to the slave manual, check the conditions for the slave to notify this error, and remedy accordingly.
14	Slave node	A request to change a change prohibited attribute has been received.	• Check that the specified MAC ID, class ID, instance ID, and attribute ID are correct. • Referring to the slave manual, check the conditions for the slave to notify this error, and remedy accordingly.
15	Slave node	The permission/privilege check failed.	• Check that the specified MAC ID, class ID, instance ID, and attribute ID are correct. • Referring to the slave manual, check the conditions for the slave to notify this error, and remedy accordingly.
16	Slave node	The requested service cannot be executed in the current device status.	• Check that the specified MAC ID, class ID, instance ID, and attribute ID are correct. • Referring to the slave manual, check the conditions for the slave to notify this error, and remedy accordingly.
17	RJ71DN91	The slave node did not respond.	• Comprehensively check the state of the network and slave node such as that the slave node is not down, and that the terminator is not disconnected.
19	Slave node	Sufficient data to execute the specified operation has not been provided.	• Check that the specified MAC ID, class ID, instance ID, and attribute ID are correct. • When executing Attributes Set, check that the specified data is sufficient, and that the data length is correct. • Referring to the slave manual, check the conditions for the slave to notify this error, and remedy accordingly.
20	Slave node	The specified attributes are not supported.	• Check that the specified MAC ID, class ID, instance ID, and attribute ID are correct. • Referring to the slave manual, check the conditions for the slave to notify this error, and remedy accordingly.
21	Slave node	The data larger than the maximum receivable size has been received.	• The data returned by the slave node must be 240 bytes or less.
22	Slave node	The specified object does not exist in the slave node.	• Check that the specified MAC ID, class ID, instance ID, and attribute ID are correct. • Referring to the slave manual, check the conditions for the slave to notify this error, and remedy accordingly.
50	RJ71DN91	The response data format is illegal.	• Comprehensively check the status of the network and slave node: if the terminating resistor comes off, and others.
55	RJ71DN91	The specified slave node address of slave node is not within 0 to 63.	• Specify a value between 0 and 63.
57	RJ71DN91	The divide receive order is illegal.	• Comprehensively check the status of the network and slave node: if the terminating resistor comes off, and others.
161	RJ71DN91	The specified slave node address of slave node is not within 0 to 63.	• Specify a value between 0 and 63.

Error code (decimal)	Error detection	Description	Remedy
257	RJ71DN91	The data length set in the buffer memory exceeds 241.	• The data length must be 240 or less.
258	RJ71DN91	An illegal value is set for the command number in the message communication command area of the buffer memory.	• Set one of 0001H, 0101H, 0102H, 0201H, or FE**H for the command number.
300	RJ71DN91	The own node is in the offline state.	• Turn on 'I/O communication request' (Y11) to set the own node in the online state.
301	RJ71DN91	Message transmitting failed.	• Perform the hardware test to check for a hardware failure.
302	RJ71DN91	Response wait timeout occurred.	• Comprehensively check the status of the network and slave node: if the terminating resistor comes off, and others.
303	RJ71DN91	An illegal response has been obtained.	• Comprehensively check the status of the network and slave node: if the terminating resistor comes off, and others.
304	RJ71DN91	The node address set as the reserved node has been specified.	• Set a node address which is not set as a reserved node.
305	RJ71DN91	A message is transmitted to the own node.	• Transmit a message with a specification of a node other than the own node.
306	RJ71DN91	An error response is received from the slave node in the connection open processing.	• Check that the message group of the parameter is correctly set.
317	Slave node	The response data length is too long.	• Check that the transmit message can respond in the slave node.

■Message communication data (Un\G304 to Un\G423)

The transmit/receive data of the message communication is stored.

• Reading the attribute data of the slave node

The read attribute data is stored in increments of bytes.

Buffer memory address	Read attribute data	
Un\G304	2nd byte	1st byte
⋮	4th byte	3rd byte
	6th byte	5th byte
Un\G423	⋮	⋮

• Writing the attribute data to the slave node

Set the attribute data to be written in increments of bytes.

Buffer memory address	Attribute data to be written	
Un\G304	2nd byte	1st byte
⋮	4th byte	3rd byte
	6th byte	5th byte
Un\G423	⋮	⋮

• Reading the communication error information of the slave node

The read communication error is stored.

The following table lists the data to be stored in each address.

Buffer memory address	Item	Description
Un\G304	Slave status	Whether the slave node is set in the parameters, and whether the slave node responded or not are stored. Troubles in the slave node are notified by the turning on/off the state of each bit. • b0: The slave node did not respond. • b1: The slave node is used by the system. • b2: The slave node has rejected writing of the attributes. • b3: The size of the I/O data set in the parameters differs from the actual size. • b4: The slave node is used by the system. • b5: The slave node is used by the system. • b6: The slave node is used by the system. • b7: The slave node is set as a reserved node in the parameter. • b8 to b15: The slave node is used by the system.
Un\G305	System area	—
Un\G306	Communication error code	The communication error code occurred in the message communication is stored. (☞ Page 60 Event code (other node error)) The same communication error code is stored in the upper byte of 'Master function error information' (Un\G433) as well.
Un\G307	General DeviceNet error code*1	The general DeviceNet error code transmitted from the slave node is stored. Enable only when the communication error code is 35 (0023H).*1
Un\G308	Additional error code	The additional vendor-specific error code transmitted from the slave node is stored. For details, refer to the manual for each slave node. When the slave node is RJ71DN91, the additional error code is not stored to the master node because there is no vendor-specific error and the additional error code is not transmitted.
Un\G309	Number of heartbeat timeouts	The number of times that the RJ71DN91 detects the number of down of each slave node is stored.

*1 The error codes are defined by ODVA. For details, refer to THE CIP NETWORKS LIBRARY Volume 1 Common Industrial Protocol (CIP™).

• Performing other message communications

For details, refer to THE CIP NETWORKS LIBRARY Volume 3 DeviceNet Adaptation of CIP Edition 1.14.

Master function own node area

This area is used to store the communication status and error information of the master function.

■Master function communication status (Un\G432)

The communication status of the master function is stored.

• Upper byte

The I/O communication status of the master function is stored.

The following table lists the values to be stored depending on the communication status.

Value	Name	Operation
00H	OFFLINE	Initializing, bus off, network power-off
40H	STOP	I/O communication stop
C0H	OPERATE	I/O communicating

When 'Auto communication start setting' (Un\G1585) is set to "No Start", the status automatically switches to STOP (40H) from OFFLINE (00H) at power-on. Turning on 'I/O communication request' (Y11) switches the status to OPERATE (C0H).

When 'Auto communication start setting' (Un\G1585) is set to "Start", the status automatically switches to OPERATE (C0H) from OFFLINE (00H) at power-on.

When a reset message is received from the network, the status automatically returns to OFFLINE (00H) and switches to OPERATE (C0H).

• Lower byte

The network communication status is stored.

Each bit turns on and off as follows depending on the communication status.

- b0: There is a node with a communication error.
- b1: This bit is always off.
- b2: A parameter error occurs.
- b3: The communication cannot be performed due to a serious problem in the network.
- b4 to b7: This bit is always off.

■Master function error information (Un\G433)

The communication error code compatible with the QJ71DN91 occurred in the master function is stored.

As the communication error codes are the same as those of the QJ71DN91, refer to the following.

📖 DeviceNet Master-Slave Module User's Manual

■Bus error counter (Un\G434)

The number of CAN chip (DeviceNet communication chip) illegal frame counts exceeding 96 times is stored.

If this value becomes lager, it indicates that the communication is unstable.

■Bus off counter (Un\G435)

The number of the RJ71DN91 transitions to the bus off status is stored.

If this value becomes lager, it indicates that the communication is unstable.

■Master function communication error information (Un\G1152)

The communication error code which occurs on the own node in the master function mode is stored. (☞ Page 57 Error code for module diagnostics (own node error))

The node address (MAC ID) of the node where an error has occurred is stored in the lower byte of the communication error code.

- FEH, FFH (254, 255): Own node (RJ71DN91 master node)
- 00H to 3FH (0 to 63): Node address (MAC ID) of the node where an error has occurred

Point

If an error occurs in multiple nodes, the error occurred in the node with the smallest node address (MAC ID) is stored.

For how to notify error occurrence and how to clear this area, refer to the following.

☞ Page 65 For master function error (X03), (Y13)

Master function each node status area

This area is used to store the operation status of each slave node.

■Configuration status of nodes (Un\G436 to Un\G439)

The parameter setting status of the slave node is stored.

When the corresponding bit is on: The parameters have already been set.

When the corresponding bit is off: No parameter is set.

The following table lists the node addresses corresponding to each bit of the buffer memory addresses.

Buffer memory address	b15	b14	···	b1	b0
Un\G436	Node 15	Node 14	···	Node 1	Node 0
Un\G437	Node 31	Node 30	···	Node 17	Node 16
Un\G438	Node 47	Node 46	···	Node 33	Node 32
Un\G439	Node 63	Node 62	···	Node 63	Node 48

• Timing when the bit turns on

If the parameter check normally completes when the I/O communication is started or the master function parameter is saved in the flash ROM, the bit corresponding to the set slave node turns on.

• Timing when the bit turns off

Remove the setting of the slave node from the master function parameter, and start the I/O communication or save the master function parameter in the flash ROM. When the parameter check normally completes, the bit corresponding to the removed slave node turns off.

When the CPU module of the master node is reset or powered off and on, all bits turn off.

■Communication status of nodes (Un\G444 to Un\G447)

The I/O communication status of the slave node is stored.

When 'I/O communicating' (X01) is off, all bits turn off.

When the corresponding bit is on: Communicating

When the corresponding bit is off: Communication interrupt

The following table lists the node addresses corresponding to each bit of the buffer memory addresses.

Buffer memory address	b15	b14	···	b1	b0
Un\G444	Node 15	Node 14	···	Node 1	Node 0
Un\G445	Node 31	Node 30	···	Node 17	Node 16
Un\G446	Node 47	Node 46	···	Node 33	Node 32
Un\G447	Node 63	Node 62	···	Node 63	Node 48

■Communication error status of nodes (Un\G448 to Un\G451)

The I/O communication error status of the slave node is stored.

When 'I/O communicating' (X01) is off, all bits turn off.

No error is detected for the node where the corresponding bit of 'Down node detection prohibit setting' (Un\G460 to Un\G463) turns on.

When the corresponding bit is on: A communication error occurs.

When the corresponding bit is off: No communication error occurs.

The following table lists the node addresses corresponding to each bit of the buffer memory addresses.

Buffer memory address	b15	b14	···	b1	b0
Un\G448	Node 15	Node 14	···	Node 1	Node 0
Un\G449	Node 31	Node 30	···	Node 17	Node 16
Un\G450	Node 47	Node 46	···	Node 33	Node 32
Un\G451	Node 63	Node 62	···	Node 63	Node 48

Point

When one of the bits in this area is turned on, 'Slave down signal' (X04) turns on.

■Error status of nodes (Un\G452 to Un\G455)

The communication trouble status of the slave node is stored.

When the corresponding bit is on: Trouble information exists.

When the corresponding bit is off: No trouble information

When the communication error information reading of the corresponding node is performed in the message communication, the corresponding bit turns off. (☞ Page 25 Acquiring communication error information)

The following table lists the node addresses corresponding to each bit of the buffer memory addresses.

Buffer memory address	b15	b14	···	b1	b0
Un\G452	Node 15	Node 14	···	Node 1	Node 0
Un\G453	Node 31	Node 30	···	Node 17	Node 16
Un\G454	Node 47	Node 46	···	Node 33	Node 32
Un\G455	Node 63	Node 62	···	Node 63	Node 48

■Down node detection prohibit setting (Un\G460 to Un\G463)

Set whether to detect the down node.

Set whether to reflect the off status of 'Communication status of nodes' (Un\G444 to Un\G447) to 'Slave down signal' (X04).

When the corresponding bit turns on: 'Slave down signal' (X04) does not turn on even if the corresponding slave node is down.

When the corresponding bit turns off: 'Slave down signal' (X04) turns on when the corresponding slave node is down.

The following table lists the node addresses corresponding to each bit of the buffer memory addresses.

Buffer memory address	b15	b14	···	b1	b0
Un\G460	Node 15	Node 14	···	Node 1	Node 0
Un\G461	Node 31	Node 30	···	Node 17	Node 16
Un\G462	Node 47	Node 46	···	Node 33	Node 32
Un\G463	Node 63	Node 62	···	Node 63	Node 48

Point

Turn on the corresponding bit of the down node detection prohibit setting for the node set as the reserved node with the master function parameter.

When the bit remains off, the reserved node is recognized as a down node.

■Other slave communication error information (Un\G1154 to Un\G1217)

The communication error code which occurs on other nodes (each slave node) while the own node is in the master function mode is stored by a node address. (☞ Page 60 Event code (other node error))

Buffer memory address	Communication error code
Start address (Un\G1154)	Communication error code occurred in the node address 0
Start address + 1 (Un\G1155)	Communication error code occurred in the node address 1
⋮	⋮
Start address + 63 (Un\G1217)	Communication error code occurred in the node address 63

The node address (MAC ID) of the node where an error has occurred is stored in the lower byte of the communication error code.

- FEH, FFH (254, 255): Own node (RJ71DN91 master node)
- 00H to 3FH (0 to 63): Node address (MAC ID) of the node where an error has occurred

Point

If an error occurs in multiple nodes, the error occurred in the node with the smallest node address (MAC ID) is stored.

For how to notify error occurrence and how to clear this area, refer to the following.

☞ Page 65 For master function error (X03), (Y13)

Master function parameter setting area

This area is used to set the master function parameters.

Set the information such as the connection type and number of I/O points for the I/O communications with each slave node (63 at maximum).

■Master function parameters (Un\G468 to Un\G975)

When setting the master function parameters using the auto configuration, refer to the following.

☞ Page 31 Auto Configuration Function

Buffer memory address	Item		Description
Un\G468 to Un\G470	System area		—
Un\G471	Constant scan		Specify this item to stabilize the link scan time. (Setting range: 0 to 65535ms (FFFFH))
Un\G472	1st slave node	Node address and message group	Lower byte • 00H to 3FH: Node address of the 1st slave node (MAC ID) 0 to 63 Upper byte • 01H: Node supporting UCMM and using one of message group 3, 2, or 1 • 03H: Node supporting UCMM and using the message group 1 • 04H: Node not supporting UCMM (group 2 dedicated server) • 80H: Reserved node
Un\G473		Connection type	Select the connection type for the I/O communication. • 0001H = Polling • 0002H = Bit strobe • 0004H = Change of state • 0008H = Cyclic
Un\G474		Number of byte modules	Lower byte: Number of input byte modules Upper byte: Number of output byte modules (Set in hexadecimal.) The bit module is calculated as 8 points equaling to 1 byte module.
Un\G475		Number of word modules	Lower byte: Number of input word modules Upper byte: Number of output word modules (Set in hexadecimal.)
Un\G476		Number of double word modules	Lower byte: Number of input double word modules Upper byte: Number of output double word modules (Set in hexadecimal.)
Un\G477		Expected packet rate	Set the expected packet rate for the slave node. The setting details vary depending on the connection type. For details, refer to the following. (Setting range: 0 to 65535ms (FFFFH))*1 ☞ Page 38 Details on the expected packet rate and the production inhibit time • 0000H: 200ms (default value) • Other than 0000H: Setting value -1 (ms)
Un\G478		Watchdog timeout action	Set the operation taken when a watchdog timeout occurs in the slave node. • 0000H: Equivalent to the following TIMEOUT (default value). • 0001H: TIMEOUT The connection becomes timeout. The communication is manually stopped and is not recovered until it is manually restarted. • 0002H: AUTO DELETE The connection is automatically deleted. The communication is stopped and is automatically restarted. The output is cleared once. • 0003H: AUTO RESET The communication continues while holding the connection. The output is not cleared.
Un\G479		Production inhibit time	Set the production inhibit time. The setting details vary depending on the connection type. (Setting range: 0 to 65535ms (FFFFH))*1 0000H: 10ms (default value) Other than 0000H: Setting value -1 (ms)
Un\G480 to Un\G975	Setting of the 2nd to 63rd slave nodes		Same as that of the 1st slave node

*1 When setting a value lager than 32768, set the value in hexadecimal.

