

Programmable Controller

MELSEC iQ-R
series

MELSEC iQ-R MES Interface Module User's Manual (Startup)



-RD81MES96N
-RD81MES96
-SW1DND-RMESIF-E(MX MESInterface-R)

SAFETY PRECAUTIONS

(Read these precautions before using this product.)

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

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

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

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

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

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

[Design Precautions]

WARNING

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

[Design Precautions]

WARNING

- Do not write any data to the "system area" and "write-protect area" of the buffer memory in the module. Also, do not use any "use prohibited" signals as an output signal from the CPU module to each module. Doing so may cause malfunction of the programmable controller system. For the "system area", "write-protect area", and the "use prohibited" signals, refer to the user's manual for the module used.
 - If a communication cable is disconnected, the network may be unstable, resulting in a communication failure of multiple stations. Configure an interlock circuit in the program to ensure that the entire system will always operate safely even if communications fail. Incorrect output or malfunction due to a communication failure may result in an accident.
-

[Design Precautions]

CAUTION

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

[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]

WARNING

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

[Installation Precautions]

CAUTION

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

[Wiring Precautions]

WARNING

- Shut off the external power supply (all phases) used in the system before installation and wiring. Failure to do so may result in electric shock or cause the module to fail or malfunction.
 - After installation and wiring, attach the included terminal cover to the module before turning it on for operation. Failure to do so may result in electric shock.
-

[Wiring Precautions]

CAUTION

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

[Wiring Precautions]

CAUTION

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

[Startup and Maintenance Precautions]

WARNING

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

[Startup and Maintenance Precautions]

CAUTION

- When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
 - Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.
 - Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire.
 - Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) more than 25cm away in all directions from the programmable controller. Failure to do so may cause malfunction.
 - Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may cause the module to fail or malfunction.
 - Tighten the screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
 - After the first use of the product, do not perform each of the following operations more than 50 times (IEC 61131-2/JIS B 3502 compliant).
Exceeding the limit may cause malfunction.
Mounting/removing the module to/from the base unit
Inserting/removing the extended SRAM cassette or battery-less option cassette to/from the CPU module
Mounting/removing the terminal block to/from the module
 - After the first use of the product, do not insert/remove the SD memory card to/from the CPU module more than 500 times. Exceeding the limit may cause malfunction.
 - Do not touch the metal terminals on the back side of the SD memory card. Doing so may cause malfunction or failure of the module.
 - Do not touch the integrated circuits on the circuit board of an extended SRAM cassette or a battery-less option cassette. Doing so may cause malfunction or failure of the module.
 - Do not drop or apply shock to the battery to be installed in the module. Doing so may damage the battery, causing the battery fluid to leak inside the battery. If the battery is dropped or any shock is applied to it, dispose of it without using.
 - Startup and maintenance of a control panel must be performed by qualified maintenance personnel with knowledge of protection against electric shock. Lock the control panel so that only qualified maintenance personnel can operate it.
-

[Startup and Maintenance Precautions]

CAUTION

- Before handling the module, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Failure to do so may cause the module to fail or malfunction.
-

[Operating Precautions]

CAUTION

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

[Disposal Precautions]

CAUTION

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

[Transportation Precautions]

CAUTION

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

CONDITIONS OF USE FOR THE PRODUCT

- (1) 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.

INTRODUCTION

Thank you for purchasing the Mitsubishi Electric MELSEC iQ-R series programmable controllers.

This manual describes the performance specifications, procedure before operation, wiring, and operation examples to use the module listed below.


Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the MELSEC iQ-R series programmable controller to handle the product correctly.

When applying the program examples provided in this manual to an actual system, ensure the applicability and confirm that it will not cause system control problems.

Please make sure that the end users read this manual.

Point

The program examples shown in this manual are the examples in which an MES interface module (RD81MES96N or RD81MES96) is assigned to the input/output No. X/Y0 to X/Y1F unless otherwise specified. To use the program examples shown in this manual, the input/output number assignment is required. For details on the assignment of input/output number, refer to the following:

 MELSEC iQ-R Module Configuration Manual

Relevant product



RD81MES96N

RD81MES96

COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES

Method of ensuring compliance



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

-  MELSEC iQ-R Module Configuration Manual (SH-081262ENG)
-  Safety Guidelines (IB-0800525)

Certification marks on the side of the programmable controller indicate compliance with the relevant regulations.

Additional measures

To ensure that this product maintains the EMC and Low Voltage Directives or other regulations, please refer to the following.

-  MELSEC iQ-R Module Configuration Manual (SH-081262ENG)
-  Safety Guidelines (IB-0800525)

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RELEVANT MANUALS

| Manual name [manual number] | Description | Available form |
|--|---|-------------------------------|
| MELSEC iQ-R MES Interface Module User's Manual (Startup) [SH-081422ENG] (this manual) | Specifications, procedure before operation, wiring, and operation examples of an MES interface module | Print book e-Manual PDF |
| MELSEC iQ-R MES Interface Module User's Manual (Application) [SH-081423ENG] | Functions, MES Interface Function Configuration Tool, DB Connection Service, parameter setting, troubleshooting, input/output, and buffer memory of an MES interface module | Print book e-Manual PDF |
| GX Works3 Operating Manual [SH-081215ENG] | System configurations, parameter settings, and operation methods for the online function in GX Works3 | e-Manual PDF |
| MELSEC iQ-R Module Configuration Manual [SH-081262ENG] | The combination of the MELSEC iQ-R series modules, common information on the installation/wiring in the system, and specifications of the power supply module, base unit, SD memory card, and battery | Print book e-Manual PDF |

This manual does not include detailed information on the following:

- General specifications
- Applicable combinations of CPU modules and the other modules, and the number of mountable modules
- Applicable combinations of remote head modules and the other modules, and the number of mountable modules
- Installation

For details, refer to the following:

 MELSEC iQ-R Module Configuration Manual

Point


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

e-Manual has the following features:


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

TERMS

Unless otherwise specified, this manual uses the following terms.

| Term | Description |
|-------------------------|--|
| Data source | Connection information which is necessary for accessing data using ODBC. With Windows, a data source name is assigned to connection information for management. The database is accessed via ODBC by specifying the data source name with the information linkage function. |
| Device memory or device | Various kinds of memory data in a CPU module. There are devices handled in each bit and in each word. |
| Device tag | A data table that contains a set of information (component) required to access device data in each CPU module on a network |
| Device tag component | A component (device data) which configures a device tag. Data that contains communication routes, data types, devices, etc. required to access device data in each CPU module on a network. |
| Engineering tool | A tool used for setting up programmable controllers, programming, debugging, and maintenance. For the supported tools, refer to the following:  MELSEC iQ-R Module Configuration Manual |
| Handshake | For highly reliable processing, devices in a CPU module are used for managing processing between the CPU module and MES interface module. |

For definitions of terms for safety CPUs, refer to the following:

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

GENERIC TERMS AND ABBREVIATIONS

Unless otherwise specified, this manual uses the following generic terms and abbreviations.

| Generic term/abbreviation | Description |
|---|---|
| Application server | A computer with a program which runs upon request from an MES interface module |
| Configuration personal computer | A personal computer to set various settings for an MES interface module. This computer can be shared with a server. |
| Database server | A computer with a relational database which links information with an MES interface module |
| FX5CPU | A MELSEC iQ-F series CPU module |
| FXCPU | A MELSEC-F series CPU module |
| LCPU | A MELSEC-L series CPU module |
| MES | Manufacturing Execution Systems. A system for controlling and monitoring the plant status in real time to optimize production activities. The system enables to speed up responses to changes of a production plan and situation that lead to efficient production processes and optimization of production activities. |
| MES Interface Function Configuration Tool | MELSEC iQ-R series MES Interface Function Configuration Tool |
| MES interface module | A MELSEC iQ-R MES interface module |
| QCPU (Q mode) | A MELSEC-Q series CPU module and a MELSEC-Q series C Controller module |
| RCPU | A MELSEC iQ-R series CPU module and a MELSEC iQ-R series C Controller module |
| Server | A database server and an application server |
| Windows 8 or later | Windows 8, Windows 8.1, Windows 10 |

DISCONTINUED MODEL

The following model is described in this manual, but has no longer been produced.

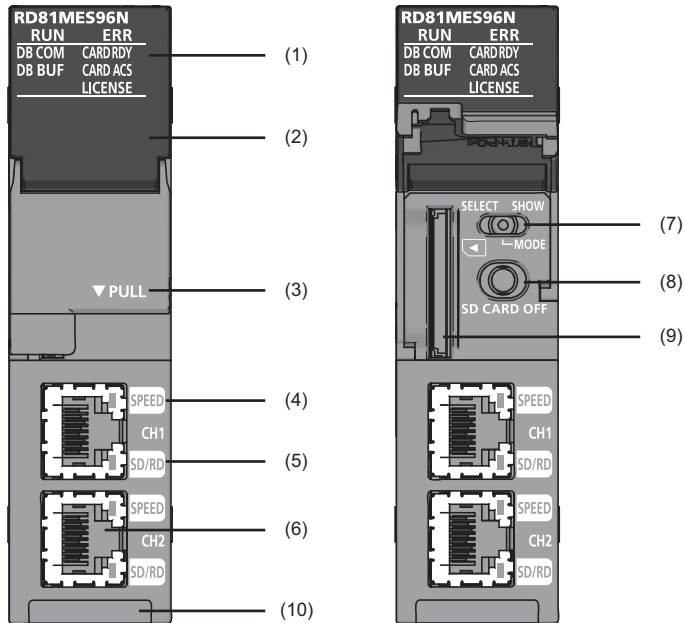
For the onerous repair term after discontinuation of production, refer to "WARRANTY" in this manual.

| Model name | Production discontinuation |
|------------|----------------------------|
| RD81MES96 | May 2020 |

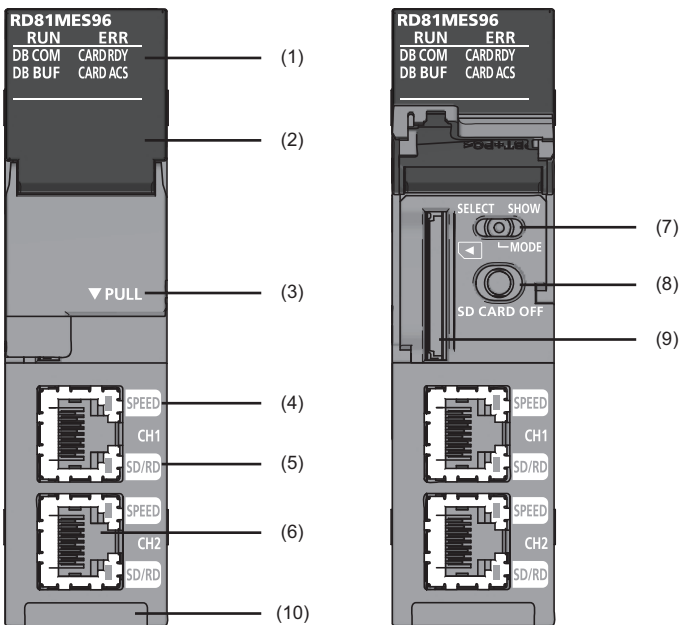
1 PART NAMES



This chapter shows the part names of an MES interface module.

RD81MES96N



RD81MES96



| No. | Name | Description | |
|-------------|--|--|-----------|
| | | RD81MES96N | RD81MES96 |
| (1) | RUN LED | <p>Indicates the operating status.</p> <ul style="list-style-type: none"> • ON: In operation • Flashing: Checking module, selecting the module for online module change (Flashes for 10 seconds when checking modules by clicking the [Module Confirmation] button in the "MES Interface Module Search" screen of MES Interface Function Configuration Tool.) • OFF: Watchdog timer error (hardware failure), module replacement allowed in the process of the online module change | |
| | ERR LED | <p>Indicates the error status of an MES interface module.</p> <ul style="list-style-type: none"> • ON: Module continuation error or watchdog timer error (hardware failure) • Flashing: Module stop error • OFF: In normal status | |
| | DB COM LED | <p>Indicates the connection status with a database.</p> <ul style="list-style-type: none"> • ON: Database normal connection status (Communication is normally being established with all databases excluding unconnected databases.) • Flashing: Database communication error status (A communication error is detected in communication with some or all databases.) • OFF: Database not connected status (Communication has never been established with any database after powering ON, resetting a CPU module, or updating the setting.) | |
| | DB BUF LED | <p>Indicates the execution status of DB buffering.</p> <ul style="list-style-type: none"> • ON: Being executed (Turns ON when the DB buffering setting is enabled and during buffering, or when either DB buffering setting 1 or 2 is buffering.) • Flashing: DB buffer full (Flashes when the DB buffering setting is enabled and the buffer is full (no capacity), or when either DB buffering setting 1 or 2 is buffer full.) • OFF: Not executed (The DB buffering setting is disabled, or the DB buffering setting is enabled and the buffer is empty.) | |
| | CARD RDY LED | <p>Indicates the accessibility of an SD memory card.</p> <ul style="list-style-type: none"> • ON: Accessible • Flashing: Being prepared or formatted • OFF: Inaccessible (removable) <p>For the considerations for using an SD memory card, refer to the following:  Page 65 Considerations for using an SD memory card</p> | |
| | CARD ACS LED | <p>Indicates the access status of an SD memory card.</p> <ul style="list-style-type: none"> • ON: Being accessed • OFF: Not accessed | |
| LICENSE LED | <p>Indicates the certification status of a license when using an option function that requires license certification.</p> <ul style="list-style-type: none"> • ON: Succeeded • Flashing: Temporarily authenticated • OFF: No licenses | — | |
| (2) | Dot matrix LED | <p>Displays the contents of each display mode or the results of the self-diagnostic test.</p> <p>The following contents are displayed in each display mode.</p> <ul style="list-style-type: none"> • User specification character: Scrolled and displayed by the width of approximately 3 characters (3.3 characters). • Error code: Displayed in four digits in hexadecimal (When multiple errors occur, only the latest error code is displayed.) • IP address: Scrolled and displayed by four characters in decimal. • DB buffer use rate: Displayed in three digits in decimal + %. <p>For the display when performing the self-diagnostic test, refer to the following:  MELSEC iQ-R MES Interface Module User's Manual (Application)</p> | |
| (3) | Slot cover | <p>A cover of the SD memory card slot and the switches.</p> <p>Open this cover to insert/remove an SD memory card or to operate the switches.</p> <p>Close the cover unless inserting/removing an SD memory card or operating the switches to prevent foreign material intrusion such as dust.</p> | |
| (4) | SPEED LED(CH1, CH2) | <p>Indicates the communication speed and the link status for Ethernet.</p> <ul style="list-style-type: none"> • ON (orange): Linking-up (1 Gbps) • ON (green): Linking-up (100 Mbps) • OFF: Linking-down or linking-up (10 Mbps) | |
| (5) | SD/RD LED(CH1, CH2) | <p>Indicates the data sending/receiving status in Ethernet.</p> <ul style="list-style-type: none"> • ON: Being sent/received • OFF: Not being sent/received | |

| No. | Name | Description | |
|------|--|---|-----------|
| | | RD81MES96N | RD81MES96 |
| (6) | Ethernet port (CH1, CH2) ^{*1} | A port for connecting to an Ethernet device (IEEE802.3, 1000BASE-T/100BASE-TX/10BASE-T standards-compliant) | |
| (7) | Dot matrix LED display mode switch (SELECT/MODE/SHOW switch) | A switch for switching the display of the dot matrix LED. <ul style="list-style-type: none"> • MODE: To display the display mode name that is currently selected. • SELECT: To select (switch) the display mode. Order: USR → ENo. → IP1 → IP2 → BUF1 → BUF2 → USR • SHOW: To display the contents of a selected display mode. (☞ Page 17 Dot matrix LED display) Put this display mode switch to 'SHOW' during operation, and move it only when switching the display mode. | |
| (8) | SD memory card lock switch (SD CARD OFF button) | A switch for disabling access to an SD memory card to remove it. Removing an SD memory card is prohibited while the CARD RDY LED is ON or flashing. For the procedures for inserting and removing an SD memory card, refer to the following: ☞ Page 64 Insertion/removal method of an SD memory card | |
| (9) | SD memory card slot | A slot for inserting an SD memory card. (SD, SDHC standards-compliant: 2 GB (SD) to 16 GB (SDHC)) | |
| (10) | Product information marking | Displays the product information (16 digits) of a module. | |

*1 Only CH1 can be connected to MES Interface Function Configuration Tool with direct connection.

Dot matrix LED display

The following table shows the contents of the display mode displayed on the dot matrix LED when switching the display mode to 'SHOW.'

| Display mode name | Description |
|-------------------|---|
| USR | Characters specified in an action are displayed. Substitute characters to display on the S_MATRIXLED_DISP (dot matrix LED display) of the system variable in the action. For details on the action, refer to the following: ☞ MELSEC iQ-R MES Interface Module User's Manual (Application) |
| ENo. | An error code is displayed. |
| IP1 | The IP address of Ethernet port CH1 is displayed. |
| IP2 | The IP address of Ethernet port CH2 is displayed. |
| BUF1 | The use rate of DB buffer 1 is displayed. |
| BUF2 | The use rate of DB buffer 2 is displayed. |

Point

The following display switching of the dot matrix LED can be set in MES Interface Function Configuration Tool.

- Default display mode at power ON (Initial value: USR)
- The display mode is switched to ENo. (error code) forcibly when an error occurs.
- ENo. (error code) is highlighted.

2 SPECIFICATIONS


This chapter explains the specifications of an MES interface module.

2.1 Performance Specifications

This section shows the performance specifications of hardware (MES interface module) and software (MX MESInterface-R).

Hardware specifications

The following table shows the specifications of an MES interface module.

| Item | | Specification | |
|--|--|--|--|
| SD memory card slot | Interface | SD memory card/SDHC memory card (2 GB to 16 GB) | |
| | Power supply | +3.3 VDC, up to 200 mA | |
| Ethernet port | Number of channels | 2 | |
| | Interface ^{*1} | <ul style="list-style-type: none"> • 1000BASE-T • 100BASE-TX • 10BASE-T | |
| | Data transmission speed | 1000BASE-T | 1 Gbps |
| | | 100BASE-TX | 100 Mbps |
| | | 10BASE-T | 10 Mbps |
| | Number of cascade connections ^{*2} (When using a repeater hub) | 1000BASE-T | Consult the manufacturer of the repeater hub used. |
| | | 100BASE-TX | 2 levels maximum |
| | | 10BASE-T | 4 levels maximum |
| | Communication mode | Full-duplex/half-duplex | |
| | Transmission method | Base band | |
| Maximum segment length ^{*3} | 100 m (length between a hub and a node) | | |
| Applicable connector for external wiring | RJ45 | | |
| Supported function | <ul style="list-style-type: none"> • Auto-negotiation (automatic recognition of 1000BASE-T/100BASE-TX/10BASE-T) • Auto-MDI/MDI-X (automatic recognition of a straight/crossover cable) | | |
| Number of occupied I/O points | 32 points/slot (I/O assignment: Intelligent function module 32 points) | | |
| Clock | Acquired from a CPU module (CPU No.1 in a multiple CPU system).  Page 19 Basic operation specification | | |
| 5 VDC internal current consumption | 1.25 A | | |
| External dimensions | Height | 106 mm | |
| | Width | 27.8 mm | |
| | Depth | 110 mm | |
| Weight | 0.25 kg | | |

*1 1000BASE-T/100BASE-TX/10BASE-T, and full-duplex/half-duplex communication mode are identified by an MES interface module depending on the hub.

For connection with a hub not having the auto-negotiation function, set the setting on the hub side according to the communication mode.

*2 For a switching hub, consult the manufacturer of the hub used.

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

Software specifications

The following table shows the specifications of MX MESInterface-R.

| Item | Description | Reference |
|---|---|---------------------------------------|
| Basic operation specification | Specification for the operation (job), startup condition for the job (trigger condition), operation unit of a job (action), and network information. | Page 19 Basic operation specification |
| Device memory input/output specification | Specification for the accessible target device types and access units (device tags). | Page 20 Device memory input/output |
| DB input/output specification | Specification for the accessible databases, access units (access table/procedure, access field/procedure argument), and buffering of output data (DB buffering) at the time of disconnection. | Page 21 DB input/output |
| Variable input/output specification | Specification for user variables (local variables, global variables) which can be defined freely, system variables to refer to system information, and data types of variable. | Page 23 Variable input/output |
| Data operation and processing specification | Specification for the operation processing such as addition and subtraction. | Page 23 Data operation and processing |
| External communication client | Specification for the communication from an MES interface module to external devices. | Page 23 External communication client |
| Security | Specification for security. | Page 23 Security |

Basic operation specification

| Item | | Specification | |
|--|--|---|--|
| | | RD81MES96N | RD81MES96 |
| Job (number of settings) | Maximum | 64 jobs | |
| Action (number of settings) | Maximum | 1920 actions | |
| | For one job | 30 actions • Main processing: 20 actions *1 • Pre/post-processing: 10 actions | 30 actions • Main processing: 20 actions • Pre/post-processing: 10 actions |
| Trigger condition | For one job | 2 events/conditions | |
| | Configuration type | <ul style="list-style-type: none"> • Single event • Multiple events • Condition combination event • Precondition × Event • Single handshake • Multiple handshake | <ul style="list-style-type: none"> • Single event • Multiple events • Condition combination event • Precondition × Event • Single handshake |
| | Event/condition type | <ul style="list-style-type: none"> • Condition (value monitoring) • Condition (period of time) • Event (value changed) • Event (fixed time) • Event (fixed cycle) (timer interval/time interval) • Event (module monitoring) (MES interface module/control CPU) | |
| | Condition combination type | <ul style="list-style-type: none"> • OR combination • AND combination | |
| | Trigger buffering count | 192 times (A value is cleared due to power interruption/reset/setting update.) | |
| Time information handling (time information)*2 | Time | Acquired from a CPU module (CPU No.1 in a multiple CPU system). | |
| | Daylight saving time | | |
| | Time zone | | |
| Ethernet | Connection method | IPv4 | |
| | Number of channels | 2 channels (CH1/CH2) (Note that they cannot be connected to a same network, and no routing function between CH1 and CH2.) | |
| | Number of default gateways | 1 (It can be registered only in CH1 or CH2.) | |
| MES Interface Function Configuration Tool | Number of tools that can be connected simultaneously | 5 (Maximum number of connections to a single MES interface module) | |

*1 Up to five actions can be set when using a DB communication action with "Multiple Insert" selected.

*2 When using the daylight saving time function of a CPU module for an RD81MES96, use an RD81MES96 the firmware version of which is '03' or later. If using one the firmware version of which is '02' or earlier, it may cause the malfunction due to the time information difference with the CPU module.

For information on the firmware version of a CPU module, refer to the manual of a CPU module used.

Device memory input/output

| Item | | Specification | |
|--|---|--|---|
| | | RD81MES96N | RD81MES96 |
| Access target device | Maximum | 64 devices | 16 devices |
| | Access target device type | <ul style="list-style-type: none"> • RCPU • QCPU (Q mode) • LCPU • FX5CPU • FXCPU | <ul style="list-style-type: none"> • RCPU • QCPU (Q mode) • LCPU |
| Device tag | Maximum | 64 device tags | |
| | Access type | <ul style="list-style-type: none"> • General access • High-speed access (interval specification) • High-speed access (each scan) | |
| | Shortest access interval | Each scan | |
| | Access interval (general access) | <ul style="list-style-type: none"> • 1 to 9 × 100 ms • 1 to 3600 s | |
| | Access interval (high-speed access (interval specification)) | <ul style="list-style-type: none"> • 1 to 9 ms • 1 to 9 × 10 ms • 1 to 9 × 100 ms • 1 to 60 s | |
| | Access interval (high-speed access (each scan)) | <ul style="list-style-type: none"> • Each scan | |
| Device tag component | Maximum | 65536 components/project (64 tags × 1024 components) ^{*1} | |
| | Maximum (for one device tag) | 1024 components | |
| | Maximum (for one job) | 20480 components ^{*2} | |
| Number of data points (Device tag component) | Maximum number of points (per project) ^{*3} | 131072 points (total number without array tag setting) 2621440 points (total number with array tag setting) | |
| | Maximum number of points (for one device tag component) ^{*3} | 40960 points (Multiple Select) | |
| Number of data points (Job) ^{*4} | Maximum number of points (per project) ^{*1*3} | 131072 points (total number excluding the data assignment settings of the Multiple Select setting) 2949120 points (total number only for the data assignment settings of the Multiple Select) | |
| | Maximum number of points (for one job) ^{*1*3} | 46080 points ^{*2} Total size of a character string type: 90000 characters/job (total of a device tag, variable, constant, and macro) | 46080 points ^{*2} Total size of a character string type: 2048 characters/job (total of a device tag, variable, constant, and macro) |
| Access data | Data type | <ul style="list-style-type: none"> • Bit • Word [unsigned]/Bit string [16-bit] • Double word [unsigned]/Bit string [32-bit] • Word [signed] • Double word [signed] • 16bit BCD • 32bit BCD • Single-precision real number • Double-precision real number • Character string [Unicode[®]] • Character string [ASCII/SJIS] | |

*1 For high-speed access, the following points can be set:

RD81MES96N the firmware version of which is '03' or later: 32768 points

RD81MES96N the firmware version of which is '02' or earlier, or RD81MES96: 8192 points

*2 When the trigger buffering is enabled, the maximum is 8192 components (points).

*3 A digit-specified bit device (K5 to K8) and double-word device are counted as two points.

*4 Counted redundantly when using a device tag component in multiple jobs.

Not counted redundantly when using multiple device tag components in a job.

DB input/output

| Item | | Specification | |
|------------------------|---|--|---|
| | | RD81MES96N | RD81MES96 |
| Access target server | Database type | <ul style="list-style-type: none"> • Oracle • Microsoft SQL Server • Microsoft Access • MySQL • PostgreSQL | |
| | Access type | <ul style="list-style-type: none"> • Connection via service • Direct DB connection | Connection via service |
| | Maximum number of settings | 16 servers | |
| Access table/procedure | DB communication type | <ul style="list-style-type: none"> • Select • Insert • Update (Data can be inserted if there is no data to be updated.) • Delete • Multiple Select • Multiple Insert • Stored Procedure | <ul style="list-style-type: none"> • Select • Insert • Update (Data can be inserted if there is no data to be updated.) • Delete • Multiple Select • Stored Procedure |
| | Maximum number of settings (for one project) | 64 tables/procedures | |
| | Maximum number of settings (for one job) | 20 tables/procedures | |
| | Maximum number of settings (for one action) | 1 table/procedure | |
| | Maximum number of settings (per access table) | Total length of DB field name: 16384 characters | |

| Item | | Specification | |
|--|--|--|---|
| | | RD81MES96N | RD81MES96 |
| Access field/ procedure argument | Maximum number of settings (per project)* ¹ | 65536 settings | |
| | Maximum number of settings (for one job)* ¹ | <ul style="list-style-type: none"> When the trigger buffering is disabled: 20480 settings When the trigger buffering is enabled: 8192 settings Note that the following limits apply: <ul style="list-style-type: none"> Date and time type access field/procedure argument: Up to 50 settings Total number of characters of a character string type: Up to 90000 characters (total number of characters of a character string type for a device tag, variable, and constant) | <ul style="list-style-type: none"> When the trigger buffering is disabled: 20480 settings When the trigger buffering is enabled: 8192 settings Note that the following limits apply: <ul style="list-style-type: none"> Date and time type access field/procedure argument: Up to 50 settings Total number of characters of a character string type: Up to 2048 characters (total number of characters of a character string type for a device tag, variable, and constant) |
| | Maximum number of settings for access field (for one table)* ² | 1024 fields | |
| | Maximum number of settings for access procedure argument (for one procedure)* ² | 256 settings | |
| | Data type | <ul style="list-style-type: none"> Integer Real number*³ Real number [floating point]*⁴ Real number [fixed point]*⁴ Character string [Unicode]*⁵ Character string [Unicode(NCHAR)]*⁶ Character string [Unicode(CHAR)]*⁶ Date and time | <ul style="list-style-type: none"> Integer Real number*³ Real number [floating point]*⁴ Character string [Unicode]*⁵ Character string [Unicode(NCHAR)]*⁶ Character string [Unicode(CHAR)]*⁶ Date and time |
| | Maximum number of settings (for one action) | Total number of characters of a character string type (total number of characters of a character string type for a device tag, variable, and constant) It differs depending on the DB communication type. <ul style="list-style-type: none"> Select: Up to 90000 characters Insert: Up to 10000 characters Update: Up to 10000 characters Delete: Up to 10000 characters Multiple Select: Up to 90000 characters Multiple Insert: Up to 20000 characters | No limit |
| DB buffer | Number of settings | 2 settings | |
| | Maximum capacity | 2048 MB (up to 1024 MB for each buffer) | |

*1 Maximum number of settings in the job setting.

*2 Maximum number of settings in the access table/procedure settings.

*3 A data type when a real number is set for an access procedure argument.

*4 A data type when a real number is set for an access field.

*5 A data type when a character string is set for an access procedure argument.

*6 A data type when a character string is set for an access field.

Variable input/output

| Item | | Specification |
|---------------|--|---|
| Variable type | Type | <ul style="list-style-type: none"> Local variable (retains data only at a job execution and can be used in a same job.) Global variable (retains data until the power supply is turned OFF or a CPU module is reset, and can be used between different jobs.) System variable |
| Data type | Type | <ul style="list-style-type: none"> Bit Word [unsigned]/Bit string [16-bit] Double word [unsigned]/Bit string [32-bit] Word [signed] Double word [signed] Single-precision real number Double-precision real number Character string [Unicode] |
| Capacity | Maximum number of settings (per project) | <ul style="list-style-type: none"> Local variable: 1024 words (2048 bytes)^{*1} Global variable: 4096 words (8192 bytes)^{*1} System variable: A defined variable is used. |
| | Maximum number of settings (for one job) ^{*2} | <ul style="list-style-type: none"> Local variable: 1024 words (2048 bytes) Global variable: 512 words (1024 bytes) |

*1 The number of settings depends on the data size. However, 2 bytes are used even when the data type is bit.

*2 The total number of characters of a character string type for one job is up to 2048 characters.

Data operation and processing

| Item | | Specification |
|--------------------------------------|----------------------------|---|
| Operator | Substitution | — |
| | Arithmetic operation | 5 types |
| | Character string operation | 8 types |
| | Bit operation | 5 types |
| | Type conversion | 4 types |
| Maximum number of operation settings | Maximum | 38400 settings (600 settings × 64 jobs) |
| | For one job | 600 settings (20 settings × 30 actions) |
| | For one action | 20 settings |

External communication client

| Item | | Specification |
|---|--|---|
| External communication client (program execution) | Number of characters for execution command | Up to 127 characters |
| | Function | <ul style="list-style-type: none"> Return value evaluation Execution completion standby |

Security

| Item | | Specification |
|--------------------------------|--------------------|---------------|
| Security (user authentication) | Number of accounts | 16 accounts |

2.2 Access Specifications for a CPU Module

This section shows the access specifications for a CPU module.

