SAFETY PRECAUTIONS

(Read these precautions before using this product.)
Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.
The precautions given in this manual are concerned with this product only. For the safety precautions of the programmable controller system, refer to the MELSEC iQ-R Module Configuration Manual.
In this manual, the safety precautions are classified into two levels: "WARNING" and "CAUTION".

⚠️ **WARNING**
Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.

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

Under some circumstances, failure to observe the precautions given under "CAUTION" may lead to serious consequences.
Observe the precautions of both levels because they are important for personal and system safety.
Make sure that the end users read this manual and then keep the manual in a safe place for future reference.
[Design Precautions]

⚠️ WARNING

● Configure safety circuits external to the programmable controller to ensure that the entire system operates safely even when a fault occurs in the external power supply or the programmable controller. Failure to do so may result in an accident due to an incorrect output or malfunction.

(1) Emergency stop circuits, protection circuits, and protective interlock circuits for conflicting operations (such as forward/reverse rotations or upper/lower limit positioning) must be configured external to the programmable controller.

(2) When the programmable controller detects an abnormal condition, it stops the operation and all outputs are:
  • Turned off if the overcurrent or overvoltage protection of the power supply module is activated.
  • Held or turned off according to the parameter setting if the self-diagnostic function of the CPU module detects an error such as a watchdog timer error.

(3) All outputs may be turned on if an error occurs in a part, such as an I/O control part, where the CPU module cannot detect any error. To ensure safety operation in such a case, provide a safety mechanism or a fail-safe circuit external to the programmable controller. For a fail-safe circuit example, refer to “General Safety Requirements” in the MELSEC iQ-R Module Configuration Manual.

(4) Outputs may remain on or off due to a failure of a component such as a relay and transistor in an output circuit. Configure an external circuit for monitoring output signals that could cause a serious accident.

● In an output circuit, when a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.

● Configure a circuit so that the programmable controller is turned on first and then the external power supply. If the external power supply is turned on first, an accident may occur due to an incorrect output or malfunction.

● Configure a circuit so that the external power supply is turned off first and then the programmable controller. If the programmable controller is turned off 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 for the network used. For the manuals, please consult your local Mitsubishi representative. Incorrect output or malfunction due to a communication failure may result in an accident.

● When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents. When a Safety CPU is used, data cannot be modified while the Safety CPU is in SAFETY MODE.
[Design Precautions]

⚠️ WARNING

● Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.

● Do not write any data to the "system area" and "write-protect area" of the buffer memory in the module. Also, do not use any "use prohibited" signals as an output signal from the CPU module to each module. Doing so may cause malfunction of the programmable controller system. For the "system area", "write-protect area", and the "use prohibited" signals, refer to the user's manual for the module used. For areas used for safety communications, they are protected from being written by users, and thus safety communications failure caused by data writing does not occur.

● If a communication cable is disconnected, the network may be unstable, resulting in a communication failure of multiple stations. Configure an interlock circuit in the program to ensure that the entire system will always operate safely even if communications fail. Incorrect output or malfunction due to a communication failure may result in an accident. When safety communications are used, an interlock by the safety station interlock function protects the system from an incorrect output or malfunction.

● For the operating status of each IO device after a communication failure, refer to the MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application). Incorrect output or malfunction due to a communication failure may result in an accident.

● Configure an interlock circuit in the program to ensure that the entire system will always operate safely even if communications fail in multiple IO devices. Failure to do so may result in an accident due to an incorrect output or malfunction.

[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.

● During control of an inductive load such as a lamp, heater, or solenoid valve, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on. Therefore, use a module that has a sufficient current rating.

● After the CPU module is powered on or is reset, the time taken to enter the RUN status varies depending on the system configuration, parameter settings, and/or program size. Design circuits so that the entire system will always operate safely, regardless of the time.

● Do not power off the programmable controller or reset the CPU module while the settings are being written. Doing so will make the data in the flash ROM and SD memory card undefined. The values need to be set in the buffer memory and written to the flash ROM and SD memory card again. Doing so also may cause malfunction or failure of the module.

● When changing the operating status of the CPU module from external devices (such as the remote RUN/STOP functions), select "Do Not Open by Program" for "Opening Method" of "Module Parameter". If "Open by Program" is selected, an execution of the remote STOP function causes the communication line to close. Consequently, the CPU module cannot reopen the line, and external devices cannot execute the remote RUN function.
[Security Precautions]

⚠️ **WARNING**

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

⚠️ WARNING

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

[Installation Precautions]

⚠️ CAUTION

● Use the programmable controller in an environment that meets the general specifications in the Safety Guidelines included with the base unit. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.