Point

To change the master function parameter, set the default values in the areas following the parameter is set.
To change the number of slave nodes which perform I/O communications from six to four, set the default values in the areas of the 5th and 6th slave node.

■Auto configuration operation setting (Un\G1008)

Set the auto configuration operation.

For the execution timing, refer to the following.

☞ Page 32 Flow of the auto configuration operation

• Setting details

Upper byte

Set the auto configuration type.

00H: All configuration (default value)

01H: Add configuration

Lower byte

Set the maximum detection node address.

00H to 3FH (0 to 63) (default value: 3FH)

For details on the auto configuration function, refer to the following.

☞ Page 31 Auto Configuration Function

Master function transmit/receive data area

This area is used to store the master function transmit/receive data.

■Master function receive data (Un\G1792 to Un\G2047)

The data received from each slave node is stored.

The data is sorted on the word border for each module.

For the double-word module, it is stored in the order from lower word to upper word.

Ex.

1st node: Number of byte modules = 3, number of word modules = 2, number of double-word modules = 2

2nd node: Number of byte modules = 1

3rd node: Number of byte modules = 1

Buffer memory address	b15 to b8	b7 to b0	Input data to be stored
Un\G1792	2nd byte module	1st byte module	1st node input data
Un\G1793	Empty*1	3rd byte module	
Un\G1794	1st word module		
Un\G1795	2nd word module		
Un\G1796	Lower word of the 1st double word module		
Un\G1797	Upper word of the 1st double word module		
Un\G1798	Lower word of the 2nd double word module		
Un\G1799	Upper word of the 2nd double word module		
Un\G1780	Empty*1	1st byte module	2nd node input data
Un\G1781	Empty*1	1st byte module	3rd node input data
⋮	⋮	⋮	⋮

*1 When the number of byte modules is an odd number, a one-byte empty area is inserted.

■Master function transmit data (Un\G2304 to Un\G2559)

Set the data to be transmitted to each slave node.

The data is sorted on the word border for each module.

For the double-word module, it is stored in the order from lower word to upper word.

Ex.

1st node: Number of byte modules = 3, number of word modules = 2, number of double-word modules = 2

2nd node: Number of byte modules = 1

3rd node: Number of byte modules = 1

Buffer memory address	b15 to b8	b7 to b0	Input data to be output
Un\G2304	2nd byte module	1st byte module	1st node output data
Un\G2305	Empty*1	3rd byte module	
Un\G2306	1st word module		
Un\G2307	2nd word module		
Un\G2308	Lower word of the 1st double word module		
Un\G2309	Upper word of the 1st double word module		
Un\G2310	Lower word of the 2nd double word module		
Un\G2311	Upper word of the 2nd double word module		
Un\G2312	Empty*1	1st byte module	2nd node output data
Un\G2313	Empty*1	1st byte module	3rd node output data
⋮	⋮	⋮	⋮

*1 When the number of byte modules is an odd number, a one-byte empty area is inserted.

■Master function I/O address (Un\G1280 to Un\G1531)

The start addresses and sizes (in increments of words) of 'Master function receive data' (Un\G1792 to Un\G2047) and 'Master function transmit data (Un\G2304 to Un\G2559)' used by each slave node are stored.

The following buffer memory addresses can be used for checking the start address of each node.

Buffer memory address	Stored data
Un\G1280	1st slave node: Input data start address
Un\G1281	1st slave node: Input data size (number of words)
Un\G1282	1st slave node: Output data start address
Un\G1283	1st slave node: Output data size (number of words)
Un\G1284	2nd slave node: Input data start address
Un\G1285	2nd slave node: Input data size (number of words)
Un\G1286	2nd slave node: Output data start address
Un\G1287	2nd slave node: Output data size (number of words)
⋮	⋮
Un\G1531	63rd slave node: Output data size (number of words)

Master function link scan time area

This area is used to store the link scan time.

■Current link scan time (Un\G1532)

The current link scan time is stored. (Unit: ms)

■Minimum link scan time (Un\G1533)

The minimum link scan time after power-on is stored. (Unit: ms)

■Maximum link scan time (Un\G1534)

The maximum link scan time after power-on is stored. (Unit: ms)

Slave function own node area

The communication status of the slave function and error information are stored.

■Slave function communication status (Un\G1536)

The I/O communication status of the slave function is stored.

The following table lists the values to be stored depending on the communication status.

Value	Name	Operation
0000H	OFFLINE	Initializing, bus off, network power-off
0040H	STOP	I/O communication stop
0080H	READY	Wait for connection establishment from the master node
00C0H	OPERATE	I/O communicating

• When 'Auto communication start setting' (Un\G1585) is set to "No Start"

Powering on automatically switches the status from OFFLINE (0000H) to STOP (0040H).

Turning on 'I/O communication request' (Y11) switches the status to OPERATE (00C0H).

However, the status is in READY (0080H) until the I/O communication request is transmitted from the master node.

• When 'Auto communication start setting' (Un\G1585) is set to "Start"

Powering on automatically switches the status from OFFLINE (0000H) to OPERATE (00C0H).

However, the status is in STOP (0040H) until the I/O communication request is transmitted from the master node.

• When a reset message is received from the network

The status automatically returns to OFFLINE (0000H) and switches to OPERATE (00C0H) from OFFLINE (0000H).

■Slave function error information (Un\G1537)

The communication error code compatible with the QJ71DN91 occurred in the slave function is stored.

As the communication error codes are the same as those of the QJ71DN91, refer to the following.

📖 DeviceNet Master-Slave Module User's Manual

For how to notify error occurrence and how to clear this area, refer to the following.

☞ Page 67 For slave function error (X08), (Y18)

■Slave function communication error information (Un\G1153)

The communication error code which occurs on the own node in the slave function mode is stored. (☞ Page 57 Error code for module diagnostics (own node error))

The node address (MAC ID) of the node where an error has occurred is stored in the lower byte of the communication error code.

• FEH, FFH (254, 255): Own node (RJ71DN91 slave node)

• 00H to 3FH (0 to 63): Node address (MAC ID) of the node where an error has occurred

For how to notify error occurrence and how to clear this area, refer to the following.

☞ Page 67 For slave function error (X08), (Y18)

Slave function parameter setting area

This area is used to set the parameters for slave function.

■Slave function receive size setting (Un\G1550)/Slave function transmit size setting (Un\G1551)

Set the number of I/O points for the slave function.

The following table lists the slave function parameters.

Buffer memory address	Item	Description
Un\G1550	Slave function receive byte size (number of input points) setting area	Set the I/O data receive size for the slave function. (Setting range: 0 to 128 bytes, default value: 8 bytes)
Un\G1551	Slave function transmit byte size (number of output points) setting	Set the I/O data transmit size for the slave function. (Setting range: 0 to 128 bytes, default value: 8 bytes)

Slave function transmit/receive data area

This area is used to store the slave function transmit/receive data.

■Slave function receive data (Un\G2816 to Un\G2879)

The data received from the master node is stored.

The size set in 'Slave function receive size setting' (Un\G1550) is valid.

Buffer memory address	b15 to b8	b7 to b0
Un\G2816	2nd byte	1st byte
Un\G2817	4th byte	3rd byte
Un\G2818	6th byte	5th byte
⋮	⋮	⋮

■Slave function transmit data (Un\G3072 to Un\G3135)

Set the data to be transmitted to the master node.

Transmit the I/O data for the size set in 'Slave function transmit size setting' (Un\G1551).

Buffer memory address	b15 to b8	b7 to b0
Un\G3072	2nd byte	1st byte
Un\G3073	4th byte	3rd byte
Un\G3074	6th byte	5th byte
⋮	⋮	⋮

Point

To use the RJ71DN91 as a master node, set an even number for the number of byte modules.

When an odd number is set for the number of byte modules, and the word module and double word module are set simultaneously, the word data and double word data cannot be transmitted/received normally.

Own node information area

This area is used to store the own node (RJ71DN91) information.

■Model display (Un\G1568 to Un\G1572)

"RJ71DN91" is stored with the ASCII code.

Buffer memory address	Model display	
Un\G1568	"J"	"R"
Un\G1569	"1"	"7"
Un\G1570	"N"	"D"
Un\G1571	"1"	"9"
Un\G1572	00H	00H

■Node address (Un\G1573)

The current operating node address is stored.

00H to 3FH (Stored in the binary.)

■Mode switch number (Un\G1574)

The current operating mode switch number is stored.

Hardware test area

This area is used for the hardware test and communication test.

☞ Page 50 Hardware test

☞ Page 51 Communication test

■Hardware test item display (Un\G1582)

The current executing test item number is stored at the hardware test and communication test.

The following table lists the item numbers of the hardware test.

Test item number	Description	Processing
0000H	Before test start	Before starting the hardware test
0001H	ROM check	Testing whether the ROM is normal
0002H	Microcomputer check	Testing whether the RAM is normal
0003H	CAN controller	Testing whether the microcomputer is normal
0004H	Check	Testing whether the CAN controller is normal
FFFFH	Test completed successfully	Executing and normally completing the hardware test

The following table lists the item numbers of the communication test.

Test item number	Description	Processing
0000H	Before test start	Before communication test start
0001H	Node address duplication check	Checking whether the same node address exists
0002H	Communication check	Checking whether the communication with one or more nodes in the network can be performed
FFFFH	Test completed successfully	Executing and normally completing the communication test

■Hardware test result area (Un\G1583)

The results of the hardware test and communication test are stored.

☞ Page 50 Checking the status and result of hardware test

☞ Page 51 Checking the status and result of communication test

Parameter save/Clear selection area

This area is used to select whether to save the parameter of the buffer memory in the flash ROM or clear the parameter saved in the flash ROM.

■Parameter save/clear selection bit (Un\G1584)

This area is set whether to save the parameter of the buffer memory to the flash ROM or clear the parameter saved in the flash ROM when 'Request for saving/clearing parameters to Flash ROM' (Y17) is turned on.

For the buffer memory area which data are saved , refer to the following.

☞ Page 73 List of buffer memory addresses

0000H: Saving the parameter of the buffer memory to the flash ROM (Default value)

8000H: Clearing the parameters in the flash ROM At this time, the parameter of the buffer memory is not cleared.

Auto communication start setting area

This area is used to set the auto communication start.

■Auto communication start setting (Un\G1585)

Set whether to start the I/O communication automatically with the parameter saved in the flash ROM when the CPU module is reset or powered off and on.

0: The I/O communication is not automatically started. (Default value)

1: The I/O communication is automatically started.

When a value other than 0 and 1 is set, the I/O communication is not automatically started.

Operation setting for bus off error area

This area is used to set whether to reset the CAN chip (communication chip) of the RJ71DN91 to restart the communication when a bus off error occurs.

■Operation setting for bus off error (Un\G1586)

Set whether to reset the CAN chip (communication chip) of the RJ71DN91 to restart the communication when a bus off error occurs.

Setting this area to "1" can restart the communication without resetting the CPU module.

Configure this setting before the I/O communication (before 'I/O communication request' (Y11) is turned on).

Setting this area to "1" after a bus off error occurred resets the CAN chip.

0: Stop the communication without resetting the CAN chip. (Default value)

1: Reset the CAN chip and restart the communication.

When a value other than 0 and 1 is set, the CAN chip is not reset.

• Check for bus off error

The bus off error occurrence can be checked with the LED and the value of the buffer memory area.

LED: The NS LED of the RJ71DN91 turns on in red.

Buffer memory: The number of error times is stored in 'Bus error counter' (Un\G434) and 'Bus off counter' (Un\G435).

• Processing after the CAN chip is reset

When the CAN chip is reset, the LED and the values of buffer memory areas turn in the following status.

LED: If the CAN chip is reset, the NS LED of the RJ71DN91 turns on in red, turns off, flashes in green, and turns on in green in order.

Buffer memory: The values of 'Bus error counter' (Un\G434) and 'Bus off counter' (Un\G435) are not cleared even if the CAN chip is reset.

Data consistency area

This area is used to maintain data consistency.

For details on the data consistency dedicated instruction, refer to the following.

📖 MELSEC iQ-R Programming Manual (Module Dedicated Instructions)

■Data consistency setting (Un\G1587)

Set whether to enable the data consistency for refresh or the data consistency dedicated instruction.

- b0: Data consistency dedicated instruction setting for the master function
- b1: Data consistency dedicated instruction setting for the slave function
- b2 to b7: Not used (Fixed to 0)
- b8: Data consistency setting for refresh
- b9 to b15: Not used (Fixed to 0)

Set this area before turning on 'I/O communication request' (Y11).

The following table lists the setting values and available dedicated instructions.

○: Available, ×: Not available

Setting value	Usable dedicated instruction				Data consistency for refresh
	Master function		Slave function		
	DNTMRD	DNTMWR	DNTSRD	DNTSWR	
0000H (Default value)	×	×	×	×	×
0001H	○	○	×	×	×
0002H	×	×	○	○	×
0003H	○	○	○	○	×
0100H	×	×	×	×	○

- Precautions

When the master function is used, disable the data consistency dedicated instruction setting for the slave function.

If the I/O communication is stared with the data consistency dedicated instruction setting for the slave function enabled, an error occurs.

Check the communication error code and take action. (☞ Page 57 Error code for module diagnostics (own node error), Page 60 Event code (other node error))

When the slave function is used, disable the data consistency dedicated instruction setting for the master function.

If the I/O communication is stared with the data consistency dedicated instruction setting for the slave function enabled, an error occurs.

Check the communication error code and take action. (☞ Page 57 Error code for module diagnostics (own node error))

■Data consistency setting status (Un\G1588)

The setting status of the data consistency for refresh and the data consistency dedicated instruction is stored.

- b0: Master function data consistency dedicated instruction setting status
- b1: Slave function data consistency dedicated instruction setting status
- b2 to b7: Not used (Fixed to 0)
- b8: Data consistency setting status for refresh
- b9 to b15: Not used (Fixed to 0)

The value to be set and usable dedicated instruction are the same as those of 'Data consistency setting' (Un\G1587). (☞ Page 92 Data consistency setting (Un\G1587))

Appendix 4 Processing Time

Link scan time

The link scan time is a time taken for the following sequential operation in the I/O communication whose connection type is polling or bit strobe: The RJ71DN91 (master node) issues a request, the request is transmitted to all slave nodes and responses are waited, and the RJ71DN91 issues another request.

The link scan time can be calculated with the following calculation formula.

LS = Σ(TIn + TOn + 0.097) + 0.222 × BR + 1.0 [ms]

LS: Link scan time [ms]

TIn: Receive data transfer time from n-th slave node [ms] (☞ Page 93 Calculating TIn)

TOn: Transmit data transfer time to n-th slave node [ms] (☞ Page 93 Calculating TOn)

Σ: Indicates that the values in () is added to all slave nodes. (except for reserved nodes)

BR: Coefficient depending on the communication speed (125kbaud = 4, 250kbaud = 2, 500kbaud = 1)

Point

- The concept of the link scan time is not applied to the change of state and cyclic type I/O communication.
- For the multi-master configuration, the link scan time may be longer than the calculated result depending on the communication timing with other master nodes.

Calculating TIn

■When the receive data length from the n-th slave node is 8 bytes or less

TIn = BT + BTa × Receive data length (byte) [ms]

BT, BTa: Coefficient depending on the communication speed (☞ Page 93 Coefficient BT, BTa depending on the communication speed)

■When the receive data length from the n-th slave node is 9 byte or more

TIn = (BT + BTa × 8 + 0.190) × a + {BT + BTa × (b + 1) + 0.450} [ms]

BT, BTa: Coefficient depending on the communication speed (☞ Page 93 Coefficient BT, BTa depending on the communication speed)

a: Value obtained when the receive data length is divided by 7 (round down the decimal)

b: Remainder obtained when the receive data length is divided by 7

Calculating TOn

■When the transmit data length to the n-th slave node is 8 byte or less

TOn = BT + BTa × Transmit data length (byte) [ms]

BT, BTa: Coefficient depending on the communication speed (☞ Page 93 Coefficient BT, BTa depending on the communication speed)

■When the transmit data length to the n-th slave node is 9 byte or more

TOn = (BTBTa × 8 + 0.130) × c + {BT + BTa × (d + 1) + 1.2} [ms]

BT, BTa: Coefficient depending on the communication speed (☞ Page 93 Coefficient BT, BTa depending on the communication speed)

c: Value obtained when the transmit data length is divided by 7 (round down the decimal)

d: Remainder obtained when the transmit data length is divided by 7

Coefficient BT, BTa depending on the communication speed

The following table shows the coefficients BT and BTa depending on the communication speed.

