

Basic Model QCPU(Q Mode)

User's Manual

(Hardware Design,  
Maintenance and Inspection)

**mitsubishi**

Q series  
Q series

Mitsubishi Programmable  
Logic Controller

**MELSEC-Q**

**Q00JCPU**

**Q00CPU**

**Q01CPU**

# ● SAFETY PRECAUTIONS ●

(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in this manual. Also pay careful attention to safety and handle the module properly.

These SAFETY PRECAUTIONS classify the safety precautions into two categories: "DANGER" and "CAUTION".




**DANGER**

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 medium or slight personal injury or physical damage.

Depending on circumstances, procedures indicated by  CAUTION may also be linked to serious results.

In any case, it is important to follow the directions for usage.

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

## [DESIGN PRECAUTIONS]



**DANGER**

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

- (1) Outside the PLC, construct mechanical damage preventing interlock circuits such as emergency stop, protective circuits, positioning upper and lower limits switches and interlocking forward/reverse operations.
- (2) When the PLC detects the following problems, it will stop calculation and turn off all output in the case of (a). In the case of (b), it will stop calculation and hold or turn off all output according to the parameter setting.

(a) The power supply module has over current protection equipment and over voltage protection equipment.

(b) The PLC CPUs self-diagnostic functions, such as the watchdog timer error, detect problems.

In addition, all output will be turned on when there are problems that the PLC CPU cannot detect, such as in the I/O controller. Build a fail safe circuit exterior to the PLC that will make sure the equipment operates safely at such times. See section 9.1 of this manual for example fail safe circuits.

- (3) Output could be left on or off when there is trouble in the outputs module relay or transistor. So build an external monitoring circuit that will monitor any single outputs that could cause serious trouble.

## [DESIGN PRECAUTIONS]

### DANGER

- When overcurrent which exceeds the rating or caused by short-circuited load flows in the output module for a long time, it may cause smoke or fire. To prevent this, configure an external safety circuit, such as fuse.
- Build a circuit that turns on the external power supply when the PLC main module power is turned on. If the external power supply is turned on first, it could result in erroneous output or erroneous operation.
- When there are communication problems with the data link, refer to the corresponding data link manual for the operating status of each station. Not doing so could result in erroneous output or erroneous operation.
- When connecting a peripheral device to the CPU module or connecting a personal computer or the like to the intelligent function module to exercise control (data change) on the running PLC, configure up an interlock circuit in the sequence program to ensure that the whole system will always operate safely.  
Also before exercising other control (program change, operating status change (status control)) on the running PLC, read the manual carefully and fully confirm safety.  
Especially for the above control on the remote PLC from an external device, an immediate action may not be taken for PLC trouble due to a data communication fault.  
In addition to configuring up the interlock circuit in the sequence program, corrective and other actions to be taken as a system for the occurrence of a data communication fault should be predetermined between the external device and PLC CPU.

### CAUTION

- Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other. They should be installed 100 mm (3.94 inch) or more from each other. Not doing so could result in noise that would cause erroneous operation.
- When controlling items like lamp load, heater or solenoid valve using an output module, large current (approximately ten times greater than that present in normal circumstances) may flow when the output is turned OFF to ON.  
Take measures such as replacing the module with one having sufficient rated current.

## [INSTALLATION PRECAUTIONS]

### CAUTION

- Use the PLC in an environment that meets the general specifications contained in this manual. Using this PLC in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.
- Hold down the module loading lever at the module bottom, and securely insert the module fixing hook into the fixing hole in the base unit.  
Incorrect loading of the module can cause a malfunction, failure or drop.  
When using the PLC in the environment of much vibration, tighten the module with a screw. Tighten the screw in the specified torque range. Undertightening can cause a drop, short circuit or malfunction. Overtightening can cause a drop, short circuit or malfunction due to damage to the screw or module.
- When installing extension cables, be sure that the connectors of base unit are installed correctly. After installation, check them for looseness. Poor connections could cause an input or output failure.
- Completely turn off the external power supply before loading or unloading the module. Not doing so could result in electric shock or damage to the product.
- Do not directly touch the module's conductive parts or electronic components. Touching the conductive parts could cause an operation failure or give damage to the module.

## [WIRING PRECAUTIONS]

### DANGER

- Completely turn off the external power supply when installing or placing wiring. Not completely turning off all power could result in electric shock or damage to the product.
- When turning on the power supply or operating the module after installation or wiring work, be sure that the module's terminal covers are correctly attached. Not attaching the terminal cover could result in electric shock.

## [WIRING PRECAUTIONS]

### CAUTION

- Be sure to ground the FG terminals and LG terminals to the protective ground conductor. Not doing so could result in electric shock or erroneous operation.
- When wiring in the PLC, be sure that it is done correctly by checking the product's rated voltage and the terminal layout. Connecting a power supply that is different from the rating or incorrectly wiring the product could result in fire or damage.
- External connections shall be crimped or pressure welded with the specified tools, or correctly soldered. Imperfect connections could result in short circuit, fires, or erroneous operation.
- Tighten the terminal screws with the specified torque. If the terminal screws are loose, it could result in short circuits, fire, or erroneous operation. Tightening the terminal screws too far may cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.
- Be sure there are no foreign substances such as sawdust or wiring debris inside the module. Such debris could cause fires, damage, or erroneous operation.
- The module has an ingress prevention label on its top to prevent foreign matter, such as wire offcuts, from entering the module during wiring.  
Do not peel this label during wiring.  
Before starting system operation, be sure to peel this label because of heat dissipation.

## [STARTUP AND MAINTENANCE PRECAUTIONS]

### DANGER

- Do not touch the terminals while power is on.  
Doing so could cause shock or erroneous operation.
- Correctly connect the battery.  
Also, do not charge, disassemble, heat, place in fire, short circuit, or solder the battery.  
Mishandling of battery can cause overheating or cracks which could result in injury and fires.
- Switch all phases of the external power supply off when cleaning the module or retightening the terminal or module mounting screws. Not doing so could result in electric shock.  
Undertightening of terminal screws can cause a short circuit or malfunction. Overtightening of screws can cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.

## [STARTUP AND MAINTENANCE PRECAUTIONS]

### DANGER

- The online operations conducted for the CPU module being operated, connecting the peripheral device (especially, when changing data or operation status), shall be conducted after the manual has been carefully read and a sufficient check of safety has been conducted.  
Operation mistakes could cause damage or problems with of the module.
- Do not disassemble or modify the modules.  
Doing so could cause trouble, erroneous operation, injury, or fire.
- Use any radio communication device such as a cellular phone or a PHS phone more than 25cm (9.85 inch) away from the PLC.  
Not doing so can cause a malfunction.
- Switch all phases of the external power supply off before mounting or removing the module.  
If you do not switch off the external power supply, it will cause failure or malfunction of the module.
- Do not drop or add an impact to the battery to be mounted in the module.  
Otherwise the battery will be broken, possibly causing internal leakage of electrolyte.  
Do not use but dispose of the battery if it has fallen or an impact is given to it.
- Before touching the module, always touch grounded metal, etc. to discharge static electricity from human body.  
Failure to do so can cause the module to fail or malfunction.

## [DISPOSAL PRECAUTIONS]

### CAUTION

- When disposing of this product, treat it as industrial waste.

## REVISIONS

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

Print Date	* Manual Number	Revision
Aug., 2001	SH(NA)-080187-A	First edition
Oct., 2002	SH(NA)-080187-B	Complete review Addition model Q32SB, Q33SB, Q35SB, Q64P, Q61SP
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## INTRODUCTION

Thank you for choosing the Mitsubishi MELSEC-Q Series of General Purpose Programmable Controllers. Please read this manual carefully so that equipment is used to its optimum.

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## About Manuals

The following manuals are related to this product.

Referring to this list, please request the necessary manuals.

### **Related Manuals**

Manual Name	Manual Number (Model Code)
Basic model QCPU (Q Mode) User's Manual (Function Explanation, Program Fundamentals) This manual explains the functions, programming methods, devices and so on necessary to create programs with the Basic model QCPU. (Sold separately)	SH-080188 (13JR44)
QCPU (Q Mode)/QnACPU Programming Manual (Common Instructions) This manual describes how to use the sequence instructions, basic instructions and application instructions. (Sold separately)	SH-080039 (13JF58)
Q Corresponding MELSEC Communication Protocol Reference Manual This manual explains how the external devices read and write PLC CPU data through communication with the MC protocol using the serial communication module/Ethernet module. (Sold separately)	SH-080008 (13JF89)
QCPU (Q Mode)/QnACPU Programming Manual (PID Control Instructions) This manual describes the dedicated instructions used for PID control. (Sold separately)	SH-080040 (13JF59)
QCPU (Q Mode)/QnACPU Programming Manual (SFC) This manual explains the system configuration, performance specifications, functions, programming, debugging and error codes of MELSAP3. (Sold separately)	SH-080041 (13JF60)
QCPU (Q Mode) Programming Manual (MELSAP-L) This manual describes the programming methods, specifications and functions that are necessary to create the MELSAP-L type SFC programs. (Sold separately)	SH-080076 (13JF61)
QCPU (Q Mode) Programming Manual (Structured Text) This manual describes the structured text language programming methods. (Sold separately)	SH-080366E (13JF68)

## How to Use This Manual

This manual is prepared for users to understand the hardware specifications of the modules such as CPU modules, power supply modules, base units and similar, maintenance and inspections of the system, and troubleshooting required when you use MELSEC-Q series PLCs.

The manual is classified roughly into three sections as shown below.

- 1) Chapters 1 and 2 Describe the outline of the CPU module and the system configuration.  
The basics of the system configuration of CPU module are described.
- 2) Chapters 3 to 7 Describe the general specifications indicating the operating environments of the CPU module, power supply module, base units, and the performance specifications of these modules.
- 3) Chapters 8 to 11 Describe the overall maintenance such as the installation of the CPU module, daily inspections, and troubleshooting.

### **REMARK**

This manual does not explain the functions of the CPU module.

For these functions, refer to the manual shown below.

- Basic model QCPU (Q Mode) User's Manual (Function Explanation, Program Fundamentals)

## About the Generic Terms and Abbreviations

In this manual, the following general names and abbreviations are used for explanation of basic model QCPU unless otherwise specified.

Generic Term/Abbreviation	Description
Basic model QCPU CPU	General name for Q00JCPU, Q00CPU and Q01CPU modules.
Q Series	Abbreviation for Mitsubishi MELSEC-Q Series PLC.
GX Developer	Product name of GPP function software package SW□D5C-GPPW-E(-EV) compatible with Q Series Abbreviation for GX Developer of Version 7 or later. Use Version "8" when using the functions of the function version B.
Q3□B	General name for Q33B, Q35B, Q38B, Q312B type main base unit with Q00CPU, Q01CPU, Q Series power supply module, input/output module and intelligent function module attachable. *1
Q3□SB	General name for Q32SB, Q33SB, and Q35SB slim type main base units to which the following modules can be installed: Q00CPU, Q01CPU, slim type power supply module, input/output module, intelligent function module *1
Q5□B	General name for Q52B and Q55B type extension base unit with Q series input/output module and intelligent function module attachable.
Q6□B	General name for Q63B, Q65B, Q68B and Q612B type extension base unit with Q Series power supply module, input/output module and intelligent function module attachable.
Main base unit	General name for Q33B, Q35B, Q38B, and Q312B type main base unit to which the following modules can be installed: Q00CPU, Q01CPU, Q-series power supply module, input/output module, intelligent function module, and Q00JCPU (base unit). *1
Slim type main base unit	General name for Q32SB, Q33SB, and Q35SB slim type main base unit to which the following modules can be installed: Q00CPU, Q01CPU, slim type power supply module, input/output module and intelligent function module. *1
Extension base unit	General name for Q5□B and Q6□B.
Base unit	General name for main base unit, slim type main base unit, and extension base unit
Extension cable	General name for QC05B, QC06B, QC12B, QC30B, QC50B, QC100B type extension cable.
Power supply module	General name for Q61P-A1, Q61P-A2, Q62P, Q63P and Q64P types power supply module.
Slim type power supply module	General name for Q61SP slim type power supply module
Battery	General name for battery for Q6BAT type CPU module.

\*1: In a multiple CPU system configuration, the motion CPU and PC CPU module are also mountable.

## Operating Precautions

### Precautions for using the Basic model QCPU for the first time

- (1) When using the Basic model QCPU for the first time, the user memories must be formatted using GX Developer.  
Refer to "6 ABOUT MEMORIES AND FILES HANDLED BY BASIC MODEL QCPU" in the Basic Model QCPU User's Manual (Function Explanation/Program Fundamentals).  
When using GX Developer for formatting, refer to the GX Developer manual.

### Precautions for the battery

- (1) Operation after storing PLC without battery  
When starting the PLC operation after being stored with the Basic model QCPU battery removed, the user memories must be formatted using GX Developer. (Refer to Section 10.4.)
- (2) When battery has gone flat during storage of PLC  
When the Basic model QCPU battery has gone flat during storage of the PLC, the user memories must be formatted using GX Developer. (Refer to Section 10.5.)

## 1 OVERVIEW

1

This manual describes the hardware specification and handling method of the basic model QCPU.

It also describes the specifications of the power supply modules, base units, extension cables and battery.

Refer to the following functions for details on power supply modules, base units, extension cables, battery specifications and other information.

Basic Model QCPU (Q mode) User's Manual (Hardware Design, Maintenance and Inspections)

### (1) Q00JCPU

- The Q00JCPU is a CPU module consisting of a CPU module, a power supply module and a main base unit (five slots).
- This CPU allows connection of up to two extension base units to accept up to 16 input/output and intelligent function modules.
- The number of input/output points controllable by the main and extension base units is 256.  
When a CC-Link/LT module is used, 1024 points can be controlled by a single module.

### (2) Q00CPU, Q01CPU

- Q00CPU and Q01CPU are stand alone CPU units that are installed in the main base unit or slim type main base unit.
- Up to four stages of extension base units can be connected and maximum 24 pieces of the input/output modules, intelligent function modules and other modules can be installed.  
However, the slim type main base unit are not compatible with extension base unit.
- The main base unit, slim type main base unit or extension base unit can control up to 1024 input/output points.  
When a CC-Link/LT module is used, 1024 points can be controlled by a single module.
- The Basic model QCPU can be used with the motion CPU and PC CPU module to configure a multiple PLC system.  
For detailed explanation of the multiple PLC system, refer to the Basic Model QCPU User's Manual (Function Explanation/Program Fundamentals) (SH-080188).

The Basic model QCPU is updated to add functions.

The added functions can be judged by the function version/serial No. of the CPU module.

Table 1.1 indicates the added functions and the GX Developer version compatible with the additional functions.

When using any of the added functions, confirm the function version/serial No. and GX Developer version.

Table 1.1 List of Functions Added to Basic Model QCPU and Function Version/Serial No.

Updates of Basic Model QCPU			Compatible GX Developer
Function version	Serial No.	Additional functions	
B	04122 or later	<ul style="list-style-type: none"> <li>• Multiple PLC system (Q00CPU, Q01CPU)</li> <li>• SFC</li> <li>• Function block</li> <li>• Structured text (ST)</li> <li>• Real number operation function</li> <li>• PID operation function *1</li> <li>• Remote password setting</li> <li>• Increased standard RAM capacity (Q00CPU, Q01CPU) *1</li> <li>• Device initial value automatic setting</li> <li>• Interrupt function from intelligent function module</li> <li>• Online program correction function using pointer</li> </ul>	Version 8 or later

\*1: Functions irrelevant to GX Developer

#### POINT

Refer to Section 2.3 for the confirmation of the function version and serial No. of the Basic model QCPU.

The following table indicates differences between the Basic model QCPU.

Item		Q00JCPU	Q00CPU	Q01CPU
CPU module		CPU module, Power supply module, Main base unit (5 slots) Integrated type	Stand-alone CPU module	
Main base unit	Main base unit	Unnecessary	Necessary (Q33B, Q35B, Q38B, Q312B)	
	Slim type main base unit	Unnecessary	Necessary (Q32SB, Q33SB, Q35SB)	
Extension base unit		Connectable (Q52B, Q55B, Q63B, Q65B, Q68B, Q612B)		
Number of extension stages		Up to 2 stages	Up to 4 stages	
Number of input/output modules to be installed		16 modules	24 modules	
Power supply module				
Main base unit		Unnecessary	Necessary	
Slim type main base unit		Unnecessary	Necessary	
Extension base unit	Q52B, Q55B	Unnecessary		
	Q63B, Q65B, Q68B, Q612B	Necessary		
Extension cable		QC05B, QC06B, QC12B, QC30B, QC50B, QC100B		
Memory card interface		No		
External interface	RS-232	Yes (transmission rate: 9.6kbps, 19.2kbps, 38.4kbps, 57.6kbps, 115.2kbps)		
	USB	No		
Processing speed (Sequence instruction)	LD X0	0.20μs	0.16μs	0.10μs
	MOV D0 D1	0.70μs	0.56μs	0.35μs
Program capacity*		8k steps (32 kbyte)	8k steps (32 kbyte)	14k steps (56 kbyte)
Memory capacity	Program memory	58 kbyte	94 kbyte	
	Standard RAM	—	128 kbyte *2	
	Standard ROM	58 kbyte	94 kbyte	
	CPU shared memory *3	None	1k bytes (user free area 320 words)	
Device memory capacity		The number of device points can be changed within the range of 16.4k words.		
Number of input/output devices points (Remote I/O is contained.)		2048 points		
Number of input/output points		256 points	1024 points	
File register		No	Yes (64k points fixed)	
Serial communication function		No	Yes (using the RS-232 interface of the CPU module)	

\*1: 1 step of the program capacity is 4 bytes.

\*2: 64k bytes for the function version A.

\*3: Memory added to the function version B.  
The CPU shared memory is not latched.  
The CPU shared memory is cleared when the PLC is powered on or the CPU module is reset.



**(6) Connection of up to four/two extension base units**

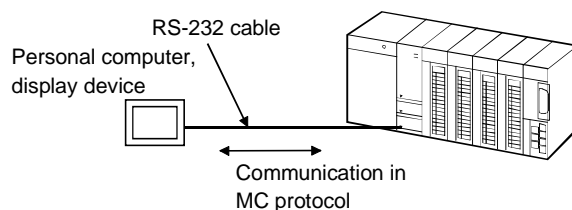
- (a) The Q00JCPU can connect up to two extension base units (three base units including the main) and accepts up to 16 modules.
- (b) The Q00CPU, Q01CPU can connect up to four extension base units (five base units including the main) and accepts up to 24 modules.
- (c) The overall distance of the extension cables is up to 13.2m to ensure high degree of extension base unit arrangement.

**POINT**

- (1) When connected with a bus, the GOT uses one of the above extension units. Therefore, the number of connectable extension base units decreases by one.
- (2) No extension base unit can be connected if the slim type main base unit (Q3□SB) is used.

**(7) Serial communication function for communication with personal computer or display device**

With the RS-232 interface of the Q00CPU or Q01CPU connected with a personal computer, display device or the like, the MELSEC communication protocol (hereafter referred to as the MC protocol) can be used to make communication.



The serial communication function only allows communication in the MC protocol (QnA-compatible 3C frame (format 4), QnA-compatible 4C frame (format 4, 5)).

The serial communication function does not allow communication in the nonprocedure protocol or bidirectional protocol.

Refer to the following manual for the MC protocol.

- Q Corresponding MELSEC Communication Protocol Reference Manual

**(8) Built-in standard ROM**

The flash ROM for storing parameters and sequential program is installed as a standard feature for easier protection of important program.

**(9) Blocking an invalid access using the file password**

Use of the file password allows the setting of the access level (read disable, write disable) of a program to prevent program changes from being made by illegal access.



(10) 64k points of file registers (Q00CPU, Q01CPU)

The standard RAM capacity has been increased from 64k bytes to 128k bytes to double the file register capacity (64k points).

The increase of battery-backed data provides allowances for control programs.

(11) Remote password setting

When external access is made to an Ethernet module, serial communication module or modem interface module, whether access to the Basic model QCPU may be made or not can be selected using a remote password.

(12) Multiple CPU system compatibility

A multiple CPU system can be configured by the Basic model QCPU (Q00CPU, Q01CPU only), motion CPU and PC CPU module.

REMARK
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- The features in (10) to (12) are functions added to the Basic model CPU whose first five digits of serial No. are 04122 or later.
- The remote password function can be executed when the Ethernet module, serial communication module or modem interface module of function version B is used with GX Developer 8 or later.

## 2 SYSTEM CONFIGURATION

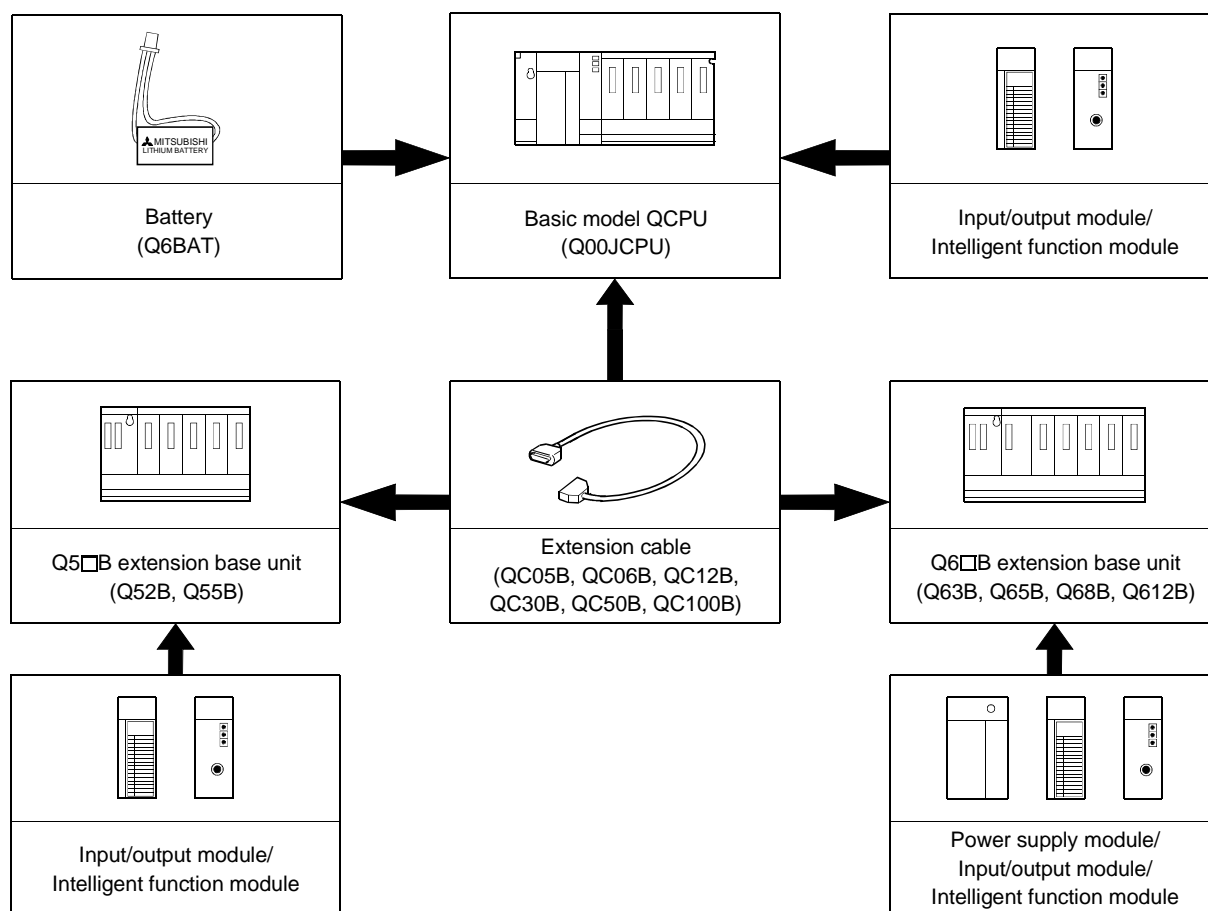
This section describes the system configuration of the Basic model QCPU, cautions on use of the system, and configured equipment.

### 2.1 System Configuration of Single CPU System

#### 2.1.1 Q00JCPU

This section explains the equipment configuration of a Q00JCPU system and the outline of the system configuration.

##### (1) Equipment configuration



## (2) Outline of system configuration

System configuration	<div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p>(a) System including extension base units</p> </div> <div style="width: 45%;"> <p>(b) System including extension base unit and GOT</p> </div> </div> <p>*Both of the above systems assume that each slot of the main and extension base units is loaded with a 16-point module.</p>
Maximum number of Extension Stages	Two Extension Stages
Maximum number of input/output modules to be installed	16 modules
Maximum number of input/output points	256 *1
Main base unit	Unnecessary
Extension base unit	Q52B, Q55B, Q63B, Q65B, Q68B, Q612B
Extension cable	QC05B, QC06B, QC12B, QC30B, QC50B, QC100B
Notes	<p>(1) Do not use an extension cable longer than an overall extension length of 13.2m(43.31ft.).</p> <p>(2) When using an extension cable, do not bind it together with the main circuit (high voltage and heavy current) line or do not lay down them closely to each other.</p> <p>(3) When setting the No. of the expansion stages, set it in the ascending order so that the same No. is not set simultaneously by two extension base units.</p> <p>(4) The QA1S6□B/QA65B cannot be connected as an extension base unit.</p> <p>(5) Connect the extension cable from OUT of the extension cable connector of the base unit to IN of the extension base unit on the next stage.</p> <p>(6) If 17 or more modules are installed, an error will occur.</p> <p>(7) When bus-connected, the GOT occupies one extension stage and one slot.</p> <p>(8) The Q00JCPU processes the GOT as a 16-point intelligent function module. Hence, connection of one GOT decreases the number of controllable points on base units by 16 points.</p> <p>(9) The bus extension connector box (A9GT-QCNB) cannot be connected to the Q00JCPU. It should be connected to the extension base unit.</p>

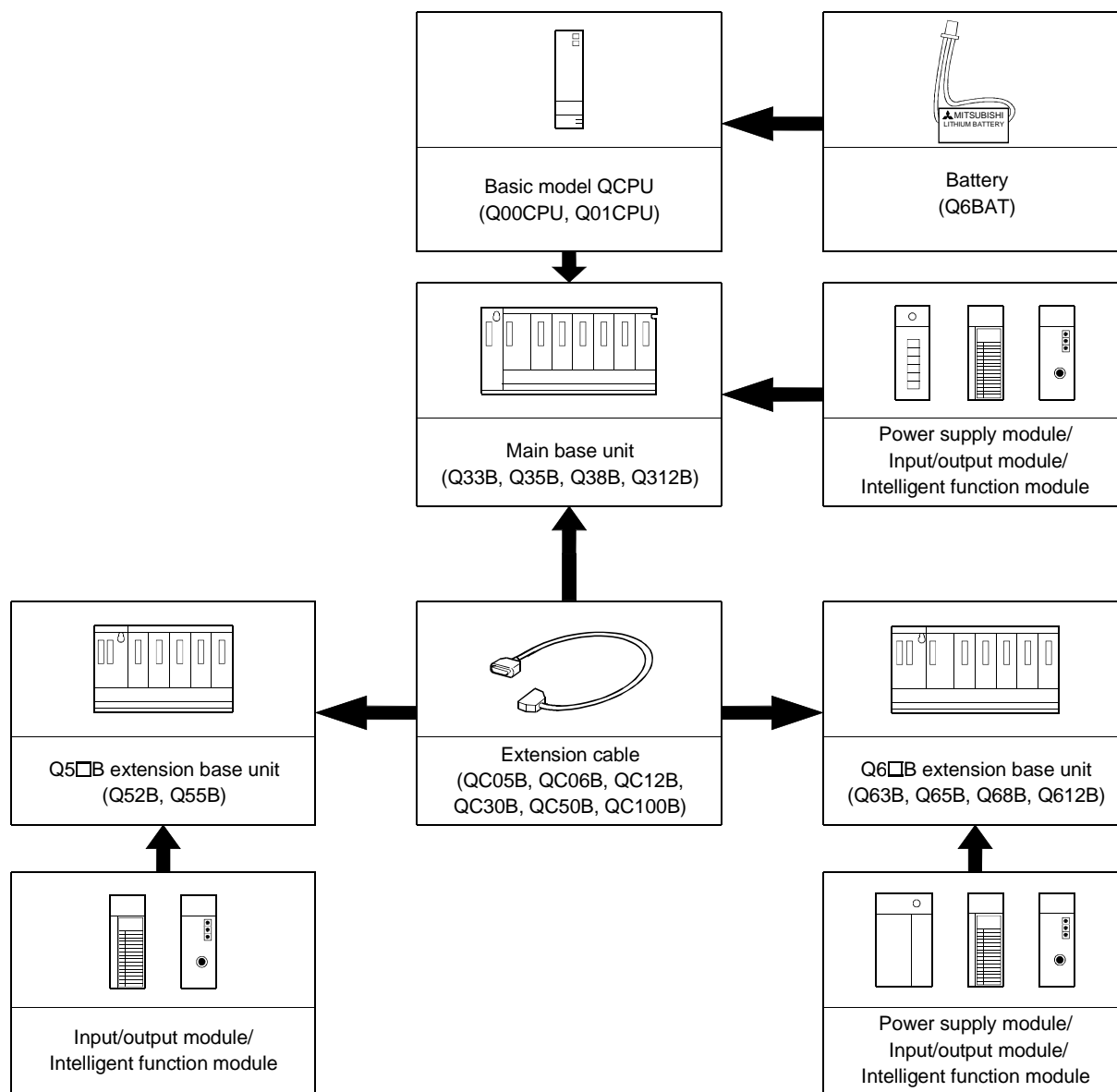
\*1 : Indicates the maximum number of I/O points of the CPU module and does not indicate the maximum number of I/O points of the system.  
 When a CC-Link/LT module is used, 1024 points can be controlled per module.

## 2.1.2 Q00CPU, Q01CPU

This section explains the equipment configuration of a Q00CPU, Q01CPU system and the outline of the system configuration.

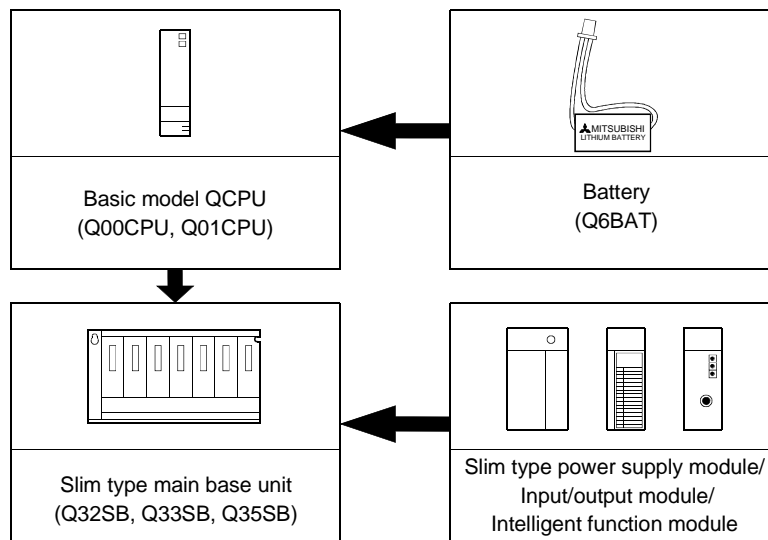
## (1) Equipment configuration

(a) When the main base unit (Q3□B) is used

**POINT**

As a power supply module, use the Q61P-A1, Q61P-A2, Q62P or Q64P.  
The slim type power supply module (Q61SP) is not available.

(b) When the slim type main base unit (Q3□SB) is used



#### POINT

- (1) As a power supply module, use the slim type power supply module (Q61SP).  
The Q61P-A1, Q61P-A2, Q62P or Q64P is not available.
- (2) The slim type main base unit does not have the extension cable connector.  
Therefore, the extension base or GOT is not connectable.

## (2) Outline of system configuration

## (a) When the main base unit (Q3□B) is used

System configuration	<p>(a) System where extension base units are connected</p> <p>(b) System where extension base unit and GOT are connected</p> <p>* The above system assumes that each slot is loading with a 32-point module.</p>
Maximum number of Extension Stages	Four Extension Stages
Maximum number of input/output modules to be installed	24 modules
Maximum number of input/output points	1024 *1
Main base unit	Q33B, Q35B, Q38B, Q312B
Extension base unit	Q52B, Q55B, Q63B, Q65B, Q68B, Q612B
Extension cable	QC05B, QC06B, QC12B, QC30B, QC50B, QC100B
Notes	<p>(1) Do not use an extension cable longer than an overall extension length of 13.2m(43.31ft.).</p> <p>(2) When using an extension cable, do not bind it together with the main circuit (high voltage and heavy current) line or do not lay down them closely to each other.</p> <p>(3) When setting the No. of the expansion stages, set it in the ascending order so that the same No. is not set simultaneously by two extension base units.</p> <p>(4) The QA1S6□B/QA65B cannot be connected as an extension base unit.</p> <p>(5) Connect the extension cable from OUT of the extension cable connector of the base unit to IN of the extension base unit on the next stage.</p> <p>(6) If 25 or more modules are installed, an error will occur.</p> <p>(7) When bus-connected, the GOT occupies one extension stage and one slot.</p> <p>(8) The Q00CPU, Q01CPU processes the GOT as a 16-point intelligent function module. Hence, connection of one GOT decreases the number of controllable points on base units by 16 points.</p> <p>(9) Q61SP cannot be used for the power supply module. Use Q61P-A1, Q61P-A2, Q62P, or Q64P for the power supply module.</p>

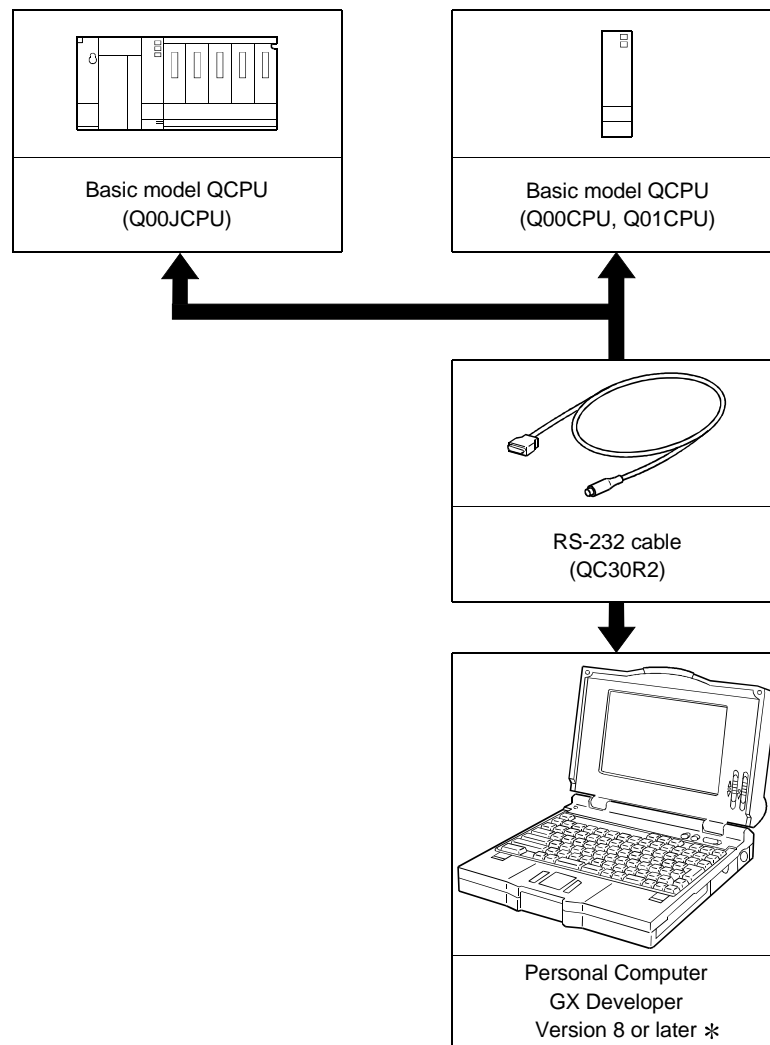
\*1 : Indicates the maximum number of I/O points of the CPU module and does not indicate the maximum number of I/O points of the system.  
When a CC-Link/LT module is used, 1024 points can be controlled per module.

## (b) When the slim type main base unit (Q3□SB) is used

System configuration	<div style="text-align: center;"><div>Slim type main base unit (Q35SB)</div><div>Slot No. 0 1 2 3 4</div><div><table><tr><td>Power supply module</td><td>00</td><td>20</td><td>40</td><td>60</td><td>80</td></tr><tr><td>CPU module</td><td>1F</td><td>3F</td><td>5F</td><td>7F</td><td>9F</td></tr></table></div></div> <p style="text-align: center;">*The above system assumes that each slot is loading with a 32-point module.</p>	Power supply module	00	20	40	60	80	CPU module	1F	3F	5F	7F	9F
Power supply module	00	20	40	60	80								
CPU module	1F	3F	5F	7F	9F								
Maximum number of Extension Stages	Not extendable												
Maximum number of input/output modules to be installed	5 modules												
Maximum number of input/output points	1024 *1												
Slim type main base unit model	Q32SB, Q33SB, Q35SB												
Extension base unit	Not connectable												
Extension cable	Not connectable												
Notes	(1) Use Q61SP for the power supply module. Q61P-A1, Q61P-A2, Q62P or Q64P is not available for the power supply module. (2) The slim type main base unit has no extension cable connector. Therefore, extension base unit or GOT is not connectable.												

\*1 : Indicates the maximum number of I/O points of the CPU module and does not indicate the maximum number of I/O points of the system.  
When a CC-Link/LT module is used, 1024 points can be controlled per module.

## 2.1.3 Configuration for Use of GX Developer

**REMARK**

\*: GX Developer Ver. 7 can be used when the functions added to the function version B of the Basic model QCPU are not used.



## 2.2 Precautions for Use of Single CPU System

This section describes hardware and software packages compatible with Basic model QCPU.

### (1) Hardware

- (a) The number of modules to be installed and functions are limited depending on the type of the modules.

Applicable Module	Type	Limit of number of modules to be installed
Q Series MELSECNET/H network module	QJ71LP21, QJ71BR11, QJ71LP21-25, QJ71LP21G, QJ71LP21GE	One module only
Q series Ethernet interface module	QJ71E71, QJ71E71-B2, QJ71E71-100	One module only
Q series CC-Link system master local module	QJ61BT11	Up to 2 modules function version B or later
Interrupt module	QI60	One module only *1

\*1 : Indicates the number of interrupt modules to which interrupt pointer setting has not been made.

When interrupt pointer setting has been made, up to the following number of modules can be used.

16 modules for Q00JCPU

24 modules for Q00CPU or Q01CPU

- (b) A graphic operation terminal can be used only for the GOT900 series and F900 series (Basic OS matching Q-mode and communication driver must be installed).

The GOT800 series, A77GOT, and A64GOT cannot be used.

- (c) A DeviceNet Master-Slave module (QJ71DN91) with function version is B or later can be used.

- (d) A FL-net module (QJ71FL71, QJ71FL71-B2) with function version is B or later can be used.

### (2) Software package

GX Developer and GX Configurator of the versions or later in the following table are usable with the Basic model QCPU.

Product Name	Type	Version
GX Developer	SW8D5C-GPPW-E	Ver. 8 *2
GX Simulator	SW6D5C-LLT-E	Ver. 6
GX Configurator-AD	SW0D5C-QADU-E	Ver. 1.10L
GX Configurator-DA	SW0D5C-QDAU-E	Ver. 1.10L
GX Configurator-SC	SW0D5C-QSCU-E	Ver. 1.10L
GX Configurator-CT	SW0D5C-QCTU-E	Ver. 1.10L
GX Configurator-TC	SW0D5C-QTCU-E	Ver. 1.10L
GX Configurator-FL	SW0D5C-QFLU-E	Ver. 1.10L
GX Configurator-DN	SW0D5C-QDNU-E	Ver. 1.10L
GX Configurator-QP	SW2D5C-QD75P-E	Ver. 2.10L
GX Configurator-PT	SW1D5C-QPTU-E	Ver. 1.10L
GX Configurator-TI	SW1D5C-QTIU-E	Ver. 1.10L
GX Configurator-AS	SW1D5C-QASU-E	Ver. 1.13P

\*2: Ver. 7 can be used when the functions added to the function version B of the Basic model QCPU are not used.

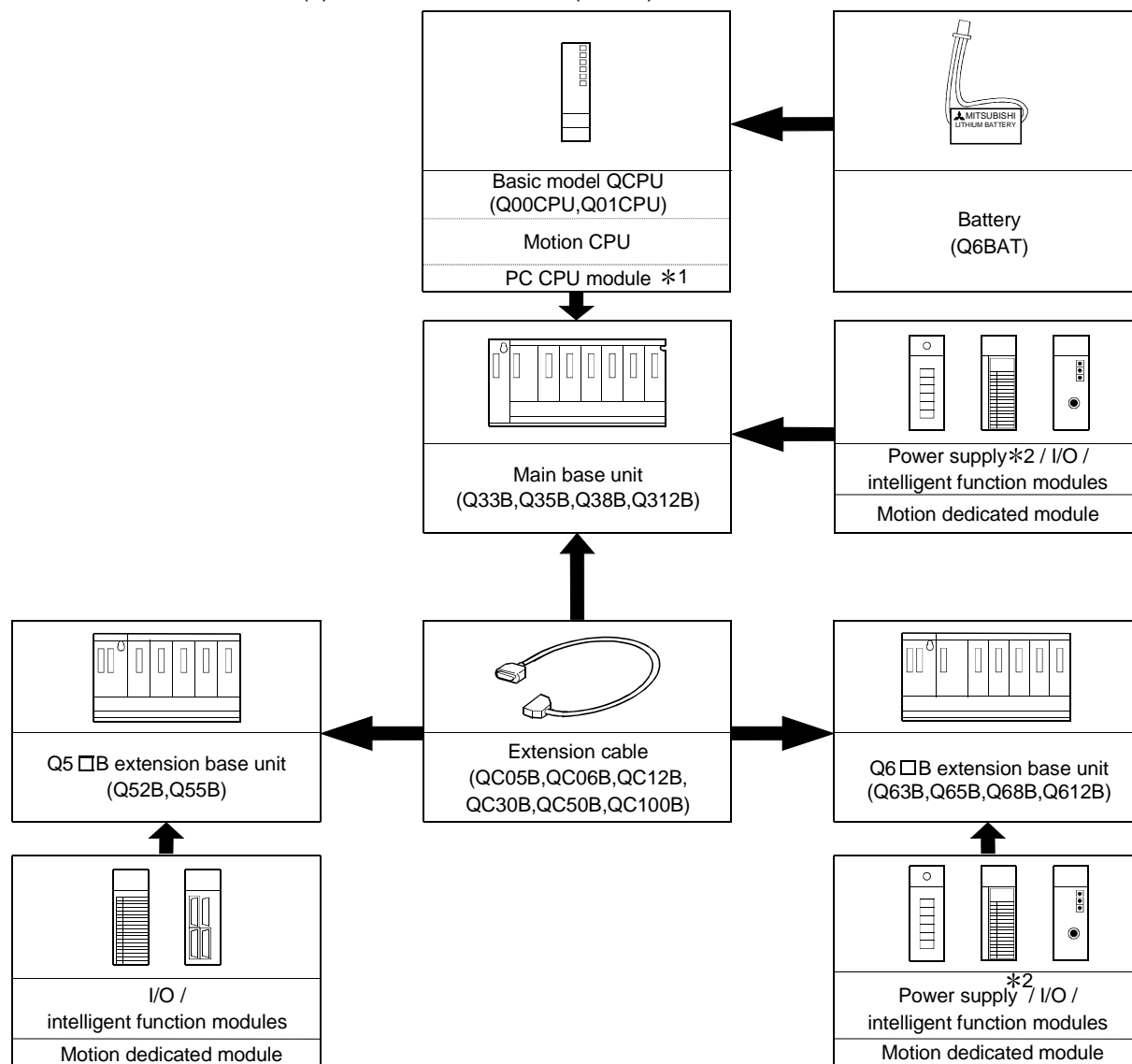
## 2.3 System Configuration of Multiple CPU System

## 2.3.1 Q00CPU or Q01CPU

This section explains the equipment configuration of a multiple PLC system and the outline of the system configuration.

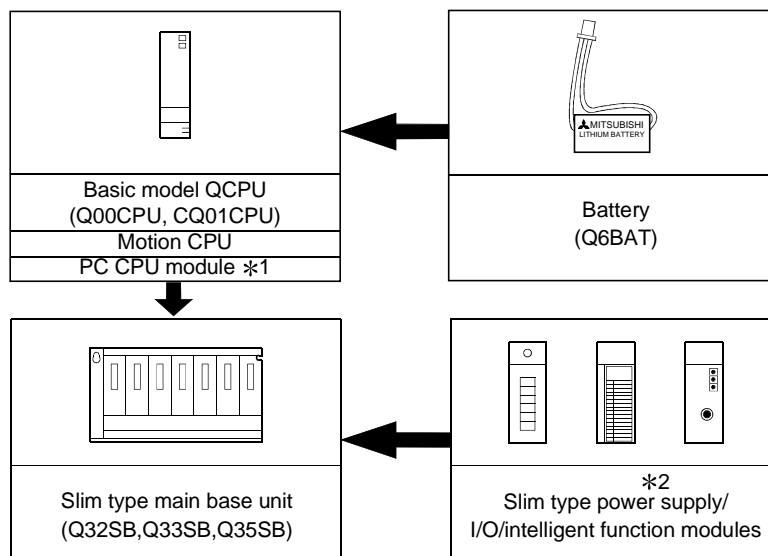
## (1) Equipment configuration of multiple PLC system

(a) When main base unit (Q3□B) is used

**POINT**

- (1) \*1: Contact the following company for the PC CPU module.  
CONTEC Co., Ltd. TEL: +81-6-6472-7130
- (2) \*2: For the power supply module, use the Q61P-A1, Q61P-A2, Q62P or Q64P.  
The current consumption must be within the rated output range of the power supply module.  
The Q61SP is not available for the power supply module.

(b) When slim type main base unit (Q3□SB) is used



#### POINT

- (1) \*1: Contact the following company for the PC CPU module.  
CONTEC Co., Ltd. TEL: +81-6-6472-7130
- (2) \*2: Use the slim type power supply module (Q61SP). The Q61P-A1, Q61P-A2, Q62P or Q64P is not available.
- (3) The slim type main base unit does not have an extension cable connector.  
The extension base or GOT is not connectable.

## (2) Outline of system configuration (when Basic model QCPU, motion CPU and PC CPU module are mounted)

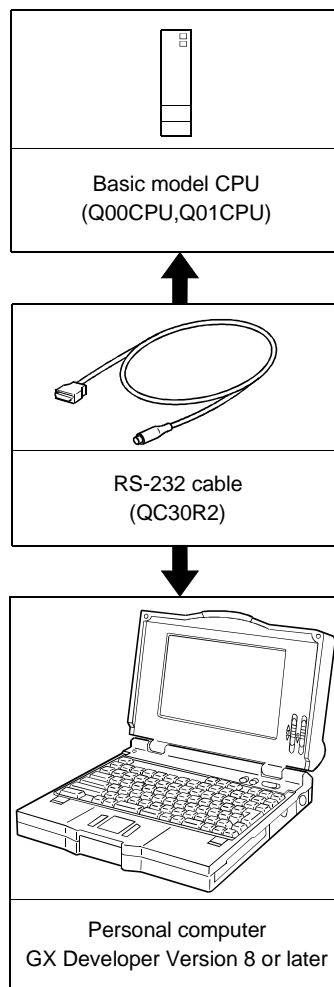
(a) When main base unit (Q3□B) is used

System configuration	<p>(a) System where extension base units are connected</p> <p>(b) System where extension base units and GOT are connected</p> <p>Number of extension units : 4 Slot No. : 0</p> <p>* When each slot is mounted with 32-point module</p>			
	CPU number		CPU1: No. 1 (Basic model QCPU), CPU2: No. 2 (motion CPU), CPU3: No. 3 (PC CPU module)	
Maximum number of extension units	Four extension units			
Maximum number of mounted I/O modules	Multiple PLC setting	1	2	3
	Number of mounted modules	24 modules	23 modules	21 modules
Maximum number of I/O points	1024 (Maximum I/O points of CPU module. 1024 points per module when CC-Link/LT module is used.)			
Main base unit type	Q33B, Q35B, Q38B, Q312B			
Extension base unit type	Q52B, Q55B, Q63B, Q65B, Q68B, Q612B			
Extension cable type	QC05B, QC06B, QC12B, QC30B, QC50B, QC100B			
Precautions	<p>(1) Use the extension cable within the overall distance of 13.2m.</p> <p>(2) When using the extension cable, do not bundle it with, or run it close to, the main circuit (high voltage, large current) line.</p> <p>(3) Set the extension unit numbers in ascending order so that the same number is not used for different extension base units.</p> <p>(4) The QA1S6□B/QA65B cannot be connected as the extension base unit.</p> <p>(5) Connect the extension cable from OUT of the extension cable connector of the base unit to IN of the next extension base unit.</p> <p>(6) An error occurs if modules are mounted on 26 or more slots. (Number of mounted modules including the CPU No. 1)</p> <p>(7) When mounting a motion CPU, refer to the Basic Model QCPU User's Manual (Function Explanation/Program Fundamentals).</p> <p>(8) For the I/O numbers in a multiple PLC system other than the above, refer to the Basic Model QCPU User's Manual (Function Explanation/Program Fundamentals).</p> <p>(9) The PC CPU occupies two slots.</p>			

(b) When slim type main base unit (Q3□SB) is used

System configuration	<p style="text-align: center;">Slim type main base unit (Q35SB)</p> <p style="text-align: center;">* Shows a system where each slot is mounted with 32-point module.</p>			
CPU number	CPU1: No. 1 (Basic model QCPU), CPU2: No. 2 (motion CPU), CPU3: No. 3 (PC CPU module)			
Maximum number of extension units	Extension not allowed			
Maximum number of mounted I/O modules	Multiple PLC setting	1	2	3
	Number of mounted modules	5 modules	4 modules	2 modules
Maximum number of I/O points	<p style="text-align: center;">1024</p> <p>(Maximum I/O points of CPU module. 1024 points per module when CC-Link/LT module is used.)</p>			
Slim type main base unit type	Q32SB, Q33SB, Q35SB			
Extension base unit type	Not connectable			
Extension cable type	Not connectable			
Precautions	<p>(1) The Q61P-A1, Q61P-A2, Q62P or Q64P cannot be used as a power supply module. Use the Q61SP as a power supply module.</p> <p>(2) The slim type main base unit does not have an extension cable connector. The extension base or GOT is not connectable.</p>			

## 2.3.2 Configuration for Use of GX Developer

**POINT**

- (1) For connection of the motion CPU and peripheral device, refer to the Motion Controller User's Manual.
- (2) When the personal computer loaded with GX Developer is connected to the motion CPU, communication can be made from GX Developer to the Basic model QCPU.
- (3) For connection of the PC CPU module and peripheral device, refer to the manual of the PC CPU Module.

### 2.4 Precautions for Use of Multiple CPU System

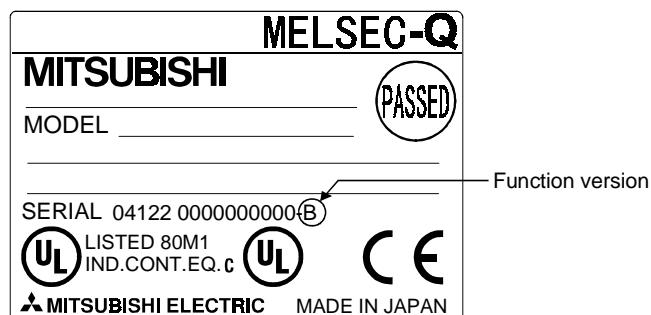
For precautions for use of a multiple PLC system, refer to the Basic Model QCPU User's Manual (Function Explanation/Program Fundamentals).

## 2.5 Confirming the Function Version

The Basic model QCPU function version can be confirmed on the rating nameplate and GX Developer's system monitor.

## (1) Confirming the function version on the rating nameplate

The function version is indicated on the rating nameplate.



## (2) Confirming the function version on the system monitor (product information list)

The product information list in the system monitor of GX Developer allows you to confirm the function version of the Basic model QCPU.

The product information list of the system monitor also allows you to confirm the function versions of the intelligent function modules.

Serial No.      Function version

↓                      ↓

Slot	Type	Series	Model name	Points	I/O No.	Master PLC	Serial No.	Ver
PLC	PLC	Q	Q01CPU	-	-	-	0305100000000000	A
0-0	Intelli. Q	QJ71E71		32pt	0000	-	0208100000000000	B
0-1	-	-	None	-	-	-	-	-
0-2	-	-	None	-	-	-	-	-
0-3	-	-	None	-	-	-	-	-
0-4	-	-	None	-	-	-	-	-
0-5	-	-	None	-	-	-	-	-
0-6	-	-	None	-	-	-	-	-
0-7	-	-	None	-	-	-	-	-

CSV file creating      Close



## 3 GENERAL SPECIFICATIONS

Performance specification of QCPU module is as follows:

Item	Specifications					
Operating ambient temperature	0 to 55°C					
Storage ambient temperature	-25 to 75°C					
Operating ambient humidity	5 to 95%RH, non-condensing					
Storage ambient humidity	5 to 95%RH, non-condensing					
Vibration resistance	Conforming to JIS B 3502, IEC 61131-2	Under intermittent vibration	Frequency	Acceleration	Amplitude	Sweep count 10 times each in X, Y, Z directions (for 80 min.)
			10 to 57Hz	—	0.075mm (0.003in.)	
		Under continuous vibration	57 to 150Hz	9.8m/s <sup>2</sup>	—	
			10 to 57Hz	—	0.035mm (0.001in.)	
			57 to 150Hz	4.9m/s <sup>2</sup>	—	
Shock resistance	Conforming to JIS B 3502, IEC 61131-2 (147 m/s <sup>2</sup> , 3 times in each of 3 directions X, Y, Z)					
Operating ambience	No corrosive gases					
Operating altitude	2000m (6562ft.) max.					
Installation location	Inside control panel					
Overvoltage category *1	II max.					
Pollution degree *2	2 max.					