Accessible CPU modules

RD81MES96N


| Series | | Model name | Access type | |
|--------------------|--|------------|---|---|
| RCPU ^{*1} | Programmable controller CPU | RnCPU | <ul style="list-style-type: none"> • General access • High-speed access (interval specification) • High-speed access (each scan) | |
| | | RnENCPU | | |
| | Process CPU (process mode) ^{*2} | | | R08PCPU, R16PCPU, R32PCPU, R120PCPU |
| | Safety CPU | | | R08SFPCPU, R16SFPCPU, R32SFPCPU, R120SFPCPU |
| | C Controller module ^{*3} | | | R12CCPU-V |
| QCPU (Q mode) | Programmable controller CPU | | Q00JCPU, Q00UJCPU, Q00CPU, Q00UCPU, Q01CPU, Q01UCPU, Q02CPU, Q02HCPU, Q02UCPU, Q03UDCPU, Q03UDECPU, Q03UDVCPU, Q04UDHCPU, Q04UDEHCPU, Q04UDVCPU, Q06HCPU, Q06UDHCPU, Q06UDEHCPU, Q06UDVCPU, Q10UDHCPU, Q10UDEHCPU, Q12HCPU, Q13UDHCPU, Q13UDEHCPU, Q13UDVCPU, Q20UDHCPU, Q20UDEHCPU, Q25HCPU, Q26UDHCPU, Q26UDEHCPU, Q26UDVCPU, Q50UDEHCPU, Q100UDEHCPU | |
| | Process CPU | | Q02PHCPU, Q04UDPVCPU, Q06PHCPU, Q06UDPVCPU, Q12PHCPU, Q13UDPVCPU, Q25PHCPU, Q26UDPVCPU | |
| | C Controller module ^{*3} | | Q12DCCPU-V ^{*4} , Q24DHCCPU-V, Q24DHCCPU-LS, Q24DHCCPU-VG, Q26DHCCPU-LS | |
| LCPU | Programmable controller CPU | | L02SCPU, L02SCPU-P, L02CPU, L02CPU-P, L06CPU, L06CPU-P, L26CPU, L26CPU-P, L26CPU-BT, L26CPU-PBT | |
| FX5CPU | | | FX5U-32MR/ES, FX5U-32MT/ES, FX5U-32MT/ESS, FX5U-64MR/ES, FX5U-64MT/ES, FX5U-64MT/ESS, FX5U-80MR/ES, FX5U-80MT/ES, FX5U-80MT/ESS, FX5U-32MR/DS, FX5U-32MT/DS, FX5U-32MT/DSS, FX5U-64MR/DS, FX5U-64MT/DS, FX5U-64MT/DSS, FX5U-80MR/DS, FX5U-80MT/DS, FX5U-80MT/DSS, FX5UC-32MT/D, FX5UC-32MT/DSS, FX5UC-32MT/DSS-TS, FX5UC-32MT/DSS-TS, FX5UC-64MT/D, FX5UC-64MT/DSS, FX5UC-96MT/D, FX5UC-96MT/DSS | |
| FX3CPU | | | FX3U-16MR/ES, FX3U-16MT/ES, FX3U-16MT/ESS, FX3U-32MR/ES, FX3U-32MT/ES, FX3U-32MT/ESS, FX3U-32MS/ES, FX3U-48MR/ES, FX3U-48MT/ES, FX3U-48MT/ESS, FX3U-64MR/ES, FX3U-64MT/ES, FX3U-64MT/ESS, FX3U-64MS/ES, FX3U-80MR/ES, FX3U-80MT/ES, FX3U-80MT/ESS, FX3U-128MR/ES, FX3U-128MT/ES, FX3U-128MT/ESS, FX3U-16MR/DS, FX3U-16MT/DS, FX3U-16MT/DSS, FX3U-32MR/DS, FX3U-32MT/DS, FX3U-32MT/DSS, FX3U-48MR/DS, FX3U-48MT/DS, FX3U-48MT/DSS, FX3U-64MR/DS, FX3U-64MT/DS, FX3U-64MT/DSS, FX3U-80MR/DS, FX3U-80MT/DS, FX3U-80MT/DSS, FX3U-32MR/UA1, FX3U-64MR/UA1, FX3UC-16MT/D, FX3UC-16MT/DSS, FX3UC-32MT/D, FX3UC-32MT/DSS, FX3UC-64MT/D, FX3UC-64MT/DSS, FX3UC-96MT/D, FX3UC-96MT/DSS, FX3UC-32MT-LT, FX3UC-32MT-LT-2, FX3UC-16MR/D-T, FX3UC-16MR/DS-T, FX3G-14MR/ES, FX3G-14MT/ES, FX3G-14MT/ESS, FX3G-24MR/ES, FX3G-24MT/ES, FX3G-24MT/ESS, FX3G-40MR/ES, FX3G-40MT/ES, FX3G-40MT/ESS, FX3G-60MR/ES, FX3G-60MT/ES, FX3G-60MT/ESS, FX3G-14MR/DS, FX3G-14MT/DS, FX3G-14MT/DSS, FX3G-24MR/DS, FX3G-24MT/DS, FX3G-24MT/DSS, FX3G-40MR/DS, FX3G-40MT/DS, FX3G-40MT/DSS, FX3G-60MR/DS, FX3G-60MT/DS, FX3G-60MT/DSS, FX3GC-32MT/D, FX3GC-32MT/DSS | |

| Series | Model name | Access type |
|--------|---|----------------|
| FXCPU | FX3S-10MR/ES, FX3S-10MT/ES, FX3S-10MT/ESS, FX3S-14MR/ES, FX3S-14MT/ES, FX3S-14MT/ESS, FX3S-20MR/ES, FX3S-20MT/ES, FX3S-20MT/ESS, FX3S-30MR/ES, FX3S-30MT/ES, FX3S-30MT/ESS, FX3S-30MR/ES-2AD, FX3S-30MT/ES-2AD, FX3S-30MT/ESS-2AD, FX3S-10MR/DS, FX3S-10MT/DS, FX3S-10MT/DSS, FX3S-14MR/DS, FX3S-14MT/DS, FX3S-14MT/DSS, FX3S-20MR/DS, FX3S-20MT/DS, FX3S-20MT/DSS, FX3S-30MR/DS, FX3S-30MT/DS, FX3S-30MT/DSS | General access |

- *1 When using high-speed access, use a CPU module supporting the sequence scan synchronization sampling function.
For a CPU module supporting the sequence scan synchronization sampling function, refer to the manual for the CPU module.
- *2 Process CPUs (redundant mode) are not supported.
- *3 Cannot be used as a relay station.
- *4 Only a module with a serial number of which the first five digits are 12042 or higher can be accessed.

Point

When using a multiple CPU system, refer to the following:

 MELSEC iQ-R Module Configuration Manual

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| Series | Model name | Access type | |
|-------------------------------------|--|---|--|
| RCPU* ¹ | Programmable controller CPU | <ul style="list-style-type: none"> General access High-speed access (interval specification) High-speed access (each scan) | |
| | RnCPU | | R00CPU* ² , R01CPU* ² , R02CPU* ² , R04CPU, R08CPU, R16CPU, R32CPU, R120CPU |
| | | RnENCPU* ³ | R04ENCPU, R08ENCPU, R16ENCPU, R32ENCPU, R120ENCPU |
| | Process CPU (process mode)* ^{3,4} | R08PCPU, R16PCPU, R32PCPU, R120PCPU | <ul style="list-style-type: none"> General access |
| | Safety CPU* ⁵ | R08SFCPU, R16SFCPU, R32SFCPU, R120SFCPU | |
| C Controller module* ^{3,6} | R12CCPU-V | | |
| QCPU (Q mode)* ³ | Programmable controller CPU | Q00JCPU, Q00UJCPU, Q00CPU, Q00UCPU, Q01CPU, Q01UCPU, Q02CPU, Q02HCPU, Q02UCPU, Q03UDCPU, Q03UDECPU, Q03UDVCPU, Q04UDHCPU, Q04UDEHCPU, Q04UDVCPU, Q06HCPU, Q06UDHCPU, Q06UDEHCPU, Q06UDVCPU, Q10UDHCPU, Q10UDEHCPU, Q12HCPU, Q13UDHCPU, Q13UDEHCPU, Q13UDVCPU, Q20UDHCPU, Q20UDEHCPU, Q25HCPU, Q26UDHCPU, Q26UDEHCPU, Q26UDVCPU, Q50UDEHCPU, Q100UDEHCPU | |
| | Process CPU | Q02PHCPU, Q04UDPVCPU, Q06PHCPU, Q06UDPVCPU, Q12PHCPU, Q13UDPVCPU, Q25PHCPU, Q26UDPVCPU | |
| | C Controller module* ⁶ | Q12DCCPU-V* ⁷ , Q24DHCCPU-V, Q24DHCCPU-LS, Q24DHCCPU-VG, and Q26DHCCPU-LS* ⁵ | |
| LCPU* ³ | Programmable controller CPU | L02SCPU, L02SCPU-P, L02CPU, L02CPU-P, L06CPU, L06CPU-P, L26CPU, L26CPU-P, L26CPU-BT, L26CPU-PBT | |

- *1 When using high-speed access, use a CPU module supporting the sequence scan synchronization sampling function and an MES interface module the firmware version of which is '03' or later.
For a CPU module supporting the sequence scan synchronization sampling function, refer to the manual for the CPU module.
- *2 Use an MES interface module the firmware version of which is '07' or later.
- *3 Use an MES interface module the firmware version of which is '03' or later.
- *4 Process CPUs (redundant mode) are not supported.
- *5 Use an MES interface module the firmware version of which is '05' or later.
- *6 Cannot be used as a relay station.
- *7 Only a module with a serial number of which the first five digits are 12042 or higher can be accessed.

Point

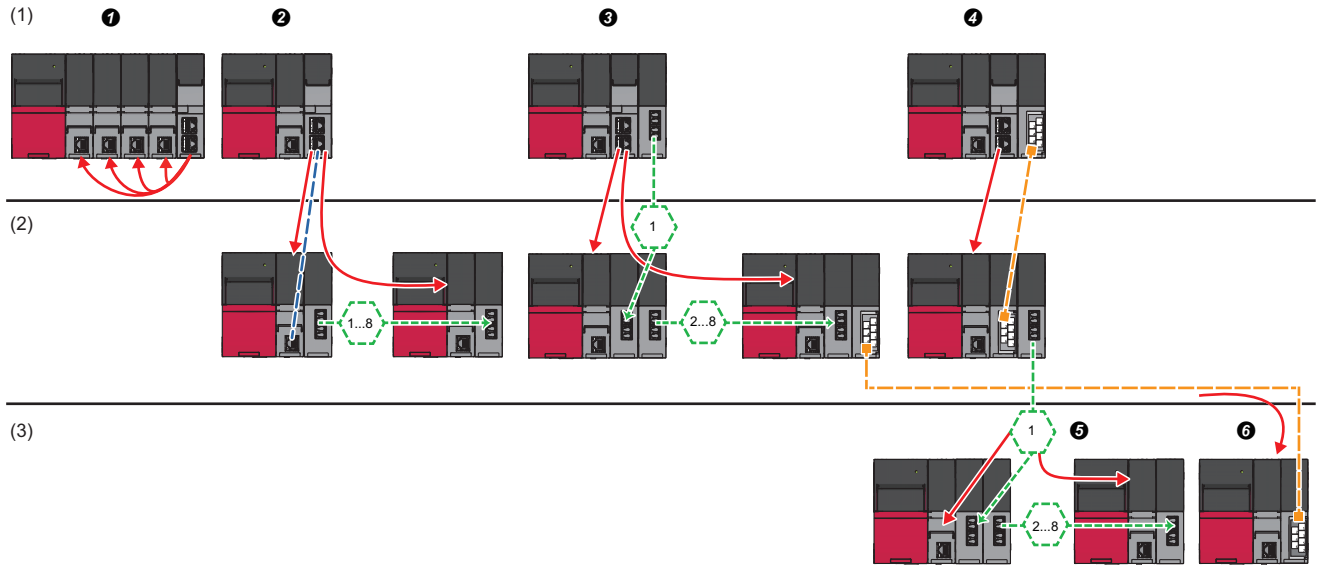
When using a multiple CPU system, refer to the following:

 MELSEC iQ-R Module Configuration Manual

Accessible routes

The following figure shows accessible routes from an MES interface module.

- ← : Access route from an MES interface module
- - - : Connection from an Ethernet port of an MES interface module
- - - : Connection by specifying the network number and the station number of a target station
- - - : Connection by specifying the start I/O No. of a module to be routed and the station number of a target station



| Accessible route | | Reference | |
|------------------|---|---|---|
| (1) | Own station (control CPU, another CPU in a multiple CPU system) | <p>1 Indicates the own station (control CPU, another CPU in a multiple CPU system)</p> | Page 27 Own station (control CPU, another CPU in a multiple CPU system) |
| (2) | Another station via a single network | 2 Access via an Ethernet port of an MES interface module | Page 28 Access via an Ethernet port of an MES interface module |
| | | 3 Access by specifying the network number and the station number of a target station | Page 29 Access by specifying the network number and the station number of a target station |
| | | 4 Access by specifying the start I/O No. of a module to be routed and the station number of a target station | Page 29 Access by specifying the start I/O number of a module to be routed and the station number of a target station |
| (3) | Another station via a co-existence network | 5 Access from the station accessed in 4 by specifying the network number and the station number of a target station | Page 30 Access by specifying the network number and the station number via another station on CC-Link |
| | | 6 Access from the station accessed in 3 by specifying the start I/O No. of a module that is routed through and the station number of a target station | Page 30 Accessing from another station specified by the network number and the station number via CC-Link |

Own station (control CPU, another CPU in a multiple CPU system)

The following table shows the accessibility to a CPU module of a station on which an MES interface module is mounted.

○: Accessible, —: No combination

| Access route | Access target device type (series) | | | | | | |
|--------------------------------------|---|----------------------|---|---------------------|------------------------------|--------|-------|
| | RCPU | | QCPU (Q mode) | | LCPU | FX5CPU | FXCPU |
| | Program mable controller CPU/ Process CPU/ Safety CPU | C Controller module | Program mable controller CPU/ Process CPU | C Controller module | Program mable controller CPU | | |
| Control CPU | ○ | ○*1 | — | — | — | — | — |
| Another CPU in a multiple CPU system | ○*2 (CPU No.1 to 4) | ○ (CPU No.1 to 4) | — | — | — | — | — |

*1 Can be accessed only when using an RD81MES96.

*2 No combination with RnENCPU.

Another station via a single network

■ Access via an Ethernet port of an MES interface module

A target device can be accessed via an Ethernet port of an MES interface module in the status where the target device is connected to a network.

For the communication destination from an Ethernet port of an MES interface module, an Ethernet interface module or a CPU module (Ethernet port) can be specified.

For accessing a target station, direct access and access via another system^{*1} are available.

*1 It is not available when the series of a target device and a system to be routed differ.

(Example) Access is available when the series of a target device and a system to be routed are 'QCPU'.

○: Accessible, —: No combination

| Access route | | | Access target device type (series) | | | | | | |
|------------------------|--|--------------------|---|------------------------------------|---|----------------------|------------------------------|-----------------|-------------------|
| | | | RCPU | | QCPU (Q mode) | | LCPU | FX5CPU | FXCPU |
| | | | Program mable controller CPU/ Process CPU/ Safety CPU | C Controller module | Program mable controller CPU/ Process CPU | C Controller module | Program mable controller CPU | | |
| Ethernet | Ethernet port of an MES interface module → Ethernet interface module ^{*2} | Direct | ○ ^{*3,4} (CPU No.1 to 4) | — | ○ (CPU No.1 to 4) | — | ○ | — | ○ ^{*5,6} |
| | | Via another system | CC-Link IE Controller Network | ○ (CPU No.1 to 4) | ○ (CPU No.1 to 4) | ○ (CPU No.1 to 4) | — | — | — |
| | | | CC-Link IE Field Network | — | | | ○ | | |
| | | | MELSECNET/H network | — | | | — | | |
| | Ethernet ^{*7} | — | — | ○ | — | | | | |
| | Ethernet port of an MES interface module → CPU module (Ethernet port) | Direct | ○ (CPU No.1 to 4) | ○ ^{*8} (CPU No.1 to 4) | ○ (CPU No.1 to 4) | ○ | ○ ^{*5} | — | |
| | | Via another system | CC-Link IE Controller Network | | | — | — | | |
| | | | CC-Link IE Field Network | | | — | ○ | ○ ^{*5} | |
| MELSECNET/H network | | | — | | | — | | | |
| Ethernet ^{*7} | — | — | ○ | — | | | | | |

*2 'Ethernet interface block' for accessing an FXCPU.

*3 It can access to an RnENCPU only in a single CPU system.

*4 No combination with the MELSECNET/H network for process CPUs and safety CPUs.

*5 Can be accessed only when using an RD81MES96N.

*6 When using an FX3U-ENET-ADP as an Ethernet interface block, use Version 1.21 or later.

*7 It is also supported by a QCPU (Q mode) for which the MELSOFT connection extended setting was set.

*8 To access an Ethernet port of Q12DCCPU-V (Basic mode) directly, MELSOFT connection is required to be permitted in the Q12DCCPU-V (Basic mode) setting.

For details on the setting, refer to the following:

📖 C Controller Module User's Manual (Utility Operation, Programming)

■ Access by specifying the network number and the station number of a target station

A target device can be accessed via a relay station when the target device is connected within eight networks from a station, on which an MES interface module is mounted, and can be identified by the network number and the station number (or CPU number).

○: Accessible, —: No combination

| Access route | Access target device type (series) | | | | | | |
|-------------------------------|---|---------------------|---|---------------------|------------------------------|-----------------|-------|
| | RCPU | | QCPU (Q mode) | | LCPU | FX5CPU | FXCPU |
| | Program mable controller CPU/ Process CPU/ Safety CPU | C Controller module | Program mable controller CPU/ Process CPU | C Controller module | Program mable controller CPU | | |
| CC-Link IE Controller Network | ○ ^{*1*} | ○ | ○ | ○ | — | — | — |
| CC-Link IE Field Network | (CPU No.1 to 4) | (CPU No.1 to 4) | (CPU No.1 to 4) | (CPU No.1 to 4) | ○ | ○ ^{*4} | |
| MELSECNET/H network | | — | | | — | — | |
| Ethernet ^{*3} | | | | — | ○ | | |

*1 It can access to an RnENCPU only in a single CPU system.

*2 No combination with the MELSECNET/H network for process CPUs and safety CPUs.

*3 It is also supported by a QCPU (Q mode) for which the MELSOFT connection extended setting was set.

*4 Can be accessed only when using an RD81MES96N.

■ Access by specifying the start I/O number of a module to be routed and the station number of a target station

The following table shows the accessible routes to connect with a target device and a station on which an MES interface module is mounted directly.

○: Accessible, —: No combination

| Access route | Access target device type (series) | | | | | | |
|--------------|---|---------------------|---|---------------------|------------------------------|-----------------|-------|
| | RCPU | | QCPU (Q mode) | | LCPU | FX5CPU | FXCPU |
| | Program mable controller CPU/ Process CPU/ Safety CPU | C Controller module | Program mable controller CPU/ Process CPU | C Controller module | Program mable controller CPU | | |
| CC-Link | ○ ^{*1} | ○ | ○ | ○ | ○ | ○ ^{*2} | — |
| | (CPU No.1 to 4) | (CPU No.1 to 4) | (CPU No.1 to 4) | (CPU No.1 to 4) | | | |

*1 It can access to an RnENCPU only in a single CPU system.

*2 Can be accessed only when using an RD81MES96N.

Another station via a co-existence network

Access by specifying the network number and the station number via another station on CC-Link

The following table shows the accessible route to a target station from a station, on which an MES interface module is mounted by specifying the network number and the station number of the target station. In this route, another station on CC-Link is accessed first (first route), then a target station is accessed from there.

○: Accessible, —: No combination

| First access route | Second access route (co-existence network) | Access target device type (series) | | | | | | |
|--------------------|--|---|----------------------|---|----------------------|------------------------------|--------|-------|
| | | RCPU | | QCPU (Q mode) | | LCPU | FX5CPU | FXCPU |
| | | Program mable controller CPU/ Process CPU/ Safety CPU | C Controll er module | Program mable controller CPU/ Process CPU | C Controll er module | Program mable controller CPU | | |
| CC-Link | CC-Link IE Controller Network | ○*1*2 (CPU No.1 to 4) | ○ (CPU No.1 to 4) | ○ (CPU No.1 to 4) | ○ (CPU No.1 to 4) | — | — | — |
| | CC-Link IE Field Network | | ○ | | ○ | ○*4 | | |
| | MELSECNET/H network | — | — | — | — | | | |
| | Ethernet*3 | — | — | ○ | — | | | |

*1 It can access to an RnENCPU only in a single CPU system.

*2 No combination with the MELSECNET/H network for process CPUs and safety CPUs.

*3 It is also supported by a QCPU (Q mode) for which the MELSOFT connection extended setting was set.

*4 Can be accessed only when using an RD81MES96N.

Accessing from another station specified by the network number and the station number via CC-Link

The following table shows the accessible route to a target station from a station, on which an MES interface module is mounted, by specifying the start I/O No. of a module that is routed through and the station number of the target station. In this route, another station on CC-Link is accessed first by specifying the network number and the station number (first route), then the target device is accessed from there.

○: Accessible, —: No combination

| First access route | Second access route (co-existence network) | Access target device type (series) | | | | | | |
|-------------------------------|--|---|----------------------|---|----------------------|------------------------------|--------|-------|
| | | RCPU | | QCPU (Q mode) | | LCPU | FX5CPU | FXCPU |
| | | Program mable controller CPU/ Process CPU/ Safety CPU | C Controll er module | Program mable controller CPU/ Process CPU | C Controll er module | Program mable controller CPU | | |
| CC-Link IE Controller Network | CC-Link | ○*1*2 (CPU No.1 to 4) | ○ (CPU No.1 to 4) | ○ (CPU No.1 to 4) | ○ (CPU No.1 to 4) | ○ | ○*4 | — |
| CC-Link IE Field Network | | | ○ | | ○ | | | |
| MELSECNET/H network | | | — | | — | | | |
| Ethernet*3 | | | — | | — | | | |

*1 It can access to an RnENCPU only in a single CPU system.

*2 No combination with the MELSECNET/H network for process CPUs and safety CPUs.

*3 It is also supported by a QCPU (Q mode) for which the MELSOFT connection extended setting was set.

*4 Can be accessed only when using an RD81MES96N.

Accessible devices

The following table shows the accessible devices.

RD81MES96N

○: Accessible, ×: Not accessible, —: No device

| Device name (device) | Access target device type (series) | | | | | | | |
|---|---|-------------------|---------------------|--|---------------------|------------------------------|--------|-------|
| | RCPU | | | QCPU (Q mode) | | LCPU | FX5CPU | FXCPU |
| | Programmable controller CPU/ Process CPU ^{*1} /Safety CPU ^{*1*2} | | C Controller module | Program mable controller CPU/ Process CPU | C Controller module | Program mable controller CPU | | |
| | General access | High-speed access | | | | | | |
| Function input (FX) | × | × | — | × | — | × | — | — |
| Function output (FY) | × | × | — | × | — | × | — | — |
| Function register (FD) | × | × | — | × | — | × | — | — |
| Special relay (SM) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — |
| Special register (SD) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — |
| Input relay (X) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Output relay (Y) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Internal relay (M) (Auxiliary relay) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Latch relay (L) | ○ | ○ | — | ○ | — | ○ | ○ | — |
| Annunciator (F) | ○ | ○ | — | ○ | — | ○ | ○ | — |
| Edge relay (V) | ○ | ○ | — | ○ | — | ○ | — | — |
| Link relay (B) | ○ | ○ | ○ | ○ | ○ ^{*3} | ○ | ○ | — |
| Data register (D) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Link register (W) | ○ | ○ | ○ | ○ | ○ ^{*3} | ○ | ○ | — |
| Timer | Contact (TS) | ○ | ○ | — | ○ | — | ○ | ○ |
| | Coil (TC) | ○ | ○ | — | ○ | — | ○ | ○ |
| | Current value (T/ TN) | ○ | ○ | — | ○ | — | ○ | ○ |
| Long timer | Contact (LTS) | ○ | ○ | — | — | — | — | — |
| | Coil (LTC) | ○ | ○ | — | — | — | — | — |
| | Current value (LT/ LTN) | ○ | ○ | — | — | — | — | — |
| Counter | Contact (CS) | ○ | ○ | — | ○ | — | ○ | ○ |
| | Coil (CC) | ○ | ○ | — | ○ | — | ○ | ○ |
| | Current value (C/ CN) | ○ | ○ | — | ○ | — | ○ | ○ |
| Long counter | Contact (LCS) | ○ | ○ | — | — | — | ○ | — |
| | Coil (LCC) | ○ | ○ | — | — | — | ○ | — |
| | Current value (LC/ LCN) | ○ | ○ | — | — | — | ○ | — |
| Retentive timer | Contact (STS, SS ^{*4}) | ○ | ○ | — | ○ | — | ○ | — |
| | Coil (STC, SC ^{*4}) | ○ | ○ | — | ○ | — | ○ | — |
| | Current value (ST/ STN, ST/SN ^{*4}) | ○ | ○ | — | ○ | — | ○ | — |
| Long retentive timer | Contact (LSTS) | ○ | ○ | — | — | — | — | — |
| | Coil (LSTC) | ○ | ○ | — | — | — | — | — |
| | Current value (LST/ LSTN) | ○ | ○ | — | — | — | — | — |
| Link special relay (SB) | ○ | ○ | — | ○ | — | ○ | ○ | — |

| Device name (device) | | Access target device type (series) | | | | | | | |
|--------------------------------------|--|--|---|---------------------|---|---------------------|------------------------------|--------|-------|
| | | RCPU | | | QCPU (Q mode) | | LCPU | FX5CPU | FXCPU |
| | | Programmable controller CPU/ Process CPU ^{*1} /Safety CPU ^{*1*2} | | C Controller module | Program mable controller CPU/ Process CPU | C Controller module | Program mable controller CPU | FX5CPU | FXCPU |
| General access | High-speed access | | | | | | | | |
| Link special register (SW) | | ○ | ○ | — | ○ | — | ○ | ○ | — |
| Step relay (S) | | × | × | — | × | — | × | × | — |
| Direct input (DX) | | — | — | — | — | — | — | — | — |
| Direct output (DY) | | — | — | — | — | — | — | — | — |
| Index register (Z, V ^{*5}) | | ○ | ○ | — | ○ | — | ○ | ○ | ○ |
| Long index register (LZ) | | ○ | ○ | — | — | — | — | ○ | — |
| File register | (R) | ○ | ○ | — | ○ | — | ○ | ○ | ○ |
| | (ZR) | ○ | ○ | ○ | ○ | — | ○ | — | — |
| | (ERnR) | — | — | — | — | — | — | — | × |
| Link direct device | Link input (Jn\X) | ○ | — | ○ | ○ | ○ | ○ | — | — |
| | Link output (Jn\Y) | ○ | — | ○ | ○ | ○ | ○ | — | — |
| | Link relay (Jn\B) | ○ | — | ○ | ○ | ○ | — | — | — |
| | Link special relay (Jn\SB) | ○ | — | ○ | ○ | ○ | ○ | — | — |
| | Link register (Jn\W) | ○ | — | ○ | ○ | ○ | ○ | — | — |
| | Link special register (Jn\SW) | ○ | — | ○ | ○ | ○ | ○ | — | — |
| Module access device | Module access device/intelligent function module device (Un\G) | ○ | × | ○ | ○ | ○ | ○ | ○ | — |
| | Multiple CPU shared device (U3En\G) | — | — | — | ○ | ○ | — | — | — |
| CPU buffer memory access device | CPU buffer memory access device (U3En\G) | ○ | × | ○ | — | — | — | — | — |
| | CPU buffer memory access device (fixed cycle communication area) (U3En\HG) | ○ ^{*6} | × | ○ | — | — | — | — | — |
| Refresh data register (RD) | | ○ | ○ | — | — | — | — | — | — |

*1 Process CPUs and safety CPUs do not support high-speed access.

*2 Safety devices cannot be accessed.

*3 Q12DCCPU-V (Basic mode) has no device.

*4 A device name for QCPUs (Q mode) and LCPUs

*5 Can be set only for FXCPUs.

*6 RnENCPUs and safety CPUs have no device.

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○: Accessible, ×: Not accessible, —: No device

| Device name (device) | Access target device type (series) | | | | | | |
|----------------------------|---|-------------------|---------------------|---|---------------------|------------------------------|---|
| | RCPU | | | QCPU (Q mode) | | LCPU | |
| | Programmable controller CPU/Process CPU ^{*1} /Safety CPU ^{*1*2} | | C Controller module | Programma ble controller CPU/ Process CPU | C Controller module | Programma ble controller CPU | |
| | General access | High-speed access | | | | | |
| Function input (FX) | × | × | — | × | — | × | |
| Function output (FY) | × | × | — | × | — | × | |
| Function register (FD) | × | × | — | × | — | × | |
| Special relay (SM) | ○ | ○ | ○ | ○ | ○ | ○ | |
| Special register (SD) | ○ | ○ | ○ | ○ | ○ | ○ | |
| Input relay (X) | ○ | ○ | ○ | ○ | ○ | ○ | |
| Output relay (Y) | ○ | ○ | ○ | ○ | ○ | ○ | |
| Internal relay (M) | ○ | ○ | ○ | ○ | ○ | ○ | |
| Latch relay (L) | ○ | ○ | — | ○ | — | ○ | |
| Annunciator (F) | ○ | ○ | — | ○ | — | ○ | |
| Edge relay (V) | ○ | ○ | — | ○ | — | ○ | |
| Link relay (B) | ○ | ○ | ○ | ○ | ○ ^{*3} | ○ | |
| Data register (D) | ○ | ○ | ○ | ○ | ○ | ○ | |
| Link register (W) | ○ | ○ | ○ | ○ | ○ ^{*3} | ○ | |
| Timer | Contact (TS) | ○ | ○ | — | ○ | — | ○ |
| | Coil (TC) | ○ | ○ | — | ○ | — | ○ |
| | Current value (T/TN) | ○ | ○ | — | ○ | — | ○ |
| Long timer | Contact (LTS) | × | × | — | — | — | — |
| | Coil (LTC) | × | × | — | — | — | — |
| | Current value (LT/LTN) | × | × | — | — | — | — |
| Counter | Contact (CS) | ○ | ○ | — | ○ | — | ○ |
| | Coil (CC) | ○ | ○ | — | ○ | — | ○ |
| | Current value (C/CN) | ○ | ○ | — | ○ | — | ○ |
| Long counter | Contact (LCS) | × | × | — | — | — | — |
| | Coil (LCC) | × | × | — | — | — | — |
| | Current value (LC/LCN) | × | × | — | — | — | — |
| Retentive timer | Contact (STS, SS ^{*4}) | ○ | ○ | — | ○ | — | ○ |
| | Coil (STC, SC ^{*4}) | ○ | ○ | — | ○ | — | ○ |
| | Current value (ST/STN, ST/SN ^{*4}) | ○ | ○ | — | ○ | — | ○ |
| Long retentive timer | Contact (LSTS) | × | × | — | — | — | — |
| | Coil (LSTC) | × | × | — | — | — | — |
| | Current value (LST/LSTN) | × | × | — | — | — | — |
| Link special relay (SB) | ○ | ○ | — | ○ | — | ○ | |
| Link special register (SW) | ○ | ○ | — | ○ | — | ○ | |
| Step relay (S) | × | × | — | × | — | × | |
| Direct input (DX) | — | — | — | — | — | — | |
| Direct output (DY) | — | — | — | — | — | — | |
| Index register (Z) | ○ | ○ | — | ○ | — | ○ | |
| Long index register (LZ) | × | × | — | — | — | — | |
| File register | (R) | ○ | ○ | — | ○ | — | ○ |
| | (ZR) | ○ | ○ | ○ | ○ | — | ○ |
| | (ERnR) | — | — | — | — | — | — |

| Device name (device) | | Access target device type (series) | | | | | |
|---------------------------------|--|---|---|---------------------|---|---------------------|-----------------------------|
| | | RCPU | | | QCPU (Q mode) | | LCPU |
| | | Programmable controller CPU/Process CPU ^{*1} /Safety CPU ^{*1*2} | | C Controller module | Programmable controller CPU/Process CPU | C Controller module | Programmable controller CPU |
| General access | High-speed access | | | | | | |
| Link direct device | Link input (Jn\X) | ○ | — | ○ | ○ | ○ | ○ |
| | Link output (Jn\Y) | ○ | — | ○ | ○ | ○ | ○ |
| | Link relay (Jn\B) | ○ | — | ○ | ○ | ○ | — |
| | Link special relay (Jn\SB) | ○ | — | ○ | ○ | ○ | ○ |
| | Link register (Jn\W) | ○ | — | ○ | ○ | ○ | ○ |
| | Link special register (Jn\SW) | ○ | — | ○ | ○ | ○ | ○ |
| Module access device | Module access device/intelligent function module device (Un\G) | ○ | × | ○ | ○ | ○ | ○ |
| | Multiple CPU shared device (U3En\G) | — | — | — | ○ | ○ | — |
| CPU buffer memory access device | CPU buffer memory access device (U3En\G) | ○ | × | ○ | — | — | — |
| | CPU buffer memory access device (fixed cycle communication area) (U3En\HG) | ○ ^{*5} | × | ○ | — | — | — |
| Refresh data register (RD) | | × | × | — | — | — | — |

*1 Process CPUs and safety CPUs do not support high-speed access.

