

Industrial PC

MELIPC

MELIPC MI5000 Series User's Manual (Startup)

-MI5122-VW
-MI5A1P
-MI5122
-MI5FAN

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. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

The precautions given in this manual are concerned with this product only.

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 product to ensure that the entire system operates safely even when a fault occurs in the external power supply or the product. 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 product.
 - (2) When the product 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 product detects an error such as a watchdog timer error.
 - Configure a circuit so that the product 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.
 - Before performing operations for the product from the peripheral connected, read the relevant manuals carefully and ensure the safety.
-

[Design Precautions]

CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Doing so may result in malfunction due to electromagnetic interference. Keep a distance of 100mm or more between those cables.
 - When selecting fuses and breakers for external circuits, consider the specification values of fusing/detection characteristics and inrush current.
 - When using an uninterruptible power supply (UPS), do not use the one that outputs square waves.
-

[Security Precautions]

WARNING

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

[Installation Precautions]

CAUTION

- Use the product in an environment that meets Page 117 General specifications in this manual. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
 - To mount a power supply module, place the concave parts located at the bottom onto the guides of the main module, and push in the power supply module until the hooks located at the top snaps into place. Incorrect interconnection may cause malfunction, failure, or drop of the module.
 - When using the product in an environment of frequent vibrations, fix the power supply module with a screw.
 - Tighten the screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
 - To connect a fan module, set the fan module at the correct position of the main module, and push in the fan module until the fan module fixing hook snaps into place. Check that the fan module fixing hook is fixed to the main module securely. If the fan module is not connected properly, the fan may not rotate or it may cause malfunction due to rise in temperature of the main module.
 - To disconnect a fan module, securely press the fan module fixing hook with your finger. Then, pull the module forward while pressing the hook.
 - Do not touch the exposed heatsink after removing the fan module. The heatsink is very hot immediately after the power is switched off and may cause burns. Additionally, touching the heat sink may deform it and decrease cooling efficiency.
 - Do not apply shock such as falling and dropping to the fan module during transportation. Doing so may result in damage to the product or deterioration in performance.
 - When using a CFast card, fully insert it into the CFast card slot. Check that it is inserted completely. Poor contact may cause malfunction.
 - Place hands to hold a CFast card when removing it from the slot because the card may be jumped out. If not placing hands, the card may fall, resulting in damage or failure.
 - Do not directly touch any conductive parts and electronic components of the module or CFast card. Doing so can cause malfunction or failure of the module.
 - Do not remove the protecting sheets attached to the plate of the base part. For this plate, it may raise to high temperature cause combined with heat-sink. So do not remove or touch this sheets when module is operating and turning off the power supply to prevent a burn.
-

[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, close the terminal cover 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 product 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 power supply module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause fire or failure.
 - Solderless terminals must be crimped with the tool specified by the manufacturer. Incomplete crimping may cause short circuit, fire, or malfunction.
 - Securely connect the connector of an external device to the product. Poor contact may cause malfunction.
 - Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm or more between them. Failure to do so may result in malfunction due to noise.
 - Place the cables in a duct or clamp them. (Cable ties made of nylon can be used as well.) If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.
 - 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.
 - Prevent foreign matter such as dust or wire chips from entering the product. 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 product during wiring. Do not remove the film during wiring. Remove it for heat dissipation before system operation.
 - When disconnecting the cable from the product, 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.
 - The product 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 Page 156 Wiring in this manual.
-

[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.
 - 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.
-

[Startup and Maintenance Precautions]

CAUTION

- Do not disassemble or modify the product. 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) 25cm or more away in all directions from the product. Failure to do so may cause malfunction.
 - Shut off the external power supply (all phases) used in the system before mounting or removing the product. Failure to do so may cause the product to fail or malfunction.
 - Do not touch any part of your body or contact any object to the rotating fan. Doing so may result in injury or failure of the fan module.
 - After the first use of the product, do not connect/disconnect the power supply module or fan module to/from the main module more than 50 times. Exceeding the limit may cause malfunction.
 - After the first use of the product, do not insert/remove a CFast card to/from the product more than 10000 times. Exceeding the limit may cause malfunction.
 - Place hands to hold a CFast card when removing it from the slot because the card may be jumped out. If not placing hands, the card may fall, resulting in damage or failure.
 - Do not drop or apply shock to the battery to be installed in the product. When removing the battery, hold the connector part so that the battery cable is not damaged.
 - Before handling the product, 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 product to fail or malfunction.
 - Do not remove the protecting sheets attached to the plate of the base part. For this plate, it may raise to high temperature cause combined with heat-sink. So do not remove or touch this sheets when module is operating and turning off the power supply to prevent a burn.
 - Usage under high temperature and humidity may cause the fan module to change colors, but this does not affect performance.
 - Do not turn OFF the power, reset this product, or remove the USB device during access of the USB device. This may cause data corruption on the USB device or a malfunction of the USB device. Stop access, and then remove the USB device.
-

[Power-on Precautions]

CAUTION

- If input power is supplied again immediately after power supply shutdown of the product, an inrush current that exceeds the specification value may flow.
 - To avoid this, wait for five seconds or more after power supply shutdown of the product. Then, supply input power again.
-

[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 Page 187 Handling of Batteries and Devices with Built-In Batteries in EU Member States.
-

[Transportation Precautions]

CAUTION

- When transporting lithium batteries, follow the transportation regulations. For details on the regulated models, refer to Page 186 Considerations on Battery Transportation.
-

CONDITIONS OF USE FOR THE PRODUCT

- (1) Mitsubishi Electric industrial PC ("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 the PRODUCT trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

PRECAUTIONS FOR USING THE PRODUCT

For the product manufactured by Microsoft® Corporation in the United States

The product is equipped with Windows® 10 IoT Enterprise manufactured by Microsoft Corporation in the United States as OS. For using this product, our company does not have any responsibility for a problem and the damage caused by the product manufactured by Microsoft Corporation in the United States.

For the problems or specifications of the Microsoft Corporation product, refer to the corresponding manual or consult Microsoft Corporation.

Contact information is available on the following website.

- Microsoft Corporation: support.microsoft.com/en-us/contactus

For the Wind River Systems product

This product is loaded with VxWorks, manufactured by Wind River Systems, Inc., as a real-time operating system. Mitsubishi Electric accepts no responsibility for dealing with or damage from problems caused by products manufactured by Wind River Systems, Inc. when using this product.

For the problems or specifications of the Wind River Systems product, refer to the corresponding manual or consult Wind River Systems, Inc.

Contact information is available on the following website.

Wind River Systems, Inc.: www.windriver.com

INTRODUCTION

Thank you for purchasing the Mitsubishi Electric Industrial PC.

This manual describes the system configuration, specifications, installation, wiring, maintenance and inspection, and troubleshooting of the product.

Before using the Mitsubishi Electric Industrial PC, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance to handle the product correctly.

Please make sure that the end users read this manual.

Relevant product

MI5122-VW, MI5A1P, MI5122, MI5FAN

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RELEVANT MANUALS

The following manuals are relevant to this product.

Manual name [manual number]	Description
MELIPC MI5000 Series User's Manual (Startup) [SH-081930ENG] (this manual)	Performance specifications, procedures before operation, and troubleshooting of the MELIPC
MELIPC MI5000 Series User's Manual (Application) [SH-081932ENG]	Functions and parameters of a MELIPC
MELIPC MI5000 Series Programming Manual (Windows) [SH-081934ENG]	Programming specifications and dedicated function libraries of the Windows part of a MELIPC
MELIPC MI5000 Series Programming Manual (VxWorks) [SH-081936ENG]	Programming specifications and dedicated function libraries of the VxWorks part of a MELIPC
MI Configurator Operating Manual [SH-081938ENG]	System configurations, parameter settings, and the operation methods of online functions in MI Configurator
CW Workbench 4 Operating Manual [SH-081940ENG]	System configuration, specifications, functions, and troubleshooting of CW Workbench 4

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
C Controller module dedicated function	A dedicated function library used for controlling a MELIPC
CW Workbench 4	An abbreviation for the engineering tool for Mitsubishi Electric Industrial PC, CW Workbench 4
Cyclic Transmission	A function that exchanges data periodically between stations on a network by using link devices
Fan module	An abbreviation for a fan module for Mitsubishi Electric Industrial PC, MI5FAN
GOT	An abbreviation for the Mitsubishi Graphic Operation Terminal
Intelligent device station	A station that exchanges I/O signals (bit data) and I/O data (word data) with another station by cyclic transmission. This station responds to a transient transmission request from another station and also issues a transient transmission request to another station.
Link scan (link scan time)	Time required for every station on the network to transmit data in order one time. The link scan time will vary depending on the data quantity and transient transmission requests.
Local station	A station that performs cyclic transmission and transient transmission with the master station and other local stations
Main module	An abbreviation for a main module for Mitsubishi Electric Industrial PC, MI5122
Master station	A station that controls the entire network. This station can perform cyclic transmission and transient transmission with all stations. Only one master station can be used in a network.
MELIPC	An abbreviation for Mitsubishi Electric Industrial PC, MI5122-VW. It comprises a main module, a power supply module, and a fan module.
MELSEC data link function	A dedicated function library used for accessing another station on a network
MI Configurator	A product name for SWnDNN-MICONF ('n' indicates its version.)
Power supply module	An abbreviation for a power supply module for Mitsubishi Electric Industrial PC, MI5A1P
Remote device station	A station that exchanges I/O signals (bit data) and I/O data (word data) with another station by cyclic transmission. This station responds to a transient transmission request from another station.
Remote I/O station	A station that exchanges I/O signals (bit data) with the master station by cyclic transmission
Slave station	A generic term for local stations, remote I/O stations, remote device stations, and intelligent device stations
Transient transmission	A function of communication with another station, which is used when requested by this product
Virtual Ethernet	A virtual network that connects the Windows part and VxWorks part in a MELIPC
VxWorks	A product name for a real-time operating system manufactured by Wind River Systems, Inc.
VxWorks part	A device in which a real-time operating system VxWorks is embedded. The information acquired from a programmable controller CPU or a CC-Link IE Field Network connected device via CC-Link IE Field Network can be processed in this section.
Windows part	A device in which Windows is embedded. Applications for processing complex calculations, such as data analysis, to process various information can run in this section.

MEMO

PART 1

PROCEDURE BEFORE OPERATION

This part shows the procedure before operations of this product.

1 PROCEDURE BEFORE OPERATION

2 PRODUCT INSTALLATION

3 HARDWARE DIAGNOSES

4 CFast CARD INSTALLATION

5 Windows SETUP

6 WIRING AND CONNECTION OF SYSTEM COMPONENTS

7 PARAMETER SETTINGS

8 ERROR CHECK

9 CREATION AND REGISTRATION OF USER PROGRAMS

1 PROCEDURE BEFORE OPERATION

This section shows the procedure before operation of this product.

When the product is to be run for the first time, prepare this product using the following procedure.

1. Installing this product (Page 20 PRODUCT INSTALLATION)

Perform the following operations to install this product.

- Installation of this product
- Insertion of a battery
- Wiring of the power supply module

2. Executing hardware diagnoses (Page 36 HARDWARE DIAGNOSES)

3. Installing a CFast card (Page 42 CFast CARD INSTALLATION)

Insert a CFast card in the product as necessary.

4. Setting up Windows (Page 50 Windows SETUP)

Perform the following work to set up Windows.

- Connecting peripheral devices
- Windows setup and initial settings

5. Wiring and connecting system components (Page 59 WIRING AND CONNECTION OF SYSTEM COMPONENTS)

6. Setting parameters (Page 70 PARAMETER SETTINGS)

Perform the following work to configure the parameters.

- Creating a project
- Setting parameters
- Writing parameters

7. Checking for errors(Page 72 ERROR CHECK)

8. Creating and registering user programs (Page 74 CREATION AND REGISTRATION OF USER PROGRAMS)

Precautions

Do not change product BIOS settings. If BIOS settings are changed, this may result in erroneous operation of the product.

2 PRODUCT INSTALLATION

This section shows the procedure before installing the product.

1. Installing the product. (👉 Page 21 Product Installation)

Install the product on a control panel or DIN rail.

2. Inserting a battery. (👉 Page 31 Inserting a Battery)

Insert a battery to this product.

3. Wiring the power supply module. (👉 Page 32 Wiring the Power Supply Module)

Connect the power supply and grounding cables to the power supply module of this product.

2.1 Product Installation

This section shows the procedure to attach this product to a control panel or similar device.

When installing this product in the control panel, pay full attention to the ease of operability of connected cables and switches; the ease of maintenance including replacement and installation of power supply modules and fan modules; and environments resistant to noise and heat.

Point

- The power supply module is installed on the main module when this product is purchased. Before using this product, make sure that the power supply module is installed correctly on the main module.
- When installing this product, hold the section near the base of the main module of this product.

Installation environment

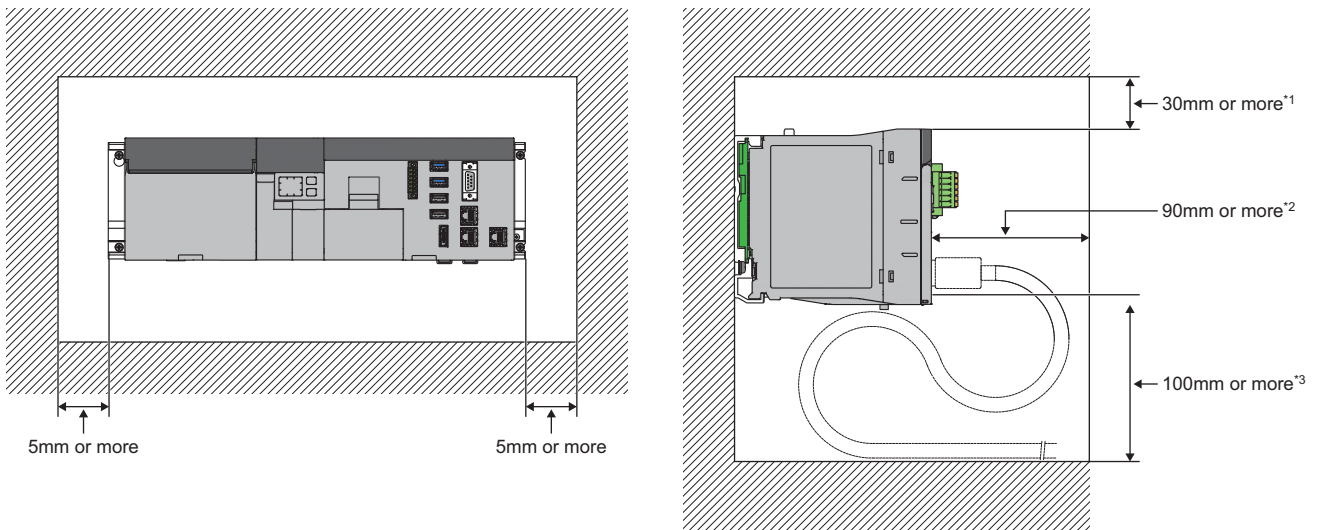
Install this product in the environment shown in the general specifications. ( Page 117 Product Specifications)

Do not install or store the product in the following locations. Doing so may result in fire, malfunction, or deterioration in performance.

- Locations in which the ambient temperature is outside 0 to 55°C
- Locations in which the ambient humidity is outside 5 to 95% RH
- Locations subject to condensation because of rapid changes to temperature or humidity
- Locations with corrosive gases or chemicals, flammable gases, or radioactive materials
- Locations with substantial quantities of conductive powder such as dust or dirt, oil mist, salt, or organic solvents
- Locations in direct sunlight
- Locations with strong electrical or magnetic fields
- Locations in which power supply lines are subject to strong electromagnetic noise
- Location subject to direct or indirect vibration or strong shocks

Installation position

To improve the airflow and ensure easy replacement of power supply and fan modules, provide clearance between the product and structures/parts as shown below.

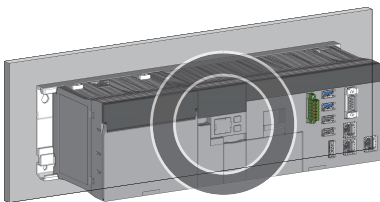


The shaded area in the illustration shows the control panel ceiling, wiring duct, and parts.

- *1 Provide clearance of 30 mm or more when the height of a wiring duct is 50 mm or less. If the height of the duct is more than 50 mm, provide clearance of 40 mm or more.
- *2 If connecting an external device connector, 90 mm or more.
- *3 If connecting an external device connector and fixing mounting location fixing bands, 100 mm or more.

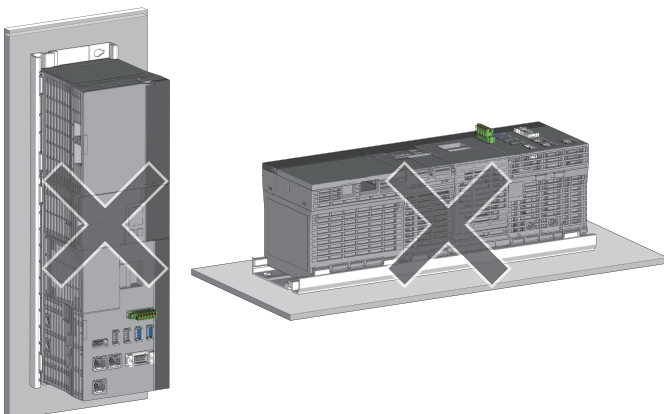
Installation direction

To improve heat dissipation, install in the following direction.



■Erroneous installation direction

Do not install the product in the following direction.



Installation surface

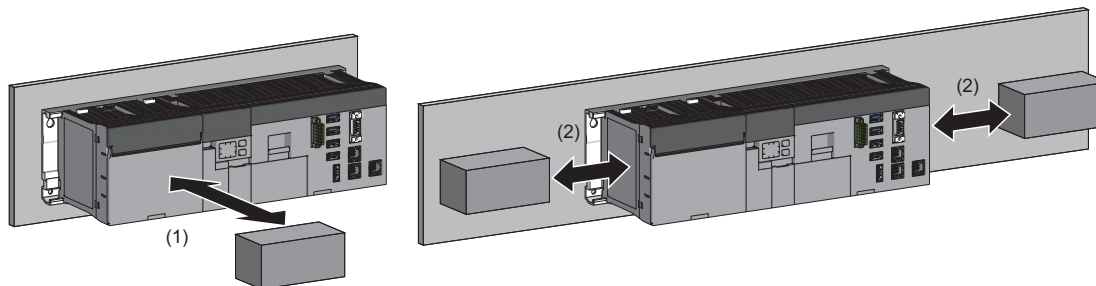
Install the product on a flat surface.

If the installation surface is uneven, excessive force is applied to the printed-circuit board, which may cause malfunction.

Installation of the product with other devices, distances

Pay attention to the following points when installing this product with other equipment.

- To avoid installation close to vibration sources such as electromagnetic contactors and no fuse breakers, either install the product in a different control panel or at a distance.
- Provide the following clearance between the product and other devices such as a contactor and relay to avoid influence from the radiated noise and heat.



(1) Equipment mounted to the front of the product: 100 mm or more

(2) Equipment mounted to the left and right sides of the product: 50 mm or more

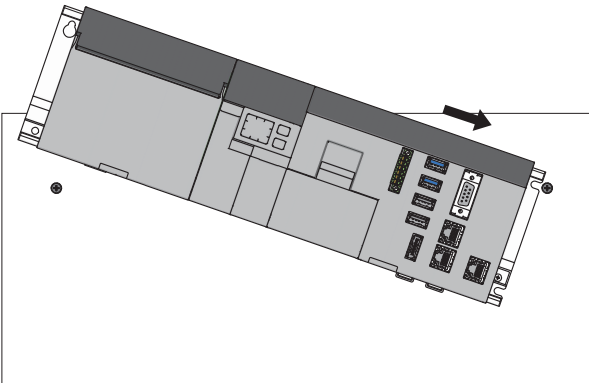
Installing the product to a control panel

This section shows the procedure to attach this product to a control panel.

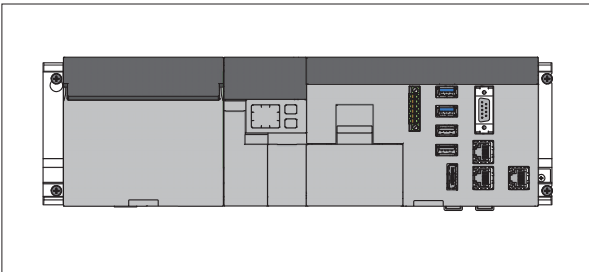
1. Fix mounting screws (x2) for the upper side of the product to the control panel.



2. Hitch the notch on the right side of the product to the screw attached on the right side.



3. Place the bell-shaped hole on the left side of the product on the screw on the left side of the control panel.



4. Fix the mounting screws (x2) into the holes at the bottom of the product.
5. Retighten all screws.

Point

If it is difficult to tighten mounting screws, first remove the power supply module. ( Page 172 Replacement of power supply module)

Mounting the product on a DIN Rail

This section shows the procedure for mounting this product on a DIN rail.

Applicable DIN rails

When mounting this product to a DIN rail, use any one of the following rail.

- TH35-7.5Fe
- TH35-7.5Al
- TH35-15Fe

■DIN rail adapter

A DIN rail adapter (sold separately) is required to mount this product to the DIN rail.

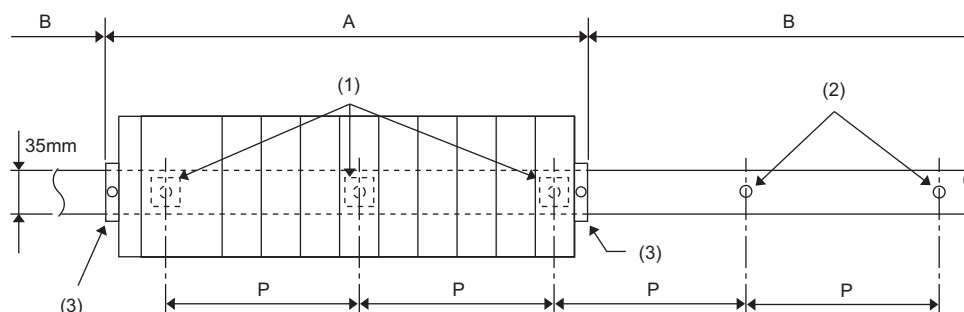
Model name	Pieces				
	Hook A	Hook B-C (with 2 attachment screws mounted)	Stopper	Square washer	Mounting screw (M5×10)
R6DIN1	2	2	2	3	3

Interval between DIN rail mounting screws

When a DIN rail is used, tighten DIN rail mounting screws at intervals of 200 mm or less to ensure the sufficient strength of the rail.

Tighten the DIN rail to the product mounting location using the screws in three locations, using the mounting screws and square washers included with the DIN rail adapter. * 1

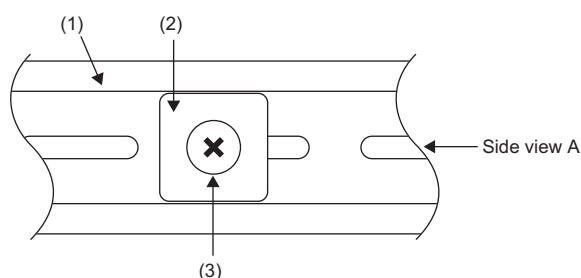
*1 When DIN rail TH35-15Fe is used, the square washers are not required.



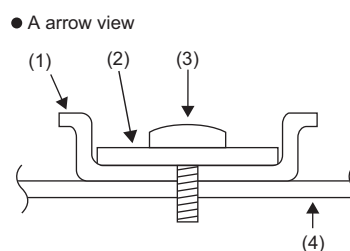
- (1) Mounting screws (included)
 (2) Mounting screws (sold separately)
 (3) Stoppers

- Tighten the A mounting area using the mounting screws and square washers included with the DIN rail adapter.
- When tightening the B mounting area, use of the mounting screws and square washers included with the DIN rail adapter is not required. Tighten the DIN rail with the mounting screws sold separately.
- Set the interval of P to 200 mm or less.

■Installation position of the square washers

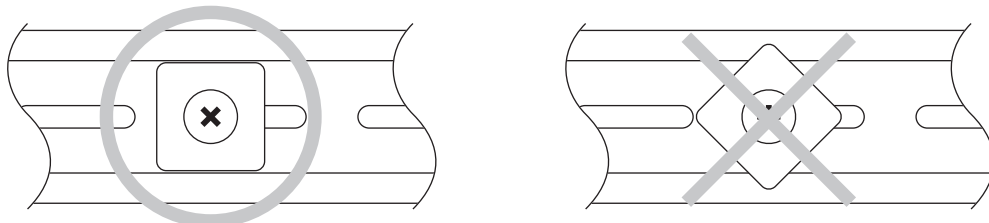


- (1) DIN rail
 (2) Square washer
 (3) Mounting screw (M5×10)
 (4) Mounting side (control panel, etc.)



Precautions

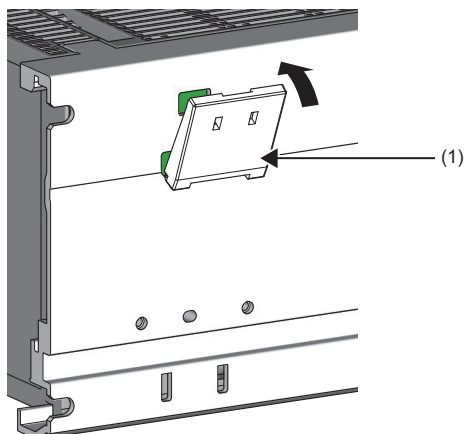
- Use a DIN rail for which M5 size screws can be used for mounting.
- Use only the square washers included with the DIN rail adapter.
- Use only one square washer for each mounting screw. If two or more square washers are used together for one mounting screw, the screw may interfere with the product.
- Align the square washers parallel to the DIN rail.



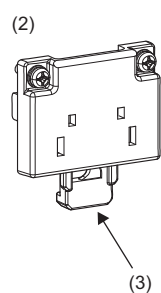
Installing the DIN rail adapter

This section shows the procedure to attach the DIN rail adapter.

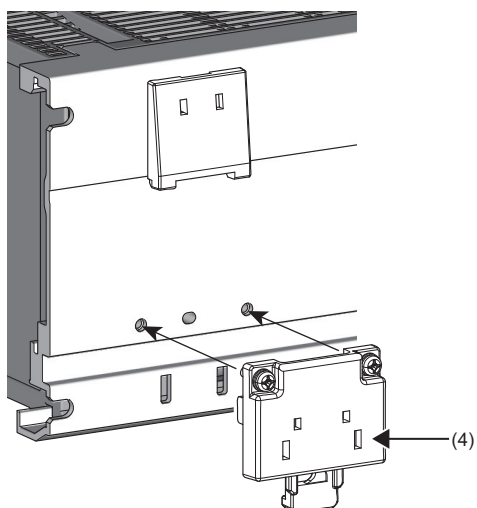
1. Insert hook A (1) in the lower square hole of two square holes arranged vertically at the upper part of the base module.
2. Next, push the upper part of hook A (1) until a click is heard.



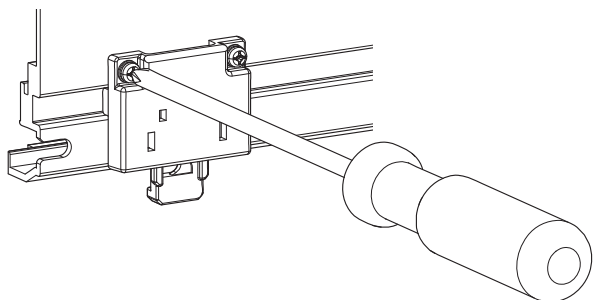
3. Project the hook B (3) of the hook B-C (2) on the downside.



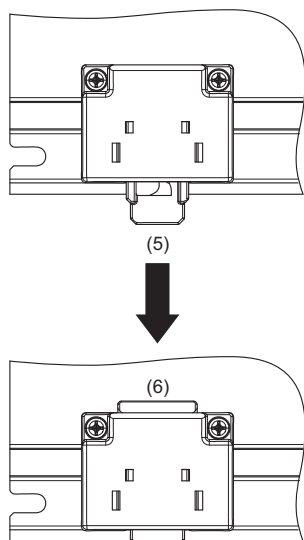
- 4.** Push the tab of the hook B-C (4) into two square holes on the left and right of the lower part of the product until it clicks.
(2 spots)



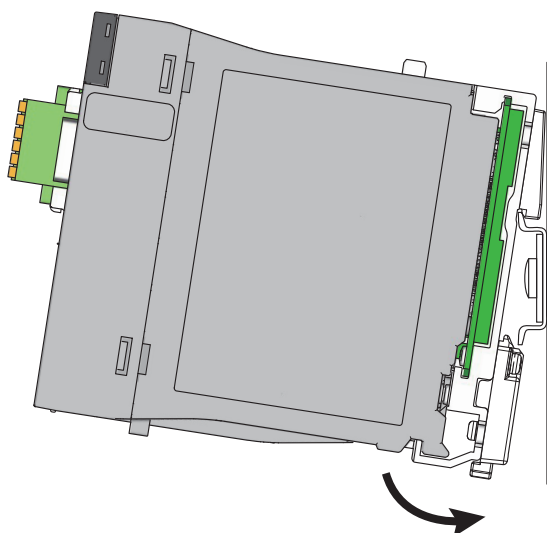
- 5.** Tighten the mounting screws (M3×10) of the hook B-C with a screwdriver and fix the hook B-C. (4 spots)
• Tightening torque: 0.37 to 0.48 N·m



- 6.** Project the tab (6) of the hook B-C on the upside by pushing up the hook B (5).



- 7.** Hitch the upper part of the product to the DIN rail and push the lower part of the base module until it clicks.



- 8.** Fix stoppers of the DIN rail.

Fixing stoppers of the DIN rail

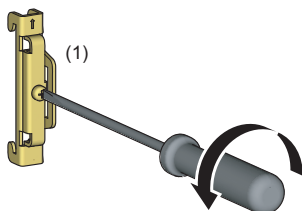
The following shows the procedure for fixing stoppers of the DIN rail.

Restriction

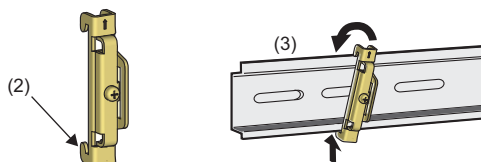
This method for fixing DIN rail stoppers is an example. Fix the module in accordance with the manual for the DIN rail stopper used.

2

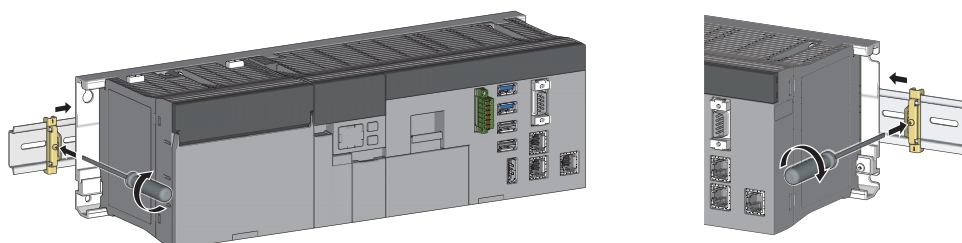
1. Loosen the screw at the upper part of the stopper (1).



2. For the stopper fixed to the left side of the product, turn up the arrow mark printed on the stopper and hitch the tab (2) at the lower part of the stopper to the DIN rail (3).



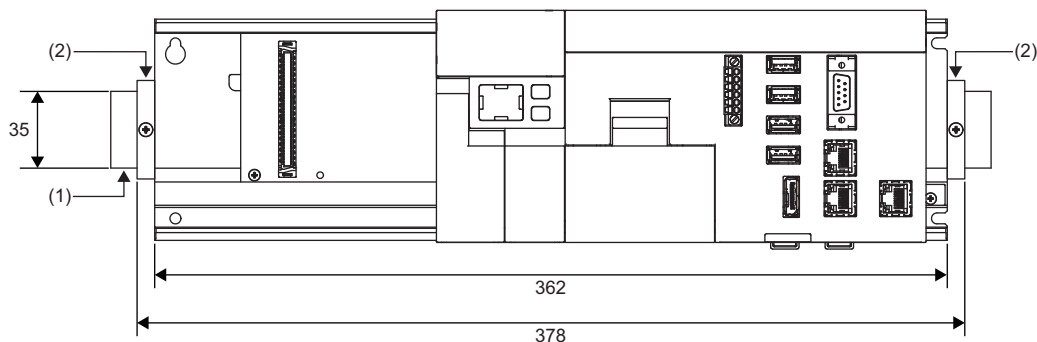
3. Hitch the tab at the upper part of the stopper to the upper part of the DIN rail.
4. Similarly, attach the stopper to the right side of this product.
Fix the stopper on the right side of the product upside down to the stopper of the left side.
5. Slide the stopper to the end of the base section.
6. Tighten the screw of the stopper with a screwdriver.
• Tightening torque: 1.00 to 1.35 N·m



7. Check that both stoppers are fixed on the DIN rail securely.

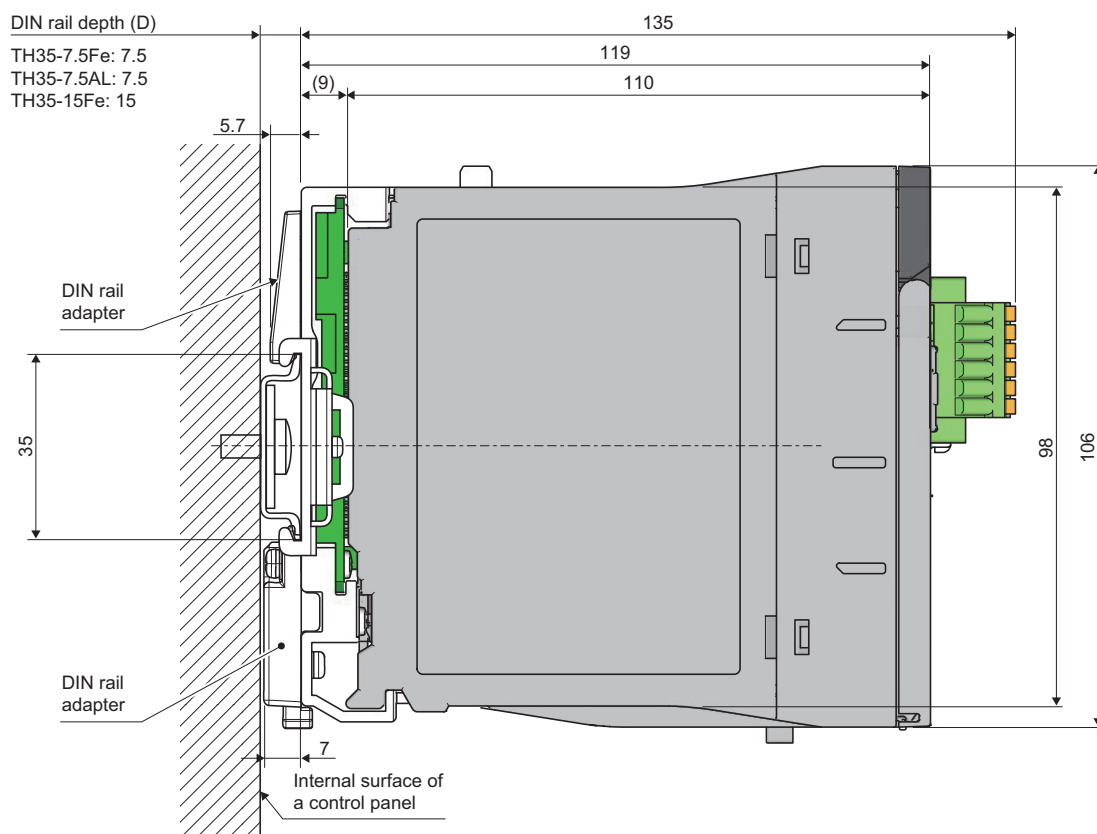
Point

When attaching the DIN rail (1) to a control panel, refer to the dimensions of the stopper (2) below.



Lateral dimensions of the base unit with the DIN rail

This section shows the lateral dimensions when the product is mounted on the DIN rail.



2.2 Inserting a Battery

This section shows the procedure to insert a battery.

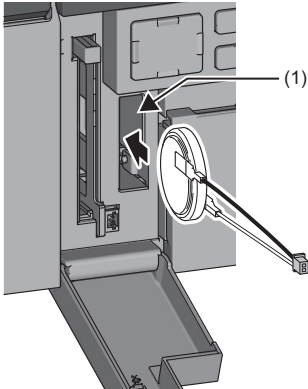
Point

When inserting the battery to this product, turn OFF the power supply of this product. (📖 Page 138 Turning OFF or Resetting This Product)

2

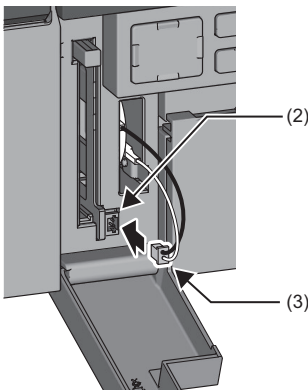
1. Open the CFast/BATTERY cover on the front side of this product.
2. Insert the battery into the battery holder (1).

Ensure that the battery is inserted fully into the battery holder.



3. Insert the battery connector (3) into the connector (2).

Align this so that the black cable is above the battery connector, and ensure that it is fully inserted.



4. Close the CFast/BATTERY cover until a click is heard.

Precautions

- When closing the CFast/BATTERY cover of the product, ensure that the battery cable is not caught.
- After attaching the battery, configure the clock of this product from MI Configurator. (📖 MI Configurator Operating Manual)

2.3 Wiring the Power Supply Module

This section shows the information for wiring the power supply module.

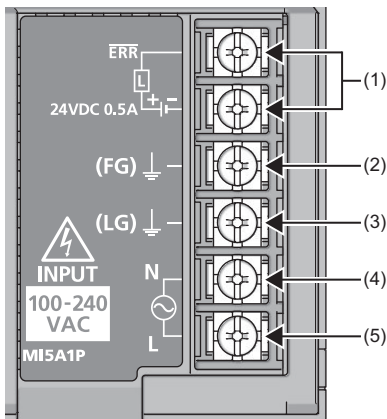
Precautions

Be aware of the following points when wiring the power supply module. Furthermore, wait for about 5 seconds between turning the power supply OFF and ON.

- Wire the power supply module correctly.
- Make sure the voltage supplied to the power supply module is correct. (☞ Page 118 Performance specifications)

Terminal block

The following shows the terminal block of the power supply module.



No.	Name	Description
(1)	ERR contact output ^{*1}	ON when the system is operating normally. This contact turns OFF (opens) in the following cases: <ul style="list-style-type: none">• When the power is not supplied• When a stop error (including reset) occurs• When the fuse is blown
(2)	FG terminal ^{*2}	A functional ground terminal connected to the shield pattern of the printed circuit board. This product has a functioning grounding terminal.
(3)	LG terminal ^{*2}	A functional ground terminal for the power supply input filter. This product has a functioning grounding terminal.
(4)	Power input terminal (N) ^{*3}	A power input terminal for the power supply module. 100 to 240 VAC power input.
(5)	Power input terminal (L) ^{*3}	

^{*1} Arrange ERR contact output cables within the control panel with a length of 30 m or less.

^{*2} Ensure the FG and LG terminals are grounded with at least class D grounding (3rd class grounding).

^{*3} The power input terminal (L) has a fuse built in. If the power supply for a power supply module is grounded, connect the power supply on the grounded side to the N terminal, and the one on the ungrounded side to the L terminal.

Wiring specifications

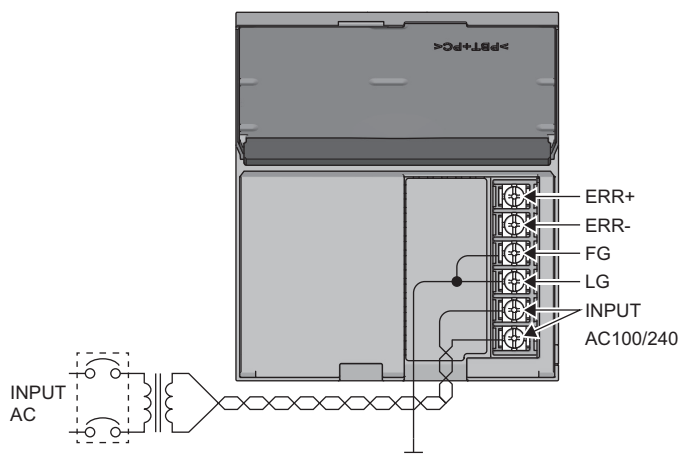
The following shows the wiring specifications of the power supply module.

Item		Specification
Solderless terminal	Terminal screw size	M4
	Solderless terminal	• RAV1.25-4 ^{*1} • RAV2-4
	Applicable tightening torque for a terminal block	1.02 to 1.38 N·m
Electrical cable	Diameter	AWG18 ^{*1} to 14
	Type	Stranded wire
	Material	Copper wire
	Rated temperature	75°C or higher

^{*1} For ERR terminals.

Wiring example

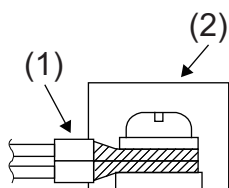
The following shows a wiring example for the power supply module.



2

Precautions

- Additionally, fully tighten terminal block screws that do not have wiring attached. If these are not fully tightened, then during operation these may loosen or fall out because of vibration.
- Wiring must be twisted tightly starting from the terminal connection. Also, use the thickest wire (up to 2mm²) to reduce the voltage drop.
- For the wiring to a terminal block, use a solderless terminal.
- To prevent a short-circuit while loosening screws, use a solderless terminal (1) with an insulation sleeve of 0.8 mm or less. Note that up to 2 solderless terminals (1) can be connected per terminal block (2).



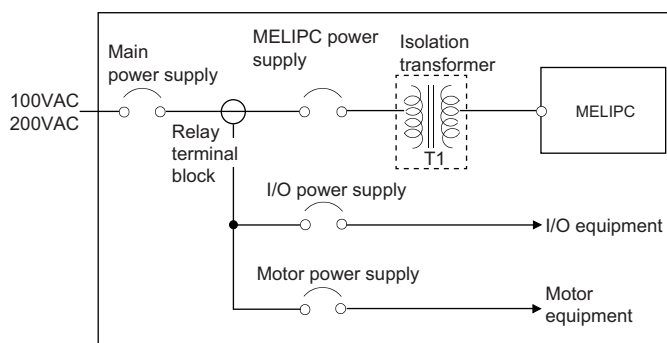
- For the LG and FG terminals, short by using the thickest and shortest ground cable possible (2mm²), and ensure this is grounded. Failure to ground may result in deterioration of the signal from noise. Additionally, the LG terminal has half of potential of the input voltage, so ensure precautions are taken against electric shock.
- Provide independent grounding when possible. In addition, grounding work is to be to a Class D grounding (third class grounding). (Insulation resistance of 100Ω or lower)
- For the ERR+ and ERR- terminals, use wires with a thickness at least 0.75 mm² and length of 30 m or less. When using cables longer than 3 m, either twist the cables or use a cabtyre cable.

Power Supply Wiring Precautions

The following shows the considerations when wiring the power supply of this product.

■Wiring of power supply, I/O power supply wiring, and motor wiring

Wire cables of the product power supply, I/O power supply, and motor power supply separately as shown below.