● To mount a module, place the concave part(s) located at the bottom onto the guide(s) of the base unit, and push in the module until the hook(s) located at the top snaps into place. Incorrect interconnection may cause malfunction, failure, or drop of the module.

● To mount a module with no module fixing hook, place the concave part(s) located at the bottom onto the guide(s) of the base unit, push in the module, and fix it with screw(s). Incorrect interconnection may cause malfunction, failure, or drop of the module.

● When using the programmable controller in an environment of frequent vibrations, fix the module with a screw.

● Tighten the screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction. For the specified torque range, refer to the MELSEC iQ-R Module Configuration Manual.

● When using an extension cable, connect it to the extension cable connector of the base unit securely. Check the connection for looseness. Poor contact may cause malfunction.

● When using an SD memory card, fully insert it into the SD memory card slot. Check that it is inserted completely. Poor contact may cause malfunction.

● Securely insert an extended SRAM cassette or a battery-less option cassette into the cassette connector of the CPU module. After insertion, close the cassette cover and check that the cassette is inserted completely. Poor contact may cause malfunction.

● Do not directly touch any conductive parts and electronic components of the module, SD memory card, extended SRAM cassette, battery-less option cassette, or connector. Doing so can cause malfunction or failure of the module.

[Wiring Precautions]

⚠️ WARNING

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

● After installation and wiring, attach a blank cover module (RG60) to each empty slot and an included extension connector protective cover to the unused extension cable connector before powering on the system for operation. Failure to do so may result in electric shock.
[Wiring Precautions]

⚠️ CAUTION

- Individually ground the FG and LG terminals of the programmable controller with a ground resistance of 100 ohms or less. Failure to do so may result in electric shock or malfunction.
- Use applicable solderless terminals and tighten them within the specified torque range. If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- Check the rated voltage and signal layout before wiring to the module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause fire or failure.
- Connectors for external devices must be crimped or pressed with the tool specified by the manufacturer, or must be correctly soldered. Incomplete connections may cause short circuit, fire, or malfunction.
- Securely connect the connector to the module. Poor contact may cause malfunction.
- Do not install the control lines or communication cables together with the main circuit lines or power cables. Doing so may result in malfunction due to noise. Keep a distance of 100mm or more between those cables.
- Place the cables in a duct or clamp them. If not, dangling cables may swing or inadvertently be pulled, resulting in malfunction or damage to modules or cables.
  In addition, the weight of the cables may put stress on modules in an environment of strong vibrations and shocks. Do not clamp the extension cables with the jacket stripped. Doing so may change the characteristics of the cables, resulting in malfunction.
- Check the interface type and correctly connect the cable. Incorrect wiring (connecting the cable to an incorrect interface) may cause failure of the module and external device.
- Tighten the terminal screws or connector screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, fire, or malfunction. Over tightening can damage the screw and/or module, resulting in drop, short circuit, fire, or malfunction.
- When disconnecting the cable from the module, do not pull the cable by the cable part. For the cable with connector, hold the connector part of the cable. For the cable connected to the terminal block, loosen the terminal screw. Pulling the cable connected to the module may result in malfunction or damage to the module or cable.
- Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction.
- A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring. Do not remove the film during wiring. Remove it for heat dissipation before system operation.
- Programmable controllers must be installed in control panels. Connect the main power supply to the power supply module in the control panel through a relay terminal block. Wiring and replacement of a power supply module must be performed by qualified maintenance personnel with knowledge of protection against electric shock. For wiring, refer to the MELSEC iQ-R Module Configuration Manual.
- For Ethernet cables to be used in the system, select the ones that meet the specifications in the user’s manual for the module used. If not, normal data transmission is not guaranteed.
[Startup and Maintenance Precautions]

⚠️ **WARNING**

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

⚠️ CAUTION

● When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.

● Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.

● Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire.

● Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) more than 25cm away in all directions from the programmable controller. Failure to do so may cause malfunction.

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

● Tighten the screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.

● After the first use of the product, do not perform each of the following operations more than 50 times (IEC 61131-2/JIS B 3502 compliant). Exceeding the limit may cause malfunction.
  - Mounting/removing the module to/from the base unit
  - Inserting/removing the extended SRAM cassette or battery-less option cassette to/from the CPU module
  - Mounting/removing the terminal block to/from the module

● After the first use of the product, do not insert/remove the SD memory card to/from the CPU module more than 500 times. Exceeding the limit may cause malfunction.

● Do not touch the metal terminals on the back side of the SD memory card. Doing so may cause malfunction or failure of the module.

● Do not touch the integrated circuits on the circuit board of an extended SRAM cassette or a battery-less option cassette. Doing so may cause malfunction or failure of the module.