*2 Safety devices cannot be accessed.

*3 Q12DCCPU-V (Basic mode) has no device.

*4 A device name for QCPUs (Q mode) and LCPUs

*5 RnENCPUs and safety CPUs have no device.

Bit specification/digit specification of devices

The following table shows the availability of bit specification and digit specification of each device.

These are available for RD81MES96Ns only.

○: Available, ×: Not available

| Device (device name) | | Bit specification | Digit specification |
|------------------------------------|--|-------------------|---------------------|
| Function input (FX) | | × | × |
| Function output (FY) | | × | × |
| Function register (FD) | | × | × |
| Special relay (SM) | | × | ○ |
| Special register (SD) | | ○ | × |
| Input relay (X) | | × | ○ |
| Output relay (Y) | | × | ○ |
| Internal relay/auxiliary relay (M) | | × | ○ |
| Latch relay (L) | | × | ○ |
| Annunciator (F) | | × | ○ |
| Edge relay (V) | | × | ○ ^{*1} |
| Link relay (B) | | × | ○ ^{*1} |
| Data register (D) | | ○ | × |
| Link register (W) | | ○ | × |
| Timer | Contact (TS) | × | × |
| | Coil (TC) | × | × |
| | Current value (T/TN) | × | × |
| Long timer | Contact (LTS) | × | × |
| | Coil (LTC) | × | × |
| | Current value (LT/LTN) | × | × |
| Counter | Contact (CS) | × | × |
| | Coil (CC) | × | × |
| | Current value (C/CN) | × | × |
| Long counter | Contact (LCS) | × | × |
| | Coil (LCC) | × | × |
| | Current value (LC/LCN) | × | × |
| Retentive timer | Contact (STS, SS ^{*2}) | × | × |
| | Coil (STC, SC ^{*2}) | × | × |
| | Current value (ST/STN, ST/SN ^{*2}) | × | × |
| Long retentive timer | Contact (LSTS) | × | × |
| | Coil (LSTC) | × | × |
| | Current value (LST/LSTN) | × | × |
| Link special relay (SB) | | × | ○ |
| Link special register (SW) | | ○ | × |
| Index register | (Z) | × | × |
| | (V) | × | × |
| Long index register (LZ) | | × | × |
| File register | (R) | ○ | × |
| | (ZR) | ○ | × |
| Extension file register (ERnR) | | × | × |
| Link direct device | Link input (JnX) | × | ○ |
| | Link output (JnY) | × | ○ |
| | Link relay (JnB) | × | ○ |
| | Link special relay (JnSB) | × | ○ |
| | Link register (JnW) | ○ | × |
| | Link special register (JnSW) | ○ | × |
| Refresh data register (RD) | | ○ | × |

| Device (device name) | | Bit specification | Digit specification |
|---------------------------------|--|-------------------|---------------------|
| Module access device | Module access device/intelligent function module device (Un\G) | ○ | × |
| | Multiple CPU shared device (U3En\G) | ○ | × |
| CPU buffer memory access device | CPU buffer memory access device (U3En\G) | ○ | × |
| | CPU buffer memory access device (fixed cycle communication area) (U3En\HG) | ○ | × |

*1 Not available for RCPUs.

*2 A device name for QCPUs (Q mode) and LCPUs

Access units

The following table shows the number of accessible device points (access units) in one process (one scanning) when accessing the device memory in a CPU module.

Note that the device memory is accessed in device tag component units when setting any of the following jobs in which only continuous array tags are used and operating an RD81MES96N.

☞ Page 37 Job setting 1, Page 37 Job setting 2, Page 37 Job setting 3

Access units differ from those shown in the following table when setting any of the jobs shown in the above sections and operating an RD81MES96N. (☞ Page 36 Setting a job in which only continuous array tags are used)

| Access target device type (series) | | Device reading | | Device writing |
|------------------------------------|-----------------------------|---|----------------------------|--|
| | | General access | High-speed access | |
| RCPU | Programmable controller CPU | 118 points* ¹ 58 points* ² | 32768 points* ³ | 78 points* ¹ 38 points* ² |
| | Process CPU | | Not supported. | |
| | C Controller module | | | |
| QCPU (Q mode)* ⁴ | | 96 points* ¹ 48 points* ² | | 96 points* ¹ 48 points* ² |
| LCPU | | | | |
| FX5CPU | | 58 points* ¹ 29 points* ² | | 38 points* ¹ 19 points* ² |
| FXCPU | | 128 points | | 128 points |

*1 For access without using an Ethernet port of an MES interface module

*2 For access by using an Ethernet port of an MES interface module

*3 8192 points when using an RD81MES96N the firmware version of which is '02' or earlier, or an RD81MES96

*4 Access units differ depending on the module type. When data inconsistency is a problem, select "Single Handshake" or "Multiple Handshake" for a trigger condition.

Setting a job in which only continuous array tags are used

When setting any of the following jobs in which only continuous array tags are used and operating an RD81MES96N, the device memory is accessed in device tag component units.

☞ Page 37 Job setting 1, Page 37 Job setting 2, Page 37 Job setting 3

The following table shows the access units when setting any of the jobs shown in the above sections and operating an RD81MES96N.

| Access target device type (series) | | Device reading | | Device writing |
|------------------------------------|-----------------------------|--|----------------------------|--|
| | | General access | High-speed access | |
| RCPU | Programmable controller CPU | 960 points | 32768 points* ¹ | 949 points |
| | Process CPU | | Not supported. | |
| | C Controller module | | | |
| QCPU (Q mode)* ² | | 480 points | | 480 points |
| LCPU | | | | |
| FX5CPU | | | | 469 points |
| FXCPU | | 32 points* ³ 64 points* ⁴ | | 32 points* ³ 64 points* ⁴ |

*1 8192 points when using an RD81MES96N the firmware version of which is '02' or earlier


*2 Access units differ depending on the module type. When data inconsistency is a problem, select "Single Handshake" or "Multiple Handshake" for a trigger condition.

- *3 For access without using an Ethernet port of an RD81MES96N
- *4 For access by using an Ethernet port of an RD81MES96N

Precautions

When accessing the device memory in device tag component units, device values may be obtained from multiple sequence scans and applied, which may cause data inconsistency.

When data inconsistency is a problem, refer to the following:

 Page 37 When data inconsistency is a problem

■Job setting 1

| Action | Details |
|---------------------------------|---|
| Operation action (substitution) | Either of the following conditions is satisfied. <ul style="list-style-type: none"> • All device tag components are devices other than bit devices. • The array sizes of all device tag components are multiples of 16. |

■Job setting 2

| Action | Details |
|---|---|
| DB communication action (Multiple Select) | All device tag components are devices other than bit devices. |
| Operation action (substitution) | Either of the following conditions is satisfied. <ul style="list-style-type: none"> • All device tag components are devices other than bit devices. • The array sizes of all device tag components are multiples of 16. |

■Job setting 3

| Action | Details |
|---|---|
| DB communication action (Multiple Select) | All of the following conditions are satisfied. <ul style="list-style-type: none"> • All device tag components are bit devices. • The array sizes of all device tag components are multiples of 16. • The checkbox of "Clear the unsubstituted assignment data to 0" is selected under "Operation Setting at the No. of Selected Records Insufficient." |
| Operation action (substitution) | Either of the following conditions is satisfied. <ul style="list-style-type: none"> • All device tag components are devices other than bit devices. • The array sizes of all device tag components are multiples of 16. |

Reading/writing in access units

When the number of accessed device points is equal to the access unit or less, device values in a same sequence scan are obtained and applied.

When the number of device points exceeds the access unit, device values may be obtained from multiple sequence scans and applied, which may cause data inconsistency.

■When data inconsistency is a problem

Set the following when a sequence program and the data needs to be synchronized and data inconsistency is a problem.

- Set the number of device points accessed at the same time to the access unit or less.
- Change the access type to high-speed access. (Only for device reading)
- Select "Single Handshake" or "Multiple Handshake" for "Configuration Type" for a trigger condition.

2.3 Access Specifications for a Database

This section shows the access specifications when an MES interface module accesses a database of a server.

Accessible databases and supported software

The following table shows the database type and supported software that can be accessed by an MES interface module.

| Database type | Accessible database type ^{*1} | Supported software ^{*1} | Supported edition | |
|---------------------------------|--|----------------------------------|----------------------------------|-------------------------------|
| Database server | Oracle [®] | Oracle 11g | Express Edition | 64-bit version only |
| | | | Standard Edition | |
| | | | Enterprise Edition | |
| | | Oracle 12c | Standard Edition | |
| | | | Enterprise Edition | |
| | | | Oracle 18c | |
| | | Oracle 18c | Standard Edition | |
| | | | Enterprise Edition | |
| | | | Oracle 19c ^{*2} | |
| | | Standard Edition | | |
| | | Enterprise Edition | | |
| | | Microsoft SQL Server | SQL Server 2008 R2 ^{*3} | |
| | Standard Edition | | | |
| | Enterprise Edition | | | |
| | SQL Server 2012 | | Express Edition | |
| | | | Standard Edition | |
| | | | Enterprise Edition | |
| | SQL Server 2014 | | Express Edition | |
| | | | Standard Edition | |
| | | | Enterprise Edition | |
| | SQL Server 2016 | | Express Edition | |
| | | | Standard Edition | |
| | | | Enterprise Edition | |
| | SQL Server 2017 | | Express Edition | |
| | | | Standard Edition | |
| | | | Enterprise Edition | |
| | SQL Server 2019 ^{*2} | | Express Edition | |
| Standard Edition | | | | |
| Enterprise Edition | | | | |
| Microsoft Access ^{®*4} | Access 2010 ^{*5} | — | 32-bit version only | |
| | Access 2013 ^{*5} | — | | |
| | Access 2016 ^{*5} | — | | |
| | Access 2019 ^{*2*5} | — | | 32-bit version/64-bit version |
| MySQL [®] | MySQL ^{*6} | Community Edition ^{*7} | | |
| | | Standard Edition | 64-bit version only | |
| PostgreSQL | PostgreSQL ^{*6} | — | | |

*1 Use a same language version for the operating system and software.


*2 For RD81MES96Ns only

*3 IA-64 cannot be used.

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

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

*5 Can be accessed when selecting "Connection via Service" for "Access Type."

 Page 39 Connection via service

*6 An open source database. The operation has been checked in the following versions.

MySQL: 5.7.10 (only for connection via service), 5.7.15 (only for connection via service), 5.7.25

PostgreSQL: 9.4.5 (only for connection via service), 9.5.4 (only for connection via service), 9.6.12, 10.7

*7 To use Community Edition, use the ODBC driver of MariaDB.

Access type

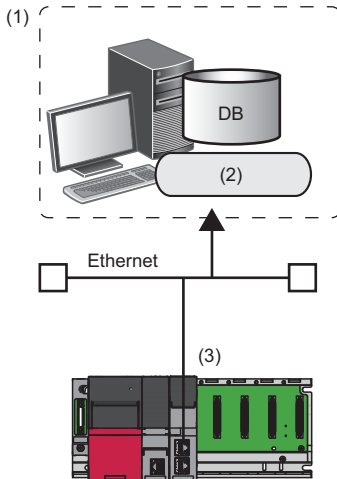
The following access types can be selected for accessing a database server from an MES interface module.

- Connection via service
- Direct DB connection

2

Connection via service

A database is accessed via DB Connection Service installed on a database server.



- (1) Database server
- (2) DB Connection Service
- (3) MES interface module

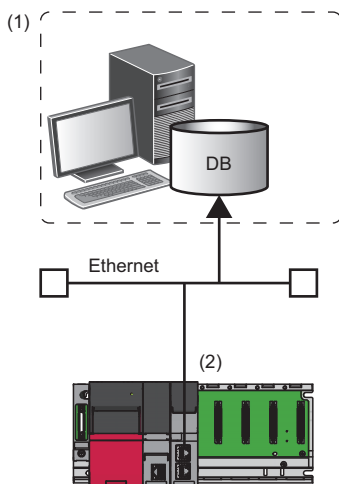
Point

The advantages of selecting "Connection via Service" for "Access Type" are as follows:

- An RD81MES96 can be replaced with an RD81MES96N without changing the settings of an MES interface module and database server.
- A startup time and troubleshooting time can be reduced in a system in which both an RD81MES96 and an RD81MES96N are included, because a database is accessed by using a same access type.

Direct DB connection

A database is accessed directly without using DB Connection Service.



(1) Database server

(2) MES interface module (RD81MES96N)

Point

The advantages of selecting "Direct DB Connection" for "Access Type" are as follows:

- No need to install DB Connection Service on a database server.
- A database that runs on Linux can be accessed.

The operations have been checked in the following operating systems.

Oracle: Oracle Linux 7, Red Hat Enterprise Linux 7, SUSE Linux Enterprise Server 12

SQL Server, MySQL, and PostgreSQL: Ubuntu 16.04 LTS, Red Hat Enterprise Linux 7, SUSE Linux Enterprise Server 12

Precautions

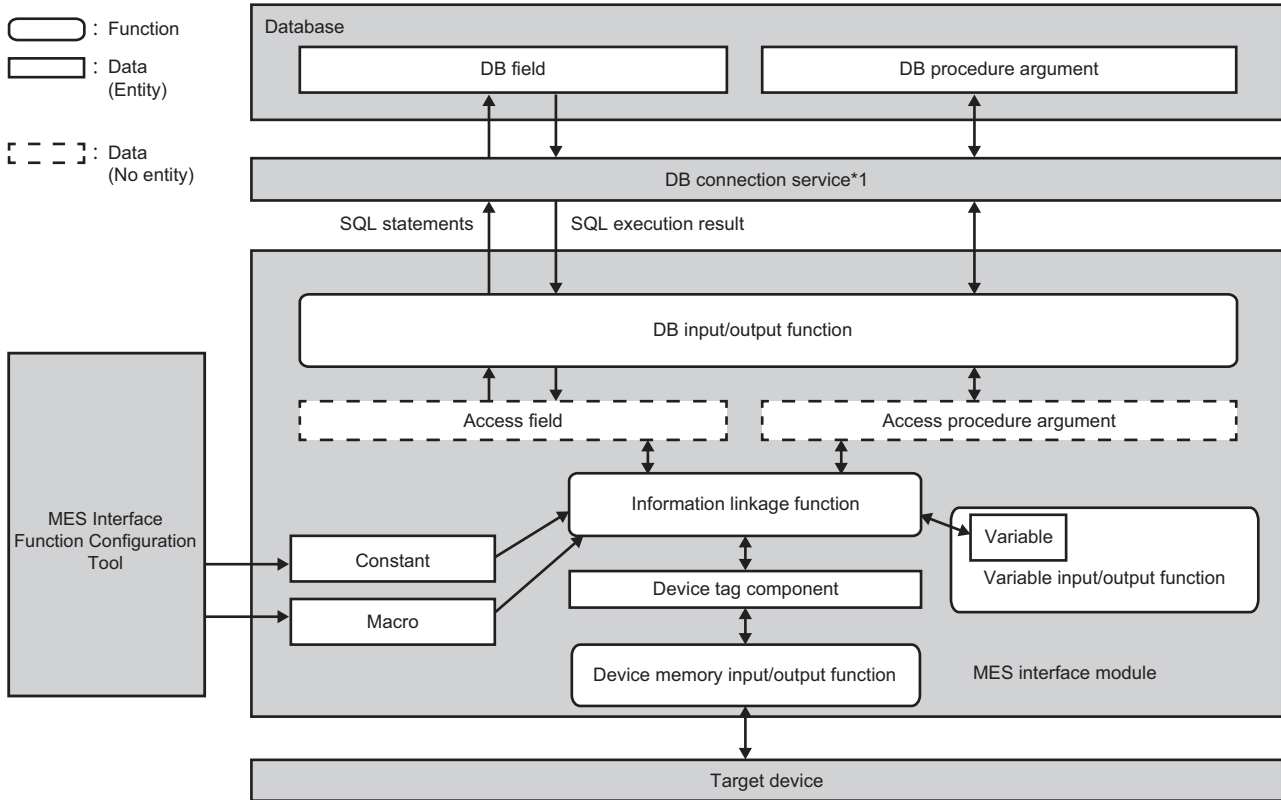
It takes longer for an MES interface module to start than when selecting "Connection via Service." When selecting "Direct DB Connection" for "Access Type," run the system by fully verifying the processing time.

2.4 Data Specifications

This section shows the specifications of data category and data type handled by an MES interface module.

Data category

The following shows the data category handled by an MES interface module.



*1 Not used for access when selecting "Direct DB Connection" for "Access Type."

☞ Page 40 Direct DB connection

| Data category | Description | Reference |
|---------------------------|---|--|
| Device tag component | Data associated with data in an access target device such as a CPU module. | Page 45 Device tag component or variable |
| Variable | Data used for storing the operation result in an MES interface module. <ul style="list-style-type: none"> Local variable: Used for sending and receiving data between operations in a same action, and actions in a same job. Global variable: Used for sending and receiving data between jobs. System variable: Used for retaining system information and controlling hardware. | |
| Constant | A value set in MES Interface Function Configuration Tool. | Page 46 Constant |
| Macro | A special value set in MES Interface Function Configuration Tool. Since any value is not determined at the setting, MES Interface Function Configuration Tool specifies a macro name not a value. | Page 47 Macro |
| Access field | Data associated with the DB field. A concept used for checking the setting, and it has no entity. | — |
| Access procedure argument | Data associated with the DB procedure argument. A concept used for checking the setting, and it has no entity. | |
| DB field | A data component stored in the table of database. Associated with the access field. | |
| DB procedure argument | An argument of a stored procedure defined in a database. Associated with the access procedure argument. | |

Data type

The following table lists the data type that can be specified in an MES interface module according to the data category and the data type classification.

Numerical value

■RD81MES96N

| Data category | | Numerical value | | | |
|--------------------------------------|----------------------|---|--|--|--|
| | | Integer | | Real number | |
| Device tag component | | <ul style="list-style-type: none"> • Bit • Word [unsigned]/Bit string [16-bit] • Double word [unsigned]/Bit string [32-bit] • Word [signed] • Double word [signed] • 16bit BCD • 32bit BCD | | <ul style="list-style-type: none"> • Single-precision real number • Double-precision real number | |
| Variable | | <ul style="list-style-type: none"> • Bit • Word [unsigned]/Bit string [16-bit] • Double word [unsigned]/Bit string [32-bit] • Word [signed] • Double word [signed] | | <ul style="list-style-type: none"> • Single-precision real number • Double-precision real number | |
| Constant | | Integer | | Real number | |
| Macro | | Any of the data types of the device tag component or variable is determined for each macro. | | | |
| Access field | | Integer | | Real number [floating point] | Real number [fixed point] |
| Access procedure argument | | Integer | | Real number | |
| DB field DB procedure argument | Oracle ^{*1} | — | <ul style="list-style-type: none"> • NUMBER(p) • NUMBER(p, 0) | <ul style="list-style-type: none"> • NUMBER • BINARY_FLOAT • BINARY_DOUBLE | • NUMBER(p, s) ^{*2} |
| | Microsoft SQL Server | <ul style="list-style-type: none"> • bit • tinyint • smallint • int • bigint | <ul style="list-style-type: none"> • decimal • numeric • decimal(p) • numeric(p) • decimal(p, 0) • numeric(p, 0) | <ul style="list-style-type: none"> • real • float | <ul style="list-style-type: none"> • decimal(p, s) • numeric(p, s) |
| | Microsoft Access | <ul style="list-style-type: none"> • Yes/No type • Number: Byte • Number: Integer • Number: Long Integer | • Number: Decimal | <ul style="list-style-type: none"> • Number: Single • Number: Double | • Number: Decimal ^{*2} |
| | MySQL | <ul style="list-style-type: none"> • TINYINT [UNSIGNED] • SMALLINT [UNSIGNED] • MEDIUMINT [UNSIGNED] • INT [UNSIGNED] • BIGINT [UNSIGNED] | <ul style="list-style-type: none"> • DECIMAL[(M[,0])] • [UNSIGNED] | <ul style="list-style-type: none"> • FLOAT [UNSIGNED] • DOUBLE [UNSIGNED] | • DECIMAL(M,D) [UNSIGNED] ^{*2} |
| | PostgreSQL | <ul style="list-style-type: none"> • smallint • integer • bigint | • numeric(p[,0]) | <ul style="list-style-type: none"> • numeric[(p,s)] • real • double precision | • numeric(p, s) ^{*2} |

| Data category | | Numerical value | | |
|-----------------------------------|----------------------|---|--|--|
| | | Integer | | Real number |
| Device tag component | | <ul style="list-style-type: none"> • Bit • Word [unsigned]/Bit string [16-bit] • Double word [unsigned]/Bit string [32-bit] • Word [signed] • Double word [signed] • 16bit BCD • 32bit BCD | | <ul style="list-style-type: none"> • Single-precision real number • Double-precision real number |
| Variable | | <ul style="list-style-type: none"> • Bit • Word [unsigned]/Bit string [16-bit] • Double word [unsigned]/Bit string [32-bit] • Word [signed] • Double word [signed] | | <ul style="list-style-type: none"> • Single-precision real number • Double-precision real number |
| Constant | | Integer | | Real number |
| Macro | | Any of the data types of the device tag component or variable is determined for each macro. | | |
| Access field | | Integer | | Real number [floating point] |
| Access procedure argument | | Integer | | Real number |
| DB field DB procedure argument | Oracle*1 | — | <ul style="list-style-type: none"> • NUMBER(p) • NUMBER(p, 0) | <ul style="list-style-type: none"> • NUMBER(p, s) • NUMBER • BINARY_FLOAT • BINARY_DOUBLE |
| | Microsoft SQL Server | <ul style="list-style-type: none"> • bit • tinyint • smallint • int • bigint | <ul style="list-style-type: none"> • decimal • numeric • decimal(p) • numeric(p) • decimal(p, 0) • numeric(p, 0) | <ul style="list-style-type: none"> • real • float |
| | Microsoft Access | <ul style="list-style-type: none"> • Yes/No type • Number: Byte • Number: Integer • Number: Long Integer | <ul style="list-style-type: none"> • Number: Decimal | <ul style="list-style-type: none"> • Number: Decimal • Number: Single • Number: Double |
| | MySQL | <ul style="list-style-type: none"> • TINYINT [UNSIGNED] • SMALLINT [UNSIGNED] • MEDIUMINT [UNSIGNED] • INT [UNSIGNED] • BIGINT [UNSIGNED] | <ul style="list-style-type: none"> • DECIMAL[(M[,0])] [UNSIGNED] | <ul style="list-style-type: none"> • DECIMAL(M,D) [UNSIGNED] • FLOAT [UNSIGNED] • DOUBLE [UNSIGNED] |
| | PostgreSQL | <ul style="list-style-type: none"> • smallint • integer • bigint | <ul style="list-style-type: none"> • numeric(p,0) | <ul style="list-style-type: none"> • numeric[(p,s)] • real • double precision |

Character string, date and time

| Data category | | Character string | | Date and time | |
|-----------------------------------|--------------------------------|--|---|---|--|
| Device tag component | | <ul style="list-style-type: none"> • Character string [Unicode] • Character string [ASCII/SJIS] | | — | |
| Variable | | <ul style="list-style-type: none"> • Character string [Unicode] | | | |
| Constant | | <ul style="list-style-type: none"> • Character string [Unicode] | | | |
| Macro | | Any of the data types of the device tag component or variable is determined for each macro. | | | |
| Access field | | <ul style="list-style-type: none"> • Character string [Unicode(NCHAR)] | <ul style="list-style-type: none"> • Character string [Unicode(CHAR)] | Date and time [without time zone] | Date and time [with time zone] |
| Access procedure argument | | <ul style="list-style-type: none"> • Character string [Unicode] | | Date and time [without time zone] | — |
| DB field DB procedure argument | Oracle ^{*1} | <ul style="list-style-type: none"> • NCHAR • NVARCHAR2 | <ul style="list-style-type: none"> • CHAR • VARCHAR2 | <ul style="list-style-type: none"> • DATE • TIMESTAMP[(p)] | <ul style="list-style-type: none"> • TIMESTAMP[(p)] WITH TIME ZONE^{*3} |
| | Microsoft SQL Server | <ul style="list-style-type: none"> • nchar • nvarchar | <ul style="list-style-type: none"> • char • varchar | <ul style="list-style-type: none"> • smalldatetime • datetime • datetime2[(p)] | <ul style="list-style-type: none"> • datetimeoffset[(p)]^{*3} |
| | Microsoft Access ^{*4} | — | <ul style="list-style-type: none"> • Text type (short text^{*5}) | <ul style="list-style-type: none"> • Date/Time | — |
| | MySQL | <ul style="list-style-type: none"> • [NATIONAL] CHAR[(M)] • [NATIONAL] VARCHAR(M) • CHAR[(M)]^{*6} • VARCHAR(M)^{*6} | <ul style="list-style-type: none"> • CHAR[(M)]^{*7} • VARCHAR(M)^{*7} | <ul style="list-style-type: none"> • DATETIME[(fsp)] • TIMESTAMP[(fsp)] | — |
| | PostgreSQL | — | <ul style="list-style-type: none"> • character[(n)] • character varying[(n)] | <ul style="list-style-type: none"> • timestamp[(p)] [without time zone] | — |

*1 The data type (DATE) in Oracle can store the date from January 1st in 4712 B.C. to December 31st in 9999 A.D. in Julian calendar. However, the date in B.C cannot be handled in an MES interface module.

*2 The data type 'real number [floating point]' of an access field is also supported.

*3 Cannot be specified for a DB procedure argument.

*4 Cannot be used for a DB procedure argument.

*5 Notation in Access 2013 or later

*6 Can be specified when the character set setting in a field of a database is utf8.

*7 Can be specified when the character set setting in a field of a database is not utf8.

Device tag component or variable

The following tables show the data type specifications for a device tag component or variable according to the classification.

Data type

Integer

| Data type | Variable |
|--|----------|
| Bit | 2 bytes |
| Word [unsigned]/Bit string [16-bit] | 2 bytes |
| Double word [unsigned]/Bit string [32-bit] | 4 bytes |
| Word [signed] | 2 bytes |
| Double word [signed] | 4 bytes |
| 16bit BCD | — |
| 32bit BCD | — |

Real number

| Data type | Variable |
|------------------------------|----------|
| Single-precision real number | 4 bytes |
| Double-precision real number | 8 bytes |

Character string

| Data type | Character string length | Character code | Variable |
|-------------------------------|-------------------------|-----------------------------|-------------------|
| Character string [Unicode] | 1 to 255 characters | UTF-16LE ^{*1} *2*3 | 2 bytes/character |
| Character string [ASCII/SJIS] | 1 to 255 characters | Windows Codepage 932 | — |

*1 The character other than BMP (U+10000 to U+10FFFF) cannot be used and it has no BOM.

*2 UTF-16LE has no BOM.

*3 Combining characters cannot be used.

System variable list

| Variable name | Data type | Write | Description | Description of a value |
|--|--|--------------|--|---|
| S_SERVER_STATUS01 to S_SERVER_STATUS16 (Connection status of an access target server) | Word [unsigned]/Bit string [16-bit] | Not writable | Displays a connection status to each access target server. | <ul style="list-style-type: none"> 0: Not connected 1: Connecting 2: Disconnecting |
| S_DEVICE_STATUS01 to S_DEVICE_STATUS64 ^{*1} (Connection status of an access target device) | Word [unsigned]/Bit string [16-bit] | Not writable | Displays a connection status to each access target device. | <ul style="list-style-type: none"> 0: Not connected 1: Connecting 2: Disconnecting |
| S_MATRIXLED_DISP (Dot matrix LED display) | Character string [Unicode] 32 characters | Writable | Displays the user specification character string of the dot matrix LED. Substitute characters to display in the action. For details on the action, refer to the following: □□MELSEC iQ-R MES Interface Module User's Manual (Application) | Usable characters: U+0020 to U+007E ^{*2} (The initial value is null character.) |
| S_MATRIXLED_MODE (Dot matrix LED display mode) | Word [unsigned]/Bit string [16-bit] | Writable | Displays the dot matrix LED display mode. | <ul style="list-style-type: none"> 0: USR (user specification character) (initial value) 1: ENo. (Error code) 2: IP1 (CH1 IP address) 3: IP2 (CH2 IP address) 4: BUF1 (DB buffer 1 use rate) 5: BUF2 (DB buffer 2 use rate) |

*1 'S_DEVICE_STATUS17' to 'S_DEVICE_STATUS64' can be used for an RD81MES96N only.

*2 When specifying a character other than a usable one, it is converted into a period (U+002E) and displayed.

Constant

The following tables show the data type specifications for a constant according to the classification.

Data type

The data type of the constant is checked by MES Interface Function Configuration Tool not an MES interface module.