■If high noise

Use an isolation transformer to reduce the noise such as the lightning surge.

Use the isolation transformer according to its usage environment and storage environment. The following table lists the performance specifications of the recommended isolation transformer.

Item	Specifications
Number of phase	Single phase
Frequency	50/60Hz
Rated capacity	*1
Secondary voltage*2	200V/100V
Rating	Continuous
Heat resistance class (insulation class)	H
Electrostatic shield	Provided
Isolation resistance and withstand voltage*3	4200V/1 minute, 5M Ω or more between P and S
	2500V/1 minute, 7M Ω or more between P and iron core
	2500V/1 minute, 7M Ω or more between S and iron core
Standard*4	UL506, UL5085
	EN61558-1
	EN61558-2-4

*1 Select an isolation transformer considering the power capacity of equipment to be used.

*2 Select the secondary voltage so that the input voltage specifications of the power supply module are met.

*3 Among required voltage values specified in UL and EN standards, stricter values are listed here.

*4 Use an isolation transformer in the conditions that satisfy the requirements of standards.

■Installation of breaker or external fuse

Always connect a breaker or external fuse between a power supply and the power input terminals (L and N) of this product. By doing so, this product can be powered OFF on its own power input side.

If a breaker or external fuse is not connected, a large current keeps flowing when this product fails, which may cause smoke or fire.

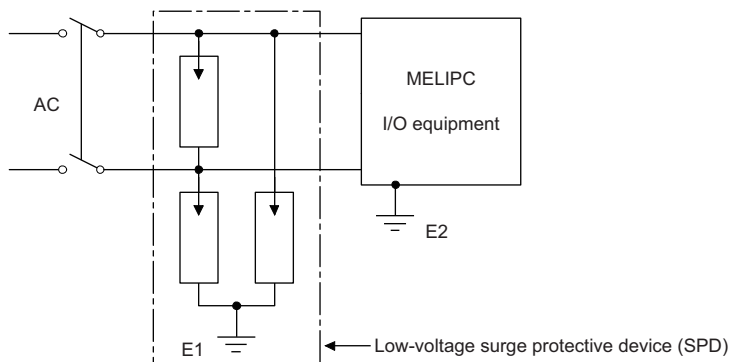
When a single product is used, connecting a breaker around 10 A or an external fuse is recommended.

■Power supply wiring

Do not install 100 VAC or 24 VDC wires bundled with or near the main circuit lines (high voltage and large current) or I/O signal wires (including common lines). Keep a distance of 100 mm or more from these lines.

■Momentary power failure or reset from lightning surge noise

A momentary power failure may be detected, or the product may be reset because of the lightning surge noise. As a measure against the lightning surge noise, connect a low-voltage surge protective device (SPD) as shown below. Using the low-voltage surge protective device can reduce the influence from the lightning.



Item	Description
Applicable circuits	Single phase 2/3 wire 100 VAC/200 VAC
Protection mode	Voltage to ground, spacing
Maximum continuous voltage used	240 VAC or higher
Maximum discharge current	<ul style="list-style-type: none"> Voltage to ground: 10 kA or higher Spacing: 5kA or higher

Precautions

- Separate the ground of the low-voltage surge protective device (E1) from that of a product (E2).
- Select a low-voltage surge protective device so that the power supply voltage of when line voltage is maximum does not exceed the maximum allowable circuit voltage of the surge absorber.
- Select a low-voltage surge protective device for power supply that complies with IEC 61643-11/JIS C5381-11 and meets the requirements of the test class "Class UnitII".

■Uninterruptible power supply (UPS)

Always use an online power system or line interactive system for the uninterruptible power supply.

For commercial supply method uninterruptible power supply systems, use Mitsubishi FREQUPS FW-J low-capacity series UPS devices.

Precautions

This product incorporates a PFC circuit, therefore do not use a square wave output uninterruptible power supply.

3 HARDWARE DIAGNOSES

Diagnose whether there is a hardware error with this product.



Perform hardware diagnoses at first operation, and during troubleshooting.

Precautions

During a hardware diagnosis, do not turn OFF the power, or reset or restart the product. Doing so may result in the product not being able to start normally.

If this product is unable to start normally, initialize the product. (📖 Page 149 Product Initialization)

3.1 Items for Diagnosis

This section shows the items that can be diagnosed by hardware diagnoses.

Dot matrix LED display	Item		Description
Mode00	Mode0	Diagnoses from Mode1 to Mode4	Perform diagnoses for Mode1 to Mode4 in order.
Mode01	Mode1	Memory diagnosis	Perform the following diagnoses for product memory. <ul style="list-style-type: none">• Memory error detection• Memory write, read, and reference
Mode02	Mode2	Product module diagnoses	Diagnose hardware problems of this product.
Mode03	Mode3	External interface diagnoses	Diagnose hardware problems of the external interfaces of this product. *1
Mode04	Mode4	Power supply module diagnoses	Diagnose hardware problems of the power supply module of this product.
Mode05	Mode5	LED diagnoses	Tests the display of product LEDs.

*1 Carries out hardware fault diagnoses for DisplayPort, USB, RS232C, and Ethernet circuits.

3.2 Performing Diagnosis

This section shows the procedure to diagnose hardware problems.

Preparation

Before diagnosing hardware problems, prepare for the diagnosis using the following procedure.

1. Checking the wiring

Check that the power supply wiring and supply voltage to this product are correct.

-  Page 32 Wiring the Power Supply Module
-  Page 118 Performance specifications

2. Preparations for diagnoses

Perform preparations required for each diagnoses step.

Item	Description
Mode0	Prepare as necessary for diagnosis from Mode1 through Mode4.
Mode1	Back up data.
Mode 2 to 5	No preparation required.

Data backup

The following shows the method to backup data of this product.

Target device		Destination	Method
VxWorks part	User drive (/ROM)	Storage on an external device (another personal computer)	Using the FTP server function or file sharing server function of this product, copy data to the storage on an external device through Ethernet.
Windows part	—		Copy data to the storage on an external device through USB or Ethernet.

Performing diagnosis

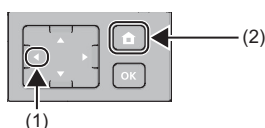
The following shows the procedure for performing hardware diagnosis.

Point

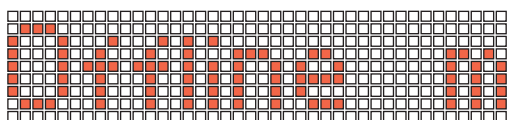
- Run a hardware diagnosis after selecting the operation mode when the power supply of this product has been turned ON. When the power supply of this product is ON, turn OFF the power supply of this product before performing a hardware diagnosis. (☞ Page 138 Turning OFF or Resetting This Product)
- If the HOME switch is pressed when the display of the dot matrix LED is the status other than 'Offline mode', the dot matrix LED returns to the default display 'Offline mode'. (During diagnosing, the display of the dot-matrix LED does not return to 'Offline mode'.)

1. Power ON the product while pressing the SELECT switch (◀) (1) and HOME switch (2).

Press and hold the SELECT switch (◀) and HOME switch until 'Offline mode' is displayed on the dot matrix LED.

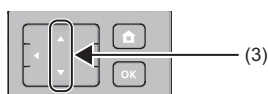
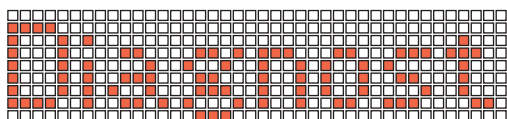


2. After 'Offline mode' is displayed on the dot matrix LED, release the SELECT switch (◀) and HOME switch.

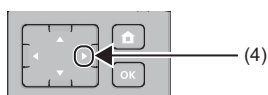


3. Press the SELECT switches (▲/▼) (3) to select an operation mode.

Switch until 'Diagnostic mode' is displayed on the dot matrix LED.

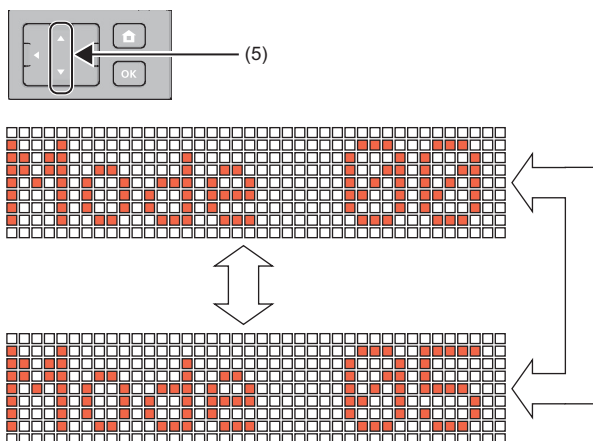


4. Press the SELECT switch (▶) (4).

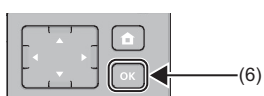


5. Press the SELECT switch (▲/▼) (5) to select diagnoses items.

The display of the dot matrix LED is changed to any of the modes from 'Mode 00' to 'Mode 05'.



6. Press the OK switch (6).



7. The selected diagnostic items are run.

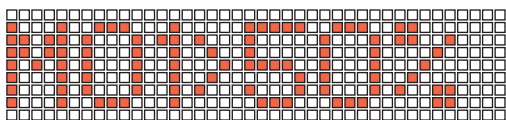
- ➞ Page 39 If Mode00 to Mode04 is run
- ➞ Page 40 If Mode05 is run

■If Mode00 to Mode04 is run

If Mode00 to Mode04 is run, then perform diagnoses using the following steps.

1. During diagnosis, the MAIN LED is lit, and the diagnostic mode and its progress are displayed on the dot matrix LED.

- If Mode01 and progress 50%



2. When diagnosis ends, the MAIN RUN LED goes off, and the diagnostic results are displayed on the dot matrix LED.

- Normal end: 'OK' is displayed on the dot matrix LED.
- Error end: the error that occurred is displayed on the dot matrix LED. (➞ Page 41 If diagnoses results show an error)

Point

Diagnoses from the detection of the error onwards stops when an error is detected.

3. Power OFF the product.

■If Mode05 is run

1. The LED display status is as follows during a hardware diagnosis.

- LEDs other than the main LED STORAGE LED and RS SD/RD LED are on.

VX RDY	WIN RDY	MAIN ERR
MAIN RUN	STORAGE	FAN
INFO	RS SD/RD	BATTERY

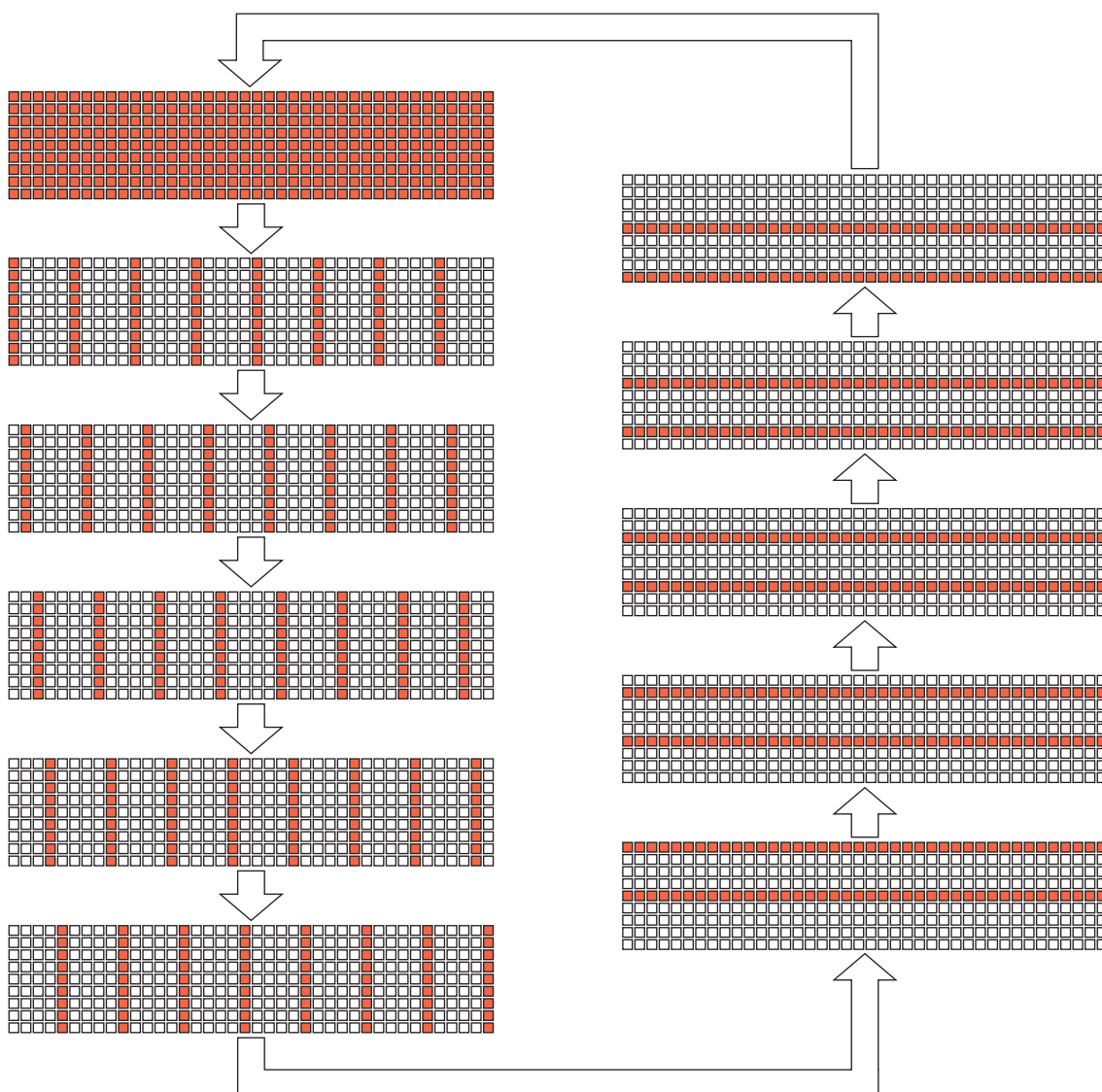
- The lighting status of the INFO LED of the main LED turns green or red by the operation of the SELECT switches (▲/▼).

VX RDY	WIN RDY	MAIN ERR
MAIN RUN	STORAGE	FAN
INFO	RS SD/RD	BATTERY



VX RDY	WIN RDY	MAIN ERR
MAIN RUN	STORAGE	FAN
INFO	RS SD/RD	BATTERY

- The dot matrix LED will change from being fully lit to showing the following in order, by operating the SELECT switch (◀/▶).



2. Check the dot matrix LED and the status of the main LED.

Item	Description
Dot matrix LED	Make sure that all LEDs are on.
MAIN LED	Make sure that all LEDs other than the STORAGE LED and RS SD/RD LED are on. In addition, make sure that the INFO LED lights green and red.

When there is a problem with the lighting status of the dot matrix LED or main LED, take measures in accordance with the diagnostic results.

 Page 41 If diagnoses results show an error

3. Power OFF the product.

If diagnoses results show an error

The following shows actions when an error is detected by the diagnosis.

■Mode00 to Mode04

The MAIN LED flashes at the point an error is detected during hardware diagnosis or configuration, and a value corresponding to the error is displayed on the dot matrix LED. If only the MAIN ERR LED is flashing, this indicates a system error.

Dot matrix LED display	Item	
101 to 103	Mode1	Internal memory diagnoses
201 to 205	Mode2	Product module diagnoses
206		Fan module diagnoses
207		Main module temperature sensor diagnoses
301		
301	Mode3	Ethernet diagnoses (CH1)
302		Ethernet diagnoses (CH2)
303		USB diagnoses
307		RS232C diagnoses
308		DisplayPort diagnoses
401	Mode4	Power supply module diagnoses
403		Power module temperature sensor diagnoses

After the error ends, carry out settings and diagnoses again. If the error occurs again, this may indicate a hardware error with the product. Consult your local Mitsubishi representative.

■Mode05

If any LEDs do not turn on, this may indicate a hardware error with the product. Consult your local Mitsubishi representative.

4 CFast CARD INSTALLATION

This chapter shows the procedure to insert a CFast card.

For procedure to remove the CFast card, refer to the following.

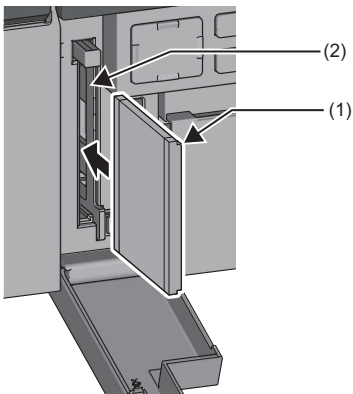
☞ Page 155 Inserting and Removing a CFast Card

Precautions

- Turn OFF the power supply of this product before inserting a CFast card.
- If a CFast card is inserted while the power supply of the product is ON, it will not be recognized.
- When using a CFast card for the first time, initialization (format) of the card is required. (☞ Page 43 Initialization (Format))

4.1 Mounting Procedure

1. Open the CFast/BATTERY cover.
2. Pay attention to the orientation of the CFast card (1), and ensure that it is inserted straight into CFast card slot (2).
Insert the CFast card until its position is approximately the same height as the printed mark on the surface of the product.



3. Close the CFast/BATTERY cover until it clicks.

4.2 Initialization (Format)

When using a CFast card for the first time, initialization of the card is required.

Point

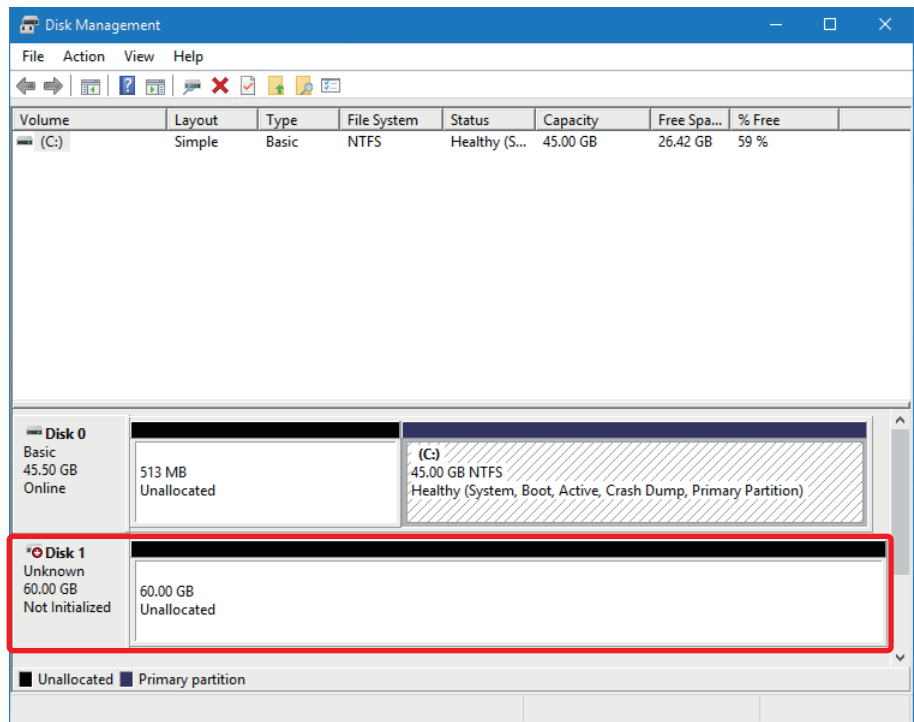
Do not insert any storage device other than a CFast card when performing the procedure below.

Restriction

Only a CFast card with MBR partition style is available. A CFast card with GPT format is not available.

- 1. Insert a CFast card to the CFast card slot.
 - 2. Right-click the Windows start menu, and select "Disk Management".
- Check that 'Disk 1 (Not Initialized)' is displayed in the "Disk Management" screen.

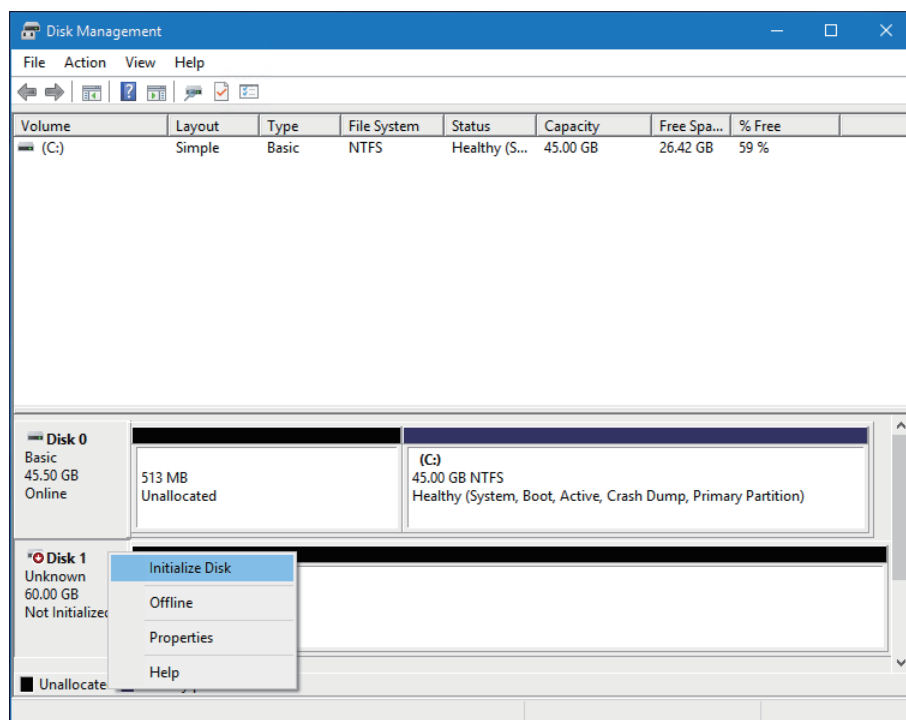
4



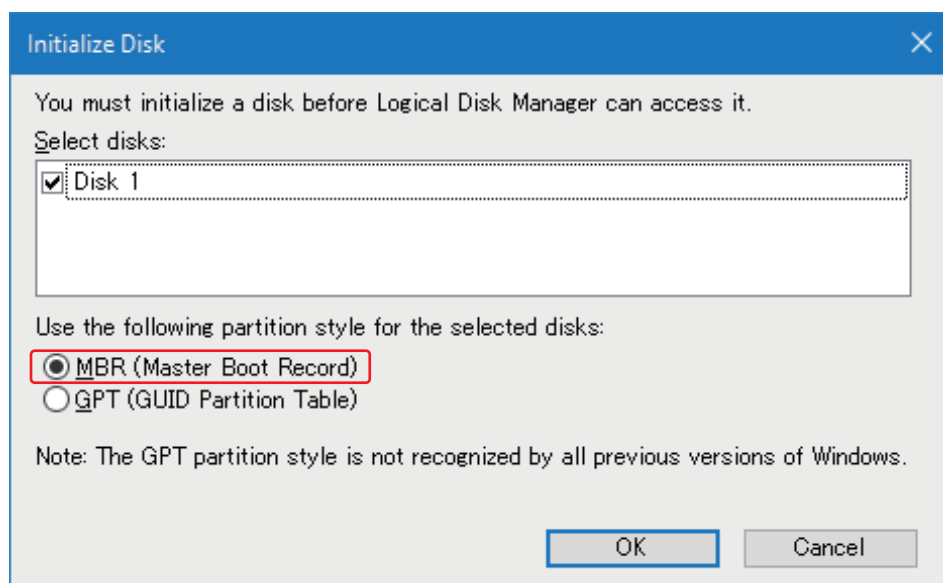
Point

If the "Initialize Disk" screen appears at the same time with the "Disk Management" screen, go on to step 4.

3. Right-click "Disk 1", and select [Initialize Disk] in the shortcut menu.



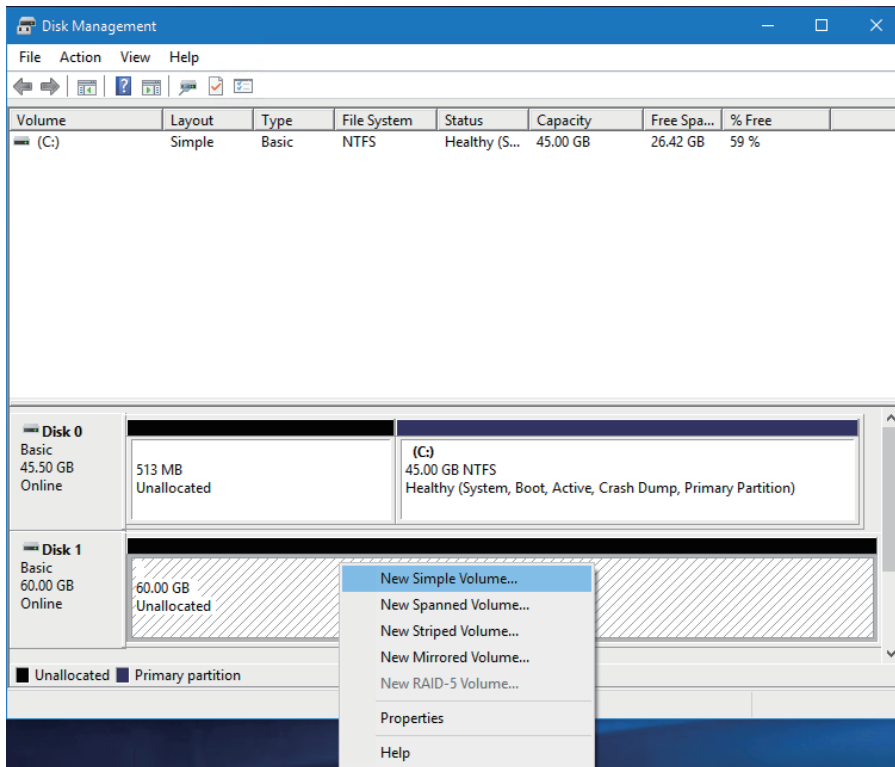
4. In the "Initialize Disk" screen, select MBR (Master Boot Record) and click the [OK] button.



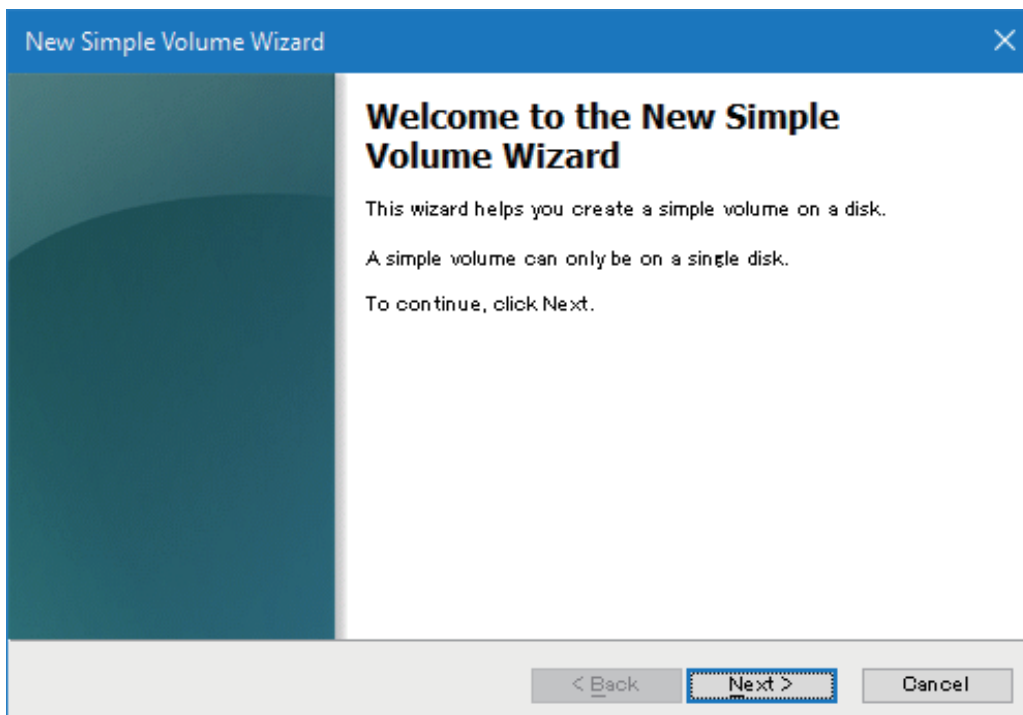
Point

Do not select GPT (GUID Partition Table) for the partition style; otherwise, a CFast card cannot be used.
(Page 48 Initialization of a CFast card whose partition style is GPT)

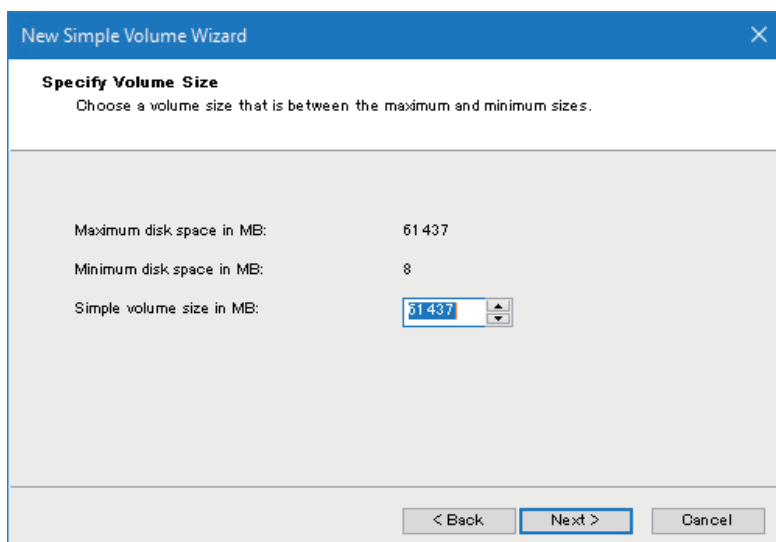
5. Right-click the area in "Disk 1", and select [New Simple Volume] in the shortcut menu.



6. Click the [Next] button.

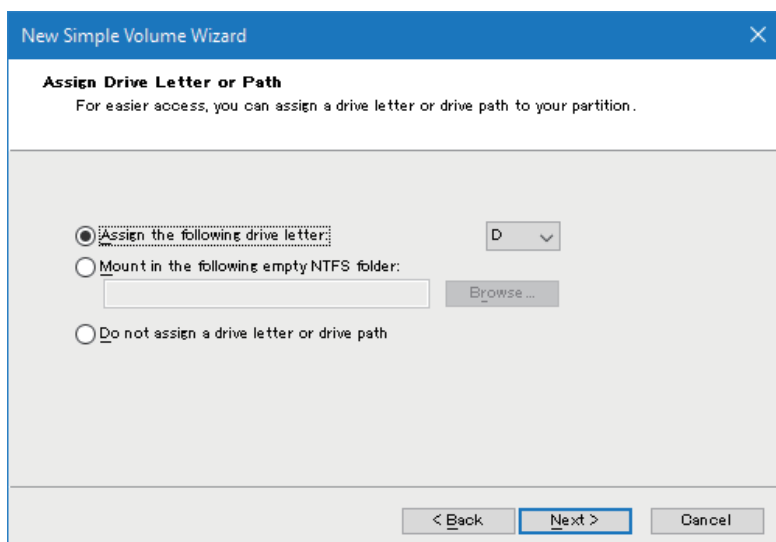


7. Specify the size for a new simple volume in "Simple volume size in", and click the [Next] button.



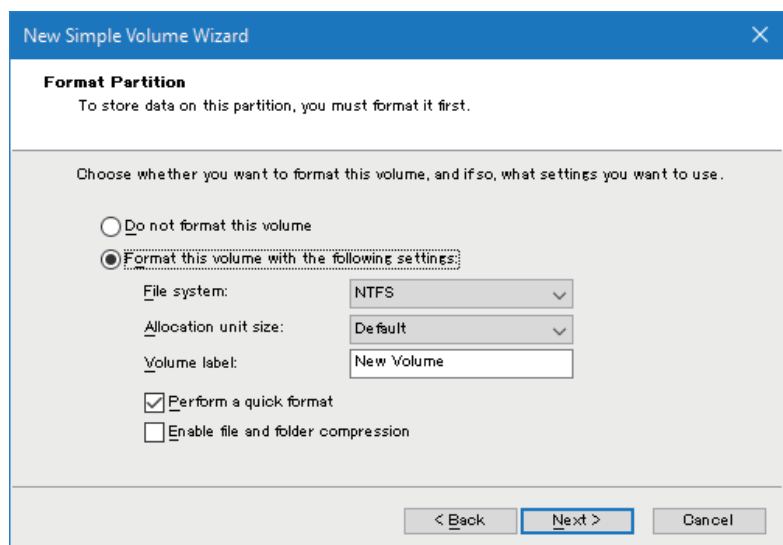
The screenshot shows the 'Specify Volume Size' step of the 'New Simple Volume Wizard'. The window title is 'New Simple Volume Wizard'. Below the title bar, the section is titled 'Specify Volume Size' with a subtitle 'Choose a volume size that is between the maximum and minimum sizes.' The main area contains three labels: 'Maximum disk space in MB:' with a value of '61 437', 'Minimum disk space in MB:' with a value of '8', and 'Simple volume size in MB:' with a spin box set to '51 437'. At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'.

8. Select a drive letter to be assigned to the new simple volume from "Assign the following drive letter", and click the [Next] button.

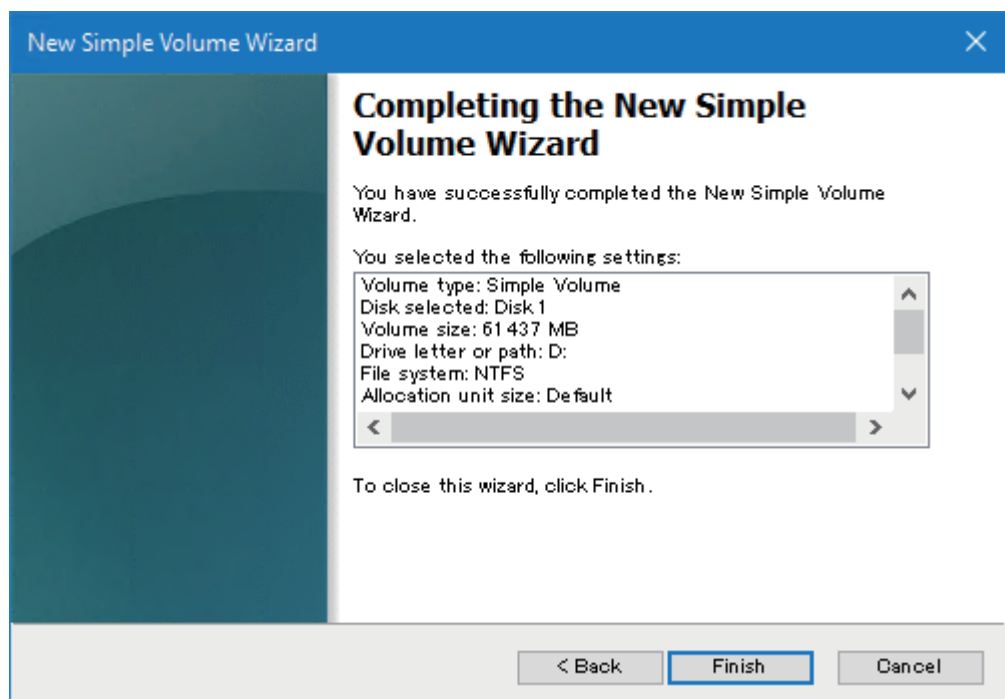


The screenshot shows the 'Assign Drive Letter or Path' step of the 'New Simple Volume Wizard'. The window title is 'New Simple Volume Wizard'. Below the title bar, the section is titled 'Assign Drive Letter or Path' with a subtitle 'For easier access, you can assign a drive letter or drive path to your partition.' There are three radio button options: 'Assign the following drive letter:' (selected) with a dropdown menu showing 'D', 'Mount in the following empty NTFS folder:' with a text box and a 'Browse...' button, and 'Do not assign a drive letter or drive path'. At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'.

9. Select a format setting in "Format Partition", and click the [Next] button.



10. Click the [Finish] button.



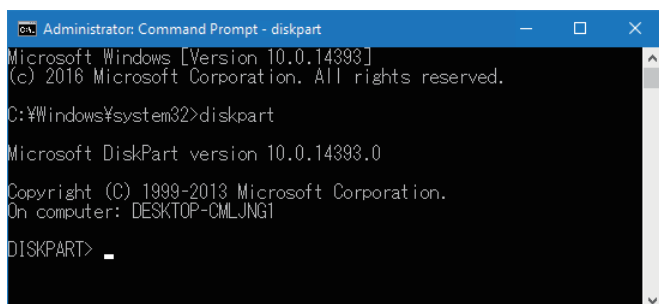
Initialization of a CFast card whose partition style is GPT

If a CFast card is initialized in GPT format by mistake, or when using a GPT-formatted CFast card which was once used in another personal computer on this product, delete the configuration information of the CFast card first, then initialize the CFast card in MBR format.

Point

- Do not insert any storage device other than a CFast card when performing the procedure below.
- After completing the following procedure, all the files stored in the CFast card are deleted. All necessary files in the CFast card must be saved in another personal computer.

1. Insert a CFast card to the CFast card slot.
2. Run the command prompt as Administrator.
3. Run 'diskpart' in the command prompt.



```
Administrator: Command Prompt - diskpart
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.

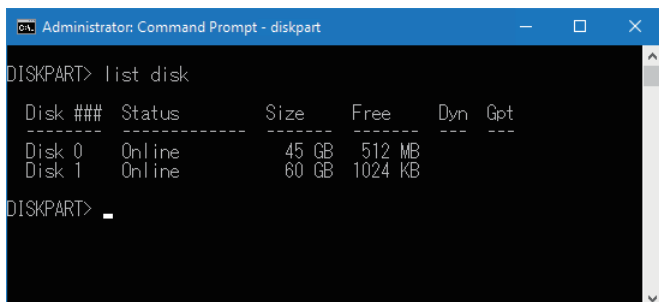
C:\Windows\system32>diskpart

Microsoft DiskPart version 10.0.14393.0

Copyright (C) 1999-2013 Microsoft Corporation.
On computer: DESKTOP-CMLJNG1

DISKPART> _
```

4. Run 'list disk' in the command prompt.
Check that Disk0 and Disk1 are displayed.



```
Administrator: Command Prompt - diskpart

DISKPART> list disk

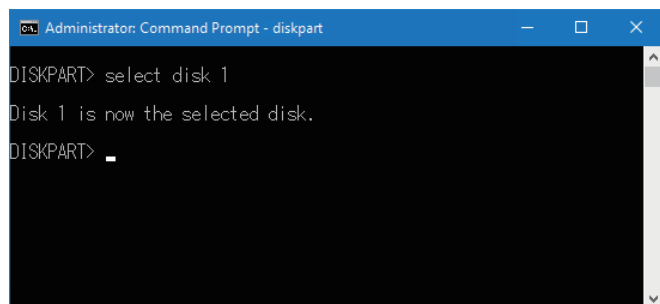
Disk ###  Status       Size      Free      Dyn  Gpt
-----  -
Disk 0    Online       45 GB     512 MB
Disk 1    Online       60 GB     1024 KB

DISKPART> _
```

Point

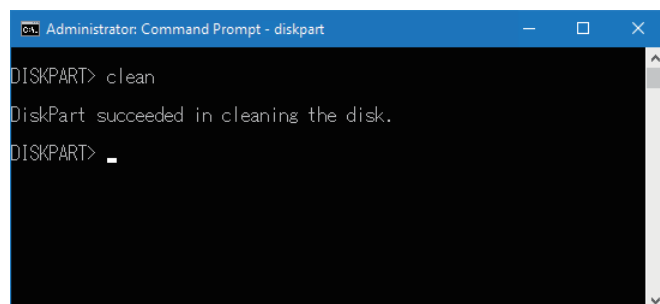
If a storage device other than a CFast card is connected, another disk is displayed. In that case, remove the storage device and follow the procedure above again.

5. Run 'select disk 1' in the command prompt.



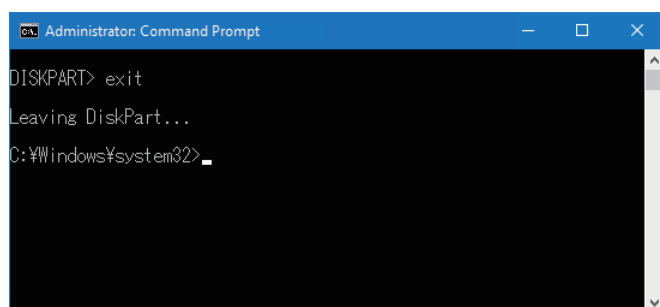
A screenshot of a Windows Command Prompt window titled "Administrator: Command Prompt - diskpart". The prompt shows the command "select disk 1" being entered. The output is "Disk 1 is now the selected disk." followed by a new prompt line "DISKPART> _".

6. Run 'clean' in the command prompt.



A screenshot of a Windows Command Prompt window titled "Administrator: Command Prompt - diskpart". The prompt shows the command "clean" being entered. The output is "DiskPart succeeded in cleaning the disk." followed by a new prompt line "DISKPART> _".

7. Run 'exit' in the command prompt.



A screenshot of a Windows Command Prompt window titled "Administrator: Command Prompt". The prompt shows the command "exit" being entered. The output is "Leaving DiskPart..." followed by a new prompt line "C:\Windows\system32> _".

8. Close the command prompt.

5 Windows SETUP

This section shows the procedure before setting up Windows.

1. Connection of peripheral devices (Page 68 Wiring and Connecting Components)

Connect peripherals including keyboards and monitors.

2. Product power ON

Power ON the product.

3. Setup (Page 51 Setup)

Set up Windows.

4. Initial settings (Page 55 Initial Settings)

Carry out the Windows initial settings as necessary.

After configuring the initial setting, power off this product. ( Page 138 Turning OFF or Resetting This Product)

Precautions

Do not change product BIOS settings. If BIOS settings are changed, this may result in erroneous operation of the product.

5.1 Setup

When the product is started the first time or after recovery is executed, Windows setup starts when the power supply of this product is turned ON.

Perform setup in accordance with the Windows setup Wizard.

Additionally, after setup is completed, configure Windows initial settings as necessary. (📖 Page 55 Initial Settings)

Point

If the Japanese language is selected during Windows setup, then the Japanese language keyboard layout changes to an English layout (101).