\*1 : 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.

\*2 : This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used.

Pollution level 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensing must be expected occasionally.

\*3 : Do not use or store the PLC under pressure higher than the atmospheric pressure of altitude 0m.

Doing so can cause a malfunction.

When using the PLC under pressure, please contact your sales representative.

# MEMO

[illegible]

## 4 HARDWARE SPECIFICATION OF THE CPU MODULE

## 4.1 Performance Specification

The table below shows the performance specifications of the Basic model QCPU.

Performance Specifications

Item		Model			Remark
		Q00JCPU	Q00CPU	Q01CPU	
Control method		Repetitive operation of stored program			—
I/O control method		Refresh mode			Direct input/output is possible by direct input/output specification (DX□, DY□)
Programming language (Sequence control dedicated language)		Relay symbol language, logic symbolic language MELSAP3(SFC), MELSAP-L, function block, structured text (ST)			The SFC function is not applicable.
Processing speed (Sequence instruction)	LD X0	0.20μs	0.16μs	0.10μs	—
	MOV D0 D1	0.70μs	0.56μs	0.35μs	—
Total number of instructions (excluding intelligent function module dedicated instructions)		318	327		—
Constant scan (Function for setting the scan timer to fixed settings)		1 to 2000 ms (configurable in increments of 1 ms)			Set parameter values to specify
Program capacity *1 *2		8k steps (32 kbyte)		14k steps (56 kbyte)	—
Memory capacity	Program memory (Drive 0)	58 kbyte	94 kbyte		—
	Standard RAM (Drive 3)	0	64kbyte		—
	Standard ROM (Drive 4)	58 kbyte	128 kbyte *3		—
	CPU shared memory *5	none	1 kbyte		—
Maximum number of stored programs	Program memory	2 *4			—
	Standard ROM	2 *4			—
Number of stored file registers	Standard RAM	—	1		—
Standard RAM number of writings		Max. 100000 times			—
Number of I/O devices points		2048 points (X/Y0 to 7FF)			Number of devices usable on program
Number of I/O points		256 points (X/Y0 to FF)	1024 points (X/Y0 to 3FF)		Number of points accessible to input/output modules

\*1: "1 step" in program capacity equals 4 bytes.

\*2: The maximum number of steps that can be executed can be obtained as follows:  
(Program capacity) - (File header size (Default: 34 steps))

\*3: 64k bytes for the function version A.

\*4: Can store each one of sequence program and SFC program (two programs in all).

\*5: Memory added to the function version B. The CPU shared memory is not latched.

The CPU shared memory is cleared when the PLC is powered on or the CPU module is reset.

## Performance Specifications (continued)

Item		Model			Remark	
		Q00JCPU	Q00CPU	Q01CPU		
Number of device points	Internal relay [M]		Default 8192 points (M0 to 8191)			Number of use points is set with parameters.
	Latch relay [L]		Default 2048 points (L0 to 2047)			
	Link relay [B]		Default 2048 points (B0 to 7FF)			
	Timer [ T ]		Default 512 points (T0 to 511) (for low / high speed timer) Select between low / high speed timer by instructions. The measurement unit of the low / high speed timer is set with parameters. (Low speed timer : 1 to 1000ms, 1ms/unit , default 100ms) (High speed timer : 0.1 to 100ms, 0.1ms/unit , default 10ms)			
	Retentive timer [ ST ]		Default 0 point (ST0 to 511) (for low / high speed retentive timer) Switchover between the low / high speed retentive timer is set by instructions. The measurement unit of the low speed retentive timer and high speed retentive timer is set with parameters. (Low speed retentive timer : 1 to 1000ms, 1ms/unit , default 100ms) (High speed retentive timer : 0.1 to 100ms, 0.1ms/unit , default 10ms)			
	Counter [C]		• Normal counter default 512 points (C0 to 511) • Interrupt counter maximum 128 points (default 0 point, set with parameters)			
	Data register [D]		Default 11136 points (D0 to 11135)			
	Link register [W]		Default 2048 points (W0 to 7FF)			
	Annunciator [F]		Default 1024 points (F0 to 1023)			
	Edge relay [V]		Default 1024 points (V0 to 1023)			
	File Register	[R]	None	32768 points (R0 to 32767)/block		—
		[ZR]	None	65536points (ZR0 to 65535)		
	Special link relay [SB]		1024 points (SB0 to 3FF)			The number of device points is fixed.
	Special link register [SW]		1024 points (SW0 to 3FF)			
	Step relay [S] *6		2048 points (S0 to 127/block)			
	Index register [Z]		10 points (Z0 to 9)			
	Pointer [P]		300 points (P0 to 299)			
	Interrupt pointer [I]		128 points (I0 to 127) The specified intervals of the system interrupt pointers I28 to I31 can be set with parameters.(0.5 to 1000ms, 0.5 ms/unit) Default I28 : 100ms I29 : 40ms I30 : 20ms I31 : 10ms			
	Special relay [SM]		1024 points (SM0 to 1023)			
	Special register [SD]		1024 points (SD0 to 1023)			The number of device points is fixed.
	Function input [FX]		16 points (FX0 to F) *7			
	Function output [FY]		16 points (FY0 to F) *7			
	Function register[FD]		5 points (FD0 to 4)			

\*6: Step relay is a device for SFC function.

\*7: Only FX0 to FX4 and FY0 to FY4 can be used in a program.

## Performance Specifications (continued)

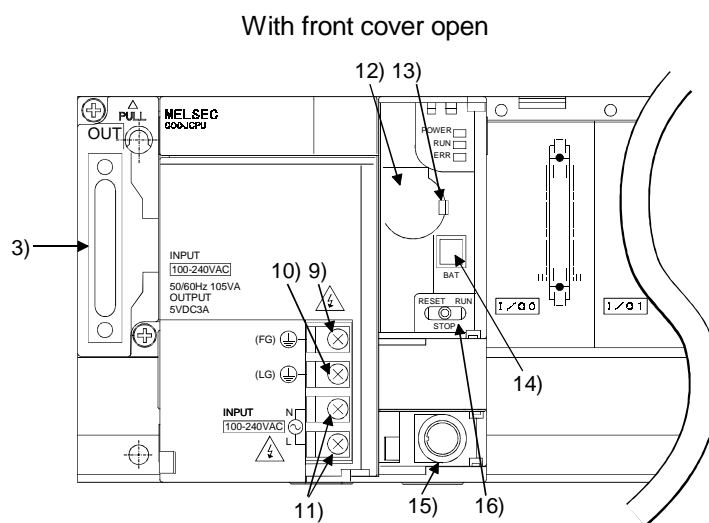
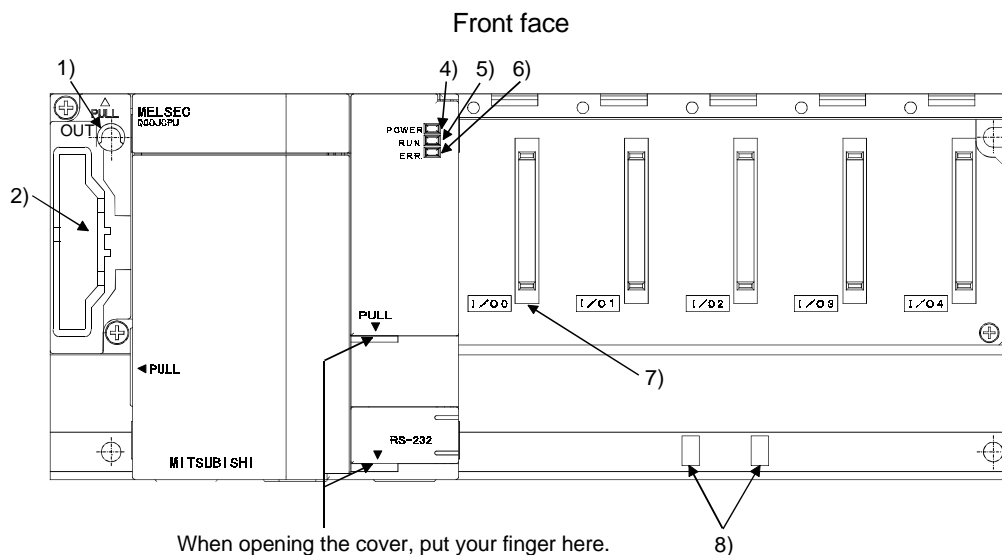
Item		Model			Remark
		Q00JCPU	Q00CPU	Q01CPU	
Link direct device		Device for direct access to link device. MELSECNET/H use only. Specified form at : J□□\X□□, J□□\Y□□, J□□\W□□, J□□\B□□, J□□\SW□□, J□□\SB□□			—
Intelligent function module device		Device for direct access to the buffer memory of the intelligent function module. Specified form at : U□□G□□			—
Latch (power failure compensation) range		L0 to 2047 (default) (Latch range can be set for B, F, V, T, ST, C, D, and W.)			Set parameter values to specify
Remote RUN/PAUSE contact		RUN and PAUSE contacts can be set from among X0 to 7FF, respectively.			
Clock function		Year, month, day, hour, minute, second, day of the week (leap year automatic distinction) Accuracy -3.2 to +5.27s (TYP. +1.98s) /d at 0°C Accuracy -2.57 to +5.27s(TYP. +2.22s)/d at 25°C Accuracy -11.68 to +3.65s(TYP. -2.64s)/d at 55°C			—
Allowable momentary stop time		Max. 20ms (Min. 100VAC)	Varies according to the type of power supply module.		—
5VDC internal current consumption		0.22A*8	0.25A	0.27A	—
External dimensions	H	98mm (3.86in.)	98mm (3.86in.)		—
	W	245mm (9.65in.)*9	27.4mm (1.08in.)		—
	D	97.5mm (3.82in.)	89.3mm (3.52in.)		—
Weight		0.66kg*9	0.13kg		—

\*8: This value includes the CPU module and base unit.

\*9: This value includes the CPU module, base unit, and power supply module.

## 4.2 Part Names

## 4.2.1 Q00JCPU

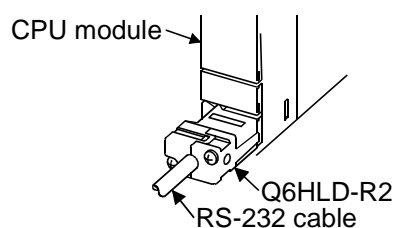


No.	Name	Application
1)	Base mounting hole	Pear-shaped hole for mounting the unit to a panel such as a control box. (For M4 screw)
2)	Cover	Protective cover for extension cable connector. Remove this cover when connecting an extension base unit.
3)	Extension cable connector	Connector for transfer of signals to/from the extension base unit. Connect an extension cable.
4)	POWER LED	LED for indicating 5VDC power. Lit when 5VDC is output normally.

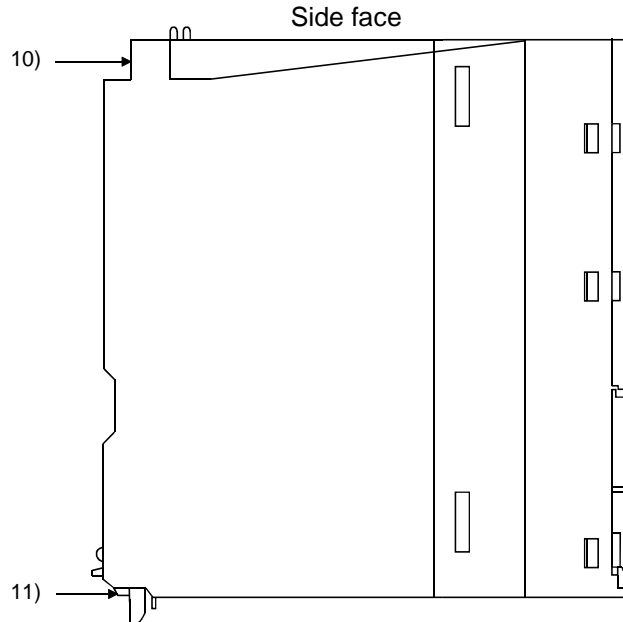
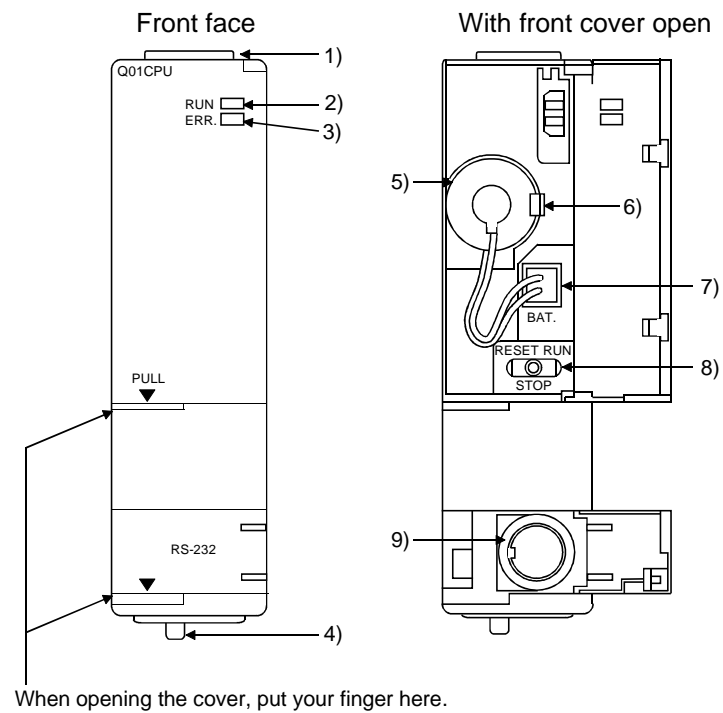
No.	Name	Application
5)	RUN LED	<p>Indicates the operating status of the CPU module.</p> <p>ON : During operation with the RUN/STOP/RESET switch set to "RUN".</p> <p>OFF : During stop with the RUN/STOP/RESET switch set to "STOP"</p> <p>Flicker :When parameters/program is written during STOP and the RUN/STOP/RESET switch is moved from "STOP" to "RUN".</p> <p>To turn ON the RUN LED after writing the program, carry out the following steps.</p> <ul style="list-style-type: none"> <li>• Move the RUN/STOP/RESET switch from "RUN" to "STOP" to "RUN".</li> <li>• Perform reset with the RUN/STOP/RESET switch.</li> <li>• Power ON the PLC again.</li> </ul> <p>To turn ON the RUN LED after writing the parameters, carry out the following steps.</p> <ul style="list-style-type: none"> <li>• Perform reset with the RUN/STOP/RESET switch.</li> <li>• Power ON the PLC again.</li> </ul> <p>(If the RUN/STOP/RESET switch is moved from "STOP" to "RUN" to "STOP" to "RUN" after changing the parameter values, the new values are not reflected on the parameters related to the intelligent function module, such as the network parameters.)</p>
6)	ERR. LED	<p>ON :When the self-diagnostic error that will not stop operation is detected.</p> <ul style="list-style-type: none"> <li>• When continuation of operation at error detection is set in the parameter.</li> <li>• When the annunciator (F) is turned ON by the SET/OUT instruction.</li> <li>• When battery low occurs.</li> </ul> <p>OFF :Normal</p> <p>Flicker :When the error whose occurrence stops operation is detected.</p> <p>When reset operation is performed with the RUN/STOP/RESET switch.</p>
7)	Module connector	<p>Connector used for loading an input/output or intelligent function module.</p> <p>To the connector of the spare space where no module is loaded, fit the accessory connector cover or the blank cover module (QG60) to prevent dust from entering.</p>
8)	DIN rail adaptor mounting holes	Holes for mounting a DIN rail adaptor.
9)	FG terminal	Ground terminal connected with the shield pattern of the printed circuit board.
10)	LG terminal	Power filter ground having a half potential of the input voltage.
11)	Power input terminals	Power input terminals for connection of a 100VAC to 200VAC power supply.
12)	Battery	Backup battery for use of the program memory, standard RAM and power failure compensation function.
13)	Battery fixing hook	Hook for holding the battery.
14)	Battery connector pin	<p>For connection of the battery lead wires.</p> <p>(When shipped from the factory, the lead wires are disconnected from the connector to prevent the battery from consuming.)</p>
15)	RS-232 connector *1	<p>Connector for RS-232 connection</p> <p>Can be connected by the RS-232 connection cable (QC30R2).</p>
16)	RUN/STOP/RESET switch	<p>RUN :Executes sequence program operation.</p> <p>STOP :Stops sequence program operation.</p> <p>RESET :Performs hardware reset, operation error reset, operation initialization or like.</p> <p>(Refer to Section 4.4 for details of reset operation.)</p>

\*1 : When a cable is to be connected to the RS-232 connector at all times, clamp the cable to prevent a loose connection, moving, or disconnection by pulling due to carelessness.

Q6HLD-R2 type RS-232 Connector Disconnection Prevention Holder is available as a clamp for RS-232 connector.



## 4.2.2 Q00CPU, Q01CPU

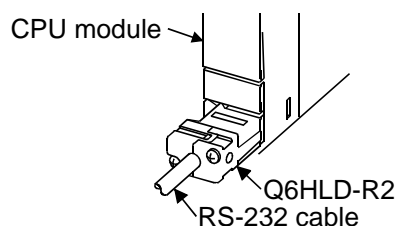




No.	Name	Application
1)	Module fixing hook	Hook used to fix the module to the base unit. (Single-motion installation)
2)	RUN LED	Indicates the operating status of the CPU module. ON : During operation with the RUN/STOP/RESET switch set to "RUN". OFF : During stop with the RUN/STOP/RESET switch set to "STOP". Flicker : When parameters/program is written during STOP and the RUN/STOP/RESET switch is moved from "STOP" to "RUN". To turn ON the RUN LED after writing the program, carry out the following steps. • Move the RUN/STOP/RESET switch from "RUN" to "STOP" to "RUN". • Perform reset with the RUN/STOP/RESET switch. • Power ON the PLC again. To turn ON the RUN LED after writing the parameters, carry out the following steps. • Perform reset with the RUN/STOP/RESET switch. • Power ON the PLC again. (If the RUN/STOP/RESET switch is moved from "STOP" to "RUN" to "STOP" to "RUN" after changing the parameter values, the new values are not reflected on the parameters related to the intelligent function module, such as the network parameters.)
3)	ERR. LED	ON : When the self-diagnostic error that will not stop operation is detected. • When continuation of operation at error detection is set in the parameter. • When the annunciator (F) is turned ON by the SET/OUT instruction. • When battery low occurs. OFF : Normal Flicker : When the error whose occurrence stops operation is detected. When reset operation is performed with the RUN/STOP/RESET switch.
4)	Module loading lever	Used to load the module to the base unit.
5)	Battery	Backup battery for use of the program memory, standard RAM and power failure compensation function.
6)	Battery fixing hook	Hook for holding the battery.
7)	Battery connector pin	For connection of the battery lead wires. (When shipped from the factory, the lead wires are disconnected from the connector to prevent the battery from consuming.)
8)	RUN/STOP/RESET switch	RUN : Executes sequence program operation. STOP : Stops sequence program operation. RESET : Performs hardware reset, operation error reset, operation initialization or like. (Refer to Section 4.4 for details of reset operation.)
9)	RS-232 connector *1	Connector for RS-232 connection Can be connected by the RS-232 connection cable (QC30R2).
10)	Module fixing screw hole	Hole for the screw used to fix to the base unit. (M3×12 screw)
11)	Module fixing hook	Hook used to fix to the base unit.

\*1 : When a cable is to be connected to the RS-232 connector at all times, clamp the cable to prevent a loose connection, moving, or disconnection by pulling due to carelessness.

Q6HLD-R2 type RS-232 Connector Disconnection Prevention Holder is available as a clamp for RS-232 connector.



### 4.3 Switch Operation After Program Write

Programs can be written to the Basic model QCPU in either the STOP or RUN status.

(1) When writing program with RUN/STOP/RESET switch set to "STOP"

When writing a program with the Basic model QCPU placed in the STOP status using the RUN/STOP/RESET switch, operate the switch in the following procedure.

1) RUN/STOP/RESET switch: STOP

RUN LED: OFF CPU module STOP status to Program write

2) RUN/STOP/RESET switch: Perform reset. (Refer to Section 4.5.3)

3) RUN/STOP/RESET switch: STOP to RUN

RUN LED: ON CPU module RUN status

(2) When it is desired to place the Basic model QCPU in a RUN status without resetting it after program write

Operate the RUN/STOP/RESET switch from STOP to RUN, STOP and then RUN.

After the second STOP to RUN operation, the CPU module is put in the RUN status.

At this time, the device memory data are the same as before program write.

(3) When writing program after remote STOP using GX Developer

When writing a program with the Basic model QCPU placed in the STOP status by remote STOP using GX Developer, the operation of the RUN/STOP/RESET switch is not necessary.

When remote RUN is performed using GX Developer, the Basic model QCPU is placed in the RUN status.

(4) When performing online change of program

When the online change of a program is performed, the RUN/STOP/RESET switch need not be operated.

POINT
The program written by online program correction during boot operation is written to the program memory After making online program correction, also write the program to the standard ROM of the boot source memory. If the program is not written in the standard ROM, the old program will be executed at the next boot operation. For details of boot operation, refer to the Basic Model QCPU (Q Mode) User's Manual (Function Explanation, Program Fundamentals).

## 4.4 Reset Operation

For the Basic model QCPU, the RUN/STOP/RESET switch of the CPU module is used to switch between the "RUN status" and "STOP status" and to perform "RESET operation".

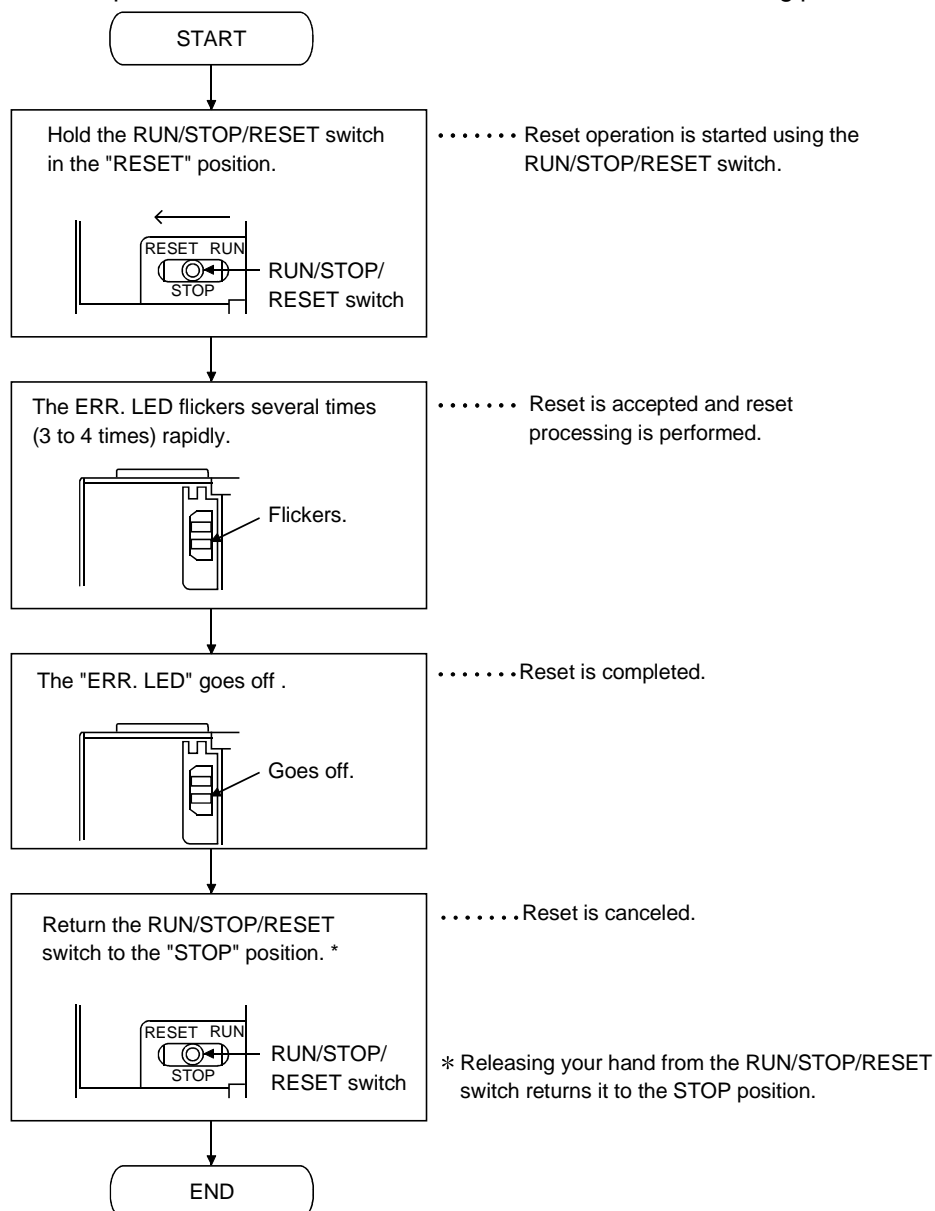
When using the RUN/STOP/RESET switch to reset the CPU module, moving the RUN/STOP/RESET switch to the reset position will not reset it immediately.

**POINT**

Hold the RUN/STOP/RESET switch in the RESET position until reset processing is complete (the flickering ERR. LED goes off).

If you release your hand from the RUN/STOP/RESET switch during reset processing (during rapid flickering of ERR. LED), the switch will return to the STOP position and reset processing cannot be completed.

Perform reset operation with the RUN/STOP/RESET switch in the following procedure.



#### 4.5 Latch Clear Operation

To execute latch clear, perform remote latch clear operation using GX Developer.  
Latch clear cannot be executed by operating the switches of the CPU module.

POINT
(1) The invalid range of latch clear can be set device-by-device by making device setting in the parameter mode. (2) For remote latch clear operation using GX Developer, refer to the operating manual of GX Developer used.

## 5 POWER SUPPLY MODULE

## 5.1 Specification

## 5.1.1 Power supply module specifications

This section gives the specifications of the power supply modules.

Item		Performance Specifications			
		Q61P-A1	Q61P-A2	Q62P	Q63P
Base loading position		Power supply module loading slot			
Applicable base unit		Q3□B, Q6□B			
Input power supply		100 to 120VAC +10% -15% (85V to 132VAC)	200 to 240VAC +10% -15% (170 to 264VAC)	100 to 240VAC +10% -15% (85V to 264VAC)	24VDC +30% -35% (15.6 to 31.2VDC)
Input frequency		50/60Hz ±5%			—
Input voltage distortion factor		Within 5% (Refer to Section 5.1.3)			—
Max. input apparent power		105VA			45W
Inrush current		20A within 8ms			100A within 1ms
Rated output current	5VDC	6A		3A	6A
	24VDC	—		0.6A	—
External output voltage		—		24VDC ±10%	—
Overcurrent protection * 1	5VDC	6.6A or more		3.3A or more	6.6A or more
	24VDC	—		0.66A or more	—
Overvoltage protection * 2	5VDC	5.5 to 6.5V			—
	24VDC	—			—
Efficiency		70% or more		65% or more	70% or more
Permissible instantaneous power failure time * 3		Within 20ms			Within 10ms (at 24VDC input)
Dielectric withstand voltage		Across inputs/LG and outputs/FG 2830VAC rms/3 cycles (2000 m (6562 ft.))			500VAC across primary and 5VDC
Insulation resistance		Across inputs and outputs (LG and FG separated), across inputs and LG/FG, across outputs and FG/LG 10M $\Omega$ or more by insulation resistance tester			10M $\Omega$ or more by insulation resistance tester
Noise immunity		<ul style="list-style-type: none"> <li>By noise simulator of 1500Vp-p noise voltage, 1<math>\mu</math>s noise width and 25 to 60Hz noise frequency</li> <li>Noise voltage IEC61000-4-4, 2kV</li> </ul>			By noise simulator of 500Vp-p noise voltage, 1 $\mu$ s noise width and 25 to 60Hz noise frequency
Operation indication		LED indication (lit at 5VDC output)			
Fuse		Built-in (Unchangeable by user)			
Contact output section	Application	ERR contact (contact switched off (opened: normally closed contact) at an error stop of CPU module), for CPU module operating status output			
	Rated switching voltage/current	24VDC, 0.5A			
	Minimum switching load	5VDC, 1mA			
	Response time	OFF to ON: 10ms max. ON to OFF: 12ms max.			
	Life	Mechanical : More than 2 million times Electrical : More than 100 thousand times at rated switching voltage/current			
	Surge suppressor	No			
	Fuse	No			
Terminal screw size		M3.5 × 7			
Applicable wire size		0.75 to 2mm <sup>2</sup>			
Applicable crimping terminal		RAV1.25 to 3.5, RAV2 to 3.5			
Applicable tightening torque		66 to 89N•cm			
External dimensions	H	98mm (3.86in.)			
	W	55.2mm (2.17in.)			
	D	90mm (3.55in.)			
Weight		0.31kg		0.39kg	0.33kg

Item		Performance Specifications
		Q64P
Base loading position		Power supply module loading slot
Applicable base unit		Q3□B, Q6□B
Input power supply		100 to 120VAC/200 to 240VAC $\begin{matrix} +10\% \\ -15\% \end{matrix}$ (85V to 132VAC/170 to 264VAC)
Input frequency		50/60Hz $\pm 5\%$
Input voltage distortion factor		Within 5% (See. section 5.1.3)
Max. input apparent power		160VA
Inrush current		20A within 8ms
Rated output current	5VDC	8.5A
	24VDC	—
Overcurrent protection*1	5VDC	9.9A to 14.4A
	24VDC	—
Overvoltage protection*2	5VDC	5.5 to 6.5V
	24VDC	—
Efficiency		70% or more
Permissible instantaneous power failure time*3		Within 20ms
Dielectric withstand voltage		Across inputs/LG and outputs/FG 2830VAC rms/3 cycles (2000 m (6562 ft.))
Insulation resistance		Across inputs and outputs (LG and FG separated), across inputs and LG/FG, across outputs and FG/LG 10M $\Omega$ or more by insulation resistance tester
Noise immunity		<ul style="list-style-type: none"> <li>By noise simulator of 1500Vp-p noise voltage, 1<math>\mu</math>s noise width and 25 to 60Hz noise frequency</li> <li>Noise voltage IEC61000-4-4, 2kV</li> </ul>
Operation indication		LED indication (lit at 5VDC output)
Fuse		Built-in (Unchangeable by user)
Contact output section	Application	ERR contact (contact switched off (opened: normally closed contact) at an error stop of CPU module), for CPU module operating status output
	Rated switching voltage/current	24VDC, 0.5A
	Minimum switching load	5VDC, 1mA
	Response time	OFF to ON: 10ms max. ON to OFF: 12ms max.
	Life	Mechanical : More than 2 million times Electrical : More than 100 thousand times at rated switching voltage/current
	Surge suppressor	No
	Fuse	No
Terminal screw size		M3.5 $\times$ 7
Applicable wire size		0.75 to 2mm <sup>2</sup>
Applicable crimping terminal		RAV1.25 to 3.5, RAV2 to 3.5
Applicable tightening torque		66 to 89N $\cdot$ cm
External dimensions	H	98mm (3.86in.)
	W	55.2mm (2.17in.)
	D	115mm (4.35in.)
Weight		0.40kg

Item		Performance Specifications
		Q61SP
Base loading position		Slim type power supply module installation slot
Applicable base unit		Q3□SB
Input power supply		100 to 240VAC $\begin{matrix} +10\% \\ -15\% \end{matrix}$ (AC85V to 264V)
Input frequency		50/60Hz $\pm 5\%$
Input voltage distortion factor		Within 5% (See. section 4.3.1)
Max. input apparent power		40VA
Inrush current		20A within 8ms
Rated output current	5VDC	0.05 to 2.0A
	24VDC	—
Overcurrent protection*1	5VDC	2.2A to 5.3A
	24VDC	—
Overvoltage protection*2	5VDC	5.5 to 6.5V
	24VDC	—
Efficiency		70% or more
Permissible instantaneous power failure time*3		Within 20ms
Dielectric withstand voltage		Across inputs/LG and outputs/FG 2830VAC rms/3 cycles (2000 m (6562 ft.))
Insulation resistance		Across inputs and outputs (LG and FG separated), across inputs and LG/FG, across outputs and FG/LG 10M $\Omega$ or more by insulation resistance tester
Noise immunity		<ul style="list-style-type: none"> <li>By noise simulator of 1500Vp-p noise voltage, 1<math>\mu</math>s noise width and 25 to 60Hz noise frequency</li> <li>Noise voltage IEC61000-4-4, 2kV</li> </ul>
Operation indication		LED indication (lit at 5VDC output)
Fuse		Built-in (Unchangeable by user)
Contact output section	Application	ERR contact (contact switched off (opened: normally closed contact) at an error stop of CPU module), for CPU module operating status output
	Rated switching voltage/current	24VDC, 0.5A
	Minimum switching load	5VDC, 1mA
	Response time	OFF to ON: 10ms max. ON to OFF: 12ms max.
	Life	Mechanical : More than 2 million times Electrical : More than 100 thousand times at rated switching voltage/current
	Surge suppressor	No
	Fuse	No
Terminal screw size		M3.5 $\times$ 7
Applicable wire size		0.75 to 2mm <sup>2</sup>
Applicable crimping terminal		RAV1.25 to 3.5, RAV2 to 3.5
Applicable tightening torque		66 to 89N $\cdot$ cm
External dimensions	H	98mm (3.86in.)
	W	27.4mm (1.08in.)
	D	104mm (4.10in.)
Weight		0.18kg

Q00JCPU (Power Supply Section) Performance Specification List

Item		Performance Specifications
		Q00JCPU (power supply section)
Input power supply		100 to 240 VAC +10% -15% (AC85V to 264V)
Input frequency		50/60Hz ±5%
Input voltage distortion factor		Within 5% (Refer to Section 5.1.3)
Max. input apparent power		105VA
Inrush current		40A within 8ms
Rated output current	DC5V	3A
Overcurrent protection*1	DC5V	3.3A or more
Overvoltage protection*2	DC5V	5.5 to 6.5V
Efficiency		65% or more
Permissible instantaneous power failure time*3		Within 20ms (100VAC or more)
Dielectric withstand voltage		Across inputs/LG and outputs/FG 2830VAC rms/3 cycles (altitude 2,000 m (6,562 ft.))
Insulation resistance		Across inputs and outputs (LG and FG separated), across inputs and LG/FG, across outputs and FG/LG 10MΩ or more by 500VDC insulation resistance tester
Noise immunity		• By noise simulator of 1500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency • Noise voltage IEC61000-4-4, 2kV
Operation indication		LED indication (lit at 5VDC output, POWER LED on the CPU module)
Fuse		Built-in (Unchangeable by user)
Contact output section		None
Terminal screw size		M3.5×7
Applicable wire size		0.75 to 2mm <sup>2</sup>
Applicable crimping terminal		RAV1.25 to 3.5, RAV2 to 3.5
Applicable tightening torque		66 to 89N•cm
External dimensions		Refer to Section 4.1
Weight		



## POINTS

## \*1 : Overcurrent protection

The overcurrent protection device shuts off the 5 V, 24 VDC circuit and stops the system if the current flowing in the circuit exceeds the specified value. The LED of the power supply module is off or on (lit dimly) upon a voltage drop.

If this device is activated, switch the input power supply off and eliminate the cause such as insufficient current capacity or short. Then, a few minutes later, switch it on to restart the system.

The initial start for the system takes place when the current value becomes normal.

## \*2 : Overvoltage protection

The overvoltage protection device shuts off the 5 VDC circuit and stops the system if a voltage of 5.5 to 6.5 VDC is applied to the circuit. When this device is activated, the power supply module LED is switched OFF. If this happens, switch the input power OFF, then a few minutes later ON. This causes the initial start for the system to take place. The power supply module must be changed if the system is not booted and the LED remains OFF.

## \*3 : Permissible instantaneous power failure time

## (1) For AC input power supply

- An instantaneous power failure for 20ms or less will cause AC power failure to be detected, but operation will continue.
- When an instantaneous power failure exceeding 20ms occurs, the system may either continue operation or make an initial start depending on the load of the power supply.

Further, when the AC supply of the AC input module (e.g. QX10) is the same as that of the power supply module, the system is prevented from being powered off due to power-off if the sensor connected to the AC input module (e.g. QX10) is ON at power-off.

However, when only the AC input module (e.g. QX10) is connected to the AC line connected to the power supply, a delay may be caused in AC down detection of the power supply module by the capacitor in the AC input module (e.g. QX10). Therefore, connect an about 30mA load to the AC line for each one AC input module (QX10).

## (2) For DC input power supply

- An instantaneous power failure for 10ms or less (\*4) will cause 24VDC down to be detected, but operation will continue.
- When an instantaneous power failure exceeding 10ms(\*4) occurs, the system may either continue operation or make an initial start depending on the load of the power supply.

(\*4: This is for a 24VDC input. This is 10ms or less for 24VDC or less.)

## 5.1.2 Selecting the power supply module

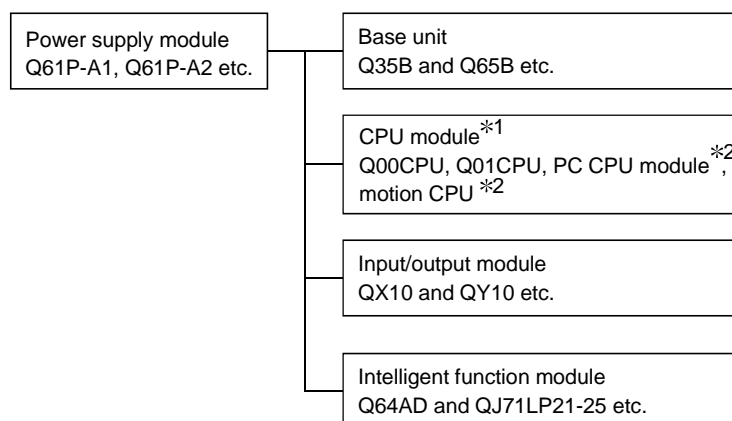
Select the power supply module according to the sum of currents consumed by the base unit, CPU modules, I/O modules and intelligent function modules supplied by that power supply module.

For the internal current consumption of 5 VDC of the base unit, see Chapter 6.

For the internal current consumption of 5 VDC of the input/output modules, and intelligent function module, see the User's Manuals of their respective modules.

For the devices prepared by a user, see the manual for the respective device.

## (1) When Q3□B or Q6□B base unit is used



\*1: In the case of the Q3□B main base unit.

\*2: In a Multiple CPU System.

## (a) Selection of power supply module for use of extension base unit Q52B, Q55B

When the Q52B or Q55B is used, 5VDC power is supplied from the power supply module on the main base unit through the extension cable.

Therefore, note the following when using the Q52B or Q55B.

- 1) The power supply module to be loaded on the main base unit should be selected to cover also the 5VDC used on the Q52B or Q55B.

For example, either of the following power supply modules must be mounted on the main base unit, when the current consumption on the main base unit is 3A and that on the Q52B or Q55B is 1A.

5VDC Rated output current	Type
6A	Q61P-A1, Q61P-A2, Q63P
8.5A	Q64P

- 2) Since 5VDC is supplied to the Q52B or Q55B through the extension cable, a voltage drop occurs at the extension cable.

You must select the power supply module and extension cable length to ensure that the "IN" connector voltage of the Q52B or Q55B is 4.75V or more.

For details of a voltage drop, refer to Section 6.6.

## (b) Ideas for reducing voltage drops

The following methods are effective to reduce voltage drops at the extension cables.

## 1) Changing the module loading positions

Load large current consumption modules on the main base unit.

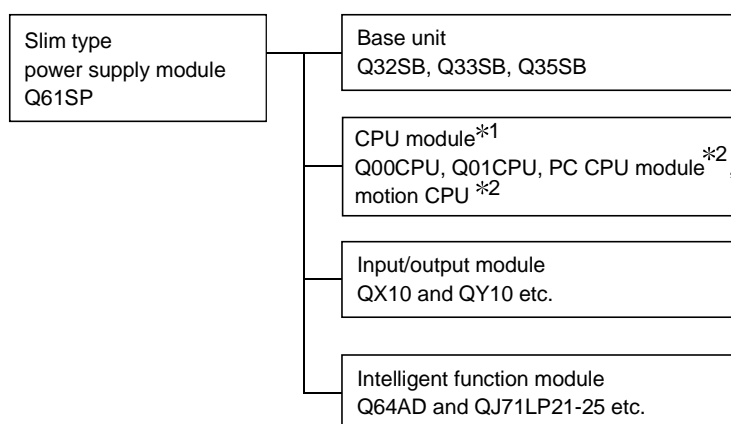
Load small current consumption modules on the extension base unit.

## 2) Using short extension cables

The shorter the extension cable is, the smaller the resistance and voltage drops are.

Use the shortest possible extension cables.

## (2) When Q3□SB base unit is used



\*1: In the case of the Q3□SB main base unit.

\*2: In a Multiple CPU System.

\*3: Since there is a strong possibility that the power supply capacity may be insufficient in a Multiple CPU System, it is recommended to use the Q3□B main base unit and Q61P power supply module.

To use the slim type main base unit and slim type power supply module, take care of the capacity of the 5 VDC power supply.

5VDC Rated output current	Type
2.0A	Q61SP

## 5.1.3 Precaution when connecting the uninterruptive power supply

Be sure of the following terms when connecting the Basic model QCPU system to the uninterruptive power supply (abbreviated as UPS hereafter):

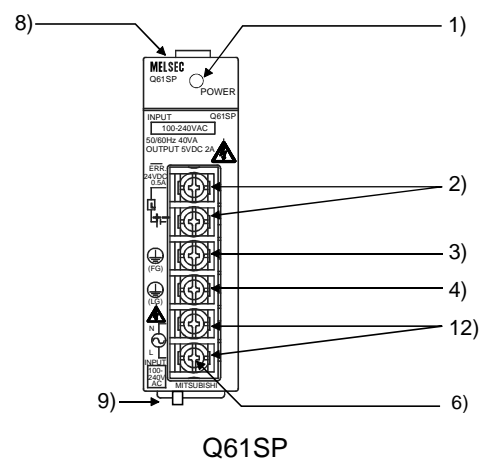
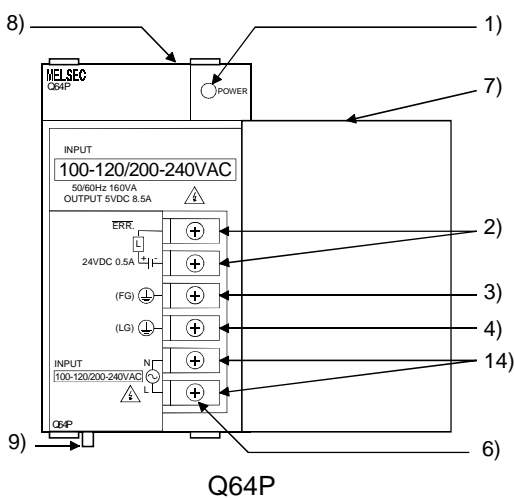
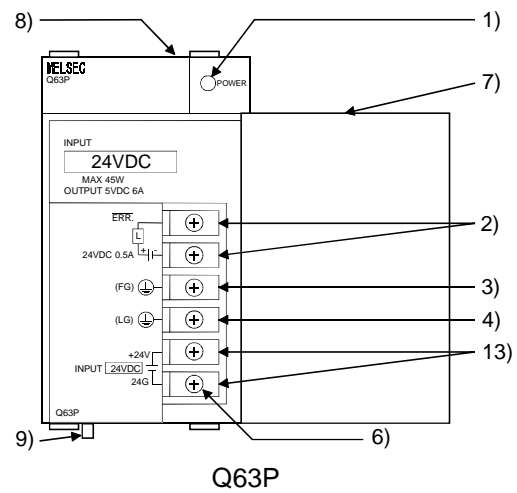
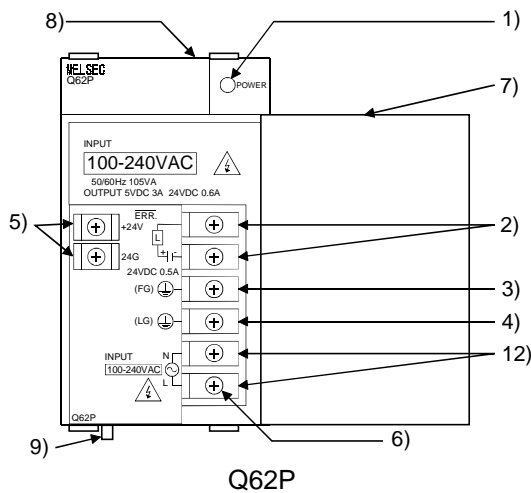
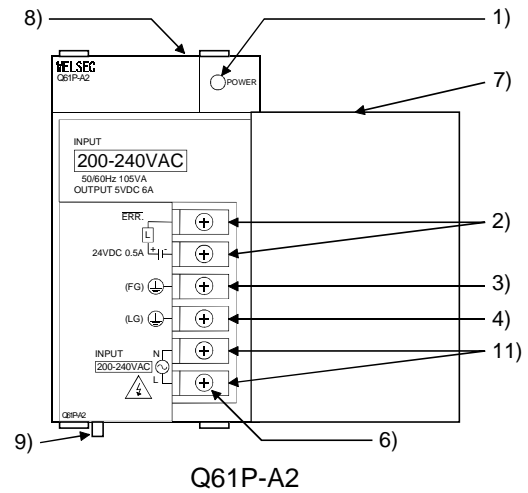
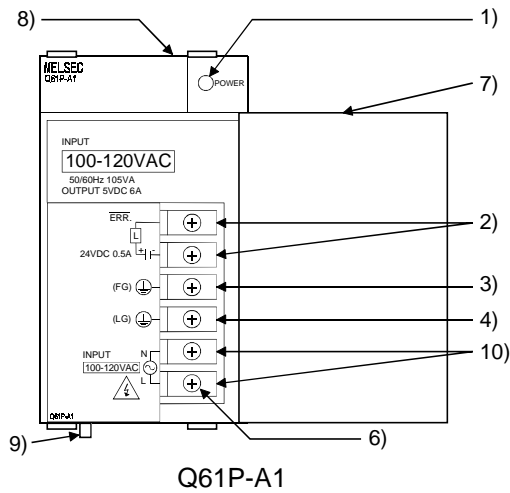
Use a UPS which employs the constant inverter power supply method with 5 % or less voltage fluctuation.

Do not use a UPS with the constant commercial power supply method.

## 5.2 Part Names and Settings

The part names of each power module are described below.

## (1) Q61P-A1, Q61P-A2, Q62P, Q63P, Q64P, Q61SP



No.	Name	Application
1)	POWER LED	5VDC power indicator LED
2)	ERR terminals	Turned OFF (opened) when a stop error occurs in the CPU module. Normally off when loaded in an extension base unit.
3)	FG terminal	Ground terminal connected to the shield pattern of the printed circuit board.
4)	LG terminal	Grounding for the power supply filter. In case of AC input (Q61P-A1, Q61P-A2, Q62P, Q64P, and Q61SP), it has a half potential of the input voltage.
5)	+24V, 24G terminal	Used to supply 24VDC power to inside the output module (using external wiring).
6)	Terminal screw	M3.5 × 7
7)	Terminal cover	Protective cover of the terminal block
8)	Module fixing screw	Used to fix the module to the base unit. M3 × 12 screw (user-prepared) (Tightening torque : 36 to 48N•cm)
9)	Module loading lever	Used to load the module into the base unit.
10)	Power input terminals	Used to connect a 100VAC power supply.
11)	Power input terminals	Used to connect a 200VAC power supply.
12)	Power input terminals	Used to connect a 100VAC to 200VAC power supply.
13)	Power input terminals	Used to connect a 24VDC power supply.
14)	Power input terminals	Used to connect a 100VAC/200VAC power supply.

## POINTS

- (1) The Q61P-A1 is dedicated for inputting a voltage of 100 VAC. Do not input a voltage of 200 VAC into it or trouble may occur on the Q61P-A1.

Power module type	Supply power voltage	
	100VAC	200VAC
Q61P-A1	Operates normally.	Power module causes trouble.
Q61P-A2	Power module does not cause trouble. CPU module cannot be operated.	Operates normally.

- (2) Q64P automatically switches the input range 100VAC/200VAC. Therefore, it is not compatible with the intermediate voltage (133VAC to 169VAC). The CPU module may not work normally if the above intermediate voltage is applied.
- (3) Ensure that the earth terminals LG and FG are grounded.

## 6 BASE UNIT AND EXTENSION CABLE

This section describes the specifications of the extension cables for the base units (main, slim type and extension base unit) used in the PLC system and the specification standards of the extension base unit.

## 6.1 Base Unit Specification Table

## (1) Main base unit specifications

Type	Q33B	Q35B	Q38B	Q312B
Item				
Number of I/O modules installed	3	5	8	12
Extension possibilities	Extendable			
Applicable module	Q series modules			
5 VDC internal current consumption	0.105A	0.110A	0.114A	0.121A
Mounting hole size	M4 screw hole or $\phi 4.5$ hole (for M4 screw)			
External dimensions	H	98mm (3.86in.)		
	W	189mm (7.43in.)	245mm (9.65in.)	439mm (17.30in.)
	D	44.1mm (1.74in.)		
Weight	0.21kg	0.25kg	0.35kg	0.45kg
Attachment	Mounting screw M4 $\times$ 14 4 pieces (DIN rail mounting adapter to be sold separately)			
DIN rail mounting Adapter type	Q6DIN3	Q6DIN2	Q6DIN1	

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## (2) Slim type main base unit specification

Type	Q32SB	Q33SB	Q35SB
Item			
Number of I/O modules installed	2	3	5
Extension possibilities	Not extendable		
Applicable module	Q series modules		
5 VDC internal current consumption	0.086A	0.086A	0.091A
Mounting hole size	M4 screw hole or $\phi 4.5$ hole (for M4 screw)		
External dimensions	H	98mm (3.86in.)	
	W	114mm (4.49in.)	197.5mm (7.78in.)
	D	18.5mm (1.74in.)	
Weight	0.12kg	0.15kg	0.21kg
Attachment	Mounting screw M4 $\times$ 12 4 pieces (DIN rail mounting adapter to be sold separately)		
DIN rail mounting Adapter type	Q6DIN3		

## (3) Extension base unit specification (Type not requiring power supply module)

Type Item		Q52B	Q55B
Number of I/O modules installed		2	5
Extension possibilities		Extendable	
Applicable module		Q series modules	
5 VDC internal current consumption		0.080A	0.100A
Mounting hole size		M4 screw hole or $\phi$ 4.5 hole (for M4 screw)	
External dimensions	H	98mm (3.86in.)	
	W	106mm (4.17in.)	189mm (7.43in.)
	D	44.1mm (1.74in.)	
Weight		0.14kg	0.23kg
Attachment		Mounting screw M4×12 4 pieces (DIN rail mounting adapter to be sold separately)	
DIN rail mounting Adapter type		Q6DIN3	

## (4) Extension base unit specifications (Power supply loaded type)

Type Item		Q63B	Q65B	Q68B	Q612B
Number of I/O modules installed		3	5	8	12
Extension possibilities		Extendable			
Applicable module		Q series modules			
5 VDC internal current consumption		0.105A	0.110A	0.114A	0.121A
Mounting hole size		M4 screw hole or $\phi$ 4.5 hole (for M4 screw)			
External dimensions	H	189mm (7.43in.)	245mm (9.65in.)	328mm (12.92in.)	439mm (17.30in.)
	W	98mm (3.86in.)			
	D	44.1mm (1.74in.)			
Weight		0.23kg	0.25kg	0.35kg	0.45kg
Attachment		Mounting screw M4×14 4 pieces (DIN rail mounting adapter sold separately)			
DIN rail mounting Adapter type		Q6DIN3	Q6DIN2	Q6DIN1	

## 6.2 Extension Cable Specification Table

The list below shows the specifications of the extension cables which can be used for the Basic model QCPU system.

