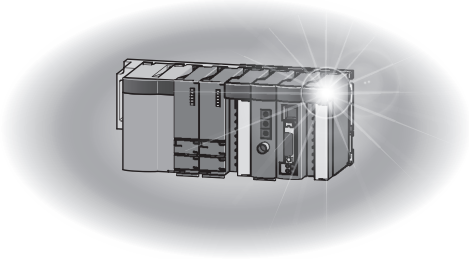
MITSUBISHI ELECTRIC

Programmable Controller

MELSEC Q series

MES Interface Module User's Manual

-QJ71MES96N
-QJ71MES96
-SW1DNC-MESIF-E (MX MESInterface)



●SAFETY PRECAUTIONS●

(Always read these precautions before using this equipment.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to handle the product correctly.
The precautions given in this manual are concerned with only this product. For the safety precautions of the programmable controller system, please read the User's Manual for the CPU module used.

In this manual, the safety instructions are ranked as "⚠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.

Note that the ⚠CAUTION level may lead to a serious consequence according to the circumstances.
Always follow the instructions of both levels because they are important to personal safety.

Please save this manual to make it accessible when required and always forward it to the end user.

[Design Precautions]

⚠WARNING

- When controlling a running programmable controller (e.g. data modification), create an interlock circuit on sequence programs so that the whole system functions safely all the time.
  Also, be sure to read the manual carefully and ensure safety before performing any other controls such as operating status change.
  Especially, when controlling a programmable controller from a remote location via network, problems on the programmable controller side may not be dealt with promptly due to failure of data communications.
  Create an interlock circuit on a sequence program.

- For the operation status of each station at a communication error, refer to the manual for that station.
  Incorrect output or malfunctions may cause an accident.

- Install a safety circuit external to the programmable controller that keeps the entire system safe even when there are problems with the external power supply or the programmable controller.
  Otherwise, trouble could result from erroneous output or erroneous operation.

[Design Precautions]

⚠WARNING

- Do not write any data to the "System area" in the buffer memory of the intelligent function module.
  As for signals output from the programmable controller CPU to the intelligent function module, never output (ON) a "Use prohibited" signal.
  Doing these operations may cause malfunctions of the programmable controller system.

[Design Precautions]

⚠CAUTION

- Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other.
  They should be installed 100 mm or more from each other.
  Not doing so could result in noise that would cause erroneous operation.

- During registering each setting, do not power OFF the mounted module or reset the programmable controller CPU.
  Otherwise, data in the CompactFlash card will be undefined. Therefore, resetting and re-registering data are required.
  This may also cause a module failure or malfunctions.

[Security Precautions]

⚠WARNING

- To maintain the security (confidentiality, integrity, and availability) of the programmable controller and the system against unauthorized access, denial-of-service (DoS) attacks, computer viruses, and other cyberattacks from external devices via the network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.

[Installation Precautions]

⚠CAUTION

- Use the programmable controller under the environment specified in the User's Manual.
  Using this programmable controller in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.

- To mount the module, while pressing the module mounting lever located in the lower part of the module, fully insert the module fixing projection(s) into the hole(s) in the base unit and press the module until it snaps into place.
  Incorrect loading of the module can cause a malfunction, failure or drop.
  When using the programmable controller in the environment of much vibration, tighten the module with a screw.

[Installation Precautions]

⚠CAUTION

- Completely turn off the externally supplied power used in the system before mounting or removing the module.
  Not doing so could result in damage to the product.

- Tighten the screw in the specified torque range.
  Undertightening can cause a drop, short circuit or malfunction.
  Overtightening can cause a drop, short circuit or malfunction due to damage to the screw or module.

- Do not directly touch the module's conductive parts or electronic components.
  Touching the conductive parts could cause an operation failure or give damage to the module.

- When connecting a connector, properly press, crimp, or solder it using the tools specified by the manufacturer.
  Incomplete connection may cause short-circuit, fire, and malfunctions.

- Push the CompactFlash card into the CompactFlash card slot and install it securely.
  After installing the CompactFlash card, check that it is inserted securely.
  Failure to do so may cause malfunctions due to poor contact.

[Wiring Precautions]

⚠CAUTION

- Always store the communication cables and power cables connected to the module in the duct or fix them in place with clamps.
  Not doing so may cause swing, move, or poor connection of the cable, or damage of a module and/or cable due to careless pull, resulting in malfunctions.

- Install connectors securely to modules.

- Tighten the screw in the specified torque range.
  Undertightening can cause a drop, short circuit or malfunction.
  Overtightening can cause a drop, short circuit or malfunction due to damage to the screw or module.

- When disconnecting communication cables connected to the module, never pull on the cable section.
  When using a cable with a connector, disconnect it with holding the connector connected to the module.
  When the cable is pulled while connected to the module, this may cause malfunctions or module/cable damage.

[Wiring Precautions]

⚠CAUTION

- Be sure there are no foreign substances such as sawdust or wiring debris inside the module.
  Such debris could cause fires, damage, or erroneous operation.

- 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 peel this label during wiring.
  Before starting system operation, be sure to peel this label because of heat dissipation.

[Start-up and Maintenance Precautions]

⚠WARNING

- Do not touch any terminal during power distribution.
  Doing so may cause malfunctions.

- Always switch OFF the external supply power used by the system in all phases before cleaning or retightening terminal screws.
  Failure to do so may cause a failure or malfunctions of the module.
  Loose screws may cause a drop of the module, short-circuit, or malfunctions.
  Tightening screws excessively may damage the screws and/or the module, resulting in a drop of the module, short-circuit, or malfunctions.

⚠CAUTION

- Do not disassemble or transform the module.
  Doing so may cause a failure, malfunctions, personal injuries, and/or a fire.

- Always shut OFF the external supply power used by the system in all phases before mounting or removing a module.
  Failure to do so may cause a failure or malfunctions of the module.

- Do not install/remove the module to/from the base unit more than 50 times after the first use of the product. (IEC 61131-2/JIS B 3502 compliant)
  Failure to do so may cause malfunction.

- Do not drop or apply any impact to the battery.
  Doing so may damage the battery, resulting in a battery fluid leakage inside the battery.
  If any impact has been applied, discard the battery and never use it.

- Before handling a module, touch a grounded metal object to discharge the static electricity from the human body.
  Failure to do so may cause a failure or malfunctions of the module.

[Operation Precautions]

⚠WARNING

- Make sure safety before controlling a running programmable controller (e.g. data modification).

- Do not write any data to the "System area" in the buffer memory of the intelligent function module.
  As for signals output from the programmable controller CPU to the intelligent function module, never output (ON) a "Use prohibited" signal.
  Doing these operations may cause malfunctions of the programmable controller system.

[Disposal Precautions]

⚠CAUTION

- When disposing of the product, treat it as industrial waste.
  When disposing of batteries, separate them from other wastes according to the local regulations.
  (For details of the battery directive in EU member states, refer to Appendix 9.)

[Transportation Precautions]

⚠CAUTION

- When transporting lithium batteries, make sure to treat them based on the transportation regulations.
  (Refer to Appendix 8 for details of the relevant models.)

●CONDITIONS OF USE FOR THE PRODUCT●

(1) MELSEC 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 ELECTRIC 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 ELECTRIC USER'S, 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 Electric 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 Electric 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 Electric representative in your region.

(3) Mitsubishi Electric shall have no responsibility or liability for any problems involving programmable controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

REVISIONS

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Print date	Manual number	Revision
Sept., 2006	SH(NA)-080644ENG-A	First edition
Jan., 2007	SH(NA)-080644ENG-B	Correction GENERIC TERMS AND ABBREVIATIONS, DEFINITIONS AND DESCRIPTIONS OF TERMS, Chapter 1, Sections 2.2, 2.4.2, 2.5, 3.1, 3.2, 3.5, 4.2, 4.6.2, 5.2, 6.1.10, 7.7.1, 7.8.1, 7.9.1, 7.10.1, 7.11.1, 7.11.2, 7.12.5, 7.13.2, 7.13.4, 8.1, 8.2, 8.6, 10.2.1, 10.3.2, 10.3.3, Appendix 3.9 Addition Sections 2.6, 2.6.1, 2.6.2, Appendix 1
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Oct., 2007	SH(NA)-080644ENG-D	Correction DEFINITIONS AND DESCRIPTIONS OF TERMS, PACKING LIST, Sections 2.2, 2.4.2, 2.6.2, 3.1, 3.3, 3.6.10, 4.1, 6.1.6, 6.1.9, 7.3.1, 7.4.5, 7.6.2, 7.6.4, 7.8.1, 7.8.3, 7.9.1, 7.10.1 to 7.10.3, 7.10.5, 7.11.1, 7.11.2, 7.12.5, 8.5, 8.8.1, 8.8.2, 10.2.1, Appendices 1.1, 3.1, 3.2, 3.8, 3.10, 3.13, 3.15, 3.16 Addition Sections 6.3.2, 7.8.2, Appendices 1.2, 3.5, 3.19, 3.20
Oct., 2007	SH(NA)-080644ENG-E	Correction Sections 3.3, 7.8, 7.11.1, 7.12.5, Appendices 3.8, 3.20
Jan., 2008	SH(NA)-080644ENG-F	Correction GENERIC TERMS AND ABBREVIATIONS, DEFINITIONS AND DESCRIPTIONS OF TERMS, Sections 1.1, 2.2 to 2.4, 2.6.2, 3.1, 3.2, 4.4.1, 4.7.1, Chapter 5, Sections 6.1.9, 6.1.10, 7.2, 7.3.1, 7.3.4, 7.5 to 7.11, 7.12.5, 7.13.4, 8.1 to 8.3, 8.5, 10.2.1, 10.2.2, 10.3.3, Appendices 1.1, 3.3, 3.4, 3.6 to 3.13 Addition Appendix 7 Change of section No. Appendix 7 → Appendix 8
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Jan., 2010	SH(NA)-080644ENG-I	Correction SAFETY PRECAUTIONS, GENERIC TERMS AND ABBREVIATIONS, DEFINITIONS AND DESCRIPTIONS OF TERMS, Sections 1.1, 2.3, 2.4.2, 2.5, 2.6.2, 3.1, 3.3, 4.3, 4.7.2, 4.8.1 to 4.8.3, 6.1.6, 6.1.9, 7.3.1, 7.3.4, 7.8.1, 7.9, 7.9.1, 7.10, 7.10.1, 7.11, 7.11.1, 7.12.5, 8.1, 8.2, 8.8.1, 10.2.1, 10.2.2, 10.3.2, 10.3.3, Appendices 3.1, 3.10, 3.13 to 3.15, 3.19, 5, 7.1 Addition CONDITIONS OF USE FOR THE PRODUCT
Sept., 2010	SH(NA)-080644ENG-J	Correction HOW TO USE THIS MANUAL, GENERIC TERMS AND ABBREVIATIONS, Sections 2.1 to 2.3, 2.4.1, 2.4.2, 3.1, 3.2, 5.1, 5.2, 7.7.1, 7.10.2, 7.12.6, 7.15, 8.3, 10.3.1, 10.3.3, Appendices 1.1, 3.7, 7.1, 7.2
Sept., 2011	SH(NA)-080644ENG-K	Correction COMPLIANCE WITH THE EMC AND LOW VOLTAGE DIRECTIVES, Sections 2.4.1, 2.4.2, 2.6.2, 3.1, 3.2, 4.3, 7.7, 7.7.1, 7.9.1, 7.11.1, 7.11.2, 7.15, 8.2, 10.2.1, 10.3.3, Appendices 1.1, 3.7, 3.8, 3.10, 4.1, 4.2
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Japanese Manual Version SH-080643-AB

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INTRODUCTION

Thank you for purchasing the Mitsubishi MELSEC-Q series programmable controllers.
Before using the equipment, please read this manual carefully to develop full familiarity with the functions and performance of the Q series programmable controller you have purchased, so as to ensure correct use.

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INFORMATION AND SERVICES

TRADEMARKS

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COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES

(1) Method of ensuring compliance

To ensure that Mitsubishi programmable controllers maintain EMC and Low Voltage Directives when incorporated into other machinery or equipment, certain measures may be necessary. Please refer to one of the following manuals.

- QCPU User's Manual (Hardware Design, Maintenance and Inspection)
- Safety Guidelines
  (This manual is included with the CPU module or base unit.)

The CE mark on the side of the programmable controller indicates compliance with EMC and Low Voltage Directives.

(2) Additional measures

To ensure that this product maintains EMC and Low Voltage Directives, please refer to one of the manuals listed under (1).

HOW TO USE THIS MANUAL

This manual is organized by objective for using the MES interface module and MX MESInterface Version 1 (SW1DNC-MESIF-E). Use this manual with referring to the following.

(1) Features and software configuration

☞Chapter 1 OVERVIEW

Section 1.1 covers the features.

Section 1.2 covers the MX MESInterface software configuration.

(2) System configuration, applicable systems, connection system equipment, and operating environment

☞Chapter 2 SYSTEM CONFIGURATION

Section 2.1 covers the system configuration.

Section 2.2 covers the applicable systems.

Section 2.3 covers the connection system equipment.

Section 2.4 covers the operating environment.

(3) Performance specifications about the MES interface module

☞Chapter 3 SPECIFICATIONS

Section 3.1 covers the performance specifications.

(4) Procedure up to MES interface module start-up

☞Chapter 4 SETTINGS AND PROCEDURE TO OPERATION

Section 4.2 covers the schematic procedure up to the MES interface module operation.

(5) Installation and uninstallation methods for MX MESInterface

☞Chapter 5 INSTALLATION AND UNINSTALLATION

CHAPTER 5 covers MX MESInterface installation and uninstallation methods.

(6) MES interface module functions

☞Chapter 6 FUNCTIONS

CHAPTER 6 covers the MES interface module functions.

(7) Setting method for MES Interface Function Configuration Tool

☞Chapter 7 MES INTERFACE FUNCTION CONFIGURATION TOOL

CHAPTER 7 covers the setting method of the MES Interface Function Configuration Tool.

Section 7.6 to Section 7.10 provide explanations as indicated below.

Section 7.6 ..... Explains a display method of the screen.
- Section 7.6.1
- Section 7.6.2
- Section 7.6.3
- Section 7.6.4

} Explains setting items and the setting methods of the screen.

* Sections 7.7 to 7.10 also provide explanations as indicated above.

(8) Setting method for DB Connection Service

☞Chapter 8 DB CONNECTION SERVICE AND SETTING TOOL

CHAPTER 8 covers the functions and setting method for the DB Connection Service.

(9) XML message format

☞Chapter 9 XML MESSAGE FORMAT

CHAPTER 9 covers the XML message format.

(10)Methods for checking errors and the corrective actions

☞Chapter 10 TROUBLESHOOTING

CHAPTER 10 covers troubleshooting and lists the error codes.

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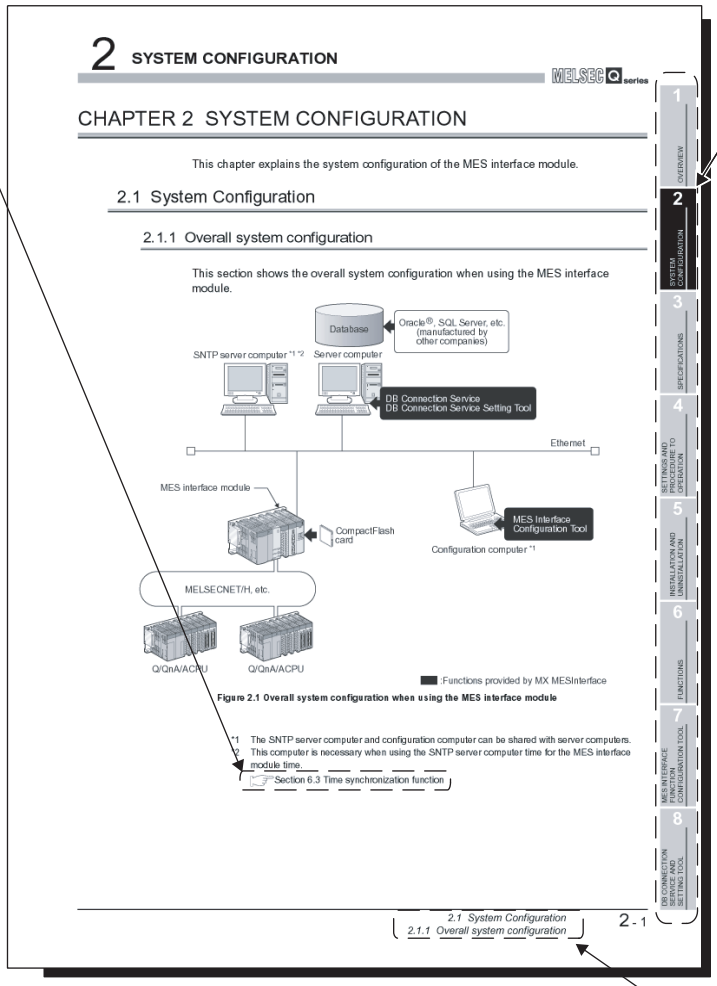

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The section in which the open page is included is clear.

The above is different from the actual page, as it is provided for explanation only.
In addition, this manual provides the following explanations.

Point

Explains the matters to be especially noted, the functions and others related to the description on that page.

Remark

Provides the reference destination related to the description on that page and the convenient information.

GENERIC TERMS AND ABBREVIATIONS

Unless otherwise specified, this manual uses the following generic terms and abbreviations to explain the MES interface module and MX MESInterface Version 1 (SW1DNC-MESIF-E).

Generic term/abbreviation	Description
ACPU	Generic term for the A1NCPU, A0J2HCPU, A1SCPU, A1SHCPU, A1SJCPU, A1SJHCPU, A2CCPU, A2CJCPU, A2NCPU, A2NCPU-S1, A2SCPU, A2SHCPU, A2ACPU, A2ACPU-S1, A2UCPU, A2UCPU-S1, A2USCPU, A2USCPU-S1, A2USHCPU-S1, A3NCPU, A3ACPU, A3UCPU, and A4UCPU
C Controller module	Generic term for the Q06CCPU-V, Q06CCPU-V-B, Q12DCCPU-V, Q24DHCCPU-V, and Q24DHCCPU-LS
C24	Another term for serial communication modules
E71 Ethernet module	Another term for Ethernet interface modules
GX Developer	Generic product name for the model names of the SWnD5C-GPPW-E, SWnD5C-GPPW-EA, SWnD5C-GPPW-EV, and SWnD5C-GPPW-EVA. (n = Version 4 or later) - A designates a multiple-license product; -V designates a version upgraded product.
LCPU	Generic term for the L02SCPU, L02SCPU-P, L02CPU, L02CPU-P, L06CPU, L06CPU-P, L26CPU, L26CPU-P, L26CPU-BT, and L26CPU-PBT
MELSECNET/H	Abbreviation for MELSECNET/H network system supporting the Q series
MELSECNET/10	Abbreviation for MELSECNET/10 network system supporting the AnU and QnA/Q4AR
MES interface module	Generic term for the QJ71MES96 and QJ71MES96N MES interface module
MX MESInterface	Product name for the model name SW1DNC-MESIF-E
QCPU (A mode)	Generic term for the Q02CPU-A, Q02HCPU-A, and Q06HCPU-A
QCPU (Q mode)	Generic term for the Q00JCPU, Q00CPU, Q01CPU, Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU, Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU, Q12PRHCPU, Q25PRHCPU, Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU, Q50UDEHCPU, Q100UDEHCPU, Q03UDVCPU, Q04UDVCPU, Q06UDVCPU, Q13UDVCPU, and Q26UDVCPU
QnACPU	Generic term for the Q2ACPU, Q2ACPU-S1, Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, Q2ASHCPU-S1, Q3ACPU, Q4ACPU, and Q4ARCPU
Q series E71	Generic term for the QJ71E71-100, QJ71E71-B5, and QJ71E71-B2
RCPU	Generic term for R04CPU, R08CPU, R16CPU, R32CPU, R120CPU
Windows Server® 2008	Windows Server® 2008 includes Windows Server® 2008 R2.
Windows Server® 2008 R2 or later server operating system	Generic term for Windows Server® 2008 R2, Windows Server® 2012, Windows Server® 2012 R2, Windows Server® 2016, and Windows Server® 2019
Windows Vista® or later	Generic term for Windows Vista®, Windows® 7, Windows Server® 2008, Windows Server® 2008 R2, Windows® 8, windows® 8.1, Windows Server® 2012, Windows Server® 2012 R2, Windows® 10, Windows Server® 2016, and Windows Server® 2019
Windows® 7 or later	Generic term for Windows® 7, Windows Server® 2008, Windows Server® 2008 R2, Windows® 8, windows® 8.1, Windows Server® 2012, Windows Server® 2012 R2, Windows® 10, Windows Server® 2016, and Windows Server® 2019
Windows® 7 or later client operating system	Generic term for Windows® 7, Windows® 8, windows® 8.1, and Windows® 10
Windows® 8 or later	Generic term for Windows® 8, Windows® 8.1, Windows Server® 2012, Windows Server® 2012 R2, Windows® 10, Windows Server® 2016, and Windows Server® 2019

DEFINITIONS AND DESCRIPTIONS OF TERMS

The following table shows the definitions and descriptions of the terms used in this manual.

Term	Description
CSV	Abbreviation for Comma Separated Values Text file in which the data are aligned and set off by commas and double quotations
DB buffering	Function temporarily stores SQL text that failed to be sent due to a communication error and resends the text when the communications have been recovered
HTTP	Abbreviation for Hyper Text Transfer Protocol Protocol to exchange XML format messages between the MES interface module and user applications in the XML processing function
Tag for Wonderware® Historian	Name for data unit in the data base Wonderware® Historian.
MES	Abbreviation for Manufacturing Execution Systems Systems for controlling and monitoring the plant status in real time to optimize production activities The systems enable to speed up the responses to production plan and status changes that lead to efficient production processes and optimization of production activities.
ODBC	Abbreviation for Open DataBase Connectivity Standard specifications for software to access databases
SNTP	Abbreviation for Simple Network Time Protocol Protocol for synchronizing computer time via a TCP/IP network
SNTP server computer	Computer that provides time information to the MES interface module This computer can be shared with a server computer.
SQL	Abbreviation for Structured Query Language Data manipulation language and used for relational database operations
URL	Abbreviation for Uniform Resource Locator Notation method for indicating the locations of information resources on the Internet
URL encode	Converts character strings into characters can be used in URLs. This designates percent encoding defined by RFC3986.
XML	Abbreviation for eXtensible Markup Language Markup language for describing documentation, data meanings, and structures
Item	One setting group unit included each setting type for editing
Account	Designates the right to use the MES interface module or server computer, or an ID necessary for their use.
Action	Unit for processing defined in a job There are [Communication action] for communicating with a database and [Operation action] for operating tag component values. [Communication action] is a processing unit for sending one SQL text (Select, Update, Insert, MultiSelect, or Delete) or one stored procedure execution request. [Operation action] is a processing unit of up to 20 dyadic operations.
System switching	Function for the Redundant CPU to switch between control system and standby system of the redundant system. (Switching from control system to standby system, and vice versa.)
COMMIT	Processing for finalizing the changes to a database
CompactFlash card (CF card)	Storage card regulated by the [CF+ and CompactFlash Specification] issued by the Compact Flash Association This memory card is necessary for the MES interface module to operate the MES interface function.

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Term	Description
Server service	Generic term for the services can be offered by a server computer to which DB Connection Service is installed There are database server service and application server service. The database server service is a service for accessing a database. The application server service is a service for linking with a program.
Server computer	There are database server computers and application server computers. The database server computer is a personal computer with a relational database which links information with the MES interface module. The application server computer is a personal computer with a program that operates upon request from the MES interface module.
Job	A unit of process for linking information by a MES interface module.
Stored procedure	Stored procedure combines sequential processing procedures into one program against the database, and save it to the database management system. This executes processing based on the arguments received from MES interface module, and returns the processing results to MES interface module.
Update settings	Processing updates the MES interface module settings from MES Interface Function Configuration Tool
Configuration computer	Personal computer for configuring various settings required for the MES interface function in the MES interface module This computer can be shared with a server computer.
Time zone	Standard time zone for each region of the world Each nation uses the time difference (±12 hours maximum) from the time at the Greenwich Observatory in the United Kingdom (GMT) as the standard time. The region using the same time difference is called a time zone. The standard time for Japan is 9 hours ahead of the GMT. In some nations, daylight time in which the clock is advanced for one hour is used in summer.
Tag component (Component)	Generic term for a component (Device data) making up a device tag (Tag) This data organizes the communications path, data type, device, etc. for access to each programmable controller CPU device data as a single data unit.
Data source	Connection information necessary for accessing data using ODBC With Windows®, a data source name is assigned to connection information for management. The database can be accessed via ODBC by specifying the data source name in the MES interface function.
Database (DB) or relational database (RDB)	Data management method that follows relational data model logic One data is expressed as a collection of multiple items (Fields) and the data collection is expressed as a table. Data can be easily merged and selected using key data.
Table	Data management format managed with relational databases It is a two-dimensional table format composed of rows and columns.
Device	Variety of memory data in the programmable controller There are devices handled in units of bits and devices handled in units of words.
Device tag (Tag)	Data table that contains a set of information (Component) required to access the device data in the programmable controller CPUs on the network The MES interface module collects device data in units of tags at an interval defined in the tag.
Trigger condition	Startup conditions for job operation

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Term	Description
Trigger buffering	When trigger conditions (conditions for data transmission) of multiple jobs are met in a concentrated manner, their data and trigger times are buffered in the module's internal memory so that actions (data operation/transmission) can be executed later using the buffered data. Even if the frequency of data transmission triggers is high, jobs are executed without missing any trigger.
Data separation	New data and old data are mixedly exists in units of 16 bits (1 word) in 32 bits data (2 words) or larger data due to data reception timing.
Daylight saving (Summer time)	The system in which clocks are set one hour ahead of standard time in a specific period of time in summer.
Handshake	For highly reliable processing, programmable controller CPU devices are used to manage processing between the programmable controller CPU and MES interface module.
Field	Corresponds to a column in a relational database and indicates a type of data (Record attribute).
Variable (Temporary variable)	Variable that can be used in a single job for temporary storage of values selected from a database and for writing operation values to a database or tag components
Record	Corresponds to a row in a relational database. One row (Record) stores the values of multiple columns (Fields).
Rollback	Processing for canceling changes to a database

PACKING LIST

The following table shows the products included to the MES interface module and MX MESInterface Version 1 (SW1DNC-MESIF-E).

Model	Product name	Quantity
QJ71MES96N	QJ71MES96N MES interface module	1
QJ71MES96	QJ71MES96 MES interface module	1
	Battery (Q6BAT)	1
SW1DNC-MESIF-E	MX MESInterface Version 1 (with one license) (CD) (Sold Separately)	1
SW1DNC-MESIF-EA	MX MESInterface Version 1 (with multiple licenses) (CD) (Sold Separately)	1

DISCONTINUED MODEL

The following model is described in this manual, but has no longer been produced.
For the onerous repair term after discontinuation of production, refer to "WARRANTY".

Model	Production discontinuation
QJ71MES96	May 2018

CHAPTER 1 OVERVIEW

This manual explains the specifications, preparatory procedures, functions, and troubleshooting for the MELSEC-Q series MES interface module.
When applying the following program examples to the actual system, make sure to examine the applicability and confirm that it will not cause system control problems.
The MES interface module links the programmable controller (Production equipment) device data with information system (Manufacturing Execution System) database without communication gateways.

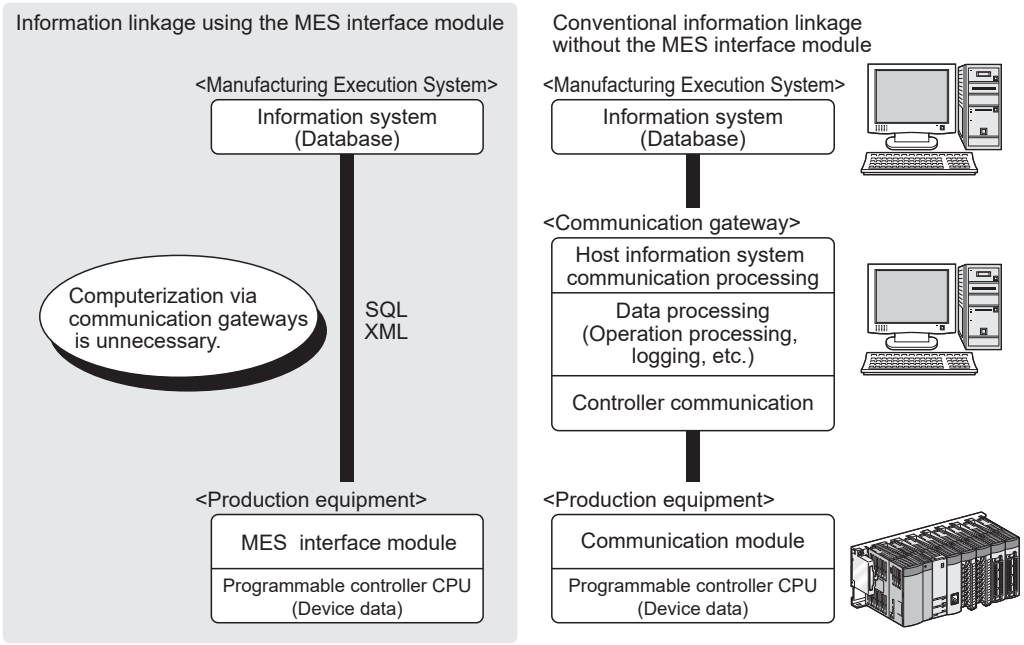


Figure 1.1 Information linkage using the MES interface module

1.1 Features

This section explains the features of MX MESInterface.

(1) Connection with the information system is enabled by simple settings without program

Access to information system databases can be realized simply by making the necessary settings with the setting tool.

There is no need to write programs for accessing databases, so the engineering costs for system construction can be reduced and the work period can be shortened.

[MX MESInterface] - [MES interface function configuration tool]

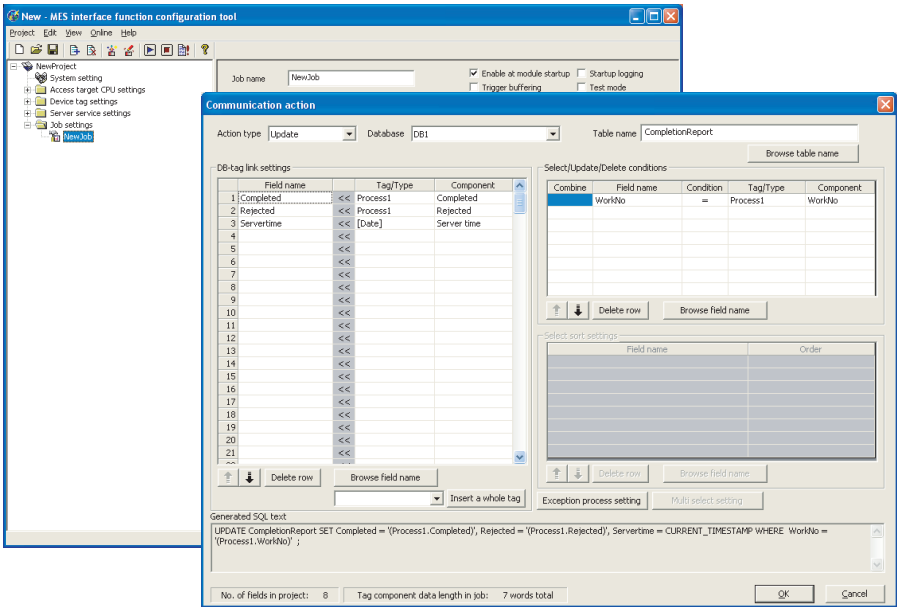


Figure 1.2 [MX MESInterface] - [MES interface function configuration tool]

(2) The information system load can be reduced.

Data can be monitored on the MES interface module side and when the conditions are met, the data can be sent to the information system.

Also, the data can be operated and the results of the operations can be sent to the information system.

This can reduce the information system loads compared to the conventional system of constantly obtaining and monitoring data.

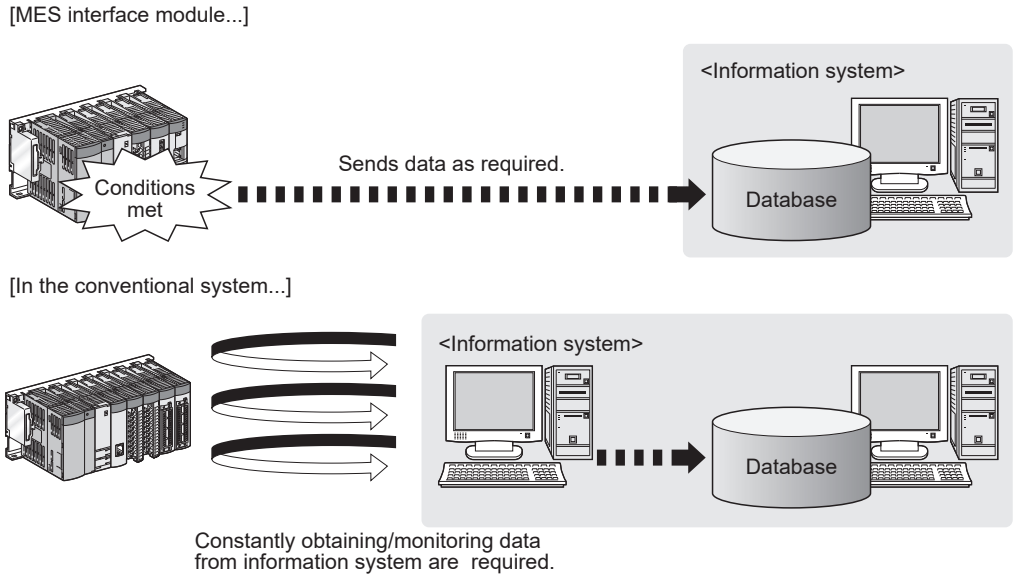
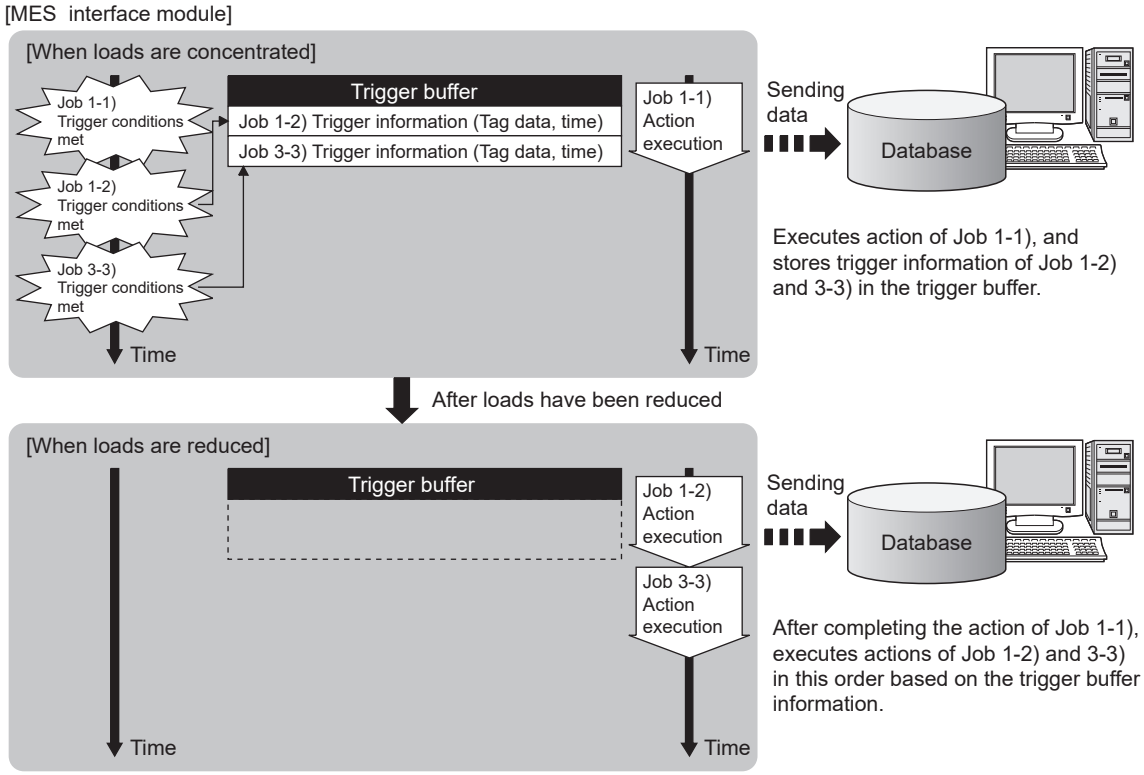


Figure 1.3 Loads reduction of information system

(3) Buffering function for reliable data acquisition/transmission

(a) Even if the frequency of data transmission triggers is high, no trigger will be missed. (Trigger buffering function)
When multiple sets of conditions for data transmission are met in a concentrated manner, their data and trigger times can be buffered in the module's internal memory.
After the loads are reduced, data operations and transmission are executed using the buffered data.



- The numbers 1) to 3) show the order in which trigger conditions of respective jobs are met.
- Job 1 and 3 are assumed to access the same database.

Figure 1.4 Data buffering in the case of load concentration

(b) Data to be send to the database are protected even if a communication error occurs. (DB buffering function)
When an error occurs during performing communication with a database, stored procedure execution requests or the SQL texts failed to send can be stored in a CompactFlash card.
After the recovery, the buffered SQL texts or stored procedure execution requests are automatically sent to the database. (Manual operation is also possible.)

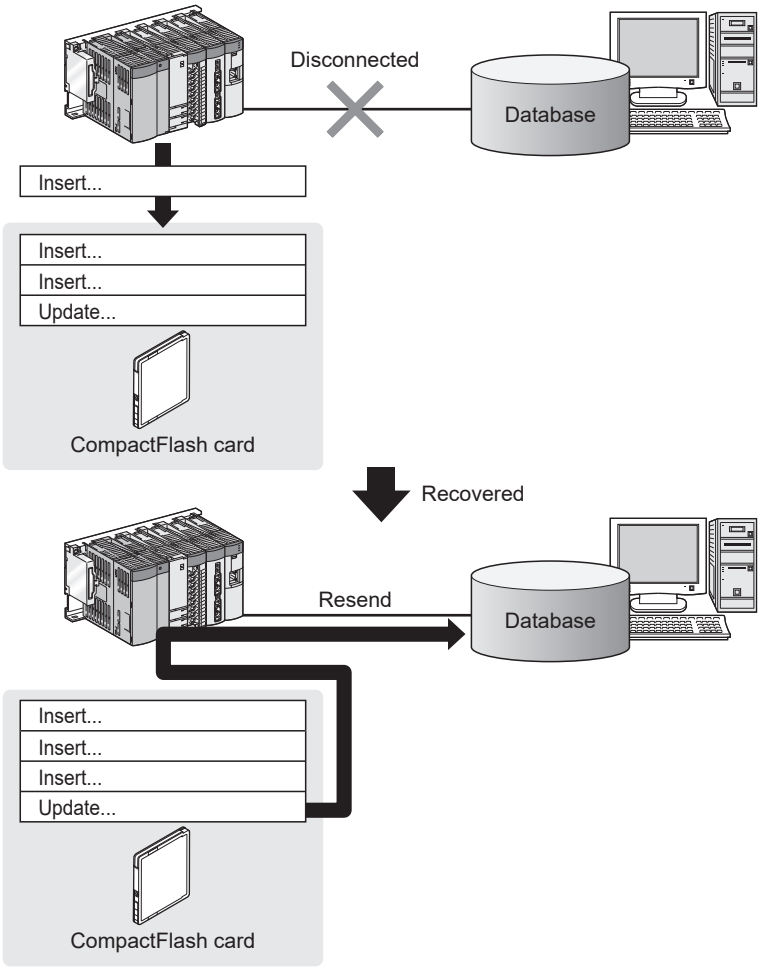


Figure 1.5 Buffering of send data (SQL text) during a communication error

(4) Log data are available in the event of an access error

After connection with a database, when there is a communication error, a log of the error contents can be recorded to the database side.
Analyzing the log can protect data and analyze the error.

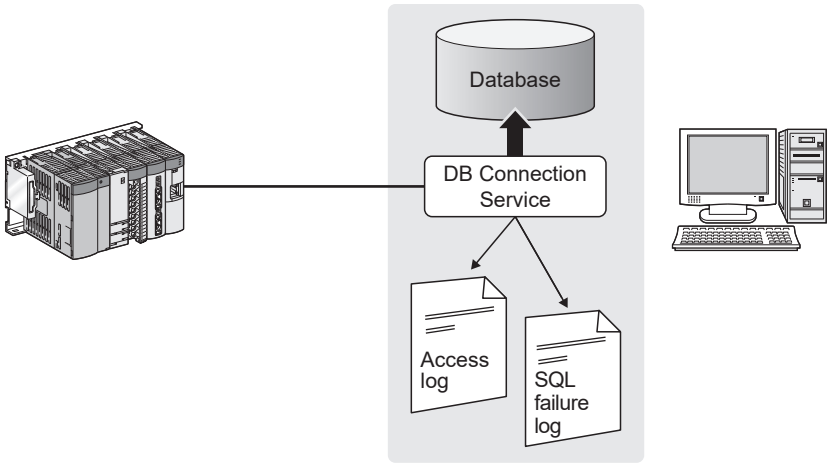


Figure 1.6 Obtaining logs for access errors

(5) Directions from the information system can be realized.

Processing registered in the MES interface module can be started from information system applications.
This enables to realize production directions from the information system.
Not only can data be sent to a database but it can also be received from a database.
This enables to download data such as production information from information system databases.

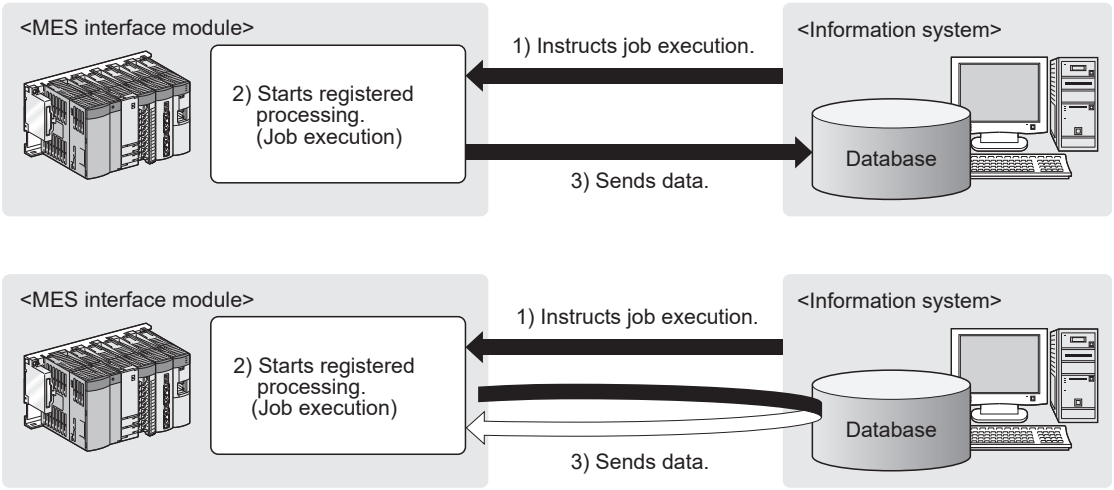


Figure 1.7 Realization of directions from the information system

(6) Supporting diverse databases

When designing a new system, a wide range of database types can be selected.
Even when connecting to the existing system, the system can be transferred without changing the existing database.

(7) Access independent of the database table configuration is possible.

Freely designed database tables can be used for access to databases.
When designing a new system, not only the high flexibility of design, but when connecting to the existing system, the system can be constructed without changing the database tables.

(8) Time synchronization using SNTP is also possible.

The clocks for the MES interface module and the programmable controller CPU can be set through communications with an SNTP server computer.
This enables to synchronize the time for the entire system.

1.2 MX MESInterface Software Configuration

This section explains the MX MESInterface software configuration.

Table 1.1 MX MESInterface software configuration

Item	Description	Reference section
Installer	Installs each execution software (MES Interface Function Configuration Tool, DB Connection Service, and DB Connection Service Setting Tool) in each operating environment.	CHAPTER 5
MES Interface Function Configuration Tool	Operates on a configuration computer and configures various settings required for the MES interface function. In addition to the configuration, the application tool offers features such as the operation status check, working log check, or stop/restart operation.	CHAPTER 7
DB Connection Service*1	Operates on the server computer and links databases with the MES interface module and the MES Interface Function Configuration Tool.	CHAPTER 8
DB Connection Service Setting Tool*1	Operates on the server computer and changes the settings of the DB Connection Service.	CHAPTER 8

*1 When the software version of MX MESInterface is "Ver.1.16S" or earlier, the Version 1 of DB Connection Service and DB Connection Service Setting Tool are installed.
As for the MX MESInterface whose software version is "Ver.1.17T" or later, either Version 1 or Version 2 of DB Connection Service and DB Connection Service Setting Tool are installed.

CHAPTER 2 SYSTEM CONFIGURATION

This chapter explains the system configuration of the MES interface module.

2.1 System Configuration

2.1.1 Overall system configuration

This section shows the overall system configuration when using the MES interface module.

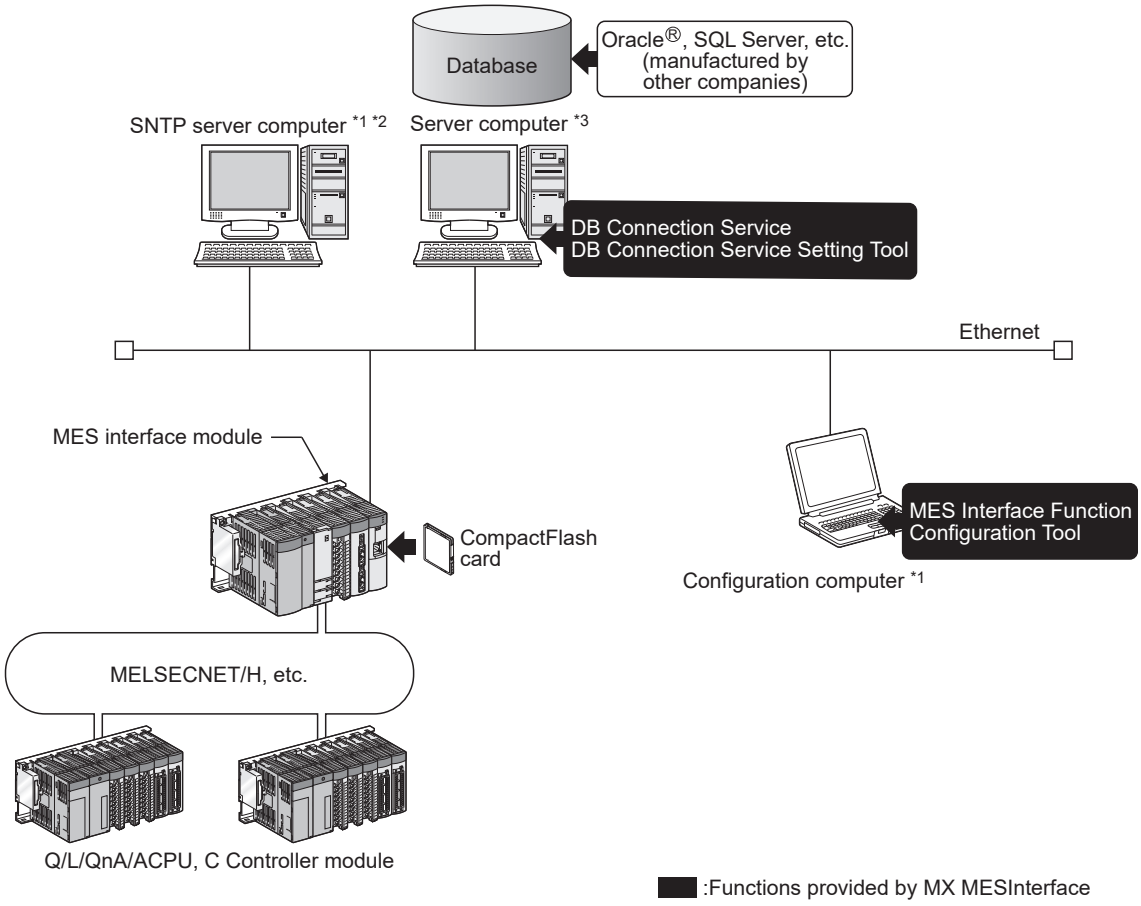


Figure 2.1 Overall system configuration when using the MES interface module

*1 The SNTP server computer and configuration computer can be shared with server computers.

*2 This computer is necessary when using the SNTP server computer time for the MES interface module time.

Section 6.3 Time Synchronization Function

*3 The redundant server system and database cannot be used.

2.1.2 System configuration for installation

This section shows system configurations for installing MX MESInterface.

(1) When installing DB Connection Service and DB Connection Service Setting Tool on a server computer

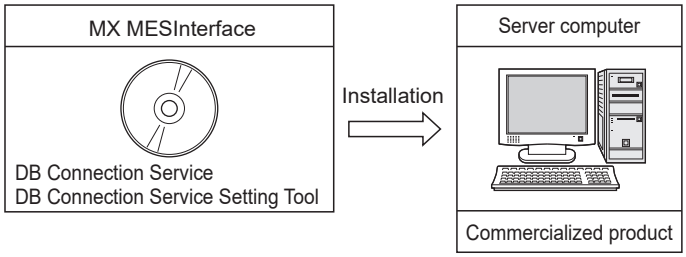


Figure 2.2 Installing DB Connection Service and DB Connection Service Setting Tool

Point

(1) When installing DB Connection Service on a database server computer, the ODBC setting for the database used must be done beforehand.
Section 8.2 Setting ODBC to the Database

(2) When installing DB Connection Service on an application server computer, an account for user program execution must be created beforehand.

(2) When installing MES Interface Function Configuration Tool on a configuration computer

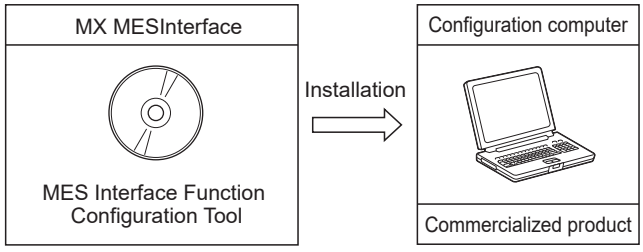


Figure 2.3 Installing MES Interface Function Configuration Tool

2.1.3 System configuration for initial setup

This section shows system configurations for initial setup of the MES interface module using MES Interface Function Configuration Tool.

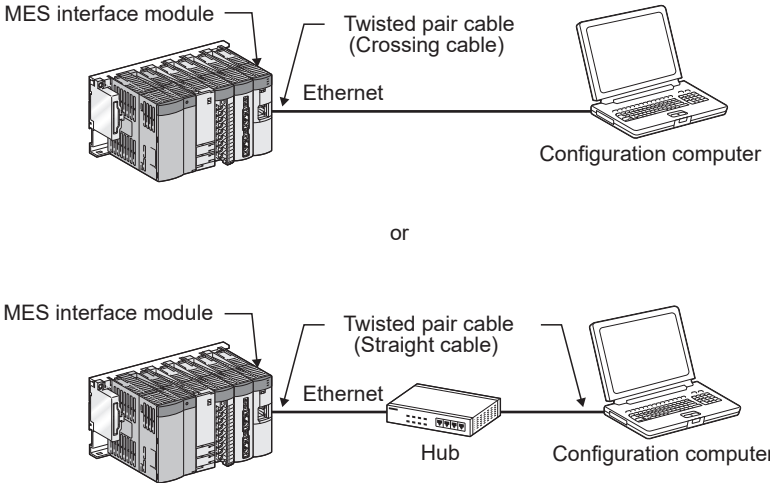


Figure 2.4 System configurations for initial setup of the MES interface module

Remark

The following explains the network settings of the configuration computer when connecting it to the MES interface module on a 1:1 basis.

1. Set the same network address as the one of the MES interface module in the network settings for the configuration computer.

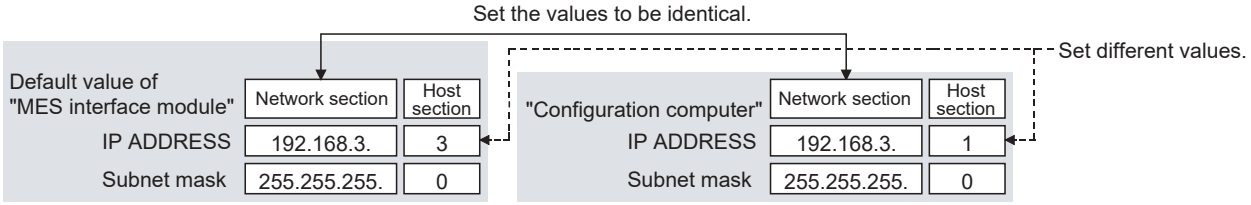


Figure 2.5 Network settings for configuration computer

2. Make the network settings of the configuration computer in the [Internet Protocol (TCP/IP) Properties] dialog box.

   Example: Microsoft® Windows® XP Professional Operating System

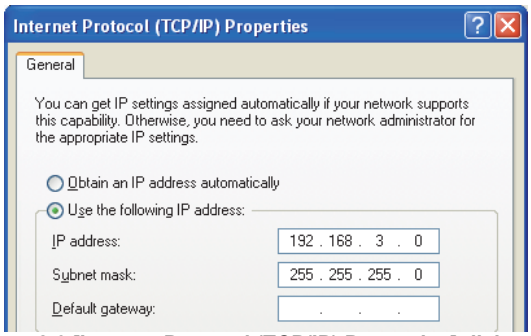


Figure 2.6 [Internet Protocol (TCP/IP) Properties] dialog box

2.1.4 System configuration for operation

This section shows the system configuration when operating the MES interface module.

Point

The MES interface module can only be connected with a LAN.
The module cannot be connected via the Internet.

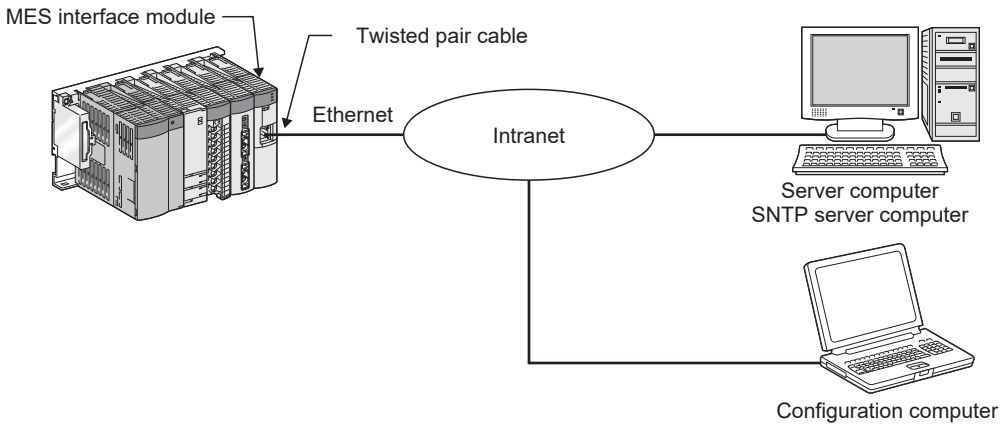


Figure 2.7 System configuration for operating the MES interface module

Point

For the precautions when using the hubs, refer to the following section.

☞Section 2.6.3 Precautions for using hubs

2.2 Applicable Systems

This section describes the applicable systems.

(1) Applicable modules and base units, and No. of modules

(a) When mounted with a CPU module

The table below shows the CPU modules and base units applicable to the MES interface module and quantities for each CPU model.
Depending on the combination with other modules or the number of mounted modules, power supply capacity may be insufficient.
Pay attention to the power supply capacity before mounting modules, and if the power supply capacity is insufficient, change the combination of the modules.

Table 2.1 Applicable modules and base units, and No. of modules

Applicable module			Serial No. (first five digits) of supported module		No. of modules*1	Base unit*2	
CPU type		CPU model	QJ71MES96N	QJ71MES96		Main base unit*1	Extension base unit
Programmable controller CPU	Basic model QCPU	Q00JCPU	All versions	All versions	8	○	○
		Q00CPU			24		
		Q01CPU					
	High Performance model QCPU	Q02CPU	All versions	All versions	64	○	○
		Q02HCPU					
		Q06HCPU					
		Q12HCPU					
		Q25HCPU					
	Process CPU	Q02PHCPU	All versions	10012 or later	64	○	○
		Q06PHCPU					
		Q12PHCPU		All versions			
		Q25PHCPU					
	Redundant CPU*3	Q12PRHCPU	All versions	09012 or later	53	×	○
		Q25PRHCPU					
	Universal model QCPU	Q00UJCPU	All versions	10012 or later	8	○	○
		Q00UCPU			24		
		Q01UCPU					
		Q02UCPU		09042 or later	36		
		Q03UDCPU		09042 or later	64		
		Q04UDHCPU					
		Q06UDHCPU					
		Q10UDHCPU		10012 or later			
		Q13UDHCPU					
		Q20UDHCPU					
		Q26UDHCPU					
		Q03UDECPU					
		Q04UDEHCPU					
		Q06UDEHCPU					
		Q10UDEHCPU					
		Q13UDEHCPU					
		Q20UDEHCPU					
		Q26UDEHCPU					

○:Applicable , ×:N/A

(To the next page)

(From the previous page)

Table 2.1 Applicable modules and base units, and No. of modules (continue)

Applicable module			Serial No. (first five digits) of supported module		No. of modules*1	Base unit*2	
CPU type		CPU model	QJ71MES96N	QJ71MES96		Main base unit*1	Extension base unit
Programmable controller CPU	Universal model QCPU	Q50UDEHCPU	All versions	11052 or later	64	○	○
		Q100UDEHCPU					
		Q03UDVCPU		14122 or later			
		Q04UDVCPU					
		Q06UDVCPU					
		Q13UDVCPU					
		Q26UDVCPU					
	RCPU	R04CPU	All versions	16072 or later	59	×	○*4
		R08CPU					
		R16CPU					
		R32CPU					
		R120CPU					
	Safety CPU	QS001CPU	-	-	N/A	×	×
C Controller module		Q06CCPU-V	-	-	N/A	×	×
		Q06CCPU-V-B					
		Q12DCCPU-V*5	All versions	12092 or later	64	○	○
		Q24DHCCPU-V		14122 or later	62	○	○
		Q24DHCCPU-LS					

○:Applicable , ×:N/A

*1 Limited within the range of I/O points for the CPU module.
*2 Can be installed to any I/O slot of a base unit.
*3 Can access host station only. Cannot access other stations.
*4 RCPU can be mounted on the RQ extension base unit or Q series extension base unit which is routed from RQ extension base unit.
*5 Use the Q12DCCPU-V whose serial No. (first five digits) is 12042 or later.

Point

Use a MES interface module appropriate to each CPU module.
If an unsupported one is used for a CPU module, it does not function normally.

(b) When mounting to remote I/O station of MELSECNET/H

The MES interface module cannot be mounted to remote I/O station of the MELSECNET/H.
Mount the MES interface module to a CPU module of the master station.

(2) Application to multiple CPU system

When using the MES interface module in multiple CPU system, refer to the following manual.

☞QCPU User's Manual (Multiple CPU System)

The MES interface module is compatible with the multiple CPU system with function version B from the first product.

2.3 Connection System Equipment

This section explains the equipment can be connected to the MES interface module.

(1) CompactFlash card (sold separately)

The MES interface module requires one CompactFlash® card.

Use a CompactFlash card manufactured by Mitsubishi listed in the following table. Failure to do so may cause a problem such as data corruption in the CompactFlash card and system stop.

Table 2.2 CompactFlash card (sold separately)

Model	Description
GT05-MEM-128MC	CompactFlash card 128 MB
GT05-MEM-256MC	CompactFlash card 256 MB
QD81MEM-512MBC	CompactFlash card 512MB
QD81MEM-1GBC	CompactFlash card 1GB

Point

(1) For CompactFlash card format, use the formatting function of MES Interface Function Configuration Tool.

☞Section 7.13.8 Formatting the CompactFlash card

(2) A CompactFlash card has a service life (restriction on the number of writes). For details, refer to the specifications of each product.

(2) Twisted pair cable (sold separately)

Use twisted pair cable that meets IEEE 802.3 10BASE-T/100BASE-TX standards.

(a) For 100 Mbps

Either 1) or 2) of the following can be used.

1) Unshielded twisted pair (UTP) cable
   Straight cable: Category 5 or higher
   Crossing cable: Category 5 or 5e
2) Shielded twisted pair (STP) cable
   Straight cable: Category 5 or higher
   Crossing cable: Category 5 or 5e

(b) For 10 Mbps

Either 1) or 2) of the following can be used.

1) Unshielded twisted pair (UTP) cable
   Straight cable: Category 3 or higher
   Crossing cable: Category 3 to 5e
2) Shielded twisted pair (STP) cable
   Straight cable: Category 3 or higher
   Crossing cable: Category 3 or 5e

Point

During high speed communication (100 Mbps) via 100BASE-TX connection, communication errors may occur due to the effect of high frequency noise generated from the equipment other than programmable controller, depending on the installation environment.
Take the following countermeasures on the MES interface module side to eliminate the effect of high frequency noise when constructing the network system.

(1) Wiring
- Do not install the twisted pair cables together with the main circuit or power lines, or bring them close to each other.
- Make sure to place the twisted pair cable in a duct.

(2) Cable
- In the environment where the cable is susceptible to noise, use the shielded twisted pair cable (STP cable).

(3) 10 Mbps communication
- Connect the 10 Mbps-compatible equipment with the MES interface module and transmit the data to the equipment at a transmission speed of 10 Mbps.

2.4 Operating Environment

2.4.1 Configuration computer

This section explains the operating environment for the configuration computer.

Table 2.3 Operating environment for configuration computer

Item		Description
Computer		Microsoft® Windows® supported personal computer.
	CPU	See Table 2.4 "Performance required for personal computer and operating systems".
	Required memory	
Hard disk available capacity		64 MB or more
Disc drive		CD disc drive
Display		Resolution 1024 × 768 pixels or higher
Operating system (English version)		Windows® 10 (Home, Pro, Enterprise, Education) Windows® 8.1, Windows® 8.1 (Pro, Enterprise) Windows® 8, Windows® 8 (Pro, Enterprise) Windows® 7 (Starter, Home Premium, Professional, Ultimate, Enterprise) Windows Vista® (Home Basic, Home Premium, Business, Ultimate, Enterprise) Windows Server® 2003 Windows® 2000 Server Operating System Service Pack 2 or later Windows® XP (Professional, Home) Windows® 2000 Professional Operating System Service Pack 2 or later
Interface		Ethernet (IPv4)

(1) Instructions for operating system

(a) Performance required for personal computer and operating systems

Table 2.4 Performance required for personal computer and operating systems

Operating system	Performance required for personal computer	
	CPU	Required memory
Windows® 10	Intel® Core™2 Duo 2GHz or more	32-bit version: 1GB or more 64-bit version: 2GB or more
Windows® 8.1		
Windows® 8		
Windows® 7	Pentium® 1GHz or more	
Windows Vista®		1GB or more
Windows Server® 2003	Pentium® 550MHz or more	256 MB or more
Windows® 2000 Server		
Windows® XP	Pentium® 300MHz or more	128 MB or more
Windows® 2000 Professional		

(b) Supported version

Table 2.5 Supported version of MX MESInterface

Operating system	Supported version of MX MESInterface
Windows® 2000 Professional	All versions
Windows® XP(32-bit version)	
Windows® 2000 Server	
Windows Server® 2003(32-bit version)	
Windows Vista®(32-bit version)	Version 1.04E or later
Windows® 7(32-bit version)	Version 1.06G or later
Windows® 7(64-bit version)	Version 1.08J or later
Windows® 8(32-bit version, 64-bit version)	Version 1.10L or later
Windows® 8.1(32-bit version, 64-bit version)	Version 1.12N or later
Windows® 10(32-bit version, 64-bit version)	Version 1.16S or later

(c) User authority

Log on as a user having administrator authority.

- Installation, uninstallation are available only by the administrator's authority.
- Use the product as a user having a privilege higher than 'Standard user' or 'Administrator'.

(d) The functions cannot be used

This product may not perform properly, when these functions are used.

- Activating the application with Windows® compatible mode
- Simplified user switch-over
- Remote desktop
- Power save mode (Standby, Hibernate, Sleep)
- Windows XP Mode
- Touch function
- Modern UI
- Client Hyper-V
- Tablet mode
- Virtual Desktops

(e) The setting cannot be used

In the following case, the screen of this product may not work properly.

- The size of the text and/or other items on the screen are changed to values other than default values (such as 96DPI, 100%, and 9 pt).
- The resolution of the screen is changed in operation.
- The multi-display is set.

(f) Others

- If the Windows firewall setting is enabled, functions may not operate correctly.

☞Section 5.1 Installation

2.4.2 Server computer

This section explains the operating environment for the server computer.

Table 2.6 Operating environment for server computer

Item		Description
Computer		Microsoft® Windows® supported personal computer.
	CPU	See Table 2.7 "Performance required for personal computer and operating systems".
	Required memory	
Hard disk available capacity		64 MB or more
Disc drive		CD disc drive
Display		Resolution 1024 × 768 pixels or higher
Operating system (English version)	When using DB Connection Service and DB Connection Service Setting Tool Version 2	Only 64-bit version operating system is supported by Version 2. Windows Server® 2019 (Standard) Windows Server® 2016 (Standard) Windows® 10 (Pro, Enterprise) Windows® 8.1 (Pro, Enterprise) Windows Server® 2012 R2 (Standard) Windows® 8 (Pro, Enterprise) Windows Server® 2012 (Standard) Windows® 7 (Professional, Ultimate, Enterprise) Windows Server® 2008 R2 (Standard)
	When using DB Connection Service and DB Connection Service Setting Tool Version 1	Windows® 10 (Pro, Enterprise) Windows® 8.1 (Pro, Enterprise) Windows Server® 2012 R2 Windows® 8 (Pro, Enterprise) Windows Server® 2012 Windows® 7 (Professional, Ultimate, Enterprise) Windows Server® 2008 R2 Windows Server® 2008 Windows Vista® (Business, Ultimate, Enterprise) Windows Server® 2003 x64 Edition Windows Server® 2003 Windows® 2000 Server Service Pack 2 or later Windows XP® Professional (32bit) Windows® 2000 Professional Service Pack 2 or later
Interface		Ethernet(IPv4)

Item		Description
Required software	When using DB Connection Service and DB Connection Service Setting Tool Version 2	When using the DB interface function: relational database (English version) • Oracle® 19c (Express, Standard, Enterprise) (64bit) • Oracle® 18c (Express, Standard, Enterprise) (64bit) • Oracle® 12c (Express, Standard, Enterprise) (64bit) • Oracle® 11g (Standard, Enterprise) (64bit) • Microsoft® SQL Server® 2019 (Express, Standard, Enterprise) (64bit) • Microsoft® SQL Server® 2017 (Express, Standard, Enterprise) (64bit) • Microsoft® SQL Server® 2016 (Express, Standard, Enterprise) (64bit) • Microsoft® SQL Server® 2014 (Express, Standard, Enterprise) (64bit) • Microsoft® SQL Server® 2012 (Express, Standard, Enterprise) (64bit) • Microsoft® SQL Server® 2008 R2 (Express, Standard, Enterprise) (64bit)*1 • Microsoft® Access® 2019 (32bit, 64bit)*2 • Microsoft® Access® 2016 (32bit)*3 • Microsoft® Access® 2013 (32bit)*3 • Microsoft® Access® 2010 (32bit)*3
Required software	When using DB Connection Service and DB Connection Service Setting Tool Version 1	When using the DB interface function: relational database (English version) • Oracle® 18c (64bit) • Oracle® 12c (64bit) • Oracle® 11g (32bit, 64bit) • Oracle® 10g (32bit) • Oracle® 9i (32bit) • Oracle® 8i (32bit) • Microsoft® SQL Server® 2014 (32bit, 64bit) • Microsoft® SQL Server® 2012 (32bit, 64bit) • Microsoft® SQL Server® 2008 R2 (32bit, 64bit)*1 • Microsoft® SQL Server® 2008 (32bit, 64bit)*1 • Microsoft® SQL Server® 2005 (32bit) • Microsoft® SQL Server® 2000 (32bit) • Microsoft® SQL Server® 2000 Desktop Engine (MSDE 2000) • Microsoft® Access® 2013 (32bit) • Microsoft® Access® 2010 (32bit) • Microsoft® Access® 2007 • Microsoft® Access® 2003 • Microsoft® Access® 2000 • Wonderware® Historian 9.0 (Industrial SQL Server®)
		When using the time synchronization function: SNTP server (Equipped as a standard to Windows® 2000 Server, Windows Server® 2003, Windows Server® 2008, Windows Server® 2012, Windows Server® 2016, and Windows Server® 2019)

*1 Itanium processor (IA-64) is not supported.

*2 Access® for Microsoft® 365 with version up to the same as Microsoft® Access® 2019 can also be used.

When using Access® for Microsoft® 365, select Microsoft® Access® 2019 in MES Interface Function Configuration Tool.

*3 Only 32-bit version of DB Connection Service and DB Connection Service Setting Tool Version 2 is supported.

(1) Instructions for operating system

(a) Performance required for personal computer and operating systems

Table 2.7 Performance required for personal computer and operating systems

Operating system	Performance required for personal computer	
	CPU	Required memory
Windows Server® 2019*1	Intel® Core™2 Duo 2GHz or more	2GB or more
Windows Server® 2016*1		
Windows® 10 (Pro, Enterprise)*2		32-bit version: 1GB or more 64-bit version: 2GB or more
Windows® 8.1 (Pro, Enterprise)*2		
Windows Server® 2012 R2*2		2GB or more
Windows® 8 (Pro, Enterprise)*2		32-bit version: 1GB or more 64-bit version: 2GB or more
Windows Server® 2012*2		2GB or more
Windows® 7 (Professional, Ultimate, Enterprise)*2	When using DB Connection Service and DB Connection Service Setting Tool Version 2: Intel® Core™2 Duo 2GHz or more When using DB Connection Service and DB Connection Service Setting Tool Version 1: Pentium® 1GHz or more	32-bit version: 1GB or more 64-bit version: 2GB or more
Windows Server® 2008 R2*2	Pentium® 2GHz or more	2GB or more
Windows Server® 2008*3		
Windows Vista® (Business, Ultimate, Enterprise)*3	Pentium® 1GHz or more	1GB or more
Windows Server® 2003*3	Pentium® 550MHz or more	256 MB or more
Windows® 2000 Server*3		
Windows® XP Professional*3	Pentium® 300MHz or more	128 MB or more
Windows® 2000 Professional*3		

*1 Only DB Connection Service and DB Connection Service Setting Tool Version 2 can be used. The supported operating system is 64-bit version only.

*2 Only 64-bit version operating system is supported when using DB Connection Service and DB Connection Service Setting Tool Version 2.

*3 Only DB Connection Service and DB Connection Service Setting Tool Version 1 can be used.

(b) Supported version

Table 2.8 Supported version of MX MESInterface

Operating system	Supported version of MX MESInterface
Windows® 2000 Professional	All versions
Windows® XP(32-bit version)	
Windows® 2000 Server	
Windows Server® 2003(32-bit version)	
Windows Server® 2003(64-bit version*1)	Version 1.05F or later
Windows Server® 2008(32-bit version, 64-bit version*1)	
Windows Vista®(32-bit version)	Version 1.04E or later
Windows Vista®(64-bit version)	Version 1.05F or later
Windows® 7(32-bit version, 64-bit version)	Version 1.06G or later
Windows® 8(32-bit version, 64-bit version)	Version 1.10L or later
Windows Server® 2012	
Windows® 8.1(32-bit version, 64-bit version)	Version 1.12N or later
Windows® 10(32-bit version, 64-bit version)	Version 1.16S or later
Windows Server® 2016	Version 1.17T or later
Windows Server® 2019	Version 1.21X or later

*1 Itanium processor(IA-64) is not supported.

(c) User authority

- Installation, uninstallation are available only by the administrator's authority.
- MX MESInterface is available only by the administrator's authority.

(d) The functions cannot be used

This product may not perform properly, when these functions are used.

- Activating the application with Windows® compatible mode
- Simplified user switch-over
- Remote desktop
- Power save mode (Standby, Hibernate, Sleep)
- Windows XP Mode
- Touch function
- Modern UI
- Client Hyper-V
- Server Core Installation
- Tablet mode
- Virtual Desktops

(e) The setting cannot be used

In the following case, the screen of this product may not work properly.

- The size of the text and/or other items on the screen are changed to values other than default values (such as 96DPI, 100%, and 9 pt).
- The resolution of the screen is changed in operation.
- The multi-display is set.

(f) Others

- If the Windows firewall setting is enabled, functions may not operate correctly.

☞Section 5.1 Installation

(2) Considerations for the database

The restrictions when using database are as follows:

- To use a relational database, a license based on the number of MES interfaces is usually required. (Varies depending on the relational database type and license type.)
  For details, please consult the relational database vendor.
- The redundant relational data base cannot be used.
- For the operating environment, refer to the specifications of the relational database used. Use 32-bit operating system for 32-bit relational database.
- For the precautions for using each database, refer to the following section.
  ☞Section 2.6.4 Precautions for using database

(a) Supported version

Table 2.9 Supported version of Databases

Database	Serial No. (first five digits) of MES interface module	Supported version of MX MESInterface
Oracle® 8i	All versions	All versions
Oracle® 9i		
Oracle® 10g		
Oracle® 11g	12012 or later	Version 1.05F or later
Oracle® 12c	16072 or later	Version 1.12N or later
Oracle® 18c	17122 or later	Version 1.21X or later
Oracle® 19c	17122 or later	Version 1.23Z or later
Microsoft® SQL Server® 2000	All versions	All versions
Microsoft® SQL Server® 2005	09012 or later	Version 1.01B or later
Microsoft® SQL Server® 2008	12012 or later	Version 1.05F or later
Microsoft® SQL Server® 2008 R2	12092 or later	Version 1.06G or later
Microsoft® SQL Server® 2012	14122 or later	Version 1.09K or later
Microsoft® SQL Server® 2014	17122 or later	Version 1.14Q or later
Microsoft® SQL Server® 2016	17122 or later	Version 1.17T or later
Microsoft® SQL Server® 2017	17122 or later	Version 1.19V or later
Microsoft® SQL Server® 2019	17122 or later	Version 1.23Z or later
Microsoft® SQL Server® 2000 Desktop Engine (MSDE 2000)	All versions	All versions
Microsoft® Access® 2000		
Microsoft® Access® 2003		
Microsoft® Access® 2007	10012 or later	Version 1.04E or later
Microsoft® Access® 2010	13092 or later	Version 1.08J or later
Microsoft® Access® 2013	15102 or later	Version 1.10L or later
Microsoft® Access® 2016	17122 or later	Version 1.17T or later
Microsoft® Access® 2019	17122 or later	Version 1.23Z or later
Wonderware® Historian 9.0®(Industrial SQL Server®)	09012 or later	Version 1.01B or later

(3) Considerations for the database

The combinations of databases, operating systems, and DB Connection Service and DB Connection Service Setting Tool supported by Q series MES interface modules are as follows.

Table 2.10 Supported versions of databases/operating systems for each version of DB Connection Service and DB Connection Service Setting Tool

Database		Version1		Version2 (32bit)*1		Version2 (64bit)*1
		OS (32bit)	OS (64bit)	OS (32bit)	OS (64bit)	OS (64bit)
Data bases (32bit)	Oracle	○	×	×	×	×
	SQL Server	○			×	
	Access	○			○	
Data bases (64bit)	Oracle	-	○	-	○	○
	SQL Server		○		○	○
	Access		×		×	×

○: Supported, ×: Unsupported, -: No combination

*1 When using DB Connection Service and DB Connection Service Setting Tool Version 2, use a MES interface module with a serial number whose first 5 digits are "17122" or later.

2.4.3 Computer for developing XML processing applications

This section explains the operating environment of the computer for developing XML processing applications.

Table 2.11 Operating environment of computer for developing XML processing applications

Item	Description
Program development environment	Microsoft® Visual Studio® .NET 2003 Sun Microsystems J2SE v1.4.2

2.5 Checking Function Version and Serial Number

The serial No. and function version of the MES interface module can be confirmed on the rating plate and GX Developer's system monitor.

(1) Confirming the serial number on the rating plate

The rating plate is situated on the side face of the MES interface module.

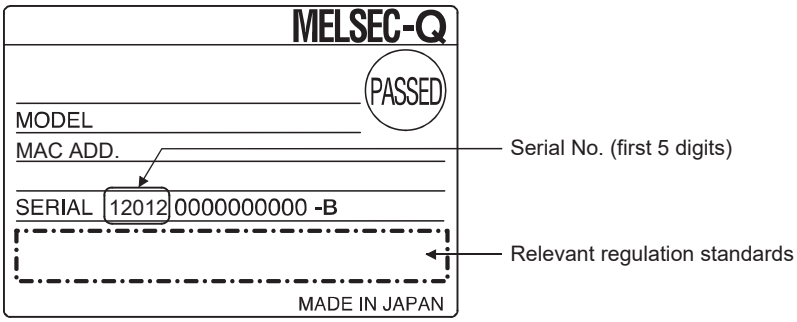


Figure 2.8 "SERIAL" on the rating plate on the side of the MES interface module

(2) Checking on the front of the module

The serial No. and function version on the serial number display are also indicated on the front of the module (lower part).

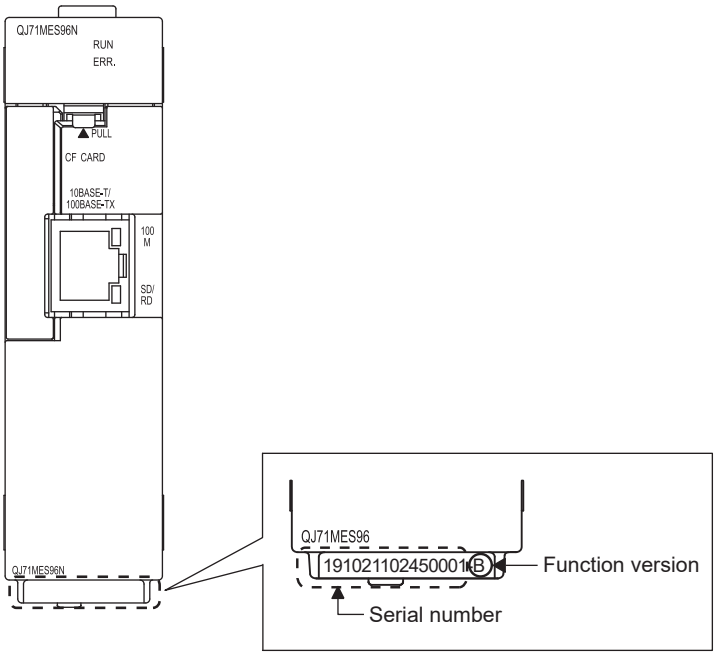


Figure 2.9 "SERIAL" on the serial number display on the front of the MES interface module

(3) Confirming the serial number on the system monitor (Product Information List)

To display the screen for checking the serial number and function version, select [Diagnostics] → [System monitor] → Product inf. list in GX Developer.

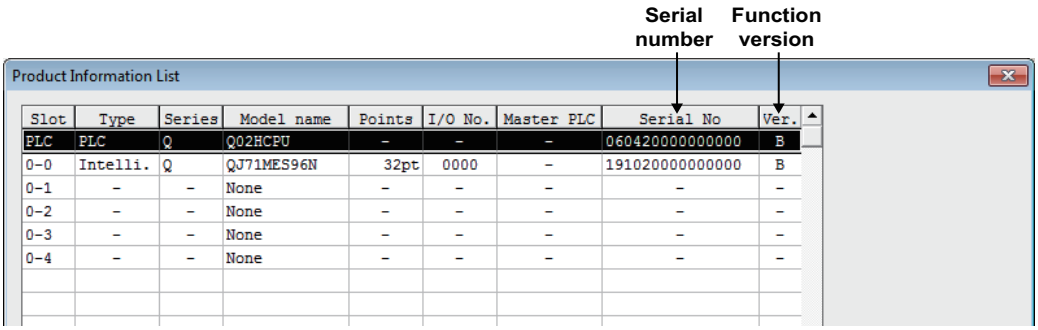


Figure 2.10 [Product Information List] of GX Developer

1 Production number display

Since the MES interface module does not support the production number display, "-" is displayed.

Point

The serial No. on the rated plate and on the front of the module may not match the serial No. displayed in the product information list of GX Developer.

- The serial No. on the rated plate and on the front of the module indicates the management information of the product.
- The serial No. displayed in the product information list of GX Developer indicates the functional information of the product.
  The functional information of the product is updated when some functions are added.

2.6 Precautions for System Configuration

This section describes precautions for system configuration.

2.6.1 Precautions for using Redundant CPU

The following describes the precautions for using the Redundant CPU.

(1) Mountable base unit

When using the MES interface module in a redundant system, be sure to mount the MES interface module to the extension base unit for CPU or redundant power supply. The MES interface module cannot be mounted to the main base unit in a redundant system.

(2) [Access target CPU setting]

- When the MES interface module is mounted to the Redundant CPU, it can access the CPU of host station only.
  It cannot access the CPU of other station.
- When the MES interface module is mounted to other than the Redundant CPU, it cannot access the Redundant CPU of other station.

(3) [Device Tag setting]

- When a system switching occurs to the Redundant CPU, collection of device tag may stop for about 15 seconds.
- When selecting [High-speed sampling] from Sampling settings of Device Tag setting, be sure to create system area for the user setting to the Redundant CPU of both systems in the same capacity.

☞Section 7.8.1 REMARKS (1) Creating a user-specified system area

(4) [Job setting]

When accessing the Redundant CPU, it is recommended to select [Handshake operation] for the trigger condition of a job.
When other than [Handshake operation] is selected for the trigger condition, the following phenomenon may occur at system switching of a redundant system.

- Data separation
- The write data is not reflected to the programmable controller CPU.

☞Section 7.10.2 (8) Handshake operation

2.6.2 Precautions for using multiple CPU system

The following describes the precautions for using the multiple CPU system.

(1) Access to each CPU module at start-up of multiple CPU system

In the system in which a MES interface module is mounted in the multiple CPU system, an error may occur when accessing other CPU from the MES interface module or accessing the other station via a network module controlled by other CPU from the MES interface module due to the difference of start-up time of each CPU module. In this case, clear the error in the MES interface module after starting up other CPU.

☞Page 10-3, Section 10.1.2 (2)

The start-up of other CPUs can be checked with the special relays, SM220 to SM223.

☞User's manual for the CPU module used

2.6.3 Precautions for using hubs

The following describes the precautions for using the hub.

(1) IEEE802.3x flow control in full-duplex communication

The MES interface module does not support the IEEE802.3x flow control. Therefore, when the load of an Ethernet line is high in the connection with the hub supporting IEEE802.3x, the data to be sent to the module may be lost.

If the above mentioned phenomenon occurs, add the hubs and reduce the load on the Ethernet line applied on single hub.

2.6.4 Precautions for using database

The following shows the precautions for using database.

Point

For characters that can be used for field and table names, refer to the following:
☞Appendix 2.4 Characters available for field names, table names, stored procedure names,etc.

(1) Microsoft® SQL Server®

(a) Set "SQL Server and Windows" or "SQL Server and Windows Authentication mode" for the security authentication mode.

- Microsoft® SQL Server® 2000
  Configure the setting in [SQL Server Properties (Configure)].

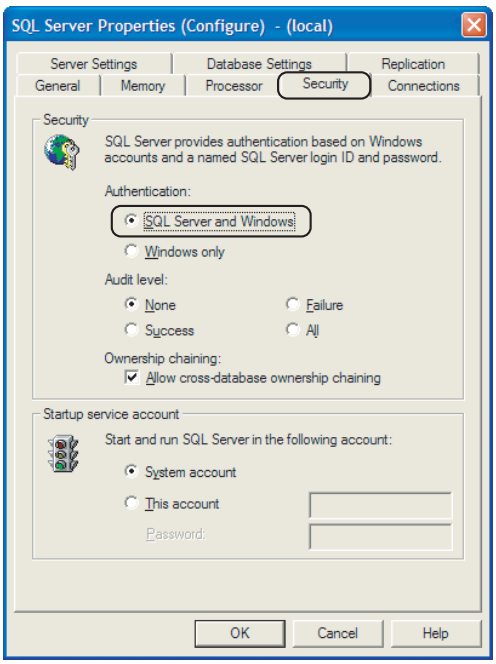


Figure 2.11 [SQL Server Properties (Configure)]

- Microsoft® SQL Server® 2000 Desktop Engine (MSDE 2000)
  Set the security authentication mode into the Mixed Mode.
  Specify the command parameter at installation of the MSDE 2000.
  setup sapwd="sa" SECURITYMODE=SQL
  (sa: Specify any password)

(b) For Microsoft® SQL Server® 2008/2012/2014/2016/2017/2019 return values, output arguments, and input/output arguments of a stored procedure which returns a result set cannot be acquired.

(c) When MX MESInterface whose software version is "1.16S" or earlier is installed, use SQL Server with any of the following condition:
- The owner of the database file created with SQL Server is an SQL Server authenticated user.
- The server administrator authentication (sysadmin) is not added to the server role of the user whose field information is to be referenced.

However, this restriction is not applicable when MX MESInterface whose software version is "1.17T" or later is installed.

(2) Microsoft® Access®

(a) Using in the following environments is not recommended.
- Where under overload
- Where high reliability, such as non-stop operation for 24 hours, is required

For details, refer to the website of Microsoft.
blogs.technet.microsoft.com/officesupportjp/2017/02/08/ace_memory

(b) The number of fields to be updated (UPDATE) by the one [Communication action] is up to 127.

(c) Do not make multiple accesses to one and the same file.
(Do not make access from multiple MES interface modules.)

(d) There are some restrictions for the data type which can be assigned to tag component, constant value, and variable with MES Interface Function Configuration Tool.
☞Section 7.11.1 (1) About tag components
Section 7.11.1 (2) About constants
Section 7.11.1 (3) About variables

(3) Wonderware® Historian

(a) The insertion (INSERT) only can be used with [Communication action].

(b) The rollback of insertion (INSERT) to the database is disabled.

2.6.5 Considerations for performance/specifications

(1) Startup time

The time from when a CPU module is started to when the processing of MES interface function is ready for execution in an MES interface module varies depending on the system configuration and settings.

The startup time can be lengthened depending on any of the following factors:

- Operating environment (network and the CompactFlash card)
- Settings of the MES interface module
- Number of DB bufferings
- Model name of the MES interface module (QJ71MES96N, QJ71MES96)

When using 'Value monitoring startup' or 'Handshake operation' for a trigger condition, check that 'Information linkage status (X5)' is in execution (ON), and create a program so that the trigger condition is satisfied.

☞Section 7.10.2 (6) Value monitoring startup
Section 7.10.2 (8) Handshake operation

(2) Processing time

For the reference value of the processing time, refer to the following.

☞Appendix 4 Processing Time

2.7 Supported Software Packages

(1) The following table shows the software packages supported by an MES interface module.

Table 2.12 Software packages supported by an MES interface module

Software package	QJ71MES96N	QJ71MES96
MX MESInterface	All versions	All versions
GX Developer	Version 8.500W or later	Version 8.37P or later
GX Works2	Version 1.570U or later	All versions
GX Works3	Version 1.040S or later	All versions

CHAPTER 3 SPECIFICATIONS

This chapter explains the performance specifications, functions, buffer memory, etc. of the MES interface module and the MX MESInterface.
For general specifications of the MES interface module, refer to the following manual.
☞QCPU User's Manual (Hardware Design, Maintenance and Inspection)

3.1 Performance Specifications

This section explains the MES interface module and the MX MESInterface performance specifications.

(1) Transmission and interface specifications

Table 3.1 Transmission and interface specifications

Item		Specifications	
Ethernet	Interface*1	10BASE-T	100BASE-TX
	Communication method	Full-duplex/half-duplex	
	Flow control	• Full-duplex: None (Does not support to the IEEE802.3x) • Half-duplex: Back pressure congestion control	
	Data transmission rate	10 Mbps	100 Mbps
	Transmission method	Base band	
	No. of cascaded stages	Maximum 4 stages*2	Maximum 2 stages*2
	Maximum segment length	100m (length between a hub and a node)*3	
	Supported function	The auto-negotiation function is available. (automatically distinguishes 10BASE-T from 100BASE-TX)	
CompactFlash card	Supply power voltage	3.3V ± 5 %	
	Supply power capacity	Maximum 150 mA	
	Card size	TYPE I card	
	No. of installable cards	1	
Number of occupied I/O points		32 points/slot (I/O assignment: Intelli. 32 points)	
Clock		The clock data is obtained from a programmable controller CPU (in multiple CPU system, CPU No.1) or the SNTP server computer. ☞Section 6.3 Time Synchronization Function	
5VDC internal current consumption		• QJ71MES96N: 0.58A • QJ71MES96: 0.69A	
External dimensions		98 (H) × 27.4 (W) × 90 (D) [mm]	
Weight		• QJ71MES96N: 0.15 kg • QJ71MES96: 0.16 kg	

*1 The MES interface module distinguishes 10BASE-T from 100BASE-TX depending on the device on other end.
For connection with a hub not having the auto-negotiation function, set the hub side to half-duplex auto communication mode.

*2 This number applies when a repeater hub is used.
When using a switching hub, check the number of cascaded stages with the manufacturer of the hub to be used.

*3 For the maximum segment length (a length between hubs), consult with the manufacturer of the switching hub used.

(2) Software specifications

Table 3.2 MX MESInterface performance specifications

Item				Specifications	Reference section
DB interface	No. of connected databases			Maximum 32 items/project	Section 7.9.1
	No. of databases that can be connected			• Oracle® 8i (32bit) • Oracle® 9i (32bit) • Oracle® 10g (32bit) • Oracle® 11g (32bit, 64bit) • Oracle® 12c (64bit) • Oracle® 18c (64bit) • Oracle® 19c (64bit) • Microsoft® SQL Server® 2000 (32bit) • Microsoft® SQL Server® 2005 (32bit) • Microsoft® SQL Server® 2008 (32bit, 64bit) • Microsoft® SQL Server® 2008 R2 (32bit, 64bit) • Microsoft® SQL Server® 2012 (32bit, 64bit) • Microsoft® SQL Server® 2014 (32bit, 64bit) • Microsoft® SQL Server® 2016 (64bit) • Microsoft® SQL Server® 2017 (64bit) • Microsoft® SQL Server® 2019 (64bit) • Microsoft® SQL Server® 2000 Desktop Engine (MSDE 2000) • Microsoft® Access® 2000 • Microsoft® Access® 2003 • Microsoft® Access® 2007 • Microsoft® Access® 2010 (32bit) • Microsoft® Access® 2013 (32bit) • Microsoft® Access® 2016 (32bit) • Microsoft® Access® 2019 (32bit, 64bit) • Wonderware® Historian 9.0 (Industrial SQL Server®)	
	Job	Allowable number of settings		Maximum 64 items/project	Section 7.10.1
		Trigger buffering		Maximum 128 times	Section 7.10.2
		Trigger conditions	No. of conditions can be combined	Maximum 2 conditions (Combination can be selected either AND or OR)/job	
			Condition type	Period: 1 to 32767 seconds Time: Year, month, day, day of the week, hour, minute Value monitoring[*1]: Compares tag component value and tag component value. Compares tag component value and constant value. Module startup Handshake[*1]	

(To the next page)

(From the previous page)

Table 3.2 MX MESInterface performance specifications

Item				Specifications	Reference section
DB interface	Job	Action	Allowable number of settings	Maximum 10 actions/job	Section 7.11
			Type	Select, update, insert, multiselect, delete, stored procedure, operation	
			No. of communication action fields	Maximum 8192 fields/project • [DB-tag link settings](Select/Update/Insert/MultiSelect): Maximum 256 rows/communication action • [DB-tag link settings](Stored procedure): Maximum 257 rows/communication action • [Select/Update/Delete conditions]: Maximum 8 rows/communication action • [Select sort settings]: Maximum 8 rows/communication action	Section 7.11.1
			No. of records/data selectable for communication action	Up to 40000 records/MultiSelect communication action Up to 45000 words/job	
			No. of operations possible for operation action	(Maximum 20 dyadic operations)/operation action	Section 7.11.4
			Operators for operation action	Addition, subtraction, multiplication, division, remainder, character string combination	
		Program execution	Allowable number of settings	Maximum 2 programs/job One program before execution of initial action + one program after execution of final action	Section 7.10.3
	Device tag		No. of access target CPU settings	64 settings/project	Section 7.7
			No. of tags	64 tags/project	Section 7.8.3
			No. of components	256 components[*2]/tag 4096 components/project	
			Data type	Signed single-precision integer type (16 bits), signed double-precision integer type (32 bits), single-precision floating point type (32 bits), bit type, character string type (1 to 32 characters), 16-bit BCD type, 32-bit BCD type	
			Statistical processing	Average, maximum, minimum, moving average[*3], moving maximum[*3], moving minimum[*3]	
	DB buffering		Buffering capacity during communication error[*4]	Maximum capacity: CompactFlash card capacity - 32M bytes (16 M bytes to 512 M bytes)	Section 7.6.4
XML processing	Command type			One-shot execution of a job, enabling the job, disabling the job	CHAPTER 9
	Request message size			Maximum 128 k bytes	
	Reception protocol			HTTP1.0	
	User authentication			No. of accounts: 16 User ID: 1 to 20 characters Password: 6 to 14 characters	
Working log	Error log capacity			Maximum capacity: 1 M byte • At least 4800 logs can be recorded.	Section 7.12.5
	Event log capacity			Maximum capacity: 4 M bytes • At least 4800 logs can be recorded. (When there is no detailed log) • At least 2 logs can be recorded. (When there is a detailed log)	

*1 The monitoring interval is 1 to 600 (in units of 0.1 seconds) or 1 to 32767 (in units of seconds).

*2 When the database is Microsoft® Access® 2000/2003/2007/2010/2013/2016/2019, refer to the following.

☞Section 2.6.4 Precautions for using database

*3 [No. of samples] can be set up to 20.

*4 The following shows the method for roughly calculating the buffering duration from the buffering capacity.

Buffering duration = (No. of executable bufferings)÷(Execution frequency [times/hour]) [h]

No. of executable bufferings = (Usage capacity)÷(SQL text length + Overhead (4 bytes) [cases]

SQL text length = Total field character length + 6 × No. of fields + Total data length + 20 [bytes]

[Calculation example]

Accessing to 256 fields with 1 job and 1 action and performing every 30 seconds when capacity: 64 M bytes, field name: 16 characters, data length: 32 characters

SQL text length = (16 × 256) + 6 × 256 + (32 × 256) + 20 = 13844 [bytes]

No. of executable bufferings = (64 × 1024 × 1024)÷(13844 + 4) ≒ 4846 [cases]

Buffering duration = 4846÷(60÷30 × 60) ≒ 40 [h]

Point

Performance of the MES interface module and the system using the MES interface module differs depending on the following factors.

Conduct a verification by user prior to starting the system.

- Operating environment (personal computer, network, and the CompactFlash card)
- Loading status of the server computer and the network.
- Sequence scan time
- Accessing status from a personal computer, terminal display, or intelligent function module to the programmable controller CPU.
- Access from a personal computer by [MES Interface Function Configuration Tool] and XML processing.
- Settings of the MES interface module.

For the reference value of the processing time, refer to the following.

☞Appendix 4 Processing Time

3.2 Accessible Devices and Ranges

This section explains the accessible devices and ranges.
For inaccessible CPU modules, refer to the following.
☞Appendix 6 Data Collection Method for CPUs that cannot be Accessed Directly

(1) Accessible CPU modules

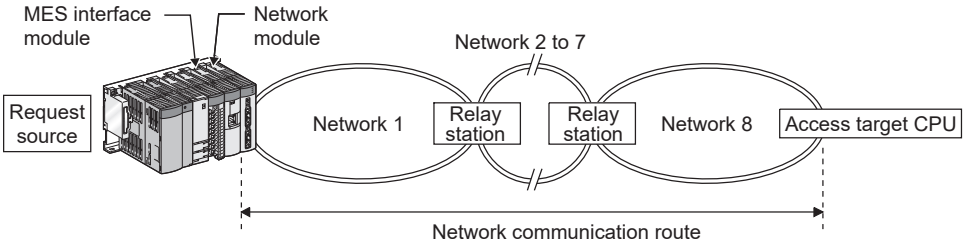
Table 3.3 Accessible CPU modules

PLC series*5		Model
QCPU (Q mode)	Basic model QCPU	Q00JCPU, Q00CPU, Q01CPU
	High Performance model QCPU	Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU
	Process CPU	Q02PHCPU*2, Q06PHCPU*2, Q12PHCPU, Q25PHCPU
	Redundant CPU*1*2	Q12PRHCPU, Q25PRHCPU
	Universal model QCPU*2	Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU, Q50UDEHCPU, Q100UDEHCPU, Q03UDVCPU, Q04UDVCPU, Q06UDVCPU, Q13UDVCPU, Q26UDVCPU
RCPU*2		R04CPU, R08CPU, R16CPU, R32CPU, R120CPU
LCPU		L02CPU*3, L26CPU-BT*3, L02CPU-P*3, L26CPU-PBT*3, L02SCPU*4, L02SCPU-P*4, L06CPU*4, L06CPU-P*4, L26CPU*4, L26CPU-P*4
QnACPU		Q2ACPU, Q2ACPU-S1, Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, Q2ASHCPU-S1, Q3ACPU, Q4ACPU, Q4ARCPU
QCPU (A mode)		Q02CPU-A, Q02HCPU-A, Q06HCPU-A
ACPU		A1NCPU, A0J2HCPU, A1SCPU, A1SHCPU, A1SJCPU, A1SJHCPU, A2CCPU, A2CJCPU, A2NCPU, A2NCPU-S1, A2SCPU, A2SHCPU, A2ACPU, A2ACPU-S1, A2UCPU, A2UCPU-S1, A2USCPU, A2USCPU-S1, A2USHCPU-S1, A3NCPU, A3ACPU, A3UCPU, A4UCPU
C Controller module*2		Q12DCCPU-V, Q24DHCCPU-V, Q24DHCCPU-LS

*1 Cannot access the Redundant CPU of other station.
*2 Serial numbers of the MES interface module to be used are restricted. The restriction is the same as the one for the applicable systems.
☞Section 2.2 Applicable Systems
*3 Use the MES interface module whose serial No. (first five digits) is 12092 or later.
*4 Use the MES interface module whose serial No. (first five digits) is 14122 or later.
*5 Do not access directly the PLC series other than the above table.
If the CPU module is accessed directly by mistake, all access target CPU may not be accessed.

(2) Accessible routes

(a) Single network



- The network is any of CC IE Control, NET/10(H), Ethernet, or CC IE Field.
- The following lists CPU modules that can be used on the network communication route.

Request source ·····Use a QCPU (Q mode) or RCPU as a control CPU for the MES interface module and network module.

Relay station ·····Use a QCPU (Q mode) or RCPU as a control CPU for the network module.

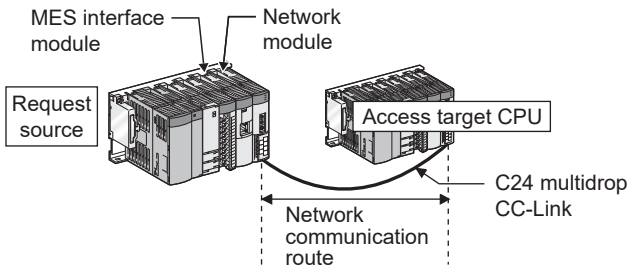
Access target CPU ·····For accessible CPU modules, refer to the following.

Figure 3.1 Single network

Table 3.4 Single network

Network communication route	Access target CPU (PLC series)					
	QCPU (Q mode)*7	RCPU*11	LCPU	QnACPU	QCPU (A mode), ACPU	C Controller module
CC IE Control, NET/10(H)	○	○ *12	×	○	○	○ *6
Ethernet*8	○ *1	○ *1	○ *1*10	○ *1 *2	×	×
CC IE Field*4	○ *5	○	○	×	×	○ *9

○: Accessible ×: Inaccessible



- The following lists CPU modules that can be used on the network communication route.

Request source ·····Use a QCPU (Q mode) or RCPU as a control CPU for the MES interface module and network module.

Access target CPU ·····For accessible CPU modules, refer to the following.

Figure 3.2 Single network

Table 3.5 Single network

Network communication route	Access target CPU (PLC series)					
	QCPU (Q mode)*7	RCPU*11	LCPU	QnACPU	QCPU (A mode), ACPU	C Controller module
CC-Link	○	○	○	○ *3	○ *3	○ *6
C24	○	○	○	○	×	×

○ : Accessible ×: Inaccessible

*1 For the network No. and the station number, set the same values as that set in the parameter settings of the access target module. (The parameter of an Ethernet module or the MELSOFT connection extended setting of QCPU (Q mode))
In addition, set the parameter in "Station No. <-> IP information" in the parameter settings of the access target module. For the [Station No. <-> IP information], specify the IP address computation method, table conversion method, or both.

*2 For the QnACPU and QE71 on the access target CPU side, use products of the manufacturing date 9707B or later.

*3 For the CC-Link system master/local module on the access target CPU side, use modules of software version "S" or later.

*4 Use a MES interface module whose serial No. (first five digits) is "13092" or later.

*5 Use Universal model QCPU whose serial No. (first five digits) is "12012" or later.

*6 When a C Controller module is used as a control CPU of the access target network module, the accessible CPU module is only the control CPU.

*7 Use QCPU (Q mode) or RCPU as a control CPU of the access target network module.

*8 Use an Ethernet module or the built-in Ethernet port of QCPU (Q mode), which is set the MELSOFT connection extended setting, to access a programmable controller CPU via Ethernet.
When using the built-in Ethernet port of QCPU (Q mode) which is set the MELSOFT connection extended setting, use MES interface module whose serial No. (first five digits) is "17122" or later.
The Ethernet port of MES interface module cannot be used.

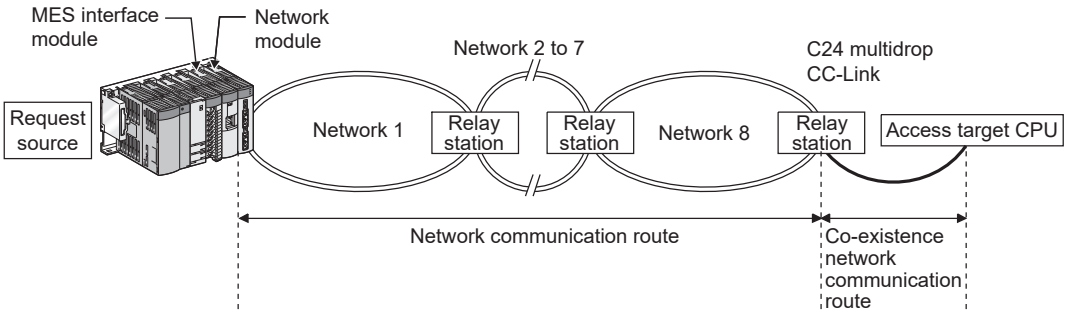
*9 When the access target CPU is Q12DCCPU-V, the access is not possible.

*10 Use a MES interface module whose serial No. (first five digits) is "15102" or later.

*11 Use a MES interface module whose serial No. (first five digits) is "16072" or later.

*12 When the Network communication route is NET/10(H), the access is not possible.

(b) Different network



- The network is any of CC IE Control, NET/10(H), Ethernet, or CC IE Field.
- The following lists CPU modules that can be used on the network communication route and the communication routes of other network types.

Request source ·····Use a QCPU (Q mode) or RCPU as a control CPU for the MES interface module and network module.

Relay station ·····Use a QCPU (Q mode) or RCPU as a control CPU for the network module.

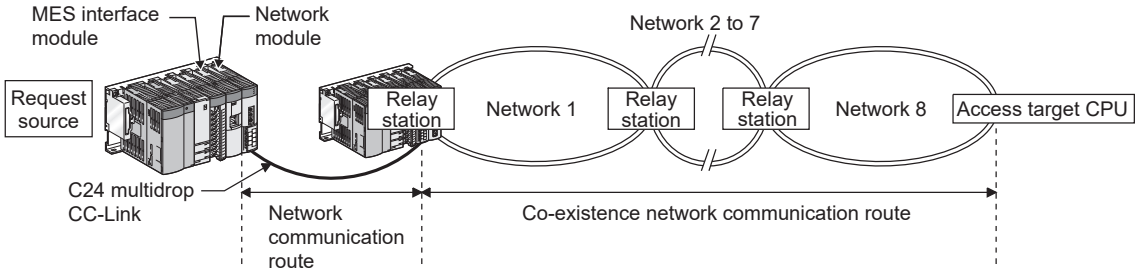
Access target CPU ·····For accessible CPU modules, refer to the following.

Figure 3.3 Different network

Table 3.6 Different network

Network communication route	Co-existence network route	Access target CPU (PLC series)					
		QCPU (Q mode)*6	RCPU*10	LCPU	QnACPU	QCPU (A mode), ACPU	C Controller module
CC IE Control, NET/10(H), Ethernet*7 CC IE Field*3	CC-Link	○	○ *11	○	○ *2	○ *2	○ *5
	C24	○	○ *11	○	×	×	×

○: Accessible ×: Inaccessible



- The network is any of CC IE Control, NET/10(H), Ethernet, or CC IE Field.
- The following lists CPU modules that can be used on the network communication route and the communication routes of other network types.

Request source ·····Use a QCPU (Q mode) or RCPU as a control CPU for the MES interface module and network module.

Relay station ·····Use a QCPU (Q mode) or RCPU as a control CPU for the network module.

Access target CPU ·····For accessible CPU modules, refer to the following.

Figure 3.4 Different network

Table 3.7 Different network

Network communication route	Co-existence network route	Access target CPU (PLC series)					
		QCPU (Q mode)*6	RCPU*10	LCPU	QnACPU	QCPU (A mode), ACPU	C Controller module
CC-Link, C24	CC IE Control, NET/10(H)	○	○*11	×	×	×	○*5
	Ethernet*7	○*1	○*1	○*1*9	×	×	×
	CC IE Field*3	○*4	○	○	×	×	○*8

○: Accessible ×: Inaccessible

*1 For the network No. and the station number, set the same values as that set in the parameter settings of the access target module. (The parameter of an Ethernet module or the MELSOFT connection extended setting of QCPU (Q mode))
In addition, set the parameter in "Station No. <-> IP information" in the parameter settings of the access target module. For the [Station No. <-> IP information], specify the IP address computation method, table conversion method, or both.

*2 For the CC-Link system master/local module on the access target CPU side, use modules of software version "S" or later.

*3 Use a MES interface module whose serial No. (first five digits) is "13092" or later.

*4 Use Universal model QCPU whose serial No. (first five digits) is "12012" or later.

*5 When a C Controller module is used as a control CPU of the access target network module, the accessible CPU module is only the control CPU.

*6 Use QCPU (Q mode) or RCPU as a control CPU of the access target network module.

*7 Use an Ethernet module or the built-in Ethernet port of QCPU (Q mode), which is set the MELSOFT connection extended setting, to access a programmable controller CPU via Ethernet.
When using the built-in Ethernet port of QCPU (Q mode) which is set the MELSOFT connection extended setting, use MES interface module whose serial No. (first five digits) is "17122" or later.
The Ethernet port of MES interface module cannot be used.

*8 When the access target CPU is Q12DCCPU-V, the access is not possible.

*9 Use a MES interface module whose serial No. (first five digits) is "15102" or later.

*10 Use a MES interface module whose serial No. (first five digits) is "16072" or later.

*11 When the Network communication route is NET/10(H), the access is not possible.

(3) Accessible devices

Table 3.8 Accessible devices

Device*1 (Device name)		QCPU (Q mode)	RCPU *16	QCPU (A mode)	LCPU	QnACPU	ACPU	C Controller module
Function input (FX)		×	×	×	×	×	×	×
Function output (FY)		×	×	×	×	×	×	×
Function register (FD)		×	×	×	×	×	×	×
Special relay (SM) (M)*2		○	○	○	○	○	○	○
Special register (SD) (D)*3		○	○	○	○	○	○	○
Input relay (X)		○	○	○	○	○	○	○
Output relay (Y)		○	○	○	○	○	○	○
Internal relay (M)*9		○	○	○	○	○	○	○*11
Latch relay (L)*9		○	○	○	○	○	○	×
Annunciator (F)		○	○	○	○	○	○	×
Edge relay (V)		○	○	×	○	○	×	×
Link relay (B)		○	○	○	○	○	○	○*13
Data register (D)		○	○	○	○	○	○	○*11
Link register (W)		○	○	○	○	○	○	○*13
Timer	Contact (TS)	○	○	○	○	○	○	×
	Coil (TC)	○	○	○	○	○	○	×
	Current value (T/TN)*4	○	○	○	○	○	○	×
	Long timer(LT)*14	×	×	×	×	×	×	×
Counter	Contact (CS)	○	○	○	○	○	○	×
	Coil (CC)	○	○	○	○	○	○	×
	Current value (C/CN)*4	○	○	○	○	○	○	×
	Long counter(LC)*14	×	×	×	×	×	×	×
Retentive timer	Contact (SS)	○	○	×	○	○	×	×
	Coil (SC)	○	○	×	○	○	×	×
	Current value (ST/SN)*4	○	○	×	○	○	×	×
	Long retentive timer(LST)*14	×	×	×	×	×	×	×
Link special relay (SB)		○	○	×	○	○	×	×
Link special register (SW)		○	○	×	○	○	×	×
Step relay (S) *9		×	×	○	×	×	○	×
Direct input (DX)		×	×	×	×	×	×	×
Direct output (DY)		×	×	×	×	×	×	×
Accumulator (A)		×	×	×	×	×	×	×
Index register	(Z)	○	○	×	○	○	×	×
	(V)	×	×	×	×	×	×	×
File register	(R)	○*8	○	○	○	○	○	×
	(ZR)	○*8	○	×	○	○	×	×
	(ERn\R)*5*10	×	×	○	×	×	○	×
Link direct device	Link input (Jn\X)*6	○	○	×	×	○	×	○
	Link output (Jn\Y)*6	○	○	×	×	○	×	○
	Link relay (Jn\B)*6	○	○	×	×	○	×	○
	Link special relay (Jn\SB)*6	○	○	×	×	○	×	○
	Link register (Jn\W)*6	○	○	×	×	○	×	○
	Link special register (Jn\SW)*6	○	○	×	×	○	×	○
Intelligent function module device (Un\G)*7		○	○	×	○	○	×	○

Device[*1] (Device name)		QCPU (Q mode)	RCPU [*16]	QCPU (A mode)	LCPU	QnACPU	ACPU	C Controller module
Module access device	Cyclic transmission area device (U3En\G)[*12 *15]	○	○	×	×	×	×	○
	Cyclic transmission area device (U3En\HG)[*12 *14]	×	×	×	×	×	×	×
Module refresh device	Refresh data register(RD)[*14]	×	×	×	×	×	×	×

○ : Accessible, ×: Inaccessible

*1 The local devices of the Q/QnA series programmable controller CPU and file registers for individual programs cannot be accessed by specifying the program name.
Do not use local devices and file registers for individual programs since they may not be read/written correctly.