● Do not drop or apply shock to the battery to be installed in the module. Doing so may damage the battery, causing the battery fluid to leak inside the battery. If the battery is dropped or any shock is applied to it, dispose of it without using.
[Startup and Maintenance Precautions]

⚠️ CAUTION

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

[Operating Precautions]

⚠️ CAUTION

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

[Disposal Precautions]

⚠️ CAUTION

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

[Transportation Precautions]

⚠️ CAUTION

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

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

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries. MITSUBISHI ELECTRIC SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI ELECTRIC USER'S, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT. ("Prohibited Application")

Prohibited Applications include, but not limited to, the use of the PRODUCT in:
- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

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

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

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

Relevant product

RJ71PN92

COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES

Method of ensuring compliance

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

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

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

Additional measures

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

- Page 27 Maintaining EMC Directive in this manual
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RELEVANT MANUALS

<table>
<thead>
<tr>
<th>Manual name [manual number]</th>
<th>Description</th>
<th>Available form</th>
</tr>
</thead>
<tbody>
<tr>
<td>MELSEC iQ-R PROFINET IO Controller Module User's Manual (Startup) [SH-081679ENG] (this manual)</td>
<td>Specifications, procedures before operation, system configuration, wiring, and communication examples of the PROFINET IO controller module</td>
<td>Print book</td>
</tr>
<tr>
<td>MELSEC iQ-R Module Configuration Manual [SH-081262ENG]</td>
<td>The combination of the MELSEC iQ-R series modules, common information on the installation/wiring in the system, and specifications of the power supply module, base unit, SD memory card, and battery</td>
<td>Print book</td>
</tr>
<tr>
<td>MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application) [SH-081680ENG]</td>
<td>Functions, parameter settings, operation methods of GX Configurator-PN, programming, troubleshooting, I/O signals, and buffer memory of the PROFINET IO controller module</td>
<td>Print book</td>
</tr>
<tr>
<td>MELSEC iQ-R PROFINET IO Controller Module Function Block Reference [BCN-P5999-0740]</td>
<td>Specifications of the MELSEC iQ-R series PROFINET IO controller module FBs</td>
<td>e-Manual PDF</td>
</tr>
</tbody>
</table>

This manual does not include detailed information on the following:
- General specifications
- Installation

For details, refer to the following.

- MELSEC iQ-R Module Configuration Manual

Point:
- e-Manual refers to the Mitsubishi Electric FA electronic book manuals that can be browsed using a dedicated tool.
- e-Manual has the following features:
  - Required information can be cross-searched in multiple manuals.
  - Other manuals can be accessed from the links in the manual.
  - The hardware specifications of each part can be found from the product figures.
  - Pages that users often browse can be bookmarked.
  - Sample programs can be copied to an engineering tool.
## TERMS

Unless otherwise specified, this manual uses the following terms.

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acyclic communications</td>
<td>Acyclic data communications. Data are read/written from/to an IO device at the desired timing.</td>
</tr>
<tr>
<td>Buffer memory</td>
<td>Memory in an intelligent function module to store data such as setting values and monitor values. For CPU modules, it refers to memory to store data such as setting values and monitor values of the Ethernet function, or data used for data communication of the multiple CPU system function.</td>
</tr>
<tr>
<td>Cycle time</td>
<td>Time required for one cycle of data exchange between the RJ71PN92 and each IO device.</td>
</tr>
<tr>
<td>Device</td>
<td>A memory of a CPU module to store data. Devices such as X, Y, M, D, and others are provided depending on the intended use.</td>
</tr>
<tr>
<td>Disconnection</td>
<td>A process of stopping communications if a communication error occurs.</td>
</tr>
<tr>
<td>Engineering tool</td>
<td>A tool used for setting up programmable controllers, programming, debugging, and maintenance.</td>
</tr>
<tr>
<td>Global label</td>
<td>A label that is valid for all the program data when multiple program data are created in the project. There are two types of global label: a module specific label (module label), which is generated automatically by GX Works3, and an optional label, which can be created for any specified device.</td>
</tr>
<tr>
<td>GSDML file</td>
<td>A file based on XML for PROFINET. The file contains information required for PROFINET configuration, such as an IO device attribute, module types, setting data of modules, and error messages.</td>
</tr>
<tr>
<td>GX Configurator-PN</td>
<td>A tool to set network configuration for PROFINET.</td>
</tr>
<tr>
<td>Intelligent function module</td>
<td>A module that has functions other than an input or output, such as an A/D converter module and D/A converter module</td>
</tr>
<tr>
<td>Module</td>
<td>A component that is a part of an IO device. The module can be easily added or replaced.</td>
</tr>
<tr>
<td>PROFINET</td>
<td>An industrial Ethernet protocol offered by PROFIBUS &amp; PROFINET International</td>
</tr>
</tbody>
</table>