Integer

| Data type | Usable characters | Minimum value | Maximum value | Maximum number of characters |
|-----------|---------------------------------|---|---|------------------------------|
| Integer | -, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 | -2147483648 (Minimum value of a signed 32-bit integer) | 4294967295 (Maximum value of an unsigned 32-bit integer) | 11 characters |

Real number

| Data type | Usable characters | Minimum of the absolute values | Maximum of the absolute values | Maximum number of significant digits in the mantissa part | Maximum number of characters |
|-------------|--|--------------------------------|--------------------------------|---|------------------------------|
| Real number | -, E, .(decimal point), 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 | 2.22507385850721E-308 | 1.79769313486231E308 | 15 digits | 22 characters*1 |

*1 '-123.456789012345e-222' and '0.00000123456789012345' etc. can be set. '1.23456789012345000000' etc. cannot be set.

Character string

| Data type | Usable characters | Maximum length of character string |
|-------------------------------|---|------------------------------------|
| Character string [Unicode] | Printable characters including the blank (U + 0020) (Escape sequences are handled without converting into control characters. (\n etc.)) | 255 characters |

Macro

The data, of which a value is not determined at the job setting such as a date and time when the trigger condition is satisfied, is set with a macro name and replaced to data in an MES interface module.

The following tables show the specifications for a macro according to the classification.

Macro list

■Time at trigger monitoring

| Data type | Description |
|---------------|--|
| Date and time | A date and time when the monitoring of a trigger condition starts. |

■Time at trigger ON

| Data type | Description |
|---------------|---|
| Date and time | A date and time when the trigger condition of a job is satisfied. |

■Job execution start date and time

| Data type | Description |
|---------------|--|
| Date and time | A date and time when the first action of a job starts. |

■Server date and time

| Data type | Description |
|---------------|---|
| Date and time | <p>A server date and time at DB field insertion/update.</p> <ul style="list-style-type: none"> • Outputs the value as an identifier of the macro to DB Connection Service. • There is no data type, because values are not used in an MES interface module. • It is treated as a date and time when checking the setting for the data assignment function in MES Interface Function Configuration Tool. • It can be used when selecting "Connection via Service" for "Access Type." |

■Failure Action No.

| Data type | Description |
|-------------------------------------|--|
| Word [unsigned]/Bit string [16-bit] | <p>An action number executed when a processing failed.</p> <ul style="list-style-type: none"> ■Upper 8 bits (processing type) <ul style="list-style-type: none"> • 1: Pre-processing • 2: Main processing • 3: Post-processing ■Lower 8 bits (action number) <ul style="list-style-type: none"> • 1 to 20: Action number |

■Date and time character string

| Data type | Description | | |
|---|--|---|--|
| Character string [Unicode] Up to 64 characters | <p>A character string converted the time, when the trigger condition is satisfied, based on the specified format.</p> <p>Specifies a format character string when using macro.</p> <p>The following characters in the format character strings are replaced with numerical values. (Example) YYYY-MM-DD hh:mm:ss.fff OFFSET → 2015-02-01 13:05:43.532 +09:00</p> <table border="0"> <tr> <td style="vertical-align: top;"> <ul style="list-style-type: none"> ■Characters to be replaced • YYYY • YY • MM • DD • hh • mm • ss • fff • OFFSET </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> ■Values to be replaced (When a value has a small number of the digits, '0' is added to the head.) • Year (4 digits) • Year (last 2 digits) • Month (01 to 12) • Day (01 to 31) • Hour (00 to 23) • Minute (00 to 59) • Second (00 to 59) • Decimal part of second: Millisecond (000 to 999) • UTC offset [+ -]xx:xx </td> </tr> </table> | <ul style="list-style-type: none"> ■Characters to be replaced • YYYY • YY • MM • DD • hh • mm • ss • fff • OFFSET | <ul style="list-style-type: none"> ■Values to be replaced (When a value has a small number of the digits, '0' is added to the head.) • Year (4 digits) • Year (last 2 digits) • Month (01 to 12) • Day (01 to 31) • Hour (00 to 23) • Minute (00 to 59) • Second (00 to 59) • Decimal part of second: Millisecond (000 to 999) • UTC offset [+ -]xx:xx |
| <ul style="list-style-type: none"> ■Characters to be replaced • YYYY • YY • MM • DD • hh • mm • ss • fff • OFFSET | <ul style="list-style-type: none"> ■Values to be replaced (When a value has a small number of the digits, '0' is added to the head.) • Year (4 digits) • Year (last 2 digits) • Month (01 to 12) • Day (01 to 31) • Hour (00 to 23) • Minute (00 to 59) • Second (00 to 59) • Decimal part of second: Millisecond (000 to 999) • UTC offset [+ -]xx:xx | | |

3 FUNCTION LISTS

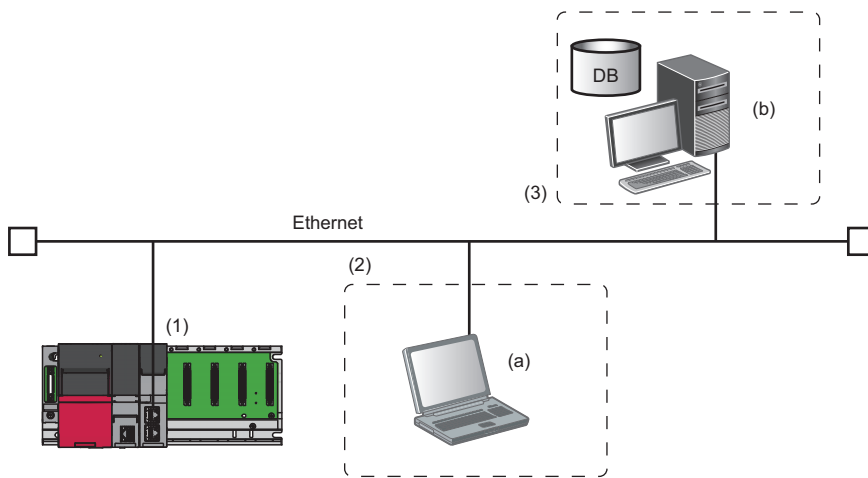
This chapter shows the function lists of an MES interface module, MES Interface Function Configuration Tool, Project File Conversion Tool, DB Connection Service, and DB Connection Service Setting Tool.

For details on each function, refer to the following:

📖 MELSEC iQ-R MES Interface Module User's Manual (Application)

3.1 Function Overview



An MES interface module links information between production equipment and host information systems by using each function of MES Interface Function Configuration Tool, Project File Conversion Tool, DB Connection Service, and DB Connection Service Setting Tool.



| Name | | Description | Reference |
|------|---------------------------------|---|---|
| (1) | MES interface module | A module to link information between production equipment and host information systems. | Page 49 MES Interface Module |
| (2) | Configuration personal computer | (a) MES Interface Function Configuration Tool | Page 50 MES Interface Function Configuration Tool |
| | | Project File Conversion Tool | Page 51 Project File Conversion Tool |
| (3) | Server | (b) DB Connection Service | Page 51 DB Connection Service |
| | | DB Connection Service Setting Tool | Page 51 DB Connection Service Setting Tool |

3.2 MES Interface Module

This section shows the function list of an MES interface module.

| Function | | Description | |
|--|--|---|--|
| Data input/output function | Device memory input/output function | Device memory input function | To read data in the device memory. Data used for trigger judgment is read, and then data used for job is read. |
| | | Device memory output function | To write data written to a device tag in a job to the device memory. |
| | DB input/output function | DB record input/output function | To read/write data in the database of the host information system. |
| | | DB buffering function | To buffer data sent to the database and resend it after recovery when the data cannot be linked due to the disconnection of the network between an MES interface module and the database or failure of the database etc. |
| | Variable input/output function | System variable input/output function | To read/write data of a system variable storing the operating status of a module such as the status of an MES interface module. |
| | | User variable input/output function | To read/write data from/to a user variable (local variable/global variable) which can be registered arbitrarily. <ul style="list-style-type: none"> • Local variable: can be used in a same job • Global variable: can be used between jobs |
| External communication client function | Program execution function | To execute a program on an application server via DB Connection Service. | |
| Information linkage function | Trigger condition monitoring function | To monitor values such as a time or device tag component, and start a job when a trigger condition is changed from false to true (the condition is satisfied). | |
| | Job execution control function | To control job execution such as the availability of job execution depending on the number of jobs that can be executed at the same time. | |
| | Trigger buffering function | To buffer information required for job execution in a trigger buffer as trigger information. | |
| | One-shot execution function | To execute any job at any timing. | |
| | Data operation and processing function | To perform the substitution ^{*1} , basic arithmetic operations, remainder, and character string operation of a device tag component value. | |
| | Data linkage function | Data assignment function | To assign and link a device tag, DB data, and a variable which are read by using the data input/output function. |
| | Communication test function | To check the communication setting between an MES interface module and an access target device or access target server. | |
| | DB information browse function ^{*2} | To access a database according to a request from MES Interface Function Configuration Tool and acquire a DB table name, DB field name, data type of a DB field, stored procedure name, and argument information of a stored procedure. | |
| External communication server function | REST server function | To enable job-related operations and job information acquisition from an REST client. In addition, the XML processing function of a MELSEC-Q series MES interface module is supported. | |
| Security function | User authentication function | To prevent illegal access to an MES interface module by setting a user name and password. | |
| Other functions | SD memory card management function | To format an SD memory card. | |
| | Self-diagnostic function | To diagnose whether an MES interface module operates normally. | |
| | Online module change function | To replace a module with another without stopping a running system. For the procedure, refer to the following:  MELSEC iQ-R Online Module Change Manual | |
| | Firmware update function ^{*2} | To update the firmware of an MES interface module. For details, refer to the following:  MELSEC iQ-R Module Configuration Manual | |
| | Initialization function ^{*2} | To initialize a firmware update-prohibited password retained in an MES interface module. | |

*1 Array tag components can be substituted only for an RD81MES96N.

*2 Can be used only for an RD81MES96N.

3.3 MES Interface Function Configuration Tool

This section shows the function list of MES Interface Function Configuration Tool.

| Function | | Description | | |
|--------------------------------------|--------------------------------|---|---|--|
| Project file function | New | To create a new project file. | | |
| | Open | To open a project file. | | |
| | Save | To save a project file. | | |
| | Import | To import individual settings of another project file. The setting items imported can be selected. | | |
| | Open CSV files | To open a CSV file and apply data to a project being edited. | | |
| | Save CSV files | To save a project being edited to a CSV file. | | |
| Information linkage setting function | Project setting function | To display the home screen of MES Interface Function Configuration Tool to start setting. | | |
| | Network setting function | To set two Ethernet ports and a common host name. | | |
| | Device access setting function | Access target device setting | To specify a device type or a CPU number in a multiple CPU system, and set a network communication route to access from an MES interface module. | |
| | | Device tag setting | To set a logic name for the device memory of an access target device as a device tag component. A group of a device tag component can also be set as a device tag. For a device tag component, global labels and common device comments set with an engineering tool can be imported. | |
| | Server access setting function | Access target server setting | To set the type of a server, network information, and user authentication information. | |
| | | Access table/procedure setting | To set a logic name for the table/procedure and field/procedure arguments of a database as an access table/procedure and access field/procedure arguments. | |
| | DB information browse function | Browse DB table information | To set a DB table name of an access target table by communicating with a database and browsing a DB table name. | |
| | | Browse DB field information | To set a DB field name and data type of an access target table by communicating with a database and browsing a DB field name and data type. | |
| | | Browse DB procedure information | To set a stored procedure name and argument information by communicating with a database and browsing a stored procedure name and stored procedure argument information. | |
| | Job setting function | Job configuration setting | To set the necessity of the pre/post-processing etc. | |
| | | Trigger condition setting | To set a condition to start a job. Trigger buffering can also be set when trigger conditions are satisfied at a time. | |
| | | Read data setting at trigger judgment | To set a method and interval for reading data required to evaluate a trigger condition. Whether to include other data used in a job can also be set. | |
| | | Pre-processing setting | To set the pre-processing performed before DB communication. | |
| | | Main-processing setting | To set the main-processing to perform DB communication. | |
| | | Post-processing setting | To set the post-processing performed after DB communication. | |
| | | Verification setting | To set a function used when verifying a job, such as job execution inhibition or log output. | |
| | Action setting function | DB communication action setting | To set a target table and type of DB communication (Select etc.), and data assignment of DB communication data and an MES interface module. | |
| | | External communication action setting | To set a target server for program execution or a command actually executed etc. | |
| | | Operation action setting | To set an operation type (basic arithmetic operations etc.) and target data (a device tag or variable) in an MES interface module for operation. | |
| | Option setting function | Variable setting | To set the following variables as a variable of an MES interface module. • Local variable using the area for a job • Global variable using the user area of the buffer memory | |
| DB buffer setting | | To set the capacity, method to resend data in a DB buffer, notification related to other DB buffers, and request for using the DB buffering function. | | |
| Security setting | | To set the user authentication for connecting to an MES interface module. | | |
| Dot matrix LED setting | | To set the settings related to the dot matrix LED display. | | |

| Function | | Description | |
|-----------------|---|---|--|
| Online function | Online data operation function | To perform the following operations to an MES interface module. <ul style="list-style-type: none"> Specify Connection Destination: To set an MES interface module of a connection destination. Read: To read a setting from an MES interface module, and overwrite a project file being edited. Write: To write a project file being edited to an MES interface module. Verify: To verify the contents of a project file being edited with those of a setting in an MES interface module. Update setting: To apply a written setting to an MES interface module. | |
| | Diagnostic function | To check the various kinds of information of an MES interface module and the detailed contents, such as actual values, for each action of jobs and diagnose them or take measures. | |
| | Management function | Firmware update management ^{*1} | To display and change the prohibition state of the firmware update set in an MES interface module. |
| | One-shot execution function | To request one-shot execution of a job specified for an MES interface module and display the detailed log. | |
| Help function | MELSEC iQ-R MES interface module help | | To open MELSEC iQ-R MES Interface Module User's Manual. |
| | Connection to MITSUBISHI ELECTRIC FA Global Website | | To connect to MITSUBISHI ELECTRIC FA Global Website. |
| | Version information | | To display the version information of MES Interface Function Configuration Tool. |

*1 Can be used only when an RD81MES96N is connected.

3.4 DB Connection Service

This section shows the function list of DB Connection Service.

| Function | Description |
|--------------------------------|---|
| DB connection function | To receive a DB communication request from an MES interface module, perform a DB communication via ODBC, and return the result of a DB communication to an MES interface module. |
| Program execution function | To receive a program execution request from an MES interface module and execute a command directly to an application server. It is also used to return an execution result to an MES interface module. |
| DB information browse function | To acquire and return the table information or stored procedure information of a database in response to a request from the table/procedure information browse function of MES Interface Function Configuration Tool. |
| Security function | To restrict an IP address and service port to limit connectable MES interface modules or applications. |
| Log output function | To output a communication log with an MES interface module or an SQL failure log when SQL execution fails. |

3.5 DB Connection Service Setting Tool

This section shows the function list of DB Connection Service Setting Tool.

| Function | Description |
|--|--|
| DB Connection Service setting function | To set and change the settings of DB Connection Service. |
| Import/export function | To import from and export to a file of DB Connection Service setting information. |
| Help function | To display the product information of DB Connection Service Setting Tool and connect to MITSUBISHI ELECTRIC FA Global Website. |

3.6 Project File Conversion Tool

This section shows the function list of Project File Conversion Tool.

| Function | Description |
|----------------------------------|--|
| Project file conversion function | To convert a project file of a MELSEC-Q series MES interface module to one of a MELSEC iQ-R series MES interface module. |

4 PROCEDURE BEFORE OPERATION

This chapter shows the procedure before operation of an MES interface module.

Operating procedure

1. Starting a server

Start a server used as a database server or application server.

(☞ Page 52 Starting a Server)

2. Starting an MES interface module and a configuration personal computer

Start an MES interface module, and a configuration personal computer on which MES Interface Function Configuration Tool is used.

(☞ Page 55 Starting an MES Interface Module and a Configuration Personal Computer)

4.1 Starting a Server

—: No operation required

| Step | Database server (Access type: Direct DB connection) | Database server (Access type: Connection via service) | Application server ^{*1} |
|------|--|---|--|
| 1 | Create a table in a relational database. ^{*2} | | Prepare an application program to run. |
| 2 | — | Configure the ODBC setting for the database. | Create an account for running the application program. |
| 3 | — | Install DB Connection Service and DB Connection Service Setting Tool. ^{*3} | |
| 4 | — | Change the setting for DB Connection Service. | |
| 5 | Start the operation. | | |

*1 Set it when using the program execution function. (☞ MELSEC iQ-R MES Interface Module User's Manual (Application))

*2 Install a relational database, and restart a server then create a table.

*3 ☞ Page 78 INSTALLATION AND UNINSTALLATION

Point

- Be sure to log on to an application server with a created account for application program execution once before using the program execution function on the application server.
- For using an application server when using the program execution function, log on with an account other than a created one for the application program execution function.

DB Connection Service/DB Connection Service Setting Tool

The information linkage function of an MES interface module can be used by installing DB Connection Service on a server. For details on DB Connection Service and DB Connection Service Setting Tool, refer to the following:

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


Point

- DB Connection Service must be installed on all database servers and application servers accessed from an MES interface module.
- When using DB Connection Service on an application server, an account for application program execution must be created in advance.
- The settings of DB Connection Service are changed in DB Connection Service Setting Tool.

4

ODBC setting for database

When using DB Connection Service on a database server, the ODBC setting for a database used must be set in advance. For the ODBC setting method, refer to the following:

 Page 110 ODBC Setting

■ 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.

- When connecting the database of Oracle using any of the following DB Connection Services, the 32-bit version of Oracle Client for the ODBC setting and the ODBC driver of Oracle need to be installed. Install them as necessary.
The DB Connection Service which is stored to MX MESInterface-R whose software version is '1.03D' or earlier.
The DB Connection Service (32-bit) which is stored to MX MESInterface-R whose software version is '1.04E' or later.
- When using PostgreSQL for a database, install an ODBC driver.

■ 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".

Startup method

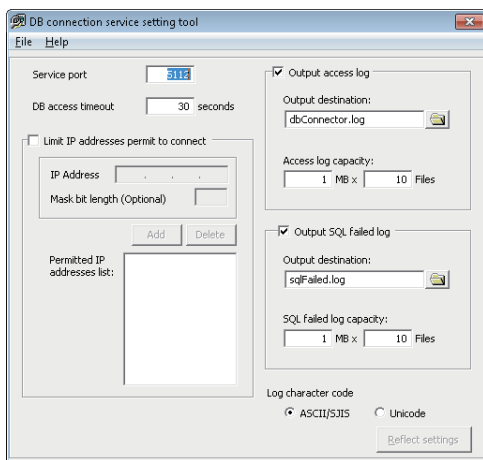
Operating procedure

1. Select [MELSOFT] ⇒ [MESInterface]^{*2} ⇒ [DB connection service setting tool] from Windows Start^{*1}.
^{*1} Select [All apps] in the Start screen or [Start] ⇒ [All Programs]/[All apps].
^{*2} Does not appear in Windows 8 or later.
2. When using an operating system with the user account control function, a warning message relating to 'DBCnctConf.exe' appears. Click "Allow" or the [Yes] button.

Point

- To prevent a warning message from being displayed, refer to the following:
 - 📖 MELSEC iQ-R MES Interface Module User's Manual (Application)
- The setting contents of DB Connection Service, which is currently in operation, are displayed during startup.

Screen configuration



Menu configuration

The following table lists the commands assigned to the menu bar.

| Menu name | | Description |
|-----------|---|---|
| File | Import | To import a saved file. |
| | Export | To export setting contents of DB Connection Service Setting Tool to a file. |
| | End | To end DB Connection Service Setting Tool. |
| Help | Product information | To display the product information of DB Connection Service Setting Tool. |
| | Connection to MITSUBISHI ELECTRIC FA Global Website | To display MITSUBISHI ELECTRIC FA Global Website. |

4.2 Starting an MES Interface Module and a Configuration Personal Computer



Start a server before starting an MES interface module and configuration personal computer.

—: No operation required

| Step | MES interface module ^{*1} | Configuration personal computer |
|------|---|--|
| 1 | Mount an MES interface module on a base unit. ^{*2} | Install MES Interface Function Configuration Tool. ^{*3} |
| 2 | Switch the dot matrix LED display mode switch to the right (SHOW). | — |
| 3 | Connect the MES interface module to the configuration personal computer on a 1:1 basis. ^{*4} | — |
| 4 | Turn the power of the system ON. (The ERR LED flashes because an SD memory card is not inserted.) | — |
| 5 | Insert an SD memory card. ^{*5} | — |
| 6 | — | Start MES Interface Function Configuration Tool. |
| 7 | — | Configure the network setting for the MES interface module. ^{*6} |
| 8 | — | Specify the default IP address, user name, and password for the MES interface module in the "Specify Connection Destination" screen. ^{*6*7} |
| 9 | — | Format the SD memory card as necessary. ^{*6} |
| 10 | — | Write the settings to the MES interface module to apply them. ^{*6} |
| 11 | Connect the MES interface module and configuration personal computer to a network according to the network setting configured in MES Interface Function Configuration Tool. | |
| 12 | — | Configure the setting for the MES interface module. ^{*6} |
| 13 | — | Change the setting for the connection destination according to the network setting for the MES interface module. ^{*6} |
| 14 | — | Write the settings to the MES interface module to apply them. ^{*6} |
| 15 | — | Check the operation result, and review the settings as necessary. |
| 16 | Start the operation. | |

*1 Perform the self-diagnostic test as necessary. (MELSEC iQ-R MES Interface Module User's Manual (Application))

*2 Do not use an electric screwdriver to attach and remove module fixing screws.

*3 Page 78 INSTALLATION AND UNINSTALLATION

*4 Use the Ethernet port (CH1) on MES interface module.

*5 Page 64 Insertion/removal method of an SD memory card

*6 For the operation methods of MES Interface Function Configuration Tool, refer to the following:

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

*7 Specify the following items (default network setting and security setting) for connection in the "Specify Connection Destination" screen of MES Interface Function Configuration Tool.

· Connection destination setting

IP address: 192.168.3.3

· User authentication setting (optional)

Use the user authentication : Select the checkbox.

User name: RD81MES96

Password: MITSUBISHI



To change the setting for the MES interface module, perform steps 12 to 14.

MES Interface Function Configuration Tool

MES Interface Function Configuration Tool is a tool to set various settings required for operating an MES interface module. Various operations such as checking each status and the working history, and stopping or restarting MES interface module can be performed.

For details on MES Interface Function Configuration Tool, refer to the following:

📖 MELSEC iQ-R MES Interface Module User's Manual (Application)

Startup method

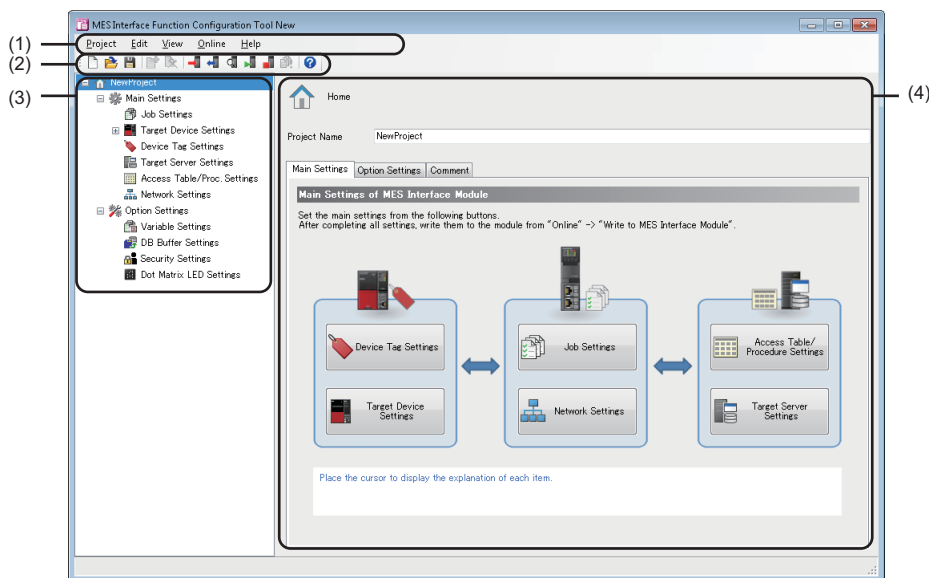
Operating procedure

Select [MELSOFT] ⇒ [MESInterface]^{*2} ⇒ [MELSEC iQ-R Series MES Interface Function Configuration Tool] from Windows Start^{*1}.

*1 Select [All apps] in the Start screen or [Start] ⇒ [All Programs]/[All apps].

*2 Does not appear in Windows 8 or later.

Screen configuration



- (1) Menu bar
- (2) Toolbar
- (3) Edit item tree
- (4) Setting edit screen

■ Menu configuration

The following table lists the commands assigned to the menu bar.

| Menu name | | Description | |
|-----------|---|--|--|
| Project | New | To discard a project being edited and create a new project. | |
| | Open | To open a project file saved in the local disk. | |
| | Save | To overwrite and save an edited project to a file. | |
| | Save As | To save an edited project under a new file name. | |
| | Import | Project File | To import a setting of a project file saved in the local disk by selecting a setting item. |
| | Recently used Project file | To select and open a project file which was recently used in MES Interface Function Configuration Tool. | |
| | Exit | To exit MES Interface Function Configuration Tool. | |
| Edit | Add Item | To add an item to a setting selected in the edit item tree. The index of the item to be added is the smallest number of each item. | |
| | Delete Item | To delete an item selected in the edit item tree. | |
| | Add CopyItem | To copy and add an item selected in the edit item tree. The index of the item to be added is the smallest number of each item. | |
| | Update Data Related to Global Label | To update data to the latest value when a value of an import source global label is changed. | |
| View | Tool Bar | To select whether to display the toolbar. | |
| | Status Bar | To select whether to display the status bar. | |
| Online | Specify Connection Destination | To set the settings for connecting to an MES interface module. | |
| | Read from MES Interface Module | To read a setting from an MES interface module. | |
| | Write to MES Interface Module | To write a setting to an MES interface module. | |
| | Verify with MES Interface Module | To compare a setting written to an MES interface module with one in MES Interface Function Configuration Tool. | |
| | Update setting of MES Interface Module | To apply a written setting to an MES interface module. | |
| | Diagnose MES Interface Module | To connect to an MES interface module and perform the module diagnostics and various operations. | |
| | Manage MES Interface Module | To display information on an MES interface module and perform operations to it. | |
| | One-Shot Execution | To execute the one-shot to a selected job after the message "Executes the one-shot. Do you really want to continue?" appears. An execution result is notified in the detailed log display regardless of the verification setting. | |
| | Communication Test to Target Device | To perform a communication test for a selected access target device. | |
| | Communication Test to Target Server | To perform a communication test for a selected access target server. | |
| Help | MELSEC IQ-R MES Interface Module Help | To open the user's manual of an MES interface module. | |
| | Connection to MITSUBISHI ELECTRIC FA Global Website | To display MITSUBISHI ELECTRIC FA Global Website. | |
| | Version Information | To display the version information (product information) of MES Interface Function Configuration Tool. | |

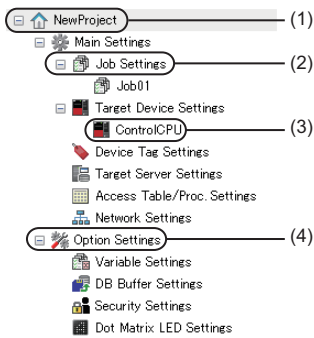
■ Toolbar configuration

The following table lists the commands assigned to the toolbar.

| Character string for the tooltip display | Items displayed on the status bar | Description |
|--|---|---|
| New (Ctrl+N) | Creates new project. | To discard a project being edited and create a new project. |
| Open (Ctrl+O) | Opens existing project. | To open a saved project file. |
| Save (Ctrl+S) | Overwrites and saves the project. | To overwrite and save an edited project to a file. |
| Add Item (Ctrl+Ins) | Adds the setting item. | To add a setting item of a type selected in the edit item tree. |
| Delete Item (Ctrl+Del) | Deletes the setting item. | To delete a setting item selected in the edit item tree. |
| Write to MES Interface Module | Writes the settings to MES interface module. | To write a setting to an MES interface module. |
| Read from MES Interface Module | Reads the settings from MES interface module. | To read a setting from an MES interface module. |
| Diagnose MES Interface Module | Displays the diagnostic screen. | To connect to an MES interface module and perform the diagnostics and various operations. |
| Restart the MES Interface Function | The MES interface function is restarted. | To connect to an MES interface module and restart the stopped MES interface function. |
| Stop the MES Interface Function | The MES interface function is stopped. | To connect to an MES interface module and stop the operating MES interface function. |
| One-Shot Execution | Performs the one-shot execution. | To execute the one-shot of a job. |
| Open MELSEC iQ-R MES Interface Module Help | Opens MELSEC iQ-R MES interface module help. | To open the user's manual of an MES interface module. |

Operations in the edit item tree

The edit item tree shows overall project settings in a tree.



- (1) Project root
- (2) Setting category
- (3) Item
- (4) Setting group

■Selecting an item

1. The items are displayed by double-clicking the project root or each setting category.
2. The editing screen of the selected item is displayed on the detailed setting editing screen by selecting the displayed item.

■Adding an item

1. The item is added by selecting the item to be added or the setting category, and performing any of the following operations.
 - Click Add Item (📄)
 - Select [Edit] ⇒ [Add Item]
2. When the item is added successfully, the added item is selected automatically and the screen is switched to the editing screen of the added item.

Point

Refer to the description of each item since the number of items which can be added is limited depending on the setting type.

■Deleting an item

The item is deleted by selecting the item to be deleted and performing any of the following operations.

- Click Delete Item (🗑)
- Select [Edit] ⇒ [Delete Item]

Point

- The item cannot be deleted if the selected item is being used in other item.
Check where the item is being used and stop using it in other item according to the displayed error dialog box before deleting.
- The first item (default name: ControlCPU) on the list in the "Target Device Settings" cannot be deleted.

■ Copying and adding an item

1. Select an item to be added and select [Edit] ⇒ [Add copyItem] to copy and add the item.
2. When the item is added successfully, the added item is selected automatically and the screen is switched to the editing screen of the added item.

Point

Refer to the description of each item since the number of items which can be added is limited depending on the setting type.

■ Moving an item

The item is moved by dragging and dropping.

Point

- The item can be moved only within each setting: "Job Settings", "Target Device Settings", "Device Tag Settings", "Target Server Settings", and "Access Table/Procedure Settings".
 - The first item (default name: ControlCPU) on the list in the "Target Device Settings" cannot be deleted.
-

Common operation

The following shows the common operations of MES Interface Function Configuration Tool.

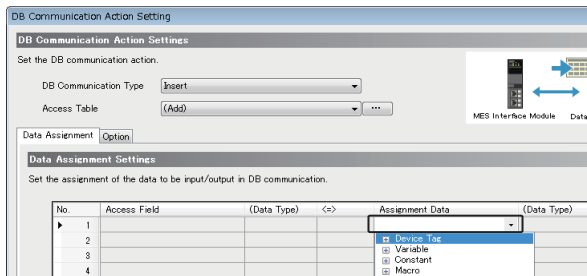
■Data setting in the data selection control tree

Perform a simple assignment for the single item such as device tag, variable, and constant.