*2 For the QCPU (Q mode)/QnACPU, specify SM; for the QCPU (A mode)/ACPU, specify M9000 or later.

*3 For the QCPU (Q mode)/QnACPU, specify SD; for the QCPU (A mode)/ACPU, specify D9000 or later.

*4 For the device name, specify either of them.

*5 For "n", specify the block number.

*6 For "n", specify the network No.

*7 For "n", specify the intelligent function module/special function module I/O number.

*8 When using the Q00JCPU, the access is not possible.

*9 M, L, and S devices are in the same region, regardless of the parameter device setting.

*10 ER0\R cannot be specified.

*11 The devices can be accessed only when specifying [Use device function] on the device setting screen in the C Controller setting utility.

*12 The device is available in a multiple CPU system only.

*13 When the access target CPU is Q12DCCPU-V, the access is not possible.

*14 The devices newly added to RCPU are not accessible.

*15 When the access target CPU is RCPU, only in the device range from 'U3En\G0' to '9999' are accessible.

*16 When the access target CPU is RCPU, only in the device range that can be set for QCPU or C Controller module are accessible.For the settable device range, refer to the following manuals.
☞QCPU User's Manual (Hardware Design, Maintenance and Inspection)
☞MELSEC-Q C Controller Module User's Manual

3.3 Function List

This section lists the MES interface module functions.

(1) Function summary

The following explains the function summary of the MES interface module and MX MESInterface.

The functions of the items are listed (2) and the subsequent descriptions.

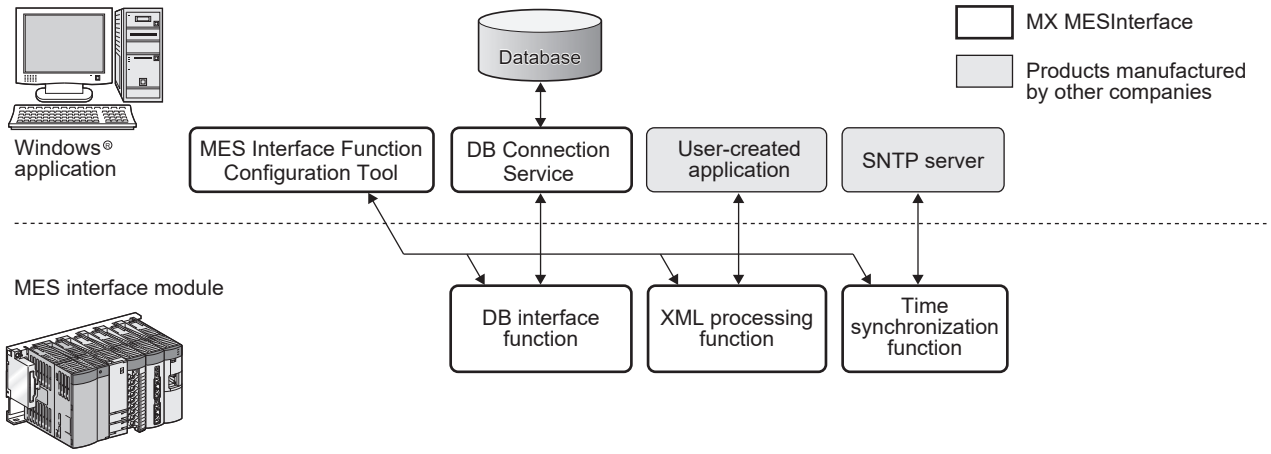


Figure 3.5 Function summary

(2) MES interface module function list

Table 3.9 MES interface module function list

Function		Description	Reference section
DB interface function		Executes access to the database in units of jobs.	Section 6.1 Section 7.10 Section 7.11
	Tag function	Collects device data of the programmable controller CPUs on the network in units of tags. By allocating database fields to tag components, the DB interface function enables the following. • Database value reading/writing • Reading/writing of programmable controller CPU device data specified with tag components	Section 6.1.3 Section 7.8
	Trigger monitoring function	Monitors values such as the time and tag values, and when the trigger condition changes from false to true (when the conditions are met), starts a job.	Section 6.1.4 Section 7.10.2
	Trigger buffering function	When multiple sets of conditions for data transmission are met in a concentrated manner, their data and trigger times are buffered in the module's internal memory so that actions (data operation/transmission) can be executed later using the buffered data. Even if the frequency of data transmission triggers is high, jobs are executed without missing any trigger.	Section 6.1.5 Section 7.10.1
	SQL text transmission function (Communication action)	Automatically creates an SQL text and communicates with the database. The following commands can be selected for the SQL text. • Select/MultiSelect • Update • Insert • Delete	Section 6.1.6 Section 7.11.2
	Stored procedure call function (Communication action)	A function to startup stored procedure in the database.	Section 7.11.3
	Arithmetic processing function (Operation action)	Performs operations for tag component values.	Section 6.1.8 Section 7.11.4
	Program execution function	Executes programs in the application server computer before execution of the first action and after execution of the last one in a job.	Section 6.1.9 Section 7.10.3
	DB buffering function	Buffers SQL texts into a CompactFlash card when they cannot be sent due to network disconnection or failure of the database server computer. After recovery, the buffered SQL texts are automatically sent to the database. (Manual operation is also possible.)	Section 6.1.10 Section 7.6.4 Section 7.10.4 Section 7.13.6
XML processing function		Processes execution of requests made by user applications using XML format messages. The XML processing function allows the following instructions for job execution. • One-shot execution of a job • Validating a job (The job is executed when the trigger conditions are met.) • Invalidating a job (The job is not executed even if the trigger conditions are met.)	Section 6.2 CHAPTER 9
Time synchronization function		Makes the time of the MES interface module synchronized with the time of the SNTP server computer on the network or a programmable controller CPU (No.1 CPU in the multiple CPU system).	Section 6.3 Section 7.6.2

(3) MES Interface Function Configuration Tool function list

Table 3.10 MES Interface Function Configuration Tool function list

Function		Description	Reference section
System Setting		Configure the initial settings for the MES interface module.	Section 7.6
	Network settings	Configure the settings necessary for connecting the MES interface module to the network.	Section 7.6.1
	Time synchronization setting	Make the time setting for the MES interface module.	Section 7.6.2
	Account setting	Set user authentication accounts used for access to the MES interface module.	Section 7.6.3
	DB buffering setting	Configure the settings for the DB buffering function.	Section 7.6.4
Access Target CPU setting		Set a connection channel to the access target CPU.	Section 7.7
Device tag settings		Configure the settings for the tag function.	Section 7.8
	Array setting	Configure this setting when writing multiple records extracted from a database to the same tag component.	Section 7.8.2
	Component setting	Configure the settings for assigning programmable controller CPU devices to tags.	Section 7.8.3
Server Service setting		Configure the settings for access to a server computer.	Section 7.9
Job settings		Configure the settings for the DB interface function.	Section 7.10
	Trigger conditions	Configure the settings for startup conditions of the job.	Section 7.10.2
	Trigger buffering	Set whether to utilize the Trigger buffering function or not.	Section 7.10.1
	Communication action	Configure the settings for communications with a database.	Section 7.11.1
	Operation action	Configure the settings for operation of tag component values.	Section 7.11.4
	Program execution	Configure the settings for the program execution function.	Section 7.10.3
	DB buffering	Set whether to utilize the DB buffering function or not.	Section 7.10.4
Online		Perform online operations to the MES interface module connected to the network.	Section 7.12
	Communication setting	Set the target MES interface module.	Section 7.12.1
	Write	Write the MES interface function settings (project) to the MES interface module.	Section 7.12.2
	Read	Read the MES interface function settings (project) from the MES interface module.	Section 7.12.3
	Verify	The MES interface function settings in the MES interface module are compared with those in the currently editing project.	Section 7.12.4
	Remote operation	Display or change the operation status of the MES interface module, or format a CompactFlash card.	Section 7.13
	Working log	The working log of the MES interface module can be checked.	Section 7.12.5
	One-shot execution of a job	Execute a job as a one-shot task.	Section 7.12.6
Help		The product information of the MES Interface Function Configuration Tool and the Connect to MITSUBISHI ELECTRIC FA Global Website screen can be displayed.	Section 7.14

(4) DB Connection Service function list

Table 3.11 DB Connection Service function list

Function		Description	Reference section
ODBC connection function		Connects the MES interface module and the ODBC interface for database.	Section 8.1
Program execution function		Executes a program on the application server computer upon request from the MES interface module.	
Table information/stored procedure information browse function		Acquires the table information and stored procedure information, and sends them to table information browse function and stored procedure information browse function of MES Interface Function Configuration Tool.	
IP filter function		Specifies the IP address of the MES interface module that can connect to the DB Connection Service to ensure the security of the server computer.	
Log output function	Access log	Outputs the communication contents between the MES interface module and DB Connection Service to the access log.	
	SQL failure log	The error contents are output to the SQL failure log when the SQL text or stored procedure cannot be completed normally in the database due to the reason such as no table exist.	
DB Connection Service Setting Tool		Software changes the DB Connection Service settings	Section 8.5

3.4 I/O Signals for Programmable Controller CPU

3.4.1 I/O signal list

The following lists the MES interface module I/O signals to the programmable controller CPU.
The following I/O signal assignment is based on the case where the start I/O No. of the MES interface module is "0000" (installed to slot 0 of the main base unit)
If the MES interface module is mounted other than slot 0, see the list with changing the I/O signals by those of the mounted slot.
Device X indicates an input signal from the MES interface module to the programmable controller CPU and device Y indicates an output signal from the programmable controller CPU to the MES interface module.

Table 3.12 I/O signal list

Signal direction MES interface module → Programmable controller CPU		Signal direction programmable controller CPU → MES interface module	
Device No.	**Signal name**	**Device No.**	**Signal name**
X0	Module READY ON: Module prepared OFF: Module being prepared	Y0	Use prohibited
X1	CompactFlash card status ON: Installed OFF: Not installed	Y1	
X2	File access status ON: Stopped OFF: Running	Y2	File access stop request ON: Stop request OFF: —
X3	Use prohibited	Y3	Use prohibited
X4	Network status ON: Initialization completed (Connectable) OFF: Initializing (Unconnectable)	Y4	
X5	Information linkage status ON: Executing OFF: Stopped	Y5	
X6	Use prohibited	Y6	
X7		Y7	
X8		Y8	
X9		Y9	
XA		YA	
XB	SNTP time query timing ON: Query complete OFF: No query	YB	
XC	Use prohibited	YC	
XD		YD	
XE		YE	
XF		YF	

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Table 3.12 I/O signal list

Signal direction MES interface module → Programmable controller CPU		Signal direction programmable controller CPU → MES interface module	
Device No.	**Signal name**	**Device No.**	**Signal name**
X10	ERR. LED status ON: Lighting, flashing OFF: Extinction	Y10	Error clear request ON: Error clear request OFF: —
X11	Sampling error ON: Error OFF: Normal	Y11	Use prohibited
X12	Information linkage error ON: Error OFF: Normal	Y12	
X13	Use prohibited	Y13	
X14		Y14	
X15		Y15	
X16	Access target CPU error ON: Error OFF: Normal	Y16	
X17	Use prohibited	Y17	
X18		Y18	
X19		Y19	
X1A		Y1A	
X1B		Y1B	
X1C	Another error ON: Error OFF: Normal	Y1C	
X1D	Use prohibited	Y1D	
X1E		Y1E	
X1F	Watchdog timer error ON: Error OFF: Normal	Y1F	

Point

As for I/O signals to a programmable controller CPU, do not output (ON) a "Use prohibited" signal.
Doing so may cause malfunctions of the programmable controller system.

3.4.2 I/O signals details

The following table shows the details of the I/O signals of the MES interface module.

(1) Input signals details

Table 3.13 Input signals details

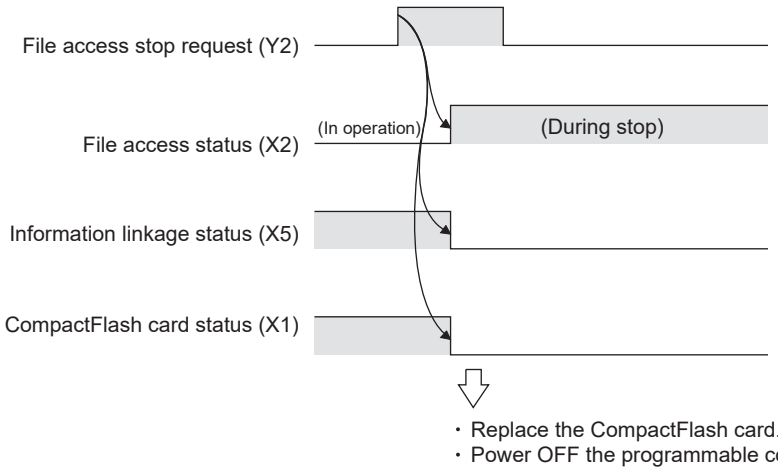
Device No.	Signal name	Description
X0	Module READY	Turns ON when the MES interface module becomes ready after the programmable controller is powered ON from OFF or the programmable controller CPU is reset.
X1	CompactFlash card status	(1) Turns ON when the CompactFlash card is installed and the file access status (X2) is OFF. (2) Turns OFF when the CompactFlash card is not installed or the file access status (X2) is ON.
X2	File access status	(1) Turns ON while file access is stopped. (a) The following operations are available while file access is stopped. ・ Removing and installing a CompactFlash card (☞Section 4.7.2 Installation/removing the CompactFlash card) ・ Powering OFF the programmable controller during operation without battery (☞Section 4.9 Operation without Mounting Battery) (b) While file access is stopped, the following status occurs. ・ Reading from or writing to a CompactFlash card is disabled. ・ The MES interface function is suspended. ・ Operation from MES Interface Function Configuration Tool is disabled. (2) Turns OFF during file access operation. Powering ON the programmable controller from OFF or resetting the programmable controller CPU brings file access in operation.  ・ Replace the CompactFlash card. ・ Power OFF the programmable controller.
X4	Network status	(1) Turns ON when the MES interface module is initialized and became a connectable state. (2) When powering ON from OFF or resetting the programmable controller CPU, the network of the MES interface module is initialized.

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Table 3.13 Input signals details

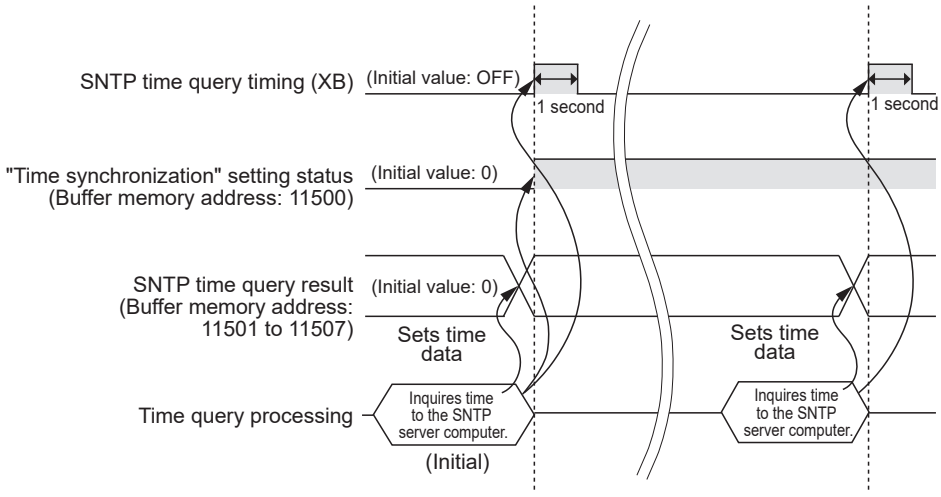
Device No.	Signal name	Description
X5	Information linkage status	(1) Turns ON when the MES interface function operation is enabled. This indicates that MES interface function processing is executable. (2) Turns OFF when the MES interface function is in stop. The MES interface function processing stops in the following cases. 1) The period after the programmable controller is powered ON from OFF or the programmable controller CPU is reset until the MES interface function starts (☞Section 2.6.5 (1) Startup time) 2) When the MES interface function processing stops with [Remote operation] of MES Interface Function Configuration Tool (☞Section 7.13 Online - Remote operation) 3) When a module stop error occurs in the MES interface module (☞Section 10.3.1 When using MES Interface Function Configuration Tool) 4) During updating settings (☞Section 7.13.2 Manipulating the operation status of the MES interface function) 5) While file access is stopped (☞Section 4.7 CompactFlash Card)
XB	SNTP time query timing	(1) Turns ON when [Synchronize with SNTP] is selected in [Time synchronization setting], and after succeeding the time query and storing the time into the buffer memory. (2) Reads time data from the SNTP time query results (Buffer memory address: 11501 to 11507), while XB is ON. (3) This device turns OFF 1 second after XB turns ON. 
X10	ERR. LED status	(1) Turns ON while the ERR. LED is ON (during a module continuation error) or flashing (during a module stop error). (2) Turns OFF when the ERR. LED is turned OFF by turning the Error clear request (Y10) ON with the ERR. LED ON. (However, this is not possible while the ERR. LED is flashing.) (3) While the ERR. LED is ON or flashing (when X10 is ON), any or some of X11, X12, X16, and X1C turn(s) ON.
X11	Sampling error	(1) Turns ON when an error regarding Sampling error occurs. (2) When this device is ON, the error code is stored into the Tag status area (Buffer memory address: 1000 to 1075). (3) Turns OFF when the Error clear request (Y10) is turned ON.
X12	Information linkage error	(1) Turns ON when an error regarding information linkage occurs. (2) When this device is ON, the error code is stored into the Error log area (Buffer memory address: 150 to 247). (3) Turns OFF when the Error clear request (Y10) is turned ON.

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Table 3.13 Input signals details

Device No.	Signal name	Description
X16	Access target CPU error	(1) Turns ON when an error occurs in communications with the access target CPU. (2) When this device is ON, the error code is stored into the Access target CPU setting status area (Buffer memory address: 4000 to 4071). (3) Turns OFF when the Error clear request (Y10) is turned ON.
X1C	Another error	(1) Turns ON when an error not corresponding to X11, X12, or X16 occurs. (2) When this device is ON, the error code is stored into the Error log area (Buffer memory address: 150 to 247). (3) Turns OFF when the Error clear request (Y10) is turned ON. (Only in case of a module continuation error)
X1F	Watchdog timer error	Turns ON when a watchdog timer error occurs.

(2) Output signals details

Table 3.14 Output signals details

Device No.	Signal name	Description
Y2	File access stop request	(1) Turns ON when file access is stopped. (2) For ON/OFF timing, refer to the description of X2.
Y10	Error clear request	(1) By turning ON during a module continuation error (ERR. LED: ON) turns OFF the ERR. LED and X10, X11, X12, X16, and X1C. During a module stop error (ERR. LED: flashing), turning this device ON does not turn OFF the ERR. LED. (2) Clears the Current error area (Buffer memory address: 140 to 145). Clears the latest error code displayed on [System monitor] of GX Developer. (☞Section 10.1.3 System monitor)

3.5 Buffer Memory List

The buffer memory list is shown below.

Table 3.15 Buffer memory list

Address (Decimal(Hex))	Application	Name	Initial value	Read/ write*1	Reference section
0 (0H)	Module status area	RUN LED status 0: OFF 1: ON	0	R	Section 3.6.1
1 (1H)		ERR. LED status 0: OFF 1: ON 2: Flash	0	R	
2 (2H)		Switch 1 status (Mode setting) 0000h: Online 0001h: Hardware test 0002h: Self-loopback test	0	R	
3 (3H)		Switch 2 status (Default operation setting/battery error detection setting) (1) Default operation setting [Account setting] (b0) 0: Operates according to [Account setting]. 1: Operates according to the default. (2) Default operation setting [Account setting] (b1) 0: Operates according to [Network settings]. 1: Operates according to the default. (3) Battery error detection setting (b2)*2 0: Detects battery errors. 1: Does not detect battery errors.	0	R	
4 (4H)		Switch 3 status (Response monitoring time setting) 15 to 255 (Second): Response monitoring time	0	R	
5 to 6 (5H to 6H)		System area	—	—	
7 (7H)		Battery status*2 0: Normal 1: Battery error	0	R	
8 to 54 (8H to 36H)	Use prohibited	System area	—	—	—
55 to 56 (37H to 38H)	Network connection status area	IP address	0	R	Section 3.6.2
57 to 58 (39H to 3AH)		Subnetwork	0	R	
59 to 60 (3BH to 3CH)		Default gateway	0	R	
61 to 70 (3DH to 46H)	Use prohibited	System area	—	—	—
71 to 72 (47H to 48H)	Network settings status area	IP address	0	R	Section 3.6.3
73 to 74 (49H to 4AH)		Subnet mask	0	R	
75 to 76 (4BH to 4CH)		Default gateway	0	R	
77 to 139 (4DH to 8BH)	Use prohibited	System area	—	—	—

*1 Shows whether or not reading/writing is possible.
R: Only reading is possible. W: Only writing is possible.
R/W: Both reading and writing are possible.
*2 Only for QJ71MES96 MES interface module

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Table 3.15 Buffer memory list

Address (Decimal(Hex))	Application	Name		Initial value	Read/ write*1	Reference section
140 (8CH)	Current error area	Error code		0	R	Section 3.6.4
141 (8DH)		System area		—	—	
142 to 145 (8EH to 91H)		Time		0	R	
146 to 149 (92H to 95H)	Use prohibited	System area		—	—	—
150 (96H)	Error log area	Error count		0	R	Section 3.6.5
151 (97H)		Error log write pointer		0	R	
152 (98H)		Error log 1	Error code	0	R	
153 (99H)			System area	—	—	
154 to 157 (9AH to 9DH)			Time	0	R	
158 to 163 (9EH to A3H)		Error log 2	(Same as Error log 1)			
164 to 169 (A4H to A9H)		Error log 3	(Same as Error log 1)			
170 to 175 (AAH to AFH)		Error log 4	(Same as Error log 1)			
176 to 181 (B0H to B5H)		Error log 5	(Same as Error log 1)			
182 to 187 (B6H to BBH)		Error log 6	(Same as Error log 1)			
188 to 193 (BCH to C1H)		Error log 7	(Same as Error log 1)			
194 to 199 (C2H to C7H)		Error log 8	(Same as Error log 1)			
200 to 205 (C8H to CDH)		Error log 9	(Same as Error log 1)			
206 to 211 (CEH to D3H)		Error log 10	(Same as Error log 1)			
212 to 217 (D4H to D9H)		Error log 11	(Same as Error log 1)			
218 to 223 (DAH to DFH)		Error log 12	(Same as Error log 1)			
224 to 229 (E0H to E5H)		Error log 13	(Same as Error log 1)			
230 to 235 (E6H to EBH)		Error log 14	(Same as Error log 1)			
236 to 241 (ECH to F1H)		Error log 15	(Same as Error log 1)			
242 to 247 (F2H to F7H)		Error log 16	(Same as Error log 1)			

*1 Shows whether or not reading/writing is possible.
R: Only reading is possible. W: Only writing is possible.
R/W: Both reading and writing are possible.

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Table 3.15 Buffer memory list

Address (Decimal(Hex))	Application	Name		Initial value	Read/ write*1	Reference section
248 to 799 (F8H to 31FH)	Use prohibited	System area		—	—	—
800 to 801 (320H to 321H)	Sampling/ monitoring cycle area	Current cycle (Unit: second)		0	R	Section 3.6.6
802 to 803 (322H to 323H)		Maximum cycle (Unit: second)		0	R	
804 to 999 (324H to 3E7H)	Use prohibited	System area		—	—	—
1000 to 1003 (3E8H to 3EBH)	Tag status area	Tag setting information		0	R	Section 3.6.7
1004 to 1007 (3ECH to 3EFH)		Sampling information		0	R	
1008 to 1011 (3F0H to 3F3H)		Sampling error information		0	R	
1012 (3F4H)		Sampling 1, error code		0	R	
1013 to 1075 (3F5H to 433H)		Sampling 2 to 64, error codes	The composition of each area is the same as that of the Sampling 1, error code. Refer to *2 for the assignment of each area.			
1076 to 1289 (434H to 509H)	Use prohibited	System area		—	—	—
1290 (50AH)	Current tag data value area	No. of requested tag		0	R/W	Section 3.6.8
1291 (50BH)		No. of stored tag		0	R	
1292 (50CH)		Update count		0	R	
1293 (50DH)		No. of components		0	R	
1294 to 1299 (50EH to 513H)		System area		—	—	
1300 to 1811 (514H to 713H)		Current tag data value		0	R	
1812 to 3999 (714H to F9FH)	Use prohibited	System area		—	—	—
4000 to 4003 (FA0H to FA3H)	Access target CPU setting status area	Access target CPU setting information		0	R	Section 3.6.9
4004 to 4007 (FA4H to FA7H)		Access target CPU error information		0	R	
4008 (FA8H)		Access target CPU 1, error code		0	R	
4009 to 4071 (FA9H to FE7H)		Access target CPU 2 to 64, error codes	The composition of each area is the same as that of the Access target CPU 1, error code. Refer to *3 for the assignment of each area.			

*1 Shows whether or not reading/writing is possible.
R: Only reading is possible. W: Only writing is possible.
R/W: Both reading and writing are possible.

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Table 3.15 Buffer memory list

Address (Decimal(Hex))	Application	Name	Initial value	Read/ write*1	Reference section
4072 to 11499 (FE8H to 2CEBH)	Use prohibited	System area	—	—	—
11500 (2CECH)	Information linkage function area	"Time synchronization" setting status 0: [Synchronize with PLC CPU time]1: [Synchronize with SNTP]	0	R	Section 3.6.10
11501 to 11507 (2CEDH to 2CF3H)		SNTP time query result	0	R	
11508 (2CF4H)		System area	—	—	—
11509 (2CF5H)					
11510 (2CF6H)		Monitoring interval timeout count	0	R	Section 3.6.10
11511 (2CF7H)		No. of trigger buffer data	0	R	
11512 (2CF8H)		Trigger buffer overflow count	0	R	
11513 to 11519 (2CF9H to 2CFFH)		System area	—	—	—
11520 (2D00H)		Trigger buffer overflow count for Job 1	0	R	Section 3.6.10
11521 to 11583 (2D01H to 2D3FH)		Trigger buffer overflow counts for Jobs 2 to 64	The composition of each area is the same as that of the Trigger buffer overflow count for Job 1. Refer to *4 for the assignment of each area.		

*1 Shows whether or not reading/writing is possible.
R: Only reading is possible. W: Only writing is possible.
R/W: Both reading and writing are possible.

*2 The following table shows the error code area assignment for Sampling 1 to 64 (Buffer memory address: 1012 to 1075).

Table 3.16 Sampling 1 to 64, error code areas

Name	Sampling 1 to 64, error code areas									
	1	2	3	4	5	6	7	8	9	10
Sampling 1 to 10, error codes	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021
	11	12	13	14	15	16	17	18	19	20
Sampling 11 to 20, error codes	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031
	21	22	23	24	25	26	27	28	29	30
Sampling 21 to 30, error codes	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041
	31	32	33	34	35	36	37	38	39	40
Sampling 31 to 40, error codes	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051
	41	42	43	44	45	46	47	48	49	50
Sampling 41 to 50, error codes	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061
	51	52	53	54	55	56	57	58	59	60
Sampling 51 to 60, error codes	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071
	61	62	63	64						
Sampling 61 to 64, error codes	1072	1073	1074	1075						

*3 The following table shows the error code area assignment for the Access target CPUs 1 to 64 (Buffer memory address: 4008 to 4071).

Table 3.17 Access target CPU 1 to 64, error code areas

Name	Access target CPU 1 to 64, error code areas									
	1	2	3	4	5	6	7	8	9	10
Access target CPU 1 to 10, error codes	4008	4009	4010	4011	4012	4013	4014	4015	4016	4017
	11	12	13	14	15	16	17	18	19	20
Access target CPU 11 to 20, error codes	4018	4019	4020	4021	4022	4023	4024	4025	4026	4027
	21	22	23	24	25	26	27	28	29	30
Access target CPU 21 to 30, error codes	4028	4029	4030	4031	4032	4033	4034	4035	4036	4037
	31	32	33	34	35	36	37	38	39	40
Access target CPU 31 to 40, error codes	4038	4039	4040	4041	4042	4043	4044	4045	4046	4047
	41	42	43	44	45	46	47	48	49	50
Access target CPU 41 to 50, error codes	4048	4049	4050	4051	4052	4053	4054	4055	4056	4057
	51	52	53	54	55	56	57	58	59	60
Access target CPU 51 to 60, error codes	4058	4059	4060	4061	4062	4063	4064	4065	4066	4067
	61	62	63	64						
Access target CPU 61 to 64, error codes	4068	4069	4070	4071						

*4 The following table shows the assignment of the Trigger buffer overflow count areas for Jobs 1 to 64 (Buffer memory address: 11520 to 11583).

Table 3.18 Trigger buffer overflow count areas for Jobs 1 to 64

Name	Trigger buffer overflow count areas for Jobs 1 to 64									
	1	2	3	4	5	6	7	8	9	10
Trigger buffer overflow counts for Jobs 1 to 10	11520	11521	11522	11523	11524	11525	11526	11527	11528	11529
	11	12	13	14	15	16	17	18	19	20
Trigger buffer overflow counts for Jobs 11 to 20	11530	11531	11532	11533	11534	11535	11536	11537	11538	11539
	21	22	23	24	25	26	27	28	29	30
Trigger buffer overflow counts for Jobs 21 to 30	11540	11541	11542	11543	11544	11545	11546	11547	11548	11549
	31	32	33	34	35	36	37	38	39	40
Trigger buffer overflow counts for Jobs 31 to 40	11550	11551	11552	11553	11554	11555	11556	11557	11558	11559
	41	42	43	44	45	46	47	48	49	50
Trigger buffer overflow counts for Jobs 41 to 50	11560	11561	11562	11563	11564	11565	11566	11567	11568	11569
	51	52	53	54	55	56	57	58	59	60
Trigger buffer overflow counts for Jobs 51 to 60	11570	11571	11572	11573	11574	11575	11576	11577	11578	11579
	61	62	63	64						
Trigger buffer overflow counts for Jobs 61 to 64	11580	11581	11582	11583						

3.6 Buffer Memory Details

This section explains the buffer memory details.

Point

(1) The values stored in buffer memory are cleared when the programmable controller is powered ON from OFF, or the programmable controller CPU is reset.
(2) When a value of 65536 or more is stored in the area composed of one word, a count is stopped at FFFFh (65535).
(3) If a value of more than two words is stored in the area composed of two words, a count is stopped at FFFFFFFFh (4294967295).

3.6.1 Module status area

The ON/OFF status of the MES interface module LED, setting status of the intelligent function module switches, and battery status are stored.
Refer to the following for details.

☞ • Section 4.3 Parts Names
• Section 4.5 Intelligent Function Module Switch Settings

3.6.2 Network connection status area

The status of network connection to which the MES interface module is currently connected is stored.

(1) Storage example of IP address (Buffer memory address: 55 to 56)
For 192. 168. 3. 3, each octet (192 (first octet). 168 (second octet). 3 (third octet). 3 (fourth octet)) is stored as follows:

	b15 to b8	b7 to b0
Buffer memory address: 55	03H (3) Third octet value	03H (3) Fourth octet value
56	C0H (192) First octet value	A8H (168) Second octet value

(2) Storage example of Subnet mask (Buffer memory address: 57 to 58)
For 255. 255. 255. 0, each octet (255 (first octet). 255 (second octet). 255 (third octet). 0 (fourth octet)) is stored as follows:

	b15 to b8	b7 to b0
Buffer memory address: 57	FFH (255) Third octet value	00H (0) Fourth octet value
58	FFH (255) First octet value	FFH (255) Second octet value

(3) Storage example of Default gateway (Buffer memory address: 59 to 60)
For 192. 168. 3. 254, each octet (192 (first octet). 168 (second octet). 3 (third octet). 254 (fourth octet)) is stored as follows:

	b15 to b8	b7 to b0
Buffer memory address: 59	03H (3) Third octet value	FEH (254) Fourth octet value
60	C0H (192) First octet value	A8H (168) Second octet value

For network connection, refer to the following.
☞Section 7.6.1 Setting items in Network setting

3.6.3 Network settings status area

The values stored to the Network setting status area is the same as the Network connection status area.For the storage examples of IP address (buffer memory address: 71 to 72), subnet mask (buffer memory address: 73 to 74), default gateway (buffer memory address: 75 to 76), refer to the following section.
☞Section 3.6.2 Network connection status area

This network settings status of the MES interface module is stored.
For network settings, refer to the following.
☞Section 7.6.1 Setting items in Network setting

3.6.4 Current error area

(1) Error code (Buffer memory address: 140)

An error code which indicates the error contents is stored.

For error codes, refer to the following:

☞Section 10.2 Error Code List

(2) Time (Buffer memory address: 142 to 145)

The time when the error occurred is stored in BCD code.

	b15 to b8	b7 to b0
Buffer memory address: 142	Month (01_H to 12_H)	Year (00_H to 99_H) The last two digits of the year
143	Hour (00_H to 23_H)	Day (01_H to 31_H)
144	Second (00_H to 59_H)	Minute (00_H to 59_H)
145	Year (00_H to 99_H) The first two digits of the year	Day of the week (0_H to 6_H)

Figure 3.6 Error time area

Point

(1) The information of the Current error area can be confirmed on the following diagnostic screen.

(a) Select [System monitor] → [Present Error] of GX Developer

(☞Section 10.1.3 System monitor)

(2) The Current error area can be cleared in either of the following methods.

(a) Turn ON the Error clear request (Y10).

(b) Power ON the programmable controller from OFF or reset the programmable controller CPU.

3.6.5 Error log area

(1) Error count (Buffer memory address: 150)

(a) The cumulative number of registrations to the Error log area is stored.

(2) Error log write pointer (Buffer memory address: 151)

(a) The number of error log to which the latest error is registered is stored.*1
0: No error (No error log stored)
1 or more: Error log number of the latest error stored

*1 The pointer value of "16" indicates that the latest error has been registered into the error log area of 16.

(b) If 17 or more errors occur, the excess errors are registered to the error log areas, starting from the error log 1 area again.

(3) Error log 1 to 16 (Buffer memory address: 152 to 247)
The error history is stored.
The Error log area is composed of 16 logs of the same data arrangement.

(a) Error code
An error code which indicates the error contents is stored.
For error codes, refer to the following:
☞Section 10.2 Error Code List

(b) Time
The time when the error occurred is stored in BCD code.

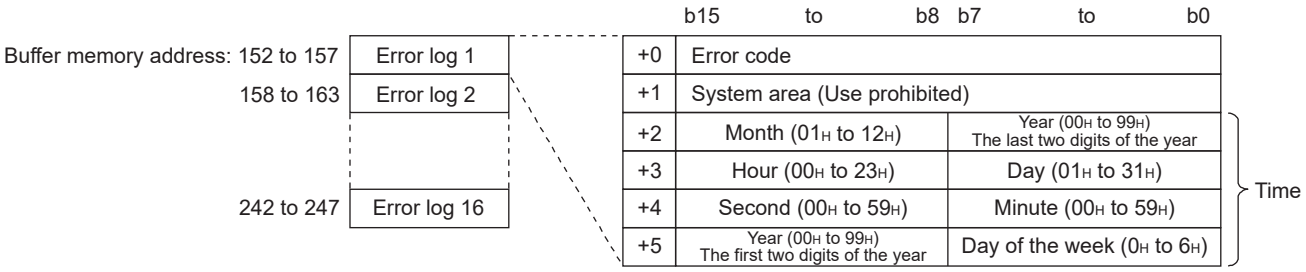


Figure 3.7 Error time area

(c) If an error that has already stored in the Error log area recurs, the error code is not stored in the Error log area.

Point

(1) The information of the Error log area can be confirmed on the following diagnostic screen.
Select [System monitor] → [Error Display] of GX Developer (Section 10.1.3 System monitor)

(2) The Error log area can be cleared in either of the following methods.
(a) Power ON the programmable controller from OFF or reset the programmable controller CPU.
(b) Select [Online] and click the [View working log] button.
(☞Section 7.12.5 Checking the working log of the MES interface module)

3.6.6 Sampling/monitoring cycle area

The MES interface module monitors the device data sampling time and trigger conditions alternately.
The time (cycle) required for this repetition can be confirmed in this area.
When the sampling/monitoring cycle is one second, device tag sampling and trigger conditions are monitored based on the set values.
When it is longer than one second, delay of up to "sampling/monitoring cycle minus 1 second" may occur in the monitoring.

(1) Current cycle (buffer memory address: 800 to 801)
The current sampling/monitoring cycle value is stored. (Unit: Second)

(2) Maximum cycle (buffer memory address: 802 to 803)
The maximum sampling/monitoring cycle value up to the present moment is stored. (Unit: Second)

3.6.7 Tag status area

(1) Tag setting information (Buffer memory address: 1000 to 1003)

(a) The information on whether [Device tag settings] have been made or not is stored.

(b) The bit corresponding to the preset tag setting No. is turned ON.
0: Not set
1: Set

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Buffer memory address: 1000	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
1001	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
1002	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
1003	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

Figure 3.8 Tag setting information area

(2) Sampling information (Buffer memory address: 1004 to 1007)

(a) The tag sampling result is stored.

(b) The bit corresponding to the tag setting No. which executed sampling is turned ON.
0: Not collected
1: Collected

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Buffer memory address: 1004	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
1005	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
1006	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
1007	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

Figure 3.9 Sampling information area

(3) Sampling error information (Buffer memory address: 1008 to 1011)

(a) The tag sampling error information is stored.

(b) The bit corresponding to the tag setting No. to which the Sampling error occurred is turned ON.
0: No sampling error
1: Sampling error detected

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Buffer memory address: 1008	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
1009	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
1010	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
1011	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

Figure 3.10 Sampling error information area

(c) The following results when a Sampling error occurs.
(Example) When an error occurred in the tag sampling of the tag setting number 16
- The Sampling error (X11) is turned ON.
- Sampling error information area (Buffer memory address: 1008 (bit 15)) is turned ON.
- The error code is stored in the Sampling 16, error code area (Buffer memory address: 1027)

(4) Sampling 1 to 64, error codes (Buffer memory address: 1012 to 1075)
The error code that indicates the error contents is stored in the corresponding tag setting number area for which the Sampling error occurred.
For error codes, refer to the following:
☞Section 10.2 Error Code List

3.6.8 Current tag data value area

The specified current tag data is stored.
This section explains how to display the specified tag data in the Current tag data value area.

1. Set the tag number displayed in the No. of requested tag (Buffer memory address: 1290). *1
2. Check that the tag number is stored in the No. of stored tag (Buffer memory address: 1291) and that the Update count (Buffer memory address: 1292) is incremented by 1. *2
3. Check that the tag component values for the No. of components (Buffer memory address: 1293) are stored in the Current tag data value (Buffer memory address: 1300 to 1811). *3

*1 The tag numbers are the numbers beginning at 1 to 64 in the order set with MES Interface Function Configuration Tool.
*2 If a value outside the range is set, the Current tag data value area is not updated.
*3 The Current tag data value area is updated each time the sampling is completed for the tag whose number is set as the No. of requested tag (Buffer memory address: 1290).

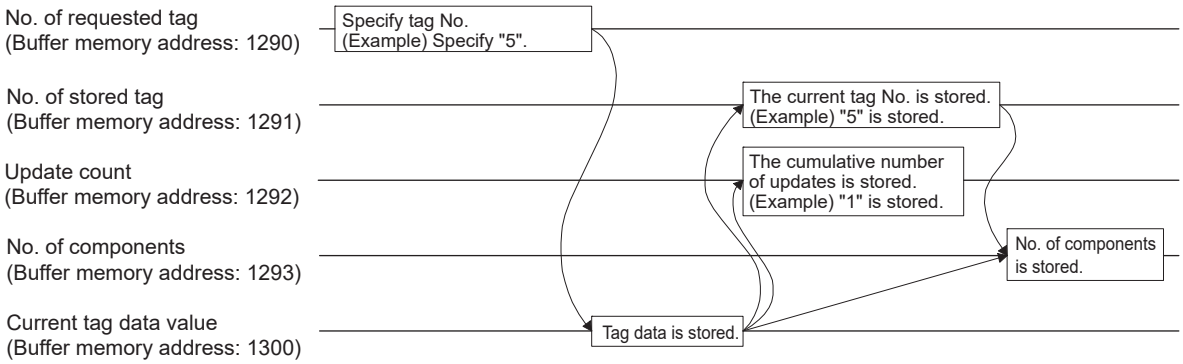


Figure 3.11 Current tag data value area

(1) No. of requested tag (Buffer memory address: 1290)
Specify the tag number whose current value is displayed as the Current tag data value (Buffer memory address: 1300 to 1811).

(2) No. of stored tag (Buffer memory address: 1291)
The tag No. displayed as the Current tag data value (Buffer memory address: 1300 to 1811) is stored.

(3) Update count (Buffer memory address: 1292)

(a) After the power is ON, the cumulative number of updates for the Current tag data value (Buffer memory address: 1300 to 1811) is stored.

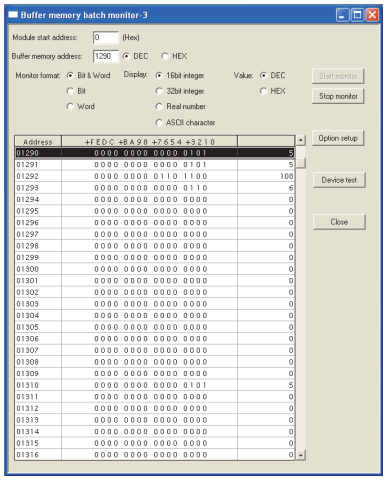
(b) After specifying the tag number displayed as the No. of requested tag (Buffer memory address: 1290), when the update count is increased, the Current tag data value (Buffer memory address: 1300 to 1811) is updated with the value of the specified tag number.

(4) No. of components (Buffer memory address: 1293)

The No. of components displayed as the Current tag data value (Buffer memory address: 1300 to 1811) is stored.

Remark

The following is an example where the current value of tag No. 5 is confirmed in [Buffer memory batch monitor] of GX Developer .



1. Specify "5" as the No. of requested tag (Buffer memory address: 1290) with [Buffer memory batch monitor] of GX Developer.
2. Check that "5" is stored as the No. of stored tag (Buffer memory address: 1291).
3. Check that the Update count (Buffer memory address: 1292) is updated.
4. Check that the No. of components for tag No. 5 is stored in the No. of components (Buffer memory address: 1293).
5. Check that the tag component value is stored in the Current tag data value (Buffer memory address: 1300 to the address required for the No. of components).

(5) Current tag data value (Buffer memory address: 1300 to 1811)

(a) The current values of the tag components whose No. is specified with the No. of requested tag (Buffer memory address: 1290) are stored.

(b) Two words are assigned per tag component.

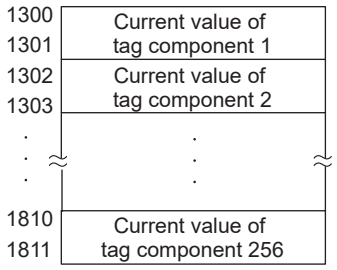


Figure 3.12 Current tag data value area

(c) Data are stored as follows depending on the data type for the tag component.

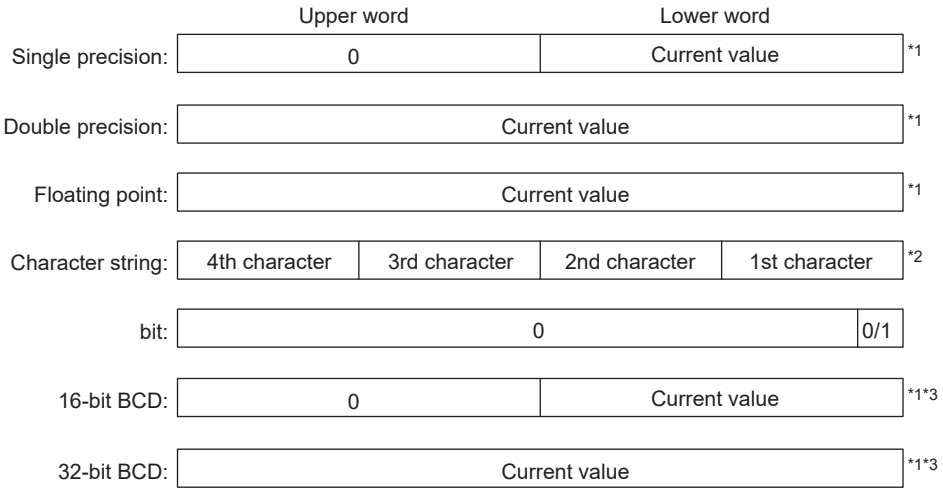


Figure 3.13 Data type of tag component

*1 When [Perform statistical processing] is set in [Device tag settings], data before the statistical processing is stored.

*2 Only the first four characters are stored.

*3 Data before the BCD conversion is stored.

3.6.9 Access target CPU setting status area

(1) Access target CPU setting information (Buffer memory address: 4000 to 4003)

(a) The information on whether [Access target CPU settings] have been made or not is stored.

(b) The bit corresponding to the preset Access target CPU setting No. is turned ON.
0: Not set
1: Set

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Buffer memory address: 4000	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
4001	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
4002	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
4003	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

Figure 3.14 Access target CPU setting information area

(2) Access target CPU error information (Buffer memory address: 4004 to 4007)

(a) The access target CPU error information is stored.

(b) The bit corresponding to the Access target CPU setting number for which the Access target CPU error has occurred is turned ON.
0: No Access target CPU error
1: Access target CPU error occurred

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Buffer memory address: 4004	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
4005	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
4006	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
4007	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

Figure 3.15 Access target CPU error information area

(c) The following results when the Access target CPU error occurs.
(Example) When an error occurred in the access target CPU for Access target CPU setting No. 16
- Access target CPU error (X16) is turned ON.
- Access target CPU error information area (Buffer memory address: 4004 (bit 15)) is turned ON.
- The error code is stored in the Access target CPU 16, error code area (Buffer memory address: 4023).

(3) Access target CPU 1 to 64, error codes (Buffer memory address: 4008 to 4071)

The error code showing the error contents is stored in the corresponding area of access target CPU setting number for which the Access target CPU error has occurred.
For error codes, refer to the following:
☞Section 10.2 Error Code List

3.6.10 Information linkage function area

(1) "Time synchronization" setting status (Buffer memory address: 11500)

(a) The setting status of [Time synchronization setting] is stored.
For [Time synchronization setting], refer to the following.
☞Section 7.6.2 Setting items in Time synchronization setting
0: [Synchronize with PLC CPU time]
1: [Synchronize with SNTP]

(b) When selecting [Synchronize with SNTP] in [Time synchronization setting]
This area is set when the time information was obtained from the SNTP server computer.
If the time information could not be obtained from the SNTP server computer, this area is not set since the operation for when [Synchronize with PLC CPU time] is selected is performed (Time is synchronized with the programmable controller CPU).

(2) SNTP time query result (Buffer memory address: 11501 to 11507)
When [Synchronize with SNTP] is selected in [Time synchronization setting], the time information obtained from the SNTP server is stored.
(When [Daylight saving setting] is enabled, time corrected to daylight saving time is stored during the period of summer time.)

Table 3.19 SNTP time query result

Address (Decimal)	Name	Description	Setting side
11501	SNTP time query result (Year)	The four-digit year data is stored.	Set on system side
11502	SNTP time query result (Month)	The month data, 01 to 12, is stored.	
11503	SNTP time query result (Day)	The day data, 01 to 31, is stored.	
11504	SNTP time query result (Hour)	The hour data, 00 to 23, is stored.	
11505	SNTP time query result (Minute)	The minute data, 00 to 59, is stored.	
11506	SNTP time query result (Second)	The second data, 00 to 59, is stored.	
11507	SNTP time query result (Day of the week)	The day of the week data is stored. 0: Sunday 1: Monday 2: Tuesday 3: Wednesday 4: Thursday 5: Friday 6: Saturday	

(3) Monitoring interval timeout count (Buffer memory address: 11510)
The cumulative number of times that a monitoring interval timeout has occurred is stored.
The monitoring interval timeout occurs when trigger detection has not been completed within the monitoring interval.
If this timeout occurs, perform the following:
- Increase the monitoring interval
  Increase the sampling interval of the tag that is used for trigger conditions.
- Reduce the trigger detection time.
  Reduce the number of configured jobs.

(4) No. of trigger buffer data (Buffer memory address: 11511)
The number of times the current trigger buffer has been used is stored.
If the number of times the trigger buffer has been used is always large, check the number of jobs for which [Trigger buffering] is enabled and the trigger condition setting. (☞Section 7.10 Job Setting)

(5) Trigger buffer overflow count (Buffer memory address: 11512)
The cumulative number of trigger buffer overflows is stored.
If the trigger buffer overflows frequently, check the number of jobs for which [Trigger buffering] is enabled and the trigger condition setting. (☞Section 7.10 Job Setting)

(6) Trigger buffer overflow counts for Jobs 1 to 64 (Buffer memory address: 11520 to 11583)
The cumulative number of trigger buffer overflows for each job is stored.

CHAPTER 4 SETTINGS AND PROCEDURE TO OPERATION

This chapter explains the settings and procedure to operate the MES interface module in a system.

Point

(1) Before use, make sure to read SAFETY PRECAUTIONS at the beginning of this manual.

(2) The mounting and installation environment of the MES interface module are the same as those of a programmable controller CPU.
For details, refer to the following manual.
☞QCPU User's Manual (Hardware Design, Maintenance and Inspection)

4.1 Handling Precautions

This section explains the precautions for handling the MES interface module itself.

(1) Do not drop or apply severe shock to the module case since it is made of resin.

(2) Before touching the module, always touch grounded metal, etc. to discharge static electricity from human body, etc.
Not doing so can cause the module to fail or malfunction.

(3) Tighten the module fixing screws within the following range.

Table 4.1 Tightening torque

Screw	Tightening torque range
Module fixing screw (usually not required) (M3 screw)*1	0.36 to 0.48 N·m

*1 The module can be easily fixed onto the base unit using the hook at the top of the module. However, it is recommended to secure the module with the module fixing screw if the module is subject to significant vibration.

4.2 Settings and Procedure to Operation

This section explains the schematic procedure up to operation for using the MES interface function.

(1) Starting the server computer

Point

Start the server computer, and then the MES interface module.

☞(2) Starting the MES interface module

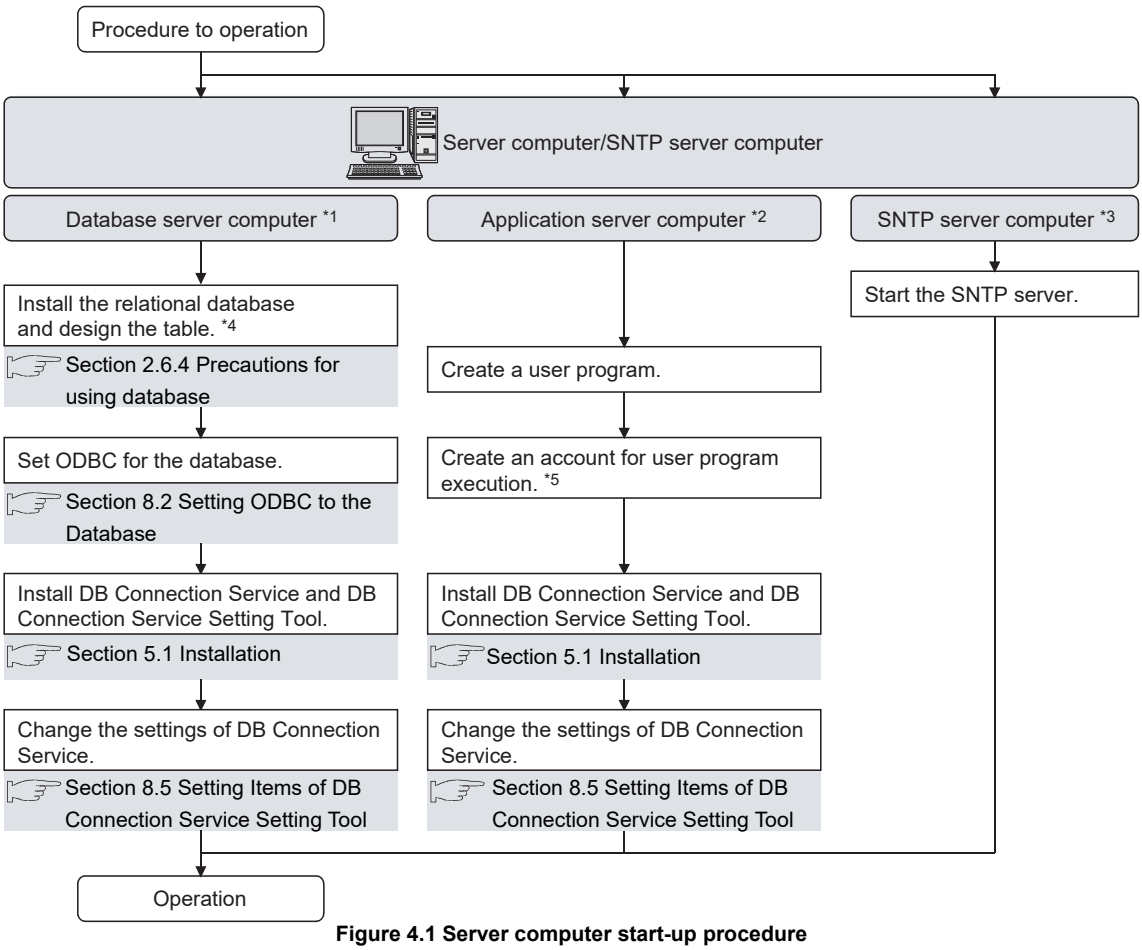


Figure 4.1 Server computer start-up procedure

*1 Be sure to make the settings to use the DB interface function.
☞Section 6.1 DB Interface Function

*2 Make the settings when using the program execution function.
☞Section 6.1.9 Program execution function

*3 Start it when using the SNTP server computer time with time synchronization function.
☞Section 6.3 Time Synchronization Function

*4 Restart a personal computer after installing the relational database.
If not, communication with the MES interface module may be impossible.

*5 Log on to the application server computer with the created account for user program execution once before using the program execution function.
When using the application server computer to which the program execution function is set, log on with an account other than the created account for user program execution.

(2) Starting the MES interface module

Point

Start the server computer, and then the MES interface module.
☞ (1) Starting the server computer in this section

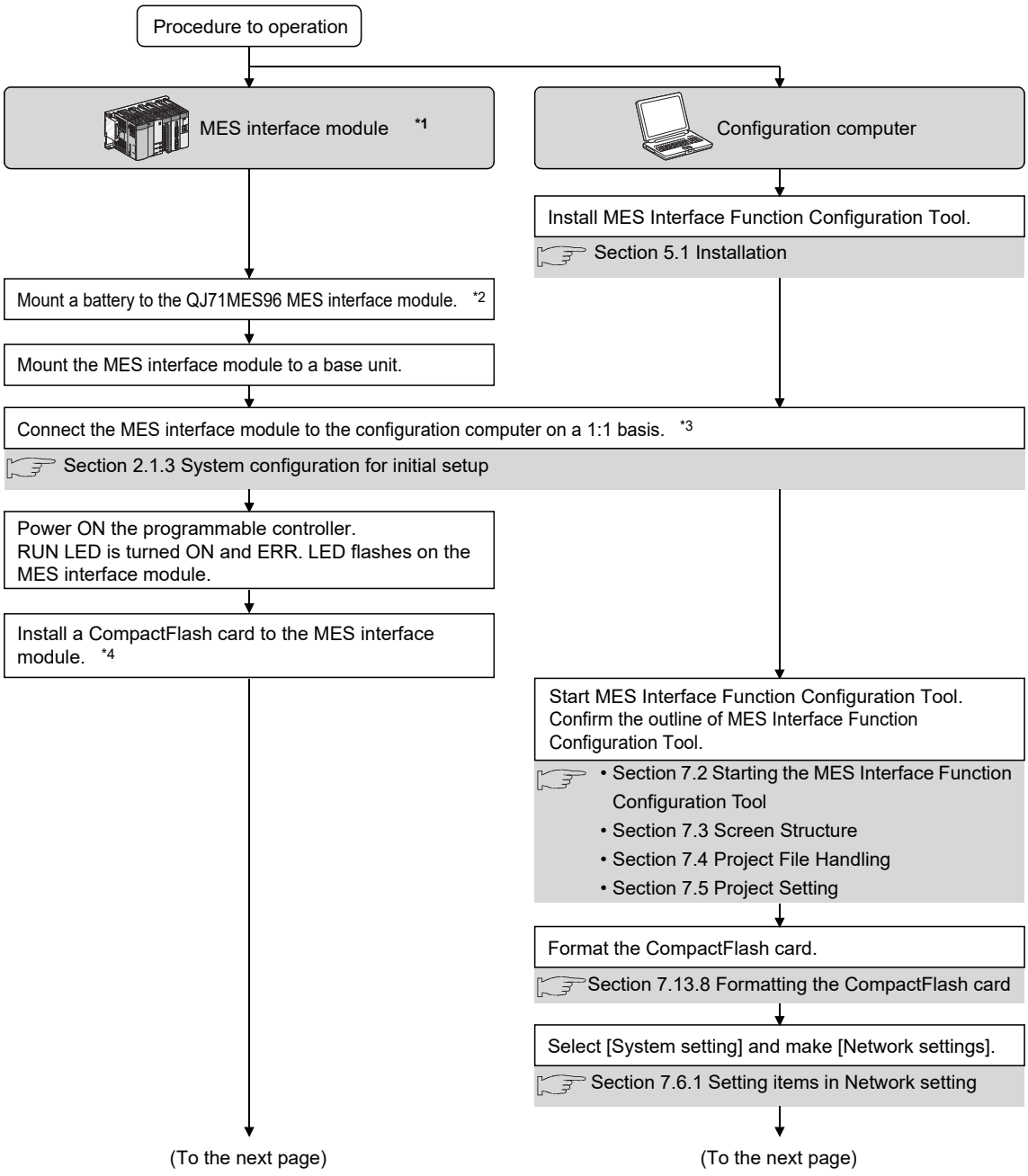


Figure 4.2 MES interface module start-up procedure

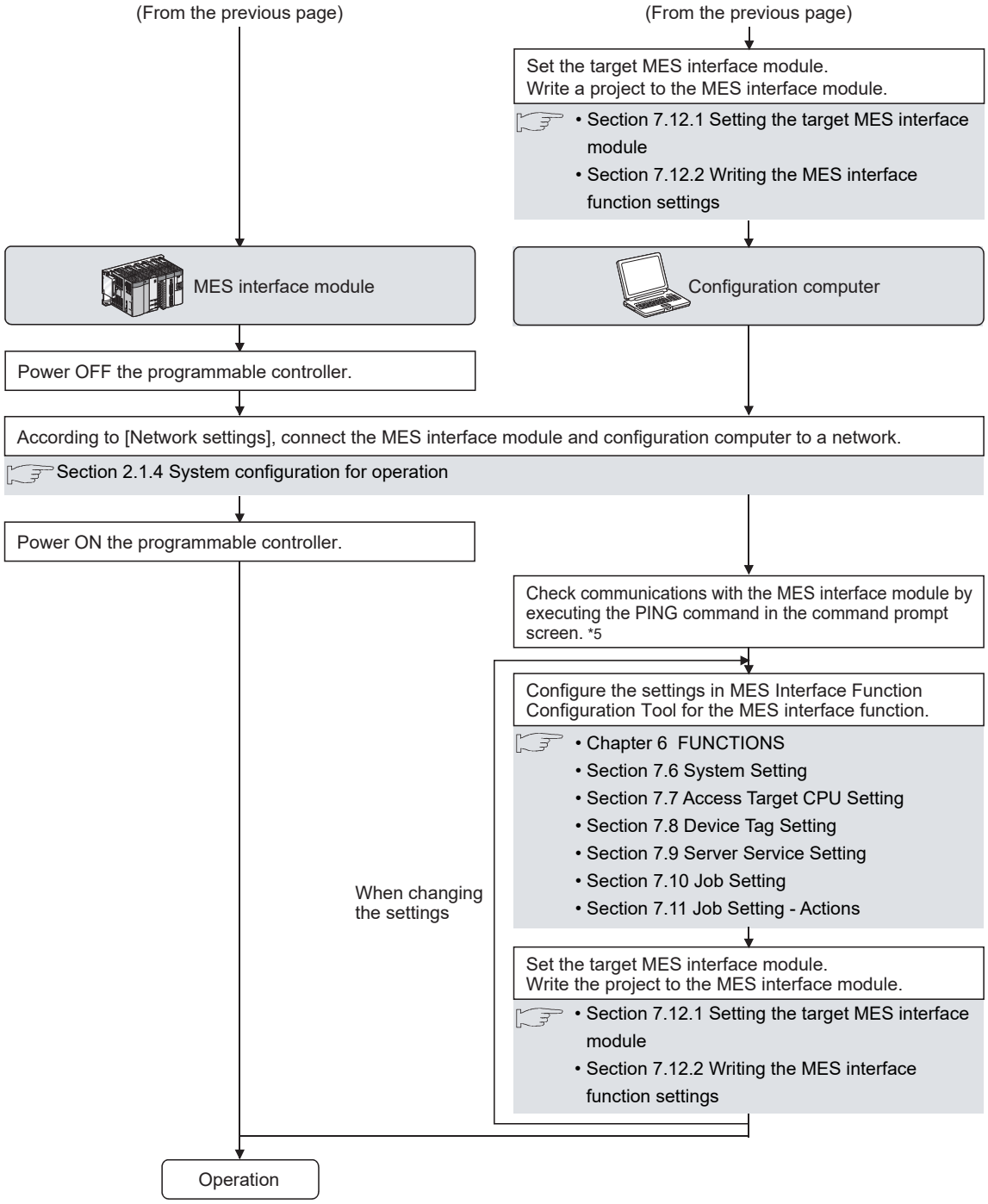


Figure 4.2 MES interface module start-up procedure

*1 As necessary, execute the self-diagnostic test for checking the communication function and hardware of the MES interface module.

☞Section 4.6 Self-diagnostics Test

*2 For a battery, refer to the following:

☞Section 4.8 Battery

☞Section 4.9 Operation without Mounting Battery

☞Section 4.10 Removing Battery for Storage

*3 If an account is forgotten and therefore connection to the MES interface module cannot be made, eject the CompactFlash card from the MES interface module, then follow the procedure in the figure above *3 and subsequent procedure.
For details on how to eject the CompactFlash card, refer to the following.

☞Section 4.7.2 Installation/removing the CompactFlash card

*4 For details on how to insert/eject the CompactFlash card and precautions for use, refer to the following.

☞Section 4.7 CompactFlash Card

*5 When the test has been completed abnormally, check the following and execute the PING command again.
- Network settings for the MES interface module or configuration computer
- Connection status of the MES interface module or configuration computer

4.3 Parts Names

This section explains the parts names of the MES interface module.

(1) With the LED cover closed

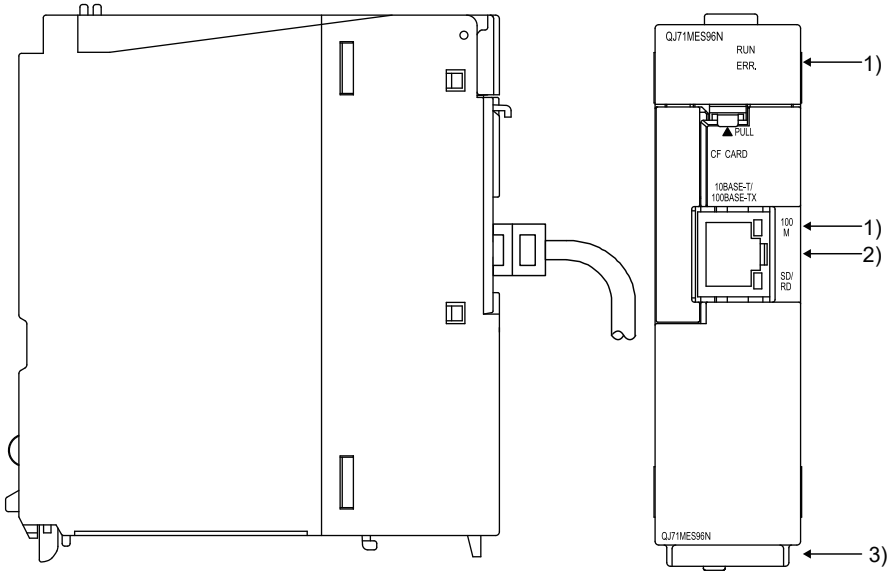


Figure 4.3 With the LED cover closed

(2) With the LED cover open

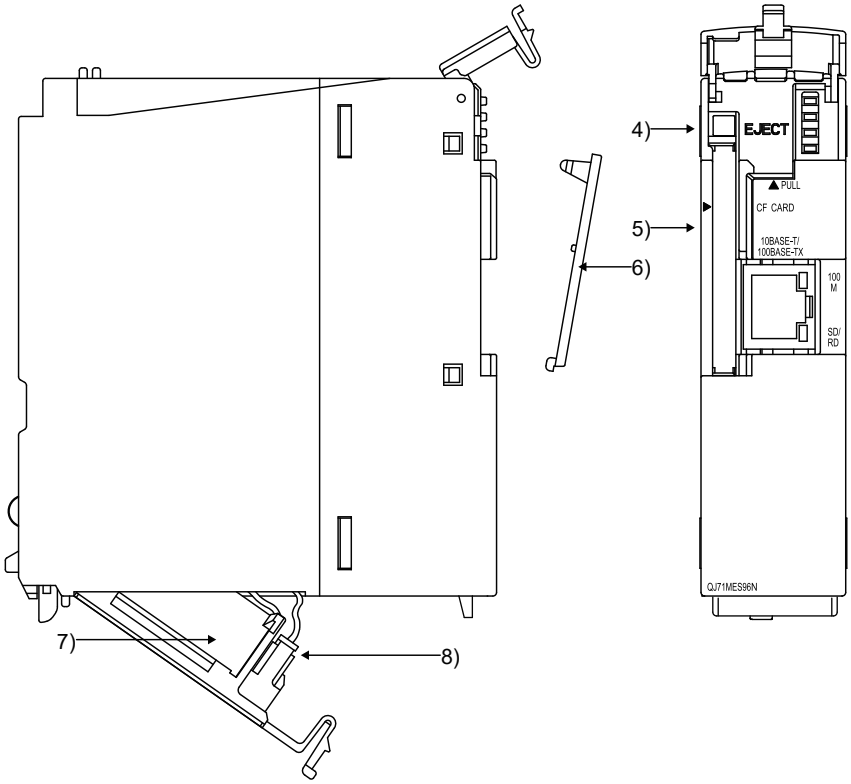


Figure 4.4 With the LED cover open

Table 4.2 Parts names

	Name	Description
1)	Indicator LED	Refer to (3) Indicator LED display contents.
2)	10BASE-T/100BASE-TX interface connector (RJ45)	Used for connecting a MES interface module to the following personal computers: • Configuration computer • Server computer • SNTP server computer (The MES interface module distinguishes 10BASE-T from 100BASE-TX depending on the device on other end.)
3)	Serial number display	Indicates the serial number of the MES interface module.
4)	EJECT button	Used for ejecting a CompactFlash card from the MES interface module.
5)	CompactFlash card slot	Used for installing a CompactFlash card to the MES interface module.
6)	CompactFlash card slot cover	Cover for the CompactFlash card slot
7)	Battery*1	Battery for file protection
8)	Battery connector pin*1	Connector pin for battery lead (The battery lead is disconnected from the connector at shipment to prevent battery consumption.)

*1 Only for QJ71MES96 MES interface module.

(3) Indicator LED display contents

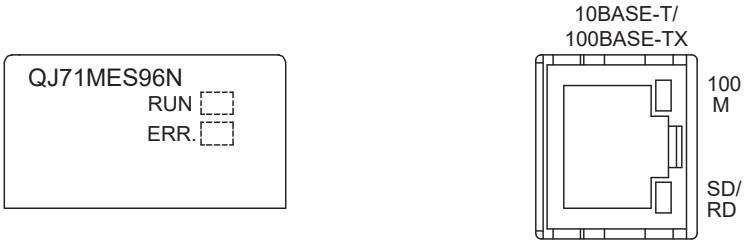


Figure 4.5 LED display

Table 4.3 LED display

Name	LED status	Description
RUN	ON	In normal operation (It may take some time until the RUN LED is turned ON after the module is started.)
	OFF	Watchdog timer error (Hardware error)
ERR.	OFF	In normal status
	ON	Module continuation error
	Flash	Module stop error
100 M	ON	100 Mbps
	OFF	10 Mbps
SD/RD	ON	During data send or data receive
	OFF	Data not transmitted

4.4 Wiring

4.4.1 Wiring

This section explains how to connect cables to the MES interface module.

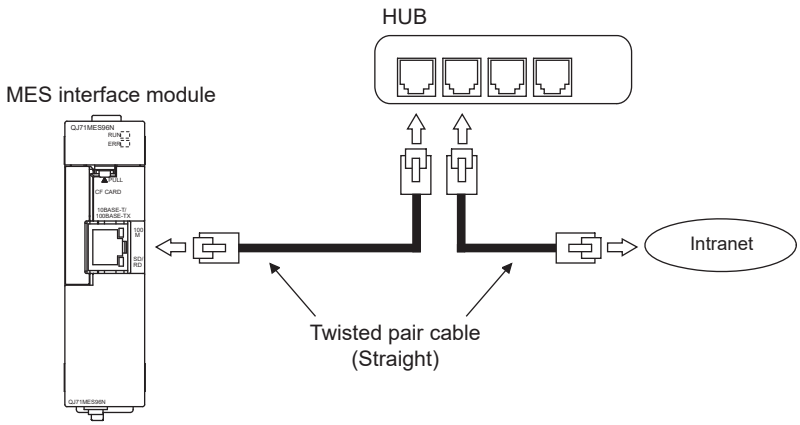


Figure 4.6 Wiring

Remark

For the equipment required for 10BASE-T/100BASE-TX connection and system configuration examples, refer to the following.

☞Section 2.1.4 System configuration for operation

☞Section 2.3 Connection System Equipment

4.4.2 Wiring precautions

To establish a reliable system and fully utilize the MES interface module functions, make wiring so that noise effect can be reduced.

(1) Sufficient safety measures must be taken when constructing the 100BASE-TX and 10BASE-T networks.
Consult a specialist when connecting connection cable terminals, installing main line cables, etc.

(2) Use a 10BASE-T/100BASE-TX connection cable compliant with the following standards.
☞Section 2.3 Connection System Equipment

(3) The bending radius near the connector should be at least four times longer than the cable's outside diameter.

(4) Connect the device on other end according to its specifications.

4.5 Intelligent Function Module Switch Settings

The intelligent function module switches are used to make the mode setting, default operation setting, battery error detection setting, and response monitoring time setting.

1. Select [Project] window → [Parameter] → [PLC parameter] → [I/O assignment] tab of GX Developer.

2. The [I/O assignment] tab is displayed.
   Set the following items for the slot to which the MES interface module is mounted, then click the Switch setting button.

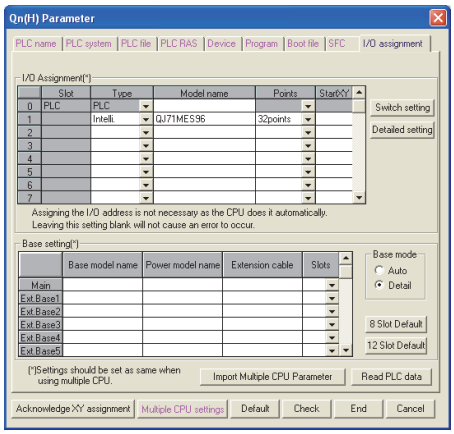


Figure 4.7 [I/O assignment] tab

Table 4.4 [I/O assignment] tab setting items

Item	Description
Type	Select "Intelli.".
Model name	Enter the model name of the module.
Points	Select 32 points.
StartXY	Enter the MES interface module head I/O number.
Detailed setting	For a multiple CPU system, specify the control CPU of the MES interface module.

3. Clicking the Switch setting button displays the [Switch setting for I/O and intelligent function module] dialog box.
   Make the setting with referring to the following descriptions.
   Selecting HEX in Input format facilitates the input.
   After completing the setting, click the End button.

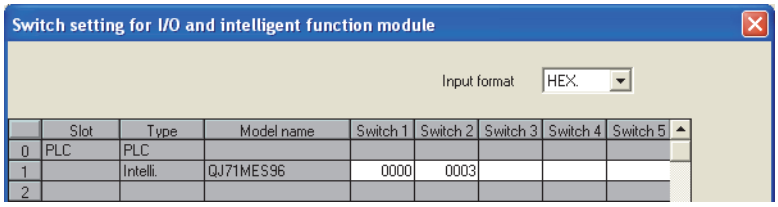


Figure 4.8 [Switch setting for I/O and intelligent function module] dialog box

Table 4.5 Setting items of the [Switch setting for I/O and intelligent function module] dialog box

Switch number	Description
Switch 1	Mode setting
Switch 2	Default operation setting/battery error detection setting
Switch 3 (Lower byte)	Response monitoring time setting
Switch 4 to 5	For system use (Do not set.)

(1) Mode setting (Switch 1)

Select the MES interface module operation mode.

Table 4.6 Mode setting (Switch 1) setting items

Setting number	Item	Description
0000h	Online	Normal operation mode
0001h	Hardware test	Tests the ROM/RAM/intelligent function module switch settings. (☞Section 4.6.2 Hardware test)
0002h	Self-loopback test	Executes the 10BASE-T/100BASE-TX interface self-diagnostics test. (☞Section 4.6.1 Self-loopback test)

(2) Default operation setting/battery error detection setting (Switch 2)

Select the default operation setting/battery error detection setting for the MES interface module.

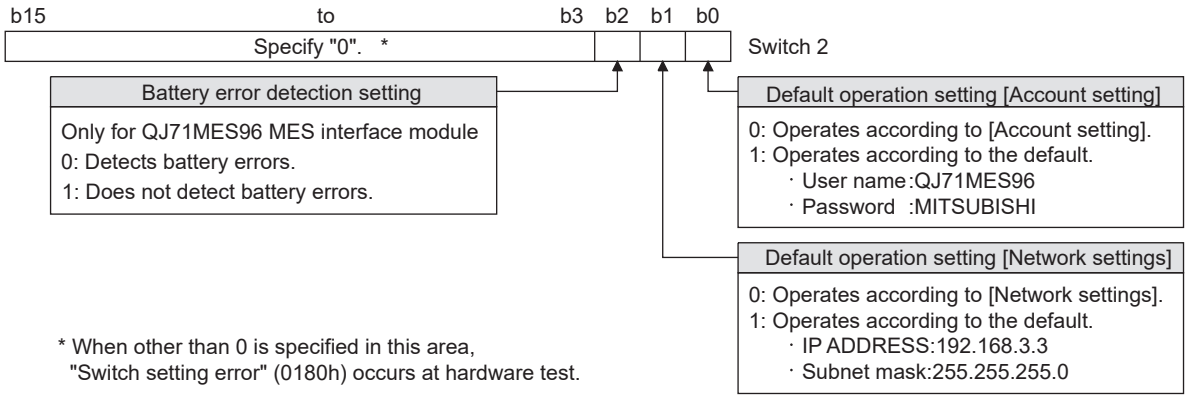


Figure 4.9 Default operation setting/battery error detection setting (Switch 2)

(a) Default operation setting (bit 0, 1)

Set whether to operate [Account setting] and [Network settings] with their default.

1) [Account setting] (bit 0)
   0: Operates according to [Account setting].
   1: Operates according to the default.

2) [Network settings] (bit 1)
   0: Operates according to [Network settings].
   1: Operates according to the default.

Point

Use the default operation setting when changing the settings of the MES interface module connected to the configuration computer on a 1:1 basis.

(b) Battery error detection setting (bit 2)

Set whether to detect battery errors while the QJ71MES96 MES interface module is operating without battery. (☞Section 4.9 Operation without Mounting Battery)

0: Detects battery errors.

1: Does not detect battery errors.

(3) Response monitoring time setting (Switch 3 (Lower byte))

Set the timeout time (Second) from when the MES interface module sends a request to the access target CPU until receiving the reply.

A response time-out error (0002h) occurs if the access target CPU does not respond within the set time.

Setting range: 15 to 255 (Second) (Default value: 15 seconds)

When setting the time between 0 and 14 or making no settings, response monitoring time operates with 15 seconds.

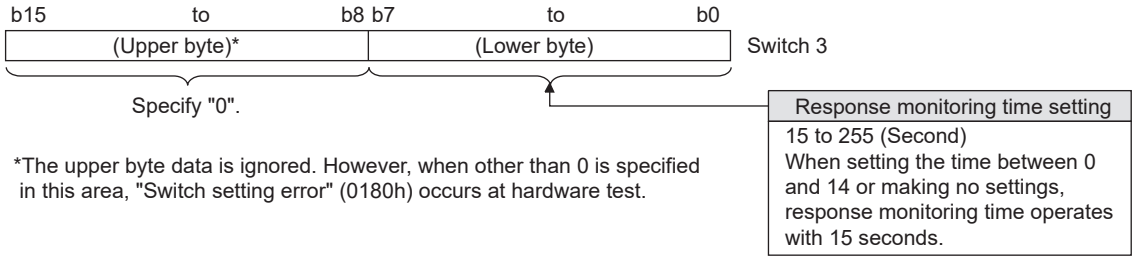


Figure 4.10 Response monitoring time setting (Switch 3 (Lower byte))

Point

After Write to PLC is executed, the intelligent function module switch settings are enabled when turning the power ON from OFF, or resetting the programmable controller CPU.

Remark

For GX Developer operation method, refer to the following manual.

☞GX Developer Operating Manual

4.6 Self-diagnostics Test

This section explains the self-diagnostics test designed for checking the MES interface module communication function and hardware.

4.6.1 Self-loopback test

Execute the self-loopback test for a hardware check including the communication function of the MES interface module (10BASE-T/100BASE-TX interface).

(1) MES interface module operation mode setting

1. In [Switch setting for I/O and intelligent function module] of GX Developer, set "Mode setting" to "Self-loopback test". (Switch 1: 0002h)
2. Match the other intelligent function module switch settings to the setting contents used.

(2) Self-loopback test execution

1. If a cable has been connected to the 10BASE-T/100BASE-TX interface, disconnect it.
2. Set the programmable controller CPU to STOP status.
3. Reset the programmable controller CPU.
4. After the programmable controller CPU is reset, the following self-loopback test is executed automatically.*1 During the test, the ERR. LED flashes.
   1) Self-loopback check
      This test checks whether data can be sent to/received from in the MES interface module.

*1 For a MELSEC iQ-R series system with an MES interface module, do not use the system monitor of GX Works3 during the self-loopback test. It is not necessary to use the system monitor of GX Works3 during the self-loopback test.

(3) Confirmation of the self-loopback test result

1. Check the ERR. LED status to see the self-loopback test result.

Table 4.7 Self-loopback test result

ERR. LED status	Self-loopback test result
OFF	Completed
ON	Failed

2. When the test is completed normally, set the "Mode setting" to "Online" with [Switch setting for I/O and intelligent function module] of GX Developer and reset the programmable controller CPU. (Switch 1: 0000h)
3. When the test has failed, conduct the self-loopback test again.
   If an error occurs again, a possible cause is the hardware failure of the MES interface module. Please consult your local Mitsubishi representative.

4.6.2 Hardware test

Test ROM/RAM/intelligent function module switch settings for the MES interface module.

(1) MES interface module operation mode setting

1. In [Switch setting for I/O and intelligent function module] of GX Developer, set "Mode setting" to "Hardware test". (Switch 1: 0001h)
2. Match the other intelligent function module switch settings to the setting contents used.

(2) Hardware test execution

1. Set the programmable controller CPU to STOP status.
2. Reset the programmable controller CPU.
3. After the programmable controller CPU is reset, the following hardware tests are executed automatically.*1
   During the test, the ERR. LED flashes.
   1) ROM check
      Reads the ROM data and checks the sum.
   2) RAM check
      Reads the test data written to the RAM and checks the consistency.
   3) Switch setting check
      Checks that the intelligent function module switch settings are set within the allowable range. However, the Switch 1 "Mode setting" is not tested.

*1 For a MELSEC iQ-R series system with an MES interface module, do not use the system monitor of GX Works3 during the hardware test. It is not necessary to use the system monitor of GX Works3 during the hardware test.

(3) Confirmation of hardware test result

1. Check the ERR. LED status to see the hardware test result.

Table 4.8 Hardware test result

ERR. LED status	Hardware test result
OFF	Completed
ON	Failed

2. When the test is completed normally, set the "Mode setting" to "Online" with [Switch setting for I/O and intelligent function module] of GX Developer and reset the programmable controller CPU. (Switch 1: 0000h)
3. When the test has failed, check that the switch setting is correctly set, and conduct the hardware test again.
   If an error occurs again, a possible cause is the hardware failure of the MES interface module.
   Please consult your local Mitsubishi representative.

4.7 CompactFlash Card

4.7.1 Precautions for using a CompactFlash card

This section explains the precautions for using the CompactFlash card.

(1) Available CompactFlash cards

Use a CompactFlash card listed in Section 2.3. (☞Section 2.3 Connection System Equipment)

Failure to do so may cause a problem such as data corruption in the CompactFlash card and system stop.

(2) When a CPU module is powered OFF or reset while writing data to a CompactFlash card, the processing to write data to the CompactFlash card may not be completed. It may cause a loss of data during DB buffering, corruption of data in the CompactFlash card that is being accessed, or occurrence of a file system error. The file is automatically recovered when the MES interface module is powered ON again, but it will not succeed in some cases.

The operation, powering OFF or resetting the CPU module after stopping file access, should be considered. For the important data, create backups in other media periodically.

☞Section 4.7.2 (1) Stopping file access

(3) When removing or replacing the CompactFlash card

(a) Be sure to stop file access before removing or replacing the CompactFlash card. (☞Section 4.7.2 Installation/removing the CompactFlash card)

(b) Not doing so may cause the data corruption in the CompactFlash card being accessed or a file system error.

(c) If an error occurs in the CompactFlash card, restore the card.

(d) The setting of information linkage function is saved to the CompactFlash card. When necessary, write those settings to the CompactFlash card after replacing the card.

(4) CompactFlash card diagnostic time

The MES interface module diagnoses (such as file restoration) the installed CompactFlash card when:

1) Powering ON the programmable controller from OFF or resetting the programmable controller CPU

2) Installing the CompactFlash card during power-on

(5) About a CompactFlash card format

(a) For the CompactFlash card format, use the formatting function of MES Interface Function Configuration Tool.

☞Section 7.13.8 Formatting the CompactFlash card

(b) Do not format the CompactFlash card with Windows®.
If doing so by mistake, restore the card according to the CompactFlash card manual.

(6) About a CompactFlash card file
User-original files cannot be stored to the CompactFlash card installed to the MES interface module.
If the user-original files are stored in the card, the characters in directories or files may be corrupted or deleted.

(7) Service life of CompactFlash card
A CompactFlash card has a service life (restriction on the number of writes).
For details, refer to the specifications of each product.
Generally, the service life of a CompactFlash card is dependant on its free space.
Therefore, set an appropriate value to the user-settable DB buffering capacity so that a sufficient free space will be ensured on the CompactFlash card.
☞Section 7.6.4 Setting items in DB buffering setting

4.7.2 Installation/removing the CompactFlash card

This section explains how to install/remove the CompactFlash card.
(Installation of the CompactFlash card)

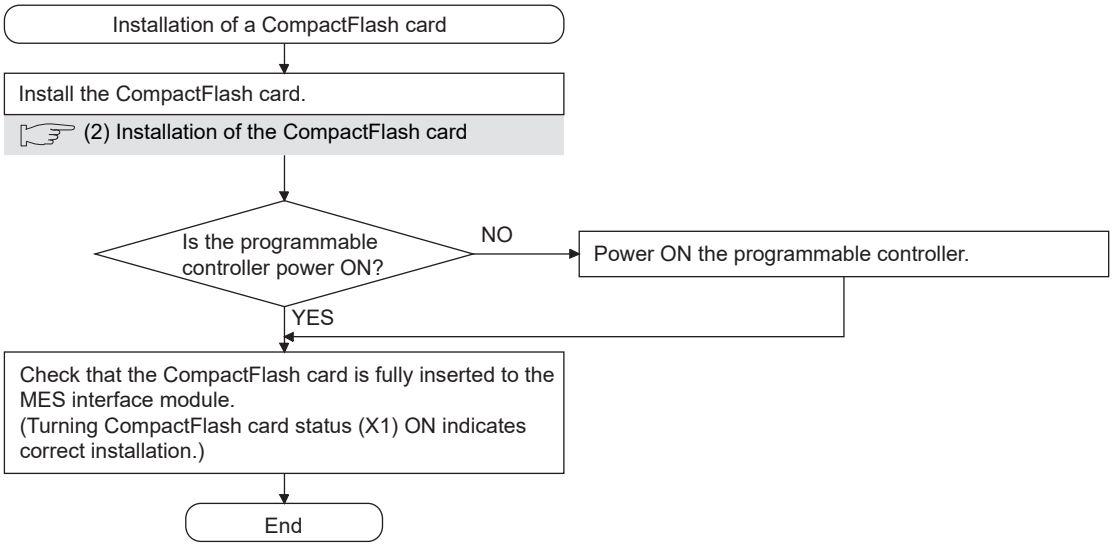


Figure 4.11 Installation of the CompactFlash card

(Removal or replacement of the CompactFlash card)
Before removing or replacing the CompactFlash card, be sure to stop file access by the following procedure.

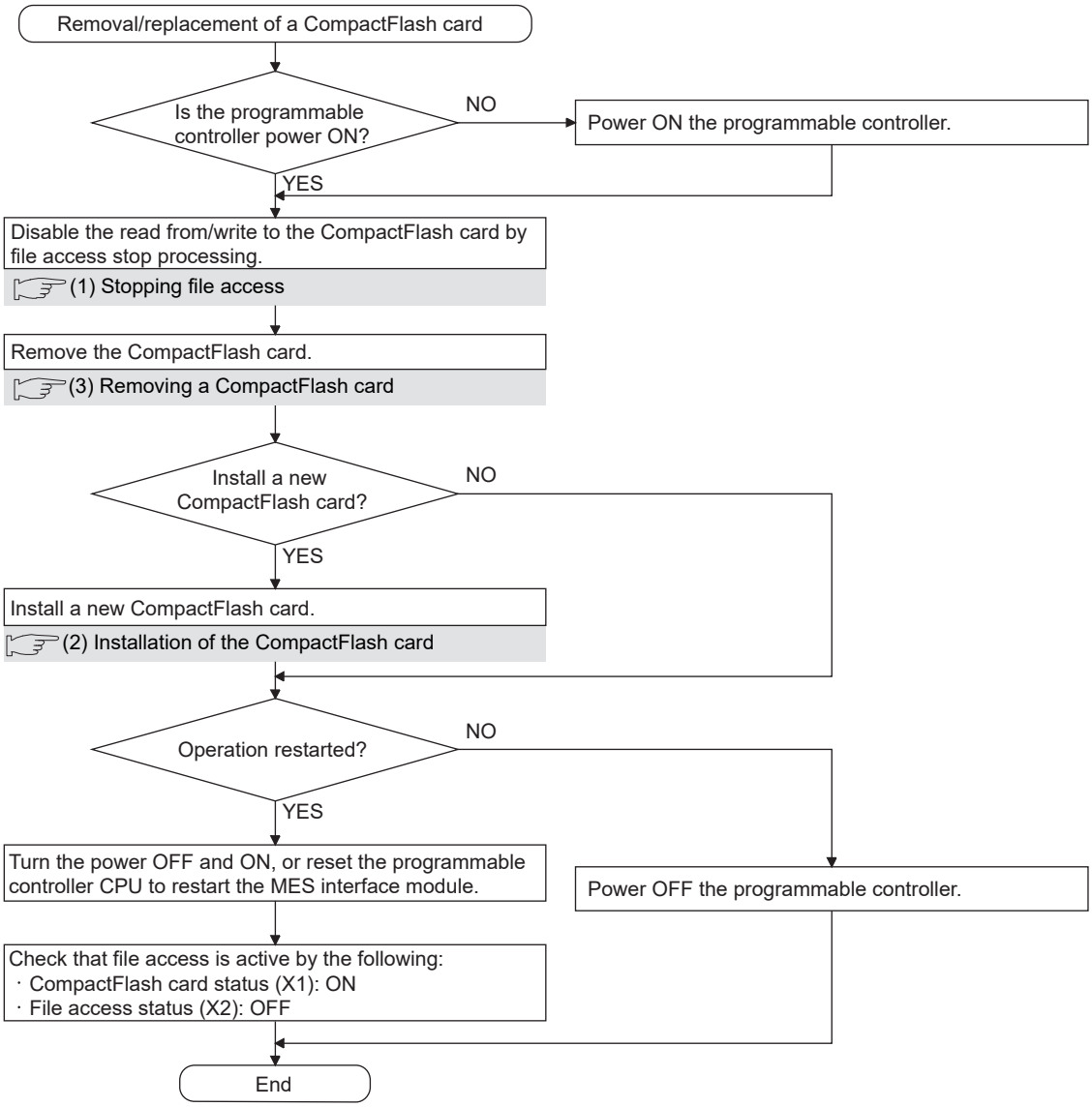


Figure 4.12 Removal or replacement of the CompactFlash card

Point

Not following the procedure may cause the data corruption in the CompactFlash card being accessed or a file system error.

(1) Stopping file access

1 Stop file access.
- Turn the File access stop request (Y2) ON from OFF.

2 Check the file access stop by the following:
- Check the CompactFlash card status (X1) is OFF.
- Check the File access status (X2) is ON.
- Turn the File access stop request (Y2) OFF from ON.

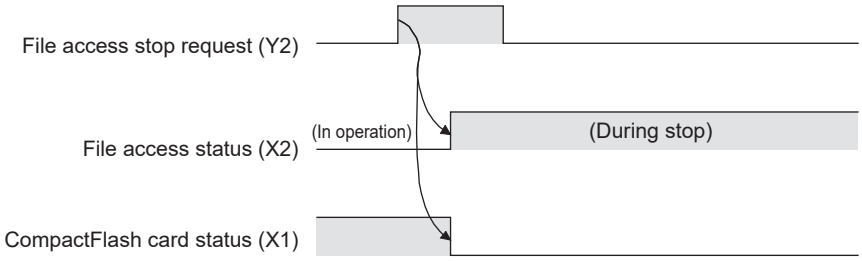


Figure 4.13 File access stop processing

(2) Installation of the CompactFlash card

1 Open the LED cover on the front of the MES interface module, then remove the CompactFlash card slot cover.

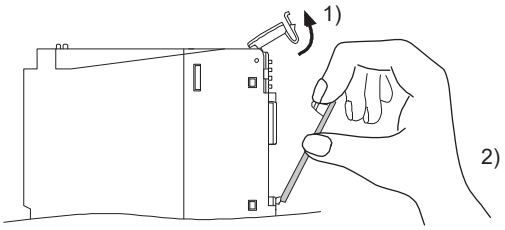


Figure 4.14 CompactFlash card slot cover removal

- Put the finger at the bottom of the LED cover that is on the front of the MES interface module, and lift the LED cover to open.
- Put the finger at the top of the CompactFlash card slot cover and then remove the cover.

2 Install the CompactFlash card.
When installing the CompactFlash card into the MES interface module, pay attention to the orientation of the card.
Push the CompactFlash card securely into the slot until it is flush with the EJECT button.

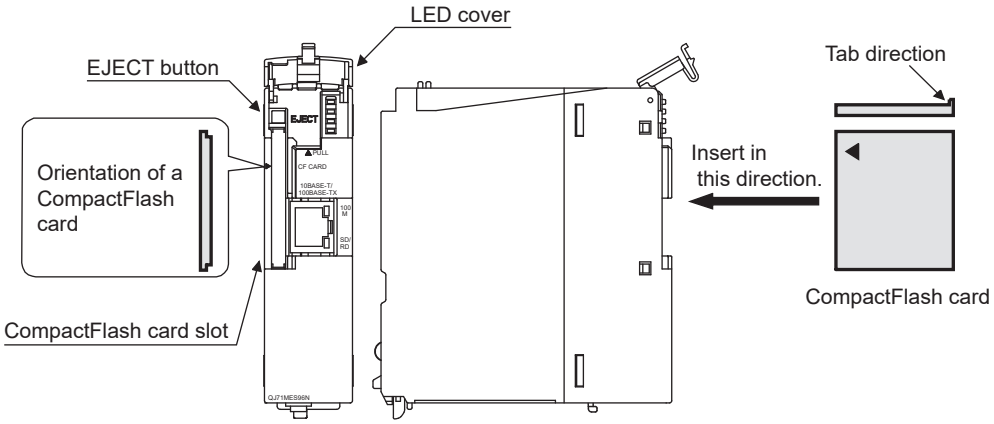


Figure 4.15 Installation of a CompactFlash card

3 Lower the LED cover on the front of the MES interface module until it clicks.
When a CompactFlash card is installed, the CompactFlash card slot cover cannot be attached to the MES interface module.
Save the removed CompactFlash card slot cover carefully.

(3) Removing a CompactFlash card

1 Open the LED cover on the front of the MES interface module, then remove the CompactFlash card.

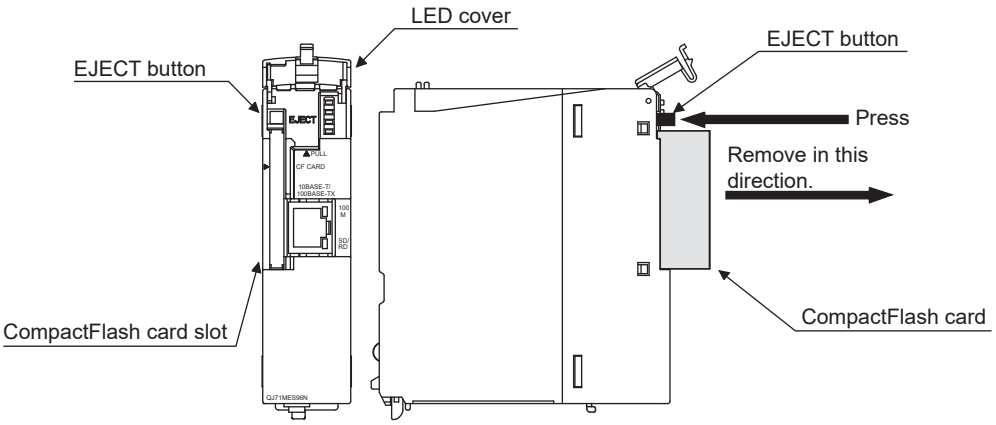


Figure 4.16 CompactFlash card removal

- Put the finger at the bottom of the LED cover that is on the front of the MES interface module, and lift the LED cover to open.
- When ejecting the CompactFlash card from the MES interface module, press the EJECT button to push the CompactFlash card out.

2 Attach the CompactFlash card slot cover and close the LED cover on the front of the MES interface module.

- Attach the CompactFlash card slot cover.
  When the CompactFlash card is not installed, attach the CompactFlash card slot cover.
- Lower the LED cover on the front of the MES interface module until it clicks.

4.8 Battery

This section explains the mounting and replacement of the battery.

4.8.1 Battery specifications

This section shows the specifications of the QJ71MES96 MES interface module battery.

Table 4.9 Battery specifications

Item	Description
	Q6BAT
Type	Manganese dioxide lithium primary battery
Initial voltage	3.0 V
Nominal current	1800 mAh
Battery life when stored	Actual life of 5 years (room temperature)
Battery life when used	☞Section 4.8.3 Battery replacement
Lithium content	0.57 g*1
Application	File protection

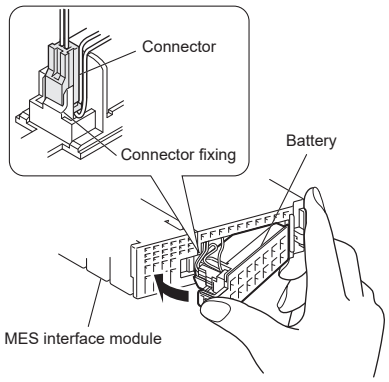
*1 The lithium content of batteries manufactured in July 2017 or earlier differs from this list. For details, refer to the following.
☞Technical bulletin No. FA-A-0242

Remark

For the battery directive in EU member states, refer to Appendix 9.

4.8.2 Mounting of battery

The QJ71MES96 MES interface module is shipped with the battery connector disconnected. Before using the module, connect the battery connector.



1. Open the battery cover located on the bottom of the module.
2. Check that the Q6BAT is correctly installed.
3. Check the direction and securely insert the connector plug of the Q6BAT to the jack of the module.
4. Close the battery cover.

Point

- Firmly push the battery connector all the way in to the connector pin.
- When operating without battery mounted, refer to the following.
  ☞Section 4.9 Operation without Mounting Battery
  Not following the procedure may cause the data corruption in the CompactFlash card being accessed or a file system error.

4.8.3 Battery replacement

This section explains how to replace the QJ71MES96 MES interface module battery.
The battery is used for file protection.
If the voltage of the battery has dropped, the battery must be replaced.

(1) Checking the module for a battery voltage drop

1. Check for a battery voltage drop in the Battery status area (Buffer memory address: 7).

2. The following results from battery errors.
   - "1 (ON)" is written to the Battery status area (Buffer memory address: 7).
   - The ERR. LED is turned ON, and ERR. LED status (X10) and Other error (X1C) are turned ON.

   The file contents will not be erased immediately after the battery error occurrence, but may be erased if the battery error is not recognized.

3. Finish the battery replacement in the total power failure compensation time since the Battery status area is turned ON is within the specified time.

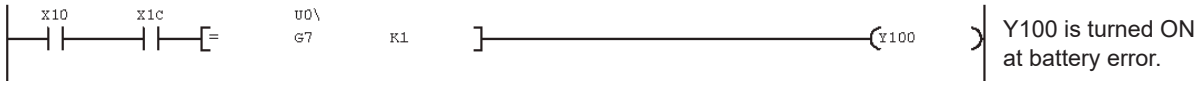


Figure 4.17 Checking for a battery voltage drop

(2) Battery (Q6BAT) life

(a) The following shows the service life of the QJ71MES96 MES interface module battery.

Table 4.10 Battery life

Power-on time ratio *1	Battery life		
	Guaranteed value *2	Actual service value (Reference value)*3	Guaranteed time after battery error *4
0%	26,000 hours 2.96 years	43,800 hours 5 years	1,500 hours 62 days
30%	37,142 hours 4.23 years	43,800 hours 5 years	1,500 hours 62 days
50%	43,800 hours 5 years	43,800 hours 5 years	1,500 hours 62 days
70%	43,800 hours 5 years	43,800 hours 5 years	1,500 hours 62 days
100%	43,800 hours 5 years	43,800 hours 5 years	1,500 hours 62 days

*1 The power-on time ratio denotes the ratio of power-on time in a day (24 hours).
(If the power is ON for 12 hours and OFF for 12 hours, the power-on time ratio is 50%.)

*2 The guaranteed value represents a battery life at 70°C, which is calculated based on characteristic values of manufacturer-supplied memories (SRAM) and on the assumption of storage within the ambient temperature range of -25 and 75°C (operating ambient temperature of 0 to 55°C).

*3 The actual service value (reference value) represents a battery life that is calculated based on the values measured at storage ambient temperature of 40°C. This value is intended for reference only, as it varies with characteristics of the memory.

*4 In either of the following status, the guaranteed time after power-off is 3 minutes.
- The battery connector is disconnected.
- The battery lead wire is broken.

(b) The battery (Q6BAT) life is 5 years when disconnected to the module.

(c) Even though the data is retained for the specified time after the Battery status area (Buffer memory address: 7) is turned ON, replace the battery as soon as possible.
However, it is recommended to replace the battery periodically according to the usage status, even when the battery error has not yet occurred.

Point

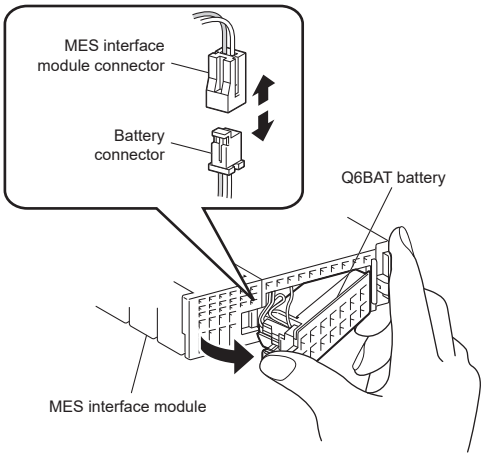
If the battery is not replaced after a battery error occurs, data in the CompactFlash card being accessed may be corrupted or a file system error may occur.

(3) Battery replacement procedure

When the life of the battery comes to an end, replace the battery, following the procedure below.

The programmable controller must be powered ON for 10 minutes or more before removing the battery.

The module holds the data on the memory for three minutes (backup power time) by the capacitor even after the battery is removed. Note that the data on the memory may be erased if the backup power time is exceeded. Replace the battery within three minutes.



1. Stop file access.
   (Turn the File access stop request (Y2) ON from OFF.)
2. Confirm that file access has stopped.
   (Check the File access status (X2) is turned ON.)
3. Power off the programmable controller.
4. Remove the module from the base unit.
5. Open the battery cover located on the bottom of the module.
6. Disconnect the connector plug of the Q6BAT from the jack of the module. When disconnecting the connector, hold the connector part so that the cables are not damaged.
7. Remove the Q6BAT from the battery cover.
8. Set a new Q6BAT to the cover in the right direction (with the positive terminal of the battery facing the connector holder).
9. Securely insert the connector plug of the Q6BAT to the jack of the module. Set the connector to the connector holder on the cover.
10. Close the battery cover.
11. Mount the module back on the base unit.
12. Power on the programmable controller.
13. Check that the Battery status area (Buffer memory address: 7) is off.

    If the Battery status area is off, the battery has been replaced successfully. If the Battery status area is on, the battery may not be installed properly. Repeat the procedure from step 1. If it remains on, the possible cause is a hardware failure of the battery. Perform the procedure with a different battery.

4.9 Operation without Mounting Battery

This section explains operation without mounting a battery to the MES interface module.

(1) Shutdown operation required when the programmable controller is powered OFF

Make sure to perform shutdown operation when the programmable controller is powered OFF regardless of whether the battery is mounted or not.
Otherwise, data such as setting information and system data may be lost.

(a) Operation procedure

1. Stop file access.
   (Turn the File access stop request (Y2) ON from OFF.)
2. Confirm that file access has stopped.
   (Check the File access status (X2) is turned ON.)
3. Power OFF the programmable controller CPU.

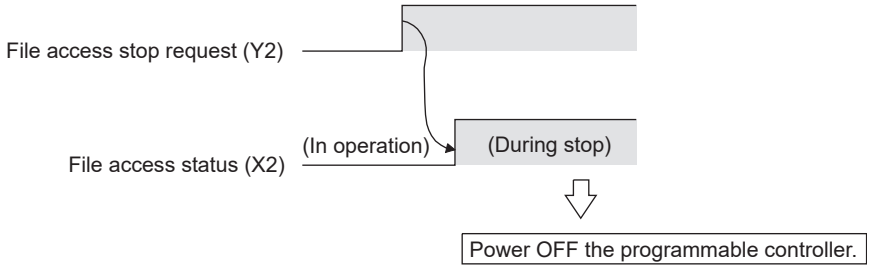


Figure 4.18 Shutdown operation required when the programmable controller is powered OFF

Point

If the shutdown operation is not performed before powering OFF a programmable controller, data in the CompactFlash card being accessed may be corrupted or a file system error may occur.

(2) Making battery error undetected during operation without battery

1. A battery error occurs when the file protection battery is not mounted to the QJ71MES96 MES interface module.
   - "1 (ON)" is written to the Battery status area (Buffer memory address: 7).
   - The ERR. LED is turned ON, and ERR. LED status (X10) and Other error (X1C) are turned ON.
2. Battery errors are not detected by turning "ON" the battery error detection setting (Switch 2 (Bit 2)) with intelligent function module switch setting of GX Developer. Refer to the following for the intelligent function module switch settings of GX Developer.

☞Section 4.5 Intelligent Function Module Switch Settings

4.10 Removing Battery for Storage

When storing the QJ71MES96 MES interface module without mounting a battery, make sure to perform the shutdown operation, then power OFF the programmable controller and remove the battery.

Point

Not doing so may cause the data corruption in the CompactFlash card being accessed or a file system error.

(a) Operation procedure

1. Mount the programmable controller CPU and QJ71MES96 MES interface module on the base unit and power ON the programmable controller CPU.
2. Stop file access.
   (Turn the File access stop request (Y2) ON from OFF.)
3. Confirm that file access has stopped.
   (Check the File access status (X2) is turned ON.)
4. Power OFF the programmable controller CPU.
5. Remove the battery from the QJ71MES96 MES interface module.

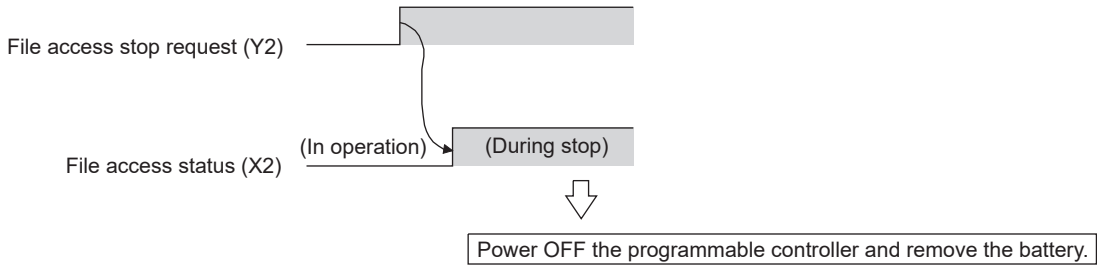


Figure 4.19 Removing battery for storage

CHAPTER 5 INSTALLATION AND UNINSTALLATION

This chapter explains how to install the execution software of MX MESInterface to each operating environment and how to uninstall it.

5.1 Installation

This section explains how to install MX MESInterface.

(1) MX MESInterface installation procedure

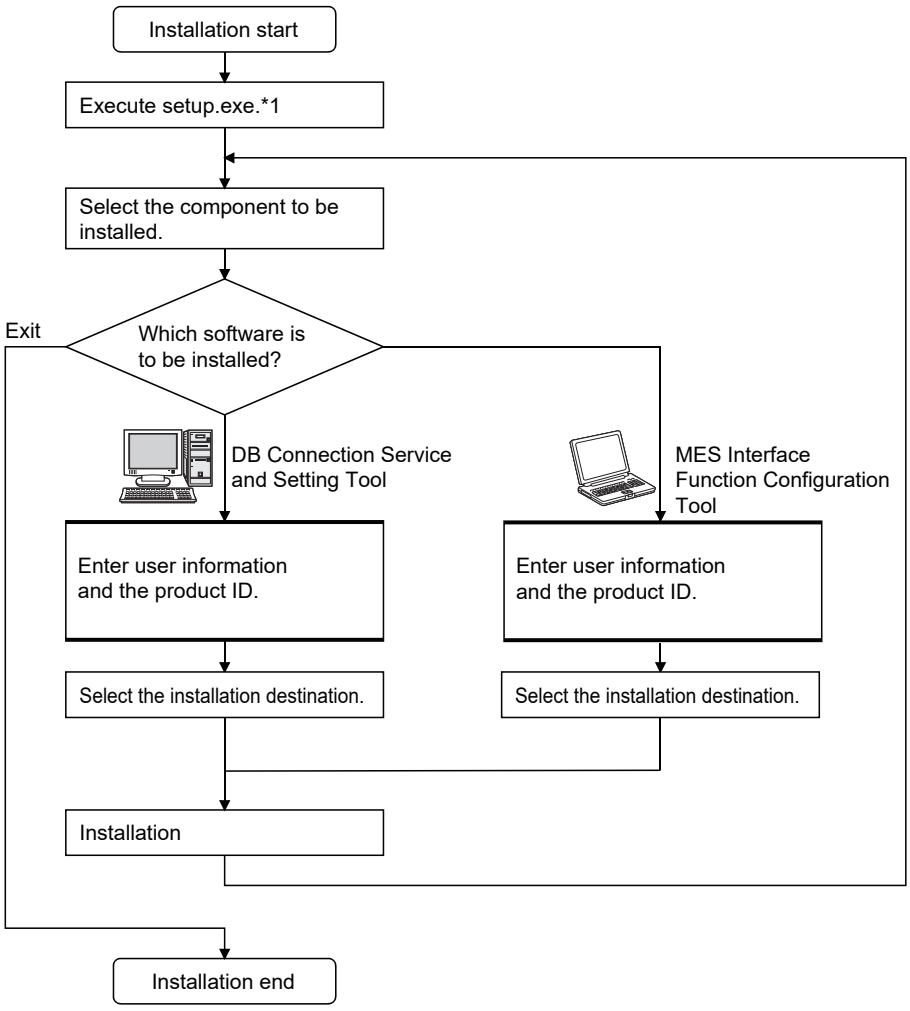


Figure 5.1 MX MESInterface installation procedure

*1 When installing DB Connection Service and DB Connection Service Setting Tool Version 1, run the setup.exe in the SUPPORT folder.

Point

If a confirmation message for overwriting DLL files is displayed at installation, click the Yes button and overwrite the DLL files.
Not overwriting the DLLs may fail to execute MX MESInterface correctly.

(2) MX MESInterface installation

For system configurations, refer to the following:

☞Section 2.1.2 System configuration for installation

Point

(1) Before installing MX MESInterface, close any other applications running on Windows®.

(2) The installer may not work normally because the update program of operating system or other companies' software such as Windows® Update and Java update may start automatically.
Please install the driver after changing the setting of the update program not to start automatically.

(3) When installing MX MESInterface, log on as a user with Administrator authority.

(4) When installing MELSOFT to a Windows Vista®, Windows® 7, Windows® 8, and Windows® 8.1 based personal computer, read the technical bulletin FA-A-0008, FA-A-0091, and FA-A-0153 respectively.

(5) When using Microsoft Access as a database or when using MX MESInterface whose software version is "1.16S" or earlier without any modification of the setting of ODBC, select "32-bit".

(The following screens are for Microsoft® Windows® 7 Professional Operating System.)