To change the keyboard layout to the Japanese language keyboard layout, use the Windows settings. (📖 Page 57 Keyboard layout settings)

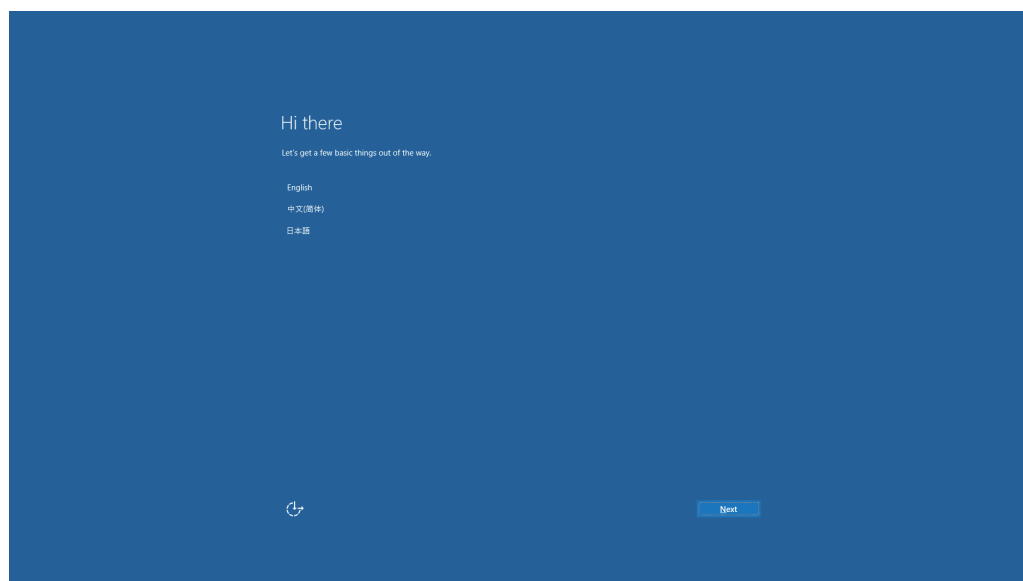
Precautions

- Do not shutdown or restart*¹ Windows or turn OFF the power supply of this product until setup is completed. Otherwise, Windows may not be set up normally.
- If this product is started after Windows was shut down or restarted or the power supply of this product was turned OFF during setup, Windows setup may not continue normally. When this happens, an error does not appear on the screen, but a part of the setup may not be carried out normally internally. Always recover Windows.

*¹ Except when the system restarts automatically.

Setup procedure

1. Select the language to use in Windows.

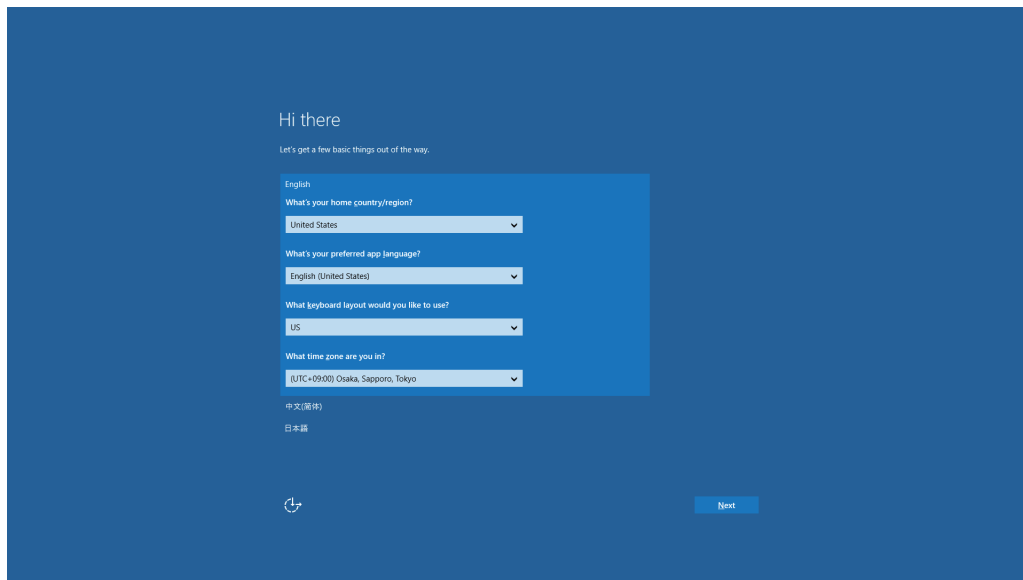


2. Set the following items, and click the [Next] button.

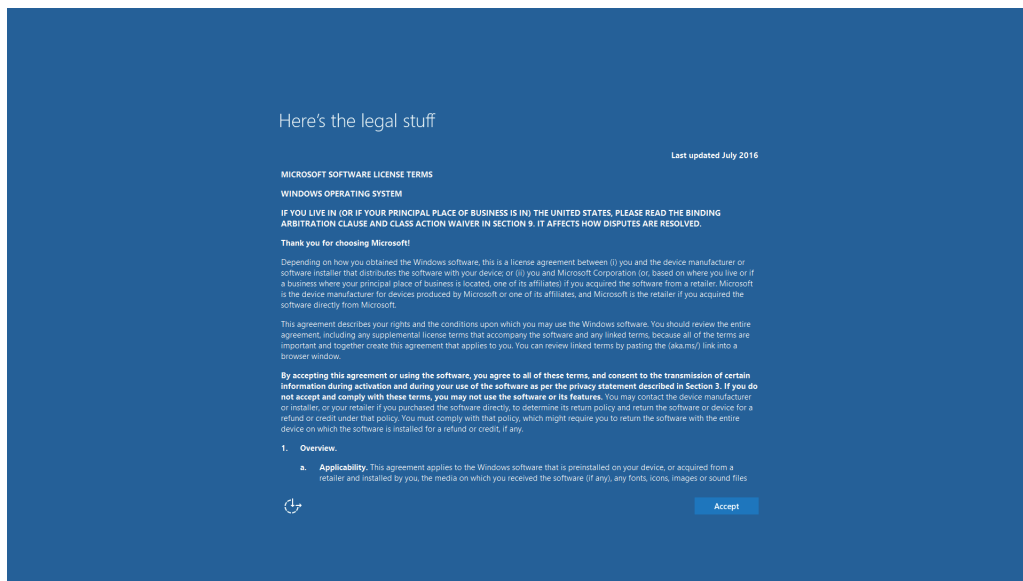
- Select your home country/region.
- Select a preferred app language. * 1
- Select a keyboard layout to use. * 2
- Select a current time zone.

*1 Select the same language to use in the application as that selected in language selection.

*2 If Japanese was selected in Step 1, then the keyboard layout cannot be selected.



3. Read the details of the license, and click the [Agree] button.



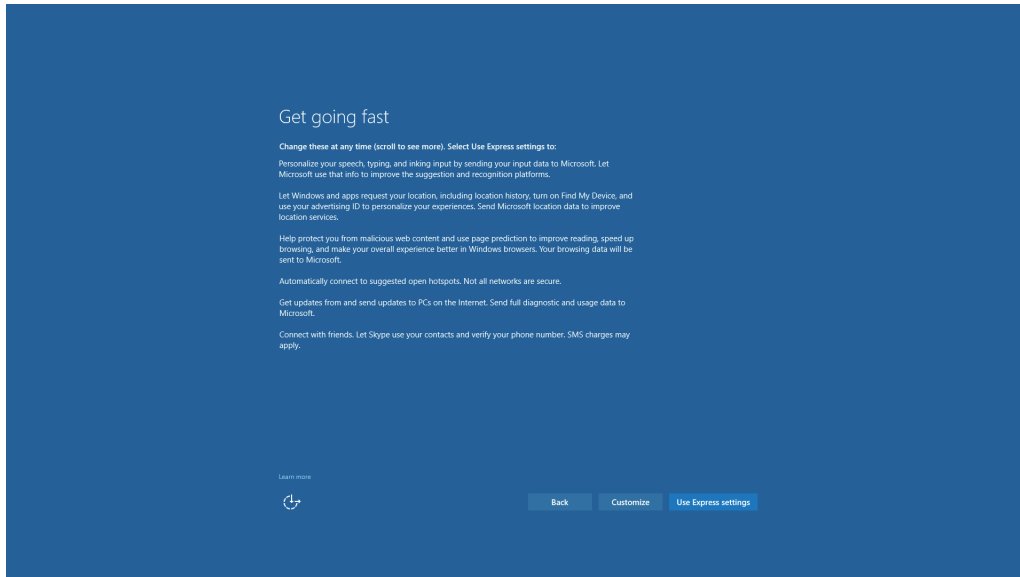
4. Select the settings method.

- If using simple settings, click the [Use Simple Settings] button.
- If not using simple settings, click the [Customize] button.



When [Customize] was selected, the following items can be configured.

- Personal settings
- Location information
- Connectivity and error reporting
- Browser, protection, and update



5

5. Set a user name and password, and click the [Next] button.



Advancing to the next setting is possible even without setting a password.

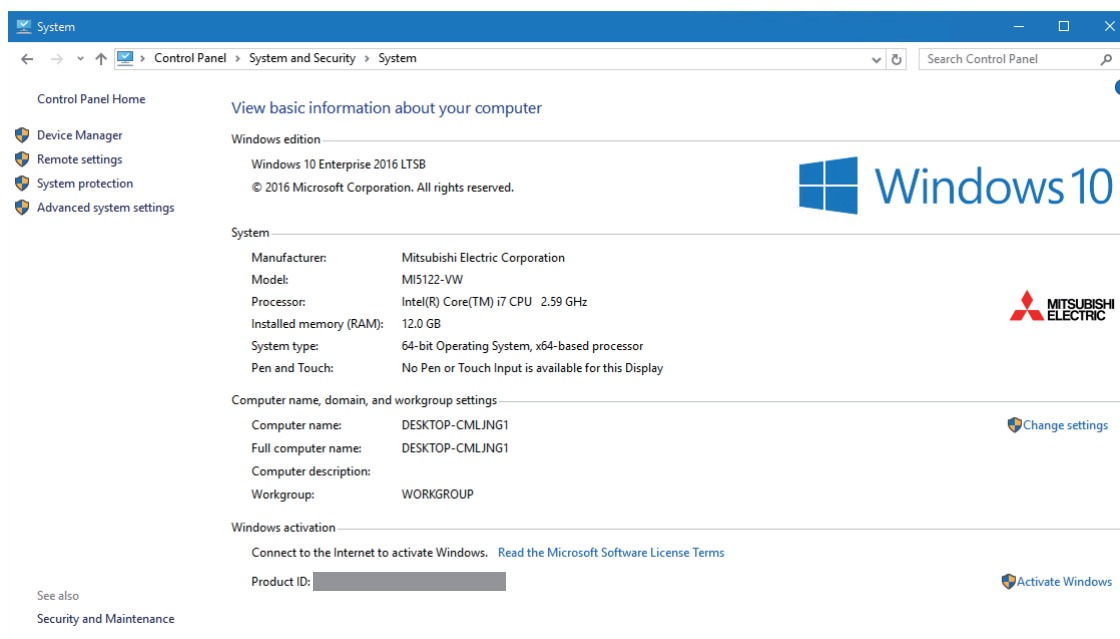
6. Soon after the username and password are set, the screen changes, and the desktop appears.
7. Windows setup is now complete.

When connecting to the Internet, performing a manual Windows Update is recommended to apply Security Update for Windows.

After Windows Update, restart the Windows part manually if Windows recommends; otherwise, Security Update content may not be applied since an automatic restart after Windows Update is disabled in this product.

System screen

When the Windows system is displayed, the following items appear.



Displayed items

Item		Description
Windows edition		Windows 10 Enterprise 2016 LTSC
System	Manufacturer	Mitsubishi Electric Corporation
	Model	MI5122-VW
	Processor	Intel® Core™ i7 CPU 2.59 GHz ^{*1}
	Installed memory	12.0 GB
	System type	64-bit operating system x64-based processor
	Pen & touch	(Displayed details will differ depending on the connected display.)
Computer name, domain, and workgroup settings		(Displayed details will correspondence to user settings.)
Windows license authentication		Not activated ^{*2}

^{*1} Because the system of this product uses the Core CPU, 2 cores can be used by the user (4 threads).

^{*2} License authentication will be carried out at connection to the Internet. Connect this product to the Internet if necessary.

5.2 Initial Settings

After setup is completed, configure Windows initial settings as necessary.
After configuring Windows initial settings, turn OFF the power supply of this product. ( Page 138 Turning OFF or Resetting This Product)

Windows update settings

To prevent an automatic restart of the Windows part by an automatic update of Windows Update while this product is in operation (a user is logged into the Windows part), change the following group policy from the Windows default settings.

Group policy	Settings after change
No auto-restart with logged on users for scheduled automatic updates installations	Enabled

Setting after change

To change the Windows Update settings, use the following procedure.

1. Starting the Local Group Policy Editor

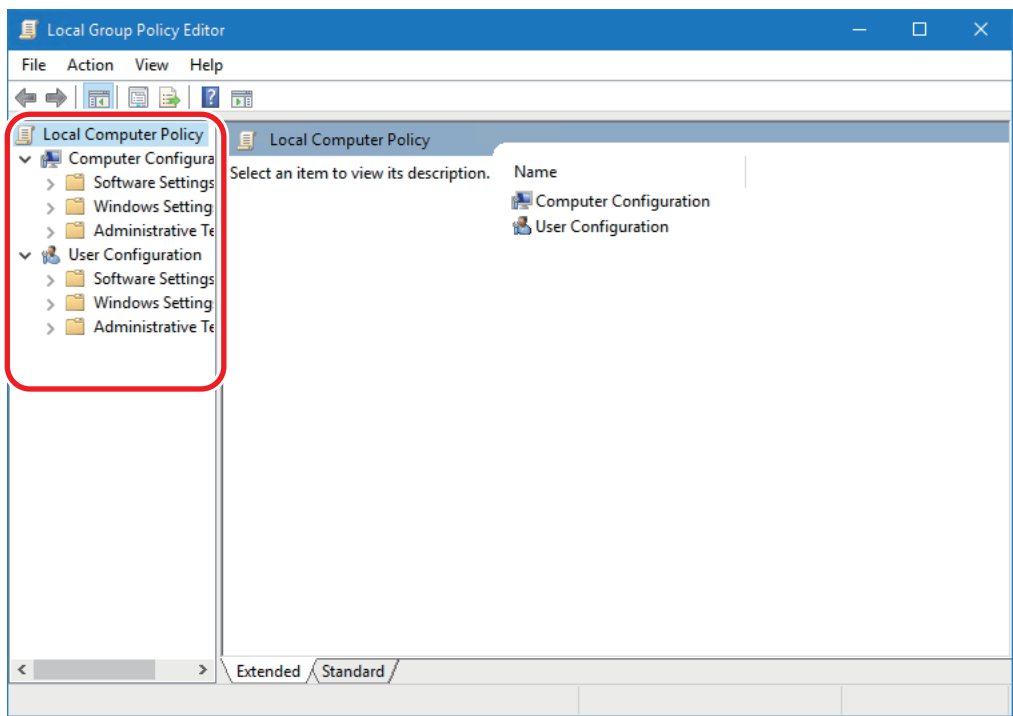
Start the Local Group Policy Editor using one of the following methods.

- For the file name, input 'gpedit.msc', and then run it
- In Windows search, input 'gpedit.msc', and then run it
- In the command prompt, input 'gpedit.msc', and then run it

2. Select Windows update settings.

In the left pane of the Local Group Policy Editor, select Windows Update.

 [Local Computer Policy]⇒[Computer Configuration]⇒[Administrative Templates]⇒[Windows Components]⇒[Windows Update]⇒[No auto-restart with logged on users for scheduled automatic updates installations]



Precautions

To update Windows, stop an automatic restart of the Windows part by selecting "Disable" for "Auto-reset Windows" in the menu selection mode. ( Page 144 Menu Operation Switch)

IP address setting

The setting to automatically acquire the Ethernet port (CH2) IP address at initial Windows startup.

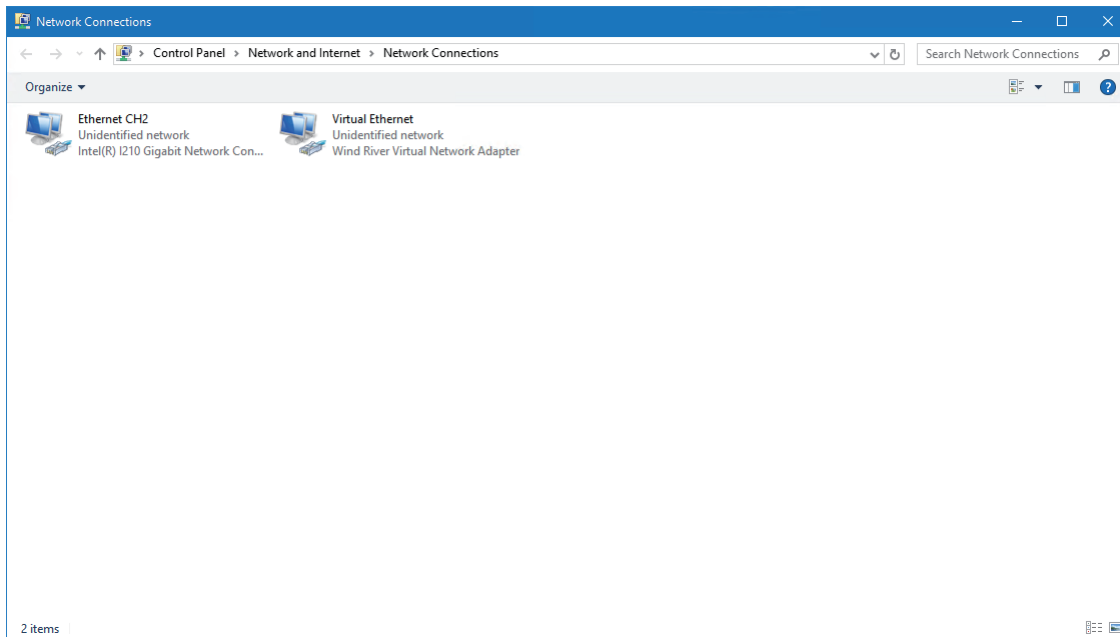
The IP address settings of Ethernet port (CH2) is changed by Ethernet CH2 (Intel I210 Gigabit Network Connection #□*1)

Change the IP address settings of the Ethernet port (CH2) as necessary.

*1 □: Number

Setting method

🖱️ Windows Start ⇒ [Windows System Tools] ⇒ [Control Panel] ⇒ [View network status and tasks] ⇒ [Change adapter settings]



Precautions

- If the Ethernet cable is not connected correctly, Ethernet CH2 (Intel I210 Gigabit Network Connection #) may not be displayed. Connect the Ethernet cable correctly.
- Do not change the virtual Ethernet (Wind River Virtual Network Adapter) settings. If the settings are changed, communication between the VxWorks part and Windows part using virtual Ethernet is no longer possible.
- The following IP address ranges cannot be set for Ethernet port (CH2).
IP address: 172.16.0.1 to 172.31.255.255
Subnet mask: 255.240.0.0

Keyboard layout settings

If the Japanese language is selected during setup, then the Japanese language keyboard layout will change to an English layout (101).

To use a Japanese language keyboard layout, change the keyboard layout.

Setting method

 Windows Start ⇒ [Settings] ⇒ [Time & language] ⇒ [Region & language] ⇒ [Languages] ⇒ click Japanese (Windows display language) ⇒ [Options] ⇒ [Hardware keyboard layout]

Time zone settings

The default time zone of this product is Japan (UTC+9:00 Osaka, Sapporo, Tokyo).

Change the setting if necessary.

Setting method

 Windows Start ⇒ [Settings] ⇒ [Time & language] ⇒ [Date and time] ⇒ [Time zone]

5

Precautions

Use the same time zone setting for the Windows part and VxWorks part. If time zone settings do not match, time data such as error and event occurrence times may not match.

To configure the time zone of the VxWorks part, refer to the following manual.

 MELIPC MI5000 Series User's Manual (Application)

Automatic configuration of time

The default setting for [Set time automatically] on this product is [Off].

Change this setting as necessary, such as when the clock data synchronization function of this product is not used.

Setting method

 Windows Start ⇒ [Settings] ⇒ [Time & language] ⇒ [Date and time] ⇒ [Set time automatically]

Configuration of .NET Framework 3.5

The settings of .NET Framework 3.5 of this product are enabled.

Change the setting if necessary.

Setting method

 Windows Start⇒[Settings]⇒[System]⇒[Apps & features]⇒[Programs & Features]⇒[.NET Framework 3.5 (includes .NET 2.0 and 3.0)]

5.3 Restrictions

The following shows the restrictions for Windows.

Change of partitions

Do not change the partitions (change partition size, split a partition, etc.) on the device upon which Windows is installed (including the C: drive). If a partition is changed, the product may not work correctly.

Sleep

Windows sleep is not supported.

Recovery options

Windows recovery options are not supported.

From Windows recovery options, do not use "Restore from system restore point", "Return PC to initial state", or similar options. To return Windows to its initial state, recover Windows. (👉 Page 153 Recovery of Windows)

6 WIRING AND CONNECTION OF SYSTEM COMPONENTS

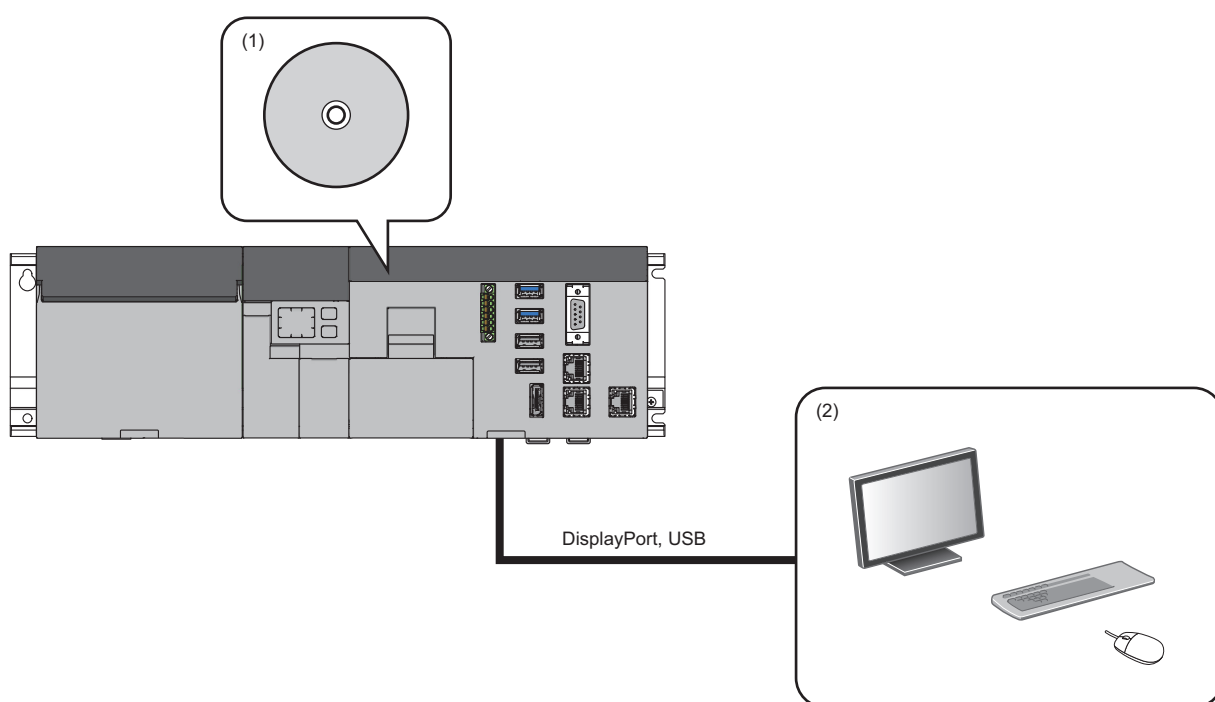
This section shows the system configuration of this product, and wiring and connection of components.

6.1 Development Configuration

This section shows the system configuration using this product in a development configuration.

Standalone development configuration

Connect peripherals (keyboard, monitor, display, etc.) to this product, and then develop user programs on this product. It is not necessary to prepare a separate personal computer for user program development, and operation can be checked soon after a program is compiled.

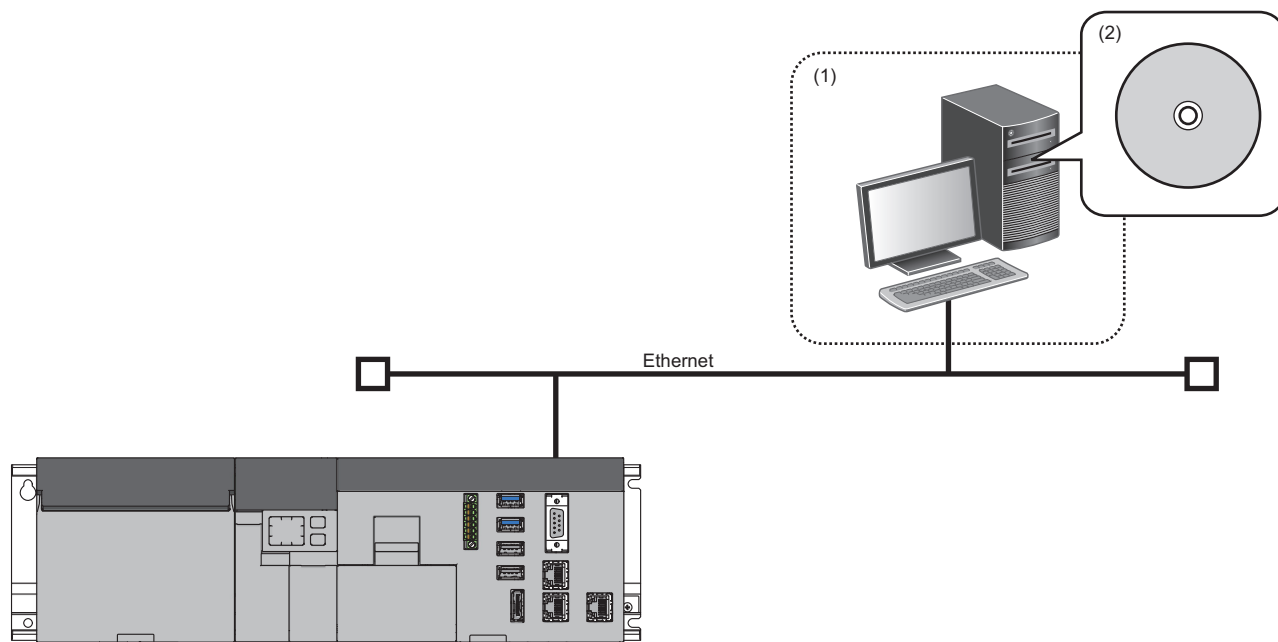


(1) Development software (MI Configurator, CW Workbench 4, Visual Studio®, etc.)

(2) Peripherals (display, mouse, keyboard, etc.)

Cross development configuration

Prepare a development environment (personal computer) separate from this product, and then develop user programs. This is optimal for development of embedded programs.

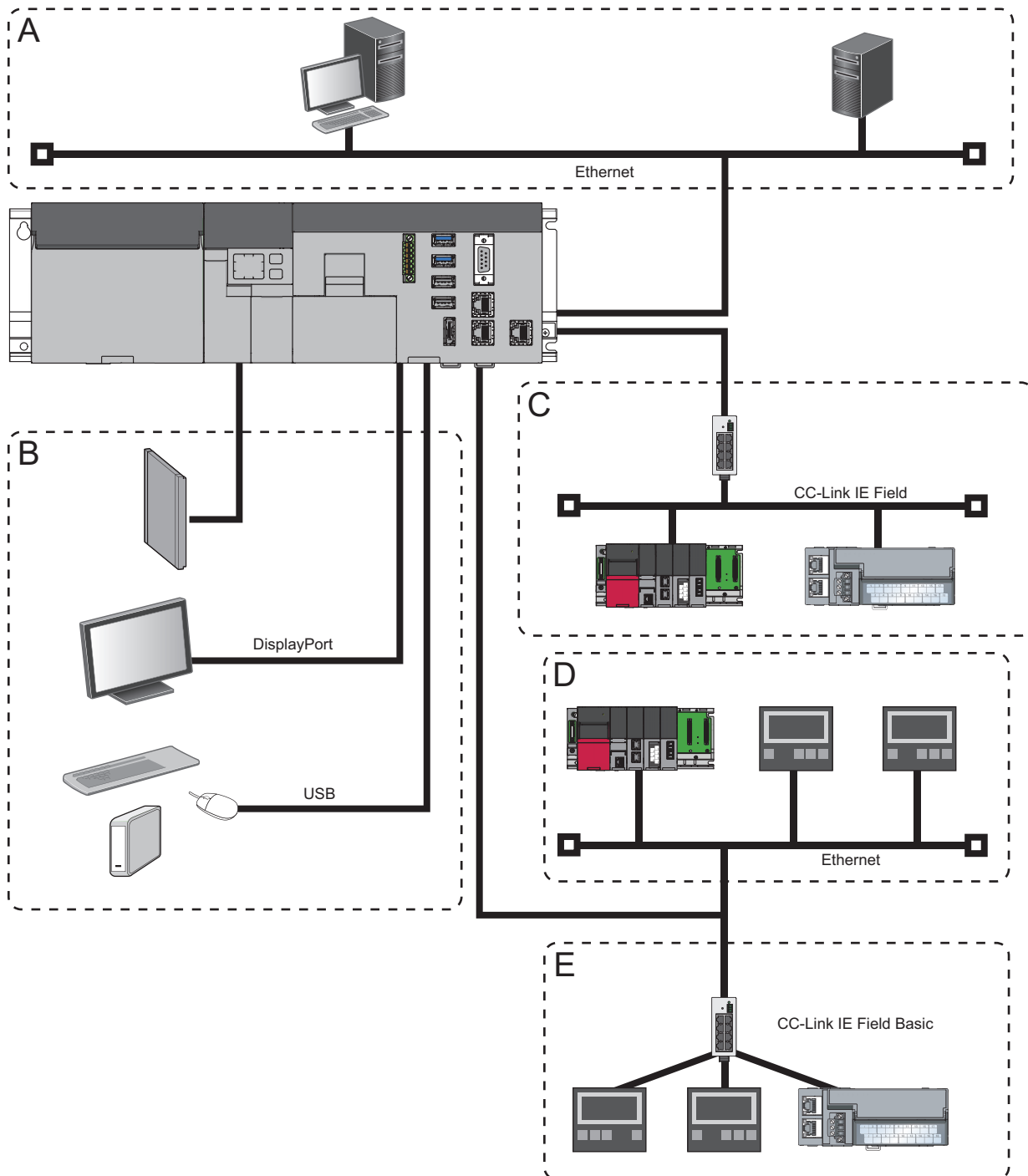


(1) Development environment (personal computer)

(2) Development software (MI Configurator, CW Workbench 4, Visual Studio®, etc.)

6.2 System Configuration

The following shows the system configuration using this product.



A: PCs, file/mail servers, cloud, etc.

B: peripheral devices (monitors, CFast cards, and USB devices)

C: Devices supporting CC-Link IE Field Network

D: Ethernet device (SLMP-compatible device)

E: Devices supporting CC-Link IE Field Network Basic

6.3 Network Configurations

This section shows the network configuration of this product.

Ethernet configuration

The following shows the Ethernet configuration using this product.

Ethernet comprises the product Ethernet port and Ethernet cabling.

Ethernet port (CH1)

The Ethernet port (CH1) is managed by the VxWorks part of this product.

This port is used to connect to a SLMP-compatible device or a peripheral device such as MELSOFT or GOT.

For 'SLMP function' and 'MELSOFT product and GOT connection function,' refer to the following:

 MELIPC MI5000 Series User's Manual (Application)

Ethernet port (CH2)

The Ethernet port (CH2) is managed by the Windows part of this product.

This port is used to connect to a system or device for linking to higher-levels such as cloud and to connect an Ethernet device and application such as SLMP Data Collector, which runs on the Windows part.

CC-Link IE Field Network configuration

This section shows the CC-Link IE Field Network configuration using this product.

The CC-Link IE Field Network comprises the CC-Link IE Field Network connector of this product and the Ethernet cable.

Point

For details on CC-Link IE Field Network devices supported by this product, refer to the following catalog.
Ethernet-based Open Network CC-Link IE Product Catalog (L-08111E)

Network topology

CC-Link IE Field Network devices are connected using Ethernet cables using a star connection or line connection.

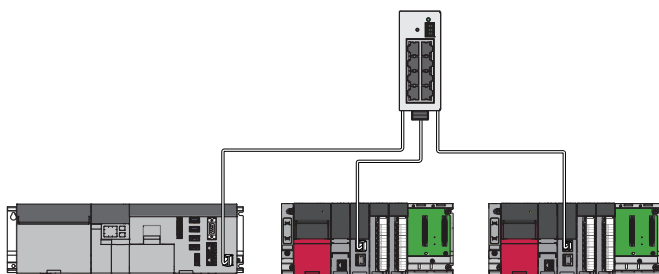
Point

Star connections and line connections can be combined on a single network.

Star connection

CC-Link IE Field Network devices are connected to a star connection by using a switching hub.

Use of star connections enables, for example, easy addition of slave stations.



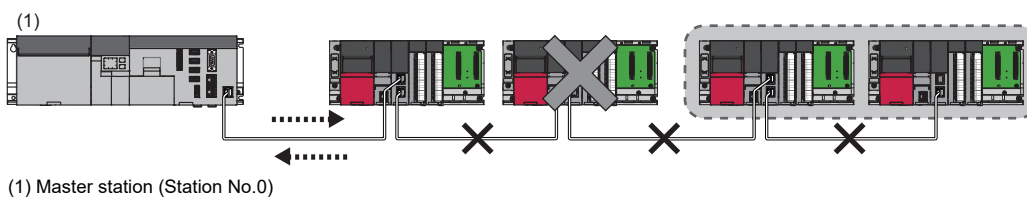
Line connection

CC-Link IE Field Network devices are connected to a line connection.

Line connections can be connected without using a switching hub.

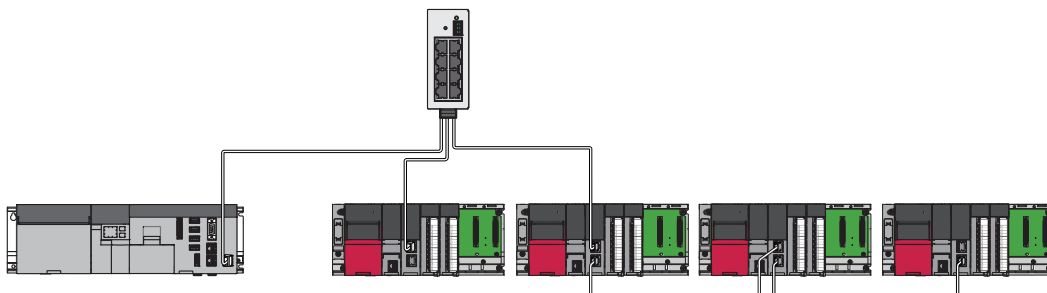


If an error occurs in some slave stations, stations further along the line are disconnected.



Mixing of star and line connections

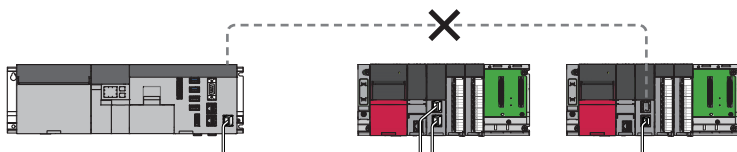
Star and line connections can be mixed for connections.



Precautions

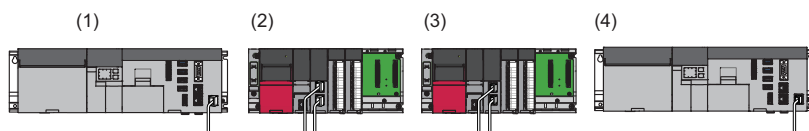
This product does not support the following connections.

■Ring connection



Station No. and connection position

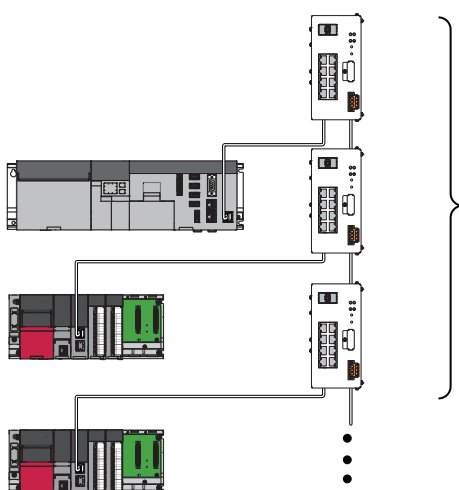
CC-Link IE Field Network devices do not need to be connected in station number order.



- (1) Station No.1
- (2) Station No.3
- (3) Station No.2
- (4) Station No.0 (Master station)

Cascade connection

Cascade connection of switching hubs can be up to 4 levels.



Considerations when configuring the CC-Link IE Field Network

This section presents the considerations when configuring the CC-Link IE Field Network.

■ Adding and removing slave stations

Add and remove slave stations one by one. If two or more stations are added or removed, all stations reconnect to the network, so all stations may have errors momentarily. Additionally, if further slave stations are added when 120 slave stations are connected, the 121st and subsequent stations do not perform baton passes or data links, while the other stations continue baton passes and data links. When 121 or more stations are connected, even disconnected stations that are reconnected may not start data links.

Point

- Confirmation as to whether 121 or more slave stations (including sub master stations) is possible in 'Connected device number excess occurrence status' (SB0099). The number of connected stations detected using 'Connected device number excess occurrence status' (SB0099) is the total of currently connected slave stations and previously connected slave stations (disconnected stations).
- By updating the CC-Link IE Field Network diagnosis network configuration, it is possible to reset the number of stations that were connected in the past. (MELIPC MI5000 Series User's Manual (Application))
- Updating the network configuration carries out reconnection processing for all stations on the network, therefore this results in a momentary data link error for all stations, with output OFF for connected slave stations. Configure in order to save output as necessary. (Page 65 Output retention at data link abnormality)

■ If cables are removed then reinserted, or power turned OFF/ON

The actual network configuration and the CC-Link IE Field diagnosis network configuration may at times not match. Confirmation as to whether these match is possible in 'Network configuration mismatch occurrence status' (SB0098).

Point

- By updating the CC-Link IE Field Network diagnosis network configuration, it is possible to match the actual network configuration with the network configuration diagram. (MELIPC MI5000 Series User's Manual (Application))
- When the network configuration is updated, all stations reconnect to the network, so all stations may have errors momentarily and output may be OFF for connected slave stations. Configure as necessary to maintain output. (Page 65 Output retention at data link abnormality)

Network configuration (Transmission line type) and operation

Network configuration	Operation
Star connection	<ul style="list-style-type: none"> • Turning slave station or switching hub power OFF/ON • Removal and reinsertion of an Ethernet cable connected to a switching hub • Changing an Ethernet cable connect destination to another slave station or switching hub • Disconnecting 10 or more devices, or more than half the slave stations • When adding slave stations, changing the network topology
Line connection	<ul style="list-style-type: none"> • Turning the power to 2 or more stations OFF or ON • Removal and reinsertion of Ethernet cables from two or more stations (when stations with a data link abnormality are reconnected, data link abnormalities result for all stations.) • Disconnecting 10 or more devices, or more than half the slave stations • When adding slave stations, changing the network topology

■ Output retention at data link abnormality

This product retains output at data link abnormality.

■ Station number of connection station

Ensure no duplication when setting station numbers.

If there is duplication in station numbers, then data link may stop.

CC-Link IE Field Network Basic configuration

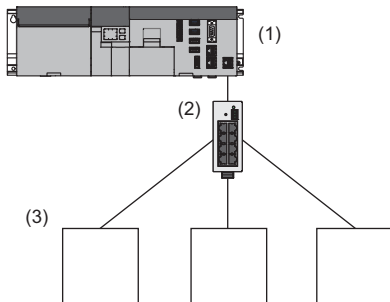
This section shows the CC-Link IE Field Network Basic configuration using this product.
CC-Link IE Field Network Basic comprises the Ethernet port (CH1) and an Ethernet cable.



Use modules and partner products supported by CC-Link IE Field Network Basic when configuring the network.

Network topology

Connect in a star configuration using switching hubs and general-purpose Ethernet cables.



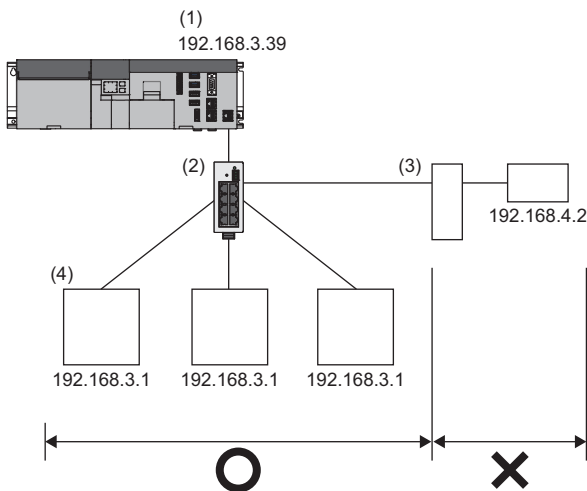
- (1) Master station
- (2) Switching hub
- (3) Slave station

access range

The access range of the CC-Link IE Field Network Basic is within the same network address of the Ethernet . Ranges outside the router cannot be accessed.

Ex.

If subnet mask 255.255.255.0 and network address 192.168.3.□



- (1) Master station
- (2) Switching hub
- (3) Router
- (4) Slave station



Have the subnet mask as the same value, and ensure there is no duplication in IP addresses.

number of link points

Link point numbers per slave station are for RX/RV: 64 points, and for RWr/RWw: 32 points.

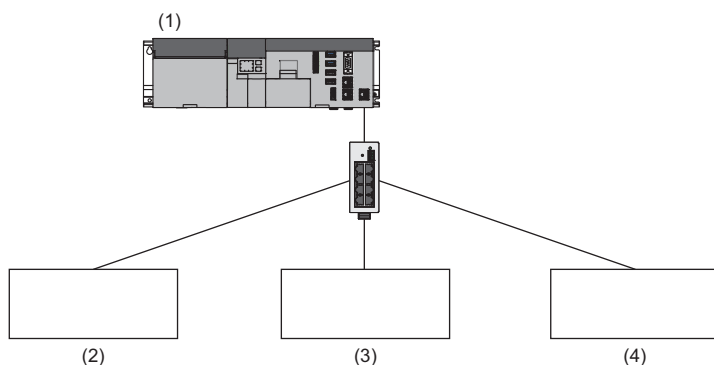
However, when changing the number of occupied stations, these can be set up to a maximum of 256 points by 64 point units for RX/RV, and 128 points by 32 point units for RWr/RWw. For the applicability of changing the number of occupied stations, refer to the manual of the slave station in use.

Point

Changing the slave station link point numbers will change the assigned range and station numbers.

Ex.

Number of link points when 3 slave stations are connected



(1) Master station

(2) Slave station 1: 1 station occupied

(3) Slave station 2: 2 station occupied

(4) Slave station 3: 4 station occupied

The following table shows the number of link points.

Slave station	Number of occupied stations	number of link points					
		RX/RV			RWr/RWw		
		Number of points	Start	End	Number of points	Start	End
Slave station 1	1 station occupied	64 points	0	3F	32 points	0	1F
Slave station 2	2 station occupied	128 points	40	BF	64 points	20	5F
Slave station 3	3 station share	256 points	C0	1BF	128 points	60	DF

Point

Having slave station link point numbers as two stations occupied is the same as having two 2 slave stations connected. Accordingly, increasing the number of slave station link points means that the number of slave stations that can be connected to a single network will decrease.

6.4 Wiring and Connecting Components

This section shows wiring and connection of this product and components.

Point

For details on wiring, refer to the following page.

 Page 156 Wiring

Precautions

Before wiring and connecting this product, be sure to power OFF the product.

Peripheral devices

The following shows the peripherals to connect to this product.

Monitor

Monitors that comply with DisplayPort standards can be connected using a DisplayPort cable.