Item \ Type	QC05B	QC06B	QC12B	QC30B	QC50B	QC100B
Cable length	0.45m (1.48ft.)	0.6m (1.97ft.)	1.2m (3.94ft.)	3.0m (9.84ft.)	5.0m (16.40ft.)	10.0m (32.81ft.)
Application	Connection across the main base unit and extension base unit or across the extension base units.					
Weight	0.15kg	0.16kg	0.22kg	0.40kg	0.60kg	1.11kg

**POINT**

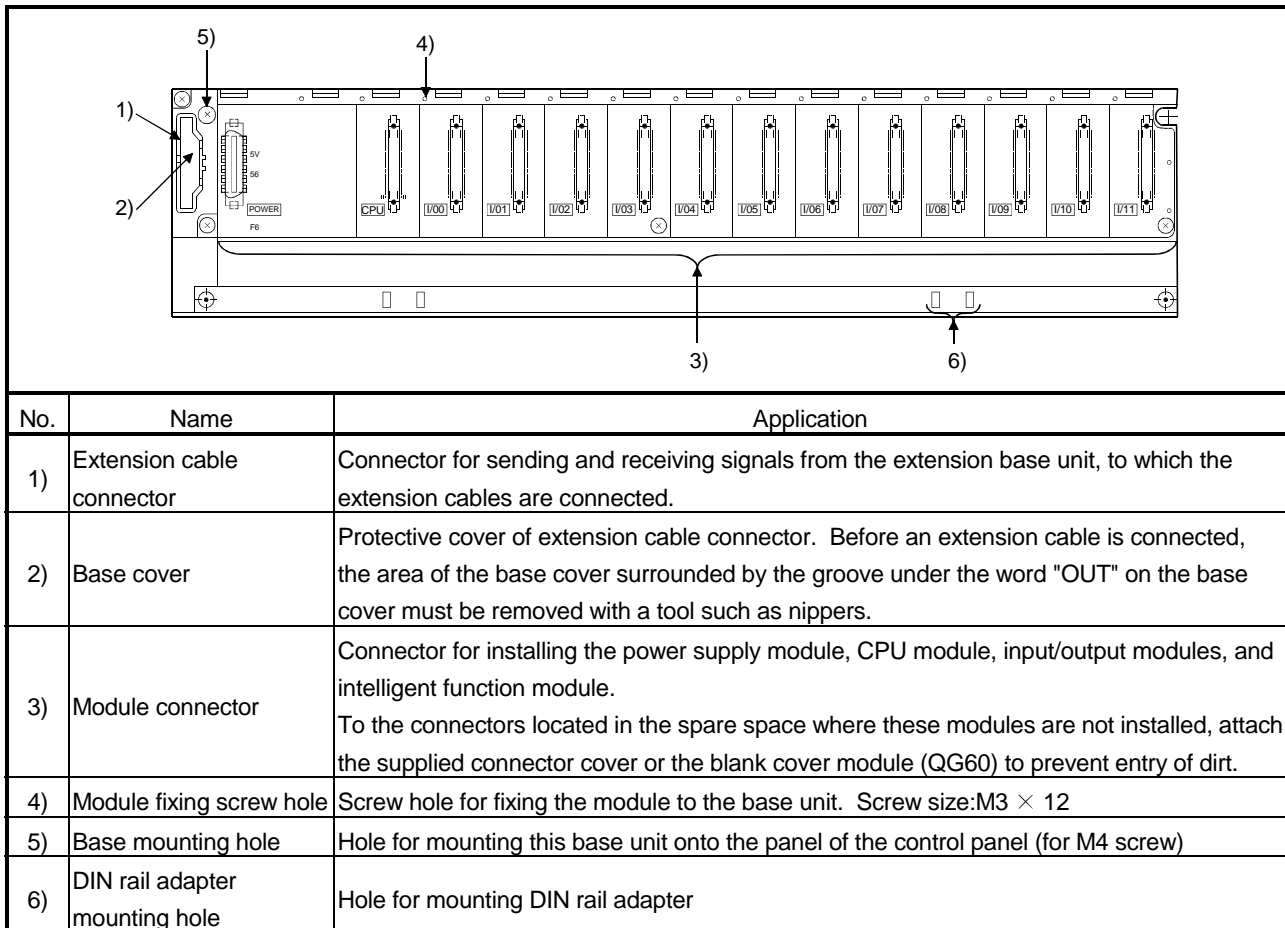
When the extension cables are used in combination, limit the overall length of the combined cable to 13.2 m(43.31 ft.).



## 6.3 Parts Names of Base Unit

The parts names of the base unit are described below.

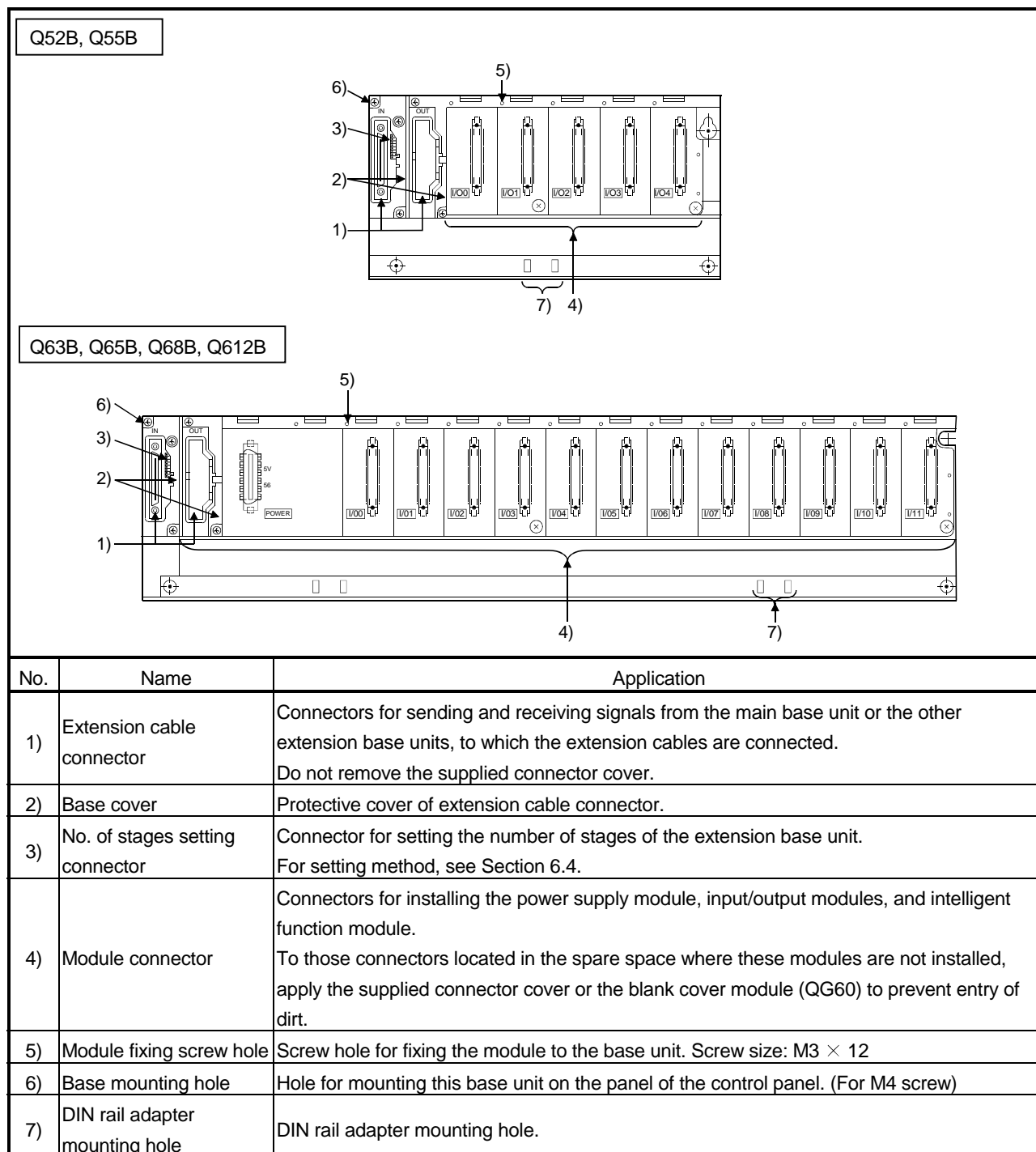
## (1) Main base unit(Q33B, Q35B, Q38B, Q312B)



## (2) Slim type main base unit(Q32SB, Q33SB, Q35SB)

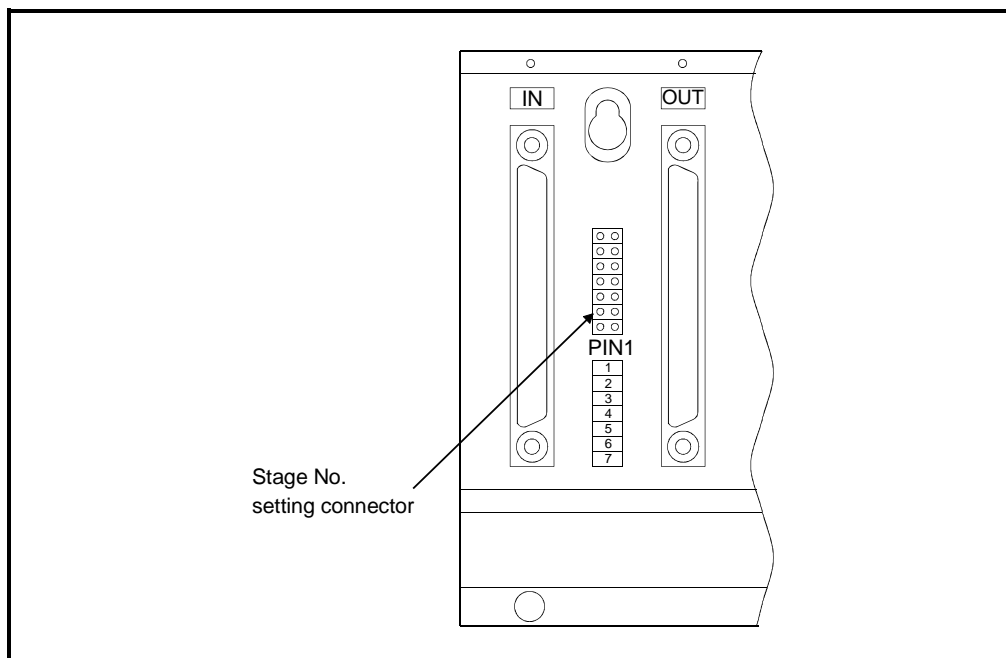
No.	Name	Application
1)	Module connector	Connector for installing the power supply module, CPU module, input/output modules, and intelligent function module. To the connectors located in the spare space where these modules are not installed, attach the supplied connector cover or the blank cover module (QG60) to prevent entry of dirt.
2)	Module fixing screw hole	Screw hole for fixing the module to the base unit. Screw size:M3 × 12
3)	Base mounting hole	Hole for mounting this base unit onto the panel of the control panel (for M4 screw)
4)	DIN rail adapter mounting hole	Hole for mounting DIN rail adapter

## (3) Extension base unit(Q52B, Q55B, Q65B, Q68B, Q612B)



## 6.4 Setting the Extension Base Unit

The number of stages setting method of each extension base unit to be used when extension base units are installed is described below.



Setting of Stage Number for Extension Base Units

	Setting of Number of Extension Stages						
	1st stage	2nd stage	3rd stage	4th stage	5th stage	6th stage	7th stage
Setting of stages No. setting connector							
Q00JCPU	Setting enabled		Setting disabled *		Setting disabled *		
Q00CPU Q01CPU	Setting enabled				Setting disabled *		

※: If setting is made, BASE LAY ERROR (2010) occurs.

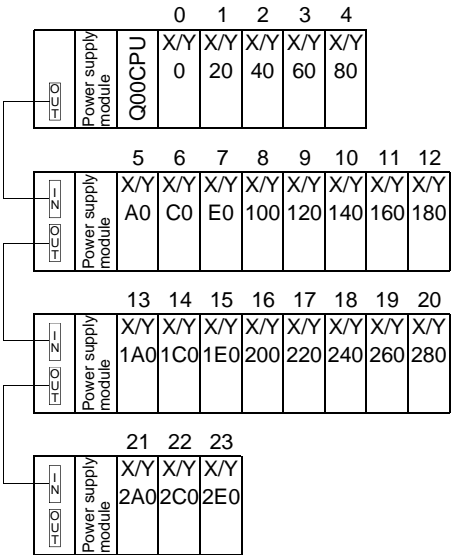
**POINT**

To set the No. of stages setting connector, set a number from 1 to 2/4 according to the number of extension stages.

Do not set the same stage number at two or more positions or do not fail to set a number. A miss-input or miss-output may occur.

REMARK

Input/output numbers are assigned automatically from the system loading status.  
Though a five-slot base in the AnS series occupies eight slots, a five-slot base designed for the Basic model QCPU occupies only five slots.



\* In this system, 32-point modules are loaded on slots 0 to 23.

For the input/output assignment setting method, refer to the GX Developer Operating Manual.

Refer to the following manual for details of input/output number assignment.

- Basic Model QCPU (Q Mode) User's Manual (Function Explanation, Program Fundamentals)

## 6.5 Guideline for Use of Extension Base Units (Q5□B)

Since the Q5□B is supplied with 5VDC from the power supply module on the main base unit, a voltage drop occurs at extension cables.

Improper input/output may be provided if the specified voltage (4.75VDC or higher) is not supplied to the "IN" connector of the Q5□B.

When using the Q5□B, make sure that the "IN" connector of the Q5□B is supplied with 4.75VDC or higher.

And it is recommend to connect it with the shortest possible extension cable right after connecting the main base unit, so as to minimize the effects of voltage drop.

## (1) When only the Q5□B is connected to the extension base unit

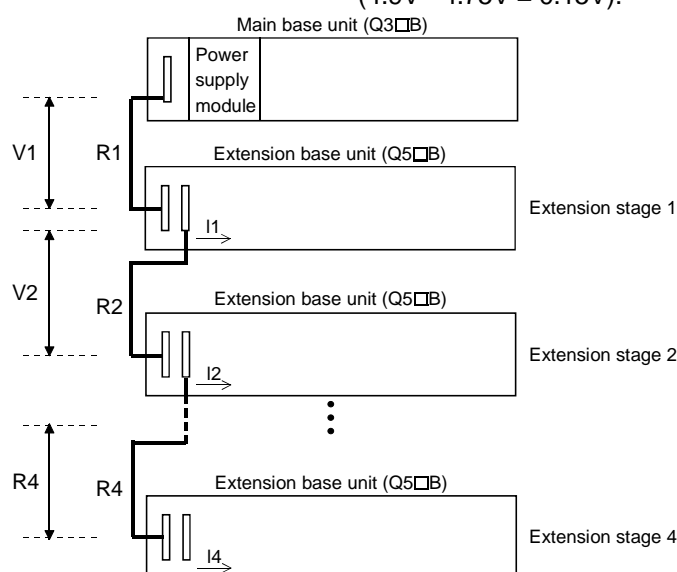
## (a) Selection condition

4.75VDC or higher should be supplied to the "IN" connector of the Q5□B in the final extension stage.

## (b) How to calculate voltage to "IN" connector

The 5VDC output voltage of the power supply module on the main base unit is set to at least 4.90VDC.

Therefore, the Q5□B can be used if the voltage drop is 0.15V or lower ( $4.9V - 4.75V = 0.15V$ ).



Extension Cable Type	Extension Cable Conductor Resistance (Ω)
QC05B	0.044
QC06B	0.051
QC12B	0.082
QC30B	0.172
QC50B	0.273
QC100B	0.530

Symbol	Description
V1	Voltage drop at the extension cable between the main base unit and extension base unit
Vn	Voltage drop at the extension cable between the extension base unit (extension stage n-1) and extension base unit (extension stage n) *1
R1	Cable resistance between the main base unit and extension base unit
Rn	Cable resistance between the extension base unit (extension stage n-1) and extension base unit (extension stage n) *1
I1 to I4	5VDC current consumption among extension stage 1 to 4 *2

\*1: n = 2 to 4 (n = 2 only for Q00J CPU)

\*2: Sum total of current consumed by Q5□B and currents consumed by the input/output, intelligent function modules loaded on the Q5□B.

The symbols including "I" (I1 to I4) vary with the modules loaded on the extension base unit. For details of the symbol, refer to the user's manuals of the module used.

List for Calculating Voltage Drops Occurring at Extension Cables in System  
Consisting of Extensions 1 to 4

Q5□B Loading Position	Voltage Drop at Extension Cable on Corresponding Extension Unit				Sum Total of Voltage Drops to "IN" Connector of Q5□B (V)
	V1	V2	V3	V4	
Extension stage 1	$R1 \cdot I1$	—	—	—	$V=V1$
Extension stage 2	$R1(I1+I2)$	$R2 \cdot I2$	—	—	$V=V1+V2$
Extension stage 3	$R1(I1+I2+I3)$	$R2(I2+I3)$	$R3 \cdot I3$	—	$V=V1+V2+V3$
Extension stage 4	$R1(I1+I2+I3+I4)$	$R2(I2+I3+I4)$	$R3(I3+I4)$	$R4 \cdot I4$	$V=V1+V2+V3+V4$

The voltage supplied to "IN" connector of the Q5□B in the final extension reaches 4.75 VDC or higher on the condition that the sum total of voltage drop to "IN" connector of Q5□B (V) is 0.15V or lower.

(2) When the Q6□B is connected between the Q3□B and the Q5□B

(a) Selection condition

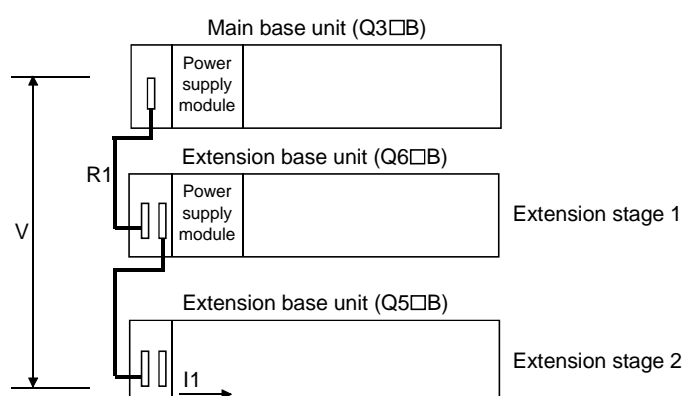
4.75VDC or higher should be supplied to the "IN" connector of the Q5□B in the final extension.

(b) How to calculate voltage to "IN" connector

The 5VDC output voltage of the power supply module on the main base unit is set to at least 4.90VDC.

Therefore, the Q5□B can be used if the voltage drop is 0.15V or lower  
( $4.9V - 4.75V = 0.15V$ ).

[When the Q5□B is connected to Extension stage 2.]



Extension Cable Type	Extension Cable Conductor Resistance (Ω)
QC05B	0.044
QC06B	0.051
QC12B	0.082
QC30B	0.172
QC50B	0.273
QC100B	0.530

Symbol	Description
V	Voltage drop at the extension cable between the main base unit and extension base unit (Q5□B)
I1	5VDC current consumption when the Q5□B is used as Extension n+1, n = 1 to 3, n: Extension No. of Q6□B connected (Sum total of current consumed by Q5□B and currents consumed by the input/output, intelligent function modules loaded on the Q5□B.)
Rn	Extension cable resistance between the main base unit (or the extension base unit (Q6□B)) and the extension base unit (Q6□B)
Rn+1	Extension cable resistance between the extension base unit (Q6□B) and extension base unit (Q5□B)

List for Calculating Voltage Drops Occurring at Extension Cables when connecting Q6□B between Q3□B and Q5□B

Position of extension base unit		Voltage drop caused by extension cable from the main base unit to the Q5□B IN connector (V)
Q6□B	Q5□B	
Extension stage 1	Extension stage 2	$V=(R1+R2)I1$
Extension stage 1, Extension stage 2	Extension stage 3	$V=(R1+R2+R3)I1$
Extension stage 1 to 3	Extension stage 4	$V=(R1+R2+R3+R4)I1$

The voltage supplied to the "IN" connector of the Q5□B reaches 4.75VDC or higher on the condition that the voltage drop (V) at the extension cable between the main base unit and Q5□B is 0.15VDC or lower.

### (3) When the GOT is bus-connected

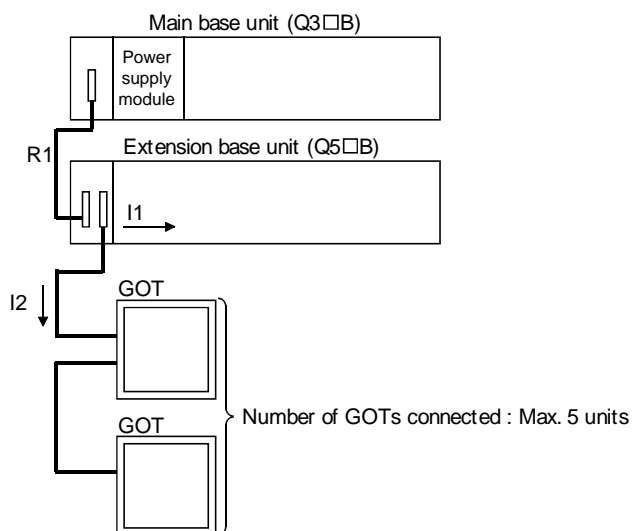
#### (a) Selection condition

4.75VDC or higher should be supplied to the "IN" connector of the Q5□B.

#### (b) How to calculate voltage to "IN" connector

The 5VDC output voltage of the power supply module on the main base unit is set to at least 4.90VDC.

Therefore, the Q5□B can be used if the voltage drop is 0.15V or lower ( $4.9V - 4.75V = 0.15V$ ).



Extension Cable Type	Extension Cable Conductor Resistance (Ω)
QC05B	0.044
QC06B	0.051
QC12B	0.082
QC30B	0.172
QC50B	0.273
QC100B	0.530

Symbol	Description
V	Voltage drop at the extension cable between the main base unit and extension base unit (Q5□B)
I1	5VDC current consumption when the Q5□B is used as Extension n+1, n = 1 to 2, n: Extension No. of the Q6□B connected (Sum total of current consumed by Q5□B and currents consumed by input/output, intelligent function modules loaded on the Q5□B)
I2	5VDC current consumption of the GOT (current consumption per GOT is 254mA) • $I2 = 254 \times c$ (c: Number of GOTs connected (c: 1 to 5))
Rn	Extension cable resistance between the main base unit (or the extension base unit (Q6□B)) and the extension base unit (Q6□B)
Rn+1	Extension cable resistance between the extension base unit (Q6□B) and extension base unit (Q5□B)



POINT
<p>When connecting GOT by extension cable that is 13.2 m (43.31ft) or longer, the bus extension connector box A9GT-QCNB is required. (A9GT-QCNB cannot be connected to the Q00JCPU main base unit. Connect A9GT-QCNB to the extension base unit.)</p> <p>Since the A9GT-QCNB is supplied with 5VDC from the power supply module loaded on the main base unit, 29mA must be added to "I2" as the current consumption of the A9GT-QCNB.</p> <p>For details of the GOT-bus connection, refer to the GOT-A900 Series User's Manual (Connection).</p>

## 7 BATTERY

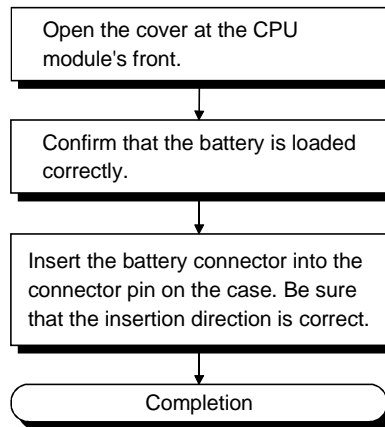
This section describes the specifications and handling of the memory card and battery which can be used on the Basic model QCPU.

### 7.1 Battery Specifications

Item	Type	Q6BAT
Classification		Manganese dioxide lithium primary battery
Initial voltage		3.0V
Nominal current		1800mAh
Storage life		5 years (room temperature)
Total power interrupt time		Refer to Section 10.3.1.
Application		Latch of the program memory, standard RAM and latch device

## 7.2 Installation of Battery

- (1) The battery for the CPU module is shipped with its connector disconnected.  
Connect the connector as follows.



Refer to Section 10.3 for the battery life and replacement method.

## 8 EMC AND LOW-VOLTAGE DIRECTIVES

For the products sold in European countries, the conformance to the EMC Directive, which is one of the European Directives, has been a legal obligation since 1996. Also, conformance to the Low Voltage Directive, another European Directives, has been a legal obligation since 1997.

Manufacturers who recognize their products must conform to the EMC and Low Voltage Directives required to declare that their products conform to these Directives and put a "CE mark" on their products.

### 8.1 Requirements for conformance to the EMC Directive

The EMC Directive specifies that products placed on the market must "be so constructed that they do not cause excessive electromagnetic interference (emissions) and are not unduly affected by electromagnetic interference (immunity)".

The applicable products are requested to meet these requirements. The sections 8.1.1 through 8.1.5 summarize the precautions on conformance to the EMC Directive of the machinery constructed using the MELSEC-Q series PLCs.

The details of these precautions has been prepared based on the requirements and the applicable standards control. However, we will not assure that the overall machinery manufactured according to these details conforms to the above-mentioned directives. The method of conformance to the EMC Directive and the judgment on whether or not the machinery conforms to the EMC Directive must be determined finally by the manufacturer.

#### 8.1.1 Standards applicable to the EMC Directive

The standards applicable to the EMC Directive are listed below.

Specification	Test item	Test details	Standard value
EN50081-2 : 1995	EN55011 Radiated noise * 2	Electromagnetic emissions from the product are measured.	30 M-230 MHz QP : 30 dB $\mu$ V/m (30 m in measurement range) * 1 230 M-1000 MHz QP : 37 dB $\mu$ V/m (30 m in measurement range)
	EN55011 Conducted noise	Electromagnetic emissions from the product to the power line is measured.	150 k-500 kHz QP : 79 dB, Mean : 66 dB * 1 500 k-30 MHz QP : 73 dB, Mean : 60 dB
EN61131-2 : 1996	EN61000-4-2 Electrostatic immunity * 2	Immunity test in which static electricity is applied to the cabinet of the equipment.	15 k V Aerial discharge
	EN61000-4-4 Fast transient burst noise * 2	Immunity test in which burst noise is applied to the power line and signal lines.	Power line : 2 kV Digital input/output (24 V or higher) : 1 kV (Digital input/output (24 V or less)) > 250 V (Analog input/output, signal lines) > 250 V
	EN61000-4-3 Radiated field AM modulation * 2	Immunity test in which field is irradiated to the product.	10 V/m, 26-1000 MHz, 80%AM modulation@1 kHz
	EN61000-4-12 Damped oscillatory wave immunity	Immunity test in which a damped oscillatory wave is superimposed on the power line.	Power line : 1 kV Digital input/output (24 V or higher) : 1 kV

(\* 1) QP : Quasi-peak value, Mean : Average value

(\* 2) The PLC is an open type device (device installed to another device) and must be installed in a conductive control panel.  
The tests for the corresponding items were performed while the PLC was installed inside a control panel.

### 8.1.2 Installation instructions for the EMC Directive

The PLC is open equipment and must be installed within a control cabinet for use. This not only ensures safety but also ensures effective shielding of PLC-generated electromagnetic noise.

#### (1) Control cabinet

- (a) Use a conductive control cabinet.
- (b) When attaching the control cabinet's top plate or base plate, mask painting and weld so that good surface contact can be made between the cabinet and plate.
- (c) To ensure good electrical contact with the control cabinet, mask the paint on the installation bolts of the inner plate in the control cabinet so that contact between surfaces can be ensured over the widest possible area.
- (d) Earth the control cabinet with a thick wire so that a low impedance connection to ground can be ensured even at high frequencies.
- (e) Holes made in the control cabinet must be 10 cm (3.94 in.) diameter or less. If the holes are 10 cm (3.94 in.) or larger, radio frequency noise may be emitted.

In addition, because radio waves leak through a clearance between the control panel door and the main unit, reduce the clearance as much as practicable.

The leakage of radio waves can be suppressed by the direct application of an EMI gasket on the paint surface.

Our tests have been carried out on a panel having the damping characteristics of 37 dB max. and 30 dB mean (measured by 3 m method with 30 to 300 MHz).

#### (2) Connection of power and earth wires

Earthing and power supply wires for the PLC system must be connected as described below.

- (a) Provide an earthing point near the power supply module. Earth the power supply's LG and FG terminals (LG : Line Ground, FG : Frame Ground) with the thickest and shortest wire possible. (The wire length must be 30 cm (11.18 in.) or shorter.) The LG and FG terminals function is to pass the noise generated in the PLC system to the ground, so an impedance that is as low as possible must be ensured. As the wires are used to relieve the noise, the wire itself carries a large noise content and thus short wiring means that the wire is prevented from acting as an antenna.
- (b) The earth wire led from the earthing point must be twisted with the power supply wires. By twisting with the earthing wire, noise flowing from the power supply wires can be relieved to the earthing. However, if a filter is installed on the power supply wires, the wires and the earthing wire may not need to be twisted.

### 8.1.3 Cables

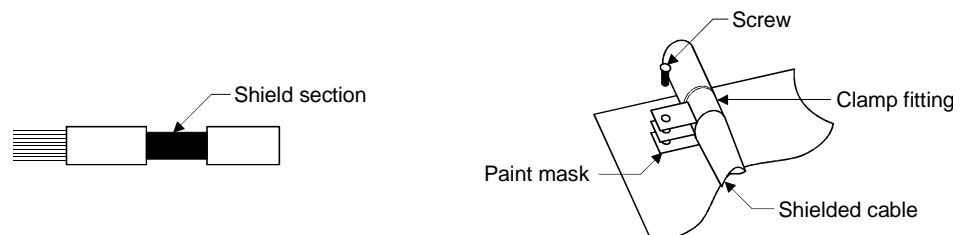
The cables extracted from the control panel contain a high frequency noise component. On the outside of the control panel, therefore, they serve as antennas to emit noise. To prevent noise emission, use shielded cable for the cables which are connected to the input/output modules and intelligent function modules and may be extracted to the outside of the control panel.

The use of a shielded cable also increases noise resistance. The signal lines connected to the PLC input/output modules and intelligent function modules use shielded cables to assure noise resistance under the conditions where the shield is earthed. If a shielded cable is not used or not earthed correctly, the noise resistance will not meet the specified requirements.

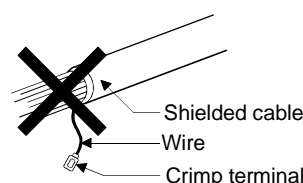
When the shield of a shielded cable is earthed to the cabinet body, please ensure that the shield contact with the body is over a large surface area. If the cabinet body is painted it will be necessary to remove paint from the contact area. All fastenings must be metallic and the shield and earthing contact must be made over the largest available surface area. If the contact surfaces are too uneven for optimal contact to be made either use washers to correct for surface inconsistencies or use an abrasive to level the surfaces. The following diagrams show examples of how to provide good surface contact of shield earthing by use of a cable clamp.

#### (1) Earthing of shielded of shield cable

- (a) Earth the shield of the shielded cable as near the module as possible taking care so that the earthed cables are not induced electromagnetically by the cable to be earthed.
- (b) Take an appropriate measures so that the shield section of the shielded cable from which the outer cover was partly removed for exposure is earthed to the control panel on an increased contact surface. A clamp may also be used as shown in the figure below. In this case, however, apply a cover to the painted inner wall surface of the control panel which comes in contact with the clamp.

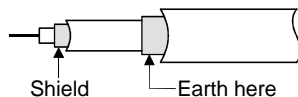


Note) The method of earthing by soldering a wire onto the shield section of the shielded cable as shown below is not recommended. The high frequency impedance will increase and the shield will be ineffective.



## (2) MELSECNET/H module

Always use a double-shielded coaxial cable (MITSUBISHI CABLE : 5C-2V-CCY) for the coaxial cables MELSECNET/H module. Radiated noise in the range of 30MHz or higher can be suppressed by use of the double-shielded coaxial cables. Earth the double-shielded coaxial cable by connecting its outer shield to the ground.



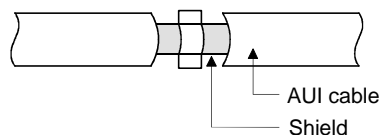
Refer to (1) for the earthing of the shield.

## (3) Ethernet module, FL-net module, Web server module

Precautions for using AUI cables, twisted pair cables and coaxial cables are described below.

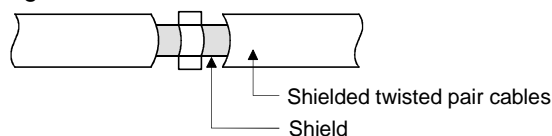
- (a) Always earth the AUI cables connected to the 10BASE5 connectors.

Because the AUI cable is of the shielded type, strip part of the outer cover and earth the exposed shield section to the ground on the widest contact surface as shown below.



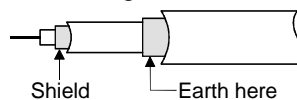
Refer to (1) for the earthing of the shield.

- (b) Use a shielded twisted pair cable to connect to the 10BASE-T/100BASE-TX connector. Remove a part of the sheath from the shielded twisted pair cable and earth the exposed shield at an area as wide as possible as shown in the figure below.



Refer to (1) for the earthing of the shield.

- (c) Always use double-shielded coaxial cables as the coaxial cables connected to the 10BASE2 connectors. Earth the double-shielded coaxial cable by connecting its outer shield to the ground.



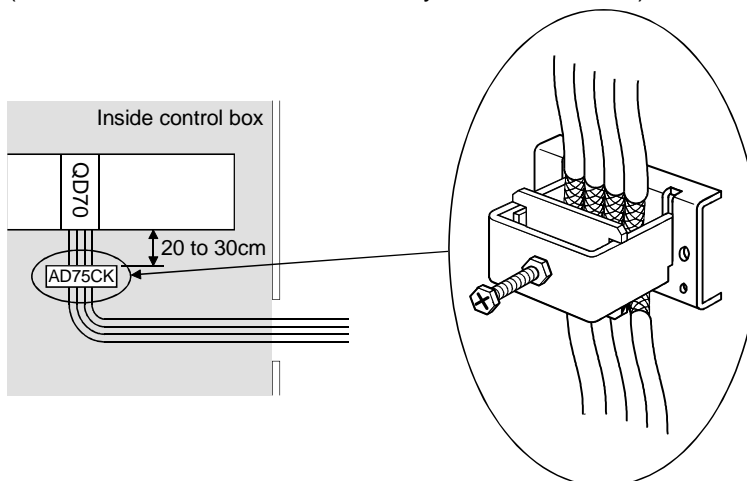
Refer to (1) for the earthing of the shield.

Ethernet is the registered trademark of XEROX, Co., LTD

(4) Positioning module, channel-isolated pulse input module

Use shielded cables for the external wiring, and ground the shields of the external wiring cables to the control box with the AD75CK cable clamp (Mitsubishi Electric make).

(Ground the shields 20 to 30cm away from the module.)

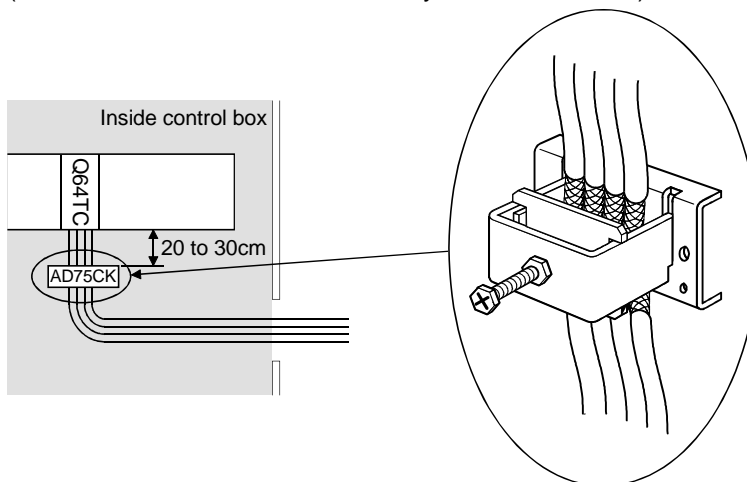


The AD75CK allows up to four cables to be grounded if the outside diameter of the shielded cable is about 7mm.

(5) Temperature control module

Use shielded cables for the external wiring, and ground the shields of the external wiring cables to the control box with the AD75CK cable clamp (Mitsubishi Electric make).

(Ground the shields 20 to 30cm away from the module.)



The AD75CK allows up to four cables to be grounded if the outside diameter of the shielded cable is about 7mm.



The required number of AD75CKs is indicated below. (When cables of 7mm outside diameter are used for all wiring.)

Required Number of AD75CKs		Number of Used Channels			
		1	2	3	4
Number of used CT channels	0	1	1	2	2
	1	1	2	2	3
	2	1	2	2	3
	3	1	2	3	3
	4	2	2	3	3
	5	2	3	3	4
	6	2	3	3	4
	7	3	3	4	4
	8	3	3	4	4

(6) I/O signal cables and other communication cables

For the I/O signal cables and other communication cables (RS-232, RS-422, CC-Link, etc.), always ground the shields of the shield cables as in (1) if they are pulled out of the control box

## 8.1.4 Power supply module, Q00JCPU power supply section

Always ground the LG and FG terminals after short-circuiting them.

## 8.1.5 Others

## (1) Ferrite core

A ferrite core has the effect of reducing radiated noise in the 30 M Hz to 100 M Hz band.

It is not required to fit ferrite cores to cables, but it is recommended to fit ferrite cores if shield cables pulled out of the enclosure do not provide sufficient shielding effects.

It should be noted that the ferrite cores should be fitted to the cables in the position immediately before they are pulled out of the enclosure. If the fitting position is improper, the ferrite will not produce any effect.

In the CC-Link system, however, ferrite cores cannot be fitted to cables.

## (2) Noise filter (power supply line filter)

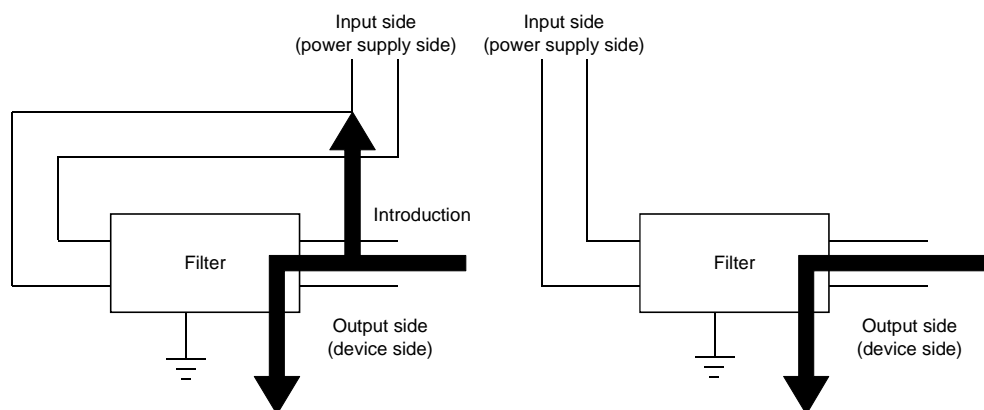
A noise filter is a component which has an effect on conducted noise.

It is not required to fit the noise filter to the power supply line, but fitting it can further suppress noise.

(The noise filter has the effect of reducing conducted noise of 10 MHz or less.)

The precautions required when installing a noise filter are described below.

- (a) Do not bundle the wires on the input side and output side of the noise filter. When bundled, the output side noise will be induced into the input side wires from which the noise was filtered.



1) The noise will be included when the input and output wires are bundled.

2) Separate and lay the input and output wires.

- (b) Earth the noise filter earthing terminal to the control cabinet with the shortest wire possible (approx. 10 cm (3.94 in.)).

## Reference

Noise Filter Model Name	FN343-3/01	FN660-6/06	ZHC2203-11
Manufacturer	SCHAFFNER	SCHAFFNER	TDK
Rated current	3 A	6 A	3 A
Rated voltage	250 V		

## 8.2 Requirement to Conform to the Low-Voltage Directive

The low-voltage directive requires each device that operates with the power supply ranging from 50V to 1000VAC and 75V to 1500VDC to satisfy the safety requirements. In Sections 8.2.1 to 8.2.6, cautions on installation and wiring of the MELSEC-Q series PLC to conform to the low-voltage directive are described.

We have put the maximum effort to develop this material based on the requirements and standards of the regulation that we have collected. However, compatibility of the devices which are fabricated according to the contents of this manual to the above regulation is not guaranteed. Each manufacturer who fabricates such device should make the final judgement about the application method of the low-voltage directive and the product compatibility.

### 8.2.1 Standard applied for MELSEC-Q series PLC

The standard applied for MELSEC-Q series PLC is EN61010-1 safety of devices used in measurement rooms, control rooms, or laboratories.

The MELSEC-Q series PLC modules which operate at the rated voltage of 50VAC/75VDC or above are also developed to conform to the above standard.

The modules which operate at the rated voltage of less than 50VAC/75VDC are out of the low-voltage directive application range.

### 8.2.2 MELSEC-Q series PLC selection

#### (1) Power module

There are dangerous voltages (voltages higher than 42.4V peak) inside the power supply modules of the 100/200VAC rated input voltages. Therefore, the CE mark-compliant models are enhanced in insulation internally between the primary and secondary.

#### (2) Input/output module

There are dangerous voltages (voltages higher than 42.4V peak) inside the input/output modules of the 100/200VAC rated input voltages. Therefore, the CE mark-compliant models are enhanced in insulation internally between the primary and secondary.

The input/output modules of 24VDC or less rating are out of the low-voltage directive application range.

#### (3) CPU module, base unit

Using 5VDC circuits inside, the above modules are out of the low-voltage directive application range.

#### (4) Intelligent function modules

The intelligent function modules such as the analog, network and positioning modules are 24VDC or less in rated voltage and are therefore out of the low-voltage directive application range.

#### (5) Display device

Use the display conforming to the EU directive.

### 8.2.3 Power supply

The insulation specification of the power module was designed assuming installation category II. Be sure to use the installation category II power supply to the PLC. The installation category indicates the durability level against surge voltage generated by a thunderbolt. Category I has the lowest durability; category IV has the highest durability.

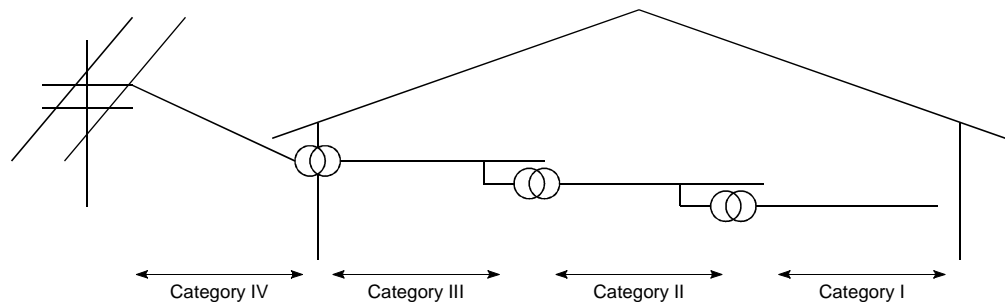


Figure 8.1: Installation Category

Category II indicates a power supply whose voltage has been reduced by two or more levels of isolating transformers from the public power distribution.

### 8.2.4 Control box

Because the PLC is an open device (a device designed to be stored within another module), be sure to use it after storing in the control box.

#### (1) Electrical shock prevention

In order to prevent persons who are not familiar with the electric facility such as the operators from electric shocks, the control box must have the following functions :

- (a) The control box must be equipped with a lock so that only the personnel who has studied about the electric facility and have enough knowledge can open it.
- (b) The control box must have a structure which automatically stops the power supply when the box is opened.

#### (2) Dustproof and waterproof features

The control box also has the dustproof and waterproof functions. Insufficient dustproof and waterproof features lower the insulation withstand voltage, resulting in insulation destruction. The insulation in our PLC is designed to cope with the pollution level 2, so use in an environment with pollution level 2 or below.

Pollution level 1 : An environment where the air is dry and conductive dust does not exist.

Pollution level 2 : An environment where conductive dust does not usually exist, but occasional temporary conductivity occurs due to the accumulated dust. Generally, this is the level for inside the control box equivalent to IP54 in a control room or on the floor of a typical factory.


Pollution level 3 : An environment where conductive dust exists and conductivity may be generated due to the accumulated dust.  
An environment for a typical factory floor.


Pollution level 4 : Continuous conductivity may occur due to rain, snow, etc. An outdoor environment.

As shown above, the PLC can realize the pollution level 2 when stored in a control box equivalent to IP54.

### 8.2.5 Grounding

There are the following two different grounding terminals.  
Use either grounding terminal in an earthed status.

Protective grounding  : Maintains the safety of the PLC and improves the noise resistance.

Functional grounding  : Improves the noise resistance.

### 8.2.6 External wiring

#### (1) 24 VDC external power supply

For the MELSEC-Q series 24VDC input/output modules and the intelligent function modules which require external supply power, use a model whose 24 VDC circuit is intensively insulated from the hazardous voltage circuit.

#### (2) External devices

When a device with a hazardous voltage circuit is externally connected to the PLC, use a model whose circuit section of the interface to the PLC is intensively insulated from the hazardous voltage circuit.

#### (3) Intensive insulation

Intensive insulation refers to the insulation with the dielectric withstand voltage shown in Table 8.1.

Table 8.1 : Intensive Insulation Withstand Voltage  
(Installation Category II, source : IEC664)

Rated voltage of hazardous voltage area	Surge withstand voltage (1.2/50 $\mu$ s)
150 VAC or below	2500 V
300 VAC or below	4000 V

## 9 LOADING AND INSTALLATION

In order to increase the reliability of the system and exploit the maximum performance of its functions, this section describes the methods and precautions for the mounting and installation of the system.

### 9.1 General Safety Requirements



#### **DANGER**

- Install a safety circuit external to the PLC that keeps the entire system safe even when there are problems with the external power supply or the PLC module. Otherwise, trouble could result from erroneous output or erroneous operation.
  - (1) Outside the PLC, construct mechanical damage preventing interlock circuits such as emergency stop, protective circuits, positioning upper and lower limits switches and interlocking forward/reverse operations.
  - (2) When the PLC detects the following problems, it will stop calculation and turn off all output in the case of (a). In the case of (b), it will stop calculation and hold or turn off all output according to the parameter setting.
    - (a) The power supply module has over current protection equipment and over voltage protection equipment.
    - (b) The PLC CPUs self-diagnostic functions, such as the watchdog timer error, detect problems.In addition, all output will be turned on when there are problems that the PLC CPU cannot detect, such as in the input/output controller. Build a fail safe circuit exterior to the PLC that will make sure the equipment operates safely at such times. For fail safe circuit examples, refer to "LOADING AND INSTALLATION" in this manual.
  - (3) Output could be left on or off when there is trouble in the outputs module relay or transistor. So build an external monitoring circuit that will monitor any single outputs that could cause serious trouble.
- When overcurrent which exceeds the rating or caused by short-circuited load flows in the output module for a long time, it may cause smoke or fire. To prevent this, configure an external safety circuit, such as fuse.
- Build a circuit that turns on the external power supply when the PLC main module power is turned on. If the external power supply is turned on first, it could result in erroneous output or erroneous operation.
- When there are communication problems with the data link, refer to the corresponding data link manual for the operating status of each station. Not doing so could result in erroneous output or erroneous operation. Not doing so could result in erroneous output or erroneous operation.

**DANGER**

- When connecting a peripheral device to the CPU module or connecting a personal computer or the like to the special function module to exercise control (data change) on the running PLC, configure up an interlock circuit in the sequence program to ensure that the whole system will always operate safely.

Also before exercising other control (program change, operating status change (status control)) on the running PLC, read the manual carefully and fully confirm safety.

Especially for the above control on the remote PLC from an external device, an immediate action may not be taken for PLC trouble due to a data communication fault.

In addition to configuring up the interlock circuit in the sequence program, corrective and other actions to be taken as a system for the occurrence of a data communication fault should be predetermined between the external device and PLC CPU.

**CAUTION**

- Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other. They should be installed 100 mm (3.94 inch) or more from each other. Not doing so could result in noise that would cause erroneous operation.
- When controlling items like lamp load, heater or solenoid valve using an output module, large current (approximately ten times greater than that present in normal circumstances) may flow when the output is turned OFF to ON. Take measures such as replacing the module with one having sufficient rated current.

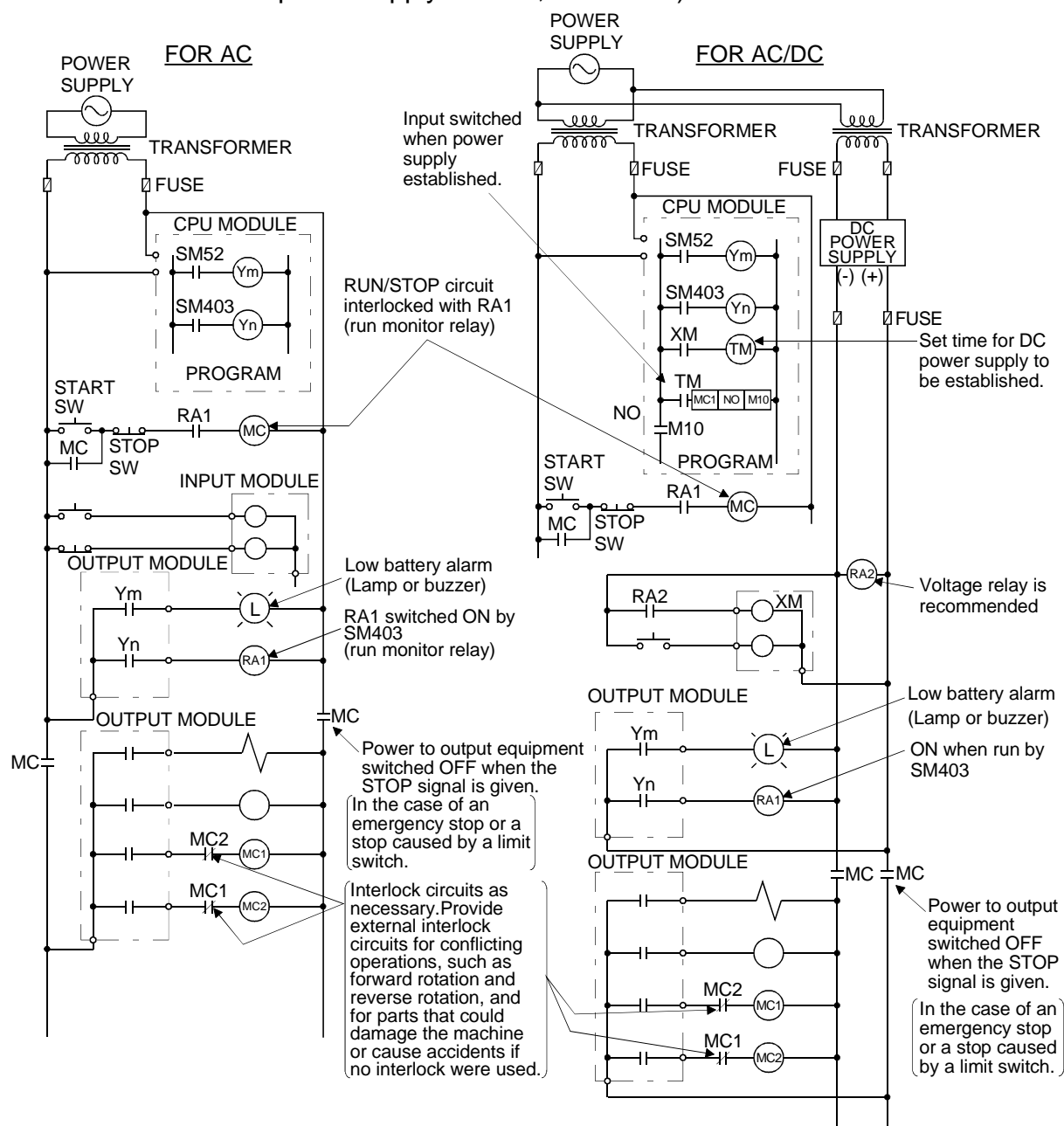
When the PLC power supply is switched ON-OFF, proper process output may not be provided temporarily due to differences in delay time and starting time between the PLC power supply and processing external power supply (especially DC).

For example, if the processing external supply power is switched on in a DC output module and the PLC power supply is then switched on, the DC output module may provide false output instantaneously at power-on of the PLC. Therefore, it is necessary to make up a circuit which can switch on the PLC power supply first.

Also, an abnormal operation may be performed if an external power supply fault or PLC failure takes place.

To prevent any of these abnormal operations from leading to the abnormal operation of the whole system and in a fail-safe viewpoint, areas which can result in machine breakdown and accidents due to abnormal operations (e.g. emergency stop, protective and interlock circuits) should be constructed outside the PLC.

The following page gives examples of system designing in the above viewpoint.