(Start)

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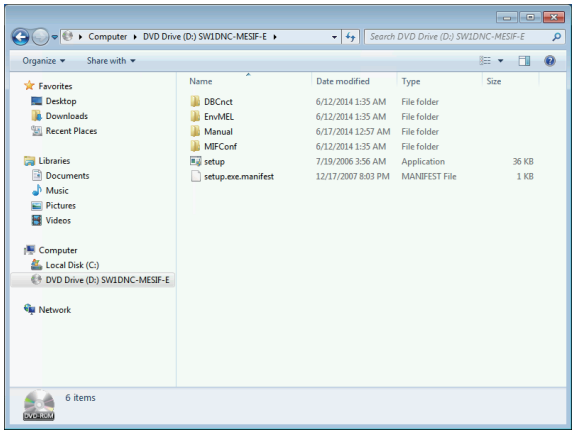
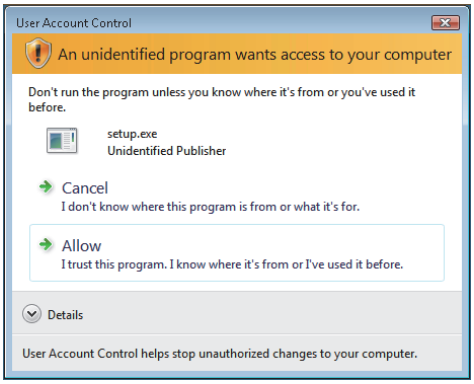
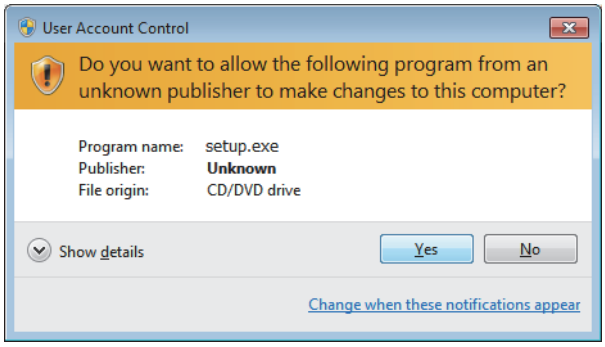


1 Start Windows Explorer, then click the drive in which the CD is loaded.
Double click "setup.exe".
To display Windows Explorer, right click [Start], then select [Explore].



(When using the operating system with the User Account Control function)
When the screen on the left is displayed, click "Allow".



When the screen on the left is displayed, click the Yes button.

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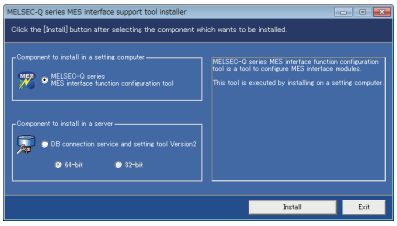
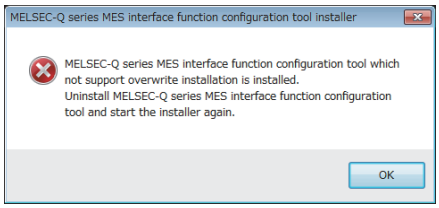
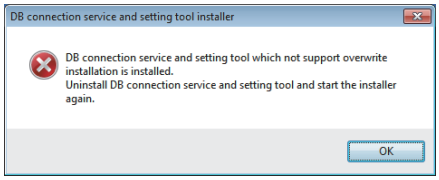


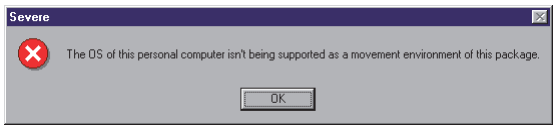
2 The dialog box for selecting the component to be installed is displayed.
Select the component to be installed with the radio button, then click the Install button.
The procedures up to step 8 are common for each tool.



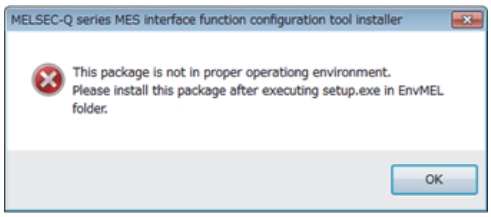
If the left message*1 appears, click the OK button and after uninstalling MX MESInterface, install this product.



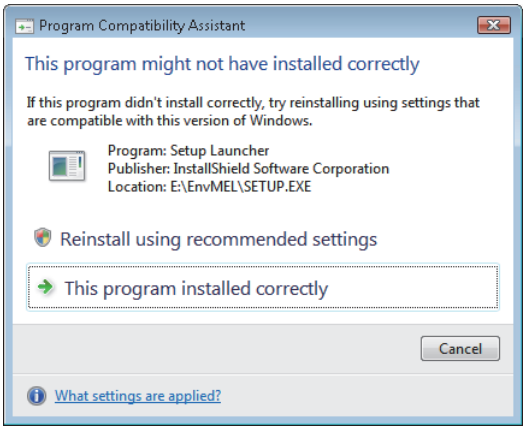
*1 When installing DB Connection Service Setting Tool, the screen shown on the left is displayed.



If the left message appears, install this product on a computer to which the operating system compatible with the product is installed.
☞Section 2.4 Operating Environment



If the left message appears, execute \EnvMEL\SETUP.EXE in the CD for this product.
After executing SETUP.EXE, install this product.
If the product is not installed correctly at the time, restart the computer.
After completion of the "Environment of MELSOFT" installation, the "Program Compatibility Assistant" shown on the left may appear.
Click "This program installed correctly" and close the window.
Do not select "Reinstall using recommended settings", because the installer installs an incorrect module.



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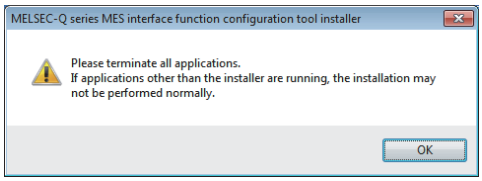
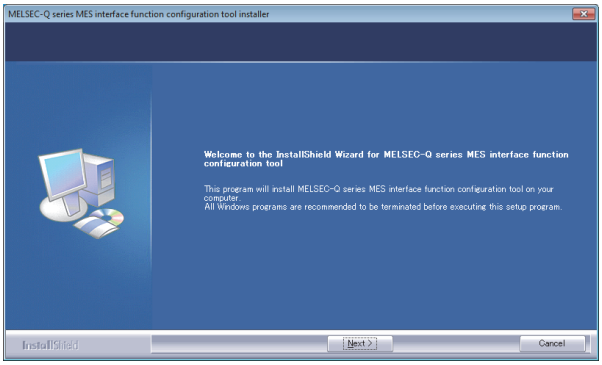
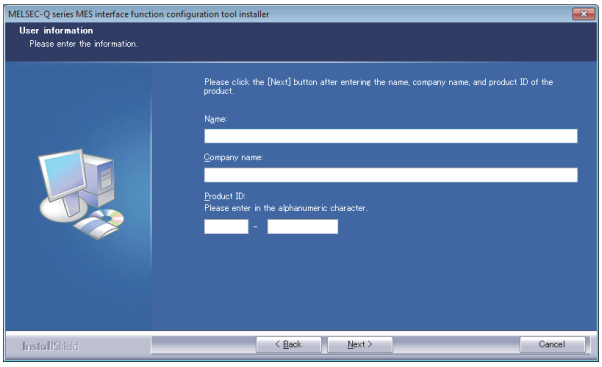


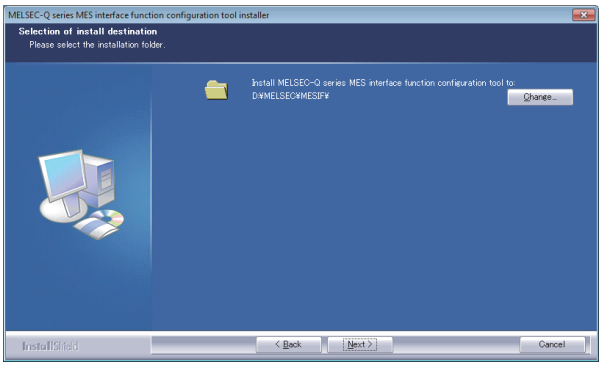
3 The left screen appears. Check that all applications have been closed, then click the OK button.
If any applications are running, close them all.



4 Setup starts.
The left screen appears. Check the description, then click the Next > button.



5 Enter a name, company name, and product ID of the product, then click the Next > button.
The product ID is shown on the software registration card that came with the product.



6 Specify the folder for installation destination.
When using the default folder, click the Next > button.
To change the folder, click the Browse... button, then specify the drive and folder for installation destination.

REMARKS
Up to 100 characters can be used for the installation destination.

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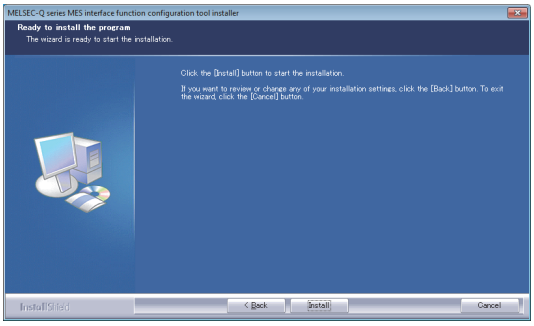

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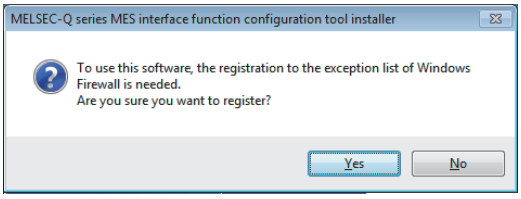


7 The installation confirmation screen is displayed.

To install it, click the Install button.
If you want to review any of your installation settings, click the <Back button.

8 For the following operation systems, the automatic registration screen to register this product to the Windows Firewall exception list automatically shown on the left is displayed.

- Windows® 7 or later client operating system
- Windows Server® 2008 R2 or later server operating system

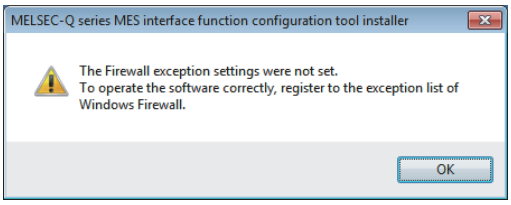
To register, click the Yes button.

If do not register, click the No button.

REMARKS

If the automatic registration is not performed with the operation system above, or the operation system other than above is used, refer to the following section and disable the firewall function after the completion of the installtion.

(3) Settings when Windows Firewall function is enabled in this section



If the automatic registration is not performed with the operating system above, the screen shown on the left is displayed.

Click the OK button.

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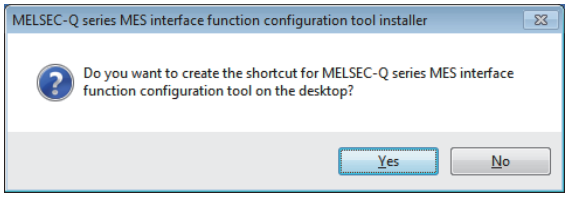

9 When installing MES Interface Function Configuration Tool, the screen shown on the left is displayed.

To create the shortcut on the desktop, click the Yes button.

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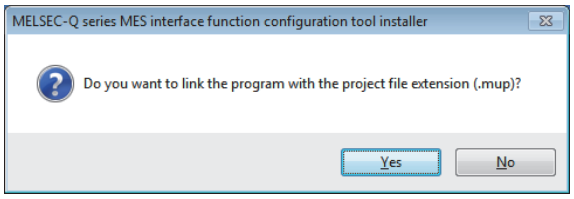

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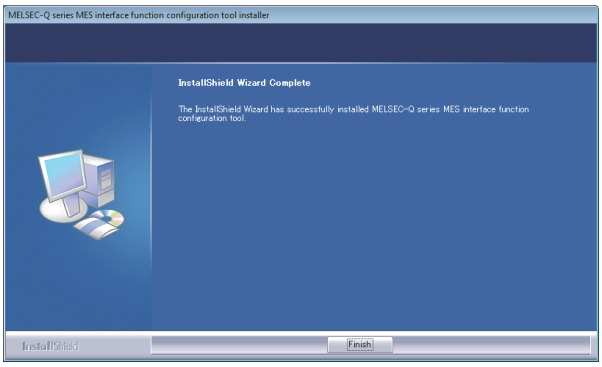

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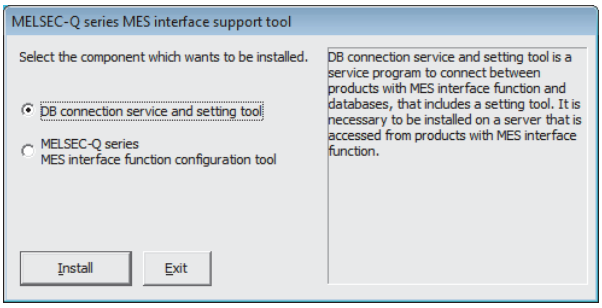


↓

(End)

10 When installing MES Interface Function Configuration Tool, the screen shown on the left is displayed.
To associate the extension (.mup) of a project file with a program, click the Yes button.

11 When the left screen appears, installation is complete.
Click the Finish button.

12 The dialog box for selecting the component to be installed is displayed.
When installing the other software, select the component to be installed with the radio button, then click the Install button.
When the installation is complete, click the Exit button.

After installing MES Interface Function Configuration Tool and DB Connection Service Setting Tool, the following icons are registered.*1

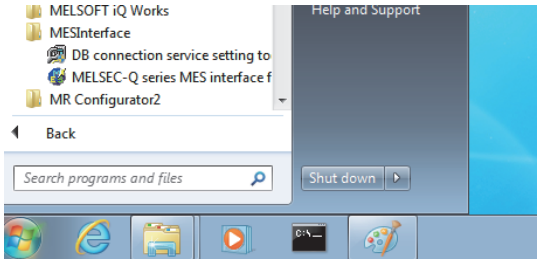


Figure 5.2 Icon registration

*1 For Windows Vista® or later, "DB Connection Service Client" is installed, and its icon (DBCnctClient) is shown in the list appeared by clicking [Startup].

(3) Settings when Windows Firewall function is enabled

If the firewall function of the operating system and the security software is enabled, make one of the following settings.

1) Disable the firewall function.
2) Set the following programs to Exception.

Program Name		Execution file storage location (if a folder for installation destination is C:\MELSEC\MESIF\)
MES Interface Function Configuration Tool is installed.	MES Interface Function Configuration Tool	C:\MELSEC\MESIF\MIFConfigTool.exe
DB Connection Service and DB Connection Service Setting Tool Version 2 (64-bit) is installed.	DB Connection Service Setting Tool Version 2 (64-bit)	C:\MELSEC\MESIF\DBCnctConf2_64.exe
	DBConnector2_64	C:\MELSEC\MESIF\DBConnector2_64.exe
	DBCnctClient2_64	C:\MELSEC\MESIF\DBCnctClient2_64.exe
DB Connection Service and DB Connection Service Setting Tool Version 2 (32-bit) is installed.	DB Connection Service Setting Tool Version 2 (64-bit)	C:\MELSEC\MESIF\DBCnctConf2_32.exe
	DBConnector2_32	C:\MELSEC\MESIF\DBConnector2_32.exe
	DBCnctClient2_32	C:\MELSEC\MESIF\DBCnctClient2_32.exe
DB Connection Service and DB Connection Service Setting Tool Version 1 is installed.	DB Connection Service Setting Tool Version 1	C:\MELSEC\MESIF\DBCnctConf.exe
	DBConnector	C:\MELSEC\MESIF\DBConnector.exe
	DBCnctClient*1	C:\MELSEC\MESIF\DBCnctClient.exe

*1 The settings are required for Windows Vista® or later.

For the setting method, refer to the manual or online help of the operating system or security software used.

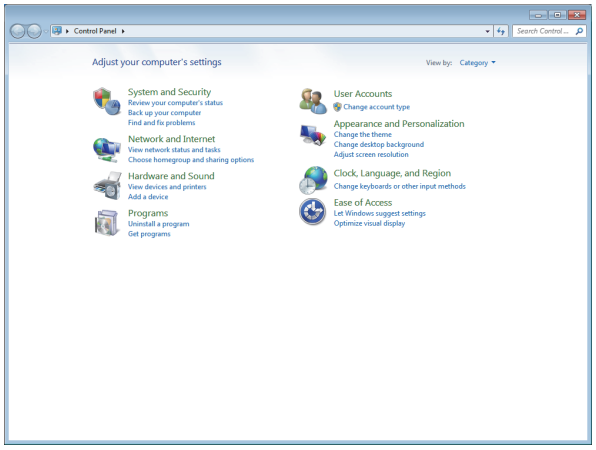
5.2 Uninstallation

This section explains how to uninstall MX MESInterface.

(1) MES Interface Function Configuration Tool, DB Connection Service, and DB Connection Service Setting Tool

(The following screens are for Microsoft® Windows® 7 Professional Operating System.)

(Start)
↓



1 From the Control Panel, select [Add or Remove Programs].
To display the Control Panel, select [Start] → [Control Panel].

REMARKS

For other operating system, select the following item from the Control Panel.

- Windows® 2000, Windows® 2000 Server, [Add/Remove Applications]
- Windows Server® 2003 [Add or Remove Programs]
- Windows Server® 2008 [Programs and features]
- Windows Vista® or later [Uninstall a program]

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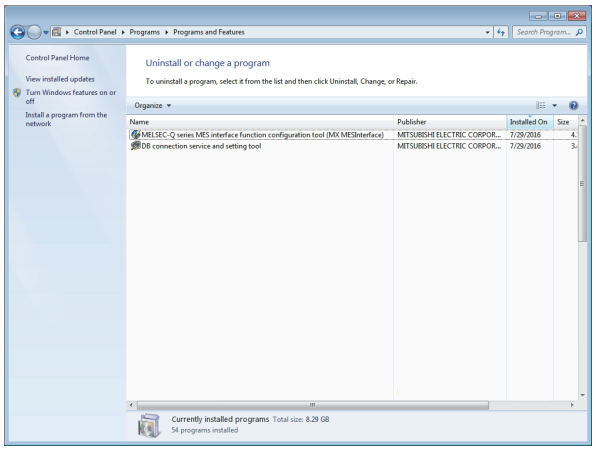


2 Select the program to be deleted and click the Change/Remove button.

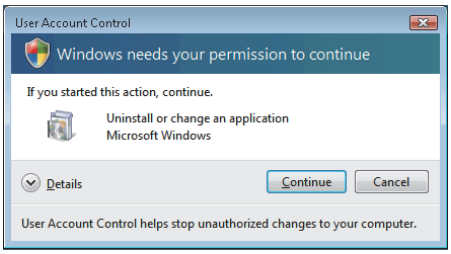
＜For DB Connection Service and Setting Tool＞
DB connection service and setting tool*1

＜For MES Interface Function Configuration Tool＞
MELSEC-Q series MES interface function configuration tool (MX MESInterface)*2

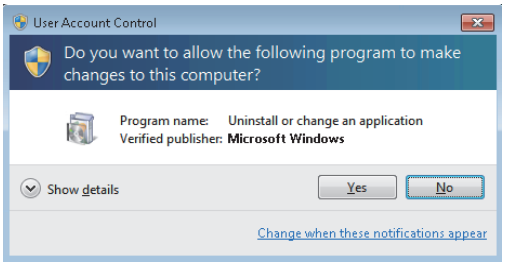
*1 When the software (version 1.15R or earlier) is installed, [DB connection service and setting tool (MESInterface DBConnector)] is displayed.
*2 When the software (version 1.12N or earlier) is installed, [MES interface function configuration tool (MX MESInterface)] is displayed.

REMARKS
(When using Windows® 2000)
(a) Click [Change or Remove Programs].
(b) Select the program to be deleted.
(c) Click the Change/Remove button.
(When using Windows Vista® or later)
Select the program to be deleted in [Uninstall or change a program], and click "Uninstall/Change".

(When using the operating system with the User Account Control function)
If the screen on the left appears, click the Continue button.



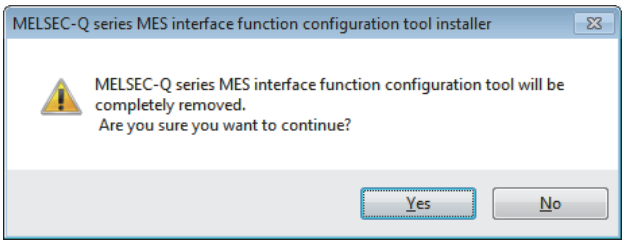
When the screen on the left is displayed, click the Yes button.



(To the next page)

(From the previous page)

↓



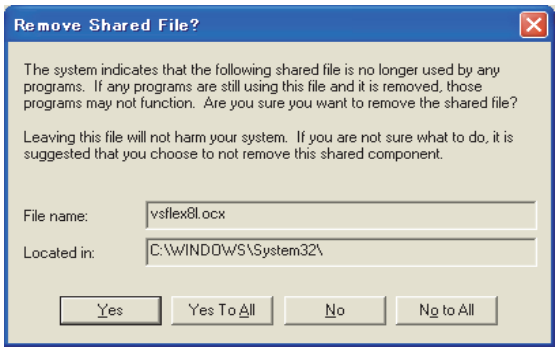
3 Confirm the file to be deleted.

To uninstall it, click the Yes button.

To not uninstall it, click the No button.

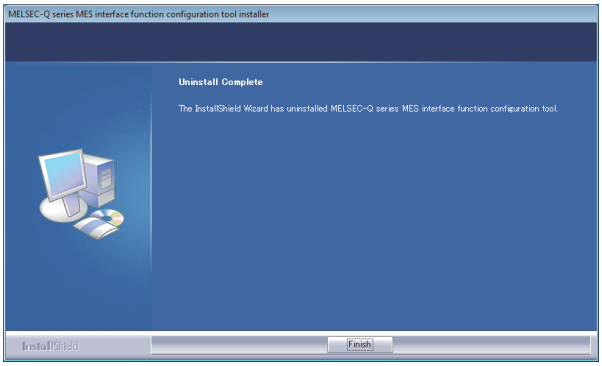
Clicking the No button returns to the previous screen.

- The component indicates the installed icons and file.



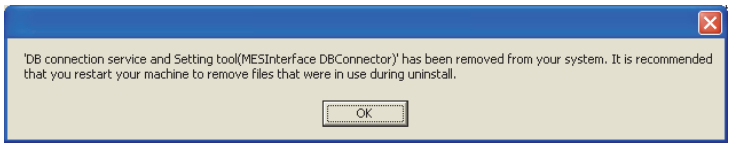
If the left screen appears, click the No to All button.

↓



4 When the message showing the completion of the removal is displayed, click the Finish button.

↓



5 When the above screen is displayed, restart the personal computer.

When reinstalling after uninstallation, be sure to restart the personal computer.

If not, the DB Connection Service and Setting tool may not operate normally after reinstallation.

↓

(End)

CHAPTER 6 FUNCTIONS

This chapter explains the MES interface functions of the MES interface module.
The MES interface functions are set using MES Interface Function Configuration Tool.
☞Chapter 7 MES INTERFACE FUNCTION CONFIGURATION TOOL

6.1 DB Interface Function

The DB interface function executes access to the database in units of jobs.

6.1.1 DB interface function operation

The operation of the DB interface function is shown below.

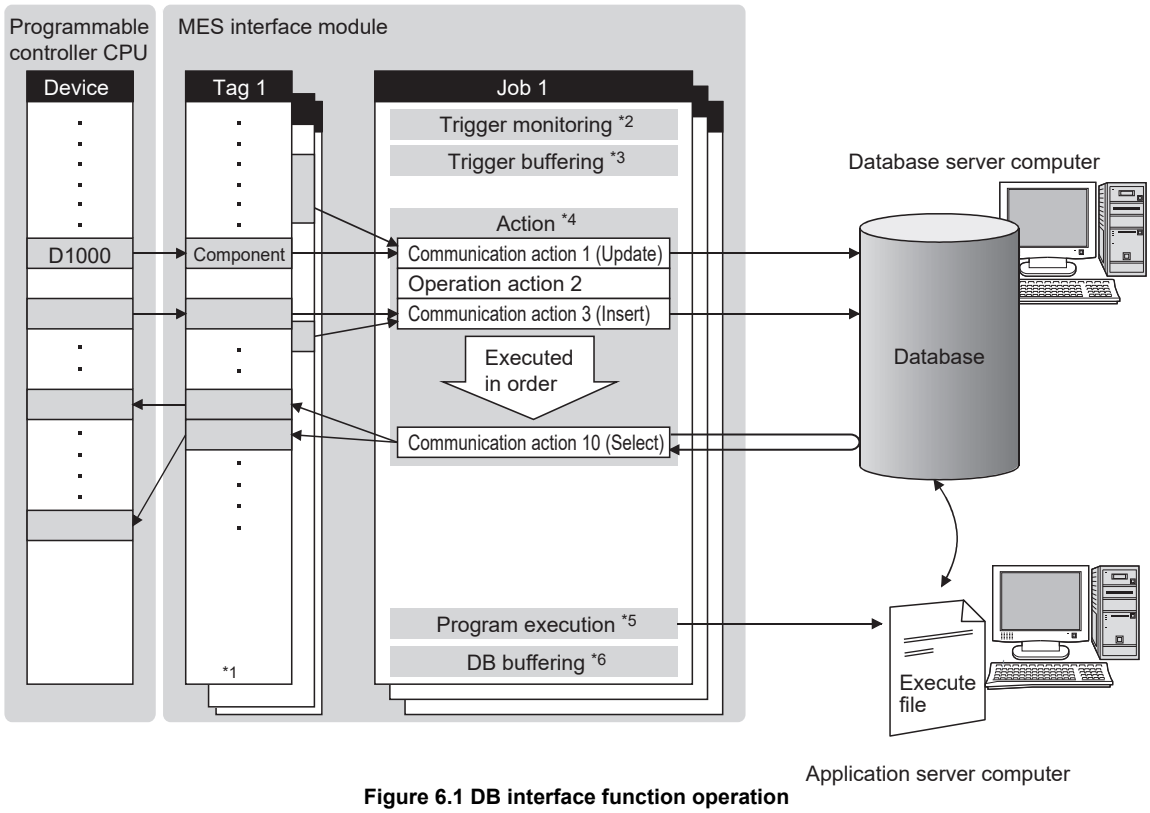


Figure 6.1 DB interface function operation

*1 Collects tag data. ☞Section 6.1.3 Tag function
*2 Activates a job. ☞Section 6.1.4 Trigger monitoring function
*3 Stores data and trigger times temporarily in the module's internal memory when loads are concentrated.
☞Section 6.1.5 Trigger buffering function
*4 Accesses the database and performs arithmetic processing.
☞ • Section 6.1.6 SQL text transmission (Communication action)
• Section 6.1.8 Arithmetic processing function (Operation action)
*5 Executes programs. ☞Section 6.1.9 Program execution function
*6 Temporarily stores SQL texts in a CompactFlash card when a communication error occurs.
☞Section 6.1.10 DB buffering function

6.1.2 Job execution procedure

The following shows the job execution procedure.

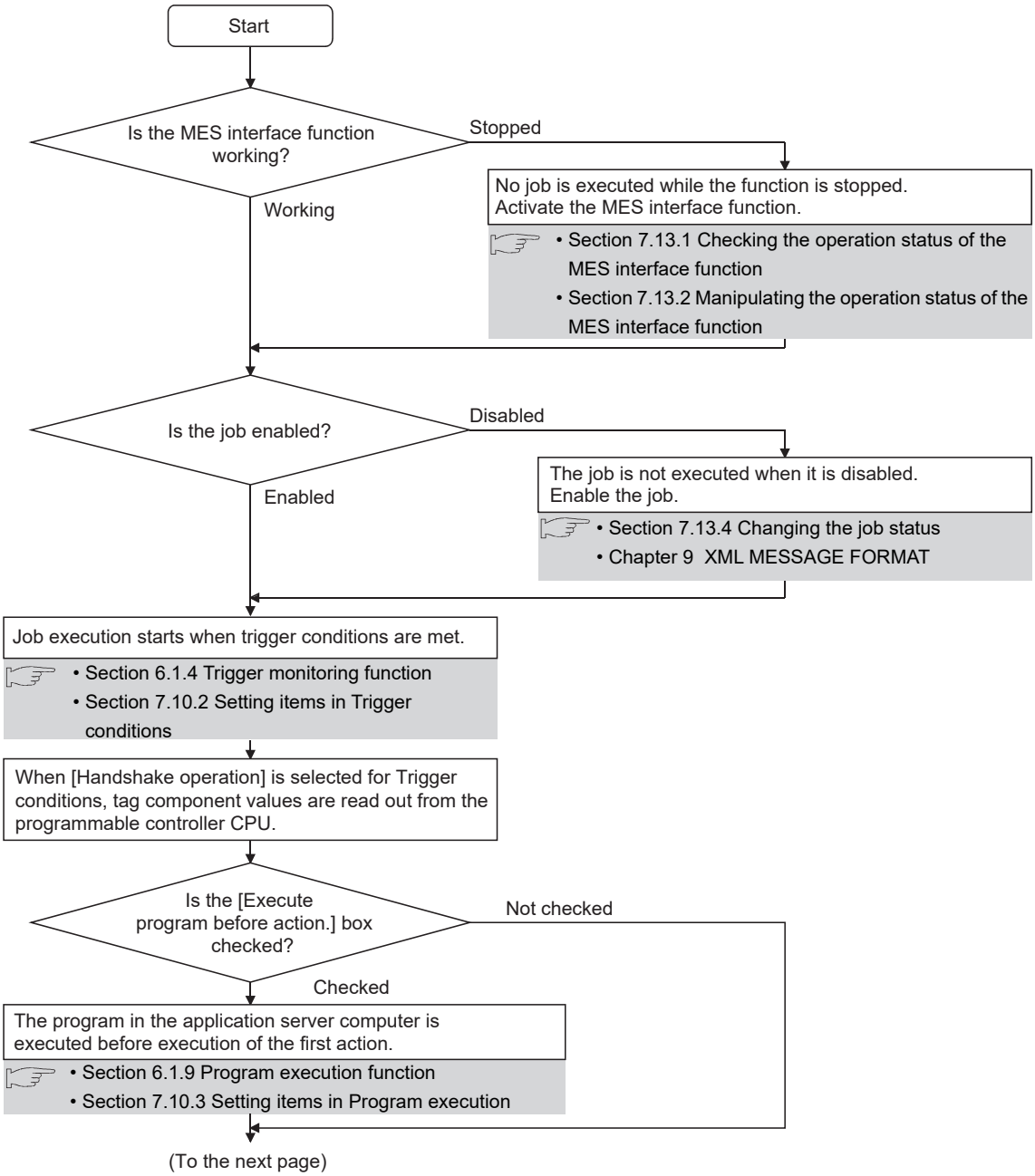


Figure 6.2 Job execution procedure

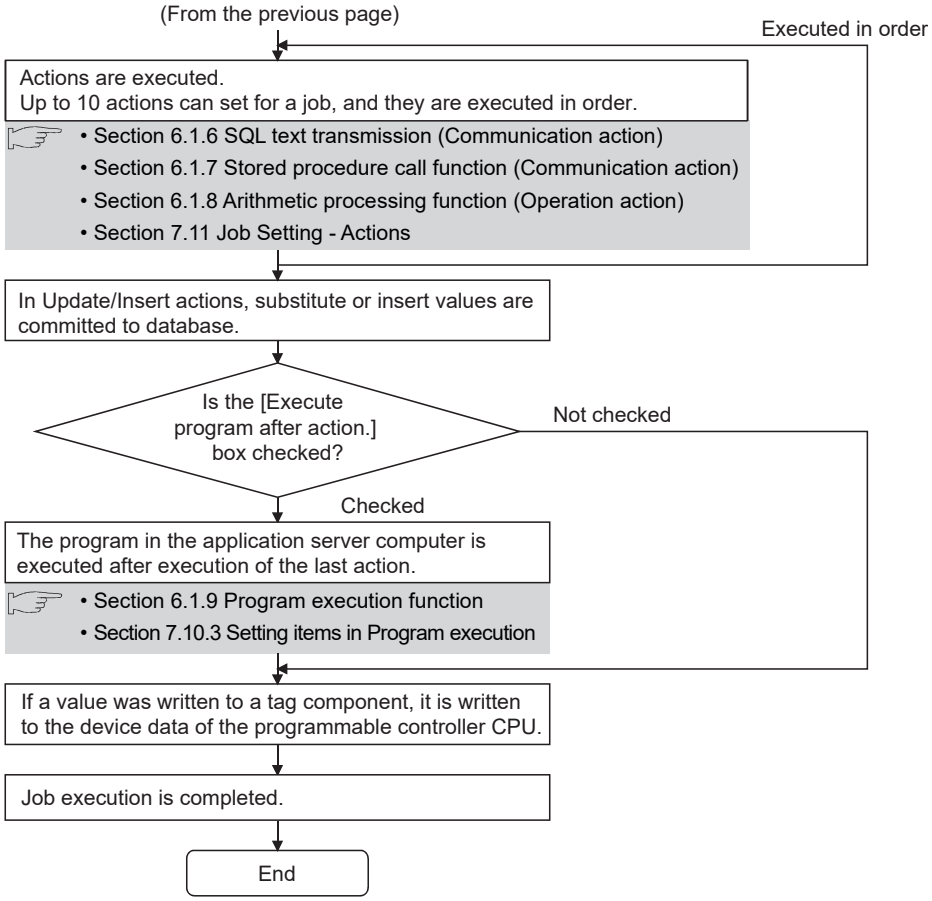


Figure 6.2 Job execution procedure

Point

For the case where an error occurs during job execution, refer to the following:

Section 6.1.11 (2) When an error occurs in job execution

6.1.3 Tag function

The tag function collects device data of the programmable controller CPUs on the network in units of tags.
By allocating database fields to tag components, the DB interface function enables the following.

- Database value reading/writing
- Reading/writing of programmable controller CPU device data specified with tag components

For the tag function setting, refer to the following:

☞Section 7.8 Device Tag Setting

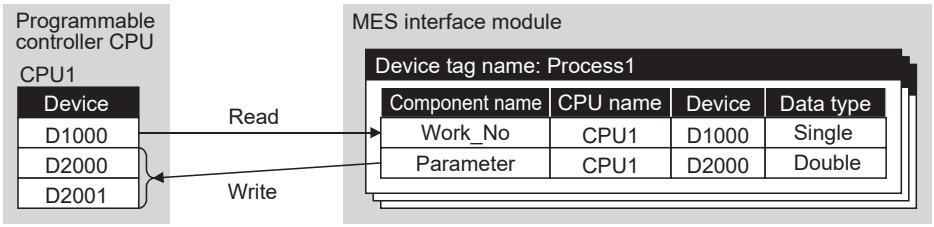


Figure 6.3 Tag function

Point

(1) Values assigned to tag components by the job are written to a programmable controller CPU after all actions of the job are completed. Since these values are occasionally written in two or more sequence scans, values from the sequence program need to be referred after all data are written.
Use the handshake operation to run the sequence program with the completion of writing all data.
☞Section 7.10.2 (8) Handshake operation

(2) For the tags for which [Enhance sampling efficiency] is selected, the tag data can be read out at high speed when they are collected and when handshake operation is performed.

6.1.4 Trigger monitoring function

The trigger monitoring function monitors values such as the time and tag values and, when the trigger condition changes from false to true (when the condition is met), starts a job.
The following setting options are available as conditions for start.

- [Disable]: Does not start the job by a trigger condition.
- [Time specification startup]: Starts the job at the specified time.
- [Specified time period startup]: Starts the job at the specified intervals (Unit: Seconds).
- [Value monitoring startup]:
  Compares the actual tag component value with the condition value (tag component value or constant value) at every sampling times, and starts the job when the condition is met.
- [Handshake operation]:
  Starts the job on request from the programmable controller CPU.
  Completion of job execution can be reported to the programmable controller CPU.
- [At module startup]:
  Starts the job only once when the MES interface module starts up.

Two kinds of conditions can be used in combination for starting a job.
For the trigger monitoring function setting, refer to the following:
☞Section 7.10.2 Setting items in Trigger conditions

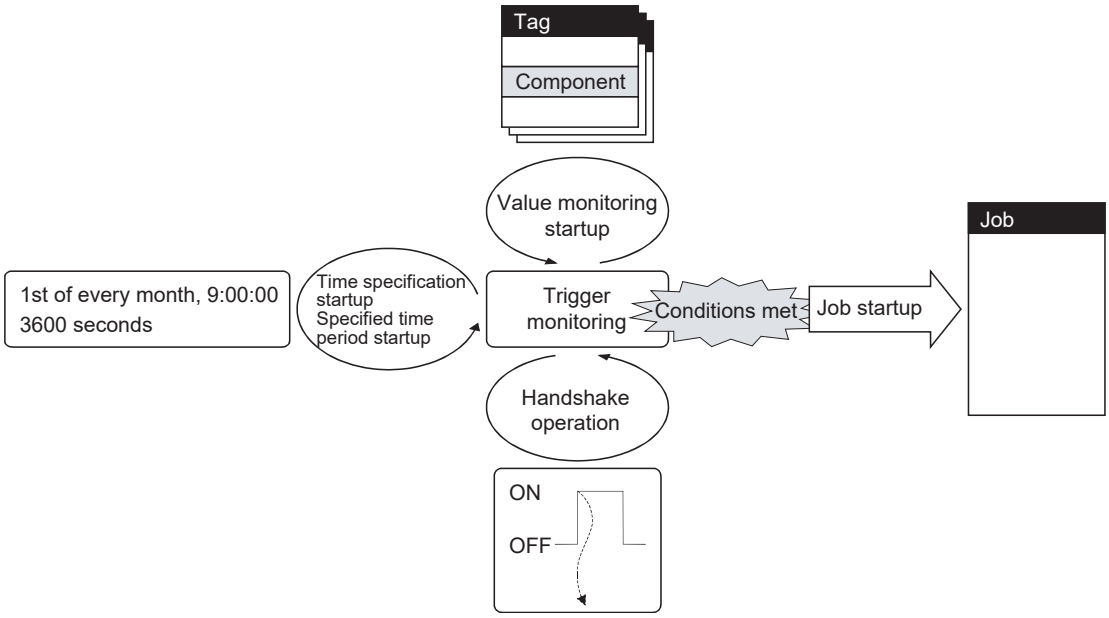


Figure 6.4 Trigger monitoring function

Point

(1) The job can be started only when the device tags used for trigger conditions of all jobs have been sampled normally. *1

*1 When the first five digits of the serial No. is "11011" or earlier, the operation of the MES interface module is different.

Appendix 1.3 (2) Trigger monitoring function

(2) If [Value monitoring startup] is selected, the tag component value used for trigger monitoring and the one used in the started job may be collected at different timings.
To collect these tag component values synchronously, use [Handshake operation].

Section 7.10.2 (8) Handshake operation

6.1.5 Trigger buffering function

When multiple sets of trigger conditions (conditions for data transmission) are met in a concentrated manner, their data and trigger times are buffered in the module's internal memory so that actions (data operation/transmission) can be executed later using the buffered data.
Even if the frequency of data transmission triggers is high, jobs are executed without missing any trigger.
To utilize the trigger buffering function, enable [Trigger buffering] at each Job settings.

(1) Trigger buffering function

This section explains the operations of the job for which [Trigger buffering] is enabled.

(a) In a normal case (Trigger interval ＞ Processing time for action)

- When trigger conditions are met, tag data and trigger time are stored in the trigger buffer.
- Based on the information in the trigger buffer, an action is executed immediately.

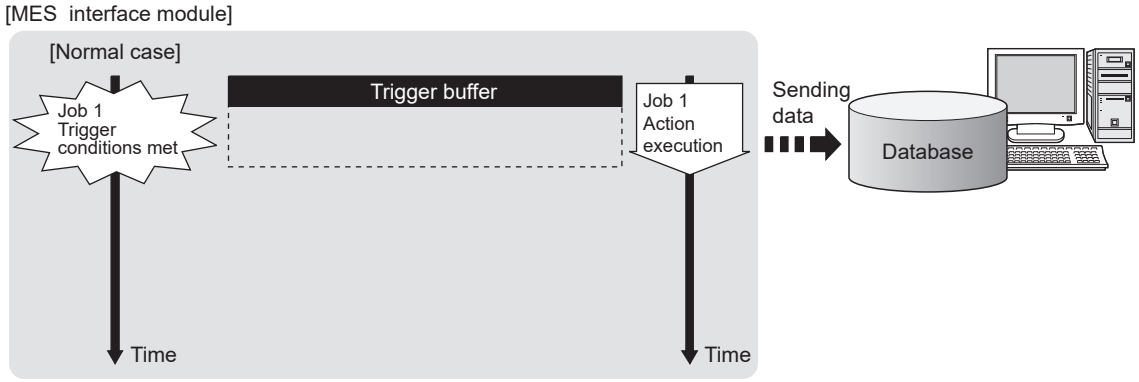
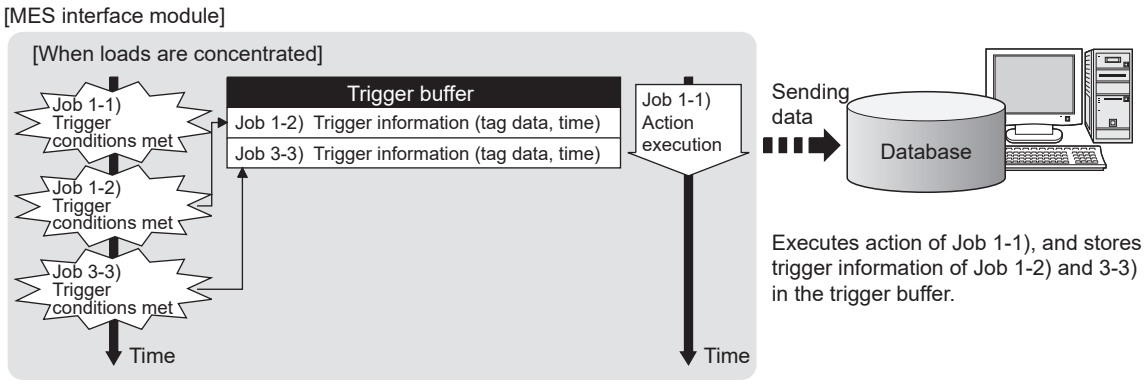


Figure 6.5 In a normal case

(b) In the case of load concentration (Trigger interval < Processing time for action)

- Every time a trigger condition is met, tag data and trigger time are stored in the trigger buffer.
- When action processing is not completed in time, up to 128 pieces of trigger information are stored in the buffer.

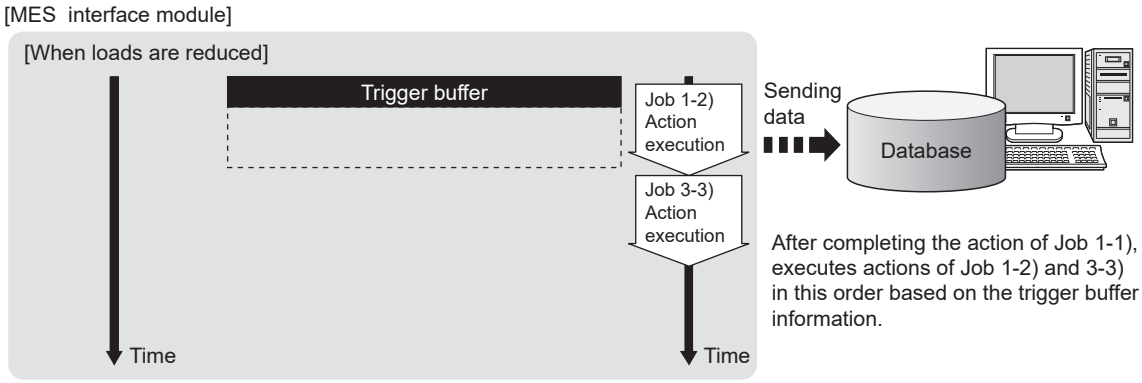


・The numbers 1) to 3) show the order in which trigger conditions of respective jobs are met.
・Job 1 and 3 are assumed to access the same database.

Figure 6.6 In the case of load concentration

(c) When loads are reduced (Trigger interval > Processing time for action)

- The information in the trigger buffer are read out sequentially, causing actions to be executed.
- Since the trigger buffer information that was used for action execution is cleared, free space is reproduced, enabling new trigger buffering.



・The numbers 1) to 3) show the order in which trigger conditions of respective jobs are met.
・Job 1 and 3 are assumed to access the same database.

Figure 6.7 When loads are reduced

Point

(1) For job operations performed when [Trigger buffering] is disabled, refer to the following:
☞Section 6.1.11 (1) Operation behavior of jobs

(2) Whether a trigger condition changed from false to true or not is determined at the time of sampling.
☞Section 7.10.2 (6) Value monitoring startup

(3) When the trigger condition of the job, for which the DB buffering function is disabled, is satisfied in the state where a communication error occurs between a MES interface module and a server computer, the processing time of the action may be longer because a connection timeout occurs after the connection timeout time (default : 10 seconds) has elapsed.
In the case when the connection timeout time is longer than the trigger interval, trigger buffering may be performed with the operation described in "(b) In the case of load concentration (Trigger interval < Processing time for action)".

(2) No. of times data can be stored in the trigger buffer

(a) The trigger buffering function allows up to 128 pieces of trigger information (tag data, time) to be stored concurrently.
Note that there are no restrictions on the number of bufferings per job.

(b) No. of trigger buffer data can be confirmed by the following:
- No. of trigger buffer data (Buffer memory address: 11511)
- [Online] - [Remote operation] (☞Section 7.13 Online - Remote operation)

(c) Since the trigger satisfied when the number of trigger bufferings is reached to 128 is discarded, the job is not performed.
The number of times the trigger buffer data are discarded can be confirmed in the Trigger buffer overflow count area (Buffer memory address: 11512).

(3) Clearing the trigger buffer

The following clears the contents of the trigger buffer.
- [Update settings] (☞Section 7.13.2 (3) Update settings)
- Stop of the MES interface function operation by [MES interface function configuration tool] - [Online] - [Remote operation]
(☞Section 7.13.2 Manipulating the operation status of the MES interface function)
- Turning the programmable controller power OFF and ON
- Resetting the programmable controller CPU

6.1.6 SQL text transmission (Communication action)

The SQL text transmission function allows automatic creation of SQL texts, enabling communications with the database.
The following commands can be selected for the SQL text.

- Select/MultiSelect
- Update
- Insert
- Delete

For the SQL text transmission setting, refer to the following:

☞Section 7.11.1 Setting items in Communication action

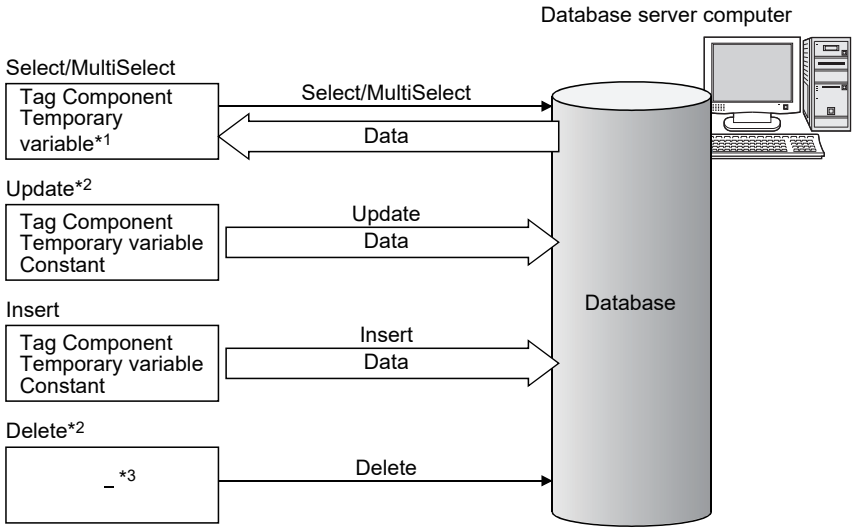


Figure 6.8 SQL text transmission (Communication action)

*1 It cannot be used for MultiSelect.
*2 When accessing the same data which is locked in the database, the processing may be delayed until the data is unlocked. Do not access the data that may be locked for a long time.
*3 There is no data communication.

(1) Select/MultiSelect

Select/MultiSelect is used to write a database value to a tag component value area or to store it in the temporary variable area by sending a SQL text to the database.
When a value is stored in the temporary variable area, it can be used as a variable for other actions.

(2) Update and Insert

Update and Insert are used to embed a tag component value or a temporary variable in an SQL text and write the value to the database.

(3) Delete

Delete is used to eliminate a record from the database.

Point

Once records are deleted from the database, they cannot be restored.
Make sure that correct target record and timing are set for the delete action.

6.1.7 Stored procedure call function (Communication action)

The stored procedure call function starts up a stored procedure in the database.
By executing a stored procedure in the database, the variety and complex control can be performed for the data in the database.
For the stored procedure call function settings, refer to the following:
☞Section 7.11.3 Setting items in Communication action (Stored procedure)

The stored procedure call function is used to pass/receive the values to/from the stored procedure by setting tag components or temporary variables to the arguments (input arguments, output arguments, and input/output arguments) or return value of the stored procedure.
When the temporary variable is received a value, it can be used as a variable for other actions.

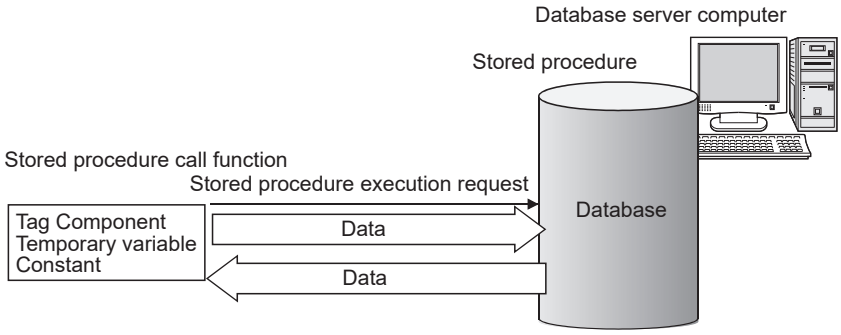


Figure 6.9 Stored procedure call function (Communication action)

(1) Considerations for the stored procedure call function

(a) Database type

The stored procedure call function is supported by the following database types.

- Oracle 10g/11g/12c/18c/19c
- SQL Server 2008/2012/2014/2016/2017/2019

(b) Return value

When the database is Oracle 10g/11g/12c/18c/19c, a stored procedure has no return value.
If the return value is required, use the output argument or input/output argument.

(c) Commit execution

When the database is Oracle 10g/11g/12c/18c/19c, do not commit in a stored procedure.
Rollback to before the job execution cannot be performed when the job execution failed.
(For the operation at job execution failure, refer to ☞Section 6.1.11 (2) When an error occurs in job execution)
A commit is executed by MES interface module after the job completion.

(d) Result set
The result set cannot be acquired from a stored procedure.
For SQL Server 2008/2012/2014/2016/2017/2019, return values, output arguments and input/output arguments of a stored procedure which returns a result set cannot be acquired.

(e) Acquiring output arguments or I/O arguments
When the following procedures are called in the stored procedure of SQL Server, the MES interface module cannot receive the value assigned to the argument as a execution result of the stored procedure.
- Select, Insert, Update, Delete statement
- Stored procedure including the above
- System stored procedure such as sp_who

Specify "SET NOCOUNT ON" before calling the above procedures in the stored procedure for the MES interface module to receive the values assigned to arguments.

6.1.8 Arithmetic processing function (Operation action)

The arithmetic processing function performs operations for tag component values.
In this function, up to 20 dyadic operations can be processed per operation action.
By storing an operation result in the temporary variable area, complicated operations are also executable.
For the arithmetic processing function setting, refer to the following:
☞Section 7.11.4 Setting items in Operation action

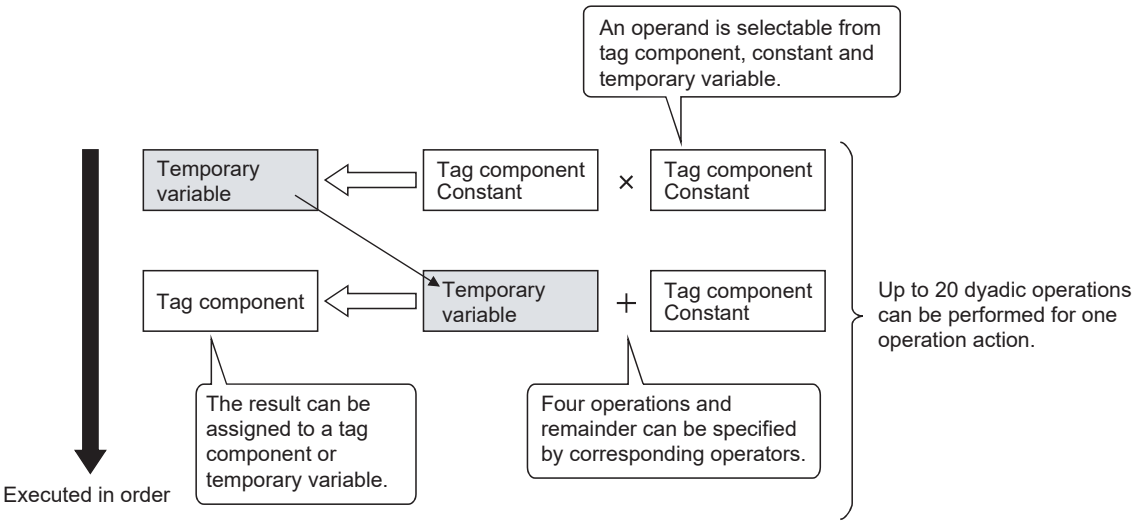


Figure 6.10 Arithmetic processing function (Operation action)

6.1.9 Program execution function

The program execution function is used for executing programs in the application server computer before execution of the first action and after execution of the last one in a job.
For the program execution function setting, refer to the following:
☞Section 7.10.3 Setting items in Program execution
Programs that can be executed from [Command line] are applicable.

Since program execution is set on the server computer as described below, more sophisticated data linkage can be realized.

(1) Before executing the first action of the job
By executing programs before the first action of the job, data required for the job can be produced on the database in advance.

(2) After executing the last action of the job
By executing programs after the last action of the job, data written to the database by the job can be utilized for programs on the server computer.

6.1.10 DB buffering function

(1) DB buffering function

The DB buffering function temporarily stores SQL texts or stored procedure call information into a CompactFlash card when they cannot be sent due to network disconnection or failure of the database server computer.
After recovery, the buffered SQL texts or stored procedure call information are automatically sent to the database. (Manual operation is also possible.)

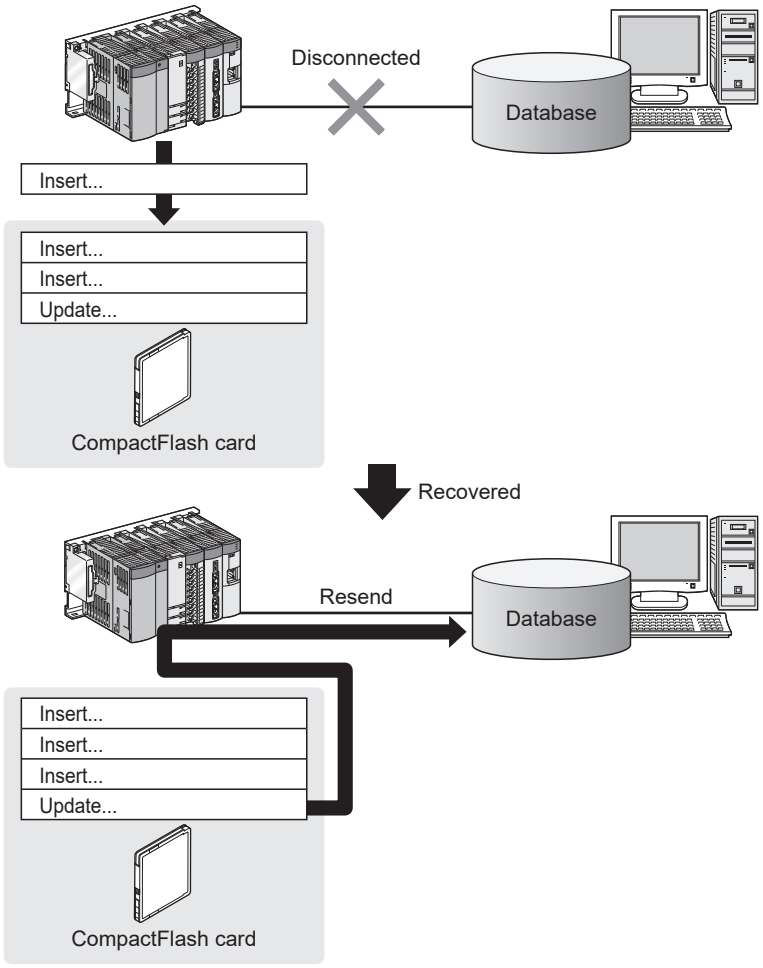


Figure 6.11 DB buffering function

(2) Factors for starting DB buffering

DB buffering is conducted when SQL texts or stored procedure call information cannot be sent to the database by any of the following causes, (a) or (b).

(a) Disconnection on the network, or failure of the database server computer

Upon detection of a connection timeout, DB buffering is started.

☞(7) DB buffering operation

Time for detecting connection timeout is set to 10 seconds by default.

☞Section 7.9.1 (8) Connection timeout (Range: 1 to 180 seconds, Default: 10 seconds)

Even if a trigger condition is met again during connection timeout detection, the corresponding job is not executed.

☞Section 6.1.11 (1) Operation behavior of jobs

(b) Failure of the database software

Upon detection of DB access timeout, DB buffering is started.

☞(7) DB buffering operation

Time for detecting DB access timeout is set to 30 seconds by default.

☞Section 8.5 (2) DB access timeout (required) (Range: 1 to 3600, Default: 30)

Even if a trigger condition is met again during detection of DB access timeout, the corresponding job is not executed.

☞Section 6.1.11 (1) Operation behavior of jobs

Point

If an error occurs when the sent SQL text or stored procedure is executed on the database, by some reason such as its incorrectness or inconsistency with the database, buffering is not performed and an SQL failure log is output on the database server computer.

☞Section 8.1 DB Connection Service Functions

(3) Processing for which the DB buffering is available

Table 6.1 Processing for which the DB buffering is available

Processing	DB buffering
Update/Insert/Delete	Available
Stored procedure (Not available when using return values, output arguments, or input/output arguments.)	
Select/MultiSelect	N/A
Program execution	

(4) Setting the DB buffering

(a) Setting for DB buffering function

Set the tag components or CompactFlash card capacity for DB buffering function.
For the setting methods, refer to the following:

☞Section 7.6.4 Setting items in DB buffering setting

(b) Enabling the DB buffering function

Set whether to enable the DB buffering function for each job.
When enabling the DB buffering function, select the type of DB buffer.
For the setting methods, refer to the following:

☞Section 7.10.4 Setting items in DB Buffering

(5) DB buffer

(a) DB buffer type

There are two types of buffering areas; Automatically resend buffer and Manually resend buffer.
Use the Automatically resend buffer if resending the data automatically after recovery.
Use the Manually resend buffer if resending the data with a desired timing.

Table 6.2 Automatically resend buffer and Manually resend buffer

Type	Condition to resend
Automatically resend buffer	After recovery, data is resent automatically.
Manually resend buffer	After recovery, the data is resent by executing the following operation. • Resend request from [MES interface function configuration tool] - [Remote operation] • Resend request from the specified tag component in [Resend DB buffer request]

(b) The job operation whose trigger condition has been met before resend completion

The operation after recovery can be set for each resend buffer whether to send the job whose trigger condition has been met immediately in case the data exists in the resend buffer or to send the buffered data after the resend completion.

Table 6.3 Operation of recovery from network disconnection

Operation setting	Job operation whose trigger condition has been met before resend completion
Immediate sending (Do not add to the buffered data)	Send the data immediately. After recovery, the job whose trigger condition has been met is sent to the database before the data remaining in the resend buffer.
Adding to the buffered data	After recovery, the job data is being added to the bottom of the buffered data until the resend operation is completed. The data is sent to the database in order of the trigger condition has been met.

For setting methods, refer to the following:[*1]

☞Section 7.6.4 (8) Operation of recovery from network disconnection

*1 The operation of MX MESInterface version 1.09K or earlier is the same as the default settings.

☞Appendix 1.3 (1) (b) For MX MESInterface version 1.09K or earlier

(6) Clearing the DB buffer

The DB buffer is cleared by the following:

(a) After writing the MES interface function setting to the MES interface module, performing any of the following operations
- Perform [Update settings]
- Power OFF and then ON
- Reset the programmable controller CPU

☞Section 7.12.2 Writing the MES interface function settings

(b) Clear request from [MES interface function configuration tool] - [Remote operation]

☞Section 7.13.6 Operating the DB buffering

(c) Clear request from [Clear DB buffer request] of the specified tag component

☞Section 7.6.4 Setting items in DB buffering setting

(7) DB buffering operation

The job data whose trigger condition has been met is processed as shown below depending on the status of communication or DB buffering settings.

Table 6.4 DB buffering operation

Communication status	Data of DB buffer	DB buffering setting		Operation
Transmission impossible	Stored/ Not stored	Invalid		Job execution is cancelled.
		Valid		Job data is stored to DB buffer.
Transmission possible	Stored	Invalid		Data is sent to database.
		Valid	Immediate sending	Data is sent to database.
			Adding to the buffered data	Job data is stored to DB buffer.
	Not stored	Valid/Invalid		Data is sent to database.

Point

Check the DB buffer status (No. of bufferings, utilization) and prevent the full status of the DB buffer.

☞ • Section 7.10.4 Setting items in DB Buffering
• Section 7.13.6 Operating the DB buffering

Processing content

1. When the job data cannot be sent to the database, one of the following processing is performed after the detection of a timeout.
   - DB buffering function is invalid : Job execution is cancelled.
   - DB buffering function is valid : Job data is stored to DB buffer.
2. The content of DB buffer is resent after recovery.
   - Automatically resend buffer : After recovery, the data is resent automatically.
   - Manually resend buffer : After recovery, the data is resent when the resend operation is performed.

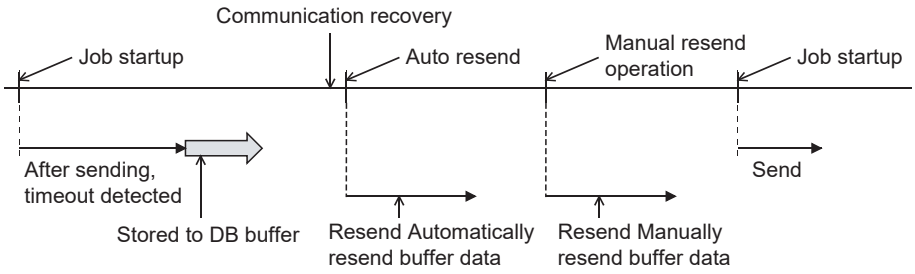


Figure 6.12 Processing content of DB buffering

Point

The job processing which is started up while the data is being stored differs depending on the settings of DB buffering.

☞ (8) Operation while data is being stored to DB buffer in this section

(8) Operation while data is being stored to DB buffer

The job processing which is started up while the data is being stored differs depending on the operation settings of resend buffer selected on each job.

Related settings

- Setting of each job (☞ Section 7.10.4)
- Operation setting of resend buffer (☞Section 7.6.4 (8))

(a) When "Immediate sending (Do not add to the buffered data)" is selected

The following shows the job processing when "Immediate sending (Do not add to the buffered data)" is selected.

Processing content

1. When the data cannot be sent to the database, it is stored to DB buffer after the detection of a timeout.
2. When the data is stored to DB buffer (the selected resend buffer), the status of communication recovery is checked for each time when the job is started up. *1

   If the communication has not been recovered, the data is stored to DB buffer.
3. The content of DB buffer is resent after recovery.
4. The job data which is started up before the resend completion is sent immediately.

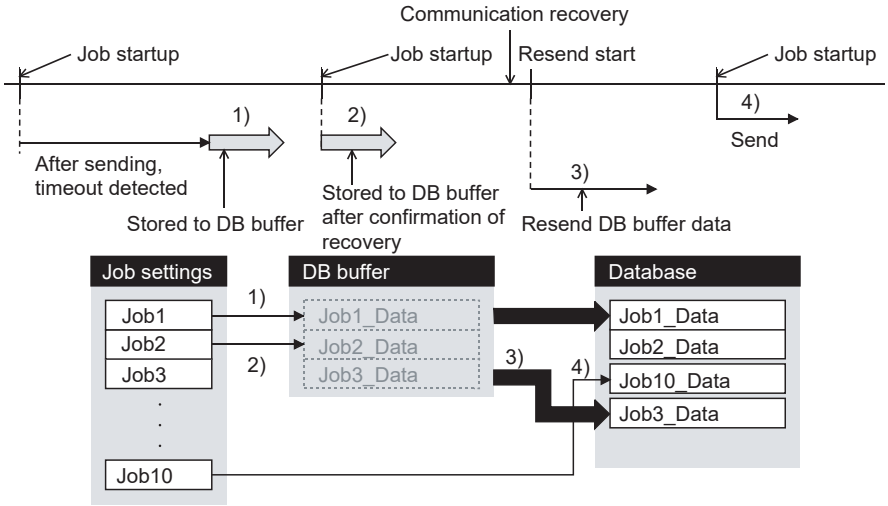


Figure 6.13 When "Immediate sending" is selected for the job

*1 When using MES interface module whose first five digits of serial No. is "09101" or earlier, the processing of DB buffering differs.

☞Appendix 1.3 (1) (a) For a MES interface module whose first five digits of serial No. is "09101" or earlier

Point

The new job data whose trigger condition is met may be sent to the database before the data stored to DB buffer.

(b) When "Adding to the buffered data" is selected
The following shows the job processing when "Adding to the buffered data" is selected.

Processing content

1. When the data cannot be sent to the database, it is stored to DB buffer after the detection of a timeout.
2. When the data is stored to DB buffer (the selected resend buffer), the data is stored to DB buffer without checking the status of communication recovery.
3. The content of DB buffer is resent after recovery.
4. The job data which is started up before the resend completion is added to the buffered data, and resend.
5. The data which is started up after the resend completion is sent normally.

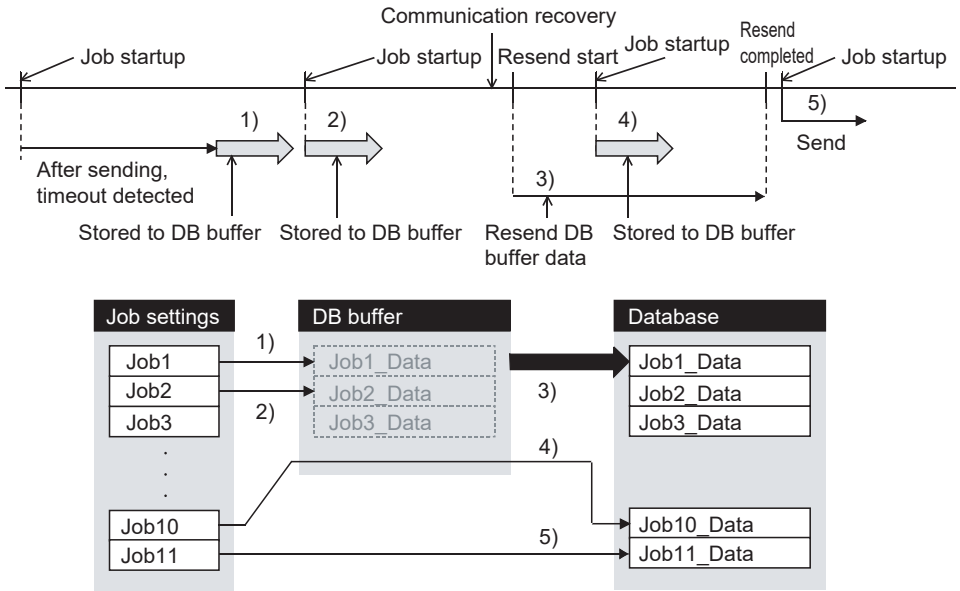


Figure 6.14 When "Adding to the buffered data" is selected for the job

Point

The data is sent to database in order of the trigger condition has been met.

6.1.11 Precautions

(1) Operation behavior of jobs

(a) When a trigger condition for a job is met again during execution of the job

1) When [Trigger buffering] is disabled for the job
Because the job is being executed, it is not executed again.

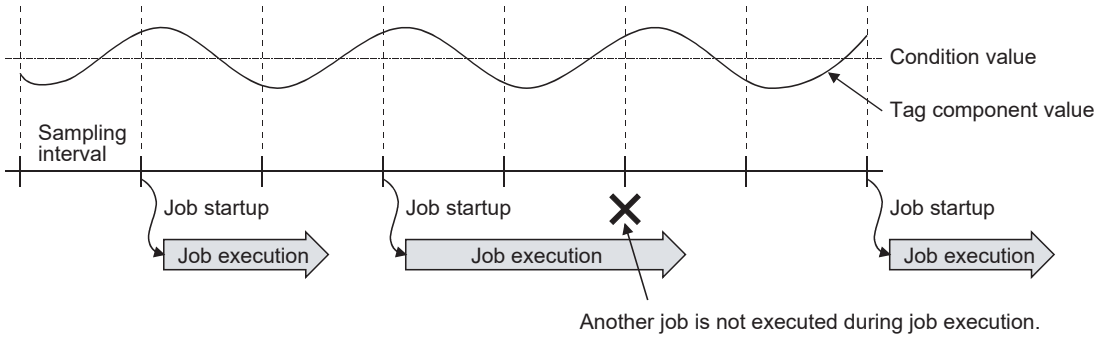


Figure 6.15 When trigger condition is met again during execution of the job set to [Value monitoring startup]

2) When [Trigger buffering] is enabled for the job
The trigger information is stored in the trigger buffer, and after completion of the current job execution, the job is executed based on the trigger information.

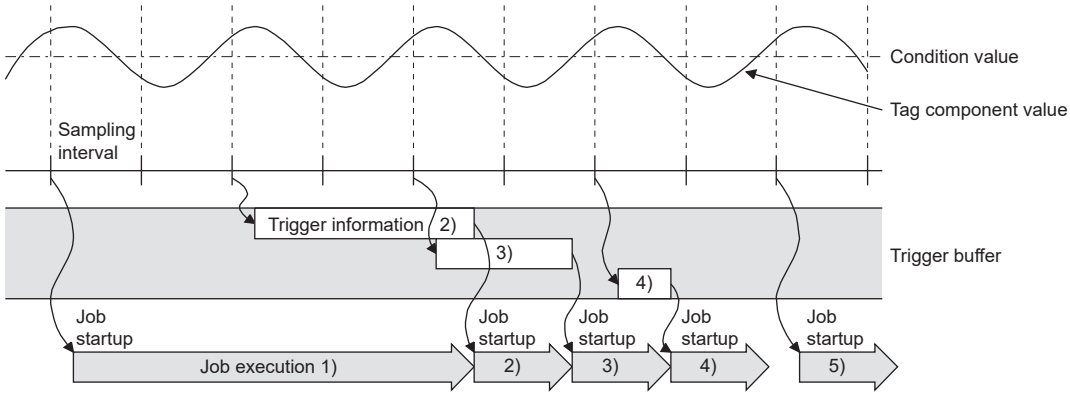


Figure 6.16 When trigger condition is met again during execution of the job set to [Value monitoring startup]

(b) When trigger conditions for multiple jobs are met concurrently

- Up to three jobs can start their executions concurrently in the order in [Job settings].
- After completion of these jobs, executions of the other jobs are started sequentially.
  Note that, if a job uses the same item in [Server service settings] that is currently used for another job, the job is not executed until another job execution is completed.
  In addition, when multiple jobs for which [Trigger buffering] is enabled are set, the next job is not performed until the execution of other jobs are complete.

(c) Monitoring interval timeout
Depending on the number of set jobs or the trigger condition setting, the monitoring interval timeout may occur.

(2) When an error occurs in job execution

(a) The job execution is canceled when the error cause is the following:
- Failure in device data writing due to network disconnection within the programmable controller system
- Failure in device data writing, or an operation error
- Failure in access to database (except for jobs for which DB buffering is enabled)

Section 6.1.10 DB buffering function
- When statistic processing of [Moving average], [Moving maximum] or [Moving minimum] is specified for a tag component, sampling for the specified number of times is not complete.
- Failure in program execution

(b) If a job execution is canceled, the operation processed before the error occurrence returns to the status before the job execution.

Remark

The following explains access to device data in the programmable controller CPU and to the database.

(1) Device data in the programmable controller CPU
Since all of data are written to the device data area in the programmable controller CPU at a time upon completion of job execution, any change due to the error is not reflected in the device data of the programmable controller CPU.

(2) Database
Rollback is executed assuming the time immediately before job activation as a commit point.

However, when the database is Wonderware® Historian, rollback is not executed. When an error occurs, data input before error occurrence is reflected on the database.

(c) When [Notify errors (job cancellation) that occur during job execution] has been selected, a value is assigned to the specified tag component.

Section 7.10.5 Setting items for job cancellation

6.2 XML Processing Function

The XML processing function is a function by which execution of XML format message requests from user applications can be processed.
The XML processing function allows the following instructions for job execution.

- One-shot execution of a job
- Validating a job (The job is executed when the trigger conditions are met.)
- Invalidating a job (The job is not executed even if the trigger conditions are met.)

For the XML message format, refer to the following:

☞Chapter 9 XML MESSAGE FORMAT

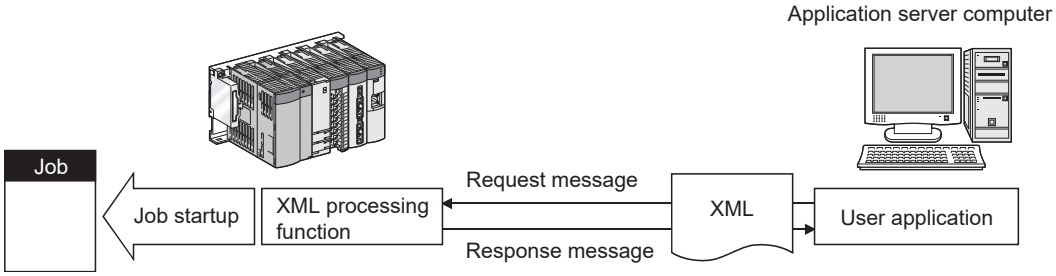


Figure 6.17 XML processing function

6.3 Time Synchronization Function

The time synchronization function adjusts the time of the MES interface module to be synchronized with the time of the SNTP server computer or a programmable controller CPU (No.1 CPU in the multiple CPU system) on the network. Time information is utilized for job start conditions or in send data to the database.
For the time synchronization function setting, refer to the following:
☞Section 7.6.2 Setting items in Time synchronization setting

6.3.1 Using the SNTP time query result in the programmable controller CPU

By using the SNTP time query timing (XB) and the SNTP time query result area (buffer memory address: 11501 to 11507), the time information acquired from the SNTP server computer can be utilized in the programmable controller CPU.

(1) Program examples

The following are program examples where, when M0 turns ON, the time of the programmable controller CPU is set at the SNTP time query timing (XB: ON).

- When the head I/O No. of the MES interface module is "0000", it indicates that the module is installed in slot 0 of the main base unit.
- A time error in these programs shall be equal to two scan times or less.

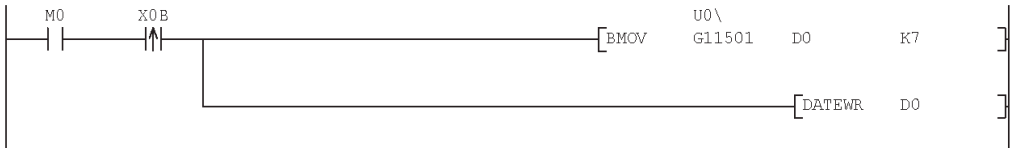


Figure 6.18 Program example (1)

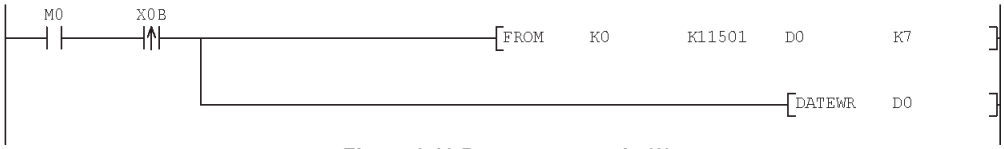


Figure 6.19 Program example (2)

6.3.2 Daylight saving time function

The daylight saving time function allows the time of the MES interface module to be changed to the daylight saving time during the period of summer time, using the clock time of the SNTP server computer.
For the daylight saving time setting, refer to the following.

☞Section 7.6.2 (2) When [Synchronize with SNTP] is selected

(1) About the daylight saving time function

When [Daylight saving setting] is enabled, one hour is added at the daylight saving start time, and one hour is subtracted at the daylight saving ending time.
The following is an example of the start and end of the daylight saving time.
(Example)

When the daylight saving time starts at 02:00 on the second Sunday in March, and ends at 02:00 on the first Sunday in November

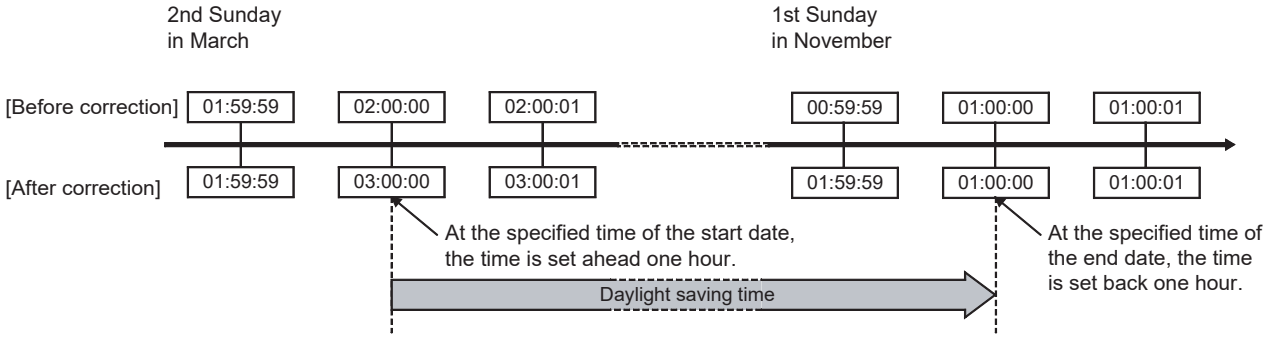


Figure 6.20 Daylight saving time function

(2) Precautions

(a) If [Time specification startup] is set for a trigger condition of a job, the following may occur:
- The job does not start at the daylight saving start time.
- The job starts two times at the daylight saving ending time.

(b) The daylight saving time function is enabled when clock time information is acquired from the SNTP server computer.
For processing performed when clock time information is not obtainable from the SNTP server computer, refer to the following.

☞Section 7.6.2 (3) When time information is not obtainable from the SNTP server computer

CHAPTER 7 MES INTERFACE FUNCTION CONFIGURATION TOOL

This chapter explains the MES Interface Function Configuration Tool.

7.1 MES Interface Function Configuration Tool

The MES Interface Function Configuration Tool is used to configure various settings required for the MES interface function in the MES interface module.
In addition to the configuration, the MES interface function offers features such as the operation status check, working log check, or stop/restart operation.

7.2 Starting the MES Interface Function Configuration Tool

1. Select Microsoft® Windows® Start*1 → [MELSOFT]*2 → [MESInterface]*3 → [MELSEC-Q series MES interface function configuration tool].*4
2. The MES Interface Function Configuration Tool is activated.
   Up to five MES Interface Function Configuration Tools can be started.

*1 [Start Screen] → [All App] or [Start] → [All Programs]/[All App] is activated.
*2 When the MX MESInterface (version 1.12N or earlier) is installed, select [MELSOFT Application].
*3 Does not appear in Windows® 8 or later.
*4 When the MX MESInterface (version 1.12N or earlier) is installed, [MES interface function configuration tool] is displayed.

7.3 Screen Structure

This section explains the screen structure of the MES Interface Function Configuration Tool.

7.3.1 Screen structure

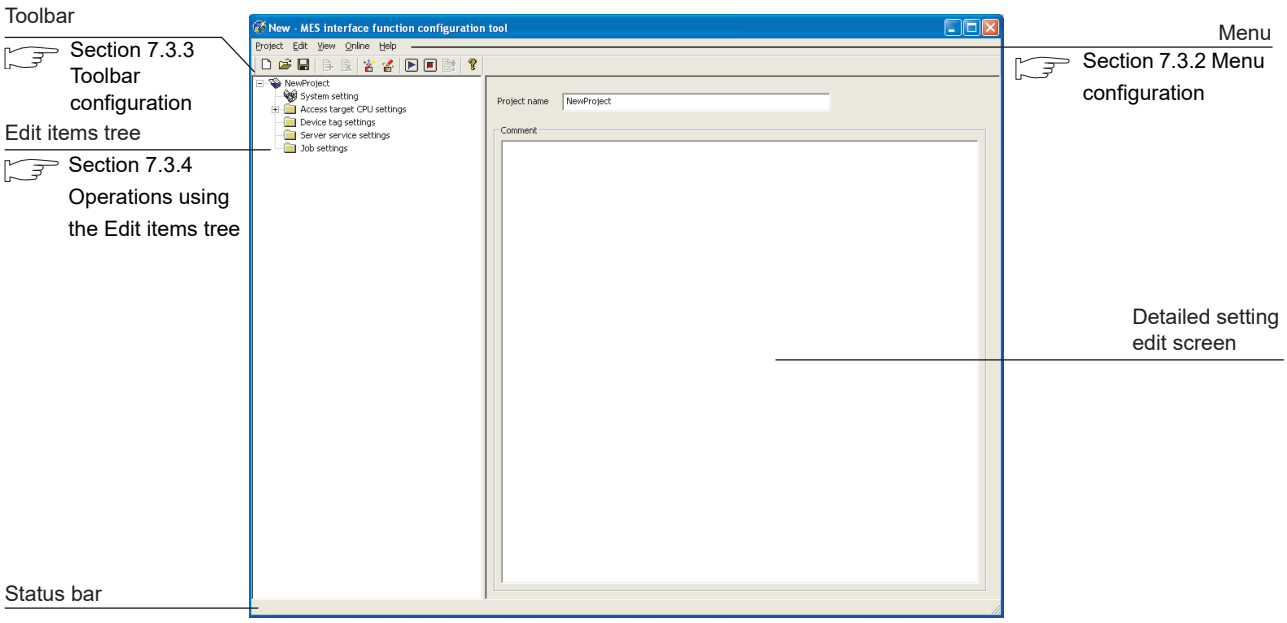


Figure 7.1 Screen structure

Remark

When a text takes up too much space and all characters are not displayed, perform the following:

- Resize the column of the table.
  Drag the right border of the column to the desired width.

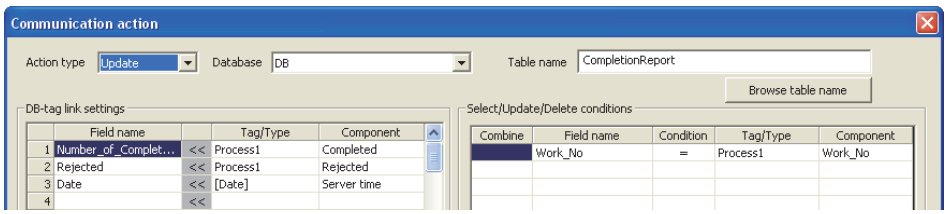


Figure 7.2 Before resizing the column

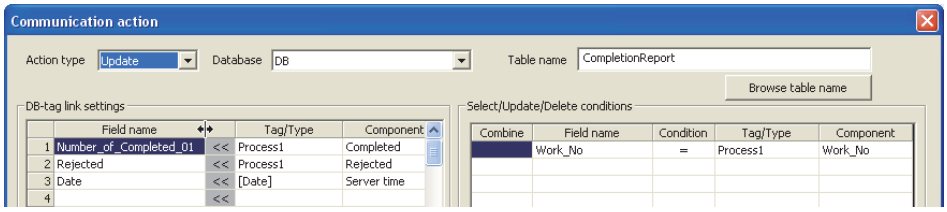


Figure 7.3 Table column width adjustment

- Place your mouse cursor on it.
  The setting can be viewed by placing your mouse cursor on the table or an input box.

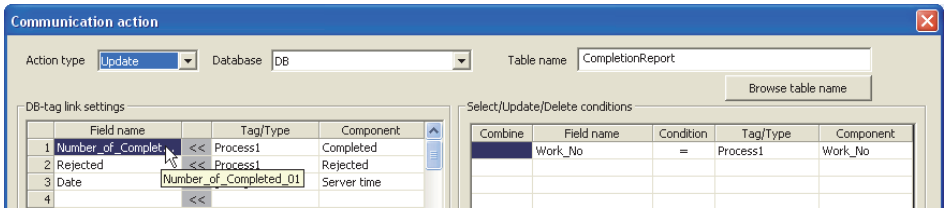


Figure 7.4 Checking with the mouse cursor

7.3.2 Menu configuration

This section shows each command provided on the menu bar.

(1) Project

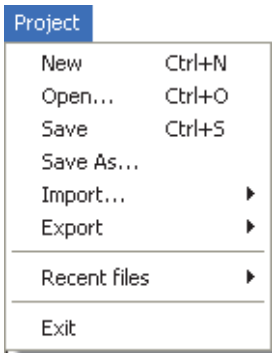


Figure 7.5 Project menu

Table 7.1 Project menu items

Item		Description	Reference section
New		Creates a new project.	Section 7.4.1
Open		Retrieves an existing project.	Section 7.4.2
Save		Overwrites and saves the current project.	Section 7.4.3
Save As		Saves the current project under a new file name.	Section 7.4.3
Import	Project file	Imports an existing project.	Section 7.4.4
	CSV Files	Imports an existing CSV file.	Section 7.4.5
Export	CSV Files	Exports the current project settings to a CSV file.	Section 7.4.6
Recent Files		Select a file recently used in MES Interface Function Configuration Tool to open it.	—
Exit		Terminates the MES Interface Function Configuration Tool.	—

(2) Edit

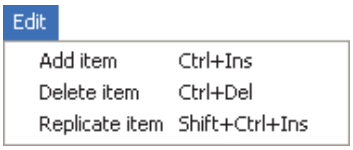


Figure 7.6 Edit menu

Table 7.2 Edit menu items

Item	Description	Reference section
Add item	Adds the item selected in the Edit items tree.	Section 7.3.4
Delete item	Deletes the item selected in the Edit items tree.	
Replicate item	Copies the item selected in the Edit items tree and adds it.	

(3) View

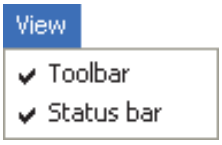


Figure 7.7 View menu

Table 7.3 View menu items

Item	Description	Reference section
Toolbar	Select whether to show or hide the toolbar.	—
Status bar	Select whether to show or hide the status bar.	

(4) Online

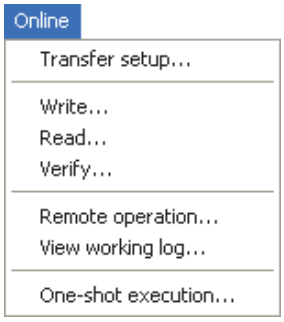


Figure 7.8 Online menu

Table 7.4 Online menu items

Item	Description	Reference section
Transfer setup	Set the target MES interface module.	Section 7.12.1
Write	Writes the MES interface function settings (project) to the MES interface module.	Section 7.12.2
Read	Reads the MES interface function settings (project) from the MES interface module.	Section 7.12.3
Verify	Compares the MES interface function settings in the MES interface module with those in the current project.	Section 7.12.4
Remote operation	Displays or changes the operation status of the MES interface module, or formats a CompactFlash card.	Section 7.13
View working log	Allows users to check the operation logs of the MES interface module.	Section 7.12.5
One-shot execution	Executes a job as a one-shot task.	Section 7.12.6

(5) Help

Figure 7.9 Help menu

Table 7.5 Help menu items

Item	Description	Reference section
Product information	Displays the product information of the MES Interface Function Configuration Tool.	Section 7.14
Connect to MITSUBISHI ELECTRIC FA Global Website	Displays the [Connect to MITSUBISHI ELECTRIC FA Global Website] screen.	

7.3.3 Toolbar configuration

This section shows each command provided on the toolbar.

Figure 7.10 Toolbar

Table 7.6 Toolbar items

Item	Description	Reference section
New	Creates a new project.	Section 7.4.1
Open	Retrieves an existing project.	Section 7.4.2
Save	Overwrites and saves the current project.	Section 7.4.3
Add item	Adds the item selected in the Edit items tree.	Section 7.3.4
Delete item	Deletes the item selected in the Edit items tree.	Section 7.3.4
Read	Reads the MES interface function settings (project) from the MES interface module.	Section 7.12.3
Write	Writes the MES interface function settings (project) to the MES interface module.	Section 7.12.2
Restart	Makes the stopped MES interface function operation restart.	Section 7.13.2
Stop	Stops the MES interface function operation.	Section 7.13.2
One-shot execution	Executes a job as a one-shot task.	Section 7.12.6
Product information	Displays the product information of the MES Interface Function Configuration Tool.	Section 7.14

7.3.4 Operations using the Edit items tree

The Edit items tree shows overall project settings in a tree.
This section explains the operations using the Edit items tree.

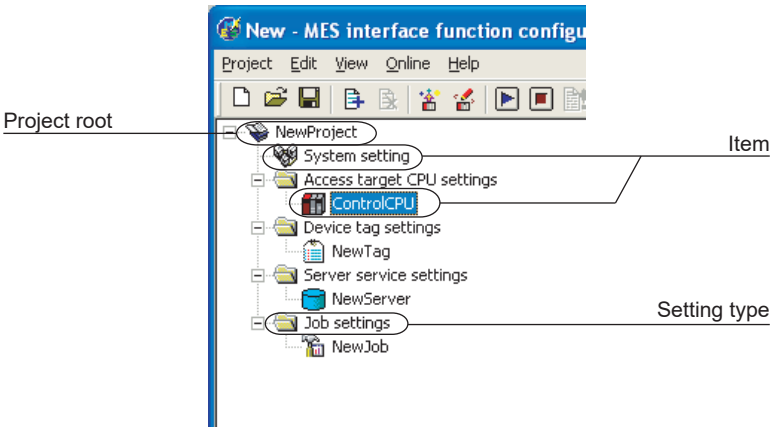


Figure 7.11 Edit items tree

(1) Selecting an item

1. When double-clicking the project root or each setting type, some items are displayed.
2. Selecting one of the items displays the corresponding edit screen on the detailed setting edit screen area.

(2) Adding an item

1. Selecting an item or a setting type to be added and performing either of the following will add the item.
   - Click (Add item).
   - Select [Edit] → [Add item] from the menu.
2. When the item is added properly, it is automatically selected and the edit screen is switched to the one for the added item.

Point

Since the number of items that can be added is limited depending on the setting type, refer to the relevant section of each item.

(3) Deleting an item

1 Selecting an item to be deleted and performing either of the following will delete the item.

- Click (Delete item).
- Select [Edit] → [Delete item] from the menu.

Point

(1) When the selected item is currently used for another item, it cannot be deleted. As the error dialog box appears, identify the location, stop using it for another item, and then delete the item.
(2) The top item listed under [Access target CPU settings] (default name: ControlCPU) cannot be deleted.

(4) Replicating an item

1 Selecting an item and choosing [Edit] → [Replicate item] from the menu replicates the item.

2 When the item is added properly, it is automatically selected and the edit screen is switched to the one for the added item.

Point

Since the number of items that can be added is limited depending on the setting type, refer to the relevant section of each item.

(5) Moving an item

1 An item can be moved by a drag and drop operation.

Point

(1) Items can be moved within each of [Access target CPU settings], [Device tag settings], [Server service settings], and [Job settings].
(2) The top item listed under [Access target CPU settings] (default name: ControlCPU) cannot be moved.

7.4 Project File Handling

This section explains how to handle project files.
MES Interface Function Configuration Tool treats the MES interface function settings for a single MES interface module as one project.

7.4.1 Creating a new project

Create a new project.
When a new project is created, the project currently being edited is discarded.

1. Perform either of the following:
   - Click (New).
   - Select [Project] → [New] from the menu.

7.4.2 Opening a project

Retrieve an existing project.

1. Perform either of the following:
   - Click (Open).
   - Select [Project] → [Open] from the menu.
2. The [Open] dialog box is displayed

   Set the following items and click the Open button.

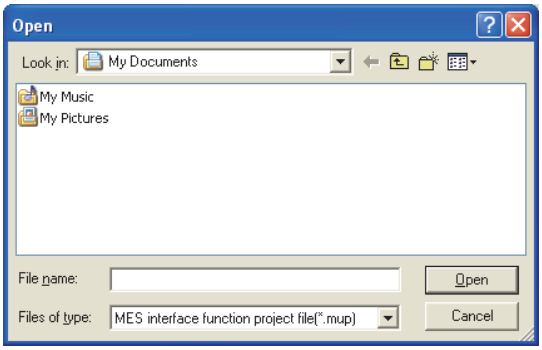


Figure 7.12 [Open] dialog box

Table 7.7 Setting items in the [Open] dialog box

Item	Description
Look in	Select the location where the project is stored.
File name	Specify a project file name.
Files of type	Select a project file type. • MES interface function project file (*.mup)

7.4.3 Saving a project

Save a project.

(1) Save the current project.

1 Perform either of the following:

- Click (Save).
- Select [Project] → [Save] from the menu.

(2) Saving a project under a new name

1 Select [Project] → [Save As] from the menu.

2 The [Save As] dialog box is displayed.

Set the following items and click the Save button.

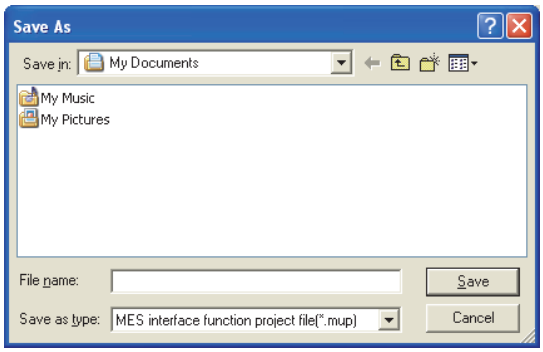


Figure 7.13 [Save As] dialog box

Table 7.8 Setting items in the [Save As] dialog box

Item	Description
Save in	Select the location where the project is to be saved.
File name	Specify the name of the project file to be saved.
Files of type	Select a type of the project file to be saved. • MES interface function project file (*.mup)

7.4.4 Importing a project

Import an existing project.
Any setting can be selected from an existing project and can be imported into the current project setting.
This function is useful when settings of an existing project is utilized for another project.

1. Select [Project] → [Import] → [Project file] from the menu.

2. As the [Open] dialog box appears, specify the project to be imported.
   For the operation for the [Open] dialog box, refer to the following:
   ☞Section 7.4.2 Opening a project

3. When the project to be imported is selected, the [Import from project file] dialog box is displayed.
   Make the setting referring to the following descriptions.
   After completing the setting, clicking the Import button starts the import.

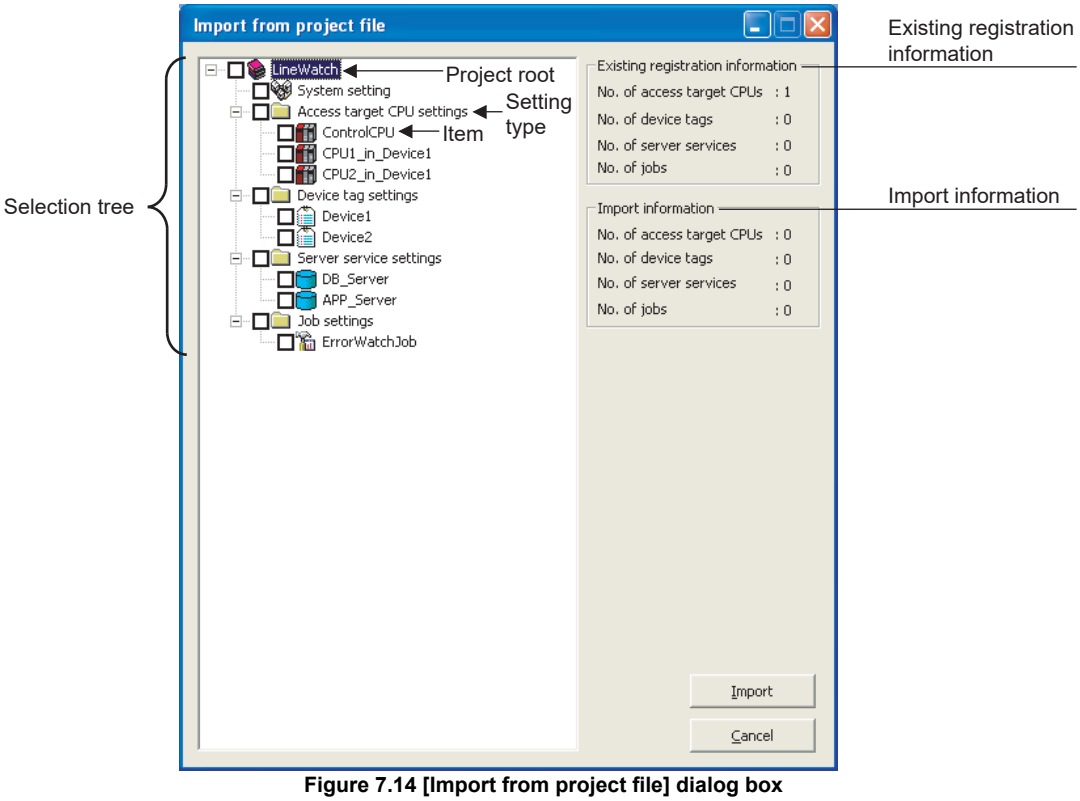


Figure 7.14 [Import from project file] dialog box

Table 7.9 Setting items in the [Import from project file] dialog box

Item	Description
Selection tree	In the tree, select the item to be imported.
Existing registration information	Displays the number of settings for each setting type in the project into which data are imported.
Import information	Displays the number of the settings to be imported for each setting type.

(1) Selecting an item to be imported

In the tree, select the item to be imported.

Table 7.10 Item to be imported

Checked item	Item to be imported
Project root	All items in the project
Setting type*1	All items under the setting type whose checkbox is checked
Item	Each item whose checkbox is checked

*1 When the setting type shown below is selected, items under any other setting type are automatically selected if they are used for the selected one.
Note that, if an item of the same name exists in the target project, the item is not automatically selected.
The user must select items to be imported.

Table 7.11 Automatically selected item

Setting type	Automatically selected item
[Device tag settings]	[Access target CPU settings]
[Job settings]	[Device tag settings], [Server service settings]

(2) Import precautions

There is a limit on the number of settings for each setting type in a project.
Check [Existing registration information] and [Import information], and select items of each setting type to be imported so that each limit is not exceeded.

Table 7.12 Number of settings available for each setting type

Setting type	Allowable number of settings*2
[Access target CPU settings]	64
[Device tag settings]	64
[Server service settings]	32
[Job settings]	64

*2 If an item of the same name exists, it is overwritten and therefore, excluded from the restriction on the number of settings for each setting type.

7.4.5 Importing a CSV file

Import an existing CSV file.
Any setting can be selected from a CSV file edited on a personal computer, and it can be imported into the setting of the current project.
[System setting], [Access target CPU settings] and [Device tag settings] can be imported.

1 Save the import target CSV files shown in Table 7.13 in the same folder.

The files, which are shown as "Required" in the "Saving in folder" column of Table 7.13, must be saved in the same folder. (If any one of them is missing, an error is detected.)
When the file shown as "Optional" is not included in the folder, it is imported with its settings treated as disabled (no settings).

Table 7.13 Import target CSV files

Import target CSV file	Settings to be imported	Saving in folder
SYSTEM.CSV	• [System setting] - [Network setting] • [System setting] - [Time synchronization setting]	Required
ACCOUNT.CSV	[System setting] - [Account setting]	Required
DST.CSV	[System setting] - [Time synchronization setting] - [Daylight saving setting]	Optional
CPU.CSV	[Access target CPU setting]	Required
TAG.CSV	[Device Tag setting]	Required
COMPONENT.CSV	[Device Tag setting] - [Component setting]	Required

2 Select [Project] → [Import] → [CSV Files] from the menu.

3 The [Open] dialog box is displayed.

Set the following items and click the Open button.

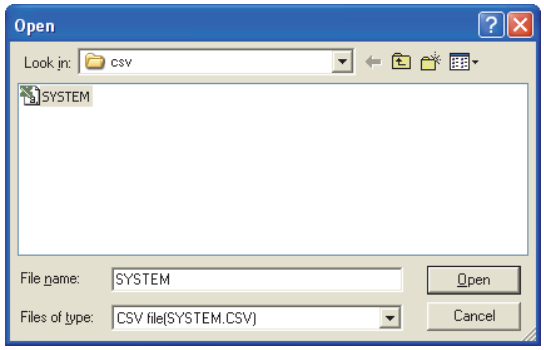


Figure 7.15 [Open] dialog box

Table 7.14 Setting items in the [Open] dialog box

Item	Description
Look in	Select the location where the CSV file is stored.
File name	Specify "SYSTEM.CSV". Files shown in the above 1 and in the same folder as the specified file (SYSTEM.CSV) are the import target CSV files. For files to be imported, refer to the following: ☞Appendix 3 Setting Information File Format (CSV File Format)
Files of type	Select [CSV file(SYSTEM.CSV)].

4 When the CSV file to be imported is selected, the [Import from CSV files] dialog box is displayed.

Make the setting referring to the following descriptions.

After completing the setting, clicking the Import button starts the import.

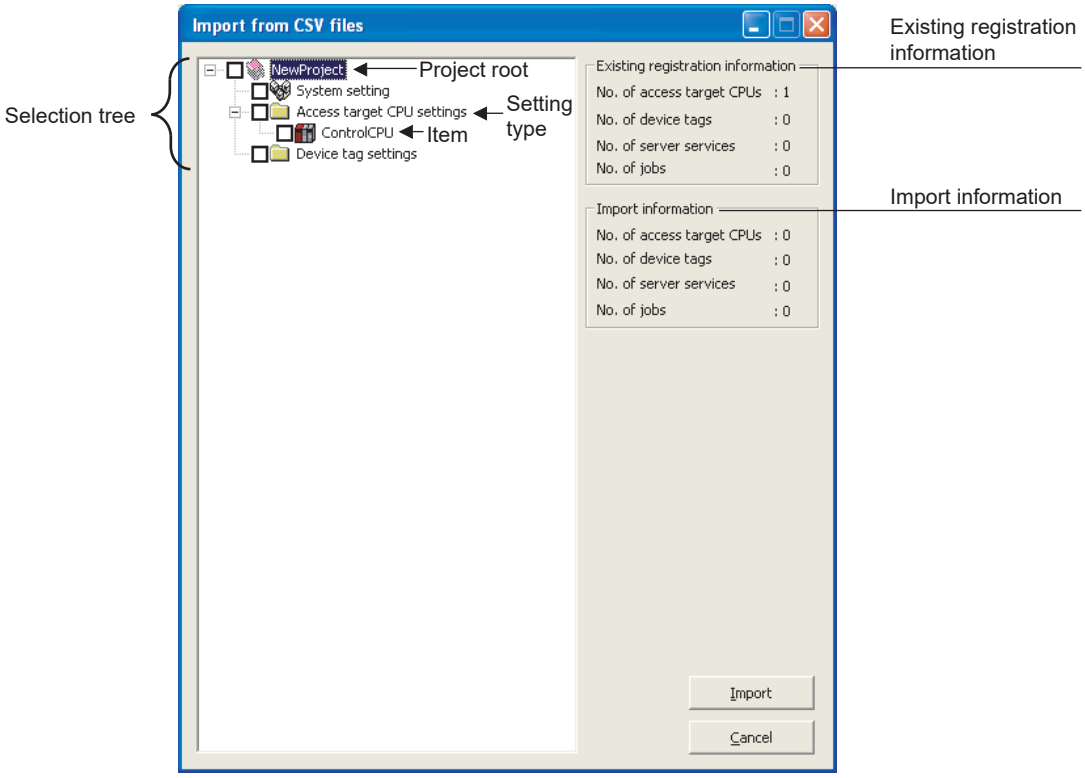


Figure 7.16 [Import from CSV files] dialog box

Table 7.15 Setting items in [Import from CSV files] dialog box

Item	Description
Selection tree	In the tree, select the item to be imported.
Existing registration information	Displays the number of settings for each setting type in the project into which data are imported.
Import information	Displays the number of the settings to be imported for each setting type.

(1) Selecting an item to be imported

In the tree, select the item to be imported.

Table 7.16 Item to be imported

Checked item	Item to be imported
Project root	All items in the project
Setting type*1	All items under the setting type whose checkbox is checked
Item	Each item whose checkbox is checked

*1 When the setting type shown below is selected, items under any other setting type are automatically selected if they are used for the selected one.
Note that, if an item of the same name exists in the target project, the item is not automatically selected.
The user must select items to be imported.

Table 7.17 Automatically selected item

Setting type	Automatically selected item
[Device tag settings]	[Access target CPU settings]

(2) Import precautions

There is a limit on the number of settings for each setting type in a project.
Check [Existing registration information] and [Import information], and select items of each setting type to be imported so that each limit is not exceeded.

Table 7.18 Number of settings available for each setting type

Setting type	Allowable number of settings*2
[Access target CPU settings]	64
[Device tag settings]	64

*2 If an item of the same name exists, it is overwritten and therefore, excluded from the restriction on the number of settings for each setting type.

7.4.6 Exporting a CSV file

Export the current project settings to a CSV file.
Exported CSV files can be utilized for creating setting sheets or printing.
[System setting], [Access target CPU settings], [Device tag settings], [Server service settings], and [Job settings] can be exported.

1. Select [Project] → [Export] → [CSV Files] from the menu.
2. The [Save As] dialog box is displayed.

   Set the following items and click the Save button.

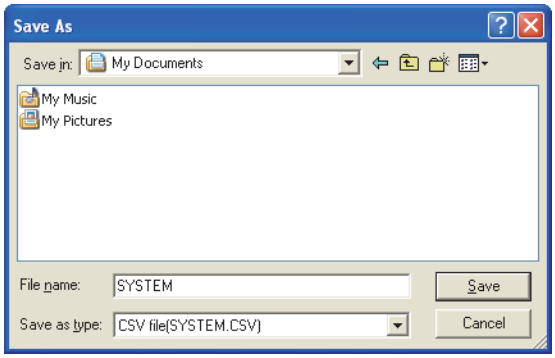


Figure 7.17 [Save As] dialog box

Table 7.19 Setting items in the [Save As] dialog box

Item	Description
Save in	Select the location where the CSV file is to be saved.
File name	Specify "SYSTEM.CSV". The respective setting files are exported into the same folder as the specified file (SYSTEM.CSV). For the files to be exported, refer to the following: ☞Appendix 3 Setting Information File Format (CSV File Format)
Files of type	Select [CSV file(SYSTEM.CSV)].

7.4.7 Printing a setting information file

To print setting details of MES Interface Function Configuration Tool, use a CSV file that includes exported project settings (setting information file).
For exporting CSV files, refer to the following:
☞Section 7.4.6 Exporting a CSV file
Print the setting information file with a tool that is capable of printing text files.

7.5 Project Setting

Set the information on the project (project name, comments).

1. Click the project root in the Edit items tree.
2. The "project setting" area is displayed on the detailed setting edit screen.
   Set the following items.

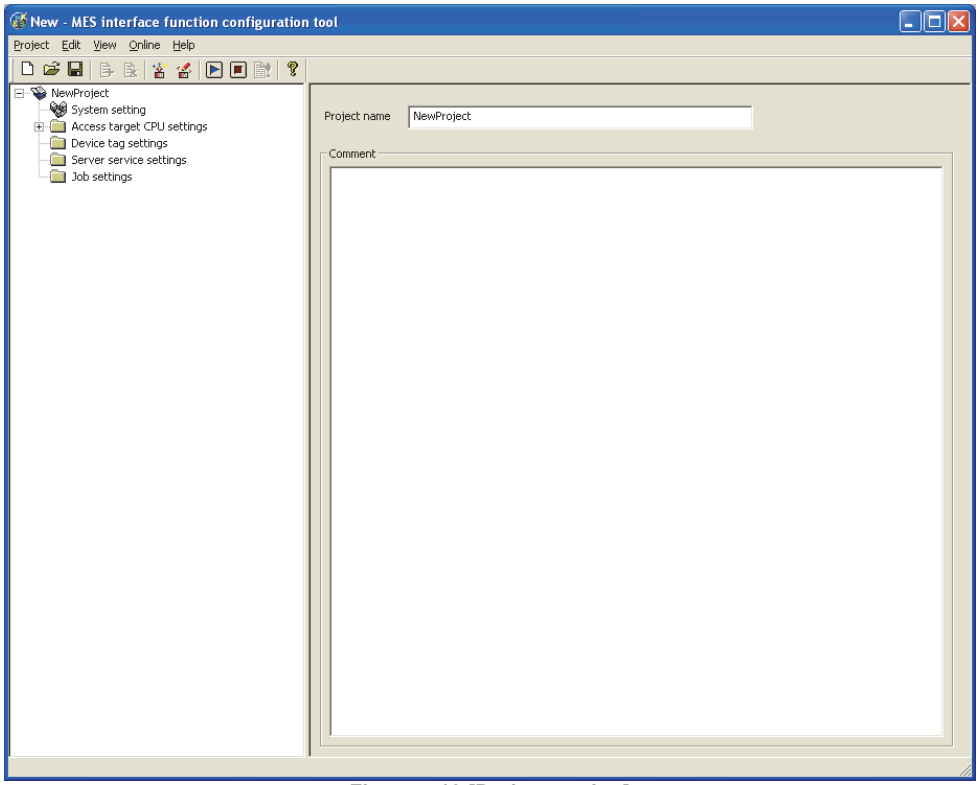


Figure 7.18 [Project setting]

Table 7.20 Setting items in [Project setting]

Item	Description
Project name	Enter a project name. (Up to 32 characters)
Comment	Enter comments about the project as necessary. (Up to 2048 characters)

(1) Project name (Up to 32 characters)

Enter a project name.

For characters that can be used for project names, refer to the following:

☞Appendix 2.2 Characters that can be used for item names, component names, variable names, etc. in the product

The set project name is displayed at the project root.

(2) Comment (Up to 2048 characters)

Enter comments about the project as necessary.

For characters that can be used for comments, refer to the following:

☞Appendix 2.2 Characters that can be used for item names, component names, variable names, etc. in the product

7.6 System Setting

Configure the initial settings for the MES interface module.

1. Click [System setting] in the Edit items tree.
2. The "system setting" area is displayed on the detailed setting edit screen. Make the setting referring to the following descriptions.