Operating procedure

1. Click a cell to enter data.

(Example) "DB Communication Action Setting" screen



2. Select data to set.

| Item | | | Description |
|------------|-----------------------------------|-----------------------------|---|
| Device Tag | (Device tag name) | (Device tag component name) | Set a selected device tag component. |
| | | [Edit] | Select this to open the "Device Tag Setting" screen of a selected device tag. |
| | [Add] | | Select this to open the "Device Tag Setting" screen for setting a new device tag. |
| Variable | Local Variable | (Local variable name) | Set a selected local variable. |
| | | [Edit] | Select this to open the "Variable Settings" screen. |
| | Global Variable | (Global variable name) | Set a selected global variable. |
| | | [Edit] | Select this to open the "Variable Settings" screen. |
| | System Variable | (System variable name) | Set a selected system variable. |
| Constant | [Integer] | | Select this to open the "Integer Type Constant Settings" screen. |
| | [Real Number] | | Select this to open the "Real Number Type Constant Settings" screen. |
| | [Character String (Unicode)] | | Select this to open the "Character String Type Constant Settings" screen. |
| Macro | Time at Trigger Monitoring | | Set a selected macro. |
| | Time at Trigger ON | | |
| | Job Execution Start Date and Time | | |
| | Server Date and Time | | |
| | Failure Action No. | | |
| | [Date and Time Character String] | | Select this to open the "Date and Time Character String Macro Settings" screen. |

- Setting a constant or macro

The following shows the procedure for setting a constant or macro used as data.

Operating procedure

1. Select "[Integer]," "[Real Number]," "[Character String (Unicode)]," or "[Date and Time Character String]" in the data selection control tree to enter a setting value.
2. Click the [OK] button.

Parameter setting

The mode setting, module operations forced change setting, target device response monitoring time setting and module READY signal delay time setting of MES interface module are set in the parameter setting of the engineering tool.

For details on the parameter setting, refer to the following:

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

Point

- CW Configurator does not support it.

Startup method

Operating procedure

Select [MELSOFT] ⇒ [GX Works3]^{*2} ⇒ [GX Works3] from Windows Start^{*1}.

*1 Select [All apps] in the Start screen or [Start] ⇒ [All Programs]/[All apps].

*2 Does not appear in Windows 8 or later.

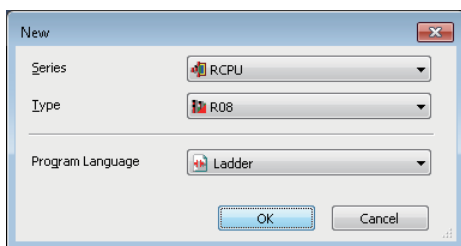
Parameter setting

Operating procedure

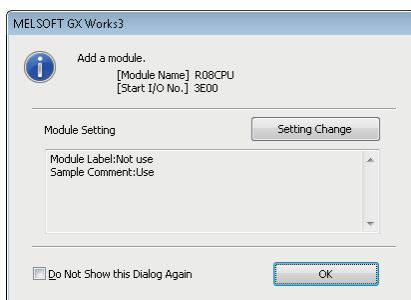
1. Create a new project.

 Select [Project] ⇒ [New] from the menu.


2. Select an item for each "Series", "Type", and "Program Language", and click the [OK] button.



3. Set whether to use module labels and sample comments, and click the [OK] button.

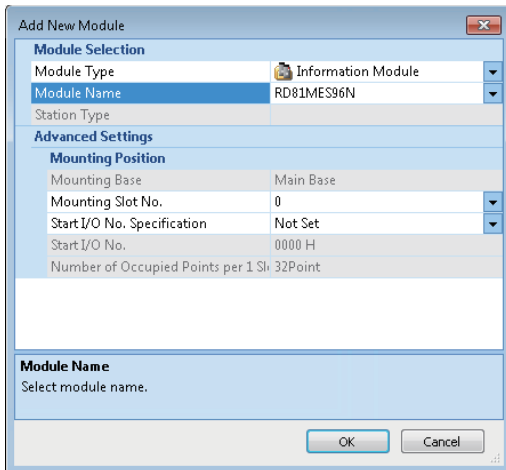


4. Display the "Add New Module" screen.

 Select "Parameter" on the Navigation window, right-click the "Module Information" and select [Add New Module].

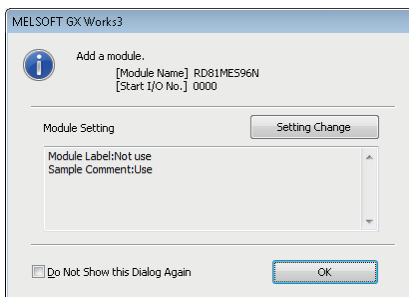
5. Add an MES interface module.

- Select "Information Module" for "Module Type" and "RD81MES96N" or "RD81MES96" for "Module Name" in the "Add New Module" screen.



| Item | Description |
|-----------------------------|--|
| Module Type | Select "Information Module." |
| Module Name | Select "RD81MES96N" or "RD81MES96." |
| Mounting Slot No. | Select the slot number where an MES interface module is mounted. |
| Start I/O No. Specification | Select "Not Set" when not specifying the start I/O number of an MES interface module; otherwise, select "Set." |
| Start I/O No. | When selecting "Set" in the "Start I/O No. specification", enter the start I/O No. of MES interface module. |

6. Set whether to use module labels and sample comments, and click the [OK] button.



7. Set the module parameters of an MES interface module.

- Select "Parameter" ⇒ "Module Information" ⇒ "(module name)" on the Navigation window.

8. After setting the parameter, write the setting to a CPU module from an engineering tool.

9. Reset the CPU module or turn the power OFF and ON to apply the setting.

4.3 SD Memory Card

This section shows an SD memory card used for an MES interface module.

For supported SD memory cards and considerations, refer to the following:

☞ Page 71 SD memory card (sold separately, required)

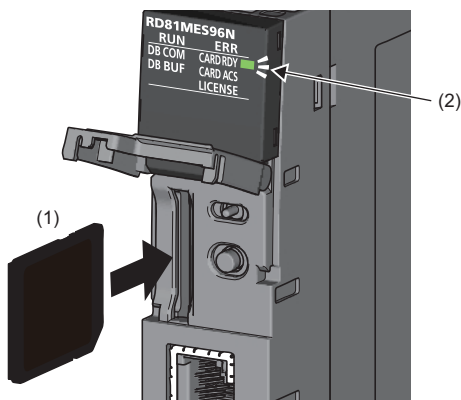
☞ Page 65 Considerations for using an SD memory card

Insertion/removal method of an SD memory card

Make sure to stop file access when removing or replacing an SD memory card.

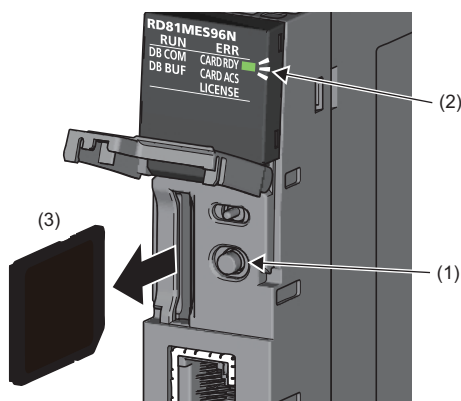
If the power is OFF and the file access is not stopped, turn the power ON and stop the file access.

Insertion procedure



- 1.** Insert an SD memory card (1) straight into the SD memory card slot with its cutout pointed down.
Make sure it is not uplifted after inserting it.
If it is inserted insufficiently, it may cause malfunction due to poor contact.
- 2.** The CARD RDY LED (2) keeps flashing until the SD memory card is ready to be used. Once the CARD RDY LED (2) turns ON, the SD memory card can be used.

Removal procedure



- 1.** Press the SD memory card lock switch (1) for one second or longer to stop the SD memory card access.
- 2.** The CARD RDY LED (2) is flashing while stopping the file access, and it turns OFF once the processing is completed.
- 3.** Push the SD memory card (3) in once, and pull it out straight.

Considerations for using an SD memory card

- For inserting and removing an SD memory card while the power is ON, follow the procedure.
Failure to do so, the data in the SD memory card may be damaged.
- If any of the functions is accessing an SD memory card when removing the SD memory card, the CARD RDY LED will turn OFF after the function completes accessing.
Therefore, a time until the CARD RDY LED turns OFF may differ depending on a function.

SD memory card to be used

Use a supported SD memory card. (☞ Page 71 SD memory card (sold separately, required))

If another SD memory card is used, data in the SD memory card may be corrupted or the system may stop.

When using an SD memory card used for other uses, make sure to format the card in MES Interface Function Configuration Tool. (📖 MELSEC iQ-R MES Interface Module User's Manual (Application))

4

Formatting an SD memory card

Format an SD memory card in the "SD Memory Card Diagnostics" screen of MES Interface Function Configuration Tool.

(📖 MELSEC iQ-R MES Interface Module User's Manual (Application))

Do not format an SD memory card with standard format commands of an operating system such as Windows.

Turning the power OFF or resetting a CPU module

When the CPU module is powered OFF or reset while writing data to an SD memory card, the processing to write data to the SD memory card may not be completed. It may cause a loss of data during DB buffering, corruption of data in the SD memory 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 periodically.

Do not power OFF or reset the CPU module since an SD memory card can be formatted while stopping the file access.

Removing or replacing an SD memory card

Make sure to stop file access before removing or replacing an SD memory card. (If the power is OFF and the file access is not stopped, turn the power ON and stop the file access.)

Otherwise, the data in the SD memory card being accessed may be corrupted or a file system failure may occur.

Check that the SD memory card is not being formatted since it can be formatted while stopping the file access.

The setting of MES interface module is saved in the SD memory card. Therefore, write the setting after replacing the SD memory card as necessary.

Files in an SD memory card

Do not edit a file or folder in an SD memory card directly by inserting the card in a personal computer.

Make sure to use an SD memory card by inserting in an MES interface module.

SD memory card life

An SD memory card has a life (a limit on the number of times for writing data). For details, refer to the specification of an SD memory card to use.

Generally, an SD memory card life depends on the free capacity. Set the DB buffering capacity, which should be set by a user, so that the SD memory card has a sufficient free capacity. (An SD memory card can be used for long time with enough capacity.)

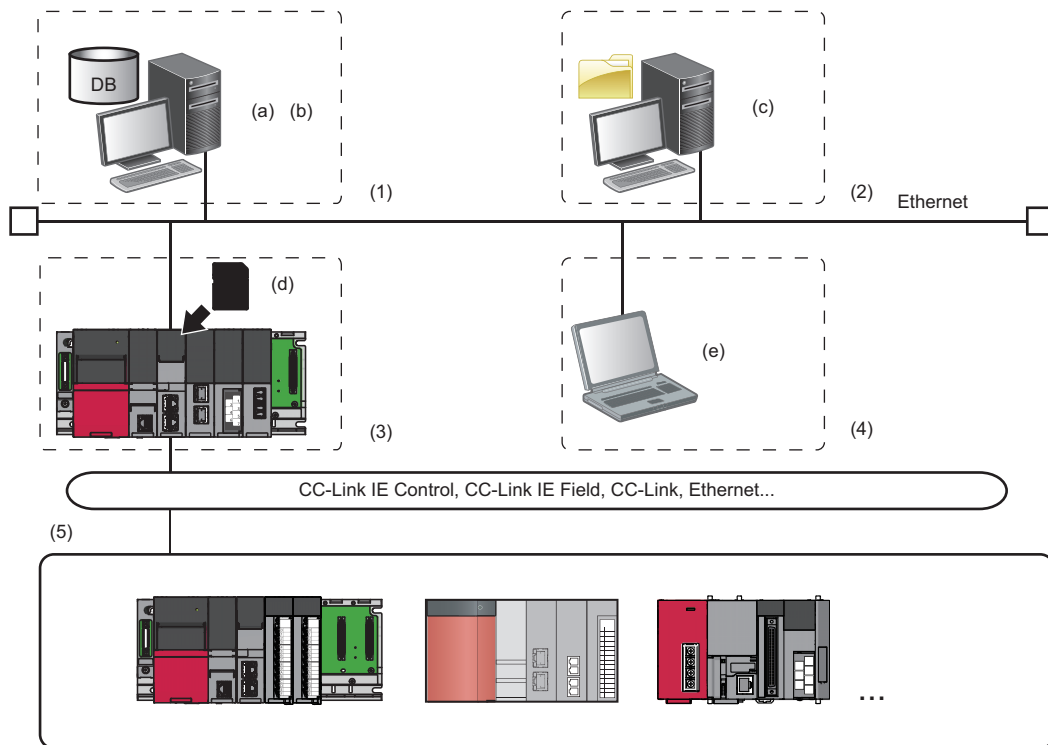
5 SYSTEM CONFIGURATION

This chapter shows the system configuration of an MES interface module.

5.1 System Configuration

Overall system configuration

The following figure shows the overall system configuration when using an MES interface module.




| System configuration | | Network |
|----------------------|---------------------------------|---|
| (1) | Database server | (a) • DB Connection Service* ¹ • DB Connection Service Setting Tool* ¹ |
| | | (b) • Oracle • Microsoft SQL Server • Microsoft Access • MySQL • PostgreSQL |
| (2) | Application server | (c) • DB Connection Service • DB Connection Service Setting Tool |
| (3) | MES interface module | (d) SD memory card (required) |
| (4) | Configuration personal computer | (e) • MES Interface Function Configuration Tool* ² • Project File Conversion Tool |
| (5) | Programmable controller | CC-Link IE Control, CC-Link IE Field, CC-Link, Ethernet etc. |

*¹ No need to install it when "Direct DB Connection" is selected as an access route.

*² When connecting to an RD81MES96N, use MES Interface Function Configuration Tool stored in MX MESInterface-R the software version of which is '1.10L' or later.

- All devices and systems (such as a server, configuration personal computer, and target device) which are connectable via Ethernet can be connected to both Ethernet ports (CH1/CH2) of a MES interface module.
- Ethernet ports (CH1/CH2) cannot be connected to a same network.
- MES interface modules can be connected only by using LAN connection. Connection via the Internet is not available.
- For available CPU modules and the number of mountable ones, refer to the following:

 MELSEC iQ-R Module Configuration Manual

Software configuration of MX MESInterface-R

The following table shows the software stored in MX MESInterface-R.

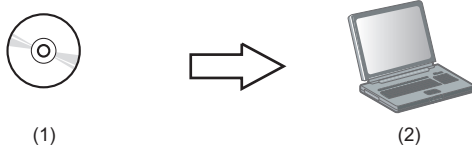
| Item | Description | |
|-------------------|---|--|
| MX MESInterface-R | MES Interface Function Configuration Tool | Software that runs in a configuration personal computer and is used to set various settings required for operating a MES interface module. In addition to the configuration, the following operations are performed. <ul style="list-style-type: none"> • Checking the operating status and working history of the MES interface function • Stopping/restarting the operation of the MES interface function • Creating settings of the MES interface function without modules |
| | Project File Conversion Tool | Software that runs in a configuration personal computer and converts a MELSEC-Q series MES Interface module project file to a MELSEC iQ-R series MES Interface module project file. This tool is automatically installed when MES Interface Function Configuration Tool is installed. |
| | DB Connection Service | Software that runs in a server and links a database with a MES interface module. (Required when linking with a database via ODBC of a personal computer with Windows.) |
| | DB Connection Service Setting Tool | Software that runs in a server and is used to change the operation of DB Connection Service. |

System configuration when installing

The following shows the system configuration when installing each piece of software stored in MX MESInterface-R.

When installing MES Interface Function Configuration Tool

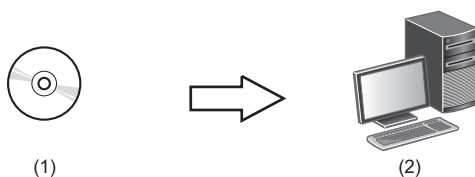
Install MES Interface Function Configuration Tool on a configuration personal computer.



- (1) MX MESInterface-R: MES Interface Function Configuration Tool
 (2) Configuration personal computer: Commercially available product

When installing DB Connection Service and DB Connection Service Setting Tool

Install DB Connection Service and DB Connection Service Setting Tool in the server.

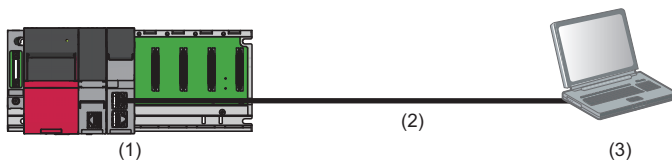


- (1) MX MESInterface-R: DB Connection Service/DB Connection Service Setting Tool
 (2) Server: Commercially available product

System configuration for the initial setting

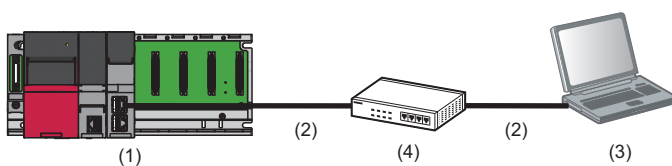
The following shows the system configuration for the initial setting, maintenance, and inspection.

Direct connection



- (1) MES interface module
- (2) Ethernet (twisted pair cable)
- (3) Configuration personal computer

Connection via a hub



- (1) MES interface module
- (2) Ethernet (twisted pair cable)
- (3) Configuration personal computer
- (4) Hub

A MES interface module and a configuration personal computer can be connected directly or via a hub.

- For direct connection, the Ethernet port (CH1) of an MES interface module can directly be connected to a personal computer on a 1:1 basis with an Ethernet cable (twisted pair cable) without a hub. Connection can be established without specifying the IP address of an MES interface module.
- For connection via a hub, the IP address of a MES interface module needs to be specified.

Point

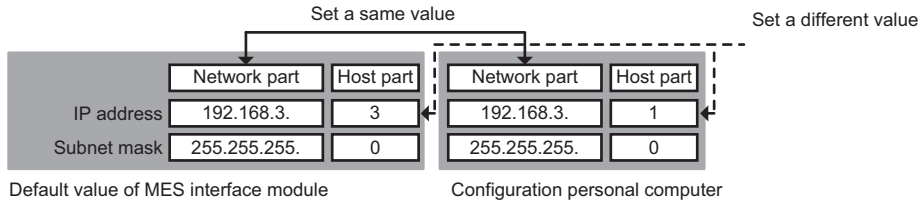
- For initial setting, only Ethernet port (CH1) can be used.
For using the Ethernet port (CH2), set the network in the "Network Settings" in MES Interface Function Configuration Tool. (MELSEC iQ-R MES Interface Module User's Manual (Application))

Network setting for connection

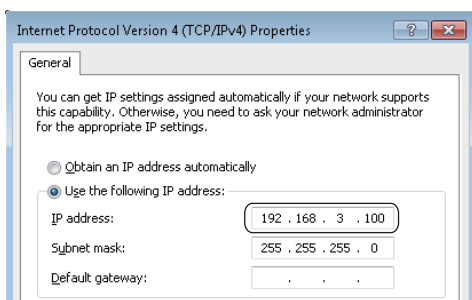
The following shows the network setting for a configuration personal computer when connecting the computer to an MES interface module via a hub.

Operating procedure

1. Set the network setting for a configuration personal computer to the same network address as MES interface module.



2. Set the network setting for the configuration personal computer on the "Internet Protocol Version 4 (TCP/IPv4) Properties" screen.



Considerations for direct connection

■When connecting to a LAN line

Do not perform communication by connecting to a LAN line directly.

This may increase the line load and affect the communications of other devices.

■When connecting via a hub

Do not set the direct connection while MES interface module and the configuration personal computer are connected via a hub.

■When applying to the condition where communication cannot be performed

The direct connection may not be performed in the following situations.

If it cannot connect, review the settings of MES interface module and the configuration personal computer.

- When all the bits of the MES interface module IP address corresponding to the '0' parts of the configuration personal computer subnet mask are ON or OFF
 - MES interface module IP address: 64.64.255.255
 - Configuration personal computer IP address: 64.64.1.1
 - Subnet mask on the configuration personal computer side: 255.255.0.0
- When all the bits of the MES interface module IP address corresponding to the host address of each class for the configuration personal computer IP address are ON or OFF
 - MES interface module IP address: 64.64.255.255
 - Configuration personal computer IP address: 192.168.0.1
 - Subnet mask on the configuration personal computer side: 255.0.0.0

Point

- The IP addresses of each class are as follows:
Class A: 0.x.x.x to 127.x.x.x, Class B: 128.x.x.x to 191.x.x.x, Class C: 192.x.x.x to 223.x.x.x
- Host addresses of each class are the '0' parts below.
Class A: 255.0.0.0, Class B: 255.255.0.0, Class C: 255.255.255.0

■When the Windows firewall setting is enabled

Disable the Windows firewall setting.

■When multiple IP addresses are enabled at the same time

The setting for direct connection cannot be set in the configurations where multiple IP addresses are enabled at the same time as shown below.

- When an IP address is assigned to each Ethernet port of the configuration personal computer with multiple Ethernet ports
- When a wireless LAN setting is enabled in addition to Ethernet port of the configuration personal computer
- When multiple IP addresses are assigned to one network device (Ethernet port) of the configuration personal computer

5.2 Connectable Devices


This section shows the connectable devices to an MES interface module.

SD memory card (sold separately, required)

One SD memory card is required for using an MES interface module.

Use one of the following SD memory cards manufactured by Mitsubishi Electric.


| Model name | Capacity |
|---------------|----------|
| NZ1MEM-2GBSD | 2 GB |
| NZ1MEM-4GBSD | 4 GB |
| NZ1MEM-8GBSD | 8 GB |
| NZ1MEM-16GBSD | 16 GB |

When using an SD memory card, make sure to refer to the following: ( Page 65 Considerations for using an SD memory card)

Ethernet (twisted pair) cable (sold separately)

The Ethernet cables compliant with IEEE802.3 1000BASE-T/100BASE-TX/10BASE-T standards can be used.

| Transmission speed | Unshielded twisted pair cable (UTP cable) Shielded twisted pair cable (STP cable) | |
|--------------------|--|------------------|
| | Straight cable | Crossover cable |
| 1 Gbps | Category 5e or higher | Category 5e |
| 100 Mbps | Category 5 or higher | Category 5 or 5e |
| 10 Mbps | Category 3 or higher | Category 3 to 5e |

When using an Ethernet cable, make sure to refer to the following: ( Page 77 Wiring Precautions)

5.3 Operating Environment

Configuration personal computer

The following table shows the operating environment of MES Interface Function Configuration Tool and Project File Conversion Tool.


| Item | Description |
|--|---|
| Personal computer | A personal computer on which Microsoft® Windows® operates |
| CPU | Intel® Core™ 2 Duo 2 GHz or more recommended |
| Memory requirements | 64-bit OS: 2 GB or more recommended 32-bit OS: 1 GB or more recommended |
| Display | Resolution 1024 × 768 pixels or higher |
| Free hard disk space | 512 MB or more |
| Disk drive | DVD-ROM disk drive |
| Communication Interface | Ethernet (IPv4) 1000BASE-T/100BASE-TX/10BASE-T |
| Operating system (English version) (32-bit version and 64-bit version are supported.) | Windows 10 (Home, Pro, Enterprise, Education) Windows 8.1, Windows 8.1 (Pro, Enterprise) Windows 8, Windows 8 (Pro, Enterprise) Windows 7 (Home Premium, Professional, Ultimate, Enterprise) |

Server (Database server/Application server)

The following table shows the operating environment of DB Connection Service and DB Connection Service Setting Tool.

| Item | Description |
|---|--|
| Personal computer | A personal computer on which Microsoft Windows operates |
| CPU | Intel Core2 Duo Processor 2 GHz or more recommended |
| Memory requirements | Recommended 2GB or more |
| Display | Resolution 1024 × 768 pixels or higher |
| Free hard disk space | 512 MB or more |
| Disk drive | DVD-ROM disk drive |
| Communication Interface | Ethernet (IPv4) 1000BASE-T/100BASE-TX/10BASE-T |
| Operating system (English version) (Only 64-bit version is supported.) | 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) |

For accessible databases, refer to the following:

 Page 38 Access Specifications for a Database

5.4 Considerations for System Configuration

Considerations for using operating systems

■User authority

For using MX MESInterface-R, logging on to the personal computer as a user with the administrator authority is recommended.

- Installation and uninstallation are available only for a user logging on with the administrator authority.
- When using a configuration personal computer, MX MESInterface-R can be used by a standard user or a user with the administrator authority.
- When using a server, MX MESInterface-R can be used only by a user with the administrator authority.

■Functions that cannot be used

When the following functions are used, this product may not run properly.

- Application start-up in Windows compatibility mode
- Fast user switching
- Remote desktop
- Power save mode (standby, hibernate, sleep)
- Windows XP Mode
- Windows Touch or Touch
- Modern UI
- Client Hyper-V
- Server Core installation (when using a server)
- Virtual environment (VMware®, Windows Virtual PC)
- Tablet mode
- Virtual desktop

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

- The size of the text and other items in the screen is other than 100% (96 DPI, 9 pt etc.).
- The resolution of the screen is changed in operation.
- Windows theme is changed in operation.
- The multi-display is set.

■.NET Framework

- If .NET Framework 4.0 and Visual C++® 2010 SP1 Redistributable Package (x86) are not installed on a personal computer where MES Interface Function Configuration Tool is to be installed, approximately 500 MB of free space is required in the system drive to install them.
- For Windows 10, if .NET Framework 4.6 Advanced Services is invalid, it needs to be valid.
- For Windows 8 and Windows 8.1, if .NET Framework 4.5 Advanced Services is invalid, it needs to be valid.

■Others

- When the Windows firewall setting is enabled, the module search function and the direct connection function may not operate properly. Disable the Windows firewall setting.

Considerations for using databases

■Restrictions for using databases

- For using a relational database, a license according to the number of MES interface modules is usually required. (Varies depending on the relational database type and license format.)
For details, consult the relational database vendor.
- The redundant relational database cannot be used.

■When using SQL Server

- Set "SQL Server and Windows Authentication Mode" for the server authentication.
- 🔗 Right-click the server to be used in the object explorer of SQL Server Management Studio ⇒ [Properties]. Select "SQL Server and Windows Authentication Mode" for the "Server authentication" in the "Security" on the "Server Properties" screen, then restart the SQL Server.
- An output argument, an input/output argument, and a return value of the stored procedure that returns a result set cannot be acquired.
- When installing a software version '1.01B' or earlier of MX MESInterface-R, set the collation sequence of SQL Server to the default (SQL_Latin1_General_CP1_CI_AS).
This is not applied when installing a software version '1.02C' or later of MX MESInterface-R.
- When MX MESInterface-R whose software version is "1.03D" 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-R whose software version is "1.04E" or later is installed.

■When using Access

- Using in the following environments is not recommended.
 - Where under overload
 - Where high reliability, such as non-stop operation for 24 hours, is requiredFor details, refer to the website of Microsoft.
blogs.technet.microsoft.com/officesupportjp/2017/02/08/ace_memory
- The number of fields that can be updated in one communication action is up to 127.
- Multiple accesses cannot be made to one file.
(The access from multiple MES interface modules cannot be made.)

■When using MySQL

- It is an open source database. For the software versions in which the operation has been checked, refer to the following section.
(🔗 Page 38 Accessible databases and supported software)

■When using PostgreSQL

- It is an open source database. For the software versions in which the operation has been checked, refer to the following section.
(🔗 Page 38 Accessible databases and supported software)

■When handling "(Blank)" DB fields

- For the considerations when handling a DB field for which "(Blank)" was set, refer to the following manual.

📖 MELSEC iQ-R MES Interface Module User's Manual (Application)

5.5 Supported Software Packages

This section shows the software packages supported by each MES interface module.

| MES interface module | Software package | | Software version |
|----------------------|-------------------|--|-------------------|
| RD81MES96N | GX Works3 | | '1.060N' or later |
| | MX MESInterface-R | MES Interface Function Configuration Tool | '1.10L' or later |
| | | DB Connection Service and DB Connection Service Setting Tool | '1.00A' or later |
| RD81MES96 | GX Works3 | | '1.020W' or later |
| | MX MESInterface-R | MES Interface Function Configuration Tool | '1.00A' or later |
| | | DB Connection Service and DB Connection Service Setting Tool | '1.00A' or later |

6 WIRING

This chapter shows the method for connecting an Ethernet cable to an MES interface module.


For connectable Ethernet cables, refer to the following:

 Page 71 Ethernet (twisted pair) cable (sold separately)

6.1 Wiring of an Ethernet Cable

This section shows the procedures for connecting and disconnecting an Ethernet cable.

Connection procedure

1. Check the insertion direction, and insert an Ethernet cable into an Ethernet port of an MES interface module until it clicks.
2. Lightly pull the cable to check that it is securely connected.
3. Check the SPEED LED lighting status of the Ethernet port connected with the Ethernet cable. ( Page 15 PART NAMES)

Point

- The time required from when an Ethernet cable is connected to when the SPEED LED turns ON may vary. Normally, it turns ON in a few seconds. However, it may take longer because the linking-up processing is repeated due to the device condition on the line.
- When the SPEED LED does not turn ON, check if the connected Ethernet cable has any failure.
- The SPEED LED turns OFF when connecting with an Ethernet device on the network the data transmission speed of which is 10 Mbps. Check the communication status by performing the PING test, etc.

Disconnection procedure

Pull out the Ethernet cable while pinching a clip on the connector.

Considerations for 1000BASE-T/100BASE-TX connection

In a high-speed data communication (1 Gbps/100 Mbps) via 1000BASE-T/100BASE-TX connection, a communication error may occur due to the effect of high frequency noise generated from the equipment other than the MES interface module system, depending on the installation environment.

The following shows the measures to be taken on MES interface module side to prevent the influence of high frequency noise when configuring a network system.

- Do not bundle a cable with the main circuit or power cable, or do not place it near those lines.
- Place a cable in a duct.
- In the environment where a cable is susceptible to noise, use the STP cable.
- Change a target device connected with an MES interface module to one which communicates at 10 Mbps, and decrease the data transmission speed.

6.2 Wiring Precautions

- To establish a reliable system and fully use the functions of an MES interface module, a wiring that does not easily receive the effects of noise is required.
- Sufficient safety measures must be taken when constructing the IEEE802.3 1000BASE-T/100BASE-TX/10BASE-T networks.
Consult a specialist when handling the terminal processing of connection cable, installing trunk cables, etc.
- Use a cable compliant with IEEE802.3 1000BASE-T/100BASE-TX/10BASE-T standards. (☞ Page 71 Ethernet (twisted pair) cable (sold separately))
- For the connection on the target device side, check the specifications of the target device in advance.
- Place an Ethernet cable in a duct or clamp it.
Otherwise, the dangling cable may swing or inadvertently be pulled. It may cause an MES interface module or the cable to damage or malfunction due to poor contact.
- Protect the core wire in the connector of an Ethernet cable or a port of an MES interface module to prevent touching by hand and sticking dirt or dust.
If any oil from your hand, dirt or dust sticks the core wire, it may increase the transmission loss and fail a data link.
- Check if an Ethernet cable used is disconnected, a short-circuit is generated, and the connector is properly connected.
- Do not use an Ethernet cable with a broken clip.
Doing so may cause the unplugged cable or malfunction.
- Hold the connector of an Ethernet cable when connecting or disconnecting it.
If the cable is pulled while being connected to an MES interface module, it may cause the module or Ethernet cable to damage or malfunction due to poor contact.
- Attach the provided connector cover to protect an unused Ethernet port from dirt and dust.
- The maximum segment length of an Ethernet cable is 100 m. However, the length may be shorter depending on the use environment of the cable. For details, contact the manufacturer of the cable used.
- The bend radius of an Ethernet cable is limited. For details, check the specifications of the Ethernet cable used.