## GENERIC TERMS AND ABBREVIATIONS

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

<table>
<thead>
<tr>
<th>Generic term/abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet device</td>
<td>A generic term for devices, such as personal computers, that support IP (Internet Protocol) communications</td>
</tr>
<tr>
<td>IO device</td>
<td>An abbreviation for the PROFINET IO device</td>
</tr>
<tr>
<td>RAS</td>
<td>An abbreviation for Reliability, Availability, and Serviceability. This term refers to the overall usability of automated equipment.</td>
</tr>
</tbody>
</table>
# PART NAMES

This section describes the names of each part of the RJ71PN92.

![Diagram of RJ71PN92 with labeled parts](image)

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>RUN LED</td>
<td>Indicates the operating status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On: Normal operation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing: Initial processing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off: Error (MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))</td>
</tr>
<tr>
<td></td>
<td>ERR LED</td>
<td>Indicates the error status of the module.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On, flashing: Error (MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off: Normal operation</td>
</tr>
<tr>
<td></td>
<td>PN RUN LED</td>
<td>Indicates the communication status of PROFINET.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On: Data communications being performed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off: Data communications stopped</td>
</tr>
<tr>
<td></td>
<td>PN ERR LED</td>
<td>Indicates the communication error status of PROFINET.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On: Communication error (MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing: One or more IO devices are not connected or an error has occurred in one or more IO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>devices. (MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off: Normal operation</td>
</tr>
<tr>
<td></td>
<td>TEST LED</td>
<td>Indicates the receive status of the Blink command.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing: Blink command received from an external device</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off: Blink command not received</td>
</tr>
<tr>
<td></td>
<td>DIA LED</td>
<td>Indicates the alarm status of the connected IO devices.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On: Alarm issued</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off: No alarm</td>
</tr>
<tr>
<td>(2)</td>
<td>SPEED LED</td>
<td>Indicates the link status of PROFINET.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On (orange): Link-up (1Gbps)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On (green): Link-up (100Mbps)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off: Link-down or link-up (10Mbps)</td>
</tr>
<tr>
<td>(3)</td>
<td>SD/RD LED</td>
<td>Indicates the data sending/receiving status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On: Data being sent or received</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off: Data not sent nor received</td>
</tr>
<tr>
<td>(4)</td>
<td>Ethernet port</td>
<td>A connector for PROFINET. Connect an Ethernet cable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For wiring methods and wiring precautions, refer to the following.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><img src="image" alt="Page 27 WIRING" /></td>
</tr>
<tr>
<td>(5)</td>
<td>Production information marking</td>
<td>Shows the production information (16 digits) of the module.</td>
</tr>
</tbody>
</table>

*1 The Blink command remotely flashes the LED on the connected IO device. This command shows the physical location of the IO device selected on GX Configurator-PN. (MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))
2 SPECIFICATIONS

2.1 Performance Specifications

The following table lists the performance specifications of the RJ71PN92.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data exchange</td>
<td>Maximum input data length per network 4096 words</td>
</tr>
<tr>
<td></td>
<td>Maximum output data length per network 4096 words</td>
</tr>
<tr>
<td></td>
<td>Maximum input data length per IO device 1437 bytes</td>
</tr>
<tr>
<td></td>
<td>Maximum output data length per IO device 1437 bytes</td>
</tr>
<tr>
<td></td>
<td>Cycle time 512ms maximum 1ms minimum *1</td>
</tr>
<tr>
<td>Service interface</td>
<td>Maximum transmission capacity per request 4116 bytes</td>
</tr>
<tr>
<td>Maximum number of connectable IO devices</td>
<td>128</td>
</tr>
<tr>
<td>Transmission specifications</td>
<td>Data transmission speed *2 1Gbps/100Mbps/10Mbps</td>
</tr>
<tr>
<td></td>
<td>Communication mode Full-duplex</td>
</tr>
<tr>
<td></td>
<td>Interface RJ45 connector (Auto-negotiation, AUTO MDI/MDI-X)</td>
</tr>
<tr>
<td></td>
<td>Transmission method Base band</td>
</tr>
<tr>
<td></td>
<td>Maximum segment length 100m (length between hub and node) *3</td>
</tr>
<tr>
<td></td>
<td>Number of cascade connections Consult the manufacturer of the switching hub used.</td>
</tr>
<tr>
<td></td>
<td>IP version IPv4</td>
</tr>
<tr>
<td></td>
<td>Communication processing performance Maximum 8000 packets (frames)/second *4</td>
</tr>
<tr>
<td>Number of occupied I/O points</td>
<td>32</td>
</tr>
<tr>
<td>Internal current consumption (5VDC)</td>
<td>1.09A</td>
</tr>
<tr>
<td>External dimensions</td>
<td>Height 106mm (Base unit mounting side: 98mm)</td>
</tr>
<tr>
<td></td>
<td>Width 27.8mm</td>
</tr>
<tr>
<td></td>
<td>Depth 110mm</td>
</tr>
<tr>
<td>Weight</td>
<td>0.24kg</td>
</tr>
</tbody>
</table>