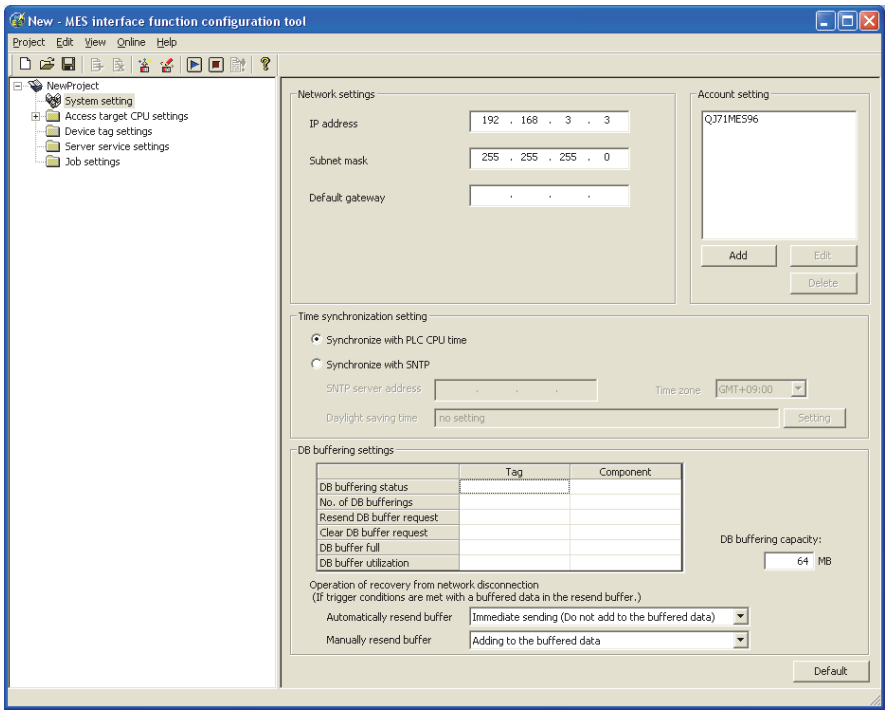


Figure 7.19 [System setting]

Table 7.21 Setting items in [System setting]

Item	Description
Network setting	Configure the settings necessary for connecting the MES interface module to the network. ☞Section 7.6.1 Setting items in Network setting
Time synchronization setting	Make the time setting for the MES interface module. ☞Section 7.6.2 Setting items in Time synchronization setting
Account setting	Set user authentication accounts used for access to the MES interface module. ☞Section 7.6.3 Setting items in Account setting
DB buffering setting	Configure the settings for the DB buffering function. ☞Section 7.6.4 Setting items in DB buffering setting
Default button	Clicking the Default button returns [System setting] to the initial status.

7.6.1 Setting items in Network setting

Configure the settings necessary for connecting the MES interface module to the network.

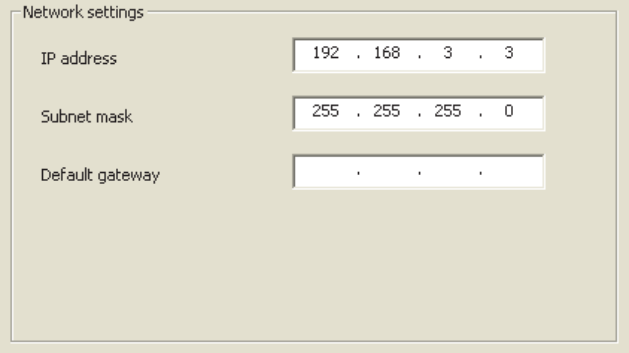


Figure 7.20 [Network settings]

Table 7.22 Setting items in [Network settings]

Item	Description
IP address (required)	Set the IP address of the MES interface module in decimal notation. (Default: 192.168.3.3)
Subnet mask (required)	Set the subnet mask in decimal notation. All devices on the same network must use the same subnet mask. (Default: 255.255.255.0)
Default gateway	Set the default gateway in decimal notation. One default gateway can be registered for the MES interface module. (Default: No setting)

Point

Before entering values in [Network settings], consult your network administrator (the person who plans networking and manages IP addresses).

7.6.2 Setting items in Time synchronization setting

Make the time setting for the MES interface module.
The time used in the MES interface module is obtained from the SNTP server computer or programmable controller CPU (CPU No.1 in the case of a multiple CPU system).

Point

To synchronize the time between the MES interface module and other devices on the network, using the time on the SNTP server computer is recommended.

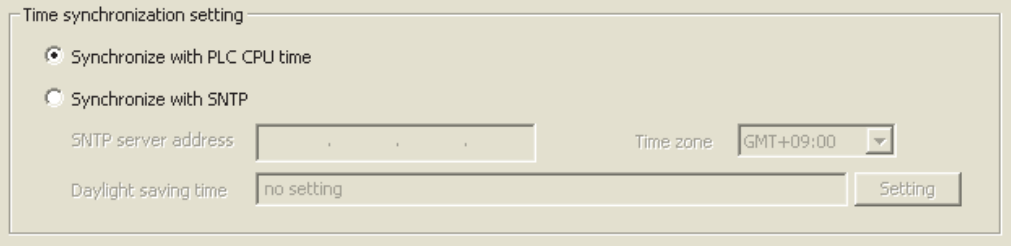


Figure 7.21 [Time synchronization setting]

(1) When [Synchronize with PLC CPU time] is selected

When the [Synchronize with PLC CPU time] radio button is selected, the time is adjusted to the time of CPU No.1.
The timing is as follows:

- When powering ON the programmable controller from OFF
- When resetting the programmable controller CPU
- Once a minute

(2) When [Synchronize with SNTP] is selected

(a) When the [Synchronize with SNTP] radio button is selected, the time is adjusted to the time of the SNTP server computer on the network.
The timing is as follows:

- When powering ON the programmable controller from OFF
- When resetting the programmable controller CPU
- Once a minute

(b) When [Synchronize with SNTP] is selected, set the following items.

Table 7.23 Setting items when [Synchronize with SNTP] is selected

Item	Description
SNTP server address (required)	Enter the IP address of the SNTP server or NTP server in decimal notation. (Default: No setting)
Time zone (required)	Select a time zone used for time synchronization. (Default: GMT+09:00 (Japan Standard Time))
Daylight saving setting	Configure the daylight saving time settings. (Default: No setting)

(c) Daylight saving setting

A click on the Setting button displays the [Daylight saving setting] dialog box.

Make settings for the following items, and click the OK button.

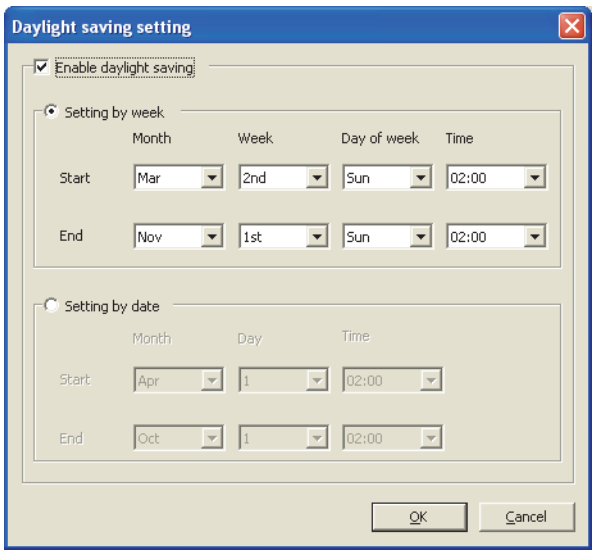


Figure 7.22 [Daylight saving setting]

Table 7.24 Setting items in [Daylight saving setting]

Item	Description
Enable daylight saving	Enable or disable the daylight saving setting.
Setting by week	Specify the date and time of the start (time at which the clock is set ahead) and those of the end (time at which the clock is set back) for Month, Week, Day of week, and Time. (The default is set to starting at 02:00 on the second Sunday in March and ending at 02:00 on the first Sunday in November.)
Setting by date	Specify the date and time of the start (time at which the clock is set ahead) and those of the end (time at which the clock is set back) for Month, Day, and Time. (The default is set to starting on April 1 at 02:00 and ending on October 1 at 02:00.)

(3) When time information is not obtainable from the SNTP server computer
When the MES interface module cannot obtain time information from the SNTP server computer due to failure of the network or time synchronization server, it behaves as follows:

(a) When time information is not obtained at the time of powering ON the programmable controller from OFF, or resetting the programmable controller CPU

1) The operation for the case of selecting [Synchronize with programmable controller CPU time] is performed. (Adjusted to the time of CPU No.1. [Daylight saving setting] is not enabled.)

2) Error code, 0A06h is output to the error log.

3) One minute later, time query is executed again to the SNTP server computer. (If the time query is successful, [Daylight saving setting] is enabled.)

(b) When time information is not obtained in timings of once a minute

1) The module continues its operations based on the information that was successfully obtained by time query.

2) When the previous time query was successful, error code, 0A07h is output to the error log.

3) One minute later, time query is executed again to the SNTP server computer.

Point

Whether time query to the SNTP server computer is executed successfully or not can be confirmed by [Online] - [View working log].
☞Section 7.12.5 Checking the working log of the MES interface module

(4) Precautions on the time synchronization function

(a) Synchronizing time with SNTP server computer

1) When [Synchronize with SNTP] is selected, an SNTP server computer is required.
Note that the SNTP server computer must have the time synchronization server function.

2) If time information cannot be obtained at the time of powering ON the programmable controller from OFF or resetting the programmable controller CPU, the MES interface module operates in time synchronization with CPU No.1 until successful time information acquisition.
When the clock time of CPU No.1 is different from that of the SNTP server computer, the clock time of the MES interface module is changed when time information is successfully obtained from the SNTP server computer. Because of this, tag sampling timing and job operation timing may be changed.

(b) Synchronizing time with programmable controller CPU

1) Before using the MES interface module, set the time of CPU No.1.
Changing time setting during operation of the MES interface module changes its clock time at the timing of time data acquisition. Because of this, tag sampling timing and job operation timing may be changed.

2) Since the MES interface module obtains time data of CPU No.1 in the following timings, transmission time delay may occur.
- When powering ON the programmable controller from OFF
- When resetting the programmable controller CPU
- Once a minute

3) When obtaining the clock data of CPU No.1, an error of up to "scan time of CPU No.1 plus 1 second" may be observed.

Point

When using the time information, which is obtained from the SNTP server computer, in the programmable controller CPU
☞Section 6.3.1 Using the SNTP time query result in the programmable controller CPU

7.6.3 Setting items in Account setting

Set user authentication accounts used for access to the MES interface module.
At least one account setting is required, and up to 16 accounts can be set.

Figure 7.23 [Account setting]

(1) Adding an account

1. Clicking the Add button displays the [Add Account] dialog box.
   Set the following items and click the OK button.

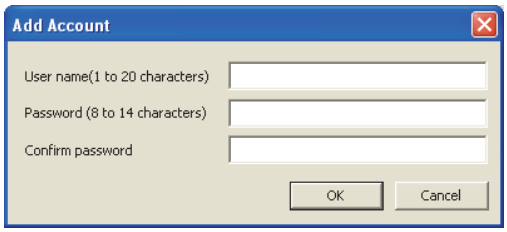


Figure 7.24 [Add Account] dialog box

Table 7.25 Setting items in the [Add Account] dialog box

Item	Description
User name	Enter a user name. (1 to 20 characters) Case-sensitive. For characters that can be used for user names, refer to the following: ☞ Appendix 2.3 Characters available for character string constants, etc.
Password/Confirm password	Enter a password. (8 to 14 characters) Case-sensitive. For characters that can be used for passwords, refer to the following: ☞ Appendix 2.3 Characters available for character string constants, etc.

(2) Modifying an account

1 Selecting an account and clicking the Edit button displays the [Edit Account] dialog box.

Set the following items and click the OK button.

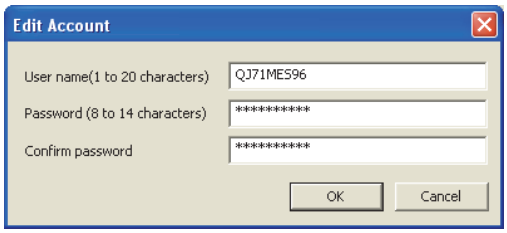


Figure 7.25 [Edit Account] dialog box

Table 7.26 Setting items in the [Edit Account] dialog box

Item	Description
User name	Enter a user name. (1 to 20 characters) Case-sensitive. For characters that can be used for user names, refer to the following: ☞Appendix 2.3 Characters available for character string constants, etc. (Default: QJ71MES96)
Password/Confirm password	Enter a password. (8 to 14 characters) Case-sensitive. For characters that can be used for passwords, refer to the following: ☞Appendix 2.3 Characters available for character string constants, etc. (Default: MITSUBISHI)

(3) Deleting an account

1 Select the account to be deleted and click the Delete button.

(4) Precautions on security of the MES interface module

Although the MES interface module supports the basic authentication (account setting) using user names and passwords, it shall not completely protect the system from illegal access.
When the programmable controller system security needs to be protected against illegal access, take measures at the user's discretion.

It is recommended to pay attention to the following:

(a) Set [Account setting] observing the following so that your account (user name, password) will not be leaked.

1) Prevent any simple setting consisting of alphanumeric characters only, and include some non-alphanumeric character(s) (e.g. $, &, ?) to create complicated user name and password.

2) To protect from illegal access using the default account, delete the account after creating another account.

(b) An account of User name, "QJ71MES96" and Password, "MITSUBISHI" is set by default.
To protect from illegal access using the default account, delete the account after creating another account.

7.6.4 Setting items in DB buffering setting

Configure the settings for the DB buffering function.
For the DB buffering function setting, refer to the following:
☞Section 6.1.10 DB buffering function

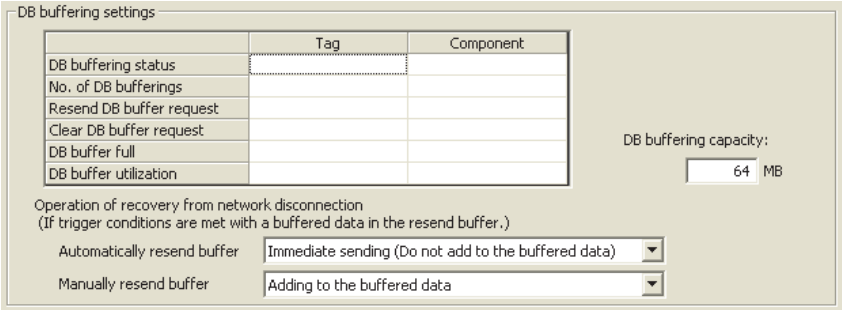


Figure 7.26 [DB buffering settings]

(1) DB buffering status

(a) Select a tag component into which whether data are currently accumulated in the DB buffer or not is stored.
Note that the following tags are not selectable.
- Tags for which [Prohibit data writing] is enabled
- Tags for which [Array setting] is set.

(b) Data are stored as follows depending on the data type.

Table 7.27 Values stored in [DB buffering status]

Data type of tag component	Description
Bit	OFF: Not accumulated ON: One or more data accumulated
Other than the above	0: Not accumulated 1: One or more data accumulated

(2) No. of DB bufferings

(a) Select a tag component into which whether data are currently accumulated in the DB buffer or not is stored.
Note that the following tags are not selectable.
- Tags for which [Prohibit data writing] is enabled
- Tags for which [Array setting] is set.

(b) Data are stored as follows depending on the data type.

Table 7.28 Values stored in [No. of DB bufferings]

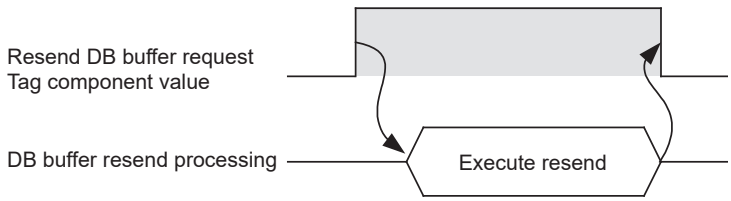
Data type of tag component	Description
Bit	OFF: Not accumulated ON: One or more data accumulated
Other than the above	0: Not accumulated 1 or greater: Number of buffering data that are accumulated

(3) Resend DB buffer request

(a) Select a tag component used to request for resend processing of the DB buffer. Note that the following tags are not selectable.
- Tags for which [Prohibit data writing] is enabled
- Tags for which [Array setting] is set.

(b) The following explains the operation of the resend processing using [Resend DB buffer request].

Table 7.29 Operation of the resend processing using [Resend DB buffer request]

Data type of tag component	Description
Bit	The resend processing of the DB buffer is performed when the specified tag component is ON. Normal: Turns OFF after completion of the resend processing.*1 *2 Error: Outputs error code, 0B83h, to the error log, and turns OFF. 
Other than the above	The resend processing of the DB buffer is performed when "1" is written to the specified tag component. Normal: "0" is written after completion of the resend processing.*1 *2 Error: Outputs error code, 0B83h, and "0" is written.

*1 Do not change the value of the specified tag component until the resend processing is completed. Even if the value changes, however, the resend processing is not interrupted.

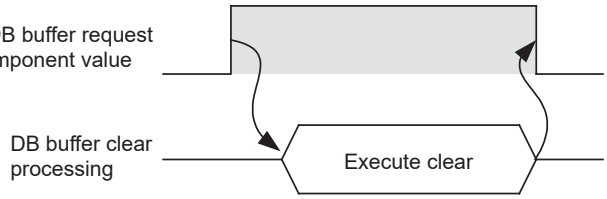
*2 To make another DB buffer resend request after completion of resend processing, wait for a sampling interval of the specified tag component or more, and then turn it ON or write "1".

(4) Clear DB buffer request

(a) Select a tag component used to request for clear processing of the DB buffer. Note that the following tags are not selectable.
- Tags for which [Prohibit data writing] is enabled
- Tags for which [Array setting] is set.

(b) The following explains the operation of the clear processing using [Clear DB buffer request].

Table 7.30 Operation of the clear processing using [Clear DB buffer request]

Data type of tag component	Description
Bit	The clear processing of the DB buffer is performed when the specified tag component is ON. Turns OFF after completion of the clear processing.*1 *2 
Other than the above	The DB buffer is cleared when "1" is written to the specified tag component. "0" is written after completion of the clear processing.*1 *2

*1 Do not change the value of the specified tag component until the clear processing is completed. Even if the value changes, however, the clear processing is not interrupted.

*2 To make another DB buffer clear request after completion of clear processing, wait for a sampling interval of the specified tag component or more, and then turn it ON or write "1".

(5) DB buffering full

(a) Select a tag component into whose device the status of whether the DB buffer (Automatically resend buffer or Manually resend buffer) is full or not is stored.
Note that the following tags are not selectable.
- Tags for which [Prohibit data writing] is enabled
- Tags for which [Array setting] is set.

(b) Data are stored as follows depending on the data type.

Table 7.31 Values stored in [DB buffer full]

Data type of tag component	Description
Bit	OFF: DB buffer is not full. ON: DB buffer is full.
Other than the above	0: DB buffer is not full. 1: DB buffer is full.

(c) When the DB buffer becomes full, even if a DB-buffering-enabled job is activated, its SQL texts are discarded without being buffered.
Note that execution of a DB-buffering-enabled job is not canceled.

Point

Check [DB buffer utilization] shown in (6) to prevent the "DB buffer full" status.

(6) DB buffer utilization

(a) Select a tag component into whose device the utilization of the DB buffer area (Unit: %) is stored.
Note that the following tags are not selectable.
- Tags for which [Prohibit data writing] is enabled
- Tags for which [Array setting] is set.

(b) Data are stored as follows depending on the data type.
Utilization rates of the Automatically resend buffer and Manually resend buffer are compared, and the greater buffer utilization rate is stored as a value.

Table 7.32 Values stored in [DB buffer utilization]

Data type of tag component	Description
Bit	OFF: Not accumulated ON: One or more data accumulated
Other than the above	0: Not accumulated Other than 0: Utilization of DB buffer area (Unit: %)*1

*1 Stored as an integer value. (Digits after decimal point are truncated.)

(7) DB buffering capacity (Range: 16MB to 512MB, Default: 64MB)

(a) Set the capacity used for DB buffering out of the entire CompactFlash card capacity within the following range.
Maximum capacity = CompactFlash card capacity - 32M bytes
Note that a sufficient free space is needed for the CompactFlash card.

(b) A half of the DB buffering capacity is used as the Automatically resend buffer and another half as the Manually resend buffer.

(c) For the calculation method of available time for buffering using DB buffering capacity, refer to the following section.
☞Section 3.1 Performance Specifications

(8) Operation of recovery from network disconnection

Set the operation when the trigger conditions are met in case the data exists in the resend buffer.

(a) Automatically resend buffer

Select the buffering operation for when the communication is recovered from the communication disconnection in case the data are accumulated in the Automatically resend buffer of the DB buffer.

(Default: "Immediate sending (Do not add to the buffered data)")

Table 7.33 Setting items in [Automatically resend buffer]

Item	Description
Immediate sending (Do not add to the buffered data)	After recovery, the data is resent automatically. After recovery, the job whose trigger condition has been met is sent to the database before the data remaining in the resend buffer. (The new job data, whose trigger condition created while the data resend is completed is met, is sent immediately. Therefore, the new job data whose trigger condition is met may be sent to the database before the buffered data.)
Adding to the buffered data	After recovery, the data is resent automatically. The job data is being added to the bottom of the buffered data until the resend operation is completed. (The data is sent in order of the trigger conditions have met including in the new job data whose trigger condition created while the data resend is completed.)

(b) Manually resend buffer

Select the buffering operation for when the communication is recovered from the communication disconnection in case the data are accumulated in the Manually resend buffer of the DB buffer.

(Default: "Adding to the buffered data")

Table 7.34 Setting items in [Manually resend buffer]

Item	Description
Immediate sending (Do not add to the buffered data)	After recovery, the data is resent when the resend operation is performed. After recovery, the job whose trigger condition has been met is sent to the database before the data remaining in the resend buffer. (The new job data, whose trigger condition created while the data resend is completed is met, is sent immediately. Therefore, the new job data whose trigger condition is met may be sent to the database before the buffered data.)
Adding to the buffered data	After recovery, the data is resent when the resend operation is performed. The job data is being added to the bottom of the buffered data until the resend operation is completed. (The data is sent in order of the trigger conditions have met including in the new job data whose trigger condition created while the data resend is completed.)

7.7 Access Target CPU Setting

Set a connection channel to the access target CPU.
The set CPU name is used in [Device tag settings].

1. Double-clicking [Access target CPU settings] in the Edit items tree displays relevant items.

2. Selecting one of the items displays the corresponding edit screen on the detailed setting edit screen area.
   Make the setting referring to the following descriptions.

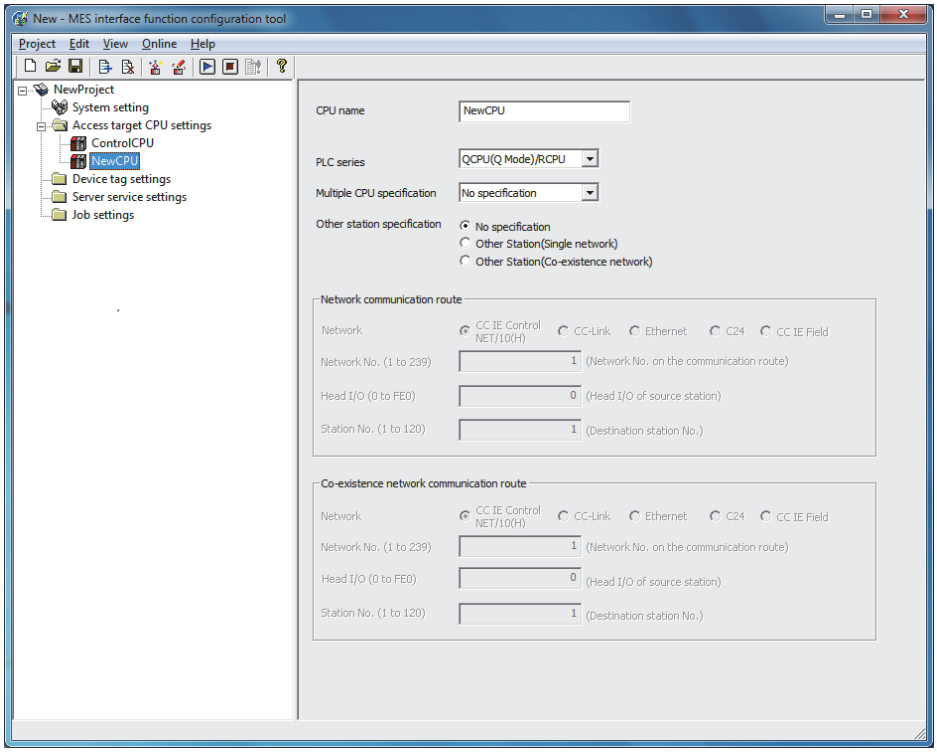


Figure 7.27 [Access target CPU settings]

Point

(1) How to add, delete, or copy an item
For addition, deletion or copying of items, refer to the following:
☞Section 7.3.4 Operations using the Edit items tree

(2) When an item is added or copied, a "New CPU" item is added.

7.7.1 Setting items in Access target CPU setting

Up to 64 items can be set in [Access target CPU settings] within one project.
By default, a control CPU is set as the first item with "ControlCPU" displayed for CPU name.
Deletion or setting modification of the first item is not allowed.
Only the CPU name can be modified.

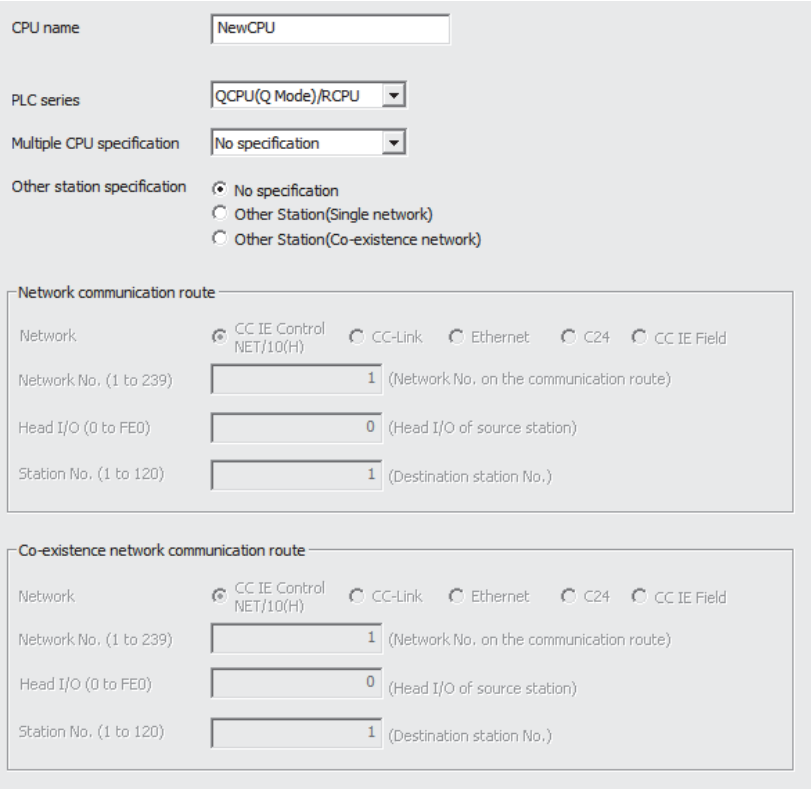


Figure 7.28 [Access target CPU settings]

Table 7.35 Setting items in [Access target CPU settings]

Item	Description
CPU name	Set the access target CPU name. (Up to 16 characters)
PLC series	Select the PLC series of the access target CPU.
Multiple CPU specification	Select a CPU No. when the access target CPU is used in the multiple CPU system.
Other station specification	Select whether or not to specify any other station.
Network communication route, Co-existence network communication route	Set the network type, network No, head I/O address, and station No. used for access when any other station is specified.

(1) CPU name (Up to 16 characters)

Set the access target CPU name.
The set CPU name is used in [Device tag settings].
For characters that can be used for CPU names, refer to the following:
☞Appendix 2.2 Characters that can be used for item names, component names, variable names, etc. in the product

(2) PLC series (QCPU (Q mode)/RCPU, QCPU (A mode), LCPU, QnACPU, ACPU)

Select the PLC series of the access target CPU.
Select the QCPU (Q mode)/RCPU when accessing a C Controller module.

(3) Multiple CPU specification (No specification, No.1 to No.4)

Select a CPU No. when the access target CPU is used in the multiple CPU system.
When "No specification" is selected, access is made to the control CPU.

(4) Other station specification

Select whether or not to specify any other station. For details on accessible routes, refer to the following:

☞Section 3.2 (2) Accessible routes

(a) No specification

Select this when accessing the CPU on the host station.

(b) Other station (Single network)

To access a CPU module on another station over the following network(s), specify a single network.

1) Using any one of the following networks:
   - CC-Link IE Controller Network
   - MELSECNET/10
   - MELSECNET/H
   - CC-Link
   - Ethernet
   - C24
   - CC-Link IE Field Network

   Ex. Access to a CPU module on another station over CC-Link IE Field Network only

2) Using more than one networks from the following:
   - CC-Link IE Controller Network
   - MELSECNET/10
   - MELSECNET/H
   - Ethernet
   - CC-Link IE Field Network

   Ex. Access from a MELSECNET/H network to a CPU module on another station over CC-Link IE Field Network

(c) Other station (Different network)
To access a CPU module on another station over two types of networks 1) and 2) listed in Table 7.34, specify a different network.

Table 7.36 Network types

No.	Network name
1)	C24
	CC-Link
2)	CC-Link IE Controller Network
	MELSECNET/10
	MELSECNET/H
	Ethernet
	CC-Link IE Field Network

Ex.
- Access from a MELSECNET/H network to a CPU module on another station over CC-Link (2) → 1))
- Access from a C24 network to a CPU module on another station over CC-Link IE Controller Network (1) → 2))

(5) Network communication route, Co-existence network communication route
Set the network type, network No, head I/O address, and station No. used for access. The setting items vary depending on the specified network type.
Specify "Ethernet" when accessing the built-in Ethernet port of QCPU (Q mode) which is set the MELSOFT connection extended setting.

Point

To access a CPU on another station, routing parameters must be set in addition to this setting.
For the routing parameters, refer to the following:
☞Manual for the network module used

(6) Precautions on [Access target CPU settings]

(a) The MES interface module prepares for communication with the access target CPU when executing [Update settings], powering ON the system from OFF, or resetting the programmable controller CPU.
Therefore, if a large number of access target CPUs are set, several minutes are required for the preparation.
Confirm that [Update settings] is completed, or the MES interface module is ready (X0 is ON.) before making access from the personal computer to the MES interface module.

(b) Be sure to set a correct series for [PLC series].
If [PLC series] is incorrectly set, either of the following will occur.
- At startup of the MES interface module, an error may occur in a programmable controller CPU or a module on the route to the access target CPU.
- The system may operate within the device range of the incorrect [PLC series] setting.

(c) When accessing the Redundant CPU, pay attention to the following points.
- When the MES interface module is mounted to the Redundant CPU, it can access the CPU of host station only.
It cannot access the CPU of other station.
- When the MES interface module is mounted to other than the Redundant CPU, it cannot access the Redundant CPU of other station.

7.8 Device Tag Setting

Configure the settings for the tag function.
For the tag function, refer to the following:
☞Section 6.1.3 Tag function
Configured tags are used in [Job settings], etc.

1. Double-clicking [Device tag settings] in the Edit items tree displays relevant items.
2. Selecting one of the items displays the corresponding edit screen on the detailed setting edit screen area.
   Make the setting referring to the following descriptions.

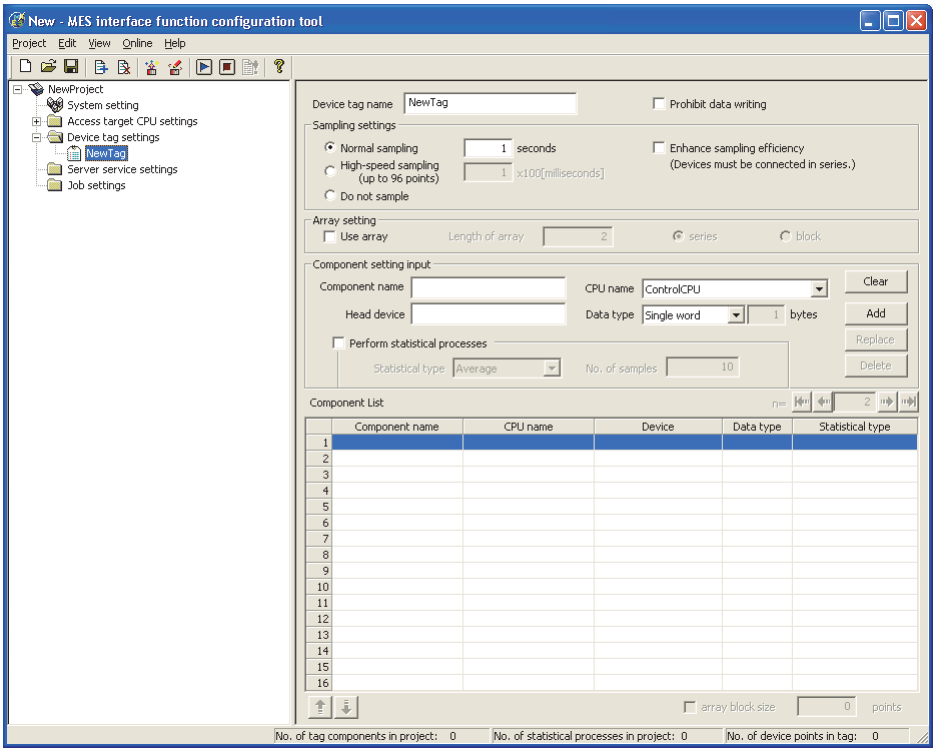


Figure 7.29 [Device tag settings]

Point

(1) How to add, delete, or copy an item
For addition, deletion or copying of items, refer to the following:
☞Section 7.3.4 Operations using the Edit items tree

(2) When an item is added or copied, a "New Tag" item is added.

7.8.1 Setting items in Device Tag setting

Up to 64 items can be set in [Device tag settings] within one project.

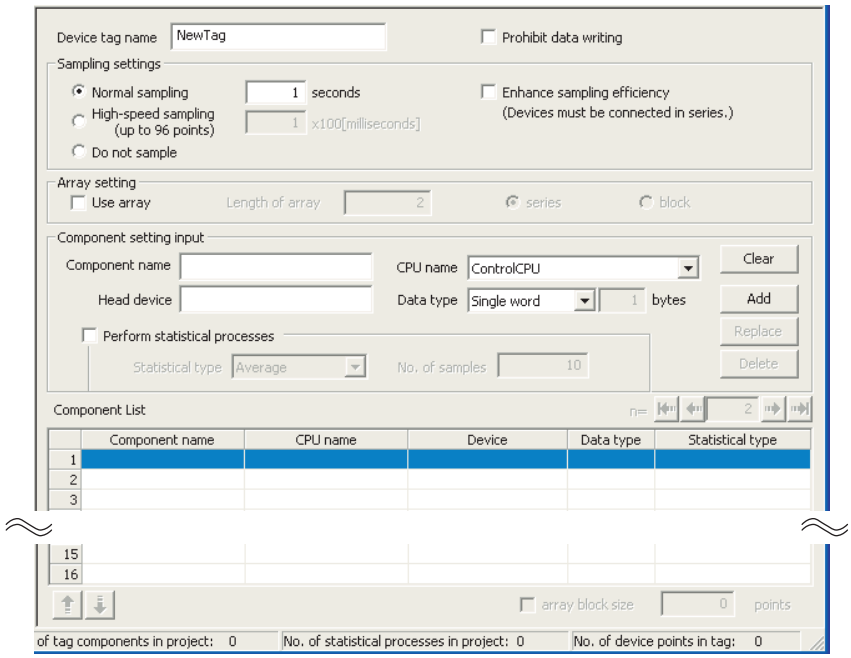


Figure 7.30 [Device tag settings]

Table 7.37 Setting items in [Device tag settings]

Item	Description
Device tag name	Enter a device tag name. (Up to 16 characters)
Sampling settings	Set whether to collect tag data at regular intervals or not. When collecting, set a sampling interval. Also, set whether to make the sampling more efficient or not.
Prohibit data writing	Enable or disable writing data to the tag.
Array setting	Set whether to use arrays for the tag or not. ☞Section 7.8.2 Setting items in Array setting
Component setting input	Configure the tag component settings. ☞Section 7.8.3 Setting items in Component setting
Component List	Displays a list of the components that have been already set. ☞Section 7.8.3 Setting items in Component setting
Array block size	Make setting when changing the block size manually. ☞Section 7.8.3 Setting items in Component setting
No. of tag components in project	Displays the number of all the tag components in the project.
No. of statistical processings in project	Displays the number of the components in the project, for which [Perform statistical processing] is selected.
No. of device points in tag	Displays the number of total device points used in [Device Tag setting].

(1) Device tag name (Up to 16 characters)

Enter a device tag name.
Configured tags are used in [Job settings], etc.
For characters that can be used for device tag names, refer to the following:
☞Appendix 2.2 Characters that can be used for item names, component names, variable names, etc. in the product
Note that using the name same as the one set in [Server service settings] is not allowed.

(2) Sampling settings

(a) Normal sampling

Tag data are collected at the specified intervals.
When [Normal sampling] is selected, the tag sampling interval can be set in units of seconds within the range from 1 to 32767.

(b) High-speed sampling (up to 96 points)

Tag data are collected at high speed at the specified intervals.
When [High-speed sampling] is selected, the tag sampling interval can be set in units of 100 milliseconds within the range from 1 to 600 (× 100ms).

1) Precautions when selecting [High-speed sampling]

- Be sure to create a user-specified system area in the program memory of the control CPU.
  For the redundant system, be sure to create system area for the user setting to the Redundant CPU of both systems in the same capacity.
  When the control CPU is the Universal model QCPU, RCPU or C Controller module, creation of a user-specified system area is not required.
  ☞ REMARKS (1) Creating a user-specified system area
- Registration of [High-speed sampling] is limited to one tag only. (Setting this to multiple tags is not allowed.)
- The choice of [CPU name] in [Component setting input] is fixed to the first item in [Access target CPU settings] (Control CPU).
- Devices of tag components can be set within the total of 96 points.
  (The number of the set points can be checked on the status bar of [Device tag settings].)
  (Example) When [Double word (2 points)] is set for [Data type] of all components, up to 48 component settings can be registered.

(c) Do not sample
The tag is not sampled.

Point

(1) Select [Do not sample] in the cases shown below.
This setting can reduce the load of the MES interface module.
- Tags for which [Array setting] is set
- Tags that perform writing only
- Tags that use handshaking for sampling device values
For handshaking, refer to the following:
☞Section 7.10.2 (8) Handshake operation
- When reserving the tag

(2) Tags with [Do not sample] setting cannot be selected in the items provided for tag read setting. (Except for the case where the trigger condition is set to [Handshake operation].)
- Tag component value for [Select/Update/Delete conditions] of [Select] in [Communication action], etc.

(3) When a system switching occurs to the Redundant CPU, collection of device tag may stop for about 15 seconds.

(3) Enhance sampling efficiency
If the [Enhance sampling efficiency] box is checked, sampling and reading of tag data under handshake operation can be executed at high speed.
This can be selected when device numbers of all the devices registered to the tag are sequential.
This is not selectable when [Array setting] is set.

(4) Prohibit data writing
Set whether to enable or disable writing data to the tag.
This is not selectable when [Array setting] is set.

Point

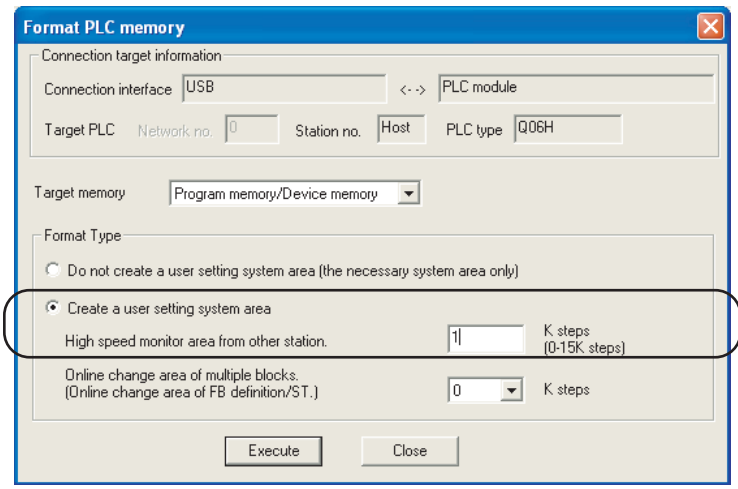
Tags for which data writing is prohibited cannot be selected in the setting items provided for writing to tags.
- [Completion notification] of [Handshake operation], substitution tags of [Select] in [Communication action], etc.

Remark

(1) Creating a user-specified system area

The following explains how to create a user-specified system area in the program memory of the control CPU.

1. Select [Online] → [Format PLC memory] from the menu of GX Developer.
2. As the [Format PLC memory] dialog box appears, select [Create a user setting area] in [Format Type].
3. Ensure 1K step for [High speed monitor area from other station.] per MES interface module. *1
4. Clicking the Execute button executes formatting of the PLC memory.



*1 Separately from the areas used by GX Developer and/or GOT, 1K step is required per MES interface module.

Figure 7.31 [Format PLC memory] in GX Developer

Point

Execution of the PLC memory formatting deletes the programmable controller CPU data.

Read the programmable controller CPU data into GX Developer before executing the PLC memory formatting.

7.8.2 Setting items in Array setting

An array is a data format, in which the specified number of data of the same data type are arranged sequentially.
The Array setting is set when writing multiple records extracted from a database to the same tag component.
Either of the following can be selected for device assignment to each tag component.

- Assigning consecutive devices to each tag component (series)
- Handling all tag components as a block and assigning the same kind of devices in a series of blocks (block)

Tags with array settings are used for [MultiSelect].

Figure 7.32 [Array setting]

(1) Use array

When the [Use array] checkbox is checked, the tag is arranged as arrays.

(2) Length of array (Range: 2 to 40000, Default: 2)

Set the number of arrays for the tag.

(3) Series/Block

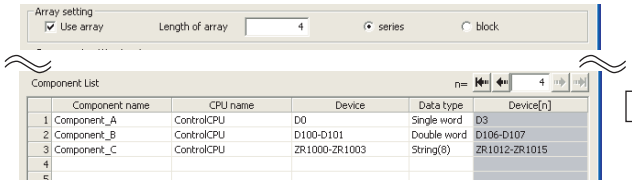
Select a method for the array setting.

(a) Series

Devices of respective tag components are arranged consecutively.
(Example)When [Length of array] is set to 4 with [series] setting

Only the start device (device in n=1) need be set.

Devices in and after n=2 are configured automatically.



	n=1	n=2	n=3	n=4
Component_A	D0	D1	D2	D3
Component_B	D100 to D101	D102 to D103	D104 to D105	D106 to D107
Component_C	ZR1000 to ZR1003	ZR1004 to ZR1007	ZR1008 to ZR1011	ZR1012 to ZR1015

Figure 7.33 When [series] is selected

Point

If any duplicate device is identified in the same tag, an error dialog box will appear.
Check the device settings.

(b) Block

Devices of all tag components are arranged as a block.

The size of the block can be changed in [array block size].

For [array block size], refer to the following.

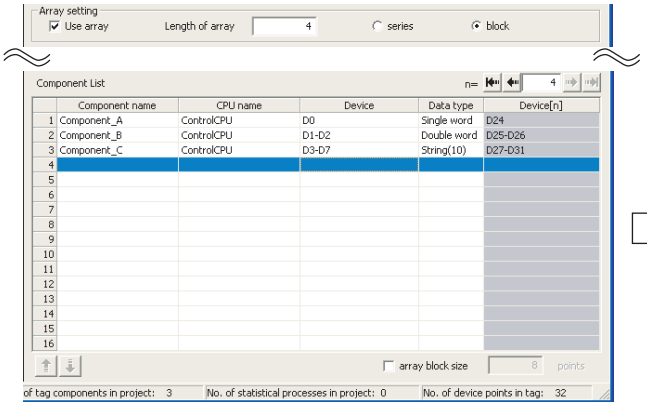
☞Section 7.8.3 Setting items in Component setting

Usually, the block size need not be changed because it is automatically adjusted to avoid device duplication.

(Example) When [Length of array] is set to 4 with [block] setting

Only the start device (device in n=1) need be set.

Devices in and after n=2 are configured automatically.



	n=1	n=2	n=3	n=4
Component_A	D0	D8	D16	D24
Component_B	D1 to D2	D9 to D10	D17 to D18	D25 to D26
Component_C	D3 to D7	D11 to D15	D19 to D23	D27 to D31

Block

Figure 7.34 When [block] is selected

Point

When device types are different, [block] cannot be selected.

7.8.3 Setting items in Component setting

Configure the settings for assigning programmable controller CPU devices to tags.
Up to 256 components can be set for one tag.
Note that the maximum number of components available for one project is 4096.

(Adding a component)

- Set required items in [Component setting input], and click the Add button.
- The component is added in [Component List].

(Modifying a component)

- When a component to be modified is selected in [Component List], its settings are displayed in [Component setting input].
- Modify the item settings in [Component setting input], and click the Replace button.

(Deleting a component)

- Select a component to be deleted in [Component List], and click the Delete button.

(Deleting the settings in [Component setting input])

- Clicking the Clear button deletes the settings in [Component setting input].

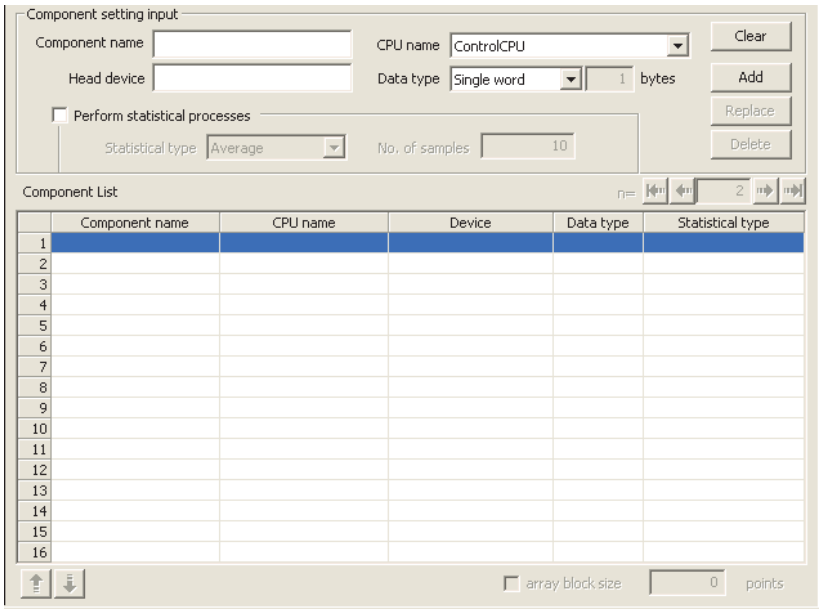


Figure 7.35 [Component setting]

Table 7.38 Items in [Component setting]

Item		Description
Component setting input	Component name	Enter a component name. (Up to 16 characters)
	CPU name	Select one from a list of the access target CPU names set in [Access target CPU settings].
	Head device	Set device name.
	Data type	Select the data type of sampling data.
	Character string length	Set a character string length when [String] is selected for [Data type]. (1 to 32 characters)
	Perform statistical processing	Set whether to perform statistical processing or not.
Component List	Component name	Displays a component name.
	CPU name	Displays a CPU name.
	Device	Displays a device range used.
	Data type	Displays a data type.
	Statistical type	When [Perform statistical processing] is set, displays the type of statistical processing.
	Device [n]	When [Array setting] is set, displays the device range of array No.n. For a display example, refer to the following. ☞Section 7.8.2 Setting items in Array setting
	n (Array No.)	Displays the array No. that is currently displayed in [Device [n]] of [Component List].
	button	If this is clicked, the device range of the first array is displayed in [Device [n]] of [Component List]. When the device range of the first array is already displayed, this button cannot be clicked.
	button	If this is clicked, the device range of the previous array is displayed in [Device [n]] of [Component List]. When the device range of the first array is already displayed, this button cannot be clicked.
	button	If this is clicked, the device range of the next array is displayed in [Device [n]] of [Component List]. When the device range of the last array is already displayed, this button cannot be clicked.
	button	If this is clicked, the device range of the last array is displayed in [Device [n]] of [Component List]. When the device range of the last array is already displayed, this button cannot be clicked.
	button	Selecting a component in [Component List] and clicking the button reverses the order between the selected component and the one immediately above it. The button cannot be clicked on the first component.
	button	Selecting a component in [Component List] and clicking the button reverses the order between the selected component and the one immediately below it. The button cannot be clicked on the last component.
Array block size		Make setting when changing the block size manually.

(1) Component name (Up to 16 characters)

Enter a component name.

For characters that can be used for component names, refer to the following:

☞Appendix 2.2 Characters that can be used for item names, component names, variable names, etc. in the product

(2) CPU name

Select one from a list of the access target CPU names set in [Access target CPU settings].

If [High-speed sampling] is selected, the choice is fixed to the first item in [Access target CPU settings] (Control CPU).

(3) Head device

(a) Set a device type and an actual device number.

(b) Indexing, digit specification, and word device specification by bit specification are not allowed.

(c) For accessible devices, refer to the following:

☞Section 3.2 Accessible Devices and Ranges

(d) When [block] is selected in [Array setting], different kinds of devices cannot be set.

(e) Set device points as follows:(The number of the set points can be checked on the status bar of [Device tag settings].)

- 96 points when [High-speed sampling] is selected.
- 40000 points when [Array setting] is set.

(4) Data type

Select the data type of sampling data (device data).

Table 7.39 Options of [Data type]

Item	Description	Selectable device
Single word	Handles data as single word data (16-bit Integer type).	Word
Double word	Handles data as double word data (32-bit Integer type).	Word
Real number	Handles data as floating point data.	Word
Bit	Handles data as bit data (in units of bits (0/1)).	Bit
String*1	Handles data as character strings.	Word
16bit BCD	Handles data as 16-bit BCD data.	Word
32bit BCD	Handles data as 32-bit BCD data.	Word

*1 When [Data type] is [String], device values are processed as follows:

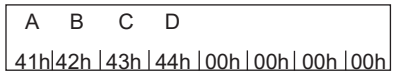
- When the device value neither an ASCII code nor shifted JIS code
  It is replaced with "." (period: 2Eh).
  MES interface module cannot access Unicode character data in RCPU.
- When the device value is model-dependent characters
  The character code may be converted during action execution.
  ☞Appendix 2.2 Characters that can be used for item names, component names, variable names, etc. in the product
- When the device value is a termination character (NULL code: 00h)
  The character data following it are ignored. (The character string is regarded as terminated.)

(5) Character string length (1 to 32 characters)

(a) Set a character string length when [String] is selected for [Data type].

(b) When [String] is selected, data are stored as follows:

1) When the value length is shorter than the character string length
NULL codes (00h) are stored after the stored values.
Example: "ABCD" is stored in the device of the tag component, whose character length is 8.



2) When the value length is longer than the character string length
The values whose quantity is equal to the character string length are stored.
Example: "ABCD" is attempted to be stored in the device of the tag component, whose character length is 2.
"AB" is stored.

(6) Perform statistical processing

(a) Set whether to perform statistical processing or not.
Up to 64 components that have [Perform statistical processing] setting can be set in all projects. (The number of the set points can be checked on the status bar of [Device tag settings].)
When the [Perform statistical processing] box is checked, statistical processing is performed for tag component values.
Statistically processed values can be used by specifying the tag component values, for which [Perform statistical processing] is selected, in [Job settings].
Note that this setting is not available when:
- [Do not sample] is selected in [Sampling settings].
- [Enhance sampling efficiency] is selected in [Sampling settings].
- The data type of the tag component is [Bit] or [String].
- [Array setting] is set.

(b) When [Perform statistical processing] is selected, set the following items.

Table 7.40 Setting items for [Perform statistical processing]

Item	Description
Statistical type	Select a type of the statistical processing.
No. of samples	Specify the number of samples (2 to 20) when [Moving average], [Moving maximum], or [Moving minimum] is selected.

1) Statistical type

Select a type of the statistical processing.

Table 7.41 Options of [Statistical type]

Item	Description
Average*1	An average value after starting sampling is stored.
Maximum*1	The maximum value after starting sampling is stored.
Minimum*1	The minimum value after starting sampling is stored.
Moving average*2 *3 *4	Tag component values are collected at sampling intervals for the number of times specified by [No. of samples] , and an averaged value is stored. Since the processing range moves at each sampling, the latest value can be obtained.
Moving maximum*2 *3 *4	Tag component values are collected at sampling intervals for the number of times specified by [No. of samples] , and the maximum value is stored. Since the processing range moves at each sampling, the latest value can be obtained.
Moving minimum*2 *3 *4	Tag component values are collected at sampling intervals for the number of times specified by [No. of samples] , and the minimum value is stored. Since the processing range moves at each sampling, the latest value can be obtained.

*1 If a statistical value of [Average], [Maximum], or [Minimum] is reset, a value obtained after resetting will be stored.

- How to reset a statistical value of [Average], [Maximum], or [Minimum]
  Perform substitution of some value for the relevant tag component using [Operation action] of a job.
  Section 7.11.4 Setting items in Operation action
  The statistical processing is reset and a value processed after the substitution is stored.

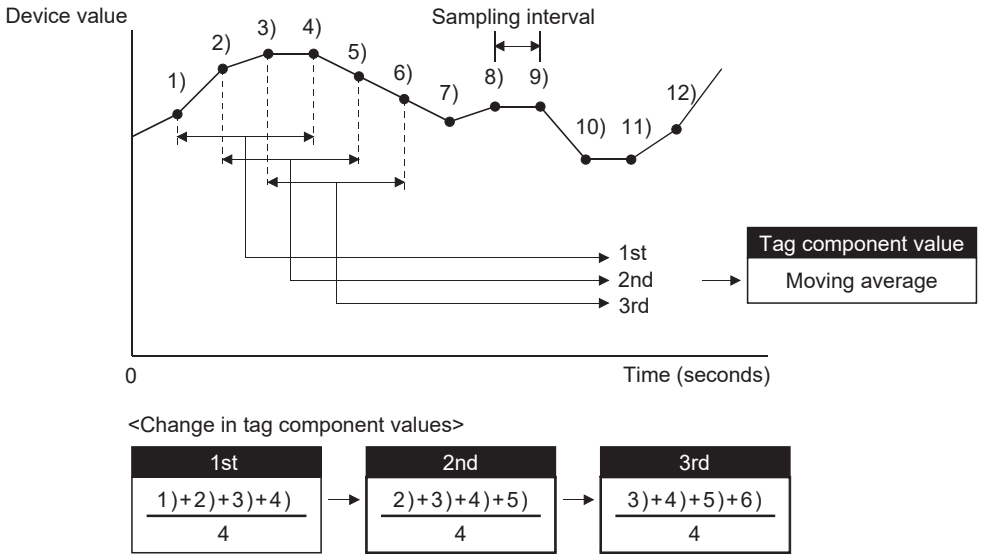
*2 Statistical values of [Moving average], [Moving maximum], and [Moving minimum] cannot be reset.

*3 The substitution cannot be performed on values of [Moving average], [Moving maximum], and [Moving minimum].
The job will be canceled.

*4 When [Moving average], [Moving maximum] or [Moving minimum] is specified for a tag component, a job using the tag component is not able to start its execution until sampling for the specified number of times is completed.
The job will be canceled.

2) No. of samples (2 to 20)
Specify the number of samples when [Moving average], [Moving maximum], or [Moving minimum] is selected.

(Moving average when [No. of samples] is 4)



<Change in tag component values>

1st	2nd	3rd
$\frac{1)+2)+3)+4)}{4}$	$\frac{2)+3)+4)+5)}{4}$	$\frac{3)+4)+5)+6)}{4}$

Figure 7.36 Moving average

(7) n (Array No.)

Figure 7.37 n (Array No.)

When [Array setting] is set, the device range of array No.n, is displayed in [Device [n]] of [Component List].
To change the [Device [n]] display, use the following methods.

- Enter a value in the box.
- Change the value with the ⏮, ◀, ▶, or ⏭ button.

(8) Array block size

Figure 7.38 [array block size]

When [block] is selected in [Array setting], [array block size] setting is available.
Usually, the block size need not be changed because the it is automatically adjusted to avoid duplication of components.
Change [array block size] when:

- Setting a desired number for the start device No. of each block.
- Adding any component in the future.

The following example explains the cases where [array block size] is manually set and is not set.
(Example) When [Component D] is to be added in the future

- When 10 is set for [array block size], device numbers are not changed.
- When nothing is set for [array block size], device numbers in and after array No.2 are changed.

Component name	Device	Data type
Component A	D0	Single word
Component B	D1	Double word
Component C	D3	String (12 characters)
Component D	D9	Single word

Planned to be added →

[When the size is set]
(Array block size = 10)

	n=1	n=2	n=3
Component A	D0	D10	D20
Component B	D1 to D2	D11 to D12	D21 to D22
Component C	D3 to D8	D13 to D18	D23 to D28
Component D	D9	D19	D29

[When the size is not set]

	n=1	n=2	n=3
Component A	D0	D9 →D10	D18 →D20
Component B	D1 to D2	D10 to D11 →D11 to D12	D19 to D20 →D21 to D22
Component C	D3 to D8	D12 to D17 →D13 to D18	D21 to D26 →D23 to D28
Component D	D9	D19	D29

Figure 7.39 An example of [array block size]

(9) Precautions on [Component setting]

If a wrong device number is set for a component in [Component setting], an error will occur on another component that has the same access target CPU setting.
Correct the device number in [Component setting].

7.9 Server Service Setting

Configure the settings for access to a server computer.
The set server service name is used in [Job settings].

1. Double-clicking [Server service settings] in the Edit items tree displays relevant items.

2. Selecting one of the items displays the corresponding edit screen on the detailed setting edit screen area.
   Make the setting referring to the following descriptions.

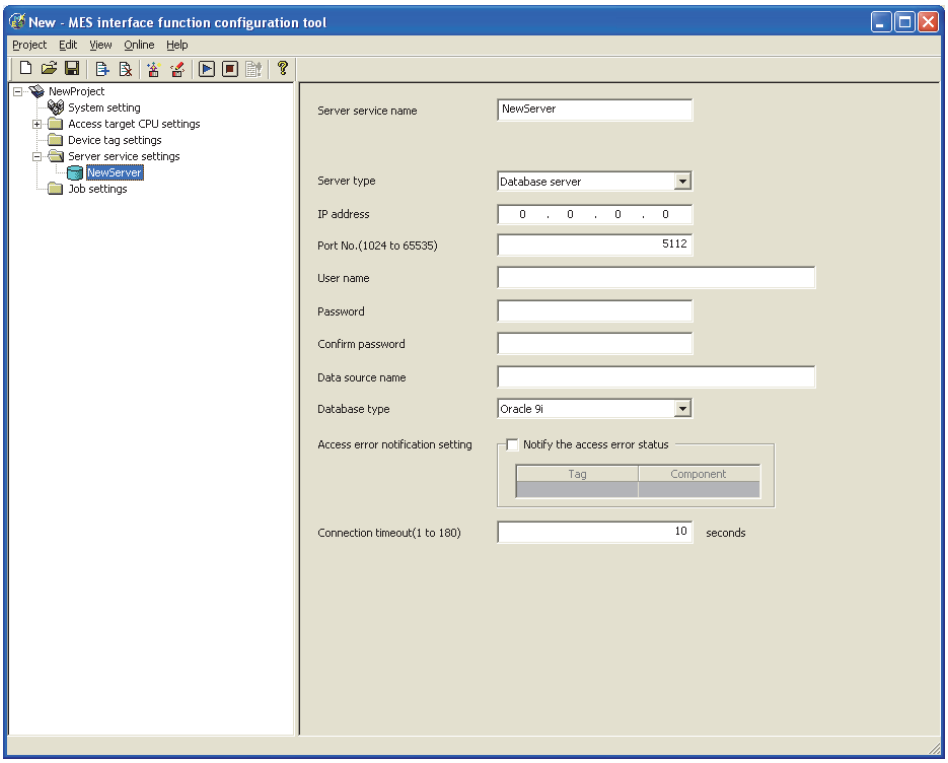


Figure 7.40 [Server service settings]

Point

(1) How to add, delete, copy, or move an item
For information on how to add, delete, copy, or move an item, refer to the following:
☞Section 7.3.4 Operations using the Edit items tree

(2) When an item is added or copied, a "New server" item is added.

7.9.1 Setting items in Server Service setting

Up to 32 items can be set in [Server service settings] within one project.

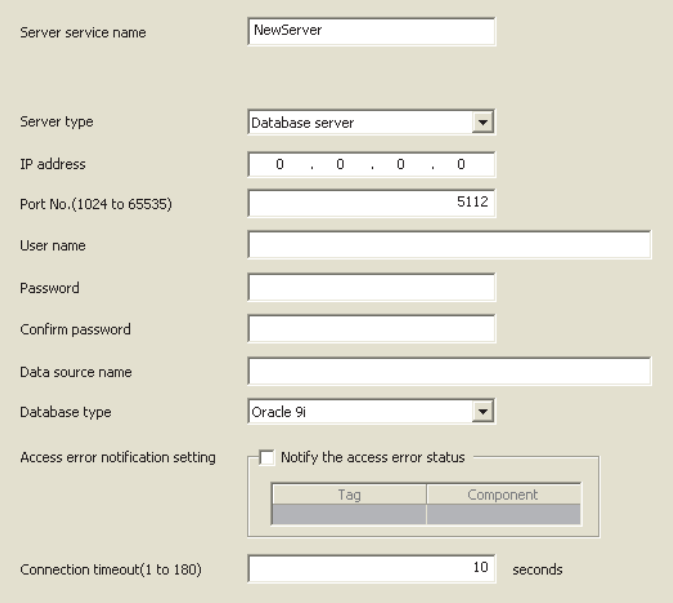


Figure 7.41 [Server service settings]

Table 7.42 Setting items in [Server service settings]

Item	Description
Sever service name	Enter a server service name. (Up to 16 characters)
Server type	Select the server type of the server computer to be accessed.
IP address	Enter a decimal IP address of the server computer where DB Connection Service is installed.
Port No.	Set a port number of the server computer. (Range: 1024 to 65535, Default: 5112)
User name	Set a user name used to access the server computer. (Up to 30 characters)
Password/Confirm password	Set a password used to access the server computer. (Up to 30 characters)
Data source name	Set the name of the ODBC data source to be accessed. (Up to 30 characters)
Database type	Select the type of the database server.
Access error notification setting	Set whether to enable or disable notification of the access error status.
Connection timeout	In case a connection error occurs on the network between the MES interface module and the server computer, set a timeout time during which the MES interface module will detect the error. (Range: 1 to 180 seconds, Default: 10 seconds)

(1) Server service name (Up to 16 characters)

Enter a server service name.

The set server service name is used in [Job settings].

For characters that can be used for server service names, refer to the following:

☞Appendix 2.2 Characters that can be used for item names, component names, variable names, etc. in the product

Note that using the name same as the one of the tag set in [Device tag settings] is not allowed.

(2) Server type

(a) Select the server type of the server computer to be accessed.

Table 7.43 Options of [Server type]

Item	Description
Database server	Used in [Communication action] of [Job settings].
Application server	Used in [Program execution] of [Job settings].

(b) When [Database server] is selected, set the following items.

Table 7.44 Items set for [Database server]

Item	Description
Data source name	Set the name of the ODBC data source to be accessed. (Up to 30 characters) For characters that can be used for data source names, refer to the following: ☞Appendix 2.3 Characters available for character string constants, etc.
Database type	Select the type of the database server. • Oracle 8i • Oracle 9i • Oracle 10g/11g/12c/18c/19c • SQL Server 2000/2005/2008/2012/2014/2016/2017/2019 • MSDE 2000 • Access 2000 • Access 2003/2007/2010/2013/2016/2019*1 • Wonderware Historian

*1 Select this item when using Access® for Microsoft® 365.

(3) IP address

Enter a decimal IP address of the server computer where DB Connection Service is installed.

(4) Port No. (Range: 1024 to 65535, Default: 5112)

Set a port number of the server computer.*1 *2

*1 Set the same value in [Port No.] as the one set in [Service port] of DB Connection Service.

☞Section 8.5 Setting Items of DB Connection Service Setting Tool

*2 Specify the number of the port that is not being used by any database or another application. Usually, it need not be changed.

(5) User name (Up to 30 characters)

Set a user name used to access the server computer.
For characters that can be used for user names, refer to the following:
☞Appendix 2.3 Characters available for character string constants, etc.

(a) When [Database server] is selected for [Server type]
Set a user name that is required for ODBC access.

(b) When [Application server] is selected for [Server type]
Set the account user name used for the operating system of the application server computer.

(6) Password/Confirm password (Up to 30 characters)

Set a password used to access the server computer.
For characters that can be used for passwords, refer to the following:
☞Appendix 2.3 Characters available for character string constants, etc.

(7) Access error notification setting

(a) [Notify the access error status]
Set whether to enable or disable notification of the access error status.
If the [Notify the access error status] box is checked, an error occurred in access to the server computer is reported to a tag component.

(b) When [Notify the access error status] is selected, choose a tag component into whose device the access error status data is stored.
Note that the following tags are not selectable.
- Tags for which [Prohibit data writing] is enabled
- Tags for which [Array setting] is set

(c) Data are stored as follows depending on the data type.

Table 7.45 Values for [Notify the access error status]

Data type of tag component	Description
Bit	OFF : Normal/Not accessed ON : Access error status
Other than the above	0 : Normal/Not accessed 1 : Access error status

(8) Connection timeout (Range: 1 to 180 seconds, Default: 10 seconds)

In case a connection error occurs on the network between the MES interface module and the server computer, set a timeout time during which the MES interface module will detect the error.

Usually, this setting is not needed.

In any of the following cases, adjust the connection timeout time if necessary.

(a) Reduce the connection timeout time to:

- Make the time elapsed from occurrence of a connection error to the start of DB buffering shorter.
- Make the time elapsed from occurrence of a connection error to notification of an access error and job cancellation shorter.

(b) Increase the connection timeout time when:

- A connection timeout occurs in spite of normal network condition.

Point

The relation of the values set for [Connection timeout] and [DB access timeout time] in [DB Connection Service Setting Tool] must be as follows:

- Connection timeout value ≦ DB access timeout value

7.10 Job Setting

Configure the settings for the DB interface function.
For the DB interface function, refer to the following:
☞Section 6.1 DB Interface Function

1. Double-clicking [Job settings] in the Edit items tree displays relevant items.
2. Selecting one of the items displays the corresponding edit screen on the detailed setting edit screen area.
   Make the setting referring to the following descriptions.

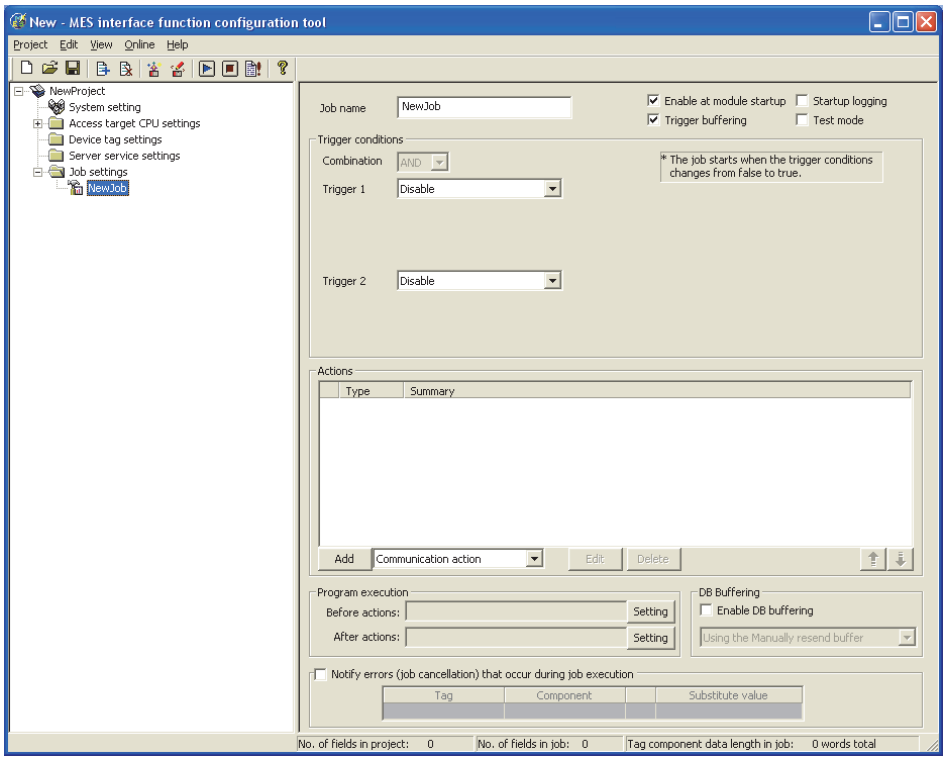


Figure 7.42 [Job settings]

Point

(1) How to add, delete, copy, or move an item
For information on how to add, delete, copy, or move an item, refer to the following:
☞Section 7.3.4 Operations using the Edit items tree

(2) When an item is added or copied, a "New job" item is added.

7.10.1 Setting items in Job setting

Up to 64 items can be set in [Job settings] within one project.
For job operations, refer to the following:
☞Section 6.1.11 (1) Operation behavior of jobs

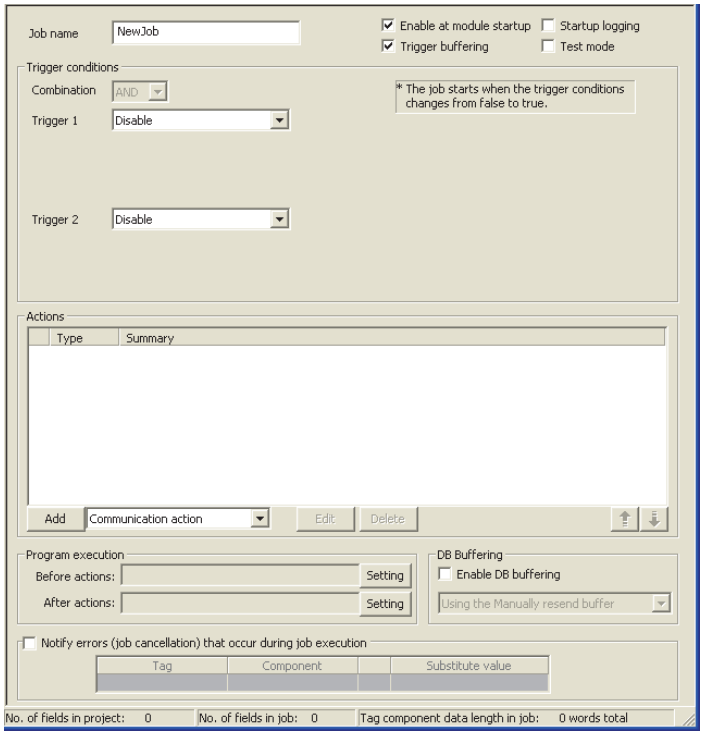


Figure 7.43 [Job settings]

Table 7.46 Setting items in [Job settings]

Item	Description
Job name	Enter a job name. (Up to 16 characters)
Enable at module startup	Set whether to enable the job at startup of the MES interface module or not.
Trigger buffering	Set whether to enable the trigger buffering or not.
Startup logging	Set whether to output the startup history of the job to the log or not.
Test mode	Set whether to operate the job in test mode or not.
Trigger conditions	Configure the settings for startup conditions of the job. ☞Section 7.10.2 Setting items in Trigger conditions
Actions	Configure the action settings. ☞Section 7.11 Job Setting - Actions
Program execution	Configure the settings for the program execution function. ☞Section 7.10.3 Setting items in Program execution
DB Buffering	Set whether to utilize the DB buffering function or not. ☞Section 7.10.4 Setting items in DB Buffering
Notify errors (job cancellation) that occur during job execution	Set whether to enable or disable notification of errors (job cancellation) that occur during job execution. ☞Section 7.10.5 Setting items for job cancellation
No. of fields in project	Displays the total number of fields in the project.
No. of fields in job	Displays the total number of fields used in [Job settings].
Tag component data length in job	Displays the total data length of the tag components in the job.

(1) Job name (Up to 16 characters)

Enter a job name.

For characters that can be used for job names, refer to the following:

☞Appendix 2.2 Characters that can be used for item names, component names, variable names, etc. in the product

(2) Enable at module startup

(a) Set whether to enable the job at startup of the MES interface module or not.
If the [Enable at module startup] box is not checked, the job is disabled at startup of the module. (Even if trigger conditions are met, the job is not executed.)

(b) While the MES interface module is operating, this setting can be changed by the following:

- "Instruction of job execution" in the XML processing function
  ☞Section 6.2 XML Processing Function
- [Online] - [Remote operation] - [Change job status]
  ☞Section 7.13.4 Changing the job status

(3) Trigger buffering

(a) Set whether to enable the trigger buffering function or not.
For the trigger buffering function, refer to the following:
☞Section 6.1.5 Trigger buffering function

(b) Precautions when selecting [Trigger buffering]

1) [Handshake operation] is not selectable for trigger conditions.
2) No tag component can be selected for the following items:
   - Substitution tag of [Select] in [Communication action]
   - Substitution tag of [Operation action]
   - Output arguments , input/output arguments, and returned values of stored procedures
3) [Communication action] - [MultiSelect] cannot be selected.
4) Up to 4096 words *1 can be set as the total tag component data length usable in one job. (The setting can be checked on the status bar of [Job settings] or in each action dialog box.)

*1 The total data length of the tag components that are set in [DB-tag link settings] or [Select/Update/Delete conditions] of [Communication action], or in [Operation action].
If two or more identical tag components are set in the same job, respective data lengths are counted.

5) When Delete is used for Communication action and if it is executed, the deleted record cannot be restored.
6) When multiple jobs for which [Trigger buffering] is enabled are set, the next job is not performed until the execution of other jobs are complete.

(4) Startup logging

(a) Set whether to output the startup history of the job to the log or not.
If this function is enabled, the job startup timing can be checked during system start-up or tune-up.
When the [Startup logging] box is checked, the startup history of the job (date and time, job name) is saved on a CompactFlash card.
The startup log can be checked from [Online] - [View working log].
☞Section 7.12.5 Checking the working log of the MES interface module

(b) When the log capacity becomes full (Log capacity: 2MB × 2)
The first half of the data are deleted.
The latest log is stored after the remaining data.

(c) When this function is enabled, a processing time is required for saving or deleting the startup history of the job.
It is recommended to disable this function during system operation.

(5) Test mode

(a) Set whether to operate the job in test mode or not.
Up to 4 jobs can be set to [Test mode].
When the [Test mode] box is checked, the test mode is activated, and execution details of the job can be confirmed before operation.
Execution details of the job can be checked by selecting [Online] - [View working log] - [View details].
☞Section 7.12.5 Checking the working log of the MES interface module

(b) When [Test mode] is selected
The following are performed in the test mode.
Operations other than the following are identical to the actual operations.
- Startup data are logged.
- Detailed data are logged.
- No data are written to the programmable controller CPU.
- No data are written to the database.

7.10.2 Setting items in Trigger conditions

Configure the settings for startup conditions of the job.
The job is activated when the trigger condition value is changed from false to true.

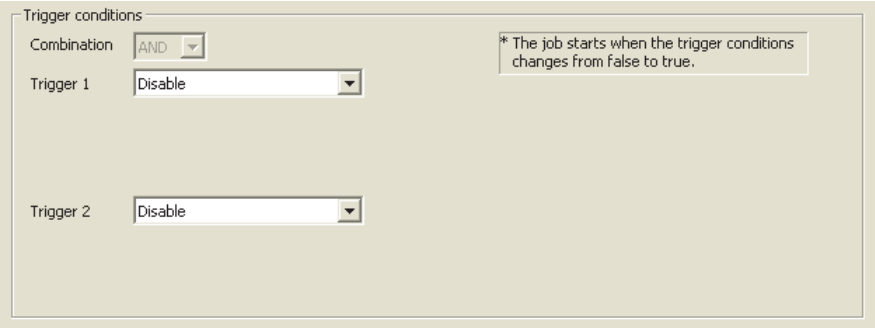


Figure 7.44 [Trigger conditions]

Table 7.47 Setting items in [Trigger conditions]

Item	Description
Combination	Selects conjunction of Trigger 1 and 2.
Trigger 1	Selects Trigger 1.
Trigger 2	Selects Trigger 2.

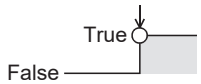
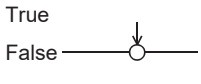
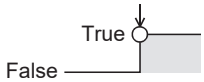
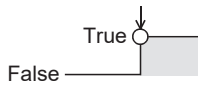
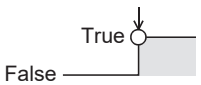
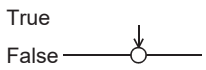
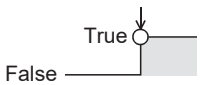
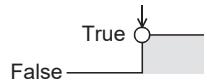
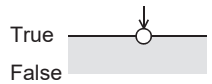
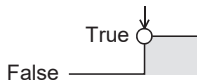
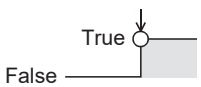
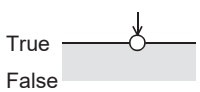
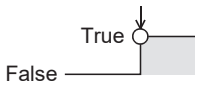
(1) Combination

(a) Selects a combination of [Trigger 1] and [Trigger 2].
- OR (When either of them is true, the result is true.)
- AND (When both of them are true, the result is true.)

The combination result of [Trigger 1] and [Trigger 2] is changed from false to true, the job is activated.

(b) The following shows the timings at which the combination result of [Trigger 1] and [Trigger 2] is changed from false to true.
(In any other cases, because the combination result is not changed from false to true, the job is not activated.)

Table 7.48 Timings at which combination result of [Trigger 1] and [Trigger 2] is changed from false to true

Combination	Trigger 1	Trigger 2	Combination result
OR (When either of them is true, the result is true.)	(Changed from false to true) 	(Remained false) 	(Changed from false to true) 
	(Changed from false to true) 	(Changed from false to true) 	
	(Remained false) 	(Changed from false to true) 	
AND (When both of them are true, the result is true.)	(Changed from false to true) 	(Remained true) 	
	(Changed from false to true) 	(Changed from false to true) 	
	(Remained true) 	(Changed from false to true) 	

(2) Trigger 1, Trigger 2

Select items for [Trigger 1] and [Trigger 2], referring to (3) and subsequent descriptions.

Table 7.49 Selection items for [Trigger 1] and [Trigger 2]

Item	Description	Trigger 1	Trigger 2
Disable	No trigger conditions ☞(3) Disable in this section	○	○
Time specification startup	When the specified date, time and day of the week match the actual date, time and day of the week, the condition changes from false to true, resulting in job startup. ☞(4) Time specification startup in this section	○	○
Specified time period startup	The condition is alternated between true and false in the specified cycles (unit: seconds), and when it changes from false to true, the job is activated. ☞(5) Specified time period startup in this section	○	○
Value monitoring startup	The actual tag component value is compared with the condition value (tag component value or constant value) at every sampling times, and the job is activated when the condition changes from false to true. ☞(6) Value monitoring startup in this section	○	○
At module startup	The job is activated only once when the MES interface module is started up. ☞(7) At module startup in this section	○	○
Handshake operation	The job is activated when [Handshake startup] of the programmable controller CPU turns ON. Upon completion of the job execution, [Completion notification] of the programmable controller CPU turns ON. ☞(8) Handshake operation in this section	○	×

○: Selectable, ×: Not selectable

Point

When using 'Value monitoring startup' or 'Handshake operation' for a trigger condition, check that 'Information linkage status (X5)' is in execution (ON), and create a program so that the trigger condition is satisfied.

☞Section 2.6.5 (1) Startup time

(3) Disable

(a) When [Disable] is selected for [Trigger 1] or [Trigger 2]
Another trigger is regarded as a trigger condition.

(b) When [Disable] is selected for both [Trigger 1] and [Trigger 2]
The job is not activated by trigger conditions.

Point

When [Disable] is selected, the job can be activated by an "instruction of job execution" of the XML processing function.

☞Section 6.2 XML Processing Function

(4) Time specification startup

(a) When the specified date, time and day of the week match the actual date, time and day of the week, the condition changes from false to true, resulting in job startup.

(b) When [Time specification startup] is selected, the date, time, and day of the week must be set.

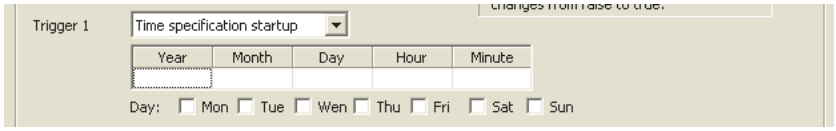


Figure 7.45 [Time specification startup]

1) Year, Month, Day, Hour, and Minute
Directly enter the date and time.
Matching with the actual date and time is not checked for any field that remains blank.

Table 7.50 Setting items in [Time specification startup]

Item	Description
Year (4 digits)	1000 to 9999
Month	1 to 12
Day	1 to 31
Hour	0 to 23
Minute	0 to 59

2) Day:
Specify a day of the week.
Check the checkbox of the day to be specified.
If no box is checked, it means "every day".

(Example) The following shows that the job is to be activated at 17:30 on Monday through Friday.

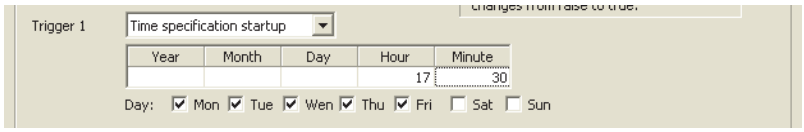


Figure 7.46 [Time specification startup] setting example 1

(Example) The following shows that the job is to be activated at 9:00 on the 1st day of every month.

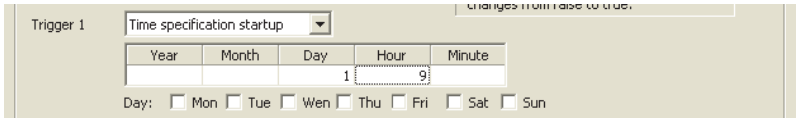


Figure 7.47 [Time specification startup] setting example 2

Point

If [Startup logging] is selected, each job startup can be confirmed with the time to the second in the startup log.
The startup log can be checked from [Online] - [View working log].
☞Section 7.12.5 Checking the working log of the MES interface module

(5) Specified time period startup

(a) The condition is alternated between true and false in the specified cycles (unit: seconds), and when it changes from false to true, the job is activated.

(b) When [Specified time period startup] is selected, set the cycle.
(Range: 1 to 32767 seconds)

Figure 7.48 [Specified time period startup]

(Example)
The following shows that the job is activated at 60-second intervals for an hour from 12:00 to 13:00 every day.

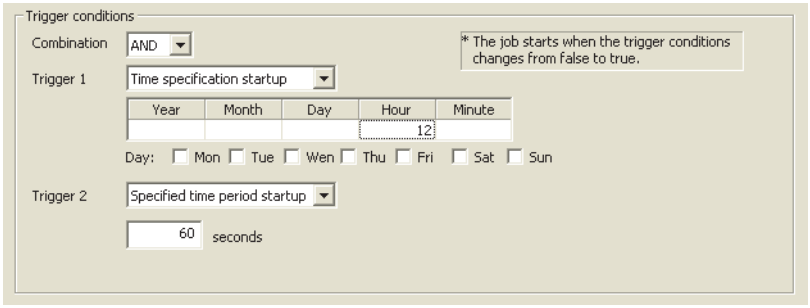


Figure 7.49 Example of setting combination of [Time specification startup] and [Specified time period startup]

(6) Value monitoring startup

(a) The actual tag component value is compared with the condition value (tag component value or constant value) at every sampling times, and the job is activated when the condition changes from false to true.
Even if the trigger condition becomes true temporarily between samplings, the job is not activated unless it is true at time of sampling.

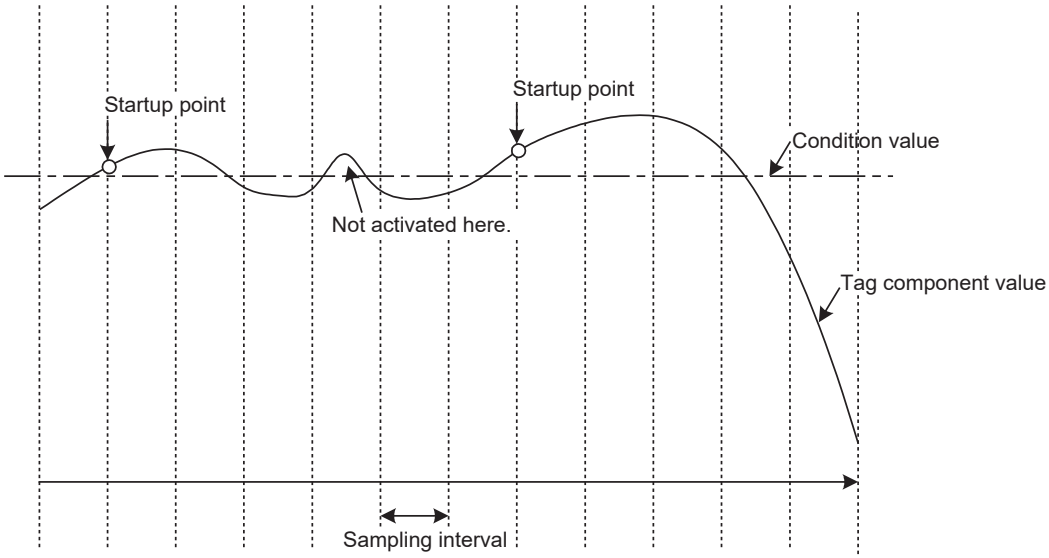


Figure 7.50 Job startup points when [Value monitoring startup] is selected

(b) When [Value monitoring startup] is selected, specify conditions for comparison.

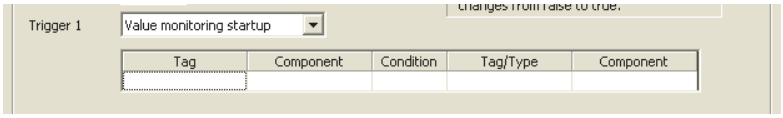


Figure 7.51 [Value monitoring startup]

1) Tag, Component
Select a tag component to be compared with.
Note that tags with [Array setting] are not selectable.

2) Condition
Select a condition for comparison.

Table 7.51 Selection items for [Condition]

Item	Description
=	The tag component value is equal to the condition value.
≠	The tag component value is not equal to the condition value.
≧	The tag component value is equal to or greater than the condition value. (Not selectable when [Data type] of the tag component is [Bit] or [String])
>	The tag component value is greater than the condition value. (Not selectable when [Data type] of the tag component is [Bit] or [String])
<	The tag component value is smaller than the condition value. (Not selectable when [Data type] of the tag component is [Bit] or [String])
≦	The tag component value is equal to or smaller than the condition value. (Not selectable when [Data type] of the tag component is [Bit] or [String])

3) Tag/Type
Select a tag or constant that is used as a condition for comparison.
Note that tags with [Array setting] are not selectable.

4) Component
Select or enter a component/constant value that is used as a condition for comparison.

(Example)
The following shows that the job is activated when the value of the tag component (Process 1, Temperature) reaches 45 or higher.

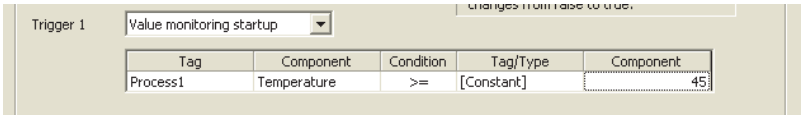


Figure 7.52 [Value monitoring startup] setting example 1

(Example)
To activate the job repeatedly while the condition of [Value monitoring startup] is met, Make settings as follows:

Table 7.52 [Value monitoring startup] setting example 2

Item	Description
Combination	[AND]
Trigger 1, Trigger 2	[Value monitoring startup], [Specified time period startup]

As the condition alternates between true and false as shown below, job startup can be repeated while the [Value monitoring startup] condition is met.

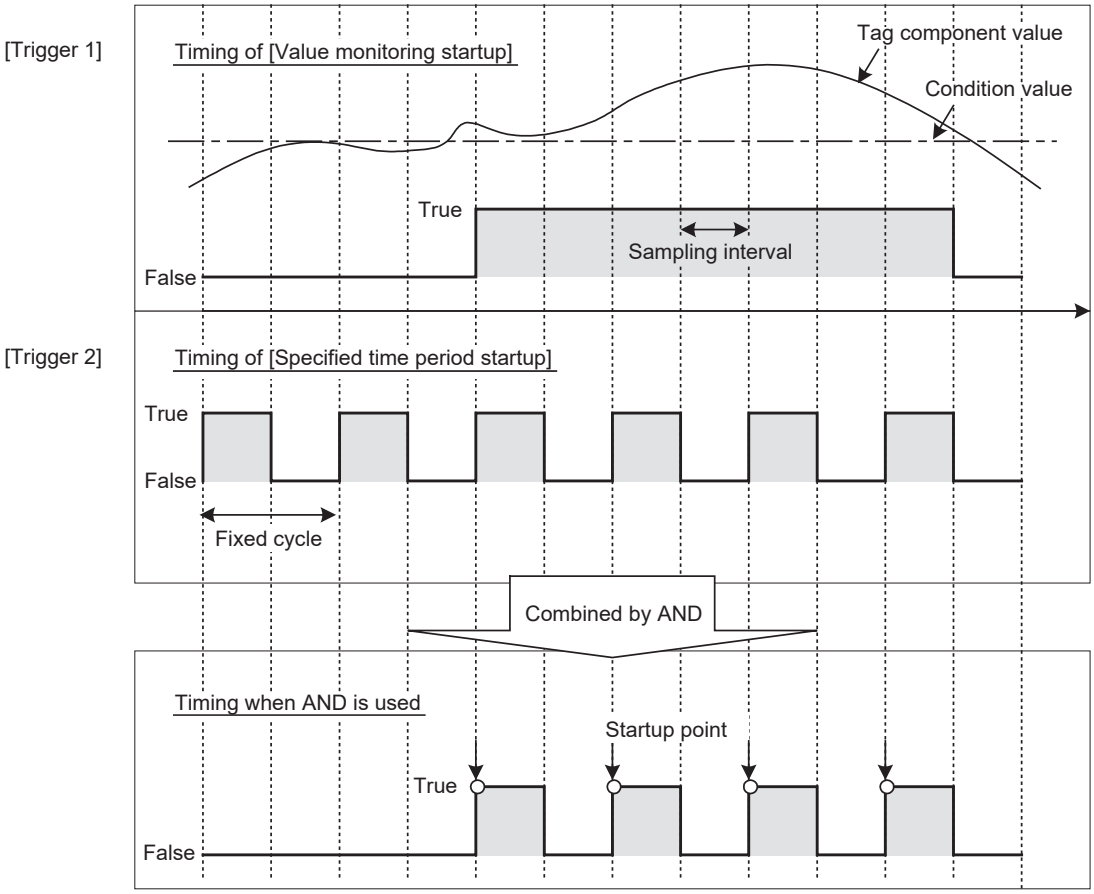


Figure 7.53 Job startup points when [Value monitoring startup] and [Specified time period startup] are combined

(7) At module startup

The job is activated only once when the MES interface module is started up.

(8) Handshake operation

(a) The job is activated when [Handshake startup] of the programmable controller CPU turns ON.
Upon completion of the job execution, [Completion notification] of the programmable controller CPU turns ON.
[Handshake operation] is a startup method by which completion of job execution can be notified to a programmable controller CPU.

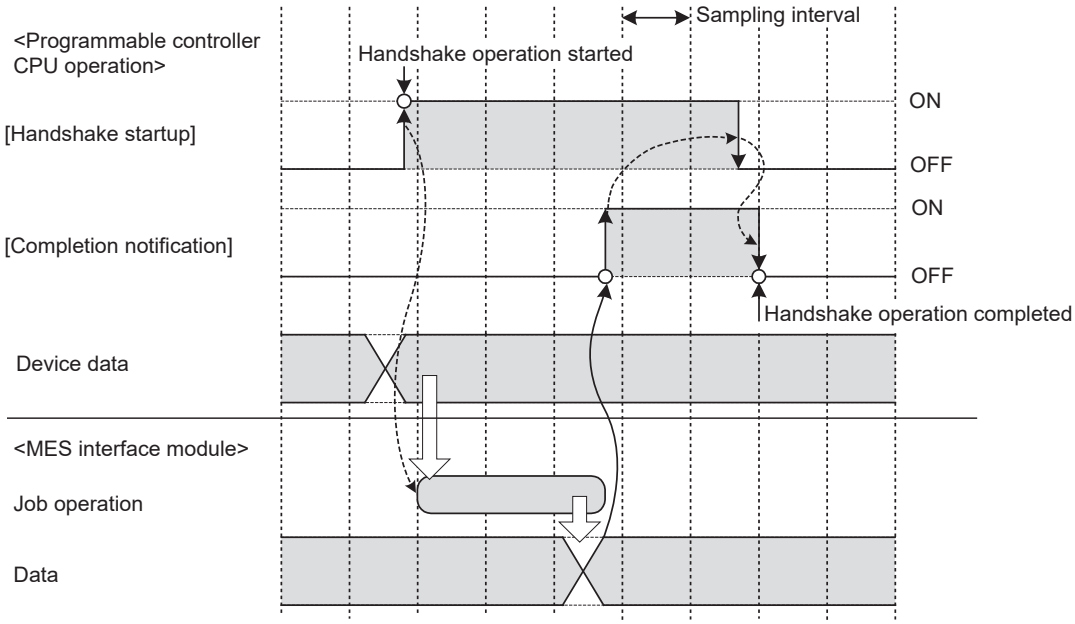


Figure 7.54 [Handshake operation]

1. When [Handshake startup] turns ON in the sequence program, the MES interface module collects tag component values used for the job and executes the job.
2. Upon completion of the job execution, the MES interface module turns ON [Completion notification].*1
3. After confirming that [Completion notification] is ON, turn OFF [Handshake startup] in the sequence program.
4. When [Handshake startup] turns OFF, the MES interface module turns OFF [Completion notification], causing the handshake operation to be completed.
5. After confirming the completion of the handshake operation, the next job is executed.

*1 If an error occurs during job execution, [Completion notification] does not turn ON.
To detect such an error, enable [Notify errors (job cancellation) that occur during job execution].
☞Section 7.10.5 Setting items for job cancellation

Point

When accessing the Redundant CPU, it is recommended to select [Handshake operation] for trigger condition.
When selecting other than [Handshake operation], data separation may occur at system switching of the redundant system.

(b) [Handshake operation] is selectable only in [Trigger 1].
When [Handshake operation] is selected, selection is not allowed for [Trigger 2].
For selection of [Handshake operation], set the following items.

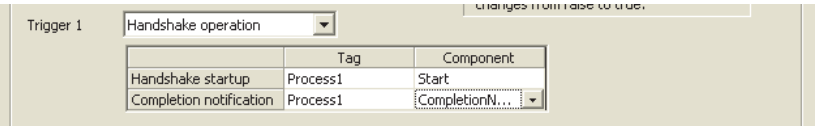


Figure 7.55 [Handshake operation]

Table 7.53 Setting items when selecting [Handshake operation]

Item	Description
Handshake startup	Select a tag component used to request for job startup. Only the tag components whose [Data type] is [Bit] are selectable. Note that tags with [Array setting] are not selectable.
Completion notification *1	Select a tag component that allows notification of execution completion of the job. Only the tag components whose [Data type] is [Bit] are selectable. Note that the following tags are not selectable. • Tags for which [Prohibit data writing] is enabled • Tags for which [Array setting] is set

*1 Do not specify the same [Completion notification] to multiple jobs.

(c) Program example

1) Devices used in the program

Table 7.54 Devices used in the program

Device name		Device	Application	
MES interface module	Input	X5	Information linkage status	
External input (command)		X100	Processing request	
Internal relay		M0	In-process	
		M100	Handshake startup	Specify at [Job settings].
		M200	Completion notification	
		M201	Job cancellation notification	

2) Program example

The following is a program example in which a job is executed when an execution request (X100) from the outside turns ON.

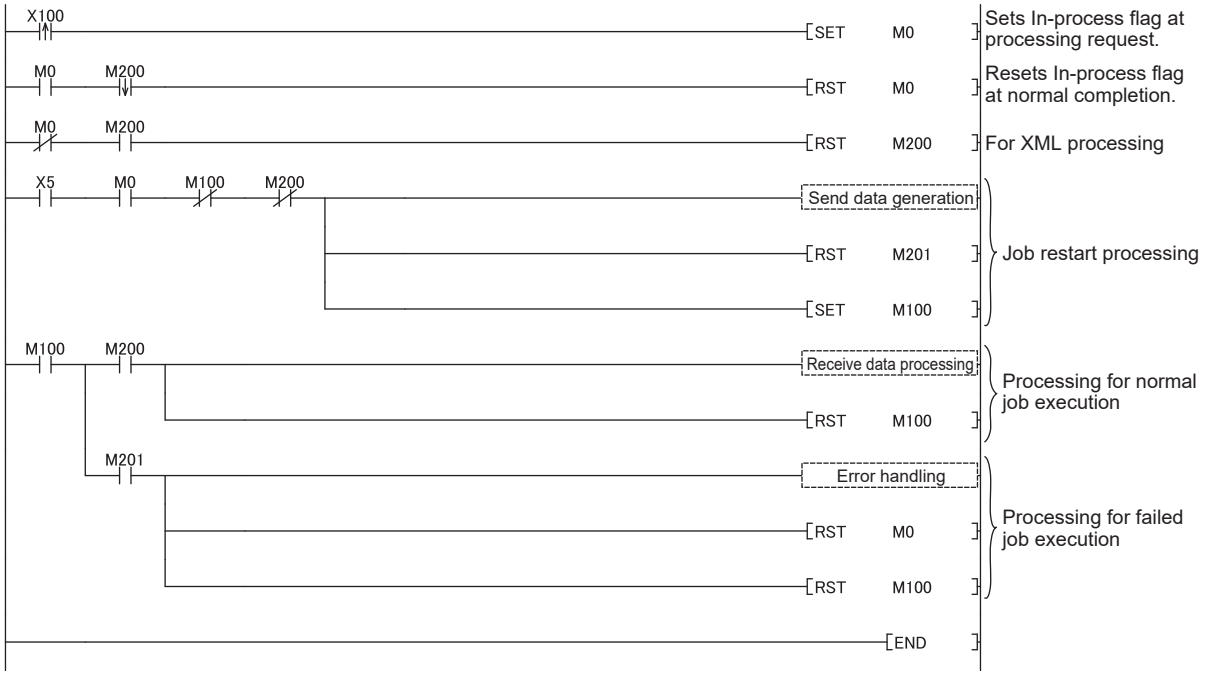


Figure 7.56 Program example

3) Timing charts
Timing charts for the program example in 2) are shown below.

(When the job is executed normally)

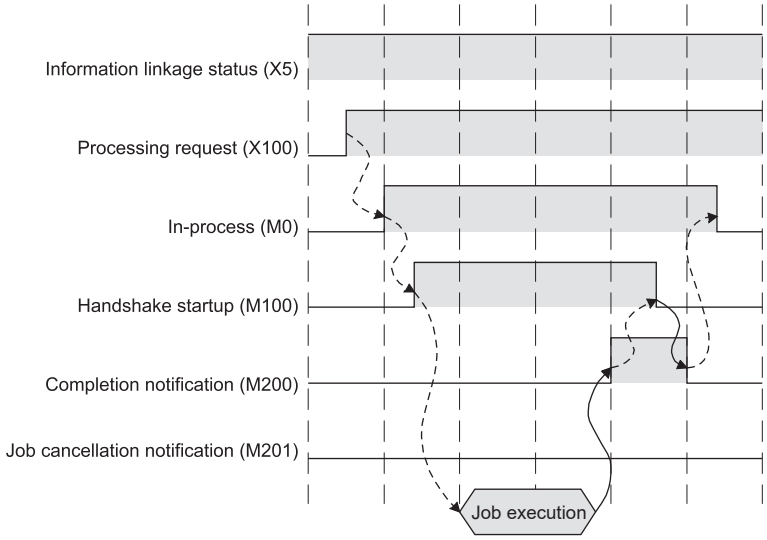


Figure 7.57 When the job is executed normally

(When an error occurs during job execution)

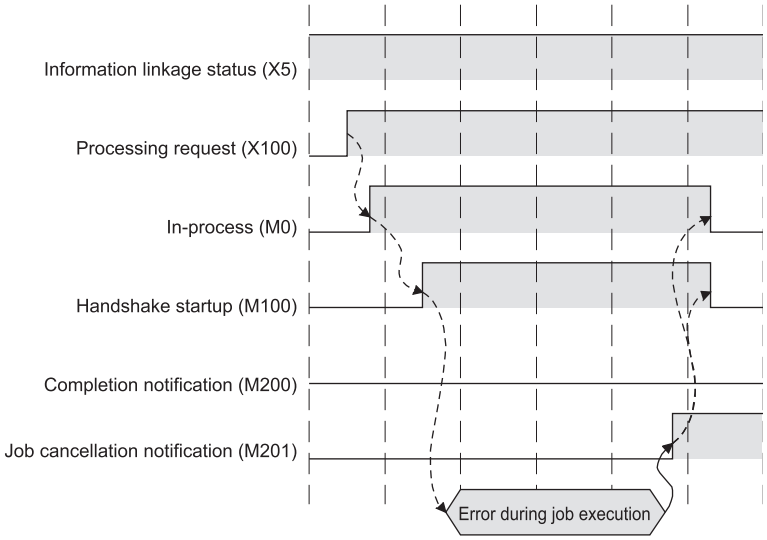


Figure 7.58 When an error occurs during job execution

(d) Program example(Accessing to the Redundant CPU)

1) Devices used in the program

Table 7.55 Device used in program when Redundant CPU is used

Device name		Device	Application	
MES interface module	Input	X5	Information linkage status	
External input (command)		X100	Processing request	
Internal relay		M0	In-process	
		M1	Retry flag	
		M100	Handshake startup	Specify at [Job settings].
		M200	Completion notification	
		M201	Job cancellation notification	
Special relay		SM1518	Standby system to control system switching status flag	
Timer		T100	Retry timer	

Point

Retry timer (T100) should be set much longer than [DB access timeout] of DB Connection Service.

2) Program example

The following is a program example in which a job is executed when an execution request (X100) from the outside turns ON.

When system switching occurs during [Handshake operation], the processing to retry is incorporated.

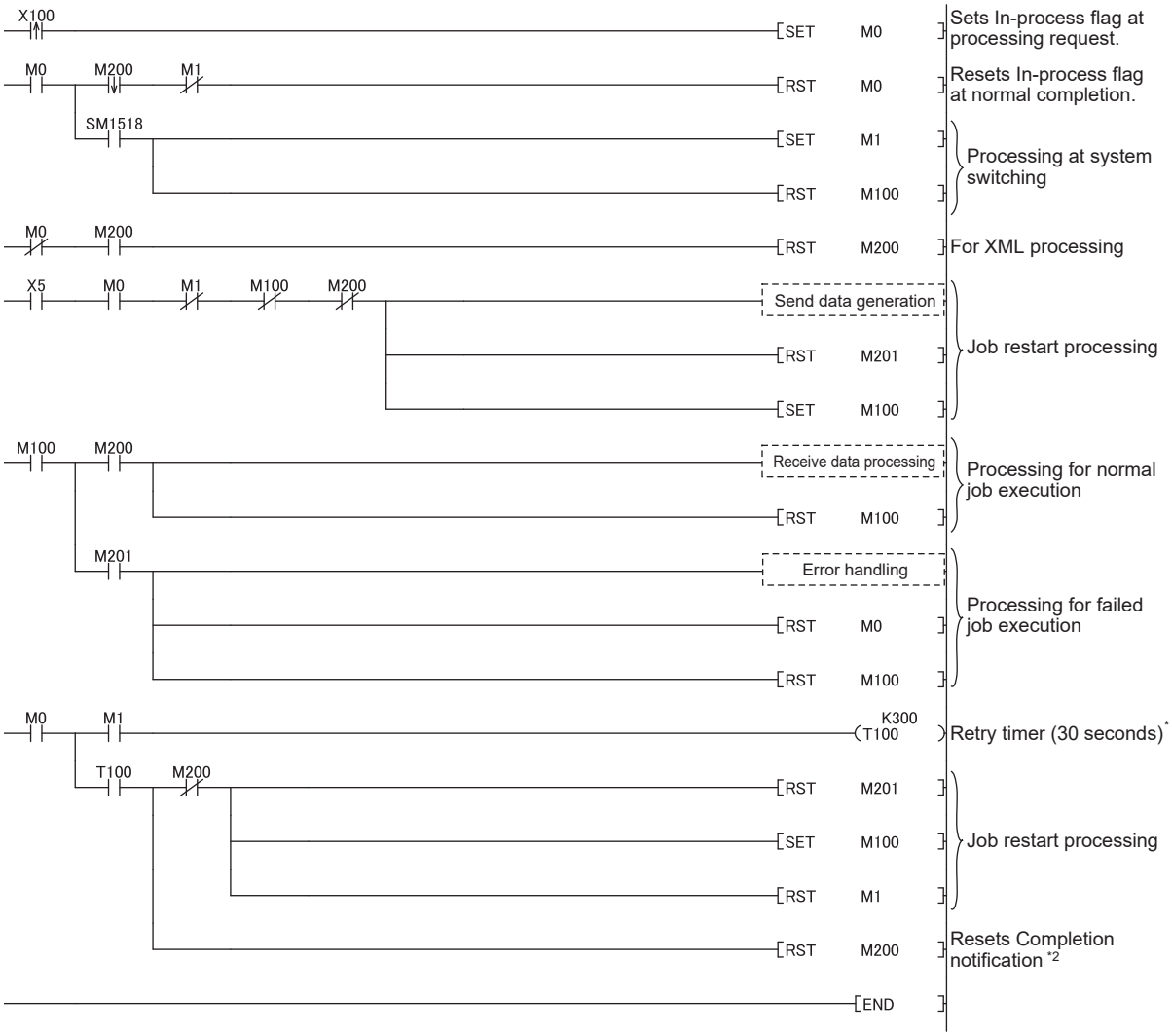


Figure 7.59 Program example when Redundant CPU is used

*1 The same job cannot be restarted during the job operation.
After switching systems, the job waits time set by Retry timer (30 seconds in program example).

*2 Completion notification (M200) may not be turned OFF at system switching.
The job restart processing is performed at the next scan.

3) Precautions

Executing the same job twice is necessary when switching systems.
Create the system in view of executing the same job twice.
(Example) When [INSERT] is used at [Communication action]
When the record of the same data (production number etc.) is inserted to the table of data base twice, create the information system to use the latest data.

7.10.3 Setting items in Program execution

Configure the settings for the program execution function.
For the program execution function, refer to the following:
☞Section 6.1.9 Program execution function

1. Click the Setting button of [Before actions] or [After actions].
   - Before actions:
     Set a program to be performed before execution of the first action of the job.
   - After actions:
     Set a program to be performed after execution of the last action of the job.

Figure 7.60 [Program execution]

2. [Program execution settings before action execution] or [Program execution settings after action execution] is displayed.
   Make the setting referring to the following descriptions.
   After completing the setting, click the OK button.

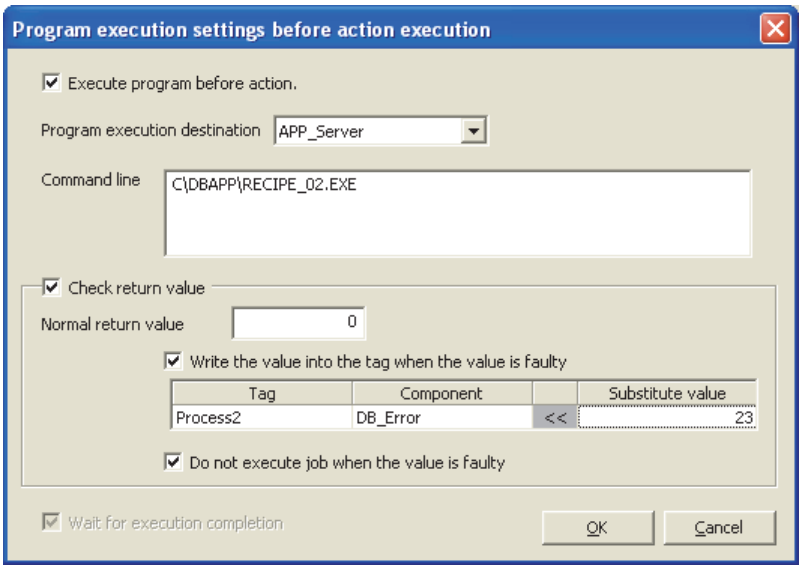


Figure 7.61 [Program execution settings before action execution]

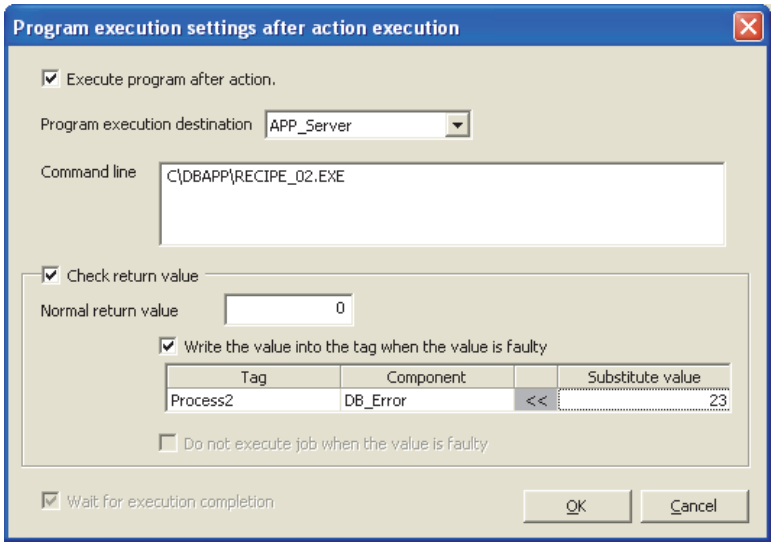


Figure 7.62 [Program execution settings after action execution]

Table 7.56 Setting items when selecting [Program execution settings before action execution] or [Program execution settings after action execution]

Item	Description
Execute program before (after) action	Set whether or not to enable program execution before or after execution of actions.
Program execution destination	Select an application server to be accessed.
Command line	Enter a command line for the program that is executed on the application server computer. (Up to 127 characters)
Check return value	Set whether to check the return value or not.
Wait for execution completion	Set whether or not to wait for execution completion of the program before executing the next processing.

(1) Execute program before action, or Execute program after action

(a) Set whether or not to enable program execution before or after execution of actions.

(b) When [Execute program before action] or [Execute program after action] is enabled, make the setting described in (2) and subsequent sections.

(2) Program execution destination

Select an application server to be accessed.

(3) Command line (Up to 127 characters)

Enter a command line for the program that is executed on the application server computer. *1 *2

For characters that can be used for command lines, refer to the following:

☞Appendix 2.3 Characters available for character string constants, etc.

*1 Programs that need to be run with administrator privileges (by a user in Administrators group) are not executable.

*2 To execute a program including any displays, place the application server computer into the logon status.

(4) Check return value

(a) Set whether to check the return value or not.
When the [Check return value] box is checked, the return value (End code) of the executed program is checked.
If no return value is returned within the [DB access timeout] time set in DB Connection Service Setting Tool, a timeout error is detected and the job execution is canceled.
For [DB access timeout], refer to the following:
☞Section 8.5 Setting Items of DB Connection Service Setting Tool

(b) When [Check return value] is selected, set the following items.