Coefficient	125kbaud	250kbaud	500kbaud
BT	0.376	0.188	0.094
BTa	0.064	0.032	0.016

Communication cycle time

The communication cycle time is an interval between the following operations: the master node issues a polling or bit strobe type request to a slave node, and the master node issues another request to the same slave node.

The communication cycle time for each slave node can be calculated with the following calculation formula.

- For LS < PIT: LC = LS + PIT [ms]
- For LS ≥ PIT: LC = LS [ms]

LC: Communication cycle time [ms]

LS: Link scan time [ms] (☞ Page 93 Link scan time)

PIT: Production inhibit time [ms] (☞ Page 84 Master function parameters (Un\G468 to Un\G975))

Transmission delay time

The transmission delay time varies depending on whether the data consistency dedicated instruction is used.

The following symbols are used in each calculation formula for explanation.

ST: Sequence scan time [ms]

LS: Link scan time [ms] (☞ Page 93 Link scan time)

PIT: Production inhibit time [ms] (☞ Page 84 Master function parameters (Un\G468 to Un\G975))

LC: Communication cycle time [ms] (For LS < PIT: LC = LS + PIT [ms], for LS ≥ PIT: LC = LS [ms])

When the data consistency dedicated instruction is not used

The following table shows the transmission delay time for performing refresh or reading/writing I/O data with the MOV instruction or the FROM/TO instruction.

■Transmission delay time of transmit data

Item	When writing transmit data with a program (with the TO instruction)	When performing refresh
Normal value	LC×0.5+LS×0.5 [ms]	LC×0.5+LS×0.5+ST×0.5 [ms]
Maximum value	LC+LS [ms]	LC+LS+ST [ms]

■Transmission delay time of receive data

Item	When reading receive data with a program (with the FROM instruction)	When performing refresh
Normal value	LC×0.5+LS×0.5+ST×0.5 [ms]	
Maximum value	LC+LS+ST [ms]	

When the data consistency dedicated instruction is used

The following table shows the transmission delay time for reading/writing I/O data with the dedicated instruction.

■Transmission delay time of transmit data

Item	Condition	When writing transmit data with a program	When performing refresh
Normal value	ST≤LS	ST×0.5+LS×1.5+LC×0.5 [ms]	LS × 1.5 + LC × 0.5 - ST × 0.5 [ms]
	LS < ST	ST×1.5+LS+LC×0.5 [ms]	ST × 0.5 + LS × 0.5 + LC × 0.5 [ms]
Maximum value	ST≤LS	ST + LS × 2 + LC [ms]	LS × 2 + LC [ms]
	LS < ST	ST×2+LS+LC [ms]	ST + LS + LC [ms]

■Transmission delay time of receive data

Item	Condition	When reading receive data with a program	When performing refresh
Normal value	2ST≤LS	ST×0.5+LS×0.5+LC×0.5 [ms]	ST×0.5+LS×0.5+LC×0.5 [ms]
	ST ≤ LS < 2ST	ST×3.5+LC×0.5 [ms]	
	LS < ST	ST×2.5+LC×0.5 [ms]	ST×1.5+LC×0.5 [ms]
Maximum value	2ST≤LS	ST+LS+LC [ms]	ST+LS+LC [ms]
	ST ≤ LS < 2ST	ST×4+LC [ms]	
	LS < ST	ST×3+LC [ms]	ST×2+LC [ms]

Appendix 5 Setting the Parameter with a Program

This section describes how to set the parameter with a program without using an engineering tool when the MELSEC-Q series project is used.

Procedure

1. Set the parameter setting method to "Program" in the module parameter of the engineering tool.

[Module Parameter] ⇨ [Basic Setting] ⇨ [Parameter Setting Method] ⇨ [Basic parameter setting]

2. Create a program for setting the parameter or starting the I/O communication start with the engineering tool.
3. Write the set parameter and created program to the CPU module, and reset or power off and on the system.

[Online] ⇨ [Write to PLC]

When the parameter is set with the program, the I/O communication does not start automatically. Therefore, start the I/O communication with 'I/O communication request' (Y11) or 'Auto communication start setting' (Un\G1585).

Program example

The following programs of the master node are divided. Write the divided programs as one program to the CPU module.

☞ Page 95 Setting the parameter for master function
☞ Page 100 Setting the master/slave function common parameter
☞ Page 103 Saving the parameter of the master node

The following programs of the slave node are divided. Write the divided programs as one program to the CPU module.

☞ Page 99 Setting the parameter for slave function
☞ Page 104 Saving the parameter of the slave node

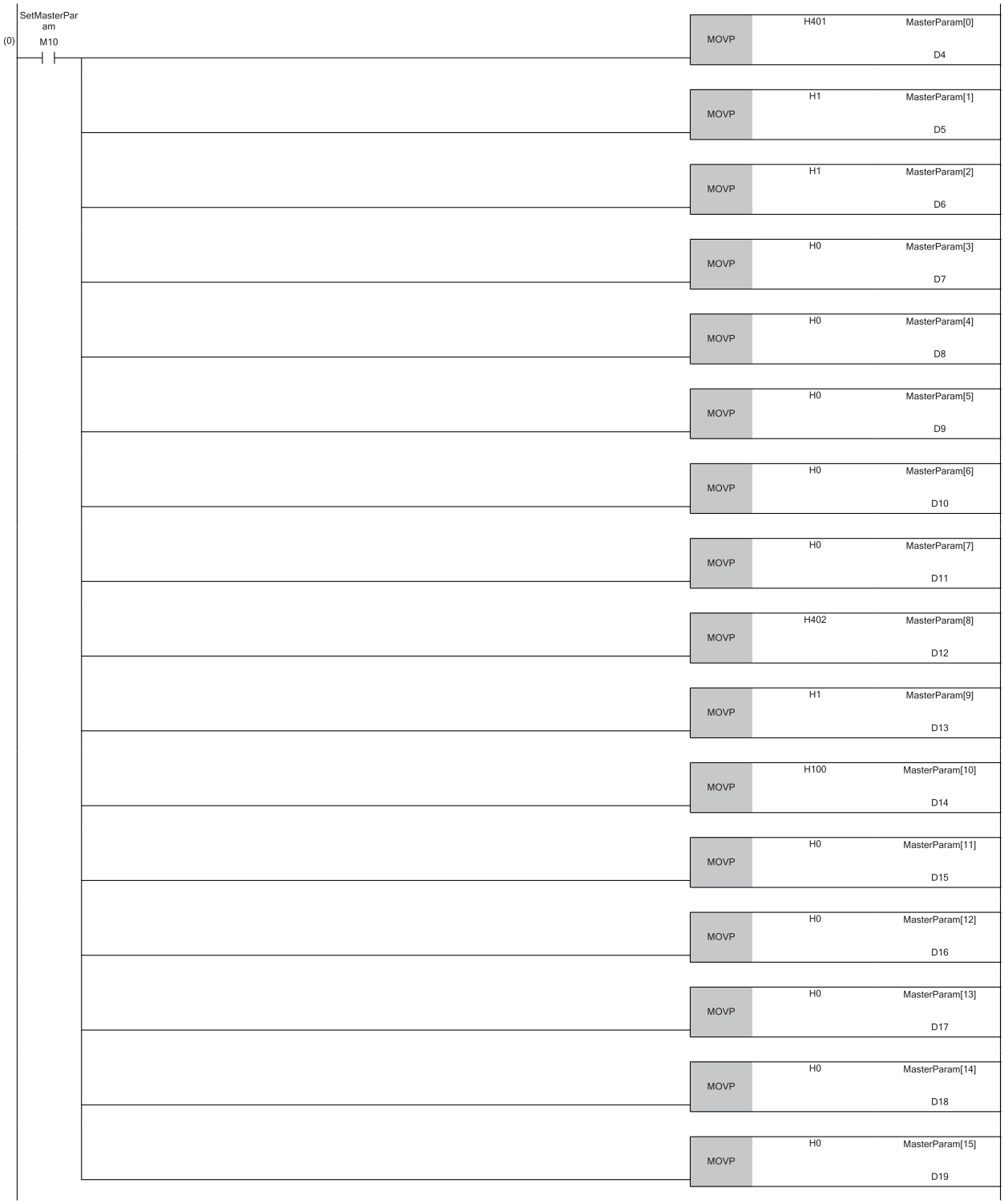
Setting the parameter for master function

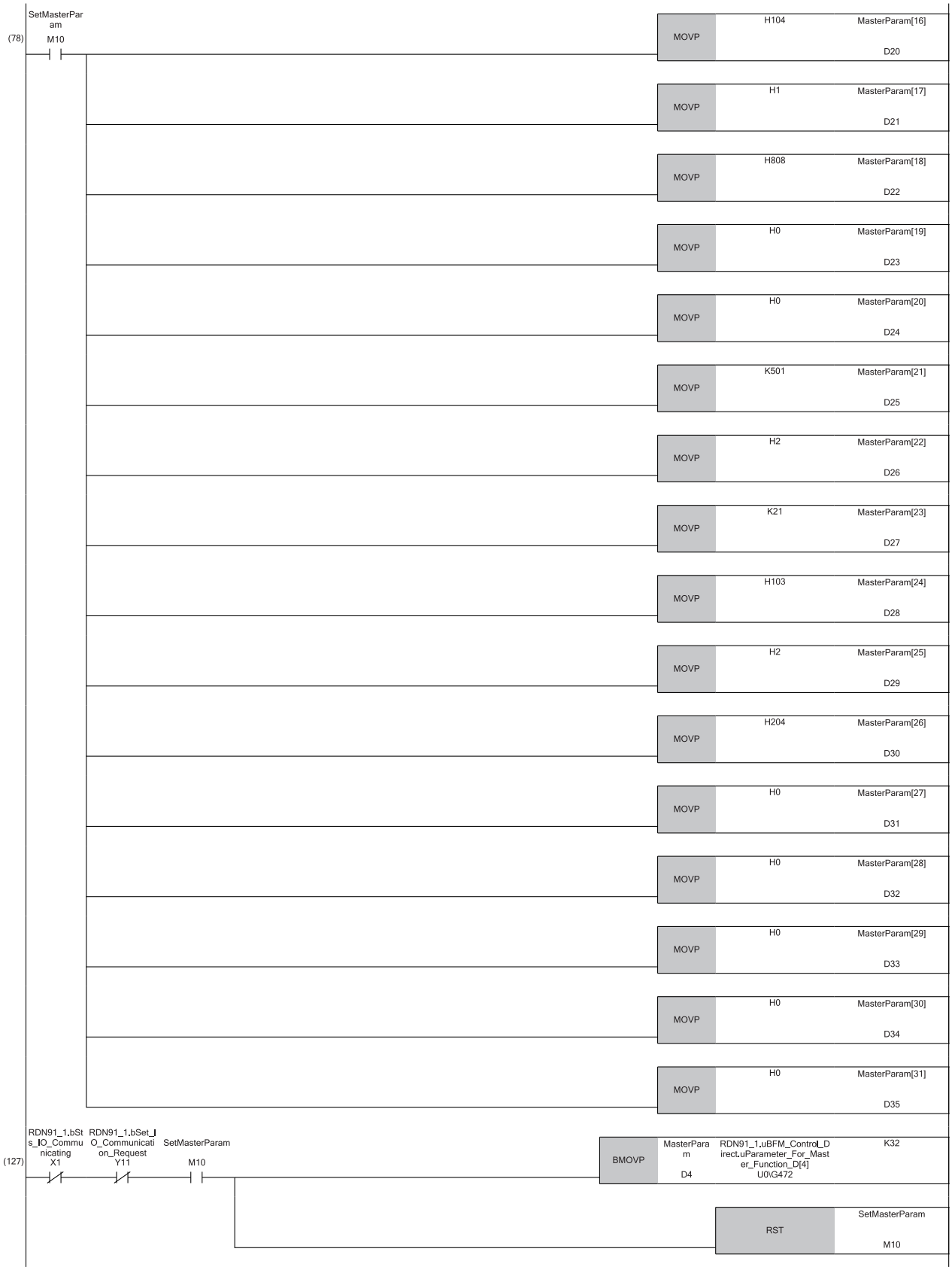
Set the parameter to the RJ71DN91 master node without using the engineering tool or auto configuration tool.

Classification	Label name	Description	Device
Module label	RDN91_1.bSts_IO_Communicating	I/O communicating	X01
	RDN91_1.bSet_IO_Communication_Request	I/O communication request	Y11
	RDN91_1.uBFM_Control_Direct.uParameter_For_Master_Function_D[4]	Master function parameters	U0\G472
Label to be defined	Define global labels as shown below.		

	Label Name	Data Type		Class	Assign (Device/Label)
1	SetMasterParam	Bit	...	VAR_GLOBAL	M10
2	MasterParam	Word [Unsigned]/Bit String [16-bit](0..31)	...	VAR_GLOBAL	D4

A


SetMasterParam
(0)
M10
MOVP
H401
MasterParam[0]
D4
MOVP
H1
MasterParam[1]
D5
MOVP
H1
MasterParam[2]
D6
MOVP
H0
MasterParam[3]
D7
MOVP
H0
MasterParam[4]
D8
MOVP
H0
MasterParam[5]
D9
MOVP
H0
MasterParam[6]
D10
MOVP
H0
MasterParam[7]
D11
MOVP
H402
MasterParam[8]
D12
MOVP
H1
MasterParam[9]
D13
MOVP
H100
MasterParam[10]
D14
MOVP
H0
MasterParam[11]
D15
MOVP
H0
MasterParam[12]
D16
MOVP
H0
MasterParam[13]
D17
MOVP
H0
MasterParam[14]
D18
MOVP
H0
MasterParam[15]
D19


SetMasterParam
(78)
M10
MOVP
H104
MasterParam[16]
D20
MOVP
H1
MasterParam[17]
D21
MOVP
H808
MasterParam[18]
D22
MOVP
H0
MasterParam[19]
D23
MOVP
H0
MasterParam[20]
D24
MOVP
K501
MasterParam[21]
D25
MOVP
H2
MasterParam[22]
D26
MOVP
K21
MasterParam[23]
D27
MOVP
H103
MasterParam[24]
D28
MOVP
H2
MasterParam[25]
D29
MOVP
H204
MasterParam[26]
D30
MOVP
H0
MasterParam[27]
D31
MOVP
H0
MasterParam[28]
D32
MOVP
H0
MasterParam[29]
D33
MOVP
H0
MasterParam[30]
D34
MOVP
H0
MasterParam[31]
D35
RDN91_1.bSts_IO_Communicating
X1
RDN91_1.bSet_IO_Communication_Request
Y11
SetMasterParam
M10
(127)
BMOVP
MasterParam
D4
RDN91_1.uBFM_Control_Direct.uParameter_For_Master_Function_D[4]
U0\G472
K32
RST
SetMasterParam
M10

A

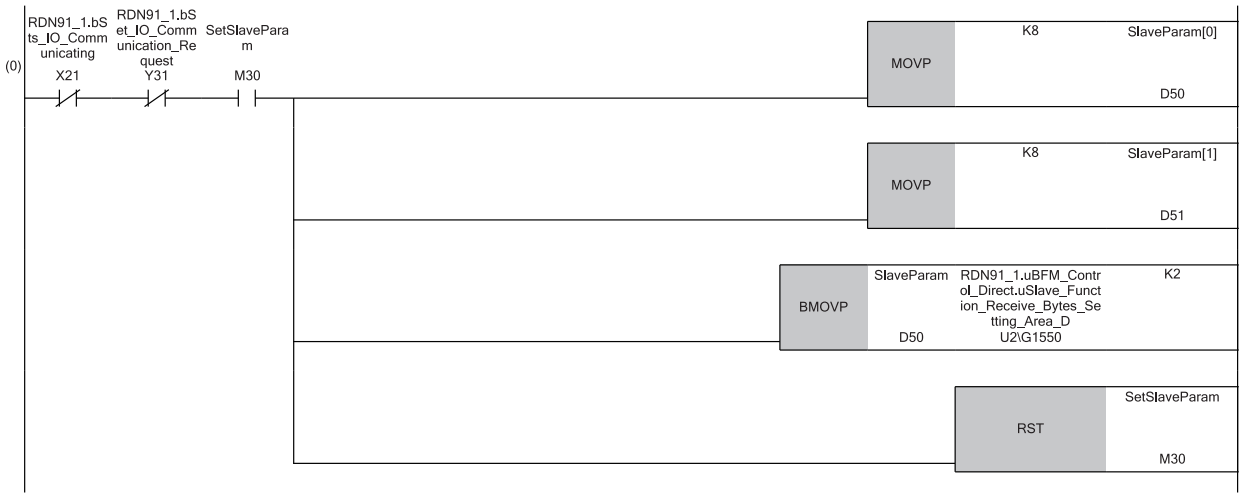
(0) The following settings are applied by the master function parameter setting command.
■1st slave node
 • Node address = 1, Message group = 4
 • Connection type = Polling
 • Input byte module = 1, Output byte module = 0
 • Input word module = 0, Output word module = 0
 • Input double-word module = 0, Output double-word module = 0
 • Expected packet rate = 200ms (default)
 • Watchdog timeout action = TIMEOUT (default)
 • Production inhibit time = 10ms (default)
■2nd slave node
 • Node address = 2, Message group = 4
 • Connection type = Polling
 • Input byte module = 0, Output byte module = 1
 • Input word module = 0, Output word module = 0
 • Input double-word module = 0, Output double-word module = 0
 • Expected packet rate = 200ms (default)
 • Watchdog timeout action = TIMEOUT (default)
 • Production inhibit time = 10ms (default)
(78) The following settings are applied by the master function parameter setting command.
■3rd slave node
 • Node address = 4, Message group = 1
 • Connection type = Polling
 • Input byte module = 8, Output byte module = 8
 • Input word module = 0, Output word module = 0
 • Input double-word module = 0, Output double-word module = 0
 • Expected packet rate = 500ms
 • Watchdog timeout action = AUTO DELETE
 • Production inhibit time = 20ms
■4th slave node
 • Node address = 3, Message group = 1
 • Connection type = Bit strobe
 • Input byte module = 4, Output byte module = 2
 • Input word module = 0, Output word module = 0
 • Input double-word module = 0, Output double-word module = 0
 • Expected packet rate = 200ms (default)
 • Watchdog timeout action = TIMEOUT (default)
 • Production inhibit time = 10ms (default)
(127) The set parameters are written to 'Master function parameters' (U0\G472).
The master function parameter setting command is turned off.