7 INSTALLATION AND UNINSTALLATION

This chapter shows the methods for installing and uninstalling each piece of execution software of MX MESInterface-R. For the software that can be installed, refer to the following:

☞ Page 67 Software configuration of MX MESInterface-R

Considerations for installation and uninstallation

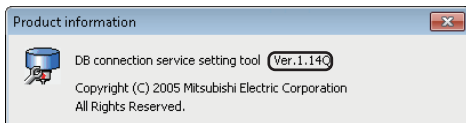
- Log on to a personal computer as a user with an administrator authority.
- Before the installation, end all running applications on the operating system.
If software is installed while other applications are running, the product may not run normally.
- Install the software after changing the setting to prevent starting the update program automatically.
The installer may not run normally if an update program for either operating system or software of other companies such as Windows Update and Java[®] update starts automatically.
- After completing the installation, the computer may need to be restarted.
If the restart message appears, restart the computer before using it.

■For installing MES Interface Function Configuration Tool

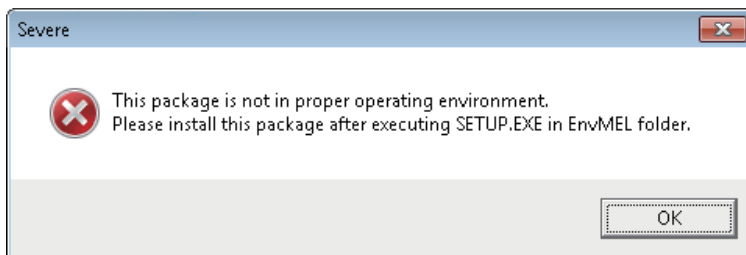
Use MX MESInterface-R the software version of which is '1.10L' or later when using an RD81MES96N.

■For installing DB Connection Service Setting Tool

- Use DB Connection Service Setting Tool the version of which is 1.14Q or later to connect to a MELSEC iQ-R series MES interface module.
The version can be checked by selecting [Help] ⇒ [Product information].



- If the following message appears, install DB Connection Service Setting Tool after executing 'SETUP.EXE' in the 'EnvMEL' folder in the DVD-ROM included in MX MESInterface-R.
If the "Program Compatibility Assistant" screen appears after completing the installation, select "This program installed correctly".



7.1 Installation Procedure

MX MESInterface-R

The following shows the procedure for installing MES Interface Function Configuration Tool, DB Connection Service, and DB Connection Service Setting Tool.

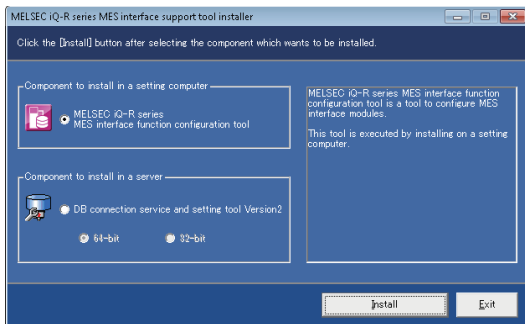
Project File Conversion Tool is automatically installed when MES Interface Function Configuration Tool is installed.

Operating procedure

1. Start the installer.

Double-click 'Setup.exe' in the DVD-ROM included in MX MESInterface-R.

2. Select the software to be installed, and click the [Install] button.



- When using the 32-bit version of Access for a database, select "32-bit."
- When selecting "64-bit", configure the ODBC setting which is supported by a 64-bit version DB connection service. (Page 53 ODBC setting for database)

3. Enter or select the necessary information according to the instructions shown in the screen.

Windows firewall setting

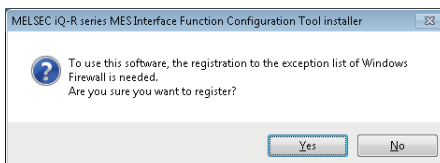
Perform any of the following operations when the firewall function of the operating system and the security software are enabled.

1 Set the following programs to the firewall exception.

For the setting methods, refer to the manuals and online help of the operating system or security software used.

| Program | Execution file storage destination (operating system is a 64-bit version) |
|---|---|
| MES Interface Function Configuration Tool*1 | • C:\Program Files(x86)\MELSOFT\RMESIF\RMIFConfigTool.exe |
| DB Connection Service Setting Tool*1 | • C:\Program Files\MELSOFT\MESIF\DBCnctConf2_64.exe or C:\Program Files(x86)\MELSOFT\MESIF\DBCnctConf2_32.exe • C:\MELSEC\MESIF\DBCnctConf.exe*2 |
| DB Connection Service*1 | • C:\Program Files\MELSOFT\MESIF\DBConnector2_64.exe or C:\Program Files(x86)\MELSOFT\MESIF\DBConnector2_32.exe • C:\MELSEC\MESIF\DBConnector.exe*2 • C:\Program Files\MELSOFT\MESIF\DBCnctClient2_64.exe or C:\Program Files(x86)\MELSOFT\MESIF\DBCnctClient2_32.exe • C:\MELSEC\MESIF\DBCnctClient.exe*2 |

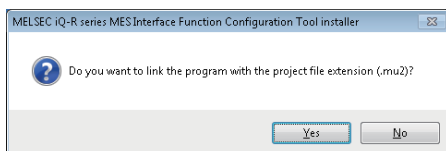
*1 This setting is not required when the [Yes] button is selected on the screen below.



*2 For MX MESInterface-R whose software version is "1.03D" or earlier is installed

2 Disable the firewall function.

■ Setting to associate the extension (.mu2) of project file and program



When the [No] button is selected on the screen above, MES Interface Function Configuration Tool does not open by double-clicking the project file with the extension (.mu2). Perform the following operation to open the project file.

Operating procedure

☞ [Project] ⇒ [Open] in the menu of MES Interface Function Configuration Tool

In another way, refer to the online help for an operating system and associate with a program.

Environment after installation

Each piece of software is installed to a specified folder and registered in the start menu.

The following table shows the startup method and the maximum number of software, which can start at the same time, for each piece of software after installing.

| Software | Startup method | Maximum No. |
|---|---|-------------|
| MES Interface Function Configuration Tool | Click [MELSOFT] ⇒ [MESInterface] ^{*2} ⇒ [(each piece of software)] from Windows Start ^{*1} . | 5 |
| DB Connection Service Setting Tool (64-bit) | | 1 |
| DB Connection Service Setting Tool (32-bit) | | 1 |
| Project File Conversion Tool | Click 'RMESIFCONVMU2toMU2.exe' under the execution file storage destination ^{*3} of the MES Interface Function Configuration Tool. | No limit |

*1 Select [All apps] in the Start screen or [Start] ⇒ [All Programs]/[All apps].

*2 Does not appear in Windows 8 or later.

*3 For 64-bit version operating system, it is installed in the following folder:
C:\Program Files(x86)\MELSOFT\RMESIF

7.2 Uninstallation Procedure

Uninstall from the control panel in Windows.

Project File Conversion Tool is automatically uninstalled when MES Interface Function Configuration Tool is uninstalled.

Disable the Windows firewall if it has been set manually.

For the method to disable the Windows firewall, refer to the manuals and online help of the operating system and the security software used.

Environment after uninstallation

The installed program files, folders, and start menu are deleted after uninstallation.

If a file, which is output after installation such as DB access log, exists in a folder, the file/folder will not be deleted.

8 OPERATION EXAMPLE

This chapter shows the operation example of simple data collection in a system configuration including an MES interface module.

8.1 Overview

The following shows the operation example based on a metal parts manufacturing line automated by a programmable controller system.

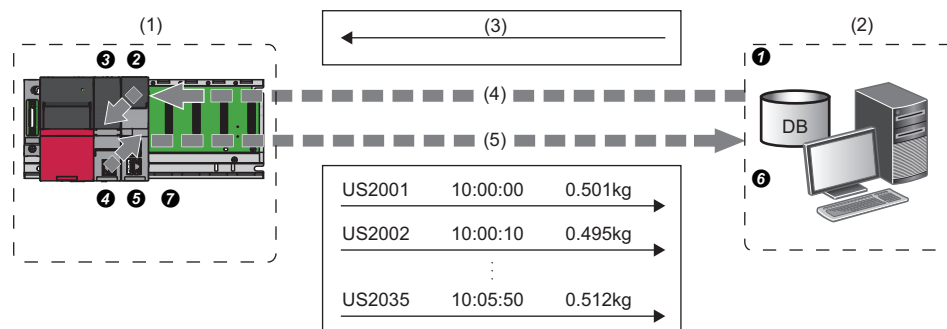
Process

Each process of the metal parts manufacturing line is shown below.

| Process | Description |
|------------|--|
| Machining | To machine metal materials and manufacture finished parts. |
| Imprint | To imprint a lot ID code and a specific serial number on each manufactured part. |
| Inspection | To measure the weight of each completed part. |

Operation

The following shows the operation between the control system and the production control database.



(1) Control system (CPU module, MES interface module)

(2) Production control database

(3) Target manufacturing number 35 units, lot ID code (US)

(4) Acquisition of manufacturing schedule information

(5) Delivering the actual manufacturing information

1. Acquire the manufacturing schedule information.

① Database → ② MES interface module → ③ CPU module

- MES interface module acquires the target manufacturing number and lot ID codes from the table of the production control database before starting the manufacture.
- The parts are manufactured according to the target manufacturing number.
The lot ID code is imprinted in front of the serial number on each part.

2. Deliver the actual manufacturing information.

④ CPU module → ⑤ MES interface module → ⑥ Database

- When each part is moved into the inspection process, the actual data, such as serial numbers, manufacturing time and part weight, are collected by MES interface module and transferred to the production control database.

3. Change the data to use easily.

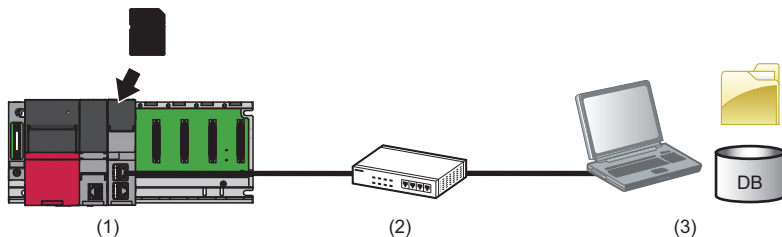
⑦ Scaling with MES interface module

- The inspection scale notifies the control system of the part weight measured by a positive decimal number in a gram.
The production report from the database information needs to be read in a kilogram.
Therefore, the weight data is converted to g→kg format with MES interface module to prevent control logic changes and extra processing at the database-level.

8.2 Setup

System configuration

This section shows the setting for configuring a sample system including the following devices and software.



| Device/Software | | Product name/description | Reference | | |
|------------------------------------|--|---|--|--|---|
| (1) | Programmable controller system | Main base unit | R35B | MELSEC iQ-R Module Configuration Manual Page 24 Accessible CPU modules — Page 71 SD memory card (sold separately, required) | |
| | | Power supply module | R61P | | |
| | | CPU module | R08CPU | | |
| | | MES interface module | RD81MES96 | | |
| | | SD memory card | NZ1MEM-nGBSD ('n' indicates a number of bytes.) | | |
| (2) | Twisted pair cable and hub | A cable and a hub compliant with IEEE802.3 1000BASE-T/100BASE-TX/10BASE-T standards | Page 71 Ethernet (twisted pair) cable (sold separately) | | |
| (3) | Personal computer (shared in a server and configuration personal computer) | | A personal computer on which Windows operates | Page 72 Operating Environment | |
| | Operating system | | Microsoft Windows 7 Professional Operating System (64-bit version) | | |
| | Relational database | | Microsoft Access 2010 (32-bit version) | | |
| | Engineering tool | GX Works3 | SWnDND-GXW3 ('n' indicates its version.) | | GX Works3 Installation Instructions GX Works3 Operating Manual |
| | MX MESInterface-R Configuration software | MES Interface Function Configuration Tool | SW1DND-RMESIF-E | | Page 67 Software configuration of MX MESInterface-R Page 78 INSTALLATION AND UNINSTALLATION |
| DB Connection Service | | | | | |
| DB Connection Service Setting Tool | | | | | |

- The IP address of an MES interface module is '192.168.3.3'.
- The IP address of a personal computer is '192.168.3.100'.

Point

To set a setting of an CPU module, connect a personal computer and the CPU module with a USB cable.

Device setup

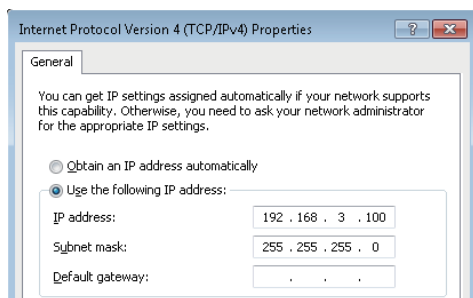
This section shows the setup procedures of devices.

Personal computer setting

Operating procedure

1. Install each piece of software (relational database/engineering tool/MX MESInterface-R).
2. Set the IP address of a personal computer to '192.168.3.100'.


This setting can be set on the "Internet Protocol Version 4 (TCP/IPv4) Properties" screen.




Programmable controller system setting

Operating procedure

1. Mount a power supply module, CPU module, and MES interface module on a main base unit.

 MELSEC iQ-R Module Configuration Manual

2. Insert an SD memory card into the MES interface module.

 Page 64 Insertion/removal method of an SD memory card

3. Set parameters and write them to the CPU module in the engineering tool.

 Page 62 Parameter setting

Point

For details on the parameter setting and programming in the engineering tool, refer to the following:

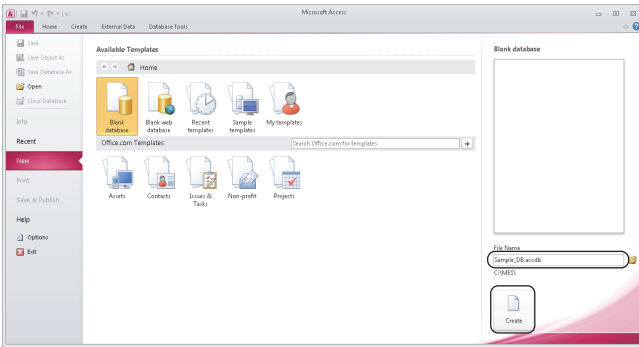
 GX Works3 Operating Manual

8.3 Creating a Database Table

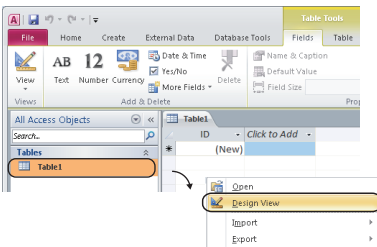
Before setting the ODBC setting and MES interface function setting, create two types of database table in Access 2010.

Database table creation procedure

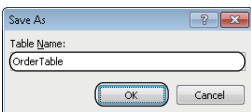
Creating a [OrderTable] table



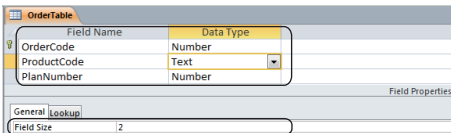
1. Start [Microsoft Access 2010] from Windows Start.
2. Select "New" on the [File] tab and enter 'Sample_DB.accdb' in the "File Name", then click the [Create] button.
In the operation example, the save location is 'C:\MES\'.



3. Right-click "Table 1" in the [Tables] and select [Design View] from the shortcut menu.

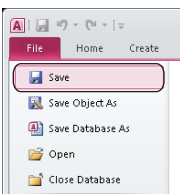


4. Enter 'OrderTable' in the "Table Name" and click the [OK] button.

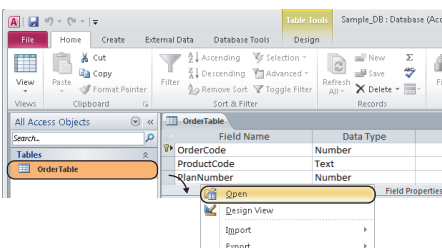


5. Set each setting item on the [OrderTable] tab and the [General] tab according to the following table.

| Field Name | Data Type | Field Size |
|-------------|-----------|------------|
| OrderCode | Number | Integer |
| ProductCode | Text | 2 |
| PlanNumber | Number | Integer |



6. Select "Save" on the [File] tab.



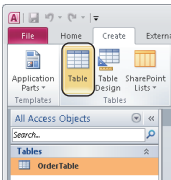
7. Right-click "OrderTable" in the [Tables] and select [Open] from the shortcut menu.

| OrderCode | ProductCode | PlanNumber |
|-----------|-------------|------------|
| 1 | EN | 20 |
| 2 | US | 35 |
| 3 | CN | 25 |

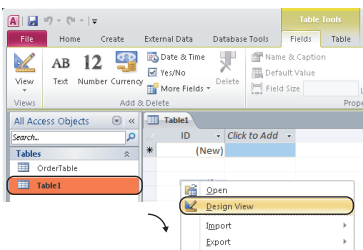
- Set each setting item on the [OrderTable] tab according to the following table.

| OrderCode | ProductCode | PlanNumber |
|-----------|-------------|------------|
| 1 | EN | 20 |
| 2 | US | 35 |
| 3 | CN | 25 |

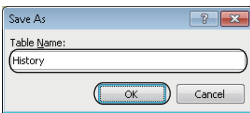
Creating a [History] table



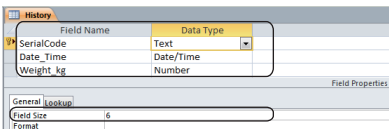
- Click "Table" on the [Create] tab.



- Right-click "Table 1" in the [Tables] and select [Design View] from the shortcut menu.

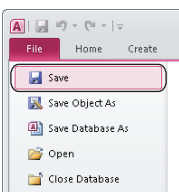


- Enter 'History' in the "Table Name" and click the [OK] button.



- Set each setting item on the [History] tab and the [General] tab according to the following table.

| Field Name | Data Type | Field Size |
|------------|-----------|------------|
| SerialCode | Text | 6 |
| Date_Time | Date/Time | — |
| Weight_kg | Number | Single |

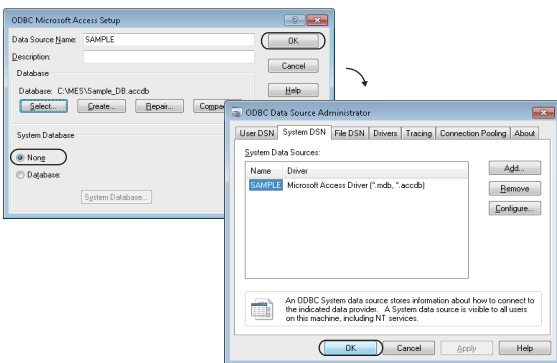
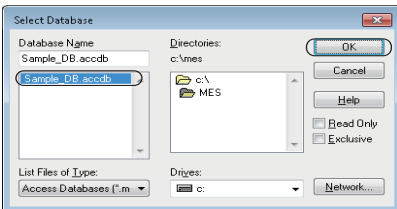
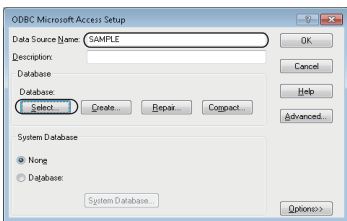
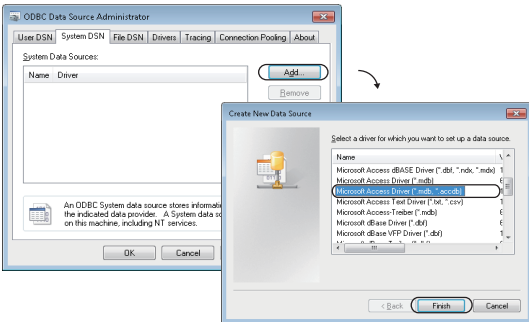
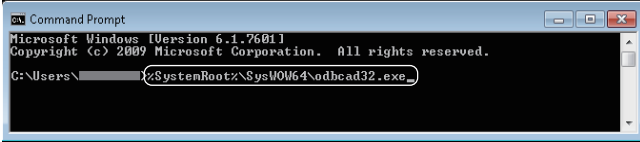


- Select "Save" on the [File] tab and end the database table setting.

8.4 ODBC Setting

This section shows the procedure for configuring the ODBC setting before setting parameters in MES Interface Function Configuration Tool.

ODBC setting procedure



1. Start the ODBC Data Source Administrator. Enter the following in the command prompt.
 - %SystemRoot%\SysWOW64\odbcad32.exe
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".

Point Any data source name can be set. The name set above is used for the data source name in the "Target Server Individual Settings" in the "Target Server Settings".

5. Select 'Sample_DB.accdb' in the "Data Source Name" and click the [OK] button.

Point The database name is for accessing to Access database. Specify a save destination for the created database tables.

6. Select "None" in the "System Database" and click the [OK] button.
7. Click the [OK] button on the "ODBC Data Source Administrator" screen to complete the ODBC setting.

8.5 MES Interface Function Setting

Data (SQL statement) communication can be performed without creating a program by setting the parameters of MES Interface Function Configuration Tool.

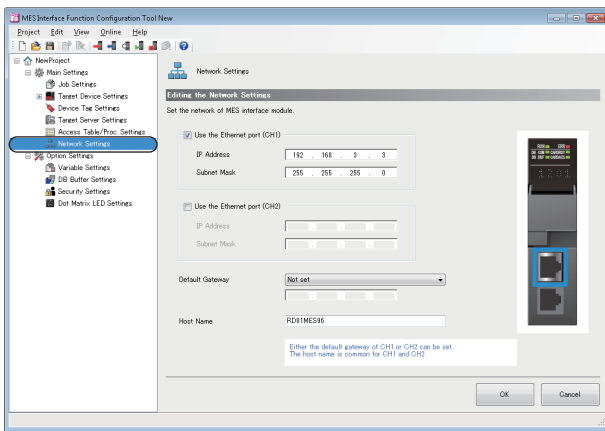
Parameter setting procedure

Starting MES Interface Function Configuration Tool



Select [Start] ⇒ [All Programs] ⇒ [MELSOFT] ⇒ [MESInterface] ⇒ [MELSEC iQ-R Series MES Interface Function Configuration Tool] from Windows Start.

Setting a network

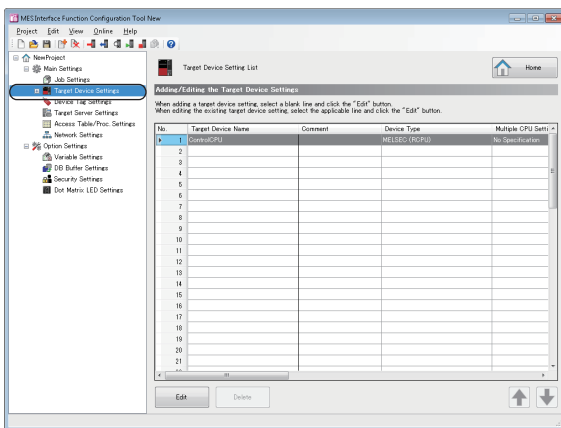


Select "Network Settings" in the edit item tree.



This setting is used as a default.

Setting a target device



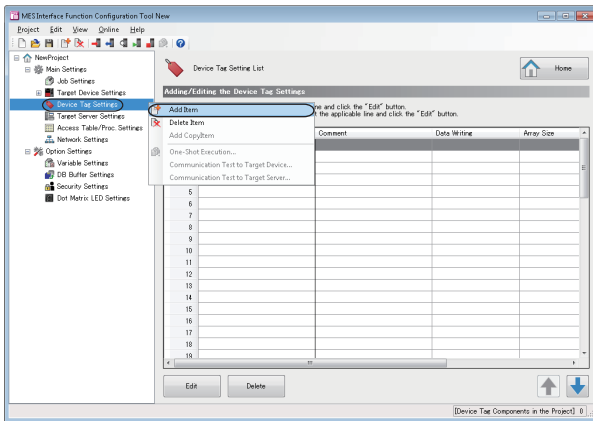
Select "Target Device Settings" in the edit item tree.



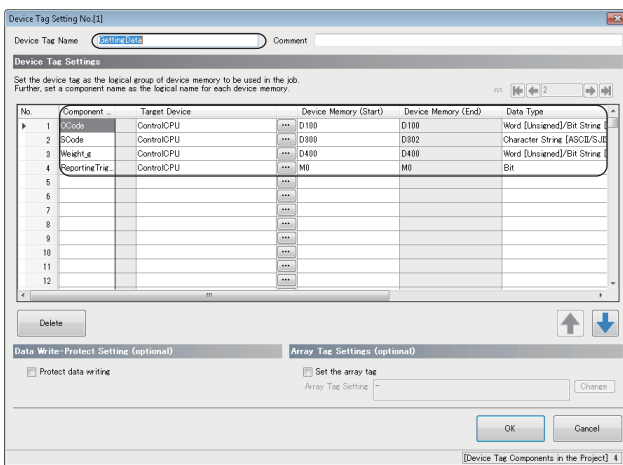
This setting is used as a default.

Setting device tags

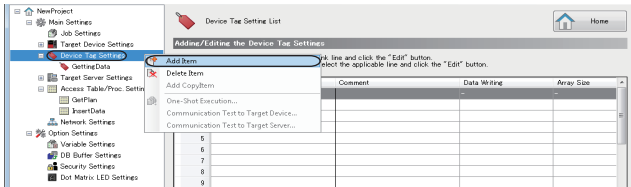
1. Right-click "Device Tag Settings" in the edit item tree, and select [Add Item] from the shortcut menu.



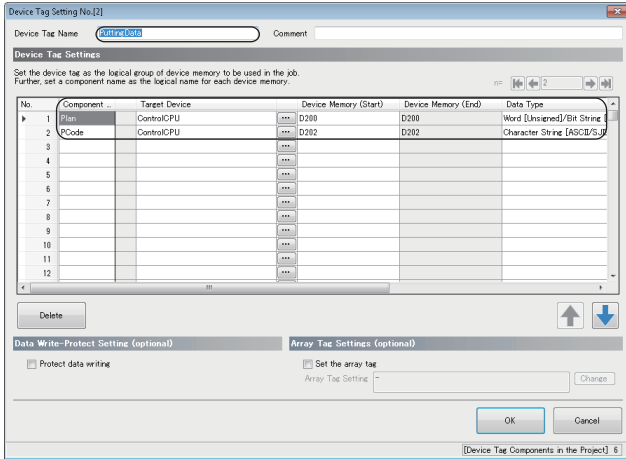
2. Enter 'GettingData' in the "Device Tag Name" and set each setting item according to the following table.



| Component Name | Target Device | Device Memory (Start) | Device Memory (End) | Data Type | Length |
|------------------|---------------|-----------------------|---------------------|-------------------------------------|--------|
| OCODE | ControlCPU | D100 | D100 | Word [Unsigned]/Bit String [16-bit] | — |
| SCode | ControlCPU | D300 | D302 | Character String [ASCII/SJIS] | 6 |
| Weight_g | ControlCPU | D400 | D400 | Word [Unsigned]/Bit String [16-bit] | — |
| ReportingTrigger | ControlCPU | M0 | M0 | Bit | — |



3. Add another device tag.

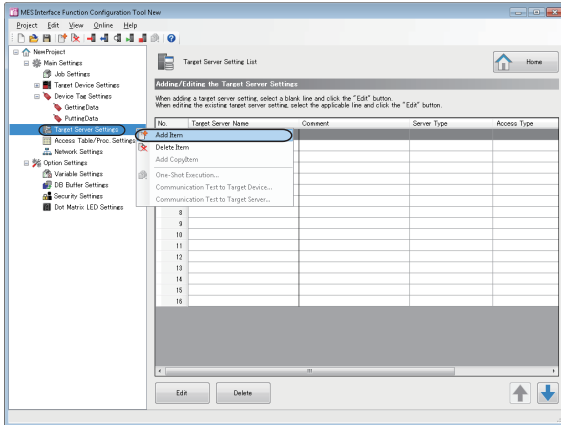


4. Enter 'PuttingData' in the "Device Tag Name" and set each setting item according to the following table.

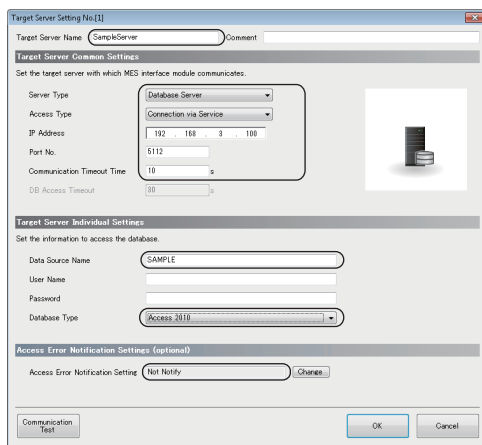
| Component Name | Target Device | Device Memory (Start) | Device Memory (End) | Data Type | Length |
|----------------|---------------|-----------------------|---------------------|-------------------------------------|--------|
| Plan | ControlCPU | D200 | D200 | Word [Unsigned]/Bit String [16-bit] | — |
| PCode | ControlCPU | D202 | D202 | Character String [ASCII/SJIS] | 2 |

Setting a target server

1. Right-click "Target Server Settings" in the edit item tree, and select [Add Item] from the shortcut menu.

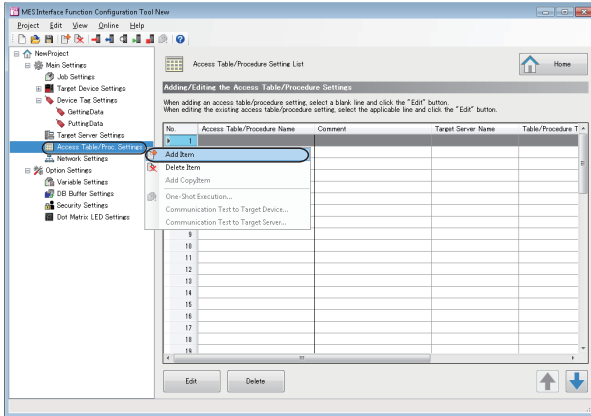


2. Enter 'SampleServer' in the "Target Server Name" and set each setting item according to the following table.

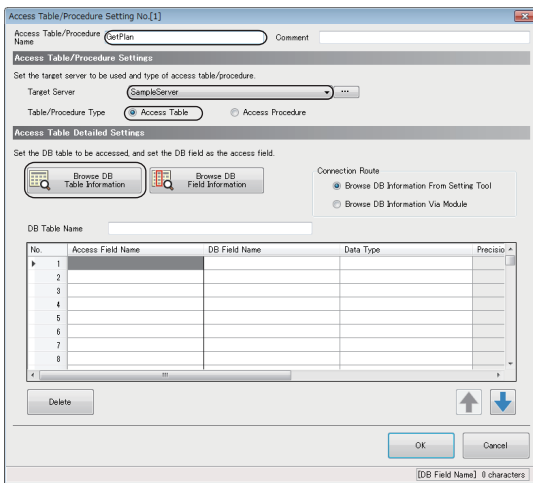


| Setting item | Setting content | |
|---|-----------------------------------|---|
| Target Server Name | SampleServer | |
| Target Server Common Settings | Server Type | Database Server |
| | Access Type | Connection via Service |
| | IP Address | 192.168.3.100 (Set the same IP address as the server.) |
| | Port No. | 5112 |
| | Communication Timeout Time | 10 |
| Target Server Individual Settings | Data Source Name | SAMPLE (Same name as the one set on the [System DSN] tab in the ODBC setting) |
| | User Name | — |
| | Password | — |
| | Database Type | Access 2010 |
| Access Error Notification Settings (optional) | Access Error Notification Setting | Not Notify |

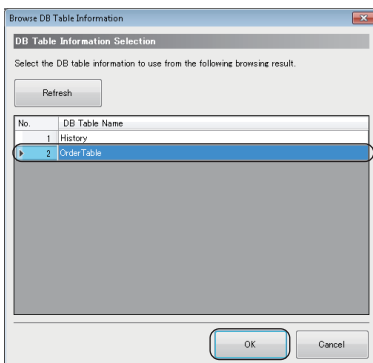
Setting access tables



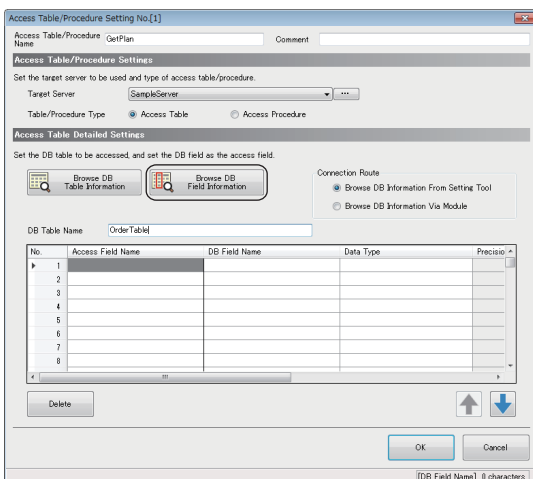
1. Right-click "Access Table/Proc. Settings" in the edit item tree, and select [Add Item] from the shortcut menu.