1) Normal return value (Default: 0)
Set a normal return value.

2) Write the value into the tag when the value is faulty
When the [Write the value into the tag when the value is faulty] box is checked, if the return value is not normal, a value is assigned to the specified tag component.
Set a tag component to which a value is assigned when this is selected.
- Tag, Component
  Select a tag component to which a value is assigned.
  Note that the following tags are not selectable.
  Tags for which [Prohibit data writing] is enabled
  Tags for which [Array setting] is set
- Substitute value
  Directly enter a substitute value.
  The following lists values that can be entered as a substitute value.

Table 7.57 Values that can be entered as a substitute value

Data type of tag component	Values that can be entered as a substitute value
Bit type	ON/OFF is selectable.
Single-precision type Double-precision type Floating-point type	Up to 16 characters • Signed decimal notation (Example: -521.98) • Signed exponential notation (Example: -5.2198E03)
16-bit BCD type	Unsigned 16-bit BCD notation 0 to 9999 (Example: 1234)
32-bit BCD type	Unsigned 32-bit BCD notation 0 to 99999999 (Example: 12345678)
Character string	Up to 32 characters For characters that can be used for character strings, refer to the following: ☞Appendix 2.3 Characters available for character string constants, etc.

3) Do not execute job when the value is faulty ([Program execution settings before action execution] only)
When the [Do not execute job when the value is faulty] box is checked, if the return value is faulty, the job execution is canceled.

(5) Wait for execution completion

Set whether or not to wait for execution completion of the program before executing the next processing.

When [Check return value] is selected, [Wait for execution completion] is always selected.

7.10.4 Setting items in DB Buffering

Set whether to utilize the DB buffering function or not.
When "Enable DB buffering" checkbox is checked, DB buffering function is enabled.
For the DB buffering function setting, refer to the following:
☞Section 6.1.10 DB buffering function

Figure 7.63 [DB Buffering]

When the DB buffering function is enabled, select the following:
(Default: Using the Manually resend buffer)

Table 7.58 Setting items when selecting "Enable DB buffering"

Item	Description
Using the Manually resend buffer	Perform the resent processing manually. After recovering from network disconnection, automatic resend is not performed.
Using the Automatically resend buffer	After recovering from the network disconnection, automatic resend is performed.

(1) Precautions for setting DB buffering

When [Trigger buffering] is selected, select "Enable DB buffering" as well.
If any one of the jobs for which "Enable DB buffering" is not selected is set, trigger buffer full will occur and data may not be accumulated in the DB buffer at a communication error occurrence.

7.10.5 Setting items for job cancellation

Set whether to enable or disable notification of errors (job cancellation) that occur during job execution.
Job execution is canceled when access to the database fails or when type mismatch is found.

☞ • Section 6.1.11 (2) When an error occurs in job execution
• Section 7.15 (5) Type mismatch

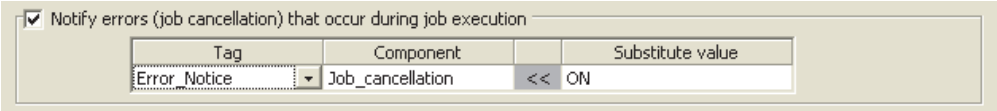


Figure 7.64 Setting example of [Notify errors (job cancellation) that occur during job execution]

(1) Notify errors (job cancellation) that occur during job execution

(a) Set whether to enable or disable notification of errors (job cancellation) that occur during job execution.
When [Notify errors (job cancellation) that occur during job execution] box is checked, if job execution is canceled, a value is assigned to the specified tag component.

(b) Set a tag component to which the value is assigned when this is selected.

1) Tag, Component
Select a tag component to which a value is assigned.
Note that the following tags are not selectable.
- Tags for which [Prohibit data writing] is enabled
- Tags for which [Array setting] is set

2) Substitute value
Directly enter a substitute value.
The following lists values that can be entered as a substitute value.

Table 7.59 Values that can be entered as a substitute value

Data type of tag component	Values that can be entered as a substitute value
Bit type	ON/OFF is selectable.
Single-precision type Double-precision type Floating-point type	Up to 16 characters • Signed decimal notation (Example: -521.98) • Signed exponential notation (Example: -5.2198E03)
16-bit BCD type	Unsigned 16-bit BCD notation 0 to 9999 (Example: 1234)
32-bit BCD type	Unsigned 32-bit BCD notation 0 to 99999999 (Example: 12345678)
Character string	Up to 32 characters For characters that can be used for character strings, refer to the following: ☞Appendix 2.3 Characters available for character string constants, etc.

7.11 Job Setting - Actions

Set actions of [Job settings].
Up to 10 actions can be set for one job.
There are two types of actions: [Communication action] for communicating with a database and [Operation action] for operating tag component values.

(Adding an action)

- Select [Communication action] or [Operation action] in the combo box next to the Add button, and click the Add button.

- The [Communication action] or [Operation action] dialog box is displayed.
  Make the setting referring to the following:
  ☞ • Section 7.11.1 Setting items in Communication action
  • Section 7.11.4 Setting items in Operation action

(Modifying an action)

- Select an action to be modified in [Action list], and click the Edit button.

- The [Communication action] or [Operation action] dialog box is displayed.
  Make the setting referring to the following:
  ☞ • Section 7.11.1 Setting items in Communication action
  • Section 7.11.4 Setting items in Operation action

(Deleting an action)

- Select an action to be deleted in [Action list], and click the Delete button.

(Copying an action)

- Select an action to be copied in [Action list], choose [Replicate the selected action] from the combo box next to the Add button, and click the Add button.

(Copying an action of another job within the project)

1 Select [Replicate actions of other jobs] in the combo box next to the [Add] button, and click the [Add] button.

2 The [Replicate Actions of other Jobs] dialog box is displayed.

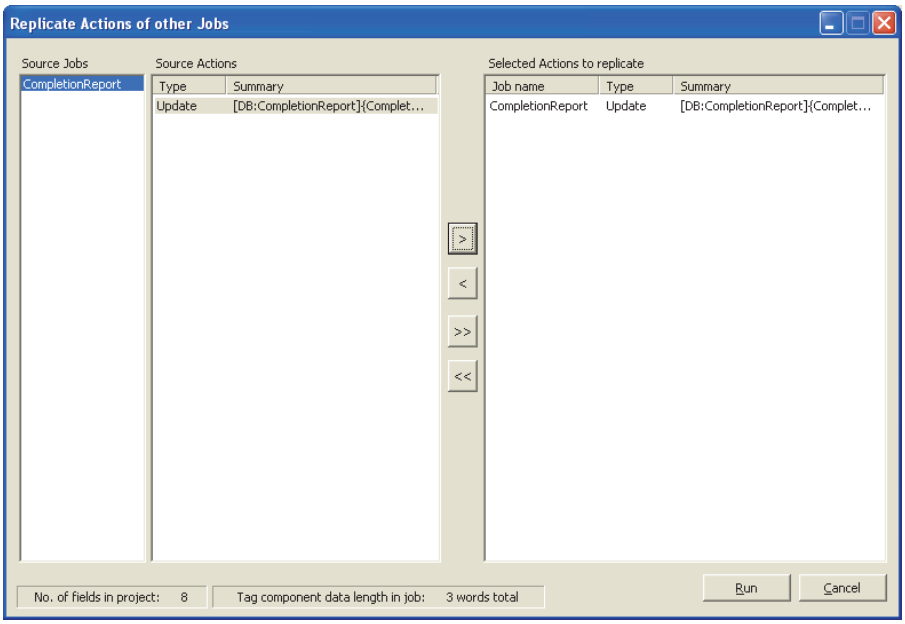


Figure 7.65 [Replicate Actions of other Jobs] dialog box

3 By repeating the following steps 4 to 6, set copy targets in [Selected Actions to replicate].

4 From [Source Jobs], select a job that includes a desired action.

5 Actions of the job selected in 4 are listed in [Source Actions]. Select an action to be copied. (Multiple selection is available.)

6 Clicking the [>] button displays the action(s) selected in 5 in [Selected Actions to replicate].

Table 7.60 Button operations in the [Replicate Actions of other Jobs] dialog box

Item	Description
[>] button	Puts the action(s) selected in [Source Actions] into [Selected Actions to replicate].
[>>] button	Puts all of the actions in [Source Actions] into [Selected Actions to replicate].
[<] button	Deletes the action(s) selected in [Selected Actions to replicate] from the box.
[<<] button	Deletes all of the actions in [Selected Actions to replicate] from the box.

7 Clicking the [Run] button executes copying.
Copied actions are placed after existing actions.

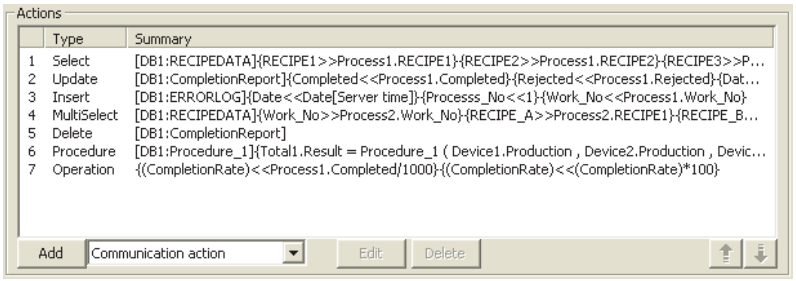


Figure 7.66 [Action list]

Table 7.61 Setting items in [Action list]

Item	Description
Type	Displays the type of the action registered.
Summary	Displays the description of the action registered.
button	Selecting an action in [Action list] and clicking the button reverses the order between the selected one and the one immediately above it. The button cannot be clicked on the first action.
button	Selecting an action in [Action list] and clicking the button reverses the order between the selected one and the one immediately below it. The button cannot be clicked on the last action.

Point

When more than one action are set, they are executed in order, starting from the top.

(1) Type

The types of the existing actions are displayed.

Table 7.62 Displays in [Type]

Item	Description
Select	[Select] of [Communication action]
Update	[Update] of [Communication action]
Insert	[Insert] of [Communication action]
MultiSelect	[MultiSelect] of [Communication action]
Delete	[Delete] of [Communication action]
Procedure	[Stored procedure] of [Communication action]
Operation	[Operation action]

(2) Summary

Details of the existing actions are displayed.

Table 7.63 Display for [Details]

Item	Display format*1*2
Select MultiSelect	[Database: Table name] {DB-Tag link setting No.1} ... {DB-Tag link setting No.n} • Select: {DB-Tag link setting} = {Field name → Tag component/constant value}
Update Insert	[Database: Table name] {DB-Tag link setting No.1} ... {DB-Tag link setting No.n} • {DB-Tag link setting} = {Field name ← Tag component/constant value}
Delete	[Database: Table name]
Procedure	[Database: Stored procedure name] {DB-Tag link setting (Return value)=} {DB-Tag link setting No.1}...{DB-Tag link setting No.n} • {DB-Tag link setting} = {Tag component/constant value} Note that, if return value does not exist, {DB-Tag link setting (Return value)=} is not displayed.
Operation	{Operation action No.1} ... {Operation action No.n} • With substitution setting: {Operation action} = {Substitution tag component/constant value ← Operation tag component/constant value Operator Operation tag component/constant value} • Without substitution setting: {Operation action} = {Substitution tag component/constant value ← Operation tag component/constant value}

*1 Display format of the tag component/constant value

Table 7.64 Display format of the tag component/constant value

Item	Description
Tag component	Device tag name, component name
Number	Numerical value
String	"Character string"
Date	Module time: Date [Module time] Server time : Date [Server time]
Date String	"Date [String]"
Variable	(Variable name)

*2 Display format of the operator

Table 7.65 Display format of the operator

Item	Description
+ (Addition)	+
- (Subtraction)	-
× (Multiplication)	×
÷ (Division)	÷
% (Remainder)	%

7.11.1 Setting items in Communication action

Configure the settings for communications with a database.

1 Performing the operation for adding or modifying an action displays the [Communication action] dialog box.
Make the setting referring to the following descriptions.

Clicking the OK button after setting adds or modifies the action.
For the operation for adding or modifying an action, refer to the following:
Section 7.11 Job Setting - Actions

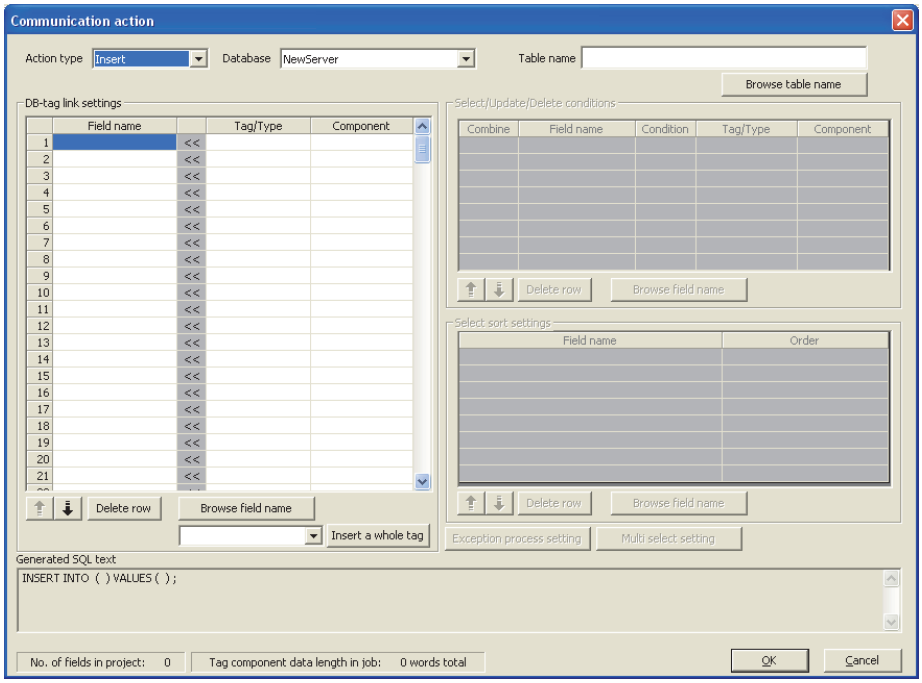


Figure 7.67 [Communication action] dialog box

Table 7.66 Setting items in the [Communication action] dialog box

Item	Description
Action type	Select an action type.
Database	Select a database to be accessed.
No. of fields in project	Displays the total number of fields in the project.
Tag component data length in job	Displays the total data length of the tag components in the job.

The setting items other than above differ depending on the selected action type. For details, refer to the following table.

Table 7.67 Selection items for [Action type]

Item	Description	Reference section
Select Update Insert MultiSelect Delete	Create SQL text specifying table name and field name.	Section 7.11.2
Stored procedure	Create stored procedure execution request specifying the procedure name.	Section 7.11.3

(1) About tag components

Tag components can be used as component values for each action or as condition values of [Select/Update/Delete conditions].
The following table lists data types of tag components and those of assignable fields.
If the data type of a tag component does not match the one of its substitution target field, an error occurs, resulting in cancellation of job execution.

Point

The data type of a tag component will change through operation processing of a job.
☞Section 7.15 (5) Type mismatch

Table 7.68 Data types of tag components and those of assignable fields

Data type of tag component	Data type of assignable field			
	Oracle®	SQL Server® MSDE 2000	Access®*1	Wonderware® Historian
(Numeric type: Integer) Bit type Single-precision type Double-precision type 16-bit BCD type*2 32-bit BCD type*2	NUMBER CHAR VARCHAR	bit int smallint tinyint float real char varchar text*3	Yes/No type Byte type Integer type Long Integer type Single type*4 Double type*4 AutoNumber type Currency type Text (Short Text) type*3*5 Memo (Long Text) type*3*5	Discrete Tag Analog Tag(Integer)
(Numeric type: Floating point) Floating-point type*6	NUMBER CHAR VARCHAR	float real char varchar text*3	Single type*4 Double type*4 Text (Short Text) type*3*5 Memo (Long Text) type*3*5	Analog Tag(Real)
Character string	CHAR VARCHAR	char varchar text*3	Text (Short Text) type*5 Memo (Long Text) type*5	String Tag

*1 When using the operation field, the insertion function (INSERT) and update function (UPDATE) cannot be executed for the operation field (for Microsoft® Access® 2010, Microsoft® Access® 2013, Microsoft® Access® 2016, and Microsoft® Access® 2019).

*2 The 16-bit and 32-bit BCD types are handled as the following types respectively when the communication action is performed to the database.
- 16-bit BCD type: single precision type
- 32-bit BCD type: double precision type

*3 Not available for [Select/Update/Delete conditions].

*4 When using "Select" and "MultiSelect" for a field whose data type is single type or double type, perform the following (for Microsoft® Access® 2007, Microsoft® Access® 2010, Microsoft® Access® 2013, Microsoft® Access® 2016, and Microsoft® Access® 2019):
- Select "Microsoft Access Driver (*.mdb)" in the ODBC setting for the database used.
  Section 8.2 (5) For Microsoft® Access®
- When the database source file used is "*.accdb", change it to "*.mdb".

*5 The fields in Rich Text Format cannot be used (for Microsoft® Access® 2007, Microsoft® Access® 2010, Microsoft® Access® 2013, Microsoft® Access® 2016, and Microsoft® Access® 2019).

*6 Values are assigned with precision of six decimal digits.

(2) About constants

Constants can be used as component values for each action or as condition values of [Select/Update/Delete conditions].
The following table lists constant types and the data types of assignable fields.
If the type of a constant does not match the data type of its substitution target field, an error occurs, resulting in cancellation of job execution.

Table 7.69 Constant types and the data types of assignable fields

Constant type	Values that can be entered in [Component]	Data type of assignable field			
		Oracle®	SQL Server® MSDE 2000	Access®*1	Wonderware® Historian
[Number]	Up to 16 characters • Signed decimal notation (Example: -521.98) • Signed exponential notation (Example: -5.2198E03)	NUMBER	bit*2 int*2 smallint*2 tinyint*2 float real	Yes/No type Byte type Integer type Long Integer type Single type*3 Double type*3 AutoNumber type Currency type	Discrete Tag Analog Tag(Integer) Analog Tag(Real)
[String]	Up to 32 characters For characters that can be used for character strings, refer to the following: ☞Appendix 2.3 Characters available for character string constants, etc.	CHAR VARCHAR	char varchar text*4	Text (Short Text) type*5 Memo (Long Text) type*5	String Tag
[Date]*6	• When using the date and time of the database server: [Server time] *7 • When using the date and time of the MES interface module: [Module time]	DATE	datetime smalldatetime	Date/Time type	-*8
[Date String]	Up to 32 characters For characters that can be used for character strings, refer to the following: ☞Appendix 2.3 Characters available for character string constants, etc. Specify the date and time of the MES interface module in the following format. Year (4 digits): YYYY Year (2 digits): YY Month (2 digits): MM Day (2 digits): DD Hour (2 digits): hh Minute (2 digits): mm Second (2 digits): ss Example:"YYYY-MM-DD hh:mm:ss" → "2005-07-01 15:12:00"	CHAR VARCHAR	char varchar text*4	Text (Short Text) type*5 Memo (Long Text) type*5	String Tag

*1 When using the operation field, the insertion function (INSERT) and update function (UPDATE) cannot be executed for the operation field (for Microsoft® Access® 2010, Microsoft® Access® 2013, Microsoft® Access® 2016, and Microsoft® Access® 2019).

*2 Signed integer notation only

*3 When using "Select" and "MultiSelect" for a field whose data type is single type or double type, perform the following (for Microsoft® Access® 2007, Microsoft® Access® 2010, Microsoft® Access® 2013, Microsoft® Access® 2016, and Microsoft® Access® 2019):

- Select "Microsoft Access Driver (*.mdb)" in the ODBC setting for the database used.
  Section 8.2 (5) For Microsoft® Access®
- When the database source file used is "*.accdb", change it to "*.mdb".

*4 Not available for [Select/Update/Delete conditions].

*5 The fields in Rich Text Format cannot be used (for Microsoft® Access® 2007, Microsoft® Access® 2010, Microsoft® Access® 2013, Microsoft® Access® 2016, and Microsoft® Access® 2019).

*6 Clock precision:
[Module time]: In units of seconds
[Server time]: Depends on the database server.

*7 [Server time] is not available for [Stored procedure].

*8 When the data is written to tag for Wonderware® Historian, the module date and time will be added automatically.
Section 7.11.2 (5) (c) When [Insert] is selected for [Action type]

(3) About variables

Variables can be used as component values for each action or as condition values of [Select/Update/Delete conditions].
The following table lists data types of variables and those of assignable fields.
If the type of a variable does not match the data type of its substitution target field, an error occurs, resulting in cancellation of job execution.
Up to 64 variables can be set for one job.

Point

(1) A variable is valid only in a single job execution and is not held.
(2) The initial variable value before substitution processing is the numerical value of zero.
(3) If a type that cannot be converted is assigned to a tag component when a substitution tag is the tag component, "Type conversion to tag component error" is displayed.
Check the source type and the data type of the tag component.
☞Section 7.15 (5) Type mismatch

Table 7.70 Data types of variables and those of assignable fields

Data type of variable	Values (variable names) that can be entered in [Component]	Data type of assignable field			
		Oracle®	SQL Server® MSDE 2000	Access®*1	Wonderware® Historian
(Numeric type: Integer) Bit type Single-precision type Double-precision type	Up to 16 characters For characters that can be used for variables, refer to the following: ☞Appendix 2.2 Characters that can be used for item names, component names, variable names, etc. in the product	NUMBER CHAR VARCHAR	bit int smallint tinyint float real char varchar text*2	Yes/No type Byte type Integer type Long Integer type Single type*3 Double type*3 AutoNumber type Currency type Text (Short Text) type*2*4 Memo (Long Text) type*2*4	Discrete Tag Analog Tag(Integer)
(Numeric type: Floating point) Floating-point type*5		NUMBER CHAR VARCHAR	float real char varchar text*2	Single type*5 Double type*5 Text (Short Text) type*2*4 Memo (Long Text) type*2*4	Analog Tag(Real)
Character string		CHAR VARCHAR	char varchar text*2	Text (Short Text) type*4 Memo (Long Text) type*4	String Tag

*1 When using the operation field, the insertion function (INSERT) and update function (UPDATE) cannot be executed for the operation field (for Microsoft® Access® 2010, Microsoft® Access® 2013, Microsoft® Access® 2016, and Microsoft® Access® 2019).
*2 Not available for [Select/Update/Delete conditions].
*3 When using "Select" and "MultiSelect" for a field whose data type is single type or double type, perform the following (for Microsoft® Access® 2007, Microsoft® Access® 2010, Microsoft® Access® 2013, Microsoft® Access® 2016, and Microsoft® Access® 2019):
- Select "Microsoft Access Driver (*.mdb)" in the ODBC setting for the database used.
☞Section 8.2 (5) For Microsoft® Access®
- When the database source file used is "*.accdb", change it to "*.mdb".

*4 The fields in Rich Text Format cannot be used (for Microsoft® Access® 2007, Microsoft® Access® 2010, Microsoft® Access® 2013, Microsoft® Access® 2016, and Microsoft® Access® 2019).
*5 Values are assigned with precision of six decimal digits.

(4) Display format of tag component/constant/variable for generated SQL text/ execution procedure

The components/constant values of the action being edited or the tag components/ constants/variables set to the condition value in "update/insert/delete" are displayed in "Generated SQL text" and "Execution procedure" with the following format.
The Tag component, Module time, Data String, and Variable are generated at job execution, therefore, they are different from the actual SQL text and stored procedure call information.

Table 7.71 Display format of the tag component/constant value

Item			Display format	
Tag component			Displayed enclosed with '( )'.	'(Device tag name, component name)'
Numerical value		Access®	Only the setting content is displayed.	Number
		Other than the above	Displayed enclosed with single quotes (').	'Number'
String				'String'
Date	Server time	Oracle® 8i	Displayed as shown on the right.	sysdate
		Access®		NOW()
		Other than the above		CURRENT_TIMESTAMP
	Module time	Oracle®	Displayed as shown on the right.	TO_DATE('(Date[YYYYMMDDhhmmss])', 'YYYYMMDDHH24MISS')
		Other than the above		'(Date[YYYY-MM-DD hh:mm:ss])'
Date String			Displayed as '(Date [ ])'.	'(Date[String])'
Variable			Displayed enclosed with '( )'.	'(Variable name)'
Table name			Only the setting content is displayed.	Table name
Field name				Field name
Stored procedure name				Stored procedure name

7.11.2 Setting items in Communication action (Select/Update/Insert/MultiSelect/Delete)

This section explains the setting items of communication action when selecting Select/Update/Insert/MultiSelect/Delete in Action type.

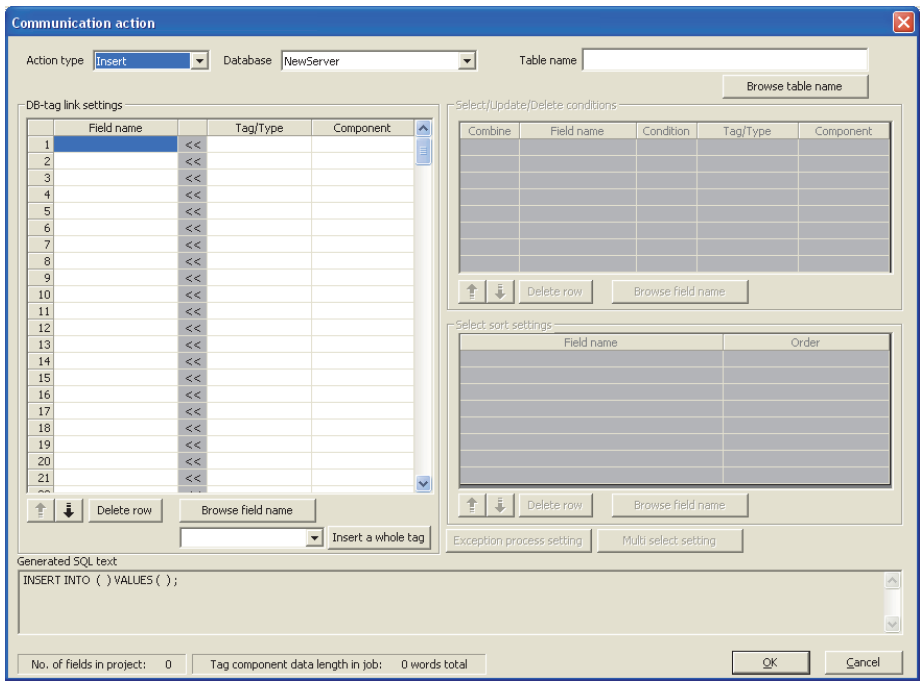


Figure 7.68 [Communication action] dialog box

Table 7.72 Setting items in the [Communication action] dialog box

Item	Description
Action type	Select an action type.
Database	Select a database to be accessed.
Table name	Set a table name of the database to be accessed.
Browse table name button	Browses the table names registered to the set database.
DB-tag link settings *1	Set assignments between field values and tag component values (or constant values).
Select/Update/Delete conditions *1	When [Select], [Update], [MultiSelect], or [Delete] is selected for [Action type], set conditions for the records to be selected, updated, or deleted.
Select sort settings *1	When [Select] or [MultiSelect] is selected for [Action type], set a condition for sorting selected records.

(To the next page)

*1 Up to 8192 fields can be set in [DB-tag link settings], [Select/Update/Delete conditions] and [Select sort settings] for each project.
(The setting can be checked on the status bar of [Job settings] or in the [Communication action] dialog box.)

(From the previous page)

Table 7.72 Setting items in the [Communication action] dialog box

Item	Description
Exception process setting button	Set the processing to be performed in the following cases: • No corresponding record exists when [Select], [Update], [MultiSelect], or [Delete] is selected for [Action type]. • Multiple corresponding records exist when [Select], [Update], or [Delete] is selected for [Action type]. • The number of records to be multi-selected is greater than the number of arrays set in [Array setting] of the tag when [MultiSelect] is selected for [Action type].
Multi select setting button	When [MultiSelect] is selected, detailed settings can be configured by clicking this.
Generated SQL text	Displays SQL text that is generated in the currently editing [Communication action].For the display format of tag components/ constants/valuables, refer to the following: Section 7.11.1 (4)
button	Selecting a row and clicking the button reverses the order between the selected row and the one immediately above it. The button cannot be clicked on the first row.
button	Selecting a row and clicking the button reverses the order between the selected row and the one immediately below it. The button cannot be clicked on the last row.
Delete row button	Selecting a row and clicking the Delete row button deletes the row.
Browse field name button	Browses the field names registered to the set database.
Insert a whole tag button	• All of the tag set in [Device tag settings] are inserted into [Tag] and [Component]. • Select a row into which data are inserted and choose a tag in a list box next to the Insert a whole tag button. Clicking the Insert a whole tag button inserts all of the tag components into contiguous rows starting from the selected one. • The existing data set in the rows starting from the selected one are moved down.

Remark

(1) Entry of [Component]
When data are entered in [Component] by [Insert a whole tag] or with the [Field name] space blank, the data are copied to the [Field name] space. (Characters not allowed for [Field name] are not entered.)
Because of this, setting the same name to each of the field name and tag component name is useful.

(1) Action type

Select an action type.

Table 7.73 Selection items for [Action type]

Item	Description
Select*1	Substitutes a field value of the record, whose conditions are met, for a substitute value (tag component value/variable).
Update*1	Substitutes a substitute value (tag component value/variable) for a field value of the record whose conditions are met.
Insert	Generates a new value, and inserts an insert value (tag component value/constant value/variable) into a field of the generated record.
MultiSelect*1	Substitutes field values of the records, whose conditions are met, for substitute values (tag component values).
Delete*1	Deletes a specific record by specifying a database and a table.

*1 Cannot be selected when the database is Wonderware® Historian.

(2) Database

Select a database to be accessed.

(3) Table name (Up to 32 characters)

Set a table name of the database to be accessed.

For characters that can be used for table names, refer to the following:

☞Appendix 2.4 Characters available for field names, table names, stored procedure names,etc.

For browsing the table names in the database, refer to the following:

☞(4) Browse table name in this section

(4) Browse table name

Clicking the Browse table name button displays the [Tables list] dialog box. Select a table name. The selected table name is set on the [Communication action] dialog box by clicking the OK button.

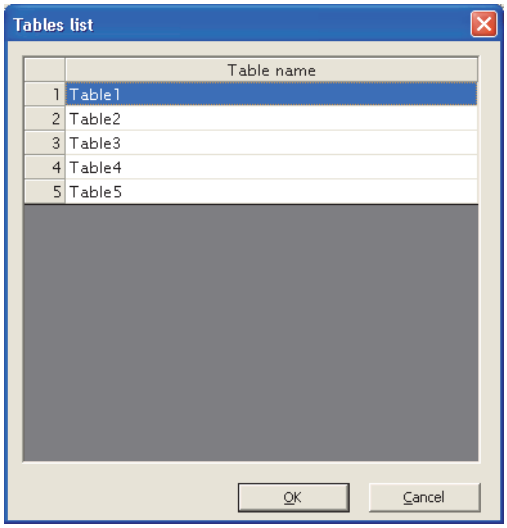


Figure 7.69 Browsing example of [Tables list]

Up to 1024 tables can be displayed.

The following table names in the database are not displayed.

- An inapplicable character is included in [Table name] of the MES Interface Function Configuration Tool.
  (☞Appendix 2.4 Characters available for field names, table names, stored procedure names,etc.)
- The number of characters exceeds 32.

When the target table name is not displayed, enter the table name manually to [Table name] in the [Communication action] dialog box.

Point

(1) When a table in the database is added/changed while the data are being browsed, close the [Communication action] dialog box once and browse the table names again.

(2) The following table name in each database type can be obtained. (The name of the following table can be obtained from the database being accessed.)
- Oracle: A table created by a user
- SQL Server: A table in the schema set for "Default schema" of the user
- Access: A table created by a user

(5) DB-tag link settings

Set assignments between field values and tag component values (or constant values).

Up to 256 rows can be set in [DB-tag link settings] for each communication action.

(a) When [Select] is selected for [Action type]

[Select] substitutes a field value of the record, whose conditions are met, for a substitute value (tag component value/variable).

Set conditions of the record to be selected in [Select/Update/Delete conditions].

(6) Select/Update/Delete conditions in this section

Conditions for sorting the selected records are set in [Select sort settings].

(7) Select sort settings in this section

1) Field name (Up to 32 characters)

Set a field name for the field value to be selected.

For characters that can be used for field names, refer to the following:

Appendix 2.4 Characters available for field names, table names, stored procedure names,etc.

For browsing the field names in the database, refer to the following:

(8) Browse field name in this section

2) Tag

Select a tag or variable for which a value is substituted.

Note that the following tags are not selectable.

- Tags for which [Prohibit data writing] is enabled
- Tags for which [Array setting] is set.

3) Component

Select or directly enter a component value or a variable of the substitution target.

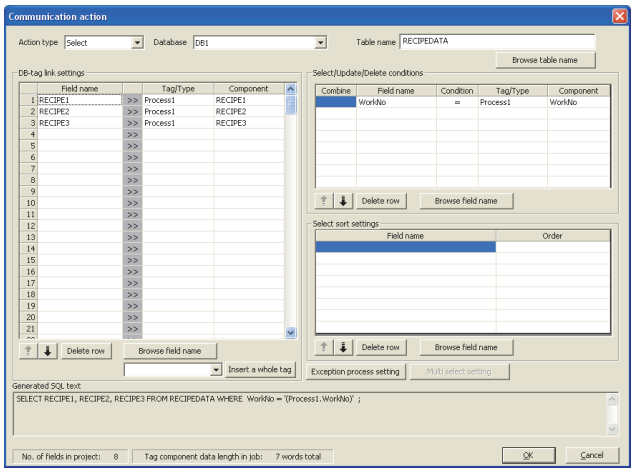


Figure 7.70 Setting example of [Select]

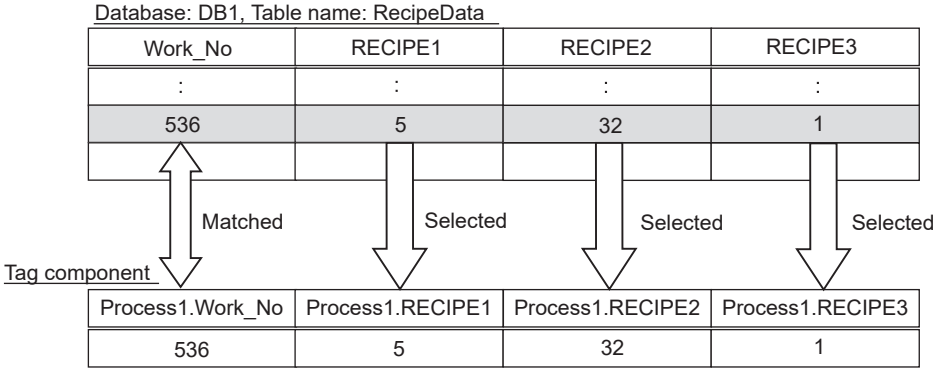


Figure 7.71 Operation example of [Select]

(b) When [Update] is selected for [Action type]

[Update] substitutes a substitute value (tag component value/variable) for a field value of the record whose conditions are met.

Set conditions of the record to be updated in [Select/Update/Delete conditions].

(6) Select/Update/Delete conditions in this section

1) Field name (Up to 32 characters)

Set a field name for the field value to be updated.

For characters that can be used for field names, refer to the following:

Appendix 2.4 Characters available for field names, table names, stored procedure names,etc.

For browsing the field names in the database, refer to the following:

(8) Browse field name in this section

2) Tag

Select a tag, constant, or variable which is substituted.

Note that tags with [Array setting] are not selectable.

3) Component

Select or directly enter a component/constant value/valuable that is to be substituted.

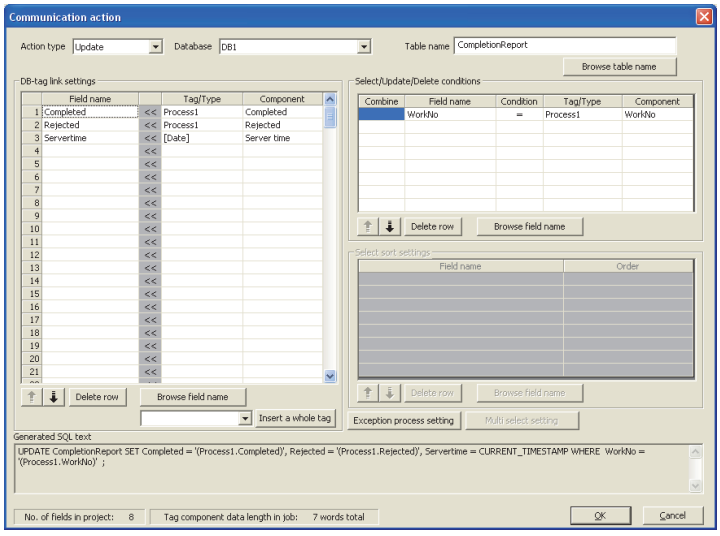


Figure 7.72 Setting example of [Update]

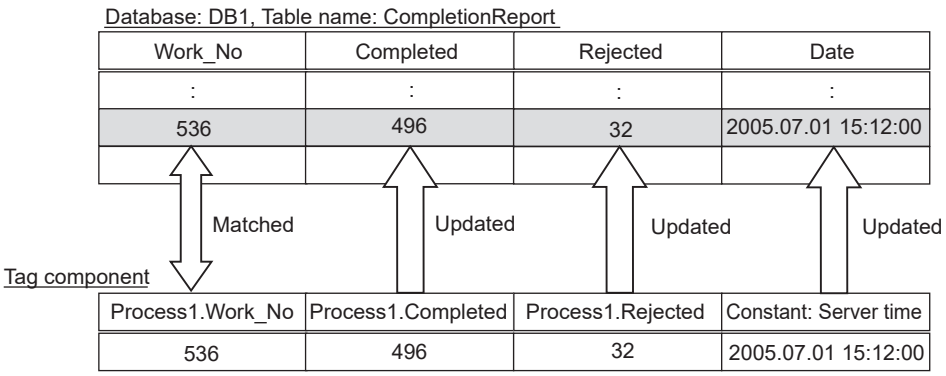


Figure 7.73 Operation example of [Update]

(c) When [Insert] is selected for [Action type]

[Insert] generates a new record, and inserts an insert value (tag component value/ constant value/variable) into a field of the generated record.

1) Field name (Up to 32 characters)

Set a field name for the field value to be inserted.

For characters that can be used for field names, refer to the following:

☞Appendix 2.4 Characters available for field names, table names, stored procedure names,etc.

For browsing the field names in the database, refer to the following:

☞(8) Browse field name in this section

2) Tag

Select a tag, constant, or variable which is substituted.

Note that tags with [Array setting] are not selectable.

3) Component

Select or directly enter a component/constant value/valuable that is to be substituted.

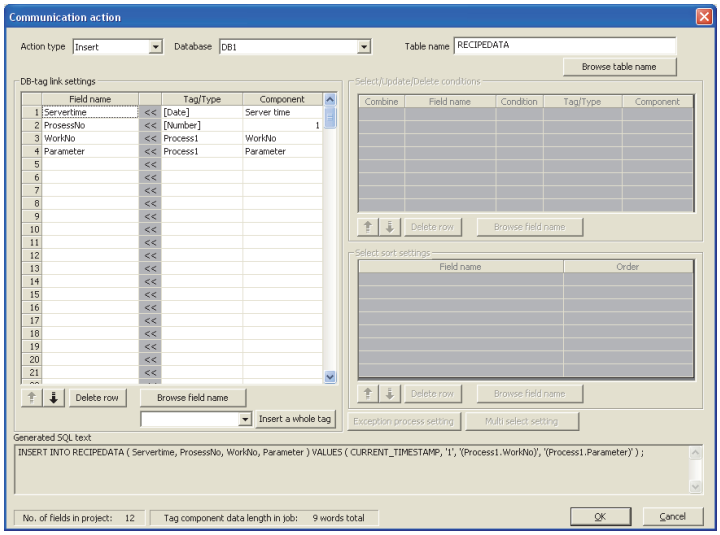


Figure 7.74 Setting example of [Insert]

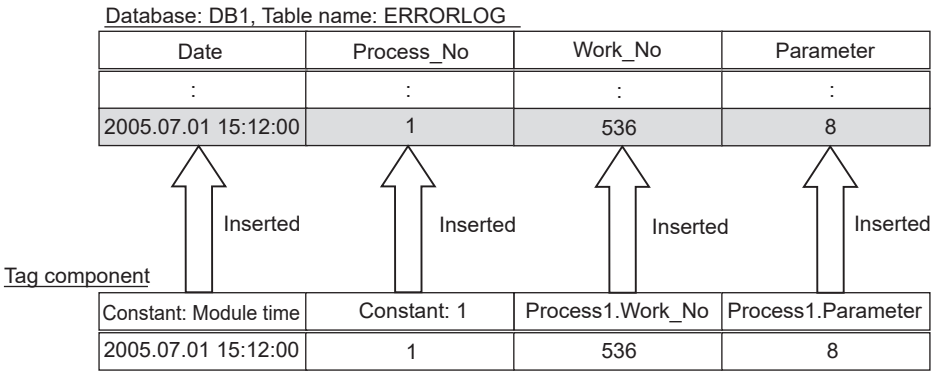


Figure 7.75 Operation example of [Insert]

4) When the database is Wonderware® Historian, the following is inserted as one record to the database by executing [Communication action].
   - Module date and time at execution
   - Tag for Wonderware® Historian set in [Field name]
   - The value of tag component or constant set in [Component]

   When multiple fields are set, the number of records corresponding to the number of fields set is inserted.

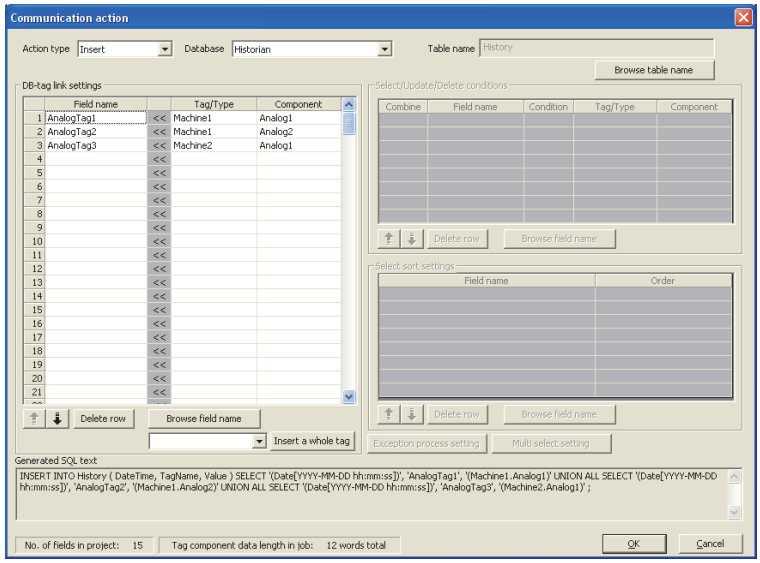


Figure 7.76 Setting example of [Insert (INSERT)] when database is Wonderware® Historian

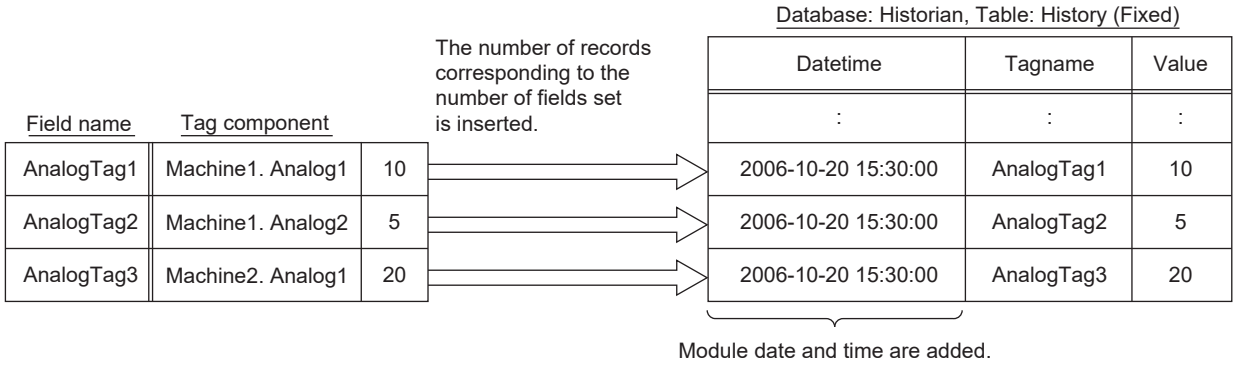


Figure 7.77 Operating example of [Insert (INSERT)] when database is Wonderware® Historian

(d) When [MultiSelect] is selected for [Action type]

[MultiSelect] substitutes field values of the records, whose conditions are met, for substitute values (tag component values).

Conditions for the records to be selected are set in [Select/Update/Delete conditions].

☞(6) Select/Update/Delete conditions in this section

Conditions for sorting the selected records are set in [Select sort settings].

☞(7) Select sort settings in this section

1) Field name (Up to 32 characters)

Set a field name for the field values to be multi-selected.

For characters that can be used for field names, refer to the following.

☞Appendix 2.4 Characters available for field names, table names, stored procedure names,etc.

For browsing the field names in the database, refer to the following:

☞(8) Browse field name in this section

2) Tag

Select a target tag.

Only the tags with [Array setting] can be selected.

3) Component

Select a target component.

Point

When [MultiSelect] is used in a job, the total of [Tag component data length in job] must be 45000 words or less.

[Tag component data length in job] represents a total length of the tag component data set for the following:

- [DB-tag link settings] in [Communication action]
- [Select/Update/Delete conditions] in [Communication action]
- [Operation action]

Even if the same tag component is set more than once in the same job, each setting is handled separately.

(The number of settings can be confirmed on the status bar of [Job setting], or in the [Communication action] or [Operation action] dialog box.)

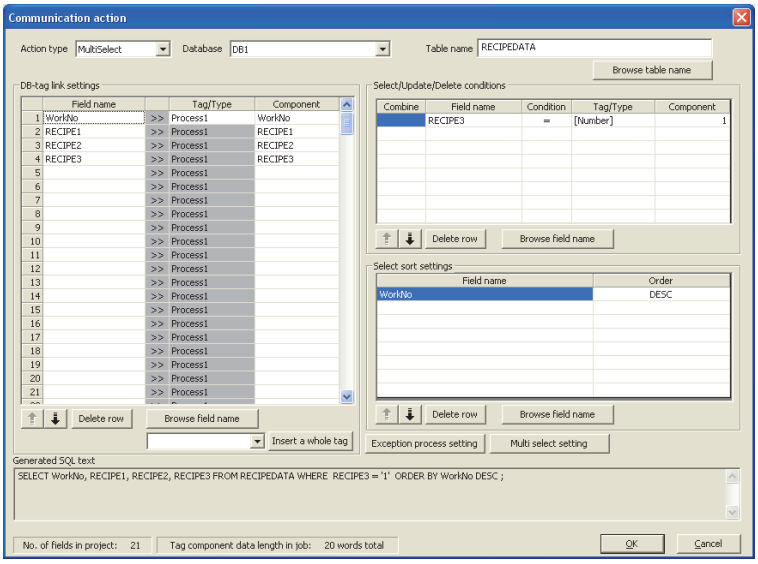


Figure 7.78 An example of [MultiSelect] setting

Database: DB1, Table name: RECIPEDATA

Work_No	RECIPE_A	RECIPE_B	RECIPE_C
:	:	:	:
536	5	32	1
537	6	33	0
538	7	34	1
539	8	35	1
540	9	36	0

Selected / Selected / Selected / Matched (RECIPE_C=1)

Work_No	RECIPE_A	RECIPE_B	RECIPE_C
536	5	32	1
538	7	34	1
539	8	35	1

Sorted (Descending)

Tag component

	Process1.Work_No	Process1.RECIPE_A	Process1.RECIPE_B	Process1.RECIPE_C
n=1	539	8	35	1
n=2	538	7	34	1
n=3	536	5	32	1

Figure 7.79 An example of [MultiSelect] operation

(e) When [Delete] is selected for [Action type]

[Delete] eliminates a specific record that satisfies the specified conditions. Conditions for the record(s) to be deleted are set in [Select/Update/Delete conditions].

(6) Select/Update/Delete conditions in this section

[DB-tag link settings] is not used.

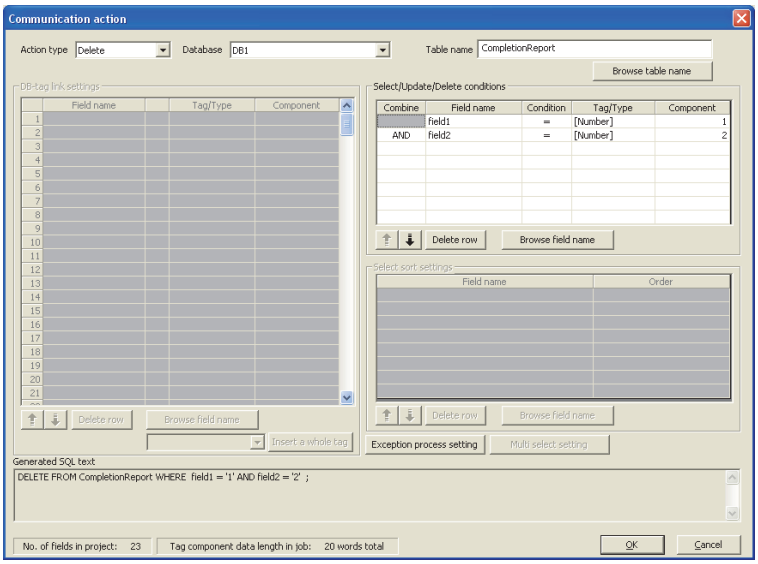


Figure 7.80 An example of [Delete] setting

Point

When [Delete] is selected for [Action type] and multiple records are found to be deleted, all of them will be deleted.

If the [Select/Update/Delete conditions] area is blank, all records will be deleted from the specified table.

(6) Select/Update/Delete conditions

When [Select], [Update], [MultiSelect] or [Delete] is selected for [Action type], set conditions for the records to be selected, updated, multi-selected or deleted.
When a field value of a record matches a condition value, the record is selected, updated or deleted.
Up to 8 rows can be set for one communication action in [Select/Update/Delete conditions].

Point

(1) Exception processing is executed when:
- Records to be selected/updated/multi-selected/deleted do not exist.
  ☞(9) (a) Exception processing: No applicable record in this section
- Multiple records exist for select/update/delete.
  ☞(9) (b) Exception processing: Multiple applicable records in this section
- The number of records to be multi-selected is greater than the number of arrays set in [Array setting] of the tag.
  ☞(9) (c) Exception processing: Applicable records overflow in this section

(2) Be careful not to create significant number of selected/updated records due to the select/update/delete conditions.
Failure to do so may affect performances of the data base or the system.

(3) When [Update] or [Delete] is selected for [Action type] and multiple records are found to be updated or deleted, all of them will be updated or deleted.
If the [Select/Update/Delete conditions] area is blank, all records of the specified table will be selected, updated, or deleted.

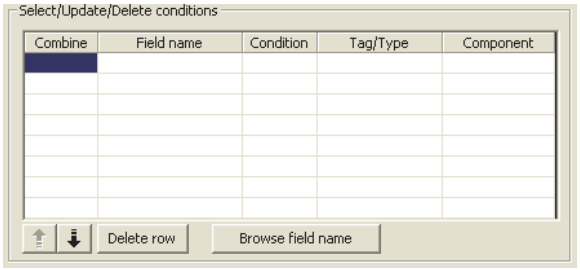


Figure 7.81 [Select/Update/Delete conditions]

(a) Combine
Select a method by which conditions set in respective lines are combined.
Select "AND" or "OR".
If "AND" and "OR" are combined, the database will process "AND" first and then "OR".

(b) Field name (Up to 32 characters)
Set a field name that is used for comparison.
For characters that can be used for field and table names, refer to the following:
☞Appendix 2.4 Characters available for field names, table names, stored procedure names,etc.
For browsing the field names in the database, refer to the following:
☞(8) Browse field name in this section

(c) Condition
Select a condition for comparison.

Table 7.74 Selection items for [Condition]

Item	Description
=	The field value is equal to the condition value.
≠	The field value is not equal to the condition value.
≧	The field value is equal to or greater than the condition value.
>	The field value is greater than the condition value.
<	The field value is smaller than the condition value.
≦	The field value is equal to or smaller than the condition value.

(d) Tag
Select a tag or constant that is used as a condition for comparison.
Note that tags with [Array setting] are not selectable.

(e) Component
Select or directly enter a component/constant value that is used as a condition for comparison.
If [Variable] is selected for [Tag], select or directly enter a variable.

Remark

For tag components, constants or variables, refer to the following:
☞ • Section 7.11.1 (1) About tag components
• Section 7.11.1 (2) About constants
• Section 7.11.1 (3) About variables

(7) Select sort settings

When [Select] or [MultiSelect] is selected in [Action type], set conditions for sorting the records to be selected/multi-selected.

If multiple sort conditions are set, the database will process the conditions in order, starting from the top.

In [Select sort settings], settings of up to eight lines are allowed for each communication action.

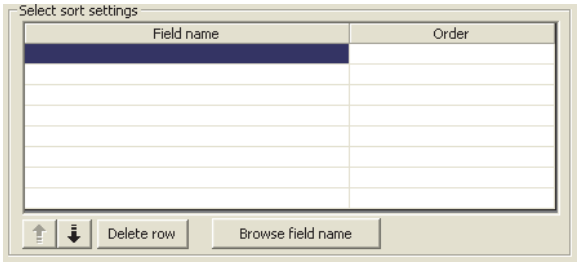


Figure 7.82 [Select sort settings]

(a) Field name (Up to 32 characters)

Set a field name for records to be selected.

For characters that can be used for field names and table names, refer to the following.

☞Appendix 2.4 Characters available for field names, table names, stored procedure names,etc.

For browsing the field names in the database, refer to the following:

☞(8) Browse field name in this section

(b) Order

Set the order of sorting the selected records.

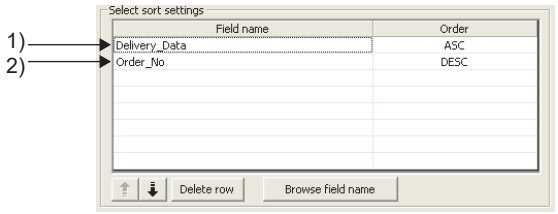
Table 7.75 Setting items for [Order]

Item	Description
Ascending order	Sorts the records so that the specified fields are arranged in ascending order.
Descending order	Sorts the records so that the specified fields are arranged in descending order.

Data base (before sorting)

ORDER_NO	PRODUCT_CODE	DELIVERY_DATE
200	707	2007-01-31
201	662	2007-01-10
202	666	2007-01-29
203	662	2007-01-31
204	707	2007-01-10
205	666	2007-01-29
206	707	2007-01-10
207	662	2007-01-29
208	662	2007-01-31

Sorting conditions in [Select sort settings]



Selected records [sorting results]

ORDER_NO	PRODUCT_CODE	DELIVERY_DATE
206	707	2007-01-10
2) 204	707	2007-01-10
201	662	2007-01-10
207	662	2007-01-29
2) 205	666	2007-01-29
202	666	2007-01-29
208	662	1) 2007-01-31
2) 203	662	2007-01-31
200	707	2007-01-31

1) First, selected records are sorted in ascending order of DELIVERY_DATE.

2) Then, records of the same DELIVERY_DATE are sorted in descending order of ORDER_NO.

Figure 7.83 Operation example of [Select sort settings

(8) Browse field name

Clicking the Browse field name button displays the [Fields list] dialog box. Select a field name. The selected field name is set on the [Communication action] dialog box by clicking the OK button. The field name is set on the row which was being selected when the Browse field name button was clicked.

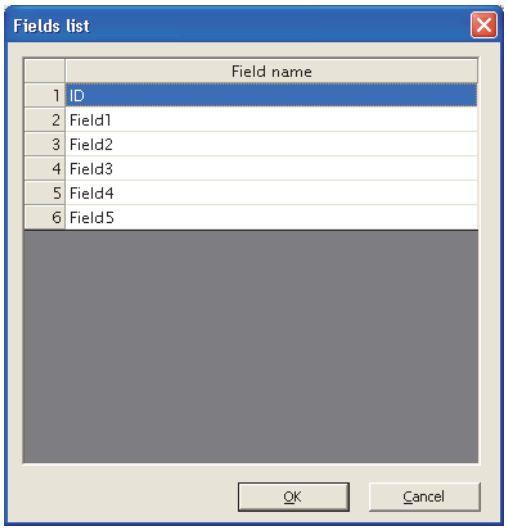


Figure 7.84 Browsing example of [Fields list]

Up to 1024 fields can be displayed.

The following field names in the database are not displayed.

- An inapplicable character is included in [Field name] of the MES Interface Function Configuration Tool.
  (☞Appendix 2.4 Characters available for field names, table names, stored procedure names,etc.)
- The number of characters exceeds 32.

When the field name is not displayed, enter the field name manually to [Field name] in the [Communication action] dialog box.

Point

When a field in the database is added/changed while the data are being browsed, close the [Communication action] dialog box once and browse the field names again.

(9) Exception process setting

A click on the [Exception process setting] button displays the [Exception process setting] dialog box.
Complete the setting, referring to the following explanation.

After completing the setting, click the [OK] button.

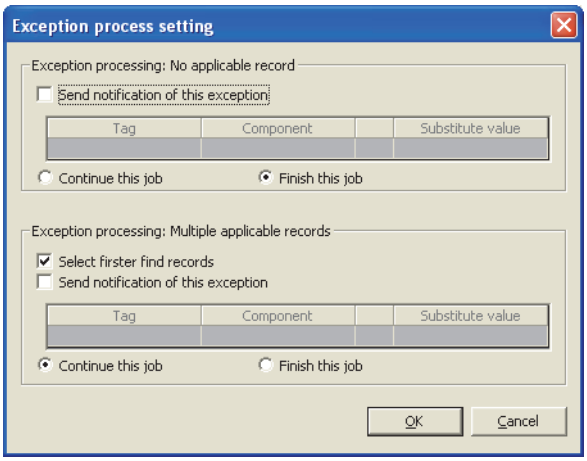


Figure 7.85 [Exception process setting] dialog box (In the case of [Select])

(a) Exception processing: No applicable record

When [Select], [Update], [MultiSelect] or [Delete] is selected for [Action type], set processing for the case where there is no record to be selected, updated, multi-selected, or deleted.

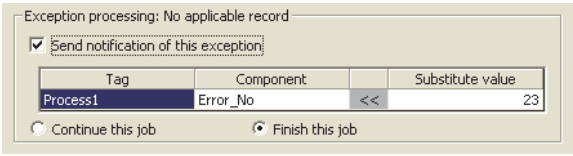


Figure 7.86 Setting example of [Exception processing: No applicable record]

1) Send notification of this exception
When the [Send notification of this exception] box is checked, if there is no record to be selected, updated, multi-selected or deleted, a value will be assigned to the specified tag component.
When [Send notification of this exception] is selected, set a tag component to which the value is assigned.
- Tag, Component
Select a tag component to which a value is assigned.
Note that the following tags are not selectable.
Tags for which [Prohibit data writing] is enabled
Tags for which [Array setting] is set
- Substitute value
Directly enter a substitute value.
The following lists values that can be entered as a substitute value.

Table 7.76 Values that can be entered as a substitute value

Data type of tag component	Values that can be entered as a substitute value
Bit type	ON/OFF is selectable.
Single-precision type Double-precision type Floating-point type	Up to 16 characters • Signed decimal notation (Example: -521.98) • Signed exponential notation (Example: -5.2198E03)
16-bit BCD type	Unsigned 16-bit BCD notation 0 to 9999 (Example: 1234)
32-bit BCD type	Unsigned 32-bit BCD notation 0 to 99999999 (Example: 12345678)
Character string	Up to 32 characters For characters that can be used for character strings, refer to the following: ☞Appendix 2.3 Characters available for character string constants, etc.

2) Continue this job/Finish this job
- When [Continue this job] is selected
After execution of exception processing described in the above 1), the system continues executions of other actions.
- When [Finish this job] is selected
After execution of exception processing described in the above 1), the job is forcibly terminated without executing remaining actions.
At this time, update/insert/delete values before exception processing execution are committed, and they are written to relevant tag components.

Point

(1) When a job is forcibly terminated due to exception processing, an error occurred during job execution (job cancellation) is not notified.
☞Section 7.10.5 Setting items for job cancellation

(2) If [Enable DB buffering] is selected for a job, its exception process setting is disabled.
☞Section 7.10.4 Setting items in DB Buffering

(b) Exception processing: Multiple applicable records
When [Select], [Update] or [Delete] is selected for [Action type], set processing for the case where there are multiple records to be selected, updated or deleted.

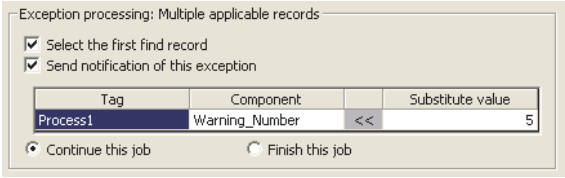


Figure 7.87 Setting example of [Exception processing: Multiple applicable records]

1) Select the first find record
When [Select] is selected for [Action type], checking the [Select the first find record] box allows extraction of the head record from multiple applicable records.
When this checkbox is not checked, the select/update/delete processing is not performed.

Point

When [Update] or [Delete] is selected for [Action type], if multiple records to be updated or deleted exist, all of them are updated or deleted.

2) Send notification of this exception
When the [Send notification of this exception] box is checked, if multiple records to be selected, updated or deleted exist, a value will be assigned to the specified tag component.
When [Send notification of this exception] is selected, set a tag component to which the value is assigned.
- Tag, Component
  Select a tag component to which a value is assigned.
  Note that the following tags are not selectable.
  Tags for which [Prohibit data writing] is enabled.
  Tags for which [Array setting] is set.
- Substitute value
  Directly enter a substitute value.
  The following lists values that can be entered as a substitute value.

Table 7.77 Values that can be entered as a substitute value

Data type of tag component	Values that can be entered as a substitute value
Bit type	ON/OFF is selectable.
Single-precision type Double-precision type Floating-point type	Up to 16 characters • Signed decimal notation (Example: -521.98) • Signed exponential notation (Example: -5.2198E03)
16-bit BCD type	Unsigned 16-bit BCD notation 0 to 9999 (Example: 1234)
32-bit BCD type	Unsigned 32-bit BCD notation 0 to 99999999 (Example: 12345678)
Character string	Up to 32 characters For characters that can be used for character strings, refer to the following: ☞Appendix 2.3 Characters available for character string constants, etc.

3) Continue this job/Finish this job
- When [Continue this job] is selected
  After executions of exception processing described in the above 1) and 2), the system continues executions of other actions.
- When [Finish this job] is selected
  After execution of exception processing described in 1) and 2), the job is forcibly terminated without executing remaining actions.
  At this time, update/insert/delete values before execution of the exception processing are committed, and they are written to relevant tag components.

Point

(1) When a job is forcibly terminated due to exception processing, an error occurred during job execution (job cancellation) is not notified.
☞Section 7.10.5 Setting items for job cancellation

(2) If [Enable DB buffering] is selected for a job, its exception process setting is disabled.
☞Section 7.10.4 Setting items in DB Buffering

(c) Exception processing: Applicable records overflow
When [MultiSelect] is set in [Action type], configure the processing for the case where the number of arrays set in [Array setting] is less than the number of records selected by [Select/Update/Delete conditions].

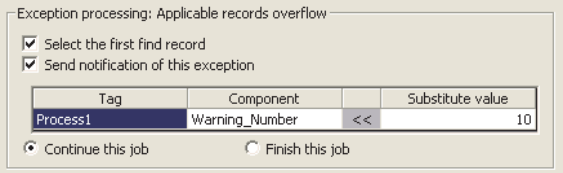


Figure 7.88 [Exception processing: Applicable records overflow]

1) Select the first find record
When the [Select the first find record] checkbox is checked, if the number of arrays set in [Array setting] is less than the number of records selected by [Select/Update/Delete conditions], records equivalent to the number of arrays are actually selected.
When this checkbox is not checked, the select processing is not performed.

Remark

If the [Select the first find record] checkbox is not checked, the following is performed.

- When [Notify the number of acquired records] is set in [Multi select setting], 0 is notified.
- When [Clear the unused tag components by zero] is set in [Multi select setting], 0 is assigned.

☞(10) Multi select setting in this section

2) Send notification of this exception
If the [Send notification of this exception] checkbox is checked, a value is assigned to the specified tag component when the number of arrays set in [Array setting] is less than the number of records selected by [Select/Update/Delete conditions].
When selecting this, set a tag component to which a value is assigned.
  - Tag, Component
    Select a tag component to which a value is assigned.
    Note that the following tags are not selectable.
    Tags for which [Prohibit data writing] is enabled.
    Tags for which [Array setting] is set.
  - Substitute value
    Directly enter a substitute value.
    The following table shows values available for substitution.

Table 7.78 Values available for substitution

Data type of tag component	Values available for substitution
Bit type	ON/OFF is selectable.
Single-precision type Double-precision type Floating-point type	Up to 16 characters • Signed decimal notation (Example: -521.98) • Signed exponential notation (Example: -5.2198E03)
16-bit BCD type	Unsigned 16-bit BCD notation 0 to 9999 (Example: 1234)
32-bit BCD type	Unsigned 32-bit BCD notation 0 to 99999999 (Example: 12345678)
String	Up to 32 characters For characters that can be used for strings, refer to the following. ☞Appendix 2.3 Characters available for character string constants, etc.

3) Continue this job/Finish this job
   - When [Continue this job] is selected.
     After executions of exception processing described in the above 1) and 2), the system continues executions of other actions.
   - When [Finish this job] is selected
     After executions of exception processing described in the above 1) and 2), the system forcibly terminates the job without executing other actions.
     At this time, update/insert/delete values before execution of the exception processing are committed, and they are written to relevant tag components.

Point

(1) When a job is forcibly terminated due to exception processing, an error occurred during job execution (job cancellation) is not notified.
☞Section 7.10.5 Setting items for job cancellation

(2) If [Enable DB buffering] is selected for a job, its exception process setting is disabled.
☞Section 7.10.4 Setting items in DB Buffering

(10)Multi select setting

A click on the Multi select setting button displays the [Multi select setting] dialog box.
Complete the setting, referring to the following explanation.

After completing the setting, click the OK button.

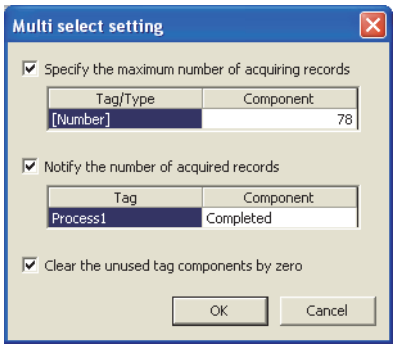


Figure 7.89 [Multi select setting] dialog box

(a) Specify the maximum number of acquiring records
If the [Specify the maximum number of acquiring records] checkbox is checked, records of up to the specified number are acquired.
The records are acquired in the sorting order set in [Select sort settings].
When selecting this, set a tag for which a value is specified.

1) Tab/Type
Select a tag for which a value is specified.
Note that tags with [Array setting] are not selectable.

2) Component
Select or directly enter a component or a constant value to be specified.

Table 7.79 Values available for Component

Item	Values available for Component
[Number]	Within the range of 1 to 40000
Device tag	Single-precision type, Double-precision type, 16-bit BCD type, or 32-bit BCD type tag component

Point

An error occurs if the specified tag component value is 0 or less.
For error codes, refer to the following.
Section 10.2.1 Error codes for the MES interface module

(b) Notify the number of acquired records

When the [Notify the number of acquired records] checkbox is checked, the number of actually acquired records is notified to the specified tag component. When selecting this, set a tag component to which a value is notified.

1) Tag

Select a tag component to which a value is notified.

Note that tags with [Array setting] are not selectable.

(c) Clear the unused tag components by zero

When the [Clear the unused tag components by zero] checkbox is checked, if the specified number of arrays of the tag component is less than the number of actually acquired records, zeros are assigned to other array areas.

(Example)

When the specified number of arrays of the tag component is "6" and the number of actually acquired records is "4":

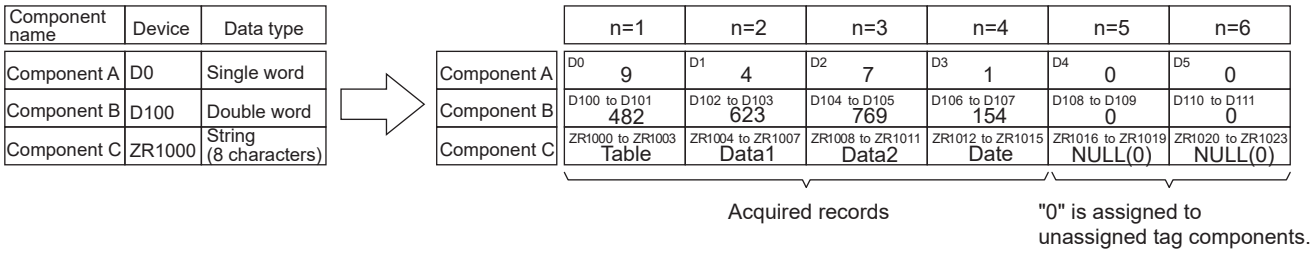


Figure 7.90 An example of [Clear the unused tag components by zero]

7.11.3 Setting items in Communication action (Stored procedure)

This section explains the setting items of communication action when selecting Stored procedure in Action type.

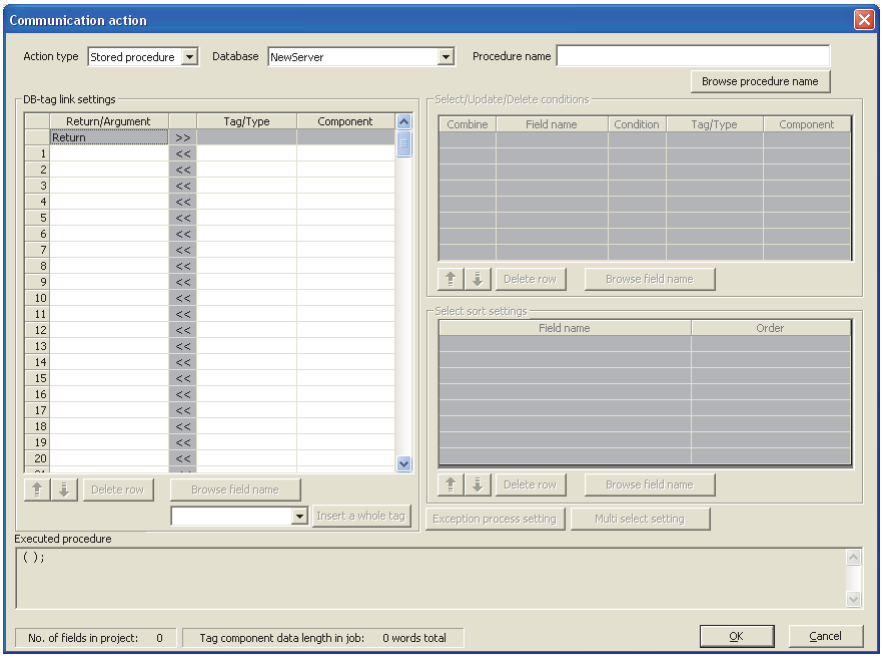


Figure 7.91 [Communication action] dialog box

Table 7.80 Setting items in the [Communication action] dialog box

Item	Description
Action type	Select an action type.
Database	Select a database to be accessed.
Procedure name	Set a procedure name to be executed.
Browse procedure name button	Browse the stored procedure names registered to the set database.
DB-tag link settings *1	Set assignments between return value/argument and tag component values (or constant values).
Executed procedure	Displays the stored procedure information executed with [Communication action] being edited. For the display format of tag components/constants/valuables, refer to the following: Section 7.11.1 (4)
button	Selecting a row and clicking the button reverses the order between the selected row and the one immediately above it. The button cannot be clicked on the first row.
button	Selecting a row and clicking the button reverses the order between the selected row and the one immediately below it. The button cannot be clicked on the last row.
Delete row button	Selecting a row and clicking the Delete row button deletes the row.

*1 Up to 8192 fields can be set in [DB-tag link settings], [Select/Update/Delete conditions] and [Select sort settings] for each project.
(The setting can be checked on the status bar of [Job settings] or in the [Communication action] dialog box.)

(1) Procedure name (Up to 32 characters)

Set a stored procedure name of the database to be accessed.
For characters that can be used for stored procedure names, refer to the following:
☞Appendix 2.4 Characters available for field names, table names, stored procedure names,etc.
For browsing the stored procedure names in the database, refer to the following:
☞(2) Browse procedure name in this section

(2) Browse procedure name

Clicking the [Browse procedure name] button displays the [Stored procedure list] dialog box. Select a stored procedure name. The selected stored procedure name is set on the [Communication action] dialog box by clicking the [OK] button.

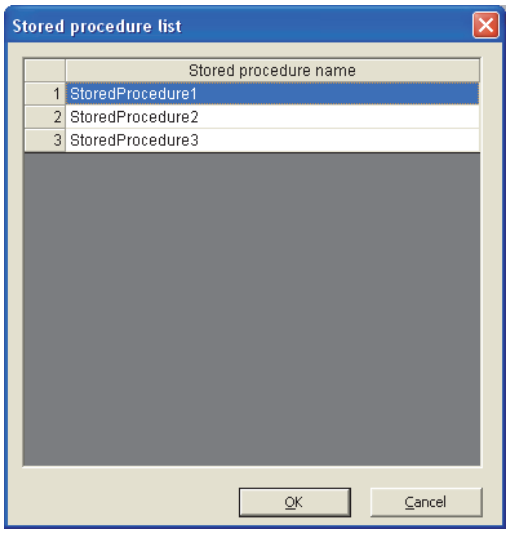


Figure 7.92 Browsing example of [Stored procedure list]

Up to 1024 stored procedures can be displayed.
The following stored procedure names in the database are not displayed.

- An inapplicable character is included in [Stored procedure name] of the MES Interface Function Configuration Tool.
  (☞Appendix 2.4 Characters available for field names, table names, stored procedure names,etc.)
- The number of characters exceeds 32.
- The number of arguments exceeds 256.

When the target stored procedure name is not displayed, enter the stored procedure name manually to [Procedure name] in the [Communication action] dialog box.

Point

(1) When a stored procedure in the database is added/changed while the data are being browsed, close the [Communication action] dialog box once and browse the stored procedure names again.

(2) The following procedure name in each database type can be obtained. (The name of the following stored procedure can be obtained from the database being accessed.)
- Oracle: All stored procedures
- SQL Server: A stored procedure in the schema set for "Default schema" of the user

(3) DB-tag link settings

Set assignments between field values and tag component values (or constant values).

Up to 256 rows can be set in [DB-tag link settings] for each communication action.

(a) Return/Argument

Select the argument type of a stored procedure in the following:

- Input (Integer), Input (Real), Input (String), Input (Date)
- Output (Integer), Output (Real), Output (String)
- I/O (Integer), I/O (Real), I/O (String)

Set the argument in accordance with the order of the first and second argument in the first row.The argument is set automatically when the procedure name is set by selecting on the [Stored procedure list] screen.*1

*1: In case the data type of the argument of the stored procedure is not applicable, any of "Input (String)", "Output (String)", or "I/O (String)" is set as an argument.

When the database type is SQL server, "Return" can be set.

Remark

(1) When "DB buffering" is enabled in Job settings, none of the return values, output variables, and input/output variables can be used.

(2) When calling the stored procedure whose returned values, output arguments, or input/output arguments exists in the job whose "DB buffering" is enabled, remain the tag settings with blank (unset).

(3) When the tag settings are blank (unset), the default value of the stored procedure are set to input value of input argument and input/output argument.

(b) Tag

Select or directly enter a tag, constant, or variable of the substitution target.

The constant can be used only for input arguments.

(c) Component

Select or directly enter a component value, constant value, or variable of the substitution target.

Remark

For tag components, constants or variables, refer to the following:

☞ • Section 7.11.1 (1) About tag components
• Section 7.11.1 (2) About constants
• Section 7.11.1 (3) About variables

7.11.4 Setting items in Operation action

Configure the settings for operation of tag component values.
Up to 20 dyadic operations can be set for one operation action.

1 Performing the operation for adding or modifying an action displays the [Operation action] dialog box.

Make the setting referring to the following descriptions.

Clicking the OK button after setting adds or modifies the action.
For the operation for adding or modifying an action, refer to the following:
☞Section 7.11 Job Setting - Actions

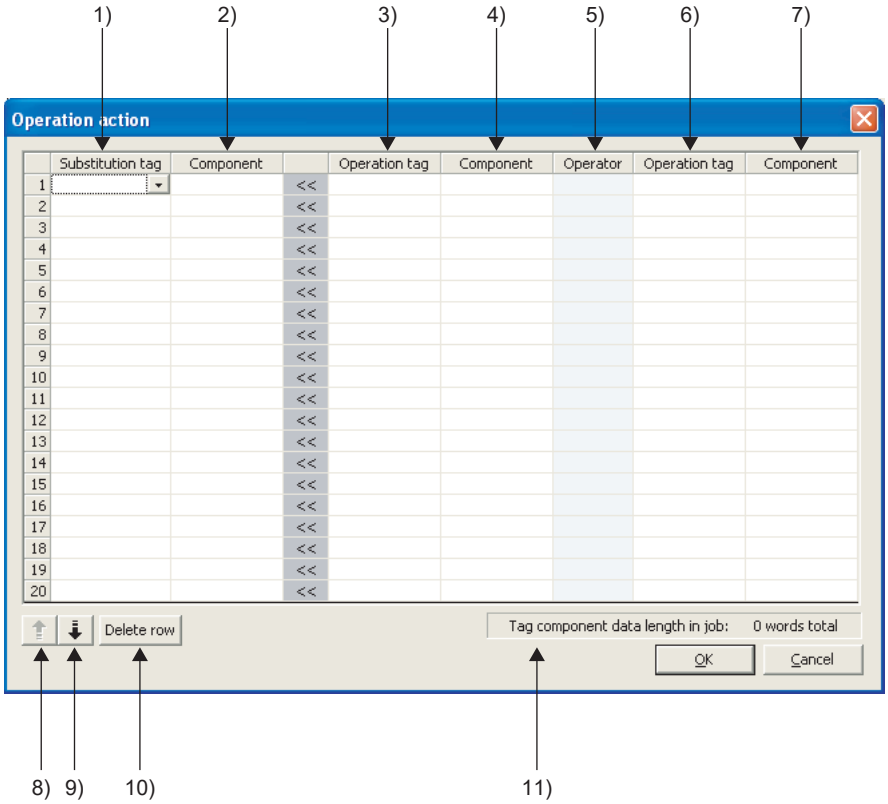


Figure 7.93 [Operation action] dialog box

Table 7.81 Setting items in the [Operation action] dialog box

	Item	Description
1)	Substitution tag	Select a tag or variable to which a value is assigned. Note that the following tags are not selectable. • Tags for which [Prohibit data writing] is enabled • Tags for which [Array setting] is set
2)	Component (left side)	Select or directly enter a component value or a variable of the substitution target.
3), 6)	Operation tag	Select a tag, constant, or variable which is computed. Note that tags with [Array setting] are not selectable.
4), 7)	Component (right side)	Select or directly enter a component/constant value or a variable that is to be computed.
5)	Operator	Select an operator. [+] (Addition), [-] (Subtraction), [*] (Multiplication), [/] (Division), [%] (Remainder)
8)	button	Selecting a row and clicking the button reverses the order between the selected row and the one immediately above it. The button cannot be clicked on the first row.
9)	button	Selecting a row and clicking the button reverses the order between the selected row and the one immediately below it. The button cannot be clicked on the last row.
10)	Delete row button	Selecting a row and clicking the Delete row button deletes the row.
11)	Tag component data length in job	Displays the total data length of the tag components in the job.

Point

Operation actions are executed in order, from the top to the bottom.

(1) About constants

Constants can be used for [Operation tag] and [Component] that are operands.
The following shows the constant types and values that can be entered in the [Component] column.

Table 7.82 Constant types and values available for [Component]

Constant type	Values that can be entered in [Component]
[Number]	Up to 16 characters • Signed decimal notation (Example: -521.98) • Signed exponential notation (Example: -5.2198E03)
[String]	Up to 32 characters For characters that can be used for character strings, refer to the following: ☞Appendix 2.3 Characters available for character string constants, etc.
[Date String]	Up to 32 characters For characters that can be used for character strings, refer to the following: ☞Appendix 2.3 Characters available for character string constants, etc. Specify the date and time of the MES interface module in the following format. Year (4 digits): YYYY Year (2 digits): YY Month (2 digits): MM Day (2 digits): DD Hour (2 digits): hh Minute (2 digits): mm Second (2 digits): ss Example: "YYYY-MM-DD hh:mm:ss" → "2005-07-01 15:12:00"

(2) About variables

Variables can be used for [Component] of [Substitution tag] or [Component] of [Operation tag].
By using a variable, a value computed in [Operation action] can be assigned to a database, or to a tag component (In the latter case, operation is performed based on a value extracted from the database).
The following table shows the variable types and values that can be entered in the [Component] column.
Up to 64 variables can be set for one job.

Point

(1) A variable is valid only in a single job execution and is not held.
(2) The initial variable value before substitution processing is the numerical value of zero.
(3) If a type that cannot be converted is assigned to a tag component when a substitution tag is the tag component, "Type conversion to tag component error" is displayed.
Check the source type and the data type of the tag component.
☞Section 7.15 (5) Type mismatch

Table 7.83 Variable types and values available for [Component]

Variable type	Values (variable names) that can be entered in [Component]
[Variable]	Up to 16 characters For the characters that can be used for variables, refer to the following. ☞Appendix 2.2 Characters that can be used for item names, component names, variable names, etc. in the product

(3) Setting example of [Operation action]

The following is a case in which correction power is calculated using a correction voltage and it is assigned to a tag component (Process 1. Correction power).
The tag component value (Process 1. Correction power) obtained from the following [Operation action] is:
(Process 1. Voltage × 100 + 50) × Current

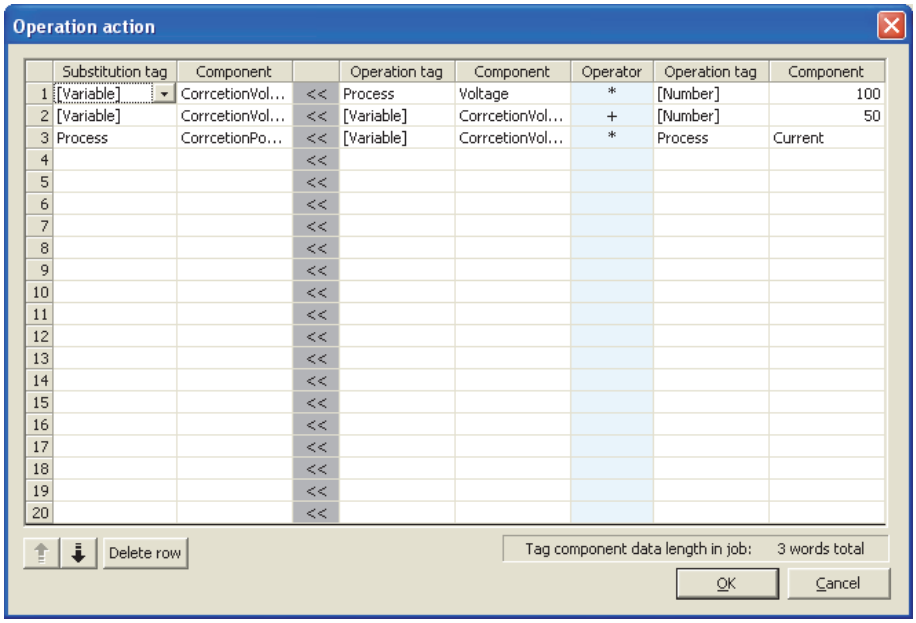


Figure 7.94 Setting example of [Operation action]

7.12 Online

Online operations can be performed to the MES interface module connected to the network.

7.12.1 Setting the target MES interface module

Set the target MES interface module.
Specify the IP address, user name and password that were set in [System setting].
☞Section 7.6 System Setting

1. Select [Online] → [Transfer setup] from the menu.
2. The [Transfer setup] dialog box is displayed.

   Set the following items and click the OK button.

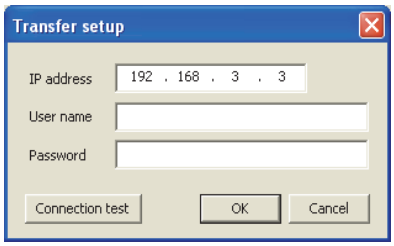


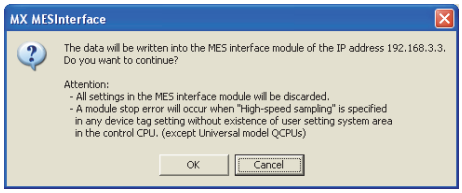
Figure 7.95 [Transfer setup] dialog box

Table 7.84 Setting items in the [Transfer setup] dialog box

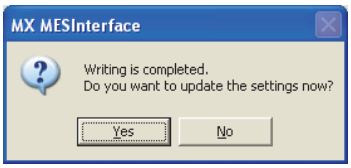
Item	Description
IP address	Specify the IP address of the MES interface module in decimal notation. (Example) 192.168.3.3
User name	Specify a user name. (1 to 20 characters) Case-sensitive. (Example) QJ71MES96
Password	Specify a password. (8 to 14 characters) Case-sensitive. (Example) MITSUBISHI
Connection test	Checks if the device of the specified IP address is connectable to the MES interface module.

7.12.2 Writing the MES interface function settings

Write the MES interface function settings (project) to the MES interface module.



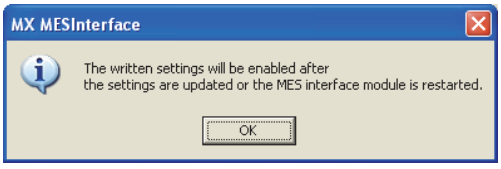
↓



↓

(When Yes button is clicked)

(When No button is clicked)



1 Perform either of the following:

- Click (Write).
- Select [Online] → [Write] from the menu.

2 A dialog box asking for confirmation is displayed. Clicking the OK button starts writing.

3 Upon completion of writing, a dialog box appears, asking for confirmation of the setting update.

4 Clicking Yes refreshes the setting data to the MES interface module.

5 Clicking No does not refresh the setting data to the MES interface module.
Perform any of the following operations later.

- Perform [Update settings]
  ☞Section 7.13.2 (3)
- Power OFF and then ON
- Reset the programmable controller CPU

Figure 7.96 Writing the MES interface function settings

Point

(1) Setting data are refreshed to the MES interface module when any of the following operations are performed.
- Perform [Update settings]
  ☞Section 7.13.2 (3)
- Power OFF and then ON
- Reset the programmable controller CPU

(2) The [System setting] data are not updated by [Update settings].
They are refreshed to the MES interface module when the power is turned OFF and then ON, or when the programmable controller CPU is reset.

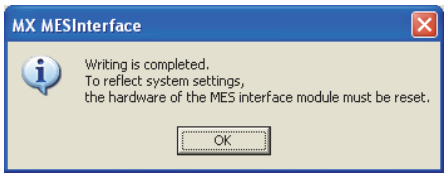
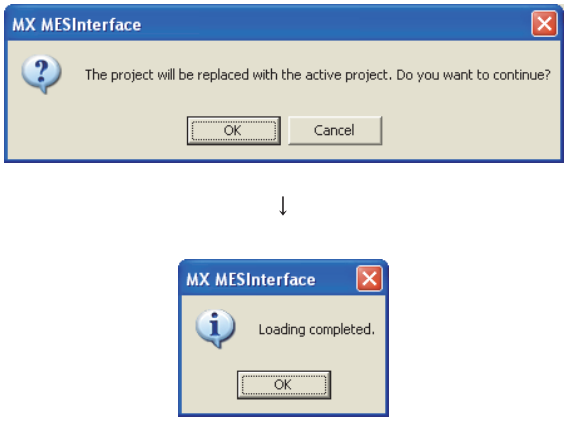


Figure 7.97 Confirmation dialog box displayed after writing [System setting] changes

(3) After writing the data, performing any of the following operations clears all the DB buffer.
- Perform [Update settings]
- Power OFF and then ON
- Reset the programmable controller CPU

7.12.3 Reading the MES interface function settings

Read the MES interface function settings (project) from the MES interface module.



1. Perform either of the following:
   - Click (Read).
   - Select [Online] → [Read] from the menu.
2. A dialog box asking for confirmation is displayed. Clicking the OK button starts reading.
3. Upon completion of reading, the confirmation dialog box appears. Click the OK button.

Figure 7.98 Reading the MES interface function settings

7.12.4 Verifying the MES interface function settings

The MES interface function settings in the MES interface module are compared with those in the currently editing project.

Point

Data of [Project name] and [Comment] in [Project setting] are not verified.

1. Selecting [Online] → [Verify] from the menu starts verification.
2. Upon completion of verification, the confirmation dialog box appears. Click the OK button.

Figure 7.99 Verifying the MES interface function settings

7.12.5 Checking the working log of the MES interface module

The working log of the MES interface module can be checked.
In [Working log], error log data of the MES interface module and job event log data can be checked.

1. Select [Online] → [View working log] from the menu.
2. The [Working log] dialog box is displayed.
   Operate it referring to the following descriptions.

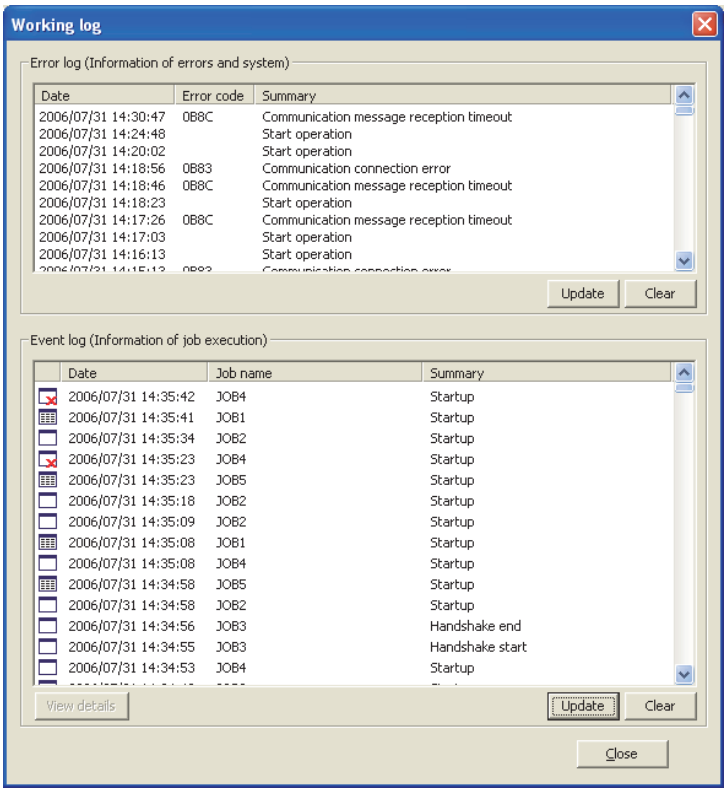


Figure 7.100 [Working log] dialog box

Table 7.85 Setting items in the [Working log] dialog box

Item		Description
Error log	Date, Error code, Summary	Error log data of the MES interface module are displayed.
	Update	Updating the error log.
	Clear	Clearing the error log history.
Event log	Icons, Date, Job, Summary	This area displays event log data of the jobs whose executions have been completed.
	View details	Detailed log data of the jobs are displayed.
	Update	Updating the event log.
	Clear	Clearing the event log history.

(1) Error log

The following explains the display of the Error log.

Table 7.86 Displays in [Error log]

Item	Description
Date*1 *2	Displays the date and time on which an error (information) occurred.
Error code*3	Displays an error code of the error occurred. For error codes, refer to the following: ☞Section 10.2 Error Code List
Summary	Displays error messages and system information.

*1 In the case of time synchronization using SNTP, the clock time of CPU No.1 is displayed for the time from when the module starts up until it succeeds in time query to the SNTP server.

*2 The date and time of an error (information) that occurred before obtaining the clock time from CPU No.1 is not displayed.

*3 For system information, no error code is displayed.

(2) Event log

There are two kinds of [Event log] data: [Startup log] and [Detailed log], by which the job startup history and job execution details can be checked respectively.

(a) Startup log

Startup log data of the jobs, each of which has [Startup logging] setting in [Job settings], are displayed.

Section 7.10.1 (4) Startup logging

The following explains the display of the Startup log.

1) Icons

Each of icons represents the completion status of a job.

Table 7.87 Icons and their meanings

Icon	Meaning
	The job was completed normally. (No detailed log)
	The job was completed normally. (With detailed log) Selecting the job and clicking the View details button displays the [View details] dialog box.
	The job was canceled. (No detailed log)
	The job was canceled. (With detailed log) Selecting the job and clicking the View details button displays the [View details] dialog box.

2) Date

Displays the date and time on which a job is activated.

3) Job

Displays a job that was activated.

4) Summary

Displays trigger conditions.

Table 7.88 Displays in [Summary]

Display	Description
Startup	Shows that any job other than handshake operation was activated.
Handshake start	Shows that job execution of handshake operation was activated.
Handshake end	Shows that job execution of handshake operation was completed.

(b) Detailed log

Detailed log data of the jobs, each of which has [Test mode] setting in [Job settings], are displayed.

Section 7.10.1 (5) Test mode

1 Selecting a job of or icon and clicking the View details button displays the [View details] dialog box.

(3) View details

The following explains the display of the [View details] dialog box.

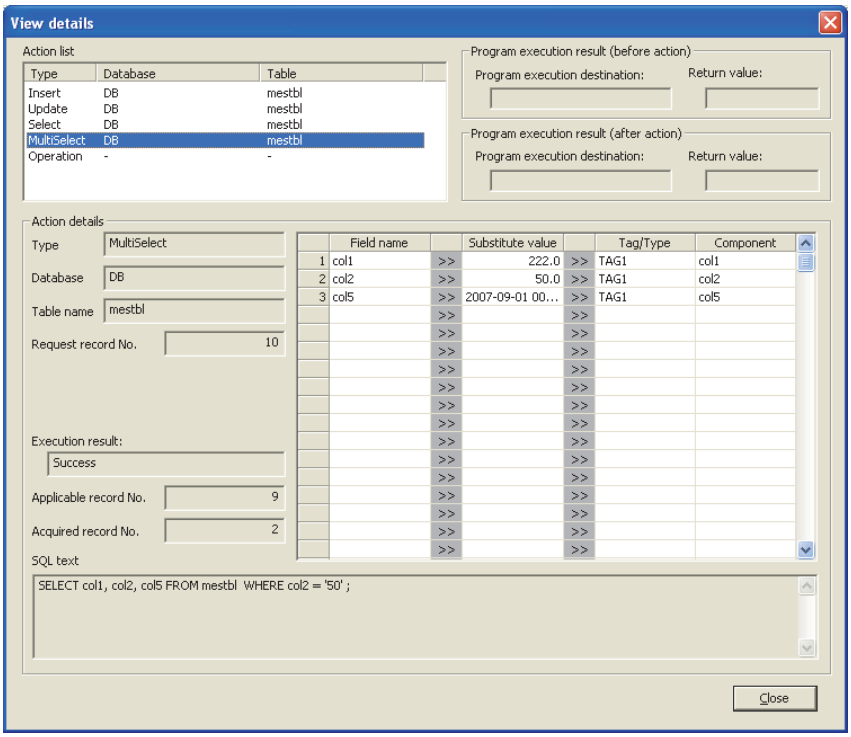


Figure 7.101 [View details] dialog box

Table 7.89 Items in the [View details] dialog box

Item	Description
Action list	Displays a list of executed job actions. Selecting an action displays its action details.
Program execution result (before action)	Displays a program execution result before execution of the first action.
Program execution result (after action)	Displays a program execution result after execution of the last action.
Action details	Displays the action details. • Communication action (Select/Update/Insert/MultiSelect/Delete) ☞(3) (a) in this section • Communication action (Stored procedure) ☞(3) (b) in this section • Operation action ☞(3) (c) in this section

(a) Communication action (Select/Update/Insert/MultiSelect/Delete)

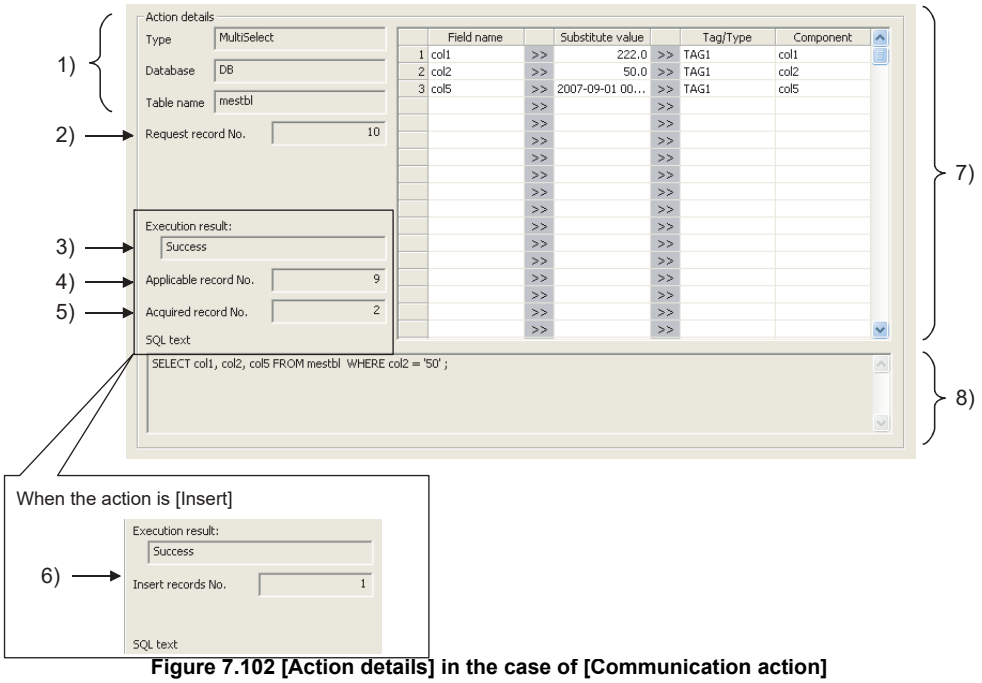


Figure 7.102 [Action details] in the case of [Communication action]

Table 7.90 Items displayed for [Communication action]

	Display	Description
1)	Type, Database, Table name	Displays data of [Action type], [Database], and [Table name], which were set in [Communication action].
2)	Request record No.	Displays the number of requested records when [Select] or [MultiSelect] is selected for [Action type]. Note that, if the number of requested records is not specified, [No specification] is displayed.
3)	Execution result	Displays the execution result of the SQL text. • When succeeded [Success] is displayed. • When failed [Failed] is displayed.
4)	Applicable record No.	Displays the number of selected records when [Select], [Update], [MultiSelect] or [Delete] is selected for [Action type]. The number of records is stored in [Applicable record No.] as follows: • When [Execution result] is [Success] Select: Number of records that met the Select/Update/Delete conditions Update: Number of records that were updated MultiSelect: Number of records that met the Select/Update/Delete conditions Delete: Number of records that were deleted • When [Execution result] is [Failed] Noting is displayed.

(To the next page)

(From the previous page)

Table 7.90 Items displayed for [Communication action]

	Display	Description
5)	Acquired record No.	Displays the number of acquired records when [Select] or [MultiSelect] is selected for [Action type]. The number of records is displayed in [Acquired record No.] as follows: • When [Execution result] is [Success] Select: Number of acquired records (0 or 1) MultiSelect: Number of acquired records • When [Execution result] is [Failed] Nothing is displayed.
6)	Insert records No.	Displays the number of inserted records when [Insert] is selected for [Action type]. The number of records is displayed in [Insert records No.] as follows: • When [Execution result] is [Success] Insert: Number of inserted records Zero may be displayed due to the following: (1) Database restrictions are violated. (2) When the database is Wonderware® Historian, [Disable writing to database] is set up. (☞Section 7.13.4 Changing the job status) • When [Execution result] is [Failed] Nothing is displayed.
7)	DB-tag link settings	Displays data of [DB-tag link settings], which were set in [Communication action].
8)	SQL text	The SQL text executed in [Communication action] is displayed.

(b) Communication action (Stored procedure)

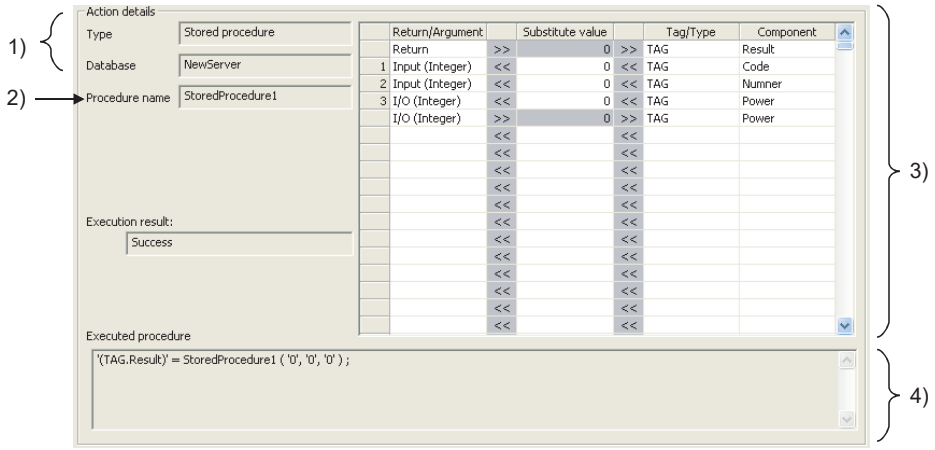


Figure 7.103 [Action details] in the case of [Stored procedure]

Table 7.91 Items displayed for [Stored procedure]

	Display	Description
1)	Type, Database, Stored procedure name	Displays data of [Action type], [Database], and [Procedure name], which were set in [Communication action].
2)	Execution result	Displays the execution result of the Stored procedure. • When succeeded [Success] is displayed. • When failed [Failed] is displayed.
3)	DB-tag link settings	Displays data of [DB-tag link settings], which were set in [Communication action].
4)	Executed procedure	The information on stored procedure executed in [Communication action] is displayed.

(c) Operation action

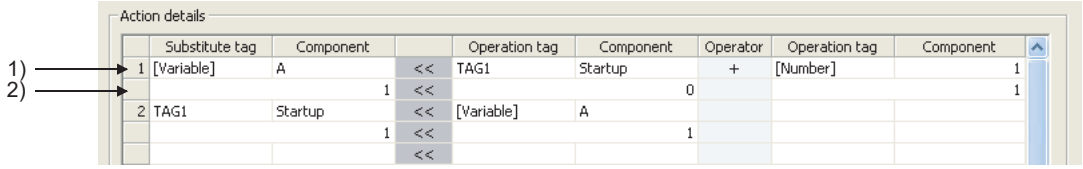


Figure 7.104 [Action details] in the case of [Operation action]

Table 7.92 Items displayed for [Operation action]

	Display	Description
1)	Upper row	Displays the settings of [Operation action].
2)	Lower row	Displays values calculated in [Operation action].

Point

If a job is canceled, information on how the cancellation has occurred is displayed in the detailed log.
In the case of job cancellation due to failed tag data acquisition, however, the detailed log information is not displayed.

7.12.6 Executing a job as a one-shot task

Execute a job as a one-shot task.
Doing so allows the user to check the execution result of the currently editing [Job settings].
For precautions for performing one-shot execution, refer to the following:
☞Section 7.15 (4) One-shot execution

Point

In [One-shot execution of a job], settings of [Startup logging] and [DB Buffering] are not executed.

1. With the edit screen of [Job settings] displayed, perform either of the following:
   - Click (One-shot execution).
   - Select [Online] → [One-shot execution] from the menu.
2. Selecting [One-shot execution] updates the setting and perform one-shot execution of the job, ignoring the trigger conditions.
   For [Update settings], refer to the following:
   ☞Section 7.13.2 (3)

Point

All of job operations running in the MES interface module are temporarily disabled during one-shot execution.

3. Check the execution result shown in the [View details] dialog box, which is displayed after the execution.
   For the display of the [View details] dialog box, refer to the following:
   ☞Section 7.12.5 (2) (b) Detailed log
4. After the one-shot execution, [Update settings] is performed.
   ☞Section 7.13.2 (3)

7.13 Online - Remote operation

Perform the remote operation for the MES interface module.

1. Select [Online] → [Remote operation] from the menu.
2. The [Remote operation] dialog box is displayed.
   Operate it referring to the following descriptions.

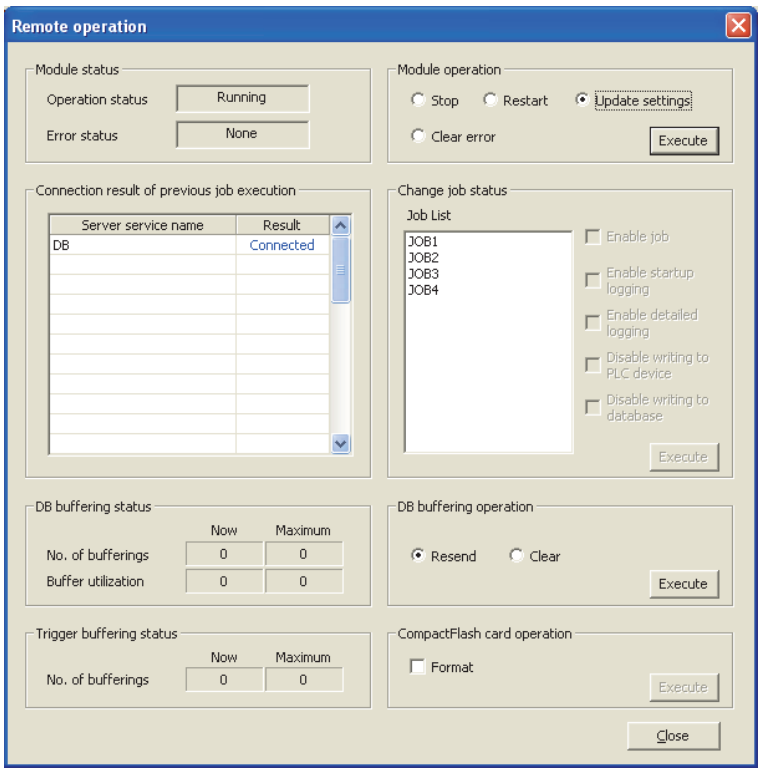


Figure 7.105 [Remote operation] dialog box

7.13.1 Checking the operation status of the MES interface function

The operation status of the MES interface function and the error status of the MES interface module can be checked.
The following explains the display of [Module status].
The display of [Module status] is updated every 3 seconds.

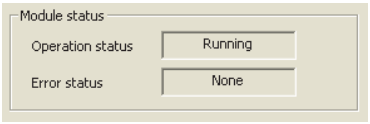


Figure 7.106 [Module status]

(1) [Operation status]

Table 7.93 Items displayed for [Operation status]

Display	Description
Running	Displayed when the MES interface function is running.
Stop	Displayed when the MES interface function is stopped. (Even if trigger conditions are met, no job will be executed during stop of the function.)
Initializing	Displayed during the operations indicated below. • Perform [Update settings] • Power OFF and then ON • Reset the programmable controller CPU (Even if trigger conditions are met, no job will be executed during initialization.)
Stopping	Displayed when the operation status of the MES interface function is changing to the [Stop] status.
Getting status	Displayed when MES Interface Function Configuration Tool is acquiring the status data from the MES interface module.
Acquirement failed	Displayed when MES Interface Function Configuration Tool has failed in connection for acquiring the status data from the MES interface module.

(2) [Error status]

Table 7.94 Items displayed for [Error status]

Display	Meaning
None	Displayed when the MES interface module is operating normally.
Continuation error	Displayed when a module continuation error has occurred in the MES interface module. Section 10.1.2 Error types
Stop error	Displayed when a module stop error has occurred in the MES interface module. Section 10.1.2 Error types

7.13.2 Manipulating the operation status of the MES interface function

Manipulate the operation status of the MES interface function.

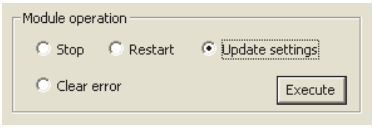


Figure 7.107 [Operation]

(1) Stop

1 Selecting the [Stop] radio button and clicking the Execute button stops the operation of the MES interface function.

Point

(1) The following operation also stops the operation of the MES interface function.

• Click (Stop).

(2) If some job is being executed, the job is canceled.

Section 7.10.5 Setting items for job cancellation

(2) Restart

1 Selecting the [Restart] radio button and clicking the Execute button restarts the operation of the stopped MES interface function.

Point

The following operation also restarts the operation of the stopped MES interface function.

• Click (Restart).

(3) Update settings

1 After writing the MES interface function settings, select the [Update settings] radio button.

Clicking the Execute button restarts the MES interface module and updates the settings.
For writing the MES interface function settings, refer to the following:
☞Section 7.12.2 Writing the MES interface function settings

When [Update settings] is performed, the operation behavior is as follows:

1) During the setting update, the MES interface function is temporarily stopped. No job is executed during the stop.
2) After the setting update, the MES interface function is operated.
3) The data changed in [Change job status] are cleared.
☞Section 7.13.4 Changing the job status
4) The written MES interface function settings are updated.
5) The trigger buffer area and the DB buffer area are cleared.

Point

[Update settings] may change the programmable controller CPU control. Ensure the safety before executing it.

(4) Clear error

1 When [Error status] is [Continuation error], take corrective actions to remove the error cause. Then, select the [Clear error] radio button and click the Execute button. Doing so clears the error status.

- The ERR. LED on the MES interface module turns off.
- The Current error area (buffer memory address: 140 to 145) is cleared.
- The latest error code displayed in [System monitor] of GX Developer is cleared. (☞Section 10.1.3 System monitor)

7.13.3 Checking the connection of the previous job execution

Connection with the server computer set in [Server service settings], which is made at the time of the previous job execution, can be checked.
The following explains the display of [Connection result of previous job execution].

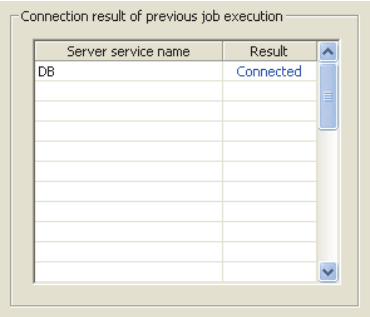


Figure 7.108 [Connection result of previous job execution]

Table 7.95 Items displayed for [Result] of [Connection result of previous job execution]

Display	Description
Connected	Normally connected to the server computer at the time of the previous job execution.
Disconnected	Not connected to the database server computer. This is displayed when normal connection could not be established at the previous job execution and thereby the line is disconnected.