The monitor is used to output the screen of Windows.

CFast card

A CFast card can be inserted in the CFast card slot of the product.

The CFast card can increase the storage of Windows and be used to store arbitrary folders and files.

USB devices

Devices supporting USB3.0 and USB2.0 can be connected.

Use USB compatible keyboards and mouse devices for Windows input.

Ethernet connected devices and external personal computers

Ethernet connected devices and external personal computers can be connected to the Ethernet ports (CH1 and CH2) of this product.

Connection with other devices and stations

Connect other devices and stations via Ethernet to the Ethernet port (CH1) of this product to enable data collection/change, operations monitoring, status control, and transfer of other data.

Devices supporting CC-Link IE Field Network

For CC-Link IE Field Network devices that can be used this product, refer to the following catalog.

 Ethernet-based Open Network CC-Link IE Product Catalog (L-08111E)

Devices supporting CC-Link IE Field Network Basic

For modules that support CC-Link IE Field Network Basic slave stations, refer to the manuals of each of these products.

GOT

GOT that supports this product can be connected to the Ethernet port (CH1) of this product.



- GOT can be connected by the CC-Link IE Field Network route.
 - GOT transparent connections are also possible as a connection route of MI Configurator.
-

RS-232 connectable device

An RS-232 supported device can be connected to the RS-232 connector on this product.

7 PARAMETER SETTINGS

This section shows the workflow up to the setting of parameters of this product.

1. Creating a project

Create a new project.

2. Setting parameters

Configure the parameters of this product.

3. Writing parameters

Write the configured parameters to this product.

After writing the parameters, power OFF this product. (👉 Page 138 Turning OFF or Resetting This Product)

Point

Use MI Configurator, which is installed on this product, to configure parameters.

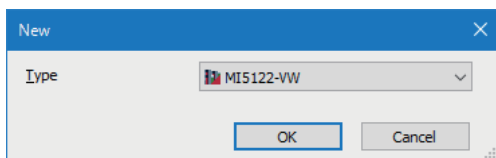
Settings of the connection destination are not necessary for MI Configurator that is installed on this product because they are the settings to connect to the VxWorks part of this product. (📖 MI Configurator Operating Manual)

7.1 Project Creation

Start MI Configurator and create a project.

Window

🖱️ [Project] ⇒ [New]



Operating procedure

In the "New" screen, select the product, and click the [OK] button.

7.2 Parameter Settings

Configure the parameters of this product.

Parameters

For details on each parameter, refer to the following manual.

📖 MELIPC MI5000 Series User's Manual (Application)

■ Basic parameters

🖱️ [Navigation window] ⇒ [Parameter] ⇒ [MI5122-VW] ⇒ [Basic Parameter]

■ CC-Link IE Field Network Parameters

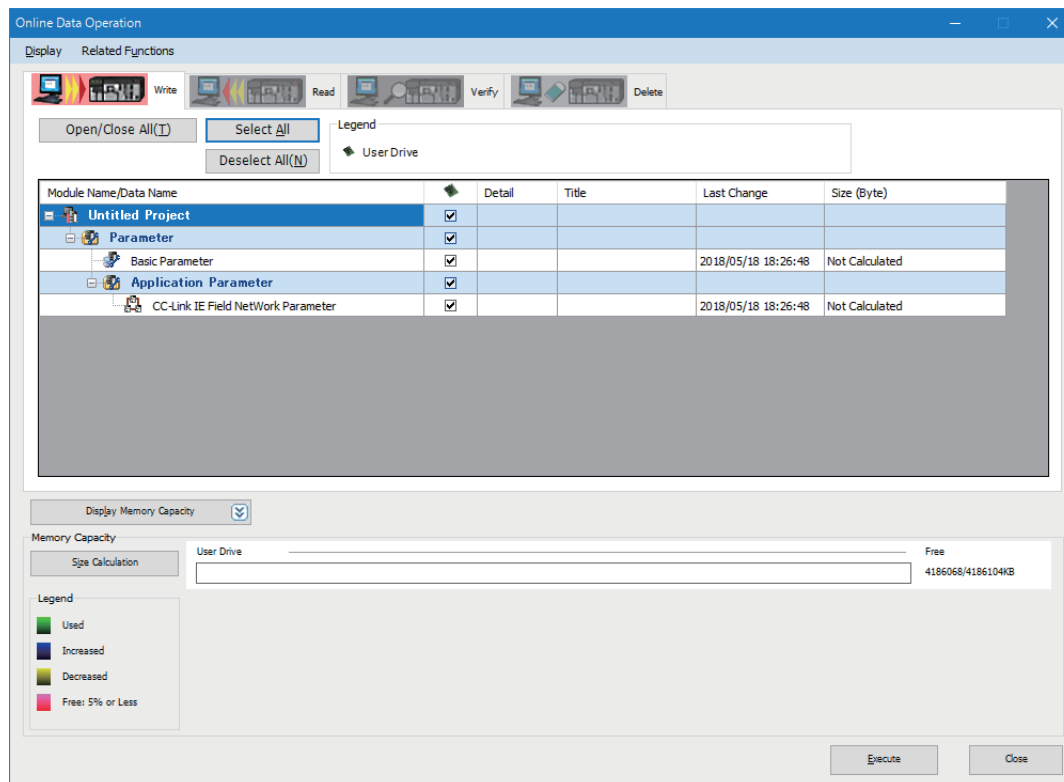
🖱️ [Navigation Window] ⇒ [Parameter] ⇒ [MI5122-VW] ⇒ [Applicable Parameters] ⇒ [CC-Link IE Field Network Parameters]

7.3 Parameter Writing

Write parameters.

Window

 [Online]⇒[Write to MELIPC]



7

Operating procedure

1. Select the parameters to be written to the product, and then click the [Execute] button.
2. After the writing of the parameters is complete, click the [Close] button.

8 ERROR CHECK

This section shows the workflow up to the confirmation of errors that occurred with this product.

- 1.** Turn ON the power of the system.
- 2.** After this product starts, check the MAIN ERR LED.

If the MAIN ERR LED is on or flashing, an error has occurred.

Check the error and eliminate the cause. (☞ Page 94 TROUBLESHOOTING)

9 CREATION AND REGISTRATION OF USER PROGRAMS

This section shows the creation and registration of the user programs for the Windows part and VxWorks part. Create and register user programs that suit the operating systems to run the user programs.



After registration, the user program runs after the power supply of the product is turned OFF to ON or after a reset.

9.1 Structure of Each Dedicated Function Library

The dedicated function library of this product is made up of two function groups: C Controller module dedicated functions and MELSEC communication functions. Both libraries can be used with C language and C++ language programs. Furthermore, C Controller module dedicated functions and MELSEC communication functions can be used together with one program.

C controller module dedicated function

The C Controller module dedicated functions are a dedicated function library that uses the following functions of this product.

- Functions associated with the VxWorks part (clock function, diagnostic function, maintenance function, etc.)
- Functions to access the hardware devices unique to this product under control of the VxWorks part. (LED, switches, Ethernet port (CH1), CC-Link IE Field Network, etc.)
- OS linking function
- Programming assistance functions that can be used for development of user programs of the VxWorks part (timers, etc.)

The C Controller module dedicated functions have a VxWorks part function library that can be used on the VxWorks part of this product and a Windows part function library that can be used on the Windows part.

However, some C Controller module dedicated functions cannot be used on the Windows part as shown below.

Function	Usage conditions
Functions associated with the VxWorks part	Only functions that satisfy the following conditions can be used on the Windows part. <ul style="list-style-type: none">• Functions that do not generate obstacles to functions and performance when run in a Windows environment.• Usage by a user program of the Windows part can be assumed.
Functions to access the hardware devices unique to this product under control of the VxWorks part	
OS linking function	All C Controller module dedicated functions can be used.
Programming assistance functions that can be used for development of user programs of the VxWorks part	No C Controller module dedicated functions can be used.

For the usage applicability of the dedicated function library, refer to the following page.

Page 76 Usage applicability list for dedicated function libraries

MELSEC data link function

MELSEC data link functions are a function library of communication functions that can be used independent of protocols types.

A program to communicate with a MELSEC product can be created regardless of destination hardware or communication protocol by using the MELSEC data link functions.

The MELSEC data link functions of this product have the following features.

- Can use the CC-Link IE Field Network as a communication method with external MELSEC equipment.
- Can access programmable controller devices of the product itself by specifying the product itself as the communication partner.

MELSEC communication functions can be used only on the VxWorks part of this product.

For the usage applicability of the dedicated function library, refer to the following page.

 Page 76 Usage applicability list for dedicated function libraries

Usage applicability list for dedicated function libraries

This section shows the usage applicability of dedicated function libraries.

C controller module dedicated function

○: Available, ×: Not available

Function	Function name	Description	Applicability	
			VxWorks part	Windows part
Clock function	CCPU_GetRTC	Acquires the clock data (local time) of a MELIPC.	○	×
	CCPU_SetRTC	Sets the clock data (local time) of a MELIPC.	○	×
CC-Link IE Field Network function	CCPU_StartLinkDeviceAssurance	Sets data assurance for the link devices of CC-Link IE Field Network.	○	×
	CCPU_EndLinkDeviceAssurance	Ends data assurance for the link devices of CC-Link IE Field Network.	○	×
	CCPU_EntryLinkScanEndFunc	Registers a routine to be executed when link scans of CC-Link IE Field Network is completed.	○	×
CC-Link IE Field Network Basic function	CCPU_StartCCIEFBDataAssurance	Starts data assurance for link devices of CC-Link IE Field Network Basic.	○	×
	CCPU_EndCCIEFBDataAssurance	Ends data assurance for link devices of CC-Link IE Field Network Basic.	○	×
	CCPU_EntryCCIEFBLinkScanEndFunc	Registers a routine to be executed when link scans of CC-Link IE Field Network Basic is completed.	○	×
	CCPU_ChangeCCIEFBCycPrm	Changes the operation parameter of the cyclic transmission of the CC-Link IE Field Network Basic function.	○	×
	CCPU_RestoreDefaultCCIEFBCycPrm	Restores the operation parameter of cyclic transmission of CC-Link IE Field Network Basic to the default value (which is set in the parameter).	○	×
	CCPU_GetCCIEFBDiagnosticInfo	Acquires the diagnostic information of CC-Link IE Field Network Basic.	○	×
Programmable controller device access functions	CCPU_ReadDevice	Reads data from the internal user devices and internal system devices of a MELIPC.	○	○
	CCPU_WriteDevice	Writes data to internal user devices and internal system devices.	○	○
	CCPU_SetDevice	Sets internal user devices and internal system devices (bit devices) of a MELIPC.	○	○
	CCPU_ResetDevice	Resets internal user devices and internal system devices (bit devices).	○	○
	CCPU_ReadLinkDevice	Reads data from own station link devices of CC-Link IE Field Network.	○	○
	CCPU_WriteLinkDevice	Writes data to own station link devices of CC-Link IE Field Network.	○	○
	CCPU_FromBuf	Reads data from the buffer memory.	○	○
	CCPU_ToBuf	Writes data to the buffer memory.	○	○
Watchdog timer function	CCPU_StartWDT	Sets and starts a user watchdog timer.	○	×
	CCPU_ResetWDT	Resets a user watchdog timer.	○	×
	CCPU_StopWDT	Stops a user watchdog timer.	○	×
	CCPU_EntryWDTInt	Registers a routine to be called when a user watchdog timer error interrupt occurs.	○	×
Operating status management function	CCPU_ClearError	Clears errors.	○	×
	CCPU_GetErrInfo	Acquires error information of a MELIPC.	○	×
	CCPU_GetCpuStatus	Acquires the operating status of a MELIPC.	○	×
	CCPU_GetPowerStatus	Acquires the power supply status of a MELIPC.	○	×
	CCPU_Control	Sets the MELIPC operating status to RUN/STOP.	○	×
	CCPU_Reset	Resets a MELIPC.	○	×
	CCPU_WinReset	Forces a restart of the Windows part of a MELIPC.	○	×
	CCPU_MELIPCShutdown	Shuts down a MELIPC.	○	×

Function	Function name	Description	Applicability	
			VxWorks part	Windows part
Event history function	CCPU_RegistEventLog	Registers event logs to an event history.	○	×
Interface functions (operation functions/ display functions)	CCPU_EntryShutdownFunc	Registers a routine to be called before the MELIPC shutdown function is executed.	○	×
	CCPU_EntryWinResetFunc	Registers a routine to be called before a Windows forced-restart of the individual reset function is executed.	○	×
	CCPU_GetSwitchStatus	Acquires the statuses of the switches of a MELIPC.	○	×
	CCPU_GetLEDStatus	Acquires the status of the display LED of a MELIPC.	○	×
	CCPU_SetLEDStatus	Sets the INFO LED status of a MELIPC.	○	×
	CCPU_GetDotMatrixLED	Acquires the values displayed on the dot matrix LED of a MELIPC.	○	×
	CCPU_SetDotMatrixLED	Sets values to be displayed on the dot matrix LED of a MELIPC.	○	×
OS linking function	CCPU_ReadSharedMemory	Reads data of the shared memory.	○	○
	CCPU_WriteSharedMemory	Writes data to the shared memory.	○	○
	CCPU_SendInterOSEvent	Notifies inter OS events.	○	○
	CCPU_ReceiveInterOSEvent	Waits for notification of inter OS events.	○	○
Programming assistance functions	CCPU_EntryTimerEvent	Registers a timer event.	○	×
	CCPU_GetCounterMillis	Acquires a 1 ms counter value of a MELIPC.	○	×
	CCPU_GetCounterMicros	Acquires a 1 μs counter value of a MELIPC.	○	×
	CCPU_GetSerialNo	Acquires the serial number of a MELIPC.	○	×
	CCPU_ShutdownRom	Shuts down the user drive of the VxWorks part and sets it to a state in which the power can be turned OFF.	○	×
	CCPU_SysClkRateGet	Reads a system clock rate.	○	×
	CCPU_SysClkRateSet	Writes a system clock rate.	○	×
	CCPU_WaitSwitchEvent	Waits for a switch interruption event of a MELIPC to occur.	○	×
	CCPU_WaitTimerEvent	Waits for a timer event to occur.	○	×

C Controller module dedicated functions for ISR

○: Available, ×: Not available

Function	Function name	Description	Applicability	
			VxWorks part	Windows part
Programmable controller device access functions	CCPU_ReadDevice_ISR	Reads data from the internal user devices and internal system devices of a MELIPC.	○	×
	CCPU_WriteDevice_ISR	Writes data to internal user devices and internal system devices.	○	×
	CCPU_SetDevice_ISR	Sets internal user devices and internal system devices (bit devices) of a MELIPC.	○	×
	CCPU_ResetDevice_ISR	Resets internal user devices and internal system devices (bit devices).	○	×
	CCPU_ReadLinkDevice_ISR	Reads data from own station link devices of CC-Link IE Field Network.	○	×
	CCPU_WriteLinkDevice_ISR	Writes data to own station link devices of CC-Link IE Field Network.	○	×
	CCPU_FromBuf_ISR	Reads data from the buffer memory.	○	×
	CCPU_ToBuf_ISR	Writes data to the buffer memory.	○	×
Event history function	CCPU_RegistEventLog_ISR	Registers event logs to an event history.	○	×
Interface functions (operation functions/ display functions)	CCPU_SetLEDStatus_ISR	Sets the INFO LED status of a MELIPC.	○	×
	CCPU_GetDotMatrixLED_ISR	Acquires the values displayed on the dot matrix LED of a MELIPC.	○	×
	CCPU_SetDotMatrixLED_ISR	Sets values to be displayed on the dot matrix LED of a MELIPC.	○	×
Programming assistance functions	CCPU_GetCounterMillis_ISR	Acquires a 1 ms counter value of a MELIPC.	○	×
	CCPU_GetCounterMicros_ISR	Acquires a 1 μs counter value of a MELIPC.	○	×

MELSEC data link function

○: Available, ×: Not available

Function	Function name	Description	Applicability	
			VxWorks part	Windows part
Programmable controller device access functions	mdDevRstEx	Resets bit devices.	○	×
	mdDevSetEx	Sets bit devices.	○	×
	mdRandREx	Reads devices randomly.	○	×
	mdRandWEx	Writes devices randomly.	○	×
	mdReceiveEx	Reads devices in a batch.	○	×
	mdRemBufWriteEx	Writes data to the buffer memory of a remote device station of CC-Link IE Field Network.	○	×
	mdRemBufReadEx	Reads data from the buffer memory of a remote device station of CC-Link IE Field Network.	○	×
	mdSendEx	Writes devices in a batch.	○	×
Operating status management function	mdControl	Performs remote RUN/STOP/PAUSE of the programmable controller CPU.	○	×
Programming assistance functions	mdClose	Closes a communication line.	○	×
	mdOpen	Opens a communication line.	○	×
	mdTypeRead	Reads the model name of programmable controller CPU.	○	×

9.2 User Programs for the Windows Part

This section shows the creation and registration procedures of the user programs of the Windows part.

1. Creation of user programs

Create a user program using development software installed in the development environment.

2. Registration of user programs

Register the user program to this product.

3. Turn the power OFF and ON or reset this product. (👉 Page 138 Turning OFF or Resetting This Product)

The user program is executed after restarting this product.

Creation of user programs

A user program is programmed in accordance with Windows specifications using the Windows standard API functions and the dedicated function libraries provided by this product.

For programming methods of Windows standard API functions, refer to the Microsoft website.

For programming methods and usable dedicated functions, refer to the following manual.

📖 MELIPC MI5000 Series Programming Manual (Windows)

Registration of user programs

Store the created user program (.exe) in the startup folder of Windows 10 IoT Enterprise.

9.3 User Programs for the VxWorks Part

This section shows the creation and registration procedures of the user programs of the VxWorks part.

1. Creation of user programs

Create the user program using CW Workbench 4.

2. Creation of script files for user program startup

Create a script file to start a user program on this product.

3. Registration of user programs

Register the user program to this product.

At this time, register the script file to start the user program as well.

4. Turn the power OFF and ON or reset this product. (Page 138 Turning OFF or Resetting This Product)

The user program is executed after restarting this product.

Creation of user programs

A user program is programmed in accordance with VxWorks specifications using the VxWorks standard API functions and the dedicated function library provided by this product.

For programming methods of VxWorks standard API functions, refer to the manual of the following version of VxWorks.

- VxWorks Version 7

For details on usable dedicated functions, refer to the following manual.

 MELIPC MI5000 Series Programming Manual (VxWorks)

Creation flow

This section shows the steps to create a user program.

Point

Use CW Workbench 4 installed in the development environment to create of user programs.

For details on CW Workbench 4, refer to the following manual.

 CW Workbench 4 Operating Manual

1. Install CW Workbench 4 in the development environment.
2. Create a user program and debug it in CW Workbench 4.
3. Create the script files for user program startup.

Precautions

The following shows the considerations for creating a user program.

■Endian format (memory allocation)

MELIPC employs little-endian format (memory allocation). Compiling user programs with little-endian format is required.

■VxWorks real-time process (RTP)

MELIPC does not support applications that run in VxWorks real-time process. Create a user program as VxWorks kernel-based application.

■Execution of a user program

To run a user program, start a task from a script file. Running a user program without starting a task may cause system malfunction.

■Starting a task that calculates floating point values

To start the following tasks, specifying the VX_FP_TASK option to the third argument of taskSpawn is required.

- A task that calculates floating point values
- A task that calls function to return floating point values
- A task that calls function for which a floating point value can be set to an argument

If the tasks above are started without specifying the VX_FP_TASK option, the operating system will out of control.

When specifying the VX_FP_TASK option in a script file, refer to the following section.

 Page 84 When specifying the VX_FP_TASK option

For details on the VX_FP_TASK option, refer to the manual for VxWorks.

■Task execution in the MELIPC STOP state

Even if the operating status of a MELIPC is in the STOP state, the user program task will not stop. To divide the process of a user program according to the MELIPC operation, use the C Controller module dedicated function (CCPU_GetCpuStatus).

■Priority of execution tasks

Set the priority of a task for running a user program as follows.

- When not to perform the access using an FTP or file sharing function while running a user program, set the priority of the user program as 100 or more (within 100 to 255). Otherwise, the system may not operate properly.
- The access using an FTP or file sharing function while running a user program is available when the processing (task) of the FTP or the file sharing function of a MELIPC operates with the priority 150. Therefore, set the priority of the user program within 151 to 255. When setting the priority within 100 to 150, set a waiting time (taskDelay) in the user program so that the FTP or file sharing function is enabled.

■To send/receive data to/from a target device in Ethernet communications

Before communicating with a target device through Ethernet, check the port number that is being used in the MELIPC using the VxWorks standard command, 'netstat' ^{*1}. Do not use the port number which has already been used for communications between the MELIPC and the target device. Doing so may result in abnormal communications.

^{*1} 'netstat' command must be run in the Telnet tool.

■When a response is not returned from a function

If an error occurs in a MELIPC, a response may not be returned from a function. Create a user program considering the aspect of this symptom.

An error occurrence status can be checked by using the C Controller module dedicated function (CCPU_GetErrInfo).

■Memory fragmentation

Reserving and releasing memory repeatedly causes memory fragmentation, and it may result incorrect system operation.

■Restrictions on MELSEC data link functions

A path for MELSEC data link function cannot be shared among multiple tasks. A path for opening/closing a task must be managed for each task.

■Considerations when changing a system clock rate

- A system clock rate must be changed, not with the VxWorks standard API function (sysClkRateSet), but with the C Controller module dedicated function (CCPU_SysClkRateSet). Otherwise, the operation on VxWorks will be unstable.

■IP address setting

Set an IP address for the VxWorks part of a MELIPC from MI Configurator. If an IP address is set using a user program, the network will not work properly.

■Considerations on interrupt service routine

A routine to execute in an interrupt service routine must be created after fully understand the specifications of VxWorks, which is the operating system on the VxWorks part of a MELIPC. Setting incorrect value to an argument or executing a function other than that for interrupt service routine may cause VxWorks runaway.

In a dedicated function library provided by MELIPC, C Controller dedicated functions for ISR can be used. To execute another dedicated function synchronizing with an interrupt, implement a notification processing to a user program and execute it in a task.

■Considerations on serial communications

To run a program for serial communications, set the communication target for serial communications to the VxWorks part using the serial I/F switching function.

Additionally, do not perform serial communications from multiple tasks; otherwise, the program may not run properly.

Script file creation

A script file (STARTUP.CMD) is a file operated by C language interpreter when this product starts. Content listed in the C language form is analyzed and executed line by line. (Conditional branches and loops cannot be used.)

By listing the load destination and task start order of the user program in the script file, the user program can be started when this product starts.

Script description

Describe the script in the following manner.

■Command description

- Only one command can be described per line.
- Up to 10 arguments can be described per command.

■Comment description

- For comments, use "/" at the start of a line.
- There are no character restrictions for comments.

■Execution of functions of "C++"

A symbol in C++ cannot be referenced directly from a script file.

Describe the function declaration section in the source code of "C++" in the following manner.

- extern "C" {function declaration section}

Point

- Commands described in the script file have the same content as listed by the VxWorks startup script. For details, refer to the manual of VxWorks.
- The following operations can be executed by describing commands in the script file.
Copying of user programs
Formatting of program memory

Ex.

When loading a user program (fileA.out) stored on the user drive (/ROM/DirA) and creating a task 'task A' to execute a function, 'funcA'.

Storage files

File		Storage destination path
Name	Description	
STARTUP.CMD	Script file to load user program	/ROM
fileA.out	User program (function "funcA" embedded))	/ROM/DirA

Task content

Task name	Priority	Stack size	Function name	Argument specification
taskA	120	5,000 bytes	funcA	Yes (1st argument: 10)

Description example of script files

```
ld(1,0,"/ROM/DirA/fileA.out")          /*(1)*/
taskSpawn("taskA",120,0,5000,funcA,10,0,0,0,0) /*(2)*/
```

(1) A file 'fileA.out' is loaded from the directory, '/ROM/DirA'.

(2) Function 'funcA' is generated by task named 'task A'. (The function 'funcA' has already been embedded in the fileA.out.)

Restriction

Up to 10 arguments can be specified per command. Therefore, up to five arguments are passed to the function entry (example: funcA) specified by taskSpawn of the description example. If more than six arguments are specified, the task does not start.

Precautions

■Usage of macro (#define)

A macro (#define) cannot be used in a script file.

■Startup of user programs

In user programs, describe commands so that the task is started^{*1} and then executed.

*1 Priority: 100 to 255

■When specifying the VX_FP_TASK option

When specifying the VX_FP_TASK option for the third argument of taskSpawn, specify "0x1000000".

The following results when the VX_FP_TASK option is specified and started for the function "funcA".

- taskSpawn("taskA",100,0x1000000,20000,funcA,0,0,0,0,0,0)

Storage location of script files

Script files can be stored on the user drive (/ROM).

Store files in the root directory of the user drive (/ROM).

Operation after registration of a script file

When a script file has been registered, the 'VX RDY LED' turns on, and the following operations are performed after the startup of this product.

- 1.** The MAIN RUN LED flashes, and the script file is run.
- 2.** After the script file is executed, the user program runs.

The MAIN RUN LED turns on and off depending on the operating status.

Registration of user programs

This section shows the registration procedure for user programs.

Storage locations

The following section shows the storage locations of user programs and script files.

For the storage configuration of this product, refer to the following section.

 Page 109 Storage configuration

■User program

Store created user programs in a folder that can be accessed from the VxWorks part of this product.

■Script files

Store script files in the root directory of the user drive (/ROM).

Registration procedure

Register the user program using the network file access function of this product.

1. Power ON the product.
2. During development in a cross development configuration, connect this product and the development environment.

Point

During an operation in a standalone development configuration, it is not necessary to connect the development environment and this product.

3. Access the user drive (/ROM) on VxWorks part of this product using the network file access function.
4. Store the user programs and script files on this product.
5. Turn the power OFF and ON or reset this product.
6. After the script file is executed, the user program is executed. ( Page 84 Operation after registration of a script file)

Precautions

A script file is necessary to execute a user program. ( Page 83 Script file creation)

PART 2

MAINTENANCE AND INSPECTION

This part shows the maintenance and inspection methods of this product.

10 MAINTENANCE AND INSPECTION

10 MAINTENANCE AND INSPECTION

This shows items that must be maintained or inspected daily or periodically to properly use the product in optimal condition at all times.

Point

- In order to prevent problems such as short circuits or bad insulation as a result of issues relating to service life or deterioration, ensure that the power supply is turned OFF when the product is not being operated for a long period of time.
- From the perspective of preventive maintenance, regular replacement of parts with a finite service life is recommended. If an ambient temperature is 40°C, a guideline is to replace the power supply module every 5 years, and the fan module every 5 to 10 years.

10.1 Daily Inspection

This section shows describes items that must be inspected daily.

Inspection Item		Inspection method	Judgment criteria	Corrective action
Product installation status	Loose	Check that mounting screws are not loose.	The screws and cover must be fixed.	Retighten the screws in order to prevent looseness.
Check installation status of the power module and fan module	Loose	<ul style="list-style-type: none"> • Check that each module is securely mounted. • Check that the fan module fixing hook is fixed securely. 	<ul style="list-style-type: none"> • Check that each module is securely mounted. • The fan module fixing hook must be fixed. 	Fix the module fixing hook securely.
Connection status	Terminal screw loosening	Tighten the terminal screw using a screwdriver.	The connector must not be loose.	Retighten the terminal screws in order to prevent looseness.
	Clearance between the solderless terminals	Check for the clearance between the solderless terminals.	The proper clearance must be provided between solderless terminals.	Provide the proper clearance.
	Connector loosening	Check for the cable connector looseness.	The connector must not be loose.	Connect the connector securely in order to ensure no looseness.
LED status	POWER LED VX RDY LED WIN RDY LED MAIN RUN LED RUN LED	Check visually.	The LED must be on.	 MELIPC MI5000 Series User's Manual (Application)
	MAIN ERR LED ERR LED FAN LED BATTERY LED		The LED must be off.	
	Dot matrix LED		The on/off status of the dot-matrix LED must be right.	Consult your local Mitsubishi representative.
Fan module	Operating noise	Confirm operating noise.	No abnormal noise.	Replace the fan module. ( Page 175 Fan module replacement)

10.2 Periodic Inspection

This section describes items that must be inspected 1 to 2 times every 6 to 12 months.

Inspect when the equipment has been relocated or modified, or wiring layout has been changed.

10

Point

- In order to prevent problems such as short circuits or bad insulation as a result of issues relating to service life or deterioration, ensure that the power supply is turned OFF when the product is not being operated for a long period of time.
- From the perspective of preventive maintenance, regular replacement of parts with a finite service life is recommended. If an ambient temperature is 40°C, a guideline is to replace the power supply module every 5 years, and the fan module every 5 to 10 years.

Inspection Item		Inspection method	Judgment criteria	Corrective action
Environment ^{*1}	Ambient temperature	Measure temperature with a thermometer.	0 to 55°C	Create the environment that satisfies the judgment criteria.
	Ambient humidity	Measure humidity with a hygrometer.	5 to 95%RH	
	Atmosphere	Measure corrosive gases.	No corrosive gases.	
Power supply voltage check		Measure voltage between 100 to 240 VAC terminals.	85 to 264 VAC	Change the supply power.
Installation	Looseness and rattling	Touch the module to check for the looseness and rattling.	The module must be mounted securely.	<ul style="list-style-type: none"> • Retighten screws in order to prevent looseness. • If the module is loose, fix with screws.
	Attachment of dirt and foreign matter	Check visually.	Dirt and foreign matter must not be attached.	Remove and clean.
Connection status	Terminal screw loosening	Tighten using a screwdriver.	The connector must not be loose.	Retighten screws in order to prevent looseness.
	Clearance between the solderless terminals	Check visually.	The proper clearance must be provided between solderless terminals.	Provide the proper clearance.
	Bends or damage to the solderless terminal	Check visually.	No bends or damage.	<ul style="list-style-type: none"> • If it is bent, correct it. • If there is any damage, replace.
	Connector loosening	Check visually.	The connector must not be loose.	Connect the connector securely in order to ensure no looseness.
Ground terminal	Attachment of dirt and foreign matter	Check visually.	Dirt and foreign matter must not be attached.	Remove and clean.
	Bends or damage to the solderless terminal	Check visually.	No bends or damage.	<ul style="list-style-type: none"> • If it is bent, correct it. • If there is any damage, replace.
Battery		Check BATTERY LED.	The LED must be off.	If the LED is on, replace the battery.
		Check the length of time after purchase of the battery.	The battery must not be used more than five years.	Replace the battery if it has been used more than 5 years.
Fan module ^{*2}	—	Check FAN LED.	The LED must be off.	<ul style="list-style-type: none"> • If the FAN LED is on, then clean the fan module. (☞ Page 90 Fan module inspection and cleaning) • If this is lit, replace the fan module. (☞ Page 175 Fan module replacement)
		Check the period of time since the manufacture of the fan module.	This must be no more than 10 years.	If 10 years or more have passed, then replace the fan module. (☞ Page 175 Fan module replacement)
	Filter clogging or soiling	Check visually.	No clogging or soiling of the filter.	Clean the filter. (☞ Page 90 Fan module inspection and cleaning)

*1 Environment within the control panel in which the product is installed.

*2 After a fan module was cleaned or replaced, always execute [Alert reset]. If it is not executed, the FAN LED does not turn on. (Even if the power supply of this product is turned off, the FAN LED turns on the next time the power supply is turned on.) (☞ Page 144 Menu Operation Switch)

Fan module inspection and cleaning

This section shows the fan module inspection and cleaning procedure.

For methods to install and remove the fan module, refer to the following.

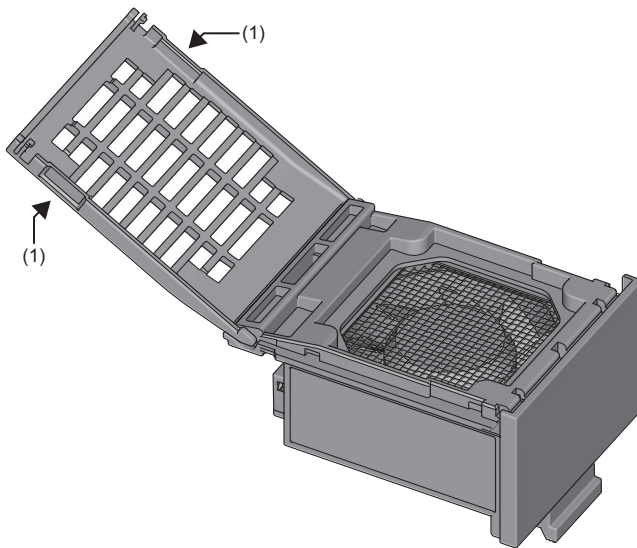
☞ Page 175 Fan module replacement

Precautions

Turn OFF the power supply of this product before inspecting or cleaning the fan module.

Inspection and cleaning procedure

1. Remove the fan module from the product.
2. Press and hold both sides (1) of the filter cover, and remove the filter cover.



3. Confirm that there is no clogging or soiling in the filter.
If there is clogging or soiling in the film to cover or filter, then wipe clean with a dry cloth.
4. Close the filter cover.
5. Install the fan module into the product.
6. Power ON the product.
7. Check that the fan module is running.
8. Execute [Alert reset]. (☞ Page 144 Menu Operation Switch)
9. Confirm that the FAN LED is off.

Precautions

- In order to avoid filter deformation or damage, do not push or scrape the filter forcefully.
- In order to prevent failure of the fan module, do not use water or detergent when cleaning. Additionally, take care to ensure dust does not enter into the fan module.
- In order to prevent poor contact, wipe off any dust on connectors.
- Do not subject the fan module to shocks from drops or falls. These may lead to failure or reduced performance.

10.3 Battery Life

Shows the battery actual service value and guaranteed value.

For battery replacement, refer to the following page.

 Page 176 Battery Replacement

Power-on time ratio ^{*1}	Actual service value ^{*2}	Guaranteed value ^{*3}
0%	43800 hours (5.00 years)	27200 hours (3.10 years)
30% or more	43800 hours (5.00 years)	35800 hours (4.08 years)

*1 Shows the ratio of the product power-ON time to 24 hours. (If the total power-on time is 12 hours, the ratio will be 50%. If the total power-on time is 6 hours, the ratio will be 25%.)

*2 The battery life is estimated based on the actual value measured by Mitsubishi under an ambient storage temperature of 40°C. This value depend on the characteristics and variation of the components, so use this as a reference value.

*3 Refers to the battery life at 75°C guaranteed by Mitsubishi in a storage ambient temperature of 75°C based on the characteristics of the memory device provided by the component manufacturer.

10.4 Fan Module Life

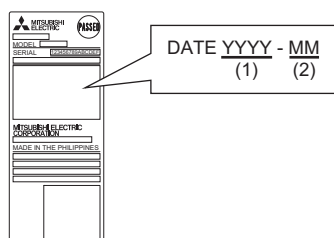
This section shows the fan module life.

The wear life of the fan module is 10 years, and the storage limit when unpowered is one year. However, the malfunctions may occur incidentally.

Confirm the date of manufacture of the fan module on its ratings panel. ( Page 190 Checking Production Information and Firmware Version)

For replacement of the fan module, refer to the following page.

 Page 175 Fan module replacement



(1) Year of manufacture

(2) Month of manufacture

Point

- When replacing the fan module, do so within 10 years from the date of manufacture, or one year after unpowered storage. If using a fan module that has exceeded this duration, then there is the possibility that the fan module may not operate correctly.
- If storing the fan module for more than a year after manufacture, power up the fan module on a yearly cycle. Additionally, carry out hardware diagnostics (Mode 2) and confirm that there are no faults in the fan module. ( Page 36 HARDWARE DIAGNOSES)

10.5 CFast Card Life

This section shows the CFast card life.

For the number of writes to the CFast card (life), refer to the manual that accompanied the CFast card.

If the number of writes (life) is exceeded, replace the CFast card.

 Page 155 Inserting and Removing a CFast Card

PART 3

TROUBLESHOOTING

PART 3

This part shows the troubleshooting for this product.

11 TROUBLESHOOTING

11 TROUBLESHOOTING

This section explains the content, causes, and solutions of errors that occur when the system is used.
If the issue is not resolved after troubleshooting, consult your local Mitsubishi representative.

Troubleshooting procedure

If trouble occurs, troubleshoot using the following procedure.

1. Check the LEDs of this product.

Check the lighting status of the LEDs of this product. (📖 MELIPC MI5000 Series User's Manual (Application))

2. Connect MI Configurator, and then execute the diagnostic function. (📖 Page 95 Checking Errors with MI Configurator)
Error causes and corrective actions can be checked. If the cause cannot be identified by the MELIPC diagnosis, check the operation and error history from the event history of MI Configurator, and then identify the cause.

3. If the cause cannot be identified by steps 1 and 2, troubleshoot each phenomenon. (📖 User's manual (application) for each module)

Point

The errors that occurred on the Windows part of this product and the rest of the error log can be checked by using the event viewer.

📖 Page 103 Checking Events with the Event Viewer

11.1 Checking Errors with MI Configurator

Check the errors occurring and event history using MI Configurator, and then identify the cause.
Information more detailed than via a visual inspection, error causes, and measures for errors can be checked.
MI Configurator has the following troubleshooting support functions.

Item	Description
MELIPC Diagnosis	Can check the operating status of this product. Can check the event information including errors that occurred, operations that were executed, and network errors.
External device configuration diagnostics	Can check the network status of the Ethernet of this product.
CC-Link IE Field diagnoses	Can check the network status of the CC-Link IE Field Network of this product.
CC-Link IE Field Basic diagnosis	Can check the network status of the CC-Link IE Field Network Basic of this product.

MELIPC diagnosis

The following information can be confirmed using MELIPC diagnosis.

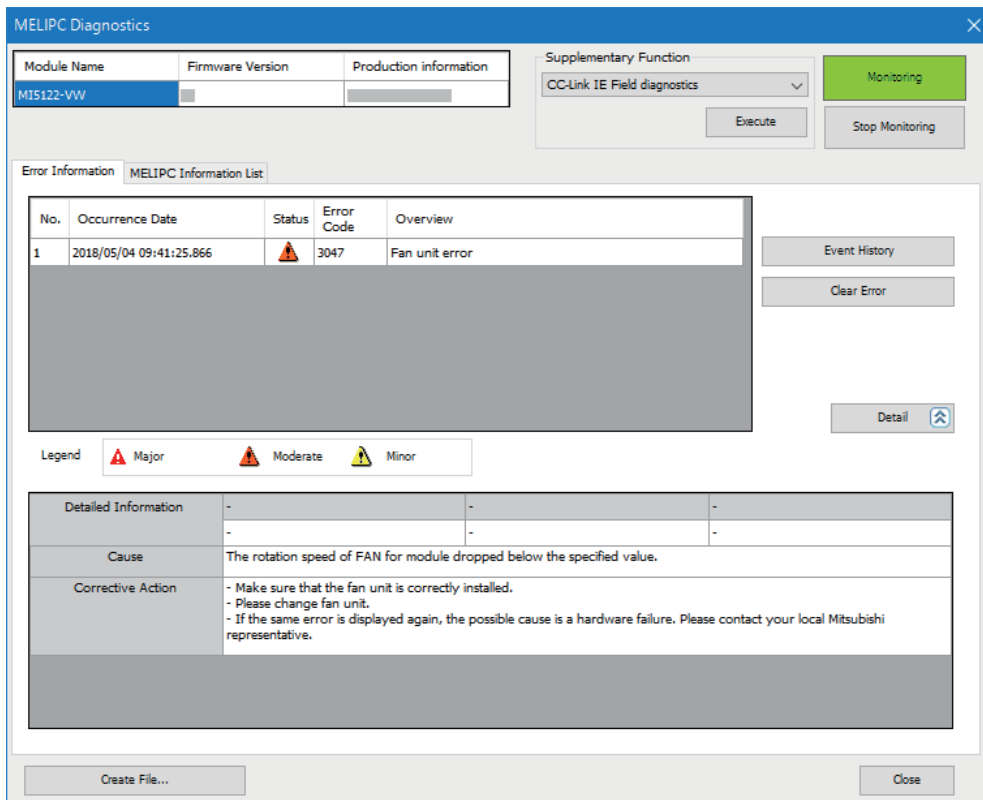
Item	Description
Error information	Displays details of currently occurring errors, and of handling methods.
Module information list	Displays status information for this product.
Event history	Can confirm the history of detected errors and executed operations on this product.

Error information

Displays details of currently occurring errors, and of handling methods.

Window

 [Diagnosis] ⇒ [MELIPC Diagnosis] ⇒ [Error Information] tab



Displayed items

Item	Description
Detailed information	Up to three items of detailed information is displayed for each error.*1
Cause	Details of the cause of errors are displayed.
Action	Displays handling methods for errors.

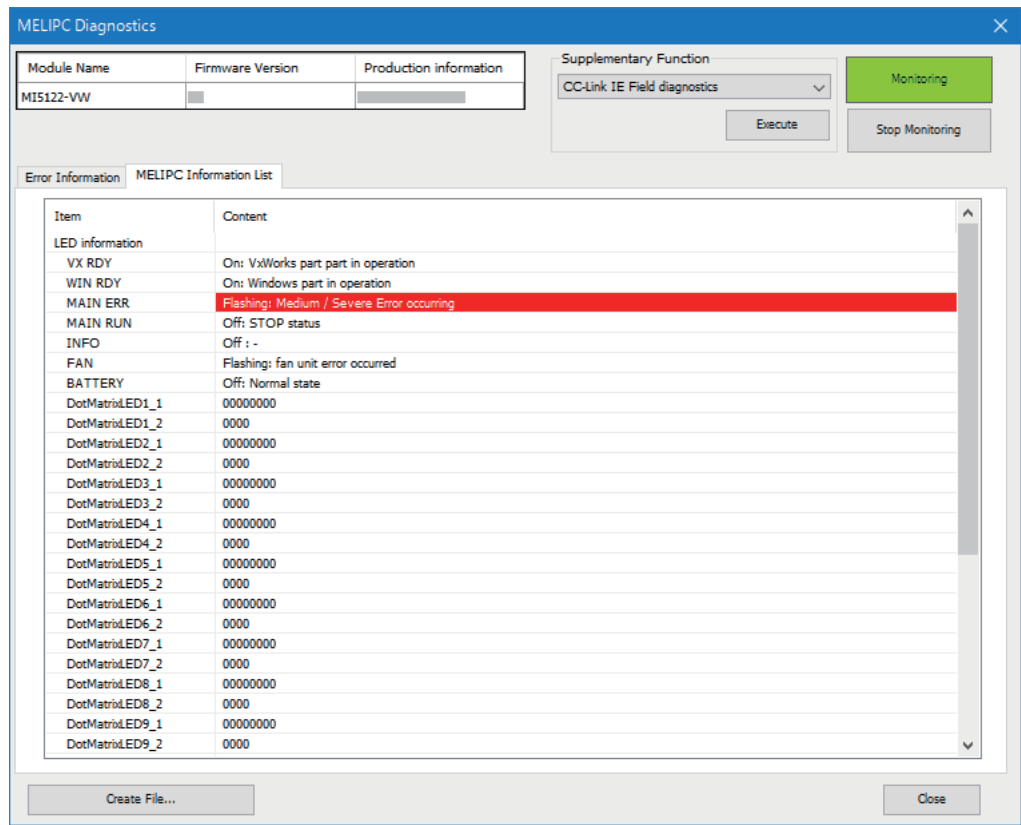
*1 In the event of a severe error, detailed information required when making an inquiry to us will be displayed. Please contact us with details of the displayed information.