Setting the parameter for slave function

Set the parameter to the RJ71DN91 slave node without using the engineering tool or auto configuration tool.

Classification	Label name	Description	Device
Module label	RDN91_1.bSts_IO_Communicating	I/O communicating	X21
	RDN91_1.bSet_IO_Communication_Request	I/O communication request	Y31
	RDN91_1.uBFM_Control_Direct.uSlave_Function_Receive_Bytes_Setting_Area_D	Slave function receive size setting	U2\G1550
Label to be defined	Define global labels as shown below.		

	Label Name	Data Type		Class	Assign (Device/Label)
1	SetSlaveParam	Bit	...	VAR_GLOBAL	M30
2	SlaveParam	Word [Unsigned]/Bit String [16-bit](0..1)	...	VAR_GLOBAL	D50



(0) The receiving byte and transmit byte are set to 16 bytes in the slave function receive/transmit size setting by the slave function parameter setting command. The set parameters are written to 'Slave function receive size setting' (U2\G1550).
The slave function parameter setting command is turned off.

A

Setting the master/slave function common parameter

Set the master/slave function common parameter to the RJ71DN91 master node.

Classification	Label name	Description	Device
Module label	RDN91_1.bSts_IO_Communicating	I/O communicating	X01
	RDN91_1.bSet_IO_Communication_Request	I/O communication request	Y11
	RDN91_1.uBFM_Control_Direct.uAuto_Communication_Start_Setting_D	Auto communication start setting	U0\G1585
Label to be defined	Define global labels as shown below. Label Name: 3 SetCommonParam, Bit, VAR_GLOBAL, M50 Label Name: 4 CommonParam, Word [Unsigned]/Bit String [16-bit](0..1), VAR_GLOBAL, D60		

(137) The auto communication start setting is set to 0 and operation setting for bus off error is set to 1 by the master/slave function common parameter setting command.
The master/slave function common parameters are written to 'Auto communication start setting' (U0\G1585).
The master/slave function common parameter setting command is turned off.

Creating the slave node information with auto configuration

Execute the auto configuration function to create the slave node information, and use it as the master function parameter. (☞ Page 31 Auto Configuration Function)

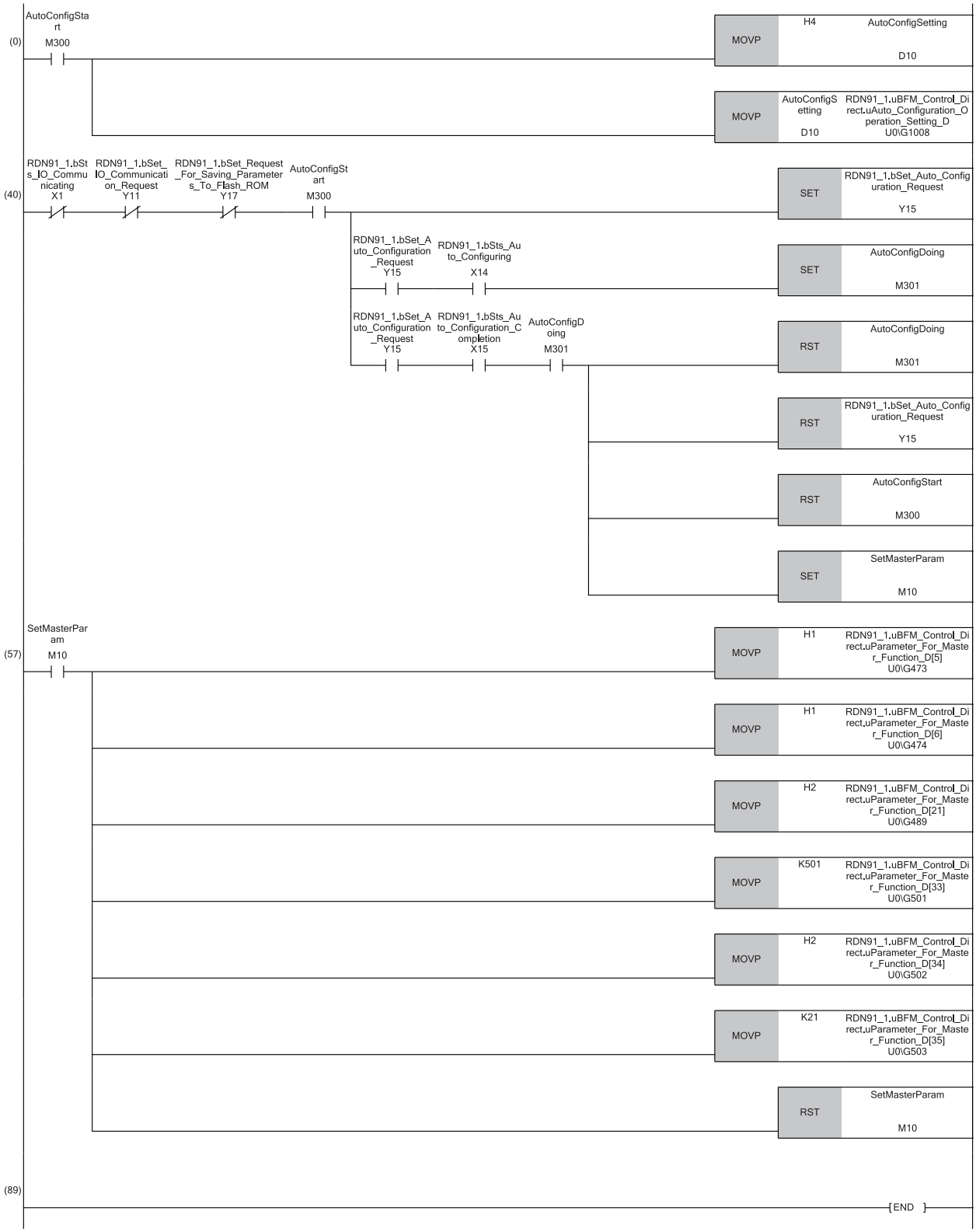
Point

- Execute the auto configuration function by turning off and on 'Auto configuration request' (Y15).
- When the parameter is created by the auto configuration function, it is not saved to the flash ROM. Save the parameter. (☞ Page 103 Saving the parameter of the master node)

Classification	Label name	Description	Device
Module label	RDN91_1.bSts_IO_Communicating	I/O communicating	X01
	RDN91_1.bSts_Auto_Configuring	Auto configuration executing	X14
	RDN91_1.bSts_Auto_Configuration_Completion	Auto configuration completion	X15
	RDN91_1.bSet_IO_Communication_Request	I/O communication request	Y11
	RDN91_1.bSet_Auto_Configuration_Request	Auto configuration request	Y15
	RDN91_1.bSet_Request_For_Saving_Parameters_To_Flash_ROM	Parameter save request to Flash ROM	Y17
	RDN91_1.uBFM_Control_Direct.uAuto_Configuration_Operation_Setting_D	Auto configuration operation setting	U0\G1008
	RDN91_1.uBFM_Control_Direct.uParameter_For_Master_Function_D[5]	Master function parameters (connection type of 1st node)	U0\G473
	RDN91_1.uBFM_Control_Direct.uParameter_For_Master_Function_D[6]	Master function parameters (number of byte modules of 1st node)	U0\G474
	RDN91_1.uBFM_Control_Direct.uParameter_For_Master_Function_D[21]	Master function parameters (connection type of 3rd node)	U0\G489
	RDN91_1.uBFM_Control_Direct.uParameter_For_Master_Function_D[33]	Master function parameters (expected packet rate of 4th node)	U0\G501
	RDN91_1.uBFM_Control_Direct.uParameter_For_Master_Function_D[34]	Master function parameters (watchdog timeout action of 4th node)	U0\G502
	RDN91_1.uBFM_Control_Direct.uParameter_For_Master_Function_D[35]	Master function parameters (production inhibit time of 4th node)	U0\G503
Label to be defined	Define global labels as shown below.		

Label Name	Data Type		Class	Assign (Device/Label)
AutoConfigStart	Bit	...	VAR_GLOBAL	M300
AutoConfigDoing	Bit	...	VAR_GLOBAL	M301
AutoConfigSetting	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D10
SetMasterParam	Bit	...	VAR_GLOBAL	M10

A



(0) The auto configuration operation setting is set to All configuration, and the maximum detection node address is set to 4.
The setting data is written to 'Auto configuration operation setting' (U0\G1008).
(40) 'Auto configuration request' (Y15) is turned on.
The flag of 'Auto configuration executing' is turned on.
After the auto configuration is completed, 'Auto configuration request' (Y15) and the auto configuration command are turned off, and the master function parameter setting command is turned on.
(57) The parameters acquired by the auto configuration are changed.
The master function parameter setting command is turned off.

Saving the parameter of the master node

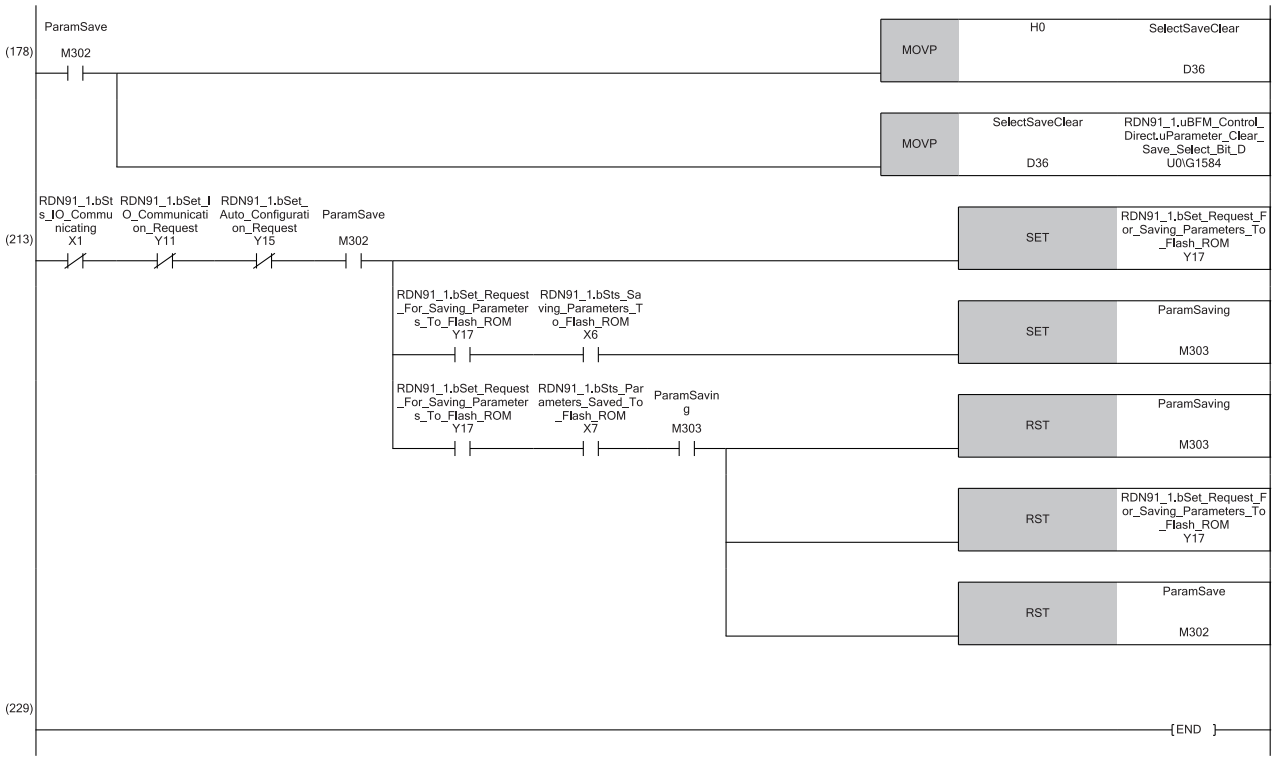
Save the parameter to the flash ROM on the RJ71DN91 master node.

Point

When 'Request for saving/clearing parameters to Flash ROM' (Y17) is turned off and on, the parameter is saved to the flash ROM.

Classification	Label name	Description	Device
Module label	RDN91_1.bSts_IO_Communicating	I/O communicating	X01
	RDN91_1.bSts_Saving_Parameters_To_Flash_ROM	Parameter saving/clearing to Flash ROM	X06
	RDN91_1.bSts_Parameters_Saved_To_Flash_ROM	Parameter save/clear completion to Flash ROM	X07
	RDN91_1.bSet_IO_Communication_Request	I/O communication request	Y11
	RDN91_1.bSet_Auto_Configuration_Request	Auto configuration request	Y15
	RDN91_1.bSet_Request_For_Saving_Parameters_To_Flash_ROM	Request for saving/clearing parameters to Flash ROM	Y17
	RDN91_1.uBFM_Control_Direct.uParameter_Clear_Save_Select_Bit_D	Parameter save/clear selection bit	U0\G1584
Label to be defined	Define global labels as shown below.		

	Label Name	Data Type		Class	Assign (Device/Label)
5	ParamSave	Bit	...	VAR_GLOBAL	M302
6	ParamSaving	Bit	...	VAR_GLOBAL	M303
7	SelectSaveClear	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D36



(178) The parameter save/clear selection bit is set to save by the parameter save command.
The setting parameters are written to 'Parameter save/clear selection bit' (U0\G1584).
(213) 'Request for saving/clearing parameters to Flash ROM' (Y17) is turned on.
The flag of 'Parameter saving to Flash ROM' is turned on.
When the parameter saving to the flash ROM is completed, 'Request for saving/clearing parameters to Flash ROM' (Y17) and the parameter save command are turned off.