Point

- The display of the connection result is not changed until the next job is executed to communicate the database server computer.
- The result of the one-shot communication with the database server computer is not reflected.

7.13.4 Changing the job status

The job status can be changed.

Point

The job status changed by this operation returns to the status set in [Job settings] by performing any of the following operations.

- Perform [Update settings]
  ☞Section 7.13.2 (3) Update settings
- Power OFF and then ON
- Reset the programmable controller CPU

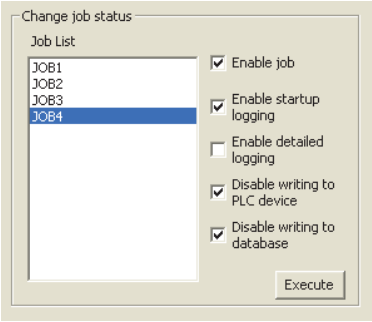


Figure 7.109 [Change job status]

1. From [Job List], select the job whose status is to be changed.
2. Select a checkbox of the status to be changed.

Table 7.96 Selection items of [Change job status]

Item	Description
Enable job	• Checked The job is enabled and thereby it is executed when the trigger conditions are met. • Not checked The job is disabled, and thereby it is not executed even if the trigger conditions are met.
Enable startup logging *1	• Checked The startup logging is enabled, and thereby startup records are logged. • Not checked The startup logging is disabled, and thereby startup records are not logged.
Enable detailed logging *2	• Checked The detailed logging is enabled, and thereby detailed records are logged. • Not checked The detailed logging is disabled, and thereby detailed records are not logged.
Disable writing to PLC device	• Checked Writing to programmable controller devices is disabled. • Not checked Writing to programmable controller devices is enabled.
Disable writing to database	• Checked *3 Writing to the database is disabled. • Not checked Writing to the database is enabled.

*1 The startup log can be checked from [Online] - [Working log].
Section 7.12.5 Checking the working log of the MES interface module
*2 [Enable detailed logging] is selectable only when [Test mode] is selected in [Job settings].
Section 7.10.1
When [Enable detailed logging] is checked, [Enable startup logging] is also selected.
The detailed log can be checked from [Online] - [Working log] - [View details].
Section 7.12.5 Checking the working log of the MES interface module
*3 When marking a check in [Disable writing to database], the following is executed.
- Execute [Communication action] set in a job and send rollback at the end.
  When the following items exist, an error will occur.
  [Server Service setting]: IP address, port number, user name, password, data source name
  [Communication action]: Table name, field name
- When the database is Wonderware® Historian, the following SQL text is sent during execution of [Communication action] that is set in the job.
  SQL text: "INSERT INTO History (DataTime, TagName, Value) SELECT TOP 0 NULL, NULL, NULL :"
  When any one of the following items is incorrect, an error will occur.
  [Server Service setting]: IP address, port number, user name, password, data source name
  An error will not occur even when [Communication action] is incorrectly set.

3 Clicking the Execute button changes the job status.

7.13.5 Checking the operation status of DB buffering

The current and past maximum values of No. of DB buffering data and buffer utilization can be viewed.

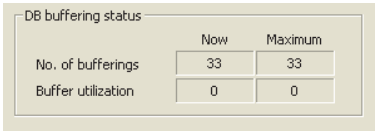


Figure 7.110 [DB buffering status]

Table 7.97 Items displayed in [DB buffering status]

Display	Description	
	Now	Maximum*2
No. of bufferings *3	Displays the current number of buffered data (jobs that have been buffered).	Displays a past maximum value in the number of buffered data (jobs that have been buffered).
Buffer utilization *1 *3	Displays the current buffer utilization.	Displays a past maximum value in the buffer utilization.

*1 The buffer utilization is stored as an integer. (Digits after decimal point is truncated.)
Utilization rates of the Automatically resend buffer and Manually resend buffer are compared, and the greater buffer utilization rate is displayed.
*2 The maximum values are cleared when the MES interface module power is turned OFF.
When power is reapplied, No. of bufferings and Buffer utilization at the time are displayed as maximum values.
*3 The space is displayed as blank during data acquisition or in the case of failure of data acquisition.

Point

When the buffer utilization is high, ensure the capacity of the CompactFlash card.
Section 7.6.4 (7) DB buffering capacity (Range: 16MB to 512MB, Default: 64MB)

7.13.6 Operating the DB buffering

Operate the DB buffering.
For the DB buffering function, refer to the following:
☞Section 6.1.10 DB buffering function

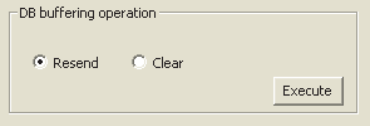


Figure 7.111 [DB buffering operation]

(1) Resending data stored in the DB buffer

1. Selecting the [Resend] radio button and clicking the Execute button executes the resend processing of the SQL texts stored in the DB buffer, when manual resend is selected for the jobs of the SQL texts or stored procedure execution request. If the resend processing fails, the error code, 0B83h, is output to the error log.

(2) Clearing the DB buffer

1. Selecting the [Clear] radio button and clicking the Execute button clears all of the SQL texts or stored procedure execution request that are stored in the DB buffer.

Point

If clear processing is executed during resend processing, error code 0B44h may be output.
☞Section 10.2 Error Code List
If this error occurs, execute the Clear error and turn off the ERR. LED.
☞Section 7.13.2 (4) Clear error

7.13.7 Checking the operation status of the trigger buffering

The current and past maximum values of No. of trigger buffering data can be viewed.

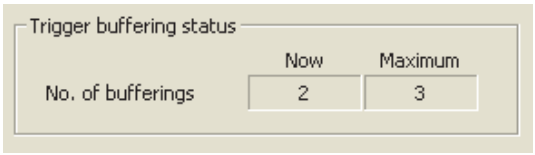


Figure 7.112 [Trigger buffering status]

Table 7.98 Item displayed in [Trigger buffering status]

Display	Description	
	Now	Maximum
No. of bufferings *1	Displays the current number of buffering data (buffered jobs).	Displays a past maximum value in the number of buffering data (buffered jobs).

*1 The space is displayed as blank during data acquisition or in the case of failure of data acquisition.

Point

When the number of buffering data is large, check the number of jobs and the trigger condition setting.

7.13.8 Formatting the CompactFlash card

Format the CompactFlash card installed in the MES interface module.

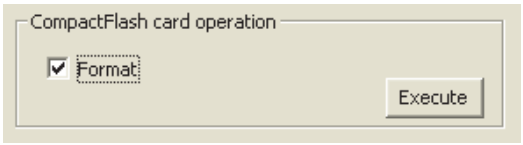


Figure 7.113 [CompactFlash card operation]

1. Check the [Format] box and click the Execute button.
2. Executing the formatting deletes all of the CompactFlash card data.

Point

When the CompactFlash card is formatted after the system operation, the MES interface function settings are cleared.
Read out the MES interface function settings to MES Interface Function Configuration Tool before formatting the card.
Section 7.12.3 Reading the MES interface function settings

7.14 Help

The product information of the MES Interface Function Configuration Tool and the Connect to MITSUBISHI ELECTRIC FA Global Website screen can be displayed.

(1) Product information

1 Select [Help] → [Product information] from the menu.

Point

The following operation also displays the product information of the MES interface Function Configuration Tool.

- Click (Product information).

2 The [Product information] dialog box of the MES Interface Function Configuration Tool is displayed.

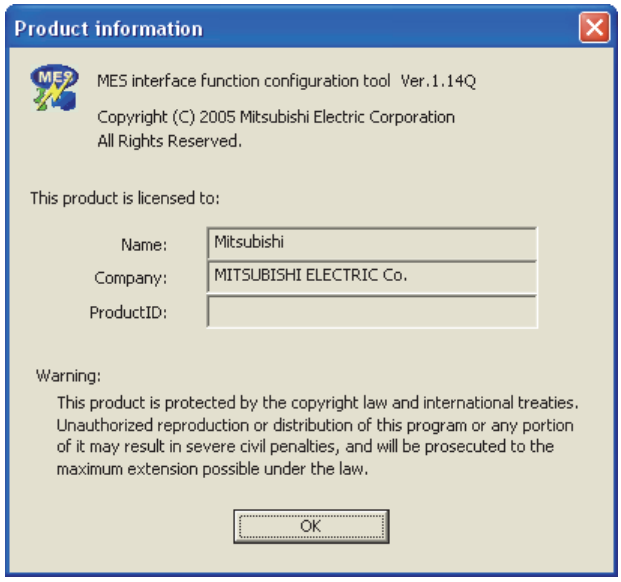


Figure 7.114 [Product information] dialog box

(2) Connect to MITSUBISHI ELECTRIC FA Global Website

1 Select [Help] → [Connect to MITSUBISHI ELECTRIC FA Global Website] from the menu.

2 The MITSUBISHI ELECTRIC FA Global Website is displayed.
Online manuals and other information can be viewed.

7.15 Precautions

This section provides precautions for using MES Interface Function Configuration Tool.

(1) When deleting an item

Deleting an item such as [Access target CPU settings] or [Device tag settings] is not allowed when the selected item is used for another item such as [Job settings].
As the error dialog box appears, identify the location, stop using it for another item, and then delete the item.

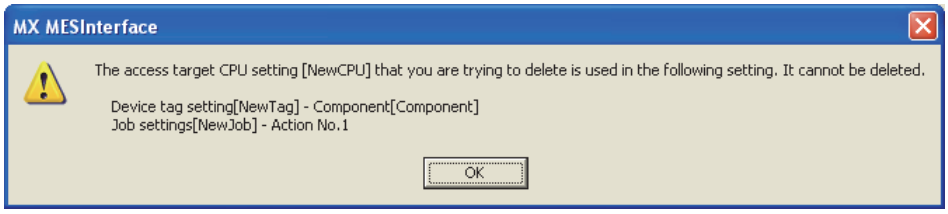


Figure 7.115 Error dialog box

(2) Changing [PLC series] in [Access target CPU settings]

The CPU type set for [PLC series] of [Access target CPU settings] cannot be changed if the change may generate illegal character strings of the devices for the tag components for which [Access target CPU settings] is selected.

(3) Changing the [Prohibit data writing] setting in [Device tag settings]

The enabled data write setting cannot be changed to "Prohibit" if the tag is used for the setting items provided for tag writing.

- [Completion notification] of [Handshake operation], substitution tags of [Select] in [Communication action], etc.

(4) One-shot execution

When performing the one-shot execution, set the same settings for the system settings being used on the MES interface module and the system settings of the project currently opened with the MES Interface Function Configuration Tool.
During one-shot execution, do not turn the power of programmable controller OFF and then ON, nor reset the programmable controller CPU.
When the one-shot execution is not completed normally by performing the above operations or due to a communication error, write a project again and perform [Update settings].
For [Update settings], refer to the following:
☞Section 7.13.2 (3)

(5) Type mismatch

(a) Value substitution

A value is assigned for a tag component after the source type is converted into the data type of the tag component.

A value is assigned to a variable after the type of the variable is converted into the type of the substitution source.

(Example) Type conversion of tag components and variables

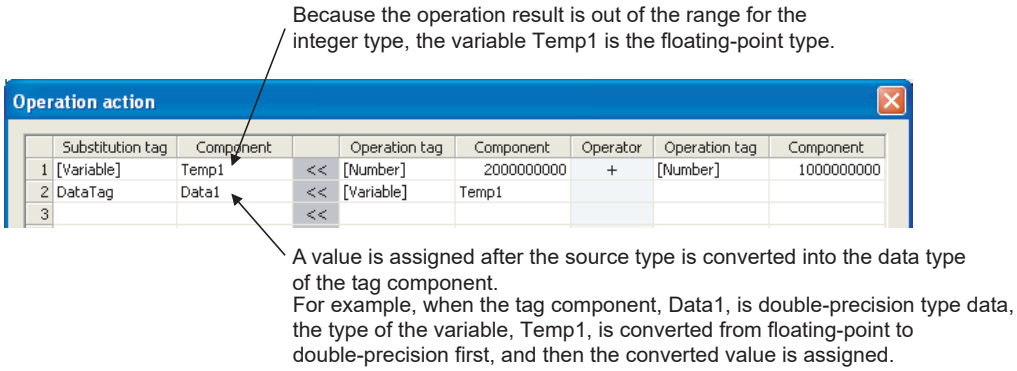


Figure 7.116 Type conversion of tag components and variables

If a type that cannot be converted is assigned to a tag component, the job execution is canceled.

At this time, "Type conversion to tag component error" is displayed in the error log.

(b) Conversion from BCD type to numerical type

When a device value of programmable controller is inapplicable as a BCD type, "BCD type conversion error" is displayed in the error log.

(c) Operation of numerical values

There are two kinds of numerical values: Integer type and Floating-point type.

- Integer type: Represents the bit type, single-precision type, 16-bit BCD type, 32-bit BCD type, and double-precision type of tag components.
- Floating-point type: Represents the floating-point type of tag components.

The following table lists operation items and types of the results.

Table 7.99 Operation items and types of the results

Item	Operation result
Operation of floating-point type	Floating-point type in all cases
Addition, subtraction, multiplication of integer type	In the range from -2147483648 to 2147483647: Integer type Exceeding the above range: Floating-point type
Division of integer type	Divisible: Integer type Not divisible: Floating-point type
	When zero divide is executed, the job execution is canceled. At this time, "zero divide error" is displayed in the error log.

(d) Operation between character string type values

1) + operator
Combines character strings.
Example: "ABCDEFG" + "HIJ" → "ABCDEFGHIJ"

2) Other operators
When both of the operands can be converted to numerical values, the operation is performed using the numerical values.
Both or either of them cannot be converted to numerical values, the job execution is canceled.
At this time, "Operation error" is displayed in the error log.
Example: "312" × "4" → "1248"
"31AH" × "4" → Cancellation of job execution

3) Operation between a character string type value and a numerical type value
Same as the case of the operation between character string type values

CHAPTER 8 DB CONNECTION SERVICE AND SETTING TOOL

This section explains DB Connection Service and DB Connection Service Setting Tool.

8.1 DB Connection Service Functions

Installing DB Connection Service on the server computer allows to use the MES interface function of the MES interface module.
The following shows the functions of the DB Connection Service.

Point

(1) It is necessary to install DB Connection Service on all the database server computers and application server computers to be accessed from the MES interface module.

(2) When using DB Connection Service on the database server computer, the ODBC setting for the database to be used must be set beforehand.

☞Section 8.2 Setting ODBC to the Database

(3) When using DB Connection Service on the application server computer, an account for user program execution must be created beforehand.

(4) Changes to the DB Connection Service settings are made with DB Connection Service Setting Tool.

☞Section 8.5 Setting Items of DB Connection Service Setting Tool

(1) ODBC connection function

The ODBC connection function connects the MES interface module and the ODBC interface for database.

The following shows operation on the database server computer.

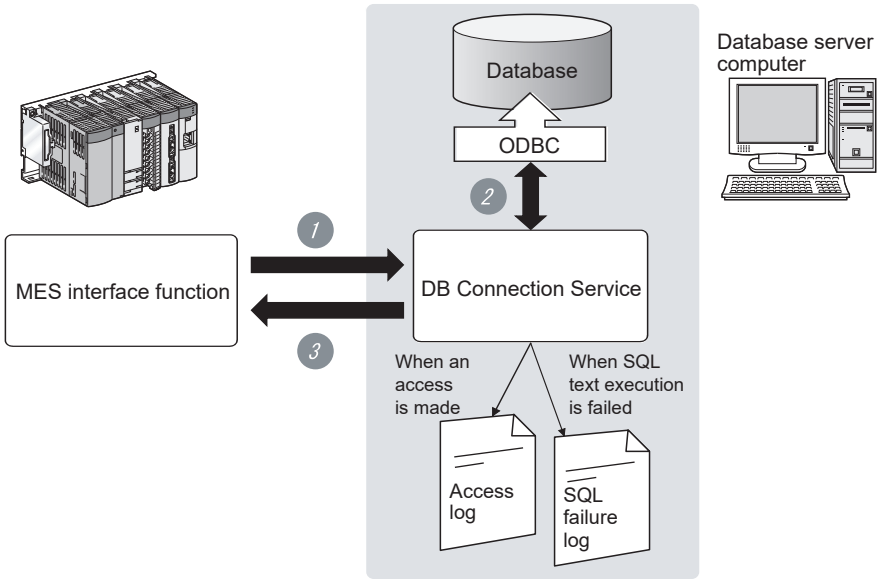


Figure 8.1 ODBC connection function

1. Receives SQL text or stored procedure execution request from the MES interface function on the MES interface module.
2. Accesses the database via ODBC interface and executes the SQL text or stored procedure.
3. Sends the execution results to the MES interface module.

(2) Program execution function

The program execution function executes a program on the application server computer upon request from the MES interface module.
The following shows operation on the application server computer.

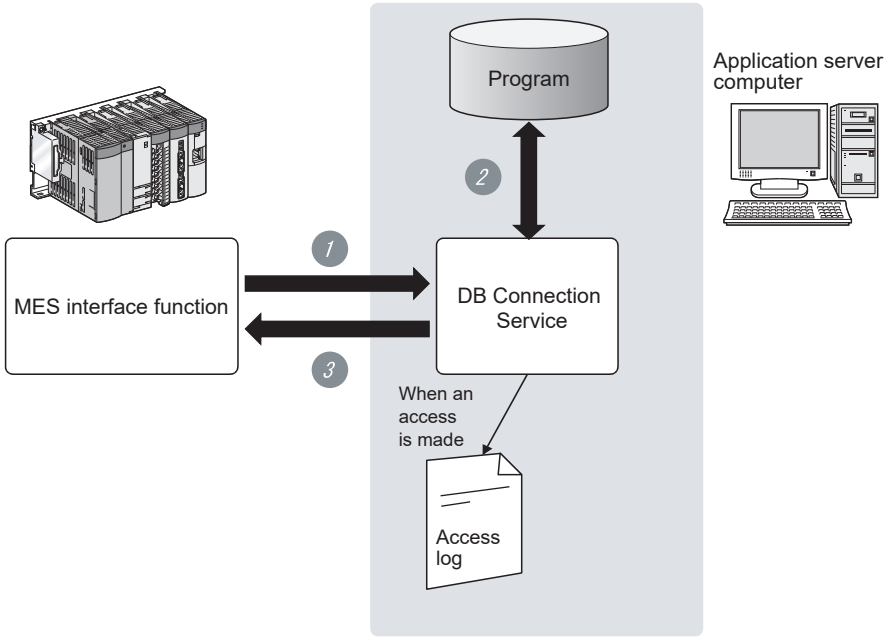


Figure 8.2 Program execution function

1 Receives program execution requests from the MES interface function operating on the MES interface module.

2 Executes programs on the application server computer.*1

3 Sends the program execution results to the MES interface module.

*1 In Windows Vista®, Windows® 7, Windows® 8, Windows® 8.1, Windows Server® 2008, Windows Server® 2008 R2, Windows Server® 2012, Windows Server® 2012 R2, Windows® 10, Windows Server® 2016, and Windows Server® 2019, DB Connection Service Client (user session) executes programs. DB Connection Service Client is automatically started at the time of user login.

(3) IP filter function (☞Section 8.5 (3) Limit IP addresses permit to connect)

The IP filter function can specify the IP address of the MES interface module or the configuration computer that can connect to the DB Connection Service to ensure the security of the server computer.
Batch specification using the mask bit length specification is possible.
If the IP filter function is not used, any MES interface module or configuration computer can connect to the DB Connection Service.

(4) Log output function

DB Connection Service outputs an access log and an SQL failure log.

(a) Access log (☞Section 8.5 (4) Output access log)

The communication contents between the MES interface module and/or the configuration computer and DB Connection Service are output to the access log.
For access log specifications, refer to the following.

☞Section 8.8.1 Access log

(b) SQL failure log (☞Section 8.5 (5) Output SQL failed log)

The error contents are output to the SQL failure log when the SQL text or stored procedure cannot be completed normally in the database due to the reason such as no table exist.
For SQL failure log specifications, refer to the following.

☞Section 8.8.2 SQL failure log

(c) Log character code

The character code (access log, SQL failure log) of the log file to output cannot be set in the "Log character code" of the DB Connection Service Setting Tool.
When the settings of the "Log character code" are changed, a new log file is output by switching the output file even if the "Access log capacity" specified by the user is not achieved. The file name at the time of switching changes in the same way when the file capacity exceeds.
When Unicode is set, "BOM" will be prefixed to the data of the log file (access log/SQL failure log).

(5) Table information/stored procedure information browse function

A function to send table information (such as table names and field names) or stored procedure information in the database to the MES Interface Function Configuration Tool. This function is executed when browsing table information or stored procedure information with Communication action of the MES Interface Function Configuration Tool.(☞Section 7.11.2 (4) Browse table name, Section 7.11.2 (8) Browse field name, Section 7.11.3 (2) Browse procedure name)

The following shows the operation on the database server computer.

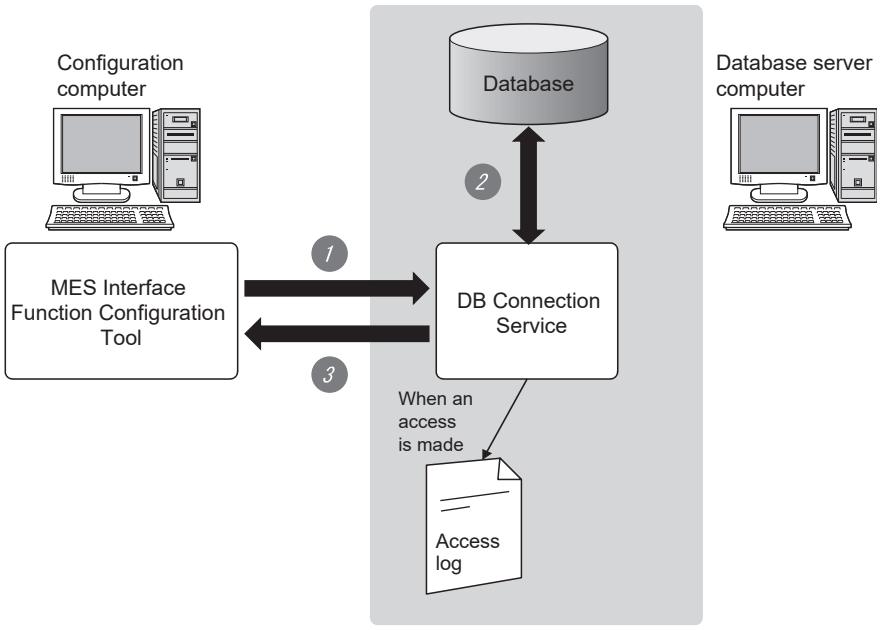


Figure 8.3 Table information/stored procedure information browse function

1. When clicking on the Browse table name button, Browse field name button, or Browse procedure name button of the MES Interface Function Configuration Tool, the table information browse request or stored procedure information browse request is received from the MES Interface Function Configuration Tool.
2. Acquire the table information (table names or field names) or stored procedure information in the database.
3. Send the table information (such as table names and field names) or stored procedure information to the MES Interface Function Configuration Tool.

8.2 Setting ODBC to the Database

When using DB Connection Service on the database server computer, the ODBC setting for the database to be used must be set beforehand.
The following explains the ODBC setting procedure.
For details, refer to the following.
☞Manuals and online help for the database software and operating system used

(1) ODBC driver

Only the ODBC driver installed at the same time as the installation of the database can be used except for the cases below.
'Microsoft Access Driver(*.mdb)', 'Microsoft ODBC for Oracle', and 'SQL Server' which are supplied with the operating system cannot be used.

- Before connecting an Oracle database using DB Connection Service Version 2 (32-bit), install the 32-bit version of Oracle Client.

(2) To start the ODBC Data Source Administrator

When the installation method of Access is Click-to-Run (C2R), install Microsoft Access database engine 2010 first, then start "ODBC Data Source Administrator".
Enter the following command in the command prompt in accordance with the software version of MX MESInterface and the version of DB connection service to be used.

DB Connection Service and DB Connection Service Setting Tool	Command
DB Connection Service and DB Connection Service Setting Tool Version 1	"%SystemRoot%\SysWOW64\odbcad32.exe"
DB Connection Service and DB Connection Service Setting Tool Version 2 (32-bit)	
DB Connection Service and DB Connection Service Setting Tool Version 2 (64-bit)	"%SystemRoot%\system32\odbcad32.exe"

(3) For Oracle®

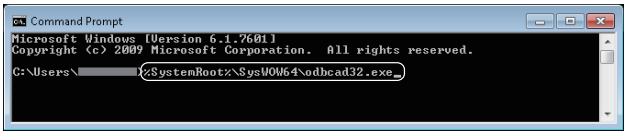
(The following shows a setting example using Oracle® 12c with Microsoft® Windows® 7 Professional Operating System.)
Set the following conditions.

- Data source name*1: SAMPLE
- TNS service name*2: SAMPLETNS
- OracleHome: OraClient12Home1

*1 Data source name can be set as desired.
For [Data source name] in [Server service settings], use the name set with this setting.

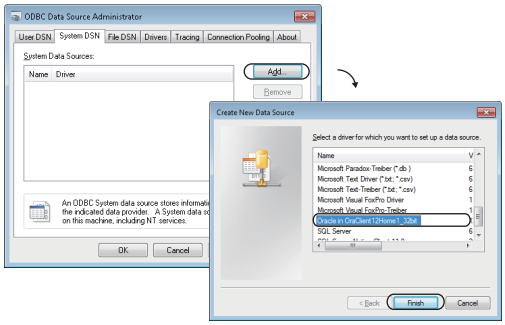
*2 The TNS service name is the name for accessing an Oracle® database.
The name is entered when installing Oracle® and creating a database instance.
This can be checked with [Configuration and Migration Tools] - [Net Manager] - [Service naming] of Oracle®.

(Start)
↓



1 Start the ODBC Data Source Administrator.
☞Section 8.2 (2) To start the ODBC Data Source Administrator

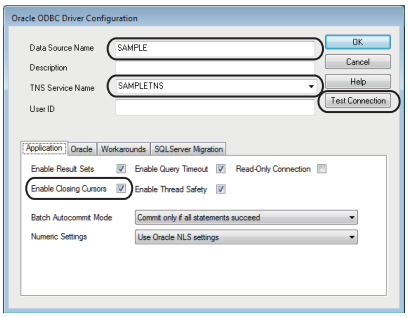
↓



2 Select the [System DSN] tab and click the Add button.

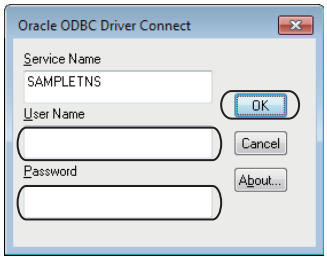
3 Select "Oracle in OraClient12Home1", and click the Finish button.

↓



4 Set the following items and click the Test Connection button.
- Data Source Name: SAMPLE
- TNS Service Name: SAMPLETNS
- Enable Closing Cursors: Select

↓



5 Enter the user name and password, and click the OK button.

6 When the connection is established normally, the "Testing Connection" screen will appear.

7 Click the OK button on the "Oracle ODBC Driver Connect" screen.

8 Click the OK button on the "ODBC Data Source Administrator" screen.

↓
(End)

(4) For Microsoft® SQL Server®, MSDE 2000, and Wonderware® Historian 9.0

(The following shows a setting example using Microsoft® SQL Server® 2012 with Microsoft® Windows® 7 Professional Operating System.)

Set the following conditions.

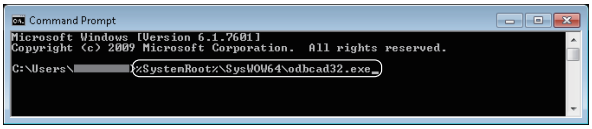
- Data source name*1: SAMPLE
- Server name*2: SAMPLESRV

*1 Data source name can be set as desired.
For [Data source name] in [Server service settings], use the name set with this setting.

*2 The server name is the name for accessing a Microsoft® SQL Server® 2012 database.
This name is entered when installing Microsoft® SQL Server® 2012.
This can be checked with the SQL Server service manager server.

(Start)

↓



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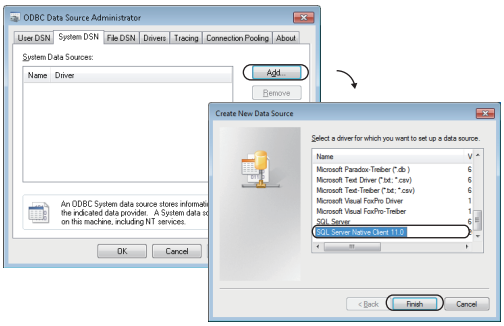

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(To the next page)

1 Start the ODBC Data Source Administrator.

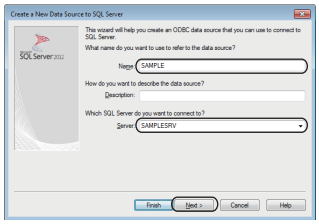
☞Section 8.2 (2) To start the ODBC Data Source Administrator

2 Select the [System DSN] tab and click the Add button.

3 Select "SQL Server Native Client 11.0", and click the Finish button.

(From the previous page)

↓



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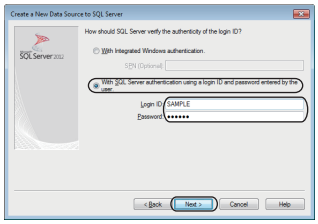

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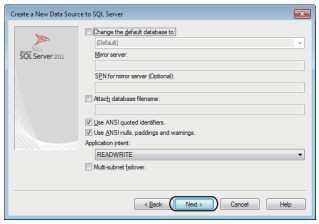

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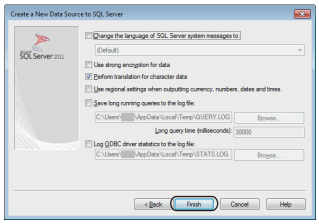

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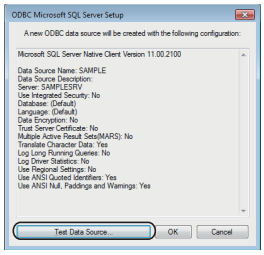


↓

(End)

4 Set the following items and click the Next > button.
- Data source name: SAMPLE
- Server name: SAMPLESRV

5 Select "With SQL Server authentication using a login ID and password entered by the user.", enter the login ID and password, and click the Next > button.

6 Click the Next > button.

7 Click the Finish button.

8 Click the Test Data Source... button, and check if the connection can be established normally.

9 Click the OK button on the "SQL Server ODBC Source Test" screen.

10 Click the OK button on the "ODBC Microsoft SQL Server Setup" screen.

11 Click the OK button on the "ODBC Data Source Administrator" screen.

(5) For Microsoft® Access®

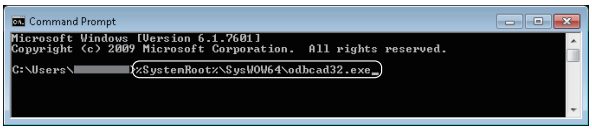
(The following shows a setting example using Microsoft® Access® 2010 (32bit) with Microsoft® Windows® 7 Professional Operating System.)
Set the following conditions.

- Data source name*1: SAMPLE
- Database name*2: C:\MES\Sample_DB.accdb

*1 A data source name can be set arbitrary.
The name set above is used in the "Data Source Name" in the "Target Server Individual Settings" on the "Target Server Settings".

*2 The database name is the name for accessing a Microsoft® Access® database.
Specify a database file path created with Microsoft® Access®.

(Start)
↓



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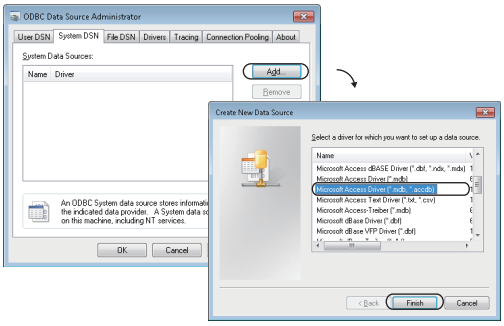

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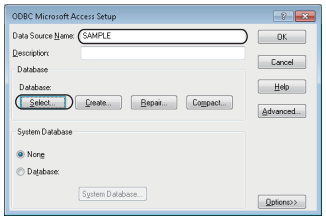

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(To the next page)

1 Start the ODBC Data Source Administrator.
☞Section 8.2 (2) To start the ODBC Data Source Administrator

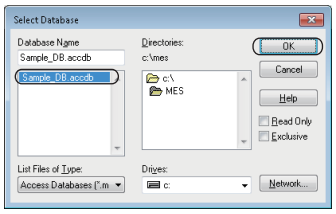
2 Select the [System DSN] tab and click the Add button.

3 Select "Microsoft Access Driver(*.mdb, *.accdb)", and click the Finish button.

4 Enter 'SAMPLE' in the "Data Source Name" and click the Select... button in the "Database".

(From the previous page)

↓



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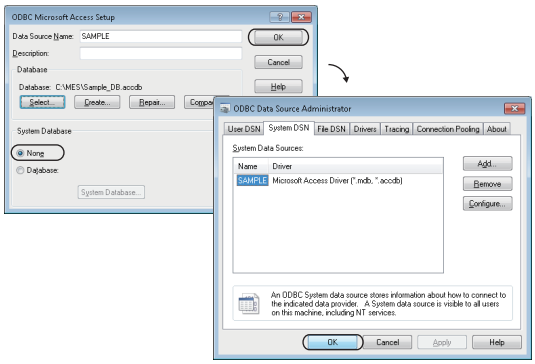

↓

(End)

5 Select 'Sample_DB.accdb' in the "Data Source Name" and click the OK button.

6 Select "None" in the "System Database" and click the OK button.

7 Click the OK button on the "ODBC Data Source Administrator" screen.

8.3 Starting DB Connection Service Setting Tool

1 Select Start*1 → [MELSOFT]*2 → [MESInterface]*3 → [DB connection service setting tool] of Microsoft® Windows®.

*1 [Start Screen] → [All App] or [Start] → [All Programs]/[All App] is activated.
*2 When the MX MESInterface (version 1.12N or earlier) is installed, select [MELSOFT Application].
*3 Does not appear in Windows® 8 or later.

2 When using the operating system with the User Account Control function, a warning message is displayed.

When the following screen is displayed, click "Allow" or the Yes button.

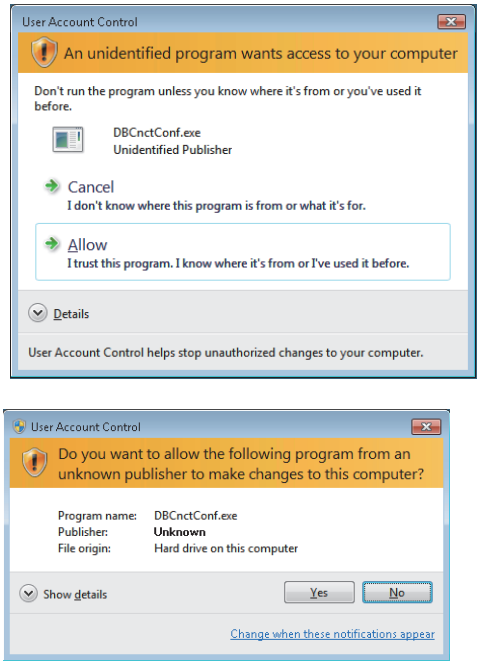

Figure 8.4 User Account Control

Point

To disable the following message display, refer to the following.

☞ Appendix 7 Warning Messages in Windows(R)

3 DB Connection Service Setting Tool starts.
Only one DB Connection Service Setting Tool can be activated.

8.4 Screen Structure of DB Connection Service Setting Tool

This section explains the screen structure of DB Connection Service Setting Tool.

8.4.1 Screen structure

Menu

Section 8.4.2 Menu configuration

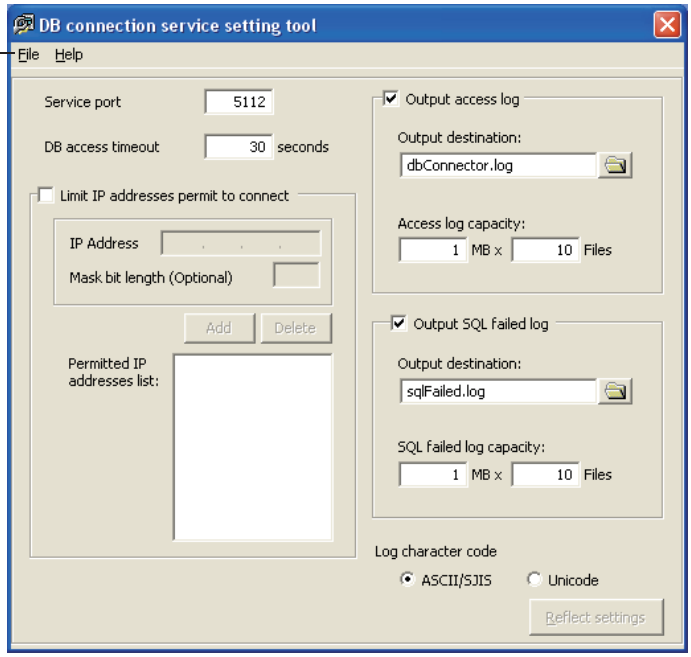

Figure 8.5 Screen structure

8.4.2 Menu configuration

This section shows each command provided on the menu bar.

(1) File

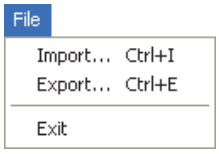

Figure 8.6 File menu

Table 8.1 File menu items

Item	Description	Reference section
Import	Imports an existing file.	Section 8.6
Export	Exports the DB Connection Service Setting Tool to a file.	
Exit	Exits the DB Connection Service Setting Tool.	—

(2) Help

Figure 8.7 Help menu

Table 8.2 Help menu items

Item	Description	Reference section
Product information	Displays product information of the DB Connection Service Setting Tool.	Section 8.7
Connect to MITSUBISHI ELECTRIC FA Global Website	Displays the [Connect to MITSUBISHI ELECTRIC FA Global Website] screen.	

8.5 Setting Items of DB Connection Service Setting Tool

The following shows how to change the DB Connection Service settings.

1. Set the following items, then click the Reflect settings button.
2. After updating the settings, check for an error by selecting [Administrative Tools] - [Event Viewer] in Windows®.
   ☞Section 10.1 Error Codes

Point

(1) Change the DB Connection Service settings when a job using the DB Connection Service is not operating.
The status is as follows:
- The programmable controller is powered OFF.
- The MES interface function operation is stopped with [Online] - [Remote operation] of [MES interface function configuration tool].
  ☞Section 7.13.2 Manipulating the operation status of the MES interface function

(2) When reflecting the settings with a job using DB Connection Service is running, the execution of the connected job is canceled and a communication error occurs.
Also, communication errors may occur by the job which was executed after reflecting the settings. When a communication error occurred in a job that selected [Enable DB buffering], any SQL text is buffered in the DB buffer.

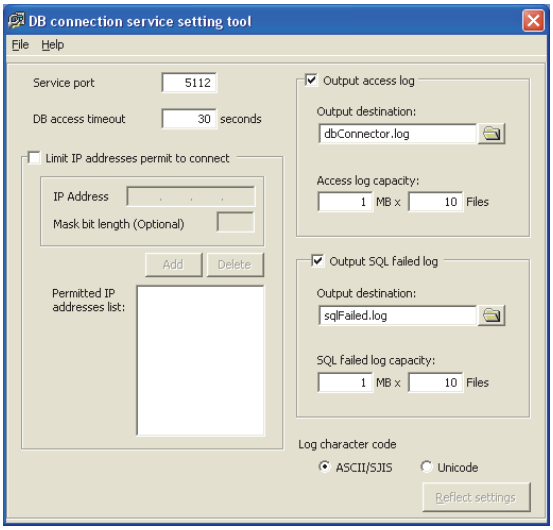

Figure 8.8 DB Connection Service Setting Tool

Table 8.3 Setting items of DB Connection Service Setting Tool

Item	Description
Service port (required)	Set the port number where the DB Connection Service operates.
DB access timeout (required)	Set a DB access timeout (Unit: seconds) for the case where no response is returned to the MES interface module after requesting the server computer for value writing to or reading from the database or for a program execution.
Limit IP addresses permit to connect	Specify whether or not to set the IP addresses permitted to connect.
Output access log	Set whether or not to output the access log.
Output SQL failed log	Set whether or not to output the SQL failure log.
Log character code	Specify the character code of the log file (access log, SQL failure log) that is output by DB connection service in ASCII/SJIS or Unicode.

(1) Service port (required) (Range: 1024 to 65535, Default: 5112)

Set the port number where the DB Connection Service operates.*1 *2
The set port number is used for communications with the MES interface module or the configuration computer.

*1 Set the same value in [Service port] as the one set in [Server service settings] - [Port No.] of MES Interface Function Configuration Tool.

Section 7.9.1 Setting items in Server Service setting

*2 Specify the number of the port that is not being used by any database or another application. Usually, it need not be changed.

(2) DB access timeout (required) (Range: 1 to 3600, Default: 30)

Set a DB access timeout (Unit: seconds) for the case where no response is returned to the MES interface module or the configuration computer after requesting the server computer for value writing to or reading from the database or for a program execution. When a timeout occurs, the connection with the MES interface module or the configuration computer is disconnected and job execution is canceled.

Point

Set a value to [DB access timeout] so that the relation with a value set in [Connection timeout] in [MES Interface Configuration Tool] is as follows:

- Connection timeout value ≦ DB access timeout value

(3) Limit IP addresses permit to connect

(a) Specify whether or not to set the IP addresses permitted to connect.
By checking the [Limit IP addresses permit to connect] box, connection is only permitted from the MES interface module or the configuration computer with the set IP address.
At least one IP address setting is required for this and up to 64 IP addresses can be set.
When not checking the box, connection is permitted from any MES interface module or the configuration computer.

(b) When selecting [Limit IP addresses permit to connect], set the IP addresses with connection permission.

1) Adding an IP address with connection permission

1 Set the following items, then click the Add button.

Table 8.4 Setting items when [Limit IP addresses permit to connect] is selected

Item	Description
IP address	Set IP addresses permitted to connect in decimal notation.
Mask bit length	(Blank)

2 The IP address is added to the [Permitted IP addresses list].
(Example) 192.168.0.64

3 Set the following items, then click the Add button.

Table 8.5 Setting items when [Limit IP addresses permit to connect] is selected

Item	Description
IP address	Set IP addresses permitted to connect in decimal notation.
Mask bit length	Set the enabled bit length of the set IP address. (Range: 1 to 32)

4 The IP address/mask bit length is added to the [Permitted IP addresses list].
(Example) 192.168.0.64/26

(Example) When specifying IP addresses in a batch
If the [IP address] is set to [192.168.0.64] and [Mask bit length] is set to [26], the IP addresses with permission connection are [192.168.0.64] to [192.168.0.127], whose logical product is [192.168.0.64].

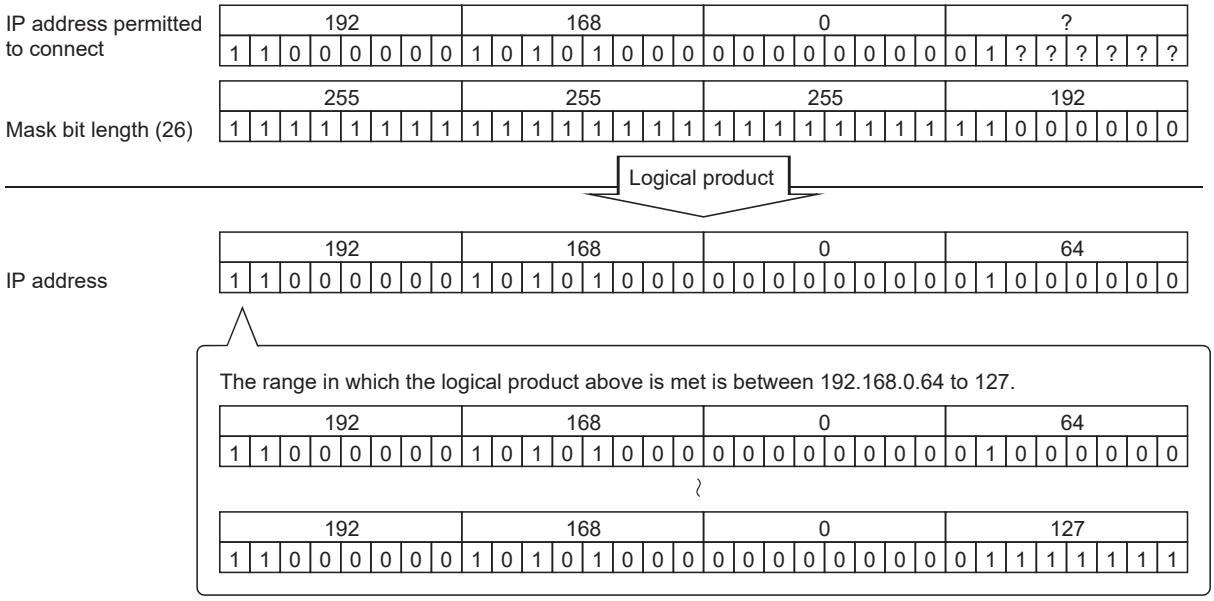

Figure 8.9 Specifying IP addresses in a batch

2) Deleting an IP address with connection permission

1 Select the IP address to be deleted from [Permitted IP addresses list], then click the Delete button.

(4) Output access log
(Default: Output)

(a) Set whether or not to output the access log.

(b) When selecting [Output access log], set the following items.

Table 8.6 Setting items when [Output access log] is selected

Item	Description
Output destination	Set the output destination of the log file.
Access log capacity	Set the file capacity per access log and number of files.

1) Output destination (Default: "dbConnector.log")
Set the output destination of the log file.
If no output destination is set, the log is output to the install folder.
If a read-only file is specified, the log is not output and [Access log output error] is output to [Administrative Tools] - [Event Viewer] of Windows®.

2) Access log capacity (Range: 1 to 10 MB × 2 to 100 files, Default: 1 MB × 10 files)
Set the file capacity per access log and number of files.
If the log exceeds the capacity for one file, a new log file which copies the original log file name with adding a number is created.
If the total number of files exceeds the set number of files, the file is deleted from the oldest one.

(Example) When [Output destination] is set to [dbConnector.log] and [Access capacity] is set to [1MB × 3 files]

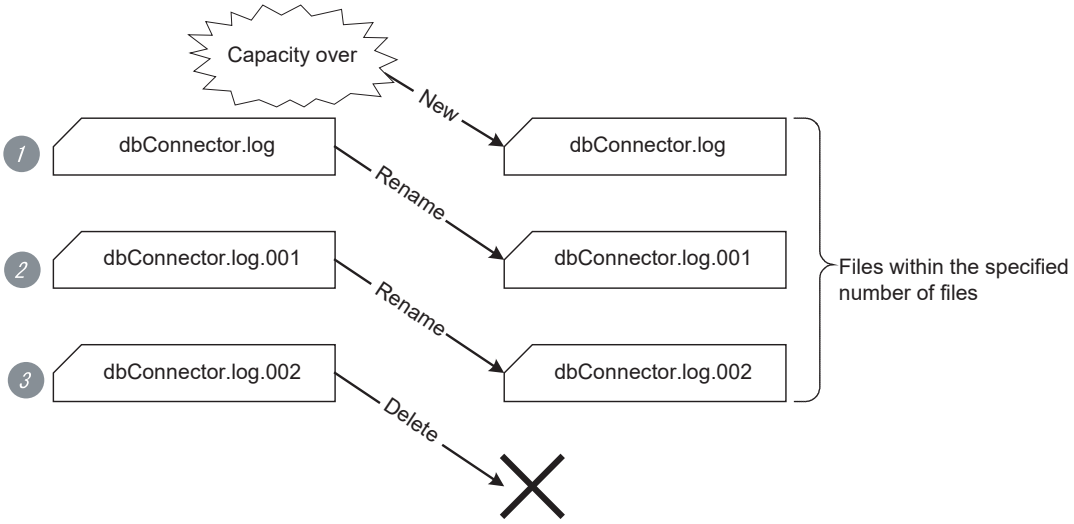

Figure 8.10 File capacity per access log and number of files

1 When [dbConnector.log] exceeds 1M byte, it is renamed as [dbConnector.log.001].
A new [dbConnector.log] is created and logging resumes.

2 [dbConnector.log.001] is renamed as [dbConnector.log.002].

3 The total number of files exceeds 3 if [dbConnector.log.002] is renamed, therefore [dbConnector.log.002] is deleted.

(5) Output SQL failed log
(Default: Output)

(a) Set whether or not to output the SQL failure log.

(b) When selecting [Output SQL failed log], set the following items.

Table 8.7 Setting items when [Output SQL failed log] is selected

Item	Description
Output destination	Set the output destination of the log file.
SQL failed log capacity	Set the file capacity per SQL failure log and number of files.

1) Output destination (Default: "sqlFailed.log")
Set the output destination of the log file.
If no output destination is set, the log is output to the install folder.
If a read-only file is specified, the log is not output and [SQL failure log output error] is output to [Administrative Tools] - [Event Viewer] of Windows®.

2) SQL failed log capacity (Range: 1 to 10 MB × 2 to 100 files, Default: 1 MB × 10 files)
Set the file capacity per SQL failure log and number of files.
If the log exceeds the capacity for one file, a new log file which copies the original log file name with adding a number is created.
If the total number of files exceeds the set number of files, the file is deleted from the oldest one.

(6) Log character code

(Default: ASCII/SJIS)

Specify the character code of the log file (access log, SQL failure log) that is output by DB connection service in ASCII/SJIS or Unicode.

The specified character code will be enabled after reflecting the settings.

Point

When the setting file exported by using DB Connection Service Setting Tool version 1.12N or earlier is imported by the version 1.14Q or later, the log character code will be set to "ASCII/SJIS" (the default).

8.6 Importing/Exporting Files

Import/export files.

(1) Import

Import a saved file.

1. Select [File] → [Import] from the menu.
2. The [Open] dialog box is displayed.

   Set the following items, then click the Open button.

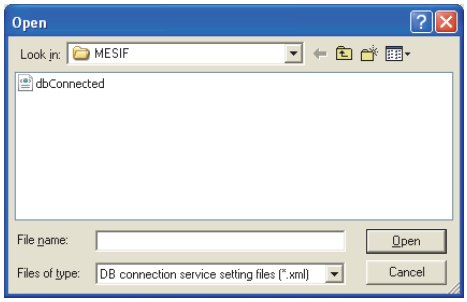

Figure 8.11 [Open] dialog box

Table 8.8 Setting items in the [Open] dialog box

Item	Description
Look in	Select the location where the file is stored.
File name	Specify the name of the file to be imported.
Files of type	Select a type of the file to be imported. • DB connection service setting files

Point

When importing a file, use the one that was stored by the export function.

Do not edit any export file.

The setting files exported by using DB Connection Service Setting Tool version 1.14Q or later cannot be used in version 1.12N or earlier.

(2) Export

Export the DB Connection Service Setting Tool to a file.

1 Select [File] → [Export] from the menu.

2 The [Save As] dialog box is displayed.

Set the following items, then click the Save button.

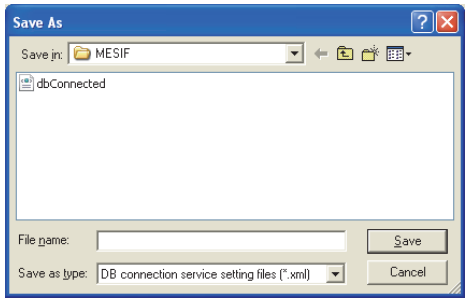

Figure 8.12 [Save As] dialog box

Table 8.9 Setting items in the [Save As] dialog box

Item	Description
Save in	Select the location where the file is to be saved.
File name	Specify the name of the file to be saved.
Files of type	Select a type of the file to be saved. • DB connection service setting files

8.7 Help

The product information of the DB Connection Service Setting Tool and the Connect to MITSUBISHI ELECTRIC FA Global Website screen can be displayed.

(1) Product information

1. Select [Help] → [Product information] from the menu.
2. The [Product information] dialog box of the DB Connection Service Setting Tool is displayed.

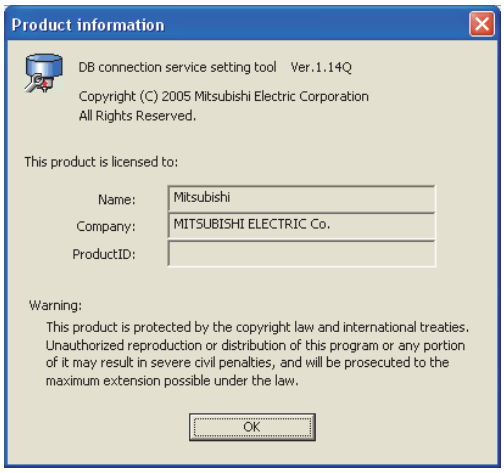

Figure 8.13 [Product information] dialog box

(2) Connect to MITSUBISHI ELECTRIC FA Global Website

1. Select [Help] → [Connect to MITSUBISHI ELECTRIC FA Global Website] from the menu.
2. The MITSUBISHI ELECTRIC FA Global Website is displayed.
   Online manuals and other information can be viewed.

8.8 Output Log Specifications

This section explains the output log format for the SQL failure log and access log shown Section 8.8.1 or later.

[Date] [Error code] Message Line feed

Table 8.10 Output log format for the SQL failure log and access log

Item				Description
Output character	[Date]	Year	1st to 4th bytes at the head of the line	Four-digit integer for year (Numbers)
		Year - Month delimiter	5th byte at the head of the line	"/" (Slash: 2Fh)
		Month	6th and 7th bytes at the head of the line	2-digit integer (01 to 12) (Numbers)
		Month - Day delimiter	8th byte at the head of the line	"/" (Slash: 2Fh)
		Day	9th and 10th bytes at the head of the line	2-digit integer (01 to 31) (Numbers)
		Day - Hour delimiter	11th byte at the head of the line	" " (Space: 20h)
		Hour	12th and 13th bytes at the head of the line	2-digit integer (00 to 23) (Numbers)
		Hour - Minute delimiter	14th byte at the head of the line	":" (Colon: 3Ah)
		Minute	15th and 16th bytes at the head of the line	2-digit integer (00 to 59) (Numbers)
		Minute - Second delimiter	17th byte at the head of the line	":" (Colon: 3Ah)
		Second	18th and 19th bytes at the head of the line	2-digit integer (00 to 59) (Numbers)
		Second - Millisecond delimiter	20th byte at the head of the line	"." (Period: 2Eh)
		Millisecond	21th and 23th bytes at the head of the line	3-digit integer (000 to 999) (Numbers)
	Millisecond - Error code delimiter		24th byte at the head of the line	" " (Space: 20h)
	[Error code]*1		25th and 34th bytes at the head of the line	Alphanumeric character of "0x" + 8-digit hexadecimal
	Error code - Message delimiter		35th byte at the head of the line	" " (Space: 20h)
	Message		36th byte at the head of the line or later	According to the specifications of each log
	Line feed		End of line	CR + LF (0Dh, 0Ah)

*1 For error codes, refer to the following:

☞Section 10.2 Error Code List

8.8.1 Access log

The communication contents of the MES interface module and DB Connection Service are output to the access log.
The following explains the access log contents.

Remark

For an access log to which a processing result (Success or Failed) is output, a numerical value inserted after 'Success' may not be normal if a trigger is set in the table.
(Example) Access log for SELECT
2005/03/01 12:00:00.000 0x00000000 SID 0:SQL<SELECT * from TABLE;>:Success(-1)
The processing result is successful in this example, but it is output for the trigger instead of the number of selected records.

(1) Service start/end

(a) Start

Table 8.11 Service start

Item	Description
Output log format	[Date] [Error code] Service Start
Example	2007/10/01 12:00:00.000 0×00000000 Service Start

(b) End

Table 8.12 Service end

Item	Description
Output log format	[Date] [Error code] Service Stop
Example	2007/10/01 12:00:00.000 0x00000000 Service Stop

(2) Connection/disconnection from the MES interface module or the MES Interface Function Configuration Tool

(a) Connection

Table 8.13 Connection from the MES interface module or the MES Interface Function Configuration Tool

Item	Description
Output log format	[Date] [Error code] SID [Session ID]:MIFWS Connected:[Source IP]:[Target data source]:[Connection User Name]
Example	2007/10/01 12:00:00.000 0x00000000 SID 00000001:MIFWS Connected:192.168.3.3:DataSource:User Name

(b) Disconnection

Table 8.14 Disconnection from the MES interface module or the MES Interface Function Configuration Tool

Item	Description
Output log format	[Date] [Error code] SID [Session ID]:MIFWS Disconnected:[Source IP]:[Target data source]:[Connection User Name]
Example	2007/10/01 12:00:00.000 0x00000000 SID 00000001:MIFWS Disconnected:192.168.3.3:DataSource:User Name

(3) Connection/disconnection to a database

For details on [Database error number] and [Database error message] in the output log format in the case of failure, refer to the manual for each database.
Depending on the [Error code], however, Database Message and subsequent data cannot be output.
According to the error code, confirm the error details and take corrective actions.
☞Section 10.2.2 (2) Access log of DB Connection Service

(a) Connection

Table 8.15 Connection to a database

Item		Description
Output log format	When succeeded	[Date] [Error code] SID [Session ID]:DB Connect:[Target data source]: [Connection User Name]:Success
	When failed	[Date] [Error code] SID [Session ID]:DB Connect:[Target data source]: [Connection User Name]:Failed Database Message [Database error number] [Database error message]
Example	When succeeded	2007/10/01 12:00:00.000 0x00000000 SID 00000001:DB Connect:DataSource:User Name:Success
	When failed	2007/10/01 12:00:00.000 0x20400022 SID 00000001:DB Connect:DataSource:User Name:Failed Database Message 0x000003f9 [Oracle][ODBC][Ora]ORA-01017: invalid username/password; logon denied

(b) Disconnection

Table 8.16 Disconnection to a database

Item		Description
Output log format	When succeeded	[Date] [Error code] SID [Session ID]:DB Disconnect:[Target data source]:[Connection User Name]:Success
	When failed	[Date] [Error code] SID [Session ID]:DB Disconnect:[Target data source]:[Connection User Name]:Failed Database Message [Database error number] [Database error message]
Example	When succeeded	2007/10/01 12:00:00.000 0x00000000 SID 00000001:DB Disconnect:DataSource:User Name:Success

(4) SQL text reception/processing results

For details on [Database error number] and [Database error message] in the output log format in the case of failure, refer to the manual for each database.
Depending on the [Error code], however, Database Message and subsequent data cannot be output.
According to the error code, confirm the error details and take corrective actions.
☞Section 10.2.2 (2) Access log of DB Connection Service

(a) SELECT

Table 8.17 SELECT

Item		Description
Output log format	When succeeded	[Date] [Error code] SID [Session ID]:SQL<[SQL text]>:Success([No. of selected records])
	When failed	[Date] [Error code] SID [Session ID]:SQL<[SQL text]>:Failed Database Message [Database error number] [Database error message]
Example	When succeeded	2007/10/01 12:00:00.000 0x00000000 SID 00000001:SQL<SELECT COL from TABLE;>:Success(1)
	When failed	2007/10/01 12:00:00.000 0x20600023 SID 00000001:SQL<SELECT COLL from TABLE;>:Failed Database Message 0x00000388 [Oracle][ODBC][Ora]ORA-00904: "COLL": invalid identifier

(b) UPDATE

Table 8.18 UPDATE

Item		Description
Output log format	When succeeded	[Date] [Error code] SID [Session ID]:SQL<[SQL text]>:Success([No. of updated records])
	When failed	[Date] [Error code] SID [Session ID]:SQL<[SQL text]>:Failed Database Message [Database error number] [Database error message]
Example	When succeeded	2007/10/01 12:00:00.000 0x00000000 SID 00000001:SQL<UPDATE TABLE SET COL = '1';>:Success(1)
	When failed	2007/10/01 12:00:00.000 0x20600023 SID 00000001:SQL<UPDATE TABLE SET COL = 'COL';>:Failed Database Message 0x000006ba [Oracle][ODBC][Ora]ORA-01722: invalid number

(c) INSERT

Table 8.19 INSERT

Item		Description
Output log format	When succeeded	[Date] [Error code] SID [Session ID]:SQL<[SQL text]>:Success([No. of inserted records])
	When failed	[Date] [Error code] SID [Session ID]:SQL<[SQL text]>:Failed Database Message [Database error number] [Database error message]
Example	When succeeded	2007/10/01 12:00:00.000 0x00000000 SID 00000001:SQL<INSERT INTO TABLE (COL) VALUES ('1');>:Success(1)
	When failed	2007/10/01 12:00:00.000 0x20600023 SID 00000001:SQL<INSERT INTO TABLE (COL) VALUES ('1');>:Failed Database Message 0x000003ae [Oracle][ODBC][Ora]ORA-00942: table or view does not exist

(d) COMMIT

Table 8.20 COMMIT

Item		Description
Output log format	When succeeded	[Date] [Error code] SID [Session ID]:COMMIT:Success
	When failed	[Date] [Error code] SID [Session ID]:COMMIT:Failed Database Message [Database error number] [Database error message]
Example	When succeeded	2007/10/01 12:00:00.000 0x00000000 SID 00000001:COMMIT:Success

(e) ROLLBACK

Table 8.21 ROLLBACK

Item		Description
Output log format	When succeeded	[Date] [Error code] SID [Session ID]:ROLLBACK:Success
	When failed	[Date] [Error code] SID [Session ID]:ROLLBACK:Failed Database Message [Database error number] [Database error message]
Example	When succeeded	2007/10/01 12:00:00.000 0x00000000 SID 00000001:ROLLBACK:Success

(f) GetNext (Request for next record)

Table 8.22 GetNext (Request for next record)

Item		Description
Output log format	When succeeded	[Date] [Error code] SID [Session ID]:GetNext:Success
	When failed	[Date] [Error code] SID [Session ID]:GetNext:Failed Database Message [Database error number] [Database error message]
Example	When succeeded	2007/10/01 12:00:00.000 0x00000000 SID 00000001:GetNext:Success

(g) DELETE

Table 8.23 DELETE

Item		Description
Output log format	When succeeded	[Date] [Error code] SID [Session ID]:SQL<[SQL text]>:Success([No. of deleted records])
	When failed	[Date] [Error code] SID [Session ID]:SQL<[SQL text]>:Failed Database Message [Database error number] [Database error message]
Example	When succeeded	2007/10/01 12:00:00.000 0x00000000 SID 00000001:SQL<DELETE FROM TABLE;>:Success(1)
	When failed	2007/10/01 12:00:00.000 0x20600023 SID 00000c60:SQL<DELETE FROM table1 ;>:Failed Database Message 0x000003ae [Oracle][ODBC][Ora]ORA-00942: table or view does not exist.

(5) Stored procedure reception/processing results

Table 8.24 Stored procedure execution reception/processing results

Item		Description
Output log format	When succeeded	[Date] [Error code] SID [Session ID]:Procedure<[Procedure name] ([Value in argument 1][, Value in argument 2][, ...])>:Success ([Return value])
	When failed	[Date] [Error code] SID [Session ID]:Procedure<[Procedure name] ([Value in argument 1][, Value in argument 2][, ...])>:Failed ([Return value]) Database Message[Database error number][Database error factor message]
Example	When succeeded	2013/10/01 12:00:00.000 0x00000000 SID 00000e14:Procedure<StoredProcedure1 ('10', '0','0')>:Success(0)
	When failed	2013/10/01 12:00:00.000 0x20f00007 SID 00000794:Procedure<StoredProcedure1>:Failed Database Message 0x00000afc [Microsoft][SQL Server Native Client 11.0][SQL Server]Could not find stored procedure 'StoredProcedure1'.

(6) Program execution reception/processing results

Table 8.25 Program execution reception/processing results

Item		Description
Output log format	When succeeded	[Date] [Error code] SID ProgramExec:[Source IP]:<[Command line]>Success ([Return value])
	When failed	[Date] [Error code] SID ProgramExec:[Source IP]:<[Command line]>Failed
Example	When succeeded	2007/10/01 12:00:00.000 0x00000000 ProgramExec:192.168.3.3:<hoge.exe>:Success(0)

(7) Table name/field name/stored procedure name browsing results

(a) Table name browsing

Table 8.26 Table name browsing results

Item		Description
Output log format	When succeeded	[Date] [Error code] SID [Session ID]:Table Get:Success
	When failed	[Date] [Error code] SID [Session ID]:Table Get:Failed
Example	When succeeded	2012/06/27 12:00:00.000 0x00000000 SID 0:Table Get:Success
	When failed	2012/06/27 12:00:00.000 0x00000000 SID 0:Table Get:Failed

(b) Field name browsing

Table 8.27 Field name browsing results

Item		Description
Output log format	When succeeded	[Date] [Error code] SID [Session ID]:Field Get:[Table name]:Success
	When failed	[Date] [Error code] SID [Session ID]:Table Get:[Table name]:Failed
Example	When succeeded	2012/06/27 12:00:00.000 0x00000000 SID 0:Field Get:TableName:Success
	When failed	2012/06/27 12:00:00.000 0x00000000 SID 0:Field Get:TableName:Failed

(c) Stored procedure name browsing

Table 8.28 Stored procedure name browsing results

Item		Description
Output log format	When succeeded	[Date] [Error code] SID [Session ID]:Procedure Get:Success
	When failed	[Date] [Error code] SID [Session ID]:Procedure Get:Failed
Example	When succeeded	2013/10/01 12:00:00.000 0x00000000 SID 00000924:Procedure Get:Success
	When failed	2013/10/01 12:00:00.000 0x00000000 SID 00000924:Procedure Get:Failed

(8) Stored procedure argument information browsing

Table 8.29 Stored procedure argument information browsing

Item		Description
Output log format	When succeeded	[Date] [Error code] SID [Session ID]:ProcParam Get:[Stored procedure name]:Success
	When failed	[Date] [Error code] SID [Session ID]:ProcParam Get:[Stored procedure name]:Failed
Example	When succeeded	2013/10/01 12:00:00.000 0x00000000 SID 00000925:ProcParam Get:ProcedureName:Success
	When failed	2013/10/01 12:00:00.000 0x00000000 SID 00000925:ProcParam Get:ProcedureName:Failed

8.8.2 SQL failure log

When an SQL text or stored procedure is executed on a database, if an error occurs, the error contents are output to the SQL failure log.
The following shows the SQL failure log contents
For details on [Database error number] and [Database error message] in the output log format, refer to the manual for each database.
Depending on the [Error code], however, Database Message and subsequent data cannot be output.
According to the error code, confirm the error details and take corrective actions.
☞Section 10.2.2 (3) SQL failure log of DB Connection Service

(1) SQL execution failed

Table 8.30 SQL execution failed

Item	Description
Output log format	[Date] [Error code] [Target data source]:[SQL text] Database Message [Database error number] [Database error message]
Example	2007/10/01 12:00:00.000 0x00000000 DataSource:INSERT INTO TABLE (COL) VALUES (") ; Database Message 0x00000388 [Oracle][ODBC][Ora]ORA-00904: "COL" :invalid identifier

(2) Stored procedure execution failed

Table 8.31 Stored procedure execution failed

Item	Description
Output log format	[Date] [Error code] [Target data source]:[Procedure name] ([Value in argument 1][, Value in argument 2][, ...]) Database Message [Database error number] [Database error message]
Example	2013/10/01 12:00:00.000 0x20f00007 SQLSERVER:SampleProcedure ('003', 'MES') Database Message 0x00000afc [Microsoft][ODBC SQL Server Driver][SQL Server]Could not find stored procedure 'SampleProcedure'.

CHAPTER 9 XML MESSAGE FORMAT

This section explains the XML message format used with the XML processing function.
Refer to the following for the XML processing function.
☞ Section 6.2 XML Processing Function
This section explains the functions of the XML message format.

(1) Instruction of job execution

Table 9.1 Instruction of job execution

Function	Description
One-shot execution	• Executes the specified job only one time regardless of whether the trigger conditions and jobs are enabled or not. • If the specified job is being executed, the job is not carried out again.
Validate	• Puts the job into the status in which the specified job is executed when the trigger conditions are met (Job enabled status). • This is the same operation as that of enabling the MES Interface Function Configuration Tool job. ☞ Section 7.13.4 Changing the job status
Invalidate	• Puts the job into the status in which the job is not executed even if the trigger conditions are met (Job disabled status). • This is the same operation as that of disabling the MES Interface Function Configuration Tool job. ☞ Section 7.13.4 Changing the job status

9.1 XML Message Format Definition

The XML message format is comprised of request messages and response messages.
This section explains the XML message format definition.

Point

(1) The maximum size of request message after applying URL encoding that the MES interface module can process is 128K bytes.
If the size exceeds 128K bytes, an error code is returned as the response message.
☞Section 10.2.3 Error codes returned in XML response messages

(1) Request message (REQUEST tag)

Table 9.2 Request message (REQUEST tag)

Item	Description	
Omission	Not possible	
Format	<REQUEST type = "[Instruction of job execution]" jobname = "[Job name]"/>	
Attribute	type	Specifies the instruction of job execution. (required) "oneshot": One-shot execution "validate": Validate "invalidate": Invalidate
	jobname	Specifies the job name to be executed.
Contents	None	
Sub-component	None	

(a) One-shot execution (An example for one-shot execution of the job named Pro01)*1

```
<?xml version = "1.0"?>
<REQUEST type = "oneshot" jobname = "Pro01"/>
```

(b) Validate (An example enabling the job named Pro01)

```
<?xml version = "1.0"?>
<REQUEST type = "validate" jobname = "Pro01"/>
```

(c) Invalidate (An example disabling the job named Pro01)

```
<?xml version = "1.0"?>
<REQUEST type = "invalidate" jobname = "Pro01"/>
```

*1 When one-shot execution is performed in the job for which [Handshake operation] is specified as a trigger condition, [Completion notification] is turned ON.
Turn OFF [Completion notification] in the sequence program.

(2) Response message (RESPONSE tag)

Table 9.3 Response message (RESPONSE tag)

Item	Description	
Omission	Not possible	
Format	<RESPONSE status = "[Job execution result]" code = "[Error code]"/>	
Attribute	status	The request message reception result is returned. "accepted": Succeeded "failed": Failed
	code	If an error occurs, the error code is returned. ☞Section 10.2.3 Error codes returned in XML response messages
Contents	None	
Sub-component	None	

(a) Succeeded

```
<?xml version = "1.0"?>
<RESPONSE status = "accepted"/>
```

(b) Failed

```
<?xml version = "1.0"?>
<RESPONSE status = "failed" code = "0x4117XXXX"/>
```

9.2 XML Message Format Sending Method

This section explains the sending method and sample program of the XML message format.

9.2.1 XML message format sending method

(1) Send destination URL

When the basic authentication information and the XML request message for a function are sent to the URL below with the HTTP POST method, the function is executed and the XML response message is returned by HTTP.

[http://[MES interface module IP address]/MESXML.CGI]

(2) HTTP basic authentication

Accessing the URL shown in (1) requires HTTP basic authentication of the MES interface module.

The HTTP basic authentication uses the account information set with [Account setting].

☞ Section 7.6.3 Setting items in Account setting

(3) URL encoding

To use HTTP, it is necessary to use URL encoding to convert special characters in the XML request message (Escape).

The following shows the URL encoding rules and an example of URL encoding application.

(a) URL encoding rules

Table 9.4 URL encoding rules

Characters before conversion	Character string after conversion
[A-Z] [a-z] [0-9] * - . @ _	Same (not converted)
Space	"+" (Plus sign)
Others	"%" +2-digit hexadecimal character code

(b) URL encoding application example

Table 9.5 URL encoding application example

Characters before conversion	Character string after conversion
%	"%25"
&	"%26"
+	"%2B"
=	"%3D"
?	"%3F"

9.2.2 Sample program

This section shows a sample program written in Java.

```
import java.io.*;
import java.net.*;
class JobStart {
   public static void main(String[] args) {
      try{
         // Storage of request message
         String requestMessage = "<?xml version=\"1.0\"?>";
         requestMessage += "<REQUEST type=\"oneshot\" jobname=\"Pro01\"/>";
         System.err.println(requestMessage );// Send contents display
         // Conversion with URL encording
         requestMessage = URLEncoder.encode(requestMessage, "UTF-8");
         // POST
         URL url = new URL("http://192.168.3.3/MESXML.cgi");
         URLConnection conn = url.openConnection();
         conn.setDoOutput(true);
         conn.setUseCaches(false);
         conn.setRequestProperty("Content-type", "text/xml");
         conn.setRequestProperty("Content-length", String.valueOf(requestMessage.length()));
         // BASIC authentication
         String account = "QJ71MES96:MITSUBISHI";
         String enc_account = new String(encodeBase64(account));
         conn.setRequepstProperty("Authorization", "Basic " + enc_account);
         OutputStream outStream = conn.getOutputStream();
         PrintStream printStream = new PrintStream(outStream);
         printStream.print(requestMessage);
         printStream.close();
         InputStream inputStream = conn.getInputStream();
         BufferedReader reader = new BufferedReader(new InputStreamReader(inputStream));
         String STr;
         while ((str = reader.readLine()) != null){
           System.out.println(str);// Receive contents display
         }
         reader.close();
      }catch(Exception e){
         System.err.println("Errorn\n" + e);
      }
   }
```