(1) System design circuit example (when not using  $\overline{\text{ERR}}$  contact of power supply module, Q00JCPU)

The power-ON procedure is as follows:

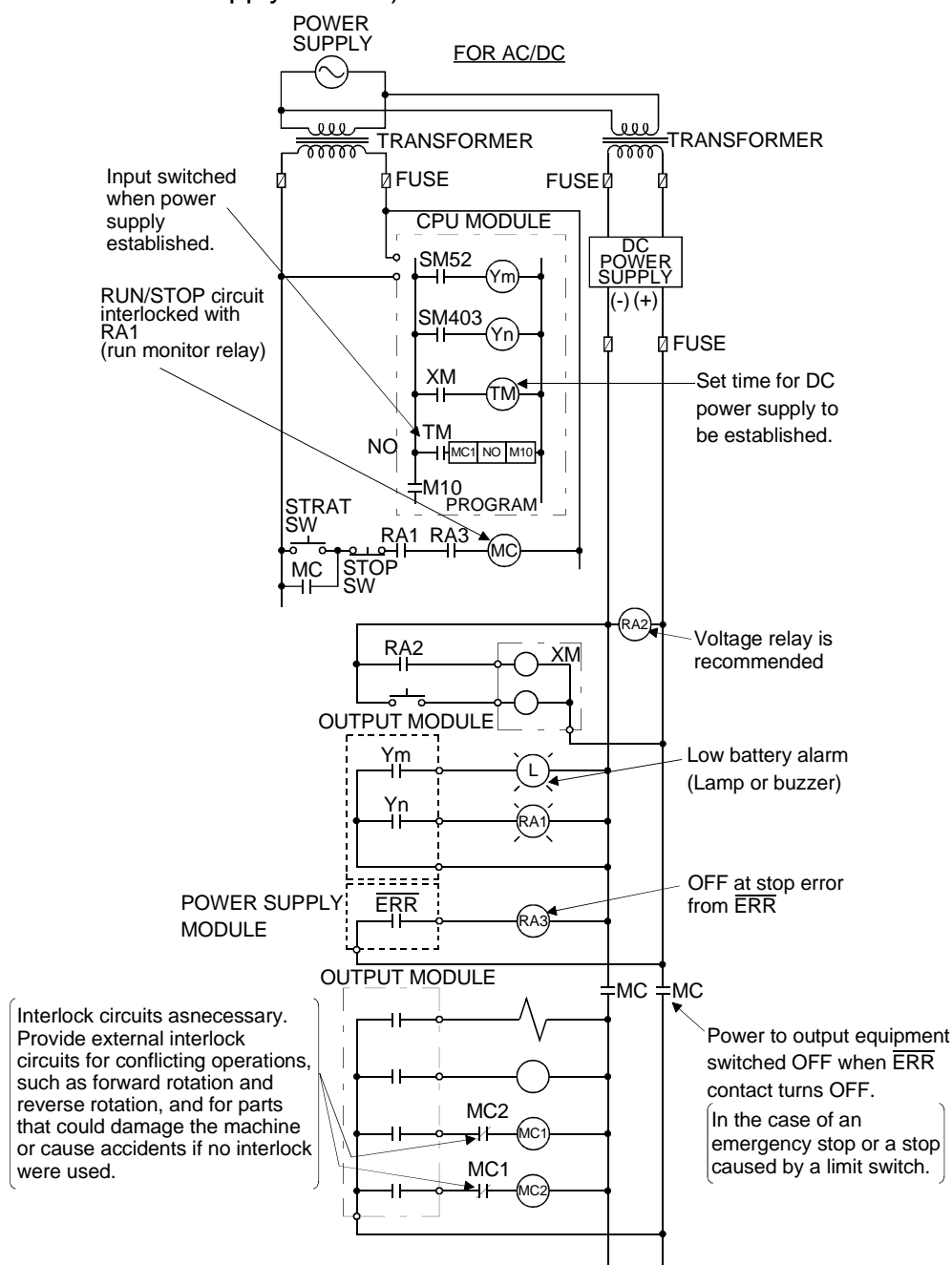
For AC

- 1) Switch power ON.
- 2) Set CPU to RUN.
- 3) Turn ON the start switch.
- 4) When the magnetic contactor (MC) comes on, the output equipment is powered and may be driven by the program.

For AC/DC

- 1) Switch power ON.
- 2) Set CPU to RUN.
- 3) When DC power is established, RA2 goes ON.
- 4) Timer (TM) times out after the DC power reaches 100%. (The TM set value should be the period of time from when RA2 goes ON to the establishment of 100% DC voltage. Set this value to approximately 0.5 seconds.)
- 5) Turn ON the start switch.
- 6) When the magnetic contactor (MC) comes on, the output equipment is powered and may be driven by the program. (If a voltage relay is used at RA2, no timer (TM) is required in the program.)



(2) System design circuit example (when using  $\overline{\text{ERR}}$  contact of power supply module)

The power-ON procedure is as follows:

For AC/DC

- 1) Switch power ON.
- 2) Set CPU to RUN.
- 3) When DC power is established, RA2 goes ON.
- 4) Timer (TM) times out after the DC power reaches 100%. (The TM set value should be the period of time from when RA2 goes ON to the establishment of 100% DC voltage. Set this value to approximately 0.5s.)
- 5) Turn ON the start switch.
- 6) When the magnetic contactor (MC) comes on, the output equipment is powered and may be driven by the program. (If a voltage relay is used at RA2, no timer (TM) is required in the program.)

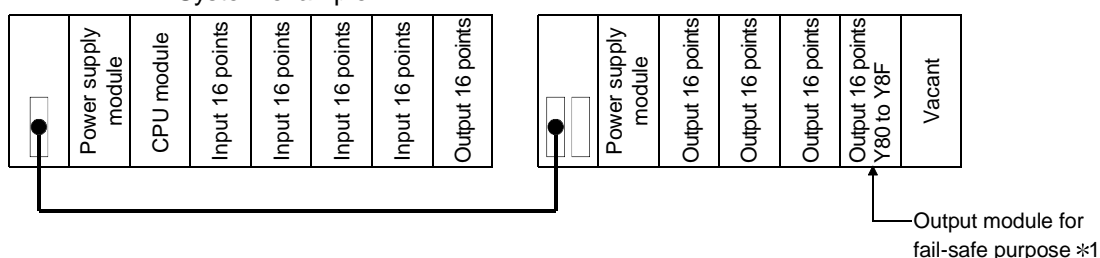
### (3) Fail-safe measures against failure of the PLC

Failure of a CPU module or memory can be detected by the self diagnosis function. However, failure of input/output control area may not be detected by the CPU module.

In such cases, all input/output points turn ON or OFF depending on a condition of problem, and normal operating conditions and operating safety cannot sometimes be maintained.

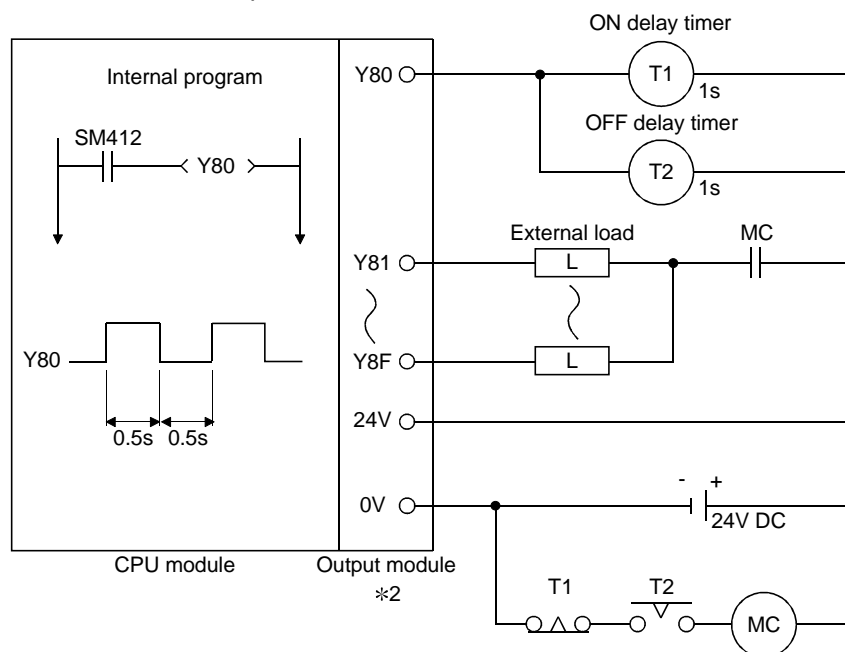
Though Mitsubishi PLCs are manufactured under strict quality control, they may cause failure or abnormal operations due to unspecific reasons. To prevent the abnormal operation of the whole system, machine breakdown, and accidents, fail-safe circuitry against failure of the PLC must be constructed outside the PLC. Examples of a system and its fail-safe circuitry are described below:

<System example>



\*1: The output module for fail-safe purpose should be loaded in the last slot of the system. (Y80 to Y8F in the above system.)

<Fail-safe circuit example>



\*2: Y80 repeats turning ON and then OFF at 0.5s intervals.

Use a no-contact output module (transistor in the example shown above).

## 9.2 Calculating Heat Generation by PLC

The ambient temperature inside the board storing the PLC must be suppressed to a PLC usable ambient temperature of 55°C.

For the design of radiation from the storing board, it is necessary to know the average power consumption (heating value) of the devices and instruments stored in the board. Here the method of obtaining the average power consumption of the PLC system is described.

From the power consumption, calculate a rise in ambient temperature inside the board.

### How to calculate average power consumption

The power consuming parts of the PLC are roughly classified into six blocks as shown below.

#### (1) Power consumption of power supply module

The power conversion efficiency of the power supply module is approx. 70 %, i.e., 30 % of the output power is consumed by heating. As a result, 3/7 of the output power becomes the power consumption. Therefore the calculation formula is as follows.

$$W_{pw} = \frac{3}{7} \times (I_{5V} \times 5) \text{ (W)}$$

$I_{5V}$ : Current consumption of logic 5 VDC circuit of each module

#### (2) Total power consumption of 5VDC logic section by all modules (including CPU module)

The power consumption of the 5 VDC output circuit section of the power module is the power consumption of each module (including the current consumption of the base unit).

$$W_{5V} = I_{5V} \times 5 \text{ (W)}$$

\* For the power consumption of the motion CPU and PC CPU module, refer to the instruction manual of the corresponding modules.

#### (3) A total of 24 VDC average power consumption of the output module (power consumption for simultaneous ON points)

The average power of the external 24 VDC power is the total power consumption of each module.

$$W_{24V} = I_{24V} \times 24 \text{ (W)}$$

#### (4) Average power consumption due to voltage drop in the output section of the output module (Power consumption for simultaneous ON points)

$$W_{OUT} = I_{OUT} \times V_{drop} \times \text{Number of outputs} \times \text{Simultaneous ON rate (W)}$$

$I_{OUT}$  : Output current (Current in actual use) (A)

$V_{drop}$  : Voltage drop in each output module (V)

#### (5) Average power consumption of the input section of the input module (Power consumption for simultaneous ON points)

$$W_{IN} = I_{IN} \times E \times \text{Number of input points} \times \text{Simultaneous ON rate (W)}$$

$I_{IN}$  : Input current (Effective value for AC) (A)

$E$  : Input voltage (Voltage in actual use) (V)

## (6) Power consumption of the power supply section of the intelligent function module

$$W_S = I_{5V} \times 5 + I_{24V} \times 24 + I_{100V} \times 100 \text{ (W)}$$

The total of the power consumption values calculated for each block becomes the power consumption of the overall sequencer system.

$$W = W_{PW} + W_{5V} + W_{24V} + W_{OUT} + W_{IN} + W_S \text{ (W)}$$

From this overall power consumption (W), calculate the heating value and a rise in ambient temperature inside the board.

The outline of the calculation formula for a rise in ambient temperature inside the board is shown below.

$$T = \frac{W}{UA} \text{ (}^\circ\text{C)}$$

W : Power consumption of overall sequencer system (value obtained above)

A : Surface area inside the board

U : When the ambient temperature inside the board is uniformed by a fan..... 6

When air inside the board is not circulated ..... 4

## POINT

When a rise in ambient temperature inside the board exceeds the specified limit, it is recommended that you install a heat exchanger in the board to lower the ambient temperature inside the board.

If a normal ventilating fan is used, dust will be sucked into the PLC together with the external air.

It may affect the performance of the PLC.

## (7) Example of calculation of average power consumption

## (a) System configuration

Q61P-A1	Q00CPU	QX40	QX40	QY10	QJ71LP21-25	Vacant	Q35B
---------	--------	------	------	------	-------------	--------	------

## (b) 5 VDC current consumption of each module

Q00CPU	: 0.25 (A)
QX40	: 0.05 (A)
QY10	: 0.43 (A)
QJ71LP21-25	: 0.55 (A)
Q35B	: 0.074 (A)

## (c) Power consumption of power supply module

$$W_{PW} = 3/7 \times (0.25 + 0.05 + 0.05 + 0.43 + 0.55 + 0.074) \times 5 = 3.01 \text{ (W)}$$

## (d) Power consumption of a total of 5 VDC logic section of each module

$$W_{5V} = (0.25 + 0.05 + 0.05 + 0.43 + 0.55 + 0.074) \times 5 = 7.02 \text{ (W)}$$

## (e) A total of 24 VDC average power consumption of the output module

$$W_{24V} = 0 \text{ (W)}$$

- (f) Average power consumption due to voltage drop in the output section of the output module

$$W_{OUT} = 0 \text{ (W)}$$

- (g) Average power consumption of the input section of the input module

$$W_{IN} = 0.004 \times 24 \times 32 \times 1 = 3.07 \text{ (W)}$$

- (h) Power consumption of the power supply section of the intelligent function module


$$W_S = 0 \text{ (W)}$$

- (i) Power consumption of overall system.

$$W = 2.94 + 6.87 + 0 + 0 + 3.07 + 0 = 13.10 \text{ (W)}$$

## 9.3 Module Installation

## 9.3.1 Precaution on installation

 <b>CAUTION</b>	<ul style="list-style-type: none"> <li>● Use the PLC in an environment that meets the general specifications contained in this manual. Using this PLC in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.</li> <li>● Hold down the module loading lever at the module bottom, and securely insert the module fixing hook into the fixing hole in the base unit. Incorrect loading of the module can cause a malfunction, failure or drop. When using the PLC in the environment of much vibration, tighten the module with a screw. Tighten the screw in the specified torque range. Undertightening can cause a drop, short circuit or malfunction. Overtightening can cause a drop, short circuit or malfunction due to damage to the screw or module.</li> <li>● When installing more cables, be sure that the base unit and the module connectors are installed correctly. After installation, check them for looseness. Poor connections could cause an input or output failure.</li> <li>● Completely turn off the external power supply before loading or unloading the module. Not doing so could result in electric shock or damage to the product.</li> <li>● Do not directly touch the module's conductive parts or electronic components. Touching the conductive parts could cause an operation failure or give damage to the module.</li> </ul>
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This section gives instructions for handling the CPU module, input/output, intelligent function and power supply modules, base units and so on.

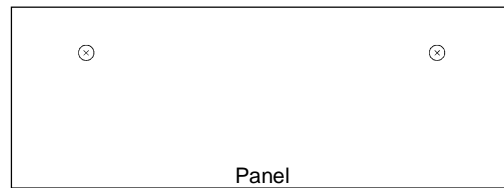
- (1) Module enclosure, terminal block connectors and pin connectors are made of resin; do not drop them or subject them to strong impact.
- (2) Do not remove modules' printed circuit boards from the enclosure in order to avoid changes in operation.
- (3) Tighten the module fixing screws and terminal block screws within the tightening torque range specified below.

Location of Screw	Tightening Torque Range
Module fixing screw (M3 × 12 screw)	36 to 48 N•cm
I/O module terminal block screw (M3 screw)	42 to 58 N•cm
I/O module terminal block fixing screw (M3.5 screw)	66 to 89 N•cm
Power module terminal screw (M3.5 screw)	66 to 89 N•cm

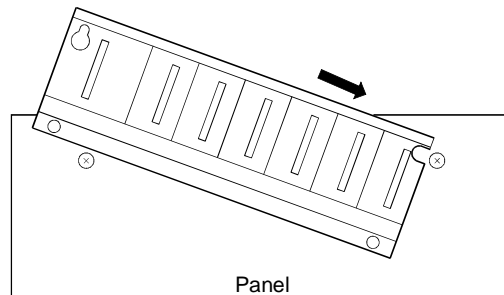
- (4) Make sure to install the power supply module on the main base unit and extension base unit. Even if the power supply module is not installed, when the input/output modules and intelligent function module installed on the base units are of light load type, the modules may be operated. In this case, because a voltage becomes unstable, we cannot guarantee the operation.
- (5) When an extension cable is used, do not bind the cable together with the main circuit (high voltage, heavy current) line or lay them close to each other.

(6) Install the main base unit, Q00JCPU (by screwing) in the following procedure.

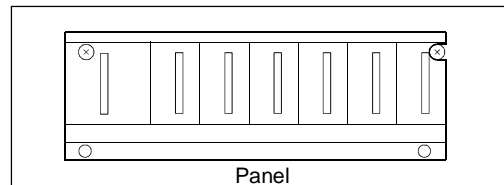
1) Fit the two base unit top mounting screws into the enclosure.



2) Place the right-hand side notch of the base unit onto the right-hand side screw.



3) Place the left-hand side pear-shaped hole onto the left-hand side screw.



4) Fit the mounting screws into the mounting screw holes in the base unit bottom and retighten the four mounting screws.

Note1 : Install the main base unit, Q00JCPU to a panel, with no module loaded in the right-end slot.

Remove the base unit after unloading the module from the right-end slot.

Note2 : The mounting screws that come with the slim type main base unit differ from those coming with other types of the base unit. To order mounting screws for the slim type main base unit, specify "cross recessed head bind screw M4 × 12 (black)."

## (7) Note the following points when mounting a DIN rail.

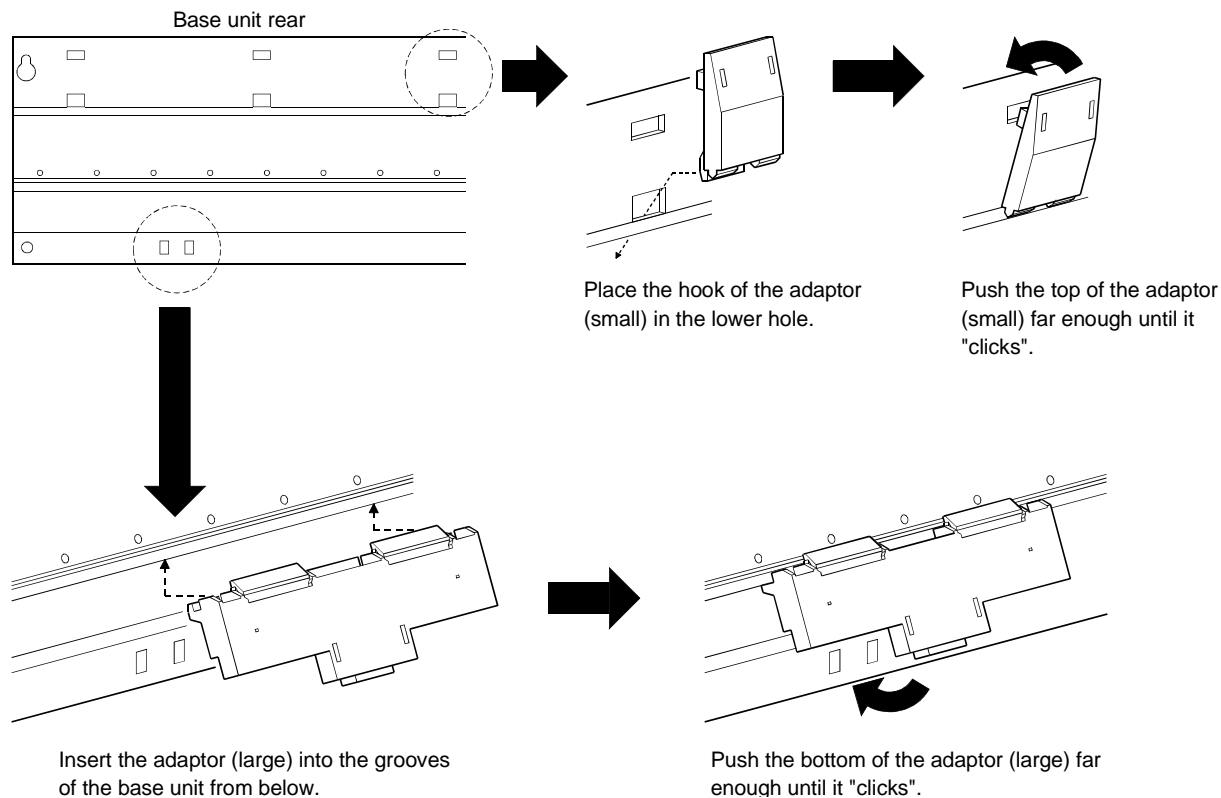
Mounting a DIN rail needs special adapters (optional), which are to be user-prepared.

## (a) Applicable adapter types

For Q38B, Q312B, Q68B, Q612B	: Q6DIN1
For Q35B, Q65B, Q00JCPU	: Q6DIN2
For Q33B, Q52B, Q55B, Q63B, Q32SB, Q33SB, Q35SB	: Q6DIN3

## (b) Adapter installation method

The way to install the adapter for mounting a DIN rail to the base unit is given below.

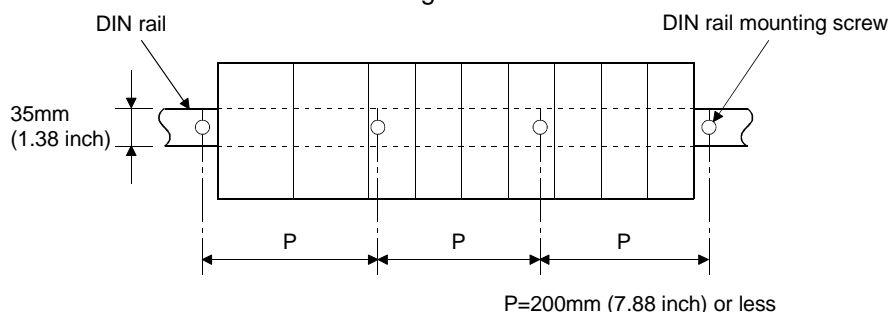


## (c) Applicable DIN rail types (JIS C 2812)

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

## (d) DIN rail mounting screw intervals

When using a TH35-7.5Fe or TH35-7.5Al DIN rail, rail mounting screws should be tightened at a pitch of 200 mm (7.88 inch) or less in order to ensure that the rail has sufficient strength.





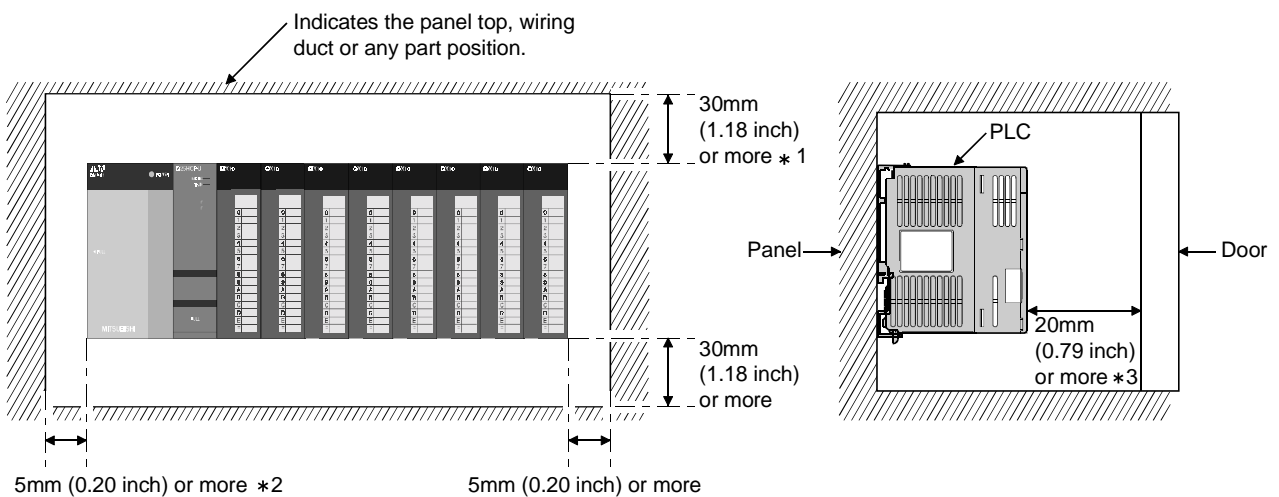
## 9.3.2 Instructions for mounting the base unit

When mounting the PLC to an enclosure or the like, fully consider its operability, maintainability and environmental resistance.

## (1) Module mounting position

For enhanced ventilation and ease of module replacement, leave the following clearances between the module top/bottom and structure/parts.

(a) In case of main base unit or extension base unit



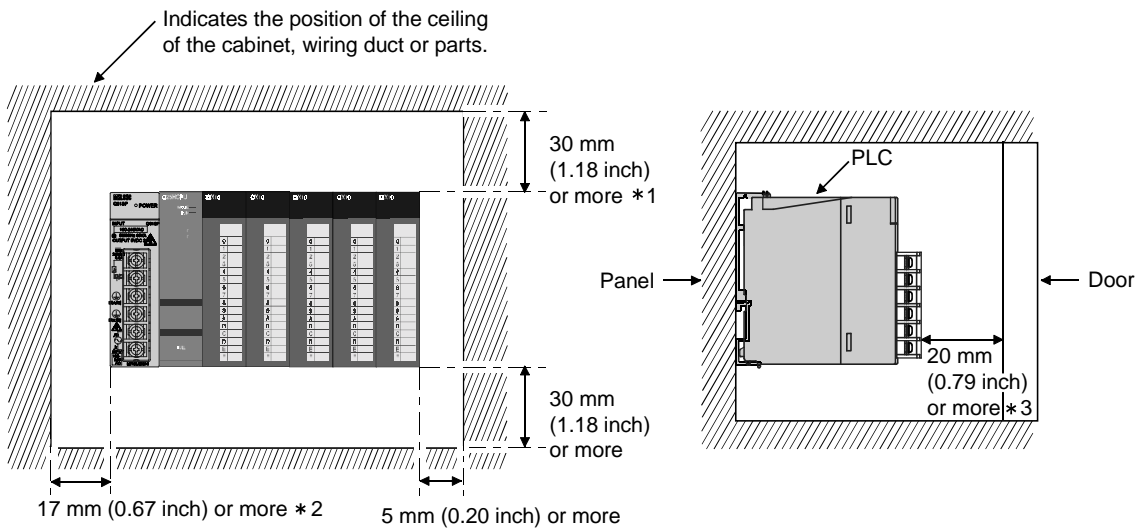
\*1 : For wiring duct (50mm (1.97 inch) or less height).

40mm (1.58 inch) or more for other cases.

\*2 : 5mm (0.20 inch) or more when the adjacent module is removed and the extension cable is connected.

\*3 : 80mm (3.15 inch) or more for the connector type.

## (b) In case of slim type main base unit



\*1 : For wiring duct with 50mm (1.97inch) or less height.

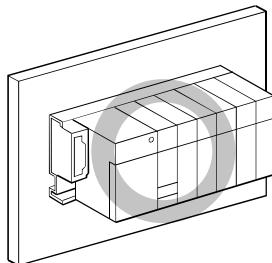
40 mm (1.58 inch) or more for other cases.

\*2 : The cable of the power supply module of the slim type main base unit protrudes out of the left end of the module. Install the module while reserving 17 mm or more wiring space. If the cable sheath is susceptible to damage caused by a structural object or part on the left side of the module, take a protective measure with spiral tube or a similar insulator.

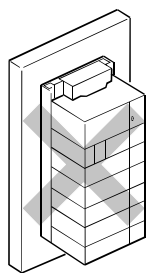
\*3 : 80mm (3.15inch) or more for the connector type.

**(2) Module mounting orientation**

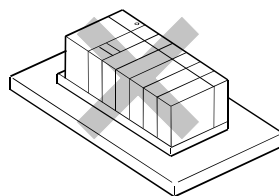
- (a) Since the PLC generates heat, it should be mounted on a well ventilated location in the orientation shown below.



- (b) Do not mount it in either of the orientations shown below.



Vertical



Flat

**(3) Installation surface**

Mount the base unit on a flat surface. If the mounting surface is not even, this may strain the printed circuit boards and cause malfunctions.

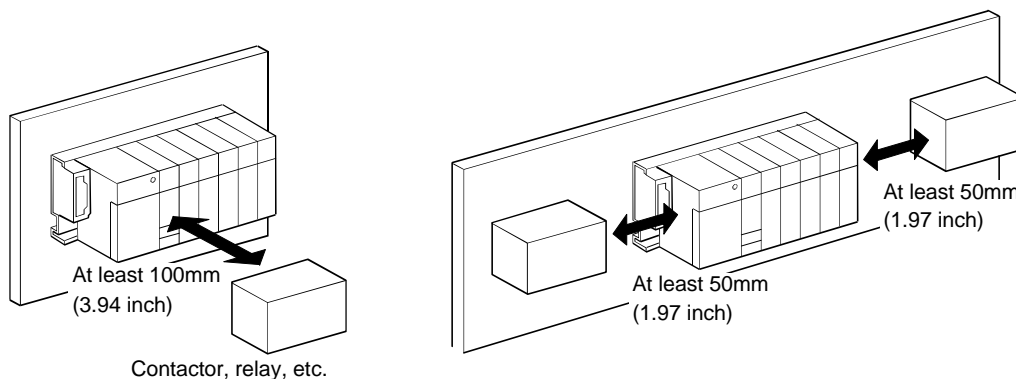
**(4) Installation of unit in an area where the other devices are installed**

Avoid mounting base unit in proximity to vibration sources such as large magnetic contractors and no-fuse circuit breakers; mount these on a separate panel or at a distance.

**(5) Distances from the other devices**

In order to avoid the effects of radiated noise and heat, provide the clearances indicated below between the PLC and devices that generate noise or heat (contactors and relays).

- Required clearance in front of PLC : at least 100 mm (3.94 inch)
- Required clearance on the right and left of PLC : at least 50 mm (1.97 inch)



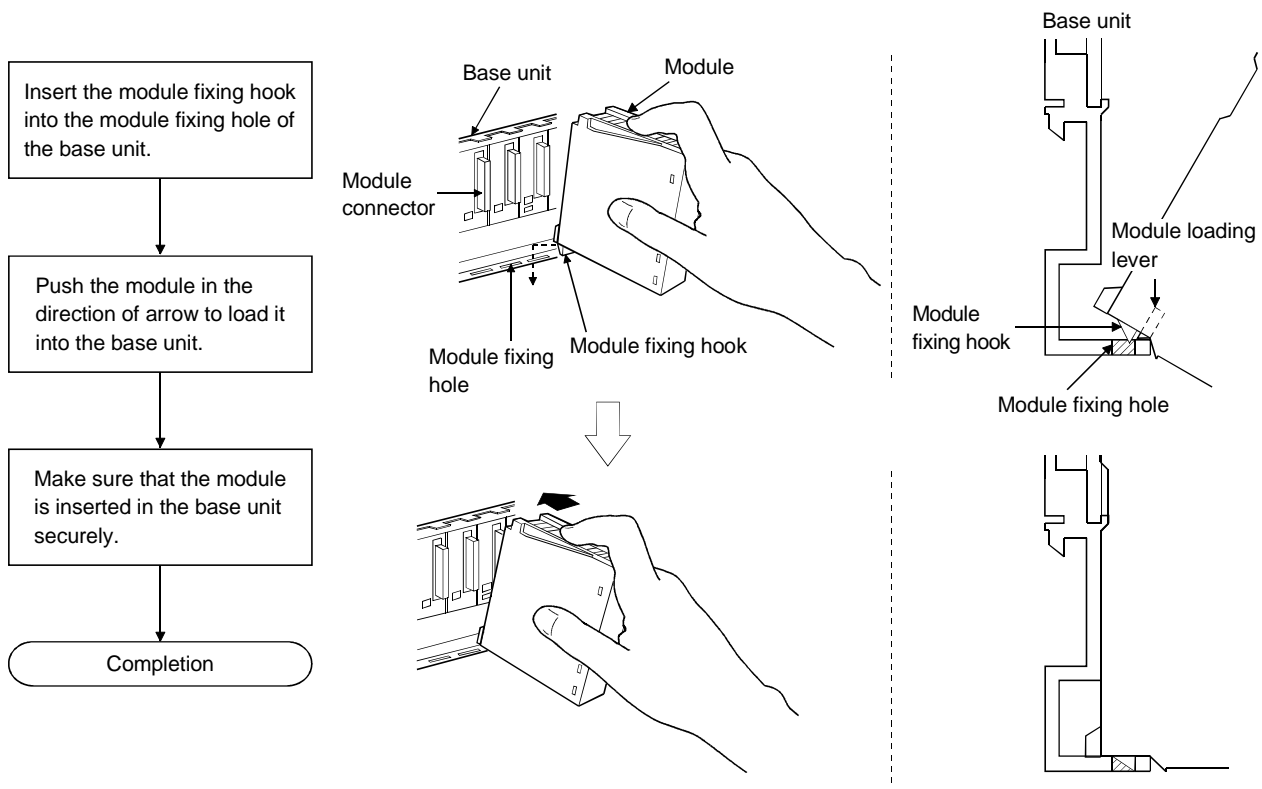
## 9.3.3 Installation and removal of the module

This section explains how to install and remove a power supply, CPU, input/output, intelligent function or another module to and from the base unit.

## (1) Installation and removal of the module from the base unit

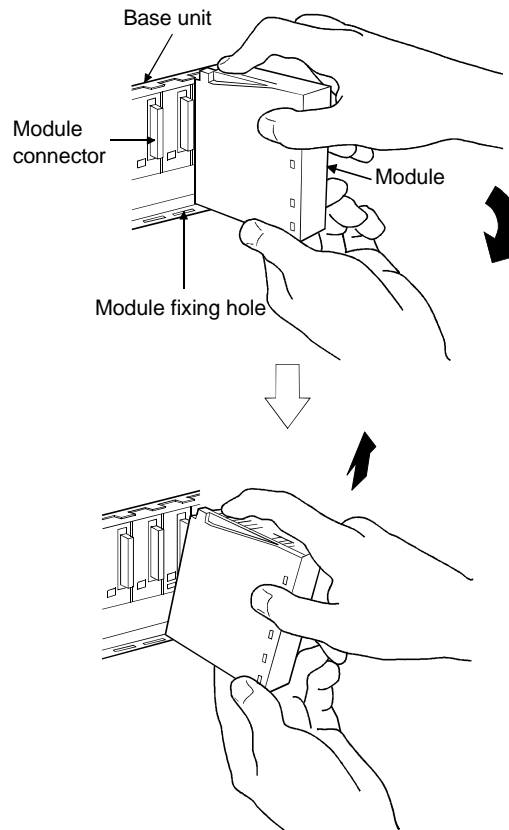
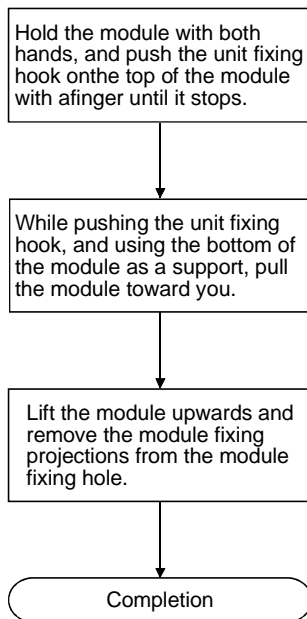
The installation and removal of the module from the base unit are described below.

## (a) Installation of the module on the base unit

**POINTS**

- (1) Always insert the module fixing hook of the module into the module fixing hole. Forcing the hook into the hole will damage the module connector and module.
- (2) When using the PLC in a place where there is large vibration or impact, screw the CPU module to the base unit.  
Module fixing screw : M3 × 12 (user-prepared)

## (b) Removal from the base unit

**POINT**

When the module fixing screw is used, always remove the module by removing the module fixing screw and then taking the module fixing hook off the module fixing hole of the base unit.

Forcibly removing the module will damage the module.

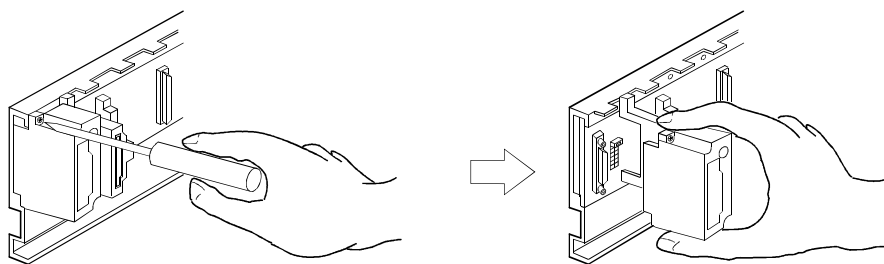
### 9.4 Setting the Stage Number of the Extension Base Unit

When using two or more extension base units, their stage numbers must be set with their "No. of stage setting connectors". Extension 1 need not be set since the extension stage number is factory-set to 1.

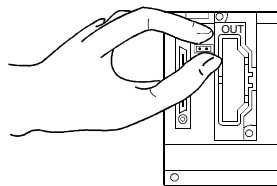
Make this setting in the following procedure.

- (1) The No. of stages setting connector of the extension base unit is located under the IN side base cover. (Refer to Section 6.4 for the setting of the No. of stages setting connector.)

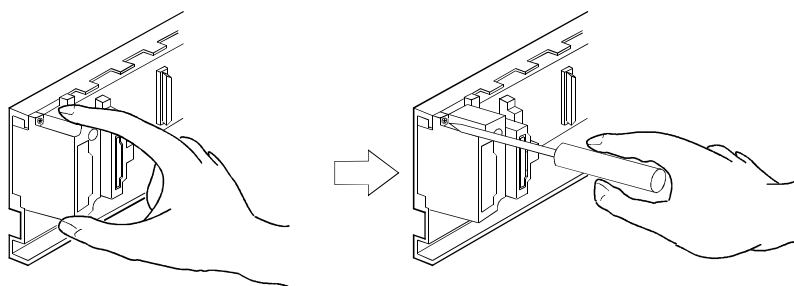
First, loosen the upper and lower screws in the IN side base cover and remove the base cover from the extension base unit.



- (2) Insert the connector pin in the required extension stages number location of the connector (PIN1) existing between the IN and OUT sides of the extension cable connector.



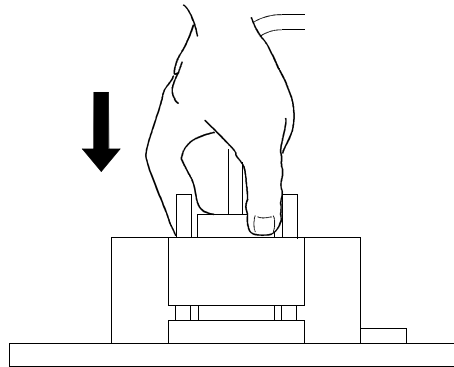
- (3) Install the base cover to the extension base unit and tighten the base cover screw. (Tightening torque: 36 to 48N • cm)



## 9.5 Connection and Disconnection of the Extension Cable

## (1) Instructions for handling an extension cable

- Do not stamp an extension cable.
- An extension cable must be connected to the base unit when the base cover has been installed.  
(After you have set the extension stage number to the extension base unit, reinstall and screw the base cover.)
- When running an extension cable, the minimum bending radius of the cable should be 55mm (2.17 inch) or more.  
If it is less than 55mm (2.17 inch), a malfunction may occur due to characteristic deterioration, open cable or the like.
- When connecting or disconnecting an extension cable, do not hold the ferrite cores mounted at both ends of the cable.  
Hold the connector part of the cable for connection or disconnection.



Holding the ferrite core may cause the cable to open within the connector. Also, if the ferrite core is shifted, the characteristic will change. When handling the cable, take care not to shift the ferrite core positions.

## (2) Connection of extension cable

**POINT**

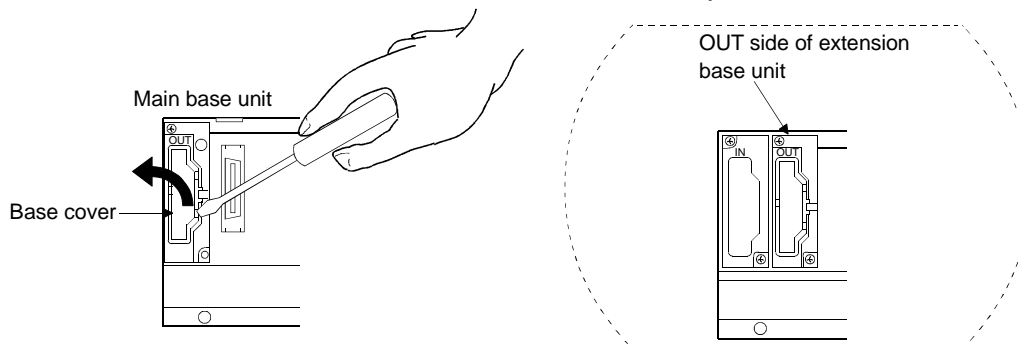
When connecting an extension base unit to the main base unit with an extension cable, always plug the OUT side connector of the main base unit and the IN side connector of the extension base unit with an extension cable. The system will not operate properly if the extension cable is connected in the form of IN to IN, OUT to OUT or IN to OUT.

When connecting two or more extension base units, plug the OUT side connector of the first extension base unit and the IN side connector of the second extension base unit with an extension cable.

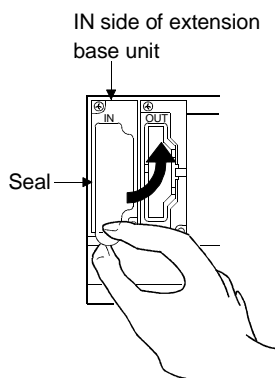
- (a) To connect an extension cable to the main base unit, remove the portion under the OUT characters on the base cover with a tool such as a flat-blade screwdriver ( $5.5 \times 75$ ,  $6 \times 100$ ).

This also applies to a case where an extension cable is connected to the OUT side connector of the extension base unit.

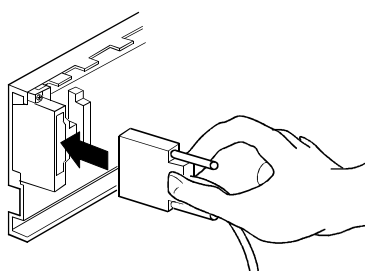
For the Q00JCPU, remove the cover by hand.



- (b) To connect the extension cable to the next extension base unit, remove the seal applied under the IN characters on the base cover.

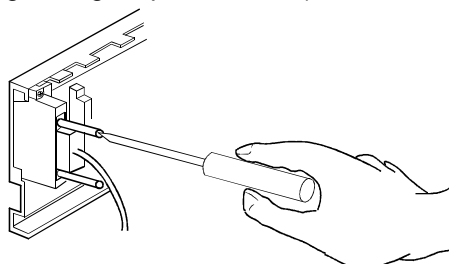


- (c) When plugging the extension cable to any base unit, hold the connector part of the extension cable.



- (d) After fitting the extension cable, always tighten the extension cable connector fixing screws.

(Tightening torque:  $20\text{N} \cdot \text{cm}$ )





(3) Disconnection of extension cable

When unplugging the extension cable, hold and pull the connector part of the extension cable after making sure that the fixing screws have been removed completely.

## 9.6 Wiring

## 9.6.1 The precautions on the wiring

**⚠ DANGER**

- Completely turn off the external power supply when installing or placing wiring. Not completely turning off all power could result in electric shock or damage to the product.
- When turning on the power supply or operating the module after installation or wiring work, be sure that the module's terminal covers are correctly attached. Not attaching the terminal cover could result in electric shock.

**⚠ CAUTION**

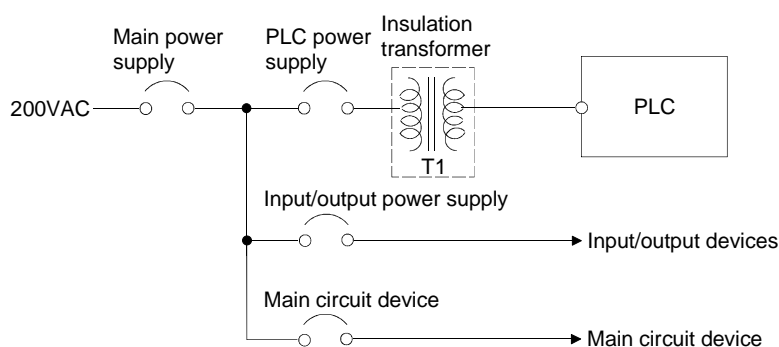
- Be sure to ground the FG terminals and LG terminals to the protective ground conductor. Not doing so could result in electric shock or erroneous operation.
- When wiring in the PLC, be sure that it is done correctly by checking the product's rated voltage and the terminal layout. Connecting a power supply that is different from the rating or incorrectly wiring the product could result in fire or damage.
- External connections shall be crimped or pressure welded with the specified tools, or correctly soldered. Imperfect connections could result in short circuit, fires, or erroneous operation.
- Tighten the terminal screws with the specified torque. If the terminal screws are loose, it could result in short circuits, fire, or erroneous operation. Tightening the terminal screws too far may cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.
- Be sure there are no foreign substances such as sawdust or wiring debris inside the module. Such debris could cause fires, damage, or erroneous operation.
- The module has an ingress prevention label on its top to prevent foreign matter, such as wire offcuts, from entering the module during wiring.  
Do not peel this label during wiring.  
Before starting system operation, be sure to peel this label because of heat dissipation.

The precautions on the connection of the power cables are described below.

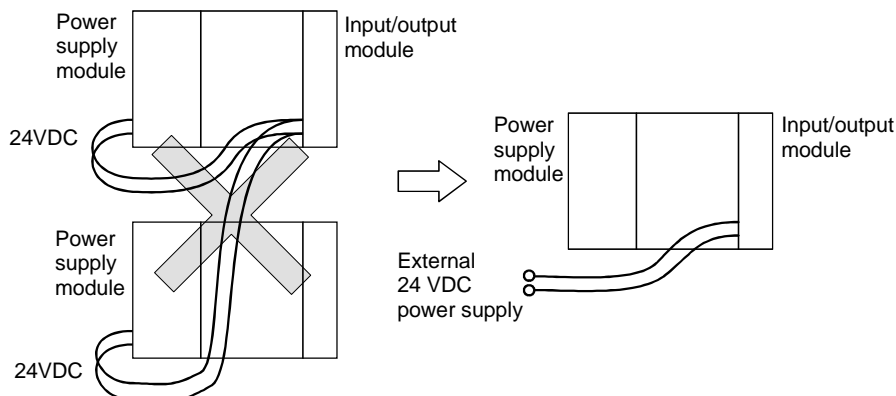
## (1) Power supply wiring

- (a) Separate the PLC's power supply line from the lines for input/output devices and power devices as shown below.

When there is much noise, connect an insulation transformer.



- (b) Do not connect 24 VDC outputs of multiple power supply modules in parallel to a single input/output module. The power supply modules will be broken if cables are connected in parallel.

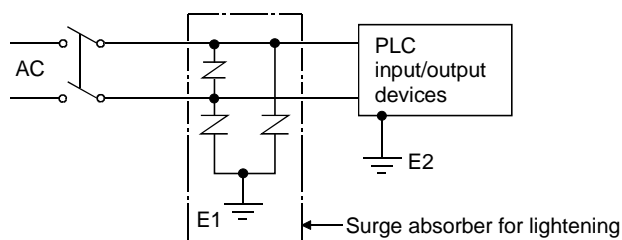


- (c) 100VAC, 200VAC and 24VDC wires should be twisted as dense as possible. Connect the modules with the shortest distance.

Also, to reduce the voltage drop to the minimum, use the thickest wires possible (maximum 2mm<sup>2</sup>).

- (d) Do not bundle the 100VAC and 24VDC wires with, or run them close to, the main circuit (high voltage, large current) and input/output signal lines. Reserve a distance of at least 100 mm (3.94inch) from adjacent wires.

- (e) As a countermeasure to power surge due to lightening, connect a surge absorber for lightening as shown below.

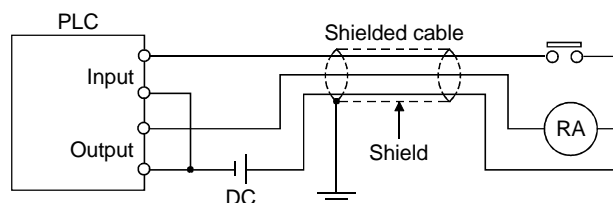


#### POINT

- (1) Separate the ground of the surge absorber for lightening (E1) from that of the PLC (E2).
- (2) Select a surge absorber for lightening whose power supply voltage does not exceed the maximum allowable circuit voltage even at the time of maximum power supply voltage elevation.

**(2) Wiring of input/output equipment**

- (a) Insulation-sleeved crimping terminals cannot be used with the terminal block. It is recommended to cover the wire connections of the crimping terminals with mark or insulation tubes.
- (b) The wires used for connection to the terminal block should be 0.3 to 0.75mm<sup>2</sup> in core and 2.8mm (0.11 inch) max. in outside diameter.
- (c) Run the input and output lines away from each other.
- (d) When the wiring cannot be run away from the main circuit and power lines, use a batch-shielded cable and ground it on the PLC side. In some cases, ground it in the opposite side.

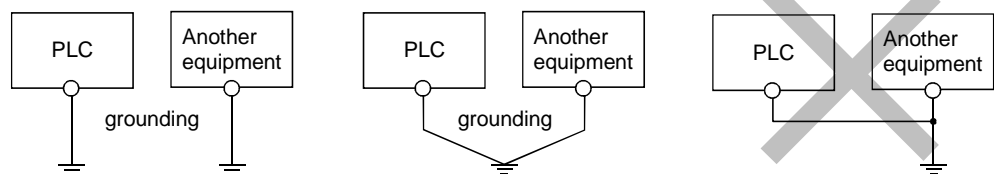


- (e) Where wiring runs through piping, ground the piping without fail.
- (f) Run the 24VDC input line away from the 100VAC and 200VAC lines.
- (g) Wiring of 200m (686.67 feet) or longer distance will give rise to leakage currents due to the line capacity, resulting in a fault. Refer to Section 11.5 for details.

**(3) Grounding**

To ground the cable, follow the steps (a) to (c) shown below.

- (a) Use the dedicated grounding as far as possible.
- (b) When a dedicated grounding cannot be performed, use (2) Common Grounding shown below.

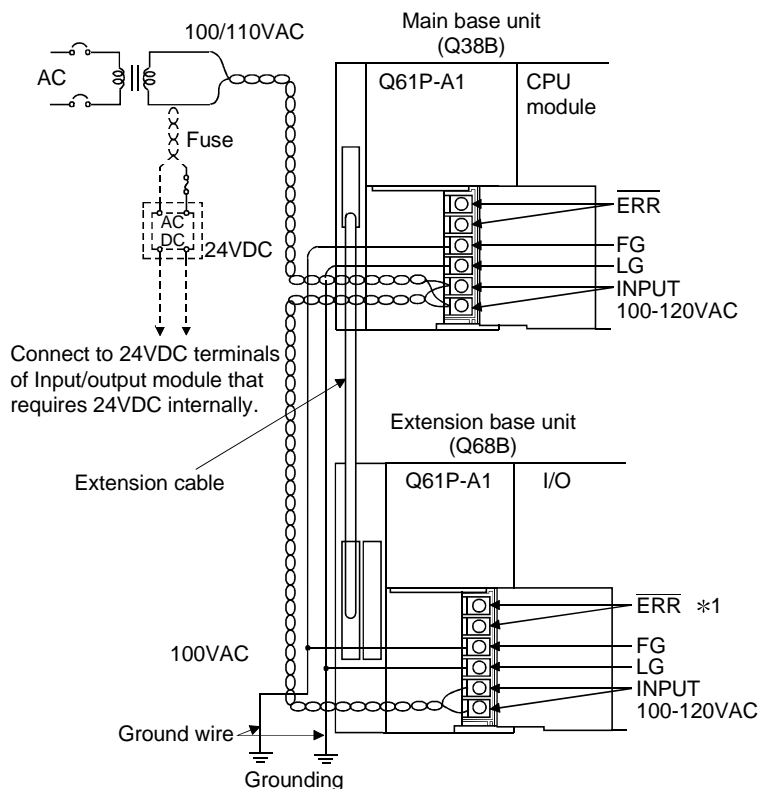


(1) Independent grounding.....Best    (2) Common grounding.....Good    (3) Joint grounding.....Not allowed

- (c) For grounding a cable, use the cable of 2 mm<sup>2</sup> or more. Position the ground-contact point as closely to the sequencer as possible, and reduce the length of the grounding cable as much as possible.

## 9.6.2 Connecting to the power supply module

The following diagram shows the wiring example of power lines, grounding lines, etc. to the main and extension base units.



## POINTS

- (1) Use the thickest possible (max. 2 mm<sup>2</sup> (14 AWG)) wires for the 100/200 VAC and 24 VDC power cables. Be sure to twist these wires starting at the connection terminals. To prevent a short-circuit should any screws loosen, use solderless terminals with insulation sleeves.
- (2) When the LG terminals and FG terminals are connected, be sure to ground the wires. Do not connect the LG terminals and FG terminals to anything other than ground. If LG terminals and FG terminals are connected without grounding the wires, the PLC may be susceptible to noise.  
In addition, since the LG terminals have potential, the operator may receive an electric shock when touching metal parts.
- (3) \*1 An error cannot be output from the ERR terminal of the power supply module loaded on the extension base unit.  
To output an error, use the ERR terminal of the power supply module loaded on the main base unit.

## 10 MAINTENANCE AND INSPECTION

**DANGER**

- Do not touch the terminals while power is on.  
Doing so could cause shock.
- Correctly connect the battery. Also, do not charge, disassemble, heat, place in fire, short circuit, or solder the battery.  
Mishandling of a battery can cause overheating or cracks which could result in injury and fires.
- Turn the power off when cleaning the module or tightening the terminal screws or module mounting screws.  
Conducting these operations when the power is on could result in electric shock.  
Loose terminal screws may cause short circuits or malfunctions.  
Failure to mount the module properly will result in short circuit, malfunction or in the module falling.

**CAUTION**

- In order to ensure safe operation, read the manual carefully to acquaint yourself with procedures for program change, forced outputs, RUN, STOP, and PAUSE operations, etc., while operation is in progress.  
Operation mistakes could cause damage to the equipment and other problems.
- Never try to disassemble or modify module. It may cause product failure, malfunction, fire or cause injury.
- When using any radio communication device such as a cellular phone or a PHS phone, keep them away from the controller at least 25 cm (9.85 inch) or it may cause a malfunction.
- Turn the power off when installing or removing the modules.  
Trying to install or remove the module while the power is on could damage the module or result in erroneous operation.
- Before touching the module, always touch grounded metal, etc. to discharge static electricity from human body.  
Failure to do so may cause the module to fail or malfunction.