Saving the parameter of the slave node

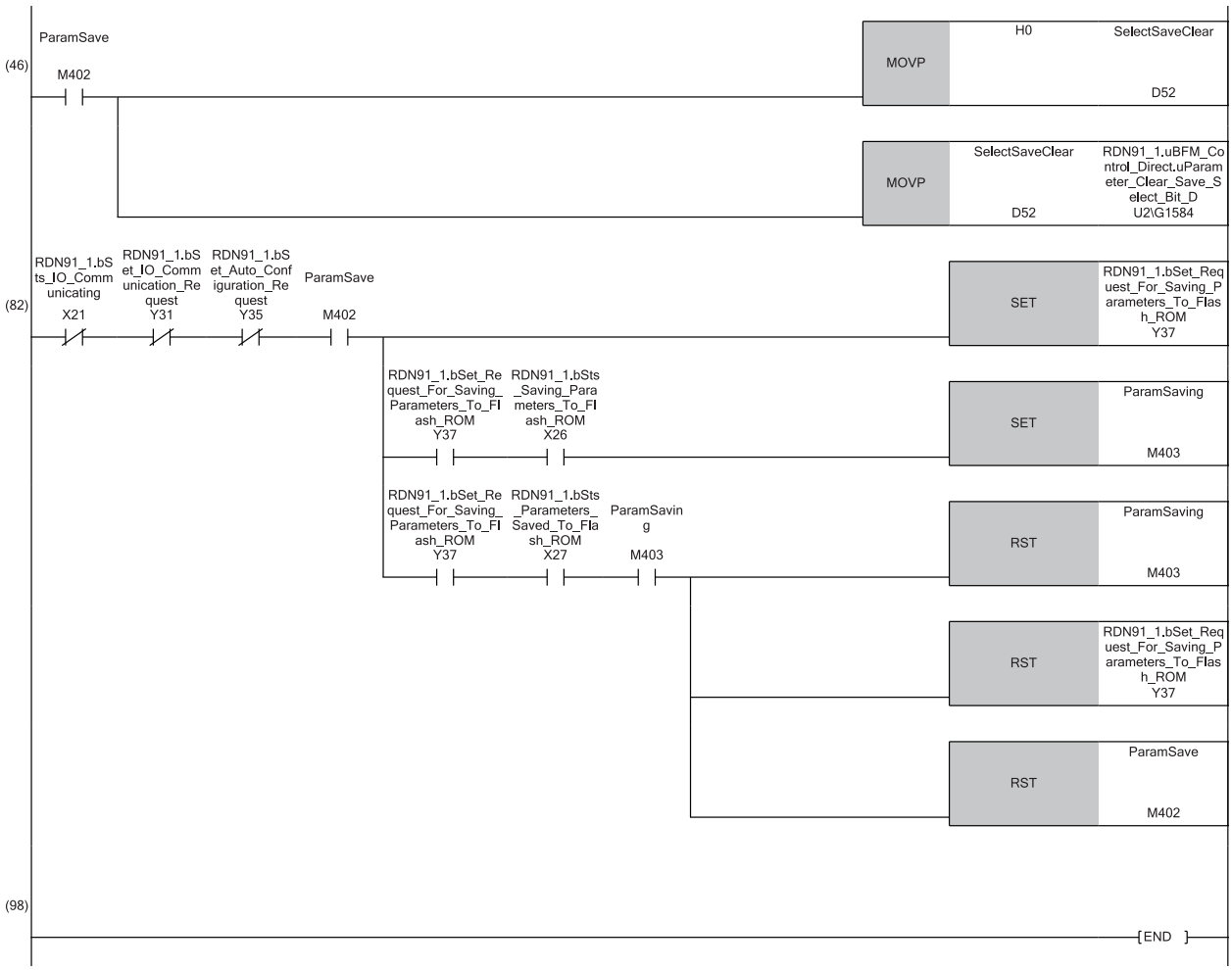
Save the parameter to the flash ROM on the RJ71DN91 slave node.

Point

When 'Parameter save request to Flash ROM' (Y37) is turned off and on, the parameter is saved to the flash ROM.

Classification	Label name	Description	Device
Module label	RDN91_1.bSts_IO_Communicating	I/O communicating	X21
	RDN91_1.bSts_Saving_Parameters_To_Flash_ROM	Parameter saving to Flash ROM	X26
	RDN91_1.bSts_Parameters_Saved_To_Flash_ROM	Parameter save completion to Flash ROM	X27
	RDN91_1.bSet_IO_Communication_Request	I/O communication request	Y31
	RDN91_1.bSet_Auto_Configuration_Request	Auto configuration request	Y35
	RDN91_1.bSet_Request_For_Saving_Parameters_To_Flash_ROM	Parameter save request to Flash ROM	Y37
	RDN91_1.uBFM_Control_Direct.uParameter_Clear_Save_Select_Bit_D	Parameter save/clear selection bit	U2\G1584
Label to be defined	Define global labels as shown below.		

	Label Name	Data Type		Class	Assign (Device/Label)
3	ParamSave	Bit	...	VAR_GLOBAL	M402
4	SelectSaveClear	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D52
5	ParamSaving	Bit	...	VAR_GLOBAL	M403



(46) The parameter save/clear selection bit is set to save by the parameter save command.
The setting data is written to 'Parameter save/clear selection bit' (U2\G1584).
(82) 'Parameter save request to Flash ROM' (Y37) is turned on.
The flag of 'Parameter saving to Flash ROM' is turned on.
When the parameter saving to the flash ROM is completed, 'Parameter save request to Flash ROM' (Y37) and the parameter save command are turned off.

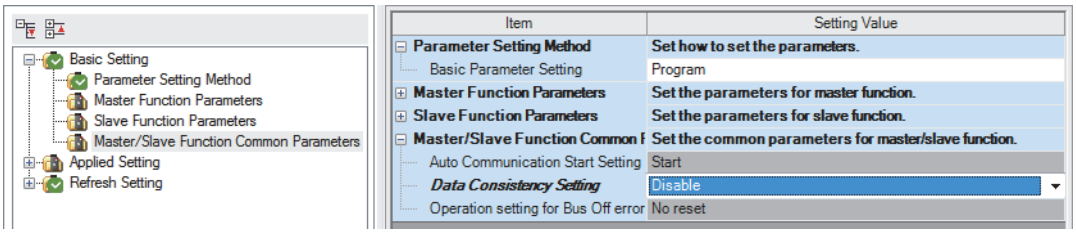
I/O communication with the slave nodes

Perform the I/O communication between the RJ71DN91 master node and the slave nodes without the refresh setting and the auto communication start setting.

■Without data consistency

Set "Data consistency setting" of "Master/Slave Function Common Parameters" to "Disable".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71DN91] ⇨ [Module Parameter] ⇨ [Basic Setting]

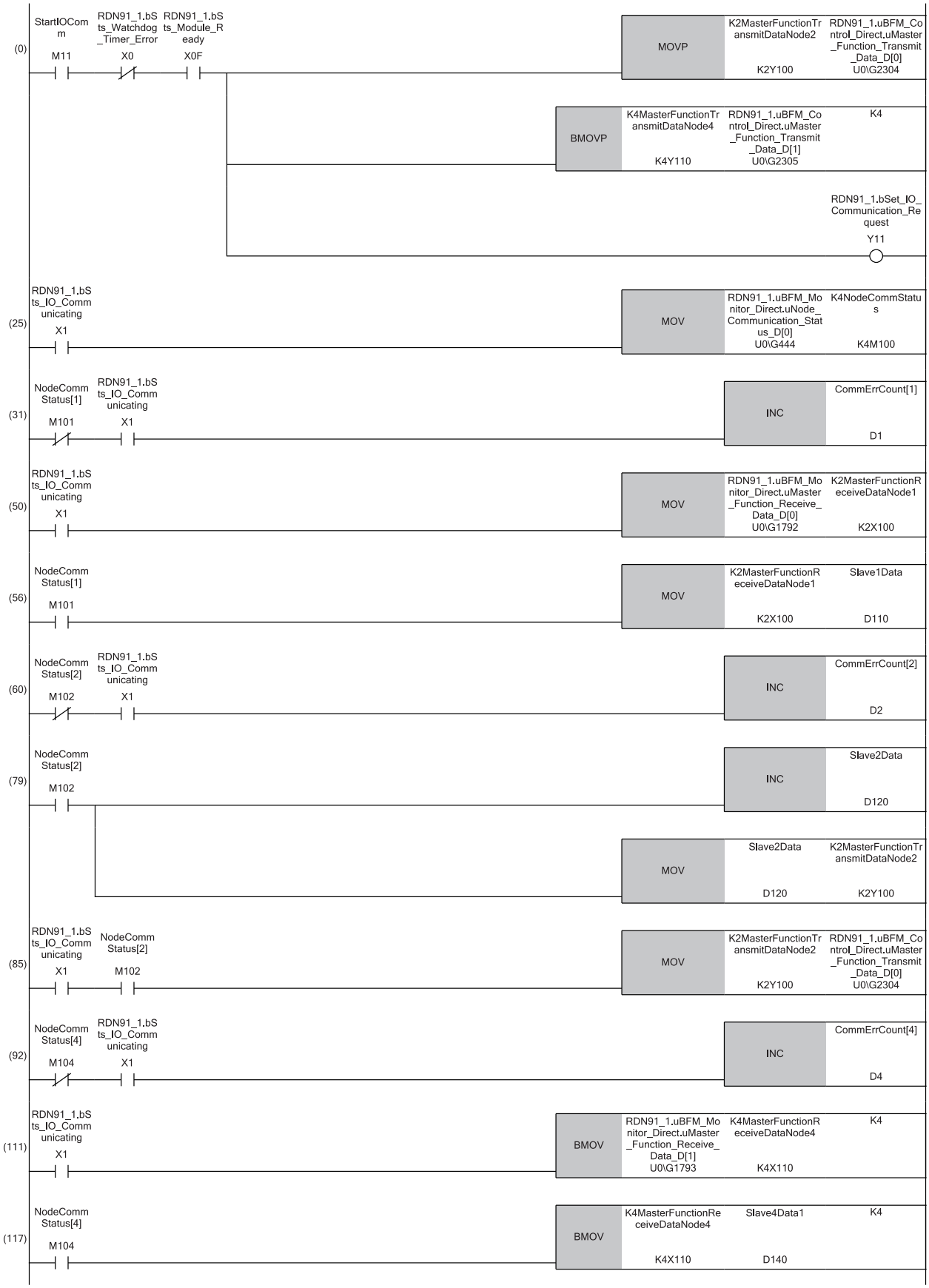


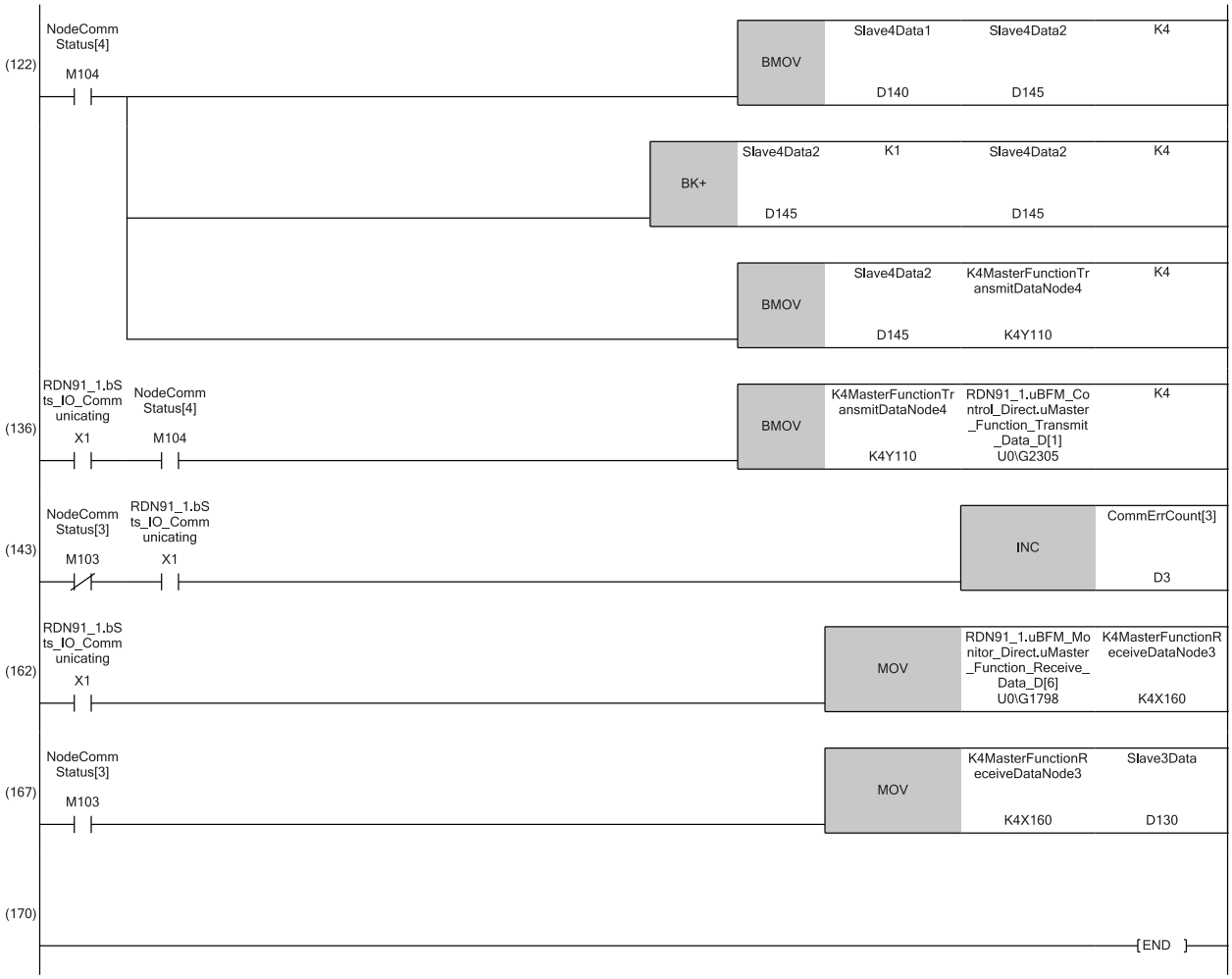
To secure the consistency of transmit/receive data of multiple words, check the data communication by providing the area for handshake at the end of the transmit/receive data.

Classification	Label name	Description	Device
Module label	RDN91_1.bSts_IO_Communicating	I/O communicating	X01
	RDN91_1.bSet_IO_Communication_Request	I/O communication request	Y11
	RDN91_1.uBFM_Control_Direct.uMaster_Function_Transmit_Data_D[0]	Master function transmit data	U0\G2304
	RDN91_1.uBFM_Control_Direct.uMaster_Function_Transmit_Data_D[1]	Master function transmit data	U0\G2305
	RDN91_1.uBFM_Monitor_Direct.uNode_Communication_Status_D[0]	Communication status of nodes	U0\G444
	RDN91_1.uBFM_Monitor_Direct.uMaster_Function_Receive_Data_D[0]	Master function receive data	U0\G1792
	RDN91_1.uBFM_Monitor_Direct.uMaster_Function_Receive_Data_D[1]	Master function receive data	U0\G1793
	RDN91_1.uBFM_Monitor_Direct.uMaster_Function_Receive_Data_D[6]	Master function receive data	U0\G1798
Label to be defined	Define global labels as shown below.		