*1 The cycle time depends on the number of IO devices and the input/output data length.
*2 Data communications at 100Mbps is recommended.
*3 For maximum segment length (length between hubs), consult the manufacturer of the hub used.
*4 An error occurs if the communication setting over 8000 packets (frames)/second is set in GX Configurator-PN.
### 3 FUNCTION LIST

The following tables list the functions of the RJ71PN92. For details on the functions, refer to the following.

MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application)

#### Data communications

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data exchange function</td>
<td>Performs data exchange between the RJ71PN92 and IO devices in a specified period.</td>
</tr>
<tr>
<td>Data consistency function</td>
<td>Assures consistency of data that is input or output in data exchange in units of an IO device.</td>
</tr>
<tr>
<td>Service interface function</td>
<td>Detects a network, detects an IO device, reads Record data in non-connection type Acyclic communications, writes Record data in connection type Acyclic communications, issues an alarm request, issues an alarm ACK, acquires IO device information, and acquires an alarm log, at a timing different from the timing of data exchange.</td>
</tr>
<tr>
<td>Communication stop at CPU STOP</td>
<td>Stops communications with an IO device if the CPU module is in the STOP state.</td>
</tr>
</tbody>
</table>

#### RAS

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm acquisition function</td>
<td>Enables the RJ71PN92 to acquire alarms generated in IO devices.</td>
</tr>
</tbody>
</table>

#### Diagnostics

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic hardware test</td>
<td>Performs a test related to hardware, such as a ROM/RAM/Ethernet port of the RJ71PN92.</td>
</tr>
</tbody>
</table>
This chapter describes the procedures before operation.

1. Mounting the module to the base unit
   The RJ71PN92 has no module fixing hooks. For how to mount and remove a module without module fixing hooks to/from the base unit, refer to the following.
   MELSEC iQ-R Module Configuration Manual

2. Network construction
   Configure the system and set the parameters which are required for start-up.
   • Wiring (Page 27 WIRING)
   • Parameter setting (MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))

3. Network diagnostics
   Check that communications are performed normally.
   With normal communications, the status of LEDs and buffer memory areas are as follows.
   • RUN LED: On
   • ERR LED: Off
   • PN RUN: On
   • PN ERR: Off
   • Corresponding bit of each IO device in 'IO device communication status' (Un\G17153 to Un\G17160): On
   • Corresponding bit of each IO device in 'IO device error' (Un\G17161 to Un\G17168): Off

4. Programming
   Create a program. For details, refer to the following.
   Page 29 COMMUNICATION EXAMPLE
5 SYSTEM CONFIGURATION

5.1 PROFINET Configuration

PROFINET consists of an RJ71PN92 (1) and IO devices (2).

In PROFINET, other PROFINET IO controllers or external devices that perform TCP/IP communications can be used with the devices above on the same network.
5.2 Applicable CPU Modules

The following table shows the availability of the RJ71PN92 when each CPU module or remote head module is used.

The CPU modules and remote head modules are indicated by symbols as follows.

- Rn: RnCPU
- RnEN: RnENCPU
- RnP(P): Process CPU (process mode)
- RnP(R)(M): Process CPU (redundant mode) (main base unit)
- RnP(R)(E): Process CPU (redundant mode) (extension base unit in the redundant system with redundant extension base unit)
- RnMT: Motion CPU
- RnNC: NCCPU
- RnRT: Robot CPU
- RnC: C Controller module
- RnPSF: SIL2 Process CPU
- RnSF: Safety CPU
- Rem: Remote head module
- Rem(R): Remote head module (redundant system)

<table>
<thead>
<tr>
<th>Model</th>
<th>Rn</th>
<th>RnEN</th>
<th>RnP (P)</th>
<th>RnP (R)(M)</th>
<th>RnP (R)(E)</th>
<th>RnMT</th>
<th>RnNC</th>
<th>RnRT</th>
<th>RnC</th>
<th>RnPSF</th>
<th>RnSF</th>
<th>Rem</th>
<th>Rem (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJ71PN92</td>
<td>O1</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>O2</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O3</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

*1 Use GX Configurator-PN with version 2.02C or later when the module is used with the R00CPU, R01CPU, or R02CPU.