In order that you can use the PLC in normal and optimal condition at all times, this section describes those items that must be maintained or inspected daily or at regular intervals.

## 10.1 Daily Inspection

The items that must be inspected daily are listed below.

## Daily inspection

Item	Inspection Item		Inspection	Judgment Criteria	Remedy
1	Installation of base unit		Check that fixing screws are not loose and the cover is not dislocated.	The screws and cover must be installed securely.	Further tighten the screws.
2	Installation of input/output module		Check that the module is not dislocated and the unit fixing hook is engaged securely.	The unit fixing hook must be engaged and installed securely.	Securely engaged the unit fixing hook.
3	Connection		Proximity of solderless terminals to each other	Terminal screws must not be loose.	Further tighten terminal screws.
			Connectors of extension cable	The connectors of extension cables must be positioned at proper intervals.	Correct the intervals.
			Check for lightening.	The connector must not be loose.	Further tighten connector fixing screws.
4	Module indication lamp	Power supply [POWER] LED *1	Check that it is lit.	The lamp must be lit. (Abnormal if the lamp goes off.)	Follow Section 11.2.
		CPU [RUN] LED	Check that the lamp lights up in RUN state.	The lamp must be lit. (Abnormal if the lamp goes off.)	
		CPU [ERR.] LED	Check that the lamp goes off.	The lamp must go off. Abnormal if the lamp lights up or flashes.	
		Input LED	Check that the lamp lights up and goes off.	The lamp must be lit when the input power is turned ON. The lamp must be extinguished when the input power is turned OFF. (Abnormal if the lamp does not light up or goes off as indicated above.)	
		Output LED	Check that the lamp lights up and goes off.	The lamp lights up when the output power is turned ON. The lamp must be extinguished when the output power is turned OFF. (Abnormal if the lamp does not light up or goes off as indicated above.)	

\*1 For the Q00JCPU, check the POWER LED of the CPU section.

## 10.2 Periodic Inspection

The items that must be inspected one or two times every 6 months to 1 year are listed below.

When the equipment is moved or modified, or layout of the wiring is changed, also perform this inspection.

Periodic Inspection

Item	Inspection Item		Inspection	Judgment Criteria	Remedy
1	Ambient environment	Ambient temperature	Measure with a thermometer and a hygrometer. Measure corrosive gas.	0 to 55 °C	When the sequencer is used in the board, the ambient temperature in the board becomes the ambient temperature.
		Ambient humidity		5 to 95 %RH	
		Atmosphere		Corrosive gas must not be present.	
2	Power voltage		Measure a voltage across the terminals of 100/200VAC and 24VDC.	85 to 132VAC 170 to 264VAC 15.6 to 31.2VDC	Change the power supply.
3	Installation	Looseness, rattling	Move the module to check for looseness and rattling.	The module must be installed fixedly.	Further tighten screws. If the CPU module, input/output module, or power supply module is loose, fix it with screws.
		Adhesion of dirt and foreign matter	Check visually.	Dirt and foreign matter must not be present.	Remove and clean.
4	Connection	Looseness of terminal screws	Try to further tighten screws with a screwdriver.	Screws must not be loose.	Further tighten.
		Proximity of solderless terminals to each other	Check visually.	Solderless terminals must be positioned at proper intervals.	Correct.
		Looseness of connectors	Check visually.	Connectors must not be loose.	Further tighten connector fixing screws.
5	Battery		check on the monitor mode of the GX Developer that SM51 or SM52 is turned OFF.	(Preventive maintenance)	Even if the lowering of a battery capacity is not shown, replace the battery with a new one if a specified service life of the battery is exceeded.



### 10.3 Battery Replacement

When the voltage of the program and power interrupt hold-on function backup battery is lowered, the special relays SM51 and SM52 are energized.

Even if these special relays are energized, the contents of the program and power interrupt hold-on function are not erased immediately.

If the energization of these relays is recognized, however, these contents may be deleted unintentionally.

While a total of the power interrupt hold-on time after the SM51 is energized is within a specified time, replace the battery with a new one.

#### POINTS

The SM51 is used to give an alarm when the capacity of the battery is lowered.

Even after it is energized, the data is held for a specified time.

For safety, however, replace the battery with a new one as early as possible.

The SM52 is energized when the battery causes a complete discharge error.

Immediately after the relay has been energized, replace the battery with a new one.

Whichever voltage of the battery of the CPU module is lowered, the SM51 and SM52 are energized.

To identify the specific battery of the memory of which voltage is lowered, check the contents of the special registers SD51 and SD52.

When the voltage of the battery of each memory is lowered, the bit corresponding to each of SD51 and SD52 memories is turned on.

Bit No. of SD51 and SD52	Object
Bit 0	CPU module

#### POINTS

The relation between the backups of the memories preformed by the batteries which are installed on the CPU module is described below.

Power supply of the power supply module	Battery of CPU Main Module	Memory of CPU Main Module
ON	Installed	○
		○
	Not installed	○
		○
OFF	Installed	○
		○
	Not installed	×
		×

○ : Backup enable    × : Backup unable

The standard service life and replacement procedures of the battery is described on the next page.

## 10.3.1 Battery service life

## (1) Battery (Q6BAT) lives of CPU modules

(a) The following table indicates the battery lives of the CPU modules.

CPU Module Type	*1 Power-on Time Ratio	Battery Lives		
		*2 Guaranteed value (MIN)	*2 Actual operation value (TYP)	After SM52 ON (Guaranteed time after alarm occurrence)
Q00JCPU	0%	26,000hr	5 years	710hr
	30%	37,142hr	5 years	710hr
	50%	5 years	5 years	710hr
	70%	5 years	5 years	710hr
	100%	5 years	5 years	710hr
Q00CPU	0%	26,000hr	5 years	710hr
	30%	37,142hr	5 years	710hr
	50%	5 years	5 years	710hr
	70%	5 years	5 years	710hr
	100%	5 years	5 years	710hr
Q01CPU	0%	5,100hr	15,000hr	420hr
	30%	7,285hr	21,428hr	420hr
	50%	10,200hr	30,000hr	420hr
	70%	17,000hr	5 years	420hr
	100%	5 years	5 years	420hr

\*1: The power-on time ratio indicates the ratio of PLC power-on time to one day (24 hours).  
(When the total power-on time is 12 hours and the total power-off time is 12 hours, the power-on time ratio is 50%.)

\*2: The actual operation value indicates a typically observed value, and the guaranteed value indicates a minimum value.

(b) When the Q6BAT is not connected to the CPU module, its service life is five years.

(c) When the battery-low special relay SM52 turns on, immediately change the battery.

However, if the alarm has not yet occurred, it is recommended to change the battery according to the operating condition.

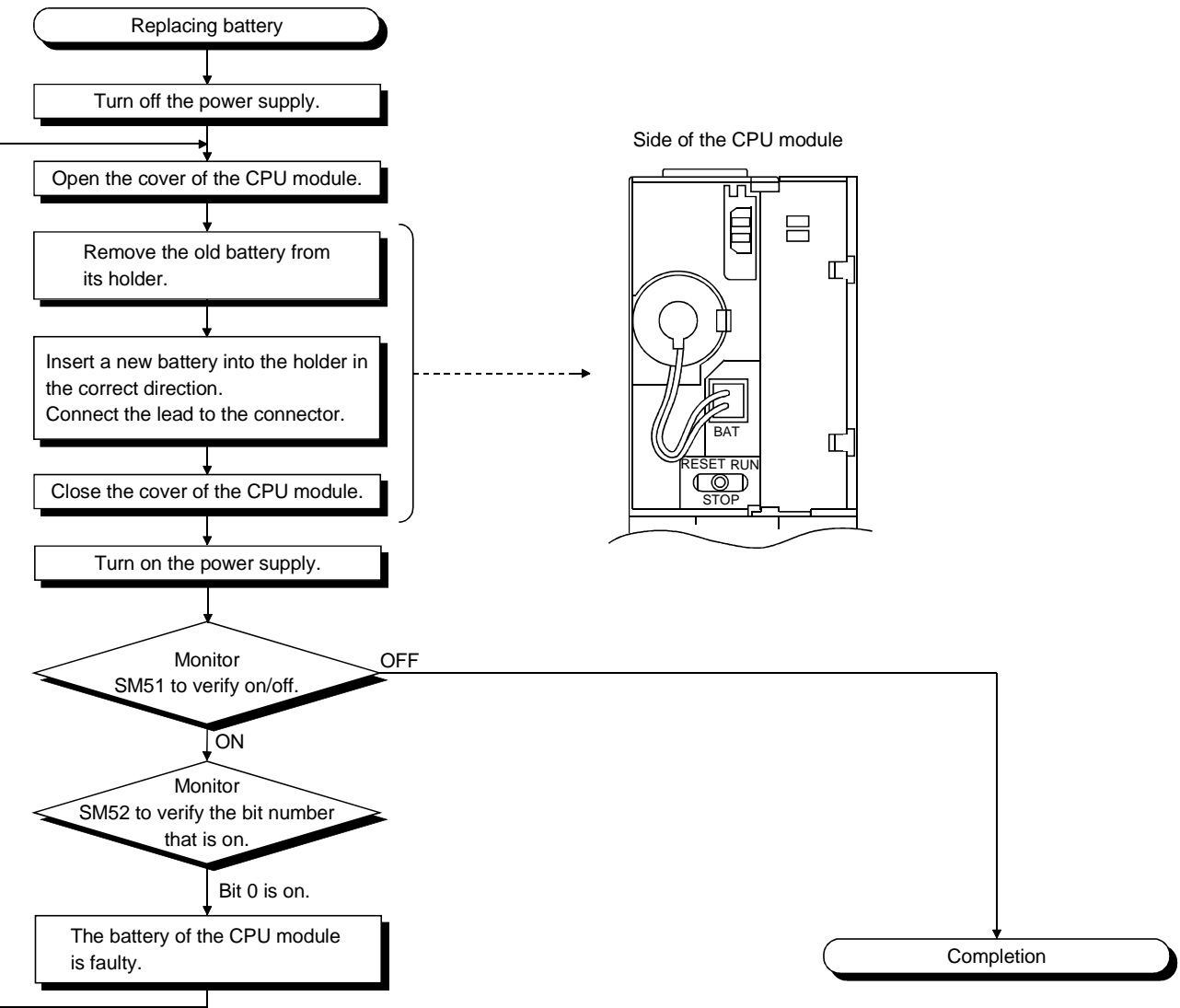
10.3.2 Battery replacement procedure

(1) CPU module battery replacement procedure

When the CPU module battery has been exhausted, replace the battery with a new one in accordance with the procedure shown below. Before dismounting the battery, turn ON the power supply for 10 minutes or longer. Even when the battery is dismounted, the memories are backed up by the capacitor for a while. However, if the replacement time exceeds the guaranteed value specified in the table below, the contents stored in the memories may be erased. To prevent this trouble, replace the battery speedily.

Backup time by capacitor

Backup time by capacitor[min]
3



### 10.4 When Resuming Operation after Storage of PLC without Battery

When the PLC operation is to be resumed after being stored with the battery removed, the memories in the CPU module may be corrupted.

Hence, before resuming operation, always format the memories using GX Developer. After formatting the memories, write the memory contents backed up prior to storage to each memory.

The following table indicates the relationships between the battery and battery-backed memories.

○ : Battery backed

Memory \ Battery		Q6BT of QCPU Module
CPU module	Program memory	○
	Standard RAM	○
	Standard ROM	- (battery backup not needed)

Format the battery-backed memories in the above table using GX Developer before resuming operation.

Refer to the GX Developer manual for the memory formatting operation.

<b>POINT</b>	
Before storing the PLC, always back up the contents of each memory.	

### 10.5 When Resuming PLC Operation after Storage of PLC with Battery Gone Flat

When the PLC is to be used after being stored for some period of time and the battery has gone flat during storage, the memories in the CPU module may be corrupted. Hence, before resuming operation, always format the memories using GX Developer. After formatting the memories, write the memory contents backed up prior to storage to each memory.

The following table indicates the relationships between the battery and battery-backed memories.

○: Battery backed

Memory \ Battery		Q6BT of QCPU Module
CPU module	Program memory	○
	Standard RAM	○
	Standard ROM	- (battery backup not needed)

Format the battery-backed memories in the above table using GX Developer before resuming operation.

Refer to the GX Developer manual for the memory formatting operation.

<b>POINT</b>	
Before storing the PLC, always back up the contents of each memory.	

## 11 TROUBLESHOOTING

This section describes the various types of trouble that occur when the system is operated, and causes and remedies of these troubles.

### 11.1 Troubleshooting Basics

In order to increase the reliability of the system, not only highly reliable devices are used but also the speedy startup of the system after the occurrence of trouble becomes an important factor.

To start up the system speedily, the cause of the trouble must be located and eliminated correctly.

The basic three points that must be followed in the troubleshooting are as follows.

#### (1) Visual inspection

Visually check the following.

- 1) Movement of sequencer (stopped condition, operating condition)
- 2) Power supply on/off
- 3) State of input/output devices
- 4) Power supply module, CPU module, input/output module, intelligent function module, installation condition of extension cable
- 5) State of wiring (input/output cables, cables)
- 6) Display states of various types of indicators (POWER LED, RUN LED, ERR. LED, INPUT/OUTPUT LED)
- 7) States of setting of various types of set switches (Setting of No. of stages setting connector of extension base unit, power interrupt hold-on state)

After confirming items 1) to 7), connect the GX Developer, and check the operating conditions of the PLC and the contents of the program.

#### (2) Check of trouble

Check to see how the operating condition of the PLC varies while the PLC is operated as follows.

- 1) Set the RUN/STOP/RESET switch to STOP. (Refer to Section 4.4 for reset operation.)
- 2) Reset the trouble with the RUN/STOP/RESET switch.
- 3) Turn ON and OFF the power supply.

#### (3) Reduction in area

Estimate the troubled part in accordance with items (1) and (2) above.

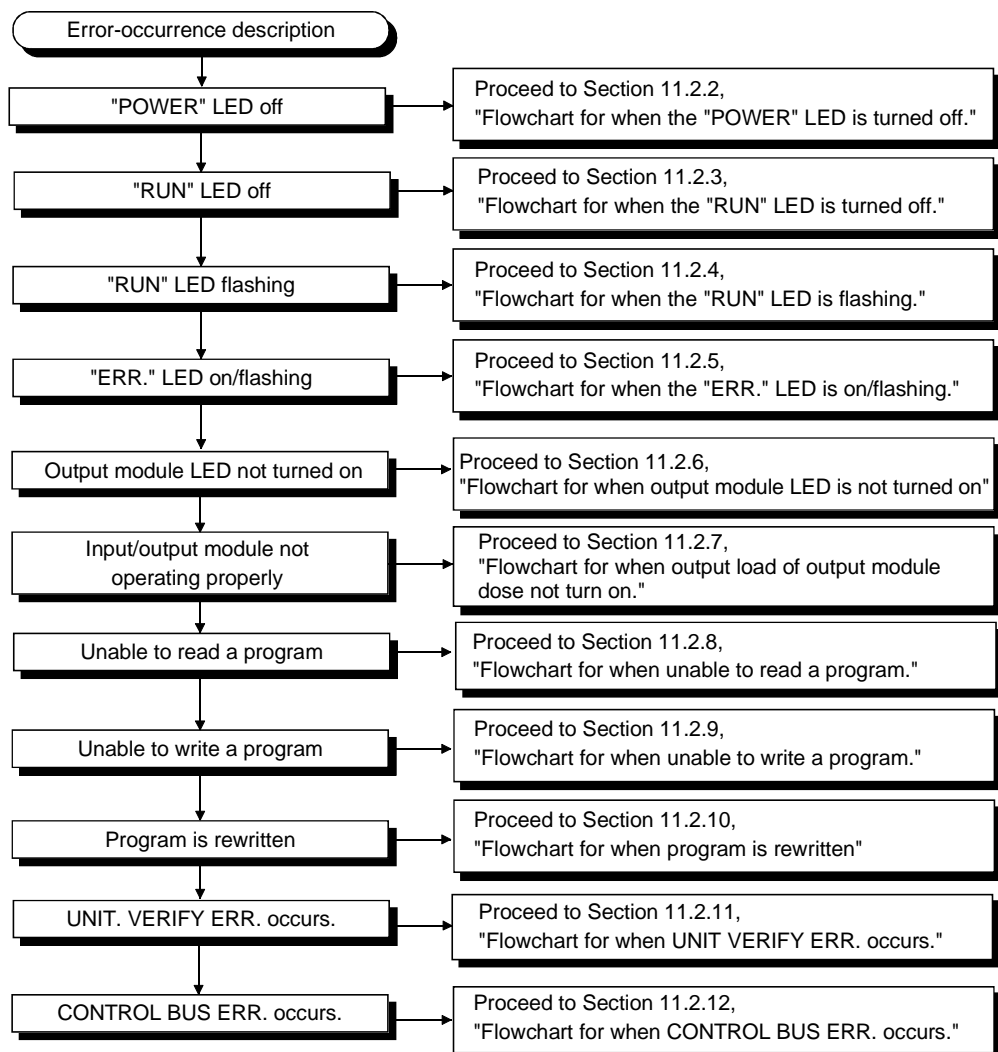
- 1) PLC or external devices
- 2) Input/output module or others
- 3) Sequence program

## 11.2 Troubleshooting

The trouble investigating methods, contents of troubles for the error codes, and remedies of the troubles are described below.

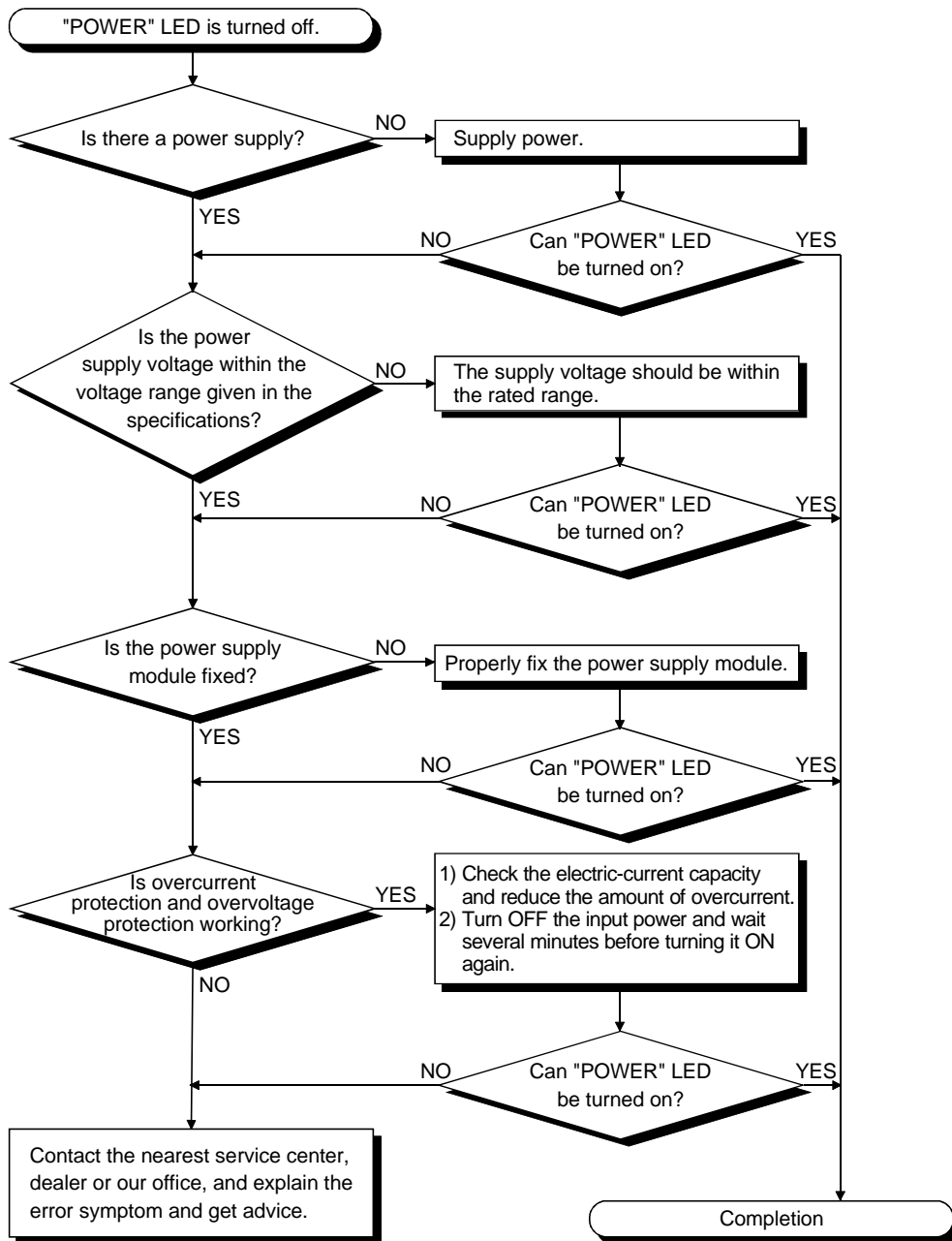
### 11.2.1 Troubleshooting flowchart

The following shows the contents of the troubles classified into a variety of groups according to the types of events.



## 11.2.2 Flowchart for when the "POWER" LED is turned off

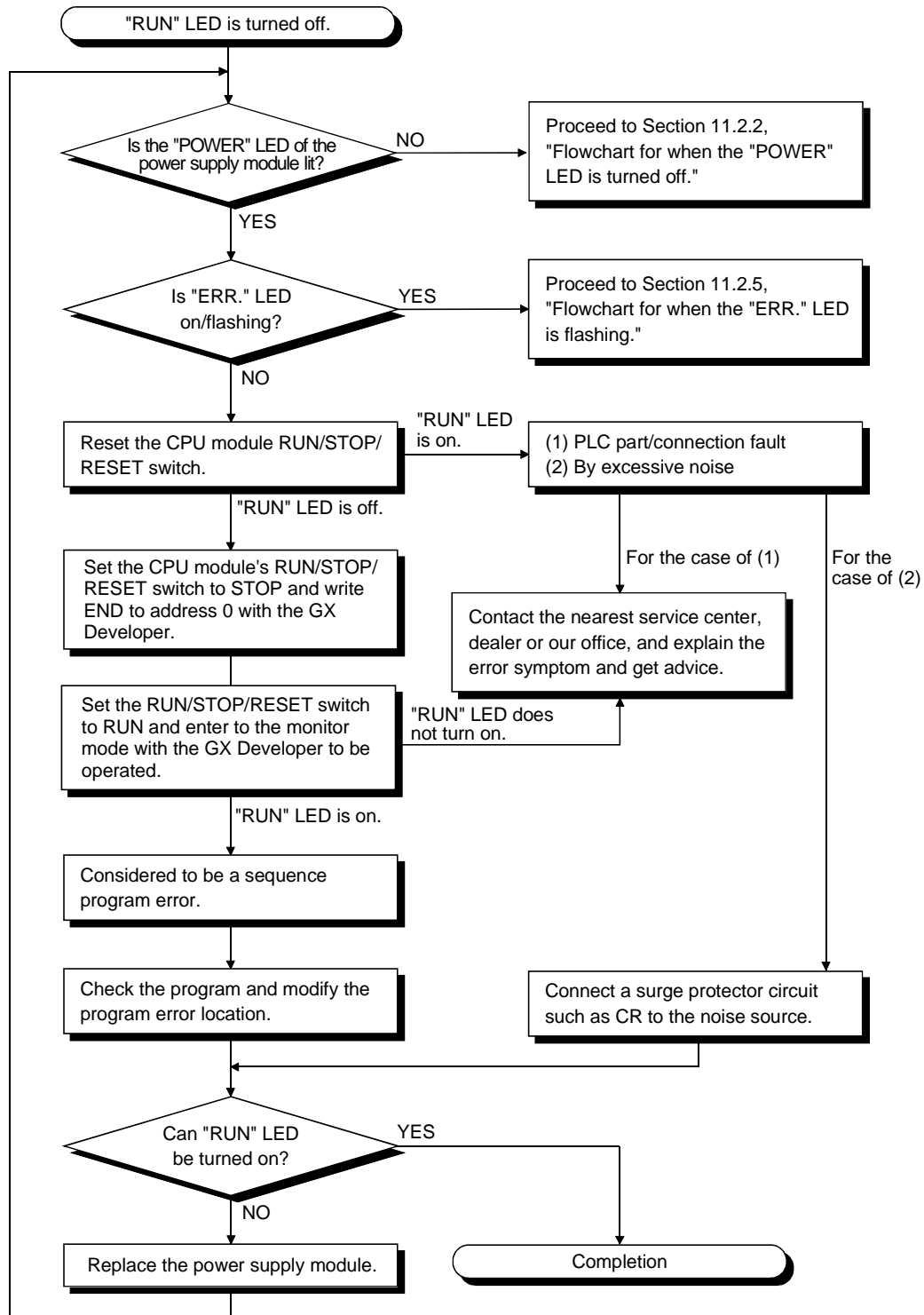
The following shows the flowchart to be followed when the "POWER" LED of the power supply module goes off when the PLC power supply is turned on or during the operation.





## 11.2.3 Flowchart for when the "RUN" LED is turned off

The following shows the flowchart to be followed when the "RUN" LED of the CPU module goes off during the PLC operation.



#### 11.2.4 When the "RUN" LED is flashing

If the "RUN" LED flashes, follow the steps below.

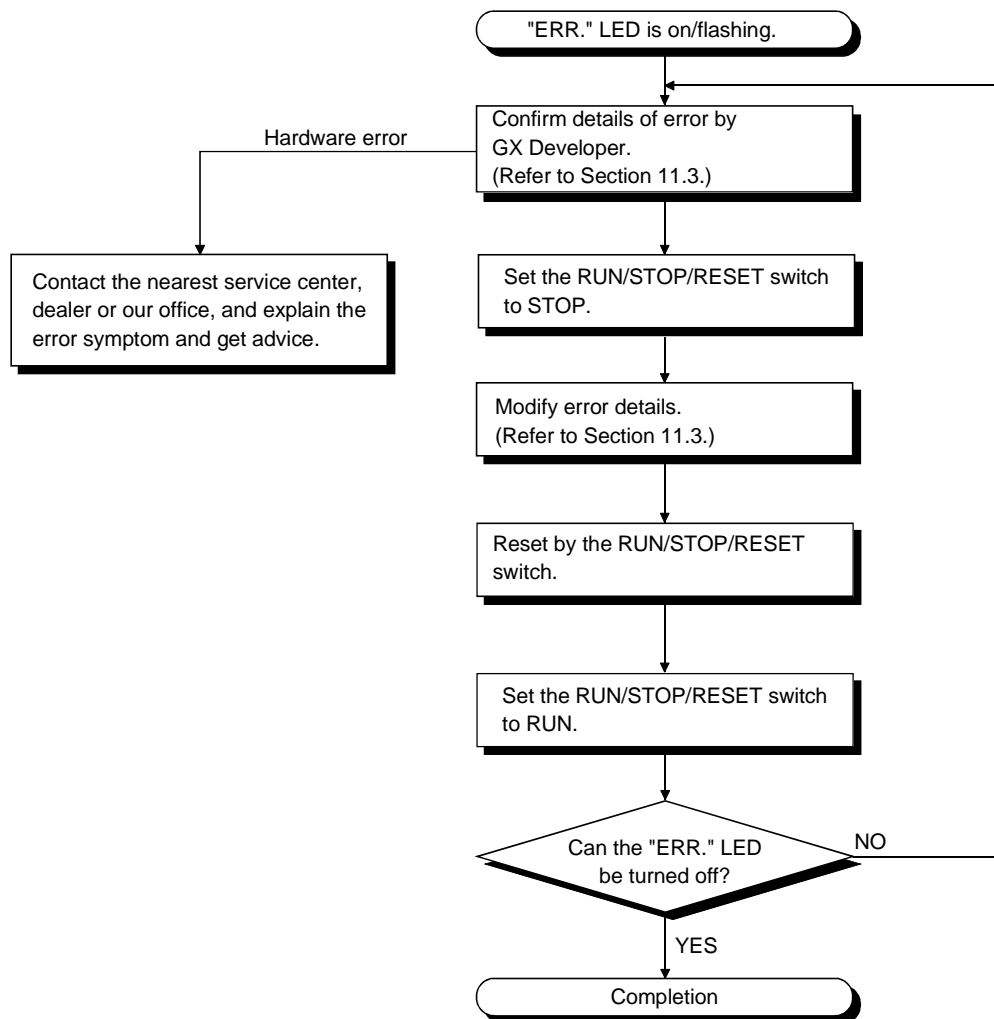
The Basic model QCPU flashes the "RUN" LED when the RUN/STOP/RESET switch is set from STOP to RUN after the program or parameter is written in the Basic model QCPU during the stoppage.

Though this is not the trouble with the CPU module, the operation of the CPU module is stopped.

To bring the CPU module into RUN state, reset the CPU module with the RUN/STOP/RESET or set the RUN/STOP/RESET switch again from STOP to RUN. The "RUN" LED lights up.

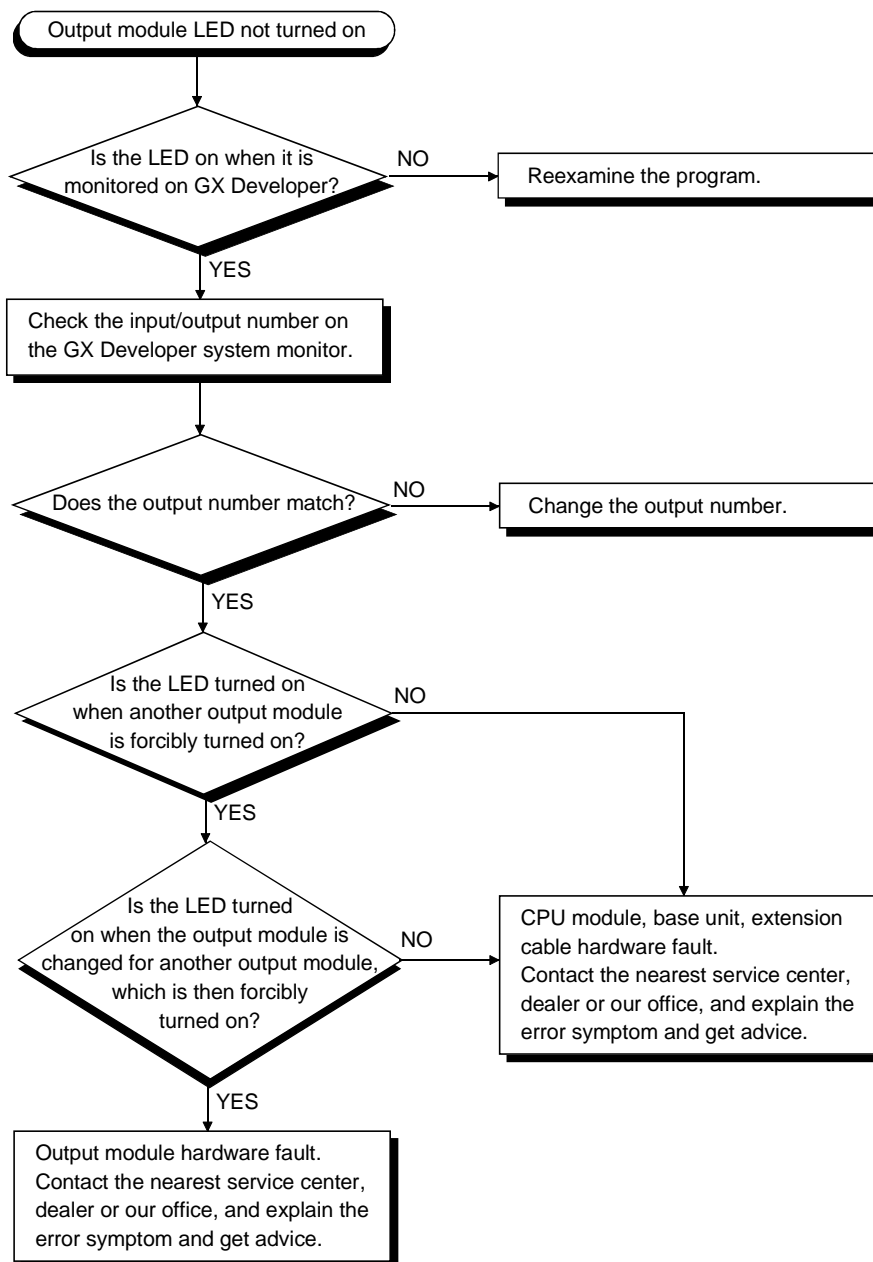
#### 11.2.5 Flowchart for when the "ERR." LED is on/flashing

The following shows the flowchart to be followed when the "ERR." LED of the CPU module lights up/flashes during the operation when the PLC power supply is turned on or the operation is started.



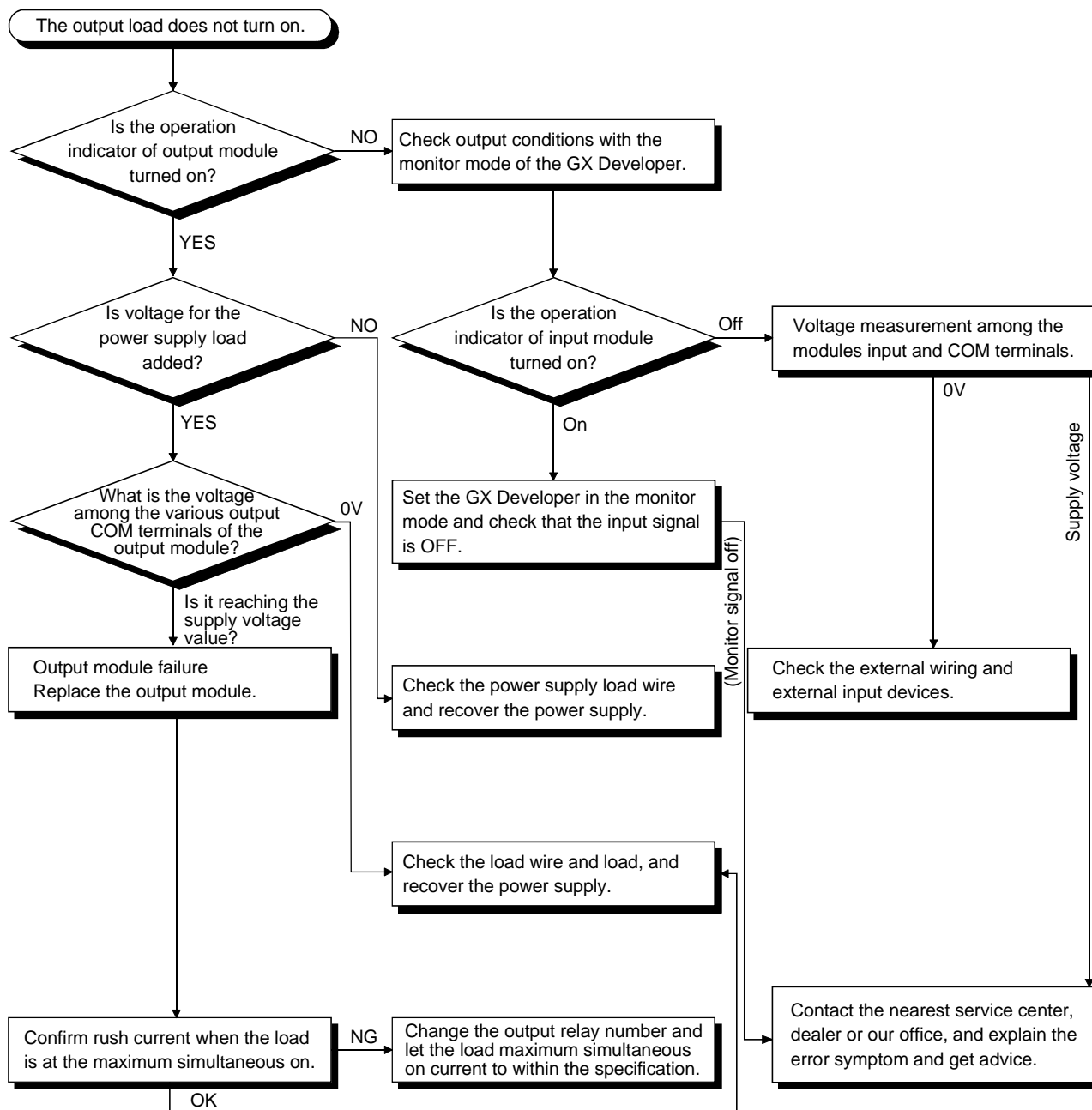
## 11.2.6 Flowchart for when output module LED is not turned on

The following shows the flowchart to be followed when the output module LED is not turned on during PLC operation.



## 11.2.7 Flowchart for when output load of output module does not turn on

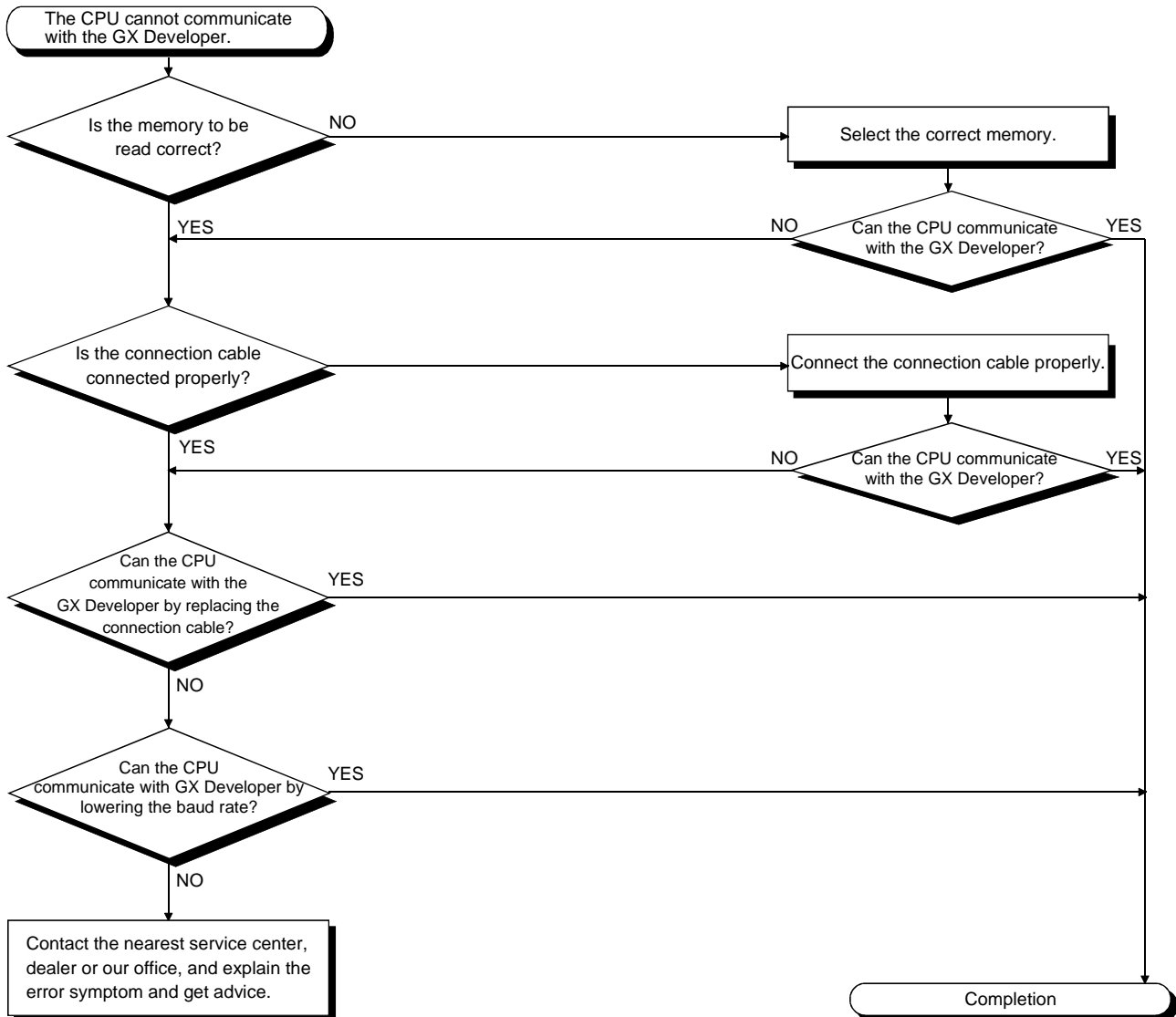
The following shows the flowchart that must be followed when the output load of the output module is not turned on during PLC operation.

**POINT**

For the trouble that the input signal to the input module is not turned off, troubleshoot referring to Section 11.5 Examples of Troubles with Input/output Modules.

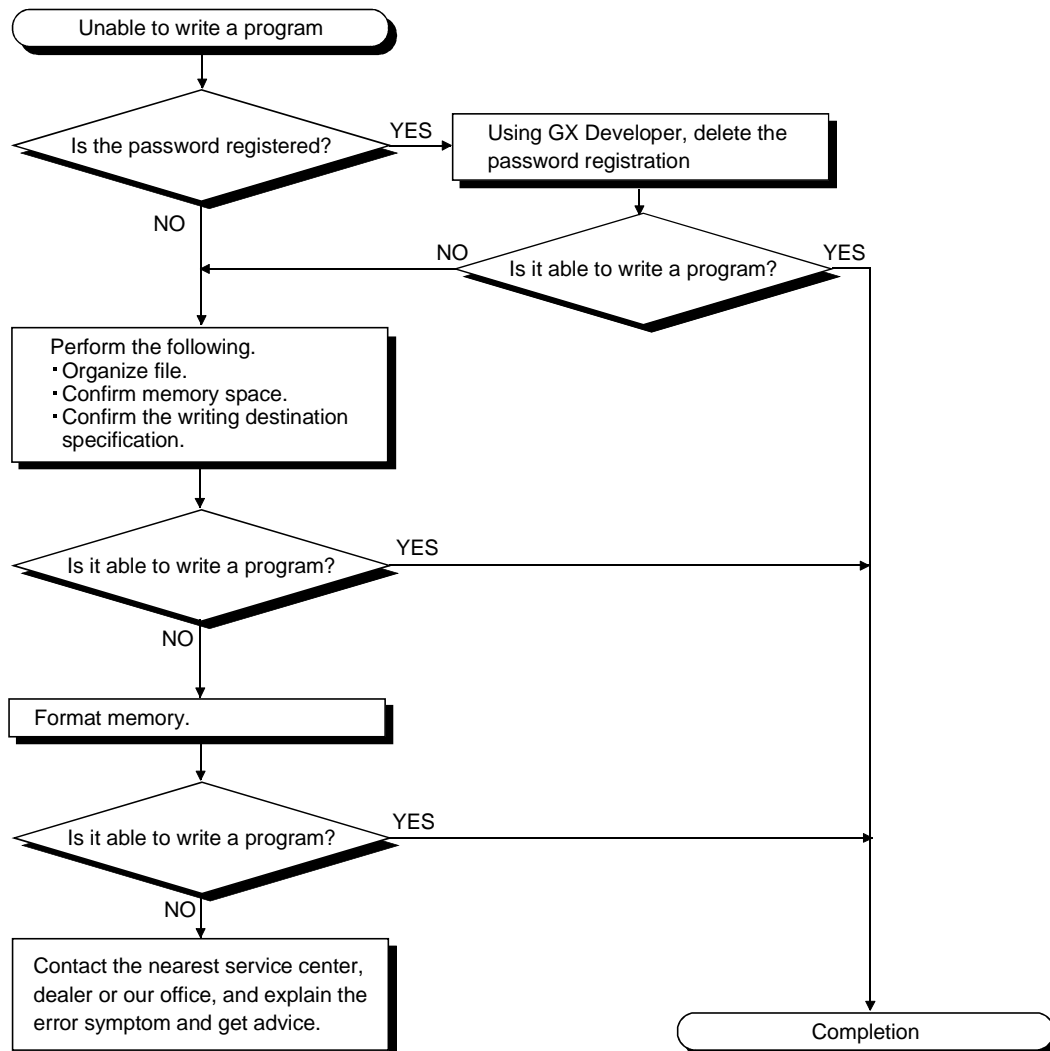
## 11.2.8 Flowchart for when unable to read a program

The following shows the flowchart that must be followed when the PLC cannot communicate with the GX Developer while the PLC power supply is turned on.



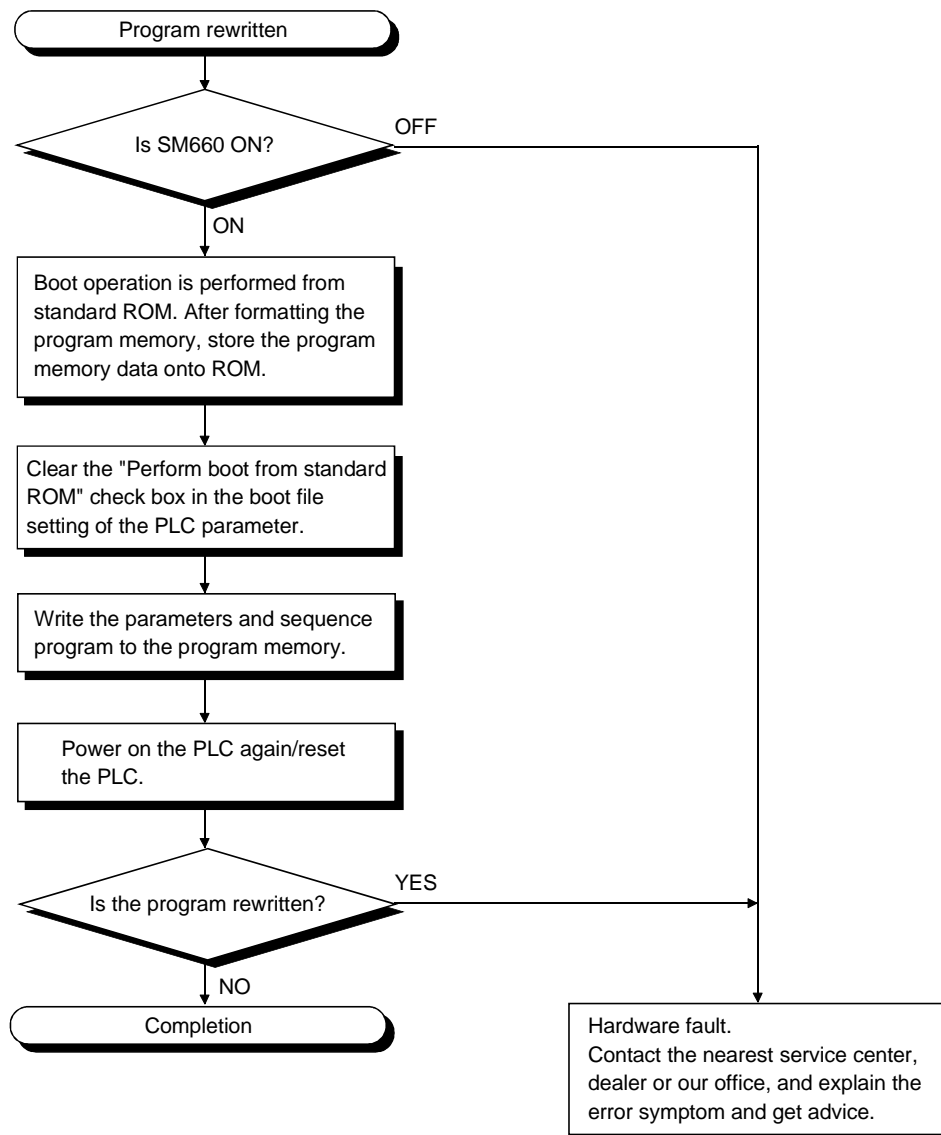
## 11.2.9 Flowchart for when unable to write a program

The following shows the flowchart that must be followed when programs cannot be written in the CPU module.



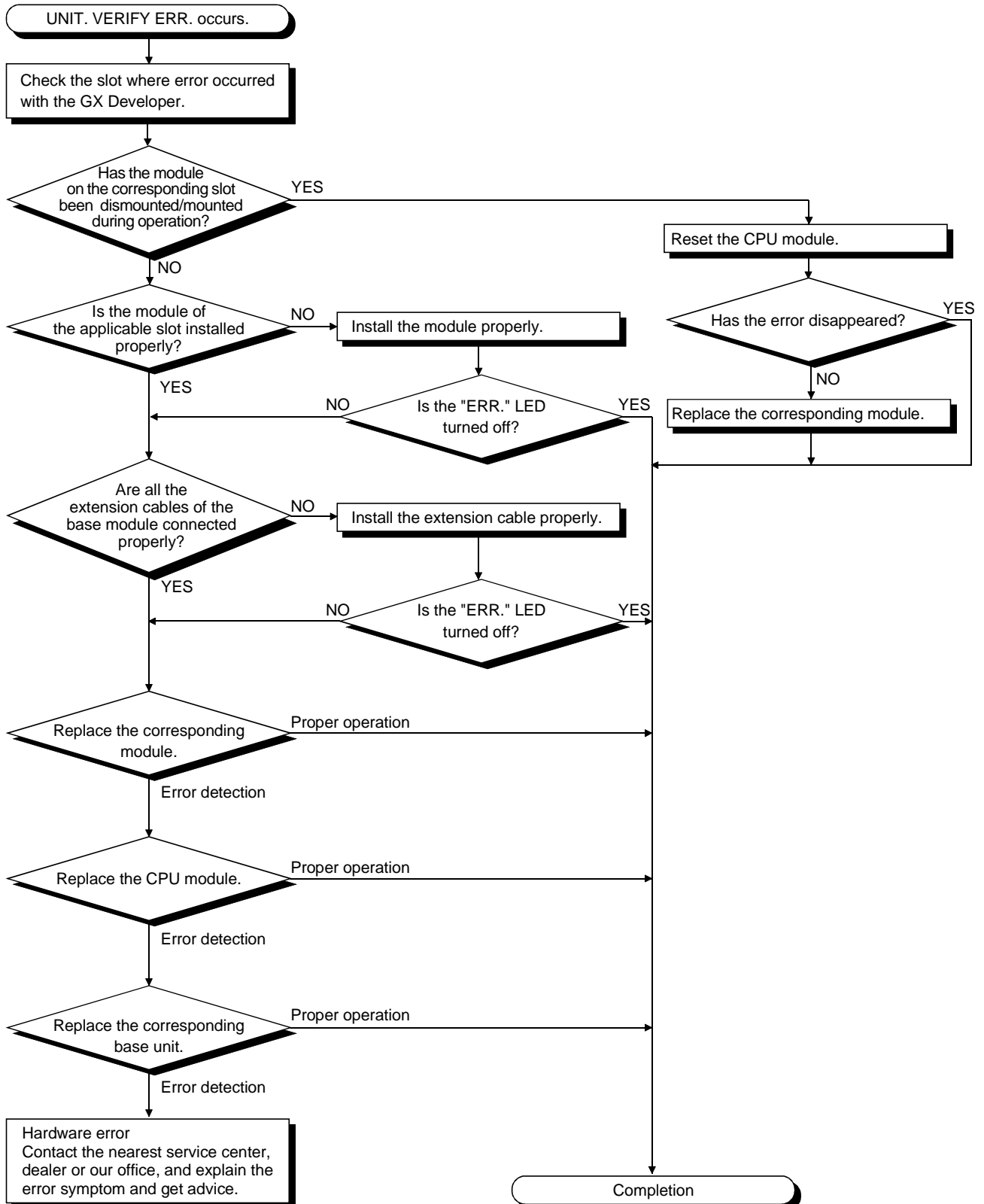
## 11.2.10 Flowchart for when program is rewritten

The following shows the flowchart to be followed when a program is rewritten when the PLC is powered on or reset.



## 11.2.11 Flowchart for when UNIT VERIFY ERR. occurs

The following shows the flowchart to be followed when the UNIT VERIFY ERR. occurs while the PLC power supply is turned on or during the operation.