Label Name	Data Type		Class	Assign
StartIOComm	Bit	...	VAR_GLOBAL	M11
NodeCommStatus	Bit(0..31)	...	VAR_GLOBAL	M100
CommErrCount	Word [Signed](0..63)	...	VAR_GLOBAL	D0
Slave1Data	Word [Signed]	...	VAR_GLOBAL	D110
Slave2Data	Word [Signed]	...	VAR_GLOBAL	D120
Slave4Data1	Word [Signed](0..3)	...	VAR_GLOBAL	D140
Slave4Data2	Word [Signed](0..3)	...	VAR_GLOBAL	D145
Slave3Data	Word [Signed]	...	VAR_GLOBAL	D130
MasterFunctionReceiveDataNode1	Bit(0..7)	...	VAR_GLOBAL	X100
MasterFunctionReceiveDataNode4	Bit(0..63)	...	VAR_GLOBAL	X110
MasterFunctionReceiveDataNode3	Bit(0..15)	...	VAR_GLOBAL	X160
MasterFunctionTransmitDataNode2	Bit(0..7)	...	VAR_GLOBAL	Y100
MasterFunctionTransmitDataNode4	Bit(0..63)	...	VAR_GLOBAL	Y110

A


(0)
StartIOComm
M11
RDN91_1.bSts_Watchdog_Timer_Error
X0
RDN91_1.bSts_Module_Ready
X0F
MOVP
K2MasterFunctionTransmitDataNode2
K2Y100
RDN91_1.uBFM_Control_Direct.uMaster_Function_Transmit_Data_D[0]
U0\G2304
BMOVP
K4MasterFunctionTransmitDataNode4
K4Y110
RDN91_1.uBFM_Control_Direct.uMaster_Function_Transmit_Data_D[1]
U0\G2305
K4
RDN91_1.bSet_IO_Communication_Request
Y11
(25)
RDN91_1.bSts_IO_Communicating
X1
MOV
RDN91_1.uBFM_Monitor_Direct.uNode_Communication_Status_D[0]
U0\G444
K4NodeCommStatus
K4M100
(31)
NodeCommStatus[1]
M101
RDN91_1.bSts_IO_Communicating
X1
INC
CommErrCount[1]
D1
(50)
RDN91_1.bSts_IO_Communicating
X1
MOV
RDN91_1.uBFM_Monitor_Direct.uMaster_Function_Receive_Data_D[0]
U0\G1792
K2MasterFunctionReceiveDataNode1
K2X100
(56)
NodeCommStatus[1]
M101
MOV
K2MasterFunctionReceiveDataNode1
K2X100
Slave1Data
D110
(60)
NodeCommStatus[2]
M102
RDN91_1.bSts_IO_Communicating
X1
INC
CommErrCount[2]
D2
(79)
NodeCommStatus[2]
M102
INC
Slave2Data
D120
MOV
Slave2Data
D120
K2MasterFunctionTransmitDataNode2
K2Y100
(85)
RDN91_1.bSts_IO_Communicating
X1
NodeCommStatus[2]
M102
MOV
K2MasterFunctionTransmitDataNode2
K2Y100
RDN91_1.uBFM_Control_Direct.uMaster_Function_Transmit_Data_D[0]
U0\G2304
(92)
NodeCommStatus[4]
M104
RDN91_1.bSts_IO_Communicating
X1
INC
CommErrCount[4]
D4
(111)
RDN91_1.bSts_IO_Communicating
X1
BMOV
RDN91_1.uBFM_Monitor_Direct.uMaster_Function_Receive_Data_D[1]
U0\G1793
K4MasterFunctionReceiveDataNode4
K4X110
K4
(117)
NodeCommStatus[4]
M104
BMOV
K4MasterFunctionReceiveDataNode4
K4X110
Slave4Data1
D140
K4

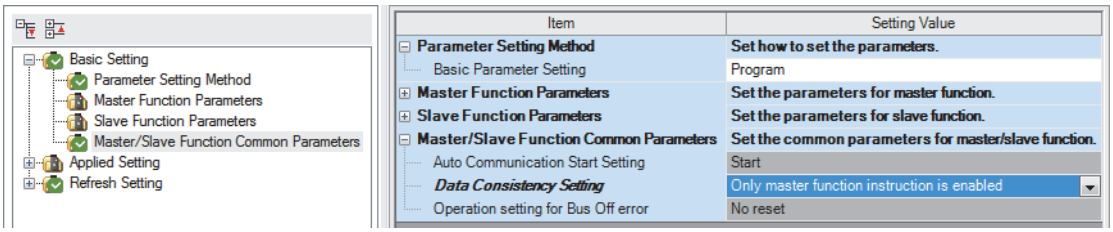


(0) The transmit data default value is set.
'I/O communication request' (Y11) is turned on.
(25) The communication status is acquired from 'Communication status of nodes' (U0\G444).
(31) When the communication status with the slave node (node address 1) is off, the number of communication errors is counted.
(50) (56) When the communication status with the slave node (node address 1) is on, the receive data is read from 'Master function receive data' (U0\G1792).
(60) When the communication status with the slave node (node address 2) is off, the number of communication errors is counted.
(79) (85) When the communication status with the slave node (node address 2) is on, the transmit data is created and written to 'Master function transmit data' (U0\G2304).
(92) When the communication status with the slave node (node address 4) is off, the number of communication errors is counted.
(111) (117) When the communication status with the slave node (node address 4) is on, the receive data is read from 'Master function receive data' (U0\G1793).
(122) The transmit data is created.
(136) When the communication status with the slave node (node address 4) is on, the transmit data is written to 'Master function transmit data' (U0\G2305).
(143) When the communication status with the slave node (node address 3) is off, the number of communication errors is counted.
(162) (167) When the communication status with the slave node (node address 3) is on, the receive data is read from 'Master function receive data' (U0\G1798).

■With data consistency (using the module function block)

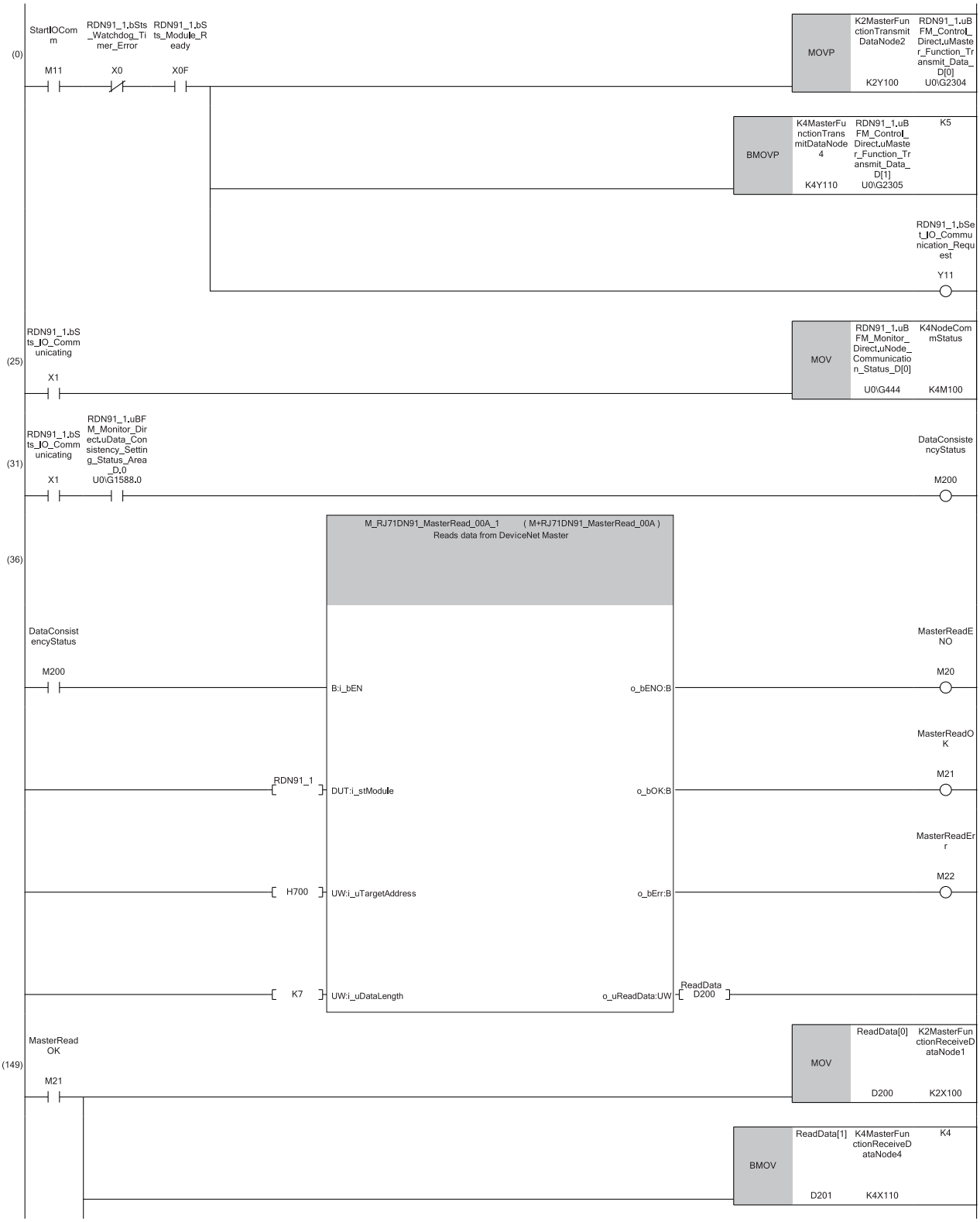
Perform the I/O communication between the RJ71DN91 master node and the slave nodes maintaining the data consistency. Set "Data consistency setting" of "Master/Slave Function Common Parameters" to "Only master function instruction is enabled".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71DN91] ⇨ [Module Parameter] ⇨ [Basic Setting]

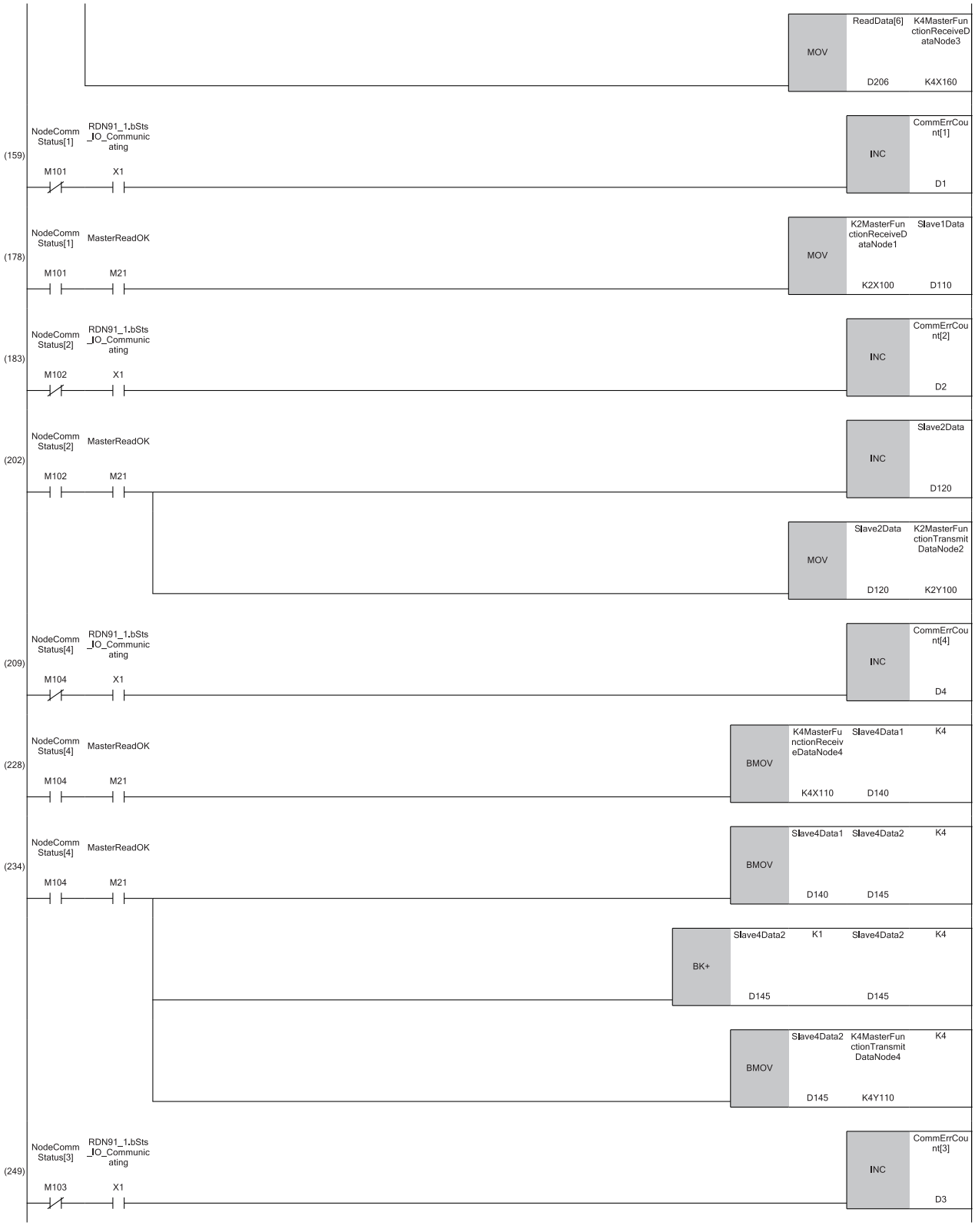


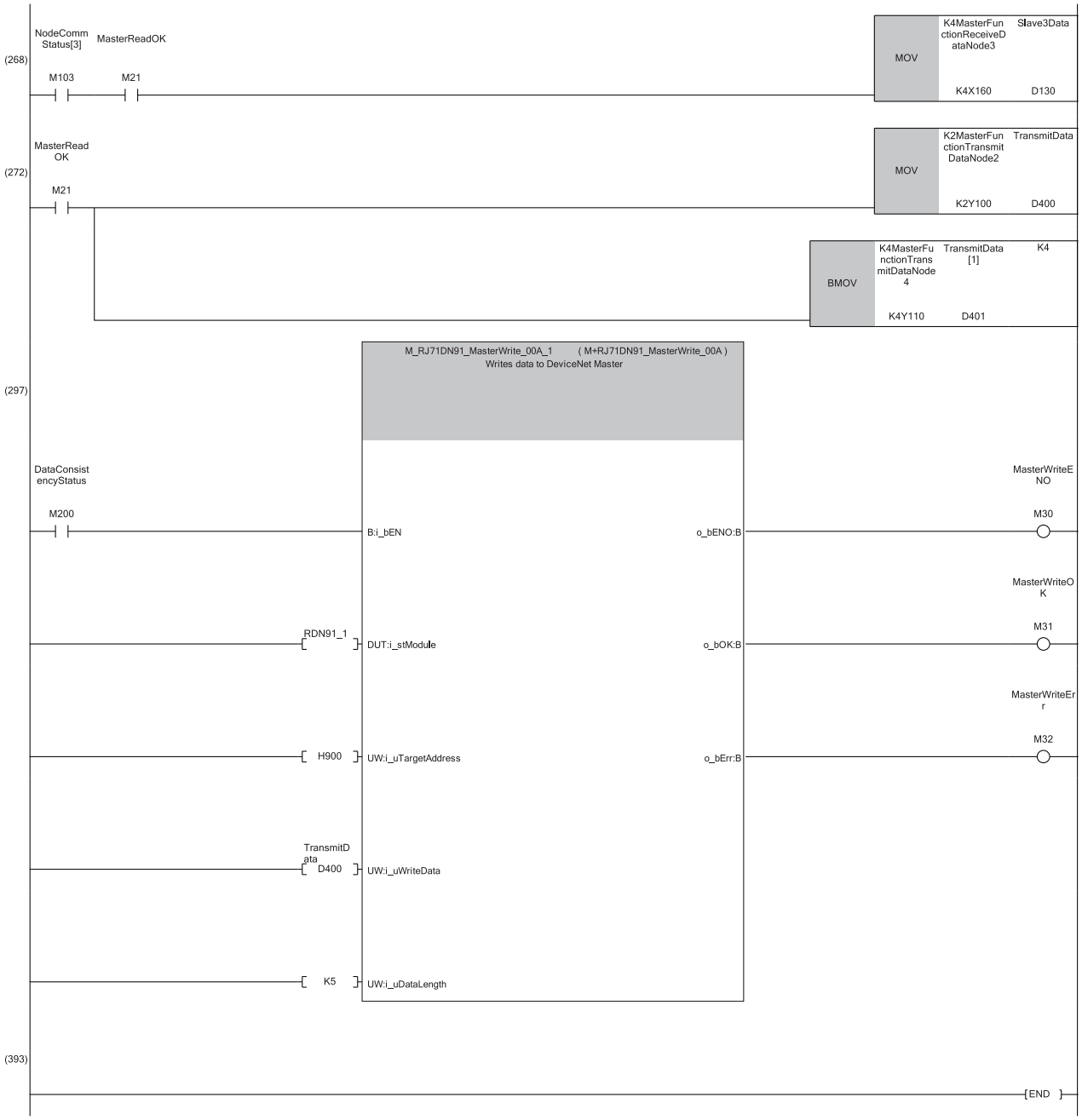
Classification	Label name	Description	Device
Module label	RDN91_1.bSts_Watchdog_Timer_Error	Watchdog timer error	X00
	RDN91_1.bSts_IO_Communicating	I/O communicating	X01
	RDN91_1.bSts_Module_Ready	Module READY	X0F
	RDN91_1.bSet_IO_Communication_Request	I/O communication request	Y11
	RDN91_1.uBFM_Control_Direct.uMaster_Function_Transmit_Data_D[0]	Master function transmit data	U0\G2304
	RDN91_1.uBFM_Control_Direct.uMaster_Function_Transmit_Data_D[1]	Master function transmit data	U0\G2305
	RDN91_1.uBFM_Monitor_Direct.uNode_Communication_Status_D[0]	Communication status of nodes	U0\G444
	RDN91_1.uBFM_Monitor_Direct.uData_Consistency_Setting_Status_Area_D.0	Master function data consistency dedicated instruction setting status	U0\G1588.0
Label to be defined	Define global labels as shown below.		