*2 The RJ71PN92 can be mounted to the same base unit on which the NCCPU is mounted. However, only the NCCPU with version A4 or later can perform as the Control CPU when it is mounted together with the RJ71PN92, because the RJ71PN92 is not compatible with the NCCPU with version earlier than A4.

*3 The RJ71PN92 does not support PROFIsafe communications. Only standard PROFINET communications are available even when the RJ71PN92 is mounted together with the Safety CPU. The RJ71PN92 does not support a safety program.

- The number of mountable RJ71PN92s depends on the specifications of the CPU module used. (For the RJ71PN92 itself, there is no restrictions on the mountable number.) For the number of mountable RJ71PN92s for each type of CPU module to be connected together, refer to the following. MELSEC iQ-R Module Configuration Manual
- An error is not detected for the following cases: the RJ71PN92s are incompatible with the CPU module or the remote head module that is mounted together; the number of mounted RJ71PN92s exceeds its limit.

Multiple CPU system

The RJ71PN92 supports the multiple CPU system. For details on the multiple CPU system, refer to the following. MELSEC iQ-R Module Configuration Manual
5.3 Available Software Packages

GX Works3 and GX Configurator-PN are required for configuring the settings of the RJ71PN92.

<table>
<thead>
<tr>
<th>Software</th>
<th>Supported version</th>
</tr>
</thead>
<tbody>
<tr>
<td>GX Works3</td>
<td>Version 1.032J or later</td>
</tr>
<tr>
<td>GX Configurator-PN</td>
<td>Version 2.00A or later</td>
</tr>
</tbody>
</table>

Profile of the RJ71PN92

The profile is data stored the information (such as a model name) of connected devices. Profile of the RJ71PN92 are automatically registered in GX Works3 during the installation of GX Configurator-PN.

Restriction

If GX Works3 is installed on the condition that GX Configurator-PN is already installed, the RJ71PN92 cannot be added in GX Works3.

Install each software in order of GX Works3 → GX Configurator-PN.
This chapter describes the wiring for PROFINET.

### 6.1 Wiring Methods

This section describes connection and disconnection of the Ethernet cable.

#### Connecting the cable

1. Push the Ethernet cable connector into the RJ71PN92 until it clicks. Pay attention to the connector's direction.
2. Lightly pull it to check that it is securely connected.
3. Check that the SPEED LED of the port connected with an Ethernet cable is on. *1

*1 The time between the cable connection and the SPEED LED turning on may vary. The SPEED LED usually turns on in a few seconds. Note, however, that the time may be extended further if the link-up processing is repeated depending on the status of the device on the line. Check whether the cables are connected properly if the SPEED LED does not turn on. In addition, when the communication speed is 10Mbps, the SPEED LED does not turn on. Perform network diagnostics to check whether the cables are connected properly. (MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))

#### Disconnecting the cable

1. Press the latch down and unplug the Ethernet cable.

#### Precautions

- Place the Ethernet cable in a duct or clamp it. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or the cable or malfunction due to poor contact.
- Do not touch the core of the cable-side or module-side connector, and protect it from dirt or dust. If oil from your hand, dirt or dust is attached to the core, this can increase transmission loss, causing a problem in communications.
- Check that the Ethernet cable is not disconnected or not shorted and there is no problem with the connector connection.
- Do not use Ethernet cables with broken latches. Doing so may cause the cables to unplug or malfunction.
- Hold the connector part when connecting and disconnecting the Ethernet cable. Pulling the cable connected to the module may result in damage to the module or the cable or malfunction due to poor contact.
- The maximum segment length of the Ethernet cable is 100m. However, the length may be shorter depending on the environment where the cable is used. For details, contact the cable manufacturer.
- The bending radius of the Ethernet cable is limited. For details, check the specifications of the Ethernet cable to be used.

#### Maintaining EMC Directive

To ensure that this product maintains EMC Directive, take the following measure.
- Use a shielded twisted pair cable to connect the 10BASE-T/100BASE-TX/1000BASE-T connector. Strip a part of the jacket of the shielded twisted pair cable as shown below and ground the exposed shield with the contact surface as large as possible.

![Diagram](image)
6.2 Wiring Products

This section describes the devices used for PROFINET.

### PROFINET devices

Ethernet cables must be prepared by users. For details on Ethernet cables, refer to the following.

- PI: www.profibus.com

A communication error may occur due to high-frequency noise from devices other than a programmable controller in a given connection environment. The following describes countermeasures to be taken on the RJ71PN92 side to avoid high-frequency noise influence.