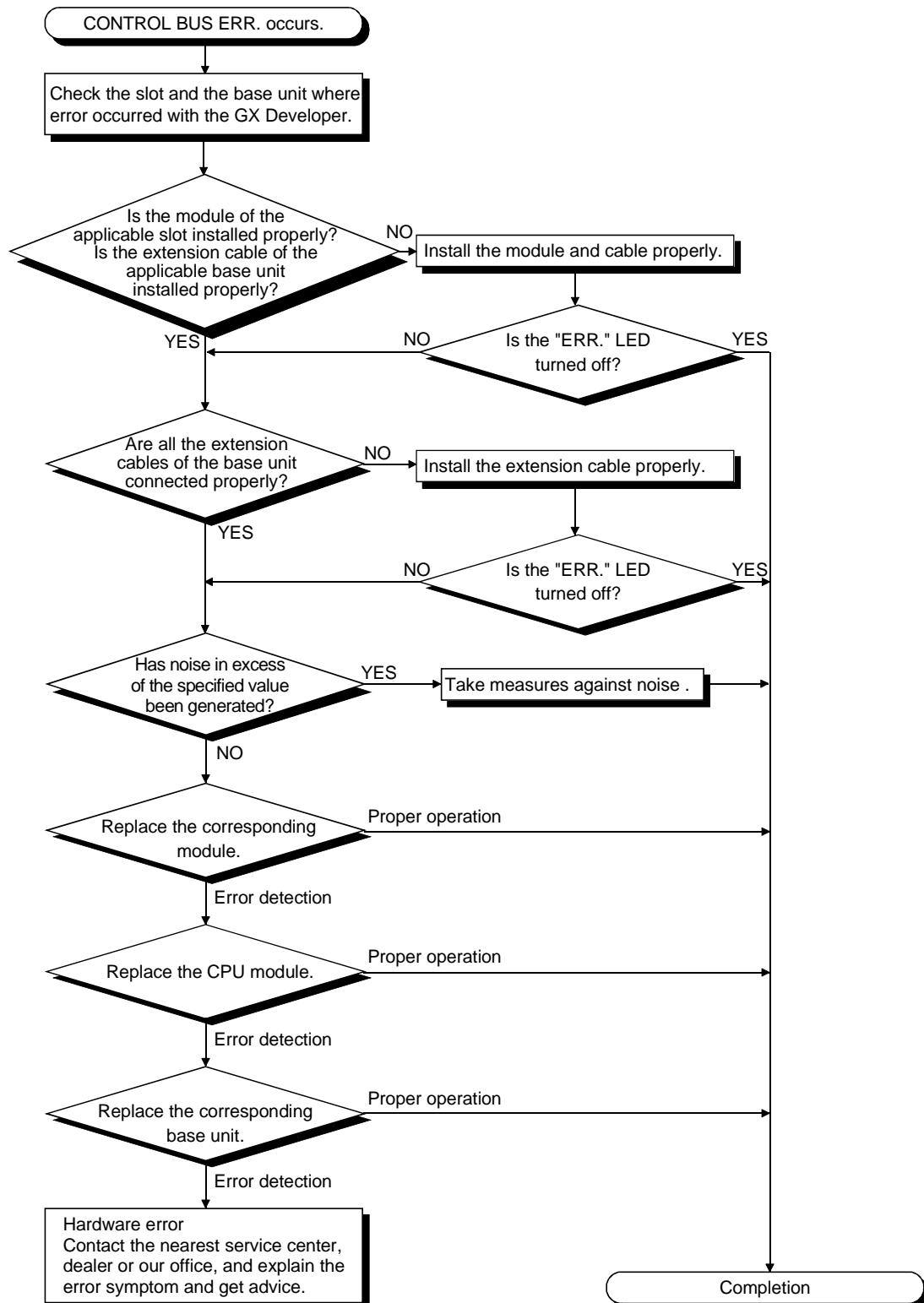




## 11.2.12 Flowchart for when CONTROL BUS ERR. occurs

The following shows the flowchart that must be followed when the CONTROL BUS ERR. occurs while the PLC power supply is turned on or during the operation.

This flow chart can be confirmed only when a specific slot/base unit can be detected by the error code.



### 11.3 Error Code List

When the sequencer power supply is turned on and the stopped CPU module runs or trouble occurs during the running, the Basic model QCPU displays an error (by LED) using the self-diagnosis function, and stores the error information in the special relay SM and special register SD.

<b>REMARK</b>
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Refer to Appendix 1 for the error code (4000H to 4FFFH) output for the case where general data processing is requested from GX Developer, intelligent function module or network system.

#### 11.3.1 Procedure for reading error codes

If an error occurs, the error code and error message can be read using GX Developer Version 7 (SW7D5C-GPPW-E) or later.

Use the following procedure to read error codes with GX Developer.

- 1) Start the the GX Developer.
- 2) Connect the Basic model CPU module to the personal computer.
- 3) Select [Online] - [Read from PLC] Menu by the the GX Developer, and also read the project from the Basic model QCPU.
- 4) Select the [Diagnostics] - [PLC diagnostics ] Menu.
- 5) Click the 'Error Jump" button in the PLC diagnostics dialog box to display the error code and error message.
- 6) Select the [Help] - [PLC error] Menu, and confirm the content of the applicable error code.

For details of the the GX Developer operating method, refer to the applicable the GX Developer Operating Manual.

## 11.3.2 Error code list

The following information deals with error codes and the meanings, causes, and corrective measures of error messages.

Error Code (SD0) * 1	Error Messages	Common Information (SD5 to 15) * 1	Individual Information (SD16 to 26) * 1	LED Status		Operating Statuses of CPU	Diagnostic Timing	
				RUN	ERROR			
1000	MAIN CPU DOWN	—	—	Off	Flicker/On	Stop	Always	
1001								
1002								
1003								
1004								
1005								
1006								
1009								
1010	END NOT EXECUTE	—	—	Off	Flicker	Stop	When an END instruction is executed.	
1011								
1012								
1020	SFCP. END ERROR	—	—	Off	Flicker	Stop	When SFC program is executed	
1101	RAM ERROR	—	—	Off	Flicker	Stop	At power ON/At reset	
1102								
1103								
1104								
1200	OPE. CIRCUIT ERR.	—	—	Off	Flicker	Stop	At power ON/At reset	
1201								
1202								
1300	FUSE BREAK OFF	Unit No.	—	Off/ON	Flicker/On	Stop/ Continue * 2	When an END instruction is executed.	
1310	I/O INT ERROR	—	—	Off	Flicker	Stop	During interrupt	
1311								
1401	SP. UNIT DOWN	Unit No.	—	Off	Flicker	Stop/ Continue * 3	At power ON/At reset/ When intelligent function module is accessed.	
1402			Program error location				When an intelligent function module access instruction is executed.	
1403			—				When an END instruction is executed.	

\* 1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.

\* 2 The CPU operation status when an error occurs can be set at the parameters. (LED display will change accordingly.)

\* 3 Stop/continue operation is selectable for each module by setting parameters.

	Error Code (SD0)* 1	Error Contents and Cause	Corrective Action	Corresponding CPU
	1000	Run mode suspended or failure of main CPU (1) Malfunctioning due to noise or other reasons (2) Hardware fault	<ul style="list-style-type: none"> <li>• Measure noise level.</li> <li>• Reset and establish the RUN status again.</li> </ul> If the same error is displayed again, this suggests a CPU module hardware error. Contact your nearest Mitsubishi representative.	○
	1001			
	1002			
	1003			
	1004			
	1005			
	1006			
	1009	The fault of the power supply module, CPU module, main base unit, extension base unit or extension cable was detected.	Reset the CPU module and RUN it again. If the same error is displayed again, the power supply module, CPU module, main base unit, extension base unit or extension cable is faulty. Contact your nearest Mitsubishi representative.	○ Serial No. 04122 or later
	1010	Entire program was executed without the execution of an END instruction.	<ul style="list-style-type: none"> <li>• Measure noise level.</li> <li>• Reset and establish the RUN status again.</li> </ul> If the same error is displayed again, this suggests a CPU module hardware error. Contact your nearest Mitsubishi representative.	○
	1011	(1) When the END instruction is executed it is read as another instruction code, e.g. due to noise.		
	1012	(2) The END instruction has been changed to another instruction code somehow.		
	1020	An SFC program could not end normally. (1) The SFC program cannot end normally due to noise, etc. (2) The SFC program cannot end normally for some reason.	<ul style="list-style-type: none"> <li>• Take noise reduction measures.</li> <li>• Reset the CPU module and RUN it again. If the same error is displayed again, it suggests the hardware fault of the CPU module. Contact your nearest Mitsubishi representative.</li> </ul>	○ Serial No. 04122 or later
	1101	Error in program memory where CPU sequence program is stored.	This suggests a CPU module hardware error. Contact your nearest Mitsubishi representative.	○
	1102	Error in RAM used as CPU work area.		
	1103	Internal CPU device error.		
	1104	RAM address error in CPU.		
	1200	The circuit that performs CPU internal index modification is not operating properly.	This suggests a CPU module hardware error. Contact your nearest Mitsubishi representative.	○
	1201	Internal CPU hardware (logic) does not operate normally.		
	1202	The circuit that executes sequence processing in the CPU does not operate properly.		
	1300	There is an output module with a blown fuse.	<ul style="list-style-type: none"> <li>• Check FUSE LED of the output modules and replace the module whose LED is lit.</li> <li>• The module with a blown fuse can also be checked with a peripheral device. Monitor special registers SD130 to SD137 and check if there is a bit "1," which corresponds to the module with a blown fuse.</li> </ul>	
	1310	An interruption has occurred although there is no interrupt module.	One of the individual modules is experiencing hardware problems, so check the modules. Contact your nearest Mitsubishi representative and explain the problem with the defective module.	
	1311	An interrupt request from other than the interrupt module was detected.	Take measures so that an interrupt is not issued from other than the interrupt module.	○ Serial No. 04121 or earlier
		An interrupt request from the module where interrupt pointer setting has not been made in the PLC parameter dialog box was detected.	<ul style="list-style-type: none"> <li>• Correct the interrupt pointer setting in the PLC system setting of the PLC parameter dialog box.</li> <li>• Take measures so that an interrupt is not issued from the module where the interrupt pointer setting in the PLC system setting of the PLC parameter dialog box has not been made. Correct the interrupt setting of the network parameter. Correct the interrupt setting of the intelligent function module buffer memory. Correct the basic program of the QD51.</li> </ul>	○ Serial No. 04122 or earlier
	1401	<ul style="list-style-type: none"> <li>• There was no response from the intelligent function module during initial communications stage.</li> <li>• The buffer memory size of the intelligent function module is wrong.</li> </ul>	The CPU module is experiencing hardware problems. Contact your nearest Mitsubishi representative.	○
	1402	The intelligent function module was accessed in the program, but there was no response.	This suggests a CPU module hardware error. Contact your nearest Mitsubishi representative.	
	1403	<ul style="list-style-type: none"> <li>• There was no response from the intelligent function module when the END instruction is executed.</li> <li>• An error is detected at the intelligent function module.</li> </ul>	The intelligent function module that was being accessed is experiencing hardware problems. Contact your nearest Mitsubishi representative.	

\* 1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.

Error Code List (Continued)

Error Code (SD0) * 1	Error Messages	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		Operating Statuses of CPU	Diagnostic Timing	
				RUN	ERROR			
1411	CONTROL-BUS ERR.	Unit No.	——	Off	Flicker	Stop	At power ON/At reset	
1412			Program error location				During execution of FROM/TO instruction set.	
1413		——	——	Off	Flicker	Stop	Always	
1414		——	——	Off	Flicker	Stop	When an END instruction is executed.	
1415		Base No.		Off	Flicker	Stop	When an END instruction is executed.	
1416		PLC No.		Off	Flicker	Stop	At power ON/At reset	
1500	AC/DC DOWN	——	——	On	Off	Continue	Always	
1600	BATTERY ERROR	Drive Name	——	ON	On	Continue	Always	
2000	UNIT VERIFY ERR.	Unit No.	——	Off/On	Flicker/On	Stop/ Continue * 2	When an END instruction is executed.	
2001	UNIT VERIFY ERR.	PLC No.	——	Off/On	Flicker/On	Stop/ Continue	When an END instruction is executed	
2010	BASE LAY ERROR.	Base No.	——	Off	Flicker	Stop	At power ON/At reset	
2011								
2100	SP. UNIT LAY ERR.	Unit No.	——	Off	Flicker	Stop	At power ON/At reset	
2103								
2106								
2107								
2110	SP. UNIT ERROR	Unit No.	Program error location	Off/On	Off/On	Stop/ Continue * 2	When instruction executed.	
2111								

\* 1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.

\* 2 The CPU operation status when an error occurs can be set at the parameters. (LED display will change accordingly.)

Error Code (SD0)* 1	Error Contents and Cause	Corrective Action	Corresponding CPU
1411	When performing a parameter I/O allocation a intelligent function module could not be accessed during initial communications. On error occurring, the head I/O number of the corresponding special function module is stored in the common information.	Reset the CPU module and RUN it again. If the same error is displayed again, it suggests the fault of the intelligent function module, CPU module or base unit. Contact your nearest Mitsubishi representative.	○
1412	The FROM/TO instruction set could not be executed, due to a system bus error with a intelligent function module. On error occurring, the program error location is stored.		
1413	The QCPU of function version A was mounted in a multiple CPU system configuration.	Remove the QCPU of function version A from the main base unit.	○ Serial No. 04122 or later
	An error is detected on the system bus. (1) Self-diagnosis error of the system bus. (2) Self-diagnosis error of the CPU module	An intelligent function module, the CPU module, or the base unit is experiencing problems. Contact your nearest Mitsubishi representative.	○
1414	The QCPU of function version A was mounted in a multiple CPU system configuration.	Remove the QCPU of function version A from the main base unit.	○ Serial No. 04122 or later
	An error is detected on the system bus.	An intelligent function module, the CPU module, or the base unit is experiencing problems. Contact your nearest Mitsubishi representative.	○
1415	Fault of the main or extension base unit was detected.	An intelligent function module, CPU module or the base unit is experiencing problems. Contact your nearest Mitsubishi representative.	
1416	A bus fault was detected at power ON or reset in a multiple CPU system configuration.	Reset the CPU module and RUN it again. If the same error is displayed again, it suggests the fault of the intelligent function module, CPU module or base unit. Contact your nearest Mitsubishi representative.	○ Serial No. 04122 or later
1500	A momentary power supply interruption of the power supply occurred. The power supply went off.	Check the power supply.	○
1600	(1) Voltage in the CPU module battery has dropped below stipulated level. (2) The lead connector of the CPU module battery is not connected.	<ul style="list-style-type: none"> <li>• Change the battery.</li> <li>• If the battery is for program memory, standard RAM or for the back-up power function, install a lead connector.</li> </ul>	
2000	I/O module information power ON is changed. (1) I/O module (or intelligent function module) is not installed properly or installed on the base unit.	Read the error common information at the peripheral device, and check and/or change the module that corresponds to the numerical value (module number) there. Alternatively, monitor special registers SD150 - SD157 using GX Developer, and check and replace the module where the bit of its data is "1".	○ Serial No. 04122 or later
2001	During operation, a module was mounted on the slot where the empty setting of the CPU module was made.	During operation, do not mount a module on the slot where the empty setting of the CPU module was made.	
2010	(1) 5 or more extension base units were installed. (2) When a display device was bus-connected, the CPU module was reset while the power of the display device was OFF.	<ul style="list-style-type: none"> <li>• Remove the fifth extension base unit and later</li> <li>• Power on the PLC and display device again.</li> </ul>	
2011	The QA□B or QA1S□B was used as the base unit.	Do not use the QA□B or QA1S□B as the base unit.	○
2100	(1) In the parameter I/O allocation settings, an Intel (intelligent function module) was allocated to a location reserved for an I/O module or vice versa. (2) In the parameter I/O allocation settings, a module other than CPU (or nothing) was allocated to a location reserved for a CPU module or vice versa. (3) In the I/O assignment setting of the PLC parameter dialog box, the number of points assigned to the intelligent function module is less than the number of points of the mounted module.	• Reset the parameter I/O allocation setting to conform to the actual status of the intelligent function module and the CPU module.	
2103	2 or more interrupt modules are mounted.	Reduce the interrupt modules to one.	
	2 or more interrupt modules where interrupt pointer setting has not been made are mounted.	<ul style="list-style-type: none"> <li>• Reduce the interrupt modules to one.</li> <li>• Make interrupt pointer setting to the second interrupt module and later.</li> </ul>	
2106	(1) 2 or more MELSECNET/H modules were installed. (2) 2 or more Q series Ethernet modules were installed. (3) 3 or more Q series CC-Link modules were installed. (4) The same network number or same station number exists in the MELSECNET/H network system.	<ul style="list-style-type: none"> <li>• Reduce the MELSECNET/H modules to one or less.</li> <li>• Reduce the Q series Ethernet modules to one or less.</li> <li>• Reduce the Q series CC-Link modules to two or less.</li> <li>• Check the network number and station number.</li> </ul>	
2107	The head X/Y set in the parameter I/O allocation settings is also the head X/Y for another module.	Reset the parameter I/O allocation setting to conform with the actual status of the special function modules.	○
2110	(1) The location designated by the FROM/TO instruction set is not a intelligent function module. (2) The intelligent function module being accessed is faulty.	<ul style="list-style-type: none"> <li>• Read error individual information, then check and edit the FROM/TO instruction set that corresponds to the numerical value there (Program error location).</li> <li>• The intelligent function module that is being accessed has a hardware error. Consult the nearest service center, agent or our branch office and describe the symptom.</li> </ul>	
2111	The location designated by a link direct device (J□□) is not a network module.		

\* 1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.

Error Code List (Continued)

Error Code (SD0) * 1	Error Messages	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		Operating Statuses of CPU	Diagnostic Timing	
				RUN	ERROR			
2112	SP. UNIT ERROR	Unit No.	Program error location	Off/On	Flicker/On	Stop/ Continue * 2	When instruction executed/ STOP → RUN	
2114	SP. UNIT ERROR	Unit No.	Program error location	Off/On	Flicker/On	Stop/ Continue	When instruction is executed	
2115								
2116								
2117								
2120	SP. UNIT LAY ERR.	—	—	Off	Flicker	Stop	At power ON/At reset	
2122								
2124								
2125	SP. UNIT LAY ERR.	Unit No.	—	Off	Flicker	Stop	At power ON/At reset	
2200	MISSING PARA.	Drive Name	—	Off	Flicker	Stop	At power ON/At reset	
2210	BOOT ERROR	Unit No.	—	Off	Flicker	Stop	At power ON/At reset	
2400	FILE SET ERROR	File name/drive name	Parameter number	Off	Flicker	Stop	At power ON/At reset	
2401								
2500	CANT EXE. PRG.	File name/drive name	—	Off	Flicker	Stop	At power ON/At reset	
2501								
2502								
2503								
2504								
3000	PARAMETER ERROR	File name/ drive name	Parameter number	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN	
3001								

\* 1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.

\* 2 The CPU operation status when an error occurs can be set at the parameters. (LED display will change accordingly.)

Error Code (SD0) * 1	Error Contents and Cause	Corrective Action	Corresponding CPU
2112	(1) The location designated by a intelligent function module dedicated instruction is not a intelligent function module. Alternatively, it is not the relevant intelligent function module. (2) The network No. specified in the network dedicated instruction does not exist, or the relay destination network does not exist.	Read the individual information of the error using GX Developer, then check and edit the intelligent function module dedicated instruction that corresponds to the numerical value there (program error location).	○
2114	The host CPU was set in the instruction that is executed with the setting of another CPU (instruction that does not allow the host CPU to be specified).	Read the common information of the error using GX Developer, and check and correct the program corresponding to that value (program error location).	○ Serial No. 04122 or later
2115	Another CPU was set in the instruction that is executed with the setting of the host CPU (instruction that does not allow another CPU to be specified).		
2116	The module controlled by another CPU was set in the instruction that does not allow the module controlled by another CPU to be specified.		
2117	The CPU module that cannot be specified in the multiple CPU system dedicated instruction was specified.		
2120	QA□B or QA1S□B was used as the base unit.	Use Q□B as the base unit.	○
2122	QA1S□B is installed to the main base unit.	Install Q□B as the main base unit.	Serial No. 04121 or earlier
2124	(1) A module is installed at 25th or higher slot (17th or higher slot for Q00J) (2) A module is installed at the slot later than the number of slots specified with base allocation setting. (3) A module is installed at the I/O points later than the actual I/O points. (4) A module was installed across the boundary of the actual I/O points.	<ul style="list-style-type: none"> <li>Remove the module installed at the 25th slot or later. (14th slot or later for Q00J)</li> <li>Remove the module installed at the slot later than the number of slots specified in the base allocation setting.</li> <li>Remove the module installed at the I/O points later than the actual I/O points.</li> <li>Change the last module for the module whose occupying points do not exceed the actual I/O points.</li> </ul>	○
	(5) 5 or more extension base units were added. (3 bases for Q00J)	Remove 5 or more extension base units. (3 bases for Q00J)	○ Serial No. 04121 or earlier
2125	(1) An unrecognisable module has been installed. (2) There was no response from the intelligent function module.	<ul style="list-style-type: none"> <li>Install a usable module.</li> <li>The intelligent function module is experiencing hardware problems. Contact your nearest Mitsubishi representative.</li> </ul>	○
2200	There is no parameter file at the program memory.	Set the parameter file to the program memory.	○
2210	The boot file contents are improper.	Reexamine the boot setting.	○ Serial No. 04122 or later
2400	The file designated at the PLC file settings in the parameters cannot be found.	Read the individual information of the error using GX Developer, check to be sure that the parameter drive name and file name correspond to the numerical values there (parameter number), and correct. Create the designated file.	○
2401	The file designated at the parameter PLC RAS settings fault history area has not been created.	Read the individual information of the error using GX Developer, check to be sure that the parameter drive name and file name correspond to the numerical values there (parameter number), and correct. Check the space remaining in the memory card.	
2500	There is a program file that uses a device exceeds the device allocation range designated by the parameter device settings.	Read the common information of the error using GX Developer, check to be sure that the parameter device allocation setting and the program file device allocation correspond to the numerical values there (file name), and correct if necessary.	
2501	(1) There are three or more program files. (2) The program name differs from the program contents.	<ul style="list-style-type: none"> <li>Delete unnecessary program files.</li> <li>Match the program name with the program contents.</li> </ul>	○
2502	The program file is not QCPU/QnACPU compatible. Alternatively, the file contents are not those of a sequence program.	<ul style="list-style-type: none"> <li>Check whether the program version is * * *.QPG.</li> <li>Check the file contents to be sure they are for a sequence program.</li> </ul>	
2503	There are no program files at all. (The drive name is stored into the common information.)	<ul style="list-style-type: none"> <li>Check program configuration.</li> <li>Check parameters and program configuration.</li> </ul>	
2504	There are two or more SFC programs.	Reduce the SFC programs to one.	○ Serial No. 04122 or later
3000	The parameter settings for timer time limit setting, the RUN-PAUSE contact, the common pointer number, the general data processing, number of vacant slots, or system interrupt settings are outside the range that can be used by the CPU module.	Read the error detailed information at the peripheral device, check the parameter items corresponding to the numerical values (parameter numbers) there, and correct when necessary.	○
3001	Parameter contents have been destroyed.	If the error is still generated following the correction of the parameter settings, it is likely that there is a memory error in the program memory of the CPU module. Contact your nearest Mitsubishi representative.	

\* 1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.



Error Code List (Continued)

Error Code (SD0) * 1	Error Messages	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		Operating statuses of CPU	Diagnostic Timing	
				RUN	ERROR			
3003	PARAMETER ERROR	File name/drive name	Parameter number	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN	
3004								
3012								
3013								
3100	LINK PARA. ERROR	File name/drive name	Parameter number	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN	
3101								
3102								
3103								
3104								
3105								

\* 1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.

Error Code (SD0) * 1	Error Contents and Cause	Corrective Action	Corresponding CPU
3003	The number of devices set at the parameter device settings exceeds the possible CPU module range.	<ul style="list-style-type: none"> <li>Read the detailed information of the error using GX Developer, check the parameter items corresponding to the numerical values (parameter numbers) there, and correct when necessary.</li> <li>If the error is still generated following the correction of the parameter settings, it is likely that there is a memory error, either in the program memory. Contact your nearest Mitsubishi representative.</li> </ul>	○
3004	The parameter file is not compatible with the QCPU/QnACPU. Alternatively, the contents of the file are not parameters.	<ul style="list-style-type: none"> <li>Check whether the parameter file version is * * *.QPA.</li> <li>Check the file contents to be sure they are parameters.</li> </ul>	
3012	In a multiple CPU system configuration, the setting of the multiple CPU system parameter differs from that of the reference CPU (CPU No. 1).	Match the setting of the multiple CPU system parameter with that of the reference CPU (CPU No. 1).	
3013	In a multiple CPU system, the multiple CPU automatic refresh setting is any of the following. (1) When a bit device is specified as the refresh device, a number other than a multiple of 16 is specified for the refresh head device. (2) The device specified is other than the one that can be specified. (3) The number of transmission points is an odd number. (4) The total number of transmission points is greater than the maximum number of refresh points.	<ul style="list-style-type: none"> <li>Check and correct the following in the multiple CPU automatic refresh parameters.</li> <li>When specifying a bit device, specify a multiple of 16 for the refresh head device.</li> <li>Specify the device that can be specified as the refresh device.</li> <li>Set the number of transmission points to an even number.</li> <li>Set the total number of transmission points within the range of the maximum number of refresh points.</li> </ul>	○ Serial No. 04122 or later
3100	<p>(1) The number of actually installed modules is different from that designated in the number of modules setting parameter of MELSECNET/H.</p> <p>(2) The head I/O number of actually installed modules is different from that designated in the network parameter of MELSECNET/H.</p> <p>(3) Some data in the parameter cannot be handled.</p> <p>(4) The station type of MELSECNET/H has been changed while the power is on. (RESET → RUN is required to change the station type.)</p>	<ul style="list-style-type: none"> <li>Check the network parameters and mounting status, and if they differ, match the network parameters and mounting status. When the network parameters have been corrected, write them to the CPU module.</li> <li>Check the setting of the extension stage numbers of the extension base units.</li> <li>Check the connection status of the extension base units and connectors. When a display device is connected to the main base unit or extension base unit, check the connection status with the display device.</li> <li>If the error occurs after the above checks have been made, it suggests a hardware fault. Contact your nearest Mitsubishi representative.</li> </ul>	○
	In a multiple CPU system configuration, the MELSECNET/H module controlled by another CPU is specified for the head I/O number in the MELSECNET/H network setting parameter.	Delete the network setting parameter of the MELSECNET/H module controlled by another CPU. Change the number for the head I/O number of the MELSECNET/H module controlled by the host CPU.	○ Serial No. 04122 or later
3101	<p>(1) The head I/O number specified in the parameter differs from the one of the mounted module.</p> <p>(2) The network type specified in the parameter differs from the one of the module. The MELSECNET/H network refresh parameter is outside the range.</p>	<ul style="list-style-type: none"> <li>Check the network parameters and mounting status, and if they differ, match the network parameters and mounting status. When the network parameters have been corrected, write them to the CPU module.</li> <li>Check the setting of the extension stage numbers of the extension base units.</li> <li>Check the connection status of the extension base units and connectors. When a display device is connected to the main base unit or extension base unit, check the connection status with the display device.</li> <li>If the error occurs after the above checks have been made, it suggests a hardware fault. Contact your nearest Mitsubishi representative.</li> </ul>	○
3102	An error was discovered when the network parameter check was made at the network module. The parameters specific to MELSECNET/H are not normal.	<ul style="list-style-type: none"> <li>Write after correcting network parameters.</li> <li>If the error persists after corrections have been made. Contact your nearest Mitsubishi representative.</li> </ul>	
3103	<p>(1) Though the number of Ethernet modules are set to one or more in the parameter, the actually mounted number of module is zero.</p> <p>(2) The head I/O number for the Ethernet module set parameters is different from that of the actually mounted I/O module.</p>	<ul style="list-style-type: none"> <li>Write after correcting network parameters.</li> <li>If the error persists after corrections have been made. Contact your nearest Mitsubishi representative.</li> </ul>	
	In a multiple CPU system, the Ethernet module controlled by another CPU is specified for the head I/O number of the Ethernet setting parameter.	<ul style="list-style-type: none"> <li>Delete the Ethernet setting parameter of the Ethernet module controlled by another CPU.</li> <li>Change it for the head I/O number of the Ethernet module controlled by the host CPU.</li> </ul>	Q00/Q01 Serial No. 04122 or later
3104	<p>(1) Ethernet and MELSECNET/H use the same network number. Network number, station number and group number set by the parameter is out of range.</p> <p>(2) The specified I/O number is outside the range of the used CPU module.</p> <p>(3) Ethernet-specific parameter setting is not normal.</p>	<ul style="list-style-type: none"> <li>Write after correcting network parameters.</li> <li>If the error persists after corrections have been made, contact your nearest Mitsubishi representative.</li> </ul>	○
3105	<p>(1) Though the number of CC-Link modules set by the parameters is one or more, the actually mounted number of module is zero.</p> <p>(2) The head I/O number for the common parameters is different from that of the actually mounted I/O module.</p> <p>(3) The station class for the CC-Link unit quantity set parameters is different from that of the actually mounted station.</p>	<ul style="list-style-type: none"> <li>Write after correcting network parameters.</li> <li>If the error persists after corrections have been made, contact your nearest Mitsubishi representative.</li> </ul>	
	In a multiple CPU system configuration, the CC-Link module controlled by another CPU is specified for the head I/O number in the CC-Link network setting parameter.	Delete the CC-Link setting parameter of the CC-Link module controlled by another CPU. Change the number for the head I/O number of the CC-Link module controlled by the host CPU.	Q00/Q01 Serial No. 04122 or later

\* 1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.

Error Code List (Continued)

Error Code (SD0) * 1	Error Messages	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		Operating statuses of CPU	Diagnostic Timing	
				RUN	ERROR			
3106 3107	LINK PARA. ERROR	File name/drive name	Parameter number	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN	
3200	SFC. PARA. ERROR	File name/drive name	Parameter number	Off	Flicker	Stop	At STOP → RUN	
3300 3301 3302 3303	SP. PARA. ERROR	File name/device name  File name/drive name	Parameter number	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN	
3400 3401	REMOTE PASS. ERROR	—	—	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN	
4000 4001 4002 4003 4004	INSTRCT CODE ERR.	Program error location	—	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN  When instruction is executed	
4010 4021 4030 4100	MISSING END INS. CAN'T SET (P) CAN'T SET (I)	Program error location	—	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN	
4101 4102 4103 4107 4111 4112	OPERATION ERROR	Program error location	—	Off/On	Flicker/On	Stop/ continue * 2	When instruction is executed	
4200 4201 4202 4203	FOR NEXT ERROR	Program error location	—	Off	Flicker	Stop	When instruction is executed	
4210 4211 4212	CANT EXECUTE (P)	Program error location	—	Off	Flicker	Stop	When instruction is executed	

\* 1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.

\* 2 The CPU operation status when an error occurs can be set at the parameters. (LED display will change accordingly.)

	Error Code (SD0) * 1	Error Contents and Cause	Corrective Action	Corresponding CPU
	3106	The network refresh parameter for CC-Link is out of range.	Check the parameter setting.	○
	3107	The contents of the CC-Link parameter are incorrect.	Check the parameter setting.	
	3200	The parameter setting is illegal. (1) Though Block 0 was set to "Auto start" in the SFC setting of the PLC parameter dialog box, Block 0 does not exist.	Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location).	○ Serial No. 04122 or later
	3300	The head I/O number in the intelligent function module parameter set on GX Configurator differs from the actual I/O number.	Check the parameter setting.	○
	3301	The intelligent function module's refresh parameter setting is outside the available range.		
	3302	The intelligent function module's parameter are abnormal.		
	3303	In a multiple CPU system, the parameter setting of automatic refresh setting, etc. was made to the intelligent function module controlled by another CPU.	<ul style="list-style-type: none"><li>• Delete the parameter setting of automatic refresh setting, etc. of the intelligent function module controlled by another CPU.</li><li>• Change the parameter setting of automatic refresh setting, etc. of the intelligent function module controlled by the host CPU.</li></ul>	○ Serial No. 04122 or later
	3400	The head I/O number of the target module of the remote password is outside the following range. (1) Q00JCPU : 0H to 1E0H (2) Q00CPU/Q01CPU: 0H to 3E0H	Change the head I/O number of the target module of the remote password for the number within the following range. • Q00JCPU : 0H to 1E0H • Q00CPU/Q01CPU : 0H to 3E0H	○ Serial No. 04122 or later
	3401	Any of the following modules is not mounted on the slot specified for the head I/O number of the remote password. (1) Serial communication module of function version B (2) Ethernet module of function version B (3) Modem interface module of function version B	Mount any of the following modules in the position specified for the head I/O number of the remote password. • Serial communication module of function version B • Ethernet module of function version B • Modem interface module of function version B	
	4000	(1) The program contains an instruction code that cannot be decoded . (2) An unusable instruction is included in the program.	Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location).	○
	4001	Though the program is not an SFC program, it includes SFC dedicated instructions.		○ Serial No. 04122 or later
	4002	(1) The extension instruction designated by the program has an incorrect instruction name. (2) The extension instruction specified in the program cannot be executed by the specified module.		○
	4003	The extension instruction designated by the program has an incorrect number of devices.		
	4004	The extension instruction designated by the program designates a device which cannot be used.		
	4010	There is no END (FEND) instruction in the program.	Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location).	○
	4021	The common pointers used by individual files are overlapping.		
	4030	The allocation pointers numbers used by individual files overlap overlapping.		
	4100	Data which cannot be dealt with by the instruction is included.	Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location).	○
	4101	(1) The designated device numbers for data processed by the instruction exceed the usable range. (2) The storage data or constants for the devices designated by the instruction exceed the usable range.		
	4102	(1) The network number and station number designated by a dedicated network instruction are not correct. (2) The link direct device ( $\text{[ ]W [ ]}$ ) is not set correctly.  In a multiple CPU system, a link direct device ( $\text{[ ]G [ ]}$ ) was specified for the network module controlled by another PLC.	<ul style="list-style-type: none"><li>• Delete the link direct device, which was specified for the network module controlled by another PLC, from the program.</li><li>• Specify the link direct device for the network module controlled by the host station.</li></ul>	Q00/01 Serial No. 04122 or later
	4103	The structure of the PID dedicated instruction is improper.	Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location).	○ Serial No. 04122 or later
	4107	33 or more multiple CPU dedicated instructions were executed from one CPU module.	Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location).	Q00/Q01 Serial No. 04122 or later
	4111	An attempt was made to perform write to the CPU shared memory write disable area of the host station CPU module with the instruction.	Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location).	○ Serial No. 04122 or later
	4112	The CPU module that cannot be specified with the multiple CPU dedicated instruction was specified.		
	4200	No NEXT instruction was executed following the execution of a FOR instruction. Alternatively, there are fewer NEXT instructions than FOR instructions.	Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location).	○
	4201	A NEXT instruction was executed although no FOR instruction has been executed. Alternatively, there are more NEXT instructions than FOR instructions.		
	4202	More than 16 nesting levels are programmed.	Keep nesting levels at 16 or under.	
	4203	A BREAK instruction was executed although no FOR instruction has been executed prior to that.	Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location).	
	4210	The CALL instruction is executed, but there is no subroutine at the specified pointer.		
	4211	There was no RET instruction in the executed sub-routine program.		
	4212	The RET instruction was before the FEND instruction in the main program.		

\* 1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.

Error Code List (Continued)

Error Code (SD0) * 1	Error Messages	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		Operating statuses of CPU	Diagnostic Timing
				RUN	ERROR		
4213	CANT EXECUTE (P)	Program error location	——	Off	Flicker	Stop	When instruction is executed
4220	CANT EXECUTE (I)	——	——	Off	Flicker	Stop	When instruction is executed
4221	CANT EXECUTE (I)	Program error location	——	Off	Flicker	Stop	When instruction is executed
4223							
4231	INST. FORMAT ERR.	Program error location	——	Off	Flicker	Stop	When instruction is executed
4410	CANT SET(BL)	Program error location	——	Off	Flicker	Stop	At STOP → RUN
4411							
4420	CANT SET(S)	Program error location	——	Off	Flicker	Stop	At STOP → RUN
4421							
4422							
4423							
4430	SFC EXE. ERROR	File name/drive name	——	Off	Flicker	Stop	At STOP → RUN
4431							
4432							
4502	SFCP. FORMAT ERR.	Program error location	——	Off	Flicker	Stop	At STOP → RUN
4503							
4504							
4505							
4506							
4621	BLOCK EXE. ERROR	Program error location	——	Off	Flicker	Stop	When instruction is executed
4631	STEP EXE. ERROR	Program error location	——	Off	Flicker	Stop	When instruction is executed
5001	WDT ERROR	Time (value set)	Time (value actually measured)	Off	Flicker	Stop	Always
5010	PRG. TIME OVER	Time (value set)	Time (value actually measured)	On	On	Continue	Always
7000	MULTI CPU DOWN	CPU No.	——	Off	Flicker	Stop	Always
							At power ON/At reset
7002	MULTI CPU DOWN	CPU No.	——	Off	Flicker	Stop	At power ON/At reset
7003							
7004	MULTI CPU DOWN	CPU No.	——	Off	Flicker	Stop	Always

\* 1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.

	Error Code (SD0) * 1	Error Contents and Cause	Corrective Action	Corresponding CPU
	4213	More than 16 nesting levels have been inserted.	Keep nesting levels at 16 or under.	○
	4220	Though an interrupt input occurred, the corresponding interrupt pointer does not exist.	Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location).	○
	4221	There was no IRET instruction in the executed interrupt program.		
	4223	The IRET instruction was before the FEND instruction in the main program.		
	4231	The number of IX and IXEND instructions is not equal.		
	4410	The block No. specified in the SFC program is beyond the maximum value.	Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location).	○ Serial No. 04122 or later
	4411	The same block No. is specified in two or more places of the SFC program.		
	4420	The step No. specified in the SFC program is beyond the maximum value.	Reduce the total number of steps to or less than the maximum value.	
	4421	The total number of steps in the SFC program is beyond the maximum value.		
	4422	The step No. specified in the SFC program is beyond the maximum value.	Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location).	
	4423	Step relays are insufficient in the SFC program.		
	4430	The SFC program cannot be executed. (1) The data of the block data setting is illegal. (2) The SFC data device of the block data setting is beyond the device setting range set in the PLC parameter.	<ul style="list-style-type: none"><li>• Write the program to the CPU module again using GX Developer.</li><li>• After correcting the setting of the SFC data device, write it to the CPU module.</li><li>• After correcting the device setting range set in the PLC parameter, write it to the CPU module.</li></ul>	○ Serial No. 04122 or later
	4431	The SFC program cannot be executed. (1) The block parameter setting is abnormal.	Write the program to the CPU module again using GX Developer.	
	4432	The SFC program cannot be executed. (1) The structure of the SFC program is illegal.		
	4502	The structure of the SFC program is illegal. (1) STEPI * instruction does not exist in the block of the SFC program.	Write the program to the CPU module again using GX Developer.	○ Serial No. 04122 or later
	4503	The structure of the SFC program is illegal. (1) The step specified in the TSET instruction does not exist. (2) In jump transition, the host step number was specified as the destination step number.	<ul style="list-style-type: none"><li>• Write the program to the CPU module again using GX Developer.</li><li>• Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location).</li></ul>	
	4504	The structure of the SFC program is illegal. (1) The step specified in the TAND instruction does not exist.	Write the program to the CPU module again using GX Developer.	
	4505	The structure of the SFC program is illegal. (1) In the operation output of a step, the SET Sn/BLmSn or RST Sn/BLmSn instruction was specified for the host step.	Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location).	
	4506	The structure of the SFC program is illegal. (1) In a reset step, the host step number was specified as the destination step.		
	4621	A block that does not exist in the SFC program was started.	<ul style="list-style-type: none"><li>• Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location).</li><li>• Turn SM321 ON if it is OFF.</li></ul>	
	4631	A step that does not exist in the SFC program was started.		
	5001	Program scan time goes over the WDT value set in the parameter PLC RAS settings.	Read the individual information of the error using GX Developer, and check the numerical value (time) there, and shorten scan time if necessary.	○
	5010	The scan time of the program exceeded the constant scan setting time specified in the PLC RAS setting parameter.	Review the constant scan setting time.	
	7000	(1) In a multiple CPU system configuration, a CPU fault occurred in the CPU module of the CPU No. where "System stop was selected" in the operation mode. (2) In a multiple CPU system configuration, a multiple CPU system incompatible CPU module was mounted.	<ul style="list-style-type: none"><li>• Read the individual information of the error, confirm the error of the CPU module that resulted in CPU fault, and remove the error.</li><li>• Dismount the multiple CPU system incompatible CPU module from the main base unit.</li></ul>	○ Serial No. 04122 or later
		In a multiple CPU system configuration, a stop error occurred in CPU No. 1 at power-on of the CPU and the other CPUs cannot start up. (This error occurs in CPU No. 2 and No. 3.)	Read the individual information of the error, confirm the error of the CPU module that resulted in CPU fault, and remove the error.	
	7002	(1) At the time of initial communication in a multiple CPU system configuration, no response is returned from the CPU No. of the initial communication target. (2) In a multiple CPU system configuration, a multiple CPU system incompatible CPU module was mounted.	<ul style="list-style-type: none"><li>• Reset the CPU and RUN it again.</li><li>• If the same error is displayed again, it suggests the hardware fault of either CPU module. Contact your nearest Mitsubishi representative.</li><li>• Dismount the multiple CPU system incompatible CPU module from the main base unit.</li></ul>	
	7003	At the time of initial communication in a multiple CPU system configuration, no response is returned from the CPU No. of the initial communication target.	<ul style="list-style-type: none"><li>• Reset the CPU and RUN it again.</li><li>• If the same error is displayed again, it suggests the hardware fault of either CPU module. Contact your nearest Mitsubishi representative.</li></ul>	
	7004	In a multiple CPU system configuration, a data error occurred in communication between the CPU modules.	<ul style="list-style-type: none"><li>• Check for the module mounted beyond the maximum number of I/O points in the system configuration.</li><li>• When there is no problem in the system configuration, it suggests the hardware fault of the CPU module. Contact your nearest Mitsubishi representative.</li></ul>	

\* 1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.

Error Code List (Continued)

Error Code (SD0) * 1	Error Messages	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		Operating statuses of CPU	Diagnostic Timing	
				RUN	ERROR			
7010	MULTI EXE. ERROR	CPU No.	——	Off	Flicker	Stop	At power ON/at reset	
7011								
7020	MULTI CPU. ERROR	CPU No.	——	On	On	Continue	Always	
7030	CPU LAY ERROR	CPU No.	——	Off	Flicker	Stop	At power ON/at reset	
7031								
7032								
7035	CPU LAY ERROR	Unit No.	——	Off	Flicker	Stop	At power ON/at reset	
9000	F*** * 3	Program error location	Annunciator number	On	On/Off * 4	Continue	When instruction is executed	

\* 1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.

\* 3 \*\*\* indicates detected annunciator number.

\* 4 Can be kept off by the special registers (SD207 to SD209) for LED display priority setting.

Error Code (SD0) * 1	Error Contents and Cause	Corrective Action	Corresponding CPU
7010	(1) In a multiple CPU system configuration, a faulty CPU module was mounted. (2) In a multiple CPU system configuration, a multiple CPU system incompatible CPU module was mounted. (The error is detected in the Q00CPU or Q01CPU of serial No.04122 or later) (3) In a multiple CPU system configuration, CPU No. 2 or No. 3 was reset with power ON. (The error is detected in the CPU No. where the reset was canceled.) (4) In a multiple CPU system configuration, the QFB (bus interface driver) whose version is 1.06 or earlier is used with the PC CPU module.	<ul style="list-style-type: none"> <li>• Read the individual information of the error, using GX Developer and replace the CPU module of the faulty CPU No.</li> <li>• Replace the CPU module with the multiple CPU system compatible CPU module.</li> <li>• Do not reset the CPU module of CPU No. 2 or No. 3.</li> <li>• Change the PC CPU module for the one whose version of the QFB is 1.07 or later.</li> <li>• Reset CPU module No. 1 and start up the multiple CPU system again.</li> </ul>	○ Serial No. 04122 or later
7011	In a multiple CPU system configuration, either of the following settings has been made. (1) Multiple CPU automatic refresh setting was made to the CPU module that cannot perform automatic refresh between multiple CPUs. (2) Non-group import setting was made to the CPU module that cannot perform non-group import.	<ul style="list-style-type: none"> <li>• Correct the multiple CPU automatic refresh setting.</li> <li>• Correct the non-group import setting.</li> </ul>	
7020	In a multiple CPU system configuration, a CPU fault occurred in the CPU module of the CPU No. where "System stop was selected" in the operation mode. (The error is detected in the CPU module where a CPU fault has not occurred.)	Read the individual information of the error using GX Developer, confirm the error of the CPU module that resulted in CPU fault, and remove the error.	
7030	An assignment error occurred in any of the CPU mountable slots (CPU slot, I/O slots 0, 1) mounted with the CPU module beyond the number of CPU modules set in the multiple CPU setting of the PLC parameter dialog box.	<ul style="list-style-type: none"> <li>• Match the number of mounted CPU modules (including CPU (empty)) with the number of CPU modules set in the multiple CPU setting of the PLC parameter dialog box.</li> <li>• Match the types set in the I/O assignment setting of the PLC parameter dialog box with the types of the mounted CPU modules.</li> </ul>	○ Serial No. 04122 or later
7031	An assignment error occurred within the range of the number of CPUs set in the multiple CPU setting of the PLC parameter dialog box.		
7032	(1) The number of mounted CPU modules that comprise the multiple CPU system is wrong. (Q00CPU or Q01CPU: More than 1 module, motion CPU: More than 1 module, PC CPU module: More than 1 module) (2) The PC CPU module is mounted on the slot of CPU No. 2 or later. (3) The motion CPU is mounted on the slot of CPU No. 3.	The number of each of the Q00CPU or Q01CPU, motion CPU and PC CPU modules should not exceed 1.	
7035	A CPU module is mounted on the slot that cannot be mounted with a CPU module.	Dismount the CPU module from the slot other than the CPU slot, I/O slots 0, 1.	
9000	Annunciator F went ON	Read the individual information of the error using GX Developer, and check the program corresponding to the numerical value (annunciator number).	○

\* 1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.



## 11.4 Canceling of Errors

The Basic model QCPU can perform the cancel operation for errors only when the errors allow the CPU module to continue its operation.

To cancel the errors, follow the steps shown below.

- 1) Eliminate the cause of the error.
- 2) Store the error code to be canceled in the special register SD50.
- 3) Energize the special relay SM50 (OFF → ON).
- 4) The error to be canceled is canceled.

After the CPU module is reset by the canceling of the error, the special relays, special registers, and LEDs associated with the error are returned to the states under which the error occurred.

If the same error occurs again after the cancellation of the error, it will be registered again in the error history.

When multiple enunciators(F) detected are canceled, the first one with No. F only is canceled.

POINT	
(1)	When the error is canceled with the error code to be canceled stored in the SD50, the lower one digit of the code is neglected. (Example) If error codes 2100 and 2101 occur, and error code 2100 to cancel error code 2101. If error codes 2100 and 2111 occur, error code 2111 is not canceled even if error code 2100 is canceled.
(2)	Errors developed due to trouble in other than the CPU module are not canceled even if the special relay (SM50) and special register (SD50) are used to cancel the error. (Example) The cause of "SP. UNIT DOWN" error cannot be removed even by using the special relay (SM50) and special register (SD50), because the error is developed on the Q bus. Refer to the error code list in Section 11.3.2 to remove the cause of the error.

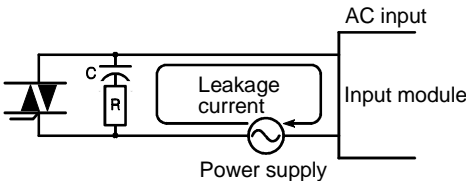
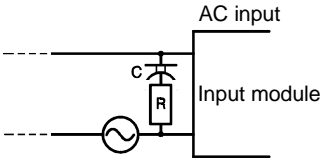
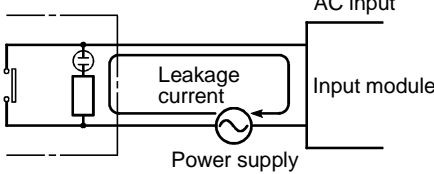
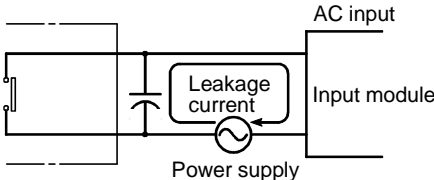
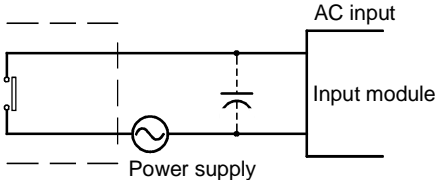
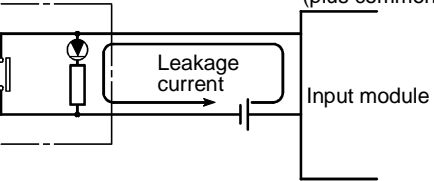
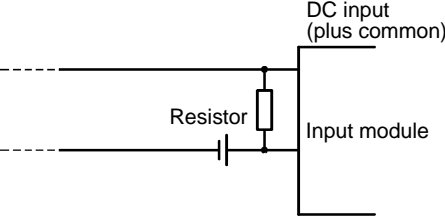
## 11.5 Input/Output Module Troubleshooting

This chapter explains possible problems with input/output circuits and their corrective actions.

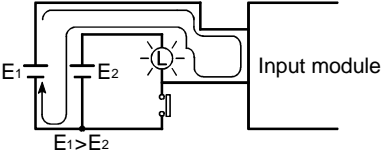
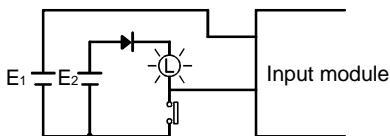
### 11.5.1 Input circuit troubleshooting

This section describes possible problems with input circuits and their corrective actions.

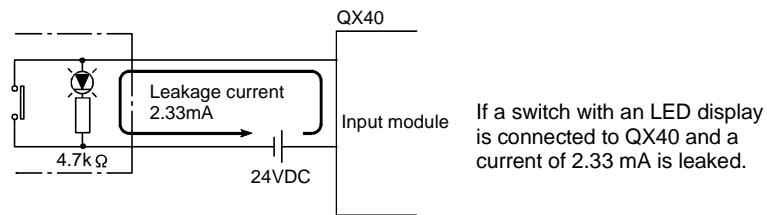
Input Circuit Problems and Corrective Actions

	Condition	Cause	Corrective Action
Example 1	Input signal does not turn OFF.	<ul style="list-style-type: none"> <li>Leakage current of input switch (e.g. drive by non-contact switch).</li> </ul> 	<ul style="list-style-type: none"> <li>Connect an appropriate resistor which will make the voltage across the terminals of the input module lower than the OFF voltage value.</li> </ul>  <p>It is recommended to use <math>0.1</math> to <math>47\mu\text{F}</math> + <math>47</math> to <math>120\Omega</math> (<math>1/2\text{W}</math>) for the CR constant.</p>
Example 2	Input signal does not turn OFF.	<ul style="list-style-type: none"> <li>Drive by a limit switch with neon lamp.</li> </ul> 	<ul style="list-style-type: none"> <li>Same as Example 1.</li> <li>Or make up another independent display circuit.</li> </ul>
Example 3	Input signal does not turn OFF.	<ul style="list-style-type: none"> <li>Leakage current due to line capacity of wiring cable. (Line capacity C of twisted pair wire is approx. <math>100\text{ pF/m}</math>).</li> </ul> 	<ul style="list-style-type: none"> <li>Same as Example 1.</li> <li>However, leakage current is not generated when the power supply is located in the input equipment side as shown below.</li> </ul> 
Example 4	Input signal does not turn OFF.	<ul style="list-style-type: none"> <li>Drive by switch with LED indicator.</li> </ul> 	<ul style="list-style-type: none"> <li>Connect a resistor which will make the voltage between the input module terminal and common lower than the OFF voltage, as shown below.</li> </ul>  <p>* A calculation example of a value for a connected resistor is given on the following page.</p>

Input Circuit Problems and Corrective Actions (Continued)

	Condition	Cause	Corrective Action
Example 5	Input signal does not turn OFF.	<ul style="list-style-type: none"> <li>Sneak path due to the use of two power supplies.</li> </ul> 	<ul style="list-style-type: none"> <li>Use only one power supply.</li> <li>Connect a sneak path prevention diode. (Figure below)</li> </ul> 
Example 6	False input due to noise	Depending on response time setting, noise is imported as input.	<p>Change response time setting. Example : 1ms → 5ms (Setting of a shorter response time may produce a higher effect on periodic excessive noise.) If no effects are produced by the above, take basic actions to prevent excessive noise from entering, e.g. avoid bundling the power and I/O cables, and suppress noise by adding surge absorbers to such noise sources as relays and conductors used with the same power supply.)</p>

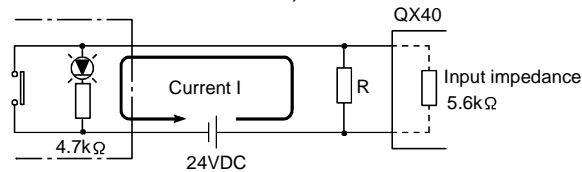
## &lt;Calculation example of Example 4&gt;



- Voltage  $V_{TB}$  across the terminal and common base is:

$$V_{TB} = 2.33[\text{mA}] \times 5.6[\text{k}\Omega] = 13[\text{V}] \text{ (Ignore the voltage drop caused by the LED.)}$$

Because the condition for the OFF voltage ( $\leq 11[\text{V}]$ ) is not satisfied, the input does not turn off. To correct this, connect a resistor as shown below.



- Calculation of current for resistor R

The voltage of QX40 across the terminals must be reduced to 11 [V] or less.

The required current

$$(24 - 11[\text{V}]) \div 4.7[\text{k}\Omega] = 2.77[\text{mA}]$$

Therefore resistor R of flowing current I of 2.77 [mA] or more must be connected.

- Calculation of resistance of connected resistor R

$$11[\text{V}] \div R > 2.77[\text{mA}] - \frac{11[\text{V}]}{5.6[\text{k}\Omega]}$$

$$11[\text{V}] \div R > 2.77 - 1.96[\text{mA}]$$

$$11[\text{V}] \div 0.81[\text{mA}] > R$$

$$13.6[\text{k}\Omega] > R$$

Resistance of the connected resistor R is obtained in the above equations.

Suppose that the resistance R is 12 [kΩ].