Label Name	Data Type		Class	Assign (Device/Label)
StartIOComm	Bit	...	VAR_GLOBAL	M11
NodeCommStatus	Bit(0..31)	...	VAR_GLOBAL	M100
CommErrCount	Word [Signed](0..63)	...	VAR_GLOBAL	D0
Slave1Data	Word [Signed]	...	VAR_GLOBAL	D110
Slave2Data	Word [Signed]	...	VAR_GLOBAL	D120
Slave4Data1	Word [Signed](0..3)	...	VAR_GLOBAL	D140
Slave4Data2	Word [Signed](0..3)	...	VAR_GLOBAL	D145
Slave3Data	Word [Signed]	...	VAR_GLOBAL	D130
DataConsistencyStatus	Bit	...	VAR_GLOBAL	M200
MasterReadENO	Bit	...	VAR_GLOBAL	M20
MasterReadOK	Bit	...	VAR_GLOBAL	M21
MasterReadErr	Bit	...	VAR_GLOBAL	M22
MasterWriteENO	Bit	...	VAR_GLOBAL	M30
MasterWriteOK	Bit	...	VAR_GLOBAL	M31
MasterWriteErr	Bit	...	VAR_GLOBAL	M32
ReadData	Word [Unsigned]/Bit String [16-bit](0..255)	...	VAR_GLOBAL	D200
TransmitData	Word [Unsigned]/Bit String [16-bit](0..255)	...	VAR_GLOBAL	D400
MasterFunctionReceiveDataNode1	Bit(0..7)	...	VAR_GLOBAL	X100
MasterFunctionReceiveDataNode4	Bit(0..63)	...	VAR_GLOBAL	X110
MasterFunctionReceiveDataNode3	Bit(0..15)	...	VAR_GLOBAL	X160
MasterFunctionTransmitDataNode2	Bit(0..7)	...	VAR_GLOBAL	Y100
MasterFunctionTransmitDataNode4	Bit(0..63)	...	VAR_GLOBAL	Y110


(0)
StartIOComm
M11
RDN91_1.bSts_Watchdog_Timer_Error
X0
RDN91_1.bSts_Module_Ready
X0F
MOVP
K2MasterFunctionTransmitDataNode2
K2Y100
RDN91_1.uBFM_Control_Direct.uMaster_Function_Transmit_Data_D[0]
U0\G2304
BMOVP
K4MasterFunctionTransmitDataNode4
K4Y110
RDN91_1.uBFM_Control_Direct.uMaster_Function_Transmit_Data_D[1]
U0\G2305
K5
RDN91_1.bSet_IO_Communication_Request
Y11
(25)
RDN91_1.bSts_IO_Communicating
X1
MOV
RDN91_1.uBFM_Monitor_Direct.uNode_Communication_Status_D[0]
U0\G444
K4NodeCommStatus
K4M100
(31)
RDN91_1.bSts_IO_Communicating
X1
RDN91_1.uBFM_Monitor_Direct.uData_Consistency_Setting_Status_Area_D.0
U0\G1588.0
DataConsistenceStatus
M200
(36)
M_RJ71DN91_MasterRead_00A_1 (M+RJ71DN91_MasterRead_00A)
Reads data from DeviceNet Master
DataConsistencyStatus
M200
B:i_bEN
o_bENO:B
MasterReadENO
M20
MasterReadOK
RDN91_1
DUT:i_stModule
o_bOK:B
M21
MasterReadErr
H700
UW:i_uTargetAddress
o_bErr:B
M22
K7
UW:i_uDataLength
o_uReadData:UW
ReadData
D200
(149)
MasterReadOK
M21
MOV
ReadData[0]
D200
K2MasterFunctionReceiveDataNode1
K2X100
BMOV
ReadData[1]
D201
K4MasterFunctionReceiveDataNode4
K4X110
K4

A


MOV
ReadData[6]
K4MasterFunctionReceiveDataNode3
D206
K4X160
(159)
NodeComm Status[1]
RDN91_1.bSts_IO_Communicating
M101
X1
INC
CommErrCount[1]
D1
(178)
NodeComm Status[1]
MasterReadOK
M101
M21
MOV
K2MasterFunctionReceiveDataNode1
Slave1Data
K2X100
D110
(183)
NodeComm Status[2]
RDN91_1.bSts_IO_Communicating
M102
X1
INC
CommErrCount[2]
D2
(202)
NodeComm Status[2]
MasterReadOK
M102
M21
INC
Slave2Data
D120
MOV
Slave2Data
K2MasterFunctionTransmitDataNode2
D120
K2Y100
(209)
NodeComm Status[4]
RDN91_1.bSts_IO_Communicating
M104
X1
INC
CommErrCount[4]
D4
(228)
NodeComm Status[4]
MasterReadOK
M104
M21
BMOV
K4MasterFunctionReceiveDataNode4
Slave4Data1
K4
K4X110
D140
(234)
NodeComm Status[4]
MasterReadOK
M104
M21
BMOV
Slave4Data1
Slave4Data2
K4
D140
D145
BK+
Slave4Data2
K1
Slave4Data2
K4
D145
D145
BMOV
Slave4Data2
K4MasterFunctionTransmitDataNode4
K4
D145
K4Y110
(249)
NodeComm Status[3]
RDN91_1.bSts_IO_Communicating
M103
X1
INC
CommErrCount[3]
D3



(0) The transmit data default value is set.
'I/O communication request' (Y11) is turned on.
(25) The communication status of nodes is read.
(31) The master function data consistency dedicated instruction setting status is read.
(36) The receive data is read from the master function receive data area.
(149) When M+RJ71DN91_MasterRead is normally completed, the read data is copied, and the copy is stored in each slave node area.
(159) When the communication status with the slave node (node address 1) is off, the number of communication errors is counted.
(178) When the communication status with the slave node (node address 1) is on, the receive data is stored in the data area for the slave node (node address 1).
(183) When the communication status with the slave node (node address 2) is off, the number of communication errors is counted.
(202) When the communication status with the slave node (node address 2) is on, the transmit data is created.
(209) When the communication status with the slave node (node address 4) is off, the number of communication errors is counted.
(228) (234) When the communication status with the slave node (node address 4) is on, the receive data is stored in the data area for the slave node (node address 4), and the transmit data is created.
(249) When the communication status with the slave node (node address 3) is off, the number of communication errors is counted.
(268) When the communication status with the slave node (node address 3) is on, the receive data is stored in the data area for the slave node (node address 3).
(272) The created transmit data points are merged into one.
(297) The merged transmit data is written to the master function transmit data area.

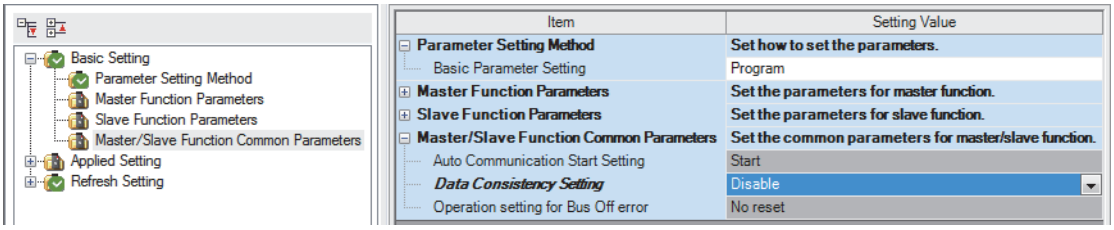
I/O communication with the master node

Perform the I/O communication between the RJ71DN91 slave node and the master node without the refresh setting.

■Without data consistency

Set "Data consistency setting" of "Master/Slave Function Common Parameters" to "Disable".

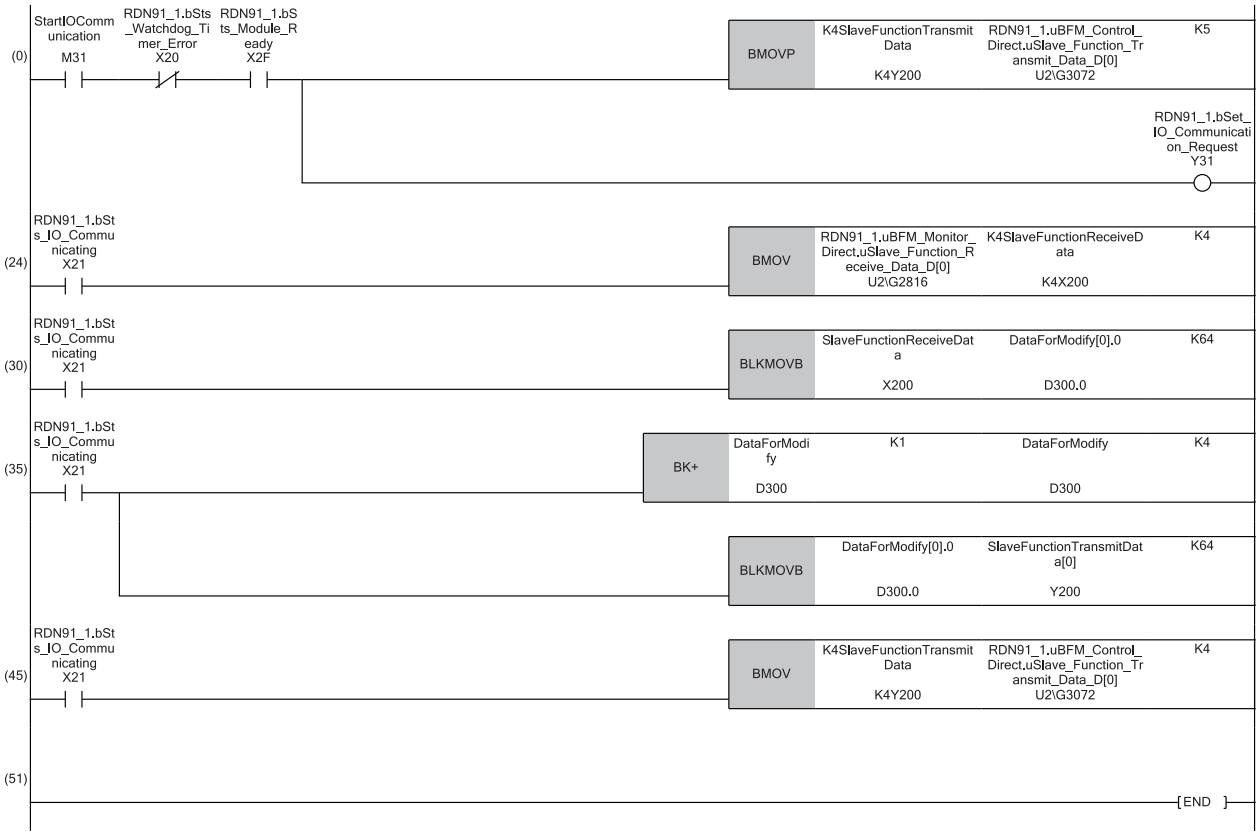
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71DN91] ⇨ [Module Parameter] ⇨ [Basic Setting]



To secure the consistency of transmit/receive data of multiple words, check the data communication by providing the area for handshake at the end of the transmit/receive data.

Classification	Label name	Description	Device
Module label	RDN91_1.bSts_IO_Communicating	I/O communicating	X21
	RDN91_1.bSet_IO_Communication_Request	I/O communication request	Y31
	RDN91_1.uBFM_Control_Direct.uSlave_Function_Transmit_Data_D[0]	Slave function transmit data	U2\G3072
	RDN91_1.uBFM_Monitor_Direct.uSlave_Function_Receive_Data_D[0]	Slave function receive data	U2\2816
Label to be defined	Define global labels as shown below.		

Label Name	Data Type		Class	Assign (Device/Label)
StartIOCommunication	Bit	...	VAR_GLOBAL	M31
DataForModify	Word [Signed](0..3)	...	VAR_GLOBAL	D300
SlaveFunctionReceiveData	Bit(0..63)	...	VAR_GLOBAL	X200
SlaveFunctionTransmitData	Bit(0..63)	...	VAR_GLOBAL	Y200

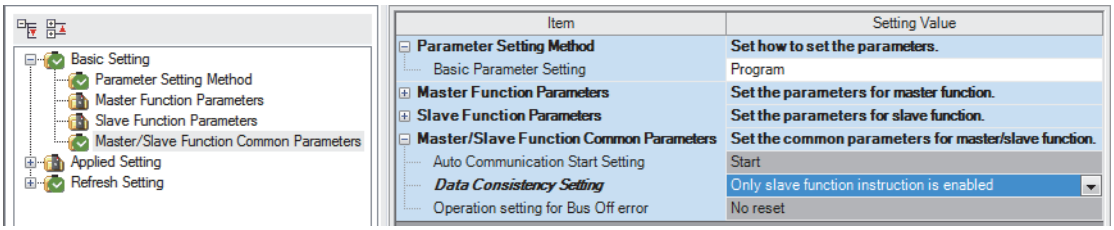


(0) The transmit data default value is set.
'I/O communication request' (Y11) is turned on.
(24) (30) The receive data is read from 'Slave function receive data' (U2\G2816).
(35) The transmit data is created.
(45) The transmit data is written to 'Slave function transmit data' (U2\G3072).

■With data consistency (using the module function block)

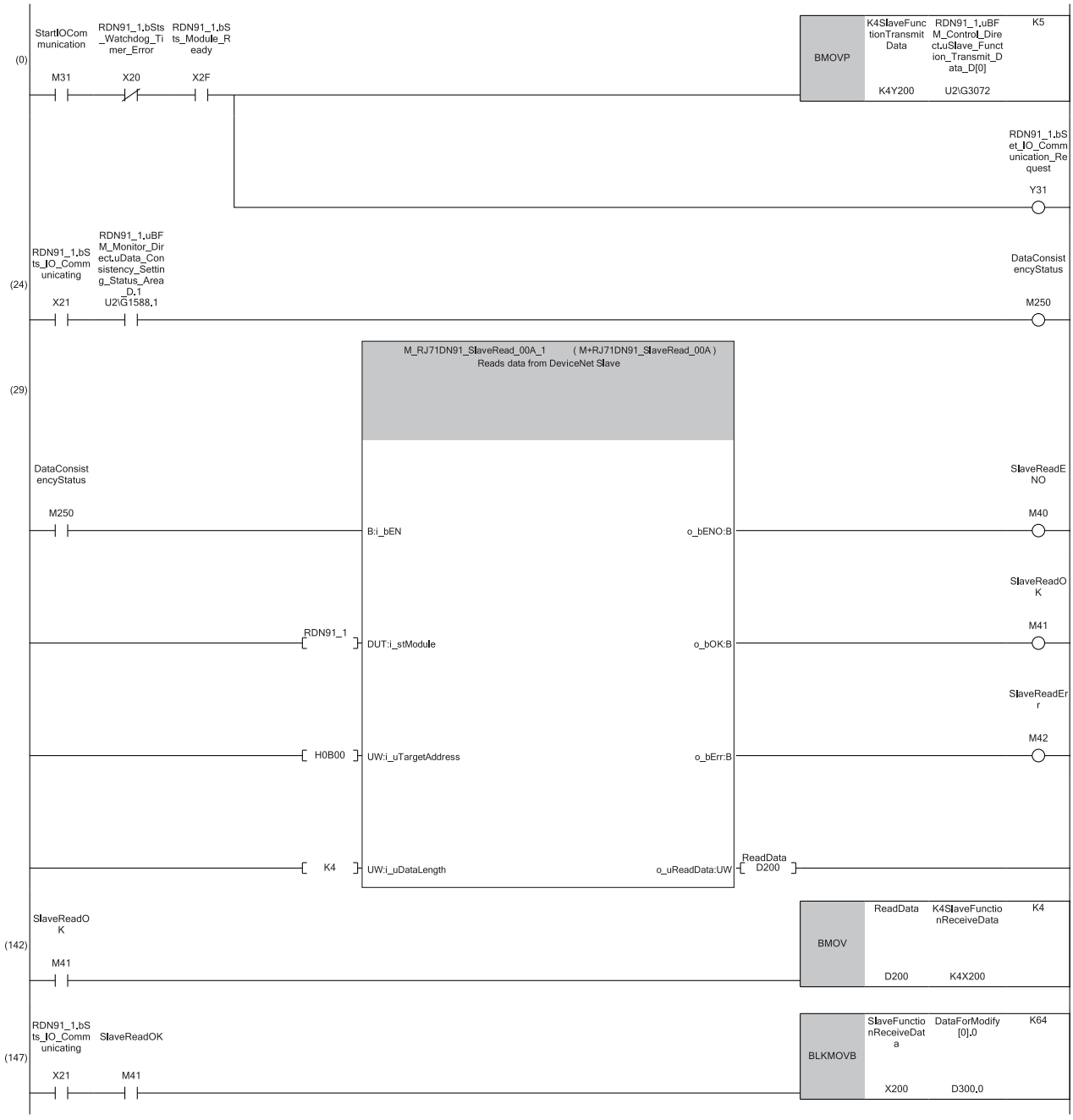
Perform the I/O communication between the RJ71DN91 master node and the slave nodes maintaining the data consistency. Set "Data consistency setting" of "Master/Slave Function Common Parameters" to "Only slave function instruction is enabled".