MELIPC information list

Displays status information for this product.

Window

Click [Diagnosis] ⇒ [MELIPC Diagnosis] ⇒ [MELIPC Information List] tab



■Dot matrix information

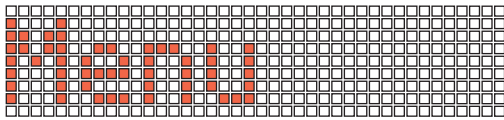
"DotMatrixLED1_1" through "DotMatrixLED9_2" under "LED Information" show the Dot matrix LED display statuses. Display details are displayed in hexadecimal, and for the DotMatrixLED□_2*1, the lower 8 bits are the valid data.

*1 □: 1 to 9

Item	Description	
DotMatrixLED1_1	From top, line 1 (A) ON dot data	
DotMatrixLED1_2	From top, line 1 (B) ON dot data	
DotMatrixLED2_1	From top, line 2 (A) ON dot data	
DotMatrixLED2_2	From top, line 2 (B) ON dot data	
DotMatrixLED3_1	From top, line 3 (A) ON dot data	
DotMatrixLED3_2	From top, line 3 (B) ON dot data	
DotMatrixLED4_1	From top, line 4 (A) ON dot data	
DotMatrixLED4_2	From top, line 4 (B) ON dot data	
DotMatrixLED5_1	From top, line 5 (A) ON dot data	
DotMatrixLED5_2	From top, line 5 (B) ON dot data	
DotMatrixLED6_1	From top, line 6 (A) ON dot data	
DotMatrixLED6_2	From top, line 6 (B) ON dot data	
DotMatrixLED7_1	From top, line 7 (A) ON dot data	
DotMatrixLED7_2	From top, line 7 (B) ON dot data	
DotMatrixLED8_1	From top, line 8 (A) ON dot data	
DotMatrixLED8_2	From top, line 8 (B) ON dot data	
DotMatrixLED9_1	From top, line 9 (A) ON dot data	
DotMatrixLED9_2	From top, line 9 (B) ON dot data	

Ex.

When "Menu" is displayed on the dot matrix LED



MELIPC information list		Dot matrix LED display (binary)									
Item	Description	DotMatrixLED □_2*1,*2		DotMatrixLED □_1*1							
DotMatrixLED1_1	00000000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
DotMatrixLED1_2	0000										
DotMatrixLED2_1	00000000	1000	1000	0000	0000	0000	0000	0000	0000	0000	0000
DotMatrixLED2_2	0088										
DotMatrixLED3_1	00000000	1101	1000	0000	0000	0000	0000	0000	0000	0000	0000
DotMatrixLED3_2	00D8										
DotMatrixLED4_1	9C900000	1101	1001	1001	1100	1001	0000	0000	0000	0000	0000
DotMatrixLED4_2	00D9										
DotMatrixLED5_1	52900000	1010	1010	0101	0010	1001	0000	0000	0000	0000	0000
DotMatrixLED5_2	00AA										
DotMatrixLED6_1	D2900000	1000	1011	1101	0010	1001	0000	0000	0000	0000	0000
DotMatrixLED6_2	008B										
DotMatrixLED7_1	12900000	1000	1010	0001	0010	1001	0000	0000	0000	0000	0000
DotMatrixLED7_2	008A										
DotMatrixLED8_1	D2700000	1000	1001	1101	0010	0111	0000	0000	0000	0000	0000
DotMatrixLED8_2	0089										
DotMatrixLED9_1	00000000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
DotMatrixLED9_2	0000										

*1 □: 1 to 9

*2 From the 16 bit portion displayed in "MELIPC diagnosis" "LED information", the lower 8 bits are the valid data. The higher 8 bits are invalid data.

Event history

The event history function shows event information including errors that occurred on this product, operations that were executed, and network errors. Because information collected before the power supply was turned OFF or a reset can be displayed, use this function to identify causes of problems from the trends of operations and errors that occurred in the past. For details on the functions and information collected by the event history function, refer to the following manual.

MELIPC MI5000 Series User's Manual (Application)

Window

[Diagnostics] ⇒ [MELIPC Diagnostics] ⇒ [Error Information] ⇒ [Event History] button

The screenshot shows the 'Event History' window. At the top, there are buttons for 'Refresh(U)' and 'Refine(D)', and a label 'Number of Events:3'. Below this is a 'Refine' section with two radio buttons: 'Match All the Conditions' (selected) and 'Match Any One of the Conditions'. There are three rows of dropdown menus for refining the search. Below the dropdowns are buttons for 'Start Refine' and 'Clear Refine Conditions'. The main part of the window is a table with the following data:

No.	Occurrence Date	Event Type	Status	Event Code	Overview	Source
00001	2018/05/04 9:57:29.128	Operation		24101	Change operating status (STOP)	Basic Function
00002	2018/05/04 9:57:28.087	Operation		24100	Change operating status (RUN)	Basic Function
00003	2018/05/04 9:57:25.988	Operation		20200	Clear event history	Basic Function

Below the table is a 'Legend' section with three icons: a red triangle for 'Major', a yellow triangle for 'Warning', and a blue circle with an 'i' for 'Moderate' and 'Information'. To the right of the legend is a 'Clear All' button. Below the legend is a 'Detailed Information' section with a table:

Detailed Information			
Cause	The operating status was changed to STOP.		
Corrective Action			

At the bottom of the window are buttons for 'Create File...' and 'Close'.

Point

Use the event history function in the following situations.

- Check the occurrence status of errors and identify the cause of problems that occurred with equipment and devices
- Check when and where programs and parameters were changed
- Check for unauthorized access by a third-party

External device configuration diagnostics

Displays communication statuses between the Ethernet port (CH1) of this product and external devices, and between virtual Ethernet and the communication target.

For details on the external device configuration diagnostics, refer to the following:

MELIPC MI5000 Series User's Manual (Application)

Window

[Diagnosis] ⇒ [External Device Configuration Diagnostics]

External device configuration diagnostics

Change IP Address Display

☒ DEC☐ HEX

Change Port No. Display

☐ DEC☒ HEX

Monitoring

Stop Monitoring

Status of Each Connection

Connection No.	Host Station Port No.	Communication Destination Communication Method	Communication Destination IP Address	Latest Error Code	Protocol	Connection Status
1	B0B5	SLMP	192.168.3.47	----	UDP	----
2	----	MELSOFT Connection	----	----	TCP	Disconnected
3	----	MELSOFT Connection	----	----	TCP	Disconnected
4	----	MELSOFT Connection	----	----	TCP	Disconnected
5	----	----	----	----	----	----
6	----	----	----	----	----	----
7	----	----	----	----	----	----
8	----	----	----	----	----	----
9	----	----	----	----	----	----
10	----	----	----	----	----	----
11	----	----	----	----	----	----
12	----	----	----	----	----	----
13	----	----	----	----	----	----
14	----	----	----	----	----	----
15	----	----	----	----	----	----
16	----	----	----	----	----	----

Clear Latest Error Code

Close

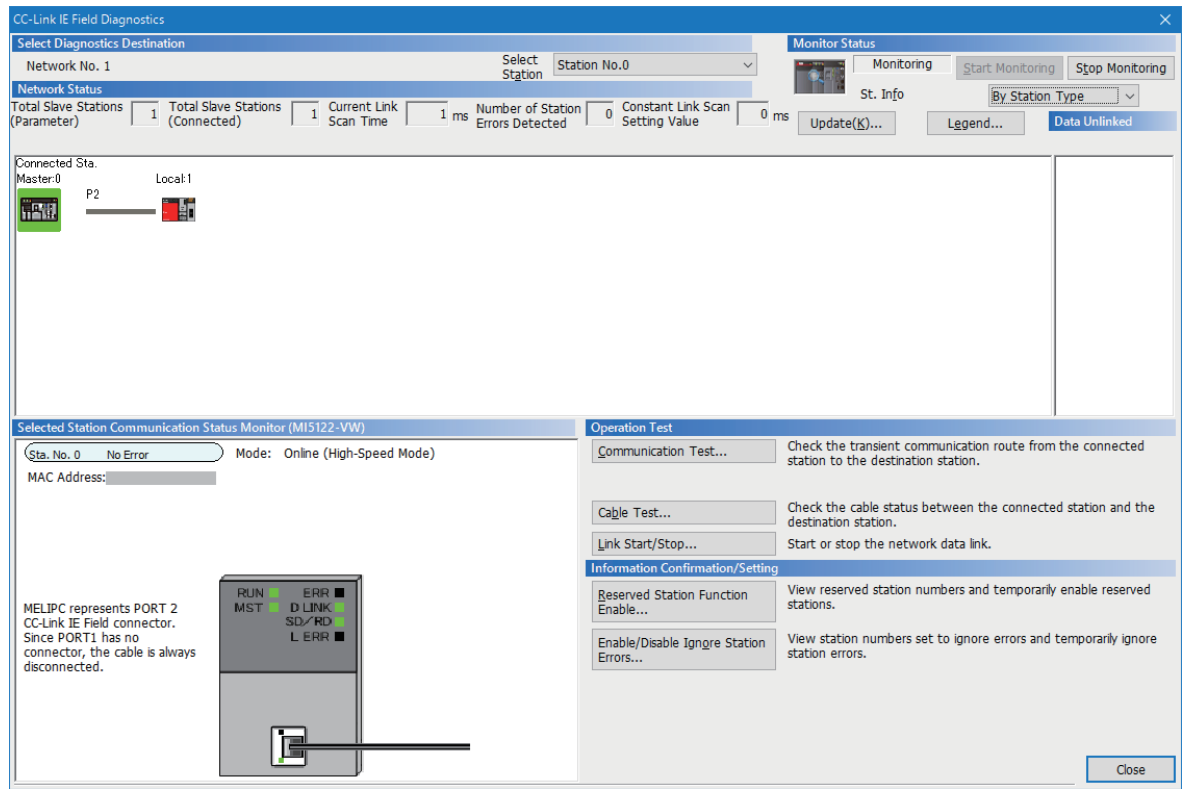
CC-Link IE Field diagnoses

Monitor, diagnose, and test network statuses.
For details on the CC-Link IE Field diagnoses, refer to the following:
📖 MELIPC MI5000 Series User's Manual (Application)

Window

🖱️ [Diagnostics] ⇒ [CC-Link IE Field Diagnostics]

11



For details on the CC-Link IEF Basic diagnostics, refer to the following:

 MELIPC MI5000 Series User's Manual (Application)

vwindow

 [Diagnostics] ⇒ [CC-Link IEF Basic Diagnostics]

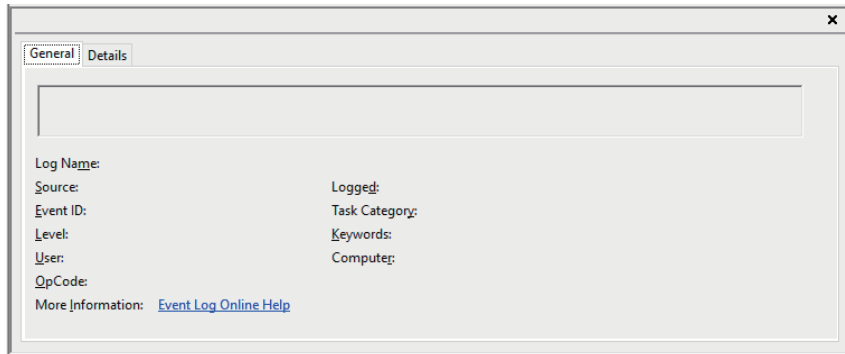
[illegible]

11.2 Checking Events with the Event Viewer

Can check the log of events that occurred on the Windows part of this product.

Window

Windows Start ⇒ [Administrative tools] ⇒ [Event Viewer] ⇒ [Applications and Services Logs] ⇒ [MELIPC Service]



Displayed items

Item	Description
dialog box	Detailed information about error messages and error causes are displayed.
Log name	Displays the name of the log of the event. ^{*1}
source	Displays the name of the application that recorded the event to the log.
Event ID	Displays the unique number assigned to the event.
level	Displays the type of event log. The following events are displayed. <ul style="list-style-type: none"> • Information: start/stop of Windows services, and other reference information • Warning: minor errors that don't involve the corruption of data • Error: Serious errors including device drivers and Windows service start errors
User	Displays the name of the user that wrote the event. ^{*2}
Operation code	Displays the operation that was being executed when the application generated the event. ^{*2}
Detailed information	Displays "Event Log Online Help".
Log date	Displays the date and time the event was written.
Task category	Displays the category of the event. ^{*3}
keyword	Displays "Classic".
Computer	Displays the computer name.

^{*1} In the event log generated on this product, 'MELIPC Service' is displayed.

^{*2} 'MELIPC Service' is not displayed.

^{*3} For 'MELIPC Service', 'None' is displayed.

Error events

The following error events are registered to the system log of Event viewer.

When an error occurs, the event and its solution are displayed in the dialog box .

Description		Corrective action
source	dialog box	
MELIPC System Watchdog	Stop MELIPC System Watchdog service because an error occurred.	Restart Windows. If the same phenomenon occurs after restarting Windows, recover Windows.
MELIPC Time Synchronization	Stop MELIPC Time Synchronization service because an error occurred.	
MELIPC Internal Communication	Stop MELIPC Internal Communication service because an error occurred.	

Information events

The following information events are registered to the system log of Event viewer.

The event content is displayed in the dialog box.

Description	
source	dialog box
MELIPC System Watchdog	Start MELIPC System Watchdog service.
	Stop MELIPC System Watchdog service.
MELIPC Time Synchronization	Start MELIPC Time Synchronization service.
	Stop MELIPC Time Synchronization service.
MELIPC Internal Communication	Start MELIPC Internal Communication service.
	Stop MELIPC Internal Communication service.

APPENDIX

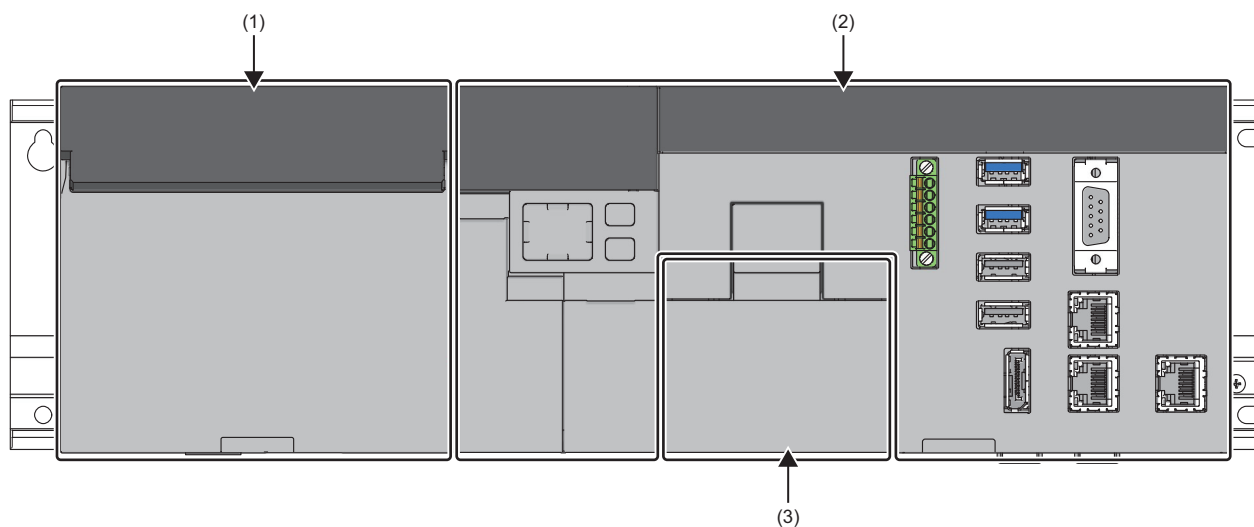
Appendix 1 Product Configuration

The appendix shows the hardware configuration, software configuration, storage configuration, and preinstalled applications of this product.

Hardware configuration

This product comprises a power supply module (1), a main module*¹ (2), and a fan module (3).

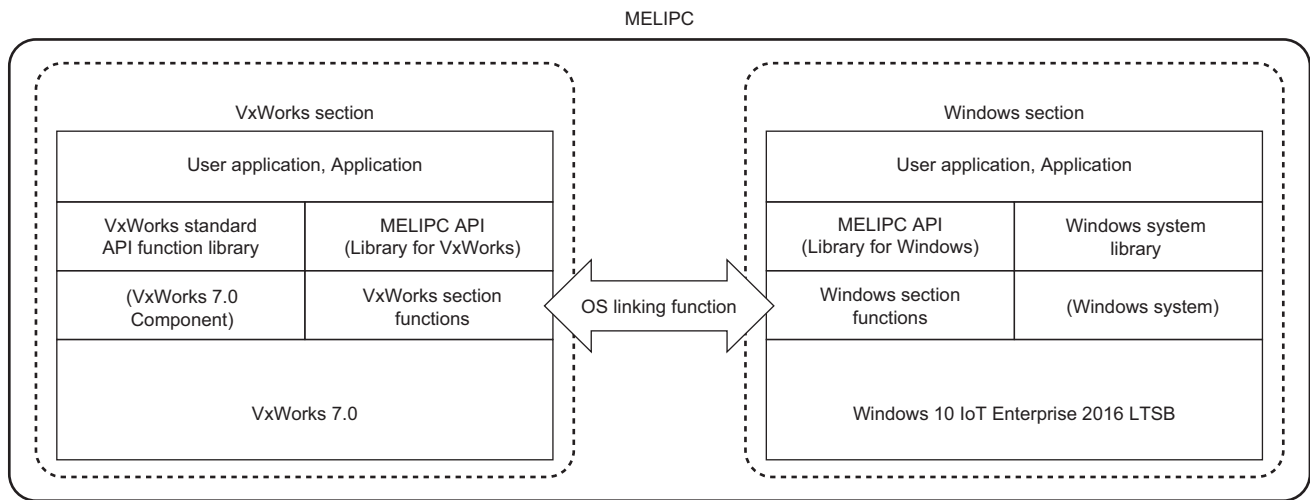
*1 The base section is also included.



A

Software configuration

This product contains a VxWorks part and a Windows part, and each operating system runs individually. Functions are provided by sharing processing on the VxWorks part and Windows part.



Point The operating systems installed on the VxWorks part and Windows part communicate using the OS linking function.

VxWorks part

The VxWorks part comes loaded with the real time VxWorks operating system. Programs to collect device data can be easily incorporated by using the VxWorks standard API functions and the dedicated function libraries (MELIPC API) provided by this product for devices connected to the CC-Link IE Field Network.

■VxWorks 7.0

VxWorks 7.0 is a real-time operating system provided by Wind River Systems, Inc.
For the standard functions of the operating system, refer to the VxWorks components of this product. (MELIPC MI5000 Series User's Manual (Application))

Point For the specifications of VxWorks 7.0, refer to the manual for VxWorks 7.0 stored on the DVD of CW Workbench 4.

■Functions for VxWorks part

Use these functions to maintain and inspect the VxWorks part and configure the necessary parameters and operations when using this product.

For details on the functions for VxWorks part, refer to the following manual.
MELIPC MI5000 Series User's Manual (Application)

■MELIPC API (Library for VxWorks)

Use the dedicated function library when creating user applications that use the functions for VxWorks part and OS linking function.

For details on the dedicated function library, refer to the following page.
Page 74 CREATION AND REGISTRATION OF USER PROGRAMS

Windows part

Windows10 IoT Enterprise 2016 LTSB is embedded on Windows part. It allows peripherals to work on Windows, and applications for analyzing production information, including camera image analysis, production results, and traceability, can be used.

■Windows 10 IoT Enterprise 2016 LTSB

Windows 10 IoT Enterprise 2016 LTSB is an operating system provided by Microsoft Corporation in the United States.

Point

It includes language packs for Japanese, English, and Chinese.

Precautions

This product is not compatible with UEFI, so functions that require UEFI are not supported.

■Functions for Windows part

Use these functions to maintain and inspect the Windows part and execute the functions of the VxWorks part from the Windows part.

■MELIPC API (Library for Windows)

Use this dedicated function library when creating user applications that use the functions of the Windows part and OS linking function.

For details on the dedicated function library, refer to the following page.

 Page 74 CREATION AND REGISTRATION OF USER PROGRAMS

OS linking

A virtual network (VNIC) and a dedicated area (shared memory) that can be accessed bidirectionally from the VxWorks part and Windows part is installed between the VxWorks part and Windows part. By utilizing the VNIC and shared memory, device data collected by the VxWorks part can be passed to the Windows part, which enables high-speed data linking between operating systems.

A

Application

The following applications (including partner software and middleware) run on either VxWorks 7.0 or Windows 10 IoT Enterprise. Applications can be installed to suit the usage of the user.

■Preinstalled applications

The following applications are preinstalled on the Windows part of this product.

- MI Configurator ( MI Configurator Operating Manual)
- e-Manual Viewer
- Edgecross Basic Software
- SLMP Data Collector ( SLMP Data Collector User's Manual)
- CC-Link IE Field Network Data Collector ( CC-Link IE Field Network Data Collector (MELIPC MI5122-VW) User's Manual)
- Smart Device Communication Gateway ( Smart Device Communication Gateway User's Manual)
- Intel® graphics driver

Precautions

■When reinstalling the preinstalled applications

- Enter the name and company name by using alphanumeric characters only.
- Store the applications in their respective default folders.

 Page 113 Folder configuration of preinstalled applications

User application

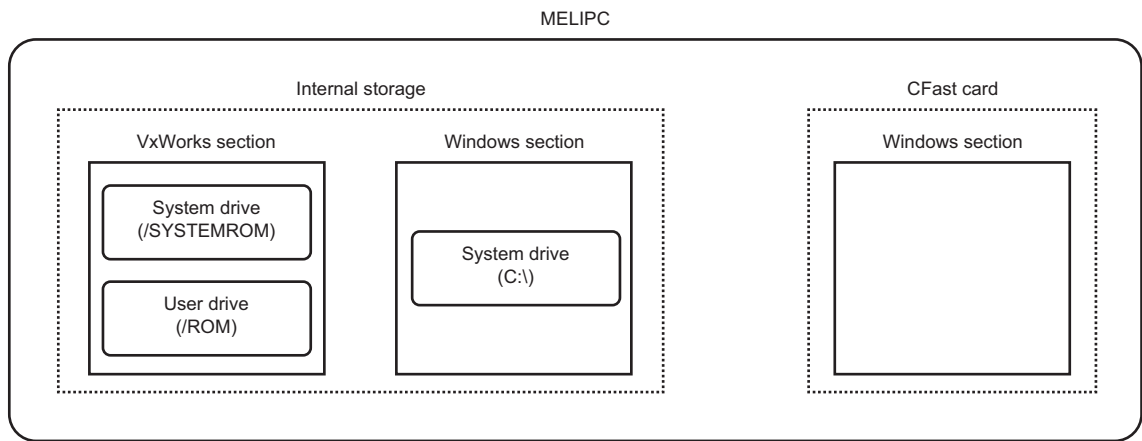
An application (user program) created by the user.

For creation of applications (user programs), refer to the following page.

☞ Page 74 CREATION AND REGISTRATION OF USER PROGRAMS

Storage configuration

This section shows the storage configuration of this product.
This product has internal storage in the main module and additional storage using a CFast card.



VxWorks part

The following table shows the drive configuration of the VxWorks part.

Type	Drive name	Application
Internal storage	/SYSTEMROM	A system drive of the VxWorks part. Stores the system files to run this product. The user cannot write files to this drive.
	/ROM	A user drive of the VxWorks part. Stores user programs, script files, parameter files, and arbitrary folders and files. The user can access this drive freely.

■File system, file size units, and file access

The following table shows the file system, file size unit^{*1}, and user file access permissions (reading and writing) of each drive.

^{*1} The minimum unit (cluster size) of the capacity when a file is stored.

Drive name	File system	file size unit	Access (reading, writing)
/SYSTEMROM	FAT32	8192 B	Read
/ROM	FAT32	8192 B	Writing, reading

A

■ Folder configuration

folder		Description
/SYSTEMROM	/OS_IMAGE	Stores the OS image file. Stores the files necessary to connect and debug this product and the integrated development environment (CW Workbench and WindRiver Workbench).
	/VSB_PRJ	Stores VSB project files. Stores the files necessary to create DKM (Downloadable Kernel Module) projects by the integrated development environment (CW Workbench and WindRiver Workbench).
	/INCLUDE	Stores function library headers.
/ROM	/MELPRJ	Stores parameters. Stores configuration information written by MI Configurator as parameter files. Do not access the parameter files. They are used by the system.
	/MELAPP	This is the data-collector storage folder. Stores the file necessary to run the data collector. Do not access this file. It is used by the data collector.

■ Storage files by folder

(1): Availability at shipping, (2): Availability after initialization

folder		file	Description	R/W	(1)	(2)
/SYSTEMROM	/OS_IMAGE	MI5122-VW_OS_IMAGE_XX ^{*1}	OS image file	R	Yes	Yes
	/VSB_PRJ	MI5122-VW_VSB_PRJ_XX.zip ^{*1}	VSB project files	R		
	/INCLUDE	CCPUFunc.h	CCPU function header file	R		
		MDFunc.h	MD function header file	R		
/ROM	—	User program files, etc. ^{*2}	—	R/W	No	No
		STARTUP.CMD	script files	R/W	Yes	Yes
	/MELPRJ	Parameter file written by MI Configurator	—	R/W	No	No
	/MELAPP	Data collector file	—	R/W		

*1 XX: upper two digits of serial number

*2 Name specified arbitrarily by the user (maximum 60 characters)

■ Number of files

The following table shows the maximum number of files that can be stored on the drive.^{*1}

*1 Total number of files and folders that can be stored in a folder.

Drive name	Number of files
/ROM	65535 (Subfolder: 65,534)



- The maximum number may be reduced depending on the lengths of file names and text types. Keep filenames, including the extension, to 12 characters or less and do not use lowercase characters.
- The number of files in one folder must be 500 or less. Storing more than 500 files or folders may significantly increase the access time.

■File names and folder names

File names and folder names used in the VxWorks part

Use the following characters for file names and folder names stored on the VxWorks part.

- Uppercase alphanumeric characters*¹ and special characters (excluding \, /, *, ?, <, >, :, |, ", and \$)

*¹ If lowercase alphanumeric characters are used, the number of storable files may decrease from the maximum value.

Special character (.)

Do not use the special character (.) for a folder name.

If the special character (.) follows usable character codes, it is not included in the folder name. Furthermore, folder names that use only the special character (.) cannot be created.

(Example: A folder named 'A' is created when the folder name is configured to 'A...')

Point

If a file name is composed of lowercase characters, it may be displayed all in uppercase characters when viewed from FTP or Telnet.

■Disabling synchronous control when writing data to a user drive (/ROM)

Normally, synchronous control is performed when writing data to a user drive (/ROM). By disabling the synchronous control, high-speed writing may be achieved.

Point

- However, depending on the amount of data to be written or writing frequency, the rate for high-speed writing differs.
- This increases the speed for writing data by the operations on VxWorks part or a user program, as well as from the Windows part or an external device that uses a function such as the file sharing server function or FTP function.

To enable/disable synchronous control, run the following commands in a script file, user program, or using Telnet before start writing to a folder in the user drive (/ROM).

- To disable synchronous control

```
romfd = open("/ROM",2,666)
ioctl(romfd,21,0)
close(romfd)
romfd = open("/ROM",2,666)
ioctl(romfd,65,0)
close(romfd)
```

- To enable synchronous control

```
romfd = open("/ROM",2,666)
ioctl(romfd,21,0)
close(romfd)
romfd = open("/ROM",2,666)
ioctl(romfd,65,0x00010000)
close(romfd)
```

A

Precautions

Before disabling synchronous control when writing data, read the following considerations. Not doing so may result in system file corruption.

- After starting the process for disabling synchronous control, do not perform any of the following operations until the synchronous control is enabled next time.
 - Turning OFF or resetting the product
 - Shutting down the product
 - Executing the C Controller dedicated function (CCPU_ShutdownRom)
- Do not write data to the user drive (/ROM) during the process for disabling or enabling synchronous control. If there is a possibility that data will be written to the user drive (/ROM) by a task of a user program, do not perform the process for disabling or enabling synchronous control. Additionally, do not write parameters from MI Configurator during the process for disabling or enabling synchronous control since it leads to writing to the user drive (/ROM).

Precautions

■Writing files

Before writing files using FTP or a Telnet during user program operation, make sure that the files to be written will not affect the running user program.

■Access to the same file

A file being written cannot be accessed. Furthermore, it is not possible to write to a file being accessed.

■If invalid characters are used

Use alphanumeric characters and special characters (excluding \, /, *, ?, <, >, :, |, ", and \$) for file names and directory names to be stored on this product. If invalid characters are used in a name, the following problems may occur.

- Garbled file name and folder name
- Loss of file and folder

Windows part

This section shows the drive configuration of the Windows part.

Type	Drive name	Application
Internal storage	C:\	A system drive of the Windows part.
CFast card	Depends on user operation	It can be used as a user drive of Windows part in an arbitrary configuration. (Page 42 CFast CARD INSTALLATION)

File system, file size units, and file access

The following table shows the file system, file size unit^{*1}, and user file access permissions (reading and writing) of each drive.

^{*1} The minimum unit (cluster size) of the capacity when a file is stored.

Drive name	File system	file size unit	Access (reading, writing)
C:\	NTFS	4096 B	Writing, reading

Folder configuration

Drive name	Folder name	Description
C:\	Windows	Windows system folder
	Program Files(x86)	Program folder
	User	Windows user folder
	MELIPC	—
	INCLUDE	Folder to store dedicated function library headers
	LIB	Folder to store dedicated function libraries

Folder configuration of preinstalled applications

Drive name	Folder name	Description
C:\	MELIPC	Edgecross
		ITGateway
		DataCollector
		CCIEF
	Edgecross	Edgecross Basic Software
	Program Files (x86)	MELSOFT

Number of files

The following table shows the maximum number of files that can be stored on the drive.^{*1}

^{*1} Total number of files and folders that can be stored in a folder.

Drive name	Number of files
C:\	—

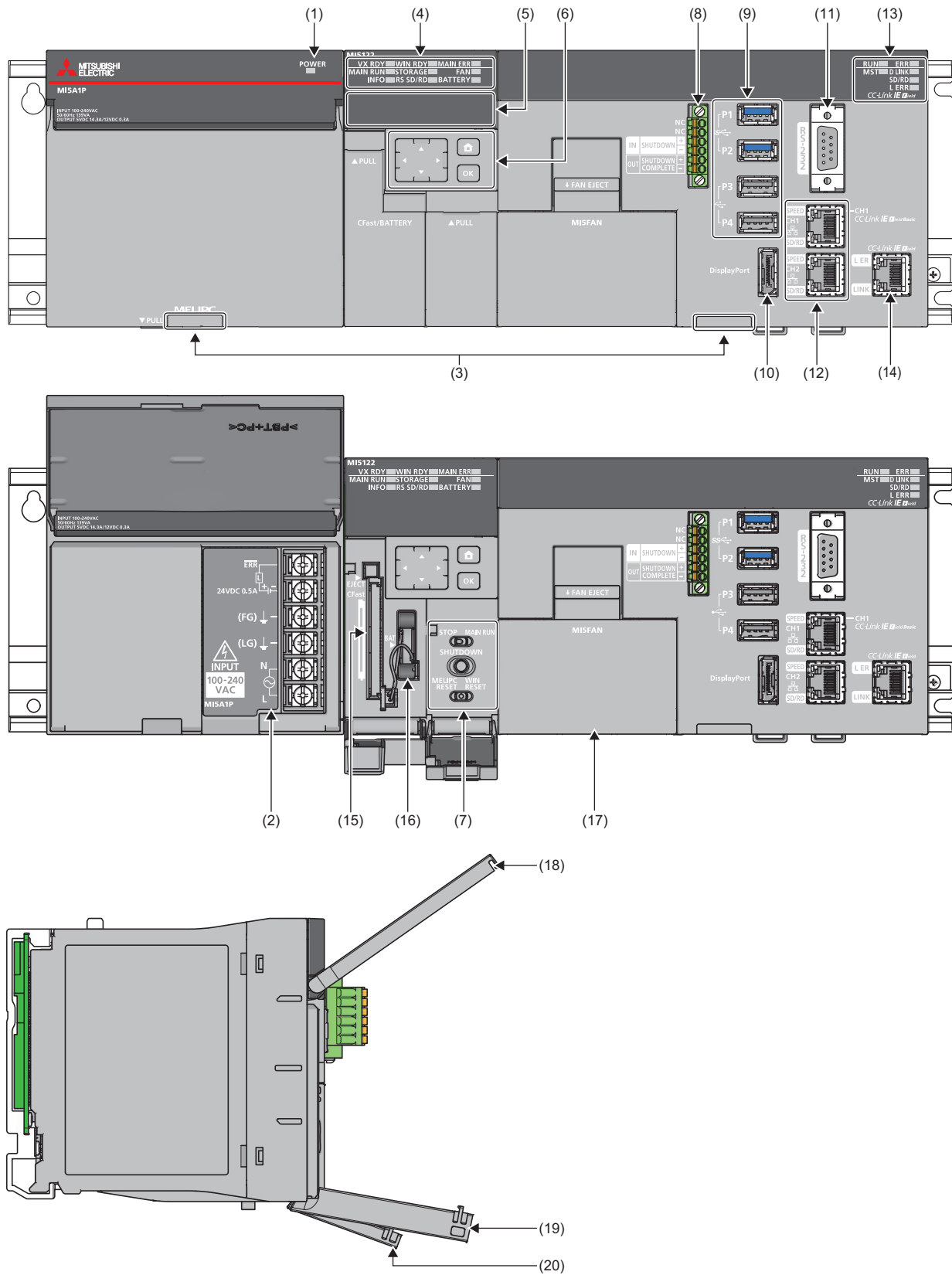
File names and folder names

Use the following characters for folder names to be specified by a file sharing service (client).

- Alphanumeric characters and special characters (excluding \, /, *, ?, <, >, :, |, ", and \$)

Appendix 2 Part Names

This section shows the part names of this product.



No.	Name		Description
(1)	POWER LED		Indicates the operating status of the power supply module. <ul style="list-style-type: none"> On: Normal (5 VDC/12 VDC output, 20 ms momentary power interruption) Off: Error (AC power is being supplied, but the power supply module is faulty (5 VDC/12 VDC error, overload^{*1}, internal circuit fault, fuse blown), AC power not being supplied, power outage (including momentary power interruptions of 20 ms or more))
(2)	Terminal block		The power supply module terminal block. For details on the terminal block, refer to the following page.  Page 156 Wiring
(3)	Production information marking		Indicates the production information (16 digits) of the power supply module and main unit.
(4)	Main LED ^{*2}	VX RDY LED	Displays operating status of the VxWorks part. <ul style="list-style-type: none"> On: VxWorks part is running Flashing: VxWorks part is preparing Off: System watchdog timer error occurring, resetting, initializing hardware, offline mode selected, major error is occurring
		WIN RDY LED	Displays operating status of the Windows part. <ul style="list-style-type: none"> On: Windows is running Flashing: Windows part is preparing, Windows part is shutting down Off: Windows part is stopping or resetting
		MAIN ERR LED	Displays product error status. <ul style="list-style-type: none"> On: Continuation error occurring, watchdog time error occurring (when VX RDY LED off) Flashing: Stop error is occurring Off: No error
		MAIN RUN LED	Displays product operating status. <ul style="list-style-type: none"> On: RUN state, offline mode function is executing Flashing^{*2}: User drive shutdown completion status (VxWorks part) Flashing (slow speed)^{*2}: Script file (STARTUP.CMD) is being executed Off: STOP state, offline mode function is stopped, system watchdog timer error is occurring, resetting
		STORAGE LED	Displays the internal storage/CFast card access status. <ul style="list-style-type: none"> Flashing: Accessing internal storage/external CFast card Off: No internal storage/CFast card access
		FAN LED	Displays the operating status of the fan module. <ul style="list-style-type: none"> On: fan module filter clean notification Flashing: fan module fault error occurred Off: No fan module error
		INFO LED	The lighting status can be controlled by a user program.
		RS SD/RD LED	Displays the communications status of RS-232. <ul style="list-style-type: none"> On: Data being sent or received Off: Data not sent or not received
		BATTERY LED	Displays the status of the battery. <ul style="list-style-type: none"> On: Battery life error is occurring^{*3} Off: No battery error
(5)	Dot matrix LED		<ul style="list-style-type: none"> Menu display of offline mode and normal mode Display of mode specified by Display mode Display according to a user program
(6)	Menu operation switch ^{*4}	SELECT switch	Perform the following operations. <ul style="list-style-type: none"> Switches OFF the power or resets the product ( Page 138 Turning OFF or Resetting This Product) Operations of the menu displayed on the dot matrix LED ( Page 144 Menu Operation Switch)
		OK switch	
		HOME switch	
(7)	STOP/ MAIN RUN switch ^{*4}		Switch that changes the hardware operating status. <ul style="list-style-type: none"> STOP: Changes the operating status to STOP. MAIN RUN: Changes the operating status to RUN.
	SHUTDOWN switch ^{*4}		Shuts down this product. ( Page 138 Turning OFF or Resetting This Product)
	MELIPC RESET/WIN RESET switch ^{*4}		Resets this product. ( Page 138 Turning OFF or Resetting This Product) <ul style="list-style-type: none"> MELIPC RESET: Forces a reset of this product. WIN RESET: Forces a reset of the Windows part.
(8)	I/O connector		Handles the following I/O signals. <ul style="list-style-type: none"> Shutdown request input Shutdown completed notification output

No.	Name		Description
(9)	USB connector	P1	Connector for connection to devices supporting USB3.0.
		P2	
		P3	Connector for connection to devices supporting USB2.0.
		P4	
(10)	DisplayPort		Image output connector for liquid crystal displays, etc.
(11)	RS-232 connector		Connector for connection to devices supporting RS-232.
(12)	Ethernet connector	CH1	Ethernet port managed by the VxWorks part of this product.
		CH2	Ethernet port managed by the Windows part of this product.
		SPEED LED	Displays the Ethernet communications status. <ul style="list-style-type: none"> On (orange): In link-up (1 Gbps) On (green): In link up (100 Mbps) Off: Link up (10 Mbps) or link down
		SD/RD LED	Displays the Ethernet transmission/reception status. <ul style="list-style-type: none"> On: Data being sent or received Off: Data not sent and not received
(13)	CC-Link IE Field Network LED	RUN LED	Displays the operational status of the CC-Link IE Field Network function. <ul style="list-style-type: none"> On: Normal operation Off: Major error is occurring
		ERR LED	Displays the error status of the CC-Link IE Field Network function. <ul style="list-style-type: none"> Off: Minor error is occurring, errors detected for all stations, major error is occurring (when RUN LED is off) Flashing: Moderate error is occurring, tethering error is detected, major error is occurring (when RUN LED is off) Off: Normal operation
		MST LED	Displays if this product is operating as a master station or local station in the CC-Link IE Field Network. <ul style="list-style-type: none"> On: Operating as master station Off: Operating as local station
		D LINK LED	Displays the CC-Link IE Field Network data link status. <ul style="list-style-type: none"> On: Data link (cyclic transmission) Flashing: In data link (cyclic transmission stopped) Off: Data link not in progress (disconnected)
		SD/RD LED	Displays the CC-Link IE Field Network transmission status. <ul style="list-style-type: none"> On: Data being sent or received Off: Data not sent and not received
		L ERR LED	Displays the CC-Link IE Field Network received data and line error status. <ul style="list-style-type: none"> On: Normal data reception and loopback not in progress Off: Error data received or loopback in progress
(14)	CC-Link IE Field Network connector	L ER LED	Displays the port status. <ul style="list-style-type: none"> On: Abnormal data reception Off: Normal data reception
		LINK LED	Displays the link status. <ul style="list-style-type: none"> On: In link-up Off: In link-down
(15)	CFast card slot		Slot for the CFast card
(16)	Battery		Backup power source to retain clock data.
	Battery slot		Slot for battery.
(17)	Fan module		Product cooling module.
(18)	Terminal cover		A protective cover for the terminal block
(19)	CFast/BATTERY cover ^{*5}		Protective cover for CFast card slot and battery slot.
(20)	Switch cover ^{*5}		Protective cover for the switch section.

*1 Excess load is shown in the following instances.

- 5 V short-circuit fault within the power supply, 5 V-SG short-circuit in the main module
- Rated output current exceeded
- An increase from 5 V power supply interior, 5 V main module

*2 Flashing occurs at the following intervals.

- Flashing: 200 ms
- Flashing (low speed): 1 s

*3 Failure to replace the battery after a battery life error has occurred may result in corruption of clock data. (➡ Page 176 Battery Replacement)

*4 Operate a switch using a fingertip. Use of screwdrivers or other tools may damage the switch.

*5 To prevent malfunctions, ensure that all front covers are closed when this product is in use.

Appendix 3 Product Specifications

This section shows the specifications of this product.

General specifications

The following shows the general specifications of this product.

Item	Specifications					
Operating ambient temperature	0 to 55°C					
Storage ambient temperature* ¹	-25 to 75°C					
Operating ambient humidity	5 to 95 %RH, non-condensing					
Storage ambient humidity* ¹						
Vibration resistance	Compliant with IEC 61131-2 and JIS B 3502	—	Frequency	Constant acceleration	Half amplitude	Sweep count
		Under intermittent vibration	5 to 8.4 Hz	—	3.5 mm	10 times each in X, Y, and Z directions
			8.4 to 150 Hz	9.8 m/s ²	—	
		Under continuous vibration	5 to 8.4 Hz	—	1.75 mm	—
			8.4 to 150 Hz	4.9 m/s ²	—	
		Shock resistance	Compliant with IEC 61131-2 and JIS B 3502 (147 m/s ² , 3 times each in X, Y, and Z bidirections)			
Operating atmosphere	No corrosive gases, flammable gases, less conductive dust					
Operating altitude* ²	0 to 2000 m* ³					
Installation location	Inside a control panel* ⁴					
Overvoltage category* ⁵	Ⅱ or less					
Pollution degree* ⁶	2 or less					
Equipment class	Class I					

*1 The storage ambient temperature of the fan module is -25 to 70°C, and the storage ambient humidity is 20 to 85% RH.

*2 Do not use or store under pressure higher than the atmospheric pressure of altitude 0 m. Doing so may cause malfunction. When using the product under pressure, consult your local Mitsubishi representative.

*3 When the product is used at altitude above 2000 m, the withstand voltage performance and the upper limit of the operating ambient temperature decrease. Consult your local Mitsubishi representative.

*4 When installing a ventilation fan in the control panel, situate it so it does not interfere with the exhaust flow from the fan module of this product.

*5 This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises. Category II applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300 V is 2500 V.

*6 Indicates the degree to which conductive material is generated in the environment in which the equipment is used. Pollution degree 2 is when only non-conductive pollution occurs. However, incidental condensation can create temporary electrical conduction in the environment.

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Before installing/connecting a peripheral device, check the usage conditions of the peripheral device.

Performance specifications

The following shows the operational specifications of this product.



For specifications of Ethernet, the CC-Link IE Field Network, and the CC-Link IE Field Network Basic, refer to the following page.