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```
    //Base64 encode
    static String encodeBase64(String inStr) {
        String refTable = "ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789+/";
        int rest = inStr.length()%3;
        if ( rest != 0)
            inStr += new String(new byte[] {0, 0, 0}).substring(rest);
        byte[] inBuf = inStr.getBytes();
        StringBuffer outStr = new StringBuffer();
        for (int i = 0; i < inBuf.length; i+= 3) {
            int tempBuf = inBuf[i]<<16 | inBuf[i+1]<<8 | inBuf[i+2];
            for (int j = 18; j >= 0; j -= 6)
                outStr.append(refTable.charAt((tempBuf >> j) & 0x3f));
        }
        if (rest != 0) {
            outStr.delete(outStr.length() - 3 + rest, outStr.length());
            outStr.append("===".substring(rest));
        }
        return new String(outStr);
    }
}
```

CHAPTER 10 TROUBLESHOOTING

The following flowchart shows the troubleshooting procedure for errors that might occur during operation of the MES interface module.

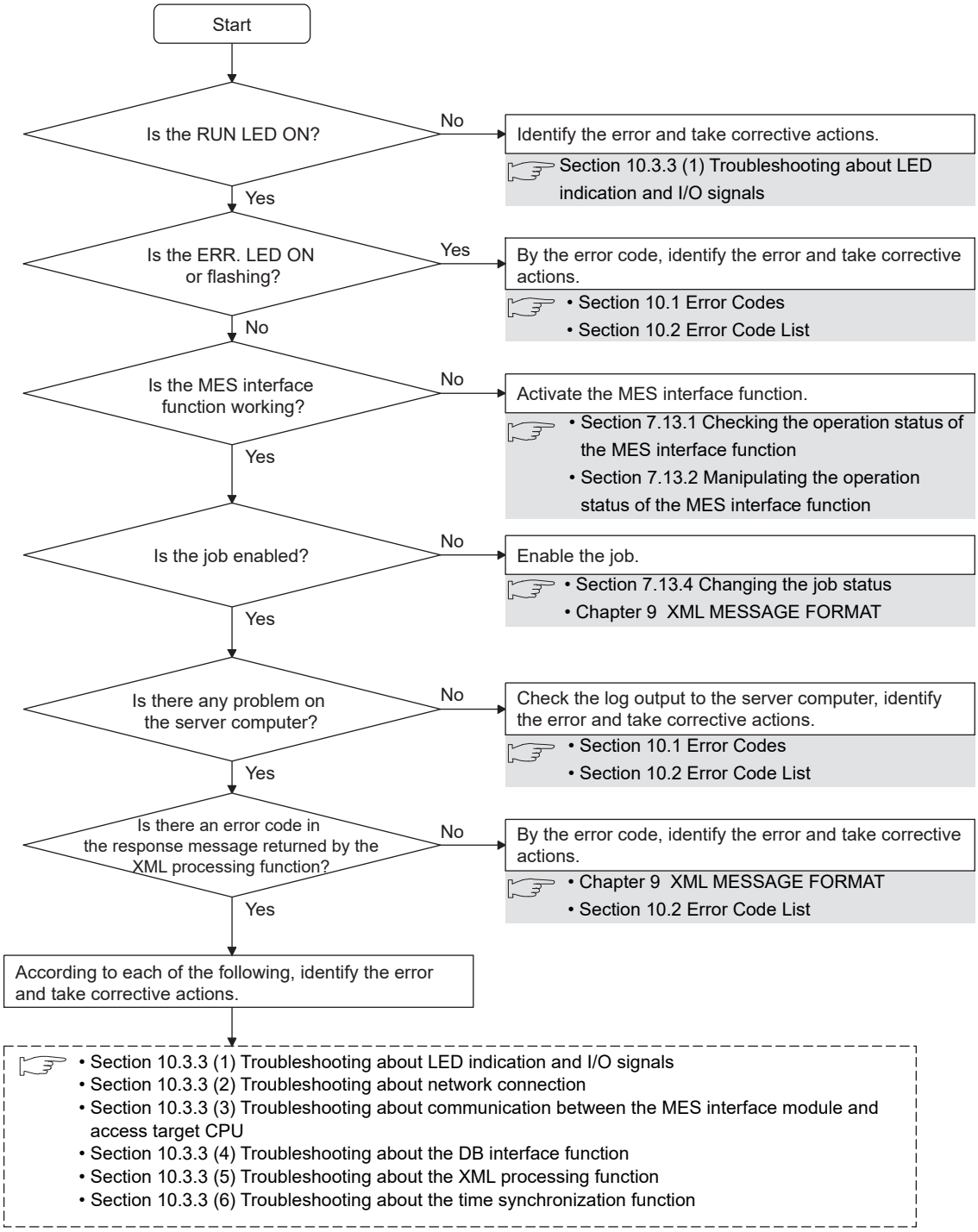

Figure 10.1 Troubleshooting flowchart for operation of the MES interface module

10.1 Error Codes

This section explains how to find an error code.

10.1.1 Finding an error code

By an error code, check the error details and take corrective actions.
☞Section 10.2 Error Code List

(1) Check an error of the MES interface module

An error (error code) of the MES interface module can be checked by any of the following:

- [System monitor] of GX Developer (☞Section 10.1.3 System monitor)
- Current error area and Error log area in the buffer memory
  ☞Section 3.6.4 Current error area
  ☞Section 3.6.5 Error log area
- [MES interface function configuration tool] - [Working log] (Error log)
  ☞Section 7.12.5 Checking the working log of the MES interface module

(2) Checking an error of the server computer

An error can be checked by log data output to the server computer.

- Access log of DB Connection Service (☞Section 8.8.1 Access log)
- SQL failure log of DB Connection Service (☞Section 8.8.2 SQL failure log)
- Event log of Windows®
  An error of DB Connection Service is output.
  It can be checked by selecting [Administrative Tools] - [Event Viewer] in Windows®.

Point

If more than one error are displayed in Error log of [Working log] or by error dialog boxes, take corrective actions in chronological order.

10.1.2 Error types

Errors are divided into the following two types.

(1) Module stop error

(a) The ERR. LED flashes.

(b) When a module stop error occurs, the MES interface function of the MES interface module is stopped.
Correct the error according to the error code, and turn the power OFF and then ON or reset the programmable controller CPU.

(c) An error code is stored in the buffer memory area that is corresponding to the error location.
For how to find an error code, refer to the following:
☞Section 10.1.1 Finding an error code

(2) Module continuation error

(a) The ERR. LED turns on.

(b) When a module continuation error occurs, the MES interface module continues operation of the MES interface function.
By correcting the error according to the error code, the correction can be reflected in the operation.
Since the ERR. LED stays ON, turn it off by the following:
- Error clear request (Y10)
- [Online] - [Remote operation] - [Clear error]
  ☞Section 7.13.2 (4) Clear error

(c) An error code is stored in the buffer memory area that is corresponding to the error location.
For how to find an error code, refer to the following:
☞Section 10.1.1 Finding an error code

10.1.3 System monitor

The module status of the MES interface module can be checked from [System monitor].

(1) Checking the module status and error code in [Module's Detailed Information] of the diagnostics function.

(a) Operation procedure

1. Select [Diagnostics] → [System monitor] from the menu of GX Developer.
2. Select the module name on [System monitor] dialog box and then click the Module's Detailed Information button displays [Module's Detailed Information] dialog box.
   Operate it referring to the following descriptions.

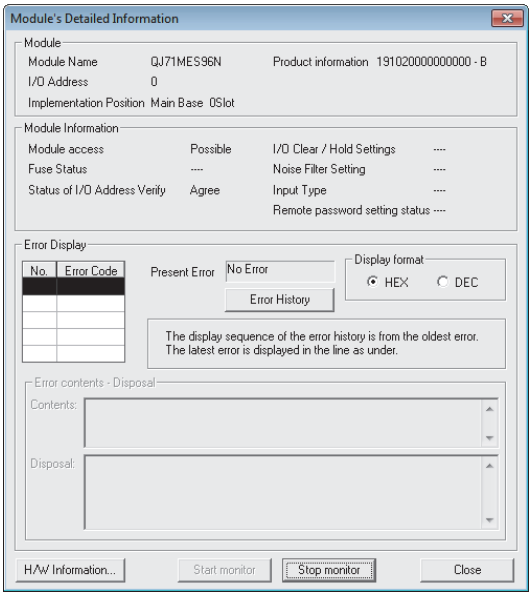

Figure 10.2 [Module's Detailed Information] dialog box

(b) Display items

The following shows the detailed information of the MES interface module.

Table 10.1 Displayed items

Item		Description
Module	Module name	Displays the name of the mounted module.
	I/O Address	Displays the head I/O signal number of the module.
	Implementation Position	Displays the slot position where the module is installed.
	Product information	Displays the product information. *1
Module Information	Module access	Displays that it is accessible when the Watchdog timer error (X1F) is OFF.
	Status of I/O Address Verify	Displays whether or not the module set with parameters by the user matches the module that is actually mounted.
Error Display	Present Error	Displays the latest error code. For error codes, refer to the following: ☞Section 10.2 Error Code List
	Error History	Displays the error history recorded from power-ON to the present time with error codes.

*1 The suffix of the product information code represents the function version of the module.
The function version of the MES interface module is B or later.
(Example) When the suffix is "B", it means the module is of function version B.

(2) Checking the LED status and the switch setting status in [H/W Information] of the diagnostics function.

(a) Operation procedure

1 Click the H/W Information button in [Module's Detailed Information].

2 The [H/W Information] dialog box is displayed.
Operate it referring to the following descriptions.

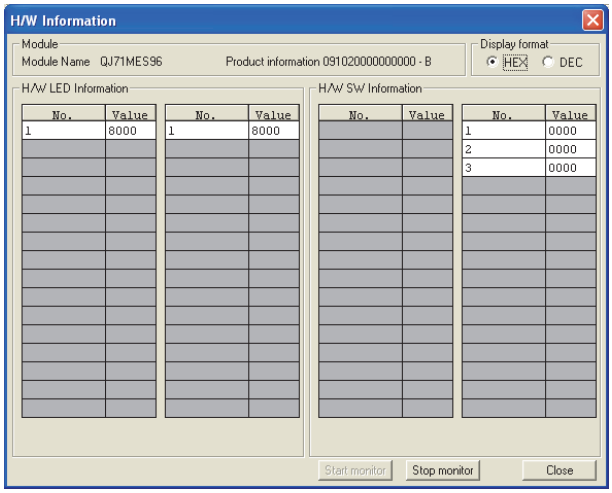

Figure 10.3 [H/W Information] dialog box

(b) Displayed items
The MES interface module information that is stored in the following buffer memory areas is displayed.

Table 10.2 Displayed items

No.	Display	Buffer memory	Address
1	H/W LED Information	0000: RUN LED OFF, ERR. LED OFF 8000: RUN LED ON, ERR. LED OFF C000: RUN LED ON, ERR. LED ON	0, 1
1	H/W SW Information	Switch 1 status (Mode setting)	2
2		Switch 2 status (Default operation setting/Battery error detection setting)	3
3		Switch 3 status (Response monitoring time setting)	4

10.2 Error Code List

The error code list is shown below.

10.2.1 Error codes for the MES interface module

Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
0001h	System error	—	• Please consult your local Mitsubishi representative.
0002h	Response time-out error	No response has been received from the other station.	• Correct [Access target CPU settings]. • Check the communication cable status and access target CPU status. • Correct the response monitoring time setting. ☞Section 4.5 (3) Response monitoring time setting (Switch 3 (Lower byte)) • Check the routing parameter set for the CPU(s) on the access route. • Check the control CPU(s) of the network module(s) on the access route to the access target CPU module. ☞Section 3.2 (2) Accessible routes • Check if the access target PLC series is supported. ☞Section 3.2 (1) Accessible CPU modules
0041h to 0044h	System error	—	• Please consult your local Mitsubishi representative.
0045h	Processing code error	A processing code that is not supported was issued.	• Check the CPU(s) on the access route.
0046h	Station No. specification error	The specified station number is incorrect.	• Check the station number setting in [Access target CPU settings].
0047h	Receive data error	Data have not been received.	• Check the CPU(s) on the access route.
0048h	System error	—	• Please consult your local Mitsubishi representative.
0049h			
004Dh			
004Eh			
0050h			
0051h			
0055h	Channel No. error	The RUN write setting of the Ethernet module is disabled.	• Check the Ethernet module setting of the access target CPU.
0064h	System error	—	• Please consult your local Mitsubishi representative.
0065h	Routing parameter error	No routing parameter has been set.	• Check the routing parameter set for the CPU(s) on the access route.
0066h	Data send error	Failed to send the data.	• Check the CPU(s) on the access route.
0067h	Data receive error	Failed to receive the data.	
0080h	Read size error	The read size is not correct.	

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Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
0081h	Device type error	The specified device type is invalid.	• Correct the device type entered in [Device tag settings].
0082h	Device No. error	The specified device number is out of range.	• Correct the device number entered in [Device tag settings].
0083h	Device point error	The number of device points is incorrect.	• Check the CPU(s) on the access route.
0084h	Write size error	The write size is not correct.	
0085h	Link parameter error	The link parameter is corrupted.	• Set a correct link parameter for the programmable controller CPU(s) on the access route.
0087h to 0089h	System error	—	• Please consult your local Mitsubishi representative.
00D2h	RUN time disable error	A request that is not permitted during RUN was issued.	• Check the CPU(s) on the access route.
00D4h	System error	—	• Please consult your local Mitsubishi representative.
00D7h	Receive data length error	The receive data length or the byte length exceeded the limit.	• Check the cables on the access route.
00D8h	Protocol error	The communication protocol is not correct.	
00D9h	Address error	The address is not correct.	• Check the CPU(s) on the access route.
00DBh	Write error	Writing is not executable.	
00E0h	Station No. error	The specified station number does not exist.	• Check the station number setting in [Access target CPU settings].
00E1h	Processing mode error	The access target CPU is not capable of processing the request.	• Check the PLC series in [Access target CPU settings].
00E2h	Intelligent function module specification error	The specified intelligent (or special) function module is faulty.	• Correct the "U□\G□" buffer memory data in [Device tag settings].
00E3h	Other data error	The request data has an error.	• Check the CPU(s) on the access route.
00E4h	Link specification error	A link module on the access route received a request that cannot be handled. (The access route is not supported.)	• Check the access route referring to the accessible range.
00E8h	System error	—	• Please consult your local Mitsubishi representative.
00E9h	Link timeout	The access target is disconnected from the link during the processing.	• Reconnect the access target on the access route.
00EAh	Special module BUSY	The receive buffer of the access target is full, or is not ready for reception.	• Examine the hardware of the intelligent (or special) function module.
00ECh	Access target BUSY	The receive buffer of the access target is full, or is not ready for reception.	• Check the access target.
00F0h	Link error	An request was made to a link stop station.	• Restore the link to connect the station on the access route.

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Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
00F1h	Special module bus error	The specified intelligent (or special) function module is not ready for processing.	• Examine the hardware of the intelligent (or special) function module.
00F2h	Special module timeout	No response has been received from the specified intelligent (or special) function module.	
0100h to 0104h	System error	—	• Please consult your local Mitsubishi representative.
0110h			
0112h			
0180h	Switch setting error	A switch setting error was detected in the hardware test.	• Check the intelligent function module switch setting. • Conduct the hardware test again.
0181h	ROM check sum error	A ROM error was detected in the hardware test.	• Conduct the hardware test again.
0182h	RAM test error	A RAM error was detected in the hardware test.	
0190h	Timeout error	An error occurred in the self-loopback test.	• Hardware failure • Please consult your local Mitsubishi representative.
0191h	Communication error		
0192h	Comparison error		
0193h	In-frame position error		
0200h to 0203h	System error	—	• Please consult your local Mitsubishi representative.
0210h			
0300h			
0301h	Setting file read error	No CompactFlash card has been installed. Failed to read out the setting file. (The setting file is corrupted.)	• Install a CompactFlash card. • Retry writing the setting with MES Interface Function Configuration Tool.
0400h to 0402h	System error	—	• Please consult your local Mitsubishi representative.
0480h	CF card initialization error	Unable to initialize the CompactFlash card.	• Check if the CompactFlash card was inserted properly. • Replace the CompactFlash card.
0481h	CF card drive data retrieve error	Unable to read out the drive information of the CompactFlash card.	
0482h	CF card mount failure	Failed to mount the CompactFlash card because a CompactFlash card error has been detected.	
0483h			
0490h to 0493h	System error	—	• Please consult your local Mitsubishi representative.
0494h	CF card format error	Failed to format the CompactFlash card.	• Check if the CompactFlash card was inserted properly. • Check the CompactFlash card for any error. (Perform check disk on the personal computer.)

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Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
0495h	CF card check error	Failed to check the CompactFlash card.	• Check the CompactFlash card for any error. (Perform check disk on the personal computer.)
0496h	CF card response error	The access to the CompactFlash card timed out while waiting for a response from the card. (CompactFlash card failure)	• Replace the CompactFlash card with another.
04D0h	Battery error	The battery voltage dropped, or the battery connector was disconnected.	• Replace the battery. • Check the battery connection.
0501h	CPU fault detected	An error was detected from the CPU of the module mounting station.	• Check the CPU status of module mounting station.
0502h	APS mismatch	APS of the request packet does not match the one of the response packet. The Start I/O specified in [Access target CPU settings] is incorrect.	• Retry the transmission. • Correct [Access target CPU settings].
0604h 0607h	Setting file error	Failed to read out the setting file. (The setting file is corrupted.)	• Retry writing the setting with MES Interface Function Configuration Tool.
060Ah	Component device error	The device name specified in the "component setting" is incorrect. Or, an invalid device was specified.	• Correct the device specified in the "component setting".
0610h	Access target CPU setting error	Information on the network communication route set in [Access target CPU settings] is corrupted.	• Initialize the module, and then configure the [Access target CPU settings] again.
0617h	Module stop error	Unable to handle the processing due to a module stop error.	• Remove the cause of the module stop error, and reset the programmable controller CPU.
0618h	Setting update time-out error	Because the load applied to the module is high, setting update timed out.	• Re-execute the setting update. • Reset the programmable controller CPU.
0619h	Device name error	The device name specified in [Device tag settings] is erroneous or invalid.	• Refer to the accessible device list, and reenter a correct device name.
061Ah	BCD type conversion error	A value which cannot be properly expressed in BCD type was stored in the device.	• Check the settings in [Device tag settings]. • Check if the value stored in the device can be properly expressed in BCD type.
0626h	Multiple CPU setting error	Invalid multiple CPU settings was configured in [Access target CPU settings].	• Correct [Access target CPU settings].
0627h	Network communication route error	The network No, head I/O, or station No. of the network route, which was specified in [Access target CPU settings], is out of range.	
0628h	Tag sampling interval setting error	The sampling interval set in [Device tag settings] is invalid.	• Correct [Device tag settings].
0629h 062Ah 062Ch	Setting file error	Failed to read out the setting file. (The setting file is corrupted.)	• Retry writing the setting with MES Interface Function Configuration Tool.
062Dh	No CPU specification error	The access target CPU specified in the "component setting" does not exist, or its setting was deleted.	• Specify an existing CPU as the access target.

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Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
062Eh	Data type incorrect error	There is an inconsistency between the device and data type that were specified in the "component setting". (Any other than Bit was specified for a bit device, or Bit was specified for any other than bit device.)	• Correct the "component setting".
062Fh	Excessive number of characters error	The number of characters specified in the "component setting" is out of range.	• Correct the "component setting".
0630h	Decimal/Exponential form setting error	The decimal or exponential type specification in the "component setting" is invalid.	
0631h 0649h	Setting file error	Failed to read out the setting file. (The setting file is corrupted.)	• Retry writing the setting with MES Interface Function Configuration Tool.
064Bh	Excessive number of device points for high speed sampling tag	The total of device points for the high-speed sampling tag exceeded 96.	• Change the setting so that the total device points will not exceed 96.
064Ch	High speed sampling tag component registration error	Failed to register a component device of the high-speed tag to the CPU.	• Ensure a system area in the program memory of the programmable controller CPU. (Format the PLC memory.) • For the Redundant CPU, check the system area for the Redundant CPU of both systems.
0650h	Setting file error	Failed to read out the setting file. (The setting file is corrupted.)	• Retry writing the setting with MES Interface Function Configuration Tool.
0659h	Network communication route error	A nonexistent module was specified for [Head I/O] in [Network communication route] of [Access target CPU settings].	• Correct the Head I/O address in [Access target CPU settings].
06A0h 06AAh 06ABh 06ADh	System error	—	• Please consult your local Mitsubishi representative.
0830h	Setting file error	Failed to read out the setting file. (The setting file is corrupted.)	• Retry writing the setting with MES Interface Function Configuration Tool.
0831h		No CompactFlash card has been installed. Failed to read out the setting file. (The setting file is corrupted.)	• Install a CompactFlash card. • Retry writing the setting with MES Interface Function Configuration Tool.
0832h		Failed to read out the setting file. (The setting file is corrupted.)	• Retry writing the setting with MES Interface Function Configuration Tool.
08A1h 08A2h 08B0h 08B1h	System error	—	• Please consult your local Mitsubishi representative.

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Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
0A00h	Initialization error	The CompactFlash card may be corrupted.	• Replace the CompactFlash card.
0A01h	Start error		
0A02h	Stop error		
0A03h	Reset error		
0A04h	Tag related error	Tag related error	• Check if the network on the programmable controller CPU side is normal.
0A05h	System error	—	• Please consult your local Mitsubishi representative.
0A06h	Initial SNTP server time enquiry error	The initial SNTP server time enquiry failed, and thereby the module started the operation synchronizing the time with CPU No.1.	• Check for any fault on the network connected to the specified SNTP server computer. • Check if the clock time is synchronized between the specified SNTP server and the host server correctly. • Check that the time of the specified SNTP server has not been manually changed.
0A07h	SNTP server time enquiry error	Failed in the SNTP server time enquiry.	
0A08h to 0A0Dh	Setting read error	The CompactFlash card may be corrupted.	• Replace the CompactFlash card.
0A0Fh	CF access stopped error	No CompactFlash card has been installed. File access is stopped (X2 is ON).	• Install a CompactFlash card. • Turn the power OFF and ON, or reset the programmable controller CPU.
0A11h	No CF card installed	No CompactFlash card has been installed.	• Install a CompactFlash card.
0A12h	CF directory operation error	The CompactFlash card may be corrupted.	
0A13h	Transferred setting file check error	The setting file written to the module is invalid. The CompactFlash card may be corrupted.	
0A14h	Setting file check error	The setting file is invalid. The CompactFlash card may be corrupted.	
0A80h to 0A83h	System error	—	• Please consult your local Mitsubishi representative.
0A84h	Illegal action setting error	Some action set in the job has an illegal part.	• Check the actions in [Job settings]. • In Job List of [Remote operation], the job having any illegal action can be checked. (Such a job is not displayed.)
0B00h to 0B0Ah	System error	—	• Please consult your local Mitsubishi representative.

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Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
0B0Bh 0B0Ch	Setting read error	The CompactFlash card may be corrupted.	• Replace the CompactFlash card.
0B0Dh	DB connection service communication error	An Ethernet communication error has occurred.	• Check the Ethernet connection. • Check if [Server service settings] is correct. • Check if the ODBC setting is correct.
0B0Eh to 0B1Eh	System error	—	• Please consult your local Mitsubishi representative.
0B1Fh	Type conversion error	The data could not be converted to the specified type.	• Change the setting so that type conversion will be available in any case.
0B20h	Tag write error	Failed to write data to the tag.	• Check if data can be written to the device specified for the tag component.
0B21h	System error	—	• Please consult your local Mitsubishi representative.
0B22h	Tag access error	Failed to read or write the tag.	• Check if [Device tag settings] is correct. • Check if the ERR. LED is on or flashing on the MES interface module. ☞Section 10.3 Troubleshooting by symptom
0B23h	System error	—	• Please consult your local Mitsubishi representative.
0B24h	Tag value read error	Failed to read data from the tag.	• Check if [Device tag settings] is correct.
0B25h to 0B28h	System error	—	• Please consult your local Mitsubishi representative.
0B29h	Type conversion to tag component error	The data could not be converted to the type specified for the tag component.	• Check the data type of the tag component or the substitute value. • Check that the operation result obtained by operation action is within the range of the data type of the substitute source tag component. (When the database is Microsoft® Access® 2007/2010/2013/2016/2019) When using "Select" and "MultiSelect" for a field whose data type is single type or double type, check that "Microsoft Access Driver (*.mdb)" is selected in the ODBC setting. ☞Section 8.2 (5) For Microsoft® Access®

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Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
0B2Ah to 0B2Dh	System error	—	• Please consult your local Mitsubishi representative.
0B2Eh	DB buffer content error	Data stored in the DB buffer are invalid. (The CompactFlash card may be corrupted.)	• Replace the CompactFlash card.
0B2Fh			
0B30h	Partial correction of DB buffer content	A part of invalid data in the DB buffer has been corrected. (A part of the DB buffered data in the CompactFlash card may have been corrupted.)	—
0B31h	System error	—	• Please consult your local Mitsubishi representative.
0B32h	DB buffer clear error	Failed to clear the DB buffer. (The CompactFlash card may be corrupted.)	• Replace the CompactFlash card.
0B33h	DB buffer file error	The DB buffer file is invalid. (The CompactFlash card may be corrupted.)	
0B34h	DB buffer content error	Data stored in the DB buffer are invalid. (The CompactFlash card may be corrupted.)	
0B35h to 0B3Ah	System error	—	• Please consult your local Mitsubishi representative.
0B3Bh	DB buffer full error	Because the DB buffer became full, the data could not be stored in the DB buffer.	• Check the network status. • Ensure a DB buffering capacity.
0B3Ch	System error	—	• Please consult your local Mitsubishi representative.
0B3Dh			
0B3Eh	DB buffering error	Failed in file operation during DB buffering operation.	• Check the CompactFlash card. • If the CompactFlash card is damaged, replace it.
0B3Fh	System error	—	• Please consult your local Mitsubishi representative.
0B40h			
0B41h	DB buffer read error	Data in the DB buffer could not be read normally.	• Check the CompactFlash card. • If the CompactFlash card is damaged, replace it.
0B42h	DB buffer clear error	Failed to clear the DB buffer.	
0B43h	DB buffer read error	Data in the DB buffer could not be read normally.	
0B44h	DB buffer empty error	The DB buffer is empty.	• Do not clear the DB buffer during resending of DB-buffered data. • Check the CompactFlash card. • If the CompactFlash card is damaged, replace it.

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Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
0B45h	DB buffer content error	Data stored in the DB buffer are invalid.	• Check the CompactFlash card. • If the CompactFlash card is damaged, replace it.
0B46h 0B47h	System error	—	• Please consult your local Mitsubishi representative.
0B48h	Error in conversion from character string to number	Character strings could not be converted to numerical values.	• Change the setting so that type conversion will be available in any case.
0B49h	System error	—	• Please consult your local Mitsubishi representative.
0B4Ah	Error in conversion from character string to number	Character strings could not be converted to numerical values.	• Change the setting so that type conversion will be available in any case.
0B4Bh	System error	—	• Please consult your local Mitsubishi representative.
0B4Ch	Error in conversion from character string to number	Character strings could not be converted to numerical values.	• Change the setting so that type conversion will be available in any case.
0B4Dh	System error	—	• Please consult your local Mitsubishi representative.
0B4Eh	Error in conversion from character string to number	Character strings could not be converted to numerical values.	• Change the setting so that type conversion will be available in any case.
0B4Fh to 0B52h	System error	—	• Please consult your local Mitsubishi representative.
0B53h	Overflow or zero divide error	Assignment to the tag component or input argument and input/output argument of stored procedure was not possible. (Overflow) Division by zero was attempted.	• Check the data type or the substitute value of the tag component or input argument and input/output argument of stored procedure. • Change the setting to avoid division by zero.
0B54h	Operation error	Invalid operation was performed.	• Change the setting so that any invalid operation will not performed.
0B55h	System error	—	• Please consult your local Mitsubishi representative.
0B56h	Trigger buffer full error	The trigger buffer became full.	• Reduce the frequency of job startups and their processing loads.
0B57h to 0B63h	System error	—	• Please consult your local Mitsubishi representative.
0B64h	DB buffering write error	Failed to write data to the DB buffer.	• Change the setting of the DB buffering capacity to ensure a sufficient free space on the CompactFlash card. • Check if the CompactFlash card is damaged or not.

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Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
0B68h	Max. number of acquired records illegal	The tag component value specified for the maximum number of acquired records is 0 or less.	• Set 1 or more to the tag component value specified for the maximum number of acquired records.
0B80h	System error	—	• Please consult your local Mitsubishi representative.
0B81h	Communication start error	An error occurred in the Ethernet communication, and the communication failed to start.	• Check the Ethernet connection. • Check if [Server service settings] is correct. • Check if the ODBC setting is correct.
0B82h	System error	—	• Please consult your local Mitsubishi representative.
0B83h	Communication connection error	An Ethernet communication error has occurred.	• Check the Ethernet connection. • Check if [Server service settings] is correct. • Check if the ODBC setting is correct. • Check if the server computer has no problem, referring to the following. ☞Section 10.1.1 (2) Checking an error of the server computer • Ask your network administrator about the firewall setting. ☞Section 5.1 Installation
0B84h	Communication connection timeout		
0B85h to 0B87h	System error	—	• Please consult your local Mitsubishi representative.
0B88h	Message transmission error	An Ethernet communication error has occurred.	• Check the Ethernet connection. • Check if [Server service settings] is correct. • Check if the ODBC setting is correct.
0B89h	Message transmission timeout		
0B8Ah	System error	—	• Please consult your local Mitsubishi representative.

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Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
0B8Bh	Message reception error	An Ethernet communication error has occurred.	• Check the Ethernet connection. • Check if [Server service settings] is correct. • Check if the ODBC setting is correct. • Check if the database has been restarted or not. (When the database is Microsoft® Access®) • Check if 128 or more fields are set in Update actions. • Check the sent SQL text and the database contents. • Check if the table and field settings are correct. • Check that reserved terms of the database are not set for table names and field names. • Check if the uniqueness constraint of the database (PRIMARY KEY constraint) is violated or not. • Check if multiple accesses have been made to one file at the same time (accesses from multiple MES interface modules).
0B8Ch	Message reception timeout	An Ethernet communication error has occurred.	• Check the Ethernet connection. • Check if [Server service settings] is correct. • Check if the ODBC setting is correct.
0B8Dh to 0B90h	System error	—	• Please consult your local Mitsubishi representative.
0B91h	DB transaction status error	The DB transaction status is invalid.	• Check the status of the database.
0B92h	DB transaction start status error	The DB transaction start status is invalid.	
0B93h	DB transaction end status error	The DB transaction end status is invalid.	
0B94h to 0B9Dh	System error	—	• Please consult your local Mitsubishi representative.
0B9Eh	Database connection error	An Ethernet communication error has occurred.	• Check the Ethernet connection. • Check if [Server service settings] is correct. • Check if the ODBC setting is correct.
0B9Fh	Message reception error		
0BA0h	Received message data error		
0BA1h to 0BA5h	System error	—	• Please consult your local Mitsubishi representative.

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Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
0BA6h	Wait for DB access (program execution) completion timed out	No response has returned, from DB when accessed the database or from the program being executed. (An Ethernet communication error has occurred.)	• Check the Ethernet connection. • Check if [Server service settings] is correct. • Check if the ODBC setting is correct. • Check if the database is operating normally. • Check if the program specified for program execution has been completed. • In [DB Connection Service Setting Tool], increase the DB access timeout value. • Check if the processing load of the server computer is excessively high. • Check if data volume in the data base is exceeding the specified capacity of the personal computer. • Check if the number of selected/ updated records are extreme when selecting or updating.
0BA7h	System error	—	• Please consult your local Mitsubishi representative.
0BA8h	SELECT execution error	Failed to execute SELECT.	• Check the sent SQL text and database contents. • Check if the table and field settings are correct. • Check that reserved terms of the database are not set for table names and field names.
0BA9h	COMMIT execution error	Failed to execute COMMIT.	
0BAAh	ROLLBACK execution error	Failed to execute ROLLBACK.	
0BABh	DB update error	Failed to update the DB.	• Check the sent SQL text and database contents. • Check if the table and field settings are correct. • Check that reserved terms of the database are not set for table names and field names. <When the database is Microsoft® Access®> • Check if 128 or more fields are set for update actions. • Check if multiple accesses have been made to one file at the same time (accesses from multiple MES interface modules).

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Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
0BACh	SQL execution error	SQL execution caused an error.	• Check the sent SQL text and database contents. • Check if the table and field settings are correct. • Check that reserved terms of the database are not set for table names and field names. • Check if the uniqueness constraint of the database (PRIMARY KEY constraint) is violated or not.
0BADh	ODBC connection error during SQL execution	An error occurred when opening the ODBC connection by SQL execution.	• Check the sent SQL text and database contents. • Check if the table and field settings are correct. • Check that reserved terms of the database are not set for table names and field names.
0BAEh to 0BB5h	System error	—	• Please consult your local Mitsubishi representative.
0BB6h	Execution error (Program execution function)	Failed to generate an event when executing the program.	• Check if the program specified with the program execution function is executable with the specified account.
0BB7h		Failed to generate a thread when executing the program.	
0BB8h	Specified program file not exist (Program execution function)	There is no execution file of the program that is specified for the program execution function.	
0BB9h	Specified program file duplicated (Program execution function)	There are more than one execution file of the program that is specified for the program execution function.	
0BBAh	Wait for DB access (program execution) completion timed out	No response has returned from the program being executed.	• In [DB Connection Service Setting Tool], increase the DB access timeout value. • Terminate running programs before logoff. (For Windows Vista®, Windows® 7, Windows® 8, Windows® 8.1, Windows Server® 2008, Windows Server® 2008 R2, Windows Server® 2012, Windows Server® 2012 R2, Windows® 10, Windows Server® 2016, and Windows Server® 2019)
0BBBh	Execution error (Program execution function)	The application server has failed to acquire user-identifying information.	• Check if the program specified with the program execution function is executable with the specified account.
0BBCh		Program startup parameters are incorrect.	

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Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
0BBDh	Execution error (Program execution function)	Failed to log on to the application server.	• Check if the program specified with the program execution function is executable with the specified account. • After creating an account used for the program execution function, be sure to log in once at least. • A user with an empty password cannot be specified. Set a password for the specified user.
0BBEh	Execution error (Program execution function)	The application server has failed to acquire user-identifying information.	• Check if the program specified with the program execution function is executable with the specified account.
0BBFh		The profile of the specified user was not found in the application server.	
0BC0h		The application server has failed to add a privilege for program execution.	
0BC1h		The application server has failed to load the user profile.	• Check if the program specified with the program execution function is executable with the specified account.
0BC2h		The application server has failed to add an access right for screen display.	
0BC3h		The application server has failed to start a program.	
0BC4h		Failed to retrieve a loaded user file.	
0BC5h		The application server has failed to terminate exclusion control.	
0BC6h	DB connection service version error	Function incompatible with DB Connection Service version of connection target is used.	• Install the latest version of DB Connection Service to a server computer of the connection target.
0BC7h			
0BC8h	Stored procedure execution error	The stored procedure execution has been failed.	• Check if the settings of the stored procedures, return values, and arguments are correct. • Check if the data type between the argument and the input argument and input/output argument of the stored procedure to be passed are the same. • Check that reserved terms of the database are not set for the stored procedure names.
0C00h to 0C56h	System error	—	• Please consult your local Mitsubishi representative.
0C80h	CF card check error (event log writing)	Failed to access the CompactFlash card during event log output.	• Check if the CompactFlash card is damaged. • Turn the power OFF and ON, or reset the programmable controller CPU.
0C81h	CF card full error (event log writing)	Remaining capacity of the CompactFlash card is not sufficient for writing the event log.	• Check the capacity of the CompactFlash card.

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Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
0D00h	Setting file out-of-range access error	Access was made to outside the setting file range.	• Turn the power OFF and ON, or reset the programmable controller CPU.
0D01h	New setting file creation error	Failed to create a new setting file.	
0D02h	Setting file open error	Failed to open the setting file.	
0D03h	Setting file seek error	Failed to seek the setting file.	
0D04h	Setting file read error	Failed to read out the setting file.	
0D05h	Setting file write error	Failed to write the setting file.	
0D06h	Setting file close error	Failed to close the setting file.	
0D80h to 0D82h	System error	—	• Please consult your local Mitsubishi representative.
100Eh			
2000h to 20FFh			
4000h to 4FFFh	Errors detected by the access target CPU ☞User's Manual for the access target programmable controller CPU		
7000h to 7FFFh	Errors detected by the serial communication module ☞User's manual of serial communication module being used ☞MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)		
9000h	System error	—	• Please consult your local Mitsubishi representative.
9006h			
9008h	Send buffer full	There is no available space in the send buffer.	• Check the control CPU(s) of the network module(s) on the access route to the access target CPU module. ☞Section 3.2 (2) Accessible routes • Check the routing parameter set for the CPU(s) on the access route. • Check if the access target PLC series is supported. ☞Section 3.2 (1) Accessible CPU modules
9202h	System error	—	• Please consult your local Mitsubishi representative.
9204h			
920Ah			
9920h			
9922h			
9923h			
9E20h	Processing code error	The issued processing code cannot be processed on the other end.	• Check the CPU(s) on the access route.
9E81h	Device type error	The device type specified for the access target station is invalid.	• Correct the device type entered in [Device tag settings].
9E82h	Device No. error	The device number specified for the access target station is out of range.	• Correct the device number entered in [Device tag settings].
9E83h	Number of device points error	The device points specified for the access target station is out of range.	• Correct the device points entered in [Device tag settings].
B000h to BFFFh	Errors detected in CC-Link System ☞CC-Link System Master/Local Module User's Manual		

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Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
C000h to CFFFh	Errors detected in the Ethernet interface module ☞User's manual of Ethernet interface module		
D000h to DFFFh	Errors detected in CC-Link IE Field Network ☞CC-Link IE Field Network Master/Local Module User's Manual		
E000h to EFFFh	Errors detected in CC-Link IE Controller Network ☞CC-Link IE Controller Network Reference Manual		
F000h to FEFFh	Errors detected in the MELSECNET/H (10) network system ☞Q Corresponding MELSECNET/H (10) Network System Reference Manual		
FFD0h	System error	—	• Please consult your local Mitsubishi representative.
FFD1h	Monitor condition dissatisfied error	Reading is not possible because the monitor condition is not met.	• Delete the monitor condition by GX Developer.
FFD2h to FFD4h	System error	—	• Please consult your local Mitsubishi representative.
FFD5h	ROM operation error	Writing a TC setting value was attempted to the programmable controller CPU that was running the ROM.	• Change the TC setting value during ROM operation.
FFD6h FFD7h FFD9h to FFDEh	System error	—	• Please consult your local Mitsubishi representative.
FFDFh	Incorrect access target error	The setting of the access target CPU is incorrect.	• Correct [Access target CPU settings].
FFE0h FFE1h FFEDh to FFEFh	System error	—	• Please consult your local Mitsubishi representative.
FFF0h	Station or Network No. error	The station No. or network No. is out of range, or the setting is incorrect.	• Check the station No. and network No. in [Access target CPU settings].
FFF1h	System error	—	• Please consult your local Mitsubishi representative.
FFF2h	Memory cassette error	No memory cassette or inappropriate one is attached to the accessed programmable controller CPU.	• Check the memory cassette of the access target CPU.
FFF3h	Write protect error	The block No. of the specified extension file register has been allocated to the write-protect area of the memory cassette.	• Check the block No. of the extension file register (device type). • Check the write-protect DIP switch on the memory cassette of the access target CPU.
FFF4h	Block error	The block No. of the specified extension file register is invalid.	• Check the block No. of the extension file register (device type).

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Table 10.3 Error codes for the MES interface module

Error code	Error name	Description	Action
FFF5h	System error	—	• Please consult your local Mitsubishi representative.
FFF8h			
FFFAh			
FFFBh	Size error	The device size exceeded the device range.	• Correct the device number entered in [Device tag settings].
FFFCh	CPU error	An invalid station was specified.	• Check the settings of the network module on the access route. • Check the station number setting in [Access target CPU settings].
FFFDh	Device type error	The device type is incorrect.	• Correct the device type entered in [Device tag settings].
FFFEh	Device No. error	The device number is incorrect.	• Correct the device number entered in [Device tag settings].
FFFFh	System error	—	• Please consult your local Mitsubishi representative.

10.2.2 Error codes of DB Connection Service

The DB Connection Service outputs errors to the Windows® Event Log, access log, and SQL failure log.
For Windows Vista®, Windows® 7, Windows® 8, Windows® 8.1, Windows Server® 2008, Windows Server® 2008 R2, Windows Server® 2012, Windows Server® 2012 R2, Windows® 10, Windows Server® 2016, and Windows Server® 2019, DB Connection Service Client also outputs errors to Windows® Event Log.

(1) Event log of Windows®

(a) Event log output warning list of DB Connection Service (source name: DBConnector)

Table 10.4 Event log output warning list of DB Connection Service (source name: DBConnector)

Error code	Error description and cause	Corrective action
1	There is no setting file. Start the service using the default setting.	• Configure the settings again with DB Connection Service Setting Tool.

(b) Event log output error list of DB Connection Service (source name: DBConnector)

Table 10.5 Event log output error list of DB Connection Service (source name: DBConnector)

Error code	Error description and cause	Corrective action
1	Unable to start the service due to insufficient memory.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
2	Unable to start the service due to insufficient resources.	
3	System error	• Please consult your local Mitsubishi representative.
4		
5	Failed to read the setting file. The service is stopped.	• Refer to the actions of error codes 101 to 129. • Actions are displayed with error codes 101 to 129.
6	Failed to initialize the log file. The service is stopped.	• Refer to the actions of error codes 401 to 403, and 501 to 503. • Actions are displayed with error codes 401 to 403, and 501 to 503.
7	System error	• Please consult your local Mitsubishi representative.
8		
9	The server port has already been opened. The service is stopped.	• Change the server port No. with DB Connection Service Setting Tool.
10	System error	• Please consult your local Mitsubishi representative.
11		
101	The computer ran out of memory while reading the setting file.	• Terminate any unnecessary applications. • Add more memory to the personal computer.

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Table 10.5 Event log output error list of DB Connection Service (source name: DBConnector)

Error code	Error description and cause	Corrective action
102	The setting file path is too long.	• Reinstall the DB Connection Service to the directory whose path name is shorter.
103	The setting file name indicates the directory.	• Reinstall the DB Connection Service.
104	The setting file could not be opened.	
105	Description of the setting file is not correct.	• Terminate other applications, and make the setting again with DB Connection Service Setting Tool.
106	Parameter specification of the setting file is not correct.	• Configure the settings again with DB Connection Service Setting Tool.
107	The version of the setting file is not correct.	
108	The server port No. setting is not correct.	
109	The server port No. setting is out of range.	
110	The DB access timeout time setting is not correct.	
111	The DB access timeout time setting is out of range.	
112	There are too many connection-permitted IP address settings.	
113	Description of the connection-permitted IP address setting is not correct.	
114	The mask bit length setting of the connection-permitted IP address is not correct.	
115	The mask bit length setting of the connection-permitted IP address is out of range.	
116	The access log setting is not correct.	
117	The setting of the access log file name is not correct.	
118	The access log file name is too long.	
119	The maximum file size setting for the access log is not correct.	
120	The maximum file size setting for the access log is out of range.	
121	The maximum number of access log files is not set correctly.	
122	The maximum number of access log files is out of range.	
123	The SQL failure log setting is not correct.	
124	The setting of the SQL failure log file name is not correct.	
125	The SQL failure log file name is too long.	
126	The maximum file size setting for the SQL failure log is not correct.	
127	The maximum file size setting for the SQL failure log is out of range.	
128	The maximum number of SQL failure log files is not set correctly.	
129	The maximum number of SQL failure log files is out of range.	

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Table 10.5 Event log output error list of DB Connection Service (source name: DBConnector)

Error code	Error description and cause	Corrective action
401	The computer ran out of memory when initializing the access log file.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
402	The computer ran out of resources when initializing the access log file.	
403	The full path name of the access log file is too long.	• Shorten the path to the access log file with DB Connection Service Setting Tool.
404	The access log file could not be opened.	• If no directory exists for storing the access log file, create it. • When the attribution of the access log file is set to read-only, cancel the setting. • If read/write is disabled for the access log file, enable it in the security setting. • When the access log file name represents a directory, rename or delete the directory. • When the access log file has been open in another application, terminate the application. • Check the disk device for any fault.
405	The log could not be written to the access log file.	• When the disk space is full, ensure a free disk space. • When the access log file has been open in another application, terminate the application. • Check the disk device for any fault.
406	Failed to delete an old access log file.	• When the attribution of the oldest access log file is set to read-only, cancel the setting. • If read/write is disabled for the oldest access log file, enable it in the security setting. • When the oldest access log file has been open in another application, terminate the application. • Check the disk device for any fault.
407	Failed to rename the access log file.	• When the attribution of the new and old access log files is set to read-only, cancel the setting. • If read/write is disabled for the new and old access log files, enable it in the security setting. • When the new and old access log files have been open in another application, terminate the application. • Check the disk device for any fault.

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Table 10.5 Event log output error list of DB Connection Service (source name: DBConnector)

Error code	Error description and cause	Corrective action
501	The computer ran out of memory when initializing the SQL failure log file.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
502	The computer ran out of resources when initializing the SQL failure log file.	
503	The full path name of the SQL failure log file is too long.	• Shorten the path to the SQL failure log file with DB Connection Service Setting Tool.
504	The SQL failure log file could not be opened.	• If no directory exists for storing the SQL failure log file, create it. • When the attribution of the SQL failure log file is set to read-only, cancel the setting. • If read/write is disabled for the SQL failure log file, enable it in the security setting. • When the SQL failure log file name represents a directory, rename or delete the directory. • When the SQL failure log file has been open in another application, terminate the application. • Check the disk device for any fault.
505	The log could not be written to the SQL failure log file.	• When the disk space is full, ensure a free disk space. • When the SQL failure log file has been open in another application, terminate the application. • Check the disk device for any fault.
506	Failed to delete an old SQL failure log file.	• When the attribution of the oldest SQL failure log file is set to read-only, cancel the setting. • If read/write is disabled for the oldest SQL failure log file, enable it in the security setting. • When the oldest SQL failure log file has been open in another application, terminate the application. • Check the disk device for any fault.
507	Failed to rename the SQL failure log file.	• When the attribution of the new and old SQL failure log files is set to read-only, cancel the setting. • If read/write is disabled for the new and old SQL failure log files, enable it in the security setting. • When the new and old SQL failure log files have been open in another application, terminate the application. • Check the disk device for any fault.

(c) Event log output error list of DB Connection Service Client (source name: DBCnctClient)

Table 10.6 Event log output error list of DB Connection Service Client (source name: DBCnctClient)

Error code	Error description and cause	Corrective action
50	Unable to start DB Connection Service Client.	• Terminate unnecessary applications. • Add more memory to the computer.
51		
52		
53		

(2) Access log of DB Connection Service

Table 10.7 Access log output error list of DB Connection Service

Error code	Error description and cause	Corrective action
0x20100001*1	(Service Not Start.) Failed to start the service due to insufficient memory.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
0x20100002*1	(Service Not Start.) Failed to start the service due to insufficient resources.	
0x20100010	System error	• Please consult your local Mitsubishi representative.
0x20100011*1	(Service Not Start.) Failed to start the service due to failure of the server port initialization.	• If firewall software has been installed, set the specified server port operational.
0x20100012*1	(Service Not Start.) Another application has opened the server port.	• Terminate the application that has opened the server port. • Set another server port No. with DB Connection Service Setting Tool.
0x20100013	System error	• Please consult your local Mitsubishi representative.
0x20200001*1	(Not Initialize a service for each client: [IP address]) Failed to initialize a service for each client due to insufficient memory.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
0x20200003	System error	• Please consult your local Mitsubishi representative.
0x20200010*1	(Deny network connection request from [IP address]) Rejected the connection request from the non-permitted IP address.	• Using DB Connection Service Setting Tool, add the IP address to those with connection permission.
0x20300001	(SID [Session ID]: Request Receive Error: [IP address]) Failed to receive data due to insufficient memory.	• Terminate any unnecessary applications. • Add more memory to the personal computer.

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Table 10.7 Access log output error list of DB Connection Service

Error code	Error description and cause	Corrective action
0x20300010	(SID [Session ID]: Request Receive Error: [IP address]) Connection disconnected during request reception.	• Check if it is connected to the network. • Check if the gateway and/or hub is operating. • Check if the power of the module is not turned off.
0x20300011	(SID [Session ID]: Request Receive Error: [IP address]) Timed out during request reception.	
0x20300012	(SID [Session ID]: Request Receive Error: [IP address]) Detected failure of the MES interface module or the configuration computer while waiting for or receiving a request.	
0x20300013	(SID [Session ID]: Request Receive Error: [IP address]) Receive I/O error	
0x20300014	(SID [Session ID]: Request Receive Error: [IP address]) Buffer overrun (Request length exceeded)	• Check if the source IP address belongs to the MES interface module or the configuration computer. • Check the version of the MES interface module or MES Interface Function Configuration Tool.
0x20300015	(SID [Session ID]: Request Receive Error: [IP address]) Received an invalid request.	
0x20310010	(SID [Session ID]: Response Transmit Error: [IP address]) Failed to transmit a response due to disconnection.	• Check if it is connected to the network. • Check if the gateway and/or hub is operating. • Check if the power of the module is not turned off.
0x20310011	(SID [Session ID]: Response Transmit Error: [IP address]) Timed out during response transmission	
0x20310012	(SID [Session ID]: Response Transmit Error: [IP address]) Detected failure of the MES interface module or the configuration computer during response transmission.	
0x20310013	(SID [Session ID]: Response Transmit Error: [IP address]) Send I/O error	
0x20400001	(SID [Session ID]: DB Connect: [Data source]: [User]: Failed) Failed in DB connection due to insufficient memory.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
0x20400002*1	(SID [Session ID]: DB Connect: [Data source]: [User]: Failed) Failed in DB connection due to insufficient resources.	
0x20400010	(SID [Session ID]: DB Connect: [Data source]: [User]: Failed) Invalid DB connection request	• Check if the source IP address belongs to the MES interface module or the configuration computer. • Check the version of the MES interface module or MES Interface Function Configuration Tool.
0x20400011	System error	• Please consult your local Mitsubishi representative.
0x20400012		

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Table 10.7 Access log output error list of DB Connection Service

Error code	Error description and cause	Corrective action
0x20400020*1	(SID [Session ID]: DB Connect: [Data source]: [User]: Failed) Failed to create a DB handle.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
0x20400021	System error	• Please consult your local Mitsubishi representative.
0x20400022*1	(SID [Session ID]: DB Connect: [Data source]: [User]: Failed) Failed in DB connection.	• Set correct data source name, user name, and password in [Server service settings] of MES Interface Function Configuration Tool. • To use a 64-bit version operating system for the server, type the following at the command prompt to start the "ODBC Data Source Administrator". %SystemRoot%\SysWOW64\odbcad32.exe
0x20400023 0x20500011 0x20500012 0x20500020 to 0x20500022	System error	• Please consult your local Mitsubishi representative.
0x20600001	(SID [Session ID]: SQL<...>: Failed) (SID [Session ID]: COMMIT: Failed) (SID [Session ID]: ROLLBACK: Failed) (SID [Session ID]: GetNext: Failed) (SID [Session ID]: Reset: Failed) Failed in SQL execution due to insufficient memory.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
0x20600002*1	(SID [Session ID]: SQL<...>: Failed) (SID [Session ID]: COMMIT: Failed) (SID [Session ID]: ROLLBACK: Failed) (SID [Session ID]: GetNext: Failed) (SID [Session ID]: Reset: Failed) Failed in SQL execution due to insufficient resources.	
0x20600010	(SID [Session ID]: SQL<...>: Failed) (SID [Session ID]: COMMIT: Failed) (SID [Session ID]: ROLLBACK: Failed) (SID [Session ID]: GetNext: Failed) (SID [Session ID]: Reset: Failed) Invalid SQL execution request	• Check if the source IP address belongs to the MES interface module or the configuration computer. • Check the version of the MES interface module or MES Interface Function Configuration Tool.
0x20600011 0x20600012	System error	• Please consult your local Mitsubishi representative.
0x20600020	(SID [Session ID]: SQL<...>: Failed) (SID [Session ID]: COMMIT: Failed) (SID [Session ID]: ROLLBACK: Failed) (SID [Session ID]: GetNext: Failed) (SID [Session ID]: Reset: Failed) DB Connection Service does not support the SQL instruction to be executed.	• Check if the source IP address belongs to the MES interface module or the configuration computer. • Check the version of the MES interface module or MES Interface Function Configuration Tool.

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Table 10.7 Access log output error list of DB Connection Service

Error code	Error description and cause	Corrective action
0x20600021*1	(SID [Session ID]: SQL<...>: Failed) (SID [Session ID]: COMMIT: Failed) (SID [Session ID]: ROLLBACK: Failed) (SID [Session ID]: GetNext: Failed) (SID [Session ID]: Reset: Failed) Failed in preparation before SQL execution.	• Set a correct database type in [Server service settings] of MES Interface Function Configuration Tool. • Select [Job settings] - [Communication action] in MES Interface Function Configuration Tool, and set a correct table name.
0x20600022*1	(SID [Session ID]: SQL<...>: Failed) (SID [Session ID]: COMMIT: Failed) (SID [Session ID]: ROLLBACK: Failed) (SID [Session ID]: GetNext: Failed) (SID [Session ID]: Reset: Failed) Failed to obtain the number of fields in the record that is to be obtained by the SQL execution.	
0x20600023*1	(SID [Session ID]: SQL<...>: Failed) (SID [Session ID]: COMMIT: Failed) (SID [Session ID]: ROLLBACK: Failed) (SID [Session ID]: GetNext: Failed) (SID [Session ID]: Reset: Failed) Failed in SQL execution.	• Set a correct database type in [Server service settings] of MES Interface Function Configuration Tool. • Select [Job settings] - [Communication action] in MES Interface Function Configuration Tool, and set a correct table name, field names, and Select/Update/Delete conditions. Also, set a correct data type for the data entered in the fields. • Check if the uniqueness constraint of the database (PRIMARY KEY constraint) is violated or not. • Check that reserved terms of the database are not set for table names and field names.
0x20600024	System error	• Please consult your local Mitsubishi representative.
0x20600025	(SID [Session ID]: SQL<...>: Failed) (SID [Session ID]: COMMIT: Failed) (SID [Session ID]: ROLLBACK: Failed) (SID [Session ID]: GetNext: Failed) (SID [Session ID]: Reset: Failed) No record was updated, inserted, or deleted by the SQL execution.	• Select [Job settings] - [Communication action] in MES Interface Function Configuration Tool, and set update, insert, or delete conditions correctly. • Check if the database has been filled with registered data.
0x20600026 to 0x2060002A	System error	• Please consult your local Mitsubishi representative.
0x2060002B	(SID [Session ID]: *** Transmitting Commit Success Response Failed. ***) Failed to transmit the COMMIT success response.	• Check if it is connected to the network. • Check if the gateway and/or hub is operating. • Check if the power of the module is not turned off.
0x20700001	(ProgramExec: [IP address]: <...>: Failed) Failed in program execution due to insufficient memory.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
0x20700002	(ProgramExec: [IP address]: <...>: Failed) Failed in program execution due to insufficient resources.	
0x20700003	System error	• Please consult your local Mitsubishi representative.

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Table 10.7 Access log output error list of DB Connection Service

Error code	Error description and cause	Corrective action
0x20700010	(ProgramExec: [IP address]: <...>: Failed) Invalid program execution request	• Check if the source IP address belongs to the MES interface module.
0x20700011	System error	• Please consult your local Mitsubishi representative.
0x20700012		
0x20700020	(ProgramExec: [IP address]: <...>: Failed) Failed to log on in program execution	• Set correct user name and password in [Server service settings] of MES Interface Function Configuration Tool. • Check if the user account is invalid or not by the administrative tool of Windows®. • Check if the setting is forcing the user to enter password at next logon by the administrative tool of Windows®. • Check if the user password is expired or not by the administrative tool of Windows®.
0x20700021	(ProgramExec: [IP address]: <...>: Failed) Failed to load user profile during program execution	• No user profile for Windows® may have been created. With the user name and password set in [Server service settings] of MES Interface Function Configuration Tool, log on Windows® once, and re-execute it. • The load applied to the computer may have been too high. Check the execution conditions of other applications.
0x20700022	System error	• Please consult your local Mitsubishi representative.
0x20700023	(ProgramExec: [IP address]: <...>: Failed) Failed to generate process during program execution	• Check if the application to be executed in program execution exists or not. • Check if the name of the application to be executed in program execution is a directory. • Make a proper security setting for the application to be executed in program execution.
0x20700024	(ProgramExec: [IP address]: <...>: Failed) The wait for process completion timed out or was interrupted during program execution.	• In [DB Connection Service Setting Tool], increase the DB access timeout value. • Terminate the application executed by program execution before logoff.
0x20800010	(SID [Session ID]: TCPOpen Request Error: [IP address]) Invalid TCPOpen request	• Check if the source IP address belongs to the MES interface module or the configuration computer. • Check the version of the MES interface module or MES Interface Function Configuration Tool.
0x20800011	System error	• Please consult your local Mitsubishi representative.
0x20800012		
0x2FE00010		

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Table 10.7 Access log output error list of DB Connection Service

Error code	Error description and cause	Corrective action
0x20B00001	System error	• Please consult your local Mitsubishi representative.
0x20B00002		
0x20B00003	Failed to acquire table names from the database	• Set the database type of the DB server setting correctly with the MES Interface Function Configuration Tool. • Check if there is any problem in the connection route.
0x20B00004	Failed to acquire the information which is necessary for table name acquisition when acquiring table names from the database	• Set the database type of the DB server setting correctly with the MES Interface Function Configuration Tool.
0x20B00005	System error	• Please consult your local Mitsubishi representative.
0x20B00006		
0x20B00008	Failed to acquire the version of the database when acquiring table names from the database	• Set the database type of the DB server setting correctly with the MES Interface Function Configuration Tool.
0x20B00009	Failed to prepare before the SQL execution when acquiring table names from the database	
0x20B0000A	Failed to execute SQL when acquiring table names from the database	• Set the database type of the DB server setting correctly with the MES Interface Function Configuration Tool. • Check if there is any problem in the connection route.
0x20B0000B to 0x20B0000D	System error	• Please consult your local Mitsubishi representative.
0x20B0000E	The database type set for the DB server setting is different from the actual database type.	• Set the database type of the DB server setting correctly with the MES Interface Function Configuration Tool.
0x20B0000F	System error	• Please consult your local Mitsubishi representative.
0x20C00001		
0x20C00002		
0x20C00003	Failed to acquire field names from the database	• Set the database type of the DB server setting correctly with the MES Interface Function Configuration Tool. • Check if there is any problem in the connection route.
0x20C00004	Failed to acquire the information which is necessary for field name acquisition when acquiring field names from the database	• Set the database type of the DB server setting correctly with the MES Interface Function Configuration Tool.
0x20C00005 to 0x20C00007	System error	• Please consult your local Mitsubishi representative.
0x20C00008	Failed to acquire the version of the database when acquiring field names from the database	• Set the database type of the DB server setting correctly with the MES Interface Function Configuration Tool.

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Table 10.7 Access log output error list of DB Connection Service

Error code	Error description and cause	Corrective action
0x20C00009 0x20C0000A	Failed to execute SQL when acquiring field names from the database	• Set the database type of the DB server setting correctly with the MES Interface Function Configuration Tool. • Check if there is any problem in the connection route.
0x20C0000B to 0x20C0000D	System error	• Please consult your local Mitsubishi representative.
0x20C0000E	The database type set for the DB server setting is different from the actual database type.	• Set the database type of the DB server setting correctly with the MES Interface Function Configuration Tool.
0x20C0000F	System error	• Please consult your local Mitsubishi representative.
0x2FE00010		

*1 [Database error number] and [Database error message] are output to the space after Database Message in the access log of DB Connection Service.
For the output log format, refer to the following.
☞Section 8.8.1 Access log

(3) SQL failure log of DB Connection Service

Table 10.8 SQL failure log output error list of DB Connection Service

Error code	Error description and cause	Corrective action
0x20600001	Failed in SQL execution due to insufficient memory.	• Terminate any unnecessary applications. • Add more memory to the personal computer.
0x20600002*1	Failed in SQL execution due to insufficient resources.	
0x20600020	DB Connection Service does not support the SQL instruction to be executed.	• Check if the source IP address belongs to the MES interface module or the configuration computer. • Check the version of the MES interface module or MES Interface Function Configuration Tool.
0x20600021*1	Failed in preparation before SQL execution.	• Set a correct database type in [Server service settings] of MES Interface Function Configuration Tool. • Select [Job settings] - [Communication action] in MES Interface Function Configuration Tool, and set a correct table name.
0x20600022*1	Failed to obtain the number of fields in the record that is to be obtained by the SQL execution.	
0x20600023*1	Failed in SQL execution.	• Set a correct database type in [Server service settings] of MES Interface Function Configuration Tool. • Select [Job settings] - [Communication action] in MES Interface Function Configuration Tool, and set a correct table name, field names, and Select/Update/Delete conditions. Also, set a correct data type for the data entered in the fields. • Check if the uniqueness constraint of the database (PRIMARY KEY constraint) is violated or not. • Check that reserved terms of the database are not set for table names and field names.
0x20600024	System error	• Please consult your local Mitsubishi representative.
0x20600025	No record was updated, inserted, or deleted by the SQL execution.	• Select [Job settings] - [Communication action] in MES Interface Function Configuration Tool, and set update, insert, or delete conditions correctly. • Check if the database has been filled with registered data.
0x20600026 to 0x20600028	System error	• Please consult your local Mitsubishi representative.
0x2060002B	(Data source name: *** Transmitting Commit Success Response Failed. ***) Failed to transmit the COMMIT success response.	• Check if it is connected to the network. • Check if the gateway and/or hub is operating. • Check if the power of the module is not turned off.

*1 [Database error number] and [Database error message] are output to the space after Database Message in the SQL failure log of DB Connection Service.
For the output log format, refer to the following.
☞Section 8.8.2 SQL failure log

10.2.3 Error codes returned in XML response messages

Table 10.9 Error codes returned in XML response messages

Error code	Error name	Description	Action
0x41170101	System error	—	• Please consult your local Mitsubishi representative.
0x41170103	XML message length error	The length of the received XML message is invalid.	• Check the content of the sent XML message.
0x41171101	XML request message interpretation error	The received XML request message is invalid. Data are not properly formatted as an XML message.	
0x41171111	Duplicated XML request message route	The XML request message route is duplicated. Multiple (Request) tags exist.	
0x41171201	XML request message route error	There is an invalid route for XML request message transmission. Any tag other than (Request) exists.	
0x41171205	XML request message, attribute error	The attribute in the received XML request message is invalid. Failed to identify the message type is oneshot, validate, or invalidate. Attribute "type" does not exist. Attribute "type" value is invalid. Attribute "jobname" does not exist. The XML declaration is incorrect.	
0x41171301	XML request message, jobname error	The jobname in the received XML request message is invalid. The job of the specified jobname does not exist.	
0x41173101	Job execution error	Failed in one-shot execution of the job which is requested by the XML processing function.	• Check if the job is already in execution. • Check if the MES interface module is operating. • Check CompactFlash card status (X1) and File access status (X2). • Execute the job after starting the module and sampling tag data. ☞ Section 3.6.7 (2) Sampling information (Buffer memory address: 1004 to 1007)
0x41173103 0x41173105	System error	—	• Please consult your local Mitsubishi representative.

10.3 Troubleshooting by symptom

10.3.1 When using MES Interface Function Configuration Tool

This section explains troubleshooting information on the setting of MES Interface Function Configuration Tool.

(1) Common to all settings

Table 10.10 Common to all settings

Symptom	Checked item	Corrective action
Unable to connect MES Interface Function Configuration Tool to the MES interface module.	Is there any disconnection in the connection route?	• Connect the cables properly.
	Is the IP address setting correct?	• Correct the IP address setting. ☞Section 7.6.1 Setting items in Network setting
	Is the user name and password setting correct?	• Correct the user name and password setting. ☞Section 7.6.3 Setting items in Account setting
	Is the IP address duplicated?	• Correct the IP address setting. ☞Section 7.6.1 Setting items in Network setting
	Is there a firewall and/or a proxy server in the connection route?	• Ask your network administrator about the firewall setting. ☞Section 5.1 Installation • Ask your network administrator about the proxy server setting.
	Is the MES interface module connected to the network? (Network connection status (X4) = ON)	• Connect the MES interface module to the network.
	Is it in "Online" mode?	• Change the mode to "Online".
	Is there any problem on the personal computer?	• Replace it with another computer.
MES Interface Function Configuration Tool does not start.	Have five MES Interface Function Configuration Tools already started?	• Terminate any of the MES Interface Function Configuration Tools and then start another. • Up to five MES Interface Function Configuration Tools can be started.
	Is the memory or the system resources on the personal computer sufficient?	• Increase the necessary memory on the personal computer. • Close other programs and restart MES Interface Function Configuration Tool.
The screen of MES Interface Function Configuration Tool is not displayed correctly.	Is the memory or the system resources on the personal computer sufficient?	• Increase the necessary memory on the personal computer. • Close other programs and restart MES Interface Function Configuration Tool.
Cannot operate MES Interface Function Configuration Tool.		
Forced to terminate MES Interface Function Configuration Tool.		

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Table 10.10 Common to all settings

Symptom	Checked item	Corrective action
Unable to import a project file.	The specified project file is incorrect or corrupted.	• Specify a correct project file.
	Is there any inconsistency in the setting?	• Check the setting and correct it if any.
	Did the number of settings exceed the upper limit?	• Check the number of settings. ☞Section 7.4.4 Importing a project
Unable to import a CSV file.	Is the CSV file description correct?	• Correct the CSV file description.
	Is there any inconsistency in the setting?	• Check the setting and correct it if any.
	Did the number of settings exceed the upper limit?	• Check the number of settings. ☞Section 7.4.5 Importing a CSV file
[Device tag name] is not displayed for the setting item by which data are written to a tag.	Is the tag set to data-write-disabled?	• Set the tag to data-write-enabled. ☞Section 7.8.1 Setting items in Device Tag setting
All the text is not displayed in a table. (The text display is truncated.)	Isn't the column width narrow?	• Adjust the column width of the table. ☞Section 7.3.1 Screen structure
The "MESInterface" folder in Start menu is not deleted behind the uninstallation.	Is the "MESInterface" folder empty?	• Delete the "MESInterface" folder manually.

(2) [System setting] (☞Section 7.6 System Setting)

Table 10.11 [System setting]

Symptom	Checked item	Corrective action
A desired device tag name is not displayed in [DB buffering settings].	Is the tag set to data-write-disabled?	• Set the tag to data-write-enabled. ☞Section 7.8.1 Setting items in Device Tag setting

(3) [Access target CPU settings] (☞Section 7.7 Access Target CPU Setting)

Table 10.12 [Access target CPU settings]

Symptom	Checked item	Corrective action
Unable to change or delete an item in [Access target CPU settings].	Is it the first item?	• If it is any item other than the first one, change the item or add an item. • Since the control CPU is set as the first item, deletion or setting change is not allowed for it. (Only the CPU name can be changed.)
	Is the selected item used in [Device tag settings]?	• As the error dialog box appears, identify the location, stop using it for another item, and then delete the item. • An item used for another item is unable to be deleted.

(4) [Device tag settings] (☞Section 7.8 Device Tag Setting)

Table 10.13 [Device tag settings]

Symptom	Checked item	Corrective action
Unable to change or delete an item in [Device tag settings].	Is the selected item used in [Job settings]?	• As the error dialog box appears, identify the location, stop using it for another item, and then delete the item. • An item used for another item is unable to be deleted.
	Is the selected item used in [DB buffering settings] of [System setting]?	
	Is the selected item used in [Access error notification setting] of [Server service settings]?	
Unable to set or change [Device tag name].	Is the same name used for [Server service name] or another [Device tag name]?	• Because a unique name must be used for [Server service name] and [Device tag name], use a different name.
Unable to select [High-speed sampling].	Is [High-speed sampling] selected in another [Device tag settings]?	• Clear the [High-speed sampling] checkbox in the [Device tag settings]. • Registration of [High-speed sampling] is limited to one tag only.
	Is any other than the first item (Control CPU) in [Access target CPU settings] selected in [CPU name] in [Component setting input]?	• Delete the component setting with selection of any other than the first item, or change the setting so that the first item will be used for it. • If [High-speed sampling] is selected, only the first item in [Access target CPU settings] (Control CPU) can be selected for the tag component.
	Is the number of device points set in the tag setting more than 96?	• Reduce the number of device points in the tag setting to 96 or less. • When [High-speed sampling] is selected, set tag component devices within the total of 96 points.
Unable to change the [Prohibit data writing] setting.	Is the tag used for a setting item by which data are written to the tag? • [Completion notification] of [Handshake operation], substitution tags of [Select] in [Communication action], etc.	• Stop using the tag for the setting item by which data are written to the tag, before changing the setting. • If the tag is used for a setting item by which data are written to the tag, clearing the [Prohibit data writing] box is not allowed.

(5) [Server service settings] (☞Section 7.9 Server Service Setting)

Table 10.14 [Server service settings]

Symptom	Checked item	Corrective action
Unable to set or change [Server service name].	Is the same name used for another [Server service name] or [Device tag name]?	• Because a unique name must be used for [Server service name] and [Device tag name], use a different name.
Unable to change [Server type].	Is the [Server service name] same as the existing one?	• Correct the [Server service name].
A desired device tag name is not displayed in [Access error notification setting].	Is the tag set to data-write-disabled?	• Set the tag to data-write-enabled. ☞Section 7.8.1 Setting items in Device Tag setting

(6) [Job settings]

☞ • Section 7.10 Job Setting
• Section 7.11 Job Setting - Actions

Table 10.15 [Job settings]

Symptom	Checked item	Corrective action
Unable to set [DB buffering settings].	Is there any Select action set for the job?	• Do not use Select actions in the job where DB buffering is enabled. • The DB buffering is not available for jobs performing Select actions.
Unable to set a new variable.	Are there 64 variables that were already defined in the job?	• Delete any unnecessary variable settings of the job. • Up to 64 variables can be set for one job.
Unable to select [Trigger 2] in [Trigger conditions].	Is [Handshake operation] selected for [Trigger 1]?	• Select any other than [Handshake operation] for [Trigger 1]. • When [Handshake operation] is selected, selection is not allowed for [Trigger 2].
A desired device tag name is not displayed in [Completion notification] of [Handshake operation].	Is the tag set to data-write-disabled?	• Set the tag to data-write-enabled. ☞Section 7.8.1 Setting items in Device Tag setting
A desired device tag name is not displayed in the field of Substitution tag for [Select] in [Communication action].		
A desired device tag name is not displayed in the field of Substitution tag in [Exception processing] of [Communication action].		
A desired device tag name is not displayed in the field of Substitution tag in [Operation action].		
A desired device tag name is not displayed under [Notify errors (job cancellation) that occur during job execution].		
Unable to set [Exception processing] in [Communication action].	Is the DB buffering enabled?	• Disable the DB buffering.
	Is [Insert], or [Stored procedure] set for [Action type]?	• Set any other than [Insert] and [Stored procedure] for [Action type].

(7) [Online]

☞ • Section 7.12 Online
• Section 7.13 Online - Remote operation

Table 10.16 [Online]

Symptom	Checked item	Corrective action
Unable to write a project to the MES interface module.	Is the total number of fields in the project more than 8192?	• Delete any unnecessary field settings. ☞Section 7.11.1 Setting items in Communication action • Up to 8192 fields can be set within one project.
Failed in online operation.	Is the IP address set in [Transfer setup] of [Online] correct?	• Select [Online] - [Transfer setup] and correct the setting. • Perform the online operation for the MES interface module selected from [Online] - [Transfer setup].
	Send a PING request from the configuration computer to the IP address of the MES interface module. Is there a response?	• If no response is returned, check if the module is powered up or if the network is properly connected.
	Has the account set in [Transfer setup] of [Online] been registered to the MES interface module?	• Select [Online] - [Transfer setup] and correct the setting. • Specify the account that is registered in the MES interface module.
	Is the firewall function of the operating system or security software enabled on the configuration computer?	• Check the firewall setting. ☞Section 5.1 Installation
Unable to select [One-shot execution] from [Online].	Was the job for one-shot execution selected?	• Select the job for one-shot execution, and then select [Online] → [One-shot execution] from the menu.
Failed to perform [One-shot execution] from [Online].	During one-shot execution, was the power of the programmable controller turned OFF and then ON, or was the programmable controller CPU reset?	• Write a project again and perform [Update settings]. ☞ Section 7.15 (4) One-shot execution
	Has a communication error occurred during one-shot execution?	
	Is there any difference between the system settings being used on the MES interface module and the system settings of the MES Interface Function Configuration Tool?	• Set the same settings for the system settings being used on the MES interface module and the system settings of the MES Interface Function Configuration Tool.
Failed to format the CompactFlash card.	Check for an error code in [System monitor] of GX Developer.	• By the error code, check the error details and take corrective actions. • Re-execute formatting of the CompactFlash card.
	Is the MES interface module operation stopped?	• Stop the MES interface module operation, and then execute formatting. ☞ Section 7.13.8 Formatting the CompactFlash card
It takes time to write the settings to the MES interface module.	Is the MES interface module operation in the [Stop] state?	• Stop the MES interface module operation, and then write the settings.

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Table 10.16 [Online]

Symptom	Checked item	Corrective action
The most recent table name/field name/ procedure name is not displayed in the list when [Browse table name]/[Browse field name]/[Browse procedure name] on the [Communication action] dialog box is executed.	Is the information on the database side updated while the [Communication action] dialog box is being opened?	• Reopen the [Communication action] dialog box, and execute [Browse table name]/[Browse field name]/[Browse procedure name] again. • Change [Database] on the [Communication action] dialog box, and execute [Browse table name]]/[Browse procedure name] again. • Change [Database] or [Table name] on the [Communication action] dialog box, and execute [Browse field name] again.
	Is an inapplicable character used for the table name, field name, or stored procedure name?	• Change the table name, field name, or stored procedure name to the name which does not include an inapplicable character. ☞ Appendix 2.4 Characters available for field names, table names, stored procedure names,etc.
	Does the number of characters used for the table name, field name, or stored procedure name exceed 32?	• Change the table name, field name, or stored procedure name to the name whose number of characters does not exceed 32.
	Is there a stored procedure whose arguments are more than 256?	• Change the arguments of the stored procedure to 256 or less.
	Are a large number of tables, fields, or stored procedures registered to the database?	• Set the DB access time much longer. ☞ Section 8.5 (2)

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Table 10.16 [Online]

Symptom	Checked item	Corrective action
The table name/field name/procedure name cannot be browsed properly when [Browse table name]/[Browse field name]/ [Browse procedure name] on the [Communication action] dialog box is executed.	Is there a response from the IP address of the server computer when a PING is sent from the configuration computer?	• If there is no response, check if the power of the server computer is ON, or the network connection status is correct.
	Is a personal computer restarted after installing relational database?	• Restart the personal computer.
	Is the port No. set in [Service port] of DB Connection Service Setting Tool the same as the port No. set in [Port No.] of [Server service settings] of MES Interface Function Configuration Tool?	• Set the same value.
	Is the firewall function of the operating system or security software enabled on the configuration computer or server computer?	• Check the firewall setting. ☞Section 5.1 Installation
	Is the port specified in [Service port] of DB Connection Service Setting Tool being used for the database or any other application?	• Change the port number to another that is not being used for the database or any other application.
	Has any Check Point software been installed in the server computer?	• Uninstall the Check Point software.
	Is the ODBC setting of the database correct?	• Correct the ODBC setting of the database.
	Is [Limit IP addresses permit to connect] of DB Connection Service Setting Tool set?	• If it is set, add the IP address of the configuration computer to [Permitted IP addresses list].
	[Browse table name, Browse field name] Is the version of DB Connection Service 1.09K or later?	• When the installed software version is 1.08J or earlier, update the software.
	[Browse procedure name] Is the version of DB Connection Service 1.10L or later?	• When the installed software version is 1.09K or earlier, update the software.
	Has ODBC setting been changed after "Browse stored procedure", "Browse field name", or "Browse procedure name" has been successfully completed?	• Start up MES Interface Function Configuration Tool again, and perform "Browse stored procedure", "Browse field name", or "Browse procedure name".
	Database is SQL Server Is the schema name set for "Default schema" of the user to access the database different from the one to which a table or a stored procedure to be referenced belongs?	• Set the same name for "Default schema" of the user to access to the database as the one to which a table or a stored procedure to be referenced belongs. ☞Section 7.11.2 (4) Browse table name ☞Section 7.11.3 (2) Browse procedure name
Failed to acquire the return values and arguments when "Stored procedure" is selected on the [Stored procedure list] screen.	Is the information of the database updated while opening the [Communication action] screen?	• After changing the "Database" on the [Communication action] screen, execute "Browse procedure name" again.
The elements cannot be added on the tag setting screen. (Device range is incorrect.)	Was the device of RCPU which does not exist in the range of QCPU or C Controller module specified?	• Specify the device number within the range that can be specified in QCPU or C Controller module.

10.3.2 When using DB Connection Service Setting Tool

This section explains troubleshooting information on the setting of DB Connection Service Setting Tool.

☞ Chapter 8 DB CONNECTION SERVICE AND SETTING TOOL

Table 10.17 [DB connection service setting tool]

Symptom	Checked item	Corrective action
Unable to start DB Connection Service Setting Tool.	Has another DB Connection Service Setting Tool been already started?	• Terminate the already started DB Connection Service Setting Tool. • Only one DB Connection Service Setting Tool can be activated.
	Is the memory or the system resources on the personal computer sufficient?	• Increase the necessary memory on the personal computer. • Close other programs and restart DB Connection Service Setting Tool.
	Is not the tool being installed, without uninstalling?	• Restart the personal computer.
The screen of DB Connection Service Setting Tool is not displayed correctly.	Is the memory or the system resources on the personal computer sufficient?	• Increase the necessary memory on the personal computer. • Close other programs and restart DB Connection Service Setting Tool.
Cannot operate DB Connection Service Setting Tool.		
Forced to terminate DB Connection Service Setting Tool.		
Unable to reflect the setting.	Was a user ID having the administrator authority used for the login?	• Log in again with a user ID having the administrator authority.
	Is there no permitted IP address?	• Clear the [Limit IP addresses permit to connect] checkbox, or add an IP address for which connection is permitted.
Unable to export a file.	Is there no permitted IP address?	• Clear the [Limit IP addresses permit to connect] checkbox, or add an IP address for which connection is permitted.
An access log output error is recorded in [Event Viewer] of [Administrative Tools] in Windows®.	Is the file set in [Output destination] read-only?	• Correct the file specification.
	Is the access to the folder containing the file set in [Output destination] authorized?	• Check the right of access to the folder.
	Is the drive space of the server computer full?	• Check the free space on the drive.
An SQL failure log output error is recorded in [Event Viewer] of [Administrative Tools] in Windows®.	Is the file set in [Output destination] read-only?	• Correct the file specification.
	Is the access to the folder containing the file set in [Output destination] authorized?	• Check the right of access to the folder.
	Is the drive space of the server computer full?	• Check the free space on the drive.
[The DBConnector service failed to start due to the following error: The system cannot find the file specified.] is recorded in [Event Viewer] of [Administrative Tools] in Windows®.	Does the following file exit in the installing destination directory of [DB connection service and Setting tool]? [MESIF\DBConnector.exe]	• Uninstall [DB connection service and Setting tool] and restart the personal computer before reinstallation.
	Is the personal computer restarted after uninstalling [DB connection service and Setting tool]? ☞Section 5.2 Uninstallation	

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Table 10.17 [DB connection service setting tool]

Symptom	Checked item	Corrective action
Oracle's data source driver is not located although "%SystemRoot%\SysWOW64\odbcad32.exe" was executed on 64-bit version Windows®.	Has the 32-bit version of Oracle Client been installed? ☞Section 8.2 Setting ODBC to the Database	• Install the 32-bit version of Oracle Client, and then execute "%SystemRoot%\SysWOW64\odbcad32.exe" again.
The "MESInterface" folder in Start menu is not deleted behind the uninstallation.	Is the "MESInterface" folder empty?	• Delete the "MESInterface" folder manually.

10.3.3 When operating the MES interface module

This section shows the troubleshooting of problems that may arise during operation of the MES interface module.

(1) Troubleshooting about LED indication and I/O signals

Table 10.18 Troubleshooting about LED indication and I/O signals

Symptom	Checked item	Corrective action
The RUN LED does not turn on.	Is the module in preparation?	• Wait for startup of the module.
	Is the Watchdog timer error (X1F) ON?	• If a watchdog timer error is identified, please consult your local Mitsubishi representative.
The ERR. LED is on or flashing.	Is the battery connected? Or, has the battery voltage dropped?	• Check the battery connection. • Replace the battery.
	Is any of the error detection signals (X11, X12, X16 and X1C) ON? X11: Sampling error X12: Information linkage error X16: Access target CPU error X1C: Another error	• According to the error code obtained by the error detection shown on the left, identify the error cause and take corrective actions.
	Check the error code in [System monitor] of GX Developer.	• By the error code, identify the error and take corrective actions.
Module READY (X0) does not turn ON, or it takes time to turn ON.	Is the module in preparation?	• Depending on the number of items set in [Access target CPU settings], it may take several minutes until X0 turns ON.
	Are there many files in the installed CompactFlash card?	• If many files are stored in the CompactFlash card, it takes time to turn X0 ON. • Delete unnecessary files from the CompactFlash card.
CompactFlash card status (X1) does not turn ON, or it takes time to turn ON.	Is file access stopped? (X2 is ON?)	• Cancel the file access stop.
	Are there many files in the installed CompactFlash card?	• If many files are stored in the CompactFlash card, it takes time to turn X1 ON. • Delete unnecessary files from the CompactFlash card.

(2) Troubleshooting about network connection

Table 10.19 Troubleshooting about network connection

Symptom	Checked item	Corrective action
Unable to access the MES interface module.	Is it in "Online" mode?	• Change the mode to "Online".
	Is the MES interface module connected to the network? (X4 = ON)	• Connect the MES interface module to the network.
	Is there any disconnection in the connection route?	• Connect the cables properly.
	Is the IP address duplicated?	• Correct the IP address setting. ☞Section 7.6.1 Setting items in Network setting
	Is there a firewall and/or a proxy server in the connection route?	• Ask your network administrator about the firewall setting. ☞Section 5.1 Installation • Ask your network administrator about the proxy server setting.
	Is there any problem on the personal computer?	• Replace it with another computer.

(3) Troubleshooting about communication between the MES interface module and access target CPU

Table 10.20 Troubleshooting about communication between the MES interface module and access target CPU

Symptom	Checked item	Corrective action
Unable to access another station via Q series E71.	Is a remote password set for the GX Developer communication port (UDP/IP) of the Q series E71 on the target or relay station?	• Remove the remote password set for the GX Developer communication port (UDP/IP) of the Q series E71 on the target or relay station.
An error occurs when accessing the Redundant CPU.	Is MES interface accessing the Redundant CPU of other station?	• Mount a MES interface module to the extension base unit of the Redundant CPU that is access target and access it. The MES interface cannot access the Redundant CPU of other station.
	Is system switching consecutively occurring?	• Review the system so that system switching will not occur consecutively.
When the MES interface module is started up, 'Errors detected by the access target CPU' (error code: 4B00h) occurs.	Is the MES interface module accessing other CPU, or accessing the other station via a network module controlled by other CPU, in the multiple CPU module?	• Clear the error in the MES interface module after starting up the CPU module in the multiple CPU system. ☞Section 2.6.2 Precautions for using multiple CPU system

(4) Troubleshooting about the DB interface function

Table 10.21 Troubleshooting about the DB interface function

Symptom	Checked item	Corrective action
The DB interface function does not work.	Is "Running" displayed in the status indication area of [Remote operation]? ☞Section 7.13.1 Checking the operation status of the MES interface function	• When "Stopped" is displayed, perform any of the following operations. ・Perform [Restart] from [Remote operation] ・Power OFF and then ON ・Reset the programmable controller CPU ☞Section 7.13.2 Manipulating the operation status of the MES interface function
No communication has been made with the server computer.	Is a personal computer restarted after installing relational database?	• Restart the personal computer.
	Is the port No. set in [Service port] of DB Connection Service Setting Tool the same as the port No. set in [Port No.] of [Server service settings] of MES Interface Function Configuration Tool?	• Set the same value. Communication is not available if different port numbers are set. ☞Section 7.9.1 Setting items in Server Service setting Section 8.5 Setting Items of DB Connection Service Setting Tool
	Is the firewall function of the operating system or security software enabled on the server computer?	• Check the firewall setting. ☞Section 5.1 Installation
	Is the port specified in [Service port] of DB Connection Service Setting Tool being used for the database or any other application?	• Change the port number to another that is not being used for the database or any other application. ☞Section 7.9.1 Setting items in Server Service setting
	Has any Check Point software been installed in the server computer?	• Uninstall the Check Point software.
	Is the ODBC setting of the database correct?	• Correct the ODBC setting of the database.

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Table 10.21 Troubleshooting about the DB interface function

Symptom	Checked item	Corrective action
In the tag component where statistical processing is set, the average, maximum or minimum value to be calculated is reset.	Is there any setting that enables data writing to the tag component where statistical processing is set?	• Disable the write setting. • Writing data to the tag component where statistical processing is set will reset the statistical values.
The database is not updated.	Has an error occurred in [Error log] of [Working log]? ☞Section 7.12.5 Checking the working log of the MES interface module	• If an error has occurred, identify the error cause and take corrective actions. ☞Section 10.2 Error Code List
	When trigger conditions of a job with [Startup logging] setting are met, is the startup logged in [Event log] of [Working log]? ☞Section 7.12.5 Checking the working log of the MES interface module	• If no startup data is logged, refer to the following: ☞Job will not start up.
	If the startup log is identified in the above case, is there an error in [Error log] of [Working log]? ☞Section 7.12.5 Checking the working log of the MES interface module	• If an error has occurred, identify the error cause and take corrective actions. ☞Section 10.2 Error Code List
	In [Change job status] of [Remote operation], is [Disable writing to database] set?	• Enable writing to the database. ☞Section 7.13.4 Changing the job status
	Has an error occurred in the access log of DB Connection Service?	• If an error has occurred, identify the error cause and take corrective actions. ☞Section 10.2 Error Code List
	Are the relevant records or table locked on the database when inserting, updating or deleting data?	• Unlock them on the database and execute it. If they are locked, the execution is delayed until they are unlocked.
	In [Connection result of previous job execution] of [Remote operation], is "Connected" displayed under [Result]? ☞Section 7.13.3 Checking the connection of the previous job execution	• If "Disconnected" is displayed, correct the setting of [Server service settings]. ☞Section 7.9.1 Setting items in Server Service setting • Check the network connection route to the database server computer.
	Is the [Database type] setting in [Server service settings] of MES Interface Function Configuration Tool correct? ☞Section 7.9.1 Setting items in Server Service setting	• Set the database being used.
	Is the DB buffering whose Manually resend buffer is enabled occurred?	• While the DB buffering is being performed, resend the buffered data.

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Table 10.21 Troubleshooting about the DB interface function

Symptom	Checked item	Corrective action
Values will not be stored in the database.	Is the number of updated, inserted, or deleted records 0 in the access log of DB Connection Service?	• Check if [Select/Update/Delete conditions] are met. • Check if there is any missing field into which a value is to be inserted. • Check if the uniqueness constraint of the database (PRIMARY KEY constraint) is violated. • Check if the value to be stored exceeds the number of characters defined for the field.
	Is an SQL statement called from the processing (such as stored procedure) executed in the database?	• When using SQL Server and calling an SQL statement from the processing (such as stored procedure) executed in the database, specify "SET NOCOUNT ON" before calling.
Database values will not be stored in programmable controller devices.	Has an error occurred in [Error log] of [Working log]? ☞Section 7.12.5 Checking the working log of the MES interface module	• If an error has occurred, identify the error cause and take corrective actions. ☞Section 10.2 Error Code List
	When trigger conditions of a job with [Startup logging] setting are met, is the startup logged in [Event log] of [Working log]? ☞Section 7.12.5 Checking the working log of the MES interface module	• If no startup data is logged, refer to the following: ☞Job will not start up.
	In [Change job status] of [Remote operation], is [Disable writing to PLC device] set?	• Enable writing to programmable controller devices. ☞Section 7.13.4 Changing the job status
	Has an error occurred in the access log of DB Connection Service?	• If an error has occurred, identify the error cause and take corrective actions. ☞Section 10.2 Error Code List