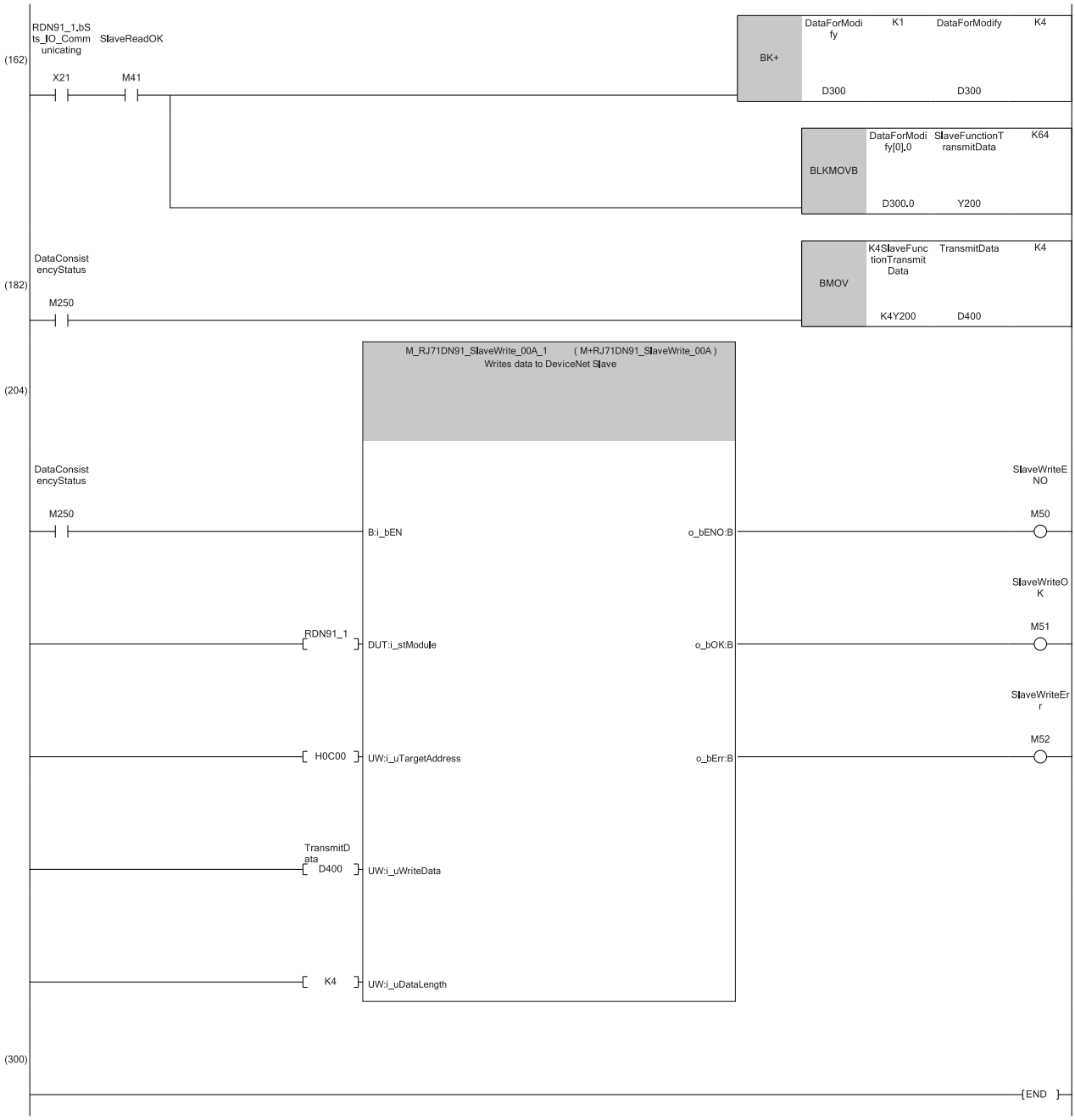
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71DN91] ⇨ [Module Parameter] ⇨ [Basic Setting]



Classification	Label name	Description	Device
Module label	RDN91_1.bSts_Watchdog_Timer_Error	Watchdog timer error	X20
	RDN91_1.bSts_IO_Communicating	I/O communicating	X21
	RDN91_1.bSts_Module_Ready	Module READY	X2F
	RDN91_1.bSet_IO_Communication_Request	I/O communication request	Y31
	RDN91_1.uBFM_Control_Direct.uSlave_Function_Transmit_Data_D[0]	Slave function transmit data	U2\G3072
	RDN91_1.uBFM_Monitor_Direct.uData_Consistency_Setting_Status_Area_D.1	Slave function data consistency dedicated instruction setting status	U2\G1588.1
Label to be defined	Define global labels as shown below.		

Label Name	Data Type		Class	Assign (Device/Label)
StartIOCommunication	Bit	...	VAR_GLOBAL	M31
DataForModify	Word [Signed](0..3)	...	VAR_GLOBAL	D300
DataConsistencyStatus	Bit	...	VAR_GLOBAL	M250
SlaveReadENO	Bit	...	VAR_GLOBAL	M40
SlaveReadOK	Bit	...	VAR_GLOBAL	M41
SlaveReadErr	Bit	...	VAR_GLOBAL	M42
ReadData	Word [Unsigned]/Bit String [16-bit](0..63)	...	VAR_GLOBAL	D200
SlaveWriteENO	Bit	...	VAR_GLOBAL	M50
SlaveWriteOK	Bit	...	VAR_GLOBAL	M51
SlaveWriteErr	Bit	...	VAR_GLOBAL	M52
TransmitData	Word [Unsigned]/Bit String [16-bit](0..63)	...	VAR_GLOBAL	D400


StartIOCommunication
RDN91_1.bSts_Watchdog_Timer_Error
RDN91_1.bSts_Module_Ready
M31
X20
X2F
(0)
BMOVP
K4SlaveFunctionTransmitData
RDN91_1.uBFM_Control_Direct.uSlave_Function_Transmit_Data_D[0]
K5
K4Y200
U2\G3072
RDN91_1.bSet_IO_Communication_Request
Y31
RDN91_1.bSts_IO_Communicating
RDN91_1.uBFM_Monitor_Direct.uData_Consistency_Setting_Status_Area_D.1
X21
U2\G1588.1
(24)
DataConsistencyStatus
M250
M_RJ71DN91_SlaveRead_00A_1
(M+RJ71DN91_SlaveRead_00A)
Reads data from DeviceNet Slave
(29)
DataConsistencyStatus
M250
B:i_bEN
o_bENO:B
SlaveReadENO
M40
SlaveReadOK
M41
RDN91_1
DUT:i_stModule
o_bOK:B
SlaveReadErr
M42
H0B00
UW:i_uTargetAddress
o_bErr:B
K4
UW:i_uDataLength
o_uReadData:UW
ReadData
D200
SlaveReadOK
M41
(142)
BMOV
ReadData
K4SlaveFunctionReceiveData
K4
D200
K4X200
RDN91_1.bSts_IO_Communicating
SlaveReadOK
X21
M41
(147)
BLKMOVB
SlaveFunctionReceiveData
DataForModify[0].0
K64
X200
D300.0



(0) The transmit data default value is set.
'I/O communication request' (Y31) is turned on.
(24) The slave function data consistency dedicated instruction setting status is read.
(29) (142) The receive data is read from the slave function receive data area.
(147) The receive data is stored.
(162) The transmit data is created.
(182) The created transmit data is stored in the write data area.
(204) The transmit data is written to the slave function transmit data area.

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Appendix 6 Differences between QJ71DN91 and RJ71DN91

This section describes the differences in the DeviceNet master/slave module between the MELSEC-Q series (QJ71DN91) and the MELSEC iQ-R series (RJ71DN91).

Function

The following table lists the differences in functions between the QJ71DN91 and the RJ71DN91.

○: Available, ×: Not available

Item		QJ71DN91	RJ71DN91
Refresh function	—	○: Configuration software	○: Engineering tool
	Start address, transfer size specification	○: The start address and transfer size can be specified in some areas.	×: Refresh with the maximum size is performed on all areas.
	Data consistency	×	○: Data consistency can be maintained with the parameter "Data consistency setting" enabled.
Hardware test/communication test function		○: • At error occurrence: Only the ERR LED turns on. • During the test: The MS LED is flashing in green.	○: • At error occurrence: The ERR LED and MS RED LED turn on. • During the test: The MS LED is flashing in green and red alternatively.
Parameter setting method	Configuration software	○: GX Works2	○: GX Works3
Operation setting for bus off error		○: The setting value set before error occurrence is valid.	○: The setting value is valid even though it is changed after error occurrence.
Data consistency dedicated instruction	DNTMRD DNTMWR DNTSRD DNTSWR	○: The setting range of data points (s3) is from 0.	○: The setting range of data points (s3) is from 1.
Parameter	Saved to the CPU	×	○: Engineering tool
	Saved to the built-in flash ROM of module	○	○: The parameter saved with the QJ71DN91, 'Operation setting for bus off error area' (Un\G1586), and 'Data consistency setting' (Un\G1587) are saved.
Communication error information storage destination	Buffer memory 'Master function communication error information' (Un\G1152) 'Slave function communication error information' (Un\G1153) 'Other slave communication error information' (Un\G1154 to Un\G1217)	×	○: The information is stored in these areas, 'Master function error information' (Un\G433), and 'Slave function error information' (Un\G1537).

Parameter

The following table lists the differences in parameters between the QJ71DN91 and the RJ71DN91.

Basic settings

○: Can be set, ×: Cannot be set, △: Can be set (different in specifications), —: No item

Item			QJ71DN91		RJ71DN91	
			Set with configuration software	Set with program	Set with engineering tool	Set with program
Parameter setting method	Setting method of basic settings		—	—	○	×
Master function parameters	Constant scan		○	○	○	○
	Setting method of slave node information		—	—	○	×
	Slave node information (□th)	Node address	○	○	○	○
		Message group	○	○	○	○
		Connection type	○	○	○	○
		Number of input byte modules	○	○	○	○
		Number of output byte modules	○	○	○	○
		Number of input word modules	○	○	○	○
		Number of output word modules	○	○	○	○
		Number of input double-word modules	○	○	○	○
		Number of output double-word modules	○	○	○	○
		Expected packet rate	○	○	○	○
		Watchdog timeout action	○	○	○	○
		Production inhibit time	○	○	○	○
Parameter for slave function	Number of input points in slave function		○	○	○	○
	Number of output points in slave function		○	○	○	○
Master/slave function common parameter	Data consistency setting (data consistency dedicated instruction setting)		×	△	△	△
	Operation setting for bus off error		×	△	△	△
	Auto communication start setting		○	○	○	○
—	Parameter save/clear selection bit (parameter save area selection)		△	△	—	△

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Applied settings

○: Can be set, ×: Cannot be set, —: No item

Item		QJ71DN91		RJ71DN91	
		Set with configuration software	Set with program	Set with engineering tool	Set with program
Output mode upon CPU error	Output mode upon CPU error	—	—	○	×

Refresh settings

○: Can be set, ×: Cannot be set, —: No item

Item		QJ71DN91		RJ71DN91	
		Set with configuration software	Set with program	Set with engineering tool	Set with program
Transfer to the intelligent function module	Master function transmit data	○	×	○	×
	Slave function transmit data	○	×	○	×
Transfer to the CPU	Master function communication status	○	×	○	×
	Master function error information	○	×	○	×
	Bus error counter	○	×	○	×
	Bus off counter	○	×	○	×
	Configuration status of nodes	○	×	○	×
	Communication status of nodes	○	×	○	×
	Communication error status of nodes	○	×	○	×
	Error status of nodes	○	×	○	×
	Current link scan time	○	×	○	×
	Minimum link scan time	○	×	○	×
	Maximum link scan time	○	×	○	×
	Slave function communication status	○	×	○	×
	Slave function error information	○	×	○	×
	Master function I/O address	○	×	○	×
	Master function receive data	○	×	○	×
	Slave function receive data	○	×	○	×
	Master function communication error information	—	—	○	×
	Slave function communication error information	—	—	○	×
	Other slave communication error information	—	—	○	×
Refresh timing	Refresh timing	—	—	○	×
	Refresh group [n] (n: 1 to 64)	—	—	○	×
Refresh timing (input/output)	Refresh timing	—	—	○	×

Buffer memory

The following table lists the differences in buffer memory between the QJ71DN91 and the RJ71DN91.

Address (decimal)	Address (hexadecimal)	QJ71DN91		RJ71DN91	
		Name	Description	Name	Description
1152	0480H	Not available		Master function communication error information	Stores the communication error code occurred on the own node. It is valid only when the own node uses the master function.
1153	0481H	Not available		Slave function communication error information	Stores the communication error code occurred on the own node. It is valid only when the own node uses the slave function.
1154 to 1217	0482H to 04C1H	Not available		Other slave communication error information	Stores the communication error code occurred on each slave node. It is valid only when the own node uses the master function.
1584	0630H	Parameter save area selection bit	Selects the parameter area saved to the flash ROM.	Parameter save/ clear selection bit	Selects whether to save or clear the parameter with 'Request for saving/ clearing parameters to Flash ROM' (Y17).
1586	0632H	Operation setting for bus off error area	Sets whether to reset the CAN chip (communication chip) of the QJ71DN91 and restart the communication when a bus off error occurs.	Operation setting for bus off error area	Sets whether to reset the CAN chip (communication chip) of the RJ71DN91 and restart the communication when a bus off error occurs. The communication can be restarted even when a value is changed after a bus off error occurs.
1587	0633H	Data consistency dedicated instruction setting area	Sets whether to enable or disable the data consistency dedicated instruction.	Data consistency setting	Sets whether to enable or disable data consistency for refresh or the data consistency dedicated instruction.
1588	0634H	Data consistency dedicated instruction setting status area	Stores the enabled/disabled state of the data consistency dedicated instruction.	Data consistency setting status	Stores the enabled/disabled state of data consistency for refresh or the data consistency dedicated instruction.

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REVISIONS

*The manual number is given on the bottom left of the back cover.

Revision date	*Manual number	Description
April 2017	SH(NA)-081767ENG-A	First edition
April 2018	SH(NA)-081767ENG-B	■Added or modified parts INTRODUCTION, RELEVANT MANUALS, TERMS, Section 2.1, 2.4, Chapter 3, Section 3.1, Appendix 3, 6 ■Deleted parts Section 3.3 to 3.7

Japanese manual number: SH-081766-B

WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.

1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

(1) Damages caused by any cause found not to be the responsibility of Mitsubishi.

(2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.

(3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.

(4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

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MODEL: RJ71DN91-U-OU-E
MODEL CODE: 13JX75

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