Page 122 Network specifications

Item		Description	
		Windows part	VxWorks part
Power source (AC input)	Input power supply voltage	100 to 240 VAC (85 to 264 VAC)	
	Fuse	Built-in (user-unchangeable)	
	Input frequency	50/60 Hz $\pm$ 5%	
	Allowable momentary power failure time	Within 20 ms	
	Inrush current	20 A, 8 ms or less	
	Maximum input apparent power	139 VA	
	Efficiency	72% or more	
Hardware	Endian method	Little-endian	
	MPU	Intel Core i7	
	RAM ^{*1}	12 GB	1 GB
	MRAM	—	1 MB
	Battery life	5 years (Page 91 Battery Life)	
	Fan module life	10 years	
	Internal storage	Capacity	45 GB
		Life	Up to 10000 times of writing
	CFast card	Maximum capacity	64 GB
		Interface	CFast SATA2 ^{*2}
		Number of slots	1
		Power supply	3.3 VDC, up to 0.5 A
Software	OS	Windows 10 IoT Enterprise 2016LTSP (64 bit edition)	VxWorks 7.0
	Format of dedicated APIs	Standard DLL	C/C++ format
Display interface	Interface	DisplayPort	—
	Connector	DisplayPort connector	
	Cable length	Max. 15 m (HBR or RBR)/3 m (HBR2)	
	Number of ports	1	
	Resolution	Maximum 3840×2160@60 Hz	
	Display colors	Maximum 16.77 million	

Item		Description	
		Windows part	VxWorks part
RS-232	Interface		Compliant with RS-232
	Number of channels ^{*3}		1
	Communications method		Full duplex/half duplex communications method
	Synchronous tracking mode		Asynchronous tracking mode
	Transmission rate		9600 bps, 14400 bps, 19200 bps, 28800 bps, 38400 bps, 57600 bps, 115200 bps
	Transmission distance		Max. 15 m
	Data format	Start bit	1
		Data bit	7/8
		Parity bit	1/none
		Stop bit	1/2
	Parity check		Yes (even/odd numbers)/no
	Checksum code		Y/N
	Transmission control		Flow control (RS/CS control)
	Connector for external wiring		D-sub9 pin (male)
USB	Number of ports		<ul style="list-style-type: none"> • USB 3.0: 2 • USB 2.0: 2
	Connector		USB A female
	Transfer rate		<ul style="list-style-type: none"> • USB 3.0: 5 Gbps (Super Speed) • USB 2.0: 480 Mbps (High Speed)
	Power supply		<ul style="list-style-type: none"> • USB 3.0: 5 VDC, up to 900 mA • USB 2.0: 5 VDC, up to 500 mA
Input terminals	Number of input points		1 point
	Rated input voltage		24 VDC (ripple rate $\pm 5\%$ or less) (Allowable voltage range 19.2 VDC to 28.8 VDC)
	Rated input current		Approx. 7 mA typ. (at 24 VDC)
	ON voltage/ON current		17.5 V or higher/2.0 mA or higher
	OFF voltage/OFF current		1.8 V or less/0.18 mA or less
	Input resistance		3.3k Ω
	Response time	OFF→ON	7 ms or less
		ON→OFF	
	Insulation method		Photo coupler
	Insulation withstand voltage		510 VAC rms (1 min.)
	Insulation resistance		10 M Ω or higher with insulation resistor tester
	Common method		1 point 1 common (common terminal: COM)
	External line connection method		Bar solderless terminal

Item			Description		
			Windows part	VxWorks part	
Output terminal	Number of output points		1 point		
	Output type		Sink type		
	Rated load voltage		24 VDC (ripple rate ±5% or less) (Allowable voltage range 19.2 VDC to 28.8 VDC)		
	Maximum load current		100 mA		
	Leakage current at OFF		0.1 mA or less		
	Maximum voltage drop at ON		1.9 V or less (output current≤100 mA)		
	Response time	OFF→ON		6.7 ms or less (at rated load and resistance load)	
		ON→OFF			
	Surge suppressor		Zener diode		
	Fuse		None		
	Insulation method		Photo coupler		
	Insulation withstand voltage		510 VAC rms (1 min.)		
	Insulation resistance		10 MΩ or higher with insulation resistor tester		
	Noise immunity		Simulator noise 500 Vp-p, noise width 1μsNoise frequency: 25 to 60 Hz (noise simulator condition)		
	Degree of protection		IP2X		
	Number of common points		1 point 1 common (common terminal: COM)		
	Protection functions	Overload protection functions		None	
		Overheat protection functions			
External device connection method		Bar solderless terminal			
Internal current consumption ^{*4}			• 5 VDC, 10 A • 12 VDC, 0.17 A		
Clock function (RTC)		View	Year, month, date, hour, minute, second, and day of the week (automatic leap year adjustment)		
		Accuracy	• Daily discrepancy: -8.62 to +3.35 sec. (0 to 55°C) • Daily discrepancy: -1.71 to +3.35 sec. (25°C)		
External dimensions		Height	106 mm		
		Width	362 mm		
		Depth	119 mm		
Weight			2.7 kg		

- *1 Shared memory: 0.25 GB
- *2 When a CFast card that complies with SATA3 is inserted, the interface is SATA2.
- *3 Can be assigned to the Windows part or VxWorks part in the parameter setting.
( MELIPC MI5000 Series User's Manual (Application))
- *4 This does not include current consumption used for USB and additional storage.

Network specifications

The following shows the network specifications of this product.

Ethernet		
Item	Description	
	Windows part	VxWorks part
Interface	10BASE-T/100BASE-TX/1000BASE-T	
Number of channels	1 (CH2) ^{*1}	1 (CH1)
IP version	IPv4/IPv6	IPv4
Communications method	Full duplex/half duplex	
Communications speed	<ul style="list-style-type: none"> • 1 Gbps (1000BASE-T) • 100 Mbps (100BASE-TX) • 10 Mbps (10BASE-T) 	
Cascade connection steps ^{*2}	<ul style="list-style-type: none"> • 1 Gbps: No restriction prescription • 100 Mbps: Maximum 2 steps • 10 Mbps: Maximum 4 steps 	
Maximum segment length	100 m	
Connector for external wiring	RJ45	
Support functions	<ul style="list-style-type: none"> • Auto negotiation function (automatic recognition of communications speed/communications method) • Auto MDI/MDIX function (automatic recognition of straight/cross) 	

*1 Compatible with GigE Vision standards.

*2 Number of connection steps possible when using a repeater hub. (No specification, given that all 1000BASE-T connect through a switching hub.)

Confirm the number of connection steps possible when using switching hubs with the manufacturer of the switching hub.

CC-Link IE Field Network

Item		Description	
Station type		Master station and local station	
Maximum link point numbers per network	RWw	8K points (8192 points, 16 KB)	
	RWr	8K points (8192 points, 16 KB)	
	RX	16K points (16384 points, 2 KB)	
	RY	16K points (16384 points, 2 KB)	
Maximum link point numbers per station	Master station	RWr	8K points (8192 points, 16 KB)
		RWw	8K points (8192 points, 16 KB)
		RX	16K points (16384 points, 2 KB)
		RY	16K points (16384 points, 2 KB)
	Local station ^{*1}	RWr	256 points (512 B) ^{*2}
		RWw	256 points (512 B) ^{*2}
		RX	2K points (2048 points, 256 B)
		RY	2K points (2048 points, 256 B)
Communications speed		1 Gbps	
Synchronous communication cycle ^{*3}		0.888 ms, 1.00 ms, 1.777 ms, 2.00 ms, 3.555 ms, 4.00 ms	
Maximum number of connected stations		120 (up to a maximum of 120 slave stations can be connected)	
Connector		RJ45	
Number of ports		1	
Communications cable		Ethernet cable that meets 1000BASE-T specifications (Category 5e or higher, straight cable (double shielded, STP))	
Network topology		Line type and star type ^{*4}	
Overall cable distance	Line type	12,000 m (when 121 devices are connected)	
	Star type	Depends on the system configuration	
Cascade connection steps		Maximum 4 steps	
Maximum distance between stations		100 m (Compliant with ANSI/TIA/EIA-568-B (Category 5e))	
Maximum number of networks		239	
Communications method		Token passing method	
Transient transmission		<ul style="list-style-type: none">• 1: N communication (monitor, etc.)• Requests from user programs	
Transient transmission capacity		Up to 1920 B	
Maximum transient numbers per link scan		4 ^{*2}	

*1 The number of distributable points for each local station by the master station. With cyclic transmission, the range allocated to other stations is also receivable.

*2 High-speed mode specifications. High-speed mode allows high-speed input/output control, analog control, and digital input/output because cyclic transmission is prioritized.

*3 Uses the CC-Link IE Field Network synchronous communication function for synchronized control of slave stations.

*4 For star type connections, use a switching hub that supports CC-Link IE Field Network synchronous communication.

CC-Link IE Field Network Basic

Item			Description
Station type			Master station
Number of slave stations on 1 network ^{*1}			64 units (16 units×4 groups)
Number of occupied slave stations			1 to 4
Maximum link point numbers per network		RWw	2048 points
		RWr	2048 points
		RX	4096 points
		RY	4096 points
Maximum link point numbers per station	Master station	RWr	2048 points
		RWw	2048 points
		RX	4096 points
		RY	4096 points
	Slave station	RWr	32 points ^{*2}
		RWw	32 points ^{*2}
		RX	64 points ^{*3}
		RY	64 points ^{*3}
data transmission speed			100 Mbps
Cascade connection steps (100BASE-TX)			Depends on the switching hub to be used.
Connection cables			Ethernet cable that meets 100BASE-TX specifications
Number of ports			1
Maximum distance between stations			100 m (Compliant with ANSI/TIA/EIA-568-B (Category 5e))
Overall cable distance			Depends on the system configuration
Network topology			Star type
UDP port numbers used in cyclic transmission			61450
UDP port numbers used in automatic detection function	Master station	Automatic assignment	
	Slave station	61451	

*1 Maximum number of slave stations managed by the master station. Changes depending on numbers of occupied slave stations. However, configure so the total number of occupied slave stations does not exceed the total number of connected devices.

*2 Up to 128 depending on occupied stations.

*3 Up to 256 depending on occupied stations.

Operational specifications

The following shows the operational specifications of this product.

Operating status

The following operating statuses can be set for this product.

- RUN
- STOP

For the method for changing the operating status, refer to the following manual.

 MELIPC MI5000 Series User's Manual (Application)

■RUN state

All the functions of this product can run.

■STOP state

Writing data from a user program^{*1} to buffer memory is disabled.

^{*1} It indicates a program using a C Controller module dedicated function.

The following functions are affected by this restriction.

Function	Description
CC-Link IE Field Network function	When STOP/RUN state is changed to STOP, select whether to clear or retain the output of cyclic data.
CC-Link IE Field Network Basic function	

For details on each function, refer to the following manual.

 MELIPC MI5000 Series User's Manual (Application)

Point

- Even when the operating status of this product is either STOP or RUN, writing data to buffer memory from MI Configurator, SLMP communication, and MELSEC data link function are available.
- Even when the operating status of this product is either STOP or RUN, the data processing in a user program is performed. To divide the program processing according to the operating status, use the C Controller module dedicated function (CCPU_GetCpuStatus). ( MELIPC MI5000 Series Programming Manual (VxWorks))

Performance specifications of dedicated functions

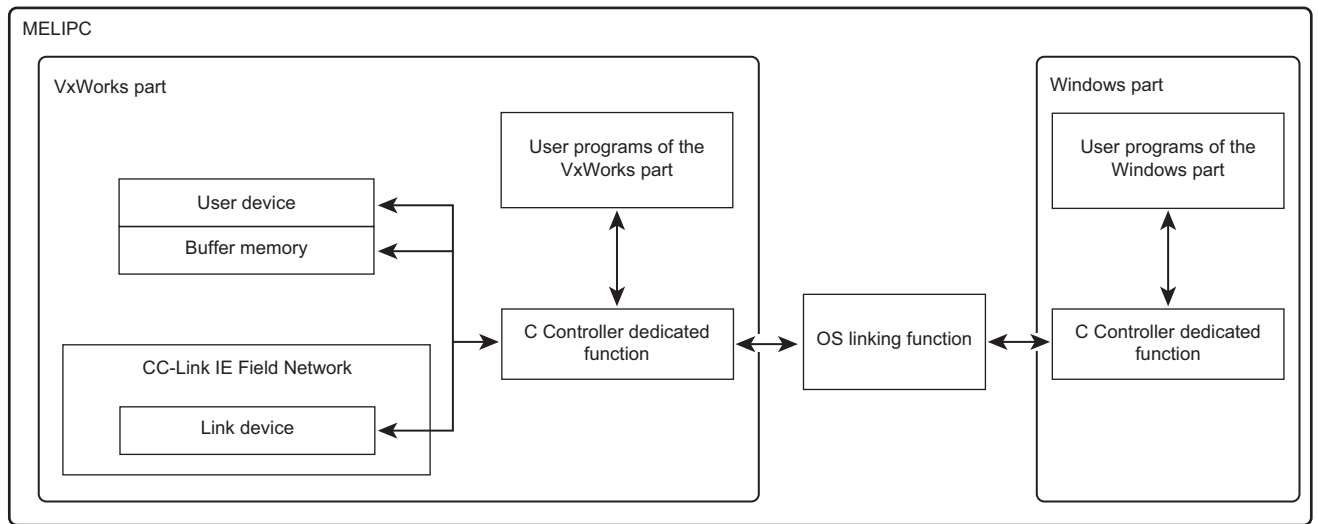
In this section, the performance of dedicated functions is explained in the following three processes: task of a VxWorks part, interrupt (ISR), and the thread (process) of a Windows part.

Performance on a user task of VxWorks part or thread (process) of Windows part

The following shows the time required for processing one user program in which a dedicated function library is used on a VxWorks part or Windows part.

The execution conditions on a VxWorks part or Windows part are as follows.

- VxWorks part: measured right after this product is started (the MAIN RUN LED is ON) (task priority: 100)
- Windows part: measured right after Windows is recovered



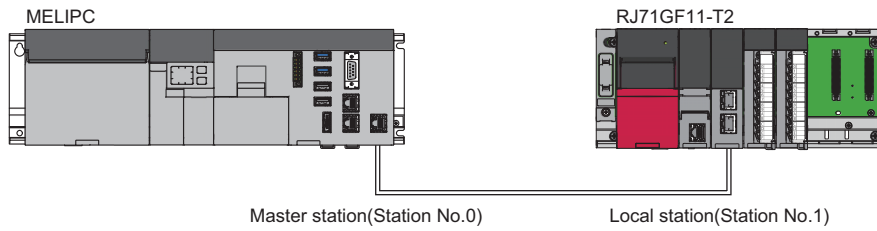
■Access time for a user device or file register

Function name	Device name	Device size (Unit: Word)	VxWorks part (Unit: Microsecond)	Windows part (Unit: Microsecond)
CCPU_ReadDevice	Internal relay (M)	1	2.6	442
		64	2.6	442
		512	2.6	442
		1024	2.6	442
		2048	2.6	852.8
		4096	—	—
	Link relay (B)	1	2.6	458.9
		64	2.6	458.9
		612	2.6	458.9
		1024	2.6	458.9
		2048	2.6	825.5
		4096	2.6	1314.3
	Data register (D)	1	2.6	425.1
		64	2.6	425.1
		512	2.6	425.1
		1024	2.6	425.1
		2048	2.6	830.7
		4096	2.6	1233.7
	Link register (W)	1	2.6	444.5
		64	2.6	444.5
		512	2.6	444.5
		1024	2.6	444.5
		2048	2.6	828.1
		4096	2.6	1456
	File register (ZR)	1	5.2	423.8
		64	328.9	665.6
		512	2047.5	2310.1
		1024	4044.3	4183.4
		2048	8216	8329.1
		4096	16389.1	16201.9

Function name	Device name	Device size (Unit: Word)	VxWorks part (Unit: Microsecond)	Windows part (Unit: Microsecond)
CCPU_WriteDevice	Internal relay (M)	1	2.6	435.5
		64	2.6	435.5
		512	2.6	435.5
		1024	2.6	435.5
		2048	2.6	829.4
		4096	—	—
	Link relay (B)	1	2.6	491.4
		64	2.6	491.4
		512	2.6	491.4
		1024	2.6	491.4
		2048	2.6	878.8
		4096	—	1235
	Data register (D)	1	2.6	423.8
		64	2.6	423.8
		512	2.6	423.8
		1024	2.6	423.8
		2048	2.6	826.8
		4096	2.6	1337.7
	Link register (W)	1	2.6	436.8
		64	2.6	436.8
		512	2.6	436.8
		1024	2.6	436.8
		2048	2.6	846.3
		4096	2.6	1251.9
	File register (ZR)	1	2.6	421.2
		64	23.4	456.3
		512	297.7	627.9
		1024	512.2	843.7
		2048	958.1	1660.1
		4096	1914.9	2919.67

■CC-Link IE Field device access time (when this product is a mater station)

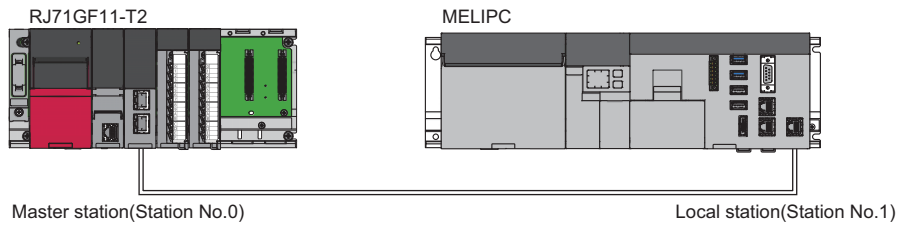
A CC-Link IE Field Network configuration when this product is a master station is as follows.



Function name	Device name	Device size (Unit: Word)	VxWorks part (Unit: Microsecond)	Windows part (Unit: Microsecond)
CCPU_ReadLinkDevice	Remote input (RX)	1	3.9	461.5
		64	3.9	461.5
		512	3.9	461.5
		1024	5.2	461.5
	Remote output (RY)	1	5.2	475.8
		64	32.5	479.7
		512	334.1	751.4
		1024	565.5	985.4
	Remote register (RWr)	1	3.9	460.2
		64	3.9	460.2
		512	3.9	460.2
		1024	5.2	460.2
		2048	5.2	881.3
		4096	5.2	1298.7
	Remote register (RWw)	1	5.2	440.7
		64	33.8	478.4
		512	234	715
		1024	591.5	981.5
		2048	1053	1859
		4096	2100.8	3277.3
CCPU_WriteLinkDevice	Remote output (RY)	1	2.6	430.3
		64	6.5	460.2
		512	32.5	468
		1024	62.4	505.7
	Remote register (RWw)	1	2.6	457.5
		64	6.5	444.6
		512	33.8	473.2
		1024	62.4	500.5
		2048	148.2	988
		4096	336.7	1483.3

■CC-Link IE Field device access time (when this product is a local station)

A CC-Link IE Field Network configuration when this product is a local station is as follows.



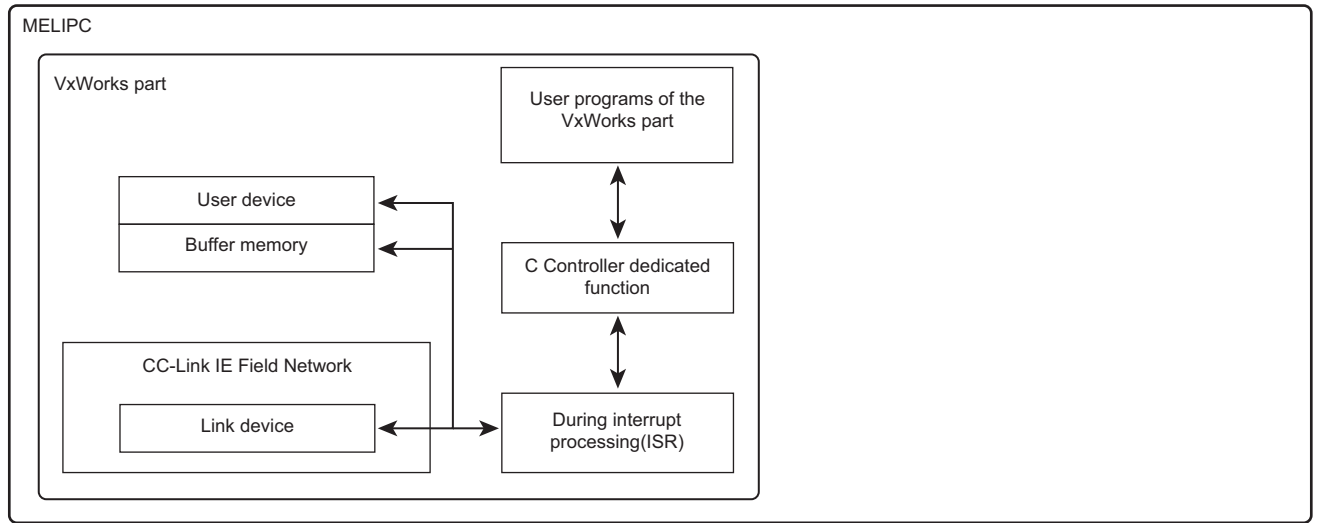
Function name	Device name	Device size (Unit: Word)	VxWorks part (Unit: Microsecond)	Windows part (Unit: Microsecond)
CCPU_ReadLinkDevice	Remote input (RX)	1	3.9	503.1
		64	3.9	503.1
		512	3.9	503.1
		1024	5.2	503.1
	Remote output (RY)	1	3.9	516.1
		64	3.9	516.1
		512	3.9	516.1
		1024	5.2	516.1
	Remote register (RWr)	1	3.9	458.8
		64	3.9	458.8
		512	3.9	458.8
		1024	5.2	458.8
		2048	5.2	899.6
		4096	5.2	1316.9
	Remote register (RWw)	1	3.9	469.3
		64	3.9	469.3
		512	3.9	469.3
		1024	5.2	469.3
		2048	5.2	894.4
		4096	5.2	1315.6
CCPU_WriteLinkDevice	Remote output (RY)	1	2.6	455
		64	6.5	457.6
		512	32.5	510.9
		1024	158.6	542.1
	Remote register (RWw)	1	2.6	461.5
		64	6.5	471.9
		512	31.2	510.9
		1024	62.4	549.9
		2048	181.9	1024.4
		4096	340.6	1518.4

■ Shared memory access time

Function name	Device size (Unit: Word)	VxWorks part (Unit: Microsecond)	Windows part (Unit: Microsecond)
CCPU_ReadSharedMemory	1	2.6	22.1
	64	2.6	22.1
	512	2.6	22.1
	1024	2.6	22.1
	2048	2.6	23.4
	4096	2.6	23.4
CCPU_WriteSharedMemory	1	2.6	22.1
	64	2.6	22.1
	512	2.6	22.1
	1024	2.6	22.1
	2048	2.6	23.4
	4096	2.6	23.4

Performance on an interrupt (ISR) of VxWorks part

The following shows the time required for processing one user program in which a dedicated function library is used from an interrupt processing (ISR) on a VxWorks part.



■Access time for a user device or file register

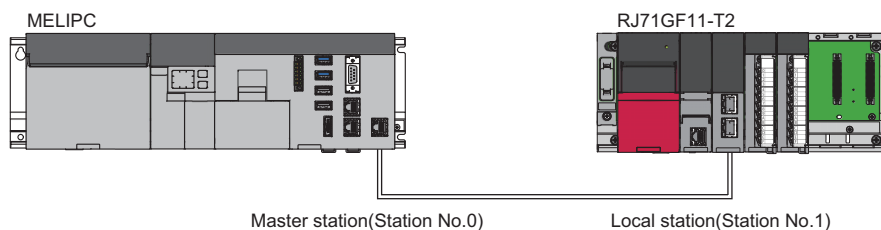
Function name	Device name	Device size (Unit: Word)	VxWorks part (Unit: Microsecond)
CCPU_ReadDevice_ISR	Internal relay (M)	1	1.3
		64	1.3
		512	2.6
		1024	2.6
	Link relay (B)	1	1.3
		64	1.3
		512	2.6
		1024	2.6
	Data register (D)	1	1.3
		64	1.3
		512	1.3
		1024	2.6
	Link register (W)	1	1.3
		64	2.6
		512	2.6
		1024	2.6
	File register (ZR)	1	5.2
		64	256.1
		512	—*1
		1024	—*1

Function name	Device name	Device size (Unit: Word)	VxWorks part (Unit: Microsecond)
CCPU_WriteDevice_ISR	Internal relay (M)	1	1.3
		64	1.3
		512	1.3
		1024	2.6
	Link relay (B)	1	1.3
		64	1.3
		512	2.6
		1024	2.6
	Data register (D)	1	1.3
		64	1.3
		512	1.3
		1024	2.6
	Link register (W)	1	1.3
		64	1.3
		512	1.3
		1024	2.6
	File register (ZR)	1	2.6
		64	23.4
		512	210.6
		1024	422.5

*1 Interrupt processing time exceeded

■CC-Link IE Field device access time (when this product is a mater station)

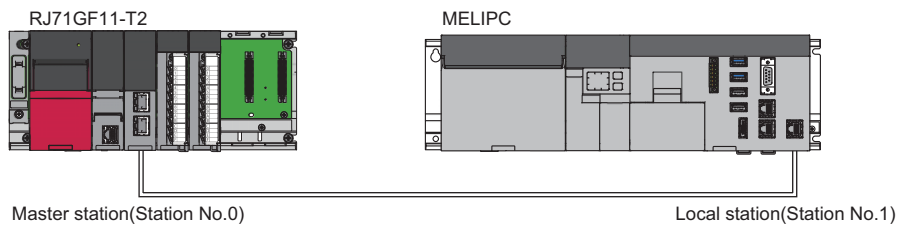
A CC-Link IE Field Network configuration when this product is a master station is as follows.



Function name	Device name	Device size (Unit: Word)	VxWorks part (Unit: Microsecond)
CCPU_ReadLinkDevice_ISR	Remote input (RX)	1	2.6
		64	2.6
		512	2.6
		1024	3.9
	Remote output (RY)	1	3.9
		64	41.6
		512	232.7
		1024	468
	Remote register (RWr)	1	2.6
		64	2.6
		512	2.6
		1024	3.9
	Remote register (RWw)	1	3.9
		64	32.5
		512	232.7
		1024	466.7
CCPU_WriteLinkDevice_ISR	Remote output (RY)	1	2.6
		64	5.2
		512	28.6
		1024	55.9
	Remote register (RWw)	1	2.6
		64	5.2
		512	28.6
		1024	55.9

■CC-Link IE Field device access time (when this product is a local station)

A CC-Link IE Field Network configuration when this product is a local station is as follows.



Function name	Device name	Device size (Unit: Word)	VxWorks part (Unit: Microsecond)
CCPU_ReadLinkDevice_ISR	Remote input (RX)	1	2.6
		64	2.6
		512	3.9
		1024	3.9
	Remote output (RY)	1	2.6
		64	2.6
		512	3.9
		1024	3.9
	Remote register (RWr)	1	2.6
		64	2.6
		512	3.9
		1024	3.9
	Remote register (RWw)	1	2.6
		64	2.6
		512	2.6
		1024	3.9
CCPU_WriteLinkDevice_ISR	Remote output (RY)	1	2.6
		64	5.2
		512	29.9
		1024	58.5
	Remote register (RWw)	1	2.6
		64	5.2
		512	29.9
		1024	57.2

Consideration

■Processing performance on a Windows part

The processing time of a dedicated function may longer depending on the operating status of the system of Windows (operating status of other processes or Windows services).

Appendix 4 Function List

This section lists the functions of this product.

Functions for Windows part

The following table shows the functions of the Windows part of this product.

Function		Description
Diagnostic and maintenance functions	Watchdog timer (WDT) function	To detect hardware errors of the Windows part of this product.

Functions for VxWorks part

The following table shows the functions of the VxWorks part of this product.

Function		Description
Clock function	Clock setting function	To set the clock data of the clock managed by the VxWorks part.
	Time zone setting function	To set the time zone of the clock managed by the VxWorks part.
	Daylight saving time setting function	To set daylight saving time (summer time) of the clock managed by the VxWorks part.
	Clock data synchronization setting function	To synchronize the clock managed by the VxWorks part and the clock managed by the Windows part.
	Time setting function (SNTP client)	To collect time information at the specified time from the time information server (SNTP server) connected to the network and automatically configures the time of the VxWorks part of this product.
Programmable controller device memory function		To create devices of the programmable controller CPU on the memory of this product and enables access to the devices from external devices.
SLMP function	SLMP server function	To write and read device data of the VxWorks part of this product from personal computers, display equipment (GOT, etc.), and other SLMP-compatible devices or the Windows part using SLMP.
iQSS function		To make iQ Sensor Solution (iQSS) available in this product.
CC-Link IE Field Network function		To perform data communications between this product and devices on the network through CC-Link IE Field Network.
CC-Link IE Field Network Basic function		To perform data communications between this product and devices on the network through general Ethernet.
Diagnostic and maintenance functions	Self-diagnosis function	To diagnose this product to check errors.
	Watchdog timer (WDT) function	To detect errors of the hardware of this product and user applications (used programs).
	Operating status management function	To manage the operating status (including STOP/RUN status) of this product.
	Event history function	To collect and save the following information: errors detected by this product, operations performed for this product, and errors occurred on a network.
	Switch/LED operation function	To operate the LEDs, acquire the LED statuses, acquire switch statuses, and manipulate operating statuses of this product.
	External device configuration diagnostics function	To display communication statuses between the Ethernet port (CH1) of this product and external devices, and between virtual Ethernet and the communication target.
	Function to forcibly restart part Windows during an error	To forcibly restart only the Windows part without resetting this product if a freeze or system error occurs on the Windows part or a system watchdog timer error occurs.
	MELIPC shutdown function	To set the VxWorks part and Windows part to the state in which the power can be turned OFF so that this product can be turned OFF.
	Individual reset function	To reset the Windows part of this product individually.
	User drive initialization function	To delete all folders and files stored on the user drive of this product.
Telnet function	Windows part startup monitoring function	To restart the Windows part automatically if the startup of the Windows part is not completed (the WIN RDY LED does not turn ON) within the specified monitoring time.
		To execute shell commands by a personal computer or Telnet tool of the Windows part using the TCP/IP network.
Network file access functions	FTP Function	To run the VxWorks part of this product as an FTP server.
	File sharing function	To run the VxWorks part of this product as a file sharing server.

Function		Description
Security function	User authentication function	To control users that can access this product.
	Service setting function	To enable and disable services running on the VxWorks part.
	Package Filtering Function	To identify the source IP address of accessing devices, thus preventing unauthorized access.
MELSOFT product and GOT connection function		To monitor and test the VxWorks part from a MELSOFT product or GOT using the Ethernet port (CH1) of this product or virtual Ethernet.
System count function		To count the elapsed time from when this product was turned ON.
Timer event function		To notify events to user programs in a specified cycle.

Common functions

The following table shows the common functions between the VxWorks part and the Windows part.

Function		Description
OS linking function	Virtual Ethernet function	To connect the VxWorks part and Windows part of this product using a virtual network.
	Shared memory access function	To perform inter OS communications by using shared memory, which is accessible bidirectionally from the VxWorks part and Windows part.
	Inter OS event notification function	To perform synchronization processing by the user programs of the Windows part and VxWorks part.
Serial interface switching function		To switch the connection destination of serial communication between the Windows part and the VxWorks part.

Appendix 5 Turning OFF or Resetting This Product

This section shows the procedures for turning OFF the power and resetting this product.

Point

Enabling the Unified Write Filter can prevent data from being written to specified folders and files. Even if the power of this product is turned OFF by a procedure other than normal one such as a power outage, the Windows system files can be protected. (Page 141 Unified Write Filter (UWF) settings)

Precautions

Close all active programs on this product before turning OFF or resetting this product.

Product power OFF

Perform one of the following procedures to turn OFF the power supply of this product.

- Performing the MELIPC shutdown function. (Page 138 Performing the MELIPC shutdown function)
- Setting the Windows and VxWorks parts to turn OFF. (Page 139 Setting the Windows and VxWorks parts to turn OFF)

However, if a system watchdog timer error has occurred on this product, perform the following procedure.

Page 139 If a system watchdog timer error occurs

Precautions

- When the MELIPC shutdown function is executed, WIN RDY LED may keep flashing for a long period of time. In that case, connect a display to DisplayPort on this product to check whether or not there are some errors (program execution is proceeding or file is overwritten) that inhibit the completion of the MELIPC shutdown function.
If an error occurred, eliminate the errors and shut down Windows from Windows Start menu. If there is no error or Windows shut down is proceeding, wait until the MELIPC shutdown function is complete and WIN RDY LED turns OFF.
However, if the Windows shutdown is not performed, perform the MELIPC shutdown function again, or shut down Windows from Windows Start menu.
- If Windows shutdown is attempted by mistake, press and hold the MELIPC RESET/WIN RESET switch to the WIN RESET side for at least 1 second to forcibly reset the Windows part.
- When powering OFF or resetting this product, be sure to follow the procedure for this product. Otherwise, Windows may not start normally, or the data in the user drive may be corrupted or a file system error may occur.

Performing the MELIPC shutdown function

Operating procedure

1. Perform the MELIPC shutdown function using any one of the following method.
 - Press and hold the SHUTDOWN switch for at least 1 second.
 - Execute the C Controller dedicated function (CCPU_MELIPCShutdown).
 - Turn on the shutdown request input of the I/O connector OS for at least 1 second. (Page 165 I/O connector)

The WIN RDY LED flashes during a shutdown.

2. Check that the shutdown is completed by any one of the following method.
 - Is the WIN RDY LED OFF, and the MAIN ERR LED flashing?
 - Is the shutdown completion output of the I/O connector on? (Page 165 I/O connector)
3. Power OFF the product.

Point

VxWorks part processing that was registered by the user in advance can be executed before performing the MELIPC shutdown function.

Advance processing is registered using the C Controller module dedicated function (CCPU_EntryShutdownFunc). (MELIPC MI5000 Series Programming Manual (VxWorks))

Setting the Windows and VxWorks parts to turn OFF

Operating procedure

1. Shut down Windows from Windows Start. ^{* 1}

The WIN RDY LED flashes during a shutdown.

2. Check that the WIN RDY LED turns OFF. ^{* 1}
3. Execute the C Controller module dedicated function (CCPU_ShutdownRom) on the VxWorks part. ^{* 2}
4. Confirm that the MAIN RUN LED is flashing (at high-speed). ^{* 2}
5. Power OFF the product.

^{*1} This step can be omitted when the system drive is protected by the Unified Write Filter (UWF) and folders and files excluded from UWF protection are not being accessed. ( Page 141 Unified Write Filter (UWF) settings)

^{*2} This step can be omitted when user programs that access the user drive are not being executed.

If a system watchdog timer error occurs

Operating procedure

1. Shut down Windows from Windows Start.
2. Power OFF the product.

Resetting the product

This section shows the procedure to reset this product.

Point

The Windows part of this product can be reset individually.
For details on the individual reset function, refer to the following manual.
 MELIPC MI5000 Series User's Manual (Application)

Operating procedure

1. Shut down Windows from Windows Start. ^{*1}
The WIN RDY LED flashes during a shutdown.
2. Check that the WIN RDY LED turns OFF. ^{*1}
3. Execute the C Controller module dedicated function (CCPU_ShutdownRom) on the VxWorks part. ^{*2}
4. Confirm that the MAIN RUN LED is flashing (at high-speed). ^{*2}
5. Press and hold the MELIPC RESET/WIN RESET switch to MELIPC RESET for 1 second or more.

Point

The MELIPC RESET/WIN RESET switch can also be operated through remote operation by MI Configurator.
( MELIPC MI5000 Series User's Manual (Application))

6. This product is reset.
7. After the VX RDY LED and WIN RDY LED flash, confirm that they are on.

^{*1} This procedure can be omitted when the system drive is protected by the Unified Write Filter (UWF) and folders and files excluded from UWF protection are not being accessed.

^{*2} This step can be omitted when user programs that access the user drive are not being executed.

Unified Write Filter (UWF) settings

By default, the Unified Write Filter is installed on this product.

When the Unified Write Filter is enabled, writing to specified folders and files can be prevented. This means that Windows system files can be protected even when the power supply was shut OFF by a power outage or other non-standard method. For details on the firmware update function, refer to the Microsoft website.

Point

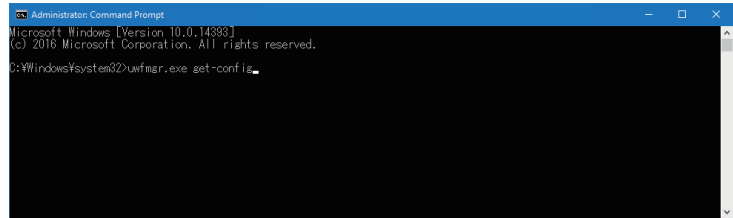
To protect the system files, protect the C drive by the Unified Write Filter. Note that applications cannot be installed after the C drive is protected.

When folders and files protected by the Unified Write Filter are written to, the written data is deleted when Windows restarts. Take the following measures when necessary.

- Exclude target folders and target files from protection.
- Save necessary files to USB memory devices or other external memory devices.

Checking whether the Unified Write Filter is enabled or disabled

1. Run the command prompt as Administrator.
2. In Command Prompt, run 'uwfmgr.exe get-config'.



Point

- To use another parameter, run either 'uwfmgr.exe ?' or 'uwfmgr.exe Help', and then check the help information.
- To change the settings of the Unified Write Filter or install software, it is necessary to temporarily disable the Unified Write Filter temporarily. ( Page 143 Disabling the Unified Write Filter)After the settings are changed or the software is installed, enable the Unified Write Filter. ( Page 142 Enabling the Unified Write Filter)

A

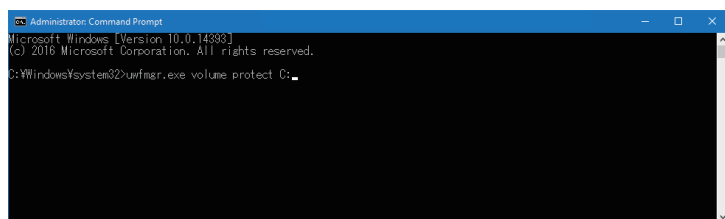
■Command list

Command	Description
get-config	The Unified Write Filter Configuration Utility appears.
?	Help for the Unified Write Filter appears.
Help	

Enabling the Unified Write Filter

1. Run the command prompt as Administrator.
2. In Command Prompt, run 'uwfmgr.exe volume protect <drive letter>' to enable protection of the drive.

To enable protection of the C drive, enter 'uwfmgr.exe volume protect C:'.



```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.

C:\Windows\System32\uwfmgr.exe volume protect C:
_
```

Point

Arbitrary folders and files of the drive can be excluded from protection.

To exclude arbitrary folders and files from protection, run the following command.

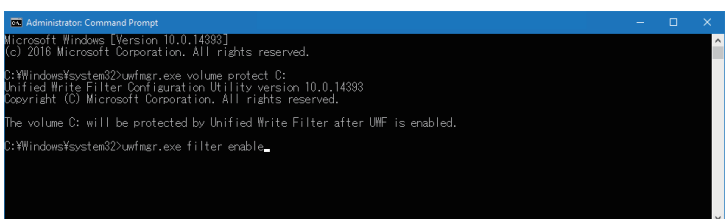
- uwfmgr.exe file add-exclusion (file path to be excluded)

Example: To exclude 'C:\Test\test.txt': uwfmgr.exe file add-exclusion C:\Test\test.txt

Example: To exclude the desktop: uwfmgr.exe file add-exclusion C:\Users\<user name>\Desktop

3. Run 'uwfmgr.exe filter enable' in the command prompt to enable the Unified Write Filter.

If the command is not run, the settings are not enabled.



```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.

C:\Windows\System32\uwfmgr.exe volume protect C:
Unified Write Filter Configuration Utility version 10.0.14393
Copyright (C) Microsoft Corporation. All rights reserved.

The volume C: will be protected by Unified Write Filter after UWF is enabled.

C:\Windows\System32\uwfmgr.exe filter enable
_
```

4. Restart Windows.

The Unified Write Filter is enabled after Windows restarts.

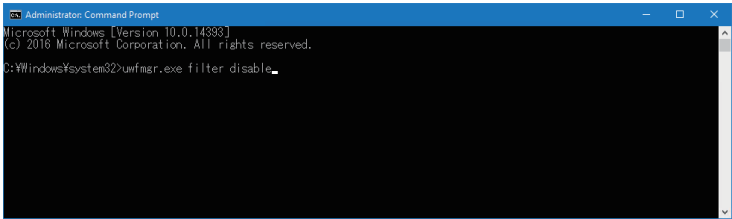
Command list

Command	Description
add-exclusion	Excludes a folder or file in a drive from the protection.
filter enable	Unified Write Filter is enabled.
volume protect	Enables a drive protection.

Disabling the Unified Write Filter

1. Run the command prompt as Administrator.
2. In Command Prompt, run 'uwfmgr.exe filter disable' to disable the United Write Filter.

The setting remains enabled without executing the command.



3. Restart Windows.

The Unified Write Filter is disabled after Windows restarts.

■ Command list

Command	Description
filter disable	Disables Unified Write Filter.

Appendix 6 Menu Operation Switch

This section shows the operation methods of the menu operation switches.

This product is equipped with the following three modes, and the following operations can be performed from the menus displayed on the dot matrix LED.

Mode		Operation	Reference
Normal mode	The power supply of the product is ON or the menu selection mode was closed. (Nothing is displayed on the dot matrix LED)	Information items selected for the Display mode in the menu selection mode are displayed on the dot matrix LED.	—
Menu selection mode	This mode (menu) appears on the dot matrix LED when the HOME switch was pressed in Normal mode.	The following operations can be performed. <ul style="list-style-type: none">• Display a user-specified character string• Confirm generated error codes• Confirm the Ethernet port (CH1) IP address• Confirm the period until the FAN LED turns on• Turn FAN LED off• Set the operation for an automatic restart of the Windows part	 Page 144 Menu selection mode
Offline mode	This mode (menu) appears on the dot matrix LED when the power supply of this product turned ON while the SELECT switch (◀) and HOME switch were pressed.	The following operations can be performed. <ul style="list-style-type: none">• Initialize this product• Diagnose hardware• Recover Windows	 Page 148 Offline mode

Menu selection mode

This section shows the operations during menu selection mode and the display specifications of the dot matrix LED.

Display of dot matrix LED

The following table shows the menus displayed on the dot matrix LED and the operation after each menu is selected.

Dot matrix LED			Description
MENU			The initial display when the menu selection mode starts.
Display mode	User		To display the content specified by the user. *1
	Error code		To display error codes. *2
	CH1 IP address		To display an IP address of the Ethernet port (CH1).
	FAN alert term		To display the period (unit: days) until the FAN LED turns on.
Maintenance	FAN alert	Alert reset	To turn the FAN LED off. The count for the period (unit: days) until the FAN LED turns on is cleared as well.
	Auto-reset Windows *3,*4	Parameter	To restart the Windows part automatically according to the parameter settings. (Default)
		Disable	To stop an automatic restart of the Windows part regardless of the parameter settings.

*1 The value specified by a C Controller module dedicated function (CCPU_SetDotMatrixLED) is displayed. When this operation is selected again after a change to another operation, the value displayed last time is displayed.