The power capacity W of the resistor during activation of the switch is:

$$W = (\text{Applied voltage})^2 / R$$

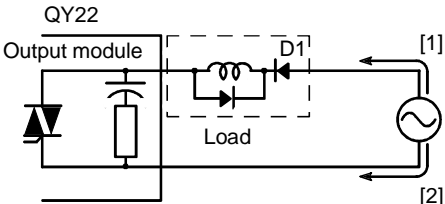
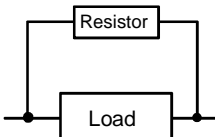
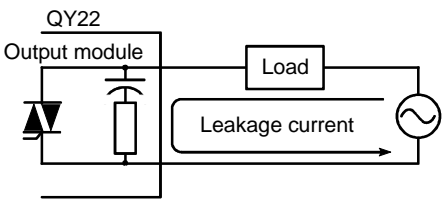
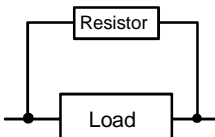
$$W = (28.8[\text{V}])^2 / 12[\text{k}\Omega] = 0.069[\text{W}]$$

- Because the resistance is selected so that the power capacity is three to five times the actual power consumption, a third to a half [W] should be selected.  
In this case, a resistor of 12 [kΩ] and a third to a half [W] should be connected across the terminal and COM.

## 11.5.2 Output circuit troubleshooting

This section describes possible problems with output circuits and their corrective actions.

Output Circuit Problems and Corrective Actions

	Condition	Cause	Corrective Action
Example 1	When the output is OFF, excessive voltage is applied to the load.	<ul style="list-style-type: none"> <li>Load is half-wave rectified inside (in some cases, this is true of a solenoid).</li> </ul>  <ul style="list-style-type: none"> <li>When the polarity of the power supply is as shown in [1], C is charged. When the polarity is as shown in [2], the voltage charged in C plus the line voltage are applied across D1. Max. voltage is approx. 2.2E. (If a resistor is used in this way, it does not pose a problem to the output element. But it may cause the diode, which is built into the load, to deteriorate, resulting in a fire, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Connect a resistor several tens to hundreds of <math>k\Omega</math> across the load.</li> </ul> 
Example 2	The load does not turn OFF (triac output).	<ul style="list-style-type: none"> <li>Leakage current due to built-in noise suppression.</li> </ul> 	<ul style="list-style-type: none"> <li>Connect C and R across the load. (When the wiring distance from the output card to the load is long, there may be a leakage current due to the line capacity.)</li> </ul> 

## 11.6 Special Relay List

Special relays, SM, are internal relays whose applications are fixed in the PLC.

For this reason, they cannot be used by sequence programs in the same way as the normal internal relays.

However, they can be turned ON or OFF as needed in order to control the CPU module and remote I/O modules.

The headings in the table that follows have the following meanings.

Item	Function of Item
Number	• Indicates the number of the special relay.
Name	• Indicates the name of the special relay.
Meaning	• Indicates the nature of the special relay.
Explanation	• Contains detailed information about the nature of the special relay.
Set by (When set)	<ul style="list-style-type: none"> <li>• Indicates whether the relay is set by the system or user, and, if it is set by the system, when setting is performed.</li> <li>&lt;Set by&gt; <ul style="list-style-type: none"> <li>S : Set by system</li> <li>U : Set by user (in sequence program or test operation at a peripheral device)</li> <li>S/U : Set by both system and user</li> </ul> </li> <li>&lt;When set&gt; → indicated only if setting is done by system. <ul style="list-style-type: none"> <li>Each END : Set during each END processing</li> <li>Initial : Set only during initial processing (when power supply is turned ON, or when going from STOP to RUN)</li> <li>Status change : Set only when there is a change in status</li> <li>Error : Set when error is generated</li> <li>Instruction execution : Set when instruction is executed</li> <li>Request : Set only when there is a user request (through SM, etc.)</li> </ul> </li> </ul>
Corresponding CPU	<ul style="list-style-type: none"> <li>• Indicates the corresponding CPU module type name.</li> <li>○ : Can be applied to all types of CPU</li> <li>Each CPU module type name: Can be applied only to the specific CPU module</li> </ul>

For details on the following items, refer to the following manual:

- Networks → • Network System Reference Manual

## Special Relay List

## (1) Diagnostic Information

Number	Name	Meaning	Explanation	Set by (When Set)	Corresponding CPU
SM0	Diagnostic errors	OFF: No error ON : Error	<ul style="list-style-type: none"> <li>Turns ON if an error occurs as a result of diagnosis. (Includes when an annunciator is ON)</li> <li>Remains ON if the condition is restored to normal thereafter.</li> </ul>	S (Error)	○
SM1	Self-diagnosis error	OFF: No self-diagnosis errors ON : Self-diagnosis	<ul style="list-style-type: none"> <li>Turns ON if an error occurs as a result of diagnosis. (Does not include when an annunciator is ON)</li> <li>Remains ON if the condition is restored to normal thereafter.</li> </ul>	S (Error)	
SM5	Error common information	OFF: No error common information ON : Error common information	<ul style="list-style-type: none"> <li>When SM0 is ON, ON if there is error common information</li> </ul>	S (Error)	
SM16	Error individual information	OFF: No error common information ON : Error common information	<ul style="list-style-type: none"> <li>When SM0 is ON, ON if there is error individual information</li> </ul>	S (Error)	
SM50	Error reset	OFF → ON : Error reset	<ul style="list-style-type: none"> <li>Conducts error reset operation</li> <li>See Section 11.3 for further information</li> </ul>	U	
SM51	Battery low latch	OFF: Normal ON : Battery low	<ul style="list-style-type: none"> <li>ON if battery voltage at CPU module drops below rated value.</li> <li>Remains ON if the battery voltage returns to normal thereafter.</li> <li>Synchronizes with the ERR. LED.</li> </ul>	S (Error)	
SM52	Battery low	OFF: Normal ON : Battery low	<ul style="list-style-type: none"> <li>Same as SM51, but goes OFF subsequently when battery voltage returns to normal.</li> </ul>	S (Error)	
SM53	AC/DC DOWN detection	OFF: AC/DC DOWN not detected ON : AC/DC DOWN detected	<ul style="list-style-type: none"> <li>Turns ON if an instantaneous power failure of within 20ms occurs during use of the AC power supply module.</li> <li>Reset when power is switched OFF, then ON.</li> <li>Turns ON if an instantaneous power failure of within 10ms occurs during use of the DC power supply module.</li> <li>Reset when power is switched OFF, then ON.</li> </ul>	S (Error)	
SM56	Operation Errors	OFF: Normal ON : Operation error	<ul style="list-style-type: none"> <li>ON when operation error is generated</li> <li>Remains ON if the condition is restored to normal thereafter.</li> </ul>	S (Error)	
SM60	Blown fuse detection	OFF: Normal ON : Module with blown fuse	<ul style="list-style-type: none"> <li>Turns ON if there is at least one output module whose fuse has blown.</li> <li>Remains ON if the condition is restored to normal thereafter.</li> </ul>	S (Error)	
SM61	I/O module verification error	OFF: Normal ON : Error	<ul style="list-style-type: none"> <li>Turns ON if the I/O module differs from the status registered at power on.</li> <li>Remains ON if the condition is restored to normal thereafter.</li> </ul>	S (Error)	
SM62	Annunciator detection	OFF: Not detected ON : Detected	<ul style="list-style-type: none"> <li>Goes ON if even one annunciator (F) goes ON.</li> </ul>	S (Instruction execution)	
SM100	Serial communication function using flag	OFF: Serial communication function is not used. ON : Serial communication function is used.	<ul style="list-style-type: none"> <li>Stores the setting of whether the serial communication function is used or not in the serial communication setting parameter.</li> </ul>	S (Power-on or reset)	
SM101	Communication protocol status flag	OFF: GX Developer ON : MC protocol communication device	<ul style="list-style-type: none"> <li>Stores whether the device that is communicating via the RS-232 interface is GX Developer or MC protocol communication device.</li> </ul>	S (RS232 communication)	
SM110	Protocol error	OFF: Normal ON : Abnormal	<ul style="list-style-type: none"> <li>Turns ON when an abnormal protocol was used to make communication in the serial communication function.</li> <li>Remains ON if the condition is restored to normal thereafter.</li> </ul>	S (Error)	
SM111	Communication status	OFF: Normal ON : Abnormal	<ul style="list-style-type: none"> <li>Turns ON when the mode used to make communication was different from the setting in the serial communication function.</li> <li>Remains ON if the condition is restored to normal thereafter.</li> </ul>	S (Error)	
SM112	Error information clear	ON : Cleared	<ul style="list-style-type: none"> <li>Turns ON when the error codes stored in SM110, SM111, SD110 and SD111 are cleared. (Activated when turned from OFF to ON)</li> </ul>	U	
SM113	Overrun error	OFF: Normal ON : Abnormal	<ul style="list-style-type: none"> <li>Turns ON when an overrun error occurred in the serial communication error.</li> </ul>	S (Error)	
SM114	Parity error	OFF: Normal ON : Abnormal	<ul style="list-style-type: none"> <li>Turns ON when a parity error occurred in the serial communication error.</li> </ul>	S (Error)	
SM115	Framing error	OFF: Normal ON : Abnormal	<ul style="list-style-type: none"> <li>Turns ON when a framing error occurred in the serial communication error.</li> </ul>	S (Error)	

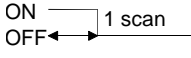
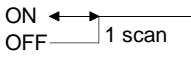
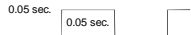

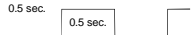

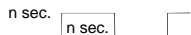
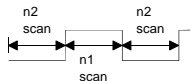
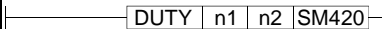
## (2) System information

Number	Name	Meaning	Explanation	Set by (When Set)	Applicable CPU
SM203	STOP contact	STOP status	• Goes ON at STOP status	S (Status change)	○
SM204	PAUSE contact	PAUSE status	• Goes ON at PAUSE status	S (Status change)	
SM206	PAUSE enable coil	OFF: PAUSE disabled ON : PAUSE enabled	• PAUSE status is entered if this relay is ON when the remote PAUSE contact goes ON	U	
	Device test request acceptance status	OFF: Device test not yet executed ON : Device test executed	• Comes ON when the device test mode is executed on GX Developer.	S (Request)	
SM210	Clock data set request	OFF: Ignored ON : Set request	• When this relay goes from OFF to ON, clock data being stored from SD210 through SD213 after execution of END instruction for changed scan is written to the clock device.	U	
SM211	Clock data error	OFF: No error ON : Error	• ON when error is generated in clock data (SD210 through SD213) value, and OFF if no error is detected.	S (Request)	○ Serial No. 04122 or later
SM213	Clock data read request	OFF: Ignored ON : Read request	• When this relay is ON, clock data is read to SD210 through SD213 as BCD values.	U	
SM240	No. 1 CPU reset flag	OFF: No. 1 CPU reset cancel ON : No. 1 CPU resetting	• Goes OFF when reset of the No. 1 CPU is canceled. • Comes ON when the No. 1 CPU is resetting (including the case where the CPU is removed from the base). The other CPUs are also put in reset status.	S (Status change)	
SM241	No. 2 CPU reset flag	OFF: No. 2 CPU reset cancel ON : No. 2 CPU resetting	• Goes OFF when reset of the No. 2 CPU is canceled. • Comes ON when the No. 2 CPU is resetting (including the case where the CPU is removed from the base). The other CPUs result in "MULTI CPU DOWN" (error code: 7000).		
SM242	No. 3 CPU reset flag	OFF: No. 3 CPU reset cancel ON : No. 3 CPU resetting	• Goes OFF when reset of the No. 3 CPU is canceled. • Comes ON when the No. 3 CPU is resetting (including the case where the CPU is removed from the base). The other CPUs result in "MULTI CPU DOWN" (error code: 7000).		
SM244	No. 1 CPU error flag	OFF: No. 1 CPU normal ON : No. 1 CPU during stop error	• Goes OFF when the No. 1 CPU is normal (including a continuation error). • Comes ON when the No. 1 CPU is during a stop error.		
SM245	No. 2 CPU error flag	OFF: No. 2 CPU normal ON : No. 2 CPU during stop error	• Goes OFF when the No. 2 CPU is normal (including a continuation error). • Comes ON when the No. 2 CPU is during a stop error.		
SM246	No. 3 CPU error flag	OFF: No. 3 CPU normal ON : No. 3 CPU during stop error	• Goes OFF when the No. 3 CPU is normal (including a continuation error). • Comes ON when the No. 3 CPU is during a stop error.		
SM315	Communication reserved time delay enable/disable flag	OFF: Without delay ON : With delay	• This flag is enabled when the time reserved for communication processing is set in SD315. • Turns ON to delay the END processing by the time set in SD315 in order to perform communication processing. (The scan time increases by the period set in SD315.) • Turns OFF to perform the END processing without a delay of the time set in SD315 when there is no communication processing. (Defaults to OFF)	U	○
SM320	Presence/ absence of SFC program	OFF: SFC program absence ON : SFC program presence	• Turns ON when an SFC program is registered. • OFF when an SFC program is not registered.	S (Initial)	○ Serial No. 04122 or later
SM321	Start/stop of SFC program	OFF: SFC program non- execution (stop) ON : SFC program execution (start)	• The same value as in SM320 is set as the initial value. (Automatically turns ON when the SFC program is present.) • When this relay is turned from ON to OFF, the execution of the SFC program is stopped. • When this relay is turned from OFF to ON, the execution of the SFC program is resumed.	S (Initial) U	
SM322	Starting status of SFC program	OFF: Initial start ON : Continued start	• The SFC program starting mode in the SFC setting of the PLC parameter dialog box is set as the initial value. At initial start: OFF At continued start: ON	S (Initial) U	
SM323	Presence/ absence of continuous transition of all blocks	OFF: Without continuous transition ON : With continuous transition	Set the presence/absence of continuous transition for the block where "Continuous transition bit" of the SFC data device has not been set.	U	
SM324	Continuous transition inhibit flag	OFF: When transition is executed ON : When transition is not executed	• OFF during operation in the continuous transition mode or during continuous transition, and ON when continuous transition is not executed. • Always ON during operation in the no continuous transition mode.	S (Status change)	



Number	Name	Meaning	Explanation	Set by (When Set)	Applicable CPU
SM325	Block stop-time output mode	OFF: OFF ON : Held	Select whether the coil outputs of the active steps are held or not at the time of a block stop. • As the initial value, the output mode at a block stop in the parameter is OFF when the coil outputs are OFF, and ON when the coil outputs are held. • When this relay turns OFF, the coil outputs are all turned OFF. • When this relay turns ON, the coil outputs are held.	S (Initial) U	○ Serial No. 04122 or later
SM326	SFC device clear mode	OFF: Device cleared ON : Device held	Select the device status at the time of switching from STOP to program write to RUN. (All devices except the step relay)	U	
SM327	Output at execution of end step	OFF: Held step output OFF ON : Held step output held	• When this relay turns OFF, the coil outputs of the steps (SC, SE, ST) being held when transition is established are turned OFF when the end step is reached.	U	
SM328	Clear processing mode when end step is reached	OFF: Clear processing is performed. ON : Clear processing is not performed.	Select whether clear processing will be performed or not if active steps other than the ones being held exist in the block when the end step is reached. • When this relay turns OFF, all active steps are forcibly terminated to terminate the block. • When this relay is ON, the execution of the block is continued as-is. • If active steps other than the ones being held do not exist when the end step is reached, the steps being held are terminated to terminate the block.	U	

## (3) System clocks/counters

Number	Name	Meaning	Explanation	Set by (When Set)	Applicable CPU
SM400	Always ON	ON _____ OFF	• Normally is ON	S (Every END processing)	○
SM401	Always OFF	ON _____ OFF	• Normally is OFF	S (Every END processing)	
SM402	ON for 1 scan only after RUN	ON  OFF	• After RUN, ON for 1 scan only. • This connection can be used for scan execution type programs only.	S (Every END processing)	
SM403	After RUN, OFF for 1 scan only	ON  OFF	• After RUN, OFF for 1 scan only. • This connection can be used for scan execution type programs only.	S (Every END processing)	
SM410	0.1 second clock		• Repeatedly changes between ON and OFF at each designated time interval. • When power supply is turned OFF, or reset is performed, goes from OFF to start. * Note that the ON-OFF status changes when the designated time has elapsed during the execution of the program.	S (Status change)	
SM411	0.2 second clock				
SM412	1 second clock				
SM413	2 second clock				
SM414	2n second clock		• This relay alternates between ON and OFF at intervals of the time (unit: s) specified in SD414. • Starts from OFF when the PLC is powered ON or the CPU module is reset. • Note that when the specified time is reached, the ON/OFF status changes even during program execution.	S (Status change)	
SM420	User timing clock No.0		• Relay repeats ON/OFF switching at fixed scan intervals. • When power supply is turned ON, or reset is performed, goes from OFF to start. • The ON/OFF intervals are set with the DUTY instruction. 	S (Every END processing)	
SM421	User timing clock No.1				
SM422	User timing clock No.2				
SM423	User timing clock No.3				
SM424	User timing clock No.4				

## (4) I/O refresh

Number	Name	Meaning	Explanation	Set by (When Set)	Corresponding CPU
SM580	Program to program I/O refresh	OFF: Not refreshed ON : Refreshed	<ul style="list-style-type: none"> <li>When this special relay is turned ON, I/O refresh is performed after execution of the first program, and the next program is then executed.</li> <li>When a sequence program and an SFC program are to be executed, the sequence program is executed, I/O refresh is performed, and the SFC program is then executed.</li> </ul>	U	○ Serial No. 04122 or later

## (5) Memory cards

Number	Name	Meaning	Explanation	Set by (When Set)	Applicable CPU
SM620	Drive 3/4 usable flags	OFF: Unusable ON : Use enabled	• Always ON	S (Initial)	○
SM621	Drive 3/4 protect flag	OFF: No protect ON : Protect	• Always OFF	S (Initial)	
SM622	Drive 3 flag	OFF: No drive 3 ON : Drive 3 present	• Always ON	S (Initial)	
SM623	Drive 4 flag	OFF: No drive 4 ON : Drive 4 present	• Always ON	S (Initial)	
SM640	File register use	OFF: File register not in use ON : File register in use	• Goes ON when file register is in use (Q00CPU, Q01CPU only)	S (Status change)	
SM660	Boot operation	OFF: Program memory execution ON : Boot operation in progress	• Goes ON while boot operation is in process	S (Status change)	

## (6) Instruction-Related Special Relays

Number	Name	Meaning	Explanation	Set by (When Set)	Applicable CPU
SM700	Carry flag	OFF: Carry OFF ON : Carry ON	• Carry flag used in application instruction	S (Instruction execution)	○
SM702	Search method	OFF: Search next ON : 2-part search	<ul style="list-style-type: none"> <li>Designates method to be used by search instruction.</li> <li>Data must be arranged for 2-part search.</li> </ul>	U	
SM703	Sort order	OFF: Ascending order ON : Descending order	• The sort instruction is used to designate whether data should be sorted in ascending order or in descending order.	U	
SM704	Block comparison	OFF: Non-match found ON : All match	• Goes ON when all data conditions have been met for the BKCMP instruction.	S (Instruction execution)	
SM715	EI flag	0 : During DI 1 : During EI	• ON when EI instruction is being executed.	S (Instruction execution)	
SM721	File being accessed	OFF: File not accessed ON : File being accessed	• Switches ON while a file is being accessed by the S.FWRITE, S.FREAD, COMRD, PRC, or LEDC instruction.	S (Status change)	
SM722	BIN/DBIN instruction error disabling flag	OFF: Error detection performed ON : Error detection not performed	• Turned ON when "OPERATION ERROR" is suppressed for BIN or DBIN instruction.	U	○ Serial No. 04122 or later
SM774	PID bumpless processing (for exact differential)	OFF: Matched ON : Not matched	• Specify whether the set value (SV) will be matched with the process value (PV) or not in the manual mode.	U	
SM775	Selection of link refresh processing during COM instruction execution	OFF: Performs link refresh ON : No link refresh performed	• Select whether or not to perform link refresh processing in cases where only general data processing will be conducted during the execution of the COM instruction.	U	
		OFF: All refresh processings are executed. ON : Refresh set in SD778 is performed.	• Select whether all refresh processings or the refresh processing set in SD778 will be performed when the COM instruction is executed.	U	○ Serial No. 04122 or later
SM794	PID bumpless processing (for inexact differential)	OFF: Matched ON : Not matched	• Specify whether the set value (SV) will be matched with the process value (PV) or not in the manual mode.	U	○ Serial No. 04122 or later

## 11.7 Special Register List

The special registers, SD, are internal registers with fixed applications in the PLC.

For this reason, it is not possible to use these registers in sequence programs in the same way that normal registers are used.

However, data can be written as needed in order to control the CPU module.

Data stored in the special registers are stored as BIN values if no special designation has been made to it.

The headings in the table that follows have the following meanings.

Item	Function of Item
Number	• Indicates special register number
Name	• Indicates name of special register
Meaning	• Indicates contents of special register
Explanation	• Discusses contents of special register in more detail
Set by (When set)	<ul style="list-style-type: none"> <li>• Indicates whether the relay is set by the system or user, and, if it is set by the system, when setting is performed.</li> <li>&lt;Set by&gt; <ul style="list-style-type: none"> <li>S : Set by system</li> <li>U : Set by user (sequence program or test operation from GX Developer or the like)</li> <li>S/U : Set by both system and user</li> </ul> </li> <li>&lt;When set&gt; → Indicated only for registers set by system <ul style="list-style-type: none"> <li>Each END : Set during each END processing</li> <li>Initial : Set only during initial processing (when power supply is turned ON, or when going from STOP to RUN)</li> <li>Status change : Set only when there is a change in status</li> <li>Error : Set when error occurs</li> <li>Instruction execution : Set when instruction is executed</li> <li>Request : Set only when there is a user request (through SM, etc.)</li> </ul> </li> </ul>
Corresponding CPU	<ul style="list-style-type: none"> <li>• Indicates the corresponding CPU module type name.</li> <li>○ : Can be applied to all types of CPU module.</li> <li>Each CPU module type name: Can be applied only to the specific CPU.</li> </ul>

For details on the following items, see these manuals:

- Networks → • For Q Corresponding MELSECNET/H Network System Reference Manual (PLC to PLC network)

## Special Register List

## (1) Diagnostic Information

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding CPU
SD0	Diagnostic errors	Diagnosis error code	<ul style="list-style-type: none"><li>Error codes for errors found by diagnosis are stored as BIN data.</li><li>Contents identical to latest fault history information.</li></ul>	S (Error)	
SD1	Clock time for diagnosis error occurrence	Clock time for diagnosis error occurrence	<ul style="list-style-type: none"><li>Year (last two digits) and month that SD0 data was updated is stored as BCD 2-digit code. <div>(Example) <div><div>b15 to b8</div><div>b7 to b0</div></div><div><div>Year (0 to 99)</div><div>Month (1 to 12)</div></div>: October, 1995 H9510</div></li></ul>	S (Error)	
SD2			<ul style="list-style-type: none"><li>The day and hour that SD0 was updated is stored as BCD 2-digit code. <div>(Example) <div><div>b15 to b8</div><div>b7 to b0</div></div><div><div>Day (1 to 31)</div><div>Hour (0 to 23)</div></div>: 10 p.m. on 25th H2510</div></li></ul>		
SD3			<ul style="list-style-type: none"><li>The minute and second that SD0 data was updated is stored as BCD 2-digit code. <div>(Example) <div><div>b15 to b8</div><div>b7 to b0</div></div><div><div>Minutes (0 to 59)</div><div>Seconds (0 to 59)</div></div>: 35 min. 48 sec. (past the hour) H3548</div></li></ul>		
SD4	Error information categories	Error information category code	<ul style="list-style-type: none"><li>Category codes which help indicate what type of information is being stored in the common information areas (SD5 through SD15) and the individual information areas (SD16 through SD26) are stored here. <div><div><div>b15 to b8</div><div>b7 to b0</div></div><div><div>Individual information category codes</div><div>Common information category codes</div></div></div></li><li>The common information category codes store the following codes: 0 : No error 1 : Unit/module No./ PLC No./Base No. 2 : File name/Drive name 3 : Time (value set) 4 : Program error location</li><li>The individual information category codes store the following codes: 0 : No error 1 : (Open) 2 : File name/Drive name 3 : Time (value actually measured) 4 : Program error location 5 : Parameter number 6 : Annunciator number</li></ul>	S (Error)	

## Special Register List (Continued)

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding CPU																																																																																
SD5	Error common information Error common information	Error common information Error common information	<ul style="list-style-type: none"><li>Common information corresponding to the error codes (SD0) is stored here.</li><li>The following four types of information are stored here:<ul style="list-style-type: none"><li>① Slot No.<table><tr><th>Number</th><th>Meaning</th></tr><tr><td>SD5</td><td>Slot No./Base No. *1 *2</td></tr><tr><td>SD6</td><td>I/O No. *3</td></tr><tr><td>SD7</td><td rowspan="9">(Vacant)</td></tr><tr><td>SD8</td></tr><tr><td>SD9</td></tr><tr><td>SD10</td></tr><tr><td>SD11</td></tr><tr><td>SD12</td></tr><tr><td>SD13</td></tr><tr><td>SD14</td></tr><tr><td>SD15</td></tr></table>(Not used for base No.)</li><li>* 1: In a multiple CPU system, the slot No. or CPU No. is stored depending on the error that occurred. Slot 0 in the multiple CPU system indicates the slot on the right-hand side of the CPU module at the right end. (Refer to the error code to check which No. is stored.) No. 1 CPU: 1, No. 2 CPU: 2, No. 3 CPU: 3</li><li>* 2: When 255 is stored into SD5, it indicates that an instruction, etc. has been executed for the module later than the one on the last slot where a module can be mounted.</li><li>* 3: When 0FFFF<sub>H</sub> is stored in SD6 (I/O No.), the I/O No. may not be identified due to I/O No. overlapping or like in the I/O assignment parameter. Use SD5 to identify the error location.</li><li>② File name/Drive name (Example)<table><tr><th>Number</th><th>Meaning</th></tr><tr><td>SD5</td><td>Drive</td></tr><tr><td>SD6</td><td rowspan="4">File name (ASCII code: 8 characters)</td></tr><tr><td>SD7</td></tr><tr><td>SD8</td></tr><tr><td>SD9</td></tr><tr><td>SD10</td><td>Extension*4</td><td>2EH(.)</td></tr><tr><td>SD11</td><td colspan="2">(ASCII code: 3 characters)</td></tr><tr><td>SD12</td><td rowspan="4">(Vacant)</td></tr><tr><td>SD13</td></tr><tr><td>SD14</td></tr><tr><td>SD15</td></tr></table></li><li>③ Time (value set)<table><tr><th>Number</th><th>Meaning</th></tr><tr><td>SD5</td><td>Time : 1 μs units (0 to 999 μs)</td></tr><tr><td>SD6</td><td>Time : 1 ms units (0 to 65535 ms)</td></tr><tr><td>SD7</td><td rowspan="9">(Vacant)</td></tr><tr><td>SD8</td></tr><tr><td>SD9</td></tr><tr><td>SD10</td></tr><tr><td>SD11</td></tr><tr><td>SD12</td></tr><tr><td>SD13</td></tr><tr><td>SD14</td></tr><tr><td>SD15</td></tr></table></li><li>④ Program error location<table><tr><th>Number</th><th>Meaning</th></tr><tr><td>SD5</td><td rowspan="4">File name (ASCII code: 8 characters)</td></tr><tr><td>SD6</td></tr><tr><td>SD7</td></tr><tr><td>SD8</td></tr><tr><td>SD9</td><td>Extension*4</td><td>2EH(.)</td></tr><tr><td>SD10</td><td colspan="2">(ASCII code: 3 characters)</td></tr><tr><td>SD11</td><td colspan="2">Pattern*5</td></tr><tr><td>SD12</td><td colspan="2">Block No.</td></tr><tr><td>SD13</td><td colspan="2">Step No./transition No.</td></tr><tr><td>SD14</td><td colspan="2">Sequence step No. (L)</td></tr><tr><td>SD15</td><td colspan="2">Sequence step No. (H)</td></tr></table></li></ul></li></ul>	Number	Meaning	SD5	Slot No./Base No. *1 *2	SD6	I/O No. *3	SD7	(Vacant)	SD8	SD9	SD10	SD11	SD12	SD13	SD14	SD15	Number	Meaning	SD5	Drive	SD6	File name (ASCII code: 8 characters)	SD7	SD8	SD9	SD10	Extension*4	2EH(.)	SD11	(ASCII code: 3 characters)		SD12	(Vacant)	SD13	SD14	SD15	Number	Meaning	SD5	Time : 1 μs units (0 to 999 μs)	SD6	Time : 1 ms units (0 to 65535 ms)	SD7	(Vacant)	SD8	SD9	SD10	SD11	SD12	SD13	SD14	SD15	Number	Meaning	SD5	File name (ASCII code: 8 characters)	SD6	SD7	SD8	SD9	Extension*4	2EH(.)	SD10	(ASCII code: 3 characters)		SD11	Pattern*5		SD12	Block No.		SD13	Step No./transition No.		SD14	Sequence step No. (L)		SD15	Sequence step No. (H)		S (Error)	○
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\* 4: For the extension, refer to REMARKS on the next page.

## Special Register List (Continued)

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding CPU																																																																																																							
SD16	Error individual information	Error individual information	<div>• Individual information corresponding to error codes (SD0) is stored here.</div> <div>① File name/Drive name</div> <div>(Example) File name= MAIN. QPG b15 to b8 b7 to b0</div> <table><tr><td>41H(A)</td><td>4DH(M)</td></tr><tr><td>4EH(N)</td><td>49H(I)</td></tr><tr><td>20H(SP)</td><td>20H(SP)</td></tr><tr><td>20H(SP)</td><td>20H(SP)</td></tr><tr><td>51H(Q)</td><td>2EH(.)</td></tr><tr><td>47H(G)</td><td>50H(P)</td></tr></table> <div>② Time (value actually measured)</div> <table><tr><td>SD16</td><td>Time : 1 μs units (0 to 999 μs)</td></tr><tr><td>SD17</td><td>Time : 1 ms units (0 to 65535 ms)</td></tr><tr><td>SD18</td><td rowspan="9">(Vacant)</td></tr><tr><td>SD19</td></tr><tr><td>SD20</td></tr><tr><td>SD21</td></tr><tr><td>SD22</td></tr><tr><td>SD23</td></tr><tr><td>SD24</td></tr><tr><td>SD25</td></tr><tr><td>SD26</td></tr></table> <div>③ Program error location</div> <table><tr><td>SD16</td><td rowspan="4">File name (ASCII code: 8 characters)</td></tr><tr><td>SD17</td></tr><tr><td>SD18</td></tr><tr><td>SD19</td></tr><tr><td>SD20</td><td>Extension *4 (ASCII code: 3 characters)</td></tr><tr><td>SD21</td><td>Pattern*5</td></tr><tr><td>SD22</td><td>Block No.</td></tr><tr><td>SD23</td><td>Step No./transition No.</td></tr><tr><td>SD24</td><td>Sequence step No. (L)</td></tr><tr><td>SD25</td><td>Sequence step No. (H)</td></tr><tr><td>SD26</td><td></td></tr></table> <div>* 5: Pattern data</div> <table><tr><td>15</td><td>14</td><td>to</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td><td>← (Bit number)</td></tr><tr><td>0</td><td>0</td><td>to</td><td>0</td><td>0</td><td>*</td><td>*</td><td>*</td><td></td></tr></table> <div>(Not used)</div> <div>SFC block specified (1)/not specified (0)</div> <div>SFC step specified (1)/not specified (0)</div> <div>SFC transition specified (1)/not specified (0)</div> <div>④ Parameter number</div> <table><tr><td>SD16</td><td>Parameter No.*6</td></tr><tr><td>SD17</td><td rowspan="10">(Vacant)</td></tr><tr><td>SD18</td></tr><tr><td>SD19</td></tr><tr><td>SD20</td></tr><tr><td>SD21</td></tr><tr><td>SD22</td></tr><tr><td>SD23</td></tr><tr><td>SD24</td></tr><tr><td>SD25</td></tr><tr><td>SD26</td></tr></table> <div>⑤ Annunciator number</div> <table><tr><td>SD16</td><td>No.</td></tr><tr><td>SD17</td><td rowspan="10">(Vacant)</td></tr><tr><td>SD18</td></tr><tr><td>SD19</td></tr><tr><td>SD20</td></tr><tr><td>SD21</td></tr><tr><td>SD22</td></tr><tr><td>SD23</td></tr><tr><td>SD24</td></tr><tr><td>SD25</td></tr><tr><td>SD26</td></tr></table> <div>⑥ Intelligent function module parameter error</div> <table><tr><td>SD16</td><td>Parameter No. *6</td></tr><tr><td>SD17</td><td>Error code for intelligent function module</td></tr><tr><td>SD18</td><td rowspan="9">(Vacant)</td></tr><tr><td>SD19</td></tr><tr><td>SD20</td></tr><tr><td>SD21</td></tr><tr><td>SD22</td></tr><tr><td>SD23</td></tr><tr><td>SD24</td></tr><tr><td>SD25</td></tr><tr><td>SD26</td></tr></table> <div>* 6 For details of the parameter numbers, refer to the user's manual (Functions Exlanation, Progruamming fundamentals) of the CPU module used.</div>	41H(A)	4DH(M)	4EH(N)	49H(I)	20H(SP)	20H(SP)	20H(SP)	20H(SP)	51H(Q)	2EH(.)	47H(G)	50H(P)	SD16	Time : 1 μs units (0 to 999 μs)	SD17	Time : 1 ms units (0 to 65535 ms)	SD18	(Vacant)	SD19	SD20	SD21	SD22	SD23	SD24	SD25	SD26	SD16	File name (ASCII code: 8 characters)	SD17	SD18	SD19	SD20	Extension *4 (ASCII code: 3 characters)	SD21	Pattern*5	SD22	Block No.	SD23	Step No./transition No.	SD24	Sequence step No. (L)	SD25	Sequence step No. (H)	SD26		15	14	to	4	3	2	1	0	← (Bit number)	0	0	to	0	0	*	*	*		SD16	Parameter No.*6	SD17	(Vacant)	SD18	SD19	SD20	SD21	SD22	SD23	SD24	SD25	SD26	SD16	No.	SD17	(Vacant)	SD18	SD19	SD20	SD21	SD22	SD23	SD24	SD25	SD26	SD16	Parameter No. *6	SD17	Error code for intelligent function module	SD18	(Vacant)	SD19	SD20	SD21	SD22	SD23	SD24	SD25	SD26	S (Error)	○
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**REMARK**

\*4 Extensions are shown below.

SD10 Higher8 bits	SD11		Extension name	File type
	Lower8 bits	Higher8 bits		
51H	50H	41H	QPA	Parameters
51H	50H	47H	QPG	Sequence program/SFC program
51H	43H	44H	QCD	Device comment
51H	44H	52H	QDR	File register

Special Register List (Continued)

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding CPU
SD50	Error reset	Error number that performs error reset	• Stores error number that performs error reset	U	
SD51	Battery low latch	Bit pattern indicating where battery voltage drop occurred	• When battery low occurs, the corresponding bit turns to 1 (ON). • Remains 1 if the battery voltage returns to normal thereafter. <div><div>b15</div><div>to</div><div>b0</div><div>0&lt;-----&gt;</div><div></div><div>CPU error</div></div>	S (Error)	
SD52	Battery low	Bit pattern indicating where battery voltage drop occurred	• Same configuration as SD51 above • Turns to 0 (OFF) when the battery voltage returns to normal thereafter.	S (Error)	
SD53	AC/DC DOWN detection	Number of times for AC/DC DOWN	• Every time the input voltage falls to or below 85% (AC power)/65% (DC power) of the rating during calculation of the CPU module, the value is incremented by one and stored in BIN.	S (Error)	
SD60	Blown fuse number	Number of module with blown fuse	• Value stored here is the lowest station I/O number of the module with the blown fuse.	S (Error)	
SD61	I/O module verification error number	I/O module verification error module number	• The lowest I/O number of the module (F number) where the I/O module verification number took place.	S (Error)	
SD62	Annunciator number	Annunciator number	• The first annunciator number to be detected is stored here.	S (Instruction execution)	
SD63	Number of annunciators	Number of annunciators	• Stores the number of annunciators searched.		
SD64	Table of detected annunciator numbers	Annunciator detection number	When F goes ON due to <b>OUT F</b> or <b>SET F</b> , the F numbers which go progressively ON from SD64 through SD79 are registered. The F numbers turned OFF by <b>RST F</b> are deleted from SD64 - SD79, and the F numbers stored after the deleted F numbers are shifted to the preceding registers. After 16 annunciators have been detected, detection of the 17th will not be stored from SD64 through SD79.		
SD65					
SD66					
SD67					
SD68					
SD69					
SD70					
SD71					
SD72					
SD73					
SD74					
SD75					
SD76					
SD77					
SD78					
SD79					

Special Register List (Continued)

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding CPU
SD100	Transmission speed storage area	Stores the transmission speed specified in the serial communication setting.	K96: 9.6kbps, K192: 19.2kbps, K384: 38.4kbps, K576: 57.6kbps, K1152: 115.2kbps	S (Power-on or reset)	○
SD101	Communication setting storage area	Stores the communication setting specified in the serial communication setting.	<div><div><div>b15</div><div>to</div><div>b6</div><div>b5</div><div>b4</div><div>b3</div><div>to</div><div>b0</div></div><div><div>*</div><div></div><div></div><div></div><div></div><div></div><div></div><div>*</div></div><div>Online program correction setting</div><div>0: Disabled 1: Enabled</div><div>Sumcheck yes/no</div><div>0: No 1: Yes</div></div> <div>* : Since the data is used by the system, it is undefined.</div>	S (Power-on or reset)	
SD102	Message waiting time storage area	Stores the message waiting time specified in the serial communication setting.	0: No waiting time 1 to FH: Waiting time (unit: 10ms) Defaults to 0.	S (Power-on or reset)	
SD110	Data sending result storage area	Stores the data sending result when the serial communication function is used.	The error code at data transmission is stored.	S (Error)	
SD111	Data receiving result storage area	Stores the data receiving result when the serial communication function is used.	Stores the error code at the time of data receiving.	S (Error)	
SD130	Fuse blown module	Bit pattern in units of 16 points, indicating the modules whose fuses have blown 0: No blown fuse 1: Blown fuse present	<div><div><div>• The numbers of output modules whose fuses have blown are input as a bit pattern (in units of 16 points). (If the module numbers are set by parameter, the parameter-set numbers are stored.)</div><div>• Also detects blown fuse condition at remote station output modules</div></div><div><div>b15b14b13b12b11b10b9b8b7b6b5b4b3b2b1b0</div><div><div>SD130</div><div>0001(YC0)0001(Y80)00000000</div><div>SD131</div><div>1(Y1F0)00001(Y1A0)00000000</div><div>SD137</div><div>00001(Y1F B0)000000001(Y1F 30)0000</div></div><div>Indicates a blown fuse</div><div><div>• Not cleared even if the blown fuse is replaced with a new one. This flag is cleared by error resetting operation</div></div></div></div>	S (Error)	
SD131					
SD132					
SD133					
SD134					
SD135					
SD136					
SD137	I/O module verification error	Bit pattern, in units of 16 points, indicating the modules with verification errors. 0: No I/O verification errors 1: I/O verification error present	<div><div><div>• When the power is turned on, the module numbers of the I/O modules whose information differs from the registered I/O module information are set in this register (in units of 16 points). (If the I/O numbers are set by parameter, the parameter-set numbers are stored.)</div><div>• Also detects I/O module information</div></div><div><div>b15b14b13b12b11b10b9b8b7b6b5b4b3b2b1b0</div><div><div>SD150</div><div>0000000000000001(X0)</div><div>SD151</div><div>0000001(X10)00000000</div><div>SD157</div><div>01(X1F 30)0000000000000000</div></div><div>Indicates an I/O module verification error</div><div><div>• Not cleared even if the blown fuse is replaced with a new one. This flag is cleared by error resetting operation</div></div></div></div>	S (Error)	
SD150					
SD151					
SD152					
SD153					
SD154					
SD155					
SD156					
SD157					



## (2) System information

## Special Register List

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding CPU
SD200	Status of switch	Status of CPU switch	<ul style="list-style-type: none"><li>The CPU module switch status is stored in the following format: <div><div>b15 to b8b7 to b4b3 to b0</div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>Vacant</div><div>②</div><div>①</div></div><div><div>①: CPU switch status0: RUN1: STOP</div><div>②: Memory card switchAlways OFF</div></div></li></ul>	S(Every END processing)	
SD201	LED status	Status of CPU-LED	<ul style="list-style-type: none"><li>The following bit patterns are used to store the statuses of the LEDs on the CPU module: <div><div>b15 to b4b3 to b0</div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>Vacant</div><div>②</div><div>①</div></div><div><div>①: RUN</div><div>②: ERR.</div></div></li></ul>	S (Status change)	
SD203	Operating status of CPU	Operating status of CPU	<ul style="list-style-type: none"><li>The CPU module operating status is stored as indicated in the following figure: <div><div>b15 to b12b11 to b8b7 to b4b3 to b0</div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div></div><div>②</div><div>①</div></div><div><div>①: Operating status of CPU0:RUN1:Vacant2:STOP3:PAUSE</div><div>②: STOP/PAUSE cause0:RUN/STOP/RESET switch1:Remote contact2:GX Developer/Serial Communication Module from some other remote source3:Internal program instruction</div><div>Note: Priority is earliest first4:Errors</div></div></li></ul>	S (Every END processing)	
SD207	LED display priority	Priorities 1 to 4	<ul style="list-style-type: none"><li>Set the ON (flicker) priorities of the LED display section at error occurrence with error item Nos.</li><li>Applicable to only the annunciator (error item No. 7). The priority setting area is as shown below. <div><div>b15 to b12b11 to b8b7 to b4b3 to b0</div><div><div>SD207Priority 4Priority 3Priority 2Priority 1</div><div>SD208Priority 8Priority 7Priority 6Priority 5</div><div>SD209Priority 10Priority 9</div></div><div>Default ValueSD207 = 0000HSD208 = 0700HSD209 = 0000H</div></div></li><li>With "7" set to any of priorities 1 to 10, the ERR. LED turns ON when the annunciator turns ON.</li><li>Without "7" being set to any of priorities 1 to 10, the ERR. LED will not turn ON if the annunciator turns ON.</li></ul>	U	Serial number 04122 or later
SD208		Priorities 5 to 8			
SD209		Priorities 9 to 10			


Special Register List (Continued)

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding CPU																
SD210	Clock data	Clock data (year, month)	<div><div><div>The year (last two digits) and month are stored as BCD code at SD210 as shown below:</div><div><div><div>b15 to b12</div><div>b11 to b8</div><div>b7 to b4</div><div>b3 to b0</div></div><div><div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div></div></div><div>Year</div><div>Month</div></div><div>Example : July 1993 9307H</div></div></div></div></div></div>	S/U (Request)																	
SD211	Clock data	Clock data (day, hour)	<div><div><div>The day and hour are stored as BCD code at SD211 as shown below:</div><div><div><div>b15 to b12</div><div>b11 to b8</div><div>b7 to b4</div><div>b3 to b0</div></div><div><div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div></div></div><div>Day</div><div>Hour</div></div><div>Example : 31st, 10 a.m. 3110H</div></div></div></div></div></div>																		
SD212	Clock data	Clock data (minute, second)	<div><div><div>The minutes and seconds (after the hour) are stored as BCD code at SD212 as shown below:</div><div><div><div>b15 to b12</div><div>b11 to b8</div><div>b7 to b4</div><div>b3 to b0</div></div><div><div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div></div></div><div>Minute</div><div>Second</div></div><div>Example : 35 min., 48 sec. 3548H</div></div></div></div></div></div>																		
SD213	Clock data	Clock data (day of week)	<div><div><div>Stores the year (two digits) and the day of the week in SD213 in the BCD code format as shown below:</div><div><div><div>b15 to b12</div><div>b11 to b8</div><div>b7 to b4</div><div>b3 to b0</div></div><div><div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div></div></div><div>Higher digits of year (0 to 99)</div><div><table><tr><th colspan="2">Day of week</th></tr><tr><td>0</td><td>Sunday</td></tr><tr><td>1</td><td>Monday</td></tr><tr><td>2</td><td>Tuesday</td></tr><tr><td>3</td><td>Wednesday</td></tr><tr><td>4</td><td>Thursday</td></tr><tr><td>5</td><td>Friday</td></tr><tr><td>6</td><td>Saturday</td></tr></table></div></div><div>Example : 1993, Friday 1905H</div></div></div></div></div></div>	Day of week		0	Sunday	1	Monday	2	Tuesday	3	Wednesday	4	Thursday	5	Friday	6	Saturday	S/U (Request)	
Day of week																					
0	Sunday																				
1	Monday																				
2	Tuesday																				
3	Wednesday																				
4	Thursday																				
5	Friday																				
6	Saturday																				
SD220	LED display data	Display indicator data	<div><div><div>Stores the message (16 characters of ASCII data) at error occurrence (including annunciator ON).</div><div><div><div>b15 to b8</div><div>b7 to b0</div></div><div><div><div>SD220</div><div>15th character from the right</div><div>16th character from the right</div></div><div><div><div>SD221</div><div>13th character from the right</div><div>14th character from the right</div></div><div><div><div>SD222</div><div>11th character from the right</div><div>12th character from the right</div></div><div><div><div>SD223</div><div>9th character from the right</div><div>10th character from the right</div></div><div><div><div>SD224</div><div>7th character from the right</div><div>8th character from the right</div></div><div><div><div>SD225</div><div>5th character from the right</div><div>6th character from the right</div></div><div><div><div>SD226</div><div>3rd character from the right</div><div>4th character from the right</div></div><div><div><div>SD227</div><div>1st character from the right</div><div>2nd character from the right</div></div></div></div><div>The display device data at PRG CHK is not stored.</div></div></div></div></div></div></div></div></div></div>	S (When changed)																	
SD221																					
SD222																					
SD223																					
SD224																					
SD225																					
SD226																					
SD227																					
SD240	Base mode	0: Automatic mode 1: Detail mode	<div><div><div>Stores the base mode.</div></div></div>	S (Initial)																	
SD241	No. of expansion bases	0: Basic only 1 to 4: No. of expansion bases	<div><div><div>Stores the maximum number of the expansion bases being installed.</div></div></div>	S (Initial)																	
SD242	Installed Q base presence/absence	Base type differentiation 0: Base not installed 1: Q * * B is installed	<div><div><div><div><div>b4 to b2</div><div>b1 to b0</div></div><div><div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div></div></div><div>Fixed to 0</div><div>Main base 1st expansion base 2nd expansion base to 4th expansion base</div></div></div></div></div></div>	S (Initial)																	
SD243	No. of base slots	No. of base slots	<div><div><div><div><div>b15 to b12</div><div>b11 to b8</div><div>b7 to b4</div><div>b3 to b0</div></div><div><div><div>SD243</div><div>Expansion 3</div><div>Expansion 2</div><div>Expansion 1</div><div>Main</div></div><div><div><div>SD244</div><div>Fixed to 0</div><div>Expansion 4</div></div></div></div></div><div>As shown above, each area stores the number of slots being installed. (Number of set slots when parameter setting has been made)</div></div></div>	S (Initial)																	
SD244	(Operation status)																				

Special Register List (Continued)

Number	Name	Meaning		Explanation	Set by (When set)	Corresponding CPU
SD245	No. of base slots (Mounting status)	No. of base slots		<div><div><div>b15 to b12</div><div>b11 to b8</div><div>b7 to b4</div><div>b3 to b0</div></div><div><div>SD245</div><div>Expansion 3</div><div>Expansion 2</div><div>Expansion 1</div><div>Main</div></div></div> <div><div>SD246</div><div>Fixed to 0</div><div>Expansion 4</div></div>	S (Initial)	Serial number 04122 or later
SD246				• As shown above, each area stores the number of module-mounted slots of the base unit (actual number of slots of the installed base unit).		
SD250	Loaded maximum I/O	Loaded maximum I/O No.		• When SM250 goes from OFF to ON, the upper 2 digits of the final I/O number plus 1 of the modules loaded are stored as BIN values.	S (Initial)	○
SD254	MELSECNET/H information	Number of modules installed		• Indicates the number of modules installed on MELSECNET/H.	S (Initial)	
SD255		Information from 1st module	I/O No.	• MELSECNET/H I/O number of first module installed		
SD256			Network No.	• MELSECNET/H network number of first module installed		
SD257			Group number	• MELSECNET/H group number of first module installed		
SD258			Station No.	• MELSECNET/H station number of first module installed		
SD290	Device allocation (Same as parameter contents)	Number of points allocated for X		• Stores the number of points currently set for X devices	S (Initial)	
SD291		Number of points allocated for Y		• Stores the number of points currently set for Y devices		
SD292		Number of points allocated for M		• Stores the number of points currently set for M devices		
SD293		Number of points allocated for L		• Stores the number of points currently set for L devices		
SD294		Number of points allocated for B		• Stores the number of points currently set for B devices		
SD295		Number of points allocated for F		• Stores the number of points currently set for F devices		
SD296		Number of points allocated for SB		• Stores the number of points currently set for SB devices		
SD297		Number of points allocated for V		• Stores the number of points currently set for V devices		
SD298		Number of points allocated for S		• Stores the number of points currently set for S devices		
SD299	Device allocation (Same as parameter contents)	Number of points allocated for T		• Stores the number of points currently set for T device	S (Initial)	
SD300		Number of points allocated for ST		• Stores the number of points currently set for ST devices		
SD301		Number of points allocated for C		• Stores the number of points currently set for C devices		
SD302	Device allocation (Same as parameter contents)	Number of points allocated for D		• Stores the number of points currently set for D devices	S (Initial)	
SD303		Number of points allocated for W		• Stores the number of points currently set for W devices		
SD304		Number of points allocated for SW		• Stores the number of points currently set for SW devices		
SD315	Time reserved for communication processing	Time reserved for communication processing		<div>• Reserves the designated time for communication processing with GX Developer or other units.</div> <div>• The greater the value is designated, the shorter the response time for communication with other devices (GX Developer, serial communication units) becomes.</div> <div>• Setting range: 1 to 100 ms</div> <div>• If the designated value is out of the range above, it is assumed to no setting. The scan time becomes longer by the designated time.</div>	END processing	
SD340	Ethernet information	No. of modules installed		• Indicates the number of modules installed on Ethernet.	S (Initial)	
SD341		I/O No.		• Indicates the I/O number of the installed Ethernet module.		
SD342		Network No.		• Indicates the network No. of the installed Ethernet module.		
SD343		Group No.		• Indicates the group No. of the installed Ethernet module.		
SD344		Station No.		• Indicates the station No. of the installed Ethernet module.		