	Is No. of selected records indicated as 0 in the access log of DB Connection Service?	• Check if [Select/Update/Delete conditions] are met.
	Was the relevant device value manipulated in the programmable controller CPU?	• Do not manipulate the device value in the programmable controller CPU at the time of writing from the MES interface module.
	Is the number of databases set for the database server computer sufficient?	• Correct the set number of databases, or change the number of [Server service settings] items to the set number of databases. ☞Section 7.9 Server Service Setting • One database connection must be used for one item of [Server service settings].

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Table 10.21 Troubleshooting about the DB interface function

Symptom	Checked item	Corrective action
Database values will not be stored in programmable controller devices.	When "Select" and "MultiSelect" are used for a field whose data type is single type or double type, is "Microsoft Access Driver (*.mdb, *accdb)" selected in the ODBC setting? (for Microsoft® Access® 2007, Microsoft® Access® 2010, Microsoft® Access® 2013, Microsoft® Access® 2016, and Microsoft® Access® 2019)	• Select "Microsoft Access Driver (*.mdb)" in the ODBC setting. ☞Section 8.2 (5) For Microsoft® Access
	Is an SQL statement called from the processing (such as stored procedure) executed in the database?	• When using SQL Server and calling an SQL statement from the processing (such as stored procedure) executed in the database, specify "SET NOCOUNT ON" before calling.
Job will not start up.	Has an error occurred in [Error log] of [Working log]? ☞Section 7.12.5 Checking the working log of the MES interface module	• If an error has occurred, identify the error cause and take corrective actions. ☞Section 10.2 Error Code List
	Did the [Trigger conditions] change from false to true completely?	• Correct the [Trigger conditions]. ☞Section 7.10.2 Setting items in Trigger conditions • Start the job when the [Trigger conditions] change from false to true.
	Did the [Combination] of [Trigger conditions] change from false to true completely?	• Correct the [Trigger conditions]. ☞Section 7.10.2 Setting items in Trigger conditions • Start the job when the [Combination] of [Trigger conditions] change from false to true.
	When [Value monitoring startup] is set for [Trigger conditions], is the time for the monitoring target device value change long enough for the sampling interval of the device tag? ☞Section 7.10.2 (6) Value monitoring startup	• Increase the time for the monitoring target device value change. (Latch it in the sequence program.) • Shorten the sampling interval of the device tag. ☞Section 7.8.1 Setting items in Device Tag setting
	Are the device tags used for trigger conditions of jobs sampled normally?	• If an error has occurred, identify the error cause and take corrective actions. ☞Section 10.2 Error Code List
	In [Change job status] of [Remote operation], is the job set to be disabled?	• Enable the job. ☞Section 7.13.4 Changing the job status • To enable the job at startup of the module, select [Job settings] - [Enable at module startup]. ☞Section 7.10.1 Setting items in Job setting

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Table 10.21 Troubleshooting about the DB interface function

Symptom	Checked item	Corrective action
Job will not start up.	Is there any other job that is being executed?	• Terminate the job that is in execution, or use another [Server service settings] item. ☞Section 7.9 Server Service Setting • If a job uses the same [Server service settings] item that is currently used for another job, the job is not executed until another job execution is completed.
	Has an error or job cancellation occurred during job execution?	• If an error has occurred, identify the error cause and take corrective actions. ☞Section 10.2 Error Code List • When the job uses a tag component for which [Moving average], [Moving maximum] or [Moving minimum] is specified, check if sampling for the specified number of times is completed.
	Is there any setting that enables data writing to the tag component for which statistical processing of [Moving average], [Moving maximum], or [Moving minimum] is specified in the job?	• Check the [Job settings] and disable data writing to the relevant tag component.
	Has trigger buffer full occurred?	• Correct the setting so the trigger interval is longer than the processing time of action. ☞Section 6.1.5 Trigger buffering function
	Check if 'Information linkage status (X5)' is in execution (ON).	• When using 'Value monitoring startup' or 'Handshake operation' for a trigger condition, check that 'Information linkage status (X5)' is in execution (ON), and create a program so that the trigger condition is satisfied.
Job will not start up after the one-shot execution.	During one-shot execution, was the power of the programmable controller turned OFF and then ON, or was the programmable controller CPU reset?	• Write a project again and perform [Update settings]. ☞Section 7.15 (4) One-shot execution
	Has a communication error occurred during one-shot execution?	
The program specified by the program execution function is not executed.	Has an error occurred in [Error log] of [Working log]? ☞Section 7.12.5 Checking the working log of the MES interface module	• If an error has occurred, identify the error cause and take corrective actions. ☞Section 10.2 Error Code List
	Was the Windows® account specified in [Server service settings] used to log on the application server computer once or more?	• Use the account that has been used to log on once or more. • An account that has not been used before cannot be used.
	Was the password of the Windows® account specified in [Server service settings] set empty?	• Set a password of the account, or use another account that does not have an empty password. • An account that has an empty password cannot be used.
	Does the program need to be run with administrator privileges (by a user in Administrators group)?	• Programs that need to be run with administrator privileges (by a user in Administrators group) cannot be executed. • Specify a program that does not need to be run with administrator privileges.
	Was execution of a program including displays attempted with the application server computer logged off?	• To execute a program including displays, set the application server computer into the logon status.

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Table 10.21 Troubleshooting about the DB interface function

Symptom	Checked item	Corrective action
The program specified by the program execution function is not executed.	Was execution of the program including displays attempted while multiple users have logged on to the application server computer?	• When a program including displays is executed, the program screen is displayed for only one user who has logged on to the application server. Make all of the users log off the application server computer once, and execute the program with a single user logged on.
Job startup is delayed.	Were the trigger conditions for multiple jobs met concurrently?	• If the trigger conditions for multiple jobs are met concurrently, startup of some job may be delayed. ☞Section 6.1.11 (1) Operation behavior of jobs
	Has an error occurred in [Error log] of [Working log]? ☞Section 7.12.5 Checking the working log of the MES interface module	• If an error has occurred, identify the error cause and take corrective actions. ☞Section 10.2 Error Code List
	Was the job execution time prolonged?	• If the job execution time is prolonged, startup of the next job may be delayed. ☞Section 6.1.11 (1) Operation behavior of jobs
	Was the value in the Monitoring interval timeout count area (buffer memory address: 11510) increased?	• Check and correct the number of job settings or trigger condition settings.
Job execution is slow.	Is the processing load of the server computer is appropriate?	• Check if the processing load of a personal computer for server is excessively high.
	Is data volume in the data base within the specified capacity of the personal computer?	• Review data volume in the data base.
	Is the number of selected/updated records are extreme when selecting or updating?	• Set the Select/Update/Delete conditions that apply appropriate records only.
	Is "Startup logging" enabled in the Job settings?	• Disable "Startup logging" in the Job settings. ☞Section 7.10.1 (4) Startup logging
	Is the service processing load on the CPU module to be accessed increased?	• Review the service setting of the CPU module to be accessed. • Use the constant scan of the CPU module to be accessed.
Selecting [Resend] from [DB buffering operation] of [Remote operation] will not resend buffered SQL texts of the job for which manual resend is selected. ☞Section 7.13.6 Operating the DB buffering	Is there any problem on the connection routes to all of the database server computers?	• Check the connections with all of the database server computers. • When buffered SQL texts are to be sent to more than one destination, unless the communication with all the database server computers is recovered, resending is not started.
	Are the DB Connection Services in all the database server computers operating normally?	• Check each of the DB Connection Services in all the database server computers. • When buffered SQL texts are to be sent to more than one destination, unless DB Connection Services in all the database server computers are operating, resending is not started.

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Table 10.21 Troubleshooting about the DB interface function

Symptom	Checked item	Corrective action
Data such as DB buffering status, No. of DB bufferings, DB buffer full, or DB buffer utilization will not be stored in the tag component which is selected in [DB buffering settings] of [System setting]. ☞Section 7.6.4 Setting items in DB buffering setting	Was the setting that enables data writing to the tag component made in [Job settings]?	• Select another tag component, or check the [Job settings] and disable data writing to the relevant tag component.
	Was the device value of the relevant tag component manipulated in the programmable controller CPU?	• Specify another device. Or do not manipulate the relevant device value in the programmable controller CPU.
Failed to communicate with the server computer several times after module startup.	Was the programmable controller powered ON immediately after OFF?	• Turn OFF the programmable controller, and after several minutes, turn it ON.
	Is there any problem on the server computer?	• Restart the server computer.
Though the job is cancelled, rollback is not executed.	Was the stored procedure created in Oracle 10g/11g/12c/18c/19c committed?	• Do not commit in the stored procedure created in Oracle 10g/11g/12c/18c/19c.
Failed to the stored procedure execution.	Has the stored procedure execution error occurred?	• Check that the settings of the stored procedure name, return values, and arguments are correct. • Check that reserved terms of the database are not used for the stored procedure name.
Return value, output argument, and input/output argument of the stored procedure cannot be acquired.	Is the stored procedure which returns a result set executed by SQL Server 2008/2012/2014/2016/2017/2019?	• Modify the stored procedure not to return the result set. (Return value, output argument, and input/output argument of a stored procedure which returns a result set cannot be acquired.)
The data of the specific term is not stored in the database.	Does the buffered data exist in the Manually resend buffer? When [Immediate sending] is selected in [Operation of recovery from network disconnection] of [System settings] - [DB buffering settings], the data whose trigger condition is met is send regardless of whether the data exist.	• While the DB buffering is being performed, resend the buffered data.
The communication between the database is slow.	Is the proper driver for ODBC data source selected when using Microsoft SQL Server?	• Select any of the following in "Create New Data Source". SQL Server® 2000: "SQL Server" SQL Server® 2005, SQL Server® 2008: "SQL Server Native Client" SQL Server® 2008 R2, SQL Server® 2012, SQL Server® 2014, SQL Server® 2016, SQL Server® 2017, SQL Server® 2019: "SQL Server Native Client 11.0"
DB buffering is not performed.	Has trigger buffer full occurred?	• Correct the setting so the trigger interval is longer than the processing time of action. ☞Section 6.1.5 Trigger buffering function

(5) Troubleshooting about the XML processing function

Table 10.22 Troubleshooting about the XML processing function

Symptom	Checked item	Corrective action
The XML processing function does not work.	Is "Running" displayed in the status indication area of [Remote operation]?	• When "Stopped" is displayed, perform any of the following operations. ・Perform [Restart] from [Remote operation] ・Power OFF and then ON ・Reset the programmable controller CPU

(6) Troubleshooting about the time synchronization function

Table 10.23 Troubleshooting about the time synchronization function

Symptom	Checked item	Corrective action
Time is not synchronized with the SNTP server computer.	Is the [SNTP server address] setting correct?	• Correct the [SNTP server address] setting. ☞Section 7.6.2 Setting items in Time synchronization setting

(7) Troubleshooting on the CompactFlash card

Table 10.24 Troubleshooting on the CompactFlash card

Symptom	Checked item	Corrective action
Settings were erased while the power was off	Is there a problem with the type of CompactFlash card?	• Replace with one of the CompactFlash cards shown in the following section. ☞Section 2.3 (1) CompactFlash card (sold separately)
	Was the power turned off or the control CPU reset during writing to the CompactFlash card?	• Stop file access before turning off the power or resetting the control CPU. ☞Section 4.7.2 (1) Stopping file access • Format the CompactFlash card again. ☞Section 7.13.8 Formatting the CompactFlash card
Cannot recognize the CompactFlash card.	Is the CompactFlash card inserted correctly?	• Eject the CompactFlash card once and insert it again.
	Was the power turned off or the control CPU reset during writing to the CompactFlash card?	• Stop file access before turning off the power or resetting the control CPU. ☞Section 4.7.2 (1) Stopping file access • Format the CompactFlash card again ☞Section 7.13.8 Formatting the CompactFlash card

(8) Troubleshooting about RCPU

Table 10.25 Troubleshooting about RCPU

Symptom	Checked item	Corrective action
When RCPU is the control CPU for the MES interface module, 'Errors detected by the access target CPU (4001h)' occurs.	Is the MES interface module whose first 5 digits of serial No. are “16071” or lower used?	• Use the MES interface module whose first 5 digits of serial No. are “16072” or higher.
Tag collection error occurs.	Were the devices of RCPU which do not exist in the range of QCPU or C Controller module collected?	• Access the device within the range that can be collected for QCPU or C Controller module.

APPENDICES

Appendix 1 Functions Added in MES Interface Module and MX MESInterface

Appendix 1.1 Comparison between QJ71MES96N and QJ71MES96

This section shows the differences between QJ71MES96N and QJ71MES96.

(1) Specifications

(a) Hardware specifications

Table App.1 Specifications of QJ71MES96N and QJ71MES96

Item	QJ71MES96N	QJ71MES96
Battery	Not mounted	Mounted
5VDC internal current consumption	0.58A	0.69A
Weight	0.15kg	0.16kg

(b) Software specifications

There is no difference in functions between QJ71MES96N (first five digits of the serial No.: 19102) and QJ71MES96 (first five digits of the serial No.: 17122).
For added functions, refer to the following section.

☞Appendix 1.2 Addition of new functions

(2) Startup time

The startup time differs between QJ71MES96N and QJ71MES96.
Fully verify this point in system construction before running the system.
For the considerations for the startup time, refer to the following section.

☞Section 2.6.5 (1) Startup time

(3) Processing time

The processing time differs between QJ71MES96N and QJ71MES96.
Fully verify this point in system construction before running the system.
For the considerations for the processing time, refer to the following section.

☞Appendix 4 Processing Time

(4) Combination with the package

The same package as QJ71MES96 can be used for QJ71MES96N.

Table App.2 Combination with the package

Package		Module	
		QJ71MES96N	QJ71MES96
MX MESInterface	DB Connection Service	○	○
	DB Connection Service Setting Tool		
	MES Interface Function Configuration Tool		

(5) How to replace from QJ71MES96

The following shows the procedure to replace from QJ71MES96 to QJ71MES96N.
Perform one of the following procedure.

Table App.3 How to replace from QJ71MES96

Method	Procedure
When using a saved project	1. Read the setting (project) of the information linkage function from QJ71MES96 using MES Interface Function Configuration Tool. (☞Section 7.12.3 Reading the MES interface function settings, Section 7.4.3 Saving a project) 2. Power OFF the programmable controller. 3. Replace QJ71MES96 with QJ71MES96N. 4. Power ON the programmable controller. 5. Open the saved project. (☞Section 7.4.2 Opening a project) 6. Write the setting of the information linkage function to QJ71MES96N. (☞Section 7.12.2 Writing the MES interface function settings) 7. Power OFF and ON, or reset the programmable controller CPU to restart QJ71MES96N.
When using a CompactFlash card	1. Power OFF the programmable controller. 2. Replace QJ71MES96 with QJ71MES96N. 3. Eject the CompactFlash card from QJ71MES96. 4. Insert the CompactFlash card to QJ71MES96N. 5. Power ON the programmable controller.

(a) Changing procedure of I/O assignment setting by using GX Works3

When RCPU is the control CPU, changing the parameters is required.
Change the parameters with the following procedure by using GX Works3 (version 1.040S or later).

1. Double-click "Parameter" → "System Parameter" in the Navigation window.
2. Change the model name from "QJ71MES96" to "QJ71MES96N" in "I/O Assignment Setting" on the [I/O Assignment] tab on the "System Parameter" screen.
3. Double-click "Parameter" → "Module Information" → "QJ71MES96N" → "Module Parameter" in the Navigation window.
4. Set the same value as the value set to QJ71MES96 in "Switch setting" and "Refresh Setting".
5. Delete "Unset: QJ71MES96" in "Parameter" → "Module Information" in the Navigation window.

6 Select [Online] → [Write to PLC] to write the changed system parameters/CPU parameters and module parameters.

7 Reset the CPU module.

Point

The startup time between QJ71MES96N and QJ71MES96 differs.
When replacing QJ71MES96 with QJ71MES96N, check if the startup time affects the processing to execute a job by synchronizing with a sequence program.
If a job does not start up due to the startup time of the MES interface module, add processing to check that 'Information linkage status (X5)' is in execution (ON).
(☞Section 2.6.5 (1) Startup time)

Appendix 1.2 Addition of new functions

This section explains the functions added in the MES interface module and MX MESInterface, and the serial No. and software version corresponding to the functions added.

Table App.4 Functions added in MES interface module and MX MESInterface

Functions added	Serial No. (first 5 digits) of MES interface module		Software version of MX MESInterface	Reference
	QJ71MES96	QJ71MES96N		
Redundant CPU modules were added to applicable systems.	09012 or later	All versions	-	Section 2.2
Connectable database servers were added. • Microsoft® SQL Server 2005 • Wonderware® Historian 9.0 (Industrial SQL Server)			1.01B or later	Section 2.4.2
Following CPU modules were added to applicable systems. • Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU	09042 or later	All versions	1.02C or later	Section 2.2
CC-Link IE Controller Network (MELSECNET/G) was added to the network communication route.				Section 3.2
The following devices were added as accessible devices: • Link direct devices, Jn\W8000 or higher • Extension data register D32768 or later • Extension link register W8000 or later	09102 or later	All versions	1.03D or later	Section 3.2
Daylight saving time was supported. • Daylight saving setting was added in the System setting.				Section 7.6.2
Array setting was configurable. • Array setting was added in the Device Tag setting.				Section 7.8.2
Timeout can be set. • Connection timeout was added in the Server Service setting.				Section 7.9.1
Multiple records can be acquired by one action. • [MultiSelect] was added as a communication action in the Job setting.				Section 7.11.1
The max. no. of characters available for table names and field names in communication actions of the Job setting was changed to 32.				
Max. event log capacity was changed to 4M bytes.			-	Section 3.1
Following CPU modules were added to applicable systems as mountable modules. • Q02PHCPU, Q06PHCPU • Q00UJCPU, Q00UCPU, Q01UCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU	10012 or later	All versions	1.04E or later	Section 2.2
Windows Vista® was added.	-	-		Section 2.4
Connectable database server was added. • Microsoft® Access® 2007	10012 or later	All versions		Section 2.4.2
The Q50UDEHCPU and Q100UDEHCPU were added to applicable systems.	11052 or later	All versions		Section 2.2

Functions added	Serial No. (first 5 digits) of MES interface module		Software version of MX MESInterface	Reference
	QJ71MES96	QJ71MES96N		
64-bit Windows® was added to the operating environment for server computer. • Microsoft® Windows Server® 2003 x64 Edition • Microsoft® Windows Server® 2008 Operating System • Windows Vista®	-	-	1.05F or later	Section 2.4.2
Connectable database servers were added. • Oracle® 11g • Microsoft® SQL Server® 2008	12012 or later	All versions		
Records can be deleted from databases. • "Delete" was added to the options of the Communication action in the Jog settings.				Section 7.11.1
Items in the Edit items tree can be moved within each setting area.	-	-		Section 7.3.4
32-bit Windows® 7 was added to the operating environment for configuration computer.	-	-	1.06G or later	Section 2.4.1
32-bit and 64-bit Windows® 7 were added to the operating environment for server computer.				Section 2.4.2
The L02CPU and L26CPU-BT were added to accessible programmable controller CPUs.	12092 or later	All versions		Section 3.2
The following devices were added as accessible devices: • Bit device M32768 or later • Bit device B8000 or later				
Connectable database servers were added. • Microsoft® SQL Server® 2008 R2				Section 2.4
The Q12DCCPU-V was added to applicable systems.			-	Section 2.2
64-bit Windows® 7 was added to the operating environment for configuration computer.	-	-	1.08J or later	Section 2.4.1
The connectable database server was added. • Microsoft® Access® 2010	13092 or later	All versions		Section 2.4.2
The CC-Link IE Field Network becomes available.				Section 3.2
The L02CPU-P and L26CPU-PBT were added to accessible programmable controller CPUs.				

Functions added	Serial No. (first 5 digits) of MES interface module		Software version of MX MESInterface	Reference
	QJ71MES96	QJ71MES96N		
The function to browse table names/field names of database used for the communication action setting was added.	-	-	1.09K or later	Section 7.11.1
The following devices were added as accessible devices: • Extension data register D4216832 or later • Extension link register W405800 or later	09102 or later	All versions		Section 3.2
The following devices were added as accessible devices: • Extension internal relay W65536 or later • Extension link relay B10000 or later • Extension file register ZR4184064 or later	14122 or later	All versions		
Connectable database server was added. • Microsoft® SQL Server® 2012				Section 2.4.2
16-bit BCD and 32-bit BCD were added to the data type of tag component.				Section 7.8.3
Following CPU modules were added to applicable systems as mountable modules. • Q03UDVCPU, Q04UDVCPU, Q06UDVCPU, Q13UDVCPU, Q26UDVCPU • Q24DHCCPU-V, Q24DHCCPU-LS			-	Section 2.2
The L02SCPU, L02SCPU-P, L06CPU, L06CPU-P, L26CPU and L26CPU-P were added to accessible programmable controller CPUs.				Section 3.2
Connectable database server was added. • Microsoft® Access® 2013	15102 or later	All versions	1.10L or later	Section 2.4
Ethernet module was added to LCPU network communication route.				Section 3.2
The stored procedure call function was added • [Stored procedure] was added as a communication action in the Job setting.				Section 7.11.3
DB buffering operation of recovery from network disconnection was added.				Section 7.6.4
Windows® 8, and Windows Server® 2012 were added to the operating environment.	-	-		Section 2.4
Windows® 8.1 was added to the operating environment.	16072 or later	All versions	1.12N or later	Section 2.4
Connectable database server was added. • Oracle® 12c				Section 2.4.2
Following CPU modules were added to applicable systems as mountable modules. • R04CPU, R08CPU, R16CPU, R32CPU, R120CPU				Section 2.2
Connectable database server was added. • Microsoft® SQL Server® 2014	17122 or later	All versions	1.14Q or later	Section 2.4
MELSOFT connection extended setting of QCPU (Q mode) was supported.				Section 3.2
Selection of the type of Log character code was added to the DB Connection Service Setting.	-	-		Section 8.5
The MELSEC iQ-R series MES interface module was supported with DB Connection Service.				-

Functions added	Serial No. (first 5 digits) of MES interface module		Software version of MX MESInterface	Reference
	QJ71MES96	QJ71MES96N		
Windows® 10 was added to the operating environment.	17122 or later	All versions	1.16S or later	Section 2.4
The installer of MES Interface Function Configuration Tool and DB Connection Service Setting Tool was improved.				Section 5.1
64-bit version DB Connection Service and DB Connection Service Setting Tool was added. (DB Connection Service and DB Connection Service Setting Tool Version 2)			1.17T or later	Section 2.4
Windows Server® 2016 was added to the operating environment.	17122 or later	All versions	1.17T or later	Section 2.4
Connectable database server was added. • Microsoft® SQL Server® 2016 • Microsoft® Access® 2016				Section 2.4 Section 3.1
Connectable database server was added. • Microsoft® SQL Server® 2017	Not supported	All versions	1.19V or later	Section 2.4 Section 3.1
Windows Server® 2019 was added to the operating environment.	Not supported	All versions	1.21X or later	Section 2.4.2
Connectable database server was added. • Oracle® 18c				Section 2.4.2 Section 3.1
Connectable database server was added. • Oracle® 19c • Microsoft® SQL Server® 2019 • Microsoft® Access® 2019	Not supported	All versions	1.23Z or later	Section 2.4.2 Section 3.1

-: Functions that are not related to serial No. or software version.

Appendix 1.3 Operations of former versions

This section describes the operations of the former MES interface module and MX MES Interface versions.

(1) DB buffering function

(a) For a MES interface module whose first five digits of serial No. is "09101" or earlier

The processing content of automatic resend while DB buffering is different.

Processing content

1. When the job data cannot be sent to the database, it is stored to DB buffer after the detection of a timeout.
2. Data is sent to database each time when the job is started up.
   When the data cannot be sent to the database, it is stored to DB buffer after the detection of a timeout.
3. The content of DB buffer is resent after recovery.

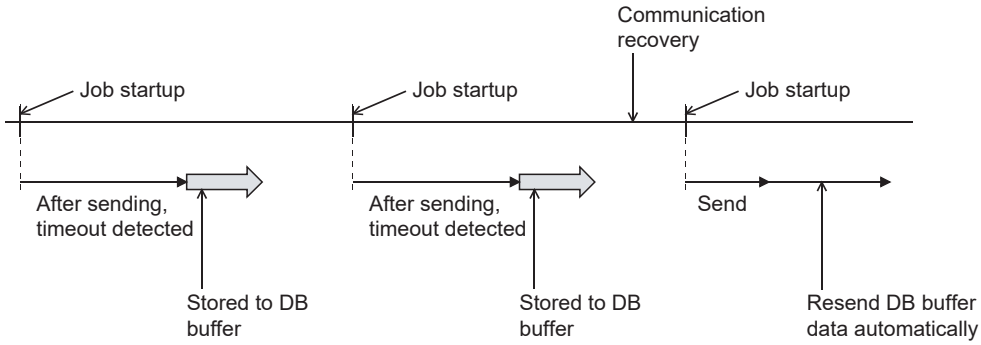


Figure App.1 When auto-resend is set for a job

For automatic resend processing of MES interface module whose first five digits of serial No. is "09102" or later, refer to the following:

- Overview of automatic resend processing ☞ Section 6.1.10 (7)
- Operation while data is being stored to DB buffer ☞ Section 6.1.10 (8) (a)

(b) For MX MESInterface version 1.09K or earlier

Due to upgrade the software version, the display contents on the DB buffering settings of the Job settings will be changed as shown in the following table.
The operation of the system settings (Operation of recovery from network disconnection) added to version 1.10L or later is the same as the default settings of version 1.09K or earlier.

Table App.5 DB buffering settings

version 1.09K or earlier	version 1.10L or later	
Job settings	**Job settings**	**System settings (Operation of recovery from network disconnection)**
Select "Automatically resend at time of restoration"	Using the Automatically resend buffer	Automatically resend buffer "Immediate sending (Do not add to the buffered data)"
Clear "Automatically resend at time of restoration"	Using the Manually resend buffer	Manually resend buffer "Adding to the buffered data"

(2) Trigger monitoring function

The operation conditions for starting a job are as described below.

(a) For an MES interface module whose first five digits of serial No. is "11011" or earlier

The job can be started only when the device tags used for trigger conditions of all jobs have been sampled normally.

(b) For an MES interface module whose first five digits of serial No. is "11012" or later

The job can be started when the device tags used for trigger conditions of the job have been sampled normally.

The job can be started even if device tags used for another job's trigger conditions have not been sampled normally.

Appendix 2 Usable Characters and ASCII Code Tables

Appendix 2.1 ASCII code table

Table App.6 ASCII code table

	0	1	2	3	4	5	6	7	8	9
0	NUL		(SP)	0	@	P	`	p		
1			!	1	A	Q	a	q		
2			“	2	B	R	b	r		
3			#	3	C	S	c	s		
4			$	4	D	T	d	t		
5			%	5	E	U	e	u		
6			&	6	F	V	f	v		
7			'	7	G	W	g	w		
8			(	8	H	X	h	x		
9			)	9	I	Y	i	y		
A			*	:	J	Z	j	z		
B			+	;	K	[	k	{		
C			,	<	L	¥	l	|		
D			-	=	M	]	m	}		
E			.	>	N	^	n	~		
F			/	?	O	_	o			

Appendix 2.2 Characters that can be used for item names, component names, variable names, etc. in the product

(1) ASCII characters

The shaded sections can be used.

(However, neither a number nor an underscore (_) can be used as the first character.)

Table App.7 ASCII characters

	0	1	2	3	4	5	6	7	8	9
0	NUL		(SP)	0	@	P	`	p		
1			!	1	A	Q	a	q		
2			“	2	B	R	b	r		
3			#	3	C	S	c	s		
4			$	4	D	T	d	t		
5			%	5	E	U	e	u		
6			&	6	F	V	f	v		
7			'	7	G	W	g	w		
8			(	8	H	X	h	x		
9			)	9	I	Y	i	y		
A			*	:	J	Z	j	z		
B			+	;	K	[	k	{		
C			,	<	L	¥	l	|		
D			-	=	M	]	m	}		
E			.	>	N	^	n	~		
F			/	?	O	_	o			

(2) Reserved terms

The following words are reserved terms and therefore cannot be used.

For reserved terms of the database, refer to the following.

☞Manuals of the database used

Table App.8 Reserved terms

	Reserved terms
A	abstract
B	boolean, break, byte
C	case, catch, char, class, const, continue
D	DATETIME, debugger, default, delete, do, double
E	else, enum, event, exit, export, extends
F	false, final, finally, float, for, function
G	goto
I	if, implements, import, in, include, Infinity, instanceof, int, interface, invoke
L	long
N	NaN, native, new, null
O	oneshot
P	package, private, protected, public
R	return
S	short, static, super, switch, synchronized, SYSTEM
T	this, throw, throws, trace, transient, true, try, typeof
U	undefined
V	var, void, volatile
W	while, with

Appendix 2.3 Characters available for character string constants, etc.

The shaded sections can be used.
(Note that use of ":" (colon) is not allowed for [User name] of [Account setting].)

Table App.9 Characters can be used in character string constants, etc.

	0	1	2	3	4	5	6	7	8	9
0	NUL		(SP)	0	@	P	`	p		
1			!	1	A	Q	a	q		
2			“	2	B	R	b	r		
3			#	3	C	S	c	s		
4			$	4	D	T	d	t		
5			%	5	E	U	e	u		
6			&	6	F	V	f	v		
7			'	7	G	W	g	w		
8			(	8	H	X	h	x		
9			)	9	I	Y	i	y		
A			*	:	J	Z	j	z		
B			+	;	K	[	k	{		
C			,	<	L	¥	l	|		
D			-	=	M	]	m	}		
E			.	>	N	^	n	~		
F			/	?	O	_	o			

Appendix 2.4 Characters available for field names, table names, stored procedure names,etc.

The shaded sections can be used.(However, a number cannot be used as the first character.)
Reserved terms of the database cannot be used. For reserved terms of the database, refer to the following.
☞Manuals of the database used

Table App.10 Characters can be used in field names, table names, etc.

	0	1	2	3	4	5	6	7	8	9
0	NUL		(SP)	0	@	P	`	p		
1			!	1	A	Q	a	q		
2			“	2	B	R	b	r		
3			#	3	C	S	c	s		
4			$	4	D	T	d	t		
5			%	5	E	U	e	u		
6			&	6	F	V	f	v		
7			'	7	G	W	g	w		
8			(	8	H	X	h	x		
9			)	9	I	Y	I	y		
A			*	:	J	Z	j	z		
B			+	;	K	[	k	{		
C			,	<	L	¥	l	|		
D			-	=	M	]	m	}		
E			.	>	N	^	n	~		
F			/	?	O	_	o			

Appendix 3 Setting Information File Format (CSV File Format)

This section explains the format of CSV files (Setting information files) created by exporting the project settings with the MES Interface Function Configuration Tool.
☞Section 7.4.6 Exporting a CSV file
Exported setting information files can be utilized for creating setting sheets or printing.

Appendix 3.1 Setting information files list

This section lists the exported setting information files.

Table App.11 List of exported setting information files

File name	Setting contents	Reference section
SYSTEM.CSV *1	[System setting] - [Network settings] [System setting] - [Time synchronization setting]	Appendix 3.3
ACCOUNT.CSV *1	[System setting] - [Account setting]	Appendix 3.4
DST.CSV	[System setting] - [Time synchronization setting]	Appendix 3.5
DBBUF.CSV	[System setting] - [DB buffering settings]	Appendix 3.6
CPU.CSV *1	[Access target CPU settings]	Appendix 3.7
TAG.CSV *1	[Device tag settings]	Appendix 3.8
COMPONENT.CSV *1	[Device tag settings] - [Component setting]	Appendix 3.9
SERVER.CSV	[Server service settings]	Appendix 3.10
JOB.CSV	[Job settings] [Job settings] - [DB buffering settings]	Appendix 3.11
CONDITION.CSV	[Job settings] - [Trigger conditions]	Appendix 3.12
ACTION.CSV	[Job settings] - [Action]	Appendix 3.13
ACFIELD.CSV	[Communication action] - [DB-tag link settings]	Appendix 3.14
ACCONDITION.CSV	[Communication action] - [Select/Update/Delete conditions]	Appendix 3.15
ACEXCEPTION.CSV	[Communication action] - [Exception processing]	Appendix 3.16
ACOPERATION.CSV	[Operation action]	Appendix 3.17
REMOTE.CSV	[Job settings] - [Program execution]	Appendix 3.18
ORDERBY.CSV	[Communication action] - [Select sort settings]	Appendix 3.19
MULTISELECT.CSV	[Communication action] - [Multi select setting]	Appendix 3.20

*1 Saved information setting file can be imported.
☞Section 7.4.5 Importing a CSV file

Appendix 3.2 Setting information file format and editing precautions

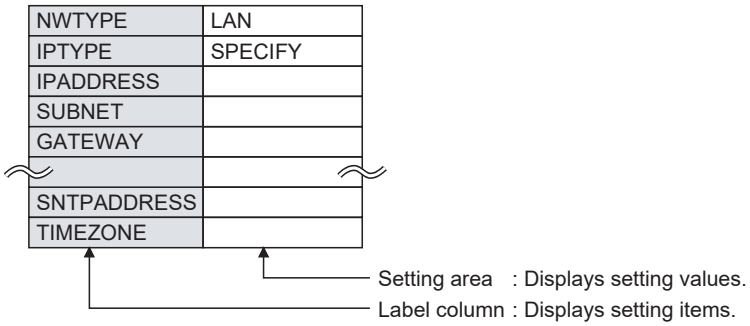
This section explains the setting information file format and editing precautions.
This section shows with an example in which the setting information file is displayed with spreadsheet software.

(1) Setting information file format

The setting information file format has the type made up of label columns and setting areas and the type made up of label columns, item rows, and setting areas.

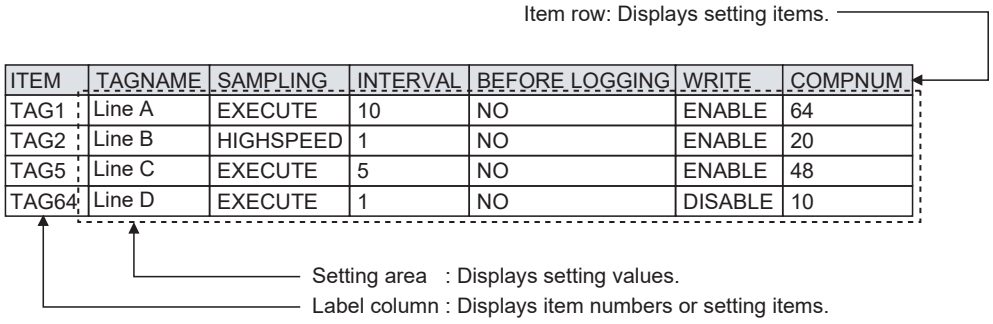
(a) Type made up of label columns and setting areas

Table App.12 Type made up of label columns and setting areas

Item	Description
File format	
Available file	SYSTEM.CSV, DST.CSV

(b) Type made up of label columns, item columns, and setting areas

Table App.13 Type made up of label columns, item columns, and setting areas

Item	Description
File format	
Available file	ACCOUNT.CSV, DBBUF.CSV, CPU.CSV, TAG.CSV, COMPONENT.CSV, SERVER.CSV, JOB.CSV, CONDITION.CSV, ACTION.CSV, ACFIELD.CSV, ACCONDITION.CSV, ACEXCEPTION.CSV, ACOPERATION.CSV, REMOTE.CSV, ORDERBY.CSV, MULTISELECT.CSV

(2) Precautions for editing setting information files

For details on how to edit setting information files and setting information files that can be imported, refer to *1 below.

☞Appendix 3.1 Setting information files list

Point

(1) When editing a setting information file using such as spreadsheet software, change the setting items to match the setting information file formats, explained starting from the following descriptions.

(2) When editing a setting information file, make sure to use the exported setting information file.
A setting information file must not be created by the user.

(a) Space
All spaces are treated as a part of the item.
If a space is used with a setting item in which a space cannot be used, an error will occur.

(b) Uppercase/lowercase characters
Uppercase and lowercase characters are distinguished.

(c) Special characters

1) "Line feed"
To input a "Line feed", enter "\n".
(Example) An error occurred in Line A. \n Execute recovery processing.

2) "\" mark
To input "\", enter "\\".

3) "," comma
When inputting a ",", enclose the entire item in double quotation marks.
(However, at the use of Excel®, double quotations do not need to be entered since they are added automatically when the data is saved in CSV format.)
(Example) "As the temperature was abnormal, the machine stopped"

(3) How to see the setting information file formats

The following shows how to see the setting information file formats explained starting from the subsequent descriptions.

The figure below is for explanation, and therefore differs from the actual pages.

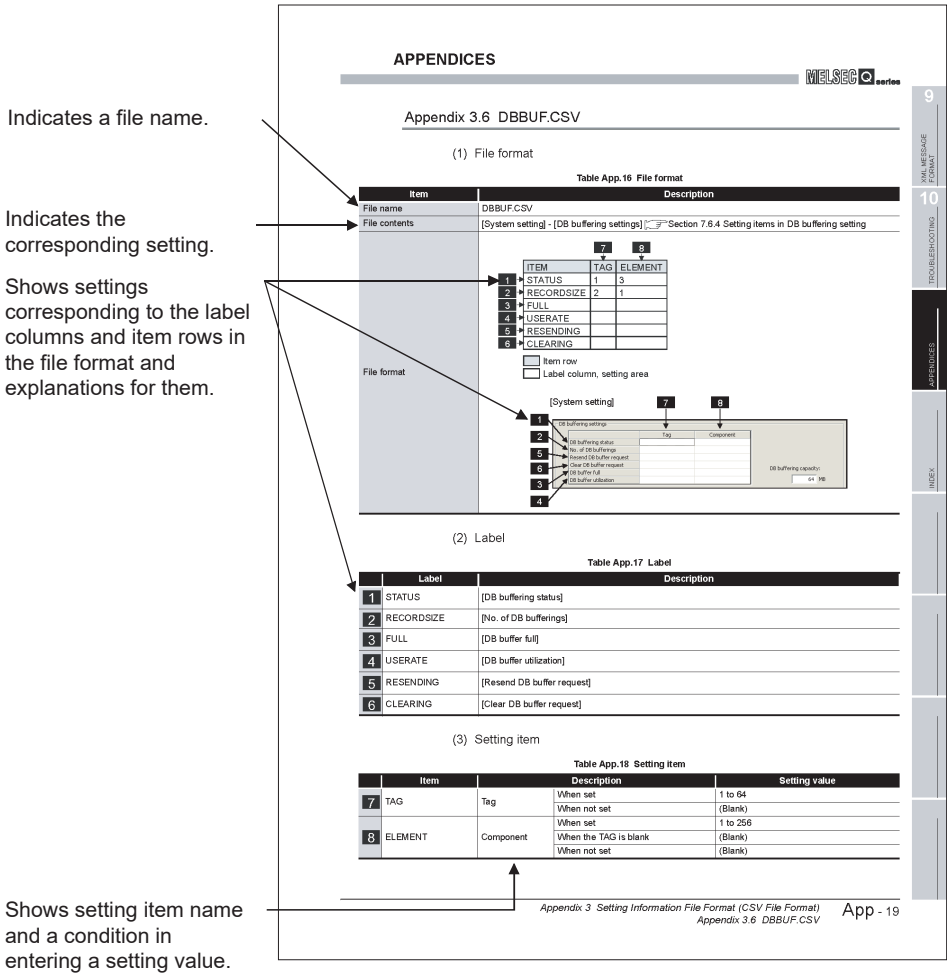


Figure App.2 How to see the setting information file formats

(a) Setting values

1) Setting values in [ ] ((Example) [YES])
Enter alphabetic characters in uppercase.

2) (Blank)
Unnecessary to enter setting values.

3) Settings other than 1) and 2) above
Enter any value according to the setting range for the setting value column.

Appendix 3.3 SYSTEM.CSV

(1) File format

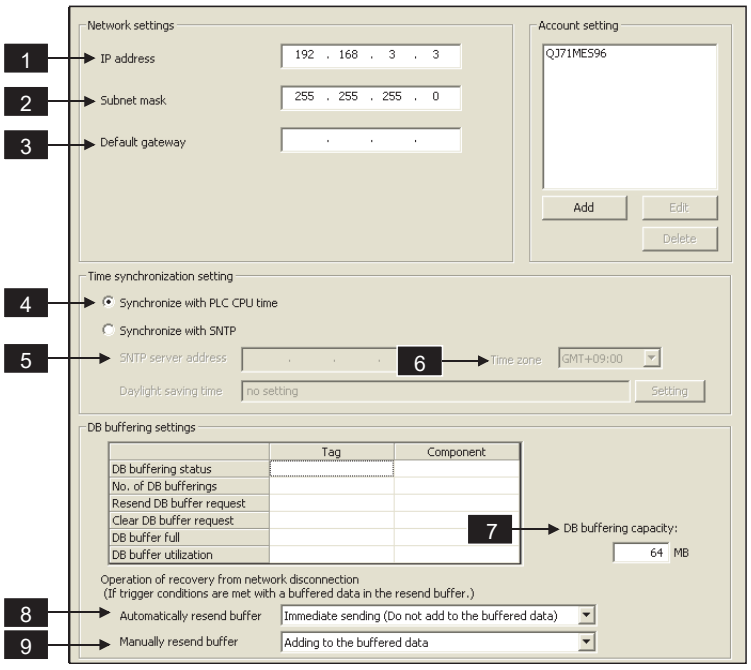
Table App.14 File format

Item	Description
File name	SYSTEM.CSV
File contents	• [System setting] - [Network settings] ☞Section 7.6.1 Setting items in Network setting • [System setting] - [Time synchronization setting] ☞Section 7.6.2 Setting items in Time synchronization setting
File format	

	NWTYPE	LAN
	IPTYPE	SPECIFY
1	IPADDRESS	192.168.3.3
2	SUBNET	255.255.255.0
3	GATEWAY	
	DNSTYPE	SPECIFY
	DNS1	
	DNS2	
	HTTPTYPE	DEFAULT
	HTTPPORT	
	HTTPNAT	NO
	FTPTYPE	DEFAULT
	FTPPORT	
	FTPNAT	NO
	SYSTEMNAME	QJ71MES96
	DIAGNOSIS	NO
	INTERVAL	
	DESTINATION	
	EDEVICE	
	STARTUP	YES
4	SNTP	PLC
5	SNTPADDRESS	
6	TIMEZONE	
7	DBBUFSIZE	64
8	AUTORESEND	
9	MANUALRESEND	

Label column : Change disabled.
Setting area : Can be changed by the user.

[System setting]



(2) Label

Table App.15 Label

	Label	Description		Setting value
—	NWTYPE	(Fixed value)		[LAN]
—	IPTYPE	(Fixed value)		[SPECIFY]
1	IPADDRESS	IP address		IP address (Decimal)
2	SUBNET	Subnet mask		Subnet mask (Decimal)
3	GATEWAY	Default gateway		Default gateway (Decimal) or (Blank)
—	DNSTYPE	(Fixed value)		[SPECIFY]
—	DNS1	(Fixed value)		(Blank)
—	DNS2	(Fixed value)		(Blank)
—	HTTPTYPE	(Fixed value)		[DEFAULT]
—	HTTPPORT	(Fixed value)		(Blank)
—	HTTPNAT	(Fixed value)		[NO]
—	FTPTYPE	(Fixed value)		[DEFAULT]
—	FTPPORT	(Fixed value)		(Blank)
—	FTPNAT	(Fixed value)		[NO]
—	SYSTEMNAME	(Fixed value)		[QJ71MES96]
—	DIAGNOSIS	(Fixed value)		[NO]
—	INTERVAL	(Fixed value)		(Blank)
—	DESTINATION	(Fixed value)		(Blank)
—	EDEVICE	(Fixed value)		(Blank)
—	STARTUP	(Fixed value)		[YES]
4	SNTP	Time synchronization setting	Synchronize with PLC CPU time	[PLC]
			Synchronize with SNTP	[SNTP]
5	SNTPADDRESS	SNTP server address	When [PLC] is selected with SNTP	(Blank)
			When [SNTP] is selected with SNTP	SNTP server address (Decimal)
6	TIMEZONE	SNTP time zone	When [PLC] is selected with SNTP	(Blank)
			When [SNTP] is selected with SNTP	Time zone character strings
7	DB BUFSIZE	DB buffering capacity		16 to 512
8	AUTORESEND	Automatically resend buffer	When "Adding to the buffered data" is selected.	BUFFERED
			When "Immediate sending (Do not add to the buffered data)" is selected.	(This item is not output.)
9	MANUALRESEND	Manually resend buffer	When "Adding to the buffered data" is selected.	(This item is not output.)
			When "Immediate sending (Do not add to the buffered data)" is selected.	IMMEDIATELY

Appendix 3.4 ACCOUNT.CSV

(1) File format

Table App.16 File format

Item	Description
File name	ACCOUNT.CSV
File contents	[System setting] - [Account setting] Section 7.6.3 Setting items in Account setting
File format	

2 3

ITEM	USERNAME	PASSWORD	DWRITE	TWRITE	ADMINISTRATOR
ACCOUNT1	QJ71MES96	MITSUBISHI	YES	YES	YES
ACCOUNT2	USER1	USERUSER1	YES	YES	YES
ACCOUNT12	USER2	USERUSER2	YES	YES	YES
ACCOUNT16	USER3	USERUSER3	YES	YES	YES

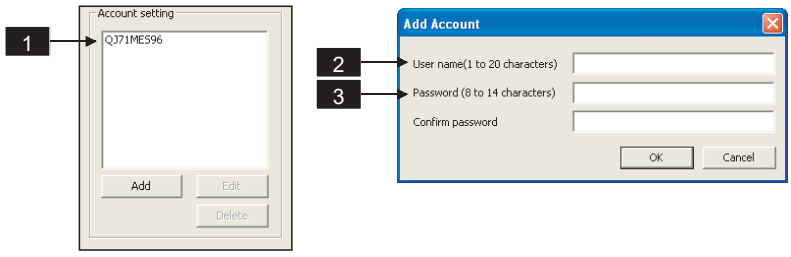
1) 1

INITIAL	FILENAME
TOP	
TOP	
TOP	
TOP	

1)

Item row : Change disabled.
Label column, setting area : Can be changed by the user.

[System setting]



(2) Label

Table App.17 Label

	Label	Description
1	ACCOUNT1 to ACCOUNT16	Set [Account setting] items No. 1 to 16. Enter only the labels desired to be set. (Unnecessary to enter labels not to be set.)

(3) Setting item

Table App.18 Setting item

	Item	Description	Setting value
2	USERNAME	User name *1 *2	1 to 20 characters
3	PASSWORD	Password *1	8 to 14 characters
—	DWRITE	(Fixed value)	[YES]
—	TWRITE	(Fixed value)	[YES]
—	ADMINISTRATOR	(Fixed value)	[YES]
—	INITIAL	(Fixed value)	[TOP]
—	FILENAME	(Fixed value)	(Blank)

*1 For characters can be used in user names and passwords, refer to the following.

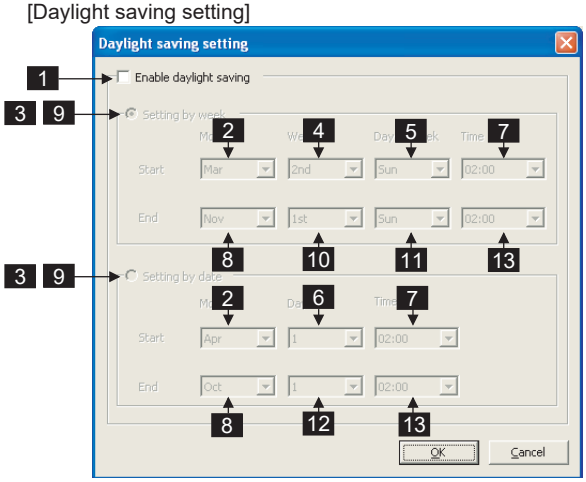
☞ Appendix 2.3 Characters available for character string constants, etc.

*2 If the same user name already exists, the existing name is overwritten.
If the same user name is set multiple times, the setting of the label with the higher number is overwritten.

Appendix 3.5 DST.CSV

(1) File format

Table App.19 File format

Item	Description
File name	DST.CSV
File contents	[System setting] - [Time synchronization setting] ☞Section 7.6.2 Setting items in Time synchronization setting
File format	1 DST, ENABLE 2 S_MONTH, MAR 3 S_TYPE, WEEK 4 S_WEEKNUM, 2 5 S_DAYOFWEEK, SUN 6 S_DAY, 7 S_HOUR, 02 8 E_MONTH, NOV 9 E_TYPE, WEEK 10 E_WEEKNUM, 1 11 E_DAYOFWEEK, SUN 12 E_DAY, 13 E_HOUR, 02 Label column: Cannot be changed by the user. Setting area: Can be changed by the user. [Daylight saving setting] 

(2) Label

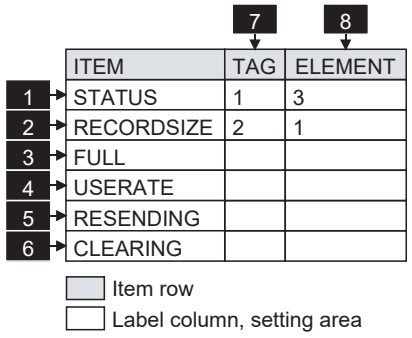
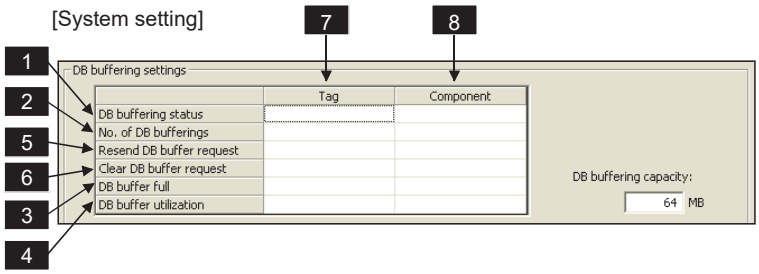
Table App.20 Setting items

	Item	Description			Setting value
1	DST	Daylight saving setting	Enable daylight setting		[ENABLE]
			Disable daylight setting		[DISABLE]
			When the time is synchronized with programmable controller CPU		
2	S_MONTH	Starting month	When DST is [ENABLE]		JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC
			When DST is [DISABLE]		(Blank)
3	S_TYPE	Specification method	Setting by week		[WEEK]
			Setting by date		[DATE]
			When DST is [DISABLE]		(Blank)
4	S_WEEKNUM	Starting week	When TYPE is [WEEK]		1 to 4, LAST
			When TYPE is [DATE]		(Blank)
5	S_DAYOFWEEK	Starting day of week	When TYPE is [WEEK]		SUN, MON, TUE, WED, THU, FRI, SAT
			When TYPE is [DATE]		(Blank)
			When DST is [DISABLE]		(Blank)
6	S_DAY	Starting day	When TYPE is [WEEK]		(Blank)
			When TYPE is [DATE]	When MONTH is 1, 3, 5, 7, 8, 10 or 12	1 to 31, LAST
				When MONTH is 4, 6, 9 or 11	1 to 30, LAST
				When MONTH is 2	1 to 28, LAST
			When DST is [DISABLE]		(Blank)
7	S_HOUR	Starting time	When DST is [ENABLE]		00 to 23
			When DST is [DISABLE]		(Blank)
8	E_MONTH	Ending month	When DST is [ENABLE]		JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC
			When DST is [DISABLE]		(Blank)
9	E_TYPE	Specification method	Setting by week		[WEEK]
			Setting by date		[DATE]
			When DST is [DISABLE]		(Blank)
10	E_WEEKNUM	Ending week	When TYPE is [WEEK]		1 to 4, LAST
			When TYPE is [DATE]		(Blank)
			When DST is [DISABLE]		
11	E_DAYOFWEEK	Ending day of week	When TYPE is [WEEK]		SUN, MON, TUE, WED, THU, FRI, SAT
			When TYPE is [DATE]		(Blank)
			When DST is [DISABLE]		
12	E_DAY	Ending day	When TYPE is [WEEK]		(Blank)
			When TYPE is [DATE]	When MONTH is 1, 3, 5, 7, 8, 10 or 12	1 to 31, LAST
				When MONTH is 4, 6, 9 or 11	1 to 30, LAST
				When MONTH is 2	1 to 28, LAST
			When DST is [DISABLE]		(Blank)
13	E_HOUR	Ending time	When DST is [ENABLE]		00 to 23
			When DST is [DISABLE]		(Blank)

Appendix 3.6 DBBUF.CSV

(1) File format

Table App.21 File format

Item	Description
File name	DBBUF.CSV
File contents	[System setting] - [DB buffering settings] Section 7.6.4 Setting items in DB buffering setting
File format	 

(2) Label

Table App.22 Label

	Label	Description
1	STATUS	[DB buffering status]
2	RECORDSIZE	[No. of DB bufferings]
3	FULL	[DB buffer full]
4	USERATE	[DB buffer utilization]
5	RESENDING	[Resend DB buffer request]
6	CLEARING	[Clear DB buffer request]

(3) Setting item

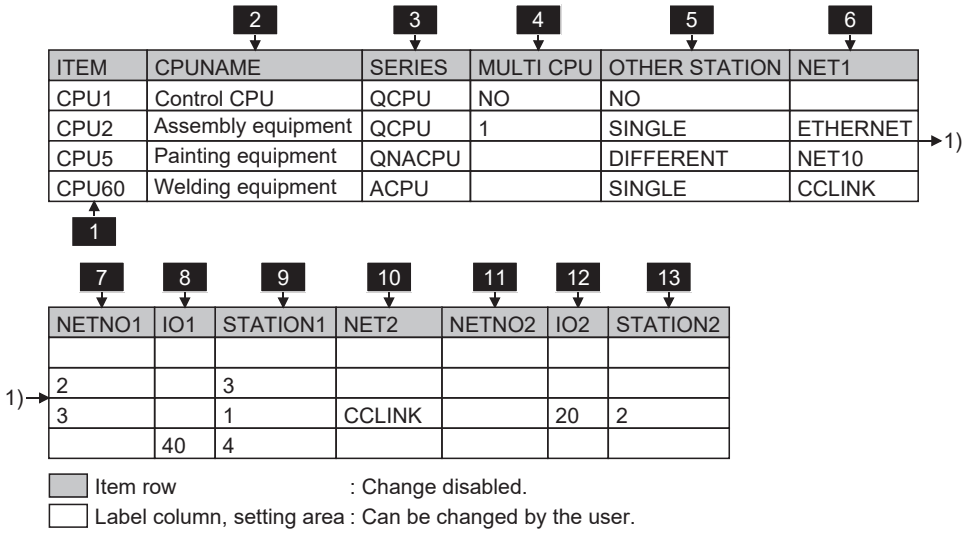
Table App.23 Setting item

	Item	Description		Setting value
7	TAG	Tag	When set	1 to 64
			When not set	(Blank)
8	ELEMENT	Component	When set	1 to 256
			When the TAG is blank	(Blank)
			When not set	(Blank)

Appendix 3.7 CPU.CSV

(1) File format

Table App.24 File format

Item	Description
File name	CPU.CSV
File contents	[Access target CPU settings] ☞Section 7.7.1 Setting items in Access target CPU setting
File format	

2	3	4	5	6
ITEM	CPUNAME	SERIES	MULTI CPU	OTHER STATION	NET1
CPU1	Control CPU	QCPU	NO	NO	
CPU2	Assembly equipment	QCPU	1	SINGLE	ETHERNET
CPU5	Painting equipment	QNACPU		DIFFERENT	NET10
CPU60	Welding equipment	ACPU		SINGLE	CCLINK

1) → CPU2 ETHERNET

1

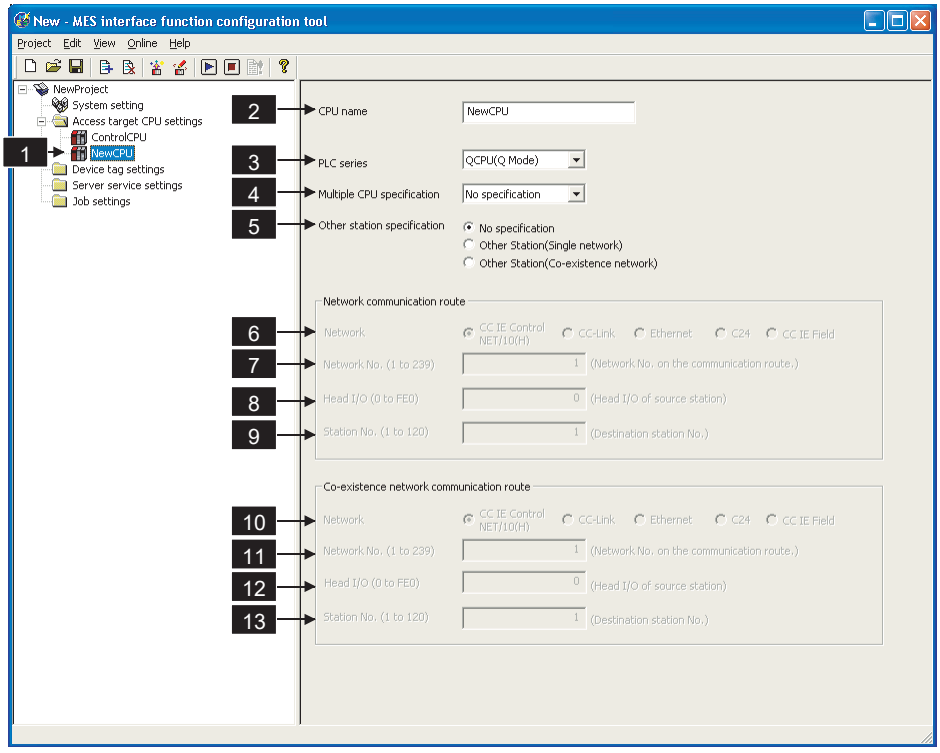
7	8	9	10	11	12	13
NETNO1	IO1	STATION1	NET2	NETNO2	IO2	STATION2
2		3				
3		1	CCLINK		20	2
	40	4				

1) → 2 3

Item row : Change disabled.

Label column, setting area : Can be changed by the user.

[Access target CPU settings]



(2) Label

Table App.25 Label

	Label	Description
1	CPU1	Set [Access target CPU settings] items No. 1. (Setting required) Only [CPUNAME] can be set. (Other setting items are disabled.)
	CPU2 to CPU64	Set [Access target CPU settings] items No. 2 to 64. Enter only the labels desired to be set. (Unnecessary to enter labels not to be set.)

(3) Setting item

Table App.26 Setting item

	Item	Description			Setting value
2	CPUNAME	CPU name *1 *2			Up to 16 characters
3	SERIES	PLC series	QCPU (Q mode)/RCPU		[QCPU]*5
			QCPU (A mode)		[QCPUA]
			LCPU		[LCPU]
			QnACPU		[QNACPU]
			ACPU		[ACPU]
4	MULTI CPU	Multiple CPU specification	When [QCPU] is selected with SERIES	No specification	[NO]
				CPU No. 1	[1]
				CPU No. 2	[2]
				CPU No. 3	[3]
				CPU No. 4	[4]
			When other than the above is selected with SERIES		(Blank)
5	OTHER STATION	Other station specification	No specification *3		[NO]
			Other station (Single network)		[SINGLE]
			Other station (Different network)		[DIFFERENT]
6	NET1	Network	When [SINGLE] or [DIFFERENT] is selected with OTHER STATION *4	CC IE Control NET/10(H)	[NET10]
				CC-Link	[CCLINK]
				Ethernet	[ETHERNET]
				C24	[C24]
				CC IE Field	[CCIEFIELD]
			When [NO] is selected with OTHER STATION		(Blank)
7	NETNO1	Network No.	When [SINGLE] or [DIFFERENT] is selected for OTHER STATION and [NET10], [ETHERNET], or [CCIEFIELD] is selected for NET1		1 to 239
			When other than the above is selected		(Blank)
8	IO1	I/O Address	When [SINGLE] or [DIFFERENT] is selected with OTHER STATION and [CCLINK] or [C24] is selected with NET1		0h to FE0h (Hexadecimal)
			When other than the above is selected		(Blank)

(To the next page)

(From the previous page)

Table App.26 Setting item

	Item	Description			Setting value
9	STATION1	Station number	When [SINGLE] or [DIFFERENT] is selected with OTHER STATION	When [NET10] or [ETHERNET] is selected with NET1	1 to 120
				When [CCLINK] is selected with NET1	0 to 63
				When [C24] is selected with NET1	0 to 31
				When [CCIEFIELD] is selected for NET1	0 to 120
			When [NO] is selected with OTHER STATION		(Blank)
10	NET2	Network	When [DIFFERENT] is selected with OTHER STATION*4	CC IE Control NET/10(H)	[NET10]
				CC-Link	[CCLINK]
				Ethernet	[ETHERNET]
				C24	[C24]
				CC IE Field	[CCIEFIELD]
			When other than the above is selected with OTHER STATION		(Blank)
11	NETNO2	Network No.	When [DIFFERENT] is selected for OTHER STATION and [NET10], [ETHERNET], or [CCIEFIELD] is selected for NET2		1 to 239
			When other than the above is selected		(Blank)
12	IO2	I/O Address	When [DIFFERENT] is selected with OTHER STATION and [CCLINK] or [C24] is selected with NET2		0h to FE0h (Hexadecimal)
			When other than the above is selected		(Blank)
13	STATION2	Station number	When [DIFFERENT] is selected with OTHER STATION	When [NET10] or [ETHERNET] is selected with NET2	1 to 120
				When [CCLINK] is selected with NET2	0 to 63
				When [C24] is selected with NET2	0 to 31
				When [CCIEFIELD] is selected for NET2	0 to 120
			When other than the above is selected with OTHER STATION		(Blank)

*1 For characters can be used in CPU names, refer to the following. For characters that can be used for describing the name, refer to the following.

☞ Appendix 2.2 Characters that can be used for item names, component names, variable names, etc. in the product

*2 If the same CPU name already exists, the existing name is overwritten.
If the same CPU name is set multiple times, the setting of the label with the higher number is overwritten.

*3 If the series other than [QCPU] is selected for SERIES, [NO] cannot be selected.
If selected, an error occurs.

*4 Some restrictions apply to the setting values of NET1 and NET2 depending on the combination (refer to the table below).
If a value is set without following the restrictions, an error occurs.

*5 "QCPU" is displayed even when using C Controller module or RCPU.

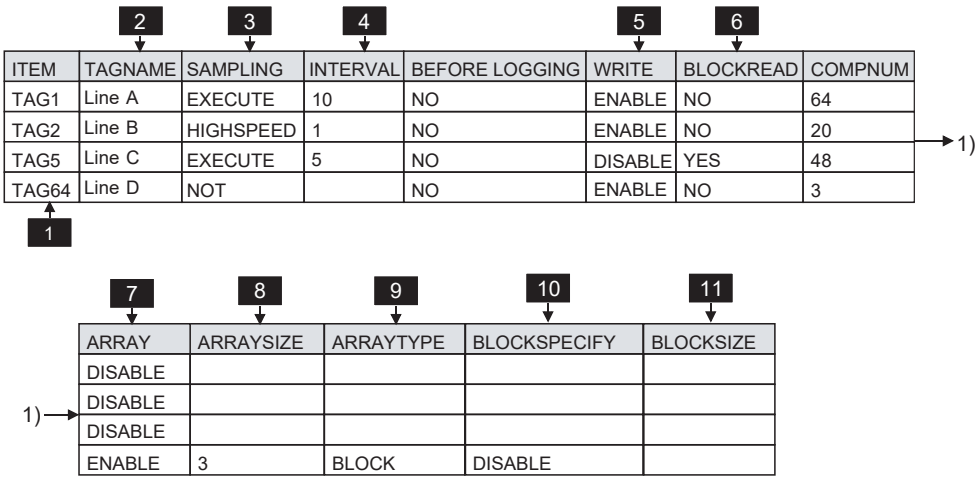
Table App.27 Setting values of NET1 and NET2

SERIES	OTHER STATION	NET1	NET2
QCPU	SINGLE	There is no restriction.	-
	DIFFERENT	There is no restriction.	1) When [NET10], [ETHERNET], or [CCIEFIELD] is set to NET1, [NET10], [ETHERNET], or [CCIEFIELD] cannot be set. 2) When [CCLINK] or [C24] is set to NET1, [CCLINK] or [C24] cannot be set.
QCPUA	SINGLE	[ETHERNET], [C24], and [CCIEFIELD] cannot be set.	-
	DIFFERENT	[CCLINK] and [C24] cannot be set.	The following values cannot be set. • [NET10] • [ETHERNET] • [CCIEFIELD] • [C24]
LCPU	SINGLE	[NET10] cannot be set.	-
	DIFFERENT	There is no restriction.	1) The following values cannot be set. • [NET10] 2) When [NET10], [ETHERNET], or [CCIEFIELD] is set to NET1, [CCIEFIELD] cannot be set. 3) When [CCLINK] or [C24] is set to NET1, [CCLINK] or [C24] cannot be set.
QNACPU	SINGLE	[CCIEFIELD] cannot be set.	-
	DIFFERENT	[CCLINK] and [C24] cannot be set.	The following values cannot be set. • [NET10] • [ETHERNET] • [CCIEFIELD] • [C24]
ACPU	SINGLE	[ETHERNET], [C24], and [CCIEFIELD] cannot be set.	-
	DIFFERENT	[CCLINK] and [C24] cannot be set.	The following values cannot be set. • [NET10] • [ETHERNET] • [CCIEFIELD] • [C24]

Appendix 3.8 TAG.CSV

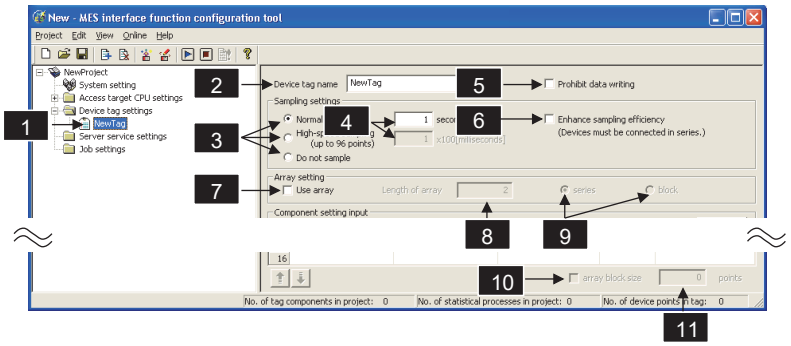
(1) File format

Table App.28 File format

Item	Description
File name	TAG.CSV
File contents	[Device tag settings] Section 7.8.1 Setting items in Device Tag setting
File format	

Item row: Cannot be changed by the user.
Label column, Setting area: Can be changed by the user.

[Device tag settings]



(2) Label

Table App.29 Label

	Label	Description
1	TAG1 to TAG64	Set [Device tag settings] items No. 1 to 64. Enter only the labels desired to be set. (Unnecessary to enter labels not to be set.)

(3) Setting item

Table App.30 Setting item

	Item	Description		Setting value
2	TAGNAME	Device tag name *1*2*3		Up to 16 characters
3	SAMPLING	Sampling specification	Do not sample	[NOT]
			Normal sampling	[EXECUTE]
			High-speed sampling *4	[HIGHSPEED]
4	INTERVAL	Sampling interval	When [NOT] is selected with SAMPLING	(Blank)
			When [EXECUTE] is selected with SAMPLING	1 to 32767 (Unit: Second)
			When [HIGHSPEED] is selected with SAMPLING	1 to 600 (Unit: × 100 ms)
—	BEFORE LOGGING	(Fixed value)		[NO]
5	WRITE	Prohibit data writing	Disable	[DISABLE]
			Enable	[ENABLE]
6	BLOCKREAD	Enhance sampling efficiency	When enabled	[YES]
			When disabled	[NO]
—	COMPNUM	No. of components		0 to 256
7	ARRAY	Use array	Use	[ENABLE]
			Not use	[DISABLE]
8	ARRAYSIZE	Length of array	When [ENABLE] is selected for ARRAY	2 to 40000
			When [DISABLE] is selected for ARRAY	(Blank)
9	ARRAYTYPE	Array arrangement	Series	[CONT]
			Block	[BLOCK]
			When [DISABLE] is selected for ARRAY	(Blank)
10	BLOCKSPECIFY	Block size specification	When enabled	[ENABLE]
			When disabled	[DISABLE]
			When [DISABLE] is selected for ARRAY	(Blank)
11	BLOCKSIZE	Array block size	When [ENABLE] is selected for BLOCK SPECIFY	1 to 1073741824 (Decimal integer)
			When [DISABLE] is selected for BLOCK SPECIFY	(Blank)
			When [DISABLE] is selected for ARRAY	

*1 For characters can be used in device tag names, refer to the following.

Appendix 2.2 Characters that can be used for item names, component names, variable names, etc. in the product

*2 A name same as a server service name cannot be set.
Make the setting causes an error.

*3 If the same device tag name already exists, the setting of the label with the higher number is overwritten.

*4 Registration of [High-speed sampling] is limited to one tag only.
Setting multiple tags for high-speed sampling causes an error.

Appendix 3.9 COMPONENT.CSV

(1) File format

Table App.31 File format

Item	Description
File name	COMPONENT.CSV
File contents	[Device tag settings] - [Component setting] Section 7.8.3 Setting items in Component setting
File format	

2 3 4 5

ITEM	COMPNAME	CPUNO	DATATYPE	DEVICE	FORMAT
COMPONENT1-1	Valve	1	BIT	M12	DEC
COMPONENT1-2	Flow	1	SINGLE	D1003	DEC
COMPONENT64-1	Pressure	1	DOUBLE	D5000	DEC
COMPONENT64-2	Opening degree (%)	2	REAL	W100	DEC

1) → 1)

1

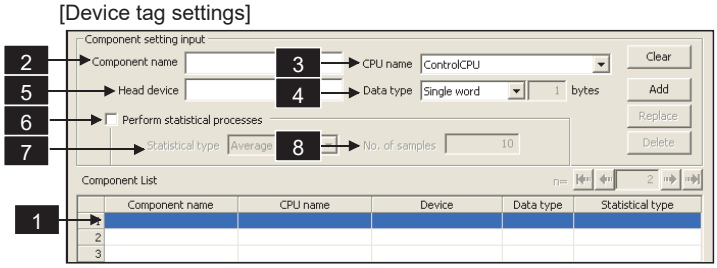
6 7 8

DECIMAL PLACES	OPERATOR	OPERAND	STATISTICS	STATTYPE	STATSIZE
0	NONE		DISABLE		
0	NONE		ENABLE	AVERAGE	
0	NONE		ENABLE	MAXIMUM	
0	NONE		DISABLE		

1) →

Item row : Change disabled.
Label column, setting area : Can be changed by the user.

[Device tag settings]



(2) Label

Table App.32 Label

	Label	Description
1	COMPONENT1-1 to COMPONENT64-256	• Set [Device tag settings] items No. 1 to 64 - [Component setting] items No. 1 to 256. COMPONENT64-256 Indicates [Component setting] No.1 to 256. Indicates [Device tag settings] No.1 to 64. • Necessary to set the number of labels set with TAG.CSV [COMPNUM] The label setting following it are ignored. (Example) When TAG.CSV label [TAG5] has [COMPNUM] of 10 COMPONENT.CSV must set labels COMPONENT5-1 to COMPONENT5-10.

(3) Setting item

Table App.33 Setting item

	Item	Description			Setting value
2	COMPNAME	Component name *1*2			Up to 16 characters
3	CPUNO	CPU name *3			1 to 64 (However, only one high-speed sampling tag allowed.)
4	DATATYPE	Data type	Single precision		[SINGLE]
			Double precision		[DOUBLE]
			Floating point		[REAL]
			Bit		[BIT]
			Character string (The number shows the number of characters.)		[STRING1] to [STRING32]
			16-bit BCD		[16BCD]
			32-bit BCD		[32BCD]
5	DEVICE	Head device *4			Head device
—	FORMAT	(Fixed value)			[DEC]
—	DECIMAL PLACES	(Fixed value)			[0]
—	OPERATOR	(Fixed value)			[NONE]
—	OPERAND	(Fixed value)			(Blank)
6	STATISTICS	Perform statistical processing	When enabled		[ENABLE]
			When disabled		[DISABLE]
7	STATTYPE	Statistical type	When [DISABLE] is selected with STATISTICS		(Blank)
			When [ENABLE] is selected with STATISTICS	Average	[AVERAGE]
				Maximum	[MAXIMUM]
				Minimum	[MINIMUM]
				Moving average	[MOVINGAVERAGE]
				Moving maximum	[MOVINGMAXIMUM]
				Moving minimum	[MOVINGMINIMUM]
8	STATSIZE	No. of samples	When [DISABLE] is selected with STATISTICS		(Blank)
			When [ENABLE] is selected with STATISTICS	Average	(Blank)
				Maximum	(Blank)
				Minimum	(Blank)
				Moving average	2 to 20
				Moving maximum	2 to 20
				Moving minimum	2 to 20

*1 For characters can be used for component names, refer to the following:
☞ Appendix 2.2 Characters that can be used for item names, component names, variable names, etc. in the product

*2 If the same component name already exists in the same item (Tag), the existing name is overwritten.
Also, if the same component name is set multiple times in the same item (Tag), the setting of the label with the higher number is overwritten.

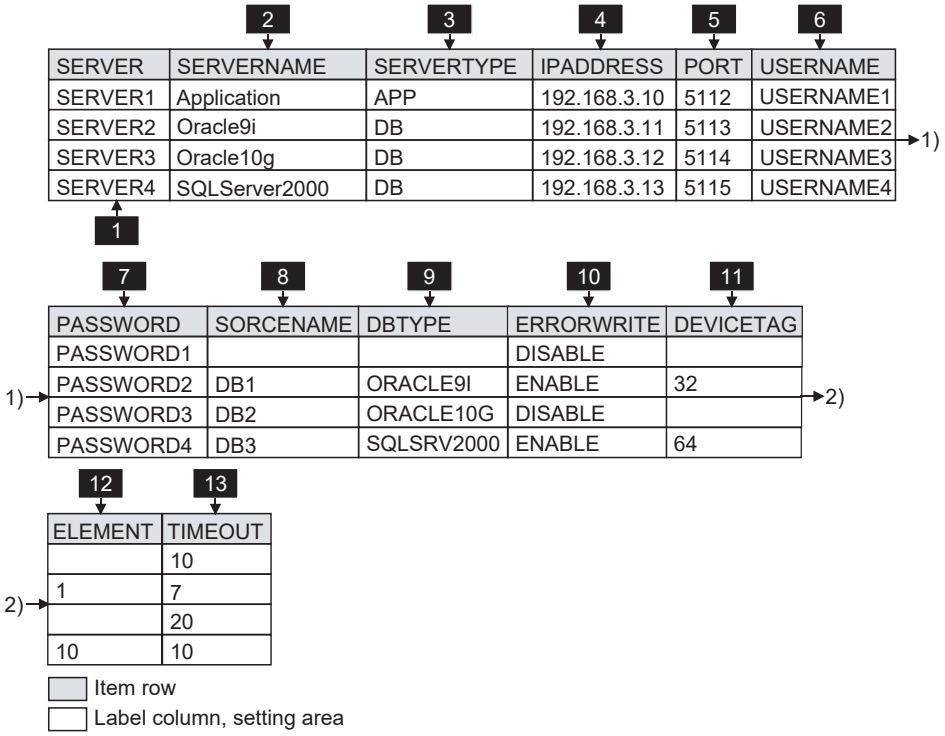
*3 Specify [Access target CPU settings] No. that is set in the CPU.CSV label.
Specifying [Access target CPU settings] No. that is not set in CPU.CSV causes an error.

*4 Setting a device that does not exist causes an error.
Setting a device that does not match the data type causes an error.
If the total of device points is set greater than 96 at [High-speed sampling] selection, this causes an error.

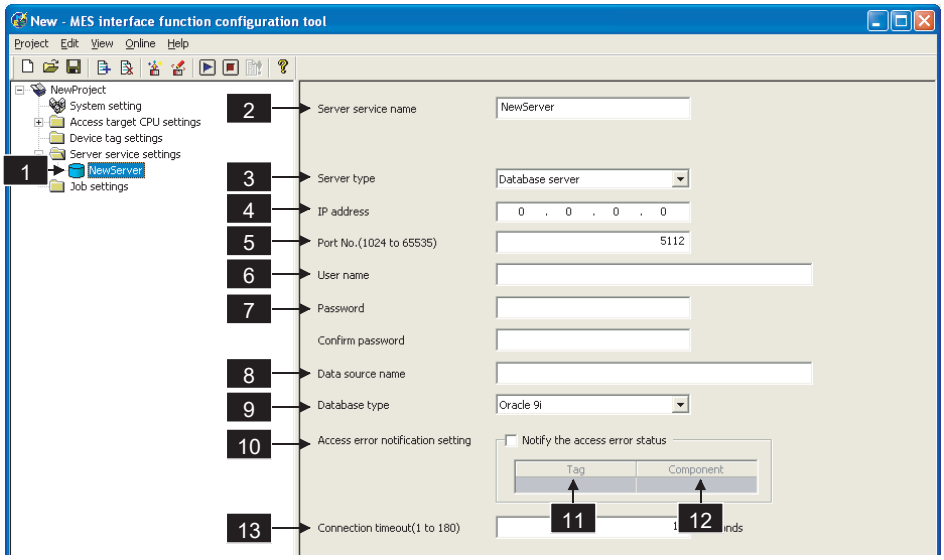
Appendix 3.10 SERVER.CSV

(1) File format

Table App.34 File format

Item	Description
File name	SERVER.CSV
File contents	[Server service settings] ☞Section 7.9.1 Setting items in Server Service setting
File format	

[Server service settings]



(2) Label

Table App.35 Label

	Label	Description
1	SERVER1 to SERVER32	[Server service settings] No. 1 to 32

(3) Setting item

Table App.36 Setting item

	Item	Description			Setting value
2	SERVERNAME	Sever service name			Up to 16 characters
3	SERVERTYPE	Server type	Database server		[DB]
			Application server		[APP]
4	IPADDRESS	IP address			IP address (Decimal)
5	PORT	Port number			1024 to 65535
6	USERNAME	User name			Up to 30 characters
7	PASSWORD	Password			Up to 30 characters
8	SOURCENAME	Data source name	When [DB] is selected with SERVERTYPE		Up to 30 characters
			When [APP] is selected with SERVERTYPE		(Blank)
9	DBTYPE	Database type	When [DB] is selected with SERVERTYPE	Oracle 8i	[ORACLE8I]
				Oracle 9i	[ORACLE9I]
				Oracle 10g/11g/12c/ 18c/19c	[ORACLE10G]
				SQL Server 2000/2005/ 2008/2012/2014/ 2016/2017/2019	[SQLSRV2000]
				MSDE 2000	[MSDE2000]
				Access 2000	[ACCESS2000]
				Access 2003/2007/ 2010/2013/2016/ 2019	[ACCESS2003]
				Wonderware Historian	[INSQL]
			When [APP] is selected with SERVERTYPE		(Blank)
10	ERRORWRITE	Access error notification setting	When enabled		[ENABLE]
			When disabled		[DISABLE]
11	DEVICETAG	Tag			1 to 64
12	ELEMENT	Component			1 to 256
13	TIMEOUT	Connection timeout			1 to 180 (Unit: second)

Appendix 3.11 JOB.CSV

(1) File format

Table App.37 File format

Item	Description
File name	JOB.CSV
File contents	• [Job settings] ☞ Section 7.10.1 Setting items in Job setting • [Job settings] - [DB Buffering] ☞ Section 7.10.4 Setting items in DB Buffering • [Job settings] - [Notify errors (job cancellation) that occur during job execution] ☞ Section 7.10.5 Setting items for job cancellation
File format	(See below)

2 3 4 5 6

JOB	JOBNAME	JOBTYPE	TRGBUFFERING	LOGGING	DEBUGMODE
JOB1	Product management 1	ENABLE	ENABLE	ENABLE	DISABLE
JOB2	Value management	DISABLE	ENABLE	DISABLE	DISABLE
JOB3	Monitoring status	ENABLE	DISABLE	ENABLE	DISABLE
JOB4	Product management 2	DISABLE	ENABLE	DISABLE	ENABLE

→1)

1

7 8 9

SQLBUFFERING	JOINTCONDITION	ACTIONNUM	CANCELWRITE
AUTORESEND		5	ENABLE
DISABLE	OR	3	DISABLE
MANUALRESEND	AND	10	DISABLE
DISABLE		7	DISABLE

1)→ →2)

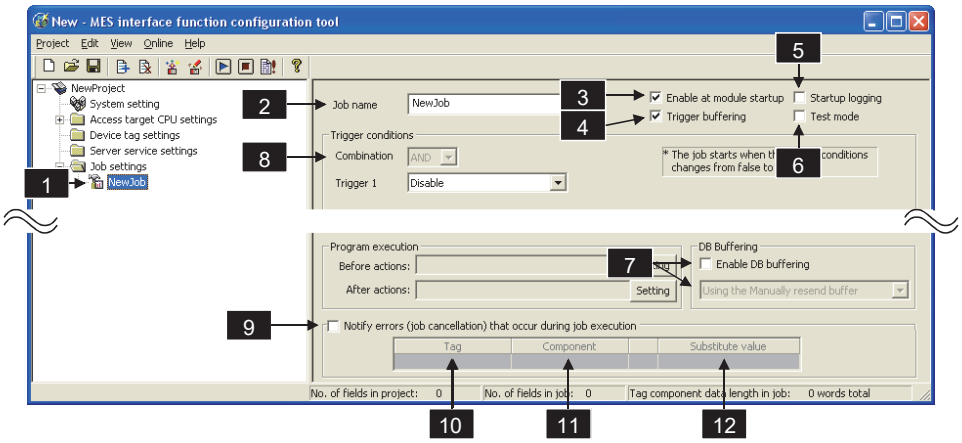
10 11 12

CANCELTAG	CANCELELEMENT	CANCELVALUE
32	1	1

2)→

Item row
Label column, setting area

[Job settings]



(2) Label

Table App.38 Label

	Label	Description
1	JOB1 to JOB64	[Job settings] No. 1 to 64

(3) Setting item

Table App.39 Setting item

	Item	Description		Setting value
2	JOBNAME	Job name		Up to 16 characters
3	JOBTYPE	Enable at module startup setting	When enabled	[ENABLE]
			When disabled	[DISABLE]
4	TRGBUFFRING	Trigger buffering	When enabled	[ENABLE]
			When disabled	[DISABLE]
5	LOGGING	Startup logging	When enabled	[ENABLE]
			When disabled	[DISABLE]
6	DEBUGMODE	Test mode	When enabled	[ENABLE]
			When disabled	[DISABLE]
7	SQLBUFFERING	DB buffering	When disabled	[DISABLE]
			When "Using the Manually resend buffer" is selected.	[MANUALRESEND]
			When "Using the Automatically resend buffer" is selected.	[AUTORESEND]
8	JOINTCONDITION	Combination	When the condition is 0 or 1	(Blank)
			When there are 2 conditions: AND	[AND]
			When there are 2 conditions: OR	[OR]
—	ACTIONNUM	Job action count		1 to 10
9	CANCELWRITE	Notify errors (job cancellation) that occur during job execution	When enabled	[ENABLE]
			When disabled	[DISABLE]
10	CANCELTAG	Tag		1 to 64
11	CANCELELEMENT	Component		1 to 256
12	CANCELVALUE	Substitute value		Optional

Appendix 3.12 CONDITION.CSV

(1) File format

Table App.40 File format

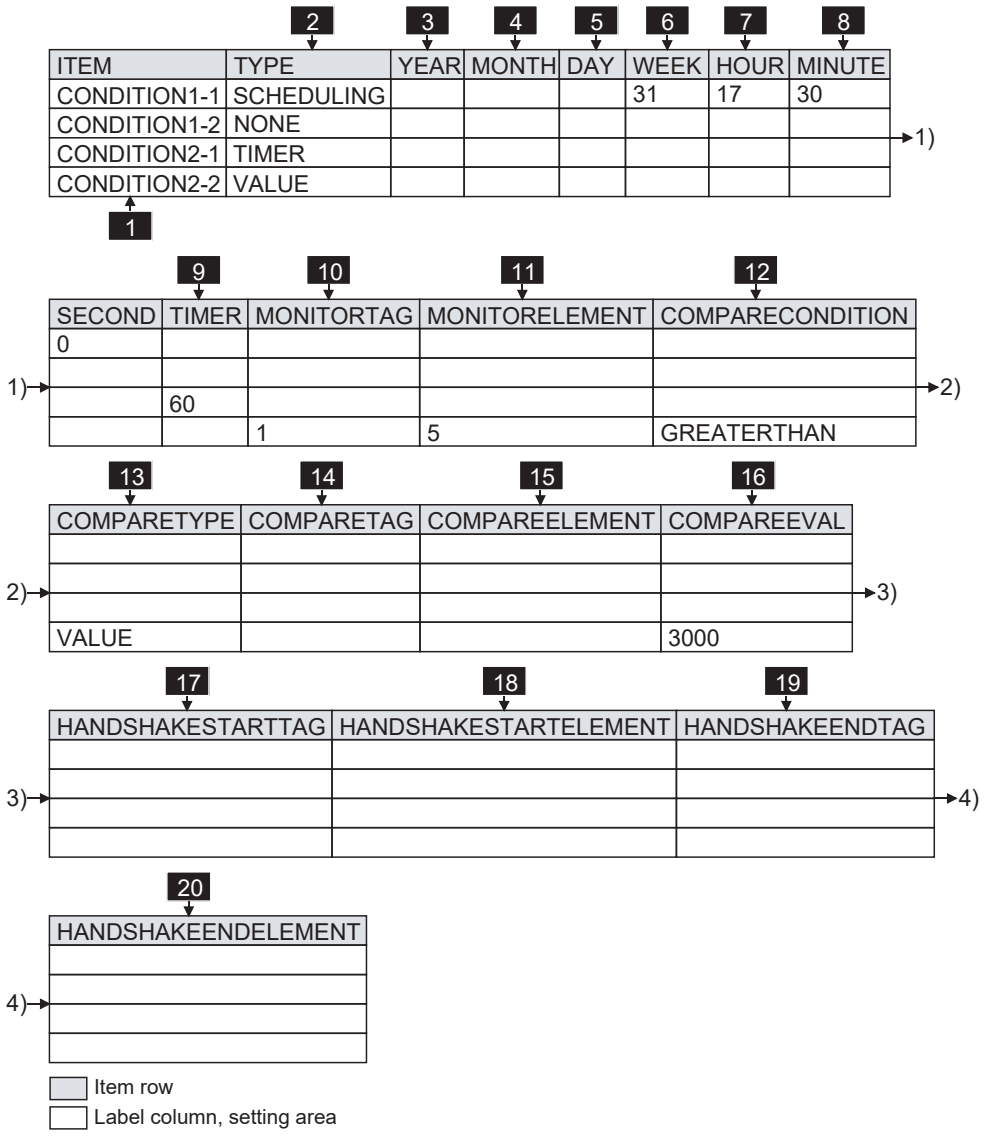
Item	Description
File name	CONDITION.CSV
File contents	[Job settings] - [Trigger conditions] ☞ Section 7.10.2 Setting items in Trigger conditions
File format	

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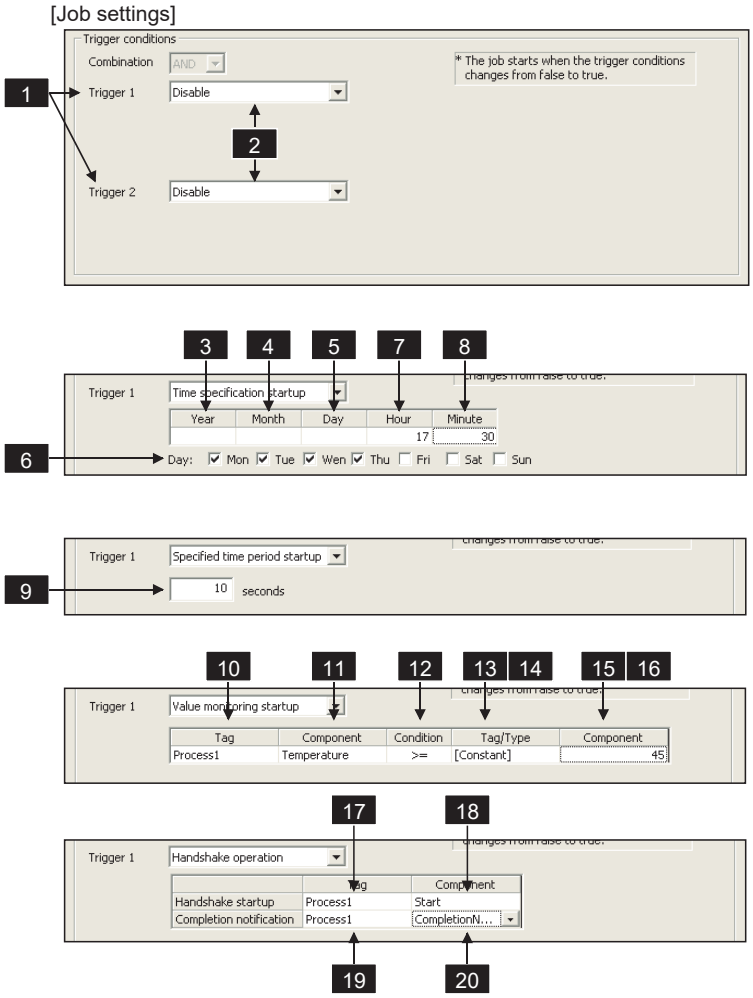
Table App.40 File format

Item	Description
File format (Continued)	[Job settings] 

(2) Label

Table App.41 Label

	Label	Description
1	CONDITION1-1 to CONDITION64-2	[Job settings] No. 1 to 64 - [Trigger conditions] - 1: [Trigger 1], 2: [Trigger 2] CONDITION64-2 Indicates 1: [Trigger 1], 2: [Trigger 2]. Indicates [Job settings] No.1 to 64.

(3) Setting item

Table App.42 Setting item

	Item	Description		Setting value
2	TYPE	Condition type	Disable	[NONE]
			Time specification startup	[SCHEDULING]
			Fixed scan interval	[TIMER]
			Value monitoring startup	[VALUE]
			At module startup	[UNITSTART]
			Handshake operation	[HANDSHAKE]
3	YEAR	Year	When [SCHEDULING] is selected with TYPE	1000 to 9999
			When other than the above is selected with TYPE	(Blank)
4	MONTH	Month	When [SCHEDULING] is selected with TYPE	1 to 12
			When other than the above is selected with TYPE	(Blank)
5	DAY	Day	When [SCHEDULING] is selected with TYPE	1 to 31
			When other than the above is selected with TYPE	(Blank)
6	WEEK	Day of the week	When [SCHEDULING] is selected with TYPE	0 to 127 (Decimal) *1
			When other than the above is selected with TYPE	(Blank)
7	HOUR	Hour	When [SCHEDULING] is selected with TYPE	0 to 23
			When other than the above is selected with TYPE	(Blank)
8	MINUTE	Minute	When [SCHEDULING] is selected with TYPE	0 to 59
			When other than the above is selected with TYPE	(Blank)
—	SECOND	(Fixed value)		(Blank)
9	TIMER	Period	When [TIMER] is selected with TYPE	1 to 32767 (Unit: second)
			When other than the above is selected with TYPE	(Blank)
10	MONITORTAG	Tag	When [VALUE] is selected with TYPE	1 to 64
			When other than the above is selected with TYPE	(Blank)
11	MONITORELEMENT	Component	When [VALUE] is selected with TYPE	1 to 256
			When other than the above is selected with TYPE	(Blank)
12	COMPARECONDITION	Condition	When [VALUE] is selected with TYPE: =	[EQUAL]
			When [VALUE] is selected with TYPE: ≠	[NOTEQUAL]
			When [VALUE] is selected with TYPE: ≦	[LESSTHANEQUAL]
			When [VALUE] is selected with TYPE: ≧	[GREATERTHANEQUAL]
			When [VALUE] is selected with TYPE: <	[LESSTHAN]
			When [VALUE] is selected with TYPE: >	[GREATERTHAN]
			When other than the above is selected with TYPE	(Blank)
13	COMPARETYPE	Tag/type	When [VALUE] is selected with TYPE: Tag	[TAG]
			When [VALUE] is selected with TYPE: Constant	[VALUE]
			When other than the above is selected with TYPE	(Blank)
14	COMPARETAG	Comparison tag	When [VALUE] is selected with TYPE and [TAG] is selected with COMPARETYPE	1 to 64
			When other than the above is selected with TYPE	(Blank)
15	COMPAREELEMENT	Comparison component value	When [VALUE] is selected with TYPE and [TAG] is selected with COMPARETYPE	1 to 256
			When other than the above is selected with TYPE	(Blank)

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Table App.42 Setting item

	Item	Description		Setting value
16	COMPAREEVAL	Comparison constant value	When [VALUE] is selected with TYPE and [VALUE] is selected with COMPARETYPE	Any number or character string
			When other than the above is selected with TYPE	(Blank)
17	HANDSHAKESTARTTAG	Handshake startup - Tag	When [HANDSHAKE] is selected with TYPE	1 to 64
			When other than the above is selected with TYPE	(Blank)
18	HANDSHAKESTARTELEMENT	Handshake startup - Component	When [HANDSHAKE] is selected with TYPE	1 to 256
			When other than the above is selected with TYPE	(Blank)
19	HANDSHAKEENDTAG	Completion notification - Tag	When [HANDSHAKE] is selected with TYPE	1 to 64
			When other than the above is selected with TYPE	(Blank)
20	HANDSHAKEENDELEMENT	Completion notification - Component	When [HANDSHAKE] is selected with TYPE	1 to 256
			When other than the above is selected with TYPE	(Blank)

*1 The setting value for the day of the week is expressed in decimal numbers.
For the setting value contents, check with the method below.
1) Convert a decimal number to a binary number.
2) Each binary bit is the setting contents for the day of the week.

b6	b5	b4	b3	b2	b1	b0
Sunday	Saturday	Friday	Thursday	Wednesday	Tuesday	Monday

Figure App.3 Setting contents for the day of the week

0: Not set
1: Set
(Example) When the WEEK setting value is 85

85 (Decimal number)

⇩ Convert decimal number into binary number.

1010101 (Binary number)

⇩ Check the corresponding bits.

b6	b5	b4	b3	b2	b1	b0
1	0	1	0	1	0	1
Sunday	Saturday	Friday	Thursday	Wednesday	Tuesday	Monday

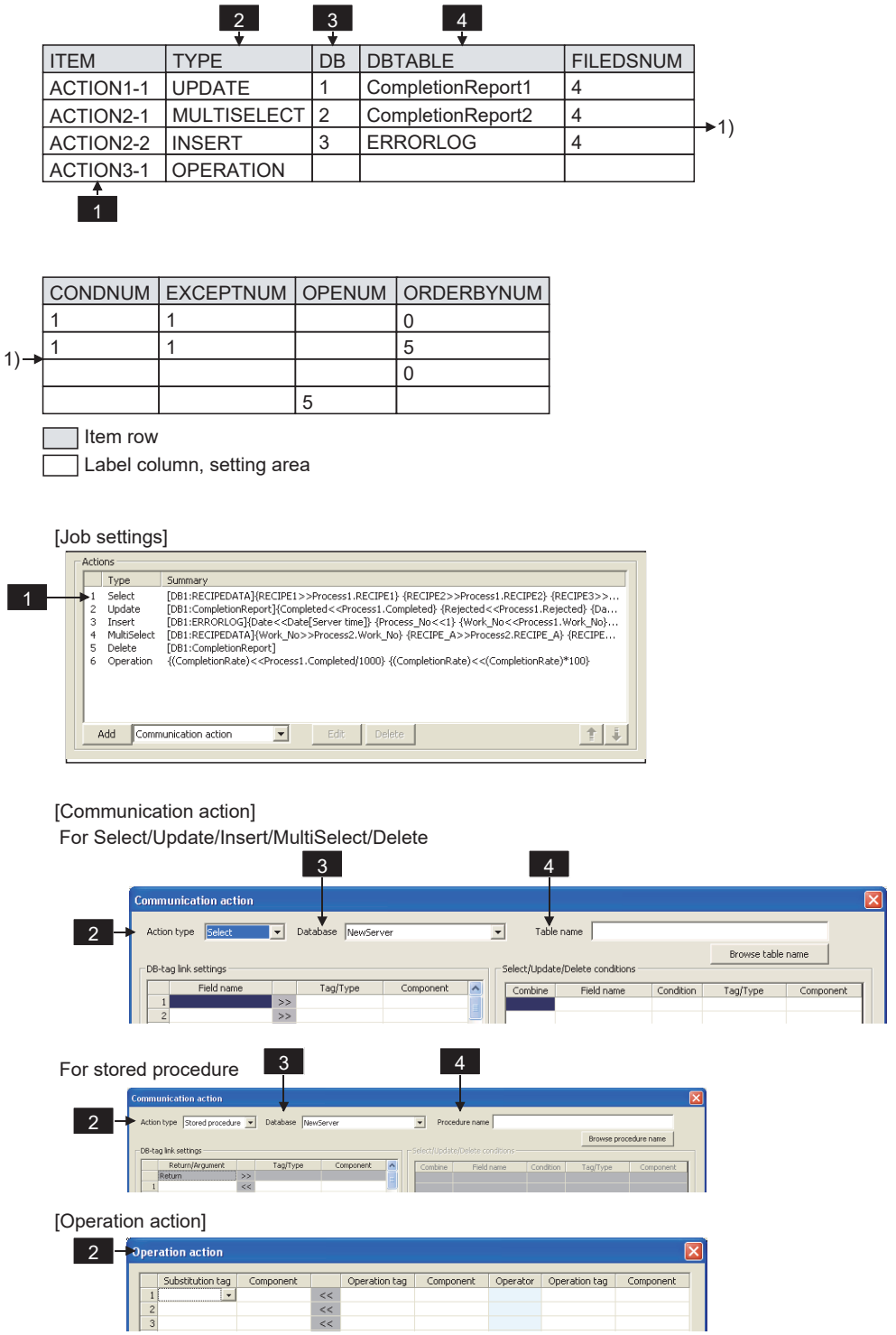
Monday, Wednesday, Friday, and Sunday are set.

Figure App.4 Setting example for day of the week

Appendix 3.13 ACTION.CSV

(1) File format

Table App.43 File format

Item	Description
File name	ACTION.CSV
File contents	[Job settings] - [Action] ☞ Section 7.11 Job Setting - Actions
File format	

(2) Label

Table App.44 Label

	Label	Description
1	ACTION1-1 to ACTION64-10	[Job settings] No. 1 to 64 - [Action] No. 1 to 10 ACTION64-10 Indicates [Action] No.1 to 10. Indicates [Job settings] No.1 to 64.

(3) Setting item

(a) For communication action (Select/Update/Insert/MultiSelect/Delete)

Table App.45 Setting item of communication action (Select/Update/Insert/MultiSelect/Delete)

	Item	Description		Setting value
2	TYPE	Action type	Select	[SELECT]
			Update	[UPDATE]
			Insert	[INSERT]
			MultiSelect	[MULTISELECT]
			Delete	[DELETE]
3	DB	Database		1 to 32
4	DBTABLE	Table name		Any character string
—	FILEDSNUM	DB-Tag link setting		0 to 256
—	CONDNUM	Number of select/ update/delete conditions	When [SELECT], [UPDATE], [MULTISELECT] or [DELETE] is selected for TYPE	0 to 8
			When [INSERT] is selected for TYPE	(Blank)
—	EXCEPTNUM	Exception processing count	When [SELECT], [UPDATE], [MULTISELECT] or [DELETE] is selected for TYPE (DB buffering is disabled)	2
			When [INSERT] is selected for TYPE	(Blank)
—	OPENUM	Operation action count		(Blank)
—	ORDERBYNUM	Sort condition count	When [SELECT] or [MULTISELECT] is selected for TYPE	0 to 8
			When other than the above is selected for TYPE	(Blank)

(b) For communication action (Stored procedure)

Table App.46 Setting item of communication action (Stored procedure)

	Item	Description		Setting value
2	TYPE	Action type	Stored procedure	[STOREDPROC]
3	DB	Database		1 to 32
4	DBTABLE	Stored procedure name		Any character string
—	FILEDSNUM	DB-Tag link setting		1 to 257

The items other than above will be blank.

(c) For operation action

Table App.47 Setting item of operation action

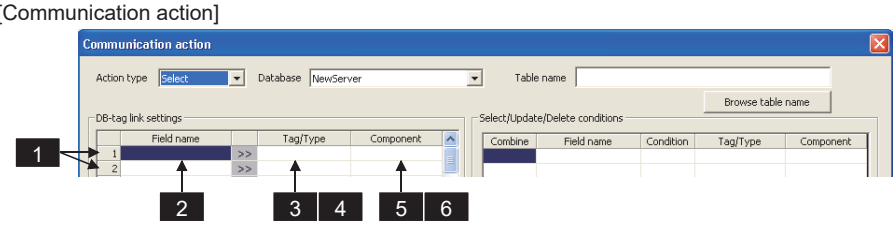
	Item	Description		Setting value
2	TYPE	Action type	Operation	[OPERATION]
—	OPENUM	Operation action count		1 to 20

The items other than above will be blank.

Appendix 3.14 ACFIELD.CSV

(1) File format

Table App.48 File format

Item	Description
File name	ACFIELD.CSV
File contents	[Communication action] - [DB-tag link settings] Section 7.11.1 Setting items in Communication action
File format	2 3 4 5 6 ITEM, FIELDNAME, TYPE, TAG, ELEMENT, VALUE FIELD1-1-1, Completed, TAG, 1, 1, FIELD1-1-2, Rejected, TAG, 1, 2, FIELD1-1-3, Date, DATE, , , SERVER 1 Item row Label column, setting area [Communication action] 

(2) Label

Table App.49 Label

	Label	Description
1	FIELD1-1-1 to FIELD64-10-256	[Job settings] No. 1 to 64 - [Action] No. 1 to 10 - [DB-tag link settings] No. 1 to 256 FIELD64-10-256 Indicates [DB-tag link settings] No.1 to 256. Indicates [Action] No.1 to 10. Indicates [Job settings] No.1 to 64.

(3) Setting item

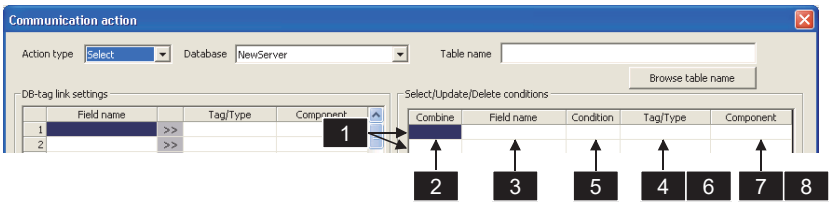
Table App.50 Setting item

	Item	Description		Setting value
2	FIELDNAME	Field name		Any character string
		Return/Argument	Return	[RETURN]
			Input (Integer)	[ININTEGER]
			Input (Real)	[INDECIMAL]
			Input (String)	[INSTRING]
			Input (Date)	[INDATE]
			Output (Integer)	[OUTINTEGER]
			Output (Real)	[OUTDECIMAL]
			Output (String)	[OUTSTRING]
			I/O (Integer)	[INOUTINTEGER]
			I/O (Real)	[INOUTDECIMAL]
			I/O (String)	[INOUTSTRING]
3	TYPE	Constant type	Tag	[TAG]
			Date	[DATE]
			Date string	[DATESTR]
			Numerical value	[NUMBER]
			Character string	[STRING]
			Variable	[VARIABLE]
			None	[NONE]
4	TAG	Tag	When [TAG] is selected with TYPE	1 to 64
			When other than the above is selected with TYPE	(Blank)
5	ELEMENT	Component	When [TAG] is selected with TYPE	1 to 256
			When other than the above is selected with TYPE	(Blank)
6	VALUE	Constant value	When [TAG] is selected with TYPE	(Blank)
			When [DATE] is selected with TYPE	Server time: [SERVER]
				Module time: [UNIT]
			When [DATESTR] is selected with TYPE	Character string valid as a date
			When [NUMBER] is selected with TYPE	Numerical value
			When [STRING] is selected with TYPE	Any character string
			When [VARIABLE] is selected with TYPE	Variable name
			When [NONE] is selected with TYPE	(Blank)

Appendix 3.15 ACCONDITION.CSV

(1) File format

Table App.51 File format

Item	Description
File name	ACCONDITION.CSV
File contents	[Communication action] - [Select/Update/Delete conditions]☞Section 7.11.2 (6) Select/Update/Delete conditions
File format	2 3 4 5 6 7 8 ITEM, COMB, FIELDNAME, TYPE, COMPARE, TAG, ELEMENT, VALUE CONDITION1-1-1, , Work_NO1, TAG, EQUAL, 1, 1, CONDITION1-2-1, AND, NUMBER, NUMBER, LESSTHAN, , , 100 CONDITION1-3-1, OR, Work_NO2, TAG, EQUAL, 1, 2, 1 Item row Label column, setting area [Communication action] 

(2) Label

Table App.52 Label

	Label	Description
1	CONDITION1-1-1 to CONDITION64-10-8	[Job settings] No. 1 to 64 - [Action] No. 1 to 10 - [Select/Update/Delete conditions] No. 1 to 8 CONDITION64-10-8 Indicates [Select/Update/Delete conditions] No.1 to 8. Indicates [Action] No.1 to 10. Indicates [Job settings] No.1 to 64.

(3) Setting item

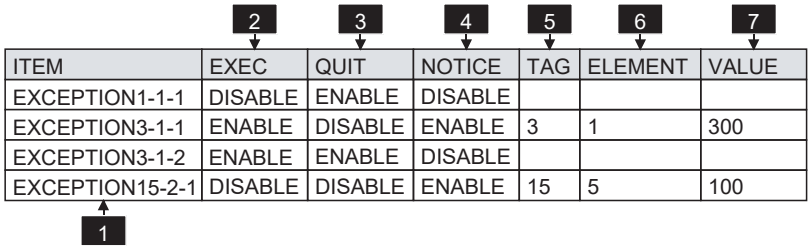
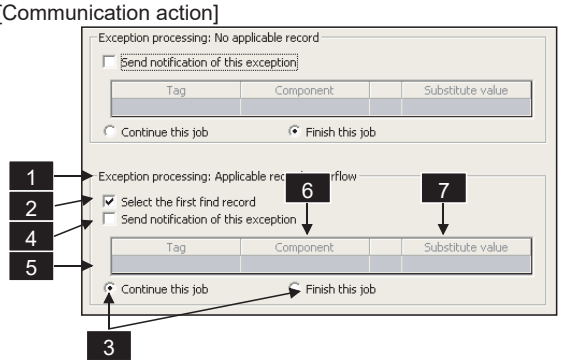
Table App.53 Setting item

	Item	Description		Setting value
2	COMB	Combination	AND	[AND]
			OR	[OR]
			For the first line	(Blank)
3	FIELDNAME	Field name		Any character string
4	TYPE	Constant type	Tag	[TAG]
			Date	[DATE]
			Date string	[DATESTR]
			Numerical value	[NUMBER]
			Character string	[STRING]
			Variable	[VARIABLE]
			None	[NONE]
5	COMPARE	Select/Update/ Delete conditions	=	[EQUAL]
			≠	[NOTEQUAL]
			≦	[LESSTHANEQUAL]
			≧	[GREATERTHANEQUAL]
			<	[LESSTHAN]
			>	[GREATERTHAN]
6	TAG	Tag	When [TAG] is selected with TYPE	1 to 64
			When other than the above is selected with TYPE	(Blank)
7	ELEMENT	Component	When [TAG] is selected with TYPE	1 to 256
			When other than the above is selected with TYPE	(Blank)
8	VALUE	Constant value	When [TAG] is selected with TYPE	(Blank)
			When [DATE] is selected with TYPE: Server time	[SERVER]
			When [DATE] is selected with TYPE: Module time	[UNIT]
			When [DATESTR] is selected with TYPE	Character string valid as a date
			When [NUMBER] is selected with TYPE	Numerical value
			When [STRING] is selected with TYPE	Any character string
			When [VARIABLE] is selected with TYPE	Variable name
			When [NONE] is selected with TYPE	(Blank)

Appendix 3.16 ACEXCEPTION.CSV

(1) File format

Table App.54 File format

Item	Description
File name	ACEXCEPTION.CSV
File contents	[Communication action] - [Exception processing] Section 7.11.2 (9) Exception process setting
File format	 [Communication action] 

(2) Label

Table App.55 Label

	Label	Description
1	EXCEPTION1-1-1 to EXCEPTION64-10-2	[Job settings] No. 1 to 64 - [Action] No. 1 to 10 - 1: [Exception processing: No applicable record], 2: [Exception processing: Multiple applicable records], [Exception processing: Applicable records overflow] EXCEPTION64-10-2 Indicates 1: [Exception processing: No applicable record], 2: [Exception processing: Multiple applicable records] or [Exception processing: Applicable records overflow]. Indicates [Action] No.1 to 10. Indicates [Job settings] No.1 to 64.

(3) Setting item

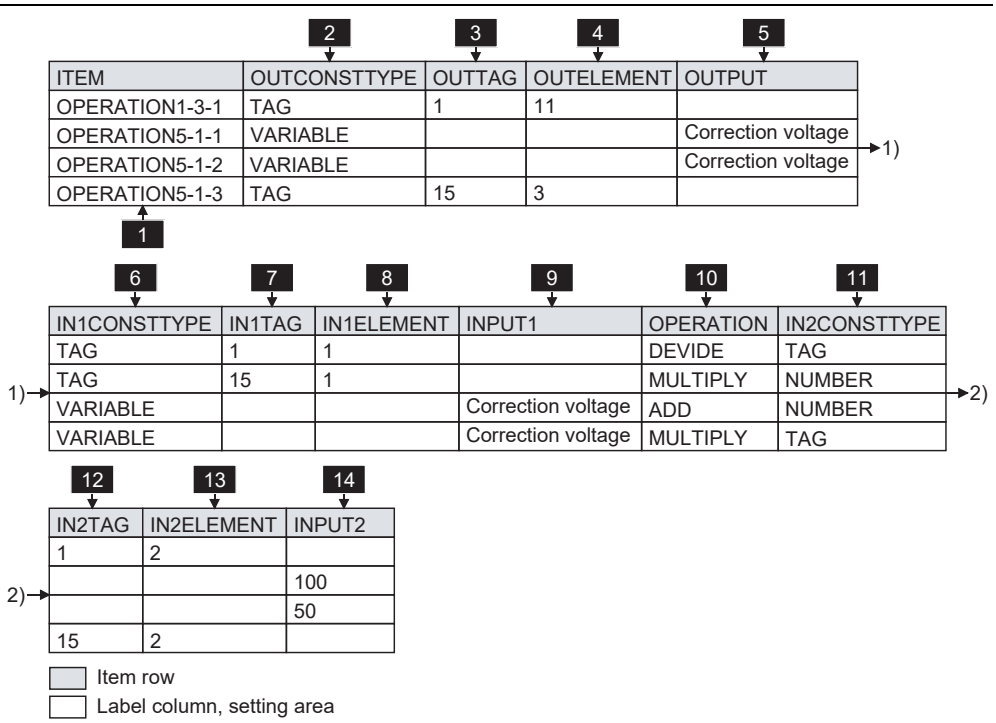
Table App.56 Setting item

	Item	Description		Setting value
2	EXEC	Select from the head record	Do not select	[DISABLE]
			Select	[ENABLE]
3	QUIT	Continue this job/Finish this job	Continue the job	[DISABLE]
			Terminate the job	[ENABLE]
4	NOTICE	Send notification of this exception	Do not send notification to tag component	[DISABLE]
			Send notification to tag component	[ENABLE]
5	TAG	Tag		1 to 64
6	ELEMENT	Component		1 to 256
7	VALUE	Substitute value		Optional

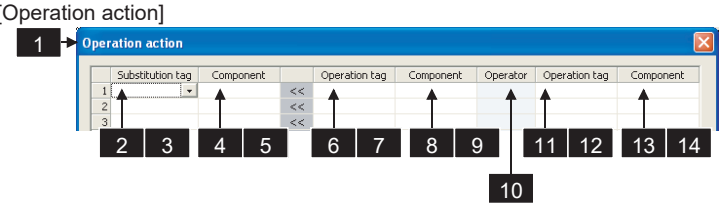
Appendix 3.17 ACOPERATION.CSV

(1) File format

Table App.57 File format

Item	Description
File name	ACOPERATION.CSV
File contents	[Operation action] Section 7.11.4 Setting items in Operation action
File format	

[Operation action]



(2) Label

Table App.58 Label

	Label	Description
1	OPERATION1-1-1 to OPERATION64-10-20	[Job settings] No. 1 to 10 - [Action] No. 1 to 10 - [Operation action] No. 1 to 20 OPERATION64-10-20 Indicates [Operation action] No.1 to 20. Indicates [Action] No.1 to 10. Indicates [Job settings] No.1 to 64.

(3) Setting item

Table App.59 Setting item

	Item	Description		Setting value
2	OUTCONSTTYPE	Substitution constant type	Tag	[TAG]
			Variable	[VARIABLE]
3	OUTTAG	Substitution tag	When [TAG] is selected with OUTCONSTTYPE	1 to 64
			When other than the above is selected with OUTCONSTTYPE	(Blank)
4	OUTELEMENT	Substitute component	When [TAG] is selected with OUTCONSTTYPE	1 to 256
			When other than the above is selected with OUTCONSTTYPE	(Blank)
5	OUTPUT	Substitute variable	When [TAG] is selected with OUTCONSTTYPE	(Blank)
			When other than the above is selected with OUTCONSTTYPE	Variable name
6	IN1CONSTTYPE	Input 1 Constant type	Tag	[TAG]
			Date string	[DATESTR]
			Numerical value	[NUMBER]
			Character string	[STRING]
			Variable	[VARIABLE]
			None	[NONE]
7	IN1TAG	Input 1 Tag	When [TAG] is selected with IN1CONSTTYPE	1 to 64
			When other than the above is selected with IN1CONSTTYPE	(Blank)
8	IN1ELEMENT	Input 1 Component	When [TAG] is selected with IN1CONSTTYPE	1 to 256
			When other than the above is selected with IN1CONSTTYPE	(Blank)
9	INPUT1	Input 1 Variable	When [TAG] is selected with IN1CONSTTYPE	(Blank)
			When [DATESTR] is selected with IN1CONSTTYPE	Character string valid as a date
			When [NUMBER] is selected with IN1CONSTTYPE	Numerical value
			When [STRING] is selected with IN1CONSTTYPE	Any character string
			When [VARIABLE] is selected with IN1CONSTTYPE	Variable name
			When [NONE] is selected with IN1CONSTTYPE	(Blank)
10	OPERATION	Operator	No operation	[NONE]
			+	[ADD]
			-	[SUBTRUCT]
			×	[MULTIPLY]
			÷	[DEVIDE]
			%	[REMAINDER]

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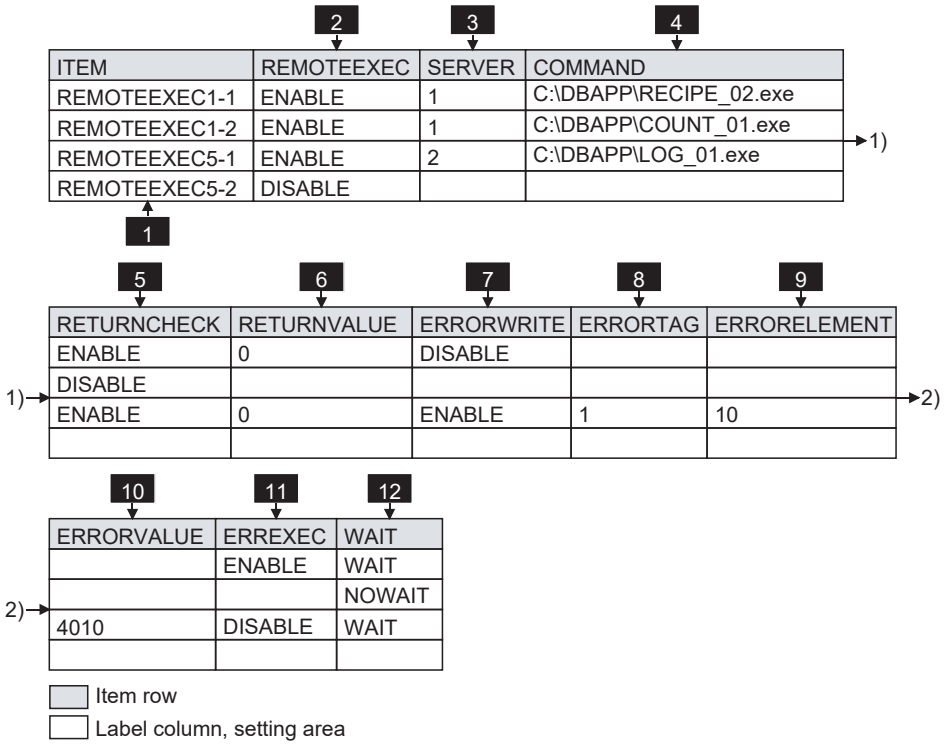
Table App.59 Setting item

	Item	Description		Setting value
11	IN2CONSTTYPE	Input 2 Constant type	When [NONE] is selected with OPERATION	(Blank)
		When other than the above is selected with OPERATION	Tag	[TAG]
			Date string	[DATESTR]
			Numerical value	[NUMBER]
			Character string	[STRING]
			Variable	[VARIABLE]
			None	[NONE]
12	IN2TAG	Input 2 Tag	When [NONE] is selected with OPERATION	(Blank)
			When other than the above is selected with OPERATION: When [TAG] is selected with IN2CONSTTYPE	1 to 64
			When other than the above is selected with OPERATION: When other than the above is selected with IN2CONSTTYPE	(Blank)
13	IN2ELEMENT	Input 2 Component	When [NONE] is selected with OPERATION	(Blank)
			When other than the above is selected with OPERATION: When [TAG] is selected with IN2CONSTTYPE	1 to 256
			When other than the above is selected with OPERATION: When other than the above is selected with IN2CONSTTYPE	(Blank)
14	INPUT2	Input 2 Variable	When [NONE] is selected with OPERATION	(Blank)
			When other than the above is selected with OPERATION: When [TAG] is selected with IN2CONSTTYPE	(Blank)
			When other than the above is selected with OPERATION: When [DATESTR] is selected with IN2CONSTTYPE	Character string valid as a date
			When other than the above is selected with OPERATION: When [NUMBER] is selected with IN2CONSTTYPE	Numerical value
			When other than the above is selected with OPERATION: When [STRING] is selected with IN2CONSTTYPE	Any character string
			When other than the above is selected with OPERATION: When [VARIABLE] is selected with IN2CONSTTYPE	Variable name
			When other than the above is selected with OPERATION: When [NONE] is selected with IN2CONSTTYPE	(Blank)

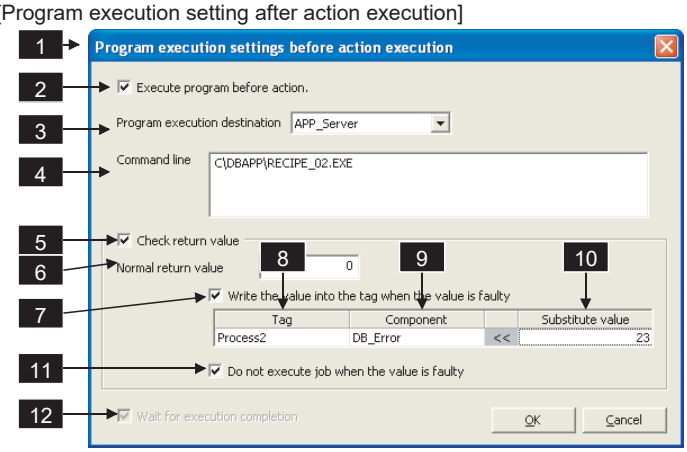
Appendix 3.18 REMOTE.CSV

(1) File format

Table App.60 File format

Item	Description
File name	REMOTE.CSV
File contents	[Job settings] - [Program execution] Section 7.10.3 Setting items in Program execution
File format	

[Program execution setting before action execution]
[Program execution setting after action execution]



(2) Label

Table App.61 Label

	Label	Description
1	REMOTEEXEC1-1 to REMOTEEXEC64-2	[Job settings] No. 1 to 64 - 1: [Before actions], 2: [After actions] REMOTEEXEC64-2 Indicates 1: [Before actions], 2: [After actions]. Indicates [Job settings] No.1 to 64.

(3) Setting item

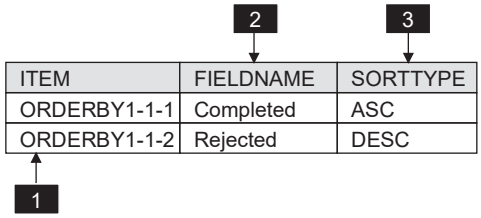
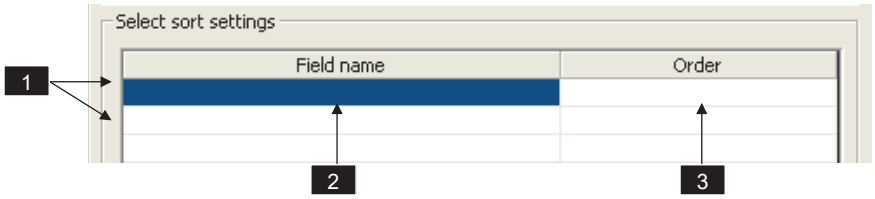
Table App.62 Setting item

	Item	Description		Setting value
2	REMOTEEXEC	Execute program before (after) action	When enabled	[ENABLE]
			When disabled	[DISABLE]
3	SERVER	Program execution destination		1 to 32
4	COMMAND	Command line		Up to 127 characters
5	RETURNCHECK	Check return value	When enabled	[ENABLE]
			When disabled	[DISABLE]
6	RETURNVALUE	Normal return value		-2147483648 to 2147483647
7	ERRORWRITE	Write the value into the tag when the value is faulty	When enabled	[ENABLE]
			When disabled	[DISABLE]
8	ERRORTAG	Tag		1 to 64
9	ERRORELEMENT	Component		1 to 256
10	ERRORVALUE	Substitute value		Any character string
11	ERREXEC	Do not execute job when the value is faulty	When enabled	[ENABLE]
			When disabled	[DISABLE]
12	WAIT	Wait for execution completion	When enabled	[WAIT]
			When disabled	[NOWAIT]

Appendix 3.19 ORDERBY.CSV

(1) File format

Table App.63 File format

Item	Description
File name	ORDERBY.CSV
File contents	[Communication action] - [Select sort setting] ☞ Section 7.11.2 (7) Select sort settings
File format	 Item row Label column, setting area [Communication action] 

(2) Label

Table App.64 Label

	Label	Description
1	ORDERBY1-1-1 to ORDERBY64-10-20	[Job setting] No.1 to 64 - [Action] No.1 to 10 - [Select/Update/Delete conditions] No.1 to 8 ORDERBY64-10-8 Indicates [Select/Update/Delete conditions] No.1 to 8. Indicates [Action] No.1 to 10. Indicates [Job settings] No.1 to 64.

(3) Setting item

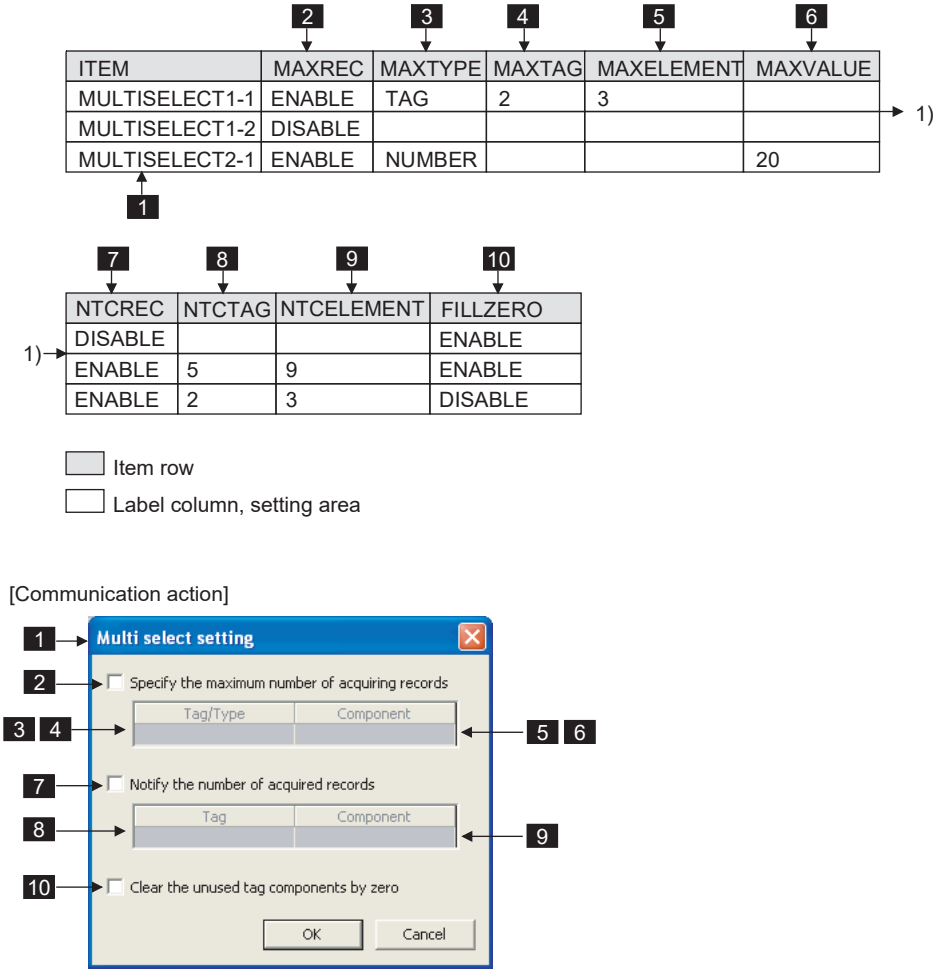
Table App.65 Setting item

	Item	Description		Setting value
2	FIELDNAME	Field name		Any character string
3	SORTTYPE	Sorting method	Ascending order	[ASC]
			Descending order	[DESC]

Appendix 3.20 MULTISELECT.CSV

(1) File format

Table App.66 File format

Item	Description
File name	MULTISELECT.CSV
File contents	[Communication action] - [Multi select setting] ☞ Section 7.11.2 (10) Multi select setting
File format	

(2) Label

Table App.67 Label

	Label	Description
1	MULTISELECT1-1 to MULTISELECT64-10	[Job setting] No.1 to 64 - [Action] No.1 to 10 MULTISELECT64-10 Indicates [Action] No.1 to 10. Indicates [Job settings] No.1 to 64.

(3) Setting item

Table App.68 Setting item

	Item	Description		Setting value
2	MAXREC	Specify the maximum number of acquiring records	Specify	[DISABLE]
			Not specify	[ENABLE]
3	MAXTYPE	Constant type	Tag	[TAG]
			Numeric value	[NUMBER]
4	MAXTAG	Device tag number	When [TAG] is selected for MAXTYPE	1 to 64
			Other than the above	(Blank)
5	MAXELEMENT	Component number of device tag	When [TAG] is selected for MAXTYPE	1 to 64
			Other than the above	(Blank)
6	MAXVALUE	Setting value	When [NUMBER] is selected for MAXTYPE	1 to 40000 (Decimal integer)
			Other than the above	(Blank)
7	NTCREC	Notify the number of acquired records	Not notify	[DISABLE]
			Notify	[ENABLE]
8	NTCTAG	Device tag number	When [DISABLE] is selected for NTCREC	(Blank)
			Other than the above	1 to 64
9	NTCELEMENT	Component number of device tag	When [DISABLE] is selected for NTCREC	(Blank)
			Other than the above	1 to 64
10	FILLZERO	Clear the unused tag components by zero	Clear to 0	[ENABLE]
			Not clear to 0	[DISABLE]

Appendix 4 Processing Time

This section explains the processing time required for "communication action" as a result of measurements made under the conditions shown in (1).
The processing time can be lengthened, however, depending on any of the following factors:

- Operating environment (personal computer, network, and the CompactFlash card)
- Loading status of the server computer and the network
- Sequence scan time
- Accessing status from a personal computer, terminal display, or intelligent function module to the programmable controller CPU
- Access from a personal computer by MES Interface Function Configuration Tool and XML processing
- Settings of the MES interface module

Use the measurement result shown in (2) as reference of the processing time.

Appendix 4.1 QJ71MES96N

(1) Measurement conditions

Table App.69 Measurement conditions

Item		Description
Server computer	CPU	Intel Core i7 3.6GHz
	Memory	16GB
	Operating system	Microsoft® Windows Server® 2012 R2 Standard (64-bit version)
	Database	Oracle® 12c (Standard Edition)
Access target CPU	Programmable controller CPU	In the case of Select, Update or Insert Q25HCPU (control CPU on own station) In the case of MultiSelect Q06UDHCPU (control CPU on own station)
	Network	No other station specified (Own station)
	Sequence scan time	1ms
MES interface module		QJ71MES96N
DB Connection Service and DB Connection Service Setting Tool		Version 2 (64-bit)
Device tag settings	No. of tags	For trigger conditions: 1 tag In the case of Select, Update or Insert For communication data: 1 tag (for 16, 64, 256 fields) 4 tags (for 1024 fields) 16 tags (for 4096 fields) In the case of MultiSelect For receive data: 1 tag (Use array)
	Sampling setting	For trigger conditions: High-speed sampling (1 × 100ms) For communication data: Do not sample
	Data type	For trigger conditions: Bit transmit/receive For data: Single precision

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Table App.70 Measurement conditions

Item		Description
Device tag settings	No. of components	For trigger conditions: No. of jobs × 2 For communication data: Same as the number of fields In the case of MultiSelect 16 data: 4 components 64 data: 8 components 256 data: 16 components 1024 data: 32 components 4096 data: 64 components 16384 data: 128 components 40000 data: 200 components
	Length of array	In the case of MultiSelect 16 data: 4 64 data: 8 256 data: 16 1024 data: 32 4096 data: 64 16384 data: 128 40000 data: 200
Job setting	Trigger conditions	Handshake operation
	No. of jobs	In the case of Select, Update or Insert 1 job (for 16, 64, 256, 1024 fields) 2 jobs (for 4096 fields) In the case of MultiSelect 1 job
	No. of actions	In the case of Select, Update or Insert 1 action (for 16, 64, 256 fields) 4 actions (for 1024 fields) 16 actions (for 4096 fields) In the case of MultiSelect 1 action
	Select/Update condition	None
	Sort condition	None
	Program execution	None
Measuring method	Measurement interval	From ON of Handshake startup to OFF of Completion notification
	No. of measurements	Average of 20 measurement results

(2) Measurement results

(a) When [Enhance sampling efficiency] is checked

The following table lists the results in the case where the [Enhance sampling efficiency] box is checked in [Sampling settings] of [Device tag settings].

Table App.71 Measurement results when [Enhance sampling efficiency] is checked

No. of fields	16	64	256	1024	4096
Select	0.2s	0.3s	0.5s	1.6s	5.6s
Update Insert	0.2s	0.2s	0.3s	0.6s	1.6s

(b) When [Enhance sampling efficiency] is not checked

The following table lists the results in the case where the [Enhance sampling efficiency] box is not checked in [Sampling settings] of [Device tag settings].

Table App.72 Measurement results when [Enhance sampling efficiency] is not checked

No. of fields	16	64	256	1024	4096
Select	0.2s	0.3s	0.5s	1.6s	5.6s
Update Insert	0.2s	0.3s	0.5s	1.5s	5.1s

(c) When [MultiSelect] is selected

The following table lists the results in the case where [MultiSelect] is selected for [Action type].

Table App.73 Measurement results when [MultiSelect] is selected for [Action type]

No. of data	16	64	256	1024	4096	16384	40000
MultiSelect	0.2s	0.3s	0.5s	1.6s	5.6s	19s	40s

Appendix 4.2 QJ71MES96 whose first five digits of serial No. is "13092" or later

(1) Measurement conditions

Table App.74 Measurement conditions

Item		Description
Server computer	CPU	Intel Core i7 2.8GHz
	Memory	3GB
	Operating system	Microsoft® Windows Server® 2008 (32-bit version)
	Database	Oracle® 11g R2
Access target CPU	Programmable controller CPU	In the case of Select, Update or Insert Q25HCPU (control CPU on own station) In the case of MultiSelect Q06UDHCPU (control CPU on own station)
	Network	No other station specified (Own station)
	Sequence scan time	1ms
MES interface module		QJ71MES96
DB Connection Service and DB Connection Service Setting Tool		Version 1
Device tag settings	No. of tags	For trigger conditions: 1 tag In the case of Select, Update or Insert For communication data: 1 tag (for 16, 64, 256 fields) 4 tags (for 1024 fields) 16 tags (for 4096 fields) In the case of MultiSelect For receive data: 1 tag (Use array)
	Sampling setting	For trigger conditions: High-speed sampling (1 × 100ms) For communication data: Do not sample
	Data type	For trigger conditions: Bit transmit/receive For data: Single precision

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Table App.75 Measurement conditions

Item		Description
Device tag settings	No. of components	For trigger conditions: No. of jobs × 2 For communication data: Same as the number of fields In the case of MultiSelect 16 data: 4 components 64 data: 8 components 256 data: 16 components 1024 data: 32 components 4096 data: 64 components 16384 data: 128 components 40000 data: 200 components
	Length of array	In the case of MultiSelect 16 data: 4 64 data: 8 256 data: 16 1024 data: 32 4096 data: 64 16384 data: 128 40000 data: 200
Job setting	Trigger conditions	Handshake operation
	No. of jobs	In the case of Select, Update or Insert 1 job (for 16, 64, 256, 1024 fields) 2 jobs (for 4096 fields) In the case of MultiSelect 1 job
	No. of actions	In the case of Select, Update or Insert 1 action (for 16, 64, 256 fields) 4 actions (for 1024 fields) 16 actions (for 4096 fields) In the case of MultiSelect 1 action
	Select/Update condition	None
	Sort condition	None
	Program execution	None
Measuring method	Measurement interval	From ON of Handshake startup to OFF of Completion notification
	No. of measurements	Average of 20 measurement results

(2) Measurement results

(a) When [Enhance sampling efficiency] is checked

The following table lists the results in the case where the [Enhance sampling efficiency] box is checked in [Sampling settings] of [Device tag settings].

Table App.76 Measurement results when [Enhance sampling efficiency] is checked

No. of fields	16	64	256	1024	4096
Select	0.2s	0.3s	0.6s	1.9s	7.3s
Update Insert	0.2s	0.2s	0.3s	0.6s	1.8s

(b) When [Enhance sampling efficiency] is not checked

The following table lists the results in the case where the [Enhance sampling efficiency] box is not checked in [Sampling settings] of [Device tag settings].

Table App.77 Measurement results when [Enhance sampling efficiency] is not checked

No. of fields	16	64	256	1024	4096
Select	0.2s	0.3s	0.6s	1.9s	7.3s
Update Insert	0.2s	0.3s	0.6s	2.0s	7.4s

(c) When [MultiSelect] is selected

The following table lists the results in the case where [MultiSelect] is selected for [Action type].

Table App.78 Measurement results when [MultiSelect] is selected for [Action type]

No. of data	16	64	256	1024	4096	16384	40000
MultiSelect	0.2s	0.3s	0.6s	1.9s	7.3s	30s	72s

Appendix 4.3 QJ71MES96 whose first five digits of serial No. is "09102" or later and "13091" or earlier

(1) Measurement conditions

Table App.79 Measurement conditions

Item		Description
Server computer	CPU	Intel Xeon 2.8GHz
	Memory	1GB
	Operating system	Microsoft® Windows Server® 2003
	Database	Oracle® 10g
Access target CPU	Programmable controller CPU	In the case of Select, Update or Insert Q25HCPU (control CPU on own station) In the case of MultiSelect Q06UDHCPU (control CPU on own station)
	Network	No other station specified (own station)
	Sequence scan time	1ms
MES interface module		QJ71MES96
DB Connection Service and DB Connection Service Setting Tool		Version 1
Device tag setting	No. of tags	For trigger conditions: 1 tag In the case of Select, Update or Insert For communication data: 1 tag (for 16, 64, 256 fields) 4 tags (for 1024 fields) 16 tags (for 4096 fields) In the case of MultiSelect For receive data: 1 tag (Use array)
	Sampling setting	For trigger conditions: High-speed sampling (1 × 100ms) For communication data: Do not sample
	Data type	For trigger conditions: Bit transmit/receive For data: Single precision
	No. of components	For trigger conditions: No. of jobs × 2 For communication data: Same as the number of fields In the case of MultiSelect 16 data: 4 components 64 data: 8 components 256 data: 16 components 1024 data: 32 components 4096 data: 64 components 16384 data: 128 components 40000 data: 200 components
	Length of array	In the case of MultiSelect 16 data: 4 64 data: 8 256 data: 16 1024 data: 32 4096 data: 64 16384 data: 128 40000 data: 200

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Table App.79 Measurement conditions

Item		Description
Job setting	Trigger conditions	Handshake operation
	No. of jobs	In the case of Select, Update or Insert 1 job (for 16, 64, 256, 1024 fields) 2 jobs (for 4096 fields) In the case of MultiSelect 1 job
	No. of actions	In the case of Select, Update or Insert 1 action (for 16, 64, 256 fields) 4 actions (for 1024 fields) 16 actions (for 4096 fields) In the case of MultiSelect 1 action
	Select/Update condition	None
	Sort condition	None
	Program execution	None
Measuring method	Measurement interval	From ON of Handshake startup to OFF of Completion notification
	No. of measurements	Average of 20 measurement results

(2) Measurement results

(a) When [Enhance sampling efficiency] is checked

The following table lists the results in the case where the [Enhance sampling efficiency] box is checked in [Sampling settings] of [Device tag settings].

Table App.80 Measurement results when [Enhance sampling efficiency] is checked

No. of fields	16	64	256	1024	4096
Select	0.2s	0.3s	0.6s	1.9s	7.5s
Update Insert	0.2s	0.2s	0.5s	1.3s	4.7s

(b) When [Enhance sampling efficiency] is not checked

The following table lists the results in the case where the [Enhance sampling efficiency] box is not checked in [Sampling settings] of [Device tag settings].

Table App.81 Measurement results when [Enhance sampling efficiency] is not checked

No. of fields	16	64	256	1024	4096
Select	0.2s	0.3s	0.6s	1.9s	7.5s
Update Insert	0.2s	0.3s	0.7s	2.5s	9.6s

(c) When [MultiSelect] is selected

The following table lists the results in the case where [MultiSelect] is selected for [Action type].

Table App.82 Measurement results when [MultiSelect] is selected for [Action type]

No. of data	16	64	256	1024	4096	16384	40000
MultiSelect	0.2s	0.3s	0.6s	1.9s	7.5s	30s	75s

Appendix 4.4 QJ71MES96 whose first five digits of serial No. is "09101" or earlier

(1) Measurement conditions

Table App.83 Measurement conditions

Item		Description
Server computer	CPU	Intel Xeon 2.8GHz
	Memory	256MB
	Operating system	Microsoft® Windows Server® 2003
	Database	Oracle® 10g
Access target CPU	Programmable controller CPU	Q25HCPU (control CPU on own station)
	Network	No other station specified (Own station)
	Sequence scan time	1ms
MES interface module		QJ71MES96
DB Connection Service and DB Connection Service Setting Tool		Version 1
Device tag settings	No. of tags	For trigger conditions: 1 tag For communication data: 1 tag (for 16, 64, 256 fields) 4 tags (for 1024 fields) 16 tags (for 4096 fields)
	Sampling setting	For trigger conditions: High-speed sampling (1 × 100ms) For communication data: Do not sample
	Data type	For trigger conditions: Bit transmit and receive For data: Single precision
	No. of components	For trigger conditions: No. of jobs × 2 For communication data: Same as the number of fields
Job setting	Trigger conditions	Handshake operation
	No. of jobs	1 job (for 16, 64, 256, 1024 fields) 2 jobs (for 4096 fields)
	No. of actions	1 action (for 16, 64, 256 fields) 4 actions (for 1024 fields) 16 actions (for 4096 fields)
	Select/Update condition	Comparison with constant value (1 condition only)
	Program execution	None
Measuring method	Measurement interval	From ON of Handshake startup to OFF of Completion notification
	No. of measurements	Average of 20 measurement results

(2) Measurement results

(a) When [Enhance sampling efficiency] is checked

The following table lists the results in the case where the [Enhance sampling efficiency] box is checked in [Sampling settings] of [Device tag settings].

Table App.84 Measurement results when [Enhance sampling efficiency] is checked

No. of fields	16	64	256	1024	4096
Select	0.2s	0.3s	0.9s	3.21s	13.5s
Update Insert	0.2s	0.2s	0.5s	1.4s	5.2s

(b) When [Enhance sampling efficiency] is not checked

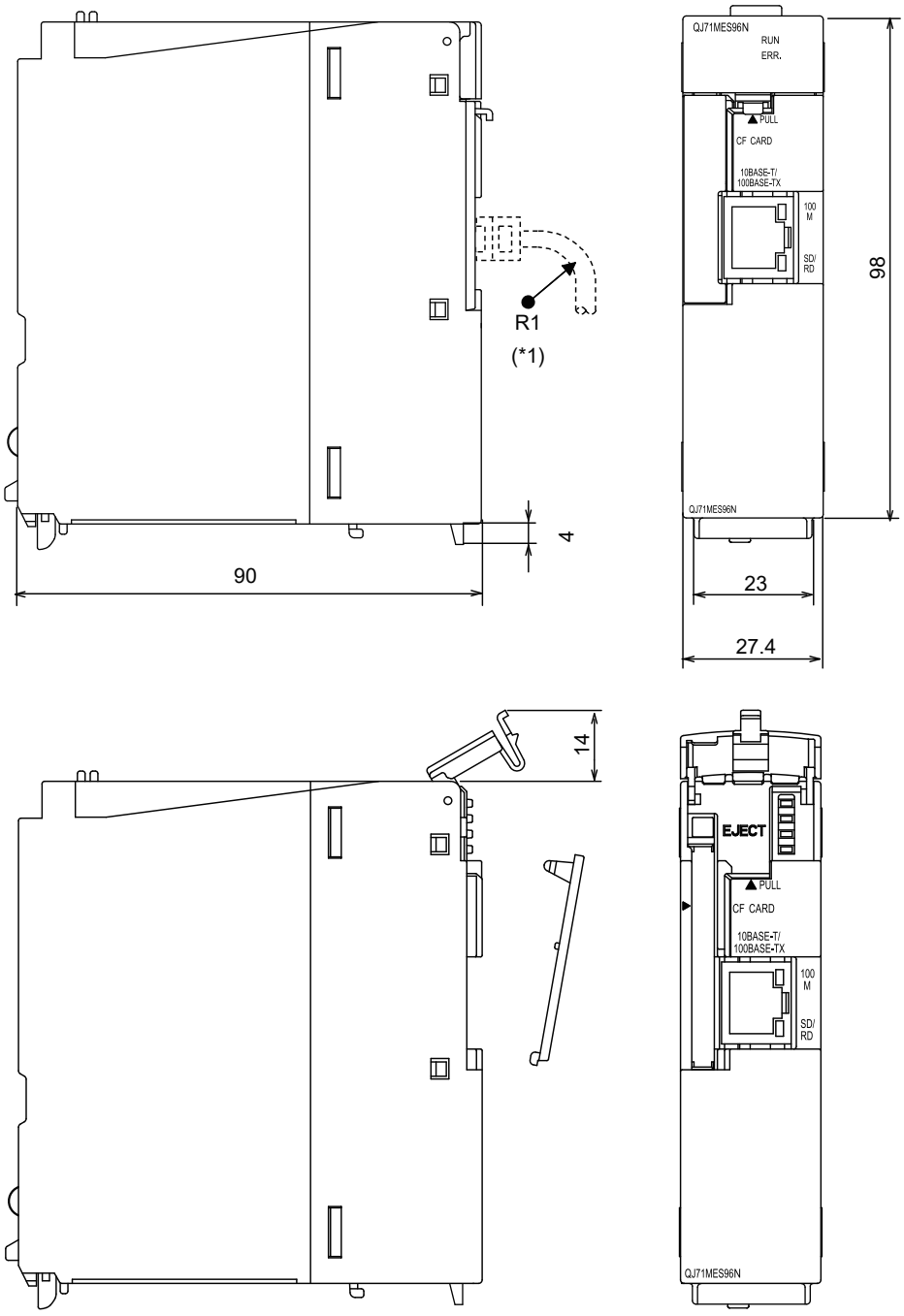
The following table lists the results in the case where the [Enhance sampling efficiency] box is not checked in [Sampling settings] of [Device tag settings].

Table App.85 Measurement results when [Enhance sampling efficiency] is not checked

No. of fields	16	64	256	1024	4096
Select	0.2s	0.3s	0.9s	3.2s	13.5s
Update Insert	0.2s	0.3s	1.0s	3.5s	15.0s

Appendix 5 External Dimensions

This section shows the external dimension diagrams of the MES interface module.



(Unit: mm)

Figure App.5 External dimensions

*1 The bending radius near the connector (R1: yardstick) should be at least four times longer than the cable's outside diameter when the twisted pair cable is connected.

Appendix 6 Data Collection Method for CPUs that cannot be Accessed Directly

This section explains the method for collecting data from CPUs that cannot be accessed directly (hereafter, explained with the Motion CPU).

(1) Auto refresh using CPU shared memory in a multiple CPU system

By performing auto refresh between the QCPU and Motion CPU in the multiple CPU system, device data in the Motion CPU can be read to the QCPU.
Registering device data read to the QCPU with tags enables to handle the device data in the Motion CPU.

(2) Settings required for auto refresh

Set the devices to which data are stored and the number of points sent by each CPU with [PLC parameter] - [Multiple CPU settings] - [Refresh settings] of GX Developer.
For auto refresh settings, refer to the following manual.

☞QCPU User's Manual (Multiple CPU System)

(3) Acquisition example of the Motion CPU device data

(a) System configuration

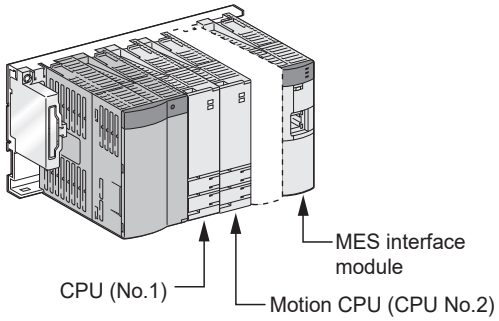


Figure App.6 System configuration

(b) [Refresh settings] for the Motion CPU (CPU No. 2)
Set the number of points to be sent and devices stored to the auto refresh area in the CPU shared memory of the Motion CPU.
(Example): D256 to D511 → Auto refresh area 0000 to 00FF

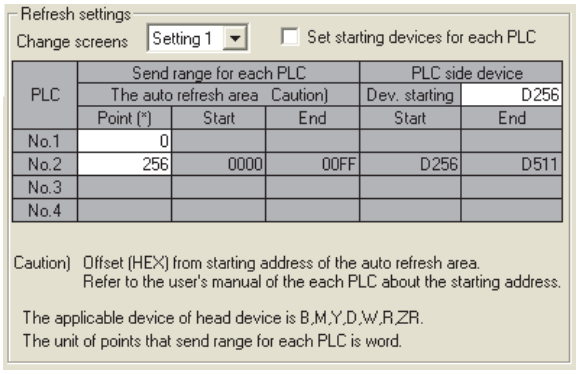


Figure App.7 [Refresh settings] for the Motion CPU (CPU No. 2)

(c) [Refresh settings] for the QCPU (CPU No. 1)
Set the number of points and devices of the QCPU to which auto refresh area data in the Motion CPU shared memory is stored.
(Example): CPU No. 2 auto refresh area 0000 to 00FF → D256 to D511

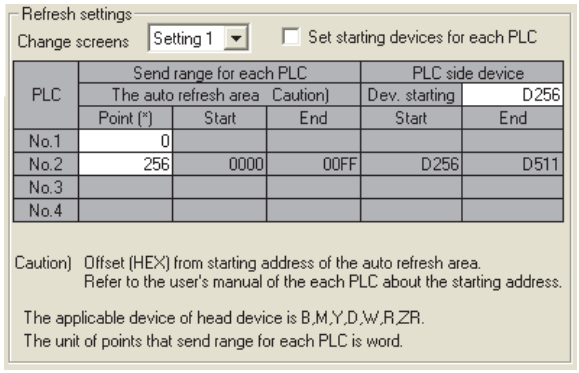


Figure App.8 [Refresh settings] for the QCPU (CPU No. 1)

(d) [Device tag settings] for the MES interface module
Register the QCPU (CPU No. 1) devices (devices set for refreshing) in the device tag.
(Example): Register D256 to D511 in tag 1.

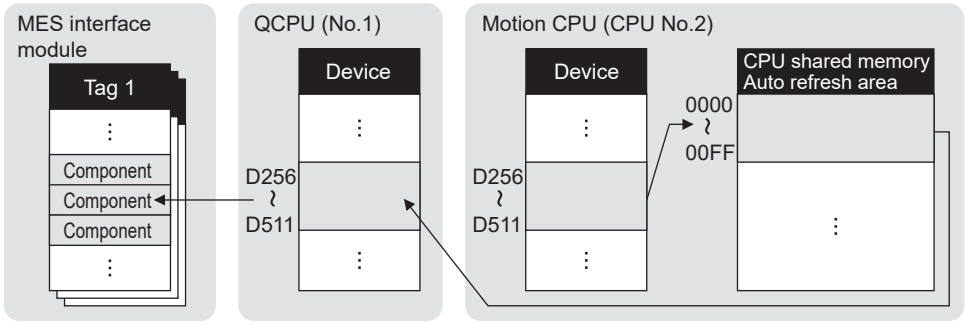


Figure App.9 Acquisition example of the Motion CPU device data

Appendix 7 Warning Messages in Windows(R)

Appendix 7.1 Overview of warning messages

When using the operating system with the User Account Control function, a warning message is displayed when the following is attempted as an administrator.

- Installation/uninstallation of MX MESInterface
- Start of "DB Connection Service Setting Tool"

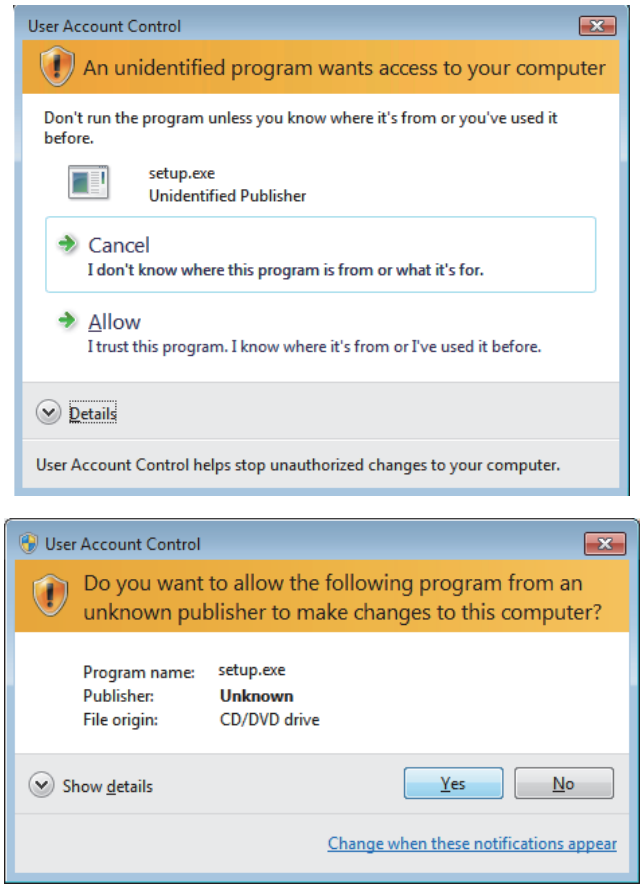


Figure App.10 User Account Control warning message

Appendix 7.2 Methods for disabling warning messages

Point

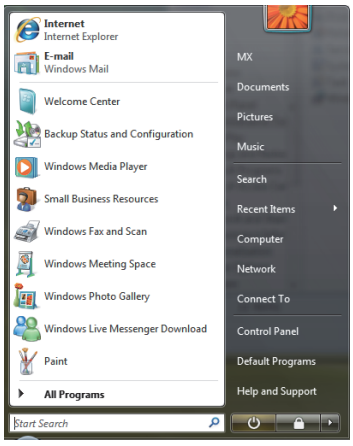
The User Account Control (UAC) is provided to protect the system from being destroyed (e.g. prevention of start-up of a program which will execute an unintended operation).
Before taking either of the methods described below, understand that the security function offered by UAC will be disabled and consider the risk.

The following two methods are available for preventing warning messages.

(1) Disabling the User Account Control function

The following shows a procedure for disabling the User Account Control function.

(a) When using Windows Vista® or Windows Server® 2008.



1 [Start] → [Control Panel]

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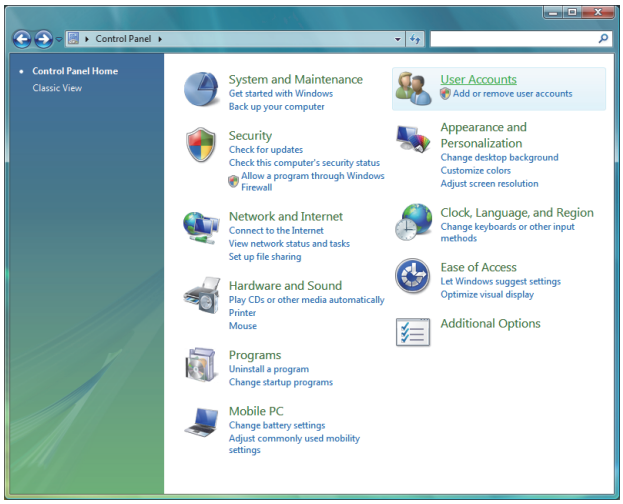
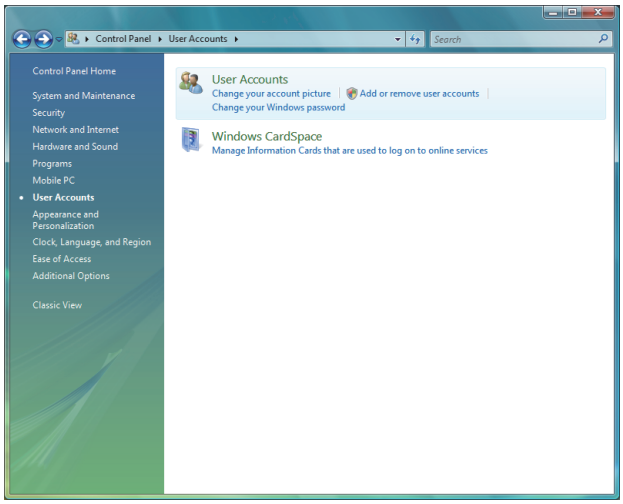


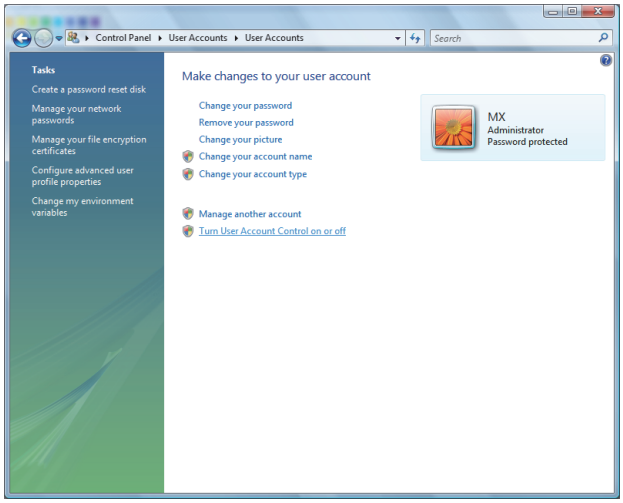
↓

2 Select [User Accounts].



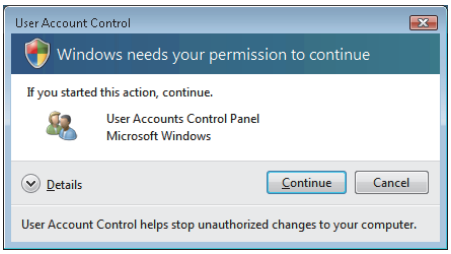
↓

3 Select [User Accounts].



↓

4 Select [Turn User Account Control on or off]. When User Account Control is enabled in Windows Vista®, the following screen appears. Click the Continue button.



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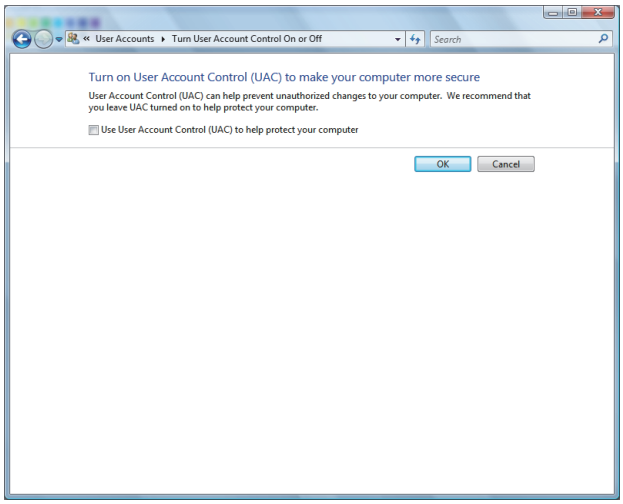
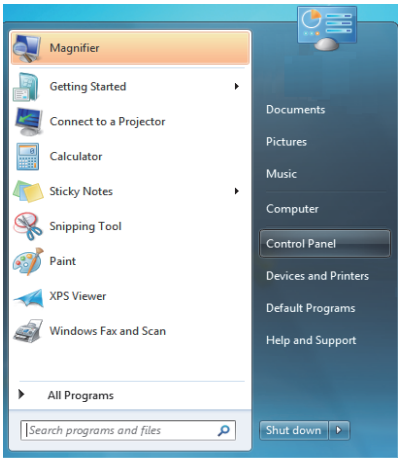


↓

(End)

5 Deselect [Turn on User Account Control (UAC) to make your computer more secure], and click the OK button.

(b) When using Windows® 7 or later

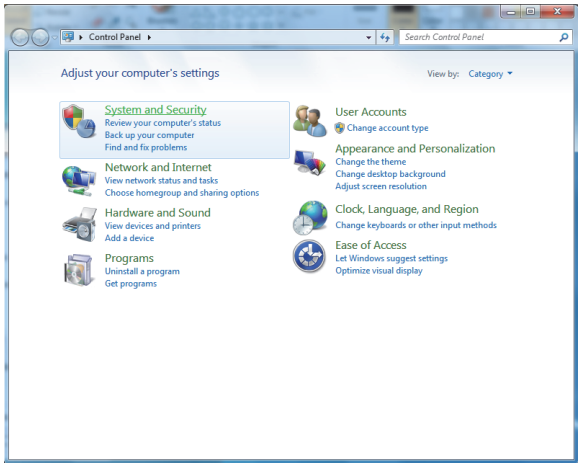


↓

1 [Start] → [Control Panel]

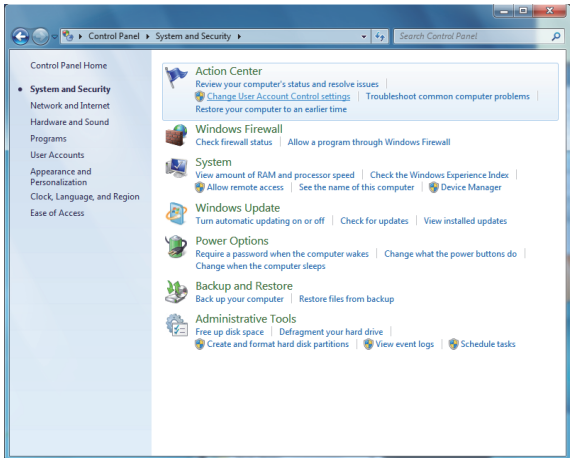
<When using Windows® 8 or later>

[Start] → [all applications] → [Windows System Tool] → [Control Panel]



↓

2 Select [System and Security].



↓

3 Select [Change User Account Control settings].

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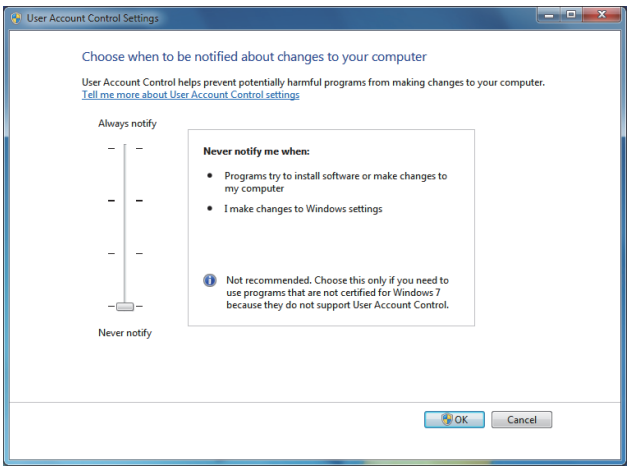


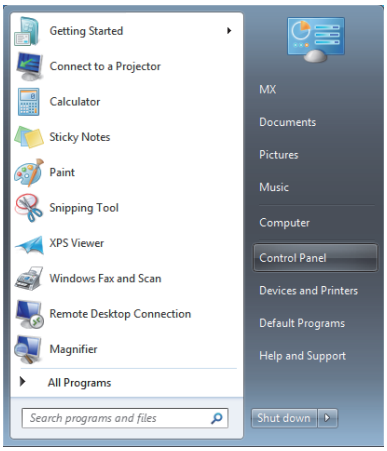
↓

(End)

4 Set the slide bar "Never notify" and click the OK button.

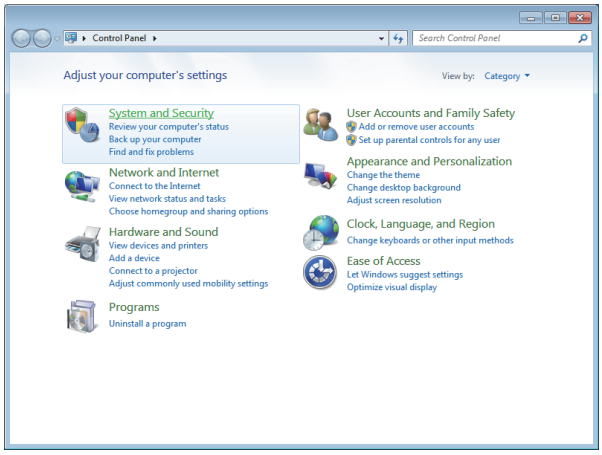
(2) Method for permitting programs without any warning message

The following shows a procedure for permitting programs without any warning message.



↓

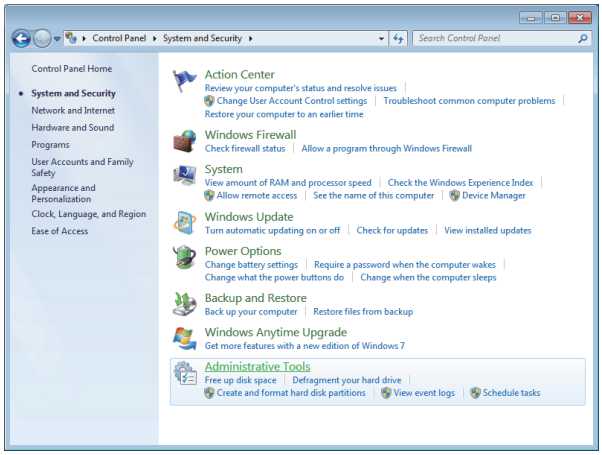
1 [Start] → [Control Panel]



↓

2 Select [System and Security].

For Windows Vista® or Windows Server® 2008, select [Classic View].



↓

3 Select [Administrative Tools].

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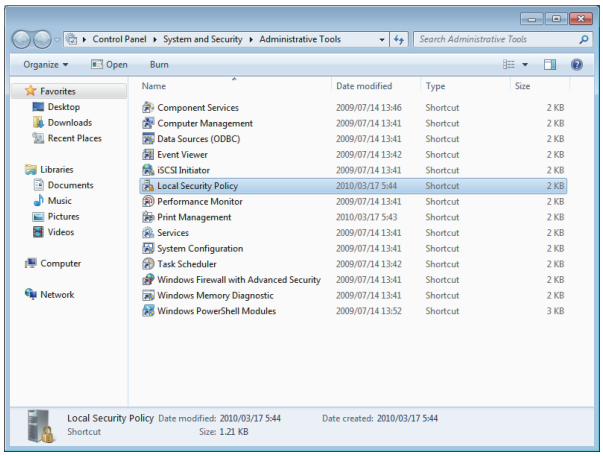
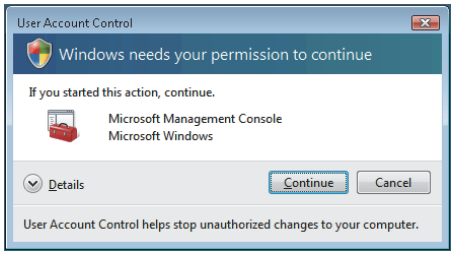
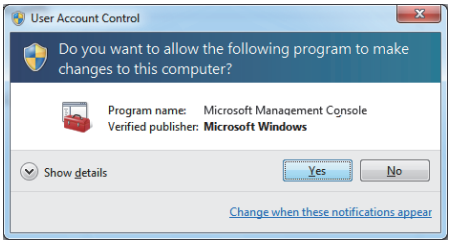
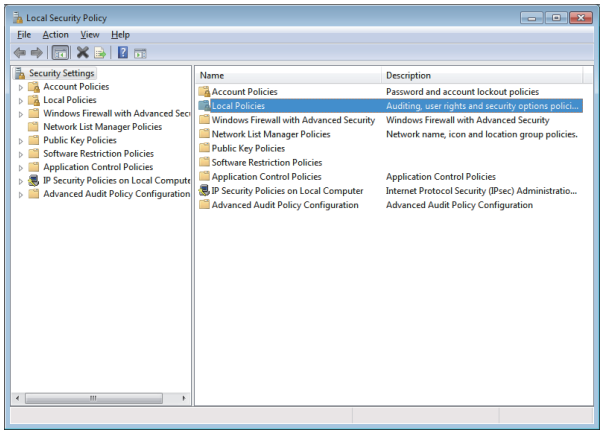


4 Select [Local Security Policy].
When User Account Control is enabled, the following screen appears.
Click the Continue or Yes button.



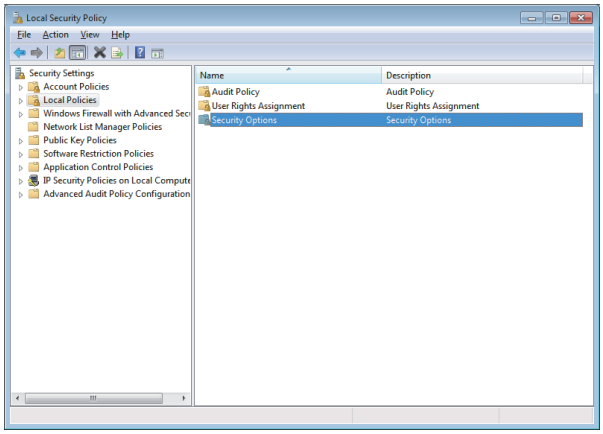


↓



5 Select [Local Policies].

↓



6 Select [Security Options].

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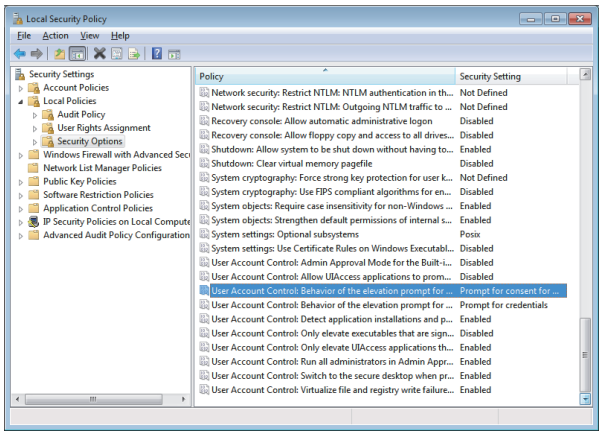
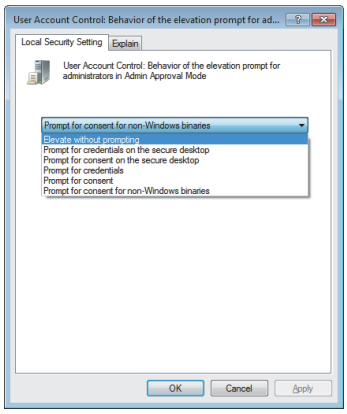


↓



↓

(End)

7 Select [User Account Control: Behavior of the elevation prompt for administrators in Admin Approval Mode, Prompt for consent].

8 Select [Elevate without prompting] on the <<Local Security Setting>> tab, and click the OK button.

Appendix 8 Transportation Precautions

When transporting a battery containing lithium, handling according to transportation regulations is required.

Appendix 8.1 Controlled model

The lithium battery used in the MES interface module is classified as follows.

Table App.86 Lithium battery

Product name	Model	Product supply status	Classification for transportation
Q series battery	Q6BAT	Lithium battery	Non-hazardous material

Appendix 8.2 Handling for shipping

The products are packed in accordance with transportation regulations before shipment. When transporting products after repacking or unpacking them, make them comply with the IATA Dangerous Goods Regulations, IMDG Code, and national transportation regulations.
For details, consult with the shipping carrier.

Appendix 9 Handling of Batteries and Devices with Built-in Batteries in EU Member States

This section describes the precautions for disposing of waste batteries in EU member states and exporting batteries and/or devices with built-in batteries to EU member states.

Appendix 9.1 Disposal precautions

In EU member states, there is a separate collection system for waste batteries. Dispose of batteries properly at the local community waste collection/recycling center.

The symbol shown in Figure App.11 is printed on the batteries and packaging of batteries and devices with built-in batteries used for Mitsubishi programmable controllers.

Figure App.11 Symbol

Note: This symbol is for EU member states only.
The symbol is specified in the new EU Battery Directive (2006/66/EC) Article 20 “Information for end-users” and Annex II.

The symbol indicates that batteries need to be disposed of separately from other wastes.

Appendix 9.2 Exportation precautions

The new EU Battery Directive (2006/66/EC) requires the following when marketing or exporting batteries and/or devices with built-in batteries to EU member states.

- To print the symbol on batteries, devices, or their packaging
- To explain the symbol in the manuals of the products

(1) Labeling

To market or export batteries and/or devices with built-in batteries, which have no symbol, to EU member states on September 26, 2008 or later, print the symbol shown in Figure App.11 on the batteries, devices, or their packaging.

(2) Explaining the symbol in the manuals

To export devices incorporating Mitsubishi programmable controller to EU member states on September 26, 2008 or later, provide the latest manuals that include the explanation of the symbol.

If no Mitsubishi manuals or any old manuals without the explanation of the symbol are provided, separately attach an explanatory note regarding the symbol to each manual of the devices.

Point

The requirements apply to batteries and/or devices with built-in batteries manufactured before the enforcement date of the new EU Battery Directive (2006/66/EC).

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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 CODE: 13JR95

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