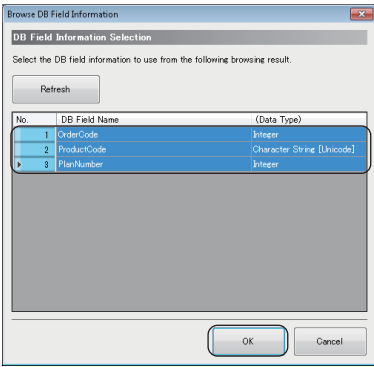
2. Enter 'GetPlan' in the "Access Table/Procedure Name".
3. Select "SampleServer" for "Target Server" under "Access Table/Procedure Settings," and select "Access Table" for "Table/Procedure Type."
4. Click the [Browse DB Table Information] button under "Access Table Detailed Settings."



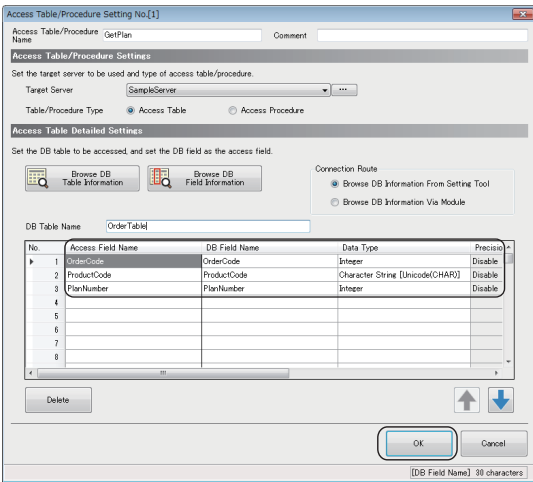
5. Select "OrderTable" and click the [OK] button.



6. Click the [Browse DB Field Information] button under "Access Table Detailed Settings."

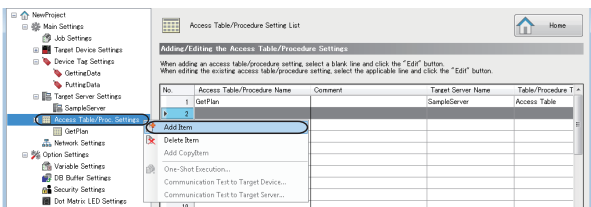


7. Select "OrderCode", "ProductCode", and "PlanNumber", and click the [OK] button.

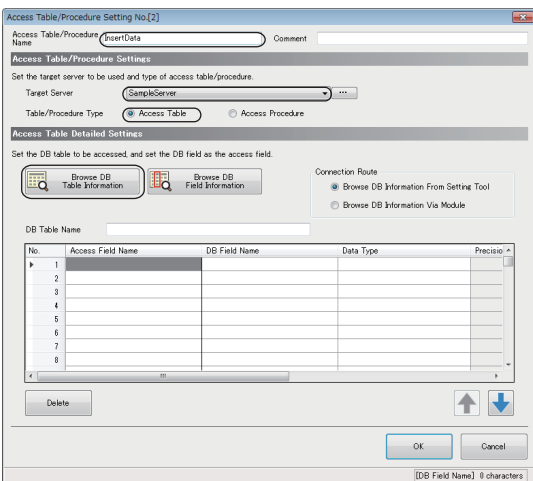


8. Set each setting item according to the following table and click the [OK] button.

| Access Field Name | DB Field Name | Data Type | Precision Hold | Default Value Setting | Default Value |
|-------------------|---------------|----------------------------------|----------------|-----------------------|---------------|
| OrderCode | OrderCode | Integer | Disable | Disable | — |
| ProductCode | ProductCode | Character String [Unicode(CHAR)] | Disable | Disable | — |
| PlanNumber | PlanNumber | Integer | Disable | Disable | — |



9. Add another access table/procedure.

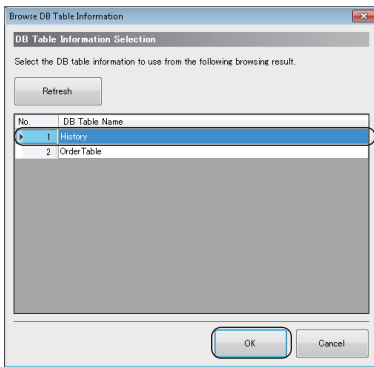


10. Enter 'InsertData' in the "Access Table/Procedure Name".

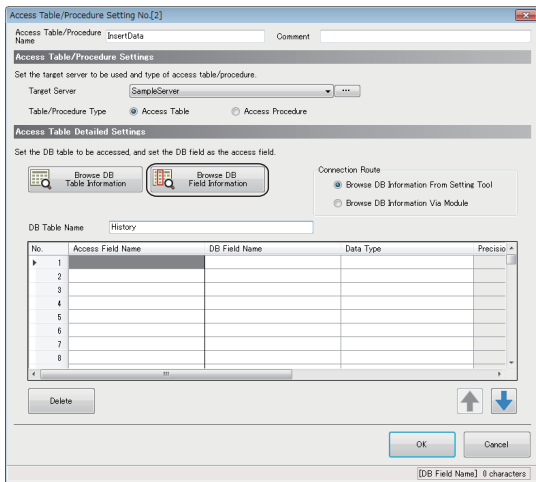
11. Select "SampleServer" for "Target Server" under "Access Table/Procedure Settings," and select "Access Table" for "Table/Procedure Type."

12. Click the [Browse DB Table Information] button under "Access Table Detailed Settings."

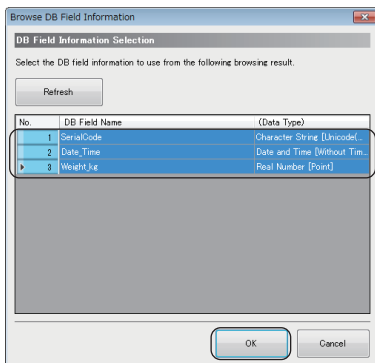
13. Select "History" and click the [OK] button.



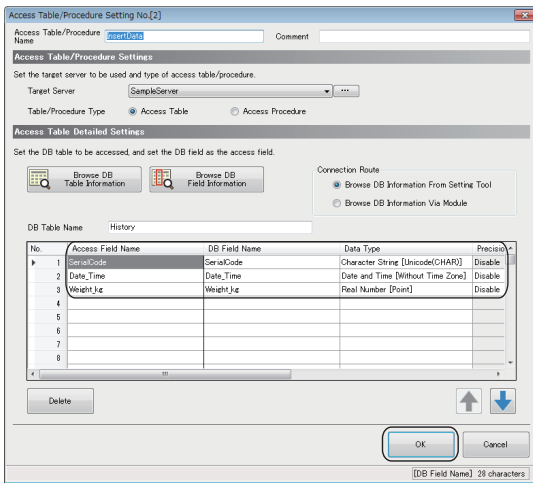
14. Click the [Browse DB Field Information] button under "Access Table Detailed Settings."



15. Select "SerialCode", "Date_Time", and "Weight_kg" and click the [OK] button.

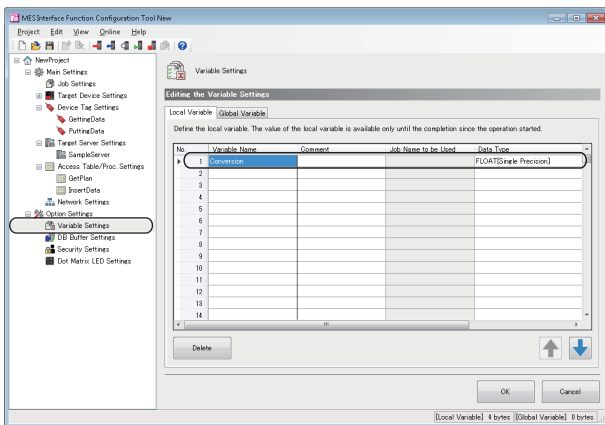


- Set each setting item according to the following table and click the [OK] button.



| Access Field Name | DB Field Name | Data Type | Precision Hold | Default Value Setting | Default Value |
|-------------------|---------------|-----------------------------------|----------------|-----------------------|---------------|
| SerialCode | SerialCode | Character String [Unicode(CHAR)] | Disable | Disable | — |
| Date_Time | Date_Time | Date and Time [Without Time Zone] | Disable | Disable | — |
| Weight_kg | Weight_kg | Real Number [Point] | Disable | Disable | — |

Setting a variable

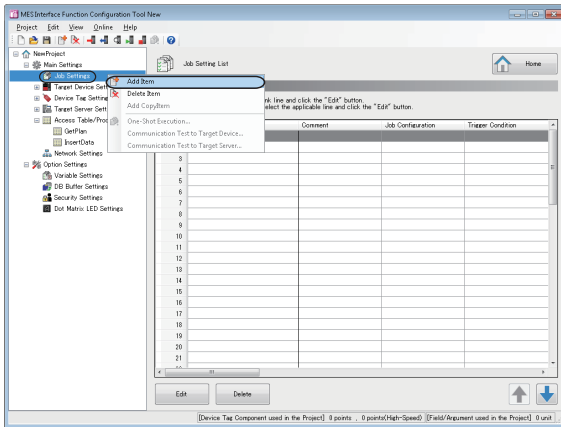


- Select "Variable Settings" in the edit item tree.
- Set a variable on the [Local Variable] tab according to the following table and click the [OK] button.

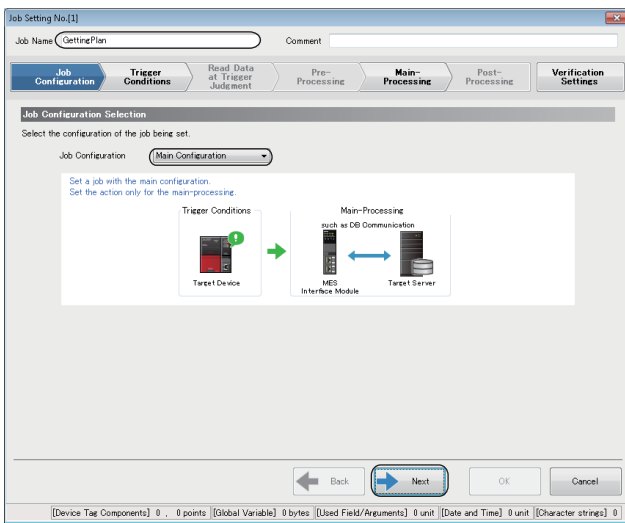
| Variable Name | Comment | Job Name to be Used | Data Type | Length |
|---------------|---------|---------------------|-------------------------|--------|
| Conversion | — | — | FLOAT[Single Precision] | — |

Setting jobs (GettingPlan)

■ Job Configuration



1. Right-click "Job Settings" in the edit item tree, and select [Add Item] from the shortcut menu.



2. Enter 'GettingPlan' in the "Job Name". Select "Main Configuration" in the "Job Configuration" in the "Job Configuration Selection" and click the [Next] button.

Trigger Conditions

Job Setting No.[1]

Job Name: GettingPlan

Comment:

Job Configuration | **Trigger Conditions** | Read Data at Trigger Judgment | Pre-Processing | Main-Processing | Post-Processing | Verification Settings

Trigger Condition Configuration Settings

Select the configuration of the trigger condition.

Configuration Type: **Single Event**

Condition Combination Type: **AND Combination**

Event/Condition Settings

Set each event/condition to be used at Trigger Judgment.

| No. | Event/Condition Type | Detail Type | Content |
|-----|----------------------|-------------|---------|
| 1 | Single Event | | |

Trigger Buffering Settings (optional)

Trigger Buffering: **Disable**

Buttons: Back, Next, OK, Cancel

Footer: [Device Tag Components] 0, [points] 0, [Global Variable] 0 bytes, [Used Field/Arguments] 0 unit, [Date and Time] 0 unit, [Character strings] 0

1. Set each setting item according to the following table and click the [Edit] button.

| Setting item | Setting content | |
|--|----------------------------|--------------|
| Trigger Condition Configuration Settings | Configuration Type | Single Event |
| | Condition Combination Type | — |
| Trigger Buffering Setting (optional) | Trigger Buffering | Disable |

Event/Condition Setting No.[1]

Event/Condition Type Common Settings

Select the event/condition type and the detail type.

Event/Condition: **Event (Module Monitoring)**

Detail Type: **MES Interface Module**

Event/Condition Type Individual Settings

Specify the timing to generate an event.

| | Event |
|---|-------------------------------------|
| At Startup of MES Interface Module | <input checked="" type="checkbox"/> |
| At Restart/Update of Settings of the MES Interface Function | <input checked="" type="checkbox"/> |

Buttons: OK, Cancel

2. Set each setting item according to the following table and click the [OK] button.

| Setting item | Setting content | |
|--|---|---------------------------|
| Event/Condition Type Common Settings | Event/Condition Type | Event (Module Monitoring) |
| | Detail Type | MES Interface Module |
| Event/Condition Type Individual Settings | At Startup of MES Interface Module | Select |
| | At Restart/Update of Settings of the MES Interface Function | Select |

Job Setting No.[1]

Job Name: GettingPlan

Comment:

Job Configuration | **Trigger Conditions** | Read Data at Trigger Judgment | Pre-Processing | **Main-Processing** | Post-Processing | Verification Settings

Trigger Condition Configuration Settings

Select the configuration of the trigger condition.

Configuration Type: **Single Event**

Condition Combination Type: **AND Combination**

Event/Condition Settings

Set each event/condition to be used at Trigger Judgment.

| No. | Event/Condition Type | Detail Type | Content |
|-----|---------------------------|----------------------|------------------------------------|
| 1 | Event (Module Monitoring) | MES Interface Module | At Startup; OR; At Restart (At...) |

Trigger Buffering Settings (optional)

Trigger Buffering: **Disable**

Buttons: Back, Next, OK, Cancel

Footer: [Device Tag Components] 0, [points] 0, [Global Variable] 0 bytes, [Used Field/Arguments] 0 unit, [Date and Time] 0 unit, [Character strings] 0

3. Click the [Next] button.

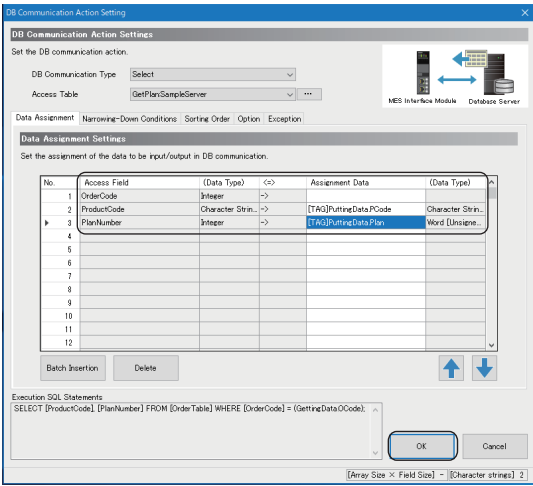
■ Main-Processing

| Setting item | | Setting content |
|--|---------------------------|-------------------------|
| Operation Settings at Main-Processing Failure (optional) | At Processing Failure | Notification: "Not Set" |
| DB Buffering Settings (optional) | DB Buffering | No Buffering |
| | DB Buffer Use Size [byte] | — |

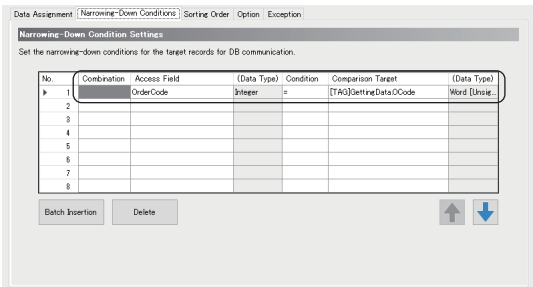
1. Set each setting item according to the following table and click the [Edit] button.

2. Click the [DB Communication Action] button in the "Action Type Selection".

3. Select "Select" for "DB Communication Type" under "DB Communication Action Settings," and select "GetPlan.SampleServer" for "Access Table."



- Set each setting item on the [Data Assignment] and the [Narrowing-Down Conditions] tab according to the following table, and click the [OK] button.



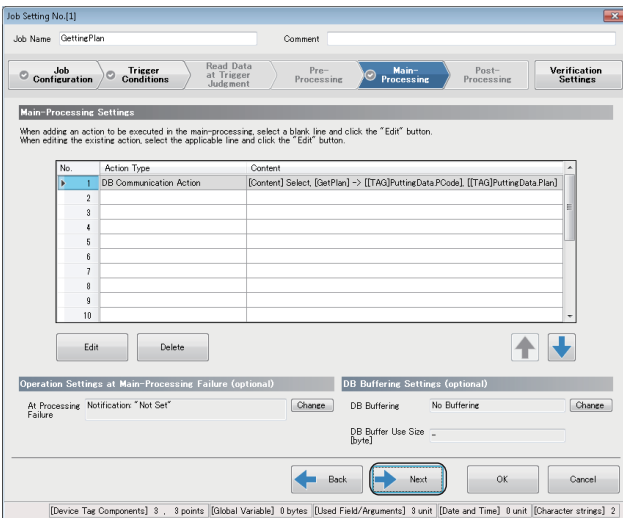
• Data Assignment Settings

| Access Field | (Data Type) | \leftrightarrow | Assignment Data | (Data Type) |
|--------------|----------------------------------|-------------------|------------------------|-------------------------------------|
| OrderCode | Integer | → | — | — |
| ProductCode | Character String [Unicode(CHAR)] | → | [TAG]PuttingData.PCode | Character String [ASCII/SJIS] |
| PlanNumber | Integer | → | [TAG]PuttingData.Plan | Word [Unsigned]/Bit String [16-bit] |

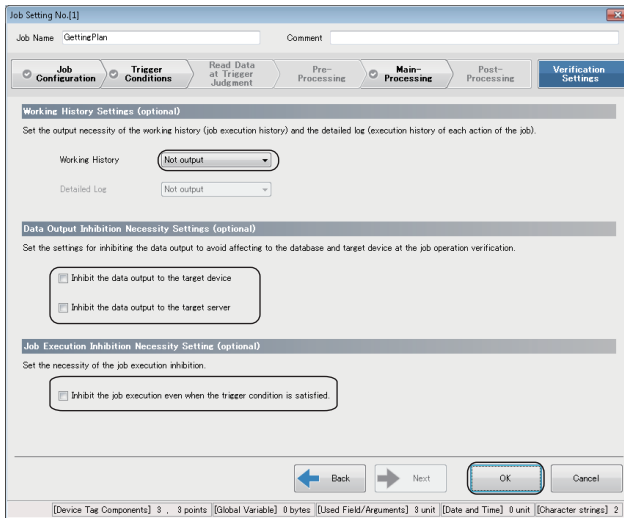
• Narrowing-Down Condition Settings

| Combination | Access Field | (Data Type) | Condition | Comparison Target | (Data Type) |
|-------------|--------------|-------------|-----------|------------------------|-------------------------------------|
| — | OrderCode | Integer | = | [TAG]GettingData.OCODE | Word [Unsigned]/Bit String [16-bit] |

- Click the [Next] button.



■ Verification Settings

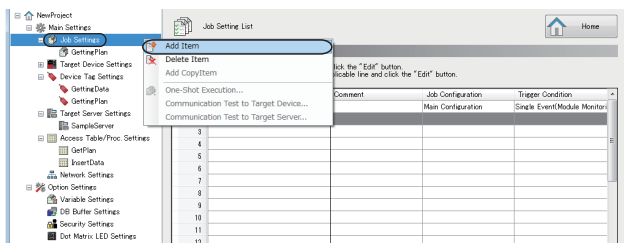


Set each setting item according to the following table and click the [OK] button.

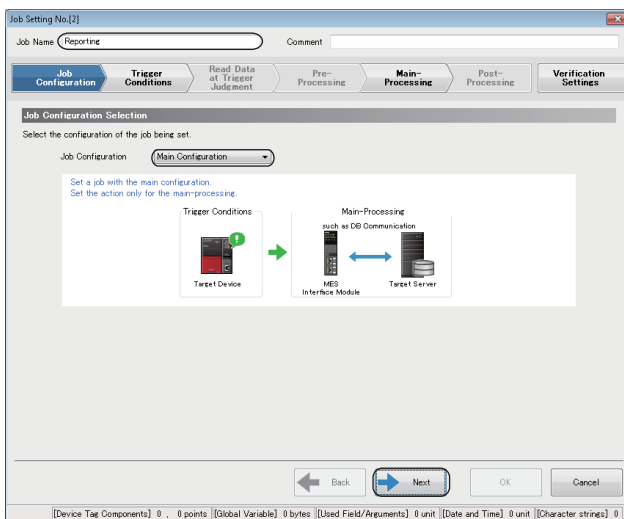
| Setting item | Setting content | Setting content |
|--|---|-----------------|
| Working History Settings (optional) | Working History | Not output |
| | Detailed Log | — |
| Data Output Inhibition Necessity Settings (optional) | Inhibit the data output to the target device | Unselected |
| | Inhibit the data output to the target server | Unselected |
| Job Execution Inhibition Necessity Settings (optional) | Inhibit the job execution even when the trigger condition is satisfied. | Unselected |

Setting jobs (Reporting)

■ Job Configuration



1. Right-click "Job Settings" in the edit item tree, and select [Add Item] from the shortcut menu.



2. Enter 'Reporting' in the "Job Name". Select "Main Configuration" in the "Job Configuration" in the "Job Configuration Selection" and click the [Next] button.

Trigger Conditions

Job Setting No.[2]

Job Name: Reporting Comment: _____

Job Configuration | **Trigger Conditions** | Read Data at Trigger Judgment | Pre-Processing | Main-Processing | Post-Processing | Verification Settings

Trigger Condition Configuration Settings

Select the configuration of the trigger condition.

Configuration Type: The timing of the specified event occurrence is considered as the satisfaction of the trigger condition. In the case of using the condition, the timing of the condition satisfaction is considered as the event occurrence.

Condition Combination Type:

Event/Condition Settings

Set each event/condition to be used at Trigger Judgment.

| No. | Event/Condition Type | Detail Type | Content |
|-----|----------------------|-------------|---------|
| 1 | | | |

Trigger Buffering Settings (optional)

Set the operation of the job whenever the trigger conditions are satisfied at the same time.

Trigger Buffering: When disabled, even if the trigger condition of the same job is satisfied again while executing the job, the satisfied trigger condition will be disabled.

[Device Tag Components] 0 / 0 points [Global Variable] 0 bytes [Used Field/Arguments] 0 unit [Date and Time] 0 unit [Character strings] 0

1. Set each setting item according to the following table and click the [Edit] button.

| Setting item | Setting content | |
|--|----------------------------|--------------|
| Trigger Condition Configuration Settings | Configuration Type | Single Event |
| | Condition Combination Type | — |
| Trigger Buffering Setting (optional) | Trigger Buffering | Disable |

Event/Condition Setting No.[1]

Event/Condition Type Common Settings

Select the event/condition type and the detail type.

Event/Condition: The value of monitoring target (device tag, variable, constant/macro) is compared and the result will be true or false of the condition.

Detail Type:

Event/Condition Type Individual Settings

Set the monitoring target, comparison target and condition that satisfy the condition.

| Monitoring Target | (Data Type) | Condition | Comparison Target | (Data Type) |
|-------------------------------|-------------|-----------|-------------------|-------------|
| [TAG]GettingData.Repor..._Bit | Bit | = | [INT]1 | |

2. Set each setting item according to the following table and click the [OK] button.

Point

"[INT]1" in the "Comparison Target" can be set on the "Integer Type Constant Settings" screen.

"Comparison Target" ⇒ "Constant" ⇒ "[Integer]"

Integer Type Constant Settings

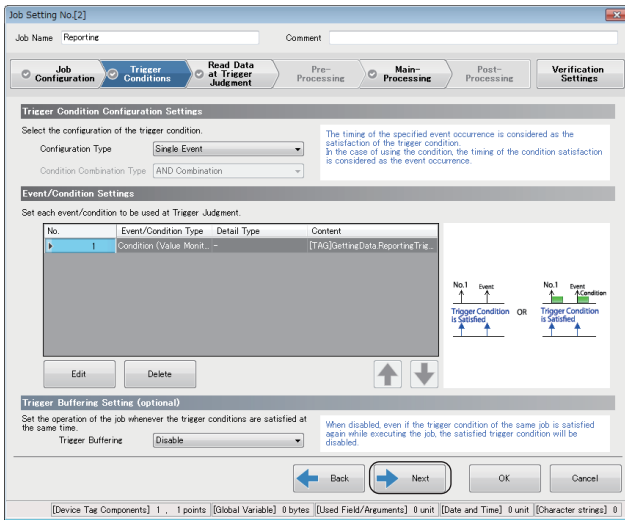
Integer Settings

Set the value of integer.

| Setting item | Setting content | |
|--|----------------------|-----------------------------------|
| Event/Condition Type Common Settings | Event/Condition Type | Condition (Value Monitoring) |
| | Detail Type | — |
| Event/Condition Type Individual Settings | Monitoring Target | [TAG]GettingData.ReportingTrigger |
| | (Data Type) | Bit |
| | Condition | = |
| | Comparison Target | [INT]1*1 |
| | (Data Type) | — |

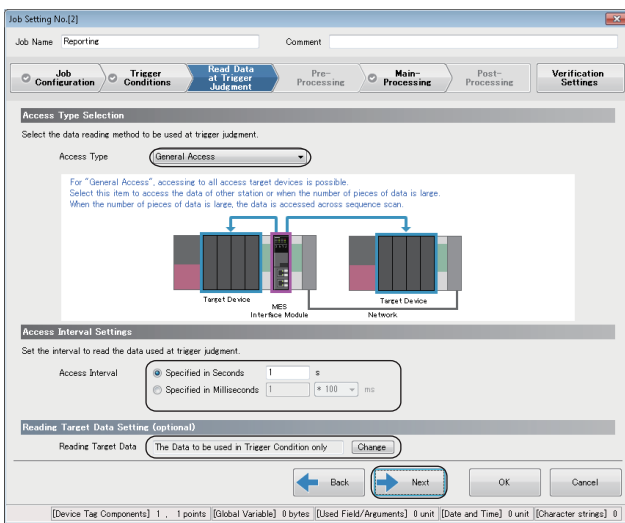
*1 When the data type of the monitoring target is "Bit", "[INT]1" in the comparison target indicates 'ON'.

3. Click the [Next] button.



■ Read Data at Trigger Judgment

Set each setting item according to the following table and click the [Next] button.



| Setting item | Setting content |
|--|--|
| Access Type Selection | Access Type General Access |
| Access Interval Settings | Access Interval Seconds Specification: '1' second |
| Reading Target Data Setting (optional) | Reading Target Data The Data to be used in Trigger Condition only |

■ Main-Processing

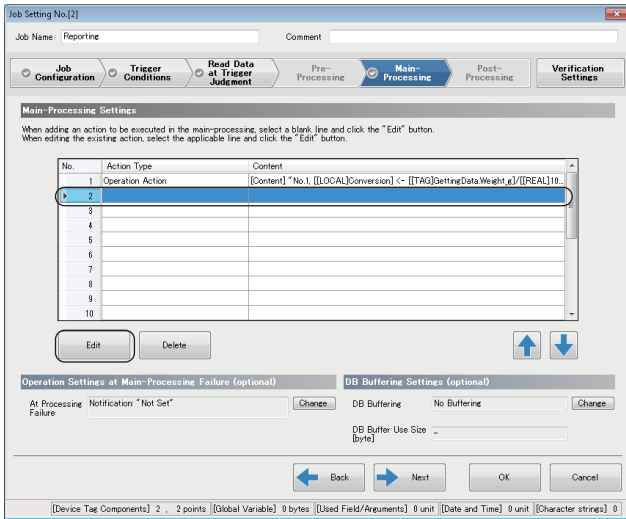
1. Set each setting item according to the following table and click the [Edit] button.

| Setting item | Setting content |
|--|--|
| Operation Settings at Main-Processing Failure (optional) | At Processing Failure Notification: "Not Set" |
| DB Buffering Settings (optional) | DB Buffering No Buffering |
| | DB Buffer Use Size — |

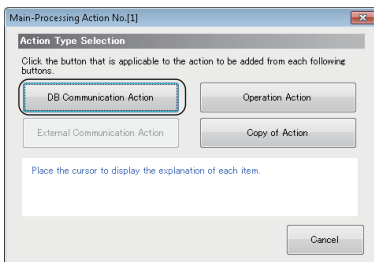
2. Click the [Operation Action] button in the "Action Type Selection".