Special Register List (Continued)

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding CPU
SD393	Multiple PLC system information	Number of multiple PLCs	<ul style="list-style-type: none"><li>The number of CPU modules that comprise the multiple PLC system is stored. (1 to 3, Empty also included)</li></ul>	S (Initial)	<div>○</div> Serial number 04122 or later
SD394		CPU mounting information	<ul style="list-style-type: none"><li>The CPU module types of No. 1 CPU to 3 and whether the CPU modules are mounted or not are stored.</li></ul> <div><div>b15 to b12b11 to b8b7 to b4b3 to b0</div><div>SD394<div>Empty (0)</div>PLC No. 3PLC No. 2PLC No. 1</div><div></div><div>CPU module mounted or not mounted 0: Not mounted 1: Mounted</div><div>CPU module type 0: PLC CPU 1: Motion CPU 2: PC CPU</div></div>		
SD395		Multiple PLC No.	<ul style="list-style-type: none"><li>In a multiple PLC configuration, the PLC No. of the host PLC is stored. No. 1 CPU: 1, No. 2 CPU: 2, No. 3 CPU: 3</li></ul>		
SD396		No. 1 CPU operation status	<ul style="list-style-type: none"><li>The operation information of each PLC No. is stored. (The information on the number of multiple PLCs indicated in SD393 is stored.)</li></ul> <div><div>b15b14 to b8b7 to b4b3 to b0</div><div><div>Empty</div>ClassificationOperation status</div><div><div>Mounted or not mounted 0: Not mounted 1: Mounted</div><div>0: Normal 1: Minor fault 2: Medium fault 3: Major fault FH: Reset</div><div>0: RUN 1: STEP RUN 2: STOP 3: PAUSE 4: Initial FH: Reset</div></div></div>	S (When END processing error occurs)	
SD397		No. 2 CPU operation status			
SD398	No. 3 CPU operation status				

## (3) System clocks/counters

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding CPU
SD412	1 second counter	Number of counts in 1-second units	<ul style="list-style-type: none"> <li>Following programmable controller CPU module RUN, 1 is added each second</li> <li>Count repeats from 0 to 32767 to -32768 to 0</li> </ul>	S (Status change)	Serial number 04122 or later
SD414	2n second clock setting	2n second clock units	<ul style="list-style-type: none"> <li>Stores value n of 2n second clock (Default is 30)</li> <li>Setting can be made between 1 and 32767</li> </ul>	U	
SD420	Scan counter	Number of counts in each scan	<ul style="list-style-type: none"> <li>Incremented by 1 for each scan execution after the CPU module is set to RUN. *</li> <li>Count repeats from 0 to 32767 to -32768 to 0</li> </ul>	S (Every END processing)	

## (4) Scan information

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding CPU
SD520	Current scan time	Current scan time (in 1 ms units)	• Stores current scan time (in 1 ms units) Range from 0 to 65535	S (Every END processing)	○
SD521		Current scan time (in 100 μs units)	• Stores current scan time (in 100 μs units) Range from 00000 to 900 (Example) A current scan of 23.6 ms would be stored as follows: D520=23 D521=600	S (Every END processing)	
SD524	Minimum scan time	Minimum scan time (in 1 ms units)	• Stores minimum value of scan time (in 1 ms units) • Range from 0 to 65535	S (Every END processing)	
SD525		Minimum scan time (in 100 μs units)	• Stores minimum value of scan time (in 100 μs units) • Range of 000 to 900	S (Every END processing)	
SD526	Maximum scan time	Maximum scan time (in 1 ms units)	• Stores maximum value of scan time, excepting the first scan. (in 1 ms units) • Range from 0 to 65535	S (Every END processing)	
SD527		Maximum scan time (in 100 μs units)	• Stores maximum value of scan time, excepting the first scan. (in 100 μs units) • Range of 000 to 900		

Special Register List (Continued)

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding CPU
SD540	END processing time	END processing time (in 1 ms units)	<ul style="list-style-type: none"><li>• Stores time from completion of scan program to start of next scan. (in 1 ms units)</li><li>• Range from 0 to 65535</li></ul>	S (Every END processing)	○
SD541		END processing time (in 100 μs units)	<ul style="list-style-type: none"><li>• Stores time from completion of scan program to start of next scan. (in 100 μs units)</li><li>• Range of 000 to 900</li></ul>		
SD542	Constant scan wait time	Constant scan wait time (in 1 ms units)	<ul style="list-style-type: none"><li>• Stores wait time when constant scan time has been set. (in 1 ms units)</li><li>• Range from 0 to 65535</li></ul>	S (First END processing)	
SD543		Constant scan wait time (in 100 μs units)	<ul style="list-style-type: none"><li>• Stores wait time when constant scan time has been set. (in 100 μs units)</li><li>• Range of 000 to 900</li></ul>		
SD548	Scan program execution time	Scan program execution time (in 1 ms units)	<ul style="list-style-type: none"><li>• Stores execution time for scan execution type program during 1 scan (in 1 ms units)</li><li>• Range from 0 to 65535</li><li>• Stores each scan</li></ul>	S (Every END processing)	
SD549		Scan program execution time (in 100 μs units)	<ul style="list-style-type: none"><li>• Stores execution time for scan execution type program during 1 scan (in 100 μs units)</li><li>• Range of 000 to 900</li><li>• Stores each scan</li></ul>		

## (5) Drive information

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding CPU
SD620	Drive 3/4 models	Drive 3/4 models	<ul style="list-style-type: none"><li>Indicates the drive 3/4 models.</li></ul> <div><div>b15 to b8 b7 to b4 b3 to b0</div><div>0</div><div><div>Drive 3 (Standard RAM)</div><div>0: Absent 1: Present</div></div><div><div>Drive 4 (Standrd ROM)</div><div>Fixed at "3".</div></div></div> <p>Drive 4 is fixed to "3" because it has built-in Flash ROM.</p>	S (Initial)	
SD622	Drive 3 (Standard RAM) capacity	Drive 3 capacity	<ul style="list-style-type: none"><li>Drive 3 capacity is stored in 1kbyte units. (Fixed to "61" because it has 61kbyte RAM built-in.)</li></ul>	S (Initial)	
SD623	Drive 4 (Standard ROM) capacity	Drive 4 capacity	<ul style="list-style-type: none"><li>Drive 4 capacity is stored in 1kbyte units.</li></ul>	S (Initial)	
SD624	Drive 3 use conditions	Drive 3 use conditions	<ul style="list-style-type: none"><li>Drive 3 use conditions are stored in bit pattern.</li></ul> <div><div>b15 to b4 b3 to b0</div><div>0 0 0 0 0 0</div><div><div>File register (R)</div><div>1: In use 0: Not used</div></div></div>	S (Status change)	
SD640	File register drive	Drive number:	<ul style="list-style-type: none"><li>Stores drive number being used by file register</li></ul>	S (Status change) * 1	
SD641	File register file name	File register file name	<ul style="list-style-type: none"><li>Stores file register file name (with extension) selected at parameters as ASCII code.</li></ul>	S (Initial)	
SD642			<div><div>b15 to b8 b7 to b0</div><div><div>SD641</div><div>Second character (A)</div><div>First character (M)</div></div><div><div>SD642</div><div>Fourth character (N)</div><div>Third character (I)</div></div><div><div>SD643</div><div>Sixth character ( )</div><div>Fifth character ( )</div></div><div><div>SD644</div><div>Eighth character ( )</div><div>Seventh character ( )</div></div><div><div>SD645</div><div>First character of extension (Q)</div><div>2EH(.)</div></div><div><div>SD646</div><div>Third character of extension (R)</div><div>Second character of extension (D)</div></div></div>		
SD643					
SD644					
SD645					
SD646					
SD647	File register capacity	File register capacity	<ul style="list-style-type: none"><li>Stores the data capacity of the currently selected file register in 1 k word units.</li></ul>	S (Initial)	
SD648	File register block number	File register block number	<ul style="list-style-type: none"><li>Stores the currently selected file register block number.</li></ul>	S (Status change) * 1	

\* 1: The data is set when the CPU is stopped and then RUN or the RSET instruction is executed after parameter execution.

## (6) Instruction-Related Registers

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding CPU																											
SD715	IMASK instruction mask pattern	Mask pattern	<div>• Patterns masked by use of the IMASK instruction are stored in the following manner:</div> <div><table><tr><td>b15</td><td>to</td><td>b1</td><td>b0</td></tr><tr><td>SD715</td><td>I15</td><td>to</td><td>I1</td><td>I0</td></tr><tr><td>SD716</td><td>I31</td><td>to</td><td>I17</td><td>I16</td></tr><tr><td>SD717</td><td>I47</td><td>to</td><td>I33</td><td>I32</td></tr></table></div>	b15	to	b1	b0	SD715	I15	to	I1	I0	SD716	I31	to	I17	I16	SD717	I47	to	I33	I32	S (During execution)	<div>○</div>								
b15				to	b1	b0																										
SD715				I15	to	I1	I0																									
SD716	I31	to	I17	I16																												
SD717	I47	to	I33	I32																												
SD716																																
SD717																																
SD718	Accumulator	Accumulator	<div>• For use as replacement for accumulators used in A-series programs.</div>	S/U																												
SD719																																
SD774	PID limit setting (for exact differential)	0: With limit 1: Without limit	<div>Specify the limit of each PID loop as shown below.</div> <div><table><tr><td>b15</td><td>to</td><td>b8</td><td>b7</td><td>to</td><td>b1</td><td>b0</td></tr><tr><td>SD774</td><td colspan="2"><div></div></td><td>Loop 8</td><td>to</td><td>Loop 2</td><td>Loop 1</td></tr></table></div>	b15	to	b8	b7	to	b1	b0	SD774	<div></div>		Loop 8	to	Loop 2	Loop 1	U														
b15	to	b8	b7	to	b1	b0																										
SD774	<div></div>		Loop 8	to	Loop 2	Loop 1																										
SD778	Refresh processing selection at COM instruction execution	<div>b0 to b4 (Default: 0) 0: Refresh not executed 1: Refresh executed b15 0: General data processing executed 1: General data processing not executed</div>	<div><div>• Select whether each refresh processing will be executed or not when the COM instruction is executed.</div><div>• Designation of SD778 is made valid when SM775 turns ON.</div><div><table><tr><td>b15</td><td>b14</td><td>to</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SD778</td><td>1/0</td><td>0</td><td>1/0</td><td>1/0</td><td>1/0</td><td>1/0</td><td>1/0</td><td>1/0</td></tr></table><div><div>↑ I/O refresh</div><div>↑ CC-Link refresh</div><div>↑ MELSECNET/H refresh</div><div>↑ Automatic refresh of intelligent function modules</div><div>↑ Automatic refresh of CPU shared memory</div><div>↑ Execution/non-execution of general data processing</div></div></div></div>	b15	b14	to	b5	b4	b3	b2	b1	b0	SD778	1/0	0	1/0	1/0	1/0	1/0	1/0	1/0	U	<div>○</div> <div>Serial number 04122 or later</div>									
b15	b14	to	b5	b4	b3	b2	b1	b0																								
SD778	1/0	0	1/0	1/0	1/0	1/0	1/0	1/0																								
SD781 TO SD785	Mask pattern of IMASK instruction	Mask pattern	<div><div>• Stores the mask patterns masked by the IMASK instruction as follows:</div><div><table><tr><td>b15</td><td>to</td><td>b1</td><td>b0</td></tr><tr><td>SD781</td><td>I63</td><td>to</td><td>I49</td><td>I48</td></tr><tr><td>SD782</td><td>I79</td><td>to</td><td>I65</td><td>I64</td></tr><tr><td colspan="4">to</td></tr><tr><td colspan="4">to</td></tr><tr><td>SD785</td><td>I127</td><td>to</td><td>I113</td><td>I112</td></tr></table></div></div>	b15	to	b1	b0	SD781	I63	to	I49	I48	SD782	I79	to	I65	I64	to				to				SD785	I127	to	I113	I112	S (During execution)	<div>○</div>
b15	to	b1	b0																													
SD781	I63	to	I49	I48																												
SD782	I79	to	I65	I64																												
to																																
to																																
SD785	I127	to	I113	I112																												
SD794	PID limit setting (for inexact differential)	0: With limit 1: Without limit	<div>Specify the limit of each PID loop as shown below.z</div> <div><table><tr><td>b15</td><td>to</td><td>b8</td><td>b7</td><td>to</td><td>b1</td><td>b0</td></tr><tr><td>SD794</td><td colspan="2"><div></div></td><td>Loop 8</td><td>to</td><td>Loop 2</td><td>Loop 1</td></tr></table></div>	b15	to	b8	b7	to	b1	b0	SD794	<div></div>		Loop 8	to	Loop 2	Loop 1	U	<div>○</div> <div>Serial number 04122 or later</div>													
b15	to	b8	b7	to	b1	b0																										
SD794	<div></div>		Loop 8	to	Loop 2	Loop 1																										

## APPENDICES

## APPENDIX 1 Error Code Return to Origin During General Data Processing

The CPU module returns an error code to the general data processing request origin when an error occurs and there is a general data processing request from the peripheral equipment, intelligent function module, or network system.

**POINT**

This error code is not an error that is detected by the CPU module self-diagnostic function, so it is not stored in the special relay (SD0).  
When the request origin is GX Developer, a message or an error code is displayed.  
When the request origin is an intelligent function module or network system, an error is returned to the process that was requested.

## APPENDIX 1.1 Error code overall explanation

These error codes differ depending on the error No. of the location the error was detected. The following table shows the relationship between the error detection location and the error code.

Error detection location	Error Code (hexadecimal)	Error description reference destination
CPU module	4000 <sub>H</sub> to 4FFF <sub>H</sub>	Refer to Appendix 1.2.
Intelligent function module	7000 <sub>H</sub> to 7FFF <sub>H</sub>	Basic model QCPU (Q Mode) User's Manual (Function Explanation, Program Fundamentals)
Network system	F000 <sub>H</sub> to FFFF <sub>H</sub>	Q Corresponding MELSECNET/H Network System Reference Manual

## APPENDIX 1.2 Description of the errors of the error codes (4000H to 4FFFH)

The following table indicates the definitions and corrective actions of the error codes (4000H to 4FFFH) detected by the CPU module.

Error code (hexadecimal)	Error item	Error description	Countermeasure
4000H	CPU related error	Sum check error	Check the connection status of the connection cable with the CPU module.
4001H		A request that could not be handled was executed.	Check the requested operation.
4002H			
4003H		Command for which a global request cannot be performed was executed.	Check the requested command.
4004H		Since the CPU module is protecting the system, what was requested cannot be executed.	Set the system protect switch of the CPU module to OFF.
4005H		The volume of data handled according to the specified request is too large.	Reduce the volume of data to that which can be processed at the specified request.
4006H		The password cannot be deleted.	Delete the set password.
4008H	CPU mode error	The CPU module is BUSY. (The buffer is not vacant).	After the free time has passed, reexecute the request.
4010H		The CPU module is running to the request contents cannot be executed.	Execute after setting the CPU module to STOP status.
4011H		The CPU module is not in the STEP-RUN status so the request contents cannot be executed.	Execute after setting the CPU module to STEP-RUN status.
4013H		Since the CPU module is not in a STOP status, the request cannot be executed.	Execute after setting the CPU module into the STOP status.



Error code (hexadecimal)	Error item	Error description	Countermeasure
4021 <sub>H</sub>	CPU file related error	The specified drive memory does not exist or there is an error.	Check the specified drive memory status.
4022 <sub>H</sub>		The file with the specified file name or file No. does not exist.	Check the specified file name and file No.
4023 <sub>H</sub>		The file name and file No. of the specified file do not match.	Delete the file and then recreate the file.
4024 <sub>H</sub>		The specified file cannot be handled by a user.	Do not access the specified file.
4025 <sub>H</sub>		The specified file is processing the request from a different location.	Forcefully execute the request forcibly. Or reexecute the request after the processing from the other location has ended.
4026 <sub>H</sub>		The keyword specification set in the corresponding drive memory is required.	Access by specifying the keyword set in the corresponding drive memory.
4027 <sub>H</sub>		The specified range exceeds the file range.	Check the specified range and access within that range.
4028 <sub>H</sub>		The same file already exists.	Forcefully execute the request forcibly. Or reexecute after changing the file name.
4029 <sub>H</sub>		The specified file capacity cannot be obtained.	Revise the specified file contents. Or reexecute after cleaning up and reorganizing the specified drive memory.
402B <sub>H</sub>		The request contents cannot be executed in the specified drive memory.	Do not execute a request for a specified drive memory in which an error has occurred.
402C <sub>H</sub>		Currently the request contents cannot be executed.	Reexecute after the free wait time has passed.
4030 <sub>H</sub>	CPU device specified error	The specified device name cannot be handled.	Check the specified device name.
4031 <sub>H</sub>		The specified device No. is outside the range.	Check the specified device No.
4032 <sub>H</sub>		There is a mistake in the specified device qualification.	Check the specified device qualification method.
4033 <sub>H</sub>		Writing cannot be done because the specified device is for system use.	Do not write the data in the specified device, and do not turn on or off.
4040 <sub>H</sub>	Intelligent function module specification error	The request contents cannot be executed in the specified intelligent function module.	Do not conduct a request for a specified intelligent function module in which an error has occurred.
4041 <sub>H</sub>		The access range exceeds the buffer memory range of the specified intelligent function module.	Check the header address and access number of points and access using a range that exists in the intelligent function module.
4042 <sub>H</sub>		The specified intelligent function module cannot be accessed.	Check that the specified intelligent function module is operating normally.
4043 <sub>H</sub>		The intelligent function module does not exist in the specified position.	Check the header input/output No. of the specified intelligent function module.
4044 <sub>H</sub>		A control bus error has occurred.	Check that there is no error in the intelligent function module or in the hardware of another module.
4045 <sub>H</sub>		The head No. of the device to be accessed is not even.	Reexamine the head No. of the device to be accessed.
4046 <sub>H</sub>		The device header or number of points in the simulation is not in 16point unit.	Check the device header No. or number of points and correct them to 16 point units.
4050 <sub>H</sub>	Protect error	Since the write protect switch of the memory card is ON, what was requested cannot be executed.	Set the write protect switch of the memory card to OFF.
4051 <sub>H</sub>		The specified device memory cannot be accessed.	Check the following and make it countermeasures. • Is the memory one that can be used? • Is the specified drive memory correctly installed?
4052 <sub>H</sub>		The specified file attribute is read only so the data cannot be written.	Do not write data in the specified file. Or change the file attribute.
4053 <sub>H</sub>		An error occurred when writing data to the specified drive memory.	Check the specified drive memory. Or reexecute write after changing the corresponding drive memory.
4054 <sub>H</sub>		An error occurred when deleting the data in the specified drive memory.	Check the specified drive memory. Or re-erase after replacing the corresponding drive memory.

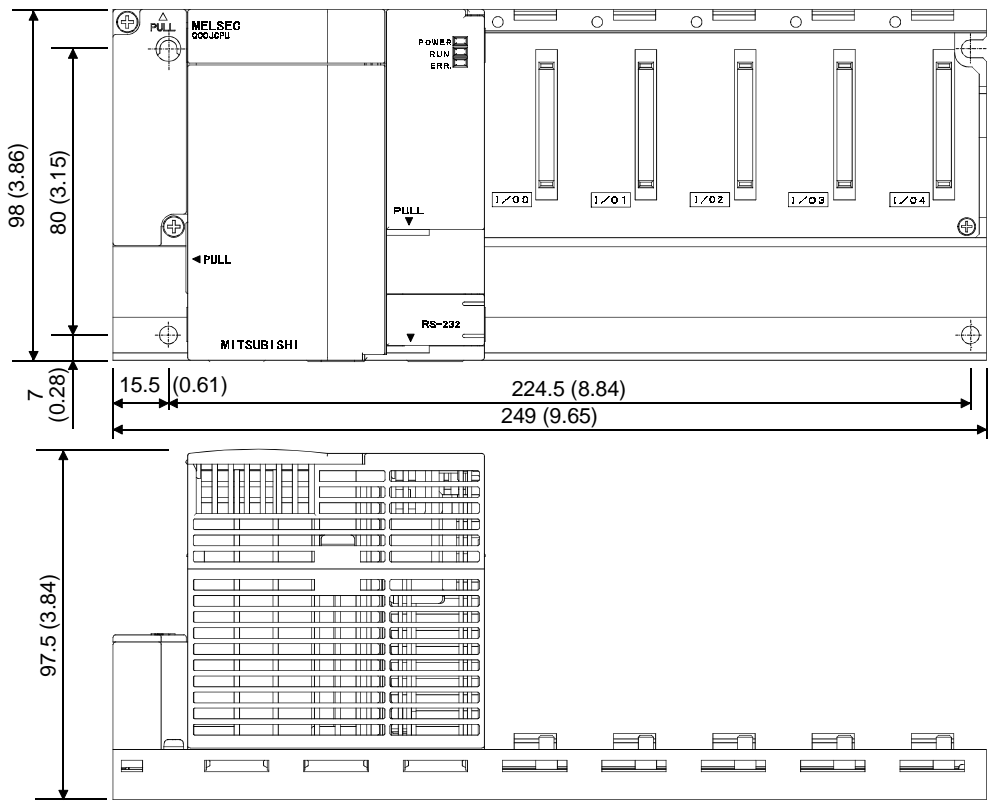
Error code (hexadecimal)	Error item	Error description	Countermeasure
4060 <sub>H</sub>	Online registration error	The monitor condition registration CPU module system area is already being used by another piece of equipment.	Reexecute monitor after the monitor by the other equipment has completed. Or increase the system area of the program memory using the format with option.
4061 <sub>H</sub>		Registration failed.	Execute registration again.
4062 <sub>H</sub>		The monitor detail condition is already being used and monitored by another piece of equipment.	Do not conduct monitor detail conditions from the specified equipment. Or reexecute monitoring after deleting the monitor detail conditions of the other equipment.
4063 <sub>H</sub>		The number of simultaneous file accesses (number of file locks) from multiple locations exceeded 10.	Reduce the number of simultaneous file accesses (number of file locks) from multiple locations to 10 or less.
4064 <sub>H</sub>		There is a problem with the specified contents.	Check the specified contents.
4065 <sub>H</sub>		The device allocation information differs from the parameter.	Check the parameter. Or check the data.
4066 <sub>H</sub>		A keyword that differs from the keyword set in the specified driver memory has been specified.	Check the specified keyword.
4067 <sub>H</sub>		The specified monitor file cannot be obtained.	Conduct monitor after obtaining the monitor file.
4068 <sub>H</sub>		Registration/deletion cannot be conducted because the specified command is being executed.	Reexecute the command after the request from the other equipment has been completed.
4069 <sub>H</sub>		The conditions have already been reached by the device match.	Check the monitor conditions. Or reconduct monitor registration and execute monitor.
406A <sub>H</sub>		A drive other than Nos. 1 to 3 has been specified.	Check the specified drive and specify the correct drive.
4070 <sub>H</sub>	Circuit inquiry	Program before correction and the registration program differ.	Check the registration program and make the programs match.
4080 <sub>H</sub>	Other errors	Data error	Check the requested data contents.
4081 <sub>H</sub>		The sort subject cannot be detected.	Check the data to be searched.
4082 <sub>H</sub>		The specified command is executing and therefore cannot be executed.	Reexecute the command after the request from the other equipment is completed.
4083 <sub>H</sub>		Trying to execute a program that is not registered in the parameter.	Register the program to be executed in the parameter.
4084 <sub>H</sub>		The specified pointer P, I cannot be detected.	Check the data to be searched.
4085 <sub>H</sub>		Pointer P, I cannot be specified because the program is not specified in the parameter.	Specify pointer P, I after registering the program to be executed in the parameter.
4086 <sub>H</sub>		Pointer P, I has already been added.	Check the pointer No. to be added and make correction.
4087 <sub>H</sub>		Trying to specify too many pointers.	Check the specified pointer and make a correction.
4088 <sub>H</sub>		The specified step No. was not in the instruction header.	Check the specified step No. and make a correction.
4089 <sub>H</sub>		An END instruction was inserted/deleted while the CPU module was running.	Conduct Insert/removal after the CPU module has stopped.
408A <sub>H</sub>		The file capacity was exceeded by the write during Run.	Write the program after the CPU module has stopped.
408B <sub>H</sub>		The remote request cannot be executed.	Reexecute after the CPU module is in a status where the mode request can be executed.
408D <sub>H</sub>		There is an instruction code that cannot be handled.	Check whether the model of the used CPU module is correct or not.
408E <sub>H</sub>		The write step is illegal.	Write the program after setting the CPU module to STOP.
40A0 <sub>H</sub>	SFC device related error	The block No. outside the range was specified.	Check and correct the setting.
40A1 <sub>H</sub>		The number of blocks outside the range was specified.	Check and correct the setting.
40A2 <sub>H</sub>		The step No. outside the range was specified.	Check and correct the setting.

Error code (hexadecimal)	Error item	Error description	Countermeasure
40B0 <sub>H</sub>	SFC file related error	The specified drive is wrong.	Check and correct the setting.
40B1 <sub>H</sub>		The specified program does not exist.	Check and correct the specified file name.
40B2 <sub>H</sub>		The specified program is not an SFC program.	Check and correct the specified file name.
4150 <sub>H</sub>	File-related errors	Formatting of the drive protected by the system was attempted.	Do not format the target drive since it cannot be formatted.
4151 <sub>H</sub>		Deletion of the file protected by the system was attempted.	Do not delete the target file since it cannot be deleted.
4165 <sub>H</sub>		A multi-block online program correction system file does not exist.	Secure a multi-block online program correction system file area at the time of formatting.
41D0 <sub>H</sub>		The route directory has no free space.	Increase the free space of the specified drive. Optimize the specified drive to increase continuous free areas.
41D1 <sub>H</sub>		The file pointer is insufficient.	Specify the correct file pointer.
41D5 <sub>H</sub>		The file of the same name exists.	Change the file name.
41DF <sub>H</sub>		The disk is write-protected.	Cancel the write protection of the disk and execute again.
41E0 <sub>H</sub>		The drive does not respond.	Check for the specified drive. If it exists, check its status.
41E1 <sub>H</sub>		The address or sector is not found.	Check if the target is a ROM drive or not.
41E4 <sub>H</sub>		The file cannot be accessed properly.	Execute again after resetting the CPU module.
41E8 <sub>H</sub>		The drive format information is illegal.	Format the target drive.
41E9 <sub>H</sub>		At the time of file access, time-out occurred during waiting for access.	Execute again after some time.
41EB <sub>H</sub>		The path name is too long.	Check the length of the path name.
41EC <sub>H</sub>		The disk is logically broken.	Change the specified drive.
41ED <sub>H</sub>		An attempt to make a file continuous failed. (There are enough free file areas, which cannot be taken continuously.)	Optimize the specified drive to increase continuous free areas.
41F2 <sub>H</sub>		The specified drive is ROM.	Check the specified drive. (Format it for RAM.)
41FA <sub>H</sub>		Program was written beyond the range of the sequence execution area.	Make either the existing program or a newly written program smaller so that the programs do not exceed the range of the sequence execution area.
41FB <sub>H</sub>		The same starting source has already opened the specified file.	Check if it is being processed by another application.
41FC <sub>H</sub>		An attempt was made to erase the mounted drive.	Execute again after dismounting the drive.
41FD <sub>H</sub>		The flash ROM is not formatted.	Erase the specified drive.
41FE <sub>H</sub>		The IC memory card is not inserted.	Insert or reinsert the IC memory card.
41FF <sub>H</sub>		The IC memory card type differs.	Check the IC memory card type.
4A00 <sub>H</sub>	Link related error	(1) The specified station could not be accessed because a routing parameter was not set in the related station. (2) Though routing via the multiple CPU system is attempted, the control CPU of the network module that relays the data is not active.	Set the routing parameter for accessing the specified station in the related station.
4A01 <sub>H</sub>		The network with the No. set in the routing parameter does not exist.	Check the routing parameter set in the related station and make a correction.
4A02 <sub>H</sub>		Cannot access the specified station.	Check if an error has occurred in the network module and if the module is offline.
4B00 <sub>H</sub>	Object related error	An error occurred in the access destination or in a relay station.	Check if an error has occurred in the specified access destination or in a relay station to the access station and if so take countermeasures.

APPENDIX 2 External Dimensions

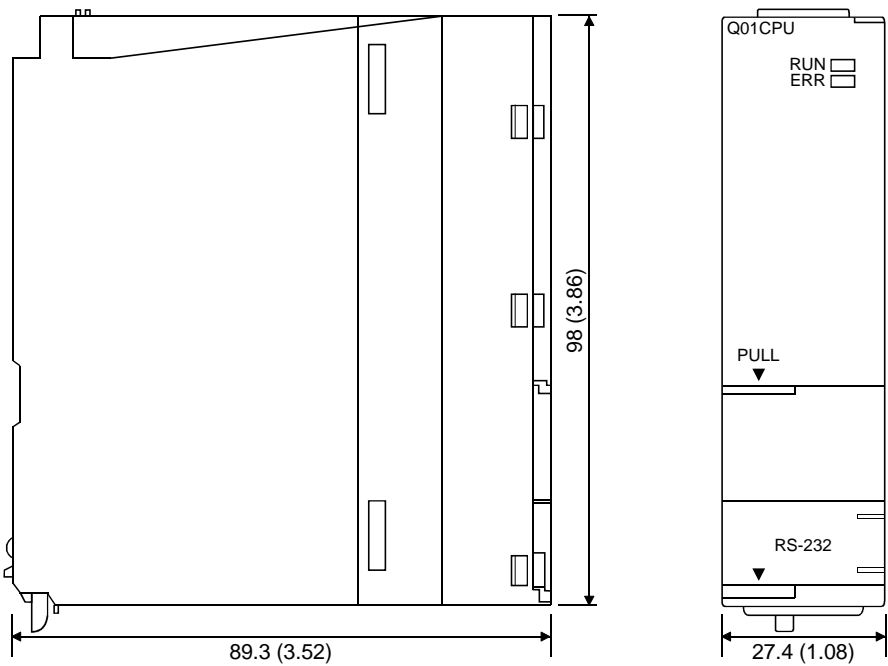
APPENDIX 2.1 CPU module

(1) Q00JCPU



Unit: mm (inch)

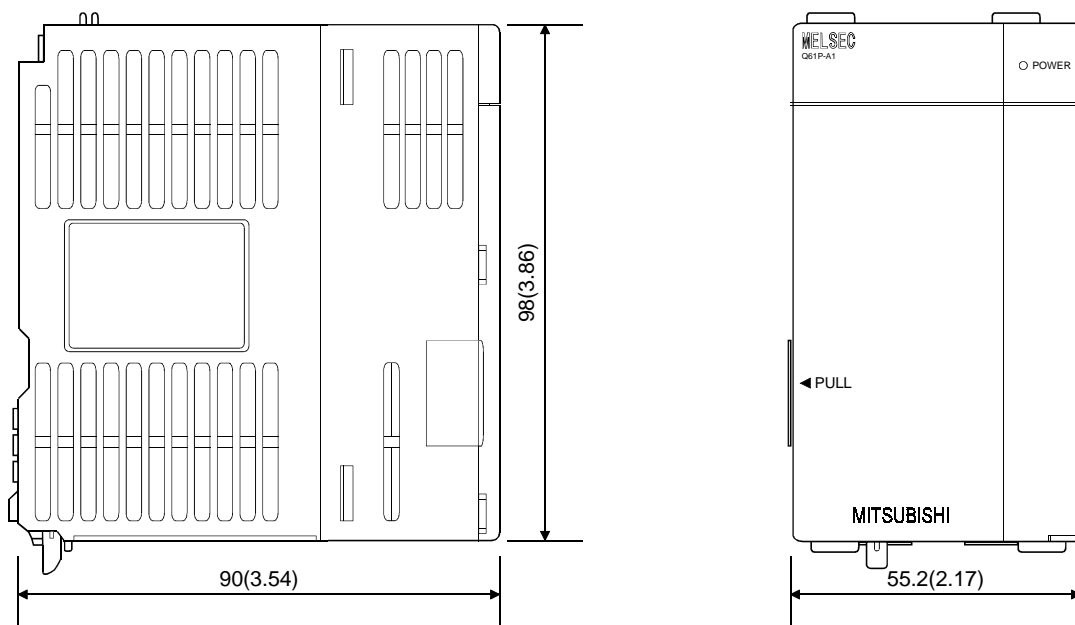
(2) Q00CPU, Q01CPU



Unit: mm (inch)

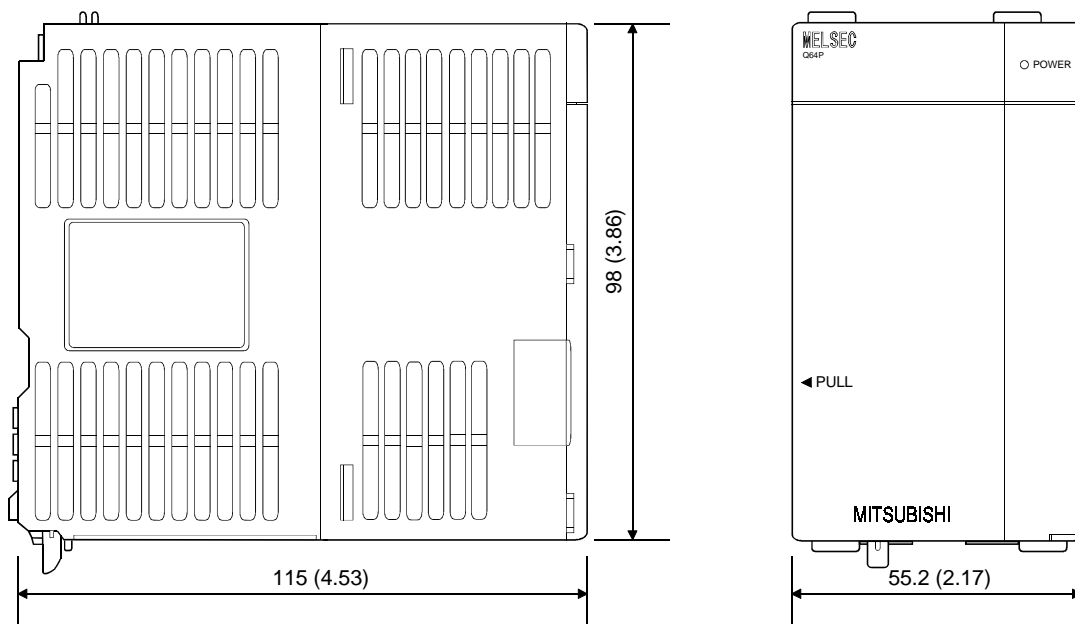
## APPENDIX 2.2 Power supply module

## (1) Power Supply Module (Q61P-A1, Q61P-A2, Q62P, Q63P)



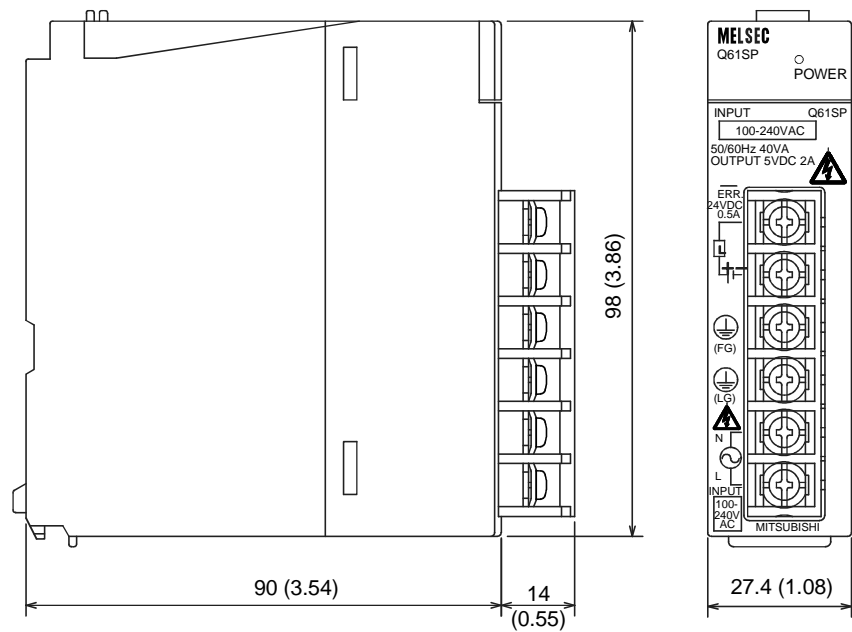
Unit: mm (inch)

## (2) Power Supply Module (Q64P)



Unit: mm (inch)

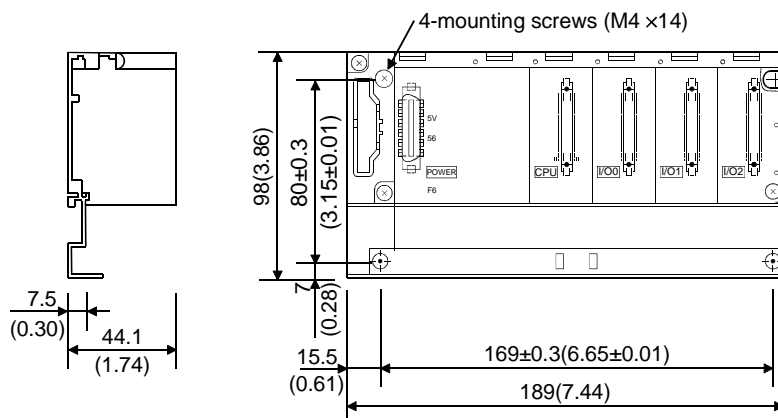
(3) Power Supply Module (Q61SP)



Unit: mm (inch)

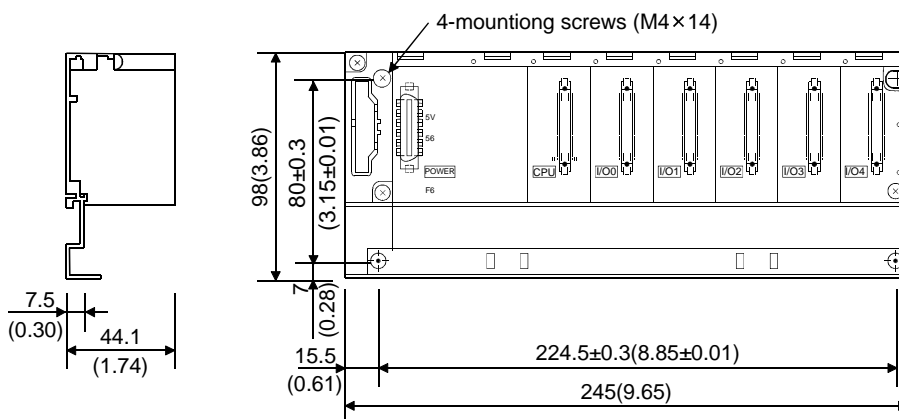
## APPENDIX 2.3 Main base unit

## (1) Main Base Unit (Q33B)



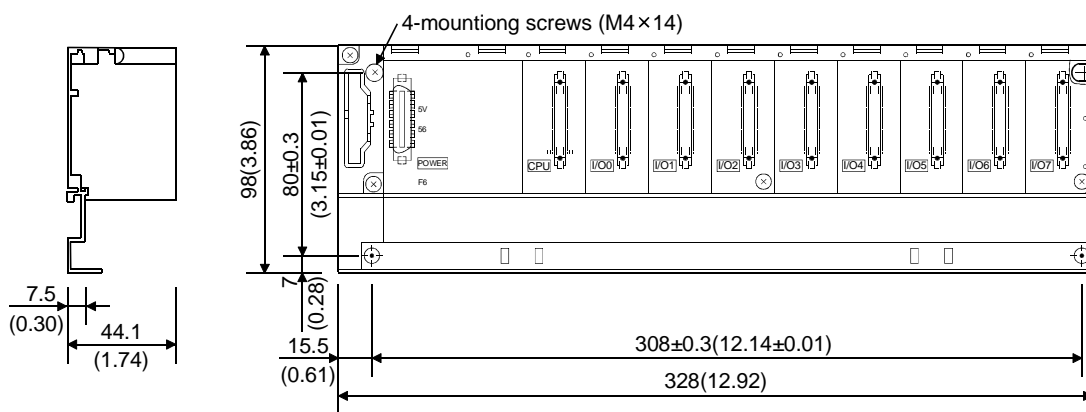
Unit: mm (inch)

## (2) Main Base Unit (Q35B)



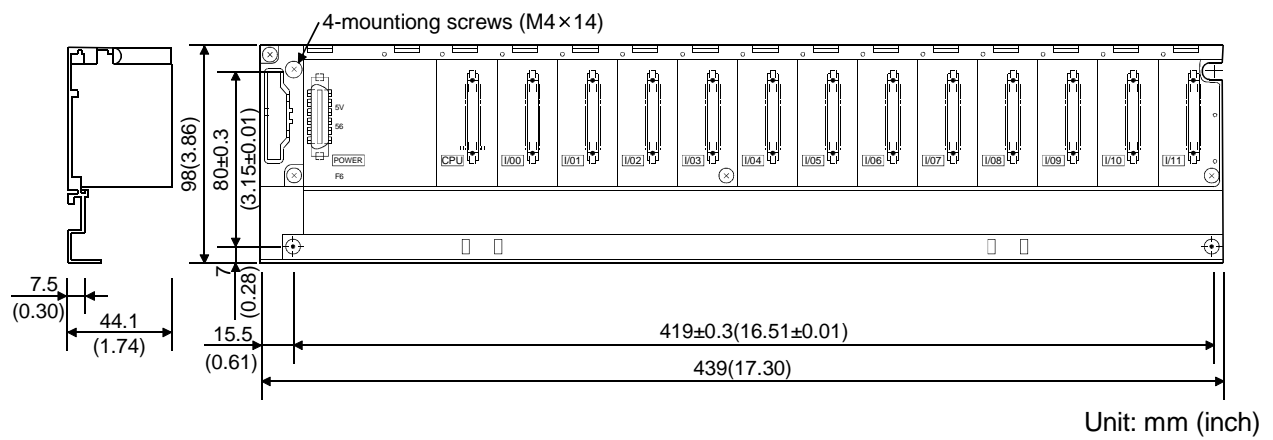
Unit: mm (inch)

## (3) Main Base Unit (Q38B)



Unit: mm (inch)

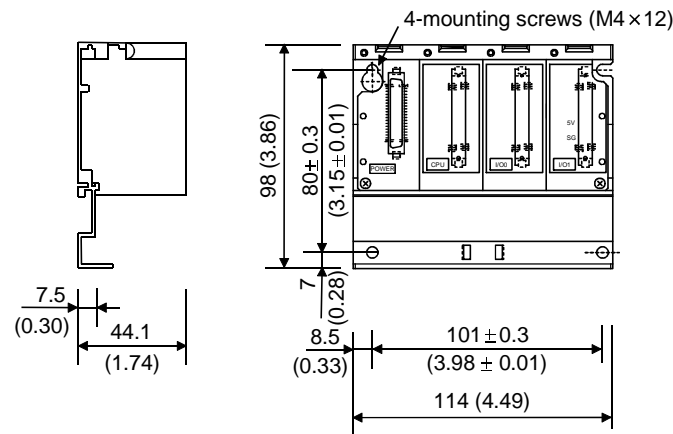
#### (4) Main Base Unit (Q312B)





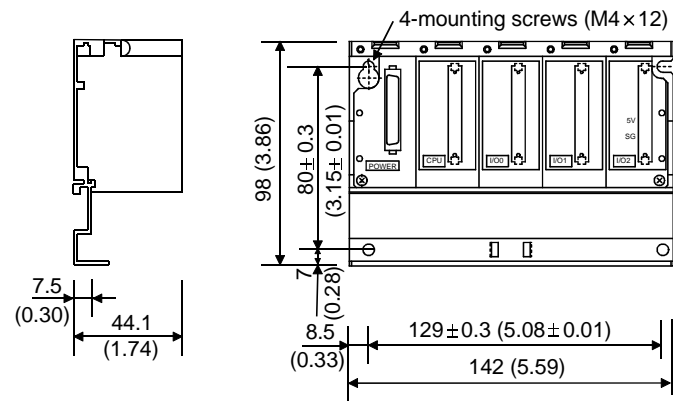
APPENDIX 2.4 Slim type main base unit

(1) Main Base Unit (Q32SB)



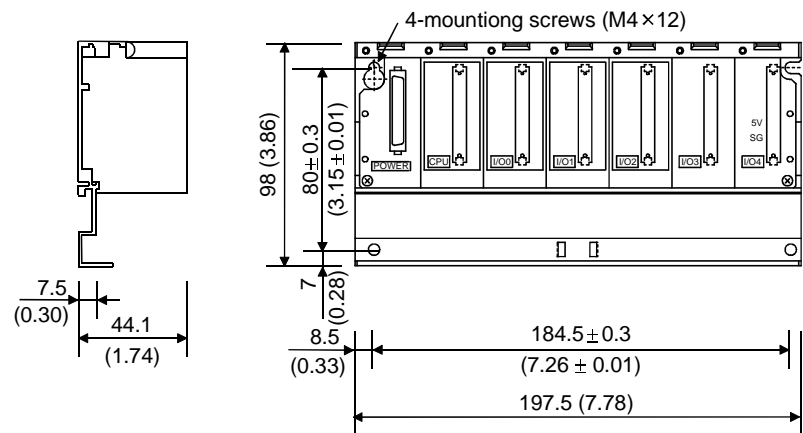
Unit: mm (inch)

(2) Main Base Unit (Q33SB)



Unit: mm (inch)

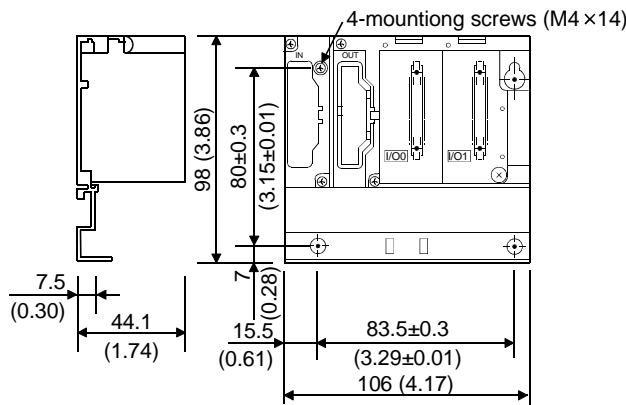
(3) Main Base Unit (Q35SB)



Unit: mm (inch)

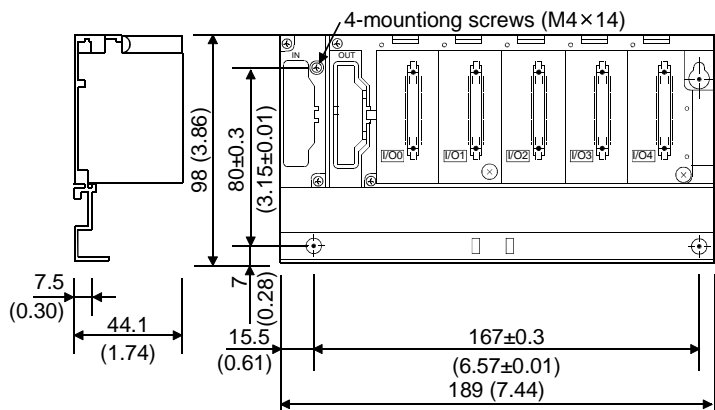
APPENDIX 2.5 Extension base unit

(1) Extension Base Unit (Q52B)



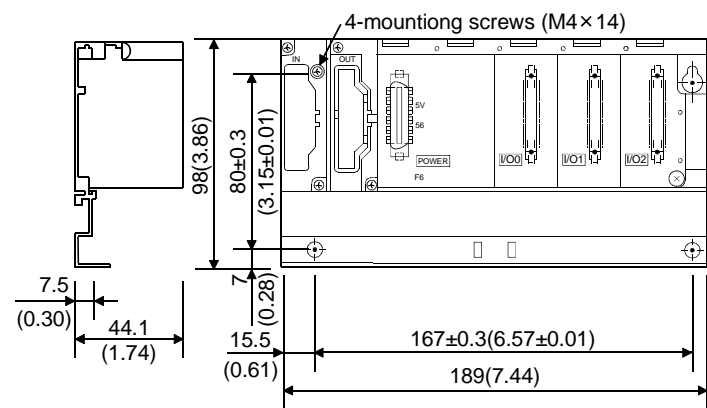
Unit: mm (inch)

(2) Extension Base Unit (Q55B)



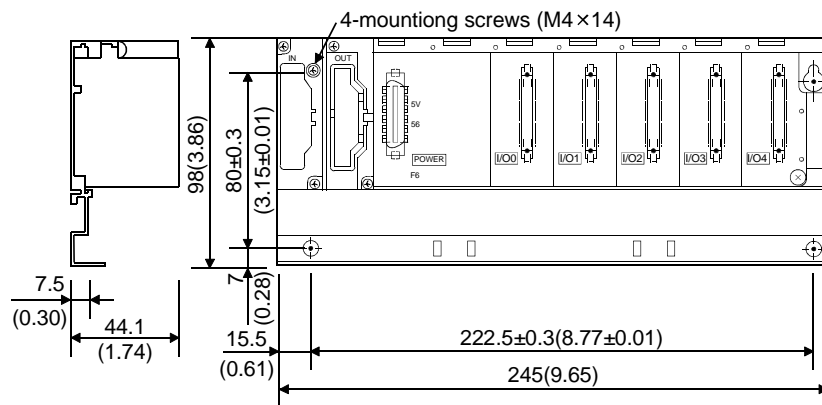
Unit: mm (inch)

(3) Extension Base Unit (Q63B)



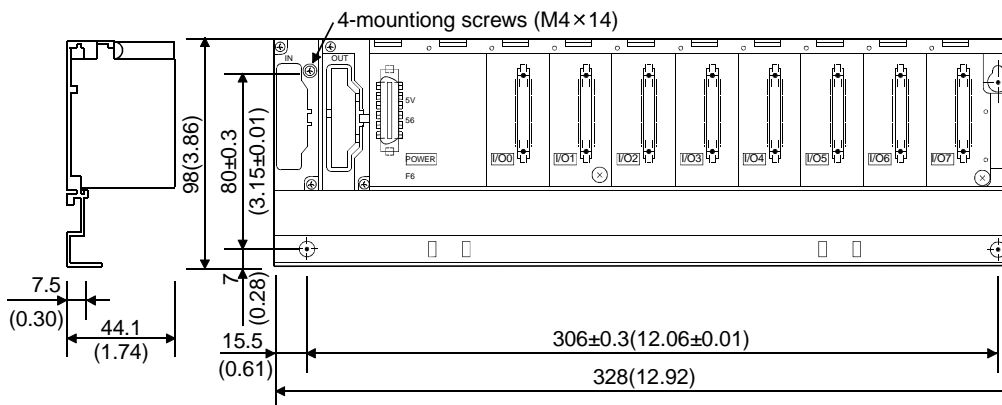
Unit: mm (inch)

## (4) Extension Base Unit (Q65B)



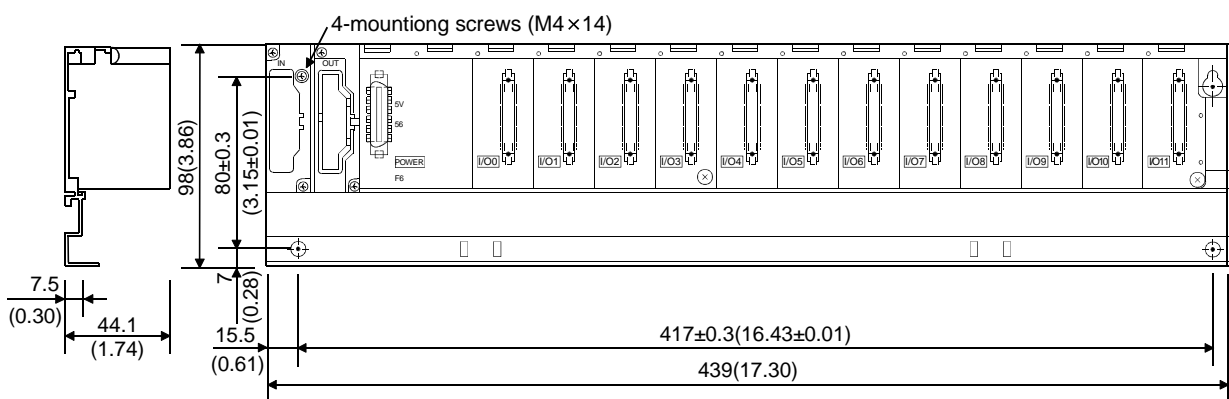
Unit: mm (inch)

## (5) Extension Base Unit (Q68B)



Unit: mm (inch)

## (6) Extension Base Unit (Q612B)



Unit: mm (inch)

## APPENDIX 3 Functions Improvement of Basic Model QCPU

The Basic model QCPU is updated to add functions and change the specifications.  
The functions and specifications that can be used by the Basic model QCPU change depending on the function version.

## APPENDIX 3.1 Specification comparison

Function Version of CPU Module		Function Version A	Function Version B
		First 5 digits of serial No. are "04121" or earlier	First 5 digits of serial No. are "04122" or later
Standard RAM capacity	Q00JCPU		×
	Q00CPU	64k bytes	128k bytes
	Q01CPU	64k bytes	128k bytes
CPU shared memory	Q00JCPU		×
	Q00CPU	×	○
	Q01CPU	×	○

○: Usable/compatible, ×: Unusable/incompatible

## APPENDIX 3.2 Additional functions

Function Version of CPU Module		Function Version A	Function Version B
		First 5 digits of serial No. are "04121" or earlier	First 5 digits of serial No. are "04122" or later
Additional Functions *1			
MELSAP3		×	○
Function Version of CPU Module		○	○
Structured text (ST) language		○	○
PID operation function		×	○
Real number operation function		×	○
Intelligent function module event interrupt		×	○
Device initial value		×	○
Remote password setting function		×	○
Electronic mail parameter		×	○
Online program correction using pointer		×	○
Increased file register R capacity		×	○
Multiple PLC system compatibility		×	○
Multi-block online program correction		×	○ *2

○: Usable/compatible, ×: Unusable/incompatible

\*1: For details of the functions, refer to the Basic Model QCPU (Q Mode) User's Manual (Function Explanation/Program Fundamentals).

\*2: Disabled for the Q00JCPU.

## APPENDIX 3.3 Usability of additional functions by GX Developer version

GX Developer Version Additional Functions	GX Developer 7 or Earlier	GX Developer 8
MELSAP3	×	○
Function block	×	○
Structured text (ST) language	×	○
PID operation function	—	—
Real number operation function	×	○
Intelligent function module event interrupt	×	○
Device initial value	×	○
○ Remote password setting function	×	○
Electronic mail parameter	×	○
Online program correction using pointer	×	○
Increased file register capacity	—	—
Multiple PLC system compatibility	×	○

○: Usable/compatible, ×: Unusable, —: Function irrelevant to GX Developer

# MEMO

[illegible]

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# WARRANTY

Please confirm the following product warranty details before starting use.

## 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 dealer or Mitsubishi Service Company. Note that if repairs are required at a site overseas, on a detached island or remote place, expenses to dispatch an engineer shall be charged for.

### [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 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 possible 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 chance loss and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to damages caused by any cause found not to be the responsibility of Mitsubishi, chance losses, lost profits incurred to the user by Failures of Mitsubishi products, damages and secondary damages caused from special reasons regardless of Mitsubishi's expectations, compensation for accidents, and compensation for damages to products other than Mitsubishi products and other duties.

## 5. Changes in product specifications

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

## 6. Product application

- (1) In using the Mitsubishi MELSEC programmable logic controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable logic controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.
- (2) The Mitsubishi general-purpose programmable logic controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or National Defense purposes shall be excluded from the programmable logic controller applications.

Note that even with these applications, if the user approves that the application is to be limited and a special quality is not required, application shall be possible.

When considering use in aircraft, medical applications, railways, incineration and fuel devices, manned transport devices, equipment for recreation and amusement, and safety devices, in which human life or assets could be greatly affected and for which a particularly high reliability is required in terms of safety and control system, please consult with Mitsubishi and discuss the required specifications.

# Basic Model QCPU(Q Mode)

## User's Manual (Hardware Design, Maintenance and Inspection)

MODEL	SQCPU(Q)-U-HH-E
MODEL CODE	13JR43
SH(NA)-080187-C(0302)MEE	



HEAD OFFICE : 1-8-12, OFFICE TOWER Z 14F HARUMI CHUO-KU 104-6212, JAPAN  
NAGOYA WORKS : 1-14, YADA-MINAMI 5, HIGASHI-KU, NAGOYA, JAPAN

When exported from Japan, this manual does not require application to the Ministry of Economy, Trade and Industry for service transaction permission.

Specifications subject to change without notice.