*2 The error that occurred most recently is displayed. (When no error has occurred, "—" is displayed.)
To exit the display of the error code, select "User".

*3 If the power is turned OFF and ON or this product is reset, the selection status is returned to 'Parameter'.

*4 The following shows the functions affected by this setting.

·Function to forcibly restart Windows part during an error

·Windows part startup monitoring function

For details on the functions, refer to the following:

 MELIPC MI5000 Series User's Manual (Application)

Point

- Operations are performed by pressing the OK switch after selecting a menu. ( Page 145 Switch operations)
- Sections that do not appear on the dot matrix LED are displayed by scrolling (right to left).

Switch operations

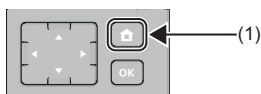
This section shows the operations during menu selection mode.

Point

- If the HOME switch is pressed when the dot matrix LED display is not 'Menu', the dot matrix LED returns to the default display ('Menu').
- If the HOME switch or OK switch is pressed when the dot matrix LED display is 'Menu', the menu is closed. (If the menu is closed, the content of the mode selected for Display mode is displayed on the dot matrix LED.)

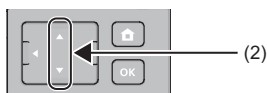
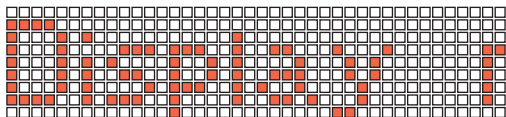
■Display mode

1. Power ON the product.
2. Press the HOME switch (1).

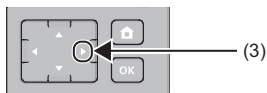


'Menu' is displayed on the dot matrix LED.

3. Select 'Display mode' using the SELECT switches (▲/▼) (2).



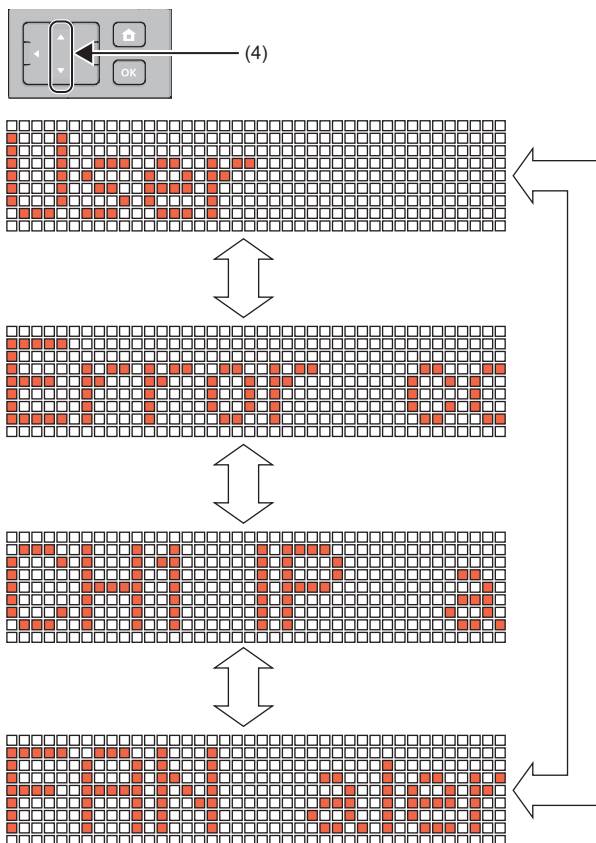
4. Press the SELECT switch (▶) (3).



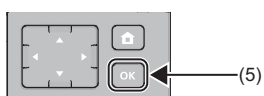
'User', 'Error code', 'CH1 IP address' or 'FAN alert term' is displayed on the dot matrix LED.

A

5. Select the function to run using the SELECT switches (▲/▼)(4).

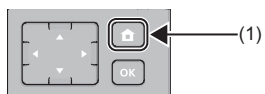


6. Press the OK switch (5).



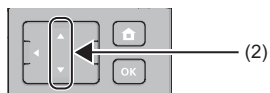
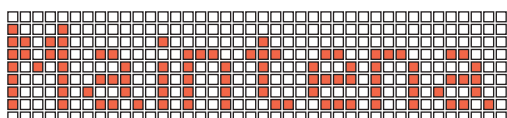
■Maintenance

1. Power ON the product.
2. Press the HOME switch (1).

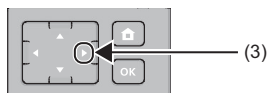


'Menu' is displayed on the dot matrix LED.

3. Select 'Maintenance' using the SELECT switches (▲/▼) (2).

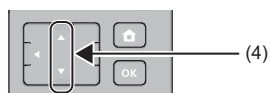
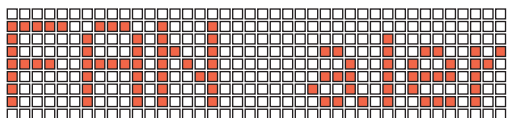
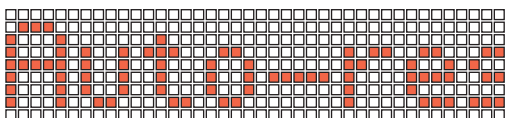


4. Press the SELECT switch (▶) (3).

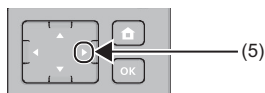


'FAN alert' or 'Auto-reset Windows' is displayed on the dot matrix LED.

5. Select the function to run using the SELECT switches (▲/▼)(4).



6. Press the SELECT switch (▶) (5).



When 'FAN alert' is selected

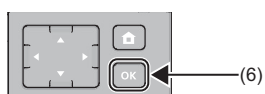
'Alert reset' is displayed on the dot matrix LED.

When 'Auto-reset Windows' is selected

The current selection status ('Parameter' or 'Disable') is displayed on the dot matrix LED.

Select the setting using the SELECT switches (▲/▼).

7. Press the OK switch (6).



Offline mode

This section shows the operations during menu selection mode and the display specifications of the dot matrix LED.

Display of dot matrix LED

The following table shows the displays of the dot matrix LED.

Dot matrix LED	Description
Offline mode	Initial display when offline mode starts.
Setting mode	Initialize this product.
Diagnostic mode	Diagnose hardware problems of this product.
Recovery mode	Recover the Windows part of this product.

Switch operations

For details of operations during offline mode, refer to the following.

-  Page 36 HARDWARE DIAGNOSES
-  Page 149 Product Initialization
-  Page 153 Recovery of Windows

Appendix 7 Product Initialization

This section shows the procedure for initializing the product.

Initialize this product in the following situations.

- This product does not start through execution of the script file registered to the VxWorks part of this product
- The username/password configured to the VxWorks part of this product has been forgotten
- It is not possible to connect to this product (incorrect settings were written to the service settings, etc.)

Point

- The VxWorks part of this product is returned to factory setting. Backup necessary data in advance because the data of the user drive of the VxWorks part is initialized.
- To initialize the Windows part of this product to factory setting, recover Windows. ( Page 153 Recovery of Windows)
- Initialization (clearing) is not performed when the fan module is operating.

Restriction

A part of the VxWorks part does not return to factory setting even when this product has been initialized.

Precautions

Do not turn OFF or reset this product when it is being initialized. If the product is turned OFF or reset, initialize it again.

Data backup

The following shows the method to backup data of this product.

Target device		Destination	Method
VxWorks part	User drive (/ROM)	Storage on Windows part	Using the FTP server function or file sharing server function of this product, copy the data to the storage on Windows part through virtual Ethernet.
		Storage on an external device (another personal computer)	Using the FTP server function or file sharing server function of this product, copy data to the storage on an external device through Ethernet.

A

Types of initialization

This product has the following 2 initialization types.

Item	Dot matrix LED display	Description
Setting initialization function	Vx Initialization	<ul style="list-style-type: none">Initialize the user drive and parameters of the VxWorks part of this product.Clear the values of the file registers to '0' and initialize the event history.
Script initialization function	Script Initialization	Rename the script file stored on the VxWorks part and create an empty file named 'STARTUP.CMD' so that the script file does not start when the power supply of this product is turned ON.

Setting initialization function

Initialize the user drive, parameters, file registers, and event history of the VxWorks part.

Use the setting initialization function in the following cases.

- The username/password configured to the VxWorks part of this product has been forgotten
- It is not possible to connect to this product (incorrect settings were written to the service settings, etc.)

■Post-initialization status

This product is in the following state when it was initialized by the setting initialization function.

Item	Description
User drive	All files stored on the user drive, including user programs and script files, are deleted.
Parameter	The default parameters are configured. *1
File register	The values of the file registers are all cleared. (Reset to '0'.)
Event history	The event history is initialized.

*1 The content of the CC-Link IE field network parameters written to this product are the default parameters, but they are not applied in the operation of the CC-Link IE field network function. (Operation uses the settings before the setting initialization function is run.)To apply the parameter file content to the operation of the CC-Link IE field network function, write the CC-Link IE field network parameters to this product, and then perform operations to apply the parameters.

Script initialization function

Execute when an out-of-control user program must be stopped or when errors in a script file prevent this product from starting. The script file stored on the VxWorks part of this product is renamed, so that the script file does not start when the power supply of this product is turned ON.

When the script initialization function is used, an empty script file named 'STARTUP.CMD' that does not process the user drive is created. The following comment is listed in the created script file.

- //Add application specific code here.

■Operation according to file availability

The following table shows the operation of the script initialization function depending on the availability of the script files 'STARTUP.CMD' or 'STARTUP.BAK'.

File available		Operation during execution
STARTUP.CMD	STARTUP.BAK	
Yes	Yes	<ul style="list-style-type: none">Creates an empty 'STARTUP.CMD' file.Overwrites the 'STARTUP.BAK' file.
Yes	No	<ul style="list-style-type: none">Creates an empty 'STARTUP.CMD' file.Creates the 'STARTUP.BAK' file.
No	Yes	<ul style="list-style-type: none">Creates an empty 'STARTUP.CMD' file.Deletes the 'STARTUP.BAK' file.
No	No	<ul style="list-style-type: none">Creates an empty 'STARTUP.CMD' file.'STARTUP.BAK' is not created

Precautions

When the script initialization function is used when 'STARTUP.BAK' file is available, the 'STARTUP.BAK' file is overwritten or deleted. To protect the existing 'STARTUP.BAK', save it to another area.

Performing initialization

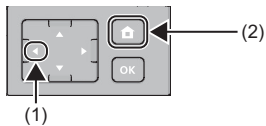
Shows steps for performing initialization.

Point

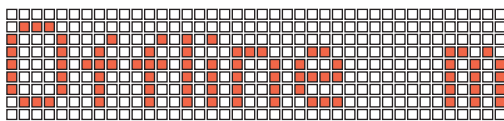
- To initialize, select an operation mode when the power supply of the product is ON.
- If the HOME switch is pressed when the display of the dot matrix LED is not 'Offline mode', the dot matrix LED returns to the default display ('Offline mode').

1. Power ON the product while pressing the SELECT switch (◀) (1) and HOME switch (2).

Press and hold the SELECT switch (◀) and HOME switch until 'Offline mode' is displayed on the dot matrix LED.

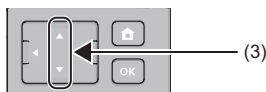
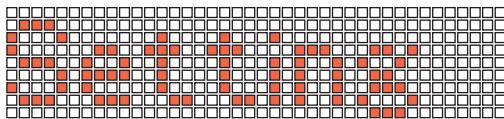


2. After 'Offline mode' is displayed on the dot matrix LED, release the SELECT switch (◀) and HOME switch.

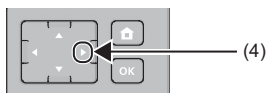


3. Press the SELECT switches (▲/▼) (3) to select an operation mode.

Switch until 'Setting mode' is displayed on the dot matrix LED.

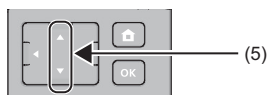
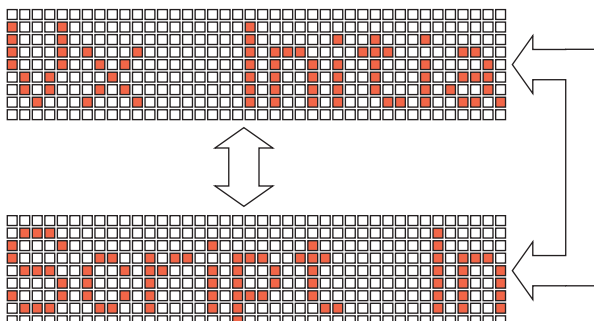


4. Press the SELECT switch (▶) (4).

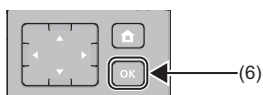


5. Select the initialization to be run using the SELECT switches (▲/▼)(5).

- Setting initialization function: Vx Initialization
- Script initialization function: Script Initialization



6. Press the OK switch (6).



7. The selected initialization is run.

During initialization, the states of the main LED and dot matrix LED of this product are as follows.

- MAIN RUN LED: lit green
- Dot matrix LED: 'Running' is displayed

8. Make sure that initialization is completed, and then turn OFF the power supply of this product.

When initialization is completed, the statuses of the main LED and dot matrix LED of this product are as follows.

- MAIN RUN LED: Off
- Dot matrix LED: 'OK' is displayed

If an error ends initialization

If an error ends initialization of this product, the MAIN ERR LED flashes in red, and a value corresponding to the error appears on the dot matrix LED. In addition, a system error occurred if only the MAIN ERR LED flashes.

Function	Dot matrix LED display	Cause	Corrective action
Setting initialization function (Vx Initialization)	1001	Initialization has failed.	Initialize again.
Script initialization function (Script Initialization)	1101	Script initialization has failed.	

If an error ended initialization, initialize again. If an error occurs again, this product may be malfunctioning. Consult your local Mitsubishi representative.

Appendix 8 Recovery of Windows

This section shows the recovery procedure for the Windows part of this product.

Recover the Windows part when the Windows part does not start or Windows needs to be initialized to factory setting.

Precautions

Do not turn OFF or reset this product during Windows recovery. Otherwise, Windows may not start normally. Recover Windows again if Windows does not start normally.

Execution of recovery

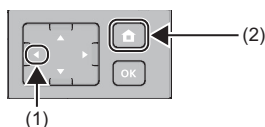
This section shows the recovery procedure.

Point

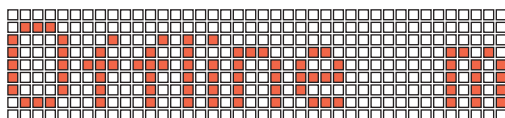
- To recover Windows, select an operation mode when the power supply of the product is ON.
- If the HOME switch is pressed when the display of the dot matrix LED is not 'Offline mode', the dot matrix LED returns to the default display ('Offline mode').

1. Power ON the product while pressing the SELECT switch (◀) (1) and HOME switch (2).

Press and hold the SELECT switch (◀) and HOME switch until 'Offline mode' is displayed on the dot matrix LED.

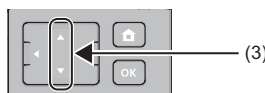
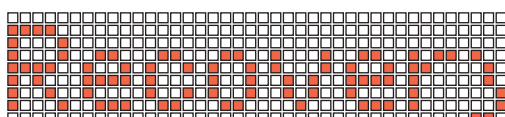


2. After 'Offline mode' is displayed on the dot matrix LED, release the SELECT switch (◀) and HOME switch.

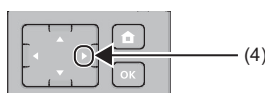


3. Press the SELECT switches (▲/▼) (3) to select an operation mode.

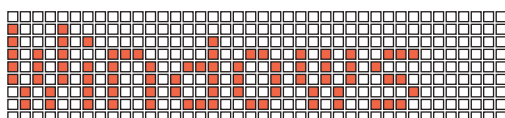
Switch until 'Recovery mode' is displayed on the dot matrix LED.



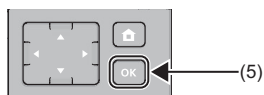
4. Press the SELECT switch (▶) (4).



'Windows' is displayed on the dot matrix LED.



5. Press the OK switch (5).



6. The MAIN RUN LED turns on and Windows recovery is run.

During recovery, the state of the dot matrix LED of this product is as follows.

- Recovery start: 'Ready' is displayed.
- Running: 'Running' is displayed.
- Recovery completed: 'OK' is displayed.

An error occurred if other text appears on the dot matrix LED. (➡ Page 154 If an error ends recovery)

7. Make sure that recovery is completed, and then turn the power supply OFF to ON or reset this product.

At completion of recovery, the MAIN RUN LED turns off.

If an error ends recovery

If an error occurs during recovery, the MAIN RUN LED turns off and the MAIN ERR LED turns on when the error is detected. An error code corresponding to the diagnosis for which the error occurred is displayed on the dot matrix LED. A system error occurred if an error code is not displayed on the dot matrix LED, and only the MAIN ERR LED is flashing.

Dot matrix LED display	Description	Corrective action
1201	Check disk error (The CFast card may be corrupted.)	Recover Windows again. If an error is detected at this time, this product may be malfunctioning. Consult your local Mitsubishi representative.
1202	Format error (The CFast card may be corrupted.)	
1203	Recovery execution error (Possible product fault.)	

Appendix 9 Inserting and Removing a CFast Card

This section shows the procedure for inserting/removing a CFast card.

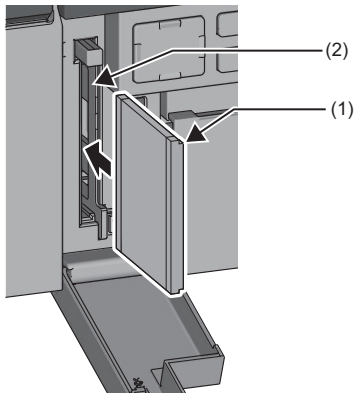
Inserted CFast cards are recognized as additional storage of the Windows part. (📖 Page 109 Storage configuration)

Precautions

- Turn OFF the power supply of this product before inserting a CFast card.
- If a CFast card is inserted while the power supply of the product is ON, it will not be recognized.
- Do not turn OFF the power supply of this product or remove a CFast card while file writing to the CFast card. Otherwise, the data on the CFast card may be corrupted or a file system error may occur.

Inserting a CFast card

The following shows the procedure to insert a CFast card.



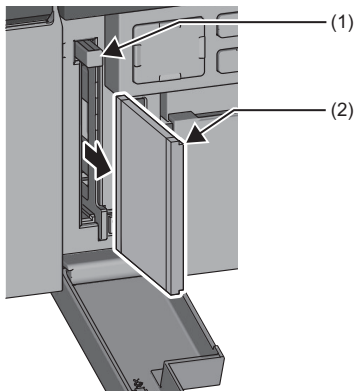
1. Open the CFast/BATTERY cover.
2. Pay attention to the orientation of the CFast card (1), and ensure that it is inserted straight into CFast card slot (2).

Insert the CFast card until its position is approximately the same height as the printed mark on the surface of this product.

3. Close the CFast/BATTERY cover until it clicks.

Removing the CFast card

The following shows the procedure to remove the CFast card.



1. Open the CFast/BATTERY cover.
2. Press the eject button (1).
3. Pull the CFast card (2) out straight from the CFast card slot.
4. Close the CFast/BATTERY cover until it clicks.

A

Appendix 10Wiring

This section shows the wiring of this product.



The bend radius (R) near the connector and ports should be 4× that of the cable external diameter.

Precautions

Turn OFF the power supply of this product before wiring.

Power supply module

For the wiring of the power supply module, see the following page.

Page 32 Wiring the Power Supply Module

Ethernet connector

This section shows the wiring of the Ethernet connector.

Wiring equipment

The following shows the equipment for wiring.



Standard (1000BASE-T/100BASE-TX/10BASE-T) and full duplex/half duplex communication modes are determined by the product in accordance with the hubs being used. If hubs without auto negotiation functionality are used, set the hub to match the communications mode.

■Ethernet cables and hubs (during Ethernet configuration)

Use Ethernet cables and hubs that meet the following conditions.

Ethernet cables

Standard	Specifications	Communication s speed	Connector
1000BASE-T	Category 5e or higher, straight cable (shielded, STP)	1 Gbps	RJ45
	Category 5e or higher, crossover cable (shielded, STP)		
100BASE-TX	Category 5 or higher, straight cable (shielded, STP)	100 Mbps	
	Category 5 or higher, crossover cable (shielded, STP)		
10BASE-T	Category 3 or higher, straight cable (shielded, STP)	10 Mbps	
	Category 3 or higher, straight cable (UTP)		
	Category 3 or higher, crossover cable (shielded, STP)		
	Category 3 or higher, crossover cable (UTP)		

Hubs

Ensure that hubs to use with an Ethernet configuration can handle the transmission speeds of communications.

■Ethernet cables and hubs (during CC-Link IE Field Network Basic configuration)

Use Ethernet cables and hubs that meet the following conditions.

Ethernet cables

Standard	Specifications	Communication s speed	Connector
100BASE-TX	Category 5 or higher, straight cable (shielded, STP)	100 Mbps	RJ45
	Category 5 or 5e, crossover cable (shielded, STP)		

Hubs

Use cables that meet all of the following conditions. Operation cannot be guaranteed if conditions are not met.

- Compliant with IEEE802.3(100BASE-TX) standards
- Incorporating auto MDI/MDI-X function
- Incorporating auto negotiation function
- Switching hub (Layer 2 switch)*¹

*¹ Repeater hubs cannot be used.

Wiring procedure

The following shows the procedure for wiring Ethernet cables.

■Connection of Ethernet cables

1. While paying attention to the connector orientation, insert the Ethernet cable connector into the Ethernet connector of this product until a click is heard.
2. Lightly pull on the Ethernet cable to check that it is properly connected.
3. Make sure that the SPEED LED of the connected connector is lit green.

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. Replacing the cable may solve this problem.
- If Ethernet devices are connected to a network that has a communications rate of 10 Mbps, the SPEED LED will turn OFF. Check communications status using PING or similar tools.

A

■Removal of Ethernet cables

Press and hold the clip on the Ethernet cable connector, and pull it out.

Precautions

■ Considerations when connecting Ethernet devices

- When replacing products or changing IP addresses, also reset Ethernet devices. If Ethernet devices retain the Ethernet addresses (MAC addresses) of devices with which they are communicating, then replacing modules will change the Ethernet address (MAC address), and ongoing communications may not be possible.
- If errors occur in Ethernet devices, then carry out troubleshooting in accordance with the Ethernet device manual.
- If the shell of Telnet or CW Workbench 4 is connected to this product when VxWorks detects an error, an event or error message may be displayed. For details on displayed events or error messages, refer to the VxWorks Manual. When processing is not possible, consult Wind River Systems, Inc.

■ Considerations during 1000BASE-T/100BASE-TX connections

In high-speed communications (1 Gbps/100 Mbps) using 1000BASE-T/100BASE-TX connections, high-frequency noise from devices other than this product in the installation environment may generate communications errors.

This shows measures to take on the product side when constructing a network system, in order to counter the effect of high-frequency noise.

- When wiring cables, do not bundle together or situate in close proximity main circuits and power wiring.
- Place cables in ducts.
- In environments subject to noise, use shielded, STP cables.
- In environments subject to noise, use programming in the user program in order to carry out retry processing.
- Change other devices that connect to this product to 10 Mbps, and decrease communications speed.

CC-Link IE Field Network connector

This section shows the wiring for a CC-Link IE Field Network connector.

Wiring equipment

The following shows the equipment for wiring.

■Ethernet cable

Use Ethernet cables that meet the following conditions.

Standard	Specifications	Connector
<ul style="list-style-type: none">IEEE802.3(1000BASE-T)ANSI/TIA/EIA-568-B(Category 5e)	Category 5e or higher, straight cable (double shielded, STP)	RJ45

The CC-Link IE Field Network Ethernet cable is sold by Mitsubishi Electric System & Service, Co., Ltd.

Model name (Manufacturer)	Specifications
SC-E5EW Series (Mitsubishi Electric System & Service, Co., Ltd.)	Straight cable (double shielded, STP)

Point

Cables can be constructed at a specified length. Consult with your local Mitsubishi representative.

■Hubs

Use cables that meet all of the following conditions. Operation cannot be guaranteed if conditions are not met.

- Compliant with IEEE802.3(1000BASE-T) standards
- Incorporating auto MDI/MDI-X function
- Incorporating auto negotiation function
- Switching hub (Layer 2 switch)^{*1}

^{*1} Repeater hubs cannot be used.

This shows introduced products.

Model name (Manufacturer)	Type
NZ2MHG-T8F2 (Mitsubishi Electric Corporation)	CC-Link IE-supported intelligent hub
NZ2EHG-T8N (Mitsubishi Electric Corporation)	Industrial-use switching hub

Use the following hubs when using CC-Link IE Field Network synchronous communication functions.

Model name (Manufacturer)	Type	Maximum connection levels when synchronization communications functions are used
NZ2MHG-T8F2 (Mitsubishi Electric Corporation)	CC-Link IE-supported intelligent hub	4
NZ2EHG-T8N (Mitsubishi Electric Corporation)	Industrial-use switching hub	

A

Wiring procedure

The following shows the procedure for wiring Ethernet cables.

■Connection of Ethernet cables

1. While paying attention to the connector orientation, insert the Ethernet cable connector into the CC-Link IE Field Network connector of this product until a click is heard.
2. Lightly pull on the Ethernet cable to check that it is properly connected.
3. Make sure that the LINK LED of the connected connector is lit green.

Point

- The time required after the Ethernet cable is connected until the LINK LED turns on will vary. This normally takes several seconds. However, depending on the status of devices on the circuits, link-up processing may repeat, requiring more time.
- If the LINK LED does not turn on, check that there are no problems with the Ethernet cable.

■Removal of Ethernet cables

Press and hold the clip on the Ethernet cable connector, and pull it out.

Precautions

- Ensure that Ethernet cables are used in a duct, or otherwise fixed using a clamp. If these are not put in a duct or otherwise fixed with a clamp, this may result in the cable swinging or moving, or otherwise being pulled, resulting in damage to the product or cables or malfunction due to poor contact.
- Take care in order to not touch the cable connectors or product connector wires with bare hands, or otherwise that dust or dirt come in contact with these. If oils, dirt, or dust on the hand contacts this wiring, this may lead to increased communication losses, preventing correct data link.
- Check that the Ethernet cables being used do not have any breakages or shorts, and that there are no problems with the connector.
- Do not use Ethernet cables with a broken connector clip. Using an Ethernet cable with a broken connector clip may result in the cable coming out, or malfunction.
- Ensure that inserting and removing the Ethernet cable is carried out by grasping the connector itself. Pulling the cable connected to the product may result in malfunction or damage to the product or cable, or malfunction due to poor contact.
- For Ethernet connectors that are not connected, use the attached cover to prevent ingress of dust and dirt.
- The maximum length between stations for Ethernet cable is 100 m. However, this distance may shorten depending on the cable usage environment. For details, consult with the cable manufacturer.
- There is a minimum bend radius for the Ethernet cable. Check the specifications of the Ethernet cable being used for the bend radius.

RS-232 connector

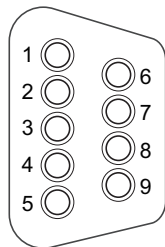
This section shows the wiring for an RS-232 connector.

Wiring equipment

The following shows the equipment for wiring.

■Connector

The specifications of RS-232 connector are as follows.



Pin numbers	Signal abbreviation	Signal name	Signal direction (This product ↔ RS-232 device)
1	CD(DCD)	Reception carrier detection	←
2	RD(RXD)	Reception data	←
3	SD(TXD)	Transmission data	→
4	ER(DTR)	Data terminal ready	→
5	SG(GND)	Signal ground	↔
6	DR(DSR)	Data set ready	←
7	RS(RTS)	Transmission request	→
8	CS(CTS)	Transmission possible	←
9	CI(RI)	Called display	←

Use the connector of the following RS-232 connection cable.

Model name	Manufacturer	Connector
17JE-13090-02(D8C)(-CG)	Fujikura Ltd. (www.fujikura.co.jp/en)	D-sub connector (soldered connection type)

A

Wiring procedure

The following shows the procedure for wiring an RS-232 connector.

■Connection of an RS-232 connection cable

1. While paying attention to the connector orientation, insert the RS-232 connection cable into the RS-232 connector.
2. Tighten the connector screws.
 - Connector fitting screws (#4-40UNC): tightening torque range 0.15 to 0.20 N·m

■Removal of an RS-232 connection cable

1. Loosen the connector screws.
2. Pull out the RS-232 connection cable.

Precautions

- When not connecting a RS-232 cable, use the attached cover to prevent ingress of dust and dirt.
- Use a single point ground for RS-232 cable shielding.
- Please check specifications of connected devices as to connection methods for peripheral devices.
- Do not short the RS-232 connection cable FG signal and SG signal. If the FG signal and SG signal are connected within peripheral devices, then do not connect the FG signal in the product.
- When connecting devices to the product, it is recommended that the same power supply be used.
- If the power plug of the device to connect is a three-pin, or has an earth cable in either the plug or on the device itself, then ensure that a plug incorporating an earth is used, or that a class D type grounding (3rd class grounding) be used.
- When connecting AC-powered devices that do not have an earth wire, install using the following procedure.
 - 1: Check that the power supply plug of the connected device is removed from the AC socket.
 - 2: Using an RS-232 connection cable, connect the device to this product.
 - 3: Insert the power supply plug of the connected device into the AC socket.

USB connector

This section shows the wiring for a USB connector.

Wiring equipment

The following shows the equipment for wiring.

■USB cable

Use the USB cable included with the connection equipment.

Precautions

Cables with a Type A connector can connect this product.

Wiring procedure

The following shows the procedure for wiring USB connectors.

■Connection of USB cables

While paying attention to the connector orientation, insert the USB cable into the USB connector.



After connecting the cable, take measures to prevent its removal. (☞ Page 171 Prevention of cable removal)

■Removal of USB cables

Pull out the USB cable.

Precautions

- When not connecting a USB cable, use the attached cover to prevent ingress of dust and dirt.
- Place connected devices within a control panel.
- When connecting devices to the product, it is recommended that the same power supply be used.
- If the power plug of the device to connect is a three-pin, or has an earth cable in either the plug or on the device itself, then ensure that a plug incorporating an earth is used, or that a class D type grounding (3rd class grounding) be used.
- When connecting self-powered devices, install using the following procedure.
 - 1: Check that the power supply plug of the connected device is removed from the AC socket.
 - 2: Connect a USB cable, connect the device to this product.
 - 3: Insert the power supply plug of the connected device into the AC socket.

A

DisplayPort

This section shows the wiring for DisplayPort.

Wiring equipment

The following shows the equipment for wiring.

■DisplayPort cable

Use cables that meet both of the following conditions.

- With shielding.
- Meet DisplayPort 1.2a standards.

Additionally, use locking connectors that prevent the cable from being disconnected.

Wiring procedure

The following shows the procedure for wiring the DisplayPort.

■Connection of DisplayPort cables

While paying attention to the connector orientation, and insert the DisplayPort cable into the DisplayPort until a click is heard.



After connecting the cable, take measures to prevent its removal. (👉 Page 171 Prevention of cable removal)

■Removal of DisplayPort cables

Release the connector lock, and pull out the DisplayPort cable.

Precautions

- When not connecting a DisplayPort cable, use the attached cover to prevent ingress of dust and dirt.
- Check that the DisplayPort cables do not have any breakages or shorts, and that there are no problems with the connector.

I/O connector

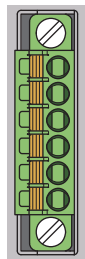
This section shows the wiring for an I/O connector.

Wiring equipment

The following shows the equipment for wiring.

■connector

The I/O connector specifications are as follows.



Pin numbers	Signal code	Signal name	Application	Type
1	NC*1	Unused terminal	—	NC
2				
3	SHUTDOWN IN +	Shutdown request input	Shutdown request signal input terminal	Input
4	SHUTDOWN IN -	Shutdown request input common	Shutdown request signal common terminal	
5	SHUTDOWN OUT +	Shutdown completed output	Shutdown completed signal output terminal	Output
6	SHUTDOWN OUT -	Shutdown completed output common	Shutdown completed signal common terminal	

*1 Do not connect anything.

■Power wiring

When connecting to the I/O connector, use power wiring with the following specifications.

Power wiring	Diameter
Stranded wire	0.25 to 0.75mm ²

■Solderless terminal

Use the following solderless terminals for wiring.

Solderless terminal	Model name	Manufacturer
Insulated bar solderless terminal	<ul style="list-style-type: none">• AI 0.25 to 10 YE (used wire: 0.25 mm²)• AI 0.34 to 10 TQ (used wire: 0.3 mm², 0.34mm²)• AI 0.5 to 10 WH (used wire: 0.5 mm²)• AI 0.75 to 10 GY (used wire: 0.75 mm²)	Phoenix Contact (www.phoenixcontact.com)

■tool

Use screwdrivers that meet the following conditions.

- Flathead screwdriver (shaft diameter: 3 mm or less, blade width: 2.6 mm or less)

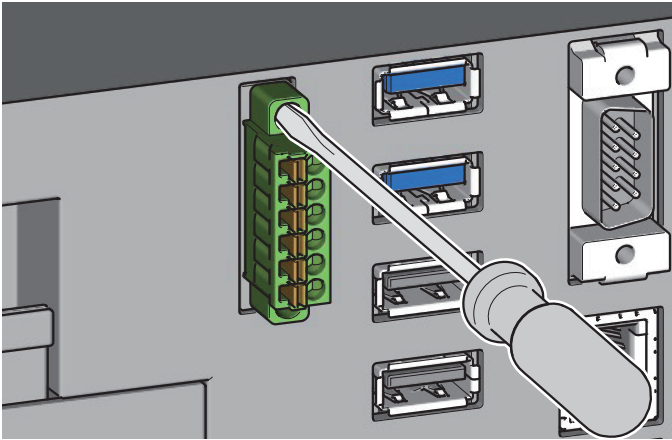
A

Mounting and unmounting of the terminal block

When unmounting the terminal block, use a flat head screwdriver to loosen the terminal block mounting screws.

When mounting the terminal block, tighten the terminal block mounting screws.

- Terminal block mounting screw tightening torque range: 0.2 to 0.3 N·m



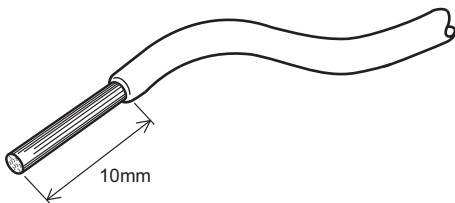
Precautions

Failure to securely fix this may result in drops, short-circuit, or malfunction.

Power wiring end processing

Use a bar solderless terminal for power wiring to insert into the I/O connector.

1. Strip 10 mm insulation from the tip of the power wiring.



2. Connect a bar solderless terminal to the stripped part of the cable.

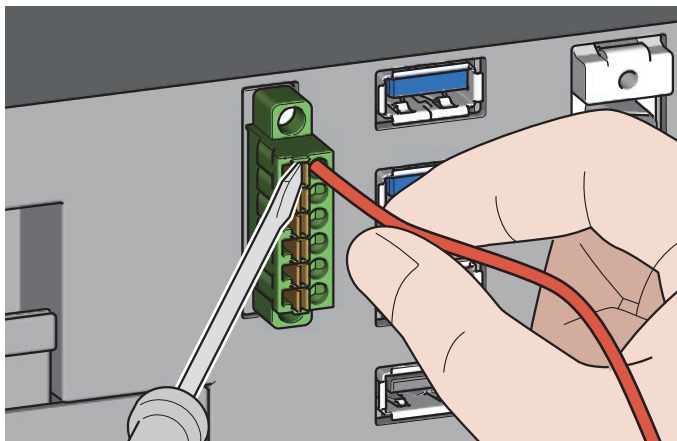
When attaching the bar solderless terminal, use a crimping tool that meets the solderless terminal manufacturer specifications.

Wiring procedure

The following shows the procedure for wiring I/O connectors.

■Connection of power wiring

1. Use a flat head screwdriver to press the terminal block, and release the power wiring slot. Keep pushing the terminal block button until the power wiring is inserted.
2. Insert power wiring with solderless terminal attached into the power wiring slot, then stop pressing the terminal block button.



3. Lightly pull on the power wiring to check that it is properly inserted.

■Removal of power wiring

1. Use a flat head screwdriver to press the terminal block, and release the power wiring slot. Keep pushing the terminal block button until the power wiring is removed.
2. Remove the power wiring from the slot, then stop pressing the terminal block button.

A

Precautions

- Power wire is of the correct length, and that a solderless terminal is attached to the stripped portion. If the power wire stripped portion is too long, the excess conductive part may protrude, and result in electric shock or short circuit between adjacent terminals. If the power wire stripped length is too short, this may result in the poor contact to the spring clamp terminal part.
- For wiring to the terminal block, use bar solderless terminals that have acquired UL certification. Inserting stripped power wiring as is into the power wire slot will mean this is not securely clamped.
- When attaching the bar solderless terminal to the power wiring, use a crimping tool recommended by the solderless terminal manufacturer.
- Prior to insertion of the bar solderless terminal, check the condition of both the power wire slot and the bar solderless terminal, and ensure correct terminal orientation. Inserting a bar solderless terminal that is too large for the power wire slot may result in damage to the terminal block.
- Do not use the wire soldered the head. Differences in finishing of soldered terminals may result in poor contact to the terminal block, or failure in insertion/removal.
- Do not connect anything to terminal block No.1 and No.2.
- Even when not carrying out any wiring, ensure that the included spring clamp terminal block is installed in order to prevent both foreign matter adhering to the I/O connector, and shorts resulting from unintended disconnection.

Protection of input terminals

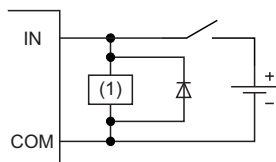
■Shutdown request input terminal

Countermeasures for electromotive force

When connecting an inductive load, connect a diode in parallel for this load.

For diodes to connect, use those that meet the following conditions.

- Reverse breakdown voltage is ten times or more than circuit voltage
- Forward current is two times or more than load current



(1) Inductive load

■Shutdown completed output terminal

Maximum open/close frequency when driving L load

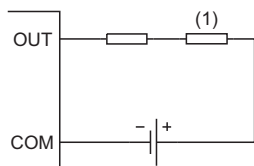
For the maximum open/close frequency, use 1 sec. ON, and 1 sec. or more OFF.

Connected load

When using counters, timers, and other devices that use DC/DC converters output module loads, check that the load inrush current is within the output terminal maximum load current. At ON or during operation, inrush current flows at a constant frequency from the connected load, and this may lead to damage to the module.

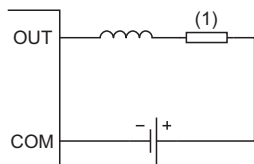
If the load inrush current exceeds the output terminal maximum load current, then ensure that one of the following measures is taken in order to mitigate the impact of the inrush current.

- Connect a resistor in series with the load



(1) Load

- Connect an inductor in series with the load



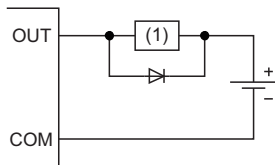
(1) Load

Countermeasures for electromotive force

When connecting an inductive load, connect a diode in parallel for this load.

For diodes to connect, use those that meet the following conditions.

- Reverse breakdown voltage is ten times or more than circuit voltage
- Forward current is two times or more than load current



(1) Inductive load

Protection of output terminals

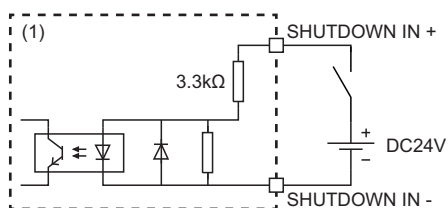
If the output terminal is subject to high noise, then output may turn ON because of output terminal protected operation.

Implement the following measures in order that the terminal voltage between output terminals does not exceed the used load voltage range.

- If using relays or other inductive loads, then a surge protector will also be required on the load side. Take into account details of measures to handle counter electromotive force, and implement these measures.
- In order to prevent excess noise enduring, do not bundle drive wiring and I/O wiring.

Circuit configuration

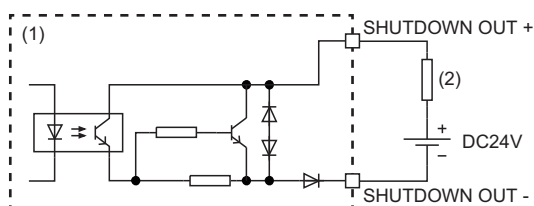
■Shutdown request input



(1) Internal circuit

■Shutdown completed output

The shutdown completion output remote controller (SHUTDOWN OUT -) outputs L at shutdown completion, and maintains L output until AC power OFF.



(1) Internal circuit

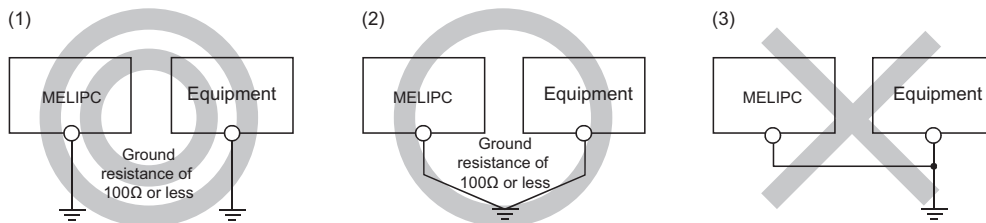
(2) Load

Precautions

- Shutdown request input and shutdown completed output functions are only supported on this product. When shutting down the product using a shutdown request input, use 1 or more seconds for the input ON time. Even if input to the shutdown request input terminal is longer than 3 seconds, a forced shutdown will not occur.
- If using shutdown processing, and restarting the product after it has entered a shutdown state (product shutdown completion output is ON), then turn the system power supply on again. Even after shutdown, if the SHUTDOWN switch is operated or there is again input into the shutdown request input terminal, the product will not restart.
- If the shutdown request input is in an ON status, then the product cannot restart.
- Do not attempt to shut down this product by using the I/O connector while Windows is starting. This may prevent Windows from shutting down correctly.
- If the shutdown-complete output signal is used for control of external devices, ensure that its use is in accordance with shutdown-complete output timing specifications.

Grounding

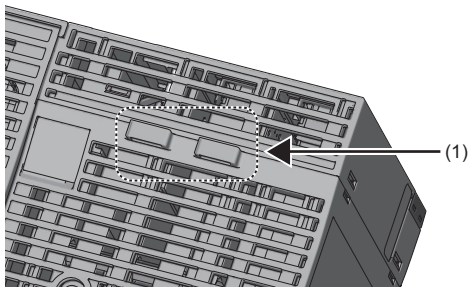
- Provide independent grounding when possible. Grounding work is to be to a class D grounding (3rd class grounding).
- Use the thickest cable (maximum of 2mm²). Bring the grounding point close as close to the product as possible in order to reduce to the minimum the length of the ground cable.
- If independent grounding cannot be provided, employ shared grounding with all grounding wires the same length.



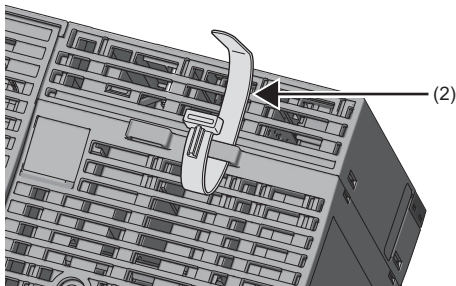
Prevention of cable removal

Take measures to prevent removal of USB and DisplayPort cables connected to this product.