3. Set an operation action according to the following table and click the [OK] button.

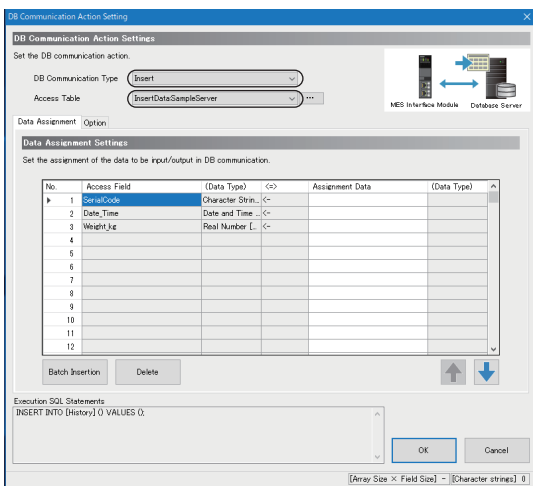
| Substitution Item | (Data Type) | ↔ | Operator | First Item | (Data Type) | Second Item | (Data Type) |
|-------------------|-------------------------|---|----------|---------------------------|-------------------------------------|-------------|-------------|
| [LOCAL]Conversion | FLOAT[Single Precision] | ← | ÷ | [TAG]GettingData.Weight_g | Word [Unsigned]/Bit String [16-bit] | [REAL]1000 | — |



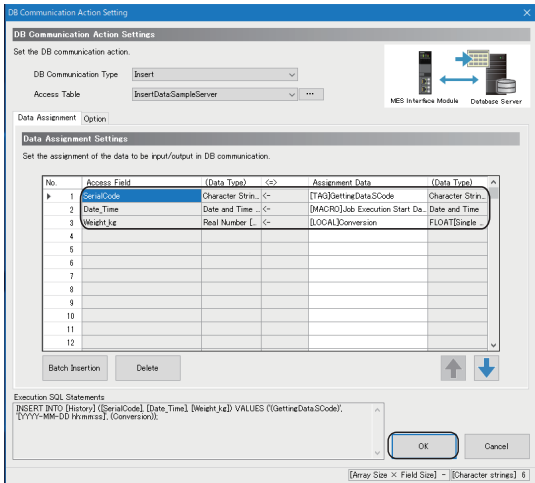
4. Add another action.



5. Click the [DB Communication Action] button in the "Action Type Selection".



6. Select "Insert" for "DB Communication Type" under "DB Communication Action Settings," and select "Insert.SampleServer" for "Access Table."

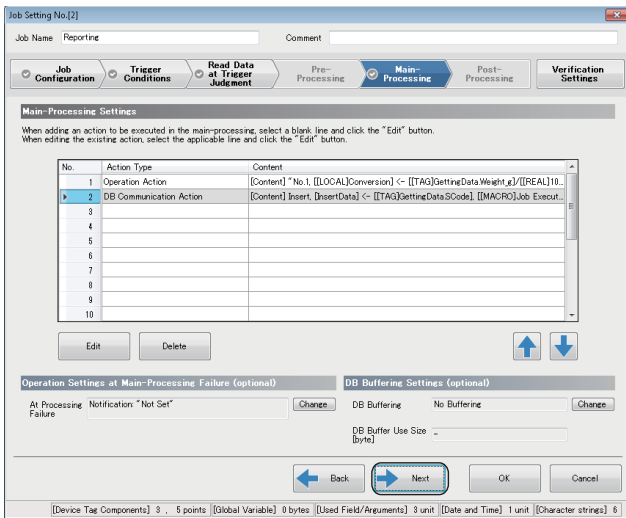


7. Set each setting item on the [Data Assignment] tab according to the following table and click the [OK] button.

• Data Assignment Settings

| Access Field | (Data Type) | ↔ | Assignment Data | (Data Type) |
|--------------|--------------------------------------|---|---|----------------------------------|
| SerialCode | Character String [Unicode(CHAR)] | ← | [TAG]GettingData.SCode | Character String [ASCII/SJIS] |
| Date_Time | Date and Time [Without Time Zone] | ← | [MACRO]Job Execution Start Date and Time | Date and Time |
| Weight_kg | Real Number [Point] | ← | [LOCAL]Conversion | FLOAT[Single Precision] |

8. Click the [Next] button.



■ Verification Settings

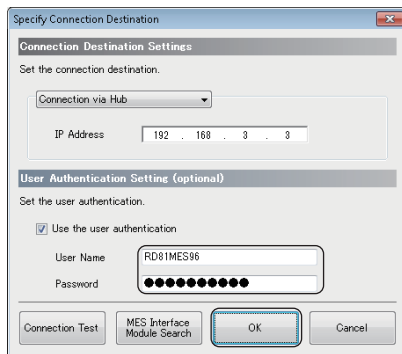
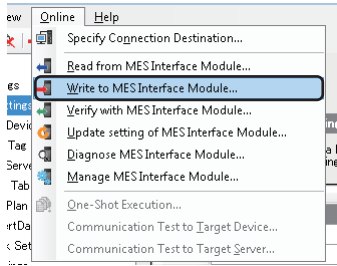
Set each setting item according to the following table and click the [OK] button.

| Setting item | | Setting content |
|--|---|-----------------|
| Working History Settings (optional) | Working History | Not output |
| | Detailed Log | — |
| Data Output Inhibition Necessity Settings (optional) | Inhibit the data output to the target device | Unselected |
| | Inhibit the data output to the target server | Unselected |
| Job Execution Inhibition Necessity Settings (optional) | Inhibit the job execution even when the trigger condition is satisfied. | Unselected |

Operation check

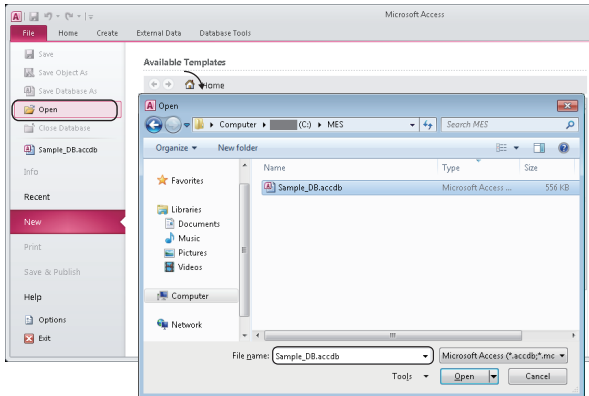
The following shows the writing procedure of parameters to MES interface module and checking procedure of the writing result to a DB table.

Writing procedure of parameters to MES interface module

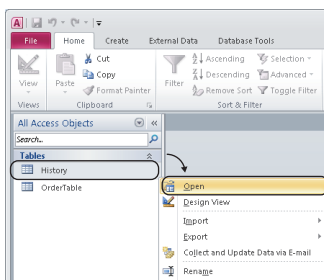


1. Select [Online] ⇒ [Write to MES Interface Module] in MES Interface Function Configuration Tool.
2. When the "Specify Connection Destination" screen appears, enter a user name and password, then click the [OK] button.
The following are set by default.
User Name: RD81MES96
Password: MITSUBISHI
3. After completing the writing, reset the CPU module and start MES interface module.
After resetting the CPU module, turn the status to RUN.
4. The parameters are written to the database automatically after starting MES interface module.

Checking procedure of a writing result to a DB table



1. Select "Open" in Access 2010 and open the "Sample_DB.accdb" file ("C:\MES\Sample_DB.accdb").



2. Right-click "History" in the [Tables] and select [Open] from the shortcut menu.

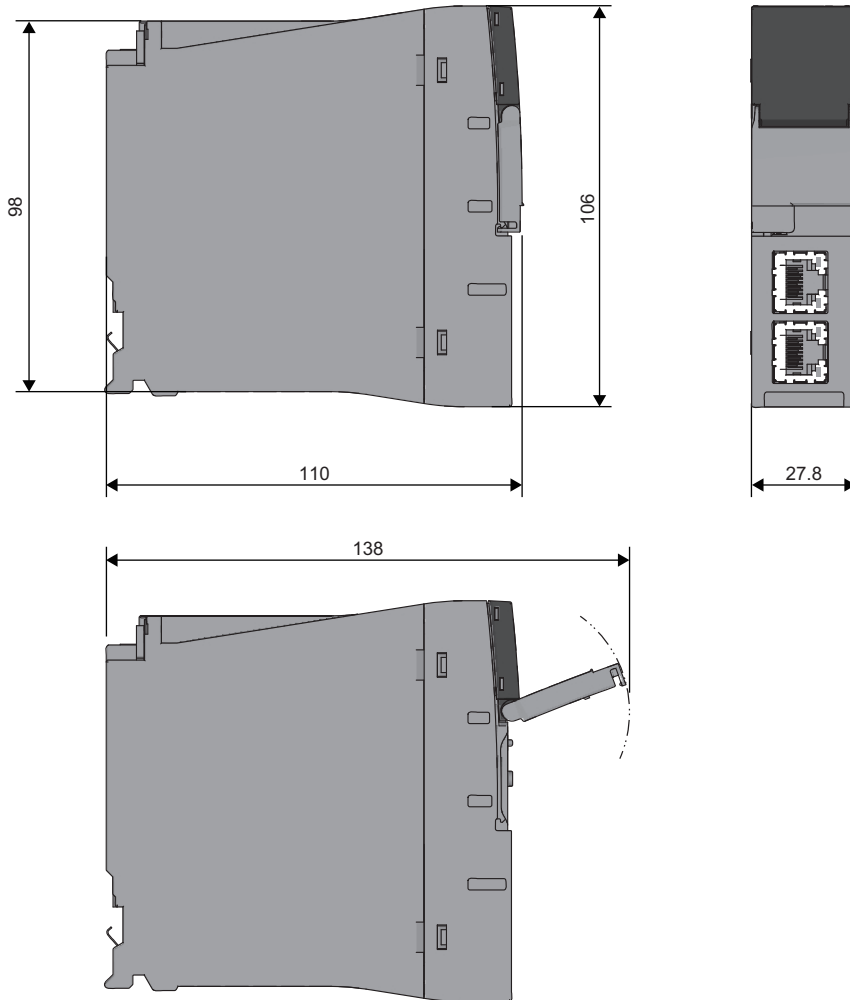
| SerialCode | Date_Time | Weight_kg |
|------------|----------------------|-----------|
| US2001 | 1/5/2016 10:56:17 AM | 0.491 |
| US2002 | 1/5/2016 10:56:27 AM | 0.508 |
| US2003 | 1/5/2016 10:56:37 AM | 0.511 |
| US2004 | 1/5/2016 10:56:47 AM | 0.5 |
| US2005 | 1/5/2016 10:56:57 AM | 0.505 |
| US2006 | 1/5/2016 10:57:07 AM | 0.496 |
| US2007 | 1/5/2016 10:57:17 AM | 0.503 |
| US2008 | 1/5/2016 10:57:27 AM | 0.496 |
| US2009 | 1/5/2016 10:57:37 AM | 0.505 |
| US2010 | 1/5/2016 10:57:47 AM | 0.5 |
| US2011 | 1/5/2016 10:57:57 AM | 0.511 |
| US2012 | 1/5/2016 10:58:07 AM | 0.508 |
| US2013 | 1/5/2016 10:58:17 AM | 0.491 |
| US2014 | 1/5/2016 10:58:27 AM | 0.49 |
| US2015 | 1/5/2016 10:58:37 AM | 0.505 |
| US2016 | 1/5/2016 10:58:47 AM | 0.506 |
| US2017 | 1/5/2016 10:58:57 AM | 0.515 |
| US2018 | 1/5/2016 10:59:07 AM | 0.518 |
| US2019 | 1/5/2016 10:59:17 AM | 0.507 |
| US2020 | 1/5/2016 10:59:27 AM | 0.512 |
| US2021 | 1/5/2016 10:59:37 AM | 0.503 |
| US2022 | 1/5/2016 10:59:47 AM | 0.51 |
| US2023 | 1/5/2016 10:59:57 AM | 0.503 |
| US2024 | 1/5/2016 11:00:07 AM | 0.504 |
| US2025 | 1/5/2016 11:00:17 AM | 0.499 |
| US2026 | 1/5/2016 11:00:27 AM | 0.51 |
| US2027 | 1/5/2016 11:00:37 AM | 0.507 |
| US2028 | 1/5/2016 11:00:47 AM | 0.49 |
| US2029 | 1/5/2016 11:00:57 AM | 0.511 |
| US2030 | 1/5/2016 11:01:07 AM | 0.496 |
| US2031 | 1/5/2016 11:01:17 AM | 0.497 |
| US2032 | 1/5/2016 11:01:27 AM | 0.514 |
| US2033 | 1/5/2016 11:01:37 AM | 0.509 |
| US2034 | 1/5/2016 11:01:47 AM | 0.498 |
| US2035 | 1/5/2016 11:01:57 AM | 0.503 |

3. The result (manufacturing information), which is inserted to a history table from MES interface module, can be checked.

APPENDIX

Appendix 1 External Dimensions

The following figures show the external dimensions of an MES interface module.



(Unit: mm)

A

Appendix 2 ODBC Setting

When using DB Connection Service on the database server, the ODBC setting for the database used is required to be set in advance.

The following shows the procedures for the ODBC setting.

For details on the setting method, refer to the manuals and online help of the operating system and the security software used.

To start the ODBC Data Source Administrator

Enter the following command in the command prompt in accordance with the software version of MX MESInterface-R and the bit version of DB Connection Service to be used.

| Software version | Bit version of DB Connection Service | Command |
|--------------------|--------------------------------------|--------------------------------------|
| '1.03D' or earlier | — | "%SystemRoot%\SysWOW64\odbcad32.exe" |
| '1.04E' or later | 32-bit | |
| | 64-bit | "%SystemRoot%\system32\odbcad32.exe" |

Oracle

The following shows the setting example of ODBC setting in the environment written below.

| Item | Description |
|---------------------|---|
| Operating system | Microsoft Windows 7 Professional Operating System |
| Relational database | Oracle 12c |
| Data source name*1 | SAMPLE |
| TNS Service Name*2 | SAMPLETNS |
| OracleHome | OraClient12Home1 |

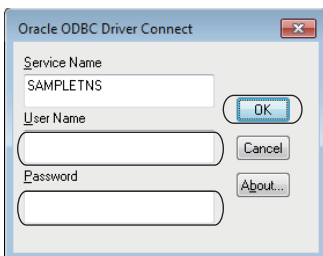
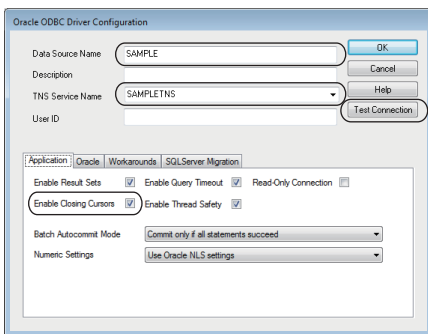
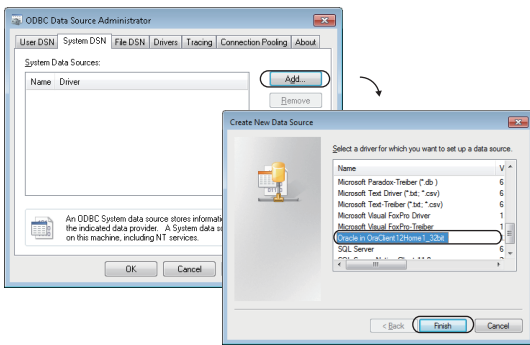
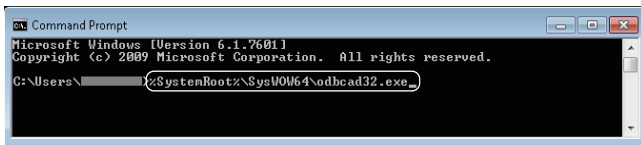
*1 A data source name can be set arbitrary.

The name set above is used in the "Data Source Name" in the "Target Server Individual Settings" on the "Target Server Settings".

*2 The TNS service name is for accessing to the database of Oracle.

It is the one entered when installing Oracle or creating database instances.

It can be checked by selecting [Configuration and Migration Tools] ⇒ [Net Manager] ⇒ "Service Naming" in the Oracle attachment tool.



1. Start the ODBC Data Source Administrator.

Page 110 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.



SQL Server

The following shows the setting example of ODBC setting in the environment written below.

| Item | Description |
|---------------------|---|
| Operating system | Microsoft Windows 7 Professional Operating System |
| Relational database | Microsoft SQL Server 2012 |
| Data source name*1 | SAMPLE |
| Server name*2 | SAMPLESRV |

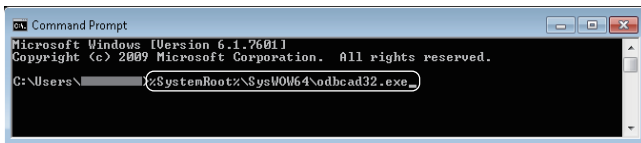
*1 A data source name can be set arbitrary.

The name set above is used in the "Data Source Name" in the "Target Server Individual Settings" on the "Target Server Settings".

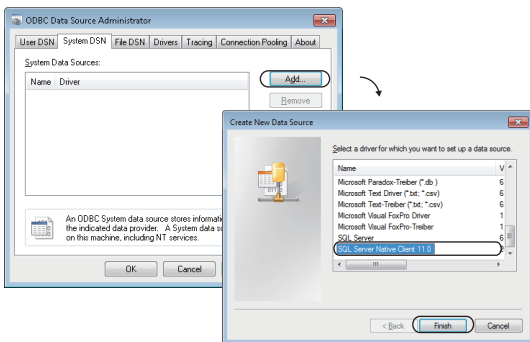
*2 The server name is for accessing to the database of Microsoft SQL Server 2012.

It is the one entered when installing Microsoft SQL Server 2012.

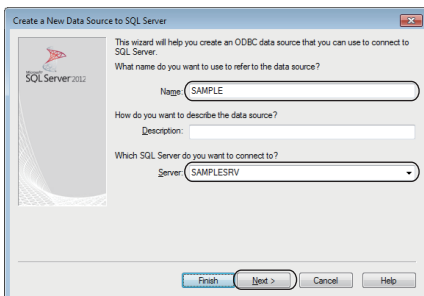
It can be checked in SQL Sever Management Studio.



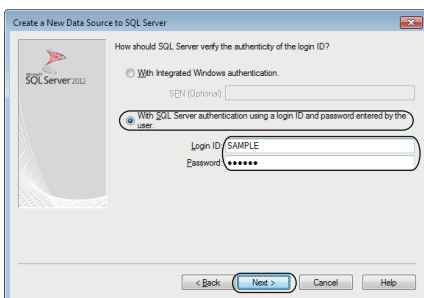
1. Start the ODBC Data Source Administrator.
 ➔ Page 110 To start the ODBC Data Source Administrator



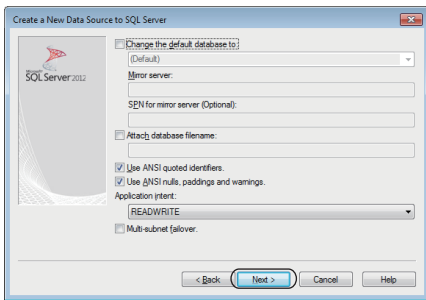
2. Select the [System DSN] tab and click the [Add] button.
3. Select "SQL Server Native Client 11.0", and click the [Finish] button.



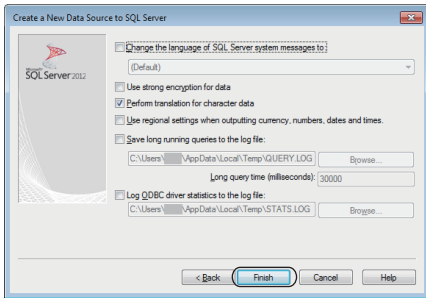
4. Set the following items and click the [Next] button.
 - Data source name: SAMPLE
 - Server name: SAMPLESRV



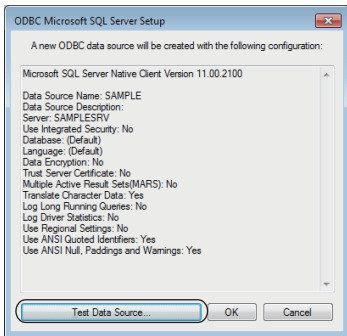
5. Select "With SQL Server authentication using a login ID and password entered by the user.", enter the login ID and password, and click the [Next] button.



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.



Access

The following shows the setting example of ODBC setting in the environment written below.

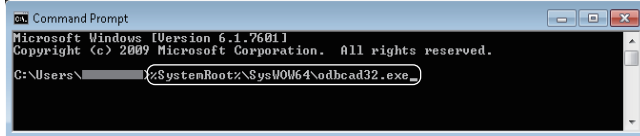
| Item | Description |
|---------------------|---|
| Operating system | Microsoft Windows 7 Professional Operating System |
| Relational database | Microsoft Access 2010(32bit) |
| Data source name*1 | SAMPLE |
| Database name*2 | C:\MES\Sample_DB.accdb |

*1 A data source name can be set arbitrary.

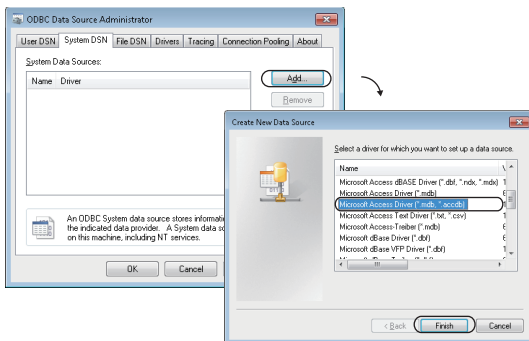
The name set above is used in the "Data Source Name" in the "Target Server Individual Settings" on the "Target Server Settings".

*2 The database name is for accessing to the database of Microsoft Access.

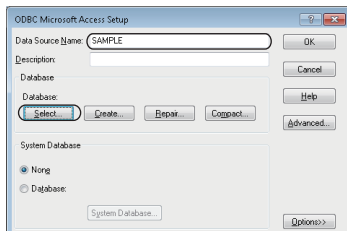
Specify the file path of the database created with Microsoft Access.



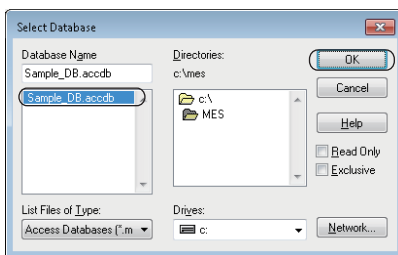
1. Start the ODBC Data Source Administrator.
 Page 110 To start the ODBC Data Source Administrator



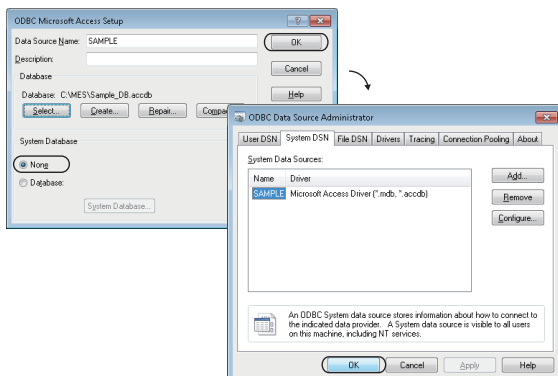
2. Select the [System DSN] tab and click the [Add] button.
3. Select "Microsoft Access Driver(*.mdb, *.accdb)", and click the [Finish] button.



4. Enter 'SAMPLE' in the "Data Source Name" and click the [Select] button in the "Database".



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.


MySQL

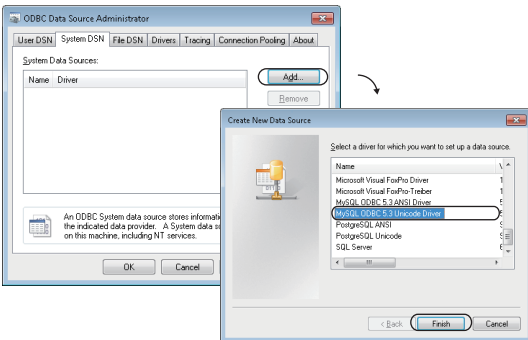
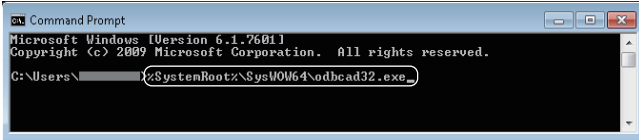
The following shows the setting example of ODBC setting in the environment written below.

| Item | Description |
|---------------------|---|
| Operating system | Microsoft Windows 7 Professional Operating System |
| Relational database | MySQL |
| Data source name*1 | SAMPLE |

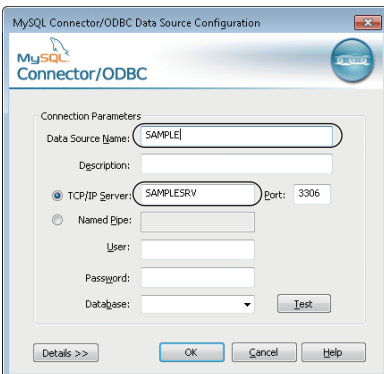
*1 A data source name can be set arbitrary.

The name set above is used in the "Data Source Name" in the "Target Server Individual Settings" on the "Target Server Settings".

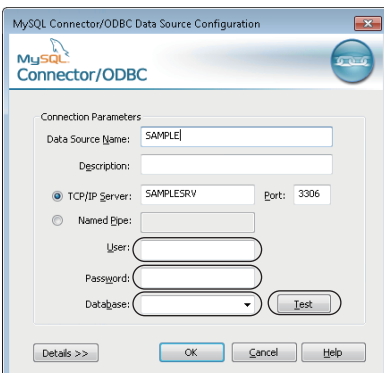
1. Start the ODBC Data Source Administrator.
 Page 110 To start the ODBC Data Source Administrator



2. Select the [System DSN] tab and click the [Add] button.
3. Select "MySQL ODBC 5.3 Unicode Driver", and click the [Finish] button.



4. Set the following items.
 - Data Source Name: SAMPLE
 - TCP/IP Server: SAMPLESRV



5. Enter the user name and password, and select a database to be used.
6. Click the [Test] button, and check if the connection can be established normally.
7. Click the [OK] button on the "MySQL Connector/ODBC Data Source Configuration" screen.
8. Click the [OK] button on the "ODBC Data Source Administrator" screen.




PostgreSQL

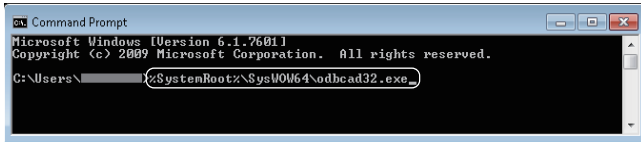
The following shows the setting example of ODBC setting in the environment written below.

| Item | Description |
|---------------------|---|
| Operating system | Microsoft Windows 7 Professional Operating System |
| Relational database | PostgreSQL |
| Data source name*1 | SAMPLE |

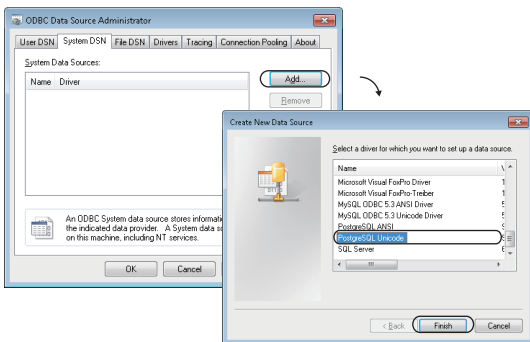
*1 A data source name can be set arbitrary.

The name set above is used in the "Data Source Name" in the "Target Server Individual Settings" on the "Target Server Settings".

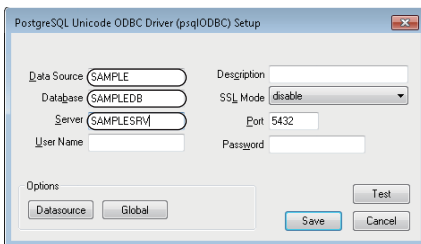
1. Start the ODBC Data Source Administrator.
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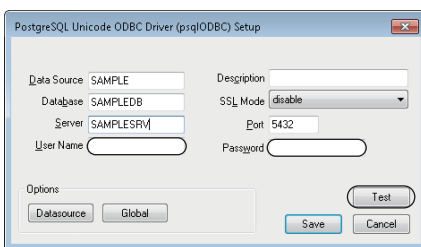
2. Select the [System DSN] tab and click the [Add] button.
3. Select "PostgreSQL Unicode", and click the [Finish] button.



4. Set the following items.
 - Data source name: SAMPLE
 - Server name: SAMPLESRV
 - Database name: SAMPLEDB



5. Enter the user name and password, and click the [Test] button.
6. When the connection is established normally, the "Testing Connection" screen will appear.
7. Click the [Save] button on the "PostgreSQL Unicode ODBC Driver (psqlODBC) Setup" screen.
8. Click the [OK] button on the "ODBC Data Source Administrator" screen.



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REVISIONS

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

| Revision date | *Manual number | Description |
|----------------|--------------------|---|
| December 2015 | SH(NA)-081422ENG-A | First edition |
| July 2016 | SH(NA)-081422ENG-B | ■Added or modified parts TERMS, Chapter 2, Section 4.1, Section 4.2, Section 5.1, Section 5.2, Section 5.3, Appendix 2 |
| September 2016 | SH(NA)-081422ENG-C | ■Added or modified parts TERMS, Section 4.1, Section 4.2, Section 5.2, Section 5.3, Section 7.1 |
| March 2017 | SH(NA)-081422ENG-D | ■Added or modified parts SAFETY PRECAUTIONS, Section 2.1, Section 2.3, Section 2.4, Section 3.3, Section 4.1, Section 4.2, Section 4.3, Section 5.1, Section 5.2, Section 5.3, Section 7.1, Section 8.5, Appendix 2 |
| May 2017 | SH(NA)-081422ENG-E | ■Added or modified part Section 2.3 |
| October 2017 | SH(NA)-081422ENG-F | ■Added functions REST server function, project file conversion function ■Added or modified parts Section 2.3, Section 3.1, Section 3.2, Section 3.3, Section 3.6, Section 4.2, Section 5.1, Section 5.2, Section 5.3, Chapter 7, Section 8.5 |
| October 2017 | SH(NA)-081422ENG-G | ■Added or modified part Section 2.2 |
| May 2018 | SH(NA)-081422ENG-H | ■Added or modified part Section 5.3 |
| August 2018 | SH(NA)-081422ENG-I | ■Added or modified part Section 2.3 |
| October 2019 | SH(NA)-081422ENG-J | ■Added or modified parts TERMS, Chapter 1, Section 2.1, Section 2.2, Section 2.3, Section 2.4, Section 3.2, Section 3.3, Section 4.1, Section 4.2, Section 4.3, Section 5.1, Section 5.2, Section 5.4, Chapter 7, Section 8.5 |
| April 2020 | SH(NA)-081422ENG-K | ■Added or modified parts Section 2.1, Section 2.2 |
| March 2022 | SH(NA)-081422ENG-L | ■Added or modified parts SAFETY PRECAUTIONS, CONDITIONS OF USE FOR THE PRODUCT, DISCONTINUED MODEL, Section 2.1, Section 2.2, Section 2.3 |

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- (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
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MODEL CODE: 13JX23

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HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS : 1-14, YADA-MINAMI 5-CHOME, HIGASHI-KU, NAGOYA, JAPAN

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