[Wiring]

- Do not install cables together with the main circuit lines or power cables.
- Place cables in a duct.

### Hubs

Use hubs that support the transmission speed of communication when using hub in PROFINET.

When the industrial managed switch (NZ2MHG-T8F2) is used, use the industrial managed switch (NZ2MHG-T8F2) with the production information (first six digits) of 7104AV or later.
7 COMMUNICATION EXAMPLE

7.1 Communication Example of the RJ71PN92 and an IO Device

This section provides an example for data exchange between the RJ71PN92 and an IO device.

System configuration example

The following system configuration is used to explain data exchange between the RJ71PN92 and an IO device.

System configuration

(1) Programmable controller system
- Power supply module: R61P
- CPU module: R04CPU
- PROFINET IO controller module: RJ71PN92 (start I/O number: 0000H to 001FH)

(2) IO device: ET 200S (IM151-3 PN V2.0)*1
- Power module: PM-E 24VDC
- I/O module: 4DI 24VDC
- I/O module: 2DO 24VDC/0.5A HF

*1 The device is manufactured by Siemens AG.
Setting parameters
Connect the engineering tool to the CPU module and set the parameters.

Setting module parameters

1. Set the CPU module as follows.
   ![Project] ⇒ [New]

2. Click the [Setting Change] button and set "Use Module Label" to "Yes".
   ![Module Setting]

3. Set the RJ71PN92 as follows.
   ![Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Right-click ⇒ [Add New Module]
4. Set the items in “Basic Setting” as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71PN92] ⇒ [Module Parameter] ⇒ [Basic Setting]

PROFINET module setting

1. Start GX Configurator-PN from the engineering tool.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71PN92] ⇒ [PROFINET Module Setting]

2. Open the “GSDML Management” window to add a GSDML file of the IO device to “Device Library”.

[Library] ⇒ [Add]

3. Click the [Next] button in the “GSDML Management” window.
4. Click the [Browse] button.

5. Select the GSDML file and click the [Open] button.

6. Click the [Next] button.
7. The result of the GSDML file addition to "Device Library" is displayed. Click the [Next] button.

8. Click the [Finish] button to exit the GSDML Management wizard.

9. Select IM151-3 PN V2.0 in "Device Library" to add it in the network configuration setting.

Select IM151-3 PN V2.0 in "Device Library". ⇒ [Library] ⇒ [Insert in Configuration]
10. Set the parameters of IO device in the IO device setting window. (The IO device setting window pops up when IM151-3 PN V2.0 is added in the network configuration setting from “Device Library”.)

- [General Configuration] tab

11. Save the set project of GX Configurator-PN.

  - [File] ⇒ [Save]

12. Exit GX Configurator-PN.

  - [File] ⇒ [Exit]
Refresh settings

1. Set items for refresh as follows.

   [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71PN92] ⇒ Right-click ⇒ [Autorefresh Settings]
   • Output devices (iQ-R CPU → PN Controller) tab

   ![PROFINET Autorefresh Settings](image)

   • Input devices (iQ-R CPU <- PN Controller) tab

   ![PROFINET Autorefresh Settings](image)

2. Click the [OK] button to complete the settings.

Updating global labels and structures

1. Update global labels and structures related to the RJ71PN92.

   [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71PN92] ⇒ Right-click ⇒ [Update PROFINET Label]

2. Convert or rebuild programs.

3. Write the set parameters to the CPU module and the RJ71PN92. Then reset the CPU module or power off and on the system.

   [Online] ⇒ [Write to PLC]

**Point**

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

- MELSEC iQ-R PROFINET IO Controller Module User’s Manual (Application)
Checking the network status

Check whether the RJ71PN92 and IO device communicate with each other normally.
Communications are performed normally if the status of LEDs and corresponding bits of each IO device in buffer memory areas are as follows after the program execution.

For the program, refer to the following.
Page 37 Program example for data exchange

• LEDs of the RJ71PN92

<table>
<thead>
<tr>
<th>LED</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUN</td>
<td>On</td>
</tr>
<tr>
<td>ERR</td>
<td>Off</td>
</tr>
<tr>
<td>PN RUN</td>
<td>On</td>
</tr>
<tr>
<td>PN ERR</td>
<td>Off</td>
</tr>
</tbody>
</table>

• Corresponding bits of each IO device in buffer memory areas

<table>
<thead>
<tr>
<th>Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>'IO device communication status' (Un\G17153 to Un\G17160)</td>
<td>On</td>
</tr>
<tr>
<td>'IO device error' (Un\G17161 to Un\G17168)</td>
<td>Off</td>
</tr>
</tbody>
</table>
Program example for data exchange