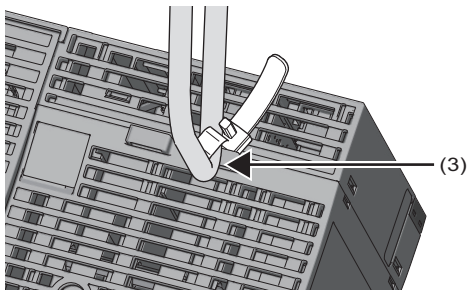
1. Pass a fixing band through the fixing band attachment structure (1) on the underside of the product.



2. Pass a cable through the attached fixing band (2).



3. Pass cables through the fixing bands (3).



Appendix 11 Module Replacement

This section shows the procedures to replace the power supply module and the fan module.

Precautions

Turn OFF the power supply of this product before replacing modules.

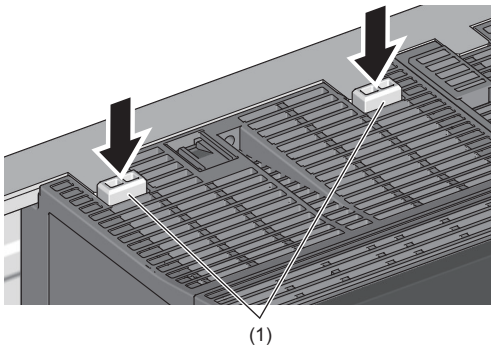
Replacement of power supply module

The following shows the procedure for replacing a power supply module.

Precautions

- The product power supply module surface temperature may be high immediately after power-OFF. When the power supply module is removed, pay attention in order to prevent burn injuries.
- Install and remove the power supply module 50 times or less. If 50 times is exceeded, malfunctions may be caused.
- Additionally, fully tighten terminal block screws that do not have wiring attached. If these are not fully tightened, then during operation these may loosen or fall out because of vibration.

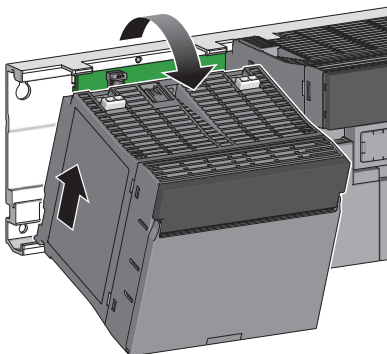
1. Remove the power supply cable from the power supply module.
2. Support the power supply module with both hands, and securely press the module fixing hook (1) with your finger.



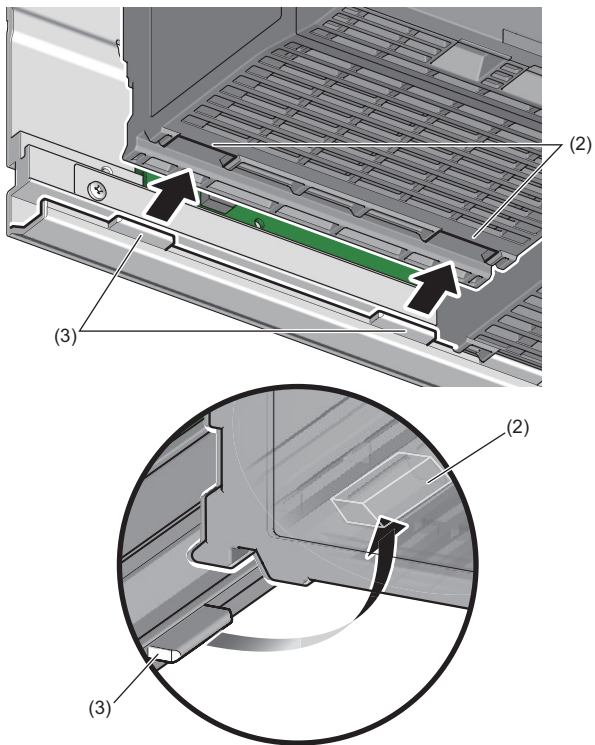
Point

When module fixing screws are used, remove the screws, and then remove module from the base unit. Failure to do so may damage the module.

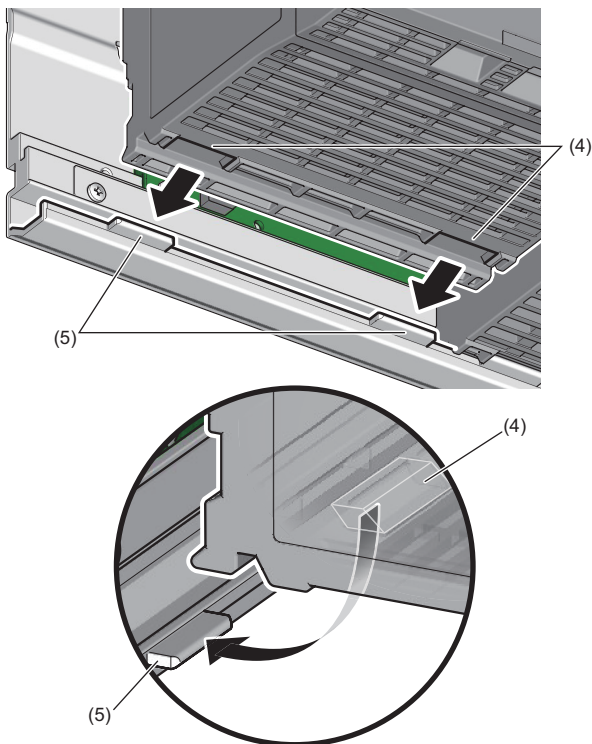
3. Pull the module straight, using the bottom of the module as a fulcrum, while pressing the module fixing hook.



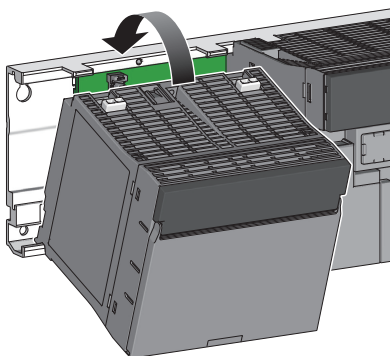
- 4.** While lifting the power supply module, remove the concave part (2) from the guide (3) of the base unit.



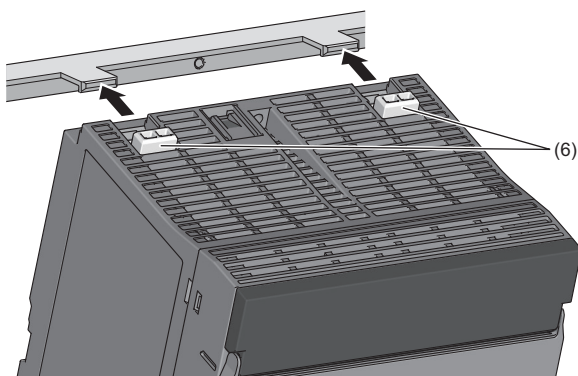
- 5.** Align the new concave parts (4) of the power supply module and the tips of the guides (5) of the main module.



6. Using the guide as a support, push in the direction of the arrows until the module fixing hook clicks.



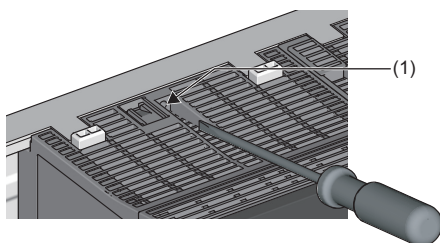
7. Check that the module fixing hooks (6) hang on the main module and the power supply module is mounted securely.



Point

When using the product in an environment of frequent vibration or impact, secure the power supply module to the product using screws (1).

- Module fixing screws (M3×12): tightening torque range 0.36 to 0.48 N·m



8. Connect the power supply cable to the power supply module. (➡ Page 32 Wiring the Power Supply Module)

Fan module replacement

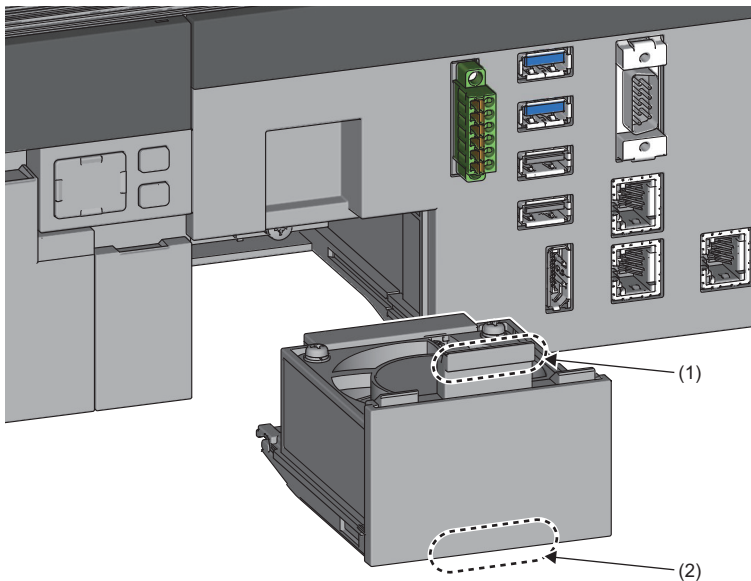
The following shows the procedure for replacing a fan module.

Point

For the life of the fan module, refer to the following page.

☞ Page 91 Fan Module Life

1. Check that the fan module has stopped operation.
After turning OFF the power supply, the fan in the fan module continues to rotate, so wait approximately 10 seconds until the fan stops.
2. Use your fingers to grasp the fan module fixing hook (1) and the bottom of the fan module (2), and then pull out the fan module slowly.



A

Point

Immediately after turning OFF the power supply of the product, the heat sink exposed after removing the fan is very hot. When removing the fan module, be careful not to touch the heat sink. Additionally, touching the heat sink may deform it and decrease cooling efficiency.

3. Align the case grooves of the main module and fan module, and then push the fan module until it clicks.
4. Power ON the product.
5. Check that the fan module is running.
6. Execute an Alert reset, and make sure that the FAN LED is off. (☞ Page 144 Menu Operation Switch)

Precautions

- In order to prevent poor contact, wipe off any dust on connectors.
- Do not subject the fan module to shocks from drops or falls. These may lead to failure or reduced performance.

Appendix 12 Battery Replacement

This section shows the procedure for replacing a battery.

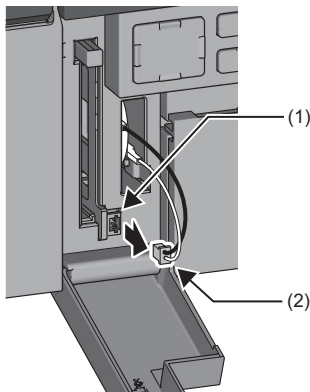
Point

For the battery life, refer to the following page.

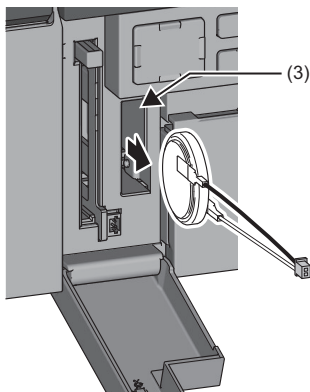
➞ Page 91 Battery Life

Precautions

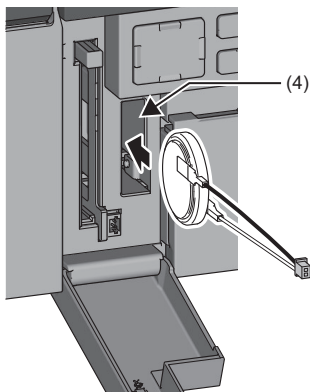
- Turn OFF the power supply of this product before replacing the battery.
- When removing the battery, hold the battery connector in order to prevent damage to the battery cable.
- When closing the CFast/BATTERY cover of the product, ensure that the battery cable is not caught.
- After installing the battery, configure clock settings in MI Configurator. (📖 MI Configurator Operating Manual)



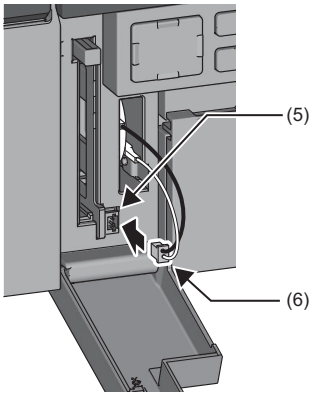
1. Open the CFast/BATTERY cover.
2. Remove the battery connector (2) from the connector (1).



3. Remove the battery from the battery holder (3).



4. Insert the battery into the battery holder (4).



5. Insert the battery connector (6) into the connector (5).

Align this so that the black cable is above the battery connector, and ensure that it is fully inserted.

6. Close the CFast/BATTERY cover until it clicks.

7. Power ON the product.

8. Make sure that the BATTERY LED is off.

If the BATTERY LED is on, the battery may have been installed incorrectly. Install the battery again. If the BATTERY LED still is not off, a battery error is likely. Replace with another battery.

Appendix 13 EMC and Low Voltage Directives

In each country, regulations concerning electromagnetic compatibility (EMC) and electrical safety are enacted. For the products sold in the European countries, compliance with the EU's EMC Directive has been a legal obligation as EMC regulation since 1996, as well as the EU's Low Voltage Directive as electrical safety regulation since 1997. Manufacturers who recognize their products are compliant to the EMC and Low Voltage Directives are required to attach a "CE marking" on their products in European countries.

In some other countries and regions, manufacturers are required to make their products compliant with applicable laws or regulations and attach a certification mark on the products as well (such as UK Conformity Assessed (UKCA) marking in the UK, and Korea Certification (KC) marking in South Korea).

Each country works to make their regulatory requirements consistent across countries based on international standards. When the requirements are consistent, measures to comply with the EMC and electrical safety regulations become common across countries.

The UK and South Korea have enacted EMC regulations whose requirements are consistent with those of the EMC Directive. The UK has also enacted electrical safety regulations whose requirements are consistent with those of the Low Voltage Directive. In this section, the requirements of the EMC and Low Voltage Directives are described as examples of those of the EMC and electrical safety regulations.

Measures to comply with the EMC Directive

The EMC Directive sets requirements for emission (conducted and radiated electromagnetic interference emitted by a product) and immunity (the ability of a product not to be influenced by externally generated electromagnetic interference). This section describes the precautions for machinery constructed with this product, to comply with the EMC Directive. These precautions are based on the requirements of the EMC Directive and the harmonized standards. However, they do not guarantee that the entire machinery constructed according to the descriptions complies with the EMC Directive. The manufacturer of the machinery must determine the testing method for compliance and declare conformity to the EMC Directive.

Cable processing

■Ethernet cable, CC-Link IE Field Network cable

For twisted pair cables connecting to 10BASE-T/100BASE-TX/1000BASE-T connectors and CC-Link IE Field Network connectors, use shielded twisted pair cables. Additionally, ensure that the shielded part of the twisted cables is grounded.

■RS-232 cable

Additionally, for the RS-232 cables, ensure that the shielded part of the twisted cables is grounded.

■USB cable, DisplayPort cable

Use shielded cables. Additionally, ensure that the DisplayPort cable is 3 m or less in length.

■I/O connector

Use shielded cables, and ensure that the shielded part is grounded. Furthermore, use a cable with a length of 30 m or less.

EMC Directive related standards

■Emission requirements

Standard: EN61131-2:2007

Test item	Test description	Value specified in standard
CISPR16-2-3 Radiated emission ^{*1}	The electromagnetic wave emitted by the product to the external space is measured.	• 30 to 230 MHzQP: 40 dB μ V/m (measured at 10 m distance) ^{*2} • 230 to 1000 MHzQP: 47 dB μ V/m (measured at 10 m distance)
CISPR16-2-1, CISPR16-1-2 Conducted emission ^{*1}	The noise level which the product emits to the power line is measured.	• 0.15 to 0.5 MHzQP: 79 dB, Mean: 66 dB ^{*2} • 0.5 to 30 MHzQP: 73 dB, Mean: 60 dB

^{*1} This product is an open-type device and must be placed in a conductive control panel or similar type of enclosure. The tests were conducted with the product installed in a control panel, applying the maximum rated input voltage of the power supply module.

^{*2} QP: Quasi-Peak value, Mean: Average value

■ Immunity requirements

Standard: EN61131-2:2007

Test item	Test description	Value specified in standard
EN61000-4-2 Electrostatic discharge immunity ^{*1}	Immunity testing in which an electrostatic discharge is applied to the enclosure of the product.	<ul style="list-style-type: none"> • 8kV: Air discharge • 4kV: Contact discharge
EN61000-4-3 Radiated, radio-frequency, electromagnetic field immunity ^{*1}	Immunity testing in which an electric field is radiated to the product.	80% AM modulation @1 kHz <ul style="list-style-type: none"> • 80 to 1000 MHz: 10 V/m • 1.4 to 2.0 GHz: 3 V/m • 2.0 to 2.7 GHz: 1 V/m
EN61000-4-4 Fast transient/burst immunity ^{*1}	Immunity testing in which burst noise is applied to power lines and signal lines.	<ul style="list-style-type: none"> • AC/DC power, I/O power, and AC I/O (unshielded) lines: 2 kV • DC I/O, analog, and communication lines: 1 kV
EN61000-4-5 Surge immunity ^{*1}	Immunity testing in which lightning surge is applied to power lines and signal lines.	<ul style="list-style-type: none"> • AC power, AC I/O power, and AC I/O (unshielded) lines: 2 kV CM, 1 kV DM • DC power and DC I/O power lines: 0.5 kV CM, DM • DC I/O, AC I/O (shielded), analog, and communication lines: 1 kV CM
EN61000-4-6 Conducted RF immunity ^{*1}	Immunity testing in which high-frequency noise is applied to power lines and signal lines.	0.15 M to 80 MHz, 80%AM modulation@1 kHz, 10 Vrms
EN61000-4-8 Power-frequency magnetic field immunity ^{*1}	Immunity testing in which the product is immersed in the magnetic field of an induction coil.	50Hz/60Hz, 30A/m
EN61000-4-11 Voltage dips and interruptions immunity ^{*1}	Immunity testing in which supply power voltage is momentarily interrupted.	<ul style="list-style-type: none"> • 0%, 0.5 periods, starting at zerocrossing • 0%, 250/300 periods (50/60 Hz) • 40%, 10/12 periods (50/60 Hz) • 70%, 25/30 periods (50/60 Hz)

*1 This product is an open-type device and must be placed in a conductive control panel or similar type of enclosure. Carry out tests with the product installed in a control panel.

Specifications: EN 61000-3-2

Test item	Test description	Value specified in standard
EN 61000-3-2 ^{*2} Power source harmonica Class A device	Test to determine whether the power supply voltage harmonic current exceeds the value limit	As per the table below

*2 This regulates the harmonic current generated by electronic devices, therefore electronic devices are classified into Class A to Class D as below, with harmonic current maximum limit values set for each of these.

- Class A: All devices not belonging to balanced 3-phase devices or other classes
- Class B: Hand-held electric tools
- Class C: Lighting equipment
- Class D: Devices with a special current waveform 600 W or less

The power module for this product corresponds to Class A.

Order	Harmonic order n	Maximum permissible harmonic current [A]
Odd-numbered harmonic	1	3
	2	5
	3	7
	4	9
	5	11
	6	13
	7	15≤n≤39
Even-numbered harmonic	1	2
	2	4
	3	6
	4	8≤n≤40

A

Installation in a control panel

This product is an open-type device intended to be placed in a conductive control panel or similar type of enclosure.

Remote modules on each network must be also installed inside the control panel. Waterproof type remote modules can be installed outside the control panel.

Placing the product inside a conductive control panel ensures safety as well as effective shielding of electromagnetic noise emitted from the product.

■Control panel

- Use a conductive control panel.
- Mask off the area used for grounding when securing the top or bottom plate to the control panel using bolts.
- To ensure electrical contact between inner plates and the control panel, mask off the bolt installation areas of each inner plate so that conductivity can be ensured in the largest area.
- Ground the control panel with a thick ground cable so that low impedance can be ensured even at high frequencies.
- Keep the diameter of the holes on the control panel to 10 cm or less. If the diameter is larger than 10 cm, electromagnetic wave may leak. In addition, because electromagnetic wave leaks through a clearance between the control panel and its door, reduce the clearance as much as possible. Use of EMI gaskets (sealing the clearance) can suppress undesired radiated emissions.

Manufacturer	Inquiries
KITAGAWA INDUSTRIES CO.,LTD.	www.kitagawa-ind.com
Zippertubing (Japan),Ltd.	www.ztj.co.jp
SEIWA ELECTRIC MFG. CO.,LTD.	www.seiwa.co.jp

The tests were conducted by Mitsubishi Electric Corporation using a control panel having damping characteristics of 37 dB (maximum) and 30 dB (average) (measured at 3 m distance, 30 to 300 MHz).

■Power cable and ground cable

- Provide a ground point to the control panel near the power supply module. Ground the LG and FG terminals of the power supply module to the ground point with the thickest and shortest ground cable possible (2mm² or less, a length of 30 cm or shorter).

The role of the LG and FG terminals is to send to ground noise generated by the product, therefore it is necessary to use a ground wire with as low an impedance as possible. Additionally, the ground cable removes noise, but can carry noise itself, therefore using a short wire prevents this from acting as an antenna.

- Twist the ground cable extended from the ground point together with the power cable. Twisting this together with the power cable sends the largest amount of noise generated from the power cable to the ground. Note that if a noise filter is attached to the power cable, twisting may not be required.

■DIN rails

Aluminum DIN rails may have insulation films. If there is not any electrical interengagement between the DIN rail and the product, ensure conductivity to the extent possible. Methods to obtain conductivity are shown below.

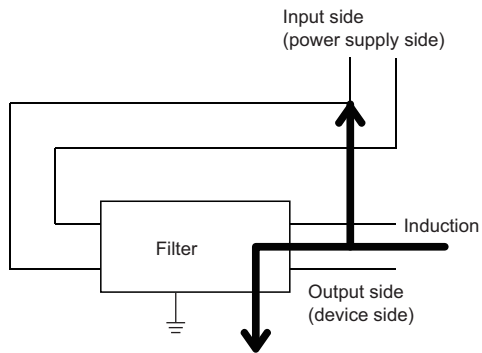
- Screw this product to the control panel. (Do not use the DIN rail)
- Use iron DIN rails, such as TH35-7.5Fe and TH35-15Fe.

■Noise filter (power supply line filter)

A noise filter is effective for reducing radiated noise in the band up to 10 MHz.

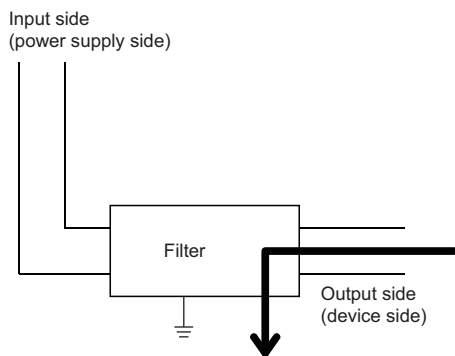
For the noise filter, use a HF3010C-SZA from Soshin Electric Co., Ltd. (or a noise filter with equivalent performance).

- Do not bundle the cables on the input side and output side of the noise filter. If bundled, the noise on the output side is induced into the filtered cable on the input side.



- Problematic example

Noise is induced when the input and output cables are bundled.



- Modification example

Install the input and output cables separately.

- Ground the ground terminal of the noise filter to the ground point of the control panel with the shortest cable possible (approximately 10 cm).

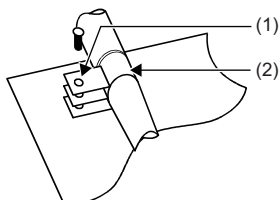
Cables extended out of the control panel

Use a shielded cable for a cable extended out of the control panel such as an I/O signal line (including a common line) and cable for communications.

If a shielded cable is not used or not grounded properly, the noise immunity will not meet the requirement.

■Installing a shielded cable

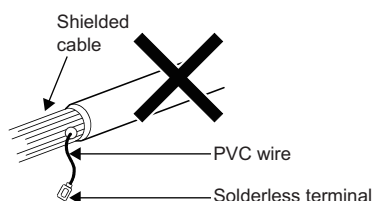
- Ground the shield of a shielded cable as close to the product as possible so that the grounded cable will not be affected by electromagnetic induction from ungrounded cables.
- Ground the exposed shield to a large area on the control panel. A clamp can be used as shown below. In this case, mask off the inner wall surface of the control panel, which comes in contact with the clamp.



(1) Paint mask
(2) Clamp

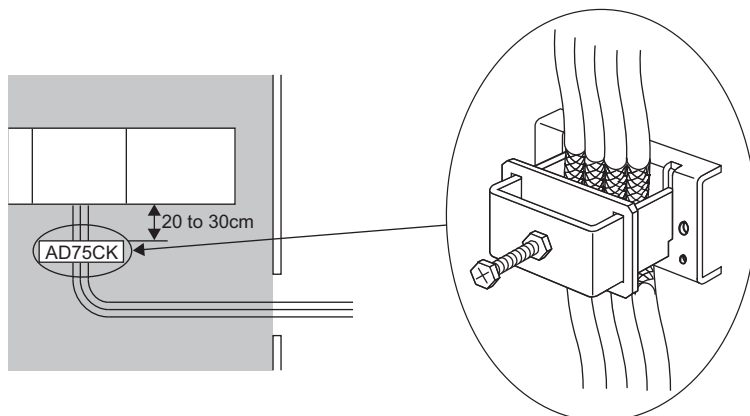


Do not use the tip of a PVC wire soldered onto a shield of the shielded cable for grounding. Doing so will raise the high-frequency impedance, resulting in loss of the shielding effect.



■Grounding cables with a cable clamp

Use shielded cables for external wiring and ground the shields of the shielded cables to the control panel with an AD75CK cable clamp (manufactured by Mitsubishi). Ground the shields within 20 to 30 cm from the module.



For details on the AD75CK, refer to the following.

📖 AD75CK-type Cable Clamping Instruction Manual

■ Ferrite core

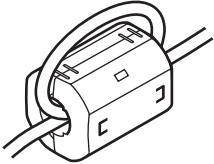
A ferrite core is effective for reducing radiated noise in the 30 MHz to 100 MHz frequency band. It is recommended to install a ferrite core if a shield cable extended out of the control panel does not provide sufficient shielding effects.

Install a ferrite core to each power cable and signal cable as shown below. If the installation position is not appropriate, the ferrite core will not produce any effect.

(Ferrite core used for the tests conducted by Mitsubishi: ESD-SR-250 manufactured by TOKIN Corporation)

● Power cable

- Twist the power cable (including the earth wire).



- Install a ferrite core on twisted cables.
 - The installation location should be as close as possible to the power supply module.
- ### ● Signal wire
- Set the installation location immediately before pulling the signal wires to the outside of the control panel.

Measures to comply with the Low Voltage Directive

The Low Voltage Directive requires electrical equipment that is designed or adapted for use between 50 to 1000 VAC or 75 to 1500 VDC to satisfy the safety requirements.

This section describes the precautions for use of these products to comply with the Low Voltage Directive.

These precautions are based on the requirements of the Low Voltage Directive and the harmonized standards. However, they do not guarantee that the entire machinery constructed according to the descriptions complies with the Low Voltage Directive.

The manufacturer of the machinery must determine the testing method for compliance and declare conformity to the Low Voltage Directive.

Regulations applicable to this product

- EN61131-2 "Safety requirements for electrical equipment for measurement, control and laboratory use"

This product and those that operate at 50 VAC/75 VDC or higher rated input voltage have also been developed in accordance with EN61131-2.

Range of application of product

■Power supply modules

Power supply modules for the AC power supply have hazardous voltage (peak voltage higher than or equal to 42.4 V) internally. Therefore, insulation between the primary and secondary circuits is reinforced for CE-marked power supply modules.

■Main module, fan module

These products are not targeted for the Low Voltage Directive compliance because the circuits in the products operate at the 24 VDC or less rated voltage.

Power supply

Power supply modules are designed to meet the overvoltage category II.

Confirm that the power supply to a product meets the overvoltage category II.

Control panel

■Protection against electric shock

Handle the control panel as necessary to protect a person who does not have adequate knowledge of electrical installation from an electric shock. This shows example handling.

- Lock the control panel so that only a person who is trained and has acquired enough knowledge of electrical installation can open the panel.
- Set a configuration in which the power supply is automatically shut off when the control panel is opened. (On this product, the OS must be shut down.)
- Use a control panel with a protection degree of IP20 or higher.

■Protection from dust and water

The control panel needs to be dustproof and waterproof.

Insufficient dustproof and waterproof lower the dielectric withstand of the control panel, possibly causing dielectric breakdown.

This product is designed to be used in an environment of pollution degree 2. Use them in an environment of pollution degree 2 or below. The environment of pollution degree 2 can be achieved when the product is installed inside the control panel with a protection degree of IP54 or equivalent.

Grounding

Use with the following ground terminals connected.

Terminal name	Application
Protective grounding	Guarantees product safety, and increases immunity to noise.
Functional grounding	Increases immunity to noise.

External wiring

■External devices

For external devices connected to a this product, use the one of which insulation between the interface circuit section to this product and the hazardous voltage circuit section is reinforced (if the device internally has a hazardous voltage circuit section).

■Reinforced insulation

Reinforced insulation means insulation having the following withstand voltage.

Rated voltage of hazardous voltage	Surge withstand voltage (1.2/50 μ s)
150 VAC or less	2500V
300 VAC or less	4000V

(Overvoltage category II, source: IEC 60664-1)

Appendix 14

Considerations on Battery Transportation

When transporting lithium batteries, follow the transportation regulations.

Regulated models

The batteries for this product are classified as shown below.

Model name	Supply status	Transport guidelines
FX3U-32BL	Lithium battery	Non-dangerous goods

Transport guidelines

Products are packed in compliance with the transportation regulations prior to shipment. When repacking any of the unpacked products for transportation, make sure to observe the IATA Dangerous Goods Regulations, IMDG (International Maritime Dangerous Goods) Code, and other local transportation regulations.

For details, consult the shipping carrier used.

Considerations for transporting to or through with California, USA

Since December 31, 2006, in California it is obligatory to include the following warning text on packaging of products incorporating or containing lithium primary cells that have a perchlorate composition of 6 ppb.

- Perchlorate Material - special handling may apply, See www.dtsc.ca.gov/hazardouswaste/perchlorate

This product incorporates the lithium primary cells detailed above, therefore when transporting this product to or through California, ensure that the warning text above is included on the packaging.

Appendix 15 Handling of Batteries and Devices with Built-In Batteries in EU Member States

This section describes the precautions for disposing of waste batteries in EU member states and exporting batteries and/or devices with built-in batteries to EU member states.

Disposal precautions

In EU member states, there is a separate collection system for waste batteries. Dispose of batteries properly at the local community waste collection/recycling center.

The following symbol mark is printed on batteries and the packaging of devices with built-in batteries. The symbol mark indicates that batteries need to be disposed of separately from other waste.



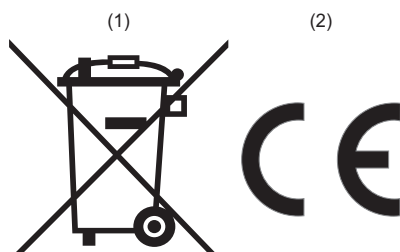
The symbol mark is specified in the European Battery Regulation ((EU)2023/1542) Article 13 "Labelling and marking of batteries" and Annex VI.

Exportation precautions

The EU Battery Regulation ((EU)2023/1542) requires the following when marketing or exporting batteries and/or devices with built-in batteries to EU member states.

- To print the symbol marks (1) and (2) on batteries (If it is not possible, print them on the manuals and packaging.)
- To explain the symbol mark (1) in the manuals of the products

The requirements for the labeling and explanation of the symbol mark (1) are unchanged from the EU Battery Directive (2006/66/EC).



■Labeling

To comply with the European Battery Regulation ((EU)2023/1542), print the symbol marks (1) and (2) on the labels attached to the batteries or the manuals and packaging. (Applicable from August 18, 2024^{*1}.)

^{*1} To market or export batteries and/or devices with built-in batteries before August 18, 2024, print the symbol mark (1) on the labels attached to the batteries or packaging to comply with the EU Battery Directive (2006/66/EC).

■Explaining the symbol in the manuals

To export devices incorporating this product to EU member states after August 18, 2024, provide the latest manuals that include the explanation of the symbol mark (1).

If the manuals of this product are not provided or the manuals do not include the explanation of the symbol mark (1), separately attach an explanatory note regarding the symbol mark (1) to each manual of the devices.

Point

The requirements apply to batteries and/or devices with built-in batteries manufactured before the enforcement date of the EU Battery Directive (2006/66/EC) and EU Battery Regulation ((EU)2023/1542).

Appendix 16Considerations for repairing the product

This section shows the considerations for repairing this product.

- When repairing, software and data installed by the customer on the product may be deleted, and the product may be returned to its default shipping condition. We shall not be held responsible for the loss or damage of content stored within storage devices regardless of faults, damage, theft during transport, or any other reason.
- When requesting repair, please ensure that you back up all data in advance. When a product is received for repair, we will work under the assumption that the data has been backed up.
- When requesting backup overseas, ensure that the following software and data is first deleted.
Software subject to export restrictions on its export (encryption software, etc.)
Software or data such as confidential company information
- We assume responsibility for the deletion or destruction of the contents of removable media removed in the repair process.
Note that we will not return any removed media or issue certification regarding deletion or destruction.

Data backup

The following shows the method to backup data of this product.

Target device		Destination	Method
VxWorks part	User drive (/ROM)	Storage on an external device (another personal computer)	Using the FTP server function or file sharing server function of this product, copy data to the storage on an external device through Ethernet.
Windows part	—		Copy data to the storage on an external device through USB or Ethernet.

Appendix 17 Checking Production Information and Firmware Version

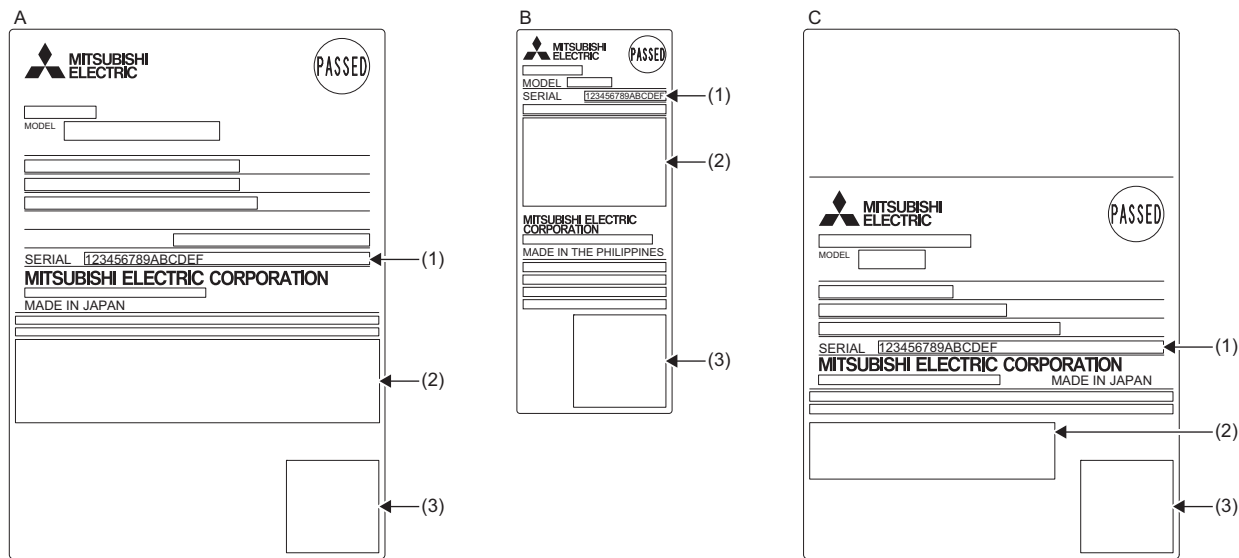
This section shows how to check the production information and firmware versions of modules.

Checking on the module

Rating plate

The rating plate is located on the side of the module.

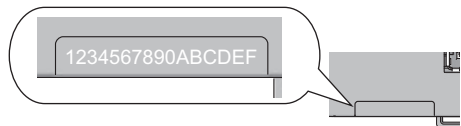
The production information (16 digits) of the module is shown on the SERIAL field.



- A: Main module
- B: Fan module
- C: Power supply module
- (1) Production information (16 digits)
- (2) Relevant regulation standards
- (3) QR code

Production information marking

The production information (16 digits) of the module is printed on the marking on the front (at the bottom) of the module.



Confirmation using MI Configurator

■MELIPC Diagnosis

The firmware version and the production information (16 digits) of the module can be checked on the "MELIPC diagnosis" window.

☞ [Diagnosis]⇒[MELIPC diagnosis]

MELIPC Diagnostics

Module Name	Firmware Version	Production information
MIS122-VW		

Supplementary Function: CC-Link IE Field diagnostics

Buttons: Monitoring, Stop Monitoring, Execute

Error Information: MELIPC Information List

No.	Occurrence Date	Status	Error Code	Overview
1	No Error		-	-

Buttons: Event History, Clear Error, Detail

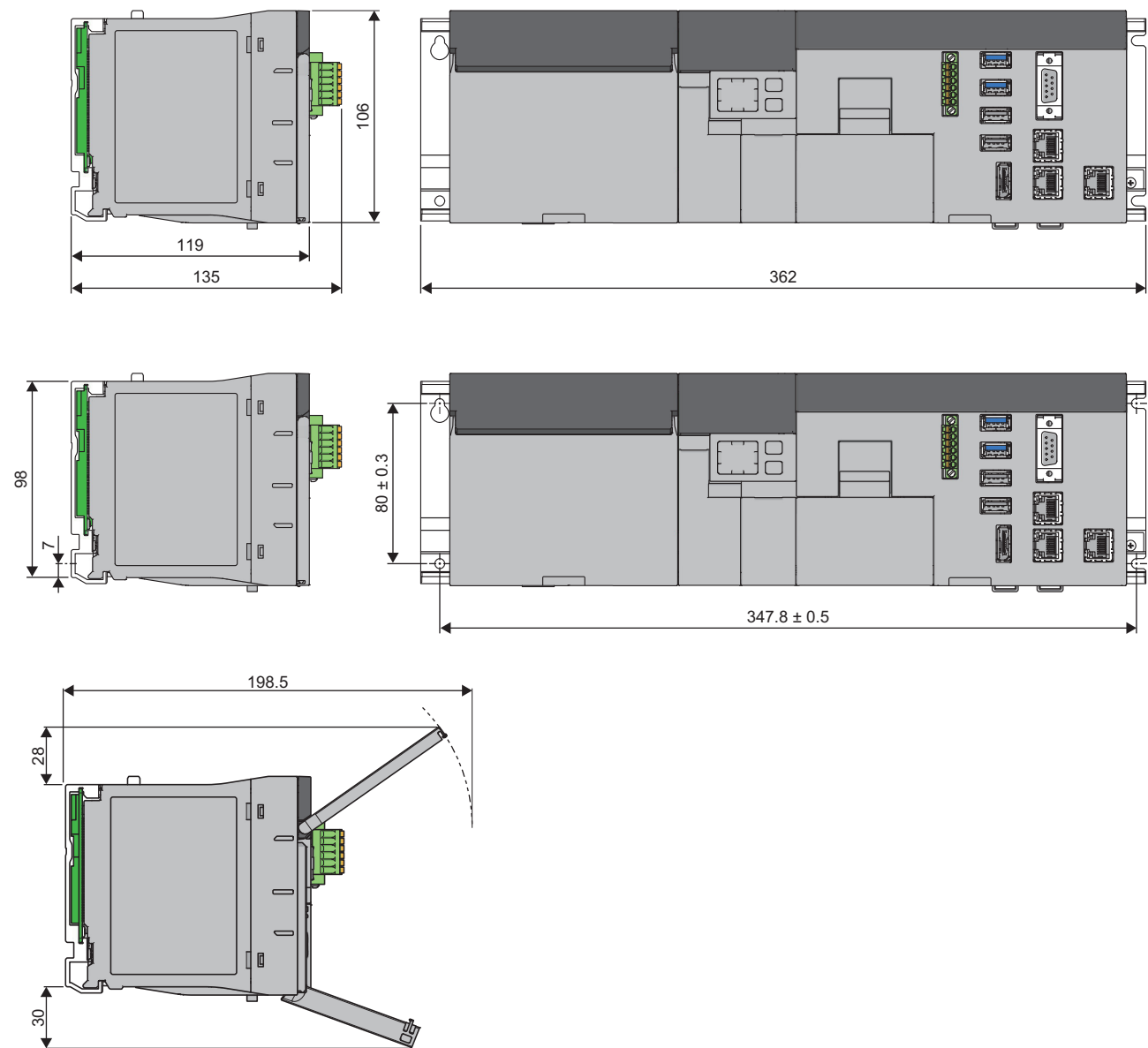
Legend: Major (red triangle), Moderate (orange triangle), Minor (yellow triangle)

Buttons: Create File..., Close

A

Appendix 18 External Dimensions

The following figures show the external dimensions of this product.



(Unit: mm)

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A

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REVISIONS

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

Revision date	*Manual number	Description
May 2018	SH(NA)-081930ENG-A	First edition
May 2018	SH(NA)-081930ENG-B	Partial correction
September 2018	SH(NA)-081930ENG-C	Partial correction
March 2019	SH(NA)-081930ENG-D	Partial correction
August 2019	SH(NA)-081930ENG-E	■Added or modified parts Section 5.2, Appendix 1, Appendix 4, Appendix 6
March 2020	SH(NA)-081930ENG-F	■Added or modified parts Section 2.3, Section 5.1, Section 6.3 , Section 9.1, Appendix 1, Appendix 2, Appendix 3, Appendix 10
July 2020	SH(NA)-081930ENG-G	■Added or modified parts SAFETY PRECAUTIONS, CONDITIONS OF USE FOR THE PRODUCT
September 2021	SH(NA)-081930ENG-H	■Added or modified part Appendix 13
September 2022	SH(NA)-081930ENG-I	■Added or modified parts Section 2.3, Appendix 13, COPYRIGHTS
January 2024	SH(NA)-081930ENG-J	■Added or modified part Appendix 1
August 2025	SH(NA)-081930ENG-K	■Added or modified part Appendix 15

Japanese manual number: SH-081929-L

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WARRANTY

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

1. Gratis Warranty Term and Gratis Warranty Range

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

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

[Gratis Warranty Term]

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

[Gratis Warranty Range]

- (1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
- (2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
 1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
 2. Failure caused by unapproved modifications, etc., to the product by the user.
 3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
 4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
 5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
 6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
 7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

- (1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
- (2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

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

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

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

- (1) Damages caused by any cause found not to be the responsibility of Mitsubishi.
- (2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
- (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
- (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

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

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The screens (screenshots) are used in accordance with the Microsoft Corporation guideline.

TRANSLATION OF THE ORIGINAL INSTRUCTIONS

SH(NA)-081930ENG-K(2508)KWIX

MODEL: MELIPC-MI5000-U-IN-E

MITSUBISHI ELECTRIC CORPORATION

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