<table>
<thead>
<tr>
<th>Classification</th>
<th>Label name</th>
<th>Description</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module label</td>
<td>RCPU.stSM.bAlways_ON</td>
<td>Always on</td>
<td>SM400</td>
</tr>
<tr>
<td>Global label that was updated in the RJ71PN92</td>
<td>glRJ71PN92_1.stMgmtOutputs.bReq_DataExchangeStartRequest</td>
<td>Data exchange start request</td>
<td>W0.0</td>
</tr>
<tr>
<td></td>
<td>glRJ71PN92_1.SLV001SLOT003DataStructOut.SLOT003_BIT_0</td>
<td>Output data to IO device 1</td>
<td>W100.0</td>
</tr>
<tr>
<td></td>
<td>glRJ71PN92_1.SLV001SLOT003DataStructOut.SLOT003_BIT_1</td>
<td></td>
<td>W100.1</td>
</tr>
<tr>
<td></td>
<td>glRJ71PN92_1.stMgmtInputs.bSts_DiagnosticError</td>
<td>Parameter setting status</td>
<td>W1000.0</td>
</tr>
<tr>
<td></td>
<td>glRJ71PN92_1.stMgmtInputs.bnSts_IODevicesConnStatus[1]</td>
<td>Module error</td>
<td>W1001.0</td>
</tr>
<tr>
<td></td>
<td>glRJ71PN92_1.stMgmtInputs.bnSts_IODevicesErr[1]</td>
<td>IO device communication status</td>
<td>W1023.1</td>
</tr>
<tr>
<td></td>
<td>glRJ71PN92_1.SLV001SLOT002DataStructin.SLOT002_BIT_0</td>
<td>Input data to IO device 1</td>
<td>W100.0</td>
</tr>
<tr>
<td></td>
<td>glRJ71PN92_1.SLV001SLOT002DataStructin.SLOT002_BIT_1</td>
<td></td>
<td>W100.1</td>
</tr>
<tr>
<td></td>
<td>glRJ71PN92_1.SLV001SLOT002DataStructin.SLOT002_BIT_2</td>
<td></td>
<td>W100.2</td>
</tr>
<tr>
<td></td>
<td>glRJ71PN92_1.SLV001SLOT002DataStructin.SLOT002_BIT_3</td>
<td></td>
<td>W100.3</td>
</tr>
</tbody>
</table>

Label to be defined

Define global labels as shown below:

<table>
<thead>
<tr>
<th>Label Name</th>
<th>Data Type</th>
<th>Class</th>
<th>Assign (Device/Label)</th>
</tr>
</thead>
<tbody>
<tr>
<td>bStartDirection_1</td>
<td>Bit</td>
<td>VAR_GLOBAL</td>
<td>M0</td>
</tr>
<tr>
<td>bSwitch_ON</td>
<td>Bit</td>
<td>VAR_GLOBAL</td>
<td>M10</td>
</tr>
<tr>
<td>bSwitch_Off</td>
<td>Bit</td>
<td>VAR_GLOBAL</td>
<td>M11</td>
</tr>
<tr>
<td>uCounterA</td>
<td>Word (Signed)</td>
<td>VAR_GLOBAL</td>
<td>D10</td>
</tr>
<tr>
<td>uCounterB</td>
<td>Word (Signed)</td>
<td>VAR_GLOBAL</td>
<td>D11</td>
</tr>
</tbody>
</table>

(7) Program to process I/O data to IO device 1
Appendix 1 External Dimensions

This section describes the external dimensions of the RJ71PN92.

(Unit: mm)
# INDEX

<table>
<thead>
<tr>
<th>A</th>
<th>Alarm acquisition function</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Buffer memory</td>
<td>15</td>
</tr>
<tr>
<td>C</td>
<td>Communication stop at CPU STOP</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Cycle time</td>
<td>15</td>
</tr>
<tr>
<td>D</td>
<td>Data consistency function</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Data exchange function</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Data transmission speed</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Device</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Disconnection</td>
<td>15</td>
</tr>
<tr>
<td>E</td>
<td>Engineering tool</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Ethernet device</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>External dimensions</td>
<td>18</td>
</tr>
<tr>
<td>G</td>
<td>Global label</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>GX Configurator-PN</td>
<td>15</td>
</tr>
<tr>
<td>I</td>
<td>Intelligent function module</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Internal current consumption (5VDC)</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>IO device</td>
<td>15</td>
</tr>
<tr>
<td>M</td>
<td>Maximum segment length</td>
<td>18</td>
</tr>
<tr>
<td>N</td>
<td>Number of occupied I/O points</td>
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      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.
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   (2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
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   (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

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